1968

Transactions of the

THIRTY-SECOND
FEDERAL-PROVINCIAL WILDLIFE CONFERENCE

held in Whitehorse, Y.T.

July 9 to 11, 1968

CANADIAN WILDLIFE SERVICE

DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT

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The Thirty-second Federal-Provincial Wildlife Conference
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Canadian Wildlife Service
Department of Indian Affairs and Northern Development

Issued under the authority of the
HONOURABLE JEAN CHRETIEN, P.C., M.P., B.A., LL.L.,
Minister of Indian Affairs and Northern Development.

Contents

Report on recommendations presented by The 31st Federal-Provincial Wildlife Conference

Recommendation 1: That the Conference commend the Canadian Wildlife Federation for its continuing efforts to encourage teacher training in conservation subjects and its valuable work in co-ordinating publicity on the annual theme for National Wildlife Week. It's also recommended that provincial resource departments distribute National Wildlife Week posters and classroom lessons widely, and use their good offices to encourage provincial departments of education to introduce conservation education into teacher training and into curricula. It is further recommended that the Conference introduce the suggested theme of "Wise use of Pesticides" for National Wildlife Week, 1968.

Action: The recommendations and appropriate appreciation were conveyed.

Recommendation 2: That the Minister of Indian Affairs and Northern Development obtain and circulate to the provinces legal opinion on (a) a definition of "wild duck" and (b) a practical statutory provision and administrative procedure to discourage "spite baiting".

Action 2a: A draft definition of wild duck and goose was circulated to some members of the Canadian Wildlife Service. Further action was deferred pending a court case in Sorel involving a definition of "wild goose".

Action 2b: Section 16 of the Migratory Birds Regulations is being amended to include the notification of intent to bait, the station-operator's responsibility to post signs, the location of baited areas relative to adjacent property and each other and protection for the enforcement officer to acquire evidence of illegal sale of migratory birds. The amendment has been circulated to all the provincial game departments.

Recommendation 3: That the Minister of Indian Affairs and Northern Development seek an amendment to the Migratory Birds Convention Act to provide authority for game officers to stop and search vehicles and boats and enter private property in the performance of their duties.

Recommendation 4: That the Minister of Indian Affairs and Northern Development seek an amendment to the Migratory Birds Convention Act to authorize the various posters placed in connection with provisions to the Act.

Action 3 and 4: A bill was drafted and approved by the Department of Indian Affairs and Northern Development and by the Department of Justice. The bill was printed and is with the Cabinet Committee on Legislation for review.

Recommendation 5: That the Minister of Indian Affairs and Northern Development arrange the deletion of Section 12 (2)(c) of the Migratory Birds Regulations. Section 12 (2)(c) reads as follows: "12(1) subject to Subsection (2), no person shall possess or transport a migratory bird unless at least one wing and the plumage thereof remains attached to the bird. (2) the wings and plumage may be removed from the migratory game bird . . . (c) after the bird is deposited in a commercial preservation plant."

Action: This amendment was effected in 1967 and appeared in the 1967 Regulations.

Recommendation 6: That the Conference express its appreciation to the U.S. Fish and Wildlife Service for making it possible to have their representatives, Mr. Noble Buell and Mr. Walter Crissey, at the 31st Federal-Provincial Wildlife Conference; Dr. Ira N. Gabrielson, President of the Wildlife Management Institute for attending the Conference; the Department of Indian Affairs and Northern Development for its efficient handling of Conference arrangements; the Royal Canadian Mounted Police for adding to the Special Migratory Birds Squad, and the individual members of the Squad for the exceptional effort they are making to enforce the Migratory Birds Convention Act and prevent violations through education of hunters; and the Honourable Arthur Laing, Minister of Indian Affairs and Northern Development, for the splendid hospitality extended to the delegates of the 31st Federal-Provincial Wildlife Conference in Ottawa.

Action: Appreciation in each case was directed as required.

Recommendation 7: Whereas an increasing number of wildlife management specialists are being employed by Canadian agencies concerned with the status and utilization of waterfowl, and whereas it is desirable and important that these specialists work together toward the achievement of common goals, it is therefore recommended that the Canadian Wildlife Service consult with other agencies with a view to establishing an organizational mechanism such as a waterfowl technical committee, that will ensure full co-operation in the development, co-ordination and evaluation of the expanding waterfowl management programs across Canada.

Action: Technical committees were established and meetings held in Fredericton on June 19 and 20 and in Edmonton on June 27 and 28, 1968.

Report of the Director of the Canadian Wildlife Service

Dr. David A. Munro

There have been several changes in Canadian wildlife administration that I would like to put on the record of this Conference. Mr. E.A. Côté, who was Deputy Minister of my Department for 4½ years, was transferred to the Department of Veterans Affairs early this year. During his term as Deputy Minister, Mr. Côté reflected a good deal of concern for wildlife in both word and deed and we were sorry to see him leave us. His place has been taken by Mr. J.A. MacDonald, who was previously Senior Assistant Deputy Minister, and as such was my immediate superior. Mr. MacDonald has a deep commitment to the concept of preserving the quality of the environment and has given our Service invaluable support.

Last year we said goodbye to Ernie Paynter and this year we welcome his successor, Mr. Bernie Forbes. Mr. Forbes is a farmer from Mortlack, Saskatchewan who has been active in local fish and game association, supporter of Ducks Unlimited, and Vice-President, Saskatchewan Wildlife Federation. I'm sure we all wish him great success in his new job.

During last year's Conference, Gerry Malaher told me that he was going to retire in October, but that I *must not* make any announcement to that effect because he didn't want to do anything that would detract from the little ceremony that we had planned for Ernie Paynter's retirement. That was certainly a measure of Gerry's unselfish nature and I wanted you to know about it. Later on I will be asking you to sign a presentation scroll that we will be sending to Gerry. Representing Manitoba here today are Dr. K.H. Doan, Acting Director of Wildlife, Mr. B.F. Bossenmaier, Chief Biologist, and Mr. R. Webb, Chief of Game and Fur Management.

Mr. Charlie Bartlett has given up the position of Director of the Fish and Wildlife Division of the Prince Edward Island Department of Fisheries to devote full time to management of the Prince Edward Island Wildlife Park. Mr. Stan Vass is now Director of the Fish and Wildlife Division.

Now I would like to report to you on some of the highlights of Canadian Wildlife Service activities during the year that has passed since our last Conference.

Our program for maintenance of migratory bird habitat has remained active. In Saskatchewan we have virtually completed the Last Mountain Lake land assembly. We have concluded the purchase of 13,455 acres. Purchase of an additional area of 1,173 acres is still in process, but the lands are in fact secure, so our total acquisition will have an area of 14,628 acres and will have cost $975,000, for an average of $66.65 per acre. Adjacent provincial Crown lands, which are managed for wildlife in co-ordination with our lands, have an area of 7,000 acres. We took possession of most of the lands concerned at the beginning of 1968. Present activities, which are being handled by Mr. John Hatfield, serving as a resident manager, include the clean-up of surplus buildings, derelict equipment, etc., the management of grazing and lure crop production, and the elaboration of plans for more intensive management to facilitate nature observation, public hunting, grazing, and the control of crop depredation on surrounding lands.

In Saskatchewan also, we have purchased a block of 892 acres in pothole country, 26 miles east of Saskatoon, to serve as the site for intensive research in pothole hydrology and waterfowl behaviour.

Proposals for the purchase of wetlands in British Columbia, Alberta, and Ontario are in the final stages of development and should be implemented this year.

In Quebec, we have completed the purchase of the Iles de la Paix, some 303 acres of wooded islands surrounded by marsh, on the south shore of Lake St. Louis. I expect that two other projects in Quebec will be completed this year.

In the Tantramar area of New Brunswick, near the Nova Scotia border, an expropriation notice has been registered covering an area of 3,800 acres, comprising small lakes, wetlands, and surrounding uplands. That area surrounds the small parcels we purchased last year, upon which the New Brunswick government has built two small dams for downstream flood control and the creation of useful waterfowl habitat upstream.

We have made good progress in completing assembly of lands associated with the John Lusby and Sand Pond projects in Nova Scotia, the latter being virtually complete. Proposals for additional projects in the three Maritime Provinces are in an advanced state of development and should be under way this year.

Our experience in land acquisition has led us to a conclusion that some of you may already have reached, namely that the period from our decision to completion of the purchase of any multi-owner properties can rarely be expected to be less than two years and will more often be close to three. Patience is a virtue.

During 1967-68, we entered into habitat maintenance agreements with an annual value of $171,000 to the landowners. The cumulative total value of "easements" including those negotiated during the pilot project period up to 1967 is $241,400. Of that total, $50,000 is in respect of the Lower Kootenay Indian Reserve near Creston, British Columbia. Agreements in the Prairie Provinces involve about 3,700 landowners and cover about 33,500 acres of wetlands. As you know, the provisions of the agreements are that the landowners undertake not to drain or fill the wetlands concerned or burn the vegetation around them, and we pay an annual rental based on the value of the surrounding land discounted at six per cent for 20 years. The agreements are cancelable by either party on 60 days' notice.

There is no doubt that our earlier definitions of goals for our "easement" program will have to be revised. Costs of land have risen so much that a re-appraisal is essential.

Fortunately, we may soon be in a position to assess in a more critical fashion our actual needs in terms of wetlands to be secured if we are to maintain habitat breeding stocks at population levels within the 1956-62 framework. To that end we are employing a consultant to study the feasibility of building a mathematical model of the system made up of ducks, water areas, and users of ducks, in the hope that computer simulations of the system will enable us to project our needs with more accuracy.

Some 1,300 acres of prime marsh on the south shore of Lake St. Clair near Chatham, Ontario, which is valued by naturalists and hunters for its waterfowl production and as an important staging area for birds on migration has been preserved from drainage for agriculture through a two-year agreement with the owners, Bradley Farms Limited, of Chatham.

The Service will use the marsh to investigate the economic aspects of wetlands use in the area. We will also be producing a management plan aimed at increasing the potential of the marsh for waterfowl use – both for production and during migration.

The Service will be conducting research on waterfowl and marsh ecology. Preservation of the marsh will permit the continuance of the University of Guelph's major investigation of red-winged blackbird ecology, which is now in its third year.

I spoke last year of our work on waterfowl habitat in the Saskatchewan Delta area centred around Cumberland House carried out in cooperation with the Saskatchewan Wildlife Branch. The job had two aspects, firstly, a thorough study of the ecological communities of the area, and, secondly, the development of a plan for management of the area in which wildlife values would be taken fully into account. I understand that the report and plan are still being considered by the Provincial Government's Saskatchewan Delta Committee, and that a decision is expected soon.

Following the pattern established by our studies in the Saskatchewan Delta, we have embarked upon studies of the Athabaska Delta-Lake Clair and Hay-Zamma Lakes areas of Alberta. Both will provide a good basis of information and understanding from which to approach problems of land management that are sure to arise in the near future.

We face an increasing and unpredictable work load brought about by a variety of proposals for changes in land use that will adversely affect migratory bird habitat. Our intensive work in the Cumberland House area was a response to the suggestion that there should be a major reclamation there, but at least it turned out that time was available for study. In other areas we have been less fortunate. There was little time for investigation between announcement of the proposal for development of a superport at Roberts Bank, near Vancouver, and the decision to begin its construction. The future course of events there is not yet clear, but we have had satisfactory contact with the National Harbours Board and have, as a consequence, the Chairman's assurance that no effort will be spared to make the National Harbours Board installation the cleanest port in the world. We were able to give only minimal attention to proposals for expansion of the harbours at Oshawa and Quebec City. We should be able to watch out for the wildlife interest more carefully, and we hope to increase our capability of doing so.

You will be pleased to hear that the Canadian Wildlife Service is now as a matter of routine being notified of any proposals for the disposition of federal Crown lands surplus to the requirements of the administering department. We are as a result in a position where we can apply for transfer of such lands to our jurisdiction if they are of value to migratory birds. Again, the only problem is in assigning people to assess the value of these lands, which, in some cases, is a time-consuming task.

Last year I spoke to you about the government's intention to do something to clarify the position of Indians and Eskimos in relation to the Migratory Birds Convention Act and Regulations. The problem

is not entirely resolved. With the judgment of the Supreme Court of Canada in the Daniels case, which involved the charge of taking a migratory bird out of season on an Indian Reserve in Manitoba, the situation in law has been completely settled. Indians and Eskimos are completely subject to the Migratory Birds Convention Act and Regulations, with such special privileges as that Act and those Regulations bestow. However, the more real problem in respect of Indians and Eskimos living their traditional way of life remains. In this respect, my Minister has said "I want to extend to Indians and Eskimos, as an evidence of good faith, the opportunity within the law to take migratory birds as they need them for food. I want to do that because, quite apart from legal arguments based on variations in wording in the various Indian treaties, it is generally believed by Indians and accepted by the government that Indians have a special claim on fish and game. However, in view of my responsibility for migratory bird conservation, I do not feel that under present day circumstances I can properly relinquish all control over Indian and Eskimo hunting of migratory birds. I therefore propose that Indians and Eskimos should be required to observe closed seasons that would cover the breeding periods in different parts of the country. Furthermore, I would certainly reserve the right to re-establish controls that might be deemed necessary as a consequence of extending the Indian opportunity to hunt migratory birds.

"It is proposed also that Indians and Eskimos be encouraged to impose needed restrictions on migratory bird hunting on themselves of their own volition. There is reason to believe that many bands in the settled area of Canada will do that.

"Another important element in the proposal is that Indians and Eskimos will be required to obtain a special free migratory bird hunting permit. The importance of that provision is two-fold: firstly, the permit will provide the opportunity to develop a system for gathering information on the kill of migratory birds by Indians and Eskimos, which will be needed in order to maintain a continuing review of conditions, and, secondly, it will provide a means for communicating with Indian and Eskimo hunters.

"I consider the latter point to be particularly important. The progress of our native people toward economic and social equality with other Canadians will depend largely upon education. I am hopeful that the mail and personal contacts to be developed with Indians and Eskimos through the special permit system will be used as opportunities to inform and persuade, so that some few decades hence Indian and Eskimo support and understanding of conservation practices will be as useful and comprehensive as that now given us by any group of Canadians.

"To obtain such support from Indians and Eskimos is, of course, our long-range objective, and when that has come to pass there will no longer be a need to continue the establishment of special regulations for Indians and Eskimos. Thus what is proposed is an interim measure, and though the interim period may be several decades, I do not believe that the measure should endure forever."

I think you have all heard of several transplants of large mammals made in recent years. All have gone rather well to date. Eighteen wood bison were moved to the area northeast of Fort Providence five years ago. They now number over 42. Three years ago, 21 wood bison were taken to Elk Island National Park. There are now 32 of them. The National and Historic Parks Branch has approved a more intensive regime of management for the bison of Wood Buffalo National Park aimed at achieving better control of the diseases to which they are subject.

This April the National and Historic Parks Branch, with the assistance of my Branch, reintroduced woodland caribou to Cape Breton Highlands National Park. By the kind co-operation of the Quebec Department of Tourism, Fish and Game, the animals involved came from near Knob Lake. We hope more will be moved next spring.

The need to restrain government spending, manifested in a stop-order on new recruiting and an order to hold the line on expenditures, has necessitated our limiting the expansion of our activities below the level we consider necessary to meet our responsibilities. Perhaps it was ever thus. In any event, we plan to take advantage of the situation by trying to improve our methods of operation, and by re-examining our goals and assumptions. This prompts me to recall that one of the liveliest sessions at last year's Conference was sparked by Dr. Hatter's presentation of a paper on "Considerations in Budgeting for Fish and Wildlife Management". I thought that this year we should follow up on the interest so obviously generated then, and we have accordingly arranged a half-day seminar on management strategy in the management of wildlife. I feel sure you will find this both interesting and useful.

Summary notes of the 32nd Conference Tuesday, July 9th.

1. Opening of the Conference

The Chairman opened the Conference and called on the Commissioner of the Yukon Territory, Mr. J. Smith, to address the meeting. Mr. Smith in welcoming the participants to Whitehorse stated that he was happy the Conference was meeting in the Yukon because the Conference discussions would emphasize those renewable resources which were fundamental to the prosperity and welfare of the area. He thought that some people found the non-renewable resources more exciting but he considered the Conference focus on renewable resources a good corrective to this view and very important.

Following Mr. Smith's address the chairman introduced members of the local committee and some others who were new to the Conference. He also drew attention to the fact that for the Thursday morning discussion it was necessary for participants to have read the three papers in advance since they would not be presented, but would form the background for discussion at this session. The chairman then nominated the members of the Recommendations Committee. It was agreed to accept the nominations as presented: Dr. S.B. Smith (Chairman), Mr. D.A. Benson (Secretary), Mr. B.C. Carter, and Dr. J. Hatter.

2. Recommendations of the 1967 Conference

Mr. F.H. Schultz presented the report on action taken on the recommendations of the 1967 Conference.

3. Technical Committees

The chairman mentioned the two migratory bird technical committees, which have each had their first meeting. He stated that he had heard that the meetings had been useful in providing an opportunity for discussion and sharing information on migratory populations, harvest, and productivity. He felt that these meetings would also make the Conference more successful. He then invited comments from one of those who had participated in each regional meeting.

Mr. R.H. Mackay reported on the western meeting which had been held in Edmonton. It had been necessary to include some administrative people in the first meeting but henceforth the meetings would be strictly technical. The group had decided to hold two meetings a year and a fall meeting was scheduled for Victoria this year. It has also been decided to discuss one specific topic at each meeting. The topic chosen for the fall meeting was the data gathering process in western Canada. The meeting had been strongly in favour of involving the Canadian Wildlife Service and Ducks Unlimited in its meetings and also felt it should be free to invite United States representatives to attend meetings. There was no inclination to create another administrative organization and the participants realized that each province would still deal with the federal government on individual problems.

Mr. Blair Dawson reported that the eastern meeting had been equally successful and had also decided to include only the technical people in its sessions. They proposed to have only one meeting a year on their own but to meet a second time in conjunction with the Atlantic Flyway Council. Mr. Frank Walden suggested that the minutes of the technical committees be circulated to all provinces and it was agreed that this would be done.

4. Report of activities of the Canadian Wildlife Service

The chairman reported on some of the activities of the Canadian Wildlife Service. (Page 6).

5. Report on Saskatchewan River Delta Project

Mr. Maliepaard reported that consideration of the comprehensive report on this project is almost completed. The individual investigations by all the disciplines involved are finished and reports finalized and presented. On the basis of this information the Saskatchewan River Delta Committee has decided on a development scheme, largely oriented towards agricultural and wildlife interests. A benefit-cost analysis was subsequently prepared which proved to be unacceptable to the wildlife interests. Discussions regarding this matter are still in progress. A consolidated version of the proposed development scheme is being prepared and will be submitted to Cabinet next fall. Mr. Maliepaard felt that considerable progress was made during the past four years and he feels optimistic that a large portion of the project area will not be subject to agricultural development but maintained and improved for wildlife purposes.

6. Report of the Canadian Wildlife Federation

Mr. R.C. Passmore presented the report of the Canadian Wildlife Federation (Page20). Mr. Passmore stated that the Federation had finally concluded that it should produce a booklet on the theme of National Wildlife Week each year, since good Canadian materials do not seem to be available. This the Federation hopes to do in 1969.

Discussion indicated that the theme of last year's Wildlife Week, pesticides, had generated both favourable and adverse reactions. Members of the Conference from Alberta commended the work of the

Federation in this matter and reported that the Alberta Government is presently drafting legislation to improve the control of the use of pesticides.

Discussion on themes proposed for National Wildlife Week, 1969, favoured "Ecology and Land Use".

7. Report on National Committee on Wildlife Land Meeting

Dr. N.S. Novakowski reported on this meeting (Page 22). There was no discussion.

8. Humane Trapping

Dr. N.S. Novakowski reported on the situation with respect to humane trapping (Page 27).

Discussion noted the following points:

a) Many Canadians are unaware that matters dealing with game and trapping are a provincial responsibility and a large number of complaints about trapping are directed toward the federal government.

b) People agitating for more humane traps are sincere but do not understand the economic aspect of trapping. It must be recognized that the Canadian Association for Humane Trapping takes a constructive approach and works co-operatively with the trappers.

c) There is still some distance to go in developing a humane trap and even when that is done, someone else will invent a more humane trap.

d) The role of the wildlife services in the provinces and the Canadian Wildlife Service is to follow-up on progress to date and continue to play a supporting role in the move towards more humane trapping.

9. The IUCN

Dr. N.S. Novakowski reported on the export-import convention sponsored by the International Union for Conservation of Nature and Natural Resources. (Page 27).

The chairman pointed out that the purpose of bringing this matter to the attention of the provinces was so that, if and when Canada becomes a member of the IUCN, the provincial agencies will be ready to advise on signing the convention. The chairman stated that the federal government would presumably seek the concurrence of the provincial governments before signing the convention since the subject matter is provincial as well as federal.

Dr. S.B. Smith of Alberta stated that when Alberta received notice of the convention the implications of the matter had been studied carefully and that he considered this an urgent matter. He considered that the dangers of importing animals were very great and that importation should be restricted.

The chairman advised the Recommendations Committee to note the general feeling of the meeting in favour of ratification of the convention.

10. Ducks Unlimited

Mr. W.G. Leitch reported that Ducks Unlimited had had a most stimulating year with a considerable expansion of budget and personnel. A British Columbia manager had been appointed and a provincial biologist was soon to be appointed there. There is also the possibility of having a permanent employee stationed in the Maritimes. With an expanding program and budget Mr. Leitch stated Ducks Unlimited would depend heavily on the Canadian Wildlife Service and the provincial services for advice. Mr. Angus Gavin, previously General Manager, Ducks Unlimited, (Canada), has been appointed Senior Vice President and Mr. Elswood Bole has been appointed Executive Director.

11. FRED and Canada Land Inventory Programs

Mr. J.M. Wright, Economist, Department of Forestry and Rural Development, and Mr. Lee Munn, Recreation Co-ordinator, Canada Land Inventory, described these programs briefly. Points noted were:

a) The Canada Land Inventory is designed to determine the physical possibilities of blocks of land, i.e., how they rate for agriculture, forestry, wildlife, etc. Socio-economic factors are not included. The information obtained is a basis for FRED program planning.

b) The FRED program springs from a concern with regional disparities. The federal government and a province must agree on an area to be developed.

c) Once the federal government and the provincial government have agreed on the area, comprehensive planning involving economic and sociological factors is begun. Planning is based on thorough study of the areas as a result of which objectives are determined and the rational development of the area undertaken. FRED programs are concerned with both economic and human aspects of development.

d) FRED programs can be adjusted to each province. After a plan has been developed, a Joint Advisory Board is set up with three members from the province and three from the federal government to provide a continuing review of the project with power to modify the plan in the light of developments.

e) In the new agreements on ARDA it is hoped that the FRED planning process will be incorporated.

f) The FRED program will probably not be as involved with wildlife resource development because

of FRED's greater concern with the human element.

g) A series of slides on land use prepared by the Canada Land Inventory staff is available for use and would be of interest to members of the Conference. They may be secured by writing to Mr. R.J. McCormack, Chief of the Canada Land Inventory, 161 Laurier Avenue West, Ottawa 4.

12. Unilateral development of projects

The chairman asked Dr. Smith of Alberta to comment on the situation developing in the Athabaska Basin as a result of the building of the "Bennett Dam".

Dr. Smith reported that as a result of the building of the dam to develop the hydro potential of the Peace River, the ecology of the Athabaska Delta area was being drastically changed. This year a light runoff and Peace River control have resulted in a severe lowering of the level of the water in Lake Athabaska, Richardson Lake and Lake Claire. The water in Lake Claire is so low that it might possibly freeze to the bottom, eliminating fish population, a million muskrats and much duck habitat which in turn would affect the income and food of the 2500 Indians in the area.

Similar instances of unilateral development were mentioned and the Recommendations Committee was instructed to take note of this discussion.

13. Enforcement

The chairman asked for brief reports on enforcement from Superintendent Huget of the R.C.M.P., Mr. W. Miller and Mr. J. Shaver of the Canadian Wildlife Service. Points noted were:

a) There is a general improvement in enforcement. The R.C.M.P. have been able to increase the number and upgrade the training of the officers employed. There has been good co-operation among the enforcement officers of the several agencies involved.

b) Definition of a "wild goose" and a "wild duck" are still to be secured. The outcome of a court case in Quebec will he helpful.

c) The use of helicopters in enforcement activities is desirable.

d) The value of training of enforcement officers is clear from the success of four such courses held in the west and more attention should be given to training.

14. Whooping Cranes

Dr. E. Kuyt reported on the program related to whooping cranes, (page 30 illustrating his paper with maps and slides. The report was followed by a brief group of questions on the project.

15. Mackenzie Mountains Big Game

Dr. N. Simmons reported on this study (page35)and illustrated his report with slides. In the discussion that followed Mr. P. Kwaterowsky of the Northwest Territories stated that Zone 21 would not be opened to hunters until the Indians were able to provide the guiding and outfitting services. He also stated that Zone 19 was divided into outfitting areas with one outfitter in each so that the controls can be more readily used and the outfitters may be forced to take some responsibility for management of the game.

16. Grizzly Bear research in the Yukon Territory

Dr. A.M. Pearson reported on his project and showed the collars and devices he uses. His report was followed by discussion, most of which was concerned with the techniques and devices used in the research.

17. Waterfowl Damage

Dr. S. Smith reviewed his paper on this subject (page 43). Following the report other experiences were reported and some problems noted:

a) Mr. E. Bossenmaier reported that in Manitoba a government program had cost $30,000 a year to provide grain to lure ducks away from commercial crops, but that after some experimentation and more information it was discovered that a program of this kind could be managed on less than $10,000.

b) Mr. C.B. Forbes of Saskatchewan reported that in certain areas near large marshes it had proved useful to purchase land and lease it to farmers on a share-crop basis.

c) It was suggested that not enough use is made of the federal-provincial Crop Insurance Act of 1959.

d) Mr. Doan of Manitoba reported that there had been resistance from local people to the establishment of wildlife habitat as a part of the Manitoba Interlake FRED Program because of fears of damage to crops. He was hopeful that farmers could be reassured through a compensation scheme similar to Alberta's.

e) There is a psychological element in the farmer's resistance to the various schemes. The farmer accepts compensation for damage due to hail or wind because no one benefits, they are 'acts of God'; but he feels resentment of finding himself raising grain to feed ducks for the hunter's pleasure. If the government owns the land, this feeling is not present.

f) Setting early seasons in Manitoba was tried for one year but the complaints about hunter damage exceeded complaints about duck damage, so the program was dropped. There was a disagreement as

to the effect of early shooting on ducks damaging crops, and it was concluded that early shooting might help in regions where there were areas to which the ducks might harmlessly be banished, but early shooting would aggravate the damage problem in areas of high pothole density.

g) It was suggested that most complaints from farmers about duck damage probably came from farmers who were operating marginal businesses. This suggestion was reported in a study completed several years ago.

h) There is no likelihood of finding any single answer to the problem, since conditions will change and are different in most areas so a variety of methods of dealing with the problem will be needed.

18. Permit and related surveys

Mr. D.A. Benson reported on the Canada Migratory Game Bird Hunting Permit and related surveys, (page 46). Mr. Benson included in his report a statement made at the western regional technical meeting as follows:

"Dr. Cooch opened the discussion on the 1967 waterfowl hunting season. He described the newly instituted nation-wide Migratory Game Bird Harvest Survey and the Waterfowl Species Composition Survey. He cautioned that the surveys are not corrected for several possible biases including exaggeration by hunters of birds bagged, exclusion of the depredation permit harvest and harvest in the Territories, and those resulting from only sampling hunters that had hunted in the previous hunting season. He also cautioned that using harvest survey data in conjunction with species composition data to determine the harvest of a particular species may not give entirely accurate estimates since the characteristics of hunters responding to one survey may differ from those of hunters responding to the other. It was agreed, however, that results of the nation-wide surveys were in surprisingly close agreement with results of provincial hunter surveys. Dr. Cooch said studies are now being made to determine possible biases in hunter surveys so that correction factors can be applied. Those studies will, in some cases, require co-operative effort between the Canadian Wildlife Service and provincial wildlife authorities. In future years, data resulting from federal hunter surveys in Canada should be available by the March following the hunting season and data resulting from band recoveries should be available by June 15. Those data, including band recovery rates, will be presented by waterfowl hunting zones.

"Dr. Cooch indicated the species composition survey is in jeopardy since the postal department has indicated great reluctance to handle the envelopes in which the duck wings and goose tails are mailed.

"He explained the need for a co-operative nation-wide hunter performance survey during the 1968 hunting season. Co-operators would observe hunters in the field to determine waterfowl crippling loss and to gain knowledge on hunter behaviour. It was agreed that a survey of this type should be undertaken.

"Dr. Cooch described a generally dismal outlook for the 1968 fall flight of waterfowl. He stated the fall flight of mallards last year was about 15 million with about 7.2 million returning to the breeding grounds this spring. He expects a production ratio of no better than .7 young per adult this year resulting in a fall flight of only about 12 million mallards. He also felt that we should not allow next year's mallard breeding population to drop below about 6 million.

"Dr. Cooch stated that mallards, total ducks, and ponds were all down about 50 per cent this spring throughout the Canadian prairie and parkland region. In the northern boreal forest region mallards are up about 12 per cent but that increase is not enough to account for decreases elsewhere."

Mr. Benson reviewed the Progress Notes by which the results of the survey are made known to wildlife biologists and agencies and invited comment on the format and usefulness of the bulletin. Dr. S. Smith expressed his pleasure in the fact that the federal and provincial survey results had been so close in most items.

There was some discussion on the problems of the survey and the sources of error. The Wildlife Service intends to work on the problem of non-response which is about 40 per cent. One of the difficulties is the lack of manpower to design the various studies required. Mr. Benson stressed that the Service was proceeding cautiously in order to avoid error or the necessity of redesigning studies.

Mr. Walter Crissey stated that in the United States they had had to use two questionnaires, one for the east and one for the west. Mr. Benson agreed that Canada might have to have two questionnaires but that so far the Service was using only one.

Dr. S. Smith suggested that the provinces might make the raw data gathered by them available to the Service as a method of improving the work.

19. Waterfowl Status reports

Mr. R.H. Mackay presented a summary of the information presented at the regional meetings as follows:

	Mallards (Unadjusted)		Total Ducks (Unadjusted)		Water		Forecast
	Change from 1967	Change from Average	Change from 1967	Change from Average	Change from 1967	Change from Average	
Manitoba	−31%	−50%	−38%	−40%			Pond counts at all-time low. The 1968 forecast index is second lowest in 16 years. Prospects are for a smaller duck crop than 1967
Saskatchewan	− 3%	−32%	−22%	−33%	−62%	−54%	Fall flight outlook pessimistic
					Late June pond survey showed a deduction of 63% in pond numbers since early May		
Alberta	−29%	−46%	−41%	−40%	−34%	−34%	Habitat conditions as poor as they have been since the 1930's. Outlook poor
					Late June pond survey showed a reduction of 66% in pond numbers since early May		
Northern Alberta and Northwest Territories	+12%	−25%	−17%	−28%			

Mr. W. Leitch of Ducks Unlimited stated that their surveys were in basic agreement. Mr. W. Crissey stated that the U.S. prediction was that there would be a decrease of 29 per cent in the mallard flight this year over last year and that the same decrease would be likely for all species.

20. Discussion on regulations

Discussion on the regulations occurred on a number of occasions during the day:

a) The chairman reported that as a result of the discussions held at the regional technical meetings the Canadian Wildlife Service had prepared recommendations which would be distributed and which he hoped individuals would discuss with him at some time during the Conference.

He stated that the proposed regulations relating to seasons and bag limits which had been distributed to the delegates were expected to result in a reduction of 15 per cent in the mallard bag. He indicated that the Service was trying to maintain as much stability as possible in the regulations over the next few years because during that time the Service expects to make large improvements in its information gathering and prediction capacities, and it is desirable to have a fairly steady regulation framework to provide a basis for later comparison.

b) The chairman reported that agreement had been reached through correspondence on amendments to the textual portion of the Migratory Birds Regulations. These regulations, along with amendments to season and bag limits should be in effect in approximately ten days when passed by the Governor-in-Council.

c) The chairman stated that the Service was working on some quite substantial amendments to the Migratory Bird Sanctuary Regulations designed to permit good management of the lands the Service was acquiring for migratory bird habitat.

d) On the question of retrieving waterfowl by power boat there was general agreement that Section 19 subsection 4 was either undesirable or unenforceable or both. Mr. N. Buell, Assistant Director, Bureau of Sport Fisheries and Wildlife, reported that as a result of a change in regulations in the United States, a hunter was no longer required to lift his motor out of the water although it was still illegal to shoot while the boat was in motion. The chairman agreed that this general question would be pursued further through correspondence, and an amendment drafted for submission in 1969.

21. Future meetings

Dr. S. Smith renewed formally Alberta's invitation to host the 1969 Conference in Edmonton. Mr. Kwaterowsky offered to host the 1970 Conference in the Northwest Territories at Yellowknife during the celebration of the Territories Centennial. The offer was accepted.

Thursday, July 11th.

22. Firearm regulations

Dr. C.H.D. Clarke introduced discussion on firearm regulations in order to secure some general understanding and possible agreement on a common position on this subject because, although it has not become a controversial issue in Canada as yet, it may do so. A number of points of view and clarifications were made in discussion:

a) The distinction between the federal role and the provincial role is that the federal government has control over guns (as weapons) and the provinces have control over hunting, since wildlife is a provincial resource. Some thought that though distinction might be argued at law, it serves as a practical guide.

b) British Columbia now requires a gun permit rather than a hunting licence because officials thought it discriminatory to require someone interested in target shooting to buy a hunter's licence.

c) An advantage of requiring a permit for a gun is that this allows some insistence that the person learn how to use the gun.

d) It would be unfortunate if fathers could not take their sons hunting prior to the age of 16 or 17, as possible under the amendments to the Criminal Code proposed in C195. However, it was pointed out that there is no legislation that prevents a son hunting with his parent. British Columbia has amended its legislation to require any person under 18 when hunting to be accompanied by someone of 21 years of age or older.

e) Special provision should be made for the use of firearms by young Indians and Eskimos and rural young people where the need and the situation are very different from that of urban populations.

f) Accidents in Ontario have been cut in half with hunter training, even though the number of hunters has increased.

g) The most common violation of the regulations is for under-age possession of a gun (40 per cent). Although it may seem heartless, it might be useful to institute proceedings against parents in the case of

accidents resulting from under-age possession of guns.

h) In the hunter safety programs, other things should be included in addition to safety precautions. These things, such as the ethics of hunting, concern for management and conservation, etc., are of more long-term importance than safety and the opportunity of the safety program should be utilized for these purposes.

i) Any push for more restrictive legislation on firearms should be resisted and if we are to have such legislation it should be uniform and a federal responsibility. This was not a unanimous opinion, however, as it was pointed out that the situations in the various provinces were very different, with a highly urbanized population in Ontario and British Columbia and possibly Quebec but with a rural population in the other provinces.

j) The Recommendations Committee was asked to take note of Bill C195 and prepare an appropriate recommendation.

23. Textual amendments

The chairman provided an opportunity for delegates to make suggestions for textual amendments to the Migratory Birds Act but none were forthcoming, other than in regard to Section 19, subsection 4.

24. United States Fish and Wildlife Service

Mr. Noble Buell presented a brief review of activities in the United States in the wildlife field.

He reported that last year the duck stamp sales had increased unexpectedly. Overall the duck kill increased by 7 per cent although the Bureau had predicted an 11 per cent decrease.

He also reported that the three-year experiment of a nine-day early season on blue-winged teal ended in 1967. The early teal season would not be continued in 1968 although this was without prejudice to action after 1968. The reasons are three:

1) Hunter performance which indicates either an unwillingness or inability to identify the bird. Of hunting parties observed, 47 per cent that had the opportunity to fire at illegal birds did so and this was a larger percentage than in earlier years. Courts in almost every state of the central and Mississippi Flyways have raised serious question as to the ethics of conservation agencies putting hunters in the position of having to identify birds when they were unable to do so.

2) The increasing ratio of green-winged teal in the bag.

3) The information from breeding ground surveys which show a 1968 decline in breeding blue-winged teal of 35 per cent from 1966 and of 29 per cent from 1967.

Whether species management can go further, Mr. Buell considered dubious and uncertain. He reported that the Bureau had started a study of hunter behaviour in the hope that through this route the ignorant hunter might be trained and the unwilling hunter might be motivated to co-operate.

Mr. Buell concluded with a brief mention of some U.S. legislation. The net effect of new legislation on firearms now being considered would be that by the end of 1970 any state which has not set up an acceptable process for registering firearms would not get Pitman-Robertson federal aid funds for wildlife research. This tying of firearm control to hunting is considered inappropriate. However, the future of the legislation is uncertain.

The Bureau is presently engaged in a study of the condition of animals in roadside zoos and the regulations and laws governing their exhibition is to be used to develop model legislation which states could adopt to provide more humane conditions for these animals.

Under new legislation (Wilderness Act) every roadless area of 5000 acres and every roadless island on national wildlife refuges must be studied and considered for wilderness status. Present legislation is clarifying what is meant by a 'wilderness area'. Meantime, two small wilderness units are being considered by Congress in the Great Swamp Refuge within a few miles of New York.

An Estuarine Areas Bill authorizes the study and inventory of estuaries in the United States and a report on the desirability of establishing a nation-wide system of estuaries and acquiring specific areas. Another act renews authorization of funds for the continued study of the effects of pesticides on fish and wildlife.

Mr. Buell stated that it was proposed to have a seminar on the problem of wildfowl damage to farms and that he hoped it would be possible for a number of Conference members to attend because their experience would be very helpful in the seminar discussions.

Mr. Buell concluded with an expression of concern about the development of 1968-69 regulations that are acceptable to hunters and will still leave a desirable number of breeders to return to the breeding grounds next year. He anticipated a long and difficult process in arriving at such regulations.

25. Representative to United States Advisory Council Meeting

Mr. Hugo Maliepaard of Saskatchewan was named as the Canadian representative to the United States Advisory Council meetings in August, 1968.

26. Fur Council

Mr. D.H. Gimmer presented the report of the Canadian Fur Council (page 50). It was understood that the Fur Council would report on any new departures at the next meeting of the Federal-Provincial Wildlife Conference.

27. Management Process in Wildlife Conservation

The chairman in introducing this discussion stated that it had been clear at the 1967 Conference that the paper by Dr. Hatter on budgeting had met both the need and great interest of the members of the Conference. He had therefore arranged a longer session with the object of going into the problems of management in greater depth. He had arranged for three papers to be prepared and circulated to members of the Conference that would open up the whole range of problems related to the planning, managing and evaluating of programs.

The chairman stated that the procedure would be to ask two members of the Conference to open the discussion. He would then ask each of the three authors of the papers to comment, and from then on would conduct the discussion in a free way.

(The following notes do not summarize the individual contributions of those who took part, in the order of delivery, but under seven headings which we hope do justice to the discussion and fairly summarize the points of view expressed. It is important to read these notes in conjunction with the three papers that constituted the background of the discussion.)

1) Social role of biologists and economists

A number of speakers stressed the fact that it was important for both economists and biologists to be aware of and to keep always in view the fact that their special skills should be expected to serve society as a whole.

2) Objectives

Everyone was in favour of clear statements of objectives but some additional points were made. The first was that getting the objectives clear is a difficult job and we often fail because we are unwilling to take the time necessary to establish our objectives. A second point was that the process of setting our objectives is different from the process of achieving the objectives efficiently. A third was that clear objectives are a necessary prerequisite for determining performance indicators. A fourth was that as conditions change it may be necessary for those engaged in wildlife management to change their objectives, although this necessity, because of tradition and interest, may be difficult to see.

3) Benefit-Cost Analysis – how useful?

There were some differences of opinion as to the usefulness of benefit-cost analysis, possibly some differences of opinion as to exactly what was meant by analysis, and some tendency to gloss over what appear to be substantial differences of opinion.

The problems and uses may be summarized as follows: Benefit-cost analysis in a general way is a simple, intuitive approach – "what do I get for what I put out? " Its virtue lies in this simplicity, whereby benefits and costs are put into dollar terms and measured against one another. Its sophistication lies in the techniques and devices whereby the dollar values are determined.

There are, however, difficulties of which everyone is aware. How does one quantify intangibles? How do we take account of qualitative differences? Those who favour the use of benefit-cost analysis suggest that with further work these difficulties can be overcome. A number of points were made:

- It is true that it is difficult to evaluate things that are not priced, but if we chose to market them they would have a price.
- At least the fact that the item cannot be given a dollar value is a part of the data.
- Studies have suggested what consumers will pay for intangibles like recreation, or disease control, etc.
- Even if the figures put on projects in a benefit-cost analysis are not accurate they are at least as accurate as those gathered by engineers in some of their projects.
- Regardless of how accurate the data are, use of the formula promotes consistency in treatment of like projects and problems.
- There are studies at present under way which are attempting to find indices of quality that will reflect differences.

The critics of benefit-cost analysis are not fully persuaded by these points. They point out that:

- Earlier business studies in which consumers were invited to indicate what price they would pay for a product have proved to yield inaccurate information.
- There is no unbiased agency to fix the dollar values and subjective judgement, which the method is designed to avoid, reappears and may not be identified as being subjective.

Another criticism of the benefit-cost approach is that it over-simplifies the problem of assessing projects, so that a project might appear to be acceptable but if considered in terms of overall objectives would not be, or a project might receive an unfavourable benefit-cost analysis and yet be necessary when considered in terms of overall objectives.

Those favouring the benefit-cost approach would assert that with all its difficulties it narrows the range of subjective judgement and that we are usually faced with marginal decisions rather than either/or ones.

4) The comprehensive approach

The comprehensive approach is based on the notion of multiple use of resources for the benefit of people. Action is perceived as arising in "areas of concern". This first step is to spell out objectives, which would take into account the total environment, physical, economic, social. Strategies, programs and projects would flow from these objectives.

There was no disagreement with this approach but two points were made in this connection having to do with the use of benefit-cost analysis.

The first was that the objectives determined what performance indicators should be used as tests of efficiency, and that this was more meaningful and useful than the benefit-cost approach in achieving efficiency. Benefit-cost analysis is designed to promote efficiency by providing an accurate method of comparing alternative courses of action. Performance indicators promote efficiency through provision of evaluative checks specific to the objectives.

The second point was that wildlife administrators and Treasury Board officers should work together in setting out the objectives and then the programs and projects that flow from them.

Definition of "areas of concern" and the setting of general objectives are a public, political decision within which, it was agreed, wildlife administrators must work.

5) Respective roles of civil servants and politicians.

It was agreed that civil servants are also citizens and have both a special role because of their particular expertise, as biologists, economists, etc., and a general role as citizens taking part in determining the goals and objectives of society.

Politicians clearly have the role of making the decisions and setting the objectives within which the civil servants must work.

A common difficulty is the failure of these roles to intermesh effectively and it was suggested that committees of Members of Parliament or Legislatures might profitably meet more often than is common practice now. It was reported that in Alberta, land-use policy is formulated in a highly integrated way in a caucus committee with one Cabinet Minister and a considerable number of other Members of the Legislature present. Each director is present and presents his projects. As a result the various disciplines are represented and the knowledge of the experts is fed into the public decision making process.

6) The management process

It was generally agreed that the systematic planning, spending and accounting for the money spent on wildlife programs are important and it was stressed that this started with thorough thinking-through of objectives and plans. To the objection that budget review of the kind outlined in the paper would take a good deal of time and was not a substitute for good judgement it was replied that it would take time but that it was time well spent if it secured results. On the other hand it was readily agreed that the procedures outlined were not a substitute for good judgement but were designed to assist judgement by the use of problem solving methods.

An important advantage of the methods outlined is that they promote a good understanding of what is going on at all levels, up to the Treasury Board and out to the field.

7) There are alternatives

It was pointed out that although many people had spoken about the need for clear objectives there was some danger that wildlife administrators take their present general objectives for granted. The objectives are in the general field of recreation but this is usually interpreted in wildlife circles as equivalent to hunting and fishing, whereas there are many people interested in wildlife who are not keen on hunting and fishing. If a "day-in-the-field" is a way of formulating the units of a recreation program there are many activities making use of wildlife resources besides hunting and fishing. And many of these activities could be financed with much less money than is now spent and with very different wildlife resources. If wildlife managers are to keep abreast of the changing social conditions and the attitudes and objectives of society it may be necessary for them to become more involved in social and psychological investigations than they have been so that they can

adjust themselves and their programs to changes. The session concluded with the remark that many difficulties arise from the decision not to maximize the opportunities to hunt and fish and that things might go better if an effort were made to maximize the costs for hunting and fishing.

28. Recommendations

Dr. S. Smith presented the report of the Recommendations Committee (page 19).

29. Feedback Forms

The Chairman stated that as a method of gathering information on the ideas and suggestions for improvement of the Conference a Feedback Form would be distributed. He stated that as a result of the suggestions made last year on a similar form a number of the changes in procedure had been carried through and that the assistance of the members was requested in continuing and extending the improvements. Completion of the form was the last formal business of the Conference.

(Summary and comment on the Feedback Forms – page 80).

Members of the committee:

Dr. S.B. Smith, Chairman
Dr. J. Hatter
Mr. B.C. Carter
Mr. D.A. Benson, Secretary

Recommendation 1:
That the Conference commend the Canadian Wildlife Federation for its continuing efforts to encourage teacher training in conservation subjects and its valuable work in co-ordinating publicity on the annual theme for National Wildlife Week. It is also recommended that provincial and territorial resource departments distribute National Wildlife Week posters and classroom lessons widely, and use their good offices to encourage provincial and territorial departments of education to introduce conservation education into teacher training and into curricula. It is further recommended that the Conference introduce the suggested theme of "Ecology and Land Use Planning" for National Wildlife Week, 1969.

Recommendation 2:
That the Conference express its appreciation to the United States Fish and Wildlife Service for making it possible to have its representatives, Messrs. Noble Buell and Walter Crissey, at the Thirty-second Federal-Provincial Conference; to the Yukon Territorial Game Branch for its handling of the Conference arrangements; and to the Royal Canadian Mounted Police for its growing support and co-operation at both provincial and federal levels.

Recommendation 3:
That the Conference, through the Minister of Indian Affairs and Northern Development, request the Government of Canada to establish further contact with the provincial resources agencies with respect to Bill C195, dealing with firearms legislation, before Bill C195 is discussed in Committee in the Parliament of Canada.

Recommendation 4:
That the Conference recognize the need for evaluation of the effects of river basin development projects on all resources, before such projects are begun, and that the Conference delegates draw to the attention of their respective governments possible undesirable effects of the Peace River storage on the water levels in Lake Athabasca, Lake Clair, Richardson Lake, and the Athabasca Delta, and the possibility of serious damage to habitat for waterfowl, fur bearers and fish resulting therefrom.

Recommendation 5:
As the import of wildlife from other lands is presently under the aegis of numerous agencies, federal and provincial, and since introduced species may represent an environmental pollutant either in themselves, by direct destruction or degradation of their environment, by degradation of compatible indigenous species through hybridization, or by introduction of diseases or parasites, it is recommended:

(a) That responsible federal and provincial authorities prohibit the import of non-indigenous species into any province or territory of Canada, except in those cases and for those species which are shown by the importer to the satisfaction of the responsible authorities not to constitute an environmental pollutant now or in the future, either in themselves or through their progeny.

(b) That responsibility for inspection of non-indigenous species at their port of entry into Canada rest with inspection personnel under authority of a duly designated federal or provincial agency and that responsible personnel should be supplied with sound, basic information on the parasites and diseases likely to be harboured by non-indigenous species.

(c) That non-indigenous species of wildlife, imported for any purpose, be subject to the decontamination procedure used for domestic species and that such procedures be carried out in a manner similar to that used for domestic species and by the same agency.

(d) That the Canadian Wildlife Service be responsible for maintaining a current list of rare and endangered species of other lands likely to be imported into Canada and that the Service conduct, in co-operation with other federal and provincial agencies, studies in diagnostic methods for determining the health of relevant non-indigenous species.

(e) That export of wildlife in danger of extinction, rare, or peripheral, be prohibited or authorized with cause by the responsible provincial agency and by the responsible federal agency when and where applicable, and that liaison be maintained by the Canadian Wildlife Service with the appropriate authorities within Canada and in other lands to assist those authorities to control export of rare and endangered species or parts thereof within their jurisdictions without their knowledge and approval.

(f) That Canada sign the Convention for the export and import of certain species as requested by the International Union for the Conservation of Nature and Natural Resources.

Recommendation 6:
That the Meeting express its appreciation to Mr. James Smith, Commissioner of the Yukon Territory, for the splendid hospitality extended to delegates of the Thirty-second Federal-Provincial Wildlife Conference, Whitehorse, Yukon Territory.

Recommendation 7:
That the Conference express its appreciation to the Yukon Fish and Game Association and many others associated with the Conference for the splendid hospitality extended to delegates to the Thirty-second Federal-Provincial Wildlife Conference.

Report of the Canadian Wildlife Federation

Mr. R. Passmore
Executive Director
Canadian Wildlife Federation

Last July, in Ottawa, the delegates to the thirty-first Federal-Provincial Wildlife Conference adopted recommendation number one, which contained a reference to the efforts being made by the Canadian Wildlife Federation to get more ecology into the curricula of elementary and secondary schools in all parts of Canada and which endorsed the suggested theme "Wise Use of Pesticides" for National Wildlife Week, 1968.

Dealing first with the latter item, you are now all familiar with the materials produced for the 1968 program. A summary of the distribution of these materials is attached to this report. Being only a summary of orders for materials, this list fails to show participation by Departments of Education and by sportsmens' groups whose efforts, along with your own, warrant grateful acknowledgment. Nor does the list show how these materials were actually used. In this connection, we estimate that, as in other recent N.W.W. programs, more than 90 per cent of the posters and classroom lessons produced were distributed to schools.

In my report to you last year, I suggested that actual use of National Wildlife Week materials in schools might be made more effective by arrangements made between Resource Departments and Departments of Education well in advance of distribution, and I agreed that I would discuss this with the people involved in each province prior to the 1969 program. These discussions did take place in every province but, regrettably, our contact with the Department of Education in Ontario was too late to influence arrangements for 1968. Elsewhere, we hope these contacts served to improve cooperation and to increase the effectiveness of the program. We would be interested in receiving your comments as to whether these improvements did materialize.

As far as we have been able to determine, the 1968 National Wildlife Week program received excellent coverage by the communications media, much of it resulting from initiative taken at the provincial or local level. Considering the somewhat controversial nature of the subject matter, we had expected that our clipping service would show substantially greater press coverage than in previous years. The expected increase did not materialize.

The 1968 National Wildlife Week program did generate the usual surge of inquiries from students and teachers at elementary schools and a greater than normal flow of correspondence from students and teachers at the high school level. Many of these

inquiries contained requests for additional information on pesticides, their uses and effects. While we were able to fill these requests, we were not able to locate recent Canadian publications which were suited to this purpose. This experience, added to that of previous years, leads us to believe that we should be producing, annually, a booklet which gives in-depth coverage to the subject chosen for National Wildlife Week. It may be possible – but this should not be taken as a commitment – to produce such a booklet in connection with the 1969 program. As some of you are aware, we are presently advertising for an additional member of staff who could be put to work on such a project. We are not yet sure how we might expect to finance production and distribution of such a booklet in the quantities required.

We have been interested by the reaction of the pesticide industry, and of the people who use pesticides, to the 1968 National Wildlife Week program. One provincial Federation of Agriculture took strong exception to our program, apparently feeling that it pointed too directly at agriculture as the villain of the piece. On the other hand, one manufacturer of chemical pesticides thought that our treatment of the subject was "such an unbiased and fair report" that it promptly took out a sustaining membership in support of the Canadian Wildlife Federation. It may be only a coincidence that the Canadian Agricultural Chemicals Association devoted the May issue of its "News and Views" to extolling the benefits, harmlessness and the general great virtues of chemical pesticides. It may be coincidental too, that the Canada Department of Agriculture issued a press release, dated May 24, entitled "Pesticides Miracle," and which leads off with a reference to the not-so-good old days when people were not uncommonly subjected to the frightful horror of finding a worm in an apple. I am not sure what all of this indicates about the success of the 1968 National Wildlife Week program.

In our report to you in Ottawa last year, we expressed the hope that we would be able to continue what had originally been called our Centennial Program into a major, continuing effort to get more ecology into the curricula of schools in Canada. We have, in fact, been able to devote considerable time and travel to this program and have, during the year which has elapsed, visited each province at least once to renew our previous contacts and, in most cases, establish new ones. In addition, we have participated in a number of conferences on conservation education and have helped to plan or facilitate others which will be held in the future.

The important point to report to you regarding these contacts is the significant change in attitude which appears to have taken place during the year or so which had elapsed between visits. My impression was that, in every case, the atmosphere for improvement had grown more favourable. There have been, in addition, a number of small but otherwise positive steps in the right direction. However, I doubt that we could be accused of being too impatient if we express the wish that these steps were longer and that they were being taken in more places and more frequently. Changes in attitudes must now be translated into changes in teacher training programmes, courses of study and attitudes toward taking children outside the classroom. Hiring an additional member of staff should make it possible for us to devote more effort to this program than we have in the past. We hope we may continue to count on the excellent cooperation we have received from Resource Departments in all parts of the country.

National Wildlife Week 1969

Before considering the subject which might be given special attention during National Wildlife Week, 1969, it might be well to refresh our memories regarding those already covered. They may be listed as:

1964 – Opportunity for Outdoor Recreation
1965 – Water Pollution
1966 – Preservation of Wildlife Habitat
1967 – Conservation in Canada's Second Century
1968 – Pesticides

For 1969, the Canadian Wildlife Federation has been considering two possibilities, namely: "Understanding the Role of Predators" and "Preserving Endangered Species". A third subject "Ecology and Land Use", dealing with the role of regional land use planning, has also been suggested. You may wish to suggest other themes which warrant consideration for use in the 1969 program.

There are certainly many subjects in need of attention in the forthcoming and subsequent National Wildlife Week programs. The problem is one of resolving which to treat first. We will appreciate any guidance which this thirty-second Federal-Provincial Wildlife Conference cares to offer.

Report on National Committee on Wildlife Land Meeting, May 28-30, 1968

Dr. Nicholas Novakowski

The inaugural meeting of the National Committee on Wildlife Land was held in Ottawa, May 28-30, 1968. Attending were representatives from the provinces, universities and the federal government.

The meeting was opened by Mr. J.A. MacDonald, Deputy Minister, representing Mr. Arthur Laing, P.C., M.P., Minister of Indian Affairs and Northern Development. The text of the opening address is enclosed. The representatives were then asked by the Chairman to give their individual views on the principles and concepts of resource management related to wildlife land. The opinions were varied but it was obvious that all shared a common view that resource planning for wildlife land was an urgent requirement.

Following the statements from the representatives, Dr. J.S. Tener was appointed chairman by acclamation and Dr. N.S. Novakowski was appointed secretary by majority vote. The representatives were then separated into four study groups to examine the terms of reference of the committee, objectives and methods for solution. General guidelines used for the purposes of discussion were represented by the Chairman as follows:

1. Examination of the preliminary terms of reference of June 1967.
2. Problems of wildlife land stewardship.
3. Access to wildlife land.
4. Co-ordination of agencies in land use.
5. Definition of standards.
6. Development of pilot studies.
7. Economic evaluation of wildlife land use and potential.
8. Quality of the environment.
9. Education in resource management.
10. Legislation which may be required to protect the quality of the environment.
11. Methods of dissemination of information.
12. Availability of land for long-term research.
13. Relating interests of agencies concerned with human affairs to those of agencies concerned with land use.
14. Developing concepts of multiple-use.
15. Official liaison with other agencies.

The results of the group discussions were placed before the Committee and new terms of reference were written and accepted.

In order to facilitate the aims of the Committee and in keeping with the terms of reference, five permanent subcommittees were formed.

1. Education — to assess professional and technical needs. All resource agencies and universities offering resource-oriented programs to be polled to obtain information on requirements for professional and technical staff and the manpower available to fill the need. Appointees on this subcommittee should also act as catalysts for the development of centres of excellence in resource management at universities inclined or capable of doing so.
2. Assessment of wildland classification schemes — as the assessment of methodology was the important criterion discussed it was accepted that a panel of experts would be appointed to this subcommittee.
3. Fragile lands — this subcommittee would assist in the cataloguing and assessment of fragile lands in conjunction with other agencies now doing this work.
4. Wetlands — the appointees are to investigate and report to the executive on various wetlands programs and suggest further measures for the preservation of this valuable resource.
5. Economic evaluation — the appointees will attempt to evaluate the economic potentialities of wildlife as it applies to multiple-use of wildland and also in relation to human interaction and experience.

The members of those subcommittees will be appointed by the executive as soon as the minutes of the Conference have been ratified.

The Committee accepted a resolution on the preservation of fragile lands which reads:

"WHEREAS the International Biological Program has received official sanction and financial support from the worlds governments and

"WHEREAS the subcommittee on Conservation of Terrestrial Communities is an integral part of the Internal Biological Program and is endeavouring to establish series of Ecological Reserves to function as scientific research and control areas against which the effectiveness of land use programs can be compared.

"Be it resolved that the National Committee on Wildlife Land endorses these efforts and

"Be it further resolved that the National Committee on Wildlife Land urge the national government and all provincial and local governments to co-operate in establishing these Ecologi-

cal Reserves which will further the objectives of the International Biological Program."

This resolution was carried unanimously.

The Conference was then adjourned after agreeing to meet within a year's time.

Address to National Committee on Wildlife Land

By J.A. MacDonald
Deputy Minister of Indian Affairs and Northern Development

I am most pleased to see the establishment of this committee. We in Canada have long recognized that the land and its products provide the basis for our very existence, that if we are to achieve and maintain prosperity, we must use our land and its products wisely. We have devoted a good deal of attention to developing techniques for effective use of agricultural land and forest land. We are still engaged in the quest for better techniques of land management and concerned that the people who work the land should be proficient in their use.

But it is only recently that we have become concerned about the land as a factor contributing to the quality of our living – the land as a setting for outdoor recreation – the land as a product of wildlife – the land as our environment.

Thus I think there is a clear and demonstrable need to look at all the land of Canada – not just our agricultural lands in terms of their ability to produce food – not just our forest lands in terms of their ability to produce wood, but *all* our land. In looking at all the land of Canada, as our environment, a most useful perspective is that of productivity of wildlife, which is not only an increasingly important element in the quality of our living but also one of the best indications of the natural condition and capability of land. The point has been well made that how a country treats its natural resources is a reflection of the maturity of that nation. Let us ensure that Canada demonstrates that its approach to resource management is as advanced as any in the world.

You may question the need for yet another committee which will make demands on your time and energy, and which may appear to duplicate existing committees and agencies concerned with wild lands. We have examined the situation carefully and are convinced that duplication does not exist and that a national committee on wildlife lands is indeed required to discuss and recommend solutions to problems of regional and national concern on the preservation or development of wildlife habitat. The very existence of the various committees and agencies concerned with, and responsible for, wild land development planning and use makes it essential that recommendations from wildlife managers be fully considered in such planning and use. I am sure you appreciate the necessity of developing sound wildlife land policies and of ensuring that they are implemented to the fullest possible extent.

Wildlife land does not necessarily include only wild land, land which is not being currently utilized

for other purposes. It is a truism for those gathered here to say that wildlife requires appropriate habitat for existence, and that such habitat may be found in agricultural areas, managed forests, and even in urban areas. Nevertheless, the average person, and this may include other land managers, unconsciously equates wildlife with wilderness areas only, or relegates wildlife to lands considered worthless for any other use. Wildlife biologists have known for a long time that many wildlife species are most productive on nutrient-rich soils, and it is here that sound multiple-use planning will reap the greatest benefits, for it is here that primary uses of land, other than for wildlife production, are taking place at an accelerated and more sophisticated pace.

Your committee will have to be aware, in as specific terms as possible, of what is happening to our wildlife lands, what the current thinking is about, what should happen, and what plans are being developed by the various land use agencies to develop or improve such lands. I would think that you will want to be in a position, sooner than later, of being able to determine quite specifically not only where wildlife interests need recognition in land use planning, but of being able to develop a national awareness of the value of such interests to the Canadian public. I would suggest that solutions to local, regional and national problems will be more easily achieved if a sound, rational philosophy is developed and expounded by your committee. Such a philosophy, I would think, would include the following elements:

(a) recognition that scientific appraisals of wildlife lands and programs should form the bases for recommendations and action;
(b) recognition of the importance of environmental quality in our daily lives;
(c) recognition of the need for multiple use development of many wildland areas, in which wildlife will play an integral role;
(d) recognition of the need for close co-operation among all agencies and the public concerned with wild lands.

We face an exciting period of renewable resource development in Canada. Permanent benefits from such developments will only be maximized if your committee takes a long-range view of growth implications and examines seriously the standards by which you will measure wildlife benefits. A perennial problem facing those concerned with wildlife is the need to determine economic values of the resource. It is a most thorny problem and has been examined by some of the best minds in Canada and the United States. A solution has yet to be found, and I would suggest that, for obvious reasons, real progress in keeping and acquiring wildlife land will only be made after an acceptable solution has been reached. You may wish to consider the problem during your meeting here or you may wish to have it considered in another context, but above all, do not ignore it, for it won't go away!

Having said that, I do not wish to imply that economic criteria are the only yardsticks to be used in judging wildlife and wild land values. We in this Department are very conscious of the importance of environmental quality in modern life, of the need to provide the highest quality we can obtain for the public, and of the role that wildlife and land play in outdoor recreation. It is difficult to quantify aesthetic values of any kind and particularly those values associated with a wilderness experience. Nevertheless they are real and are appreciated by a wide section of the public. In your examination of wildlife land problems, I hope you will identify such values and give the fullest possible expression to them in your discussions and recommendations. It is true that our national and provincial parks contain some of the finest wilderness areas in the country, but the total area involved is small in comparison with the total area of wildlife land that you will be considering. I hope that as a result of your collective activities, the public will be well informed of the high aesthetic values inherent in wildlife lands and will exert appropriate pressures to ensure they are perpetuated or created.

I know that a great deal of thought was directed in forming your committee. The number here is rather large, but it is both desirable and necessary to have as wide a representation as possible of agencies and individuals who are concerned with the preservation and management of wildlife lands. Co-operation and co-ordination will be the main-spring of your efforts. Persuasion and education will be necessary adjuncts to success, if agencies involved in other forms of land use are to be convinced of the merits of your arguments and if you are to have the support of the public you deserve.

This conference has the potential for developing into the most important forum for the discussion and resolution of wildlife land problems in Canada. It is my earnest hope that it will become so, and I wish you every success in your deliberations.

National Committee on Wildlife Land

Terms of Reference

The primary aim of the Committee will be to promote sound management of land for wildlife in Canada by fostering development of management policies and programs of national and regional significance, in the interests of the Canadian people. To meet this aim the Committee will undertake:

1. to promote the most effective use of land by bringing about co-operation between land management agencies;
2. to serve as a clearing house for proposals on management, research and classification related to land for wildlife;
3. to foster increased public awareness and understanding of wildlife land resources and their place in an integrated resource management context;
4. to identify problems and recommend policy guidelines, information reviews and research programs related to short and long-term social needs and public demand, habitat requirements, management and land classification for wildlife. The Committee may also suggest management programs of national scope and express a viewpoint on problems of national concern;
5. to assess the professional and technical manpower needs of wildlife agencies in Canada and to promote the development of curricula which will meet present and future land management needs;
6. to maintain liaison with other resource oriented committees such as the National Committee on Forest Land, the National Soil Survey Committee of Canada, and the National Advisory Committee on Water Resources Research; and
7. to assess land classification schemes in relation to the needs of wildlife and recommend necessary modifications.

University Representatives

Dr. C. David Fowle,	Department of Biology, York University, Toronto, Ontario.
Dr. J.B. Cragg,	Department of Biology, University of Calgary, Calgary, Alberta.
Dr. J.S. Rowe,	Department of Plant Ecology, University of Saskatchewan, Saskatoon, Saskatchewan.
Dr. Donald G. Dodds,	Department of Biology, Acadia University, Wolfville, Nova Scotia.
W.W. Jeffrey, Esq.	Faculty of Forestry, University of British Columbia, Vancouver, British Columbia.
Dr. W.O. Pruitt, Jr.,	Department of Biology, Memorial University, St. John's, Newfoundland.
Dr. E.M. Hagmeier,	Department of Biology, University of Victoria, Victoria, British Columbia.
Dr. Douglas H. Pimlott,	Department of Zoology, University of Toronto, Toronto, Ontario.
Dr. W.A. Fuller,	Department of Zoology, University of Alberta, Edmonton, Alberta.
Dr. J.F. Bendell,	Department of Zoology, University of British Columbia, Vancouver, British Columbia.
Dr. E.G. Pleva,	Department of Geography, University of Western Ontario, London, Ontario.

Provincial Members

*Commissioner James Smith	Yukon Territory
Dr. Ben Simard	Quebec
Gordon R. Kerr, Esq.	Alberta
**G. Staines, Esq.	Saskatchewan
F Payne, Esq.	Nova Scotia
W.G. Smith, Esq.	British Columbia
T. Dilworth, Esq.	New Brunswick
G. Bossenmaier, Esq.	Manitoba
F.A. Walden, Esq.	Ontario
S. Vass, Esq.	Prince Edward Island
P. Kwaterowsky, Esq.	Northwest Territories
Neil Payne, Esq.	Newfoundland

*To appoint representative
**Alternate to be appointed

National Members

R.J. McCormack, Esq.,	Acting Chief, Canada Land Inventory, Ottawa, Ontario.
Dr. W.A. Ehrlich,	Research Co-ordinator, Pedology, National Soil Survey, Department of Agriculture, Ottawa, Ontario.
L.C. Munn, Esq.,	Operations Co-ordinator, Canada Land Inventory, Ottawa, Ontario.
W.K. Sly, Esq.,	Argometeorology Section, Plant Research Institute, Department of Agriculture, Ottawa, Ontario,
Dr. Peter Meyboom,	Inland Waters Branch, Department of Energy, Mines Calgary, Alberta. and Resources,
L.E. Philpotts, Esq.,	Farm Economic Services Division, Department of Agriculture, Ottawa, Ontario.
G.H. Watson, Esq.,	Eastern Regional Co-ordinator, Canadian Wildlife Service, Sackville, New Brunswick.
N.G. Perret, Esq.,	Staff Specialist – Land use Canadian Wildlife Service, Ottawa, Ontario.
R.H. Mackay, Esq.,	Acting Western Regional Director, Canadian Wildlife Service, Edmonton, Alberta.
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G. Staines, Esq.,	Western Regional Co-ordinator, Canadian Wildlife Service, Winnipeg, Manitoba.

The Export-Import Convention

Dr. Nicholas Novakowski

This report is to bring you up to date on the export-import convention sponsored by the International Union for Conservation of Nature and Natural Resources, which is the result of Resolution No. 5 of the IUCN's Eighth General Assembly held in 1963.

The convention is still in draft form and the Canadian Government through our Department of External Affairs has been asked to sign or agree to the convention as drafted. Furthermore, copies of the draft convention were sent to some provincial governments and various federal government departments which had sent representatives to the General Assembly. Canada is not yet a member nation of the IUCN but our application is to be ratified at the next General Assembly in New Delhi in 1969. State membership has been approved by the CCRM.

It is very likely that Canada will sign the convention. Although the Federal Government has some control through the Migratory Birds Convention Act (Sections 14 and 31) and the Provinces some through the Game Export Act it should be obvious that there are still many forms of fauna and flora unprotected. In lieu of enabling federal legislation to cover all contingencies in this matter we will keep you informed about any new additions to the list of species protected, or those which Canada has been asked or committed to refuse entry, so that there is no reason for misunderstanding.

Convention for the import, export and transit of certain species

Replies received from:

STATES

Unganda	+	Belgium	
Zambia		West Germany	
Gabon	+	Denmark	+
Senegal	+	Italy	
Tanzania	+	Rhodesia	+
Ethiopia	+	Great Britain	−
Cyprus	+	Finland	+
Malawi		New Zealand	
Madagascar	+	Portugal	+
Maroc	+	Guyana	+
Canada		Romania	+
Singapore	+	India	
		Switzerland	+

Humane Trapping

Dr. Nicholas Novakowski

The subject of humane trapping has been discussed by the Federal-Provincial Wildlife Conference on several occasions over the past few years. You are probably all well aware of the joint efforts of the Canadian Wildlife Service and the National Research Council to design and develop a trap which is both technically efficient and humane. In 1966 the Indian Affairs Branch became actively involved in the development of the Mohawk Trap, resulting in the production of 2,500 muskrat-mink models and 300 beaver models for field testing purposes. The Conibear Trap, developed by the American Trap Co., has been available for several years and its use has gradually increased, particularly for beaver trapping and other underwater sets.

When the Mohawk Trap was distributed, a questionnaire accompanied each trap, requesting certain specific information relating to its technical efficiency, catching capability and killing qualities, and also to determine its market potential. Many of you are familiar with the questionnaire.

The overall response to the questionnaire has been disappointing in that relatively few trappers have replied, and few detailed comments have been received from the field staff concerned. However, this may be due in part to the method used to solicit the information and the fact that only a small number of trappers were equipped with the traps. In any case, 20 questionnaires were returned on the beaver trap and 43 returned on the muskrat trap.

In addition to these returns, we have reports on several projects designed to test the traps under more or less controlled conditions. It is significant to note that reports from both sources are comparable. We can, therefore, assume the comments received are a fairly true indication of the Mohawk Trap's technical efficiency and humane qualities.

The Mohawk 10" beaver model has several faults that must be corrected before it can be given further serious consideration. Without going into details on this trap, it is sufficient to say that it does not operate efficiently – beaver and otter can escape from it and it is, therefore, not a humane trap because it does not kill effectively.

The Mohawk 6" muskrat-mink model, on the other hand, was well received, with favourable response, by the trappers. The following is a breakdown of the answers contained in the questionnaire.

Questions		Favourable	Not Favourable	No Answer
1.	Compare with leghold trap.	29-67%	7	7
2.	Compare with improved traps.	25-58%	12	6
3.	Does it catch and hold animal?	36-83%	5	2
4.	Does it kill instantly?	30-70%	9	4
5.	Do animals die from drowning?	21-48%	8	14
6.	Do animals die of exposure?	30-70%	4	9
7.	Were pelts damaged?	35-81%	4	4
8.	Is trap hard to set?	23-53%	16	4
9.	How does weight compare?	29-67%	8	6
10.	How does bulk compare?	29-67%	8	6
11.	Would you buy this trap?	27-65%	12	4

In questions 5 and 6, most answers were negative, since the trappers claim the trap kills instantly. The negative answers were from trappers who said animals were dead, but didn't know whether they were trap-killed or died from other causes. One trapper said muskrats died within 5 seconds, therefore, couldn't drown. Most agreed it was better than the Conibear 110 as a humane trap.

The comments on trap purchases, both favourable and unfavourable, were often qualified on the basis of cost.

The question of cost is one which has not yet been answered. A rough estimate based mainly on the initial production of experimental traps, with some adjustments, indicates it would cost approximately $2.00 to produce. We have solicited the assistance of the Department of Industry to conduct a cost analysis and study of the economic feasibility of production, but have not yet received a reply. We plan to keep you advised of future planning in respect to production and related matters.

You are all aware that there is much agitation for an immediate ban on the leg-hold trap. There is little doubt that we, as a part of a civilized nation, would agree that this would be ultimately desirable. Furthermore, you are no doubt aware that the responsibility for legislation and enforcement is a matter for each individual province to decide, except where responsibility refers to Indians, Eskimos or Federal Crown Lands. The efforts toward developing and testing a humane trap by federal authorities thus is applicable to those areas of their responsibility. We can reasonably expect that provincial authorities will take some initiative in this matter also.

In view of the above and realizing the inadequacies of present humane traps, we solicit your support to the following proposals:

(a) When an acceptable humane trap has been developed, tested and approved by the trapping fraternity, humane societies, and by wildlife specialists in each of your departments and federal government departments are you prepared to enter into discussions on legislation to ban the leg-hold trap in your respective provinces, or are you in favour of a federal statute which would probably be an amendment to the Criminal Code of Canada?

(b) In view of the fact that (regardless of agitation by humane societies) the trapper must have a substitute which would not penalize him, by loss of efficiency, or economically, or endanger the industry in any other way, are you prepared to work out a reasonable replacement method by cost-sharing, subsidization or other means in collaboration with federal government agencies, notably the Department of Indian Affairs and Northern Development?

(c) Will you accept the responsibility of providing the trapping industry in your respective provinces through trappers councils and other organizations with information and advice on the feasibility of humane trapping, so that adjustments may be made well in advance of developments?

(d) Do you wish to have a formal committee or council representing all interested parties set

up for the purpose of making decisions? They could meet or only correspond.

Because this topic has been discussed and argued for many decades with little result, we should make every effort to solve it. To ignore it would be to turn our backs on a large body of public opinion.

So long as we remain mindful of the trappers' interest, we ask your support in continuing efforts to encourage the design and development of humane trapping equipment and its introduction, wherever it is proven to be efficient and economically feasible.

Information regarding the number of trappers both part time and full time in Canada, the size of their traps and the average number of traps/trapper.

Yukon – 1966
Approximately 36 traps and snares/trapper. Mostly 1, 1.5, 2 of the Victor type and 4.5 x 4.5 of the Conibear type. No information regarding traps/trapper or number of trappers.
Northwest Territories – August 1967
Three thousand seven hundred and fifty-six general hunting licences issued. These authorize hunting of big game and birds and the trapping of fur bearing animals.
British Columbia – 1966-67
6,500 trappers
102.3 traps/trapper
65% small size (0-2)
35% large size (3-+)
Saskatchewan – 1965-66
Northern areas:
3,203 total licenced trappers
2,308 active trappers
Licence Sales:
1965 – 3,203 in North, 3,034 in South
1966 – 2,562 in North, 4,009 in South
Manitoba – 1965-66
Four thousand five hundred and ninety-five ordinary trappers licences. These are generally issued to part time trappers in central and southern areas, trapping in private and Crown land.
2,688 registered trap line licences in northern and eastern parts of the Province.
142 treaty Indian licences.
Popular sizes – 1, 1.5, 2, 3, 4. The Victor, stop loss and Conibear favoured.
Ontario
Total full time – 5,600
One hundred and fifty small single spring and the No. 110 Conibear traps were used per full time trapper; 50 large double spring and No. 330 Conibear used per full time trapper.
Total part time – 4,900
100 single spring/trapper
10 double spring/trapper
New Brunswick
Licences –
1963-64 – 3,279
1964-65 – 3,320
1965-66 – 3,228
Nova Scotia
Estimated 2,000 part time trappers. No full time trappers.

Collection of Whooping Crane Eggs from Wood Buffalo National Park

by Ernie Kuyt

Abstract

The whooping crane is North America's most widely publicized bird. The species has increased by only one bird a year during the last 27 years. The low rate of increase is, in part, due to the loss of nearly half the crane's nesting effort. With that knowledge, Canada and U.S. Wildlife Services have begun an operation to collect eggs from the wild to start a captive flock to be used in a propagation program. The Canadian responsibilities in the joint project include the collection of eggs from the wild. The present report discusses the 1967 and 1968 egg collection from Wood Buffalo National Park as well as prior surveys to locate breeding pairs of whooping cranes and post egg pick-up surveys to ensure that no egg loss due to nest abandonment occurred. Logistics of the egg pick-up are described, as well as results of aerial surveys to determine hatching success of eggs left in the nest. Nest abandonment has not occurred to date. A brief description is given of the nesting habitat, eggs, and parental behaviour near the nest.

Introduction

The whooping crane is perhaps North America's most widely publicized example of a species in danger of extinction. A tremendous amount of publicity appears annually in newspapers and magazines. Books and technical articles have been printed recently. We have been acquainted with the cranes' slow increase from a low of 15 birds in 1941 to 46 birds in the spring of 1968. Although the population has tripled in 27 years, the average rate of population increase during that period of a little over one bird a year is not encouraging.

Dr. Novakowski in 1966 in his paper on whooping crane population dynamics on the nesting grounds, Wood Buffalo National Park, summarized the nesting success of six nest sites near the Sass River from 1954 to 1965. Only eight times were both eggs in the clutch known to have hatched, and five of these twin hatchings were observed at one nest site. The arrival at the Aransas winter headquarters of twin young whooping cranes is a rare occurrence.

It has become apparent, therefore, that nearly half the whooping crane nesting effort is wasted owing to loss of eggs. With that thought in mind, Canadian and U.S. Wildlife Services embarked on an operation to collect whooping crane eggs from the wild for use in a captive propagation program. The eggs collected are to be hatched artificially, and the birds raised and eventually mated. When a sufficient number of offspring from the captive flock becomes available, the birds will be released in the wild to bolster the existing wild migratory population. The mechanics of the re-introduction have not yet been decided upon.

The U.S. responsibilities in the joint program to the present have included the care of the eggs as soon as they are collected, the hatching of the eggs, and the raising of the birds in the Patuxent Wildlife Research Center at Laurel, Maryland.

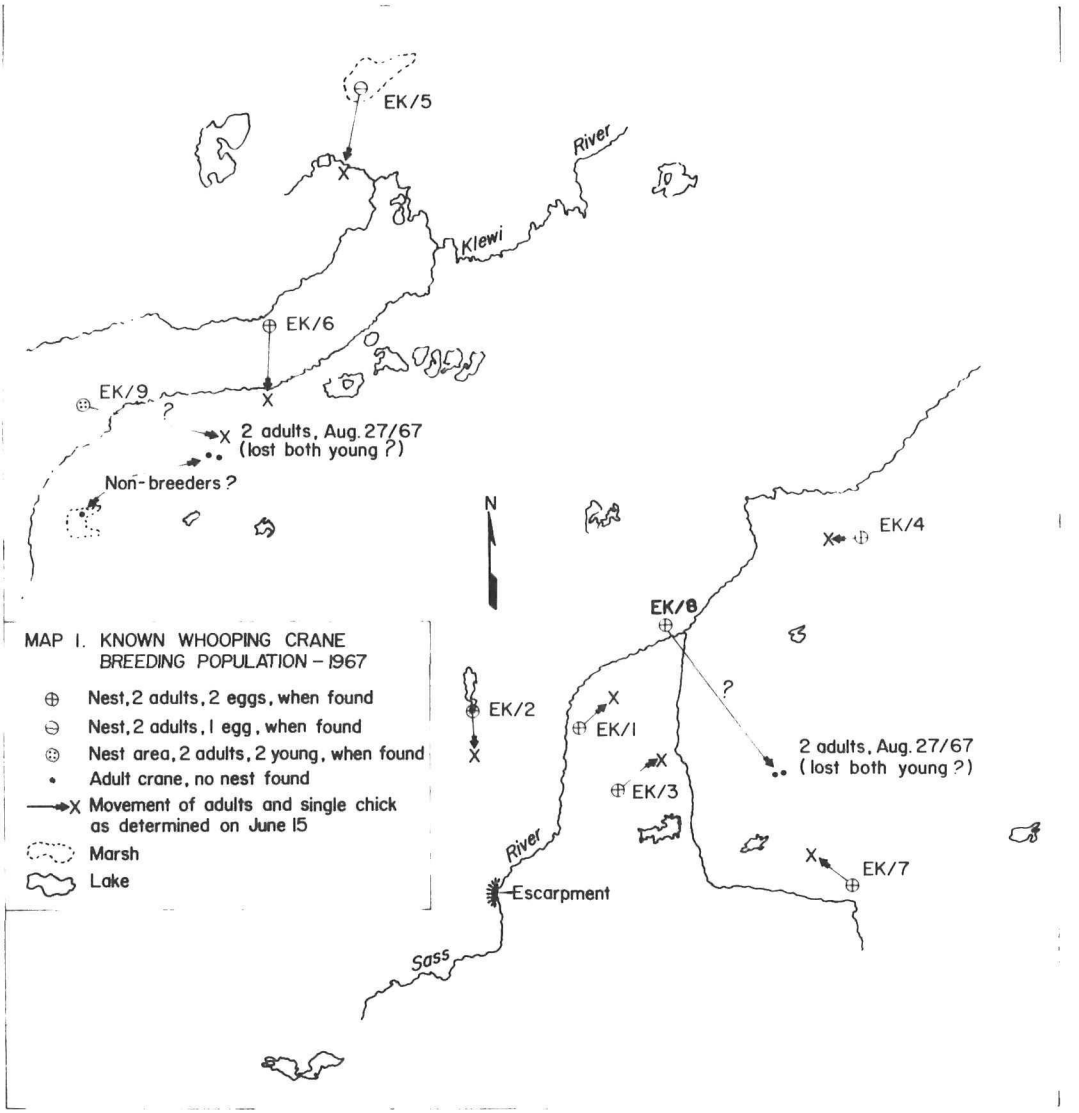
The Canadian responsibilities have included spring surveys over the nesting area to plot nest sites; organizing the egg pick-up by helicopter; making post egg pick-up surveys over the nesting area to determine hatching success and survival of whooping crane chicks; and providing air transportation from Fort Smith for the U.S. biologists and the collected eggs. The purpose of my talk is to report on the Canadian part of the operation in 1967 and 1968 and to briefly describe the nesting grounds.

1967

Aerial surveys in 1967 to find nests were made by a small 2-place Bell helicopter.

The first flight on May 17 was postponed due to rainy weather. The second flight on May 18 located three pairs of cranes (two pairs with two eggs each) and two single adults. No additional nests were found on May 19. On May 23, two new nests were found in the Sass River area, both with two eggs; and one nest with a single egg was found in the Klewi River area. One pair of adults in the Sass area and two singles in the Klewi area were also seen.

On the fifth and last survey on May 25, two new nests with two eggs each were found, one near the Sass River and one near the Klewi River. The total for 1967 was seven nests and 13 eggs. During flights after the egg pick-up, two additional families were found, one with two eggs along the Sass River and one with twin young along the Klewi River. The distribution of the nine whooping crane families is plotted on Map 1.


EK/5
River
Klewi
EK/6
EK/9
?
2 adults, Aug. 27/67
(lost both young ?)
Non-breeders ?
N
EK/4
EK/8
?
EK/2
EK/1
EK/3
2 adults, Aug. 27/67
(lost both young ?)
River
Escarpment
EK/7
Sass
MAP I. KNOWN WHOOPING CRANE
BREEDING POPULATION – 1967
Nest, 2 adults, 2 eggs, when found
Nest, 2 adults, 1 egg, when found
Nest area, 2 adults, 2 young, when found
Adult crane, no nest found
Movement of adults and single chick
as determined on June 15
Marsh
Lake

1968

The 1968 spring flights to find whooping crane nests were made in a fixed-wing aircraft. The reasons for the change from a helicopter were several:

1. In 1967 nest sites were plotted on aerial photographs, and no difficulty was encountered in locating them from a fixed-wing aircraft during the post egg pick-up check flight.
2. There is much less disturbance using a fixed-wing aircraft.
3. Much more territory can be covered in a fixed-wing aircraft than in a helicopter, at about half the cost.

On May 10, five nests were found, four with two eggs. The contents of the fifth nest could not be determined. Nine of the ten parents were seen, and five additional cranes were observed.

On May 14 three new nests were found. Contents of the nests were not seen as the birds remained on the nests. Five additional cranes were seen.

On May 17, two new nests were located, both containing two eggs. A single, a pair, and a trio of white-plumaged birds not associated with any of the 10 nests were observed.

No new nests were found on the last survey made on May 21. The accumulated total for 1968 is ten nests, 20 nesting birds, six white-plumaged birds apparently non-breeding, a possible seventh, and a possible eighth non-breeder (seen on egg pick-up).

The distribution of nests and of non-breeders in 1968 is given in Map 2.

Logistics of egg pick-up

1. Briefing on the eve of the pick-up of all participants, including the helicopter pilot. During the briefing, a flowsheet of the entire operation is prepared.
2. Pick-up begins the following day as soon as the weather allows it. In 1967, two trips were made with three eggs each. In 1968, the six Sass River nests were visited first. The fixed-wing support aircraft makes a photographic record of the operation and collects information on behaviour of parents. Eggs are collected from the nests, placed in a woolen sock, carried to the helicopter, and placed in suitcase-incubators.
3. Both aircraft return to Fort Smith and are refueled. The eggs are taken to the electric incubator in the Canadian Wildlife Service lab.
4. Pick-up of remaining eggs begins. In 1968 the four nests in the Klewi River were visited on the second trip. The support aircraft assists as before.
5. Both aircraft return to Fort Smith and refuel. Eggs are taken to the laboratory.
6. Within half an hour and as soon as the fixed-wing aircraft has been refueled, a check is made of all nests sites to determine whether or not the parents have returned. The helicopter is on stand-by during that period in case further collections have to be made of abandoned eggs.

Egg pick-up

1967

On June 2, six nests were visited and one egg collected from each clutch of two eggs. The last egg picked up was pipping. The chick was unable to get out of the egg and died aboard the commercial aircraft taking the U.S. biologists and the eggs to the Patuxent Research Center. The other five eggs hatched normally, but one of the young died at two months of age as a result of nutritional deficiency. The four young remaining are now one year old.

1968

On May 29, nine eggs and a chick were collected from the ten nests located. The first egg picked up was pipping and had hatched normally before we returned with the second load of eggs. The egg shell of a hatched chick was also found in the nest. On our last stop a freshly hatched chick and an egg were found. As the chick was still damp and the weather had begun to deteriorate somewhat, it was felt that the chick's chance of survival was less than that of the egg and consequently the chick was taken.

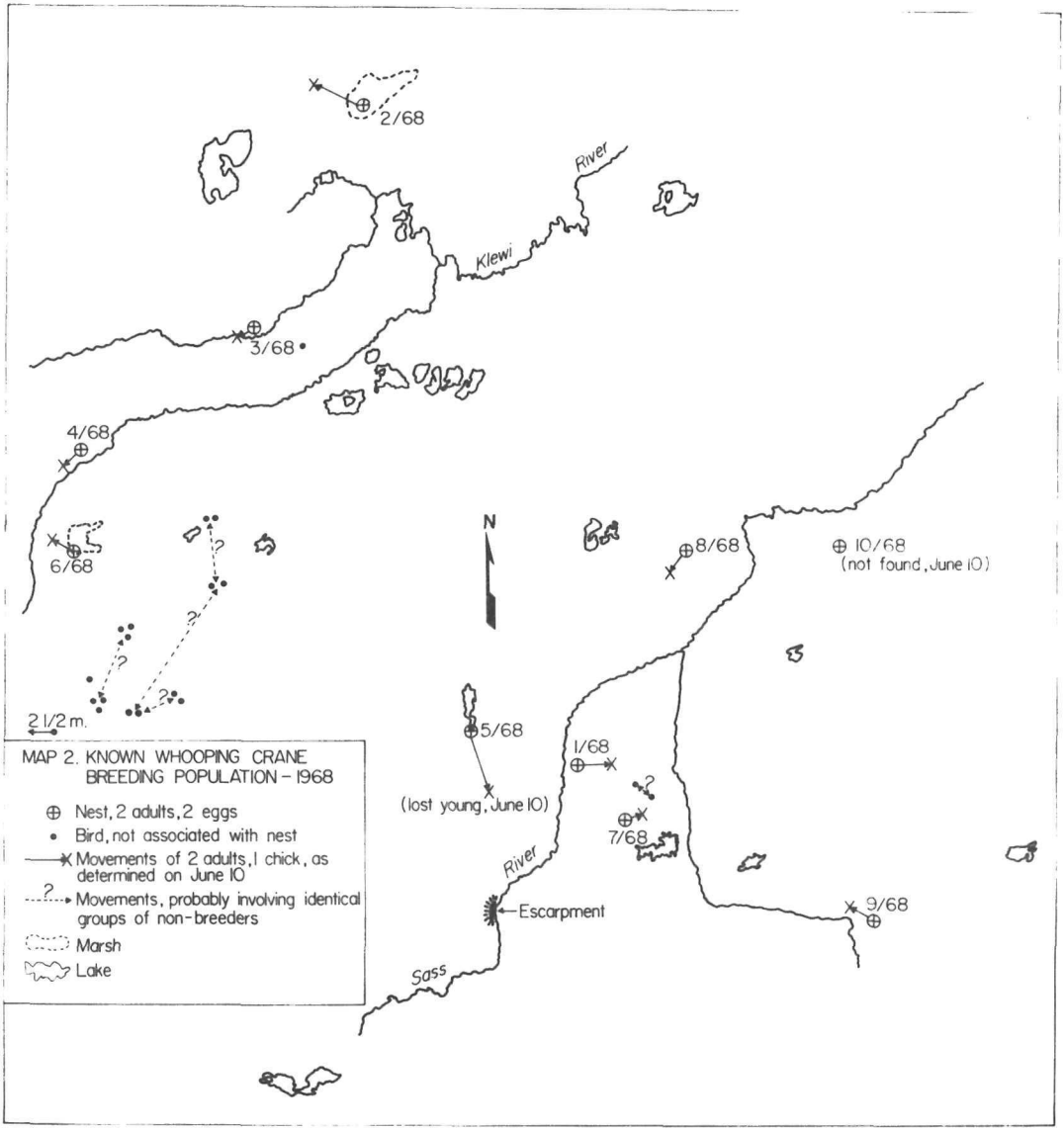
Both chicks were able to walk and were eating bits of canned dogfood and baby cereal on May 31, the day of departure for Patuxent. By June 10, all 10 eggs collected had hatched normally in the Patuxent Research Centre.

Post pick-up check flights

1967

No evidence was found of nest abandonment or mortality of young due to the pick-up in 1967. All six nests visited earlier were again attended by one or both adults.

An aerial survey on June 15 to determine chick survival showed single chicks at six nests, four of which had been visited during the egg pick-up. A new family with twin young was found during the survey, bringing the total of known nesting pairs to


2/68
River
Klewi
3/68
4/68
6/68
N
8/68
10/68
(not found, June 10)
2 1/2 m.
5/68
1/68
(lost young, June 10)
7/68
River
Escarpment
9/68
Sass
MAP 2. KNOWN WHOOPING CRANE BREEDING POPULATION - 1968
Nest, 2 adults, 2 eggs
Bird, not associated with nest
Movements of 2 adults, 1 chick, as determined on June 10
Movements, probably involving identical groups of non-breeders
Marsh
Lake

nine. A subsequent flight on August 28 revealed single young at each of five nests in the Sass River area. From all five nests one egg had been collected. The sixth pair, the nest of which was first found on the day of the egg pick-up appeared to have lost both its young. The same flight showed two young in the Klewi area, the twin young of the last family found in 1967 apparently having been lost since June 15.

A total of 33 adults and nine young arrived at Aransas in the fall of 1967. As none of the young were twins, it appears that two families were not located in 1967 and that each family raised its customary single young.

1968

In 1968 as in the previous year no abandonment of eggs due to disturbance at the egg pick-up was observed. A post pick-up check flight in a fixed-wing aircraft on May 29 showed six birds to be incubating, two birds standing on the nest, and one just walking away from the nest. The tenth nest had been examined on the second egg pick-up that day. The first survey to determine hatching success was made June 10. Eight of the ten families visited during the egg pick-up now had a small chick with them. One family had lost its chick, and the remaining pair could not be found. A pair of non-breeding birds was also seen, making a total of 28 cranes seen on June 10, a new one-day "record".

Description of nesting grounds

Because of the danger of disturbing the rare cranes and of the inaccessibility of the area, ground studies are relatively incomplete and will probably remain so for the time being.

The habitat has been described by Allen (1966) and Novakowski (1966). Briefly, the area consists of a poorly drained patch-work of shallow ponds and marshes separated from each other by narrow strips of land which support a dense growth of birch, willow, spruce, tamarack, and shrubs such as labrador tea and other ericaceous plants. The more obvious plants growing in the marshes are various species of rushes and sedges. Cat-tail is also common but only in deeper portions of the ponds.

Nests

The whooping crane nest is a large mound of dead vegetation, usually bulrush *Scirpus validus* but sometimes containing sedge, cat-tail, or sphagnum moss. The nest has a slight depression at the top and is roughly circular, measuring from 2 to 3 feet in diameter, and about 12 to 18 inches high.

Nests are usually located in a fairly shallow part of the marsh and surrounded by tall emergent vegetation. From the air a large open area surrounding the nest is evident, particularly near nests in the wetter sites. The parent birds denude these areas and use the vegetation as nest material. Some nests have been found in deeper parts of ponds and one nest found in 1967 was a truly floating nest. Perhaps the water in the marsh rose considerably after the nest had been built. One nest in 1968 was only about 2 feet in diameter and 8 inches high. The small nest resembled that of a loon and the eggs were somewhat moist at the bottom.

Eggs

Of 16 nests examined in 1967 and 1968, all but one contained two eggs. One nest in 1967 contained only one egg when found. Eggs are large, measuring about five by three inches, weighing between four and five ounces at hatching and are light buffy-olive in colour with irregular brown blotches. The blotches are often dense enough at the blunt pole to obscure the ground colour. In the nest the two eggs are usually spaced several inches apart.

Behaviour of adults near nest.

Whooping cranes pay relatively little attention to a fixed-wing aircraft even when the aircraft is at a low altitude. The incubating bird frequently remains on the nest, but shows its displeasure by calling. On several occasions we have been unable to get the incubating bird to rise so that eggs could be counted. The mate is usually found feeding within one-half mile of the nest.

The behaviour of cranes toward a helicopter is markedly different. Upon the approach of the helicopter, the incubating crane will leave the nest and walk away. If the mate is present, it usually flies a short distance and is then often joined by the other bird. Sometimes both birds will fly a mile, then gradually circule back towards the nest and land. They may again take to the air when the helicopter departs.

When chicks are with the parents, the adults will remain with them, unless the helicopter approaches very closely. Then the birds will fly a short distance. One of the parents will frequently place itself between the chick and the circling helicopter, lowering its head and sometimes pointing its bill towards the chick. The male often ruffles the plume-like tertiaries over its back, culminating by partially or fully spreading its wings, which exposes the black wing tips. That behaviour has also been

noted on nests where eggs had just hatched or were in the process of hatching.

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Big game in the Mackenzie Mountains, Northwest Territories

by N.M. Simmons

Abstract

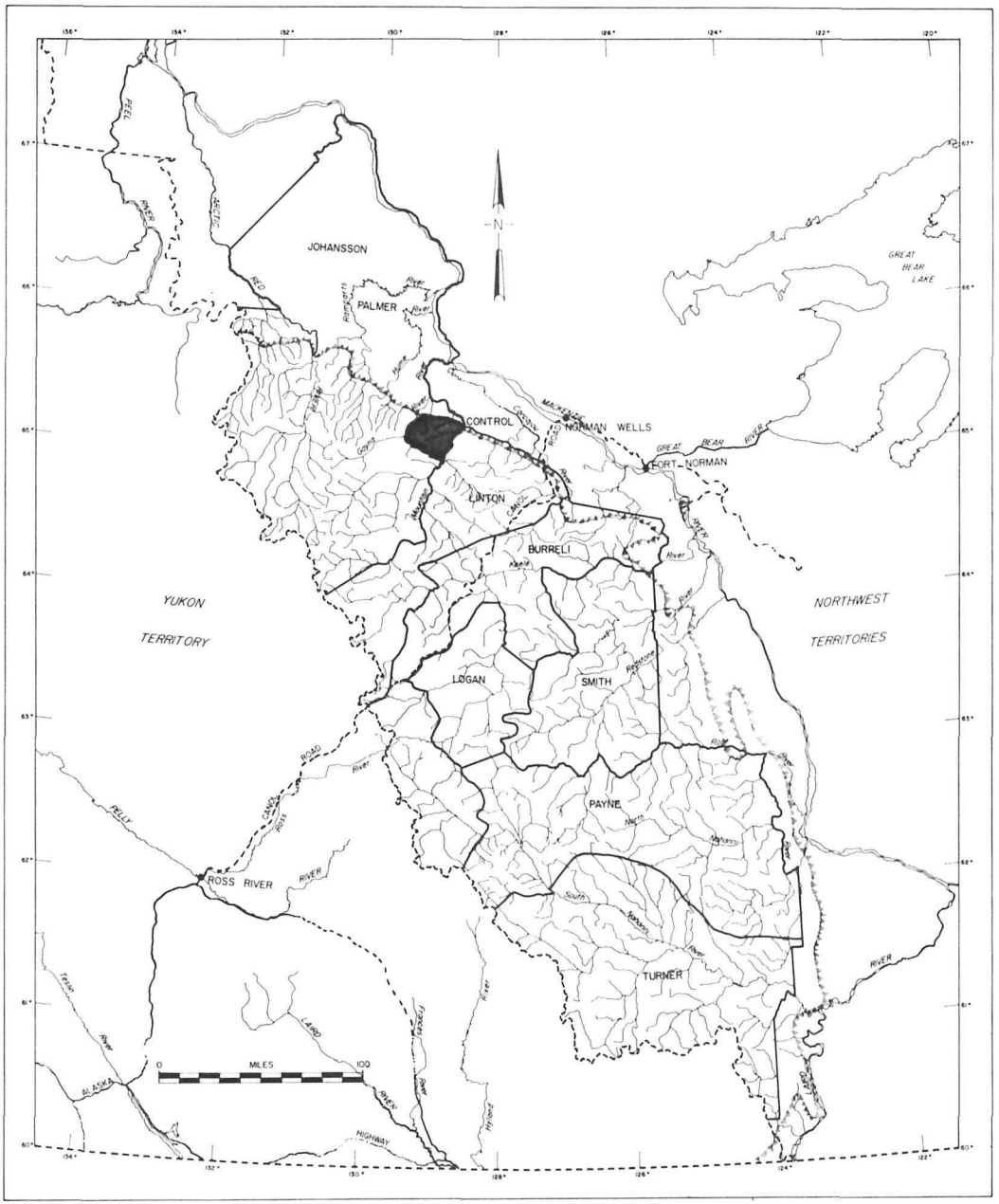
Game Management Zone 12 in the Mackenzie Mountains, N.W.T., was opened to non-resident hunting of big game in 1965 after a long period of light harvest by Indians and other residents of the Northwest Territories. The five to seven outfitters that have been operating in the over 44,300-square-mile area have used at most only 24 per cent of the Zone. They have been restricted in their operations primarily by the high cost of conducting business in a wilderness where transportation is a major problem. Hunting pressure by Indians continues to be light and is limited mainly to government-supported winter caribou hunts. Hunter success is highest on the most common big game species – Dall sheep, caribou, and moose.

In order to keep federal and territorial conservation agencies informed about the status of big game populations and about wildlife management problems, a Canadian Wildlife Service biologist was assigned in late 1966 to conduct big game research in the Mackenzie Mountains. Feasibility studies have since been made, and research on Dall sheep was started this spring. Simultaneously, information is being gathered from observations and reported hunter kill data on other big game species in the area – caribou, moose, mountain goat, grizzly bear, and wolf. A 400-square-mile control area was set aside in Zone 19, just north of Zone 12. This year, all of Zone 19 but the control area will be opened to non-resident hunting. In spite of the high cost of doing business in the Mackenzie Mountains, resource use will probably increase in the future, necessitating development of effective management programs.

Introduction to the east slope

The Mackenzie Mountains area, which lies east of the Yukon Territory border and west of the Mackenzie River in the Northwest Territories, is an almost entirely uninhabited wilderness. The area supports a lightly harvested big game resource that only recently has drawn the full attention of game managers and wildlife biologists. I am sure that most of you here are unfamiliar with this fascinating and valuable area. For this reason I would like to introduce you to the Mackenzie mountains region, its big game populations, and the recent steps toward wise management of its wildlife resource.

Ecological descriptions of the east slope of the Mackenzie Mountains have been published by Raup (1947. The botany of the southwestern Mackenzie. Lancaster, Penn.: Lancaster Press. 275 pp.) and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others. Raup remarked on several features of the east slope that are of particular interest to wildlife ecologists.

1. The upper slopes and peaks of the mountains are far above timberline, making possible the natural development of large areas of alpine tundra.
2. These summits and high slopes are isolated from their neighbours by low, spruce-covered plateaus and lowlands.
3. The rocks of the east slope are predominantly limestone, dolomite, and shale, contrasting with the profusion of quartzite, argillite, cherty rock, sandstone, and granite of the west slope. A greater instability of soil can be expected on the east slope due to the ease with which limestone and shale are broken up by frost action.
4. The west slope receives heavy precipitation which is drained by broad, gentler valleys, while the east slope receives comparatively light precipitation and the valleys are more like canyons.
5. The average frost-free season lasts only for 70 to 75 days.
6. The wettest period at the south end of the range is in July, but farther north it is in August (west of Norman Wells).
7. The annual precipitation is between 10 and 12 inches. Such low precipitation in a warmer climate would produce a desert, yet in the Mackenzie Mountains there seems to be no lack of moisture available to vegetation. Since much of this moisture is trapped as snow, ice and permafrost, the availability of moisture to vegetation depends greatly on summer temperatures high enough to release it.

Few zoologists have studied the fauna of the east slope, and there are only *two publications* available that list the mammalian occupants of even a sample area (Rand, A.L. 1945. Mammal investigations on the Canol Road, Yukon and Northwest Territories, 1944. Nat. Mus. Canada. Bull 99, p. 1-523; and Youngman, P.M. 1968. Notes on mammals of southeastern Yukon Territory and adjacent Mackenzie District. Nat. Mus. Canada Bull. 223, p. 70-86). Big game hunters who search the mountains in the Northwest Territories can reasonably expect to find Dall sheep (*Ovis dalli*), moose (*Alces alces*), and caribou (*Rangifer tarandus*). It would not be unusual if they also saw a few of the grizzly bear (*Ursus arctos*) and wolves (*Canis lupus*) that inhabit the entire range. Wolverine (*Gulo gulo*), prize trophies, can be found throughout the Mackenzies, but they are not usually seen by hunters. Lynx (*Felis canadensis*) may never be collected by trophy hunters, but they are occasionally trapped on the east slope. Mountain goats (*Oreamnos americanus*) are very thinly distributed in the south half of the range, mostly south of the 63rd parallel and west of 126° west latitude. Rarely occurring on the east slope except along the Nahanni and Flat River valleys and the foothills are black bear (*Ursus americanus*). A few have been shot at Tungsten, just east of the Yukon border. Mule deer (*Odocoileus hemionus*) have been seen in the Nahanni Butte area and near the mouth of the Flat River.

History of big game utilization

Up until the early 1900's, Indians hunted and trapped annually in the Mackenzie Mountains. They occasionally built cabins beside the major streams and stayed in the mountains a year or more at a time. They would travel along stream valleys with pack dogs in the summer and dogs and sleighs in the winter. Trips to villages in the Yukon and along the Mackenzie River at the end of long hunts were usually made in the early spring or between June and September in large boats made of raw moose skins.

The Indians often traveled in family units of ten or more people. During a hunt beginning in the late winter (February or March) and lasting until June, such a family might kill over 30 moose, their main source of meat. All caribou, Dall sheep, and moose seen would be hunted by the family and as many killed as possible. Meat was not wasted. Surplus meat was dried on racks over smoky fires in the spring.

In 1938, the Mackenzie Mountains Game Preserve, covering the mountains east of the Yukon Territory, was set aside for the purpose of protecting the hunting grounds of the Indians that were by then residing in villages along the Mackenzie River. However, hunting by Indians in the Mackenzie Mountains has since declined markedly. During the ten years between 1946 and 1956 only a few hunting trips were made deep into the mountains. Only two or three skin boats traveled the mountain rivers to the lowlands. The Indians from Fort Norman were the last to forsake the mountains and settle into the relatively secure life of their village.

The Indian Affairs Branch stimulated some of the Fort Norman Indians to hunt in the mountains by offering to fly their meat from the mountains to their settlement. These hunts occurred in the winter and lasted for about a month. The Indians usually confined their hunts to caribou in the Drum

(Wrigley) Lake — North Redstone River area. About 100 caribou would be taken during each hunt. The remainder of the game resource in the vast Game Preserve was left virtually unharvested.

Because the Game Preserve was not serving a useful purpose, the Northwest Territories Council abolished it in 1953. In 1956 and 1957, a reconnaissance of the east slope of the Mackenzie Mountains was conducted by members of the Territorial Game Management Service and the Canadian Wildlife Service to determine the relative abundance of big game species and to ascertain the availability of these species for normal sport hunting.

The surveyors recommended that big game sport hunting by residents and non-residents be permitted, and in the fall of 1965 five outfitters set up operations in Game Management Zone 12. In 1966, Zone 12, an arbitrarily defined management area extending approximately from the British Columbia border north to the Mountain River, was divided into seven individual outfitting areas (Fig.1). The outfitter areas were established mainly to distribute hunting pressure evenly over the Management Zone.

Current utilization of big game in Game Management Zone 12.

Even with government support, utilization of big game by Indians in the Mackenzie mountains continues to be slight. Table 1 summarizes the reported harvest of Dall sheep and caribou by Indians and a very few non-Indian General Hunting License holders in the Zone 12 area in 1964-65 and in 1965-66. In the villages listed reside nearly all the Indians that still hunt in the Mackenzie Mountains. Fort Norman had 61 men old enough to hunt (between 15 and 64 years of age) in 1967; Nahanni Butte had 21; and Fort Liard had 42 of hunting age. However, only a very small percentage of the hunters journey into the mountains. Of the 61 men between 15 and 64 years of age in Fort Norman, only about a third of them have hunted in the mountains since 1964, and perhaps as few as ten of them regularly participate in the government-supported or unfinanced hunts.

This past March I accompanied 13 Fort Norman Indians on a caribou hunt in the North Redstone River valley west of Drum Lake. They killed 86 caribou or about 10 per cent of the 825 caribou seen in the hunt area. They also killed five Dall ewes. Most of the caribou killed were pregnant females. Only a very few, if any, of the Fort Norman Indians will hunt again this year in the mountains. Even these few will probably not venture more than 50 miles into the mountains in search of game.

Compared with hunting pressure in the Yukon and the provinces, pressure exerted on big game in Zone 12 by non-resident hunters is light. Zone 12 occupies well over 44,300 square miles of mountainous terrain. At most, the area hunted in 1966 and 1967 by both Indians and non-Indians covered only 24 per cent of Zone 12. Nearly 70 per cent of the hunted area was concentrated in the northern half of Zone 12 along the abandoned Canol Road and the Keele River valley where powerful boats, horses, and small aircraft on oversized wheels help solve the critical transportation problem. The Canol Road, constructed during World War II, is badly washed out in Zone 12 and is practically impassable to wheeled vehicles.

Table 1

Estimated harvest of Dall sheep and caribou in Zone 12 by General Hunting License holders, 1964-65 and 1965-66. (Data courtesy of N. W. T. Game Management Service.)

Village of residence	Dall Sheep		Caribou	
	1964-65	1965-66	1964-65	1965-66
Fort Norman	11	3	216	143
Nahanni Butte	1	1	8	0
Fort Liard	0	0	19	0
Totals	12	4	243	143

As can be expected, hunter kills have been concentrated near lakes and navigable streams where aircraft and boats can be used to transport hunters and their trophies. The areas hunted reflect not only game density and the presence of navigable rivers and lakes, but also the ability of the hunter or outfitter to acquire the expensive specialized equipment mentioned above for transportation. To some extent, the size of the areas hunted is an indication of the number of hunters the outfitters can support.

Regulations permit hunters to take one of each of the big game species in Zone 12. Outfitters may further restrict the collection of trophies by hunters who do not elect to stay with them for a specified period.

Table 2 is a summary of the animals reported killed by 114 hunters in Zone 12 during the fall season of 1967, as well as a summary of hunter success ratios by species. In addition to the species listed in Table 2, ten wolves, three wolverine, and one black bear were reported killed. The black bear was from the South Nahanni River valley.

Table 2
Estimated big game hunter success in Zone 12, Mackenzie Mountains, N. W. T. August 1-October 15, 1967, season

Species	No. reported killed by 114 hunters	Percent success	Success range between outfitter areas*, per cent
Dall sheep	85	74	43-93
Caribou	59	52	21-70
Mountain goat	5	4	0-36
Moose	37	32	13-43
Grizzly bear	23	20	13-42

*Only six outfitters are considered here. The seventh had only seven hunters. Only one of those hunters reported his kill, and he killed only one caribou.

Most hunters in Zone 12 were primarily after Dall sheep trophies, and since sheep were relatively easy to find, success was high. Most, if not all, outfitters encouraged their hunters to take only "full curl" rams, and most of the trophies I examined bore horns that completed or approached a 360° circle. Grizzly were perhaps the next most sought-after trophy, but they were hard to find. Mountain goats inhabit only a small portion of Zone 12 and in low numbers. Only the hunters in the southernmost outfitter area collected goats. Moose and caribou were considered incidental trophies by most hunters, though moose were plentiful and caribou easy to locate in all but one or two outfitter areas.

Research and management on the east slope

In the foregoing discussion there are hints of several management problems that may exist in Zone 12: uneven distribution of hunting pressure due partly to transportation difficulties in this wilderness and the solvency of the individual outfitter; the insignificant harvest of the large moose population; and the pressure of hunters on mountain goats and grizzly bears, two species whose populations may not withstand such pressure for many years. It became my job in late 1966 to keep my fingers on the pulse of the game populations in the Mackenzie Mountains; to recognize and examine such problem areas, and to refer my findings to the Territorial Game Management Service for whatever action they deemed necessary.

We accepted the Game Management Service's suggestion that the Canadian Wildlife Service concentrate on the population fluctuations and movements of Dall sheep, a prime trophy species of which little is known. I spent the fall of 1966 and the summer and fall of 1967 trying to gather background material on which I could base research plans. This spring my project began in earnest with the first of a planned series of intensive aerial surveys of Dall habitat and an effort to capture and mark a few sheep. During the coming years I plan to spend most of my time trying to determine the density and distribution of Dall in the Mackenzie Mountains and evaluate man's influence on the sheep and their habitat.

Though our concentration is presently on Dall sheep, attention is also given the other species of big game. The spring caribou hunt by Indians from Fort Norman presented us with an exceptional opportunity to obtain a large sample from a group of caribou, and to age, sex, measure, and autopsy these animals. With the help of five Indians and the Assistant Superintendent of Game, I was able to obtain such information from 64 per cent of the caribou killed on the hunt.

During the 1967 fall hunting season, 75 per cent of the hunters turned in hunter report forms and specimens. The data on the forms and the specimens (jaws, teeth, femurs) gave us valuable information about the age classes, sizes, and health of the animals killed. This fall I hope to spend time with each outfitter and increase the report form return.

The future

I see no reason to expect a significant increase in the number of Indians hunting in the mountains; the number may even decline further. Fort Norman will probably continue to field most of the native mountain hunters in the area south of the 67th parallel.

Outfitting in the Mackenzie Mountains is a costly business. Initial expenditures for equipment to feed, shelter, and transport clients who have spent large sums to hunt in the Mackenzie Mountains are necessarily large. Initial returns are comparatively low. Expensive advertisements are necessary to attract clientele. For these and other reasons outfitters may get discouraged and quit, or they may handle only a few customers each year (a range of 7 to 54 hunting customers per outfitter in 1967). In spite of

such setbacks in this new industry, continent-wide demands for new outdoor recreation areas are rapidly increasing, and I expect more and more people will come to the Mackenzie Mountains to hunt. With an increase in hunters, management policy will have to change from a slightly restrictive one to one of more rigidly controlled harvests.

To keep pace with the increasing demand for big game hunting areas, the rest of the Mackenzie Mountains might eventually be opened to non-resident sport hunting. This fall, Zone 19, which contains well over 9,300 square miles of mountainous terrain, will be opened to non-resident hunters. Two outfitters will divide the area between them. (At our request, a 500-square-mile portion of this zone has been temporarily set aside by the Game Management Service as a "control" area in which no hunting is permitted.) Only Zone 22, containing the Richardson Mountains, remains closed to non-resident hunting.

The dangerous print of pollution has already been stamped in a ruggedly beautiful valley on our east slope, and more pollution may come if mining activity increases. The scar of the Canol Road is still relatively fresh, and long, wide strips of timber have been bulldozed into the eastern foothills by oil exploration crews. Helicopter and fixed-wing aircraft owned or leased by oil companies are active in the area all summer long. This activity may increase and must be watched closely by conservationists. The planned 350-mile Dempster Highway will cross the mountains from east of Dawson, Yukon Territory, to Fort McPherson, N.W.T.. Another highway may be constructed to connect Norman Wells with the road system in the Yukon. These roads will facilitate access to the east slope of the Mackenzie Mountains and will permit an increase in the utilization of the resources it has to offer.

Grizzly bears in the Yukon Territory

Dr. A.M. Pearson

The Canadian Wildlife Service is responsible for advising the Government of the Yukon Territory on game matters. Because big game in the Yukon is largely utilized through sport hunting, the Service became concerned about the impact of hunting on the grizzly bear. Little was known about the ecology of this large carnivore, particularly in its northern environment, and studies were begun in 1964 on this animal.

The main objective of the study was to determine at what population density grizzly bear occurred under non-hunted conditions and what factors controlled that density. The grizzly under consideration could be classed the northern interior or mountain race. Work was already underway by other agencies on the southern mountain (Yellowstone Park) and coastal (Kodiak Island-Alaska Peninsula) types of grizzly.

A study area was established in the Kluane Game Sanctuary in southwestern Yukon Territory. The area was remote, interior in climate and vegetation, did not support salmon runs, and, as a Game Sanctuary, the grizzlies were not hunted.

A program of live capture and tagging was begun in 1965 in the study area, and has continued to the present. Each bear captured was weighed, measured, and all additional biological information recorded. It was then tagged to enable future identification and correlation of observations with a particular animal.

A second program was set up to utilize information obtainable from grizzlies harvested each year by hunters throughout the Territory. For two hunting seasons skulls were solicited from hunters and guides. At the same time several one-man crews accompanied selected hunting parties in order to be available should a grizzly be killed. Information regarding condition, parasitism and disease, and food habits was obtained as well as valuable information on the attitudes and opinions of hunters and guides towards grizzlies and the hunting of them.

In 1968 a regulation was made by the Commissioner of the Yukon Territory whereby the skulls of all grizzlies killed in the Territory must be turned in for inspection and marking. An evaluation of complete harvest statistics over a two-year period will at least provide a basic life table against which future information can be interpreted.

The study area in the Kluane Game Sanctuary is centered around the conflux of the Kaskawulsh and Dezadeash Rivers. No definite limits were given to the area since it was not known—and still is not—what

range an individual might inhabit. Trapping was limited to a 14-mile trail through the valley. Observations were made wherever grizzlies might be seen within a 30-mile radius of the camp.

The valley bottoms in the area are at about the 1,800-foot elevation. Mountain peaks extend to 7,600 feet and are unglaciated above about the 4,000-foot level. Numerous mountain creeks drain into the major river system, cutting steep-walled canyons in the mountains.

Four biotic types are recognizable in the area. Grizzly activity occurs in all at various times of the year.

a) Gravel flood plains

These areas, in their virgin state, are pure gravel and mud cut by the river channels. Vegetation is constantly invading the less active, fringe area. Several grasses, pea vine (*Hedysarum alpinum*), raspberries (*Rubus* sp.), gooseberries (*Ribes* sp.), bearberry (*Arctostaphylos uva-ursi*), and most important for grizzlies, soapberry (*Shepherdia canadensis*) occur among the invading herbaceous species. Tree cover is spotty and dominated by willow (*Salix* sp.). A few balsam poplar (*Populus Balsamifera*) and white spruce (*Picea glauca*) occur.

b) Spruce forest

This zone begins where the slopes of the mountain meet the valley flats and extends upwards to the 3,000- to 4,000-foot level. There is usually a wide intergradation zone between a) and b) somewhat similar to parkland areas. The forest area is composed mainly of white spruce with some stands of willow, balsam poplar, and white poplar (*Populus tremuloides*). Dense thickets of alder (*Alnus* sp.) are found in the moist spots. Grass alone is found on the steeper slopes.

c) Sub-alpine willow

The 4,000- to 6,000-foot levels are dominated by dense stands of dwarf willows and birch (*Betula glandulosa*). A typically alpine flora is found in the moist areas on the plateaus. More herbaceous species occur at the upper limits of the zone.

d) Rock and snow

Very little vegetation is found above the 6,000-foot level, although some lichen communities occur. Very precipitous rock outcroppings and slide areas occur along with many permanently covered by snow.

Results

To the end of 1967, 27 grizzly bears and 21 black bears were captured. Many of those animals were recaptured while others were subsequently observed free-roaming but not captured.

The sex ratio of the catch was approximately 2:1 males:females for both species. It is suspected that males wander more extensively and are thus more susceptible to trapping.

There are no old female grizzlies in the sample. Under 15 years of age the sex ratio of the catch is about even. No females over 15 years of age were captured. To determine age of bears caught in 1967, we removed a premolar tooth and counted the annuli in the cementum. Ages of bears taken in 1965 and 1966 were calculated from the formulae:

$$\log X = 4.503 \log Y - 9.355 \text{ for males}$$

$$\log X = 5.754 \log Y - 11.970 \text{ for females}$$

where X = age in years

Y = zygomatic breadth in millimeters

In 1967 no cubs or yearlings were seen on the study area. However, three adult female grizzlies tagged in 1965 and 1966 were not located in 1967 and they could well have moved or changed their movement pattern with the presence of young.

Reproduction seems to be low in the area. Over the duration of the study two females with two young each have been seen and five have been recorded with single young. This average litter size is well below the 2.21 from Yellowstone National Park, 2.2 from Glacier National Park, 2.36 from Kodiak National Wildlife Regfuge, and 2.07 from the Alaska Peninsula. No sighting of a grizzly with three cubs has been recorded from the Yukon Territory.

It was found that young stay with the female until 2-1/2 years of age. This means a minimum of 3 years between litters.

It is not known when females reach sexual maturity, although two 5-year-olds had not produced any young.

If all these preliminary vital statistics prove correct, a female grizzly would produce about four young during its lifetime of 14 years.

In southwestern Yukon grizzlies begin to emerge from winter sleep in mid-April. Numbers increase until early may when all are active. During the emergence period and until the end of May, grizzlies feed on roots of pea vine, catkins of willows, and berries of bearberry and crowberry (*Empetrum nigrum*). The animals are found above timber in the sub-alpine zone or on the vegetated alluvial river flats.

From June to mid-July the females in oestrous and the males travel mainly in the timbered regions.

They feed on grass and horsetail (*Equisetum* sp.) and are seldom seen. Tracks are found on roads through timber and occasionally traps in or next to heavy timber are visited.

In mid-July the berries of soapberry begin to ripen and grizzlies occur along the more open areas in the timber and on the edges of the river flats where soapberry thrives. Berries remain the major food item through the end of August. Grass is still eaten. If the soapberry crop is poor, grizzlies remain in the timber eating mainly grass until September, when they concentrate on the vegetated alluvial islands along the rivers. Pea vine occurs in abundance on those islands, and some areas of several hundred feet square have been greatly disturbed by the digging of bears.

Even if berries are plentiful some grizzlies appear on the flats every September, but many seem to find better food at higher altitudes. This pattern continues to mid-October when grizzlies enter their winter sleep.

Sows with cubs do not seem to follow the same pattern. In June they can be found high in the mountains and often are located in the rock and snow area. They stay in the more isolated areas until it is time to den.

All the den sites located thus far have been in the sub-alpine zone. The den is an excavation. The opening may face in any direction, but southerly exposures seemed to be favoured. Heavy willow cover always surrounded the opening. An area with a slope of 40° or greater was always chosen. The dens have all been simple circular excavations 150-200 cm. deep, about 140 cm. wide and 90 cm. high. A slight depression occurred in the centre and this bed was lined with willow twigs chewed to 6-inch lengths.

The harsh dietary regime plus the short active season combine to produce relatively small although no less agressive grizzlies. Adult males peak in weight at 450-500 lbs. One weighed 360 lbs. in July and 480 lbs. late in the season. The largest female weighed 270 lbs. but mature animals weighing 170 lbs. have also been handled.

In 1967 big game outfitters in the Yukon were questioned regarding observations of grizzlies during their hunts. Travels of the parties were drawn on 1:250,000 maps of the area. Observations were recorded. It was assumed that, on the average, a hunting party surveyed an area one-half mile on each side of the path of travel. Total areas surveyed were measured and the density of grizzlies calculated.

Eight outfitters reported sighting 91 grizzlies over an area of 4,018 square miles. The average density was one grizzly per 44 square miles. This should be considered a minimum figure.

Two tagged grizzlies were killed by hunters outside the Game Sanctuary. One had moved 19 miles in 45 days and the other 36 miles in 120 days. Both were adult males. Two other tagged males were recovered on the study area. Both had been killed by other grizzly bears. One was an immature bear weighing about 160 lbs.; the other was an old bear weighing 250 lbs. Prime males weigh about 450 lbs.

Earlier in 1968 a program of capturing grizzlies with the use of a helicopter was begun. Eight grizzlies were successfully handled. Additionally, several tagged grizzlies were observed but not captured. One sow that had a litter in 1965 was seen with two cubs again this year.

Animals were herded onto flat, open areas and approached by helicopter from the rear. A powder charge projectile filled with Sernylan (phencyclidine hydrochloride) was fired from an extra long range Cap-chur rifle into the animal. The drug took about 15 minutes to react. During this time it was often necessary to herd the animal with the helicopter to ensure that it was in an accessible place when it succumbed.

Transmitters were placed on two grizzlies so movements could be traced more efficiently. The transmitter was attached around the neck of the grizzly. Frequencies were in the 40.680 megacycle range with a constant pulsed beat of 3 to 5 beats/second. Monitoring from an aircraft produced a maximum range of five miles although various factors seemed to affect reception. Both the instrumented grizzlies were located after they had fully recovered from the drug. One moved about six miles in three days staying mainly in the timber. The other moved one mile in two days. Neither bear would have been located except by radio-tracking. This program will continue and be expanded through 1968 and 1969.

The study is scheduled to end after the 1969 season, at which time management proposals will be made to ensure the maintenance of the grizzly as a part of our wildlife heritage.

Wildlife damage legislation in Alberta

by S.B. Smith
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Each year in Alberta a number of persons engaged in agriculture suffer crop losses to big game animals and game birds. Losses or damage caused by big game animals generally involve elk, and to a lesser extent, moose and mule or whitetail deer which may feed on stack hay or grain. Losses caused by game birds almost invariably involve waterfowl, and may be caused by geese (although this is of a minor nature) and ducks (almost always mallards and pintails). Waterfowl feed on swathed or stooked cereal grain crops and can do enormous damage under certain conditions.

Interested hunters in the Alberta Fish and Game Association requested the Government to provide relief for crop damage by setting up a crop damage insurance plan, to be financed partially by premium (to offset administrative costs) and largely by direct contributions by hunters (to pay the major portions of damage claims). As a consequence, The Wildlife Crop Damage Insurance Act was passed in 1961. This act specified that the Alberta Hail Insurance Board, in agreement with the Minister of Lands and Forests, would administer the investigation and payment of claims and would sell policies and collect premiums. At the end of each crop year, the Board is required to submit a statement of claim to the Minister, who then reimburses the Board for all money expended in carrying out the program.

The crop protection insurance premium was discontinued shortly after inception of the program. Instead, authority was provided under the Game Act of Alberta for establishment of a Wildlife Damage Fund. The Fund receives money from the sale of Wildlife Certificates, which in effect are general hunting permits, which are required before hunters may obtain licences to hunt the various species. Section 125 (a) of the Game Act of Alberta specifies that the Minister of Lands and Forests (a) shall pay the Wildlife Certificate fees into the Wildlife Damage Fund, (b) may make payments from the Fund for crop damage or (c) for "other purposes which may be approved by the Lieutenant Governor in Council". Point (c) is important, and I will return to it later.

Having now explained the background to establishment of the Wildlife Damage Fund and its fiscal support, I would like to deal briefly with the authority under which the Fund actually operates. This authority, simply stated under Section 126 (w) of the Game Act of Alberta, is that the Lieutenant Governor in Council may make regulations providing "for the operation of the wildlife damage fund". Under this authority the Wildlife Damage Fund Regulations have been passed by Order-in-Council, and now provide the mechanisms for administration of the Fund previously residing in the Wildlife Crop Damage Insurance Act, which, while it has not been repealed, is inoperative as far as the Wildlife Damage Fund is concerned.

When the damage claims for Alberta are plotted, an obvious similarity exists in the distribution of claims from year to year. Not only is crop damage obviously oriented to certain geographical areas, but more intimate knowledge of the situation reveals that the birds involved often are using a particular body of water, from which they fly to the grain fields. When damage permits are issued to farmers, waterfowl are killed or driven off a field to an adjacent area. It would appear that the desired result of minimizing crop depredation is unlikely to be achieved if birds are widely dispersed by being frightened off an area where they have chosen to feed.

Crop damage probably is related also to opening dates for the hunting of waterfowl. As a general rule, it would appear that provincial authorities including those in Alberta have tended to request the earliest possible opening dates for waterfowl seasons. It is of considerable importance to open the season early to provide as much waterfowl hunting as possible before the water freezes over. In addition, it is probable that consideration of opening dates is influenced by the desire to keep the issuance of damage permits to a maximum. Early open seasons may minimize the number of damage permits issued, but there is no evidence that damage to crops is reduced. Indeed, as mentioned earlier, close examination of feeding patterns of ducks might lead to the opposite conclusion.

The initiation of the crop damage compensation program in Alberta was a direct result of representation to the provincial government by the Alberta Fish and Game Association. Hunters felt that if they provided the funds for crop damage payments, the relationship between landowners and hunters would be improved, and that better access would be obtained to the private lands on which most of the waterfowl are killed. It is likely that relations between hunters and landowners have improved, although this aspect is difficult to assess.

However, no information on the behaviour of ducks or the distribution of actual damage to crops

has been used to determine whether the program might be improved. At the present time, compensation payments to farmers fluctuate according to weather and harvest completion dates, which largely determine extent of damage. Since the program was initiated in 1961, total payments have ranged from as low as $43,000 to more than $300,000 in a single season. Table I summarizes the payments made from 1961 to 1967.

Table 1

Crop damage claims, payments and acres damaged in Alberta, 1961-1967.

Year	Number of claims	Amount paid, $	Acres damaged
1961	2	140.00	28
1962	10	1,458.00	177
1963	22	5,448.00	604
1964	743	321,841.00	33,119
1965	531	207,752.00	21,188
1966	477	158,130.00	15,800
1967	99	28,222.00	73,306
Totals	1,884	$722,991.00	73,306

Observations of ducks feeding on grain suggest that crop size (number of bushels per acre), rate of damage by waterfowl, size of field, rate of consumption by waterfowl, average size of flocks, and other factors could be used to predict damage, as well as to compare the total effect of shot or unshot flocks of birds. Most people working with waterfowl are familiar, in principle at least, with lure crop programs, in which feeding ducks are protected from shooting in an attempt to restrict them to relatively small areas. Theoretically, even large flocks of ducks would find it impossible to consume all the grain on a field of the size commonly farmed (say 50 acres), even if they ingested grain at the maximum rate over a very long period of time. The following example illustrates the point: a field of 50 acres of barley has an average crop of 30 bushels to the acre, or 1,500 bushels total crop. Barley weighs 48 pounds to the bushel, so that 72,000 pounds of grain are available. Assuming that a duck eats a maximum of 8 ounces of grain daily, 144,000 duck feeding days are possible on the field. Assuming also that an average flock size is 500 birds, it would take 288 days for the birds to consume all the available grain. Obviously, birds would have migrated long before they could have consumed the available grain, even if they fed at their maximum rate of consumption.

Consider also the hypothetical case illustrated in Figure 1, which approximates the rate of damage caused by waterfowl feeding on swathed grain, irrespective of rate of consumption. It is generally conceded by experienced observers that ducks will trample or foul far more grain than they will eat when they first descend on a swathed field. If the approximation in Figure 1 is valid, it can easily be seen that little is to be gained by driving ducks from a field of swathed grain if they have been present even for a comparatively short time. Further, the likelihood of causing extensive damage in adjacent fields probably is higher, and in direct proportion to the number of times a flock is forced to move.

If early opening dates, damage shooting permits, and scare programs are used to keep waterfowl mobile, one can guess that damage is likely to be greater than if the birds were left alone to feed on fields of their choice. The individual who owns the grain which is eaten by ducks must, of course, be compensated for his direct loss which reduces damage in adjacent areas. The landowner whose property provides such so-called "lure crops" must be paid enough to provide him with income equal to or greater than what he would have received if he had been able to harvest an undamaged crop. The effectiveness of a lure crop program can be judged in two ways: (1) by the total damage caused and by total cost of compensation; and (2) by the reduction in the number of unhappy farmers, regardless of loss. The first criterion is relatively easy to assess by adding up the books; the second can be judged only by indirect methods of assessment, such as the number of complaints received, or perhaps by the improved relationship between the landowner and the hunting public.

In Alberta, it is by no means certain that money from the Wildlife Damage Fund is being disbursed in the most effective manner; it is equally uncertain that the rate of unhappiness of farmers has been reduced to an acceptable level. It is unlikely that unhappiness resulting from waterfowl crop damage will ever be eliminated, or that direct compensation for damage will be eliminated. At the present time a detailed analysis of crop damage and the compensation program is required in order to determine more accurate prediction of losses, with attendant costs, under a wide variety of conditions, from early harvests and low waterfowl populations, to late harvests and high populations. The first phase of such a study in Alberta will be available to this Conference in 1969. When the Alberta Game Act,

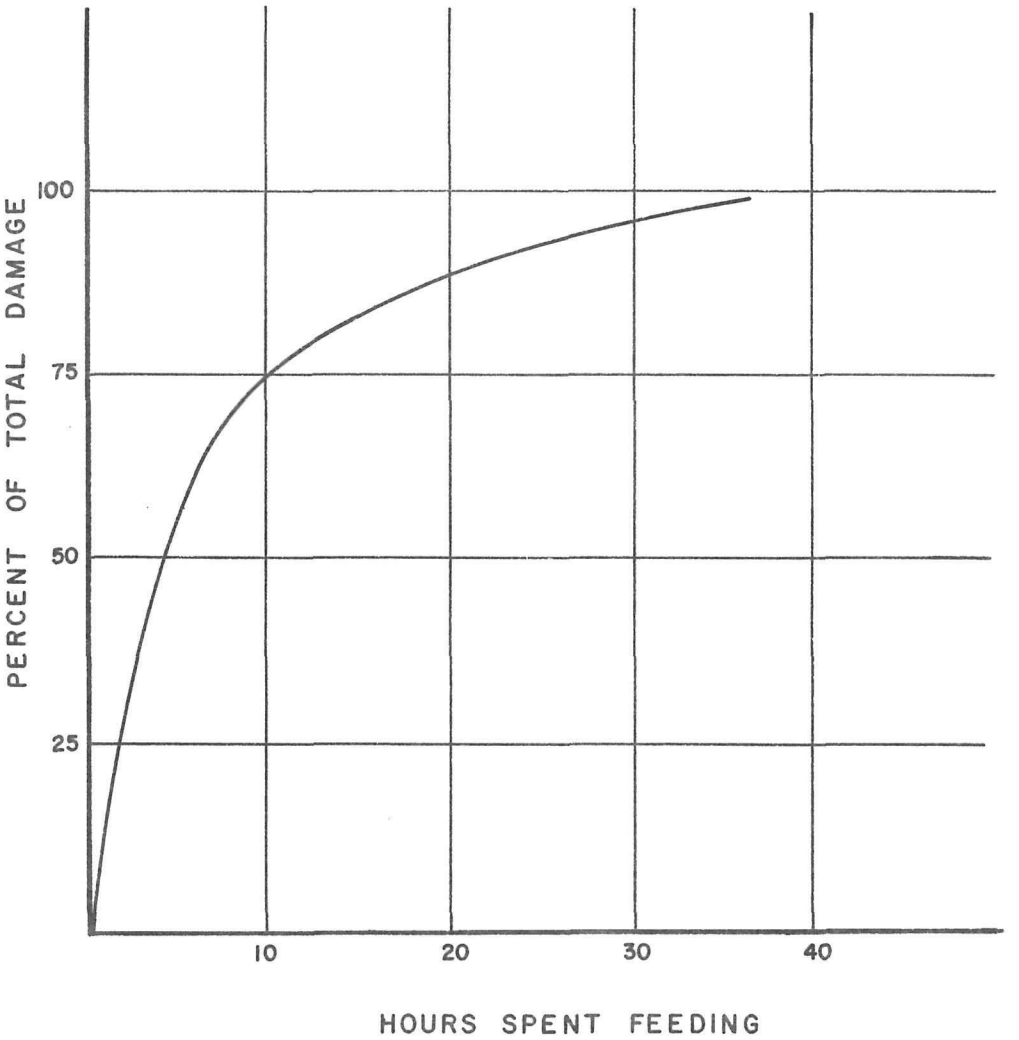

FIGURE 1. HYPOTHETICAL RELATIONSHIP BETWEEN TIME DUCKS SPEND FEEDING AND PERCENTAGE OF CROP DAMAGED.

Sec. 125 (a), was mentioned earlier, it was pointed out that enough flexibility resided in the Act to allow the Minister of Lands and Forests to make payments not only for specified damage claims, but also for "other purposes". Again, for any province considering a compensation program, it is suggested that legislation be very broad, until specific research information is available, upon which programs can be developed.

A survey of wildlife damage in the Prairie Provinces (Stephen, 1965) suggests that frequency of duck damage is greatest in Alberta, and that it is greater in the Edmonton area than in other parts of Alberta. Factors such as the occurence of ponds in relation to field crops, frequency of rainfall during the harvest season, behaviour and distribution of ducks, and a variety of other factors could influence occurrence of damage. At the present time, none of these factors has been examined in sufficient depth that its importance to the complete damage picture can be assessed.

Alberta has relatively complete statistics on crop damage by waterfowl up to 1966. From and including 1967, statistics are more detailed and will be of more value. It is apparent that a research program of considerable scope is required before any but the broadest generalizations or speculations can be made concerning damage by waterfowl or the relationship of damage to waterfowl hunting recreation. All that can be said at present is that (a) damage is of very serious concern to (individual) farmers, and (b) a costly program is in operation without any logical basis other than the commendable wish to provide relief to those in distress.

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The Canada Migratory Game Bird Hunting Permit and Related Surveys

D.A. Benson

Head, Biometrics Section

Introduction

In 1966, for the first time in Canada, purchase and possession of a federal permit was required of persons hunting migratory birds for sport.

This paper presents the background and describes the development of the permit system. A brief outline is given of plans now being implemented for the initiation of mail questionnaire surveys to sample the universe provided by records of sale of the Canada migratory game bird hunting permit. A summary of results of the first two years of operation of the permit system and the first year of operation of a migratory game bird harvest survey is given in Canadian Wildlife Service Progress Notes No. 2 (1967), No. 4 (1968), and No. 5 (1968).

For many years, one of the major needs of continental waterfowl management has been for management data for Canada comparable to those obtained annually for the United States through the "duck stamp".

In addition to the needs of the provinces and of Canada as a whole for management information, it is hoped and intended that the permit system and surveys to be based on it will contribute substantially to the continental pool of data required for the management of a continental resource.

The internal needs of Canada and the United States differ, as do the legal, financial, administrative, and sociological environments within which they operate. The Canadian Wildlife Service has followed a general policy of designing the system to produce data for Canada comparable to those now available from the duck stamp for the United States. The Service has not restricted the system to provision of those data, now has it been considered necessary, or indeed possible, to seek absolute uniformity of methods.

Historical and Legal Background

Constitutionally, Canadian wild creatures belong to, and are managed by, the province in which they are found. Section 132 of the British North America Act, however, provides that the Federal Government has all powers required to carry out the terms of a treaty with a foreign country.

Migratory birds, therefore, continue to be provincial property, but the responsibility for their protection and management under the terms of the Migratory Birds Convention between Canada and the United States rests primarily with the Federal Government. In practice, federal and provincial governments work in harmonious co-operation in all

matters concerning migratory birds. The evolution of the permit system is an excellent example of that co-operation in action.

Initiation of a federal waterfowl survey has been discussed at many annual Federal-Provincial Wildlife Conferences. Further discussions have been held during more recent years with the provinces and with Federal Government and private agencies including the Federal-Provincial Premiers Conference, the Canadian Council of Resource Ministers, and the Canadian Wildlife Federation. The outcome of those discussions was a decision to issue a federal permit in the fall of 1966.

Existing legislation consisting of the Migratory Birds Convention Act, the Migratory Birds Regulations, and the Department of Northern Affairs and National Resources Act provided the necessary legal support.

The permit system is only one small part of the interlocking activities of the Canadian Wildlife Service. The larger concept was formalized in a statement by the Honourable Arthur Laing, Minister of the then Department of Northern Affairs and National Resources* in the House of Commons on April 6, 1966, entitled "Canada's National Wildlife Policy and Program".

In that statement, under general policy relating to migratory birds, paragraph 4 reads as follows:

> "Because migratory birds move back and forth across the continent, *inter-governmental and international consultation co-ordination and co-operation in research and management will be continued and expanded.*" (Italics in the original).

Under the heading "Research Related to Populations", paragraph 3 reads as follows:

> "*The use of waterfowl by hunters should be measured so that there can be an annual balancing of population gains and losses.* This can be done most effectively by a national kill survey that will be carried out by mail questionnaires directed to a sample of persons hunting waterfowl. The statistical universe from which the sample will be selected will be provided by a list of names and addresses of hunters purchasing the Canada migratory game bird hunting permit, although it will be issued free of charge to Indians and Eskimos. This survey and associated inquiries will also yield information on the species of birds hunted, as well as when and where they are hunted. That sort of information will permit an evaluation of the effects of changes in regulation that have not previously been possible." (Italics in the Original).

The balance of this paper describes the development to date of the permit system and the surveys to be based upon it.

Organization and administration

The Biometrics Section was developed around a nucleus of personnel whose responsibility had previously been the provision of advisory services in biometrics to field researchers. The new section will continue and expand that function and will design and operate the permit system and mail questionnaire surveys. Since the section is the major user of electronic data processing equipment in the Service, it will become the natural reservoir of knowledge and experience in that field.

General guidelines for the development of the section have been:

1. The section shall be an agency oriented toward the provision of services to the rest of the Branch. It will be responsible to no single user. The section head will be administratively responsible to the Director.
2. The section shall operate the permit system and mail questionnaire surveys.
3. The section shall provide statistical designs and will arrange for analyses of data as required.
4. The section shall not carry out activities that can be performed more efficiently by other agencies.

The permit system

The permit is printed on postcard stock as a single form, separable by perforations into three parts. It is provided to the vendor as a single form and is separated at the time of sale.

The permit itself is a wallet-sized card bearing a serial number and a space for the signature of the permittee which is required to validate the permit. Space is provided for the name and address of the hunter and the number of his provincial licence if one is required.

*Bill C-174 passed by the House of Commons on June 6, 1966, created a new Department, the Department of Indian Affairs and Northern Development. With the addition of increased responsibility for Indian Affairs, and reduced responsibility for some other activities, the new Department is the successor to the old. The Canadian Wildlife Service retains its existing name. It has, however, been raised to the status of a Branch (by action unrelated to the Departmental re-organization).

A part of the form is used for a message to the hunter.

The remainder of the form consists of a prepaid postcard addressed to the Director of the Canadian Wildlife Service in Ottawa. The reverse of the postcard is the sales record which is the heart of the entire system. The permit forms are individual, rather than in books, to ensure the return of each sales record immediately upon the sale of each permit.

The sales record bears a preprinted number matching that on the permit proper and the vending postmaster fills in the following information:

1) Vending post office number.
2) Date of sale.
3) Province of issue.
4) Age and sex of permittee.
5) Name and address of permittee.
6) Whether or not the permittee is a Canadian resident.
7) Whether or not the permittee purchased a permit during the preceding year. (This question was asked for the first time in 1967, which was the second year of sale of the permit).

The Canada Post Office, as vendor, accepts large blocks of permits at major depots across Canada and controls the operation from that point to the return of sales records.

The development of distribution lists was a major job for the first year of operation. The Post Office Department supplied a record of all post offices in Canada, classified in various ways, in the form of punched cards and machine listings. The Wildlife Service created a magnetic tape record of post offices.

The game agencies of all ten provinces co-operated generously by providing detailed records of the number and location of sales of those provincial game licences required for the hunting of migratory game birds. The Wildlife Service then allocated an appropriate number of permits to post offices on the basis of geographical proximity to provincial vendors. All vending post offices were assigned a minimum of ten permits. Safety factors were added, and large reserves allocated to post office depots. The known information was used by a computer program employing a tape of proportional allocation to assign quotas to post offices which had not been individually assigned a known number of permits. The computer then produced distribution lists prepared by the district served by each post office depot.

The distribution lists of the first year have since been replaced by actual records of sales kept by the Post Office Department.

Distribution lists for 1966-67 covered the ten provinces and included only permits that would be sold. The Yukon and Northwest Territories were not included and free distribution to Indians and Eskimos has not been achieved. However, those parts of the program will be implemented as soon as the legal and administrative mechanics of distribution can be established.

The permit went on sale August, 1966. The first season opened on September 1. By the end of November the greater part of the sales records had been received in Ottawa.

It is essential that sales records be returned as soon as possible after the date of sale. About 400,000 individual records must be processed. The speed and efficiency of the Post Office Department makes it possible to handle the workload which must be scheduled to complete all manual processing before the end of January.

We assumed most sales would occur before the end of January of the year following the year of issue. That assumption has proved essentially correct.

Sales records were scrutinized by Wildlife Service staff and the data transferred to punch cards. The data were then placed on magnetic tape and various reports produced from the tape in the form of table listings. We entitled that tape the "Permittee tape".

The entire operation is dependent upon electronic data processing equipment. Several computers were used in the early stages of the project. We are now concentrating on the use of an I.B.M. 360/65 operated by the Central Data Processing Service Bureau, which is a governmental service agency.

The Bureau originally supplied computer programmers. However, provision of programs and computer systems assistance has now become a function of the Computer Systems Information Division of the Department of Indian Affairs and Northern Development.

Over-all co-ordination is maintained by personnel of the Biometrics Section of the Wildlife Service which contains the subject-oriented specialists.

The harvest survey

Introduction

The Harvest Survey is a mail questionnaire, human response, sample survey of the universe contained on the permittee tape.

The Post Office tape referred to earlier in this paper contains a list of all post offices in Canada. It is updated annually from records provided by the Post Office Department. The Wildlife Service adds to the record the latitude and longitude of each post office. By means of computer programs it is possible to classify individual post offices by any geographical areas in Canada that can be defined by lines of latitude and longitude to the nearest minutes.

Stratification

The Service has agreed to present results of the survey by province. Provinces are employed as primary strata in the survey. Those primary strata may be broken down further into substrata consisting or one or more hunting season zones.

If the system is examined in detail, it will be observed that we can identify the place of purchase of the permit by province or by latitude or longitude. We can also identify the location of the residences of the hunter by state or province of residence (assuming receipt of a complete sales record).

The obvious next step was to develop a means of identifying the geographical location of the place where a survey respondent actually hunted. The method chosen was designed to enable the hunter to describe, in a way meaningful to him, the general area in which he "did most of his hunting". It was also necessary to design a system which would enable the Wildlife Service to translate the description provided by the hunter into precise terms which would facilitate mass analysis of the answers by computer methods.

A "location finder" was developed on which the hunter will provide the name of nearby town or village and the distance and direction from that place where he did most of his hunting.

The questionnaires will be checked individually on return to the Service and the latitude and longitude of the place given by the hunter will be entered on the questionnaire. Gazetteers are produced by computer from the Post Office tape. Post offices are listed alphabetically, each followed by its latitude and longitude. Any names of places given by hunters which are not identifiable as post office names will be located by reference to sets of maps of Canada maintained by the Biometrics Section.

Keypunch operators will punch the latitude and longitude of the "nearest town or village" and the distance and pre-coded direction to the place of hunting. The computer is thereby provided with information needed to compute the latitude and longitude of the place of hunting. That latitude and longitude is recorded in the appropriate sub-stratum within the province by a computer program.

The primary stratification of Canada will continue to be by province. However, in future years the provinces will be broken down into substrata. Substrata within the provinces may change when hunting season zones are changed.

Annual reports of survey results will continue to be useful as historical records and as a source of information for examining trends. Substrata used in any year must be identifiable without reference to other documents. To achieve this objective each annual report will contain outline maps showing approximate substrata boundaries. Those boundaries are also given precisely in the form of points of latitude and longitude. That method of presentation was illustrated for the first time in Progress Note No. 4 of 1968.

The stratification system is extremely flexible. It was designed primarily to provide a standardized procedure for summarizing results by substrata which, in general, represent geographical areas within which seasons dates and/or limits are uniform in any given year. However, any category of locations definable by latitude and longitude such as post offices or places of hunting may be substratified in other ways. For example, at the request of the Province of Ontario, the boundaries of 23 forest districts were approximated by lines of latitude and longitude, and sales of permits in 1966-67 in Ontario were then summarized by post office within forest district. Provided the boundaries do not change, the necessary computer programs may by used annually to produce a standardized listing. The operation in no way interferes with the use of the data to summarize sales by survey substrata.

Results

A summary of 1966-67 permits was distributed (Canadian Wildlife Service Progress Note no. 2 of May 31, 1967). The 1967-68 version appeared as Progress Note no. 4 of 1968. Our first harvest survey

report appeared as Progress Note no. 5 of 1968. Copies are available to the delegates at this meeting so I will not repeat the details here.

Summary and forecast

In this paper I have attempted to describe briefly the data collection system which has been many years in the planning and development stages. We are now moving into the operational stage. Early results are available.

Our rate of progress in the future and our ability to use the system effectively will, of course, depend on the human and material resources available to us. Subject to the proviso, the 1968-69 harvest survey results will be presented by substrata within province. The species composition survey, which will become a part of the permit and survey computer system in 1968-69, will be substratified in the same manner.

Studies of non-response bias and other biases are high on our list of priorities. Sampling procedures and statistical design of the surveys are under study. We expect to introduce refinements of the present procedures as rapidly as possible.

We make no pretence of having produced an instant system, nor a complete system, nor a perfect system. We do believe, however, that we have a realistic legislative base and have created a practical and flexible mechanical and administrative framework. We have recruited a team with the requisite biomathematical training and experience to improve and adapt a system to supply many of the requirements of waterfowl managers for management information.

Canadian Fur Council

D.H. Gimmer

At the Federal-Provincial Wildlife Conference held at Ottawa, June 25 and 26, 1957, the provincial delegates passed, among others, Resolution 7 as follows:

WHEREAS the economy of persons dependent on the fur industry for a livelihood has been adversely affected by declining prices for raw furs;

AND WHEREAS the widening of market outlets appears to offer the best means of ameliorating the present situation;

AND WHEREAS initial efforts to promote the sale of Canadian furs abroad have met with a substantial measure of success;

AND WHEREAS the agencies concerned are confident that a more widely representative group could accomplish even better results in the field of promotion;

NOW THEREFORE BE IT RESOLVED that a Canadian Fur Council Composed initially of representatives of governments, both Federal and Provincial, be formed for the purpose of advising on and implementing policies and procedures which might best stimulate the sale of Canadian furs both at home and abroad;

AND BE IT RESOLVED ALSO that consideration be given to ways and means of achieving an effective working relationship with the primary producers and trade either as members of the proposed Council or through liaison with their organizations;

AND BE IT FURTHER RESOLVED that the Interdepartmental Committee on Fur Promotion of the Federal Government shall undertake the necessary steps to ensure the organization of the above mentioned Council as soon as possible.

As most of you are aware, the Fur Council was formed and held its first meeting in St. John's, Newfoundland, in 1958, following which terms of reference were drafted and approved by the members as follows:

1. To assist the Interdepartmental Committee on Fur Promotion in the planning implementation and co-ordination of promotion programmes in foreign countries.
2. To stimulate the interest and sales of Canadian furs in Canada.
3. To act as liaison between the respective Provincial Governments and the Federal Government.
4. To be responsible for all matters pertaining to the fur industry in which the provinces

and Federal Government are jointly concerned.

5. To form effective liaison with members of private fur industry when necessary.

The Council met here on Monday morning, July 8, with representation of both federal and provincial agencies participating, with some notable exceptions. The meeting was primarily a session of soul searching, aimed at reviewing the role and past activities of the Council, and for this reason members of the trade were not invited to attend.

There has been concern expressed by members of the Council for its future role, its apparent lack of achievement and general inability to come to grips with the problems confronting fur harvesters. Many of the problems, which were assumed could be resolved by the activities of the Fur Council, still exist, while other problems have since developed. This does not mean the Council has been entirely inactive; several promotional activities have been initiated and generally the annual meetings, held in conjunction with this Conference, have provided a forum for discussion of problems if achieving nothing else.

However, to examine the questions raised respecting the future of the Council, its role and activities and related matter, a steering committee was established to be made up of one representation from the Canadian Wildlife Service, Indian Affairs Branch, Province of Ontario and Department of Trade and Commerce.

The Committee has been directed to prepare a brief report on the achievements of the Council over the past ten years in relation to the terms of reference and objectives established in 1958, together with a brief statement on the difficulties which have been experienced in attempting to develop an adequate program. This will be sent to all Provinces and other agencies with a request for an analysis of the results of the past ten years.

They will also be asked to submit comments and recommendations on the following topics:—

1. Revise Terms of Reference and objectives which will more clearly define the role of the Council and its members;
2. Define membership of the Council;
3. Define relationship with the fur trade; and
4. Placing greater emphasis on the promotion of wild fur.

When the submissions have been received from the Provinces and other agencies concerned, a meeting of the Council will be called to consider the above topics and to determine the new course of action which we hope can be developed. It is anticipated this meeting will be held before the next Federal-Provincial Wildlife Conference when the Council will be able to report.

Economic Evaluation of Wildlife Development Projects Through Benefit-Cost Analysis

Peter H. Pearse and G. Bowden

Introduction

Wildlife management in Canada is entering a new phase. Hitherto, the management of game and sports fisheries has consisted largely of regulating exploitation – enacting and policing laws governing hunting and fishing in order to protect existing populations of wildlife. But with growing demands for wildlife resources on the one hand, and the relentless pressures on their natural supply from economic and population growth on the other, this traditional protective role is no longer adequate. Wildlife managers are now being forced to take the initiative, not only in asserting the requirements of wildlife against incursions of industry and other human pressures, but also in undertaking intensive projects to create and augment natural wildlife populations.

Thus, we witness a new and rapidly-growing interest in specific projects aimed at rehabilitating or creating wildlife and fisheries habitat. In recent years, sports fisheries and spawning grounds have often figured importantly in water resources development projects, and have sometimes been the primary consideration. The federal government has launched a substantial program in wetland development for the production and management of waterfowl. Big game is now recognized as a worthy consideration in planning the use of many rural public lands. Sports fish hatcheries and stocking programmes have become an integral part of game management in most provinces. And so on.

While the tools required for "protective" wildlife management are mostly those of the biologist and administrator, intensive development projects call also on the disciplines of economics, engineering and regional planning. These projects and programs are never costless. Typically, they involve the use of substantial quantities of economic resources – capital, labour, land and water. Where these projects are paid for by government, the labour and capital are purchased with public funds. Sometimes the land and water are already public property and therefore do not have to be paid for. But whether purchased or not, these resources are often useable for purposes other than wildlife, and hence there is a cost involved in withholding them from other uses.

The costliness of intensive wildlife development projects forces wildlife managers to consider the economic implications of their proposals. The biologist and ecologist are better equipped than others to analyze wildlife management problems and to estimate the implications of engineering or other works for wildlife production and survival. But there are important questions that they are usually not trained to answer: What is the value of free recreation? When is a project justified in the public interest? How can priorities between projects be determined? What is the best scale of a project to be undertaken? How can benefits to future generations be compared with those enjoyed in the present? These are economic questions and the modern theory of economics offers useful guidance in answering them.

Thus, the modern wildlife manager is inevitably concerned with economics – a field not traditionally included in his professional training. For if he does not pay attention to the economic aspects of his actions, he will become a mere technician. His guidance in important decisions will be respected only if he is able to correctly identify costs and benefits, weigh them against each other, and formulate decisions in the best interests not of wildlife but of the people whose resources he is using. (Hatter, 1967).

Gradually, but inevitably, (perhaps even reluctantly) wildlife managers and ecologists are beginning a dialogue with social scientists – especially economists. Certainly they need each other. The natural scientists must be depended upon for an understanding of the requirements of fish and game, and of the technical aspects of resource management generally. But the economist is needed to relate these issues to human needs and provide criteria for making choices and setting priorities in the interest of the people they are working for. Progress requires that these two groups understand each others' problems and methodology.

Some significant progress has already been made in bridging the disciplines of social science and the natural and applied sciences. Economic theory, as applied to agriculture and forestry, has been a subject of inquiry for a very long time, and there is a well-established literature in these fields. In recent decades, some highly competent economists have addressed themselves to the problems of commercial fisheries, mining and the petroleum industries. More recently, there has been a flurry of interest among economists in the complex problems associated with recreational resources. And, in the United States particularly, there has been a massive research effort during the last few years into the economics of water resource development.

All these efforts can be said to be in response to the growing need to make consistent and rational decisions about resource management as the pressures on our national resources grow. As our technical knowledge becomes ever more sophisticated, and our ability to augment nature increases, our range of choices and their economic significance increases also.

This paper attempts to outline one of the most basic criteria for economic decision-making in resource management planning — that of so-called benefit-cost analysis. Emphasis is placed on the purposes of this economic technique, how and for what purposes it can properly be applied and the questions it can help to answer with special reference to public wildlife management projects. The more esoteric issues of economic theory involved are not investigated in detail; these are examined elsewhere in the already extensive literature on this subject, some of which is referred to below.

Benefit-Cost Analysis: Purposes and Principles

The underlying purpose of all public investment can be assumed to be to increase social welfare in some sense. But the specific way in which welfare is to be raised can vary. It may be through increased output generally, by changing the distribution of income between rich and poor or between regions, or by increasing security or the quality of life. Sometimes a program is meant to accomplish several of these things at once, and even where this is not the specific objective, a large project will usually generate a wide variety of effects.

The concepts of economic efficiency and feasibility. The extent to which the desired results can be produced with a given amount of resource inputs measures the *efficiency* of the project, and this concept of efficiency is fundamental to benefit-cost analysis.* Biologists are familiar with the idea of efficiency as it pertains to the conversion and transfer of solar energy through flora and fauna to animal protein, where the unit of account is calories. Benefit-cost analysis is a systematic framework for measuring the long-run economic efficiency with which resources used in some specific way can be converted to products or services. The resource inputs are measured in terms of their dollar values and the products or services produced are measured either in dollar values or physical units.

The term resources, in this context, applies to all inputs that are productive and hence have value — labour and capital as well as natural resources. Benefit-cost analysis is thus a way of assuring the economic efficiency of projects by weighing the benefits that can be expected to be produced against the cost of all the inputs the projects require. It can also be used to rank alternative projects in terms of their relative desirability, and to establish the desirability of adjustments in their planned scale or form (Prest and Turvey 1965, Sewell *et al* 1962).

A project is considered economically *feasible* if the value of the expected products or services (the "benefits") exceed the value of the resources (the "costs") required to produce them. This is because the costs, if correctly measured, represent the values that the inputs would generate if employed elsewhere. If these alternative values are less than the benefits to be derived from the project, society would therefore be better off with the project than without it. In other words, a feasible project is one in which the gains exceed the sacrifices. The losers and gainers may be the same people, in which case their welfare will be increased by the project. But even if they are different people, the gainers could more than compensate the losers. Whether compensation actually takes place, however, is another (distributional) question: the government might wish to subsidize some groups (gainers) at the expense of others (such as taxpayers).

One project is more efficient than another if it can produce more benefits with the same or lower costs. Consistent choice of those projects which show the highest expected benefit per unit of cost will ensure that maximum net benefits are generated, and that all resources employed are put to their most valuable (efficient) use.

Purposes and benefits of a project. Benefit-cost analysis can be used in its most complete form where the objective is to increase output in clearly defineable economic terms. But its usefulness is not confined to projects in which the product is measurable in money. Wherever there is only one form of product, benefit-cost techniques can demonstrate the efficiency with which resources can be converted to the product, and if the product is not measured in dollar values at least the cost of producing it can be shown and compared with that in alternative projects.

*The authors are aware of the desirability (in view of the audience to which this paper is addressed) of economizing on economic jargon. We shall introduce unfamiliar terms only to the extent that they are useful for the purposes of this paper, and try to make their meaning clear.

When, as is frequently the case, a project is meant to serve several purposes, the problem is more complicated. In some cases two or more values are perfectly complementary, in the sense that the values increase in constant proportion. Thus adjustments to the size of a reservoir might conceivably affect water storage and sport fishing capacity in constant proportions. Whenever such inflexible technical interdependence of joint products exists, the only meaningful benefit-cost analysis is one which compares all costs and all values associated with the project.

More frequently, however, the several products of a multiple-purpose project are not necessarily produced in fixed proportions: the proportions vary with the scale of the project and more of one product can be had at the expense of another. A common example is that of projects aimed at both wildlife production and the enhancement of regional incomes. In the absence of a common denominator for comparing the value of wildlife with that of income redistribution, the appropriate "trade-off" between these two forms of benefit cannot be defined. In such cases the implications for one form of benefit of having more or less of another can be identified, along with any relevant effects on costs, leaving the choice between alternatives to the judgment of the decision-maker. This procedure will at least narrow his range of guesswork and clarify the implications of his choice.

Development of benefit-cost analysis. Most of the development of benefit-cost techniques has taken place in the United States in the last 25 years, although there are traces of related work a century or more ago. The main thrust in the advance of benefit-cost analysis in the post-war period has been in the context of water resource management, and much of the basic literature on the subject is concerned with the design of water resource systems (Ekstein 1958; Maass *et al* 1962; U.S. Government 1958, 1962). The massive water resource development schemes in the United States in recent years have given rise to a strong demand for methods of systematically evaluating projects, determining their optimum scale and form, and setting priorities.

But although the development of benefit-cost analysis has been closely associated with government-sponsored water projects, it is an entirely general technique that can be applied to a wide range of investment programmes. In principle, it is equally adaptable to projects in the private sector and the public sector; in a capitalistic and a centrally planned economy. Although the relevant data will differ depending upon the context of the analysis, the method can be applied whenever a specific party wishes to examine the economic implications of a specific proposal or set of proposed projects.

The benefit-cost framework has found its greatest usefulness in government investment decisions, for it is public projects which present the more complicated problems associated with large scale, multiple products, non-marketed benefits, external effects and regional considerations (McKean 1958). Recently, its applicability to a whole range of public spending programmes – including national defence, education, disease control programmes, agricultural schemes as well as water resource development – has been explored and developed (Dorfman (ed.) 1965). Very little rigorous work has been done, however, on benefit-cost analysis as it applies to investments primarily for wildlife management – the subject of this paper.

Criteria for Decision-Making

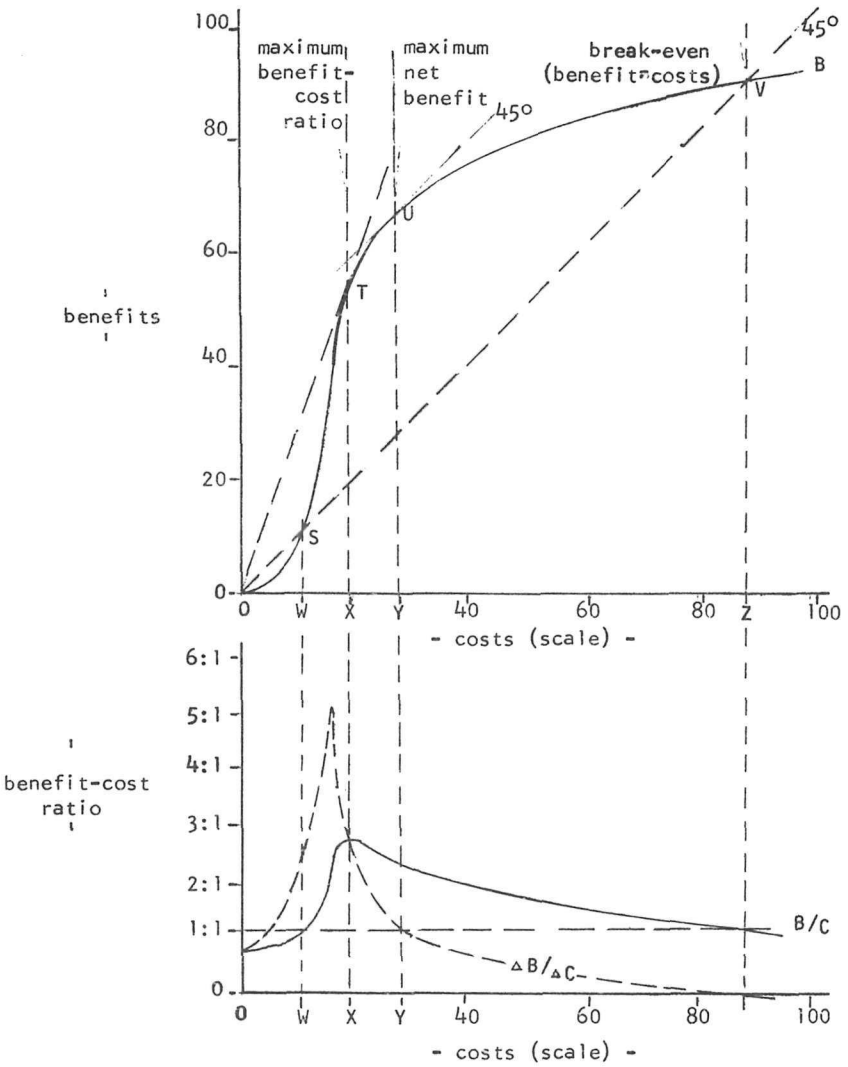
The basis for decision-making through benefit-cost analysis is the relationships between the values produced and the costs of producing them. For purposes of illustrating the principles involved, we shall adopt a highly generalized example below. Some of the complications that are encountered in practice are discussed later.

General relationships between benefits and costs of a project

The basic theoretical relationships underlying benefit-cost analyses can be illustrated with the aid of the accompanying figure.* In both quadrants, the present worth of total costs of the project is measured along the horizontal axes. Costs serve as a proxy for the project's scale. The vertical axis of the upper quadrant measures the present worth of gross benefits produced, and in the lower quadrant the ratio of gross benefits to gross costs.

Normally, more benefits will be produced the larger the scale of the project, and hence the curve O B, which depicts the relationship between benefits and costs in the upper quadrant, rises throughout its length. But benefits rarely rise in constant proportion to scale (or costs), and the shape of the curve in the upper quadrant reflects some important general economic phenomena. At extremely small scale, the project can be seen to be unfeasible, because benefits fall short of costs. Over the range OW, the curve of

*The figure is adapted from Sewell *et al* (1962)



BENEFITS AND COSTS AS A FUNCTION OF SCALE FOR A TYPICAL PROJECT

gross benefits, OB, is below the 45° reference line which joins up all points of equality between benefits and costs. This reflects the usual situation that below a certain scale the project is not worthwhile.

But for any feasible project the curve of benefits will rise above the 45° line over some range. Up to the scale OY, the excess of benefits over costs grows, depicting increasing net benefits in response to scale. Beyond point U, where the curve has a slope of 45°, benefits rise slower than costs, until point V is reached where benefits equal costs. At a scale greater than OZ, benefits again fall short of costs. The project is feasible, in the sense that benefits exceed costs, only over the range of scale WZ.

The solid curve in the lower quadrant shows the ratio of total benefits to costs at every point over the same range of scale. Where benefits equal costs, at scales OW and OZ, the benefit-cost ratio is 1:1. Within this range of feasibility, the ratio is greater than 1:1, and outside it, it is less. It will be noted that while a scale of OY shows the greatest net benefit, the highest benefit-cost ratio occurs at a smaller scale, OX. This latter point is geometrically depicted in the upper quadrant as the scale at which a straight line drawn through the origin is just tangent to the benefit curve.

The dashed curve in the lower quadrant depicts the incremental benefit-cost ratios, or the ratio of benefits generated by marginal increments of costs at each level of scale. This curve is the first difference of the total benefit curve OB above. Over an initial range it lies above the total benefit-cost ratio curve, which rises upward over this range because as long as the incremental ratio is greater than the average ratio, the latter must increase. Beyond the scale OX, marginal additions to scale yield an incremental benefit-cost ratio less than the ratio of total benefits to cost, pulling the latter curve downward. Beyond a scale of OY, benefits rise less than costs, so the incremental benefit-cost ratio is less than 1:1.

Before addressing the problem of selecting the best scale from these general relationships, a few observations should be made about the nature of these curves. First, the curve of benefits with respect to costs reflects the greatest benefits that can be produced at each level of cost. For any level of cost, of course, a project can take a variety of forms, and we assume that the form which yields the most value for each level has already been selected. Thus, the curve OB shows the *maximum* benefits that can be produced at every level of scale.

Secondly, while these theoretical curves are drawn smooth in the figure, it is unlikely in practice that such continuous marginal adjustments to the scale of a project are possible. Frequently the smallest practicable additions to the scale of a project are substantial works or large pieces of equipment. This will produce jogs or discontinuities in the curves.

The relationships discussed here with respect to a single project are equally applicable to segments of projects or to an entire programme which consists of a number of projects. Where a project or projects must be selected from a variety of alternatives, the first problem is to ascribe priorities. Once those of highest priority have been selected, the next problem is to determine the optimum scale of each. These questions will now be dealt with in turn.

For the time being, let us assume that a public decision-making body has allocated a given amount of funds for a specified purpose in wildlife development, such as wetland rehabilitation for waterfowl production. There is a large number of separate projects that might be undertaken, each different in terms of its cost and benefit characteristics.

Ascribing priorities among alternative projects. Putting aside for the moment the problems of identifying and quantifying the benefits and costs of public projects, let us assume that we have, for each possible project, the information underlying the curves in the figure. The problem is one of selecting those projects which will make the most efficient use of the available funds in terms of the specified objectives. For this purpose, the benefits need not be quantifiable in money terms. If the objective is, for example, to maximize waterfowl production, benefits can be measured in terms of numbers of waterfowl produced. This will not, in general, alter the characteristic shape of the curves in the figure.

If benefits are not measured in dollars, however, the economic feasibility of projects cannot be specified, since costs and benefits are not quantified in similar units. Thus the 45° guideline in the upper quadrant of the figure, depicting equality of costs and benefits, cannot be drawn, and the benefit-cost ratios in the lower quadrant measure physical units of product (such as ducks) in relation to costs measured in dollars. However the allocation of public funds itself indicates a political decision that the specified purpose can yield values that justify the

costs. The analytical problem reduces to one of maximizing the benefits that can be generated, given the available funds.

The project deserving the highest priority is that which yields the greatest benefits per dollar of costs. Priorities should therefore be ascribed to projects in the order of their maximum possible benefit-cost ratios. In the figure, at the scale OX, a benefit-cost ratio of about 2.8:1 is indicated, which means that if the project is built to this scale each dollar's worth of resources used will produce 2.8 dollars' worth of benefits (or 2.8 units of product). This is the highest benefit-cost ratio that can be reached in this example. But while the scales at which benefit-cost ratios are maximized indicates the relative efficiencies of different projects, they are not necessarily the scales that should be planned for development, as we shall demonstrate below.

Determining the optimum scale of selected projects: Having set priorities among projects in terms of their maximum benefit-cost ratios, it remains to determine the best scale for the projects to be undertaken. Continuing with the above example, let us assume that the 2.8:1 maximum benefit-cost ratio in the figure is the highest of any project, and the next-best project shows a maximum ratio of 2:1. We assume that funds are sufficient to permit undertaking more than these two projects.

Obviously the single most productive use of funds is in the project which can produce 2.8 dollars (or million dollars or thousand waterfowl per year, etc) per dollar invested, and the next most efficient use is that on which 2 units of benefit can be produced per unit of cost. But at the scale, OX, where the benefit-cost ratio of the first project is maximized, it is possible to expand the scale further and still gain benefits per dollar of cost in excess of that obtainable in the next-best project. The efficiency objective requires that the costs be incurred where they will be most productive, and the lower quadrant of the figure shows that there is a range beyond the scale OX over which additional dollars of cost will yield incremental benefits of between 2.8:1 and 2:1.

So, if the second project is to be undertaken, the appropriate scale of the first is at least up to the point where its *incremental* benefit-cost ratio is 2:1. If a third project is to be undertaken also, which has a lower maximum benefit-cost ratio – say of 1.5:1 – then the first two projects should be extended to a scale at which their *incremental* benefit-cost ratios decline to 1.5:1, and so on. This process will ensure that the last dollar spent on every project yields the same benefit, and it would therefore be impossible to reallocate costs among the projects in any way to yield higher net benefits.

Where both costs and benefits are measured in dollars, the scale of a project should under no circumstances exceed the point at which net benefits are maximized, which corresponds to the point at which the incremental benefit-cost ratio declines to 1:1 (the scale OY in the figure). It is true that greater benefits can be obtained beyond this point, but only at more than proportionate increases in cost. The fact that the incremental benefit-cost ratio is less than 1:1 beyond this point means that additional costs incurred yield less than equivalent increases in benefits.

Benefit-Cost Versus Other Investment Criteria

This criterion for decision-making, which concentrates on benefit-cost ratios, differs fundamentally from some other criteria which are sometimes assumed to be appropriate. First, we can reject any process of project selection based on *gross benefits* generated, because this ignores cost considerations, and the weighing of costs against benefits is essential for the efficient allocation of resources. Second, and less obviously, we must reject also the ranking of projects on the basis of their *net benefits* generated. Selection of those projects which generate the greatest excess of benefits over costs will favour big projects, but not necessarily the most efficient ones. A large project with costs of $50,000 and benefits of $150,000 would not be as efficient as two projects each involving half the cost and benefits of only $100,000. The net benefits of a small project is only $75,000 compared with the large project's $100,000 but their benefit-cost ratios are respectively 4:1 and 3:1. And by choosing the two smaller projects the total net benefit would be greater by $50,000.

The benefit-cost approach also differs fundamentally from analyses based on the *rate of return on invested capital.* Projects will rank differently on the basis of benefit-cost relationships and the rate of return earned on the capital invested. This is because the rate of return criterion ascribes all the benefits, after the cost of other inputs have been deducted, to the capital input, while benefit-cost aims at comparing the value of benefits with the value (cost) of all inputs – land, labour and capital. A rate of return assessment is appropriate only from the point of

view of a supplier of capital, just as the wage rate is for a supplier of labour. It is the efficient allocation of all kinds of resources (Turvey 1963).

There is, however, a close correspondence between the benefit-cost criterion and the *profitability criterion* implicitly used by private investors attempting to maximize profits. In considering alternative investment opportunities private investors normally weight the costs against the expected stream of revenues from each. Using the market rate of interest, the private investor will calculate the present worth (see below) of expected costs and revenues of each alternative in search of the one which can be expected to show the greatest excess of revenues (profits) per dollar spent.

Benefit-cost analysis, as it applies to public projects, differs from the profitability criterion of private investors only in scope and form of the data used. While the benefits considered by the private investor include only the money receipts from sales of product, those of a public project might include values which consumers do not pay for, such as aesthetic benefits and free recreation, or values which are not accurately reflected in their market prices. Similarly, while the private investor's relevant costs are his monetary disbursements, the public decision-maker may not find these outlays an adequate measure of real social costs. Some of the problems in identifying and measuring the value to society of benefits and costs which are not accurately reflected in market prices are:

Some Complications in Practice

An important complication arises if the projects are in any way interdependent, so that the construction of one affects the costs or benefits of another. A number of more-or-less separate projects might, for example, be considered for the management of water levels on a single area of wetland. If one of these were undertaken, the cost of a second project might be lower than it would be if it were undertaken in the absence of the first. Moreover, the benefits it generates are likely to be different because of the construction of the first project. This means that once the project of top priority has been selected, the benefit-cost analysis of the remaining interdependent projects must be repeated on the assumption that the first has been built. When the second has been selected, the remainder must be reworked again, and so on (Krutilla 1960). Subsequent analysis may well change the ranking of remaining projects.

The above discussion assumes that the total available funds have been determined in advance, and that project selection should continue until these funds are exhausted. But, especially if the projects are large, the projects selected on this basis might not absorb precisely the amount of the fund; insufficient resources may be available for the last project selected, or some might be left over. If, once allocated, the fund is totally inflexible as to purpose and amount, the last project should be selected simply on the basis of whichever project can show the highest net benefit with the remaining funds.

Finally, we should consider the question of the appropriate fund allocation, which has hitherto been assumed fixed. While in the United States budgetary allocations by Congress to certain agencies (such as the Corps of Engineers) or for certain purposes are often made without reference to specific projects, this is less frequently the case in Canada. In this country, legislatures typically debate financial allocations to specific projects, and must therefore be convinced that the amount demanded is justified in each case.

Theoretically, the allocation of funds to a particular purpose is justifiable as long as it can be shown that the benefits generated exceed the costs. This means that more funds are warranted so long as there remain any projects which show a benefit-cost ratio greater than 1:1. It follows also that if this were done, the scale of all projects should be expanded to the point at which the incremental benefit-cost ratio declines to 1:1 (this is the scale OY in the figure). At that point all opportunities to increase net benefits would be exhausted, and any further allocations would involve a loss.*

If the allocation of funds is insufficient to permit exploitation of all economically feasible opportunities, the maximum net benefit will be obtained by equating the incremental benefit-cost ratio in all projects, as indicated above. This ratio will be at least as high as the maximum benefit-cost ratio obtainable in the last-added project, and will, of course, be greater than 1:1.

The criterion for economic feasibility or justification is clear enough as long as benefits are measured in dollars. This is the usual case in natural resource projects, becuase the objective is typically to increase the value of economic output. The benefits are the projected streams of dollar values that will be earned with the project, and the costs are the dollar values that would be earned by the

land, labour and capital in alternative uses if the project was not undertaken. But the benefits of wildlife projects and programs are often not directly measurable in dollar values, and this adds a new dimension to the problem of efficient resource allocation, which is discussed briefly later.

It is worth repeating, however, that the problem of expressing benefits in dollar rather than physical units does not arise once the allocation of funds has been fixed. The selection of projects, their form and their best scale can be determined by the above criteria just as well if the product is measured in numbers of recreation-days, birds, or mammals.

Measuring Benefits and Costs

Benefits are any advantageous effects of a project or program. They represent the *output* of real values, while costs comprise the value of *inputs*.

Primary (or direct) benefits are those that accrue to people who make use of the goods or services produced by a project or program. Frequently, a project produces primary benefits in a variety of forms at once, such as irrigation water, flood control and recreation of various kinds. Theoretically, the real value of these benefits is the maximum amount the beneficiaries are willing to pay for them. And the upper limit to these values is the cost that would be necessary to produce them from the least-cost alternative source.

When the benefits are marketed, and constitute a small addition to the existing supply (such as a small increment of hydroelectric power) they can be evaluated simply by multiplying the amount produced by the price. Where the project would produce a large addition to the existing supply, however, the present price might not be appropriate, because a substantially increased supply might be marketable only at a lower price. In this case, the appropriate value is roughly the average of the initial observed price and the expected price after the addition of the project.

When the product is used in further production and is either not priced, or is sold at a price which does not reflect its real value (such as irrigation water in some cases), the appropriate value is the net increase in income to the users which can be attributed to the project. If the benefits are consumed directly without charge to the consumers (such as some forms of recreation) an indirect evaluation method is required (see below).

Secondary (or indirect) benefits are gains which are not directly produced by the project itself, but are induced by the existence of it. For example, the construction of a recreational project might stimulate the business of restaurants, hotels or service stations, and any new income thus generated constitutes secondary benefits.

Some projects produce benefits which may have to be regarded as *unmeasurable* in money terms, such as aesthetic gains, or enhancement of human safety. These should be carefully identified, and left for subjective weighing against unmeasurable costs in considering the final benefit-cost relationship.

Benefits, in these various categories, may accrue directly to private individuals and companies or to governments. Once quantified, the way in which the benefits are distributed is of no importance in determining the final benefit-cost relationships of public projects. Private benefits are usually direct gains to consumers or additions to private profits, wages and rents. Fiscal benefits may be received by governments in the form of taxes, user-charges, licences or reduced cost of public services. It is usually helpful to itemize private and public benefits separately.

Primary (or direct) costs are properly measured as the value of alternative output that must be sacrificed in order to construct and operate the project or programme. Insofar as the inputs must be purchased in a competitive market, their price represents their value in alternative uses. But some costs, or losses, may be inflicted on others by the project, and these must be included whether or not compensation is made. If land, water or other natural resources are to be devoted to the project and these have alternative uses, their value in the highest alternative use must be included under costs. Construction costs include, in addition to the obvious expenditures for materials, equipment and labour, interest during the construction period, promotional expenses, engineering, land acquisition, relocation of existing facilities and costs of financing. Tax payments should be included only insofar as they must be paid to a government whose jurisdiction is not limited to that of the government carrying out the analysis.

*It is the function of treasury boards to allocate government budgets among various departments in such a way that the aggregate net benefit of government spending is maximized. Their problem is analogous to that described above, for their goal will be reached when the net benefit from the last dollar allocated to each department is equal.

The expected costs of operating the finished project must be estimated, and capitalized (see below) to be included in terms of their present value equivalent.

Associated costs are those which must be incurred by the primary beneficiaries of a project in order to make use of its products. An example is the cost of irrigation installations that farmers may have to incur in order to utilize irrigation water. Another is the cost of commercial boating facilities that may be planned for an otherwise public project.

Secondary (or indirect) costs are those involved in the production of secondary benefits. If, for example, the project stimulates the tourist servicing business, the additional costs that these enterprises incur with the greater volume of business represent secondary costs.

Unmeasurable costs are those which defy quantification in money terms, such as the loss of scenic values. As with unmeasurable benefits, they should be identified and described for the guidance of the decision-maker in considering the final benefit-cost relationships.

These various categories of benefits and costs are summarized in the accompanying table. The appropriate treatment of some of the effects of development projects often presents serious practical and theoretical difficulties, not all of which can be reviewed in the space available here. In the following paragraphs, a few of the more general procedural problems are discussed briefly.

Limitations of market prices. It has already been noted that where competitive market prices exist for the inputs and products of a project, these provide a direct evaluation of benefits and costs. But there is a variety of circumstances in which the market does not work effectively to indicate real values, certain cases in which it cannot work, and other situations in which we choose to prevent it from operating. In all these cases it is necessary to adjust market prices or costs in order to approximate real values.

If the market is not competitive, such as when monopoly influences are at work, market prices are unreliable. Monopolistic situations may result from the market power of one or a few firms, or may be the almost inevitable result of the productive process or the nature of the product – such as electrical power or local water supplies. In the latter case, the monopolies are often government-owned or regulated. The product prices of unregulated private monopolies tend to exaggerate real values, but those influenced by government may be either higher or lower. In any case, non-competitive situations present the delicate problem of calculating the degree to which prices are different than they would be under ideal competitive conditions.

Sometimes even competitive market prices do not reflect real social values because of so-called "external effects" in production processes. These are advantageous or disadvantageous effects inflicted on others which are not fully reflected in the costs and revenues of a production process. Control of a

TYPES OF BENEFITS AND COSTS

	Private	Government	Total
Benefits:			
primary secondary unmeasurable	(consumer gains, wages, rents, interest, profits)	(tax revenues, user charges, licences, etc., saving in government spending)	
Total Benefits			_____
Costs:			
primary associated secondary unmeasurable	(costs to individuals and businesses resulting from project operation and use, uncompensated private losses, etc.)	(public costs of construction and operation, additions to other government spending, subsidies, loss of public amenity, etc.)	
Total Costs			_____

stream for waterfowl production, for example, might benefit farmers in a flood plain downstream, although no payment is received for this service. An industrial plant polluting a watercourse might lower the value of water (or increase the cost of treatment) to users downstream, without this cost being reflected in its accounts. External costs and benefits are sometimes very significant, and market values must be adjusted to account for them insofar as it is possible to do so.

The market cannot function, and so there can be no market indicators of value, where the goods or services cannot be divided up and sold to individual consumers. Obvious examples are national defense and depolluted air. Sometimes scenic and other aesthetic benefits fall into this category. In such cases, evaluations must rest on collective or political consensus.

Situations in which we deliberately choose not to let the competitive market reflect real values include cases of taxed and subsidized products and goods and services provided free. Whenever inputs or products are taxed or subsidized, market prices are overestimates or underestimates (respectively) of real values. Providing the taxing or subsidizing is done by the same government as that undertaking the benefit-cost analysis, market prices can either be corrected (by substracting taxes or adding subsidies) or taxes and subsidies can be dealt with separately as government benefits and costs.

Our provision of most forms of public outdoor recreational opportunities without charge is an extreme case of price subsidy. Having chosen to reject market pricing as the means of allocating the benefits of public recreation and wildlife, we lack direct indicators of value. This threatens to frustrate the evaluation of recreational and wildlife projects, and to confuse their economic justification in the first place.

Quantification of the economic value of non-marketed recreational and aesthetic benefits has been the subject of considerable academic enquiry in recent years (Pearse 1968). A good deal of progress has been made in devising criteria for establishing indirectly what people would pay for these benefits, even though they are typically available without charge. There is not space here to review that literature except to note that the problems have been substantially clarified and several methods of calculating surrogate prices have already been developed. Values have been calculated for free outdoor recreation in a number of studies, but a good deal of work remains to be done before it will be possible to put reliable dollar values on various kinds of non-marketed benefits without a good deal of research into each case.

The objection that it is either immoral, misleading, or impossible to evaluate the "intangible" worth of wildlife or outdoor recreation reflects a basic confusion about the nature of the problem. These values are no more intangible than those of any marketed good or service. The problem is simply that we choose not to price some of these things, and so consumers are prevented from expressing their evaluation of them. In most cases, there is no technical reason why they could not be priced, and the fact that they are usually provided free reflects a political policy, the virtues of which are not in question here. Having adopted this policy, we are confronted with the problem of determining values in the absence of the usual direct market indicators.

It is worth noting that the difficulty of ascertaining the value of non-marketed benefits with precision in no way diminishes the need for consistency in these evaluations. Even a very rough schedule of values, if applied consistently to all problems, will do much to ensure that the best choices are made.

Some confusion has occasionally arisen in the analyses of sport fisheries and wildlife projects over the form of the product. The benefits of these projects cannot be said to rest in the existence of fish or game *per se,* and it is misleading to attempt to ascribe values to the animals themselves. The real value usually lies in recreation, and the benefits of the projects lie in the recreation they generate. Thus, evaluations cannot be made with information relating only to fish or wildlife produced; they must be based on the anticipated demand of recreationists to pursue them, and estimates of their willingness to pay to do so. This relates to a fact that some wildlife managers have been reluctant to accept: that they are ultimately working for people, and not fish and game for its own sake.

Calculating the Present Value of Future Costs and Benefits

Wildlife projects are typically designed to yield a stream of benefits extending into the future – sometimes indefinitely. Operating costs are also anticipated annually or at intervals. Benefit-cost analysis requires that benefits and costs be expressed as lump sums, and so we must reduce all future values to their equivalent present worth. This is accomplished

by means of standard mathematical formulae for discounting future values over specified time periods and at prescribed interest rates.*

The discounting of future benefits and costs is not only necessary for benefit-cost analysis but is essential for a true assessment of future values. The fact that an amount receivable today is valued more highly than the same amount receivable in the future (quite apart from expected changes in the value of money) is readily observable from human behaviour. Moreover, the resources invested in a project would be productive in other uses, and the interest rate measures their productivity through time. Discounting, therefore, is the process by which values dispersed through time can be expressed in terms of an equivalent present lump sum (Arrow 1966).

The most critical variable in discounting is the interest rate. The appropriate interest rate for use in public project evaluation has been the subject of considerable controversy (Krutilla and Eckstein 1958; Marglin 1963a; 1963b). For a local government agency, its usual borrowing rate can be chosen. For a senior government, however, the yield it must pay in bonds might not be a true reflection of the time-evaluations of the public it represents. The correct rate, it appears, is a political decision, and in the absence of direct political guidance agencies have usually adopted the average rate of yield on long-term bonds of the government they represent.

Some Pitfalls

Brief reference should be made to a few of the most common sources of error in benefit-cost analyses. The first relates to past costs. Frequently a project promises to destroy facilities that have been built in the past, or to enhance their value. The important point is that the cost of past investments is in no way relevant in deciding the best course of action. Such costs should therefore be disregarded. Past investments may, of course, affect the benefits and costs of future development, but the amount spent in a previous period is of no help in deciding the most efficient future step.

Secondly, when the dollar value of future benefits or costs is expected to change, no account should be taken of the change unless it is different from the anticipated change in the general price level. Expected increases resulting from general *inflation should be ignored, since this does not* represent any real change in relative values.

Thirdly, if some of the resources used in a project would, in the absence of its undertaking, be involuntarily unemployed, there is no real economic cost involved in using them, regardless of any money payments made. This is particularly important in connection with some development projects in depressed areas which give employment to otherwise unemployed labour. As long as the labour would otherwise be unemployed, society does not sacrifice any other output (the true measure of cost) by employing it on the project. Studies have shown that this consideration can account for a substantial difference between the financial and true economic cost of a project (Krutilla and Haveman 1967).

Finally, a word must be said about the treatment of risk and uncertainty. It is a common tendency to provide for risk by increasing the interest rate used in discounting future values. This is a dangerous procedure, however, because it distorts the relationship between benefits and costs to a degree that depends upon their dispersal through future time. A more appropriate treatment is to use whatever statistical data and experience are available to reduce expected future values to an amount that can be regarded as a lower limit with a high degree of probability. An informative exercise is to carry out the analysis separately using "high" and "low" estimates of uncertain future values.

The Scope of the Analysis

A critical issue that must be dealt with before any meaningful benefit-cost analysis can be undertaken is the sphere of reference for measuring benefits and costs. Analysis of a project carried out from the point of view of the local community is likely to yield very different benefit-cost relationships from one based on the viewpoint of a provincial government and both would differ from one carried out at the national level. The question of the appropriate terms of reference has caused much confusion in the past, and failure to appreciate its significance can lead to seriously distorted results (Hammond 1958).

The terms of reference of the analyst are important because what may be a benefit from the point of view of one region may not be a benefit

*For example, the equivalent present value of an amount A payable or receivable in years hence is $(\frac{A}{1+i})^n$ where i is the interest (or discount) rate. The equivalent present value of an amount x receivable each year forever is simply $\frac{x}{i}$. More complicated formulae exist for values at intervals of years and so forth.

from that of a larger jurisdiction. The same is true of costs. A few examples will serve to illustrate.

i. To the extent that a project is financed by the federal government, no costs are incurred by the local government. Analysis from the point of view of the local government might therefore show much lower costs than one from the viewpoint of the national government.

ii. A project might attract business or other economic activity from nearby areas. This must be counted as a gain for the local community, but from the standpoint of a larger jurisdiction it is merely a transfer of activity among regions, involving no net benefit.

iii. Payments of taxes to a national government are largely net costs from the point of view of a local or provincial agency, but they are receipts or benefits to the federal government.

iv. Subsidies paid to people or products produced in a region are gains to the region, but not to the aggregate of the people in the jurisdiction of the subsidizing government (who must pay the taxes). Similarly, reduced unemployment payments resulting from higher employment is a benefit to the federal government, but not to the local community.

v. Enhancement of the value of land is a benefit to the landowner, but if he does not live in the area this is not a benefit to the local community (except insofar as local property tax yields are increased). The landlord's gain can be counted only by a government that includes him in its jurisdiction.

vi. If a project benefits foreigners (e.g. by producing migratory birds) the full benefits can be counted only through an international analysis.

Many more examples could be given, but these are sufficient to illustrate the importance of the problem. Certainly an analysis carried out from the standpoint of one governmental jurisdiction will be entirely inappropriate for the decision-making of another (Little 1967).

Conclusion

Benefit-cost analysis is a useful technique for organizing the data necessary for making the best economic choices about development projects. As a particular methodological framework, it is not indispensible, but it embodies criteria which are essential for correct and consistent decision-making, and in many cases facilitates the application of these essential criteria more than any other method.

Certainly, benefit-cost analysis is well suited for analysis of wildlife projects. As the economic significance of such projects grows, planners are likely to find it increasingly necessary to develop evaluation procedures for justifying projects and programmes, determining their best form and examining their economic implications, setting priorities, and generally developing criteria for consistent decisions. Benefit-cost analysis is likely to prove the most useful tool for these purposes.

It is equally important to recognize what benefit-cost analysis cannot do. In the first place, it cannot set ultimate objectives; these must be specified by the decision-maker. Moreover some objectives seriously limit the usefulness of the technique. For example, it is of little help in analysing the degree to which certain social groups are made better off by a project as distinct from other groups. Benefit-cost analyses does not offer a ready means of assessing the desirability of different distributions of incomes or wealth. It can, however, be used to demonstrate regional implications, providing sufficient data are available.

Some of the common difficulties in applying benefit-cost analysis have been mentioned briefly above. They are mostly problems of data, and the accuracy with which analyses can be carried out will depend largely on these data problems. Examples of these and other problems, and how they should be treated, are available elsewhere (Krutilla and Eckstein 1958; Little 1967; Sewell, *et al* 1962; Smith and Castle (eds.) 1964; U.S. Govt. (1958).

It should be clear from this discussion that the purely economic analysis of projects, through benefit-cost analysis or other techniques, differs from a financial analysis. The latter relates to the purely monetary aspects of the problem – the revenues expected, the capital and operating outlays required, and how and at what cost projects can be financed. An economic analysis is concerned with basic economic implications which are only sometimes reflected in financial transactions.

One of the major virtues of benefit-cost analysis is that it provides a framework for organizing data which concentrates attention on the proper variables. It makes it difficult to ignore important effects, and provides data collectors with a guide for the most valuable allocation of their efforts. Hitherto, analyses have been frustrated not so much by problems of theory or even lack of information so much as the unavailability of data in a form amenable to analysis.

It is in this respect that an increased appreciation among economists and wildlife managers for each others' scientific principles and problems can have the most beneficial effect. With greater understanding of each other's methodologies and difficulties, economists and biologists can substantially increase the productivity of their efforts in obtaining meaningful evaluations of wildlife projects.

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Performance Indicators and Program Evaluation for Wildlife Management

by J. M. Wright

Some people say the justification of wildlife programs is self evident; others say they can never be justified; some pressure groups justify them in terms of conservation and preservation. Others say *this* is inadequate without the application of sound business principles and efficient management; still others have no time for conservation for its own sake, seeing recreation as a multi-billion dollar a year industry, and looking only for the short-term return. Some people take nature and outdoor life for granted, without thought; others through pesticides and pollution destroy, thoughtlessly and wantonly; and finally, for some, wildlife is still their only source of food and shelter.

While it is difficult to separate out clearly and comprehensively the implicit direct and indirect costs and benefits which lie behind each one of these separate viewpoints, they seem to fall into three main categories: *first,* those which have a market price and can be measured and evaluated; *second,* those which cannot easily be measured in dollar terms; and *third,* those for which at present there are no data available with which an economist can work.

It is the intention of this paper to suggest that benefit-cost analysis is the most suitable tool for analysis of the first category, but that the other two categories do not lend themselves to benefit-cost analysis. In the second category, imputed values sometimes distort and confuse the issue at stake and in the third category, subjective judgement and government policy are the only available justifications for such programs.

The following paper has been divided into three sections:

Section I — Value Judgements and the Selection of Objectives;

Section II — The Selection of Programs, Performance Indicators; and Output Budgeting for Management Purposes

Section III — Program Justification

1. Value judgement and selection of objectives

Before undertaking a benefit-cost analysis, or indeed any other type of analysis of a project or program, the objective and purpose of the project must be clearly stated. This is easy to say, but practically and conceptually it is the most difficult step to take. For example, the objective of ARDA is rural development. These two words cover a multitude of facets and have such a variety of connotations that economists still have no common definition of the word "development". Is it sociological development, economic development, or land use adjustment program? Is it any one of these, or some combination of all of them? How are the programs to be measured and evaluated? What are the objectives? Are these short, medium, or long term? How can one evaluate a program? What are the benefits to be derived? Are these benefits the relevant benefits? Do they meet the prime objective?

Questions are easy but the answers are not. For ARDA, one of the prime objectives which have been selected is this. The objective of an ARDA program is to raise the level of personal income in the target area. This sets up one possible test for every ARDA program. Do sufficient benefits accrue to the residents of the target area for the project to qualify?

Having posed this question, we raise a thousand more. How do we measure and evaluate shifts in income distribution? How do we measure qualitative differences? Are we sure that the program selected is the most effective and efficient? Can the problem of the area be solved within the area or do we have to work on the linkages between that area and those areas adjacent to it?

There are no tailor-made solutions. All data are merely data, or to give the word its literal meaning "that which is given". Manipulation of this data, and identification of these relevant trends and interdependencies for policy and program development require judgement.

It is this judgement function of management which causes the largest headache, as justification of that judgement is sometimes necessary.

Adequate justification of wildlife programs under pressure from all other self-centered and self-interested groups is difficult. Most people look to the economist to provide techniques and quotations with which to battle the cost accountants, and where there is no clearly defined framework or model within which the economist can work, the economist is lost.

It is not easy, sometimes, to defend the allocation of funds on emotional grounds; it is still harder to convince the Government, short of money, with reasoned arguments to divert funds into what appears to be a non-productive resource.

However, it is necessary to start somewhere and the "somewhere" is a judgement made by society, or government speaking for it, that "conservation and the preservation of species in their natural environment is an integral part of national policy".

Unfortunately, this statement and the budget allocation that accompanies it are normally only a sop to the collective conscience. The amount of money made available is usually inadequate. Hence, the need for performance indicators and techniques of program evaluation to enable wildlife management to design and implement effective programs and policies.

What is it in terms of which programs and projects should be selected? Until this question is adequately answered it is impossible to proceed further with an analysis or the selection of performance indicators.

Some objectives have been made explicit. They are the following: 1. The establishment and maintenance of wildlife conservation areas; 2. The maintenance of certain species at desired population levels and the preservation of selected species from extinction; 3. The preservation of designated areas in their natural state; 4. The provision of outdoor recreational facilities; 5. Wildlife management.

Some of the above, for example the preservation of selected species from extinction, have been selected as an end in themselves. The other objectives form part of a large socioeconomic framework; on the economic side they form part of an integrated rational land use or resource-based program; on the sociological side they fulfill the increasing need of an affluent society for outdoor recreation facilities.

2. **The selection of programs, performance indicators, and output budgeting for management purposes**

Once the objectives have been selected and clearly defined, the next step is to define policies, programs, and projects. Should the budget be less than adequate, there arises the problem of selection among the many available alternatives.

The selection of any one program must take into account all the alternative approaches. If, for example, the objective is to save *human* life, there is a variety of possible approaches. Medical facilities could be upgraded; more traffic lights and speed limits could be introduced to save life on the roads; a better labelling system for poisons to reduce home accidents; life guard facilities on the beaches, the reduction of atmosphere pollution. The list is endless. Similarly in wildlife programs. Pollution control, removal of the species' predators, provision of adequate habitat, game licensing laws are all methods that can be used, singly or jointly, to reach the objective.

The broad functional headings for wildlife management might be:

A. 1. the reduction of losses caused by wildlife to human activities.
   2. an increase in the natural use of wildlife for pest control and other functions.
   3. the maintenance of certain species at desired population levels, and the preservation of species from extinction.
   4. the supply of outdoor recreation facilities.

B. Administration and policing of the Game Laws.

There are many different techniques of program evaluation available. One of these techniques is B/C analysis. However, the prime prerequisite for this type of analysis is that the benefits and costs, whether direct or indirect, tangible or intangible, must be measured, quantified, and translated into dollar terms.

In the case of wildlife management this is not always possible. The following examples highlight some of the difficulties.

(1) Examples of losses can be measured. The ongoing level of damage to crops and aircraft can be established, and levels of damage during or after a program can be subtracted from the previous level to determine the benefits arising from such a program. The measurable damage would then be the performance indicator. The effectiveness of certain programs can then be established and the costs related to the benefits, an evaluation made and alternatives compared.

(2) Performance indicators of the natural use of wildlife for pest control and other functions are at present a difficult area, as both knowledge and data are lacking.

The cost of radiation of certain insects is known. The direct costs of alternative methods of spraying are also known. The effectiveness of both methods can be compared and selection of alternatives made on the basis of least cost weighted by effectiveness. The indirect costs and indirect benefits however are not fully known and it is in this area that further research needs to be done. The full extent of the damage caused to an ecological cycle by the residual DDT is not as yet known or measurable, and for these reasons cannot be evaluated. Until such time as it is, the relevant indirect costs or benefits to society cannot be included in any evaluation process or technique. Since it is these long-term damages or costs which may be the deciding factor in the choice

between two or more alternatives, I would suggest that this should be an area for intensified research.

(3) The preservation of some species at desired population levels, and others from extinction, calls for different performance indicators. This time the benefits cannot be measured in dollar terms but in the species population. The existence of this type of program depends not on a benefit-cost ratio of the species, but on the value judgement of society. Society has decided that the preservation of this species is a good thing, but they have not said to what extent they are prepared to pay for it.

(4) The provision of outdoor recreation facilities and wildlife to be seen, shot at, photographed, and fished for, caters to a demand that represents an annual spending of billions of dollars. The 10,000 tons of lead fired annually at ducks, geese, moose and other game, together with other equipment costs and transportation costs, represent the amount of money that Canadian residents and foreign visitors to Canada spend annually on outdoor recreation. I do not intend here to go into the economics of outdoor recreation or the methods used to evaluate it, or the problems of evaluation. Much has been written. However, the relevant performance indicator from the point of view of wildlife management should be wildlife population or output, rather than imputed dollar values to intangible recreational benefits.

The starlings in Russia control pests in the forest, migrate to Germany where they eat the grape harvest, and go on to France where the grape harvest is finished by the time they arrive. The same animal or bird, in many cases, is beneficial to some and detrimental to others.

Some people would construct a benefit-cost analysis of the starlings and weight the benefits to Russia and France against the costs to Germany in order to decide whether the starling population should be reduced. This would be absurd. What is called for is an intelligent management program to minimise the costs to Germany and maximise the benefits to Russia and France.

Other examples are equally hard to evaluate, as their impacts are difficult to measure. For example, how much money do sea-gulls save municipalities on refuse collection? Or again, how much money do the African scavengers save international health authorities by preventing outbreaks of diseases? How much money could be saved by the harnessing of wildlife to perform some of these tasks? Conversely, what are the costs to society if man has to do what nature does efficiently without reference to budgets and taxations and funds.

The benefit-cost paper presented to the Resources for Tomorrow Conference pointed out the fallacy of imputing the dollar value of costs as benefits. The argument runs, "if $1,000 is spent on the Canadian goose, the benefits to society are $1,000." This technique not only begs the question but has the additional disadvantage that it is misleading to impute a 1 to 1 correlation between input and the resultant output.

But, with adequate knowledge, it is possible to fit many of the intangible and indirect costs and benefits into an economic analysis, but it cannot be done until more reliable data are made available by the biologists and ecologists.

The selection of the relevant performance indicators in the above cases is a matter of correctly answering the question "What is this program designed to do?" The answer should be X. The X must then be measurable according to some scale or other. This then serves as the correct performance indicator. I suggest that all performance indicators cannot be translated into dollar terms. Indeed it is the main point of this paper to suggest that to attempt to do so can result in absurdities. A system of performance indicators and output budgeting, when working in a field that does not readily lend itself to the traditional market-price structure, is more appropriate.

The value of output budgeting from the point of view of program selection is twofold. First it separates judgement clearly from evaluation. Second it permits a flexible approach.

The methodology of output budgeting is as follows: *First:* Select and clearly define the objectives. *Second:* Rank those objectives in terms of priorities. *Third:* Select alternative programs and projects.

At this stage the alternative programs may be subjected to some type of benefit-cost analysis which permits an assessment of the costs together with an assessment of the effectiveness of the available *alternatives.*

Fourth: Rank programs and projects in terms of priorities within each objective.

We, therefore, should have a table that looks as follows:

Priority	1.	2.	3.	4.	5.
Objective	B	A	C	D	E
Programs	B1	A1	C1	D1	E1
	B2	A2	C2		E2
	B3	A3			E3
	B4	A4			E4
					E5

Fifth: Cost the programs and projects

Each of these programs now has a cost attached to it. It is therefore now possible to select alternative mixes of programs that are possible within budgetary constraints.

We might have:

Mix No. 1 (B1; A1; A4; C2; D1; E4; E5)
Mix No. 2 (B1; B4; A2; C1; D1; E3)
Mix No. 3 (B3; A2; A3; C2; D1; E5;)

etc.

The next step is to assign an *arbitrary numerical* value to the alternatives in order to rank the mixes. This says not only that program A1 is preferred to A2, but by how much. It may be that program A1 is higher in the scale of preferences than B3 and B4. In this case A1 is assigned a higher value.

Mix 1 has, therefore, the highest preference value. This combination is then reviewed to determine whether the omission of any of the other programs is acceptable to management. If it is felt that it is unacceptable, the omitted programs can be given a higher priority and the possible mixes re-selected. Alternatively, the costs of some of the programs may be revised or cut back to permit the inclusion of additional programs or projects, until such time as an acceptable mix is determined.

At this stage, program review becomes important. If the function of the program is, for example, "to restore a salmon stream" a combination of projects may be necessary: pollution control, provision of salmon ladders and spawning grounds, removal of pike from the river, control of the netting at the mouth of the river, adequate policing, and so-on. Care must be taken so that where choice is necessary the removal of one project does not curtail the effectiveness of the total program.

It is my contention that the proper use of this method of program selection is more appropriate than benefit cost analysis in an area where the indirect costs and benefits are not known and where most of the impacts cannot be easily translated into dollar terms.

Therefore as an example:

Priority	1	Rating	2	Rating	3	Rating	4	Rating	5	Rating
Objective	B		A		C		D		E	
Program	B1	50	A1	45	C1	43	D1	40	E1	35
	B2	45	A2	30	C2	28			E2	28
	B3	40	A3	27					E3	24
	B4	35	A4	24					E4	21
									E5	20

It may be said, with some justification, that the ranking of projects in this way is artificial and arbitrary. It is. The same process is however used for imputing values to intangible benefits. Using benefit cost analysis, one project can be made to appear more attractive than another by ascribing a higher dollar value to the benefits that do not have a market value.

The advantage of ascribing arbitrary values to *priorities* is that it highlights the area of judgement which gets buried in a benefit cost analysis.

Imputing these values to the alternative mixes: Mix 1 has a rating of 228; Mix 2 has a rating of 222; Mix 3 has a rating of 185; Mix X has a rating of Y.

3. Justification of program

The above two sections have described an approach that can be taken to select and evaluate wildlife programs and projects once the objectives and functions of wildlife management have been defined.

There remains, however, one area which is exceedingly difficult to deal with, namely the over-all justification of objectives and, therefore, of funds to implement policies and programs.

It has been shown above that complete benefit-cost analysis is not completely satisfactory owing to the inadequacy of the techniques presently available and the difficulties of attaching convincing dollar values to many of the benefits.

What value can be ascribed to the Canada goose? It can be said that a species nearing extinction is like a work of art. Once destroyed it is irreplaceable. What is it worth – 5 cents or $50 million? Your guess is as good as mine.

What therefore can an economist say when wildlife managements asks for weapons to do battle with the cost accountants? I would suggest the following piecemeal approach be considered.

First that output budgeting is the best available technique for internal use, but that it cannot be used to compare outputs of different sectors.

Second, to construct a yardstick to compare and rank outputs of different sector programs for budget allocation purposes is impossible. I do not know of any technique, including benefit-cost analysis, that can convincingly compare the marginal costs and marginal benefits to society of projects in two or more unrelated fields, when the benefits cannot be adequately measured by the price mechanism.

The problem of benefit-cost analysis is that the benefit-cost ratio in these instances depends in its turn on an imputed value per unit of intangible output. Comparison of these imputed values and ranking of the intangible benefits to society has never been done. In the final analysis I would suggest it can never be adequately done, and it can never be done for this reason. No consumer preferences can be adequately determined without a price mechanism. It may not be possible to establish and price consumer preferences either because the data is unavailable at a reasonable cost, or because these preferences change during the time necessary for the calculation process, or simply because adequate measurement techniques are not available.

This leaves one in a predicament. What possible way is there for an economist to justify a value judgement, when no one has stated what he is prepared to pay for the item? I suggest that the reason this problem exists is that, with the present government institutional framework, the battle is being fought in the wrong place. Priorities and budget allocation should be done on the basis of political priorities as well as on straight economic grounds. There should be continuing dialogue between those responsible for setting priorities and those responsible for program design, costing, and implementation. Referring back to the selection of the optimum mix, the final mix selected can be done only when objectives, priorities, and costs are examined in the light of effectiveness and efficiency.

Until such time as such a mechanism exists, I venture to suggest that the attempt to use economic analysis as a justification or substitution for political decisions is doomed to failure. It should be used only as one management tool and as an aid to, rather than a substitute for judgement.

Summary

The arguments set forth above can be summarised as follows:

1. In order to undertake any kind of evaluation analysis, the objectives of a program must be clearly stated.
2. Once these have been defined, performance indicators can be selected for policies and programs.
3. Benefit-cost analysis is applicable only in those cases where output can be measured in terms of the market price mechanism.
4. In other cases, output budgeting results in less confusion and artificiality.
5. Both benefit-cost analysis and output budgeting become significant only if there is a continuing dialogue between those responsible for setting objectives and priorities and those responsible for program development and costing.

Program planning and budgeting for wildlife management programs – the federal experience

by F. H. Schultz

To manage is to plan, control, and direct. This is accomplished in major part by having people spend money according to plan. The key words then are *money* and *people*. You will note at the outset that I have carefully referred to dollars and to manpower together. Planning for, use of, and accounting for both resources concurrently is a basic principle in the new management system for government.

The financial management techniques employed in the Federal Government in the early 1960's were archaic. The Report of the Royal Commission on Government Organization chaired by J. Grant Glassco assessed the Canadian government's financial practices with these words:

> "The government's financial controls and accounting systems are cumbersome, with a multiplicity of checks, counterchecks, and duplication; and blind adherence to regulations is too often given precedence over efficiency and despatch. This ponderous system, virtually unchanged in the past thirty years, is regarded by many as the price that must be paid under democracy in order to hold public servants properly accountable."

Those words and the report that went with them (the Glassco Report) initiated a critical reappraisal of the Federal Government's financial practices and procedures, and the introduction of program planning and budgeting based on a system of accountability and delegated responsibility and adequate authority. The objective of the change was to provide the means for managers at all levels to determine whether they are spending the proper amount of money on the right thing.

Four departments (of which the Department of Indian Affairs and Northern Development was one) were selected to test the new concept.

The departmental studies were begun by private management consultants. The opening paragraph of their terms of reference for improving management in the four departments reads in part as follows:

> "The plan for financial management calls for the development and implementation of techniques and tools which will enable departmental management to utilize the Department's financial resources more effectively. Therefore, the tools and techniques must be designed to assist operating managers in more effectively carrying out their duties and responsibilities . . ."

This paper deals with the principles and practices of the financial management system which evolved in the Department of Indian Affairs and Northern Development and which is being introduced throughout the Public Service. It describes what is necessary to achieve a practical and comprehensive financial management system which translates policies and plans into terms of money and people. The system meets the requirements of the Canadian Wildlife Service well. I believe that it could well be used by other wildlife organizations.

Consider the manager's role for a moment. He must allocate and use men and money to achieve maximum effectiveness in meeting the objectives and goals of his organization in the most economical way. He is constantly faced with deciding the priorities of various tasks and their relative importance in the total picture. He has to decide which task should receive what part of his resources. He must decide what mix of jobs he will do next month or next year if he is given fewer resources than he thinks necessary, or if new programs are suddenly thrust upon him. He must assess the effectiveness of each task relative to objectives and he must evaluate the results. He needs all the help he can get in planning, measuring, evaluating, and deciding.

The system which I am going to discuss has the following principal components:

(a) forecasting and planning;
(b) accounting and reporting;
(c) financial control, and
(d) audit.

Forecasting and planning

The manager's first requirement is to produce a long-term plan which contains:

a) a description of objectives;
b) a plan of action and precise goals for each unit of work;
c) alternative plans in case of adjusted resources; and
d) methods of measuring effectiveness, performance, and efficiency.

"Long-term planning", here termed Program Review, is receiving increased emphasis, and is quite different from preparing financial estimates as most of us recognize them. Estimates provide information to Parliament and are the vehicle for obtaining fiscal authority from Parliament. The Program Review prepared annually within our organization summarizes, for both departmental management and Treasury Board, the Canadian Wildlife Service's objectives and resource requirements for the ensuing five years and provides a justification within the

general framework of government policy for carrying out its plan. Main Estimates are an extraction from the first segment of the long-term plan.

Program Review

The Canadian Wildlife Service is one of several branches within the Department of Indian Affairs and Northern Development. Within the Department's financial framework the work of the Service is known as an Activity and forms part of the Department's Conservation Program. The work of the Canadian Wildlife Service is organized, planned, budgeted, and carried out under eight distinct areas of interest known as sub-activities. They are:

1) *Administration* — support services not directly allocated to other sub-activities, including support for university training in wildlife biology through scholarships and directed research contracts.

2) *Migratory Birds* — research on and management of migratory birds as defined under the Migratory Birds Convention Act.

3) *Wildlife Research* — research on wildlife, particularly big game and furbearing mammals, and the provision of information and recommendations to the Commissioners of the Northwest and Yukon Territories, Northern Administration Branch, the Indian Affairs Branch, and National and Historic Parks Branch.

4) *Pesticides* — research to determine the effects of chemical biocides on wildlife.

5) *Pathology* — research to determine the occurrence and significance of wildlife disease and parasites.

6) *Limnology* — research in support of fisheries management in the National Parks.

7) *Information* — dissemination of wildlife information to the public.

8) *Interpretation* — the development and operation of centres in the major biomes of Canada to interpret wildlife and wildlife conservation to the public.

The objectives of the Canadian Wildlife Service as a whole, and of each of the sub-activities defined above, are stated in the Program Review. The objectives are written so they relate to the federal responsibilities for wildlife. They must be carefully prepared to include all aims of the organization without infringing on objectives of other organizations. They must be clearly written so that all readers (the Department and Treasury Board) understand precisely what the Canadian Wildlife Service is attempting to do. (see Appendix 1)

An important part of Program Review is the detailed consideration of factors significant in that they forecast a change in responsibilities during the five years under review. For instance, the Canadian Wildlife Service Program Review for the period 1969-70 to 1973-74 discusses such factors as salary and price increases, the levels of salaries for new positions required, long-term plans for construction of offices, laboratory and interpretive centres, forecasts and expenditures on rental and purchase of land for wildlife management, and the expansion of research, as well as such continuing requirements as surveys of caribou, crop damage alleviation, pesticide analyses, and others.

The Review then deals with the details of each sub-activity (Administration, Migratory Birds, Pathology, etc.), and the related requirements for men and money. The requirements are divided into Operation and Maintenance (salaries, materials, travel funds, service contract moneys, housekeeping facilities, etc.) and Capital (land, construction, equipment, etc.). For each sub-activity (see Appendix 2) personnel and financial requirements are summarized, changes from year to year are explained, and some indication of performance is given. One of the difficulties of applying the new Program Planning and Budgeting system in the wildlife field is the development of quantitative measures of performance. The measures we use are not literally "performance indicators".

For instance, how do you measure performance in studying the life history of a mallard duck. Eventually there is a report which leads to the production of a scientific paper which may be acclaimed by fellow scientists. But try to quantify the results of that paper as an output of the organization, using measurable factors comparable to the number of schools or miles of road built. Worse still, try to quantify it before the study is completed and reported. Or, try to show the value of a waterfowl management project in increasing the number of ducks. You can measure the bird population and you can measure hunter-use. But what about the sense of discovery of a city dweller spotting a flock of Canada geese zeroing in on a marsh. How do you measure aesthetic values?

Performance in the research field is not always measurable by using a yardstick or a set of numbers. As you all know, quantitative output may not be related to the quality of that output. Therefore we must be doubly careful of the indicators we use.

Somehow we must balance off the inclination of government administrators to cut back research programs which by nature do not have immediate, quantitative value. Perhaps we can design long-term performance indicators. We in the Canadian Wildlife Service are doing some serious thinking in this area.

Within each sub-activity, our financial and manpower requirements for the next five years (e.g. 1969-70 to 1973-74) are compared with the requirements approved for the current year (1968-69) and with what was, in fact, spent and used during the past year (1967-68). A memorandum is produced which describes the sub-activity in detail, what it is intended to do, what goals are established for it, and what may be alternative approaches to the goals. For example, one of the goals of the Migratory Bird sub-activity is:

"to prevent the extinction of any species"

We say that the several approaches to prevent the extinction of any species are:

"a) Remove birds from the wild and rear in captivity;

b) Study the history of rare and endangered species and reduce causes of natural loss – many factors such as climate cannot be controlled, others such as predators or habitat deterioration may be controlled;

c) Preserve habitat required for breeding, resting, and migration."

We may select one or several approaches to follow in proceeding toward our goal and we explain our selection.

In each sub-activity memorandum we also include a detailed explanation of what we will need if our planned expansions and new programs are accepted. We decide upon and list the priorities assigned to each plan of action and related requirement. This is the major statement of justification for the proposals and requirements of the sub-activity. The final portion of the memorandum provides an analysis of cost for personnel, for other Operation and Maintenance and for Capital.

After each sub-activity is fully developed, we present various summary tables. We provide the total requirements for Operation and Maintenance Funds, Capital Funds and Personnel. (Appendix 3 shows the two forms in which our personnel requirements are summarized.) Summaries of actual and estimated revenue are included. The value of services provided free by this and by other departments is estimated and tabulated, and finally a tabulation of the personnel requirements by their various categories (Scientific, Administration, Technical, etc.) and groups (e.g. Biologists, Research Scientists, Engineers, Statisticians, Chemists, etc. within the Scientific category) is also included.

The Program Review stresses the objectives, plans, and priorities of an organization and provides opportunity for examination of immediate and long-range plans before detailed budgets are prepared. It indicates why the organization exists, where the organization is going, and when and how it will get there. The final step in the Program Review process is a review of the plans and estimate targets for the Branch by senior departmental managers and officers of Treasury Board. Review of our program is undertaken by a senior committee of the Department chaired by the Deputy Minister. Over-all objectives and plans are discussed and related to Departmental and Governmental policy. Individual projects are frequently discussed and accepted, postponed or rejected. All decisions are recorded and amendments are made to Program Review before it is incorporated into the Departmental submission and forwarded to Treasury Board. Treasury Board then considers the Departmental submission in total and the individual programs in particular. The result is acceptance or amendment of the total Departmental program and the individual program of each branch. Regional participation in the preparation of Program Review is limited to the Director and supervisory levels. However, we believe that the over-all plans of the Canadian Wildlife Service, its goals and objectives as set forth in Program Review, should be known by all supervisory, professional, and technical staff and copies are sent to them when it is sent to the Department.

Estimates

The next step in the forecasting and planning phase is the preparation of the more detailed "Main Estimates". Participation in the preparation of information for that document is extended to all staff levels. Estimates are a translation of the short-range plans of the Service into the precise requirements for people and money for approved programs for the next fiscal year, only. The Estimates are prepared in accordance with targets established for the Canadian Wildlife Service as a result of analyses of Program Review by the Department and Treasury Board. They are also subject to any financial restrictions which may be imposed by subsequent decision of the Government.

Submission of "Main Estimates" is the means by which Parliament is requested to authorize the appropriation of funds. Throughout the Estimates, comparisons are made with the detailed expenditures of the past year, the appropriations that have been provided for the current year, and the amounts of money and manpower that were specified for next year in Program Review. It has been our experience that *if the detailed Estimates are within the targets presented in Program Review, and/or within the targets prescribed by Treasury Board and the Department as a result of Program Review, there is little or no difficulty in obtaining approval of Estimates.*

Significantly, the requirement for manpower (new positions in various categories and groups) is considered throughout the entire forecasting and planning process. A statement of manpower requirements forms an integral part of the Program Review and Main Estimates. This was not always the case. Not too long ago Estimates of our financial and manpower requirements were prepared and reviewed separately.

Accounting and reporting

As we approach the fiscal year that has been planned for, and for which funds have been appropriated, the manager must prepare to spend the money in accordance with prescribed laws and regulations and in pursuit of the objectives and goals used in justifying the appropriation. During the fiscal year, he must be provided with the details of expenditures as they are being made. Those details provide the manager with one means of determining if progress is according to plan.

At the beginning of the fiscal year a detailed monthly budget is prepared and fed into the memory bank of a computer. The budgets represent the planned schedule of action for the fiscal year. Expenditures are then put into the computer on a monthly basis, coded in such a way so that they can be related to various elements of the budget.

The computer then compares expenditures with budget and issues a monthly statement which highlights any difference. That difference is called a variance. It is that difference, which can be either an over-expenditure which is called negative variance, or an under-expenditure which is called positive variance, that the manager analyses, explains, and discusses with the next higher level in the organization. That process is known as variance analysis. The reasons for either positive or negative variance may be equally significant from the managerial point of view.

One of the essential elements of variance analysis is its timing. Computer statements are available seven working days after the end of each month. Variance reports are submitted by Regional Directors to Branch Headquarters by the 15th working day. The Deputy Minister's office receives the report by the 18th working day. Detailed progress of the Branch program has, therefore, been discussed at all levels of the Department within less than one month of the month in question and of the year to date.

A key consideration in setting up variance analysis is deciding on the base level at which analysis should begin. At the moment, the Canadian Wildlife Service carries out variance analysis at the sub-activity (Administration, Migratory Birds, Pathology, etc.) level, with input from the Regional Directors. Quite frankly, it is not good enough. Variance should be determined at the project level with explanations originating at supervisory or project leader level. To date we have not had great difficulty in assessing variance from programs. It is conceivable, though, that positive and negative variance could balance out within any sub-activity creating at the more senior managerial level a false impression of progress. Variance reports at the job or project level and analysis of variance at that level would eliminate that weakness and be of major benefit to the individual working in the field.

The values of a variance analysis are:

a) Managers are forced to estimate carefully;
b) Managers are forced to think carefully about the probable monthly progress of their organization when preparing their annual budget;
c) Administrative staff must adopt good accounting practices in order to provide correct and current data;
d) A biologist in charge of projects must analyse and report on his experience as a year progresses; a manager must review the monthly progress of the entire program; both analyses help the biologist and the manager to do a better job;
e) Significant dialogue regarding the progress of the program is created among senior levels of management. The Deputy Minister is thereby appraised of what is happening in the various units of his Department and of the difficulties that may be encountered;
f) Managers are able to adjust their programs and plans to meet changing or emergency

situations on the basis of reliable data, while the fiscal year is in progress.

g) Objective criteria are provided to managers for evaluating the ability of those who report to them.

The results of using the new accounting and reporting system have been significant already. No longer is there a negative attitude towards lapsing funds, provided that managers get their jobs done: lapsing funds are not regarded as an impediment to obtaining funds for subsequent years. Funds are allotted on the basis of worthy and realistic goals and greater understanding and appreciation of the responsibilities of the Canadian Wildlife Service.

Financial control

As an organization grows larger, it becomes necessary to delegate management duties, even though senior management retains complete responsibility.

Allocating authority to spend money is one way by which responsibility is delegated. Such authorities are never unrestricted, though delegated authorities are often limited by the regulatory controls of external agencies. For example, the Government Contract Regulations impose specific limits for various types of contracts. Aside from such regulatory controls, the problem for the senior manager is to strike the right balance between responsibilities and authorities to be given to line managers and those to be retained by himself.

The balance, of course, is determined by the objectives of financial control. Those objectives are:

a) To place responsibility at the effective level relative to local conditions;
b) To provide flexibility to managers who understand local conditions;
c) To simplify administrative procedures and reduce paperwork and delays;
d) To develop responsibility and understanding of managerial decisions at the local level;
e) To develop participation of local managers in all aspects of the financial program.

In the past financial control was limited mainly to systems designed to prevent illegal or other improper payments. By contrast, in a system of program budgeting, budgets are used to guide a manager toward specific goals by monitoring performance not by restricting freedom to act.

Responsible financial management requires the application of controls over the collection of revenues as well as over the expenditure of funds. Frequently, managers think that controls apply only to expenditures and that revenue collection requires only a routine accounting practice. With several notable exceptions, managers in the Federal Government have failed generally to assume proper responsibility for the collection of appropriate charges for services rendered.

Control is exercised by the Comptroller of the Treasury. He ensures that expenditures are charged to the proper (parliamentary) vote; that no vote is over-expended; that authorities, regulations, and directives are observed; and that mathematical accuracy is maintained and verified. Treasury Board, of course, exercises broad control over appropriations. The extent of that control will vary as departments demonstrate their ability to manage responsibly.

Audit

There are two significant types of audit. They are financial audit and operational or management audit. Both are important in determining whether a department or any branch within it is using its resources both legally and effectively.

Financial audits are conducted where auditors check and report on the reliability of balance sheets and accounting practices, or when they conduct exhaustive investigation of financial transactions to determine the existence of fraud. Such audits are conducted by two organizations in government, the office of the Auditor General and the office of the Comptroller of the Treasury. The Auditor General's office concerns itself with the efficient use of public funds and whether proper authorities were obtained in spending such funds. The Comptroller of the Treasury, through his Audit Services Branch, performs a continuous internal audit of mechanisms established by management to protect assets and prevent misuse of funds.

Operational audit is basically a service to management for the improvement of operations. It is referred to in our Department as Program Management Evaluation. This audit is performed by a compact group of trained personnel who report only to the Deputy Minister. It reviews the entire scope of the Department's programs on a post-audit basis, and appraises the value of these programs from the point of view of over-all government policy. It also evaluates the effectiveness of each unit in the Department and determines whether such units are carrying out their plans and meeting their objectives and schedules. Such evaluations are conducted in a

positive and constructive atmosphere with a view to providing assistance and advice, not criticism.

The Canadian Wildlife Service, like most organizations, tries to evaluate its own program continuously. All projects are monitored by supervisors and senior managers through a system whereby biologists and research scientists are required to submit regular "Job Progress Reports". Those reports are reviewed by supervisors of research or management, by Regional Directors, by Staff Advisers to the Director and others as necessary to ensure that research and management projects are proceeding as planned and as required.

Conclusion

Those of you who have waded this far have, no doubt, sighed and concluded that there must be an easier and simpler way. There *are* easier and simpler ways. The Government of Canada used them prior to Glassco. However, besides being simple and easy they were cumbersome, inefficient, uninformative, and useless to the manager.

Today the size and complexity of government operations generally, and of our respective wildlife administrations specifically, demand the use of improved management techniques. We in the wildlife game have often been inclined to plan poorly and resist long-range thinking using the excuse that we are dealing with a fast-changing resource and therefore must maintain flexibility. We have claimed that we must maintain our biological objectivity and let the "administrators" find the means. If this is your present practice, I can tell you that it won't work that way much longer. I don't care how small your unit may be, the requirement for proper planning, budgeting, and reporting will soon be upon you.

We in the wildlife business must wake up to the fact that we can't do a good job without careful planning, enunciation of objectives, establishment of specific and realistic goals, and preparation of properly justified budgets. We need to employ good methods of measuring the use of dollars and manpower. We need to keep line managers, directors, and deputy minister informed. Thus adequate methods of audit and program evaluation are as important to the wildlife manager as they are to the corporate manager. David A. Munro, Director of the Canadian Wildlife Service, said to a meeting of his senior managers and advisers recently —

> "I think that in the past we have all been too subject-oriented. We have been concerned about mallards, or bison, or population dynamics, or stress, to the extent that we have ignored or at least overlooked the context in which we were able to pursue those interests. To be subject-oriented is a personal thing and not to be denied — in fact, we would not bring the dedication to our work that we do if we were not possessed of a consuming interest in some aspect of wildlife biology. This has been both our strength and our weakness. So I am not saying that our interest in subject matter should be diminished. I am merely saying that it should be consciously directed toward the solution of problems and the attainment of goals that are the proper responsibility of the Canadian Wildlife Service".

In short, Program Planning can be of great help in obtaining the maximum appropriation for your wildlife organization and in extracting the maximum benefit from every dollar and man. It is not a substitute for judgement wisdom. It is not a fad. It is the application of the basic principles of problem solving and decision making to the problems of governmental organizations such as ours.

Acknowledgements

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APPENDIX 1 – Objectives of the Canadian Wildlife Service

PROGRAM REVIEW

PROGRAM Convervation DEPARTMENT Indian Affairs & Northern Development PAGE

ACTIVITY

SUBJECT Activity Highlight Memorandum – Canadian Wildlife Service

OBJECTIVES OF THE ACTIVITY

The Canadian Wildlife Service discharges all federal responsibilities in regard to wildlife, except for management of wildlife in the National Parks. Those federal responsibilities include:

- research on and management of birds referred to in the Migratory Birds Convention Act with the United States
- research on and provision of advisory services in relation to wildlife
  - in the National Parks
  - in the Northwest and Yukon Territories
  - in Indian Reserves
  - on other federal lands, e.g., airports

The Canadian Wildlife Service supports the management of wildlife under provincial jurisdiction

- by undertaking fundamental research
- by co-operating in management activities with the provinces on request and by agreement
- by providing information about wildlife to the public
- by developing and operating wildlife interpretive centres

The primary objective of the activity is to ensure the preservation and wise use of wildlife resources under federal jurisdiction and to support the provinces and territories in their efforts to achieve the same objective in respect of wildlife under their jurisdiction. Secondary objectives are specified under sub-activity headings.

Work of the Canadian Wildlife Service is planned and carried out under eight sub-activities. Objectives of the sub-activities are as follows:

(1) *Administration*
- to provide effective and efficient administrative support for wildlife research and management activities;

(2) *Migratory Birds*
- to ensure the maintenance of migratory bird populations at levels in harmony with man's interests;

(3) *Wildlife Research*
- to provide the information and advice needed in support of wildlife management in National Parks, Indian Reserves, territories, and provinces;

(4) *Pesticides*
- to determine the effects of pesticide-use programs on wildlife populations; to recommend changes in the use of pesticides so as to favour the survival of wildlife; and to promote an awareness of the unity of biological communities and of the possible consequences of the uses of pesticides;

(5) *Pathology*
- to assess the occurrence and significance of diseases and parasites affecting Canadian wildlife populations; and to recommend methods to combat and alleviate the effects of outbreaks of pathological conditions;

(6) *Limnology*
- to provide the information and advice needed for the management of National Parks' waters and fisheries so as to maintain adequate stocks of fish under natural conditions; and to control nuisance aquatic organisms;

(7) *Information*
- to provide for the dissemination to the public, by all media, of information on Canadian Wildlife Service activities and on wildlife in general;

(8) *Interpretation*
- to develop and maintain public awareness and appreciation of the value of wildlife, the significance of ecological relationships, and the relationship between research, management and the survival of wildlife; and to preserve samples of distinctive biotic areas of Canada not preserved through the National Parks system.

APPENDIX 2 – Sub-Activity Summary

PROGRAM REVIEW

PROGRAM Conservation DEPARTMENT Indian Affairs & Northern Development PAGE

ACTIVITY

SUBJECT Sub-Activity Summary – Wildlife Research $(000'S)

DESCRIPTION	67/68 PY	68/69 CY	69/70 NY	70/71 NY+1	71/72 NY+2	72/73 NY+3	73/74 NY+4
Personnel Requirements							
Establishment							
Continuing							
Casual							
Strength							
Average							
Year End							
Financial Requirements							
Payroll							
Caribou Resurvey							
Research Projects							
Explanation of Changes							
Program Changes – Non-recurring							
Caribou Resurvey							
Changes to Maintain Current Levels							
Salary Adjustments							
Normal Growth							
– Staffing Increase							
– Financing of Research Projects by new staff							
Change Over Preceding Year							
Performance Indicators							
Percentage of total vote (Financial)							
Percentage of total vote (Personnel							

APPENDIX 3 – Personnel Summary by Sub-Activity

PROGRAM REVIEW

PROGRAM Conservation DEPARTMENT Indian Affairs & Northern Development PAGE

SUBJECT Activity Summary by Sub-Activity – Personnel

DESCRIPTION	1967/68		1968/69		1969/70		70/71	71/72	72/73	73/74
	PY		CY		NY		NY+1	NY+2	NY+3	NY+4
	Strength (Mar. 31)	Estab.	Strength (Mar. 31)	Estab.	Strength (Mar. 31)	Estab.	Estab.	Estab.	Estab.	Estab.
Administration										
Continuing										
Casual										
Migratory Birds										
Continuing										
Casual										
Wildlife Research										
Continuing										
Casual										
Pesticides										
Continuing										
Pathology										
Continuing										
Limnology										
Continuing										
Casual										
Information										
Interpretive										
Continuing										
Casual										
Total										
Continuing										
Casual										

APPENDIX 3 – Personnel Summary by Category and Group

PROGRAM REVIEW

PROGRAM Conservation DEPARTMENT Indian Affairs & Northern Development PAGE

SUBJECT Establishment Summary by Category and Group

DESCRIPTION	1967/68		1968/69		1969/70		70/71	71/72	72/73	73/74
	PY		CY		NY		NY+1	NY+2	NY+3	NY+4
	Strength (Mar. 31)	Estab.	Stength (Mar. 31)	Estab.	Strength (Mar. 31)	Estab.	Estab.	Estab.	Estab.	Estab.
Executive Category										
General or Senior Executive Group										
Scientific and Professional Category										
Biology and Bacteriologist Group										
Research Scientists										
Research Managers										
Engineers										
Statisticians										
Chemists										
Administrative and Foreign Service Category										
Administrative Services Group										
Program Administrative Group										
Financial Administrative Group										
Personnel Administrative Group										
Technical Category										
Technicians and Technical Officers (not converted)										
Administrative Support Category										
Clerical and Regulatory Group										
Secretarial, Stenographic, Typing Group										
Operational Category										
General Services										
Storemen										
Sub-total										
Casual										
Total										

Summary of Replies to Feedback Form – total 33 replies

1. What is your general assessment of the Conference? To what extent did it meet your expectations? To what extent did it fall short?

The majority of delegates and observers felt that the Conference was very good. Eighteen replied that it was "very good" or "excellent". Another seven thought it was better than average and three more called it "the best in my experience". One thought it was only "fair" and two had no comment.

The "lack of the annual haggle over regulations" was mentioned by four; three commended the prior circulation of papers; and two each found the "seminar" and discussion good.

Other items favourably mentioned were the effect of the earlier technical committee meetings, the papers, the "good participation by some", the length and location of the Conference, and the relation of the topics to the Yukon.

Most complaints about the Conference focused on timing aspects. Seven mentioned the importance of setting the time in advance so that travel arrangements could be made with confidence. Three felt that there was inadequate time for discussion: two of these considered that rushing to conclude, impaired the quality of discussion, and one suggested that the discussions had been "arranged ahead" and there was no allowance for "impromptu discussion".

Three considered that waterfowl problems should have received more time and two wanted more discussion of regulations.

A number of other points were made – that some discussion was "too abstract", that there was not enough discussion, that too much time was given to social activities, that the papers were not distributed soon enough, that the feedback form should have been distributed earlier, that the majority present took no active part and that there might have been some discussion on land use.

One person voiced general approval but asked "what were our targets"? Another person questioned the wisdom of planning to hold the Conference in the west three times in a row.

2.(a) What comments do you have on the social activities and the "free day" activities?

The comments were "excellent", "superb", "superlative", "great", "very appropriate", "well organized" – 24 of them! The "free day" is seen by some members of the Conference as "an integral part" of the Conference, contributing to its informal environment and so helping with the learning process. Four recommended that the "free day" be continued.

However, not everyone was happy with the amount of time spent in recreational activity. One delegate said "many delegates came a long way to spend 40% of the time being entertained". Two others suggested that the "free day" be cut in half and that the morning be spent working.

One delegate stated that it was a broadening experience to "discuss the local scene with local people". Only one delegate had no comment.

2.(b) What comments do you have on the general reports (on Recommendations, Canadian Wildlife Service activities, National Committee on Wildlife Land, etc.)?

Nineteen members of the Conference rated these reports as "good", "satisfactory", "OK", three as "adequate", and six had no comment.

However, although the delegates and observers generally approved of these reports there were a number of suggestions for improvement. Three suggested that prior circulation of these papers would result in better discussion. Delegates could formulate questions and one member added that these papers often contain information otherwise not available for months but immediately useful. Another delegate suggested that there be a variation in the reports from year to year allowing for special emphasis on the province or territory where the Conference is held. Another suggested that provincial summaries of a similar sort should be presented. Another suggested less structure with "more panel discussions similar to the last day". One member stated that these reports were "the meat of the conference but they could have been better prepared".

2.(c) What comments do you have on the technical papers (Whooping Cranes, Mackenzie Mountain Big Game, Grizzly Bear, Waterfowl Damage)?

The twenty-four general comments ranged from "good" to "excellent".

The specific comments on content and presentation are grouped in three sections.

The favourable comments approved the presentation of local activities, the "sense of accomplishment" expressed, the "educational aspect", and the use of audio-visual aids.

Critics suggested greater use of audio-visual aids, avoidance of "too much detail when talking to administrators", and "more concise" and "less monotonous" presentations. Four people commented on the prior distribution of papers. Two

stated that the papers had not been distributed sufficiently far in advance and two commented on the effect of the predistribution: one pointing out the improved level of discussion and one suggesting that when papers were distributed in advance they be discussed only, not re-presented.

Others comments ranged over the purpose of these papers in the context of the overall purpose of the Conference. Two felt the papers were not "within the purposes of the Conference" and "could have been omitted without real loss" and that perhaps we are "straying from the original need to cover waterfowl needs, etc." On the other hand, one person said these papers should be a continuing part of the Conference and another suggested this aspect be expanded. Two said that topics of a more theoretical nature should not be excluded. Another suggestion was that "a statement of overall objectives, i.e., within the 'program' as opposed to the 'project' would be useful, perhaps by more senior personnel".

2.(d) What comments do you have on the discussion on regulations?

There was a fairly even split among the members of the Conference in their feelings about the discussion on regulations. Some thought they were "poorly covered", that the discussion was "too brief", or "not as complete as I would have liked". A somewhat larger group thought the discussion was "satisfactory" or was "an improvement over past years". Regardless of how the members of the Conference felt about this aspect of the discusions, advance preparation through the technical committees and in correspondence was seen as the major way to improve this aspect of the Conference.

Some suggestions went beyond these opinions. One person felt there should be "more time for 'soul-searching'.— in more clearly defining goals". One suggested a "closed session for freer discussion" and one a small subcommittee that "would stimulate more detail". One person thought there should continue to be general discussion of the general regulations at the Conference.

2.(e) What comments do you have on the three general papers on Management Process in Wildlife Conservation?

Almost without exception members of the Conference found both the papers and the presentation "excellent" or "enlightening" or both (25 comments). There were a few comments that were less enthusiastic – one thought the discussion was "repetitive", one that it was "good but long", one that the discussants were not controversial enough. One person thought there was an "unfortunate overlap in the papers that led to probably unproductive discussion" and one person thought that "earlier distribution of the papers would have enhanced the discussion quality" and that it would be better to make "earlier arrangements regarding the format and appointment of discussants". One other person suggested that the papers should be distributed "at least two weeks in advance".

Three members of the Conference suggested that this kind of session should be repeated. One suggested that the topic of the session be repeated at "three- or four-year intervals as techniques and problems change". Another suggested that this kind of session be continued and "include other aspects, for example, a look at resource legislation, preferably by a lawyer". Another suggested that he would like to hear in such a discussion "an economist from a nonrenewable resource field such as hydro development" since "we were the 'saved' talking to the 'saved'".

3. How could the Conference be improved?

As a number of members of the Conference pointed out on the feed-back forms, suggestions for improvement were made in answer to the earlier questions on the form. These suggestions have been incorporated in the summary at the point where they were made, with the exception of those dealing with timing. In this case all the suggestions on this subject from both question 3 and 1 were summarized under question 1. The balance of the suggestions made in response to question 3 are summarized under three headings, administrative arrangements, membership, and program.

There were eight suggestions on administrative arrangements: that the accommodation be improved; that the accommodation and the meeting place be together; that a central location be chosen to provide more time; since time seems to be at a premium, that smaller centres be chosen for the Conference; that advance information provide some indication of dress at functions; that members be provided with name tags, and that the proceedings be published at an earlier date.

The one suggestion on membership regretted the absence of some provinces from the Conference.

There were eleven suggestions with respect to program, dealing with both the content and the methods. Two people mentioned the general reports.

One stated – "again" – that he thought each host should have the opportunity "to present staff and report programs"*. The other person suggested that "each agency be given the opportunity to review high lights" as is now done by the Canadian Wildlife Service and the U.S. representative.

Four other suggestions dealt with content in a more general way. One suggested that more attention should be given to the importance of people understanding wildlife programs and that therefore time should be spent on the federal and provincial programs directly involving the public. Another suggestion was that there should be a "continuing emphasis on the principles of wildlife ecology". A third suggestion was that some thought "be given to the relationship of people/wildlife". A fourth suggestion was that if Benefit/Cost analysis was again considered there should be present representatives of organizations that control finances.

Two suggestions dealt with participation at the Conference. One suggested that there should be more participation by delegates from the territories and smaller provinces. The other comment on this aspect of the Conference was that several observers, although well-informed, had refrained from taking part because they were not delegates and suggested that observers be added to the panels to make them more lively.

Two people suggested that it would be an improvement to send the background material earlier. One suggested that an outside speaker, possibly from FAO or the UK, might be brought to the Conference. Another suggested that the feedback form be distributed earlier. One person wrote "try the same approach again and improvement will come with familiarity with the organizational set-up and the new procedures".

Comments of the observer

These comments are in four groups dealing with the discussion on regulations, the methods used, the content, and the administrative arrangements.

The regulations

Although there was general agreement that the discussion of the regulations was better as a result of the technical committee meetings and the correspondence that preceded the Conference there were a fair number of delegates and observers who were unhappy over this aspect of the Conference. This suggests that some members do not want to depart too far or too quickly from the traditional business of the meeting. The new practice was clearly an improvement but the suggestion of one member that there be an open discussion of the general regulations, if programmed more firmly and fixed clearly on the agenda, might meet the need of those who felt the regulations got short shrift.

The methods used

Apart from the change in methods in handling the regulations there were two changes in methods: the papers were distributed in advance and some of the papers were not read but were used as background for discussion. Both changes received a large measure of approval from the members of the Conference and I would agree with those participants who want both practices extended.

Discussion is the main reason for having the Conference. In the last analysis human communication requires face-to-face discussion to be effective. No amount of printed material can substitute for this direct communication. We need the discussion because there are ambiguities, misunderstandings, small items of information, etc. that can only be supplied in face-to-face talk. Unfortunately, however, we often spend a high proportion of the precious time of the meeting in reading to one another or providing verbally information which could be more easily taken by reading. Practices that were necessary before the age of printing or the mimeograph machine seem hard to shake. But in a literate society, and in a professional group, to provide information in this way is close to irresponsible, and I would agree with those who think that all papers and reports should be distributed ahead of time and should be discussed, but not read, at the meeting.

During the first day at the Conference the presentations of the papers and reports took approximately three hours. The discussion occupied two hours with the balance of the time spent in introductions, getting started, etc. Some of the presentations were fairly short and all were interesting but none were necessary for discussion purposes. There was also little or no discussion of some presentations, probably because there was little time available following the presentation and members of the Conference disciplined themselves accordingly.

*Mentioned by same person under 2.(b).

The proposal that an author not read his paper or present his report is designed to make the maximum time available for exchange between the members of the Conference and the author of the paper. The flavour of the author's personality or particular interest or style is an important part of the experience but this can usually be secured as readily, or better with many people, in discussion than in formal presentation.

Related to this question is the question of participation. One member stated that the smaller provinces and the territories took less part than representatives from the larger provinces. Whether or not this is true, it is true that some members make more interventions than others and delegates take a larger part than observers although both categories are equally free to participate. For example, apart from those making presentations (15) on the first day, approximately 25 other members of the Conference spoke at least once. But of these only 5 spoke 5 times or more, and of these 5, two spoke 10 times or more. Clearly, a few members of the Conference contribute most often to the discussions. One person pointed out that participation would be easier and more useful if papers were distributed in advance because then members could reflect on what they wished to say and formulate their intervention more usefully.

The enthusiastic reception of the method used in handling the three papers on the management process should, I think, provide the guide for future improvements. In other words, this pattern should be extended to all the reports, presentations and papers brought to the Conference.

The use of discussants to lead-off would guarantee the initiation of discussion and would distribute the leadership roles more widely among the members of the Conference. Where a paper should be considered from more than one point of view two or three discussants may be chosen so that all aspects of the subject are brought into view from the beginning.

The use of small groups should also be considered. They might be employed for consideration of the technical papers with the papers presented in concurrent sessions. Members of the Conference would thus be able to take part in discussion of only one of the papers but this they could do at greater length and possibly with more satisfaction than at present. Use of small groups within the Conference would also make more certain that the observers participated more fully.

If the papers are to be circulated in advance then the planning of the Conference must begin in the late fall of this year and the papers be solicited in January of 1969. The deadline for delivery of the paper should be April 30th to allow a month for reproduction and six weeks for distribution and study.

Content

It is not in the province of the observer to comment on the content of the Conference but a suggestion made last year was made again this year, namely, that in addition to the report of the Canadian Wildlife Service and the U.S. Bureau of Sport Fisheries and Wildlife there should be "highlight" reports from other provinces. If the reports are pre-circulated in written form, the problem of taking time for presentation is not a factor but the bulk of the papers might well be. On the other hand the suggestion of one delegate that the host province present a report might meet the intent of those delegates who have made this recommendation without increasing the bulk of the papers.

Administration

There were a number of suggestions with respect to the arrangements and I find myself concurring with all of them.

ALPHABETICAL LIST OF DELEGATES

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