Co-Management of Fish and Wildlife: in North America:
A Review of Literature

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EXECUTIVE SUMMARY

The purpose of this literature review is to better understand how co-management of fish and wildlife has been applied and described in North America. This document provides an overview of some of the existing literature on co-management in North America and the general themes found in it. The literature included in this review draws from experience primarily in fisheries co-management and in the co-management of wildlife and other resources between the Canadian or U.S. governments and aboriginal communities in the Canadian Arctic and Alaska.

The review identified the following key points:

- There is no single, widely accepted definition of co-management. Rather, the term has been used to describe a variety of management arrangements. One useful definition is that adopted by the World Conservation Congress in 1996: "...a partnership in which governmental agencies, local communities and resource users, non-governmental organizations and other stakeholders share, as appropriate to each context, the authority and responsibility for the management of a specific territory or a set of resources."

- Several authors have described co-management within the theoretical framework of common property theory.

- Proponents of co-management have described its potential benefits, which can be categorized broadly as more appropriate, more efficient, and more equitable management.

- Co-management has generally developed as a form of crisis management. The process of developing co-management arrangements presents many challenges. These include defining who participates and their appropriate roles, identifying the appropriate geographic scale and levels of decision-making, developing processes for communication and conflict-resolution, developing appropriate mechanisms for cost-sharing, enhancing the capacity of local communities and government agencies, and creating supportive policies, among others.

- While substantial empirical material has accumulated on co-management, the field is weak in terms of theory development. Issues that require further systematic study include investigating the process of co-management, analyzing experience with co-management agreements and structures, and exploring capacity-building requirements. Of additional research interest is the question of whether co-management can be a successful approach to realize opportunities in the absence of crisis.
ACKNOWLEDGMENTS

Funding for this project was provided by the New York State Department of Environmental Conservation and the Cornell University Agricultural Experiment Station. I would like to thank Daniel Decker, Jody Enck and Bruce Lauber for their helpful reviews of this report. I also thank Margie Peech for assistance with publication.
INTRODUCTION

The purpose of this literature review is to better understand how co-management of fish and wildlife has been applied and described in North America. The review sought to define "co-management," examine cases where it has been applied, and identify common patterns regarding the contexts in which co-management generally occurs and the factors that contribute to its success or failure. It also sought to identify implications of co-management for theory, policy, and practice, as well as related questions for further research. This document is intended to provide an overview of some of the existing literature on co-management in North America and the general themes found in it.

Development of the idea of co-management can be traced to a number of different resource areas including fisheries, parks and protected areas, forests, wildlife, water, and aboriginal land claims. A number of related terms have been used interchangeably with co-management. These include cooperative management, collaborative management, joint management, participatory management, or multi-stakeholder management (Berkes 1997). Relevant literature occurs in biology, human ecology, cultural ecology, sociology, economics, geography, history, and political science (Pinkerton 1994). The literature included in this review draws from experience primarily in fisheries co-management and in the co-management of wildlife and other resources between the Canadian or U.S. governments and aboriginal communities in the Canadian Arctic and Alaska.

WHAT IS CO-MANAGEMENT?

There is no single, widely accepted definition of co-management. Rather, the term has been used to describe a variety of management arrangements from "... those that merely involve, for example, some local participation in government research being carried out, to those in which the local community holds till the management power and responsibility" (Berkes et al. 1991:12). Pinkerton suggests that "it is useful to conceptualize co-management as 8 potential points on a 10-point continuum between state management (at point 1) and community management (at point 10)" (1994:2367). Any given arrangement may fall at different points on the continuum over time. Some co-management systems are more comprehensive than others. However, seemingly "incomplete" systems are not necessarily static; sometimes they are in evolution toward more comprehensive co-management. In other cases, they may have achieved all that is appropriate or feasible in a particular situation (Pinkerton 1989).

Pinkerton offers a succinct definition that captures the essence of co-management: "power sharing in the exercise of resource management between a government agency and a community or organization of stakeholders" (Pinkerton 1992:331). Power sharing implies that stakeholders not only give input for management decisions, but also share responsibility and

* To keep the literature review manageable, I limited its scope primarily to North America. However, many references to international cases appeared in literature search results. Certainly, lessons can be learned for the application of co-management in the U.S. from experiences in community-based management abroad. See the Berkes and Pinkerton papers cited above for citations of early references on co-management, as well as those representative of the various disciplines. Some, but not all, are included in this review.
accountability for making the decisions and implementing them. While most authors define co-management as shared responsibility among government and stakeholders, in its broadest sense co-management refers to any arrangement in which two or more entities share management responsibilities. The scale could vary from governments working together to manage resources that cross international boundaries to private individuals cooperating to manage neighboring parcels of land.

One interesting example of private cooperation is the Malpai Borderlands Group. Local ranchers located around the Arizona-New Mexico border cooperate to restore and maintain "the natural processes that create and protect a healthy, unfragmented landscape to support a diverse, flourishing community of human, plant, and animal life in our Borderlands Region" (Page 1997:55). The Nature Conservancy is also a cooperator in the group, and the group works closely with federal agencies such as the U.S. Forest Service and Bureau of Land Management.

Sen and Nielsen (1996) offer a typology (figure 1) that classifies co-management arrangements into five broad types according to the role that government and users (or stakeholders) play. In instructive arrangements, only minimal information exchange occurs between government and stakeholders. Mechanisms exist for dialogue with stakeholders, but the process tends to be government informing stakeholders on the decisions that government plans to make. Consultative arrangements include mechanisms for government to consult with stakeholders but all decisions are made by government. Cooperative co-management occurs where government and stakeholders cooperate together as equal partners in decision-making. In advisory arrangements, stakeholders advise government of decisions and government endorses them. In informative arrangements, government has delegated decision-making authority to stakeholders who are responsible for informing government of these decisions. The authors recognize that "this typology is a simplification of a very complex situation. There is a multitude of tasks that can be co-managed under a different type of co-management arrangement at different stages in the management process" (Sen and Nielsen 1996:407).

The definition that may best apply to the investigation of co-management as an approach for many state wildlife agencies is that adopted by the World Conservation Congress in Montreal in 1996: "a partnership in which governmental agencies, local communities and resource users, non-governmental organizations and other stakeholders share, as appropriate to each context, the authority and responsibility for the management of a specific territory or a set of resources." (in Berkes 1997:6, emphasis added).

| Table 1: Definitions of "co-management"
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<td>&quot;... power sharing in the exercise of resource management between a government agency and a community or organization of stakeholders.&quot; (Pinkerton 1992:331)</td>
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<td>&quot;... the sharing of power and responsibility between the government and local resource users.&quot; (Berkes, George and Preston 1991:12)</td>
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<td>&quot;The term co-management signifies [local people's] claim to the right to share management power and responsibility with the state.&quot; (McCay and Acheson 1987:32)</td>
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<td>&quot;Cooperative management means that two or more parties share decision making responsibilities regarding the management of resources.&quot; (Carpenter, Fasthbridge and Boiler 1991)</td>
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<td>&quot;Co-management is the joint management involving resource users and government. It is characterized by two important properties: the sharing of decision-making power and a focus on management process.&quot; (Susan Hanna, Oregon State University, in Taylor and Alden 1998:2)</td>
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<td>&quot;Co-management refers to institutional arrangements in which government agencies with jurisdiction over resources and user groups enter into agreements covering specific geographic regions. Each agreement spells out a system of rights and obligations for those interested in the resource, a collection of rules indicating actions that users and managers are to take under various circumstances, and procedures for making collective decisions affecting the interests of government actors, user organizations, and individual users.&quot; (Oshiteroko 1988:13)</td>
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**COMMON PROPERTY THEORY**

Several authors (McCay and Acheson 1987; Berkes et al. 1989; Feeny et al. 1990; Berkes et al. 1991; Pinkerton 1994) find an appropriate framework for the theoretical development of co-management in common property theory. These authors challenge conventional wisdom that resources held in common will invariably be overexploited -- the "tragedy of the commons" described by Garrett Hardin in 1968.

Common property (also called common pool) resources share two key characteristics. First, exclusion of potential resource users, or control of access, is problematic. Second, each user is capable of subtracting from the welfare of others. Thus, common pool resources are defined as "a class of resources for which exclusion is difficult and joint use involves substitutability" (Berkes et al. 1989:91).

Common pool resources are held in one of four basic property rights regimes: open access, private property, communal property, and state property. Hardin and others have argued that the solution to the "commons dilemma" is privatization or government control of common property.
pool resources. Common property theorists, on the other hand, cite successful examples of communal property systems, such as wildlife hunting territories in James Bay, Québec and lobster management in Maine. These cases illustrate that while Hardin's model provides insight about the divergence between individual and collective rationality, it fails to take into account the self-regulating capabilities of users. The Hardin model confuses common pool resources with open access. It assumes that individual interest is unconstrained by existing institutional arrangements and overlooks the role of institutions that provide for exclusion and regulation of use. Finally, the model offers too limited a set of solutions (Berkes et al. 1989).

Co-management is one viable approach for addressing issues of exclusion and subtractability in the management of common pool resources. Feeny, Berkes, McCay and Acheson (1990:13) state:

The new interest in communal property arrangements is perhaps related to the resurgence of interest in grass-roots democracy, public participation, and local-level planning. State property regimes in which officials exercise exclusive decision-making powers have been falling into disfavor. Given that there are many situations in which users have the capacity for self-management, it makes administrative and economic sense to involve them in resource management. Communities of resource users are, however, no longer relatively isolated and resources often have multiple uses. Therefore, complete devolution may not be appropriate; it makes sense for the state to continue to play a role in resource conservation and allocation among communities of users. Shared governance or state regulation jointly with user self-management is thus a viable option.

**POTENTIAL BENEFITS OF CO-MANAGEMENT**

Pinkerton proposes that "In most general terms, the benefits sought by one or all of the actors in fisheries co-management are more appropriate, more efficient, and more equitable management" (1989:5). Similarly, Sen and Nielsen suggest three general outcomes for evaluating the success of fisheries co-management: sustainability, efficiency and equity (1996). These broad outcomes provide a useful framework for categorizing the many potential benefits of fish and wildlife co-management that various authors have identified.

**More Appropriate Management**

By bringing both scientific and local or traditional knowledge to the management process, co-management improves the quality of data and data analysis and contributes to a better understanding of resource systems than does management solely by a government agency (Drolet et al. 1987; Pinkerton 1989; McCay and Jenetof 1996). Co-management can promote conservation of resources and lead to greater ecological sustainability (Pinkerton 1989; Berkes et al. 1991). Co-management can also better address the variation among local resource systems than general regulations imposed by central government (Jenetof and Kristoffersen 1989). State-level management is complementary to that at the community-level and provides regional and international coordination where resources extend beyond local areas (Pinkerton 1989). Co-management can also promote cultural sustainability of local populations, such as when indigenous people’s role in

resource management is recognized (Berkes et al. 1991). Similarly, such arrangements can contribute to the economic well-being of local populations and promote community economic development where use of the resource, such as a fishery, brings commercial value to communities (Pinkerton 1989; Berkes et al. 1991).

**More Efficient Management**

Co-management may also lead to more efficient management than that by central government. It can create better coordination between interdependent actors, such as harvesters and processors in a fishery (Jeneto 1985). By providing a process for conflict resolution, co-management may reduce the transaction costs, including court cases, associated with conflict (Jeneto and Kristoffersen 1989; Pinkerton 1989). It may also reduce the costs of enforcing regulations since compliance is likely to be greater when those who experience the regulation are involved in making it (Jeneto 1985; Jeneto and Kristoffersen 1989; Winter 1997). Co-management systems may also be more flexible and adaptable in situations where contingency and change are paramount and learning is critical (Jeneto and Kristoffersen 1989; McCay and Jenetof 1996).

**More Equitable Management**

Several authors note that co-management can lead to more equitable management than that by central government, because it brings stakeholders together around one table to address difficult decisions, such as the allocation of fishing opportunities (Jeneto 1985; Pinkerton 1985). Others describe it as a more democratic approach that can result in greater legitimacy of management because more stakeholders are involved in decision-making (McCay and Jenetof 1996).

**THE CO-MANAGEMENT PROCESS: CONDITIONS FOR SUCCESS AND POTENTIAL BARRIERS**

Co-management has generally developed as a form of crisis management in response to real or perceived resource depletion (Pinkerton 1989) or as a means to prevent or resolve conflicts among stakeholders and government or among stakeholder groups (Sen and Nielsen 1996). Co-management arrangements are most likely to develop when stakeholders show a willingness to contribute, including financially, to management functions and possess the organizational capacity to do so (Pinkerton 1989, Sen and Nielsen 1996, Prystupa 1998). Co-management arrangements are also most likely to develop when the opportunity exists for a negotiation process or the experimental management of a single function, which may later be expanded to other functions (Pinkerton 1989). Trust among the actors is an essential element for success (Berkes 1997).

Some of the obstacles to developing co-management arrangements that are most often cited are cultural and institutional barriers. Cultural barriers may include the difficulty of communication when participants speak different languages, as well as the challenge of bridging different perceptions of problems and interpretations of information between resource managers and stakeholders (Drolet et al. 1987; Osherenko 1988, Smith 1995). Institutional barriers include agency resistance to sharing authority with local communities and rigidly structured institutions.
that do not deal well with local participation (Pinkerton 1992, Little 1994, Little 1996). Another significant barrier includes conflicts with existing policy (Little 1996) and failure to legally recognize local rights (Pinkerton 1994, Berkes 1997).

Many important questions arise in the process of developing and implementing co-management structures. Who participates? How is the problem defined? What geographic scale does the co-management arrangement cover? Do appropriate local and governmental institutions exist? What are the appropriate roles and relationships among the actors? How does communication and conflict resolution occur? What are the political, economic, and social contexts?

The question of representation, or who participates, is a critical element of the co-management process. The choices involved in managing the commons "... go beyond who benefits and who loses to who shall decide, who takes responsibility, and how the decisions will be made" (McCay and Acheson 1987). McCay and Jenoff note, "The democratic principle that all affected interests should have a say ... sounds great in theory. In real life, however, the principle may be too demanding, and a narrower specification of who should really be involved may be required" (1996:242). Co-management arrangements are more likely to be successful when clear criteria exist for membership or participation in local management (Pinkerton 1980, 1994). Establishing criteria for participation can have significant consequences, as a common way to exert influence on management outcomes is through the designation of legitimate stakeholders. "Much of the conflict over the management of lands and natural resources ... concerns who has a legitimate voice in how those lands are used" (Paulson 1998:311).

Beyond determining who participates is the question of defining appropriate relationships among the actors. Pinkerton proposes that "the successful operation of co-management ultimately rests on the relationships among human actors" (1989:29). Nurtured by the formal institutions and informal arrangements that make them possible, these relationships require cooperation, commitment to share both costs and benefits, an appropriate vehicle of conflict resolution, an equal negotiating relationship, improved organization among stakeholders, and greater trust among all actors (Pinkerton 1989). These relationships will vary with interests and capabilities of stakeholder groups and with the types of management tasks to be undertaken (Sen and Nielsen 1996). Co-management arrangements are most likely to be successful when appropriate roles are spelled out in a formal, multi-year agreement (Pinkerton 1989, 1994).

An equally important consideration is determining the appropriate domain to be covered by co-management. This includes the importance of scale and level. Scale refers to the resource system and the management tasks to be undertaken. Level refers to the level at which decision-making should and does take place, namely local, regional, national or supra-national (Sen and Nielsen 1996).

First, what is the appropriate geographic scale given the characteristics of the resource? Clear geographic and resource boundaries increase the likelihood of successful co-management. These boundaries should designate management units that are of a scale appropriate to both human resources and the ecology of an area. Trade-offs occur between management units that are small enough to be easily monitored by community members and large enough for more com-
those that downplay it. Understanding such mechanisms may have useful implications for facilitation of co-management processes and training of participants.

Additional considerations in the development of co-management structures and processes include appropriate mechanisms for cost-sharing (Pinkerton 1994); legal definition of local powers (Pinkerton 1994, Berkes 1997); local empowerment, including the capacity of local organizations (Little 1994, Warner 1997, Prystupa 1998); economic incentives (Little 1994, Berkes 1997); the political and institutional context; and evaluation of the process itself (Little 1994).

CO-MANAGEMENT CASE STUDIES

Although co-management arrangements are not common, the number of examples is much greater than one might imagine. Co-management arrangements appear most prevalent in fisheries, and much of the literature is based on this experience. In addition, many authors draw upon case studies of co-management of wildlife, fish, and other resources between the Canadian government and aboriginal communities in the Arctic. Often, co-management in these cases has developed during the settlement of comprehensive land claims (Treseder et al. 1998).

A small sample of co-management cases that are commonly cited include: the James Bay and Northern Quebec hunting, fishing, and trapping regime; the Beverley and Kaminirriak caribou management regime in Northern Canada; goose management on the Yukon-Kuskokwim Delta of Alaska; Beluga management in Northern Quebec; the lobster "fledoms" of Maine, the herring fisheries of the Bay of Fundy, and the Lofoten fishery of Norway, where cooperative management has been occurring since 1897. There are many other cases in North America and internationally that illustrate the breadth and depth of co-management experience to date.

Also of interest is a project coordinated by the International Institute for Environment and Development (IIEF) called "Evaluating Eden." This project addresses the need for further research on community-based wildlife management in order to share understandings and promote best practice examples. Scheduled to run from 1996 to 1999, the project focuses on developing countries. However, some other regions, including Canada and New Zealand, have voluntarily contributed reports to the project.

QUESTIONS FOR FURTHER RESEARCH

"As a rapidly developing field of study, there is a substantial accumulation of empirical material on co-management, and yet the field is weak in terms of theory development" (Berkes 1997:5). Little scholarly work addresses the question: When is co-management feasible? Berkes suggests three clusters of issues that need further systematic study. First is an analysis of experience with the process of co-management, not only in the development of co-management agreements, but also in their implementation and monitoring. Second is an analysis of experience with co-management agreements. Little work has been done on the structure and content of existing agreements. Generic models of co-management that can be adapted for different areas and resources are needed. Third is an analysis of capacity-building requirements, not only of resource users and stakeholder groups, but also of government resource managers. Berkes proposes a re-

search agenda that includes the following items: "reasons for successes and failures; key conditions for feasibility; institution-building; appropriate techniques to facilitate co-management; cross-cultural approaches and methods; 'adaptive management' (feedback learning); and designing supportive policies and legislation" (1997:7). Sen and Nielsen (1995) concur that research is needed to increase understanding of the general circumstances under which different co-management arrangements work and the factors that influence the movement from one type of co-management arrangement to another.

An additional question of interest is: What are appropriate roles for non-governmental organizations and private enterprise? For instance, how may NGOs catalyze action or help build the capacity of local organizations without usurping the proper role of government (Feldmann 1994, Warner 1997)?

Many studies of wildlife co-management have involved indigenous communities, while few have addressed co-management in communities dominated by capitalist development (Reed 1995). Co-management "experiments" in communities with no recent or remembered tradition of community-based governance of common pool resources are also of research interest (Kapuscinski 1996).

It seems that inquiry into co-management of wildlife as it may be applied in many states could contribute to the development of co-management theory in several of these areas. In particular, further investigation of co-management arrangements in wildlife management could: (a) increase understanding of the appropriate roles of various actors in co-management, particularly in situations with multiple stakeholders; (b) increase understanding of the processes by which co-management agreements are reached and implemented; (c) investigate how co-management applies in situations where the problem has been identified as resource abundance rather than resource depletion; (d) help describe and understand experience with co-management in communities with no recent tradition of community-based resource management; and (e) explore the application of co-management as an approach to realize potential community benefits from wildlife-related opportunities, rather than in response to a crisis.
LITERATURE CITED


APPENDIX A
ABSTRACTS OF CO-MANAGEMENT REFERENCES REVIEWED

This brief article states the need for theory development around co-management, identifies some of the
earliest literature on the subject, and suggests issues for further systematic study.

Conventional wisdom holds that resources held in common will invariably be overexploited — the "tragedy
of the commons." A number of examples show that this is not necessarily so.

This article explores the idea that co-management and self-management in Northern Canada are not
merely matters of wildlife use. Indeed, self-management is at the core of the social and economic health of many
native communities, and is tied to larger questions of self-government. Thus, the cooperative management of re-
sources becomes a key issue (since wildlife has been so important in the traditional economy) in the implementa-
tion of principles of environmentally sustainable, culturally appropriate economic development.
The discussion starts by exploring the role of native groups in the management of the resources they use.
The full range of alternatives run from "none at all" to complete self-government that includes sole jurisdiction
over resource management. In reality, what have been evolving in the Canadian North are a number of arrange-
ments in between: a sharing of management responsibilities by means of co-management regimes.

Blanchard, K. (1987). "Strategies for the conservation of seabirds on Quebec's North Shore and
goose on Alaska's Yukon-Kuskokwim Delta: a comparison." Transactions, 52nd North American
This paper explores educational responses to the problems of declining geese in Alaska and declining
shorebirds on the North Shore of the Gulf of St. Lawrence (Quebec North Shore). Both cases involve strategies
designed to complement efforts in research, habitat protection and enforcement. Recent increases among puffed
and common murres in Quebec and black and Geese in Alaska suggest that education, combined with regulation and en-
forcement, does work in helping to solve critical management problems. The need now is to strengthen informa-
tion and education programs and to incorporate education as a vital element of long-term comprehensive manage-
ment planning.

Bromley, D. W. and M. M. Cernia (1989). The management of common property natural re-
The term "common property" has been largely misunderstood and falsely interpreted for the past two-three
decades. Common property regimes are not the free-for-all that they have been described as to be, but are structured
ownership arrangements within which management rules are developed, group action is known and enforced, incentives
exist for co-owners to follow the accepted institutional arrangements, and sanctions work to insure compli-
ance.

Resource degradation. In the developing countries, while incorrectly attributed to "common property sys-
tems" it is actually originates in the dissolution of local-level institutional arrangements whose very pur-
pose was to give rise to resource use patterns that were sustainable. Natural resource deterioration is also occurring
widely outside the boundaries of common property systems, under private property and state property regimes.

When local-level institutional arrangements were undermined or destroyed, the erstwhile common prop-
erty regimes gradually converted into open access in which the rate of capture drove each to get as much as possi-
ble before others did. While this has been referred to as the "tragedy of the commons" it is, in reality, the "tragedy
of open access." The dissolution of traditional local institutional arrangements has not been followed by the estab-
lishment of more effective institutions, and national governments in most developing countries have not adequately
substituted for these former resource management regimes.

Development assistance for agriculture, environmental protection and natural resource management will
succeed only if programs and projects become more concerned with the people using natural resources, rather than
primarily preoccupied with the particular commodities around which projects have often been organized.
Natural resource projects in the developing countries that do not actively incorporate the local users will
ultimately fail. The notion that national (or even regional) governments in the developing countries can effectively
manage natural resource systems largely without empirical (historical) support would be a mistake.

Interventions aimed at sustainable agricultural development must explicitly address the social arrange-
ments among people as they interact with each other and with the natural resource base and help build up forms of
social organization conducive to sustainable productive use of natural resources.

An essential ingredient in program and project formulation and implementation is the system of incenti-
tives and sanctions for influencing the individual behaviors of those who live in the local area, and who depend
upon the natural resource in question.

Carpenter, A., B. M. V. Hambidge, et al. (1991). "Co-management of wildlife in the Western Can-
adrian Arctic: an Inuvialuit perspective." Transactions of the Fifty-fifth North American Wildlife
This paper describes the system of co-management shared by the Inuvialuit of the western Canadian Arc-
tic and the Government of Canada. It details four examples of management plans and components of wildlife leg-
islation developed during the first six years of this system of co-management: Grizzly Bear Harvest, Beaufort Sea

management in Australia, Institute for Environment and Development.

Community wildlife management (CWM) refers to management systems and processes which are directed and
consented to at a community level. Effective CWM returns benefits to local people and provides for sustainable
use to wildlife. Indigenous CWM in a sub-set of Australian CWM in general. This review focuses on use and
management of terrestrial vertebrates and some marine species. It also considers conservation oriented manage-
ment of indigenous owned lands and aspects of indigenous involvement in natural resource management at a re-
gional scale. This review is produced in collaboration with the first stage of the Evaluating Edens project in which
the International Institute for Environment and Development (IIED) is examining the positive and negative im-
pacts and effectiveness of CWM activities in a number of countries.

groups."
Transactions, 52nd North American Wildlife and Natural Resources Conference: 389-
98.
Sharing of wildlife management responsibilities with Native peoples, particularly in the context of the im-
plementation of land-claim settlements, is a concept that offers many potential benefits. It has been the object of
much consideration and discussion in recent years. Current Canadian federal government policy, following some of
the recommendations from the Coolican (1986) report, calls for participation of Native peoples in the decisions-
making process regarding land and resource management within their traditional territories. An excerpt from a
1986 policy statement makes this explicit: "It is expected that (claim) settlements will recognize a particular abo-
riginal managerial interest in relation to environmental matters including... wildlife management. Under the
policy, aboriginal groups may negotiate membership in management boards and other agencies with decision-
making powers as well as negotiating representation on advisory committees" (Department of Indian Affairs and

This paper will first review some of the accomplishments and shortcomings of one such advisory com-
mittee - the Coordinating Committee established to implement the hunting, fishing and trapping regime of the
James Bay and Northern Quebec Agreement. In the following sections, it will present three examples of projects
related to wildlife management that have been successfully conducted with the collaboration of Native groups of
Northern Quebec, beneficiaries of the Agreement. The examples deal with Inuit and elders, Inuit and beluga, and Cree Indians and caribou. The positive aspects of these ventures as well as the shortcomings will be discussed.


Hardin’s Tragedy of the Commons model predicts the eventual overexploitation or degradation of all resources used in common. Given this unambiguous prediction, a surprising number of cases exist in which users have been able to restrict access to the resource and establish rules among themselves for its sustainable use. To assess the evidence, we first define common-property resources and present a taxonomy of property-rights arrangements in which such resources may be held. Evidence accumulates over the last twenty-two years indicates that private, state, and communal property are all potentially viable resource management options. A more complete theory than Hardin’s should incorporate institutional arrangements and cultural factors to provide for better analysis and prediction.


This article provides a brief overview of three informal cases of co-management between the Ontario Ministry of Natural Resources and the Cree: polar bear, caribou, and snow goose.


The World Conservation Strategy is intended to stimulate a more focused approach to the management of living resources and to provide policy guidance on how this can be carried out by three main groups: government policy makers, conservationists, and development practitioners.

The aim of the World Conservation Strategy is to achieve the three main objective living resource conservation: (a) to maintain essential ecological processes and life-support systems, (b) to preserve genetic diversity, and (c) to ensure the sustainable utilization of species and ecosystems.

These objectives must be achieved as a matter of urgency because: (a) the planet’s capacity to support people is being irreversibly reduced in both developing and developed countries, (b) hundreds of millions of rural people in developing countries are compelled to destroy the resources necessary to free them from starvation and poverty; (c) the energy, financial and other costs of providing goods and services are growing; and (d) the resource base of major industries is shrinking.

The main obstacles to achieving conservation are: (a) the belief that living resource conservation is a limited sector; (b) the consequent failure to integrate conservation with development; (c) a development process that is often inflexible and needlessly destructive; (d) the lack of a capacity to conserve; (e) the lack of support for conservation; and (f) the failure to deliver conservation-based development where it is most needed.

The World Conservation Strategy therefore: (a) defines living resource conservation and explains its objectives; (b) determines the priority requirements for achieving each of the objectives; (c) proposes national and sub-national strategies; (d) recommends anticipatory environmental policies, a cross-sectoral conservation policy and a broader system of national accounting; (e) proposes an integrated method of analysing land and water resources; (f) recommends review of legislation; (g) suggests ways of increasing the number of trained personnel; (h) recommends greater public participation; and (i) suggests ways of helping rural communities to conserve their living resources.

In addition, the strategy recommends international action to promote, support and coordinate national action, emphasizing in particular the need for: (a) stronger more comprehensive international conservation law; (b) international programs to promote conservation; and (c) regional strategies to advance the conservation of shared living resources.

The World Conservation Strategy ends by summarizing the main requirements for sustainable development.


Cooperative organization has rarely been regarded as a general remedy to management problems and "market failure" of the fishing industry. Instead, the cooperative alternative has most often been introduced as a means of solving crises, as a result of last resort. Drawing on Norwegian and Canadian experiences for illustrative purposes, this paper discusses the specific fisheries problems to which the cooperative approach has been applied. In four sections the cooperative alternative is discussed as a vehicle for controlling distributional processes within the fishing industry; as a tool for handling problems of coordination among production and marketing units; as a way to fulfill the need for regulation of competitive actions stemming from the common property resource base; as an instrument for innovation and regional development within fishing communities. It is argued that the cooperative approach has much broader potential than has been recognized in the past and that it deserves more serious consideration when appropriate means for solving management problems in the fisheries are sought.


The authors use a case study of the Lofoten fishery of Norway to address the efficacy of fisheries co-management. The Lofoten fishery has been successfully regulated since 1897 by the fishermen themselves. The paper describes its historical roots, how the system is organized, the main factors for its success, and lessons to be learned from this particular case.


This paper provides a general overview of community involvement in marine protected areas and highlights the importance of education. It discusses components of successful interpretative and educational programs and highlights three model programs.


An overview of community based efforts to influence forest management in the United States.


To address the need for suburban deer control, the New Jersey Division of Fish, Game and Wildlife developed a community-based approach to the problem. Under the Community-Based Deer Management Program (CDBMP), the Division will cooperate with municipal, county, state, and federal agencies and other responsible entities (cooperatives) to develop and implement alternative options for use in suburban environments where traditional hunting programs are not an option or where hunting programs alone cannot achieve the desired level of deer reduction. This paper describes the mechanisms by which CDBMP operates and two cases where it has been implemented.


In 1968 Garrett Hardin vaddled a theory that he called the "tragedy of the common." This collection of original essays is an anthropological and ecological approach to the theory, the controversies surrounding it, and the phenomenon of the "common." The chapters are grouped into three sections. The first, "Conservation and the Commons," brings ethnographic, ecological, and historical studies of hunter-gatherers and fishermen in the subarctic, the Amazon, Papua New Guinea, and the United States to bear on the topics of what conservation is, how it can be measured, and how it is related to common and other property rights. Chapters in the second section, "Specifying the Commons," address issues of community and the commons, sharing recognition that common property is a social institution. Included in this section are studies of farming, pastoral, and marine communal institutions in Indonesia, Ireland, Spain, Ethiopia, Botswana, and the United States. The last section, "The State and the Commons," includes an economic analysis of public policy concerning fisheries management and three chapters that explore interrelationships among government agencies, local communities, and user groups in commercial fisheries of Malaysia, Iceland, and Canada.

"Co-management" is among several slogans used to indicate a dissatisfaction with present systems and a movement to more decentralized systems of marine resource management. The authors note the necessary distinction between decentralization and participatory management and use comparative analyses of case studies of fisheries management systems in Scandinavian and North American countries and New Zealand to explore potentials for both decentralization and delegation of authority in fisheries management. The article focuses on issues of representation, domain, and communication in the design of fisheries management systems. It notes the value of the concept of subsidiarity, recently adopted in the process of European integration, and raises the question of sources of more "communicative rationality" in the social and political processes surrounding fisheries management.


This opinion piece summarizes co-management as it has developed between the Canadian government and First Nations and suggests that co-management regimes will continue to grow in number and scope.


Two systems of wildlife management are in common use throughout Alaska and the Canadian North: an indigenous system and a state system. Yet the former has limited application, and the latter has never worked well. This article examines problems arising from this dualism and explores the potential solution offered by co-management regimes, in which public authorities share power with indigenous user groups. It reviews three cases of co-management (caribou, white whales, and geese) and suggests lessons for the future.


This article tells the story of the Malpai Borderlands Group, a nonprofit organization of local ranchers in Arizona and New Mexico that is devoted to restoring and maintaining "the natural processes that create and protect a healthy, unfragmented landscape to support a diverse, flourishing community of human, plant, and animal life in our Borderlands Region." It provides an example of private landowners voluntarily cooperating to manage habitat. The group works closely with The Nature Conservancy and federal agencies, such as the USFS and the BLM.


Wildlife managers, villagers and federal agencies are considering partnering in order to manage Alaska's largest caribou herd (the Kilkeuck caribou herd).


During the past two decades, population declines have occurred in four goose species that nest on Alaska's Yukon-Kuskokwim (Y-K) Delta: ecellating Canada geese, Pacific white-fronted geese, black brant, and emperor geese. In 1983, a major cooperative program was initiated throughout the Pacific Flyway to address these serious biological problems. The purposes of this paper are to: (1) provide a brief historical overview and current status of the four goose populations that nest on the Y-K Delta; (2) summarize the recent cooperative efforts to reverse the population declines, and describe the effectiveness of these actions; and (3) describe key elements that should be included in future management actions.


Collaborative processes are gaining acceptance as a means to integrate different values and interests in the management of natural resources. This paper examines one form of collaboration, Coordinated Resource Man-

agement (CRM), as it is being applied to public rangeland management in Wyoming. The study included personal and telephone interviews of participants in CRM groups, document review, and personal observation to understand how the process works to achieve consensus among diverse stakeholders. Groups used five mechanisms to deal with different values and interests in their processes: (1) elimination of unnecessary or "overly" conflict, (2) limitation of values and visions considered, (3) use of broad goals to guide action, (4) casting value differences as disagreement over facts, and (5) search for and faith in win-win solutions. These mechanisms vary in their usefulness for achieving co-management ideals. Where interests or values have come into open conflict, as in some conflict-resolution groups, CRM has had limited success. This paper suggests that the mixed results of successful co-management requires more than just an equal sharing of decision-making powers. We have to design highly effective processes that can work with conflicting interests. It is also argued that struggles among various interests for greater recognition (and hence power) will continue to underpin the power-sharing collaborative and co-management processes.


This book is about negotiated agreements and other legal or informal arrangements between groups or communities of fishermen and various levels of government responsible for fisheries management in Canada and the United States. It identifies problems, prospects, and propositions for attaining better fisheries management through co-management. It includes case studies that illustrate: Indian-state co-management in the U.S. Pacific Northwest; non-indigenous commercial fishermen creating regional and local co-management; creative aboriginal management regimes under new state regulation in Alaska and Wisconsin; provisions in comprehensive land claims for native self-management; and tradition and innovation of native fishermen in British Columbia. It concludes with a multi-disciplinary assessment of the future of fisheries co-management.


In many cases the management of certain common property natural resources has been successfully shared between government agencies and groups claiming co-management rights. This analysis adds to existing middle-range theoretical propositions about how such co-management arrangements develop, and specifically how groups overcome barriers to co-management when their co-management rights are protected in law but resisted politically.


Pinkerton describes the development of community forestry activism in British Columbia and the formation of the Tsin Wis Coalition in 1988, which proposed a model forest practices act that represented an attempt to institute a co-management agreement between the provincial government and the communities, aboriginal people and other stakeholders most affected by forestry practices in the long run. Pinkerton then discusses the Tsin Wis Coalition as a social movement defined by general sociological and specific political conditions.


The theory and practices of community-based self-management and government-community co-management is examined in terms of the potential of these management systems to address some of the major biological, ecological, and political problems of the salmon fishery of British Columbia, Canada. Particular attention is given to government-multiparty arrangements that integrate the concerns of multiple interests, while recogniz-
ing the special rights of aboriginal communities. Elements identified as key to the success of various arrangements include: (1) logistical arrangements, such as clear boundaries, membership criteria, interception agreements, and management-unit sizes appropriate to the abundance of natural and human resources; (2) cost-sharing arrangements, such as local cost recovery and local volunteering; (3) power-sharing arrangements through checks and balances between local multiparty boards, a provincial board, and the Department of Fisheries and Oceans. The processes engendering social learning, through which government and local bodies could move toward such regime, are discussed through a review of relevant literature on interorganizational conflict resolution, public policy, and organizational learning. Many of the elements of success of both arrangements and processes are likely to apply to a broad range of fisheries co-management situations.


Lake Te Waihora, near Christchurch on the South Island of New Zealand, has been at the forefront of a public policy debate concerning the co-management of Conservaton Lands. Several developments have crystallized the assertion by Ngai Taui, a Maori tribe, that they should be more involved in the management of the water body. Yet despite these catalysts for co-management, several conservation-oriented interest groups with their close ties to the Department of Conservation and their ability to engender public concerns successfully prevent... studies are analyzed in detail. The analysis shows that co-management covers a wide variety of collaborative arrangements between government and users. On the basis of the information from these case studies, a number of observations are made concerning the determinants of the type of co-management regime in place. Determinants include the capabilities and aspirations of user groups, the type of approach, the difficulty of the decision to be taken, the type of management tasks, the stage in the management process, boundaries, types of user groups and political culture and social norms. The paper concludes with the issues that require further research.


The political dynamics of hinterland locality and a provincial government participating together in a co-management initiative to develop environmental resource policies were examined. In the case of Ontario, Canada, local hinterland dependency affected both the process and the outcome of the initiative.


This report is the proceedings of a one-week workshop hosted by the Inuvialuit Game Council and Joint Secretariat-Inuvialuit Renewable Resource Committees. The workshop examined the experiences of northern co-management regimes and current issues in northern co-management and environmental assessment. Over 240 participants from five countries -- Canada, the United States, Russia, Greenland, and England -- shared their experience with co-management and environmental assessment practices. The opening session focused on international and interjurisdictional perspectives of co-management practice. Presentations described the successes and problems experienced by various co-management regimes in northern Canada, Alaska, and Greenland, as well as the struggle faced by aboriginal people in Labrador and Russia to state recognition of aboriginal rights and land claims and develop co-management arrangements. The two case studies presented during the second session -- the Kola Sami Co-Management Project and polar bear co-management -- illustrated the range of co-management experience in the North. These sessions provided background information for the discussion of eight issues in co-management practice: (1) community participation and traditional knowledge; (2) wildlife management and research; (3) legislating and enforcing co-management decisions; (4) finances and general administration of co-management structures; (5) fish and marine mammals; (6) migratory birds; (7) ungulate management; and (8) harvest studies in land claim area.

The primary issues and observations highlighted in the presentations and discussions on co-management practice include: the role of land claims, formal vs. informal arrangements, industrial and commercial developments, management pressures, interjurisdictional issues, internal and external politics, communication, sharing co-management knowledge, cooperation, community involvement, using traditional knowledge, scientific research, muskox and caribou interaction, language and terminology, management actions and strategies, enforcing decisions, administration, and harvest studies. The first portion of the workshop closed with a session on the future of co-management. Participants identified lessons learnt from co-management experience to date and co-management issues that still need to be resolved.


Sawhill describes elements of The Nature Conservancy's approach to community-based conservation.


This paper is based on a review of 32 case studies on fisheries co-management in small-scale, semi-industrial and industrial fisheries in developing and developed countries in Africa, Asia, the Caribbean, Europe, North America and the Pacific. Case studies are classified according to a typology of co-management arrangements. The typology is based on the nature of the decision-making arrangements between governments and users. Decision-making arrangements refer to the ratio of governments and user groups, the management tasks and the stage in the management process. Eleven case studies are analyzed in detail. The analysis shows that co-management covers a wide variety of collaborative arrangements between government and users. On the basis of the information from these case studies, a number of observations are made concerning the determinants of the type of co-management regime in place. Determinants include the capabilities and aspirations of user groups, the type of approach, the difficulty of the decision to be taken, the type of management tasks, the stage in the management process, boundaries, types of user groups and political culture and social norms. The paper concludes with the issues that require further research.


Using the example of the New England Regional Fisheries Management Council and its attempts to manage the fisheries in its area, this paper argues that differences in the way Nature operates constitutes a major source of divisiveness between, on the one hand, those members (and other managers in, any government) who use linear modeling systems and, on the other hand, the majority of those in the commercial fishing sector who, intuitively, have cast nature in those non-linear terms currently being explored in the Chaos paradigm. Since these two different models have not been explicitly addressed, there is a history of members on each side accusing those on the other of bargaining in poor faith and lacking an adequate understanding of the thrust of the paper is that there exists an underlying cognitive model of problems in such co-management arenas as the fishery management councils and elsewhere.


Co-management promotes the management of fisheries in Maine. There are three basic reasons for co-management: (1) fisheries management requires a smaller ecological scale, (2) one-size-fits-all approaches do not work, and (3) fishermen have to be accountable to prevent overfishing. The report describes examples of co-management in Maine (the softshell clam industry, the sea urchin industry, and the lobster industry) and identifies the key issues to be resolved as Maine moves forward with co-management.


APPENDIX B
ADDITIONAL CO-MANAGEMENT REFERENCES


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