

Fraser River Action Plan



Economic Instruments for Managing the Resources of Forest Landscapes



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ECONOMIC INSTRUMENTS

for

Managing the Resources of Forest Landscapes

by

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PREFACE

This paper is the product of a study aimed at identifying opportunities for improving forest management through expanded use of economic instruments and related institutional changes. It is a preliminary discussion paper, intended to provide an overview of the issues and to identify priorities for further investigation. This documentation of initial ideas, and the comments, criticism and advice we receive from readers, will guide our more substantial studies to follow.

This paper explores the scope for economic instruments with particular reference to forest resource management in the context of contemporary British Columbia. It attempts to build on the now considerable literature about economic instruments in general by identifying those that could be invoked as adjuncts to forest policy in this province, thereby strengthening integrated forest management. It gives particular attention to reforms that offer promise in improving management of environmental forest products and services.

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1. INTRODUCTION

The burgeoning interest in sustainable development has converged with two current trends in public attitudes. One is the growing anxiety about how natural resources, especially forest resources, are being managed. In Canada, this includes concern about the management and use of industrial timber, but even greater apprehension surrounds the non-industrial, or environmental, products and services of forests, such as water, wildlife, recreation aesthetic values and atmospheric balance.

The other trend is the almost universal weakening of confidence in governmental regulation, both as a means of organizing economic activity (as in eastern Europe) and as a means of controlling private economic activities (as in western industrialized countries). Correspondingly, confidence in markets and economic incentives as means of influencing the behaviour of producers and consumers has been gaining favour.

The convergence of these trends has drawn attention to possibilities for invoking additional economic forces to guide private behaviour in directions consistent with the public interest, as an alternative to increasing governmental command-and-control regulation. Both federal and provincial governments have shown growing interest in economic instruments as adjuncts of environmental policy.

There is now considerable literature on the general subject of economic instruments, the various forms they can take, their incentive effects and administrative implications. There is also some documentation of experiments with new economic instruments, notably new forms of rights for commercial fisheries, tradeable emissions permits for managing air pollution and tax-rebate schemes to promote recycling. But so far little attention has been given to the potential application of these ideas to the pervasive problems of managing forest landscapes in Canada. The present study explores the practical opportunities and implications of invoking these instruments and related institutional changes in support of integrated sustainable development of forests in British Columbia, consistent with declared objectives of public policy.

The following section examines briefly the relationship between economic behaviour and the framework of law and institutions within which economic activity takes place. This is followed by a sketch of the economic instruments relevant to forest management. The next part explores the potential applicability of particular instruments to particular forest products and services, giving special attention to values other than industrial timber. The paper then turns to the legal and institutional impediments to the development of economic instruments for forest management in British Columbia and changes that would facilitate them. The final part identifies subjects of research that deserve priority in order to support policy development in this area. The paper is supplemented with a substantial list of reference documents appended as a Bibliography.

2. ECONOMIC BEHAVIOUR AND ECONOMIC ORGANIZATION

Economics textbooks give much attention to explanations of how resources are misallocated, and inefficiencies result from “market failures.” The theory of the market system predicts that a perfect market economy (meaning one without imperfections, hence one that will not fail) would create incentives that drive individual producers and consumers to behave in ways that tend to maximize aggregate public welfare, given the resources and technology available to them. But real economies are always fraught with imperfections and the resulting inefficiencies in resource allocation waste and inequities provide the rationale for governmental regulation of economic activity to forestall or offset these unwanted effects.

Thus the environmental problem, and the misuse of natural resources, can be explained in terms of market failures, and the extensive regulatory activity of governments in these areas can be seen as interventions to “correct” market failures (Stager, 1988). But in spite of the rapid expansion of governmental regulatory activity in recent decades, environmental deterioration continues. As a result policy-makers have begun to search for alternative means of inducing producers and consumers to adopt environmentally friendly behaviour.

Institutions

Growing concern about degradation of the environment and natural resources has also led economists to explore the causes of these market failures and ways of preventing them. The result is a growing body of literature about deficiencies in property rights, economic structures, and the laws and conventions that affect economic behaviour, which we refer to here collectively as “economic institutions.”

The recent emphasis on institutions has served to focus attention on the fact that institutional arrangements are the product of public choice; they can be created and modified through collective decisions. Once decided upon the institutional system sets the exogenous conditions for the decision-making of producers and consumers that determines the allocation of scarce resources. But our ability to create and modify the institutional arrangements that guide economic behaviour means that they warrant the attention of economic analysts to support policy development (Bromley, 1989).

Economic Instruments

Deficiencies in the institutional framework thus lead to market failures, which provide the scope for governmental intervention to improve economic performance. Most governmental interventions in the natural resources field are command-and-control type regulations, such as administrative restrictions on the way resources are used rationing among users, performance standards and required technologies. These regulatory arrangements are aimed at controlling the behaviour of users with threats of penalties.

The alternative is to “control behaviour and improve economic performance by means of incentives. Appropriate pricing of resources, property rights, taxes and subsidies can be invoked to induce people to use resources more conservatively and efficiently. The defining characteristic of these “economic instruments” is that they depend on altering economic incentives to change behaviour. Much of the recent literature on this subject (see the Bibliography appended to this paper) suggests considerable scope for developing economic instruments to forestall or correct market failures of the kind that lead to degradation of natural resources and the environment.

In comparison with command-and-control regulations, economic instruments are often claimed to have important advantages, such as:

- They are less costly for governments to administer, because they are less demanding of technical information, monitoring and data. They tend to generate more helpful data and they are less costly to enforce because they do not entail policing users' adherence to rules of behaviour that conflict with their private self-interest.
- The costs of compliance incurred by producers and consumers is also lower, because these instruments leave wider choice and greater flexibility than administrative regulations.
- Insofar as they ensure that resource costs are reflected in the prices paid by users, they encourage more efficient allocation and use of all resources.
- They tend to ensure that users bear the cost of the resources they use.
- They respond more effectively, and with less uncertainty, to changing economic circumstances.
- They encourage research and development on resource-saving technologies.
- They allow greater flexibility in managing resources among users and under diverse circumstances, thus allowing environmental goals to be achieved at lower cost.

‘ Whether particular economic instruments will realize these advantages depends, of course, on *their* design and on the circumstances in which they are invoked. Thus it is important to examine carefully the feasibility and likely effects of developing economic instruments to improve the management of specific resources in specific social and economic circumstances.

This is the purpose of the remainder of this paper. It builds on the considerable literature about economic instruments in general by examining their applicability and promise as means of improving the management of specific forest resource values in British Columbia. It is intended to be a first step in exploring opportunities for advancing forest and environmental policies through institutional changes and related development of economic instruments.

3. ECONOMIC INSTRUMENTS FOR FOREST MANAGEMENT

The underlying theme of sustainable development is the need for economic development without damage to the natural environment. Much of the discussion is about needed changes in behaviour to eliminate adverse side effects of economic growth. But the literature also explains that, in order to achieve these things, social institutions must be changed to ensure that users bear the full social cost of the resources they use.

Thus, while sustainable development calls for harmonizing economic growth with environmental protection it also calls for harmonizing economic institutions with natural resources and ecosystems. This means, for example, that markets should exist to ensure that resources are priced according to their relative scarcity, that property rights allow producers to utilize resources efficiently, and that contracting arrangements allow competing users of resources to determine their most beneficial use.

Forms of Economic Instruments

If economic instruments are defined widely, the number and variety that can potentially apply to in managing natural resources and the environment is considerable. Environment Canada's 1990 Green Plan Consultations produced a list of over 40 such instruments (Canada's Green Plan 1990). However, for present purposes the array can be grouped into five general categories: property rights, pricing, taxes and subsidies, deposit-refund systems, and compliance incentives.

Property Rights

Markets can be expected to operate efficiently only if producers can control their inputs. This calls for a system of property rights for resources, to enable users to acquire control over them and organize their use without interference *from others* (Posner, 1977).

Property has several dimensions, which are embodied in varying degrees in different forms of property (Pearse, 1990c). *Exclusiveness* refers to the extent to which the holder of the property can

exclude others. This ranges, in natural resource rights, from the completely exclusive rights of private owners of certain minerals to the common property rights of fishers and recreationists. Another characteristic is *duration*, or the time over which the rights will endure. Again, the range in natural resource rights is wide, from a year or less in the case of permits for hunters and fishers to perpetuity in the case of freehold forest landowners. A third is *transferability*, which varies from the readily divisible and transferable rights of private landowners to non-transferable rights to water and waste discharges. A fourth is *comprehensiveness* — *the* extent to which the holder's rights extend to all the attributes of the resource. Thus, the rights of a fee simple landowner include timber and any agricultural or developmental values and sometimes water and the sub-surface minerals as well, whereas a Timber License holder can claim only the rights to the timber. A fifth fundamental characteristic is the right of the holder to the economic *benefits* of the resources, which is often truncated in varying degrees by obligations to pay governmental royalties, stumpage fees, rentals and other charges that share the benefits with the Crown.

Rights to resources vary in almost infinite detail; the dimensions of property noted here are only the most fundamental characteristics. They have important implications for the way resources are treated by those who hold the rights to use them and for the value they generate; Exclusiveness, duration and rights to the economic benefits obviously weigh heavily in the holder's incentives to conserve and manage the resources over time and to invest in their continuing production and enhancement. Comprehensiveness determines users' inclinations to take account of the impact of their actions on other resource values, and to search for the best combination of uses where multiple uses are feasible. And transferability enables resources to be continuously allocated and reallocated to those uses and users which can make the best use of them. Holders of property are much influenced by the security of their rights, which depends on all these characteristics as well as the legal form that the rights take.

In the theoretical sense, "complete" property gives its holder exclusive rights, forever, with unrestricted transferability, comprehensive entitlement and rights to all the economic benefits. All rights to resources in British Columbia today are more or less "incomplete," however. The earliest

Crown grants of forest land notably on Vancouver Island, come closest to the model of complete property they give the owner exclusive, perpetual, transferable rights to sub-surface resources and surface water as well as to the land itself. But even here the landowners' rights have been truncated in various ways; some attributes, such as wildlife, have been severed by legislation and are reserved to the Crown land use is restricted by zoning, and taxes force owners to share the economic benefits with the Crown.

Most resources are used under much weaker forms of rights. Almost all users of timber, rangelands and minerals hold only usufructory rights issued by the provincial government. These have limited terms, convey rights only to a specific resource or use, are transferable only under certain conditions, and require sharing of resource rents with the Crown through royalties or other charges. Many of these licenses and permits do not provide exclusive use — rights to water, the waste absorbing capacity of water, fish and wildlife afford access to resources only in common with other holders of rights. Some, such as hunting and fishing rights, have terms as short as one season. Many are non-transferable and all require payments to the Crown.

The general pattern of rights across the spectrum of forest *resources* and values is broadly consistent with theories about the development of property (Cease, 1960; Demsetz 1967). The essential point of this theory is that where demands on a resource are low relative to the amount available, so its value is low, the system of users' rights is likely to be crude, and appropriately so. But as the value of a resource rises, so does the potential gain from more efficient allocation arrangements, and more sophisticated systems of property rights can be expected to emerge.

The history of natural resource development in British Columbia fits this model well. The first Europeans found such an abundance of fish timber, water and other resources that there was no scarcity in the economic sense, and no allocation problem and therefore no need for individual property rights. But gradually: one natural resource after another became scarce — fur-bearing animals with development of the fur trade, minerals with the gold rush agricultural land with settlement then timber, water, game, and fish. As pressures on each resource developed its value increased and some system was needed to allocate it among competing users. Rights in the form of

grants, leases, licenses, and permits, were issued over resources as they became scarce and valuable. The process continues, with new forms of rights being developed for users of the waste assimilative capacity of water (waste discharge permits), fish and outdoor recreational resources.

This suggests that the system of property rights over resources should be viewed in an evolutionary context gradually responding and adapting to increasing demands and pressures. In a modern, rapidly changing economy, governments can play a useful if not essential, role in encouraging and assisting in this development. In this light, the later sections of this paper reveal a range of opportunities to develop property rights that are likely to contribute to improved management of various attributes of forest landscapes.

Pricing

Prices are the critical signals for producers and consumers in a market system, so it is important that they accurately reflect relative costs and social values. To provide appropriate guidance, the price of each resource product or service should correspond to its marginal cost which in turn should reflect its opportunity cost in its next-best use and utilization in its next-best point in time. Such prices will be generated only in a perfectly competitive market for well-defined resources or resource rights. ‘

The exacting conditions for such effective pricing of forest-related resources rarely exist in British Columbia. Title to most attributes of forest land is retained by the provincial Crown which seldom allocates rights by competitive processes. Rights to timber, water, minerals, grazing, fish and wildlife are allocated by administrative processes or by negotiation with particular applicants. Restrictions on the transferability and divisibility of resource rights are major obstacles to the emergence of effective prices. Access to some resources, such as those used for outdoor recreation are provided without charge as a matter of policy, and the fees charged for most other resources are fixed administratively and undiscriminatingly rather than by competitive processes. Nevertheless, as we discuss below, the opportunities for developing markets and prices for forest resources are considerable.

We use the general term “pricing” hereto include “user fees,” “resource charges” and similar levies, as well as conventional market prices. The essential characteristic of all these measures is that they require the user to incur a cost for each unit of a resource used.

In the present context, we are concerned primarily with the effect of economic instruments on the behaviour of resource users. This is important, because charges for natural resources are often advocated or justified on other grounds, such as the equity of “user pay,” the fiscal desirability of “cost-recovery” in government programs, the right of public owners to resource rents, or the need for public revenue in general. All these considerations influence policy-makers. But here we are concerned with economic instruments as means of altering economic behaviour in ways consistent with sustainable development so we leave aside these other considerations (though it is worth noting that pricing is likely to advance other fiscal objectives, also).

Taxes and Subsidies

Taxes on goods and services tend to raise their prices and hence dampen demand for them. Subsidies have the opposite effect and so can be employed to promote desired products or actions.

A broad array of taxes and subsidies can be used to promote resource management. Subsidies in the form of grants, soft loans or allowances against taxes can assist producers in complying with pollution control standards, and are often employed when new standards requiring new technologies are imposed. Tax credits can encourage environmental investments. And taxes on equipment that reduce environmental damage can be removed, reduced or refunded.

Conversely, tax measures can be used as disincentives, to discourage undesirable behaviour. Environmental charges can be levied on products (such as automobile tires) that impose a burden on the environment. Effluent charges can be used to encourage abatement. And revenues from such levies can be earmarked for funds for environmental improvement. Examples of all of these measures are found in British Columbia.

Deposit-Refund Systems

A fourth category of economic instruments for environmental protection is deposit–refund systems. These involve adding a charge to the price of a product which may pollute if discarded, and refunding the charge when the product is returned. In British Columbia deposit-refund systems are associated with beverage containers and batteries, but do not apply to natural resources. However, performance bonds, which are a common feature of timber licenses, have a corresponding influence in encouraging licensees to meet performance requirements.

Compliance Incentives

The final class of economic instruments is compliance incentives. The primary mechanism of this kind is non-compliance fees, charged as penalties for failure to meet regulations. Such fees must ultimately be enforced through courts.

All of the above five categories of economic instruments have some present or potential application to forest resource management in British Columbia. However, compliance incentives are adjuncts to regulatory measures. Deposit-refund systems have limited scope in natural resource based activities. And taxes and subsidies affect economic behaviour through their effect on costs and prices. Accordingly, in the remainder of this paper, we focus on property rights and pricing as the two forms of economic instruments that deserve most attention as means of promoting sustainable forest resource management.

4. POTENTIAL ECONOMIC INSTRUMENTS TO SUPPORT SUSTAINABLE DEVELOPMENT OF FOREST RESOURCES

We now turn to the prospects for wider application of economic instruments to specific forest resources and values. As noted earlier, the feasibility and effectiveness of particular economic instruments depends on the institutional framework which is itself susceptible to policy change. In the following discussion potential economic instruments are discussed in the context of the present

institutional framework in British Columbia. Later, we discuss scope for institutional change to facilitate broader application of economic instruments.

In the following paragraphs, property rights and pricing mechanisms are discussed in terms of their application to each of the major forest resources — timber, water, fish wildlife and forage. For each we comment briefly on the way the resource is now managed in British Columbia drawing particular attention to problems that arise from distorted economic incentives on the part of users. This leads to examination of the most promising directions of policy development with respect to economic instruments.

Timber

Timber is managed and used under a tenure system that embraces a complex array of property rights. A small fraction of the forest land in British Columbia in the order of four percent is privately owned. Almost all the rest is the property of the provincial Crown and rights to the timber on it are conveyed to private users through various forms of usufructory rights. With few exceptions these rights to timber on Crown land are allocated without competition their terms range from one to 25 years (usually with provisions for renewal or replacement) the holders' rights extend only to industrial timber, and they require the holders to pay a stumpage fee to the Crown as the timber is harvested. Although some forms of tenure extend exclusive rights over a defined forest area the major form — Forest Licenses — entitles the holder to harvest timber within a general administrative area in which others also hold cutting rights. The Ministry of Forests closely regulates activities under these licenses, notably with respect to the rate and pattern of harvesting, utilization of the timber cut roadbuilding, environmental protection and silviculture.

These arrangements have a number of shortcomings from the viewpoint of providing users with incentives to promote sustainable resource development. The tenure system requires users of timber to conduct their operations under property rights which are truncated in various ways that obstruct efficiency and blunt incentives to invest in silviculture and forest enhancement. These weaknesses can be identified with reference to the dimensions of property noted earlier

- Licenses that do not convey exclusive rights over a defined area undermine licensees' incentives to invest in future forest production because the benefits are likely to accrue to others (Pearse, 1985).
- License terms are much shorter than the time it normally takes to grow forest crops, and renewals are always conditional, which deters licensees from investing in new crops of timber (Haley and Luckert, 1990).
- Rights that extend only to the timber discourage holders from considering the impact of their logging and other operations on water, wildlife and other forest resources.
- Restrictions on the transferability and divisibility of licenses impede competition% promote industry concentration and prevent advantageous reallocation of resources among potential users as conditions change. The absence of competition in initial allocations of licenses aggravates these tendencies (Pearse, 1992a).

These and other weaknesses of the tenure system undermine the general security of rights to resources as perceived by timber enterprises. They suggest that sustainable development of timber resources would be advanced by strengthening the property rights of users.

The most pervasive impediment to users' incentives to manage industrial forests and enhance timber production is the prevailing uncertainty of their rights. The limited temporary and closely controlled usufructory rights that characterize the present tenure system coupled with uncertainties in contemporary British Columbia arising from native land claims, environmental pressures and a history of legislative intervention to cancel or alter the rights held by timber companies, leave present licensees too uncertain about the security of their rights to voluntarily invest in long-term forest management (Luckert and Haley, 1990).

Accordingly, policy aimed at promoting sustainable development of timber resources should address means of improving the security of users' rights (CORE, 1994). Several avenues warrant consideration:

- Strengthening the proprietary interest of holders of timber rights. Possibilities include the sale or transfer of Crown lands to private owners, conversion of licenses to leases or

other forms of property that give holders a registered interest enforceable against third parties, and providing assurance of compensation in the event of cancellation or reduction of rights by the Crown.

- Incorporating less restrictive terms and conditions in usufructory rights. This might include longer terms and more certain provisions for renewal, and abolition or relaxation of restrictions on the divisibility and transferability of rights, the exportation of logs harvested and on methods of harvesting.
- Defining more clearly the resources to which the rights apply. Notably, licenses that do not identify the timber that the licensee is authorized to cut might be altered to apply to defined geographical areas, within which the licensees hold exclusive rights to the timber.

Strengthening the tenure system in such ways would stimulate the licensees' proprietary interest and incentives to invest in the long-term productivity of the forests they use. The magnitude of the impact of such changes is difficult to estimate, because few empirical studies are available, but the available evidence suggests it could be substantial. One study revealed that timber companies in coastal British Columbia spend four times as much per hectare on voluntary silviculture on their freehold lands as they do on their similar Crown lands held under Tree Farm Licenses (Luckert and Haley, 1990).

The weaknesses of property rights to timber extend beyond issues of security. Licensing arrangements for Crown forests provide licensees with rights to the timber only, leaving them no incentive to protect other forest values such as water, wildlife and recreational opportunities which are often adversely affected by timber operations. Moreover, the users of these other forest resources typically hold much weaker rights, which they cannot assert against detrimental timber operations (as are explained in the following pages). As a result patterns of forest management and use are biased against non-timber forest values (Pearse, 1992a).

The goal of integrated resource use calls for weighing conflicting forest values and uses against each other to determine the use or combination of uses of each forest tract that will generate

the greatest benefit. The present imbalance in the rights available to users of different attributes of forest environments militates against optimum patterns of resource use. This suggests worthwhile investigation of ways to eliminate or reduce these distortions, such as:

- Strengthening the rights available to users of non-timber forest resources to put them on a comparable legal footing withholders of timber rights (as discussed in the following pages).
- Incorporating provisions for divisibility and transferability of rights to the full range of forest resources, to enable competing forest users to bargain with each other to determine the most beneficial compromises in resource values.

Finally, present arrangements suggest considerable scope for improvements in the pricing of timber to promote sustainable forest development. The value of timber is depressed by the prohibition of log exports and other restrictions on utilization and marketing, and by weak markets for intermediate products such as logs and pulp chips. Regulatory requirements that raise the cost of harvesting timber have the same economic effect; these include utilization standards, cut controls, scaling rules, and the wide range of constraints on logging in cutting permits, logging guidelines and the proposed Forest Practice Code. And the absence of competition for timber rights prevents the market from revealing the value of standing timber (Pearse et al 1974). These impediments to prices that fully reflect the value of timber and timber rights weaken the incentives of forest enterprises to invest in silviculture and forest resource development (Haley and Luckert 1990).

Several changes to strengthen the role of prices in guiding timber users toward improved forest management are worthy of investigation:

- Expansion of provisions for competitive bidding as the means of allocating timber rights.
- Promotion of markets for intermediate wood products such as logs and chips by removing existing restrictions, including export restrictions.

- Revision of the manner in which stumpage charges are collected from the present fixed amount per cubic metre of wood recovered in logging regardless of its quality or value (which encourages “high-grading” and waste) to a fixed lump-sum or annual payment.

The available evidence suggests that such measures would substantially increase the value and price of timber. Competitive sales normally fetch stumpage prices several times the administered prices paid under the usual non-competitive licenses (BCMOF, 1993). Export prices for many types of logs are substantially higher than domestic prices (Pearse, 1993a). Higher values for timber and timber rights will strengthen incentives to invest in continuing timber production.

Water

Fresh water is an abundant and valuable natural resource in British Columbia. It has two useful dimensions, both of which are subjects of regulation — its flow or quantity dimension and its capacity to absorb waste. In addition, water has important ecological, aesthetic and recreational values which are managed only indirectly.

To authorize withdrawals of water from its natural watercourse, licenses or permits are issued by the Water Rights Branch of British Columbia's Ministry of the Environment. These rights are allocated on a first-come-first-served basis, for indefinite terms.

The security of water rights depends on their seniority. If withdrawals leave insufficient flow in a watercourse, giving rise to conflict among users, licensees are given priority according to the date in which they first applied for their licenses. The frequency of such conflicts is increasing.

The use of waterways to dispose of waste is regulated by the Pollution Control Branch of the Ministry of Environment under a system of pollution control permits. These permits require licensing of discharges, and the regulatory system has focused on restricting the discharges of individual permit holders. Recent changes to the pollution control permit system include fees related to the amount and toxicity of the permitted discharges. But the fees are aimed at recovering only administrative costs. The incentive effects are therefore weak and the emphasis remains on command-and-control regulation.

Jurisdiction to control fresh water to sustain ecological, aesthetic and outdoor recreation values is divided among federal, provincial, municipal and first nations governments, giving rise to pressing management problems.

Various weakness in current policy and institutional arrangements for water management can be attributed to deficiencies in property rights and impediments to market pricing. Among the weaknesses of property rights are the following:

- Water rights are not easily transferred among uses and users, which impedes reallocation to higher uses as circumstances change.
- There is no provision for changing the terms of licenses or permits (short of determining that a water use has been legally abandoned) no matter how inappropriate these terms have become.
- There is no provision for periodic reassessment of the licensed uses of a watercourse, to ensure that they are the most beneficial combination of uses and that the water is being used efficiently.
- . The method of determining priorities among licensed users and potential uses takes no account of the value of water in alternative uses.
- Pollution control permits leave polluters with weak economic incentives to abate their pollution within the permitted level.
- Prescribed pollution control technologies provide no incentives to invest in the development of new abatement methods.

The limited role of pricing in current policy arrangements also impedes efficient allocation and use of water

- Most water licenses are charged a fixed fee, leaving them no incentive to economize on their use of water.
- The administered charges for water do not reflect either the value of water used or its value in alternative uses.

- Charges for waste discharge are not related to the environmental damage caused by the permittees or the value of the absorptive capacity of receiving waters.

These weaknesses in the water regulatory regime suggest considerable scope for economic instruments and market forces as means of advancing the sustainable development of water resources. These instruments could create circumstances in which water, water rights, and waste discharge rights were divisible and transferable among uses and users, within limits consistent with the character of each watercourse, so that the resources could be allocated and reallocated to their most beneficial uses, and their prices could reflect their value in alternative uses. The prices, and cost, of these rights would provide incentives for conservative use (Campbell, Pearse, and Scott 1972).

In the interest of sustainable development of water resources, several changes in the form of property rights warrant investigation:

- Water rights and discharge permits could be made divisible and transferable (within the limit imposed by the natural watercourse). The resulting prices attached to these rights, and hence the cost to users, would provide incentives to conserve water and abate pollution even within initial allocations. The market in rights would facilitate continuous reallocation to the most beneficial users.
- The system of priority among water licensees based on their initial date of application could be abolished. With free transferability, any necessary reduction in total use could be applied pro-rata to all licensees, leaving them free to make adjustments among themselves.
- Regulations relating to technologies for pollution abatement could be relaxed leaving polluters to respond to economic incentives to abate pollution using the most efficient methods available.

Other opportunities exist for development of pricing to stimulate sustainable use of water resources:

- All water users could be metered and charged for the quantity of water they use, to encourage water conservation.
- A pricing formula for water could be developed to take account of the fixed and variable costs of water supply and resource rent, according to the principles of marginal cost pricing (Pearse and Tate, 1991).
- Declining block rate schedules for non-residential users could be eliminated, to reduce distortions in water use.
- Pollution charges could be based on the environmental damage caused by the pollutants discharged, to stimulate investment in abatement.

Finally, certain changes in the character of water licenses and discharge permits would provide market processes to help balance competing resource uses:

- The onus on government to ~~try~~ to arrange efficient allocation of water resources and to respond to changing needs would be alleviated by clear provisions for divisibility and transferability of water rights.
- The government could allocate additional rights on a watercourse through market sales, or reduce demands on a watercourse through purchases of rights, without having to adjudicate priorities among uses and users.
- Water rights and waste discharge permits could be administered jointly, to ~~take~~ account of the close relationship between the volume of water in a watercourse and its waste assimilative capacity (Pearse, Bertrand and McLaren 1985).

Such innovations in property rights and pricing for water would give users economic incentives to use water more consistently with the objectives of sustainable resource development, and thereby reduce the onus on regulatory control.

Fish

British Columbia's extensive waterways support rich and varied fish resources. By far the most valuable are the five species of Pacific salmon which depend on migration routes and spawning beds in rivers and lakes throughout most of the province. While the most valuable are the five species of Pacific salmon they are utilized mainly in ocean fisheries, so we set them aside here to focus on freshwater fisheries in forest environments. These are of two kinds — recreational fisheries and so-called Indian fisheries.

Recreational fisheries are regulated through annual angling licenses issued to individual fishers, and detailed sport fishing regulations that control bag limits, the size of fish caught fishing gear, area and seasonal closures and related matters. The regulations that apply to different species and waterways vary considerably, in an effort to reconcile fishing demands with the capacity differing stocks and other circumstances.

An angling license entitles its holder to fish in non-tidal water throughout the province, subject to the regulations, although supplementary licenses are required to fish for certain species (notably steelhead) and in certain waters. The basic license fee is \$12.00 plus a contribution of \$5.00 to the Habitat Conservation Fund. Special rates apply to seniors and non-residents. An additional daily fee is charged to fish in certain special streams (termed "Class I Streams") such as the Dean River.

With minor exceptions, fishing rights are non-exclusive: that is, fishing is open to all licensees, and there is no direct control of the number who fish in any fishery. The main exceptions are some interior lakes where access is controlled by owners of all the surrounding land. Fish stocks are enhanced through an extensive stocking program. Management is thus focused on traditional techniques for managing the supply of fish as opposed to managing the demand for them.

Although the management of freshwater fisheries in British Columbia compares favorably in many respects with that of most other Canadian provinces, there are evident weaknesses in the present policy framework (Pearse, 1988b). The most serious management deficiencies arise from

the nature of recreational fishing rights. Because angling rights are not exclusive, and the number of fishers in individual lakes and streams is not restricted each fishery is, in effect the common property of an unlimited number of fishers. As a result catches often exceed the sustainable capacity of the fish stocks, leading to depletion. This is particularly evident near population centres, and it is a growing problem as populations and access expand. Effort to offset stock decline with artificial stocking become increasingly difficult and costly.

Furthermore, uncontrolled numbers of fishers erode the quality of the fishing experience through crowding and other effects apart from stock depletion. Repeated studies show that recreational fishers judge the quality of their fishing opportunities not so much by their catches of fish as by the solitude and wilderness characteristics they offer, yet fisheries management concentrates on managing stocks of fish (Pearse, 1988b).

Similarly, recreational fishing opportunities lack variety. The wide range of preferences among sports fishers, from esoteric trophy fishing to put-and-take trout ponds for children coupled with the differences of access and natural conditions among fisheries, call for a diversity of management regimes. The highly centralized provincial management structure cannot easily accommodate the needed variety. These problems are compounded by the fact that recreational fishers have neither the incentive nor the means to engage in the conservation and management of fish resources, leaving the burden of management and enforcement entirely to government.

Property rights offer potential means of enhancing recreational fishing opportunities and values. Most important are the opportunities afforded by new forms of fishing rights that would provide individuals or groups exclusive rights to manage and use designated fisheries. Experience in other provinces and other western countries suggests that this approach can be adapted in several ways.

- Resort owners can be assigned responsibilities for managing and regulating fishing on individual lakes and streams. Some successful experiments of this kind are found in fly-in lakes in Manitoba (Pearse, 1988b). These arrangements facilitate management systems adapted to local circumstances, accommodate specialization and variety in

fishing opportunities, and relieve the burden on governmental regulation and enforcement.

- Local organizations can be authorized to manage specified fisheries. A notable model is Quebec's ZECS (*zones d'exploitation controllees*) which are non-profit organizations licensed to manage local salmon streams and other fisheries under management plans approved by the government. These private organizations enlist biological experts to manage and enhance fish stocks, plan and organize fishing to provide a variety of opportunities, charge fees and assume regulatory and enforcement responsibilities. Roughly similar arrangements exist in New Zealand where freshwater fisheries are managed by local Fisheries Councils (formerly Acclimatization Societies).
- Fisheries in lakes and streams can be privatized In England almost all fishing is organized under usufructory or freehold rights to fisheries held by local enterprises, clubs or landowners.

Arrangements such as these offer promising means of overcoming the weaknesses in the present management of recreational fisheries. They provide fishers and others opportunities to participate in management the means to regulate fishing pressure, the facility to provide a variety of fishing opportunities, the incentive to protect and enhance the quality of fishing generally, and the means to fiance improvements, regulation and enforcement.

There are weaknesses also in the pricing arrangements. The nominal fees charged for angling licenses do not of course, reflect the full value of recreational fishing, nor do they recognize the differences in value of different fisheries. In addition the fees charged for recreation fishing rights bear no systematic relationship to either the amount of fishing activity or the demands on resources of individual fishers. Fisheries management is financed entirely through provincial government budget allocations, with little reference to either the value of the resources or the opportunities they afford.

These shortcomings in pricing could be alleviated in several ways:

- Angling license fees could be raised to constrain growth in fishing pressure and to increase financial resources for more intensive management.
- More discriminating licenses and fees, or supplemental licenses, could be adopted to ration access to lakes and streams under particularly heavy recreational pressure or having special characteristics that are threatened by growing numbers of fishers.
- Charges for fishing would be related to fishers' use of the relevant fishing sites in terms of fishing-days.

Such discriminating pricing would undoubtedly be more difficult and costly to administer under the present centralized management system than under the decentralized management schemes suggested above.

Indian fisheries are founded on the aboriginal right to fish. These fisheries are directed mainly at salmon during their freshwater migrations, but *some other* species are caught as well. Historically, catches in these fisheries have been controlled by restrictions on fishing time and gear used by native fishers, and by a general prohibition on the sale of fish caught. However, recent court rulings have strengthened aboriginal rights and severely restricted the government's authority to impose traditional controls. Recent experiments have involved catch quotas for individual bands coupled with arrangements for commercial sale of catches (Pearse, 1992c).

The aboriginal rights on which the so-called Indian fisheries are based raise complicated constitutional and political problems which go well beyond the scope of this report. However, it can be said that the orderly management of these fisheries has hitherto suffered seriously from the absence of clear definition of aboriginal fishing rights and the resulting disputation, litigation and confusion.

It is worth noting, also, that recent court decisions which have strengthened aboriginal fishing rights, and the resulting innovations in regulatory policy, help to define more clearly the extent of native rights to fish and the use that can be made of them. Recent agreements between the federal government and some bands and tribal organizations specify the quantity of fish to be taken in

Indian fisheries and permit the fish to be sold. These arrangements offer native groups at least a potential opportunity to take advantage of economic instruments themselves. The freedom to sell their fish gives them access to fish markets and enables them to generate higher economic returns from their catches. Specific quotas also facilitate management and encourage cooperation among native groups along waterways such as the Fraser River. These allocations enable native groups to trade in fishing rights so that harvests can be taken in places where migrating fish are most valuable; opportunities to enhance stocks can be exploited in return for larger quotas; and other beneficial arrangements can be made through markets and contracts.

Wildlife

British Columbia's wide range of geophysical and vegetative conditions supports a rich abundance of wildlife. A variety of small and big game is valued by recreational and native hunters; and by commercial guides and outfitters that depend largely on non-resident clients. Fur-bearing animals support a modest trapping industry. And there is a rapidly growing non-consumptive demand for wildlife, associated with photography, bird-watching and tourism.

All wildlife is the property of the provincial Crown and consumptive users are issued usufructory rights in the form of licenses and permits.

Recreational hunting by residents of the province calls for a general hunting license, currently issued for a fee of \$21.00 (Ministry of Environment Wildlife Branch 1993). This fee is somewhat higher for other Canadians, and for foreigners to hunt in British Columbia the fee is \$145.00. Supplementary licenses and tags are required to hunt particular species of big game. In some cases, the number of animals that maybe taken in a management area is limited and the hunters given the right to hunt are selected by lot. A special permit is also required to hunt in certain areas, such as the Gulf Islands.

Hunting activity is managed through this system of licenses and detailed hunting regulations that specify closed and open seasons, hunting techniques and related matters for each management area. But hunting rights are non-exclusive, and the game is effectively common property. The

weaknesses of this regulatory framework therefore parallel those of recreational fisheries.

Management is conservatively oriented toward protecting wildlife rather than to enhancing it or taking advantage of opportunities to improve wildlife values (Minister of the Environment, 1983).

The potential scope for economic instruments to support recreational hunting is also similar to that in recreational fishing. Exclusive hunting rights over defined geographical areas could be issued to hunting clubs, enterprises or individuals, providing holders not only the right to organize and regulate hunting and to charge fees, but also the responsibility to manage and develop the wildlife resources according to approved management plans. This approach would build on the experience with private hunting rights in Britain and Europe, the ZEC regime in Quebec and the framework of guiding territories in British Columbia. It would enable diversified and decentralized management with local participation provide incentives for resource enhancement and development and ensure that the costs were borne by users.

There is also scope for improved pricing arrangements, even under the present centralized management regime. For example, where the number of animals taken must be restricted the limited number of privileges could be allocated through auctions, thus ensuring more efficiency and certainty in allocations and raising revenue for management purposes.

Aboriginal hunting rights give native Indians the right to hunt for food and other traditional purposes on unoccupied Crown land. Their harvest maybe restricted for conservation purposes, but is otherwise unlimited. Under present policy, the harvested game cannot be sold and the rights are not transferable.

Aboriginal rights to take game raise many of the same problems as the aboriginal rights to fish, and the recent innovations in Indian fishery policy suggest ways of improving native hunting rights in the interests of resource management and beneficial use of resources. Specification of each native band's right to game in quantitative terms, removal of restrictions on the sale of game, and the transferability of hunting rights could enable native people to realize greater economic benefit from the resources they use, while facilitating management planning.

Commercial hunting is regulated through registered guide-outfitters in British Columbia. Guides must hold licenses, and their access to game is regulated through a system of guiding “territories”. Within his assigned territory a guide has an exclusive right to engage in commercial guiding. Territories are transferable with the consent of the Minister. Non-resident hunters are required to be accompanied by a guide, and they comprise the bulk of guides’ clientele.

The main weakness of these guiding rights is that they are exclusive only in respect of commercial operations — they do not exclude resident hunters. As a result uncontrolled numbers of resident hunters can interfere with high-quality guided hunting experiences offered by guides, and undermine the licensees’ incentive to manage and conserve game within their territories.

These difficulties could be alleviated by strengthening the rights conveyed under guiding licenses. For example, guides could be given complete control of hunting within their territories by requiring resident hunters, also, to employ their services. Alternatively, the number of resident hunters, or the animals allocated to this group, could be fixed (based perhaps, on historical activity) and allocated among the potential resident hunters by lot auction or through a local hunting club. This would give the holder of the guiding territory better opportunity to plan hunting and harvests, and to contribute to management. The resident hunters might also be required to conform to the guide’s hunting plan to minimize interference with commercial operations. Eligibility to hold licenses to guiding territories might be extended to persons other than licensed guides, such as local hunting clubs (who could employ guides, if they chose to do so). This, combined with the holder’s right to manage all hunting in his territory, would undoubtedly enhance the value of these rights, give the holders incentive to manage and conserve game for maximum value, and enable decentralized management with the participation of local user groups.

In recent years, British Columbia’s guide-outfitters have been developing wilderness tours and other non-consumptive experiences as adjuncts to highly seasonal guided hunting. As both the range of activities and the level of demand for them grows with time, so will the potential gains from the more comprehensive forms of rights suggested here.

Trapping rights to harvest fur-bearing animals are allocated through licenses that give each holder an exclusive right to engage in this activity within a defined geographical area. The licenses are transferable with the consent of the Minister (which is rarely withheld). They are the oldest and most complete form of right to use wildlife in the province, (apart from the aboriginal rights of native people), having first been defined in this region when the exclusive right to trade in fur was granted to the Hudson's Bay Company in 1821 (Rich, 1967). Trapping areas were formally mapped and registered in British Columbia in the 1920s (Novak *et al.*, 1987).

Non-consumptive uses of wildlife by photographers, viewers, bird-watchers and tourists lend themselves less readily to economic instruments for management. Nevertheless, we have already noted opportunities to develop the territorial rights of guides and outfitters who provide opportunities for such users through normal market processes. Below, we note the scope for pricing access to parks and other recreational resources.

However, the values generated by small wildlife are too diffuse to apply conventional economic instruments. Those who value songbirds, raptors, reptiles and many small mammals are difficult to identify; their "use" of them is hard to quantify, and means of charging them for the benefits they receive is even more problematical. These are forms of wildlife use that come closest to pure public goods, the provision and management of which must be left in large part at least to governments.

Recreation

British Columbia's natural environment provides a vast array of outdoor recreational opportunities, most of which are associated with forests. Access to recreational resources is provided under a variety of arrangements. At one end of the spectrum, strictly private businesses provide facilities for recreationists in the form of guest ranches, lodges, campgrounds, ski resorts and so on. The management of these facilities is largely based on private land and resources, and market processes that engage economic instruments without special governmental involvement.

A second category consists of recreational resources that are the property of the Crown but are licensed to private enterprises. This includes some campsites, the guiding territories described earlier, as well as areas for guided hiking and nature observation trail riding, heli-skiing, and snowmobiling. The opportunities for expanded use of economic instruments lie mainly in the improvement of property rights held by the operating enterprises. While there is considerable variation most would benefit from larger terms, greater security, and less restricted transferability.

The third category consists of recreational resources on Crown lands that are managed by public agencies, and includes most national and provincial parks, wilderness areas, wildlife reserves and most importantly, Crown forest land. These are typically isolated from market processes: the numbers of non-consumptive recreational users are not controlled and they are not required to pay for access. Government provides trails and other facilities. Management is largely supply-oriented, passively responding to demand under free access. This category presents the greatest opportunity for development of economic instruments.

The weaknesses of this third category of arrangements are characteristic of open-access, common-property regimes. Recreationists lack any incentive to constrain their use of the resources, so that as demand grows, overuse and crowding threaten to degrade the resources and the quality of the recreation. Management falls entirely to government with funding largely unrelated to the opportunities to generate value.

The scope for economic instruments depends on the extent to which the values generated are private goods (like camping, for which the number of consumers that can be accommodated is limited they are identifiable and can be charged a price) as distinct from goods (like the aesthetic value of a forested mountain appreciated by an unlimited and unknown number of viewers). Parks and wilderness areas typically generate values of both kinds, but economic instruments of management are appropriate only for private goods.

Private goods, nevertheless include most forms of outdoor recreation and many lend themselves to economic instruments in the form of property rights; for example, campgrounds and hiking trails could be licensed to private enterprises who could manage them on a user-pay basis.

Pricing would be feasible, also, for government-managed parks and other clearly defined recreational areas. While fees are currently applied only to campground use, entry fees could be levied on recreationists according to their use as measured in recreation-days, in the interests of controlling demand, user-pay and revenue generation. For sites where numbers must be restricted to protect the quality of the recreational experience, pricing can assist in regulating access and through variable rates, help spread use over periods of high and low demand.

Beyond organized parks and other recreational sites, in the province's vast Crown forests where much recreation takes place, the problem of pricing is the practical one of intercepting and charging recreationists in often remote areas. In many circumstances the costs of administration and enforcement are likely to exceed the benefits of improved management.

Range

Through much of the southern interior of British Columbia including the Thompson Cariboo and Chilcotin regions of the Fraser Basin, the ranching industry depends on natural rangelands. Most rangeland is forested. Livestock grazing takes place under several forms of property rights:

private land owned by ranching enterprises, typically provides the central core of the range utilized by ranching enterprises.

grazing leases, granted by the Crown give exclusive rights to graze livestock in the leased area. As on his private land, the lessee makes all decisions about management and use of the land and has the right to restrict public access. Leases are issued for 21 years, and are generally renewed unless the rangeland is badly abused. They are taxed as private property. The Ministry of Forests is in the process of converting leases to permits (see below).

grazing licenses give ranchers a non-exclusive right to graze specified numbers of livestock on designated areas of Crown range. They are issued for terms of 10 years, renewable in their eighth year, subject to the discretion of the Crown. An annual grazing fee is payable to the Crown based on a constant ground rent and the average price for calves the previous season,

and applied to the numbers of livestock authorized under the license (Range Act, RSBC 1979).

Licensees are required to assume certain resource management responsibilities, - including the preparation of a management plan outlining the use, management, and improvements of Crown range during the term of the license.

The Ministry's district managers are given wide discretion in the allocation of grazing" licenses among competing applicants, having regard to their individual circumstances and past performance. Under certain circumstances he may invite competitive bids, but this is rare.

grazing permits convey rights similar to grazing licenses; they are also allocated in the same way and carry the same fees. However, their terms are only one to five years, renewed upon expiry unless the holder has abused his rights or the forage supply is inadequate. The resource management responsibilities required of permittees are minimal.

hay cutting licenses and permits grant the right to harvest hay in a prescribed area under essentially the same conditions as grazing licenses and permits.

Of these rights to rangelands, grazing licenses and permits are the most important forms on Crown range, and the most relevant to the present discussion. They suffer from several weaknesses (BCMOF, 1989). A continuing grievance of ranchers is the administration of the grazing fees, which are applied uniformly across licenses and permits, without reference to their differing capacities and qualities. The method of allocating rights is also viewed as arbitrary and inequitable. More fundamentally grazing licenses and permits are not sufficiently secure to give their holders incentives to invest in long-term improvements and to manage the resources sustainably. This is a result of their short terms, the non-exclusive nature of the rights, and poor compensation arrangements. Moreover, the way these rights can be exercised is tightly unstrained by the Forest Service's management regulations and requirements, which constrains the users' flexibility and ability to use the resources efficiently. Correspondingly, the Forest Service bears a heavy burden of

administration and enforcement. And finally, conflicts over the allocation of forage, especially between cattle and wildlife, are common and difficult to resolve.

These shortcomings suggest a number of potential changes based on the development of property rights:

- The arbitrariness and alleged inequities in grazing fees and the allocation of grazing rights could be reduced by allocating them through competitive bidding.
- The security of licenses could be enhanced through longer terms, more certain renewability, and broader provisions for compensation in the event of withdrawal or reduction in the holder's rights.
- The common-property nature of grazing permits could be eliminated by converting them to leases that provide exclusive rights over designated areas.
- Holders of grazing rights could be *given* more flexibility to utilize the resources efficiently, by assigning them responsibility to prepare plans and to manage resource use within general constraints.

Rights of Other Forest Values

There are many other forest values, and forms of rights other than the most important ones, discussed above. Special licenses or permits are issued to cut fenceposts, pit-props and wild hay, and to utilize specified areas for commercial or other purposes. New forms of rights continue to emerge; at least one company on Vancouver Island allocates areas of its forest lands among apiarists, and the burgeoning matsutake mushroom industry is generating discussion about the desirability of licensing mushroom pickers.

These minor uses cannot be dealt with individually here, and it is difficult to generalize about them. Some, though few in number, require secure forms of property rights to support heavy investments, while others do not. Some conflict or interfere with other forest uses, present fire danger or other hazards, are difficult to police, or have other characteristics that bear on the utility of property rights and the practicality of other economic instruments.

A pervasive issue is the balance between the benefits that can be derived from introducing such policy instruments and the costs of introducing, administering and enforcing them. All that can be said of a general nature is that, as economic and population growth proceeds, and demands on forest resources grow, the potential benefits are likely to grow to exceed the costs for an increasing variety of forest uses.

5. INSTITUTIONS

The success of efforts to harness market forces in the pursuit of sustainable development of natural resources depends on appropriate institutions. Accordingly, it is important to assess the existing institutional structures, and the scope for improvements in them to accommodate economic instruments of the kind suggested in the preceding pages.

For the purposes of this paper, 'institutions' are defined as the various structures and arrangements that provide the framework for our economic, social, political, and cultural systems. They include governments at all levels, political groups, legal arrangements, culture, educational systems, social organization markets, and enterprises. These institutions interact with each other, and provide the context for individual and group decisions. They provide the delivery system for policy changes, and so they must be adapted to accommodate sustainable development objectives.

Six aspects of institutional structure must be considered — democratic, jurisdictional, geographic, environmental, social, and economic (Artibise et *al.*, 1993). Each will influence the efficacy of economic instruments that maybe introduced in pursuit of sustainable development of natural resources, and each will be affected by such changes. democratic issues include representation, that is, whether the changes will lead to broader or narrower participation by individuals, interest groups and organizations. Others are accessibility and accountability, and any additional cost of government. `

Jurisdictional issues include the scale of governmental authority, the regional implications of the decisions of different levels of government and the extent to which policy changes tend to

integrate or fragment responsibilities. *Geographic* aspects refer to the area or regions influenced by institutions and their linkages elsewhere. *Environmental* aspects include provisions for protection of ecosystems, and the extent to which institutional arrangements facilitate environmental monitoring and enforcement. *Social* considerations include questions about barriers to participation in social and economic activities and the distribution of wealth. Finally, *economic* aspects relate to the efficiency of the institutional framework in managing economic activity and promoting growth and its equity implications.

All these aspects of institutional structure need to be considered in the context of proposals to develop economic instruments in support of natural resources management.

6. RESEARCH PRIORITIES

The review of resource management arrangements and their deficiencies in this paper suggests certain priorities for research to clarify opportunities for advancing sustainable development policies through economic instruments.

Rights to Resources. A recurrent weakness in present arrangements is deficient forms of property rights for resource users. Opportunities to improve systems of rights and tenure should be investigated through studies in property law applicable to natural resources. This should include potential means of creating more complete forms of property for all resources. Forms applicable to resources currently managed under poorly-defined rights, such as fish wildlife, and environmental and recreational values, deserve careful investigation.

The most pervasive weakness of resource rights is their insecurity. Research should focus on means of strengthening users' rights — defining them more clearly protecting them from risks of interference by governments and third parties, and providing for compensation for infringements.

Provisions for Bargaining among Resource Users. The interdependence of resource uses and values implies that different resource users need to be able to bargain among one another to bring about the most beneficial combination of resource use. This calls for special attention to the legal and institutional changes needed to enable users of different resources to deal with each other to resolve conflicts over patterns of resource use, as an alternative to the present dependence on regulatory control.

Pricing A major obstacle to harnessing market forces in support of resource management in British Columbia is the absence of markets, and hence prices, for some resource values such as non-consumptive recreation. For many others, such as water and fisheries, nominal administered prices fail to reflect resource values and cannot reliably guide users' behaviour. The scope for developing markets and prices for resources, and the institutional structures needed for these, demand careful investigation.

Centralization of Decision-Making. In British Columbia authority over resource management and use is highly centralized — a consequence of broad public ownership and centralized bureaucracies of both provincial and federal governments. Centralized decision-making conflicts with the general need for resource management geared to local and even site-specific conditions. In addition federal and provincial responsibilities overlap for resources such as water and fish and in some cases, policies conflict (Rees, 1990). These sources of inefficiency in governance, and means of alleviating them warrant examination.

Stability Another governmental problem is the instability of policy, again a consequence of the high degree of public ownership of resources combined with the economic importance of resource industries and the characteristic political polarization of this province. Attention needs to be given to institutional arrangements that are resilient to political shifts, ensure orderly change, and create a climate of stability for investors.

Alternative Institutional Arrangements. There is considerable experience with alternative institutional structures and management systems in other regions and countries, but these are

largely unfamiliar in British Columbia Much can be gained by investigation of the experiences of others, and the applicability of their arrangements here. We have referred to localized management systems in Quebec and New Zealand and private property arrangements in Britain and Europe, but there are many others deserving examination. In addition consideration should be given to experiments and pilot projects to test alternative systems of management.

These are not the only subjects worthy of research but they indicate some priorities suggested by this preliminary review.

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KEY:	{A}	Air
	{c}	Range
	{E}	Energy
	{F}	Fish
	{G}	Global Warming
	{H}	Water
	{M}	Minerals
	{R}	Recreation
	{T}	Timber
	w}	Wildlife