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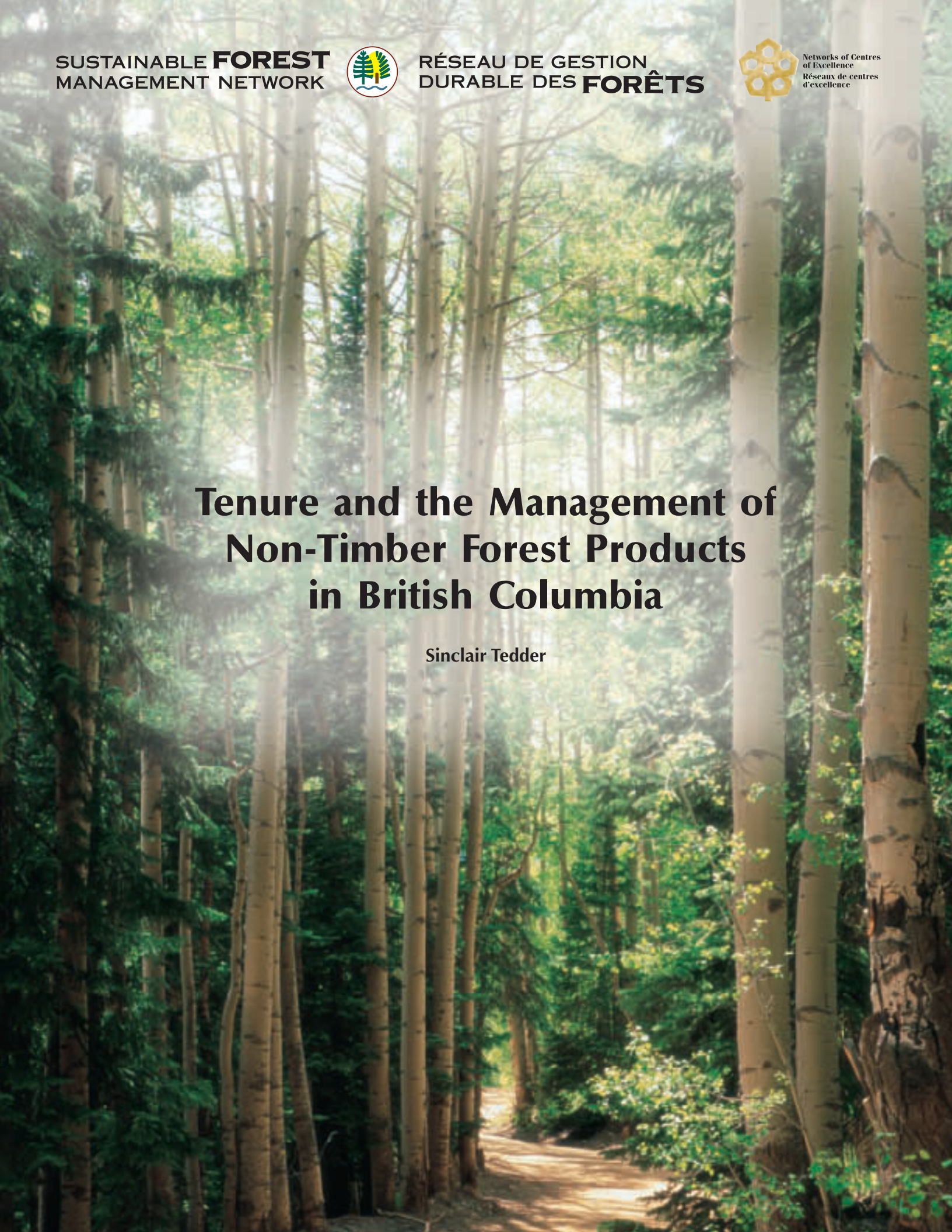

Tenure and the Management of Non-Timber Forest Products in British Columbia

Sinclair Tedder

THE SUSTAINABLE FOREST MANAGEMENT NETWORK

Established in 1995, the Sustainable Forest Management Network (SFM Network) is an incorporated, non-profit research organization based at the University of Alberta in Edmonton, Alberta, Canada.

The SFM Network's mission is to:
- Deliver an internationally-recognized, interdisciplinary program that undertakes relevant university-based research;
- Develop networks of researchers, industry, government, Aboriginal, and non-government organization partners;
- Offer innovative approaches to knowledge transfer; and
- Train scientists and advanced practitioners to meet the challenges of natural resource management.

The SFM Network receives about 60% of its $7 million annual budget from the Networks of Centres of Excellence (NCE) Program, a Canadian initiative sponsored by the NSERC, SSHRC, and CIHR research granting councils. Other funding partners include the University of Alberta, governments, forest industries, Aboriginal groups, non-governmental organizations, and the BIOCAP Canada Foundation (through the Sustainable Forest Management Network/BIOCAP Canada Foundation Joint Venture Agreement).

KNOWLEDGE EXCHANGE AND TECHNOLOGY EXTENSION PROGRAM

The SFM Network completed approximately 300 research projects from 1995 – 2004. These projects enhanced the knowledge and understanding of many aspects of the boreal forest ecosystem, provided unique training opportunities for both graduate and undergraduate students and established a network of partnerships across Canada between researchers, government, forest companies and Aboriginal communities.

The SFM Network's research program was designed to contribute to the transition of the forestry sector from sustained yield forestry to sustainable forest management. Two key elements in this transition include:
- Development of strategies and tools to promote ecological, economic and social sustainability, and
- Transfer of knowledge and technology to inform policy makers and affect forest management practices.

In order to accomplish this transfer of knowledge, the research completed by the Network must be provided to the Network Partners in a variety of forms. The KETE Program is developing a series of tools to facilitate knowledge transfer to their Partners. The Partners' needs are highly variable, ranging from differences in institutional arrangements or corporate philosophies to the capacity to interpret and implement highly technical information. An assortment of strategies and tools is required to facilitate the exchange of information across scales and to a variety of audiences.

The KETE documents represent one element of the knowledge transfer process, and attempt to synthesize research results, from research conducted by the Network and elsewhere in Canada, into a SFM systems approach to assist foresters, planners and biologists with the development of alternative approaches to forest management planning and operational practices.

Knowledge Exchange and Technology Extension Program (KETE)
Sustainable Forest Management Network

Tenure and the Management of Non-Timber Forest Products in British Columbia

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EXECUTIVE SUMMARY

Non-timber forest products (NTFPs) provide a rich case study of the evolution of forest management to include common pool resources. NTFPs are a complex juxtaposition of traditional and commercial uses amidst various other overlapping and at times competing or complementary demands on the same landbase. In British Columbia (BC), the harvest of non-timber forest products operates across a range of property regimes, including private land, tenured public land, and open access public land. This report focuses on the commercial use of NTFPs and explores whether or not various property rights regimes include NTFPs in forest management. Does tenure matter in the appropriation and provision of NTFPs? Four case studies covering a range of property rights types are used to answer this question.

Property rights theory suggests that, in relation to natural resources, when property rights are secure, exclusive and comprehensive a rights holder will invest in the resource and seek to maximize available rents. Property rights tend to evolve when the value in a resource rises and its use becomes congested. The evolution of property rights is complicated, however, by the common pool nature of NTFPs, where restricting access is costly and the flow of resource units is subtractable.

Research for this report found that regardless of the exclusivity or comprehensiveness of the property rights (i.e., the privateness of the rights), single non-timber species let alone NTFPs as a group were generally not incorporated into forest management. However, while the landowner or tenure holder tended to show little direct interest in NTFPs, or was challenged by their developmental costs and planning requirements, a thriving NTFP industry worked around, within, and underneath them. This approach has left much of the NTFP sector operating within an open access environment where the threat of free riders creates little incentive to invest and harvest at sustainable levels. It has also resulted in commercial encroachment of First Nations traditional harvest areas.

Results of these case studies reveal consistencies with open access and common pool theory, but also suggest that there are more specific reasons or contextual characteristics explaining the lack of interest and perceived inability to manage and encourage investment in NTFPs. These characteristics include:

- heterogeneity,
- a prescriptive versus entrepreneurial focus,
- a consistent targeting of user rights,
- land adjacency influences,
- a public access ethic, and
- a variety of influences related to uncertainty.

Establishing property rights or tenure in a similar manner as timber may not be the best option, nor would allocating NTFPs to the timber sector in hopes of maximizing benefits through joint production.

This report offers a management proposal for NTFPs that would involve a restructuring of forest management through a separation of the timber harvesting function. This would include separating the actual process of felling, processing and marketing of timber from the post-harvest silviculture reforestation and stand tending function, where a focus on NTFP production would broaden the comprehensiveness and potential benefits of joint production. There is significant potential for local participation in this form of management, especially among First Nations.

TABLE OF CONTENTS

1.0 Introduction

NTFPs provide a rich case study of the evolution of forest management to include common pool resources

Non-timber forest products (NTFPs) provide a rich case study of the evolution of forest management to include common pool resources. NTFPs are considered by some as insignificant compared to the timber industry, offering little more than a few scattered "boutique" markets. Others consider them an important component of rural livelihoods. NTFPs are a complex juxtaposition of traditional and commercial uses amidst various overlapping and at times competing or complementary demands on the same landbase.

In BC the harvest of NTFPs occurs across a range of property regimes

In British Columbia (BC), the harvest of non-timber forest products occurs across a range of property regimes, including private land, tenured public land, and open access public land. This report focuses on the commercial use of NTFPs and explores whether or not various property rights regimes include NTFPs in forest management. This focus does not infer that non-commercial activities are less valuable or important. In fact, subsistence and traditional values may be higher; however, commercial activity has changed the pattern of land use and has heightened the need for more coordinated management. This study is part of a larger research effort undertaken by the Sustainable Forest Management Network entitled *The Challenge of Institutional Redesign: Tenure, Competitiveness and Sustainability*.

In most of BC, the harvest of NTFPs is unrestricted, unmonitored and un-regulated, operating within, around and beneath a timber dominated system of land use

In most of BC, the harvest of NTFPs is unrestricted, unmonitored and un-regulated, operating within, around and beneath a timber dominated system of land use. Would the establishment of more private property rights offer a solution to the potential for resource degradation and a lack of investment associated with this *de facto* open access environment? Does tenure matter in the appropriation and provision of NTFPs?

In the case of NTFPs, resource managers are faced with a lack of information and uncertainty regarding how to approach NTFP management and the ability of tenure or property rights to:

1) lead to sustainable use or appropriation;

2) encourage investment in or provision of the resource;

3) provide an avenue to exploit the synergies among timber and non-timber uses; and

4) ensure that traditional and subsistence uses are protected and enhanced.

The term NTFP refers to a heterogeneous collection of products used for a variety of commercial and non-commercial purposes

The term NTFP refers to a heterogeneous collection of products used for a variety of commercial and non-commercial purposes that may have a similarly varied range of management needs. Policy needs to be able to consider and address the evolving need for managing complexity in resource use. Focusing on one species does not consider this complexity therefore narrowing to one or two species avoids a central challenge to NTFPs, or integrated and more holistic forest

management in general. This paper argues that property rights are but one consideration within a complex institutional milieu and various contextual factors may have as much or more of a role in the sustainable use and management of non-timber forest products in BC.

To explore this issue, two research questions are considered:

1) Do more well-defined property rights necessarily influence the way in which NTFPs are managed?

2) What NTFP resource characteristics support or hinder the efficacy of any particular property rights regime?

The paper opens with a literature review of property rights and resource types. This is followed by a profile of BC and the NTFP sector, both as a primer on NTFPs in BC and to place NTFPs within the context of property rights. Section 4 presents four case studies, followed by an analysis of the influence of property rights on the appropriation and provision of NTFPs. The four case studies cover a range of the property rights spectrum; a mix of *de facto* open access on public land, community forest tenures on public land, a community forest on private land, and a private industrial forest land owner. The concluding section discusses various elements to consider in the consideration of a NTFP management regime and provides a recommendation for one possible approach.

2.0 The institutional[2] milieu

The question of tenure raises the more general issue of property rights, but even more important to the discussion is the social-ecological context within which a resource, in this case NTFPs, is situated. This section provides a literature review that attempts to clearly differentiate between property rights (a social construct) and resource types (a physical characteristic). The important message in this section is that in order to avoid institutional failure (see Acheson, 2000), the property rights solution envisioned for any particular resource must be structured to coincide with the resource type and its finer characteristics, in addition to the social context around which the resource is used.

2.1 Property rights

Property rights are a social construct establishing a right to a flow of benefits associated with the use of land or some other product or item. Hanna (1996) focuses the definition to natural resources:

> [P]roperty rights are the arrangements which people devise to control their use of natural resources, and comprise property rights, bundles of entitlements defining owner's rights and duties in the use of the resource, and property rules, the rules under which those rights and duties are exercised.

Property rights are a social construct establishing a right to a flow of benefits associated with the use of land or some other product or item

[2] The concept of institutions used in this paper follows North (1990) as the "rules of the game", and what Dietz *et al* (2002) consider as the humanly devised rights, rules and responsibilities that define, legitimize and underlie our relationship with each other and the resources we exploit and consume. Institutional failure can occur through market, collective action, or policy failures (see Swanson, 1996).

Private property rights and state owned or public property are the most recognizable types of property rights, but a more complete typology also includes common property (private rights held by a group in common) and no property, or open access (Bromley, 1991). While common property is closely associated with private property in that it excludes non-owners, common property emphasizes the individuals comprising the entity and the rights and duties associated with membership (Bromley, 1991). The transferability of rights and sharing of benefits is generally held in common by the group, not the individual as with private property rights. The typology does not necessarily suggest a reduction in the relationships suggested by Hanna, except for open access which establishes none of the relationships and is often termed *res nullius*, or no one's property, thus open to anyone. It is under conditions of open access and/or *de facto* open access (where property rights are established but not enforced) that Hardin's (1968) Tragedy of the Commons outcome is relevant.

NTFPs in BC are an example of resources within state owned land that appear to fall under de facto open access

Any property type can fall into a state of open access in the absence of effective monitoring and enforcement of property rights. Non-timber forest products in BC provide an example of resources within state owned land that appear to fall under *de facto* open access. Without some form of coordinating mechanism and the establishment of rules a situation of open access will prevail and no person or private entity will provide for the socially optimal level of use. When demand and prices are high or increasing, resources under open access conditions are often associated with over-exploitation, a lack of investment, the dissipation of resource rents (through increasing extraction costs for example) and resource degradation (Swanson, 1996). Resource users have no other incentive than to harvest all available supply as others with similar incentives will follow and take what remains. The tendency for users is to act with a focus on short-term individual interests and ignore the longer-term implications of this action on the broader society or group.

Many common property systems persist with no recognition from the state and while "outsiders" may view the property system as open access, users may have a sophisticated set of rules in place that limits use and practices

A characteristic of many common property systems is that they persist with no recognition from the state. While "outsiders" may view the property system as open access, users may have a sophisticated set of rules in place that limits use and practices. A good example of this type of common property system can be found in various First Nations communities throughout Canada. A prominent example of this is the organization of communal fishing rights along the Fraser Canyon in BC (see Berkes, 1987 for other examples). Property rights also need not be established or sanctioned by the state (*de jure* property rights) and may exist without the knowledge of the state, maintained only through the collective action of the users. This *de facto* approach to property rights may be as or more effective than any state based rights (see for example McCay and Acheson, 1987; National Research Council, 2002).

Property rights and the completeness of those rights are generally described in terms of a bundle of rights (Haley and Luckert, 1990, 1998; Hanna, 1996). The elements included in the bundle may vary, but generally include the following:

- ***exclusivity*** – the rights holder is able to exclude others from seeking to benefit from the resource;
- ***comprehensive*** – the rights encompass a broad range of benefits and costs that may result from using the rights;
- ***duration*** – the time frame that the rights may be held by the rights holder;
- ***transferability*** – the rights, including the flow of benefits from the use of the property are transferable, or saleable to others; and
- ***enforceability*** – the rights and any benefits are secure from capture by others.

This bundle of rights can be used to describe how well defined and private, or alternatively how poorly defined, is a particular property regime. Economic theory suggests that the more well-defined or private are the rights to resources, the more likely the holders of these rights will pursue strategies to maximize the benefits from that resource (Demsetz, 1967). Under conditions of perfectly competitive markets, perfect information and no transaction costs, well defined and complete or un-attenuated property rights will lead to efficiency in resource allocation and production (Pearse, 1990).

Theory suggests that the more well-defined or private are the rights to resources, the more likely the holders of these rights will pursue strategies to maximize the benefits from that resource

Property rights provide a form of coordination necessary to avoid the implications of resources exploited under open access, but are property rights sufficient? Pearse (1998) suggests that more comprehensive rights as found in Europe would lead holders of those rights to provide for multiple values. For example, if the holder of logging rights also has the right to manage and charge for other services (such as recreation) then they may adjust their development plans to account for these other values. However, as Haley and Luckert (1998) consider, "the use of property is rarely absolute or unfettered." Property rights, whether private or not, come under some form of influence by the state to ensure "socially acceptable uses" (Movik, 2004). Baland and Platteau (1996) contend that these less than ideal market conditions are to be expected and that no property right system can be considered able to ensure the efficient use and allocation of resources.

Other authors (Haley and Luckert, 1998; Wiebe and Meinzen-Dick, 1998) suggest that the provision of rights across a wider range of users may be more beneficial under certain conditions – for example, with a supportive institutional infrastructure, low transaction costs, and when private property rights predominate. Experience in the US suggests that 'partial interests' may lead to the accommodation of a broader range of values in the land (Wiebe and Meinzen-

The complex nature of resource rights and use, inequities in power relationships, and transaction costs introduces several constraints to effective institutional design and implementation

Dick, 1998). Regardless, the complex nature of resource rights and use, inequities in power relationships, and transaction costs introduces several constraints to effective institutional design and implementation (Haley and Luckert, 1998). There is little debate however that property rights are important. Ruiz-Perez and Belcher (2004) found in their survey of NTFP case studies that people in developing countries were more prone to cultivate NTFPs with some form of private tenure.

Should the state intervene in the market to establish property rights and encourage appropriate use and investment when property rights fail or under these open access conditions? Pearse (1993 p. 82) states that

> …when a resource is abundant relative to the demands on it, so that its value is low, the systems of user's rights will remain crude, and appropriately so. But as resource values rise, raising as well the potential gain from improved allocation arrangements, more sophisticated systems of property rights can be expected to emerge.

The state may have a role in resource managment however, this is not without its challenges

Randall (1983 p. 134) argues that it is a point of "congestion" or when the number of users "approaches the capacity constraint" that the establishment of more formal rights becomes necessary. Wang and van Kooten (2001 p. 14) argue that "failure by government to exercise control over the resource, via management and enforcement, can and often does lead to open access exploitation, and its attendant problems." Grafton (2000) is careful to point out, however, that the resource type and institutional approach are inextricably linked and this relationship will influence the outcome of management effort. This suggests a careful consideration of the mode of intervention, but also that the state has an important role in supporting effective institutional regimes if the level of congestion and resource value warrants such intervention. Government intervention in resource markets isn't without its challenges. Two constraints that challenge the design, implementation and effectiveness of any institutional approach are the public goods nature of some resources and the costs associated with that institutional transformation, or transaction costs.

2.2 Resource types and transaction costs

Two defining characteristics of a resource type is the level of exclusivity and subtractability

Resources are not only biologically different; they can also be described in a more institutional context. A resource typology includes the familiar private and public goods, but also expands to include the not so familiar common pool resources and club goods. Two defining characteristics of a resource type is the level of exclusivity and subtractability. Ostrom, Gardner and Walker (1994) provide a useful depiction (see Table 1).

Table 1. Resource typology[3]

		Subtractability	
		Low	**High**
Exclusion	Difficult	Public Goods	Common-Pool Resources
	Easy	Toll Goods	Private Goods

[3] Source: Ostrom, Gardner, and Walker. 1994. p. 7.

Private goods have the characteristics of exclusivity (access to the good can be restricted at a reasonable cost) and subtractability (a finite supply such that what is used by one person is not available to another). Public goods are found on the other end of the spectrum.[4] They are non-exclusive in that access cannot be restricted, and they are not subtractable in that one person's enjoyment does not preclude another person's enjoyment of the same good (viewing a starry sky on a clear night for example). Common pool resources share some characteristics of both public and private goods. Like a private good a common pool resource has a subtractable supply, but the ability to exclude others is limited and costly (Ostrom, 1990; Mckean, 2000). What were once thought to be public goods and private goods are now being reconsidered for their common pool nature. For example, forests, water resources, or a city's supply of clean air. As McKean (2000) argues, the *in situ* nature of a good does not change. Thus one finds common pool resources under private property rights, common property or state based property rights. Non-timber forest products are examples of common pool resources. Limiting access to public or private forest land to harvest NTFPs may be prohibitively costly to achieve – one cannot effectively fence and monitor all land at all times and trespass (a form of free riding) is a continual threat.

Common pool resources share some characteristics of both public and private goods – they have a subtractable supply but the ability to exclude others is limited and costly

Natural resources can be divided into stock and flow components. The stock is the usable or exploitable portion of the resource; the flow is the annual productive yield or growing portion of a natural renewable resource stock. Taking too much of the flow eventually reduces the stock below its ability to maintain a sufficient level of production for both itself and the user, with the ultimate result of complete resource degradation. Open access exploitation of fisheries is a classic example of this (see Gordon, 1954). While dividing and securely allocating the forests or oceans may be problematic, harvestable flows from these resource systems – the fish caught in a net or bucket of wild mushrooms – are convertible into private goods once in the possession of the fisher or picker. The ability to capture the value of the privatized flow creates an underlying incentive to extract more volume in an open access situation, especially in cases where anyone following could take what is left behind. Investment in the privatized flow can be observed in the form of processing and shipping infrastructure, but not in the resource stock (for an NTFP example see Tedder, Mitchell and Hillyer, 2002).

For all resource types, at some point of use there is scarcity, or limits to the volume of the resource available for exploitation – a function of value as suggested by Pearse (1990), or when reaching the capacity constraint as directed by Randall (1983). However, for common pool resources, the costs of restricting access, monitoring and enforcing rights to avoid over-exploitation may be prohibitive and could outweigh any benefits from increased coordination. Exclusion and enforcement costs are termed transaction or institutional costs and confound the ability of the market to effectively allocate resource use in the most efficient and socially optimal manner (i.e., they can lead to market failure).

For common pool resources, the costs of restricting access, monitoring and enforcing rights to avoid over-exploitation may be prohibitive and could outweigh any benefits from increased coordination

[4] Toll goods, also termed "club goods" are not included in this discussion. They are defined as having easy exclusion and low subtractability. Examples of toll goods include cable television, a theater performance, or service club.

In addition to enforcement costs, transaction costs also include costs associated with the access to and provision of information, and the coordinating efforts necessary among disparate users of a resource to come together and negotiate appropriate usage (Bromley, 1991). Baland and Platteau (2002) consider open access, or "unregulated common property" as having "pervasive transaction costs." Conversely, they find that "private ownership avoids all kinds of negotiation costs necessary to reach collective action as well as all the governance costs that have to be incurred with a view to monitoring and enforcing such agreements" (Baland and Platteau, 2002 p. 9). Can more private rights (access restrictions) be designed at a reasonable cost to achieve these private benefits?

A lack of available information, secrecy and extreme competitiveness, avoidance of income taxes and the fear of inappropriate and ineffective government regulations prevents formal or informal development of an NTFP management regime

For NTFPs, transaction costs may be considerable for either the formal development of a management regime, or an informal evolution of collective action. A lack of available and shared information and a formal mechanism to collect information from the NTFP sector hinders an awareness of ecological and social issues and blurs any recognition of the benefits from collaboration. Secrecy and extreme competitiveness among harvesters and buyers within the same NTFP sub-sector contributes to a lack of trust and a disincentive to seek methods to increase returns from joint decision making. The avoidance of income taxes and the fear of inappropriate and ineffective government regulations also contribute to a lack of information sharing, and a tendency towards guarded secrecy and avoidance of seeking solutions to known or perceived problems. Under the current system of NTFP use, information provides a competitive advantage.

Without some form of property rights, the incentive of users of common pool resources is to take more resources with no consideration of the future – there is little incentive to invest in the resource

Without some form of user management and collective action, users of common pool resources have little incentive to invest in the resource through development and enhancement activities, by leaving product in the forest to perpetuate the species, or by improving its quality and potential future value. Others – free riders – are able to reap some of the benefits of that investment at little or no cost to themselves. Indeed, the incentive of users is to take more resources with no consideration of the future. Any coordinating effort under these conditions may fail and a situation of open access will result. Indeed, even if exclusive access were possible, limiting who can harvest is not the only condition for sustainable use. Limited-user open access is a situation where a limited number of people may have access to a resource, but no limits are placed on harvest levels. Thus, access to the resource may be restricted but the common pool nature of the resource drives over-exploitation and free riding. The same incentives and potential for resource degradation exist. Consequently, resource management failures are not solved by simply introducing access restrictions; an underlying system of rules are necessary to ensure the objectives of resource management are met.

Users can overcome tendencies to over-use a resource through the* de facto *establishment of common property rights

This "tragic" outcome is not a necessary result, however, and users can overcome tendencies to over-use a resource. Many examples of the *de facto* establishment of common property rights exist (Grafton, 2000; Ostrom, 1990; Ciriacy-Wantrup and Bishop, 1975), often in response to the inability of governments to enforce its *de jure* state-based rights. However, with no collective action or agreement among users effectively establishing some rules, rights and responsibilities,

overexploitation of a highly valued common pool resource is likely to continue regardless of the property system in place (Ostrom, Gardner and Walker, 1994; Baland and Platteau, 1996). The costs associated with exclusion will vary among common pool resources, and at some value it becomes beneficial for users or government to introduce some form of control for some resources in some areas. This does not reduce the costliness of exclusion; it just makes it worth the expense and if excluded users value the resource sufficiently, the threat of trespass and free riders will persist.

Common features of management success include active participation of resource users as well as the state

Grafton (2000) discusses the efficacy of the range of state, common and private institutional arrangements within a resource management context and concludes that each has strengths and weaknesses. The success of any regime depends on the objectives of management, physical characteristics of the resource, benefits generated by the stock and flow of the resource, history, and the institutional environment. In his comparison of a range of institutional approaches, Grafton (2000 p. 515) notes that a common feature of management success was the "active participation of resource users in the management of the flow of benefits from the resource." Instrumental for any regime is the role of the state in providing legitimacy of rights, the facilitation of information and coordination among users, and efforts to minimize costs associated with this facilitation.

Institutional development must consider the social-ecological system and its pressures or risk policy failure

The discussion of property rights and resources to this point suggests a somewhat static asocial context. Any change to institutions governing a resource, whether those rules are formally established by government, or informally developed by the community of users, can alter the social-interaction among users and their relationship to the resource. Changes to rules may displace the original users of a resource, whether intentionally or not. Other factors influencing change include migration and other population effects, rising values or shifts in the use of a particular resource, or poverty. Institutional development based on a static look at the components of property rights and resources without a more contextual understanding of the social-ecological system and its pressures contributes to policy failure (see Lam, 1996 for an example of irrigation systems in Nepal).

The beginning of this institutional discussion suggested that to effectively overcome failures in the management and appropriate use of common pool resources it is important to consider the social, resource and coordinating (property rights) characteristics of resource exploitation. Three conclusions are as follows: 1) property rights are important; 2) property rights should evolve in relation to the characteristics of the particular resource social-ecological system, and 3) property rights may exist through collective action by the users with no participation or acknowledgement of the state. The next section attempts to provide the context for NTFPs in BC within this social-ecological framework.

3.0 The context

3.1 The BC forest institutional landscape

British Columbia is the western-most province in Canada with an area of about 95 million hectares. Close to 95% of that landbase is provincial Crown land, with the remainder split between private (about 4%) and federal Crown land, including Indian Reserves (about 1%). Of that total provincial landbase, 63%, or 60 million hectares is forested.

Prior to European settlement, forests provided a source of sustenance and identity to the aboriginal populations – far exceeding the single use of timber. Turner (1995, 1998) identifies hundreds of plants used by First Nations in BC for food, medicines, clothing, implements and tools, and ceremonial purposes. Supporting these uses were well established systems of rights and responsibilities to the land (Turner and Jones, 2000; Trosper, 1998). First Nations used a mixture of open access areas absent of property rights, to a form of complete private property based on exclusive ancestral rights. Resources of high value were subject to "the most stringent controls and well defined boundaries" providing the holder with exclusive rights involving traditions of succession and responsibilities towards the appropriate use and care of the land (Turner and Jones, 2000 p. 17). Numerous subsistence and traditional uses continue today, including the collection of berries (huckleberries for example) and medicinal products such as Devil's club (*Oplopanax horridus*) (Turner and Cocksedge, 2001).

BC First Nations used a mixture of open access areas absent of property rights, to a form of complete private property based on exclusive ancestral rights

Since the establishment of the *Forest Act* in 1912, the timber and pulp industries have maintained a significant role as a source of wealth for the province. Developing and maintaining that wealth, however, required the predominance of that sector in the use and planning of provincial forests. Today, forestry remains an integral source of wealth for BC and is managed through a complex system of legislation and regulations. Of the total forested landbase of 60 million hectares, about 42%, or 25 million hectares is available for timber harvesting over the long-term (BC Ministry of Forests and Range). Provincial Crown land is divided into three forest regions – the Coast, Northern and Southern Forest Regions, comprising 29 forest districts. Within these forest districts are an assortment of timber tenures, including area based tree farm licences and smaller woodlot and community forest agreement licences, volume based forest licences, and short term competitive timber sales. Most of the privately held forest land is located on Vancouver Island, where about 30% of the forested landbase is owned and managed by forestry companies.

Today, forestry remains an integral source of wealth for BC and is managed through a complex system of legislation and regulations

While timber is the predominant commercial species under management, forests are sources of numerous other values. The *Ministry of Forests Act, Forest Act* and *Forest Range and Practices Act* reflect society's desire for the enhancement and protection of other timber and non-timber values. The Ministry of Forests and Range has the legislated mandate to consider a variety of forest resource values,

including recreation, scenic values, biodiversity, wildlife, old growth timber and riparian habitat. Section 4(c) of the *Ministry of Forests Act* states that the purpose and function of the ministry are to

> plan the use of the forest and range resources of the government, so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated, in consultation and cooperation with other ministries and agencies of the government and with the private sector;
>
> *Ministry of Forests Act*, Section 4(c), Consolidated Version, March 4, 2006. http://www.for.gov.bc.ca/tasb/legsregs/minfor/minfact/mofa.htm

Through the *Forest Range and Practices Act* (FRPA) companies are required to develop forest stewardship plans (FSPs) indicating how they will accommodate 11 stated values: soils; timber; wildlife; water, fish, wildlife and biodiversity in riparian areas; wildlife and biodiversity at the landscape and stand levels; community watersheds; fisheries sensitive watersheds; cultural heritage resources; visual quality; resource features and recreation resources; and forage and plant communities. Non-timber forest products are not an explicitly mentioned forest value for management purposes.

Non-timber forest products are not an explicitly mentioned forest value for management purposes in BC's forest management regime

3.2 Defining non-timber forest products

In BC, the Ministry of Forests and Range uses the terms NTFPs[5] or botanical forest products and identifies over 200 species harvested for commercial and non-commercial purposes (de Geus, 1995). These products are grouped into the following categories (de Geus, 1995):

- Wild edible mushrooms,
- Floral and greenery products,
- Medicinal, nutraceutical, and pharmaceutical products,
- Wild berries and fruit,
- Herb and vegetable products,
- Landscaping products,
- Craft products,
- Other, such as honey, and
- Forest based services, such as fungi tours and other eco-tourism related activities.

[5] The Food and Agriculture Organization of the United Nations (FAO) uses the term non-wood forest products (NWFP) and expands the definition to include all products of biological origin, including game and animal products, products other than wood derived from forests, other wooded land and trees outside forests (FAO: http://www.fao.org). Non-timber forest products, or NTFPs, and non-wood forest products, or NWFPs, have become standard terminology within the research and governance sectors. For communities using these products, however, this catch all phrase is not used or perhaps even known. Similar issues and management challenges confront most of these products.

NTFPs exhibit significant product, geographic and user heterogeneity

Within this grouping is significant product, geographic and user heterogeneity. Numerous products are used by different people for a variety of reasons and the growth and abundance of these products varies widely across the province. For example, salal (*Gaultheria shallon*) is abundant within coastal rainforests and is harvested for commercial purposes, and is also a source of berries for First Nations and other subsistence harvesters. Salal is also a hindrance to the timber industry due to its dense and invasive growth. The growth and abundance of edible wild mushrooms is another example. A number of wild mushroom species, such as pine mushrooms (*Tricholoma magnivelare*), chanterelles (*Cantharelus spp.*), morels (*Morchela spp.*), and king boletes (*Boletus edulis*) grow in many specific areas of the province, but their fruiting and abundance may vary widely by species, year and location. They are also highly valued and sought after commercial species.

3.3 NTFP users

NTFPs users include commercial users, subsistence users, and First Nation harvesters seeking traditional products

People entering the forest to harvest NTFPs include commercial users seeking a supplemental or main source of income, subsistence users entering the forest for pleasure and sustenance, and First Nation harvesters seeking traditional products for cultural (food and medicines for example) or ceremonial purposes. First Nations continue to use and rely on a variety of products from the forest for a variety of purposes. Many species remain integral to First Nations livelihoods and may provide significant commercial opportunities and sources of employment (Turner and Cocksedge, 2001). However, the most intensive use of the forest "understory" results from its commercial value. The demand for some NTFP species and their value has created significant interest in and commodification of, for example, floral greenery products, including salal for the floral industry and a variety of boughs (e.g., Western redcedar (*Thuja plicata*) and white pine (*Pinus monticola*)) used for Christmas garlands, wreaths and other decorations. In addition, edible wild mushrooms are a widely sought after commercial commodity and recreational sources of food and medicines.

Commercial NTFP users differ widely

Commercial NTFP users differ widely. For example, harvesters of edible wild mushrooms consist of local and non-local people. Fruiting abundance and favorable prices can attract hundreds, and potentially thousands of people to particular areas. Most harvesters sell their findings to field buyers who represent major exporters; however, some do sell direct to restaurants or consumers. Hansis (1998) identified three types of mushroom harvesters at Cresent Lake, Oregon, that also typify harvesters in BC: commuter pickers who travel to a site for one to three days, vacation pickers who arrive and stay for several weeks in one location, and circuit pickers who travel to multiple areas throughout the mushroom season. These circuit harvesters may begin in the Yukon and BC in May and June to harvest morels, followed by pine mushrooms or chanterelles in the late summer-early fall in various areas of BC and south to the US Pacific Northwest.

There is no indication of how many people will show up to pick in any specific area. While pine mushrooms, and similarly chanterelles, can be found each year in the same general location, fruiting productivity – the volume available for harvest – can vary significantly in any given year. A significant level of morel fruiting can occur in mid to late spring following a forest fire the previous year, but again productivity can vary. As such any location and community can be inundated by mushroom pickers or be ignored as word spreads throughout the picking community about the location of favourable conditions and prices (see matsiman.com for discussion among harvesters).

Any location and community can be inundated by harvesters or be ignored as word spreads about the location of favourable conditions and prices

Salal and bough harvesters, in contrast, are generally from BC and travel shorter distances to harvest their products. They can be individuals, small groups or larger more organized picking units. Harvested product is trucked to a local or non-local buyer where it is processed and shipped to wholesalers, retailers or consumers. There are no field buyers located at or near harvest sites as is the case with the wild mushroom industry, although there are intermediaries who organize and lead harvester groups. The situation in BC is in contrast to Washington State, where numerous floral buyers are located within areas where salal and boughs are harvested (Ballard *et al*, 2002). The salal harvesting season continues throughout the year, except for the main growing months of May to July. Boughs are generally harvested in the later part of summer to late fall in order to fill the Christmas season demand for wreaths and other decorations. Salal and bough harvesters are not associated with the large temporary camps commonly erected by mushroom pickers.

The lack of prescribed and allocated rights does lead to land use conflicts. Conflicts over informally 'claimed' harvesting areas occur within commercial floral and wild mushroom harvester communities. Conflicts between commercial and non-commercial harvester groups also occur where demand overlaps. The harvest of wild berries has led to user conflicts when commercial interests access First Nation's traditional berry patches (Williams and Clarricoates, 2002). A community's history of traditional harvesting rights is transgressed when commercial harvesters enter areas normally used by First Nations for traditional and subsistence purposes. No prescribed rights provide a mechanism for dealing with these issues. The increasing interest in the potentially high valued medicinal species growing in the wild can also create conflicts between the commercial and non-commercial harvester.

The lack of prescribed and allocated rights does lead to land use conflicts

The NTFP resource is subject to rights and title claims from First Nations who see NTFPs as one of the last remaining resources not taken from them following colonization. The lack of assigned rights or any management strategy, regardless of the ultimate owner of the resource, removes from those who place a high value on certain products the ability to either exercise ownership rights or enter into some form of negotiation to gain or allow access to a particular product.

Other products, such as boughs and edible wild mushrooms are less associated with this type of commercial versus non-commercial user conflicts. However, tension among competing commercial users within specific sectors can occur over harvesting areas and access to product. Conflicts can also occur across sectors. An example is when bough harvesters illegally target young tree plantations and harvest all but a few branches, effectively killing the tree and future timber value.

3.4 NTFP commercial volumes and values

The commercial NTFP sector consists of an export and domestic supply component. The completeness of information for the commercial NTFP sector can be evaluated using commodity chain analysis (te Velde *et al*, 2006). The commercial value chain from an NTFP's *in situ* value to its final demand value has roughly 5 stages:

- its unit rent or pre-harvest value,
- picker/harvester value,
- buyer/distributor/exporter value,
- import value/wholesaler value, and
- retail value.

There is incomplete data for NTFPs at all levels of the domestic and export supply chain

There is incomplete data at all levels of the domestic and export supply chain. The following provides a summary of the information available through statistical agencies and published reports.

Formally collected information (i.e., through statistical and customs agencies) is available for the declared export value at the point of export, including costs, insurance and freight, and the landed import value. The Harmonized System (HS) of trade statistics provides relative consistency of data among countries; however, the agglomeration of products within HS categories limits any species specific analysis for most NTFPs. Exceptions are pine mushroom and chanterelle import data, from Japan Customs and Eurostat, respectively.[6] In recent years there has been an effort to collect this data for a number of the more valuable NTFP species (see Centre for Non-Timber Resources, 2006; Alexander *et al*, 2002; Tedder, Mitchell and Farran, 2000; Wills and Lipsey, 1999; Blatner and Alexander, 1998) although many information gaps remain throughout the value chain components.

A market for value-added or processed products also exists

A market for value-added or processed products also exists. Examples include Christmas wreaths and garlands, jams and jellies, tinctures, and teas (see companies listed in the *Buy BCWild Directory*, Centre for Non-Timber Resources, Royal Roads University, www.buybcwild.com/). Most of the more intensely harvested NTFPs from BC are destined for export (Centre for Non-Timber Resources, 2006) although no formal statistics are available to verify or quantify

[6] The Harmonized System of trade statistics is an international trade data system with standardized codes for product groupings. Individual countries have the ability to refine the Codes by further breaking down the agglomerations. For example, within the fresh or chilled mushroom category, HS 070959 Fresh or Chilled Mushrooms Other is an internationally shared code. Japan has further disaggregated this code by adding the suffix 0103 for Matsutake (pine) mushrooms.

this claim. Wills and Lipsey (1999) estimated the total direct commercial value of NTFPs to be about $280 million in 1998. While total provincial values are available for some NTFPs, local and site specific estimates of the volume and value of product removed from the land base are not officially collected. More recent estimates for Canada range from $750 million to $1 billion (Wetzel *et al*, 2006; Duschesne *et al*, 2000).

The total value of NTFPs includes the commercial worth of products sold into markets within North America and overseas, and the non-commercial value related to the subsistence and traditional uses of NTFPs. The value of NTFPs to First Nations and others who use a variety of products for non-commercial reasons is unknown. Anecdotally, the value of berry patches, access to medicinal products, and wild foods is certainly high for individuals and communities who rely on these products. Some researchers have estimated the values of wild foods for aboriginal groups in some areas, but the estimates are not necessarily transferable to the use and products in BC (see Usher 1976, 2002). Starbuck *et al* (2004) estimated that non-commercial huckleberry and mushroom picking generated a benefit to harvesters (consumer surplus) of US$36.03 per day. However, the value derived reflects more of the recreational aspect of NTFP picking, not the subsistence or traditional value. No such study has been undertaken in BC.

The value of NTFPs to First Nations and others who use them for non-commercial reasons is unknown

3.4.1 Edible wild mushrooms: volume and price trends

The 'big four' edible wild mushrooms of commercial value are pine mushrooms, chanterelles, morels and boletes. Pine mushrooms are almost exclusively exported to the Japanese market. The remaining edible wild mushrooms are mainly exported to Europe. A small volume remains in the domestic market and are sold at some grocery stores and restaurants. The lack of formal reporting requirements for the distribution of mushrooms, or any NTFP reduces the reliability of any domestic value or volume estimate.

The lack of formal reporting requirements for any NTFP reduces the reliability of any domestic value or volume estimate

A recent study by the Centre for Non-Timber Resources, Royal Roads University (2006) estimated that from 2001-2005 edible wild mushrooms had an export value ranging from $10-42 million per year. An earlier study by Wills and Lipsey (1999) estimated an edible wild mushroom value at between $25-50 million. The wide range in total value reflects the nature of the resource and its unpredictable fruiting abundance in any given year, the variation in per unit prices (Canada has a small market share in most markets thus is a price taker), and data inconsistencies associated with the lack of formal reporting requirements. In terms of resource value, Alexander *et al* (2002) derived soil expectation values for commercial edible wild mushrooms and compared the per hectare values to the per hectare value of trees. The assumptions used regarding mushroom productivity had a significant influence, and they found that while chanterelles certainly generated positive rents (up to US$309 per hectare) Matsutake, or pine mushrooms could rival the timber with a value up to US$1492 per hectare.

Pine mushrooms are the most valued edible wild mushroom export

Pine mushrooms are the most valued edible wild mushroom export. Statistics Canada reports that from 1995 to 2004, an average of 350,000 kg of fresh pine mushrooms were shipped to Japan during the fruiting months of late August through November. Virtually 100% of the declared volumes shipped to Japan from Canada originate in BC (Statistics Canada). Data from Japan Customs indicate that the average volume shipped from 1995 to 2004 was about 380,000 kg, relatively close to the Canadian figure. Canada's share of the Japanese import market for pine mushrooms is about 12-15% (Japan Customs). The largest supplier is China, followed by the Korean peninsula.

Canada has 12-15% of the Japanese pine mushroom market

The average annual value of Canadian pine mushroom shipments was just over Cdn$12.3 million. The mean per kilogram declared value from 1995-2004 at the point of export was Cdn$36.03 (CIF).[7] The landed (i.e., to a Japanese point of entry) price for North American pine mushrooms over the same period was Cdn$52.50 per kilogram. The average landed price paid for North American pine mushrooms can be less than one third of the landed price for the South Korean variety, which is the highest valued import averaging Cdn$173/kg over the same period (Japan Customs). Note these are export values and do no necessarily reflect prices paid to pickers, the daily variability in prices, or changes over the harvest season. While per unit prices have remained relatively consistent, the absolute volume and value of pine mushroom shipments to Japan have decreasing since about 1996 (Centre for Non-Timber Resources, 2006).

Most of the chanterelles harvested in BC are exported to Europe, although a growing domestic market does exist. Statistics are available for exported volumes, but not for volumes consumed in Canada. From 1995 to 2004, Eurostat reports that an average of about 200,000 kg per year of chanterelles was shipped to the European Union from Canada. These volumes can fluctuate quite significantly: the lowest volume shipped was about 96,000 kg in 1995 and the highest was 382,000 kg in 2004. The total value of these shipments averaged Cdn$3.4 million, with the highest values being recorded in 1996, 1997, and 2004 at about Cdn$5.5 million. The total value of the European chanterelle market over the same ten year period was Cdn$102 million based on a total volume of 13 million kg.

Canada's share of the European market for chanterelles is under 2%

Canada's share of this market, almost all of which comes from BC, is under 2%. By far the largest suppliers to the European market are within the European continent, including Russia. Belarus is the largest supplier, followed by Poland, Lithuania and the Russian Federation. Combined, these four sources ship 8 million kg of chanterelles per year to the European Union. Of interest, however, is the per kilogram value of Canadian and US chanterelles versus the European value. From 1995 to 2004, the average value of North American chanterelles was Cdn$17-18/kg, while those sourced within Europe and Russia were valued far less at an average of $7-8/kg. Other mushrooms such as morels and boletes are also shipped to Europe; however no specific statistics are available for them. Statistics Canada data indicate that about 100,000 kg of fresh or chilled mushrooms are shipped from Canada during May and June (the main morel harvesting period). Approximately 99% of this volume is from BC, although some originates in the Yukon.

[7] Values are CIF, costs-insurance-freight at the point of export.

3.4.2 Floral greenery: value and price trends

The most commercially valuable floral greenery products include salal for the floral industry, and boughs used for Christmas garlands, wreaths and other decorations

The most commercially valuable floral greenery products include salal for the floral industry, and a variety of boughs used for Christmas garlands, wreaths and other decorations. Boughs of various species are harvested to fill the Christmas demand and are shipped to eastern Canada and Europe, and south to Washington State where they are processed and re-shipped to California, the eastern US and Europe. Salal is shipped to the US, the rest of Canada and Europe; however, a large volume remains in BC and may be found in floral arrangements at many local convenience stores and florist shops.

The Centre for Non-Timber Resources (2006) estimated that the floral greens sector in BC has an export/wholesale value of between $27-65 million per year. The Wills and Lipsey (1999) study estimated the total value of floral greens harvested in BC at $55-60 million with up to 15,000 people involved in bringing the product to market. Approximately 60-70% of the volume of salal, which forms the main component of floral greens, is shipped to the US where it may be further processed then shipped to other destinations within and outside the US (Centre for Non-Timber Resources, 2006). Statistical agencies combine various products within the floral sector, thus it is not possible to determine per unit values for salal or other floral exports, as was done for the edible wild mushroom industry.

In terms of domestic shipments, a recent study by the Centre for Non-Timber Resources (2006) found that the value of the domestic market for floral greenery products range from about 7-10% of the total wholesale value. This domestic estimate includes some 60 floral species. Estimates of the volume and value of harvests by location, or by forest district are not available. In terms of the resource value, salal management trials on Vancouver Island indicate that thinning of stands to 75% from 90% canopy cover can, in some instances, increase the value of salal to $500 per hectare from an average value $200 per hectare (Forest Practices Board, 2004).

3.5 NTFP resource and user heterogeneity

In many areas and for many products an adaptable heterogeneous management regime may be necessary

The previous discussion indicates the product and geographic heterogeneity that defines NTFPs. In many areas and for many products an adaptable heterogeneous management regime may also be necessary. The literature describing resource and user attributes (Ostrom, 1990), or contextual factors (Edwards and Steins, 1998) recognizes the influence these characteristics may have on the rights and rules guiding resource use. Thus there is a need to explicitly acknowledge and incorporate them into institutional design, analysis and resource management. While part of these differences is definitional (i.e., the term non-timber forest products is a 'catch-all' that encompasses a myriad of products) differences are often observed for single or similar species.

Geographically, species availability varies by forest type and the concentration of certain species occurs only in select areas, while other species are present over wide areas. Product heterogeneity suggests that within NTFP categories, variations may be present. For example, salal is a coastal species and while heavy harvesting has denuded its quality on southern Vancouver Island forcing harvesters to seek product in other areas, on northern Vancouver Island such over-harvesting is much less prevalent. Edible wild mushrooms provide another interesting case. Single species, such as pine mushrooms or chanterelles may not only vary in abundance in any given area and year, they may also face very different demand and prices. The potential location of fire associated morels can be determined based on the previous year's forest fires, yet there is no pattern to fires, nor is there any guarantee that weather and terrain conditions will lead to an abundance of morels.

Not all products harvested from the wild require management – however, some do require tools to effectively manage products in situations of high values and demand

The value and demand for some products (e.g. craft products such as lichens, twigs and cones) may be minimal, resulting in little or no related impacts. Conversely, rapidly increasing commercial value and demand, for example for cascara bark (*Rhamnus purshiana*), in the late 1950s and yew bark (*Taxis brevifolia*) in the 1980s and early 1990s, led to significant concerns over the appropriate harvest of these products. Not all products harvested from the wild require management; however, some do and certainly having the legislative or regulatory tools available to effectively manage products in situations of high or increasing values and demand would be prudent.

The heterogeneity of NTFP users makes it a challenge to collectively organize and seek group solutions

Heterogeneity also characterizes the users of NTFPs and may lessen the ability to collectively organize and seek group solutions (Poteete and Ostrom, 2004). Some people travel great distances to harvest product and rely on the money earned as a main source of income. Others may reside in communities adjacent to harvest areas and use the harvest to supplement their incomes. Some local and non-local harvesters may have a deep respect for the land, while others see only a source of short-term income. Harvesters who travel short or long distances may also be associated with certain ethnic communities and may or may not communicate with others about harvest locations and appropriate harvesting methods. McLain and Jones (1997 p. 7) find that "mobile harvesting/buying strategies" are common in the wild mushroom industry and that these harvesters have become stewards of the resource and have a role in the appropriate management of edible wild mushrooms, regardless of their transience.

Variations in group size can also characterize the industry with small groups of local users attracted to some products, such as harvesters of boxwood, and significantly larger groups attracted to others, such as pine mushrooms. User ability to access areas also varies. For example, areas with significant road access near urban centres (such as locations of highly productive salal and boughs on southern Vancouver Island) will experience higher levels of exploitation than more remote, less road areas. Areas having a small number of entry-points and with locked or staffed gates will be more amenable to access restrictions, unless adjacent areas and land owners allow open access (leading to ease of trespass). Remote areas with no roads are not necessarily immune from exploitation, however. During periods of high pine mushroom prices, it has not been uncommon for buyers to charter helicopters and float planes to access remote areas.

4.0 Case Studies

Four case studies are presented to explore the degree to which property rights influence the provision or consideration of one or more NTFPs in BC. The case studies cover a range of the property rights spectrum including *de facto* open access on public land, community forest tenures on public land, a small community forest on private land, and a large private industrial forest land owner. Information for the case studies was obtained through email, telephone and in-person interviews with representatives from community forests and the private landowners. Information regarding the open access situation of public lands was obtained from previous studies and the notes from the author's previous work.

Four case studies are presented to explore the degree to which property rights influence the management of NTFPs in BC

NTFP management refers to resource and user management, thus attending to appropriation and provision issues. *Resource* management is the investment in research and land use planning activities that enhance, protect, or in some other manner incorporate a resource into a management framework and longer term strategy, at both the strategic and operational levels. *User* management refers to the efforts of a land owner to develop and implement strategies to manage user access to the forest and to guide appropriate user practices. User management could be in the form of access limits, harvest guidelines or other prescriptions, such as the use of certain harvest technology. Management also reflects policy developed by a government or land owner and could be more formal through legislative and regulatory action, or a more informal direction within an organization reflecting a more *ad hoc* approach to resource management.

For analytical purposes the open access case study is considered a base-case to which the other examples are compared. The following section introduces the case subjects, describes their level of NTFP management and provides an evaluation compared to the other case study subjects.

The following evaluative points are based on the two resource management categories to help differentiate the focus of management effort: 1) the management of the resource; and 2) the management of the user. The case studies were evaluated based on the following five points:

The case studies were evaluated based on the management of the resource and the management of the user

- The effort and ability to control access;
- The level of resource investment;
- The incorporation of NTFPs or a single NTFP within forest management;
- The level of research into NTFP characteristics and resource management; and
- The collection of resource rents and maximization of profit.

A discussion of these five points for each case study is provided at the end of each case description.

4.1 Public land – state managed or *de facto* open access?

There are two dimensions to the use of NTFPs on public lands in BC: first is the province's investment in species management; second is the commercial and non-commercial exploitation of these forest resources.

There is no formal direction from government to incorporate NTFPs into forest management or to regulate use of the resource in BC

In BC, there is no formal management regime or strategy for NTFPs, although legislative tools do exist to develop and implement one. More informal efforts have been used to deal with some specific management conflicts and research has looked into various characteristics of some species, mainly pine mushrooms. Research and management efforts have contributed to the knowledge base of some species' habitat needs and response to disturbances, and various underlying institutional issues associated with the use and management of NTFPs. Research has increased knowledge and resulted in some resource integration in planning efforts, but the provincial government undertakes no formal data collection of the value of the resource, the volumes being harvested, and whether or not harvest rates for any number of products is appropriate.

The legislative approach has focused more on who is using the NTFP resource, but has not specifically addressed access issues. Section 168 (1) of the BC *Forest Range and Practices Act* (FRPA) allows for the development of regulations for NTFPs; however, no regulations have been developed to implement this section of the Act. Additionally, Forest Stewardship Plans required under *FRPA* do not need to specifically address NTFPs. Thus, there is no formal direction from government to incorporate NTFPs into forest management or to regulate use of the resource. The minor exception is the Community Forest Agreement tenures, which can provide the tenure holder with the right to manage NTFPs (presented in the next case study).

In some areas of the province, the BC government has taken an active role in researching various NTFPs and there is an ad hoc approach to address issues when deemed necessary

In some areas of the province, the BC Ministry of Forests and Range has taken an active role in researching various NTFPs and describing the appropriate conditions for their continued use. Research efforts have explored various habitat requirements for pine mushrooms and other wild mushroom species, and have explored institutional issues associated with developing a management regime for NTFPs (see for example Kranabetter *et al*, 2005; Kranabetter and Kroeger, 2002;Tedder, Mitchell, and Hillyer, 2002; Berch and Wiensczyk, 2001; Hagerman *et al*, 1999). The provincial government has no formal legislative or regulatory policy establishing rights, rules and responsibilities of harvesting, and no written informal policy (i.e., non-legislated) of resource or user management. However, there is an ad hoc approach to address issues when deemed necessary. It is important to note that such responses are constrained by budgetary and human resources, the predominant focus on the management of timber and the level of issue relevance.

The provincial government's response to the change in demand for cascara and yew bark are examples where intense harvest interest led to a legislative response or harvest guidelines. In the case of cascara bark, used for its laxative properties, a significant increase in demand led the provincial government to introduce

legislation in 1958 to regulate harvesting (de Geus, 1995). In the case of yew, its use in the production of taxol for cancer treatment trials and subsequent commercial production led to a sharp increase in demand for the western version of the species in 1991 (de Geus, 1995). The demand for these species has subsided and these management responses for cascara and yew are no longer in effect. However, two more recent developments may be returning NTFPs to the government agenda – First Nations land claims and the spread of the mountain pine beetle infestation. Many BC interior communities are looking for opportunities to help overcome the economic implications associated with the expected decline in the volume of timber available for harvest as a result of the pine beetle. NTFPs are considered one avenue to contribute to economic diversification of beetle affected regions and First Nation communities.

NTFPs are considered one avenue to contribute to economic diversification of beetle affected regions and First Nation communities in BC

Other examples of provincial efforts that have influenced timber management include modifying small business timber sales in the Nahatlach watershed in the Fraser Canyon area of the Chilliwack Forest District to address the presence of high value pine mushroom habitat. The Blackwater Creek pine mushroom habitat area in the Squamish Forest District is another example of a community inspired "log-around" which has been in place since the mid-1990s. In the Kispiox Forest District, the presence of high valued pine mushroom habitat led the provincial Chief Forester to include this habitat as a constraint on logging, which contributed to a decrease in the timber supply area's allowable annual cut (BC Ministry of Forests, 2003). On the Queen Charlotte Islands/Haida Gwaii, the provincial government withheld approval of one company's logging development plans, which included highly productive chanterelle mushroom habitat around Skidegate Lake on Moresby Island (Tedder, Mitchell and Farran, 2000). Finally, some large tenure holders have collaborated with universities to research linkages and synergies between the NTFP and timber sectors (Centre for Non-Timber Resources, 2006).

Efforts to manage NTFPs have ifluenced timber management in BC

While these resource management efforts have provided for pine mushrooms, some other edible wild mushroom species and salal, there are many other NTFPs that receive little or no research or land use attention. Combined with government's choice not to introduce a formal policy to manage commercial access to the forest, there is a policy mix of limited state directed resource provision and *de facto* open access to the NTFP resource. Conflicts or perceived crises are dealt with on an *ad hoc*, resource specific basis at the forest district level. This approach reflects a response driven, reactive strategy, rather than a proactive strategy seeking more optimal solutions. For example, government, through the Ministry of Forests and Range, provides for the natural production of pine mushrooms through identification and protection of specific habitat, but it does not address the more social issues of access, user conflicts, camp garbage and other camp related issues, over-concentration of labour effort, product quality, and tax avoidance.

Many NTFPs receive little attention and conflicts are dealt with on an* ad hoc *basis

The Blackwater Creek area provides an example of the Ministry of Forests and Range recognizing community concerns about the protection of the availability of pine mushrooms, and planning timber sales to avoid highly productive and valuable areas. However, the lack of formal property rights afforded to pine mushroom areas and their community of users only forestalled timber development pressure. In 2005, the provincial BC Timber Sales (BCTS) began to plan for and target timber harvesting within the Blackwater area where the informal agreement between the ministry and local mushroom users to protect mushroom habitat was in place. Reasons behind this apparent turnaround include internal pressure within BCTS to meet its sale forecasts, significant other 'log-arounds' or other prohibitions on logging in the Blackwater Creek area as a result of old growth strategies, spotted owl habitat, and ungulate management requirements, and a new organizational structure of BCTS whose office was no longer located in the Squamish Forest District and less tied to any informal agreements. Future logging pressure is likely. This case suggests that an *ad hoc* method of informally incorporating NTFPs into forest management is not necessarily as effective over the long term compared to more formal rights such as legislated rights of timber production.

The ad hoc method of informally incorporating NTFPs into forest management is not necessarily as effective over the long term compared to more formal rights

The relationship between the timber industry and NTFP commercial and non-commercial users can be both competitive and complementary. Various stages of a forest's growth will complement the availability and growth of other understory species and their quality. For example, commercial quality salal is associated with particular forest types (such as second growth) and can be enhanced by commercial thinning. Research trials have also indicated that fertilization can produce high quality salal while also increasing timber volume (Forest Practices Board, 2004). The construction and maintenance of forestry roads also allows commercial harvesters more access to product and distributes the harvesting pressure over a larger geographic area. Conversely, roads can also lead to easy access and a greater potential for over-harvesting.

The relationship between the timber industry and NTFP commercial and non-commercial users can be both competitive and complementary

Wild mushrooms can also have a complementary relationship with timber harvesting. Chanterelles thrive in younger stands 60-80 years of age. However, timber operations can have a negative impact. Clearcutting eliminates chanterelle and pine mushroom fruiting for decades, and salal can lose its commercial quality, although the volume of salal berries available for harvest increases in more open and younger forests (Forest Practices Board, 2004). There are potential benefits that could evolve from more coordinated management of multiple species – something an appropriate institutional structure and associated property rights may promote.

The NTFP industry has taken the availability of open access to public resources and a lack of harvest prescriptions to build a significant industry sector. However, it lacks a consistent focus on the way in which the resources are used. A number of small and medium sized companies have evolved, and thousands of people participate in the harvest on a part-time, seasonal and full time basis. This value has been created by harvesters converting a common pool resource into a private good by picking and selling that good to buyers/distributors, thus capturing the benefits of the resource flow.

The NTFP industry has taken the availability of open access to public resources and a lack of harvest prescriptions to build a significant industry sector

However, the NTFP industry at the buyer/distributor level has taken little interest in the resource stock. This is mainly due to the apparent abundance of resources, but also the result of the potential for and distrust of government intervention – even in cases where the resource is being depleted or damaged. In contrast to the distributor level, many harvesters have adopted sustainable practices (e.g. long-term edible wild mushroom harvesters), while others seek short term gains with adverse resource impacts (e.g. bough harvesters). Some harvesters have also invested in methods of enhancing the resource, despite the lack of rights to protect one's investment. From a broad perspective, however, the opportunity for self-induced collective action among harvesters appears unlikely.

The opportunity for self-induced collective action among harvesters appears unlikely

At the buyer/distributor level for wild mushrooms any interest in collective action has occurred only when government has taken an interest in seeking regulatory solutions to the open access use of NTFPs. Cooperative measures among companies to ensure sustainable harvesting or to solve other product distribution issues have not been observed, although wild mushroom field buyers and floral buyers do attempt to ensure harvesters collect resources that are marketable and in the appropriate condition for the intermediate customer. Anecdotal evidence indicates that quality issues have begun to affect the pine mushroom and salal markets (Centre for Non-Timber Resources, 2006).

In general, while the industry appears to be experiencing success from the free and open access to NTFPs, there are fundamental issues associated with the sustainable use of the resource and the incentives created through the open access environment. Market failure warning signs are becoming more explicit: salal over-harvesting; damage to young trees by bough harvesting; potential decline in pine mushroom and salal quality; land use conflicts; and poor collection and sharing of information. From the provincial government and private land owner's perspective, the potential costs associated with developing and implementing a management regime, then monitoring and enforcing a regulatory framework or management strategy may exceed any benefits. To paraphrase one wild mushroom buyer speaking about government intervention, "the system may not be perfect, but regulating it may be worse" (pers. comm. wild mushroom buyer, 2004). This concern relates directly back to the lack of information and inability to determine resource rents, thereby contributing to the uncertainty associated with any number of potential outcomes of resource management activities.

While the industry appears to be experiencing success from the free and open access to NTFPs, market failure warning signs are becoming more explicit

In terms of this report's evaluation, the open access/state property rights regime provides what should be considered the lowest level of management. However, while the lack of state intervention in NTFP use results in open access, investment in the resource does occur for specific high value products in specific areas. NTFPs are also incorporated into higher level forest land use management in species and area specific cases. There is no attempt to overcome any free rider access to the flow of benefits or any particular recognition of concern. There also appears to be little collective action efforts among users to establish an articulated set of rights, rules and responsibilities governing the commercial use of NTFPs, and no or little correspondence and collaboration between the provincial government and resource users. There is no general provincial, regional or local

The open access/state property rights regime provides what should be considered the lowest level of management

assignment of rights, other than through community forest agreements, and no support for non-commercial users other than through the overlapping inclusion of other forest values in land use planning and forest stewardship plans. The two dimensions of NTFPs on public land, state resource provision and user access appropriation, are not linked within any management strategy.

4.2 Public land tenure rights – Community forest tenure agreements

The introduction of the CFA pilot program was to provide communities with greater control over a portion of local forest resources and thus be more reflective of community values

In 1998, the provincial government introduced legislation that would see the evolution of community forest agreement tenures (CFAs) in British Columbia. The intent of this program was to provide communities with greater control over a portion of local forest resources and thus be more reflective of community values. The initial CFA program was a pilot project and provided tenures for up to five years in duration. New CFAs are also provided with probationary five year tenures. After this initial period the tenure may be converted into a long-term tenure of between 25 to 99 years. Transferability of CFAs is limited, allowed, as stated in the *Forest Act*, only under circumstances that meet prescribed criteria. The *Forest Act* does not define those circumstances or criteria. In terms of evaluating the completeness of rights, CFAs do offer potentially long-term, secure and relatively comprehensive tenures conducive to a broader inclusion of multiple values. The objectives of CFA communities tend to be more reflective of the broader local social values as well. Regardless, CFAs are timber oriented tenures with planning and cut-control requirements.

CFAs account for about 2% of the timber harvesting land base

As of May 2008, there were 28 CFAs (six long term and 22 probationary) in BC covering a total area of 490,017 hectares with a total allowable annual cut of 509,985 cubic metres. A further 24 communities were invited to apply for or offered CFAs, two of which are in the application process (for a list of community forest see http://www.bccfa.ca/). The CFAs are located throughout the province in a wide variety of terrain and timber types. Community forest agreements account for about 2% of the timber harvesting land base.

CFAs are the only Crown forest tenure in the province to specifically include NTFPs within legislation

Community Forest Agreements are area based tenures and the only Crown forest tenure in the province to specifically include NTFPs (referred to as botanical forest products in the *Forest Act*) within legislation. This makes CFAs somewhat more comprehensive than other forms of timber tenures. Section 43.3(c)(ii) states that the minister or authorized delegate "may give to its holder the right to harvest, manage and charge fees for botanical forest products and other prescribed products" (*Forest Act*). The term "may" in the legislation results in some uncertainty as to whether it is necessary to incorporate NTFPs into the tenure agreement and whether tenure holders must ensure of its inclusion. It also suggests that the Minister of Forests or delegate can choose not to include rights to the NTFP resource.

In contrast to the timber resource, the tenure does not provide any exclusive rights to manage or limit access to NTFPs within the CFA landbase. In terms of timber, Section 43.3(c)(i) states that a community forest tenure under Division 7.1 of the *Forest Act* "must give to its holder the exclusive right to harvest timber on Crown land…" but in terms of botanicals Section 43.3(c)(ii) does not use the term 'must' or 'exclusive'. This weakens the property right to NTFPs, and reduces any incentive to invest in the resource.

However, CFAs do not provide any exclusive rights to manage or limit access to NTFPs within the CFA landbase

In many cases, timber planning requirements overwhelm the ability to develop NTFPs as a commercial enterprise. This constraint is somewhat compounded by the management philosophy of CFAs, which are generally more holistic than other timber tenures. As a result they are more prescriptive than entrepreneurial in their approach to NTFPs, seeking NTFP inventories and some sense of the sustainability of commercially viable levels of harvest. Access to third party funding sources to undertake this type of inventory work has been difficult to obtain, both from government funding sources and private investment, suggesting that returns are not attractive enough in money markets. In addition to inventory information, market information can also be difficult, costly and time consuming to collect. Combined, the absence of these two sets of information makes testing the net-benefits and marketability of a small volume of material difficult.

In many cases, timber planning requirements overwhelm the ability to develop NTFPs as a commercial enterprise

CFAs show a variety of attitudes and efforts towards the development of an NTFP component. Some CFA members certainly appear interested in the potential of NTFPs, but their ability to proceed is constrained by capacity, NTFP endowment, and access to information and funding. Some CFAs have focused on the provision of traditional medicinal and other forest values for its community members, rather than focusing on commercial possibilities. Note also the emphasis on NTFPs and not a specific product such as edible wild mushrooms. Unlike timber which has a well established market and distribution system, NTFPs as a group do not have a market. Some individual products do, but they differ and are not always easily identifiable.

In terms of developing an NTFP component, the Harrop-Procter community is one CFA to have successfully launched an NTFP venture. Some CFAs prefer to sell permits for others to enter the CFA landbase to harvest the NTFPs. With adjacent Crown land under open access and uncertain property rights, the ability to do this is severely undermined. Permitting use in this way on a small landbase would likely return rather insignificant rents, again undermining the decision to develop inventories and identify appropriate harvest levels. Thus, the cost of exploring NTFP opportunities and the uncertain net returns appear to be muting the desire to explore this area further.

This case study describes a regime that has moved from the open access/state model to link the resource and user dimensions of NTFPs within a public land setting. While this tenure provides the right to permit NTFP users, the cost of exclusion remains. Given the small landbase of many CFAs, trespass may not be an issue unless valuable product is located within the tenure boundaries and not on adjacent open access lands. CFAs appear more likely to invest in NTFPs than

While this tenure provides the right to permit NTFP users, the cost of exclusion remains

users within open access state lands, but do not have the funding to match the effort by government. Thus there is a capacity issue both in funding and subsequently having the necessary information to more fully incorporate NTFPs into management decisions. The more holistic approach to forest management envisioned by CFA communities suggests that guidelines, the assignment of rights and the support of non-commercial uses will be considered. However, at this stage the level of effort is not consistent across CFAs. The ability to internalize local values into the management system generally requires a base of profitability through timber exploitation.

CFAs highlight the question of the compatibility of scale and scope between a timber-oriented tenure and the requirements for NTFP development

CFAs are predominantly timber tenures, with harvest requirements and a timber oriented stumpage system which overwhelms other values. This minimal shift in the provision of NTFPs may reflect an inadequacy of the tenure to promote the development of an NTFP venture, but it does not suggest that effective property rights are unnecessary, nor that a more appropriate property right cannot be developed. This brings in to question the compatibility of scale and scope between a timber-oriented tenure and the requirements for NTFP development. Establishment of the CFAs was based on the availability of an area with sufficient timber resources, identified through well established estimates of timber inventories. While the presence of NTFPs may well have been known, NTFP inventories, production possibilities and profitability would not have been understood to the same degree as for timber. The timber area may also not be conducive to the needs of developing a NTFP venture. It may well be that a spatially larger tenure is required for profitable NTFP production in some areas. Reasons include economies of scale given the variability in abundance, the commodity volume-based nature of the industry, and because it may reduce the trespass or access to adjacent open access common land.

4.3 North Cowichan Forest Reserve

The North Cowichan Forest Reserve is owned by the Municipality of North Cowichan, on southern Vancouver Island

The North Cowichan Forest Reserve (NCFR) is located on southern Vancouver Island between the cities of Victoria and Nanaimo. The NCFR is comprised of about 5,344 hectares ranging from low elevation flatlands to mountainous areas within the Vancouver Island Range (Municipality of North Cowichan, 1997). The NCFR is owned by the Municipality of North Cowichan, which formed the Forest Reserve in 1946. The NCFR lies predominantly within the Coastal Western Hemlock Dry Maritime biogeoclimatic sub-zone, with smaller portions found within the Coastal Douglas Fir zone. Tree species are dominated by Douglas-fir, Western red cedar, grand fir and red alder.

The NCFR generates a number of forest related values including timber, recreation, NTFPs, old growth, riparian and ecological integrity values. In terms of timber, the allowable annual cut was set at 20,000 cubic metres in 1995. The NCFR operates no processing facilities, and as such is considered a market logger. In 2005, net log sales returned about $673,000, based on a volume harvested of 16,017 cubic metres (Municipality of North Cowichan, 2006). Silviculture work undertaken by the NCFR includes planting, site preparation, juvenile spacing, brushing, and white pine pruning. In addition to timber for sawmills, pulp mills

and a veneer mill, the NCFR also provides pole and pile products, shake and shingle, firewood and hardwoods. The NCFR also provides for NTFPs (called "lesser vegetation" in the development plan), such as salal, sword fern, mushrooms, berry picking, and other botanical products such as those used for medicinal purposes (Municipality of North Cowichan, 1997).

The NCFR is a private forest reserve which has property right characteristics of exclusiveness and comprehensiveness. However, being owned by a municipality means that it needs to reflect the values of the community of owners, and thus has an interesting mix of private and public influences. This is evident in the NCFR's board which is represented by North Cowichan elected officials, local residents and NCFR staff. This focus is also manifested in the NCFR's attention to social values, such as recreational opportunities including hiking trails. The NCFR incurs costs for providing recreation opportunities through road and trail maintenance.

The NCFR is a private forest reserve which has property right characteristics of exclusiveness and comprehensiveness but also needs to reflect the values of the community of owners

In terms of participating in the NTFP industry, the NCFR is currently limiting its effort to providing access via harvesting permits. In 2004, the NCFR issued 26 permits generating $1,645, at $60 (plus GST) per permit. In 2005, revenue from permits dropped to $900. Salal is the main target of these harvesters. The permits are intended to be issued on a per person basis, but more likely work on a per truck basis. The NCFR collects no harvest volume or value information from its permit holders, nor has it attempted to undertake any research into NTFP inventories or revenue potential. As with most timber oriented companies, this minimal effort stems from its timber focus, a lack of human resources to undertake additional responsibilities, and a discounting of the value or potential rents from the NTFP resource. The NCFR considers the permit value to be reflective of the true value of the resource (i.e., low). Admittedly, given the more volume and commodity based nature of the industry, the size of the NCFR landbase may limit the revenue potential of the area, thus reducing any interest in attempting to develop an NTFP component of the reserve. However, there is no inventory or harvest volume and value statistics to substantiate any economic potential or lack thereof.

NCFR is currently limiting its NTFP effort to providing access via harvesting permits

This example of private property rights suggests that the rights holder is certainly more concerned about charging for access and knowing who is entering the forest than the public land owner, but not so concerned about controlling or significantly limiting access. Any signs of overharvesting are observed through declining requests for permits – after any depletion has occurred. Concern about the sustainability of NTFPs is not apparent. However, salal is the main product known to be harvested and it has a robust regenerative ability. Significant harvesting pressure does not appear to be occurring, as indicated by the low numbers of permit requests (only 2 between January and May 2006). However, this reduction in applications may also reflect declining or a lack of commercial quality salal volume due to past over-harvesting. Salal or other NTFP harvesters are attracted to the area in an effort to capture economic rents. Creating conditions to encourage small scale investment in the NTFP resource may be possible, but would require initial effort by staff at the NCFR and appropriate contracting arrangements between the land owner and the NTFP user.

Concern about the sustainability of NTFPs is not apparent under this tenure – there is no inventory/harvest volume and any signs of overharvesting are observed through declining requests for permits

In terms of creating a valued asset through NTFP property rights, there have be no attempts to auction the rights to a single NTFP (such as salal), NTFPs in general, or to allocate the rights or seek expressions of interest. In the 1980s, an attempt was made by the NCFR to contract out monitoring and policing of NTFP activity, but this resulted in the contractor abusing its power and no subsequent efforts have been undertaken since. NCFR staff have indicated some interest in pursuing the potential to allocate NTFP rights, but staffing constraints currently limit this ability. Experience with small area NTFP brush (florals) sales within Washington State forests (Tedder, Mitchell and Hillyer, 2002) suggests that the size of the area and resources may not be the issue and using a similar format may attract bidding interest among NTFP companies.

This case study moves further towards the private property model, yet still has some vestiges of public ownership and public influences

This case study moves further towards the private property model, yet still has some vestiges of public ownership and public influences. It is perhaps not entirely consistent with private property, and may be more reflective of broader social values. As with the other case studies, the common pool nature of the resources render exclusion difficult, although a permitting system is used and compliance seems reasonable (although no monitoring of compliance is undertaken). Increased investment and incorporation within broader forest planning is not evident, nor is there an effort to develop rights or rules of conduct to harvest NTFPs. This may reflect the high transaction costs associated with not only developing effective rules, but also engaging with the harvesting community. As with most landowners, non-exclusive access rights are provided, not rights to the resource. As such there is little investment by the user at the resource level.

4.4 TimberWest Forest Corp.

TimberWest Forest Corp. (TimberWest) is a private landowner with forestry operations located on Vancouver Island

TimberWest has been an active provider of access to some of its private lands for NTFP harvesting

TimberWest Forest Corp. (TimberWest) is a private landowner with forestry operations located on Vancouver Island. TimberWest owns 322,000 hectares of forest land on Vancouver Island, producing an annual harvest of 2.5 million cubic metres of logs, about 70% of which are second growth. The company also has tenure to harvest about 700,000 cubic metres of Crown timber within the Coast Forest Region. As a private land owner, TimberWest has well defined rights and enjoys exclusive and comprehensive rights over its surface resources – including the right to restrict access and control or gate any entry points. In addition to timber-based products, TimberWest has been an active provider of access to some of its private lands for NTFP harvesting, notably salal and some boughs on southern Vancouver Island on its Sooke and Muir Creek lands. TimberWest has been permitting access to these lands for about 15 years. TimberWest has not attempted to introduce a permitting requirement on its more accessible lands to the north, given the more open terrain, multiple access routes and lack of enforcement capabilities. On average the sale of permits provided $4,000 to $5,000 per month during the approximately nine months of the salal season.

In 2005, after several years of intense competition for access to salal and its overuse in the company's Sooke and Muir Creek areas, TimberWest provided exclusive access to one company. The arrangement provides an exclusive right of access and control for the harvest of salal. The company has the right to sell harvesting permits and purchase all harvested material for an annual fee based on the number of permits sold. The salal company has invested in the installation of gates and locks to control access, and has managed picking practices among its workforce. The salal company has also introduced safety programs for the pickers. For TimberWest, the arrangement has lowered costs by eliminating its need to allocate permits and monitor gate access. The arrangement has also dealt with liability issues and other employer-employee relationships and responsibilities by shifting the responsibility to the NTFP tenure holder. A TimberWest spokesperson indicated that if these responsibilities and costs were shifted to TimberWest, the company would likely cease allowing access to its private lands (Steve Lorimer, pers. comm.). Regardless of these arrangements, however, theft continues to occur, overpicking happens where access is more difficult to control, and the public ethic of universal access to the forest has led to some tension among those excluded from the area.

In some areas TimberWest has provided exclusive right of access and control to one company for the harvest of salal – with mixed results

Incorporating salal or other NTFPs any further into TimberWest's forest management appears unlikely at this point, other than being incidental to timber production. A potential method of incorporating NTFPs into timber management is to develop arrangements whereby some silviculture activity is completed by NTFP companies: for example pruning and the sale of boughs, or the fertilization of stands that also provide increased growth of salal and benefits to the salal industry. TimberWest is looking at expanding its NTFP offering by including boughs and other products such as grasses. TimberWest undertakes a silviculture program focused on tree improvement, vegetation management during the early years of plantation establishment, and late rotation fertilization on its private tenures. Like many forest companies, little pruning is done on its public or private lands, thus seeking synergies between this type of activity and the NTFP industry do not appear likely. While non-timber values may exceed those of timber in some areas, TimberWest has highly productive timber stands whose total value would exceed the NTFP value. Nonetheless, access to and use of at least salal remains an important source of income for many people.

Incorporating salal or other NTFPs any further into TimberWest's forest management appears unlikely – other than being incidental to timber production

For the salal company, acquiring the exclusive property rights to permit, use and benefit from the salal resource has significant value. The exclusive access to these areas provides a more stable base from which to manage the flow of resources, and a secure source of product. Whether this type of tenure arrangement could lead to any influence over timber harvesting decisions is uncertain. However, a TimberWest representative indicated that any reasons to shift harvest plans or road work, for example, would have to be compelling, heard well in advance of scheduled harvesting, and have significant revenue potential to offset any additional planning related costs (Steve Lorimer, pers. comm.). What the salal tenure does provide, however, is more direct access to TimberWest management and planning and an opportunity to discuss any issues or concerns that may arise.

This tenure has positive information, monitoring, administrative, and control implications for the land owner

Thus the tenure has positive information, monitoring, administrative, and control implications for the land owner, further supporting the more resource specific approach to the way in which property rights may be designed for multiple or individual NTFPs.

The TimberWest case study provides an example of well defined private property rights from a Canadian legal perspective. Gated areas do allow TimberWest to limit access to its lands in areas not adjacent to highways or other public road systems. While a physical limitation on access, TimberWest also reveals a cognitive desire as a private landowner to control access to its lands and to profit from alternative uses. The company does not invest in the salal resource or incorporate the development or enhancement of salal or other NTFPs within its management or operational framework. By providing exclusive rights of access to one company and allowing the placement of locked gates it may be able to more effectively limit trespass and free riding. The tenure rights may also lead to the development of rules and responsibilities among salal users. One local harvester commented that there is a significant difference in salal quality and availability on private land versus public land. The case provides an example of the assignment of rights based on a single offering for a single product. A bid process for the rights to multiple products could increase the returns to TimberWest, but its current arrangement may provide the stability necessary to encourage investment by the salal company, and is less onerous for the landowner.

Providing rights to multiple products may increase returns but the current stability may encourage investment

5.0 Case study discussion[8]

The design of the existing property rights may have little bearing on the sustainable use, investment, development or provision of NTFPs

Table 1 summarizes the findings from the case studies presented. Are these results consistent with what the theory suggests? The case studies considered in this assessment indicate that the design of the existing property rights may have little bearing on the sustainable use, investment, development or provision of NTFPs. While private landowners are found to be more likely to manage access to their lands by requiring entry permits, they appear less likely to incorporate NTFPs into their resource management decisions, or to invest in research activity, regardless of the existence of a market and rents for these products. Conversely, the state, where open access predominates, shows a greater inclination to invest marginally in the resource, but not in managing access. Is this simply a reflection of value and the level of congestion, subsequently the most economically efficient approach for the rights holder? Are social values reflected?

Property rights examined in this comparative manner do not fully reflect the institutional milieu and contextual factors that influence the resource environment. In fact, the disparate institutional landscape – private tenure, public tenure, open access – may obscure the potential value of property rights in NTFPs were a more consistent recognition of rights present. The following section examines the case study results from a more deductive perspective in terms of what property rights and common pool resource theory would suggest. The case studies are evaluated in terms of how NTFPs are incorporated into operational planning in an effort to maximize rents, investment in resource and market development, the evolution of

[8] This section is based on information gathered from representatives of the case study subjects, as well as comments from a wide variety of stakeholders interviewed during research for a number of other projects. In the interests of anonymity, references to the information and sources will not be provided.

property rights under high demand, the influence of common pool characteristics and transaction costs. This is followed by a discussion of various contextual characteristics that are revealed inductively through an examination of the case study results.

Property rights theory suggests that when resource values or use warrants, holders of well-defined exclusive and comprehensive property rights to resources will expend the effort to maximize available rents from the landbase. This optimization would suggest that NTFPs, timber and other forest values are considered within the forest management and planning framework in order to establish an appropriate utilization of resources. Private forest landowners in BC and in the US Pacific Northwest attach little value to NTFPs and make little effort to capture associated rents. Yet NTFP harvesters attach a high value to NTFPs and actively participate in commercial markets for salal, boughs, edible wild mushrooms, and a variety of other products. The divergence of interest and value in NTFPs is then one of focus and scale – in terms of the target resource, the operation, capital investment, and its role within local community economic development.

Private forest landowners attach little value to NTFPs and make little effort to capture associated rents – yet NTFP harvesters attach a high value to NTFPs and actively participate in commercial markets

As the existing NTFP industry illustrates, the question is not one of either timber or NTFPs. Rather it is one of obtaining a higher value from the forest by exploiting resources in addition to timber. There is no indication from the case studies that more private rights encourage the collection of all available rents or that a private timberland owner, large or small, would necessarily examine the profit potential from products other than timber. No research in industry, government or the academic community has been undertaken to assess the costs and benefits associated with various NTFP management alternatives. The simple (perhaps simplistic) answer is that the profit potential from most NTFPs is too small to consider, certainly in relation to timber production, yet some NTFP sub-sectors provide family-supporting livelihoods to many. The lack of interest in lesser-valued forest resources suggests that landowners will not necessarily incorporate non-timber values (of which NTFPs are one group) into their management perspective unless there is sufficient value from the corporate perspective – this example provides an illustration of the division between private and social values.

There is no indication from the case studies that more private rights encourage the collection of all available rents or that a private timberland owner would examine the profit potential from products other than timber

Table 2. Tabular summary of five evaluative elements for each property type.

	Landowner or rights holder			
	Open access/state	**Community Forests Agmts.**	**Small private**	**Large private**
Species of interest	Wild edible mushrooms, boughs, salal dominate.	Variety of species of interest.	Salal dominates access; others include boughs.	Salal mainly, some boughs, others limited.
Level of congestion	Significant congestion in some areas for some resources, little congestion in other areas.	Generally low levels of congestion. May vary depending on location and product.	Forest area examined may experience congestion, but use is not monitored. Values thought too low for concern.	Some private lands show significant congestion.
Effort and ability to control access	No access control. Costly to introduce, monitor and enforce.	CFAs only public tenure to include NTFPs. Limited ability to restrict access. No documented efforts.	Permits NTFP harvesters. Unaware of significant trespass. Difficult to control or monitor actual activity.	Moved from permitting harvesters to allocating NTFP rights to one NTFP company. Where possible, gates used to control access; alternate entry points limited.
Level of NTFP resource or market investment	Marginal investment in some species in some areas. No investment to assist sector develop markets.	Minimal, seen as a barrier to identifying opportunities and developing NTFP inventories and opportunities.	No investment in resource or market development.	Landowner does not invest in resource or market development.
Incorporation of NTFPs or single NTFP within forest management planning	Pine mushrooms only species included in some higher level planning, setting of AAC, land use related log-arounds.	Timber emphasis and lack of information limits ability to include NTFPs. Multiple use based community values.	NTFPs are not part of forest management and operational planning.	NTFPs are not part of forest management and operational planning.
Level of research into NTFP characteristics and resource management	Research mirrors level of investment. Most significant level by state focus on pine mushroom.	Research desired but access to funding limited; affects NTFP promotion.	No NTFP research undertaken, but open to outside researchers.	No NTFP research undertaken by company but open to collaboration. User interest in research varies widely.
Collection of NTFP resource user fees and maximization of profit	No fees or other payments collected.	Legislation allows non-exclusive permitting and fees but few if any have used authority.	Permit fees collected; relationship to resource rents unclear. No analysis done by landowner.	Fees collected from NTFP tenure holder based on number or harvesters; relationship to resource rents unclear. No known analysis.

Moving from open access to a greater level of organization is precipitated when demand increases and congestion in the use of a scarce resource is reached. Until TimberWest introduced a single NTFP tenure[9] to its land, one could argue that virtually all areas essentially operated under *de facto* open access (regardless of the permitting). No or few restrictions were placed on the number of harvesters and the non-exclusive nature of common pool resources reduced the efficacy of any efforts to restrict access. Overharvesting was observed in all property types.

Moving from open access to a greater level of organization is precipitated when demand increases and congestion in the use of a scarce resource is reached

As more information becomes available and access issues more acute, a move to a clearer expression of rights should be expected, as with TimberWest's move to providing access through a single NTFP tenure. The move to more managed access may indicate that it is possible in some cases to overcome the costly exclusion, common pool character of NTFPs by tenuring and empowering resource users with a legitimate and valued monitoring function. Within the BC Crown land environment no such movement to exercising property rights over access to the NTFP resource has occurred, other than as a sub-component to the CFA tenures. State property rights may be well-defined, although who the owner is may be less certain as First Nations pursue their rights and title to various parts of the landbase. However, at the operational resource use level – the level where overharvesting, user conflicts and inefficiencies occur – these property rights are not exercised. The open access and common pool characteristics of NTFPs have a significant influence on the perception of management potential on public land.

It may be possible to overcome the costly exclusion, common pool character of NTFPs by tenuring and empowering resource users

Individual NTFP species have varying degrees of the non-exclusive common pool characteristic, which may have a bearing on the success of any management regime. For example, experience in the US Pacific Northwest indicates that regulating access by requiring permits or leases to harvest and transport salal does not necessarily lead to any greater level of sustainable harvesting practices, resource investment or the elimination of free riders and trespass (Tedder, Mitchell and Hillyer, 2002; Ballard *et al*, 2002). Evident in the Pacific Northwest, however, is a high rate of compliance with permitting requirements. Thus most users are willing to purchase a permit, or at least are not willing to risk being caught without one. Often the permit is used per vehicle, not per individual in the vehicle.

NTFPs have varying degrees of the non-exclusive common pool characteristic, which may have a bearing on the success of any management regime

However, the permit itself has little relation to the way in which the land is used. This appears to be the case for salal, boughs and edible wild mushrooms. Ballard (2004) and Spreyer (2004) have identified failures in the management of salal in the Pacific Northwest including continued trespass and overharvesting. What is also evident in the Pacific Northwest is far greater capital investment in plant facilities, notably within the floral industry sector, thus reflecting the private value of the resource after conversion from a common pool resource to a private good. Yet for all the private and tenured rights to brush in the Pacific Northwest, the overharvesting of salal has led to a shift in the product offered, from the more valuable 'longs' to 'tips' and 'bouquet tips.'

Edible wild mushrooms fruit over a wide range and pose significant access management challenges. Fencing, monitoring, or relying on coercion to manage access is costly and likely to fail. The Nisga'a treaty lands provide an illustrative contrast to this conclusion, however. The pine mushroom is one of the most valuable NTFPs and the Nisga'a have established a permitting system for pickers and buyers and are seeking to invest in their own distribution system in order to

The expression of the Nisga'a exclusive rights to the resource indicates an apparent ability to overcome the open access associated with pine mushroom harvesting

[9] Western Forest Products has also provided exclusive access to harvest salal on southern Vancouver Island.

more fully benefit from any revenue potential. The expression of their exclusive rights to the resource indicates an apparent ability to overcome the open access associated with pine mushroom harvesting. The cost of establishing this regime and achieving exclusivity is unknown, and ensuring that people harvest appropriately and follow any rules (i.e., not free ride) is still problematic.

The Nisga'a example is different than the other private examples. The Nisga'a lands and the NCFR are both community held resources, yet display different values associated with NTFPs. The value of the pine mushroom, potential rents and community development opportunities associated with developing more processing and direct marketing of pine mushrooms are prominent reasons. As North (1990) and Grafton (2000) suggest, institutional history also likely plays a significant role. The Nisga'a sense of place and relatively homogeneous community may be an important factor in the ability to develop an enduring institutional framework for long term stewardship of the resource. Yet has this greater management increased net returns or rent, or is it simply resulting in a shift in who accrues the existing benefits? The expression of property rights may have shifted the distribution of rents, but may or may not have resulted in any positive gain from greater management. Acquiring a better understanding of this case could contribute to a rationale for introducing a management regime on adjacent public land, thus is an important area for future research.

Nisga'a sense of place and relatively homogeneous community may be an important factor in the ability to develop an enduring institutional framework for long term stewardship of the resource

Research on the attributes of NTFPs is far more prevalent on public lands than private, perhaps reflecting the state's need to respect broader social values. Some timber companies with predominantly public tenures have collaborated with NTFP research efforts (Forest Practices Board, 2004). Open access as defined in the literature dissuades investment, yet the provincial government conducts research and manages land use for some of these common pool resources within an unregulated environment. To the state, the *de facto* open access and common pool nature of NTFPs appear somewhat irrelevant, and it accepts a role of sharing the benefits while incurring most of the costs (more appropriately, society's costs). The state in this case, is taking an active role in the provision of information, which is consistent with the needs of a common property management regime. As users, however, the NTFP sector typifies those within an open access environment investing little in the resource and pursuing short-term harvest strategies. The NTFP industry does invest in processing and distribution once the resource is harvested and becomes a private good. Thus the state tends to show less of an expected tendency to withhold investment, but the users of the resource follow quite closely with the theoretical depiction of open access common pool resources.

Research on the attributes of NTFPs is far more prevalent on public lands than private – perhaps reflecting the state's need to respect broader social values

Transaction costs and their influence on policy development within the NTFP sector include the information, cooperation, and enforcement costs consistent with transaction cost theory. They also include the perceived opportunity costs that the NTFP industry may experience through the introduction of a management regime. There is a lack of information collected and associated uncertainty concerning the range of products harvested and their volumes and values, harvesting, distribution and other industry costs, and rates of resource productivity. This renders evaluation of the sector's level of exploitation and the calculation or inference of any rent dissipation extremely difficult and costly to obtain.

The conditions for cooperation or some form of collective action to manage the NTFP resource are also hindered by this lack of information and the competitive and secretive nature of the industry. The NTFP industry is more intent on remaining below government scrutiny and, with minor exceptions, is unwilling to provide information – seeing the costs of any collaboration as being too high. In addition, the benefits of cooperating with other competitors appear to be too low in light of the significant transaction costs and risk associated with sharing information and cooperation. The chance of cooperation is enhanced from a clear recognition of associated resource risk, the opportunity of feasible improvement and reliable information, among other user and resource attributes (Ostrom, 1999). As Ostrom (1990) notes, appropriators and providers need to recognize the costs and benefits of institutional change if it is to be supported. In the NTFP sector, the risk of resource degradation increases from this barrier to information and communication, but the lack of information also reduces the understanding of the level of risk and what specifically is at risk.

The conditions for cooperation or some form of collective action to manage the NTFP resource is hindered by a lack of information and the competitive and secretive nature of the industry

Enforcement costs would affect each of the reviewed property systems through the need for monitoring and ensuring legitimate and effective rights. Little monitoring occurs and exclusive access rights are discounted as being infeasible, perhaps rightly so. Other costs seen as prohibitive to a more formal management regime include payroll deductions and insurance requirements. Perhaps the most difficult barrier to overcome is the concern about the potential negative impacts associated with government intervention in the sector. Based on both the uncertainty regarding which regimes may work and First Nations' rights and title claims, the ***perceived*** outcome of government intervention could be a complete cessation of activity, affecting long-term businesses and hundreds of employees. To the NTFP industry, these potentially real opportunity costs of management likely outweigh any potential individual benefits from more well-defined property rights and any uncertain opportunity to enhance the sector.

The BC Forest Practices Board (2004) suggests that seeking sources of greater complementarity among timber and non-timber uses may enhance the value of the 'forest' resource, without detrimental effects on timber or non-timber resources. Exploiting these potential synergies could lower transaction costs by reducing the level of negotiation required to find collaborative solutions to resource use and investment. This could both reduce timber theft and NTFP abuse through a 'second set of eyes' in the forest. The Board's report also suggests that there may be ways to invest in the forest that would benefit the timber and non-timber industries. Until such time as each participant within this policy arena – timber, non-timber, First Nations, and government – seek these complementary relationships, the costs may remain or appear too significant.

Seeking complementarity among timber and non-timber uses may enhance the value of the 'forest' resource, without detrimental effects on timber or non-timber resources

6.0 Contextual characteristics and NTFP management

Research on contextual characteristics may help clarify why the presence of more private timber dominated rights may not necessarily lead to the sustainable management of NTFPs

Contextual characteristics are a set of factors that can influence a management regime, and include economic, cultural, physical, and social influences situated locally, or endogenously within the community, and remotely or exogenously and beyond the control of the user community (Edwards and Steins, 1998). Contextual factors "are important in determining the evolution of decision-making arrangements for managing common pool resources" (Edwards and Steins, 1998 p. 1). From an inductive perspective, the research on these characteristics helps to clarify why the presence of more private timber dominated rights in the BC context may not necessarily lead to the sustainable management of NTFPs. It also provides potential direction for an approach to sustainable NTFP management and topics of further research. Property rights including NTFPs are influenced by various underlying contextual elements reflected (in the BC case) within seven NTFP characteristics:

- product and geographic heterogeneity;
- a prescriptive versus entrepreneurial focus;
- land adjacency influences;
- a public access ethic;
- homogeneity of user rights;
- First Nations rights and title; and
- a variety of influences related to uncertainty.

Thus, in addition to considering the non-exclusive nature of NTFPs, any property rights regime developed for NTFPs, or intended to include NTFPs, needs to address these influences.

There are other factors that will influence the efficacy of property rights, not just in this particular case of NTFPs in BC. Ostrom (1990, 1999) discusses various resource and user attributes that contribute to self-governing institutions, and provides design principles that help to explain enduring coordination once in place. There are likely others relevant for NTFPs in BC. However, the hope in this paper is to reveal additional, more specific elements that also contribute to or detract from effective property rights.

Product and geographic heterogeneity refers to the particular area and the abundance of NTFPs and their associated values. In BC, NTFPs are spread over various areas, specific to certain locations, and associated with a wide variety of uses (even for a single product), level of interest, intensity of harvest, and threat of

overuse. For the CFAs, the rationale behind the location of these tenures first reflected community interests, and second an area of land that held sufficient timber value. The influence of NTFPs on the location of choice was secondary or non-existent, and perhaps understandably so given the timber requirements of the tenure. The private property examples are both located within high value NTFP areas, thus have been subject to greater user pressure and access control. Within state open access areas, even those of high value and extreme use have no access control. The product and geographic heterogeneity suggests the need to evaluate each case or product for its value, commercial or non-commercial nature, history of use, intensity of use, resilience to harvesting, and ability to be flexible in any response to the use of NTFPs. A single comprehensive regulatory approach to NTFPs would do little to address specific resource and user related conditions.

A single comprehensive regulatory approach to NTFPs would do little to address specific resource and user related conditions

Prescriptive versus entrepreneurial focus refers to the objective of resource development and the underlying planning requirements that would reflect the sustainable use of any resource. One CFA respondent referred to inventory studies and an assessment of sustainable harvest rates as a precursor to commercial development of an NTFP resource. While ideal, a characteristic that reflects the NTFP sector is its lack of resource planning and a greater focus on entrepreneurial ability to lead to the successful marketing of product, whether at the wholesale or retail level. In a recent study of the contribution of entrepreneurship in the commercialization of NTFPs in Mexico and Bolivia, te Velde *et al* (2006 p. 739) found that "entrepreneurs are important in the development of innovative marketing of NTFPs and are often key to spreading success through the value chain." The literature on community forests also recognizes the necessity for entrepreneurial skills (see Gunter, 2000; or Markey and Vodden, 1999 for a discussion).

Private land owners lack an entrepreneurial focus with NTFPs; however, investment returns from efforts to expand their timber supply, customer base, and product line may easily exceed any returns from investments in NTFPs. The net benefits of any NTFP investment are as yet uncertain, but could contribute to the 'bottom line.' The question is who captures the increased wealth from the 'forest' resource: the landowner or the NTFP user? For those interested in an NTFP focus, developing a prescriptive NTFP plan without an assessment of the marketing potential of the particular NTFP precludes the ability to accurately calculate the profitability or net benefits of such a venture.

There is a need to assess the marketing potential of NTFPs before developing a prescriptive management plan

On public land and in some cases private, access to the forest to recreate or to search for sustenance through other interests (including the commercial harvesting of NTFPs) is considered a pubic right. This **public access ethic** increases the difficulty of introducing any rights based approach to managing commercial access to the forest for NTFPs. The NCFR, being owned by the North Cowichan Municipality also deals with the citizen expectation that access to the forest reserve is open and restrictions are unwarranted. In the US Pacific Northwest, it appears that most commercial users have accepted the permitting requirements both on public and private lands, but this may have more to do with the general tendency to comply with the law than with any belief that permitting is an effective method of managing the NTFP resource. Subsistence, traditional, and recreational users also need assurances that any management regime would not restrict their access to public land.

A public access ethic increases the difficulty of introducing any rights based approach to managing commercial access to the forest for NTFPs

Attempting to permit users within tenured lands may be ineffective when adjacent areas remain under open access

Associated with this access ethic are **land adjacency issues** where, in the case of CFAs for example, attempting to permit users within the CFA tenured lands may be ineffective when adjacent areas remain under open access. Those interested in harvesting NTFPs would enter these adjacent unregulated lands rather than purchase a permit. A more strategically located or larger NTFP related tenure component may have in part dealt with this tendency. This raises the issue of the appropriateness of the tenure right provided. Is the legislative right to permit NTFP users within a CFA a legitimate, effective and usable right? If not, it is meaningless or valueless to the rights holder.

Private landowners are also affected by public land adjacency exposing the landbase to intentional and unintentional trespass. Incorporating the heterogeneous characteristics of NTFPs into a flexible regime may be necessary. However, as the preceding discussion suggests, without some homogeneity in commercial user rights dealing with adjacency within specific locales, promoting the production of NTFPs as a secondary or primary product may be problematic. A comprehensive approach across the province or for large regions would magnify enforcement challenges, although what the actual compliance rates would be among commercial harvesters is unknown. Regardless, any broad regional approach would have to reflect a need for management intervention at that scale.

First Nations' interests provides opportunities, but also adds a layer of complexity to the development and implementation of institutions for the management of NTFPs

First Nations' interest in having their rights and title to lands and resources recognized provides opportunities, but also adds a layer of complexity to the development and implementation of institutions for the management of NTFPs. First Nations traditional and continued reliance on many forest resources other than timber suggest their legitimate role as users and managers of local forests. However, the significant level of commercial activity in some areas and the challenge in monitoring the landbase is no different for First Nations as it is for the provincial government: the same property rights and resource issues are present regardless of the landowner. First Nations, however, reside in communities closely tied to and within traditional harvesting areas, thus the opportunities for effective local management are present. How local management would co-exist with or conflict with the current industry and how the existing industry may function under a First Nations led system is uncertain. Developing a tenure system or any other form of access management rights to NTFPs would likely be met with significant resistance from First Nations. However, while this uncertainty over title continues, so too does the commercial harvesting of NTFPs within traditional areas.

Uncertainty increases transaction costs, which inhibit the effective development of institutions and coordination of users. North (1990 p. 6) states the "major role of institutions in a society is to reduce uncertainty by establishing a stable (but not necessarily efficient) structure to human interaction." North (1990) defines institutions as the formal or informal rules and norms of behavior used to guide our interaction with others, but which also change within different cultural contexts. Uncertainties or low levels of pooled or shared information within the NTFP sector are prevalent and include a lack of harvest information, levels of resource use or overuse, values including costs and benefits, employment levels, commercial versus non-commercial values, marketing information, and observable synergies between and among other sectors.

Each of the cases in this study showed a marked lack of information about the level of activity either ongoing or possible. These information gaps appear to have led to the inability to attract third party funding and have relegated NTFPs to a minor or non-existent role within the calculation of the province's wealth creation – based on an 'educated guess' of its lack of worth. Yet in high valued areas companies, individual harvesters and community groups extract sufficient product to maintain businesses and households, the total dollar value of which is measured in the tens of millions. Information is often in the hands of these participants in the NTFP sector. McLain *et al* (1998) attributes a significant level of information and expertise to the NTFP community. Thus, to solve part of the NTFP tenure puzzle there must be an attempt to join those that know with those that can manage. Under certain conditions they may be the same entity.

Each of the cases in this study showed a marked lack of information about the level of activity either ongoing or possible

7.0 Is there a suitable NTFP tenure?

At least four themes emerge from this research that may help to focus a management strategy:

1) there is a risk that the high value of some NTFPs may lead to unsustainable use and warrant intervention, but at what cost;

2) establishing well defined property rights within a timber oriented tenure may not be a sufficient or effective solution;

3) the term NTFPs masks the individual nature of these resources, thereby obscuring management needs and appropriate responses; and

4) a regime of learning and adapting should accompany any management strategy.

The open access situation within which these various resource and user conditions persist underlies the potential for institutional and government failure if over-exploitation and resource or sector collapse results. The provincial government has thus far chosen not to introduce a regulatory or other form of management regime to promote appropriate and sustainable harvesting practices, encourage resource investment, and to ensure an equitable sharing of the flow of benefits. The heterogeneity and common pool nature of the resource suggests that a single management regime for all NTFPs across the province would be inappropriate, if the objectives of the regime are to 1) solve market and other institutional failures, 2) create positive incentives, 3) avoid unnecessary regulatory burden, 4) minimize management costs, and 5) ensure an equitable sharing of benefits.

The open access situation within NTFP resource and user conditions persist underlies the potential for institutional failure if over-exploitation results

Open access related market failures resulting from NTFP commercial and non-commercial users within BC may not be present or significant enough in all areas to warrant province wide intervention. However, the high demand and value for some products and the commodification of products with small profit margins (such as edible wild mushrooms, salal, and boughs) provides opportunities solely based on volume. Subsequently, these species are at risk of over-harvesting under the current open access regime.

Tenure rights to NTFPs must reflect the underlying contextual characteristics that challenge sustainable NTFP management

Tenure rights to NTFPs must reflect the underlying contextual characteristics that challenge sustainable NTFP management, such as costly exclusion, high transaction costs, a lack of information and uncertainty. A regime may need to strategically target the rights, rules and responsibilities associated with property rights toward the specific entity or organization undertaking the harvesting activity, whether on private or public land. This approach to tenure could see overlapping but nested tenures within the timber management framework, thereby exploiting the synergies between the two and enhancing 'forest' values and community development efforts. It is also evident that user organization and coordination fails to contribute to the enhancement of the NTFP sector. The sector fits with the rational profit maximizing perspective with NTFP industry representatives arguing that they face less risk under a *status quo* no-management scenario versus introducing forms of management with uncertain objectives and outcomes. This more individualist perspective is consistent with common pool resources (see Ostrom, Gardner and Walker, 1994). The industry sector, as much as the government regulator, needs to determine whether the benefits will exceed the costs of a more managed resource.

Species specific property rights may be more appropriate for NTFPs under harvest pressure than for new areas where the NTFP inventory is unclear and market opportunities uncertain

The discussion of heterogeneity suggests that focusing on the concept of 'NTFP' tenure may be a problematic starting point. In addition to the variation in product and geographic characteristics, the "NTFP sector" is rather loose. Some companies participate in one sub-sector such as edible wild mushrooms or salal, and others deal in three or four, such as mushrooms, salal, boughs, and other florals. Species and area specific management approaches based on a strategy of intervention and co-management when various conditions arise (such as congestion of resource use within an open access environment and high or increasing values) may provide a more responsive and appropriate governance model. Species specific property rights may be more appropriate for NTFPs under harvest pressure than for new areas where the NTFP inventory is unclear and market opportunities uncertain, such as with the CFAs.

Joint production of NTFPs may best be served by continuing to allow entrepreneurs to find and exploit new products outside of any formal restrictive tenure

However, does providing a tenure right to salal or edible wild mushroom picking areas, for example, address the core "forest" value and management issue that the varied commercial and traditional interests in NTFPs raises? A patchwork of tenures across the landscape for individual products continues the fragmentation of forest values and moves away from a policy that would recognize the joint production of forest resources. From a commercial context, joint production of NTFPs may best be served by continuing to allow entrepreneurs to find and exploit new products outside of any formal restrictive tenure. These apparently contradictory perspectives flow from the heterogeneous contextual nature of NTFPs and suggest that government intervention is not the only policy choice.

One strategy to reduce the uncertainty of managing NTFPs is to introduce a number of trial management approaches, or pilots in selected areas (See Tedder, Mitchell, and Hillyer, 2002, for a more in-depth rationale and proposal). Additional design work on the concept of a pilot program was developed, but not considered for implementation in BC. Government's role in the suitable NTFP tenure would consist of the need to:

- support and maintain the underlying rights, rules and responsibilities of NTFP management,
- increase the flow of information through more robust data collection methods, and
- reduce other transaction costs such as those associated with the cooperation among user groups, and enforcement of any chosen management objectives.

One strategy to reduce the uncertainty of managing NTFPs is to introduce a number of trial management approaches

Currently, the presence, use and abuse of various NTFPs do not motivate government to action. Nor does the conflict created by the commercial use of NTFPs vis-à-vis other uses and users. Is there a significant loss of resource rents? Is there a sustainability issue, such that resource collapse may occur? The current use of NTFPs does not appear problematic or have the salience within the political system to elicit some form of management response – but this perspective may be a function of the limited information available to government regulators.

The current use of NTFPs does not appear problematic or have the salience within the political system to elicit some form of management response

One management proposal for NTFPs would involve a restructuring of forest management through a separation of the timber harvesting function – the actual process of felling, processing and marketing of timber – from the post-harvest silviculture reforestation and stand tending function. These two functions would not be geared towards a single value extraction (timber), then a re-establishment (silviculture) component. It would have two value functions in which timber retains its value, but the longer-term silviculture component and establishment of a subsequent rotation of timber is combined with a shorter-term value enhancement of various non-timber and timber stand tending uses. A silviculture company, local community corporation or existing company could assume the function of replanting and tending the timber, for which it would receive fair remuneration, in addition to being able to use the variety of products throughout the stages of forest growth and regeneration for commercial and/or non-commercial purposes.

One management proposal for NTFPs would involve a restructuring of forest management by separating the timber harvesting function from the post-harvest reforestation and stand tending function

This form of management would first address the access issue, clarifying who has the right to establish access, withdrawal and alienation privileges. It would allow for multiple benefits and avoid focusing on one resource at the expense of or without recognizing the benefits of joint management. Ideally, the timber and silviculture functions would be undertaken by different companies to avoid existing issues at different stages in the forest's cycle. The two tenures may differ in several other ways, such as the spatial extent of the tenures. The point is that the two are corporately separate, each focusing on value generation from a particular stage of the forest. Systems based on reciprocity and co-management may

function well in this joint-management environment (see Trosper, 1998). This magnitude of change would function best under a pilot format with an underlying adaptive management framework to ensure the appropriate monitoring, testing and evaluation of outcomes.

8.0 Conclusion

Sustainable forest management refers to the ability of citizens, land owners, land use managers, and users of the forest to achieve a balance between the generation of wealth from the forest in a variety of ways and the maintenance of that forest for present and future users, be they human or otherwise. This lofty objective requires the establishment of certain rights, rules and responsibilities, or institutions to direct the manner in which we relate to each other and the broader forest resource. For NTFPs, the numerous species, variety of commercial, subsistence and traditional users, and wide ranging values associated with these resources creates a complex and challenging management environment. In BC, most NTFPs persist under an open access environment where there are no property rights established by government or the land owner to ensure the appropriate use and respect for the broad range of forest values.

This report attempts to provide some initial insight into the role that property rights theoretically should, actually do, and hopefully could play in the sustainable management of NTFPs. The report found that regardless of the exclusivity or comprehensiveness of the property rights (i.e., the privateness of the rights), single non-timber species let alone NTFPs as a group were generally not incorporated into forest management. However, while the landowner or tenure holder tended to show little direct interest in NTFPs, or was challenged by their developmental costs and planning requirements, a thriving NTFP industry worked around, within, and underneath them. This approach has left much of the NTFP sector operating within an open access environment where the threat of free riders creates little incentive to invest and harvest at sustainable levels.

Single non-timber species let alone NTFPs as a group were generally not incorporated into forest management

Results of these case studies reveal consistencies with open access and common pool theory, but also suggest that there are more specific reasons or contextual characteristics explaining the lack of interest and perceived inability to manage and encourage investment in NTFPs. These characteristics include heterogeneity, a prescriptive versus entrepreneurial focus, a consistent targeting of user rights, land adjacency influences, a public access ethic, and a variety of influences related to uncertainty.

These case studies reveal consistencies with open access and common pool theory, but also suggest that there are contextual characteristics explaining the lack of interest and perceived inability to manage and encourage investment in NTFPs

If the objective is to overcome the NTFP management conundrum land owners must incorporate a response to these issues, in addition to the common pool nature of NTFPs, and the need for flexibility across the product and geographic landscape. Given the uncertainty associated with the ways in which various property rights approaches may best adapt to these issues, a pilot format could provide a learning tool to move towards an overlapping but nested property rights

format. In addition, the research indicates that targeting the property rights to the NTFP resource, not incorporating them within more comprehensive forest tenures may provide better support and incentives for NTFP users. Thus, current forms of timber tenures appear inappropriate for the development, management or protection of the NTFP resource. Government will need to take the initiative to improve information, reduce uncertainty and to create a homogeneous environment to support this regime. Non-timber users will also have to take an increasingly more responsible role in the management and promotion of the industry.

Research indicates that targeting property rights to the NTFP resource, not incorporating them within more comprehensive forest tenures may provide better support and incentives for NTFP users

The proposed silviculture tenure may provide the appropriate incentives to pursue a more broadly based value-focused inter-rotation use of the forest. Testing this proposal through a pilot format based on an adaptive management framework is the best method to proceed with this type of institutional change to the management of BC's forests. However, this form of tenure may only be effective in areas not currently under intense harvest pressure. For example, activity in high use salal areas on Vancouver Island may prove too difficult and costly to enforce this type of tenure. First Nations in various interior locations, however, may benefit greatly from such a format. As with the heterogeneous NTFP characteristics highlighted in this report, responses must also vary and be adaptable to specific geographic, species, and user-community needs.

There are numerous research needs within the NTFP subject area. Research areas relevant to the study of property rights include:

- Further exploration into the volume and values, costs and benefits, and resource rents of harvesting NTFPs;
- Determination of the existence of informal common property rights, rules and responsibilities that may already exist within the harvester community, especially those among First Nations communities, and local harvester groups;
- Acquiring a better understanding of the threats to the resource via over-harvesting or the use of inappropriate harvesting techniques. It is important in any research effort to revisit the problem statement. Why are we interested in NTFP management and where will it get us, the industry, and various other users of the forest?
- Determination of the role of government in the management of NTFPs. What can government legitimately and practically expect to achieve, and how should they go about achieving that outcome?
- Learn more about other NTFP management regimes, such as the Nisga'a lands and in other jurisdictions across North America and Europe;
- Establish a NTFP management pilot project based on adaptive management principles to test and develop characteristics that could become part of a future management regime;
- Establish a silviculture regime to test and promote the joint management of forest resources.

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