

# The Role of the State in Managing Common Pool Resources: the Search for Solutions to Manage Non-Timber Forest Products in British Columbia, Canada

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## Abstract

Institutional and property rights literature on common pool resources (CPRs) describes various conditions under which successful property regimes may evolve. But what happens when this natural evolution does not occur, property regimes dissolve, or competing and detrimental uses have well defined rights that take precedence? The backdrop for this presentation is British Columbia, Canada, where the commercial harvest of non-timber forest products occurs at potentially destructive rates on *de facto* open access or under-managed public land, amidst a well defined timber tenure system. Appropriators are disorganized and the provincial government struggles to understand if a problem exists, and to identify appropriate policy responses. The research upon which this paper is based seeks to understand why a state should intervene in a CPR market, when a state should intervene, and how a state may intervene and begin to structure the way in which it approaches the management problem? Thus, what is the state's role in managing CPRs? The paper develops an intervention model to assess CPRs under stress and to determine whether or not some form of intervention is necessary. By identifying sources of institutional failure and contextual factors that contribute to the level of potential degradation the model provides a basis to begin to approach the management of a CPR through facilitative, coordinating, or prescriptive approaches. This approach does not start with a particular management paradigm; rather it starts with the CPR social-ecological system and builds the management regime up from the level of the resource and user-community. The commercial harvest of salal in British Columbia is used as a test case. The model indicates commercial salal is at risk and government intervention is warranted.

**Keywords:** *common pool resources, institutional failure, non-timber forest products, the role of the state.*

The institutional and property rights literature on common pool resources (CPRs) describes various conditions under which successful property regimes may evolve. But what happens when this natural evolution does not occur, property regimes dissolve, or competing and detrimental uses have well defined rights that take precedence? The backdrop for this presentation is British Columbia, Canada, where the commercial harvest of non-timber forest products (NTFPs) occurs at potentially destructive rates on *de facto* open access or under-managed public and private land, amidst a well defined

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timber tenure and forest management system. Appropriators lack coordination and the provincial government struggles to understand if a problem exists, and if so to identify appropriate policy responses. In Acheson's (2006) paper on institutional failure he concludes that while government is a necessary and inevitable participant in natural resource management, its failures suggest there is room for improvement. To meet this challenge he poses two questions for researchers to pursue: "How much government do we need? What kind of government do we need?" (Acheson 2006). This paper, and the dissertation upon which it is based, provides one viewpoint. The research seeks to understand why a state should intervene in a CPR market, when a state should intervene, and how a state may intervene and structure the way in which it approaches the CPR management problem? Thus, what is the state's role in managing a CPR?

To answer why and when a state should intervene, the research uses inputs from a variety of disciplines to develop an evaluative tool to understand a social-ecological CPR system under stress, the sources of that stress, and whether or not some form of state intervention is warranted. The research then pursues the latter question of how to intervene by exploring the literature for clues about the roles states play across locations and CPRs, thereby helping to expand and define the depth of solutions available and guide how to structure an intervention approach. Applying these lessons to NTFPs in British Columbia then serves as a test case. The research bridges academically oriented research with the practical needs of resource managers.

### **Impetus for research**

The impetus for this research comes from observations of and attempts at developing an appropriate policy for the management of NTFPs. The term "non-timber forest products" describes a heterogeneous collection of products found in the forest, other than those used for pulp, lumber or other solid wood products. They are used for a variety of reasons from commercial exploitation, to non-commercial subsistence and traditional uses. Non-timber forest products, and certainly those in British Columbia, are characterized by a highly complex and challenging management context. British Columbia's large landbase (93 million hectares of which 60 million hectares are forested and 25 million are managed for industrial production), its low population per hectare and many remote regions create numerous opportunities to enter and exit areas unobserved. The province's more centralized management of natural resources also elevates the responsibility for monitoring appropriators and the enforcement of rules to a more centralized authority faced with typical capacity challenges such as funding and staffing levels necessary to maintain the appropriate levels of presence. As a result of these management challenges and heterogeneous resource characteristics associated with NTFPs, British Columbia's provincial government has chosen not to introduce a management regime for any non-timber species. Appropriators have found little common ground to successfully introduce informal common property systems to manage access or levels of exploitation, and for some NTFPs extraction levels and incentives are consistent with an open access common pool resource.

There are some minor but notable exceptions to this lack of management, but they occur over small areas and are surrounded by under-managed *de facto* open access

public lands. For example, the provincial *Forest Act* has numerous tenure types and provides one of these, Community Forest Agreement tenures, the non-exclusive right to manage and charge fees for NTFPs on public tenured land. However, these tenures do not necessarily include the right to manage NTFPs nor does the *Act* provide the right to limit access (see B.C. Provincial *Forest Act*, Div.7.1 Sect. 43.3(c))<sup>2</sup>. The value of this NTFP component in this community tenure is questionable. There are no other public land examples, but on Nisga'a treaty lands the Nisga'a Lisims government manages the habitat and harvest of pine mushrooms (see [www.nisgaalisims.ca](http://www.nisgaalisims.ca)). Some large private industrial forest landowners attempt to control access to some of their lands by providing for exclusive access contracts, but much of the private land base is deemed too difficult to control. Private landowners appear to be uninterested in monitoring and evaluating the value of the NTFPs coming off their land base, regardless of its revenue potential. Contrary to expectations, however, appropriators will invest in the resource on open access public lands if they feel confident that no one will find "their" patch (Tedder 2008). For example, edible wild mushroom or salal harvesters will tend a "secret" patch, leaving sufficient volume behind to ensure next year's harvest or next week's. First Nations also have a long history of managing forest resources for their personal, ceremonial and commercial needs (Turner 2001).

The result of this inconsistent approach to managing NTFPs is that some species are predictably being over-harvested and degraded (e.g., commercial quality salal, conifer boughs, mosses), there is conflict among commercial users and between commercial and non-commercial users (wild berries), and little investment in the resource occurs. Is the provincial government avoiding a serious problem with potentially tragic consequences by choosing not to intervene in the use of NTFPs on public land? Not all NTFPs pose a problem. Some NTFPs in some areas attract little attention and local harvesters do little damage to the resource. In other areas where significant pressure is placed on one or two NTFP species damage can occur. However, timber harvesting is the dominant activity, planning does not consider NTFP values, and industrial activity can denude the landbase of harvestable product for at least two decades. In addition, because of its low profile and unorganized participants the issue of NTFPs lacks political salience and does not appear high on government's agenda, and when it has entered into decision making and policy development, implementation has invariably failed (Tedder draft manuscript). The provincial government has yet to consider incorporating NTFPs into management requirements that would lead to more compatible management between timber and non-timber species. Overcoming the challenge of restricting access also confounds management efforts for most NTFPs. Finally, First Nations are currently participating with the provincial and federal governments in treaty talks that may see and rights and title to resources, including NTFPs, pass to First Nations governments. As a result, First Nations need to be full participants in any discussion regarding management options such as tenure rights to NTFPs. It is clear that the current institutional format is not meeting the needs of NTFPs or the people who depend on them.

### **Defining institutional failure and common pool resources**

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<sup>2</sup> See <http://www.for.gov.bc.ca/tasb/legsregs/comptoc.htm>

Institutions in this paper are defined 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 (Dietz, Dolsak et al. 2002). These individual “sets of ordered relationships” are embedded within multiple levels and are a source of emergence (Schmid 2004, p.6). This emergent nature suggests a dependent relationship among levels, but also a measure of unpredictability in crafting or designing institutions. Institutions provide a coordinating function among users within a social-ecological system and establish the rules and obligations that underlie those relationships; yet institutions often fail to provide the socially optimal outcome expected or desired. Coordinating mechanisms in resource management are broadly described as markets through competition and private property or the private sector, government policy through state property or the state sector, collective action through local-level management or the community sector (Rasmussen and Meinzen-Dick 1995; Wang and Van Kooten 2001; Acheson 2006). Thus, being sources of coordination, they can also be sources of failure leading to resource degradation (Acheson, 2006). Successful institutions then would be those that coordinate users in an effective and efficient manner leading to the sustainable use and investment in a resource or resources, or perhaps more encompassing a social-ecological system.

The focus of this paper is on common pool resources in an open access or under-managed situation. Common pool resources are defined by two core characteristics: costly exclusion and a subtractable flow (Ostrom 1990; Ostrom, Gardner et al. 1994). Complicating efforts to manage CPRs are a variety of other characteristics that reflect the collective action dependence of solutions, including resource and user heterogeneity, group size, storage and mobility issues, and uncertainty associated with the human response to rules and collective action (Libecap 1994; Schlager, Blomquist et al. 1994; Schlager and Blomquist 1998; Poteete and Ostrom 2004). The result can be a variety of appropriation and provision problems (Ostrom, Gardner et al. 1994) that preclude the efficient allocation of resources, undermine investment and create incentives to over-exploit a resource, potentially leading to Hardin’s (1968) classic “Tragedy of the Commons” outcome. Here lies the institutional quest at the heart of CPR research, theory, and practice and the efforts to define ways in which more certainty can be introduced to successful institutional design.

The variety of privatization methods, state management and common property regimes are broad concepts that present a myriad of choices to government. But is state intervention even needed? What information exists to suggest that the exploitation of a resource will lead to degradation and a “tragedy of the commons” outcome? What other contextual factors may preclude or hasten that outcome? A common characteristic of unregulated CPRs is a lack of information in the hands of government, such that ill-informed and inappropriate decisions may result. How then can a government interpret the need for and structure of intervention, thereby avoiding inappropriate responses? The open access intervention model outlined in Figure 1 is intended to provide that starting point and basis for a rationale to intervene, or not intervene in the particular market. The following discussion identifies a number of variables that comprise the intervention model.

The anthropological, institutional and economics literature devoted to CPRs is well known and describes institutional failure in a variety of ways, with each description generally leading to the same conclusion: without some form of effective coordination among users, by whatever formal or informal means, CPRs can be subject to over-exploitation and potential degradation (Gordon 1954; Townsend and Wilson 1987; Ostrom, Gardner et al. 1994; Baland and Platteau 1996; Swanson 1996; McKean 2000; Acheson 2006). For economists, market failures generate externalities as a result of, for example, poorly defined property rights, imperfect or incomplete markets, imperfect information and a lack of competition. Gordon (1954) describes the result of an open access fishery (a lack of property rights) in which the incentive for fishers is to increase effort to catch additional fish beyond economically efficient and stock replenishment levels. Per unit costs increase for all users until rents are fully dissipated, the resource stock is degraded and potentially exhausted. Investing in the resource through enhancement or reduced effort is discouraged as the lack of effective property rights allows free riders to reap the benefits of these investments while paying none of the costs. However, when a resource's value and extraction levels are increasing, there is a point at which the benefits of more coordinated actions exceed the costs of their development thus leading to the evolution of property rights (Pearse 1993). However, some scholars reject this natural, spontaneous emergence of economically efficient institutions (North 1990, as cited in Evans 2004). Precluding this seemingly natural and evident need for greater coordination through property rights are transaction costs, the costs associated with information, coordination, monitoring and enforcement, which can be significant under conditions of ill-defined property rights, and can overwhelm any necessary bargaining or collaboration among resource users (Bromley 1991).

Ostrom, Gardner and Walker (1994) describe the potential failures associated with common pool resources in terms of appropriation and provision problems. Appropriation problems comprise appropriation externalities, technological externalities, and assignment problems. Depending on the type of resource, its location and abundance, methods of extraction, and coordination among appropriators, individual incentives can lead to over-use, resource degradation and ultimately its destruction. Provision problems focus on the incentives of appropriators or resource stewards to invest in the resource either through changes to extraction levels or methods, thus lowering their potential short-term gains from the resource in support of the longer-term supply, or through providing for the maintenance and enhancement of the resource. Attempts to overcome these CPR problems confronts the collective action nature of CPRs: a first order collective action dilemma to change use patterns among the group; a second order dilemma involving the need for the group to come together and act collectively to develop a solution to the first order dilemma; and a third order where the group needs to invest in the monitoring and enforcement of the chosen management regime. Thus, solving the problem of externalities is complicated by the presence of these collective action dilemmas for a CPR.

The conventional response to a CPR situation was to introduce private property or a state management regime. The commons literature, however, has introduced

numerous examples of resource user-groups successfully overcoming these appropriation and provision problems. Given a CPR's costly and potentially prohibitive exclusion some degree of collective action is essential for the efficient and sustainable management of a CPR. Ostrom (1999) provides a list of resource and user attributes that support the evolution of self-governing organizations – a lack of these features would suggest that user communities face a greater challenge in collectively dealing with CPR dilemmas. Resource attributes include the following: feasible improvement, reliable indicators, predictability, and a reasonable spatial extent. User attributes include the following: resource salience, shared understanding of resource system, a low discount rate, trust and reciprocity, decision making autonomy, and organizational experience.

Acheson (2006) argues that private property, government and local level management can all lead to institutional failure. Efficiency in use and well-defined property rights are not necessarily linked to conservation or sustainable use and the incentives to over-use and even liquidate a resource may seem more efficient and rational to an individual than managing the resource for a longer-term steadier stream of income. Drawing from a number of sources, Acheson (2006) identifies several characteristics that when missing from local level management can lead to collective failure in resource management: a sense of community, social capital, social homogeneity, dependence on the resource, leadership, and secure boundaries. Interference from a central government is also identified as one of the more pervasive external sources of local-level failure through the elimination of traditional management regimes. Other external influences include demographic changes, technological changes, and the introduction of new markets which alter the traditional emphasis on a resource's use, its demand and the volume extracted. Acheson (2006) notes that policy failure can evolve from a number of sources such as the state's inability or lack of capacity to meet its monitoring and enforcement requirements, a captured bureaucracy, rent seeking, a lack of inter-agency cooperation, a common unwavering reliance on science and engineering, a penchant for regulatory uniformity, corruption, and a lack of respect for local community knowledge.

Resource and community characteristics of resilience and robustness complete the discussion of the model's intervening variables. A resilient ecosystem is one which is able to withstand and absorb perturbations, either having the ability to return to its natural state of equilibrium, or is robust and able to avoid inadvertently "flipping" to some new state (Holling 1973, as cited in Perrings 1998). Social-ecological systems can also be characterized by the concept of resilience. Fragile economies, as with fragile ecosystems, have a high degree of interdependence, uncertainty and a path dependent nature that can "lock-in" economic actors on unpredictable and destructive courses. Perrings (1998) discusses resilience in terms of economy-environmental systems, suggesting that the concept can inform analysis of change. Troster (2003) uses the concept of social-ecological resilience to evaluate the contribution of the potlatch system to maintain community stability and enhance social resilience to survive disturbance, to self-organize and learn in pre-contact societies of the Pacific Northwest.

The characteristics of a resource, its reproductive methods and capacity have a bearing on how well or quickly a resource will return to its pre-harvest state and be able to contribute to the flow of benefits attracting resource appropriators. Randall (1983) uses the concepts of a capacity constraint and congestion to link resilience to the way in which a resource's user-community is organized. Congestion is useful in understanding the point or level of demand at which some form of organization or management may be necessary. A congested resource is "a good which is nonrival for some number of users, while rivalry sets in as that number is increased and becomes intense as the number of users approaches the capacity constraint" (Randall, 1983 p.134). The concept of congestion within the CPR category introduces several indicators and suggests a historical element to understanding the need for intervention. The evolution of management regimes is also more likely for resources with low resilience than those with high resilience and the ability to regenerate quickly (Poteete and Welch 2004). The concept of a capacity constraint suggests a particular threshold in the exploitation of a resource that may lead to an inefficient outcome for society. The indicators of resource demand, rising values and sources of change can compliment resource abundance and flow information, thereby reflecting a trajectory of use leading to congestion and overuse, potentially raising concerns of eco-system stress.

How does a government know when to intervene in an unregulated market for a common pool resource, and how should it design appropriate and efficient policy that can be effectively implemented? Mazmanian and Sabatier (1983) suggest that successful implementation requires the following: clear and consistent objectives; an understanding of the causal linkages between the issue, the policy instrument of choice and objectives; and the support and commitment from both state leadership and constituent groups. Government does have a role in successful resource management, whether that role is benign or active, facilitative or prescriptive. However, government intervention is not necessarily a panacea to resource management and policy choices may also lead to inefficiencies in resource use or result in distributional inequity. Evans (2004) discussion of "institutional monocropping" – "the imposition of blueprints based on idealized versions of Anglo-American institutions," suggests the need to question our assumptions of state led development paradigms.

### **CPR open access assessment model**

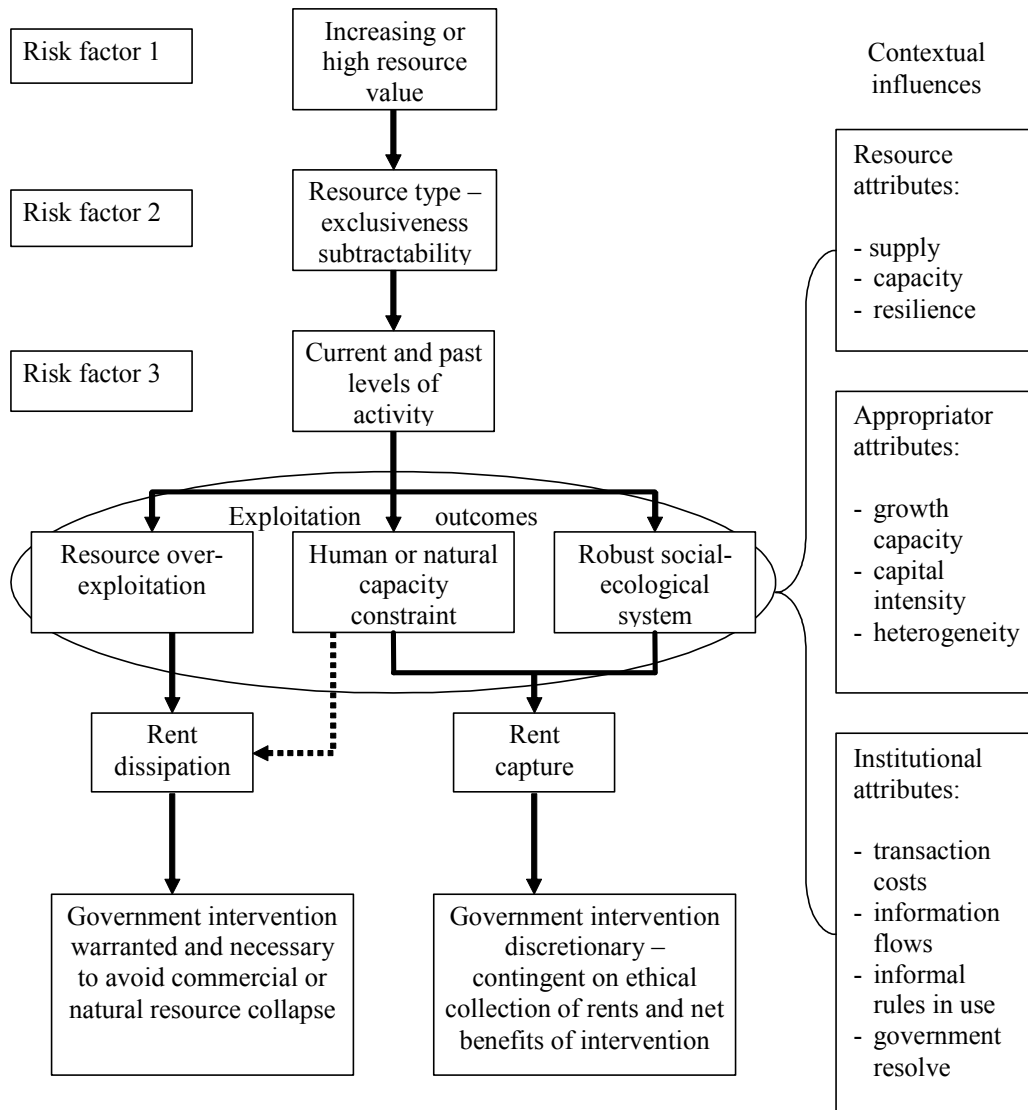
The flow model incorporates various elements of the previous discussion and charts the evolution of the resource and its use from a rise in value through to the potential for full rent dissipation and over-exploitative ruin. This perspective reflects the variety of influences and contextual factors that could be the source of and lead to over-use of a resource and the potential for rent dissipation. Results from the model can also aid in the identification of information gaps, direct research efforts, and expose sources of institutional failure and points of intervention. The model incorporates an initial risk assessment, identifies the exploitation outcome, followed by an intervention outcome. Within each category is a finer level of detail. As is evident from examining the intervention model, its format draws from the work of Ostrom (1990; 2005) and Edwards and Steins (1998). In terms of the IAD framework, the model uses evaluative criteria and applies them to the interactions observed within an open access or under-managed

CPR social-ecological system. It also suggests the embedded nature of these social-ecological systems within and affected by other systems and contextual factors.

The resulting model is based on the assumption that the potential over-exploitation of the resource already exists if certain conditions apply (i.e., open access) – the model seeks to elaborate on those conditions. The model is divided into three analytical sections: the first section evaluates the level of risk associated with the exploitation of the particular resource. It uses three risk factors to indicate a problematic situation: rising or high prices, the resource type, and current level of use. Satisfying these conditions suggests that resource congestion may have been reached and a tragedy of the commons outcome may be possible – further investigation is warranted. The second section evaluates the severity of that risk by examining various resource, appropriator and institutional attributes that indicate a particular exploitation outcome, ranging from a robust resource with little associated threat to the resource or user community, over-exploitation but with natural or human constraints to that use, and finally the tragedy of the commons outcome. Each of these outcomes lead to a particular level of rent dissipation or capture, suggesting a range in the level of government intervention required. How that intervention is designed and what research may be necessary to support that design can be identified through the assessment process. The exact specifications of the model as presented in this paper can obviously be adapted to particular situations. In some cases the indicators will not be relevant and other indicators can be considered. For more discussion of the model's components see Tedder and Gulati (2007).



**Figure 1: Common pool resource open access intervention assessment model.<sup>3</sup>**



<sup>3</sup> Source: Adapted from Tedder and Gulati (2007).

### **Using the open access intervention model**

A CPR intervention assessment involves first assessing the risk associated with the particular resource, followed by additional probing using the contextual factors outlined in the model. Risk factors include resource value, resource type, and current and past levels of activity. The resource value indicator would be satisfied if the value of the resource is either increasing or has reached a high level relative to other opportunities. Other opportunities reflect the opportunity cost of alternative employment choices, consequently the likelihood of increasing current effort or attracting new entrants. However, the opportunity cost as a function of wages may not be the only factor and working conditions may also play a role. For the resource type risk indicator, the level of risk increases with the degree of non-excludability and subtractability. Common pool resources all share these characteristics, but often differ in other ways such that some are more amenable to limiting access than others. Under current and past levels of activity, information about levels of activity situates the high value resource type within a range of potential outcomes. Certain levels of activity may suggest early or late stages in exploitation history of the resource and how acute the need is for intervention, or of the perceived feasibility of improvement, or ability to 'rescue' the resource. High levels of activity may suggest intervention is needed in the short term while low levels may indicate more time is available to investigate various policy options.

Satisfying these three risk categories – high or increasing value, common pool characteristics, and significant levels of current and past activity – will indicate whether or not further investigation is necessary. However, information for the subsequent attribute sections may indicate a more intense, or less intense, level of congestion than first thought and that the risk is higher, or lower, than first envisioned. Thus the model is iterative in that there is no reason not to re-evaluate risk if new information enters the calculus. If the conditions of these indicators are met, the model posits three possible exploitation outcomes.

1. Overexploitation of the resource, use is congested and is at or exceeds its capacity constraint – the Tragedy of the Commons scenario. Under Outcome 1, the result would be the dissipation of all or most resource rent through excess capital and labour effort, potentially leading to temporary or permanent resource ruin, and the loss of income and community wealth.
2. Resource use is nearing congestion, but natural or human capacity constraints limit or discourage entry and expansion, and use rates stabilize. Nonetheless inefficiencies may exist as a result of an inefficient number of companies and labourers vying for a limited volume. Under Outcome 2, some rent dissipation may be occurring, but rent capture is perhaps more likely.
3. Resource use is not congested, the resource is currently plentiful, and the social-ecological system is robust and able to withstand a high level of use and foreseen user expansion. In this scenario, the resource is able to quickly recover if overused and the appropriators have the ability to shift to other economic sectors if necessary,

remain in the community and contribute to its socio-economic health. Under Outcome 3, rent would be captured by the resource user.

The purpose of introducing contextual influences to the analysis is to determine whether or not there are certain attributes of the particular sector and resource that would preclude or contribute to a tragedy of the commons outcome. These characteristics can be grouped into the familiar categories of resource attributes, user attributes and institutional attributes. For example, while the state may not provide any effective *de jure* resource management, harvesters themselves may have created some form of organization through collective action efforts. If this organizational attribute is not satisfied and the state attempts no resource management, this contextual influence would contribute to a conclusion suggesting a higher likelihood of over-exploitation and potential rent dissipation. The attributes in the model may not be relevant for every case and other attributes may be added as needed. The intent of the model is to provide a framework that allows a systematic analysis of the particular situation. Some attributes have overlapping influences and may best be discussed together.

### **Intervention model case study and policy approach**

The commercial harvest of salal in British Columbia provides an interesting example of the use of the intervention model and subsequent structure of intervention. The following will provide an introduction to salal and its use, followed by its interpretation using the intervention model and recommendations for how to structure a more formal approach to managing salal.

#### ***Salal***

Salal (*Gaultheria shallon*) is used in the floral greens market and as a source of berries. This particular species is indigenous to the Pacific Northwest coast and is found along a band from southern Alaska to northern California (Brayshaw 1996). Salal can grow in extremely dense patches, but will not always uniformly cover a particular stand. The growth and fruiting of salal plants also varies by the amount of canopy closure and resulting levels of light (Cocksedge 2003). Salal berries for example, fruit under conditions with more light; however, commercial quality salal thrives under partial shade, either in older growth stands, or second growth stands prior to canopy closure (Fredrickson 2000, as cited in Cocksedge 2003). These characteristics create a compatible and complementary relationship between timber and non-timber harvesting. Other compatibilities include mutually beneficial silviculture activities such as fertilization, pruning (also a benefit to the bough sector) and pre-commercial and commercial thinning (Gagné 2004).

In the commercial floral greens market, salal is used as bouquet filler adding a deep green background accentuating the colour of cut flowers. The salal industry is comprised of a very large and disparate harvesting sub-sector and a small, competitive buyer/distributor sub-sector of about 15 Canadian and U.S. buying firms, with two or three export companies dominating the industry in the U.S. and Canadian Pacific Northwest. The main markets for salal foliage are Europe, the U.S. and Canada, and increasingly Japan. China is considered a potential source of significant demand as

individual wealth increases and Western luxuries become more appealing. Shipments to the European Union have declined over the last two years as a result of sectoral restructuring of European importers; however, the demand is expected to increase as this restructuring is completed. The attractiveness of salal as a commodity species is its durability. Salal both transports well, thus can withstand lengthy container shipping times to Europe and the wholesale-retail marketing process. In 2006, the Royal Roads University, Centre for Non-Timber Resources estimated the floral greens sector to generate an annual wholesale/export value of \$27-65 million (CNTR 2006).

The market for salal has shifted in the last ten years, mainly as a result of the declining availability of quality salal. For example, salal was originally harvested as 'longs' (26-30 inches); however, because of over-harvesting in Washington State companies there began to offer 'tips' (18-24 inches) and bouquet tips (8-10 inches) (Cocksedge, 2003). Europe almost exclusively imports tips and Japan is more interested in bouquet tips, while the North American market still purchases longs. This shift was not led by a change in consumer taste; rather, it reflects a reduction in the available supply of salal and the need to harvest new growth at a much earlier stage. It also reflects the market power of the larger salal companies in Washington State as they reacted to this supply shortage by successfully promoting alternative products.

The value between these different products also varies, with longs valued the highest, followed by tips and bouquet tips (Cocksedge, 2003). Harvester incomes are likely reduced by over-harvesting through lower piece-rates, while harvesting effort changes little or increases subsequently increasing per unit costs of production. Salal harvesters are a heterogeneous group, some relying on salal for most or all of their income, and others only for part of their income, for example when logging operations are shut down during the winter months. Wills and Lipsey (1999), estimated the number of salal harvesters in British Columbia at about 13,000. The harvest season lasts about 10 months, stopping only when the new growth is forming in May-June. Harvesters collect and sell salal in piece units. A less productive picker can harvest about 40 to 50 bunches per day, depending on the time of year and location, and a good harvester can bring in 70 to 100 bunches per day, again depending on the site and growing conditions. Daily wages can range from below \$50 per day to well over \$100 per day.

The salal sector also provides employment for immigrants who have difficulty entering the mainstream labour market (Hansis 1998; Lynch and McLain 2003). As a result, the picking sector in B.C. is characterized by Cambodian, Vietnamese, Indian, and other ethnic groups. In the Pacific Northwest, the salal industry is dominated by Mexican and Central American labourers. Non-immigrants also participate in the salal industry, often attracted to its unregulated and outdoor nature, and as a source of supplemental income. Salal company spokespersons indicate that there is a pending labour shortage as the current workforce ages and their children opt for other more mainstream employment opportunities. Companies must find new sources of employment and have considered employing a temporary non-resident labour force.

The potential for over-harvesting salal does exist as illustrated by the supply reductions in Washington State and also based on evidence from Vancouver Island, where most of the harvesting of salal occurs in B.C. Cocksedge (2003) found that habitat destruction through urban growth, clear-cut logging, and commercial harvesting of salal was affecting the availability of commercial quality salal on Vancouver Island. Industry participants often cite parts of southern Vancouver Island and the Nanaimo area as severely over-harvested (Cocksedge, 2003; Industry interviews, February, 2007). The intense pressure on the resource and lack of control over who enters the forest led two private forest land owners, Western Forest Products Ltd. and TimberWest Forest Corp., to issue exclusive brush harvesting contracts for access to certain portions of their private lands. Unregulated harvesting continues on provincial public land and most other private forest land, accounting for the largest share of the landbase in B.C. and on Vancouver Island where salal is predominantly harvested.

### ***Intervention model assessment of salal***

The assessment indicates a rather typical open access history and outcome for a common pool resource. Increasing resource value leads to exploitation, but there is little collective incentive to invest in the resource by harvesting less or using more intensive stand management techniques that would enhance the volume of commercial quality salal. Resource and appropriator attributes suggest that while salal is resilient, over-harvesting does occur and has affected the supply of commercial quality salal. Individually, there are examples of harvesters tending the resource with a longer term perspective; however, there is a collective failure to ensure that the benefits of this tending are fully realized and that more collective efforts are encouraged. There is little or no coordination between the timber and salal sectors. Salal may always return to the landscape, but if low quality shifts the market to a substitute the commercial salal market may not return, pushing values, and rent, to zero. Some areas are experiencing highly problematic use rates, indicating congestion has been reached. While the breadth of this overuse is not well understood, industry sources report the expansion into areas once thought too far and costly to access, suggesting that cheaper high quality sources located on Vancouver Island are becoming more difficult to locate and costs of production are increasing.

Tempering this high rate of harvesting and expansion are potential limitations to the labour supply, but that too may be overcome through the use of foreign workers. Renewed European demand and the expanding Chinese market may result in a significant increase in demand, pushing prices higher and attracting additional labour. Dealing with these issues requires collective action amongst the commercial salal community and efforts from the provincial government. However, limiting the evolution of a *de jure* or *de facto* management regime is the lack of trust within the appropriator community, which significantly inhibits the ability to engage in collective action. This collective action failure may be the most significant element contributing to the over-exploitation of the resource, as it precludes a limiting factor of local norms and customs. The lack of a collaborative ethic also significantly increases the transaction costs facing government in any attempt to introduce a management regime either unilaterally or through user participation and knowledge.

The exploitation outcome currently falls in the middle: resource exploitation with “human or natural capacity constraint,” although there are indications that the sector is tending towards higher rent dissipation in some areas. Given the range of use rates and harvest intensity, denuded areas and the pursuit of salal in more remote areas it is likely that some rent dissipation is occurring; however, rent capture likely predominates. The potential for an expansion in future demand and lack of collective action indicates that the exploitation outcome may be tending towards greater rent dissipation, pushing the outcome closer to the “tragedy” outcome, at least in terms of commercial quality salal.

### ***Model recommendation***

The analysis suggests that government intervention is warranted. However, intervention is not a necessary condition to preserve salal or the broader ecosystem, but to maintain and/or enhance the commercial salal sector and to better coordinate the salal and timber industry. Efficient and effective intervention is also not necessarily associated with the expansion of existing timber tenures to incorporate salal or other NTFPs. Tedder (2008) evaluates the role of a variety of property rights in the provision of NTFPs in British Columbia. In the case of salal, regardless of its value, the product was for the most part left within open access, even on private land. While in two areas of private land studied, there was an effort by the landowners to control access in more intensely harvested areas, or at least charge for access to the land, there was no effort to incorporate salal into a ‘forest’ management regime.

Four characteristics appear most salient to the analysis: the issue of exclusivity; the need for better more consistent market and resource productivity information; high collaboration and information costs; and the challenge to collective action among appropriators. Any government attempt to introduce a management regime should recognize the challenges associated with these attributes and focus attention on methods to incorporate them within any management regime. In addition, in the B.C. context regardless of the level of participation within the salal commercial sector, First Nations would need to be engaged in early stage of policy development.

If the goal of government is to support economic development and rural livelihoods, to engage with sectors generating revenues in the tens of millions of dollars and assist those that are or may experience difficulties (at the least those threatened by collapse) then based on this analysis the salal industry is a candidate for government intervention. However, the salal industry needs to accept a role and engage with government to evaluate methods of intervention, examine the costs and information needs, and how to ensure a high quality, potentially branded and certified product. An appropriate, effective and equitable intervention must be supported by industry collective action.

### **The structure of government intervention**

If the model identifies that a problem exists, now what? Government has two initial choices: to intervene or not to intervene. Having a politically palatable policy option available can influence policy change; however, no particular method guarantees

institutional success, as such caution and forethought is critical to avoid further failure. Swanson (1996, p. 15) defines government or policy failure as “the failure of a government to supply an effective institution in response to the emergence of a need for one.” Yet institutional failure is not restricted to government action; government inaction can also lead to inefficiencies. Policy failure could persist through a reliance on status quo policies, which could become more formalized or entrenched in a bureaucracy’s operational policy framework resulting in less opportunity to develop and implement an appropriate alternative response when needed. Systematic, path dependent resistance to alter the *status quo*, or negative decisions in which policies are explicitly rejected (Howlett and Ramesh 2003) reflect instances of institutional failure *when* this inaction leads or contributes to socially negative outcomes. Some type of formal and/or informal policy change that links with and addresses the core characteristics of the resource and user community is necessary to avoid coordination failure (McKean 2000).

Acheson (2006, p. 129) argues that resource “management will be effective only if resources are matched with government structures and management techniques. A governance structure using a certain technique on one resource might succeed, whereas the same governance organization using the same technique might fail miserably when applied to another resource.” Grafton (Grafton 2000, p. 515) concludes that if a state acts as a “facilitator or coordinator” in resource management it “should recognize its limits ... manage within its capabilities ...” and provide a regime that matches “individual incentives with collective interests.” Resource management policy endeavours to assign an institutional regime defining the rights, duties and obligations associated with resource use, but there is no one property system that necessarily provides assured, successful coordination among users (Stevenson 1991; Baland and Platteau 1996; Grafton, Squires et al. 2000). As such, Acheson (2006, p. 129) concludes that institutional design will have to “combine various elements of privatization, government control, local control and managerial techniques...”

The literature identifies a variety of coordinating methods from assigning or redefining property rights (private or state property), to reconfiguring the locus of decision making (decentralization, centralization, co-management), and a more nested polycentric approach (multiple level, interactive but independent organizations). But what do these terms mean in relation to the specific direction of policy and focus of state intervention? What role does the state need to take to ensure the efficient and sustainable use of an under-managed CPR? By clarifying and defining institutional complexity, Ostrom (2005) provides a means to transcend institutional design and evaluation from a focus on property rights or styles of governance, to a specific classification system of rules that describe the way in which a resource social-ecological system is coordinated. Understanding how these rules influence resource use is critical to understanding the way in which the state can intervene in a CPR market identified in the intervention model as at risk. Thus there are three pieces to state intervention: an understanding of the problem as identified by the intervention model, identification of the level of intervention required, and a configuration and definition of institutional rules for CPR management to achieve efficiency and sustainability objectives. This perspective may be overly optimistic, however, as the state’s development objectives may be antithetical

to those of current users and it may desire to change incentives and income creation through a redistribution of property rights. Thus, the evolution of policy is driven not only by the specific characteristics and failures within the resource or social-ecological system, but also by the objectives of the state.

The type and intensity of intervention may vary geographically and by resource type reflecting an adaptable model of resource management that is contextually grounded and supported within the broader social-ecological system. The resulting governance form (decentralized, centralized, polycentric) is thus not an *a priori* policy choice, but is reflected in what the regime becomes as influenced by the sources of institutional failure, social-ecological characteristics, and state objectives. The intervention model assesses a CPR social-ecological system from the case under study to the type and source of failure. Responses to CPR dilemmas can then proceed in reverse, from the underlying reasons for failure or lack of management (outcome of the intervention model) to the resource characteristics and type, rule configurations, and finally to the level of intervention. From a higher policy collective-choice level, the role of the state may be characterized by one particular descriptor; however, at the operational level these categories are not mutually exclusive and can be mixed in various ways to match various elements of the CPR social-ecological system. This operational variety is what is of interest in this research and most appropriate for CPRs. How these roles are configured can be characterized using Ostrom's (2005) seven-rule classification system. A state's approach to CPR management based on this perspective can be characterized along the following continuum: absent, facilitative, coordinating, and prescriptive. Moving from absent through to prescriptive has the state taking a more interested and involved role in the resource and its use.

**Absent** describes a situation where the state does not participate in the rule category either during its development or operationalization. There may be no rules defined in this case by either the state itself or in collaboration with a local user-group, or the user group may have developed and operationalized its own rules or guides resource use based on norms and strategies. The state may be unaware of the level of user management present. Absent policy does not necessarily indicate complete state ignorance of a problem. A non-decision or negative decision may have led to the state's absence in resource management.

In a **facilitative** role the state attempts to aid the user community to more effectively allocate and use resources themselves through the development of user-generated rules. The state may have attempted to provide a secure set of property rights to a resource or land, or information and other support to assist in encouraging the development of a user-organized management regime or the reformation of an existing system and set of user generated rules. Rules become more dominant over reliance on norms and strategies among the user-community.

A **coordinating** role indicates that the state takes a stronger leadership or partnering role in the development and maintenance of a management regime. Rather than supporting user groups in rule making and maintenance, the state participates in rule



making, coordinates the development, implementation, maintenance and enforcement of a set of rules to coordinate resource use. Users are required to follow the rules, in contrast to the facilitative role which establishes a foundation and perhaps incentives for user-based regime development, but does not necessitate its use. Property rights are specified, although common pool challenges to restricting access remain and collective action among the user community remains critical.

A **prescriptive** approach to managing a common pool resource describes a situation where the state is the dominant participant in defining rules that broadly influence the way in which users are provided access, how they participate in resource extraction, the methods used, when and where. The state takes a significant role in information gathering and analysis that is used in the setting of various obligations, requirements, appropriation limits and in the monitoring of infractions. The prescriptive approach tends toward a top down method of rule configuration and implementation.

An example of a combined approach would be a prescriptive-coordinating approach suggesting that the user community may have property rights and develop rules, but within potentially very narrow bounds, or the state specifies particular rule categories, but leaves others to the design of the user-community.

In many cases, institutional change occurs incrementally; this stepped or gradual, adaptive method of policy change can be based on the state typology, for example as one moves from a lack of policy, to more facilitative then coordinating roles. There is no need to proceed any further than warranted. This format provides a framework to approach intervention in a CPR market in terms of understanding whether or not there is an issue, dealing with the source of the CPR dilemma in question and resolving the threats to the well-being of both the local user and broader society. The development of an approach for any CPR should be based on principles of adaptive management.

### **Structuring intervention in the case of salal**

The assessment model indicates that the uncoordinated salal sector combined with the *de facto* open access to public and most private land is the basis for a lack of trust among appropriators and significant uncertainty related to any benefits that may result from government intervention. The grey market nature of the business, its cash based payments and potential for tax evasion also reduces harvester's incentives to cooperate. Salal buyers/distributors are resistant to intervention preferring to operate under the *status quo* laissez-faire approach, versus an unknown government led management system. Some companies in the salal sector however are seeing the negative implications of current conditions. Over-harvesting, higher costs and lower quality salal is affecting operations. As a result of these characteristics and complexities, the transaction costs associated with information, coordination are significant. The net benefits from any regime are also uncertain for both the sector and individual harvesters.

Government is unwilling to intervene for a number of reasons, including its ability to establish effective access restrictions, a lack of recognition of a problem, a lack of

sufficient resources, other more salient timber related issues, and First Nations rights and title issues. The immediate intervention then must fit within these restrictions. In addition, the need for collective action among the salal harvesting and distribution sub-sectors suggests that much groundwork is necessary before a fully integrated salal/timber regime is possible – if indeed an integrated system is necessary. There is evidence however that compatible management can produce benefits for both timber and non-timber species.

Government needs to approach this resource problem using both a facilitative and coordination approach. It needs to facilitate the incentives of individuals and companies through examples of how coordination can increase the net benefits to the sector. This can be partially accomplished through pilot projects. Information is key in supporting this shift in incentives and government plays a significant role in addressing the lack of information. However, information alone is not a sufficient condition of success. Salal harvesters and companies must begin to cooperate through associations or some other mechanism in order to increase their voice in policy decision making. Creating associations may require government to mandate the need for user-groups to organize by region or company affiliation, for example. These two interventions may then begin to deal with the issue of trust, lower transaction costs for the sector through government involvement, and may provide more input to the forest management system through a recognition of the sector's legitimacy. Creating exclusive harvest access for harvesters will continue to be difficult, thus the secretive 'salal patch' method will likely continue, thus should be incorporated or respected within any regime design. Government needs to provide commitment and leadership to ensure the longevity of any system or open access will naturally prevail, given the current salal industry structure.

This approach does not initiate a substantive change to the sector, but recognizes that a gradual coordination of the sector is possible, given the outcome of the intervention model which suggests that there is some leeway in the intensity of intervention required. Tasks can be decentralized, in fact need to be shifted to more regional entity such as an association in order to 1) build capacity among user groups, and 2) avoid the need for costly access restrictions by government, and 3) to provide a level of authority and self-determination to user-groups. Examples of this type of intervention include the geoduck fishery management system in British Columbia (Mitchell 1997). While challenges to this type of management environment abound (Kearney, Berkes et al. 2007) and do not evolve over night (McCay and Jentoft 1996), salal, similar to the geoduck, is not mobile and its governance does not extend to the national or international levels. Undoubtedly there will be resistance from within the salal sector, thus benefits must quickly become clear. Benefit sharing, access to forest management policy development and decision making are details requiring significant discussion and development among stakeholders. The role of First Nations needs recognition at each stage and in some areas may be the coordinating basis among the user groups.

This is a multi-layered approach that recognizes the knowledge and expertise of the salal sector and recognizes that government lacks the resources to introduce a prescriptive management approach. Yet it also recognizes the lack of capacity of the

sector to organize itself, and the lack of voice and means to influence forest management. Such a system may evolve to be consistent with decentralization through a polycentric approach focussing on the 'subsidiarity' of responsibilities at appropriate levels (Marshall 2008). The method attempts to link the user with the appropriate stepped level of governance in the cross-scale organizational format envisioned by Berkes (2002). It supports the salal industry rather than rejecting its expertise and passing off that responsibility to the timber industry through an expansion of the comprehensiveness of timber tenure rights.

### **Future considerations, summary and conclusion**

The purpose of this paper is to consider three questions regarding the role of the state in managing common pool resources: why should the state manage, when should the state manage, and how does the state approach the management of a common pool resource? This paper provides the preliminary considerations of work leading to the author's Ph.D. dissertation.

There is an inherent risk within state bureaucracies to approach natural resource management and policy development from a more positivist perspective, relying on the 'superiority' of policy development based on rational choice models, fully informed and well intentioned decision makers, and existing approaches and paradigms, thereby leading to a perception of predictable and measurable outcomes. Applying policy that is relevant and applicable to the CPR situation versus expanding or adapting existing forms of management is more risky and may have higher up-front costs. Subsequently, there may be a greater likelihood of approaching resource management and development from a "path dependent" perspective where increasing returns associated with historical and current choices lock policy development on a linear path (Pierson 2000). For common pool resources that suffer from a lack of policy direction by the state or coordination by the user-community and remain within an environment of open access, some form of state supported collaboration among users and resource managers is necessary to overcome emerging CPR dilemmas. The approach presented here seeks to locate the source of institutional failure, information needs and different roles of the participants.

The paper provides policy analysts with a model to evaluate institutional (market, policy and collective action) failure in the exploitation of a common pool resource within an unregulated open access environment, and the subsequent necessity for government intervention. The model can provide a rationale for government intervention in common pool resource situations where over-exploitation of a resource and tragedy of the commons outcome is possible and pinpoint attributes of the resource system where intervention is warranted.

The paper then discusses one method for the state to approach a CPR dilemma that fits with both the needs of the resource and the user community. The role of the state will range from a facilitative to cooperative and finally prescriptive approach to coordination. The salal case study indicated that the model can identify characteristics that contribute to the threat of a CPR under stress from inappropriate practices. It helps to indicate

where a government can focus its policy or information gathering energy and provides an indication of the source of further institutional failure if certain conditions such as trust among users, a lack of information, and high transaction costs persist. Finally, a preliminary conclusion suggests that government may combine the facilitative and coordinating approaches to create a system where local user groups are organized and the benefits of cooperation and collaboration can become clearer. This shift in policy and cooperation among salal users will not evolve rapidly, however, and time will be necessary to build capacity, with various adjustments along the way.

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