5. Historicizing Indigenous Knowledge

Practical and Political Issues

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As the crises in the world's fisheries become increasingly harder to ignore, mainstream fisheries management has come under increasing pressure to change. In the search for alternatives to the dominant models of fisheries management, Indigenous knowledge has been championed as a potential substitute for, or supplement to, scientific knowledge about resources and as a basis for Indigenous or co-management systems. Scholars, activists, resource managers, and users are looking to those ways of knowing marginalized by colonial or state domination to inform the fisheries structures of the future. Indigenous knowledge and its place in the management of fisheries and other natural resources is increasingly a topic of discussion in policymaking forums.

Yet, somehow in this discussion, which is premised upon colonial domination, that very domination is being effectively eclipsed. The massive disruption of Indigenous resource use that these failing structures have perpetrated is forgotten in the efforts to promote Indigenous knowledge and management systems as the solution to the global crisis. In this chapter I argue that a critical recognition of the impacts of colonialism on Indigenous knowledges is crucial if there is to be any successful integration into resource management. An uncomplicated and uncritical promotion of Indigenous knowledge as the solution to the global crisis in natural resource use is both practically and politically dangerous. Placing the burden of sustainability and responsible resource management on the shoulders of Indigenous

knowledges dooms them to failure. And failing to recognize and highlight the impact of colonial domination on Indigenous systems of knowledge and management effaces the culpability of colonial states.

Complicating Indigenous Knowledge

I have chosen to discuss these issues using the label of "Indigenous knowledge" (IK), but this is only one of many types of knowledge discussed in the growing literature on alternative resource management systems. Traditional ecological knowledge seems to be the most popular term used—this is used to refer to both Aboriginal and non-Aboriginal knowledge of the local environment. I have chosen IK as a referent because I am focusing on issues of colonial domination, and because I am using a case study of a First Nation within the Canadian state to illustrate my points. However, many of the issues that I broach may be just as relevant regarding non-Indigenous knowledges (see, for example: McGoodwin and Griffith this volume). My discussion of the current literature will touch on discussions of traditional knowledge (TK), traditional ecological knowledge (TEK), Indigenous knowledge (IK), and local knowledge (LK) because these are essentially related in their marginalized position relative to and as proposed alternatives to mainstream fisheries knowledge.

Berkes suggests that the term "local knowledge" is useful for referring to more recent knowledge (1999:8) and is utilized when discussing non-Indigenous artisanal fisheries (Ruddle 1994). Kuhn and Duerden suggest that TEK is essentially local knowledge because it is based on experience (1996:74). So all traditional knowledge is local, but not all local knowledge is traditional.

A cursory survey of the literature on traditional knowledge suggests an emphasis on continuity and cumulative acquisition over long periods of time. Inglis specifies a knowledge base developed over many hundreds of years (1993:vi). Berkes describes a cultural transmission of information down through generations (1993:2), as does Martha Johnson (1992:4). Legat does not specify a temporal framework but relates TK to a "traditional way of life" (1991:1). A great deal of the Canadian work on TK has developed in northern communities and has focused on the ecological knowledge of Aboriginal peoples. TK is thus generally associated with communities with long histories of resource use, specifically Indigenous or "non-industrial" societies (Berkes 1993:3).

It is perhaps the primacy of northern examples and case studies that has encouraged a somewhat uncomplicated understanding of traditional knowledge and its potential integration into resource management. The concentration of most of the key studies of TK in fairly remote communities seems to have resulted in a failure to adequately flesh out the complexities of alternative knowledges and their interconnection with dominant knowledges and structures. Although I am sure that few scholars of northern life would suggest that Indigenous resource use has been untouched by non-Indigenous forces, their discussions of Indigenous knowledge and Indigenous resource management are premised on a continuity of access and lack of external interference. There are serious limitations to the relevance of these studies to resource issues in the more densely settled parts of North America.

The emphasis on long-term use and continuity has, however, been tempered by a recognition of the dynamic nature of TK. Berkes recognizes that TEK "builds on experience and adapts to change" (1999:8). Ruddle suggests that local knowledge often becomes "hybridized" with nonlocal knowledge, and that new knowledge is constantly added in response to change (1994:163, 176; see also Menzies this volume). Johnson criticizes the tendency for TK to be associated with a static image of the past (1992:4).

Although the necessarily dynamic nature of traditional knowledge has been indicated, a somewhat uncritical emphasis on the temporal aspect of this knowledge persists. Most descriptions of TK refer to long-term resource use, to knowledge developed from cumulative practical experience (for a parallel discussion, see both Snively and Corsiglia in this volume). This emphasis may reflect the circumstances of TK's current use in resource management spheres. TK is constructed as the opposite of mainstream management structures, which are relatively new, externally formulated, and rarely site specific, and therefore its worth is seen to lie in its historical

and local nature. One of the major failures of "modern" resource use has been the lack of attention to long-term effects, and the reaction to this is a search for long-term perspectives and solutions. The valorization of TK's temporal characteristics is extremely problematic because the assumption of continuity fails to recognize historical change, cultural interaction, and power relations.

Pálsson suggests that a focus on "practical knowledge" resolves the issues of Indigenous versus traditional versus local, by avoiding both cultural and temporal boundaries (1997:52). It is the practical knowledge that fishers gain from daily resource use that is of interest and use to fisheries management. This focus on practical knowledge and experience, however, reveals the inadequacies of many discussions of TK—they do not interrogate the practical knowledge of resource users. The literature on TK assumes the generation of knowledge through experience but does not problematize that experience. Colonial force, for example, has significantly impacted the resource-use experience of Indigenous peoples; in some places, this interference has occurred for four centuries.

We have reached a moment when fisheries managers are realizing that their knowledge of the ocean resources is inadequate, and they are looking to resource users for information about particular resources. Practical knowledge is being recognized as a necessary supplement to scientific knowledge. Therefore when we ask about a resource, we have to ask about resource use—knowledge must be related to experience. I contend that external forces of change have in many cases seriously impacted traditional knowledge because Indigenous practices have been interrupted or inhibited by these forces (see Menzies's discussion of pine mushroom knowledge in this volume and its relation to changes in the wider political economy). Indigenous knowledge can be valuable only when one has a detailed understanding of the processes resulting in the production of that knowledge and, specifically, the practical experience of resource use that generates it.

The experiences of the fishers of the Sto:lo First Nation in southern British Columbia provide a valuable case study of the forces acting upon indigenous knowledge. Sto:lo territory stretches along the Fraser River valley, the most densely populated area of the province. Massive non-Native settlement and industrial development have occurred on Sto:lo land, significantly impacting Sto:lo fishing activities. Sto:lo fishers have valuable and important knowledge to contribute to the management of the Fraser salmon stocks; however, the utilization of the knowledge must be related to a detailed examination of the history of Sto:lo fishing since contact.

In the following pages I provide a discussion of the context of Sto:lo fisheries knowledge production. This discussion draws heavily on the work of Lawrence Felt, who has cogently argued for the understanding of fisheries knowledge as a social construction (1994:253). According to Felt, fishers' knowledge must be examined in light of the context of its production, use, and articulation—the forces that influence both the practical experience of fishing and the assertion that knowledge must be identified. Felt's argument has both practical and political implications—the experience of fishing that generates the knowledge and the political situation that shapes its expression must be illuminated. I therefore identify the forces of change influencing Sto:lo fishing since contact and locate Sto:lo fishing knowledge in local and national political struggles.

Changing Practices, Changing Knowledge

The incorporation of Indigenous knowledge into contemporary resource management structures requires an evaluation of the forces impacting that knowledge. The colonization of Sto:lo territory and the alienation of Sto:lo resources by non-Natives has had significant impact on their relationship with the land and resources. The fishing practices of the Sto:lo peoples have been transformed during the one-hundred-and-fifty years since contact, and, therefore, the knowledge generated by fishing and about fishing has necessarily been impacted. In the following sections I consider the forces of change—social, environmental, and regulatory—engendered by colonization and their implications for Sto:lo practical knowledge of the river resources.

Social Change

The Sto:lo First Nation has a population of approximately five thousand, most of whom now live on 23 reserves along the Fraser River between Mission

and Hope, British Columbia. The word Sto:lo is the name of the river in the nation's traditional language, Halkomelem (Carlson and Eustace 1997:140); they are thus the people of the river. Since time immemorial the Sto:lo and other First Nations of southern British Columbia have relied on the Fraser salmon stocks to provide them with food and trade products. Until the latter half of the 19th century Sto:lo fishing activities continued to follow established patterns of participation, and the river continued to provide the bulk of Sto:lo food and trade products. The establishment of Fort Langley in 1827 as an inland trading post for the Hudson Bay Company does not appear to have significantly inhibited Sto:lo fishing and, in fact, provided a market for surplus salmon. However, as non-Native settlement increased in Sto:lo territory, Aboriginal access to the river was compromised, and fishing participation decreased. As Duff points out, during the gold rush of 1858, some of the most gold-rich stretches of the Fraser were found between Hope and Fort Yale (1952:41). Along this part of the river were found a huge concentration of Sto:lo fishing sites and drying racks for the processing of salmon. The influx of settlers during the gold rush accelerated the movement of Sto:lo villages to reserves downriver in the Fraser valley. Sto:lo fishers then had to make a seasonal migration to their canyon fishing sites.

The movement downriver and away from the richest fishing sites resulted in smaller harvests. Legal restrictions of the sale of the Indian catch (see below) further limited the Sto:lo people's ability to continue to make a living from the river. Many people were motivated to turn to wage labor for income. Sto:lo men and women were employed in the salmon canneries that were established at the end of the 19th century, in the hop yards in the valley, and in logging, berry picking, and other enterprises. Employment in the industrial or agricultural economy rarely accommodated seasonal harvesting activities; this reinforced the alienation of wageworkers from fishing. One Sto:lo elder suggests that it was in the hop yards in the 1930s that Sto:lo people first began to buy dried salmon with cash because they were no longer producing it themselves.

Elders also point to the residential school experience as a significant force in separating the Sto:lo people from their fishing traditions. Sto:lo children

were removed from their communities and placed in boarding institutions where they were prohibited from speaking their language and were taught "civilized" skills. Mrs. Lena Moran, an elder in her seventies, believes that the children of her generation who were sent to residential school lost a great deal of their culture through the assimilationist policy of the schools. As she commented: "Over the generation we never thought to teach the kids Native things. We were whitewashed, brainwashed."

After the move downriver, many families relied on the Canadian National Railways (CNR) as a means of traveling to their canyon fishing sites. Throughout the middle part of the 20th century, they often rode on the cargo trains to the seasonal fishery and were dependent on the trains to transport their harvest home. However, during the 1970s the weigh freight stopped running on the CNR, and the people who fished on that side of the river no longer had access to their sites, unless they could acquire a boat.

Social and economic shifts during the last century and a half have resulted in major changes in the relationship between the Sto:lo and the Fraser River resources. Non-Native intrusion forced the Sto:lo people to move from their canyon villages downriver, away from their primary fishing sites. Fishers then had to migrate seasonally to canyon fisheries, impacting the regularity of their fishing activities and shifting the site of daily production. Decreased participation led people to look for other means of making a living; employment in industry and agriculture further inhibited regular involvement in fishing. Colonial policies promoting the assimilation of Aboriginal peoples to white society resulted in the residential school system and the discouragement of fishing as a livelihood.

Environmental Change

The history of the Fraser River and Sto:lo fishing territory in particular is a story of environmental degradation and disruption. In the mid-19th century the gold-panners came and went; their disruption was intense but short-lived. The most physically destructive force was the railroads constructed in the late 1800s and early 1900s. The construction of the Canadian Pacific Railway (CPR) line on the west bank of the river resulted in landslides that

buried many fishing sites and shifted the flow of the river, destroying the eddies that attracted the salmon. The Canadian National Railways (CNR) line was even more devastating. The track was built only a few meters from the water, leaving little space for the erection of drying racks or campsites to replace those lost during construction. The damage to the salmon fishery in general caused by the CNR was staggering. In 1914, blasts from the railroad construction caused a huge landslide at what is known as Hell's Gate (upriver from Sto:lo territory). The slide resulted in a significant narrowing of the river and, consequently, a quickening of the current. Salmon were unable to swim past the slide and died en masse before reaching their spawning grounds. The stocks from that cycle are still recovering.

The railroads resulted in major changes to both the river and to Sto:lo fishing. The landslides changed the flow of the river, thereby shifting the productive fishing spots. Many Sto:lo fishing sites were lost completely, and others were significantly altered. Some families were forced to move their fishing activities downriver, which severely inhibited harvest success. The establishment of drying racks was curtailed by the lack of shore area available after the CNR construction; there are hardly any permanent fishing sites left on the east side of the river.

The Fraser River valley has also been transformed by development initiatives. In the 1920s Sumas Lake, in the lower part of Sto:lo territory, was drained to create farmland for non-Native settlers. The lake had been a prime sturgeon-fishing area for the Sto:lo people.

During the 20th century, increasing settlement and development along the banks of the Fraser River has resulted in pollution and spawning habitat destruction. As early as 1889, boat traffic on the Fraser River was identified as a possible risk to fish stocks. Industrial logging practices and the use of the Fraser to transport enormous log booms have been criticized as destroying fish habitat and water quality. The bottom of the Fraser River is regularly dredged, which disrupts the river bottom and muddies the water. The most densely populated area of British Columbia lies along the Fraser River; residential and industrial sewage has poured into the river untreated for many decades. While fishers have noticed an improvement in the river water quality over the last 30 years, environmental degradation has been significant.

Non-Native settlement, industry, and resource extraction have effected serious environmental change along the Fraser River. The river flow has been altered, the banks degraded, the bottom disrupted, and the water quality polluted. The density of settlement in the lower mainland of British Columbia has resulted in rapid environmental change and disruption that has necessarily impacted Sto:lo knowledge of the river.

Regulation

The strongest force pulling Sto:lo fishers from the river has been the increasing regulation of the fisheries by the Canadian state. The governments of Canada and British Columbia supported the growth of capitalist industry and the British Columbia economy through regulations that aided the industrial salmon fishery, specifically the large canneries. The regulatory system thus worked to shrink Native harvests in favor of the non-Native commercial fishery, to severely limit Native salmon sales, and to channel Native labor into the canneries.

Government regulation began to impact Sto:lo fishing in the late 19th century. In 1878 weekly fishing closures and gear restrictions were first introduced on the Fraser when British Columbia was brought under the jurisdiction of the Canadian Fisheries Act. Although the Native population was unofficially exempt from these regulations, a distinction was made between "Indian fishing" and "modern fishing," so that Indians fishing with "modern appliances" came under the general law (Ware 1983:18).

In 1888 this distinction became fully legislated with the creation of the Indian food fishery. A proviso to the Fisheries Act initiated the licensing of the industrial fishery and restricted Indian fishing rights just to salmon caught only for the purpose of feeding themselves (see Newell 1993:47). This legislation created an artificial economic distinction for Aboriginal fishing activities, making subsistence an Indian activity and situating the sale of fish as a White enterprise. Basically, by prohibiting the sale of Indian-caught salmon, the government prevented Aboriginal people from continuing to draw their livelihood from fishing.

In 1894 a permit system was adopted for the management of the invented food fishery, adding seasonal closures and gear restrictions (Ware 1983:22). In 1909 weekly closures were imposed (Newell 1993:94), and Indians were required to report their catches (McKay 1977:44).

The increasing curtailment of Aboriginal harvesting is reflected in the changing language used to describe fishing periods. In the early part of the 20th century, access was discussed in terms of "closures." Today Sto:lo fishers talk about short "openings." Elder Fred Prentiss describes how Sto:lo fishing has been inhibited by non-Native regulation: "My white son-in-law told me I should be happy—We've given you three days to fish, he told me. I said, no you didn't. He said, yes we did. I said, no—you've taken four days away. Before you came here we fished everyday."

The regulations worked to transfer the bulk of the salmon harvest from First Nations to the industrial fishery and to transform Aboriginal people from independent producers to wage laborers for the canneries.

More recently, the environmental degradation and industrial harvest pressures have resulted in conservation concerns regarding the Fraser River's salmon stocks. Conservation initiatives have impacted heavily on Aboriginal catches in the last several decades as run-specific closures have coincided with Sto:lo food fisheries.

Although the Sto:lo and other Fraser River First Nations have acquired the right to sell salmon through the Aboriginal Fishing Strategy established in 1992, AFS commercial openings have been few, and short, and have failed to provide Sto:lo fishers with their desired access to the salmon resources. The sales allocation has been unreliable, and Sto:lo participants remain unable to make a living from fishing.

During the last hundred and fifty years, external regulation has completely changed Sto:lo fishing practices. Traditional fishing methods were outlawed, and fishers were restricted to using set gillnets rather than traps, fish wheels, or mobile nets. Whereas Sto:lo families used to fish when they wanted to, and according to need, fishing became restricted to short openings, and harvest limits were imposed. Sto:lo fishing used to be an integrated activity, providing food and products for trade and sale, according to need. The intrusion of government regulation resulted in the separation of the salmon fishery into different categories—food and commercial—dislocating the interconnected aspects of the Sto:lo economy.

The Department of Fisheries and Oceans (DFO) now determines the timing and practice of Sto:lo fishing and regulates the disposal of the harvest. Although recent shifts in fisheries management have resulted in greater salmon harvest allocations to First Nations along the Fraser, and the inclusion of First Nations in the management structure, the Sto:lo have little real self-determination regarding their fisheries.

Implications

Traditional knowledge is promoted as a valuable addition or supplement to scientific knowledge about resources because of its association with long-term resource use, management, and adaptation. However, such a characterization of traditional knowledge assumes regular, uninterrupted, uninhibited, self-determined resource use. I suggest that the history of Canada precludes the existence of a system of resource use unchanged by the forces of colonialism, and that a consideration of traditional knowledge in resource management necessitates a consideration of these forces. The Sto:lo experience provides an extreme experience of disruption and external interference in the practice of Aboriginal resource use.

Non-Native settlement and government policy have completely changed both the circumstances and practice of Sto:lo fishing. The river environment and the salmon resource itself have been impacted, and Sto:lo fishing methods and use of the harvest have changed. Sto:lo families no longer all live on the banks of the river; they don't fish everyday. Salmon is no longer a staple in the Sto:lo diet, and fishing is not the livelihood of most of the population. The Department of Fisheries and Oceans dictates where the Sto:lo fish, what they fish, how they fish, and when they fish. But where, what, how, and when are precisely the questions that traditional knowledge is supposed to answer. Not only have the where, what, how, and when of fishing changed during the last century, but they have been determined by external forces. Fishing practice and the decision-making (and knowledge-making) processes have been alienated from the Aboriginal resource users.

Sto:lo fishers know a great deal about the Fraser River and about salmon, and this knowledge could contribute to the sustainable management of the Fraser stocks. However, documentation of Sto:lo fisheries' knowledge must also document the practical experience of the contributors. Elders, whose knowledge of fishing may include the experiences of their parents and grandparents in the 19th century, know different things than young Sto:lo fishers whose participation has been shaped by the Aboriginal Fisheries Strategy. An understanding of fishing in the Fraser canyon is strengthened by information on the old fishing sites and the newer ones established after railroad construction. Fishers who fish every year and therefore harvested from each of the four runs have a different understanding than those whose participation has been irregular. The segregation of commercial and food fisheries have created two different kinds of fishing experience and thus two different kinds of knowledge. Some fishers make a seasonal trip to a family site in the canyon; others fish regularly at more recently established sites closer to their reserves. When asking what Sto:lo fishers know, it is also important to ask how they know it—what are the circumstances of their fishing experience, how have these circumstances changed over time? Sto:lo knowledge needs to be directly related to the variants of Sto:lo fishing experience.

Ideological Issues

As I discuss above, the history of resource use and access has major relevance regarding the generation and preservation of traditional knowledge. However, Lawrence Felt points out that the utilization of traditional knowledge requires consideration of not only the circumstances of knowledge production (i.e., fishing practice) but also the context of its use and articulation (1994:253). Felt suggests that knowledge claims are influenced by factors such as competition for the resource and participation in unions and other organizations. Fishers often assert conclusions about the salmon resources that reflect their economic interests or the perspective of their organization. Thus, in considering Sto:lo traditional knowledge, it is crucial to pay attention not only to its production, but also to its construction, the highly politicized circumstances of its assertion, and implementation.

Mark Nuttall, commenting on the use of Indigenous knowledge in the Arctic, indicates that such knowledge is increasingly becoming a "political resource" used by Aboriginal leaders and communities (1998:27). Similarly, Frank Sejersen describes Indigenous knowledge as a "political crowbar" (1998:46) that can be used to Indigenous groups' advantage in a colonial context. The use of Indigenous knowledge is a political act—it is a claim of Aboriginality, an assertion of land and resource rights, and a demand for management power.

Sto:lo traditional knowledge claims operate within a highly politicized context and against several different levels of opposing claims. At the national level, Sto:lo Indigenous knowledge is framed by the broader struggle for Aboriginal rights. Since the utilization of Indigenous knowledge in the Berger inquiry regarding the impact of the Mackenzie Oil Pipeline, such knowledge has found increasing power and generated growing interest in the spheres of Canadian politics and resource management. Alliances of Aboriginal and environmental concerns have emphasized the value of Indigenous knowledge and have drawn public attention to the need for its "preservation." Resource degradation and environmental crises have precipitated the search for alternatives to dominant management systems, and Indigenous knowledge is promoted as a key to such alternatives. This valorization necessarily influences the rhetoric of Aboriginal claims and frames discussions of co-management.

At the provincial level, Indigenous knowledge has become wrapped up in the treaty process; the landmark Delgamuukw decision in the Supreme Court (Delgamuukw v. British Columbia [1997] 3 S.C.R. 1010) reinforced the relevance of Aboriginal oral tradition in the settlement of land claims. This ruling has significant implications for the use of Indigenous knowledge in the assertion of sovereignty and resource ownership. Such knowledge has a newfound weight in the non-Native system—which will mean new uses and new applications.

At the local level, on the Fraser River, Sto:lo ecological knowledge is embedded in highly politicized and competitive circumstances. The historical construction of Aboriginal fishing as a noncommercial enterprise

has pitted Sto:lo fishers against the non-Native commercial fishers in the struggle for salmon allocations and quotas. Non-Native fishers protested the Aboriginal Fisheries Strategy and pilot sales program as a race-based fishery that afforded Native fishers an unfair advantage. Fisheries regulations have thus created a situation where Native and non-Native fishing interests are considered as opposing each other. The salmon sports fishery constitutes another discrete resource claim, and these three categories—Native, commercial and sports—have been constructed as a triangle of competing interests.

The structure of the Aboriginal Fishery Strategy also places different First Nations along the Fraser in competition with each other. The Aboriginal salmon allocation must be divided among several nations, and the struggle often plays out in an upriver versus downriver opposition.

Thus Sto:lo claims are articulated in opposition to these competing claims and are made against a government that has curtailed Aboriginal fishing and other Indigenous traditions for over a century. These claims are made in the context of a growing revival of Aboriginal cultural practices and increasing assertions of political sovereignty and self-determination. Sto:lo traditional knowledge or Indigenous knowledge is part of larger claims and is a premise of these claims. DFO conservation initiatives are resisted with an assertion of the superiority and priority of Indigenous conservation knowledge and practices. Management structures are challenged on the basis of Aboriginal tradition and expertise.

Indigenous knowledge is thus a tool in the Aboriginal struggle for access to resources. The claim of prior rights and prior knowledge grounds the Sto:lo fight for a portion of a disappearing resource because it is a rhetoric unique to First Nations fishers, a group who have been historically disadvantaged and dispossessed. Just as Indigenous knowledge has been impacted by the forces of colonialism that have dislocated First Nations from their resource base, it has also been impacted by a political situation in which IK is a key tool in the assertion of sovereignty. IK has been constructed as an epistemological opposite to Western knowledge, specifically to science. It has been promoted as an alternative in situations where science has "failed."

It has been situated as a basis of rights to resource access and management and is the foundation of Aboriginal claims against competing resource users. As such, IK has been inextricably wrapped up in ideas of Aboriginal culture, sovereignty, difference. IK is not simply a body of knowledge, but a political discourse.

This entanglement with political struggles and cultural claims complicates IK's successful incorporation into management strategies. I am not suggesting that IK assertions are false attempts to claim resource access, or that the content of IK is necessarily "polluted" by resource competition. Interrogating the "integrity" of IK is an unproductive project, because it implies an immutability that is neither possible nor desirable. IK is valuable precisely because it is dynamic and adaptive. What I am suggesting is that when considering IK, it is crucial to understand the context of its articulation (see again Felt 1994)—the political and ideological forces that influence its construction. Above I argue that one must have a critical understanding of the practical circumstances of resource use and access that shapes Indigenous ecological knowledge. One must also have a detailed understanding of the political circumstances of resource use and access that shape assertions of Indigenous ecological knowledge.

Evaluating Change

The history of Sto:lo fishing on the Fraser points to successive changes in the circumstances of resource use over the last hundred and fifty years, resulting in multiple and varied experiences of salmon harvesting. Sto:lo fisheries knowledge must be documented, therefore, by talking to many different fishers: old and young, subsistence and commercial, and so on. Their understandings of the salmon resource must be read against the backdrop of their practical experience of harvesting (how often they do, how they do it, what external restrictions dictate fish harvesting) and the political circumstances of their expressions of that experience.

Joyce Lui has identified some necessary questions in the evaluation of local knowledge for resource planning. They include queries regarding whether the information can be proved or compared with another report, how

detailed the information is and how many observations it is based on, to what scale it is accurate and whether it can be mapped, and, finally, how this information affects the individual who provides it (1995:27). These questions help to establish the validity and applicability of the information provided by resource users. They are premised on an evaluation of the qualifications of the contributor.

Such an evaluation is a necessary starting place for the implementation of alternative knowledge in resource management. Information about a resource must be located within the context of its generation—an understanding of how the information was gained, when it was gained, how it was transmitted. One of the criticisms of resource management systems has been their failure to look at the big picture—the multiple and interrelated forces impacting the health of resources and their sustainable harvest. Therefore, the information or knowledge that informs new management methods must be evaluated in terms of its relation to the big picture—facts must be contextualized, connections fleshed out, and influencing factors identified.

The issue of "evaluating" knowledge that is intended to complement mainstream scientific data becomes somewhat more complicated when dealing with Indigenous knowledge. The "evaluation" of Indigenous knowledge according to non-Indigenous measures and standards could easily become an act of colonization. The necessary contextualization of data *and* the necessary recognition of Aboriginal sovereignty and rights of resource management require close collaboration in data collection, assessment, and implementation. The growing recognition of First Nations' rights to manage the natural resources within their traditional territories is working to transform natural resource management structures and to expand the data that inform this management. The contemporary context of multiple user groups and stakeholders has resulted in structures of co-management, which, although not reflecting complete Aboriginal self-determination in resource use and management, have made some progress toward power sharing. Increasing efforts toward the integration of Indigenous knowledge and Western resource management reflect an affirmation of Aboriginal rights and title. It is therefore crucial that the way in which Indigenous knowledge is made available for co-management of natural resources reflects community protocols and priorities.

The utilization of Indigenous knowledge in resource management is itself inevitably a transformative act. Kuhn and Duerden point out that the abstraction of TEK is a problem inherent to its integration into mainstream resource management (1996:78). When empirically based knowledge is removed from its local and specific context, it is necessarily changed. First Nations and other Indigenous groups are rightfully concerned about the current interest in their knowledge and the desire to translate it into resource management and other external structures. However, Indigenous knowledge can be respectfully and appropriately used to inform resource management structures that shape the harvest of resources by Indigenous peoples. The incorporation of Indigenous understandings can establish better management practices and enhance Indigenous control of resources. IK can be evaluated and utilized in a noncolonizing, nontotalizing way when its documentation, evaluation, and use is done in close collaboration with the contributing community. The harvesters themselves know best the circumstances of their resource use and can best formulate questions to differentiate their experiences. Furthermore, issues of intellectual property and the protection of sacred knowledge can best be dealt with through collaborative research and management partnerships.

Menzies (2001) has outlined the necessary structures for collaborative research with First Nations communities. Documenting, evaluating, and implementing Indigenous knowledge for resource co-management requires a research structure that is developed and implemented by the community. Menzies recommends a long process of community consultation, team interviews, and several levels of data review. This type of structure would enable community members to define relevant data, identify local experts, evaluate data appropriately, and define the ways in which their Indigenous knowledge may best be integrated with scientific data for co-management needs.

Historicizing Indigenous Knowledge

Indigenous knowledge has not developed, and does not exist, in a vacuum. The forces of change generated since contact have influenced Indigenous

understandings of natural resources and the environment. These forces have been different and of varying strength in different parts of Canada, but they have been in effect in every community. Indigenous knowledge is inextricably related to the experience of colonial domination because it is this experience that has constructed it as a separate way of knowing. IK is a discrete category of knowledge because of its opposition to Western knowledge—it is IK's history of marginalization and neglect by the dominant society that makes it a novel and innovative approach to resource management at the beginning of the 21st century.

However, as Agrawal points out, there are pitfalls to this opposition of knowledge types. Promoters of IK remain trapped in the dichotomy of Indigenous versus Western, and this acts to reproduce the distinction that underpinned IK's denigration by scientists and dominant societies (1995:420). Agrawal emphasizes that the dichotomization of these knowledge systems assumes that they have had completely segregated evolutions and neglects the realities of contact and exchange (422). Furthermore, the vast variations within the knowledges diminishes the significance of the differences between them (421).

A more productive approach is recognizing the many different types of knowledges with "differing logics and epistemologies" (Agrawal 1995:433). And it is necessary to emphasize the diversity within knowledge systems, so that the varied knowledge of Indigenous peoples is not glossed over. The rigid dichotomy of Indigenous versus Western keeps Indigenous knowledge trapped in history—Western knowledge is thereby modern and dynamic, Indigenous knowledge is related to the past and to precontact resource use experience.

Much of the current literature on TK or IK identifies the value of this knowledge as lying in information about precontact resource management. However, there are limits to the worth of precontact understandings and structures in such complicated resource use situations as the Fraser River salmon fisheries, with multiple user groups and a high degree of competition and external regulation. Rather, what can be truly valuable and relevant to the pressing resource management issues of today is Indigenous knowledge's cumulative and dynamic aspects. Indigenous knowledge is necessarily a knowledge of change; through considering Indigenous experiences and resource knowledge, we are given a picture of the rapid transformations that have been wrought on the landscape and natural resources during the centuries of colonial settlement. Indigenous knowledge's spanning of the precontact past, the processes of colonization, and contemporary circumstances is the key to understanding the problems of current management strategies. For example, the differing perspectives of Sto:lo elders and young fishers can provide an understanding of the impacts of regulatory change during the last fifty years of the Fraser River fisheries. Indigenous knowledge is uniquely positioned to reveal the shortcomings of resource management structures by highlighting the impacts of these structures over time. A detailed, historicized explication of Indigenous resource use and Indigenous knowledge in a colonial context thus has applications beyond the construction of an opposite or alternative to Western scientific knowledge.

In addition to its practical value in revealing the impacts of settlement, development, and regulation and the complexities of environmental change during the last few centuries, a historicized IK has important political implications. This approach brings to the fore issues of power, control, and sovereignty in resource use and management. Emphasizing the colonial domination of Indigenous resource activities does not undermine the value or integrity of IK; rather, such emphasis engages its history of disruption and oppression and in doing so can contribute to the project of enhancing Indigenous self-determination in resource use. Berkes points out that "the use of traditional knowledge provides a mechanism, a point of entry, to implement co-management and self-government and to integrate local values into decision-making" (1999:181). A historicized IK highlights the disruption of Indigenous systems and makes a cogent argument for the aggrandizement of Indigenous resource control.

The Sto:lo Nation case study suggests the multiple and constantly changing experiences of salmon harvesters on the Fraser River. These experiences have generated multiple and dynamic knowledges of the salmon resources. A successful management system will integrate these knowledges. The

case study indicates that the development of an industrial fishery and the marginalization of Aboriginal fishers have created competing user groups with different experiences and different understandings. The experiences and knowledges of non-Aboriginal fishers must be examined as well as those of Aboriginal fishers. A historicized understanding of Sto:lo fisheries knowledge thus highlights the need to break down oppositions between user groups to create a management structure that reflects various knowledges, interests, and values to meet the needs of all salmon harvesters.

What resource management has been lacking and what it is currently searching for is usable practical knowledge about resources. Indigenous knowledge is one type of knowledge system that can inform management structures. However, practical, experience-based information must be related to the experience and practice of resource use. Indigenous knowledge must thus be historicized—it must be understood in light of the forces of change acting upon Indigenous resource activities since contact. This historicized perspective, which evaluates knowledge against experience, can provide an understanding of resource and environmental change over the last few centuries—the critical period of resource extraction. Furthermore, a perspective attentive to the power relations of colonialism and the history of Indigenous dispossession provides a valuable tool in Indigenous political struggles for sovereignty and land claims. Engaging critically with the practical and political issues of Indigenous knowledge production thus provides both practical and political benefits.

6. The Case of the Missing Sheep

Time, Space, and the Politics of "Trust" in Co-management Practice

Paul Nadasdy

In July of 1996 Yukon government biologists conducting an aerial survey of the Ruby Range in the southwest Yukon counted 147 fewer Dall sheep than they had just the year before—an apparent decline of almost 26 percent in the course of a single year. This drop in the population was potentially of serious concern to the members of the Ruby Range Sheep Steering Committee (RRSSC), a multi-stakeholder co-management body established in 1995 specifically to address concerns about perceived declines in the Ruby Range Dall sheep population. When biologists presented the results of their sheep survey to the RRSSC on January 28, 1997, however, no alarms were sounded. Indeed, by the time they presented their survey data to the committee, they were confident that the sheep population had not, in fact, declined at all. Significantly, the biologists had not come to this conclusion on their own; instead, they had come to their current knowledge of the sheep population by integrating their own knowledge (the product of aerial surveys and other techniques of scientific wildlife management) with the very different knowledge of another member of the RRSSC.

Any attempt to understand why the biologists were not worried about the sheep population must begin with a look at the unusual circumstances surrounding the aerial survey itself. For one thing, biologists had performed the 1996 annual survey in July rather than in June, when it was normally carried out. The second unusual thing about the survey was that there