"Keeping it Living": Applications and Relevance of Traditional Plant Management in British Columbia to Sustainable Harvesting of Non-timber Forest Products

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Abstract.—There has been increasing concern about sustainability in harvesting and marketing of non-timber forest products in North America. This paper examines traditional approaches and practices for use of plant resources by Aboriginal peoples and discusses their applications in a contemporary context. Philosophies and attitudes of caring and respect are embodied in many traditional resource use systems, and these can become models for developing a responsible land ethic as an essential component of any program of sustainable land use. Aboriginal peoples have also developed and used a variety of practices and techniques in resource management that maintain the capacity for growth and regeneration of species being harvested, including re-planting and transplanting, pruning and coppicing, and burning. These also have relevance in current harvesting and production systems. Traditional systems of tenure, too, have enabled Aboriginal peoples to control access and monitor impacts of use. Traditional modes of knowledge transmission, including experimental, site-based learning, use of specialized names and vocabulary, stories, discourse, and ceremonial reinforcement of values of respect and careful use, are also potentially valuable and applicable to contemporary harvesting practices for NTFPs. In such applications, however, the rights and interests of Aboriginal peoples must be recognized and incorporated in any relevant NTFP use.

INTRODUCTION

Non-timber forest products (NTFPs) include many species and products harvested and used by Indigenous peoples. In British Columbia, for example, a wide range of traditional botanical foods, materials, and medicines have current or potential value in the NTFP industry (De Geus 1995, Mitchell 1998).

In all, over 500 plant and fungus species are known to have specific cultural applications among Aboriginal peoples of northwestern North America, and most of these are forest species (see Compton 1993; Kuhnlein and Turner 1991; Turner 1995, 1997b, 1998). Products from some of these species are already being marketed. For example, pine mushrooms (*Tricholoma magnivelare*) and chanterelles (*Cantharellus* spp.) are currently bringing wild mushroom pickers in B.C. (some of whom are Aboriginal) around $25-50 million Canadian each year, while exporters are earning $50-80 million (Hamilton 1998). In B.C. in 1997, the 200-300 commercial gatherers of medicinal plants collectively earned an estimated $2-3 million Canadian (Wills and Lipsey 1999), but most of this would have been for non-Aboriginal harvesters. Other locally marketed products include huckleberries, baskets and weaving materials, and specialty wood carvings (Turner and Cocksedge, in press).

Indigenous peoples have a number of concerns about commercialization of their traditional

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species, many of which have critical culturally defined values over and above their economic potential (Turner and Cocksedge, in press). These concerns range from issues of intellectual property rights and cultural appropriation (Brush and Stabinsky 1996, Department of Indian Affairs and Northern Development 1999, Greaves 1994) to fears that the resources that are precious to them will be inappropriately used and/or overexploited by outsiders who neither understand the cultural significance of these species nor know how to properly harvest or sustain them. To date, sparse attention has been paid to social and cultural aspects of the NTFP industry in general (for exceptions, see Liegel *et al.* 1998, Richards and Creasy 1996), yet we must understand these factors if we are to develop truly sustainable NTFP industries.

Traditionally, Indigenous peoples have had many culturally mediated ways for sustainably using their resources, embodied within worldviews and philsophies, and "played out" on the ground through various practical strategies. These strategies include habitat enhancement and diversification, through controlled burning and clearing, and careful selective, strategically timed harvesting, and increasing productivity through pruning, coppicing, tilling, and control of weeds and pests. Traditional tenure systems are an important element of sustainable resource use. Also relevant are effective methods and institutions for acquiring and disseminating such knowledge within Indigenous societies.

In this paper, I present information and examples of various views and aspects of traditional plant knowledge and use among British Columbia First Peoples, which need to be considered by all those practicing and promoting the harvesting and marketing of NTFPs in the province. Of particular relevance are the ideologies for looking after the land and its resources, and the understanding and incorporation of the techniques for sustainable harvesting that have been applied for many generations.

Since the harvesting of NTFP species can potentially provide alternatives to current economies focused solely on large-scale timber production—usually involving clearcutting and severe habitat disruption for both forest and aquatic systems, as well as for cultural systems—NTFP industries are seen by First Nations and others concerned about environmental integrity to be a desirable form of economic development. This traditional knowledge could form a basis for sustainable and respectful use of NTFPs in small-scale industry settings that would benefit many local communities, as long as it is used appropriately.

The information provided here is drawn from various literature sources (e.g., Deur and Turner, in press; Peacock and Turner 1999; Turner 1997a; Turner and Atleo 1998; Turner and Cocksedge, in press; Turner and Peacock, in press; Turner *et al.* 2000) and, most importantly, from knowledgeable Indigenous elders and plant specialists who understand cultural traditions relating to the natural world and have in some cases practiced the techniques described. These people are mentioned by name in the Acknowledgments section at the end of this paper.

It is important to emphasize that there is tremendous cultural diversity among and within B.C. First Nations. The knowledge and practices discussed here cannot be generalized without qualification; to do so would be disrespectful and inaccurate. However, there are common philosophical themes and practices known to many people from Indigenous communities that are geographically and linguistically diverse. It can be assumed that many of these beliefs and practices are widespread and longstanding, and that they will serve Aboriginal communities well into the future.

MANAGING AND SUSTAINING PLANT RESOURCES IN BRITISH COLUMBIA

"The Earth's Blanket": Philosophies of Caring for the Environment

Indigenous peoples' relationships with the environment share a common theme of kinship with and respect for all living things (Anderson 1996; Berkes 1993, 1999; Gadgil *et al.* 1993, Turner and Atleo 1998; Turner *et al.* 2000). This perspective is reflected in peoples' teachings and lifestyles in many ways, and it is manifested as a general cultural constraint against waste and overexploitation. One example is in the metaphor of "The Earth's

Blanket," as recorded for the Nlaka'pamux (Thompson) people by ethnographer James Teit: "*flowers, plants and grass especially the latter are the covering or blanket of the earth. If too much plucked or ruthlessly destroyed [the] earth [is] sorry and weeps[.] It rains or is angry & makes rain, fog & bad weather.*" (ca. 1900, cited from Turner *et al.* 1990:54). Other, similar expressions of the need for respecting resources are reflected in the teachings from a wide variety of sources. For example, Ahousaht Elder Roy Haiyupis explained:

> Respect is the very core of our traditions, culture and existence. It is very basic to all we encounter in life.... Respect for nature requires a healthy state of stewardship with a healthy attitude. It is wise to respect nature. Respect the Spiritual.... It is not human to waste food. It is inhuman to overexploit. "Protect and Conserve" are key values in respect of nature and natural food sources. Never harm or kill for sport. It is degrading to your honour.... It challenges your integrity and accountability. Nature has that shield or protective barrier [that], once broken, will hit back at you. (Roy Haiyupis, Nuu-Chah-Nulth, cited in Turner and Atleo 1998)

This type of respect and concern for Nature and its intrinsic values is essential in the development of an ethic for harvesting and use of non-timber forest products. It is like a safety net, overriding and enveloping any specific quantitative prescriptions for harvesting products from the wild. Such values need to be instilled in all of us, providing us with a major guiding principle in planning, decisionmaking, harvesting, and marketing activities, no matter what products are being considered.

Guarding the Meristem Bank: Practical Strategies for Sustaining and Promoting the Productivity of Perennial Plant Resources

John Zasada (Zasada 1992; pers. comm., 1999) has pointed out that, especially for the harvesting of perennials, the key to continued reproduction and propagation is to maintain a healthy meristem source for each species. Meristems, tissues comprised of cells capable of rapid growth and differentiation, are found in various parts of plants of all ages, including root and stem tips, nodes, and cambium tissues. It is these tissues that can give rise to new shoots and roots, both in normal times and in response to damage such as from pruning or cutting away of part of the plant. As long as plants maintain meristematic tissues and have the capacity to absorb sufficient nutrients and water, they can reproduce vegetatively and maintain individuals and populations even with a certain level of harvesting.

This process is captured well in the Kwak'wala word, ***q'waq'wala7owkw***, which translates as "Keeping it Living" (Chief Adam Dick, Kwaxistala, pers. comm., 1998). This term, according to Adam Dick, pertains to peoples' "gardening" practices for traditional root vegetables, such as in the areas of tidal flats at Kingcome River estuary and in many other locations along the coast. These areas were intensively cultivated and the root vegetables were harvested in tremendous quantities, yet the beds were maintained for many generations:

> It was all important. That ***texwsus*** [springbank clover; *Trifolium wormskioldii*], and the ***tliksam*** [silverweed; *Potentilla anserina* ssp. *pacifica*], and the ***q'weniy'*** [Nootka lupine; *Lupinus nootkatensis*], and the... ***xukwem*** [rice-root; *Fritillaria camschatcensis*]. See, when they go down the flats, they use little pegs. "This is my area." You got your own pegs, in the flats. And then you continue on that, digging the soft ground... so it will grow better every year. Well, I guess, fertilizing, cultivating, I guess that's... the word for it. Every family had pegs, owned their little plots in the flats. (Kwaxistala, Chief Adam Dick, Kwakwa'ka wakw, from Kingcome Inlet, 1996).

One of the secrets to maintaining these root gardens was to replant the propagules—portions of the underground parts in this case that contain active meristematic tissues and hence have the ability to regenerate. Adam Dick described this practice as follows: "... you don't pick those little ones that's going to grow the next season. You know, you just pick off the [pieces]." This was done with several different root vegetable species.

Perhaps the most detailed account of replanting propagules comes from Adam Dick's recollections of how, as a boy, he was instructed to remove the bottom part of the rice-root

[***xukwem***] bulb and put it back into the ground, specifically so it would grow into a new plant. They call this propagule "***GaGemp***" (literally "Grandfather"). "Yes, well, that was my job... to pick them off, the bottom of that [rice-root bulb]... it's... called the ***GaGemp***, then they told me to throw it back in the [ground].... It's on the bottom... that ***GaGemp***. It sits on there.... that was my job, to pull them off and throw it back in the [ground]... when ... I was with the old people" (Chief Adam Dick, pers. comm., 1997).

On southern Vancouver Island, there is also evidence that people re-planted the smaller bulbs of camas (*Camassia* spp.), selecting only the large ones to cook and eat. Some people also talked about planting the seed stalks in the upturned ground when the bulbs were being harvested in the summertime (Babcock 1967; Stern 1934:42-43; Suttles 1951a,b). Similar practices are noted in managing root vegetable resources in the interior of British Columbia, with yellow glacier lily (*Erythronium grandiflorum*) and other species such as rice-root (*Fritillaria lanceolata*), spring beauty (*Claytonia lanceolata*), and balsamroot (*Balsamorhiza sagittata*) (Loewen 1998; Peacock 1998; Secwepemc Elder Mary Thomas, pers. comm. 1997; Turner *et al.* 2000), as well as among other First Peoples, such as those of California (Anderson 1996b, 1998; Blackburn and Anderson 1993).

In addition to replanting propagules, people sometimes transplanted species from one site to another. Transplanting of culturally important plants, to make them more accessible, has been practiced on many occasions within the past century on the Northwest Coast of British Columbia. There are documented cases of people transplanting cattail (*Typha latifolia*) and American bulrush (*Scirpus americanus*) for basketry and mat-making materials, stinging nettle (*Urtica dioica*), cottonwood trees (*Populus balsamifera* ssp. *trichocarpa*), highbush cranberry (*Viburnum edule*), camas, wapato (*Sagittaria latifolia*), silverweed, and springbank clover (Turner and Peacock, in press). There is no way of knowing for sure whether species were transplanted through reproductive propagules in pre-European days, although it seems logical that people would have done this. Compelling evidence of this can be seen in the fact that some of these plants, particularly camas, were found outside of their "natural" range at contact and have since disappeared from these locations as Indigenous management ceased (D. Deur, pers. comm., 1999).

Pruning and coppicing of individual berry and hazelnut (*Corylus cornuta*) bushes was also practiced, both on the coast and in the interior: another means of "keeping it living," since this process took advantage of meristematic tissues at the bases and nodes of the stems of shrubs that allow them to regenerate easily. The breaking of the branches of berry bushes has been little documented, but like other practices, this may be in large part because people had not been asked about such practices. California First Peoples are known to coppice their basketry plants to produce better, longer, and straighter shoots (Anderson 1993). In the interior, too, Plateau peoples talk about increasing the productivity of their saskatoon bushes (*Amelanchier alnifolia*), chokecherries (*Prunus virginiana*), soapberries (*Shepherdia canadensis*), and huckleberries (*Vaccinium* spp.) by breaking the branches off during or following the harvest. On the coast, this seems to be a widely known but little publicized practice. Chief Adam Dick, as soon as he was asked, started to talk about it: "Especially that ***gwadems*** [red huckleberry, *Vaccinium parvifolium*], when they finished picking the ***gwadems***, you know, they pruned them. They chopped the tops off. Salmonberries [*Rubus spectabilis*] too. So, when the ***qwasem*** it's done, after you pick... after they get all ***tl'axwey'*** then we all break the tops off." ["Oh, and that makes them grow better?" NT] "Yes. My grandma tell me that if you let it grow this high [above your head], then it doesn't produce much berries. You know. But when you keep it down and, she says, the water, it's hard going up there, I guess, when it's too tall." He said the people also pruned the grayberry plants (*Ribes bracteosum*) and wild blueberries (*V. ovalifolium*). Nuu-Chah-Nulth people talk about breaking off the branches of red huckleberry, blueberry, and salal (*Gaultheria shallon*) (Craig 1998). This was said to make them produce more prolifically in the following years. Saanich Elder Elsie Claxton recalled "pruning" the branches of soapberries when picking the berries on San Juan Island, to increase their abundance (pers. comm., 1997).

Another harvesting technique was the intentional thinning of density-dependent species such as slough sedge (*Carex obnupta*) for basketry; this is said to aid the growth and

reproduction of the plants (Craig 1998). Similar thinning has been observed to enhance the growth of Indian hemp (*Apocynum cannabinum*), cattail and stinging nettle; all of these die back in the winter, and hence are not harmed by late-season harvesting.

Partial harvesting of tree bark for materials and medicines, and selective harvesting of branches and roots for basketry and other purposes were also part of the "keeping it living" philosophy. In using tree bark, such as Pacific yew (*Taxus brevifolia*) or cascara (*Rhamnus purshiana*), for medicine, people apply the traditional technique of harvesting a single strip from the trunk, or large branch, without girdling the tree, thus keeping it alive and allowing it to regenerate (Turner and Hebda 1992). Similarly, redcedar (*Thuja plicata*) and yellow-cedar (*Chamaecyparis nootkatensis*) bark for basketry was harvested in single or double straps from relatively young trees; generally no more than one-third of the circumference was removed, allowing the tree to continue to live and grow. The numerous "culturally modified trees" (CMTs) seen along the British Columbia coast, with evidence of bark removal dating back 100 years or more in some cases, bear testimony to the effectiveness of this practice in keeping the trees living, while still using parts of them (Stryd 1997, Turner 1996). Even, on occasion, planks were removed from standing trees without killing them (Garrick 1998, Stewart 1984, Stryd 1997). Sheets of birch bark (*Betula papyrifera*) and wild cherry bark (*Prunus emarginata*) for basketry were, and still are, harvested from living trees without damaging the inner bark or the growing cambium layer (Peacock and Turner 2000; Mary Thomas, pers. comm., 1997). Cedar, willow (*Salix* spp.) and other types of withes, spruce roots (*Picea* spp.) for basketry, and evergreen boughs for bedding were routinely cut selectively from living trees. Medicinal shrubs such as devilsclub (*Oplopanax horridus*) were also selectively harvested. At least recently, Aboriginal harvesters such as Arvid Charlie (pers. comm. to NT and T. Lantz, 1999) have started replanting lengths of devilsclub stem in the damp soil every time they remove part of the plant; the stems root easily and thus continue to regenerate.

In addition, burning is a widely practiced form of plant management and habitat manipulation that was used by B.C. First Peoples. By keeping the forest canopy at bay, removing woody fuel, and temporarily enhancing the nutrient composition of local soils, burning enhanced the growth of a number of culturally important plants. If undertaken carefully, fire did not damage the meristematic tissues at the base of most shrubs or in the root-crowns of wild strawberries (*Fragaria* spp.) or underground storage organs of root vegetable species such as camas, yellow glacier lily, or wild onions (*Allium cernuum*). This method was used especially for producing and enhancing camas in such places as southern Vancouver Island, but also for promoting berry production along the coast at Haida Gwaii, Bella Coola Valley, Clayoquot Sound, and numerous other places, as well as throughout the interior. Berry species promoted include trailing wild blackberry (*Rubus ursinus*), blackcap (*Rubus leucodermis*), red huckleberry, blueberry, wild strawberries, and salal. Burning was also said to enhance forage for deer and was also used to create clearings and to produce readily available firewood from snags (Johnson 1999, Turner 1999). The Kwakwaka'wakw quotation from Boas (1930:203), in "Prayer" to berries [type unspecified], is a classic example of apparent longstanding use of fire in berry management:

> I have come, Supernatural Ones, you, Long-Life-Makers, that I may take you, for that is the reason why you have come, brought by your creator, that you may come and satisfy me; you Supernatural Ones; *and this, that you do not blame me for what I do to you when I set fire to you the way it is done by my root (ancestor) who set fire to you in his manner when you get old on the ground that you may bear much fruit.* [emphasis added]. Look! I come now dressed with my large basket and my small basket that you may go into it, Healing-Women; you Supernatural Ones. I mean this, that you may not be evilly disposed towards me, friends. That you may only treat me well...."

Traditional Tenure Practices for Sustainable Resource Use

Another component of traditional ecological knowledge that is highly relevant to use of NTFPs is social control of resource use through land tenure systems and related cultural institutions. Ownership or proprietorship of plant resources is one obvious way to ensure that one might benefit from the long-term care

and enhancement of plant resources. Ownership makes investments of time and energy worthwhile; it can be both a cause and an effect of "adding value" to a place and its plant resources.

While all Indigenous peoples of B.C. have a strong sense of traditional territory, there is variation in the intensity, levels, and nature of ownership recognized. With the Nuu-Chah-Nulth and most central and northern coastal peoples, an individual chief or lineage had proprietorship over key, important plant resources. One social institution constructed around, and contributing to, sustainable resource use is ***hahuulhi*** of the Nuu-Chah-Nulth. Roy Haiyupis characterizes ***hahuulhi*** as follows:

> ***Hahoolthe*** [***hahuulhi***]... indicates... that the hereditary chiefs have the responsibility to take care of the forests, the land and the sea within his ***hahoolthe*** and a responsibility to take care of his ***mus chum*** or tribal members (Scientific Panel for Sustainable Forest Practices in Clayoquot Sound 1995).

Under this system, chiefs are given, along with their hereditary title to specific lands and resources, the responsibility for monitoring and sustaining them, and for sharing their resources with all members of their community. Thus, each stream, each beach, each root patch, each prime berry-picking area, was recognized as belonging to an individual and his (or her) family and was thus closely observed and maintained by them. "Owned" plant resources—roots, berries, redcedar stands, and individual crabapple trees (*Pyrus fusca*)—have been documented along the entire coast. In all, over 20 food species have been identified as having been "owned" by individuals or lineages in locations on the Northwest Coast (Turner and Jones 2000)

Ethnographer Edward Sapir (unpublished notes, 1913-14) provides a Nuu-Chah-Nulth example of ownership from the Somass River estuary at Port Alberni: "A place for roots or berries was called [***tlh'ayaqak***]. These patches for roots or berries had four cedar stakes marking the boundaries of the area, which were about one acre in extent. The stakes were six feet high.... These posts [***tl'ayaqiyaktlhama***] were changed about every 10 years to prevent rotting." (see also Arima *et al.* 1991: 190-191). A very similar pattern appears in other locations up and down the coast (Turner and Jones 2000).

Ownership of resources was a serious matter, especially those resources for which considerable effort was invested over many years. Pacific silverweed and wild clover root-digging patches were particularly prized; one elder explained that owners of silverweed "gardens" were very possessive of their holdings, as they "cultivated" the plants by placing the ends of the roots back in the ground so that they would grow the following year (Turner and Efrat 1982). Traditionally, digging on a chief's rhizome plot without permission would have been a grave offense (Turner *et al.* 1983). Yet, proprietorship of resources implied an obligation to monitor and care for them (Stanley Sam, cited in Bouchard and Kennedy 1990: 337). Many of the places where various resources were routinely looked after, or where prime populations were found, were named after their special status.

Even for the Central Coast Salish and for the interior peoples, whose social organization was generally more fluid, families or village units owned resources, and controls were in place over who could harvest from which areas, when the harvest could take place, and how much could be taken (Turner and Jones 2000).

Ownership and tenure are key considerations in the sustainable harvesting of NTFPs, and the practices of Indigenous peoples provide some good models. As noted, those in control of the resources were also accountable for their maintenance and for equitable sharing of their benefits. They also received considerable training, often from the time of early childhood (Chief Earl Maquinna George, pers. comm., 2000), in how to care for the land and resources under their stewardship. Elders and knowledgeable specialists were consulted about the timing and intensity of harvesting, and, if the productivity of a resource declined, the owners were responsible for reducing or stopping harvesting altogether until the resource recovered (Chief Adam Dick and Daisy Sewid-Smith, pers. comm., 1998; Turner and Jones 2000).

"Learning the Ropes" and Imparting the Knowledge

Traditional Ecological Knowledge embodies—as well as philosophies and practical strategies for sustainable living—ways of communicating knowledge, ideas, and information within families and communities, and from one generation to the next. The modes of transferring and communicating traditional ecological knowledge in Indigenous societies are fundamentally different from ways of passing on and learning knowledge and information in mainstream society. These traditional modes of communicating, teaching, and learning are potentially extremely valuable in learning about and practicing sustainable harvesting of NTFPs.

Traditionally, Indigenous children and youth actively participated alongside their parents and elders in harvesting and processing resources. During this time, they were continuously learning, from their own observations and from the teachings and instructions of the experts. They were taught not only the best techniques, but also the philosophies of respect and value of other lifeforms. As they participated in ceremonies like the First Fruits ceremony, and in the expressions of thanks and appreciation routinely addressed to the lifeforms they were harvesting and to the Creator who made them (Boas 1930), they learned to understand their relationships to the land and their environment and to care for and appreciate all the things that sustained them. Secwepemc Elder Mary Thomas (pers. comm., 1997) recalled how her mother, even when she was in her 90s, would always hold a handful of berries up before she ate them and say ***Kwukwschámcw, Kwukwschámcw, Kwukwschámcw***! ["Thank you, Thank you, Thank you!"]. Observing elders showing gratitude and respect for Nature is a highly effective way for young people to learn this approach.

When children were taught about peeling cedar bark, for example, they would be taught not only how to peel the strips and how not to girdle the tree, but also how to recognize the power and spirituality of the tree itself:

> Even when the young cedar-tree is quite smooth, they do not take all of the cedar-bark, for the people of the olden times said that if they should peel off all the cedar-bark... the young cedar would die, and then another cedar-tree near by would curse the bark-peeler so that he would also die. Therefore, the bark-peelers never take all of the bark off a young tree (Boas, 1921: 616-617; see also Boas, 1921: 619; Schlick 1994).

This kind of holistic teaching is extremely important and is also imparted in narratives that children and young people are told over and over again. Such stories as the Nuu-Chah-Nulth Yellow Cedar Sisters, and the Origin of Bunchberry [*Cornus canadensis*], the origin story of Daisy Sewid-Smith's family (Kwakwa̲ka̲'wakw), and the Nlaka'pamux story of Old One and the Creation of the Earth all impart ecological knowledge as well as cultural perspectives of resources as gifts for people to treasure and appreciate and never abuse (Sewid-Smith and Dick 1998, Turner 1997a, Turner and Atleo 1998, Turner *et al.* 2000).

Language and cognitive systems are integral to the process of knowledge transfer, and in the various languages there are not only names for the plants and plant products, but also terms and concepts for the processes involved in harvesting and preparing them, and in caring for them as well. Unfortunately, Aboriginal languages have been in serious decline, and with their loss comes the loss of much of the knowledge embodied within them. Even the names of places can reflect and perpetuate knowledge of plants and ecological systems (Turner *et al.* 2000). Additionally, day-to-day discourse in traditional languages is often associated with peoples' relationships to the land and its various lifeforms. The loss of languages is thus a major tragedy, yet the concepts are at least partially retained to the present day.

Major cultural institutions such as potlatches, feasts, first foods ceremonies, and systems of designated authority have been, and continue to be, vitally important in passing on traditional ecological knowledge and the philosophies that underlie resource use. For example, the Nuu-Chah-Nulth concept of ***hahuulhi***, discussed previously, leads to intimate knowledge of specific places by individuals. Those inheriting positions of proprietorship over lands are instructed, almost like apprentices, about these places and their resources and how to care for them, from the time they are very young. They are taught the philosophies associated with the use of the land, specific practical strategies, and obligations associated with its use, such as maintaining and caring for

salmon spawning beds and pools in a particular river (Scientific Panel for Sustainable Forest Practices in Clayoquot Sound 1995). Thus, there is continuity over generations of people knowledgeable about the same sites and localities. This is an important concept when considering sustainable resource use. Systems of stewardship and proprietorship over lands and resources comparable to ***hahuulhi*** were in place along the whole Northwest Coast. Short-term, broadly based land tenures, such as those operating in much of industrial forestry, usually lead to overexploitation, because there is no long-term understanding, monitoring, or commitment to the land and little specific knowledge over time of particular sites or populations.

CONCLUSIONS

Traditional approaches and practices for use of plant resources have much relevance to contemporary efforts to harvest NTFPs by Aboriginal and non-Aboriginal people alike. A responsible land ethic that includes respect for all lifeforms, and sanctions against waste or wanton destruction, is an essential component of any sustainable land use. Practices and techniques that maintain the capacity for growth and regeneration of species being harvested, including re-planting and transplanting, pruning and coppicing, and burning, are also essential, and Aboriginal people have traditionally used a variety of such practices.

Also important are locally developed and recognized area-based, long-term tenure systems in which responsibility and control over particular places or resources is held in trust by a particular individual or lineage and passed on from one generation to the next, along with the teachings about their use, management, and care. Finally, modes of communication and teaching about responsible resource use, including experiential, site-based "apprentice-style" learning, use of specialized names and vocabulary, stories, discourse, and ceremonial reinforcement of values of respect and careful use, are potentially valuable and applicable to contemporary harvesting practices for NTFPs.

There is every indication that a carefully and thoughtfully planned NTFP industry could be a sustainable and healthy one for the forest. The main task is to retain ecological integrity of an area, including species' capacity for regeneration at a rate equivalent to harvesting levels. For example, according to Juliet Craig's interviews with Ahousaht elders (1998), picking berries does not reduce the crop yield for the next year. In a similar vein, Richard Ross (1998) claims that harvesting of salal greens can be sustainable and can be undertaken annually, if the pruning is done correctly (1998). Some sites have been harvested since the 1950s and are still producing good quality shoots. However, higher intensity of salal harvesting, such as has occurred over the last 5 years in some places, can result in deterioration in salal quality and productivity, and this can lead to higher harvesting requirements and more pressure on the sites and populations. More research and monitoring are required for this and other NTFP species to determine sustainable levels of harvest and the extent to which the harvesting of salal greens impacts the productivity of the berries (W. Cocksedge, pers. comm., 2000).

As with traditional understandings, NTFP harvesting needs to be holistic in its approach. Impacts of harvesting NTFPs on other wild plants and animals in the ecosystem must be considered. Care must be taken in any large-scale berry harvesting program, for example, that the needs of birds, bears, and other wildlife are not compromised, and that some areas are left intact for these other users of forests. Aboriginal people are particularly conscious of such requirements and particularly appreciative of the interconnectedness of all things (Turner and Atleo 1998). Diversification—harvesting a variety of products over the course of several years rather than intensive harvesting of just one resource—is another lesson to be learned from Indigenous use. Flexibility and adaptability are important characteristics of Traditional Ecological Knowledge. Part of such a strategy in its contemporary form would be to combine educational opportunities, ecotourism, and other types of land use with the NTFP industry. In short, Indigenous traditional land and resource use is based on a long-term commitment to an area and its resources and detailed understanding of and continual monitoring of a resource base; these concepts are as essential today as they have been in the past for long-resident Indigenous and local peoples.

ACKNOWLEDGMENTS

The knowledge and wisdom of many individuals and many First Nations is incorporated here. I would like to acknowledge the specific contributions of Elsie Claxton, Tom Sampson, Christopher Paul (Saanich); Arvid Charlie (Hulq'umi'num); Percy and Dolores Louie (Chemainus); Chief Earl Maquinna George, Dr. Richard Atleo (Chief Umeek), Roy Haiyupis, and Stanley Sam (Nuu-Chah-Nulth); Dr. Daisy Sewid-Smith (*Mayanilth*), Chief Adam Dick (*Kwaxsistala*), Kim Recalma-Clutesi (Kwakwaka'wakw); Dr. Margaret Siwallace (Nuxalk); Captain Gold, Barbara Wilson, and Florence Davidson (Haida); Annie York and Mandy Jimmie (Nlaka'pamux); Sam Mitchell, Baptiste Ritchie, and Charlie Mack Seymour (Stl'atl'imx, or Lillooet); Dr. Mary Thomas, Chief Ron Ignace, Nellie Taylor (Secwepemc); and Pete McCoy (Ktunaxa). I am also grateful to the following people who contributed to this paper in various ways and to my understanding of Traditional Knowledge and its applications: Dr. Douglas Deur, Dr. Marianne Boelscher Ignace, Dr. Fikret Berkes, Iain Davidson-Hunt, Dr. John Zasada, Dr. Darcy Mitchell, Dr. Alan Thomson, Jennifer Carpenter, Marguerite Babcock, Denis St. Clair, Randy Bouchard and Dorothy Kennedy, Dr. Wayne Suttles, Dr. Richard Ford, Dr. Eugene Anderson, Dr. Kat Anderson, Dr. Sandra Peacock, Dawn Loewen, Juliet Craig, Robin Smith, Brenda Beckwith, Kimberlee Chambers, Wendy Cocksedge, Jim Jones, Michael Keefer, Trevor Lantz, Kate Leslie, and Shirley Mah.

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