Extension Note

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A black huckleberry case study in the Kootenay region of British Columbia

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Abstract

This case study explores the commercial development of black huckleberries (*Vaccinium membranaceum* Dougl.) in the Kootenay region of British Columbia. Black huckleberries have a long history of human and wildlife use, and there are increasing demands on the resource in the region. Conflicts between commercial, traditional, and recreational users have emerged over expanding the harvest of this non-timber forest product (NTFP). This case study explores the potential for expanding huckleberry commercialization by examining the potential management and policy options that would support a sustainable commercial harvest. The article also reviews trends and issues within the huckleberry sector and ecological research currently conducted within the region.

KEYWORDS: *British Columbia; forest ecology; forest economic development; forest management; huckleberries; non-timber forest products; wildlife.*

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Editor's Note:

Please refer to Mitchell and Hobby (2010; see page 27) in this special issue for a description of the overall non-timber forest product project and details of the methodology employed in the case studies.

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Introduction[1]

The black huckleberry (*Vaccinium membranaceum* Dougl.) has had an important role in the culture and sustenance of the Ktunaxa and other First Nations and is still widely used. In addition to black huckleberries, First Nations harvested eight other *Vaccinium* species and Turner notes the use of an additional three species used along the British Columbia coast (Turner and Royal British Columbia Museum [editors] 1997). After European settlement, the use of huckleberries continued and early settlers harvested them in nearby northern Idaho and Montana (Utter 1993, in Richards and Alexander 2006). Huckleberries are a critical summer food for bears (McLellan and Hovey 1994). Of all the *Vaccinium* species in this region, *Vaccinium membranaceum*[2] is today the most important species commercially harvested in the United States Pacific Northwest (Richards and Alexander 2006) and is known for its superior flavour.[3]

Black huckleberry study methods

A survey of 39 huckleberry harvesters and buyers was conducted in the West Kootenay region of British Columbia in the summer of 2006 to develop an overview of the social, ecological, and economic characteristics of huckleberry harvesting and to understand the influence of policies and market trends. Respondents were selected purposively. Huckleberry harvesters and buyers were approached at the Hills Garlic Festival that is held in New Denver, B.C., each year and at the weekly farmers' market held in Nelson, B.C. Others were identified by local NTFP experts and contacted to complete the survey. Expert opinions were also obtained by the researchers from participants at a NTFP workshop that was held in Nelson, B.C., in the fall of 2005. The combination of the surveys, expert opinion, and secondary research was used to complete the huckleberry case study. For a more complete description of the objectives and methods of the broader NTFP project supported by the Sustainable Forest Management Network, please refer Mitchell and Hobby (2010; see page 27 in this issue).

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Biology and ecology of the black huckleberry

Black huckleberry is a deciduous shrub of low to medium height (0.1–2 m). It is densely branched and the branches are angled in profile. The leaves are alternating, variable but commonly elliptical in shape, with finely toothed edges and a pointed tip. The flowers, borne singly in leaf axils, are cream-pink and bell shaped. The fruit is round, ranges from red to black in colour and has a sweet flavour (Parish et al. 1996) (Figure 1).

Black huckleberry is among the most widely distributed members of the *Vaccinium* genus[4] in British Columbia's Kootenay region. It is found from low to high elevations in the moist West Kootenay region, and from intermediate to upper elevations in the East Kootenay region. Despite the broad ecological range of the species, it typically only fruits abundantly under ideal conditions. The black huckleberry reproduces from underground

[1] Extension notes in this issue of the *BC Journal of Ecosystems and Management* are based on a series of case studies that represent an attempt to document economic, social, cultural, and ecological aspects of important non-timber forest products in British Columbia. For more details on the case studies, please contact the Centre for Livelihoods and Ecology through *http://www.royalroads.ca/cle*. It should be noted that the socio-economic data was largely collected through non-random surveys of harvesters, from interviews with key informants (harvesters and buyers), from direct observation, and from a limited amount of published literature from areas outside the case study region. Survey results are based on the responses of a small number of respondents, and should not be taken as necessarily representative of the larger population. Despite these limitations, the extension notes and the case studies on which they are based present new information on little-known resource sectors and suggest a number of useful and important avenues for future research.
Please note that in 2010 the Centre for Non-Timber Resources at Royal Roads University was renamed the Centre for Livelihoods and Ecology.

[2] "Huckleberry" will refer to *V. membranaceum* unless otherwise noted.

[3] Commercial activities were not a large enterprise until the early 1900s.

[4] The black and the globe huckleberry are nearly indistinguishable (Alexander and Richards 2006).The two taxons will be treated as *V. membranaceum* in this paper.

FIGURE 1. Black huckleberry (*Vaccinium membranaceum*).

rhizomes with adventitious buds distributed throughout (Tirmenstein 1990), and by seed (Minore 1975; Minore et al. 1979; Stark and Baker 1992). Each fruit contains 47 seeds on average (Stark and Baker 1992). Estimates of huckleberry production range from 132 to 3168 kg/ha (Stark and Baker 1992). The sweet berries are consumed by many wildlife species, which should serve as a means of seed distribution; however, it is extremely rare to find huckleberry seedlings in the wild (Miller 1978; Stark and Baker 1992), although bear scat is often riddled with huckleberry seeds. In 18 years of observations, Stark reported finding only six wild seedlings (Stark and Baker 1992). On close examination, what appear to be seedlings generally turn out to be clones growing from a rhizome.

Black huckleberry is considered to be an indicator of nitrogen-poor soils (Klinka et al. 1989). In the Kootenay region, it is most prevalent in areas of neutral to acidic bedrock. Areas of limestone and other highly basic bedrocks generally have low huckleberry cover except in microsites with high levels of duff accumulation. In Montana, black huckleberry prefers soils derived from quartzite and granite over limestone (Tirmenstein 1990). Huckleberries may tolerate a wide range of pH, but research in the United States has shown that the best huckleberry sites range from 5 to 5.5 pH (Minore et al. 1979).

Weather variation can have a major influence on huckleberry production. The late arrival or early melting of snow makes the plants susceptible to frost damage on the stems (Minore et al. 1979). Deep snowpacks serve to insulate them from desiccation by heavy winter frosts and moisture deficits (Stark and Baker 1992). Heavy spring frosts may cause the termination of flowering and the loss of the year's crop. The timing of precipitation is also important as heavy spring rains may lower the activity of pollinators (Stark and Baker 1992) and summer drought frequently results in the abortification of the berry crop (D. Barney, pers. comm., 2007).

In the Kootenay region, huckleberries are commonly found in Interior Cedar–Hemlock,[5] and Englemann Spruce–Subalpine Fir biogeoclimatic zones (Hamilton et al. 2005). Based on the preliminary analysis found on the huckleberry potential map (Figure 2), an estimated 43–70 % of the total land base is potentially suitable habitat for black huckleberry plants based on biogeoclimatic data; however, presence of the species does not necessarily imply productivity. This map illustrates the need for site-level mapping to accurately predict potential productive berry habitat to make huckleberry management practical for resource managers. There are areas in the East Kootenay region with huckleberry as one of the dominant shrubs that seldom produce a crop. There is a gap in the literature concerning what makes a good huckleberry site in the Kootenay region and other areas.

Keystone species are those with a disproportionate effect on other species. Given their importance to bears, it can be argued that huckleberries are a keystone species. Bears have short digestive tracts requiring easily digested food such as huckleberries (Bunnell and Hamilton 1983), thus huckleberries are considered a critical food for bears (McLellan and Hovey 1994). In the Flathead Valley, bears are known to gain over 1 kg per day eating huckleberries (B. McLellan, pers. comm., 2006). The failure of huckleberry crops is known to increase the probability of bear–human conflicts (Schorger 1946; Hatler 1967), and heavy human harvests are likely to have the same result.

[5] British Columbia lands are divided up by the Biogeoclimatic Ecosystem Classification system (BEC) into major units, subzones, variants, and site series. This classification system may be used to predict certain likely locations of plant communities, such as huckleberry patches. See: *http://www.for.gov.bc.ca/hre/becweb*

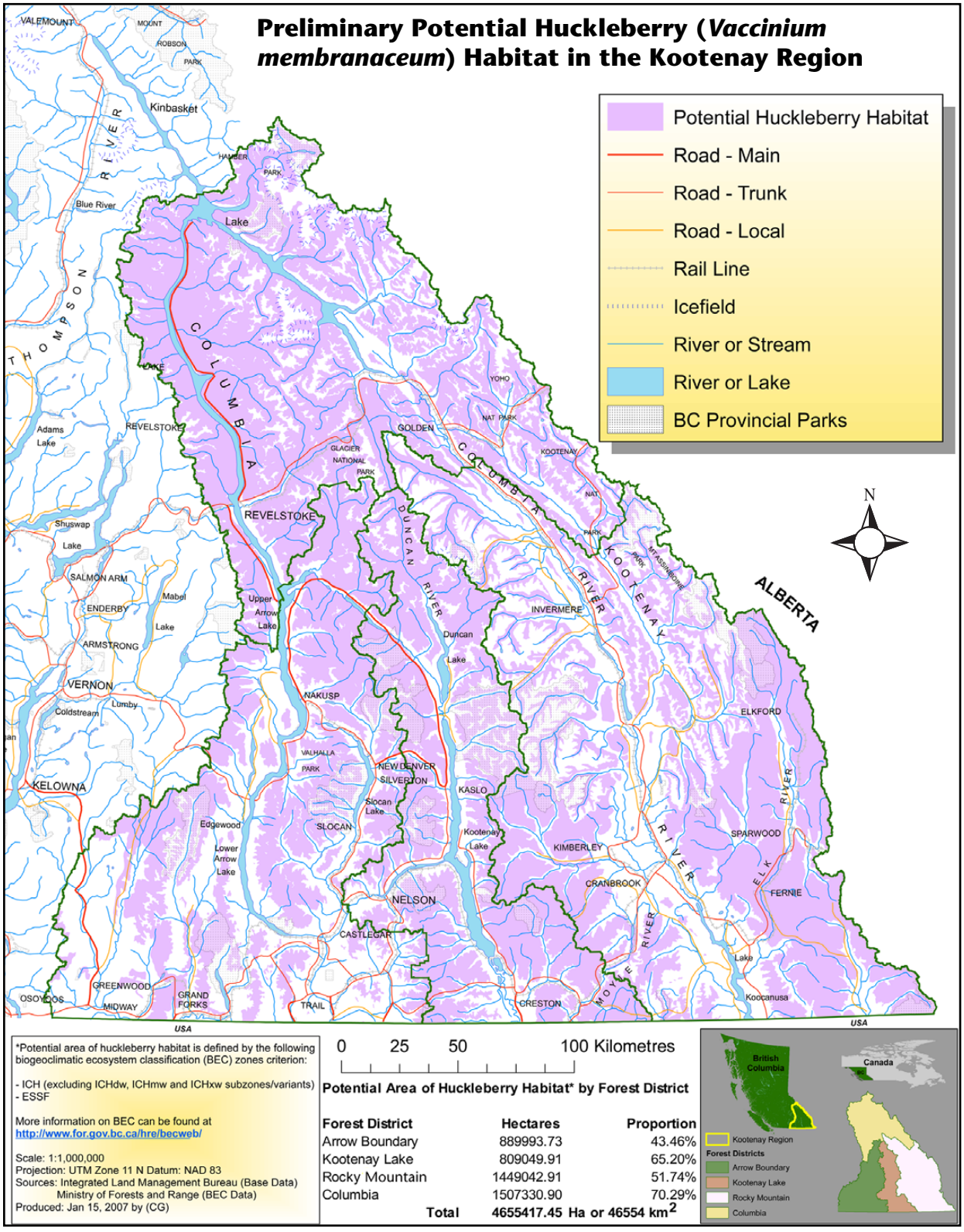

FIGURE 2. Map of potential huckleberry habitat in the Kootenays study area (Source: Keefer Ecological Services Ltd. and Selkirk College Geospatial Research Centre).

Wildfires and logging effects

Hamilton and Peterson noted[6] that huckleberry re-establishes following fire more rapidly than other shrub species and knowledgeable huckleberry pickers confirm that fire is critical to the creation of productive huckleberry sites. In good conditions, abundant new suckers have been found a few weeks after a wildfire.[7] Fire suppression practices are believed to reduce available productive huckleberry sites (Minore 1975; Minore et al. 1979). Huckleberry patches were burnt by numerous First Nations in traditional management systems (Tirmenstein 1990; Turner 1991; Trussler 2001). Huckleberry rhizomes are typically found between 8–30 cm below the surface, but may be found up to 1 m deep (Minore 1975), protecting them from all but the most severe fires (Minore et al. 1979). Miller (1977) found that fall fires with heavy dry slash loading were more likely to cause the death of rhizomes than cooler spring burns.

Before fire suppression activities, forest fires burned vast tracks of land. One fire in the 1930s burned from Plumbob Creek near Cranbrook, B.C., all the way over the Rockies into the Alberta foothills. This fire produced or maintained many of the most productive huckleberry stands in the Flathead Valley (R. Munro, pers. comm., 2006). Based on fieldwork by Munro and MacLellan, it is evident that these stands are in decline (R. Munro, pers. comm., 2008).

Typically, the most productive contemporary huckleberry sites in the East Kootenay region have been logged and broadcast burnt. Nevertheless, modern silviculture is generally so successful at re-establishing new tree stands that logging no longer replaces fire as a means of creating or enhancing long-term berry sites. Research in the United States indicates that plants take 10–15 years to come into peak production (Minore et al. 1979). This fact, coupled with the expectation that many plantations reach canopy closure in 15–20 years, leads to the conclusion that typical silviculture management would diminish berry production over time.

The huckleberry harvest

Most recreational harvesters pick huckleberries by hand. Since the 1930s, however, commercial harvesters have used "can rakes" to improve harvesting efficiency and the technology has remained essentially the same since that time (Figure 3) (Richards and Alexander 2006).

FIGURE 3. Huckleberry pickers circa 1950.

The can rake was originally an oil can with 10-cm tines welded to, or cut from, the top and a handle attached. The can rake is scooped through a huckleberry bush to strip the berries. The use of rakes for huckleberry harvesting is highly contentious in many areas.

Issues of sustainability

There are concerns over the sustainability of the commercial huckleberry harvest in British Columbia (Gayton [editor and compiler] 2000; Gagné et al. 2004; Richards and Alexander 2006). Reports note that commercial harvesters use inappropriate methods, most notably rake or comb tools, which are believed to damage the plants (Gagné et al. 2004). Along with possible damage to plants, such techniques leave few berries for wildlife. In 2000, the Ktunaxa Kinbasket Treaty Council organized a non-timber forest product conference in Creston, B.C., at which several presenters raised these issues (Gayton [editor and compiler] 2000). The concern over harvesting methods is also found in the Montana literature (Richards and Alexander 2006); however, Dan Barney notes that the use of can rakes may be less damaging than often perceived. He found that the berry rakes remove less than 5% of the leaves if used properly. Many huckleberries are also found at higher elevations where the harvest period falls after

[6] Hamilton, E. and L. Peterson. 2003. Response of vegetation to burning in a subalpine forest cutblock in central British Columbia: Otter Creek site. Unpublished manuscript.

[7] Keefer field notes from the Lamb Creek Fire, 2004.

photosynthesis has completed its annual cycle. The removed leaves are from the current season's wood and the fruitwood for next year's crop has not yet formed, so berry production is unlikely to be affected (Barney 2004, cited in Richards and Alexander 2006). Although the research is inconclusive, concerns over harvesting methods have led Washington State to pass House Bill 2779, which bans "using a rake, mechanical device, or other method that damages the huckleberry bush" (Washington State HB 2779, March 2008). The absence of conclusive scientific evidence before this Bill was passed serves as an example of a premature policy decision before a clear and defensible understanding of the resource is known.

Harvester profile

Harvesters reported picking an average of 11.34 kg of huckleberries per person per year, with an average of 8 days harvesting per season. Respondents also reported eating huckleberries an average of 67 days per year, with 20% of respondents eating huckleberries over 100 days per year.

Commercial harvesters (n = 8) picked 9–544 kg per year and harvested from 10–40 days annually. They picked an average 1.26 kg per hour. Average prices for the 2005 and 2006 seasons were $10.85–$12.50/kg, respectively. Based on a full 8-hour harvesting day and using average picking productivity reported by respondents and average prices reported,[8] a harvester could on average earn $118 per day and could net approximately $98 per day, once daily travel and supply expenses were deducted. This would translate into an average harvester wage of $12.30 per hour. The overall range of net income from huckleberries for an average commercial harvester is estimated to average $1000 in a low production year and $2000 in a high production year.

Seasonal factors affect huckleberry productivity and therefore harvests. Using the survey data collected, it is estimated that the commercial harvest for the region could range between 8163–58 503 kg, and the recreational harvest between 25 163–51 247 kg per year. This would translate to an approximate commercial market value range of $91 000–$685 000 per year, and recreational harvest value of $298 000–$596 000 per year.

Trade and marketing

Commercial trade in black huckleberries is not specifically tracked under the harmonized system of commodity codes used to record international trade statistics. There is a code that includes *Vaccinium* species and a two-digit extension for wild harvested berries (Statistics Canada 2009). Some huckleberries may be included in available export data, although this designation primarily relates to the trade data for wild harvested lowbush blueberries (*Vaccinium angustifolium*, *Vaccinium angustifolium f. nigrum*, and *Vaccinium myrtilloides*) in eastern Canada. Neither of the two huckleberry buyers in the Kootenay region surveyed were exporting huckleberries to markets outside Canada. All commercial harvesters surveyed reported that they sold huckleberries either directly to consumers or to local outlets.

The market chain described for British Columbia is much shorter than the market chain for huckleberries in Montana, Idaho, and Washington. Nevertheless, as demand for huckleberries increases, commercial harvesters in the Kootenay region may be enticed to sell their berries into American markets, and commercial buyers in the United States Pacific Northwest region may expand into British Columbia. This evolution is likely as the commercial huckleberry market in the United States Pacific Northwest is now estimated to be worth over US$1 million per year (Richards and Alexander 2006), and in recent years it has been difficult for buyers to source enough supply in the region due to international competition for the resource (M. Dell, Western Huckleberry and Billberry Association, pers. comm., 2007).

There is growing demand for products with high anti-oxidant levels, as found in *Vaccinium* species (Haines 1997). There is also increasing demand for a range of value-added huckleberry products. To help meet these demands, the University of Idaho Sand Point Research and Extension Station (affiliated with the Idaho Agricultural Experiment Station network) is developing cultivated varieties and agronomic systems to grow western *Vaccinium* species, expected to be released by 2012 (D. Barney, pers. comm., 2008). As field trial results become available, transition from wild harvesting to a cultivated agricultural setting may be possible in the

[8] The respondents used 2005 harvesting levels as the 2006 year was a very low year for berry production.

future (Barney 1999). Cultivated huckleberries would potentially reduce pressures on wild huckleberry stocks and may address some of the overharvesting concerns voiced on behalf of First Nations, wildlife managers, and recreational harvesters (Barney 2007).

Compatible management with other forest values

Given that the black huckleberry is not yet commercially cultivated, there is good potential for compatible management of huckleberries and timber in mountain forest ecosystems. A strong, science-based understanding of where the species fruit most abundantly is needed (E. Hamilton, B.C. Ministry of Forests and Range, pers. comm., 2006). Such research is currently under way in the East Kootenay region through a British Columbia Forest Science Program (Project No. Y091160)[9] run by Keefer Ecological Services Ltd. The results of this research may allow forest managers to better explore options for managing huckleberries compatibly with timber and meet other management objectives such as recreation, ecological restoration, and wildfire risk reduction.

Live huckleberry plants have been found to be very non-flammable. Miller (1977) reported that in a prescribed fire experiment in Oregon, dense stands of huckleberry did not carry fire. Therefore, black huckleberry could be managed to reduce wildfire risk, and used in fuel breaks.

Compatible management could also be achieved when stand stocking levels are reduced to mitigate mountain pine beetle infestation. In the Kootenay region, plantations in the Engelmann Spruce–Subalpine Fir zone near Cranbrook, B.C., typically have a maximum stocking after spacing of 2200 stems per hectare. Reducing this level to the minimum legal post-spacing stocking standards of 1200 stems per hectare (B.C. Ministry of Forests and Range 2006) in key berry-producing locales may build greater stand resilience to mountain pine beetles and would extend huckleberry production over a typical timber rotation. However, a lower stocking in the 600–800 stems per hectare would be preferable for huckleberry production. Such possibilities were being explored by Keefer Ecological Services in 2007 in association with the Ktunaxa Kinbasket Development Corporation in the post-wildfire reforestation in Lamb Creek as part of the Forests for Tomorrow Program.

These examples suggest that compatible management strategies may work in different contexts, although most of these ideas are still in the exploratory stage. Additional work is needed to establish how much canopy removal and thinning is required to significantly expand the period of berry productivity. It would be valuable to model and compare the potential berry production gains against the possible loss of wood volumes and quality from modified silvicultural treatments. As some of the productive huckleberry sites are poor sites for timber production, it may be preferable to manage these areas to meet other habitat and ecological objectives, including huckleberry production.

Policy environment

Although there are no specific policies that regulate huckleberry harvesting in British Columbia, the provincial government has the ability to regulate NTFPs under current laws. As large areas of huckleberry are found on Crown forest lands, the B.C. Ministry of Forests and Range is the responsible agency for managing much of the huckleberry resource, and under the Forest and Range Practices Act, the Ministry can implement land use policies for huckleberries.

Regulating the management of huckleberry resources could reduce tensions between user groups. In the United States, the "handshake agreement" in Washington state (U.S. Department of Agriculture 2007) has protected a portion of Native Americans' huckleberry harvesting rights in the Sawtooth berry fields since 1932. In this area, located in the Gifford Pinchot National Forest, only recreational harvesting is allowed and an area is designated for use by native peoples exclusively.

Policies that require the consideration of huckleberries in the development of silviculture prescriptions in key huckleberry habitat and highly productive sites could also be proposed. Huckleberry habitat enhancement plans that meet wildlife needs as well as human use objectives could be developed for such areas. Resource management could mitigate the negative impacts on wildlife, in particular on grizzly bears, and reduce conflict between huckleberry harvester groups.

[9] See: *http://www.for.gov.bc.ca/hfd/library/FIA/HTML/FIA2009MR057.htm*

Trends and issues

The commercial use of wild harvested huckleberries is increasing globally and within North America. Over the past decade, rural entrepreneurs in the United States Pacific Northwest have reacted to the growth by diversifying huckleberry products, which now include products such as beer, sauces, and dressings. As marketing the huckleberry niche has gained momentum in recent years, this trend is expected to continue (Dell 2007). The potential for value-added huckleberry products marketed to tourists visiting the region is relatively untapped.

Given the risk of over-harvesting if huckleberry habitat management is not initiated, increased commercial harvesting may be resisted by individuals concerned with traditional and recreational harvesting rights as well as the impacts on wildlife. With these potential limitations, huckleberry harvesters could consider expanding into value-added products to increase revenues rather than selling greater quantities of berries into the global market. Appropriate huckleberry habitat management on Crown land in the future could also assist in stabilizing supply and continuing research into developing cultivated black huckleberries for the commercial market could potentially reduce pressure on wild stocks.

Managing huckleberry habitat is a priority for conservation efforts. Over the last century, much of the huckleberry habitat once abundant in this region is believed to have declined through wildfire suppression and minimal use of prescribed fires. Clearcutting has provided some huckleberry enhancement at the beginning of a timber rotation; however, specific huckleberry management objectives at stand and landscape levels have yet to be developed.

In response to the identification of the knowledge gap in huckleberry management, a British Columbia Forest Science Program study entitled "Synthesis of knowledge and development of huckleberry management recommendations in British Columbia" was funded (Project No. S084006; Keefer 2008b). This project drew upon expert knowledge and existing literature to synthesize a document designed to support land managers and others interested in huckleberry management. This plain-language document includes sections on taxonomy, species description, distribution, ecology, human and wildlife uses, applications in agriculture and agroforestry, cultivation and response to disturbances, and management. A related B.C. Forest Science Program project (Project No. Y082329; Keefer 2008a) presents similar guidelines for Saskatoon (*Amelanchier alnifolia*), blackcap raspberry (*Rubus leucodermis*), beaked hazelnut (*Corylus cornuta*), and soopolallie (*Shepherdia canadensis*).

A key gap identified in the synthesis project was the habitat relations for huckleberry and the question of what makes for a productive huckleberry site. In response, a current 3-year B.C. Forest Science Program project called "Quantifying the effects of silvicultural techniques, wildfire and forest stand attributes on black huckleberry abundance and productivity" (Project No. Y091160)[10] has been funded and is being led by Keefer Ecological Services Ltd. This project includes the installation of permanent plots with temperature loggers in the Lamb Creek and Flathead River watersheds in British Columbia. The study will inform forest managers, wildlife managers, First Nations groups, and other stakeholders of the effects of forestry, natural disturbances, and site conditions on the productivity of black huckleberry. Estimates can be integrated with habitat supply models for important species, such as grizzly bears, and help to predict the locations for forest management with berry objectives.

Conclusions

The black huckleberry has been significant to the people living in the Kootenay region for centuries, and today hundreds of commercial huckleberry harvesters may add a few hundred to a few thousand dollars per year to their income from the harvest. However, commercial harvesters are small in number when compared to the thousands of recreational and traditional harvesters in the Kootenay region. As most huckleberries currently grow on "open access" Crown land, conflict over wild huckleberry resources will likely continue between commercial, traditional, and recreational users.

Given that commercial harvesting of black huckleberries has increased over the last few decades (whereas natural abundance has declined due to former forest management practices), a successful huckleberry NTFP industry is contingent upon incorporating timber and non-timber values into forestry practices. Research focussing on best practices

[10] See: *http://www.for.gov.bc.ca/hfd/library/FIA/2009/FSP_Y091160.pdf*

Research focussing on best practices for managing huckleberry resources in a forest setting, combined with work on developing cultivated black huckleberries should support successful ongoing commercialization of the industry.

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Note

This series contains information on the ecology and management of non-timber forest products. In promoting implementation of this information, the user should recognize the importance of equitable sharing of any benefits derived from the management and use of this resource as addressed in Article 8(j) of the United Nations Convention on the Conservation of Biological Diversity.

References

Barney, D. 1999. Growing western huckleberries. University of Idaho, Sandpoint Research and Extension Center, Moscow, Idaho. *http://www.cals.uidaho.edu/edcomm/pdf/BUL/BUL0821.pdf* (Accessed October 2010).

_____. 2007. Selecting, propagating and growing huckleberries. The Big Huckleberry Summit. June 21, 2007. University of Washington, Eatonville, Wash. *http://students.washington.edu/jklm/Huckleberry_Summit_2007/Barney_propagation.pdf* (Accessed October 2010).

B.C. Ministry of Forests and Range. 2006. Rocky Mountain Forest District FSP Stocking Standards. *http://www.for.gov.bc.ca/ftp/drm/external/!publish/web/Silviculture/RMFDFSPSTDS.pdf* (Accessed October 2010).

Bunnell, F.L. and N. Hamilton. 1983. Forage digestibility and fitness in grizzly bears. In: Proceedings, International Conference on Bear Research and Management, pp. 179–185.

Dell, M. 2007. The value-added gourmet food entrepreneur's perspective. The Big Huckleberry Summit. June 21, 2007. University of Washington, Eatonville, Wash. *http://students.washington.edu/jklm/Huckleberry_Summit_2007/OUTLINE.doc* (Accessed October 2010).

Gagné, J., W. Cocksedge, B. Titus, R. Winder, P. Burton, A. Thompson, S. Berch, S. Tedder, M. Keefer, W. Fekete, and G. Prest. 2004. Integrating non-timber forest products into forest planning and practices in British Columbia. Forest Practices Board, Victoria, B.C. Special Report No. 19. *http://www.fpb.gov.bc.ca/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=3058* (Accessed October 2010).

Gayton, D.V. (editor and compiler) 2000. Non-timber forest product workshop: Report and recommendations. Southern Interior Forest Extension and Research Partnership, Kamloops, B.C. *http://www.forrex.org/publications/other/FileReports/fr00-2.pdf* (Accessed October 2010).

Haines, S. 1997. Is nature's best medicine found in functional foods? *http://www.uoguelph.ca/research/publications/Assets/HTML_MAGS/health/page6.html* (Accessed October 2010).

Hatler, D.F. 1967. Some aspects in the ecology of the black bear (*Ursus americanus*) in interior Alaska. University of Alaska, College, Alaska.

Keefer, M. 2008a. Measuring success in managing for Saskatoon berries and other traditionally important plants. B.C. Forest Science Program, FIA Project No. Y082329. *http://www.for.gov.bc.ca/hfd/library/FIA/2008/FSP_Y082329.pdf* (Accessed October 2010).

_____. 2008b. Synthesis of knowledge and development of huckleberry management recommendations in British Columbia. B.C. Forest Science Program, FIA Project S084006. *http://www.for.gov.bc.ca/hfd/library/FIA/2008/FSP_S084006.pdf* (Accessed October 2010).

Klinka, K., V.J. Krajina, and A. Ceska. 1989. Indicator plants of coastal British Columbia. University of British Columbia Press, Vancouver, B.C.

McLellan, B. and F.W. Hovey. 1994. The diet of grizzly bears in the flathead river drainage of southeastern British Columbia. Canadian Journal of Zoology 73:704–712.

Miller, M. 1977. Response of blue huckleberry to prescribed fires in a western Montana larch-fir forest. U.S. Department of Agriculture Forest Service, Intermountain Forest and Range Experiment Station, Missoula, Mont. Research Note INT-188, p. 33.

_____. 1978. Effect of growing season on sprouting of blue huckleberry. U.S. Department of Agriculture Forest Service, Intermountain Forest and Range Experiment Station, Ogden, Utah.

Minore, D. 1975. Observations on the rhizomes and roots of *Vaccinium membranaceum*. U.S. Department of Agriculture Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, Oreg. Research Note PNW-261. p. 5.

Minore, D., A.W. Smart, and M.E. Dubraisch. 1979. Huckleberry ecology and management research in the Pacific Northwest. U.S. Department of Agriculture Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, Oreg. General Technical Report PNW-093. *http://purl.access.gpo.gov/GPO/LPS116193* (Accessed October 2010).

Mitchell, D. and T. Hobby. 2010. From rotations to revolutions: Non-timber forest products and the new world of forest management. BC Journal of Ecosystems and Management 11(1&2):27–38. *http://jem.forrex.org/index.php/jem/article/view/58/22*

Parish, R., R. Coupé, and D. Lloyd . 1996. Plants of southern interior British Columbia. Lone Pine Publishing, Vancouver, B.C.

Richards, R.T. and S.J. Alexander. 2006. A social history of wild huckleberry harvesting in the Pacific Northwest. U.S. Department of Agriculture Forest Service, Pacific Northwest Research Station, Portland, Oreg. General Technical Report PNW-GTR 657. *http://www.fs.fed.us/pnw/pubs/pnw_gtr657.pdf* (Accessed October 2010).

Schorger, A.W. 1946. Influx of bears into St. Louis county, Minnesota. Journal of Mammalogy 27:177.

Simonin, K.A. 2000. *Vaccinium membranaceum*. In: Fire Effects Information System. U.S. Department of Agriculture Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory, Missoula, Mont. *http://www.fs.fed.us/database/feis/* (Accessed October 2010).

Stark, N. and S. Baker. 1992. The ecology and culture of Montana huckleberries: A guide for growers and researchers. University of Montana, School of Forestry, Missoula, Mont. Miscellaneous Publication No. 52, p. 87.

Statistics Canada. 2009. Canadian export classification. *http://www.statcan.gc.ca/trade-commerce/cec/index-eng.htm* (Accessed October 2010).

Tirmenstein, D. 1990. *Vaccinium membranaceum*. In: Food plants of interior First Peoples. N.J. Turner and Royal British Columbia Museum (editors). 1997. University of British Columbia Press, Vancouver, B.C.

Trussler, S. 2001. Footsteps amongst the berries: The ecology and fire history of traditional Gitsxan and Wet'suwet'en huckleberry sites. MSc thesis, University of Northern British Columbia. Prince George, B.C.

Turner, N.J. 1991. Burning mountainsides for better crops: Aboriginal landscape burning in British Columbia. Archaeology in Montana 32(2):57–73.

Turner, N.J. and Royal British Columbia Museum (editors). 1997. Food plants of interior First Peoples. University of British Columbia Press, Vancouver, B.C.

U.S. Department of Agriculture Forest Service. 2007. Commercial huckleberry permits available August 15th. Gifford Pinchot National Forest, Vancouver, Wash. News release. *http://www.fs.fed.us/gpnf/news/2007/20070806a-commercial-huckleberry-permits.shtml* (Accessed October 2010).

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Test Your Knowledge . . .

A black huckleberry case study in the Kootenay region of British Columbia

How well can you recall some of the main messages in the preceding Extension Note?
Test your knowledge by answering the following questions. Answers are at the bottom of the page.

1. Huckleberry is a consistently productive species; wherever you find the plant, you will find berries.
   A) True
   B) False

2. According to this article, huckleberries are most important for their contribution to economic diversification; they have high current and potential commercial value.
   A) True
   B) False

3. According to this article, what are three methods that could be used to help with issues of huckleberry sustainability?

ANSWERS

1. B – False, although the plant grows in many habitats, only some habitats seem to produce productive crops of berries.
2. B – False; huckleberries are also a critical food for bears and hold a longstanding key importance to First Nations.
3. (1) Cultivation; (2) enhanced habitat within the forest (e.g., compatible management such as managing stand density); and (3) developing value-added products rather than relying on bulk sales.