

Chapter 4: Resource Values

by

A. MacKinnon, W.L. Harper, S. Chatwin, and B.M. Wikeem

INTRODUCTION	70
AGRICULTURE	70
FORESTRY	70
FORESTS AND COMMUNITY WATERSHEDS	72
RANGE	74
RECREATION	75
WILDLIFE	76
LITERATURE CITED	78

INTRODUCTION

British Columbia has a great diversity of ecosystems. These ecosystems provide us with many resources. The ecosystems are used and managed in many ways to provide products that are important to the economic and physical well-being of the people of this province.

The “value” of some of these resources is presented in this chapter in order to give a provincial perspective to the resource value comments in each of the biogeoclimatic zone chapters.

AGRICULTURE

A very small percentage of British Columbia’s land is suitable for agricultural production. Less than 1% (2.4 million ha) is highly productive (that is, rated Class 1, 2 or 3 — capable of growing a wide variety of crops — in the Canada Land Inventory agricultural land capability ratings). An additional 2.6 million ha of Class 4 agricultural land are available to grow some crops, and 6.7 million ha of Class 5 soils are capable only of producing perennial forage crops (B.C. Ministry of Crown Lands 1989). Most of the best agricultural land in the province (approximately 4.7 million ha) is protected in the Agricultural Land Reserve, in an effort to preserve that land for agriculture and to encourage agricultural production.

According to the latest figures available (1986), British Columbia had 19 063 farms, 5% fewer than in 1981. The number of large farms is increasing, the number of small farms decreasing. Improved land decreased 5% (to 900 000 ha) and unimproved land increased 23% (to 1.5 million ha). Total farmland increased by 11% (to 2.4 million ha) from 1981 to 1986. About 60% of the farmland is owned by operators, the rest, a significant portion of which is Crown land, is rented.

British Columbia has Canada’s second highest percentage (28%) of farms with gross sales less than \$2500; and highest proportion (51%) of operators who work off the farm (Statistics Canada 1987).

A wide variety of crops are produced on the province’s farms. Fifty-three percent of all the area under crops is in tame hay. As well, British Columbia leads Canada in growing the following crops: cranberries (93% of the total area in Canada), apricots (66%), sweet cherries (60%), raspberries (57%), and brussel sprouts (56%).

FORESTRY

Eighty-five percent of British Columbia’s land is located in the “provincial forests” — the commercial forests on which wood is harvested. These lands support more than 8 billion m³ of mature timber, about 95% of it coniferous. British Columbia’s standing softwood timber represents about 50% of the Canadian — and 20% of the

North American — total (B.C. Provincial Government 1989). Forest productivity is high (mean annual increment [MAI] 6.4 m³/ha per year) in most of the Coastal Western Hemlock (CWH), Coastal Douglas-fir (CDF) and Interior Cedar — Hemlock (ICH) zones; medium (MAI = 3.5-6.3 m³/ha per year) in most of the central and southern Interior (Sub-Boreal Spruce [SBS], Sub-Boreal Pine — Spruce [SBPS], Montane Spruce [MS], and Interior Douglas-fir [IDF] zones), low (MAI = 0.8-3.4 m³/ha per year) in subalpine areas, dry southern Interior, and northern Interior (Engelmann Spruce — Subalpine Fir [ESSF], Mountain Hemlock [MH], Ponderosa Pine [PP], Bunchgrass [BG], and Boreal White and Black Spruce [BWBS] zones); and very low (MAI 0.8 m³/ha per year) in the northern subalpine Spruce — Willow — Birch [SWB]) zone.

In fiscal year 1988-89, about 85 million m³ of timber was cut, 76 million m³ on Crown lands and 9 million m³ on private lands (B.C. Ministry of Forests 1990a). Volumes cut can be summarized by species (Table 6), but not by biogeoclimatic zone. Some assumptions can be made about the latter, however, based on species distribution: *Larix* spp. (largely *L. occidentalis*) are from the IDF and MS zones, and the southern ICH; *Thuja plicata* is from the CDF and (largely) CWH on the Coast, the IDF and (largely) ICH in the Interior; *Chamaecyparis nootkatensis* is from the MH and CWH; Douglas-fir is from the CDF and southern CWH on the Coast, the IDF, MS, and drier parts of the ICH in the Interior; and the other species are more widely distributed.

TABLE 6. Volume of all wood products billed in fiscal year 1988/89, by species (from B.C. Ministry of Forests 1990a)

Species	'000 m ³
<i>Abies</i> spp.	11226
<i>Chamaecyparis nootkatensis</i>	925
<i>Larix</i> spp.	660
<i>Picea</i> spp.	16518
<i>Pinus contorta</i>	20956
<i>Pinus monticola</i>	289
<i>Pseudotsuga menziesii</i>	9398
<i>Thuja plicata</i>	8641
<i>Tsuga</i> spp.	15253
Other species	1323
TOTAL	85189

These volumes were cut from an area of about 270400 hectares, 237500 hectares on Crown land and 32900 hectares on private land, but again the information is not available for each biogeoclimatic zone.

The timber cut in 1988 was manufactured into about 37 million m³ of dimension lumber, 1.8 million m³ of plywood, 7 million tonnes of pulp, 2.9 million tonnes of paper and paperboard, and 1.6 million tonnes of newsprint. Cutting, hauling, manufacturing and selling British Columbia's forest products directly employed about 7% of the province's workers in 1988. Exports totalled \$13 billion (\$7.3 billion from wood products, \$6 billion from paper products), about 48% of the total value of shipments of British Columbia's manufactured products (B.C. Provincial Government 1989). Though fluctuating strongly with the strength of our export markets, the volume and value of products produced by our forest industry have generally increased over the past decade. The latest Ministry Annual Report (B.C. Ministry of Forests 1990) shows total shipments of all products for 1988/89 to be up 4.4% from 1987/88.

Silviculture contracting is another important area of income and employment generation from forestry in British Columbia. In 1988, more than 900 000 person-days of employment were provided in the reforestation effort.

FORESTS AND COMMUNITY WATERSHEDS

Forested watersheds are by far the main water supply for the majority of British Columbians. Table 7 shows a breakdown of the general source of domestic water for the province. Eighty percent of the population obtains its water from small rivers and lakes located within forests. The remaining 20% of the population draws water from large lakes, reservoirs, large rivers, or groundwater supplies.

The quality and quantity of water within a watershed is largely a function of the intact forest cover. Tree cover controls snow storage and melt rates by snow interception, shading, and wind ablation, influencing both yield and streamflow. Peak flows with their consequent high soil erosion rates are reduced by an intact forest cover. In snow-dominated forested watersheds, seasonal snow melt rates are less and runoff from rain-on-snow events is less than in deforested watersheds. In coastal watersheds, fog drip from branches can also be an important source of summer flow.

TABLE 7. Domestic water sources in British Columbia

Population	Percent of B.C. population	Water supply source
1205000	50.3	Greater Vancouver Water District - Capilano, Seymour, Coquitlam watersheds
216000	9.0	Greater Victoria Water District - Sooke River Watersheds
221000	9.2	Main stem or large lakes
245000	10.2	Wells, springs and miscellaneous individual sources
512000	21.3	Community watersheds
2400000	100.0	

Water quality is maintained best in forested watersheds. On the coast, forested watersheds have landslide rates many times less than comparable logged watersheds. Slope stability is enhanced by the tree roots anchoring the steeply sloped soils. An intact forest cover shields the soil from raindrop erosion, as do the organic soil horizons. Overland flow of water is extremely rare in forested watersheds because of the high surface infiltration through the well-structured forest soils, and because of the macro-permeability provided by earthworm holes, burrows, and rotted root channels. As a consequence, rates of surface soil erosion are very low in forested watersheds.

In some watersheds, streambank erosion is one of the main sources of sediment supply. Streambank vegetation, however, can reduce streambank erosion and maintain stream channel morphology. A wide buffer of streamside forest can also act to filter sediment washing off adjacent disturbed hillslopes.

The importance of maintaining forested slopes in many community watersheds is illustrated by the high proportion of small watersheds that make up the provincial water supply. Small watersheds are, of course, much more susceptible to alterations in water flow or quality, because any disturbance will affect a high proportion of the watershed area. As shown in Table 8, there are 285 watersheds in British Columbia that serve as community water supplies. The majority of these watersheds (175) have an area of less than 15.6 km². These “Category I” watersheds are designated as having maximum protection from disturbance of forest cover. They serve 41% of the provincial population, yet they make up only 0.09% of the land area of British Columbia. The high value of small forested watersheds is emphasized by the fact that they serve, on average, nearly 700 people per 2.5 km² of watershed area.

Forests play a vital role in regulating water supply and maintaining pristine water quality in British Columbia. The relatively small percentage of the provincial forest land base that is within community watersheds combined with the high proportion of the population that depends on this type of water supply, indicates the high value of forests in watersheds.

TABLE 8. Population served by watersheds of different sizes

Watershed designation	No. of watersheds	Total population (No.)	Total population (%)	Total land area (km ²)	Population served per km ²
Category I (<15.6 km ²)	175	210085	41.0	836	251.3
Category II (15.6-90.6 km ²)	79	178368	34.9	3227	55.3
Category III (>90.6 km ²)	31	123529	24.1	7224	17.1
Totals	285	511982	100.0	11 287	n/a

RANGE

Crown range provides spring, fall, and summer forage to mainly cow/calf and yearling operations in British Columbia. Nearly 1 million animal unit months (AUM's), or 60% of the total forage requirement for beef production in the province, were produced on Crown rangeland in 1989/89 (B.C. Ministry of Forests 1990a). The remaining 40% (600000 AUM's) was produced on approximately one million ha of private pasture and rangeland.

Rangeland is often considered as land dominated by grasses, grasslike plants, forbs, or shrubs that are suitable for grazing or browsing by domestic livestock and certain wildlife. Range managers typically include as rangeland open, non-forested, plant communities such as natural grasslands, savannas, shrublands, deserts, tundra, coastal marshes, and wet meadows (Kothmann 1974). Forest land, however, may also be considered as range, particularly when the tree overstory has been removed by logging or burning, or when the forest canopy is sufficiently sparse to allow an understory of herbs and shrubs for grazing (Blaisdell *et al.* 1970).

The range resource in British Columbia is floristically diverse because of the wide variations in climate, physical characteristics, and historical use throughout the province. Both elevation and latitude play important roles in determining the kinds of plant communities that are available for domestic grazing.

Except for the Peace River area, the estimated 11 million ha of rangeland in British Columbia lies between the Coast Range and Rocky Mountains and spans a diversity of ecosystems including grasslands, wetlands, montane and subalpine forestlands, and alplands. Forest land is a particularly important component of the forage base, totalling nearly 80% of the provincial Crown range resource.

Eleven of the 14 biogeoclimatic zones in British Columbia are used to some extent for domestic livestock grazing (Table 9). The most important zones, in terms of forage production and extent, include the Bunchgrass, Ponderosa Pine, Interior Douglas-fir, Montane Spruce, Sub-Boreal Pine — Spruce, Sub-Boreal Spruce, and Boreal Black and White Spruce zones. The Mountain Hemlock, Coastal Douglas-fir, and Coastal Western Hemlock zones are not considered part of the range resource, although some local grazing does occur in these zones.

Considerable information is available describing range values for low-elevation grassland and southern forested biogeoclimatic zones (Tisdale 1947, 1950; Tisdale and McLean 1957; van Ryswyk *et al.* 1966; McLean 1970; McLean *et al.* 1971), but significantly less is known about the potential for livestock and the effects of grazing on high-elevation and northern zones. Few data are available describing range values for subzones, site associations, or seral plant communities, although descriptions at these levels would be more useful for range management than zonal descriptions would be. Similarly, the extent of provincial rangelands within each biogeoclimatic unit has not been documented.

TABLE 9. Biogeoclimatic zones used for livestock grazing in British Columbia, by Forest Region

Biogeoclimatic Zone	Forest Region					
	Nelson	Kamloops	Cariboo	Prince George	Prince Rupert	Vancouver
Alpine Tundra	X	X	X	X		X
Spruce — Willow — Birch				X		
Boreal White and Black Spruce				X		
Sub-Boreal Pine — Spruce		X	X	X	X	
Sub-Boreal Spruce		X	X	X	X	
Mountain Hemlock						
Engelmann Spruce — Subalpine Fir	X	X	X			
Montane Spruce	X	X	X			
Bunchgrass		X	X			
Ponderosa Pine	X	X	X			
Interior Douglas-fir	X	X	X			
Coastal Douglas-fir						
Interior Cedar — Hemlock	X	X	X		X	
Coastal Western Hemlock						

RECREATION

Recreational opportunities in British Columbia are managed by a variety of municipal, provincial, and federal government agencies. The three largest agencies involved are Parks Canada (national parks), the B.C. Ministry of Parks (provincial parks), and the B.C. Ministry of Forests (the provincial forest). The areas managed and the use of each are detailed in Table 10 (methods of recording use vary widely, and so any comparisons should be treated with caution).

Parks Canada manages four national parks (Glacier, Kootenay, Mt. Revelstoke, and Yoho), two national park reserves (South Moresby and Pacific Rim), three national historic parks (Fort Langley, Fort Rodd Hill, and Fort St. James), and many natural historic sites in British Columbia. The majority of the 6.7 million visits to Parks Canada sites in the province in 1987/88 were to the national parks and park reserves.

The 384 parks and recreation areas managed by the B.C. Ministry of Parks include 297 "Class A" parks (highest degree of protection) totalling over 4 million ha; 2 "Class B" parks (restricted resource development allowed) with an area of 25 000 ha; 30 "Class C" parks (community-type parks in Regional Districts) totalling 950 ha; 54 Recreation Areas (allowing multiple use when compatible with recreation) of 1.2 million ha; and one Wilderness Conservancy (a separate wilderness designation) of 132 000 ha. Use of provincial parks increased approximately 25% between 1983/84 and 1987/88 (B.C. Ministry of Environment and Parks 1988).

TABLE 10. Recreational use of federal parks, provincial parks, and B.C. Ministry of Forests recreation sites and trails (all fiscal year 1987/88)

Responsible Ministry	B.C. Ministry of Parks^a	B.C. Ministry of Forests^b	Parks Canada^c
Number of parks/ recreation sites	384	1234	9
Total area (ha)	5362602	-	4412000
Trail length (km)	-	7995	-
Wilderness areas (ha)	-	132000	-
Total recorded visits 1987/88	19642016	1841791	6984369

^a B.C. Ministry of Environment and Parks (1988).

^b B.C. Ministry of Forests and Lands (1989).

^c Canadian Parks Service Monthly Attendance. Environment Canada, Canadian Parks Service, Socioeconomic Information Division. Ottawa, Ont. (Monthly periodical).

The B.C. Ministry of Forests manages recreational resources on provincial forest lands, which make up approximately 85% of the province. Recreation sites and trails have been established “to provide the opportunity for recreation experiences and benefits by protecting recreation resources ... and managing their use,” and wilderness areas have been designated “to maintain and protect a wilderness resource ... and provide the opportunity for a wilderness experience.”¹¹ Logging is prohibited in wilderness areas; mining may be (this depends on the management objectives for the area). Because much of the recreation activity is dispersed throughout the provincial forest, rather than being concentrated on particular sites and trails, the recreation resource must be managed and integrated with other resources. The Ministry of Forests has created a Recreation Inventory (including recreation features, along with other biophysical and cultural amenity resources such as visual landscape sensitivities and values) and a Recreation Opportunity Spectrum (ROS) (a classification of the degree of remoteness and naturalness of an area). These have been mapped at a 1:50000 scale for most of the province.

WILDLIFE

British Columbia’s wildlife resource supports many uses and provides many benefits — recreational, scientific, sustenance-related, cultural, and commercial. B.C. Ministry of Environment has estimated that over 1 million people each year are engaged in recreational and commercial uses of wildlife in British Columbia. The total value of wildlife related activities to provincial residents exceeds \$1 billion annually (Wildlife Branch 1989).

¹¹ B.C. Ministry of Forests (1990b)

Non-consumptive wildlife viewing accounts for the majority of this use. About 1.3 million residents of British Columbia (65% of the adult population) had indirect non-hunting encounters with wildlife while on outings during 1983 (Reid *et al.* 1986). In addition, about 500 000 residents (24% of the adult population) participated in direct non-hunting wildlife activities, where the main purpose was recreation involving non-consumptive uses, primarily viewing, feeding, identifying, and photographing wildlife (Wildlife Branch 1989).

Currently there are approximately 130 000 licensed resident hunters in British Columbia. Resident hunting is concentrated on deer (Mule Deer, Black-tailed Deer, and White-tailed Deer), upland gamebirds, Moose, waterfowl, small game, Elk, and Black Bear (Reid 1985a).

Big game guiding, primarily of non-resident hunters, is a significant economic activity, particularly in the North and in the East Kootenays. Non-resident hunting is concentrated on Moose, Black Bear, Deer, Elk, Mountain Goat, Mountain Sheep, Caribou, and Grizzly Bear (Reid 1985b).

Trapping is also an important use of wildlife, particularly in rural and northern communities. Marten and squirrels are the most common pelts taken, followed by Muskrat and Beaver. Weasels, Mink, Lynx, and Coyote also make up a significant proportion of the total harvest. In response to fashion demands, Marten accounted for 71% of the raw fur sales value in 1987/88, followed by Lynx (9%), Beaver (7%), Mink (5%), and others (8%).

LITERATURE CITED

- B.C. Ministry of Crown Lands. 1989. British Columbia Land Statistics. B.C. Min. Crown Lands, Victoria, B.C.
- B.C. Ministry of Environment and Parks. 1988. Annual report 1987-88. B.C. Min. Environ. Parks, Victoria, B.C.
- B.C. Ministry of Forests and Lands. 1989. Annual report 1987-88. B.C. Min. For. Lands, Victoria, B.C.
- B.C. Ministry of Forests. 1990a. Annual report 1988-89. B.C. Min. For., Victoria, B.C.
- B.C. Ministry of Forests. 1990a. Recreation guide. B.C. For. Serv., B.C. Min. For., Integrated Resources Br., Victoria, B.C.
- B.C. Provincial Government. 1989. Quick facts about British Columbia 1989. Public Affairs Bureau, Victoria, B.C. Pamphlet.
- Blaisdell, J.P., V.L. Duvall, R.W. Harris, R.D. Lloyd, and E.R. Reid. 1970. Range research to meet new challenges and goals. *J. Range Manage.* 23:227-234.
- Kothmann, M.M. (chairman). 1974. A glossary of terms used in range management. 2nd ed. *Soc. Range Manage.* Belke Printing Co., Denver, Colo.
- McLean, A. 1970. Plant communities of the Similkameen Valley, British Columbia, and their relationships to soils. *Ecol. Monogr.* 40:403-424.
- McLean, A., T.M. Lord, and A.J. Green. 1971. Utilization of the major plant communities in the Similkameen Valley, British Columbia. *J. Range Manage.* 24:346-351.
- Reid, R. 1985a. The value and characteristics of resident hunting. B.C. Min. Environ., Wildl. Br., Victoria, B.C.
- _____. 1985b. The value and characteristics of non-resident hunting. B.C. Min. Environ., Wildl. Br., Victoria, B.C.
- Reid, R., M. Stone, and F. Rothman. 1986. Report on the British Columbia Survey of non-hunting and other wildlife activities for 1983. B.C. Min. Environ., Wildl. Br., Victoria, B.C.
- Statistics Canada. 1987. Agriculture. British Columbia, Census Canada 1986. Statistics Canada, Min. Supply Serv. Can., Ottawa, Ont.
- Tisdale, E.W. 1947. The grasslands of the southern interior of British Columbia. *Ecology* 28:346-365.
- _____. 1950. Grazing of forest lands in interior British Columbia. *J. For.* 48(912):856-860.

- Tisdale, E.W. and A. McLean. 1957. The Douglas-fir zone of southern interior British Columbia. *Ecol. Monogr.* 27:247-266.
- van Ryswyk, A.L., A. McLean, and L.S. Marchand. 1966. The climate, native vegetation, and soils of some grasslands at different elevations in British Columbia. *Can. J. Plant Sci.* 46:35-50.
- Wildlife Branch. 1989. Provincial wildlife strategy. B.C. Min. Environ., Victoria, B.C.