Clearcut Policy and Utilization Standards in British Columbia

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Executive Summary

A typical logging site in British Columbia's old-growth forest contains not only highly valued mature timber but also a large amount of smaller, younger and inferior timber of very little value. To prevent the industry from wasting this small and inferior timber, the BC Forest Service developed close utilization standards - regulations requiring timber above a minimum size to be removed from a harvested site.

Since close utilization standards form the basis for the calculation of the merchantable timber inventory, tighter standards increase that volume and thereby increase allowable annual cuts.

Data from a representative logging site on the BC coast indicate that 73% of the logs removed under the close utilization policy were uneconomic, suggesting that, if the policy were not in effect, the majority of trees might have been left standing. The forced removal of uneconomic timber from this site reduced the profitability of logging from a potential net profit of $3346 per hectare to a net profit of $604 per hectare; a difference of $2742 per hectare, indicating that arbitrary utilization standards may be reducing the potential rents from BC's forests by millions of dollars.

Close utilization standards encourage the conversion of complex old-growth forest to simplified and weakened managed forest. Favouring a narrow range of commercial tree species over the rich diversity of old-growth forest, the government's industrial forest management policy reduces the forest's resilience to environmental stress and its long-term productivity.

Economically and ecologically costly, utilization standards decrease the profitability of logging and encourage undesirable forestry practices. Utilization standards contribute to harvesting at unsustainable levels. The rapid expansion of processing capacity encouraged by tighter standards endangers the long-term economic viability of the Canadian forest industry.

Regulated utilization standards constitute a major institutional obstacle to the conservation of our forest resource. The standards should be rescinded.

Allowable annual cuts should be economically and ecologically determined by local communities with a stake in the economic stability and ecological integrity of their environments. Regulated annual cuts based on arbitrary definitions of merchantable timber inventories should be abandoned.

Introduction

Over the years, British Columbia's public forest managers have promoted increasing timber yields from public forests in the belief that more timber volume means more processing, more jobs and therefore greater benefit to society. Timber yields have increased manyfold over the years, as new techniques and economies have opened up virtually all of British Columbia's crown forests to industrial forest management. But a large proportion of the present allowable annual cut (AAC) makes no economic or technical sense. As much as one-fifth of BC's AAC occurs by government fiat. A central tenet of this policy is utilization standards.

The BC Ministry of Forests sets minimum utilization standards for all timber harvesting on public land in the province. Called "close utilization" standards, any log above a stump 30 cm high, longer than 3 m and larger than 15 cm in diameter inside bark at its top in old growth, and 10 cm in second growth, must be removed from a clearcut area. (Close utilization standards are slightly different in the interior of the province.) Utilization standards for harvested timber increase timber yield per hectare by enforcing the removal of smaller, inferior timber.

But these arbitrary utilization standards are expensive. Forest policy in British Columbia deliberately enforces the harvesting of timber for which the cost of harvesting exceeds the benefit.

As the industry cuts the prime timber and relies more upon timber of lower quality, this policy increasingly jeopardizes the financial health of the forest industry and the stability of communities that rely upon it. Additionally, utilization standards have reinforced the industry's reliance on clearcut harvesting practices, degrading public forests and encouraging cutting at rates far beyond sustainable levels.

Close utilization policy promotes poor forest management

Utilization standards form the basis for a range of better known management rules. In British Columbia, the definition of merchantable timber relies upon a regulated standard of utilization. The smaller the standard, the greater the volume of merchantable timber. Stringent utilization standards have resulted in larger AACs and have been partly responsible for the rapid expansion in processing capacity over the last twenty years, especially in the pulp and paper industry where utilization standards have encouraged the use of inferior quality timber unsuited to lumber production.

BC's utilization standards have increased the volume of timber cut in provincial forests. But this policy ignores environmental quality and the economic value of public forests - both of increasing importance to society.

The calculation of AACs depends critically on the utilization

standard.[1] When the Forest Service sets the rate of harvesting for timber on crown land, it considers the composition of the forest and its expected rate of growth, the productivity of the site and its capacity for regeneration, and the standard of timber utilization. The more stringent the standard, the greater the volume of timber considered harvestable and consequently the higher the rate of harvest.

After harvesting, an inspection determines the volume of waste: timber which should have been removed, according to the minimum standards, but has been left. BC's policy classifies waste as either unavoidable - that which cannot be removed with a reasonable effort because of physical impediments and safety reasons - or avoidable. The volume of avoidable waste is calculated as an average of avoidable waste measurements from sample plots within all cut blocks logged in the calendar year. The government charges stumpage on avoidable waste at the average billed stumpage rate for the preceding 12 months.

The Development of Utilization Standards

Forest managers introduced utilization standards to prevent the "cut and run" wasteful forestry practices of the 19th century, mistakenly believing that the pursuit of profit blinded the industry to the value of public timber. But at the time of confederation, the industry had no incentive to husband the resource because of the apparent abundance of virgin timber, and

because the industry only had short-term harvesting rights to the timber. Private enterprise began investing in successive crops, and conserving existing forests, only when virgin timber became relatively scarce, and harvesters were granted security of tenure to future forests.

Unfortunately, these underlying economic causes for cut and run forestry practices have been misunderstood. And rather than correcting the underlying causes of wasteful practices, forest managers have focused on conservation of wood fibre and have ignored the high cost of removing uneconomic timber.

Until January 1989, utilization standards in BC specified a minimum piece size but allowed a margin of avoidable waste - up to 35 m^3 per hectare in the coast region. Waste above the regulated minimum level was charged stumpage but was not deducted from the AAC. This encouraged a harvester to "highgrade", removing only the profitable timber from a logging site and leaving uneconomic timber if the stumpage to be paid on the avoidable waste were less than the net cost of removing it, without penalty to his AAC.

If, for example, the AAC for a cut block were 100,000 m^3 and 25,000 m^3 of that allowance were "avoidably" wasted (a normal level for operations on the Queen Charlotte Islands in the period 1981-1985), only 75,000 m^3 would be deducted from the AAC and the

company would be allowed to make up the difference from a subsequent cut block. This policy not only encouraged highgrading but allowed logging at levels far exceeding the long run sustainable yield for an area, as uneconomic logs could be abandoned and the reduction in AAC replaced by more valuable logs from other sites.

In 1981, in the trough of a recession, the BC government introduced a policy of "sympathetic administration" designed to cushion cash-strapped forest companies. In an internal memorandum to Forest Service officials, then Deputy Minister T. M. Apsey (now head of the industry lobby group, the Council of Forest Industries of BC) instructed officials to "use the velvet-glove approach instead of a ten-pound sledgehammer."[2] In practice, the Forest Service allowed waste over and above the 35 m^3 per hectare regulations and, in some cases, forgave stumpage charges and allowed harvesters to postpone reporting high waste areas to reduce their average in a given year.

The unwritten policy of "sympathetic administration" only came to light after newspaper articles in December 1987[3] exposed a flagrant series of violations of the written waste regulations on the Queen Charlotte Islands. The BC Forest Service responded to the ensuing public outrage by developing new "zero tolerance" avoidable waste standards. These standards set the avoidable waste limit at zero cubic metres per hectare, and most

significantly, bill all avoidable waste against the AAC, thus ending profitable highgrading.

The experience of the last few years demonstrates the flaws in the Forest Service's zero tolerance standards, as rather than making utilization standards more rational they became even more arbitrary and less sensitive to economic forces. Waste surveys costing thousands of dollars routinely report little or no chargeable waste.[4] The fiscal hardship many forest companies are now experiencing will doubtless encourage them to seek a more sympathetic utilization policy.

The economic cost of close utilization standards

Economic theory suggests that all timber be harvested for which the benefit of doing so exceeds the cost, and that harvesting continue until the incremental benefit from the last piece harvested equals the incremental cost of its harvest. The limit of harvesting depends on a variety of factors of cost and benefit. Where operating costs are lower or timber prices are higher, more timber will be harvested. In more remote areas, areas of rough terrain or inhospitable operating conditions, or where other factors impose higher operating costs[5] and where timber prices are lower, less timber will be harvested. In short, under optimal economic conditions, utilization standards would vary with timber price and geographic location.

Arbitrary standards, insensitive to market conditions and operating costs, are more costly the more they deviate from an optimal economic standard. Data from a representative logging site in the coast forest region of British Columbia indicate that only 27% of the logs removed under close utilization standards proved to be economic.[6] However, because larger logs are more valuable and more likely to be economic, these 27% contained about 59% of the volume removed. The forced removal of uneconomic timber from this site had a significant impact on the profitability of logging.

Under close utilization standards, logging yielded an estimated net profit of $604 per hectare.[7] If the uneconomic material had been left on the site, according to an economic standard of utilization, logging would have yielded a net profit of $3346 per hectare (a difference of 554%). In 1988-1989, the latest period for which figures are available, the stumpage collected in the Vancouver forest region, representing most of BC's coast forest, was $134 million. If utilization standards were abandoned in this region, and stumpage rates were set to collect the net profit, stumpage in the Vancouver forest region might be as high as $725 million, nearly double the stumpage collected in the entire province in 1988-1989.

If utilization standards were abandoned, and uneconomic timber left, this site would be more than five times more profitable

than under the present system. Without utilization standards, many fewer trees would have to be removed to generate the same level of profit that is generated with them. On this site, for example, the original profit of $604 per hectare could be obtained by removing less than 5% of the timber on this site, or conversely by removing all the economic timber on only one-fifth of its area. If this data is representative of logging sites on the BC coast, this result suggests that 95% of the logs harvested under the present system add no economic benefit.

Closer examination of the data from this site reveals that of all the trees harvested, a mere 10% contributed 83% of the gross profit, 15% contributed 95% and 20% contributed 99% of the gross profit. Since only 27% of the trees on this site contributed positively to profit, the remainder would not have been removed under an economic standard of utilization. Indeed, were market forces allowed to dictate, the remaining 73% might potentially have been left standing - obviating the need to reforest and foregoing all the negative ecological consequences of clearcutting, shortening the length of time to the next harvest and increasing immensely the productive value of the site.

Alternatives to clearcutting, such as selection logging or shelterwood logging, are generally more expensive (per unit of volume) than clearcutting. If this site were selectively logged, probably fewer than 27% of the trees would be economic to remove,

as the economic cut-off size (the size of the smallest profitable log) would have to be larger to accommodate the higher costs. Despite the higher costs of alternative harvesting methods, abandoning utilization standards will increase the profitability of logging, create more forest management jobs and require cutting fewer trees.

Close utilization standards promote unsustainable rates of cut

Utilization standards form the basis for determining the inventory of timber and the allowable rate of cut but have no relation to the economics of timber harvesting. For this reason, the British Columbia 1976 Royal Commission on Forest Resources identified the urgent need for a "systematic method of identifying that portion of the physical inventory that can reasonably be considered [economically] harvestable in the foreseeable future."

A study of operating costs on the BC coast found that, while the industry was experiencing the full range of potential costs of recovery, it did not follow that all the remaining inventory was worth the cost of harvesting it.[8] Because geographic location largely determines recovery cost, the industry faces serious impending economic timber supply shortages as it cuts the prime timber and makes the transition to smaller and more remote timber.

The coast forests of BC contain 1.728 billion cubic metres of mature timber, which at the present rate of harvesting (25.8 million cubic metres annually) should last for some 62 years.[9] However, a study of the economic stock of timber in the coast region of BC recognized "that the economic stock of timber, or that portion of the physical inventory which can be recovered profitably, is much smaller than the physical stock."[10]

This study found the average operating cost for the entire remaining inventory to be $48 per cubic metre (1986$) and the average stand value to be about $38 per cubic metre.[11] The surplus of gross value over operating costs varies from -$50 per cubic metre to $35 per cubic metre, with an average for the entire inventory of -$10 per cubic metre. The study concluded that 74% of the coast forest cannot be considered profitable under current economic conditions. The remaining 26%, if current harvesting rates continue, will be depleted in less than 15 years.

Relaxation of utilization standards enforcing the removal of low value timber can improve the profitability of otherwise uneconomic sites. The profitability of the inventory improves substantially if the lowest value logs are not removed. Williams and Gasson demonstrated that if the two least valuable grades of logs were not removed, the entire inventory became profitable. These logs, however, are estimated to represent 18% of the total

inventory. If they are not to be removed, the AAC must be reduced by 18%.

Profit-seeking produces lower annual cuts. Regulations based on physical targets alone make poor use of our forest resource and place the forest's future in financial jeopardy.

The government's enthusiasm for regional economic development at any price, and the seeming abundance of mature timber in British Columbia, has contributed to a significant expansion of processing capacity in the forest industry. AAC regulations allow a license holder to exceed or undercut its AAC by 50% in a given year and by 10% over five years without penalty. When timber prices are high, the industry accelerates its cut, and expands its processing capacity. When markets are depressed and timber prices fall the industry finds itself in dire straits due to high levels of unemployed capacity and associated high fixed costs.

In 1987, British Columbia's AAC was 75 million m^3 and the harvest was 91 million m^3, but the manufacturing capacity of the industry was approximately 100 million m^3.[12] The reduction in long-run sustainable yield of 10% per decade expected with the transition from old-growth to second-growth forests will result in an AAC of 55 million m^3 by 2010.[13] With so much capital sunk in processing capacity, the industry can be expected to stubbornly resist any

effort to reduce allowable cuts to sustainable levels in the short-term.

The ecological cost of close utilization standards

Only very recently has research begun to illuminate the complex relationships that give life to a forest. Forest science has been predominantly interested in the productivity of forests for wood fibre alone. Goaded by public pressure, public forest managers have only recently begun to manage for other values. Integrated resource management includes management for fisheries, wildlife habitat, water quality and the prevention of soil erosion, and human recreational and aesthetic considerations. Integrated management unfortunately ignores a myriad of relationships essential to a natural and dynamic forest.

Industrial forestry emphasizes the conversion of old-growth forests to single-species managed-growth forests. Old-growth forests, or decadent forests, as they are called by foresters, are in a state of zero-growth - a balance between new growth and decay. The low, perhaps even negative, wood fibre productivity of an old-growth forest prompts foresters to replace the old-growth forest with an even-aged, simplified forest plantation.

A large body of evidence suggests, however, that artificial methods of boosting productivity ignore the thousands of unseen interactions in the forest ecosystem and, if effective at all,

are effective only in the short term.[14] Clearcutting and slashburning, far from replicating natural processes, as foresters maintain, seriously impair the forests' long-term productivity. Large scale tampering with the natural equilibrium of a forest further imperils its ability to withstand environmental stresses like those from acid rain and airborne pollutants.

But timber harvesting and industrial forest management are by far the most damaging stress humans impose on our forests. Roadbuilding, clearcutting and site preparation pose the greatest threat to the long-term productivity and resilience of the forest. The majority of ground water displacement and subsequent soil erosion and stream siltation occurs as a result of building roads. Clearcutting destroys much of the forest understory - species that rely on the shelter of the mature timber overstory - and exposes the soil to higher levels of winter precipitation, stronger winds and hotter summer temperatures. Site preparation, undertaken prior to replanting or in order to accelerate natural regeneration, most frequently involves slashburning, but includes hand and machine brush clearing, chemical herbicide treatment, and scarification (mechanically tilling the upper soil strata and removing brush).

The industry's insistence on replacing the original balanced forest with an engineered forest also poses serious problems. In

an old-growth forest, insect populations exist in equilibrium. Herbivorous insects, those feeding on trees and other forest flora, are roughly balanced by predatory insects that eat other insects. In a monocultural, even-aged forest, herbivores outnumber predators by a wide margin and become "pests" that must be managed.[15] The widespread infestations of Spruce Bud Worm in the dryer interiors of the Pacific Northwest, and the Root Bark Beetle in stands of Douglas-fir may be the direct result of our disrupting the natural equilibrium in our forests. Infestations of herbivorous insects in turn necessitate increased reliance on chemical insecticides, further weakening the ecological resilience of the forest by removing innocent insect bystanders. Frequent management incursions into the forests, such as for intensive silvicultural treatments like juvenile spacing, can also accelerate the spread of forest pathogens like the Black Stain Fungus that attacks the roots of Douglas-fir.

Industrial forest management simplifies the forest in three ways: genetically, temporally and structurally. Genetic simplification occurs when a monoculture forest, often genetically engineered, replaces a species-diverse old-growth forest. The replacement of an uneven-aged forest in which the median tree age may be 400-500 years with some trees living in excess of 1000 years, to an even-aged forest, in which the median tree age is 40-50 years and no trees survive beyond maturity, results in temporal simplification. "Fully stocked young forests, the forester's

ideal, are the most simplified stage of forest development in terms of structure and function, and the most impoverished in terms of biological diversity."[16] Short-circuiting the natural succession of species that leads to a diverse old-growth forest eliminates a series of intermediate tree species. Where they do appear in a managed forest, they are systematically eradicated, either by mechanical or chemical means.

Structural simplification, upon which utilization standards have the most bearing, involves clearing the forest floor and replacing a natural jumble of standing and downed, live and dead trees in various states of decomposition, with a geometrically spaced forest of uniform tree sizes and heights. This dramatic modification of the natural forest landscape affects all life in the forest.

The ecologically useful life of a tree extends far beyond its living stage.[17] Downed trees, in addition to decomposing and recycling nutrients to the forest floor, trap water and other organic matter, arresting erosion, enhancing the forests ability to hold water and speeding the decomposition and natural fertilization that leads to new life in the forest. Downed trees provide habitat for small mammals like squirrels and chipmunks and untold numbers of insect species. "Dying and dead wood provides one of the two or three greatest resources for animal species in a natural forest ... if fallen timber and slightly

decayed trees are removed the whole system is gravely impoverished of perhaps more than a fifth of its fauna."[18] But utilization standards prohibit leaving this timber in the forest if it is considered merchantable, even if it is not economic to remove it.

Conclusion

Utilization policies were designed to encourage the removal of the maximum volume of timber from the forest, based on the misconception that abandoning uneconomic timber is wasteful. But these policies degrade and devalue the forest resource.

Management objectives should be to maximize timber and non-timber values, not volume. Policies that encourage the removal of small and inferior logs to conserve wood fibre waste money, and bureaucratic justifications for accelerated allowable cuts do not guarantee a secure supply of economic timber.

Abandoning utilization standards will have far-reaching implications. AACs will be smaller, as market forces and site-specific ecological considerations determine the merchantable stock of timber. Clearcutting may become much less prevalent in most areas, as economics and ecology favour leaving timber standing, making costly artificial regeneration unnecessary, preserving forest cover and reducing environmental damage. The forest industry will employ more people as intensive forestry

jobs replace the heavy machinery used for large-scale clearcutting. And benefits from timber harvesting will increase at the same time as environmental pressures on Canadian forests decline.

Because of the overwhelming evidence that utilization standards are economically unsound, environmentally costly and promote the damaging practices associated with clearcutting, they should be rescinded. The standard of utilization should be determined on a stand-by-stand basis, where economic and ecological factors are considered.

The calculation of the merchantable timber inventory and the subsequent determination of AACs must take into account not only physical factors, but economic, social and ecological factors as well. The present system of allowable annual cuts, where rates of cut are set far from the forests, and promote harvesting at rates that are clearly unsustainable, should also be abandoned. AACs are better determined by a decentralized system of forest management where individual watersheds and stands of timber are assessed based on economic and ecological considerations.

Notes

1. The British Columbia Forest Act states that "In determining an allowable annual cut ... the chief forester shall consider [among other things] the standard of timber utilization expected to be applied with respect to timber harvesting on the area" RS Chap. 140:7(3)(iv).

2. Christie McLaren, "Quest for profit leaves timber to rot," Globe and Mail, 12/30/1987, p. A4.

3. Christie McLaren, "People in BC logging town fear riches running out," Globe and Mail, 12/28/1987, P. A1; "BC firm didn't report all its timber waste," Globe and Mail, 12/29/1987, P. A1; "Quest for profit leaves timber to rot," Globe and Mail, 12/30/1987, p. A4.

4. Personal communication, Jim Gowriluk, Utilization forester, Timber Harvesting Branch, BC Ministry of Forests, January 1991.

5. Morrison, Peter, et al., The Recovery Cost of the Merchantable Timber in Coastal British Columbia, Information Report 85-8, FEPA, December 1985.

6. Uhler, Russell S., and Peter D. Morrison, Utilization Standards and Economic Efficiency in British Columbia Forests, FEPA, Report 86-1, March 1986. The data were obtained from a coastal site selected because it was thought to be representative of the coastal forest in general. Detailed data on tree species, size and grade, selling price and harvesting cost were collected.

7. This profit was estimated under the current system of stumpage. In British Columbia, the provincial government charges royalties on the volume of timber removed, and the volume of avoidable residue left as waste. This reduces the price of logs to the logging operator, raises the economic cut-off size of logs and reduces the profitable volume of timber removed from a site. A non-distorting stumpage system would levy a royalty on the value of timber removed rather than the volume.

8. Morrison, Peter, et al., ibid., p. 15.

9. Douglas H. Williams and Robert Gasson, "The Economic Stock of Timber in the Coastal Region of British Columbia," Forestry Economics and Policy Analysis Project, Report 86-11, Vol. 1, revised, December 1986.

10. ibid., p. 2.