

Visual Resource Management in British Columbia: Part I

**The effects of visual resource
management on timber availability:
A review of case studies and policy**

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Abstract

This paper explores relationships between visual resource management (VRM) and timber availability in the context of recent findings and current VRM policy in British Columbia. Selected North American case studies and relevant aspects of visual resource management in British Columbia are reviewed. Both research and practice indicate that public preferences for landscapes generally decrease as visible landscape alteration increases. Visual resource management requirements in visually sensitive areas are typically viewed as a major constraint on timber supply where conventional clearcutting is the main harvesting method. However, for a given level of timber removal, people may react more adversely to clearcutting than to partial cutting distributed over a larger area. This raises the possibility of increased timber availability under alternative forest practices in visually sensitive areas. Therefore, forest managers have a number of possible options for resolving perceived conflicts between visual resources and timber availability. Current policies and regulations in British Columbia provide district managers with sole discretion (unless otherwise specified in a Higher Level Plan) in the management of the province's visual resources. This allows for potential variations in how VRM is applied from one forest district to another, and emphasizes the district manager's central role in striking a balance between visual quality and timber availability in British Columbia's forested landscapes.

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Introduction

The conflict between timber supply¹ or timber availability² and landscape aesthetics has been a major issue for over 30 years in North American forestry. It helped fuel the “clearcut crisis” of the 1970s in American national forests, and led to the implementation of a major program of visual resource management in the U.S. Forest Service. This situation led, in turn, to development of visual resource management programs in other regions and jurisdictions, such as British Columbia. In British Columbia, conventional forest management has often been seen as conflicting with landscape aesthetics and other resource values associated with tourism, recreation, and aspects of community quality of life.

Visual resource management (VRM), as practised in the province, has resulted in the implementation of detailed procedures to protect the more visually sensitive landscapes, and has successfully reduced conflict over landscape aesthetics in many such areas (Sheppard 2000). However, these protective measures are typically interpreted as constraints on timber supply. Over the last two decades, the use of Visual Quality Objectives (VQOs), which set visibility thresholds for human-caused alterations (see Table 1 for definitions), has substantially limited timber harvesting in highly visible and scenic areas; this reduction is routinely factored into Allowable Annual Cut calculations (B.C. Ministry of Forests 1998b). Essentially, VQOs act as a sliding scale of allowable landscape modification. However, assessing the effect of VQOs on timber availability is a complex exercise because of the overlaps and interactions between different resource values or objectives.

This paper examines alternative harvesting and planning practices (such as partial cutting and landscape design) that offer the possibility of maintaining visual quality while releasing increased timber volumes. Selected case studies relevant to the relationship between timber availability (and timber supply in some cases) and landscape aesthetics in North America are reviewed, followed by a brief overview of current legislation and

Increased partial cutting can allow for greater timber harvests and still maintain or improve the level of visual quality.

policy in British Columbia as it pertains to VRM and timber availability. Also included is a discussion of implications and options for reconciling visual quality and timber availability conflicts.

Review of the Relationships Between Aesthetics and Timber Availability or Supply: Selected Case Studies

In an attempt to gauge the effects of visual resource management on timber availability, we examine specific North American case studies that assess various forest harvesting approaches. These case studies portray different levels of visual resource management and different harvesting conditions, and, therefore, illustrate a wide range of effects on timber availability. We discuss these cases in terms of overall influence on timber supply and availability, impacts on timber harvesting costs, effects on delay of harvesting due to green-up requirements, and limits on the area available for harvesting.

Effects on Timber Availability and Cost

Fight and Randall (1980) attempted to assess the cost (\$/acre) of enhancing the visual quality of forest lands (to meet a Partial Retention VQO³ from middle-ground) in the Mt. Hood National Forest, located in Oregon. The same silvicultural treatments (i.e., planting, pre-commercial thinning, commercial thinning, and a final cut) were undertaken on pairs of similar areas and the same volume was harvested using different approaches (one using conventional practices, and one using

¹ The B.C. Ministry of Forests defines “timber supply” as: the available timber categorized by species, end-use, and relative value (B.C. Ministry of Forests 2001). However, for the purpose of this paper, timber supply is used as an estimate of future timber supplies over long planning horizons (more than 200 years).

² In this paper, the expression “timber availability” is used in the context of current or near-term timber availability. Availability incorporates both the biophysical and the legislative availability of timber. Availability does not necessarily take into account forest growth rates, which should be included if longer-term timber supply is being considered.

³ Definitions of visual quality objectives under the U.S. Forest Service Visual Management System (U.S. Forest Service 1974) are broadly similar to those defined under the British Columbia system (see Table 1).



TABLE 1. Visual Quality Objective (VQO) definitions (B.C. Ministry of Forests 1997c) and corresponding percent denudation ranges (measured in plan) allowed for each VQO, when clearcutting is used (B.C. Ministry of Forests 1998b)

Visual Quality Objective (VQO)	Definition	% denudation allowed for each VQO
Preservation	No visible alterations	0–1
Retention	Human-caused alterations are visible, but not evident	1.1–5
Partial Retention	Human-caused alterations are evident, but subordinate and do not dominate	5.1–15
Modification	Human-caused alterations are dominant, but have natural-appearing characteristics	15.1–25
Maximum Modification	Human-caused alterations are dominant and out of scale	25.1–40

practices designed for visually sensitive areas). Visual sensitivity was addressed through a combination of large planting stock, thorough slash cleanup, staged timber removals, long rotations, and shaped harvest blocks in small units. Consequently, there was an increased cost at roadside of about 14%. Fight and Randall found no evidence of any impact on the timber availability (in terms of cubic metres available) from the visual resource management practices.

Stier and Martin (1997) looked into the financial impact of visual and forest cover constraints for private forest land owners along a river in Wisconsin valued for recreation. In this case, three visual zones were established:

- River Edge Zone: 25 m on each side of the river with a “no touch” rule.
- Bluff Zone: 30 m on each side of the skyline (top of bluff) as seen from the river, where only selective logging (removing 30% on average of the basal area) was allowed.
- River View Zone: All land occurring between the two previous zones. No clearcuts over 2.5 ha were allowed and no more than one-third of the land could be clear-cut per 10-year period. Adjacency constraints were applied and if partial cutting was used, up to 50% of the basal area was allowed for removal.

The projected effects of this regime were modelled over 15–20 years for five management scenarios (control, unregulated selected thinning, unregulated diameter-limit cut, basal area regulated thinning, and regulated patch clearcut). Reductions in present value

of forest lands attributed to visual and forest cover constraints ranged from 0% to 18%. However, the magnitude and direction of the effects on timber supply could not be estimated from current stand conditions alone (Stier and Martin 1997). For example, “high-grading” harvests, undertaken to meet visual quality constraints but still allow some flow of timber, may reduce the short-term financial effect of visual constraints, but may jeopardize future harvests and worsen the long-term impact. Also, the influence of VRM practices on timber supply depends on what the owner would do if no visual restrictions existed (Stier and Martin 1997). In other words, VRM may not have much of an impact if the land is not logged for other reasons (other regulations, poor market conditions, water quality, soil stability, etc.). The critical measure is not the percentage of merchantable timber, but percentage of timber that would otherwise be available. This finding emphasizes the importance of the assumption that licensees would harvest more wood in visual zones in the absence of visual management.

In a third study conducted for a road corridor in California, VRM practices were found to increase timber availability as well as improve the scenery by opening up views (McDonald and Litton 1998). The harvest method was a combination of commercial thinning, non-commercial thinning, and brush removal. Thinnings were based on initial ratios of species composition and diameter classes (per species). Twenty-seven percent of the basal area (and 53% of the trees) was removed along a roadside, which enhanced the view and met the equivalent of British Columbia’s “partial retention” VQO (McDonald and Litton 1998). These results



highlight the importance of linking landscape design and silviculture to preserve visual quality and recreational experiences while allowing some harvesting.

In British Columbia, Clay (1998) successfully achieved a “retention” VQO in phase one of a harvesting approach that employed irregular strip shelterwood treatments in the Nelson Forest Region. The management scenario involved a 90-year rotation with entries every 30 years (three entries total), removing approximately 180 m³ per ha at each entry. Clearcut strips, sandwiched between partial-cut strips and then reserve strips, were harvested in the first entry. In the next entry, the reserve strips will be partially cut and the initial partial-cut strips will be clear-cut. In the last entry, the initial reserve strips (partially cut in the second entry) will be clear-cut and the cycle will start again. Volumes harvested through this staged removal are not compared with those that could be harvested with clearcutting over a 60-year rotation; however, costs are estimated to be 20% higher than with clearcutting, although cost increases are expected to decline with increased experience (Clay 1998). The success of this operation was attributed to the involvement of highly motivated loggers in all aspects of layout and harvesting.

In the Robson Timber Supply Area (TSA) in British Columbia, the use of clearcutting in conjunction with partial cutting (via uniform selective harvest) within scenic areas was analyzed in relation to its effect on timber supplies and availability (Industrial Forestry Services and B.C. Ministry of Forests 1998). The results of this analysis show that both short-term timber availability and long-term timber supply will increase when partial cutting is chosen over clearcutting in the more visually constrained areas. More specifically, partial cutting of 22% of the stands within scenic areas could increase timber availability by as much as 58% and timber supply by 36% (Industrial Forestry Services and B.C. Ministry of Forests 1998). These results may be underestimated because no current visible alterations were assumed to exist in the Visual Landscape Units⁴, which is unlikely to be the case. Another interesting point revealed by this study was that silviculture foresters, intimately familiar with partial cutting, believed that any stand can be partially cut, while licensees (also experienced with partial cutting) believed the opposite (Industrial Forestry Services and B.C. Ministry of Forests 1998). Clearly, more research is needed to

determine the economic viability and benefits of partial-cutting approaches.

In the coastal Strathcona TSA, a similar study was conducted that evaluated timber availability using partial cutting versus clearcutting in scenic areas subject to VQOs (Timberline Forest Inventory Consultants and Rowe 1999). This study concluded that wood availability in scenic areas is increased considerably (36–46%, depending on the scenario considered) with the use of partial cutting and that most of this increase comes from the areas under a partial retention VQO. These gains are achieved despite the relatively small proportion of areas considered suitable for partial cutting (14–25%) (Timberline Forest Inventory Consultants and Rowe 1999). Once again, this study showed that partial cutting could be carried out in most stands in the Strathcona TSA, but that increased costs were also a limiting factor. The authors noted that without partial cutting, much of the timber is otherwise unavailable (Timberline Forest Inventory Consultants and Rowe 1999).

Another study on the effects of partial cutting on the timber supply of the Arrow, Cranbrook, and Golden TSAs (Wang and Pollack 1998) found that a gain in annual harvest of 2–3% could be achieved in the first decade as a result of partial cutting in areas subject to VQOs. In the Arrow TSA, decade-one harvests are expected to increase 3–5% by using partial cutting (Wang and Pollack 1998). Note that these results are TSA-wide increases achieved from partial cutting only portions of the TSA (i.e., areas under VQOs); this means that the local increase or benefit from partial cutting may be significantly higher in specific and highly constrained areas (e.g., the Slokan Valley). However, Wang and Pollack report that the Arrow TSA already uses partial cutting on 25% of the area harvested and on 35% in areas subject to VQOs. They conclude that the potential gain realized through partial cutting is already being utilized in the Arrow TSA (Wang and Pollack 1998). This may not be the case, however, since other recent documents indicate that approximately 90% of the harvesting in this TSA is carried out under an even-aged management regime (B.C. Ministry of Forests 1999). This difference may be due to the definition given to “partial cutting.” Wang and Pollack (1998) define partial cutting as a two-stage treatment in which all of the volume is removed in two passes, while the Ministry of Forests (1999) defines partial cutting as harvesting

⁴ The present paper also assumed no initial denudation in visually sensitive areas.



that falls under uneven-aged management regimes. Wang and Pollack (1998) also found that the annual harvest increase (or decrease) that could be achieved through the use of partial cutting was very sensitive to the determination of minimum economic volumes (for partial cutting). This last finding stresses once again the importance of economic viability in the success of any partial-cutting operation.

In the Nelson Forest Region, Crampton (1995) located areas subject to VQOs that could benefit from visual rehabilitation and therefore have an influence on short- and long-term timber supplies. The rehabilitation of existing clearcuts in visually sensitive areas (using landscape design and partial cutting) was the main focus of this study for short-term wood opportunities (Crampton 1995). Applying this approach in the Arrow District led to an increase in the acceptable percent denudation⁵ to 15–25% for a “partial retention” VQO (e.g., allowing a 10% increase) and 30–40% for a “modification” VQO (also allowing a 10% increase). These increases generate a short-term volume of 17 875 m³ over 55 ha (at 325 m³/ha) throughout the Arrow Forest District. However, the rationale for such percent denudation increases is not clear. These increases are the assumed result of active visual landscape design and visual rehabilitation of specific cases. Also, the study does not consider the use of partial cutting as a means to “unlock” timber within those areas constrained by VQOs.

Effects on Harvesting Delay

In assessing the effect of visual resource management on timber availability, a crucial point is to determine how long harvested stands will take to be “visually healed.” This process of restoring a “natural” visual appearance directly affects the time lag before more logging activities are allowed in its vicinity. In British Columbia, the concept used to make such a determination is called “visually effective green-up” (VEG)—“the stage at which

regeneration is perceived by the public as newly established forest” (B.C. Ministry of Forests 1998b). However, the U.S. Forest Service has used the notion of “effective alteration,” which is defined as the “percent of noticeably altered lands at any one time” (U.S. Forest Service 1981). The U.S. Forest Service defines “noticeably altered” as extending through post-harvest regenerated stands that are noticeable as visual contrasts. This presumably means that the American system has a more severe effect on timber availability because of the longer delays before achieving visually acceptable “green-up.” Since VEG determines the time at which a given stand ceases to contribute negatively to visual quality, this could cause major variations in the effect of management policy on timber availability. In general, the sooner VEG is reached, the lesser is the impact of the management regime on timber availability for any level of VQO.

Limits on Harvesting Area

The extent of human-caused alteration is used to define adherence to VQOs in British Columbia and is expressed as a percentage of “visible alteration” (i.e., as measured in perspective view)⁶. However, in assessing the effects visual resource management regimes on timber supply, “percent denudation” (i.e., as measured in plan view) is applied (B.C. Ministry of Forests 1998b). This conversion between percent alteration and percent denudation depends mainly on the slope, tree height, viewing angle, and viewing distance (J. Marc, Senior Visual Resources Specialist, B.C. Ministry of Forests, pers. comm., 1999). Whenever possible⁷, this conversion should be calculated on a case-by-case basis for greater accuracy, since it may significantly affect the management of visual resources, as well as the available timber under a given VQO. In practice, recent studies have shown that the percent alteration ratio between plan and perspective views is about 2:1 on average (J. Marc, Senior Visual Resources Specialist, B.C. Ministry of Forests, pers. comm., 1999).

⁵ Percent denudation is currently used by the Ministry of Forests to quantify how much alteration is permitted in a visual landscape unit at any one time in order to meet a given VQO. It is expressed as the allowable range of area clear-cut in any given “visual quality class” (VQC). These ranges should be applied planimetrically to the total forested area (whether operable or not) (B.C. Ministry of Forests 1998b).

⁶ Percent alteration is the scale of any type of disturbance to a landscape caused by human activity (including cutblocks); it is expressed as a percentage of a landscape or the total scene viewed in perspective (B.C. Ministry of Forests 1997c).

⁷ When a full visual landscape inventory and analysis are lacking, the Ministry of Forests (1998b) recommends that the middle value of the percent denudation range (see Table 1) should be modelled in clearcut areas. However, where visual landscape design is actively practised, a greater value for clearcutting in each VQO may be used. Higher “visual absorption capability” (VAC) will also allow for the use of greater values for clearcutting in each class (1998b); VAC is a component of the visual landscape inventory that rates the relative capacity of a landscape to absorb visual alterations and still maintain its visual integrity (B.C. Ministry of Forests 2001).



Paquet and Belanger (1997) worked with sensitive recreational landscapes in Quebec's boreal balsam fir forest type, and found that people tested in perception studies reacted adversely to even very low levels of clearcut activity. However, most felt that a certain level of clearcut was acceptable (up to approximately 25% of the visible landscape in a photographic slide, as measured in perspective) when seen in a single cutblock situation in middle-ground views with rolling terrain. Harvesting activity that occupied 50% or more of the visible landscape was considered unacceptable by most people (Paquet and Belanger 1997). When the cutblocks were distributed as smaller patches over the visible landscape, acceptability thresholds were somewhat higher, and closer to 50% with the majority of tested groups. Above the 50% harvest level, the level of unacceptability did not increase substantially.

In the West Kootenays, Berris and Bekker (1989) also explored public preferences for forested landscapes with varying levels of landscape alteration. Their results suggested that preferences are most affected by the presence or absence of highly visible alteration, and second by the drama of the landscape (Berris and Bekker 1989). A high degree of correlation was found between public preferences and Ministry of Forests' visual quality objectives.

In a large public perception study, the acceptability of forest scenery in middle-ground landscape views of clearcuts varied substantially with the "existing visual condition" (EVC)⁸ and the scale of alteration (B.C. Ministry of Forests 1996c). People consistently expressed high levels of acceptability with more natural-appearing conditions (e.g., EVC classes of "preservation" and "retention," with percent alteration of approximately 0–1.5% of dominant landforms seen in perspective), and high levels of unacceptability with landscapes with an EVC of "maximum modification" (approximately 5–30% alteration) (B.C. Ministry of Forests 1996c). More specifically, alterations greater than 6% (of a visual landscape unit as seen in perspective) were rated as neutral to unacceptable (B.C. Ministry of Forests 1996c). These results appear to indicate that provincial conditions (more mountainous, with steeper slopes, and

possibly other cultural, biophysical, and visual factors) result in much lower thresholds of acceptable percent alteration than the 25% and 50% figures obtained in the Quebec study⁹ (Paquet and Belanger 1997).

The U.S. Forest Service (1981), using the Effective Alteration system in California (Region 5), attempted to equate VQOs with the maximum percentages of land that could be in an altered state at any one time. These percentages, which are assumed to be applied planimetrically, range as follows:

- Retention: 0–30% alteration (15% avg)
- Partial Retention: 4–40% alteration (22% avg)
- Modification: 10–50% alteration (30% avg)
- Maximum Modification: 30–60% alteration (45% avg)

It is interesting to compare the British Columbia figures (B.C. Ministry of Forests 1996c) with these U.S. Forest Service percentages. Note that the American percent averages of land that could be altered under VQOs using these calculations are considerably higher than in British Columbia, even though the provincial figures reflect percent alteration in perspective view, while the U.S. Forest Service figures reflect percent alteration in plan view. Also, the range of overlap across VQOs is substantially greater, indicating more flexibility in the American approach. All of these factors suggest that the system of percent alteration used in British Columbia may be significantly more restrictive than that used in the United States. However, this may be compensated for by shorter times required for green-up in British Columbia; also, landscape conditions (e.g., drier, more open forests) in the national forests of California may permit more timber removal under a given VQO because of the higher visual absorption of human activities.

In a public perception study of partial cutting, the B.C. Ministry of Forests (1997c) found that higher levels of partial-cut removal were associated with lower levels of visual quality. Certain stand variables were correlated with professional evaluations of the post-harvest existing visual condition; the best statistical predictors of EVC came from a combination of the basal area, percent

⁸ Existing visual condition refers to the same definitions of level of visual alteration as VQOs, but reflects actual rather than desired conditions. A team of visual landscape management specialists (Ministry of Forests staff and consultants) assessed EVC for the B.C. Ministry of Forests perception studies (1996c and 1997c).

⁹ The B.C. Ministry of Forests study (1996c) used percent alteration of the dominant landform (within the total photograph area), while the Quebec study (Paquet and Belanger 1997) used percent alteration of the total photo area. The alteration figures obtained in the Quebec study would represent an even greater percent alteration if applied to the dominant landform instead of the entire photo area.



volume, and percent stems removed, and the average heights of residual trees. A correlation between EVC classifications used by visual landscape specialists and public perceptions of scenic quality was also evident in this study (B.C. Ministry of Forests 1997c). The study did not yield any strong statistical relationships between participants' scenic quality judgements and stand variables (perhaps because of the limited sample of sites available). However, the study results suggest that use of partial cutting techniques, even with severe visual constraints, permits the harvesting of *much higher timber volumes* under the more restrictive VQOs than would be possible with clearcutting (B.C. Ministry of Forests 1997c; Sheppard 1999). For example, with 25-m trees and 60% volume removal, a 90% chance (or greater) exists of meeting a VQO of partial retention (B.C. Ministry of Forests 1997c).

In summary, various studies suggest that in forested landscapes, aesthetic public preferences decrease as the amount of visible landscape alteration increases (Berris and Bekker 1989; B.C. Ministry of Forests 1996c, 1997c; Paquet and Belanger 1997). Accordingly, traditional visual resource management approaches using visual quality objectives have assumed that increased visual sensitivity constrains timber supply (B.C. Ministry of Forests 1998b). The most common effects of visual resource management regimes on the timber resource include higher harvesting costs and some reduction in timber availability relative to non-visually sensitive areas. However, according to the literature we reviewed, meeting VQOs may not affect timber availability (e.g., the modification and maximum modification objectives may place less spatial constraints on clearcutting than do other legislative requirements such as adjacency). The use of alternative cutting practices, as opposed to conventional clearcutting, appears to offer potential gains in timber availability in visually constrained areas.

Increased harvest volume does not necessarily correlate with reduced visual quality. In fact, the use of various partial-cutting practices has proven successful in meeting VQOs in visually sensitive areas (Fight and Randall 1980; B.C. Ministry of Forests 1997c; Clay 1998), and may even increase both timber availability and aesthetic quality (McDonald and Litton 1998).

Finally, careful analysis is required to determine the true effect of visual resource management regimes on timber availability. This will depend on:

- the extent of overlapping constraints from other non-timber resource values and policies (which limit

the influence of VRM on timber supply, as pointed out by Stier and Martin [1997]);

- the forest practices used (e.g., clearcutting vs. partial cutting);
- the extent of VQO coverage and the class of VQOs (i.e., more restrictive preservation, retention, and partial retention VQOs vs. lesser or not restrictive modification or maximum modification VQOs); and
- the VEG tree height requirements of the particular area, since this may directly affect timber availability.

In addition, the influence of visual resource management regimes on timber supply may also depend on the policies and decision-making styles of managers. This is discussed in more depth in the following section.

Overview of the Management of Visual Resources in British Columbia

The B.C. Ministry of Forests' objective regarding visual resources is to find a balance between protecting visual resources and minimizing the effect of such protection on timber supply (see B.C. Ministry of Forests 1996a and 1996b for an appraisal of the impact of the Forest Practices Code on timber supply). Despite the breadth of this objective, there is a risk that forest managers will undertake to protect the visual resources of provincial forests only as long as this has little effect on timber supply. Exactly how the balance is to be maintained is unclear, but it appears that the Ministry intends to keep the overall impact of the Forest Practices Code (including VRM) on timber supply at no more than 6% (B.C. Ministry of Forests 1996a, 1996b). However, until this target amount is reached, visual resources will be managed as summarized in Figure 1, which provides managers with considerable flexibility.

In British Columbia, a potentially important issue influencing the effect of visual resource management on timber supplies and availability is the role of the District Manager. Unless otherwise stated in a Higher Level Plan, the District Manager has considerable discretion in the management of visual resources (B.C. Ministry of Forests 1998b). The District Manager has the latitude to determine the intensity and extent to which visual resource management will be conducted, including deciding whether or not to establish VQOs, based on the initial visual landscape inventory. The District Manager can also modify the management of visual resources if the effect on timber supplies is judged to be too great. Unless the management of VQOs is established in a



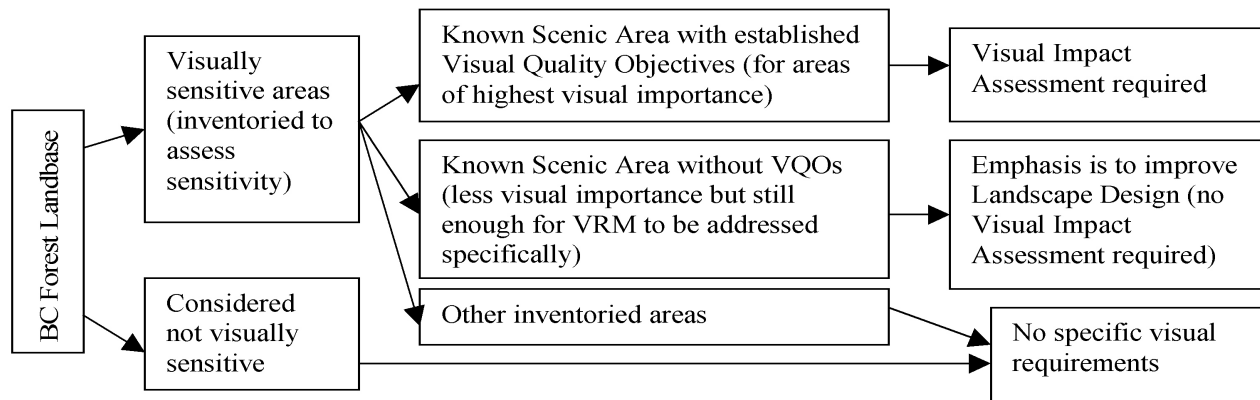


FIGURE 1. Visual resource management procedures for different areas within British Columbia (adapted from B.C. Ministry of Forests 1998a).

Higher Level Plan, the District Manager can “relax” or tighten them by moving to a lower or higher Visual Quality Class (B.C. Ministry of Forests 1997a, 1997b, 1998c). However, once the decision to manage for visual resources is made (especially if VQOs are established), it is unclear to what extent established VQOs can be dismissed. Ministry of Forests’ documents mention that “given the sensitivity around this issue, it is important that this process [“relaxing” VQOs] be carried out in a prudent and rational manner” (B.C. Ministry of Forests 1998c). No further guidance is given on the meaning or interpretation of “prudent and rational.” From the licensees’ point of view, visual resources must be protected to the satisfaction of the District Manager.

While legislation and policy seem to permit considerable flexibility and regional variation in the District Manager’s stance on visual resource management, the relaxation of established VQOs may not be politically feasible because this procedure encourages external input and consultation with the public (B.C. Ministry of Forests 1997b) and stakeholders such as the Ministry of Small Business, Tourism and Culture (B.C. Ministry of Forests 1998c).

Implications and Options for Visual Resource Management in British Columbia

The prevailing philosophy of the current visual resource management system is often criticized as safeguarding the “front country” at the expense of the environmentally

pristine backcountry—an out-of-sight, out-of-mind approach (as discussed in Sheppard [2000]). However, in some areas of British Columbia, the remaining merchantable timber in the less visible parts of the landscape is no longer available as a result of:

- Forest Practices Code requirements (B.C. Ministry of Forests 1995),
- increasing scientific arguments for biodiversity and ecosystem management,
- lobbying by environmental and eco-tourism groups, and
- previous logging of many backcountry valley bottoms.

In many areas (e.g., the West Kootenays), an acute shortage of available timber¹⁰ exists relative to historic levels. This puts pressure back on the more visible slopes with maturing second-growth timber closest to the communities and highways, but where VRM constraints have typically been highest.

How should this dilemma be resolved? Several options present themselves.

- Maintain the existing visual constraints and accept the continuing reduction in timber availability as the less visible areas are used up or become unavailable. This situation is likely to continue in areas where VQOs are already established and conventional cutting practices are maintained.

¹⁰ In the case of the Arrow TSA, the currently available timber almost equals the Allowable Annual Cut (AAC), leaving licensees with very little or no maneuverability (Arrow Forest License Group 2000).



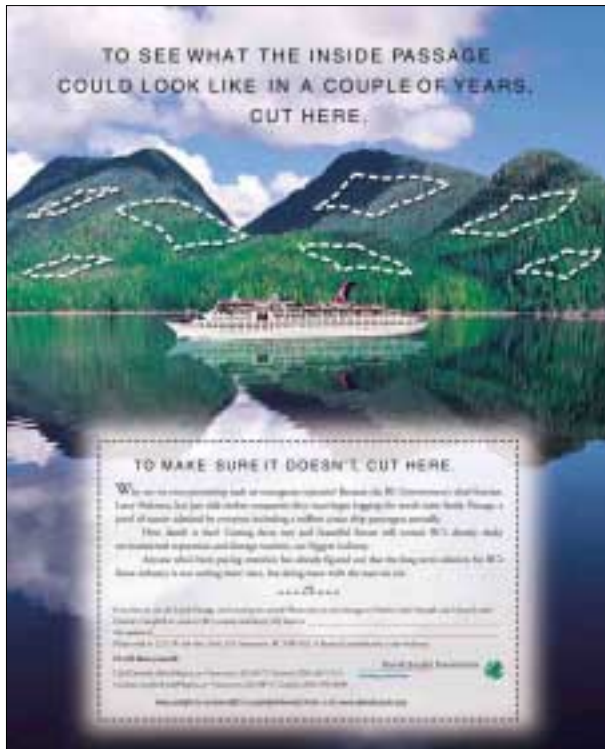


FIGURE 2. Advertisement, which ran in the Vancouver Sun (October 20th, 2000:A5), condemning the Chief Forester’s request for licensees to harvest in the Inside Passage or risk losing their rights to the timber.

- Relax visual constraints and permit expanded conventional harvesting in the front country. This is an option now open to district managers when deciding whether to impose or relax VQOs. With this approach, however, the risk exists that visual objectives will be compromised and public outcry will arise from affected communities, tourism providers, and visitors. This seems especially likely in places such as British Columbia’s Inside Passage, in the North Coast TSA, where recommended VQOs were relaxed in 1998 to reduce their impact on timber supply (B.C. Ministry of Forests 2000). Despite this relaxation, visually sensitive areas are still avoided by licensees, which places increased pressure on the remaining timber harvesting land base. In response to this situation, the Chief Forester waved the spectre of an AAC reduction in the North Coast TSA unless more harvesting took place in the visually sensitive areas of the Inside Passage (B.C. Ministry of Forests 2000)—a “cut it or lose it”

approach. This announcement triggered strong and immediate reaction; within a week, an advertisement condemning the situation appeared in the *Vancouver Sun* (Figure 2), clearly assuming use of conventional harvesting practices.

- Explore alternative planning procedures and timber harvesting practices (e.g., partial cutting) that meet visual objectives in the front country and are more acceptable to local communities, but that permit timber extraction at levels substantially higher than is possible with clearcutting under VRM procedures and the Code (Figures 3A, 3B).

Available evidence suggests that for a set of restrictive VQOs in a given landscape (or on a given visible slope, if considered in perspective), the greatest timber availability occurs when partial cutting is used. Similarly, for potentially any given level of timber availability, highest visual quality is achieved when using partial cutting. This is because the screening effect of remaining stand structure, even at quite high levels of removal, can soften the resulting visual impact substantially, relative to even small clearcuts. In addition, as pointed out by McDonald and Litton (1998), linking landscape design with silviculture may increase both timber yields and scenic values, or at least help to mitigate the effect of visual resource management regimes on timber supplies and vice versa.

For a given volume removal, however, different harvesting techniques result in different visual effects. The harvesting patterns shown in Figure 3A and 3B illustrate a very different appearance from what would be expected from a uniform partial cut in which residual trees are evenly distributed throughout the harvested area. A wide range of partial-cut harvesting techniques and silviculture systems exist, ranging from low-intensity thinnings to seed tree and wildlife patch techniques that may look like clearcutting to most people. The notion of perceptible thresholds in the effect of timber harvesting on the visual integrity of the forest may have major implications for the public acceptability of the practice of Variable Retention (for example) as an alternative to clearcutting (as espoused by MacMillan Bloedel Ltd., now owned by Weyerhaeuser) (Anonymous 1999).

To illustrate the implications of these approaches to visual resource management and timber availability, we analyzed the status quo and potential options for VRM in the Arrow Forest District [discussed in the forthcoming Part II of this paper]. Considering the importance of





FIGURE 3A. Example of partial cutting approach using a shelterwood concept.



FIGURE 3B. Example of partial cutting approach using a checkerboard pattern of removal.

visual resources and public perceptions in this district (B.C. Ministry of Forests 1994a, 1994b), it is surprising that, up until January, 2001¹¹, no VQOs were established (D. Fitchett, Recreation/Range Officer, B.C. Ministry of Forests, pers. comm., 1999). One possible explanation for this is that, given the uncertainties inherent in British Columbia's forest sector, managers want to maintain as much flexibility as possible, and therefore avoid establishing VQOs, which are binding once established. This may result in low levels of visual protection "on the books," but higher levels of visual resource management on the ground. Clearly, district managers have many of the legal mechanisms to bypass VQOs, but it is not clear whether they feel comfortable without VQOs as guidelines, or whether they will realize the timber availability gains expected. Community perceptions may actually constrain timber supplies and availability, even if official VQOs are relaxed or eliminated. It is often assumed that VQOs are used as a *de facto* indicator of public acceptance of forest management (Sheppard 2000). However, if public pressures are more constraining than the established VQOs themselves, the influence of visual resource management regimes on timber availability is effectively eliminated since the most restrictive constraint determines what management will prevail. It is also possible that differences in the degree of visual constraint between

different districts may become more marked, reflecting the priorities of the district and the inclinations of the individual district manager.

The ultimate effect of any VQO depends on the assumption that more timber would be harvested in the absence of such visual management regimes (Stier and Martin 1997). This is far from being clear in the Arrow TSA, where harvesting has been avoided in many of the areas subject to more restrictive VQOs. This situation is attributed to public pressure (e.g., that led to a logging moratorium in Hasty Creek) and the higher costs associated with operations in areas with VQOs (B.C. Ministry of Forests 1994a, 1994b). Other Code regulations, and biodiversity or forest cover constraints for community watersheds, could also significantly reduce the influence of VQOs on timber supply and availability (B.C. Ministry of Forests and B.C. Ministry of Environment, Lands and Parks 1995), or even eliminate the effects if these other values were more constraining on the cut.

Conclusions

The relationship between visual resources and timber availability is closely linked with the management of other non-timber resources, as well as to public perceptions of landscape alterations. Several case studies have

¹¹ The Kootenay/Boundary Land Use Plan (KBLUP) came into effect at the end of January 2001 and establishes three classes of landscape management for scenic areas, which translate into Retention, Partial Retention, and Modification VQOs, that are visible from major highways, towns, and lakes (Land Use Coordination Office 2000).



identified the potential of using alternative forest practices to improve visual quality, while increasing timber supplies and availability. Better visual landscape design can allow for greater timber harvests and still maintain or improve the level of visual quality, although potentially with somewhat higher costs. Partial cutting may significantly increase harvested volumes, even in sensitive front-country locations, and preserve forest cover and high visual values. However, partial cutting is still experimental in many ecosystems, and substantial research (on interactions with forest health, costs, safety, etc.), training, and policy reform are urgently needed if licensees and government staff are to facilitate its use on a large scale.

Meanwhile, the percent alteration measures currently used under a clearcut system with VQOs are useful for predicting timber supply impacts, but may be over-limiting in some cases at the forest design or cutblock planning level. If this system is not to be used uniformly as a rigid timber supply constraint or as the dominant visual design determinant, increased landscape design resources and training will be needed to deliver the more flexible solutions promised by the B.C. Ministry of Forests (1998c)—without loss of visual quality.

Further analysis and modelling of the timber/visual resource relationship is provided in Part II of this paper.

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