

**Aesthetic Values and Visual Resource Management in British
Columbia's Community Forests**

by

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Abstract

The Community Forest Agreement established in 1998 in the province of British Columbia was initiated to provide communities with increased access to and control over timber supply areas proximate to them. Following the initiation of this agreement, many communities throughout British Columbia sought to obtain Community Forest licenses in an attempt to exercise local control over forested lands adjacent to their communities, and to integrate a variety of values into the management of those forests. This study explores a singular value, that of landscape aesthetics. A grounded theory approach was used to interview local community members and determine their aesthetic landscape values. In addition, visual quality effectiveness evaluations were conducted on each of the sample community forests to evaluate their achievement of Visual Quality Objectives established by the Ministry of Forests Range and Natural Resource Operations. Taken together, these studies serve to evaluate how well the community forests of Revelstoke, McBride and Creston are managing for scenic quality, and documents the dominant aesthetic landscape values of members of these communities.

My research findings suggest that biological, cultural and personal factors influence the development of aesthetic landscape values within the sample communities.

Respondents expressed five categories of aesthetic landscape appreciation during the interview process: non-instrumental, ecological, recreational, visible stewardship and utilitarian. Despite variation in aesthetic valuation of local landscapes, a preferential trend exists towards landscapes with higher levels of canopy retention. Interview results indicate an overall satisfaction with management of visual quality by community forests. Results of the Visual Quality Effectiveness Evaluation indicate the sample community forests in my study have met, and in some cases surpassed, provincial expectations for maintaining and enhancing visual quality on provincial Crown lands. Analysis of aesthetic management in community forests can enrich co-management theory through attention to and inclusion of landscape preference theory, including how potential conflicts between aesthetic and utilitarian values may be resolved through innovative management practices. **Keywords:** community forestry, visual resource management, alternative harvesting, co-management, landscape values

Dedication

This study is dedicated to the forest professionals, community members and provincial staff who, despite numerous challenges, endeavour to preserve the aesthetic integrity of scenic landscapes across British Columbia.

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List of Acronyms

| | |
|-------|---|
| AAC | Allowable Annual Cut |
| BC | British Columbia |
| CCF | Creston Community Forest |
| CFA | Community Forest Agreement |
| CBNRM | Community-based natural resource management |
| CVFC | Creston Valley Forest Corporation |
| CF | Community Forest |
| EVC | Existing Visual Condition |
| EVQO | Established visual quality objective |
| FPB | Forest Practices Board |
| FRPA | <i>Forest and Range Practices Act</i> |
| FSC | Forest Stewardship Council |
| HPCF | Harrop-Procter Community Forest |
| HA | Hectares |
| IRM | Integrated resource management |
| LXCF | Likely-Xat'sull Community Forest |
| MCFC | McBride Community Forest Corporation |
| MOF | British Columbia Ministry of Forests (the provincial ministry responsible for forestry regulation up until 2004) |
| MOFR | British Columbia Ministry of Forests and Range (the provincial ministry responsible for forestry regulation since 2004) |
| NTFP | Non-timber forest products |
| SOP | Standard Operating Procedures |
| VEG | Visually Effective Green-up |
| VSC | Visual Sensitivity Classification |
| VSU | Visual Sensitivity Unit |

Introductory Image



1. Introduction

Decision-making over forests in Canada is shared between the provincial and federal governments and private forest licensees. Canada's forests are largely owned by the public: 71% are owned by the provinces, 23% are owned by the federal government and 6% are under private ownership. This shared ownership model reflects the complex sociocultural and ecological relationship between the people and forests of British Columbia. Unsurprisingly, repeated confrontations have occurred over access, ownership and use of forest resources (Bull & Schwab 2005, Charnley & Poe 2007). For much of the twentieth century, management of forested Crown lands has focused on industrial timber production by private forest companies under long-term leases with provincial governments (Beckley 1998). The industrial model of timber production emphasizes sustained yield management, which focuses on maximizing timber yield by supplanting mature stands with second-growth stands (Bull & Schwab 2005). However, this model neglects other key forest objectives including aesthetic resource values.

Repeated use of the sustained yield model resulted in increasing levels of discontent amongst other user groups, and the emergence of an environmental movement in the late 1970s (Satterfield 2002). In the decades that followed, public demand for participation in decision-making on Crown lands increased. Repeated conflicts among the public, industry, First Nations and resource agencies caused the province of BC to initiate a land use planning program that attempted to incorporate more public participation into the development of landscape objectives and the strategies used to achieve them. A suite of land use planning tools, including Higher-Level Land Use Plans, Strategic Land Use Plans and Forest Stewardship Plans, was used to identify areas of visual sensitivity among other landscape attributes and set resource management objectives. Public participation largely occurred during high level land use planning processes and during the completion of visual landscape inventories.

In 1998, in an attempt to further mitigate resource-related conflicts, and integrate recommendations made in the Sloan (1945) and Pearse (1976) reports, the New Democratic Party announced a pilot project known as the Community Forest Agreement Program (CFAP). The CFAP devolved a small portion of the Crown timber supply area to small locally based forest tenures, and allowed them to harvest timber and non-timber forest products (NTFPs) on public lands. In return, a portion of the sales is paid back to the Crown through stumpage¹ (Teitlebaum 2007).

Presently, community forests in British Columbia are supported by the *Forest Revitalization Act* (S.B.C 2003, C.17). The Act attempts to integrate locally based forest management into the forest sector through the reallocation of 20% of long-term replaceable logging rights from major licensees to other uses including woodlots and community forests. While community forestry has been defined in many ways, it is typically characterized by three main components: formal investment in local communities of decision-making power, social and economic gain derived by local communities and sustainable forest use (MOF 2003). Community forests exercise considerable autonomy in forest operations; however, community forest tenures remain subject to the Ministry of Forest's *Forest and Range Practices Act* and the objectives set therein. The Act establishes a professional reliance-based management framework that outlines objectives for 11 resource values that must be achieved by those managing the Timber Supply Area (TSA), but does not specify how these should be achieved (MFLNRO 2008). The resource values included in the Act include biodiversity, cultural heritage, fish, plant communities, recreation, significant resource features, soils, timber, water, wildlife and visual quality. The forest practices requirements listed under FRPA, as well as the socio-environmental expectations of community forest tenures, place significant responsibility on community forests. Ambus, Davis-Case and Tyler (2007) note that "small tenures are expected to reflect local goals and priorities, manage for multiple forest values, generate benefits, spur economic diversification, test innovative

¹ Stumpage is the fee paid to the BC government for the harvesting of provincially owned timber (MFLNRO 2013).

forest practices, as well as support local milling, manufacturing, and value-added processing.”

1.1. Contribution to Existing Literature

Historically, academic inquiry into North American forest management was limited to industrial tenures or small privately owned tenures such as woodlots. However, the emergence of alternative tenure types such as community forests presents new questions concerning alternative forest management practices and increased access to resources (Beckley 1998). Much of the literature on community-based forest management (CBFM) is conceptually rather than empirically based, with much of the existing literature readily acknowledging the economic, regulatory and ecological constraints placed on CBFM tenures (Agrawal and Gibson 1999). Teitlebaum (2007) emphasizes the need to undertake research on the “practical dimensions of community forestry such as the objectives, organizational approaches to tenure arrangements and general outcomes.” It has been widely documented that aesthetic landscapes contribute significantly to the economy and cultural identity of British Columbia (Harshaw, Sheppard & Lewis 2007). However, examination of aesthetic values and visual management practices specific to community forests tenures are subjects that are largely unexplored, as community forests represent a relatively recent tenure type.

This study contributes a qualitative and quantitative assessment of aesthetic resources in the communities of Creston, Revelstoke and McBride (Table 1). The qualitative assessment examines the aesthetic values held by community members. It assists in redefining previously assumed polarities between non-timber resources and timber interests by identifying commonalities in aesthetic preferences between different stakeholders using well-established indicators (Bourassa 1990, Appleton 1975a). It also attempts to demonstrate what Pinkerton et al. (2008) describe as the evolution of community forests from partial co-management institutions to more fully developed ones, as they adopt and implement management requirements established during LRMP planning processes and adapt to address emergent concerns. Visual Quality Effectiveness Evaluations were conducted on each of the sample forests to determine if aesthetic management practices in visually sensitive areas were achieving provincially

established visual quality objectives (VQOs) for that Timber Supply Area (TSA). Visual Quality Effectiveness valuations are part of a larger provincial evaluation program, known as the Forests and Range Evaluation Program (FREP), and provide a quantitative evaluation of one of the 11 resource management objectives identified by the province.

Table 1. Sample community forests

| | Revelstoke Community Forest Corporation | McBride Community Forest Corporation | Creston Valley Forest Corporation |
|---------------------|---|---|---|
| Location | Columbia Forest District | Headwaters Forest District | Kootenay Forest District |
| Size (Ha) | 119,748 | 60,000 | 17,639 |
| Organizational type | Private corporation (Privately owned Tree Farm License) | Private corporation (municipally-owned) | Private corporation (not-for-profit status) |
| Land Ownership | Provincial Crown | Provincial Crown | Provincial Crown |
| AAC (m3) | 100,000 | 50,000 | 15,000 |

2. History of Community Forestry and Aesthetic Management in British Columbia

2.1. History of Community Forestry in British Columbia

The expansive forests of British Columbia are valued for their scenic beauty, cultural significance and economic opportunities. Provincial timber supply areas have historically been managed under a management regime referred to as maximum sustained timber yield. This regime emphasizes high levels (>50%) of basal area removal, and places emphasis on economic gains over other landscape objectives (MOFR 1992). However, this approach frequently neglected other resource values held by members of the public such as recreation, berry picking, water quality, scenic quality and biodiversity, resulting in eventual “legitimacy crises” in the forestry sector (Beckley 1998). The focus of this section is to briefly describe the historic context in which community forestry emerged, and the current legislative requirements governing visual resources of community forest tenures.

2.1.1. *Early Forest Management and Sustained Yield Harvesting*

The BC Ministry of Forests and Range defines the province’s tenure system as “the collection of legislation, regulations, contractual agreements, permits, and government policies that define and constrain the use of public forest resources, primarily timber” (MOFR 2005a). The tenure system in British Columbia was first established in the early nineteenth century as a means to direct both labour and capital towards the development of the land base. The Forest Service introduced regulated harvests in 1946 in response to recommendations made by the Sloan Commission. The commission suggested that Crown lands be harvested for sustained timber production (Sloan 1945). These recommendations led to the establishment of the Sustained Yield Plan, and consisted of consolidating large areas of Crown land under the management of the Forest Service, as well as existing private licenses (Pearse 1992). Tenure

allocation by the Crown resulted in a number of large forest companies acquiring much of the available timber supply and homogenous harvest prescriptions, which focused on maximum fibre production (Beckley 1998). The province defines sustained yield as achieving a “perpetual” or “sustained” yield of wood that is commercially viable in regional areas in yearly or periodic quantities of equal or increasing value” (Ambus et al. 2007; Sloan 1945). The Forest Service undertook sustained yield management, with the intention of conserving forest resources for use into perpetuity.

Sustained-yield policies, however, did not achieve the lofty objectives expected of them. Byron (1978) observes that the resiliency of the forest sector was not dependent on a constant supply of timber but on “technological economies of scale, proximity to processing centers and international export markets.” The Pearse Royal Commission Report (1976) also identified a number of areas not addressed by the sustained-yield management framework, including unsustainable harvest rates; concerns over environmental degradation, job loss and concentration of corporate licenses continued to pervade public opinion. By 1988, had begun to revise its forest policy incrementally in response to recommendations made in the report including the creation of new forms of license, new AAC determinations and forest management obligations (MOFR 2005a). The release of the report was followed by the rise of more widespread mobilization of the public over shared environmental concerns including the War in the Woods in BC and the Sage Brush Rebellion in the United States in the 1980s. These movements ushered in a new era of environmental activism. Some common concerns amongst these movements included ecologically sustainable forest practices, greater inclusion of the public in forest management decisions and provincial support for small-scale forestry operations (Satterfield 2002).

2.1.2. *Emergence of Small-Scale Tenures*

Forest tenure in British Columbia provides a mechanism that enables the government to allocate Crown forest resources. While management of Crown land in BC is primarily concentrated in large integrated harvesting-milling operations, modest changes have occurred over the past 30 years to include the emergence of smaller-scale tenures that attempt to provide greater inclusion of the public in forest management decisions (MOFR 2005a, Ambus et al. 2007). In response to continued

public dissent, the provincial government under the New Democratic Party implemented a series of environmental policy reforms in the early 1990s. These reforms focused on increasing public participation in land use planning decisions. Tenure reform towards community forestry in BC occurred incrementally through regional and sub-regional planning processes such as the Commission on Resources and Environment (CORE) and the development of Land and Resource Management Plans. These planning processes sought public opinion on set-asides for parks, reserves, timber supply areas, commercial leases, recreational areas and areas of visual significance (BCRTEE 1991). The requirements associated with different tenure types assist government in controlling timber harvests, utilization, silvicultural practices, ecological protection and other forest objectives, as well as more broadly defined objectives such as economic growth, and social and environmental sustainability.

Community forest tenure in British Columbia has evolved over time in response to changing public values and environmental conditions (Pearse 1992). The amendments made to the *Forest Act* in 1998 established the first statutory framework for community forests. The Act defines community forests (CFs) as “any forestry operation that is managed by a community group, First Nation, or local government in the interest of the community” (Charnley & Poe 2007). Initial community tenures were issued under the Community Forest Pilot Program (CFP) with subsequent tenures being awarded through Community Forest Agreements (CFAs), and in the form of 25- to 99-year renewable leases (BCCFA 2013). CFAs differ from other timber tenures in a number of important ways. Historically, community forests would competitively apply for CF tenures. Community forest timber supply areas are often defined by what Hammond (1991) refers to as eco-centric geographical boundaries, which may include watersheds and viewscales as well as proximity to the community. The overarching objectives for the community forest agreement are to diversify management of Crown-forested land by providing communities with an opportunity to acquire small forest licenses to manage for a variety of local values, thereby expanding the range of social, environmental and economic benefits captured by the community forest timber supply area.

2.1.3. The Present State of Community Forestry

Approximately 2% of the provincial AAC is presently being managed by community forests. Since the inception of the CFP in 1998, the province (MFLNRO 2010) has awarded over 47 community forest tenures. The competitive application process has been replaced by invitations to apply that are extended by the province to select community organizations. The release of the Ministry of Forest's *Forestry Revitalization Plan* in 2003 describes the transfer of existing probationary agreements to long-term agreements, and the reallocation of 20% of timber — approximately 1.2 million cubic meters — for small tenures such as community forests and woodlots. However, presently community-based forest management tenures are underrepresented as shown in the figure below:

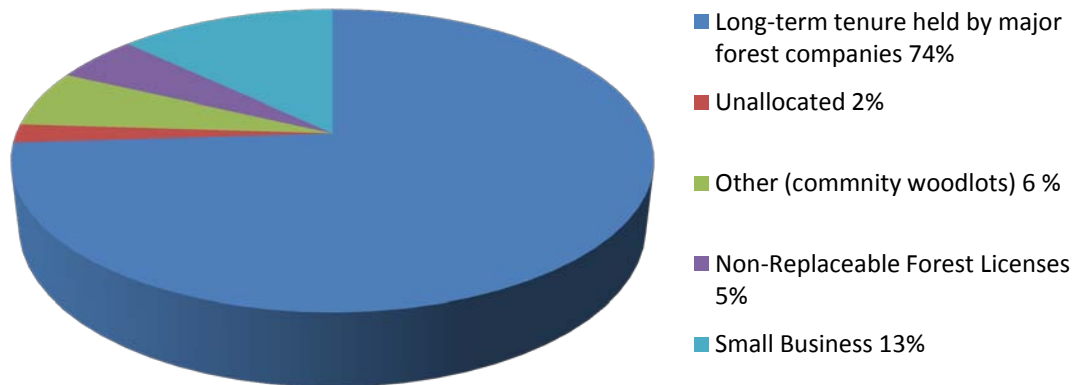


Figure 1. MOFR (2006) Allocation of Allowable Annual Cut based on tenure type

Despite an increase in popularity, a number of criticisms have been launched against community forestry and CBFM in general. Numerous studies also note the challenges inherent in community forests management (CIFOR 2005, Ambus 2008, MOFR 2006). For example, they caution practitioners not to view pluralist policy as a “panacea” for landscape planning, stating that many forest values are mutually exclusive. A representative from the province also notes this challenge: “Almost all of the landscape planning that happens results in people walking away getting some of what they wanted but not all of what they wanted” (MOFR staff correspondence 2012).

2.2. Aesthetic management in British Columbia

The following section outlines the historic setting and present context of aesthetic resource management in British Columbia. The significance of early land use planning processes in the United States and preliminary legislation in British Columbia are explored, as well as the current legislative regime governing aesthetic resources.

2.3. History of aesthetic management: inventory, design and implementation

Aesthetic management on public lands in British Columbia emerged in the early 1990s as part of a wider land use planning process. It attempted to integrate economic, biophysical, ecological and social considerations into forest management practices on Crown lands. The initial identification of Visually Sensitive Areas (VSAs) in British Columbia was informed by the Visual Management System of the United States Forest Service (USFS) (MoF 1997; Bacon n.d.). Visually Sensitive Areas are defined as those areas that are “sufficiently sensitive to visual alteration to warrant special consideration in strategic and operational planning.” VSAs may contain viewsheds visible from areas of recreation, travel or residency (RIC 1999).

The United States had experienced public concern over the impact of forestry operations on scenic landscapes as early as the 1940s, with a culmination in the 1960s, during a period known as the “clearcut crisis” (CBC Digital Archives 1984). Timber harvesting prescriptions during this period were largely reflective of a clearcutting silvicultural system, which did not require size restrictions on blocks, minimum retention levels or boundary treatments (Paquet & Belanger 1997). In response to mounting public opposition over the impact of industrial harvesting regimes on the visual quality of the landscape, the US Department of Agriculture (USDA) integrated a policy suite known as the “Visual Management System” into its National Forest Landscape Management Program (USDA 1974). The Visual Management System provided the US Forest Service with a regulatory framework that established a set of visual guidelines. The publication of the Forest Service Manual in 1974 was the first formal planning system for aesthetic forest management and landscape planning in the United States. The Visual

Management System specifically addressed aesthetic management around scenic rivers, recreational trails, scenic highways and coastal zones.

Determining what should be considered aesthetically important may easily dissolve into a subjective process, subject to the individual whims of what is aesthetically pleasing to the surveyor. In an effort to standardize landscape inventories, the USDA divided scenic landscapes into their component parts. Visual characteristics such as continuity, contrast, colour, edges and boundaries are evaluated and represented in the form of rock formations, water forms and vegetative patterns (Litton 1968). The implementation of the Visual Management System required an extensive inventory of the land base for “observable and known natural characteristics” (USFS 1974). Scenic areas were mapped based on “physiographic sections” of the landscape that were of scenic significance. Several other guidance documents subsequently emerged in the USA including the Timber Management of Visual Management System (USFS 1974) and the Scenic Management System guidance manual (USDA 1995), which recognizes the importance of public input through “constituent analysis.”

Alternative forest management systems in British Columbia emerged under volatile conditions similar to the United States. Environmental discontent amongst various user groups concerning how public lands were being managed and the aesthetic impacts of industrial harvesting practices resulted in members of the public demanding increased public participation in land use planning (MFLNRO n.d.). Prolonged conflicts such as those in Clayquot Sound throughout the 1980s and 1990s resulted in reformations in forest planning practices, as evidenced by the Clayquot Sound Land Use Decision in 1993, and the Commission on Resources and Environment (CORE) British Columbia Land Use Strategy in 1994 (Butt & McMillan 2009, Clayquot Sound Scientific Panel 1995). These land use planning strategies were a dramatic departure from prior industrial models, as they attempted to regulate the management of resources that had not been addressed previously, such as visually sensitive landscapes, riparian protection and watershed planning. Public concern during CORE consultations over the visual impact of harvesting operations eventually led to the development of Land and Resource Management Plans (LRMPs), and a management process under the Forest Practices Code that considered aesthetic quality of the landscape as resource in and of itself (FPC 1995). The Code established a legal framework for the management of aesthetic

resources during landscape planning, timber supply analysis and forest operations. Under the Code, three principal means for scenic classification were developed: Visual Landscape Inventory (VLI), Visually Scenic Areas (VSAs) and Visual Quality Objectives (VQOs). By establishing a common inventory methodology, and including identification and designation of VSAs and VQOs, aesthetic management activities, which had previously been conducted on a site-by-site basis, could be evaluated in an aggregated manner (MFLNRO n.d.).

2.4. The present context of aesthetic management in British Columbia

Many of the scenic areas and VQOs in the province were grandfathered into FRPA from the Forest Practices Code, and are governed by the British Columbia Government Action Regulation (GAR) and Forest and Range Practices Regulation (FRPR). Section 9.2 of the FRPR identifies Scenic Areas as “any visually sensitive area or scenic landscape that is identified through a visual landscape inventory or planning process carried out or approved by the district manager.” FRPA also specifies that Forest Stewardship plans must identify established scenic areas for each Forest Development Unit (FDU) within four months from the date the amendment or plan was submitted (FPPR 14[2], [3]). These include areas or landscapes identified under the Code and continued under Section 180 of FRPA, as well as new scenic areas established by the Ministerial GAR [7] (1) under the *Land Act*. The procedures for managing scenic values in these areas depend on whether formally established VQOs exist or not. In some circumstances, scenic areas did not have VQOs or the VQOs were flexible. In these circumstances, VQOs have been established through GAR Orders (MFLNRO 2001). The management of visual resources is currently implemented through a five-stage process that includes the following:

1. Visual Landscape Inventory
2. Analysis and Establishment of Visual Quality Objectives
3. Planning and Visual Design

4. Implementation of Forest Practices

5. Monitoring

(MOF 2001)

2.4.1. Visual landscape inventory

Under FRPA section 9.2 (2004), the purpose of the visual landscape inventory (VLI) is to identify areas within the province that are visually sensitive, and to classify them according to their visual sensitivity. The VLI enables a Visual Sensitivity Class rating to be assigned and corresponding VQO regulations to be established. Visual landscape inventories may be conducted at a broad or detailed scale. At a broad scale, Crown land in the province is grouped into three classifications: not visually sensitive, visually sensitive and unclassified. In a detailed inventory, Visually Sensitive Areas are broken up into Visual Sensitivity Units (VSUs), which are characterized by their biophysical components and viewing conditions, and assigned a Visual Sensitivity Class (VSC) (MoF 1999). MFLNRO is responsible for conducting VLIs as well as establishing procedures and standards for data collection (MoF 1997). In addition, TFL licensees are required to maintain an inventory of forest resources (including visual resources), which must accompany each new Management Plan (*Forest Act*, Sec. 35.1.d.ii MOFR, n.d.).

2.4.2. Visual quality objectives

A VQO is defined under FRPA, section 180 and 181, as a resource management objective, which identifies an optimal level of scenic quality based on physical characteristics and social concern for a given area. VQOs are established by the district manager, or are contained in higher-level land use plans. VQOs that were previously established under the Forest Practices Code (EVQOs) continue under FRPA section 181. Scenic areas designated prior to October 24, 2002, which do not explicitly identify VQOs, still have objectives set in regulation for visual quality under MFRNRO GAR 17 (2004). In many cases, the establishment of VQOs and associated design objectives reflected limited public input. Opportunities for public participation were largely restricted to land use planning open houses, which were often poorly attended.

2.4.3. Implementation of visual quality objectives

A number of approaches to implementing VQOs were developed that generally focused on retaining higher levels of in-block tree retention and irregular cutblock boundaries minimizing site disturbance. Methods used to achieve VQOs include

- Alternative harvesting techniques (i.e., cable harvesting, ground skidding, heli-logging, yarding, commercial thinning, partial cutting)
- Consideration of terrain in site selection (BEC Zone, slope and natural disturbance regime)
- Advanced silvicultural regime (post-harvest planting and monitoring to ensure visually effective green-up)
- Retaining higher levels of basal area to achieve variable retention in the form of leave strips, patch cuts, leave trees and riparian zones
- Road deactivation
- Harvesting techniques used also vary: heli-logging, skylining and yarding have also been used along with commercial thinning, partial cutting

2.4.4. Evaluating visual quality management

2.4.4.1. Aesthetic accountability: Forests and Range Evaluation Program

Management of aesthetic resources in British Columbia is monitored under the Forests and Range Evaluation Program (FREP). FREP was initiated in 2005 to determine if forest practices within British Columbia were protecting the 11 resource values identified under the FRPA as being provincially significant. These include biodiversity, cultural heritage, soil, water, fish, forage and associated plant communities, timber, recreation, resource features, visual quality and wildlife. FREP effectiveness evaluations examine the implementation of these objectives and whether they were successful in achieving the wider goal of sustainable resource management throughout the province (BCMOF, BCMOE, BCMA 2006).

Visual quality effectiveness evaluations under FREP are primarily “ocular estimates,” which report on the achievement of VQOs in scenic areas (MFLNRO webpage 2013). Visual quality effectiveness evaluations are not, however, used for forest practice audits and are not associated with any penalties. Achievement of VQOs is assessed by examining the design elements present on the harvest block such as position on the landform, distance from viewer, presence of boundary treatments and

response to visual lines of force (FREP 2008). The recommended procedure for conducting visual quality effectiveness evaluations is outlined in Figure 2 below. The Chief Forester's Annual Report on FREP (2010) provides a useful snapshot of the overall success of aesthetic management practices in British Columbia. Results of the report indicate that under FRPA licensees are meeting EVQOs 69% of the time, borderline achieving them 11% of the time and not meeting them 20% of the time.

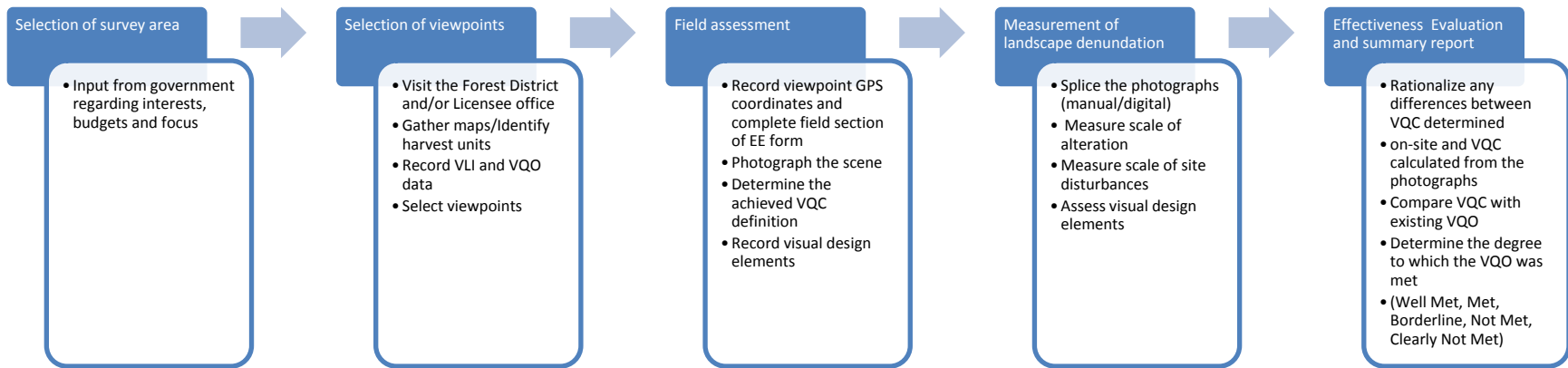


Figure 2. Protocol for Visual Quality Effectiveness Evaluations (Marc 2008)

3. Community forests and co-management of aesthetic resources in British Columbia

3.1. Community forestry as a vehicle for the co-management of aesthetic resources

Community forestry and the emergence of aesthetic management in British Columbia did not occur in isolation but as part of a larger social movement towards the co-management of forest resources. The foundational principles of co-management of forest resources include collaborative efforts between communities and government agencies resulting in community-based institutional structures, which have rights and responsibilities for forest management activities on Crown lands (Teitelbaum 2006). Pinkerton (1993) identifies co-management as a system of governance that includes decentralized decision-making, accountability between government and community forests, as well as community forests and local community members and some degree of government control. Berkes et al. (1991) discuss co-management as a problem-solving process involving extensive deliberation, negotiation and joint learning within problem-solving networks:

Co-management involves a sharing of decision-making, but it also implies the merger of two different styles or models of resource management. One model is characterized by state bureaucratic, legal, scientific management (essentially the components that comprise the industrial model). The other model is local, consensus-based, and is characterized by a customary tradition of resource management enforced by social rather than legal sanction.

Examples of co-management of forest resources in North America are relatively new in comparison to other global forest management models (Rethoret 2010), and have historically been concerned with wildlife and fisheries management (Pinkerton 1989b). Community Forestry Agreements in British Columbia provide institutional examples of co-management of aesthetic resources, as they are locally based with some operational

control over aesthetic management, which provides opportunities for the public to express aesthetic values while working within the VQO established by the Ministry of Forests. Singhal and Benneker (2004) succinctly describe this institutional arrangement as follows:

Collaborative management of state forest lands under co-operative arrangements between local user groups and a public forest administration. Local people maintain the forests as a shared resource but under a mandate of an official public forest management administration rather than according to their own objectives only.

The figure below demonstrates the complex and in some cases reciprocal relationships between VQOs established by government, aesthetic resource management by community forests and visual values of local community members.

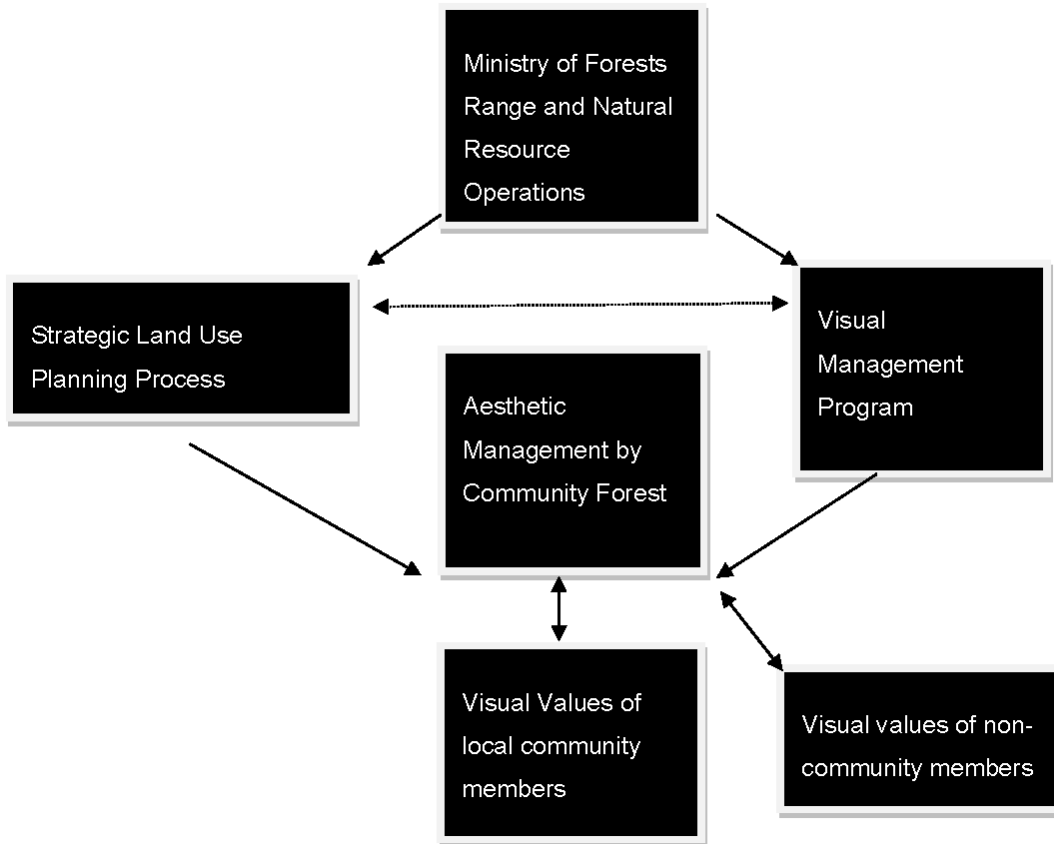


Figure 3. Pathways of influence in aesthetic management of sample community forests

3.1.1. Evolution of aesthetic co-management in British Columbia

As described above, the commencement of CORE and the emergence of subsequent regional land use plans constituted an attempt by government to reflect a greater diversity of public values across the land base. While it is beyond the scope of this paper to evaluate the overall success of the CORE and LRMP processes, or the merit of competing land use preferences, aesthetic management emerged as a public concern during the CORE planning process (Williams et al. 1998, MOF 1999). Attempts were made by provincial planners to integrate decisions reached during LRMP negotiations by providing broad direction to operations and planning activities on Crown lands through the designation of Resource Management Zones (RMZs). The classification of the landscape in this particular way permitted the designation of

allowable activities based on land uses such as mining, forestry, recreation, traditional harvesting practices and residential, among others.

3.1.1.1. **High-level land and resource management planning**

LRMPs established resource management zones based on the type of land use occurring, including enhanced resource management zones, general resource management zones and special resource management zones. In enhanced resource management zones, priority is given to maximizing the development and extraction of natural resources and job creation. Enhanced resource development zones generally occur in areas of low visual sensitivity (ILMB 1997).

General resource management zones cover the majority of the timber supply area in British Columbia and are designated as areas of “mixed use,” which focus on both timber and non-timber resource extraction including forestry, mining, grazing, tourism, guide outfitting and recreation. Under this designation, resource extraction will be minimized in areas of visual sensitivity to reflect aesthetic considerations providing they do not “unduly” affect timber supply (ILMB 1997).

Finally, Special Management Zones (SMZs), while not considered protected areas, offer management direction in areas of high sensitivity where natural features, as well as cultural, recreational and scenic values, precede resource development objectives; approximately 14% of the province is designated as a special resource management zone, comprising approximately 14 million ha of the landbase (Province of BC 2003). Scenic areas are established within SMZs and visual quality classes are assigned, which indicate appropriate harvesting prescriptions and design for a given landscape unit (ILMB 1997).

The land use plans associated with each of the sample communities in this study include the Kootenay-Boundary Land Use Plan (KBLUP), Revelstoke Higher Level Land Use Plan and the Robson Valley Land Resource Management Plan. Despite each of the above land use plans being developed in consultation with the general public, high-level land use planning provides only coarse direction for achieving visual quality across the landscape and may neglect more locally oriented visual values, such as backcountry

views and “less conspicuous” scenery. The KBLUP acknowledges the limitations of aesthetic management in sub-regional planning, stating

The KBLUP addresses scenic values, recreation settings, tenure and access to Crown land and infrastructure at the regional scale. However, the localized nature of many of the recreation features and tourism issues makes them difficult to address through a regional land use plan (MOFR, 1995).

It is therefore necessary to address localized landscape planning challenges such as maintaining scenic areas with strategic sub-regional plans capable of reflecting site-specific details.

3.1.1.2. Strategic land use planning

The guidance provided by regional plans identifies and prioritizes broad landscape-level objectives. Following the development of regional LRMPs, sub-regional plans (SLRMPs) were developed to provide detailed direction for the management of multiple resources, including aesthetic resources. The SLRMP process was implemented under the Forest Practices Code, as well as other government agencies (Robson Valley LRMP; MOF 2005); they augment regional aesthetic management objectives and land use plans by providing spatially referenced aesthetic management objectives and strategies. The SLRMPs relevant to this study, discussed further below, include the Kootenay Boundary Land Use Plan (KBLUP) Implementation Strategy (IS), the McBride Management Plan and the Revelstoke Higher Level Plan Order.

i) Kootenay Boundary Land Use Plan Implementation Strategy

The West Kootenay Land Use Plan Implementation Strategy was developed to supplement the Kootenay Boundary Land Use Plan. The KBLUP Implementation Strategy presents more detailed land and resource management guidance. It identifies and spatializes aesthetic resource values, and establishes management guidelines for resource management zones that include the Creston Community Forest Corporation TSA (ILMB 1997).

ii) The MCFC Stewardship Plan

The MCFC Stewardship Plan (2013) attempts to provide more spatially explicit objectives which supplant or compliment forest practice requirements developed in larger planning initiatives, such as the Robson Valley Land and Resource Management Plan (1999). While visual quality was noted as being a “driving factor” during the Robson Valley LRMP process, the Robson Valley LRMP was not designated as a higher-level plan and is consequently not legally binding. Despite the absence of any legal requirements, the MCFC 2013 FSP states that it will “undertake to comply with the established VQO’s of the known scenic areas” identified by the LRMP, but does not provide any specific guidance on how aesthetic management practices will be implemented (MCFC FSP 2013). With the exception of the MCFC Stewardship Plan at the time of this study, no strategic land use planning processes for the McBride area were identified (Luc Roberg Personal Correspondence 2012).

iii) The Revelstoke Higher Level Plan Order

The Revelstoke Higher Level Plan Order constitutes an attempt to provide locally informed strategic land use planning objectives that address community concerns with the West Kootenay Land Use Plan (1995). It identifies economic, environmental and social considerations unique to Revelstoke, and proposes alternative management practices, which attempt to integrate these concerns. Specifically, it recommends new visual sensitivity class assignments to visually sensitive areas along HWY 23S, emphasizes landscape design in future harvesting prescriptions, recommends rehabilitation of existing industrial openings and an increase in public consultation efforts (MOFR 1995).

3.1.2. Visual Resource Management by Community Forests

Aesthetic management and visual quality play a significant role in the formation and management of many North American and European community forests. Singhal and Benneker (2004), and Kissing-Nat and Bisang (2002) find that many community forests are founded around the creation of a better living environment, health and relaxation, preservation of visual quality and/or the desire to participate in landscape and

biodiversity conservation, with extractive resource benefits often playing a lesser role. As Singhal and Benneker (2004) state,

Community organizations are increasingly based on common interests and social relations rather than on common residence, while the motivations to join such schemes are increasingly based on psychological dependence on aesthetic, ecological and recreational benefits rather than on material dependence.

Early examples of visual resource management by community forest include the North Cowichan Community Forest established in 1946, and the Mission Community Forest created in 1958. Both forests indicate specific areas as set asides for ecological reserves and important scenic viewpoints (Municipality of North Cowichan website 2013, District of Mission 2011). This study attempts to demonstrate community concern for aesthetic resources. Interview results, as well as review of relevant theoretical literature, government documents, community forests' Management Plans and Site Plans, suggest visual resource management is an important non-timber resource for many community forests, and that some requirements unique to community forest tenures may support integration of visual design and achievement of provincial VQOs (Ambus et al. 2007). This study provides a snapshot of aesthetic management in three community forests in British Columbia. The results, which are discussed below, suggest that community forests act as institutional vehicles for the co-management of aesthetic resources as they satisfy the foundational principles of co-management institutions, including devolution of government responsibility, community consultation and use of innovative forestry practices to achieve both government and localized landscape objectives.

3.1.2.1. **Devolving responsibility and diversifying benefits**

The awarding of a CFA under the *Forest Act* constitutes a substantial devolution of government control (Pinkerton et al. 2008). The Community Forest Agreement decentralizes decision-making by empowering communities with the authority to make operational decisions concerning their timber supply area. Under the CFA, community forests are formally accountable to both the community and to the provincial government. This collaboration represents what Singhal and Benneker (2004) describe as locally based institutions operating within a public forest administration: "Local people maintain the forest as a shared resource, but under a mandate of an official public forest

management administration rather than according to their own objectives only.” Pinkerton et al. (2008) also notes the powers held by CFs. Under the Community Forest Agreement, CFs remain subject to regulations enacted by the *Forests and Range Practices Act* SBC (2002), as well as the *Wildlife Act* RSBC 1996 Chapter 488 and the *Fisheries Act* (1985). However, CFs are granted autonomy in implementing FRPA objectives, and are able to exclusively regulate the harvest and development of non-timber forest products such as mushrooms, berries and medicinal plants. In addition, they may submit their own strategies for achieving FRPA objectives, including aesthetic objectives. Additionally, many CFAs receive reductions in stumpage payments of up to 85% for the purpose of offsetting costs associated with these unique requirements (Ambus et al. 2007).

3.1.2.2. **Community consultation and expression of aesthetic preferences**

As noted in Section (3) *Emergence of community forestry in British Columbia*, some communities unsatisfied with the objectives, strategies or guidelines identified in government land use planning processes desired more control over management of local forest resources. Aesthetic management was an important concern of many communities during the CORE landscape planning process; Community Forest Agreements provided a means of more intimately involving local communities in forest planning and management, including management of scenic areas. This is captured clearly in one interviewee’s response, from my study (refer to Section 5):

I would not mind seeing the Robson Valley dominated by large community forests; that is my opinion, it just works. You get a lot better public buy-in because you are seeing that tie to the community in terms of jobs, benefits; control of the land base in terms of management-to-management style, what products and that can include a lot of recreation type stuff and doing things to attract people... (Interview R-26M).

The application and awarding of CF tenure requires, among other criteria, demonstrated awareness and consent of the community. One provincial staff member noted that Community Forest Stewardship Plans do not provide alternative management direction, but rather a different means of implementation by providing a local venue for expression of aesthetic objectives. Although providing evidence of adequate public consultation is difficult, CF applications must demonstrate concerted effort to reflect the

concerns expressed by the members of the public, organizations and First Nations (Ambus et al. 2007). Following the award of a CFA, a CF must continue to engage the public on forest development activities. While strategies for public engagement may vary, they often include annual, bi-annual or quarterly public meetings, flyers and other communication materials, posting of proposed site plans online, newspaper ads, website updates, site tours and other forms of educational outreach. Additionally, operations managers and CF staff are usually available for direct contact, providing an important point of contact for community members to express aesthetic concerns to forest managers. Collectively, these features of the CF tenure enable aesthetic preferences to be expressed to the minister prior to a CFA being awarded, and are conducive to establishing continuing dialogue with CF staff following the awarding of the CFA (FRPA 2002, RCFC n.d., CVFC n.d., McBride n.d.).

3.1.2.3. **Innovative forest practices**

Aesthetic management by community forests may address gaps in landscape-level planning by implementing a more integrated approach to visual design when making operational decisions. Integrated visual design specifies that aesthetic resources be considered throughout the operational planning process (MOF 1993). While the steps identified below provide a rough framework for integrating visual management into community forest operations, it remains an area of study that is difficult to quantify and has been under researched. VQOs set by the province, and the strategies used to achieve them, differ considerably amongst and within CFs, and visual quality effectiveness evaluations are still in the process of being completed by the province under FREP. However, a provincial audit conducted of the Headwaters district concluded that the Wells Grey Community Forest, as well as other licensees in the area, had diligently adhered to VQO established by the province and had in some cases exceeded them (FPB 2011). Provincial requirements for integrating visual design into forest management practices include the following:

1. Identify resource objectives; these objectives should consist of both qualitative and quantitative criteria against which progress may be evaluated.
2. Collect resource information and site-factor influences such as water, BEC zones, soils, slope stability, wildlife habitat/use, archaeology, rare/endangered species, disturbance regimes,

history of use, insects and disease, silvicultural systems and recreational opportunities are documented. Visual landscape information is also considered at this time, i.e., visual sensitivity class, key viewpoints and charismatic features.

3. Analyze resources that identify opportunities and constraints to development. Information on riparian areas, OGMA and slope stability site productivity should be included, as well as a visual analysis that identifies visual force lines on a landform and surface patterns on land features (MOF 2001).
4. Collate findings of visual analysis, as well as opportunities and constraints identified in resource analysis.
5. Revise the initial design using 2D and 3D visualizations; note that this may be refined to reflect changes over time.
6. Document all steps in the design process by presenting design in 2D map, 3D perspective and 4 D passes over time, and seek public approval by presenting designs to public organizations, community groups, First Nations and relevant government agencies. Presentations may include topographic, distance and in-stand photos, visualizations and artist interpretations.
7. Reflect silvicultural prescriptions in the objectives set out in the Forest Development Plans.
8. Monitor cutblocks both during and after harvesting to evaluate if VQOs were achieved. Designs should be dynamic and respond to natural disturbances and other environmental changes over time (MOF 1994).

4. Methods

The methods used in this study consist of a qualitative examination of aesthetic values of community members from three sample community forests using a grounded theory approach and provincial visual quality evaluations. Grounded theory, in contrast to other qualitative study methods, does not begin with a pre-conceived hypothesis (Glaser and Strauss 1967). The use of grounded theory to collect data allowed various themes to emerge organically during the interview process, and decreased the potential influence of interviewer bias. Provincial Visual Quality Effectiveness Evaluations were also used to quantitatively evaluate aesthetic management in visually sensitive areas by sample community forests (MOFR 2008). Taken together, these separate evaluations provide insight into the aesthetic values of local community members in the three sample communities, as well as the aesthetic management practices of the community forests.

The initial sample groups consisted of the Creston Valley Community Forest (CVCF), Revelstoke Community Forest Corporation (RCFC), Harrop-Proctor Community Forest (HPCF), Likely-Xats'ull Community Forest (LXCF) and the McBride Community Forest (MCF). Of the five community forests surveyed during the research period, Revelstoke, McBride and Creston were selected for analysis because of their relevance to the central research questions, which ask the following: what are the aesthetic landscape values of members within the sample communities, and to what extent are sample community forests implementing aesthetic management practices within their TSAs? The communities of Harrop-Proctor and Likely-Xats'ull were excluded, as they did not possess cutblocks that met the provincial criteria for conducting Visual Quality Effectiveness Evaluations and were not actively implementing aesthetic management practices at the time of study. The selection of Creston, Revelstoke, and McBride as sample forests was based on regulatory, ecological and geographical considerations. Both Creston and McBride are subject to established MFRNRO visual requirements, while Revelstoke demonstrates strictly voluntary aesthetic management practices. Each of the community forests is located in a distinct forest district that is subject to

independent decision-making by forest district managers. Additionally, the AACs of each CF collectively represent small, medium and large harvesting volumes, allowing aesthetic values and management practices to be evaluated across a spectrum of operational contexts. All of the sample forests occur in rural settings, thus reducing comparisons to landscapes of semi-rural or urban aesthetic value (Zube, 1974). The biogeoclimatic zones of Revelstoke and Creston are both typical of the Southern Interior Forest Region, while McBride contains aspects of both the Interior Wet Belt and the colder, drier Sub-boreal Interior (von der Gonna n.d. McBride CF Proposal).

Fieldwork was conducted as part of an interdisciplinary research group, which facilitated co-learning amongst its members. Field studies employed the use of qualitative research techniques to provide a dynamic approach to data collection. Herbert and Riene Rubin (1995) note that “qualitative interviewing design is flexible, iterative, and continuous rather than prepared in advance and locked in stone.” I was thus able to modify my inquiry to reflect my deepened understanding of aesthetic values and additional insights as the study progressed. My initial investigation focused on more broadly held values of community members. However, after completing our research in Likely, BC, I narrowed my analysis to focus on the aesthetic landscape values of community members. Non-random sampling methods and rapid rural appraisal (RRA) were used to gather information on visual landscape values of members in each community. Interview respondents were selected by referral with care to represent the diversity in the community.

Interview transcripts were examined to determine the aesthetic values held by community members, as well as to identify if aesthetic management was occurring at sites of visual importance within the surveyed communities. A review of relevant literature on co-management and aesthetic management was conducted following the fieldwork.

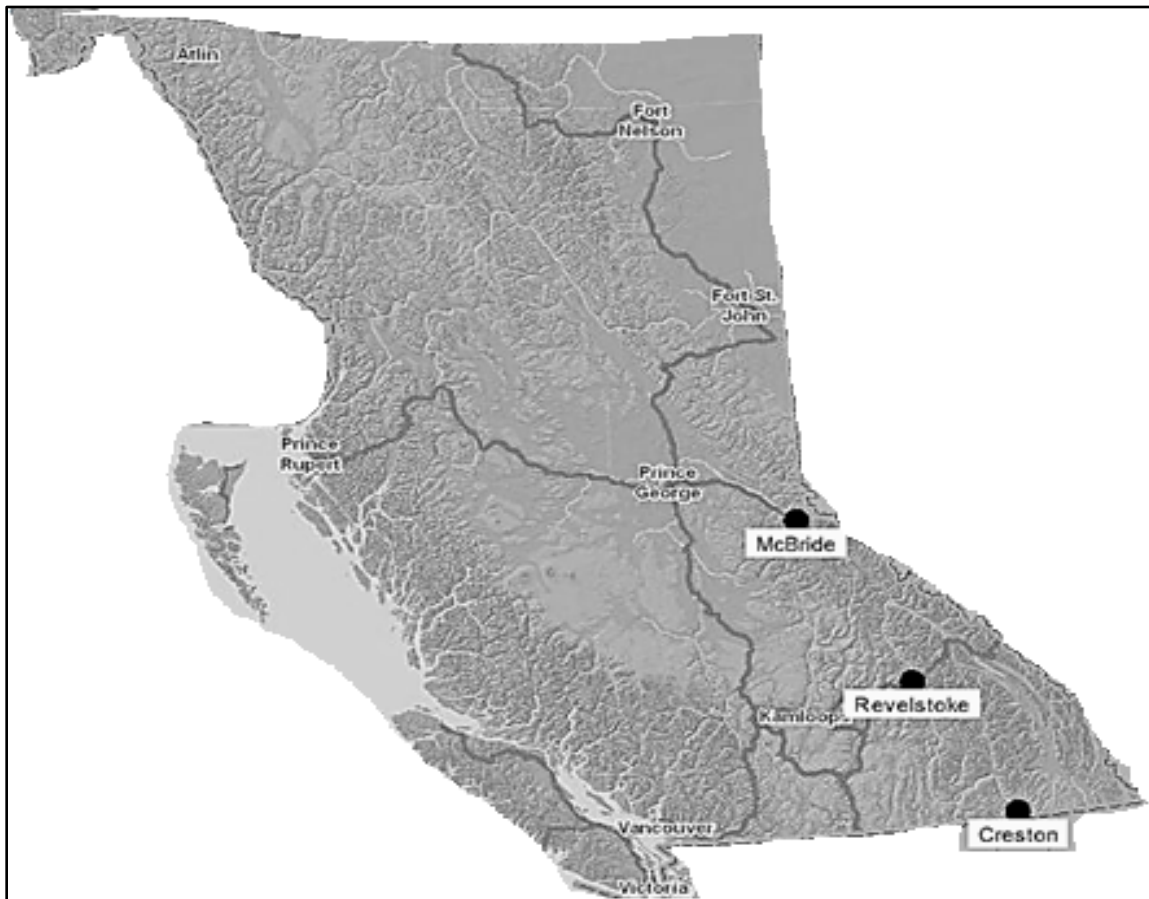


Figure 4. *Location of sample communities*

4.1. Determining aesthetic values

To examine aesthetic values of community members, the research team used qualitative, semi-structured interviews with individual participants, focus groups and field visits to gather information. White (2008) notes that a number of texts distinguish between different types of interview structure, stating that “interviews may be more or less structured in their deliverance of questions, as well as their interpretation of responses.” DiCicco-Bloom and Crabtree (2006) also differentiate between structured, semi-structured and unstructured interviews. They note that characteristic features of semi-structured interviews include interviews that are scheduled in advance, have a specified time and location, and are loosely organized around a central theme. The use of semi-structured interviews in this study allowed the research team to schedule a

number of interviews in each of the sample communities, thereby increasing our sample size and directing the conversation around topics relevant to the research interests without over-prescribing the discussion.

Our interviews targeted the themes of the five principle researchers, focusing on economics, water quality, ecology, co-management and aesthetic management of community forests. Each of the researchers was present during the relevant interviews with a series of questions for interviewees. Due to the interdisciplinary nature of the interviews, it was sometimes difficult to direct the conversation to the desired topics. Thus variable amounts of time were spent discussing each topic in order to maintain the flow of the discussion. Herbert and Reine Rubin (1995) note, “If you can limit the number of main topics, it is easier to maintain a conversational flow from one topic to another. Transitions should be smooth and logical...” My interview questions targeted cultural issues, aesthetic landscape preferences, aesthetic management goals and the forestry activities used to achieve them. Participants were asked to answer questions as openly as possible, but were not obliged to answer any of them. In addition, each respondent was provided a copy of a Simon Fraser University Statement of Ethics in compliance with the Tri-council Policy Statement on Ethical Research Practices (Public Works and Government Services 2005).

4.2. Visual quality effectiveness evaluation

Visual quality effectiveness evaluations were conducted for the Creston, Revelstoke and McBride Community Forests, as no provincial assessments had previously been conducted. The intent of the Effectiveness Evaluations was to determine if operations of the sample community forests are meeting the visual goals and objectives established by the province under the *Forest and Range Practices Act* and Government Action Regulation (GAR). Viewpoint selection was completed using VQO Maps, Management Plans and Site Plans for each community forest (MOFR 2004). Only areas with established VQOs, which occur 1–8 km from viewpoints, and with harvest dates occurring within the past three years, were selected, as these areas provided optimal locations from which to view scenic areas. All viewpoints selected for the study were validated during field visits. Visual inventory techniques outlined in the FREP

Protocols for Visual Quality Management were used for each effectiveness evaluation (MOFR 2008). During field evaluations, GPS coordinates and viewing direction were recorded, along with all visual design elements. Photographs of landform and alterations were taken. Photos included in the evaluation were taken at a focal length of 55mm, as well as 35mm and 10mm to capture additional opening details. Following the field evaluation, photographs were stitched together to create panoramas and landforms were delineated. Openings and landform areas were measured in perspective view using Adobe Pro 9 software, and the percent alteration was determined by dividing individual disturbance areas by the total landform area. Finally, visual design elements such as boundary treatments, lines of force, as well as cutblock size and shape were identified and weighted to provide an overall effectiveness rating (MOFR 2008). Table 2 below provides definitions for each of the ratings (refer to Appendix for detailed information on Effectiveness Evaluation information).

Table 2. Effectiveness Evaluation Rating

| | |
|-----------------|---|
| Clearly not met | Neither method indicated VQO achievement; both are far from the Visual Quality Class thresholds. |
| Not met | Neither method indicates VQO achievement but both are close to the Visual Quality Class thresholds. |
| Borderline met | One method indicates VQO achievement; one does not. |
| Met | Both methods indicate VQO achievement, but one or both are close to the maximum % alteration limit. |

4.3. Data Analysis

4.3.1. *Qualitative research paradigm*

When conducting data analysis for this project, blended techniques from a grounded theory approach and more general qualitative research approaches were employed. Originally proposed by Glaser and Strauss in the late 1960s, grounded theory advocates a reverse scientific method approach to research (Babbie & Benaquisto 2002). The use of grounded theory is well suited for the purposes of this study, as it is reflexive and allows for the subjective details of aesthetic landscape preferences to be captured. Data was collected without any presupposing hypotheses, and explanatory theories were developed following the analysis. Use of this method allowed for responsive theory formation informed by a comprehensive comparison of variables derived from literature review on interpretation of landscape aesthetics, and for the establishment of provisional categories from interview data. Provisional categories derived from interview data were later cross-referenced against externally developed categories acquired from research of aesthetic and co-management literature. The categories generated from my analysis were continually validated against each other as new categories emerged in subsequent analyses, and these are discussed in my findings section. Corbin and Strauss (1998) note the importance of this validation process: “The validation process is especially important for researchers who use categories derived from research literature because categories are always context specific.” The use of organic and established categories for describing aesthetic landscape values is justified as it provides an objective, yet sensitive, interpretation of the data, thus capturing the widest possible range of known preferences.

4.3.2. *Coding and quotes*

Axial coding was used to identify categories within the data. Axial coding is a process of disaggregation of central themes during qualitative research. Emergent categories were contrasted against those that were externally identified in the literature. Relationships between the categories were examined initially and cross-examined using selective coding specific to the newly identified categories. Babbie and Strauss (1967) note that the re-examination of emergent hypotheses is the central legitimizing process

of grounded theory, as it provides a means of testing and retesting existing categorical hypotheses against one another.

Interview quotes used within the text are taken from transcribed interviews. In some cases, members of the research groups transcribed these interviews. In other instances, professional transcribers were employed to record the transcriptions. In all cases, interviews were transcribed verbatim. Minor disfluencies identified in the professionally transcribed interviews were corrected where necessary to facilitate understanding.

4.4. Limitations

Limitations associated with the study include a small sample size that precludes a quantitative comparison of achievement of EVQOs by community forests and other types of tenure. In addition the study was not perceptually based, as it did not use visual aids to illustrate different levels of harvesting and patterns of removal during interviews. Responses are therefore qualitative in nature. Interview results were not linked to the Effectiveness Evaluations; aesthetic landscape preferences expressed during interviews were for the most part not spatially explicit. Finally Effectiveness Evaluations, while useful for assessing percent denudation, may in some cases not address locations where increased removal may be desirable to achieve a more natural looking opening.

5. Research Findings

As noted above, the use of grounded theory in this study allowed an iterative approach to data collection. Participants had the opportunity to describe their landscape perceptions in detail. For the purposes of this study, I employ the definition of landscape perception put forth by Zube, Brush, and Fabos (1975), which states “landscape perception is considered a function of the interaction of humans and the landscape.” They note that the interaction of both components can result in changes to the landscape that in turn may affect both. The dynamic nature of this perceptual relationship resulted in relationships between variables emerging spontaneously during interviews and served to mitigate structural or personal bias in interview design.

When discussing aesthetic landscape preferences and visual sensitivity to disturbance in rural forested areas, interview responses tended to be perceptually based. As Daniel (2001) states, perceptual interpretations of landscape aesthetics “treat biophysical features of the landscape as stimuli that evoke aesthetically relevant psychological responses through relatively direct sensory–perceptual processes and/or through intervening cognitive constructs”. Expert based landscape interpretations translate biophysical features of the landscape into elements of landscape design such as colour line and form. Some expert approaches were documented during interviews. Within the expert approach were common ideas that centered around visual stewardship and timber utilization. Interestingly, visual stewardship appears to be both a perceptual and expert based recognition of the landscape. Impressions of the landscape are often interwoven with attention to design details, including line, form and colour. Perceptual and expert approaches to landscape assessment are well recognized in existing literature (e.g. Daniel 2001).

Aesthetic values expressed by participants during interviews were divided into five unique groups. As will be discussed in detail below, despite some of these groups having similar aesthetic qualities, each possesses characteristics that distinguish it from

the others. Aesthetic values that were expressed include non-instrumental, visible stewardship, recreational, utilitarian, and ecological. With the exception of non-instrumental aesthetic appreciation, all aesthetic preferences were related in varying degrees to informational triggers communicated by the landscape to them.

5.1.1. *Theoretical paradigms for the aesthetic interpretation of landscapes*

As Daniel (2001) notes, a key limitation to any inquiry on visual landscape perception is the variety of methodological approaches and theoretical interpretations that may be applied. In addition to identifying and describing the visual values of community members in each of my sample groups, my study attempts to explain them using a tripartite cognitive paradigm put forth by Bourassa (1990). Bourassa's tripartite paradigm acknowledges the existence of multiple paradigms to explain human landscape perception. He emphasizes a "developmental approach" to understanding landscape perception that incorporates three modes of aesthetic experience identified by Vygotsky, the biological, cultural and personal. Bourassa suggests that each of these modes contains unique characteristics, which distinguish it from the other experiential modes. He states that these modes may occur in isolation from one another or in tandem to produce a given response to a landscape, making identification of absolute indicators difficult. To the extent possible, this study attempts to organize responses within these paradigms. Collectively these paradigms assist in explaining the basis for the variation amongst landscape assessments.

5.1.1.1. Biological Paradigm

The biological paradigm describes an instinctual response to the landscape that is based on biological determinants and comprises behaviors that are instinctual. Appleton (1975a) postulates a habitat and prospect refuge theory, which suggests that humans subconsciously prefer landscapes that are conducive to survival. Forested landscapes offer opportunities for seeking refuge, as well as materials for sustaining oneself; as such, they are viewed as more desirable than denuded landscapes. A number of other works also support the biological interpretation of the landscape (e.g., Kaplan 1987). Most respondents that indicated a preference for undisturbed landscapes were tourists or respondents with strong environmental backgrounds.

5.1.1.2. **Cultural paradigm**

The cultural paradigm describes attitudes that are expressed as a result of culturally-induced modifications to what would otherwise be a biologically based interpretation of the environment. Cultural values are learned through the process of acculturation, which occurs incrementally over time; with the aesthetic value of a forest environment varying depending on changing biophysical characteristics and the evolving socio-cultural background of the observer (Nassauer 1995, Naveh 1995). This relationship is described by Zube as “dynamic and transactional” (Zube 1987).

The cultural paradigm is useful in characterizing many of the interview responses in this study. Many participants cited their role and residence within the community, or their professional training as directly affecting the way in which they viewed the landscape and how they interacted with it. A particularly emergent theme was that those who worked within the forest industry, or lived within the communities and used the community forests for recreating and harvesting of non-timber forest products, were tolerant of higher levels of modification than were non-residents who were cited as being very sensitive to disturbances.

5.1.1.3. **Personal Paradigm**

In addition to being shaped by biological and cultural influences, aesthetic landscape interpretation is also determined by personal experiences of individuals. Bourassa (1990) notes the influence of an individual’s experience on aesthetic perception. He suggests that interpretation of the landscape is not strictly based on biologically or culturally driven responses; that these may be modified or overridden by individual determinations; “The individual has internalized a language and uses it as a tool to influence his or her behavior.” A MFRNRO visual resource specialist also affirmed this phenomenon stating, “in the case of forest management, it all comes down to attitudes. Specific attitudes and opinions about forest management are developed from emotionally charged beliefs about what is desirable, right and appropriate for the landbase” (R-47). Coeterier J.F. (1996) also notes the influence of personal or experiential relationship with the rural landscapes stating: it “colours” the way the way an individual views it.

5.2. Visual values of community members

5.2.1. *Non-instrumental aesthetic value:*

For the purpose of this study, non-instrumental aesthetic value refers to the appreciation of scenic views in and of themselves. Respondents who discussed this preference noted that there were no altruistic motives for appreciation of scenic landscapes; rather that the appreciation of the landscape occurred in isolation from any deeper meaning. Non-instrumental assessments appear to be based on perceptual or non-expert judgments, as a result of environmental stimulus. While no respondents fell solely in this category, many discussed this preference as being held by tourists and non-community members who did not have any knowledge of forestry. Respondents who discussed these preferences amongst tourists noted that they were primarily concerned with the presence of anthropogenic disturbances and placed an emphasis on the shape, size, and location of cutblocks. Landscapes without visible openings were preferred simply because individuals thought they were more aesthetically pleasing. Despite no respondents directly expressing non-instrumental aesthetic values; the responses suggest contiguous landscapes without visible signs of anthropogenic modification may have existence value for tourists.

The findings above are consistent with those of Bush and Schafer (1975) who note that non-expert objective categorization of landscape aesthetics occurs as a stimulus response mechanism, which does not utilize cognitive processing in its estimation of a landscape. These findings are also affirmed by a public perception study conducted by MoF (1996), which examined public response to harvesting on Crown lands and found that despite differences in individual and socio-economic backgrounds, public acceptance of landscape modification generally increases with increased retention of basal area. One provincial visual specialist noted that the public care very much about how forested environments look, regardless of the environment's ecological condition or designated land use (personal communication, MFLNRO Visual Resource Specialist 2012). Kimmins (2001) also recognizes that most of the public opposition to logging, and clearcutting in particular, has arisen because of the "distasteful appearance of clearcuts in the immediate post-harvest state..."

5.2.2. *Visible stewardship as an aesthetic value*

Many of the respondents in this study expressed a preference for viewing signs of visual stewardship of the landscape. In my analysis I adopt the interpretation of visible stewardship offered by Sheppard (2001a), which states that visible stewardship constitutes a “perceptual theory” with a central focus on visible indicators which demonstrate active care of a landscape and represent to the viewer non-visible, sustainable ecological conditions (Kaplan & Ryan 1998). Most respondents expressed a preference for landscapes which demonstrate some obvious signs of stewardship of the land. There was an overall opinion that anthropogenic modification should communicate attachment to the landbase and evidence of deliberate and ongoing maintenance by those managing it. During interviews, many respondents mentioned brush removal, variable retention, partial cutting, cutblock design, stream and watershed maintenance, lack of soil disturbance, removal of coarse woody debris, pest management, and management of fire interface zones as visible indicators of sustainable forest management. Benson (2008) identifies similar aesthetic values in farmers surveyed across the British Countryside, who regard “tidiness” as an indicator of good farming practices.

Visible stewardship as an aesthetic value is a relatively recent trend in landscape appreciation. This preference appears to demonstrate aspects of the cultural paradigm, personal paradigm and biological paradigm acting together. It suggests that humans are influenced by the general aesthetic principles of landscape design and architecture that are received innately, such as form, line, colour and viewing distance, but also by socio-cultural influences such as profession or individual upbringing. Combined, these preferences often result in a general desire to see demonstrable evidence of a healthy well cared for landscape. This area of research requires further study to confirm applicability in other contexts.

5.2.3. *Ecological resiliency as an aesthetic value:*

Within the study 14% of respondents expressed aesthetic values related to absence of logging for the purpose of maintain ecological integrity. Respondents in the category did not wish to see any evidence of any forest harvesting or associated infrastructure. They discussed the importance of maintaining understory, and the use

single-tree selection to manage for insect infestations. Participants in this category were willing to accept disturbances that were the result of natural processes such as infestations or fires. In many cases, participants in this category felt that visual management practices were not necessary if licensees were properly managing for ecological values across the landscape.

5.2.4. Utility as an aesthetic value:

5.2.4.1. Forest Harvesting

In contrast to non-instrumental or visual stewardship aesthetic values, practical ideas concerning the utility and efficiency of timber removal and recreation opportunities were also found to evoke a positive aesthetic experience. As Benson (2008), and Lewis (2006) note, land which has been delineated for utilitarian purposes such as timber supply areas, recreation or farmlands may still have “aesthetic character” and that aesthetically pleasing or displeasing features are associated with the characteristics of the land use.

Many persons directly affiliated with the forest industry had aesthetic opinions that centered on harvesting techniques and visual cues, which correspond with utility, efficiency, and ecological integrity and forest and soil productivity (Sheppard and Meitner 2005). These respondents valued landscapes where forestry operations were visible, efficient, and ecologically responsible; they did not find evidence of timber harvesting as necessarily unattractive. Some respondents even described feelings of satisfaction from seeing a “working forest.” Often utilitarian ideas about aesthetics expressed by those involved with the forest industry appeared to be conditioned by their professional and routine interactions with the forest. These findings are best explained by the cultural paradigm in which experts emerge as a “salient group” (Bourassa 1990, Zube 1982).

A large body of aesthetic literature supports the findings above. Jackson (1986) describes utilitarian aesthetic values in his characterization of the selection of vernacular landscapes by the founders of Saxon England--who valued landscapes that contained suitable areas for conducting village life, erecting infrastructure, farming, and grazing livestock. Aesthetic acceptance was thus tied to the utilitarian associations with various aspects of the landscape. Benson (2008) similarly notes that “the farmer’s view of

amenity” is very much conditioned by his role as a food producer resulting from the common view that “if it is farmed well, it looks good’. Thus many farmers do not object at all to bare landscapes provided that the farming is technically efficient.” Sheppard (2001b) observes that forest professionals often place little emphasis on aesthetic resources, viewing them as a constraint to timber supply. Finally, Zube (1982) identifies this phenomenon in his discussion of the expert paradigm, stating that efficient resource management techniques may have “intrinsic aesthetic effects” when viewed by skilled or trained observers in the field of art, design, and ecology or resource management.

5.2.4.2. **Recreation as an aesthetic value**

A number of respondents expressed aesthetic value for landscapes, which facilitate recreational opportunities. The emergence of this form of aesthetic preference is likely the result of a more widespread increase in outdoor recreation and ecotourism activities over the past two decades and demonstrates the dynamism of aesthetic interpretation of the landscape (Hof & Kaiser 1983). The tripartite paradigm described above assists in explaining recreation as an aesthetic value, as it asserts that aesthetic values for the forest environment result from biologically and contextually driven transactions between people and a forest’s physical characteristics. Many participants described visual values for recreational sites, that varied from person to person, as well as by recreation type. Respondents in this category were accepting of some anthropogenic modification to allow for tourism enhancement opportunities but generally preferred higher levels of retention. Visual indicators mentioned by participants include: trail creation and maintenance, establishment of scenic vistas, established openings for backcountry skiing and harvesting NTFPs, and road maintenance for recreational access. My results are also supported by the research findings of Jaakko Poyry (1993), who posit a strong correlation between aesthetic and recreational values.

Staff at each of the sample community forests discussed the importance of providing and maintaining recreational opportunities within their TSA including hiking, biking, camping, berry and mushroom picking, skiing (downhill and backcountry) and snowmobiling. However, staff also discussed the perception that some outdoor recreationalists, particularly non-community members, wanted to see “park-like” or “pristine” viewsapes when recreating. These respondents indicated that balancing

harvesting in recreationally significant landscapes while optimizing timber removal can be challenging and contentious. Some respondents felt threatened that aesthetic management practices may indirectly affect their livelihood while others saw recreational enhancement opportunities as a chance to diversify economic drivers away from primarily resource extraction. Tourists were often perceived as possessing different cultural backgrounds than local residents and were described as being environmentally sensitive, employed in tertiary industries and without knowledge of forest ecology. This phenomenon is described by Urry (1990) in, *The Tourist Gaze*, which asserts that an inherent part of the tourist's experience is

...to gaze upon or view a set of different scenes, of landscapes or townscapes that are out of the ordinary. The viewing of such tourist sites often involves different forms of social patterning, with a much greater sensitivity to visual elements of landscape or townscape than is normally found in everyday life.

5.3. Sample Communities

5.3.1. Creston, British Columbia

5.3.1.1. History and context of aesthetic management in Creston Community Forest

Environmental conflict over industrial logging practices has been present in Creston for over 40 years. Strong public concern exists over maintaining the scenic quality in the area, as well as protecting other non-timber values. One respondent described the history of scenic management in the area as a long transition away from “clear cut the world!” towards more inclusive harvesting practices which protect a diversity of values (Interview R-15C). Early attempts at mitigating conflicts in Creston resulted in the establishment of a public advisory committee to the Forest Service (PAC) in 1977. The PAC represented an initial step towards more pluralistic forestry planning by the provincial government and was responsible for relating public concerns to the Ministry of Forests. The PAC was followed by other regional and sub-regional participatory planning initiatives undertaken by the province including the Kootenay Boundary Higher Level Plan Order and the Kootenay Boundary Land Use Plan.

As described in Section 5, the KBHLPO attempted to provide a high level integrated planning approach to landscape management for the Kootenay Boundary Region of southeastern British Columbia. The KBHLPO specifies resource management zones and their associated objectives which include: consumptive use streams, grizzly bear and caribou habitat, old and mature forests, biodiversity, fire and pest management, social and economic stability and visuals (MOFR 1995). The KBLUP Implementation Strategy (KBLUP IS) was developed to complement the KBHLPO by providing a more detailed strategy for achieving high level aesthetic management objectives for the Arrow Resource Management Zone. Despite the management direction of the PAC, KBHLPO and KBLUP IS, the Creston community desired a more direct means of involvement in protecting the diverse resource values of the community. Many residents wanted the opportunity to participate in the development, as well as the implementation, of land use planning objectives. The community applied for a CF license and in 1997, the Creston Valley Community Forest (CVFC) was established.

5.3.1.2. **Co-management of aesthetic resources in Creston**

CVFC is a not-for-profit corporation with a mandate to conduct ecosystem based forest management, harvest annual allocated cut volumes, protect the Arrow Creek watershed, manage for non-timber resources (including visuals) and provide social and economic benefits to the community of Creston. Initially a volume based tenure with a 15,000m³/yr cut allocation and a timber harvesting land base of 18,159 ha, CVFC later obtained area-based tenure in February of 2008. The CVFC management area is located within a SMZ and contains a number of important resources including watersheds, wildlife habitat, scenic and recreational features. Included in the TSA are: Arrow Creek community watershed, Russell Creek, portions of the Okell Creek domestic watershed including Big Bear Creek, portions of Goat Mountain and the western side of the Skimmerhorn Range (CVCF Website n.d.). The following sections attempt to demonstrate CVFC's implementation of co-management of aesthetic resources as defined in Section 4.1.2, by outlining their institutional structure, public engagement strategies, and aesthetic harvesting practices.

i) Institutional structure

The institutional structure of CVFC provides for more collaborative forest management of aesthetic resources than traditional industrial models. CVFC consists of three equal shareholders: the Town of Creston, Regional District of Central Kootenay, and an environmental group called Wildsight. The shareholders appoint five directors annually comprising a board of eight members, which are largely representative of the community. The structure of the board allows for more direct means of participating in managing for timber resources, as well as other forest resources. Interviews with board members revealed that individual participation on the board is sometimes limited and that some board members have served repeated terms. This may potentially affect the level of representation from various interests.

ii) Public engagement

Interviews with CVFC board members, as well as community members not directly affiliated with CVFC, indicate that the CVFC provides a channel through which public concerns concerning aesthetic management may be expressed, but that participation by members of the public in daily operational decisions was low. CVFC hosts annual general meetings, as well as monthly public meetings to provide forums for the public to communicate in person any individual or group concerns around management activities, including visual quality. CVFC also maintains a website that informs interested parties about opportunities for community involvement, forest education, and sustainable business practices (CVFC website n.d.). Additionally, CVFC staff expressed a willingness to engage the public directly, by taking people to view socially sensitive sites with one board member stating:

Some people were opposed to us logging in certain places, but we have responsibility to be in there. They have to understand that. Forestry companies just – they will say, “Here’s our FTP. Oh yes, by the way, we’re going to start logging next week.” That has happened a lot. I think that is where the community forest is different. It just acknowledges these certain groups- these individuals (Interview R-20C).

Overall, there was a high degree of confidence in CVFC’s management practices and few aesthetic concerns. CVFC staff identified community engagement and

acknowledgment of public concerns as key management goals but expressed that community mistrust existed around the formation of CVFC and logging in the Arrow Creek watershed, with less concern about the influence of logging in scenic areas.

iii) *Aesthetic harvesting practices*

Interviews with CVFC staff revealed an emphasis on harvesting practices that demonstrate a commitment to maintaining scenic quality across the landscape (Interview R-20C). Staff also indicated that having a sustainable forestry operation included socially sustainable forest practices that considered more than simply timber optimization. They stated that most prescriptions retain approximately 50% of the basal area with fir and larch but that pine has been harvested more heavily to address mountain pine beetle (*Dendroctonus ponderosae*) infestations and in some areas, this has affected visual quality (Interview R-14C). Staff also discussed explicitly maintaining understory to offset visual impacts of more intensive harvests of pine and using single tree selection to maintain narrow yarding corridors, “Others just don’t take the time. Even if we weren’t logging for them I would be all for it. I take pride in our work and what it looks like when we are done” (Interview R-20 C).

A number of visually sensitive areas exist around Creston. Interviews and management plans identified the use aesthetic management practices to mitigate impacts of forest operations on scenic quality (Silva Forest Foundation 2003). CVFC board members expressed a high degree of confidence in their faller, their operations manager and their capacity to manage for visual values as well as for forest health. CVFV utilizes a number of alternative harvesting regimes. Some strategies discussed during interviews with CVFC staff include narrow, 3-metre wide yarding corridors, reserve shelterwood and shelterwood silvicultural systems, small (1/3 ha) group selection cuts, single tree selection and high lead cable logging.¹ Staff also discussed leaving “the best trees behind and retention of basal area” as important factors in forest planning, “It’s important to manage the landscape and not just an individual block level”

¹ See forestry definition list

(Interview R-22C). Equipment used during harvesting included a feller buncher and a small Cat excavator for roadside removal of blown down trees (Interview R-15C).

Respondents expressed a variety of opinions when asked if visual management practices of CVFC and other local licensees were similar. Some felt that the cutblock of other companies' blocks were larger, had fewer leave trees and less retention. A few respondents felt that the local mills in Creston, J.H. Huscroft and Wynndel Box Lumber Sales Ltd., while subject to VQOs, were not managing for them as intensively as CVFC. Others saw aesthetic management by CVFC as excessive, and felt it constituted concealing their identity as loggers by attempting to make operations look non-existent.

5.3.1.3. **Visual Values of research participants:**

The respondents interviewed in Creston expressed a diversity of aesthetic landscape preferences. This variation may largely be explained by a mix of individual, cultural and biological influences. The vast majority of individuals expressed scenic values, which were consistent with those found in the visible stewardship and there was a consensus that CVFC was actively and successfully managing for visuals.

5.3.1.3.1. ***Non-instrumental aesthetic value***

No respondents expressed a purely aesthetic value for the landscape. Most respondents communicated an aesthetic preference for indicators that demonstrated some evidence of anthropogenic activity on the landbase. One community member indicated that viewsapes from the town of Creston be maintained as a "natural cut" (Interview R-16C) and stated that visuals were a major consideration in and for themselves: "It's just nice to see visuals. That would be a big one, yes" (Interview R-16C). Three other respondents indicated that non-instrumental aesthetics was important for tourists.

5.3.1.3.2. ***Visible Stewardship***

The majority of respondents in Creston expressed a desire to see some level of active, conscientious management across the landscape. Approximately 42% of the respondents who discussed aesthetic preferences expressed aesthetic values, which were connected to use, and demonstrated evidence of a balanced approach to forest management as well as signs of scenic management. Participants in this category

incorporated both ecological aesthetic indicators of forest health as identified by Gobster (1996), as well as evidence of attachment to the landscape beyond simply maintenance activities into their visual estimation of the landscape (Nassauer 1997). Some of the stand level indicators of sustainable harvesting expressed by participants include: percentage of basal area removed, presence of leave trees and wildlife patches, evidence of selective logging in scenic areas, retention of understory, avoidance of erosion, size/shape of yarding corridors and cutblock s and landings that are free of debris (Interviews R-21C, R-20C, R-14C). One respondent felt that there were areas where higher retention was required and expressed the desire to see stand level characteristics such as heli-logging or mill logging over cable logging (Interview R-40C).

Staff members at CVFC conveyed the desire to demonstrate an environmental ethic on the land base that could be observed. Many saw the harvesting activities of CVFC as enhancing the area (Interviews R-19C, R-15C). A number of professionals indicated they found managing for visuals and other resource values by conducting alternative logging practices personally rewarding and derived a sense of pride from executing alternative logging practices. Many expressed a desire to demonstrate their technical ability to log while maintaining aesthetic resources (Interviews R-20C, R-15C, R-16C). One respondent notes that “The fun and the challenge and the real education takes place in – in designing a landscape and landscape level objectives and then implementing them, you know...and it’s possible to do it for visuals, for sure” (Interview R-15C).

5.3.1.3.3. ***Ecological aesthetic***

In 17% of the interviews which discussed visual resources, participants expressed an aesthetic preference for landscapes managed primary for ecological resiliency. While many of the indicators discussed by participants are similar to those of visible stewardship, participants in this category may be distinguished by the intrinsic value they place on forest health over all other objectives. The desire to observe ecologically sustainable landscapes is not directly connected with any anthropogenic uses with one participant stating: “sometimes you have to just let nature run the show” (Interview R-17C). Participants in this category found that the most aesthetically pleasing

environments were those that showed signs of a healthy and robust forest: where soil, vegetation, water quality, and wildlife were all properly managed.

Specific visual indicators of sustainable ecosystems discussed by respondents include the absence of logging and all evidence of any associated infrastructure, the presence of understory, and harvesting methods that use single-tree selection to manage for insect infestations (Interview R-20C). Some forest professionals felt that optimal cutblock design should adapt to accommodate varying site characteristics and reflect localized environmental conditions such as south or north facing aspects, biogeoclimatic zone, climax species and habitat requirements (Interviews R-16C, R-22C, R-44C). In many cases, participants in this category felt that visual management practices were not necessary if licensees were properly managing for ecological values across the landscape. In such examples, participants were willing to accept disturbances that were the result of natural processes.

5.3.1.3.4. ***Utilitarian Aesthetic***

Of the participants who discussed visual resources, 25% stated that they perceived working landscapes as aesthetically pleasing. Respondents in this category were affiliated with the forest industry whose aesthetic landscape preferences were strongly connected to timber utilization. Respondent's perceived non-instrumental aesthetic values as artificial constructs that negatively affect timber supply. They believe that logging activities should occur in front country areas in an effort to dispel the negative connotations around harvesting trees and revive a culture of logging. Respondents often felt that the visual concerns of the public were exaggerated, biased, or uninformed and that attempts at managing for visuals constituted attempts at hiding forest practices (Interviews R-18C, R-12C). One member for the forest industry saw the CF tenure as an ideal vehicle for advancing front country modification, as it enjoys increased public buy-in and public trust in comparison with industrial harvesting models (Interview R-18C).

5.3.1.3.5. ***Recreational aesthetic***

Both members of the forest industry, as well as community members not involved in forestry valued landscapes, which afford recreational opportunities. This preference

group constitutes approximately 17% of total sample. Many participants placed a high aesthetic value on landscapes that were conducive to a variety of recreational activities including hunting, snowmobiling, ATViing, hiking, biking and huckleberry picking (Interviews R-21C, R-16C). Thompson Mountain (lookout) and Skimmerhorn were two areas that were emphasized as being of particular importance for both recreation and scenic viewsapes (Interview R-15C, R-16C). Indicators of harvesting practices which maintain recreational objectives were: selective logging, boundary treatments, patch cuts and leaving shelterwood; CVFC staff (Interview R-15C) indicated that recreational values within the community were a consideration in harvest prescriptions.

As you can tell Thompson Mountain is quite popular; people are out there hiking and biking and collecting huckleberries. In this prescription on Block 4, we left about 22% basal area and then took it up to 44%, but we created a fire-based prescription that is quite open.

A number of participants interviewed noted the culture of outdoor recreation around Creston and that harvesting by CVFC was not detracting from recreational opportunities but in some cases enhancing them. CVCF maintains the Ladyslipper and Thompson Rim trail, and as stewards of these trails CVCF provides signage and debris removal between spring and fall. One participant described how CVFC maintained scenic quality while harvesting along Skimmerhorn ridgeline, which represents an important scenic area both to locals and to tourists (Interviews R-15C, R-14C, R-16C).

5.3.1.4. **Creston Visual Quality Effectiveness Evaluation**

The CVFC Management Plan (2007) states that CVFC will use the KBHLPO and Silva Management Plan (2003) guidelines to inform forest management practices in visually sensitive areas around the communities of Erikson and Creston. In areas of visual sensitivity, such as highways and waterways, a prescription of retention or partial retention will be employed.² To evaluate whether CVFC aesthetic management practices were successful in achieving VQOs on three visually sensitive CVFC cutblocks, Blocks K3D 004

² Refer to Appendix B Visual Quality Effectiveness Evaluation Section 2.3.2 Percent Alteration Ranges

BLK 2, K3D 002 BLK 2 and K3D 003 BLK 1 were evaluated and were assigned an effectiveness ranking between “clearly met” and “not met”. As described in Section 4.1 above, these rankings indicate the extent to which sample CVFC cutblocks adhere to provincially established Visual Quality Classes and incorporate principles of landscape design (see Appendix B for detailed FREP Visual Quality Effectiveness Evaluation form).

Table 3. Creston Valley Community Forest viewpoint location information

| Cutblock | Coordinates | Location Description | Viewer Status | Elevation (m) | Viewing Distance (km) |
|-----------------|---------------------------|---|----------------------|----------------------|------------------------------|
| K3D 002-2 | 49' 05 37N 116' 30 31W | Downtown Creston | Stationary | 617m | 7.3 |
| K3D 003-1 | 49' 09 42N 116' 17 55W | Demolition Derby along Highway 3 | Stationary | 751m | 1.5 |
| K3D 004-2 | 49' 09 41N 116' 16 52W | Highway 3 adjacent to BC right of way | Stationary | 767m | 1.9 |

5.3.1.4.1. *Effectiveness Evaluation Summary: Block K3D 004-2*

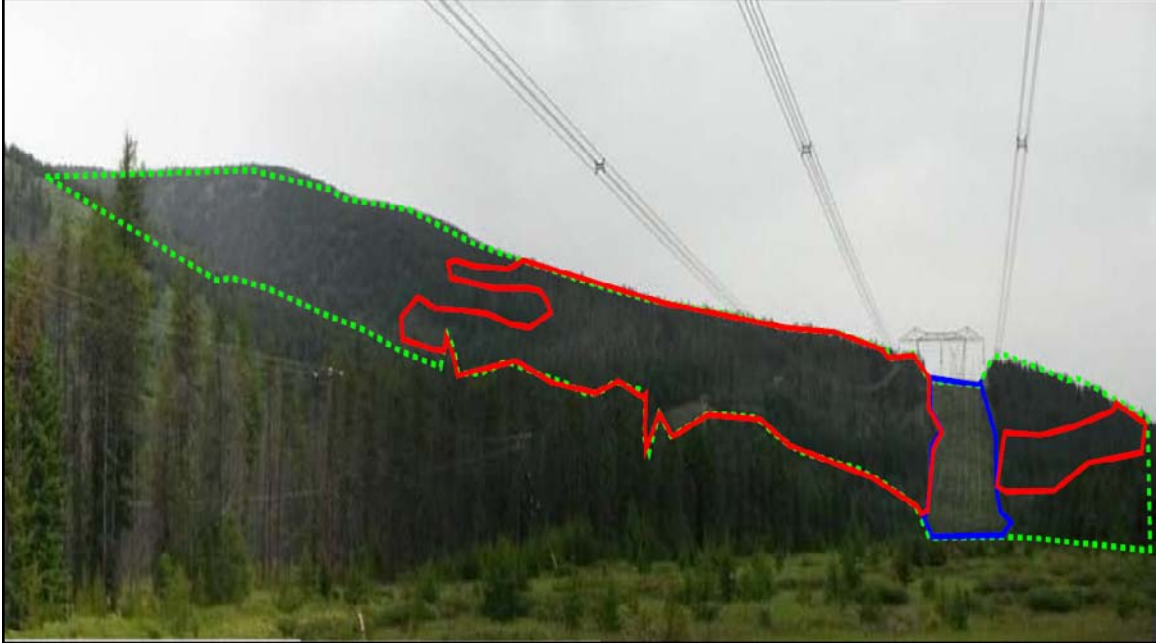


Figure 5. CVFC Cutblock K3D 004-2

- Polygon A (Landform)
- Polygon B (Disturbances outside cutblock)
- Polygon D (K3D 004-2 cutblock)

i) Location and site characteristics:

Block K3D 004-2 occurs in an integrated resource management zone in Creston, BC. The cutblock is situated along Highway 3, in a Class 1 Scenic Area and has a provincially established VQO of partial retention.³ The block is situated next to a BC Hydro right of way, which bisects the block at approximately a 45-degree angle. Ocular estimates indicated approximately a 60% basal area removal and an average tree height of 20-25 meters. The Site Plan for this block indicates a prescription of partial retention

would be used and a leave component of 30-40% of the dominant and co-dominant crown classes would be retained to maintain scenic and ecological values (Brace 2010).

ii) Cutblock design observation

The cutblock is located low to midway up the landform and minimizes visual disturbance by retaining approximately 40% of the basal area. The cutblock design uses "undulating" or irregular boundaries and reserve zones, to further mitigate visual disturbance from the highway corridor. Additionally, the overall shape of the block adheres to lines of force of the landform (Brace 2010).

iii) Percent Alteration

The percent alteration of K3D 004-2 was determined using both partial cut as well as clear-cut calculations (Jacques et al. 2008). Polygon A represents the total landform being evaluated; it is characterized by one evident opening, Polygon B, which is a BC Hydro Right-of-Way. Polygon C represents the partially harvested area with cutblock K3D 004-2, which is less readily visible, as a high proportion of the basal area has been retained. Together Polygon B and C account for a cumulative alteration of 13.83% and the assignment an initial Visual Quality Class of Modification. Following the determination of an initial VQC, an adjusted VQC was generated that incorporated the positive design observations of cutblock K3D 004-2 described above, resulting in a reduced percent alteration of 2.21% and an adjusted VQC of Retention. An overall effectiveness evaluation rating of "borderline met" was assigned to this landform.

5.3.1.4.2. **Effectiveness Evaluation summary: cutblock K3D 002-2**

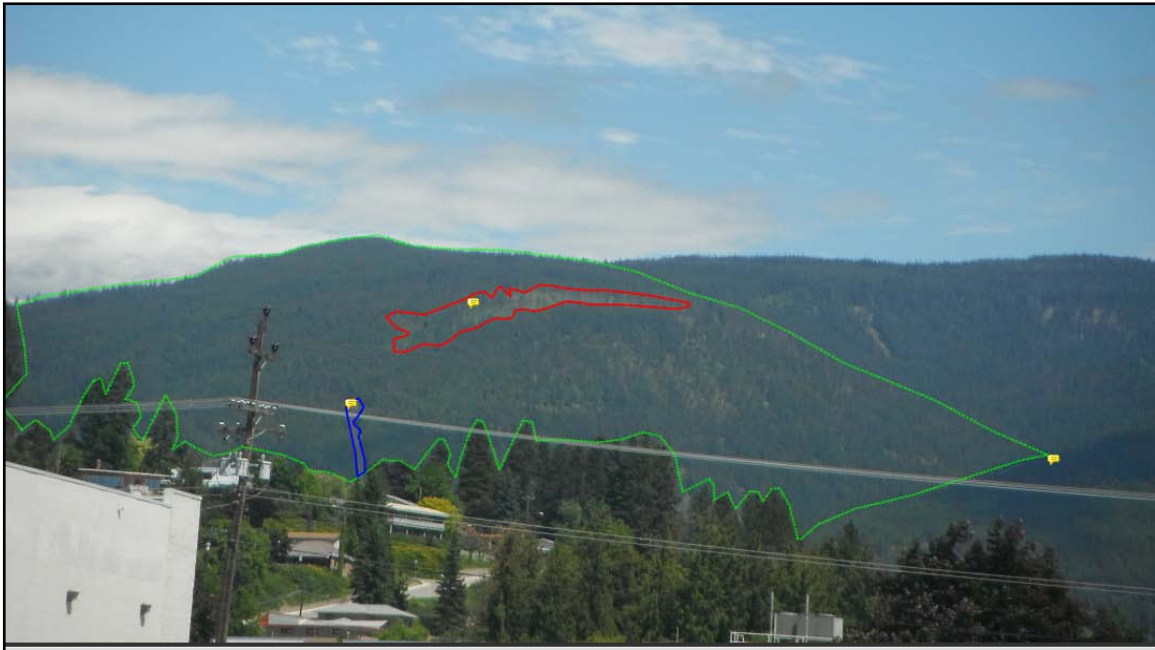


Figure 6. CVFC Cutblock K3D 002-2

- Polygon A (Landform)
- Polygon B (Disturbance outside cutblock)
- Polygon C (Cutblock K3D 002-2)

i) Location and site characteristics:

CutblockK3D 002-2 is a 10.4 ha block located within CVFC's TSA in the forest district of Kootenay Lake, approximately 5.5 km along Thompson Mountain Forest Service road. It occurs in a Class 1 Scenic Area and has an established VQO of Retention. The cutblock is located high on the landform at an elevation of 1400-1490 metres and is visible from downtown Creston. Despite having a VQO of retention, the K3D 002-2 Site Plan indicates that a silvicultural system of clear-cuts with reserves will be used to address persistent Mountain pine beetle infestations and with a 10% leave component, to minimize some of the visual impacts as well as maintain ecological values.

ii) Cutblock design observation:

Ocular estimates of the stand suggest approximately 85-90% of the basal area was removed and that the approximate tree height was 23 metres. Natural landscape characteristics and principles of aesthetic landscape design were explicitly incorporated into K3D 002-2. A silvicultural system of clear-cut with reserves was used to address Mountain pine beetle infestations on the block. Although the opening is located relatively high on the landform, the design uses the implementation of boundary treatments such as a feathering of cutblock edges, irregularly shaped boundaries, as well as 10% leave component to mitigate some of the aesthetic impacts of harvesting. Collectively these design features reduce the overall impact of harvesting activities; the harvesting generally adheres to the lines of force on the landform, travelling down ridgelines and up hollows.

iii) Percent Alteration:

Consistent with provincial guidelines, the percent alteration was calculated using a clear-cut as well as a partial cut calculation (Jacques et al. 2008). Polygon A represents the landform being evaluated; polygon B represents a disturbance outside of the CVFC opening, which contributed a 0.4% alteration and polygon C is a visible opening in K3D 002-2, which contributed a 3.9% alteration. A partial cut calculation was also included to account for partial harvests within the block. It is estimated that partial cutting accounted for a clearcut equivalent of 6.2% alteration on the landform. All values were totaled and subtracted from the area of the landform to produce a cumulative alteration of 10.5% across the landform and an initial VQC Partial Retention. However, once the VQC was adjusted to account for the design elements discussed above, the percent alteration was reduced to 9%. While this percent alteration exceeds the prescribed VQO of Retention by 5%, an allowance for over-ride was applied to this evaluation due to pervasive mountain pine beetle infestations and a high component of Lodge-pole pine. As a result an allowance for override was applied and the cutblock was assigned an effectiveness evaluation rating of "met".

5.3.1.4.3. *Effectiveness Evaluation summary: cutblock K3D 003-1*



Figure 7. CVFC Cutblock K3D 003-1

- Polygon A (Landform)
- Polygon B (Disturbance outside cutblock)
- Polygon C (Cutblock K3D 003-1)

i) Location and site characteristics

Block K3D 003-1 is located on a northeastern aspect, approximately 3km along the Russell Creek Forest road in Creston BC. The cutblock is located within a Class 1 Scenic Area, approximately 3 km from HWY 3 and has an EVQO of Partial Retention. A partial-cut silviculture system was used, which retained approximately 35% of the total dominant and co-dominant basal area, averaged over the entire block. The Site Plan prepared for block K3D 003-1 indicates that leave components be retained to mitigate the visual impacts of harvesting, maintain ecological function and provide thermal cover for wintering ungulates (Brace 2010).

ii) Cutblock design

Cutblock K3D 003-1 demonstrates effective use of visual management practices. The harvesting prescription utilizes reserve zones and “undulating boundaries” to help achieve VQOs. This design borrows from the natural character of the landscape by retaining a high basal area and a low position on the landform. The cutblock adheres to

the lines of force of the landform, with the block shape flowing up gullies and down ridges. A visual simulation package was not prepared for this cutblock (Correspondence with CVFC forest staff).

iii) Percent alteration

Consistent with provincial guidelines for landforms with both partial cut and clearcut alterations (disturbances with <15%), both partial cut, as well as a clear cut calculations were used to determine the percent alteration of block K3D 003-1 (MOFR 2008). Partial harvesting within polygon A resulted in a clear-cut equivalent of 6.2% alteration. Clear-cut removals in polygon C contributed a 0.88% percent alteration. A limitation of this assessment was the presence of a large sign, which obscures the view of the entire landform. However, input from the forest manager and use of google earth allowed the spatial attributes of the landform to be accurately reflected.

Cumulatively the partial harvesting, as well as the clear-cut harvesting in polygon C accounted for 7.08% alteration on the landform and an initial VQC of Partial Retention. An adjusted percent alteration of 1.12% was determined using the design elements noted above, which resulted in an adjusted VQC of Retention. As the initial VQC as well as the adjusted VQC both met the VQO of Partial Retention, an effectiveness evaluation rating of “met” was assigned to the landform (see Appendix B).

5.3.1.5. CVFC Effectiveness Evaluation Summary

The results of the effectiveness evaluation suggest that CVFC is attempting to implement visual management practices at all of the sample locations. CVFC staff expressed a high degree of concern for visual quality and implementation of alternative harvesting practices, which included boundary treatments, and use of partial retention harvesting, adhering to visual lines of force and borrowing from natural character of the landform.

External factors such as pest infestations and existing disturbances on the landscape were identified as occasionally posing challenges to CVFC achieving EVQOs. As Table 3 summarizes, Block K3D 003-1 was assigned a rating of “met”, indicating it incorporated minimum retention levels and design elements to achieve an EVQO of Partial Retention. Cutblock K3D 004-2 also incorporated high levels of retention and

many design elements. However, the Existing Visual Condition of the landform was highly disturbed as a result of a BC Hydro right of way, resulting in an assigned rating of “borderline met”. Finally, cutblock K3D 002-2 borrowed from the natural character of the landscape and incorporated boundary treatments despite having a high Lodgepole pine component. As a result an allowance for override was applied to this block, as the strategy employed was consistent with the Kootenay Lake District Manager’s letter of July 12, 1999, which states that VQO’s may be exceeded temporarily if necessary to salvage damaged timber or address forest health issues, but the principles of visual design will be employed to mitigate visual impacts. A final effectiveness evaluation rating of “met” was assigned to cutblock K3D 002-2.

Table 4. Results Summary: Creston Valley Community Forest Corporation Visual Quality Effectiveness Evaluation

| Block Number | Scenic Class | Partial Cutting % Removed | Established VQO | Effectiveness Evaluation Rating |
|---------------------|---------------------|----------------------------------|------------------------|--|
| K3D 004 BLK 2 | Class 1 | 60% | Partial Retention | Borderline met |
| K3D 002 BLK 2 | Class 1 | 85-90% | Retention | Met |
| K3D 003 BLK 1 | Class 1 | 65% | Retention | Met |

5.3.2. Revelstoke, British Columbia

5.3.2.1. History and context of aesthetic management by Revelstoke Community Forest Corporation

The community of Revelstoke is composed of approximately 8,300 people, 70% of which have resided in the community for over a decade. Revelstoke is similar to the

other sample communities in that it has a history of resource based conflict; one RCFC staff member noted dissent among Revelstoke residents towards the forest practices of Westar, the major corporation holding the Tree Farm in their area during the 1980's (Interview R- 45R). Revelstoke is in a state of economic and social transition from primarily extractive resource development to more tertiary industries such as outdoor recreation and tourism. Following a decline in population during the early 2000's, Revelstoke began to advertise itself as affordable mountain living destination. This resulted in an influx of migrants from a variety of destinations seeking affordable living, scenic rural landscapes and access to outdoor recreation activities with an emphasis on backcountry skiing (Interviews R-3R, R-2R, R-25R, R-45R). A community survey in 2012 found that the "environment" was an important concern for the community, with approximately 85% listing it as very important; and 14% stating it is somewhat important. The forest sector employs approximately 20% of the population and tourism and hospitality employ 16% respectively. Additionally, tourism and hospitality were listed as being in the top four economic sectors that should be developed further (Mountain Labyrinths Inc. & Selkirk Planning & Design 2012).

RCFC is a for profit community forest that operates under a tree farm license (TFL) within the Columbia Forest District in Revelstoke, British Columbia. RCFC was purchased in 1993 from Westar Ltd. for \$3.5 million dollars in an attempt to gain greater control over local forest resources and is owned by RCFC Holding Company Ltd. Industry partners include Downie Timber, Joe Kozek Sawmills and Cascade Cedar Products. The total timber harvesting land base of RCFC is 33,700 hectares, including 12,000 hectares that are allocated to meet wildlife and biodiversity requirements. The allowable annual cut is presently set at 90,000 cubic metres per year, with BCTS controlling 11,480 cubic meters, making RCFC the largest sample forest in my study (RCFC 2009). The purchase was also given social license by North Columbia Resource Council—an early local roundtable established in the Kootenays, which represented a diverse number of resource interests. RCFC was active during the CORE land use planning process, informing the Minister's Advisory Committee on landscape objectives, which were later used in establishing the Revelstoke Higher Level Planning Order (HPLO). Objectives included goals for visuals, mountain caribou habitat, biodiversity corridors, winter ungulate range and other forest uses (Interviews R-3R, R-45R).

5.3.2.2. **Co-management of Visual Resources by Revelstoke Community Forest Corporation**

As discussed above in the history and context of aesthetic management in BC, community forest tenures were created as a means of increasing community participation in land management activities and reducing resource based conflict in resource dependent communities. RCFC is a for profit corporation with a mandate to manage TFL #56 in a sustainable manner in accordance with RHLPO and GAR legislation. The RCFC tenure claim arose with the sale of TFL #56 by Westar in 1993, out of a desire to regain control over local forest resources and improve forest management practices for social and economic reasons (RCFC n.d.). 60% of RCFC sawlogs are sold at the log sort, with the remaining 40% being allocated to Downie Timber, and Cascade Cedar Products. RCFC's timber supply area (TSA) is situated 40km north of Revelstoke in an enhanced resource management zone. As a result of this designation there are no visual quality objectives established for the area and management goals prioritize extractive resource development over other types of resources.

Despite being located in an RMZ, the RCFC TSA is also valued for a number of non-timber resources including aesthetics, as well as recreation opportunities. Revelstoke has been recognized internationally as one of the best locations for winter adventure sports and other outdoor recreational activities. Increased emphasis on aesthetics in both front country areas such as viewscales along HWY 23, and backcountry areas including ski lodges has created the potential for conflicts with environmental values. As will be discussed in greater detail below, RCFC is exceeding provincial visual quality objectives and is arguably more adept at achieving these as a result of its pluralistic management model. The following section is intended to demonstrate how RCFC's community based institutional structure allows for increased access from the public, resulting in harvesting practices which reflect both provincial objectives as expressed in land use planning documents, as well as site specific objectives for recreational ski operators such as those established for Adamants and Gothics Lodges (QMI-SAI Global 2012) .

5.3.2.2.1. *Institutional Structure*

Visual resources within the RCFC TSA have been to some extent been co-managed between MFLNRO and RCFC. Similar to other forms of forest tenure, RCFC is subject to resource objectives established by the province under the RHLPO, Forest Planning and Practices Regulation (FPPR) and as well as GAR orders. While no formal VQOs exist for the RCFC TSA, recreational objectives are outlined in the RHLPO, which include visual values for select recreational sites on or near the RCFC TSA including the Keystone Standard Basin alpine/subalpine areas and the Goldstream canoe route--both highly valued for their recreation opportunities. The RCFC Forest Stewardship Plan (FSP) includes provisions for aesthetic management of the recreation sites as specified in the RHLPO.

The institutional structure of RCFC lends itself to more pluralistic aesthetic management practices than many other forms of forest tenure. RCFC operates under a Tree Forest License (TFL), rather than an actual community forest. However, board members state that they have maintained the core values of the community (Interview R-3R). It is governed by a seven member Board of Directors, which includes the City Administrator, two City Councillors, the Mayor and three appointed community members. The RCFC annual report notes that local ownership of the license has resulted in an increase in public participation in forest management: "Local ownership leads to local decision making. It also creates community concern on what is happening in our economic, environmental, and social environment. We are a lot more aware of our surroundings and the role we play in the health of our area" (RCFC Annual Report 2009-2010). One staff member noted that because RCFC has stakeholders rather than stockholders they did not experience the same level of pressure to generate profits as other types of institutional arrangements and can therefore manage with more responsibility and greater flexibility than private licensees.

My personal opinion is that the benefit of the CF, is that it doesn't have shareholders and that the money goes back into the town...the loggers take a lot of pride in what they do and if someone is screwing things up and doing things poorly... it gets out and in a small town like Revelstoke I believe we should practice good forestry ...I think a lot of people are looking at RCFC. My personal opinion is that RCFC tries to have a little more social consideration in its economic decision-making. Where I see the difference between big industry and smaller tenures, the decision is being made locally. With Canfor, and Interfor the

decisions aren't being made locally, and the people making those higher level decisions they don't know much about community or recreation and all those other aspects. So yeah, by keeping everything under one umbrella...you have more knowledge of the area being applied to the land base (Interview R-46R).

5.3.2.2.2. **Public Engagement**

A review of the RCFC website, Forest Stewardship Plan, Sustainable Forest Management Policy and staff interviews suggests that public consultation is an important management goal of RCFC. As a member of the Sustainable Forestry Initiative (SFI) RCFC has committed to broadening the “practice of sustainable forestry on public lands through community involvement” (SFI n.d.). Community members are encouraged to participate in forest planning on both the RCFC website and as well as in the annual report, which states that RCFC has an “open door policy” when it comes to members of the public raising concerns about harvesting practices, including visuals. Some interviewees indicated that RCFC could engage with the public more actively, stating that RCFC was more involved in public engagement in the early years of its inception but had recently been less involved (Interview 45R). Staff members also acknowledge that direct participation by board members has diminished since RCFCs inception, but that the decline may be attributed to increases in trust between board members and RCFC staff: “this is a process of growing to understand one another’s expectations and needs... the community has confidence in RCFC’s harvesting practices because of their past performance and future plans...” (Interview R-3R, R-41R). They noted the presence of a strong and active environmental group but had not experienced any antagonism between them and the RCFC (Interview R-25R). Follow-up interviews with staff indicated that some of the information on the RCFC website requires updating and that there are presently no public meetings taking place. However, RCFC staff indicated they had plans to engage community members more strategically in the future by hosting open houses (Interview R-46R).

5.3.2.2.3. **Harvesting practices**

RCFC has no provincially designated visual quality objectives for its TFL. However, it has implemented alternative harvesting practices for the purpose of maintaining scenic values in a number of locations. A review of the RCFC Management Plan, Forest Stewardship Plan, forest practices audits, as well as interviews with

community members suggest that aesthetic management is a concern for RCFC and that where possible RCFC is attempting to preserve scenic quality.

RCFC has undertaken a number of inventories that may assist with management of visual quality. As noted above, no provincially designated scenic areas exist within the RCFC TSA; therefore a Visual Resource Inventory (VRI) was not conducted. However, a Recreation Features Inventory (RFI), Recreation Use Inventory as well as a Recreation Opportunity Spectrum (ROS) classification were conducted in 2000 to gather information about recreation features, their use and their proximity to travel corridors within the RCFC TSA. These inventories identified a number of non-commercial and commercial recreation activities and locations taking place within and adjacent to the RCFC TSA including: backcountry skiing, mountaineering, hunting, hiking, mountain biking, canoeing and kayaking, snowmobiling, sightseeing, fishing and camping. In order to protect the integrity of these recreational opportunities the RCFC Management Plan states that it will assist in maintaining access to important recreational areas and trail heads and cooperate with the Ministry of Forest and Range to identify new and enhance existing recreation sites (RCFC 2009). It also expresses RCFCs intent to work with commercial recreation firms to maintain commercial recreation opportunities. The table below is taken from the RCFC Management Plan #4 and outlines the aesthetic management practices that RCFC will employ to maintain existing aesthetic features.

Table 5. Aesthetic features and visual design practices at RCFC

| Plan | Guideline |
|------------------------|---|
| <p>MAC Plan</p> | <p>Feature: campsites, cabins, historic sites</p> <p>Definition: Forest Service campsites, named historic sites</p> <p>Design Intent: Resource exploration and development should minimize potential impacts to the immediate surroundings of the site.</p> <p>Visual Design: Any logging within 200m of the site should be designed such that modification may be discernibly but not clearly evident from the site.</p> |
| | <p>Feature: lodges, commercial cabins, camps</p> <p>Definition: Permanent or semi-permanent camps or structures associated with commercial tourism tenures, without highway access.</p> <p>Design Intent: Resource exploration and development should minimize potential impacts to the immediate surroundings of the site.</p> <p>Visual Design: Any logging within 200m of the site should be designed such that modification may be discernibly but clearly evident from the site. Statements of concern and interest are to identify areas requiring particular design consideration.</p> |
| | <p>Feature: Tenured or licensed use areas</p> <p>Definition: Areas tenured for commercial recreation under the Lands Act</p> <p>Design Intent: Resource exploration and development activities will be evident in tenured use area. Where possible, this activity should be designed to complement or minimize conflict with commercial recreation activity.</p> |

| | |
|--|--|
| | <p>Visual Design: Resource exploration and development in tenured use areas should show evidence of good visual design. Statements of interest and concern are to identify areas requiring particular design consideration.</p> |
| | <p>Feature: Backcountry lakes</p> <p>Definition: Lakes, 2 ha or larger, with no road or highway access within 500m.</p> <p>Design Intent: Backcountry lakes should be managed to maintain an unroaded condition (ROS Semi-Primitive Non-motorized)</p> <p>Visual Design: Any logging within 200m of the lake should be designed such that modification may be discernibly but not clearly evident from the lake.</p> |

The RCFC Forest Management Plan describes harvesting strategies that satisfy provincial AAC requirements, as well as provide for the protection of a number of non-timber resources, including aesthetics. The current harvest prescription for TFL 56 is primarily clearcut with reserve (see glossary). However, RCFC uses a wide range of clearcut sizes in its operations with the average cutblock size being under 20 ha. In addition to clearcuts, RCFC employs a number of alternative harvesting systems to manage for other resource values. The systems include shelterwood, group selection and in some cases single tree selection. RCFC staff also noted the use of alternative harvesting systems stating “a clearcutting system was anticipated in most block designs but many blocks are suited to small group selection where other values dictate a less intrusive harvesting system” (RCFC 2009). The RCFC website (n.d.) acknowledges these practices stating

Sometimes logging an area takes on a very different look than many people expect to see. RCFC has been using partial cutting and commercial thinning as a method of extracting value out of the forest without clearcutting. While clearcutting has its place in forestry, so does partial cutting. In the right situation, partial cutting can dramatically increase the value of the forest over a number of entries and leave the forest manager with multiple options in the future.

The RCFC 2010 Annual Report also acknowledges their commitment to harvesting practices which maintain non-timber resource values, including scenic values stating:

Before a cutblock is harvested, many days of field work are done to locate roads, identify and mark logging boundaries, estimate the volume of timber and ensure all the values are identified and addressed in compliance with legislation, our planning documents and SFI commitments (RCFC Annual Report 2010).

Harvesting practices which reflect a management for non-timber forest resources have also been substantiated by two third party audits. The RCFC Stewardship Plan is certified by the Sustainable Forestry Initiative (SFI) and approved by the Ministry of Forests. The SFI 2010-2014 standards specify that RCFCs forest harvesting and silvicultural practices should provide useful forest products and protect or enhance recreation and aesthetics amongst other resources. The SFI Management Policy (2010) directly addresses management of aesthetic resources stating that, "RCFC will manage the visual impacts of forest operations to provide recreational opportunities for the public". An audit conducted by SFI which included a review of Forest Stewardship Plans, Site Plans, reports and stakeholder communications found Revelstoke in compliance with SFI Objective #5, Management of Visual Quality and Recreational Benefits, and recognized RCFCs general adherence to best management practices. The audit also noted that RCFC had undertaken voluntary aesthetic management practices in a number of visually sensitive areas around the Gothics Lodge (SAI Global 2012).

When asked about aesthetic management practices, knowledgeable respondents generally felt that RCFC was maintaining scenic quality in the area. Moreover, some even expressed that RCFC had sense of responsibility to the land base, as many of the staff used it for recreating (Interview R-45R). Two respondents noted that RCFC was more willing to absorb the increased costs of aesthetic management practices such as aerial logging, heli-logging and cutblock design than other licensees (Interview R-25R). However, one forester expressed that while RCFC did a good job of managing for aesthetics, there were few differences between the management practices of RCFC and other industrial licensees. "They (the government) still give everybody the same direction and you have to follow the rules" (Interview R-43R). RCFC board members felt that their

harvesting practices exceeded the visual quality standards used by other industrial licensees. The board indicated that if provincial VQOs were applied to the TSA, RCFC would achieve them (Interview R-47R). Interviews with RCFC staff indicated that the rugged terrain of TFL#56 made management of aesthetics difficult but that no public complaints were raised during early community meetings;

The landscape is tough to work in and doing anything other than clear-cut harvesting is difficult...it's not like it is flat and there are huge skid trails you can make that no one is going to see; every blowout on a road, you can see on the landscape, so you pay the price (Interview R-45R).

RCFC operations staff acknowledged a number of aesthetic management practices: "We operate on less than 20,000 ha and therefore we have different logging techniques including reserves, aerial logging, heli-logging, single tree selection and boundary treatments (Interview R-41R). RCFC staff expressed a high degree of confidence in their faller to manage for aesthetics with limited oversight. Staff noted their faller's attention to detail and ability to make operational decisions which consider aesthetic, as well as wildlife values and solely timber.

Quite often with high production fallers and their layout we have to go in and mark everything because they don't like making those decisions about what's a wildlife tree, what's a leave tree but with Murray he is a faller himself so he can make those decisions about what trees to leave and wildlife trees etc. So we are getting the best of both worlds, where we can get the wood out but we can know what trees to leave and how to manage for visuals (Interview R-45R).

Staff stated that they use the Merve Wilkinson's model where possible to inform their harvesting practices. This model states that partial harvests can produce more than a clear cut (by not taking everything on the first pass) (MOF 1996). RCFC spends more on layout than other licensees to accommodate other values. "Our layout costs are high because they are the same as if you did a clear cut but we are only taking 20%" (Interview R-41R).

5.3.2.3. ***Visual values of research participants in Revelstoke***

Community members expressed a range of aesthetic values during the interview process. Similar to Creston, Bourassa's tripartite paradigm assists in explaining the vast majority of responses in Revelstoke. Many participants expressed subjective views of

the landscape that were influenced by socio-cultural conditions such as individual upbringing, employment history and amount of time spent in the community (Interview R-3R). When discussing visual quality in the area, one RCFC staff member notes the variation in aesthetic landscape appreciation, stating that some people, particularly forest workers, may view evidence of harvesting as “beautiful plantations”, while other non-experts may see them as “crappy cutblocks” (Interview R-3R). It was often emphasized during interviews that what Benson (2008) refers to as an “inversion” of aesthetic values was underway in Revelstoke, because of relatively recent demographic changes. Some residents felt that increased tourism in the area had resulted in a desire among tourists or newcomers in the community to see undisturbed or pristine landscapes that showed no signs of timber harvesting. This inversion has resulted in considerable variation in visual values amongst expert and non-experts’ opinions. One respondent captured this dichotomy well, stating

I'll argue that most of you don't know what you're looking at, okay? And more of the new demographic don't know what's they're looking at and I'll give you that perspective because I've been around here for so long. When I sat down in elementary school, I'd watch the trees falls across the lake on a cutblock , right? So, you probably can't find those cutblock s now. If we look from the window here you probably won't pick up the fires in the cutblock s that I know were there... The point I wanted to make is that we both come from the valley. We have shares, we grew up here. The people that we associated with were loggers that went to work and supported their families and that's the piece that sometimes people coming from the outside don't see. It's just that how critical that becomes or how fundamental that is in our culture (Interview R-2R).

5.3.2.3.1. ***Non-instrumental aesthetic values:***

Few respondents communicated purely aesthetic values for the local landscape. These respondents generally preferred seeing pristine conditions with minimal or no site disturbance. As in the Creston and McBride sample communities, respondents from this category did not have forestry backgrounds, possessed limited knowledge of the local landscape or forest practices and had relocated from urban areas. Respondents in this category considered visual characteristics, which a person receives readily from glancing at a visual landscape unit, often referencing aesthetic values such as form, contrast, colour, location, and viewing distance to support this preference.

5.3.2.3.2. **Visible Stewardship:**

The respondents in Revelstoke who expressed a preference for visible stewardship constituted 50% of the total sample group to discuss aesthetic landscape values. Similar to respondents in Creston and McBride, participants in this category were often experienced in forestry and had resided in the community a long time. This resulted in participants expressing specific ecological indicators, as well as a general attachment to scenic landscapes in their evaluation (Gobster 1996; Nassauer 1997). The statement below depicts this evaluation.

Aesthetic management should not and does not have to come at the expense of ecologically responsible forest practices. Most community members are not capable of reading the landscape. As experts in the forest industry, we are best able to strike a type of eco-aesthetic appreciation that both demonstrate productivity and ecologically responsible harvesting practices (Interview R-2R).

Respondents in this category held the perception that maintaining aesthetic resources and accessing available timber were not mutually exclusive management objectives and that anthropogenic disturbance would not necessarily result in a reduction in the overall aesthetic quality. One member of the forest industry noted that in some instances aesthetic management might actually involve the *removal* of vegetation to maintain existing viewsheds and create new scenic vistas. In general, many participants found well-executed layouts, harvesting designs that incorporated boundary treatments, partial-cuts, leave strips and legacy trees, the presence of coarse woody debris, as well as minimal waste and site disturbance as aesthetically pleasing because they provided visible evidence that RCFC was conducting logging but that it is being done sustainably, as is evidenced by the statement below:

Do we manage visuals from town? Yes. We plan a lot...are we getting better at it? Yes. Does it (visual quality) justify poor forest practices? No. At the end of the day you've got to leave a forest behind it; you really have to consider both ecological values and visual ones and you have to look at your visual impacts...but I'm also quite sensitive to the fact that you can overplay it...people have seen logging for years and years and they will see logging again. Logging is not bad, I love logging (Interview R-2R).

This finding was corroborated by an RCFC board member who stated that community members in Revelstoke wanted to see a “sustainably managed forest” that encouraged

ecological resiliency and accommodated human activity, and that other board members would agree (Interview R-3R). Some participants noted that part of their aesthetic appreciation comes from understanding the technical challenges involved in conducting alternative cutting practices, with one respondent stating that RCFC was “really doing their homework” when it came to progressive forest practices (Interview R-1R).

5.3.2.3.3. ***Ecological aesthetic***

In contrast to other sample communities, no respondents expressed the desire to see a totally unmodified landscape. This may be because the interviewees were drawn largely from the forest industry (Interview R-2R). While many respondents expressed preferences for landscapes managed for ecological resiliency, this was often paired with the desire for to see a landscape that was supporting other types of anthropogenic use.

5.3.2.3.4. ***Utilitarian aesthetic***

Approximately 10% of Revelstoke respondents, who expressed aesthetic landscape preferences, stated they preferred seeing clear evidence of anthropogenic use of the landscape. Respondents in this group viewed the harvesting of timber as a source of pride and as a part of the culture of industry in Revelstoke. One respondent noted that “Working forests are a source of pride, not something to be hidden; there could even be industrial tourism where people could come and see what happens, what goes on” (Interview R-2R). Members of this group saw logging as a way of life and were open to disturbances on the landscape, stating that logging in and of itself does not degrade the landscape. Many saw foresters as integral to a balanced approach to landscape planning. However, among foresters professional opinion on partial cutting and clearcutting varied. One respondent mentioned that in some cases larger disturbances may be necessary to promote regeneration (Interview, R-46R). Some members of this group felt threatened by changes in the demographic composition of Revelstoke, stating that they predict it will restrict forestry in the area. Utilization and silvacultural practices were identified as indicators for evaluating modified landscapes (Interviews R-2R, R-3R).

5.3.2.3.5. *Recreational aesthetic*

The town of Revelstoke is an area of rugged and stark scenic beauty. However, the remote location and mountainous terrain has historically meant minimal recreational use (RCFC 2009). Recent increases in the popularity of backcountry hiking, biking and skiing, as well as the establishment of a number of ski resorts in Revelstoke has meant a greater number of people are accessing the remote areas for recreational purposes.

Of the Revelstoke respondents who expressed aesthetic preferences for the landscape, 40% preferred to see evidence of opportunities for recreational activity on the landbase. An interview with a representative of a number of back country ski lodges in the area, noted that scenic quality was an important part of their business and a key piece of the “world-class outdoor experience” they provide (Interview R-24R). This respondent stated that guests visiting the lodges expected to see incredible mountain vistas. In some cases, guests had expressed concerns around openings with abrupt edges, as well as the cumulative visual effects of cutblocks in areas that were more heavily harvested. Despite these concerns lodge operators did not perceive recreational tourism and forestry to be incompatible objectives. Representatives of the lodge expressed an awareness that their tourism tenure occurred within an industrially zoned landscape and noted that in many cases harvesting was important to the heli-skiing industry as it provided critical infrastructure including roads, culverts, bridges, and landings for helicopter pick-ups (Interview R-24R). Lodges also reported doing a significant amount of forest education with clients, informing them of the cultural and economic importance of logging in British Columbia and the use of logging to open up areas for ski landings and trail networks (Interview R-24R).

RCFC staff noted that tourists and new residents are often sensitive to even small levels of disturbance on the landscape. They desired landscapes that were conducive to recreation, had little evidence of anthropogenic modification, and maximized wilderness values (Interview R-2R). They noted that while they did not have any legal requirements to implement visual management practices, as there are no known scenic areas identified for TFL 56, they are conscious of the recreational values in the area and that they will attempt to accommodate those as much as possible (Interview R-25R).

We want to make sure that, you know, when people are going in there (backcountry areas), they're still going to have an experience..., and even though it's not a wilderness experience with complete wilderness, at least it's not clearcutting right to the trail...(Interview R-3R).

RCFC staff, as well as the lodge staff noted that collaborative planning with forest licensees had successfully produced intriguing cutblock design and placement that increases ski values that allow for no loss of timber values.

5.3.2.4. **Revelstoke Visual Quality Objectives Effectiveness Evaluation**

There are presently no provincially designated known Scenic Areas or Visual Sensitivity Units established for RCFC under Section 180 of FRPA. Nor are there any new Scenic Areas proposed by the Ministerial GAR [7] (1) under the Land Act. Despite no formal EVQOs existing, a number of visually sensitive areas exist close to and within the RCFC TSA. The Columbia Forest District set visual objectives for the Keystone Standard Basin and the Goldstream Canoe Route (RCFC 2010) as these two sites represent important recreation areas within TFL 56. The identification of scenic recreational objectives as well as their subsequent layout and design is guided by both visual considerations, as well as site conditions.

As no provincial effectiveness evaluations exist for RCFC, my study undertook evaluations on three visually sensitive RCFC cutblocks, to determine if aesthetic management practices were successful in maintaining visual quality and achieving visual objectives stated in RCFC Management Plan (2009). In order to conduct an Effectiveness Evaluation cutblocks CP 322-1, CP 324-1, CP 320-1 were assigned a VQO of Partial Retention. Partial Retention was selected because the legal definition for this Visual Quality Class closely aligns with the visual resource management objectives for lodges, commercial cabins and camps outlined in RCFC's Management Plan (RCFC 2009). Partial Retention is defined as a "human caused alteration that is evident but subordinate and therefore not dominant on the landform" (Resources Inventory Committee 1999). Effectiveness Evaluations on for all three cutblocks were conducted in accordance with provincial guidelines and were based on a consideration of each cutblock's basic visual quality class, as well as the design elements present and the influence of other disturbances on the landform. Each cutblock was assigned a rating between "clearly not met" and "well met " based on the changes to the Existing Visual Condition (refer to

Appendix C for detailed RCFC FREP Visual Quality Effectiveness Evaluation). Table 5 provides a summary of each of the cutblocks as well as the viewpoint information; site characteristics and a selection rationale are provided in the body of this work for each viewing location.

Table 6. *Revelstoke Community Forest Corporation viewpoint location information*

| Location ID | Coordinates | Location Description | Viewer Status | Elevation | Viewing Distance |
|--------------------|-------------------------|-----------------------------|----------------------|------------------|-------------------------|
| CP 322-1 | 51 36 29N 118 09 26W | Adamants Lodge | Stationary | 1362 m | 2.92 km |
| CP 324-1 | 51 36 50N 118 08 46W | Adamants Lodge | Stationary | 1052 m | 2.55 km |
| CP 320-1 | 51 37 46N 118 11 22W | Adamants Lodge | Stationary | 1013 m | 2.39 km |

5.3.2.4.1. *Evaluation: cutblock CP 322-1*

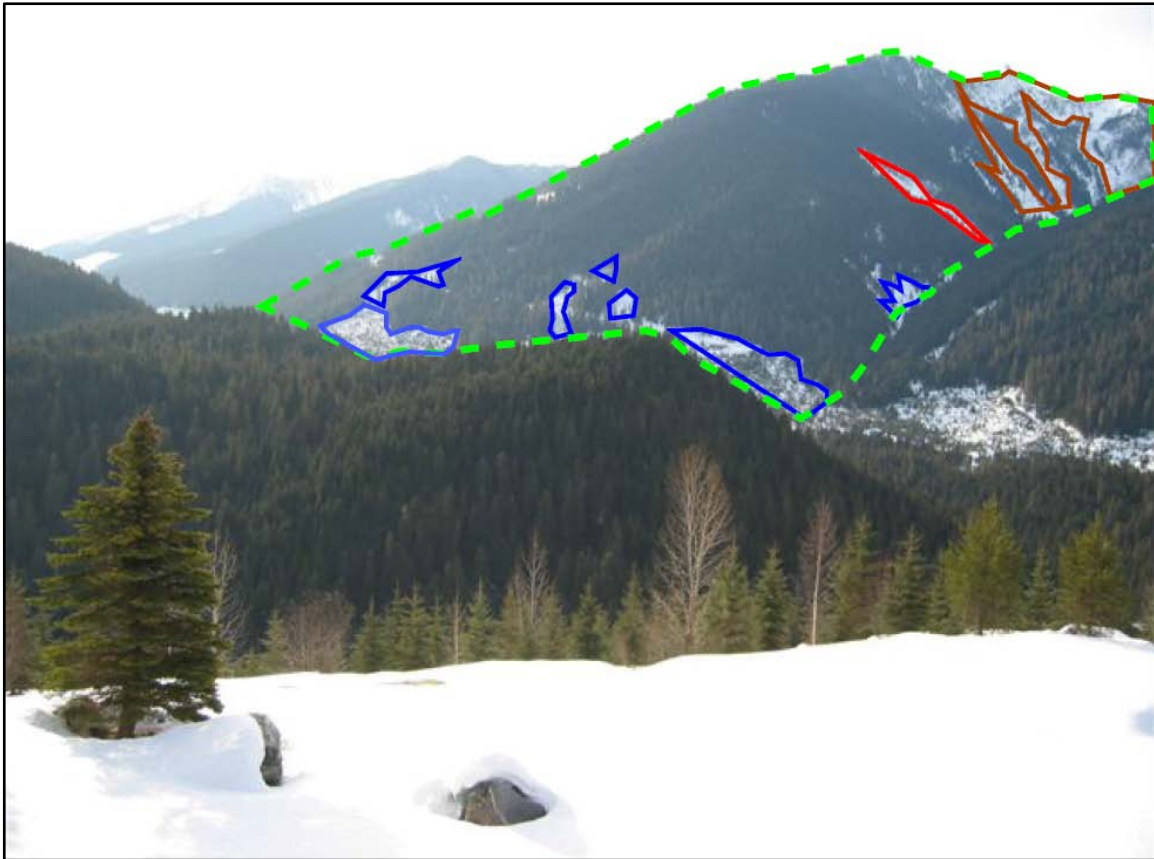


Figure 8. *RCFC Cutblock 322-1*

- Polygon A (Landform)
- Polygon B (Disturbance outside cutblock)
- Polygon C (Cutblock 322-1)
- Polygon D (Natural disturbance outside cutblock 322-1)

Location and site characteristics:

Cutblock 322-1 is located adjacent to cutblock 324-1 on TFL 56 in the Columbia Forest District. The cutblock is approximately 2.92 km south-west of the Adamants Lodge. While no site plan was available for this block, correspondence with RCFC staff indicates that a clear-cut silvicultural system was used and that the placement size and

shape of the block were designed to maximize harvest, while maintaining scenic quality and ecological function. The site has been previously disturbed, with large openings inherited by RCFC near the base of the landform.

i) Cutblock design observations

The cutblock 322-1 is located low to midway on the landform at an elevation of 1362m. It is small in size, with a net area of approximately 14.5 ha. Boundary treatments are present and the block is longitudinal in shape, closely resembling an avalanche chute. The design of the cutblock adheres to the natural lines of force on the landform (iMap BC).

ii) Percent alteration

Consistent with provincial guidelines, the percent alteration of 322-1 was calculated using a clear-cut calculation (Jacques et al. 2008). Polygon A represents the total landform being evaluated. Polygon B represents the non-vegetated areas within cutblock 322-1, and Polygon(s) C represents old disturbances outside cutblock 322-1 not harvested by RCFC. Finally Polygon D represents natural disturbances on the landform that do not influence the percent alteration calculation. Together these openings account for a cumulative alteration of 8.4% and the assignment an Initial Visual Quality Class of Partial Retention. Following the determination of an Initial VQC, an adjusted VQC was generated that incorporated the positive design observations of cutblock 322-1 described above, resulting in a reduced percent alteration of 6.1% and an adjusted VQC of Partial Retention. An overall effectiveness evaluation rating of “well met” was assigned to this landform.

5.3.2.4.2. **Evaluation: Block CP 324-1**

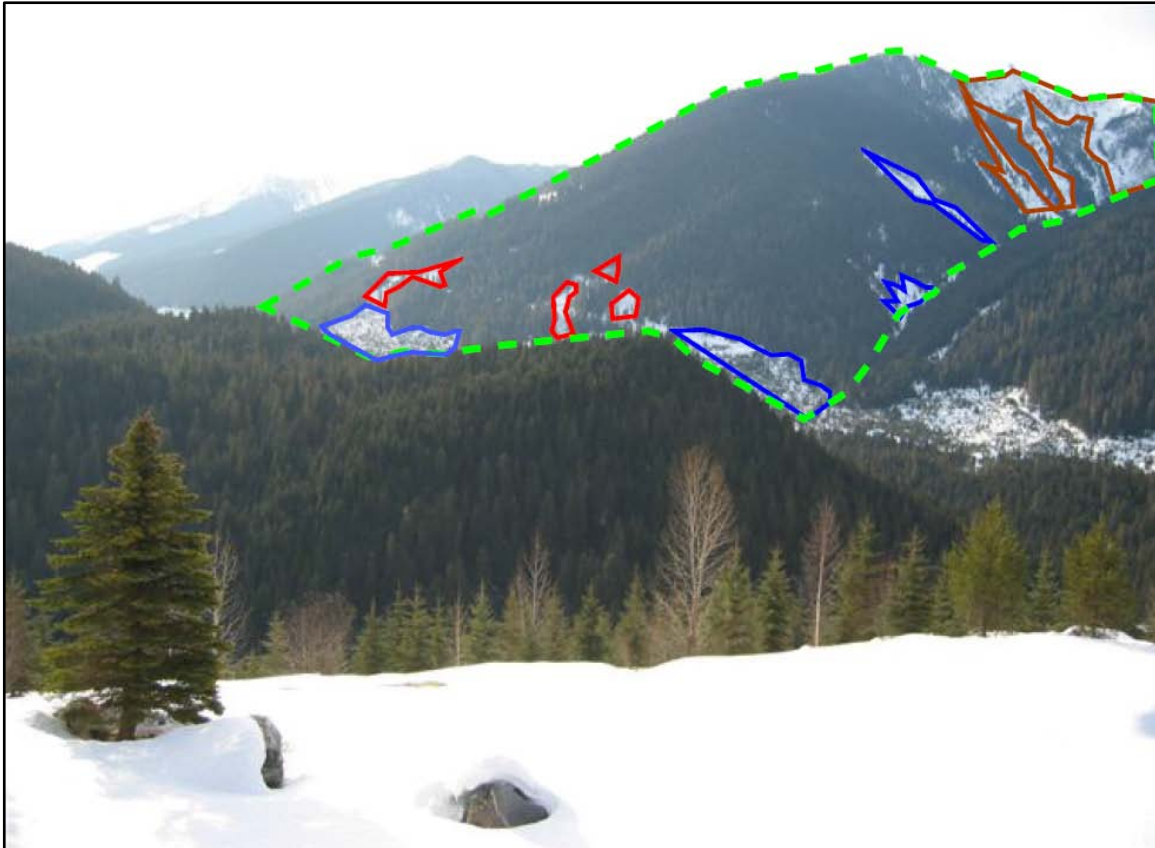


Figure 9. RCFC CP 324-1

- Polygon A (Landform)
- Polygon B (Disturbance outside cutblock being assessed)
- Polygon C (Cutblock 323-3)
- Polygon D (Natural disturbance outside cutblock)

i) Location and site characteristics

CP 324-1 is located on TFL 56 in the Columbia Forest District on the same landform as cutblock 322-1, approximately 2.55 km from the CMH Adamants Lodge. The net area harvested was 28.4 ha and a harvest prescription of clearcut was assigned (iMap BC). The site has been previously disturbed, with large openings inherited by RCFC near the base of the landform.

ii) Cutblock design observations

CP 324-1 is situated low on the landform at an elevation of 1052 m. The block consists of small dispersed openings, which had a prescription of clear-cut. It was cable logged and ground skidded. Boundary treatments were used to mitigate edge effects. In addition, the total patch size was reduced to minimize visual impact.

iii) Percent alteration

Consistent with provincial guidelines, the percent alteration of 324-1 was calculated using a clear-cut calculation (Jacques et al. 2008). Polygon A represents the total landform being evaluated. Polygon B cutblock 324-1 which is characterized by three evident openings, Polygons C represents a large disturbance outside the opening being evaluated. Together these openings account for a cumulative alteration of 8.37% and the assignment an Initial Visual Quality Class of Partial Retention. Following the determination of an Initial VQC, an adjusted VQC was generated, that incorporated the positive design observations of block 324-1 described above, resulting in a reduced percent alteration of 3.68% and a final VQC of Partial Retention. An overall effectiveness evaluation rating of “well met” was assigned to this landform.

5.3.2.4.3. **Evaluation: Cutblock 320-1**

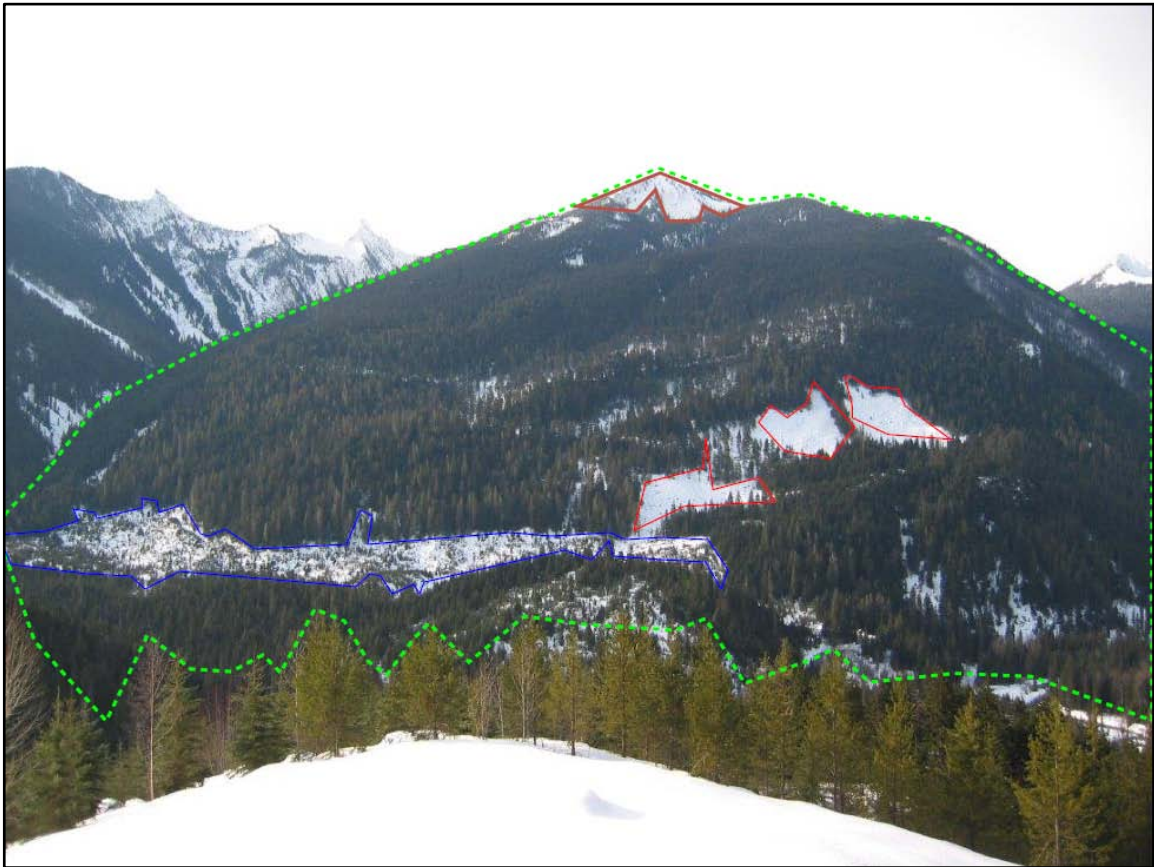


Figure 10. RCFC Cutblock CP 320-1

- Polygon A (Landform)
- Polygon B (Anthropogenic disturbance outside cutblock)
- Polygon C (Cutblock 320-1)
- Polygon D (Natural disturbance outside cutblock)\

i) Location and site characteristics

Cutblock CP 320-1 is located on TFL 56 in the Columbia Forest District, approximately 1.84 km from Adamants Lodge. The site is a visually sensitive area that is of recreational importance. The cutblock occurs at an elevation of 3572 feet, was logged in 2002 and has a net area of 39.1ha. Existing anthropogenic disturbance occurs on the landform near the base and some naturally unforested areas occur near the top.

ii) Cutblock design observations

The cutblock is designed to reflect a non-geometric shape and is situated low to midway up the landform. Boundary treatments are present. The block maintains approximately 60% retention, with some small areas of group selection.

iii) Percent alteration

Consistent with provincial guidelines, the percent alteration was calculated using a clearcut and partial cut calculations (Jacques et al. 2008). Polygon A represents the total landform being evaluated. Polygon B represents non-vegetated areas within cutblock 320-1. The cutblock is characterised by 3 small openings located on the lower portion of the cutblock, as well as some partial cutting. Together these disturbances account for a 8.7% alteration. Polygon C represents a larger older opening on the landform, which contributed a 6.4% disturbance rating. Finally Polygon D represents a small, naturally non-vegetated area at the peak of the landform, which did not contribute to the overall disturbance rating. Combined polygons C and D accounted for an initial alteration of 15.1% and a VQC of Modification. Following the determination of an Initial VQC, an adjusted VQC was generated that incorporated the positive design observations of cutblock 320-1, resulting in a reduced percent alteration of 8.76% and an adjusted final VQC of Partial Retention. A final effectiveness evaluation rating of “borderline met” was assigned to this landform.

5.3.2.4.4. RCFC Effectiveness Evaluation Summary

The results of the RCFC Effectiveness Evaluation suggest that RCFC is successfully implementing visual management practices at all three sample sites. RCFC staff discussed their commitment to working with local tourism operations to address visual concerns and the variety of alternative harvesting practices used, which included use of boundary treatments, and use of partial retention and group selection harvesting. All cutblocks adhered to the natural lines of force, and borrowed from the natural character of the landform. A number of large existing disturbances were present on the landform that significantly increased the overall level of disturbance. However, despite no EVQOs being identified for the site, RCFC still managed to achieve a final visual

condition of Partial Retention and an effectiveness evaluation rating of “well met” and “borderline met” for all 3 cutblocks evaluated. Table 7 provides a summary of the results of the RCFC effectiveness evaluation.

Table 7. Results Summary: RCFC Visual Quality Effectiveness Evaluations

| Block | Scenic Class | Established VQO | Partial Cutting % Removed | Existing Visual Condition | Effectiveness Evaluation Rating |
|--------------|---------------------|------------------------|----------------------------------|----------------------------------|--|
| CP 322-1 | NVS | No | 100% | Partial Retention | Well Met |
| CP 324-1 | NVS | No | 100% | Partial Retention | Well Met |
| CP 320-1 | NVS | No | 75% | Partial Retention | Borderline Met |

5.3.3. McBride, British Columbia

5.3.3.1. History and context of aesthetic management by McBride Community Forest Corporation

Historically the foundation of McBride’s economy has consisted of forestry, agriculture, rail and shipping. However, more recently, McBride has been primarily sustained through a combination of agricultural, forestry and ecotourism industries (Destination B.C. 2013). Management of aesthetic resources by MCFC is influenced in a number of ways. The Robson Valley Land and Resource Management Plan attempted to reflect a balanced approach to land use planning in the Robson Valley by integrating consultation feedback on the economic, ecological, spiritual, visual, recreational and cultural concerns of the public (ILMB 1999). As discussed in detail above in Section 4.1.1., the Robson Valley LRMP attempts to provide high-level guidance for the sustainable use of Crown land within the Robson Valley TSA. When MCFC was not yet

incorporated, the Village of McBride was a stakeholder at the Robson Valley Round Table (RVRT).

Throughout the consultation process, scenic quality was noted as being an important concern among many of the sectors represented. The overarching visual quality goals established by the Robson Valley LRMP are to maintain and/or enhance scenic beauty and visual quality within the planning area, with particular attention to the Robson Valley Settlement Corridor. In an attempt to further refine the objectives established by the LRMP, a sub-regional plan, the Robson Valley Sustainable Resource Management Plan (SRMP) was developed to provide direction on implementation of the LRMP, which includes the McBride Community Forest TSA (ILMB 2006). The MCFC TSA is located within a Special Resource Management Zone (RMZ) (ILMB 1999) and has a range of harvest prescriptions to reflect that diversity of resources in the area, from Preservation to Modification (see Appendix A for Robson Valley VQOs). Some of the strategies suggested by the LRMP and SLRMP for maintaining scenic quality in the area include:

- Conducting and maintaining visual landscape inventories on individual TSAs to determine the presence of unique features and possible public/commercial recreation opportunities
- Drafting forest development plans which include silvacultural systems that utilize basic principles of landscape design and retain canopy coverage where possible
- Utilization of topographic features and ground conditions to minimize aesthetic impact of developments
- Adherence to provincially established VQOs
- Soliciting public input for development activities and providing a development plans for public comment

5.3.3.2. **Co-management of aesthetic resources by McBride Community Forest Corporation**

Similar to the other sample forests in this study, the McBride Community Forest Corporation (MCFC) began as a means to gain greater control over the local forest resources and provide a more balanced management system that returned multiple benefits back to the community (MCFC n.d.). The Village of McBride initially sought a CFA in order to satisfy a number of community objectives including the development of timber, tourism and recreational opportunities, mineral extraction, education and research, healthy living, spiritual enrichment, and biodiversity. The McBride and District Community Forest Corporation developed the initial community forest proposal in consultation with the local community and was awarded a Community Forest Pilot Agreement in 2002. In February 2007, MCFC obtained a long-term community forest agreement (CFA) (MCFC n.d.). The following sections attempt to demonstrate the extent to which MCFC implements co-management of aesthetic resources as defined in Section 4.1.2, by outlining their institutional structure, public engagement strategies, and aesthetic harvesting practices.

5.3.3.2.1. ***Institutional Structure:***

The McBride Community Forest Corporation (MCFC) is a for profit corporation owned in full by the Village of McBride. MCFC operates under area based license that permits exclusive harvesting rights within a specified area. The MCFC Board of Directors is comprised of five directors, including three Village of McBride Council members and two Directors at Large that are appointed by the Village through an application process. Each director is appointed by the Council of the Village of McBride (Thompson 2011). The purpose of the Board is to provide supervision and high level policy direction to the General Manager and the General Manager is responsible for overseeing the Operations Supervisor (BCCFA 2013). MCFC is properly incorporated under the Corporation Act and the Inspector of Municipalities and is wholly owned by the Village of McBride. The Village of McBride is obliged to retain control of its Corporation and the Corporation and Board must act in the best interest of the Corporation and the taxpayers (Thompson 2011).

5.3.3.2.2. **Public Engagement:**

Interviews with MCFC staff and the MCFC proposal indicate that acknowledgement of, and management for, the concerns of community members is an important MCFC objective. The MCFC Access to Information and Privacy Prevention Policy states that the public has as much access to information as possible while maintaining the privacy required by legislation. It specifically states that all publicly available documents will be made available to the public and that MCFC will comply with all applicable legislation. Requests for information, other than for publicly available documents, are to be made in writing, tracked and reported to the MCFC Board of Directors. Finally, procurement of information requests should not unduly interfere with MCFC staff performance (MCFC 2010).

Similar to the other Creston and Revelstoke community forests, MCFC presently has a website that provides information on decisions reached by the Board of Directors, notification of board meetings and public information meetings, reports, publications, as well as the MCFC Management Plan and Forest Stewardship Plan. The website serves as a primary source for communicating aesthetic and recreational management objectives to the public and receiving feedback on their implementation. In addition to their website, MCFC engages the public directly by hosting four open Director's meetings and two public information meetings annually (MCFC n.d.). Meeting minutes and formal responses to public concerns are also posted on the MCFC website.

While many respondents viewed MCFC as a means to provide increased participation in managing forest resources in McBride, some felt that MCFC did not necessarily represent the interests of all groups within the wider community. They indicated that McBride was not inclusive enough of the aesthetic concerns of neighbouring communities such as Dunster and Valemount. These respondents indicated that opinion concerning MCFC is at times very polarized between those who are logging for MCFC and those community members not involved in the logging industry, and that this could be improved by soliciting more substantive public feedback prior to logging (Interview R-38M, R-28M, R-6M).

5.3.3.2.3. *Harvesting practices*

The MCFC mission statement indicates that the long-term vision of the McBride Community Forest Corporation is to serve the social, environmental, and economic needs of the community and sustainably manage the forest for all of its potential uses. (MCFC 2007) (Interview R-32M, R-39M). MCFC primarily conducts intermediate logging under a single logging permit referred to as a “pick and poke” permit. Intermediate logging is often employed as a means of reducing visual impacts of harvesting and achieving VQOs by retaining higher levels of basal area across a cutblock (Forest Practices Board 2008). Concerns related to FRPA requirements for pick and poke permits, as well as the use of intermediate logging by MCFC were identified in a Forest Practices Board audit and complaint investigation as well as participant interviews. However, as these concerns were not related to scenic quality, they are not addressed further. The Forest Practices Board Audit did not report any non-compliances in achieving VQOs established under GAR section 17 and FRPA section 181. (FPB Audit 2013)

In addition to the mission statement, the MCFC Management Plan states that MCFC will sustainably manage the forest for all of its potential rather than just timber. Section 3.7 addresses the management of visual resources, stating that visual quality will be maintained in accordance with provincial VQOs within the Community Forest Agreement Area and that MCFC will achieve these VQOs by incorporating principles of visual design into the MCFC harvest plans. The Plan specifies which alternative harvesting methods and silviculture systems will be used in areas of visual sensitivity to allow for optimal timber extraction, while still maintaining visual quality in the area. The Plan also indicates that MCFC will maintain an accurate visual inventory of the landscape including sensitivity ratings, existing alterations and viewpoints. Interview responses concerning visual resource management by MCFC varied. Some respondents involved with the community forest felt that MCFC endeavored to preserve a variety of values associated with the forest through their operations, while others expressed the view that the MCFC's aesthetic management practices were similar to other industrial licensees in the area, citing Carrier Lumber as an example. This respondent felt that visual management could be improved by replanting directly after harvest and relying less on natural regeneration (Interview R-39M). The minutes from

public information meetings were reviewed to identify visual objectives and concerns within the community. While some operational issues were expressed, few specifically addressed visual concerns (MCFC 2011).

5.3.3.3. ***Visual values of research participants***

The following section outlines the aesthetic preferences of interview respondents in McBride. Research participants expressed a variety of aesthetic values during the interview process. Similar to Creston and Revelstoke, these visual values ranged from more utilitarian viewpoints, which placed an emphasis on timber extraction and recreation to more conservationist viewpoints that favored little or no anthropogenic disturbance on the landscape. One respondent succinctly summed up this dichotomous relationship stating that McBride is characterized by “redneck” and “artsy” approaches to visual resource management (Interview R-29M, R-10M). Like the other sample community forests, this finding is best explained by Bourassas’s tripartite paradigm, which accounts for the expression of subjective views of the landscape that are influenced by socio-cultural, as well as biological conditions such as individual upbringing, employment history, amount of time spent in the community and ecological reliance (Interview R-3R).

5.3.3.3.1. ***Non-instrumental aesthetic***

A number of participants were members of the forest industry and had views strongly opposed to non-instrumental aesthetic values. Four respondents emphasized the importance of non-instrumental aesthetic values to tourists. Non-instrumental aesthetic values were not held by locals and people with forestry knowledge. An example of this opposing opinion is described by one respondent who stated,

Visual quality as a starting point is completely asinine...I’m sorry but that’s just my opinion. I really do think it is because you’re ignoring utility and forest health and saying what looks pretty, and we have to make it fit that and it depends on where the damn highway runs(Interview R-9M).

The statement above assists in explaining how non-instrumental aesthetic values do not acknowledge ecological or utilitarian values on the land base and that catering to this

type of aesthetic preference is seen by many respondents with more utilitarian values as an unrealistic expectation for the MCFC TSA.

5.3.3.3.2. ***Stewardship Aesthetic***

A total of 52% of the McBride respondents expressed a preference for some form of stewardship aesthetic. Similar to the other sample forests, the characteristics of visible stewardship and its expression on the land base varied according to whether or not respondents were employed by the forest industry or possessed a working knowledge of forest ecology. Expert interpretations of a stewardship aesthetic generally reflected the desire to view what were often referred to as “working forests” characterized by sustainable harvesting practices, with higher levels of retention, structural diversity and species diversity. Specific visual indicators of a stewardship of the land base expressed by participants involved in the forest industry were: over-all cleanliness of the cutblock, removal of dead standing pine, replanting of visible sites in a timely manner, stacking and burning of debris piles and retention of understory (Interview R-27M, R-28M, R-33M). During interviews MCFC staff noted similar preferences amongst community members as well, stating: “We are highly visible; everyone is very much in tune with the forest around them and they demand a high level of stewardship” (Interview R-29M, R-9M). In all cases participants in this category favoured forest health over other management objectives (Interview R-37M).

Management for multiple objectives including landscape aesthetics was consistently mentioned (Interview R-6M, R-36M, R-32M, R-35M, R-33M). Most people in this category felt some management of the land base was necessary, with a few forest professionals stating that the forest was “decrepit and endangering itself” thus requiring continuous human intervention to enhance productivity and ecological resilience (Interview R-36M, R-6M, R-33M).

5.3.3.3.3. ***Ecological Aesthetic***

Interviewees who expressed a strong aesthetic preference for landscapes that conveyed ecological resilience and showed little sign of anthropogenic disturbance constituted 19% of the total McBride sample. While many indicators discussed by participants in this category were similar to those of visible stewardship, respondents

differed in the emphasis they placed on forest health over all other landscape objectives and the importance of minimal human intervention on the landscape. An example of this preference is clearly communicated in the following quotation.

Your mentality on the landscape, and people's action on the landscape will be informed by that sort of process, and so how they engage the landscape itself will also continue to be a product of....a basic focus I guess. It is all how you look at it. So, if you look at it from a standpoint of forest health, you will follow the things that are going on in the forest, and that will have its randomness...Because you are already following the landscape around, and if you already follow the randomness of the landscape, you actually have a visual quality to it, because it will seem or appear consistent with the other things going on anyway, so if you plan from a forest health perspective you will get that (Interview R-9M).

Another response, which communicated an ecological aesthetic, included one individual stating that they would like to see the CF managed as “wilderness”, used to protect watersheds and intakes as well as viewsheds (Interview R-10M). Strategies suggested to implement these ecological objectives included: minimum cutting to fulfill provincial harvesting requirements, and strict adherence to management plans.

5.3.3.3.4. *Utilitarian aesthetic*

Of the respondents who discussed aesthetic landscape preferences in McBride, 24% of them perceived evidence of timber extraction as aesthetically pleasing. Respondents in this category generally possessed an intimate knowledge of forestry and their aesthetic preferences were directly associated with timber utilization (Interview R-36M). Similar to the other sample communities, respondents felt that the visual concerns of the general public were often overstated and uninformed. Visual management practices were viewed as attempts to undermine the terms of tenure with respect to logging licenses, and extinguish the culture of logging by hiding it from the public (Interview R-31M). Participants in this category viewed aesthetic management as an artificial construct that negatively affects timber supply and that, where visuals and timber utilization came into conflict, visuals should be sacrificed to obtain desired yields. They saw this conflict as “inevitable” due to constrained operating areas and cited viewscapes south of McBride in Valemount and Blue River as examples. One respondent in this group acknowledged that it may be possible to achieve both visual

and timber supply objectives through adaptive and creative logging practices, stating that some highgrading may be necessary to preserve visuals. An optimal prescription that was put forth by this respondent included clear cuts that were approximately 100 acres, interspersed with 100-acre blocks of retention to provide a mixed, multi-aged stand (Interview R-35M).

5.3.3.3.5. **Recreational aesthetic**

Both community members and those working in the forest industry acknowledged the importance of aesthetic beauty to recreation and tourism. With one community member stating,

...so many people who live here don't see that they have an absolute jewel of a valley, that people really want to come and see, especially because we don't have these horrible squares and dirty water. The community forest has played a large role in supporting recreational tourism in McBride. The community forest has assisted with building and renovating recreational infrastructure...tourism is founded upon the scenic beauty of McBride; it is the primary source of new business development (Interview R-8M).

Despite a more widespread acknowledgement of the relationship between scenic beauty, recreation and tourism, only 5% actually indicated that they preferred visible evidence of disturbances related to recreation on the landbase and partial cutting practices that maintained or enhanced access to these areas (Interview R-27M). Some of the recreational activities participants engaged in included hunting, fishing, snowmobiling and hiking. Areas of particular scenic significance within the TSA are the Dore and Mckale Rivers, which provide opportunities for cross-country skiing, and snowmobiling, mountaineering, climbing, wilderness hiking, camping and other forms of eco-tourism (MCFC n.d.). Staff indicated that consideration of recreation opportunities influences cutblock design and the silvacultural systems used within the MCFC TSA and that recreation tourism is important to McBride. Selective harvesting is generally used in areas of recreational significance (Interview R-29M). This was affirmed by another respondent who maintained that when MCFC is building or maintaining hiking trails, they are appealing to scenic values associated with a recreational aesthetic: "they are doing it so that people could look back and say, I could see myself walking down there" (Interview R-30M).

5.3.3.4. **McBride Visual Quality Effectiveness Evaluation**

The McBride CFA proposal, as well as the MCFC Management Plan, recognize the importance of scenic quality to the community of McBride. The MCFC management area is located within a SMZ, as it contains scenic and recreational features, as well as important wildlife and watershed values. MCFC has a number of established VQOs within its TSA; much of the TSA occurs within the main Rocky Mountain Trench at higher elevations rendering them highly visible. The McBride Management Plan identifies EVQOs and provides strategies to achieve them. Staff at MCFC state that VQOs established for the trench were a key consideration in deciding retention levels on a number of cutblocks (Interview R-29M).

Visual quality effectiveness evaluations were conducted on three MCFC cutblocks to determine the percent denudation to the landscape post-harvest. Site characteristics and a selection rationale are provided in the body of this work for each viewing location (see Appendix C for the detailed MCFC Visual Quality Effectiveness Evaluation). Effectiveness Evaluations for all three cutblocks were conducted in accordance with provincial guidelines and were based on a consideration of EVQOs, visual quality classes, as well as the design elements present and the influence of other disturbances on the landform. Each cutblock was assigned a rating between “clearly not met” and “well met” based on the changes to the Existing Visual Condition. Table 8 provides a summary of the cutblock location information, as well as the viewpoint information.

Table 8. McBride Community Forest Corporation viewpoint location information

| Location ID | Cutblock Coordinates | Location Description | Viewer Status | Elevation | Viewing Distance |
|----------------|--|------------------------------------|---------------|-----------|------------------|
| K1H 993 14A | Lat: 53 19' 08" N Long: 120 08' 18" W | Small recreation site McBride Peak | Stationary | 1050 m | 1.36 km |
| K1H 420-1 | Lat: 53 25' 24"N Long: 120 17' 54"W | Elder Creek | Stationary | 1100 m | 2 km |
| K1H 420-3 | Lat: 53 26' 15" N Long: 120 19' 15"W | Elder Creek | Stationary | 1100 m | 2.51 km |

5.3.3.4.1. **Effectiveness Evaluation: K1H 993 14A**



Figure 11. MCFC Cutblock K1H 993 14A

- Polygon A (Landform)
- Polygon B (Natural disturbance outside cutblock opening)
- Polygon C (Cutblock K1H 993 14A)

i) Location and site characteristics:

Block K1H 993 14A is located on McBride Peak in McBride, British Columbia. The cutblock is located within a known scenic that has an assigned visual sensitivity class of 2 and a Visual Absorption Capability of *Moderate*. Block K1H 993 14A area and has an established VQO of *Retention*. The total block area is 82 ha and it contains an entrance road to a scenic outlook on McBride Peak. The leave tree specifications state that birch will primarily be harvested to maintain aesthetic values of the area. Site disturbance is minimized through the use of existing road and trail networks. The site plan states that the block will not only satisfy VQO requirements but will also serve as a dispersed Wild Life Tree Patch (McBride, 2012).

The cutblock is located low on the landform at an elevation of between 750-1050m. The block is irregularly shaped and has high levels of retention. It responds to visual lines of force well and borrows from the natural character of the landscape. The position of the cutblock is low on the landform and boundary treatments have been successfully incorporated.

iii) Percent Alteration

The percent alteration was determined using a partial cut calculation as outlined in provincial protocols and guidelines for partial cut alterations. Polygon A represents the total landform being evaluated, polygon B represents natural disturbances outside the cutblock and polygon C represents the general area of cutblock K1H 993 14A. An ocular estimate of the percentage of volume that was removed during harvesting was conducted by observing and photographing the texture and permeability of the residual canopy to the nearest 10% and contrasting these values against to the Visual Equivalent to a Clearcut Table (refer to Appendix B) (MFLNRO 2008). Cutblock K1H 993 14A resulted in a 0.36% alteration on the landform and an effectiveness evaluation rating of “well met” was assigned.

5.3.3.4.2. Effectiveness Evaluation: K1H 420-1

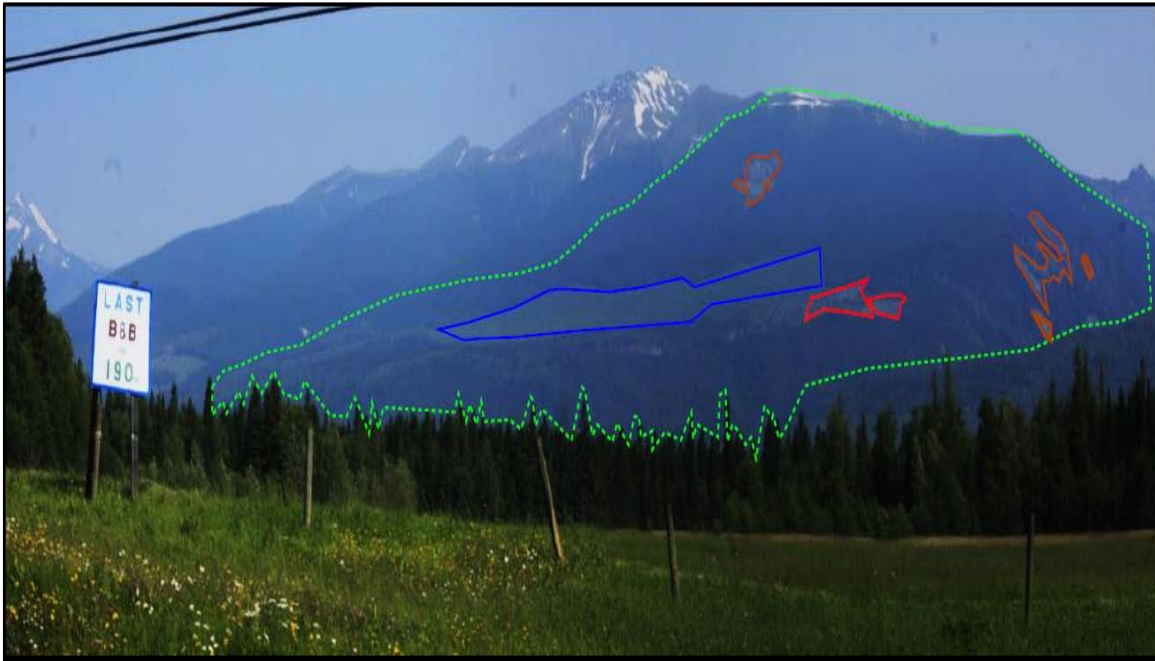


Figure 12. MCFC Cutblock K1H 420-1

- Polygon A (Landform)
- Polygon B (Natural disturbance outside cutblock soil/rock)
- Polygon C (Cutblock K1H 420-1)
- Polygon D (Anthropogenic disturbance outside cutblock)

i) Location and site characteristics:

Block K1H 420-1 is located in McBride British Columbia near Elder Creek. The gross area of the block is 80 ha and it is located adjacent to Highway 16. The designated Visual Sensitivity Class for the landform is a 2 (moderate to high visual sensitivity) and the Visual Absorption Capability for the cutblock is also moderate. The EVQOs for the area are Modification and Partial Retention. The McBride Site Plan for this block states that clear cut with reserves will be used to achieve VQOs along Highway 16 (McBride 2007). A large existing disturbance dominates the landform and contributes to the overall disturbance calculation. In addition, there are a number of small natural disturbances

adjacent to the blocks that do not contribute to the disturbance calculation but are visible.

ii) Cutblock design observations

Cutblock K1H 420-1 incorporates some positive design principles. It is located low to midway on the landform, and has an irregular shape. However some geometric aspects remain and the scale is relatively large. The cutblock adheres to some of the natural lines of force by travelling up the gully and down the ridgelines.

iii) Percent Alteration

Consistent with provincial guidance, clearcut and partial cut calculations were used to determine the percent alteration from cutblock K1H 420-1 on the landscape (MOFR 2008). Results of the effectiveness evaluation indicate that the initial Visual Quality Class for the landform was 17.54% and an initial rating of Modified was assigned. However, consideration of design elements in a post field analysis resulted in an adjusted percent disturbance of 5.2% and final VQC of Partial Retention. A final effectiveness evaluation of “met” was assigned.

5.3.3.4.3. Effectiveness Evaluation K1H 420-3

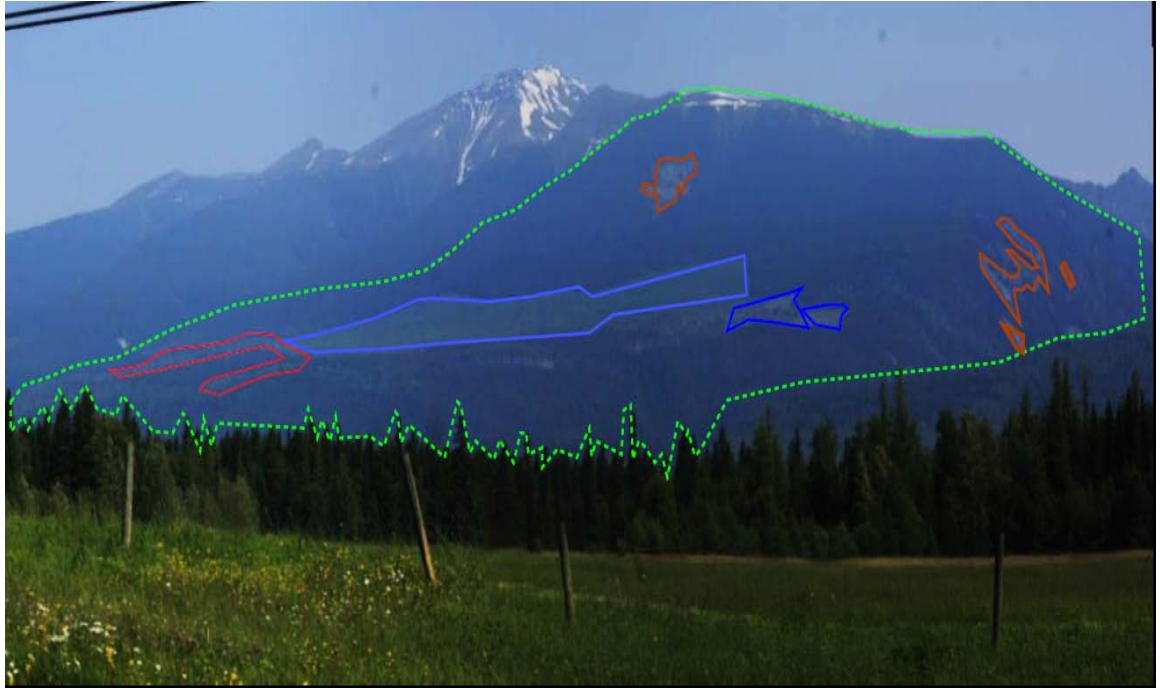


Figure 13. MCFC K1H 420-3

- Polygon A (Landform)
- Polygon B (Natural disturbance outside cutblock soil/rock)
- Polygon C (Cutblock K1H 420-3)
- Polygon D (Anthropogenic disturbance outside cutblock)

i) Location and site characteristics:

Block K1H 420-3 is located in McBride British Columbia near Elder Creek. The gross area of the block is 177.8 ha and it is located adjacent to Highway 16. The designated Visual Sensitivity Class for the landform is 2 (moderate to high visual sensitivity). The Visual Absorption Capability for the cutblock is also moderate. The VQO for the area is Modification and Partial Retention. The McBride Site Plan for this block states that clear cut with reserves were used to achieve VQOs along Highway 16 (McBride 2007). A large existing disturbance dominates the landform and contributes to the overall disturbance calculation. In addition, there are a number of small natural

disturbances adjacent to the block that do not contribute to the disturbance calculation but are visible.

ii) Cutblock design observations

Cutblock K1H 420-3 incorporates a number of positive design principles. It is located low on the landform, has significant boundary treatments and adheres to the natural lines of force by travelling up the gully and down the ridges. Retention is between 10% and 40% over the entire block.

iii) Percent Alteration

Consistent with provincial guidance, clearcut and partial cut calculations were used to determine the percent alteration from cutblock K1H 420-3 on the landscape (MOFR 2008). Polygon A represents the total landform being evaluated, Polygon B represents the natural disturbance outside the cutblock, Polygon C represents cutblock 420-3 and Polygon(s) D represents the existing anthropogenic disturbance outside of the cutblock. Results of the effectiveness evaluation suggest that cutblock K1H 420-3 contributed a 8.54% alteration to the landscape. The size of the cutblock, moderate VSC, and moderately restrictive VQO resulted in a final effectiveness evaluation rating of “met” being assigned to the cutblock.

5.3.3.4.4. MCFC Visual Quality Effectiveness Evaluation Summary

The results of the effectiveness evaluation suggest that MCFC is successfully implementing visual management practices at all of the sample locations. Site plans and discussions with MCFC staff regarding harvesting approaches indicated that MCFC staff had detailed knowledge of alternative harvesting practices, which included boundary treatments, and use of partial retention harvesting, adhering to visual lines of force and borrowing from natural character of the landform.

Cutblock K1H 993 14A incorporated high levels of retention and many elements of visual design resulting in an assigned rating of “well met”. Existing disturbances on the landscape were identified as posing challenges to achieving EVQOs for cutblocks 420-1 and 420-2. Both of these cutblocks had EVQOs of both Partial Retention and Modification. As Table 9 summarizes, cutblock 420-1 and 420-3 were assigned a rating

of “met” for the Modification EVQO and “partially met” for the Partial Retention EVQO, as the initial visual quality class was identified as being Modified but was adjusted to Partial Retention to reflect positive design elements in accordance with provincial guidelines (MOFR 1997).

Table 9. Results Summary: McBride Community Forest Corporation Visual Quality Effectiveness Evaluations

| Block | Scenic Class | Partial cutting % Removed | Established VQO | Effectiveness Evaluation Rating |
|----------------|---------------------|----------------------------------|------------------------|--|
| K1H 993 14A | 2 | 20% | Retention | Well Met |
| K1H 420-1 | 3 | 64% | Partial Retention | Borderline |
| | | | Modification | Well Met |
| K1H 420-3 | 2 | 64% | Partial Retention | Borderline |
| | | | Modification | Well Met |

6. Common findings and recommendations

The following section outlines several common findings identified in Section 5 and provides recommendations to assist in the management of aesthetic resources by community forests. Specifically, it identifies the common groupings of aesthetic values held by interview respondents, as well as the extent to which co-management of visual resources by sample community forests is being implemented. It should be noted that the sample forests examined in this study comprise only a small sub-set of a much greater number of CF licensees throughout the province. Environmental conditions and institutional practices varied by forest. Therefore, recommendations suggested herein may not be applicable across all community forests.

6.1. Shared Visual Values

Research participants expressed a number of common aesthetic values during this study. Aesthetic preferences for local landscapes existed along a broad spectrum, related particularly to disturbances on landscape and the patterns of retention. Interview responses were divided into five groups of aesthetic values, with each group having distinct but overlapping aesthetic qualities. Of the aesthetic values identified, visible stewardship accounted for 50% of the overall responses, ecological 14%, recreational 16%, and utilitarian 20%. No participants directly expressed non-instrumental values. However, many associated this preference with tourists and people without knowledge of forestry. Participants who expressed non-instrumental and ecological visual values were highly sensitive to landscape disturbances and preferred to see minimum levels of disturbance. Participants who expressed visible stewardship or recreational values were less sensitive to evidence of harvesting activities and were comfortable with some visible disturbances on the landscape, providing that they demonstrated an ethic of care for the landscape and or consideration of recreational opportunities. Participants who

expressed utilitarian landscape values were the most tolerant of conspicuous disturbances that demonstrated active logging and maximization of timber resources.

While respondents were divided into groups, some overlap in responses existed. Ecological, visual stewardship and non-instrumental values tended to emphasize the aesthetic importance of small openings, with moderate to high levels of in-stand retention, while visual stewardship and utilitarian values-holders acknowledged the importance of visible human intervention in forest management activities. Amongst these various values, respondents tended to discuss ecological and visible stewardship values the most and these were often expert or embedded opinions, which were informed by knowledge of the landscape and alternative forest practices. Non-instrumental values were in all cases perceptually based, with the respondents having no experience in forest management or any related discipline. Managing differences in landscape perception was cited as a common challenge in implementing visual resource management practices. Striking a balance between utilitarian and non-instrumental visual values was frequently discussed during interviews.

6.2. Co-management of Visual Resources

All of the sample forests in this study sought community forest tenure as a means of gaining greater control over local forest resources. The community forests in this sample provided a number of monetary and non-monetary benefits including timber revenues, non-timber forest product revenues, water supply, aesthetic quality, recreation opportunities, wildlife habitat and open spaces (Community Forest Collaborative 2007). Overall, community forests in this study demonstrated co-management of visual resources and incorporation of the principles of landscape design into their harvesting regimes in visually sensitive areas. This is reflected in their more participatory institutional structures, public engagement strategies and implementation of alternative harvesting practices, as will be described in greater detail below.

6.3. Institutional Structure

6.3.1. Summary of findings

All of the sample forests in this study are incorporated organizations with appointed boards of directors. Ownership models differed, with CVFC and RCFC having joint ownership between municipalities and other shareholders and MCFC being owned in full by the Village of McBride as a municipally-owned corporation. As outlined in Sections 6.3.1, 6.3.2, and 6.3.3, the chief motivational factors for applying for a CFA in all cases was the desire to provide a more balanced management system, focused on management of multiple community objectives. All forests reported challenges associated with implementing visual resource management amongst other competing objectives associated with community based forest management (Interview R-26M). This finding corresponds with the findings of Ambus et al. (2007), which include the ambitious management goals of community forests and the challenges associated with that tenure type. Despite the challenges posed by managing for multiple objectives, all forests were largely successful at achieving Established Visual Quality Objectives (EVQOs) within their TSA. The community forest tenure appears to be an appropriate vehicle for management of visual resources. It is unclear to what extent the institutional structure of the individual sample community forests influences the co-management of visual resources within their respective TSAs. However, the for-profit structure of Revelstoke and McBride appears to create an increased incentive to remove higher levels of basal area in order to maximize economic returns than Creston Valley Community Forest. While this has the potential to affect the management of visual resources, it does not appear to have comprised visual management practices in any of the case studies.

While staff in all community forests were highly experienced, they reported a general lack of forestry knowledge amongst most board members and a relatively low level of direct participation by board members in operational management activities. The methods used for selection of the Board members differed among CFs. CVFC appeared to have the most accessible board membership, through solicitation of potential members from within the community. MCFC had a more restrictive process of elected officials appointing board members, resulting in a board composition that some felt was

not necessarily representative of all of the interests within the community, particularly those outside of the Village of McBride (Interview R-42M).

6.3.2. Recommendations

Some strategies that may be used to increase participation on the boards of directors for each community forest, to encourage more collaborative decision making and to ensure a minimum level of knowledge of principles of landscape design, include:

- Base board structure on an open application system whereby all members of the community are encouraged to apply for membership,
- Ensure that board members receive internal or external training on forest resource management , and
- Ensure board members are familiar with provincial protocols and guidelines on forest landscape design, e.g., attending MFLNRO VLI training and visual quality effectiveness evaluation training.

6.4. Public Participation

6.4.1. Summary of findings:

All sample forests acknowledged the importance of public participation to forest management activities including visual resource management. Sample forests relied primarily on websites and regularly scheduled meetings as a means to engage the general public. All forest managers indicated that they are influenced by social pressure from members of the community to maintain the integrity of visually sensitive areas within their TSA.

Despite the above engagement strategies, all forests reported relatively low levels of direct public engagement in operational decisions. However, members of the public did typically help in setting high level policy direction, which influenced operations management. Community forest staff attributed the lack of public participation to different factors. CVFC cited its large geographic area as the primary challenge to effective engagement, while RCFC stated that public confidence in RCFC's logging practices had

resulted in public complacency amongst members of the community. Finally, staff at MCFC indicated that attendance at meetings was generally low due to lack of interest. All forests acknowledged that low levels of public participation have at times resulted in barriers to achieving more integrated visual resource management, as local concerns may not necessarily be incorporated into planned harvest activities. Staff at the Creston and Revelstoke community forests indicated a desire to increase communication with the public through more direct and regular open houses.

6.4.2. Recommendations

Improved public engagement efforts would assist in increasing public knowledge of community forests, their management objectives and operational activities. A number of strategies exist that could assist in improving communication with members of the public and co-management of visual resources overall. Some of these strategies include:

- Presence of a community advisory body, where members of the community who do not sit on the board can participate more directly in setting and responding to aesthetic management objectives
- Development of a community forest newsletter that provides updates on community forest activities, upcoming public meetings and community forest contributions to the community
- Conducting semi-annual field tours, which are open to the public, showcase alternative logging practices, and contain in-field design exercises such as marking up of photographs and maps, that allow participants to learn about and influence cutblock design in an applied setting
- Installation of signage that identifies visually sensitive areas and explains visual strategies on roadsides and recreation sites
- Installation of pop-up booths at public events would also help increase public awareness of community forest presence and the role they play in the community

- Use of landscape simulations that present three dimensional, spatially accurate landscape images of harvesting to engage the public on websites and during open houses may increase numbers and effectiveness of participation

6.5. Implementation of Visual Resource Management

6.5.1. *Summary of Findings*

Results of the effectiveness evaluations suggest that all forests were attempting to implement the basic principles of landscape design in their harvesting practices. Some of the common methods used by community forests to manage for visual resources included placing cutblocks lower on the landform, reducing the overall size of the cutblock and percent basal area removal, incorporation of boundary treatments and removal of slash piles. All of the cutblocks evaluated either complied with or partially complied with Established Visual Quality Objectives under FRPA for visually sensitive blocks within their TSA. Instances of partial compliance were the result of pine beetle uplifts and the presence of a BC Hydro right of way. There is no obvious evidence of conflicts between the perceptions of community member's aesthetic preferences and the Visual Quality Effectiveness Evaluation findings.

The small sample size and lack of EVQOs within the Revelstoke TSA precludes a quantitative comparison of achievement of EVQOs by community forest and other types of tenure. However, a number of respondents indicated they felt that overall community forests were managing visual resources better than industrial licensees. Correspondence with forest managers and review of meeting minutes indicate an overall satisfaction with visual resource management by community forests and few public complaints. The presence of tourism opportunities was often stated as increasing the impetus to manage for visual quality. This is evidenced by RCFC's visual resource management practices in the viewshed of Adamant's Lodge, and McBride's visual resource management of viewing opportunities from McBride Peak. The types of pre-harvest planning undertaken by each community forest differed, depending on the EVQO for the landscape unit, visual sensitivity and absorption capacity of the landscape,

and the financial resources and capacity available to the community forest. The types of tools used to plan harvesting were similar amongst the forests and included recreational Visual Resources Inventories (VRI), Recreational Features Inventories (RFI), harvest simulations, Forest Management Plans and Stewardship Plans.

An emergent theme throughout my research was the numerous operational and non-operational challenges associated with the implementation of integrated visual management practices. As will be discussed in more detail below, some of the non-operational challenges identified during our research included communication between operations staff and foresters, motivational issues, regulatory constraints, and financial constraints. Operational challenges faced by community forests in our sample group included environmental conditions such as unstable or unsuitable terrain, different biogeoclimatic zones, as well as competing management objectives such as pest management, watershed and wildlife protection. Together these factors often resulted in netdowns, serving to concentrate harvesting in suitable areas, and making management of visual resources in those areas more difficult. Finally, equipment was also cited as an impediment to managing for visual quality, with long-line cable harvesting, traction winches and helicopter logging being cited as possible means to address inaccessible timber or improve line speeds.

6.5.1.1. **Communication Challenges**

Operations staff in each of the community forests noted the difficulty in implementing alternative harvesting designs at the operational level due to ineffective communication of site-specific mitigation measures to the foresters conducting the harvesting. Remote management of logging contractors to ensure that design elements specified in site plans are implemented on the landbase was cited as being costly and time consuming. Some staff stated that it may be necessary for forest staff to conduct site visits with logging contractors to identify leave trees and reserve areas prior to harvesting. RCFC staff emphasized the importance of clear communication between the forester and loggers to ensure that visual, as well as wildlife values, are retained and note that tree marking was an effective way of ensuring desired leave trees were retained. One respondent stated: “The important thing is you got to have good people

doing the layout; you got to have good loggers that are not bashing the residual trees you have left” (Interview R-45R).

6.5.1.2. **Terrain Challenges**

Terrain was cited by staff in all three forests as a being a significant operational challenge to implementing visual resource management practices. Steep and mountainous terrain, north facing aspects, low visual absorption capacity combined with restrictive EVQOs, were all cited as posing potential constraints for managing visual resources across the community forest. Alternative cable harvesting systems require less steep terrain while north facing aspects often result in slower regeneration times (Interview R-25R, R-KBR).

6.5.1.3. **Ecological Health Challenges**

Successful management of aesthetics was also at times constrained by the need for maintaining forest health. As discussed in detail above, the imitation of natural disturbance often requires small opening sizes and higher levels of retention. This finding is affirmed by MFLNRO Public Perception Study (2010), which associates moderate to high public acceptance with tree retention levels between 15% and 20%. Many embedded observers in each of the community forests expressed the need to balance aesthetics, with the levels of removal necessary to expose mineral soils and allow sufficient light for new growth to occur. Opening sizes are in part dictated by climax species, some of which require more light and therefore larger openings to regenerate. Selective logging for preferred species, while maintaining minimum openings to reduce visible disturbances, were cited as sometimes resulting in highgrading and ultimately a depleted genetic bank, as disturbance levels are insufficient to ensure species with less shade tolerance regenerate (Interview R-25R). Management of insect infestations was another forest health concern that was identified as a challenge. CVFC and McBride staff discussed the challenge of meeting more restrictive EVQOs of Preservation and Retention in areas where the leading species is Pine (*Pinus*). Caribou netdowns, for the purpose of maintaining Mountain Caribou ungulate winter range, have concentrated harvesting in specific areas making managing for visual quality objectives more difficult. Some staff felt that TSA areas should be increased as a result of caribou netdowns to allow community forests additional area to operate and disperse harvesting over a broader land base. With CVFC, RCFC and MCFC experienced caribou netdowns of approximately 14%, 32% and 3% respectively.

6.5.1.4. **Motivational Challenges**

Motivational challenges to implementing visual resource management identified during research include the community culture of logging, which resulted in some contract loggers being resistant to implementation of visual resource management practices, as they felt that VRM was an attempt to “hide” logging on the landscape. Some respondents felt that forest harvesting should be celebrated, as it demonstrated evidence of this “trade” and the economic gains associated with it, across the landscape. Expected profit margins, and employment were also cited as challenges to managing for visual values, when there was incentive to remove more basal area in order to increase

profit margins and provide additional opportunities for employment. Operations staff at each of the forests discussed presence or absence of tourism component as a key consideration in implementing visual resource management.

6.5.1.5. **Regulatory Challenges**

Regulatory challenges were also cited by a number of respondents as limiting the capacity of community forests to manage visual resources. This has also been recognized by Cronkleton et al. (2012) who note that partial devolution of rights and responsibilities in community forest may at times limit their ability to operate effectively.

The RCFC Annual Report indicates that aesthetic management is somewhat constrained by the terms of RCFC's Tree Forest License tenure. Members of the RCFC board suggested that a transition to community forest tenure could potentially provide more flexibility in making management decisions, which affect visual resources.

Some CVFC respondents also discussed how regulations under FRPA do not provide enough oversight or guidance on management of visual quality. They maintained that the shift in regulation from the *Forest and Range Practices Code* to *Forest and Range Practices Act* retained existing scenic areas, but removed many of the more prescriptive regulations, including the requirement to include visual simulation packages in proposed harvest plans. Some felt that this results in aesthetic inventories and forest stewardship plans that are not capable of visually demonstrating the aesthetic impacts of timber removal prior to harvest. Some respondents in CVFC also indicated that international agreements, such as the Softwood Lumber Agreement, have imposed conditions on landscape planning by government, making it difficult to manage for non-timber values including visual resources. One emphasized this finding stating that "The Softwood Lumber Agreement has tied the hand of government in planning; they will lose the cut if they don't harvest it and therefore must generate many small cutting permits and this encumbered community forest's attempts to apply a more integrated design that retained higher levels of designed in-block tree retention (Interview(s) R-48, R-47R).

6.5.1.6. **Financial Challenges**

The sample forests in the study discussed financial challenges associated with both planning and implementing visual resource management practices. CVFC staff

revealed that both the development of detailed cutblock site plans and alternative harvesting costs increase when alternative management practices such as boundary treatments, single- tree selection and cable logging are utilized (CVFC staff correspondence 2009). The costs associated with the above logging practices may be as high as \$41.50 per cubic meter, compared with that of conventional harvesting, which costs approximately \$25.00 per cubic meter (Barry and Associated Consulting date, cited in Teitlebaum 2007). However, CVFC staff note that some of the layout costs may be reduced by conducting a thorough desktop analysis of existing conditions and layout options *prior* to initiating fieldwork, thereby reducing the amount of time in the field.

6.5.1.7. **Recommendations**

Community Forest staff indicated that effective communication between operations staff and contract loggers is critical to achieving VQOs on the landscape and may in some cases involve the marking of specific leave trees in order to ensure sufficient basal area is maintained and that specific trees or clusters of trees be retained. In addition to improving direct communications, foresters should possess detailed understanding of site plans for proposed cutblocks and provincial principles of landscape design. It is recommended that foresters and logging crews conducting harvesting activities within community forest TSAs be required to have provincial training in conducting Visual Landscape Inventories, and knowledge of the guidelines outlined in the Visual Landscape Design Training Manual (1997) and Interactive web-based Visual Landscape Design Training Package (MFLNRO webpage).

The challenges posed by landscape terrain are not easily remedied. Interview responses and literature review suggest that in many cases community forest tenures are sometimes allocated TSAs that are considered operationally challenging. Often the total size of the TSA is small relative to other tenure types. Where possible it is recommended that the province increase the size of community forest TSAs to account for inoperable areas, and netdowns identified in the management plans. In addition, more detailed site planning of visually sensitive landscape units would assist in implementation of VQOs. Site plans should be prepared and submitted for all proposed cutblocks that intersect visually sensitive landscape units and should indicate whether harvesting will comply with EVQOs and RVQCs and if required, what mitigation

measures are proposed to ensure compliance. This may include retaining higher levels of designed in-block tree retention to facilitate more natural-appearing landscapes. Designing dispersed retention harvesting can facilitate greater overall short-term volume removal from a given landform, for a given VQO, when compared to clearcutting techniques (Sheppard and Piccard 2001). Some methods identified in the literature that may be appropriate for use within visually sensitive areas of community forest TSAs include radial harvesting in front country areas, use of partial cutting where (ecologically sustainable) and ensuring boundary treatments are present. Sheppard et al. (2004) notes that the use of radial-strip cutting can reduce the visual impacts of harvesting by incorporating uphill or downhill cable-yarding along multiple narrow strips from each landing, feathered edges and buffer strips, which mimic natural disturbances between blocks. The radial design results in only small portions of a block being visible from different view angles and maintains connectivity corridors important for wildlife and other forest values, while increasing access to timber in front country areas that were previously unavailable.

The types of equipment used were often cited as a challenge to managing visual resources. Recommendations reported during interviews identified the use of alternative long-line cable harvesting, as a means to reduce visual disturbance on the landscape, and provide increased access to more difficult to access timber. In addition to long-line cable harvesting, the use of a traction winch was recommended to improve line speeds and profitability, while simultaneously reducing the amount of disturbance required. RCFC currently uses a number of alternative harvesting systems as noted above. RCFC has experienced reduced operational costs as a result of using this system. It also allows loggers to apply boundary treatments by harvesting side to side, selecting individual trees and thinning the stand along the edge of harvesting activities thereby reducing the visible contrast between unharvested and harvested areas.

The following recommendations attempt to address some of the regulatory challenges discussed in Section 7.2.3.1.5. Literature review and numerous responses during interviews suggest that the submission of visual simulation packages previously required under Forest and Range Practices Code should be reinstated under FRPA. As Sheppard (2001, 2006) notes, the use of visual simulations can provide a powerful tool for illustrating the visual impact of proposed disturbances from a

perspective view on the landform prior to harvest. However, use of these landscape visualizations should adhere to visual impact assessment procedures, as identified in the *Visual Impact Assessment Guidebook* (MOF 2001). The use of predictive simulations prior to harvesting would allow community forests and regulators to better determine any visual impacts associated with a proposed cutblock, as well as any cumulative impacts from existing disturbances and possible mitigation measures that may be required. Visualizations may also help to engage and inform boards of directors and the general public on important design and siting issues for harvesting activities.

Finally, it is recommended that a self-administered monitoring program be established for visually sensitive areas within community forest TSAs. The use of FREP Effectiveness Evaluations forms would provide a means to more objectively evaluate and document the visual impacts of forest harvesting activities (refer to Appendix B). Conducting FREP Effectiveness Evaluations or a similar form of aesthetic assessment would assist forest managers in planning future cutblocks on the same landform or within the same viewshed, as it would enable them to determine the existing visual condition of cutblocks within three years of harvesting and record if they comply with provincial EVQOs and RVQCs.

7. Conclusions

The preceding discussion of my results identified three central findings common to all sample community forests, including evidence of co-management of visual resources, variation in aesthetic preferences and implementation of visual resource management practices.

7.1. Presence of co-management of visual resources

It appears that in all of the sample forests community-based boards of directors allowed for direct expression of aesthetic landscape preferences from members of the community, resulting in increased awareness by community forest staff of local visually sensitive areas within community forest TSAs. All community forests demonstrated some level of public engagement through open houses, websites or newsletters. A variety of expectations exist for community forests, and forest managers must bear the responsibility of engaging in commercially viable, ecologically sustainable and aesthetically pleasing forestry activities. Balancing these competing objectives, at times, limited the extent to which visual resources could be managed. However, overall, the sample forests demonstrated successful integration of VRM in their forest management activities, with very few complaints related to visual quality reported.

7.2. Variation in aesthetic preferences

My research identified a variety of aesthetic preferences for forest landscapes within the community forests TSA. These preferences ranged along a spectrum from little or no basal area removal to higher levels of removal in excess of 50%. Preferences for different levels of basal area removal often corresponded with landscape use and the respondent's socio-economic background. This range of preferences sometimes resulted in dissatisfaction amongst respondents in the ecological and utilitarian groups

as most forestry activities tended to reflect moderate levels of disturbance in visually sensitive areas that corresponded with the Visible Stewardship theory discussed in Section 6.2.2, which places value on sustained visibility of forest operations, management and personnel on the landscape.

7.3. Implementation of visual resource management practices

A number of shared operational and non-operational challenges to effective visual management were identified during interviews. Common operational constraints to alternative harvesting approaches noted by respondents included invasive species, inoperable areas, and windthrow. Non-operational constraints were largely related to insufficient motivation of loggers, high cost of alternative logging practices and limited capacity of logging teams or staff.

Despite operational and non-operational challenges, and differences in aesthetic preferences amongst community members, it was observed that overall, community forests are successfully managing visual resources within visually sensitive areas in their TSAs, with most cutblocks achieving and some cases exceeding EVQOs and RVQCs, and few instances of public complaints related to visual quality. This finding represents a significant achievement for such a small tenure with many competing objectives, and demonstrates the responsiveness of community forests to provincial visual resource management requirements, as well as local aesthetic concerns. The community forest model appears to be a successful model that may be more widely applied by communities seeking to manage visual impacts of harvesting amongst other resource objectives, with methods that could also be adopted for larger scale forest operations.

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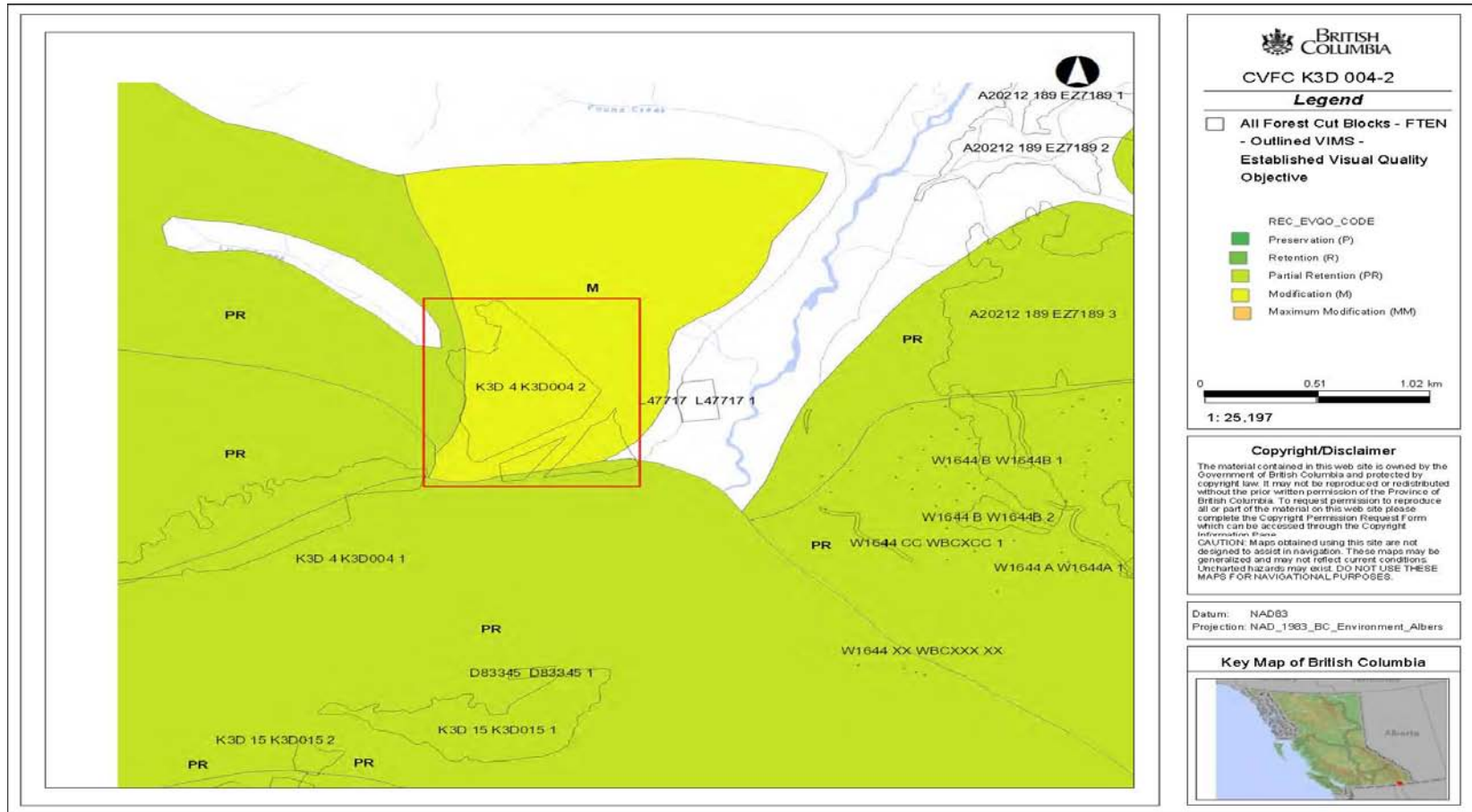
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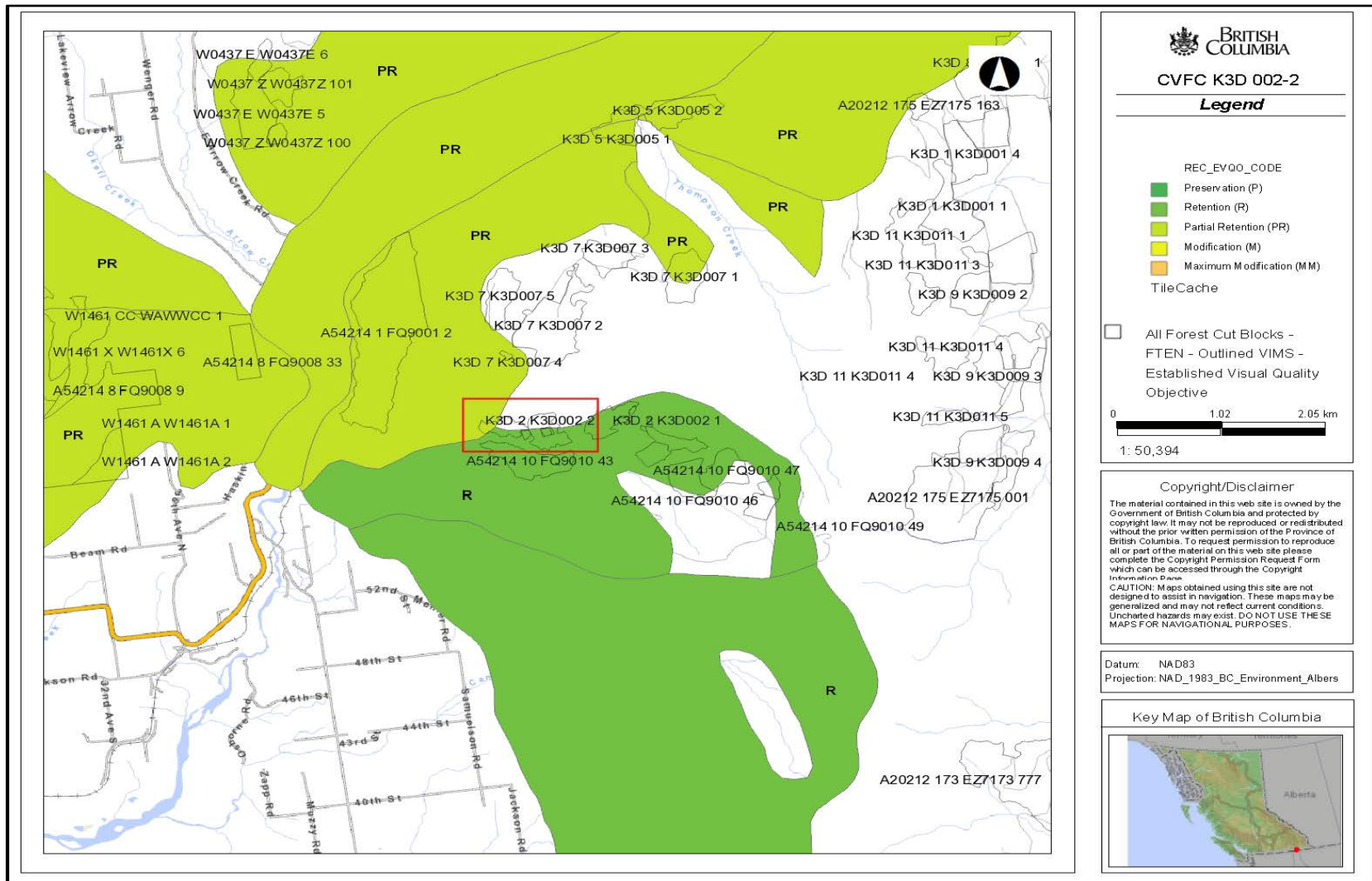
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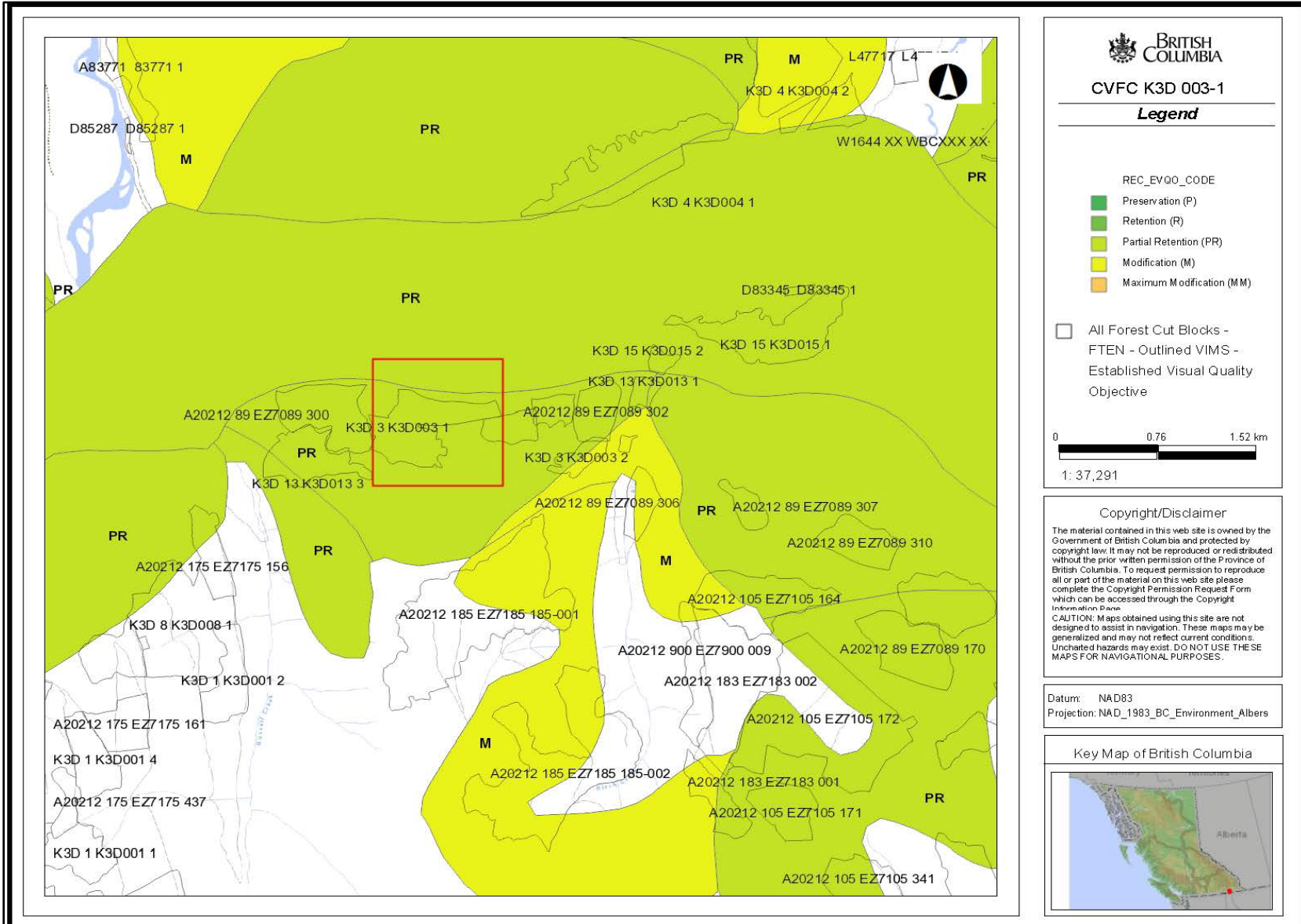
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Appendix A

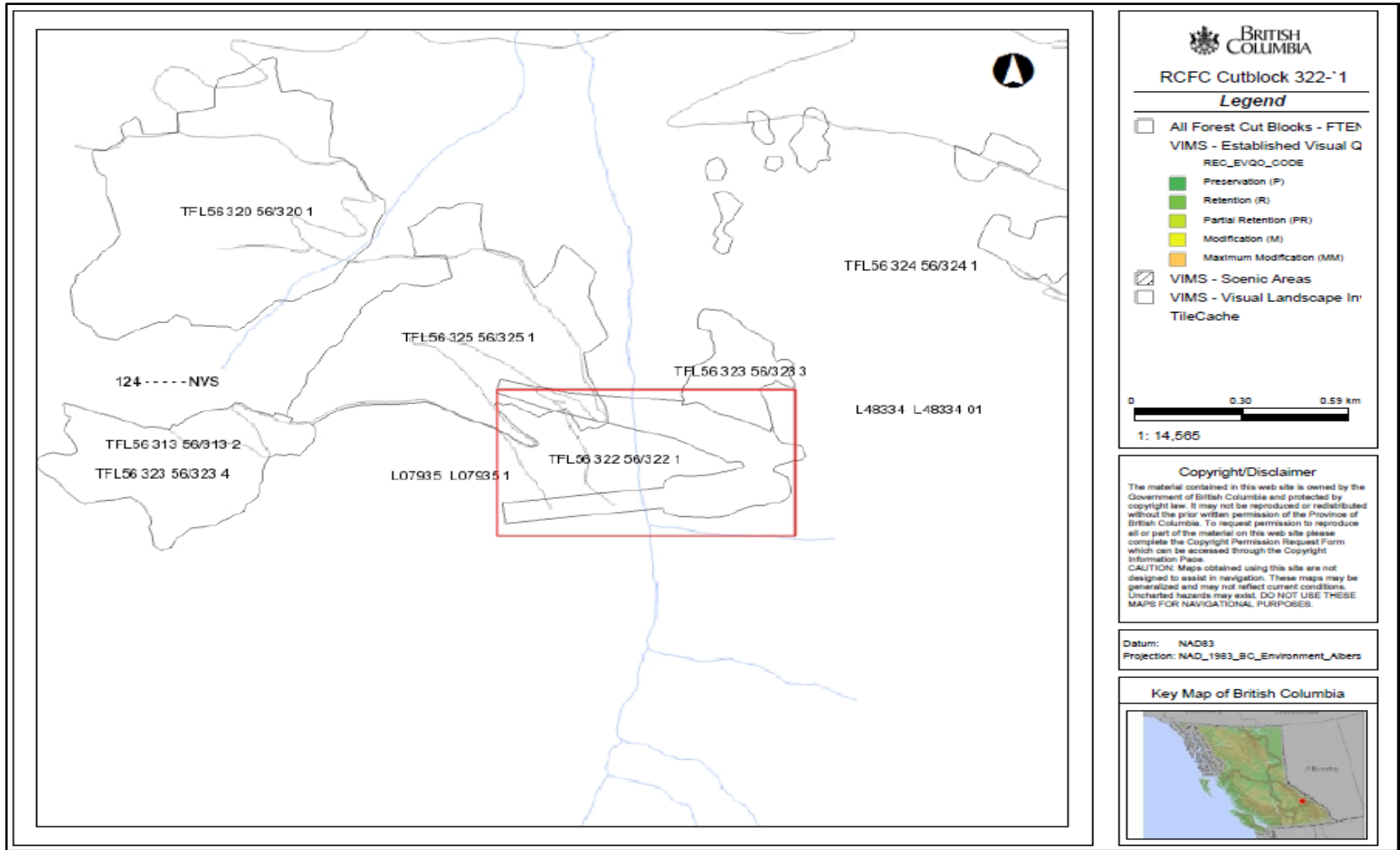
Creston Valley Community Forest EVQO Maps

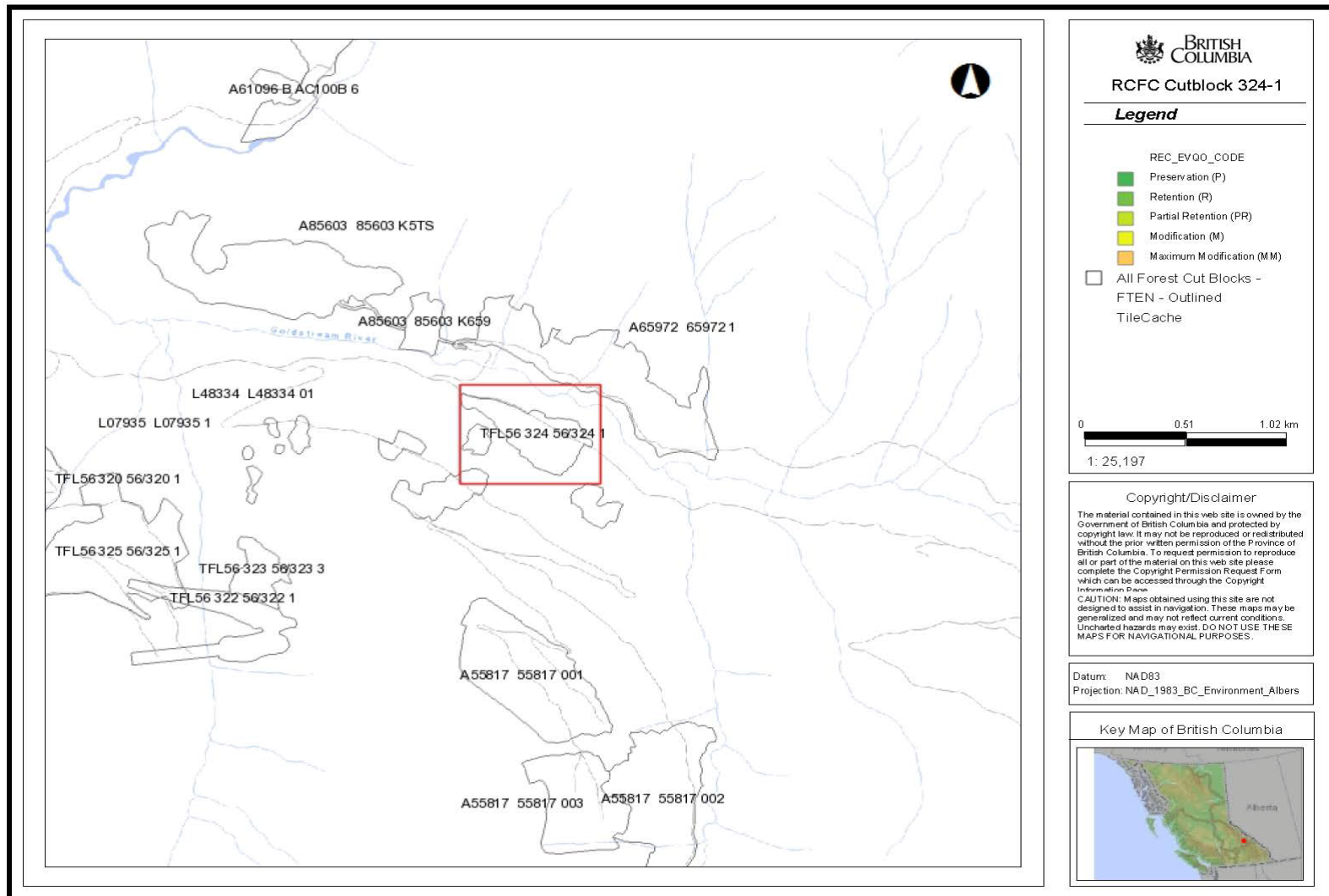


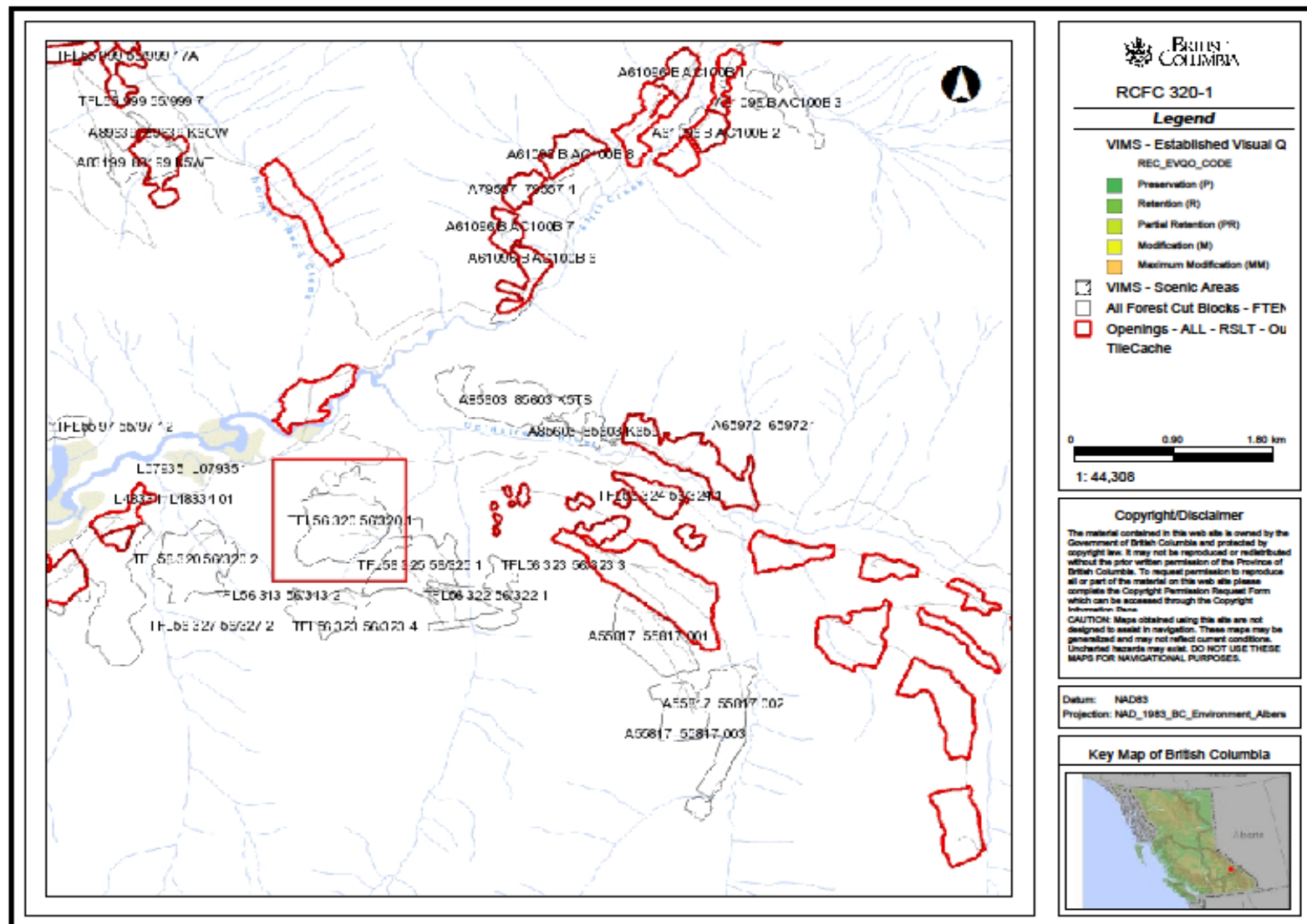




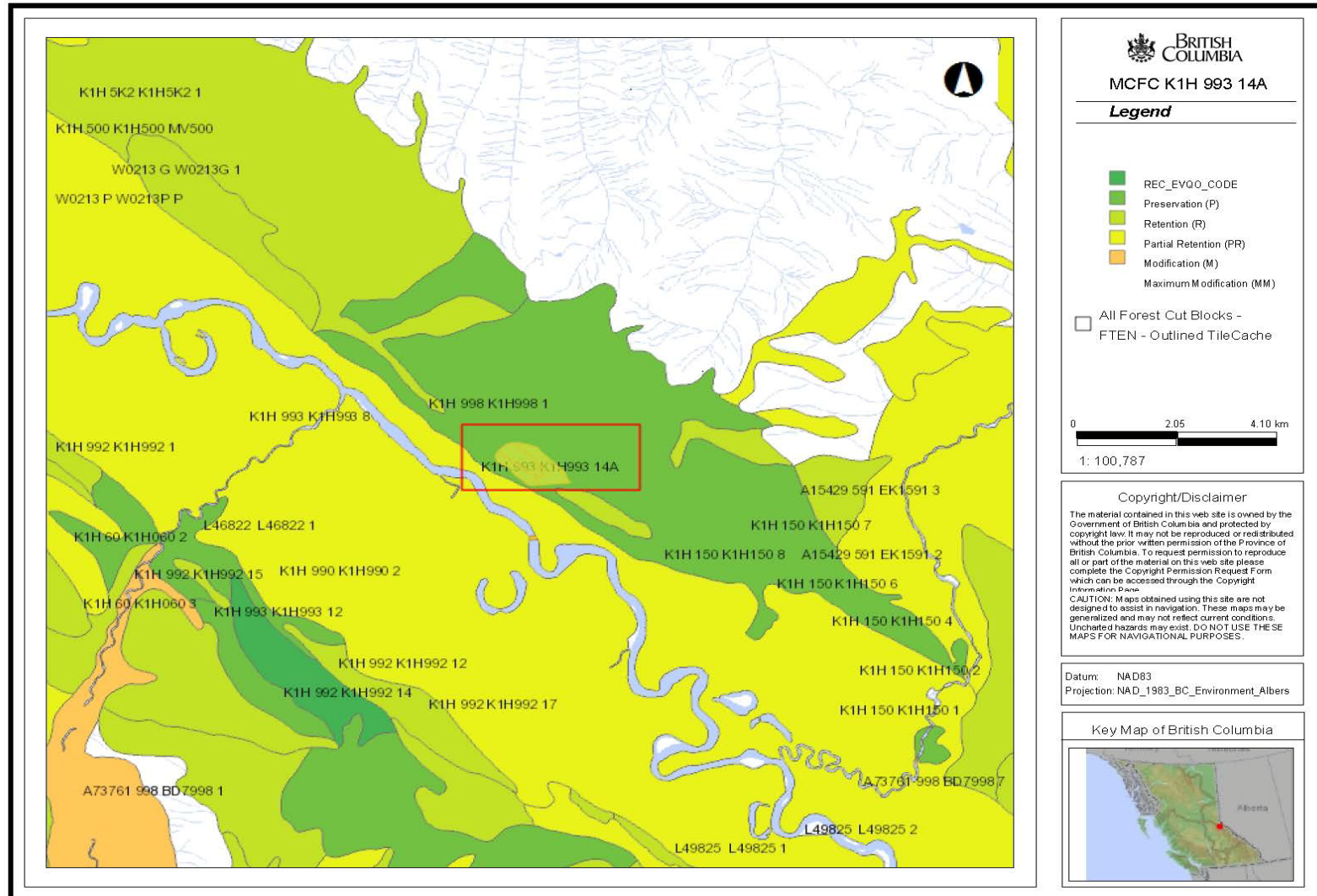
Revelstoke Community Forest Corporation EVQO Maps

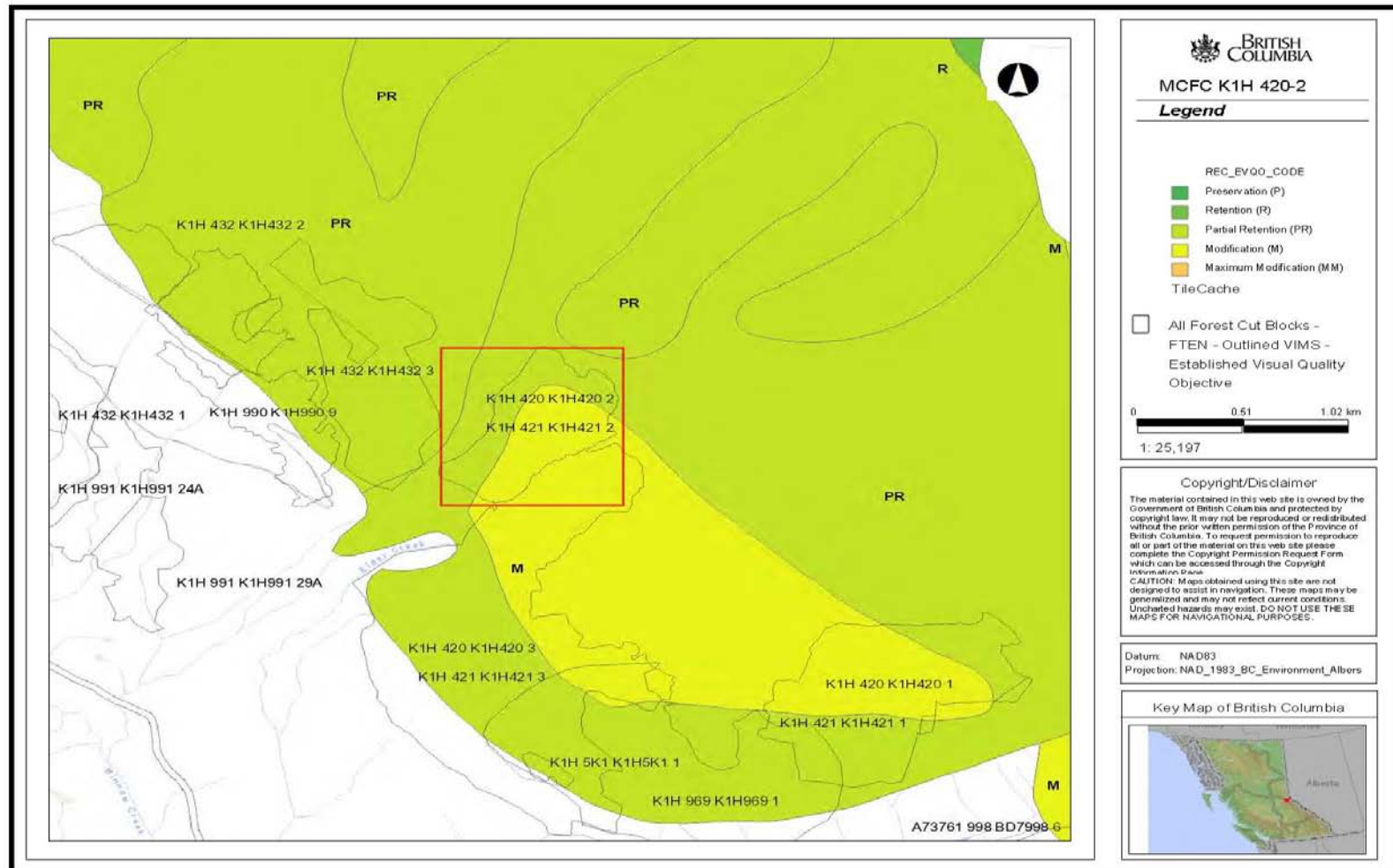


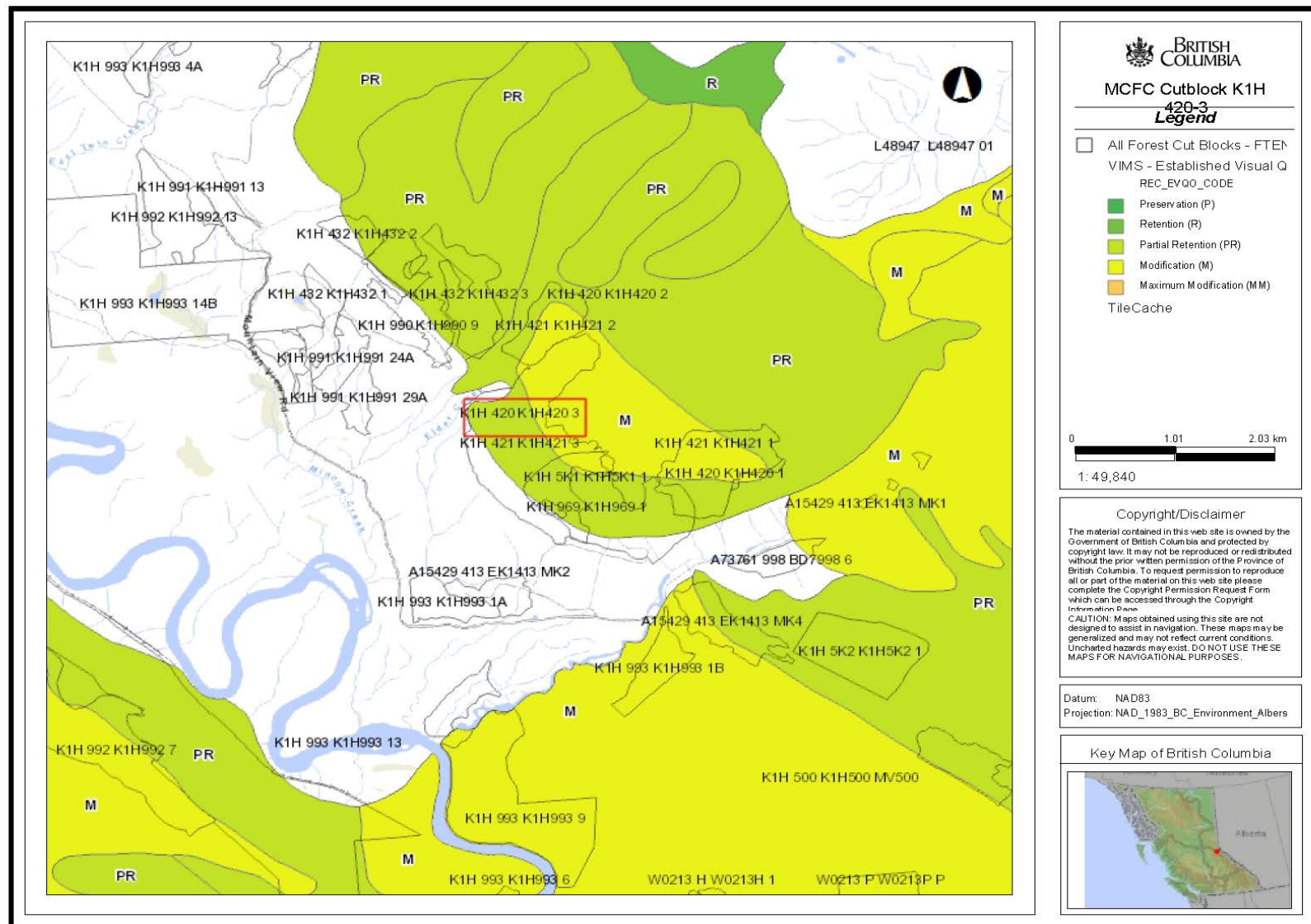




McBride Community Forest Corporation Cutblock EVQO Maps







APPENDIX B Effectiveness Evaluation Form and Field Notes



BRITISH COLUMBIA

Forest and Range
Evaluation Program

Visual Quality Effectiveness Evaluation
Resource Stewardship Monitoring

Page 1

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--------|--------|--------|--------------------------------|-------|-------|-------|--------------------------------|-------|-------|-------|------------------------------|-------|-------|-------|-----------------------------|-------|-------|-------|--------------------------|-------|-------|-------|---------------------|-------|-------|-------|--|
| 2.1.2 Site Information (Office) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Forest District _____ Licensee _____ Licence No. _____ CP No. _____ General Location _____ | Sample Code _____ Date of Field Evaluation M M / D D / Y Y Y Y Block _____ Results Opening ID _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.1.3 VLI Information (Office) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Date of Update M M / D D / Y Y Y Y VAC _____ Established VQO _____ Polygon No. _____ VSC _____ Date of Establishment M M / D D / Y Y Y Y EVC _____ Recommended VQC _____ Source Document _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.2.1 Viewpoint (Field) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Viewpoint No. _____ GPS Latitude _____ Viewing Direction _____ GPS Longitude _____ Elevation (m) _____ Viewing Distance _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.2.2 Photography (Field) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Roll No. _____ ID Nos. _____ Viewpoint Importance (low) 1 2 3 4 5 (high) _____ Field of View Width(degrees) _____ Digital Photo ID Nos _____ Viewpoint Description _____ Field of View Height(degrees) _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.2.3 Assess Basic VQC (Field) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Alterations meet with Basic VQC definition? Circle where in the range for that VQC. Notes: Basic VQC P R PR M MM → | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.2.4 Design Observations (Field) | 2.3.4 Partial Cut Alterations | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:30%;">Design Elements</td> <td style="width:10%; text-align: center;">G (-1)</td> <td style="width:10%; text-align: center;">M (0)</td> <td style="width:10%; text-align: center;">P (+1)</td> </tr> <tr> <td>Response to visual force lines</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> </tr> <tr> <td>Borrows from natural character</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> </tr> <tr> <td>Edge treatments incorporated</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> </tr> <tr> <td>Distance from the viewpoint</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> </tr> <tr> <td>Position on the landform</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> </tr> <tr> <td>Total Design</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> <td style="text-align: center;">_____</td> </tr> </table> | Design Elements | G (-1) | M (0) | P (+1) | Response to visual force lines | _____ | _____ | _____ | Borrows from natural character | _____ | _____ | _____ | Edge treatments incorporated | _____ | _____ | _____ | Distance from the viewpoint | _____ | _____ | _____ | Position on the landform | _____ | _____ | _____ | Total Design | _____ | _____ | _____ | Partial cutting % removed _____ Average tree height (m) _____ Clearcut equivalent _____% alteration as read from Table 4. Record this value on line 2.3.2 a. |
| Design Elements | G (-1) | M (0) | P (+1) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Response to visual force lines | _____ | _____ | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Borrows from natural character | _____ | _____ | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Edge treatments incorporated | _____ | _____ | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Distance from the viewpoint | _____ | _____ | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Position on the landform | _____ | _____ | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Design | _____ | _____ | _____ | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.3.2 Assess Initial VQC (Office) | 2.3.6 Determining EE Rating for the Landform by Comparing Basic VQC with Adjusted VQC (Office) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| a) % of landform altered by recent openings _____ b) % of landform with site disturbance outside openings _____ c) % non veg contribution of old openings _____ X = (a+b+c) = _____ % alteration Initial VQC _____ | 1 <input type="checkbox"/> Clearly not met (Neither method indicates VQO achievement, both are far from class boundary) 2 <input type="checkbox"/> Not met (Neither method indicates VQO achievement, but both are close to class boundary) 3 <input type="checkbox"/> Borderline (One method indicates VQO achievement, one does not) 4 <input type="checkbox"/> Met (Both methods indicate VQO achievement, but one or both are close to the high end "maximum % alteration limit.") 5 <input type="checkbox"/> Well met (Both methods indicate VQO achievement and are on the lower % alteration limit or mid-range for the class) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.3.3 Assess Adjusted VQC (Office) | 2.3.7 Allowance for Over-ride | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| d) Impact of roads, side cast, etc. (within openings) _____ <input type="checkbox"/> None <input type="checkbox"/> Subordinate <input type="checkbox"/> Significant <input type="checkbox"/> Dominant Adj. Factor _____ e) Tree retention _____ <input type="checkbox"/> Good <input type="checkbox"/> Moderate <input type="checkbox"/> Poor Adj. Factor _____ f) Design (enter total from 2.2.4 above) Adj. Factor _____ Total adjustment Y = (d+e+f) Adj. Total _____ Calculate adjusted % alteration X*(1 + 0.14*Y) = _____ Adjusted VQC P R PR M MM → Adjusted % alt _____ | Over-ride EE _____ Rationale for over-ride _____ _____ _____ _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Evaluated by _____ Signature _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| 2.2.2 Viewpoint Importance | | | | | | | | | | | |
|--|---|--|--|--|------|------|------|------|------|------|------|
| (1) glimpse view, less than 10 seconds (2) sustained side view (3) sustained focal view, travelling toward the alteration for more than one minute (4) viewpoint is at a rest stop, campsite, or other static short-term view location (5) viewpoint is the location of a community, commercial tourist-related enterprise, or other static long-term view location | | | | | | | | | | | |
| 2.2.3 Table 1 – Definitions of Visual Quality Classes | | | | | | | | | | | |
| Visual Quality (Class Symbol) | Basic Definition | | | | | | | | | | |
| Preservation (P) | "preservation" means an alteration of a forest landscape resulting from the presence of cutblocks or roads, such that when assessed from a viewpoint that is representative of significant public viewing opportunities, the alteration (a) is very small in scale, and (b) is designed to be indistinguishable from the pre-harvest landscape. | | | | | | | | | | |
| Retention (R) | "retention" means an alteration of a forest landscape resulting from the presence of cutblocks or roads, such that when assessed from a viewpoint that is representative of significant public viewing opportunities, the alteration (a) is difficult to see, (b) is small in scale, and (c) has a design that mimics natural occurrences. | | | | | | | | | | |
| Partial Retention (PR) | "partial retention" means an alteration of a forest landscape resulting from the presence of cutblocks or roads, such that, when assessed from a viewpoint that is representative of significant public viewing opportunities, the alteration (a) is easy to see, (b) is small to moderate in scale, and (c) has a design that appears natural and is not angular or geometric. | | | | | | | | | | |
| Modification (M) | "modification" means an alteration of a forest landscape resulting from the presence of cutblocks or roads, such that, when assessed from a viewpoint that is representative of significant public viewing opportunities, the alteration is very easy to see and is either (a) large in scale with a design that is natural in its appearance, or (b) small to moderate in scale but with a design that has some angular characteristics. | | | | | | | | | | |
| Maximum Modification (MM) | "maximum modification" means an alteration of a forest landscape resulting from the presence of cutblocks or roads, such that, when assessed from a viewpoint that is representative of significant public viewing opportunities, the alteration is extremely easy to see and one or both of the following apply (a) the alteration is very large in scale, or (b) the alteration is angular and geometric. | | | | | | | | | | |
| 2.2.4 Table 2 – Design Observations (Field) | | | 2.3.2 Table 3 – Percent Alteration Ranges for Visual Quality Classes | | | | | | | | |
| Design Elements | Good (-1) | Moderate (0) | Poor (+1) | Alteration percent of landform in perspective view | | | | | | | |
| Visual Quality Class | | | | | | | | | | | |
| 1. Response to Major Lines of Force | Strong | Force Lines Not Apparent | Weak or No Response | P – Preservation 0 | | | | | | | |
| 2. Borrowing from Natural Character | Fully | Partially | Isolated or Not at All | R – Retention 0 – 1.5 | | | | | | | |
| 3. Incorporating Edge Treatment | Feathering and Irregular Boundaries Present | Either Feathering or Irregular Boundaries Present | Neither Aspect Present | PR – Partial Retention 1.6 – 7.0 | | | | | | | |
| 4. Distance between Alteration and Viewpoint | > 8 km | > 1 and < 8 km | < 1 km | M – Modification 7.1 – 18.0 | | | | | | | |
| 5. Position of Opening on the Landform | Lower Down & To One Side | Small Opening near Center | High on the Landscape or Large near Center | MM – Maximum Modification 18.1 – 30.0 | | | | | | | |
| 2.3.4 Table 4 – Visual Equivalent to Clearcut Percent Alteration Factors for Partial Cut Alterations | | | | 2.3.3 Adjustment Factors | | | | | | | |
| Volume removed (%) | Mean height (m) of residual trees | | | | | | | | | | |
| | | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| | 10 | 0.1 | 0.2 | 0.4 | 0.6 | 0.7 | 0.8 | 1.0 | 1.2 | 1.8 | 2.2 |
| | 20 | 0.3 | 0.4 | 0.7 | 1.0 | 1.2 | 1.4 | 1.8 | 2.2 | 3.3 | 4.4 |
| | 30 | 0.7 | 0.9 | 1.2 | 1.4 | 2.0 | 2.4 | 3.3 | 4.2 | 5.0 | 6.5 |
| | 40 | 1.2 | 1.4 | 2.0 | 2.4 | 3.4 | 4.3 | 5.2 | 6.1 | 6.7 | 7.8 |
| | 50 | 1.8 | 2.3 | 3.4 | 4.3 | 5.2 | 6.2 | 6.8 | 7.7 | 8.4 | 9.0 |
| | 60 | 3.5 | 4.3 | 5.0 | 6.2 | 6.7 | 7.7 | 8.4 | 9.2 | 10.0 | 11.5 |
| | 70 | 4.9 | 5.5 | 6.5 | 7.7 | 8.4 | 9.2 | 10.0 | 11.4 | 12.7 | 14.0 |
| | 80 | 6.0 | 6.6 | 8.3 | 9.2 | 10.0 | 11.0 | 12.0 | 13.2 | 14.4 | 15.5 |
| 90 | 8.0 | 9.0 | 10.0 | 11.0 | 12.0 | 13.0 | 14.0 | 15.0 | 16.0 | 17.0 | |
| Legend: Retention Partial Retention Modification | | | | | | | | | | | |
| c) Roads: | | 0 = None 1 = Subordinate 2 = Significant 3 = Dominant | | | | | | | | | |
| d) Tree Retention: | | -2 = Good > 22% -1 = Moderate 15 - 22% 0 = Poor < 15% | | | | | | | | | |
| e) Design: | | Record Total from 2.2.4 | | | | | | | | | |

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