



# Multiple Resource Value Assessment (MRVA)

Lillooet Timber Supply Area – Cascades Natural Resource District

December 2013

## FOREWORD

Forest management in British Columbia is governed by a hierarchy of legislation, plans and resource management objectives. For example, federal and provincial acts and regulations, Land Use and forest stewardship plans, and protected areas and reserves collectively contribute to achieving balanced environmental, social and economic objectives. Sustainable forest management is key to achieving this balance and a central component of forest management certification programs. The purpose of Multiple Resource Value Assessment (MRVA) reports is to provide resource professionals and decision makers with information about the environmental component of this 'balance' so that they can assess the consistency of actual outcomes with their expectations.

The *Forest and Range Practices Act (FRPA)* lists 11 resource values essential to sustainable forest management in the province; biodiversity, cultural heritage, fish/riparian and watershed, forage and associated plant communities, recreation, resource features, soils, timber, visual quality, water, and wildlife. The MRVA report is a summary of the available field-based assessments of the conditions of these values. Field assessments are generally conducted on or near recently harvested cut blocks and therefore are only evaluating the impact of industrial activity and not the condition of the value overall (e.g., they don't take into account protected areas and reserves). Most of the information is focused on the ecological state of the values and provides useful information to resource managers and professionals on the outcomes of their plans and practices. This information is also valuable for communicating resource management outcomes to stakeholders, First Nations and the public, and as a foundation for refining government's expectations for sustainable resource management in specific areas of the province.

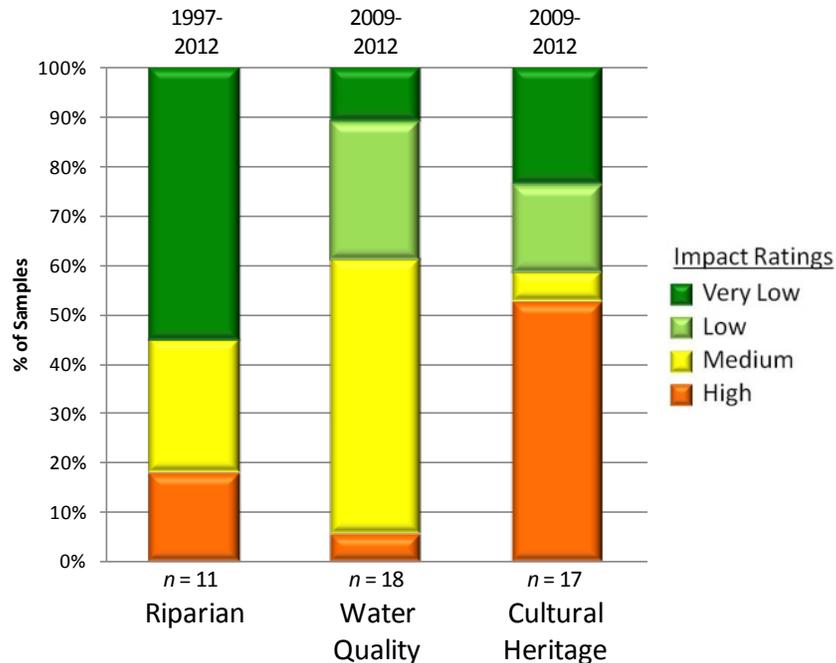
I encourage readers to review the full report and direct any questions or comments to the appropriate district office.

Tom Ethier  
Assistant Deputy Minister  
Resource Stewardship Division  
Ministry of Forest, Lands and Natural Resource Operations

## MULTIPLE RESOURCE VALUE ASSESSMENTS—IN BRIEF

Multiple resource value assessments show the results of stand and landscape-level monitoring carried out under the Forest and Range Evaluation Program (FREP). This report summarizes results for riparian, water quality (sediment), and cultural heritage monitoring conducted in the Lillooet Timber Supply Area and includes a district manager commentary of key strengths and weaknesses. Through MRVA reports, decision makers communicate expectations for sustainable resource management of public resources and identify opportunities for continued improvement.

**Figure 1: Lillooet Timber Supply Area site-level resource development impact ratings by resource value with trend (Riparian trends by harvest year/era. Water quality and cultural heritage trends by evaluation year.)**



### Important Context for Understanding this Assessment

The extraction and development of natural resources, along with natural factors (e.g., insects, wind, floods), influence and impact ecological condition. The goal of effectiveness evaluations is to assess these impacts on the state of public natural resource values (status, trends, and causal factors); such evaluations *do not assess compliance with legal requirements*. These evaluations help resource managers:

- assess whether the impacts of resource development result in sustainable resource management
- provide transparency and accountability for the management of public resources
- support the decision-making balance between environmental, social, and economic factors
- inform the ongoing improvement of resource management practices, policies, and legislation.

The resource development impact ratings contained in this report are based on assessments conducted within the areas where resource extraction takes place and do not reflect the ecological contributions of parks, protected areas, or other conservancy areas.

Although this report focuses on forestry-related activities, FREP monitoring protocols have also been applied to other resource sector activities, including mining (roads) and linear developments (hydro and pipelines). Procedures are being adapted to expand monitoring into these resource sectors over time.

## INTRODUCTION

The development of the *Forest and Range Practices Act (FRPA)* had several key objectives, including:

- simplifying the forest management legal framework
- reducing operational costs to both industry and government
- allowing “freedom to manage”
- maintaining the high environmental standards of the *Forest Practices Code of British Columbia Act (FPC)*.

As part of the results-based *FRPA* framework, the provincial government committed to conducting effectiveness evaluations and publically reporting the monitoring results. The science-based information provided by these evaluations will be used to determine whether *FRPA* is achieving the government’s objectives of maintaining high environmental standards and ensuring sustainable management of public resources. If those objectives are not being met the monitoring results will be used to help inform the necessary adjustments to practices, policies, and legislation. Government is delivering its effectiveness evaluation commitment through the Forest and Range Evaluation Program (FREP; for details, see <http://www.for.gov.bc.ca/hfp/frep/>). The 11 *FRPA* resource values monitored under FREP include: biodiversity, cultural heritage, fish/ riparian & watershed, forage and associated plant communities, recreation, resource features, soils, timber, visual quality, water and wildlife.

Multiple Resource Value Assessments (MRVAs) reflect the results of stand- and landscape-level monitoring carried out under FREP. The program’s stand-level monitoring is generally conducted on forestry cutblocks, resource roads, or other areas of industrial activity. As such, these evaluations provide a stewardship assessment of resource development practices. Landscape-level monitoring of biodiversity, visual quality, and wildlife resource values is more broadly an assessment of the overall landscape. Reports on MRVAs are designed to inform decision making related to on-the-ground management practices, statutory decision-maker approvals, and data for the assessment of cumulative effects.

This report summarizes FREP monitoring results for the Lillooet Timber Supply Area. MRVA reports clarify resource stewardship expectations, and promote the open and transparent discussion needed to achieve short- and long-term sustainable resource management in British Columbia.

MRVA reports are intended for those interested in the status and trends of resource values at the timber supply area (TSA) or natural resource district scale, such as natural resource managers and professionals, government decision makers, and First Nations. These reports are also useful in communicating resource management outcomes to the public.

**Government managers and decision makers** are encouraged to consider this information when:

- discussing district or TSA-level resource stewardship with staff, licenced stakeholders, tenure holders and First Nations
- clarifying expectations for sustainable resource management of public land
- integrating social and economic considerations into balanced decision making
- reviewing and approving forest stewardship plans
- developing silviculture strategies for TSAs
- assessing Timber Supply Reviews and their supporting rationale
- informing decision making at multiple scales.

**Natural resource professionals** are encouraged to consider this information, along with other FREP information such as reports, extension notes, protocols, and monitoring data to:

- maintain current knowledge of the resources they manage
- inform professional recommendations and decisions, particularly when balancing environmental, social, and economic values
- enhance resource management, consultation, and treaty rights discussions between First Nations, government, and licensees.

Published FREP reports and extension notes contain detailed findings for each resource value. These documents are available on the FREP website at:

<http://www.for.gov.bc.ca/hfp/frep/publications/reports.htm>. Licensees can request data collected on their operating areas. FREP staff will assist licensees with the analysis of their data and the preparation of licensee-specific MRVA reports.

Although this MRVA report documents monitoring results at the district or TSA level, the MRVA concept is scalable. Reports for individual licensees, treaty settlement areas, or landscape units can be produced when sufficient monitoring data is available. Reports can also be prepared at the regional or provincial levels. This report provides site-level resource value assessments and trends through comparisons of cutblocks harvested before 2005 with those harvested in 2005 or later (where data is sufficient). FREP's site assessment monitoring results on each resource value are categorized by impact (very low, low, medium, or high). This classification reflects how well site-level practices achieve government's overall goal of sustainable resource management. Site-level practices that result in "very low" or "low" impact are consistent with sustainable management objectives. Practices resulting in "high" impact are seen as inconsistent with government's sustainability objectives. For a description of the MRVA methodology see Appendix 1.

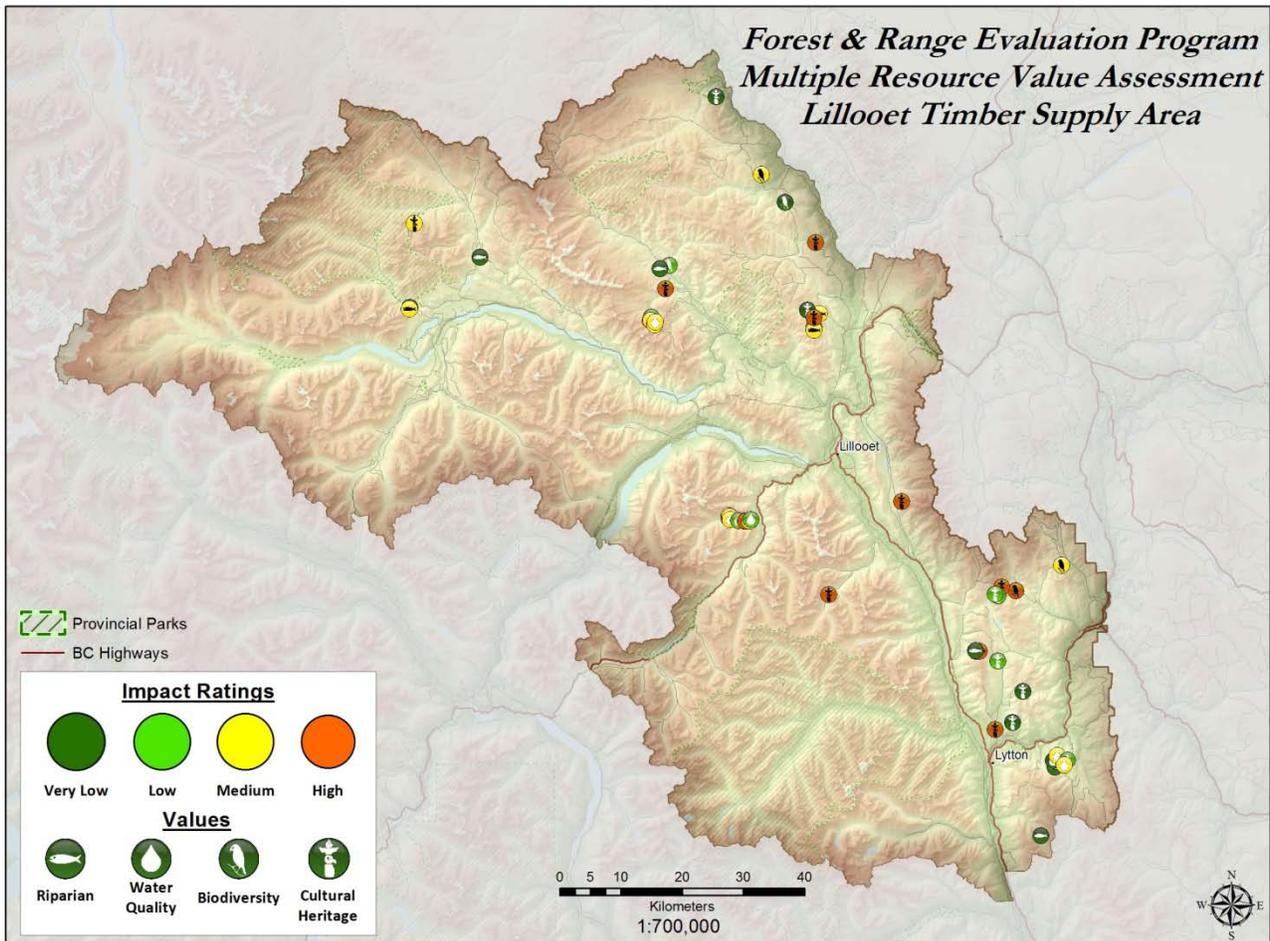
## LILLOOET TIMBER SUPPLY AREA – ENVIRONMENTAL AND STEWARDSHIP CONTEXT

This report covers the Lillooet Timber Supply Area, which covers half of the Cascades Resource District (figure 2). The Lillooet TSA covers approximately 1.125 million hectares in southwestern British Columbia, between the Coast Mountains and the Thompson-Okanagan Plateau. There are several provincial parks and protected areas located in the TSA including Stein Valley Nlaka'pamux Heritage Provincial Park and Spruce Lake Protected Area which support significant recreation activities. The varied landscapes and the lakes and streams in the Lillooet TSA support a wide variety of wildlife, bird and fish species, some of which are at risk with declining populations across the province; ten red-listed species (endangered or threatened), and 23 blue-listed species (species of concern) may be found in the TSA. Forestry is the main industry in the Lillooet TSA but other contributors to the regional economy include tourism, agriculture and mining. A large portion, an estimated one-half, of the TSA's residents are First Nations' members. St'át'imc and Nlaka'pamux First Nations communities reside within the TSA and some Tsilhqot'in and Secwepemc communities have interests in the TSA.

The Lillooet TSA has historically undercut the allowable annual cut (AAC). In recent years this has not changed. Historically mostly non-pine, and largely Douglas-fir has been harvested. This seems to be a result of economically challenged harvesting opportunities, only a veneer peeler plant in Lillooet and there are no sawmills in the community. There is a partitioned cut (AAC) in the Lillooet TSA limiting the amount of non-pine to around 400 000 m<sup>3</sup>. Recently pine harvest has been between 30 percent and more recently 10 percent (2012) of total harvest although pine comprises around 49 percent of the volume in the THLB. The mountain pine beetle (MPB) is forecast to kill 30 percent of the pine. Salvaging a significant amount of this MPB killed volume is unlikely and may result in future AAC reductions and/or a continued partition.

The Lillooet TSA has many significant values other than timber, such as Species at Risk, First Nations values, and recreation. Types of Cultural Heritage Resources found during FREP assessments include: culturally modified trees, cultural trails, animal dens, cultural depressions (house pit and cache pit), trap lines, and lithic scatter.

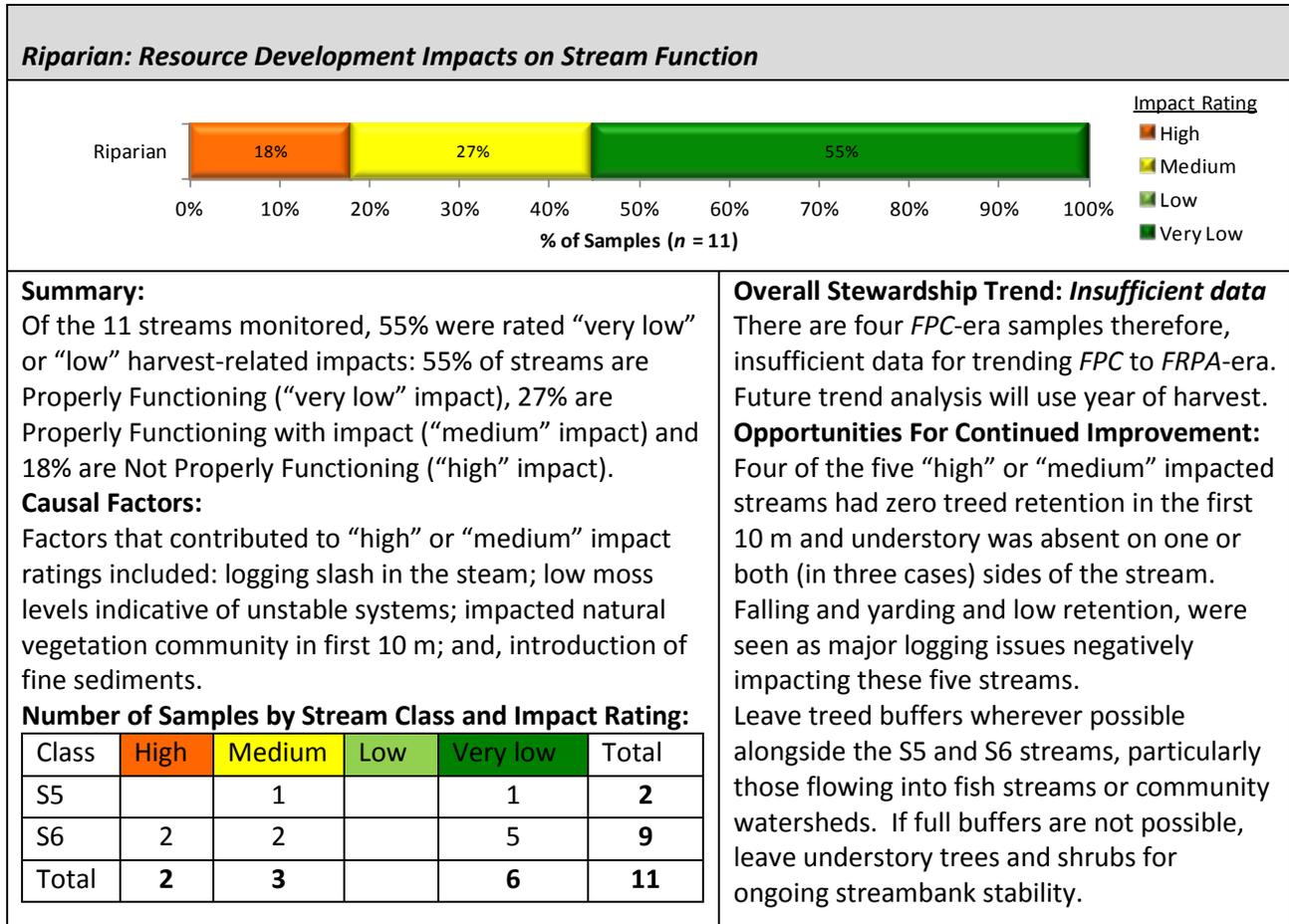
Figure 2: Lillooet Timber Supply Area, showing FREP sample locations and results (see <http://www.for.gov.bc.ca/hfp/frep/publications/mrva.htm> for a high-resolution version of this map).



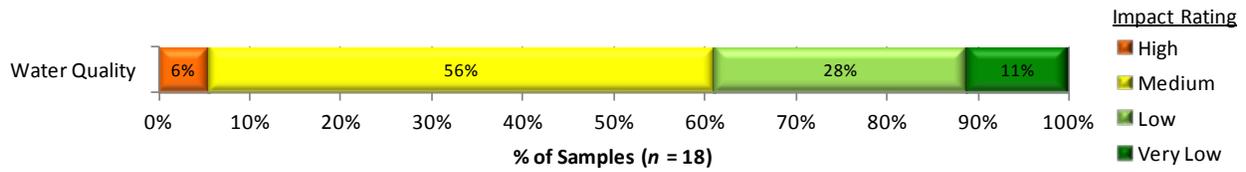
## KEY RESULTS BY RESOURCE VALUE AND OPPORTUNITIES FOR CONTINUED IMPROVEMENT

Table 1 shows the resource values assessed for the Lillooet Timber Supply Area, and includes a summary of key findings, causal factors, trends, and opportunities for continued improvement. Data are presented for *FPC*-era samples at sites harvested before 2005 and *FRPA*-era samples at sites harvested in 2005 or later. This approximates the *Forest and Range Practices Act* (*FRPA*) era, and allows for a comparison between earlier and later stewardship practices. The impact rating indicates the effect of resource development on the resource value, from “very low” to “high” impact.

**Table 1: Resource development impact rating, key findings, and opportunities for improvement by resource value for the Lillooet Timber Supply Area.**



**Water Quality (fine sediment): Resource Development Impacts on Water Quality**



**Summary:**

Of the 18 road segments assessed, 39% were rated as “very low” or “low” road-related impact. Site assessments show the range for potential sediment generation as 11% “very low” (“very low” impact), 28% “low” (“low” impact), 56% “moderate” (“medium” impact), 6% “high” and 0% “very high” (“high” impact).

**Causal Factors:**

See opportunities for improvement for “high” or “medium” impacted road segments. Some opportunities will apply to ongoing maintenance issues, while others mainly apply to new road construction.

**Overall Stewardship Trend: *Insufficient data***

Trending for water quality is done based on the evaluation year, assessing the impact of ongoing traffic and maintenance on the roads.

**Opportunities For Improvement:**

Though 18 road segments have been sampled, these originated from only three cutblocks. On these three road networks, the suggestions for improvement are increase the number of strategically located culverts, use good quality materials and crown roads, and avoid road use when wet or thawing.

**Stand-level Biodiversity: Resource Development Impacts on Stand-Level Biodiversity**

**Summary:**

Of 8 cutblocks, 4 were rated as “very low” or “low” harvest-related impact. Considering total retention, retention quality, and coarse woody debris quantity and quality, 1 site is rated as “very low” impact on biodiversity, 3 as “low,” 3 as “medium,” and 1 as “high.” There are three additional sampled cutblocks that could not be ranked due to insufficient baseline, though other indicators are discussed.

**Causal Factors:**

Average percent retention for all 11 cutblocks is 18.5%. Density of big diameter trees for the site is similar or higher than expected compared to baseline. The number of live tree species is similar to what is expected from baseline.

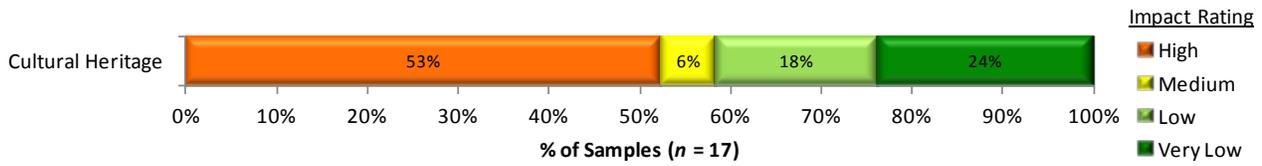
**Overall Stewardship Trend: *Insufficient data***

Overall, a neutral trend is evident, although there are fewer “high” impact to biodiversity cutblocks in the *FRPA*-era due largely to fewer cutblock with less than 3.5% retention.

**Opportunities For Continued Improvement:**

Continue leaving big trees for the site. Leave higher densities of big coarse woody debris pieces ( $\geq 20$  cm diameter and  $\geq 10$  m).

**Cultural Heritage: Resource Development Impacts on Cultural Heritage Resources (CHR)**



**Summary:**  
 Of the 17 cutblocks assessed, 42% were rated “very low” or “low” impact on cultural heritage resources. Overall, 22% of blocks were considered well to very well managed, 24% moderately and 53% poorly or very poorly managed. At the feature level, 48% showed no evidence of harvest-related damage while 52% showed evidence of damage. 42% of damaged features showed irreversible damage and (or) were rendered unsuitable for continued use.

**Causal Factors:**  
 Primary causes of damage were removal of features and windthrow.

**Overall Stewardship Trend: *Insufficient data***  
 No data for FPC cutblocks to allow for trending. Future trend analysis will use year of harvest.

**Opportunities For Improvement:**  
 Greater consideration of cultural heritage resource values in the planning phase (e.g., discussions with First Nations to understand their perspectives, understand existing CHR information and pre-identify and describe on-site CHR values for site plans and logging plans). Communication of management actions (verbally and with maps) to operators before harvesting begins.

**Soils: Resource Development Impacts on Soil Productivity and Hydrologic Function**

There are currently only two Soils samples in the Lillooet Timber Supply Area. Analysis will be completed in subsequent years when more samples are available.

**Landscape-level Biodiversity: Is the forested matrix at the landscape-level providing the range of habitat understood as necessary for maintaining ecosystem function and old and mature forest dependant species?**

This protocol is in development. The three primary landscape-level biodiversity indicators are: (1) site index by leading species (ecosystem representativeness); (2) percent of TSA by age class (young, mid-, mature, and old forest); and (3) percent interior habitat of old forest. Each indicator is categorized by percent in non-commercial land base, timber harvesting land base, and protected areas. Data for these indicators is derived from Hectares BC and other spatial databases.

## RESOURCE VALUE STEWARDSHIP RESULTS COMPARISON

Table 2 provides ratings of stewardship effectiveness at varying scales. Effectiveness is determined by the percentage of samples with a “very low” or “low” resource development impact rating. Appendix 2 shows stewardship effectiveness results by resource value for the North, South and Coast Areas and the province as a whole.

**Table 2: Stewardship effectiveness within the Thompson Okanagan Region as determined by resource development impact rating (ID = Insufficient Data; sample sizes in brackets).**

Resource Value	Effectiveness of Practices in Achieving Resource Stewardship Objectives: % Very low + Low Resource Development Impact Rating (sample size in brackets)				
	Thompson Okanagan Region Comparison				Thompson Okanagan Region <sup>a</sup>
	Lillooet TSA	Merritt TSA	Thompson Rivers District	Okanagan-Shuswap District	
Riparian – all data	<b>55%</b> (11)	<b>64%</b> (47)	<b>59%</b> (124)	<b>80%</b> (65)	<b>65%</b> (247)
FRPA-era data	ID (7)	55% (22)	63% (56)	78% (37)	66% (122)
FPC-era data	ID (4)	72% (25)	56% (68)	82% (28)	65% (125)
Water quality – all data	<b>39%</b> (18)	<b>41%</b> (84)	<b>65%</b> (346)	<b>67%</b> (230)	<b>62%</b> (678)
2010–2012 samples	39% (18)	42% (77)	70% (225)	62% (109)	62% (429)
2008–2009 samples	ID (0)	ID (7)	57% (121)	70% (121)	63% (249)
Cultural Heritage	<b>42%</b> (17)	<b>94%</b> (18)	<b>ID</b> (0)	<b>ID</b> (0)	<b>69%</b> (35)

<sup>a</sup> Includes the Kamloops, Cascades and Okanagan-Shuswap Natural Resource Districts

## DISTRICT MANAGER COMMENTARY<sup>1</sup>

I recognize that the evaluation criteria in this report are based upon stewardship objectives (e.g., sustainable resource management practices) and do not always correspond with the minimum standards set in legislation. A “high” impact rating does not necessarily mean a practice has not met legislation or the results/strategies in a Forest Stewardship Plan (FSP). Harvesting in the Lillooet TSA is well under the Annual Allowable Cut (AAC) and this has led to fewer samples being randomly selected from the district random list for the Lillooet TSA.

Appropriate riparian management is extremely important for good water quality. I encourage licensees to mitigate stream bank impacts as described in the report. I also acknowledge the difficulty, in some cases, to leave treed retention due to the steep and variable terrain that characterizes much of the Lillooet TSA’s forests.

Having a limited amount of samples for some of the values has reduced the ability to report out with confidence. One value with sufficient FREP monitoring samples was the cultural heritage value. Monitoring of this value is somewhat different than others in that it is our district policy to include First Nations and forest licensees in the monitoring field work. This has greatly increased the understanding of all parties and has helped with improving the management strategies around protecting cultural heritage values.

Nine out of 17 cultural heritage samples were randomly chosen from our district list further broken down by TSA. Since 2011 the FREP sampling has focused on those blocks harvested under the *FRPA*. Every year the sampling is done on blocks older than two years (two winters), and therefore, the results are not reflective of improved practices today. Half of the sites assessed appeared to be effectively conserved through the use of various management strategies. However, in the other half of cases, damage to or removal of cultural heritage sites or features appeared to be unjustified by operational factors and assessors noted that more effective management options were likely available. However, many of the samples (10) were harvested blocks from the former *FPC*-era, and many improvements have been made in managing cultural heritage resources since that time including improved preliminary field reconnaissance (PFR) standards, and use of GPS to better map cultural heritage features.

Within the Lillooet TSA, pre-harvest cultural heritage resource assessment information was available for all cutblocks. The PFR is used by proponents as a tool for cultural heritage resource management planning, and are completed by First Nations. Some proponents have included commitments in their FSPs to complete such assessments and some have entered into formal business arrangements with First Nations to complete this work.

Almost 50 percent of the cultural heritage samples were targeted blocks (8 out of 17), identified by First Nations either because of known features and/or targeting provided an opportunity for First Nations to investigate practices post-harvest where none existed before. New licensees working in the Lillooet TSA were also a focus of FREP cultural heritage monitoring and this helped us to get a sense of their baseline cultural heritage resource management and provided an opportunity to develop a relationship with the First Nations. I believe, this has led to an improvement in licensee’s understanding of the value of protecting and managing cultural heritage resources.

The FREP monitoring has increased awareness of practices which lead to low and high impact ranking of results. I believe the District’s communication of these practices with licensees has led to an improvement of practices. I expect licensees and First Nations to consider all the opportunities for improvement as identified in this report.

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<sup>1</sup> Commentary supplied by Cascades Natural Resource District Manager, Charles van Hemmen.

## APPENDIX 1. SUMMARY DESCRIPTION OF RESOURCE DEVELOPMENT IMPACT RATING CRITERIA

Table A1.1 shows the criteria used to determine the resource development impact ratings for each resource value. Detailed rating criteria, methodology, and definition of terms used are described in the companion document *Methodologies for Converting FREP Monitoring Results to MRVA Resource Development Impact Ratings* ([http://www.for.gov.bc.ca/ftp/HFP/external/!publish/frep/technical/FREP\\_Technical\\_Note\\_06.pdf](http://www.for.gov.bc.ca/ftp/HFP/external/!publish/frep/technical/FREP_Technical_Note_06.pdf)). The ratings of “very low”, “low”, “medium” and “high” are technical ratings based on best available science.

**Table A1.1: Criteria for determining resource development impact rating outcomes for each resource value.**

Resource Value	FREP Evaluation Question	Indicators	Resource Development Impact Rating Criteria	Very low	Low	Medium	High
Riparian	Are riparian forestry and range practices effective in maintaining the proper functioning of riparian areas?	Fifteen key questions (e.g., intact channel banks, fine sediments, riparian vegetation)	Number of “no” answers on assessment questions of channel and riparian conditions	0–2	3–4	5–6	> 6
Stand-level Biodiversity	Is stand-level retention providing the range of habitat and attributes understood as necessary for maintaining species dependant on wildlife trees and coarse woody debris?	Percent retention, retention quality from nine key attributes (e.g., big patches, density of large diameter trees), coarse woody debris volume, coarse woody debris quality from two key attributes (e.g., density of pieces $\geq 10$ m and 20 cm, and volume of large diameter pieces)	Cumulative score. A 60/40 weighting is used for tree retention versus coarse woody debris, recognizing the longer-term ecological value of standing retention.	> 70%	55–70%	40–55%	< 40%
Water Quality (sediment)	Are forest practices effective in protecting water quality?	Fine sediment potential	Fine sediment ( $m^3$ ) due to expected surface erosion or past mass wasting	< 0.1	< 1	1–5	> 5
Soils	Are forest practices preventing site disturbance that is detrimental to soil productivity and hydrologic function?	Amount of access, restoration of natural drainage patterns, road side work area soil disturbance, amount of mature forest and coarse woody debris and restoration of natural drainage patterns	Overall assessment of practices on cutblock to maintain soil productivity and hydrologic function	Well	Moderately		Poor
Cultural Heritage	Are cultural heritage resources being conserved and where necessary protected for First Nations cultural and traditional activities?	Evidence and extent of damage to features, operational limitations, management strategies and type and extent of features	Combined overall cutblock assessment results with consideration of individual feature assessment results	See methodology report			
Timber: Stand Development Monitoring	What is the overall health and productivity of managed 20-40 year stands?	Impacts of forest health factors on stand stocking (ratio of total and well spaced)	Forest health damaging agent (% level of incidence) and level of stocking (well spaced stems per hectare)	$\geq 1.7$	0.8–1.69	0.3–0.79	0–0.29
Landscape-level Biodiversity	Is the forested matrix at the landscape-level providing the range of habitat understood as necessary for maintaining ecosystem function and old and mature forest dependant species?	Ecosystem representativeness, age class and interior old	Overall ranking: within protected and non-protected areas	Ranking under development			
Visual Quality	How are we managing views in scenic areas and achieving visual quality objectives?	Visual evaluation of block, design of block, percent of landform altered, impact of roads, tree retention and view point importance	Basic visual quality class (determined using the VQC definitions) is compared with the Adjusted VQC (derived using percent alteration measurements and adjustment factors) to determine if VQO is achieved.	VQO achieved, and % alteration low or mid-range	VQO achieved, but % alteration for one or both close to alteration limit	Only one method indicates VQO achieved	Both methods indicate VQO not achieved

## APPENDIX 2. COMPARATIVE FREP RESULTS BY RESOURCE VALUE FOR OTHER AREAS

Table 2, in the main body of the document, describes overall ratings for the Lillooet Timber Supply Area as compared to adjacent TSAs and districts. Table A2.1 below describes the same results but by the North, South and Coast areas and the province as a whole. The three operational areas represent combined natural resource regions.

**Table A2.1: FREP monitoring results by resource value for the North, South, and Coast Areas and the province as a whole compared to the Lillooet Timber Supply Area.**

Resource Value	Effectiveness of Practices in Achieving Resource Stewardship Objectives: % Very low + low resource development impact rating (sample size in brackets)				
	Lillooet TSA	Forests, Lands and Natural Resource Operations Areas			Province
		North	South	Coast	
Riparian – all data	<b>55%</b> (11)	<b>71%</b> (654)	<b>69%</b> (678)	<b>58%</b> (451)	<b>67%</b> (1783)
FRPA-era data	ID (7)	71% (257)	68% (277)	62% (198)	67% (732)
FPC-era data	ID (4)	71% (394)	70% (401)	55% (253)	67% (1048)
Water quality – all data	<b>39%</b> (18)	<b>66%</b> (992)	<b>70%</b> (1515)	<b>76%</b> (1526)	<b>71%</b> (4033)
2010–2012 samples	39% (18)	67% (505)	70% (823)	79% (1021)	73%(2349)
2008–2009 samples	ID (0)	64% (487)	70% (692)	70% (505)	68% (1684)
Cultural Heritage	<b>42%</b> (17)	<b>76%</b> (96)	<b>67%</b> (36)	<b>53%</b> (15)	<b>72%</b> (147)