



Multiple Resource Value Assessment (MRVA)

Former Chilcotin Forest District
Williams Lake Timber Supply Area

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 the Multiple Resource Value Assessment (MRVA) report 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.

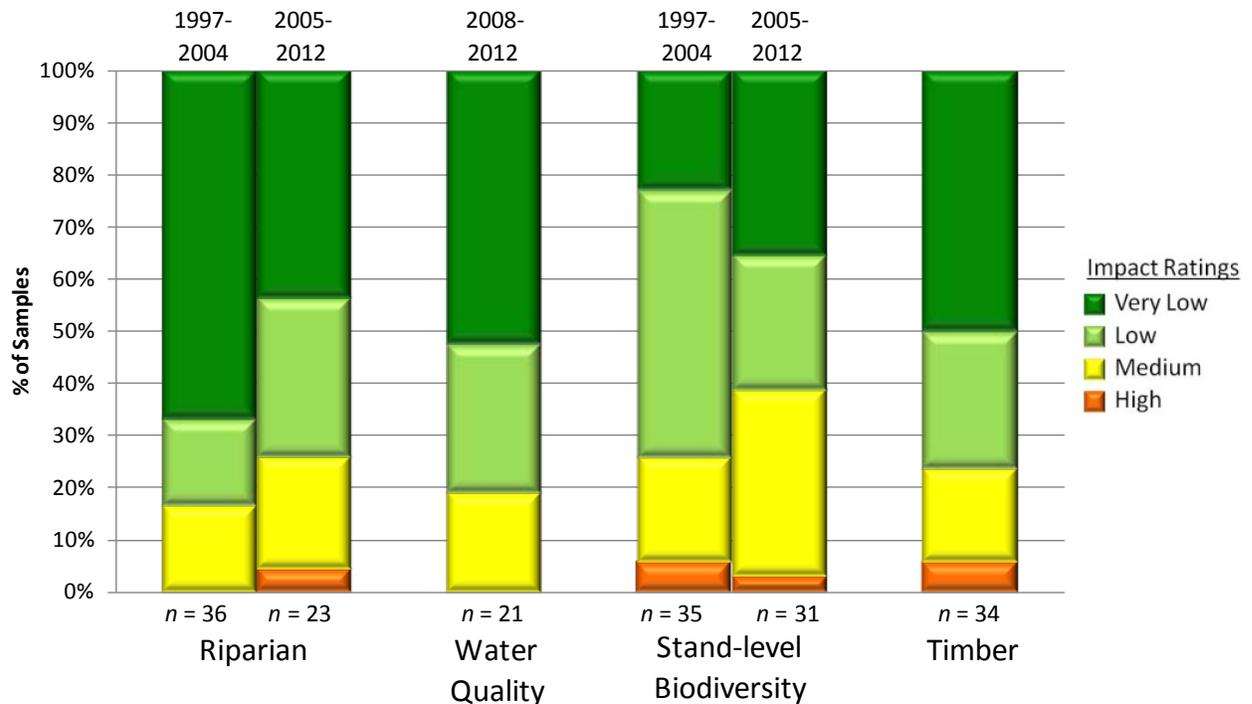
A handwritten signature in black ink, appearing to read 'Tom Ethier', is written in a cursive style.

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 document the results of stand and landscape-level monitoring carried out under the Forest and Range Evaluation Program (FREP). This report summarizes results for riparian, biodiversity (stand level), water quality (sediment), and timber (stand development) monitoring conducted in the former Chilcotin Forest District 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: Former Chilcotin Forest District site-level resource development impact rating by resource value with trend (Riparian and stand-level biodiversity trend by harvest year/era. Water quality trends by evaluation year. Timber samples are all post-free growing.)



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 former Chilcotin Forest District. 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, licensed 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.

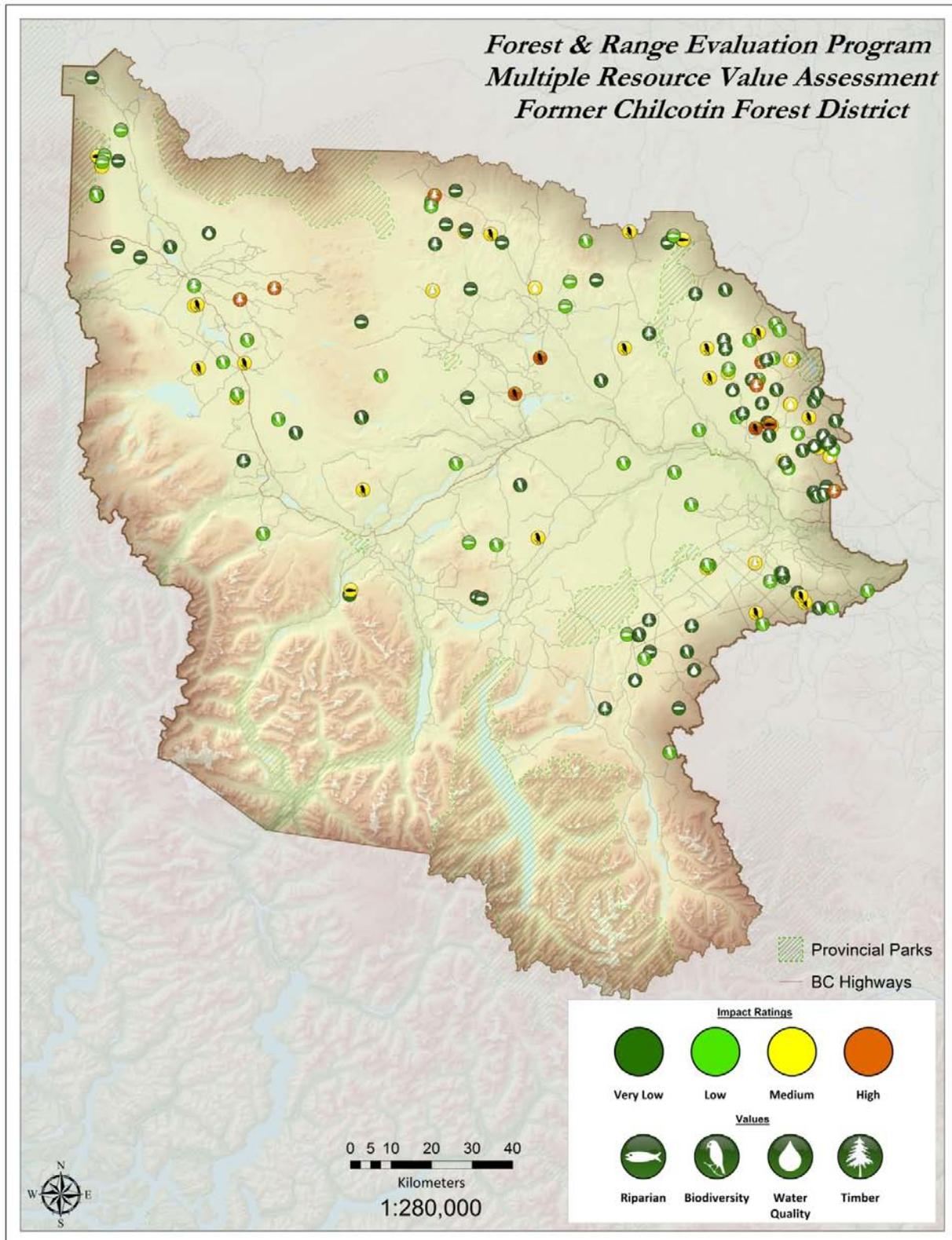
FORMER CHILCOTIN FOREST DISTRICT – ENVIRONMENTAL AND STEWARDSHIP CONTEXT

The Williams Lake TSA, situated in central British Columbia's interior plateau, is about 4.9 million hectares in size. The TSA is home to about 25 000 residents. The economy is primarily resource based, with forestry, mining, ranching and tourism being the major employers in the region

Lodgepole pine stands dominate the western plateau portion of the TSA, whereas mixed stands of lodgepole pine, Douglas-fir and spruce are predominate throughout the wetter portions of the TSA.

Virtually all stands with a pine component have been heavily impacted by the mountain pine beetle (MPB) epidemic. To date, approximately 59% of the commercial pine volume in the TSA has been killed by the MPB. It is estimated that young pine stands aged 31-55 will have a volume loss of about 20% due to the impacts of mountain pine beetle. Harvesting activities have been primarily focused on salvage in pine stands since the late 1990's. In addition to the requirements specified in the *FPC* and the *FRPA*, these harvesting activities must comply with land use objectives for caribou, seral stage distribution, old growth, habitat connectivity and wildlife tree retention.

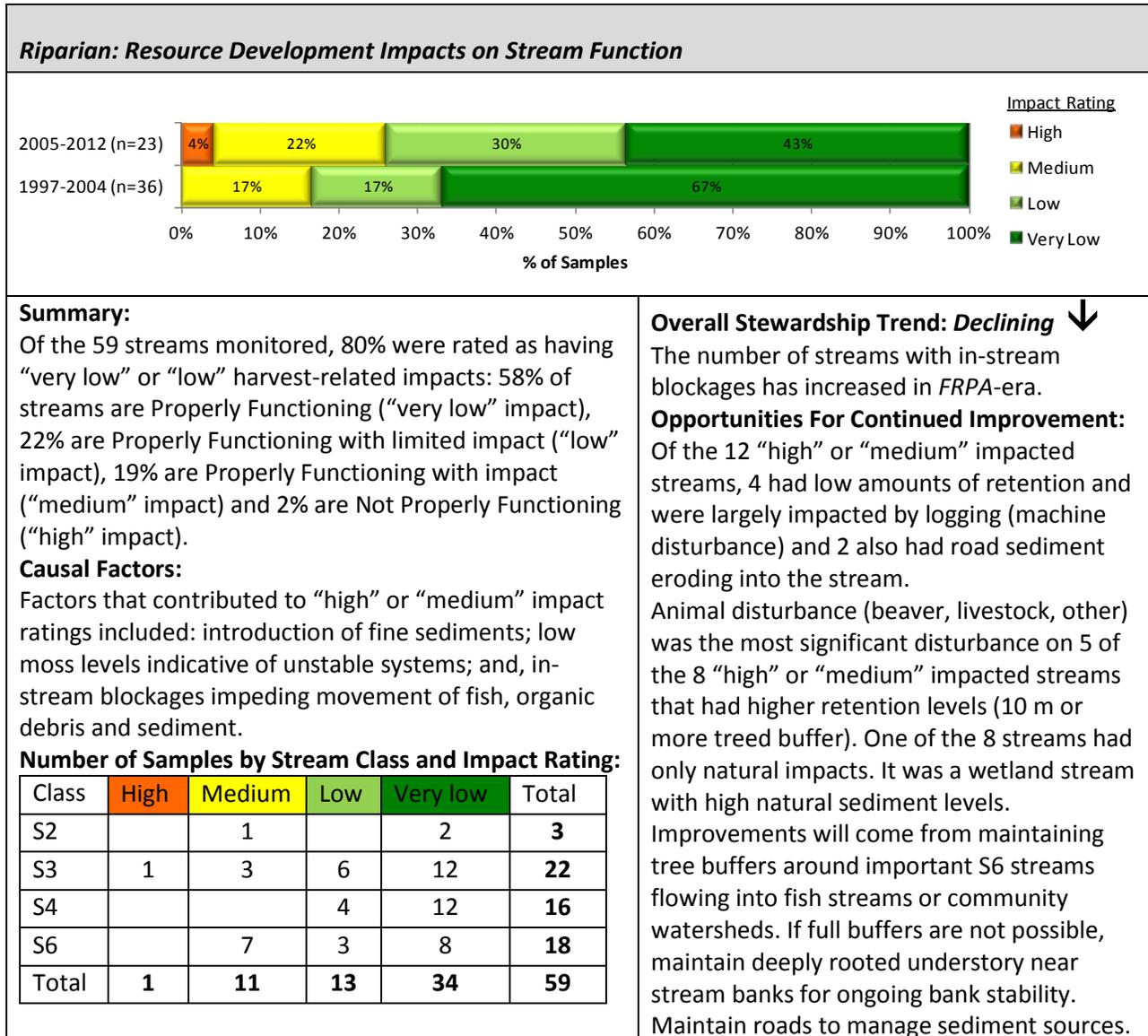
Figure 2: Former Chilcotin Forest District, showing FREP sample locations and results (see <http://www.for.gov.bc.ca/hfp/frep/publications/mrva.htm> for a high-resolution version of this map).



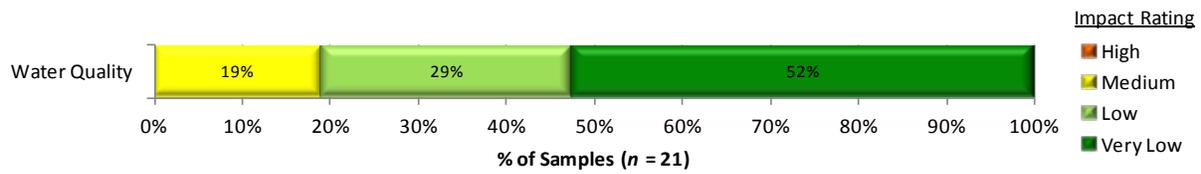
KEY RESULTS BY RESOURCE VALUE AND OPPORTUNITIES FOR CONTINUED IMPROVEMENT

Table 1 describes the resource values assessed for the former Chilcotin Forest District, 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, only approximating the *Forest and Range Practices Act* (FRPA) era, but allowing for a comparison between earlier and later stewardship practices. The impact rating indicates the effect of the 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 former Chilcotin Forest District.



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



Summary:

Of the 21 road segments assessed, 81% were rated as having “very low” or “low” road-related impact. Site assessments show the range for potential sediment generation as 52% “very low” (“very low” impact), 29% “low” (“low” impact), 19% moderate (“medium” impact), 0% “high” and 0% “very high” (“high” impact).

Causal Factors:

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

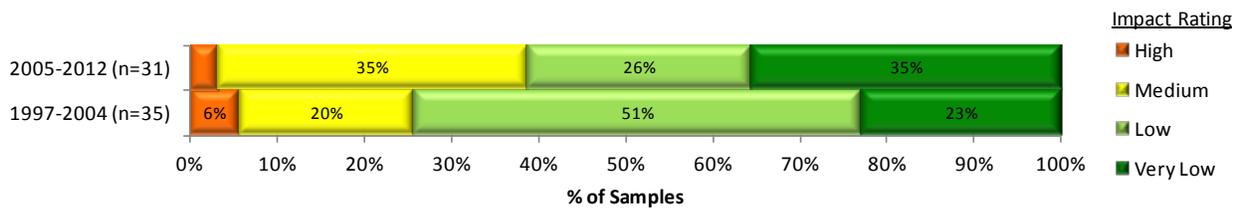
Overall Stewardship Trend: *Insufficient data*

Trending for water quality is based on survey years, to capture impact of road traffic and maintenance.

Opportunities For Improvement:

For the five road segments that fell into “high” or “medium” impact categories, increased numbers of strategically placed culverts would have improved three of them. Too long a gradient leading into stream was the problem for another.

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



Summary:

Of 66 cutblocks, 68% of sites were rated “very low” or “low” harvest-related impact. Considering total retention, retention quality, and coarse woody debris quantity and quality, 29% sites are rated as “very low” impact on biodiversity, 39% as “low,” 27% as “medium,” and 5% as “high.” Six additional cutblocks were sampled but could not be rated as they were in biogeoclimatic ecosystem classification subzones with insufficient baseline, though individual indicators were assessed.

Causal Factors:

76% of all blocks had more than 3.5% tree retention, dropping to 68% when considering only the FRPA-era blocks. Coarse woody debris volume increased from an average of 54 m³/ha in harvested areas of FPC-era to 74 m³/ha in harvested areas of FRPA-era. Coarse woody debris quality in terms of big pieces (volume from ≥20 cm pieces and, density of big pieces ≥20cm and ≥10 m) has not changed.

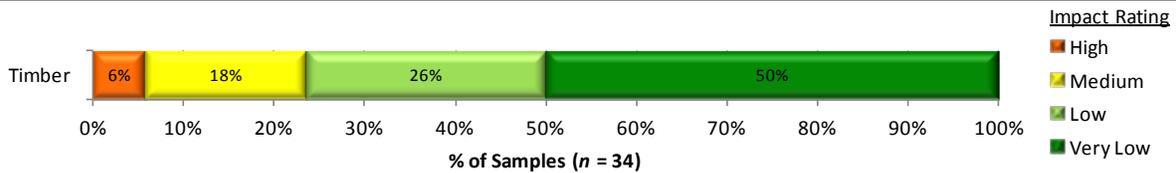
Overall Stewardship Trend: *Neutral*

Despite the increase of low retention blocks, retention increased from an average 13.5% in the FPC-era to 15.3% in the FRPA-era. This was driven by higher numbers of blocks with very high (>30%) retention. Retention quality and coarse woody debris quality did not change between eras, though coarse woody debris volume increased.

Opportunities For Continued Improvement:

Leave at least low levels of retention on every block and a range (e.g., 3% to 30%) over many blocks. Continue leaving the full range of tree species as found on pre-harvest blocks.

Timber Resource Value: Resource development impacts on the overall health and stocking of managed 20-40 year stands



Summary:

Of the 34 polygons sampled (2009, 2010, and 2011) the weighted average well-spaced density over the three biogeoclimatic ecosystem classification (BEC) zones (IDF, MS, SBPF) achieved 78% of target stocking standard (TSS).

Percent target stocking standard by BEC

BEC	IDF	MS	SBPS	Ave
TSS	72%	73%	80%	80%

76% of the polygons were rated “very low” and “low” impact to health and stocking, 18% “medium” and 6% “high”. Eleven of the 34 polygons were spaced (all but one were in the SBPS).

Overall, the SBPS appeared to contain the healthiest polygons. A draft Stand Development Monitoring TSA Data summary report was not available at the time of this report to give more detailed stand development monitoring data summaries. A simple average of total stems/ha at declaration (based on 24 polygons) was 7334 and 3645 stems/ha at the time of the stand development monitoring survey (based on 34 polygons). Well spaced stems/ha at declaration was 1234 and 956 stems/ha at the time of the stand development monitoring survey.

Causal Factors:

Opportunities For Continued Improvement:

Once the Williams Lake TSA-Stand Development Monitoring Data summary is available it will provide more detailed polygon information.

NOTE: Completing the Stand Development Monitoring Polygon Coversheets will provide a clearer picture why some stands have such low stocking

Soils: Resource Development Impacts on Soil Productivity and Hydrologic Function

There are currently only four Soils samples in the Chilcotin component of the Williams Lake TSA. 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?

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 results by resource value for the North, South and Coast Areas and the province as a whole.

Table 2: Stewardship effectiveness within the Cariboo 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)				
	Cariboo Region Comparison				Cariboo Region ^a
	Williams Lake TSA		Quesnel District	100 Mile House District	
	Former Chilcotin District	Former Central Cariboo District			
Riparian – all data	80% (59)	75% (69)	66% (67)	83% (54)	76% (249)
FRPA-era data	74%(23)	71% (35)	68% (22)	ID (13)	75% (93)
FPC-era data	83%(36)	79% (34)	64%(45)	78% (41)	76% (156)
Water quality – all data	81% (21)	80% (160)	82% (44)	82% (119)	81% (343)
2010–2012 samples	ID (9)	77% (91)	ID (18)	80% (54)	78% (171)
2008–2009 samples	ID (12)	84% (69)	ID(26)	83% (65)	84% (172)
Stand-level biodiversity –all data	68% (66)	81% (73)	52% (67)	75% (60)	69% (266)
FRPA-era data	61% (31)	94% (36)	76% (21)	87% (23)	80% (89)
FPC-era data	74% (35)	68% (37)	41% (46)	68% (37)	61% (95)
Timber (stand development monitoring)	76% (34)	62% (42)	83% (35)	74% (27)	73% (138)

^a 100 Mile House TSA, Quesnel TSA, and Williams Lake TSA (reported as former Central Cariboo and Chilcotin districts)

DISTRICT MANAGER COMMENTARY¹

Overall: FREP Monitoring in the Cariboo-Chilcotin has been ongoing since 2004, and indicates that impacts to forest values as a result of forest management practices have remained fairly consistent, with some variation, since implementation of the Forest and Range Practices Act (FRPA). However, there are indications that improvements in practices are required to reduce the impacts to resource values across the district. Specifically, riparian management and the potential impact to future timber supply should be examined to identify areas for improvement.

Riparian assessments show that impacts to streams under the *FRPA* have increased slightly in the former Chilcotin district. On the Chilcotin plateau, creeks are widely dispersed and are vulnerable to impacts of forest practices. High cattle use is one of the greatest impacts to riparian quality and can be mitigated by well planned management practices. I see the greatest opportunity for improvement to be improved design and maintenance of road crossings as well as maintaining treed buffers, especially along small creeks. Maintaining windfirm buffers will help riparian health and help ensure future large woody debris contribution to these creeks.

Water Quality: There is insufficient data in the Chilcotin to identify trends in water quality assessments. However, assessments indicate that there are opportunities to improve water quality through better culvert placement and improved approaches to crossings. Good design and maintenance of crossings, and management of cattle access is required to prevent the introduction of fine sediments into streams.

Stand-level Biodiversity: Monitoring in the Chilcotin indicates there has been a slight increase in stand level retention since the inception of the *Forest and Range Practices Act*. This is likely a result of increased retention on large blocks since the Chief Forester's guidance for large scale retention. However there has not been an increase to the retention quality or coarse woody debris quality in that time, likely due to the nature of the stands that have been harvested on the Chilcotin plateau as a result of the mountain pine beetle epidemic. I expect that in the future the quality of retention and coarse woody debris will improve as harvesting shifts from mountain pine beetle impacted pine to harvest of other species and stand types. Until then, I encourage licensees to endeavor to maximize the amount and quality of retention in the stands as available.

Timber Resource Value: Stand Development Monitoring (SDM) is of immediate concern in the Chilcotin. Surveys indicate that on average, stands are only achieving 78% of the target stocking in the Chilcotin. In the Interior Douglas-fir and Montane Spruce biogeoclimatic zones the stocking is 72% and 73% of the target stocking respectively.

These low stocking numbers indicate that in some areas there may be stocking density and forest health issues that may be jeopardizing the productivity of some managed stands. This is concerning from a future timber supply perspective and a forest health perspective. Specifically, western gall rust and elythroderma are the most common forest health factors affecting managed stands in the Chilcotin. Silviculturalists need to be diligent about choosing species and stocking densities that are most likely to be disease resistant and will achieve or exceed target stocking densities that are required for future timber objectives.

Stocking standards and establishment densities also need to be evaluated and appropriately adjusted to ensure the future productivity, diversity, resilience and health of our forests.

¹ Commentary supplied by Mike Pedersen district manager of Cariboo-Chilcotin Resource District

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 *FREP Technical Note #6: Methodologies for Converting FREP Monitoring Results to Multiple Resource Value Assessment (MRVA) Resource Development Impact Ratings* (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 describes overall ratings for the former Chilcotin Forest District as compared to adjacent districts or TSAs. The table 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 former Chilcotin Forest District.

Resource Value	Effectiveness of Practices in Achieving Resource Stewardship Objectives: % Very low + low resource development impact rating (sample size in brackets)				
	Chilcotin District (part of Williams Lake TSA)	Forests, Lands and Natural Resource Operations Areas			Province
		North	South	Coast	
Riparian – all data	80% (59)	71% (654)	69% (678)	58% (451)	67% (1783)
FRPA-era data	74%(23)	71% (257)	68% (277)	62% (198)	67% (732)
FPC-era data	83%(36)	71% (394)	70% (401)	55% (253)	67% (1048)
Water quality – all data	81% (21)	66% (992)	70% (1515)	76% (1526)	71% (4033)
2010–2012 samples	ID (9)	67% (505)	70% (823)	79% (1021)	73%(2349)
2008–2009 samples	ID (12)	64% (487)	70% (692)	70% (505)	68% (1684)
Stand-level biodiversity –all data	68% (66)	42% (655)	54% (780)	77% (455)	56% (1890)
FRPA-era data	61% (31)	49% (270)	61% (347)	84% (201)	63% (818)
FPC-era data	74% (35)	38% (385)	49% (433)	72% (254)	50% (1072)