



Multiple Resource Value Assessment (MRVA)

Prince George Resource District
(exclusive of the Robson Valley TSA)

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.

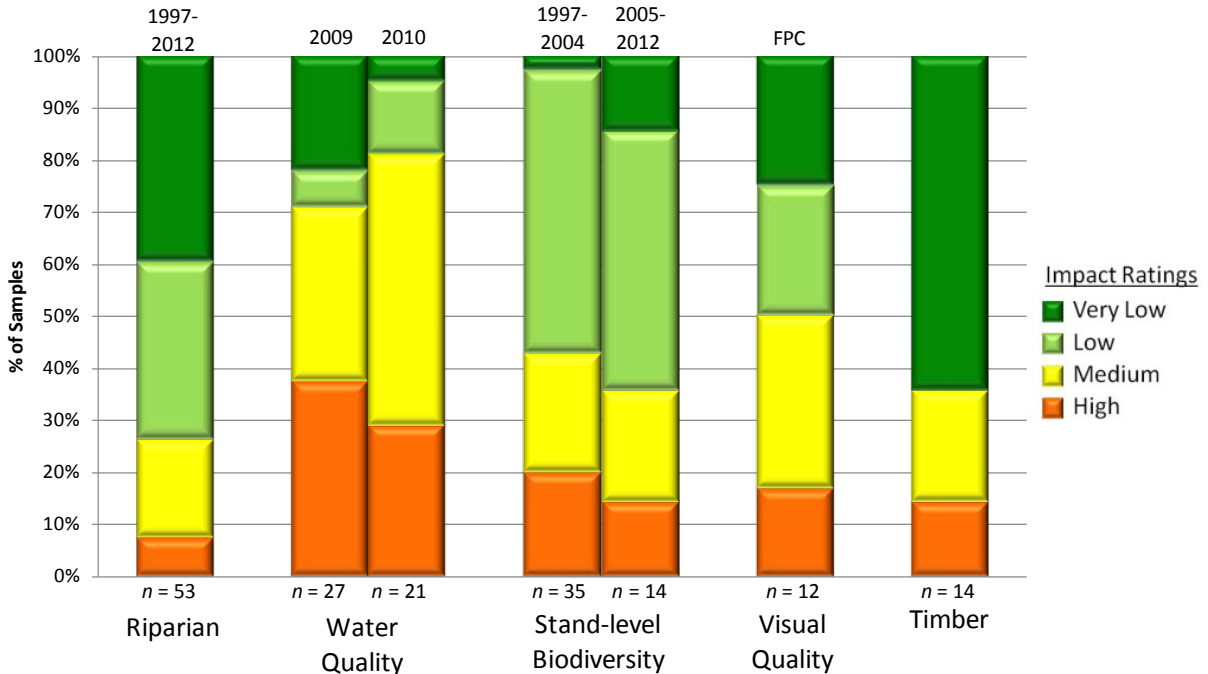
I encourage readers to review the full report and direct any questions or comments to the appropriate district office.

Tom Ethier
Assistant Deputy Minister
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Ministry of Forests, 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), biodiversity, visual quality and timber (stand development) monitoring conducted in the Prince George Natural Resource 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: Prince George Natural Resource District site-level resource development impact ratings by resource value with trend. (Riparian, stand-level biodiversity and visual quality 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 Prince George Natural Resource 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, 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.

PRINCE GEORGE NATURAL RESOURCE DISTRICT – ENVIRONMENTAL AND STEWARDSHIP CONTEXT

The Prince George Natural Resource District (figure 2) is located in north-central British Columbia. It covers a portion (43%) of the Prince George TSA and all of the Robson Valley TSA.

A separate MRVA report has been developed for the Robson Valley TSA.

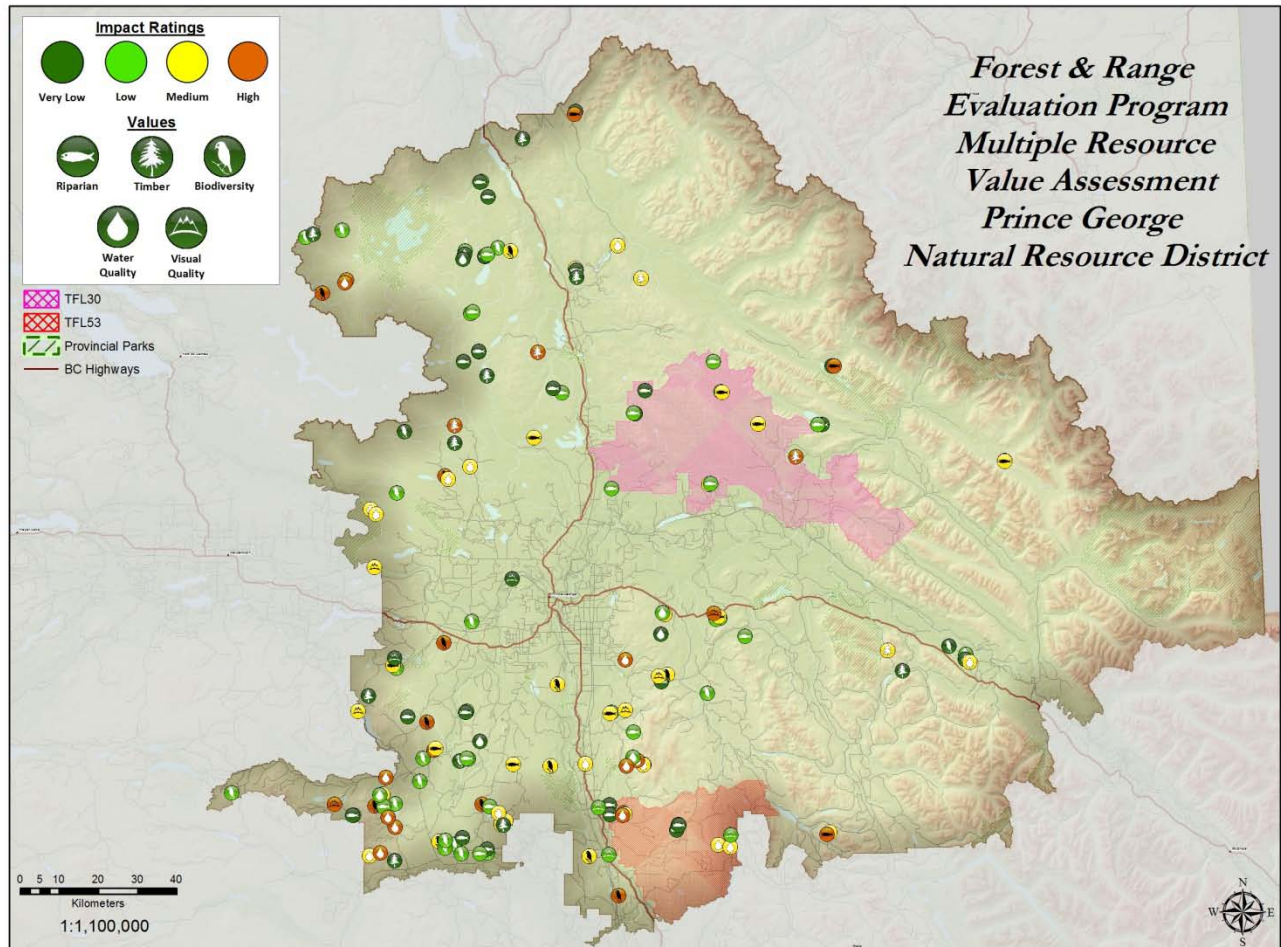
The Prince George Natural Resource District is about 3.4 million hectares in area. The City of Prince George is the largest community and is situated at the junction of Highways 16 and 97. Smaller communities include Hixon, Bear Lake, McLeod Lake, Willow River and Dome Creek. First Nations with communities in the District include the Lheidli T'enneh and McLeod Lake.

Landscapes within the District are diverse and include rugged alpine terrain and sub-alpine forests in the Cariboo and Rocky Mountains, ancient cedar-hemlock rainforests in the Rocky Mountain Trench, spruce forests in wetter ecosystems east of Prince George and dry pine-dominated forests on the interior plateau.

Approximately 80% of the commercial pine volume (49 million cubic metres) in the District was killed by the mountain pine beetle and harvesting activities have been focused on pine salvage for the past 10 years. The impacts to biodiversity, streams and other environmental values from large scale salvage logging continue to be assessed through monitoring and research. As well, the impacts of the mountain pine beetle epidemic on mid-term timber supply is a concern and constraints on timber supply from management objectives for non-timber values are being evaluated.



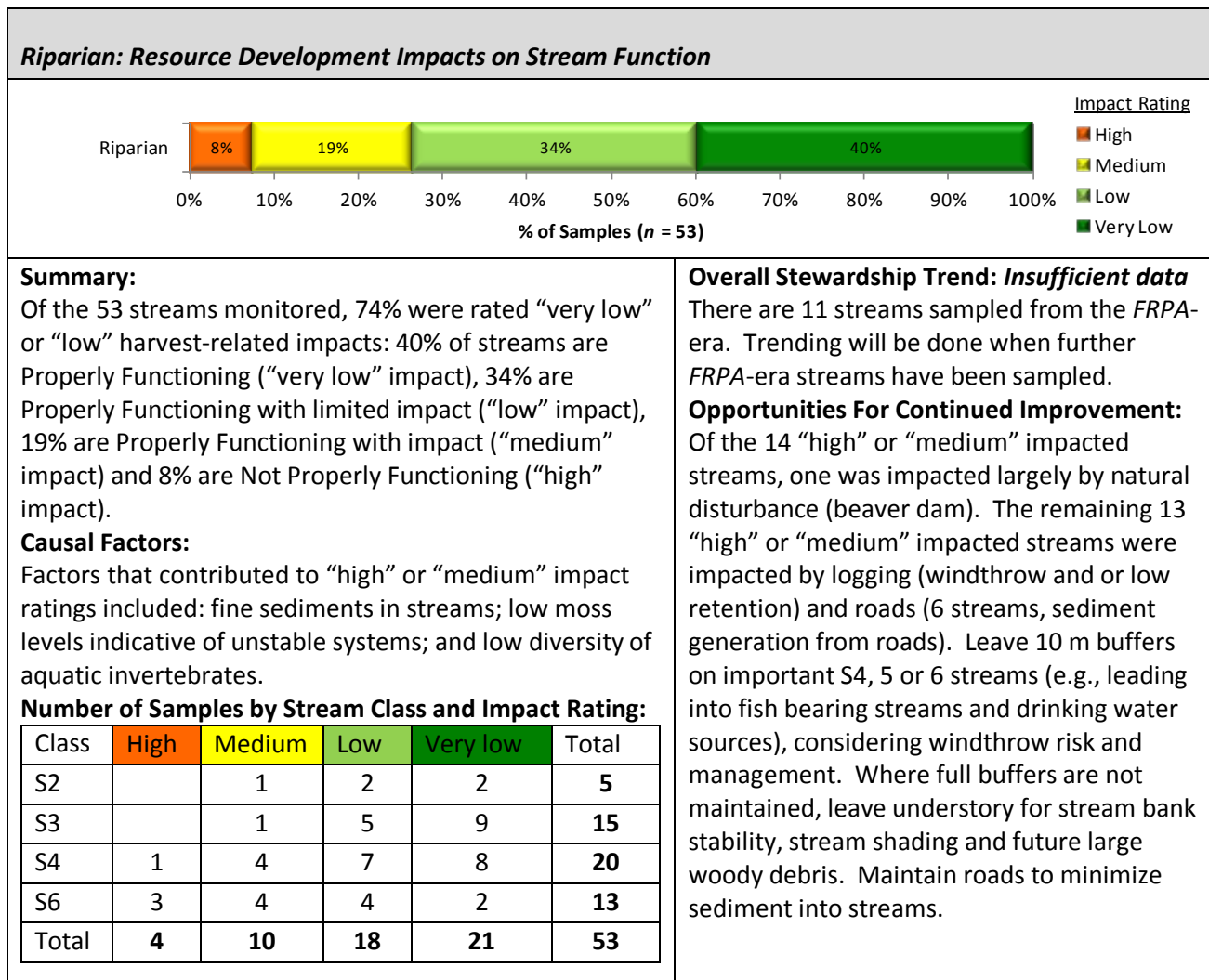
Figure 2: Prince George Natural Resource District, showing FREP sample locations and results (see <http://www.for.gov.bc.ca/hfp/frep/publications/mrva.htm> for a high-resolution version of this map).



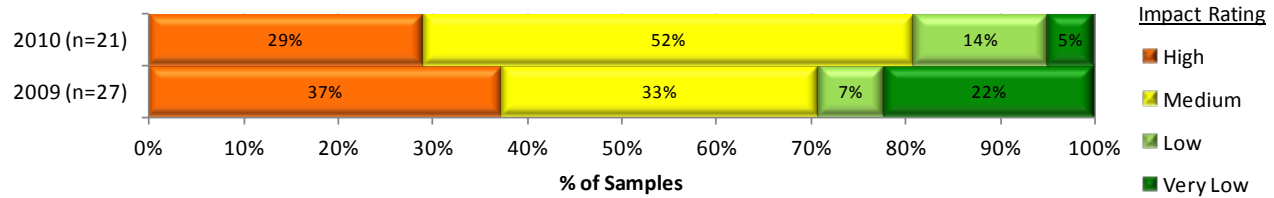
KEY RESULTS BY RESOURCE VALUE AND OPPORTUNITIES FOR CONTINUED IMPROVEMENT

Table 1 shows the resource values assessed for the Prince George Natural Resource 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. 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 Prince George Natural Resource District.



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



Summary:

Of the 48 road segments assessed in 2009 and 2010, 25% were rated as “very low” or “low” road-related impact. Site assessments show the range for potential sediment generation as 15% “very low” (“very low” impact), 10% “low” (“low” impact), 42% “moderate” (“medium” impact), 31% “high” and 2% “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.

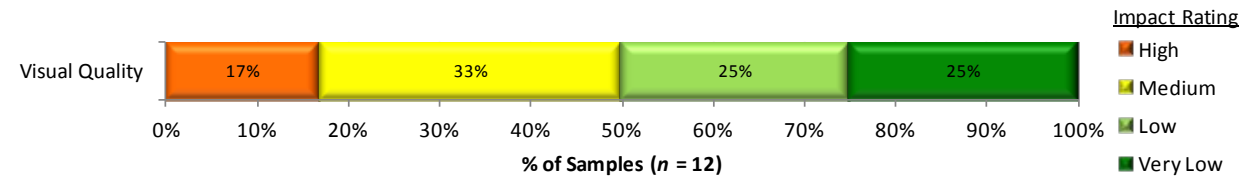
Overall Stewardship Trend: Neutral

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

Opportunities For Improvement:

There are low numbers of samples and sampling has not occurred since 2010. A better analysis will be possible with further and more current data. The most frequent suggested solutions to improve “high” or “medium” impacted road segments are: placing bridge decks higher than road, and, unknown, though 3 of these “unknown” cause or solutions segments had long road approaches to streams.

Visual Quality: Resource Development Impacts on Achievement of Visual Quality Objectives (VQO)



Summary:

Of the 12 landforms assessed (all FPC cutblocks), 50% were rated with “very low” or “low” harvest-related impacts on achieving the Visual Quality Objectives.

VQOs were “well met” (“very low” impact) on 25% of landforms, “met” (“low” impact) on 25%, “borderline” (“medium” impact) on 33%, “not met” on 8%, and “clearly not met” (“high” impact) on 8%.

Causal Factors:

None of the openings contained visually effective levels of tree retention (> 22% by volume or stem count) and 25% of landforms sampled had good visual quality design (cutblock shaping).

Number of Samples by VQO and Impact Rating:

VQO ¹	High	Medium	Low	Very Low	Total
MM			1		1
M		1		1	2
PR	1	3	2	2	8
R	1				1
Total	2	4	3	3	12

¹ MM= maximum modification, M = modification, PR = partial retention, R = retention

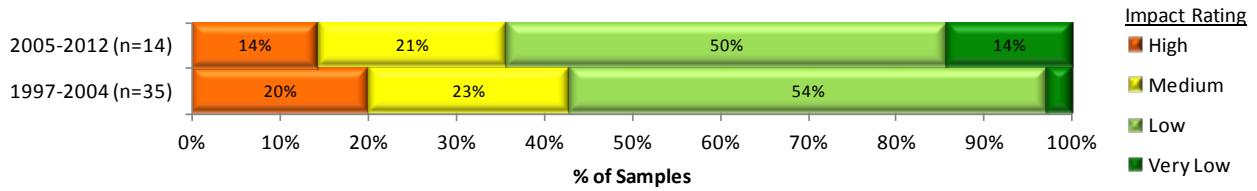
Overall Stewardship Trend: Insufficient data

No data for FPC cutblocks to allow for trending. Future trend analysis will use year of harvest.

Opportunities For Improvement:

Use existing visual design techniques to create more natural-looking openings and better achieve VQOs. Use partial cutting to retain higher levels of volume/stems. Reduce opening size in retention and partial retention VQO areas.

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



Summary:

Of 49 cutblocks sampled (combined *FPC* and *FRPA*-eras), 59% of sites were rated as “very low” or “low” harvest-related impact. Considering total retention, retention quality, and coarse woody debris quantity and quality, 6% are rated as “very low” impact on biodiversity, 53% as “low,” 22% as “medium,” and 18% as “high.” Six additional cutblocks were sampled but could not be rated due to insufficient baseline information for the biogeoclimatic ecosystem classification (BEC) subzone.

Causal Factors:

85% of all blocks had more than 3.5% tree retention, and this number increased to 93% in the *FRPA*-era. Big diameter tree density (generally ≥ 40 cm dbh) and number of tree species is close to expected from baseline. Range of coarse woody debris volume over many blocks has improved in the *FRPA*-era to be close to expected from baseline (that found in retention patches) though coarse woody debris quality (volume from ≥ 20 cm pieces and pieces/ha of ≥ 20 cm and ≥ 10 metres) is skewed more towards lower amounts

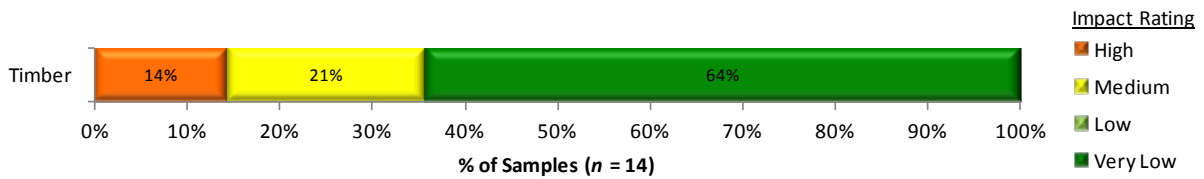
Overall Stewardship Trend: Improving ↑

Retention increased from an average 16.1% in the *FPC* to 18.1% in the *FRPA*-era (note low sample size in *FRPA*-era), much of this increase may be due to fewer very low retention blocks in *FRPA*-era and higher number of very high retention (3 of the 14 *FRPA*-era blocks had $>50\%$ retention, much of this from dispersed retention in the ICHvk BEC subzone. Average retention quality did not change between eras.

Opportunities For Continued Improvement:

Continue trend to leave at least low levels of retention on every cutblock. Have a range of retention (e.g., 3 to 30%) over many blocks. Continue leaving big diameter trees and full range of tree species compared to pre-harvest conditions. Leave higher densities of big coarse woody debris pieces on site.

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



Summary:

Of the 14 polygons sampled, 64% were rated “very low” and “low” impact on overall health and productivity, 21% “medium”, and 14% “high” impact. The weighted average well spaced density for the combined SBS and ESSF biogeoclimatic ecosystem classification (BEC) zones achieved 86% of target stocking standard (TSS).

BEC	SBS	ESSF	Average
TSS	87%	73%	86%

Since a Stand Development Monitoring TSA Data Summary (2009-2011 data only) was done only at the Prince George TSA level it is impossible to summarize the leading stand damaging agents impacting the polygons sampled for each of the three districts. For the Prince George TSA mean age of all polygons sampled was 26.1 years. The top four leading agents identified in the plots were; Western gall rust (DSG); tree competition (VT), stem forking (K), and Commandra blister rust (DSC).

Agent	DSG	VT	K	DSC
380 plots	168/380	122/380	106/380	99/380

No change in leading species was found in 90% of the polygons sampled (overall Prince George TSA).

Causal Factors:

For the Prince George district, two of the three “medium” impacted polygons had total trees < 2000 stems/ha. It is not clear from the incomplete declaration data whether these stands were spaced. The one “high” impacted polygon had a well spaced value of 420 stems/ha.

Overall Stewardship Trend:

No trend can be established at this time.

Opportunities For Improvement:

The majority of the polygons sampled were relatively healthy and should produce productive stands. For the “medium” and “high” impacted stands a clearer picture of these stands will be ascertained once data from the completed Stand Development Monitoring Polygon cover sheets are available.

NOTE: Completing the Stand Development Monitoring Polygon Cover sheet 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 five soils samples in the Prince George Natural Resource District. 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 Omineca 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)					
	Omineca Region Comparison					Omineca Region ^a
	Prince George District	Mackenzie District	Vanderhoof District	Fort St. James District	Robson Valley TSA	
Riparian all data	74% (54)	73% (62)	70% (74)	64% (83)	57% (14)	69% (287)
FRPA-era	ID (11)	60% (25)	74% (35)	72% (29)	ID (12)	70% (112)
FPC-era	71% (42)	81% (37)	67% (39)	59% (54)	ID (2)	68% (174)
Water quality all data	25% (48)	48% (82)	69% (127)	64% (133)	52% (58)	56% (448)
2010-2012 sample years	19% (21)	39%(41)	74%(57)	41% (44)	41% (27)	48% (190)
2008-2009 sample years	30% (27)	56% (41)	64%(70)	75% (89)	61% (31)	63% (258)
Stand-level biodiversity - all data	59% (49)	22% (63)	8% (65)	71% (93)	ID (32) ^b	43% (283)
FRPA-era	64% (14)	25% (32)	5% (22)	88% (33)		46% (108)
FPC-era	57% (35)	20% (31)	9% (43)	62% (60)		41% (175)
Visual Quality						
FRPA	ID (0)	ID (0)	85% (14)	75% (20)	ID (8)	79% (42)
FPC	50% (12)	ID (0)	ID (0)	70% (10)	53% (21)	56% (43)
Timber (stand development monitoring)	64% (14)	56% (30)	73% (30)	73% (26)	ID (0)	67% (100)

^aIncludes the Prince George, Mackenzie, Fort St. James and Vanderhoof Districts

^bThere is insufficient baseline for ESSFmm and ICHmm BEC zones so ranking is not possible at this time for Robson Valley.

DISTRICT MANAGER COMMENTARY¹

The monitoring results presented in this document show that forest practices can be rated as “very low” or “low” impact (definitely sustainable) on over half of the sites sampled for riparian, stand-level biodiversity, visual quality, and timber (stand development monitoring).

Data from water quality monitoring is a concern but I am encouraged to see that the results from more recent harvesting operations are showing improvement.

I acknowledge that the diverse landscapes and environmental conditions in the Prince George Natural Resource District provide many challenges for forest management. As well, the mountain pine beetle epidemic and related large scale salvage logging have created conditions for cumulative effects. However, there is significant room for improvement where forest practices are rated high or medium impact on a resource value. Therefore, I expect licensees to:

- Riparian management - Leave appropriate buffers on priority S4 and S6 streams that are connected to fish bearing streams, or if not possible, retain near-stream deeply rooted vegetation and understory trees. Keep logging slash out of streams and manage sediment from road sources
- Water quality management – When constructing roads, avoid long gradients approaching streams. Bridge decks should be higher than road surfaces.
- Visual quality management - Use visual design techniques to create more natural looking openings and better achieve visual quality objectives (VQO).
- Stand-level biodiversity management – Maintain, at a minimum, low levels of tree retention on every cut block. The range of retention should generally be between 3 and 30% over many blocks. The characteristics of wildlife tree patches (densities of large trees and snags and tree species) should be similar to pre-harvest stands conditions. Leave longer, larger pieces of coarse woody debris.

District staff should continue to monitor practices and complete sufficient samples to show trends for all values.

Forest professionals should review monitoring results, and use them when preparing, reviewing and implementing forest stewardship plans.

¹ Commentary supplied by Prince George Natural Resource District Manager, John Huybers.

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, in the main body of the document, describes overall ratings for the Prince George Natural Resource District as compared to adjacent TSAs or district. 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 Prince George Natural Resource District.

Resource Value	Effectiveness of Practices in Achieving Resource Stewardship Objectives: % Very low + low resource development impact rating (sample size in brackets)				
	Prince George District	Forests, Lands and Natural Resource Operations Areas			Province
		North	South	Coast	
Riparian – all data	74% (54)	71% (654)	69% (678)	58% (451)	67% (1783)
FRPA-era data	ID (11)	71% (257)	68% (277)	62% (198)	67% (732)
FPC-era data	71% (42)	71% (394)	70% (401)	55% (253)	67% (1048)
Water quality – all data	25% (48)	66% (992)	70% (1515)	76% (1526)	71% (4033)
2010–2012 samples	19% (21)	67% (505)	70% (823)	79% (1021)	73%(2349)
2008–2009 samples	30% (27)	64% (487)	70% (692)	70% (505)	68% (1684)
Stand-level biodiversity –all data	59% (49)	42% (655)	54% (780)	77% (455)	56% (1890)
FRPA-era data	64% (14)	49% (270)	61% (347)	84% (201)	63% (818)
FPC-era data	57% (35)	38% (385)	49% (433)	72% (254)	50% (1072)
Visual Quality					
FRPA	ID (0)	73% (122)	54% (136)	78% (153)	69% (411)
FPC	50% (12)	56% (96)	65% (85)	62% (68)	61% (249)