



# Multiple Resource Value Assessment (MRVA)

Vanderhoof Natural Resource District

Prince George Timber Supply Area

January 2014

## 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.

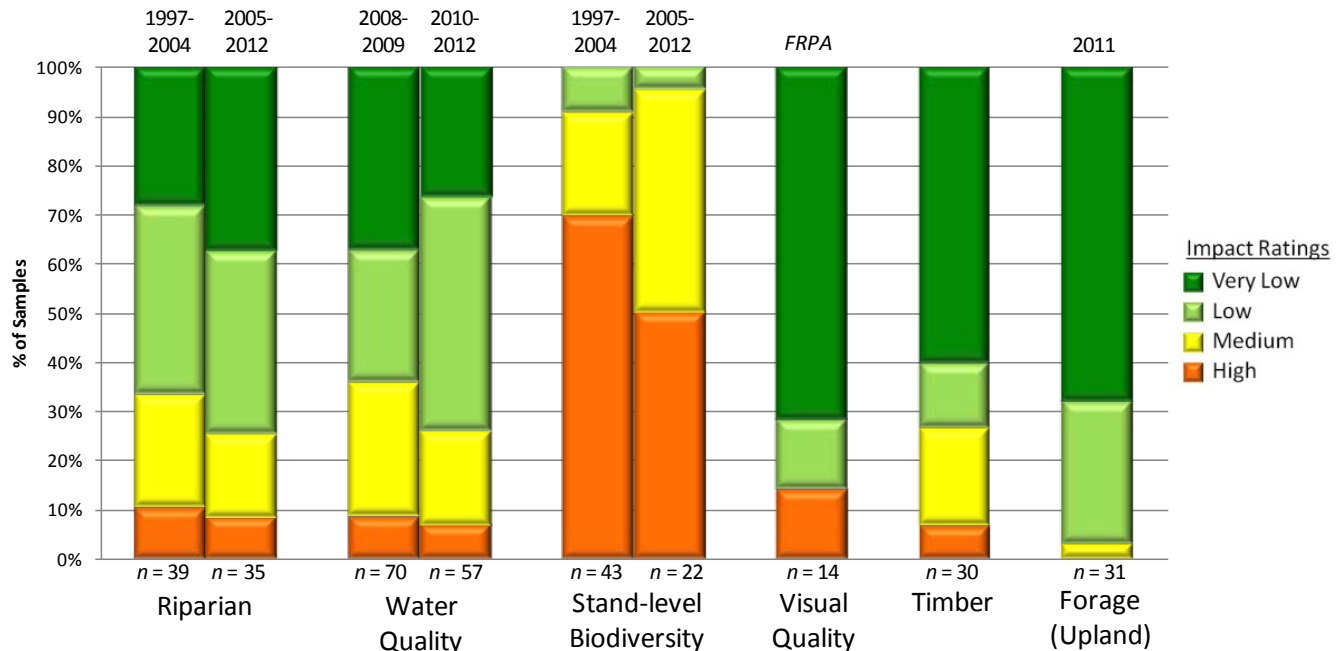
I encourage readers to review the full report and direct any questions or comments to the appropriate district office.

Tom Ethier  
Assistant Deputy Minister  
Resource Stewardship Division  
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, timber (stand development) and forage (range) monitoring conducted in the Vanderhoof 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: Vanderhoof Natural Resource District site-level resource development impact rating by resource value with trend (Riparian, stand-level biodiversity and visual quality trend by harvest year/era. Water quality 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 Vanderhoof 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 of 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.

## VANDERHOOF NATURAL RESOURCE DISTRICT – ENVIRONMENTAL AND STEWARDSHIP CONTEXT

This report covers the Vanderhoof Natural Resource District, one of the three districts that make up the Prince George TSA (figure 2). It is located in the north central of British Columbia on the North Central Interior Plateau and surrounds the Nechako Valley. The total area within the District is 1.39 million hectares which represents about 17 percent of the Prince George TSA. This area is dominated by gently rolling hills but also includes the occasional steep rocky bluffs and mountains. The biogeoclimatic zone is mostly Sub-Boreal Spruce with a smaller component of Engelmann Spruce-Subalpine-fir. The area is dominated by 85 percent lodgepole pine mixed with stands of spruce, balsam/fir, Douglas-fir, aspen and birch.

The Vanderhoof District supports a number of species including moose, mule deer, woodland caribou, mountain goats, wolves, grizzly and black bears, and mountain lions. Smaller animals of interest include pine marten, fisher, beaver and lynx. It is renowned for its bird migration corridor used by many species of ducks, Canada geese, snow geese, and trumpeter swans, as well as raptors. Parks and protected areas in this region include Sutherland River Provincial Park and Protected area, Stuart River Provincial Park, Beaumont Provincial Park, Finger-Tatuk Provincial Park, Francois Lake Provincial Park, Nechako Canyon Protected Area, and a portion of the Entiako Provincial Park.

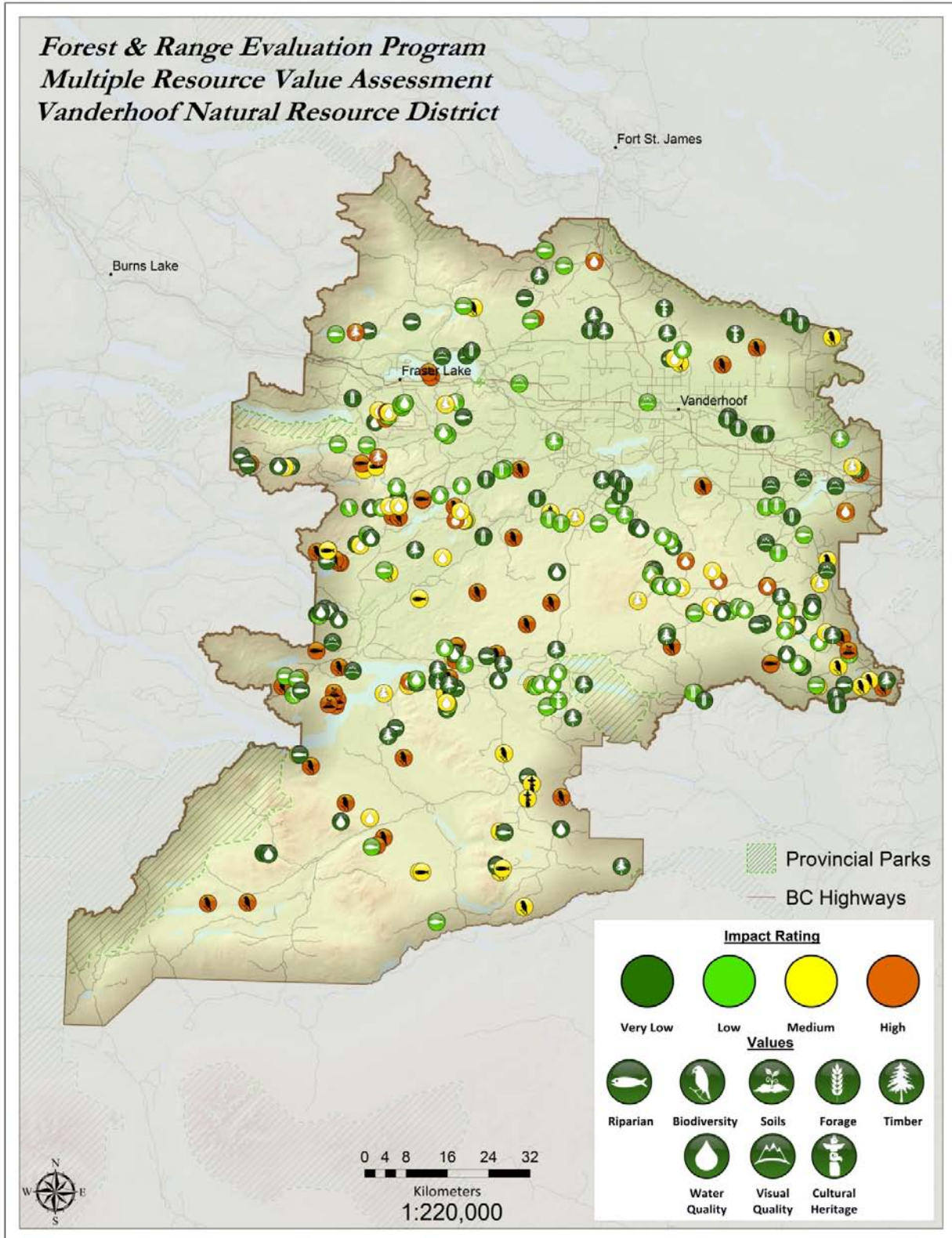
The Vanderhoof District includes three main towns: Vanderhoof, Fraser Lake and Fort Fraser; serving a total population of around 10 000. The primary employers are associated with the forestry sector but mining and agriculture also contribute to the area's economy. The agricultural industry is located primarily within the Nechako Valley but there are range activities spread throughout the district.

Twelve First Nations have asserted territories in the district: Saik'uz First Nation, Nazko First Nation, Ulkatcho First Nation, Skin Tye First Nation, Stellat'en First Nation, Lheidli T'enneh First Nation, Lhoosk'uz Dene First Nation, Nadleh Whut'en First Nation, Cheslatta Carrier Nation, T'lazt'en First Nation, Nak'azdli First Nation, and Yekooche First Nation.

Due to the high component of pine in the district, the mountain pine beetle (MPB) flourished when the epidemic began in 2001 with peak attack occurring in 2006. The allowable annual cut has been increased over these years from a low of 2.2 million cubic meters per year up to 6.5 million cubic meters per year. The initial aggressive action was an attempt to curtail the spread of the beetle, then as the epidemic spread the focus was on recovering the economic value of the dead timber before it burns or decays while trying to respect all the other values on the landscape. Due to the accelerated harvest levels there are concerns with retention levels and how they achieve our land use objectives and old-growth targets.

There are other forest health factors in the area that are becoming a growing concern. In particular, the potential impact of the incidence of hard pine stem rusts on timber supply modeling. We are monitoring the growth and early tree survival or mortality of managed stands and plan to produce a separate report on these results in the near future.

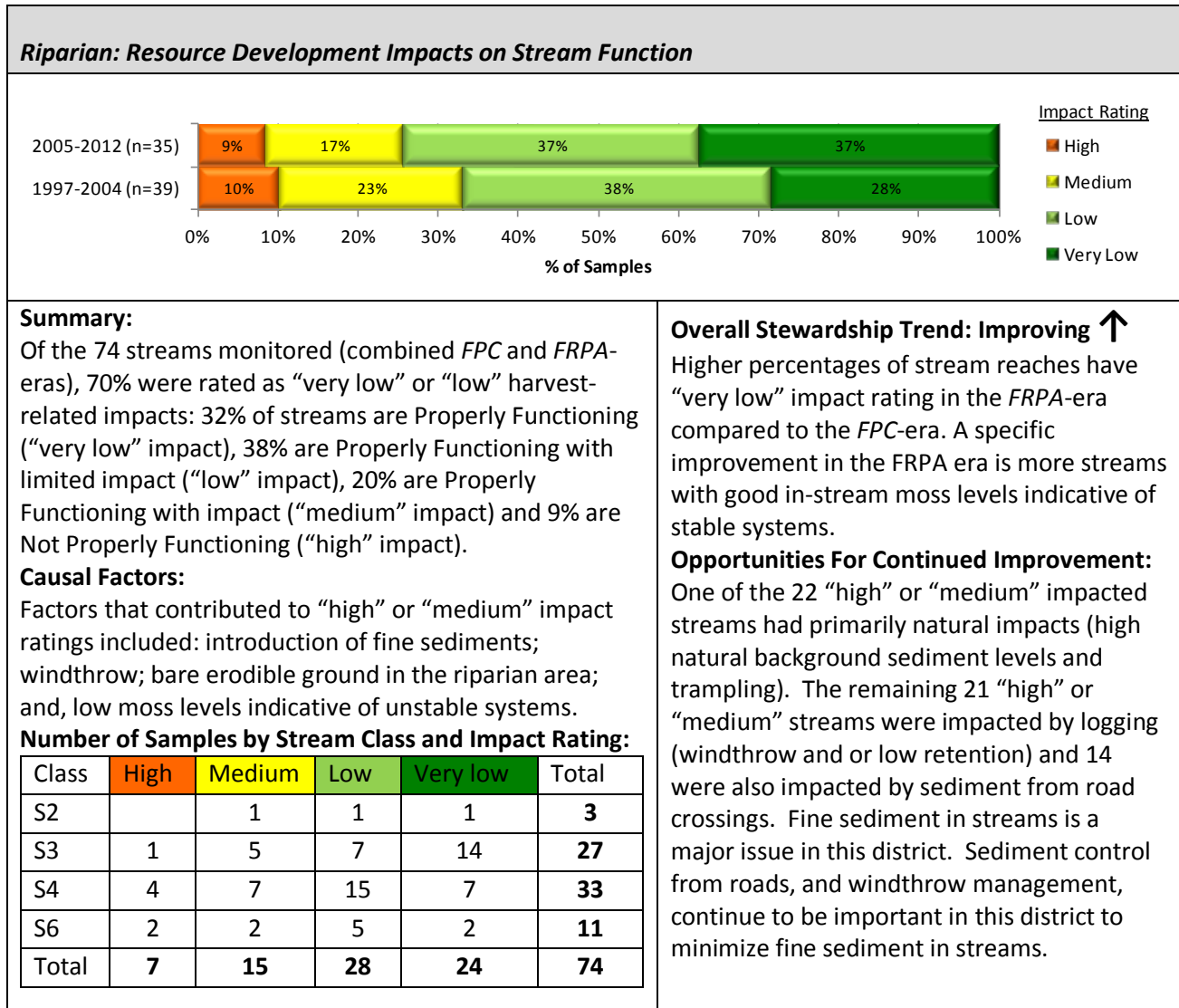
Figure 2: Vanderhoof Natural Resource District, showing FREP sample locations and results (see <http://www.for.gov.bc.ca/hfp/frep/publications/mrva.htm> for a high-resolution version of this map).



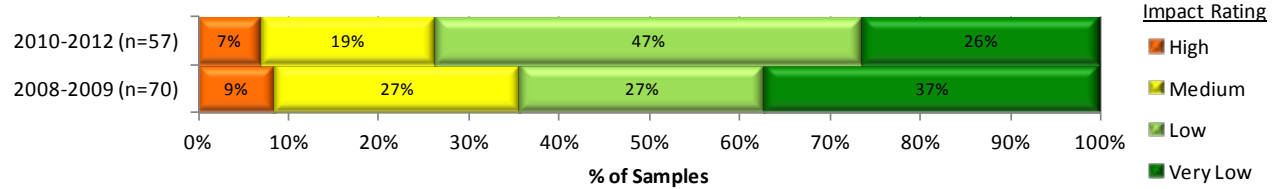
## KEY RESULTS BY RESOURCE VALUE AND OPPORTUNITIES FOR CONTINUED IMPROVEMENT

Table 1 shows the resource values assessed for the Vanderhoof 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, but 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 Vanderhoof Natural Resource District.**



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



**Summary:**

Of the 127 road segments assessed from 2008 to 2012, 69% were rated as “very low” or “low” road-related impact. Site assessments show the range for potential sediment generation as 32% “very low” (“very low” impact), 36% “low” (“low” impact), 24% “moderate” (“medium” impact), 8% “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.

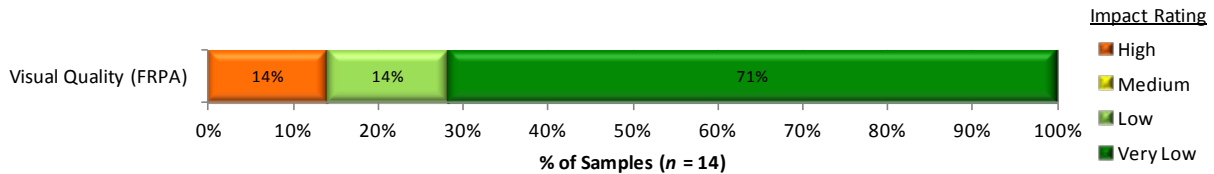
**Overall Stewardship Trend: Neutral**

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

**Opportunities For Improvement:**

The most frequent suggested improvements are; to use cross ditches and kickouts, use good quality materials and crown road, and increase the number of strategically located culverts.

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



**Summary:**

Of the 14 landforms assessed (all were harvested under the FRPA), 85% were rated with “very low” or “low” harvest-related impacts on achieving the Visual Quality Objectives.

VQOs were “well met” (“very low” impact) on 71% of landforms, “met” (“low” impact) on 14%, and “clearly not met” (“high” impact) on 14%.

**Causal Factors:**

14% of the openings contained visually effective levels of tree retention (> 22% by volume or stem count) and 36% of landforms sampled had good visual quality design (cutblock shaping).

**Number of Samples by VQO and Impact Rating:**

VQO <sup>1</sup>	High	Medium	Low	Very Low	Total
M				5	5
PR	2		2	3	7
R				2	2
Total	2	0	2	10	14

<sup>1</sup> M = modification, PR = partial retention, R = retention

**Overall Stewardship Trend: Insufficient data**

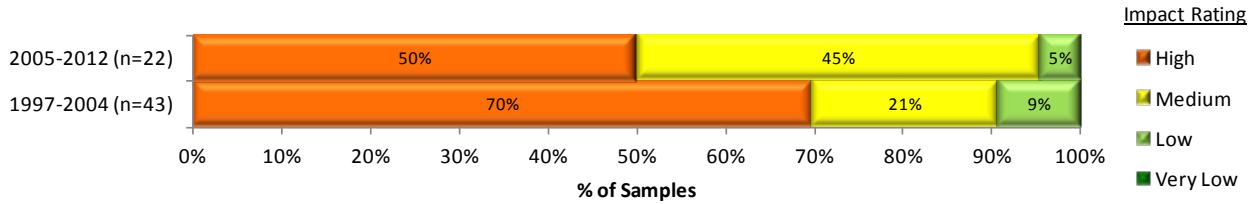
No data for FPC to allow for trending. Future trend analysis will use year of harvest.

**Opportunities For Improvement:**

Use existing visual design techniques to create more natural-looking openings and better achieve VQOs. Use a variety of differing tree retention strategies which may include: scattered/individual retention, small tree patch retention, large tree patch retention, reduced opening size, and/or partial retention to reduce/minimize the visual impact.



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



**Summary:**

Of 65 cutblocks sampled (combined *FPC* and *FRPA*-eras), 8% of sites were rated as “very low” or “low” harvest-related impact.

Considering total retention, retention quality, and coarse woody debris quantity and quality, 0% sites are rated as “very low” impact on biodiversity, 8% as “low,” 29% as “medium,” and 63% as “high.”

**Causal Factors:**

52% of all blocks had more than 3.5% treed retention. However, considering only the *FRPA*-era blocks, that number increased to 70%. Retention increased from an average 8.9% in the *FPC* to 13.6% in *FRPA*-era. Average gross cutblock area increased from 30 hectares in *FPC*-era to 123 hectares in *FRPA*-era (note that a single cutblock of 867 hectares harvested in 2009 has skewed that average up for *FRPA*-era blocks). Large snag ( $\geq 10$  m tall and  $\geq 30$  cm dbh) and large tree ( $\geq 40$  cm dbh) densities, and the number of tree species retained have increased in *FRPA*-era and where there is retention are now similar to expected baseline densities. Large patches ( $> 2$  ha) are more prevalent in the *FRPA*-era, consistent with the larger cutblocks. Coarse woody debris quantity ( $m^3/ha$ ) and quality in terms of big pieces ( $\geq 20$  cm and  $\geq 10$  m) is skewed to lower amounts regardless of era.

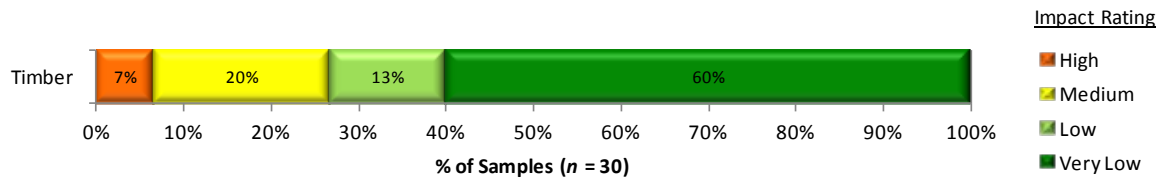
**Overall Stewardship Trend: Neutral**

Although there is a neutral trend overall, the fewer high impacted blocks in the *FRPA*-era are due to an increase in the number of blocks with 3.5% or more retention. Overall retention quality has also increased slightly in the *FRPA* era.

**Opportunities For Continued Improvement:**

Continue trend to leave treed retention on every cutblock and further increase the percentage of cutblocks with  $>3.5\%$  retention. Continue retaining densities of large trees, snags and tree species similar to range found in pre-harvest conditions. Leave a large range of coarse woody debris volumes (e.g., 8 to  $180 m^3/ha$ ) and big pieces of coarse woody debris ( $\geq 20$  cm and  $\geq 10$  meters) (e.g. up to 115 pieces/ha) over many blocks.

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



**Summary:**

Of the 30 polygons sampled the weighted average well spaced density for the SBS and ESSF BEC achieved 80% of Target Stocking Standard (TSS).

BEC	SBS	ESSF	Average
TSS	79%	87%	80%

73% were rated “very low” or “low” impact on overall health and stand productivity, 20% “medium”, and 7% “high”.

At this time, results have only been summarized at the Prince George TSA level. For the Prince George TSA the 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 19 (90%) of the 21 polygons sampled.

**Causal Factors:**

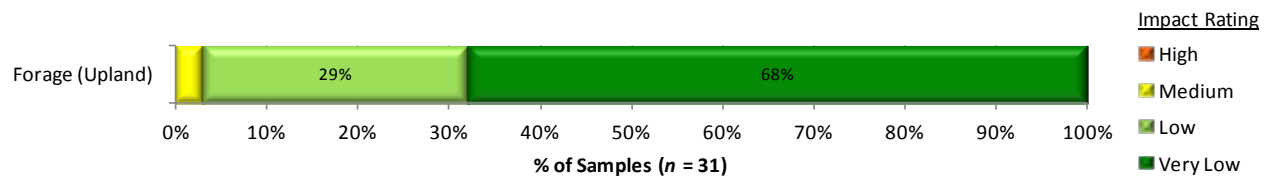
Six of the eight polygons rated as having a “medium” or “high” impact were a result of low well spaced stems/ha at the time of stand development monitoring. It is not clear whether these stands were spaced. If they were spaced then their impact rating would be re-assessed to “very low” or “low”. Tree competition (VT) observed during stand development monitoring in Vanderhoof is primarily due to shading of natural pine ingress by the older, larger planted tree species.

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

**Opportunities For Improvement:**

The majority of the polygons sampled were relatively healthy and should produce productive stands. For the “medium” and “high” impacted rated stands a clearer picture of these stands will be ascertained once data from the completed Stand Development Monitoring Polygon cover sheets become available. More information will be available in an upcoming, separate Vanderhoof district report.

**Forage: Range practice impacts on the desired plant succession and the water cycle/hydrologic function**



**Summary:**

Range staff conducted 31 upland health assessments, 8 wetland health assessments, and 6 stream health assessments in the Vanderhoof Natural Resource District in 2011. Of the upland assessments, 97% were rated very low or low impact.

**Causal Factors:**  
Livestock grazing is at an acceptable level. Livestock grazing does affect ecosystem function where inadequate distribution allows animals to overgraze a small area of a tenure. Most range tenures in this area have more forage available than is demanded by range users.

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

Generally, rangeland health assessments indicate good health in the area. These tenures are generally stable in this trend.

**Opportunities For Improvement:**

Range tenure holders can improve rangeland health by increasing riding on their tenure and improving salting practices. Range staff spend a lot of time dealing with conflicts between different land users. Private land owners often do not realize their obligations to fence out their land when living near provincially designated open range. Staff review licenses and permits regularly to ensure tenure holders are in compliance with their range use plans. Forest licensees can help reduce grazing effects by increasing tree retention near sensitive streams and communicating harvesting activities.

**Cultural Heritage: Resource Development Impacts on Cultural Heritage Resources**

There are currently only seven Cultural Heritage samples in the Vanderhoof Natural Resource District. Analysis will be completed in subsequent years when more samples are available. General field observations to date indicate that, on an overall block basis, forest licensee performance is average to above average when managing and/or conserving cultural heritage resources. The outcomes of management of individual cultural heritage features tend to be more variable. Success is best achieved when government staff, forest licensees and First Nations work collaboratively to share previously known and new cultural heritage information during consultation, prior to harvest planning and development phases.

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

There are currently only five soils samples in the Vanderhoof 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?**

In development.

## 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 Omineca 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 ratings (sample size in brackets)					
	Omineca Region Comparison					Omineca Region <sup>1</sup>
	Vanderhoof District	Mackenzie District	Prince George District	Fort St. James District	Robson Valley TSA	
Riparian – all data	<b>70%</b> (74)	<b>73%</b> (62)	<b>74%</b> (54)	<b>64%</b> (83)	<b>57%</b> (14)	<b>69%</b> (287)
FRPA-era data	74% (35)	60% (25)	ID (11)	72% (29)	ID (12)	70% (112)
FPC-era data	67% (39)	81% (37)	71% (42)	59% (54)	ID (2)	68% (174)
Water quality – all data	<b>69%</b> (127)	<b>48%</b> (82)	<b>25%</b> (48)	<b>64%</b> (133)	<b>52%</b> (58)	<b>56%</b> (448)
2010–2012 samples	74%(57)	39%(41)	19% (21)	41% (44)	41% (27)	48% (190)
2008–2009 samples	64%(70)	56% (41)	30% (27)	75% (89)	61% (31)	63% (258)
Stand-level biodiversity –all data	<b>8%</b> (65)	<b>22%</b> (63)	<b>59%</b> (49)	<b>71%</b> (93)	<b>ID</b> (32) <sup>2</sup>	<b>43%</b> (283)
FRPA-era data	5% (22)	25% (32)	64% (14)	88% (33)		46% (108)
FPC-era data	9% (43)	20% (31)	57% (35)	62% (60)		41% (175)
Visual Quality						
FRPA	<b>85%</b> (14)	<b>ID</b> (0)	<b>ID</b> (0)	<b>75%</b> (20)	<b>ID</b> (8)	<b>79%</b> (42)
FPC	<b>ID</b> (0)	<b>ID</b> (0)	<b>50%</b> (12)	<b>70%</b> (10)	<b>53%</b> (21)	<b>56%</b> (43)
Timber (stand development monitoring)	<b>73%</b> (30)	<b>56%</b> (30)	<b>64%</b> (14)	<b>73%</b> (26)	<b>ID</b> (0)	<b>67%</b> (100)

<sup>1</sup> Prince George, Mackenzie, Fort St. James and Vanderhoof Districts

<sup>2</sup> There is insufficient baseline for ESSFmm and ICHmm so ranking is not possible at this time for Robson Valley

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

There has been a significant amount of monitoring completed across multiple values within the Vanderhoof Natural Resource District and this MRVA report provides a good synopsis of how we are managing our resources. I have taken the opportunity to fully consider previous licensee/district reports and presentations made on the Forest and Range Evaluation Program (FREP) results and this current report on Multiple Resource Value Assessments will provide additional information. I expect that this report will further encourage improvements to forest and range practices and provide an opportunity to express my future expectations for the Vanderhoof Natural Resource District.

I am pleased to see that the Vanderhoof District's "very low" and "low" impact results exceed the Omineca Regional average for Riparian, Water Quality, Visual Quality and Timber, however we should always be striving for excellence and continue to work towards eliminating our high and medium impact results. Therefore, I ask that you focus on the Opportunities for Continued Improvement sections for all values in Table 1. Although these values assessed individually may appear satisfactory, we will need to find a way to assess the cumulative effect various activities have on our landscape.

The cumulative effect of resource development is an area that we need to spend more time on in the coming years. In particular, we need to monitor our species at risk and ecosystem function at the landscape level through landscape level assessments which are currently being developed. It is good to know that the Prince George TSA has the Landscape Objectives Working Group to help oversee old-growth retention targets. Until FREP is able to report out on these values through wildlife and landscape level assessments, all parties involved in resource management should pay attention to how cumulative effects impact various values and ensure any impacts are minimized.

Due to the particularly high percentage of blocks with "high" and "medium" impact for stand-level biodiversity, I would like to focus our discussion on this value. It would appear that licensees are meeting and in most cases exceeding the minimum legal requirements for retention and coarse woody debris (CWD) as set out in the *Forest Planning and Practices Regulation* sections 66 and 68 or section 12.5, but I continue to encourage continuous improvement in terms of the quantity and quality of retention patches and CWD left on site.

Wildlife tree retention areas for every block are a key component to stand-level biodiversity. Although it may not show up in our results, it is acknowledged that smaller blocks do not necessarily have formally associated retention areas but the block may be linked with another block's wildlife tree patch or an adjacent stream, lake, wildlife, etc. retention area. As a result, we encourage that all these retention areas be formally designated for each block for future stand-level biodiversity assessments. This also helps to ensure biodiversity and a future supply of CWD for all areas.

I understand the concerns of comparing CWD in Mountain Pine Beetle (MPB) impacted retention patches to harvest areas and the challenges in CWD retention when salvaging the MPB damaged timber in achieving economic recovery. In consideration of these challenges, I still strongly encourage licensees to leave more bigger and longer pieces of CWD for biodiversity and basic soil health. As a result, I am urging all professionals ensure their Forest Stewardship Plan results and strategies take into consideration these opportunities for improvement. As the district manager reviewing and approving these plans, I will exercise my discretion where there is a need to balance competing objectives that seek to conserve environmental values while maintaining timber supply.

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<sup>1</sup> Commentary supplied by Vanderhoof Resource District Manager, Lynda Currie.

Please see the following chief forester's guidance documents respecting landscape- and stand-level structural retention in large-scale MPB salvage operations and CWD management:

[http://www.for.gov.bc.ca/hfp/mountain\\_pine\\_beetle/stewardship/cf\\_retention\\_guidance\\_dec2005.pdf](http://www.for.gov.bc.ca/hfp/mountain_pine_beetle/stewardship/cf_retention_guidance_dec2005.pdf)

<http://www.for.gov.bc.ca/ftp/hfp/external/!publish/frep/extension/Chief%20Forester%20short%20CWD.pdf>

## 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](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 Vanderhoof Natural Resource District as compared to adjacent TSAs or districts. 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 Vanderhoof Natural Resource District.**

Resource Value	Effectiveness of Practices in Achieving Resource Stewardship Objectives: % Very low + low resource development impact rating (sample size in brackets)				
	Vanderhoof District	Forests, Lands and Natural Resource Operations Areas			Province
		North	South	Coast	
Riparian – all data	<b>70%</b> (74)	<b>71%</b> (654)	<b>69%</b> (678)	<b>58%</b> (451)	<b>67%</b> (1783)
FRPA-era data	74% (35)	71% (257)	68% (277)	62% (198)	67% (732)
FPC-era data	67% (39)	71% (394)	70% (401)	55% (253)	67% (1048)
Water quality – all data	<b>69%</b> (127)	<b>66%</b> (992)	<b>70%</b> (1515)	<b>76%</b> (1526)	<b>71%</b> (4033)
2010–2012 samples	74%(57)	67% (505)	70% (823)	79% (1021)	73%(2349)
2008–2009 samples	64%(70)	64% (487)	70% (692)	70% (505)	68% (1684)
Stand-level biodiversity –all data	<b>8%</b> (65)	<b>42%</b> (655)	<b>54%</b> (780)	<b>77%</b> (455)	<b>56%</b> (1890)
FRPA-era data	5% (22)	49% (270)	61% (347)	84% (201)	63% (818)
FPC-era data	9% (43)	38% (385)	49% (433)	72% (254)	50% (1072)
Visual Quality					
FRPA	<b>85%</b> (14)	<b>73%</b> (122)	<b>54%</b> (136)	<b>78%</b> (153)	<b>69%</b> (411)
FPC	<b>ID</b> (0)	<b>56%</b> (96)	<b>65%</b> (85)	<b>62%</b> (68)	<b>61%</b> (249)