Multiple Resource Value Assessment (MRVA)

Fort Nelson Natural Resource District

December 2013

FOREWORD

Forest management in British Columbia is governed by a hierarchy of legislation, plans and resource management objectives. For example, federal and provincial acts and regulations, Land Use and Forest Stewardship plans, and protected areas and reserves collectively contribute to achieving balanced environmental, social and economic objectives. Sustainable forest management is key to achieving this balance and a central component of forest management certification programs. The purpose of 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.

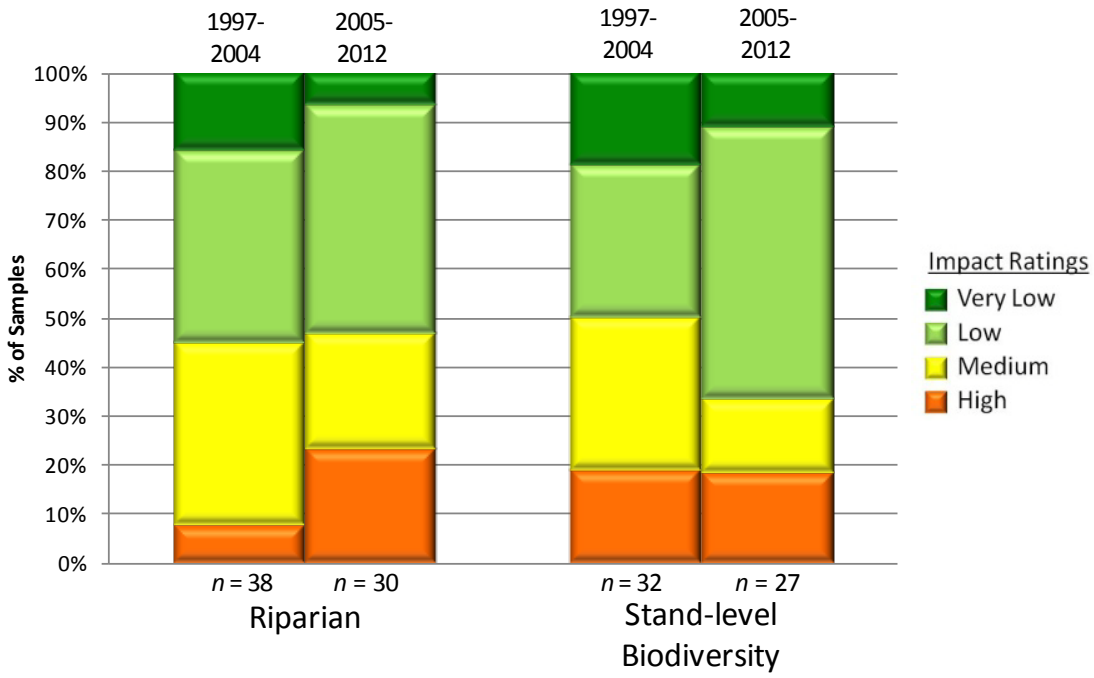
I encourage readers to review the full report and direct any questions or comments to the appropriate district office.

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 and biodiversity monitoring conducted in the Fort Nelson 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: Fort Nelson Natural Resource District site-level resource development impact ratings by resource value with trend (Riparian and stand-level biodiversity trend by harvest year/era.)



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 Fort Nelson 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, 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.

FORT NELSON NATURAL RESOURCE DISTRICT – ENVIRONMENTAL AND STEWARDSHIP CONTEXT

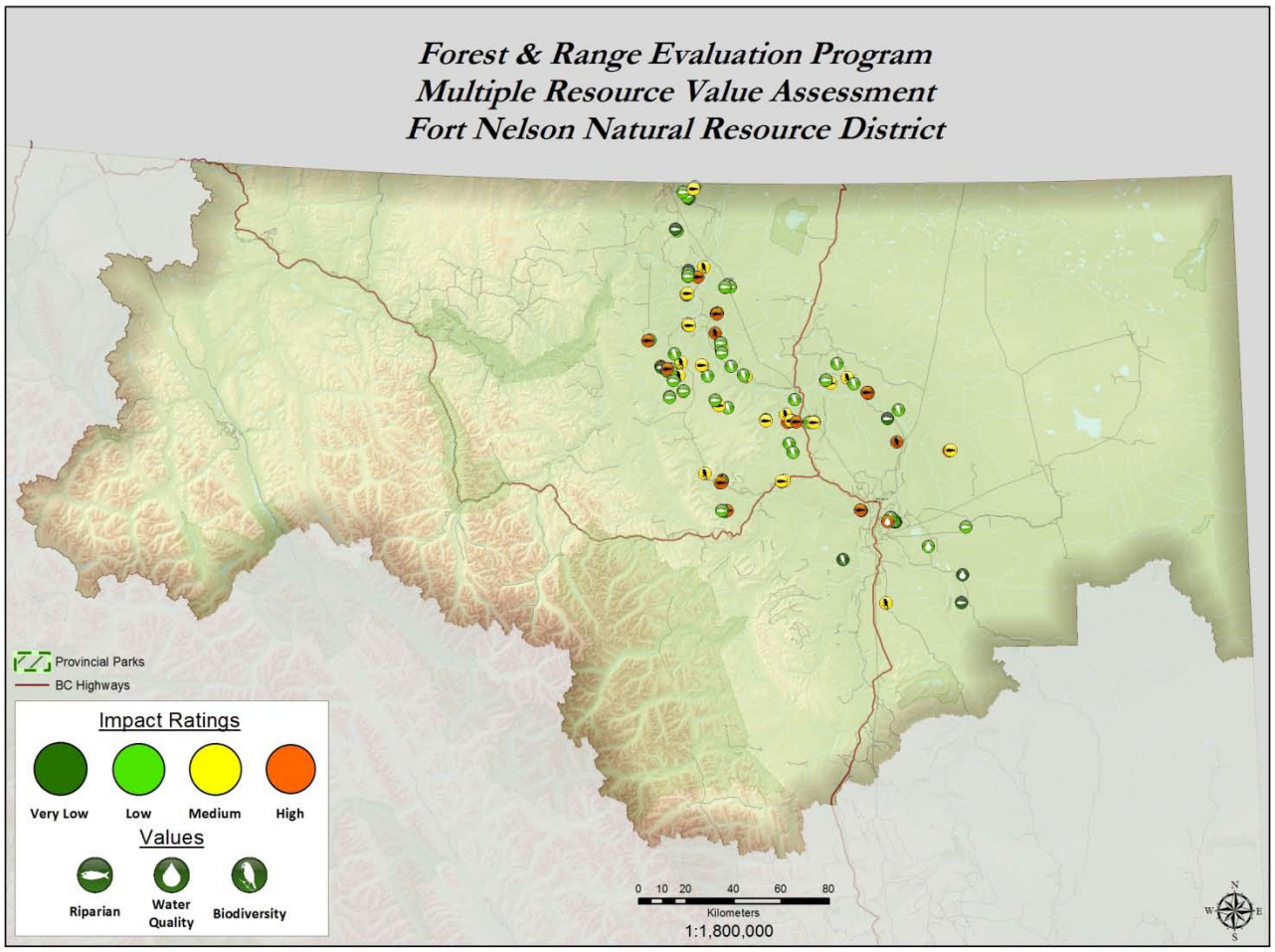
This report covers the Fort Nelson Natural Resource District (figure 2). The district is bounded on the south by the Mackenzie and Fort St. John TSAs, on the west by the Cassiar-Stikine area and the Rocky Mountains, on the east by the Alberta border, and on the north by the Yukon/Northwest Territories border. The district encompasses 9.8 million hectares, 58.1 percent of which (about 5 741 212 hectares) is considered productive forest, and currently 25 percent of that productive forest (or 14.5 percent of the TSA, 1 432 269 hectares) is currently within the Timber Harvesting Land Base. Provincial parks in this district include Northern Rocky Mountains Provincial Park, Muncho Lake Provincial Park, Liard River Corridor Provincial Park and Denetiah Provincial Park. As well, almost half of the TSA is allotted to the Muskwa-Kechika Management Area.

The Fort Nelson Natural Resource District includes the Boreal White and Black Spruce zone which is a mixture of two main ecosystems, upland forests and muskeg. There are several upland forest types in this zone, the most common being trembling aspen and white spruce and mixed stands of lodgepole pine and black spruce. Other tree species present are balsam poplar, tamarack, subalpine fir, common and Alaska paper birch and cottonwood. Fire is common and often intensive enough to kill most trees over a large area. Because the upland forests have many fires, the landscape is a mosaic of forest stands of various types and ages. Both the mountainous terrain in the west and the large tracts of non-productive black spruce swamp and muskeg in the central and east portions limit access and commercially viable forest area. Other constraints include the 11 percent of land designated as protected area and the 29 percent within the Muskwa-Kechika Management Area, a significant wilderness and wildlife habitat area where resource developments such as recreation, range forestry, mining and oil and gas development may occur, but require a higher standard of management to accommodate cultural and environmental sensitivities.

The population of the Fort Nelson Natural Resource District is about 6000 people, mostly concentrated in the city of Fort Nelson. The economy of the district is dominated by forestry, public sector, oil/gas, and tourism. Trapping, agriculture, construction, public sectors, service industries and other small businesses employ the remainder of the labour force. The town of Fort Nelson is the major economic and employment centre for northeastern B.C. As of March 2008 there are no longer any major lumber producing mills operating in the district. Currently all harvesting activities taking place are associated with land clearing for other resources development such as community expansion (both urban and rural); gravel quarries; sand quarries; geophysical exploration; communication sites; agricultural lots; and oil and gas developments (well sites, camps, compressor sites, pipelines, etc.). As a result of the current harvesting activities and on-going mill closures, concerns around the lack of utilization of merchantable timber have been raised by local First Nations, residents, stake holders and general public.

Four First Nations - Fort Nelson First Nation, Dene Tsaa Tse K'Nai First Nation, Dena Tha' First Nation and Halfway First Nation - are signatories to Treaty 8, which covers the Fort Nelson Natural Resource District. The Fort Liard First Nation, the Dene Tha' of Assumption, Alberta, the Kaska-Dena First Nation, and the Tahltan First Nation all have traditional territory in the timber supply area.

Figure 2: Fort Nelson 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).

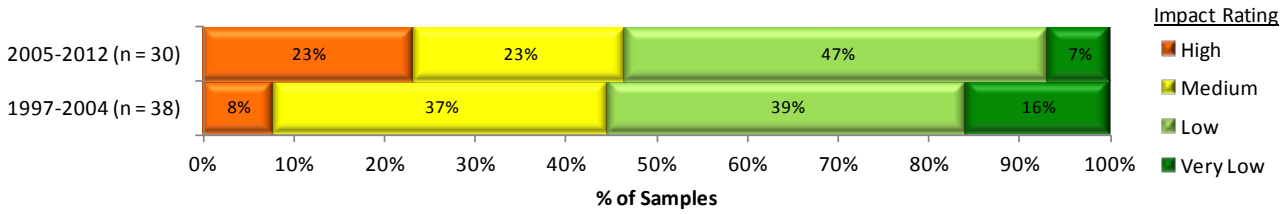


KEY RESULTS BY RESOURCE VALUE AND OPPORTUNITIES FOR CONTINUED IMPROVEMENT

Table 1 shows the resource values assessed for the Fort Nelson 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 Fort Nelson Natural Resource District.

Riparian: Resource Development Impacts on Stream Function



Summary:
Of the 68 streams monitored (combined *FPC* and *FRPA*-eras), 54% were rated "very low" or "low" harvest-related impacts: 12% of streams are Properly Functioning ("very low" impact), 43% are Properly Functioning with limited impact ("low" impact), 31% are Properly Functioning with impact ("medium" impact) and 15% are Not Properly Functioning ("high" impact).

Causal Factors:
Factors that contributed to "high" or "medium" impact ratings included: low moss levels indicative of unstable systems, fine sediments in the streams, in-stream blockages, and low diversity of aquatic invertebrates.

Number of Samples by Stream Class and Impact Rating:

Class	High	Medium	Low	Very low	Total
S2			3	2	**5**
S3	1	3	3	1	**8**
S4	5	9	6	3	**23**
S5		1	1	1	**3**
S6	4	8	16	1	**29**
Total	**10**	**21**	**29**	**8**	**68**

Overall Stewardship Trend: *Declining* ↓
Lower percentages of stream reaches have "very low" impact ratings in the *FRPA*-era samples compared to the *FPC*-era samples, and more streams have a "high" impact rating.

Opportunities For Continued Improvement:
Logging (windthrow, low retention) and sediment from roads and crossings was a contributor for 26 of the "high" or "medium" impacted streams. Natural impacts from high natural background sediment levels were also factors in all of the "high" and "medium" impact streams. Minor improvement may therefore come by decreasing erosion potential near streams from roads or bare erodible ground (e.g., windthrow).

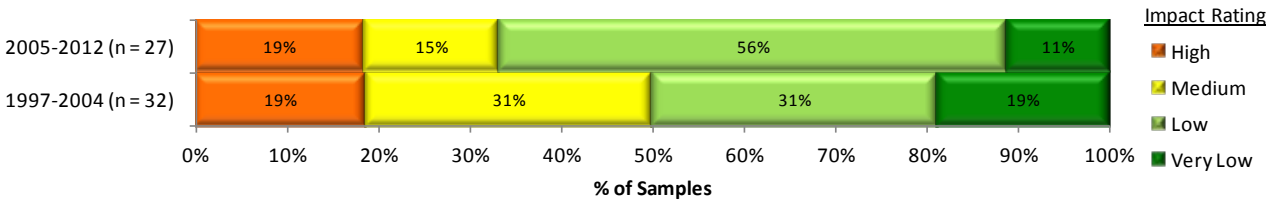
Three of the "medium" impacted streams were mainly affected by natural events indicative of high natural levels of sediment in the area, with beaver activity also noted for one.

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

Summary:

There have been only 11 road segments sampled, originating from one harvest block. In the Fort Nelson Natural Resource District, resource roads for movement of heavy equipment such as logging trucks, are winter use only. These winter use roads are functional only when the subgrade and grade are completely frozen. Since the water quality protocol addresses gravel roads that are used in all seasons it is not applicable to the Fort Nelson situation.

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



Summary:

Of 59 cutblocks sampled (combined *FPC* and *FRPA*-eras), 58% of sites were rated as "very low" or "low" harvest-related impact.

Considering total retention, retention quality, and coarse woody debris quantity and quality, 15% sites are rated as "very low" impact on biodiversity, 42% as "low", 24% as "medium", and 19% as "high" impact.

Causal Factors:

Coarse woody debris volume increased from *FPC*-era (average: 113 m^3/ha) to *FRPA*-era (average: 133 m^3/ha). Coarse woody debris quality (i.e., volume from ≥20 cm dbh pieces, and density of big coarse woody debris ≥20 cm dbh and ≥10 m long) improved. 75% of all the blocks had more than 3.5% retention. Very low retention (under 3.5%) occurred almost equally in *FRPA*- and *FPC*-eras. Average retention was constant at 9.5% between the *FPC* and *FRPA*-eras. Average gross area was 53 ha in the *FPC*-era and 93 ha in the *FRPA*-era. The quality of the retention in terms of average density of large snags, large trees (≥40 cm dbh) and number of tree species retained was the same in the two eras.

Overall Stewardship Trend: *Neutral*

The increasing average gross cutblock size (from the *FPC*- to *FRPA*-era) did not have a corresponding increase in retention, a concern to the overall biodiversity.

Opportunities For Continued Improvement:

The main opportunity for improvement is to leave retention on every cutblock. 18% of the sampled cutblocks had no retention.

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

There is currently only one Visual Quality sample in the Fort Nelson TSA.

Soils: Resource Development Impacts on Soil Productivity and Hydrologic Function

There are currently only five Soil samples in the Fort Nelson 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 Northeast Region as determined by resource development impact rating (ID = Insufficient Data; sample sizes in brackets).

	Effectiveness of Practices in Achieving Resource Stewardship Objectives: % Very low + Low Resource Development Impact Rating (sample size in brackets)			
	Northeast Region Comparison			**Northeast Region**[a]
Resource Value	**Fort Nelson District**	**Dawson Creek TSA**	**Fort St. John TSA**	
Riparian – all data	**54%** (68)	**74%** (46)	**60%** (10)	**62%** (124)
FRPA-era data	53% (30)	53%(15)	ID (0)	53% (45)
FPC-era data	55% (38)	84% (31)	60% (10)	67% (79)
Stand-level biodiversity –all data	**58%** (59)	**23%** (44)	**ID** (9)	**40%** (112)
FRPA-era data	67% (27)	ID (13)		51% (41)
FPC-era data	50% (32)	23% (31)		34% (71)

[a] Includes the Fort Nelson and Peace Natural Resource Districts

DISTRICT MANAGER COMMENTARY[1]

Overall, I recognize that the evaluation criteria are based on stewardship objectives and do not always correspond with the minimum standards set out in legislation. A "medium" or "high" resource development impact rating does not mean that the practice has not met legislation or the results and strategies contained within a forest licensee's forest stewardship plan (FSP). Of the five values identified as sampled in this report, only two had adequate data to perform an analysis. This is indicative of the current times; the forest industry is no longer a major player in the district or presence on the land. The data analyzed represents a slice in time which ended when the mills shut down in 2008, and may not adequately represent the current situation, and therefore the trend from the *FPC* to the *FRPA*. At this time, the FREP sampling does not provide any data on any of the other numerous disturbance activities that are currently taking place in the district.

Riparian assessments potentially assess the cumulative effects of forestry practices, natural impacts and a myriad of other past and present industrial impacts both upstream and within the reaches. The naturally occurring sediments in the district waters contribute to some of the higher impact FREP ratings in this district. I see the greatest opportunity for improvement in maintaining high levels of wind firm retention within the first 10 m of the stream and minimizing sediment input at any road and skidder crossings. While the streams in the district naturally have high sediment content, appropriate practices on the ground will ensure the levels do not become any higher than what would naturally occur. The riparian assessment could be easily transferable to other disturbance types to assess the impacts of other resource development on the streams. This shift could be implemented as the FREP program moves to Natural Resource Sector Monitoring which would evaluate the impacts of forestry practices being used in conjunction with other natural resource developments.

Stand-level biodiversity assessments show that there is opportunity to improve the amount of retention associated with harvest areas. When major forestry activity comes back to the district, there is opportunity at the forest planning stage to initiate innovative practices to increase retention, and decrease wind throw. I see these improvements as very manageable and this report as a basis for monitoring stand-level trends.

Soil assessments have been completed on five blocks, and another six have been identified for assessment. It is important to finish what we started with this value and continue the sampling on the identified blocks.

With the shift in activity on the land base, the district FREP program will be focusing on assessments of timber through Stand Development Monitoring evaluations and forage through range practices evaluations. In addition I encourage the development of Natural Resource Sector Monitoring evaluations, as this would be an important component of our integrated monitoring.

[1] Commentary supplied by Fort Nelson District Manager, Steve Lindsey

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 ≥ 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)	≥ 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 Fort Nelson Natural Resource District as compared to adjacent TSAs. 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 Fort Nelson Natural Resource District.

	Effectiveness of Practices in Achieving Resource Stewardship Objectives: % Very low + low resource development impact rating (sample size in brackets)				
		Forests, Lands and Natural Resource Operations Areas			
Resource Value	Fort Nelson District	North	South	Coast	Province
Riparian – all data	**54%** (68)	**71%** (654)	**69%** (678)	**58%** (451)	**67%** (1783)
FRPA-era data	53% (30)	71% (257)	68% (277)	62% (198)	67% (732)
FPC-era data	55% (38)	71% (394)	70% (401)	55% (253)	67% (1048)
Stand-level biodiversity all data	**58%** (59)	**42%** (655)	**54%** (780)	**77%** (455)	**56%** (1890)
FRPA-era data	67% (27)	49% (270)	61% (347)	84% (201)	63% (818)
FPC-era data	50% (32)	38% (385)	49% (433)	72% (254)	50% (1072)