



Multiple Resource Value Assessment (MRVA)

Chilliwack Natural Resource District

November 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.

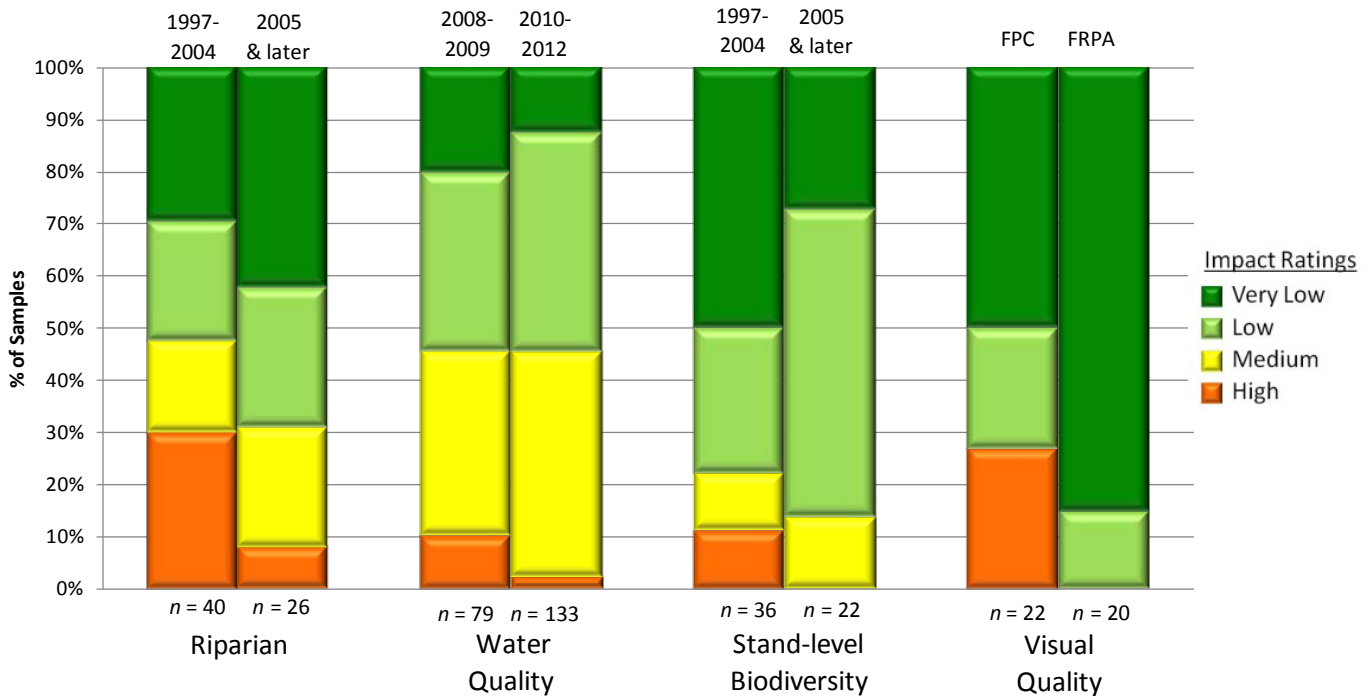
A handwritten signature in black ink, appearing to read "Tom Ethier". The signature is stylized and cursive.

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 document the results of stand and landscape-level monitoring carried out under the Forest and Range Evaluation Program (FREP). This report summarizes results for riparian, biodiversity (stand level), water quality (sediment), visual quality and timber (stand development) monitoring conducted in the Chilliwack 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: Chilliwack 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 Chilliwack 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.

CHILLIWACK NATURAL RESOURCE DISTRICT – ENVIRONMENTAL AND STEWARDSHIP CONTEXT

This report covers the Chilliwack Natural Resource District encompassing the Fraser TSA, Tree Farm Licence (TFL) 26, TFL 43 and the Cascade Lower Canyon Community Forest (figure 2). The district is located in the southern mainland portion of the South Coast Region bordered by Bowen Island to the west, Manning Park to the east, Boston Bar to the north and the United States border to the south. The TSA and associated TFLs cover approximately 1.4 million hectares. There are several large provincial parks and reserves in the area including Golden Ears Provincial Park, Indian Arm Provincial Park, Chilliwack Lake Provincial Park and Manning Provincial Park. Within the district, 38 First Nations Indian Bands and five tribal organizations have asserted traditional territories. An additional 14 First Nations and seven tribal organizations located outside the district also have traditional territories that extend into the district.



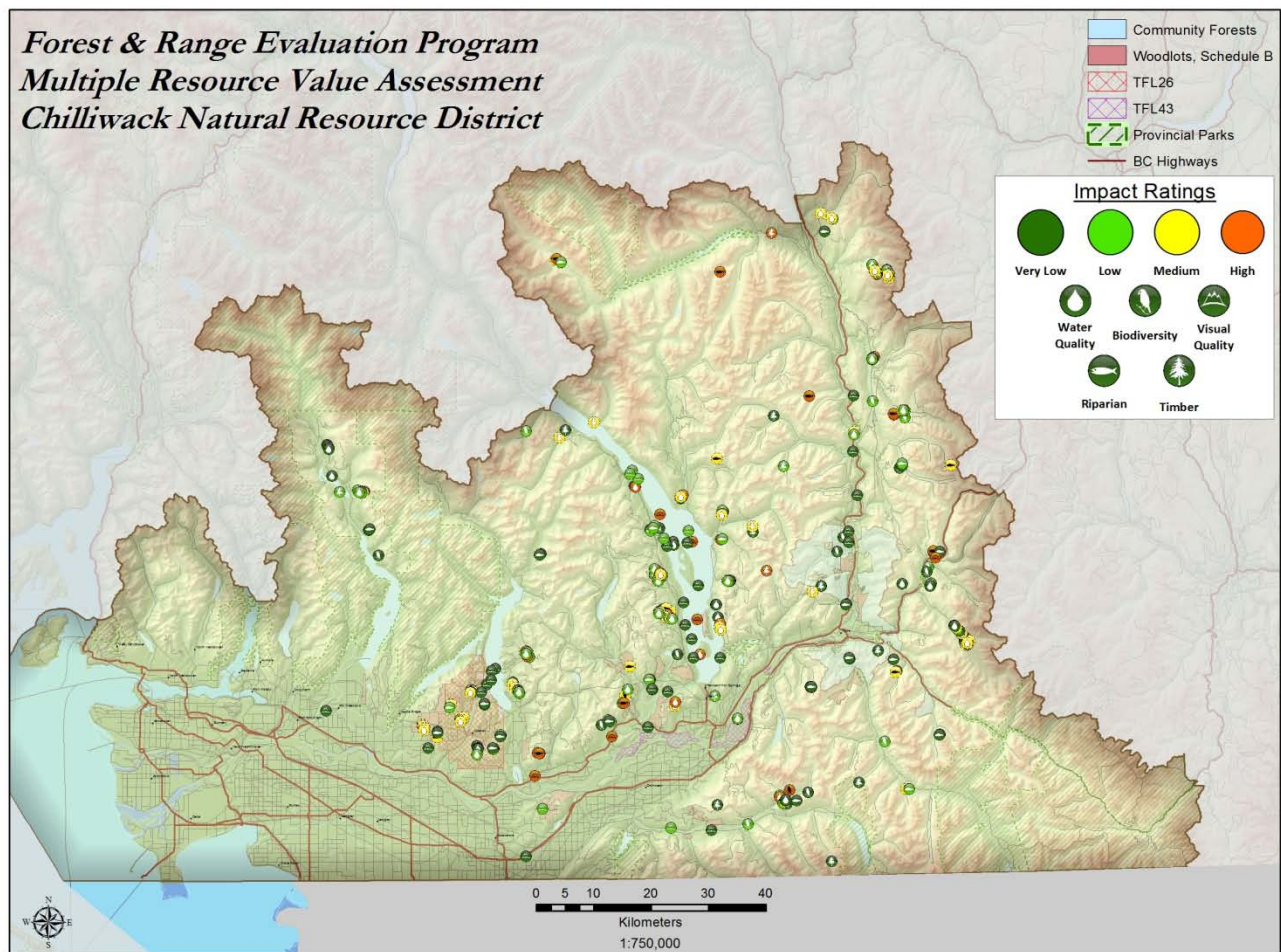
The Chilliwack Natural Resource District is the most densely populated district in the province, encompassing the major population centres of the Lower Mainland and the Fraser Valley.

The district's forest resources are very important to the area's economic activity. This area contributes to the sustainable annual harvest of the Fraser TSA and is part of the broad fiber profile that sustains the forest industry in BC and secondary industries which are linked to the forest resource industry. Currently the district has an Allowable Annual Cut of 1 270 000 m³ within the Fraser TSA, as well as, a smaller component of area based tenure AAC's (TFL, Community Forest Agreements or Woodlots). Many of the First Nation communities are located in the forest community interface area. Tourism, recreation, biodiversity, scenic, and conservation values are also very important in the district.

There is a diverse range of ecosystems and species in the District. Three broad physiographic units shape the area: the Coast and Cascade Mountains border the District on the north and east; the Fraser lowland, a broad plain of riverine and glacial deposits, extends east from Vancouver to the community of Hope; and the Fraser estuary which includes the delta and tidal areas surrounds the outlet of the Fraser River. Within these physiographic units are five biogeoclimatic zones: Coastal Western Hemlock (CWH), Mountain Hemlock (MH), Interior Douglas-fir (IDF), Engelmann Spruce-subalpine fir (ESSF), and Alpine Tundra (AT).

The District's varied topography and climate support a rich variety of wildlife. More than 300 species of migratory and resident birds, 45 species of mammals and 11 species of amphibians and five species of reptiles range throughout the area. The District, along with the adjacent districts, provide critical areas of habitat for wildlife and endangered species. The northern spotted owl has the highest profile of the species of management concern in the Fraser TSA, and is recognized as nationally endangered. The Lower Fraser River and its tributaries are spawning and migration corridors for chinook, chum, coho, sockeye and pink salmon, as well as a number of other valuable fish species.

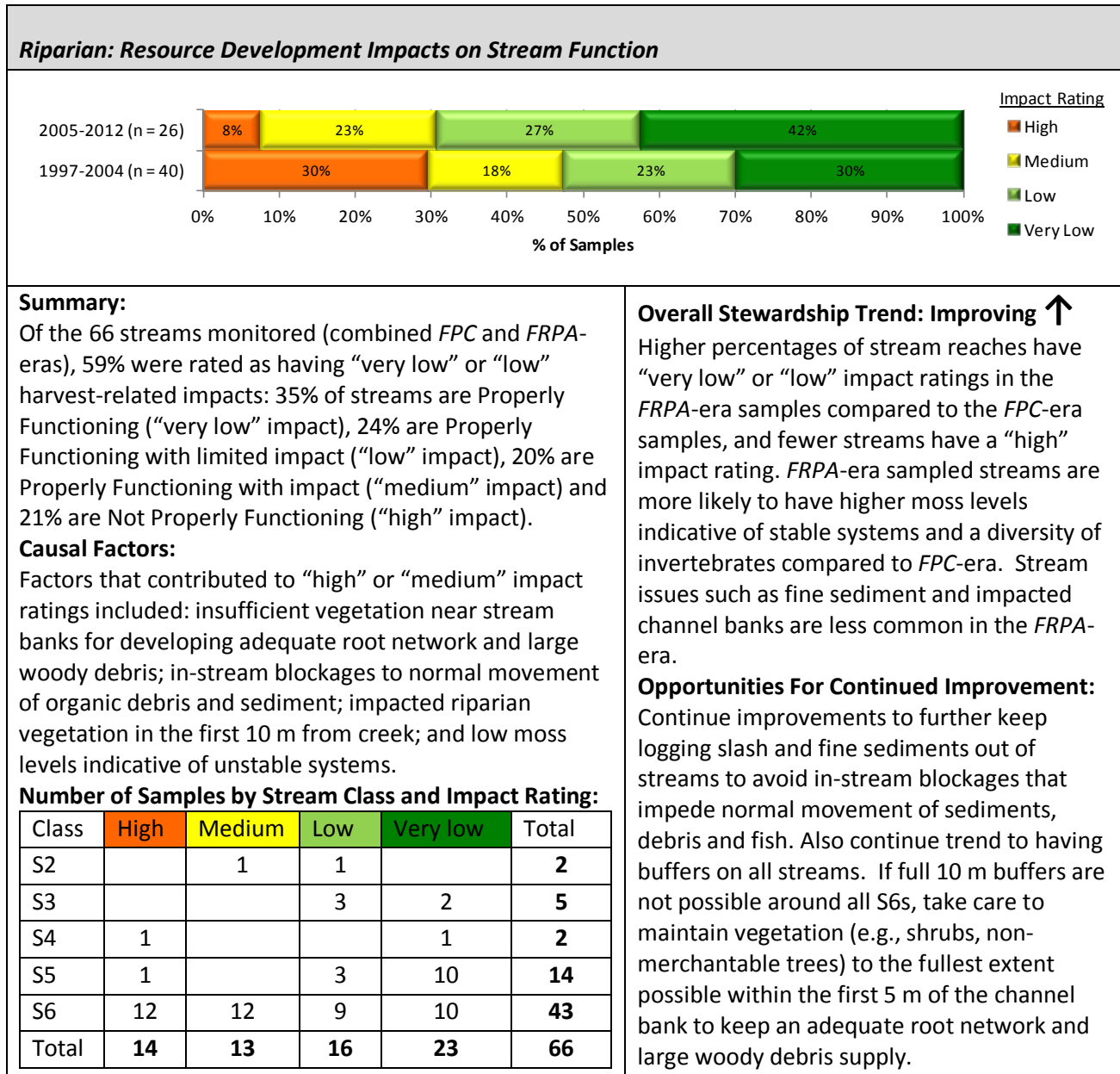
Figure 2: Chilliwack Natural Resource District, showing FREP sample locations and results (see <http://www.for.gov.bc.ca/hfp/frep/publications/mrva.htm> for a high-resolution version of this map).



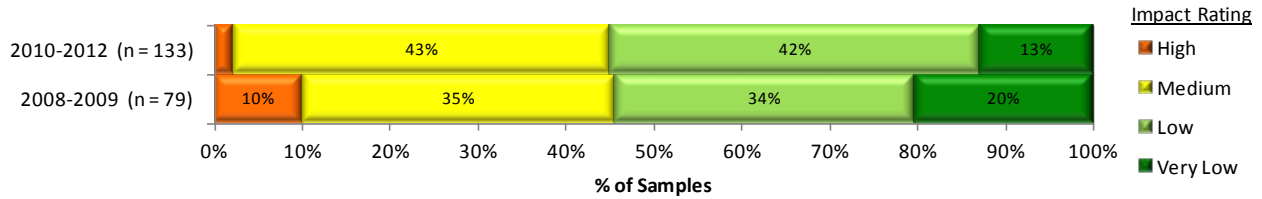
KEY RESULTS BY RESOURCE VALUE AND OPPORTUNITIES FOR CONTINUED IMPROVEMENT

Table 1 describes the resource values assessed for the Chilliwack 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, only approximating the *Forest and Range Practices Act* (*FRPA*) era, but allowing for a comparison between earlier and later stewardship practices. The impact rating indicates the effect of the resource development on the resource value, from “very low” to “high” impact.

Table 1: Resource development impact rating, key findings, and opportunities for improvement by resource value for the Chilliwack Natural Resource District.



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



Summary:

Of the 212 road segments assessed from 2008 to 2012, 55% were rated as having “very low” or “low” road-related impact. Site assessments show the range for potential sediment generation as 16% “very low” (“very low” impact), 39% “low” (“low” impact), 40% “moderate” (“medium” impact), and 5% “high” (“high” impact).

Causal Factors:

See opportunities for improvement for “medium” and “high” impacted road segments. Some suggestions apply to ongoing maintenance issues, while others may apply to new road construction.

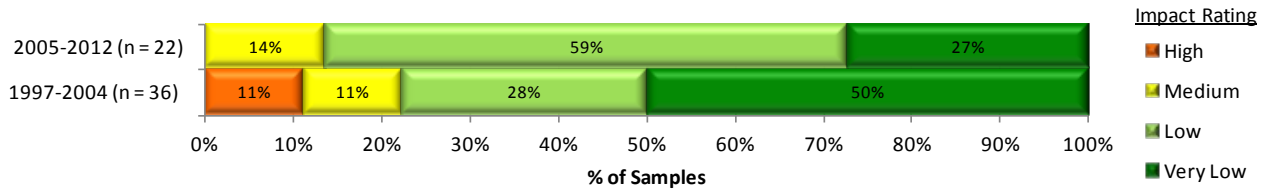
Overall Stewardship Trend: *Neutral*

Trending for water quality is based on *FRPA* survey years (not *FPC* vs. *FRPA*) to capture impact of road traffic and maintenance. There is higher percentage of “medium” and “low” impacted stream segments in the later survey years but overall the trend is neutral.

Opportunities For Improvement:

The most frequent suggestions for improvement are: increase the number of strategically placed culverts; outflow armouring as needed, promptly seed and protect bare soil; and use cross ditches and kickouts.

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



Summary:

Of 58 cutblocks sampled (combined *FPC* and *FRPA*-eras), 81% of sites were rated “very low” or “low” harvest-related impact. Considering total retention, retention quality, and coarse woody debris quantity and quality, 41% sites are rated as “very low” impact on biodiversity, 40% as “low,” 12% as “medium,” and 7% as “high.” An additional nine blocks were sampled and assessed for individual indicators but could not be ranked due to lack of baseline data from timber cruise plot data from the same ecosystems.

Causal Factors:

93% of all blocks had $\geq 3.5\%$ tree retention, increasing to 96% in the *FRPA*-era. Large snag retention decreased to lower than baseline. Big diameter tree density (≥ 70 cm dbh) decreased. The number of tree species retained improved in the *FRPA*-era and is similar to expected baseline values. The range of coarse woody debris volume over many blocks is similar to baseline values (compared to characteristics of retention patches). Coarse woody debris quality (i.e., volume from ≥ 30 cm dbh pieces, and density of big coarse woody debris ≥ 20 cm dbh and ≥ 10 m long) is slightly lower in the *FRPA*-era.

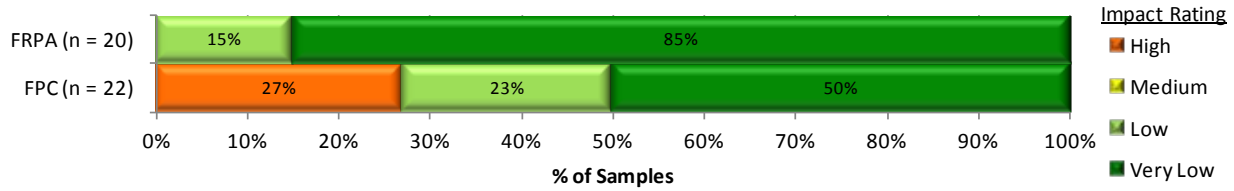
Overall Stewardship Trend: *Neutral*

Percent retention increased from an average 26.7% under the *FPC* to 36.3% in the *FRPA*-era. Much of the increase came from very high (>30%) retention. In particular there was increasing retention in the CWHms biogeoclimatic ecosystem classification zone cutblocks, going from an average of 41% (12 *FPC*-era blocks) to 51% (9 *FRPA*-era blocks). Management for spotted owl was a factor in these very high retention CWHms blocks.

Opportunities For Continued Improvement:

Continue trend to leave at least low levels of retention (e.g., >3%) on most cutblocks with a larger range of retention (e.g., 3 to 30%) over many blocks, with higher levels as needed for particular issues such as species at risk. Improve retention quality by leaving higher densities of large snags and big diameter trees.

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



Summary:

Of the 42 landforms assessed (22 harvested using Forest Development Plans under the *FPC* and 20 harvested under Forest Stewardship Plans under the *FRPA*), 86% were rated with “very low” or “low” harvest-related impacts on achieving the Visual Quality Objectives. VQOs were “well met” (“very low” impact on achieving VQO) on 67% of landforms, “met” (“low” impact) on 19%, “borderline” (“medium” impact) on 10%, “not met” on 10%, and “clearly not met” (“high” impact) on 5%.

Causal Factors:

17% of the openings contained visually effective levels of tree retention (> 22% by volume or stem count) and 43% 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
M				1	1
PR	4		8	25	37
R	2			2	4
Total	6	0	8	28	42

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

Overall Stewardship Trend: Improving ↑

There are more landforms rated “very low” or “low” impact post-harvest under the *FRPA* and none rated “high”. *FRPA* openings had better cutblock design (14% more “very low” impacted openings).

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.

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

Summary:

Data is based on preliminary observations since less than 30 polygons have been surveyed. Sampled stands were selected from areas harvested 20 to 40 years ago; therefore the young stand reflects the forest practices of those eras. Generally, harvesting was located in mid to high elevation sites. This is reflected in the preliminary results of the 17 polygons sampled in 2012. The mean age of the polygons sampled was 28.4 years. 78% of all the trees sampled were live and healthy. The weighted average total stems/ha (for all biogeoclimatic ecosystem classification zones) was 2593 stems/ha and 704 stems/ha for well-spaced trees. The four leading stand damaging agents for the 170 plots were abiotic: snow press (44 of 170 plots); tree competition (44 of 170 plots); unknown sweep (15 of 170 plots); broken top (7 of 170 plot). No change in leading species between declaration and the stand development monitoring survey was found in 15 of the 17 polygons.

Causal Factors:

From only 17 polygons sampled to-date it appears that the stands in the Fraser timber supply area are very healthy and productive. The majority of forest health factors are abiotic tree competition and snow press.

Overall Stewardship Trend: *Insufficient data*

No trending can be established at this time.

Opportunities For Improvement:

Natural regeneration tends to result in clumpy distribution. Planted stands typically have more uniform spacing which decreases inter-tree competition and potentially decreases snow press. If economically justifiable, spacing of young productive stands would also decrease the inter tree competition.

Soils: Resource Development Impacts on Soil Productivity and Hydrologic Function

There were only four Soils samples in the Chilliwack 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. 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

Tables 2 provides ratings of stewardship effectiveness at the site-level results. 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 South Coast Region as determined by resource development impact rating (ID = Insufficient Data; sample sizes in brackets).

Resource Value	Effectiveness of Practices in Achieving Resource Stewardship Objectives: % Very low + Low Resource Development Impact Rating (sample size in brackets)			
	South Coast Region Comparison			South Coast Region ^a
	Chilliwack District	Sea to Sky District	Sunshine Coast District	
Riparian – all data	59% (66)	65% (55)	63% (65)	62% (186)
FRPA-era data	69% (26)	81% (16)	63% (38)	69% (80)
FPC-era data	53% (40)	59% (39)	63% (27)	58% (106)
Water quality – all data	55% (212)	60% (136)	81% (230)	66% (578)
2010–2012 samples	55% (133)	72% (61)	83% (157)	70% (351)
2008–2009 samples	54% (79)	49% (75)	77% (73)	60% (227)
Stand-level biodiversity –all data	81% (58)	94% (52)	75% (72)	82% (182)
FRPA-era data	86% (22)	100% (17)	89% (35)	91% (74)
FPC-era data	78% (36)	91% (35)	62% (37)	77% (108)
Visual Quality				
FRPA	100% (20)	100% (12)	65% (20)	86% (52)
FPC	73% (22)	83% (18)	ID (0)	73% (40)
Timber (stand development monitoring)	65% (17)	ID (0)	86% (14)	74% (31)

^a Includes the Chilliwack, Sea to Sky and Sunshine Coast Natural Resource Districts

DISTRICT MANAGER COMMENTARY¹

I am pleased to see that forest stewardship values are generally well managed in the Chilliwack Natural Resource District, and are potentially improving under the *FRPA*. The results for Visual Quality management appear to have improved under the *FRPA* with attention paid to the necessary elements of cutblock design to meet overall VQOs. The visual aesthetics of forests in the Chilliwack District are visible to a large local, provincial, national and international population and as such, forest professionals need to be world leaders. Riparian function has also improved under the *FRPA* with approximately 69% of streams showing a “very low” or “low” impacted condition, and there appear to be some workable practice changes that can bring this number closer to 100%. The information gathered for Water Quality indicates some room for improvement, recognizing the mix of old and new roads that create complexities for forest managers. Results from these assessments indicate that strategically placed culverts during new road construction, culvert outflow armouring, prompt seeding of exposed soil and using cross ditches/kickouts during road management will all contribute toward improved water quality results. While Stand-level Biodiversity results are generally acceptable, additional attention to site-level opportunities to maintain ecological anchors (e.g., snags, wildlife and large diameter trees) where available will improve these assessments. I look forward to continuous improvement as licensees follow the recommendations of this report.

Overall, I am cognisant that the assessments in this report are based upon evaluation criteria to support the advancement of sustainable resource management practices and that a lower than desired assessment does not necessarily mean a practice has not met the minimum legislative requirements. The results do, however, indicate there may be risks to stewardship values associated with ongoing or extensive use of some of these types of practices. Based on the findings of this report, I expect licensees will:

- Carefully consider the various elements of stand-level biodiversity (especially leaving higher densities of large snags, coarse woody debris and big diameter standing trees) in planning and field operations, both at the stand-level, and also across stands;
- Minimize fine sediment delivery on all roads and at stream crossings and other structures;
- Minimize soil disturbance within 10 m of streams; retain understory vegetation and non merchantable trees for cut bank stability wherever operationally feasible; and avoid leaving woody debris on small streams that could create stream blockages post harvest;
- Continue to use good visual block design and consider landforms when planning cutblocks in visually sensitive areas.

District staff should continue to monitor forest and resource practices for all *FRPA* values, emphasizing those that warrant some improvement, namely water quality and stand-level biodiversity. Forest professionals should also consider monitoring results when preparing, reviewing, and implementing forest stewardship plans and operational plans.

¹ Commentary supplied by Chilliwack Natural Resource District Manager, Allan Johnsrude.

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 Chilliwack Natural Resource District as compared to adjacent TSAs or districts. Table A2.1 below describes the same results but by the North, South and Coast areas and the province as a whole. The three operational areas represent combined natural resource regions.

Table A2.1: FREP monitoring results by resource value for the North, South and Coast Areas and the province as a whole compared to the Chilliwack Natural Resource District.

Resource Value	Effectiveness of Practices in Achieving Resource Stewardship Objectives: % Very low + low resource development impact rating (sample size in brackets)				
	Chilliwack District	Forests, Lands and Natural Resource Operations Areas			Province
		North	South	Coast	
Riparian – all data	59% (66)	71% (654)	69% (678)	58% (451)	67% (1783)
FRPA-era data	69% (26)	71% (257)	68% (277)	62% (198)	67% (732)
FPC-era data	53% (40)	71% (394)	70% (401)	55% (253)	67% (1048)
Water quality – all data	55% (212)	66% (992)	70% (1515)	76% (1526)	71% (4033)
2010–2012 samples	55% (133)	67% (505)	70% (823)	79% (1021)	73%(2349)
2008–2009 samples	54% (79)	64% (487)	70% (692)	70% (505)	68% (1684)
Stand-level biodiversity –all data	81% (58)	42% (655)	54% (780)	77% (455)	56% (1890)
FRPA-era data	86% (22)	49% (270)	61% (347)	84% (201)	63% (818)
FPC-era data	78% (36)	38% (385)	49% (433)	72% (254)	50% (1072)
Visual Quality					
FRPA	100% (20)	73% (122)	54% (136)	78% (153)	69% (411)
FPC	73% (22)	56% (96)	65% (85)	62% (68)	61% (249)