



Multiple Resource Value Assessment (MRVA)

Kootenay Lake Timber Supply Area

December 2013

FOREWORD

Forest management in British Columbia is governed by a hierarchy of legislation, plans and resource management objectives. For example, federal and provincial acts and regulations, Land Use and Forest Stewardship plans, and protected areas and reserves collectively contribute to achieving balanced environmental, social and economic objectives. Sustainable forest management is key to achieving this balance and a central component of forest management certification programs. The purpose of the Multiple Resource Value Assessment (MRVA) report is to provide resource professionals and decision makers with information about the environmental component of this 'balance' so that they can assess the consistency of actual outcomes with their expectations.

The Forest and Range Practices Act (FRPA) lists 11 resource values essential to sustainable forest management in the province; biodiversity, cultural heritage, fish/riparian and watershed, forage and associated plant communities, recreation, resource features, soils, timber, visual quality, water, and wildlife. The MRVA report is a summary of the available field-based assessments of the conditions of these values. Field assessments are generally conducted on or near recently harvested cut blocks and therefore are only evaluating the impact of industrial activity and not the condition of the value overall (e.g. they don't take into account protected areas and reserves). Most of the information is focused on the ecological state of the values and provides useful information to resource managers and professionals on the outcomes of their plans and practices. This information is also valuable for communicating resource management outcomes to stakeholders, First Nations and the public, and as a foundation for refining government's expectations for sustainable resource management in specific areas of the province.

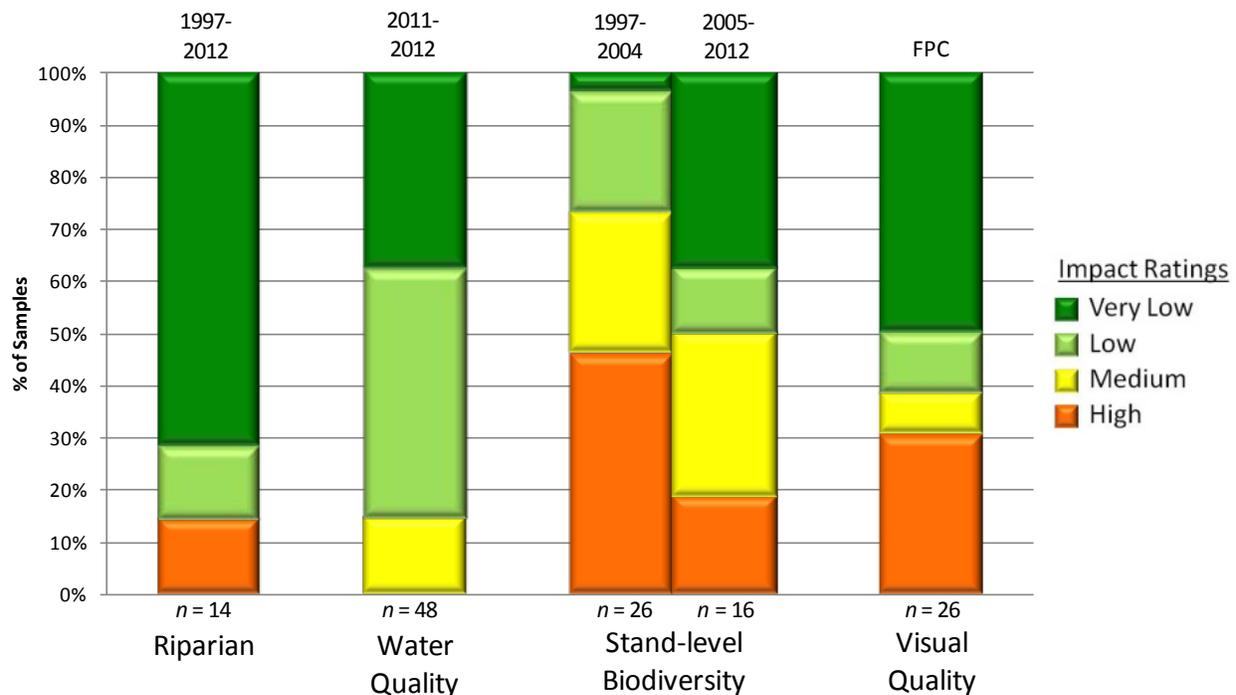
I encourage readers to review the full report and direct any questions or comments to the appropriate district office.

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, biodiversity, water quality (sediment), and visual quality monitoring conducted in the Kootenay Lake Timber Supply Area 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: Kootenay Lake Timber Supply Area site-level resource development impact ratings by resource value with trend (Riparian, stand-level biodiversity and visual quality trend by harvest year/era. Water quality trends by evaluation year.)



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 Kootenay Lake Timber Supply Area. 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.

KOOTENAY LAKE TIMBER SUPPLY AREA – ENVIRONMENTAL AND STEWARDSHIP CONTEXT

This report covers the Kootenay Lake Timber Supply Area (figure 2). It is bounded by Glacier National Park to the north, the U.S.A. to the south, and the Purcell and Selkirk mountains to the east and west respectively. The TSA covers approximately 1.2 million hectares. The First Nations which have identified traditional territories within the Kootenay Lake timber supply area are: Ktunaxa/Kinbasket, Shuswap and Okanagan. The Lower Kootenay Band (a band within the Ktunaxa/Kinbasket) is the only First Nation that has a reserve and/or community located within the area (at Creston). The economy of the Kootenay Lake Timber Supply Area is diversified with forestry, agriculture, tourism and the public sector predominating.

Forests in the TSA have the distinction of being among the most productive in the interior of the province. In addition, lower elevation forests have a wide diversity of tree species. Within the land base currently considered available for timber harvesting, Douglas-fir, western larch, Engelmann spruce, subalpine fir, lodgepole pine, western redcedar and western hemlock are the predominant species.

About 50 per cent of the total land base is considered productive forest land managed by the Ministry of Forests, Lands, and Natural Resource Operations (approximately 613 300 hectares). Currently about 42 percent of that productive forest is considered available and suitable for harvesting (or 21 percent of the total TSA land base).

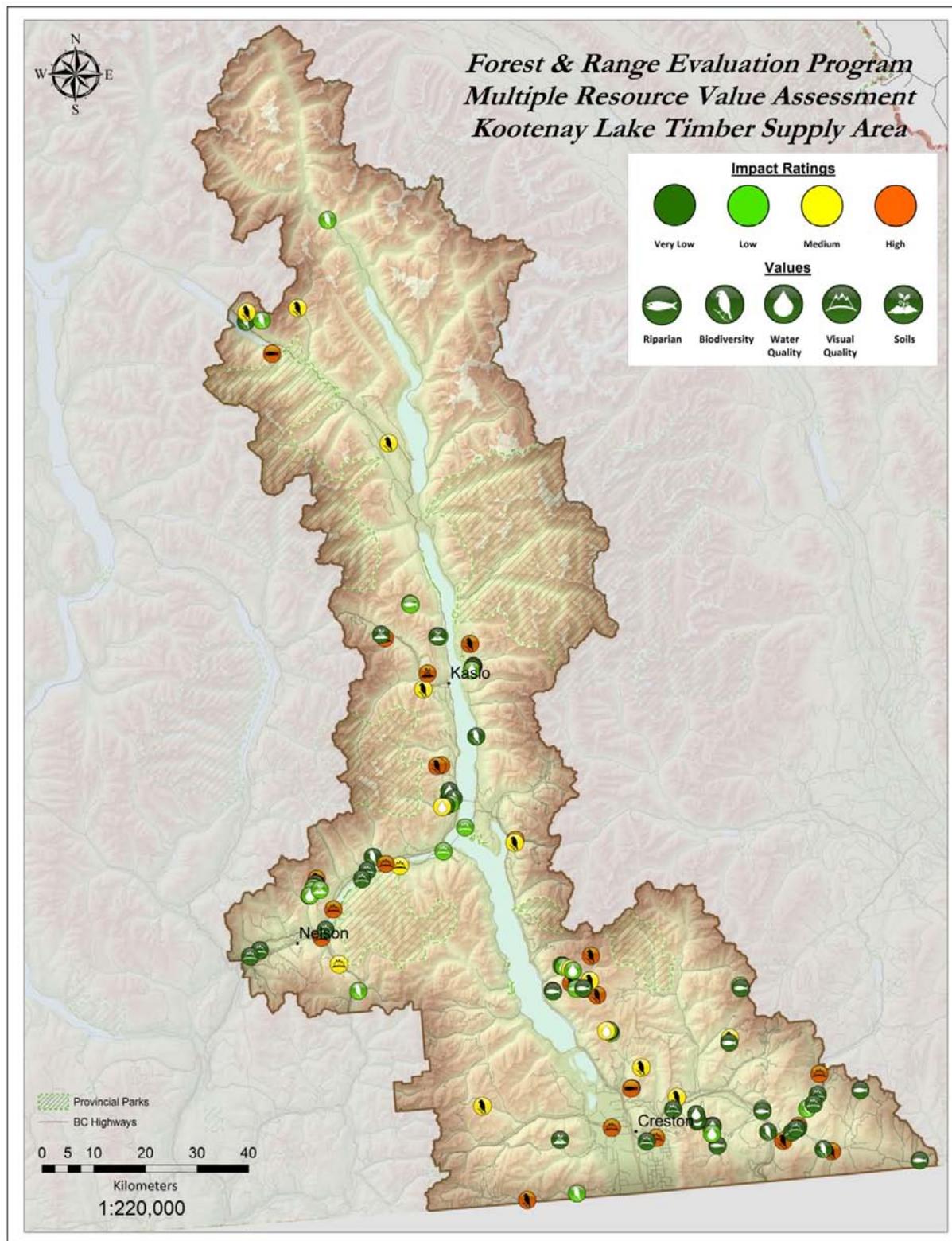
The forests of the TSA provide a wide range of forest land resources, including timber, water, minerals, forage, fisheries, wildlife, scenic landscapes and recreation opportunities. The TSA includes part or all of several parks, including the Purcell Wilderness Conservancy, Kokanee Glacier, Lockhart, Kianuko, West Arm and Goat Range provincial parks. Numerous recreation trails and campsites are scattered throughout the district.

Important non-timber values include domestic and community watersheds, visuals, caribou, controlled recreation areas and ungulate winter range.

Bark beetles active in the TSA that are considered significant include mountain pine beetle, Douglas-fir beetle and spruce beetle. Many of the forest stands in the southeast portion of the TSA are pure pine types and have been deemed a high priority for treatment and control for mountain pine beetle. Yearly, detailed aerial surveys, ground probes and fall & burn activities are budgeted for to control the spread of mountain pine beetle.

Water is a primary and fundamental resource. Whether occurring as surface or groundwater, it is a crucial component of the ecosystems found in the area. The recreational fishery is important throughout the TSA. As well, approximately 36 per cent of the timber harvesting land base is managed with a priority on protecting water quality and quantity for consumptive uses.

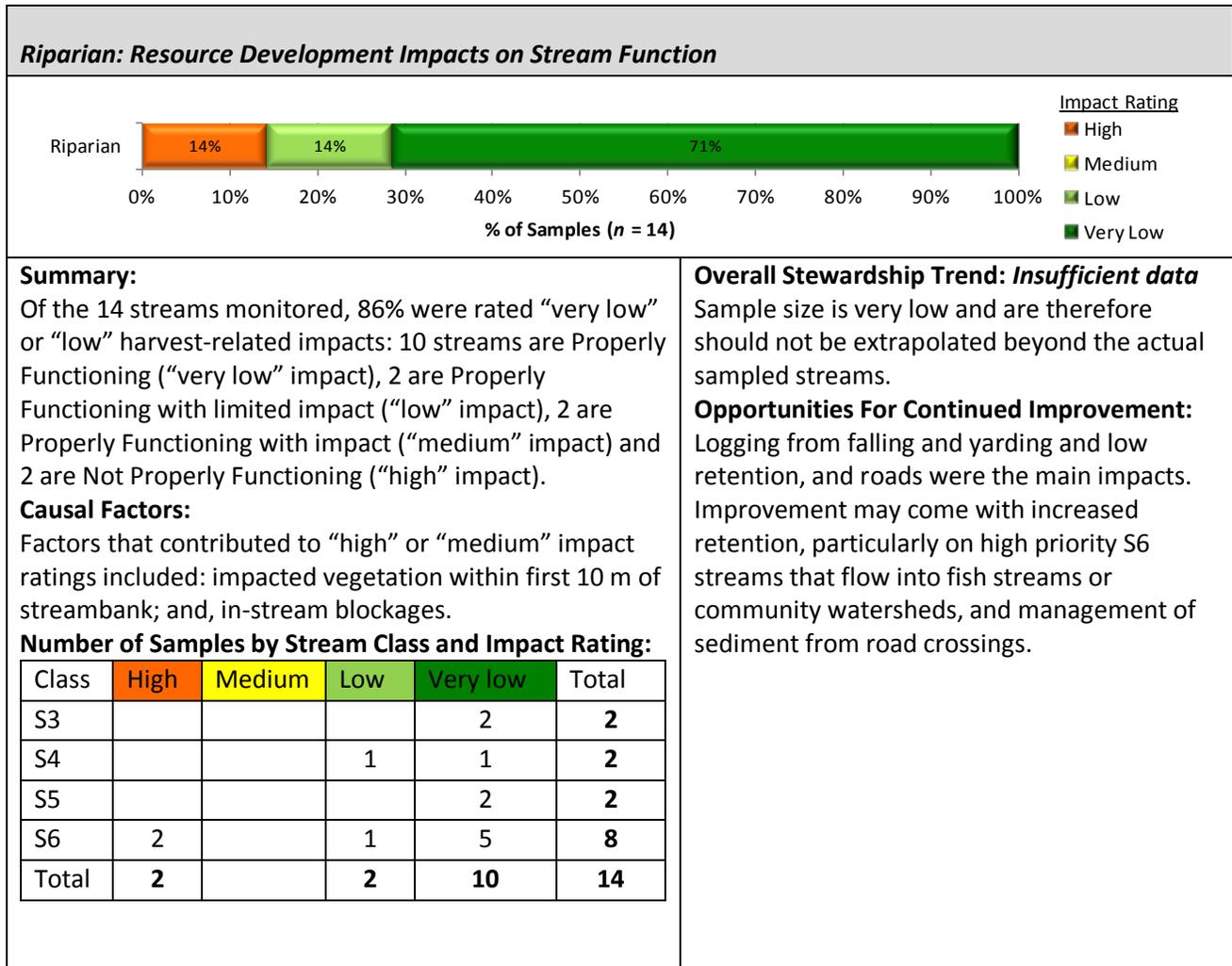
Figure 2: Kootenay Lake Timber Supply Area, showing FREP sample locations and results (see <http://www.for.gov.bc.ca/hfp/frep/publications/mrva.htm> for a high-resolution version of this map).



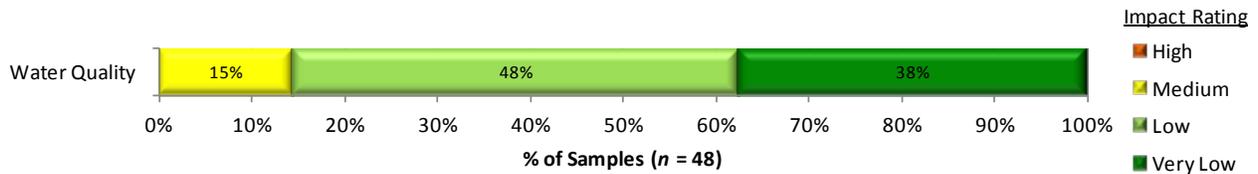
KEY RESULTS BY RESOURCE VALUE AND OPPORTUNITIES FOR CONTINUED IMPROVEMENT

Table 1 shows the resource values assessed for the Kootenay Lake Timber Supply Area, 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 Kootenay Lake Timber Supply Area.



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



Summary:

Of the 48 road segments assessed, 85% were rated as “very low” or “low” road-related impact. Site assessments show the range for potential sediment generation as 38% “very low” (“very low” impact), 48% “low” (“low” impact), and 15% “moderate” (“medium”).

Causal Factors:

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

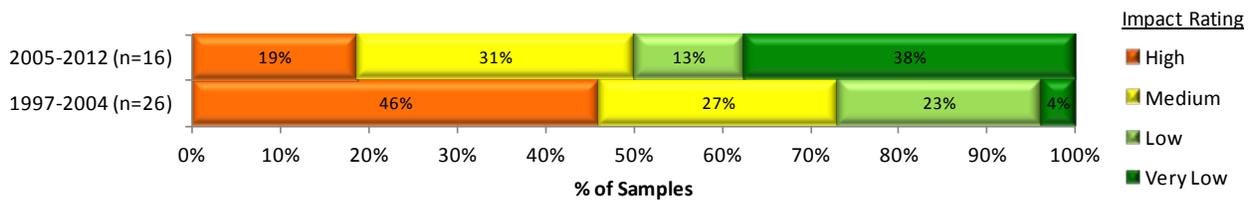
Overall Stewardship Trend: *Insufficient data*

Trending for water quality is based on survey years, to capture impact of road traffic and maintenance. The 48 road segments originated from just seven cutblocks and therefore results should not be extrapolated beyond these road systems.

Opportunities For Improvement:

The most frequent suggested maintenance issue was to armour, seed and protect bare soil.

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



Summary:

Of 42 cutblocks sampled (combined *FPC* and *FRPA*-eras), 36% of sites were rated as “very low” or “low” harvest-related impact.

Considering total retention, retention quality, and coarse woody debris quantity and quality, 17% sites are rated as “very low” impact on biodiversity, 19% as “low,” 29% as “medium,” and 36% as “high.” There were three other blocks sampled but could not be ranked since there was insufficient baseline for one and two others had no data from the patch retention though patches did exist (likely a safety issue).

Causal Factors:

55% of all blocks had more than 3.5% treed retention. This equated to 20% of the sampled area with low levels (<3.5%) of retention. Average retention is 17.3%. Large snag (≥ 30 cm dbh and ≥ 10 m high) density has decreased in the *FRPA*-era, while large diameter tree density (≥ 40 or 50 cm dbh) has decreased.

Overall Stewardship Trend: *Increasing* ↑

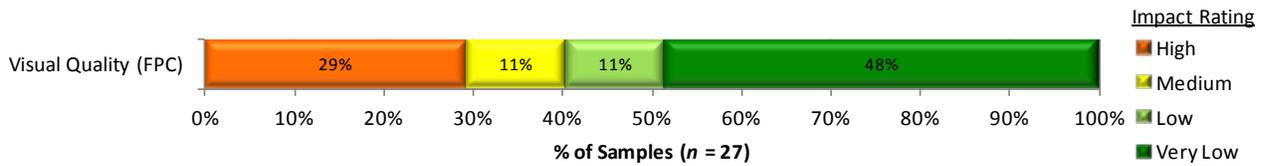
There has been increase in average retention in *FRPA*-era, partly due to fewer blocks with zero retention and partly due to increasing numbers of blocks with high (>30%) retention. Harvested area coarse woody debris volumes and quality has increased.

Opportunities For Continued Improvement:

Continue trend to leave at least low levels of retention on every cutblock with a range of retention (e.g., 3 to 30%) over many cutblocks with densities of large trees similar to pre-harvest conditions.

Increase retention quality by retaining large snags in densities similar to pre-harvest conditions and the full range of pre-harvest tree species.

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



Summary:

Of the 27 landforms assessed (26 FPC cutblock and 1 FRPA cutblock), 60% were rated with “very low” or “low” harvest-related impacts on achieving the Visual Quality Objectives.

VQOs were “well met” (“very low” impact) on 48% of landforms, “met” (“low” impact) on 11%, “borderline” (“medium” impact) on 11%, “not met” on 22%, and “clearly not met” (“high” impact) on 7%.

Causal Factors:

63% of the openings contained visually effective levels of tree retention (>22% by volume or stem count) and 67% 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	1	2	10	17
R	4	2	1	2	9
Total	8	3	3	13	27

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

Overall Stewardship Trend: *Insufficient data*

There is currently only one sample conducted on FRPA-era harvested blocks. Future trend analysis will occur after sufficient FRPA-era assessments are completed.

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.

Soils: Resource Development Impacts on Soil Productivity and Hydrologic Function

There are currently only seven Soils samples in the Kootenay Lake Timber Supply Area. 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 Kootenay Boundary 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)						
	Kootenay Boundary Region Comparison						Kootenay Boundary Region ^a
	Kootenay Lake TSA	Invermere TSA	Golden TSA	Revelstoke TSA	Cranbrook TSA	Arrow Boundary TSAs	
Riparian – all data	86% (14)	92% (25)	54% (35)	37% (35)	72% (25)	73% (48)	66% (182)
FRPA-era data	ID (8)	ID (4)	39% (18)	ID (13)	ID (9)	ID (10)	61% (62)
FPC-era data	ID (6)	90% (21)	71% (17)	36% (22)	69% (16)	71% (38)	68% (120)
Water quality – all data	ID (48)	77% (71)	60% (88)	64% (59)	78% (132)	73% (95)	73% (493)
2010–2012 samples		ID (52)	ID (35)	ID (28)	ID (51)	ID (8)	78% (222)
2008–2009 samples		ID (19)	ID (53)	ID (31)	74% (81)	76% (87)	68% (271)
Stand-level biodiversity –all data	36% (42)	31% (39)	66% (38)	45% (31)	55% (31)	42% (59)	45% (240)
FRPA-era data	50% (16)	25% (20)	88% (16)	29% (17)	69% (16)	50% (14)	52% (99)
FPC-era data	27% (26)	37% (19)	50% (22)	64% (14)	40% (15)	40% (45)	41% (141)
Visual Quality							
FRPA	ID (1)	ID (4)	ID (3)	ID (2)	20% (19)	45% (11)	39% (36)
FPC	62% (26)	ID (0)	ID (8)	82% (11)	ID (0)	ID (5)	68% (50)

^a Includes the Selkirk and Rocky Mountain Natural Resource Districts.

DISTRICT MANAGER COMMENTARY¹

The evaluation criteria in this report is based upon stewardship objectives (e.g., sustainable resource management practices) and do not always correspond with the minimum standards set in legislation. A rating of “high” impact to stewardship does not necessarily mean that a practice has not met the legislation or the results and strategies contained within a forest licensee’s forest stewardship plan (FSP). The monitoring results reported in this document contain a mix of stewardship ratings; a number of the resource values still need more samples before a conclusion can be drawn.

Stand-level biodiversity assessments show an increasing trend (more “very low” and “low” impacted blocks) for blocks harvested after 2005. Retention levels have increased in FRPA blocks; I encourage licensees to leave at least low levels of retention on every cutblock with a range of retained valuable ecological attributes (e.g., large snags) in densities similar to pre-harvest conditions to improve these results.

Riparian assessments potentially assess the cumulative effects of forestry practices and natural impacts. From the streams sampled to date, the trend shows the majority of riparian assessments as rated “very low” or “low” impact. More samples are needed to confirm if this good stewardship is a trend. Increasing retention along stream buffers and being cognizant of machine disturbance around streams will improve results for the highly impacted streams.

Water quality assessments are predominantly “very low” and “low” impact indicative of low sediment generation potential, though again the sample size is small and requires more samples to determine if this is a trend. Opportunities for improvement relate largely to maintenance; armour, seed and protect bare soil.

There is insufficient data to determine a trend for the visual quality assessment. More recent assessments are needed to establish a trend. From the samples assessed so far the majority have met the visual quality objectives though improvements should be made. Licensees are encouraged to use visual design techniques to create more natural looking openings and improve upon the Visual Quality Objective results.

District staff should continue to monitor practices for all values with an emphasis on those related to riparian, water quality and visual quality, to gain sufficient samples so that trends can be established for these values.

¹ Commentary supplied by Garth Wiggill, District Manager of the Selkirk Natural Resource District

APPENDIX 1: SUMMARY DESCRIPTION OF RESOURCE DEVELOPMENT IMPACT RATING CRITERIA

Table A1.1 shows the criteria used to determine the resource development impact ratings for each resource value. Detailed rating criteria, methodology, and definition of terms used are described in the companion document *FREP Technical Note #6: Methodologies for Converting FREP Monitoring Results to Multiple Resource Value Assessment (MRVA) Resource Development Impact Ratings* (http://www.for.gov.bc.ca/ftp/HFP/external/!publish/frep/technical/FREP_Technical_Note_06.pdf). The ratings of “very low”, “low”, “medium” and “high” are “technical ratings” based on best available science.

Table A1.1: Criteria for determining resource development impact rating outcomes for each resource value.

Resource Value	FREP Evaluation Question	Indicators	Resource Development Impact Rating Criteria	Very low	Low	Medium	High
Riparian	Are riparian forestry and range practices effective in maintaining the proper functioning of riparian areas?	Fifteen key questions (e.g., intact channel banks, fine sediments, riparian vegetation)	Number of “no” answers on assessment questions of channel and riparian conditions	0–2	3–4	5–6	> 6
Stand-level Biodiversity	Is stand-level retention providing the range of habitat and attributes understood as necessary for maintaining species dependant on wildlife trees and coarse woody debris?	Percent retention, retention quality from nine key attributes (e.g., big patches, density of large diameter trees), coarse woody debris volume, coarse woody debris quality from two key attributes (e.g., density of pieces \geq 10 m and 20 cm, and volume of large diameter pieces)	Cumulative score. A 60/40 weighting is used for tree retention versus coarse woody debris, recognizing the longer-term ecological value of standing retention.	> 70%	55–70%	40–55%	< 40%
Water Quality (sediment)	Are forest practices effective in protecting water quality?	Fine sediment potential	Fine sediment (m^3) due to expected surface erosion or past mass wasting	< 0.1	< 1	1–5	> 5
Soils	Are forest practices preventing site disturbance that is detrimental to soil productivity and hydrologic function?	Amount of access, restoration of natural drainage patterns, road side work area soil disturbance, amount of mature forest and coarse woody debris and restoration of natural drainage patterns	Overall assessment of practices on cutblock to maintain soil productivity and hydrologic function	Well	Moderately		Poor
Cultural Heritage	Are cultural heritage resources being conserved and where necessary protected for First Nations cultural and traditional activities?	Evidence and extent of damage to features, operational limitations, management strategies and type and extent of features	Combined overall cutblock assessment results with consideration of individual feature assessment results	See methodology report			
Timber: Stand Development Monitoring	What is the overall health and productivity of managed 20-40 year stands?	Impacts of forest health factors on stand stocking (ratio of total and well spaced)	Forest health damaging agent (% level of incidence) and level of stocking (well spaced stems per hectare)	\geq 1.7	0.8–1.69	0.3–0.79	0–0.29
Landscape-level Biodiversity	Is the forested matrix at the landscape-level providing the range of habitat understood as necessary for maintaining ecosystem function and old and mature forest dependant species?	Ecosystem representativeness, age class and interior old	Overall ranking: within protected and non-protected areas	Ranking under development			
Visual Quality	How are we managing views in scenic areas and achieving visual quality objectives?	Visual evaluation of block, design of block, percent of landform altered, impact of roads, tree retention and view point importance	Basic visual quality class (determined using the VQC definitions) is compared with the Adjusted VQC (derived using percent alteration measurements and adjustment factors) to determine if VQO is achieved.	VQO achieved, and % alteration low or mid-range	VQO achieved, but % alteration for one or both close to alteration limit	Only one method indicates VQO achieved	Both methods indicate VQO not achieved

APPENDIX 2: COMPARATIVE FREP RESULTS BY RESOURCE VALUE FOR OTHER AREAS

Table 2, in the main body of the document, describes overall ratings for the Kootenay Lake Timber Supply Area 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 Kootenay Lake Timber Supply Area.

Resource Value	Effectiveness of Practices in Achieving Resource Stewardship Objectives: % Very low + low resource development impact rating (sample size in brackets)				
	Kootenay Lake TSA	Forests, Lands and Natural Resource Operations Areas			Province
		North	South	Coast	
Riparian – all data	86% (14)	71% (654)	69% (678)	58% (451)	67% (1783)
FRPA-era data	ID (8)	71% (257)	68% (277)	62% (198)	67% (732)
FPC-era data	ID (6)	71% (394)	70% (401)	55% (253)	67% (1048)
Water quality – all data	ID (48)	66% (992)	70% (1515)	76% (1526)	71% (4033)
2010–2012 samples		67% (505)	70% (823)	79% (1021)	73% (2349)
2008–2009 samples		64% (487)	70% (692)	70% (505)	68% (1684)
Stand-level biodiversity all data	36% (42)	42% (655)	54% (780)	77% (455)	56% (1890)
FRPA-era data	50% (16)	49% (270)	61% (347)	84% (201)	63% (818)
FPC-era data	27% (26)	38% (385)	49% (433)	72% (254)	50% (1072)
Visual Quality					
FRPA	ID (1)	73% (122)	54% (136)	78% (153)	69% (411)
FPC	62% (26)	56% (96)	65% (85)	62% (68)	61% (249)