



Multiple Resource Value Assessment (MRVA)

Invermere TSA

Rocky Mountain 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.

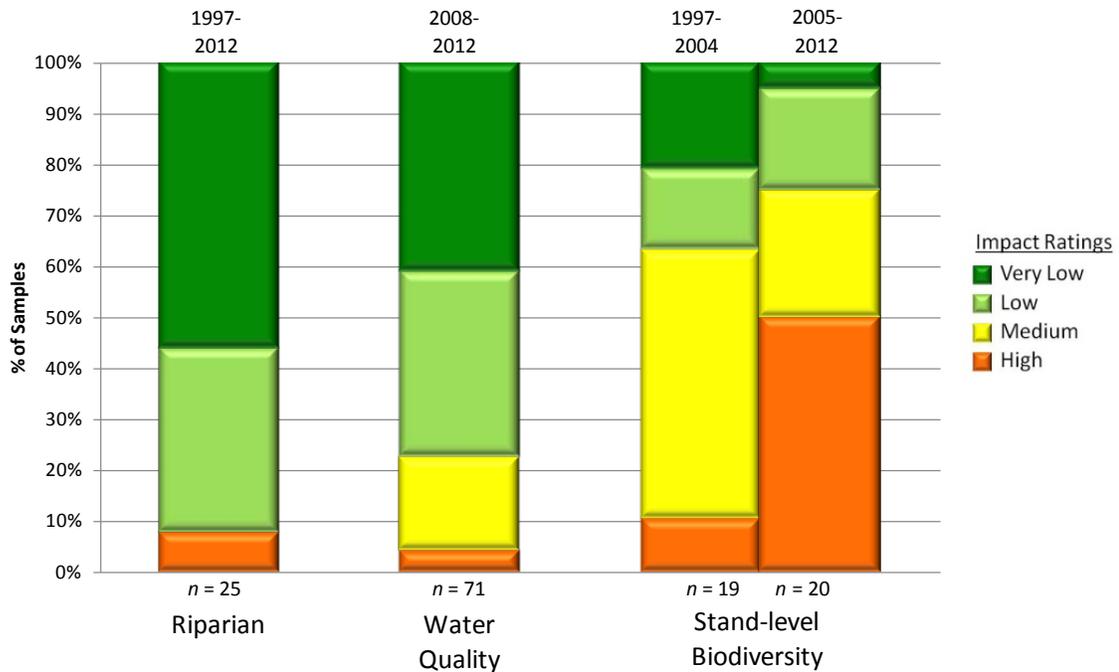
I encourage readers to review the full report and direct any questions or comments to the appropriate district office.

Tom Ethier
Assistant Deputy Minister
Resource Stewardship Division
Ministry of Forest, 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, and water quality (sediment) monitoring conducted in the Invermere 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: Invermere Timber Supply Area 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 Invermere 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:

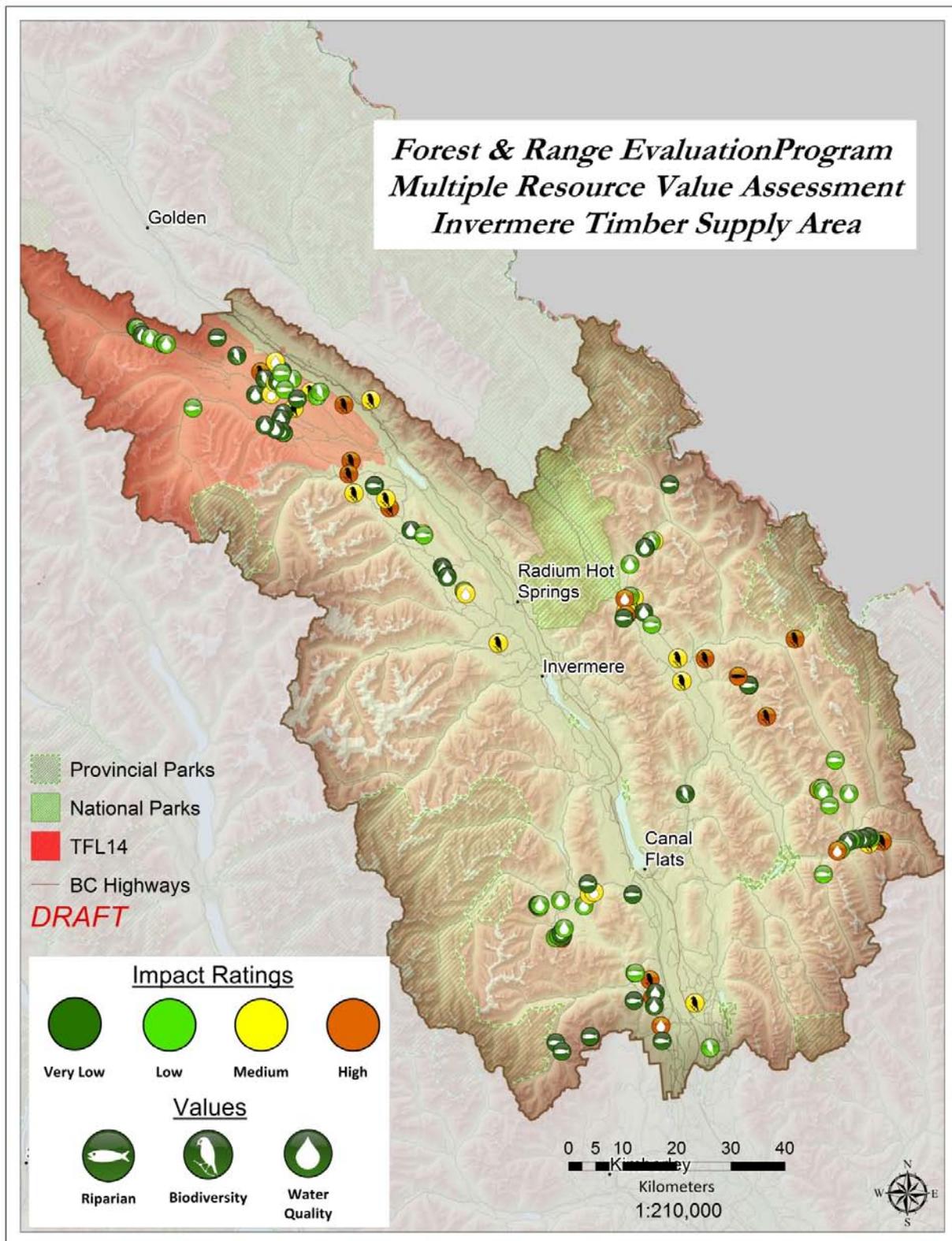
<http://www.for.gov.bc.ca/hfp/frep/publications/reports.htm>. Licensees can request data collected on their operating areas. FREP staff will assist licensees with the analysis of their data and the preparation of licensee-specific MRVA reports.

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.

INVERMERE TIMBER SUPPLY AREA – ENVIRONMENTAL AND STEWARDSHIP CONTEXT

This report covers the Invermere Timber Supply Area and TFL 14, both of which are contained within the Rocky Mountain Natural Resource District (figure 2). This area is bounded by the Cranbrook TSA to the south, the Golden TSA to the north, the Rocky Mountains and Alberta border to the east, and the Purcell Mountains to the west. The TSA and associated TFL cover approximately 1.2 million hectares. The TSA contains one national park (Kootenay) and eleven provincial parks; Mount Assiniboine, Height of the Rockies, Top of the World, Purcell Wilderness Conservancy, Bugaboo Glacier, Windermere Lake, Whiteswan Lake, Premier Lake, Canal Flats, James Chabot and Dry Gultch. Due to the range of habitat types, the area is often described as being unique in North America, given its density and diversity of ungulates and other mammals and birds. This region supports 70% of the bird species known to occur in BC and 62% of all the bird species that breed in the province. The Columbia Wetlands is an important habitat for nesting and migration of numerous species. The public sector, tourism, construction and forestry account for about 92% of the total employment in the Invermere TSA with forestry at 19 percent. Most First Nations people in the Invermere TSA are part of the Ktunaxa people. Two First Nations communities exist in the TSA, the Columbia Lake Band at Windermere and the Shuswap Band at Invermere. The Shuswap people are culturally and linguistically aligned with the Shuswap Nation and politically aligned with the Ktunaxa Kinbasket Tribal Council.

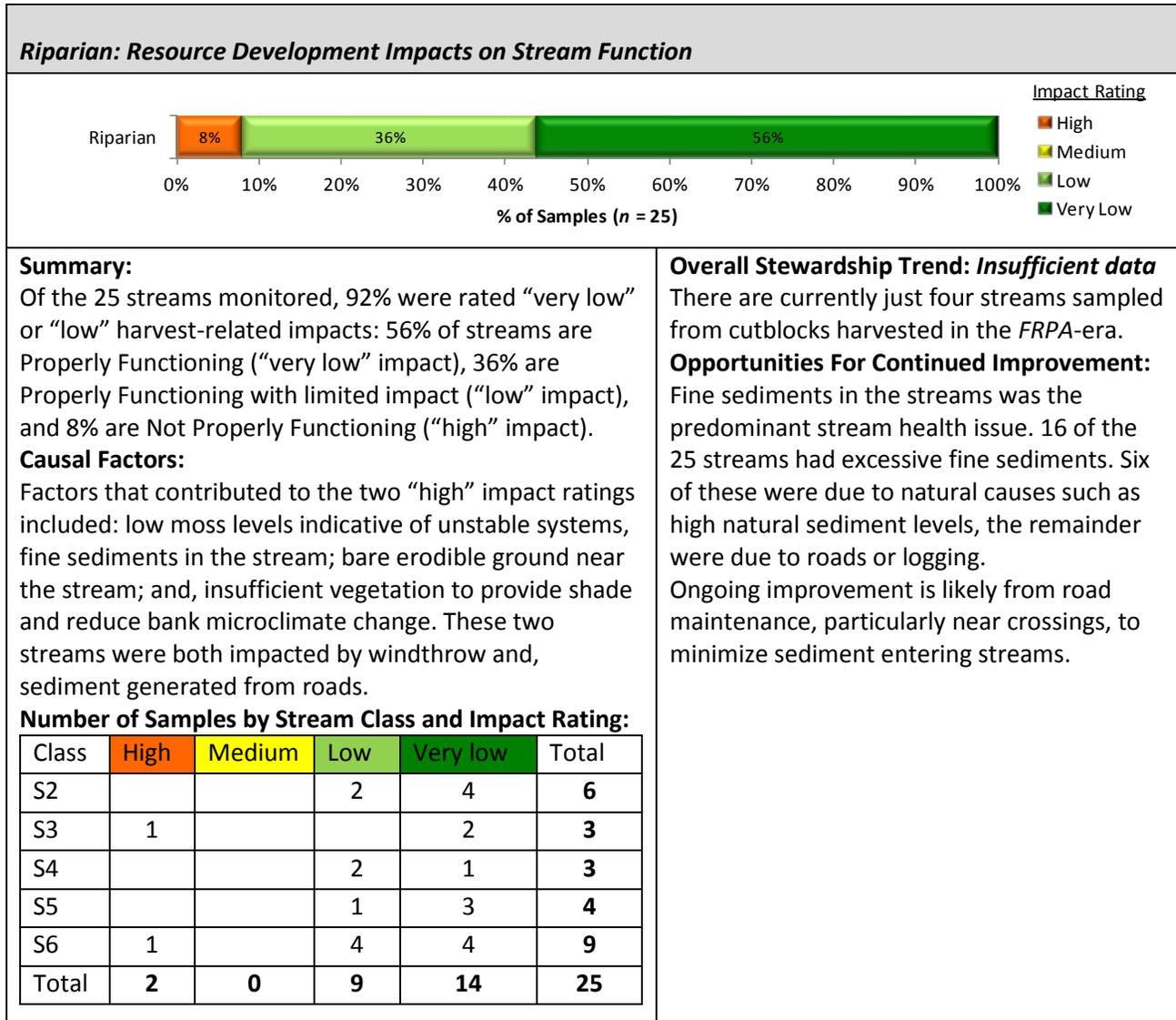
Figure 2: Invermere Timber Supply Area, showing FREP sample locations and results (see <http://www.for.gov.bc.ca/hfp/frep/publications/mrva.htm> for a high-resolution version of this map).



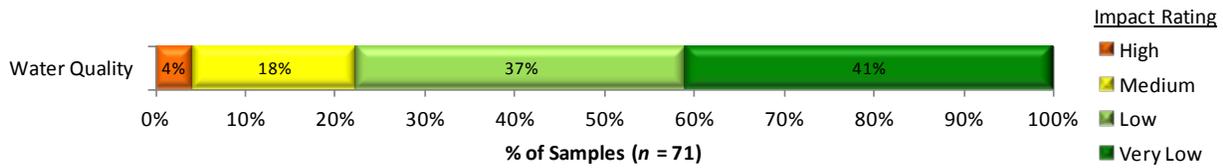
KEY RESULTS BY RESOURCE VALUE AND OPPORTUNITIES FOR CONTINUED IMPROVEMENT

Table 1 shows the resource values assessed for the Invermere 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 Invermere Timber Supply Area.



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



Summary:

Of the 71 road segments assessed, 77% were rated as “very low” or “low” road-related impact. Site assessments show the range for potential sediment generation as 41% “very low” (“very low” impact), 37% “low” (“low” impact), 18% “moderate” (“medium” impact), 4% “high” or “very high” (“high” impact).

Causal Factors:

See opportunities for improvement for moderate or poor road segments. Some opportunities will apply to ongoing maintenance issues, while others would mainly apply to new road construction.

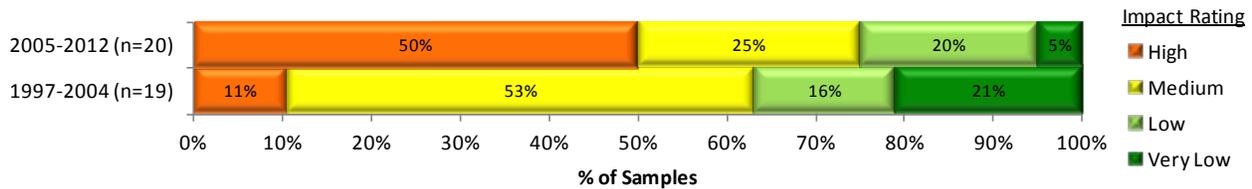
Overall Stewardship Trend: *Insufficient data*

Trending for water quality is based on survey years to capture impact of road traffic and maintenance. The 71 road segments originate from 12 harvested cutblocks. Trending will occur when further data is collected.

Opportunities For Improvement:

Suggested issues for the “high” or “medium” impacted road segments are: avoid long gradients approaching streams; seek alternate alignment; and, use cross ditches, kickouts, etc.

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



Summary:

Of 39 cutblocks, 31% of sites were rated as “very low” or “low” harvest-related impact. Considering total retention, retention quality, and coarse woody debris quantity and quality, 18% sites are rated as “very low” impact on biodiversity, 18% as “low,” 38% as “medium,” and 31% as “high.” One additional block was sampled but could not be ranked due to no baseline (timber cruise data for the same subzone), though individual indicators are still assessed.

Causal Factors:

69% of all blocks had more than 3.5% treed retention. Average retention is 16.8%. The density of large trees (≥40cm) is low compared to baseline levels as is the number of tree species retained.

Overall Stewardship Trend: *Declining* ↓

Retention has decreased from the FPC-era as more blocks harvested post 2005 than pre 2005 have ‘very low’ retention (less than 3.5%), have fewer ‘large’ trees, and have lower quantity and quality of coarse woody debris (smaller diameter and shorter lengths). There are a high percentage of openings with very low retention in both eras.

Opportunities For Continued Improvement:

Leave at least low levels of retention on every cutblock. Leave large trees for the site in densities similar to that found in pre-harvest conditions.

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|---|
| Visual Quality: Resource Development Impacts on Achievement of Visual Quality Objectives (VQO) |
| There are currently only four Visual Quality samples in the Invermere TSA. Analysis will be completed in subsequent years when more samples are available. |
| Soils: Resource Development Impacts on Soil Productivity and Hydrologic Function |
| There is currently only one Soils sample in the Invermere TSA. 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 | | | | | | West Coast Region ^a |
| | Invermere TSA | Cranbrook TSA | Golden TSA | Revelstoke TSA | Kootenay Lake District | Arrow Boundary District | |
| Riparian – all data | 92% (25) | 72% (25) | 54% (35) | 37% (35) | 86% (14) | 73% (48) | 66% (182) |
| FRPA-era data | ID (4) | ID (9) | 39% (18) | ID (13) | ID (8) | ID (10) | 61% (62) |
| FPC-era data | 90% (21) | 69% (16) | 71% (17) | 36% (22) | ID (6) | 71% (38) | 68% (120) |
| Water quality – all data | 77% (71) | 78% (132) | 60% (88) | 64% (59) | ID (48) | 73% (95) | 73% (493) |
| 2010–2012 samples | ID (52) | ID (51) | ID (35) | ID (28) | | ID (8) | 78% (222) |
| 2008–2009 samples | ID (19) | 74% (81) | ID (53) | ID (31) | | 76% (87) | 68% (271) |
| Stand-level biodiversity –all data | 31% (39) | 55% (31) | 66% (38) | 45% (31) | 36% (42) | 42% (59) | 45% (240) |
| FRPA-era data | 25% (20) | 69% (16) | 88% (16) | 29% (17) | 50% (16) | 50% (14) | 52% (99) |
| FPC-era data | 37%(19) | 40% (15) | 50% (22) | 64% (14) | 27% (26) | 40% (45) | 41% (141) |

^a Arrow Boundary, Rocky Mountain, Columbia and Kootenay Lake Natural Resource Districts.

DISTRICT MANAGER COMMENTARY¹

Overall, the evaluation criteria in this report are based upon stewardship objectives (eg., sustainable resource management practices) and do not always correspond with the minimum standards set in legislation. A “high” resource development impact rating does not necessarily mean that a practice has not met legislation or the results and strategies contained within a forest licensee’s forest stewardship plan (FSP). For all values assessed, sample sizes are still relatively low however it is still timely and of interest to discuss early findings and opportunities for improvement.

Riparian assessments potentially assess the cumulative effects of forestry and range practices, natural impacts, and any other past and present industrial uses that may have had impact upstream or within the reaches sampled. The stream reaches sampled to date were rated largely (92%) as having “low” or “very low” impact indicating that forest licensees are doing well in this category. Fine sediments are indicated as the predominant stream health issue and therefore, opportunities for continued improvement include road maintenance to minimize sediment entering streams.

The water quality protocol involves estimating the amount of potential sediment generation and delivery to watercourses as a result of forestry related activities. While the majority of road segments assessed indicate a “very low” and “low” impact, opportunities for continued improvement are to avoid long gradients approaching streams; seek alternative alignment; and use cross ditches and kickouts.

Stand level biodiversity assessments show a declining trend as more blocks harvested post 2005 than pre 2005 have very low retention. If the decline was a short term effort to mitigate the very high levels of retention that were left in the mid to late 1990’s, this may not be of great concern. However, I caution licensees to pay attention to retention quantity and quality by leaving at least low levels of retention on every block and leaving large trees for the site in densities similar to pre-harvest conditions. Licensees are also reminded of the value of coarse woody debris for habitat and soil stability functions.

Visual quality, soils, and timber (stand development monitoring) values have had some monitoring conducted however, inadequate sampling has been done to include in this report. District staff should continue to monitor practices for all values with an emphasis on those related to stand-level biodiversity, visuals and timber.

I encourage licensee forest professionals to become more familiar with the monitoring protocols and to use the monitoring results when preparing, reviewing and implementing operational plans.

¹ Commentary supplied by Rocky Mountain Natural Resource District Manager, Ray Morello.

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 describes overall ratings for the Invermere Timber Supply Area as compared to adjacent TSAs or districts. The table below describes the same results but by the North, South and Coast areas and the province as a whole. The three operational areas represent combined natural resource regions.

Table A2.1: FREP monitoring results by resource value for the North, South, and Coast Areas and the province as a whole compared to the Invermere Timber Supply Area.

| Resource Value | Effectiveness of Practices in Achieving Resource Stewardship Objectives: % Very low + low resource development impact rating (sample size in brackets) | | | | |
|-----------------------------------|---|--|-------------------|-------------------|-------------------|
| | Invermere TSA | Forests, Lands and Natural Resource Operations Areas | | | Province |
| | | North | South | Coast | |
| Riparian – all data | 92% (25) | 71% (654) | 69% (678) | 58% (451) | 67% (1783) |
| FRPA-era data | ID (4) | 71% (257) | 68% (277) | 62% (198) | 67% (732) |
| FPC-era data | 90% (21) | 71% (394) | 70% (401) | 55% (253) | 67% (1048) |
| Water quality – all data | 77% (71) | 66% (992) | 70% (1515) | 76% (1526) | 71% (4033) |
| 2010–2012 samples | ID (52) | 67% (505) | 70% (823) | 79% (1021) | 73%(2349) |
| 2008–2009 samples | ID (19) | 64% (487) | 70% (692) | 70% (505) | 68% (1684) |
| Stand-level biodiversity all data | 31% (39) | 42% (655) | 54% (780) | 77% (455) | 56% (1890) |
| FRPA-era data | 25% (20) | 49% (270) | 61% (347) | 84% (201) | 63% (818) |
| FPC-era data | 37%(19) | 38% (385) | 49% (433) | 72% (254) | 50% (1072) |