



Multiple Resource Value Assessment (MRVA)

South Island 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.

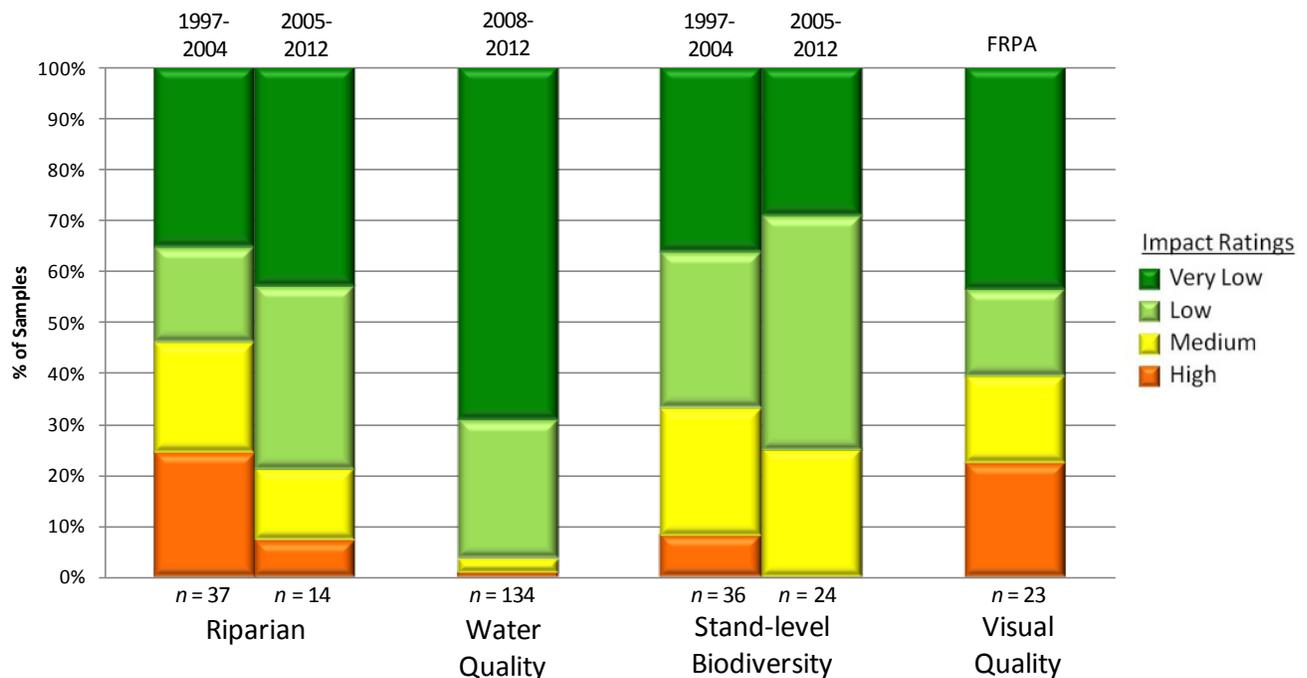
I encourage readers to review the full report and direct any questions or comments to the appropriate district office.

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 South Island 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: South Island Natural Resource District 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 South Island 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 detailed description of the MRVA methodology and terms used in this report, please go to:

http://www.for.gov.bc.ca/ftp/HFP/external!/publish/frep/technical/FREP_Technical_Note_06.pdf. Appendix 1 contains a brief description of the criteria used to determine impact ratings.

SOUTH ISLAND NATURAL RESOURCE DISTRICT – ENVIRONMENTAL AND STEWARDSHIP CONTEXT

Located within the Ministry of Forests, Lands and Natural Resource Operations' West Coast Region, the South Island Natural Resource District covers the southern third of Vancouver Island. The district boundaries extend from Victoria to Denman and Hornby Islands on the east coast, and from Victoria to the southern shores of Nootka Sound. The southeastern portion of the district supports a population of approximately 610 000. The demands from an increasing population for urban development, parks, and recreation are increasing the pressure on natural resources.

Thirty-six First Nations have traditional territories located within the district's geographical area. Four treaty associations and two tribal councils represent all but three of the First Nations. Nine of the 10 Douglas Treaty First Nations and four of the five Maa-nulth Treaty First Nations are located in the district.

The South Island Natural Resource District includes the Arrowsmith TSA, part of the Pacific TSA, and Tree Farm Licences 44, 46, 54, 57, and 61 (see Figure 2), which cover approximately 1.9 million ha. In contrast to other TSAs in British Columbia, the Arrowsmith TSA is made up of many non-contiguous parcels of land, ranging in size from a few hectares to a few thousand hectares. These parcels are situated amongst private land; urban and suburban areas; rural agricultural lands; and national, provincial, and regional parks and reserves.

The east side of the district has a long history of timber harvesting and urban development. The forested area consists principally of second- and third-growth Douglas-fir stands, with lesser amounts of red alder, western redcedar, western hemlock, grand fir, and western white pine. A substantial portion of this area is private managed forest land. The Crown land parcels of the Arrowsmith TSA are relatively small and fragmented on the east coast of the island and often interface with population centres.

The west side of the district has a shorter history of timber harvesting. The forested area is primarily old-growth forest with some maturing second growth. Forest stands consist mainly of western hemlock, western redcedar, amabilis fir, and yellow-cedar, with minor amounts of red alder, Douglas-fir, and mountain hemlock. A very high proportion of the land on the district's west side is Crown land. The land is roughly equally divided in area between timber supply areas (Arrowsmith and Pacific) and major area-based tenures.

The district has a temperate coastal climate with cool, wet winters and warm summers. The district does not experience long periods of drought or freezing temperatures. Mature forests are not prone to catastrophic, landscape-level disturbances. Fire, insect, and disease outbreaks tend to be small and localized.

The timber industry on Southern Vancouver Island was initiated in the mid-1800s. At the time, harvested lands were either converted to settlements or were left to regenerate naturally. Artificial reforestation began to be implemented in the years after World War II. The amount of backlog not satisfactorily restocked area in the district is nil. Old-growth timber remains an important component of the annual harvest, but there is a growing transition to second-growth management. The harvested volume of second-growth timber is steadily increasing as these stands become mature.

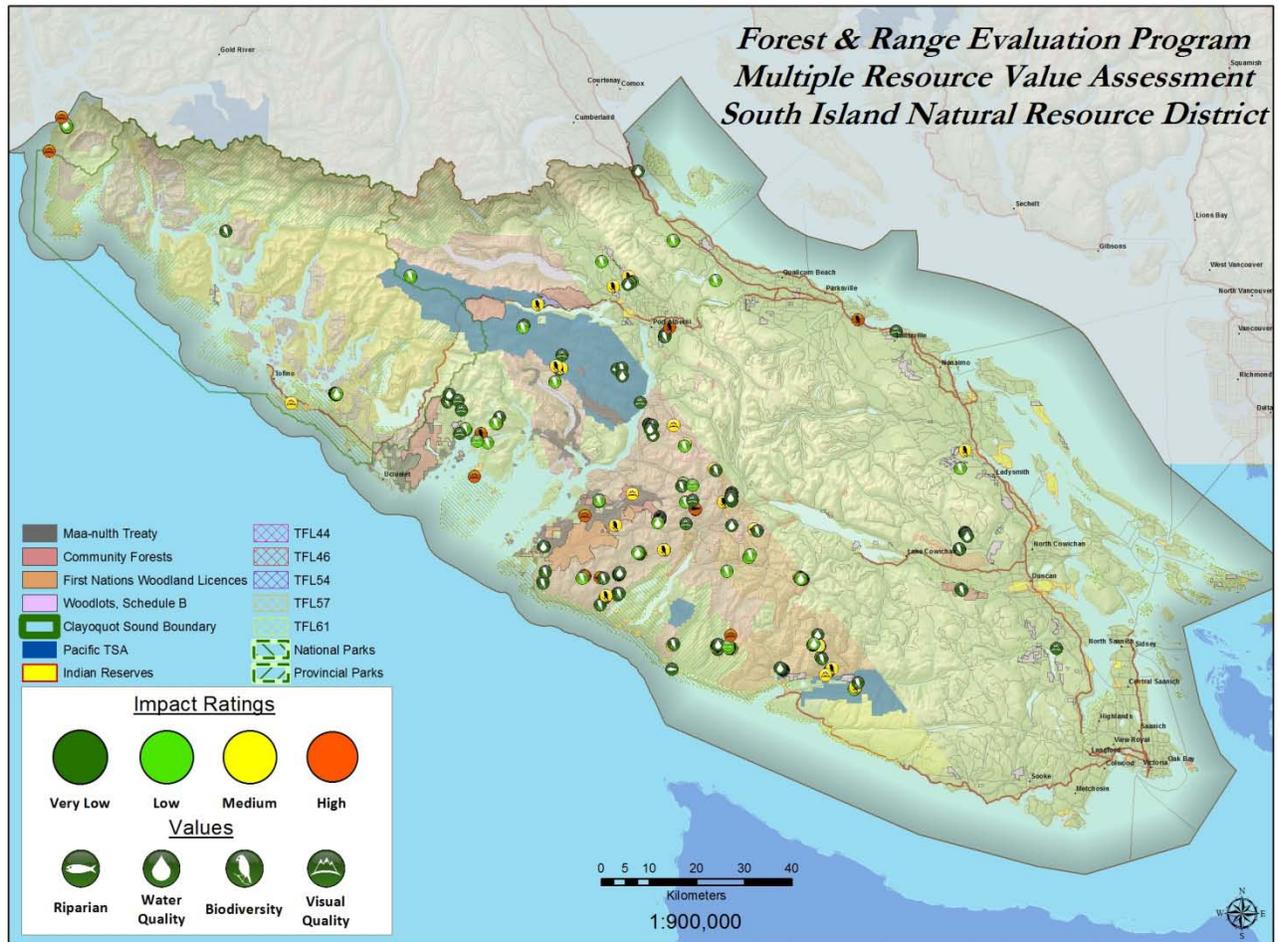
In December 2000, resource management zones and objectives were established for the district under the Vancouver Island Land Use Plan Higher Level Plan Order. This plan identifies Special Management Zones in which forest resource management activities are carried out with special consideration of primary non-timber values. Enhanced Forestry Zones were also identified to encourage economic activity without affecting other core values. In addition to this plan, two landscape unit plans established objectives for old growth and wildlife tree retention in the Caycuse, Gordon, Nitinat, San Juan, Sproat, and Walbran landscape units. Objectives have also been established for old-growth management areas within the Coastal Douglas-fir moist maritime biogeoclimatic subzone (CDFmm). In 2008, land-use objectives were established for Clayoquot Sound to maintain aquatic ecosystems, biological diversity, and community and First Nations cultural values.

Forest ecosystems in Clayoquot Sound are managed in accordance with the principles of sustainable management as embodied in the Clayoquot Sound Watershed Plans.

Specific resource values have been identified as resource features under Government Action Regulation orders. These resource values are visual quality, karst topography, recreation sites and trails, and cultural heritage specific to the Hupacasath First Nation at Thunder Mountain. Wildlife are managed through the establishment of wildlife habitat areas for rare and endangered species (e.g., northern goshawk and marbled murrelet), ungulate winter ranges for deer and Roosevelt elk, and the Parksville Qualicum Wildlife Management Area.



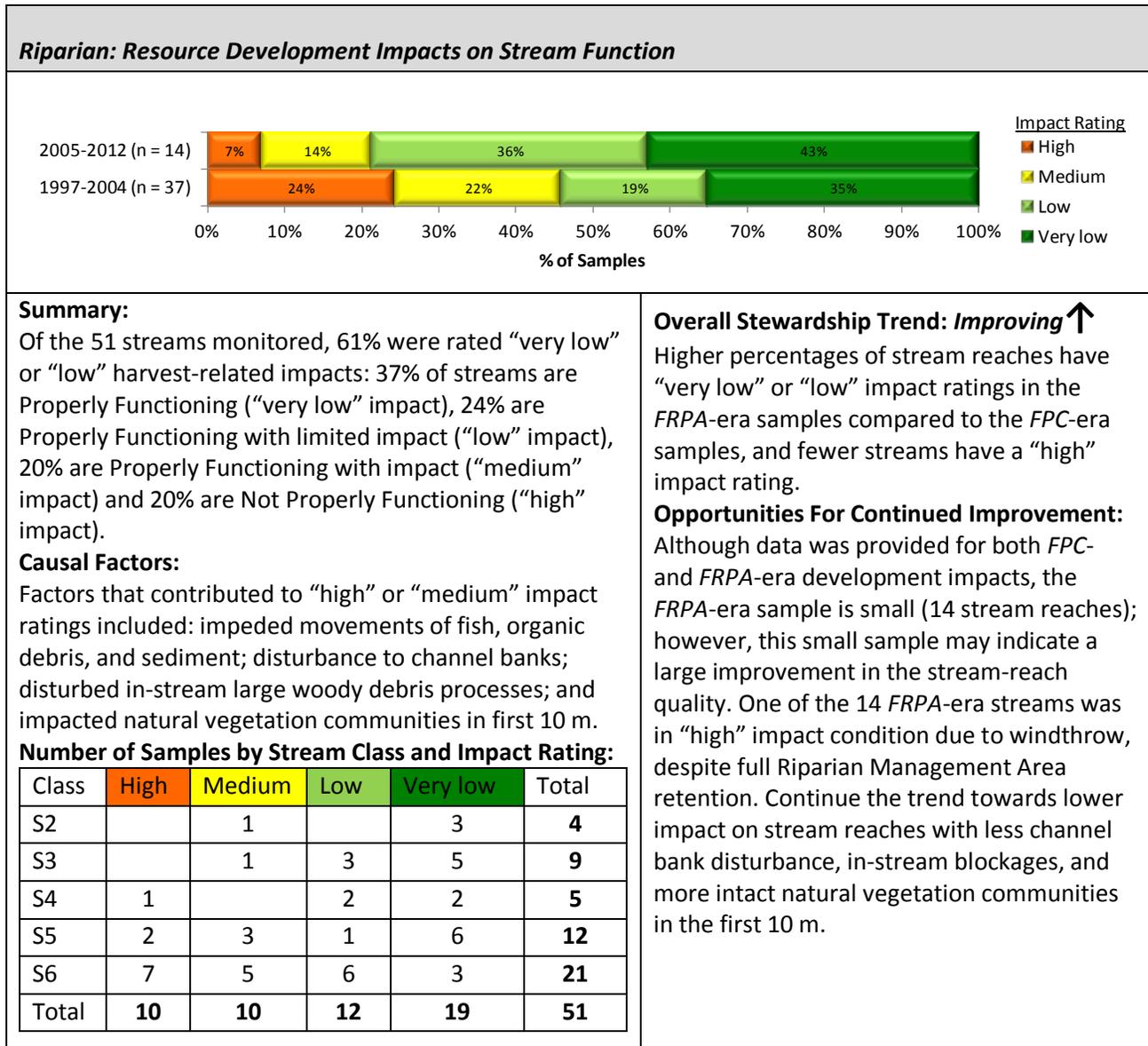
Figure 2: South Island Natural Resource District, showing FREP sample locations and results (see http://www.for.gov.bc.ca/ftp/HFP/external/!publish/frep/maps/MRVA_South_Island_District.pdf for a high-resolution version of this map).



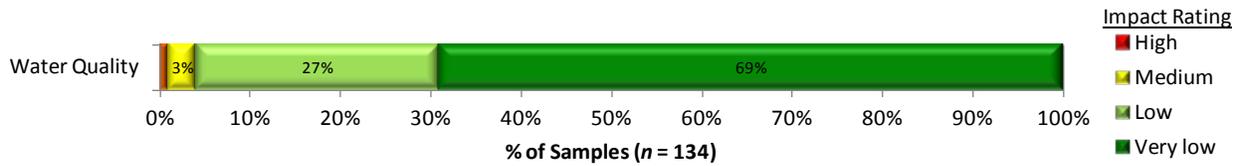
KEY RESULTS BY RESOURCE VALUE AND OPPORTUNITIES FOR CONTINUED IMPROVEMENT

Table 1 shows the resource values assessed for the South Island 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 South Island Natural Resource District.



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



Summary:

Of the 134 road segments assessed, 96% were rated as “very low” or “low” road-related impact. Site assessments show the range for potential sediment generation as 69% “very low” (“very low” impact), 27% “low” (“low” impact), 3% “moderate” (“medium” impact), 0% “high” and 1% “very high” (“high” impact).

Causal Factors:

There were very few road segments with “high” or “medium” impact ratings (4%). 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.

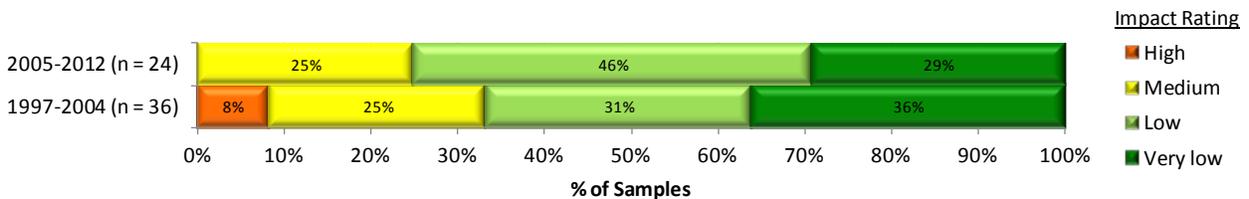
Overall Stewardship Trend: *Insufficient data*

There were less than 10 cutblocks initiating the water quality sampling in the later sample years; therefore, trend information is not currently available.

Opportunities For Improvement:

For the five road segments that fell into “high” or “medium” impact categories, increased numbers of strategically placed culverts would have improved three of them. Too long a gradient leading into stream was the problem for another.

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



Summary:

Of 60 cutblocks, 70% of sites were rated as “very low” or “low” harvest-related impact. Considering total retention, retention quality, and coarse woody debris quantity and quality, 33% sites are rated as “very low” impact on biodiversity, 37% as “low,” 25% as “medium,” and 5% as “high.” Four additional cutblocks were sampled but could not be rated as three had patch retention and no tree data (likely a safety issue), and one was in a biogeoclimatic ecosystem classification subzone with insufficient baseline.

Causal Factors:

Coarse woody debris volume in harvested areas increased from FPC-era (average: 416 m³/ha) to FRPA-era (average: 535 m³/ha). Coarse woody debris quality (i.e., volume from ≥ 30 cm diameter pieces, and density of big coarse woody debris ≥ 20 cm dbh and ≥ 10 m long) improved. 92% of all cutblocks had more than 3.5% tree retention. Retention increased from 21.9% in the FPC to 23.8% in the FRPA-

era. The quality of the retention in terms of average density of large snags, large trees (≥ 70 cm dbh), and number of tree species retained was lower in the FRPA-era.

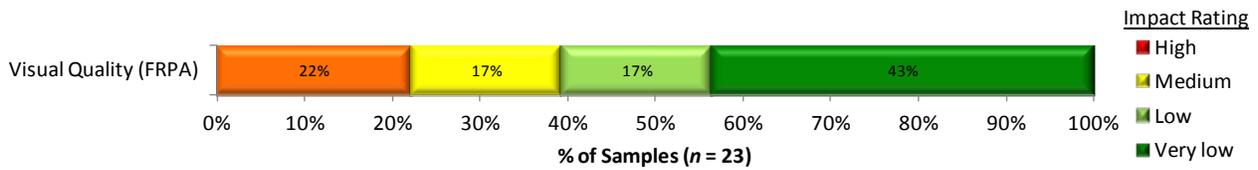
Overall Stewardship Trend: *Neutral*

Overall, a neutral trend is evident, although there are fewer “high” impact to biodiversity cutblocks in the FRPA-era due largely to fewer cutblock with less than 3.5% retention.

Opportunities For Continued Improvement:

Continue leaving retention on every cutblock. Continue trend to good quality coarse woody debris (i.e., big pieces). Increase retention quality by retaining large trees (e.g., ≥ 70 cm dbh) and big snags (e.g., ≥ 10 m tall and ≥ 30 cm dbh) in densities similar to pre-harvest conditions.

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



Summary:

Of the 23 landforms assessed (all FRPA cutblocks), 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 43% of landforms, “met” (“low” impact) on 17%, “borderline” (“medium” impact) on 17%, “not met” on 13%, and “clearly not met” (“high” impact) on 9%.

Causal Factors:

13% of the openings contained visually effective levels of tree retention (> 22% by volume or stem count) and 30% 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		3	2	6	11
PR	4	1	1	3	9
R	1		1	1	3
Total	5	4	4	10	23

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

Overall Stewardship Trend: *Insufficient data*

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

Opportunities For Improvement:

Use existing visual design techniques to create more natural-looking openings and better achieve VQOs. Use partial cutting to retain higher levels of volume/stems. Reduce opening size in retention and partial retention VQO areas.

Cultural Heritage: Resource Development Impacts on Cultural Heritage Resources

There is currently only one Cultural Heritage Sample in the South Island Natural Resource District. Analysis will be completed in subsequent years when more samples are available.

Soils: Resource Development Impacts on Soil Productivity and Hydrologic Function

There are currently only five soils samples in the South Island 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 BY TIMBER SUPPLY AREA

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 West 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)				
	West Coast Region Comparison				West Coast Region ^a
	South Island District	Haida Gwaii District	North Island-Central Coast District	Campbell River District	
Riparian – all data	61% (51)	60% (58)	54% (72)	50% (84)	55% (265)
FRPA-era data	79% (14)	46% (24)	61% (31)	55% (49)	58% (118)
FPC-era data	54% (37)	71% (34)	49% (41)	43% (35)	54% (147)
Water quality – all data	96% (134)	92% (173)	83% (229)	72% (412)	82% (948)
2010–2012 samples	ID (69)	92% (56)	all data is 2010–2012	75% (255)	83% (670)
2008–2009 samples	ID (65)	91% (117)		67% (157)	78% (278)
Stand-level biodiversity –all data	70% (60)	66% (61)	89% (70)	74% (82)	74% (273)
FRPA-era data	75% (24)	80% (25)	100% (32)	70% (46)	80% (127)
FPC-era data	67% (36)	56% (36)	79% (38)	81% (36)	69% (146)
Visual Quality	60% (23)	58% (12)	83% (49)	77% (17)	74% (101)
FRPA	ID (0)	ID (0)	50% (16)	41% (12)	56% (28)
FPC					

^a Includes the Campbell River, North Island/Central Coast, Haida Gwaii, and South Island Natural Resource Districts.

DISTRICT MANAGER COMMENTARY¹

Water Quality

Water-quality sediment management appears to be well done on new cutblocks and roads. The observed results are a function of properly locating drainage structures, minimizing the linear distance of catchment areas associated with water-crossing structures, the soil characteristics of the district, the use of rock and coarse material for road construction, and the implementation of drainage water diversion techniques. I encourage tenure holders to continue maintaining natural drainage patterns, and diverting ditch and road surface water away from streams and watercourses.

I note that the effectiveness evaluation protocol selection criteria focus sampling on newly constructed roads that emanate from recent cutblocks. The older mainlines and long-established branch roads may not be captured in this data. The mainlines tend to be located in proximity to higher-order streams at the valley bottoms, where there is a potential to affect fish, fish habitat, and (in some cases) domestic water quality. I encourage the stewardship staff to monitor the older established infrastructure.

Visual Quality

Visual-quality management appears to be a challenge in this district and across the province, given the data presented above. A contributing factor may be that while the size of cutblocks and harvest intensity in scenic areas are being managed, the individual block shapes and resulting visual impacts are given lesser consideration. There are particular challenges on the east coast of the island where the landscapes are a mix of Crown and private ownership. In these cases, the licensee does not have management control over the viewscape and therefore the ability to affect visual quality is limited to cutblock design.

I encourage tenure holders to incorporate natural lines, boundaries, and visual buffers into cutblock and road design in scenic areas. To improve the overall management of visual resources, district staff are also encouraged to continue monitoring of visual quality in scenic areas and to use the results in discussions with tenure holders. Both district and tenure holder staff are encouraged to seek training when needed and professional advice on visual resource management and visual landscape design.

Riparian

The results suggest that, on the whole, fish-bearing streams are well managed.

The evaluation protocol requires a sample be taken from the highest riparian class first (e.g., S2 before S3, etc.) that is within two riparian-management-area widths of the harvest area, for a distance of 30 stream widths or minimum 100 m. In many instances, the cutblock is oriented in a fashion that reduces its proximity to larger fish streams and places it below the threshold of the selection criteria. Consequently, given the stream populations where the harvesting is occurring and the general orientation and placement of cutblocks, the majority of streams that meet the selection criteria are the S-5 and S-6 streams located adjacent to or within the cutblock harvest area. The higher-level, fish-bearing streams (S-1 to S-4) are sampled less frequently.

It appears that the harvesting techniques employed are having an impact on the function of smaller streams. I encourage tenure holders to continue to employ mitigation techniques to manage S-6 streams located within harvest areas.

Stand-level Biodiversity

There appears to be a neutral trend in the management of stand-level biodiversity. Some biodiversity components have improved, while others have decreased between the *FPC* and *FRPA* years. In particular, I

¹ Commentary supplied by South Island Natural Resource District Manager, Rhonda Morris.

am pleased to see that every sampled cutblock harvested during the *FRPA* years has retention, and 96% of these blocks have more than 5% retention. Coarse woody debris quality has also improved in the *FRPA* era, with a higher density of log-sized pieces left out on the cutblock. Small pieces of coarse woody debris have less value for biodiversity purposes than larger diameter, tree-length pieces, which decompose more slowly over many decades. These large pieces often are broken up in the course of harvesting. I encourage tenure holders to continue to retain higher levels of large, intact coarse woody debris within the cutblock, while reducing or utilizing the remaining debris left on site in piles and along roadsides. I see retaining large coarse woody debris as particularly important as we move into second- and third-growth harvesting. Valuable biodiversity components that have decreased in the *FRPA*-era cutblocks are the density of retained large snags and, to a lesser extent, the density of large trees.

Tenure holders are diligently designating wildlife-tree patches in areas with valuable ecological anchors, such as veteran trees, cavity nests, and large hollow trees. In light of the decreasing numbers of large snags that are being found, I ask that licensees look for opportunities to safely retain large snags as ecological anchors within retention patches.

There appears to be high levels of standing tree retention areas in proportion to the size of the cutblock areas. The majority of retention is found in leave areas that are not specifically designated for wildlife tree or riparian retention but are established to manage other resource values. The larger retention areas tend to be found on the periphery of the cutblock, acting as buffers on creeks and gullies. Both large and small leave areas may remain unharvested during the rotation simply because of their size and scattered distribution. The practice of retaining high levels of retention on non-constrained areas will be modelled in the upcoming timber supply review for the Arrowsmith TSA to determine whether it has an effect on timber supply.

Sampling to date has focussed on the four values of riparian, water quality, stand-level biodiversity, and visual quality. As resources allow, I see significant value in the inclusion of cultural heritage monitoring to both determine how well our cultural heritage resources are being conserved and to increase knowledge and communication about this important resource value among South Island staff, forest tenure holders, and First Nations.

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 South Island Natural Resource District as compared to adjacent TSAs. 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 South Island Natural Resource District.

Resource Value	Effectiveness of Practices in Achieving Resource Stewardship Objectives: % Very low + low resource development impact rating (sample size in brackets)				
	South Island District	Forests, Lands and Natural Resource Operations Areas			Province
		North	South	Coast	
Riparian – all data	61% (51)	71% (654)	69% (678)	58% (451)	67% (1783)
FRPA-era data	79% (14)	71% (257)	68% (277)	62% (198)	67% (732)
FPC-era data	54% (37)	71% (394)	70% (401)	55% (253)	67% (1048)
Water quality – all data	96% (134)	66% (992)	70% (1515)	76% (1526)	71% (4033)
2010–2012 samples	ID (69)	67% (505)	70% (823)	79% (1021)	73%(2349)
2008–2009 samples	ID (65)	64% (487)	70% (692)	70% (505)	68% (1684)
Stand-level biodiversity –all data	70% (60)	42% (655)	54% (780)	77% (455)	56% (1890)
FRPA-era data	75% (24)	49% (270)	61% (347)	84% (201)	63% (818)
FPC-era data	67% (36)	38% (385)	49% (433)	72% (254)	50% (1072)
Visual Quality					
FRPA	60% (23)	73% (122)	54% (136)	78% (153)	69% (411)
FPC	ID (0)	56% (96)	65% (85)	62% (68)	61% (249)