



Multiple Resource Value Assessment (MRVA)

Ecosystem Based Management (EBM) Area Within the
North Island-Central Coast Natural Resource District

February 2014

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.

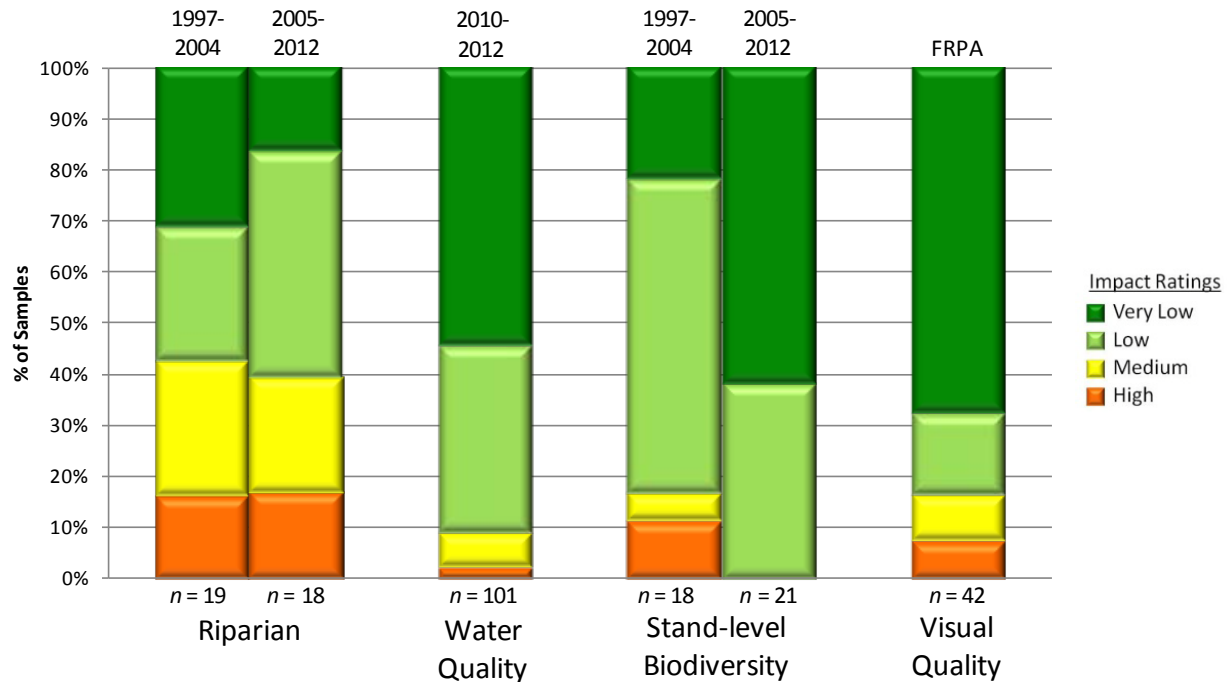
I encourage readers to review the full report and direct any questions or comments to the appropriate district office.

Tom Ethier
Assistant Deputy Minister
Resource Stewardship Division
Ministry of Forests, Lands and Natural Resource Operations

MULTIPLE RESOURCE VALUE ASSESSMENTS—MANAGEMENT SUMMARY

Multiple resource value assessments show the results of 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 portions of North Island-Central Coast Natural Resource District area subject to Ecosystem Based Management (EBM) 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: North Island-Central Coast Natural Resource District EBM Area site-level resource development impact ratings by resource value with trend (Riparian, stand-level biodiversity and visual quality 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 professionals in non legal decision-making between environmental, social, and economic factors
- inform the ongoing improvement of resource management practices

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 conservation 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 more discretion and “freedom to manage” under Professional Reliance
- 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. The results will be published to ensure transparency but 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/>). Provincially, the 11 *FRPA* resource values monitored under FREP include: biodiversity, cultural heritage, fish/ riparian & watershed, forage and associated plant communities, recreation, resource features (Karst), 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 at the district level. 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 are examples of possible broad assessments of the overall landscape. Reports on MRVAs are designed to inform professional 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 EBM area within in the North Island-Central Coast 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 over large geographic areas and scales, 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 level resource stewardship with staff, licenced stakeholders, tenure holders and First Nations
- clarifying expectations for sustainable resource management of public land
- integrating MRVA feedback and results into balanced decision making
- reviewing and approving forest stewardship plans
- 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
- adjust practices where applicable
- inform professional recommendations and decisions, particularly when balancing non legal aspects of FRPA such as environmental, social, and economic values

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>.

Although this MRVA report documents monitoring results at a district level, the MRVA concept is scalable. Reports for individual licensees, treaty settlement areas, or landscape units can be produced in the future 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. Appendix 1 contains a brief description of the criteria used to determine impact ratings.



Figure 2: Grizzly Bear in the Klinaklini River fishing for salmon



Figure 3: Sea lions in Fife Sound

NORTH ISLAND-CENTRAL COAST EBM AREA – DISTRICT MANAGER COMMENTARY, ENVIRONMENTAL AND STEWARDSHIP CONTEXT¹

This report covers the geographical areas under ecosystem based management including portions of the world renowned *Great Bear Rainforest*. Within the North Island-Central Coast Natural Resource District, this area is located on the mainland from West Craycroft Island and Knight Inlet in the south to Princess Royal Island in the north and is approximately 190 km wide and 286 km long. The diverse landscape is characterized by; rocky shorelines and coastal plains to rugged ice-capped mountains, unique scenery and deep inland fiords, first nation communities and territories, BC ferries and world class cruising ship routes, internationally recognized recreation and tourism opportunities including marine activities, a forestry sector, and notable wildlife focal species such as the white phase Kermode bears (*Spirit Bear*), grizzly and black bears, cougars, moose, wolves, elk, deer, mountain goats, bald eagles, and other identified wildlife species such as Marbled Murrelets, Northern Goshawks, and Tailed Frogs. The ecosystems in the area range from the wet and warm Interior Douglas Fir (IDFww) to the very wet hypermaritime Coastal Western Hemlock (CWHvh2). The main biogeoclimatic ecosystems in the area are the CWHvm1 and 2, and CWHvh1 and 2. Tree species from Red Alder and Broadleaf Maple to Hemlock, Douglas Fir, Western Red Cedar and Cypress, Sitka Spruce, Balsam Fir, and Yew trees are found in the landscape. The area contains impressive old growth representation within the established Parks (544 596 ha), Wildlife Habitat Areas (23 313 ha), Biodiversity-Mining-Tourism-Areas (135 938 ha), Conservancies (881 780 ha), and Ecological Reserves (933 ha).

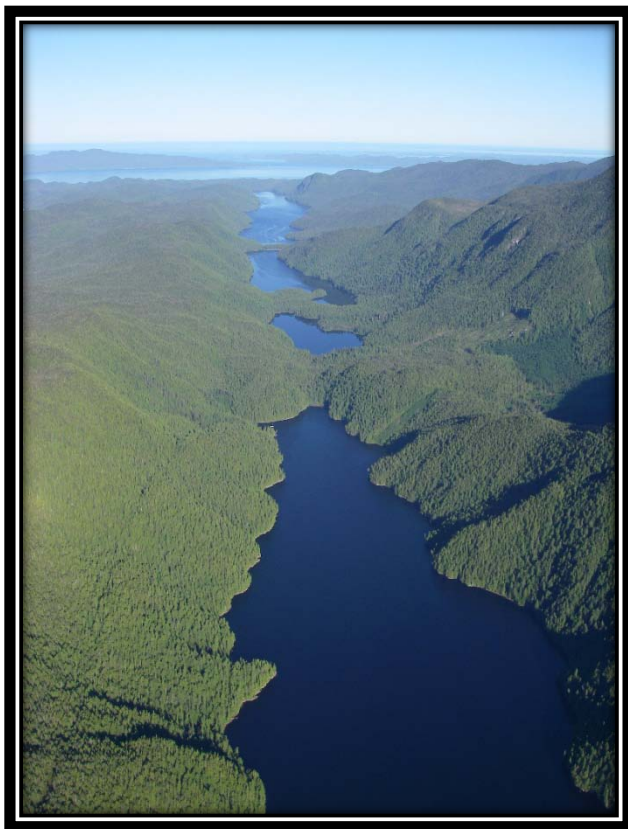


Figure 4: Hardy Inlet foreground, then Elizabeth Lake, Mid-Coast TSA

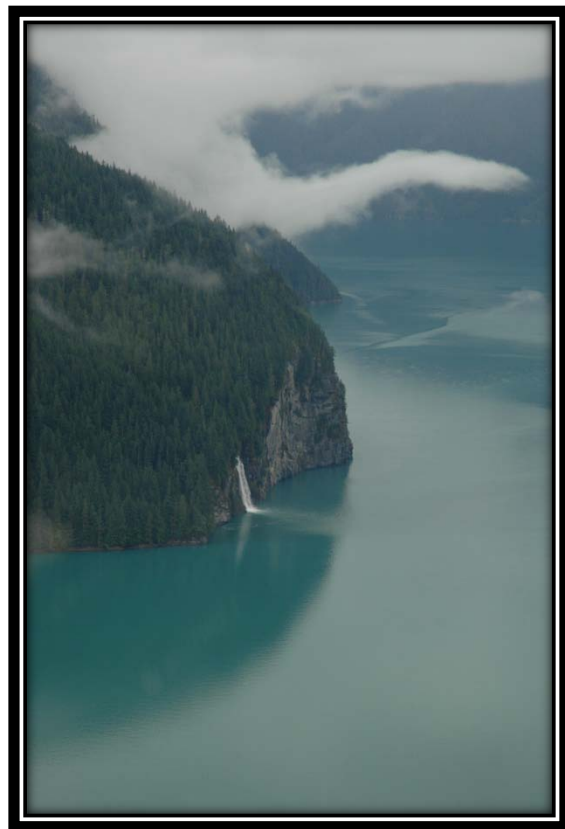


Figure 5: Knight Inlet, Kingcome TSA

¹ Commentary supplied by North Island-Central Coast Natural Resource District Manager, Andrew Ashford

The FREP program was established in 2005 to satisfy aspects of the results based model of the *Forests and Range Practices Act (FRPA)*. The random² FREP monitoring and effectiveness evaluations continue to be a district priority for two reasons;

- 1) to provide opportunities for continuous improvement with respect to decision making within the non legal context of FRPA under professional reliance and,
- 2) to “assess whether the practices carried out in compliance with the requirements of FRPA are consistent with current scientific/technical knowledge” (*Roberta Reader, 2007*).

Over the years, the district stewardship team has met with licensees to discuss trends in resource effectiveness evaluations and have conducted joint FREP effectiveness evaluations in the field. This group of professionals has also participated in joint training and mentoring sessions for resource values such as Karst and Water Quality. In 2011, the stewardship team hosted the Coast Regional Implementation Team (CRIT) “Making FREP Operational” field tour portion to review both *Forest Practices Code Act (FPC)* and *FRPA* results in the field with licensees, contractors, Provincial staff and resource specialists of British Columbia.



Figure 6: CRIT Making FREP Operational Tour 2011 at the base of a living ancient cedar tree on Vancouver Island

I am now pleased to share with you another FREP compendium of science based information, the 2014 FREP MVRA report for the North Island-Central Coast Natural Resource District EBM Area. The report itself is a concise summary of effectiveness evaluations of forestry practices that identify resource management trends

² Random: https://www.for.gov.bc.ca/ftp/hfp/external/!publish/frep/technical/FRPA_Evaluator_Technical_Note_03.pdf

that are not only encouraging, but provides essential feedback to clients operating within the EBM area that needs to be shared within this professional community of practice. Opportunities for improvement that are linked to reducing harvest related impacts observed by my field staff are supported by the data collected for further consideration within your organization.

It is my expectation that professional resource managers will read this MRVA report with interest, and recognize both successes and areas for improvement contained within the report. Overall, I am very encouraged by the data trends that support this publication.

Figure 7: North Island-Central Coast EBM 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).

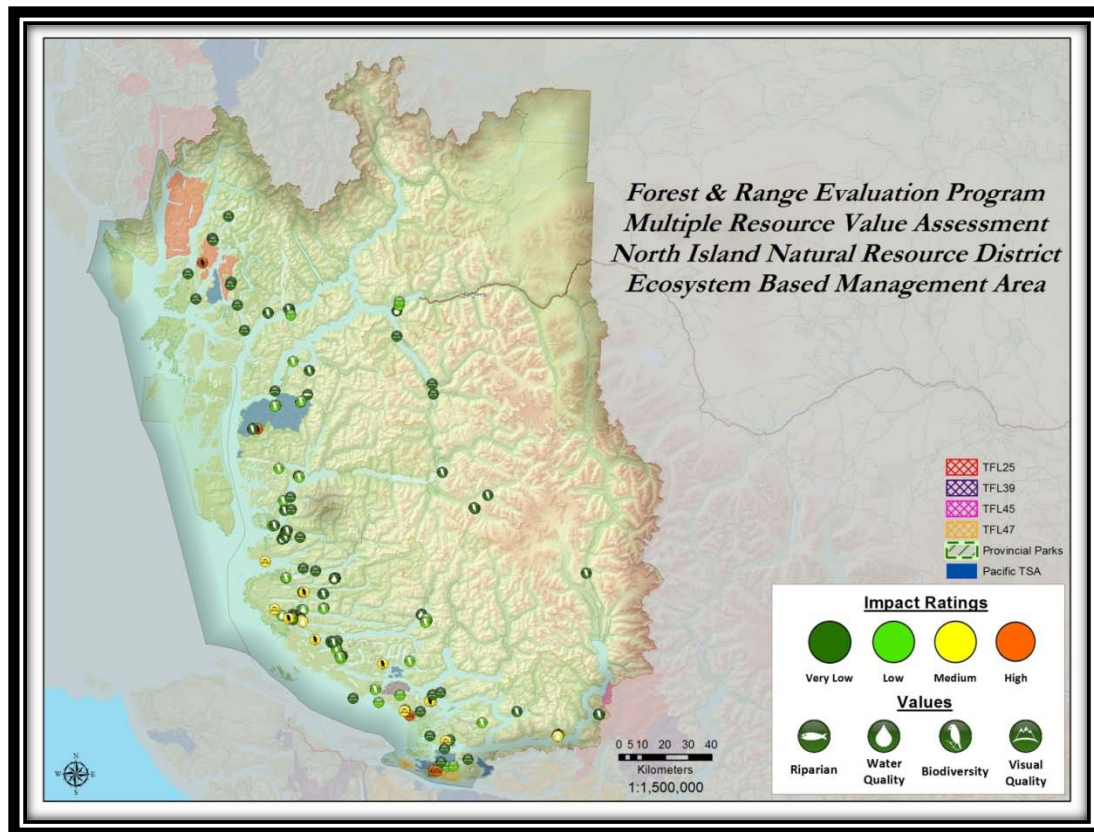


Figure 8: Forest Patrol used by District Staff for FREP Sampling

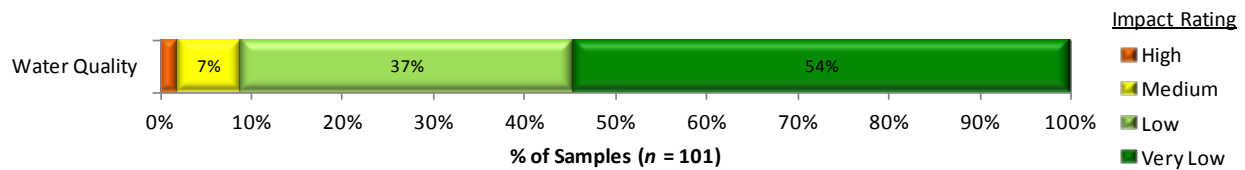
KEY RESULTS BY RESOURCE VALUE AND OPPORTUNITIES FOR CONTINUED IMPROVEMENT

Table 1 shows the resource values assessed for the EBM area within the North Island-Central Coast 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 where data is available. The impact rating indicates the effect of resource development on the resource value, from “very low” (desirable) to “high” impact (less desirable).

Table 1: Resource development impact rating, key findings, and opportunities for improvement by resource value for the EBM area within the North Island-Central Coast Natural Resource District.

Riparian: Resource Development Impacts on Stream Function																																															
<p>Summary: Of the 37 streams monitored, 59% are properly functioning were rated “very low” or “low” harvest-related impacts: 24% are properly functioning were rated as “medium” harvest related impacts, and 16% are Not Properly Functioning were rated “high” harvest related impacts.</p> <p>Causal Factors: Harvest related factors that contributed to “high” or “medium” impact ratings included: impeded movements of organic debris and inorganic sediment from high levels of logging slash in the stream; and low riparian vegetation retained within the first 10 m of the Riparian Management Area (RMA).</p> <p>Number of Samples by Stream Class and Impact Rating:</p> <table border="1"> <thead> <tr> <th>Class</th><th>High</th><th>Medium</th><th>Low</th><th>Very low</th><th>Total</th></tr> </thead> <tbody> <tr> <td>S2</td><td></td><td></td><td>1</td><td>1</td><td>2</td></tr> <tr> <td>S3</td><td></td><td></td><td>1</td><td>1</td><td>2</td></tr> <tr> <td>S4</td><td></td><td></td><td>1</td><td>2</td><td>3</td></tr> <tr> <td>S5</td><td>2</td><td>1</td><td>1</td><td>4</td><td>8</td></tr> <tr> <td>S6</td><td>4</td><td>8</td><td>9</td><td>1</td><td>22</td></tr> <tr> <td>Total</td><td>6</td><td>9</td><td>13</td><td>9</td><td>37</td></tr> </tbody> </table> <p>*Streams with higher values; include fish and water but not limited to low gradient (<20%) S4 streams, and all perennial S5 and S6 streams that deliver water, nutrients and invertebrates downstream to fish-bearing areas throughout the year. This applies to smaller class (S4) fish bearing streams however the data above indicates S4s are very well managed.</p>						Class	High	Medium	Low	Very low	Total	S2			1	1	2	S3			1	1	2	S4			1	2	3	S5	2	1	1	4	8	S6	4	8	9	1	22	Total	6	9	13	9	37
Class	High	Medium	Low	Very low	Total																																										
S2			1	1	2																																										
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S5	2	1	1	4	8																																										
S6	4	8	9	1	22																																										
Total	6	9	13	9	37																																										
<p>Overall Stewardship Trend: <i>Neutral</i> Overall there was little change in the categories of the <i>FPC</i>-era streams compared to the <i>FRPA</i>-era under EBM.</p> <p>Opportunities For Continued Improvement:</p> <ol style="list-style-type: none"> 1) For streams* with higher water values within the first 10m of the RMA, retain a range of retention as described in the Best Management Practices for coastal S5 and S6 streams (<i>FPC</i> Guidebook, Tables 9, 10) (http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/riparian/rip-toc.htm) up to a full 10 m of mature windfirm retention (Chief Forester’s Report 2010) (http://www.for.gov.bc.ca/ftp/hfp/external/publish/frep/reports/FREP_Chief%20Forester%E2%80%99s%20Report_Feb2011.pdf). 2) For all RMAs of S5 and S6 class watercourses consider minimizing the amount of logging slash deposition into the stream channel itself. 3) If stream cleaning is employed to remove introduced logs and slash avoid disturbing the channel bed and banks. 																																															

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



Summary:

Data is from *FRPA* era random samples only. Of the 101 road segments assessed, 91% were rated as “very low” or “low” road-related impact. Site assessments show the range for potential sediment generation as 54% “very low” (<0.2 m³/yr), 37% “low” (0.2 -1 m³/yr), 7% “moderate” (1-5 m³/yr), 2% “high” (>5 m³/yr).

Causal Factors:

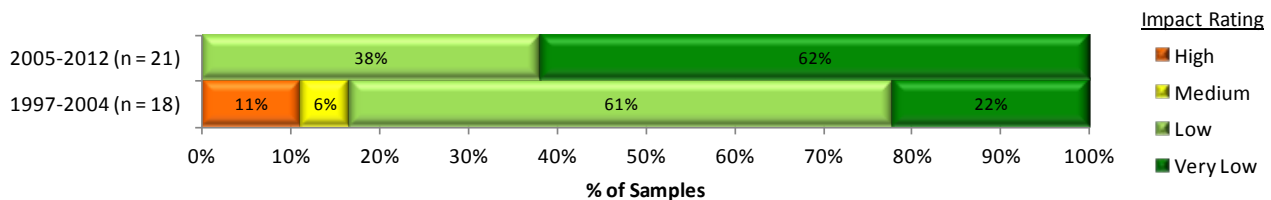
See opportunities for improvement for “high” or “medium” impacted road segments.

Opportunities For Improvement:

The most frequent suggested maintenance or construction issues are to:

- 1) Remove or create a berm break prior to channelling water into streams at crossings.
- 2) Use cross ditches, kickouts, culverts strategically located to divert water prior (20m+) to the crossing itself onto the forest floor (in stable terrain).
- 3) When possible place the bridge deck higher than the road itself.
- 4) Machine operators involved in road maintenance and grading play a critical role, consider operator training for sediment control.

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



Summary from both era's:

Of 39 cutblocks, 93% of sites were rated as “very low” or “low” harvest-related impact. Considering total retention, retention quality, and coarse woody debris quantity and quality, 44% of sites are rated as “very low” impact on biodiversity, 49% as “low,” 3% as “medium,” and 5% as “high.”

Causal Factors:

Average EBM retention increased from 17.1% to 27.2% under *FRPA*. Retention quality slightly improved since the *FPC* era. For example, there were higher densities of large snags. Density of large trees (≥70 cm), number of tree species retained and the number of large patches (>2 ha) stayed consistent in the two eras. Coarse woody debris quantity (≥7.6 cm in diameter) increased from 528 to 623 m³/ha in the *FRPA*-era.

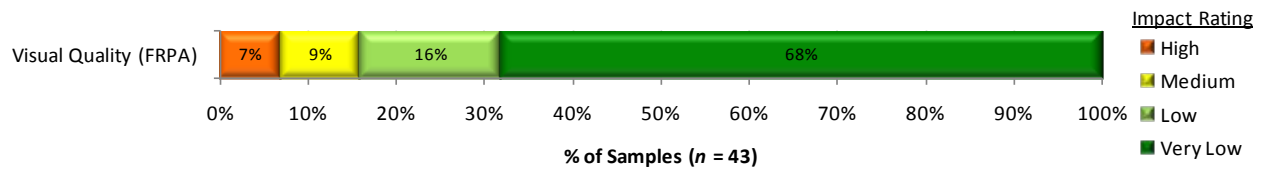
Overall Stewardship Trend: **Increasing** ↑

Stand level retention amount and quality have both increased under EBM. All blocks are achieving stand level biodiversity well. There was also a very large increase in coarse woody debris over the sample of blocks harvested in the *FRPA*-era exceeding natural levels of coarse woody debris.

Opportunities For Continued Improvement:

- 1) Continue leaving retention areas, focusing on ecological anchors (Wildlife Tree Retention and others reserves).
- 2) Retain densities of large snags (≥70 cm dbh) similar to pre-harvest conditions to increase retention quality.

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



Summary:

Of the 43 landforms assessed, in EBM areas, there was a high level of VQO achievement in a challenging operating area. Eighty-four percent were rated with “very low” or “low” harvest-related impacts on achieving the Visual Quality Objectives. Nine percent of the VQOs were “borderline²” (“medium” impact) and 7% “not met” (“high” impact) attributed to harvesting.

Causal Factors:

Many openings contained visually effective levels of tree retention and demonstrated good visual quality design (cutblock shaping). For the “borderline” (“medium” impact) and “not met” (“high” impact) categories see opportunities for improvement to reduce harvest related impacts.

Number of Samples by VQO and Impact Rating:

VQO ¹	High	Medium	Low	Very Low	Total
MM				2	2
M			1	8	9
PR	1	4	5	18	28
R	2		1	1	4
Total	3	4	7	29	43

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

² Borderline; visual evaluations carried out use two approaches, an ocular assessment and a numerical assessment. A borderline result indicates one assessment indicates the objective was met and the other indicates it was not.

Opportunities For Improvement:

- 1) Conduct post-harvest assessments to compare actual results to projected results.
- 2) Take advantage of local topography, and ensure openings appear in keeping with the natural landform characteristics.
- 3) Avoid angular corners, creating skyline gaps, or scattered residual trees along ridgelines.
- 4) Use appropriate block size, natural shapes, lower/lateral location on landform, and strategic retention within blocks to limit visual impacts, especially on smaller coastal landform units.
- 5) Incorporate visual design concepts and principles during planning in scenic areas.

DISTRICT MANAGER COMMENTARY³

Under the *FRPA* model, the non-legal expectations that influence management decisions under professional reliance have increased (i.e., FREP, Certification, Government Extension Services, Forest Practices Board, etc). The FREP monitoring and effectiveness evaluations are based upon science and technical information to support the *FRPA* model. The FREP feedback can then be incorporated into practices by resource professionals. This guidance document is intended to aid professional decision making, not only to meet societal expectations, but to maintain the goals of *FRPA* for increased flexibility and innovation, while maintaining high environmental standards. Therefore, FREP does not assess compliance with the minimum standards established under *FRPA* legislation or Forest Stewardship Plans.

Riparian

The results indicate overall there was little change in the post harvest condition of the *FPC*-era streams compared to the *FRPA*-era under ecosystem based management (EBM) model in the central coast.

- Approximately 60% of the streams from both eras are well managed
- Approximately 24% of the streams from both eras have “medium” impacts from harvesting
- Approximately 16% of the streams from both eras have “high” impacts from harvesting

Opportunities for Continued Improvement S5 and S6 class streams:

- 1) For priority streams, S5 and S6 that are direct tributaries to fish bearing streams, within the first 10 m of the riparian management area (RMA); consider Best Management Practices and retaining the range of mature retention as identified in the *FPC* Riparian Management Area Guidebook Tables (8) 9, 10 Best Management Practices, up to a full 10m of 100% windfirm retention as identified by the Chief Forester’s Report on FREP (2010).
- 2) If harvesting the RMAs of (S4) S5 and S6 class watercourses and leaving no mature retention consider minimizing the amount of logging slash deposition into the stream channel.
- 3) If stream cleaning is employed to remove introduced logs and slash, avoid disturbing the channel bed and banks.

The data identifies that harvesting is having an impact on the functioning condition of 40% of the S6 and S5 streams during both *FPC* and *FRPA* eras. The primary drivers of impacts are low retention levels within riparian management zones and slash deposition into streams. I encourage licencees to utilize best management practices and FREP riparian recommendations within riparian management areas to provide outcomes that avoid harvest related impacts.

³ Commentary supplied by Andrew Ashford, R.P.F.

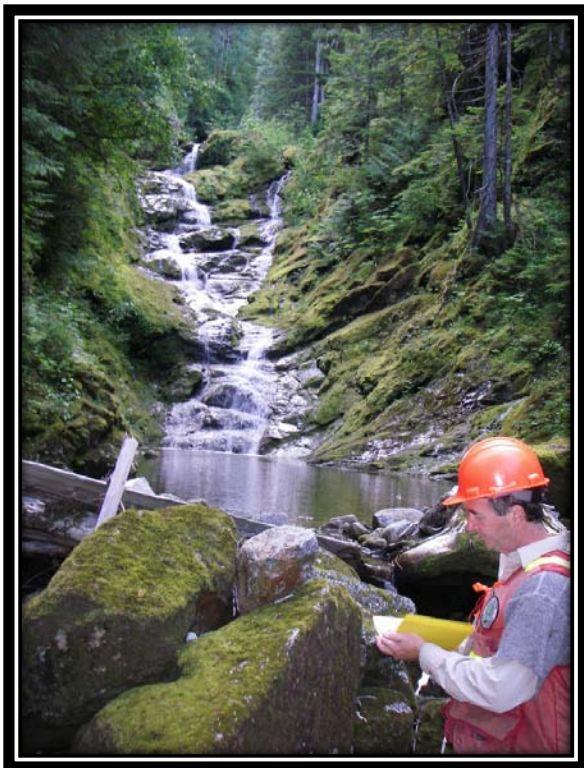


Figure 9: S5 stream

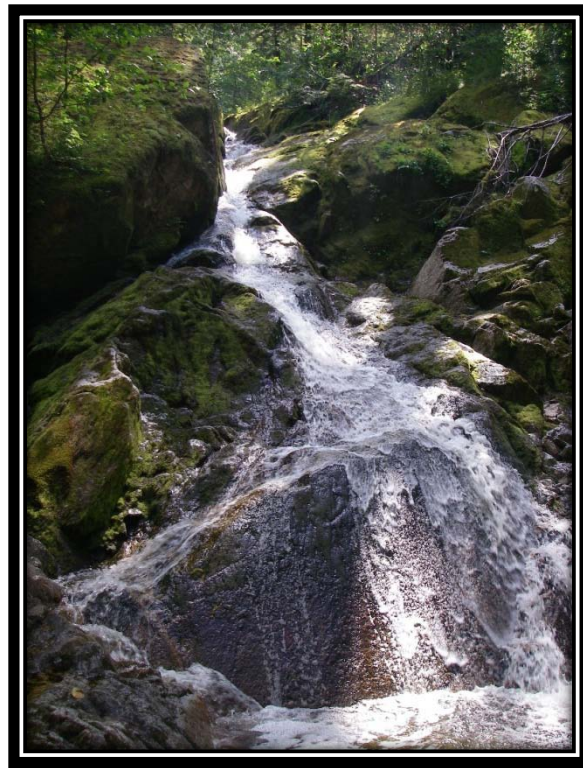


Figure 10: S5 stream

Sixty percent (60%) of the streams sampled have a “very low” and “low” impact from harvesting, as represented in Figures 9 and 10. This S5 stream is properly functioning post harvest with a minimum of 10 meters windfirm retention (without topping or pruning) within the RMA retained on both sides. FREP staff caught and observed coastal tailed frogs within the sample reach.



Figure 10: S5 stream

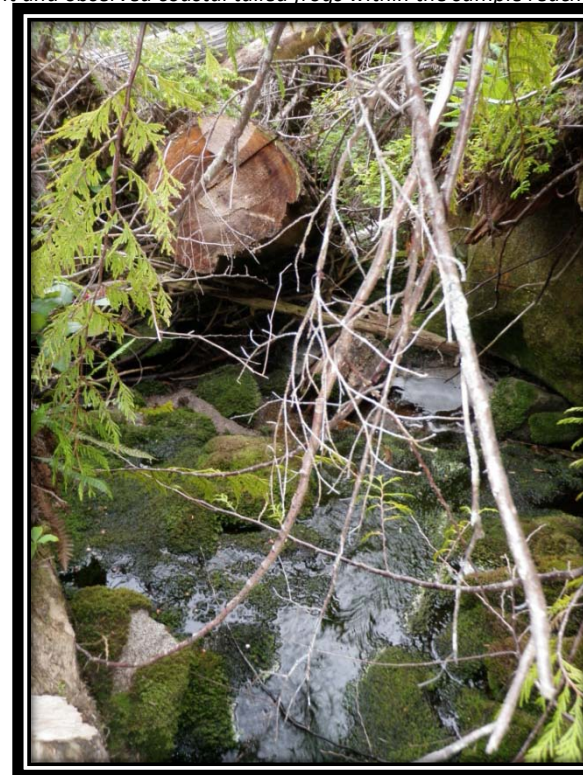


Figure 11: S5 stream

Twenty- four (24%) of the streams sampled have “medium” impacts from harvesting, as represented in Figures 10 and 11. This S5 streams reach post harvest has no mature tree retention within the RMA and slash deposition into the channel bed itself from harvesting, which impedes the downstream movement of organics debris and sediments, and impacts other resources.



Figure 12: S6 class stream



Figure 13: S5 class stream

Sixteen percent (16%) of the streams sampled have “high” impacts from harvesting, as represented by Figures 12 and 13. The S6 on the left and the S5 stream on the right have no vegetation (and or tree) retention within the RMA on either side. Heavy slash deposition into the channel bed and streams itself from harvesting impedes the downstream movement of organics debris, sediments, and other resources. Both streams are not functioning properly.

Water Quality and Sediment Delivery

Water-quality and sediment management have been well done under EBM, marked by a high level of achievement with 91% “very low” and “low” impacts related to harvest. Opportunities for improvement exist with road construction and 7% of the sites with “medium” impacts from harvest activities. Larger areas of recently exposed soils comprise the other 2% of sites resulting in “high” impacts ($>5\text{m}^3/\text{yr}$).

I encourage tenure holders to continue to employ practices to provide good outcomes that avoid harvest related impacts. These practices include:

- 1) Remove or create a berm break to avoid channelling water into or near a stream at crossings.
- 2) Cross ditches, kickouts, and strategically located culverts to divert water onto the forest floor prior to the crossing itself, preferably 20 m prior to the crossing.
- 3) When possible place the bridge deck higher than the road itself.
- 4) Machine operators involved in road maintenance and grading play a critical role; consider ongoing operator training and discussions for sediment control and deactivation.

The observed results are a function of properly locating drainage structures; prompt road deactivation, and less road building overall due to helicopter harvesting. Staff also observed the use and availability of coarse rock materials is frequent, as is the implementation of drainage water diversion techniques. I encourage tenure holders to continue maintaining natural drainage patterns, while diverting ditch and road surface water away from streams and watercourses at culvert or bridge crossings.



Figure 14: Deactivation, well armoured resulting in “very low” and “low” harvest related impacts.



Figure 15: Permanent access wood corduroy road with no fines or sedimentation from harvest related impacts.

Figures 14 and 15 represent 91% of the “very low” and “low” harvest related impacts observed by staff.

Visual Quality

Forest licensees are working diligently to achieve Visual Quality Objectives (VQOs) in a challenging operating area. Eighty-four percent were rated with “very low” or “low” harvest-related impacts on achieving the Visual Quality. Nine percent of the landforms were borderline (“medium” impact from harvesting/evaluations carried out use two approaches, an ocular assessment and a numerical assessment. Borderline means one assessment indicates the objective was met and the other indicates it was not), while seven percent (“high” impact from harvesting) of landforms sampled did not meet the provincial visual quality objectives. Also, there was an observed “over-achievement” of established visual objectives for samples that achieved classes that were more restrictive (e.g., achieves partial retention in modification VQO) than the legally required VQO, and this raises a stewardship concern around inconsistency with timber supply modelling assumptions and long term sustainability. Effective visual resource management balances forestry and tourism to protect scenic views while maintaining harvesting opportunities over time. The district will continue to monitor the over-performance of licensees in terms of timber supply impacts.

For borderline (“medium” impact) and not met (“high” impact) cases the majority of samples fell within partial retention VQOs and a lesser amount in retention. Consider the following opportunities for improvement developed by North Island-Central Coast Natural Resource District staff:

- 1) Conduct post-harvest assessments to compare actual results to projected results.
- 2) Incorporate visual design concepts and principles during planning in scenic areas.
- 3) Take advantage of local topography, and ensure openings appear in keeping with the natural landform characteristics.
- 4) Avoid angular corners, creating skyline gaps, or scattered residual trees along ridgelines.
- 5) Use appropriate block size, natural shapes, lower/lateral location on landform, and strategic retention within blocks to limit visual impacts, especially on smaller coastal landform units.



Figure 16: Example of Partial Retention VQO = met (Partial retention achieved). “Low” and “very low” impact from harvesting.



Figure 17: Example of Partial Retention VQO= not met (Modification achieved). “High” impact from harvesting.



Figure 18: Example of over-achievement on Modification VQO (Retention achieved).

The crown objective for visual management has been set to balance crown priorities of employment for both the tourism and forestry industries. I encourage tenure holders to diligently manage visual resources in collaboration with neighbours and other resource users to ensure consistency with our social licence values. Both district and tenure holder staff are encouraged to seek training and professional advice when needed to meet the objectives of visual resource management. Conducting post-harvest assessments to compare actual results to projected results is encouraged.

Stand-level Biodiversity

There has been an increase in the amount of the stand level retention and quality from the *FPC* to *FRPA* years consistent with the voluntary implementation of EBM (2000-2007) and legal EBM era (2008 onwards). The retention amount and quality have increased under EBM for stand level biodiversity. The average retention level increased from 17.1% to 27.2% during the *FRPA*-era. Retention quality slightly improved between the two eras with increasing densities of large snags. Coarse woody debris quantity increased from 528 to 623 m³/ha (for *FREP* coast woody debris measured is any piece that is ≥7.5 cm diameter excluding stumps) in the *FRPA*-era generally exceeding natural levels of coarse woody debris.

Opportunities for Continued Improvement:

- 1) Continue leaving retention and Wildlife Tree Retention areas focusing on ecological anchors.
- 2) Maintain biodiversity values using larger aggregate retention areas as supported by research.
- 3) Retain densities of large snags (≥ 70 cm dbh) similar to pre-harvest conditions when possible to increase retention quality.

Tenure holders are diligently designating old growth wildlife-tree patches in areas with valuable ecological anchors, such as veteran trees, bear dens, cavity nests, and large hollow trees. Where possible, leave larger retention patches as biodiversity lifeboats and capture opportunities to safely retain large snags as ecological anchors within retention patches.



Figure 19: Well designed block with larger retention patches for snags to be retained.



Figure 20: Larger retention areas with ecological anchors important to maintaining biodiversity at the stand level.



Figure 21: Old growth trees within a wildlife tree retention area.



Figure 22: Dispersed trees within the harvest area itself contributing to stand level biodiversity under EBM.

APPENDIX 1. SUMMARY DESCRIPTION OF RESOURCE DEVELOPMENT IMPACT RATING CRITERIA

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

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

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