



# Multiple Resource Value Assessment (MRVA)

Haida Gwaii 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.

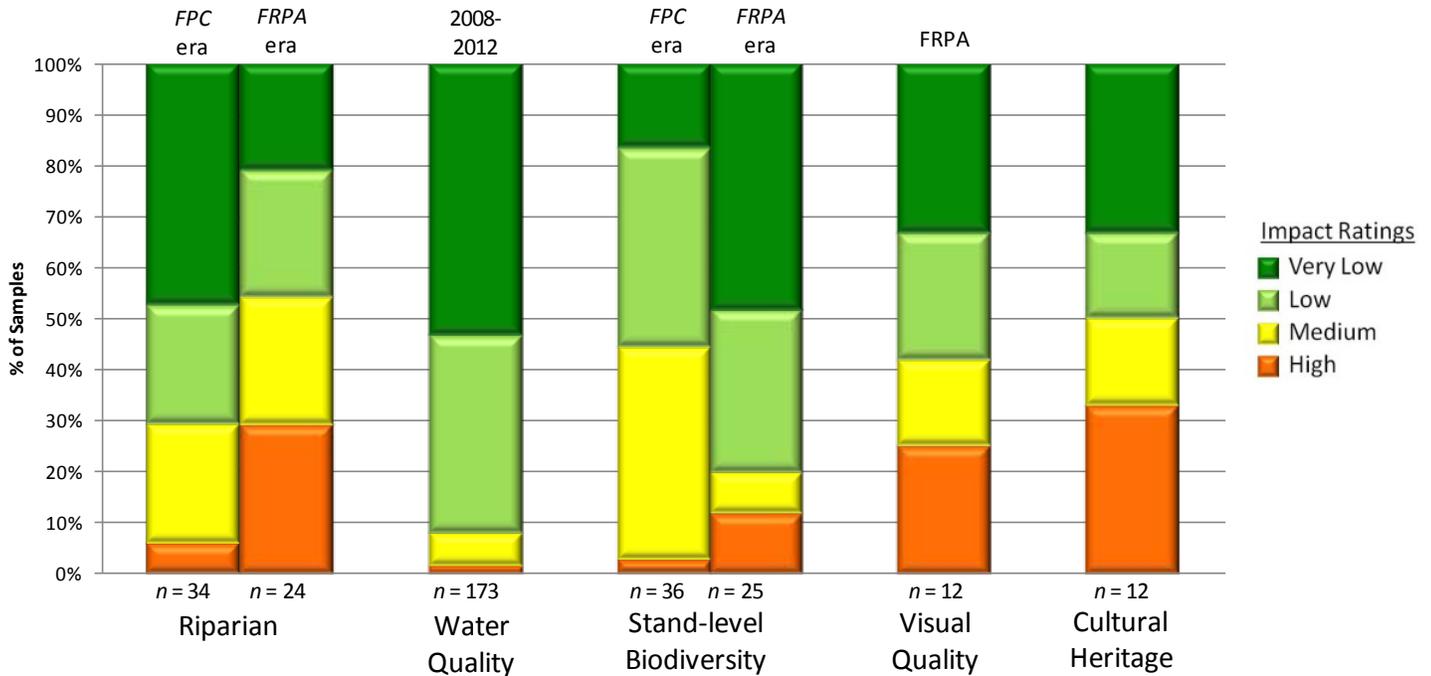
I encourage readers to review the full report and direct any questions or comments to the appropriate district office.

Tom Ethier  
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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), visual quality and cultural heritage monitoring conducted in the Haida Gwaii 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: Haida Gwaii Natural Resource District site-level resource development impact ratings by resource value with trend (Riparian, stand-level biodiversity, cultural heritage 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 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 Haida Gwaii 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 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
- 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 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.

## HAIDA GWAII NATURAL RESOURCE DISTRICT – ENVIRONMENTAL AND STEWARDSHIP CONTEXT

This report includes a Multiple Resource Value Assessment of forest development within the Haida Gwaii Natural Resource District (DHG) which includes the Haida Gwaii Timber Supply Area (TSA25), Tree Farm Licences 58 and 60 and a major Forest License to Cut (A87661) (Figure 2). The administrative boundaries of the DHG lie entirely within Haida Gwaii, an archipelago of more than 150 islands covering approximately one million hectares and located 90 kilometers off British Columbia's north coast. Over half of the land area of Haida Gwaii is in some form of protection. The main sources of employment are public sector, forestry and tourism. Haida Gwaii is the traditional territory of the Haida Nation and as such, the Province and the Council of the Haida Nation share management responsibilities for all lands and natural resources.

Lower elevations on Haida Gwaii are generally forested, with western hemlock (*Tsuga heterophylla*), Sitka spruce (*Picea sitchensis*) and western redcedar (*Thuja plicata*) the dominant tree species, with red alder (*Alnus rubra*) on disturbed sites. As elevation increases, western hemlock and western redcedar are joined by mountain hemlock (*Tsuga mertensiana*) and yellow-cedar (*Chamaecyparis nootkatensis*) in subalpine forests (generally above 550-600m).<sup>1</sup>

Natural disturbances on Haida Gwaii can include windthrow, mass wasting events, floods, and sometimes wildfire. Wind is a major disturbance factor, but most canopy gaps are quite small and many are formed by the stem breakage of 1 or a few dominant trees. Larger scale blowdown with root-throw can occasionally occur on specific, exposed, topographic positions, creating larger forest openings. The strongest winds, from the southeast, generally occur in the fall and winter.<sup>1</sup>

Mass wasting events (including landslides, debris flows and torrents, slump earth-flows, and bedrock failures) and shifts in stream channels are dominant geomorphic processes on Haida Gwaii, especially in mountainous terrain. The combination of shallow, poorly-developed soils, high annual rainfall and rugged topography also translates to periodic intense flooding events, which help define the structure and dynamics of river systems on the Islands.<sup>1</sup>

Insects and pathogenic fungi that affect vegetation have remained at essentially background levels since 1850—with some notable exceptions, including the recent outbreaks of blackheaded budworm (*Acleris gloverana*) and hemlock sawfly (*Neodiprion tsugae*)<sup>2</sup> (Turnquist et al. 1998). Defoliating insects, needle diseases, dwarf mistletoe, root rots and stem rots all play direct and indirect roles in disturbance dynamics by killing or weakening individual trees and preconditioning them to stem breakage and windthrow.

Overbrowsing by introduced deer has evidently altered the structure of the forest vegetation and has virtually eliminated or greatly reduced preferred forage species in many areas. Deer browsing has seriously depleted and sometimes eliminated western redcedar as regeneration in many old forests as well as on logged-over sites on Haida Gwaii. Yellow-cedar has also suffered, especially in montane forests, but has not been as severely reduced overall as redcedar. Deer have affected Sitka spruce much less, but locally have eaten it

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<sup>1</sup> Banner, A., W.H. MacKenzie, J. Pojar, A. MacKinnon, S.C. Saunders and H. Klassen. 2014. *A Field Guide to Site Classification and Identification for Haida Gwaii*. Prov. B.C., Victoria, B.C. *Land Manag. Handb.* 68. [www.for.bc.ca/hfd/pubs/Docs/Lmh/Lmh68.htm](http://www.for.bc.ca/hfd/pubs/Docs/Lmh/Lmh68.htm)

<sup>2</sup> Turnquist, R., R. Garbutt, and V. Nealis. 1998. *Report on forest pest conditions and special projects: Queen Charlotte Islands, British Columbia*. Forest Health Network Report, Pacific Forestry Centre, Victoria, B.C.

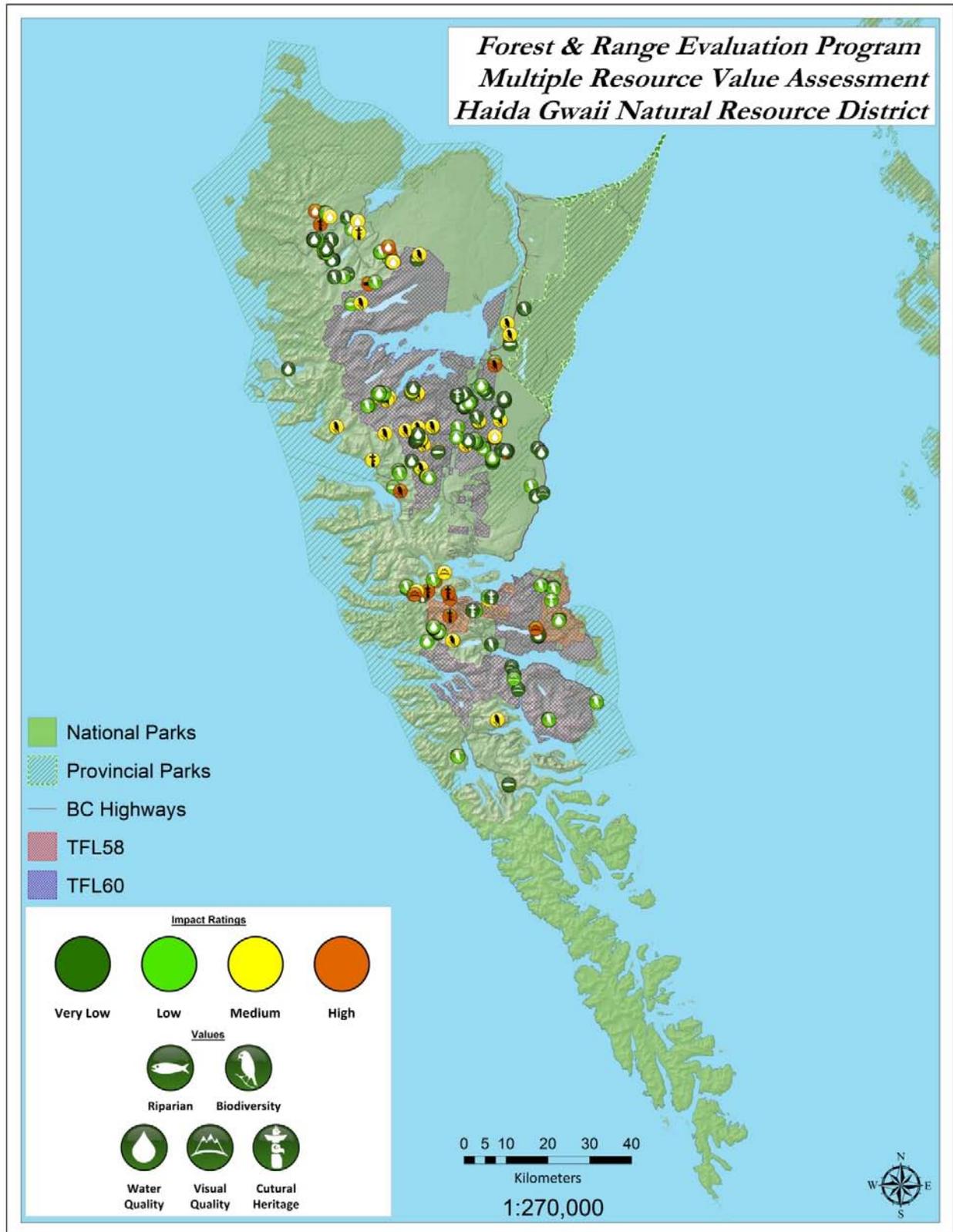
back heavily. Deer browsing has also contributed to the decline of ecologically, geographically, and culturally significant plant species of forested and nonforested communities.<sup>3</sup>

In 2007 the Province of British Columbia and the Council of the Haida Nation signed into the Strategic Land Use Agreement (SLUA). This initiated three years of detailed strategic planning that resulted in the establishment of Protected Areas and the Haida Gwaii Land Use Objectives Order. This Order brought forth new cultural, aquatic, biodiversity and wildlife objectives for resource management on Haida Gwaii. In November of 2011, the Haida Gwaii Forest Stewardship Plan was approved marking the beginning of an ecosystem-based management regime on Haida Gwaii.

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<sup>3</sup> Gaston, A.J et. al. 2008. *Lessons from the Islands: Introduced species and what they tell us about how ecosystems work. Proceedings from the Research Group on Introduced Species 2002 Symposium, Queen Charlotte, B.C. C.W.S. Env. Can., Ottawa*

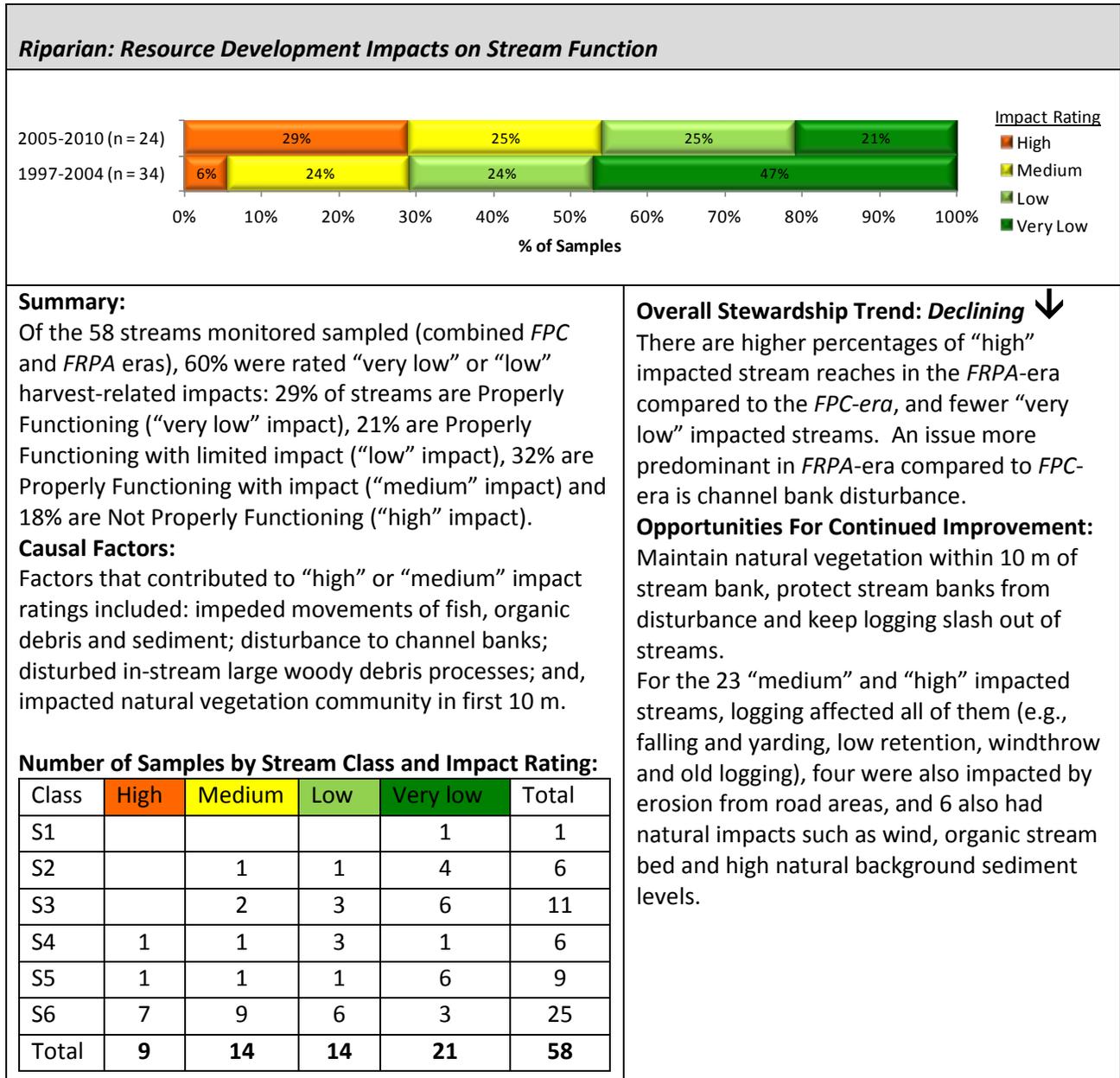
Figure 2: Haida Gwaii Natural Resource District, showing FREP sample locations and results (see <http://www.for.gov.bc.ca/hfp/frep/publications/mrva.htm> for a high-resolution version of this map).



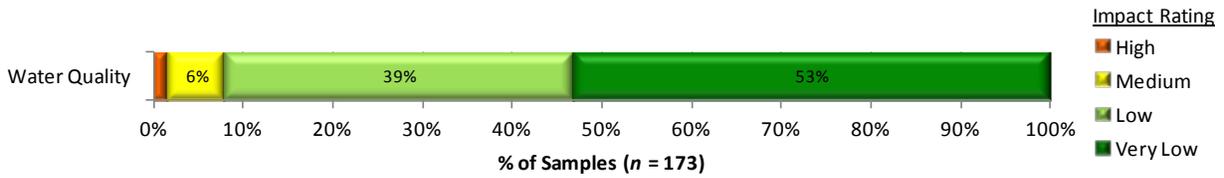
## KEY RESULTS BY RESOURCE VALUE AND OPPORTUNITIES FOR CONTINUED IMPROVEMENT

Table 1 shows the resource values assessed for the Haida Gwaii 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 Haida Gwaii Natural Resource District.**



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



**Summary:**

Of the 173 road segments assessed from 2008 to 2012, 92% were rated as “very low” or “low” road-related impact. Site assessments show the range for potential sediment generation as 53% “very low” (“very low” impact), 39% “low” (“low” impact), 6% “moderate” (“medium” impact), 1% “high” and 1% “very high” (“high” impact).

**Causal Factors:**

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

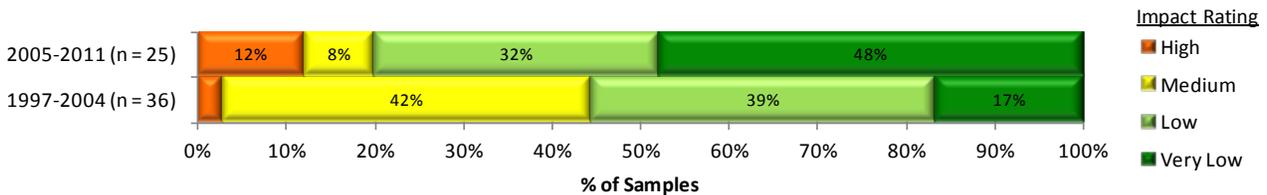
**Overall Stewardship Trend: data not separated**

Roads are generally well-managed concerning sediment in the TSA.

**Opportunities For Improvement:**

For the 14 road segments in the “moderate”, or “high” impact categories armour, seed and protect bare soil, avoid wet areas where possible or use options such as brush mats.

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



**Summary:**

Of 61 cutblocks sampled (combined *FPC* and *FRPA*-eras), 66% of sites were rated as “very low” or “low” harvest-related impact. Considering total retention, retention quality, and coarse woody debris quantity and quality, 30% sites are rated as “very low” impact on biodiversity, 36% as “low,” 28% as “medium,” and 7% as “high.”

**Causal Factors:**

Coarse woody debris volume in harvest areas increased from *FPC-era* (average: 383 m<sup>3</sup>/ha) to *FRPA-era* (average: 512 m<sup>3</sup>/ha). Coarse woody debris quality (i.e., volume from ≥30 cm dbh pieces, and density of big coarse woody debris ≥20c m dbh and ≥10 m long) improved. 92% of all the blocks had more than 3.5% retention. Retention increased from 16.6% in the *FPC-era* to 20.6% in the *FRPA-era*. The number of live tree species in retention areas is representative or slightly better than pre-harvest conditions. The density of large trees (≥70 cm dbh) decreased on *FRPA-era* blocks.

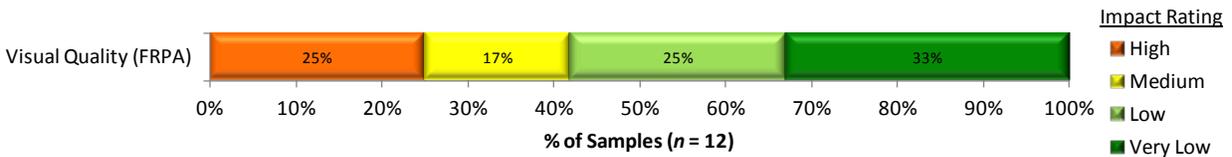
**Overall Stewardship Trend: Improving ↑**

There has been improvement in stand-level biodiversity, largely due to the increasing percent retention and increase in coarse woody debris quality. Retention quality was similar in the two eras.

**Opportunities For Continued Improvement:**

Continue leaving retention on every cutblock. 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 12 landforms assessed (all FRPA cutblocks), 58% were rated with “very low” or “low” harvest-related impacts on achieving the Visual Quality Objectives. VQOs were “well met” (“very low” impact) on 33% of landforms, “met” (“low” impact) on 17%, “borderline” (“medium” impact) on 17%, “not met” on 17%, and “clearly not met” (“high” impact) on 8%.

**Causal Factors:**

None of the openings contained visually effective levels of tree retention (> 22% by volume or stem count) and 8% of landforms sampled had good visual quality design (cutblock shaping).

**Number of Samples by VQO and Impact Rating:**

VQO <sup>1</sup>	High	Medium	Low	Very Low	Total
M				1	1
PR	3	2	3	3	11
Total	3	2	3	4	12

<sup>1</sup> M = modification, PR = partial retention

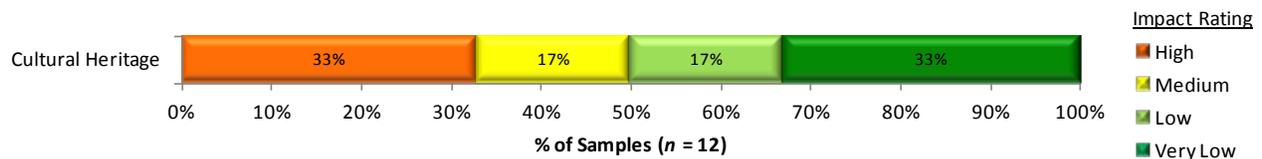
**Overall Stewardship Trend:**

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 (CHR)**



**Summary:**

Of the 12 cutblocks assessed, 50% were rated “very low” and “low” impact to cultural heritage resources.

Overall, 33% of blocks were considered “well” to “very well” managed, 33% “moderately” and 33% “poorly” or “very poorly” managed. At the feature level, 51% showed no evidence of harvest-related damage while 51% showed evidence of damage. 25% of damaged features showed irreversible damage and (or) were rendered unsuitable for continued use.

**Causal Factors:**

Primary causes of damage include removal of features and windthrow.

**Overall Stewardship Trend: *Insufficient Data***

**Opportunities For Improvement:**

Greater consideration of cultural heritage resource values in the planning phase (e.g., discussions with First Nations to understand their perspectives, understand existing CHR information and pre-identify and describe on-site CHR values for site plans and logging plans). Communication of management actions (verbally and with maps) to operators before harvesting begins.

<p><b><i>Soils: Resource Development Impacts on Soil Productivity and Hydrologic Function</i></b></p>
<p>There are currently only two Soils samples in the Haida Gwaii Natural Resource District. Analysis will be completed in subsequent years when more samples are available.</p>
<p><b><i>Timber Resource Value: Resource development impacts on overall health and stocking of managed 15-40 year stands</i></b></p>
<p>There are currently only two Stand Development Monitoring samples in the Haida Gwaii Natural Resource District. Analysis will be completed in subsequent years when more samples are available.</p>
<p><b><i>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?</i></b></p>
<p>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.</p>

## 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 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 <sup>a</sup>
	Haida Gwaii District	South Island District	North Island-Central Coast District	Campbell River District	
Riparian – all data	<b>60%</b> (58)	<b>61%</b> (51)	<b>54%</b> (72)	<b>50%</b> (84)	<b>55%</b> (265)
FRPA-era data	46% (24)	79% (14)	61% (31)	55% (49)	58% (118)
FPC-era data	71% (34)	54% (37)	49% (41)	43% (35)	54% (147)
Water quality – all data	<b>92%</b> (173)	<b>96%</b> (134)	<b>83%</b> (229)	<b>72%</b> (412)	<b>82%</b> (948)
2010–2012 samples	92% (56)	ID (69)	all data is 2010–2012	75% (255)	83% (670)
2008–2009 samples	91% (117)	ID (65)		67% (157)	78% (278)
Stand-level biodiversity –all data	<b>66%</b> (61)	<b>70%</b> (60)	<b>89%</b> (70)	<b>74%</b> (82)	<b>74%</b> (273)
FRPA-era data	80% (25)	75% (24)	100% (32)	70% (46)	80% (127)
FPC-era data	56% (36)	67% (36)	79% (38)	81% (36)	69% (146)
Visual Quality					
FRPA	<b>58%</b> (12)	<b>60%</b> (23)	<b>83%</b> (49)	<b>77%</b> (17)	<b>74%</b> (101)
FPC	ID (0)	ID (0)	<b>50%</b> (16)	<b>41%</b> (12)	<b>56%</b> (28)
Cultural Heritage	<b>50%</b> (12)	<b>ID</b> (1)	<b>ID</b> (2)	<b>ID</b> (0)	<b>53%</b> (15)

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

## DISTRICT MANAGER COMMENTARY<sup>4</sup>

When reviewing these results, it's key to recognize that effectiveness evaluations are not synonymous with compliance inspections. Resource stewardship monitoring does not attempt to measure compliance with legislated requirements, but rather seeks to investigate the overall condition of the natural resource values that we attempt to manage on Haida Gwaii. A "high" impact rating can be associated with actual management decisions, but it can also be a result of pre-existing background conditions, old development or natural disturbance factors as well. A better understanding of these factors will facilitate adaptive management, will promote better professional dialogue among prescribing and reviewing professionals and will allow me to make informed and pragmatic determinations.

### *Fish/Riparian*

The FREP protocol for the Fish/Riparian Value uses 15 indicators (instream and from the adjacent management area) to assess whether forest practices are effective in maintaining the structural integrity and functions of stream ecosystems and other aquatic resource features over both the short and long term. The proportion of stream reaches sampled that resulted in a "medium" or "high" impact rating is significantly larger under the *FRPA* regime than under the *Forest Practices Code*. Roughly 40% of the stream reaches sampled since 2006 have had negative indicator results (i.e., blockage impeding fish movement, infilling of organic debris and/or sediment, disturbance to channel banks). Though most of these negatively impacted streams (18 out of 23) are non-fish bearing, there are notable opportunities for improvement for streamside management on S5 and S6 streams on Haida Gwaii.

### *Stand-level Biodiversity*

The stand-level biodiversity protocol observes whether cutblock retention provides the range of structural attributes that are necessary for maintaining habitat for species that depend on wildlife trees and coarse woody debris. It is encouraging to note that resource development impacts on stand-level biodiversity under the *Forest Practices Code* have been reduced from 44% to 20% under the *Forest and Range Practices Act*. This is largely attributable to greater retention levels and better quality of coarse woody debris left on site. Stand-level retention in the ecosystem-based management era will continue to increase and I expect impact ratings to continue to decrease with appropriate consideration of the quality and diversity of what's left behind at the cutblock level. As stand-level retention increases, so does the amount of edge susceptible to windthrow. I anticipate there will be a greater emphasis placed on windthrow mitigation strategies as we move forward.

### *Water Quality*

The water quality protocol assesses and predicts the annual amount of fine sediment generated and delivered to randomly selected watercourses that intersect newer forest development areas. For the most part, water quality effectiveness evaluation results in our district have been positive. The future of forest development may see an increase in active road-building to access remote or isolated areas and the potential reactivation of old infrastructure as second-growth stands become operational. I would encourage licensees to continue diligent road-building practices as we embark on a new chapter of development on Haida Gwaii.

### *Visual Quality*

Visual resource management is about identifying and classifying scenic landscapes and managing forestry activities on the landscape to meet the needs of the public, visitors and other resource users. The visual quality effectiveness evaluation protocol measures the per cent alteration of a randomly selected landform and compares it to the *Forest Planning and Practices Regulation* definition of the associated Visual Quality

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<sup>4</sup> Commentary supplied by Haida Gwaii Natural Resource District Manager,

Objective. Although 7 of the 12 landforms assessed had a “low” or “very low” impact, significant improvement can be made with this resource value. This is the primary driver in the development of the Haida Gwaii District policy for visual management that was established in 2013. It is expected that consideration of this policy coupled with an increase in internal cutblock retention under ecosystem-based management objectives will mitigate these impacts.

### ***Cultural Heritage Resources***

This protocol observes whether cultural heritage resources that interface resource development are being conserved or protected for current and future use by the Haida Nation. The majority of the cutblocks sampled were post-*Forest Practices Code*-era (i.e., 2 of 12 were harvested prior to 2006), and 50% of the samples were measured at “medium” to “high” impact due to windthrow or removal of the feature. Greater consultation can yield better results, but specific objectives for cultural features and pre-harvest assessment under the Haida Gwaii Land Use Objectives Order will significantly affect future outcomes.

The previous text represents a snapshot of forest management outcomes on Haida Gwaii over the last 15 years. It’s critical to recognize that these results reflect successes and challenges of the two former management eras under the Forest Practices Code and the more recent Forest and Range Practices Act. As you know, we have all embarked on a new era of ecosystem-based management with the establishment of the Haida Gwaii Land Use Objectives Order. It is my expectation that the results of future effectiveness evaluations will continue to demonstrate a diligent and adaptive approach to forest management on Haida Gwaii.

## 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](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 Haida Gwaii 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 Haida Gwaii Natural Resource District.**

Resource Value	Effectiveness of Practices in Achieving Resource Stewardship Objectives: % Very low + low resource development impact rating (sample size in brackets)				
	Haida Gwaii	Forests, Lands and Natural Resource Operations Areas			Province
		North	South	Coast	
Riparian – all data	<b>60%</b> (58)	<b>71%</b> (654)	<b>69%</b> (678)	<b>58%</b> (451)	<b>67%</b> (1783)
FRPA-era data	46% (24)	71% (257)	68% (277)	62% (198)	67% (732)
FPC-era data	71% (34)	71% (394)	70% (401)	55% (253)	67% (1048)
Water quality – all data	<b>92%</b> (173)	<b>66%</b> (992)	<b>70%</b> (1515)	<b>76%</b> (1526)	<b>71%</b> (4033)
2010–2012 samples	92% (56)	67% (505)	70% (823)	79% (1021)	73%(2349)
2008–2009 samples	91% (117)	64% (487)	70% (692)	70% (505)	68% (1684)
Stand-level biodiversity all data	<b>66%</b> (61)	<b>42%</b> (655)	<b>54%</b> (780)	<b>77%</b> (455)	<b>56%</b> (1890)
FRPA-era data	80% (25)	49% (270)	61% (347)	84% (201)	63% (818)
FPC-era data	56% (36)	38% (385)	49% (433)	72% (254)	50% (1072)
Visual Quality					
FRPA	<b>58%</b> (12)	<b>73%</b> (122)	<b>54%</b> (136)	<b>78%</b> (153)	<b>69%</b> (411)
FPC	<b>ID</b> (0)	<b>56%</b> (96)	<b>65%</b> (85)	<b>62%</b> (68)	<b>61%</b> (249)
Cultural Heritage	<b>50%</b> (12)	<b>76%</b> (96)	<b>67%</b> (36)	<b>53%</b> (15)	<b>72%</b> (147)