

# FREP Monitoring and Evaluation Strategy

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**BRITISH  
COLUMBIA**

Ministry of Forests and Range  
Ministry of Environment  
Ministry of Agriculture and Lands



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## Purpose of this Document

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Under the FRPA Resource Evaluation Program (FREP), a number of important documents have been produced, including a program charter, extension notes, technical notes, evaluation reports, monitoring protocols, and program business maps. These documents describe the various components of the program in detail. To date, there has not been a comprehensive document providing an overview of how the overall program is structured and how all the components fit together. This document has been written to provide a comprehensive program overview. Readers requiring detailed information on any one aspect of the program should visit the FREP website (<http://www.for.gov.bc.ca/hfp/frep/>) where all program documents are located, and/or contact any member of the FREP Working Group (see Appendix 1).

## Background (FREP Context)

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British Columbians desire sustainable use of the forests they hold in trust for future generations. Sustainable use can be defined in many ways. For the purpose of FREP, sustainable use means:

- managing forests to meet present needs without compromising the needs of future generations
- providing stewardship of forests based on an ethic of respect for the land
- balancing economic, productive, spiritual, ecological and recreational values of forests to meet the economic, social and cultural needs of the Province's people and communities
- conserving the resource values identified under FRPA and regulations, namely, biodiversity, cultural heritage, soil, water, fish, forage and associated plant communities, timber, recreation, resource features, visual quality and wildlife.

The *Forest and Range Practices Act* and regulations introduce the transition to a results-based forest practices framework in British Columbia. For more information on FRPA and its regulations, resource values, objectives, etc., see <http://www.for.gov.bc.ca/code/>. Under this new approach to forest management, the forest industry is responsible for developing results and strategies, or using specified defaults, for the sustainable management of resources. The role of government is to ensure compliance with established results and strategies and other practice requirements, and evaluate the effectiveness of forest and range practices in achieving management objectives.

FREP has been put in place as a multi-agency program to evaluate whether practices under FRPA are meeting not only the intent of current FRPA objectives, but also to determine whether the practices and the legislation itself, are meeting government's broader intent for the sustainable use of resources.

FREP is a long-term commitment designed to:

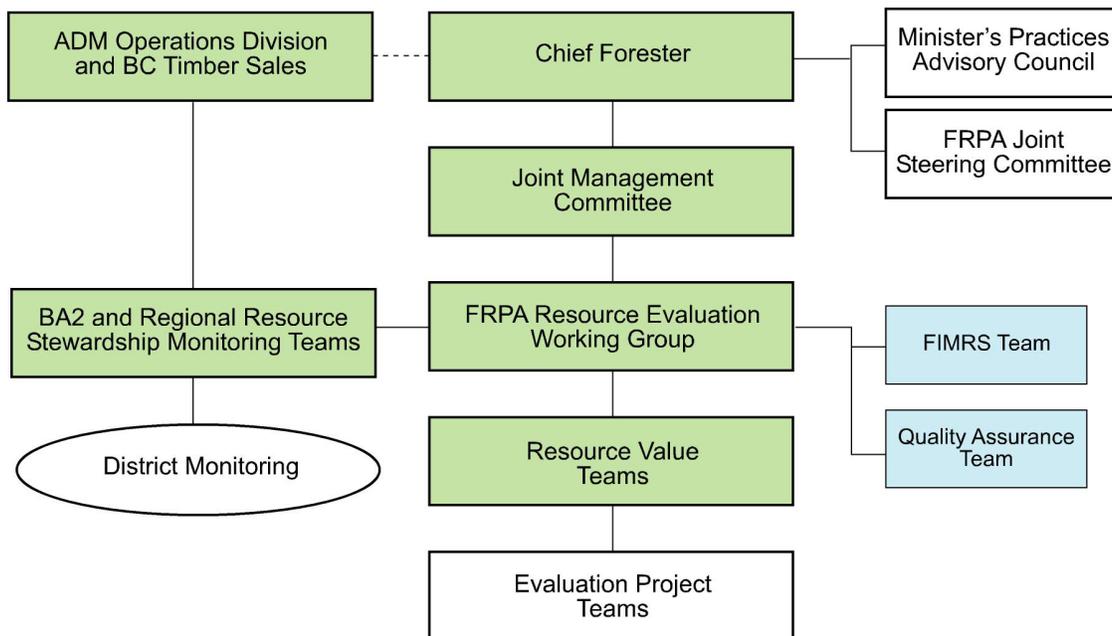
- assess the effectiveness of FRPA and its regulations in achieving stewardship objectives
- determine if forest and range policies and practices are achieving government’s objectives, with a priority on environmental parameters and consideration for social and economic parameters, where appropriate
- identify issues related to the implementation of forest policies, practices and legislation in achieving stewardship objectives, and
- implement continuous improvement of forest management in British Columbia.

In order to accomplish these objectives, FREP will:

- develop specific monitoring and evaluation questions
- evaluate the status or trends of resource values and determine causal factors
- determine whether resource values are being managed in a sustainable manner through proven or alternative forest practices
- communicate the results of evaluations, and
- recommend changes to forest and range policies and legislation, where required.

## Administrative Structure of FREP

The administrative structure of FREP is presented in Figure 1.



**Figure 1. Administrative structure of FREP.**

Ongoing direction and guidance for FREP is provided by the Program Sponsor (Chief Forester), who also receives input from the Minister's Forest and Range Practices Advisory Council, the FRPA Joint Steering Committee and the Assistant Deputy Minister of Operations. The Joint Management Committee makes program decisions in consultation with the Program Sponsor, and reviews and forwards recommendations from the FRPA Resource Evaluation Working Group to the Program Sponsor. The FRPA Resource Evaluation Working Group (FREWG), consisting of a committee of internal stakeholders, leads the development and implementation of FREP. External stakeholders are invited to provide input on evaluation issues and participate on working groups, as required. Regional Stewardship Monitoring Teams (RSMTs) are in place in all three forest regions. RSMTs will help facilitate the implementation of Resource Stewardship Monitoring (RSM) at the district level, including playing a key role in the implementation of quality control and identifying regional priorities.

For each resource value specified in FRPA and its regulations, a FREP Resource Value Team (RVT) has been formed. The purpose of the RVTs is to provide technical expertise in identifying priority evaluation questions or issues, and in the development of FREP evaluation and monitoring indicators and protocols. These teams also conduct analysis, provide interpretation of monitoring and evaluation data, and develop recommendations for continuous improvement to forest practices and policies. RVTs provide the broad base of scientific and technical expertise essential for the success of FREP. The list of RVTs and their members for each resource value can be found at [http://www.for.gov.bc.ca/hfp/frep/repository/Resource\\_Value\\_Checklist\\_Training\\_Contacts.pdf](http://www.for.gov.bc.ca/hfp/frep/repository/Resource_Value_Checklist_Training_Contacts.pdf).

## Program Coordination and Participation

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The coordination, development and implementation of FREP, via the FRPA Evaluation Working Group (FREWG), is being led by the Ministry of Forests and Range, Forest Practices Branch, in collaboration with Research Branch; Resource Tenures and Engineering Branch; the three forest regions and districts; the Ministry of Environment, Biodiversity Branch; and the Ministry of Agriculture and Lands.

Internal stakeholders consist of Executive members from the three resource agencies; the FRPA Joint Steering Committee and Joint Management Committee; and staff from the Ministry of Forests and Range, the Ministry of Environment, and the Ministry of Agriculture and Lands. External stakeholders include provincial and federal resource agencies, the Forest Practices Board, academics, consultants, non-government organizations, the forest industry, First Nations groups, municipalities and regional districts, other groups and organizations, and members of the public.

Representatives from agencies involved in other monitoring and evaluation programs have been and will continue to be consulted in the development of the program (see: Linkages with Other Monitoring/Evaluation Programs). Input is sought from external stakeholders throughout all phases of the evaluation process to ensure that stakeholder needs, priorities and concerns are identified and addressed. Stakeholders are kept apprised on ongoing projects, and mechanisms are in place to enable stakeholders to provide technical input into the design, implementation and analysis of FREP, as well as individual program initiatives and projects.

## Program Delivery

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There are two primary delivery mechanisms for FREP – resource stewardship monitoring and intensive evaluations. There are three levels of intensity for monitoring and evaluations conducted under FREP (see descriptions below). All three levels can be used to assess the current status of resource features or to identify trends by conducting a series of evaluations over time.

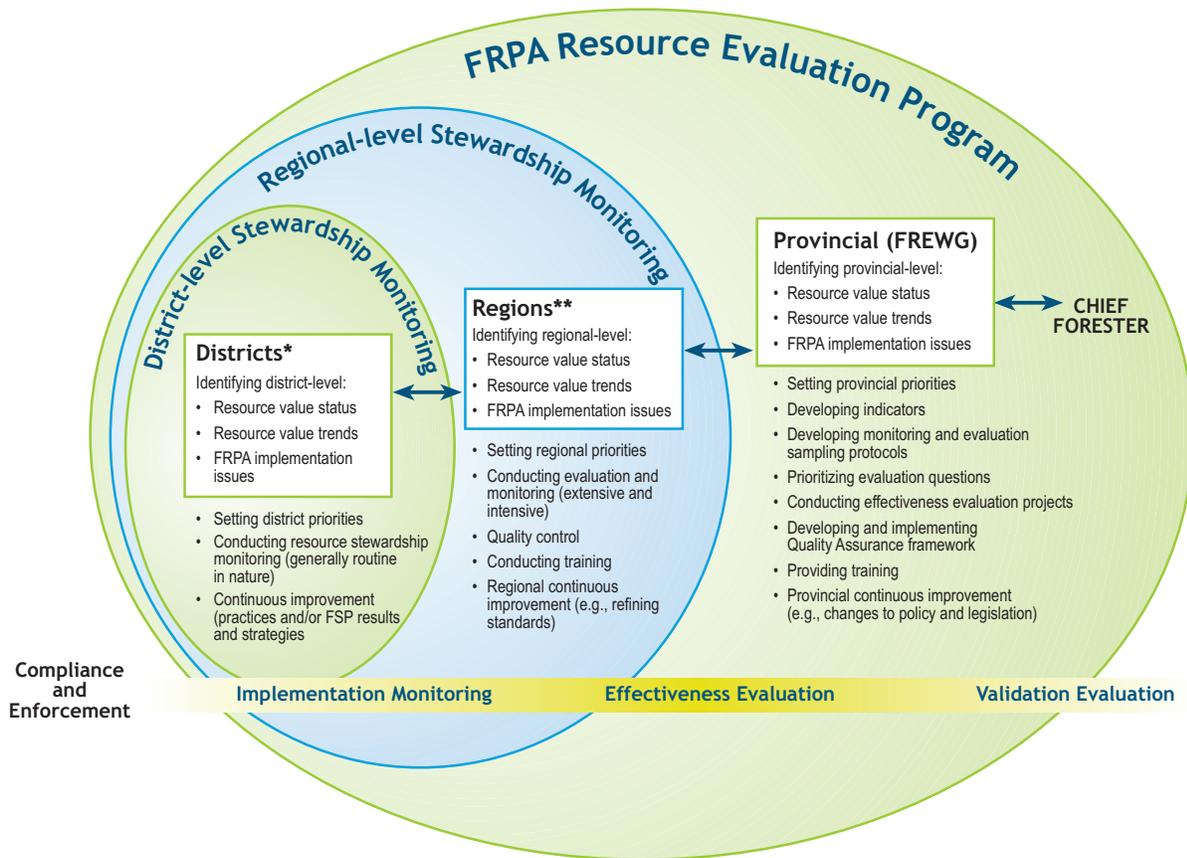
There are several key reasons why the ministry is initiating FREP prior to the full implementation of FRPA:

- The government’s 2002 Discussion Paper titled, *A Results-based Forest and Range Practices Regime for British Columbia*, specifies “maintaining the Codes high environmental standards” as a key objective of FRPA. Implementing RSM at this time allows us to begin measuring the achievement of that objective through the collection of baseline data during the transition period from the Forest Practices Code to FRPA.
- It will take at least two years of training and implementation before we are able to ensure that staff across the province have the skills and abilities to consistently deliver high-quality RSM. Implementation now gives us time to develop those skills and abilities.
- The tools and techniques for RSM have been rigorously developed and extensively tested using the most knowledgeable scientists, consultants and staff. Nevertheless, a staged implementation allows FREP to continuously refine and improve RSM tools and techniques.
- One of government’s primary monitoring and evaluation objectives is to determine the status, trends and causal factors related to resource values. The sooner we begin these activities, the sooner we will be able to identify/assess these factors, particularly resource value trends.

## Resource Stewardship Monitoring

Under FREP, RSM is a district and regional implemented activity, with regions providing support to the districts. Figure 2 illustrates the relationship of district and regional RSM within the overall provincial FREP process.

Resource stewardship monitoring is generally the first line of assessment of FRPA and associated forest practices. It provides valuable information on resource status/trends, and identifies implementation issues regarding forest policies, practices and legislation, as well as Forest Stewardship Plan results and strategies. This type of information identifies “red flags” that may require further investigation, and helps to focus the efforts of more detailed intensive evaluations. As a result, RSM is a fundamental component for implementing continuous improvement of forest management in British Columbia.



\*district-level monitoring is co-ordinated in partnership with regional BA2 teams. Districts monitor practices carried out under FSPs; and flag any specific results, strategies or outcomes they feel need to be evaluated at a more intensive level. Resource Stewardship monitoring will generally be routine in intensity.

\*\*regional-level monitoring/evaluation is a co-ordinated partnership with FREWG and Regional BA2 teams. Regional and FREWG monitoring and effectiveness evaluations will include all levels of intensity.

FSP = Forest Stewardship Plan

BA2 Team = Regional Stewardship Business Area Team

FREWG = FRPA Resource Evaluation Working Group

**Figure 2. Integrated approach to district, regional and provincial monitoring and evaluations.**

Resource stewardship monitoring consists of monitoring on-the-ground forest practices on randomly selected sampling sites to assess whether resource value objectives or strategies are being achieved. There are two levels of RSM:

- **Routine** – A relatively low intensity evaluation calling for typically inexpensive and rapid data collection.

Routine evaluations are low-cost overview evaluations that often involve visual estimates and “yes/no” checklists. These types of evaluations are useful for identifying management trends or issues that may require more detailed evaluations. An example of a routine-level evaluation might be an overview survey of impacts related to riparian management, which could include visual assessments of stream bank disturbance.

- **Extensive** – A more detailed evaluation involving the collection of categorical data using visual estimates or relatively simple measurements.

Extensive evaluations are more rigorous and quantitative than routine evaluations, and are used to collect more detailed information on a given area. An example of an

extensive evaluation might be collecting categorical and quantitative data on the impacts of forest management on karst resources, such as assessing the level of soil disturbance on high vulnerability karst terrain.

A detailed description of the RSM framework is available at [http://www.for.gov.bc.ca/hfp/frep/7\\_rsm.html](http://www.for.gov.bc.ca/hfp/frep/7_rsm.html).

## Intensive Evaluations

Intensive evaluations are carried out at the provincial or regional level to assess the status or trends of resource values. Intensive evaluations will generally be conducted by branch or regional staff (see Figure 2). Priorities for intensive evaluations will be based on RSM results and identified “red flags,” as well as emerging operational and political issues. Intensive evaluations will be used primarily to provide input into science-based recommendations to improve policies (e.g., legislation, guidelines and best management practices) and provide overall continuous improvement of forest policy and practices.

Intensive evaluations are in-depth investigations involving detailed quantitative data collection and analysis. They are much more time consuming and expensive to conduct than routine or extensive RSM. Comprehensive quantitative data is collected to assess the impacts of operational activities on specific resource values, often using comparisons with baseline data.

A more detailed description of intensive evaluations carried out under FREP can be found at [http://www.for.gov.bc.ca/hfp/frep/5\\_types\\_of\\_eval.html](http://www.for.gov.bc.ca/hfp/frep/5_types_of_eval.html).

## Evaluation Types

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There are generally four different types of evaluations described in evaluation/monitoring literature: implementation, effectiveness, validation and compliance. Resource stewardship monitoring usually involves implementation or effectiveness evaluations. Implementation evaluations measure progress towards a specific goal (e.g., adoption of new practices, policies or guidelines) and determine whether practices were implemented as planned. Effectiveness evaluations determine whether plans and practices are achieving objectives and anticipated outcomes. Validation evaluations are used to assess the assumptions upon which forest management strategies, practices and standards are based. Compliance evaluations examine adherence to legislative requirements and are therefore not part of FREP as illustrated in Figure 2.

For additional information on the terminology used by FREP, see *Technical Note #2 – FRPA Resource Evaluation Program Terminology* at: [www.for.gov.bc.ca/hfp/frep/repository/FRPA\\_Evaluator-Tech-n02.pdf](http://www.for.gov.bc.ca/hfp/frep/repository/FRPA_Evaluator-Tech-n02.pdf).

## Setting Resource Stewardship Monitoring and Evaluation Priorities

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Resource stewardship monitoring and intensive evaluations focus on monitoring and evaluating the achievement of government's objectives for the resource values (subject areas) specified in FRPA and its regulations. In order to focus FREP activities, questions of key interest are compiled and used as the basis for developing RSM and intensive evaluations. A list of 34 priority questions ([http://www.for.gov.bc.ca/hfp/frep/4\\_frep\\_pe\\_questions.html](http://www.for.gov.bc.ca/hfp/frep/4_frep_pe_questions.html)) has been developed. The identified questions provide the context for the development of indicators and help determine program funding and resource allocation decisions. The list of priority questions is being updated annually based on the results of RSM and intensive evaluations, operational feedback and/or political issues, and feedback from stakeholders.

FRPA resource value objectives are generally not specific enough to provide sufficient clarity for measuring the intent of those objectives. The FREP priority questions and refined RSM questions reflect the FRPA Resource Evaluation Working Group's understanding of the FRPA objective statements in a way that will allow for measuring whether the intent of the objective statements has been achieved. Figure 3 illustrates the linkage between the objectives for FRPA resource values and the process used to monitor and evaluate the extent to which those objectives are being met.

The tables in Appendix 2 provide additional information on the resource value objectives, priority evaluation questions, indicators, and how the data will be used to facilitate continuous improvement of forest practices for each of the 11 resource values under FRPA.

## FREP Protocols and Standards

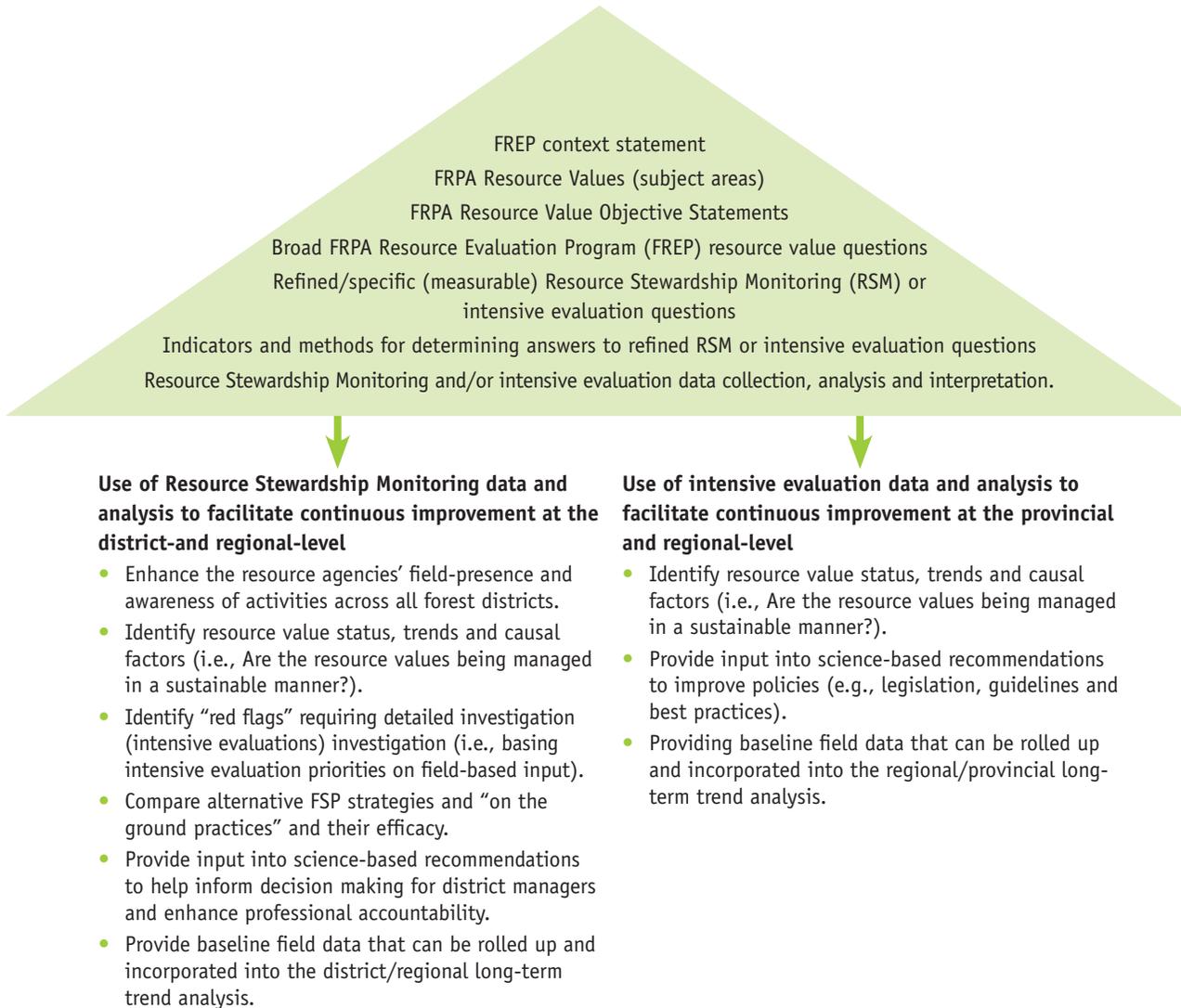
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For various aspects of FREP (e.g., sample site selection, quality control, report review, resource team participation, etc.), protocols (standards or standardized methodology) have or will be developed that provide guidance to help ensure the program's objectives, including maintaining high standards of quality control, are achieved. These protocols can be found on the FREP website.

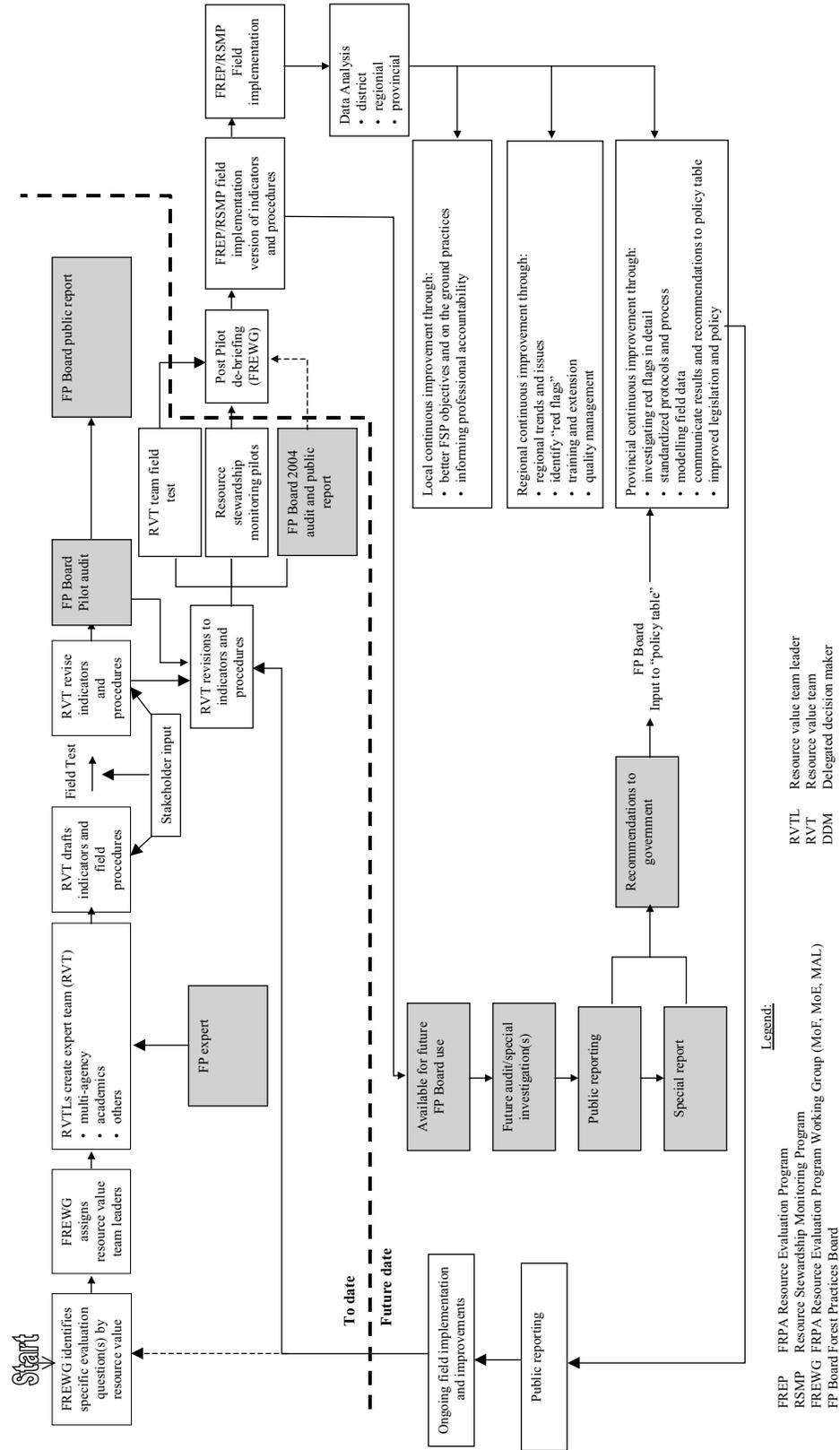
## Indicators

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Resource stewardship monitoring and intensive evaluations both use indicators to assess a question regarding the effects of forest and range management on a specific resource value. Indicators are measurable attributes or components (often environmental or social) of a resource value that provide reliable information on the status or state of that resource. Under FREP, a comprehensive process for the development, implementation and continuous improvement of scientifically valid, peer reviewed and field-tested indicators and protocols has been developed ([http://www.for.gov.bc.ca/hfp/frep/Repository/FRPA\\_Evaluator-Tech-n01.pdf](http://www.for.gov.bc.ca/hfp/frep/Repository/FRPA_Evaluator-Tech-n01.pdf)). Figure 4 illustrates the FREP indicator development and implementation process. Resource Value Teams have been assigned to develop indicators and protocols for each of the FRPA resource values. Indicators and protocols developed to date can be found at <http://www.for.gov.bc.ca/hfp/frep/>.



**Figure 3. Linkage between FRPA resource value objectives and the process used to monitor and evaluate the extent to which those objectives are being met.**



**Figure 4. FREP indicator development and implementation process.**

## Principles of Site Selection

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There are a number of statistical design principles that were used to develop a site selection protocol for resource stewardship monitoring. These principles ensure that the data we collect and analyze can be used at multiple scales (district, region and province) with statistical validity and credibility. This protocol can be found at: <http://www.for.gov.bc.ca/hfp/frep/>.

### Random Sampling<sup>1</sup>

The sites sampled under RSM in 2005 will be selected using simple random sampling (without replacement) within each pre-defined stratum. The primary reasons for using random selection include:

- Sampling result is objective and defensible;
- Sampling errors can be estimated so that confidence limits can be calculated; and
- Determining sample size requirements can be done objectively.

### Sample Sizes

The number of sites sampled within each stratum can vary depending upon available resources, variability in the data, or the expectation of problem sites. For 2005, this value is set at 15 sites per district, although a district may choose to sample more sites. It is possible to determine optimal sample sizes given a variety of assumptions; however, this will not be undertaken until after the 2005 RSM data analysis is completed.

### Targeted Sampling

In some cases, districts may also wish to do some targeted sampling of specific geographic areas, licensees, or other criteria in order to meet immediate operational needs. Targeted sampling has limited value within formal RSM if it does not provide information about the state of the population within a whole district, a region, or the province. It may provide some indication of worst case scenarios, but the targeting itself indicates that we know where policy/practices are most likely breaking down. If we only sample targeted sites, we might miss identifying circumstances where the policy/practices don't work for reasons we did not anticipate.

Data collected through targeted sampling will not be incorporated into the RSM database unless the following conditions are met:

- The target population is one or more of the defined strata for that resource value. This means that the data collected can be appropriately weighted and included during data analysis.
- Sites within the target population or strata are randomly selected with known probability.

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1 For more discussion on this topic, see *FRPA Evaluator, Technical Note #3 – Why the Units We Select Should be Randomly Selected* at: [http://www.for.gov.bc.ca/hfp/frep/repository/FRPA\\_Evaluator-Tech-n03.pdf](http://www.for.gov.bc.ca/hfp/frep/repository/FRPA_Evaluator-Tech-n03.pdf).

## Scale and Frequency of Resource Stewardship Monitoring and Intensive Evaluation Activities

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Resource stewardship monitoring and intensive evaluations may take place at various scales and frequencies. Depending on the RSM question, data may be collected, analyzed and reported at various spatial scales (e.g., stand or landscape), measurement cycles (e.g., yearly, every 2–3 years, etc.), sampling intensity, or specific site selection criteria. For example, different sampling designs may be used to:

- identify resource value status, trends and causal factors
- compare the effectiveness of alternative FSP strategies and “on the ground practices”
- identify “red flags” requiring detailed intensive evaluation (i.e., basing intensive evaluation priorities on field-based input).

Resource stewardship monitoring and intensive evaluation protocols are generally designed at either a stand or landscape level. For example, soils and biodiversity resource values will have protocols for assessing both stand and landscape levels. In many cases, it will be important to place stand-level results into a landscape-level context.

The frequency of data collection for any one RSM or intensive evaluation protocol will be determined through an assessment of priorities at the district, regional and provincial levels. There will be varying priorities between districts or regions. Furthermore, the resources required to monitor all values in a given district every year exceed available resources.

Staged implementation of RSM will begin in 2005 for two resource values, with province-wide implementation for three to five values in 2006. In 2005, each region will participate in the staged implementation with a minimum target of four or five districts per region. Support funding (linked to Internal Performance Measures) will be provided for districts, where necessary, to provide contract support, access costs and/or equipment purchases. The target number of cutblocks monitored by resource value will be 10–15 per participating district.

## Linkages with Other Monitoring/Evaluation Programs

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FREP is linked to the work of several other agencies, and shares data and information with a number of complementary monitoring and evaluation initiatives in British Columbia, including:

- FRPA Administrative Effectiveness Evaluation Program (Ministry of Forests and Range, Resource Tenures and Engineering Branch)
- Ministry of Environment, biodiversity and environmental monitoring programs
- Ministry of Forests and Range and Ministry of Environment compliance and enforcement programs
- Forest Practices Board audits and special investigations
- Certification audits

- National Criteria and Indicators Reporting
- Provincial State of the Forest Reporting.

Effective cooperation with these other agencies is important to ensure that FREP's budget and staff resources are allocated efficiently and effectively.

A key linkage is with FRPA compliance and enforcement (C&E). Compliance evaluations assess compliance with legal requirements, and answer the question, "Have they done what they were legally required to do?" Compliance evaluations do not evaluate effectiveness.

The mandate of C&E is to ensure compliance with, and enforcement of, legislation. Therefore, FREP will not undertake compliance evaluations and C&E staff will not participate in FREP. Nevertheless, information from C&E databases (e.g., Compliance Information Management System) and other non-confidential data relevant to FREP priorities and projects may be requested and used during RSM or intensive evaluations.

Another important linkage is with the MoFR research programs. Research staff are involved in validation evaluations. Validation evaluations assess or verify the basic assumptions under which a specific management direction was developed and answer the question, "Are the assumptions upon which we base our policies and practices correct?" Validation evaluations are primarily research tools for examining the cause and effect relationships between an ecological system and management actions. FREP will coordinate with MoFR research activities and recommend validation evaluations that could be undertaken by researchers.

## Continuous Improvement Cycle

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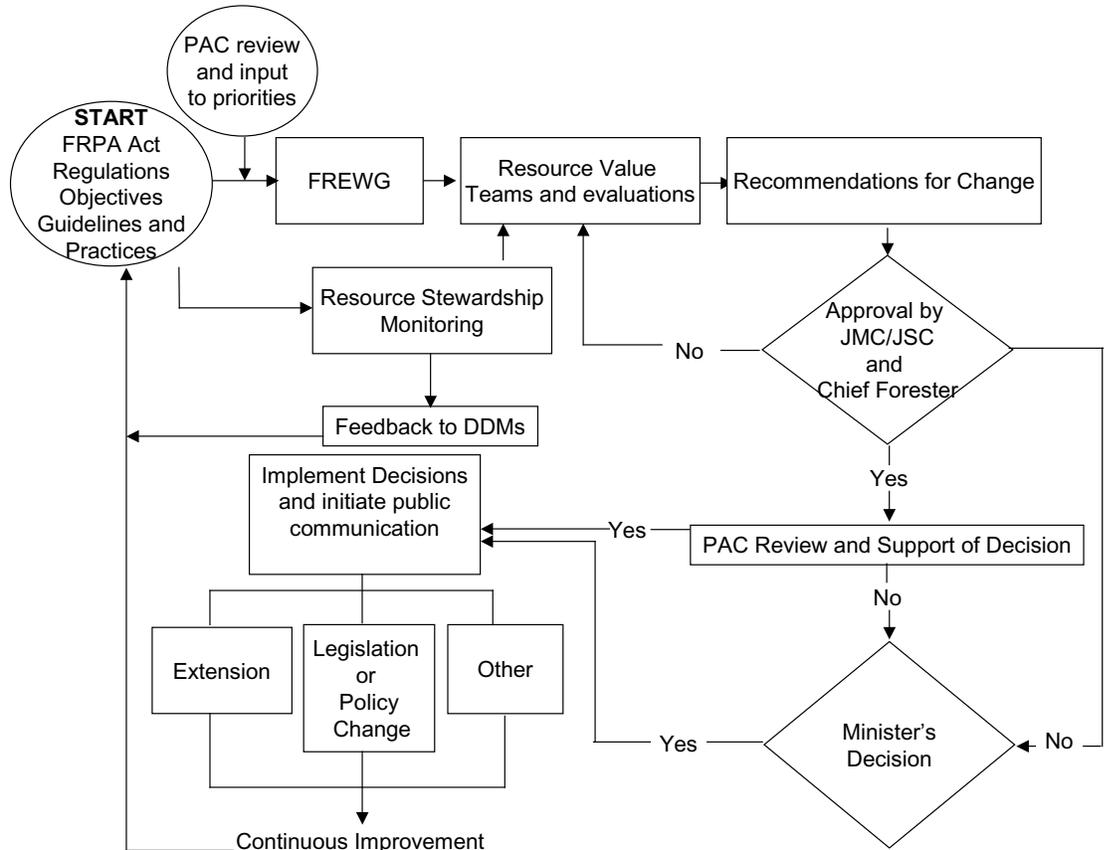
One of the main objectives of FREP is to promote the continuous improvement of forest management practices in British Columbia. Continuous improvement occurs at two levels – the district/regional level, and the regional/provincial level.

Continuous improvement at the district/regional level relates to improving local forest practices and Forest Stewardship Plan objectives and strategies. The results of RSM are communicated directly to forest licensees and district managers. These results may indicate training or extension requirements, or may be used to refine local practices to ensure that resource value objectives are being achieved. RSM may also identify "red flags" that require more detailed investigation at the regional/provincial level.

Continuous improvement at the regional/provincial level relates to affecting changes to legislation, policies and guidelines as a result of RSM or intensive evaluations. Monitoring and evaluation results, along with associated recommendations, are communicated to the Joint Management Committee and the Program Sponsor (Chief Forester). Social, economic and environmental factors are all considered prior to determining appropriate actions (e.g., training, extension, and/or policy and legislation changes).

The continuous improvement process within FREP is designed to ensure that the program addresses the right questions and collects the right information to ensure that resource value objectives are being met, and that the process is open and accountable to the

public. See Figure 5 for an overview of the FREP continuous improvement process. A more detailed continuous improvement business map can be found on the FREP website at <http://www.for.gov.bc.ca/hfp/frep/>.



**Figure 5. Overview of the FREP continuous improvement process.**

## Information Management

Field-based evaluations and monitoring are time consuming and expensive, but necessary to achieve the objectives of FREP. A major criticism of monitoring and evaluation programs in other jurisdictions is the inadequate management of data collection and analysis. Use of existing information management systems in the FREP evaluation program will result in significant savings to program costs and increased program efficacy. The development and implementation of an effective information management system will ensure that these increased savings and efficacy will be realized. Details regarding the FREP information management system will be available when developed at the FREP website <http://www.for.gov.bc.ca/hfp/frep/>.

## Measuring the Success of the Program - Quality Assurance

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To measure the success of FREP, a quality assurance framework (QAF) is being developed. Quality assurance will apply at both the program and project levels. Key questions at the program level include: “Are program objectives being met?” “Is the Province receiving value for the resources allocated to FREP?” “Are monitoring and evaluation results valuable and being used?” Quality assurance at the project level covers all aspects of RSM and intensive evaluations, including indicator and protocol development; data collection, management and analysis; and reporting, reviewing and approval processes. Performance indicators for evaluating the success of FREP are currently under development. The most current version of the QAF can be found at <http://www.for.gov.bc.ca/hfp/frep/>. The Forest Practices Board will conduct an independent assessment of the FREP framework, strategy and work to date in 2005/06. The terms of reference for this assessment are posted on the FREP web site under: [http://www.for.gov.bc.ca/ftp/HFP/external/!publish/FRPA%20Evaluation%20Program/repository/FPB\\_assessment\\_of\\_FREP\\_TOR.pdf](http://www.for.gov.bc.ca/ftp/HFP/external/!publish/FRPA%20Evaluation%20Program/repository/FPB_assessment_of_FREP_TOR.pdf).

## Program Implementation and Funding

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FREP is jointly funded by the Ministry of Forests and Range and the Ministry of Environment. Significant financial contributions have also been made through the Forest Practices Board for the development and testing of routine and extensive indicators. In 2004, three RSM protocols for biodiversity, riparian and soils were pilot tested. Two or three monitoring protocols will be implemented each year beginning in 2005. In addition, 2–3 monitoring protocols will be pilot tested for implementation in the following year. As a result, it is anticipated that it will be 5–6 years before FREP is fully operational. In addition to implementing and piloting new RSM protocols each year, 2–3 intensive evaluations will be undertaken by FREP. A detailed work plan for FREP, including budget allocations, can be found at <http://www.for.gov.bc.ca/hfp/frep/>.

## Appendix 1. FREWG Membership List

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## Appendix 2. FRPA Resource Value Evaluation and Monitoring Structure

**Table 1. FRPA Value – Biodiversity**

FRPA objective statement(s)	FREP evaluation question(s)	Indicators from RSM checklist (stand level)	How data resulting from the RSM checklist will be used (dealing with the results of monitoring)
<p>The objective set by government for wildlife and biodiversity at the stand level is, <i>without unduly reducing the supply of timber from British Columbia's forests, to retain wildlife trees</i> (section 9.1 FPPR)</p> <p>The objective set by government for wildlife and biodiversity at the landscape level is, <i>without unduly reducing the supply of timber from British Columbia's forests and to the extent practicable, to design areas on which timber harvesting is to be carried out that resemble, both spatially and temporally, the patterns of natural disturbance that occur within the landscape</i> (section 9 FPPR).</p> <p>The objectives set by government for biodiversity are as follows: (a) <i>conserve biodiversity;</i> (b) <i>maintain native plant community dynamics;</i> (c) <i>encourage the development of late seral plant communities or other desired plant communities;</i> (d) <i>maintain plant communities consistent with natural successional stages on areas where forage seeding is carried out within transitory range areas</i> (section 11 RPPR).</p>	<p><b>Broad FREP question:</b> Is the structural retention (WT and CWD) left associated with cutblocks adequate to maintain habitat for dependent species at the site and across the landscape now and in the future?</p> <p><i>Refined question used to develop checklist:</i> Is stand-level retention providing the range of habitat with the structural attributes commonly understood as necessary for maintaining the species dependent on wildlife trees and CWD?</p>	<ul style="list-style-type: none"> <li>• % area retained</li> <li>• Presence of ecological anchors</li> <li>• WT Class 3+ stems/ha</li> <li>• Tall trees WT class 3+ stems/ha</li> <li>• Total large trees all classes &gt;50 cm</li> <li>• CWD vol/ha</li> </ul> <p>CWD by length &amp; diameter class</p>	<p>The data collected on the indicators will be compared against existing ecosystem baseline data to determine an individual biodiversity rating for each cutblock.</p> <p>The results of each cutblock assessment will be put into a landscape-level context in order to assess overall "biodiversity health."</p>

1. FRPA resource value objectives are generally not specific enough to provide sufficient clarity for measuring the intent of those objectives. The FREP questions and the refined RSM questions are the FRPA Resource Evaluation Working Group's interpretation of the FRPA objective statements that will allow for measuring whether the intent of the objective statements has been achieved. The entire list of FREP evaluation questions (and the process used to derive and prioritize these questions) can be found on the FREP website (<http://www.for.gov.bc.ca/hfp/frep/>). FREP evaluation questions are reviewed on an annual basis and vetted through the FRPA Joint Management Committee.

2. Depending on the RSM question, data may be collected, analyzed and reported at various spatial scales (e.g., cutblock or landscape), measurement cycles (e.g., yearly, every 2-3 years, etc.), sampling intensity, or specific site selection criteria. For example different sampling designs may be used to:

- identify resource value status, trends and causal factors
- compare alternative FSP strategies and "on the ground practices" and their efficacy
- identify "red flags" requiring detailed (intensive) evaluation (i.e., basing intensive evaluation priorities on field-based input).

**Table 2. FRPA Value – Fish (riparian)**

FRPA objective statement(s)	FREP evaluation question	Indicators from RSM checklist	How data resulting from the RSM checklist will be used (dealing with the results of monitoring)
<p>The objective set by government for water, fish, wildlife and biodiversity within riparian areas is, <i>without unduly reducing the supply of timber from British Columbia's forests, to conserve, at the landscape level, the water quality, fish habitat, wildlife habitat and biodiversity associated with those riparian areas.</i> (FRRP section 8)</p> <p>The objectives set by government for fish are as follows: (a) <i>conserve fish, fish habitat and aquatic ecosystems;</i> (b) <i>manage any adverse effect of deleterious material.</i> (section 9 RPPR)</p>	<p>Are riparian forestry and range practices effective in maintaining the structural integrity and functions of stream ecosystems and other aquatic resource features over both short and long terms?</p>	<ul style="list-style-type: none"> <li>● Channel bed disturbance</li> <li>● Channel bank disturbance</li> <li>● LWD processes (jams)</li> <li>● Channel morphology</li> <li>● Aquatic connectivity</li> <li>● Fish cover diversity</li> <li>● Moss abundance &amp; condition</li> <li>● Fine sediments</li> <li>● Aquatic invertebrate diversity</li> <li>● Windthrow frequency</li> <li>● Riparian soil disturbance</li> <li>● LWD supply</li> <li>● Shade &amp; microclimate</li> <li>● Disturbance-increaser plants</li> </ul>	<p>As above</p>

Table 3. FRPA Value – Soils

FRPA objective statement(s)	FREP evaluation question	Indicators from RSM checklist	How data resulting from the RSM checklist will be used (dealing with the results of monitoring)
<p>The objective set by government for soils is, without unduly reducing the supply of timber from British Columbia's forests, to conserve the productivity and the hydrologic function of soils. (section 5 FPPR)</p> <p>The objectives set by government for soils are as follows: (a) protect soil properties; (b) minimize erosion and compaction; (c) minimize undesirable disturbance to soils; (d) maintain a vigorous and diverse cover of desirable plant species with a variety of root depths sufficient to protect the soil; (e) re-establish ecologically suitable vegetation after disturbance occurs; (f) maintain ground cover, including sufficient litter and residual dry matter accumulation to protect soil; (g) minimize accelerated soil erosion; (h) minimize sealing of the soil surface. (section 6 RPPR)</p>	<p>Are forest practices resulting in levels of site disturbance detrimental to soil productivity and hydrologic function?</p>	<ul style="list-style-type: none"> <li>● % access structures</li> <li>● Area of landslides, drainage diversion, erosion caused by access</li> <li>● Disturbance to natural drainage patterns</li> <li>● Soil disturbance hazard and level</li> <li>● Green tree retention</li> </ul>	<p>As above</p>