

**FRPA Resource Evaluation Program  
Resource Stewardship Monitoring**

**2005 Quality Assurance Site Visit Report**

**for**

**Stand-level Biodiversity Monitoring**

**and**

**Evaluating the Condition of Streams and Riparian Management Areas**

Prepared by:

Dean McGeough, RPF

January 3, 2006

## INTRODUCTION

Under the provincial FRPA Resource Evaluation Program two routine effectiveness evaluations were simultaneously trained and launched at selected forest districts throughout BC in 2005. The protocols guiding these two evaluations were:

- Stand-level Biodiversity Monitoring, and
- Evaluating the Condition of Streams and Riparian Management Areas

Following training, district staff implemented the routine effectiveness evaluations on randomly selected harvest openings within their respective districts. To ensure the results of the evaluations meet stakeholder expectations, a quality control protocol for “QA Site Visits” (QA) was drafted to guide the assessment of the field data.

## SCOPE

Trainer and consultant Dean McGeough delivered training at 4 sessions and commenced QA visits in August 2005. Dean visited forest districts while evaluations were underway, both to assist and mentor staff with their evaluations, and to audit sites that had been completed. The goal for the 2005 QA was to visit one forest district from each of the 3 forest regions. However, the plan was expanded upon receiving requests for mentoring by North Island–Central Coast (NICC) and South Island (SIFD), and a request for a QA visit by the Kalum FD. The following summarizes the QA Site Visits completed during the 2005 season:

Forest District	Date of Visit	Opening Visited	Stand-Level Biodiversity	Riparian Area
NICC	Aug., 23, 2005	92L026-183	Mentor	Mentor
Vanderhoof	Sept., 12, 2005	93F086-076	Mentor	
	Sept., 13, 2005	93K007-058	Mentor/audit	Mentor
	Sept., 21, 2005	93G072-107	Audit	Audit
Chilcotin	Sept., 15, 2005	92O053-021	Audit	Audit
	Sept., 15, 2005	92O053-048		Mentor
	Sept., 16, 2005	93C038-041	Mentor	
Campbell River	Oct., 19, 2005	92L048-521	Mentor	
	Oct., 20, 2005	92K014-507	Audit	Audit
SIFD	Oct., 18, 2005	92F025-075	Mentor	Mentor
	Nov., 29, 2005	92F016-053	Audit	Audit
Kalum	Nov., 8, 2005	103I059	Mentor	Audit
	Nov., 9, 2005	103I096	Audit	Audit

Selection of sites for the QA focused on openings that were identified by the district staff as being representative of their sites completed, were relatively easy to access, or were openings that fit into the staff’s work plans (sites that were incomplete or in proximity to sites needing evaluation). Therefore, the QA provided mentoring and helped to bolster productivity where staff selected sites that were underway.

## **QA SITE VISIT PROCESS**

### **Mentoring**

Dean met with the field staff at the district office and traveled with the staff to field sites. Dean observed the staff's planning and block set-up, and then accompanied staff in locating each biodiversity plot or riparian reach. Dean participated in and observed field data collections by the staff, and in ad hoc manner field measurements were audited by Dean to verify accuracy. At all times, Dean availed himself to questions and provided clarification, interpretation and application of the protocols. Where opportunities arose, Dean also provided field support to the staff by establishing plots and taking measurements to increase productivity (helping the staff complete the block in a timely manner).

### **QA audits**

With the exception of the NICC forest district, Dean audited biodiversity and riparian evaluations completed by the district staff. At Chilcotin and Kalum, district staff accompanied Dean during these site audits. Following each district visit, Dean provided feedback and a review of site-specific issues, either in person, by phone or via e-mail.

Dean randomly selected biodiversity plots, capturing at least one retention patch plot and one dispersed area plot. If issues were encountered, Dean increased his sampling or collected missing data while on-site. For riparian area evaluations, Dean checked at least one reach sampled by the district staff.

## **QA SITE VISIT OUTCOMES**

Without exception, the forest district staff welcomed the mentoring opportunities of Dean's visits. In many instances, staff shared that the time delay (in some instances a 1-2 month time lag) between training and implementation of the evaluations had created some uncertainty about assessment processes and a realization that some of the finer details had been either forgotten or confused. Furthermore, bringing in alternate staff to assist with fieldwork created temporary reductions in productivity because of the need to review the processes with each new person joining the fieldwork well after training.

Having a trainer on-site provided opportunity for continuous improvement, refinement of their data collection processes, and reassurance to the district staff that their assessments were correct and accurate. This also provided a forum for field relevant review of their questions pertaining to the protocols.

Common to both the completion of stand-level biodiversity and riparian protocols was a weakness in supplying fully completed field cards and maps. Not all data fields were completed, and in some instances, maps lacked notation of field sampling details. During debriefing, it was evident that these omissions reflected staff spending long field days collecting the mensuration details, then hoping to complete the administrative aspects and personal review of the cards during their next office day.

A common concern expressed by district staff during the field visits was the time commitment required to undertake these 2 evaluations. In spite of staff enjoying the field process, they commonly expressed the need for guidance on how to prioritize sampling within their openings for stand-level biodiversity, and when combining riparian with stand level biodiversity evaluations. District staff requires guidance to answer the following questions:

- When is a return trip warranted?
- What crew size will achieve the goal of a field day per opening?
- How were travel and mobilization (helicopter, boat, walk-in, ATV access) issues factored into the time budgets?

### **Stand-level Biodiversity Monitoring**

The following items were encountered during QA site visit reviews of the stand-level biodiversity sampling process:

- Mensuration accuracy was generally on target, meeting the 10% margin; largely because staff chose to measure most trees for diameter and heights, or measure CWD for diameter and length; or rigorously calibrated their measurements with frequent “estimate then measure” performances. Where measurements did not meet the 10% margin it was primarily because visual estimation lacked calibration.
- Tree species recognition was most accurate and consistent for tree tallies than for CWD. Species recognition for CWD was weakest for decay class 4; persons often chose X (unknown) rather than extrapolate (e.g., if in a predominantly Pine stand presume CWD to be pine), and often chose not to define CWD unknowns into conifer (Xc) or hardwood (Xh).
- Decay class recognition was most accurate for standing trees than for CWD. For those staff without previous training in these classifications, their recognition depended upon the schematic diagrams more than the condition of the tree or CWD. For example, live trees mechanically cut to create stubs were tallied as class 8 instead of class 3.
- Sampling rules for CWD and methodology for handling borderline plots were not adequately covered within the protocol. In an attempt to clarify, sampling was elaborated following training and a supplement was prepared in July. Most district staff had not seen this supplement.
- Sampling intensity information within the protocol needs to be expanded to provide better guidance when encountering complex harvest area and tree retention designs.
- Inadequate field marking sometimes complicated verification of CWD data. CWD transects could not be audited when transects were neither field marked nor directional bearings recorded. The field procedures can be easily strengthened to guide field marking (recording the transect bearing on the field card, and flagging the transects in the field; painting the CWD at the point crossed by the transect line is the best for audit purposes).
- Professional opinion/comments section of form C needs to be elaborated. The scale is generally not understood to be a simple expression of accomplishment

compared to the opportunities available for the site. Some staff viewed this to be a gauge of practice compliance to the stated commitments within the SP; and therefore did not feel “qualified” to make such a comment.

- Retention patches were not always sampled, but rather “grouped” if of similar timber type or retention type, and therefore only 1 form B was completed.
- The selection process for 15 openings was confused between Biodiversity and Riparian; some discarded the need for biodiversity sampling if the block lacked a stream reach or if there were no retention patches.
- Plotting can be streamlined for efficiency with training, both on the use of handheld GPS receivers as well as using a compass and hip-chain. GPS units were not available to all districts at the start of the fieldwork, and thus some were traversing with hip-chain and compass.

### **Evaluating the Condition of Streams and Riparian Management Areas**

The following items were encountered during QA site visits of the stream reach and riparian area assessments:

- Staff attempted to sample as many reaches from the opening as time would permit. Most found the riparian assessment to take as much as a ½ field day for the first few openings following training; usually complicated by deciding whether a stream was affected by the treatment, where to establish the reach for sampling, and whether the reach was correctly classified.
- Decisions about which stream reaches required sampling were generally appropriate; although many did not include the upstream side of crossing structures when sampling.
- Training needs to provide sites or photos that will help staff to identify the different channel morphologies (Riffle-Pool, Cascade-Pool, Step-Pools, and Non-Alluvial).
- The sampling for benthic invertebrates was not always consistent. Some simply relied on searching the underside of rocks, which in October was not revealing the diversity anticipated (kick sampling is required during cool temperatures).
- Question 1 (Is the channel bed undisturbed?) – recognition of lateral bars or a meandering thalweg was consistently weak, especially if streams were narrow or dry.
- Question 2 (Are the channel banks undisturbed?) – recognition of recent erosion from cattle, and recognition of deeply rooted banks were problematic.
- Question 4 (Is the channel morphology undisturbed?) – recognition of pools when channels are dry was problematic; the concept of heterogeneous substrate was confused; measurement process for determining a deep pool was inconsistent.
- Question 5 (Connectivity aspects) – recognition of a blockage is weak; need clarification that all applicable indicator statements must be answered, regardless of fish or non-fish status; beaver dams are not a blockage.
- Question 7 (Moss presence) – clarification that we are to evaluate aquatic moss growing on channel substrate (rocks not logs).
- Question 8 (Minimized fine sediments) – clarification needed that >15% fines is exceeding the threshold; some clarification about embedding was required;

distinguishing between organic fines and inorganic fines was a common weakness.

- Question 10 (Windthrow management) – clarification was required that indicator “A” pertains to the presence of a RRZ or WTP, and not the voluntary choice to retain a timbered leave area along an S4, S5, or S6; also, that a clearcut RMA is an effective windthrow management strategy for an S4, S5, or S6 reach; field measurement and calculations of historic levels to current levels of windthrow were not consistently understood.
- Questions 11 (Bare erodible soil or disturbed ground) – not always were sampled reaches located to capture a road crossing; some required a review of the measurement and estimation process associated with crossings and cattle/wildlife impacts.
- Question 13 (Vegetation cover to provide shade) – canopy and ground vegetation data collection were not always supportive of the indicator conclusions because the wording for the data record (vegetative cover) was interpreted to be live ground vegetation (exclusive of tree canopy cover plus organic forest floor covering by needles and leaves).
- Question 15 (Normal plant community within 10m of the stream) – some confusion surrounding application of “A” and “B” to harvested riparian areas (should explicitly state to default to NO if there was harvesting or high windthrow within this area); identification of heavily browsed versus extensive browsing is needed; grazing applicability to non-grazing tenures has implications to outcome to this question if “D” can be N/A.
- Data records and conclusions to indicators did not always support one another; this may affect data compilation and verification. For example, in Question 4 (is the channel morphology undisturbed) the pool lengths recorded may be lower than the indicator threshold, yet the indicator was answered “Yes” based upon their overall impression of the entire reach.
- Conclusion on Functioning Condition and the source for impacts was not always elaborated – perhaps a reflection of time constraints when trying to complete both riparian and biodiversity evaluations in one trip.
- Some staff remains apprehensive about the validity of conclusions that might be extrapolated from the data. This concern was raised where the impact sources were not always obvious, or where it was difficult to categorize whether the impacts were wholly attributed to recent or historic events or activities.

## **CONCLUSION and RECOMMENDATIONS**

During the QA process it was readily apparent that the development and delivery of these two protocols was effective. Staff was able to undertake the field evaluations with a good measure of reliability. Pilot testing of these protocols in 2004 helped to refine the field procedures. The 2005 launching of these two protocols provided a broader test of procedures and a chance for those who participated in the pilot tests to review the procedures before implementation across all forest districts. The QA process of mentoring and auditing is a valuable process for ensuring the integrity and validity of the data being collected, and identified opportunities for continuous improvement.

The QA Site Visit protocol is appropriately rigorous. The combination of mentorship reviews following training will strengthen the reliability of the data collected. Once mentoring is completed, data quality should be verified by field audits prior to the end of the field season. In 2006, it is advisable to continue with training at the onset of implementation. Mentoring should follow this training. The QA auditing should be applied to those districts that were not covered in 2005. Once the 2006 season is completed, an audit program should be planned that will target all districts with a sampling intensity of one audit visit every 3 years. A target of three sites should be randomly selected at each district to confirm the validity of data collection, and to guide the continuous improvement initiatives of effectiveness evaluation.

The following recommendation are made following the visits in 2005, and in part reflect the data cleaning and review efforts during the month of December. These will in turn strengthen the QA protocol and support the overall process of continuous improvement.

### **Training**

The 2005 training process was provided at eight locations, commencing in early June 2005. The agenda combined 3 days of riparian training followed by 1 day of stand-level biodiversity training. This is a rigorous schedule, but very necessary for staff not experienced with these two protocols. For those staff that completed fieldwork during the 2005 season, a one-day session of refresher training is suggested. Refresher training could be a compulsory component of effectiveness evaluations, taken on a cycle of once every three years.

To improve upon the delivery and retention results, shorter courses (such as the stand-level biodiversity training) should be placed first. This will maintain focus and ensure the protocol is adequately covered. This scheduling order will also provide opportunity for topical reviews during the successive days when traveling or debriefing. Additional comments to consider are as follows:

- Hold a debriefing session each day, to gather and focus participants,
- Elaborate upon the “office” tasks required to efficiently implement the evaluations. This requires an extended indoor session on the first day of training,
- Provide a range of sites that address the complexities of the scenarios staff may encounter once underway. Ideally, 2 biodiversity sites and 6 riparian reaches are adequate,

- Consider combining biodiversity with riparian evaluations on the final training day to guide the process for prioritizing tasks within one opening where both protocols are to be applied, and
- A train-the-trainers session should be conducted prior to delivery of the training to ensure consistency, and to ensure all support materials are complete.

### **Data quality assurance and productivity efficiencies**

Data quality assurance and productivity efficiencies are mutual needs and can be greatly strengthened with a combination of training followed promptly with field implementation, early mentoring and data review, followed by formal auditing. The following suggestions are proposed:

- Ideally, experienced field staff should receive refresher training prior to the start of field sampling. This will increase the confidence of district staff, and equip them with up-to-date understanding of the field procedures.
- Training and implementation needs to commence in early spring. This will capture more of the field season and permit staff greater flexibility for planning amidst other duties and vacation schedules. It will also optimize the use of favorable weather and increased daylight hours.
- Field implementation must commence within 2-3 weeks of receiving the training. The completed evaluations should then be sent for data review and evaluation without delay. Stockpiling the completed evaluations delays the opportunity for timely reviews and corrective adjustments.
- Training should be supported with mentoring visits by trainers or other support staff specialists. Inevitably, there arise site-specific issues that were not covered in training that require on-site assistance and resolution.
- Data collection methodology needs to be procedurally consistent to be credible, and field staff reminded that their data (and in the case of riparian evaluations, their conclusions) be defensible.
- Staff needs to be encouraged to conduct peer review during data collection. It is acceptable to review each other's work, propose corrective practices, and to give positive and constructive critiques.

### **Project preparation and planning**

Random opening lists, equipment and field supplies need to be readily available to staff at the beginning of training. This will permit staff a chance to organize their equipment, be trained in its correct use, and to gather supporting documents (maps, SP's, access routes). It is advisable that staff takes the time to prepare opening packages – locate plots on a working map, review SP documents, obtain orthophoto coverage, and to pre-label plot cards with all administrative information. If these opening lists are available at the onset, time can be allocated during training to ensure the opening selection process is correctly applied for each district.

### **Data card improvements**

For both the riparian and stand-level biodiversity protocols, a number of field card improvements were suggested. Many of these were also raised during the training sessions.

- Remove extraneous detail if not required for the evaluation; it simply slows down the data collection process.
- Provide unique identifier opportunities on the backside of each field card. For example, the stand-level biodiversity's "form A side 2" has no identifier; an issue when making photocopies of the data.
- All header cards need to require the RESULTS Identifier in addition to the opening. Is landscape unit a critical detail? (Vanderhoof does not use such planning designations).

### Stand-level biodiversity data card improvements

In addition to previously mentioned comments for data card improvements, consider the following for the stand-level biodiversity protocol:

- Form D's CWD section has a typo (\* Characteristics ... For other species...); and emphasize class "V" is for reference only, not to be sampled.
- Form C should require the date and name(s) of the evaluator(s); elaborate on the context for professional opinion; perhaps the poorly to excellent scale is too coarse (what is excellent?).
- Form B needs to be designed to allow summary of the harvest area (it is not a patch nor a reserve); the "age of trees" options use coastal terms (OG and 2<sup>nd</sup> growth); the reserve types are confusing and overlapping, and lack CC for clearcut. Refine to capture the goals of the data analysis; how different is DO from DU, and how much of the WTP is occupied by a stream and its RMA to be termed PR instead of PW?
- Form A can be improved by providing the "no trees" option in the stand table, such as can occur in a clearcut. The CWD section needs to prompt transect orientation and number of pieces in each leg of the transect (for field verification during auditing).

### Riparian data card improvements

In addition to previously mentioned comments for data card improvements, consider the following for the stream and riparian management area protocol:

- Staff provided a number of suggestions for improvements to the field card layout; of significance is the desire to use fewer sheets of paper (make pages 2-9 a template and then expand page 10 for recording conclusions to indicators and questions), and to make a waterproof field guide version of the protocol.
- Pages 2-14 need to provide opening specific identification, beyond the sample number.
- "Level of retention" and "Retention description" were confusing for staff, and usually they recorded a range instead of a finite number.

### **Implementation of the Protocol for Stand-level biodiversity monitoring**

There were a number of items discussed with staff that could improve the field data collection process, as outlined below:

- Form C's quality control self-assessment should add "Do the plots fairly represent the values within the stratum?" and "Did you look for reserve constraints and ecological anchors within each of the retention units?" These statements may help to enhance the reliability of the data collected and provide context for the retention summaries. It is important for staff to review the merits within each retention area, whether sampled or not.
- CWD sampling needs to be refined to balance time with the value of the data. Is the labour intensive task of collecting data for numerous small pieces (requires measuring to confirm the piece is >7.5 cm) a valuable data set? Perhaps a simple tally, by species and decay class, could suffice for pieces shorter than 2m in length.
- Tree and CWD dimensions should be recorded according to size classes, rather than actual dimension, to reduce time demands.
- Do all retention patches need sampling? Perhaps only patches greater than 1.0 hectare in size should be sampled, and the smaller patches summarized with qualitative or anecdotal comment.

### **Implementation of the Protocol for Evaluating the Condition of Streams and Riparian Management Areas**

There were a number of items discussed with staff that could improve the field data collection process, as outlined below:

- Provide a target number of reaches to be sample, instead of the present target of sampling the reaches found within 15 openings. In the coastal districts, this would reduce the workload commensurate to what a lot of the interior districts sampled.
- Provide a field book version of the protocol so that it is more readily referenced while undertaking field evaluations.
- Provide rules for establishing the sample locations. For example, where crossings are present, the sample must include the right-of-way clearing above the reach, and the sampling direction to be downstream.
- The field cards provide too many "N/A" options. These should be filtered out where they are not intended as a viable option when answering the indicator statements. The protocol can expand on the options where "N/A" is acceptable.

### **On-line support**

To provide additional support services, and to promptly spread the responses to queries, a Question-and-Answer forum should be created and added to the RSM website link. An addendum that was created in July to assist with the Stand-level biodiversity protocol was e-mailed but most failed to receive this document. Such support materials should also be posted on the RSM website as a bulletin update, or perhaps e-mailed to more than one contact person in each district.