



LAND BASED INVESTMENT STRATEGY

Current Reforestation Assessment
Maintenance of Existing Investments in the Forests for Tomorrow Program



SUMMARY

Introduction

The Ministry of Forests, Lands and Natural Resource Operations Land Based Investment Strategy (LBIS) provides strategic guidance for land-based investment by aligning targets and outputs for eligible activities with the provincial government's goals and objectives.

Current Reforestation which includes the Forests for Tomorrow program is one of several investment categories within the LBIS. The Current Reforestation investment category addresses priority areas throughout the province where catastrophic disturbances, such as wildfires and the mountain pine beetle epidemic, are expected to create reductions in the mid- and long-term timber supply.

This summary was prepared from the full report by Dennis Sabourin of Silent Running Consultants. Readers are advised that the [full report](#), and its accompanying appendices, provides the primary reference for the assessment.

Background

The Forests for Tomorrow program includes a range of treatments:

- Vegetation management to maintain adequate growth rates on existing government funded land-based investments,
- Annual reforestation on areas where the mid- and long-term timber supply will be impacted by catastrophic disturbances,
- Planting of 61.3 million seedlings from 2005 to 2012 on areas impacted by wildfires and the mountain pine beetle,
- Elimination of the pre-1987 provincial backlog of NSR.

Purpose

This Current Reforestation Assessment (CRA) is an evaluation under the terms of the LBIS Evaluation Program.

The objectives of LBIS evaluation program are to:

- (i) Assess the performance and impact of the LBIS;
- (ii) Generate findings and recommendations that would serve as broad guidance for the development, refinement and improvement of the LBIS; and
- (iii) Assess whether the appropriate performance measures are in place to meet the objectives.



Method

The CRA was developed from the three LBIS evaluation program objectives. The evaluation process included interviews, data analysis, and field reviews.

First, the evaluation process was based on a series of protocols developed to assess the following areas of significance within the CRA:

- General – A broad overview of FFT and of the management practices in respect of FFT program;
- Site Index – How the proponent of the project determined SI and how SI influenced workplans (i.e., ranking and scheduling);
- Return on Investment - How the Investment Lead determined ROI and how ROI influenced workplans (i.e., ranking and scheduling);
- Ministry Overview – How ministry Branch and regional staff managed FFT; and,
- Field Assessments – Questions and field results related to how practices in the office and field affected the overall performance and success of the reforestation efforts.

Second, 13 interviews were conducted with Investment Leads and recipient agreement holders, regional FFT staff, Resource Practices Branch staff, and third-party contractors.

Third, data was collected from approximately 75 openings for analysis of site index and return on investment. An unbiased selection process relied on a random number generator. The planted units were separated into five temporal populations of 2004/05, 2006, 2007, 2008, and 2009 for analysis and comparison over time to determine any temporal trends in respect of the reforestation program.

Field assessments were conducted using a specifically designed field card. The field reviews were not intended to be a survey of the sites or an audit of the works conducted by the recipients, but instead were an overview of the site that included confirmation of:

1. Stocking status (SR, NSR, Borderline SR, and FG);
2. Health and vigour of planted and natural stock;
3. Competing vegetation, pests and disease; and
4. Future treatment regimes.



Results

The following information is comprised from selected data results from the field assessments; most numbers have been rounded to the nearest whole number for this summary. The data are presented as percentages of the total net planted area (NPA) of the total population of openings that were assessed.

- 67% were fire origin stands, 32% were beetle-killed stands, and 0.4% were Timber Agreement Licences.
- 18% of planting was under live and/or dead stems killed by MPB; 40% of planting was underneath live and/or dead stems killed by fire and 30% was on cleared areas. The remaining 12% was planted on areas treated through knock down, mulching, and other site preparation methods.
- 71% was SR, 18% was borderline SR and 11% was NSR.
- 82% was assessed as requiring planting;
- 10% had appropriate levels of "naturals" and planting was not required.
- Only 5% was assessed as having excessive stocking (from combined naturals and planted stock). Excessive would mean that the block did not require planting in retrospect
- 3% should not have been planted at all. These areas met SI and ROI but should not have been planted due to, for example, heavy grazing by cattle, being a seasonal flood plain or browsing by hares.
- Over 98% of planted stock was assessed as "good" to "very good" for the sites.
- 93% had "good" to "very good" species mix (planted and naturals);
- 74% of planted stock health and 79% plant stock vigour were "good" to "very good". Coincidentally, 87.4% of the natural's stock health and vigour was "good" to "very good".
- The survival rate of planted stock was assessed at 73% ("good" to "very good").
- 17% was assessed to have a "high" to "very high" need for vegetation management;
- 49% are recommended for a stocking survey, 39% for a future free growing survey and 4% to "leave as is". There is a need for follow-up surveys to ensure that the LBIS investments are maintained.
- 67% are "On Track to FG" and 18% are "Potentially On Track to FG" (meaning with appropriate management they should achieve FG). The remaining 15% that is "Not On Track to FG" typically consists of sites that should not have been planted originally, or are in need of some immediate and possibly major intervention to achieve free-growing status. These sites may not be advisable to proceed with further or any treatment.

Temporal Changes

The planted units were separated into five temporal populations to determine if there have been any temporal trends in the current reforestation program. Here are the trends that were observed:

- There has been a trend toward treating more "MPB" and less "Fire" origin hectares.
- There was a trend towards understorey planting but this dropped off in 2009.
- The need for planting remained fairly consistent at approximately 80%.
- The number of blocks on track to Free Growing remained fairly consistent throughout the program.

- The appropriate stocking levels remained consistent, at approximately 76%.
- There has been a steadily decline in very good stock type from 81% to 20 % moving down one category to good stocking type
- Very good species mix was fairly consistent at approximately 60%.
- There has been a steady decline in planted stock health of very good from a high of 98% to 52% moving down one category to good. Predominantly poor stock health was due to either pest damage or planting of an inappropriate species.
- Naturals health rate steadily declined from very good to good, but has stabilized at approximately 75%.
- There has been a steadily declined from very good to good planted stock survival rate from a high of 95% to 53%.
- Although still high, there has been a reduction in the requirement for treatment of vegetation competition from very high to high.

Conclusions

The interview assessments showed that, overall, the Current Reforestation program was managed and functioned at a satisfactory to highly satisfactory level.

The field assessments resulted in over two-thirds (67%) of Net Planted Area (NPA) is "On Track to FG" and 18% is "Potentially On Track to FG". In total, 85% of the Net Planted Area was assessed as being free-growing achievable. This is at the very high end of the "satisfactory" range and it just misses the 85% target level to be classified as "highly satisfactory."

Recommendations and Action Items

The following recommendations are based on observations and results from the interviews and field assessments. The 13 recommendations are grouped into three categories: very high priority, high priority, and medium or low priority.

Very High Priority

1. Develop and implement consistent provincial policy for data transfer and storage. The current system does not adequately address future access and use of information and findings. This issue requires further examination, planning, and established storage and transfer policies by the Ministry before the expiration of more recipient agreements.

Action:

Develop a provincial policy on storage of data within government systems.

High Priority

2. Develop a simple, measurable and repeatable system for Return On Investment (ROI). The current system (i.e., TIPSy, where ROI field cards are not used) is expensive and can be manipulated to provide the desired result. It is recommended that the development of standardized ROI field cards, for the major species and species mixes, would make the ROI calculation straightforward and simple to repeat (e.g., by an adjudicating body).



Action:

Move to using Fan\$ier with strict guidelines to prevent manipulation. ROI calculations are done in a systematic way that is simple, measurable and repeatable (same result no matter who is entering the data).

3. Develop and implement a policy across the province regarding the recalculation of ROI where a post-survey treatment prescription is significantly different than the original treatment prescription (from which the original ROI was based and used to rationalize treatment).

Action:

Develop treatment regimes that will self populate a scheduled stocking survey and develop policy around the calculation of ROI based on these treatment regimes to provide consistency when comparing similar sites when developing planting priorities.

4. Use standardized ROI field cards for the major species and species mixes. Typically, recipients received funding sufficient to their investment plans, and prioritizing of treatment units (by strategic plan, site index, or return on investment) was therefore not required. However, in future, with potential funding limitations, a system of priority ranking units for future treatment defined on a management unit basis and subsequently on a provincial level, would make that practical.

Action:

Look into the possibility of expanding ROI field cards to include species mixes. Currently they are calibrated for pure pine, fir or spruce under natural distribution. It must be noted that Topsy does not model interactions amongst species and natural distribution (random) may not reflect the real stand dynamics.

5. Review the benchmark of SI 17 for treatment because it excludes many areas of the province for treatment. Either the SI threshold should be removed or modified to reflect the unique site indices throughout the province.

The Multiple Accounts Decision Analysis system works well to address non-timber values on a site where the ROI is <2%, where it was used to justify treating sites with <2% ROI, follow-up should be undertaken to determine if the other values have been met.

Action:

Filter 4 (Maximization of productivity) in the "LBIS Silviculture Funding Criteria for Forests For Tomorrow" now gives guidance that areas < SI 15 are not to be treated. Continued monitoring to determine if this is the right cut off point. Where non-timber values were used to justify treating sites, develop a process to track these non-timber values.

6. Conduct stocking surveys on many of the assessment sites to determine stocking status and requirements for any future treatments (e.g., fill-planting, vegetation management, etc.), and to ensure survival and performance rates.

This also would be important for planning and budget forecasting. It is expected that this is a widespread need throughout the global population.

Action:

Develop treatment regimes that will self populate a scheduled stocking survey and develop policy around the use of treatment regimes.

Medium or Low Priority

7. The field assessments raised five needs related to “Fire Origin Units” that require further review or study:
 - 7.1. Analyze natural regeneration efficacy, i.e., SR versus NSR (post fire data) to determine the percentage of net area of wildfires that regenerates naturally to SR versus those that are NSR.
 - 7.2. Establish a consistent policy in respect of when a germinant assessment and/or natural regeneration stocking status are undertaken.
 - 7.3. Determine the best timeline for planting to optimize survival and performance.
 - 7.4. Determine the stock survival and performance (natural and planted) when comparing immediate plant (following season, or same season if feasible) to post-NSR natural regeneration stocking survey plant.
 - 7.5. Conduct cost analyses of:
 - a) “Immediate plant” (same or following season) versus waiting and classifying naturally regenerated SR versus NSR; and,
 - b) The impacts of “opportunity lost” due to potential better stock performance with an “immediate plant” and earlier free growing declaration, than with natural regeneration and/or fillplanting;

Action:

Build into the Survey Standard the inclusion of a potential seed-in assessment. Work with researchers to provide extension resources to help resource managers answer questions around germination and survival of natural stands after a catastrophic event.

8. The stocking standards used should reflect the expanded use of greater species diversification.

Action:

Provide guidance to those developing the prescription to develop, if necessary, district or regional stocking standards that meet the objectives of the FFT program.

9. Planting sites such as wildfires and beetle-killed stands requires greater flexibility in respect of minimum inter-tree distance, in order to plant the best possible microsites (i.e., 1.0m MITD);



Action:

Determine the scope of the issue. If it is prevalent, provide guidance to those developing the prescription to maximize the use of microsites and ensure they have an understanding of the Planting Quality Inspection process so that planting best microsites will not result in “too close” or “excess” in an inspection plot tally.

10. Treatment prescriptions should (and in this case ROI determination) factor in a “margin of error” to account for the potential requirement for fillplanting, vegetation management, etc.;

Action:

Move to using Fan\$ier with strict guidelines to prevent manipulation. ROI calculations are done in a systematic way that is simple, measurable and repeatable (same result no matter who is entering the data). With all similar sites modelled the same way, all blocks will be benchmarked the same way. Provide guidance on costs to consider when using the ROI field cards.

11. Avoid underplanting beetle-killed pine stands due to mixed results; stocking survival and performance could not be adequately predicted. In fact most of the field assessments showed marginal success.

Action:

Look into adding to Filter 4 (Maximization of productivity) in the “LBIS Silviculture Funding Criteria for Forests for Tomorrow” no underplanting of dead Pl. 12. Conduct further analysis to determine whether ROI should be increased from the current 2% threshold.

Action:

Build in a filter that maximises the productivity in the “LBIS Silviculture Funding Criteria for Forests for Tomorrow” so that the higher ROI’s are addressed first.

The average annual inflation rate since 1913 has been 3.24% per year (inflationdata.com). The analysis done for ROI uses today’s costs and does not adjust for inflation but, by the same token, the value of the timber is also not adjusted for inflation. 2% is merely a reference point and was initially chosen based on limited data from other jurisdictions that determined minimum return of investment on areas similar to interior sites.

13. Develop a RESULTS record for ROI that can be queried and updated for the effective management of the Current Reforestation Program.

Action:

Discuss this finding with RESULTS team to determine cost. Exploration of this should also consider the future of deriving the ROI based on current data in RESULTS and running it as a batch through Fan\$ier.

