



Ministry
of Forests



**WILDFIRE AREA TREATMENT PLAN
AND SURVEY STANDARDS**
Forests For Tomorrow Program

These standards are applicable to the wildfire area treatment plans and silviculture surveys funded under the Forest For Tomorrow Program. The standards highlight elements and considerations specific to the wildfire damaged land base. Additional standards specific to individual activities may be found in FIA and Ministry recognizing Standards Documents.

CONTENTS	
ARTICLE 1: GENERAL STANDARDS	ARTICLE 5: RETURN ON INVESTMENT
<ul style="list-style-type: none"> Phases of FFT Wildfire Survey Net Down Treatment Costs Survey Intensity Return on Investment Treatment Prescription & Plan GPS RESULTS 	<ul style="list-style-type: none"> Background Modeling Method Short Form 2% Threshold
ARTICLE 2: NET DOWNS	ARTICLE 6: GPS TRAVERSING
<ul style="list-style-type: none"> Net Down Criteria 	<ul style="list-style-type: none"> Reference to GPS Standards
ARTICLE 3: TREATMENT COSTS	ARTICLE 7: TREATMENT PRESCRIPTION & PLAN
<ul style="list-style-type: none"> Treatment Cost Estimates 	
ARTICLE 4: SURVEY INTENSITY	ARTICLE 8: RESULTS
<ul style="list-style-type: none"> Intensity Sampling Methods 	ARTICLE 9: TEMPLATES

Background

The Forests for Tomorrow (FFT) Program is funding that is targeted for treatment of forests in management units catastrophically impacted by the mountain pine beetle (MPB) and wildfires. The primary objective of the program is to improve the long term timber supply through the reforestation of areas outside industry obligations that would otherwise remain under productive. Areas to be reforested under this program must meet the required Return on Investment (ROI) for the FFT Program. (See Article 5) As much as possible efficiencies should be maximized through the selection of larger treatment areas. Smaller areas may be treated provided they meet the ROI criteria. These standards outline the basic elements involved in treatment planning and surveying for major wildfire damaged areas.

ARTICLE 1 GENERAL STANDARDS

The key phases/considerations involved in the FFT wildfire surveys are:

- a) Net down of areas
- b) Treatment costs
- c) Survey intensity
- d) Return on investment – ROI
- e) Prescription and treatment plan
- f) GPS boundary traverse
- g) RESULTS
- h) Templates

- (a) Net down of the fire area to isolate the treatment area eligible under the Forests For Tomorrow program.
- (b) Estimation of treatment costs, site index, regeneration materials for those areas likely to pass the Return on Investment threshold of 2%.
- (c) Regeneration Survey. Due to the large size of the fires the plot intensity has been reduced to a minimum of 1 plot per 5 hectares. However, this intensity may be altered for reasons discussed under sampling intensity.
- (d) Return on Investment (ROI). An ROI of 2% or greater is a program requirement to proceed with treatments. Therefore, prior to doing a full treatment prescription or treatment plan the ROI for each unit must be calculated. There are different options available for determining the ROI's. See Article 5. Note that an ROI of less than 2% may be acceptable as described under Article 5.
- (e) Prescription & Treatment Plan

For those blocks designated as treatment blocks the following activities are then carried out:

 - i. treatment prescriptions are developed,
 - ii. areas are GPS traversed, and
 - iii. the unit is entered into RESULTS.
- (f) GPS boundary traverse
- (g) RESULTS. A spatial file is loaded into the RESULTS database, including an inventory label and future treatments scheduled.
- (h) Templates. Use of templates will provide consistency across all the survey contracts

ARTICLE 2 NET DOWN

The criteria for determining which fire damaged areas are selected for treatment under the FFT program includes:

- (a) Areas must be within productive forest land base, contributing to the timber supply of the management unit, and outside of any licensees obligations/plans to harvest.

(b) ROI: areas must fulfil the FFT programs Return on Investment as discussed under Article 5.

ARTICLE 3 TREATMENT COSTS

Treatment costs should be estimated based upon field inspections, sample plots, surveys and treatment plan/prescriptions developed. Cost estimates should factor in the physical qualities and characteristics of the site, the accessibility, status of the regeneration, treatment regimes proposed, and the objectives of the FFT Program and the area. The following costs can be used when determining the ROI.

Cost Estimates for Wildfires of 2003

Activity	SIFR Cost / ha	Lillooet Cost / ha Add 10% on to SIFR
Full Survey (regen & FG)	\$20	
Walk through survey	\$10	
Brushing	\$400	
Cabling	\$300	
Bunching & Burn	\$425	
Machine falling and crushing	\$500	
Planting	\$1,000	
Fill in planting	\$600	
Snag evaluation	\$240	
Snag falling (hand)	\$300	
Snag Falling for density control	\$400	
Lay out	\$15	
Access (example portable bridge)		

These are baseline costs, if you recommend a different cost than the ones listed above, support it with rational.

ARTICLE 4 SURVEY INTENSITY

Wildfires leave a wide range of stand conditions depending upon the intensity of the burn. The intensity of the survey should reflect the range of post fire conditions including the site characteristics, stand/regeneration condition, and homogeneity. Sample plot intensity must enable accurate depiction of the field conditions, so that sound decisions can be made

regarding treatments, the return on investment and the management of the site to a free growing stand. The fire area in question should be stratified into survey units before sampling begins.

- (a) The intensity for ground plots should be a minimum of 1 plot per 5 ha for burn that display on homogeneity of site conditions and regeneration levels.
- (b) The intensity may be increased to 1 plot per less than 5 ha, to a maximum of 1 plot per ha, for burn areas that display a range of site and regeneration conditions, which cannot be accurately mapped, planned and treated with an intensity of 1 plot per 5 ha.
- (c) Alternative sample plot intensity may be proposed by the contractor. A rationale should outline why less frequent ground plots are required, the frequency of walkthroughs, and the expected cost and time saved by the reduced plot sampling.

Additional standards specific to individual activities may be found in FIA and Ministry recognizing Standards Documents.

ARTICLE 5 RETURN ON INVESTMENT

To be eligible for FFT funding the prescribed regime of treatments must meet the FFT return on investment (ROI) criteria. A 2% rate of Return on Investment is employed to balance the economic return of reforestation investments with future timber supply and other resource values and objectives. Variation to levels between 0 and 2% will be utilized when benefits to timber supply or other resource values reflect a higher social priority.

There are two different methods employed by the FFT program to predict the IRR; 1) the ROI field sheets or 2) the Stand Rehabilitation Financial Analysis worksheet. The purpose of this document is to describe the situation and circumstances where each method should be used.

In both the ROI field sheets and the Stand Rehabilitation Financial Analysis worksheets TIPSYS was, or is (in the case of the worksheets), used to predict and compare future volumes and Net Present Values (NPV) with respect to the treated and untreated stands. For these comparisons the Internal Rate of Return is determined, in the case of the worksheets, or was determined, in the case of the ROI field sheets, for each scenario being explored.

ROI field cards

The charts included with these field sheets are intended as a coarse screening aid or determining whether stocking enhancements will generate at least 2% rate of return in young even-aged stands. They are primarily intended for use following catastrophic disturbances in cases where natural regeneration is expected to produce less-than-desirable stocking.

The ROI field cards should only be used if **ALL** of the following conditions are met:

- Stand is predominantly even-aged, with little or no advance regeneration in excess of 1 m in height
- Stand is ≤ 6 years old
- Stand is currently mainly comprised (meaning $> 80\%$) of lodgepole pine, interior or Englemann spruce, subalpine fir, Douglas fir, or western larch.

Both of the inputs for this screening aid are subject to considerable uncertainty which can dramatically affect assessment outcomes:

- Considerable local knowledge of species response to disturbance, coupled with assessments of seed source and seed bed conditions, will be required to predict stocking that will occur without intervention
- Many sources of site index (SI) data for individual sites will underestimate site potential by 2 to 3 m or more. Of particular concern are inventory estimates of SI and estimates of SI from first generation SIBEC. The best sources will be from:
 - a) height/age or growth intercept measures on nearby stands with similar species and ecosystem parameters (site series, soil, slope, aspect, etc. or
 - b) second generation SIBEC estimates.

Users should be cognizant of the risk of uncertain inputs and question how the results might be different if the inputs have a significant error. In all cases, where results from these charts indicate a maximum expenditure that is close to the expected expenditure, it would be prudent to test the scenario using the Stand Rehabilitation Financial Analysis worksheet. Such actions will not reduce uncertainties related to stocking or SI inputs, but will avoid the simplifying assumptions required to build the screening charts.

Further information on the short form and caveats that apply to its use are found on FFT website:

<http://testwww.for.gov.bc.ca/hfp/fft/Notes%20on%20applying%20the%20ROI.pdf>

Stand Rehabilitation Financial Analysis worksheet

The procedure for completing a financial analysis on the benefits of stand rehabilitation consists of two major steps. The first of these is the production of yield and financial analysis tables using TIPSYS. The second major step involves importing the TIPSYS tables into the Stand Rehabilitation Financial Analysis worksheet, where treated and untreated stands are compared. Based on differentials in operational costs and product values, a set of economic indices are calculated (internal rate of return, net present value and benefit/cost ratios) to help evaluate the financial viability of proposed treatments.

In order to successfully run the Stand Rehabilitation Financial Analysis worksheet the following information is required:

- BEC to the site series level
- Site Index for each species
- Name of the Pre 2002 Forest District the block falls in
- Estimated Regeneration delay in years and predicted stocking densities by species.
- Prescribed planting density by species
- An estimate of silviculture treatment costs to Free Growing
- Year of disturbance (fire)
- Estimated total trees/ha and well spaced trees/ha at Free Growing by species
-

Key points of consideration when using the Stand Rehabilitation Financial Analysis worksheet

- Regeneration Delay
 - An untreated option with a long natural regeneration delay increases the ROI of the treated option
- Initial stocking density
 - An untreated option with low estimated initial density increases the ROI of the treated option
- Treatment cost
 - Treatment costs should be chosen carefully as they are one of the major determining factors in NPV.
- Site Index
 - Generally, higher site indices have higher Internal Rates of Return.
- Species
 - Pines, generally, have lower economical value at low densities than other coniferous species

Extreme caution should be employed when attempting to use TIPSy to predict the yield of uneven-aged, or mixed species stands.

Further information on TIPSy is available at the Ministry of Forests, Research Branch website: <http://www.for.gov.bc.ca/hre/gymodels/TIPSy/features.htm#Overview>

A step by step use of the TIPSy model is explained on the Ministry of Forests, Forest For Tomorrow website: http://testwww.for.gov.bc.ca/hfp/fft/Return_on_investment/Documentation.doc

Other ROI Methods

Alternatively, other methods than the two described here can be used with approval from the appropriate MOFR personnel.

Exceptions to 2% Internal Rate of Return criteria

It is recognised that the IRR approach does not account for factors other than future timber value. In some instances addressing a landscape or stand level issue, such as the future timber supply or critical wildlife habitat, may not result in a IRR of 2% or above. In these instances, the prescribing Foresters can prepare an acceptable rationale to accept an IRR lower than 2%. Projects that have an IRR less than 2% must be approved by one of the Regional FFT Forester.

ARTICLE 6 TREATMENT PRESCRIPTION & PLAN

A treatment prescription will be completed for each treatment unit and incorporated into an overall treatment plan for the fire area. The prescriptions will be completed using MOFR approved methods. The maps attached to the treatment prescription must be re-printable maintaining the clarity of the treatment details.

Digital mapping standards will be the same as those for RESULTS submissions and may be found on the MoFR ftp server at: http://www.for.gov.bc.ca/his/results/Silv_Map_Stand.pdf.

The Contractor shall ensure that:

- (a) each Crew engaged in the execution of the Work includes at least one Accredited Silviculture Surveyor or a Registered Profession Forester in good standing with > 15 years of Silviculture related experience. This experience must include recent regeneration and free growing survey experience;
- (b) all personnel have familiarized themselves with those available silviculture treatment options that the Province considers feasible for the Work Area; and
- (c) prior to the commencement of Work, the Contractor shall provide the Ministry representative with the names of all persons who will be performing the Work.

The final treatment plan must be signed and sealed by a Registered Professional Forester with silviculture experience.

ARTICLE 7 GPS TRAVERSE

6.0 A GPS boundary traverse will be completed using MoFR approved methods.

The GPS system must be capable of meeting the NAD83 Station (Datum) Accuracy of 2-5 metres under a closed canopy. The GPS Base Station being utilized must correct the field survey data to an accuracy of 0.25 metres.

Standards for GPS traversing have been established and published under the following document.

British Columbia Standards, Specification and Guidelines for Resource Surveys Using Global Positioning System (GPS) Technology – Release 3.0 March 2001.

This document may be found on the following Ministry of Forests Site:

http://ilmbwww.gov.bc.ca/bmgs/gsr/specifications/resource_gps/bc%20specifications%20-%20gps%20resource%20mapping%20release%203.0.pdf

Standards for GPS traversing have been established and published under the following document. *British Columbia Standards, Specification and Guidelines for Resource Surveys Using Global Positioning System (GPS) Technology* – Release 3.0 March 2001. This document may be found on the Integrated Land Management Site at:

<http://www.for.gov.bc.ca/ftp/TPG/external!/publish/GIS%20and%20GPS%20Standards/BC%20Standards%20for%20GPS%20Release%203.0.pdf>

ARTICLE 8 RESULTS

Upon completion of the survey work and treatment plan, the information must be entered into the Reporting Silviculture Updates and Land status Tracking System (RESULTS) as per the [FFT RESULTS Field Data Capture Standard](#) . The FFT RESULTS Field Data Capture Standard specifies mandatory data elements to be loaded into RESULTS from wildfire and mountain pine beetle (MPB) affected areas funded under the *Forest For Tomorrow* (FFT) program.

ARTICLE 9 Templates

To provide consistency throughout the program and provide the ability for the FFT program to store prescriptions electronically the use of these templates is required. Templates can be found on the FFT website at <http://www.for.gov.bc.ca/hfp/fft/fia/landbase/surveys.htm>.

- Planting Prescriptions (PlantingPrescTemplate.xls)
- Sowing Requests (SowingRequestsTemplate.xls)
- Treatment Assessment (AssessmentTemplate.xls)
- Stand Rehabilitation Financial Analysis (This will be generated by the ROI worksheet - http://www.for.gov.bc.ca/hfp/fft/Return_on_investment/IRR%20Workbook%20v%202.0.xls)