Forests For Tomorrow

ESTABLISHING SUSTAINABLE HEALTHY AND RESILIENT FORESTS

Recognized globally as a world leader in sustainable forest management, British Columbia has the largest and most diverse public forests in Canada. With about 95% of its forests being publicly owned, the government of British Columbia is responsible for the sustainable management of this rich diversity of timber, water, wildlife, recreation and other values. One way the government achieves sustainability is through ensuring that a comprehensive reforestation program is in place to effectively restore healthy resilient forests in a timely manner.

SIDEBAR The total area of British Columbia is 95 million ha of which 55 million ha is forested. Of this 55 million ha of forested land, 52 million ha (95%) is public land and 3 million ha (5%) is private. The public forest land subject to forest management agreements is 22 million ha (timber harvesting land base) .Parks and protected areas comprise 14.1 million ha or 14.8%, plus another 14% in special management zones

Approximately 80% of the areas harvested for timber in British Columbia are reforested by planting; the remaining 20 % is reforested through natural regeneration. On average, about 218 million seedlings are planted each year. In 2016, about 238 million trees were planted and, for 2017, about 255 million trees are projected to be planted. To that end, the provincial reforestation program which began in the 1930's is on target to plant the 8th billion tree in 2017.

Reforestation in British Columbia is delivered via a range of programs and funding sources. Forest licensees [1]and the Province through BC Timber Sales (BCTS) [2] are legally required to reforest the areas that they harvest. This has been the law in British Columbia since Oct. 1, 1987.

The forest industry currently delivers approximately 75% of the total seedlings planted each year in British Columbia. The BC Timber Sales program plants and funds from its own revenue stream

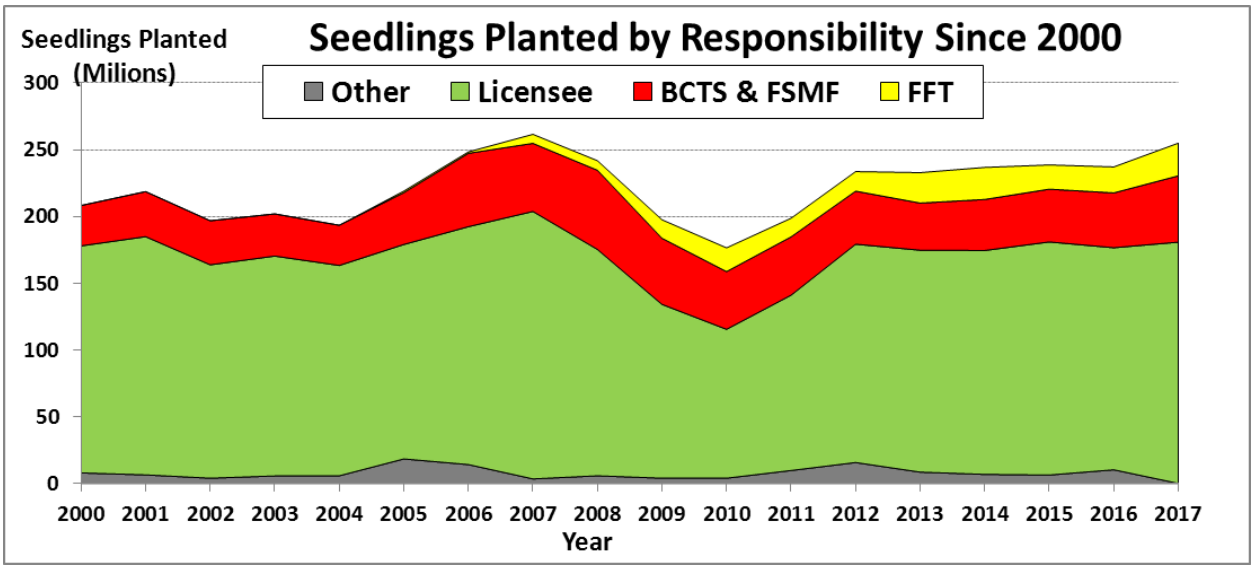
[1] A forest licence allows timber harvest over a portion of a sustained yield management unit, and the timely reforestation of harvested areas according to a strategic resource management plan for each timber supply area. .

[2] A significant portion of the provincial timber harvest is carried out by the holders of timber sales licences under a BC government program called BC Timber Sales (BCTS).

[3] The Forests for Tomorrow Program was established by the Province of B.C. in 2005 to respond to the catastrophic wildfires that occurred in the southern and central Interior, and to the mountain pine beetle epidemic.

approximately 15% of the total. The remaining 10 % is planted by programs such as the Forests for Tomorrow (FFT) Program[3] funded by the Province.

Responding to specific issues the government may, when and as required, introduce new programs which include reforestation for a specific purpose , for example wildfire hazard abatement or carbon sequestration, as was the case with the establishment of the Forest Enhancement Society (FES) in 2016. Planning and coordination work is now underway between FES and FFT to ensure efficient and effective coordinated delivery of both programs when FES begins it's planting program, likely starting in 2019.



Before harvesting begins, forest resource professionals plan a reforestation regime specific to the unique characteristics of each site and designed to meet government regulations. Other than in a few very limited exceptions (less than 1% of all trees planted), only native species are planted and the choice of species is guided by both present and projected future conditions. British Columbia uses a mix of over 20 different tree species in its reforestation program. This mix of species helps maintain ecosystem processes, resilience and diverse habitats.

SIDEBAR The Auditor General of BC conducted an audit of the Ministry of Forests, Lands and Natural Resources management of timber in 2012. The audit report showed the total area harvested by industry compared with the total area declared reforested by industry over a five-year period: 2006/07 to 2010/11. The average area reforested was 98 percent of the area harvested which indicated that industry is meeting their obligation to reforest harvested areas

SIDEBAR Professionals make decisions on how to reforest both harvested areas and natural disturbances in a way that effectively manages and protects the range of forest values including fish, wildlife and water.

RESPONDING TO CATASTROPHIC WILDFIRES AND THE MOUNTAIN PINE BEETLE EPIDEMIC

New challenges began in the early 1990's with the largest recorded mountain pine beetle (MPB) outbreak in North America which has impacted approximately 18 million hectares in British Columbia, roughly the same area as the entire State of Washington. By the time the MPB epidemic is over, projected to be by 2020, the infestation will have killed an estimated 55 % of B.C.'s mature merchantable pine, approaching 740 million cubic metres ($m^{3)}$.

SIDEBAR- Based on 40 m^3 per logging truck load, 740 million m^3 equates to 18.5 million logging truck loads.

Many of the mature trees killed by these disasters remain usable for a decade or more and significant efforts have been made to harvest where appropriate and reforest as much other affected areas as possible. Today, timber harvesting of dead pine is declining as it becomes increasingly uneconomic to either access or manufacture.

Combined with increasingly large wildfires, beginning in 2003, the forests of British Columbia have been under unprecedented attack for the past few decades. Five of the top 11 years for hectares burned since 1950 occurred between 2003 and 2017, including 2017 (1,020,909 hectares as of Aug. 26), 2014 (368,786 hectares), 2010 (337,149 hectares), 2015 (280,605 hectares), and 2003 (265,053 hectares).

Unlike harvested areas where there is a legal obligation to reforest , the decision to reforest naturally disturbed areas is a discretionary decision made and funded by the provincial government as the steward of BC's forest resources.

A significant portion of the MPB and wildfire impacted areas that will not be harvested will regenerate naturally, requiring little more than government monitoring and a survey to confirm success. However, on many other areas the naturally regenerated forest will be too sparse or too dense, covered in brush, or establish too slowly.

SIDEBAR- Following MPB or wildfire there is generally a window of 15 to 20 years to implement reforestation treatments (varies by site.) After 20 years there is often enough natural regeneration, (although likely at less than optimal density and species), so that it is no longer cost-effective or practical to plant. Areas on sensitive terrain or very low productivity are also not good candidates for rehabilitation.

SIDEBAR Over 1 million hectares of MPB and wildfire impacted areas need to be assessed to confirm the actual area suitable for treatment.

While new forests will eventually regenerate naturally in these areas, a proactive reforestation program restores forest values, including carbon sequestration, soil and water quality, wildlife habitat , and biodiversity much more quickly and effectively. Reforestation also provides the opportunity to re-establish forests with seedlings grown from improved (select) seed which can increase forest productivity and resilience while also mitigating economic impacts to communities caused by potential reductions in allowable annual cut.

FORESTS FOR TOMORROW PROGRAM

As part of its stewardship response to the MPB and wildfires, the FFT program was established in 2005 to respond to the increasing area of understocked Crown forest land. The program is restoring healthy resilient forests on the impacted land base to mitigate the impacts on the multiple values provided by our forests while also creating economic opportunities for forestry and bioenergy production and helping return B.C.'s forests to a carbon sink.

SIDEBAR The timber volume gain from silviculture investments compliments the attainment of the provincial sustainable harvest level targets of 57 million cubic metres per year during the mid-term, and 65 million cubic metres per year for the long-term. Silviculture activities such as FFT directly support this performance measure.

Recognized as a long-term program from the outset FFT now in its 13th year is the longest running government funded silviculture program in BC. The challenges and priorities have shifted over time and the program has proven to be particularly adept at addressing a wide range of priorities that have included First Nations participation, increasing well-paying jobs, storing carbon, using low quality fibre, promoting the recovery of watersheds and wildlife habitat and mitigating climate change.

FFT is responding to the most pressing needs in the Province, which since inception has been heavily focused on MPB, wildfire rehabilitation and more recently mid-term timber supply. Over the next several years the FFT program will still be largely focussed on MPB and wildfire rehabilitation, but as this declines, more funding will be put to working on the emerging priority issues. There may include restoration of high productivity sites impacted by other types of forest health concerns, areas of under-performing growth, poorly stocked forest on very productive sites, second growth strategies

for regional economic growth and other activities that will have multiple benefits for maintaining resilient and sustainable forests.

RESTORING HEALTHY RESILIENT FORESTS

FFT is focused on addressing risks to the full range of forest values. This is achieved through a diverse portfolio of treatments including rehabilitation of wildfires and MPB stands, fertilization, spacing and conifer release [4] with specific treatments selected to support the range of local forest values. To ensure strategic investments, FFT funds and oversees the preparation of management unit silviculture strategies which are built on local input to guide and best direct where investments that sustainably manage the full suite of forest values in a given management unit.
These strategies help set objectives for (and prioritize) silviculture investments as well as identifying opportunities to provide fibre for bioenergy and carbon sequestration. FFT works with Wildfire Management Branch to identify strategic opportunities for deploying rehabilitation treatments in a way that contributes to fire proofing landscapes. In addition, FFT incorporates the latest research and technology into its practices and identifies areas where further research is required.

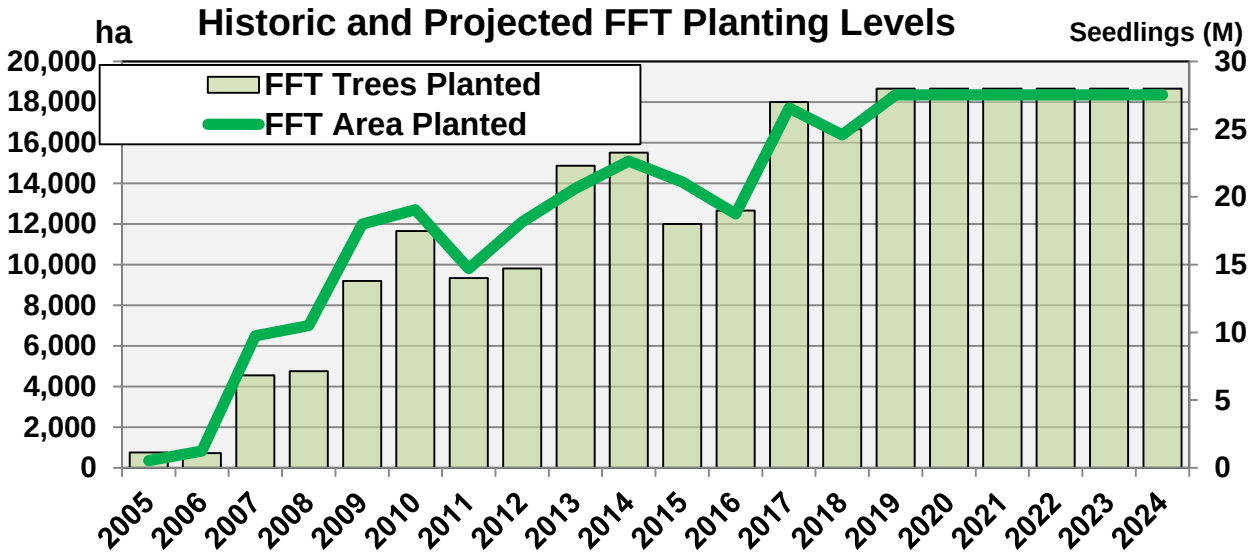
SIDEBAR_ In addition to strategically planning investments, FFT has financial criteria which must be met for a project to proceed. To be approved for FFT funding the project must meet the FFT incremental internal rate of return criteria of 2 %. Lower returns are considered when benefits to timber supply or other resource values reflect a higher social priority

STAND REHABILITATION

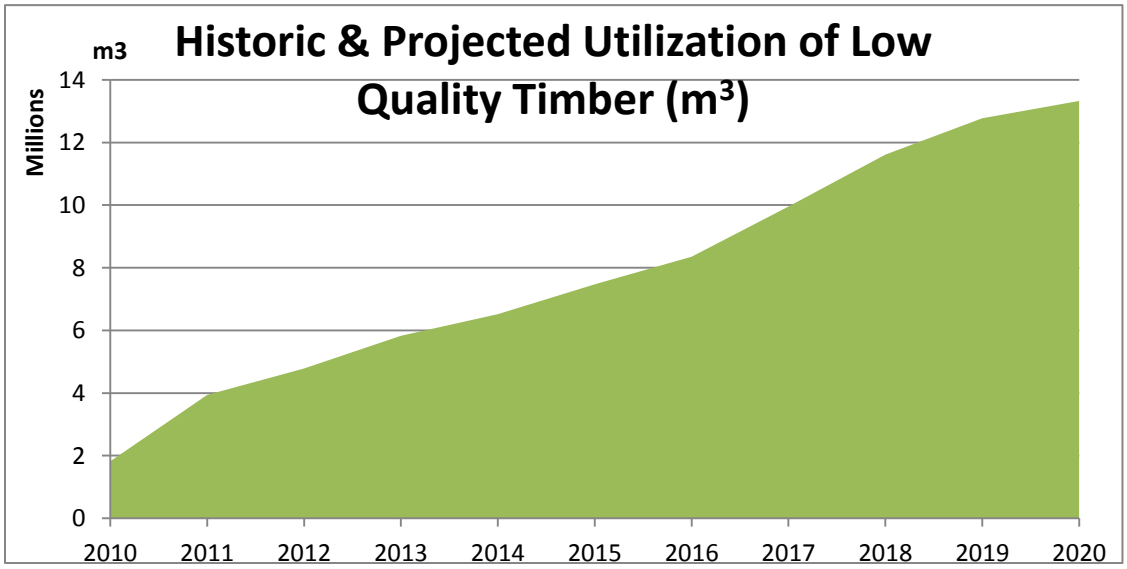
Stand rehabilitation is the re-establishment of young forests on land impacted by MPB and wildfire that would otherwise remain under-productive. FFT has rehabilitated over approximately 129,000 hectares since 2005 and in the process has planted about 184 million trees to re-establish healthy resilient forests. FFT is on track to reforest 300,000 ha of not satisfactorily restocked areas by 2025. For every one

[4] To 'release' established coniferous trees from a situation in which they have been suppressed by thinning out undesirable trees and shrubs which have overtopped them. Carried out to improve the growth of the coniferous trees released.

million trees planted an estimated 2,480 person days of employment are generated and 100,121 tonnes of carbon dioxide are stored.



MAXIMIZING THE ECONOMIC CONTRIBUTION OF MPB AND WILDFIRE DAMAGED TIMBER



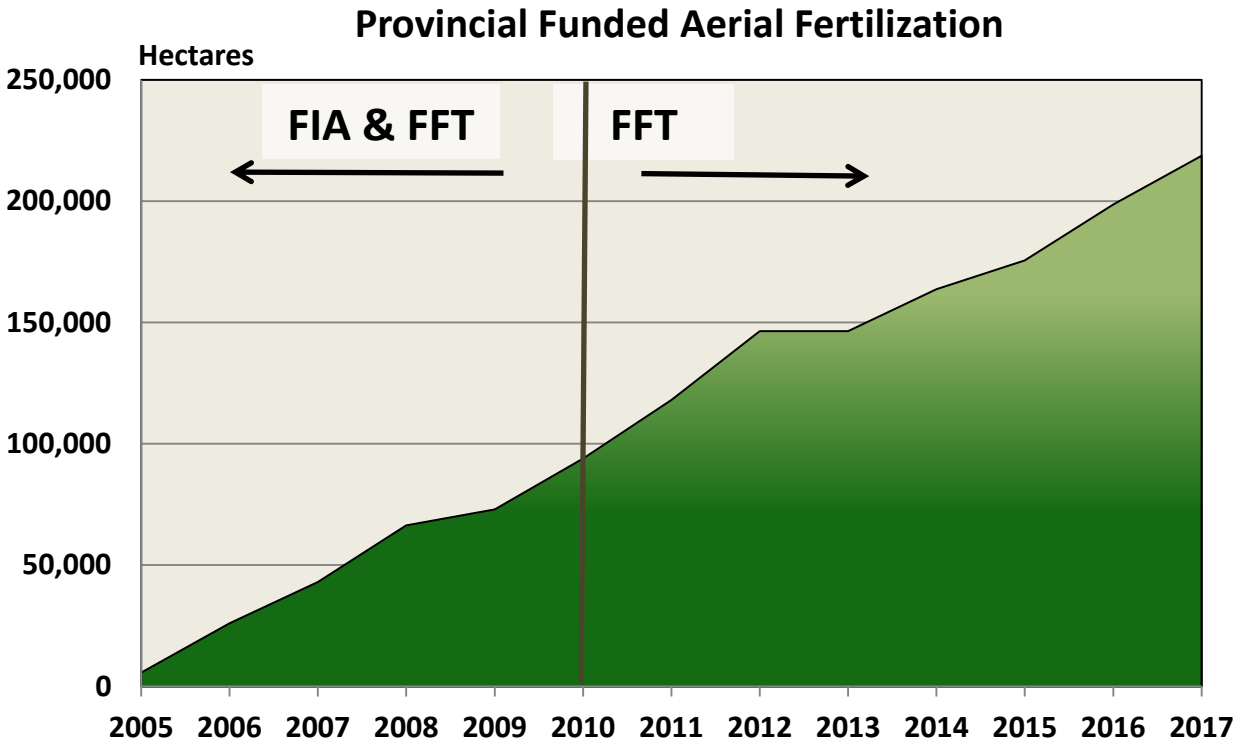
FFT stand rehabilitation is focussed in areas where the damage to timber by MPB or wildfire renders it uneconomical for conventional harvesting. Seizing an opportunity to maximize the economic contribution of this low quality timber, FFT partnered with the BC Timber Sales program to create viable harvesting opportunities. Since 2009, a total of 47,500 hectares of severely impacted forest has been publically auctioned and sold by BCTS for FFT. The 8.4 million cubic metres recovered to date is supporting local forestry employment by creating approximately 7,150 direct jobs. In addition the economic value of the timber significantly reduces FFT rehabilitation costs, allowing much more area to be rehabilitated.

RESTORING BURNT PLANTATIONS

FFT provides the funding to ensure plantations burnt by wildfire are restored. Since 2004, FFT funding has restored approximately 27,930 hectares of burnt plantations back to the condition they were before being destroyed by wildfire.

INTENSIVE SILVICULTURE - ACCELERATING THE GROWTH OF EXISTING FORESTS

Fertilization has been used in BC widely since 1981 with treatments on public lands made by government, and delivery on private land on the coast by industry. Public funding has come from various programs over the years. From 2005 to 2010 it was funded by the Forest Investment Account and FFT and has been exclusively funded by FFT since 2010.



By enabling second-growth stands to become merchantable sooner, investments in fertilization can effectively compensate for reductions in the timber harvesting land base (THLB), and offset an increasing number of forest cover constraints by, for example, shortening the time until young forests are providing restored hydrological functioning and visual recovery as well as wildlife habitat. Fertilization effectively increases the rate of carbon sequestration which contributes towards provincial and federal government greenhouse gas emission reduction targets.

The current level of FFT fertilization funding treats approximately 20,000 ha annually. At this rate the 100,000 hectares fertilized every five years will produce approximately 2.0 million cubic metres of incremental wood which is a net increase of 1.4 M million tonnes of carbon dioxide sequestered. In turn the additional timber will create 1,700 direct jobs.

SIDEBAR In the Lakes TSA the annual timber supply is forecast to decline to about 500,000 cubic metres by 2021 from its current AAC of 1.975 million cubic metres. If an annual fertilization program is maintained at current estimated levels, areas already fertilized under the FFT program will provide 187,000 m3 over the next 10 years followed by an increase of 22,500 cubic metres per year starting in 2025.

There are opportunities for additional forest investment funds to be directed into fertilization such as the Forest Enhancement Society of B.C., which will be funding a portion of the 2017 fertilization program.

A comprehensive fertilization research program provides the basis for accurate stand selection guidelines, site-specific fertilizer application, and response predictions. Further to this there is an ongoing continuous improvement approach. For example, in 2017 the FFT program is collecting water quality data in fertilized areas as well as assessing the impacts of fertilization on moose forage. More sampling will be done in the future in other areas.

In addition to fertilization, FFT funds tree spacing and conifer release that like fertilization also make stands suitable for harvest sooner. Juvenile spacing and conifer release activities in the Interior focus on MPB and wildfire impacted areas, while treatments on the Coast focus on areas of constrained timber supply where the highest return-on-investment will be achieved. Juvenile spacing can also be used to create old growth conditions in younger forests.

FOCUS ON RURAL COMMUNITIES

By mitigating the impacts of the MPB and wildfire on the timber supply through restoring new forests and accelerating the growth of existing forests, FFT investments directly support a competitive forest industry and create immediate and long term employment opportunities in rural communities.

SIDEBAR The BC forest industry is the economic backbone of many BC Communities. A vital part of BC's economy, it is increasingly more important in Central and Northern BC. In 2014 the forest sector saw exports in commodity wood products reach $12.4 billion which represents approximately 35% of the total of all exports in BC. *Williams Lake & District Chamber of Commerce and the Prince George Chamber of Commerce http://www.pgchamber.bc.ca/wp-content/uploads/2016/06/Future-of-the-Forest-Industry-and-Importance-to-British-Columbias-Economy-2016-FINAL.pdf*

As long-term advocates for maintaining the required reforestation level to ensure the sustainability of BC's forests, the Western Forestry Contractors' Association strongly supports the Forests for Tomorrow program. Working on site in the MPB and wildfire impacted areas; our members understand the devastating impacts and are proud to participate in the restoration of these areas. In addition to promoting the recovery of healthy resilient forest ecosystems, the growing and planting of millions of seedlings and other related forestry activities provides significant work and well-paying jobs for BC's silviculture work force.

John Betts, Executive Director, Western Forestry Contractors' Association

A portion of the fertilization, tree spacing and conifer release funding is directed annually to community forests and woodlot owners providing an additional significant boost to rural communities.

"In areas of the province where future timber shortages are most likely, the FFT program provides much needed funding to be invested in the crown land portion of woodlot licences. FFT projects not only improve forest health and growth, but also provide better habitat for wildlife, mitigate fire hazards and create greener spaces for recreation. The Federation of BC Woodlot Associations and its members appreciate the important contributions that the FFT program makes to improving forest management on woodlot licences and the forests of BC."

Mark Clark, President, Federation of BC Woodlot Associations

'As the holder of area-based community forest tenure, we have found the Forests for Tomorrow Program to be a valuable and reliable source of funding to support our long term stewardship objectives for this landbase.'

Mike Francis, Lower North Thompson Community Forest

SPONSORED TREES

Although FFT trees are not linked to carbon credits, some BC businesses fund the planting of some of the FFT seedlings to give back to their communities, customers and province by growing trees that absorb carbon dioxide, and help restore other forest values.

Current sponsors are:

- 100 Mile Funeral Service Ltd.
- Pacific Western Brewing Company
- Restwell Sleep Products – Spring Air BC

ADDRESSING CLIMATE CHANGE

Prior to the MPB epidemic B.C.'s forests were an important carbon sink, sequestrating carbon and helping offset climate change. The province's forests are now one of the largest contributors to B.C.'s greenhouse gas emissions due in large part to the MPB and wildfires. FFT activities directly support returning BC's forests to a net carbon sink by improving carbon sequestration through enhanced reforestation, and intensive silviculture including fertilization to offset the increased CO_2 from large wildfires and the decay of trees killed by the MPB.

SIDEBAR FFT investments planned in 2017 are projected to store 2.5 million metric tonnes of carbon dioxide equivalent

Planting seedlings adapted to future climates will help maintain healthy, productive forests, and capture gains from decades of selective breeding. FFT is implementing climate based landscape level species direction, trends and targets into its practices including:

- Identifying vulnerable species to climate change and reducing their usage
- Identifying species more adapted to future climate and promoting their use
- Increasing the use of multiple species and increased seedling densities to account for risk

FFT PROGRAM DELIVERY

FFT has developed a highly flexible delivery model targeted to meet the needs and resources of any given local area. The program is delivered throughout the province by the Ministry of Forests, Lands and Natural Resource Operations and Rural Development. Provincial oversight and responsibility rests with the Stewardship Division's Resource Practices Branch, while operational implementation is largely delivered by regional Operations and BC Timber Sales. FFT delivery also relies on a cross section of major licensees, small tenure holders, First Nations and consultant support. Silviculture contractors provide thousands of person days of work to deliver the needed activities on the ground. Ensuring the safety of workers is a critical consideration, and the FFT program works with the BC. Forest Safety Council and WorkSafe BC to ensure worker safety is a priority. FFT also conducts

effectiveness evaluations to help ensure that the program goals are being met and learnings are applied. This approach helps ensure continuous improvement and due diligence.

The FFT program is a great example of taking charge of our future by improving BC's forest landbase for the citizens of the Province. The FFT team of highly capable forest professionals working with a world class silviculture industry are dedicated to good stewardship and ensuring sustainable forest management. By establishing and maintaining healthy resilient forests, a secure future will be provided for rural communities as well as delivering a wide range of benefits to all British Columbians.

FOR MORE INFORMATION

Please visit the Forests for Tomorrow webpage at the MFLNRO:
http://www2.gov.bc.ca/gov/content/environment/natural-resource-stewardship/land-based-investment/forests-for-tomorrow