

Report 11: February 2012

AN AUDIT OF THE MINISTRY OF FORESTS,
LANDS AND NATURAL RESOURCE OPERATIONS'
MANAGEMENT OF TIMBER

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The Honourable Bill Barisoff
Speaker of the Legislative Assembly
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Dear Sir:

I have the honour to transmit to the Legislative Assembly of British Columbia my 2011/2012 Report 11: *An Audit of the Ministry of Forests, Lands and Natural Resource Operations' Management of Timber*.

Nearly two thirds of British Columbia's 95 million hectares is forested. These forests contribute to employment, tourism and recreational opportunities, as well as generate significant revenue for government to finance public services. However, trends indicate that the future availability of timber will be even smaller and less diverse, putting future revenue opportunities at risk. Stewardship responsibility for these forest resources lies with the Ministry of Forests, Lands and Natural Resource Operations.

In light of the devastation resulting from mountain pine beetle, the ministry has a window of opportunity to shape our future forests and mitigate the impact with a timely, strategic reforestation plan and cost-effective silviculture. To do this, government needs to establish a provincial plan that states its long-term timber objectives and focuses its resources in order to foster economic stability and quality of life for British Columbians now and in the future.

I will follow up on the six recommendations made in this report through my Office's usual follow-up process.

John Doyle, MAcc, CA
Auditor General

Victoria, British Columbia
February 2012

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JOHN DOYLE, MAcc, CA
Auditor General

NEARLY TWO THIRDS of British Columbia's 95 million hectares is forested. These forests contribute to employment, tourism and recreational opportunities, as well as generate significant revenue for government to finance public services. However, trends indicate that the future availability of timber will be even smaller and less diverse, putting future revenue opportunities at risk. Stewardship responsibility for these forest resources lies with the Ministry of Forests, Lands and Natural Resource Operations.

Approximately 22 million hectares of forested land in the province are available for timber production and harvesting. When industry harvests from this land, it is legally required to, and does, reforest it. Industry has a legal obligation on about 10% of the 22 million hectares.

Significant areas of the forest are presently damaged by wildfire, diseases or pests such as mountain pine beetle, and the decision whether to replant lies with government. Unlike industry, government is not legally obligated to reforest. As such, very limited replanting has occurred. Since government is responsible for over 90% of British Columbia's forests, government's reforestation decisions have a significant impact on our future forests.

While not legally obligated to reforest damaged areas, this should not prevent government from acting in the public interest by actively managing these areas. In general, we expected to find the ministry's stewardship activities to be guided by its immediate and long-term timber objectives, and to be aligned with its established silviculture needs. Because the ministry does not have clear timber objectives and outcomes at the provincial level, it cannot demonstrate that it is applying sufficient strategies and programs to achieve these objectives and outcomes.

In light of the devastation resulting from mountain pine beetle, the ministry has a window of opportunity to shape our future forests and mitigate the impact with a timely, strategic reforestation plan and cost-effective silviculture. To do this, government needs to establish a provincial plan that states its long-term timber objectives and focuses its resources in order to foster economic stability and quality of life for British Columbians now and in the future.

I thank the ministry for their assistance and cooperation during this audit. I look forward to receiving updates on their implementation of the recommendations made in this report through our follow-up process.



John Doyle, MAcc, CA
February 2012

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EXECUTIVE SUMMARY

THE VAST MAJORITY of British Columbia's Crown land is forested. Logging rights to this land were first granted in the 1800s. In 1912 government established the first *Forest Act*, governing forest practices. This year marks the 100-year milestone for the British Columbia Forest Service.

Today, the management of forests is guided by the concept of sustainable forest management, which means maintaining the long-term health of forest ecosystems while providing environmental, economic, and social opportunities for present and future generations. The forest sector is important to British Columbia's economy: it sustains rural and First Nations communities and generates revenues that finance a broad range of public services.

The total area of British Columbia is 95 million hectares. Of that, 90 million hectares is publicly owned, and 55 million hectares, almost 60%, is forested, with an estimated timber value of a quarter of a trillion dollars. Approximately 22 million hectares are currently available for timber production and harvesting, after parks, protected areas, and areas that are difficult to access or that have low economic value are subtracted from the total forested area.

The Ministry of Forests, Lands and Natural Resource Operations is assigned stewardship responsibility for the province's forest resources through the *Ministry of Forests and Range Act*. The ministry's primary role is to set clear direction and ensure that activities conducted on forested land are achieving the aims of the legislation.

The *Forest and Range Practices Act* (FRPA) and its regulations govern industry activities. The FRPA focuses on achieving results rather than on process, and delegates some of the stewardship considerations previously fulfilled by government officials to industry. The Act and its regulations set government's economic, social and environmental forest objectives and require licence holders (such as private companies, First Nations or communities) to prepare forest stewardship plans that show how their activities are consistent with those objectives.

Our audit focused on timber, because timber is the primary revenue generator in the forest and success in managing it is integral to the successful management of the other social and environmental values.

The purpose of the audit was to determine whether the Ministry of Forests, Lands and Natural Resource Operations is achieving its forest objectives for timber. To do this, we asked three questions:

1. Has the ministry clearly defined its forest objectives for timber?
2. Does the ministry have the management practices it needs to achieve its objectives for timber?
3. Does the ministry appropriately monitor and report its timber results against its objectives for timber?

We concluded that:

- ◆ The ministry has not clearly defined its timber objectives. Without clearly defining its timber objectives, the ministry cannot ensure that its management practices are effective.
- ◆ Existing management practices are insufficient to offset a trend toward future forests having a lower timber supply and less species diversity in some areas.
- ◆ The ministry does not appropriately monitor and report its timber results against its timber objectives.

SUMMARY OF RECOMMENDATIONS

WE RECOMMEND THAT THE MINISTRY OF FORESTS, LANDS AND NATURAL RESOURCE OPERATIONS:

- 1** develop a plan for directing forest stewardship that establishes clearly defined timber objectives and stewardship principles to guide decision-making, actions, time frames and assessment of results.
- 2** ensure that its investments in silviculture are sufficient to achieve long-term timber objectives, and that they align with stewardship principles and are cost-effective.
- 3** ensure that restocking activities result in the establishment of forests that are consistent with its long-term timber objectives.
- 4** ensure that its information systems reflect actual forest conditions in priority management areas.
- 5** ensure that the collective and individual components of its oversight framework are sufficient to ensure the achievement of long-term timber objectives.
- 6** develop and implement appropriate performance measures to demonstrate progress towards achieving long-term timber objectives and report publicly on the results.

THE MINISTRY OF FORESTS, Lands and Natural Resource Operations (FLNR) appreciates the efforts of the Office of the Auditor General of British Columbia in their audit of the ministry's management of timber.

The timber harvesting land base is the area where timber has been or is expected to be harvested; it excludes protected areas, other reserves, and forests that are uneconomical for timber production. About 22 million hectares of B.C.'s public forest lands are currently in the timber harvesting land base, which is derived as part of the process for setting allowable annual cuts.

The timber harvesting land base is subject to other resource use demands, natural disturbances and climate change. The state of the timber harvesting land base may affect many environmental values such as wildlife habitat and water quality, as well as key economic outputs such as natural resource sector jobs and provincial revenues. First Nations and other communities value and use forests in many ways including traditional uses and forest recreation.

The management of timber in consideration of other resource values and uses is a key mandate of the ministry. The audit and its recommendations will help support the ministry's efforts towards continuous improvement in the management of these values and uses.

RECOMMENDATION 1: *Develop a plan for directing forest stewardship that establishes clearly defined timber objectives and stewardship principles to guide decision-making, actions, time frames and assessment of results.*

FLNR response: The ministry agrees clear timber objectives and stewardship principles are important aspects of forest management. Government has established objectives for timber in the *Forest and Range Practices Act*, *Forest Planning and Practices Regulation* (s. 6) as follows:

The objectives set by government for timber are to

- (a) maintain or enhance an economically valuable supply of commercial timber from British Columbia's forests,*
- (b) ensure that delivered wood costs, generally, after taking into account the effect on them of the relevant provisions of this regulation and of the Act, are competitive in relation to equivalent costs in relation to regulated primary forest activities in other jurisdictions, and*
- (c) ensure that the provisions of this regulation and of the Act that pertain to primary forest activities do not unduly constrain the ability of a holder of an agreement under the Forest Act to exercise the holder's rights under the agreement.*

In addition the ministry has established stewardship principles as well as objectives and direction for timber management in several documents such as Minister letters to the Chief Forester related to Allowable Annual Cut determination, provincial incremental silviculture strategy, Land Base Investment Strategy, Establishment to Free Growing Guide Books, and various other forms of technical guidance.

Since timber management objectives must be integrated with objectives for the other forest values addressed under the *Forest and Range Practices Act*, the most appropriate scale for developing plans that address this recommendation is at the management unit level. For example the appropriate trade off for volume, value and species diversity is significantly influenced by strategies and objectives for water, wildlife, and visuals. These types of plans include legally required Forest Stewardship Plans, and other management unit level plans and strategies such as Type I and II silviculture strategies. The Ministry will review this framework including the suite of guidance, objectives, and principles to ensure that they are adequately directing timber management.

The ministry is engaged in various strategic initiatives, such as the forest sector strategy, cumulative effects assessment and management, and mid-term timber supply analysis which support the ongoing evolution of timber and other resource management objectives. We also continue to examine approaches for management unit level planning as a means to establish and/or refine timber objectives and stewardship principles.

RECOMMENDATION 2: *Ensure that its investments in silviculture are sufficient to achieve long-term timber objectives, and that they align with stewardship principles and are cost-effective.*

FLNR response: Under B.C. law, harvested areas must be reforested and these ‘basic silviculture’ investments are recognized as a cost of doing business in determining the stumpage payable to the Crown. Government funds incremental (non-obligation) silviculture investments through the Forests for Tomorrow program. Forests for Tomorrow is a part of an overarching Land Base Investment Strategy that addresses several resource values in addition to timber. Forests for Tomorrow uses several criteria, including ‘return on investment’, to ensure investments are cost-effective and targeted at the highest priorities. The ministry aligns Forests for Tomorrow investments with its service plan objectives and the other investment opportunities assessed in the annually updated three-year Land Based Investment Strategy.

Forests for Tomorrow was introduced in 2005 and is the Provincial Government’s stewardship response to the not-satisfactorily-restocked (NSR) area associated with mountain pine beetle, wildfire and other catastrophic disturbances. Currently, Forests for Tomorrow plans forecast about 20 million seedlings per year for reforestation of priority areas impacted by these disturbances. For example, 14.5 million seedlings are planned for planting in 2012/13 and another 21.5 million seedlings for 2013/14.

The appropriate level of government investment in silviculture in the future will continue to be determined in the context of available funding and relative priority to other government investments.

RECOMMENDATION 3: *Ensure that restocking activities result in the establishment of forests that are consistent with its long-term timber objectives.*

FLNR response: The ministry’s existing stocking standards and standards for seed use help ensure that forest establishment in B.C. is effectively delivered. The existing standards will be reviewed to determine if there are areas for improvement relative to emerging issues such as climate change adaptation.

The ministry’s Future Forest Ecosystem Initiative projects assist the ministry’s restocking activities by providing science-based information to guide policy and practices within a changing climate.

RECOMMENDATION 4: *Ensure that its information systems reflect actual forest conditions in priority management areas.*

FLNR response: The ministry is committed to ensuring that the accuracy of forest inventory and yield projection is adequate for

strategic decision-making. The ministry aims for a level of accuracy and detail that is effective both in terms of forest planning and in costs. The ministry will continue:

1. to periodically re-inventory all forest lands to ensure that information on stands is up-to-date in the period between free-growing and harvest;
2. to implement the ground sampling program that is used to validate forest cover estimates that have been derived from aerial photography;
3. to reduce the backlog of submissions to the ministry’s information system (RESULTS) that have not been integrated into the inventory;
4. to test and refine the growth and yield projection models;
5. to implement programs to monitor young stand growth, yield, and condition;
6. to provide publicly accessible information on the accuracy of forest inventories, to carefully set inventory priorities and focus investment on areas with the greatest need, and to report on the performance of the forest inventory program.

RECOMMENDATION 5: *Ensure that the collective and individual components of its oversight framework are sufficient to ensure the achievement of long-term timber objectives.*

FLNR response: The ministry’s existing framework works within the context of public oversight in the annually reviewed ministry budget and service plan. The oversight framework includes a number of components which are directly connected to the ministry such as:

- ◆ Compliance & Enforcement,
- ◆ Forest and Range Evaluation Program,
- ◆ Legislative authorities (e.g. *Forest and Range Practices Act* and regulation objectives, plan approvals),
- ◆ Minister’s Forest and Range Practices Advisory Council.

Components of the oversight framework that are external to the ministry include:

- ◆ the Forest Practices Board,
- ◆ third party certification, and associated public advisory groups,
- ◆ Reliance on resource professionals through standards of practice established by professional associations and their members.

All components are important individually and in combination and the ministry strives to ensure that the overall framework is coordinated and effective. The ministry assesses the individual components, and their findings, to evaluate achievement of desired results and as new information arises, changes are made accordingly. The ministry will continue to ensure that the framework is sufficient to support the achievement of long-term timber objectives.

RECOMMENDATION 6: *Develop and implement appropriate performance measures to demonstrate progress towards achieving long-term timber objectives and report publicly on the results.*

FLNR response: The ministry will strive to develop a publicly reported performance measure(s) that demonstrates progress in achieving timber objectives.

BACKGROUND

THE VAST MAJORITY OF BRITISH COLUMBIA'S Crown land is forested. Logging rights to this land were first granted in the 1800s. In 1912 government established the first *Forest Act*, governing forest practices. This year marks the 100-year milestone for the British Columbia Forest Service.

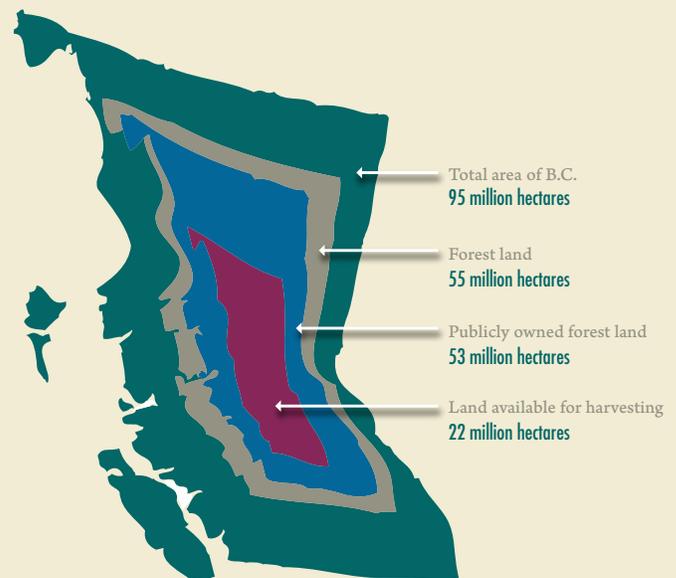
Today, the management of forests is guided by the concept of sustainable forest management, which means maintaining the long-term health of forest ecosystems while providing environmental, economic and social opportunities for present and future generations. The forest sector is important to British Columbia's economy: it sustains rural and First Nations communities and generates revenues that finance a broad range of public services.

The total area of British Columbia is 95 million hectares. Of that, 90 million hectares is publicly owned, and 55 million hectares, almost 60%, is forested, with an estimated timber value of a quarter of a trillion dollars. Approximately 22 million hectares are currently available for timber production and harvesting, after parks, protected areas, and areas that are difficult to access or that have low economic value are subtracted from the total forested area (see Exhibit 1).

Such a significant resource must be well managed for its current and future social, economic and environmental benefits. Forest management in British Columbia is supported by a sophisticated combination of ecological classification, mapping tools and guidebooks that reflect the province's unique ecology. These are designed to help ensure that tree species selected during reforestation reflect local conditions and are primarily native species. This complex system is based on a set of working assumptions about how current forest management practices contribute to a productive and ecologically suitable future forest.

This audit focuses on the Ministry of Forests, Lands and Natural

Exhibit 1: British Columbia's forested land



Source: Adapted from the Ministry of Forests, Lands and Natural Resource Operations.

Resource Operations' management of the 22 million hectares of forest currently available for timber production and harvesting.

Forest Stewardship: The Ministry's Role

Stewardship: the responsible management of natural resources (such as forests) for the benefit of present and future generations.

Source: Adapted from the Ministry of Forests, Lands and Natural Resource Operations.

The *Ministry of Forests and Range Act* assigns the stewardship responsibility for the province's forest resources to the Ministry of Forests, Lands and Natural Resource Operations. Under the Act, the ministry is expected to:

- ◆ encourage maximum productivity of the forest and range resources in British Columbia;
- ◆ manage, protect and conserve the forest and range resources of the government, taking into consideration the immediate and long-term economic and social benefits they may confer on British Columbia;

- ♦ plan the use of the forest and range resources of the government, so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are co-ordinated and integrated, in consultation and co-operation with other ministries and agencies of the government and with the private sector;
- ♦ encourage a vigorous, efficient and world-competitive timber processing industry and ranching sector in British Columbia;
- ♦ assert the financial interest of the government in its forest and range resources in a systematic and equitable manner.

The *Ministry of Forests and Range Act* entrusts the ministry with a significant responsibility to manage today's forest while also developing tomorrow's. The ministry's primary role is to set clear direction and ensure activities conducted on forested land are achieving the aims of the legislation.

Another Act, the *Forest Act*, provides the ministry with a framework for allocating harvesting rights to public timber resources to industry. The main focus of the Act is:

- ♦ determining the annual rate of logging, known as the allowable annual cut;
- ♦ granting logging and road building rights through a series of area- or volume-based agreements that comprise the tenure system; and
- ♦ establishing rules for the logging industry, such as what stumpage or fees the harvester will pay government for the timber, and how timber is to be measured, classified and identified.

Forest Stewardship: Industry's Role

"Industry" refers to companies or organizations with a licence or agreement with the ministry to harvest timber. Before 1987, the *Forest Act* provided rights to cut existing mature timber but imposed no replanting obligations. In the absence of such obligations, most reforestation occurred through natural regeneration. In 1987, government amended the *Forest Act* to include legal obligations to reforest areas affected by harvesting, fire, insects and diseases. Industry became responsible for reforesting the areas it harvested and the Crown for reforesting areas affected by natural disturbances such as pests, diseases and wildfire. The legal obligation for the Crown to reforest areas degraded by natural disturbances was removed from legislation in 2002.

The provincial forest tenure system

Government enters into tenure agreements with companies, communities and individuals to allow them to develop and harvest timber. The obligations of the agreement holder are specified in legislation. The agreements include consideration of the fees charged for harvesting Crown timber, known as stumpage. There are many different tenure agreements outlined in the legislation, but they all fall into two categories:

- ♦ Volume-based tenure – allows a tenure holder to harvest an established annual volume of timber for the term of the licence. The Forest Licence is the most common volume-based tenure.
- ♦ Area-based tenure – allows a tenure holder to harvest an established annual volume of timber within a specific area.

Different forms of tenure confer different duties and obligations on the tenure holder, cover different timescales and, in some instances, transfer the duty of care to the Crown.

Source: Adapted from the Ministry of Forests, Lands and Natural Resource Operations.

The requirement for industry to reforest harvested areas with ecologically suitable trees of a sufficient density has been strengthened since 1987 to include minimum height requirements (1994) within 20 years (2004). This means reforested areas are expected to be established with healthy, commercially valuable species that are not impeded by competition from plants, shrubs or other trees and that will continue to develop and provide a merchantable volume of timber with minimal additional intervention. Reforested areas meeting these criteria are declared as "free growing."

In 1995, government introduced a statutory framework, the *Forest Practices Code*, to regulate industry activities. The Code reflected a highly prescriptive approach to managing public forests. Responding to concerns about the prescriptiveness of the *Forest Practices Code*, government enacted the *Forest and Range Practices Act* (FRPA) in 2004 to focus on achieving results rather than on process. The FRPA delegates some of the stewardship considerations previously fulfilled by government officials to industry. The Act and its regulations set government's forest objectives and require licence holders (such as private companies, First Nations or communities) to prepare forest stewardship plans that show how their activities are consistent with those objectives.

DETAILED REPORT

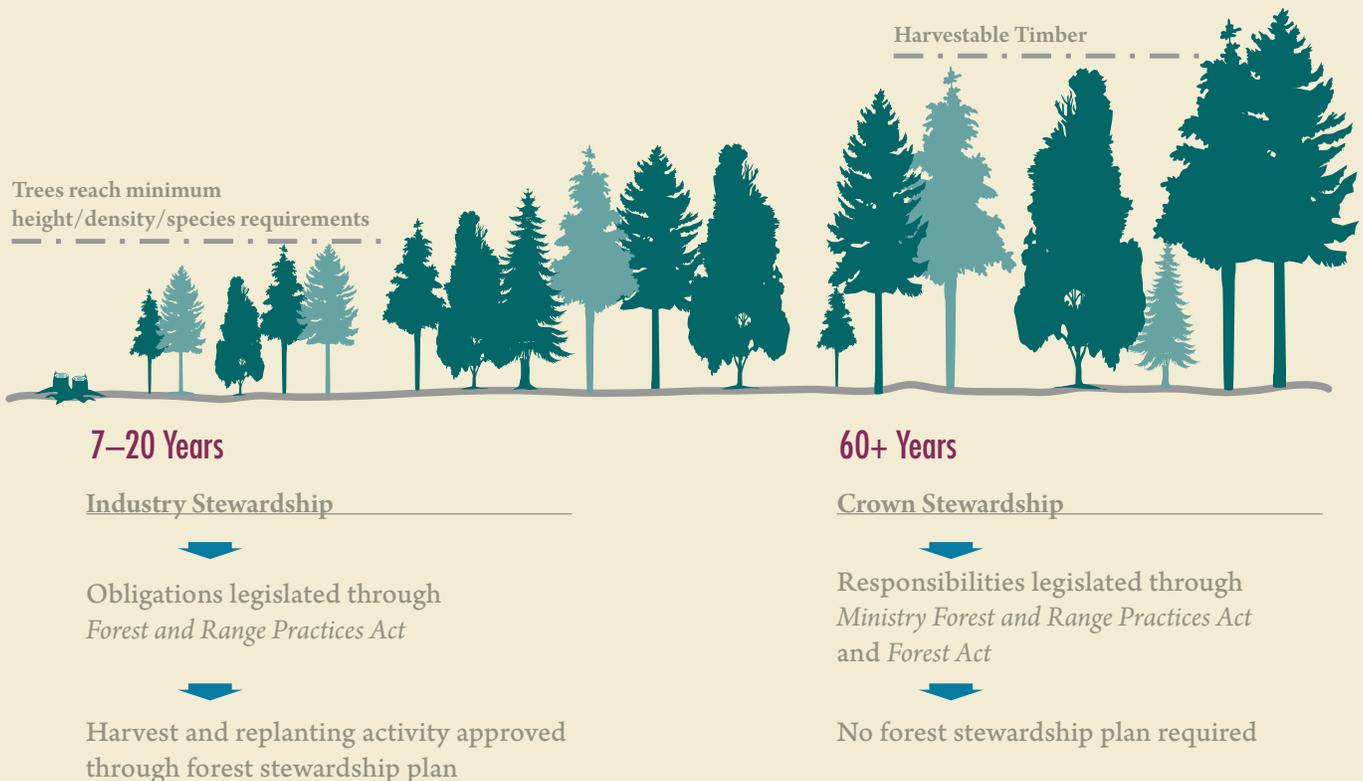
The forest stewardship plan is a planning document setting out a licence holder's stewardship responsibilities in relation to the legislated objectives for timber and the other social and environmental objectives. The timber objectives established for industry by the FRPA's Forest Planning and Practices Regulation are to:

- ◆ maintain or enhance an economically valuable supply of commercial timber from British Columbia's forests;
- ◆ ensure that delivered wood costs, generally, after taking into account the effect on them of the relevant provisions of this regulation and of the Act, are competitive in relation to equivalent costs in relation to regulated primary forest activities in other jurisdictions; and
- ◆ ensure that the provisions of the regulation and the Act that pertain to primary forest activities do not unduly constrain the ability of a holder of an agreement under the *Forest Act* to exercise the holder's rights under the agreement.

The legislation and related approval of individual forest stewardship plans establish industry stewardship responsibilities from harvesting to reforestation. When a harvested area is declared free growing, industry's stewardship obligations are complete. Any future stewardship required in that area becomes the responsibility of the ministry.

Currently, 11% of the forest available for timber production and harvesting is under industry obligation and 89% is the responsibility of the ministry. Exhibit 2 shows this cycle of forest stewardship.

Exhibit 2: The forest stewardship cycle in British Columbia



Source: Office of the Auditor General of British Columbia.

AUDIT OBJECTIVES AND SCOPE

The purpose of this audit was to determine whether the Ministry of Forests, Lands and Natural Resource Operations is achieving its forest objectives for timber. To do this, we asked three questions:

1. Has the ministry clearly defined its forest objectives for timber?
2. Does the ministry have the management practices it needs to achieve its objectives for timber?
3. Does the ministry appropriately monitor and report its timber results against its objectives for timber?

We developed the audit objectives using the requirements of the *Ministry of Forests and Range Act* and the *Forest and Range Practices Act* as well as information from interviews with Ministry of Forests, Lands and Natural Resource Operations staff.

Timber is one of 11 values identified in legislation as important in managing the overall forest for society's many economic, social and environmental needs and expectations. Our work focused on timber because it is the primary revenue generator in the forest and success in managing it is integral to the successful management of the other social and environmental values (soil, wildlife, water, fish, biodiversity, visual quality, cultural heritage, forage and associated plant communities, resource features and recreation).

The audit focused on the areas of provincial forest available for volume-based tenures within timber supply areas. We did not look at the area-based tenures covered by tree farm licences or other area-based agreements. We considered both ministry and industry activities. We conducted our audit between January and June 2011. We interviewed Ministry of Forests, Lands and Natural Resource Operations staff, as well as a number of external stakeholders, including academics and forest professionals.

We conducted the audit in accordance with section 11(8) of the *Auditor General Act* and the standards for assurance engagements established by the Canadian Institute of Chartered Accountants.

AUDIT CONCLUSIONS

We concluded that:

- ◆ The ministry has not clearly defined its timber objectives. Without clearly defining its timber objectives, the ministry cannot ensure that its management practices are effective.
- ◆ Existing management practices are insufficient to offset a trend toward future forests having a lower timber supply and less species diversity in some areas.
- ◆ The ministry does not appropriately monitor and report its timber results against its timber objectives.

KEY FINDINGS AND RECOMMENDATIONS

Defining Timber Objectives

The ministry's legislated mandate includes encouraging maximum productivity of the forest resources and making stewardship decisions that address both immediate and long-term economic and social benefits derived from British Columbia's forests. We expected the ministry to have developed strategic objectives for timber to demonstrate how it will achieve its legislated mandate over the immediate and long-term. These would serve as a frame of reference to assess the results achieved.

We found that the ministry has not developed strategic timber objectives that guide decision-making and demonstrate the outcomes it is pursuing at the provincial level. Two areas in particular need to be more clearly defined:

- ◆ whether the desired timber outcome seeks to achieve a targeted volume, value or species diversity, or some combination of each; and
- ◆ how current economic interests are balanced with providing environmental, economic and social opportunities for present and future generations.

This lack of clarity is of particular concern given the significant issues and risks currently facing British Columbia's forests. For instance, we found ministry evaluations and reviews identifying:

- ◆ declines in forest diversity resulting from industry harvest and reforestation decisions; and

- ♦ a growing area of under-stocked forest resulting from pests, diseases, wildfires and areas being left to regenerate naturally instead of being replanted.

These trends suggest that long-term timber benefits and forest resiliency are being eroded. The ministry has resources assigned to many of these issues and applies a mix of individual strategies and programs intended to mitigate these risks to some extent. However, without clearly defined provincial outcomes, the ministry cannot assess the trends in a provincial context nor can it demonstrate it has applied sufficient strategies and programs to achieve these outcomes.

Industry is required to complete and comply with forest stewardship plans to fulfil its stewardship responsibilities for the forest under its obligation. Despite the damage to public forests from pests, diseases and wildfires, the ministry has no overall plan indicating how it will manage the forest for which it is responsible.

RECOMMENDATION 1: *We recommend that the ministry develop a plan for directing forest stewardship that establishes clearly defined timber objectives and stewardship principles to guide decision-making, actions, time frames and assessment of results.*

Management Practices Affecting the Future Forest

Ministry stewardship

In the 2010 *State of British Columbia's Forests* report, the ministry estimated that British Columbia's public forest land can generate a long-term sustainable timber supply (harvest level) of 70 million cubic metres per year. However, there are many factors that can reduce the amount of timber available, including pests, diseases, wildfires and planting failures. Practising sustainable forest management and maximizing forest productivity when areas become degraded involves cost-effective reforestation that addresses immediate and long-

term timber objectives. Although government is no longer legally obligated to reforest areas damaged by natural disturbances, this does not prevent it from acting in the public interest by committing to stewardship principles like those to which industry is required to commit. We expected the ministry's stewardship activities to be guided by its immediate and long-term timber objectives and to be aligned with the established silviculture needs.

The allowable annual cut in the province is currently 78.6 million cubic metres. This is higher than the estimated sustainable harvest level because the ministry is allowing increased harvesting of mountain pine beetle damaged wood before it becomes unmerchantable. In the 2010 *State of British Columbia's Forests* report, the harvest level was expected to decline to 50 to 60 million cubic metres within the next decade and continue at this level for 50 to 60 years. This downward trend reflected the cumulative effects of natural disturbances such as mountain pine beetle and the transition from old-growth to second-growth forests. This significant reduction in the volume of timber available for harvesting was not expected to return to the sustainable harvest level of 70 million cubic metres until about 2080. More recent ministry projections of the future timber supply now anticipate only 65 million cubic metres by about 2110.

Exhibit 3 shows ministry estimates of the number of hectares affected by wildfire over the past five years and the area affected by mountain pine beetle. In the past two years alone, wildfires affected more than three times as many hectares as the area harvested annually. The ministry estimates that, of the 17.5 million hectares affected by the mountain pine beetle, nearly 10 million are within the 22 million hectares available for timber production and harvesting.

When disturbances occur, the ministry has an opportunity to influence the speed and volume of recovery, as well as the species composition of the future timber supply through its own silviculture activities. Stewardship considerations for areas affected by natural disturbances are different from those for harvested areas, because damage from natural

Exhibit 3: Area affected by wildfire and mountain pine beetle

	Hectares
Area affected by wildfire over the past 5 years	760,472
Area affected by mountain pine beetle	17,500,000

Source: Ministry of Forests, Lands and Natural Resource Operations.

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disturbances can be minimal or extensive, can occur over high- or low-production areas, and can occur in areas not easily accessible or treatable. Before making silviculture decisions the ministry undertakes aerial surveys to identify areas of disturbance. This provides a focus for ministry staff to conduct ground surveys and to determine the most effective options, including whether replanting is a cost-effective solution.

A ground survey recommending replanting as the best option represents a decision made at a specific point in time. If there is a significant delay in replanting after the initial ground survey, the cost of replanting may rise because additional site preparation is needed, or it may no longer be cost-effective to replant at all. This opportunity exists for about 20 years before the area is no longer cost-effective to replant. As an example, the ministry has had a long-standing commitment to reforest areas harvested or damaged by natural disturbances prior to 1987. Some of these commitments extend beyond 30 years and the ministry has yet to address them or has accepted lower stocking levels in these sites because they have regenerated naturally or it is no longer cost-effective to replant. Sites left to regenerate naturally usually have a lower timber volume per hectare because they take longer to establish and do not have the benefit of the nursery seeds used for high productivity and genetic gain. In addition, when the ministry does not replant, it misses an opportunity to influence species composition.

The ministry's silviculture program directs where activities such as replanting or fertilization should occur, and is guided by principles intended to:

- ◆ increase the availability of the future timber supply;
- ◆ minimize future risks; and
- ◆ maintain options and ensure return on investment.

We noted a significant gap between the total area replanted by the ministry and the total area suitable for replanting. The ministry has not indicated how this low level of silviculture investment reconciles with its legislated mandate to achieve long-term timber benefits and to maintain or enhance the future timber supply. The ministry's inability to address the decline in future timber supply through a robust silviculture program is of significant concern, given the extent of the areas damaged and the severity of the damage. Exhibit 4 shows the ministry's current estimate of forest within its area of responsibility (but without legal obligation to replant) with potential for replanting.

The ministry estimates that as much as 1.1 million hectares of forest within its area of responsibility (but without legal obligation to replant) have potential for replanting. This represents approximately 5% of the harvestable forest. The ministry has ground surveyed 385,000 hectares over the past five years: a relatively small proportion of the area when compared to the total area affected by natural disturbances. Replanting activities funded by Forests for Tomorrow, a program established in 2005 to reforest areas impacted by the mountain pine beetle and wildfires, averaged 8,730 hectares a year over the past five years – despite a plan calling for the planting of 22,000 hectares a year. Avoiding replanting today will reduce opportunities for future generations.

RECOMMENDATION 2: *We recommend that the ministry ensure that its investments in silviculture are sufficient to achieve long-term timber objectives, and that they align with stewardship principles and are cost-effective.*

Exhibit 4: Ministry's estimate of confirmed and potential area suitable for replanting

	Hectares
Ministry-confirmed area of not satisfactorily restocked forest under its responsibility	240,000
Ministry's estimate of potential area suitable for replanting related to mountain pine beetle	650,000
Ministry's estimate of potential area suitable for replanting related to other disturbances such as wildfire	200,000
Current estimate of confirmed plus potential area suitable for replanting	1,090,000

Source: Ministry of Forests, Lands and Natural Resource Operations.

Industry stewardship

Since 1987, industry has been responsible for reforesting the areas it harvests according to ministry-approved stocking standards and, since 2004, within a 20-year time frame. Stocking standards typically allow a variety of tree species to be planted depending on the ecology of the area. The standards are intended to ensure that ecologically suitable trees are planted to achieve sufficient density and height within the allowable time frame.

Industry is motivated to achieve the restocking obligations as soon as possible by the need to reduce its financial liability and risks. About 2.3 million hectares are currently under industry obligation – 11% of the timber harvesting land base.

We found that ministry assessments generally conclude that forest companies achieve their individual reforestation obligations and are doing so sooner than in the past: in some cases as early as seven years after harvesting. Exhibit 5 shows the total area harvested by industry compared with the total area declared reforested by industry over a five-year period. Because of the time delay between harvest and reforestation, a year-to-year comparison is less relevant than a five-year average. The average for industry is currently 98%, indicating that they are meeting their obligation to reforest harvested areas.

Investments in silviculture in British Columbia are largely driven by what is required to meet reforestation regulations – reaching a “free to grow state.” This means that often the least cost options are used to satisfy that requirement. It is unclear whether these investments always result in maximum potential productivity, increased value and improved forest resiliency, and whether the current allocation of basic and incremental silviculture responsibilities results in the best future forest conditions.

Source: *The Report of the Working Roundtable on Forestry*, 2009.

Diversity in replanted areas

Forest diversity is an important consideration in reforestation. Tree species diversity can help minimize known health risks, reduce vulnerability to climate change and help maintain a valuable supply of timber into the future. We found ministry evaluations raising concerns about:

- ◆ harvesting of high-value species and then reforesting with lower-value species;
- ◆ a growing increase in reforested areas being dominated by a single tree species; and
- ◆ the suitability of the stocking standards in light of climate change.

Exhibit 5: Area harvested and reforested annually by industry

	2006/07	2007/08	2008/09	2009/10	2010/11	5-year total
Area harvested (hectares)	175,198	159,306	177,748	112,366	132,344	756,962
Area reforested (hectares)	143,795	144,400	164,584	154,745	133,155	740,718
% reforested	82%	91%	93%	138%	101%	98%

Source: Ministry of Forests, Lands and Natural Resource Operations.

There are a number of reasons why a change in tree species diversity is occurring. These include:

- ◆ Reforestation is a cost to forest companies, not an investment. In managing their business, forest companies tend to take the least-cost, least-risk approach to meet reforestation regulations, which means planting lower-cost, faster-growing species.
- ◆ Short-term reforestation decisions made by industry to get a harvested area to a free-growing state are not necessarily the same as reforestation decisions taken to ensure long-term forest resilience and productivity.

The trend toward reduced diversity is inconsistent with the Chief Forester's vision for British Columbia's future forests as providing a diversity of well-adapted, healthy, resilient forests that will fulfil the needs of future generations. It is also inconsistent with what the ministry believes is needed to maximize forest resilience to conditions associated with climate change. A particular concern raised by some forest professionals is the tendency to plant lodgepole pine as the dominant single species.

The ministry has initiated a number of activities designed to highlight its concerns about diversity and to provide industry with guidance on achieving diversity and developing a healthy future forest. For example:

- ◆ In 2005, the Chief Forester initiated the Future Forest Ecosystems Initiative. The intent of the initiative is to increase understanding of ecological changes associated with climate change and to identify adaptation strategies. The Future Forest Ecosystem Initiative funds research, forecasting and monitoring projects that inform management decisions.
- ◆ In 2009, the Chief Forester issued guidance on tree species composition, encouraging tenure holders to consider planting a diversity of species in order to help address immediate and long-term forest health risks.
- ◆ In 2011, the Forest and Range Evaluation Program recommended the planting of species mixes at densities that address local forest health conditions and their expected long-term impacts.

RECOMMENDATION 3: *We recommend that the ministry ensure that restocking activities result in the establishment of forests that are consistent with its long-term timber objectives.*

Monitoring and Reporting

Determining forest inventory

The Chief Forester is legally required to determine the allowable annual cut or rate of timber production that can be sustained in an area after taking into account:

- ◆ the composition of the forest and its expected rate of growth;
- ◆ the time that it will take the forest to become re-established;
- ◆ silviculture treatments;
- ◆ standards of timber utilization;
- ◆ constraints on the amount of timber that may be harvested due to use of the forest for other purposes; and
- ◆ any other information relating to the area's capacity to produce timber.

The process of determining the allowable annual cut is referred to as a timber supply review and is required at least once every 10 years for each of the 38 timber supply areas and 34 tree farm licences in the province. In determining the allowable annual cut, among other considerations, the Chief Forester depends on the accuracy of information available from the ministry in three primary areas:

- ◆ utilizing the forest inventory, including species composition, age and density;
- ◆ changes occurring in the forest inventory since the last update (such as harvesting, reforestation and natural disturbances); and
- ◆ growth and yield projections of the forest inventory.

We expected the ministry to have sufficient information, particularly in priority management areas, to support well-informed decisions.

Utilizing the forest inventory

A key component of the timber supply review is assessing the forest inventory, which involves identifying the vegetation and land-based attributes of a timber supply area. The forest cover inventory is determined using aerial imagery and ground sampling to categorize areas according to their attributes, including tree species composition, density, height, and age class of the trees, and growing conditions on the sites. Ground sampling provides the information necessary to determine the accuracy of estimates made from the aerial images.

We found cases where the ministry lacks the information needed to accurately categorize the attributes of a forested area. In particular, the ministry has limited information on areas affected by pests, diseases, wildfires and other natural disturbances. This is because only small portions of the affected areas are ground surveyed to the extent needed to inform decision-making and assist in timber supply reviews. Ground sampling is important in assessing the nature and extent of the disturbances identified in aerial imagery. Without sufficient ground sampling, the Chief Forester has to estimate the effect of disturbances rather than rely on a more valid, updated inventory.

Updating the forest inventory

Having determined the forest inventory at a specific point in time, the ministry updates the map for disturbances known to have occurred since the last update. Disturbances include harvest and replanting activity, as well as natural disturbances such as pests, diseases and wildfires. Harvest and replanting data available to the ministry are more extensive than information on natural disturbances, which is limited.

To update the inventory, the ministry uses a system called the Reporting Silviculture Updates and Land Status Tracking System (RESULTS). The majority of harvest and replanting information in RESULTS is entered by industry and forms the ministry's primary information source on changes in the provincial forest. Since the introduction of RESULTS in 2003, over 40% of the timber harvesting land base has been updated in RESULTS. However, of the entries made by industry, we found many required modification because mapping or silviculture data was missing or did not meet the ministry data quality specifications. The effect of these deficiencies is that until these records are corrected, they will not be used to update the forest cover inventory, limiting the completeness of the information and its overall usefulness for monitoring and decision-making purposes. Again, this means the Chief Forester has to try to estimate the effect of the disturbances rather than rely on a more valid, updated inventory.

Projecting forest growth and yield

To forecast a timber supply, the ministry relies on its forest inventory information, including tree species composition, growth rates and local growing conditions. This information forms the basis of the timber supply projections used by the ministry in determining allowable annual cuts.

The ministry collects extensive information about forest cover inventory after harvesting and reforestation and at the point in time

when free growing is declared. However, because limited information is available about forest conditions after free growing is declared, the ministry relies heavily on the accuracy of its growth and yield projections to predict timber productivity.

Current ministry research in 15- to 40- year-old forests raises a number of questions about the accuracy of ministry growth and yield projections in light of observed actual forest conditions. These include:

- ◆ a high rate of forest health damage resulting from pests, diseases and other forest health factors;
- ◆ in about 20% of the areas sampled, a change in the dominant tree species caused by natural regeneration of trees;
- ◆ a difference between current forest cover inventory information and actual growing conditions, growth rates and forest density.

These findings reveal potential weaknesses in the information available to support timber supply reviews and other areas of management importance.

RECOMMENDATION 4: *We recommend that the ministry ensure that its information systems reflect actual forest conditions in priority management areas.*

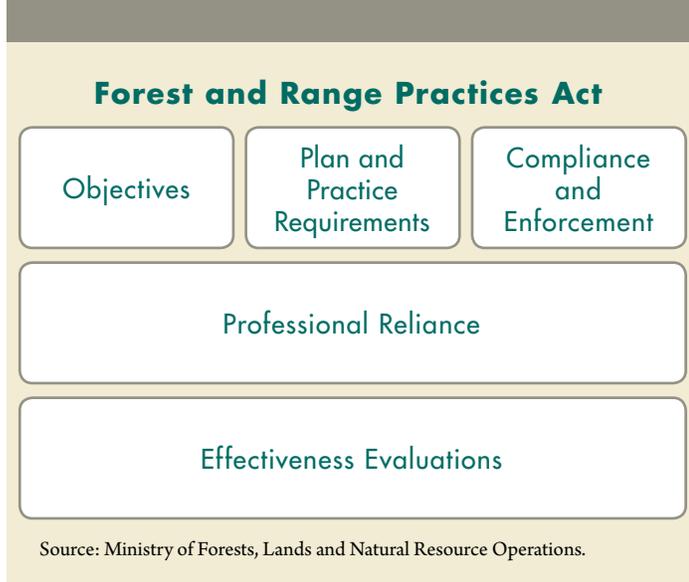
Monitoring industry

The Ministry of Forests, Lands and Natural Resource Operations is accountable for approving forest practices consistent with all legislated requirements. Before the *Forest and Range Practices Act* (FRPA) came into effect, ministry staff made most of the decisions affecting forest practices. The FRPA introduced the sharing of responsibility for the stewardship of public forests. Under the FRPA, government establishes what must be achieved and allows industry to determine the practices that will achieve it.

This transition between the *Forest Practices Code* and the FRPA necessitated a shift in the way the ministry ensures that industry forest practices are achieving government objectives. To reflect this shift in oversight responsibility and to fulfil its stewardship role, the ministry developed the framework shown in Exhibit 6.

The framework depends on the ministry defining measurable objectives for industry. The ministry relies on forest professionals, hired by industry, to make stewardship recommendations consistent with their standards of professional conduct and to reflect these recommendations in forest stewardship plans. The ministry uses the forest stewardship

Exhibit 6: Ministry oversight framework



plans as the basis for conducting compliance and enforcement activities and ensuring that planned results are being delivered. Lastly, the ministry evaluates the results of forest activity to assess the overall effectiveness of forest and range practices in achieving government objectives. Beyond this framework, additional oversight of forest practices is provided through independent audits conducted by the Forest Practices Board and individual forest certification bodies.

We expected the ministry to periodically assess its oversight framework to determine whether the combination of legislation, shared stewardship and ministry oversight is effective in achieving desired results.

We found ministry reports pointing to concerns within individual components of the oversight framework, particularly in the areas of forest stewardship plans, compliance and enforcement and effectiveness evaluations.

Forest stewardship plans

Forest stewardship plans are an essential component of the ministry’s oversight framework. Falling under the “plan and practice requirements,” they form the legal basis for the relationship between the forest stewardship plan holder and the ministry. Through these plans, companies commit to results or strategies that they will use when conducting forest activities, explaining how they are consistent with government objectives established in the FRPA. The plans have a five-year maximum term and create an opportunity for industry to propose new and innovative approaches to forest management.

We found two reports that reviewed the utility of forest stewardship plans, both of which identified a number of weaknesses in the plans. A Forest Practices Board report looking at the initial plans found that they generally stated vague and non-measurable commitments that could restrict the ministry’s ability to enforce or hold licensees accountable. Similarly, in 2009 the ministry evaluated a sample of forest stewardship plans to determine what the plan holders intended to achieve in relation to their restocking obligations. It determined that the plans proposed few innovations in forest practices, as they were generally very similar to the default standards provided by the ministry. The findings of our own review of 15 recent forest stewardship plans were similar to those in these two reports.

Nearly half of the 204 active forest stewardship plans are scheduled for renewal in 2012. This provides an opportunity to rectify known issues during the renewal process; however, the ministry has not demonstrated how these weaknesses will be addressed in the new plans.

Compliance and enforcement

Under the FRPA, compliance and enforcement is an important pillar in ensuring that environmental standards are being met by industry. As such, the ministry included compliance and enforcement as a component of its oversight framework.

Our review of compliance and enforcement reports showed a steady decline in forest practice inspections, from over 31,000 in 2000/01 to less than 15,000 in 2008/09 (the most recently published compliance and enforcement data). However, this reduction did not appear to be related to a greater degree of compliance by industry, nor was it reflective of the ministry’s expectation that compliance and enforcement work would be more complex under the FRPA. Despite the significant role compliance and enforcement plays in the oversight framework, the ministry has not demonstrated whether its existing compliance and enforcement inspections are sufficiently robust to ensure industry compliance.

Effectiveness evaluations

Effectiveness evaluations are designed to determine whether policies, plans or practices under the FRPA result in the desired objectives being met. The Forest and Range Evaluation Program (FREP) conducts these evaluations and has resource teams in place for each of the 11 resource values identified in the FRPA. Timber is one of these values and FREP is active in conducting evaluations and issuing publications in this area. In particular, FREP has identified a number of issues relating to the development and expectations of forests after they are declared as free growing. The results of these evaluations call into question the

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assumption that once trees reach this milestone they will continue to grow as expected with minimal additional silviculture. Ministry staff expressed concern about whether there is sufficient capacity at the field level to carry out the evaluations needed to support decision-making.

Despite these concerns with individual components of the framework, we found no assessment of the risks posed to the success of the framework or whether changes are needed. We also found no overall assessment of how the components of the framework contribute individually and collectively to the achievement of the ministry's desired results.

RECOMMENDATION 5: *We recommend that the ministry ensure that the collective and individual components of its oversight framework are sufficient to ensure the achievement of long-term timber objectives.*

Public reporting

We expected the ministry to have developed and reported on performance measures that demonstrate how the ministry is meeting timber objectives. We found this was not the case.

The ministry's reporting on its performance is not comprehensive enough to assess overall results against timber objectives. The ministry publishes a number of reports on many aspects of government and industry results, but they do not demonstrate the extent to which timber objectives have been achieved. Where performance measures are included, we found that they focused primarily on activities and outputs, and seldom compared progress over time against the intended result.

The main public reports containing performance information on timber results and trends are the latest *State of British Columbia's Forests* report (2010) and the annual service plan reports. We found that the state of the forests report presents a snapshot of the condition of the forest, but lacks sufficient assessment or interpretation to make the results more meaningful. The report does not describe or assess the ministry's activities, goals, targets or performance because, as the report itself states, these are covered in the ministry's service plans and annual reports.

We reviewed ministry service plans and annual reports from the past five years. They included a number of performance measures; the main measures relating to timber objectives are shown in Exhibit 7.

We found that the performance measures lacked the detail needed to assess results and trends appropriately. These measures taken as a whole do not provide the information needed to demonstrate progress over time or indicate whether the overall condition of the forest is increasing or decreasing in terms of volume, value or species diversity. As well, they do not distinguish between industry or government stewardship, making it difficult to assess the individual performance of industry and government. Finally, the measures do not show how current results are balanced with their long-term economic and social impacts or how they will affect the future forest.

RECOMMENDATION 6: *We recommend that the ministry develop and implement appropriate performance measures to demonstrate progress towards achieving long-term timber objectives and report publicly on the results.*

Exhibit 7: Ministry performance measures related to timber

Performance measure	2007/08		2008/09		2009/10		2010/11		2011/12
	Target	Actual	Target	Actual	Target	Actual	Target	Actual	Target
Crown forest and lands gross revenue (\$ millions)	1066	1088	939	583	381	403	471.5	433	523
Ratio of area reforested to area harvested or lost to fire and pest (unsalvageable losses)	.86	.83	.82	.78	.82	.88	*		*
Timber volume gain expected in 65 years from silviculture treatments completed in B.C. in each fiscal year (millions of m ³)		*		*		*	7.1	7.7	6.8

* Not used as a performance measure by the ministry for that year.

Source: Ministry of Forests, Lands and Natural Resource Operations service plans and annual service plan reports.

WE WILL FOLLOW UP on the status of the implementation of these recommendations in our April 2013 follow-up report.

The Ministry of Forests, Lands and Natural Resource Operations is responsible for managing a number of forest values other than timber. We will consider opportunities in the future to examine how some of these values are addressed.