Government of Saskatchewan

2012 Report on Saskatchewan Forests

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Minister's Message

I am pleased to provide the *2012 Report on Saskatchewan's Forests*. This report, compiled annually, provides a snapshot of the condition of the more than 34 million hectares of publicly owned forests, assessing four key indicators of the 23 that were evaluated for the 2009 *State of Saskatchewan's Provincial Forests* report. In future years, more indicators may be added as required, with a full assessment of the State of Saskatchewan's Provincial Forest due in 2019.

In Saskatchewan, our legislation commits us to report comprehensively on the state of our forests every ten years and on the state of our environment every two years. This report provides linkages to both of these required assessments; this ongoing evaluation allows us to identify trends, assess the effectiveness of our actions, and further inform future forest management decisions. I am pleased to say that this report finds that our forests are being maintained in a healthy state, through thoughtful forest management and, in many instances, by allowing natural processes to play the role they have for thousands of years.

The Ministry of Environment has a responsibility to deliver on our mandate of sustainable resource management and environmental protection. As a government, we are also firmly committed to delivering sustainable economic growth, while providing a competitive business environment. Saskatchewan's forest industry is an important part of our province's thriving economy, and the sector depends on sustainable provincial forests.

Forests are important for all of us, for the values they embody and the important benefits they provide. Our government is committed to protecting this significant part of Saskatchewan's natural heritage and to reporting regularly on our progress. I encourage you to review this and future reports to judge our success for yourself.

The Honourable Ken Cheveldayoff
Minister of Environment

Introduction

Forests are an important part of Saskatchewan's economy and environment. Over half of the province is forested, providing a multitude of benefits. As stewards of the forest resource, the Government of Saskatchewan is committed to its sustainable management, as well as to the sustainable economic growth the forest supports. This means that the government will balance the human use of the forests for various socio-economic and cultural purposes with the need to protect the long-term health of forest ecosystems (Saskatchewan Ministry of Environment 2009).

This public report on Saskatchewan Forests looks at four indicators that provide a broad overview of the condition and trends of Saskatchewan provincial forests, as well as highlighting the actions being taken to address forestry challenges. Government will work with industry to achieve desired future forest outcomes such as productive biologically diverse forests, a sustainable forest sector, and a resilient forest in the face of climate change to name a few, which meet the government commitments to enhance environmental protection and facilitate economic growth (see Appendix A for list of government desired future forest outcomes).

Saskatchewan forests are home to many thousands of species of plants and animals within a variety of ecosystems. Boreal forests have ecosystems that are influenced over time by natural disturbances such as insect and disease outbreaks, and wildfires. Maintaining the natural range of ecosystems results in a more resilient forest better equipped to recover from human or natural disturbances. Wildfire and insects are the dominant natural agents of change in the boreal forest, shaping the northern landscape. The first indicator, forest wildfire disturbance, tracks area burned by wildfire over time. The second indicator, forest insect and disease disturbance, tracks the levels of insect and disease disturbances in the boreal forest. Insects such as the eastern spruce budworm (*Choristoneura fumiferana*) are a significant disturbance agent and is a natural part of the ecosystem periodically affecting large areas of the forest.

Forest harvesting is a human disturbance affecting the forest landscape. However, the area of forest harvested each year is much less than that disturbed by wildfires and forest insects. Forest managers are working to make human disturbances associated with logging more closely resemble natural disturbances and at harvest levels that would ensure sustainable forest management is achieved. The third indicator, the proportion of sustainable harvest level utilized, tracks this important measure of sustainability over time. The fourth indicator, forest regeneration, relates to long-term forest productivity as the proportion of timber harvested area successfully regenerated, or in other words, the trees are restored in harvested areas to an accepted and measurable standard. Forests that are regenerated successfully are essential to a long-term sustainable flow of wood products and the maintenance of ecosystem diversity and productivity.

1. Indicator: Forest Wildfire Disturbance

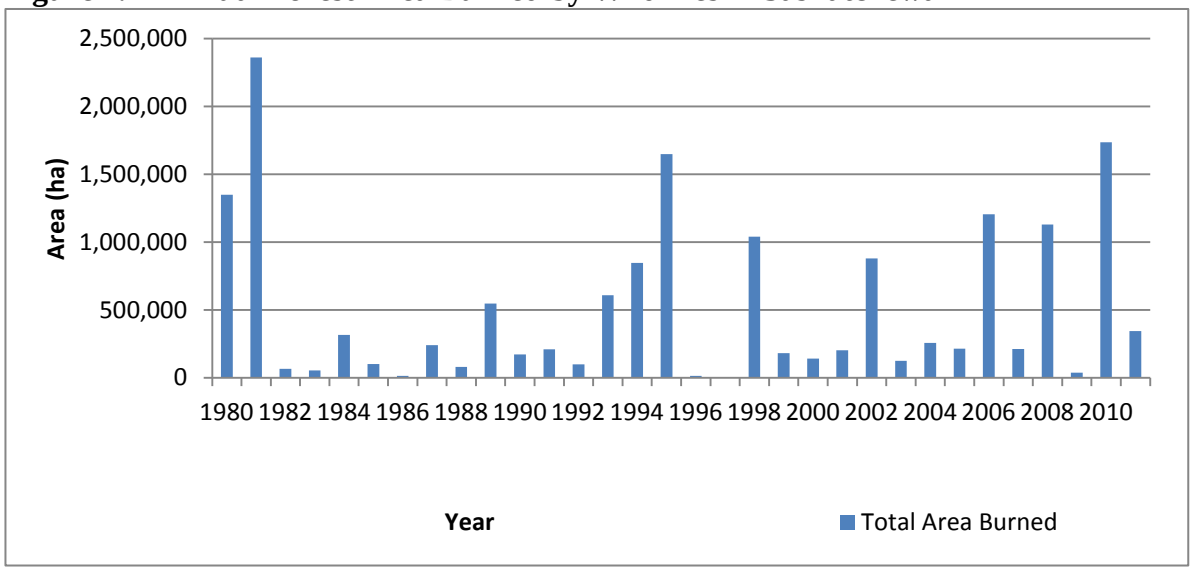
- **Why is this indicator important?**

Forest wildfires are the single largest source of natural disturbance in the boreal forest in Saskatchewan. Over time, burned over land create the mosaic of ecosystems and their associated biological diversity that characterize the forest and provide the landscape pattern for forest management. Tracking forest depletions due to wildfire is useful to determine the impacts to sustainable forest management.

- **What does this indicator show?**

Figure 1.1 shows the annual area of forest burned in Saskatchewan from 1980 to 2011. The total amount of area burned by wildfires each year is extremely variable. In some years, practically nothing burns, and in other years, over one million hectares can be affected. This variation can be largely attributed to annual variation in weather patterns, particularly with respect to precipitation and temperature. The commercial forest zone, the southern portion of the Northern Provincial Forest, the area south of the Churchill River but north of the Saskatchewan agriculture lands, receives significant attention for fire suppression activities. The ten-year average area burned for the full response zone is 140,880 ha and the ten-year average area burned for the modified response zone (the area north from the Churchill River to the border) is 473,220 ha. Collectively, these zones cover the entire Northern Provincial Forest.

Figure 1.1 Annual Forest Area Burned by Wildfires in Saskatchewan



Source: Forest Service GIS

- **What should we be concerned about?**

  - Preventing unnecessary human-caused wildfires
  - Increased threat of wildfire to settlement areas and commercial forest as wildland-urban interface area increases
  - A reduction in the Harvest Volume Schedule is possible after large wildfire events

Related Desired Future Forest Outcome and Strategies:

Outcome	Strategy
Sites that are ecologically sensitive are protected	To the extent possible, allow natural renewal processes, such as fire, to continue in ecological areas protected from human disturbance
Sustainable forest sector	Prevent and reduce risks to human health
Sustainable forest sector	Minimize volume losses to natural disturbance and ensure that wildfire suppression priorities coincide with industry priorities

- **What actions are being taken?**

  - The Wildfire Management Branch of the Ministry of Environment has adopted a number of wildfire management strategies in conjunction with forest fire management strategy zones. The objectives of the management strategies are: to continue to protect the things of value to people; to allow fire to play a more natural and beneficial role on the landscape; and to reduce the chances of incurring the extreme costs often associated with controlling all forest wildfires. The Wildfire Management Strategy Zones direct the way the province responds to wildfires. Many factors are considered when deciding what actions to take on any particular forest fire. The Ministry of Environment believes that healthy, vibrant forests that are naturally renewed by fire, or through forest harvesting practices that approximate the disturbance created by wildfire, are in the best interest of northern residents, businesses and the province. (Saskatchewan Ministry of Environment, 2011)

  - New forest fires are mapped every year, creating a database of landscape disturbances caused by fire in northern Saskatchewan for more than 60 years (Saskatchewan Ministry of Environment 2010c). This is an important planning tool for timber volume allocations and wildlife management.

  - Other elements of the wildfire strategy include daily reporting during the fire season, fire bans during periods of high fire risk, the operation and maintenance of weather and fire observation towers, wildfire education and prevention, and aviation operations.

2. Indicator: Forest Insect and Disease Disturbance

- **Why is this indicator important?**

Disturbance to Saskatchewan's forests by various insects and diseases also plays a significant role in forest composition and structure, and has a significant impact on sustainable forest management when there are outbreaks. There are a number of native species that serve as agents of change in the forest, such as forest tent caterpillar (*Malacosoma disstria*), large aspen tortrix (*Choristoneura conflictana*), eastern larch beetle (*Dendroctonus simplex*) and eastern spruce budworm (*Choristoneura fumiferana*) Eastern spruce budworm is a major insect pest that disturbs and damages spruce forests in Saskatchewan. Repeated moderate and severe defoliation by this caterpillar kills trees.

However, the effects of climate change and changes in annual weather patterns may be affecting the numbers and distribution of native and invasive forest pests. Range expansion and changes in biology and synchrony may cause their effects to be greatly magnified over time (Logan and Powell 2004).

In addition to spruce budworm, the most significant and potentially devastating forest insect threat to Saskatchewan's forests is mountain pine beetle (*Dendroctonus ponderosae*), which is presently only found naturally in Saskatchewan in the Cypress Hills area in association with lodgepole pine. In British Columbia this insect has killed millions of hectares of lodgepole pine forest and is moving eastwards, having reached Grande Prairie and east of Slave Lake in central Alberta where there are lodgepole pine and jack pine hybrid trees. Potentially, the mountain pine beetle could kill jack pine forests throughout Saskatchewan and right across to eastern Canada if it continues to spread eastward unchecked and becomes established in Saskatchewan's northern jack pine forests.

Mountain pine beetles attack pine trees by laying eggs under the bark. When the eggs hatch, the larvae excavate the phloem area beneath the bark and eventually cut off the tree's supply of waster and nutrients. The beetles also carry a fungus that causes dehydration and inhibits a tree's natural defences against beetle attacks. (BC Ministry of Forests, 2012)

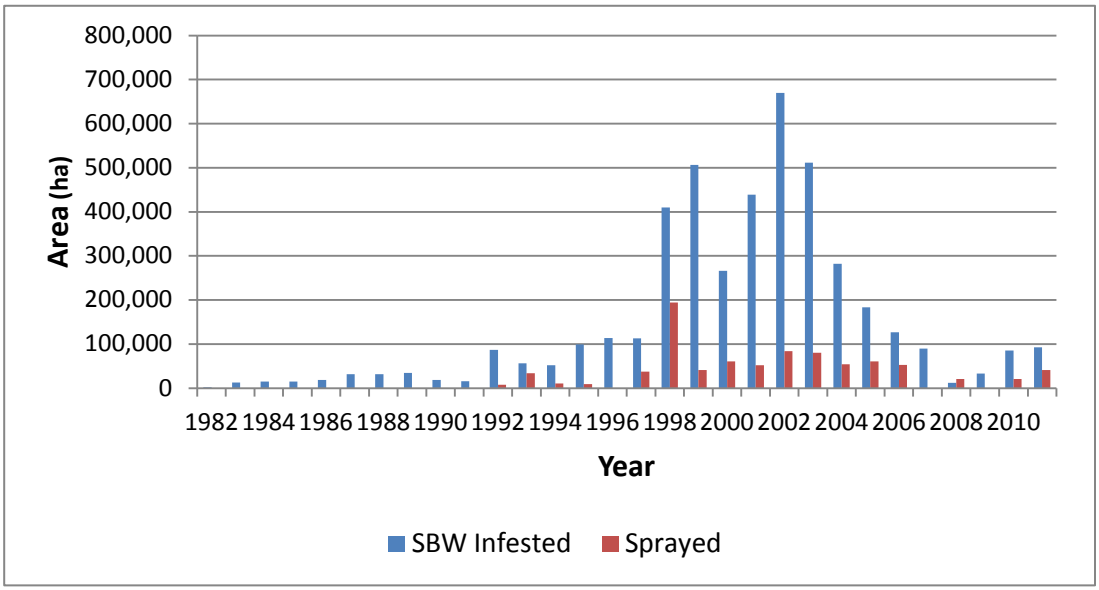
- **What does this indicator show?**

Figure 1.2 shows the annual area of forest infested by spruce budworm in Saskatchewan from 1982 to 2011. It also shows the annual area treated with the natural insecticide *Bacillus thuringiensis var. kurstaki (Btk*) in efforts to control the outbreak of the insect and to preserve high value merchantable forest stands.

Spruce budworm is a periodic forest disturbance agent; outbreaks in eastern Canada typically occur on 30 to 35-year cycles. A substantial outbreak of spruce budworm occurred within Saskatchewan's forests between 1996 and 2005. The Ministry of Environment began spraying affected areas with Btk as early as 1992 in hopes of

minimizing the area affected. However, area sprayed is relatively small in comparison to the total area under attack. The infestation reached its peak in 2002 and returned to pre-outbreak levels in 2008. The ten-year average of moderate and severe defoliated area within the commercial forest zone is 208,737 ha.

Figure 1.2 Annual Area Infested by Spruce Budworm and Sprayed



- **What should we be concerned about?**
    - Spread of invasive insects like mountain pine beetle into jack pine forests
    - Losing economically viable trees due to insect and disease outbreaks
    - The effects of climate change may affect the numbers and distribution of native and invasive forest pests
    - A surge then a reduction in the Harvest Volume Schedule due to potentially vast numbers of trees killed

Related Desired Future Forest Outcome and Strategies:

Outcome	Strategy
Productive biologically diverse forests	Minimize the impacts of invasive forest associated species
Resilient forest in the face of climate change	Respond to increased insect and disease problems related to climate change
Sustainable forest sector	Minimize volume losses to natural disturbance

- **What actions are being taken?**

    - The ministry has prepared a draft Forest Insect and Disease Action Plan for Saskatchewan. The plan sets the strategic and tactical framework for monitoring and mitigating insects and diseases in the province.

    - Spruce budworm defoliated areas are mapped each July, using aerial surveys followed up by ground surveys. Predictions of defoliation for the following year are determined by sampling over-wintering larvae in the autumn. The spruce budworm management program uses specific criteria in selecting areas for treatment with the objective of keeping economically valuable trees green so they can be harvested within six to 20 years. If required, aerial spraying of the biological pesticide Btk to kill spruce budworm occurs during late May or early June.

    - Saskatchewan has banned the import, transport and storage of pine forest products with bark attached from British Columbia, Alberta and the United States to reduce the risk of inadvertently transporting mountain pine beetles into Saskatchewan's northern forests.

    - Mountain pine beetle aerial surveys and ground-truthing activities have been completed on jack pine stands within the northern commercial forest and on Lodgepole pine in the Cypress Hills Inter-provincial Park. Fall and burn activities have taken place in the Cypress Hills Inter-provincial Park where lodgepole pine and mountain pine beetle have coexisted.

    - Pine forest inventory information in the transitional agriculture lands south of the Crown forest have been collected and linked to the provincial inventory so that the disturbance and extent of susceptible forests can be used in risk analysis.

    - Saskatchewan and Alberta have entered into a Memorandum of Agreement to implement a co-ordinated approach to slowing the eastern spread of mountain pine beetle. Under this agreement the province is investing money to combat mountain pine beetle infestations in east-central Alberta to deter the spread into jack pine in Saskatchewan's northern forests.

    - Manage the provincial forest to a variety of age classes in order to keep the forest healthy and more resilient; older forests are more prone to insect and disease infestations.

3. Indicator: Proportion of Sustainable Harvest Level Utilized

- **Why is this indicator important?**

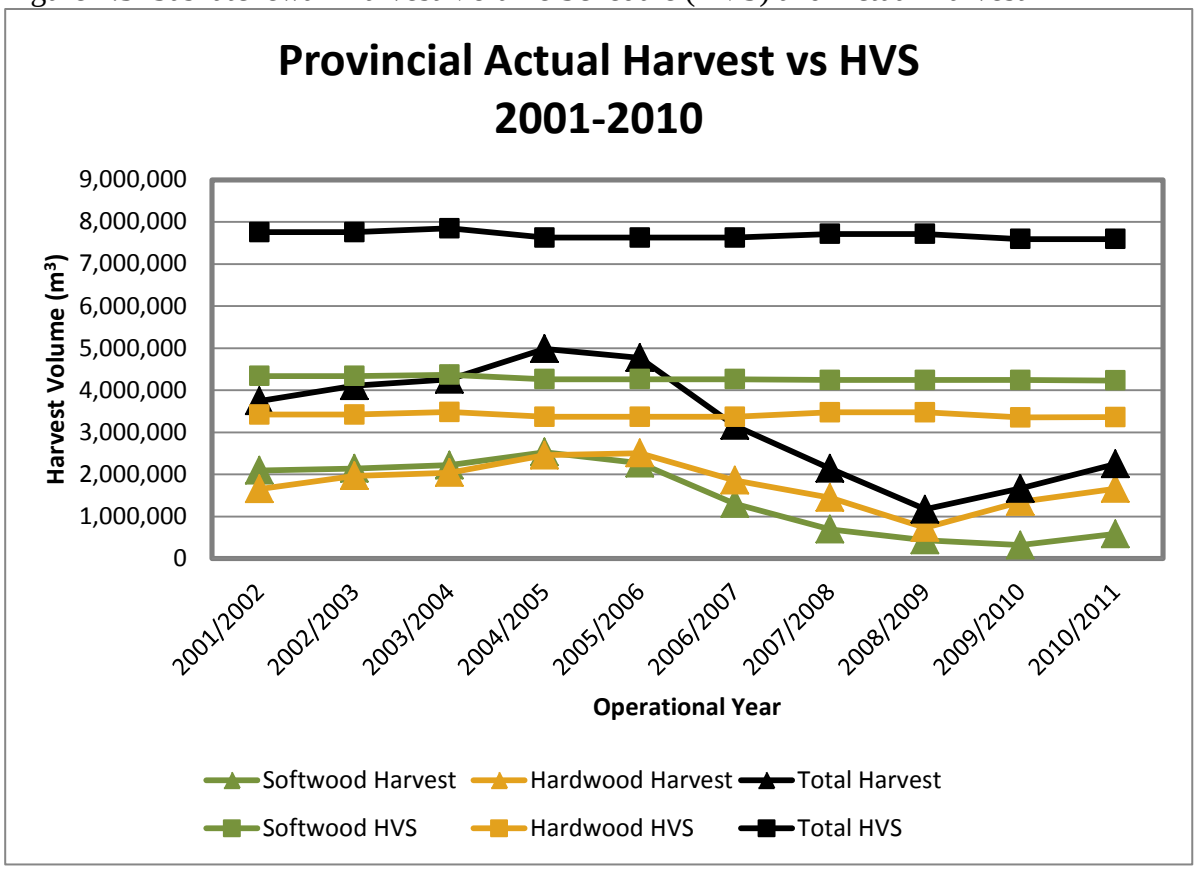
Annual sustainable timber harvest is called Harvest Volume Schedule (HVS) in Saskatchewan, or Annual Allowable Cut (AAC) in other jurisdictions. The HVS is determined for a licence area, based on sustainability assessments of economic, social and environmental values as processed through forest estate models over a 200-year timeframe. Keeping the annual harvest level under (or equal to) the HVS is one of the principles for sustainable forest management.

- **What does this indicator show?**

Figure 1.3 shows the total annual calculated HVS relative to the actual total annual volume of timber harvested including the softwood and hardwood split from 2001/2002 to 2010/2011 for Saskatchewan's commercial forests. For comparison with natural disturbances, the 10-year average harvested area within the commercial forest zone is approximately 21,000 hectares.

The HVS for Saskatchewan's forests has been relatively constant between seven and eight million cubic meters of timber per year. Each licensed forest area (forest management agreement areas and area-based term supply licence areas) have an HVS calculated for them. While the forest could sustain this harvest level, in the northern portion of the commercial forest zone the lower quality of wood, higher harvest and transportation costs, and limited infrastructure will affect how much of the available volume is realized. The actual amount of timber harvested each year has been far less than the HVS and has even declined recently, largely as a result of depressed forest products markets and the global recession.

Figure 1.3 Saskatchewan Harvest Volume Schedule (HVS) and Actual Harvest



- **What should we be concerned about?**
    - The impacts to social and economic benefits due to under harvesting the HVS
    - Although the HVS may be under utilized overall, we need to avoid over-harvesting specific species or forest types
    - Maintaining reliable forest inventories since they are used by computer modeling to determine the HVS
    - Maintaining a healthy competitive forest industry in the province

Related Desired Future Forest Outcome and Strategies:

Outcome	Strategy
Sustainable forest sector	Encourage products and business diversification
Sustainable forest sector	Encourage sustainable utilization of biomass
Sustainable forest sector	Maintain reliable forest inventory for informed decision making
Productive biologically diverse forests	Maintain the composition of forest types within the natural range of variation
Productive biologically diverse forests	Approximate natural disturbance patterns more closely

- **What actions are being taken?**

    - A new standard is under development under the Saskatchewan Environmental Code for 20-year forest management plans, which will ensure sustainable harvest levels are consistent with long-term management objectives for a variety of environmental, economic and social forest values. This standard will also improve the accuracy of long-term timber supply forecasts.

    - The Ministry of Environment supports the efforts by the Ministry of Energy and Resources to revitalize the forest industry with the long-term goal of full utilization of the HVS.

    - The assignment of the Pasquia-Porcupine Forest Management Agreement (FMA) area to Edgewood Forest Products and Weyerhaeuser was completed in October 2009.

    - The assignment and amending agreements for the Prince Albert FMA area were signed in October 2010 with Sakâw Askiy Forest Management Inc. (Sakâw). The partnership company includes: two First Nations groups (AC Forestry Limited and Montreal Lake Business Ventures Inc.) and six forest companies (Carrier Forest Products Ltd., Edgewood Forest Products Inc., L&M Wood Products Limited Partnership, Meadow Lake Mechanical Pulp Inc., Meadow Lake OSB Limited Partnership, and NorSask PA Forestry Inc.).

    - Additional volume in the Prince Albert FMA will be allocated to independent timber operators through a formal Request for Proposals process. The Forest Service is finalizing the allocation of timber to independent operators through the issuance of Term Supply Licences and permits.

    - Wood supply analyses were completed and harvest volume schedule reports were prepared in 2011 for the following timber supply zones: North West Communities, Kitsaki-Zelensky, and Mee-Toos.

4. Indicator: Forest Regeneration

- **Why is this indicator important?**

Measures of reforestation are important because forests not sufficiently renewed to maintain their long-term productivity lose their commercial value, leading to socio-economic impacts on northern communities. Improperly renewed forests may also be ecologically different from forests prior to being harvested.

- **What does this indicator show?**

Table 1.4 shows, for each timber licence area in Saskatchewan, the area of forest harvested and the proportion that is 'sufficiently regenerated' (SR) following re-forestation efforts. Sufficiently regenerated means 80 per cent of the available growing area is occupied with trees at least 30 cm tall at seven years of age (or 1.5 m tall at 14 years of age). It should be noted that most forests not sufficiently regenerated (NSR) according to this definition are still functioning boreal forest ecosystems, containing significant numbers of trees and wildlife habitats. However, low stocking levels in these areas diminishes their commercial timber value, and for this reason they are designated as NSR. The table also shows who is responsible for the NSR areas. (Saskatchewan Ministry of Environment, 2011)

Overall, approximately 96.8 per cent of harvested forest areas in Saskatchewan have been successfully regenerated. Areas with the lowest proportions of successfully regenerated forests are the Island Forests, especially Fort-a-la-Corne, and the Pasquia-Porcupine FMA area. Most NSR forestlands in the province pre-date the establishment of FMAs and are therefore the responsibility of the government to restore to SR status.

Table 1.4 Saskatchewan Forest Harvest and Regeneration -March 31, 2012 Status Report

Licence Area	Harvest Period	Harvest Area (ha)	Sufficiently Regenerated Area (ha)	NSR (ha)	Sufficiently Regenerated Area (%)	Responsibility for Not Sufficiently Regenerated Areas
Pasquia Porcupine FMA[1]	1995-2010	75,404	74,409	500	98.7	Industry
Pasquia Porcupine FMA[1]	Pre-1995	225,231	221,836	4,300	98.5	Government
Prince Albert FMA[1]	1987-2010	156,504	154,000	54	98.4	Industry
Mistik FMA[1]	1984-2008	125,558	124,858	360	99.4	Industry
L&M FMA[2]	1987-2007	8,794	8,794	0	100	Industry
Mee-Toos TSL[2]	1999-2008	3,195	2,767	168	86.5	Industry and Government

Kitsaki-Zelensky TSL[2]	1999-2008	2,645	2,513	132	95	Industry and Government
North West Communities TSL[2]	2002-2008	237	225	12	94.9	Industry
Island Forests[1]	Pre- 2008	28,325	16,466	3,500	58.1	Government
Meadow Lake OSB TSL[2]	2003-2010	4,805	4,805	0	100	Industry
Totals		**630,698**	**610,673**	**9,026**	**96.80%**	

[1] Numbers include regeneration surveys and estimates
[2] Numbers are estimates only

- **What should we be concerned about?**

  - Insect and disease, blowdown and wildfire damage to renewing stands
  - Government not to lose sight of resourcing backlog renewal efforts
  - Compliance with regeneration standards
  - Rates of successful regeneration are in line with HVS modeling assumptions

Related Desired Future Forest Outcome and Strategies:

Outcome	Strategy
Productive biologically diverse forests	Renew provincial forests promptly and address not-sufficiently regenerated (NSR) land
A resilient forest in the face of climate change	Adopt flexible policies related to regeneration
The cumulative impacts of multi-sector developments on forest lands are mitigated	Reclaim and renew identified linear developments and other industrial disturbances to a defined forest condition
Compliance to environmental and forestry regulations	Co-operatively work with licensees to achieve compliance with applicable operational standards and recognize industry performance

- **What actions are being taken?**

  - To address government renewal obligations on the Pasquia-Porcupine FMA area, stand tending activities will continue to be undertaken; funding for stand tending has increased significantly in 2012/13. In 2011/12 aerial surveys of the renewal success of older plantations were carried out.

  - Remaining renewal responsibilities of the previous Prince Albert FMA holder were determined and have been assumed by the new licensee, Sakâw Askiy Management Inc., where much of the work has now been completed.

- To address government renewal obligations on the Island Forests, tree planting and site preparation activities commenced in 2011 along with a reassessment of regeneration surveys to better direct renewal efforts in subsequent years. The areas needing renewal in the Island Forests are primarily due to a series of fires in the forest in the early 2000's impacting young plantations. Natural regeneration of the forest following fire did not occur, leaving areas that require remedial treatment. Approximately two million trees have been planted in the Island Forests in 2012/13. The ministry anticipates that all treatable NSR areas in the Island Forest will be planted over the next few years.

- To assess industry performance against forest management plan assumptions and commitments, audits of regeneration surveys have been undertaken on the Mistik and L&M FMAs in 2011/12. This will supplement audits of annually submitted regeneration surveys on other FMAs and Term Supply Licence (TSL) areas. 2012/13 will see the audit of regeneration surveys within the Prince Albert FMA.

- Current standards for regeneration are being incorporated into the new Saskatchewan Environmental Code to be implemented in the fall of 2012. The code sets out results-based objectives for assessing forest regeneration.

Conclusion

The indicators reported on in this report can stand alone or be viewed as an integrated set that incorporates and reflects on the current status of sustainable forest management in Saskatchewan. Boreal forests are very dynamic ecosystems, constantly changing in response to landscape level natural disturbances such as wildfires and insect outbreaks. As a result the forest ecosystem landscape becomes a mosaic or patchwork of habitat types. All boreal forest species have evolved in concert with this ever changing landscape.

There is a growing consensus among scientists and foresters that by conducting forest management that more closely emulates the natural pattern and young forest stand structure caused by natural disturbance, there is a reduced risk of creating undesirable effects, such as the loss of forest biodiversity. The Saskatchewan focus on using natural forest patterns to direct forest management creates landscapes that more closely resemble those naturally found in the boreal forest and should provide sufficient habitat for all forest species, including species like the woodland caribou (Saskatchewan Ministry of Environment 2009).

It is also important to understand that natural forces continue to affect the forest, hence the need to monitor and measure the effects of both wildfires and insect damage. Effects of both fire and insects and disease disturbances serve to renew vast areas of forest,

although the amount varies widely from year to year. The effects of natural disturbances need to be factored into the calculation of HVS. In the commercial forest zone older forests are present in amounts greater than what would likely occur under normal circumstances. This is mainly due to several decades of forest fire management and harvest levels lower than the available Harvest Volume Schedule (HVS)

Nonetheless, there are challenges and opportunities to improving forest management. The program to replant historic not sufficiently regenerated (NSR) lands is one example where government is taking action. Blowdown events are emerging as a dominant change agent and will be explored in future reports. Today there is great uncertainty how climate change will affect natural disturbance regimes and the renewing of the forest.

Appendix A

Saskatchewan Forest Service Twelve Desired Future Forest Outcomes

1. Productive biologically diverse forests
2. Maintain natural hydrology
3. Resilient forest in the face of climate change
4. Mitigate cumulative impacts of multi-sector developments on forest lands
5. Protect sites that are archaeologically, culturally, historically or ecologically sensitive
6. Respect Aboriginal treaty rights and community needs
7. Sustainable forest sector
8. Maintain non-timber uses of the forest
9. Compliance to environmental and forestry regulations
10. Forest management values are accommodated fairly and consistently
11. Timely and accurate collection of royalties
12. Improved client service satisfaction

References

British Columbia Ministry of Forests, Lands and Natural Resource Operations website, Frequently Asked Questions website, 2012. http://www.for.gov.bc.ca/hfp/mountain_pine_beetle/faq.htm#3

Logan, J. A., and J. A. Powell. 2004. Ecological consequences of climate change altered forest insect disturbance regimes. *In* F. H. Wagner (ed.), Climate change in western North America: evidence and environmental effects. Allen Press, Lawrence, Kansas. http://www.usu.edu/beetle/documents/Logan-Powell2005.pdf

PARC (Prairie Adaptation Research Collaborative). 2010. Research summary documents. http://www.parc.ca/research_summaries.htm

Saskatchewan Ministry of Environment. 2009. Saskatchewan's 2009 State of the Environment Report: State of Saskatchewan's Provincial Forests. http://www.environment.gov.sk.ca/soereport

Saskatchewan Ministry of Environment, 2011. 2011 State of the Environment Report. http://www.environment.gov.sk.ca/soereport2011

Saskatchewan Ministry of Environment. 2010c. Forest Fire History 1945-2009. http://www.environment.gov.sk.ca/adx/aspx/adxGetMedia.aspx?DocID=d7089209-a346-4059-9e76-201b613ae624&MediaID=3450&Filename=Fire+History+1945-2009+Map.pdf&l=English

Saskatchewan Ministry of Environment, 2003. Status and Conservation Management Framework for Woodland Caribou in Saskatchewan. Saskatchewan Environment Fish and Wildlife Technical Report 2003-03.