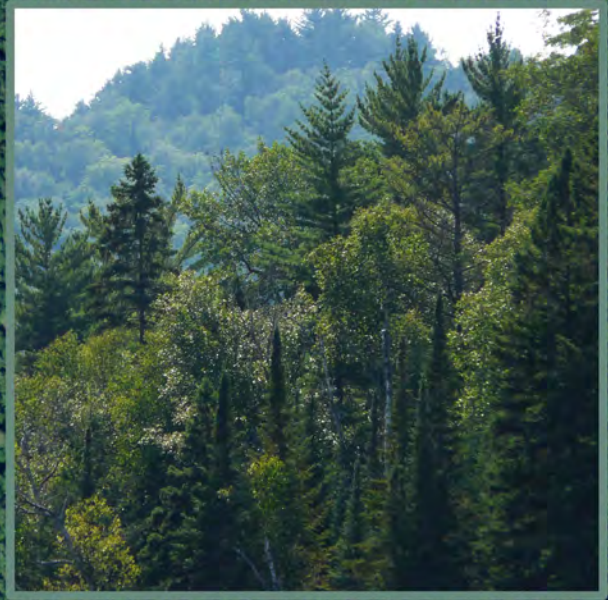
Ministry of Natural Resources

Ontario

Natural. Valued. Protected.

The Forest Resources of Ontario 2011



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Foreword

"The Forest Resources of Ontario" (FRO) has been produced since the 1920s. Each version of the FRO builds on the previous in response to improved information and user feedback. This version is contains more maps and greater detail that responds to the questions received about Ontario's forests.

The accuracy of FRO 2011 has been enhanced by current forest resources inventory (FRI) data, satellite imagery, and other mapping information. Significant MNR projects, such as the Southern Ontario Land Resource Information System (SOLRIS), provincial land cover updates, and a preview of the new enhanced Forest Resources Inventory (eFRI) are included.

This version of the report is digital, allowing for greater freedom in volume and content. Detailed summaries are available for more geographic areas complete with full colour photos and examples.

The Forests Branch notes the contribution of MNR district and Regional staff and forest industry partners for providing forest resources and annual report information. The remote sensing staff in Peterborough for providing satellite (land cover) imagery for provincial summaries. This report is compatible with the 2001 and 2006 versions of FRO.

Introduction

This document is the latest installment in a series of forest statistics documents that have been published since the 1920s. Forest Resources of Ontario 2011 provides a comprehensive overview of Ontario's forests. Statistics describing the area of land and water, forest types and the distribution of tree species across the province are summarized in the form of tables, charts and colour maps.

General Statistics

- Ontario is 107,636,418 hectares in total area*
  - or 266.0 million acres or 415,587 square miles

- 86.6% of Ontario is Crown or publicly owned (93.2 million ha)
  - 9.1% is within existing or proposed Parks and Protected Areas (9.7 million ha)
  - 77.6% is unregulated Crown land** (83.5 million ha)
  - 13.4% of Ontario is Federal, First Nations or privately owned (14.4 million ha)

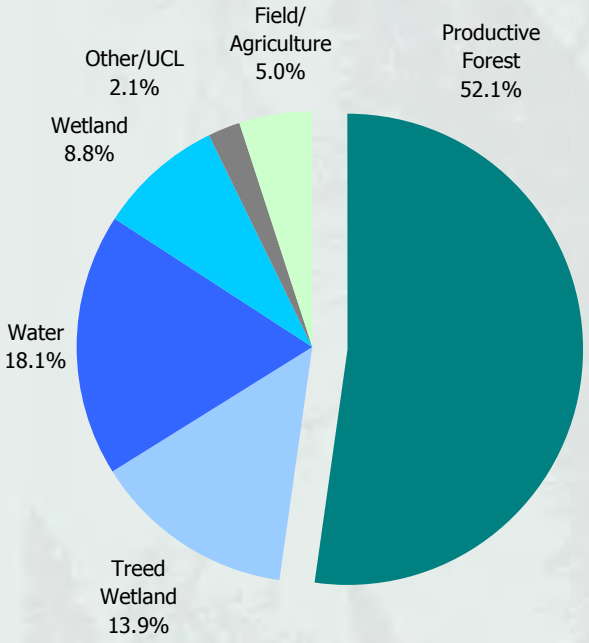
- 66% of Ontario is forested land (71.1 million ha)
  - 52% is productive forest (56 million ha)

- 18.1% of Ontario is water (19.4 million ha) of which 8.7 million ha is the Great Lakes
- 8.8% of Ontario is wetland, marsh and open bog (9.5 million ha)
- 13.9% of Ontario is forested wetland or treed bog and swamp (15.0 million ha)
- Forest management occurs on 40.7% (43.8 million ha) of Ontario
- 37.1% of Ontario's Crown forest is managed for forestry (26.4 million ha)

- Ontario's most common tree is the black spruce (37.2% of all growing stock)
- The sugar maple is Ontario's 6th most common tree (4.1% of all growing stock)
- There is over 7.1 billion cubic metres of growing stock (tree volume) in Ontario
- Ontario has approximately 85 billion trees
- 61% of Ontario's forests are in the mature to late successional seral stage

** total area is calculated in a set projection based on best available data*

*** unregluated Crown land in this document is publicly owned land not within Parks or Protected Areas*



Area by Land Class

Table of Contents

Chapters by Page Number

The table of contents allows for quick navigation of this report. Each chapter has a topic index page as well. Users can click the Home icon on the upper right of most pages to return to the main index.

The page numbers in this pdf match the index numbers so users can utilize the pdf "go to page" function.

The geographic profiles chapter has been separated as an appendix to the main document. These profiles highlight various geographic zones such as forest region or ecozones.

Main Chapter

Table of Contents

Interactive Index - Table of Contents

Click on any of the main index icons shown below to go to each main chapter index. These link to individual topics or pages.
Your mouse icon will change to a hand when you are over the navigation icon.

Click the home icon (upper right)
to return to this page at any time.

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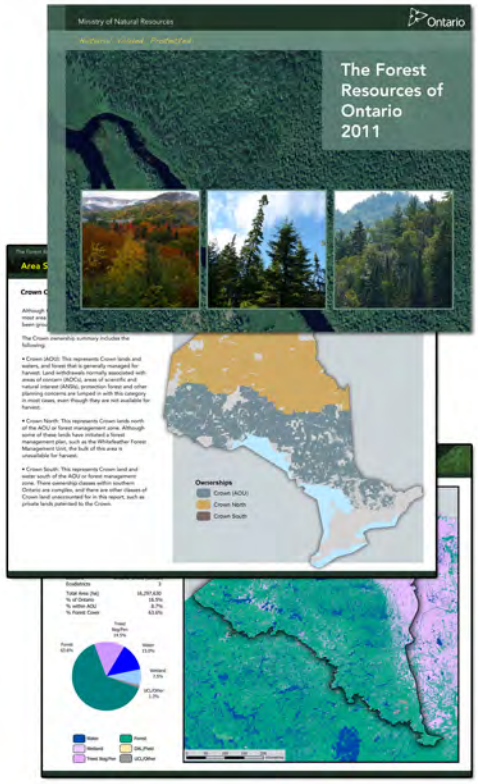

select a chapter

Physical Context/Geography

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Interactive Chapter Index

The physical geography of Ontario is complex. Many factors affect the growth and distribution of forests. This report highlights the physical features and characteristics that significantly affect forests including geology, soils and climate.

select a topic

Geographic Context

Canada occupies over 998 million hectares of the earth's surface and includes more than 400 million hectares of forests. This represents about 6% of the world's forests. Ontario has over 71 million hectares of forest – 2% of the world and 17% of Canada's. There are 10 hectares of land and water for every citizen of the province, 6.5 hectares is forest.

Ontario's forests cover a land area equivalent in size to the landmasses of Germany, Italy and the Netherlands combined, with 56 million hectares of productive forest covering an area roughly equivalent to the area of France.

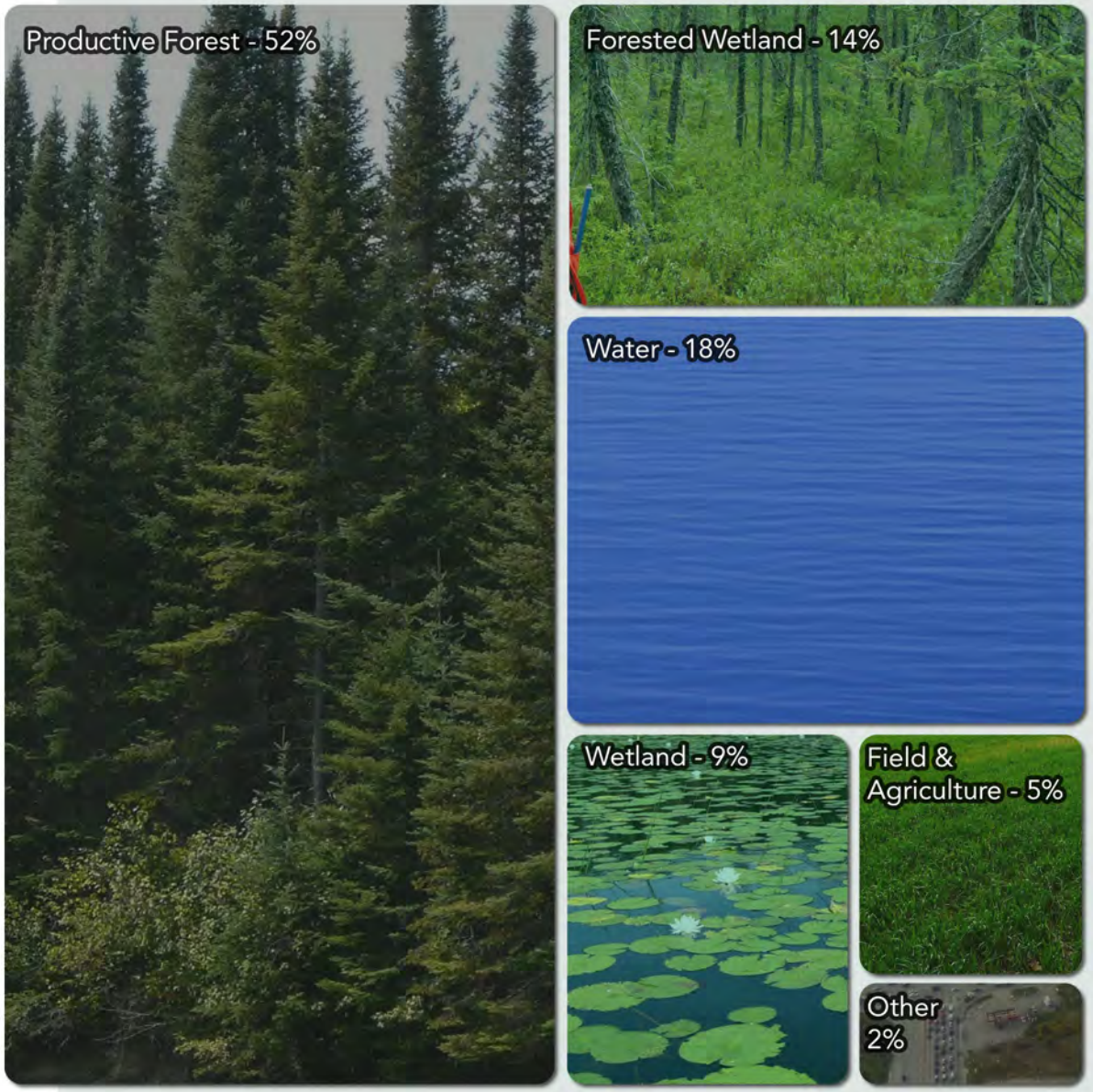
Ontario's landscape is dominated by forests, lakes and wetlands. Most citizens of Ontario are very familiar with the southern portions of the province which contain a mixture of small patches of forest, agricultural lands and urban areas. In reality, that image of Ontario represents only about 7% of the province. The rest of Ontario is dominated by vast tracts of forest.

Geographic Context

To put Ontario's land base into a simpler context, the diagram at right shows broad land classes and proportions in a histogram. Forests, both non-productive (treed bog and treed fen) and productive, make up 66% of the province. This is significantly higher than the Canadian total, which is only 42%. Each of these land classes will be further discussed in this report.

Land classes are not the only way to partition Ontario. Depending on the context, there are numerous of ways of viewing pieces of the province. Some of the sub-divisions that will be highlighted in this report are:

- forest regions
- ecological regions
- administrative regions
- management zones



Area by Satellite Land Class in Ontario

Physical Geography

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The physical geography of Ontario is complex. Many physical factors, for example geology, soils and climate affect the growth and distribution of forests in the province are described here.

Geology

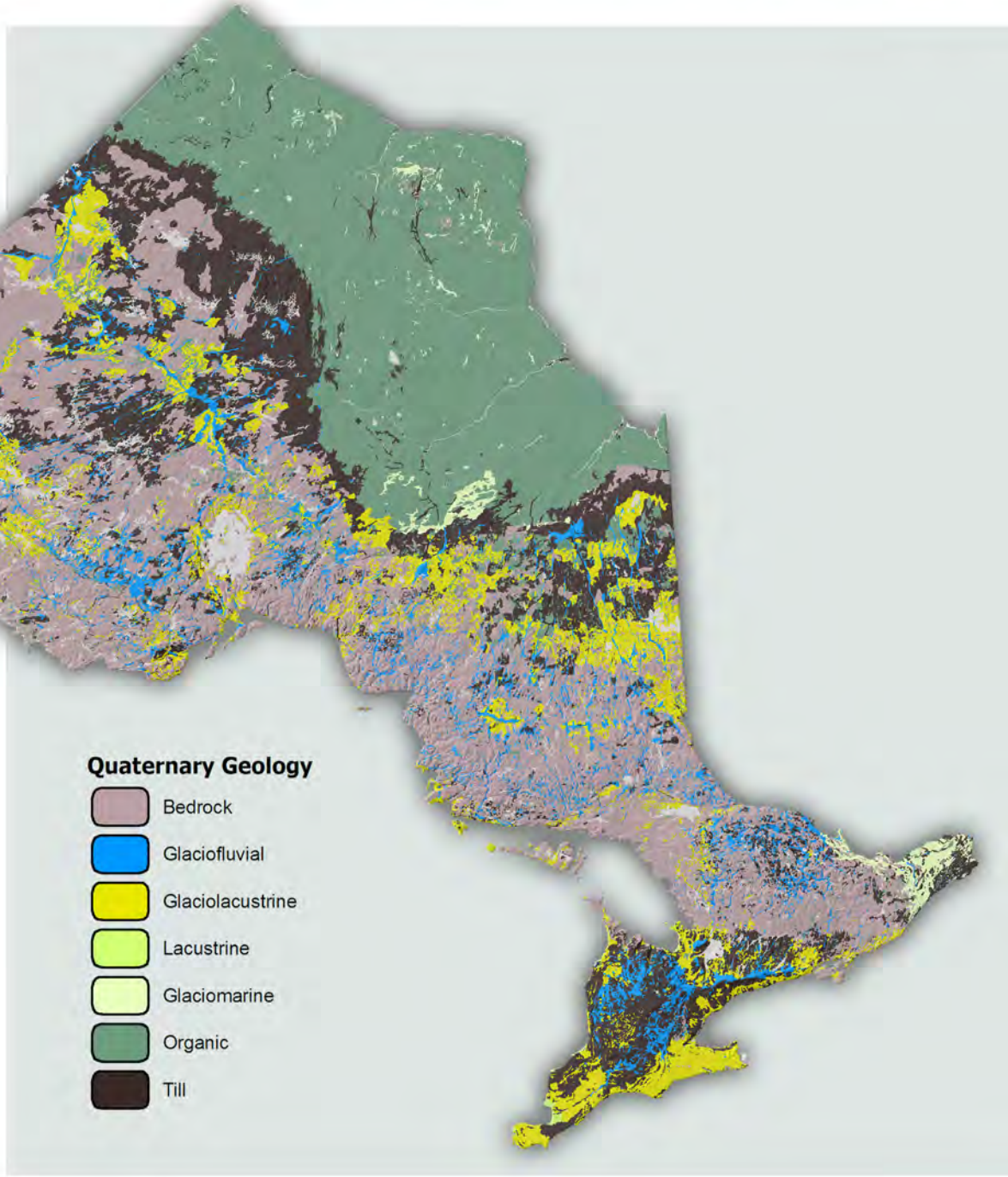
Ontario lies on a foundation of bedrock and sedimentary rock that are among the oldest in the world. The Cambrian Shield (often referred to as the Canadian Shield) is dominated by shallow soils and granite bedrock that stretch from the northern end of the Great-Lakes St. Lawrence forests through to the Hudson Bay Lowlands. There are two portions to the shield. One is estimated to be over 2.5 billion years old, formed during the Archean Era. The other found in the Lake Nipigon and Sudbury-to-Kemptville area was formed in the Proterozoic Era, is over 680 million years old and covers 11% of the province. Combined, these two areas account for 66% of Ontario's area. They contain approximately 86% of Ontario's productive forests.

Physical Geography

North and south of the Cambrian shield lies areas of carbonate or limestone sedimentary rock formed during the "Phanerozoic" Era, specifically the "Silurian" Period over 438 million years ago. Both of these areas contain much less productive forest than the shield, but for very different reasons. The Hudson Bay Lowlands have strong influences of climate and organic soil cover that limit forests to mostly slow growing black spruce. Southern Ontario, in comparison, is a highly productive area that has surrendered its hardwood forests to agriculture and urban settlement.

Ontario's quaternary geology ("quaternary" is a division of time that covers the last two million years through to today) has been heavily influenced by successive periods of glaciation.

Approximately 12,000 years ago, the last major glacial advance extended in several major lobes across Ontario (the Laurentide ice sheet). The retreating ice sheet deposited materials of many types across their range. The map at right shows a provincial overview of our current surficial geology. The most common material deposited was till, or mixture of unsorted and unstratified clay, silt, sand gravel and boulders. Fluvial and lacustrine features were deposited by water (river or lake) and organic deposits are areas of very deep peat or sphagnum.



Physical Geography

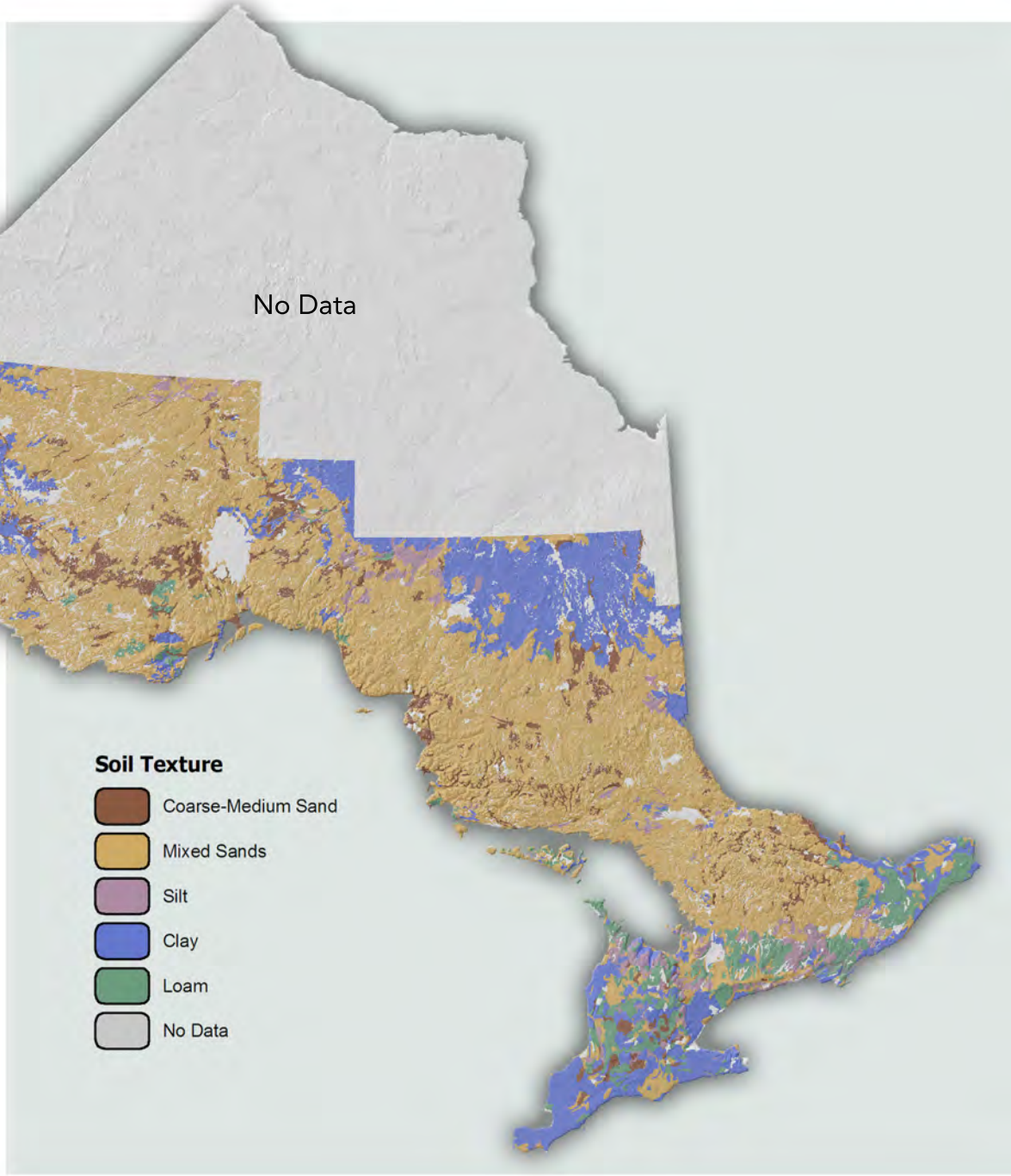
Soils

Soils are an important factor affecting tree species distribution and growth. Each tree species in Ontario has site specific soil requirements. Surficial geology maps and data indicate the majority or dominant soil types existing within each zone. Variations can occur within those zones. There are three major sources of soils data used in this report:

- The Canadian (Ontario) Land Inventory (OLI), based on 1:250,000 inventories conducted in the early 1970s.
- The Northern Ontario Engineering Terrain Study (NOEGTS), surficial geology & soils data, based on detailed air photo interpretation conducted in the late 1970s.
- The Surficial Geology of Southern Ontario, based on Geological Survey of Canada data.

All studies cover slightly different areas, and were generated at slightly different resolutions. Several maps summarizing these layers are featured in this report.

The relationship between forest soils, climate and forest vegetation is known to be important to forest management. Starting in 1999, the MNR began photo interpreting broad forest ecosystem classification (FEC) types along with stands of trees in the forest resources inventory (FRI).



Physical Geography

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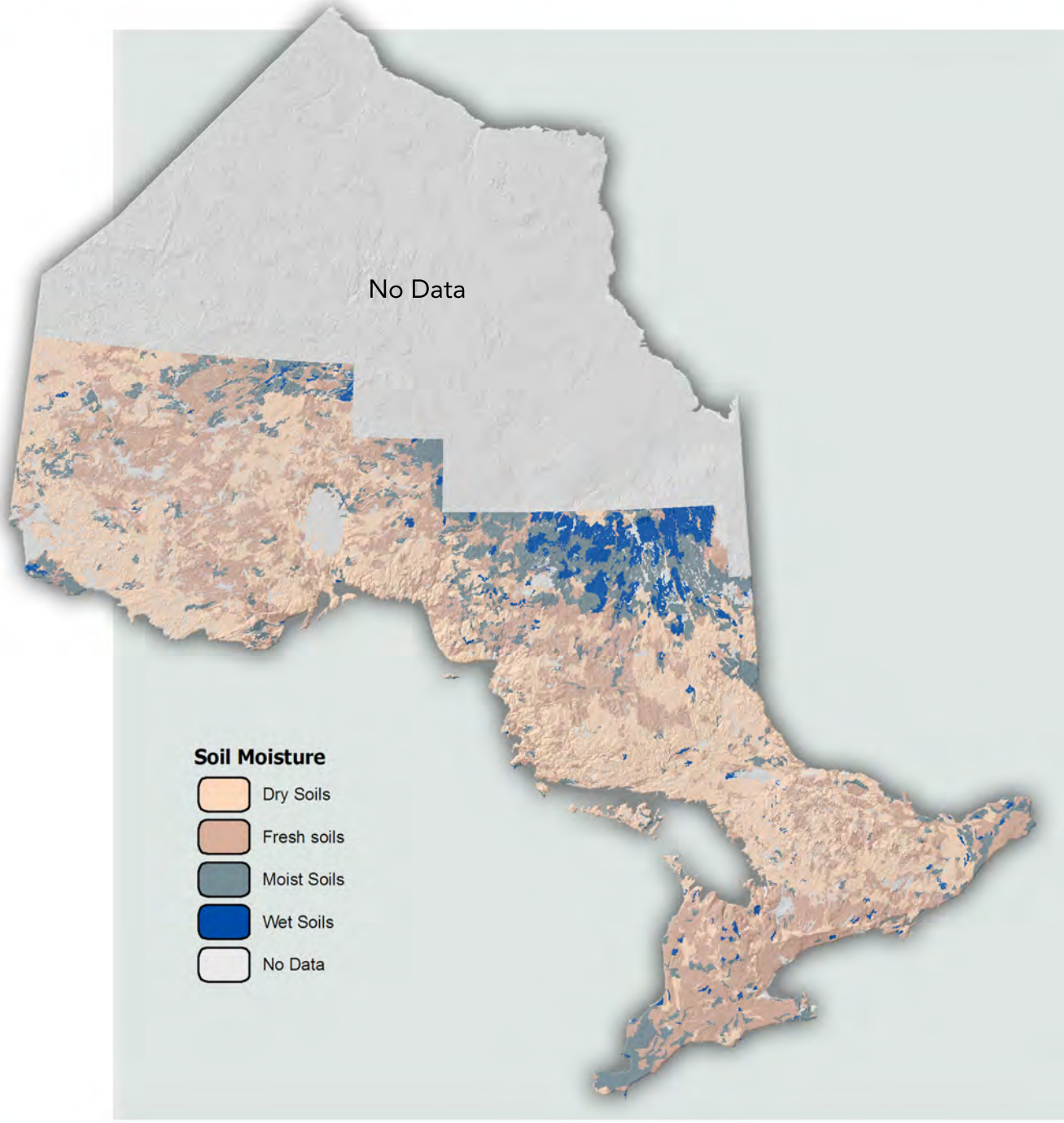
Soil depth, texture and moisture class are key characteristics in identifying ecosystem types. Ecosystem type is a further refinement/classification of stand level forest inventories.

This version of Forest Resources of Ontario uses an aggregation of ecosystem types to develop a more meaningful summary of forest information based on these new FEC inventories and other available information.

As an example, black spruce can occur on many soil types but dominates the clay belt area in the northeastern part of Ontario because of its ability to grow on wet clay sites. Jack pine grows best on dry to fresh sandy sites. Utilizing all soils and ecosite information, provincial forest types are determined.

The maps on these two pages show soil texture and moisture for most of Ontario based on the Ontario Land Inventory data. The abundance of dry to fresh sandy soils is evident across the boreal forest, and generally coincides with soil depth, as these sites are very often shallow soils over bedrock. The occurrence of jack pine and balsam fir on these sites is dramatically higher than wet or clay based sites. The area of clay and wet soils in the upper reaches of the northeast region, also know as the clay belt is very visible on these maps. This area is dominated by black spruce lowlands with smaller amounts of poplar and larch.



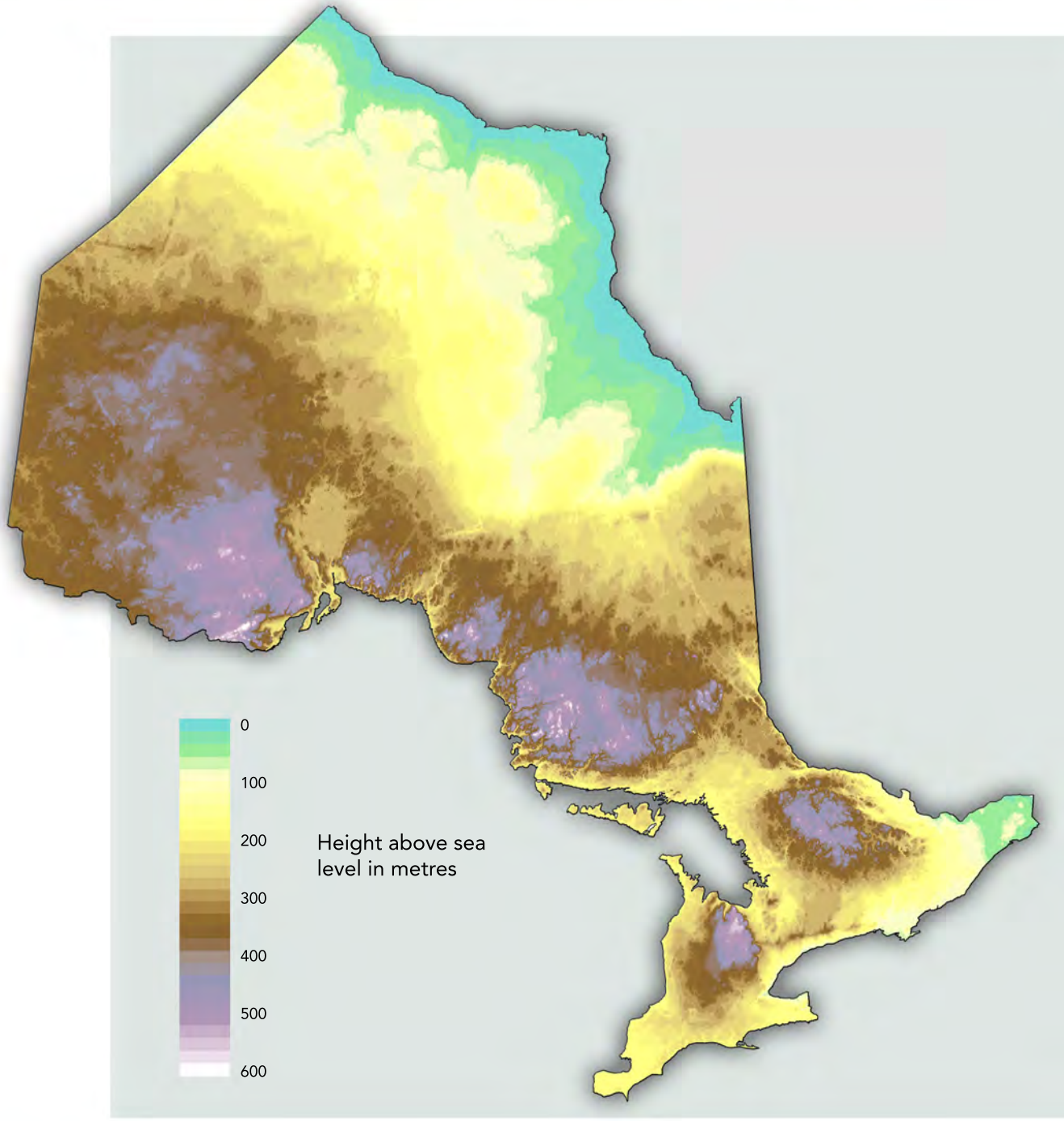
Physical Geography

Topography

Ontario topography is varied, with rolling hills and rugged uplands northwest and east of Lake Superior and flat lowlands in the far north along the Hudson and James Bay coastlines. The average elevation across the province is approximately 220 metres and reaches a maximum height of nearly 700 metres.

The average height of southern Ontario is approximately 200 metres with peaks of 450 metres on portions of the Niagara Escarpment. Lake Ontario sits at 75 metres above sea level.

The highest point in Ontario is Maple Mountain in Lady Eveyln Smoothwater Park near Temagami, which is 693 metres above sea level. Other peaks near Sault Ste. Marie and Thunder Bay reach the 650 metre mark.



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Climate

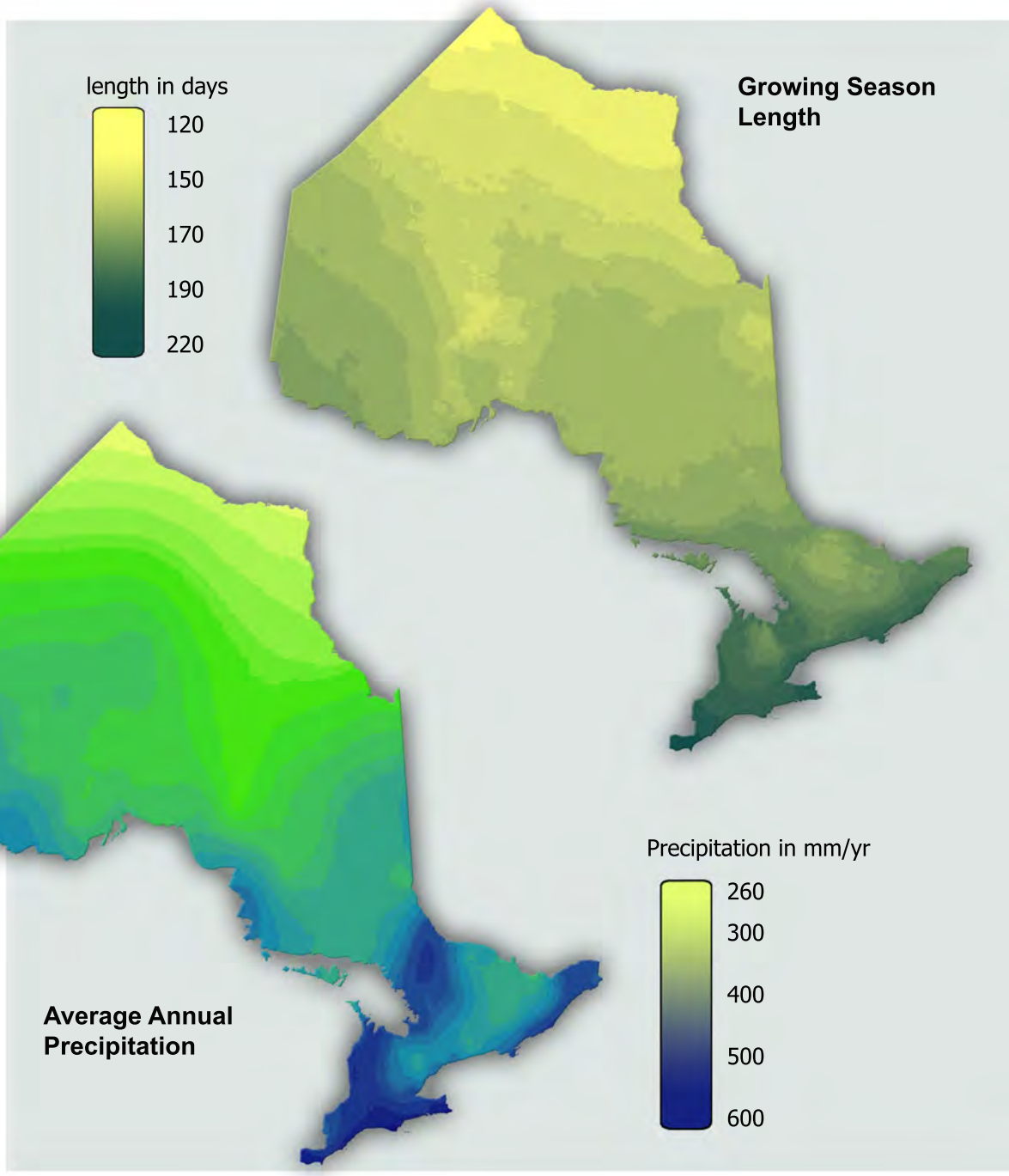
Climate influences Ontario's forests in a complex pattern. The interaction of climatic factors and soil characteristics has dramatic impact on the tree species found in any given area. Ontario's climate is most affected by cold polar air from Hudson Bay and the prairies, and warmer air from the Gulf of Mexico. The Great Lakes also have a profound influence on Ontario's weather as can be seen in the following climate maps.

Growing Season Length

One physical factor affecting Ontario's forests is the length of the growing season. The map at right shows the average annual growing season length in days from 1971 to 2000. The transition in growing days from north to south, which very nearly doubles as it reaches southwestern Ontario, highlights the wide range of latitude that Ontario covers.

Precipitation

Annual precipitation is another major physical factor affecting Ontario's forests. The precipitation map at right shows the average annual precipitation in millimetres per year from 1971 to 2000.



Physical Geography

Seasonal drought also affects distribution of some tree species. Species such as jack pine can thrive in the drier regions of northwestern Ontario, whereas maple is limited to more southern, wetter, warmer regions.

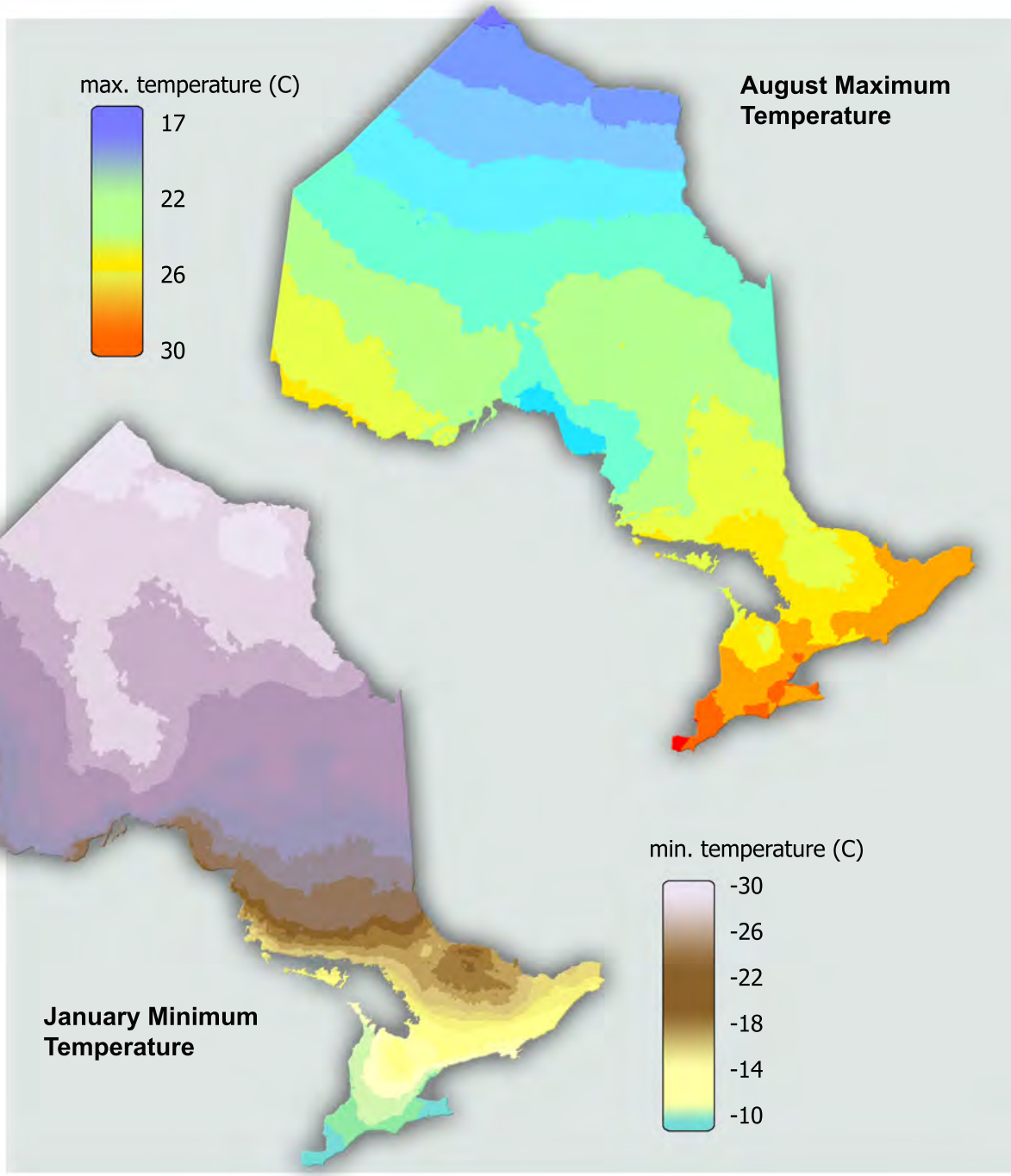
Temperature

Minimum and maximum temperatures can dramatically influence tree species distribution. Many deciduous species found in the Great Lakes-St. Lawrence forests are sensitive to very cold winter temperatures. Their occurrence in the north is limited.

Average summer temperatures can also influence tree species distribution by affecting the survival of young trees.

The figures at right demonstrate August maximum temperature over the last 20 years and January minimum temperature over the same period.

Map Source*: Colombo et al. 2007. OMNR Climate Change Research Report CCRR-05.*



Measuring Ontario's Forests

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Interactive Chapter Index

Measuring Ontario's forests can be subjective. There are different definitions for that which qualifies as forest. Methods to measure forests and other land features vary.

select a topic

Measuring Ontario's Forests



What is a forest?

"*A dense growth of trees and underbrush covering a large tract*" according to Webster's online dictionary. A person's concept of a forest varies as per their experience. A Torontonian may consider a small plot of trees in an urban park to be a forest. A northern Ontarian would consider a forest or bush to be large uninhabited tracts of trees. Birds and mammals likewise vary in their use and understanding of a forest. A white-throated sparrow may require a patch of young forest less than two hectares in size. A black-backed woodpecker may require up to 40 hectares. A wolverine's home range can be up to 100,000 hectares.

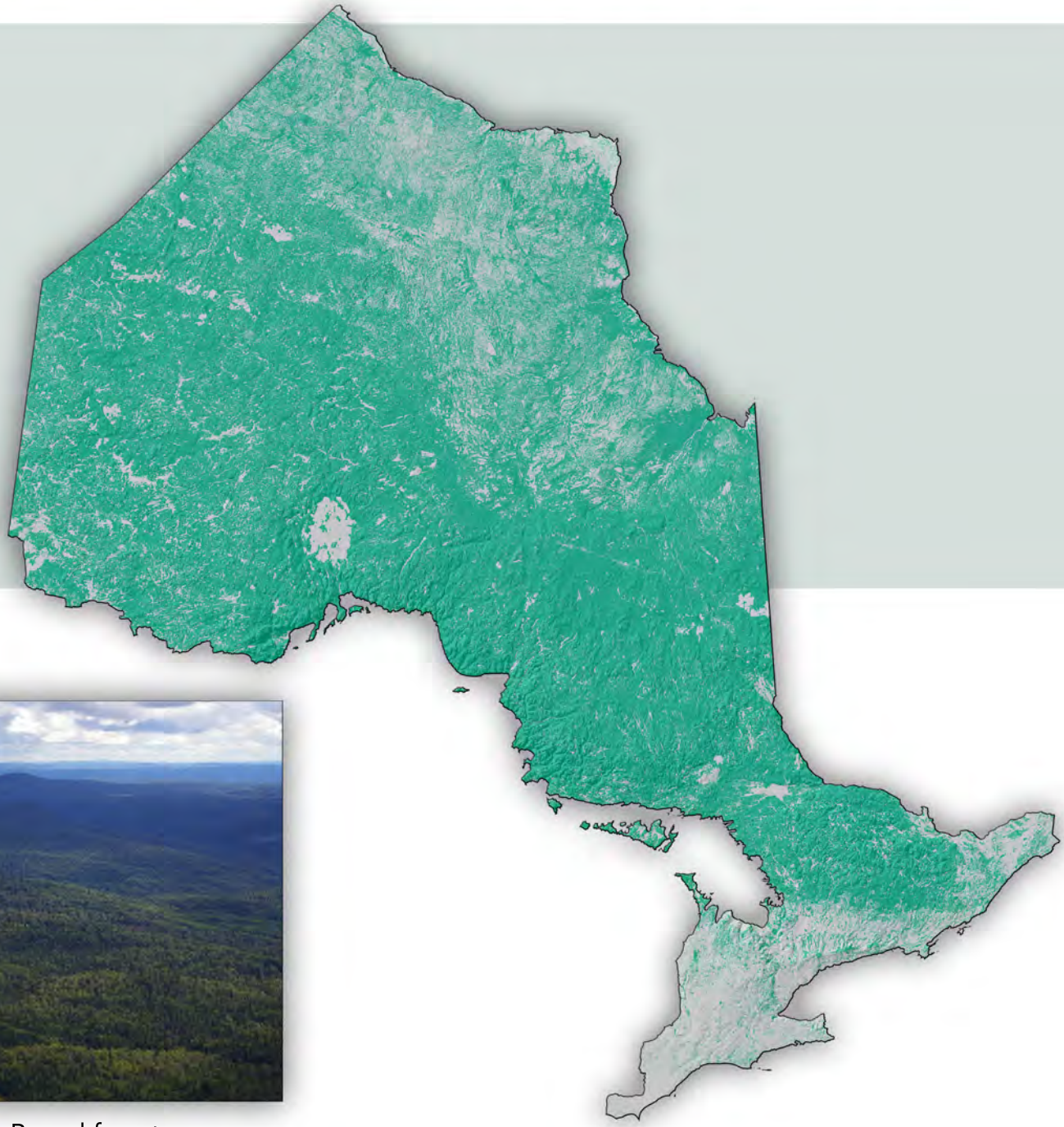
Forests in Ontario range from small fragmented patches of trees in the south to vast contiguous expanses of spruce and pine in the far north. The satellite imagery used in this document can class a group of trees as small as 0.56 hectares as dense forest. The forest resources inventory used in this document generally does not class a stand of trees as forest unless it is greater than 2 to 4 hectares in size.

Forest patch size (contiguous area of forest) varies greatly across the province. The average forest patch size is several thousand hectares and increases as one moves north.

Measuring Ontario's Forests

Southern Ontario patch sizes range from slightly more than 1 hectare in the Windsor area to more than 1,100 hectares on the tip of the Bruce Peninsula. Of all the patches of forest in Southern Ontario, only 0.2% is greater than 100 hectares, and only 4.4% are greater than 10 hectares.

In the Boreal Forest, patch sizes range from 250 hectares to more than 16,500 hectares on the north-eastern shores of Lake Superior. The area where commercial forestry takes place, the Area of the Undertaking (AOU – see map on page 25) contains very large patches of contiguous forest, generally broken only by water and wetland.



Southern Ontario forest/agriculture

Boreal forest

Measuring Ontario's Forests

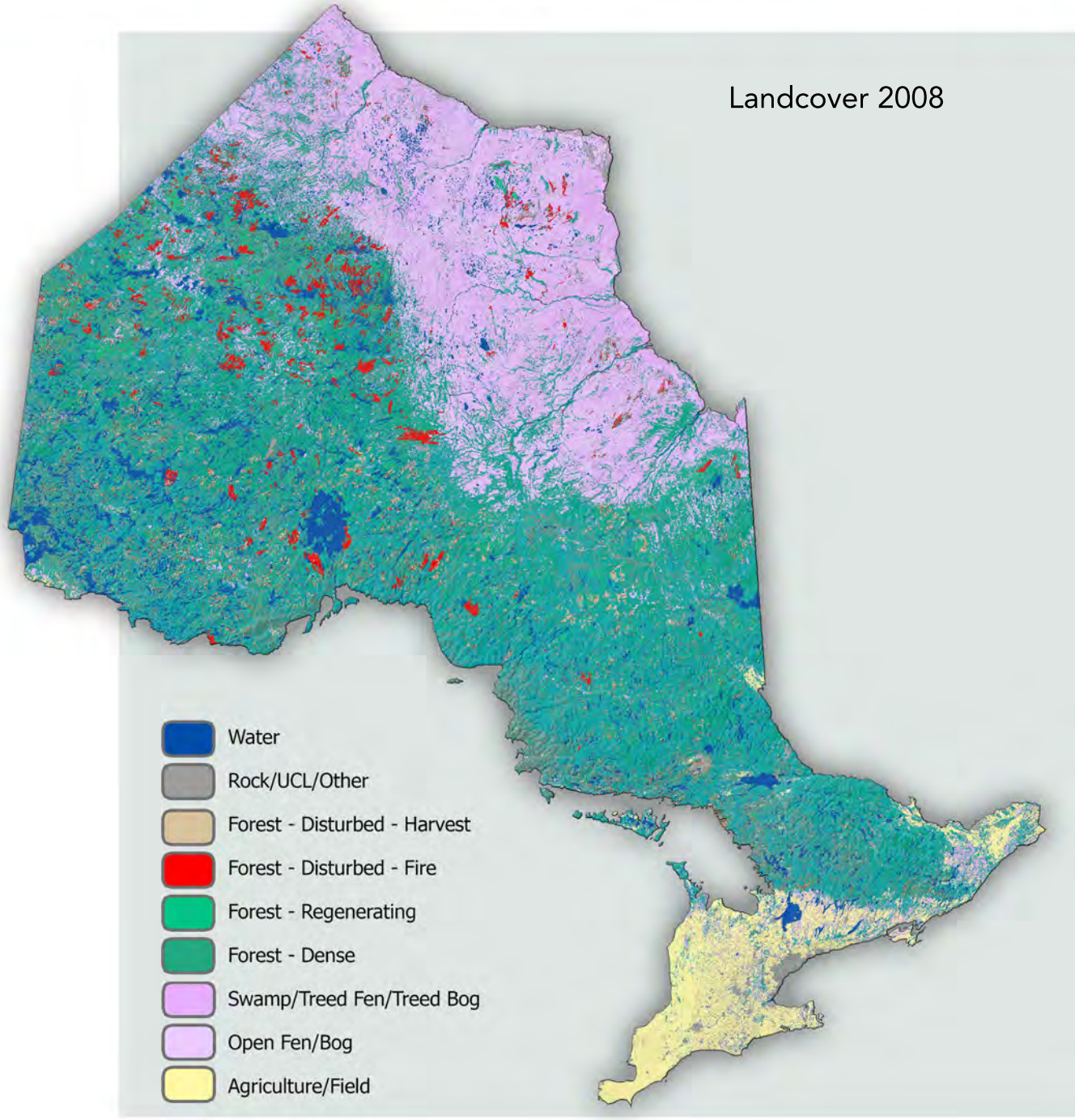
The *Forest Resources of Ontario 2001* was the first in the report series to utilize satellite data. This change allowed for a complete breakdown of all the land and water in the province. The satellite data used in the 2006 report was compiled by the MNR between 1999 and 2002 and is based on Landsat 7 imagery (Landcover 2002). The data set used in FRO 2011 is Landcover 2002 plus harvest and natural depletions and silviculture updates from 2002 to 2008 – Landcover 2008. A discussion of the imagery and satellite classes is also included in this report.

Satellite Land Classes

The 26-class data set has been summarized into the following 15 groupings:

Non-forested Land/Water:

- Water – all inland water bodies other than marshes and wetlands.
- Great Lakes water – all water contained in the Great Lakes and St. Lawrence Seaway.
- Wetlands – all wetland areas including coastal mudflats, marshes, open fens and open bogs.
- Rock – areas of sand & gravel, mine tailings, quarries and rock outcrops.
- UCL – Unclassified Land – settlement and developed land.
- Field / DAL – areas of field, pasture, open grassland and alvar or developed agricultural land (crops).



Measuring Ontario's Forests

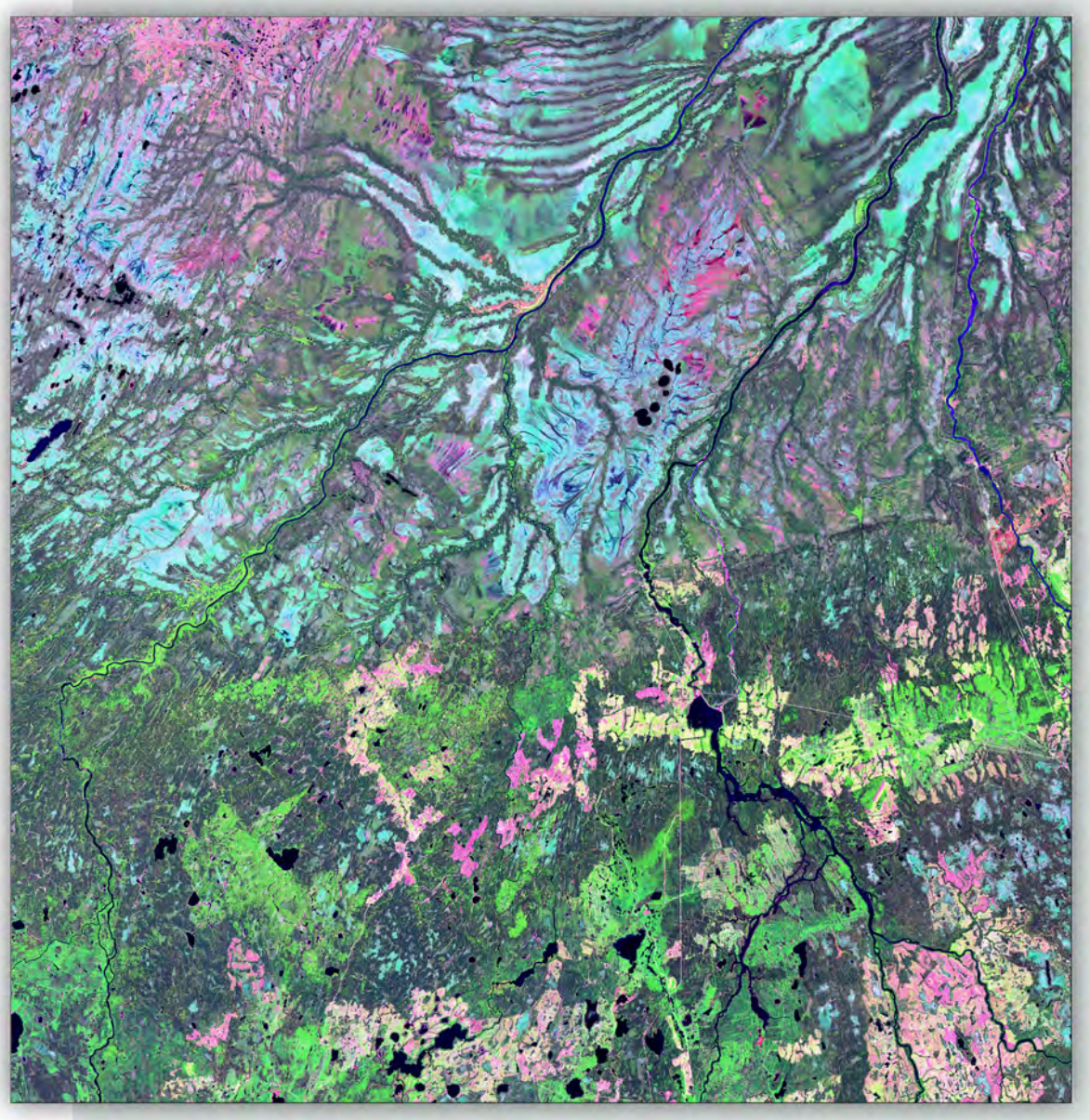
- Other – includes tundra heath, mudflats and other satellite classes

Non-productive forest:

- Treed Wetlands – all wetlands containing tree cover, including deciduous swamp and conifer swamps, treed bogs and treed fens.

Productive Forest:

- Dense deciduous forest - continuous forest dominated by deciduous (hardwood) species such as maple or aspen.
- Dense coniferous forest - continuous forest dominated by coniferous (softwood) species such as spruce or pine.
- Mixed forest – continuous forest composed of coniferous and deciduous species.
- Sparse forest - patchy forest canopy (less than 30% canopy closure).
- Regenerating forest – recent harvest - forest clearcuts estimated at less than 10 years of age.
- Regenerating forest – recent forest fires - forest estimated at less than 10 years of age.
- Regenerating forest – forest clear-cuts and burns estimated at more than 10 years of age, and generally less than 25 years old.



Landsat 7 Imagery of the Abitibi River area north of Kapuskasing

Measuring Ontario's Forests

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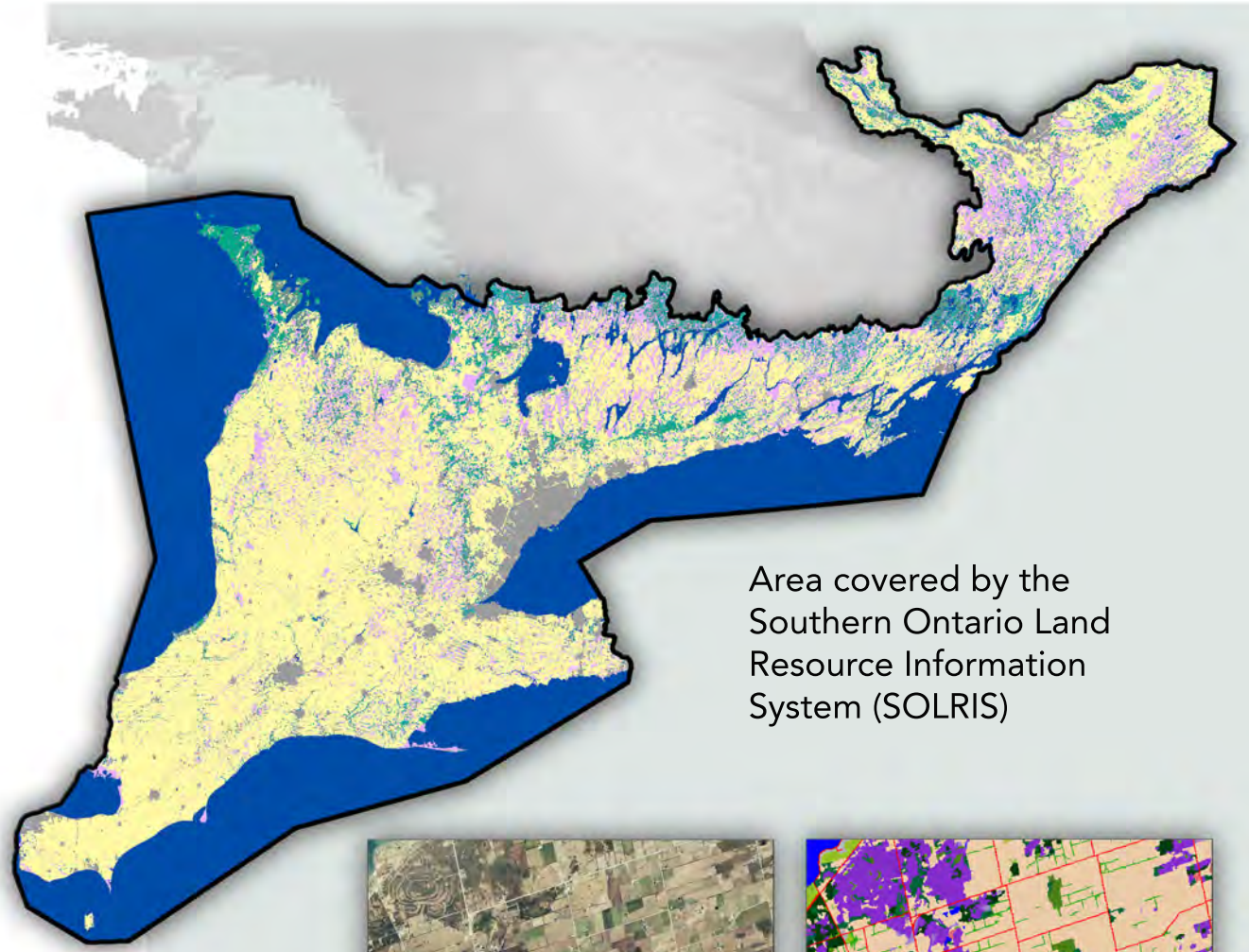
Southern Ontario Land Resource Information System (SOLRIS)

SOLRIS was developed in 2008 to assist in planning initiatives in southern Ontario. It was compiled from various sources including topographic maps, aerial photos and satellite imagery. For this version of the report, SOLRIS has been included as the best source of satellite update for the south.

In *The Forest Resources of Ontario 2006* and *2001*, the southern Ontario portions of the satellite coverage were based on imagery compiled from 1985 to 1990. Since SOLRIS data has been incorporated into this version of the report, the update reflects 15 to 20 years of change, rather than 5 years. Changes in classifications, such as forest to hedgerows where appropriate, have also changed forest area. For these reasons, the actual area of forest in southern Ontario is more accurately depicted as 1.2 million hectares, rather than 2 million hectares previously reported.

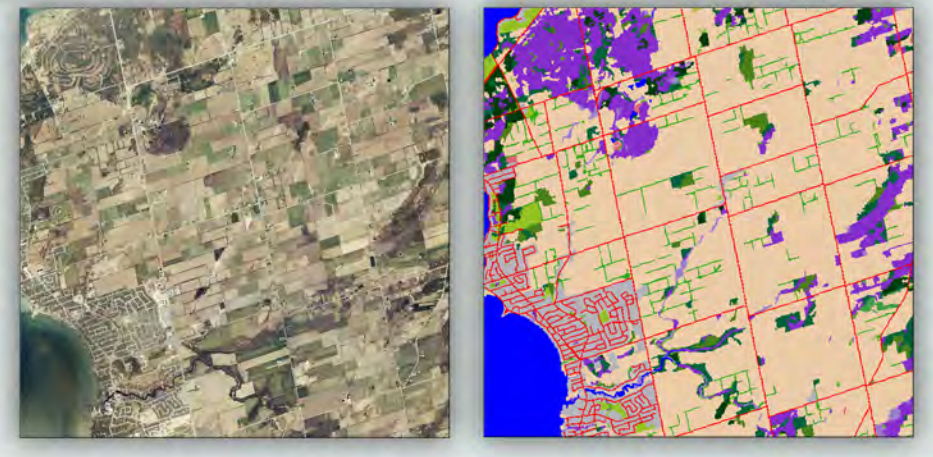
SOLRIS includes more detailed classes (such as hedgerows, plantations, tallgrass savannah and woodland) than the Landcover 2008. To maintain consistency with the rest of the Landcover 2008, some grouping of classes has occurred.

The map at right shows where SOLRIS has updated Landcover 2008.



Area covered by the Southern Ontario Land Resource Information System (SOLRIS)

aerial photo compared to SOLRIS data



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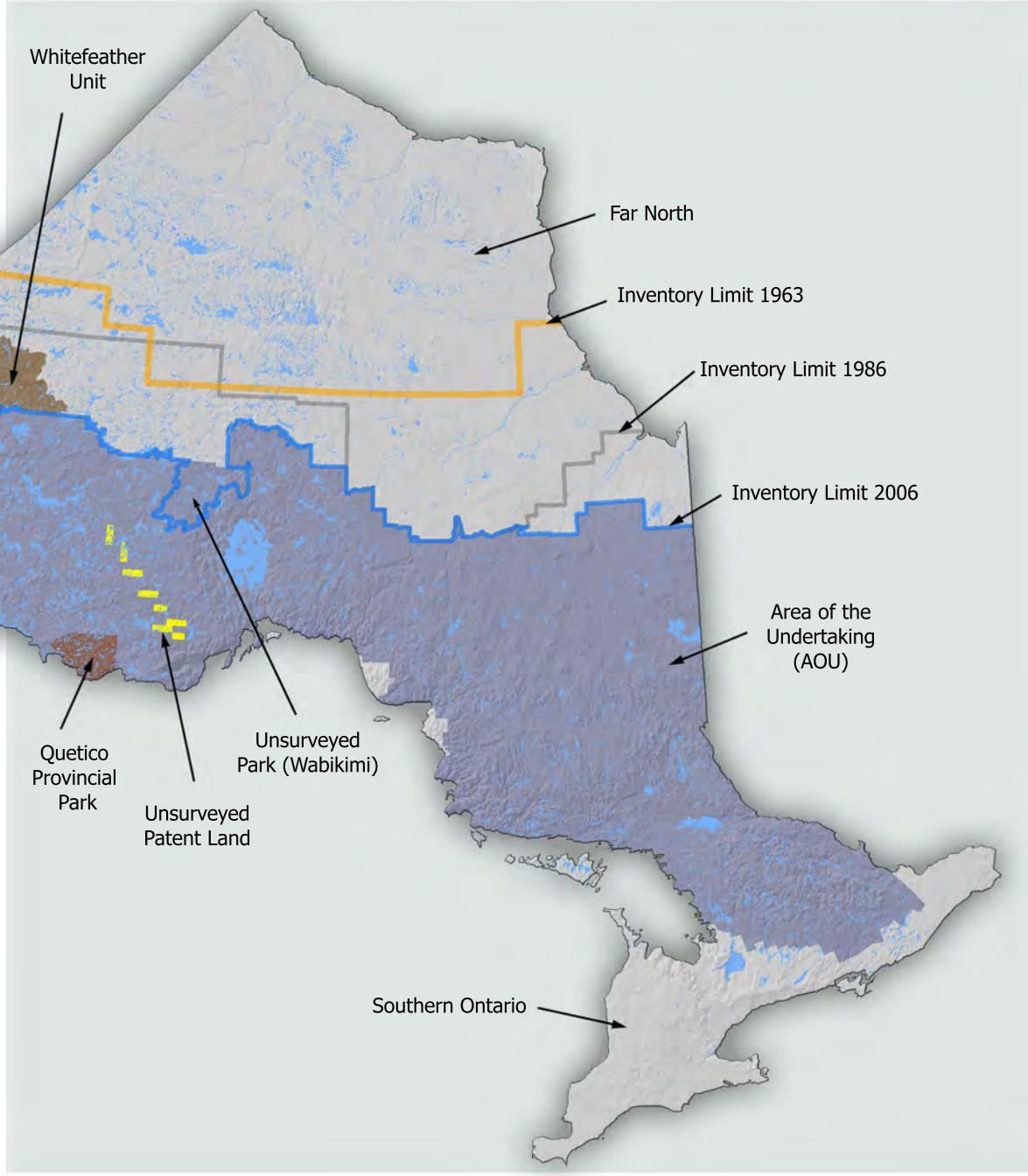
Forest Resources Inventories (FRI)

Traditionally, *The Forest Resources of Ontario* uses FRI to summarize provincial statistics on forest cover as well as land and water classes. Each FRO report is based on a slightly different land base due to the availability and currency of inventories. The 1963 report covered over 70 million hectares (66% of the province), while the 1986 and 1996 reports covered 61 million hectares (57% of the province). The FRI utilized in the 2001 and 2006 reports was generally limited to the Area of the Undertaking (AOU), which covers 43.8 million hectares of Ontario, and represents the area where forest management is practised. The delivery of the Whitefeather inventory, in the far north, along with the new enhanced Quetico Provincial Park inventory, has expanded the inventoried area to 44.1 million hectares.

A summary of all inventoried area is provided within each FRO report. Most of the AOU is summarized, but there are small gaps including: pockets of private land in the northwest corner of the AOU, Lake Nipigon and its islands, and most of Wabikimi Provincial Park. As well, the large parks outside the AOU that constitute the Planning Area (see page 39) are also missing (part of Wabikimi, Woodland Caribou, Lake Superior Park and Pukaskwa). To make an accurate representation, the missing pieces will be summarized using satellite data. Both the Planning Area and AOU are also summarized in this report.



Measuring Ontario's Forests

The FRI is a detailed forest map compiled on an ongoing basis by the MNR. Stands of trees and other non-forested areas are classified through interpretation of aerial photographs combined with field checks. Ontario has been inventorying its forests in this basic style since 1922. With the advent of geographic information systems (GIS) in the 1980s and 90s, digital inventories now provide detailed spatial information about Ontario's forests.

The FRI classifies a land base into broad physical components such as productive forest, non-productive forest, non-forested land and water. Each component is further classified by its ownership, land use type and ecological characteristics. It is important to note that the way satellite and FRI classify forests is different, and that the numbers in this section may differ slightly from each other. The total area of forest however, is remarkably similar considering the different sources of data. A comparison between a FRI based stand and a satellite interpretation is documented in this report. The most significant difference between these systems is what actually constitutes forest. The FRI has a 2 hectare minimum stand size (although smaller groups of trees do occur in the FRI) and the satellite data used in this document will allow groupings of trees to be classed as forest smaller than 0.56 hectares. This results in more forest area in some portions of the province where small fragmented pieces of forest exist, such as those in southern Ontario. The average age of FRI data within the AOU is less than 5 years with most inventories now being updated and submitted every FMP cycle.

Example Forest Resources Inventory from Quetico Provincial Park

Measuring Ontario's Forests

In 2005 the MNR announced it was going to acquire new forest resource inventories by investing $10 million annually. This 10 year project would expand the normal geographic scope of the FRI from the AOU to include the large provincial and national parks in and around the AOU, as well as new Northern Boreal Initiative projects such as the Whitefeather Forest. Only one of these inventories was available for this version of the report - Quetico Provincial Park.

The new enhanced inventories include more than the traditional black and white photo derived details of the past 20 years. Ecosite information, such as soil texture, depth and plant communities growing below the trees, as well as additional forest information create a much more valuable picture of the forest. These additions move the FRI beyond a timber inventory to something that can be used to measure things such as biodiversity indicators or wildlife habitat.

The technology used in the new inventory process is a significant improvement in inventory methodology. Using 3-D aerial imagery, interpreters require specific goggles to interpret forest attributes. The new process is also augmented by field sampling and measurements to help calibrate photos and interpretation work.

determining soil texture

using soil auger

measuring tree age with increment borer

using 3D imagery for interpretation

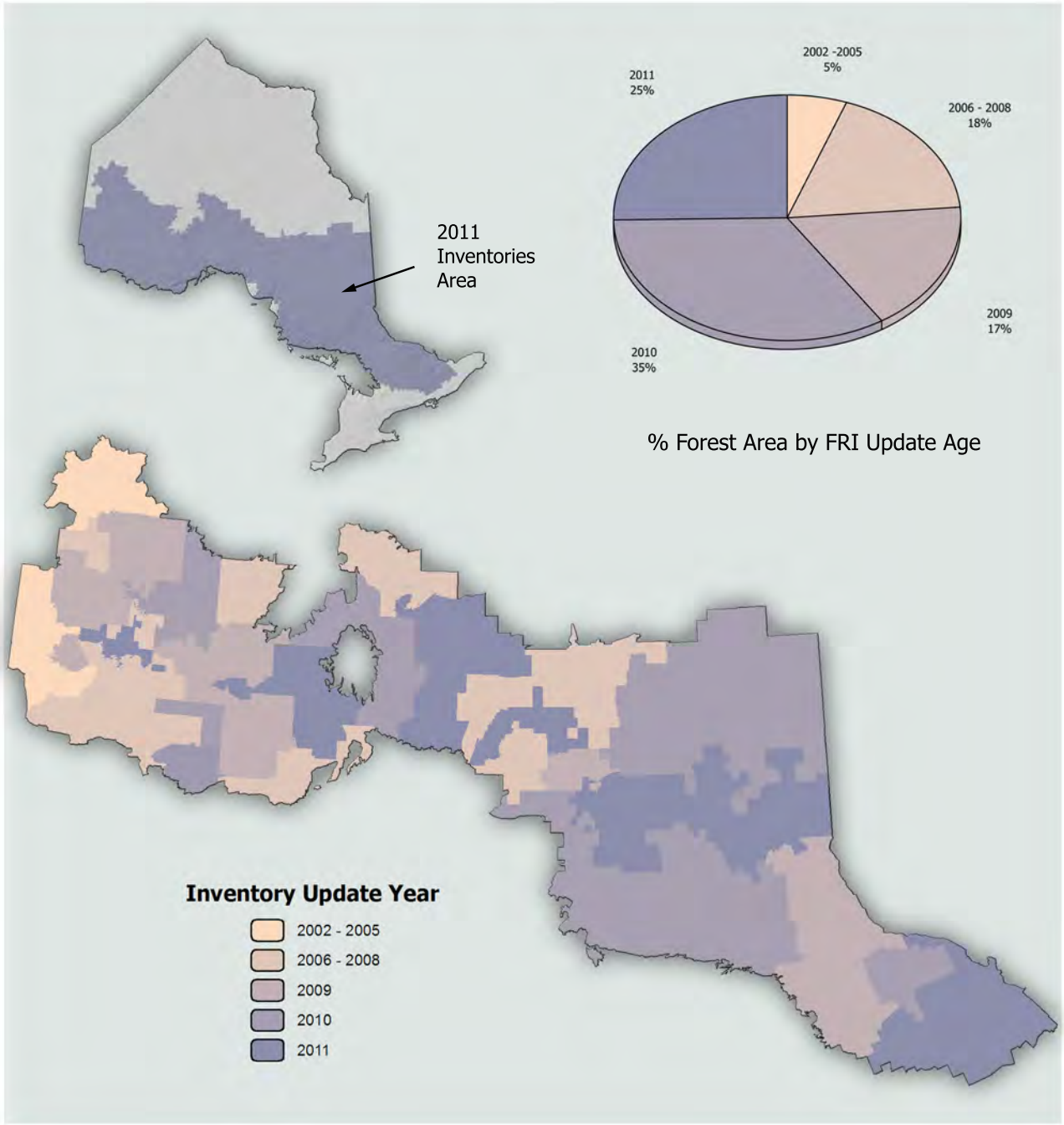
Measuring Ontario's Forests

The inventory age is determined by the age of the photography used for the inventory or by the year of inventory update, whichever is younger. All inventories in this report have been updated for harvest, fire and insect damage.

Historically, The Forest Resources of Ontario summarizes forest types by working groups or dominant tree species. The 2011 version includes traditional working group summaries and also includes provincial forest types, first summarized in 2001.

Provincial forest types are based on ecological processes and utilize forest / landscape units described in the regional forest ecosystem classification (FEC) guides. This forest ecosystem aggregation uses dominant tree species and incorporates information on forest understory vegetation, soil and associated tree species. There are currently three provincial FEC sets (one for each region) that aggregate into the standard regional forest units and the wildlife habitat units used in forest management planning. This system is being harmonized for the new enhanced FRI into one provincial set. The provincial forest types used in this document are an aggregation of these classification sets, applied to the current set of forest resources inventories.

All summaries except those involving provincial forest types and age class data utilize satellite data. Please check the source listed on each summary page.



Measuring Ontario's Forests

The 8 provincial forest types are:

- White and red pine – all white and red pine mixedwood stands
- Jack pine – predominantly jack pine stands;
- Upland conifers – predominantly mixed spruce, jack pine and fir stands on upland sites
- Lowland conifers – predominantly black spruce stands on low, poorly drained sites
- Mixedwood – mixed stands made up mostly of spruce, jack pine, fir, poplar and white birch
- Poplar – predominantly poplar stands;
- White birch – predominantly white birch stands
- Tolerant hardwoods – predominantly hardwoods such as maple and oak, found mostly in the Great Lakes forest region

Along with traditional age class summaries, this report includes age summaries by seral (or development) stage. The five stages have different onset ages or age groupings for each provincial forest type. For instance, poplar is a much less long-lived species than black spruce, and old growth poplar is defined as 95 years of age, as opposed to 135 years for lowland black spruce.

upland conifer provincial forest type near Chapleau

Measuring Ontario's Forests

The five stages are:

- Pre-Sapling
- Sapling
- Immature
- Mature
- Late Successional (Old Growth)

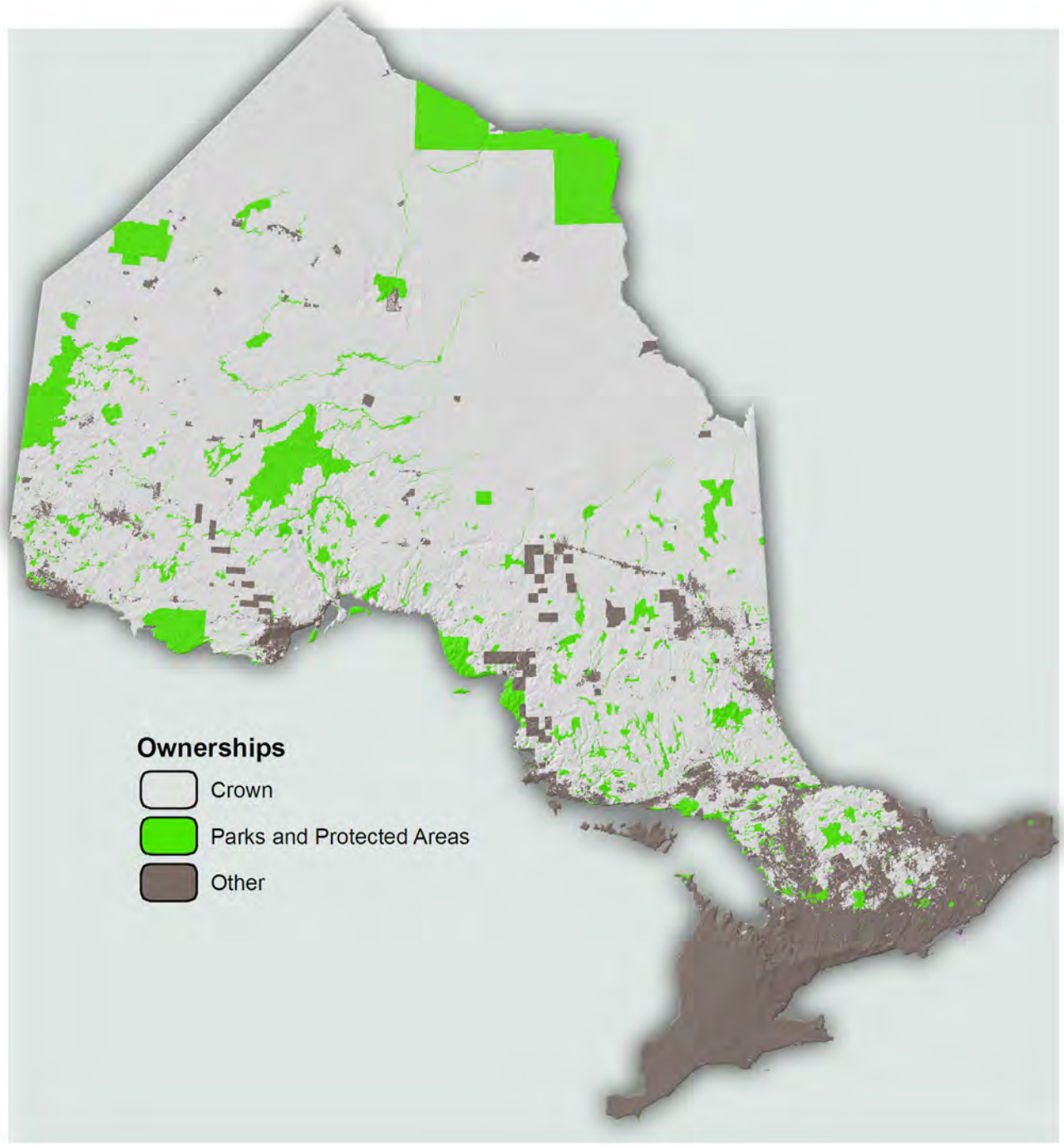
While there are various types of ownerships, for most area summaries in this report they have been grouped. Individual ownership types are detailed in their own summary table.

The ownership groups used in this report are:

- Crown Forest: this represents publically owned forest that is generally managed for harvest. In most cases, land withdrawals normally associated with areas of concern (AOCs), areas of scientific and natural interest (ANSIs), protection forest and other planning concerns are included, even though they are not available for harvest.

- Parks and Protected Areas: areas of forest/land within all provincial and federal parks, recreation reserves and conservation reserves, both proposed and existing.

- Other: Areas of forest within federal, private or First Nations ownership.



Measuring Ontario's Forests

Index

Comparing areas derived from satellite and forest resources inventory (FRI) will highlight differences in both resolution and land classification.

An inventory is a process that delineates land classes for use within the forest management planning process. Forest stands are generally only delineated to a minimum size (2-4 hectares). Although smaller stands do occur after the FRI is refined, and other map information is incorporated, they will generally not reflect the same types of forest that satellite imagery captures.

Satellite imagery defines forest based on pixels on a photograph, so a small group of trees in the center of a field can be captured and classed as forest. Slight differences in a stand of trees may be classed as different forest types, where in an FRI they would be reflected in the species composition, but not as a separate stand of trees.

Similarly, small open stretches of water within a wetland may be classed as water, even though an inventory would class the entire area as wetland.

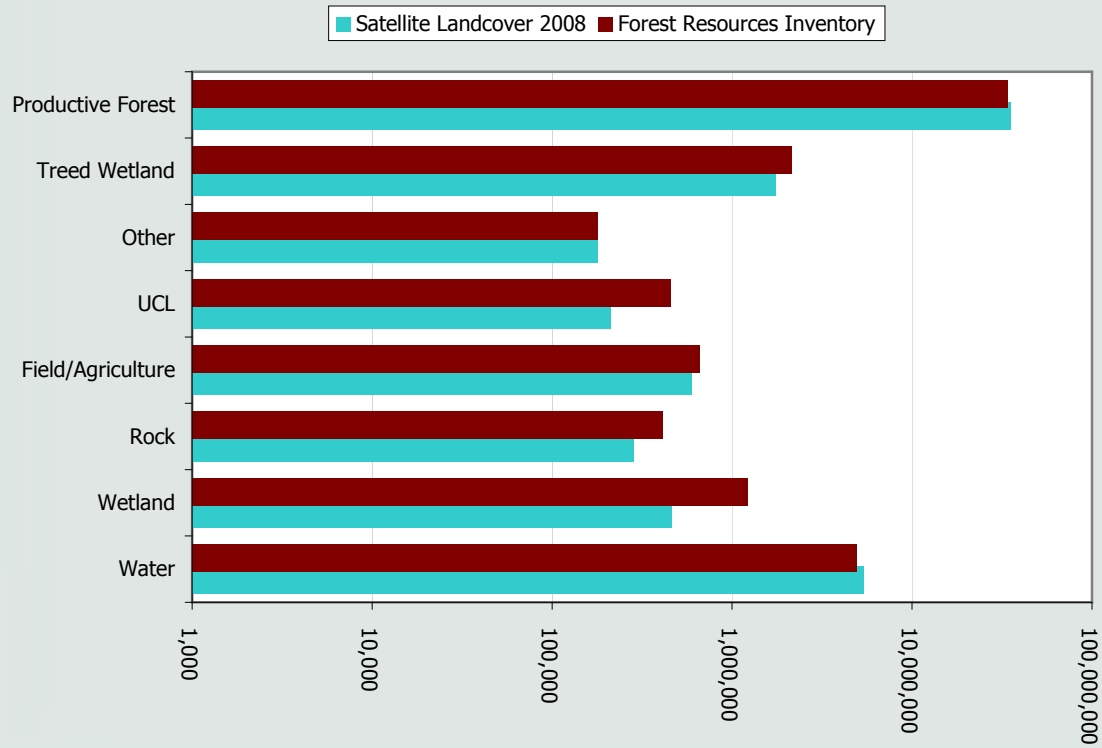
Some lumping of nonforested polygons can occur within an inventory, or even grouping of forested areas influenced by other factors, such as residential homes within a forested area being grouped as UCL or unclassified lands.

A detailed comparison of FRI vs. landcover is included in this report.

Area Comparison - All Inventoried Area - Satellite vs. FRI

All Area in hectares

Land Class	Satellite Landcover 2008	Forest Resources Inventory
Water	5,369,638	4,928,368
Wetland	460,879	1,222,381
Rock	283,178	410,930
Field/Agriculture	595,809	661,968
UCL	211,138	454,882
Other	179,738	178,612
Treed Wetland	1,745,972	2,138,952
Productive Forest	35,254,072	34,104,331
Total:	44,100,424	44,100,424



Comparison of Area by Class - area in hectares

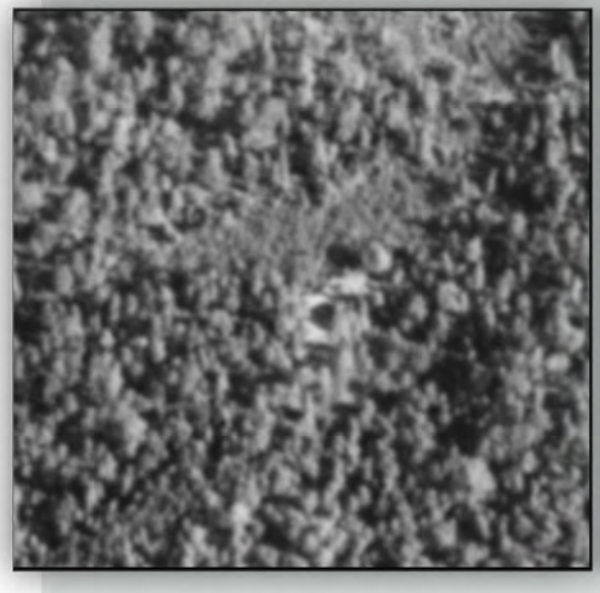
Measuring Ontario's Forests

During the "early years" of forest inventory, analysts would work exclusively with black and white photos and paper maps. Generating summaries of the province was a massive undertaking that involved a great deal of paperwork. Inventories from the 1950s through to the 1980s tended to focus on important commercial species such as spruce or jack pine. Photo interpreters would often ignore small amounts of poplar or white birch in large coniferous stands.

During the 1990s, stand sizes started to shrink and become more complex, as interpreters were highlighting subtle differences in height, species composition or other physical features. Small amounts of other species were introduced into the provincial inventory, giving the impression to those viewing summaries that there was an increase in these species. In reality it was simply an increase in detail. An examination of the successive inventories where no harvest or natural disturbance has occurred has shown a 50-80% increase in the number of stands marked as individual polygons, and a significant increase in poplar, balsam fir and other incidental species.

It has been observed with the new enhanced FRI that certain species such as larch and balsam fir are much more readily seen due to the nature of the enhanced digital photography. The 2016 version of this report may see an increase in these species that is again simply an increase in resolution.

black and white aerial photos (stereo pair) used in interpreting FRI



approximate change in resolution in 1985 film photography vs. 2010 digital photography

Measuring Ontario's Forests

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Prior to 2001, the FRO series reported Ontario's total area as 106.8 million hectares. In 2001, that area was revised to 107.6 million hectares. Ontario did not increased in size. The way we measure it changed. Improvements in mapping technology and geographic information systems continue to refine the actual measurements we derive from our landbase.

For the purposes of this report, Ontario's total area is 107,636,418 hectares, which is slightly higher than the 2006 reported total. The changes result from increased precision in the provincial boundaries, especially in southern Ontario and along the Ottawa River.

Geographic Projections

Due to curvature of the Earth, any paper or flat map distorts the Earth's surface. The larger the area represented by a map, the greater the distortion can be. Ontario covers a very large area, and is over 1,500 kilometres north to south and east to west. A map projection is a way to portray geographic data on a flat surface. Many types of projections are in use today, and each has its own advantages and disadvantages.

Information used in this report comes from several different map projections. Most of Ontario's digital FRI data is developed in the Universal Transverse Mercator Projection (UTM).

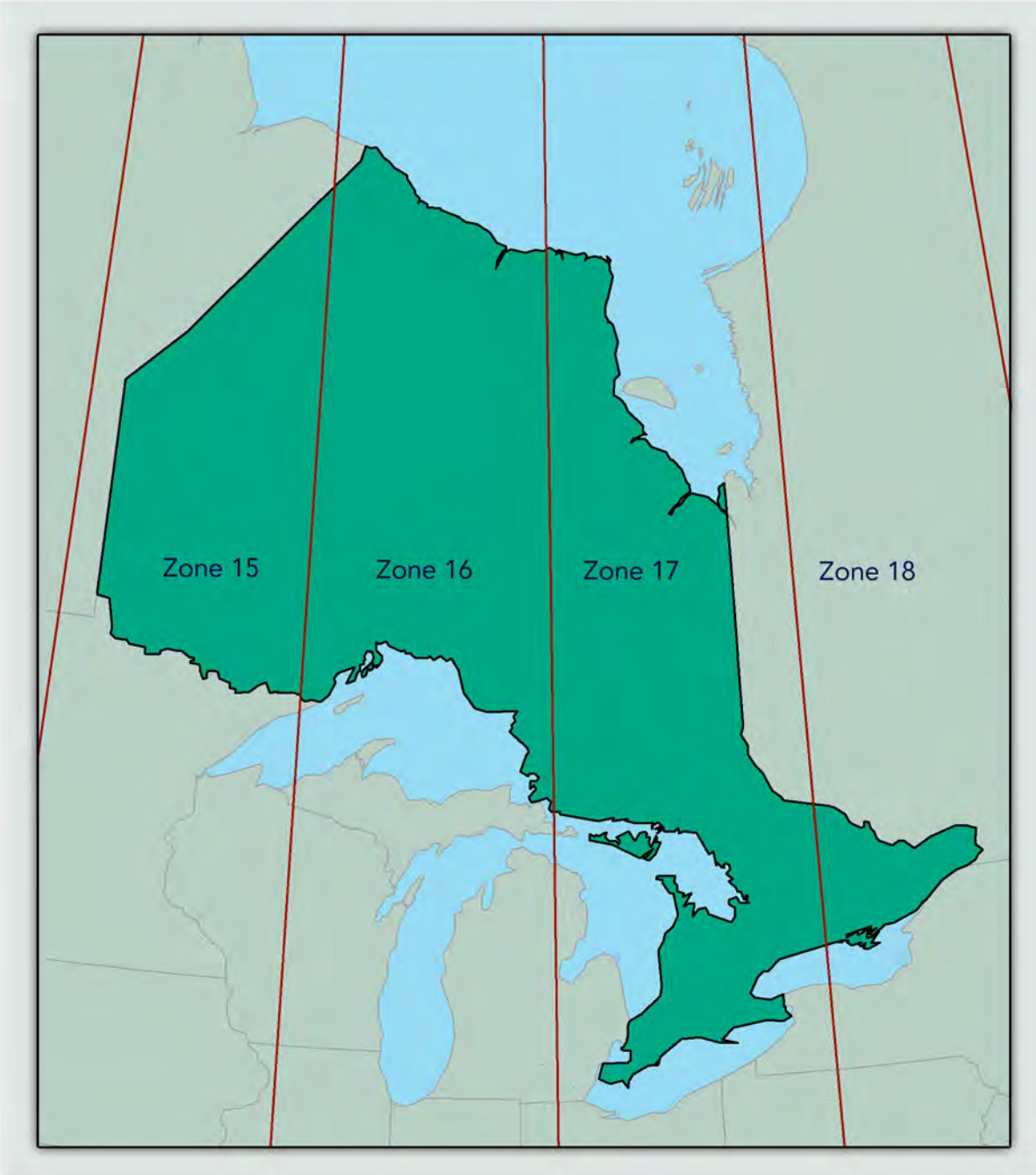
Measuring Ontario's Forests

The UTM system divides Ontario into four zones (15-18), and is generally a very accurate and reliable system within each zone.

Since Ontario crosses four UTM zones, provincial level mapping needs to use a slightly different projection to view its full extent. The second most common projection used by the MNR is Lambert Conformal Conic, which is commonly used by other jurisdictions in North America. This projection represents direction and area very well, and shapes of geographic areas remain true. All of the data used in this report has been moved to the Lambert Conformal Conic Projection for consistency and ease of use. The actual details of the projection are:

- Canada_Lambert_Conformal_Conic, GCS North American 1983, Datum – North American 1983 (NAD83), Spheroid - GRS 1980, False Easting 930,000, False Northing 6,430,000, Central Meridian 85.0, Standard Parallel 1 - 44.5, Standard Parallel 2 - 53.5, Latitude Of Origin, 0.0.

It is important to note as well that many of the pieces used to compile this report originated from varying scales, accuracies, vintages and sources. All attempts have been made to ensure that the data layers line up correctly with minimal errors or overlap. As well, class or data definitions between data sources can vary, and not all data elements line up exactly.



Area and Forest Summaries

Index

Interactive Chapter Index

The most simple level of forest area summaries begin with the entire province. Since this report utilizes different types of forest information which covers different geographical areas and different methodologies, they are described and summarized in this chapter.

For detailed breakdowns of specific geographic areas, such as forest regions or ecozones, please refer to the geographic profiles chapter.

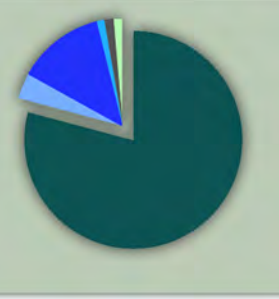
select a topic

All Ontario

Inventoried Area

Forest Mgmt. Area

Forest Summaries



Ownerships

Area Summary - All Ontario

Index

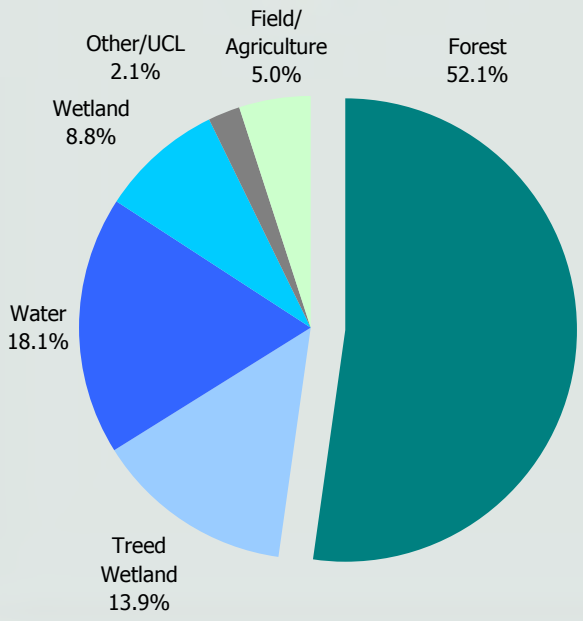
Total Area by Land Class and Ownership

All Area in hectares

Land Class	Crown	Parks and Protected Areas	Other	Total	Proportion
Non-forested Land and Water					
Water (Great Lakes)	8,544,737	150,917	-	8,695,654	8.1%
Water	8,484,110	1,668,529	594,998	10,747,637	10.0%
Wetland	8,170,336	1,082,148	245,512	9,497,997	8.8%
Rock	357,098	131,427	146,701	635,225	0.6%
Field/Agriculture	32,564	6,901	5,362,145	5,401,611	5.0%
UCL	50,099	3,893	815,160	869,152	0.8%
Other	409,138	278,757	33,478	721,373	0.7%
Subtotal:	26,048,082	3,322,573	7,197,994	36,568,649	34.0%
Non-productive Forest					
Treed Wetland	12,744,149	1,142,442	1,086,587	14,973,177	13.9%
Productive Forest					
Dense Deciduous	3,116,344	541,011	1,695,077	5,352,433	5.0%
Dense Conifer	13,388,952	1,587,482	1,018,988	15,995,422	14.9%
Mixed Forest	11,719,114	1,579,184	2,242,483	15,540,781	14.4%
Sparse Forest	11,043,761	1,200,602	1,133,904	13,378,267	12.4%
Regenerating Forest	2,307,411	188,708	20,457	2,516,575	2.3%
Disturbance - Fire	1,268,389	173,083	11,998	1,453,470	1.4%
Disturbance - Harvest	1,839,044	6,649	11,949	1,857,643	1.7%
Productive Forest:	44,683,015	5,276,719	6,134,858	56,094,592	52.1%
All Forest:	57,427,164	6,419,161	7,221,444	71,067,769	66.0%
Grand Total:	83,475,246	9,741,734	14,419,438	107,636,418	100.0%
Proportion:	77.6%	9.1%	13.4%	100.0%	

Source: Landcover 2008 satellite imagery

Summary Area - All Ontario



Area Summary - All Inventoried Area

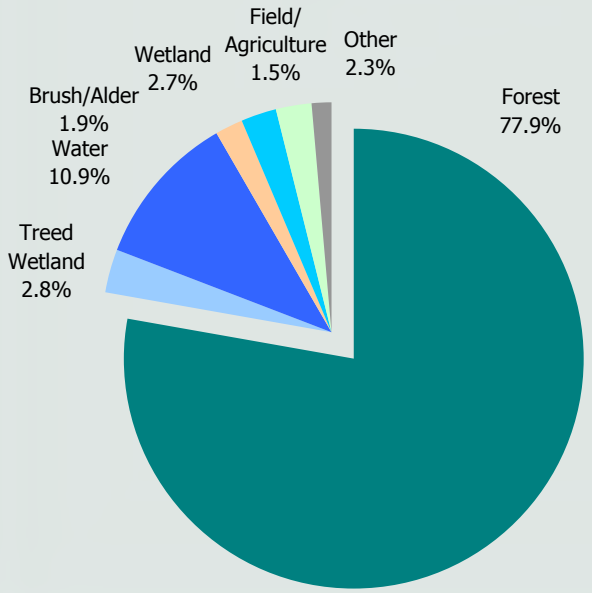
Total Area by Land Class and Ownership

All Area in hectares

Land Class	Crown	Parks and Protected Areas	Other	Total	Proportion
Non-forested Land and Water					
Water	3,987,789	781,689	155,449	4,924,926	10.9%
Wetland	902,722	125,661	193,998	1,222,381	2.7%
Rock	228,682	97,696	84,478	410,856	0.9%
Field/Agriculture	8,494	877	652,596	661,968	1.5%
Brush/Alder	648,072	62,477	163,295	873,844	1.9%
UCL	173,246	6,793	294,653	474,692	1.0%
Other	92,237	12,575	53,935	158,748	0.4%
Subtotal:	6,041,242	1,087,769	1,598,404	8,727,414	19.3%
Non-productive Forest					
Treed Wetland	1,044,717	148,689	71,702	1,265,108	2.8%
Productive Forest					
Dense Deciduous	2,864,480	313,005	1,105,934	4,283,419	9.5%
Dense Conifer	7,673,117	871,061	630,017	9,174,194	20.3%
Mixed Forest	9,686,047	1,161,516	1,761,015	12,608,578	27.9%
Sparse Forest	4,569,650	593,095	904,309	6,067,055	13.4%
Regenerating Forest	918,809	43,023	3,217	965,048	2.1%
Disturbance - Fire	257,221	34,960	6,441	298,622	0.7%
Disturbance - Harvest	1,838,989	6,298	11,870	1,857,157	4.1%
Productive Forest:	27,808,314	3,022,958	4,422,802	35,254,073	77.9%
All Forest:	28,853,031	3,171,647	4,494,504	36,519,181	80.7%
Grand Total:	34,894,273	4,259,415	6,092,907	45,246,596	100.0%
Proportion:	77.1%	9.4%	13.5%	100.0%	

Source: Landcover 2008 satellite imagery

Summary Area - Inventoried Area



Forest Summary - Inventoried Area

Total Area by Forest Type and Ownership

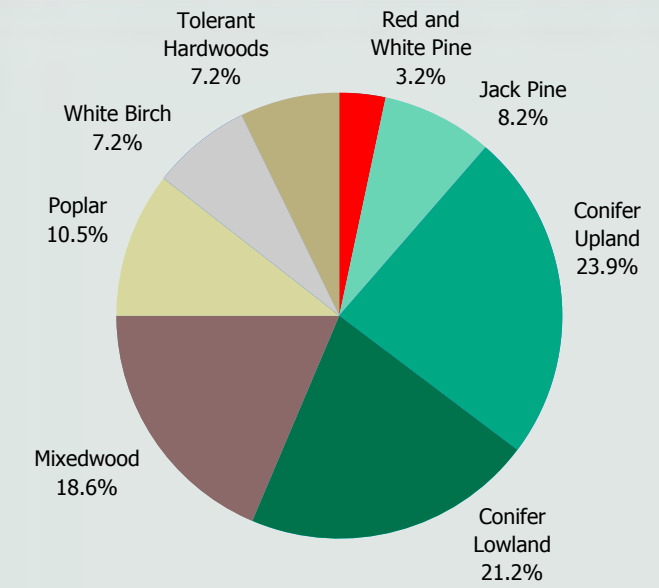
All Area in hectares

Forest Type	Crown	Parks and Protected Areas	Other	Total	Proportion
Red and White Pine	739,584	184,373	175,413	1,099,370	3.2%
Jack Pine	2,465,187	282,467	49,260	2,796,914	8.2%
Conifer Upland	6,943,262	669,245	531,077	8,143,584	23.9%
Conifer Lowland	6,202,617	441,681	588,783	7,233,081	21.2%
Mixedwood	5,095,368	641,419	604,462	6,341,249	18.6%
Poplar	2,655,747	272,492	668,383	3,596,622	10.5%
White Birch	1,708,462	262,889	477,380	2,448,731	7.2%
Tolerant Hardwoods	1,217,066	186,411	1,041,303	2,444,779	7.2%
Total:	27,027,294	2,940,976	4,136,060	34,104,331	100.0%

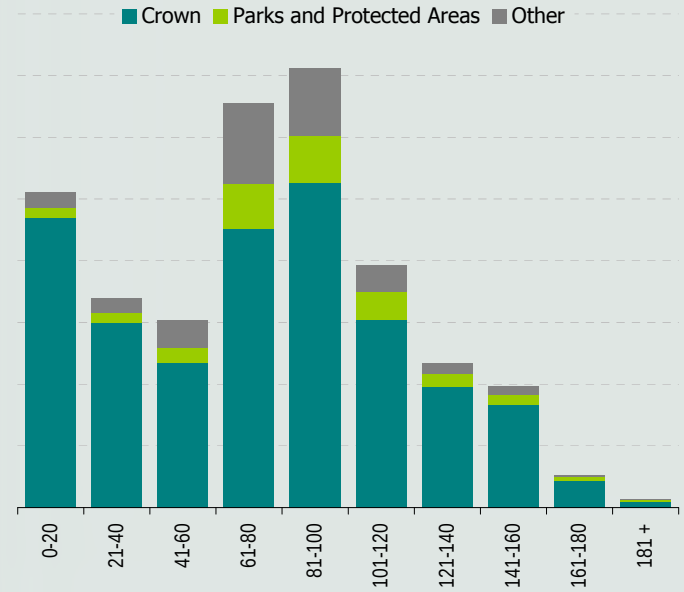
Total Area by Age Class and Ownership

Age Class/Seral Stage	Crown	Parks and Protected Areas	Other	Total	Proportion
0-20	4,693,699	161,833	254,110	5,109,642	15.0%
21-40	2,993,256	166,216	242,595	3,402,067	10.0%
41-60	2,342,544	241,191	449,439	3,033,174	8.9%
61-80	4,519,909	719,594	1,312,358	6,551,861	19.2%
81-100	5,262,308	753,940	1,099,243	7,115,491	20.9%
101-120	3,039,896	451,213	431,749	3,922,859	11.5%
121-140	1,957,458	211,472	173,175	2,342,105	6.9%
141-160	1,660,520	167,220	132,827	1,960,567	5.7%
161-180	437,706	66,641	29,440	533,787	1.6%
181 +	95,581	26,308	10,890	132,779	0.4%
Total:	27,002,877	2,965,629	4,135,825	34,104,331	100.0%
Pre-Sapling	2,501,256	54,755	63,508	2,619,519	7.7%
Sapling	3,223,393	141,778	281,700	3,646,871	10.7%
Immature	5,478,945	500,933	864,592	6,844,470	20.1%
Mature	11,447,262	1,708,801	2,529,302	15,685,364	46.0%
Late-Successional	4,352,022	559,362	396,724	5,308,107	15.6%
Total:	27,002,877	2,965,629	4,135,825	34,104,331	100.0%

Source: 2010 Forest Resources Inventories



area by forest type



area by age class

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Forest Management Area (AOU)

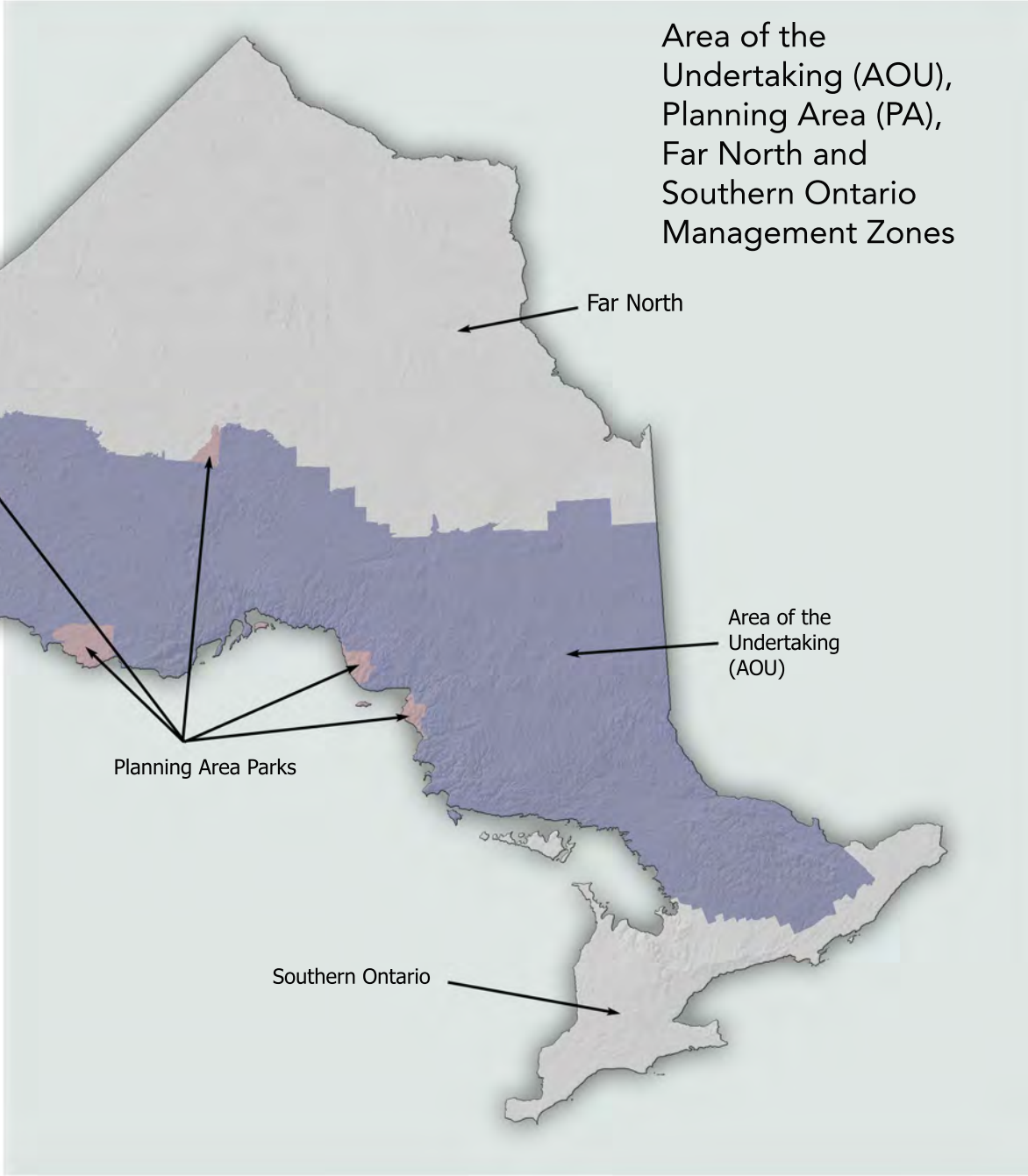
The "Area of the Undertaking" or AOU is where forest management occurs. It is an area that was delineated in the Class Environmental Assessment for forest management in 1994. The details of the EA are available on the MNR website www.mnr.gov.on.ca.

A small portion of parks and private land (3.2%) within the AOU is *not available* digitally, so the inventory summaries will be supplemented with satellite data (see FRI page).

The *Planning Area* is a slightly expanded version of the AOU that was used during Ontario's Living Legacy exercise to encompass the large parks that border the AOU. It is also summarized in this report.

The AOU is 43.8 million hectares, of which, nearly 80% is forest, and 62% is Crown forest.

It is important to note that summaries using Landcover data will always have slightly more forest than a forest resources inventory.



Area Summary - Forest Management Area (AOU)

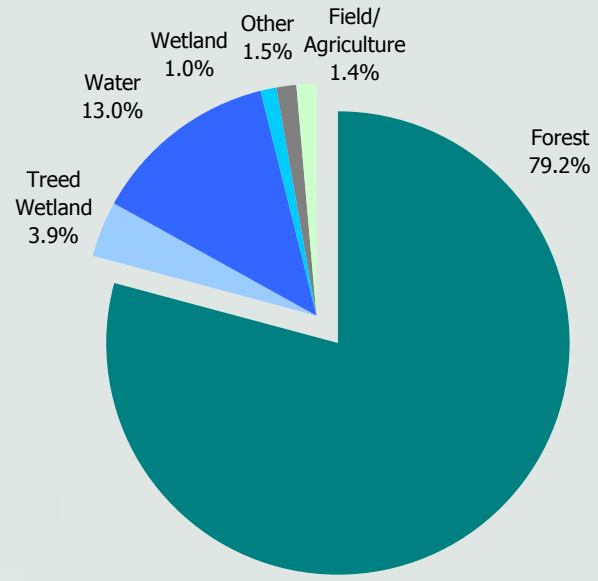
Total Area by Land Class and Ownership

All Area in hectares

Land Class	Crown	Parks and Protected Areas	Other	Total	Proportion
Non-forested Land and Water					
Water	4,550,586	882,338	276,775	5,709,699	13.0%
Wetland	284,810	63,001	98,389	446,200	1.0%
Rock	118,127	57,895	102,826	278,848	0.6%
Field/Agriculture	13,728	649	581,423	595,800	1.4%
UCL	38,553	2,228	158,173	198,954	0.5%
Other	115,668	13,687	29,503	158,858	0.4%
Subtotal:	5,121,471	1,019,799	1,247,088	7,388,358	16.9%
Non-productive Forest					
Treed Wetland	1,350,304	168,821	182,965	1,702,090	3.9%
Productive Forest					
Dense Deciduous	2,838,949	291,235	1,125,349	4,255,532	9.7%
Dense Conifer	7,427,663	972,884	664,485	9,065,031	20.7%
Mixed Forest	9,615,450	1,012,613	1,811,293	12,439,356	28.4%
Sparse Forest	4,338,470	581,912	958,025	5,878,407	13.4%
Regenerating Forest	867,094	62,855	3,106	933,055	2.1%
Disturbance - Fire	239,860	41,559	6,442	287,861	0.7%
Disturbance - Harvest	1,838,982	5,937	11,929	1,856,848	4.2%
Productive Forest:	27,166,467	2,968,993	4,580,629	34,716,090	79.2%
All Forest:	28,516,771	3,137,814	4,763,594	36,418,180	83.1%
Grand Total:	33,638,242	4,157,613	6,010,683	43,806,538	100.0%
Proportion:	76.8%	9.5%	13.7%	100.0%	

Source: Landcover 2008 satellite imagery

Summary Area - AOU



Forest Summary - Forest Management Area (AOU)

Total Area by Forest Type and Ownership

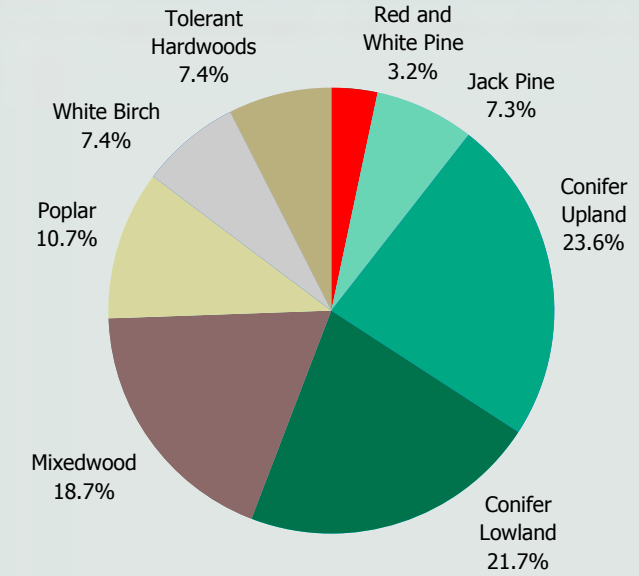
All Area in hectares

Forest Type	Crown	Parks and Protected Areas	Other	Total	Proportion
Red and White Pine	735,098	146,485	175,413	1,056,996	3.2%
Jack Pine	2,203,963	144,073	49,260	2,397,296	7.3%
Conifer Upland	6,686,967	534,030	531,002	7,751,999	23.6%
Conifer Lowland	6,124,509	391,206	588,775	7,104,490	21.7%
Mixedwood	5,060,066	452,089	604,371	6,116,526	18.7%
Poplar	2,631,756	210,261	668,355	3,510,372	10.7%
White Birch	1,702,013	247,850	477,346	2,427,208	7.4%
Tolerant Hardwoods	1,215,260	174,540	1,041,303	2,431,103	7.4%
Total:	26,359,631	2,300,534	4,135,825	32,795,989	100.0%
*Other Forest**	-	579,415	158,644	738,059	

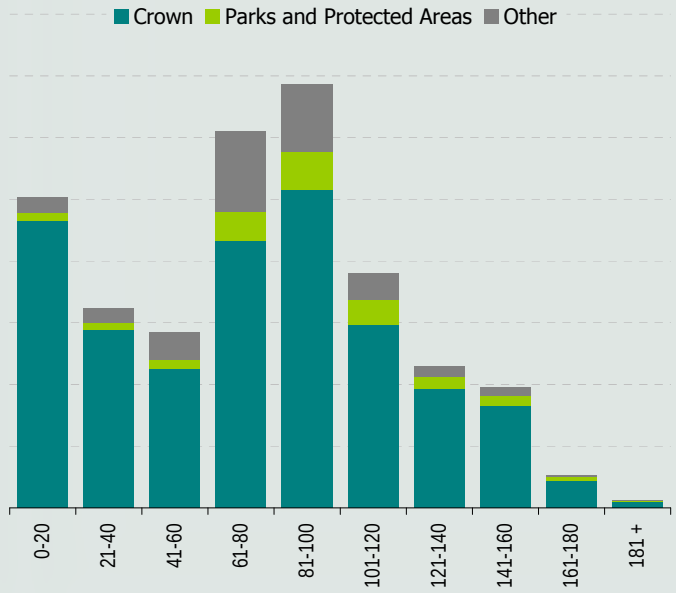
Total Area by Age Class and Ownership

Age Class/Seral Stage	Crown	Parks and Protected Areas	Other	Total	Proportion
0-20	4,659,585	120,269	254,110	5,033,964	15.3%
21-40	2,888,579	107,434	242,595	3,238,608	9.9%
41-60	2,259,534	142,118	449,439	2,851,092	8.7%
61-80	4,327,485	465,232	1,312,358	6,105,075	18.6%
81-100	5,156,302	616,493	1,099,243	6,872,038	21.0%
101-120	2,963,152	406,430	431,749	3,801,331	11.6%
121-140	1,926,069	190,306	173,175	2,289,550	7.0%
141-160	1,650,344	161,834	132,827	1,945,005	5.9%
161-180	434,250	64,877	29,440	528,566	1.6%
181 +	94,330	25,540	10,890	130,760	0.4%
Total:	26,359,631	2,300,534	4,135,825	32,795,989	100.0%
Pre-Sapling	2,481,500	41,556	63,508	2,586,563	7.9%
Sapling	3,159,743	105,624	281,700	3,547,067	10.8%
Immature	5,303,197	315,463	864,592	6,483,252	19.8%
Mature	11,133,460	1,317,456	2,529,302	14,980,219	45.7%
Late-Successional	4,281,730	520,434	396,724	5,198,888	15.9%
Total:	26,359,631	2,300,534	4,135,825	32,795,989	100.0%

Source: 2010 Forest Resources Inventories, Other Forest denotes area from Landcover 2008 where FRI is not available



area by forest type



area by age class

Forest Summary - Development Stage

Index

Development stage was introduced into the forest resources inventory in 2004. It provides a way to tag stands with a current state of growth and development. Some of these states are the last major silvicultural treatment that was applied. Recently disturbed stands are tracked by regeneration type, and are assessed from 5 to 15 years later to determine if they have met regeneration standards. This process is part of silvicultural effectiveness monitoring. When stands meet regeneration requirements, they are classed as "free-growing".

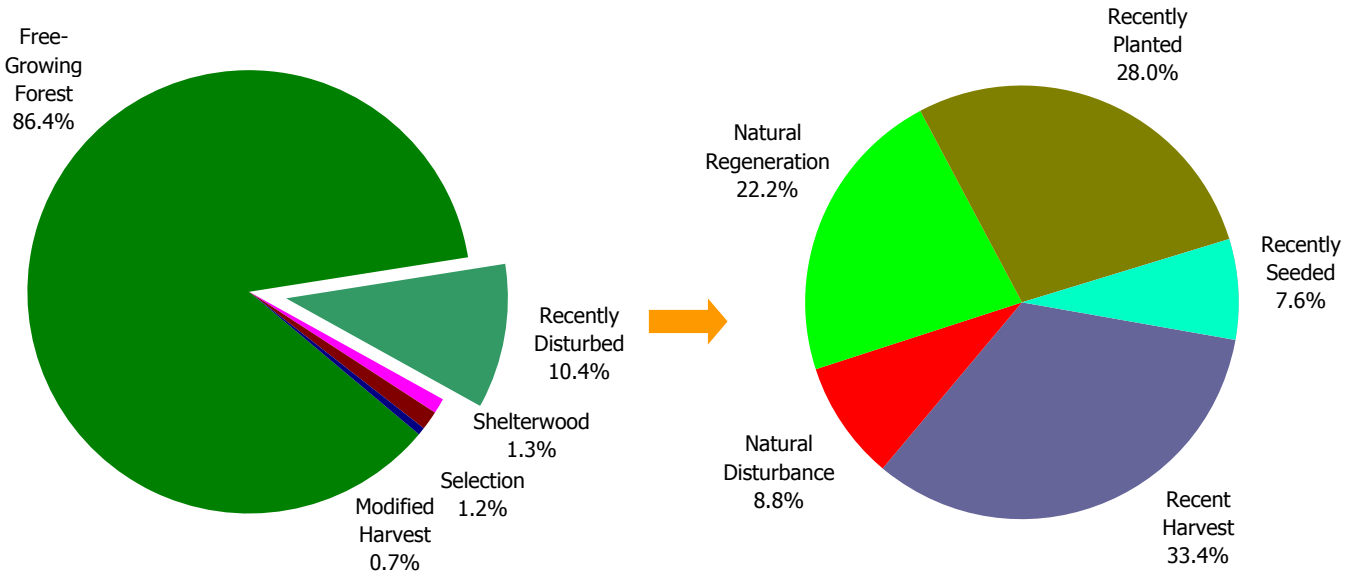
All Area in hectares

Total AOU Crown Forest Area by Development Stage

Development Stage	Crown Forest	Proportion
Free-Growing Forest	22,780,908	86.4%
Recently Disturbed	2,740,299	10.4%
Shelterwood	332,640	1.3%
Selection	325,978	1.2%
Modified Harvest	179,806	0.7%
Total:	26,359,631	100.0%

Total AOU Crown Forest Area Recently Disturbed

Development Stage	Crown Forest	Proportion
Recent Harvest	916,168	33.4%
Natural Disturbance	240,362	8.8%
Natural Regeneration	609,582	22.2%
Recently Planted	766,382	28.0%
Recently Seeded	207,806	7.6%
Total:	2,740,299	100.0%



Source: 2010 Forest Resources Inventories - Crown forest within the AOU

Forest Summary - Management Consideration

Management consideration was introduced into the FRI in 2004. It provides a way to tag stands with an ecological or landscape feature or site condition that may require special consideration during resource management planning. Examples could be shallow or rocky soils, a wet area or physical damage. Stands may be made unavailable due to a management consideration.

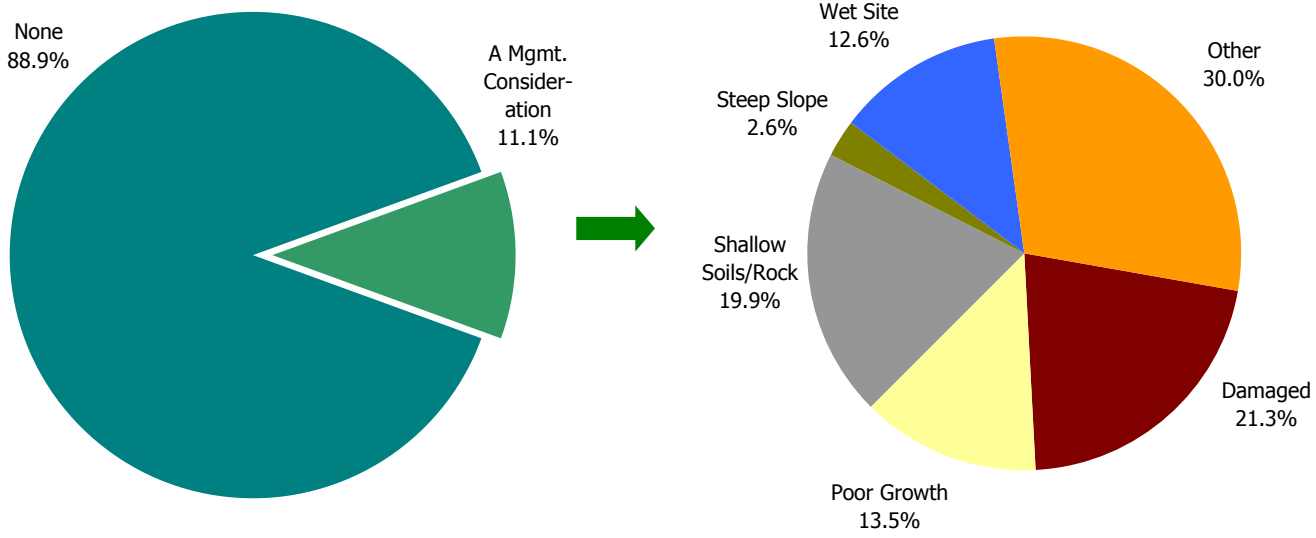
All Area in hectares

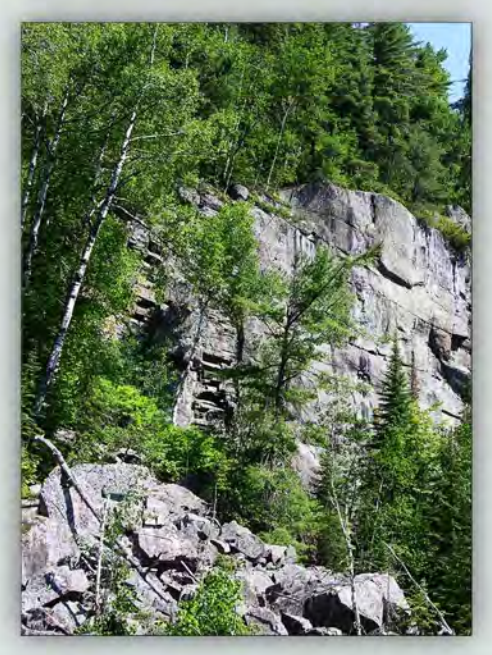
Total AOU Crown Forest Area by Management Consideration

Mgmt. Consideration	Crown Forest	Proportion
None	23,424,759	88.9%
Consideration	2,934,872	11.1%
Total:	26,359,631	100.0%

Total AOU Crown Forest Area by Management Consideration

Mgmt. Consideration	Crown Forest	Proportion
Damaged	625,326	21.3%
Poor Growth	395,906	13.5%
Shallow Soils/Rock	585,158	19.9%
Steep Slope	77,576	2.6%
Wet Site	370,681	12.6%
Other	880,225	30.0%
Total:	2,934,872	100.0%





Source: 2010 Forest Resources Inventories - Crown forest within the AOU

Forest Summary - Silvicultural System

Index

All productive forest stands are tagged with a silvicultural system code. These codes represent a method of harvest activity that optimizes the regeneration of the forest. The silvicultural system chosen is based on the characteristics of the current forest stand as well as the desired future forest condition.

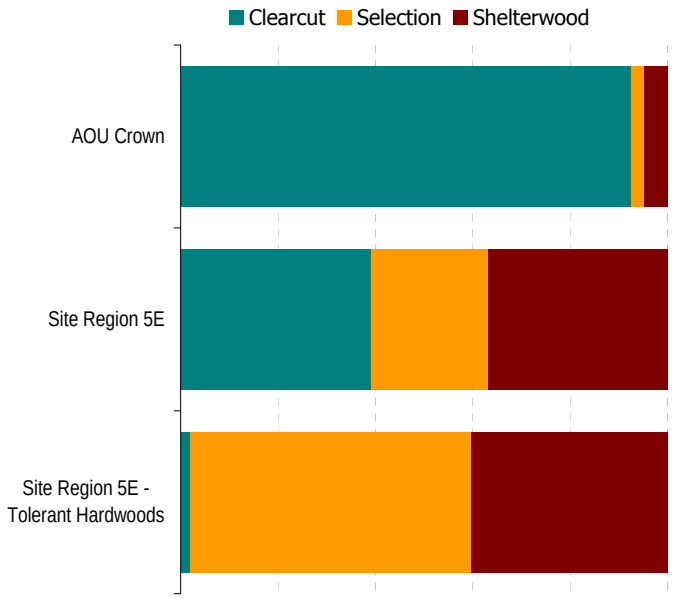
Ontario uses three basic silvicultural systems:

- Clearcut represents a system of regenerating an even-aged forest after most of the existing trees have been removed.
- Selection is an uneven-aged system where mature and/or undesirable trees are removed individually or in small groups. Regeneration is generally natural.
- Shelterwood is an even-aged system where mature trees are harvested in two or more cuts. Regenerating trees are grown under the shelter of residual trees.

All Area in hectares

Total AOU Crown Forest Area by Silvicultural System

Silvicultural System	Crown Forest	Proportion
Total AOU		
Clearcut system	24,394,565	92.5%
Selection system	702,703	2.7%
Shelterwood system	1,262,364	4.8%
Total:	26,359,631	100.0%
Site Region 5E		
Clearcut system	1,046,529	39.2%
Selection system	637,209	23.9%
Shelterwood system	982,973	36.9%
Total:	2,666,711	100.0%
Site Region 5E - Tolerant Hardwood Forest Type		
Clearcut system	19,950	2.0%
Selection system	570,820	57.6%
Shelterwood system	399,787	40.4%
Total:	990,557	100.0%



white pine shelterwood on the Northshore Forest

Source: 2010 Forest Resources Inventories - Crown forest within the AOU

Forest Summary - Age Structure

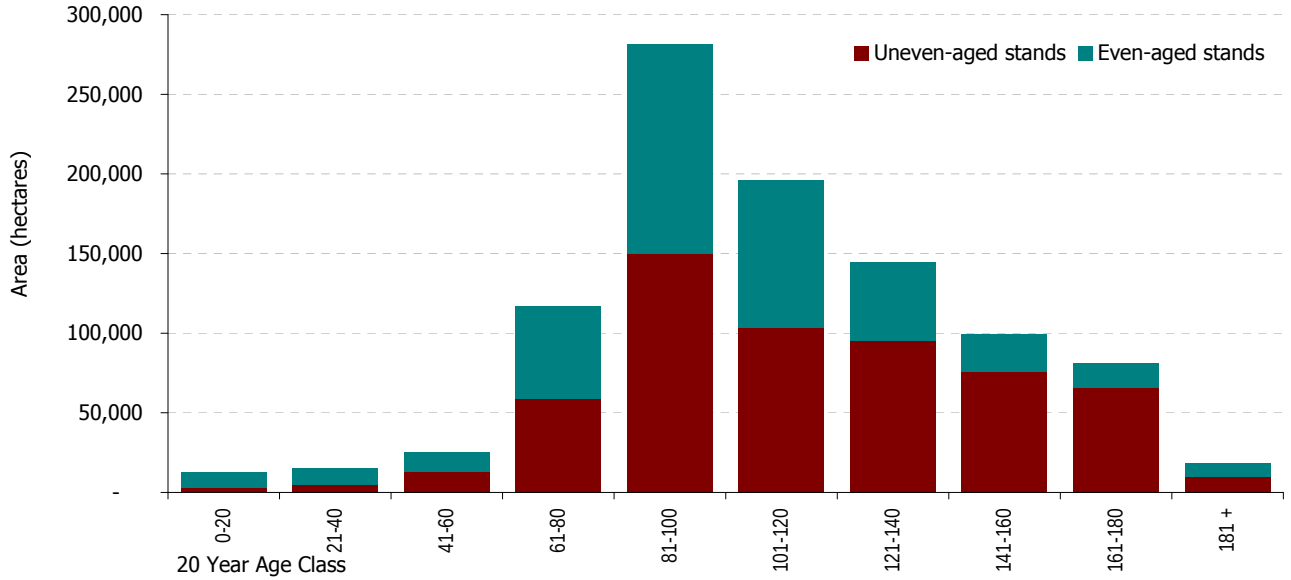
All forest stands in the FRI are tagged with an age structure indicator, which indicates the range of ages of the trees in a forest stand. Some forest types common in the boreal forest, such as jack pine or upland conifer, are usually found to have a single age in a stand. Forest types such as tolerant hardwoods in the Great Lakes-St. Lawrence forest often have a wide mix of ages in a stand from very young to very old. This should be noted when looking at the age class structure of individual species in other summaries in this document, as uneven-aged stands are often assigned an age related to their oldest trees rather than the youngest.

Crown Forest Area by Silvicultural System

All Area in hectares

Silvicultural System	Crown Forest	Proportion
Total AOU		
Even-aged stands	25,613,922	97.2%
Uneven-aged stands	745,709	2.8%
Total:	26,359,631	100.0%
Site Region 5E - Tolerant Hardwood Forest Type		
Even-aged stands	412,346	41.6%
Uneven-aged stands	578,211	58.4%
Total:	990,557	100.0%

Forest area by 20 year age class and age structure - Tolerant hardwoods in site region 5E on Crown land



Source: 2010 Forest Resources Inventories - Crown forest within the AOU

uneven-aged tolerant hardwood forest type

Area Summary - Ownerships (Crown)

Index

Crown Ownership

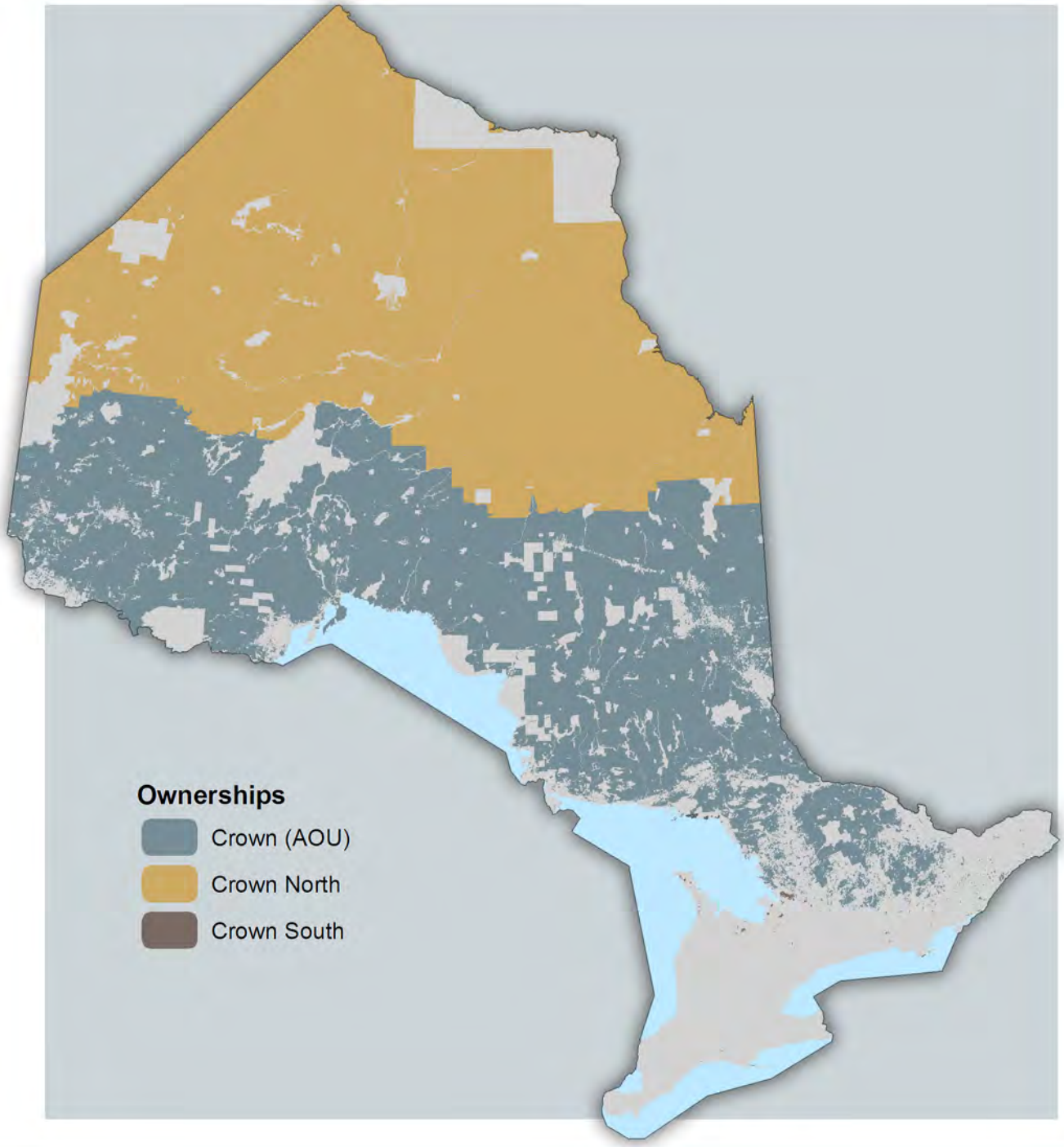
In this report, ownerships have been grouped for most area summaries.

The Crown ownership summary includes the following:

Crown (AOU): represents Crown lands and waters, and forest that is generally managed for harvest. Land withdrawals normally associated with areas of concern (AOCs), areas of scientific and natural interest (ANSIs), protection forest and other planning concerns are, in mmost cases, included with this category, even though they are not available for harvest.

Crown North: represents Crown lands north of the AOU or forest management zone. Although some of these lands have initiated a forest management plan, such as the Whitefeather Forest Management Unit, the bulk of this area is unavailable for harvest.

Crown South: represents Crown land and water south of the AOU or forest management zone. The ownership classes within southern Ontario are complex. Some classes of Crown land are unaccounted for, such as private lands patented to the Crown.



Area Summary - Ownerships (Crown)

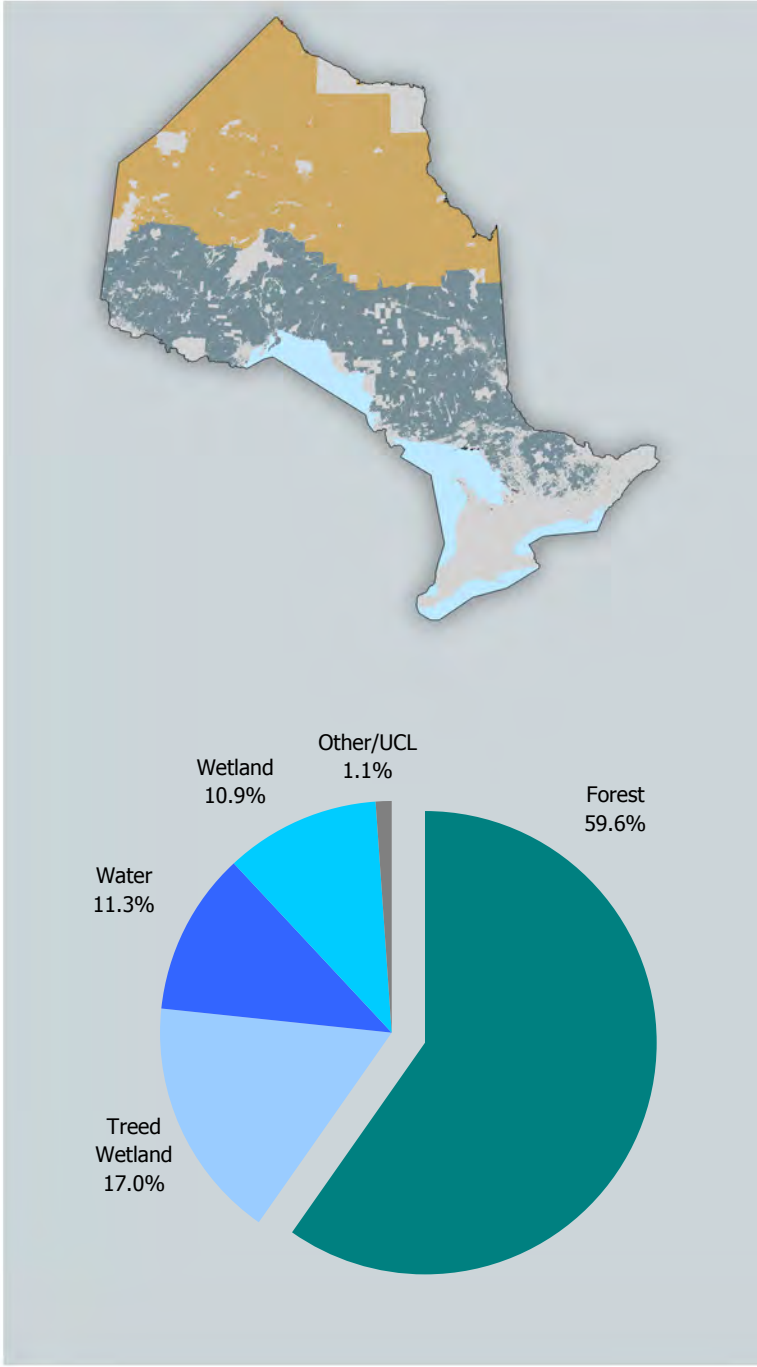
Total Area by Land Class and Crown Ownership

All Area in hectares

Land Class	Crown (AOU)	Crown North	Crown South	Total	Proportion
Non-forested Land and Water					
Water (Great Lakes)	8,544,737	-	-	8,544,737	
Water	4,642,537	3,839,417	2,156	8,484,110	10.2%
Wetland	286,737	7,877,719	5,881	8,170,336	9.8%
Rock	139,946	217,039	113	357,098	0.4%
Field/Agriculture	25,236	12	7,317	32,564	0.0%
UCL	40,998	8,584	517	50,099	0.1%
Other	117,609	291,495	35	409,138	0.5%
Subtotal:	13,797,800	12,234,265	16,018	26,048,082	31.2%
Non-productive Forest					
Treed Wetland	1,352,138	11,377,701	14,309	12,744,149	15.3%
Productive Forest					
Dense Deciduous	2,845,355	264,258	6,731	3,116,344	3.7%
Dense Conifer	7,433,135	5,948,299	7,518	13,388,952	16.0%
Mixed Forest	9,632,516	2,078,516	8,081	11,719,114	14.0%
Sparse Forest	4,350,308	6,693,075	378	11,043,761	13.2%
Regenerating Forest	867,094	1,440,316	-	2,307,411	2.8%
Disturbance - Fire	239,868	1,028,521	0	1,268,389	1.5%
Disturbance - Harvest	1,838,991	53	0	1,839,044	2.2%
Productive Forest:	27,207,268	17,453,039	22,709	44,683,015	53.5%
All Forest:	28,559,406	28,830,740	37,018	57,427,164	68.8%
Grand Total:	42,357,206	41,065,005	53,036	83,475,246	100.0%
Proportion:	50.7%	49.2%	0.1%	100.0%	

Source: Landcover 2008 satellite imagery

** Great lakes water has been lumped under Crown (AOU) area*



Area Summary - Ownership (Parks and Protected Areas)

Index

Parks and Protected Areas

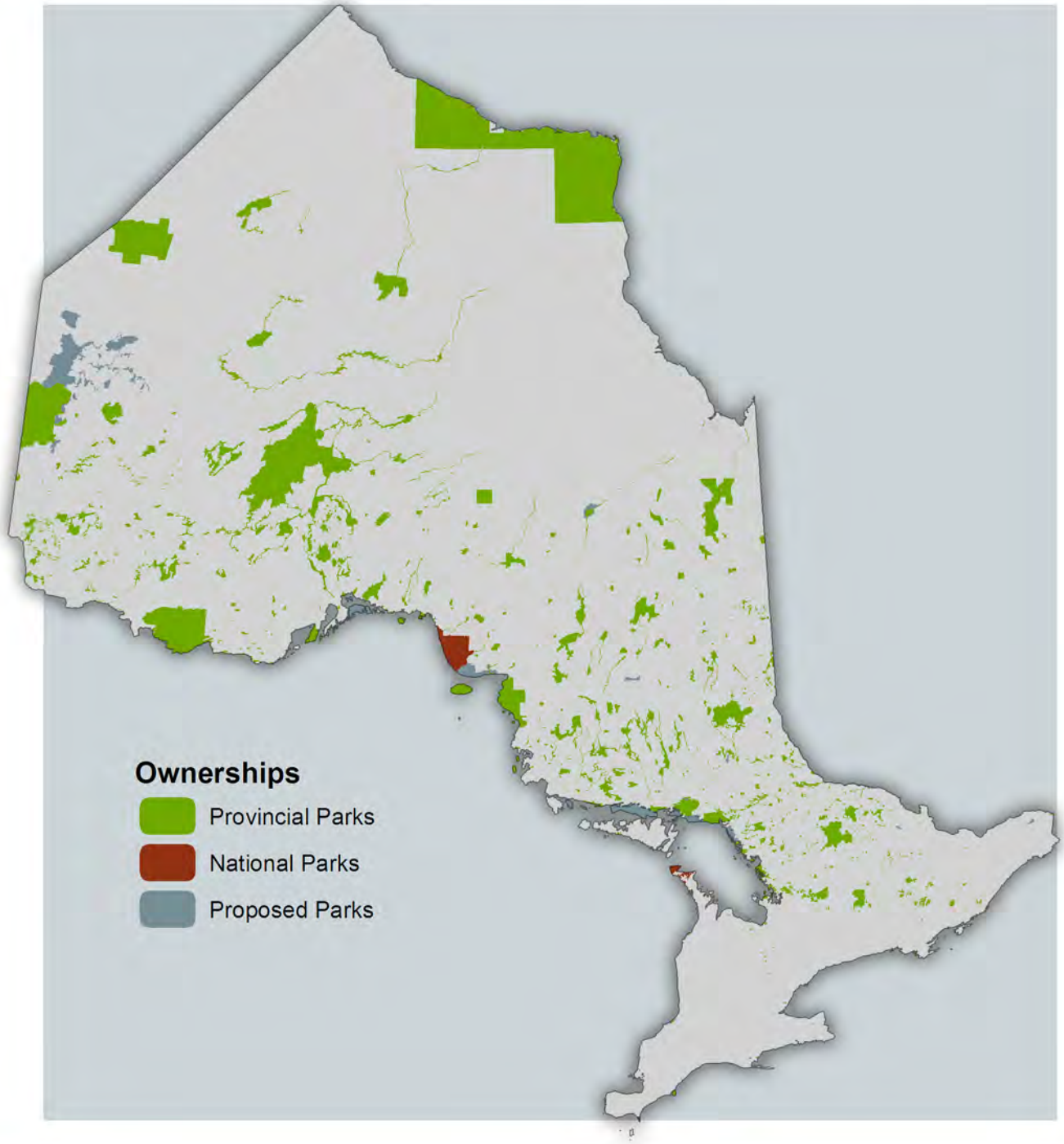
The parks and protected areas category represents all existing and proposed parks as of April 2010.

The parks and protected areas summary includes the following:

Provincial Parks: all provincial parks, conservation reserves and forest reserves designated as of April 2010.

Proposed Provincial Parks: all new or proposed provincial parks that have received interim protection as of April 2010.

National Parks: all federal or national parks, including Pukaskwa National Park, Georgian Bay Islands National Park, Fathom Five National Park.



Area Summary - Ownership (Parks and Protected Areas)

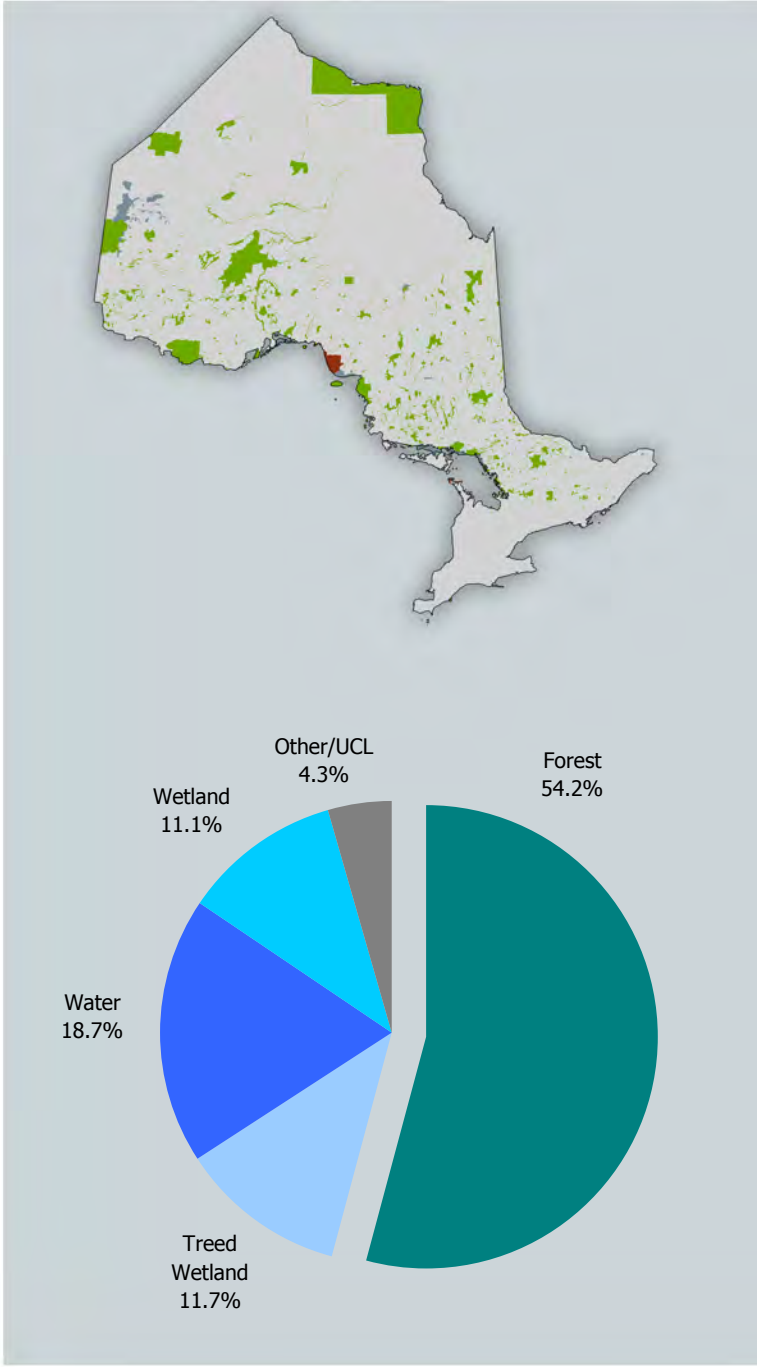
Total Area by Land Class and Parks Ownership

All Area in hectares

Land Class	Provincial Parks	Proposed Provincial Parks	National Parks	Total	Proportion
Non-forested Land and Water					
Water	1,581,729	216,442	21,276	1,819,446	18.7%
Wetland	1,064,854	15,781	1,514	1,082,148	11.1%
Rock	102,265	25,795	3,366	131,427	1.3%
Field/Agriculture	6,317	216	368	6,901	0.1%
UCL	3,727	72	94	3,893	0.0%
Other	270,530	8,137	90	278,757	2.9%
Subtotal:	3,029,422	266,442	26,709	3,322,573	34.1%
Non-productive Forest					
Treed Wetland	1,113,719	27,139	1,583	1,142,442	11.7%
Productive Forest					
Dense Deciduous	431,031	46,230	63,750	541,011	5.6%
Dense Conifer	1,419,256	131,631	36,595	1,587,482	16.3%
Mixed Forest	1,381,269	126,907	71,008	1,579,184	16.2%
Sparse Forest	1,059,962	131,655	8,986	1,200,602	12.3%
Regenerating Forest	161,389	27,318	1	188,708	1.9%
Disturbance - Fire	162,487	10,555	41	173,083	1.8%
Disturbance - Harvest	6,453	24	172	6,649	0.1%
Productive Forest:	4,621,846	474,320	180,553	5,276,719	54.2%
All Forest:	5,735,565	501,459	182,136	6,419,161	65.9%
Grand Total:	8,764,987	767,902	208,845	9,741,734	100.0%
Proportion:	90.0%	7.9%	2.1%	100.0%	

Source: Landcover 2008 satellite imagery

** Great lakes water has been lumped under water*



Area Summary - Ownerships (Other)

Index

Other Ownerships

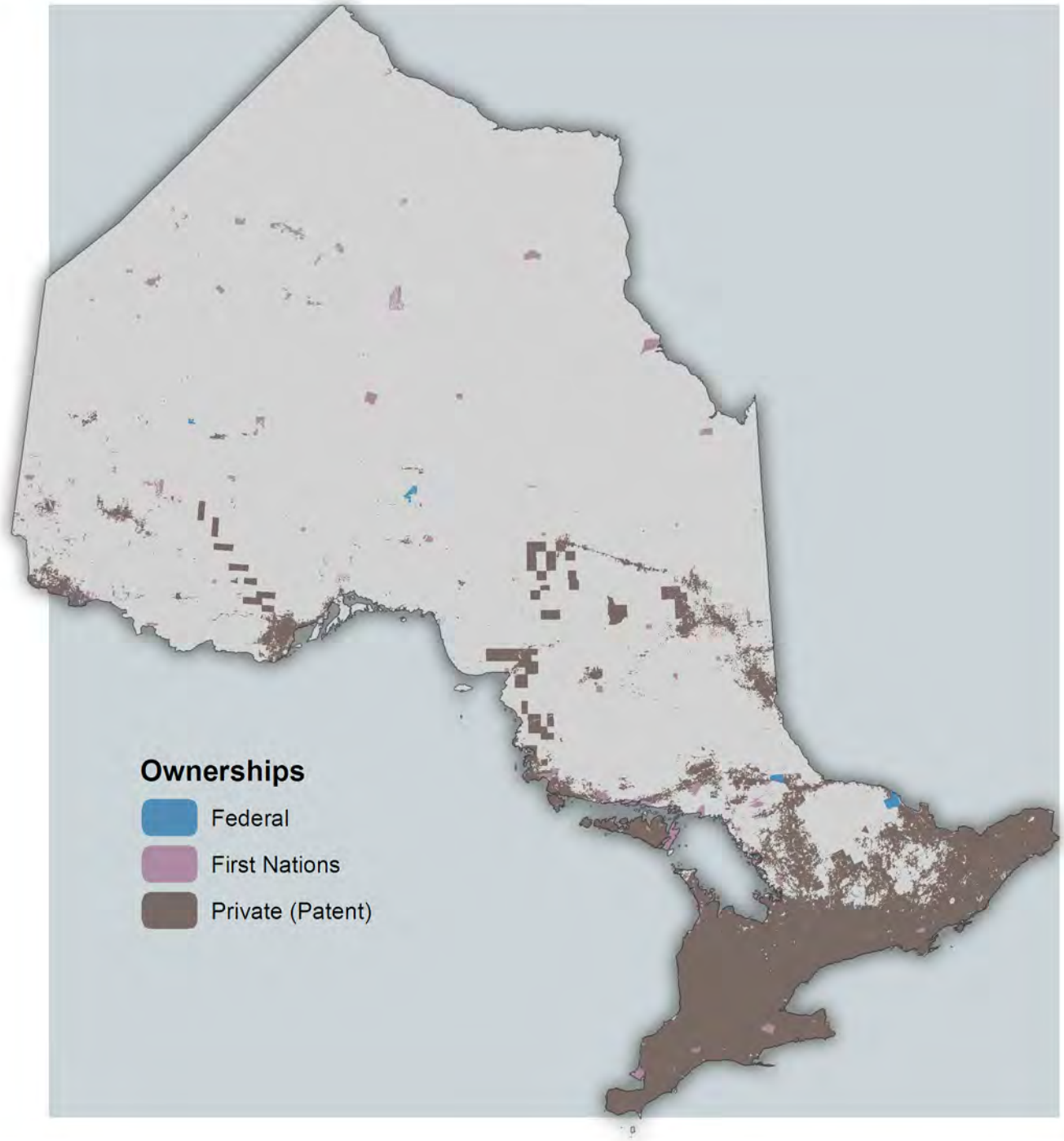
The ownership group "Other" represents three main non-Crown ownerships.

The Other Ownership area summary includes the following:

Federal: all federally owned land and water.

First Nations: all existing First Nations lands as defined in provincial coverages as of April 2010. Within this data set there are overlaps and conflicts with the "Federal" class of ownership.

Private: all private or patented land and water (owned by private citizens).



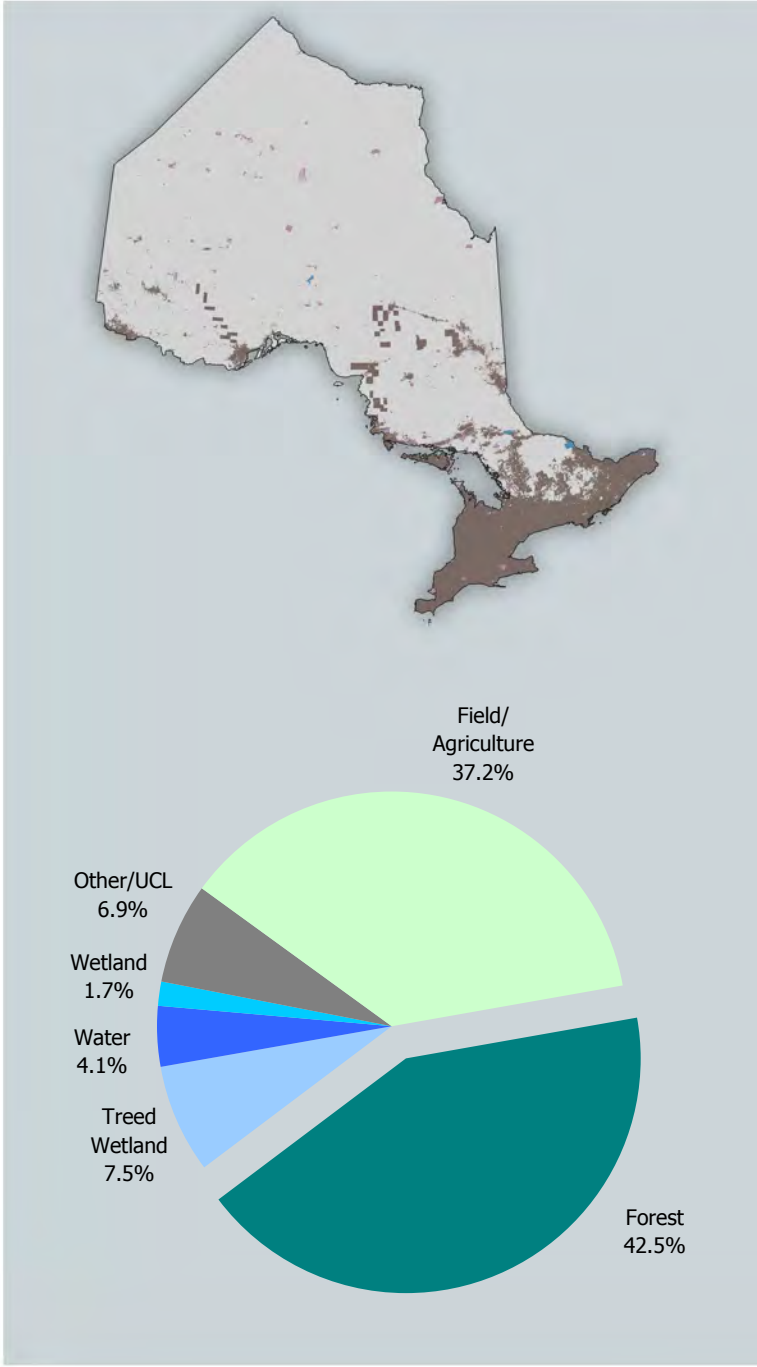
Area Summary - Ownership (Other)

Total Area by Land Class and Other Ownerships

All Area in hectares

Land Class	Federal	First Nations	Private (Patent)	Total	Proportion
Non-forested Land and Water					
Water	3,665	60,302	531,030	594,998	4.1%
Wetland	175	32,605	212,732	245,512	1.7%
Rock	632	13,985	132,084	146,701	1.0%
Field/Agriculture	345	33,080	5,328,721	5,362,145	37.2%
UCL	1,811	11,423	801,926	815,160	5.7%
Other	171	3,544	29,763	33,478	0.2%
Subtotal:	6,800	154,938	7,036,256	7,197,994	49.9%
Non-productive Forest					
Treed Wetland	2,761	84,214	999,612	1,086,587	7.5%
Productive Forest					
Dense Deciduous	6,725	102,891	1,585,462	1,695,077	11.8%
Dense Conifer	25,148	113,475	880,366	1,018,988	7.1%
Mixed Forest	26,442	195,788	2,020,253	2,242,483	15.6%
Sparse Forest	22,848	135,247	975,809	1,133,904	7.9%
Regenerating Forest	159	18,146	2,152	20,457	0.1%
Disturbance - Fire	872	9,382	1,744	11,998	0.1%
Disturbance - Harvest	220	143	11,586	11,949	0.1%
Productive Forest:	82,414	575,072	5,477,372	6,134,858	42.5%
All Forest:	85,175	659,286	6,476,984	7,221,444	50.1%
Grand Total:	91,975	814,224	13,513,239	14,419,438	100.0%
Proportion:	0.6%	5.6%	93.7%	100.0%	

Source: Landcover 2008 satellite imagery



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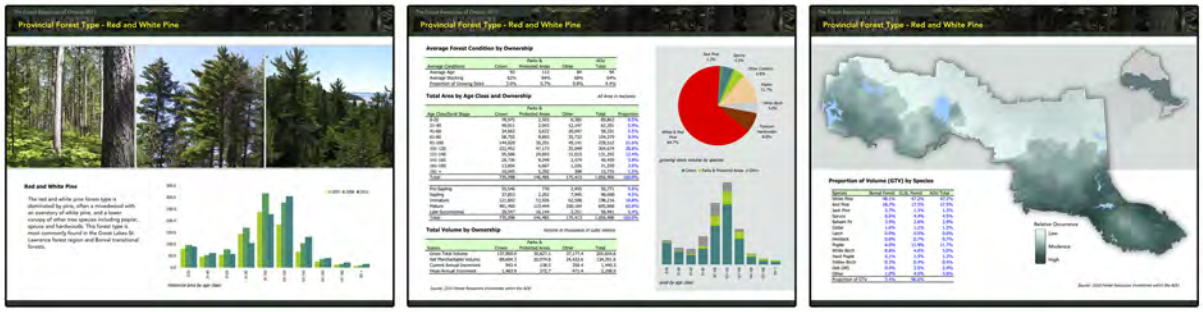
Provincial Forest Types

Interactive Chapter Index

Each of the eight provincial forest types is highlighted in a three page summary that includes:

- Introduction page, with a text description, age class distribution and three images
- Inventory (FRI) summary page, with detailed area, volume and other statistics
- Distribution map for the AOU with a growing stock summary by species



select a summary

Red & White Pine

Jack Pine

Conifer Upland

Conifer Lowland

Mixedwood

Poplar

White Birch

Tolerant Hardwoods

Provincial Forest Types

Broad forest cover classes (provincial forest types) are summarized in this chapter. Individual species are summarized later, in the species distribution summaries.

Provincial forest types are based on ecological processes, and utilize forest / landscape units described in the regional forest ecosystem classification (FEC) guides. By incorporating information on forest understory vegetation, soil, and associated tree species, this forest ecosystem aggregation uses more than just the dominant tree species. The provincial forest types used in this document are an aggregation of these classification sets, applied to the current set of forest resources inventories (FRI).

Each forest type contains a varying mix of individual tree species. Some are more homogenous such as the jack pine forest type which is mostly pure upland jack pine stands. Others, such as mixedwood or tolerant hardwoods have a wide variety of tree species. Each forest type has an associated species summary based on gross total volume (GTV) by species.

Provincial forest type summaries are based on inventory within the AOU only, but do include parks and protected areas as well as other ownerships where inventory is available.

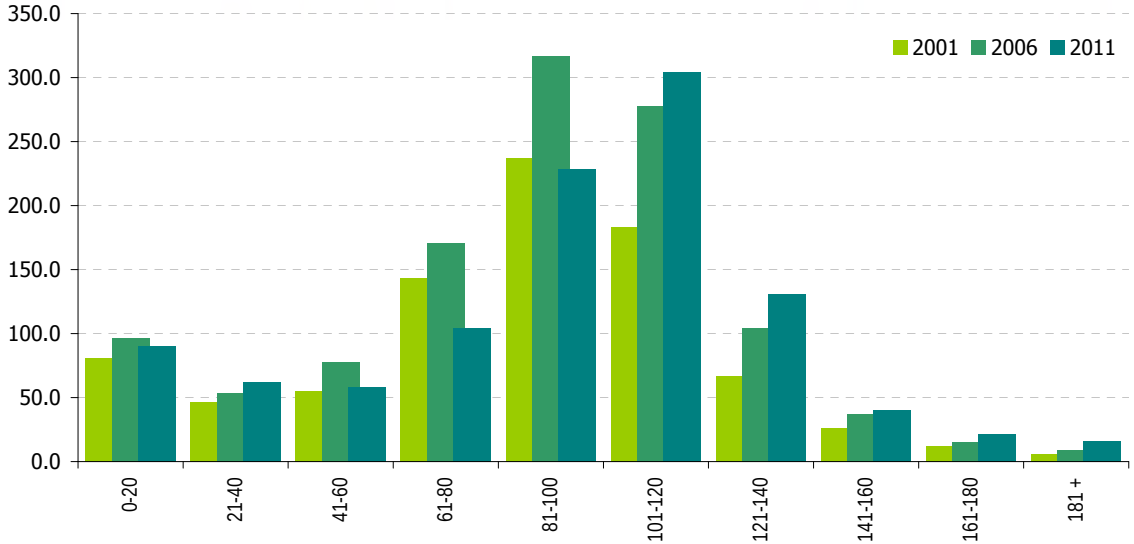
tolerant hardwood provincial forest type on the Algoma Forest

Provincial Forest Type - Red and White Pine

Index

Red and White Pine

The red and white pine forest type is dominated by pine, often a mixedwood with an overstory of white pine, and a lower canopy of other tree species including poplar, spruce and hardwoods. This forest type is most commonly found in the Great Lakes-St. Lawrence forest region and Boreal transitional forests.



Historical area by age class

Provincial Forest Type - Red and White Pine

Average Forest Condition by Ownership

Average Conditions	Crown	Parks & Protected Areas	Other	AOU Total
Average Age	93	113	84	94
Average Stocking	62%	64%	68%	64%
Proportion of Growing Stock	3.0%	0.7%	0.8%	4.4%

Total Area by Age Class and Ownership

All Area in hectares

Age Class/Seral Stage	Crown	Parks & Protected Areas	Other	Total	Proportion
0-20	78,975	2,503	8,385	89,863	8.5%
21-40	48,011	2,043	12,147	62,201	5.9%
41-60	34,662	3,622	20,047	58,331	5.5%
61-80	58,755	9,893	35,732	104,379	9.9%
81-100	144,020	35,351	49,141	228,512	21.6%
101-120	222,452	47,173	35,049	304,674	28.8%
121-140	95,586	24,693	11,013	131,292	12.4%
141-160	28,736	9,249	2,474	40,459	3.8%
161-180	13,856	6,667	1,026	21,550	2.0%
181 +	10,045	5,292	398	15,735	1.5%
Total:	735,098	146,485	175,413	1,056,996	100.0%

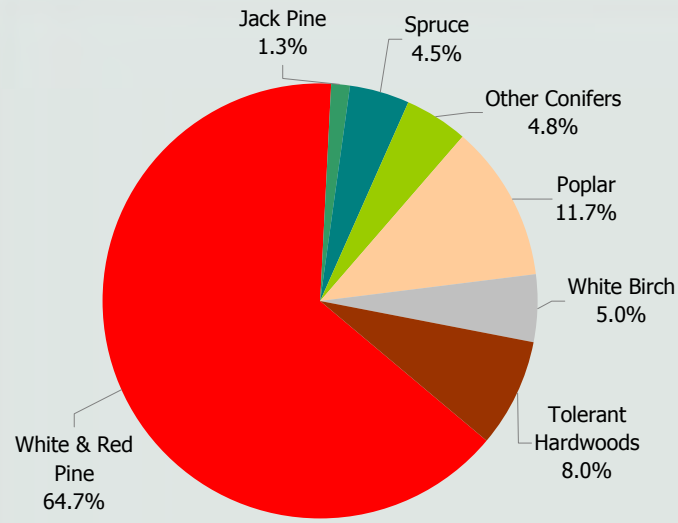
Pre-Sapling	55,546	770	2,455	58,771	5.6%
Sapling	37,853	2,202	7,945	48,000	4.5%
Immature	121,692	13,926	62,598	198,216	18.8%
Mature	481,460	113,444	100,164	695,068	65.8%
Late-Successional	38,547	16,144	2,251	56,941	5.4%
Total:	735,098	146,485	175,413	1,056,996	100.0%

Total Volume by Ownership

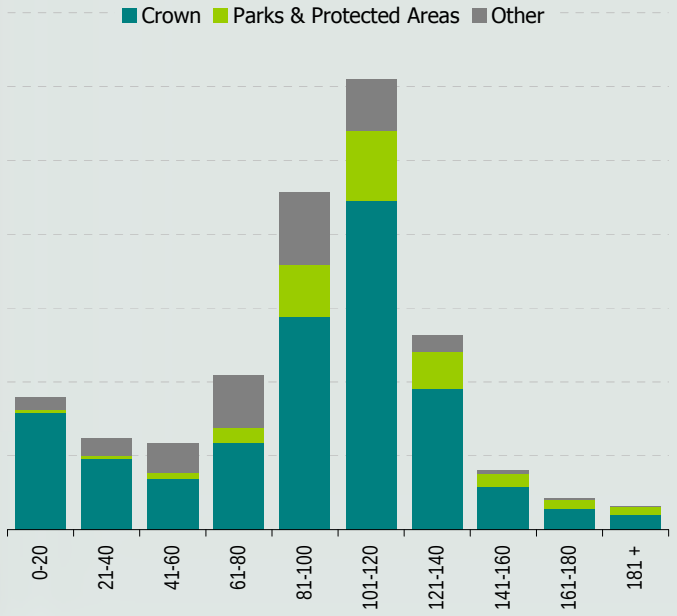
Volume in thousands of cubic metres

Statistic	Crown	Parks & Protected Areas	Other	Total
Gross Total Volume	137,850.0	30,627.1	37,177.4	205,654.6
Net Merchantable Volume	89,694.3	20,074.8	24,432.6	134,201.6
Current Annual Increment	943.4	138.5	358.4	1,440.3
Mean Annual Increment	1,463.9	272.7	471.4	2,208.0

Source: 2010 Forest Resources Inventories within the AOU

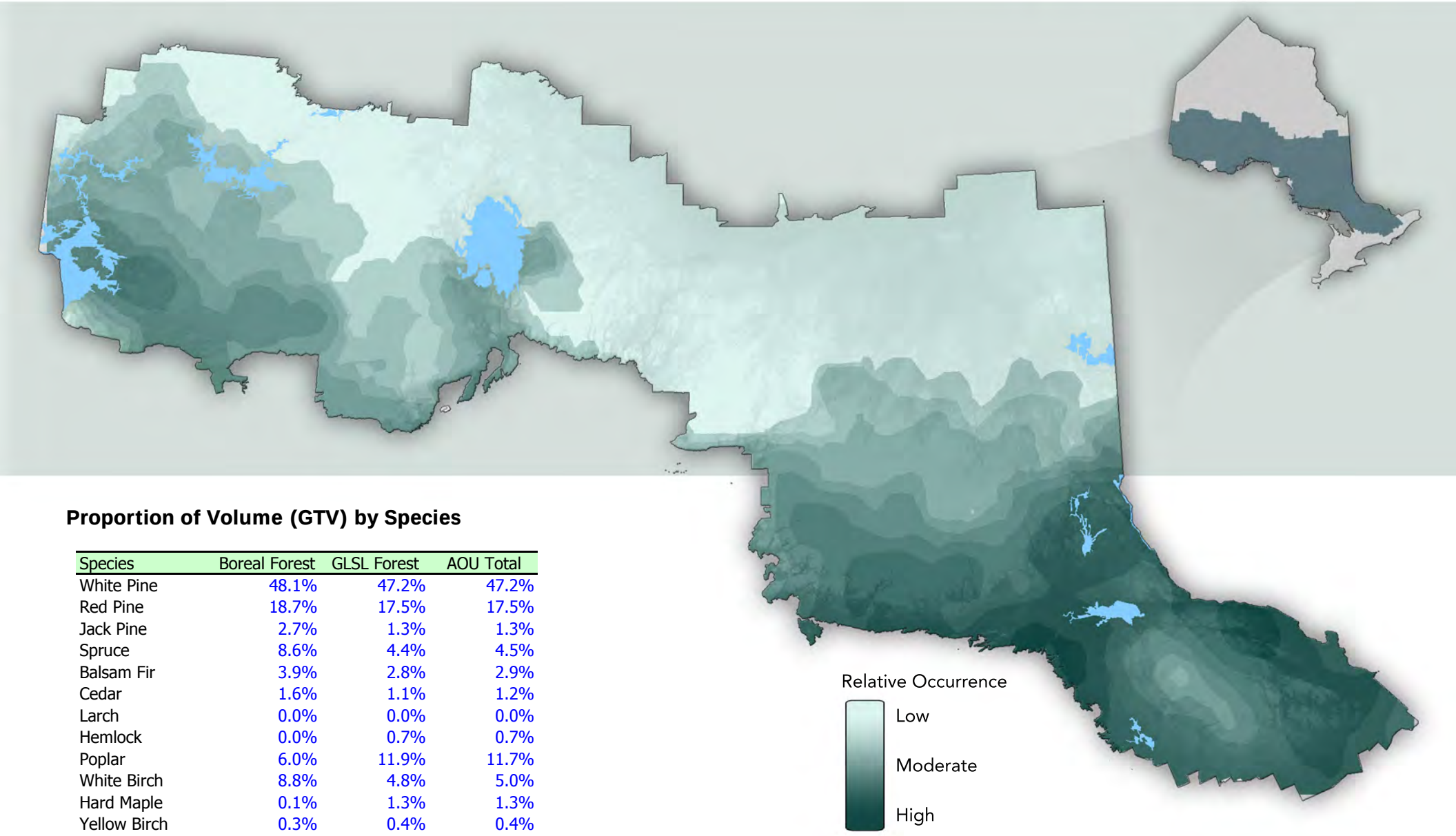


growing stock volume by species



area by age class

Provincial Forest Type - Red and White Pine



Proportion of Volume (GTV) by Species

Species	Boreal Forest	GLSL Forest	AOU Total
White Pine	48.1%	47.2%	47.2%
Red Pine	18.7%	17.5%	17.5%
Jack Pine	2.7%	1.3%	1.3%
Spruce	8.6%	4.4%	4.5%
Balsam Fir	3.9%	2.8%	2.9%
Cedar	1.6%	1.1%	1.2%
Larch	0.0%	0.0%	0.0%
Hemlock	0.0%	0.7%	0.7%
Poplar	6.0%	11.9%	11.7%
White Birch	8.8%	4.8%	5.0%
Hard Maple	0.1%	1.3%	1.3%
Yellow Birch	0.3%	0.4%	0.4%
Oak (All)	0.0%	2.5%	2.4%
Other	1.0%	4.0%	3.9%
Proportion of GTV	3.4%	96.6%	

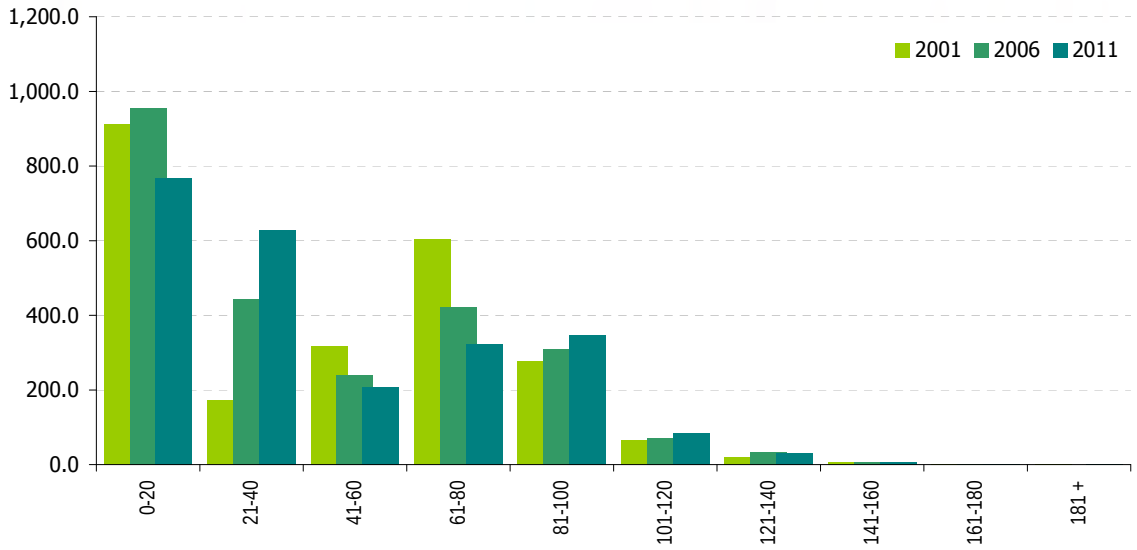
Source: 2010 Forest Resources Inventories within the AOU

Provincial Forest Type - Jack Pine

Index

Jack Pine

The jack pine forest type is dominated by homogenous, even-aged stands, often on well drained sandy sites. It can be associated with poplar and spruce on some sites, but is generally almost pure jack pine. It is most commonly found in the Boreal forest, especially in the northwest.



Historical area by age class

Provincial Forest Type - Jack Pine

Average Forest Condition by Ownership

Average Conditions	Crown	Parks & Protected Areas	Other	AOU Total
Average Age	44	64	52	46
Average Stocking	74%	79%	61%	74%
Proportion of Growing Stock	5.1%	0.4%	0.1%	5.7%

Total Area by Age Class and Ownership

All Area in hectares

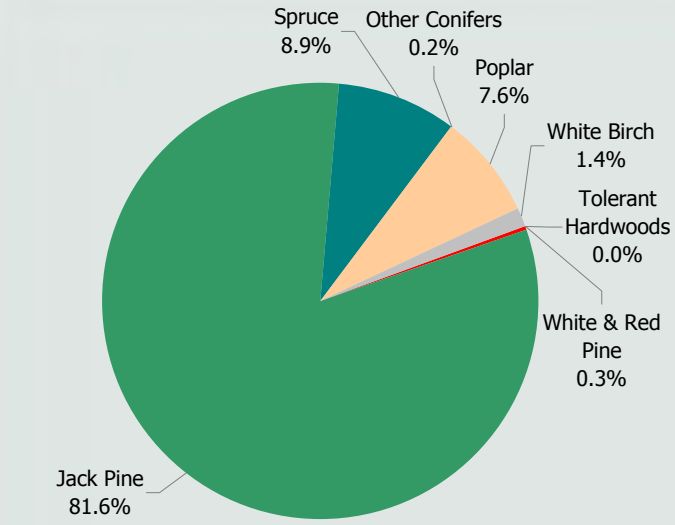
Age Class/Seral Stage	Crown	Parks & Protected Areas	Other	Total	Proportion
0-20	739,096	16,483	10,858	766,437	32.0%
21-40	582,217	34,214	10,603	627,035	26.2%
41-60	186,018	15,219	7,634	208,870	8.7%
61-80	290,330	22,936	10,954	324,220	13.5%
81-100	298,820	39,777	7,891	346,487	14.5%
101-120	72,013	10,454	667	83,134	3.5%
121-140	27,548	4,132	173	31,854	1.3%
141-160	5,877	757	88	6,723	0.3%
161-180	448	62	-	509	0.0%
181 +	1,595	40	390	2,026	0.1%
Total:	2,203,963	144,073	49,260	2,397,296	100.0%
Pre-Sapling	302,686	4,167	1,118	307,971	12.8%
Sapling	607,803	18,980	13,332	640,115	26.7%
Immature	648,555	46,938	16,038	711,531	29.7%
Mature	587,738	65,236	17,924	670,898	28.0%
Late-Successional	57,181	8,753	847	66,781	2.8%
Total:	2,203,963	144,073	49,260	2,397,296	100.0%

Total Volume by Ownership

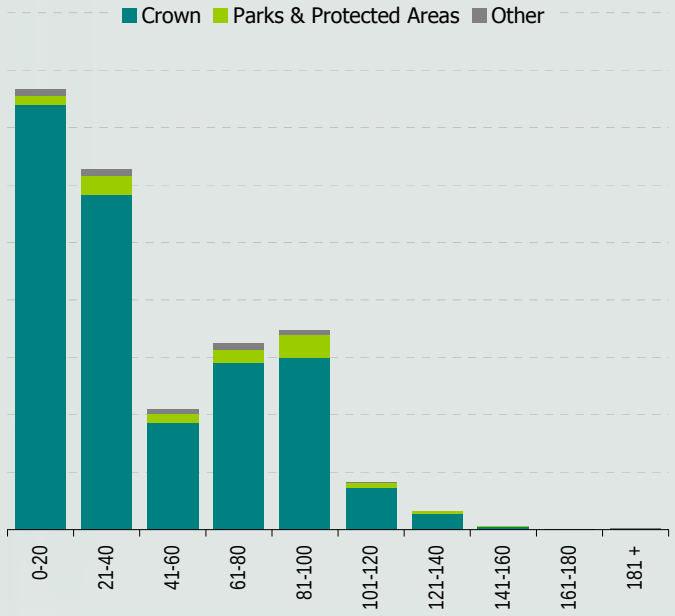
Volume in thousands of cubic metres

Statistic	Crown	Parks & Protected Areas	Other	Total
Gross Total Volume	238,212.2	20,731.9	5,670.1	264,614.1
Net Merchantable Volume	149,248.0	13,953.0	3,866.2	167,067.1
Current Annual Increment	3,309.6	209.1	59.6	3,578.3
Mean Annual Increment	4,529.8	314.7	95.8	4,940.3

Source: 2010 Forest Resources Inventories within the AOU

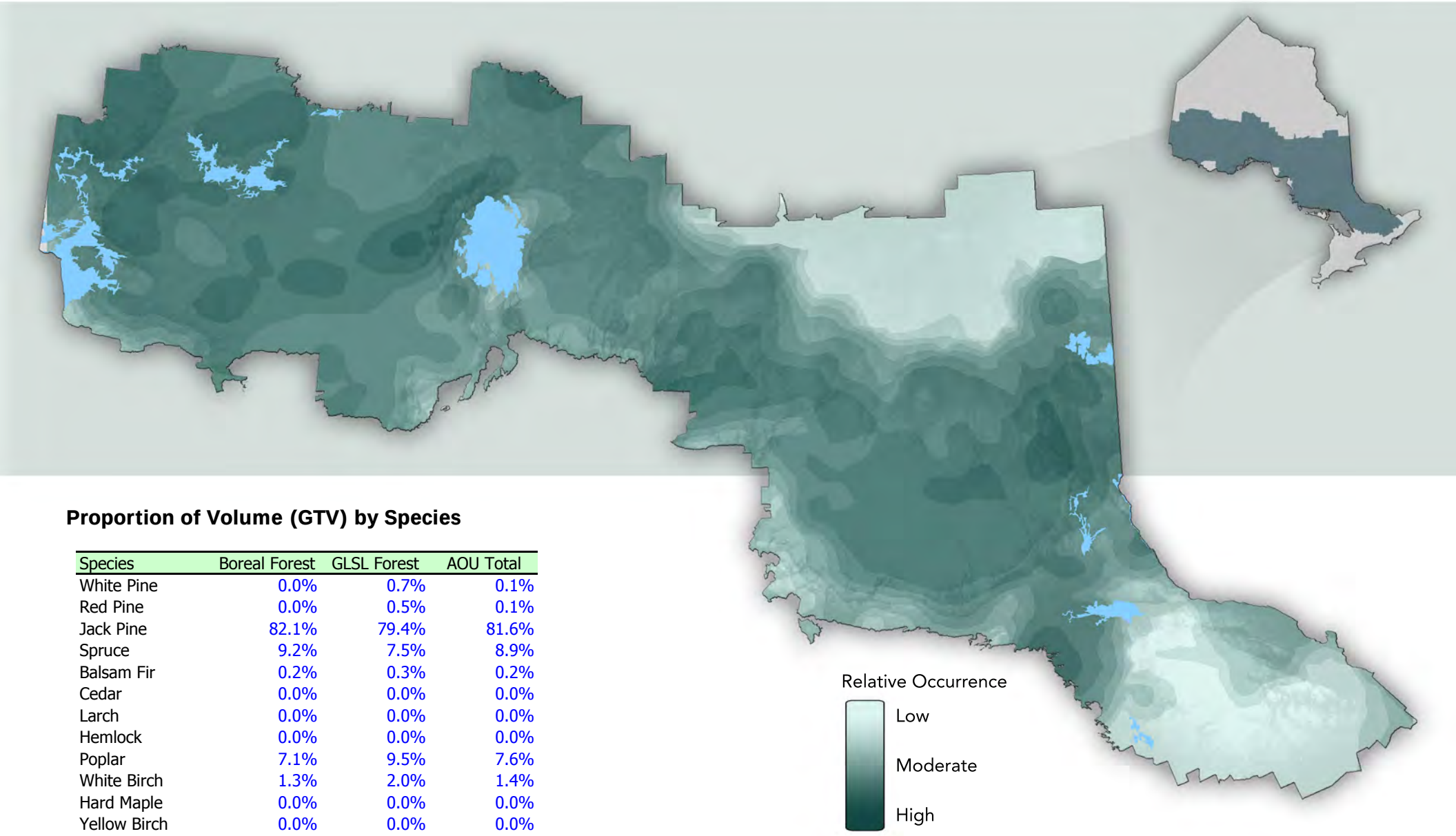


growing stock volume by species



area by age class

Provincial Forest Type - Jack Pine



Proportion of Volume (GTV) by Species

Species	Boreal Forest	GLSL Forest	AOU Total
White Pine	0.0%	0.7%	0.1%
Red Pine	0.0%	0.5%	0.1%
Jack Pine	82.1%	79.4%	81.6%
Spruce	9.2%	7.5%	8.9%
Balsam Fir	0.2%	0.3%	0.2%
Cedar	0.0%	0.0%	0.0%
Larch	0.0%	0.0%	0.0%
Hemlock	0.0%	0.0%	0.0%
Poplar	7.1%	9.5%	7.6%
White Birch	1.3%	2.0%	1.4%
Hard Maple	0.0%	0.0%	0.0%
Yellow Birch	0.0%	0.0%	0.0%
Oak (All)	0.0%	0.0%	0.0%
Other	0.0%	0.1%	0.0%
Proportion of GTV	80.7%	19.3%	

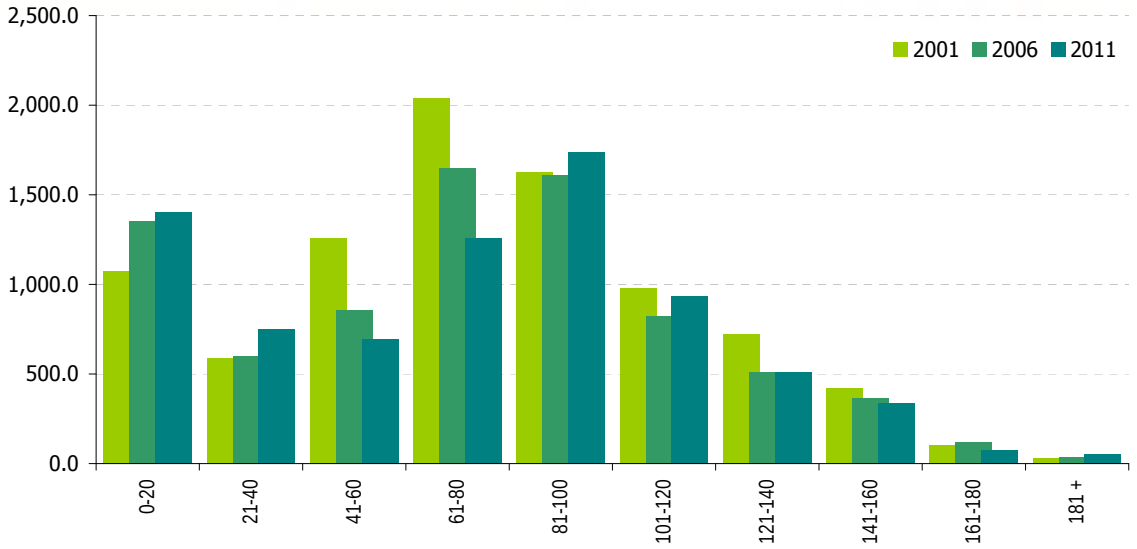
Source: 2010 Forest Resources Inventories within the AOU

Provincial Forest Type - Conifer Upland

Index

Conifer Upland

The mixed conifer upland forest type is dominated by black and white spruce, jack pine and balsam fir, often with a component of poplar and white birch. It occurs on upland or well drained to shallow sites, and is most commonly found in the Boreal forest.



Historical area by age class

Provincial Forest Type - Conifer Upland

Average Forest Condition by Ownership

Average Conditions	Crown	Parks & Protected Areas	Other	AOU Total
Average Age	72	93	82	74
Average Stocking	65%	70%	66%	66%
Proportion of Growing Stock	19.7%	2.0%	2.0%	23.7%

Total Area by Age Class and Ownership

All Area in hectares

Age Class/Seral Stage	Crown	Parks & Protected Areas	Other	Total	Proportion
0-20	1,333,032	30,808	37,967	1,401,807	18.1%
21-40	710,419	17,674	20,333	748,427	9.7%
41-60	599,288	33,999	60,703	693,990	9.0%
61-80	997,651	96,870	165,155	1,259,676	16.2%
81-100	1,430,746	163,377	142,765	1,736,888	22.4%
101-120	787,904	98,670	49,237	935,810	12.1%
121-140	434,857	48,766	24,716	508,339	6.6%
141-160	290,698	27,810	19,362	337,871	4.4%
161-180	65,894	6,184	4,569	76,646	1.0%
181 +	36,478	9,872	6,194	52,545	0.7%
Total:	6,686,967	534,030	531,002	7,751,999	100.0%

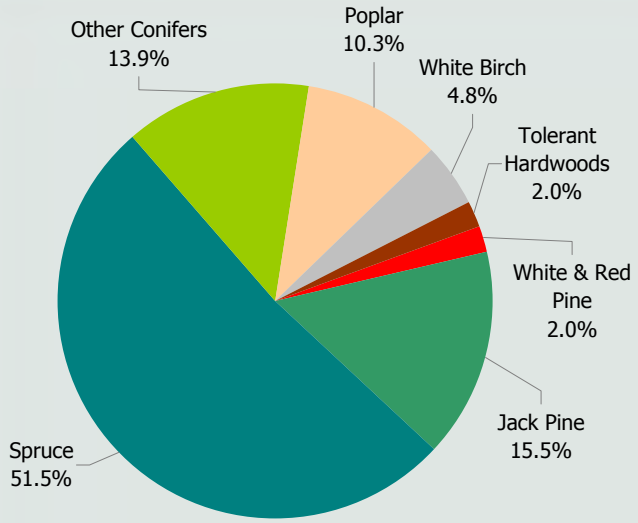
Pre-Sapling	623,394	10,469	6,961	640,824	8.3%
Sapling	928,653	25,158	35,500	989,311	12.8%
Immature	1,463,116	78,824	141,433	1,683,372	21.7%
Mature	2,482,005	279,887	272,377	3,034,268	39.1%
Late-Successional	1,189,799	139,692	74,731	1,404,223	18.1%
Total:	6,686,967	534,030	531,002	7,751,999	100.0%

Total Volume by Ownership

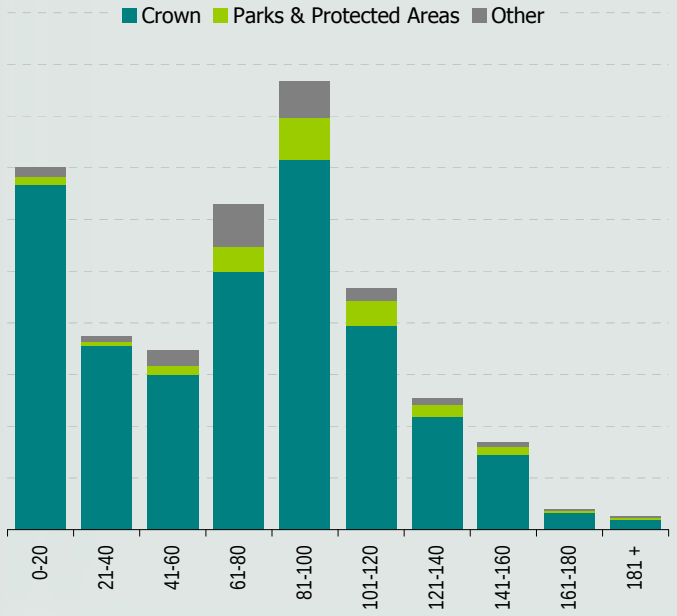
Volume in thousands of cubic metres

Statistic	Crown	Parks & Protected Areas	Other	Total
Gross Total Volume	920,601.0	93,727.0	91,352.5	1,105,680.5
Net Merchantable Volume	551,042.6	57,702.5	53,601.2	662,346.2
Current Annual Increment	8,379.5	626.3	828.3	9,834.0
Mean Annual Increment	11,208.0	992.3	1,105.9	13,306.2

Source: 2010 Forest Resources Inventories within the AOU

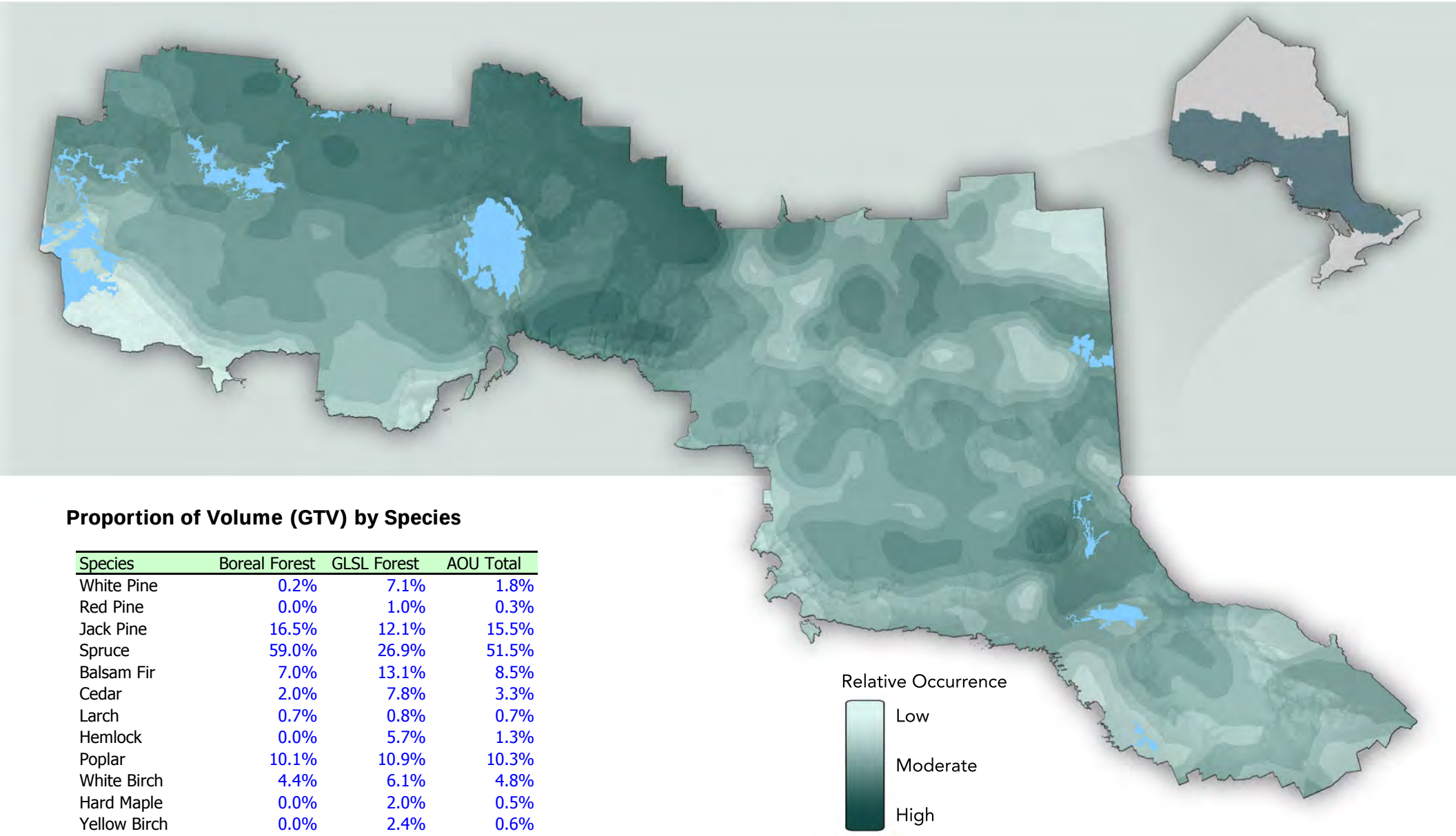


growing stock volume by species



area by age class

Provincial Forest Type - Conifer Upland



Proportion of Volume (GTV) by Species

Species	Boreal Forest	GLSL Forest	AOU Total
White Pine	0.2%	7.1%	1.8%
Red Pine	0.0%	1.0%	0.3%
Jack Pine	16.5%	12.1%	15.5%
Spruce	59.0%	26.9%	51.5%
Balsam Fir	7.0%	13.1%	8.5%
Cedar	2.0%	7.8%	3.3%
Larch	0.7%	0.8%	0.7%
Hemlock	0.0%	5.7%	1.3%
Poplar	10.1%	10.9%	10.3%
White Birch	4.4%	6.1%	4.8%
Hard Maple	0.0%	2.0%	0.5%
Yellow Birch	0.0%	2.4%	0.6%
Oak (All)	0.0%	0.4%	0.1%
Other	0.0%	3.7%	0.9%
Proportion of GTV	76.6%	23.4%	

Source: 2010 Forest Resources Inventories within the AOU

Provincial Forest Type - Conifer Lowland

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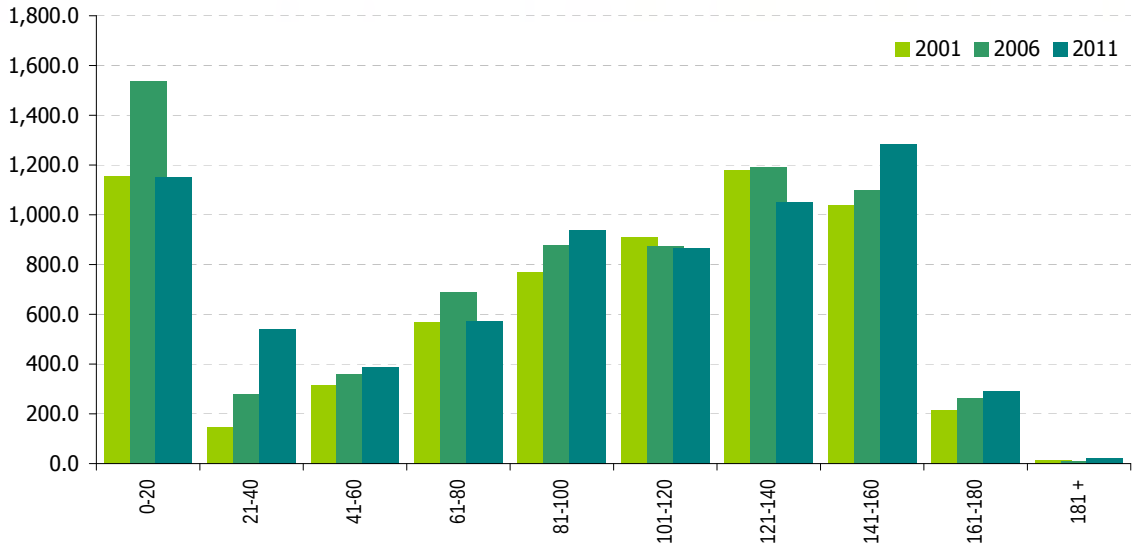
Conifer Lowland

The conifer lowland forest type is dominated by black spruce, often associated with cedar and larch. It is commonly found on moist to wet or organic soils on lowland sites. The lowland conifer forest type is found primarily in the Boreal forest, especially in the far north and the north end of the northeast.



Historical area by age class

Provincial Forest Type - Conifer Lowland

Average Forest Condition by Ownership

Average Conditions	Crown	Parks & Protected Areas	Other	AOU Total
Average Age	94	114	83	94
Average Stocking	61%	66%	56%	61%
Proportion of Growing Stock	14.8%	1.2%	1.5%	17.5%

Total Area by Age Class and Ownership

All Area in hectares

Age Class/Seral Stage	Crown	Parks & Protected Areas	Other	Total	Proportion
0-20	1,060,387	28,104	61,470	1,149,961	16.2%
21-40	438,765	12,867	89,063	540,695	7.6%
41-60	318,907	10,443	59,503	388,853	5.5%
61-80	469,323	27,961	75,264	572,548	8.1%
81-100	786,093	49,324	104,044	939,461	13.2%
101-120	726,077	74,386	64,235	864,698	12.2%
121-140	937,482	63,485	49,495	1,050,462	14.8%
141-160	1,114,503	96,077	72,626	1,283,206	18.1%
161-180	253,196	27,555	12,010	292,762	4.1%
181 +	19,775	1,004	1,066	21,844	0.3%
Total:	6,124,509	391,206	588,775	7,104,490	100.0%

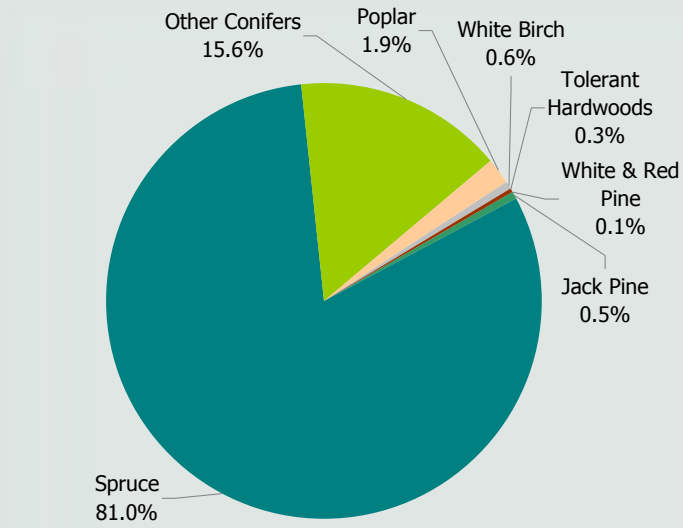
Pre-Sapling	821,101	11,812	28,188	861,100	12.1%
Sapling	668,723	29,092	121,650	819,465	11.5%
Immature	759,442	34,692	125,173	919,307	12.9%
Mature	2,360,163	183,592	211,921	2,755,675	38.8%
Late-Successional	1,515,080	132,019	101,844	1,748,943	24.6%
Total:	6,124,509	391,206	588,775	7,104,490	100.0%

Total Volume by Ownership

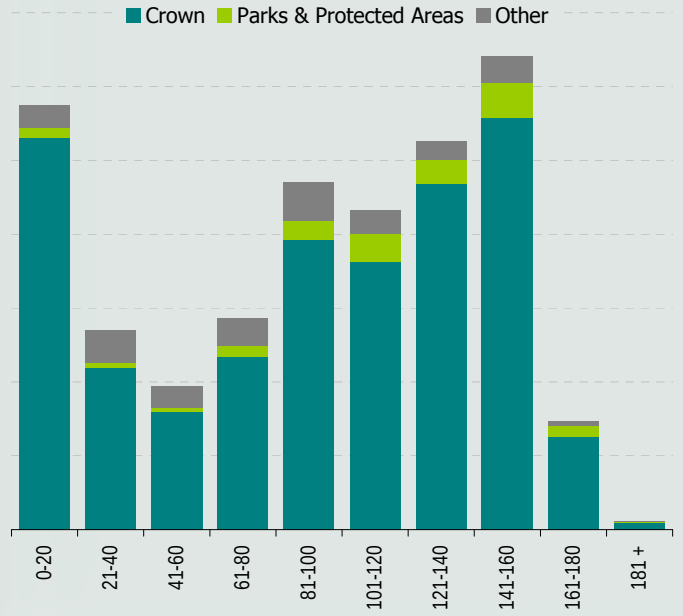
Volume in thousands of cubic metres

Statistic	Crown	Parks & Protected Areas	Other	Total
Gross Total Volume	688,190.8	56,035.8	71,030.4	815,256.9
Net Merchantable Volume	370,478.8	31,668.6	35,934.1	438,081.5
Current Annual Increment	4,891.1	270.2	540.5	5,701.8
Mean Annual Increment	6,478.0	459.8	709.4	7,647.2

Source: 2010 Forest Resources Inventories within the AOU

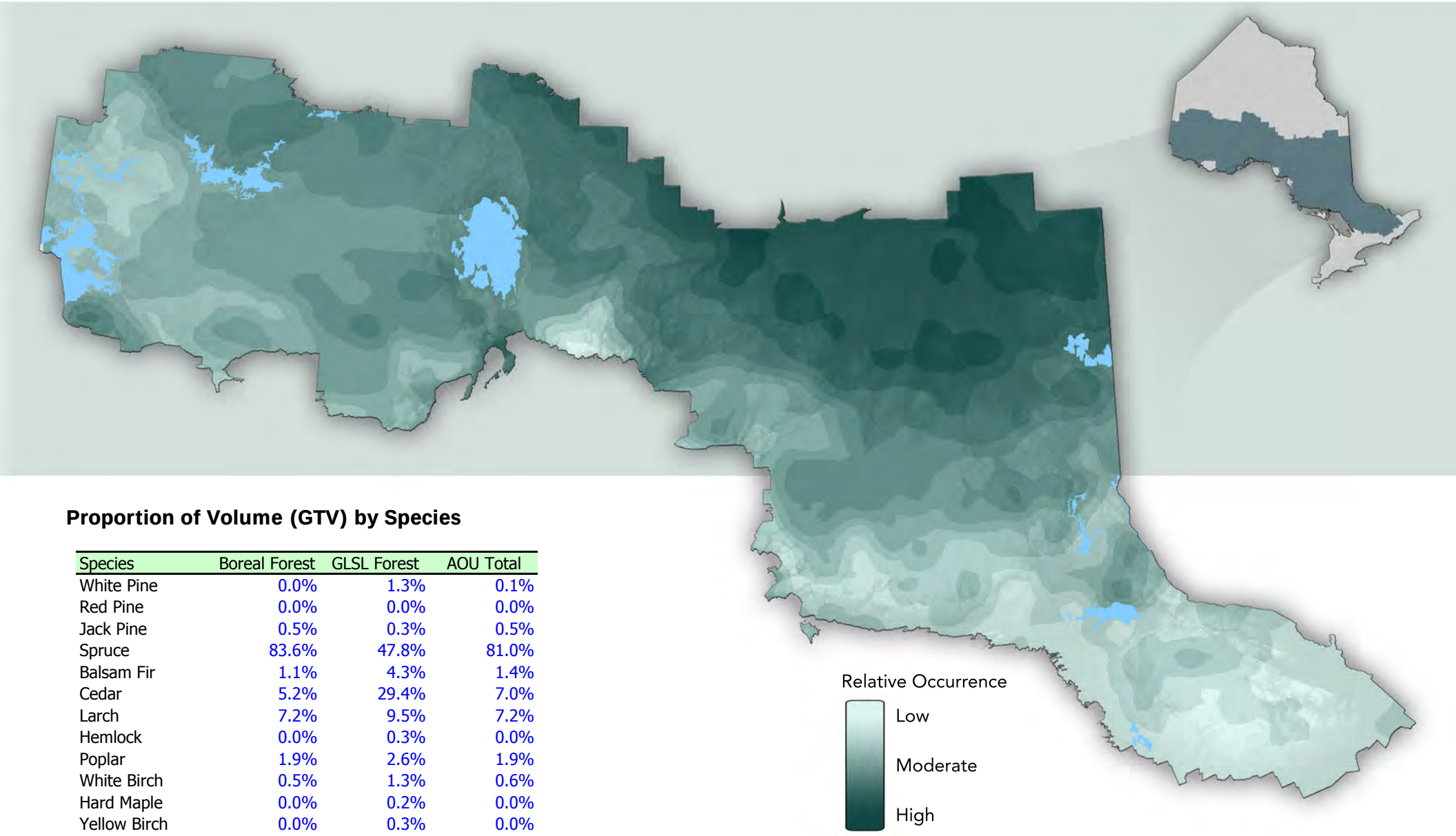


growing stock volume by species



area by age class

Provincial Forest Type - Conifer Lowland



Proportion of Volume (GTV) by Species

Species	Boreal Forest	GLSL Forest	AOU Total
White Pine	0.0%	1.3%	0.1%
Red Pine	0.0%	0.0%	0.0%
Jack Pine	0.5%	0.3%	0.5%
Spruce	83.6%	47.8%	81.0%
Balsam Fir	1.1%	4.3%	1.4%
Cedar	5.2%	29.4%	7.0%
Larch	7.2%	9.5%	7.2%
Hemlock	0.0%	0.3%	0.0%
Poplar	1.9%	2.6%	1.9%
White Birch	0.5%	1.3%	0.6%
Hard Maple	0.0%	0.2%	0.0%
Yellow Birch	0.0%	0.3%	0.0%
Oak (All)	0.0%	0.0%	0.0%
Other	0.0%	2.5%	0.2%
Proportion of GTV	91.2%	8.8%	

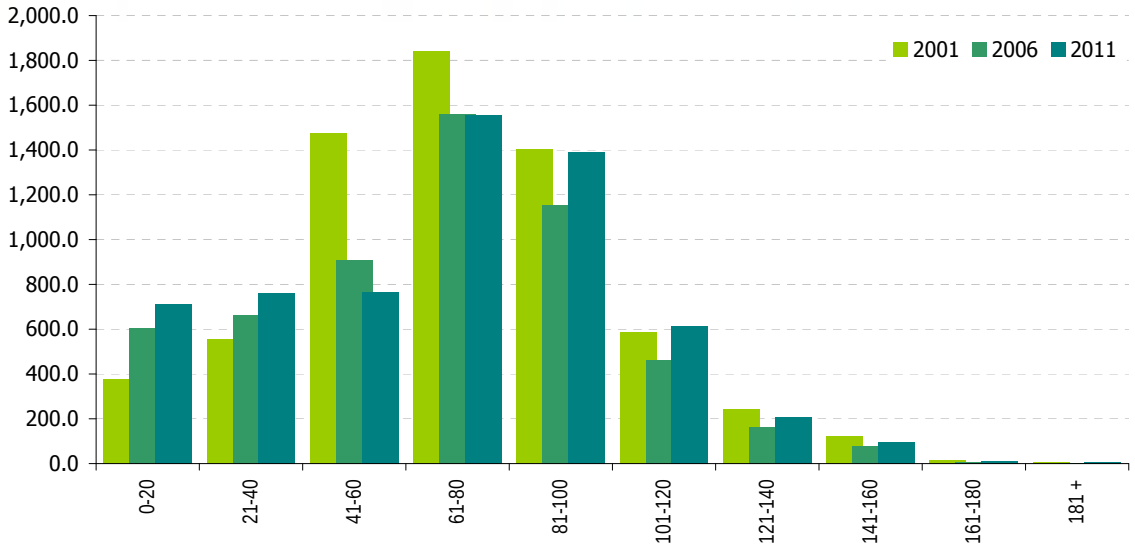
Source: 2010 Forest Resources Inventories within the AOU

Provincial Forest Type - Mixedwood

Index

Mixedwood

The mixedwood forest type is composed of mostly spruce, poplar, jack pine, balsam fir, and white birch. Occurring on a wide variety of sites, mixedwood stands are commonly found throughout the Boreal and Boreal transitional forest.



Historical area by age class

Provincial Forest Type - Mixedwood

Average Forest Condition by Ownership

Average Conditions	Crown	Parks & Protected Areas	Other	AOU Total
Average Age	68	85	77	70
Average Stocking	69%	72%	72%	69%
Proportion of Growing Stock	14.7%	1.5%	2.1%	18.3%

Total Area by Age Class and Ownership

All Area in hectares

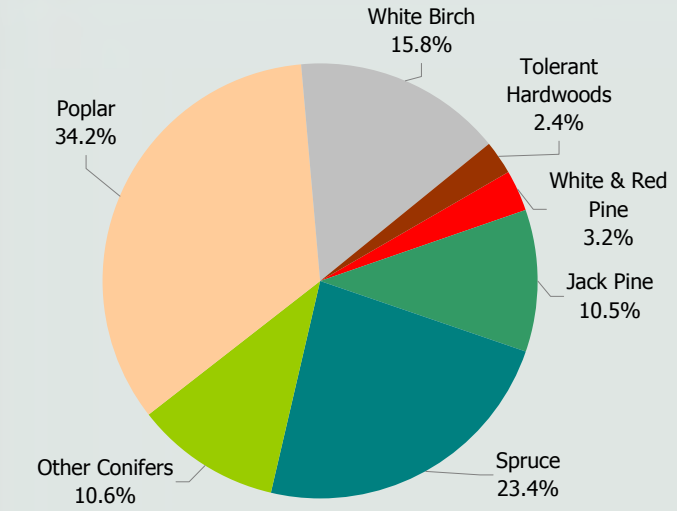
Age Class/Seral Stage	Crown	Parks & Protected Areas	Other	Total	Proportion
0-20	694,101	10,482	5,482	710,065	11.6%
21-40	715,685	22,364	23,748	761,797	12.5%
41-60	636,571	39,007	92,091	767,670	12.6%
61-80	1,155,499	133,026	268,701	1,557,225	25.5%
81-100	1,098,250	142,156	150,778	1,391,184	22.7%
101-120	496,437	72,958	42,859	612,254	10.0%
121-140	175,170	20,591	10,457	206,219	3.4%
141-160	75,202	10,036	9,491	94,729	1.5%
161-180	8,915	1,135	601	10,650	0.2%
181 +	4,236	334	163	4,732	0.1%
Total:	5,060,066	452,089	604,371	6,116,526	100.0%
Pre-Sapling	317,807	3,826	1,079	322,713	5.3%
Sapling	548,419	8,540	7,316	564,276	9.2%
Immature	1,396,230	80,251	162,154	1,638,635	26.8%
Mature	2,318,325	295,738	396,581	3,010,644	49.2%
Late-Successional	479,285	63,733	37,240	580,259	9.5%
Total:	5,060,066	452,089	604,371	6,116,526	100.0%

Total Volume by Ownership

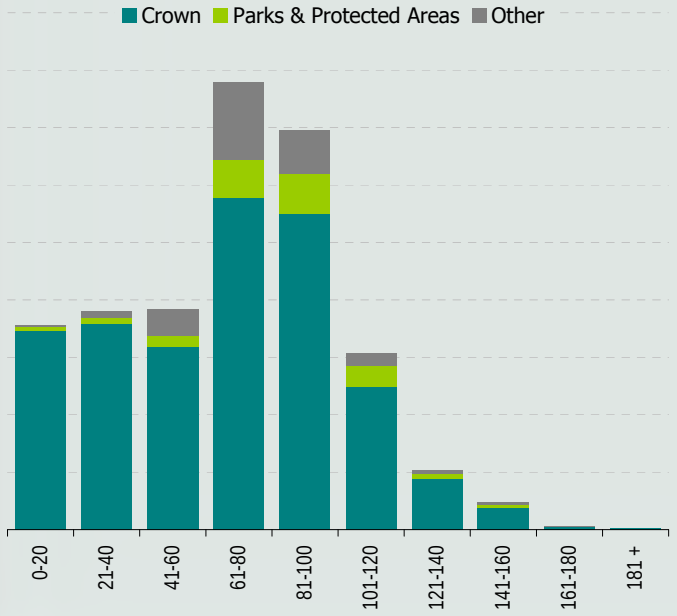
Volume in thousands of cubic metres

Statistic	Crown	Parks & Protected Areas	Other	Total
Gross Total Volume	685,313.2	70,610.1	98,191.6	854,114.9
Net Merchantable Volume	395,524.0	41,428.8	56,909.0	493,861.8
Current Annual Increment	7,608.3	550.0	992.2	9,150.4
Mean Annual Increment	9,599.6	830.6	1,295.9	11,726.1

Source: 2010 Forest Resources Inventories within the AOU

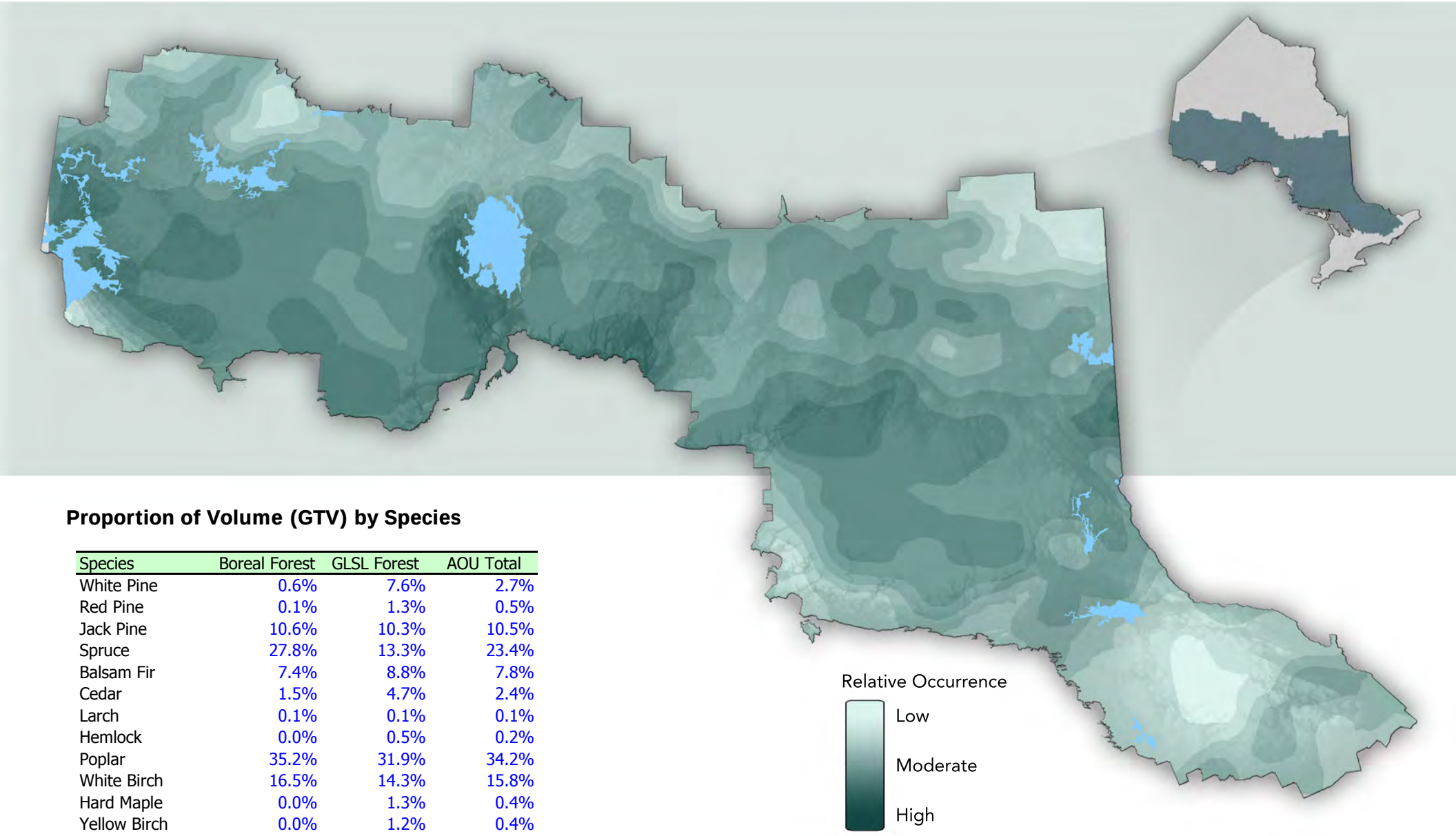


growing stock volume by species



area by age class

Provincial Forest Type - Mixedwood



Proportion of Volume (GTV) by Species

Species	Boreal Forest	GLSL Forest	AOU Total
White Pine	0.6%	7.6%	2.7%
Red Pine	0.1%	1.3%	0.5%
Jack Pine	10.6%	10.3%	10.5%
Spruce	27.8%	13.3%	23.4%
Balsam Fir	7.4%	8.8%	7.8%
Cedar	1.5%	4.7%	2.4%
Larch	0.1%	0.1%	0.1%
Hemlock	0.0%	0.5%	0.2%
Poplar	35.2%	31.9%	34.2%
White Birch	16.5%	14.3%	15.8%
Hard Maple	0.0%	1.3%	0.4%
Yellow Birch	0.0%	1.2%	0.4%
Oak (All)	0.0%	0.3%	0.1%
Other	0.2%	4.3%	1.5%
Proportion of GTV	69.3%	30.7%	

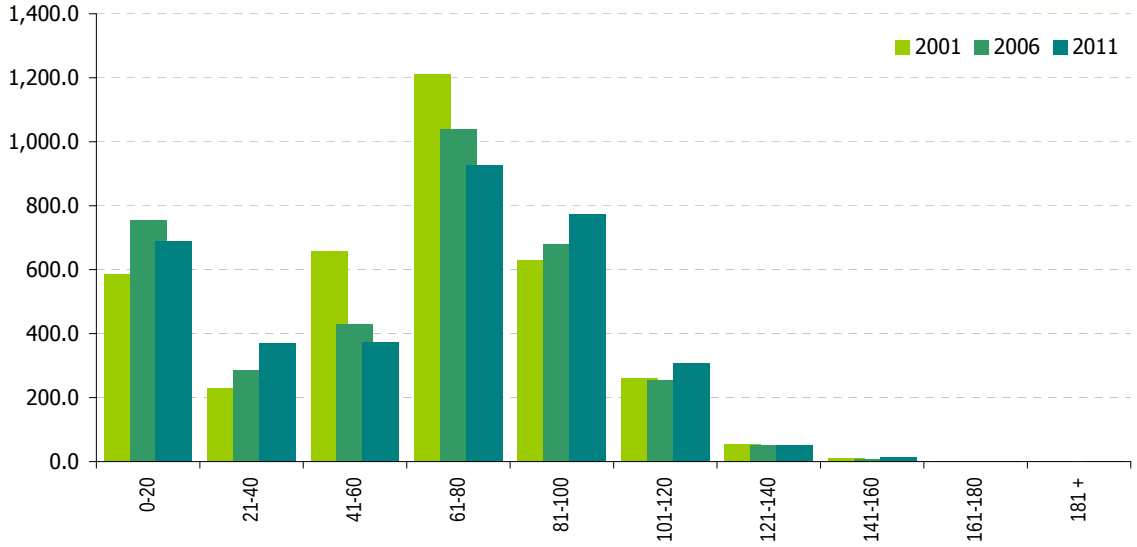
Source: 2010 Forest Resources Inventories within the AOU

Provincial Forest Type - Poplar

Index

Poplar

The poplar forest type is dominated by trembling aspen (poplar), and is often associated with white birch, spruce, jack pine and balsam fir. It occurs primarily on deep, fresh upland sites in the Boreal forest.



Historical area by age class

Provincial Forest Type - Poplar

Average Forest Condition by Ownership

Average Conditions	Crown	Parks & Protected Areas	Other	AOU Total
Average Age	62	78	62	63
Average Stocking	73%	74%	65%	71%
Proportion of Growing Stock	9.3%	0.9%	2.4%	12.6%

Total Area by Age Class and Ownership

All Area in hectares

Age Class/Seral Stage	Crown	Parks & Protected Areas	Other	Total	Proportion
0-20	579,709	20,379	89,580	689,668	19.6%
21-40	295,724	12,645	62,847	371,216	10.6%
41-60	264,804	14,956	94,293	374,054	10.7%
61-80	582,928	52,250	292,241	927,420	26.4%
81-100	602,224	63,248	107,154	772,626	22.0%
101-120	249,917	41,161	18,129	309,208	8.8%
121-140	43,872	4,852	2,157	50,881	1.4%
141-160	11,164	743	1,388	13,295	0.4%
161-180	406	-	31	436	0.0%
181 +	1,007	26	534	1,567	0.0%
Total:	2,631,756	210,261	668,355	3,510,372	100.0%

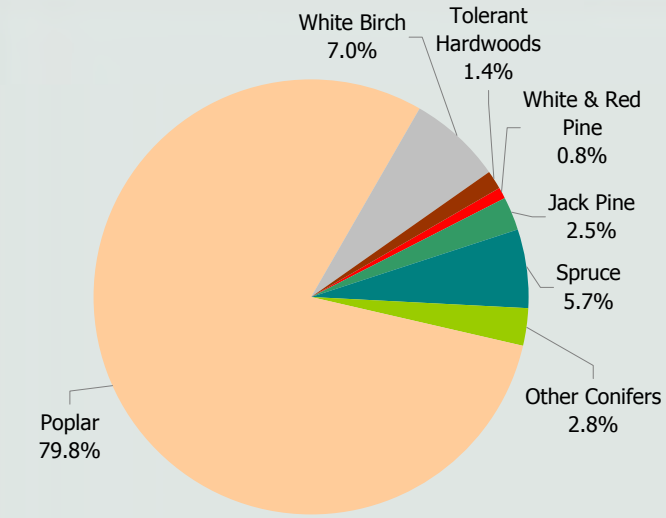
Pre-Sapling	272,991	5,209	7,831	286,030	8.1%
Sapling	284,216	14,567	69,585	368,369	10.5%
Immature	570,645	27,041	158,650	756,336	21.5%
Mature	1,167,811	114,744	408,516	1,691,072	48.2%
Late-Successional	336,093	48,700	23,773	408,565	11.6%
Total:	2,631,756	210,261	668,355	3,510,372	100.0%

Total Volume by Ownership

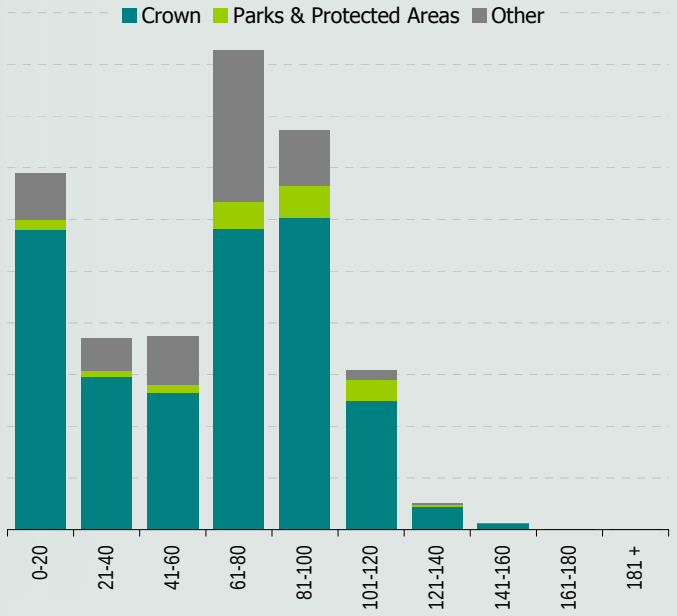
Volume in thousands of cubic metres

Statistic	Crown	Parks & Protected Areas	Other	Total
Gross Total Volume	435,537.9	39,834.4	110,342.9	585,715.3
Net Merchantable Volume	266,330.3	24,632.6	69,015.7	359,978.6
Current Annual Increment	3,968.5	227.9	1,120.4	5,316.8
Mean Annual Increment	5,995.3	460.5	1,581.4	8,037.2

Source: 2010 Forest Resources Inventories within the AOU

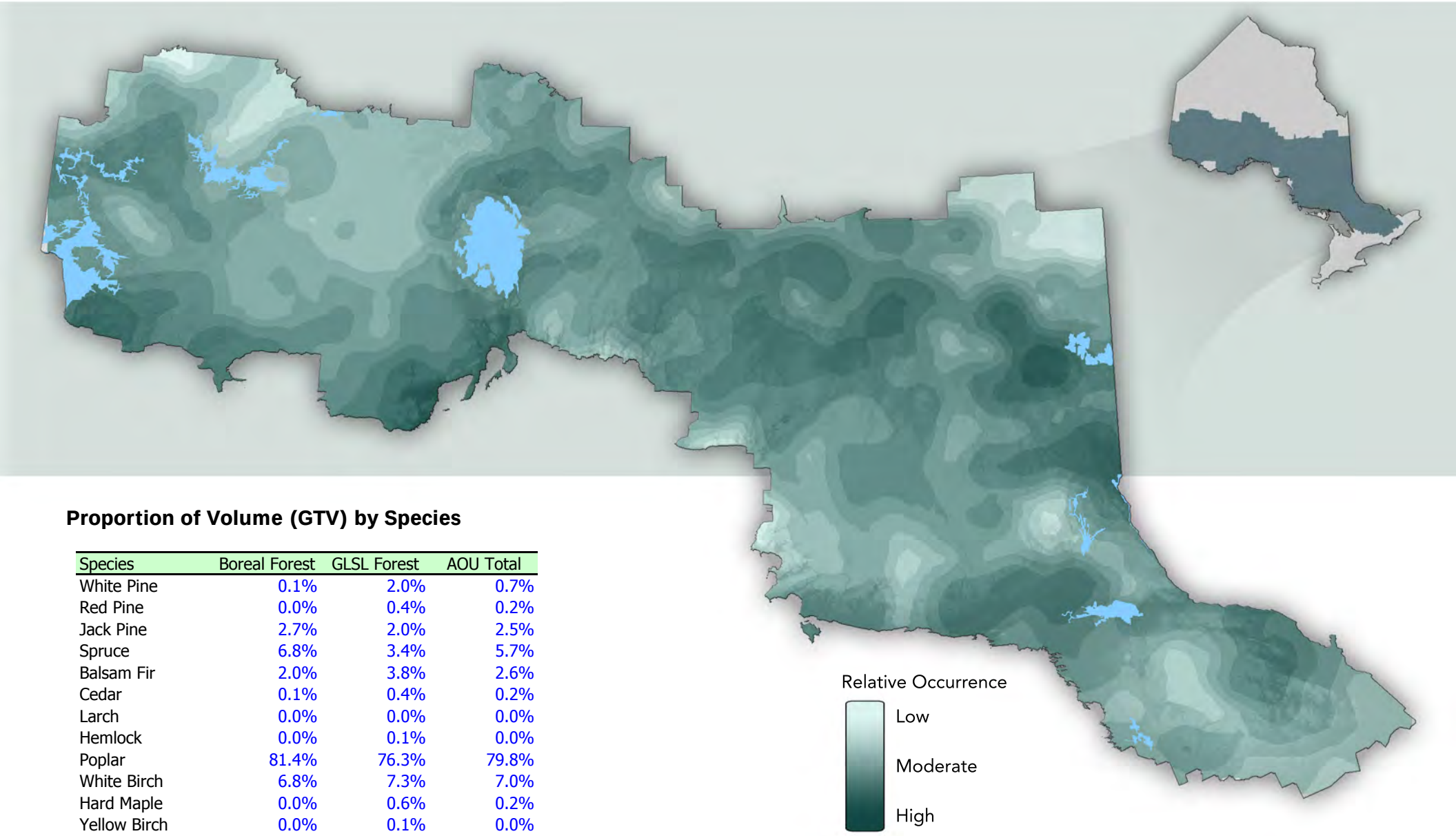


growing stock volume by species



area by age class

Provincial Forest Type - Poplar



Proportion of Volume (GTV) by Species

Species	Boreal Forest	GLSL Forest	AOU Total
White Pine	0.1%	2.0%	0.7%
Red Pine	0.0%	0.4%	0.2%
Jack Pine	2.7%	2.0%	2.5%
Spruce	6.8%	3.4%	5.7%
Balsam Fir	2.0%	3.8%	2.6%
Cedar	0.1%	0.4%	0.2%
Larch	0.0%	0.0%	0.0%
Hemlock	0.0%	0.1%	0.0%
Poplar	81.4%	76.3%	79.8%
White Birch	6.8%	7.3%	7.0%
Hard Maple	0.0%	0.6%	0.2%
Yellow Birch	0.0%	0.1%	0.0%
Oak (All)	0.0%	0.4%	0.1%
Other	0.1%	3.2%	1.1%
Proportion of GTV	68.3%	31.7%	

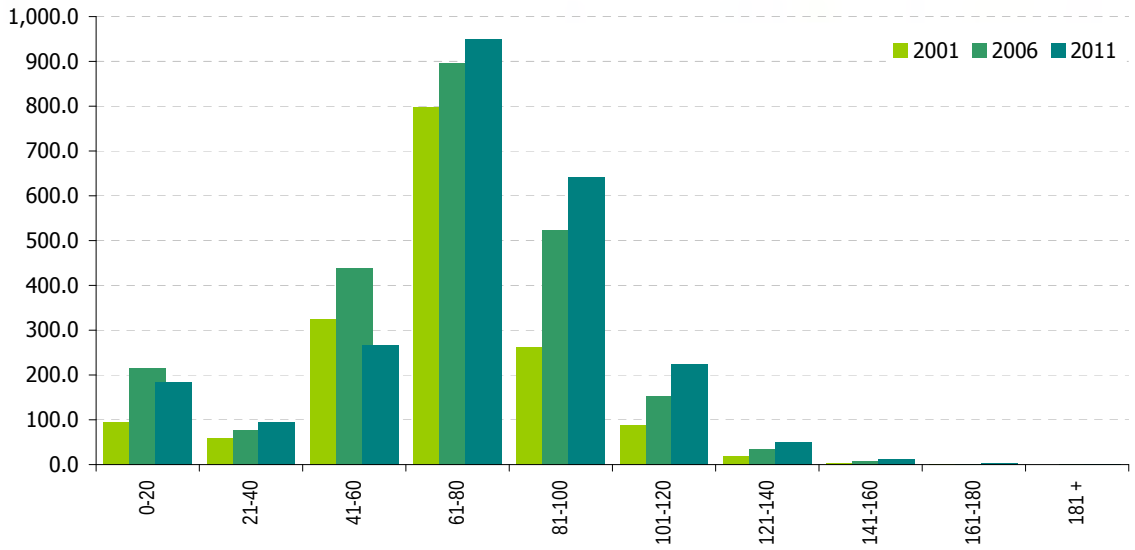
Source: 2010 Forest Resources Inventories within the AOU

Provincial Forest Type - White Birch

Index

White Birch

The white birch forest type is dominated by white birch, and is associated with poplar, spruce and fir. It is often found with spruce/fir understory. This forest type is typically found on fresh to moist sandy sites in the boreal forest.



Historical area by age class

Provincial Forest Type - White Birch

Average Forest Condition by Ownership

Average Conditions	Crown	Parks & Protected Areas	Other	AOU Total
Average Age	74	81	75	75
Average Stocking	76%	77%	77%	76%
Proportion of Growing Stock	5.2%	0.7%	1.6%	7.5%

Total Area by Age Class and Ownership

All Area in hectares

Age Class/Seral Stage	Crown	Parks & Protected Areas	Other	Total	Proportion
0-20	155,692	10,112	17,577	183,382	7.6%
21-40	78,769	4,048	11,425	94,242	3.9%
41-60	186,470	20,064	60,741	267,275	11.0%
61-80	616,409	100,543	232,800	949,751	39.1%
81-100	446,186	75,411	120,019	641,616	26.4%
101-120	168,726	29,175	26,489	224,391	9.2%
121-140	36,512	6,930	6,327	49,769	2.1%
141-160	10,922	1,164	1,180	13,266	0.5%
161-180	1,393	268	690	2,351	0.1%
181 +	932	134	99	1,164	0.0%
Total:	1,702,013	247,850	477,346	2,427,208	100.0%

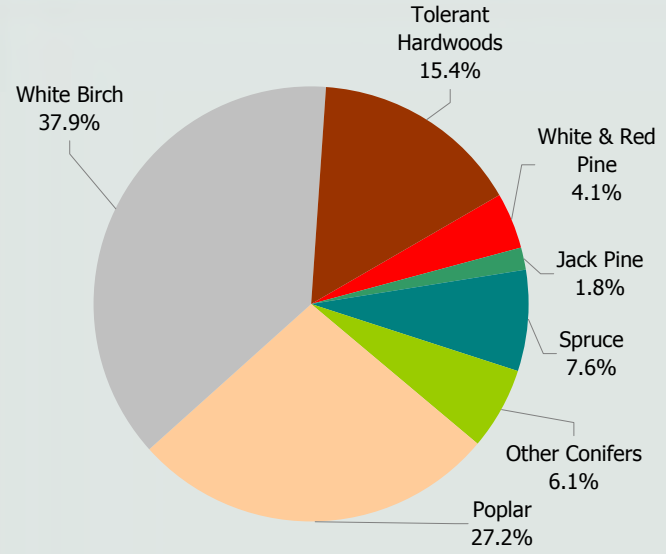
Pre-Sapling	76,414	4,352	4,526	85,292	3.5%
Sapling	72,127	5,541	11,605	89,273	3.7%
Immature	250,679	20,913	62,770	334,362	13.8%
Mature	1,055,275	173,159	358,837	1,587,271	65.4%
Late-Successional	247,517	43,884	39,608	331,010	13.6%
Total:	1,702,013	247,850	477,346	2,427,208	100.0%

Total Volume by Ownership

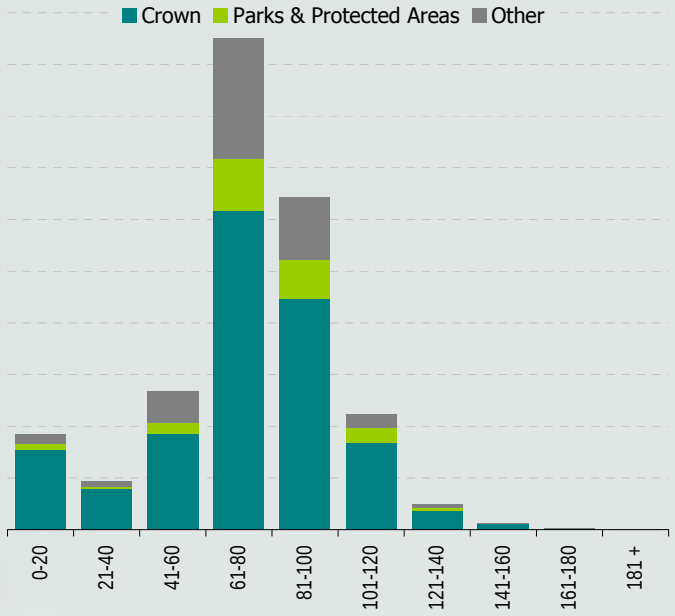
Volume in thousands of cubic metres

Statistic	Crown	Parks & Protected Areas	Other	Total
Gross Total Volume	240,241.7	34,167.9	76,589.2	350,998.8
Net Merchantable Volume	144,537.1	20,794.5	47,509.6	212,841.1
Current Annual Increment	1,954.0	240.3	730.3	2,924.6
Mean Annual Increment	3,090.8	415.2	1,000.8	4,506.8

Source: 2010 Forest Resources Inventories within the AOU

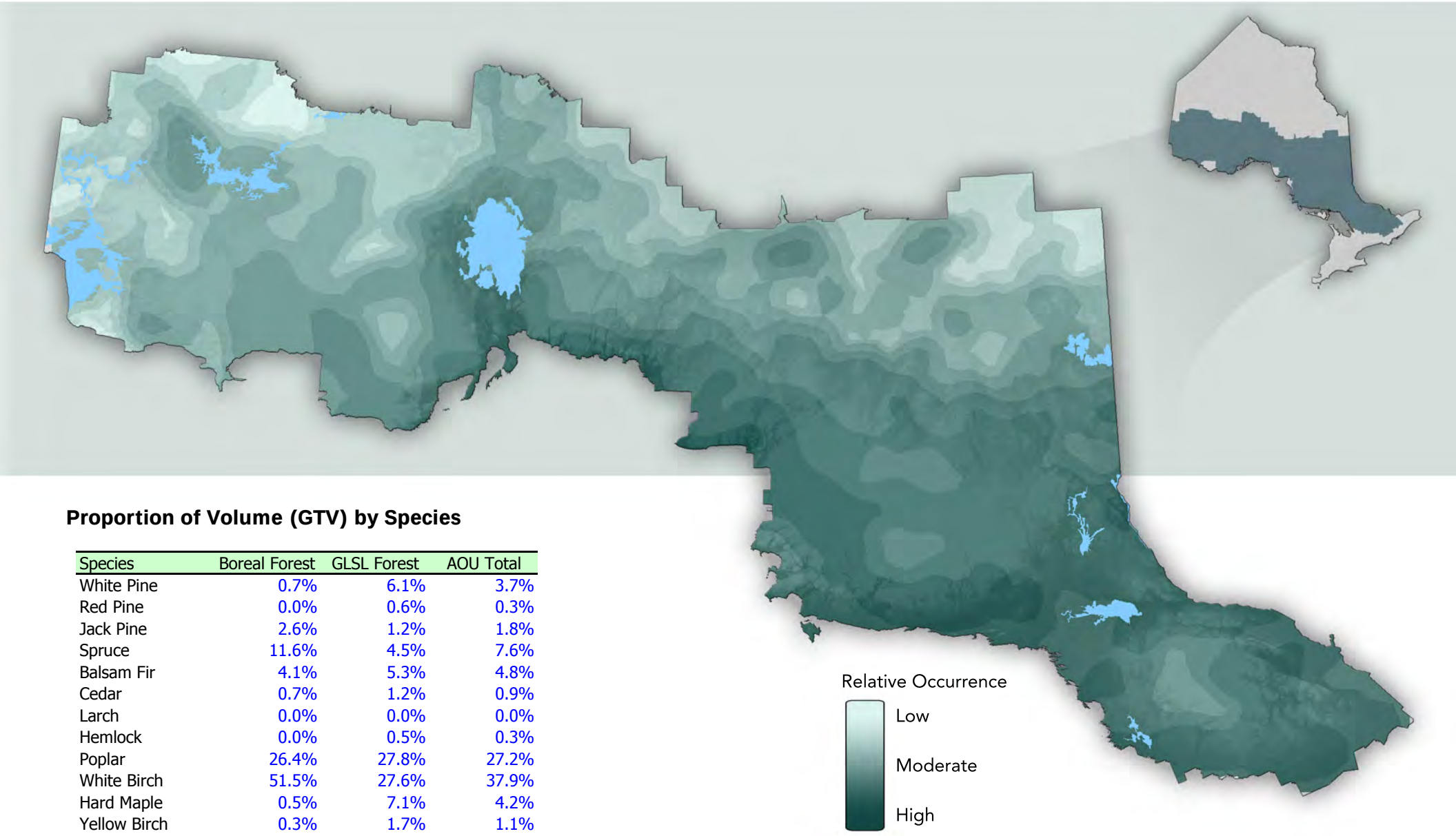


growing stock volume by species



area by age class

Provincial Forest Type - White Birch



Proportion of Volume (GTV) by Species

Species	Boreal Forest	GLSL Forest	AOU Total
White Pine	0.7%	6.1%	3.7%
Red Pine	0.0%	0.6%	0.3%
Jack Pine	2.6%	1.2%	1.8%
Spruce	11.6%	4.5%	7.6%
Balsam Fir	4.1%	5.3%	4.8%
Cedar	0.7%	1.2%	0.9%
Larch	0.0%	0.0%	0.0%
Hemlock	0.0%	0.5%	0.3%
Poplar	26.4%	27.8%	27.2%
White Birch	51.5%	27.6%	37.9%
Hard Maple	0.5%	7.1%	4.2%
Yellow Birch	0.3%	1.7%	1.1%
Oak (All)	0.0%	1.9%	1.1%
Other	1.7%	14.6%	9.0%
Proportion of GTV	43.2%	56.8%	

Source: 2010 Forest Resources Inventories within the AOU

Provincial Forest Type - Tolerant Hardwoods

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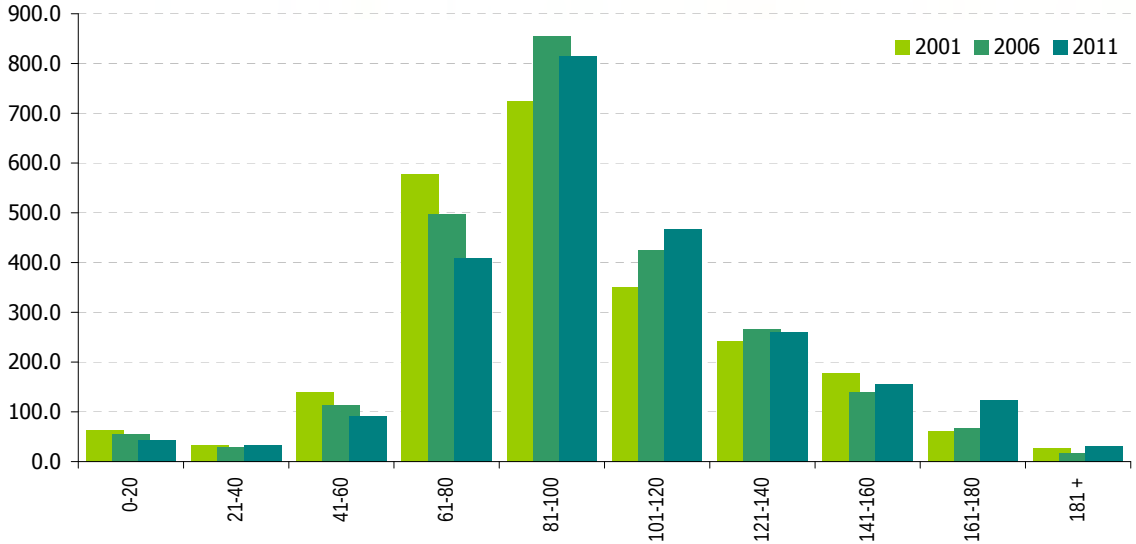
Tolerant Hardwoods

The tolerant hardwood forest type consists of a wide range of deciduous species, primarly sugar or hard maple with a lesser component of yellow birch, oak, beech, basswood and ash and white pine. It is the dominant forest type in the Great Lakes-St. Lawrence forest region.



Historical area by age class

Provincial Forest Type - Tolerant Hardwoods

Average Forest Condition by Ownership

Average Conditions	Crown	Parks & Protected Areas	Other	AOU Total
Average Age	109	117	92	103
Average Stocking	77%	75%	83%	79%
Proportion of Growing Stock	5.0%	0.7%	4.5%	10.3%

Total Area by Age Class and Ownership

All Area in hectares

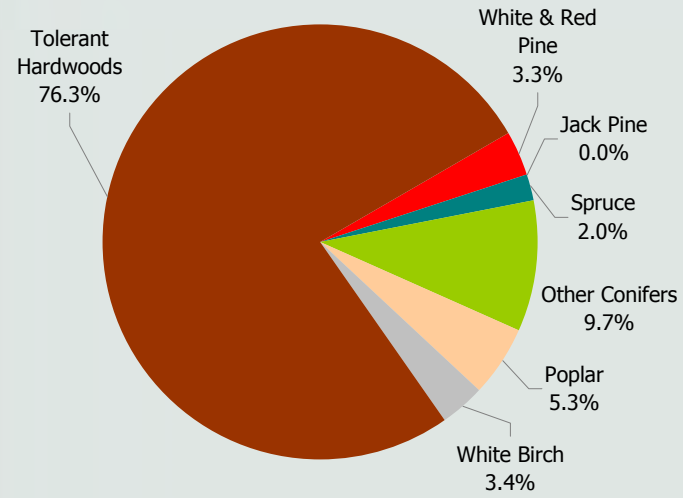
Age Class/Seral Stage	Crown	Parks & Protected Areas	Other	Total	Proportion
0-20	18,592	1,399	22,790	42,781	1.8%
21-40	18,989	1,578	12,428	32,995	1.4%
41-60	32,814	4,808	54,427	92,050	3.8%
61-80	156,590	21,754	231,512	409,855	16.9%
81-100	349,962	47,850	417,451	815,263	33.5%
101-120	239,626	32,453	195,083	467,161	19.2%
121-140	175,042	16,855	68,836	260,733	10.7%
141-160	113,241	15,998	26,217	155,456	6.4%
161-180	90,142	23,006	10,514	123,661	5.1%
181 +	20,262	8,838	2,046	31,147	1.3%
Total:	1,215,260	174,540	1,041,303	2,431,103	100.0%
Pre-Sapling	11,561	952	11,350	23,863	1.0%
Sapling	11,948	1,544	14,766	28,258	1.2%
Immature	92,839	12,879	135,775	241,493	9.9%
Mature	680,684	91,656	762,982	1,535,323	63.2%
Late-Successional	418,227	67,509	116,430	602,166	24.8%
Total:	1,215,260	174,540	1,041,303	2,431,103	100.0%

Total Volume by Ownership

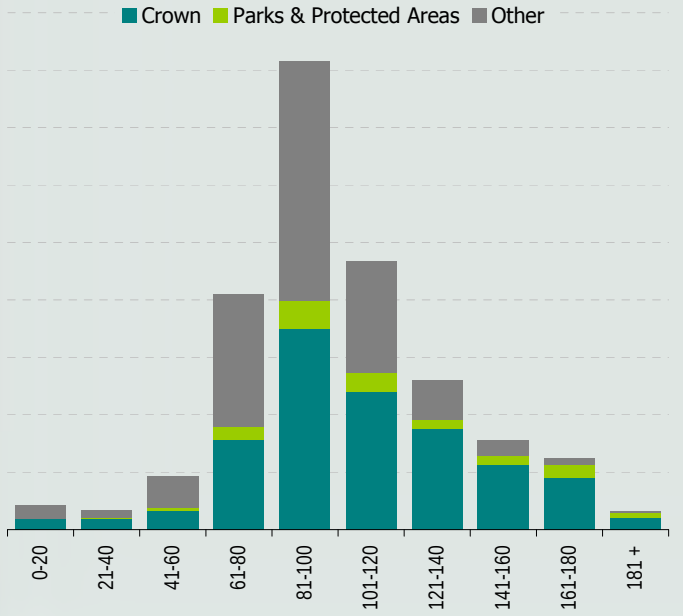
Volume in thousands of cubic metres

Statistic	Crown	Parks & Protected Areas	Other	Total
Gross Total Volume	234,718.1	32,714.1	211,807.2	479,239.3
Net Merchantable Volume	153,868.1	21,521.0	141,358.2	316,747.3
Current Annual Increment	1,567.1	190.6	1,926.7	3,684.4
Mean Annual Increment	2,219.6	291.0	2,320.0	4,830.7

Source: 2010 Forest Resources Inventories within the AOU

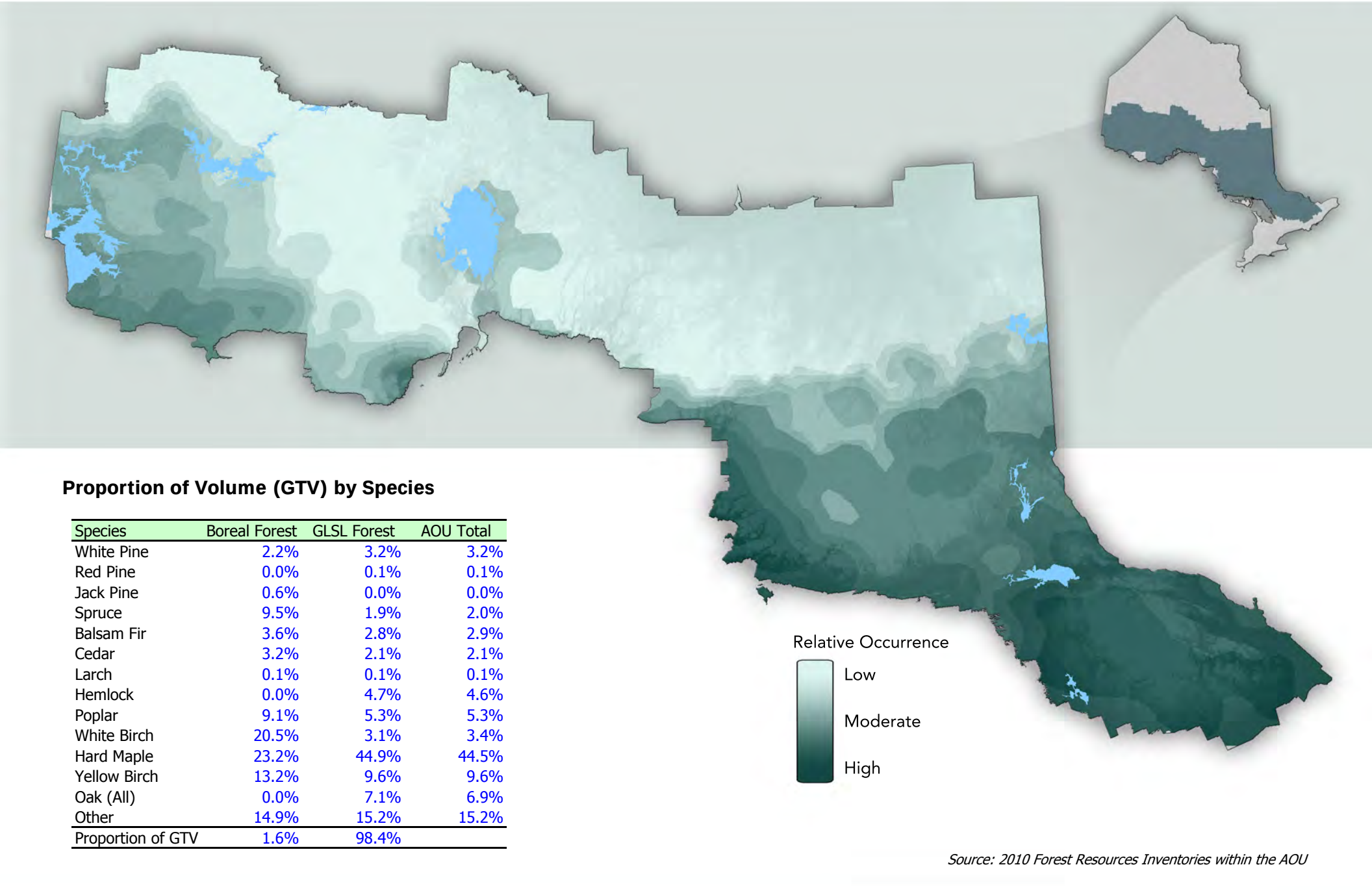


growing stock volume by species



area by age class

Provincial Forest Type - Tolerant Hardwoods



Proportion of Volume (GTV) by Species

Species	Boreal Forest	GLSL Forest	AOU Total
White Pine	2.2%	3.2%	3.2%
Red Pine	0.0%	0.1%	0.1%
Jack Pine	0.6%	0.0%	0.0%
Spruce	9.5%	1.9%	2.0%
Balsam Fir	3.6%	2.8%	2.9%
Cedar	3.2%	2.1%	2.1%
Larch	0.1%	0.1%	0.1%
Hemlock	0.0%	4.7%	4.6%
Poplar	9.1%	5.3%	5.3%
White Birch	20.5%	3.1%	3.4%
Hard Maple	23.2%	44.9%	44.5%
Yellow Birch	13.2%	9.6%	9.6%
Oak (All)	0.0%	7.1%	6.9%
Other	14.9%	15.2%	15.2%
Proportion of GTV	1.6%	98.4%	

Source: 2010 Forest Resources Inventories within the AOU

Species Distribution

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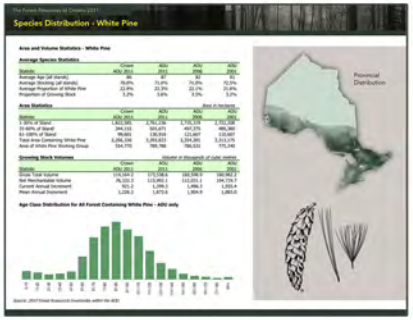
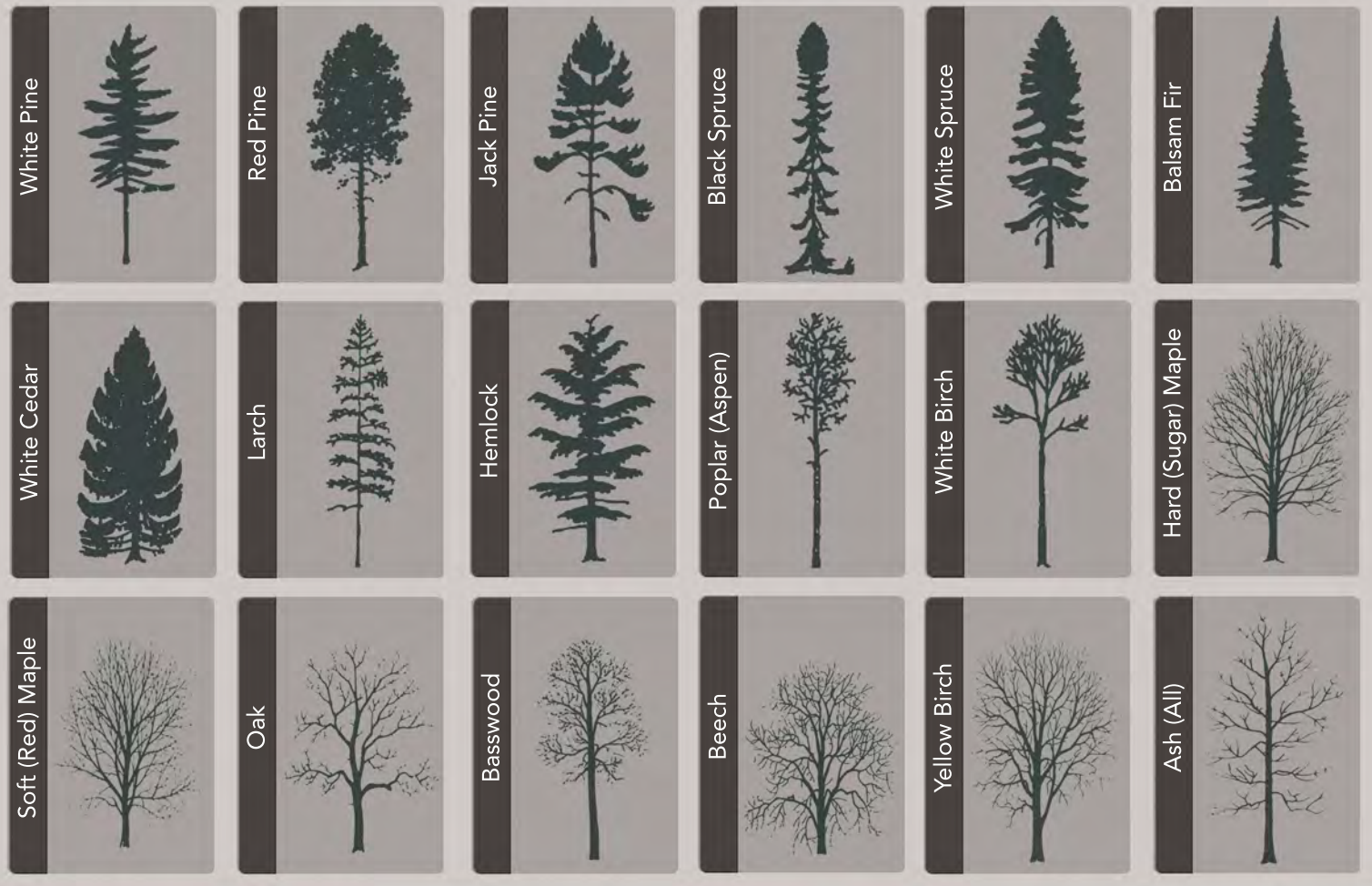
Interactive Chapter Index

Each of the eighteen species highlighted in this report has a two page summary that includes:

- Introduction page with text description, distribution map and image
- Inventory (FRI) summary page with detailed area, volume and other statistics.



select a summary



Species Distribution

Another method of summarizing forest information is by individual tree species, regardless of the forest type in which they occur. In these summaries, tree species distribution, as well as growing stock volumes and growth are measured from a sub-stand level, by species, independent of working group or forest type. For example, the black spruce component within the lowland conifer forest type is summarized along with the black spruce component of upland conifer, mixedwood, and anywhere else it may occur.

Many species in Ontario occur in a wide variety of stands, in very small amounts. For example, within the AOU, white pine can be found in concentrations of 1% or more on 3.3 million hectares of forest, but as a provincial forest type (red and white pine) is only found on 1.1 million hectares.

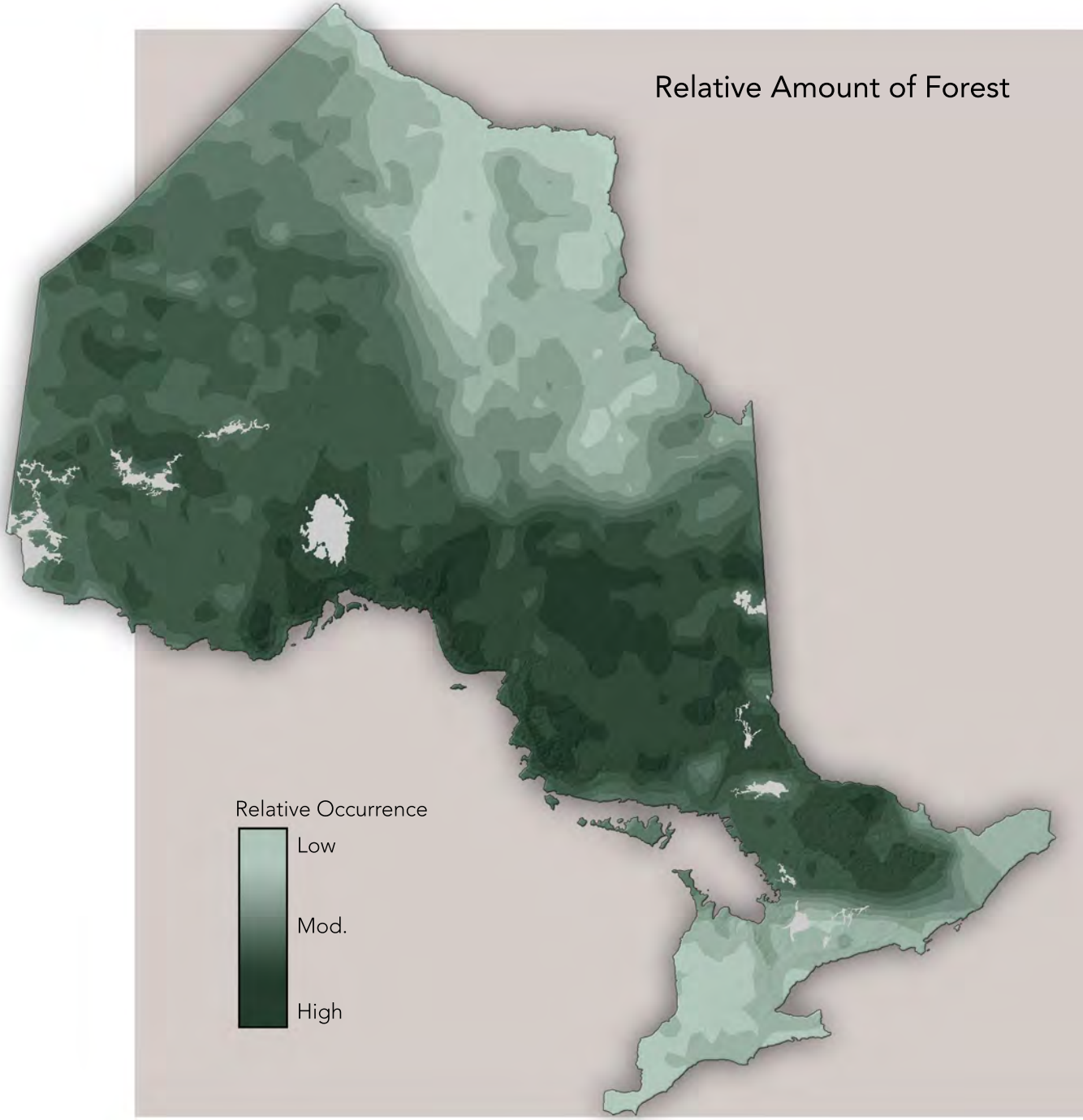
The context for this chapter's area and volume summaries is the AOU. Summary information from past reports (2006 and 2001) are included, as well as a highlight of crown forest within the AOU. Each tree species distribution map attempts to cover the entire province. Utilizing satellite imagery, coupled with a sampling of available FRI, the tree species maps extrapolate relative tree species occurrence north of the inventory limit. The reliability of these maps varies by species, and some allowances in interpretation are necessary. The maps for black spruce and jack pine trees which make up the bulk of the forest north of the inventory limit, are relatively reliable. Poplar and white birch share a satellite class and are somewhat less reliable.

white pine growing on a mixedwood forest stand

Species Distribution

This first map (at right) is represented differently from the other maps in this chapter. This map shows the relative amount of forest based on total area rather than species occurrence. The subsequent species maps relate to this map in terms of amount of forest but calculate occurrence based on stand proportion for forested land only. Without this shift in mapping, or concentration of data, southern species such as basswood or beech do not register because of the low concentration of forested land.

The scale is also species dependent, ranging from the highest concentration of a species within a given area to the lowest. In the case of black spruce, which is commonly found in pure stands over large areas, this scale would be 0-100%, with 100% being coloured dark green. In the case of basswood, which is rarely found in pure stands, this scale would be approximately 0-30%. Since 30% is the highest large area concentration of basswood found in the provincial summary, that area would be classed as "High" and coloured dark green. This mapping can be tied to the relative amount of forest area.



Species Distribution - White Pine

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Common Name: White Pine
Latin Name: *Pinus strobus*

White pine is a common tree throughout central and southern Ontario, and is Ontario's provincial tree. It has long needles (6 to 12 cm) that are soft to the touch and grow in bunches of five. White pine has long been used for trim, furniture and lumber, and has a light white, knotty wood.

Species Distribution - White Pine

Area and Volume Statistics - White Pine

Average Species Statistics

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Average Age (all stands)	86	87	82	81
Average Stocking (all stands)	70.0%	71.0%	71.0%	72.5%
Average Proportion of White Pine	22.9%	22.3%	22.1%	21.8%
Proportion of Growing Stock	3.2%	3.6%	3.5%	3.2%

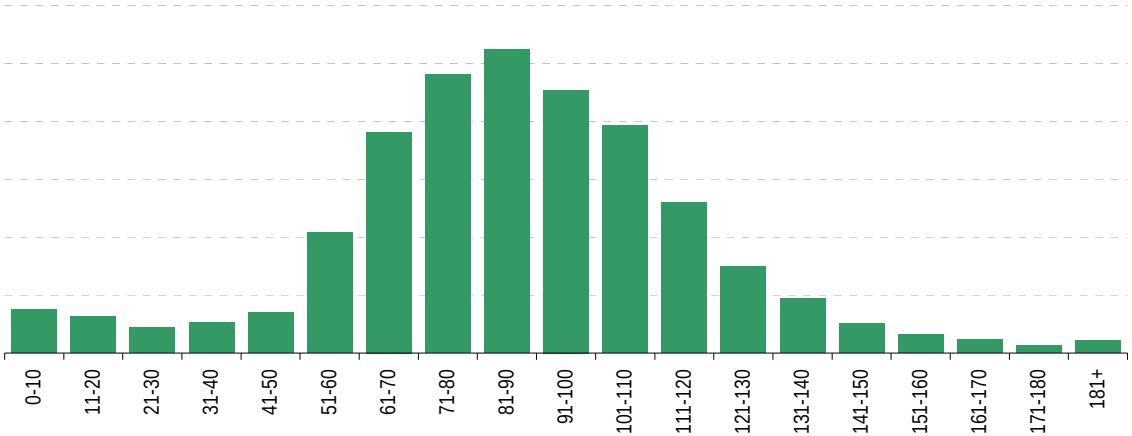
Area Statistics *Area in hectares*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
1-30% of Stand	1,822,585	2,761,236	2,735,319	2,722,208
31-60% of Stand	344,151	501,671	497,275	480,360
61-100% of Stand	99,601	130,916	121,607	110,607
Total Area Containing White Pine	2,266,336	3,393,823	3,354,201	3,313,175
Area of White Pine Working Group	554,770	789,788	786,531	775,240

Growing Stock Volumes *Volume in thousands of cubic metres*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Gross Total Volume	114,164.2	173,538.6	169,598.9	160,982.2
Net Merchantable Volume	76,332.3	115,992.1	112,031.1	104,729.7
Current Annual Increment	921.2	1,399.3	1,486.3	1,555.4
Mean Annual Increment	1,226.3	1,873.6	1,904.9	1,883.0

Age Class Distribution for All Forest Containing White Pine - AOU only



Source: 2010 Forest Resources Inventories within the AOU

Species Distribution - Red Pine

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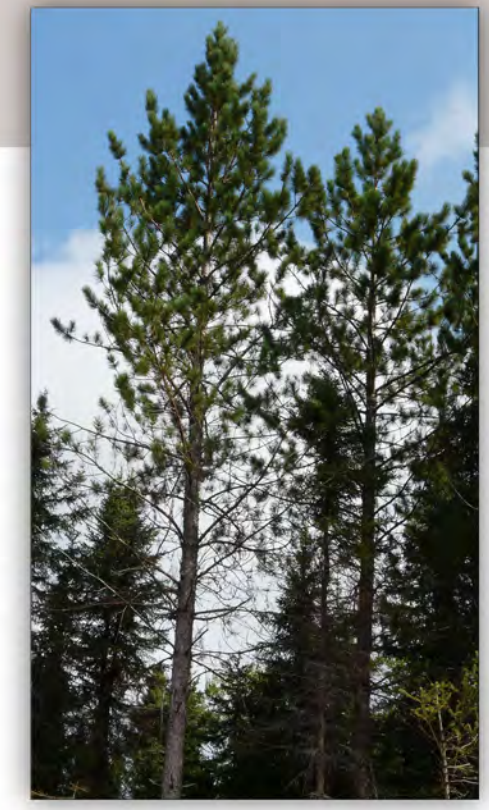


Common Name: Red Pine
Latin Name: *Pinus resinosa*

Red pine is a common tree throughout central and southern Ontario, as well as the northwest. It has long needles (10 to 16 cm) that are sharp, dark green and grow in pairs. Red pine has traditionally been used to make poles and lumber, and has a strong pale red to reddish brown wood.

Species Distribution - Red Pine

Area and Volume Statistics - Red Pine

Average Species Statistics

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Average Age (all stands)	81	83	80	79
Average Stocking (all stands)	69.0%	70.0%	70.0%	71.2%
Average Proportion of Red Pine	23.0%	23.2%	22.8%	22.0%
Proportion of Growing Stock	0.9%	1.0%	0.9%	0.8%

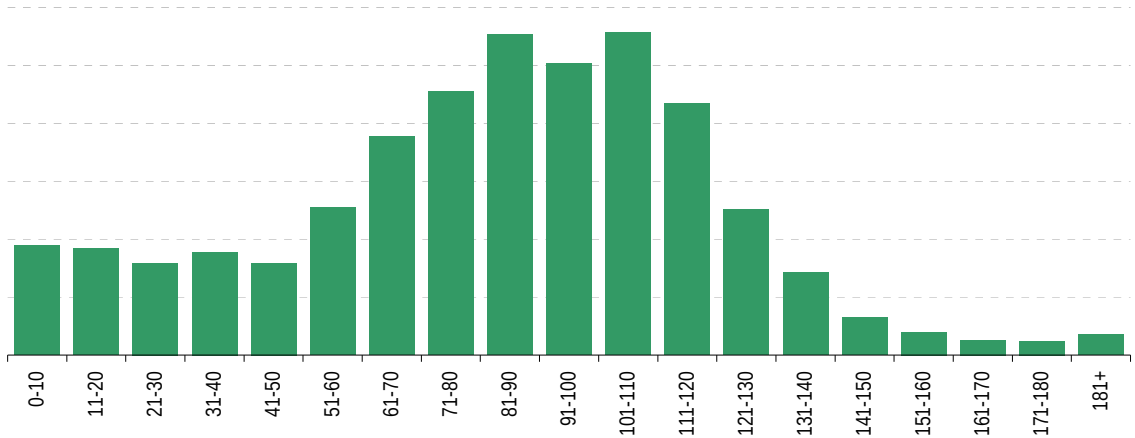
Area Statistics *Area in hectares*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
1-30% of Stand	553,447	755,624	731,878	724,719
31-60% of Stand	69,495	89,611	82,233	76,355
61-100% of Stand	48,518	73,025	67,195	59,193
Total Area Containing Red Pine	671,461	918,260	881,306	860,266
Area of Red Pine Working Group	127,446	174,875	163,674	148,471

Growing Stock Volumes *Volume in thousands of cubic metres*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Gross Total Volume	30,793.3	45,704.0	43,108.6	40,296.6
Net Merchantable Volume	22,566.2	33,551.0	31,793.5	29,724.0
Current Annual Increment	288.1	443.9	401.7	394.8
Mean Annual Increment	424.5	641.8	619.0	584.9

Age Class Distribution for All Forest Containing Red Pine - AOU only



Source: 2010 Forest Resources Inventories within the AOU

Species Distribution - Jack Pine

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Common Name: Jack Pine
Latin Name: *Pinus banksiana*

Jack pine is a common tree found throughout Ontario, but is more common on sandy or rocky sites in the north. It has short needles (2 to 4 cm) that are sharp, slightly curved and grow in pairs. The cones are curved and will open after a forest fire. Jack pine is most commonly used for dimensional lumber, but can be used to make pulp and paper.

Species Distribution - Jack Pine

Area and Volume Statistics - Jack Pine

Average Species Statistics

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Average Age (all stands)	59	61	61	67
Average Stocking (all stands)	72.0%	72.0%	74.0%	76.4%
Average Proportion of Jack Pine	42.0%	41.4%	41.9%	41.9%
Proportion of Growing Stock	12.6%	10.9%	10.8%	10.4%

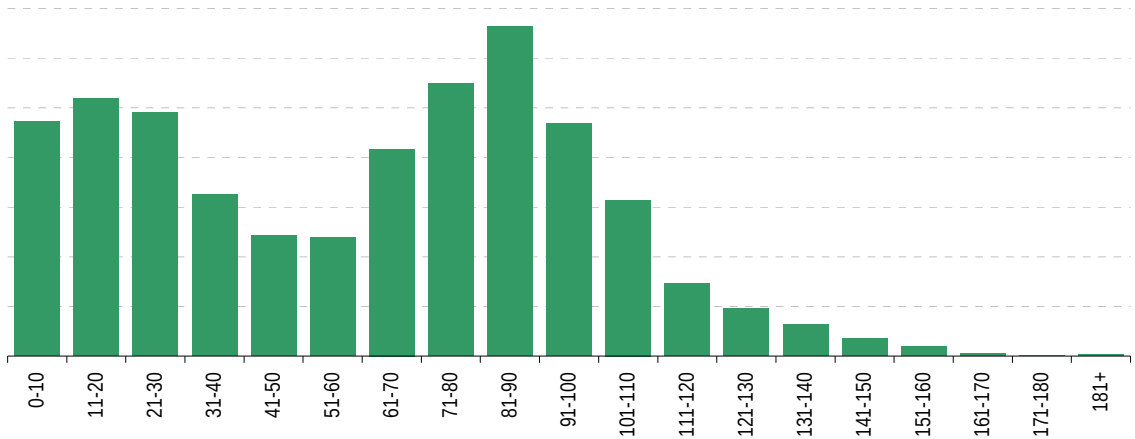
Area Statistics *Area in hectares*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
1-30% of Stand	4,590,856	5,211,332	5,128,502	5,051,234
31-60% of Stand	2,204,913	2,409,461	2,293,832	2,168,041
61-100% of Stand	2,322,146	2,522,732	2,550,267	2,508,452
Total Area Containing Jack Pine	9,117,915	10,143,525	9,972,601	9,727,727
Area of Jack Pine Working Group	4,352,077	4,752,693	4,652,725	4,576,787

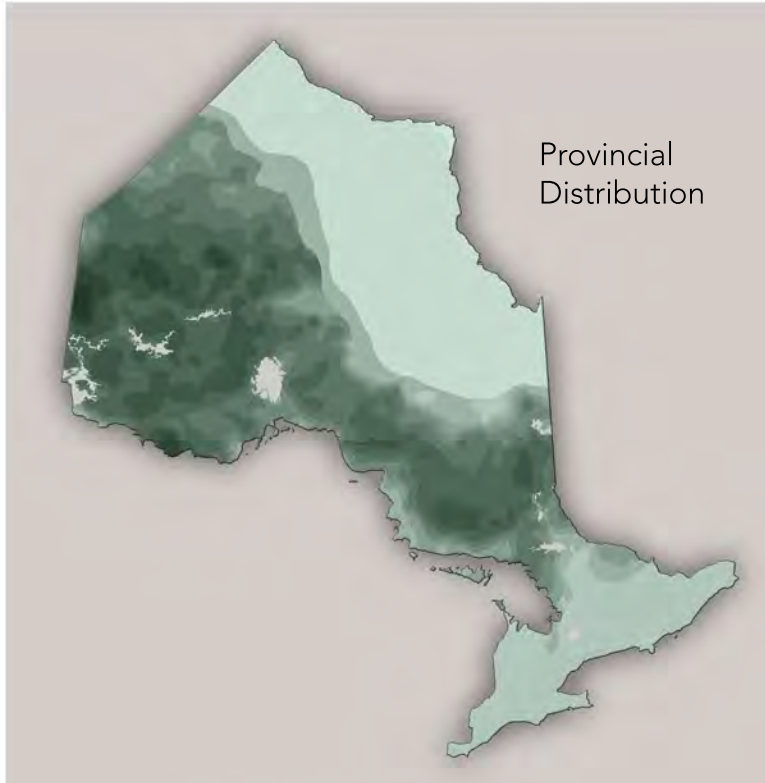
Growing Stock Volumes *Volume in thousands of cubic metres*

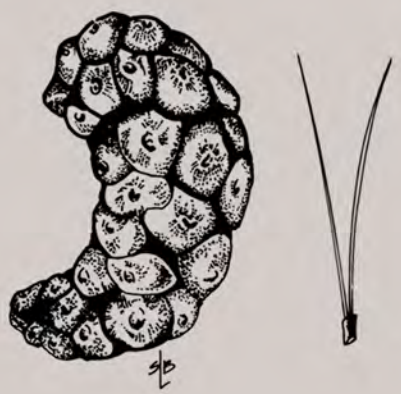
Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Gross Total Volume	451,711.8	517,540.8	515,616.0	518,686.4
Net Merchantable Volume	305,238.0	352,095.5	355,836.8	367,255.1
Current Annual Increment	4,701.4	5,199.0	4,633.1	3,792.9
Mean Annual Increment	7,783.0	8,744.2	8,521.8	8,244.2

Age Class Distribution for All Forest Containing Jack Pine - AOU only



Source: 2010 Forest Resources Inventories within the AOU





Species Distribution - Black Spruce

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Common Name: Black Spruce
Latin Name: *Picea mariana*

Black spruce is the most commonly found tree in Ontario even though it is primarily found in the Boreal forest. Although found on dry and sandy areas, it is often associated with wet or organic sites and can be a slow growing, long lived tree. Black spruce often occurs in large, relatively pure stands. It is used primarily for pulp and paper due to its long fibres, but is also used for dimensional lumber and other solid wood products.

Species Distribution - Black Spruce

Area and Volume Statistics - Black Spruce

Average Species Statistics

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Average Age (all stands)	75	76	76	82
Average Stocking (all stands)	67.0%	67.0%	66.0%	69.1%
Average Proportion of Black Spruce	52.1%	51.5%	52.7%	53.3%
Proportion of Growing Stock	34.5%	30.9%	31.9%	30.9%

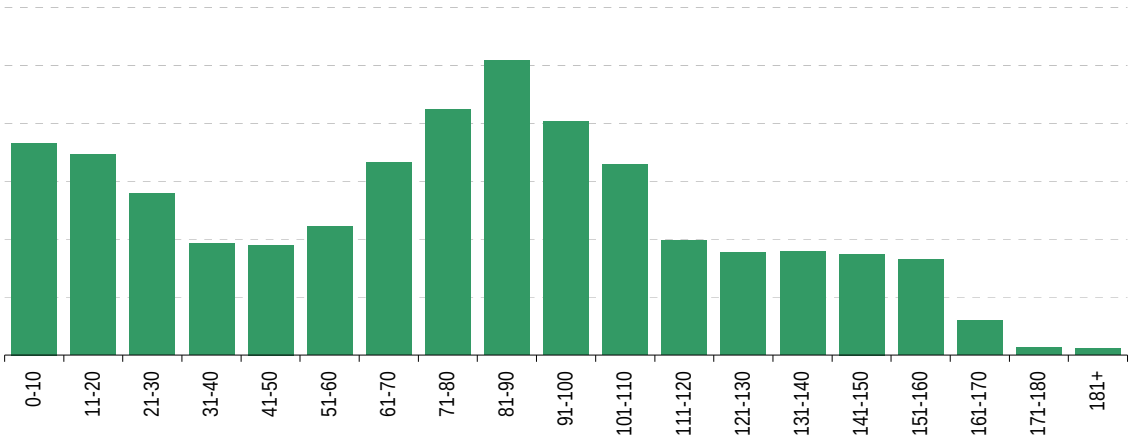
Area Statistics *Area in hectares*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
1-30% of Stand	8,343,631	9,696,394	9,492,357	9,231,406
31-60% of Stand	3,791,122	4,275,089	3,993,601	3,755,239
61-100% of Stand	7,916,471	8,891,461	9,156,434	9,062,847
Total Area Containing Black Spruce	20,051,225	22,862,944	22,642,392	22,049,493
Area of Black Spruce Working Group	11,268,043	12,694,052	12,904,507	12,890,724

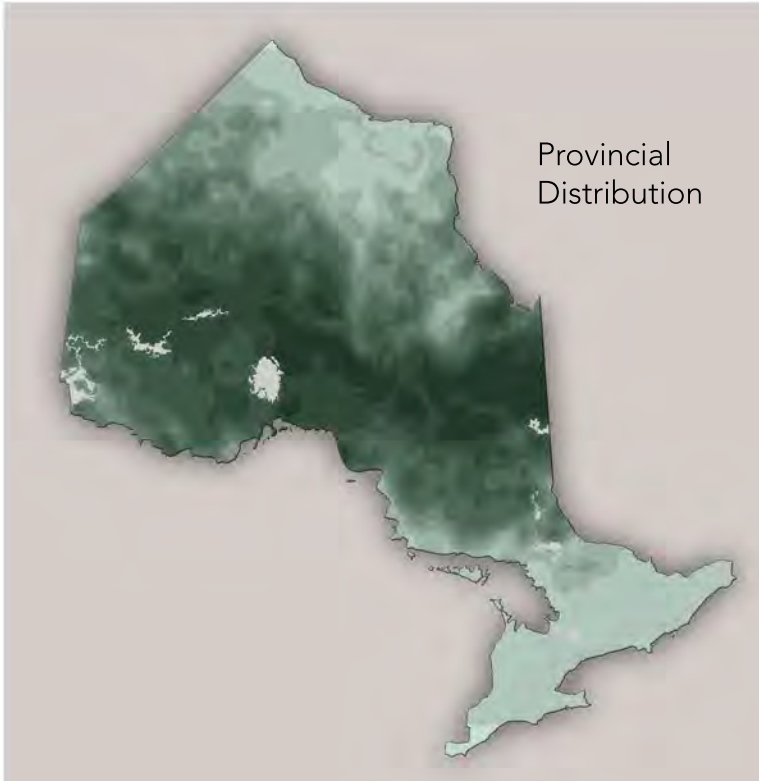
Growing Stock Volumes *Volume in thousands of cubic metres*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Gross Total Volume	1,235,322.9	1,472,918.4	1,522,646.0	1,538,797.3
Net Merchantable Volume	710,684.5	849,603.7	882,034.3	887,936.3
Current Annual Increment	11,274.6	13,155.3	13,163.9	13,788.4
Mean Annual Increment	13,109.1	15,491.1	15,866.2	16,318.3

Age Class Distribution for All Forest Containing Black Spruce - AOU only



Source: 2010 Forest Resources Inventories within the AOU



Species Distribution - White Spruce

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Common Name: White Spruce
Latin Name: *Picea glauca*

White spruce is found across Ontario but is most common in the Boreal forest, on dry to fresh upland sites. It has sharp short needles (2 cm) that are bluish green to green in colour. The cones are small (5 to 7 cm) and light. White spruce is most commonly used as dimensional lumber but is also used in pulp and paper and is a popular Christmas tree.

Species Distribution - White Spruce

Area and Volume Statistics - White Spruce

Average Species Statistics

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Average Age (all stands)	79	80	77	78
Average Stocking (all stands)	68.0%	69.0%	69.0%	70.2%
Average Proportion of White Spruce	15.2%	15.1%	15.0%	14.8%
Proportion of Growing Stock	2.3%	2.4%	2.3%	2.1%

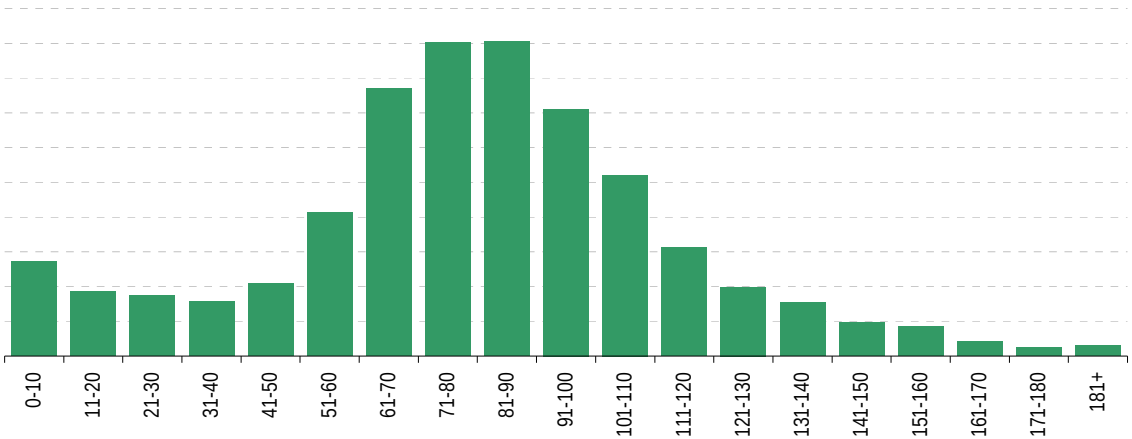
Area Statistics *Area in hectares*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
1-30% of Stand	4,293,022	5,842,225	5,889,157	5,923,070
31-60% of Stand	166,964	210,914	181,539	161,814
61-100% of Stand	78,089	108,785	115,953	99,007
Total Area Containing White Spruce	4,538,076	6,161,924	6,186,649	6,183,891
Area of White Spruce Working Group	241,950	330,974	325,030	302,373

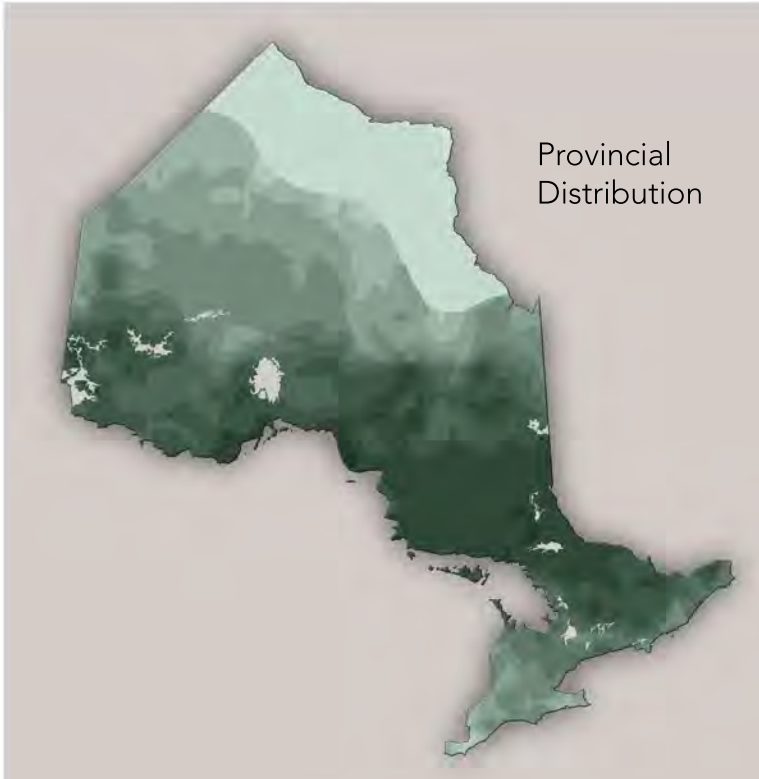
Growing Stock Volumes *Volume in thousands of cubic metres*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Gross Total Volume	80,680.3	114,702.9	111,072.8	106,401.5
Net Merchantable Volume	48,514.7	69,077.9	65,544.2	60,953.7
Current Annual Increment	1,004.8	1,391.3	1,404.8	1,425.5
Mean Annual Increment	985.0	1,395.2	1,385.4	1,360.8

Age Class Distribution for All Forest Containing White Spruce - AOU only



Source: 2010 Forest Resources Inventories within the AOU



Species Distribution - Balsam Fir

Index

Common Name: Balsam Fir
Latin Name: *Abies balsamea*

Balsam fir is a common softwood species in Ontario. It has a tall narrow profile that tapers to a point at the top of the tree with sticky resin blisters on the trunk. It is often found as a successional species growing under other species in clumps, as it is shade tolerant. It is generally not as long lived as spruce. Balsam fir has traditionally been used for pulp, paper and lumber products.

Species Distribution - Balsam Fir

Area and Volume Statistics - Balsam Fir

Average Species Statistics

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Average Age (all stands)	71	73	73	77
Average Stocking (all stands)	68.0%	70.0%	70.0%	71.0%
Average Proportion of Balsam Fir	16.8%	17.0%	17.5%	19.6%
Proportion of Growing Stock	4.3%	4.8%	4.9%	4.3%

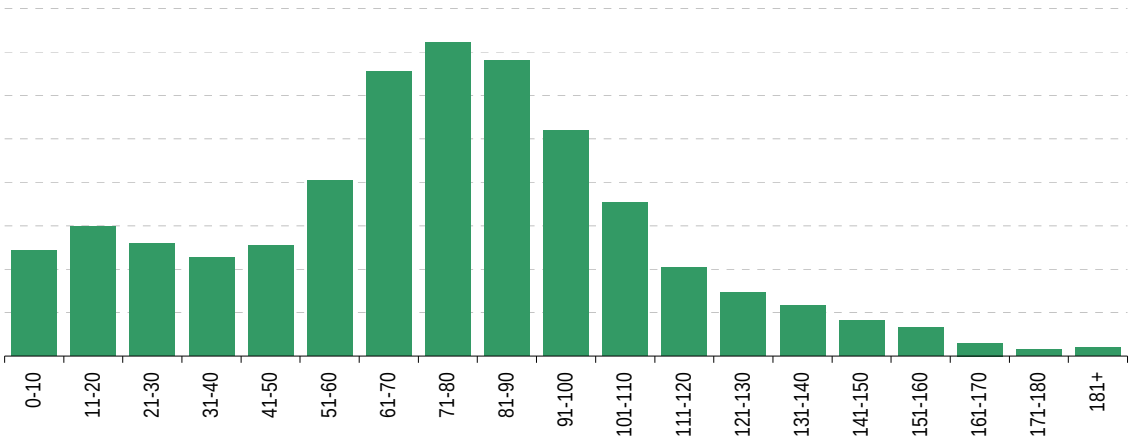
Area Statistics *Area in hectares*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
1-30% of Stand	7,406,229	9,778,696	9,593,120	9,638,827
31-60% of Stand	499,625	702,456	736,687	730,642
61-100% of Stand	79,430	100,940	127,316	102,838
Total Area Containing Balsam Fir	7,985,284	10,582,093	10,457,123	10,472,307
Area of Balsam Fir Working Group	653,072	935,450	921,803	1,365,096

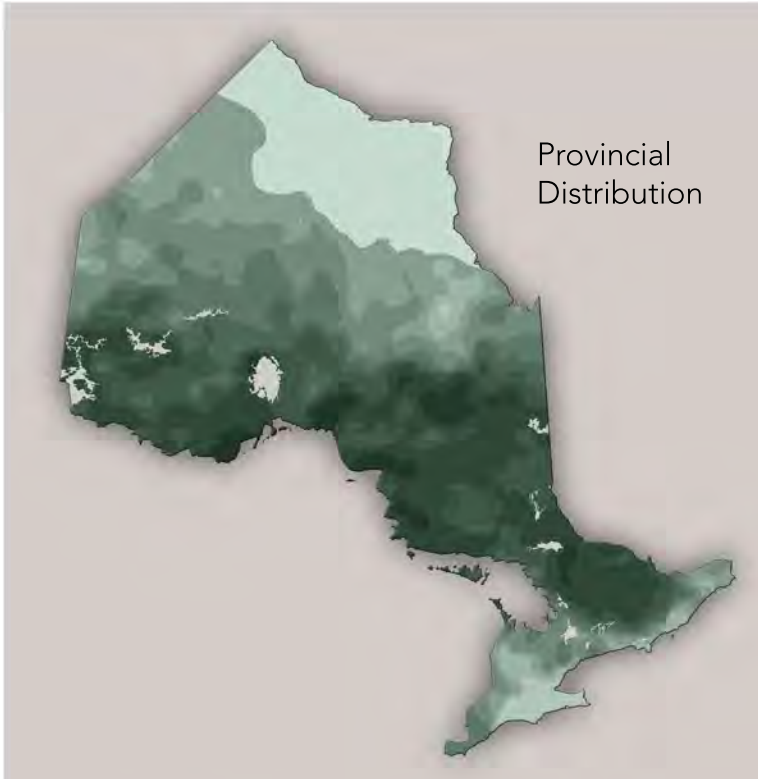
Growing Stock Volumes *Volume in thousands of cubic metres*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Gross Total Volume	154,878.7	227,995.7	233,841.2	212,426.6
Net Merchantable Volume	57,496.8	87,289.9	89,071.0	78,635.9
Current Annual Increment	2,152.2	3,054.8	3,263.5	3,182.6
Mean Annual Increment	2,032.9	2,955.4	3,091.4	2,884.6

Age Class Distribution for All Forest Containing Balsam Fir - AOU only



Source: 2010 Forest Resources Inventories within the AOU



Species Distribution - Cedar

Index

Common Name: Cedar
Latin Name: *Thuja occidentalis*

Eastern white cedar is a common tree found throughout Ontario. It is a slow growing tree that prefers swampy areas, but can be found on rocky upland sites. Cedar is often planted as an ornamental tree for hedges. White-tailed deer eat the branches of cedar in the winter months. Cedar wood is resistant to rot, and has many uses, including cedar shakes (shingles), fenceposts, lumber and boats.

Species Distribution - Cedar

Area and Volume Statistics - Cedar

Average Species Statistics

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Average Age (all stands)	94	94	91	94
Average Stocking (all stands)	67.0%	68.0%	68.0%	70.2%
Average Proportion of Cedar	22.2%	23.2%	23.6%	23.4%
Proportion of Growing Stock	2.4%	2.8%	2.8%	2.6%

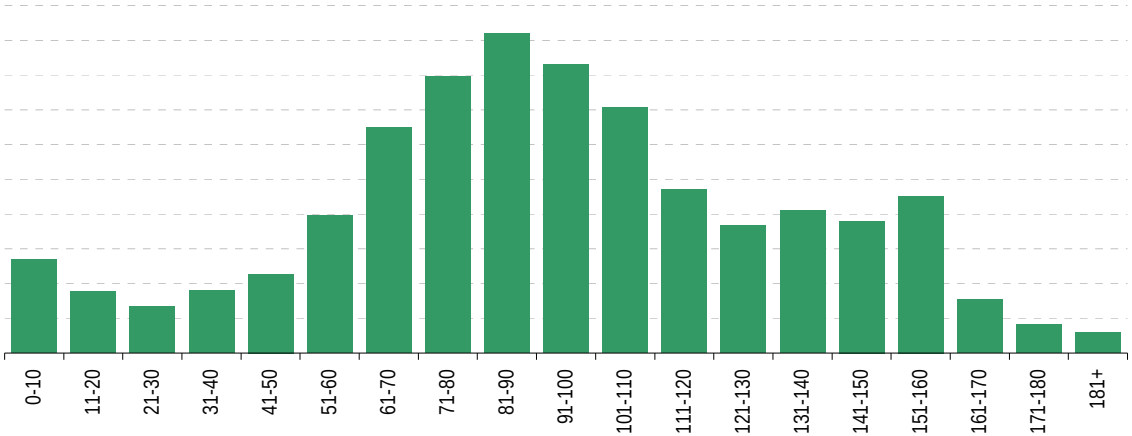
Area Statistics *Area in hectares*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
1-30% of Stand	2,275,683	3,096,287	3,075,395	2,984,022
31-60% of Stand	325,326	495,231	495,830	478,669
61-100% of Stand	152,183	237,691	253,444	237,805
Total Area Containing Cedar	2,753,193	3,829,208	3,824,668	3,700,496
Area of Cedar Working Group	484,296	765,007	781,878	721,775

Growing Stock Volumes *Volume in thousands of cubic metres*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Gross Total Volume	86,552.7	133,123.2	131,788.9	131,051.6
Net Merchantable Volume	28,049.6	44,278.3	43,716.4	43,337.8
Current Annual Increment	608.0	991.6	1,027.4	1,121.7
Mean Annual Increment	810.2	1,294.7	1,305.4	1,349.3

Age Class Distribution for All Forest Containing Cedar - AOU only



Source: 2010 Forest Resources Inventories within the AOU

Species Distribution - Larch

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Common Name: Larch
Latin Name: *Larix laricina*

Larch, or tamarack, is found throughout Ontario, but is more common in the north. This coniferous tree has needles that turn yellow in autumn and drop off. Although larch grows on many sites, it prefers swamps or wet organic soils, and is usually associated with black spruce. Larch wood is tough yet flexible, and has been used for lumber, pulp, poles and snowshoes.

Species Distribution - Larch

Area and Volume Statistics - Larch

Average Species Statistics

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Average Age (all stands)	94	95	97	107
Average Stocking (all stands)	63.0%	64.0%	64.0%	68.3%
Average Proportion of Larch	19.8%	20.1%	20.1%	20.2%
Proportion of Growing Stock	1.5%	1.5%	1.3%	1.2%

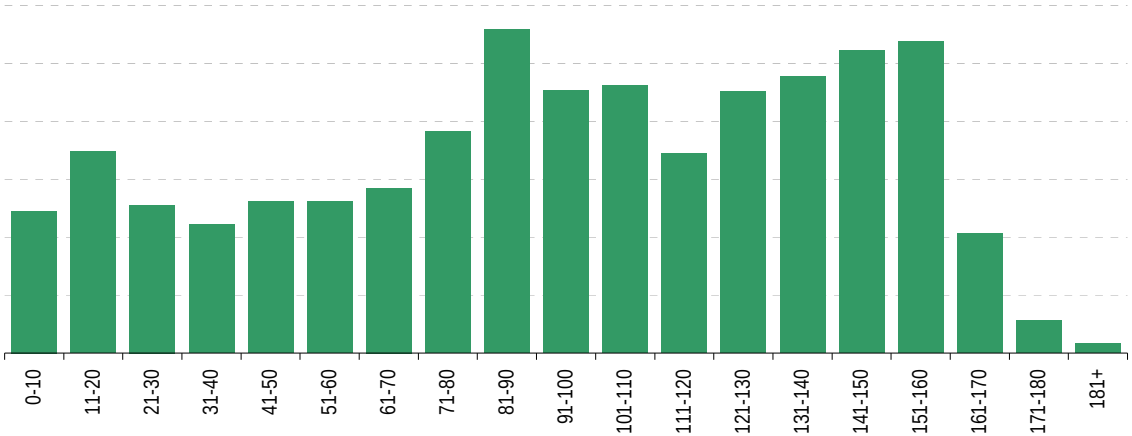
Area Statistics *Area in hectares*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
1-30% of Stand	2,388,601	2,806,437	2,291,934	1,893,702
31-60% of Stand	209,673	249,591	182,003	155,380
61-100% of Stand	93,552	120,076	108,132	88,729
Total Area Containing Larch	2,691,827	3,176,104	2,582,069	2,137,812
Area of Larch Working Group	200,310	253,812	204,295	167,868

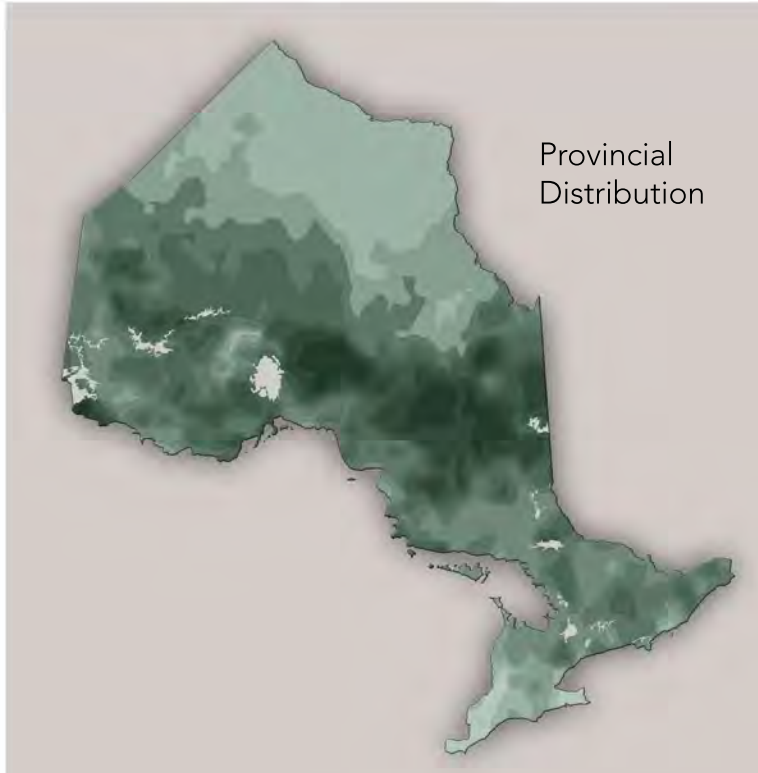
Growing Stock Volumes *Volume in thousands of cubic metres*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Gross Total Volume	55,249.0	71,199.7	61,978.2	57,832.7
Net Merchantable Volume	18,366.0	24,001.8	21,084.7	19,944.7
Current Annual Increment	455.8	584.3	477.0	450.1
Mean Annual Increment	543.4	704.8	600.8	566.3

Age Class Distribution for All Forest Containing Larch - AOU only



Source: 2010 Forest Resources Inventories within the AOU



Species Distribution - Hemlock

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Common Name: Hemlock
Latin Name: *Tsuga canadensis*

Hemlock is a long living tree found across the Great Lakes-St. Lawrence and Deciduous forest regions. It is commonly associated with yellow birch, and maple, and is very shade tolerant. It is usually found on cool moist soils near water, and is an excellent wildlife tree, providing cover from snow. White-tailed deer often yard in the winter under stands of hemlock. Hemlock has been used for lumber and railway ties, and is often planted as an ornamental tree.

Species Distribution - Hemlock

Area and Volume Statistics - Hemlock

Average Species Statistics

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Average Age (all stands)	118	111	106	105
Average Stocking (all stands)	73.0%	78.0%	81.0%	80.9%
Average Proportion of Hemlock	19.7%	18.7%	18.7%	19.1%
Proportion of Growing Stock	0.6%	0.9%	0.9%	0.8%

Area Statistics

Area in hectares

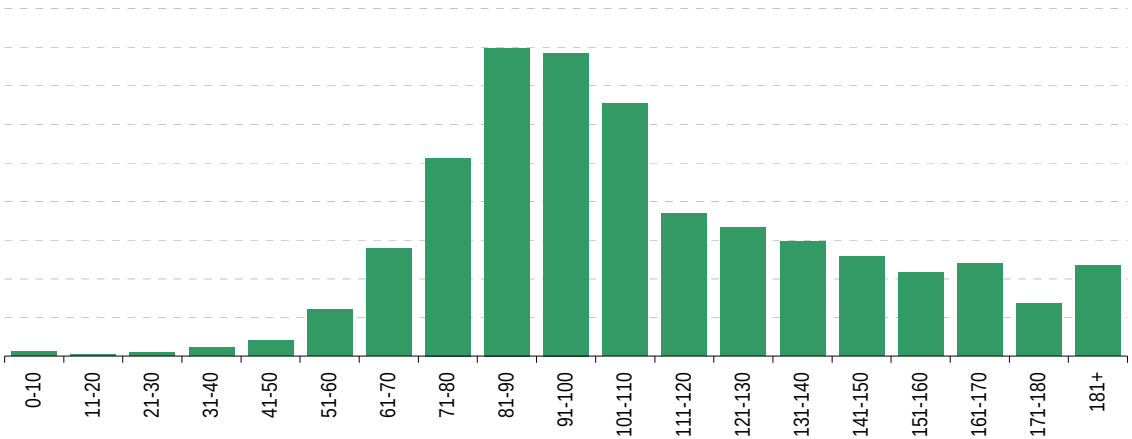
Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
1-30% of Stand	453,702	932,561	928,661	923,676
31-60% of Stand	63,894	113,581	112,611	115,963
61-100% of Stand	11,416	18,618	18,140	20,236
Total Area Containing Hemlock	529,012	1,064,761	1,059,412	1,059,875
Area of Hemlock Working Group	86,660	157,654	149,747	151,646

Growing Stock Volumes

Volume in thousands of cubic metres

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Gross Total Volume	20,966.1	41,112.2	41,748.1	41,415.3
Net Merchantable Volume	14,337.0	28,345.9	28,826.6	28,201.2
Current Annual Increment	108.7	252.2	271.5	295.9
Mean Annual Increment	159.2	350.5	369.8	387.2

Age Class Distribution for All Forest Containing Hemlock - AOU only



Source: 2010 Forest Resources Inventories within the AOU

Species Distribution - Poplar

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Common Name: Poplar
Latin Name: *Populus tremuloides*

Poplar or trembling aspen is a common tree throughout Ontario. A successional species, it is often the first tree to grow on a newly disturbed site. Native poplar in Ontario also includes largetoothed aspen and balsam poplar. Poplar has a very light, white soft wood, and is commonly used in composite board products, as well as pulp and paper.

Species Distribution - Poplar

Area and Volume Statistics - Poplar

Average Species Statistics

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Average Age (all stands)	66	68	69	72
Average Stocking (all stands)	71.0%	71.0%	72.0%	74.5%
Average Proportion of Poplar	31.5%	32.3%	33.3%	32.5%
Proportion of Growing Stock	22.3%	22.5%	22.3%	22.0%

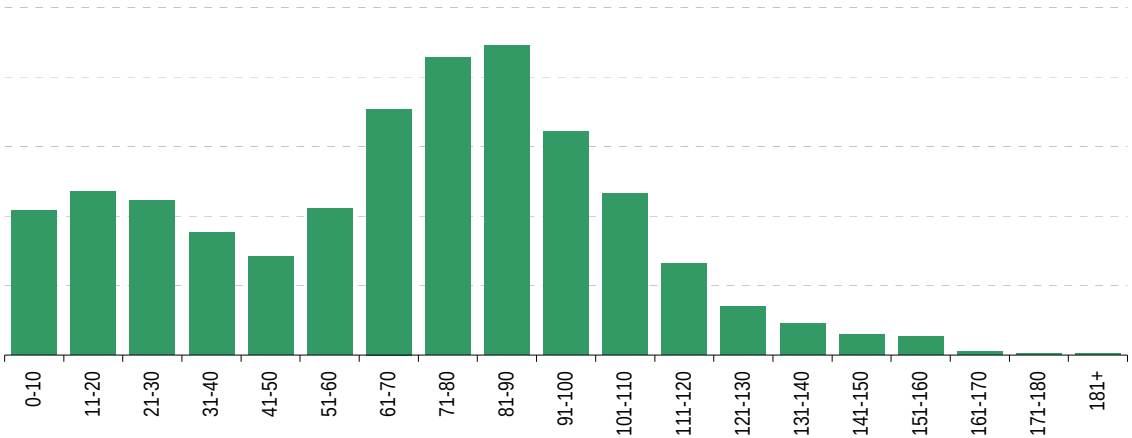
Area Statistics *Area in hectares*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
1-30% of Stand	8,662,797	10,655,267	10,307,043	9,801,699
31-60% of Stand	2,864,363	3,743,126	3,688,032	3,777,385
61-100% of Stand	1,548,687	2,039,658	2,042,421	2,100,483
Total Area Containing Poplar	13,075,846	16,438,050	16,037,496	15,679,568
Area of Poplar Working Group	4,450,634	5,907,699	5,899,812	5,846,832

Growing Stock Volumes *Volume in thousands of cubic metres*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Gross Total Volume	797,626.6	1,072,581.2	1,067,332.2	1,098,140.7
Net Merchantable Volume	489,512.1	664,987.8	667,580.0	692,857.7
Current Annual Increment	7,227.6	9,282.5	9,367.7	10,321.7
Mean Annual Increment	11,085.0	14,676.6	14,685.9	15,452.1

Age Class Distribution for All Forest Containing Poplar - AOU only



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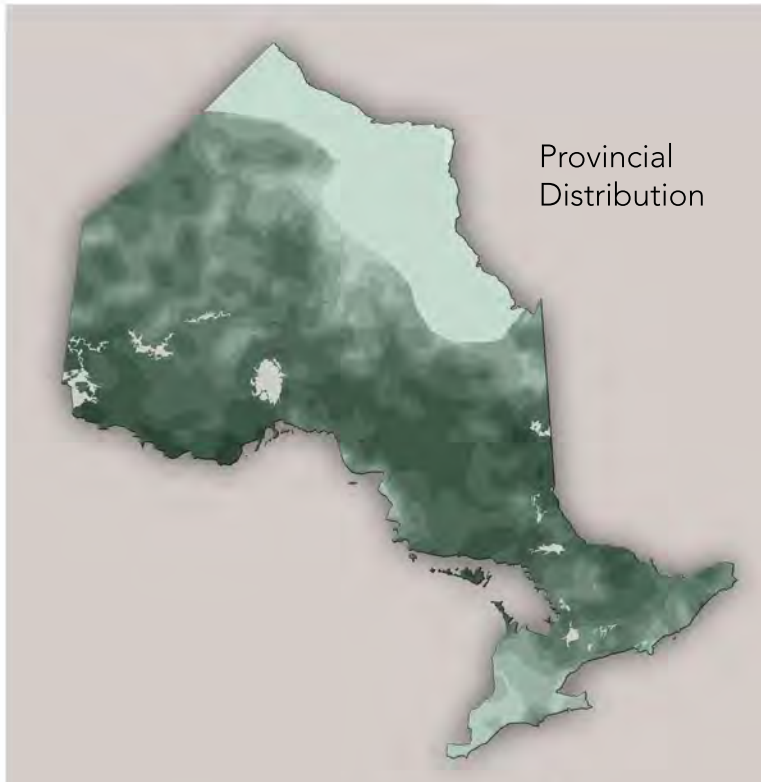
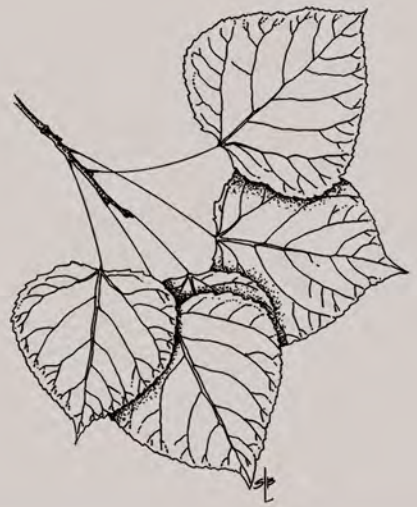




Species Distribution - White Birch

Index

Common Name: White Birch
Latin Name: *Betula papyrifera*

White birch is a common tree found throughout Ontario. The smooth white paper-like bark is immediately recognizable and the tree is sometimes referred to as "paper" birch. Often found in homogenous stands, white birch is an important source of food for many birds and animals which consume the leaves, buds and seeds. White birch is often used as firewood but is also used for veneer, pulp and paper and specialty products like hockey sticks.

Species Distribution - White Birch

Area and Volume Statistics - White Birch

Average Species Statistics

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Average Age (all stands)	71	73	71	75
Average Stocking (all stands)	71.0%	72.0%	73.0%	75.1%
Average Proportion of White Birch	23.9%	24.0%	24.1%	23.9%
Proportion of Growing Stock	8.6%	8.4%	8.2%	8.0%

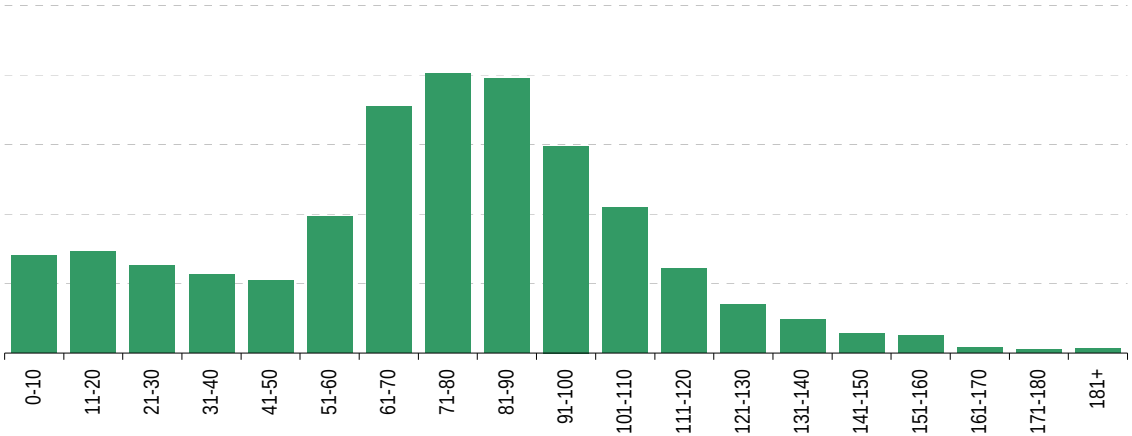
Area Statistics *Area in hectares*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
1-30% of Stand	8,787,225	11,027,983	10,868,010	10,453,443
31-60% of Stand	1,882,163	2,353,613	2,311,898	2,318,055
61-100% of Stand	457,149	604,840	595,935	612,425
Total Area Containing White Birch	11,126,537	13,986,435	13,775,842	13,383,923
Area of White Birch Working Group	2,519,342	3,190,415	3,097,548	2,984,641

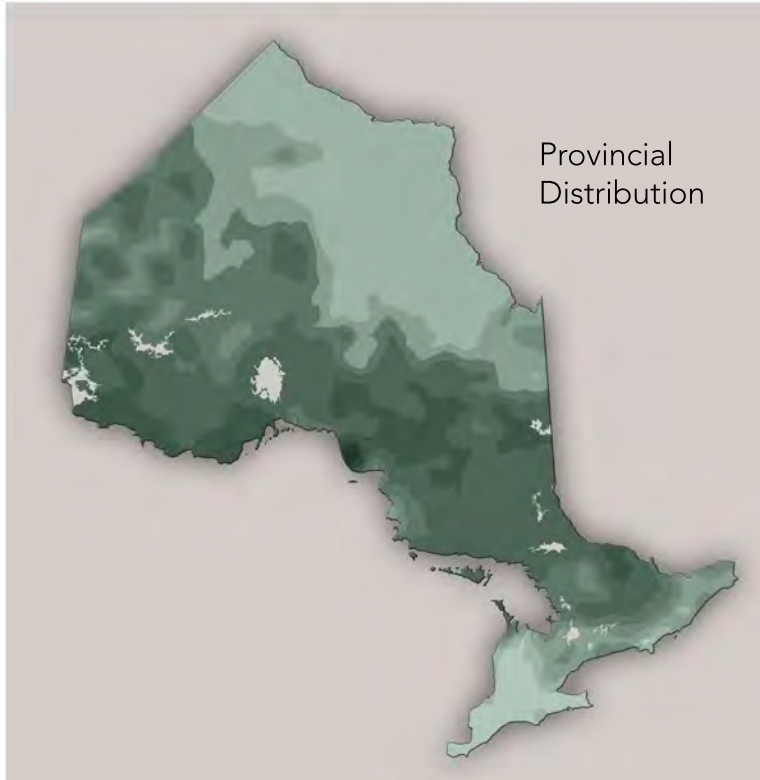
Growing Stock Volumes *Volume in thousands of cubic metres*

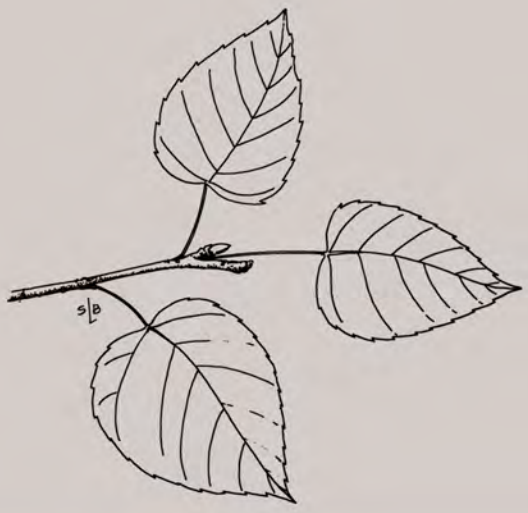
Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Gross Total Volume	307,945.7	400,471.0	393,712.8	399,422.5
Net Merchantable Volume	182,770.2	238,928.2	234,481.5	235,567.2
Current Annual Increment	1,920.3	2,338.2	2,568.9	3,189.1
Mean Annual Increment	4,001.7	5,144.8	5,302.5	5,694.5

Age Class Distribution for All Forest Containing White Birch - AOU only



Source: 2010 Forest Resources Inventories within the AOU





Species Distribution - Hard Maple

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Common Name: Hard Maple
Latin Name: *Acer saccharum*

Sugar or hard maple is a common tree in the Great Lakes - St. Lawrence forest. The leaf of the sugar maple is found on the Canadian flag. It is most commonly found in the Great Lakes - St. Lawrence and Deciduous forest regions, and is also well known for maple syrup. With a hard white wood, sugar maple is often used for furniture or flooring, but is also popular as firewood.

Species Distribution - Hard Maple

Area and Volume Statistics - Hard Maple

Average Species Statistics

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Average Age (all stands)	105	100	95	94
Average Stocking (all stands)	77.0%	80.0%	82.0%	81.6%
Average Proportion of Hard Maple	39.1%	39.2%	37.3%	38.1%
Proportion of Growing Stock	3.4%	5.1%	5.1%	4.7%

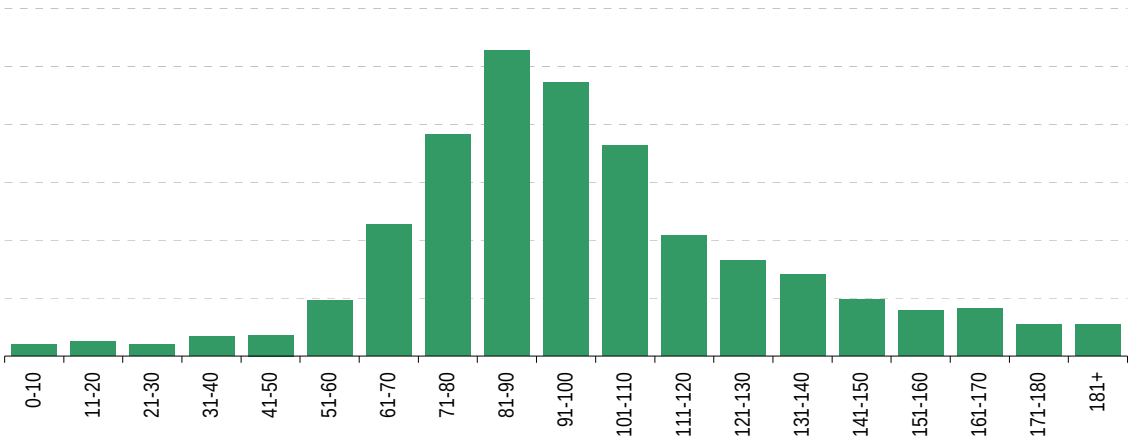
Area Statistics *Area in hectares*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
1-30% of Stand	785,634	1,458,744	1,447,832	1,424,544
31-60% of Stand	547,946	1,111,635	1,106,642	1,102,390
61-100% of Stand	294,330	515,099	521,883	539,900
Total Area Containing Hard Maple	1,627,910	3,085,478	3,076,358	3,066,834
Area of Hard Maple Working Group	919,004	1,803,560	1,885,198	1,846,755

Growing Stock Volumes *Volume in thousands of cubic metres*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Gross Total Volume	123,316.6	240,836.1	242,982.3	234,588.7
Net Merchantable Volume	78,203.4	153,642.3	154,570.4	146,459.1
Current Annual Increment	862.7	1,933.9	2,062.8	2,154.0
Mean Annual Increment	1,152.5	2,384.9	2,472.3	2,474.2

Age Class Distribution for All Forest Containing Hard Maple - AOU only



Source: 2010 Forest Resources Inventories within the AOU

Species Distribution - Soft Maple

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Common Name: Soft Maple
Latin Name: *Acer rubrum*

Red or soft maple is less common than sugar maple, and is found in the Great Lakes - St. Lawrence and Deciduous forest regions. It is often found on wetter sites than sugar maple, and is know for its brilliant red leaves in autumn. Red maple is often planted as an ornamental tree, and is an important source of food for wildlife.

Species Distribution - Soft Maple

Area and Volume Statistics - Soft Maple

Average Species Statistics

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Average Age (all stands)	85	86	82	80
Average Stocking (all stands)	75.0%	76.0%	77.0%	77.6%
Average Proportion of Soft Maple	15.2%	16.5%	16.5%	16.6%
Proportion of Growing Stock	1.3%	2.0%	1.9%	1.7%

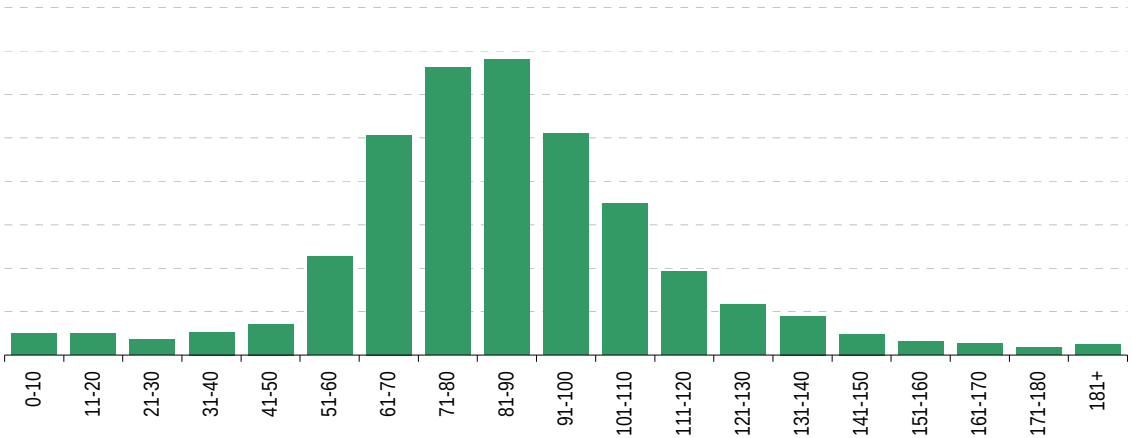
Area Statistics *Area in hectares*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
1-30% of Stand	1,989,208	3,514,217	3,479,240	3,746,131
31-60% of Stand	86,466	208,535	205,721	319,864
61-100% of Stand	3,895	20,930	21,043	165,213
Total Area Containing Soft Maple	2,079,569	3,743,682	3,706,004	4,231,207
Area of Soft Maple Working Group	152,589	365,264	355,616	344,748

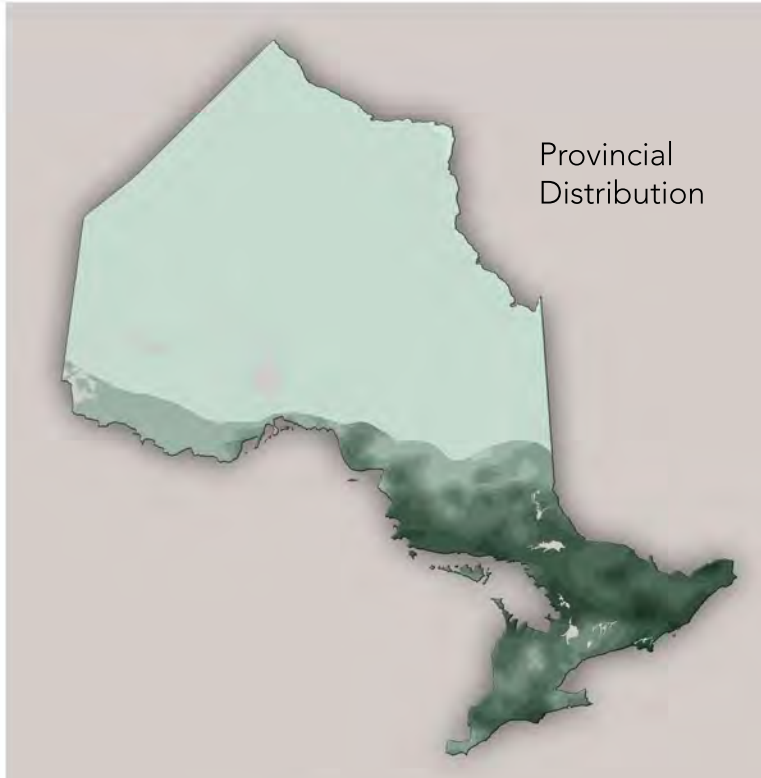
Growing Stock Volumes *Volume in thousands of cubic metres*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Gross Total Volume	46,103.6	94,605.4	91,484.7	85,100.9
Net Merchantable Volume	32,736.4	67,319.8	63,892.6	44,118.5
Current Annual Increment	516.7	1,078.7	1,114.4	1,139.7
Mean Annual Increment	540.2	1,115.5	1,115.6	1,091.9

Age Class Distribution for All Forest Containing Soft Maple - AOU only



Source: 2010 Forest Resources Inventories within the AOU



Species Distribution - Beech

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Common Name: Beech
Latin Name: *Fagus grandifolia*

Beech is found throughout the Great Lakes-St. Lawrence and Deciduous forest regions, but is more common in the southern portion of the province. It has a smooth silver-gray bark and typically grows in shady forests associated with sugar maple. The nuts are eaten by many birds and animals including bear, turkey, deer and squirrels. Beech wood is a tough heavy wood which is traditionally used for flooring and furniture.

Species Distribution - Beech

Area and Volume Statistics - Beech

Average Species Statistics

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Average Age (all stands)	117	107	104	104
Average Stocking (all stands)	72.0%	80.0%	83.0%	82.7%
Average Proportion of Beech	14.5%	14.1%	14.2%	14.6%
Proportion of Growing Stock	0.2%	0.4%	0.4%	0.3%

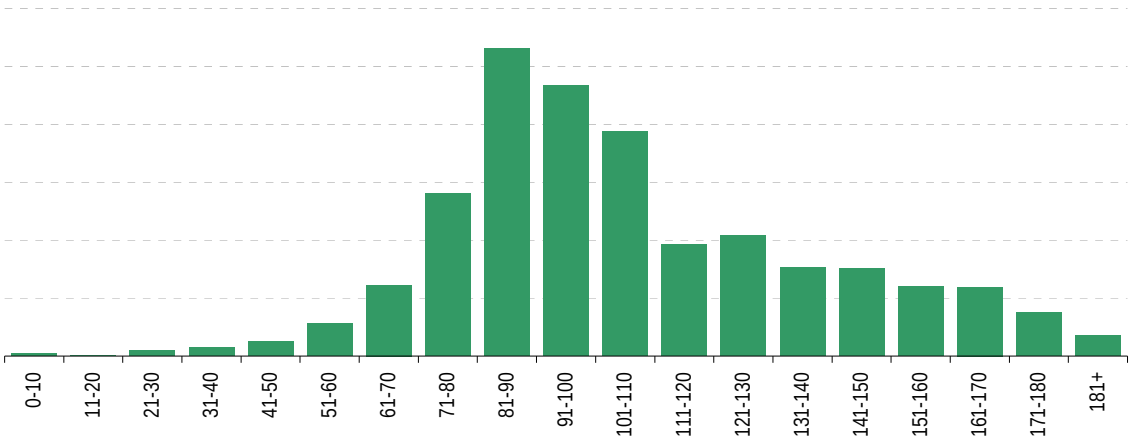
Area Statistics *Area in hectares*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
1-30% of Stand	261,349	581,864	572,301	546,555
31-60% of Stand	4,871	9,169	9,319	9,941
61-100% of Stand	126	404	388	2,261
Total Area Containing Beech	266,347	591,437	582,008	558,757
Area of Beech Working Group	14	486	-	-

Growing Stock Volumes *Volume in thousands of cubic metres*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Gross Total Volume	7,692.4	17,894.7	18,326.8	17,204.6
Net Merchantable Volume	5,688.8	13,371.8	13,768.1	12,821.0
Current Annual Increment	46.9	135.6	141.4	137.2
Mean Annual Increment	67.5	171.7	177.9	169.6

Age Class Distribution for All Forest Containing Beech - AOU only



Source: 2010 Forest Resources Inventories within the AOU

Species Distribution - Basswood

Index

Common Name: Basswood
Latin Name: *Tilia americana*

Basswood, or Linden, is found throughout the Great Lakes-St. Lawrence and Deciduous forest regions. It is commonly found with sugar maple, and rarely grows in pure stands. It is often found near water where the ground is moist. Basswood seeds provide food for birds, squirrels, mice and rabbits. Basswood has a bright, light weight wood that is very soft, and is used for lumber, picture frames and toys, as well as baskets and plywood.

Species Distribution - Basswood

Area and Volume Statistics - Basswood

Average Species Statistics

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Average Age (all stands)	93	89	88	86
Average Stocking (all stands)	76.0%	83.0%	83.0%	86.0%
Average Proportion of Basswood	12.7%	12.5%	12.6%	12.5%
Proportion of Growing Stock	0.1%	0.2%	0.2%	0.2%

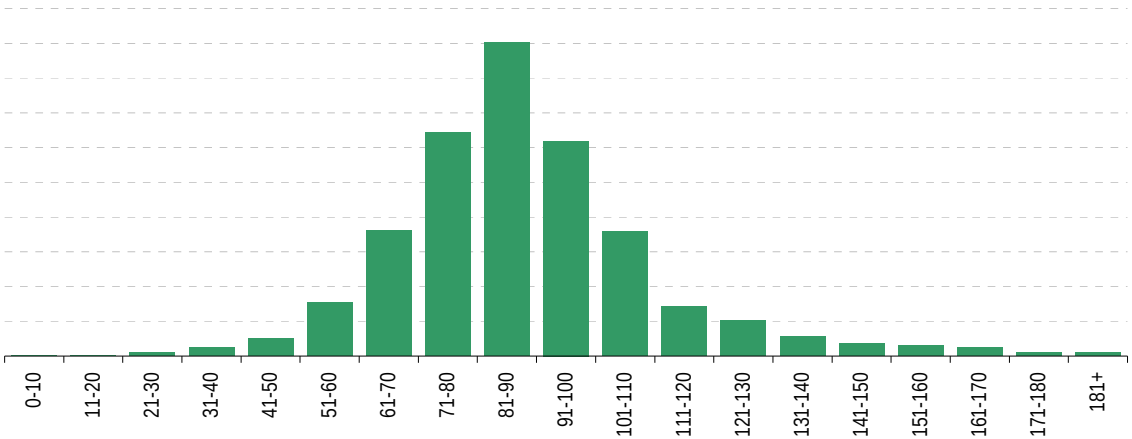
Area Statistics *Area in hectares*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
1-30% of Stand	113,002	351,742	348,560	346,395
31-60% of Stand	819	2,103	2,136	2,965
61-100% of Stand	4	177	177	263
Total Area Containing Basswood	113,825	354,022	350,874	349,623
Area of Basswood Working Group	-	-	-	-

Growing Stock Volumes *Volume in thousands of cubic metres*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Gross Total Volume	2,646.4	8,905.4	8,863.6	8,813.2
Net Merchantable Volume	1,959.2	6,544.5	6,507.4	6,292.4
Current Annual Increment	26.3	95.2	95.1	104.0
Mean Annual Increment	29.0	101.0	100.8	105.4

Age Class Distribution for All Forest Containing Basswood - AOU only



Source: 2010 Forest Resources Inventories within the AOU

Species Distribution - Ash (All)

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Common Name: Ash (All)
Latin Name: *Fraxinus spp.*

Both black and white ash are common trees across Ontario. Black ash is often associated with wet sites in central and northern Ontario, where white ash is more common in the south on drier sites. Ash in Ontario has been impacted dramatically by emerald ash borer over the past few years, especially in the southwest. Ash has a very hard and strong wood and has been used for tool handles, baseball bats and furniture, but is used as pulp and is excellent firewood.

Species Distribution - Ash (All)

Area and Volume Statistics - Ash (All)

Average Species Statistics

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Average Age (all stands)	84	82	81	79
Average Stocking (all stands)	70.0%	75.0%	77.0%	79.5%
Average Proportion of Ash (All)	15.9%	17.6%	10.7%	12.4%
Proportion of Growing Stock	0.2%	0.4%	0.4%	0.3%

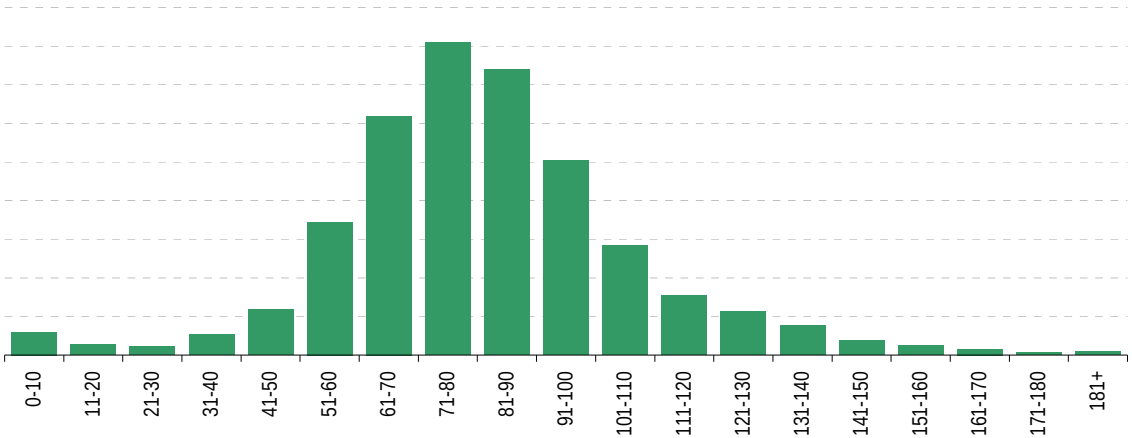
Area Statistics *Area in hectares*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
1-30% of Stand	266,201	726,070	913,200	733,566
31-60% of Stand	13,257	49,542	51,806	46,813
61-100% of Stand	8,867	27,580	29,792	24,575
Total Area Containing Ash (All)	288,325	803,192	994,798	804,954
Area of Ash (All) Working Group	23,546	81,637	79,857	67,380

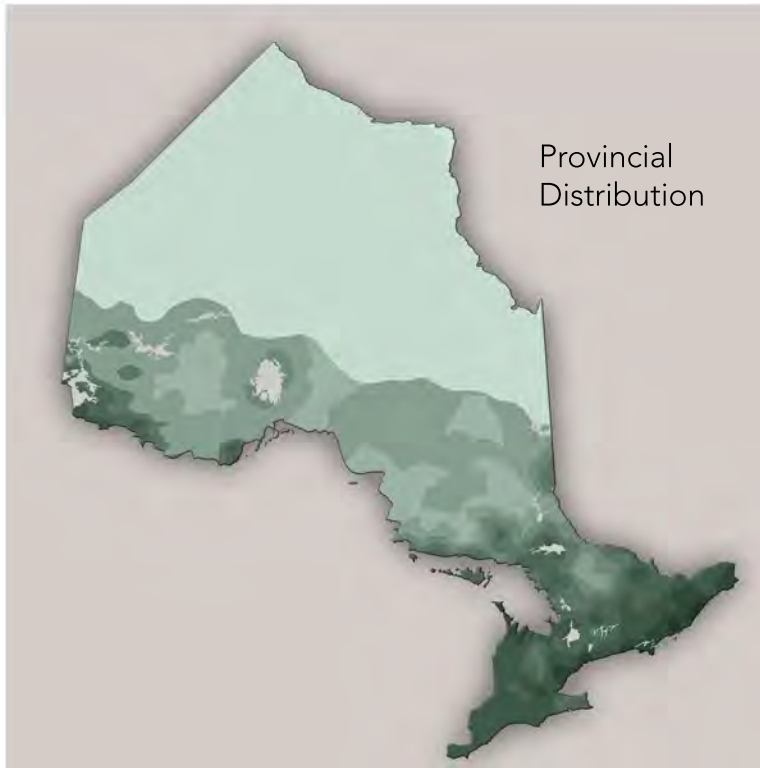
Growing Stock Volumes *Volume in thousands of cubic metres*

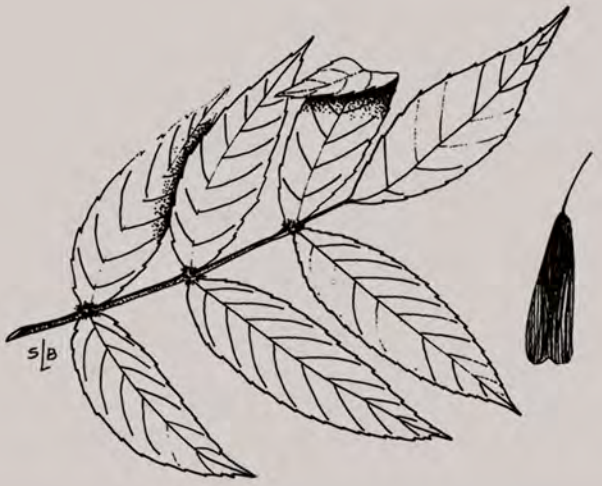
Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Gross Total Volume	6,589.6	20,781.6	20,346.2	15,008.3
Net Merchantable Volume	4,741.1	14,580.6	14,172.1	7,738.4
Current Annual Increment	72.2	254.1	254.2	206.3
Mean Annual Increment	76.0	253.6	251.1	195.0

Age Class Distribution for All Forest Containing Ash (All) - AOU only



Source: 2010 Forest Resources Inventories within the AOU





Species Distribution - Oak (All)

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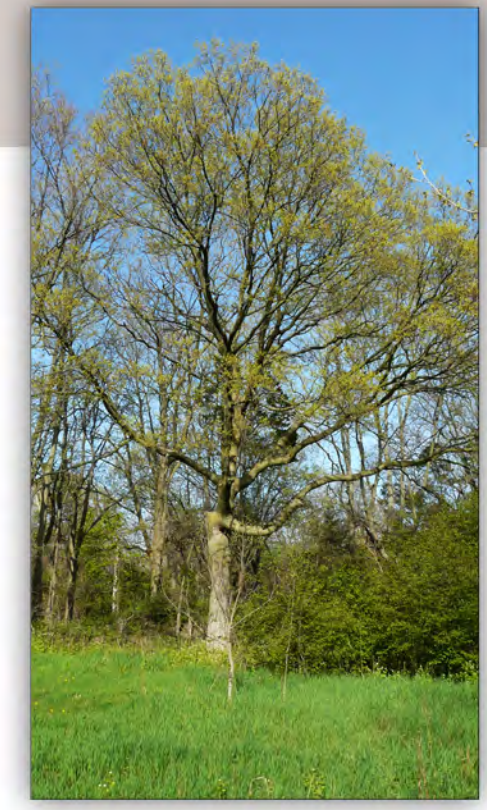


Common Name: Oak (All)
Latin Name: *Quercus spp.*

Red oak is a common hardwood species in central and southern Ontario. It is known for its large crown and distinctive leaves. The acorns of oak trees are an important food source for animals such as deer, turkeys, squirrels and woodpeckers. Oak is a highly valued wood, often used for trim, flooring or furniture, and has a very hard reddish brown wood.

Species Distribution - Oak (All)

Area and Volume Statistics - Oak (All)

Average Species Statistics

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Average Age (all stands)	88	87	85	83
Average Stocking (all stands)	72.0%	75.0%	76.0%	76.8%
Average Proportion of Oak (All)	22.6%	22.9%	24.0%	23.7%
Proportion of Growing Stock	0.6%	0.9%	0.9%	0.9%

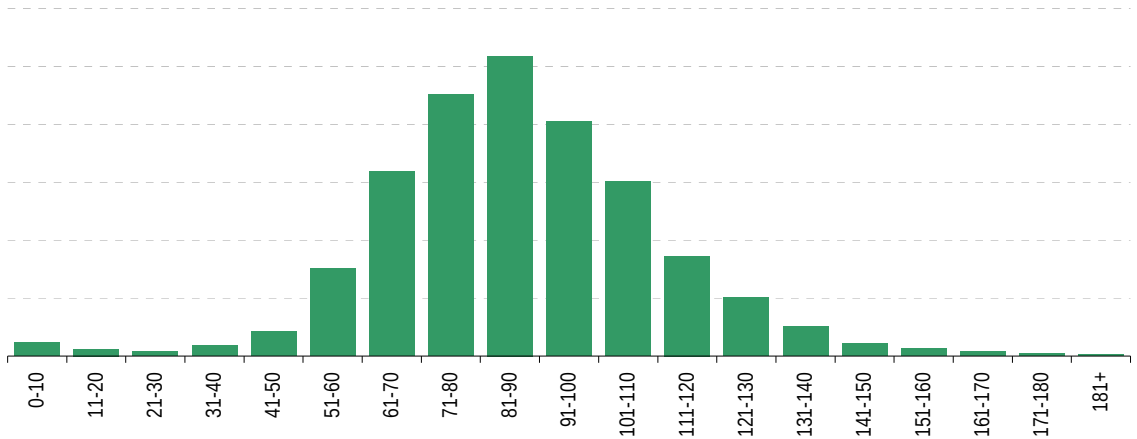
Area Statistics *Area in hectares*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
1-30% of Stand	483,925	1,076,822	1,008,813	973,321
31-60% of Stand	93,516	196,753	195,685	201,824
61-100% of Stand	20,364	38,902	37,271	52,671
Total Area Containing Oak (All)	597,805	1,312,476	1,241,768	1,227,816
Area of Oak (All) Working Group	134,651	280,894	282,521	306,816

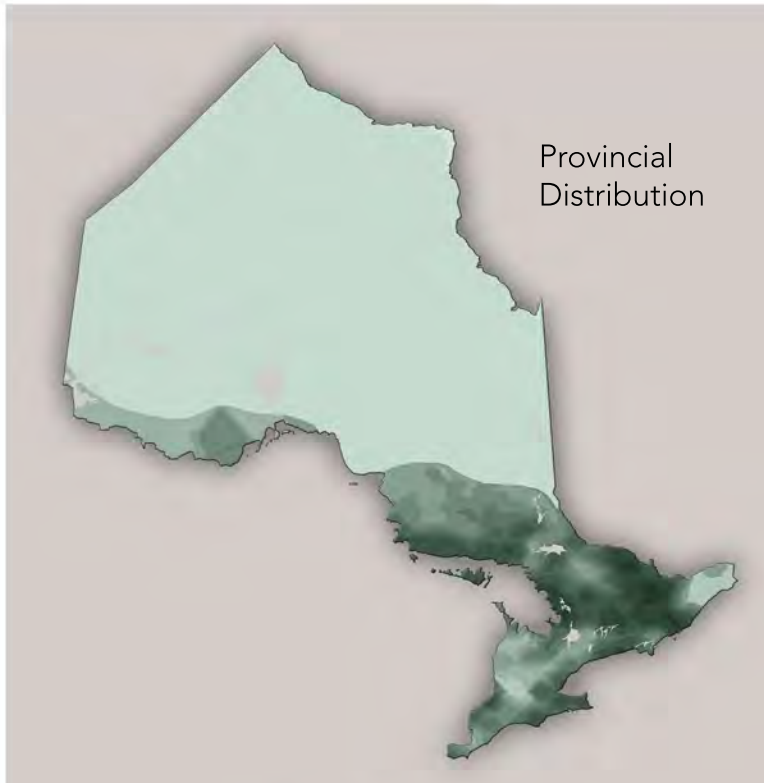
Growing Stock Volumes *Volume in thousands of cubic metres*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Gross Total Volume	20,030.8	44,616.3	44,280.3	44,075.6
Net Merchantable Volume	14,947.7	33,118.3	32,633.8	31,732.3
Current Annual Increment	196.7	451.3	464.7	510.9
Mean Annual Increment	219.7	495.6	500.5	523.4

Age Class Distribution for All Forest Containing Oak (All) - AOU only



Source: 2010 Forest Resources Inventories within the AOU



Species Distribution - Yellow Birch

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Common Name: Yellow Birch
Latin Name: *Betula alleghaniensis*

Yellow birch is a common hardwood across the Great Lakes - St. Lawrence forest, preferring cool moist upland sites. The silvery gray to yellowish bark gives the tree its name. Catkins and seeds are eaten by wildlife. Yellow birch is commonly used in furniture, cabinet making, plywood and doors, and is also popular as firewood.

Species Distribution - Yellow Birch

Area and Volume Statistics - Yellow Birch

Average Species Statistics

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Average Age (all stands)	113	111	105	104
Average Stocking (all stands)	76.0%	78.0%	81.0%	80.5%
Average Proportion of Yellow Birch	17.6%	17.0%	17.1%	17.0%
Proportion of Growing Stock	1.1%	1.3%	1.3%	1.2%

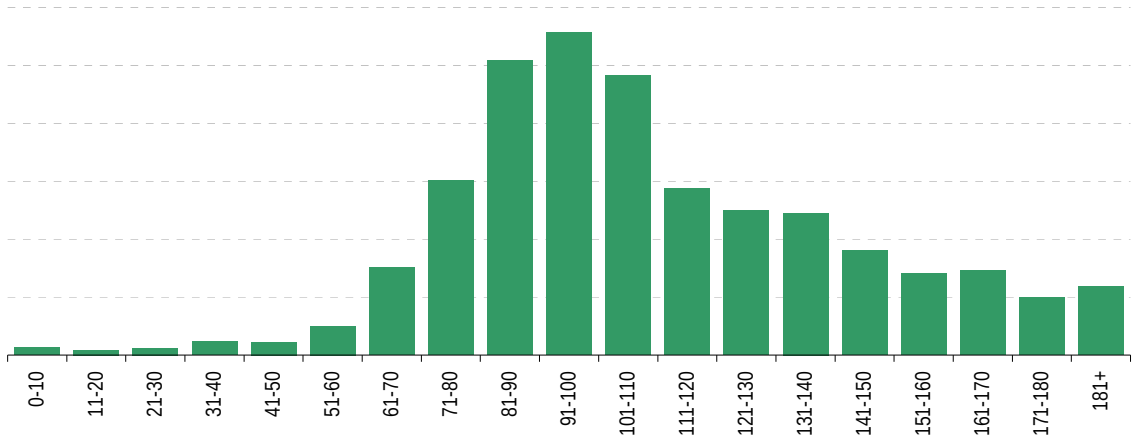
Area Statistics *Area in hectares*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
1-30% of Stand	1,037,035	1,678,644	1,672,520	1,679,803
31-60% of Stand	79,634	114,476	112,916	113,210
61-100% of Stand	4,051	5,366	5,670	4,913
Total Area Containing Yellow Birch	1,120,720	1,798,486	1,791,106	1,797,926
Area of Yellow Birch Working Group	115,051	165,695	153,057	154,440

Growing Stock Volumes *Volume in thousands of cubic metres*

Statistic	Crown AOU 2011	AOU 2011	AOU 2006	AOU 2001
Gross Total Volume	38,042.1	60,628.2	60,371.8	58,856.3
Net Merchantable Volume	28,342.5	45,342.9	45,040.1	43,386.7
Current Annual Increment	233.6	392.3	428.7	450.8
Mean Annual Increment	336.2	546.5	566.1	570.0

Age Class Distribution for All Forest Containing Yellow Birch - AOU only



Source: 2010 Forest Resources Inventories within the AOU

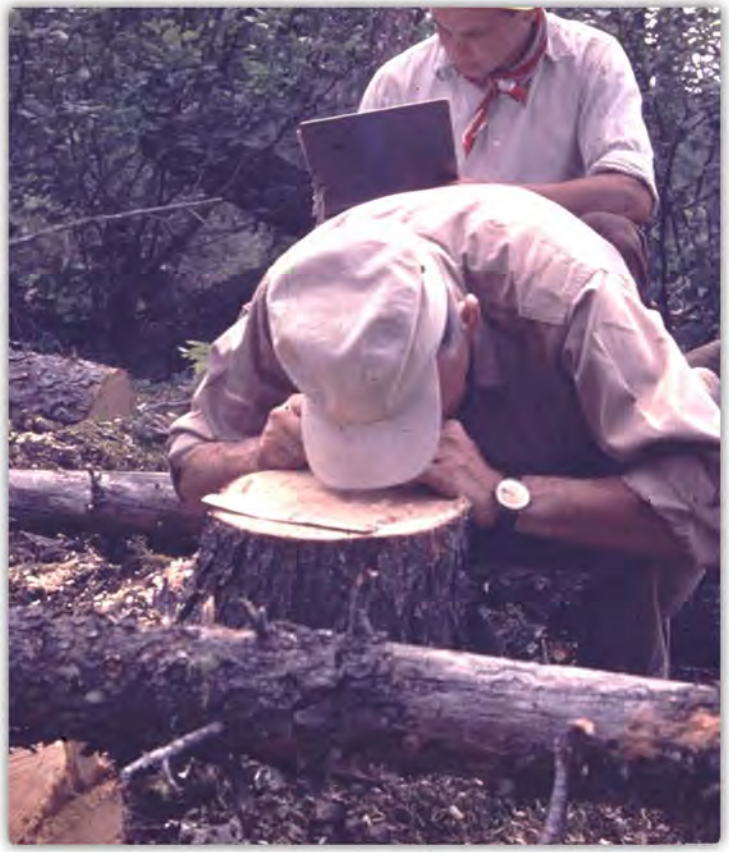
Historical Summaries

Index

Interactive Chapter Index

FRO has been published since the 1920s. Historical information from the 1986, 1996, 2001 and 2006 versions has been included in this report to provide some indications of forest change over time.

Summaries are by "working group" or dominant tree species and 20 year age class



select a topic

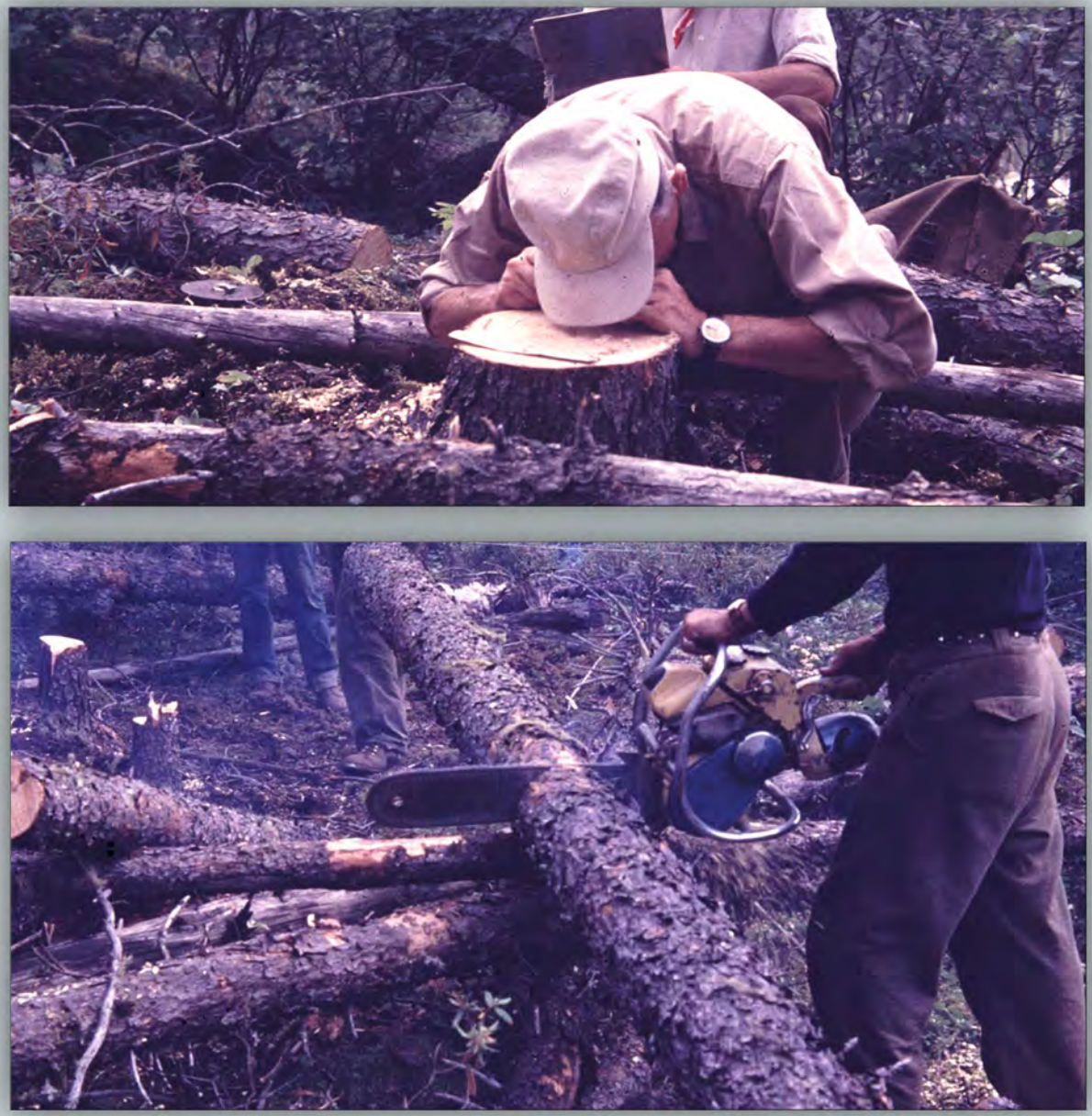
Historical Summaries

The FRO series has been published since the 1920's, although the format has changed quite a bit since then.

Originally, forest cover was surveyed according to broad cover types and seral stages, essentially *mature*, *immature* and *young growth* forest, as the inventory was purely for commercial logging purposes. The 1953 set was done on a district basis. It wasn't until 1986 that the concept of age classes was introduced to the report. Working groups and 20 year age classes were published in 1986 and this report has carried that tradition through for comparative purposes.

Volume measurements (growing stock) were published earlier than age class summaries. Therefore the growing stock historical summaries report back to 1963.

It should also be noted that changes in the methods of data collection and summarization should be considered when examining historical trends.



sampling boreal forest stands for growth and yield studies - circa 1955

Historical Summaries by Working Group

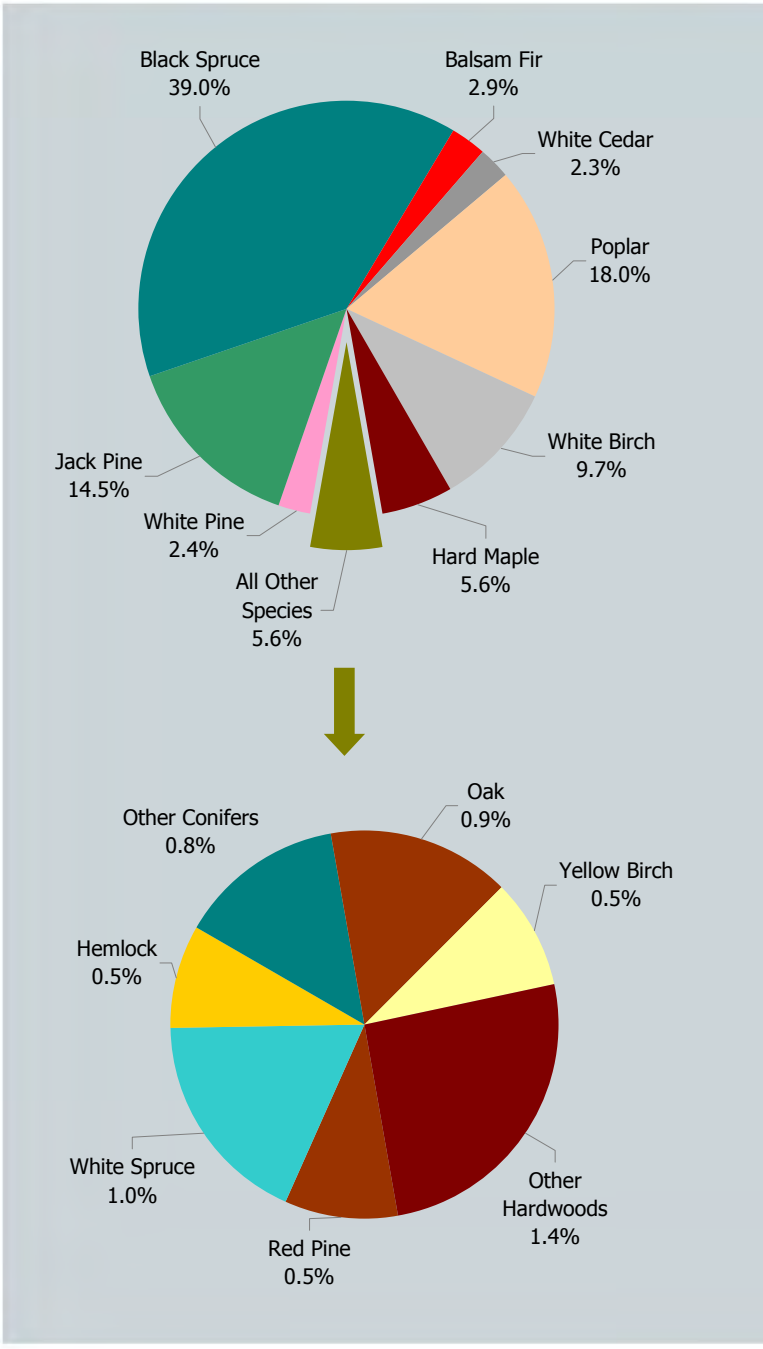
Index

Total Area by Working Group and Year

All Area in hectares

Working Group	1986	1996	2001	2006	2011
White Pine	571,040	693,682	775,240	786,531	789,788
Red Pine	158,433	132,590	148,471	163,674	174,875
Jack Pine	4,319,137	4,608,320	4,576,787	4,652,725	4,752,693
Spruce (All)*	13,670,936	13,391,233	13,193,097	13,229,537	13,105,953
Black Spruce	n/a	13,095,277	12,890,724	12,904,507	12,774,963
White Spruce	n/a	295,956	302,373	325,030	330,990
Balsam Fir	1,862,366	1,775,390	1,365,096	921,803	935,450
White Cedar	n/a	442,253	721,775	781,878	765,007
Hemlock	108,431	131,181	151,646	149,747	157,654
Other Conifers (All)*	884,977	823,530	917,232	991,563	1,023,571
Other Conifers	n/a	381,277	195,457	209,684	258,564
Poplar	5,011,979	5,704,712	5,846,832	5,904,395	5,907,699
White Birch	2,828,997	2,950,846	2,984,641	3,097,548	3,190,415
Hard Maple	2,391,937	1,916,763	1,846,755	1,865,165	1,838,283
Oak	n/a	146,311	306,816	282,521	280,896
Yellow Birch	162,925	137,992	154,440	153,057	165,695
*Other Hardwoods (All)	710,121	609,975	746,141	765,532	753,913
Other Hardwoods	n/a	463,664	439,325	483,011	473,017
Total:	32,681,277	32,876,215	32,706,378	32,681,277	32,795,989

** Forest Resources of Ontario 1986 grouped spruce (black and white), other conifers (including white cedar), and other hardwoods (including oak), so these lines are double counted for comparative purposes. 1986 AOU total were proportionally reduced to reflect available inventories in 2006.*



Historically, forest stands were grouped into classifications based on the dominant species, known as working groups, rather than ecosite or forest unit which was introduced in the 1990s in Ontario. Working groups are still a valid aggregation, and are reported here to provide historical context.

Age classes were also grouped in historical documents, available only in 20 year classes, and any stands older than 120 years old were often grouped into the 121+ (121 - 140) age class. These ages have been adjusted to better represent estimated actual ages.

Source: Historical Forest Resources Inventories within the AOU

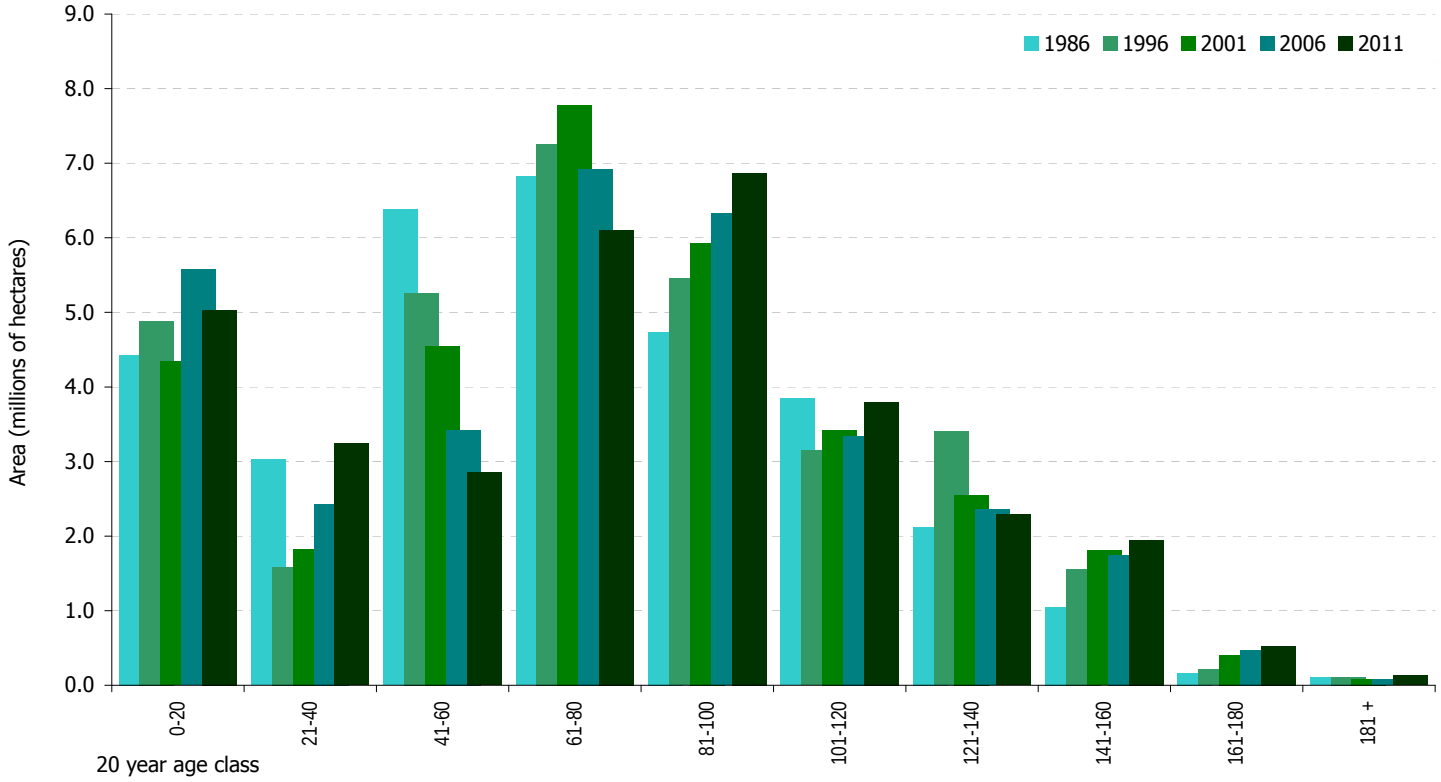
Historical Summaries by Working Group

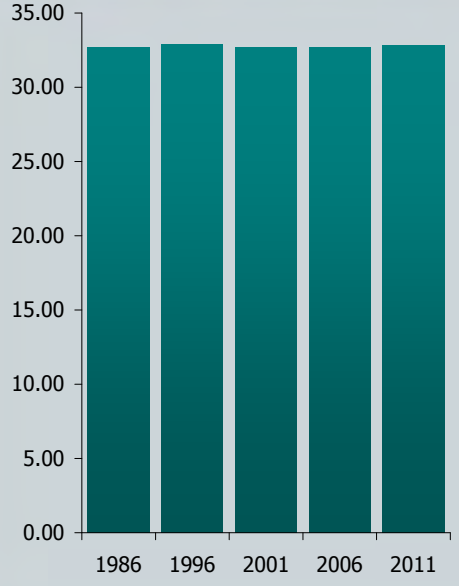
Index

Total Area by Age Class and Year - All Working Groups

Area in hectares

Age Class	1986	1996	2001	2006	2011
0-20	4,431,154	4,882,846	4,345,095	5,576,622	5,033,964
21-40	3,025,423	1,588,116	1,831,034	2,429,979	3,238,608
41-60	6,381,739	5,261,256	4,545,771	3,425,021	2,851,092
61-80	6,825,035	7,255,395	7,781,621	6,925,956	6,105,075
81-100	4,736,066	5,453,227	5,932,371	6,325,561	6,872,038
101-120	3,847,069	3,147,220	3,422,297	3,341,936	3,801,331
121-140	2,119,754	3,402,203	2,549,100	2,360,186	2,289,550
141-160	1,050,193	1,558,847	1,809,021	1,746,628	1,945,005
161-180	162,453	212,372	409,179	472,308	528,566
181 +	102,392	114,732	80,955	77,080	130,760
Total Area	32,681,277	32,876,215	32,706,444	32,681,277	32,795,989





Total area by working group (millions of hectares)

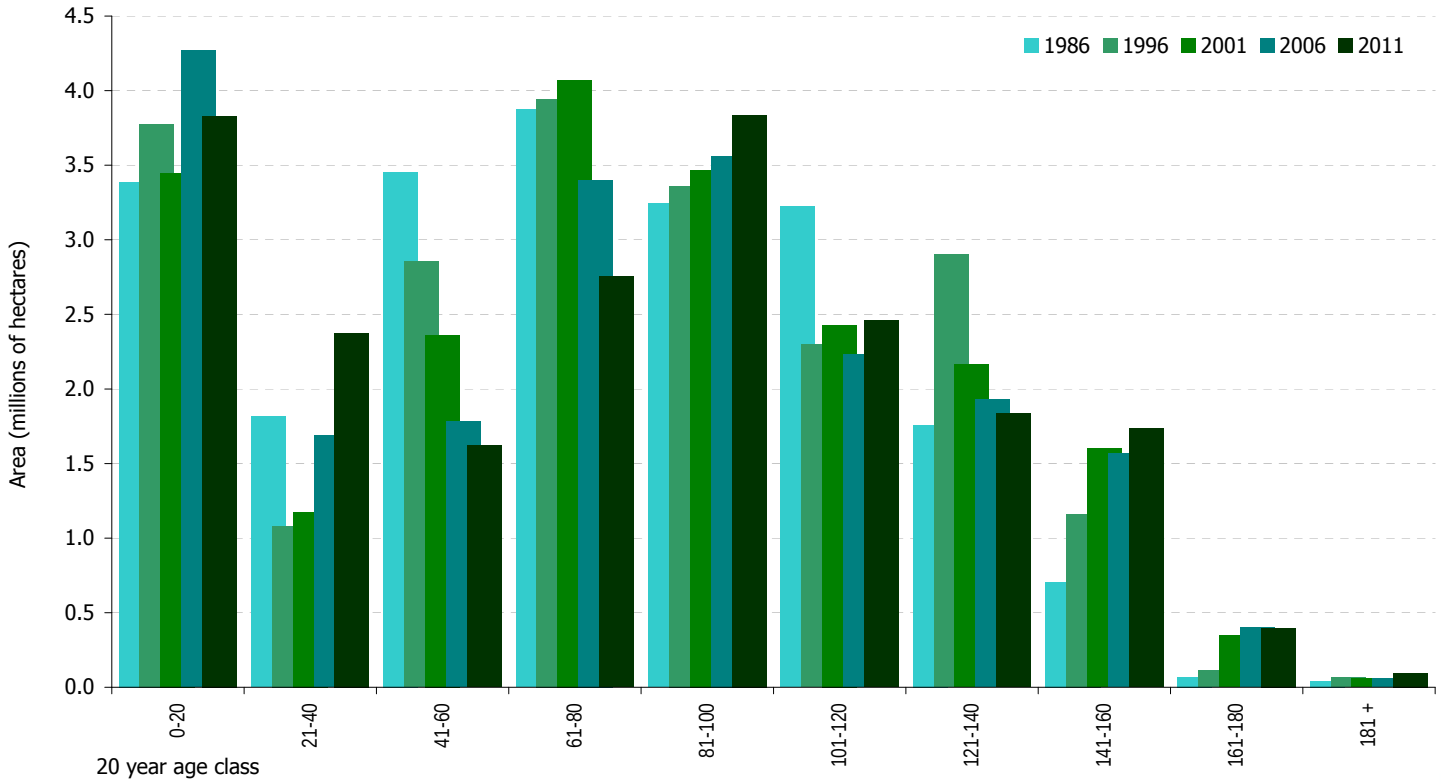
Source: Historical Forest Resources Inventories within the AOU - Variation in area measured by inventories is approximately 0.3%

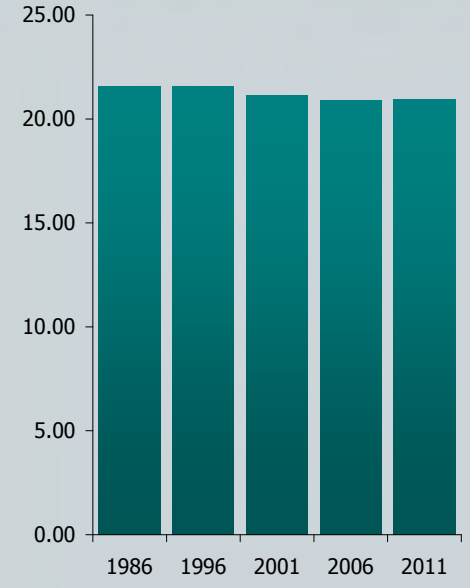
Historical Summaries by Working Group

Total Area by Age Class and Year - Softwood Working Groups

Area in hectares

Age Class	1986	1996	2001	2006	2011
0-20	3,389,054	3,777,845	3,446,547	4,270,768	3,832,161
21-40	1,816,379	1,080,593	1,176,209	1,689,087	2,374,134
41-60	3,454,380	2,853,301	2,361,733	1,781,232	1,620,613
61-80	3,873,172	3,943,932	4,071,256	3,401,177	2,755,170
81-100	3,243,141	3,362,096	3,469,372	3,562,758	3,836,777
101-120	3,222,926	2,296,258	2,428,647	2,232,025	2,459,149
121-140	1,756,987	2,901,572	2,165,142	1,929,764	1,834,066
141-160	705,058	1,161,623	1,601,052	1,567,923	1,733,730
161-180	69,876	113,857	348,073	400,896	397,885
181 +	44,346	64,849	59,603	59,949	96,298
Total Area	21,575,319	21,555,927	21,127,635	20,895,581	20,939,984





Total area by working group (millions of hectares)

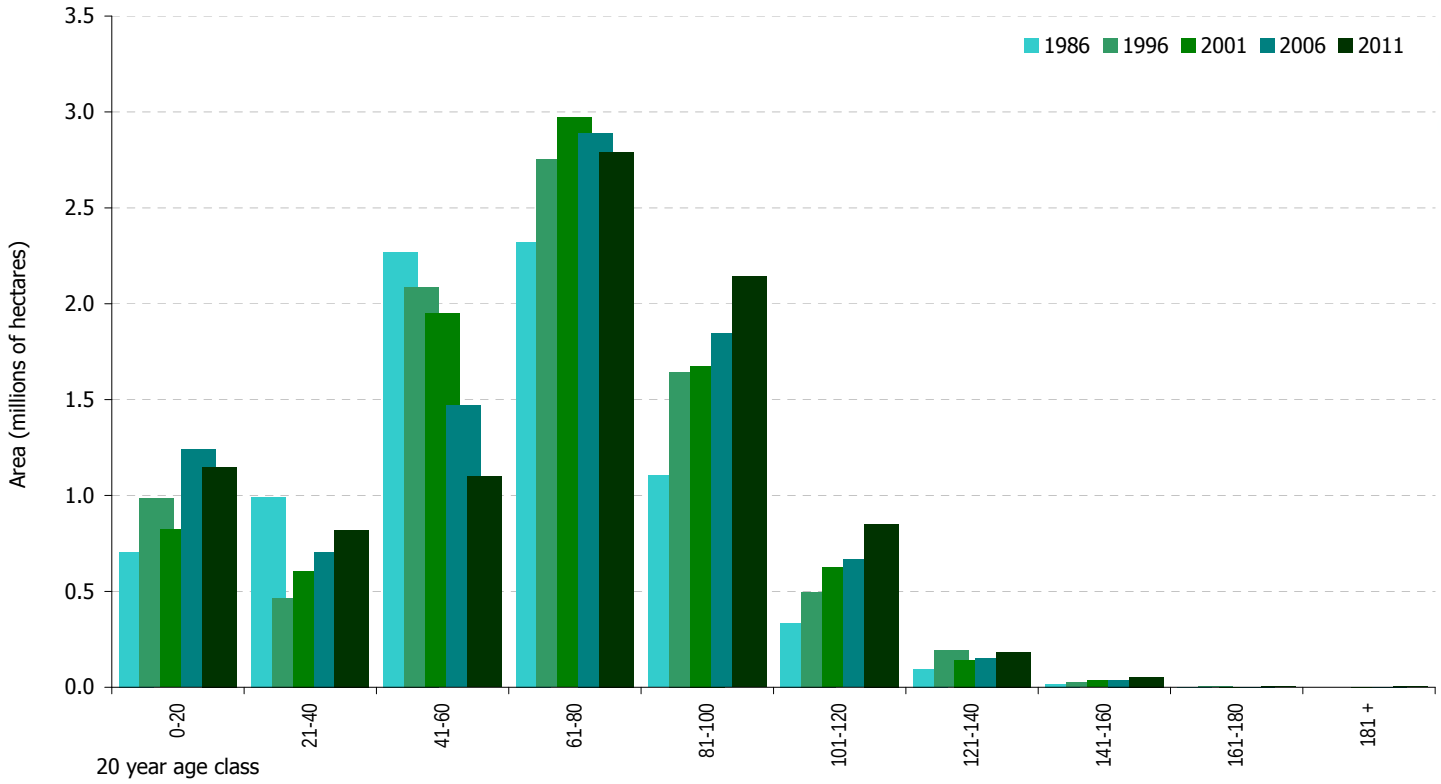
Source: Historical Forest Resources Inventories within the AOU - Variation in area measured by inventories is approximately 0.3%

Historical Summaries by Working Group

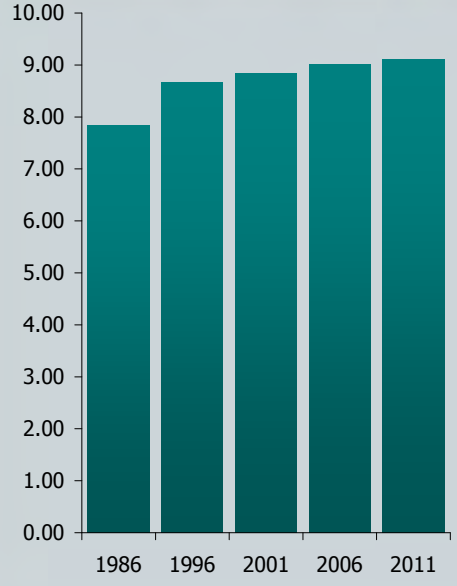
Total Area by Age Class and Year - Intolerant Hardwood Working Groups

Area in hectares

Age Class	1986	1996	2001	2006	2011
0-20	704,955	985,432	822,664	1,238,586	1,147,774
21-40	992,940	466,713	606,988	704,066	819,769
41-60	2,268,860	2,087,720	1,948,622	1,469,096	1,099,816
61-80	2,321,527	2,752,905	2,970,822	2,889,276	2,792,373
81-100	1,104,557	1,645,413	1,675,617	1,844,068	2,140,765
101-120	335,077	496,388	625,212	665,568	852,055
121-140	95,258	192,722	141,646	151,923	183,991
141-160	15,614	24,848	34,749	36,433	53,863
161-180	2,058	3,185	2,663	2,143	4,235
181 +	130	233	2,492	783	3,475
Total Area	7,840,975	8,655,559	8,831,474	9,001,943	9,098,115



Source: Historical Forest Resources Inventories within the AOU - Variation in area measured by inventories is approximately 0.3%



Total area by working group (millions of hectares)

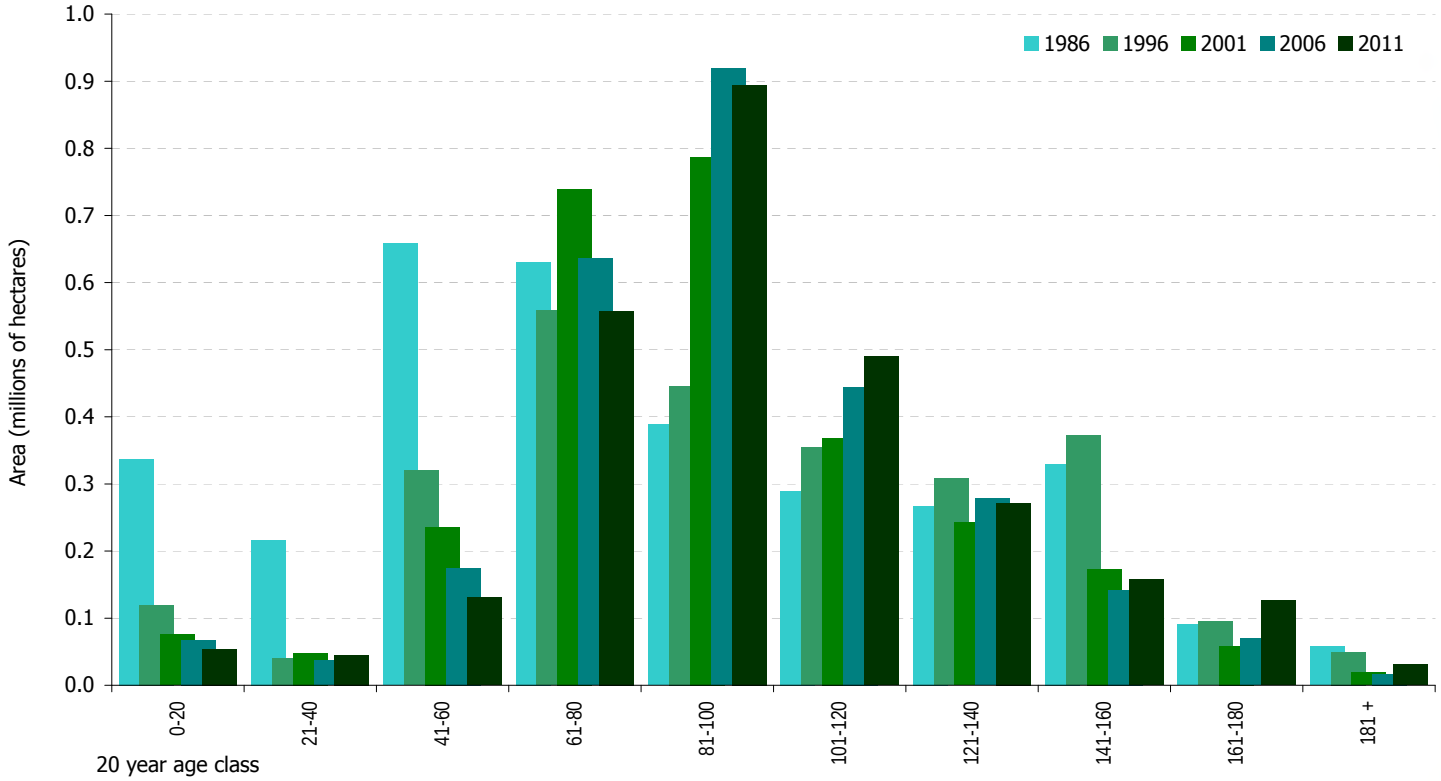
Historical Summaries by Working Group

Index

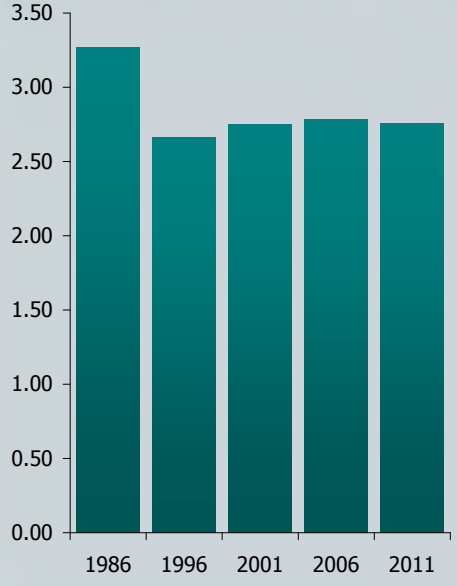
Total Area by Age Class and Year - Tolerant Hardwood Working Groups

Area in hectares

Age Class	1986	1996	2001	2006	2011
0-20	337,144	119,570	75,885	67,268	54,029
21-40	216,104	40,810	47,837	36,826	44,705
41-60	658,499	320,235	235,415	174,693	130,664
61-80	630,336	558,558	739,542	635,502	557,533
81-100	388,368	445,718	787,382	918,735	894,496
101-120	289,067	354,574	368,438	444,343	490,127
121-140	267,509	307,908	242,312	278,498	271,493
141-160	329,521	372,376	173,219	142,272	157,412
161-180	90,519	95,330	58,443	69,269	126,446
181 +	57,916	49,651	18,860	16,347	30,987
Total Area	3,264,983	2,664,729	2,747,335	2,783,754	2,757,891



Source: Historical Forest Resources Inventories within the AOU - Variation in area measured by inventories is approximately 0.3%



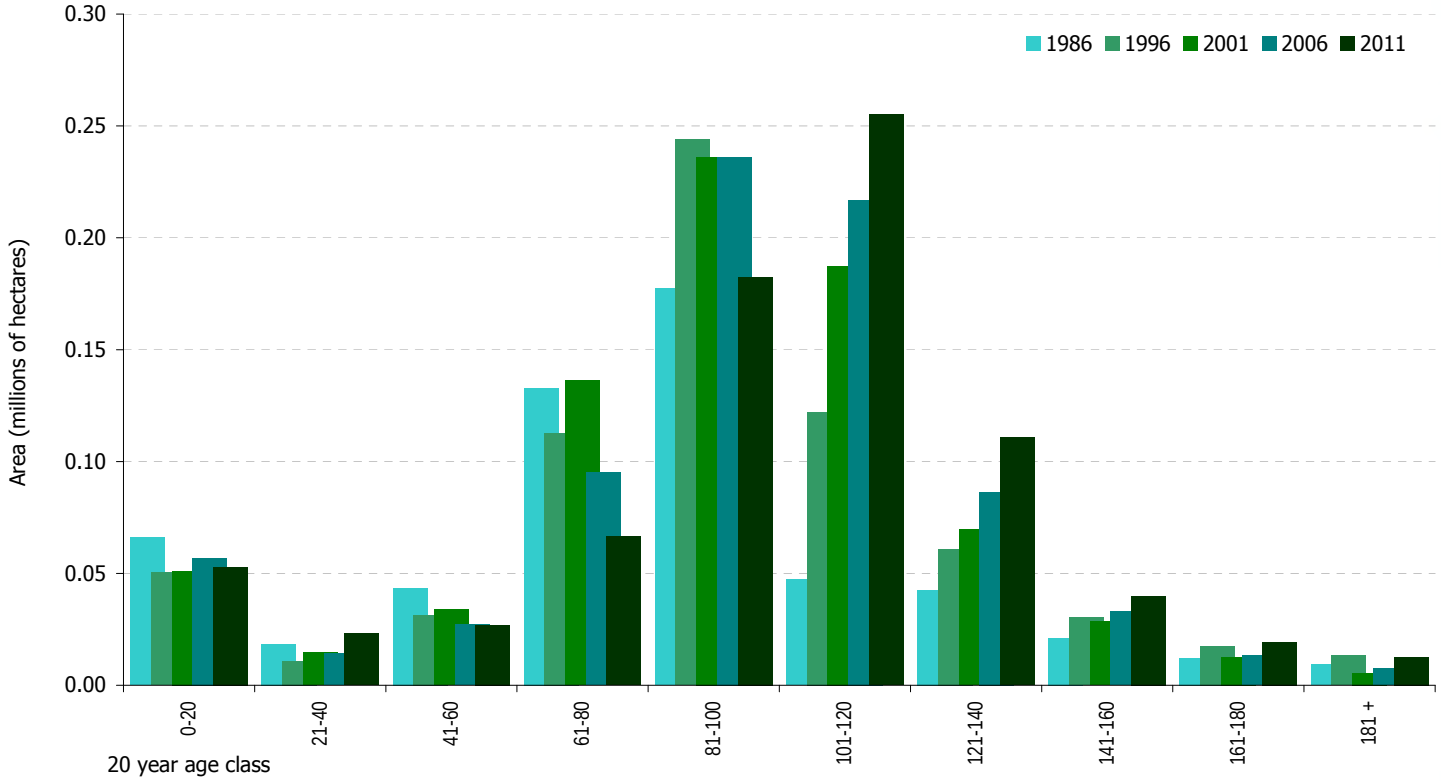
Total area by working group (millions of hectares)

Historical Summaries by Working Group

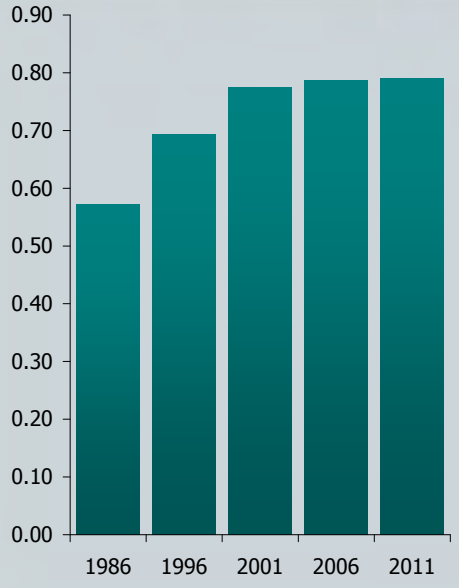
Total Area by Age Class and Year - White Pine Working Group

Area in hectares

Age Class	1986	1996	2001	2006	2011
0-20	66,150	50,471	50,963	56,773	52,772
21-40	18,355	10,867	14,607	14,261	23,156
41-60	43,524	31,346	33,845	27,130	26,990
61-80	132,920	112,752	136,145	95,163	66,550
81-100	177,459	243,927	236,035	236,133	182,467
101-120	47,320	122,046	187,279	216,847	255,081
121-140	42,468	60,868	69,608	86,404	110,857
141-160	21,217	30,409	28,607	32,890	39,948
161-180	12,319	17,657	12,747	13,331	19,251
181 +	9,308	13,341	5,404	7,599	12,715
Total Area	571,040	693,682	775,240	786,531	789,788



Source: Historical Forest Resources Inventories within the AOU - Variation in area measured by inventories is approximately 0.3%



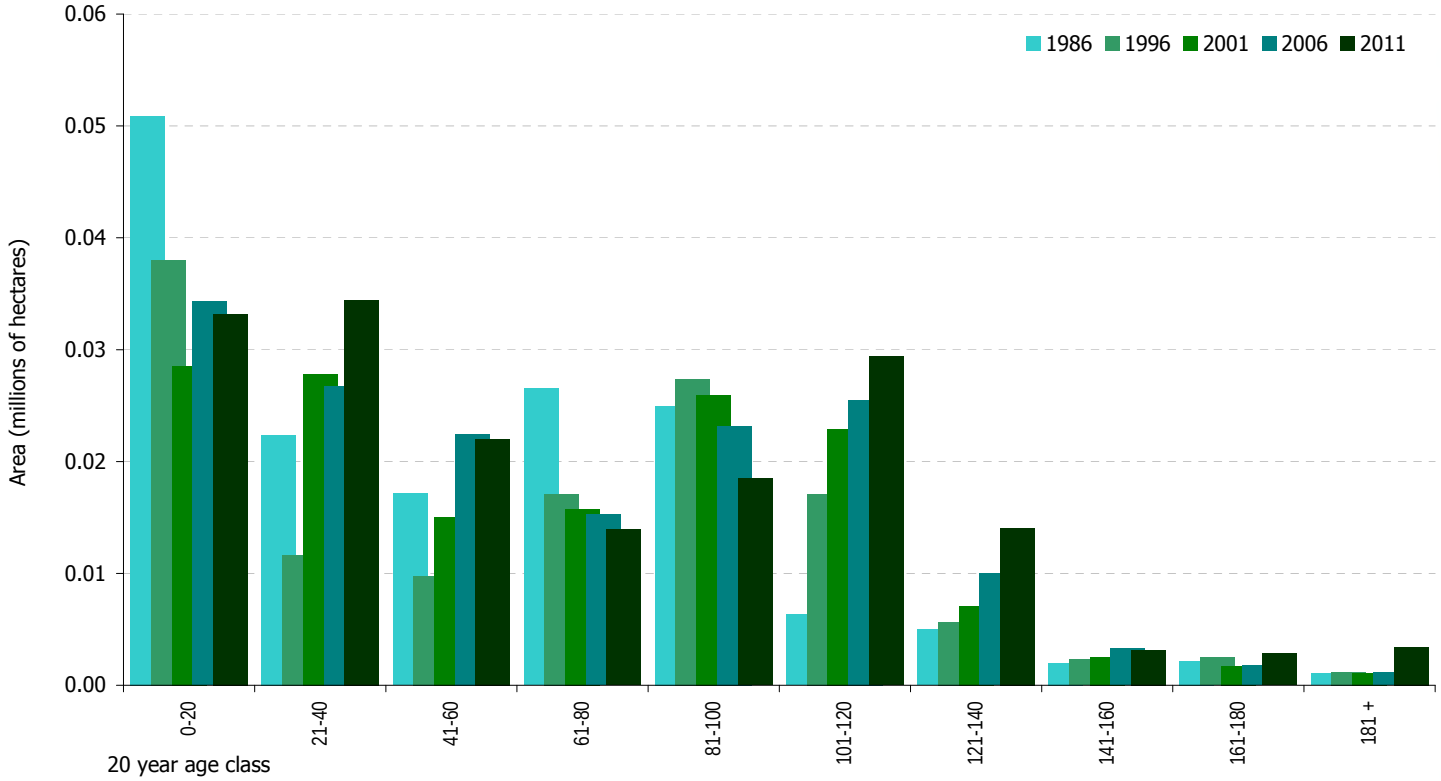
Total area by working group (millions of hectares)

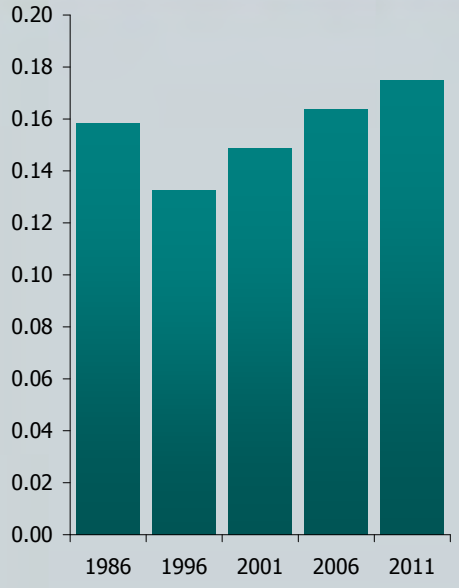
Historical Summaries by Working Group

Total Area by Age Class and Year - Red Pine Working Group

Area in hectares

Age Class	1986	1996	2001	2006	2011
0-20	50,890	38,000	28,562	34,303	33,169
21-40	22,379	11,646	27,809	26,759	34,426
41-60	17,165	9,749	15,050	22,480	21,997
61-80	26,541	17,083	15,780	15,253	13,912
81-100	24,947	27,377	25,936	23,166	18,472
101-120	6,307	17,083	22,920	25,520	29,396
121-140	4,971	5,677	7,073	9,989	14,057
141-160	2,002	2,286	2,519	3,294	3,163
161-180	2,182	2,491	1,702	1,753	2,854
181 +	1,050	1,199	1,120	1,157	3,430
Total Area	158,433	132,590	148,471	163,674	174,875





Total area by working group (millions of hectares)

Source: Historical Forest Resources Inventories within the AOU - Variation in area measured by inventories is approximately 0.3%

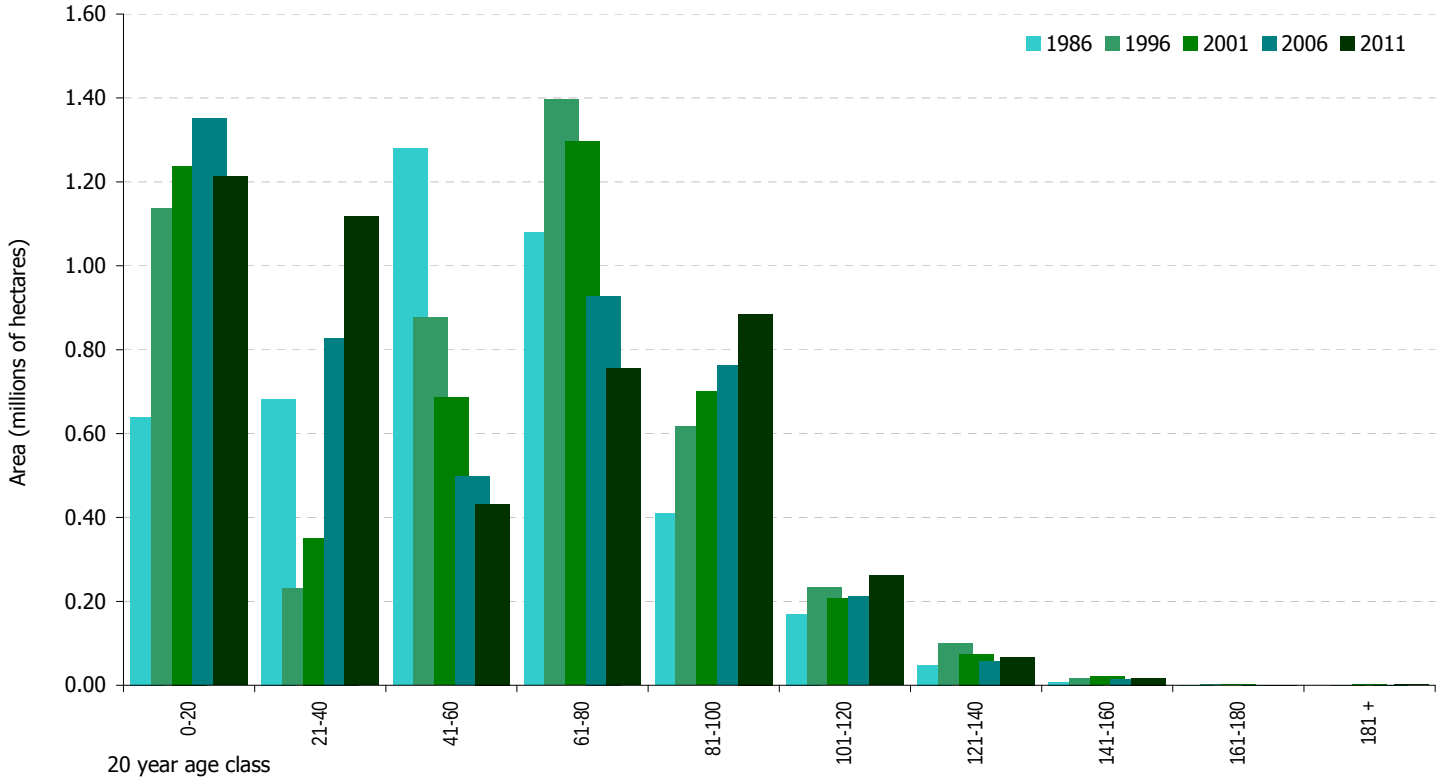
Historical Summaries by Working Group

Index

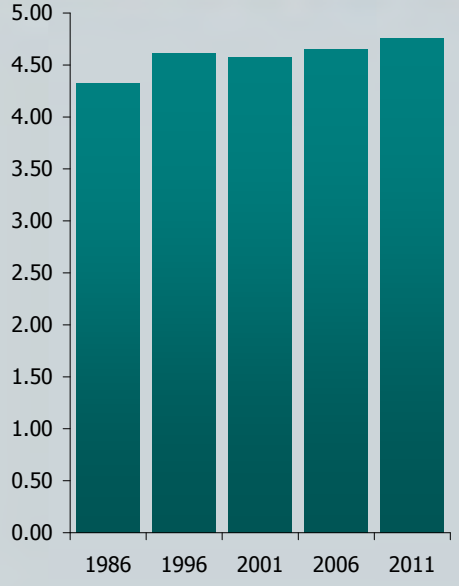
Total Area by Age Class and Year - Jack Pine Working Group

Area in hectares

Age Class	1986	1996	2001	2006	2011
0-20	639,593	1,136,271	1,237,909	1,350,906	1,212,756
21-40	682,794	230,500	351,452	827,804	1,118,061
41-60	1,279,475	877,119	686,085	497,403	432,423
61-80	1,079,255	1,396,454	1,295,909	927,507	755,670
81-100	410,090	617,088	700,615	762,358	884,361
101-120	169,727	232,902	206,471	212,202	261,301
121-140	48,921	99,169	74,725	57,823	67,393
141-160	8,384	16,996	20,414	15,137	17,155
161-180	719	1,458	1,738	1,172	1,161
181 +	180	364	1,467	413	2,410
Total Area	4,319,137	4,608,320	4,576,787	4,652,725	4,752,693



Source: Historical Forest Resources Inventories within the AOU - Variation in area measured by inventories is approximately 0.3%



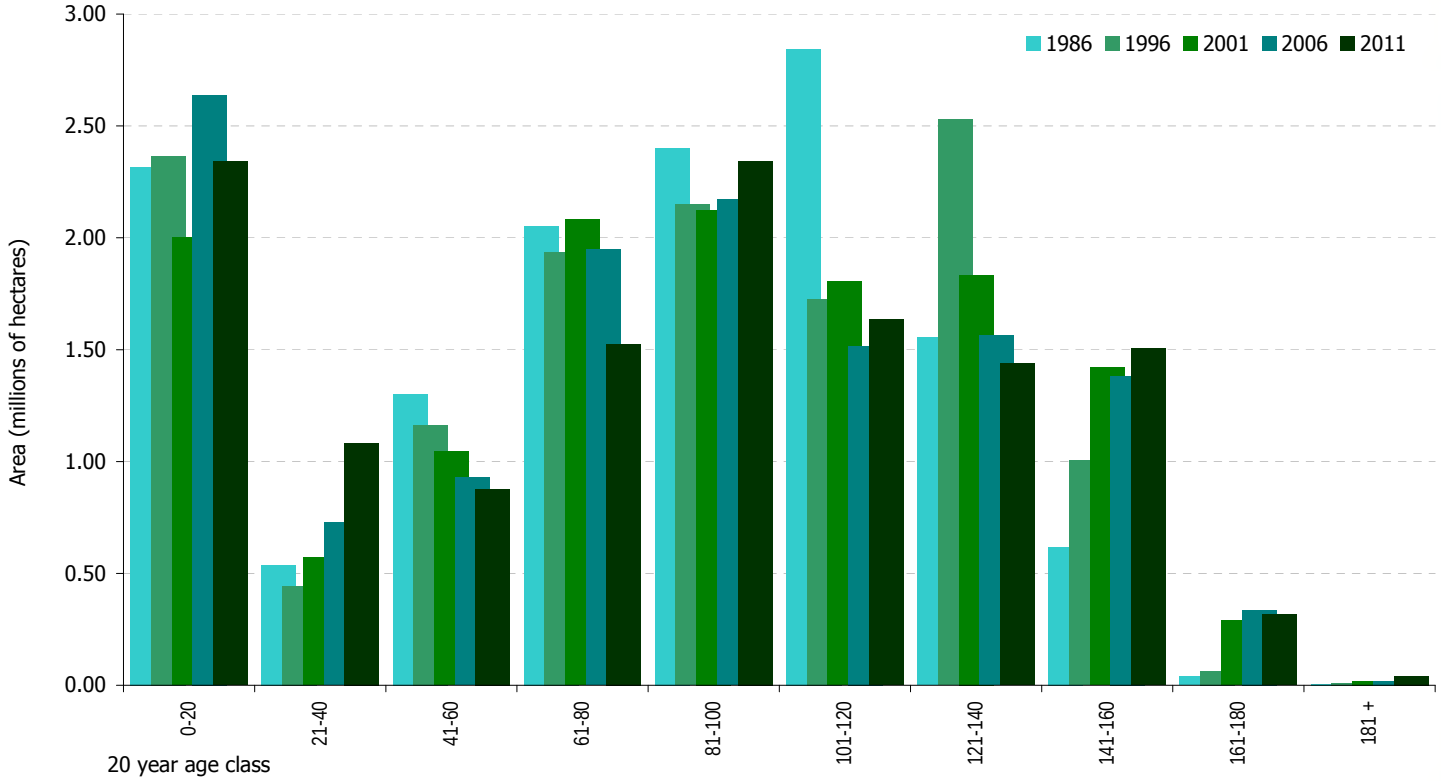
Total area by working group (millions of hectares)

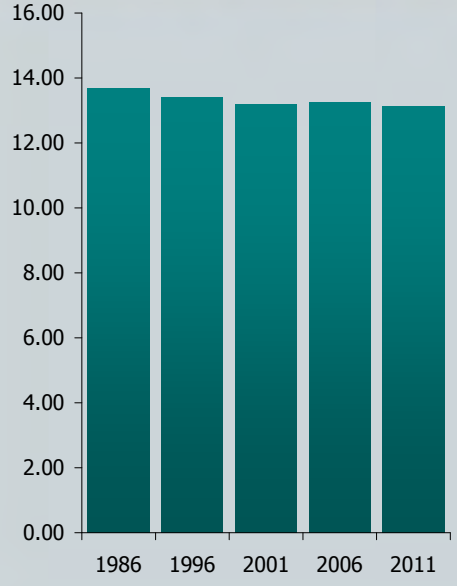
Historical Summaries by Working Group

Total Area by Age Class and Year - Spruce Working Groups

Area in hectares

Age Class	1986	1996	2001	2006	2011
0-20	2,315,972	2,365,269	2,001,586	2,637,246	2,341,725
21-40	537,406	443,844	570,574	726,901	1,082,778
41-60	1,300,987	1,163,692	1,045,852	929,562	877,235
61-80	2,053,022	1,936,061	2,082,372	1,947,428	1,524,806
81-100	2,402,420	2,148,611	2,124,462	2,171,842	2,344,078
101-120	2,843,760	1,726,589	1,805,991	1,517,771	1,635,632
121-140	1,553,863	2,527,790	1,833,842	1,563,013	1,437,124
141-160	617,202	1,004,051	1,420,545	1,381,295	1,504,823
161-180	39,787	64,724	288,662	335,536	317,149
181 +	6,516	10,600	19,210	18,944	40,602
Total Area	13,670,936	13,391,233	13,193,097	13,229,537	13,105,953





Total area by working group (millions of hectares)

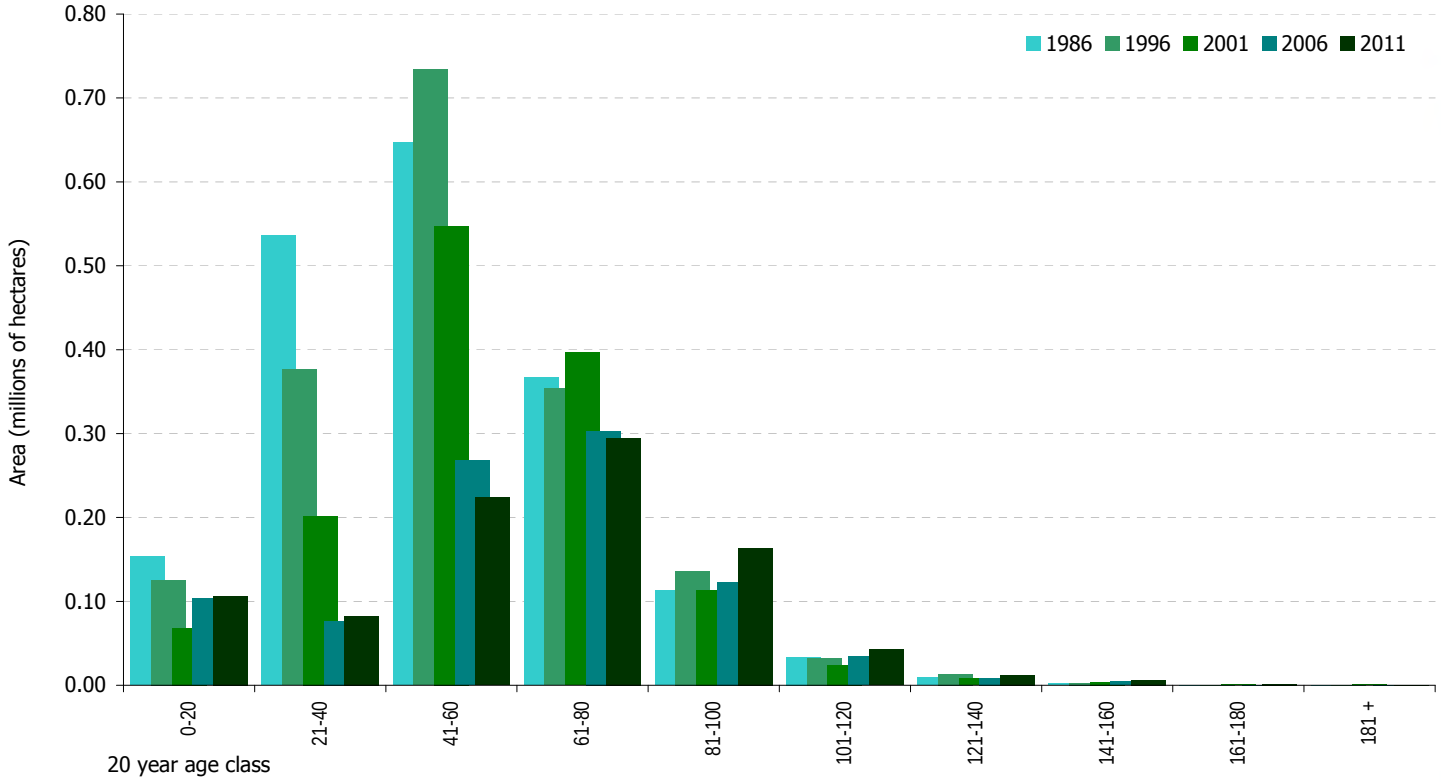
Source: Historical Forest Resources Inventories within the AOU - Variation in area measured by inventories is approximately 0.3%

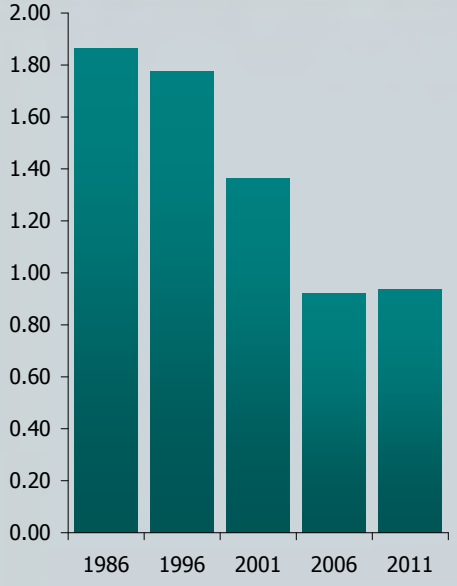
Historical Summaries by Working Group

Total Area by Age Class and Year - Balsam Fir Working Group

Area in hectares

Age Class	1986	1996	2001	2006	2011
0-20	153,729	125,545	68,119	103,594	106,541
21-40	536,096	376,648	201,635	76,723	82,455
41-60	647,084	734,066	547,172	267,986	223,982
61-80	366,896	353,749	396,588	302,900	295,062
81-100	112,827	136,147	113,474	122,741	163,774
101-120	33,622	32,243	24,151	34,149	42,669
121-140	9,529	13,369	8,025	8,604	12,569
141-160	2,119	2,973	4,178	4,467	6,277
161-180	235	330	717	268	1,557
181 +	228	320	1,037	373	565
Total Area	1,862,366	1,775,390	1,365,096	921,803	935,450





Total area by working group (millions of hectares)

Source: Historical Forest Resources Inventories within the AOU - Variation in area measured by inventories is approximately 0.3%

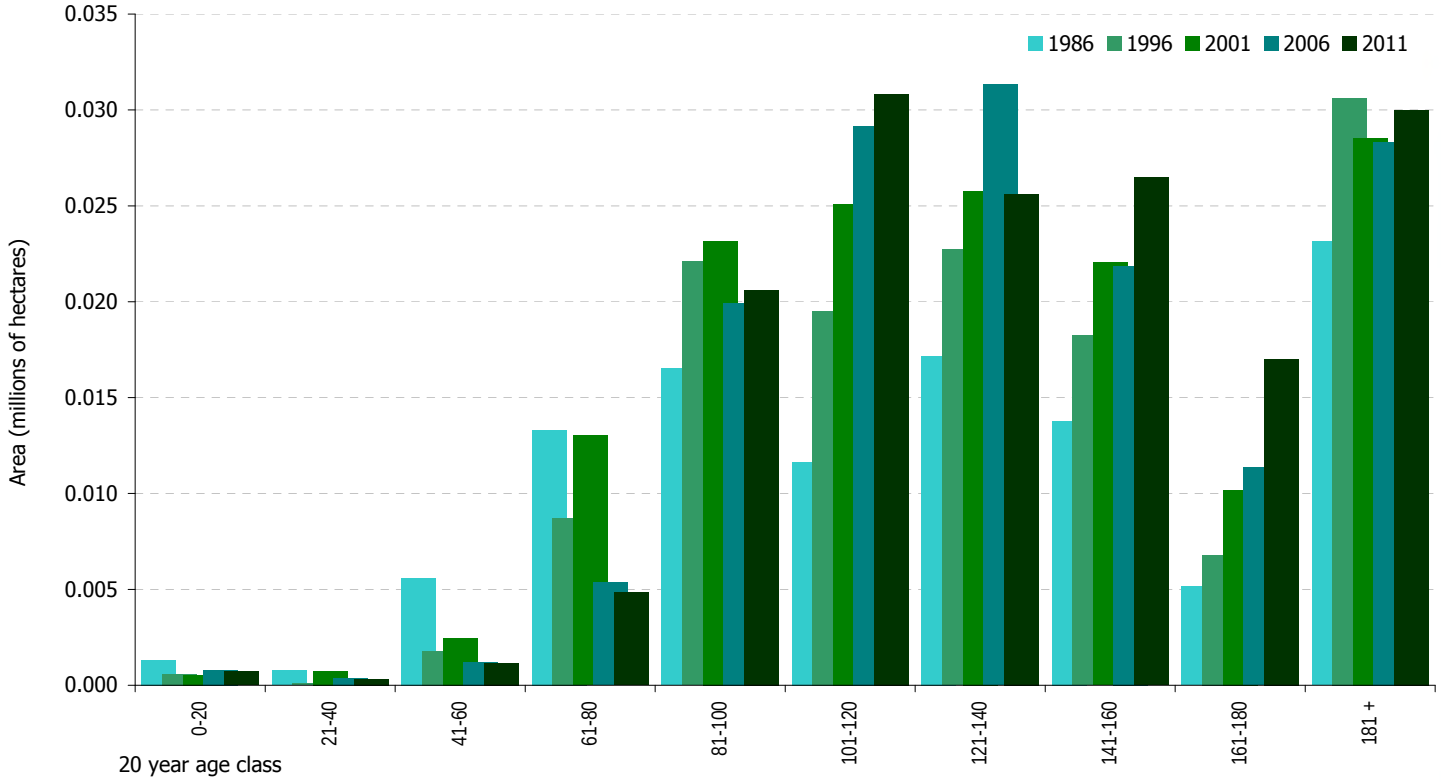
Historical Summaries by Working Group

Index

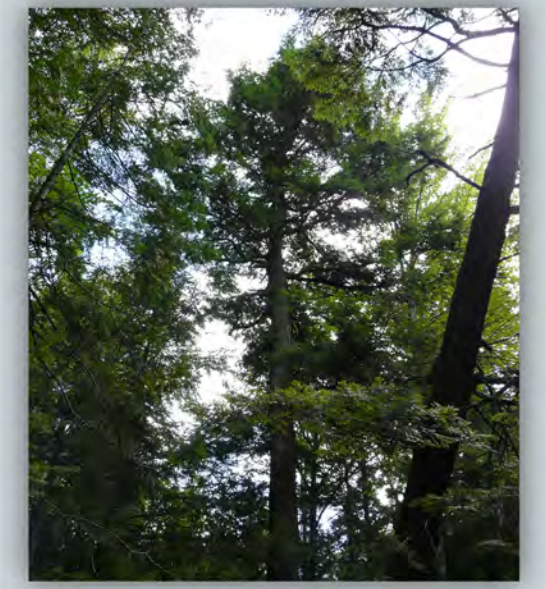
Total Area by Age Class and Year - Hemlock Working Group

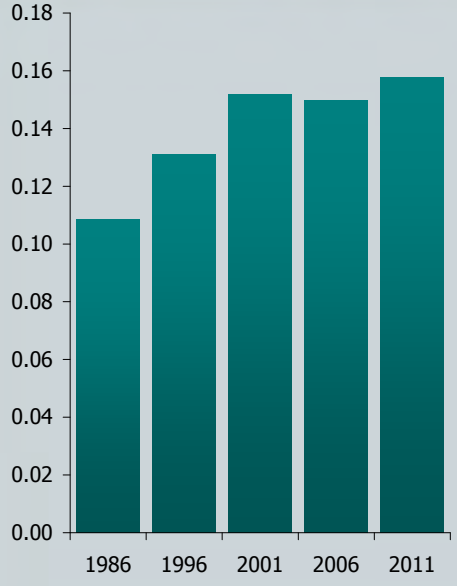
Area in hectares

Age Class	1986	1996	2001	2006	2011
0-20	1,323	577	541	812	711
21-40	774	84	737	369	336
41-60	5,595	1,786	2,482	1,228	1,177
61-80	13,320	8,736	13,035	5,349	4,831
81-100	16,511	22,099	23,178	19,939	20,627
101-120	11,645	19,515	25,109	29,162	30,829
121-140	17,181	22,725	25,783	31,322	25,626
141-160	13,790	18,239	22,032	21,863	26,490
161-180	5,137	6,794	10,199	11,364	17,022
181 +	23,154	30,626	28,550	28,339	30,005
Total Area	108,431	131,181	151,646	149,747	157,654



Source: Historical Forest Resources Inventories within the AOU - Variation in area measured by inventories is approximately 0.3%





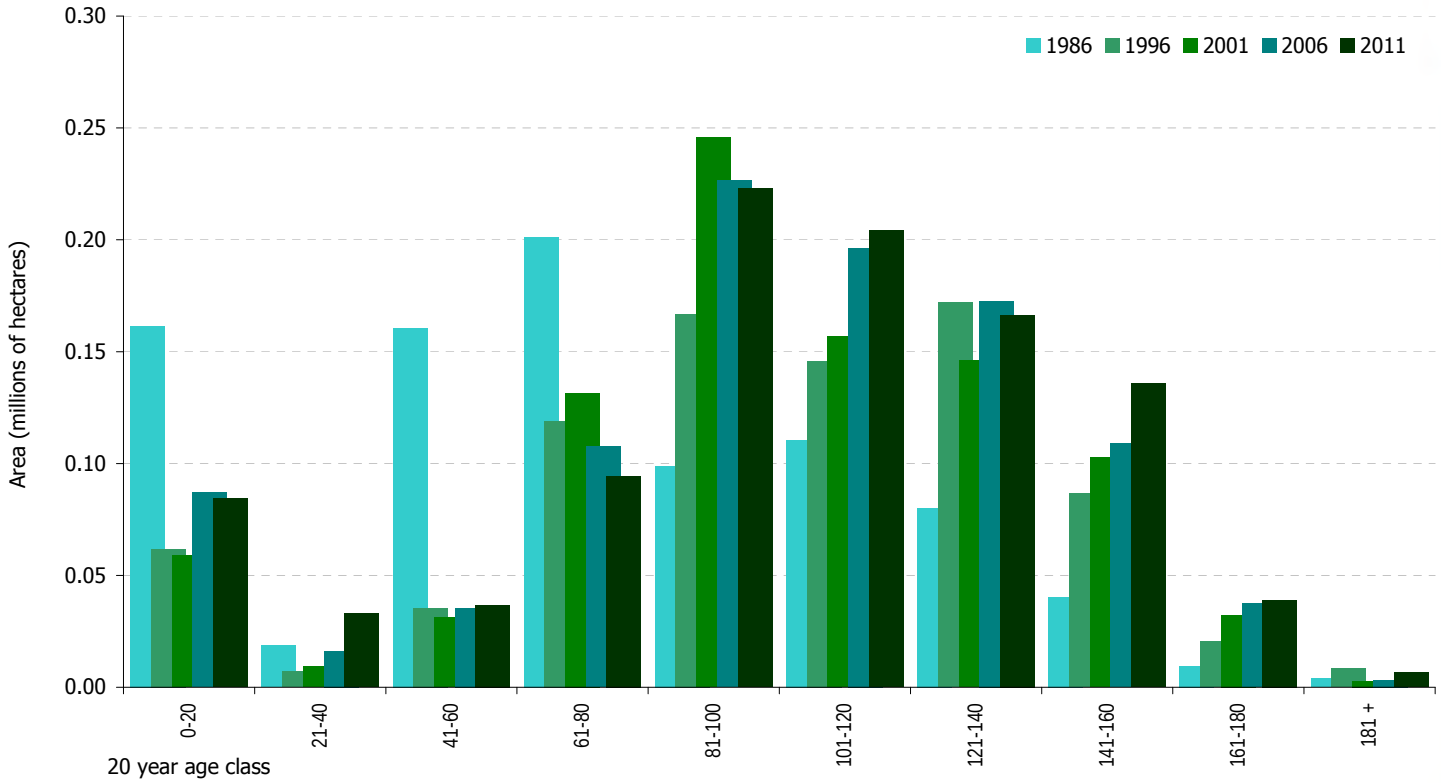
Total area by working group (millions of hectares)

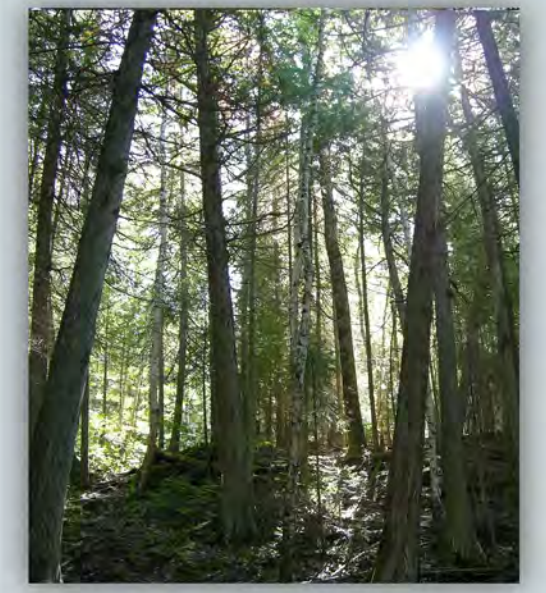
Historical Summaries by Working Group

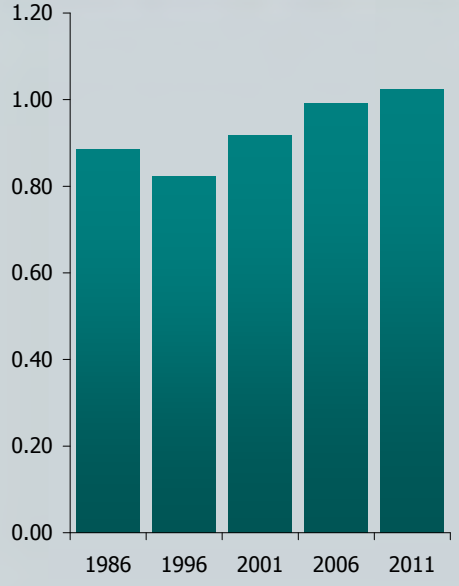
Total Area by Age Class and Year - Other Conifers Working Groups

Area in hectares

Age Class	1986	1996	2001	2006	2011
0-20	161,397	61,712	58,866	87,134	84,486
21-40	18,575	7,004	9,396	16,271	32,922
41-60	160,550	35,543	31,247	35,444	36,809
61-80	201,217	119,098	131,427	107,578	94,339
81-100	98,887	166,847	245,672	226,579	222,998
101-120	110,545	145,881	156,727	196,374	204,240
121-140	80,054	171,974	146,086	172,608	166,440
141-160	40,345	86,670	102,756	108,979	135,874
161-180	9,497	20,403	32,306	37,472	38,891
181 +	3,910	8,399	2,816	3,125	6,572
Total Area	884,977	823,530	917,298	991,563	1,023,571







Total area by working group (millions of hectares)

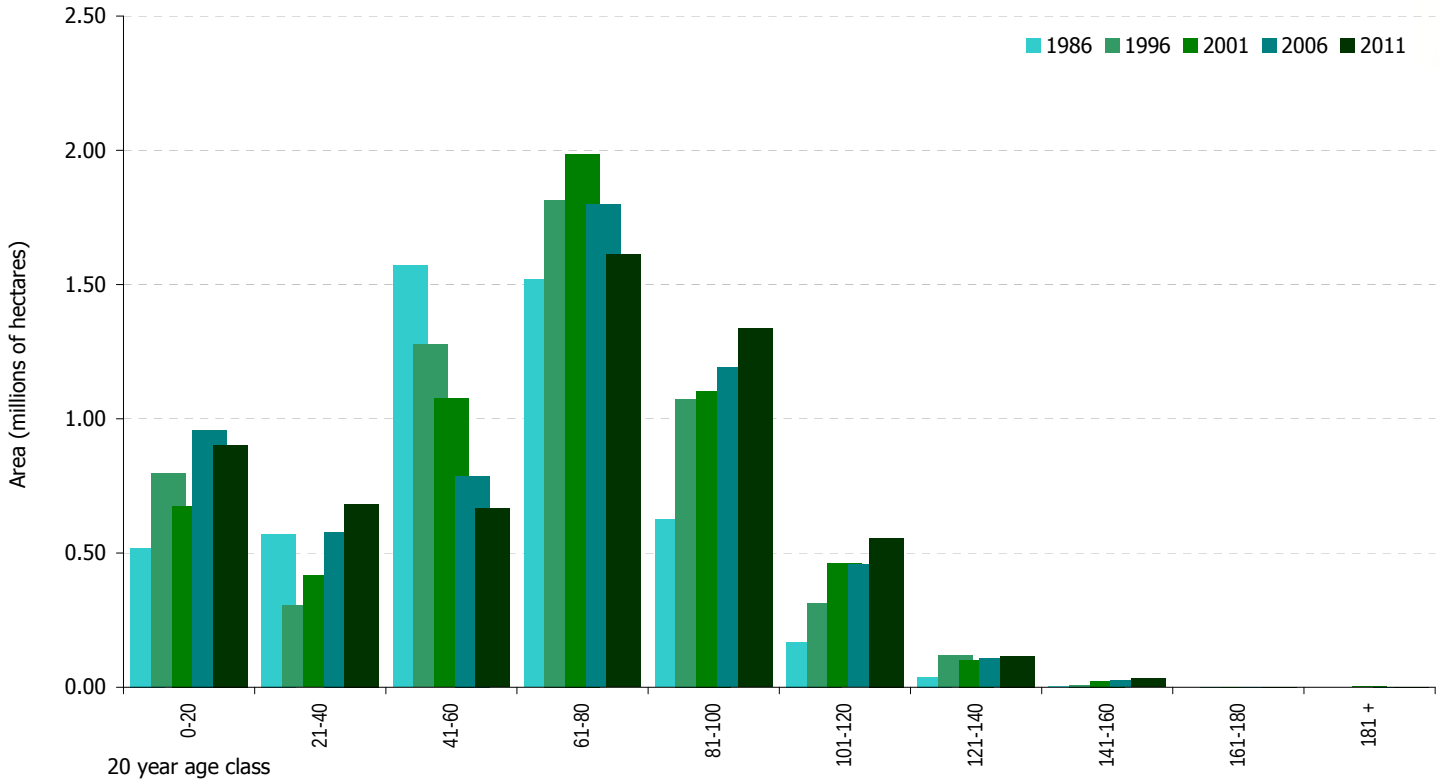
Source: Historical Forest Resources Inventories within the AOU - Variation in area measured by inventories is approximately 0.3%

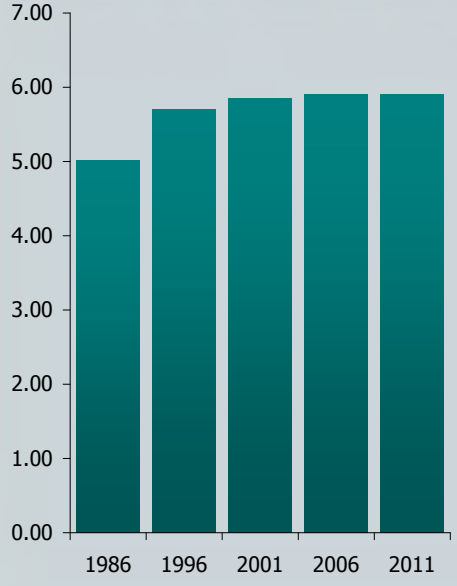
Historical Summaries by Working Group

Total Area by Age Class and Year - Poplar Working Group

Area in hectares

Age Class	1986	1996	2001	2006	2011
0-20	519,271	795,861	675,226	958,240	902,306
21-40	570,040	303,720	416,555	577,270	682,033
41-60	1,570,199	1,275,735	1,075,118	788,130	665,569
61-80	1,519,497	1,814,445	1,986,718	1,798,271	1,612,235
81-100	624,554	1,073,116	1,103,196	1,191,291	1,336,310
101-120	167,891	313,393	460,922	456,352	555,893
121-140	37,595	119,149	102,001	107,840	115,947
141-160	2,601	8,244	23,463	25,221	33,484
161-180	295	936	1,464	1,272	1,979
181 +	36	113	2,169	507	1,943
Total Area	5,011,979	5,704,712	5,846,832	5,904,395	5,907,699





Total area by working group (millions of hectares)

Source: Historical Forest Resources Inventories within the AOU - Variation in area measured by inventories is approximately 0.3%

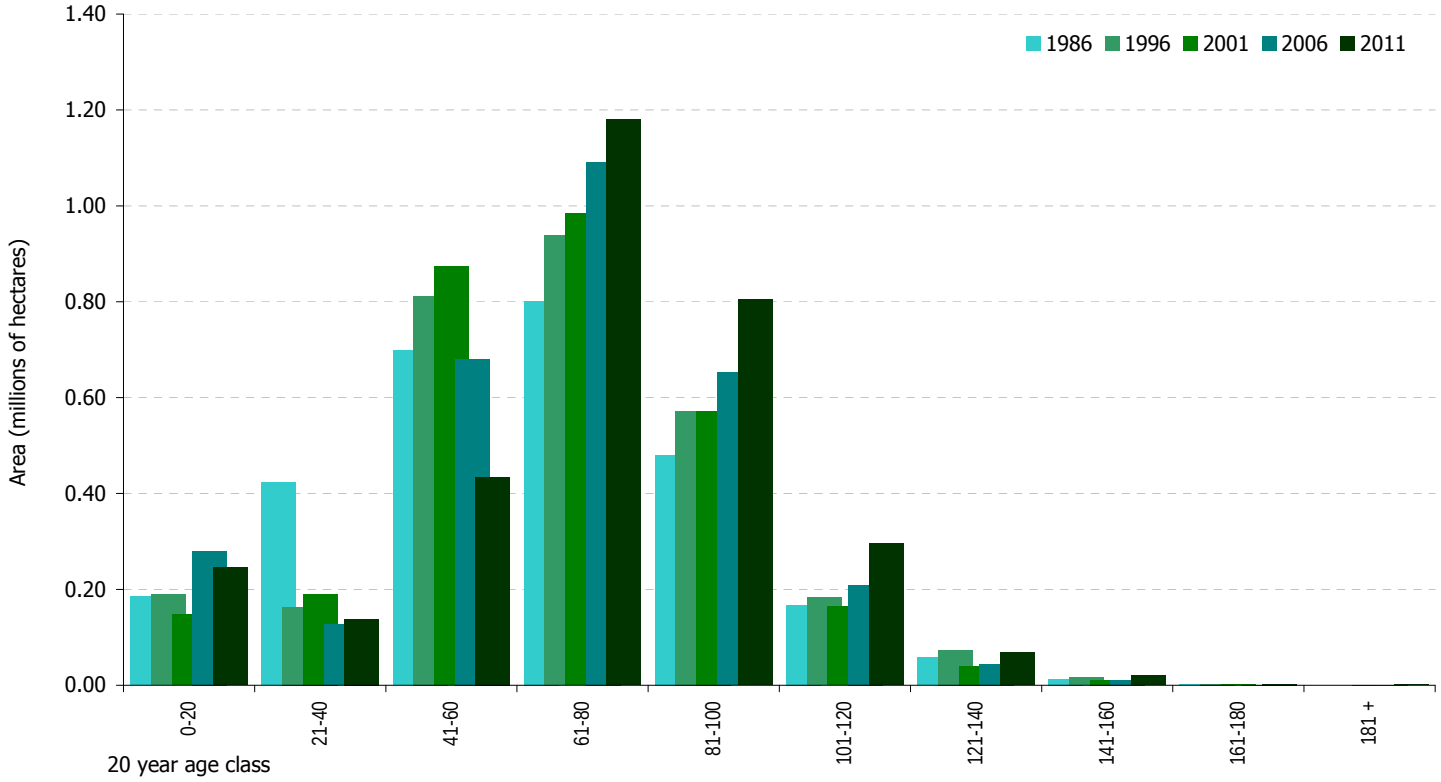
Historical Summaries by Working Group

Index

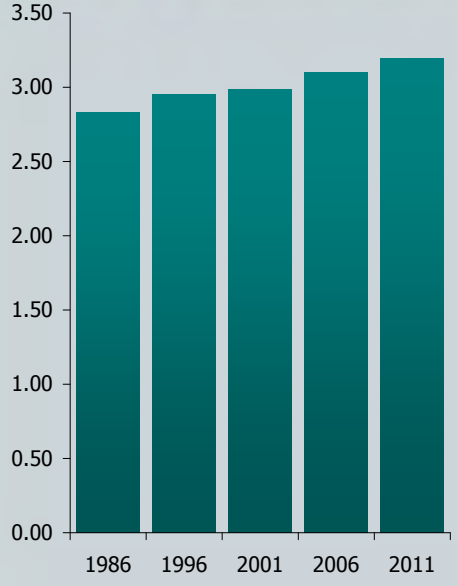
Total Area by Age Class and Year - White Birch Working Group

Area in hectares

Age Class	1986	1996	2001	2006	2011
0-20	185,684	189,571	147,437	280,346	245,467
21-40	422,900	162,993	190,433	126,796	137,736
41-60	698,661	811,985	873,504	680,966	434,247
61-80	802,030	938,460	984,104	1,091,006	1,180,137
81-100	480,003	572,297	572,421	652,777	804,454
101-120	167,186	182,995	164,290	209,216	296,161
121-140	57,663	73,574	39,644	44,083	68,043
141-160	13,013	16,604	11,285	11,212	20,379
161-180	1,763	2,249	1,200	871	2,257
181 +	94	120	323	276	1,532
Total Area	2,828,997	2,950,846	2,984,641	3,097,548	3,190,415



Source: Historical Forest Resources Inventories within the AOU - Variation in area measured by inventories is approximately 0.3%



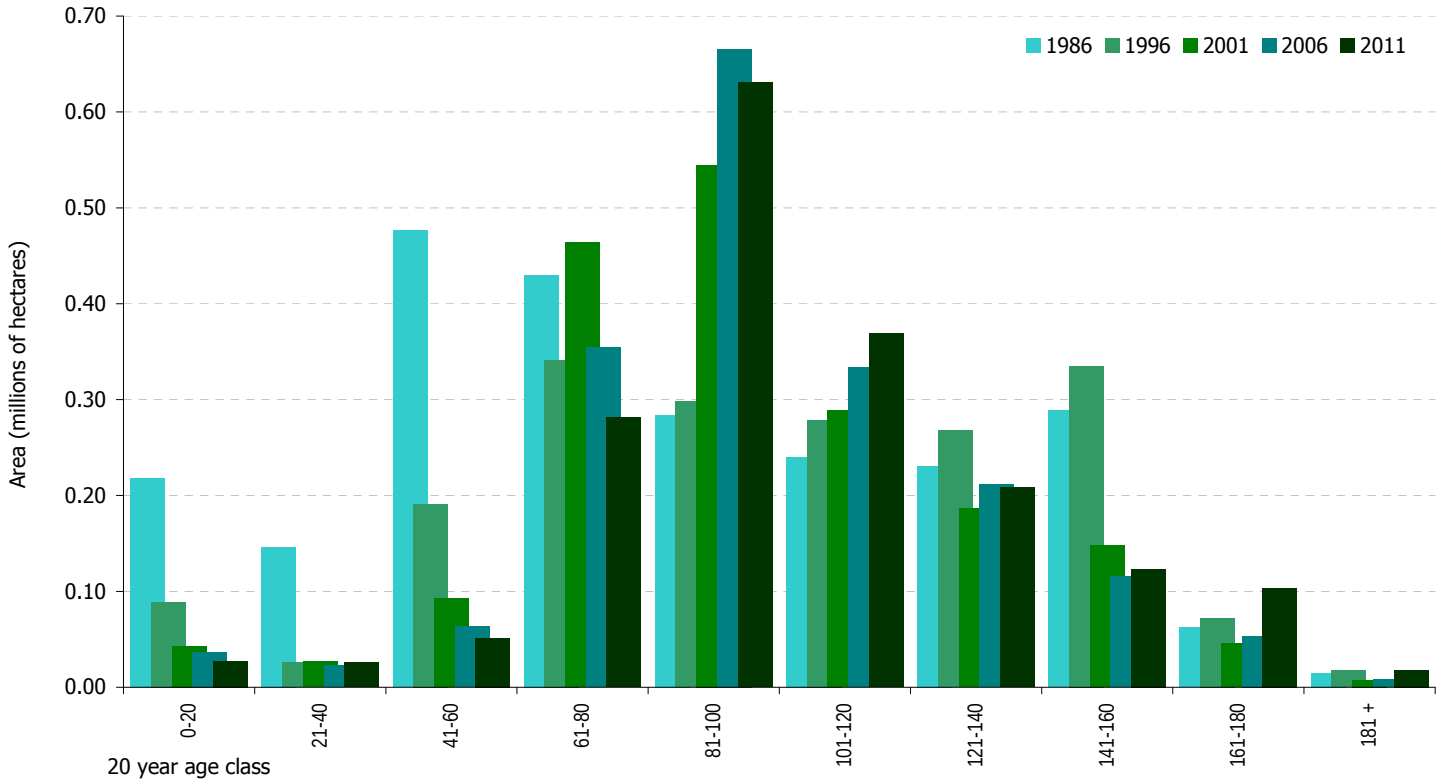
Total area by working group (millions of hectares)

Historical Summaries by Working Group

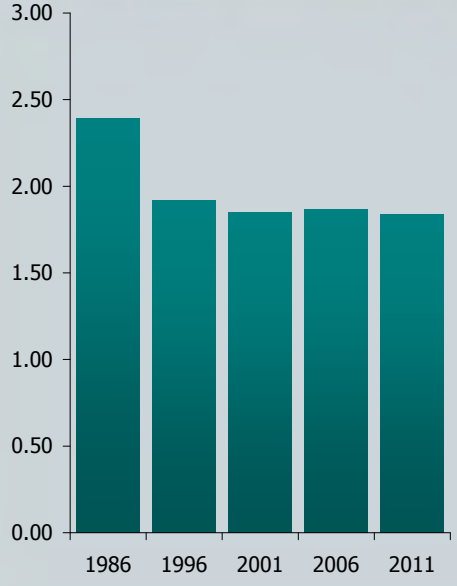
Total Area by Age Class and Year - Hard Maple Working Group

Area in hectares

Age Class	1986	1996	2001	2006	2011
0-20	218,177	88,806	42,861	36,572	27,305
21-40	146,095	25,883	27,001	22,544	25,731
41-60	476,155	190,895	92,481	63,507	51,466
61-80	430,015	341,352	464,089	354,298	281,132
81-100	284,069	297,780	544,584	665,609	630,591
101-120	239,997	278,606	288,450	333,682	368,697
121-140	230,923	268,034	186,214	211,617	208,480
141-160	288,876	335,302	147,895	115,634	123,124
161-180	62,432	72,466	45,831	53,417	103,810
181 +	15,198	17,640	7,350	8,284	17,947
Total Area	2,391,937	1,916,763	1,846,755	1,865,165	1,838,283



Source: Historical Forest Resources Inventories within the AOU - Variation in area measured by inventories is approximately 0.3%



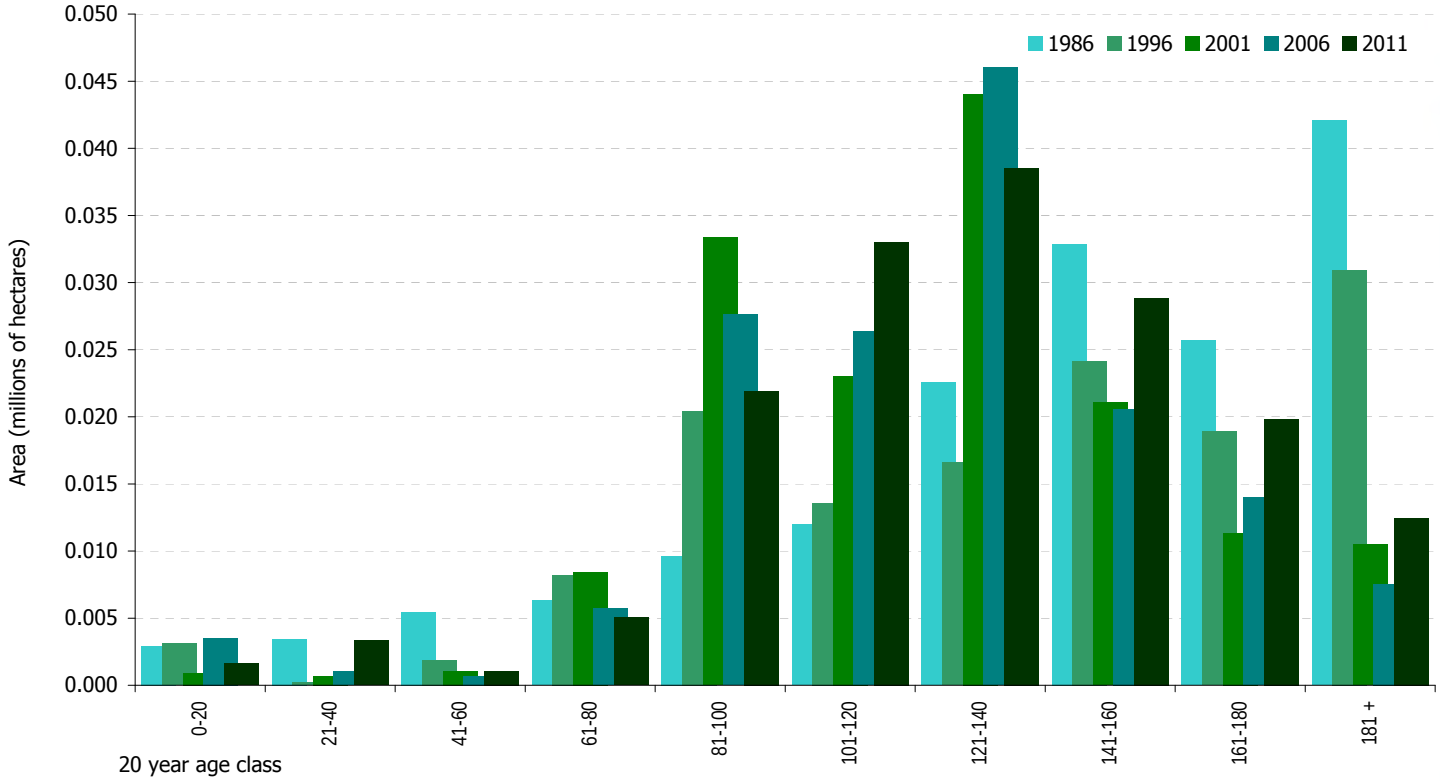
Total area by working group (millions of hectares)

Historical Summaries by Working Group

Total Area by Age Class and Year - Yellow Birch Working Group

Area in hectares

Age Class	1986	1996	2001	2006	2011
0-20	2,937	3,118	907	3,540	1,612
21-40	3,443	215	694	1,009	3,342
41-60	5,475	1,873	1,065	683	1,076
61-80	6,299	8,204	8,433	5,734	5,042
81-100	9,636	20,446	33,362	27,618	21,917
101-120	11,965	13,563	23,041	26,345	33,007
121-140	22,543	16,577	44,041	46,023	38,546
141-160	32,864	24,167	21,044	20,570	28,856
161-180	25,693	18,893	11,356	14,000	19,837
181 +	42,071	30,937	10,496	7,538	12,460
Total Area	162,925	137,992	154,440	153,057	165,695



Source: Historical Forest Resources Inventories within the AOU - Variation in area measured by inventories is approximately 0.3%

Total area by working group (millions of hectares)

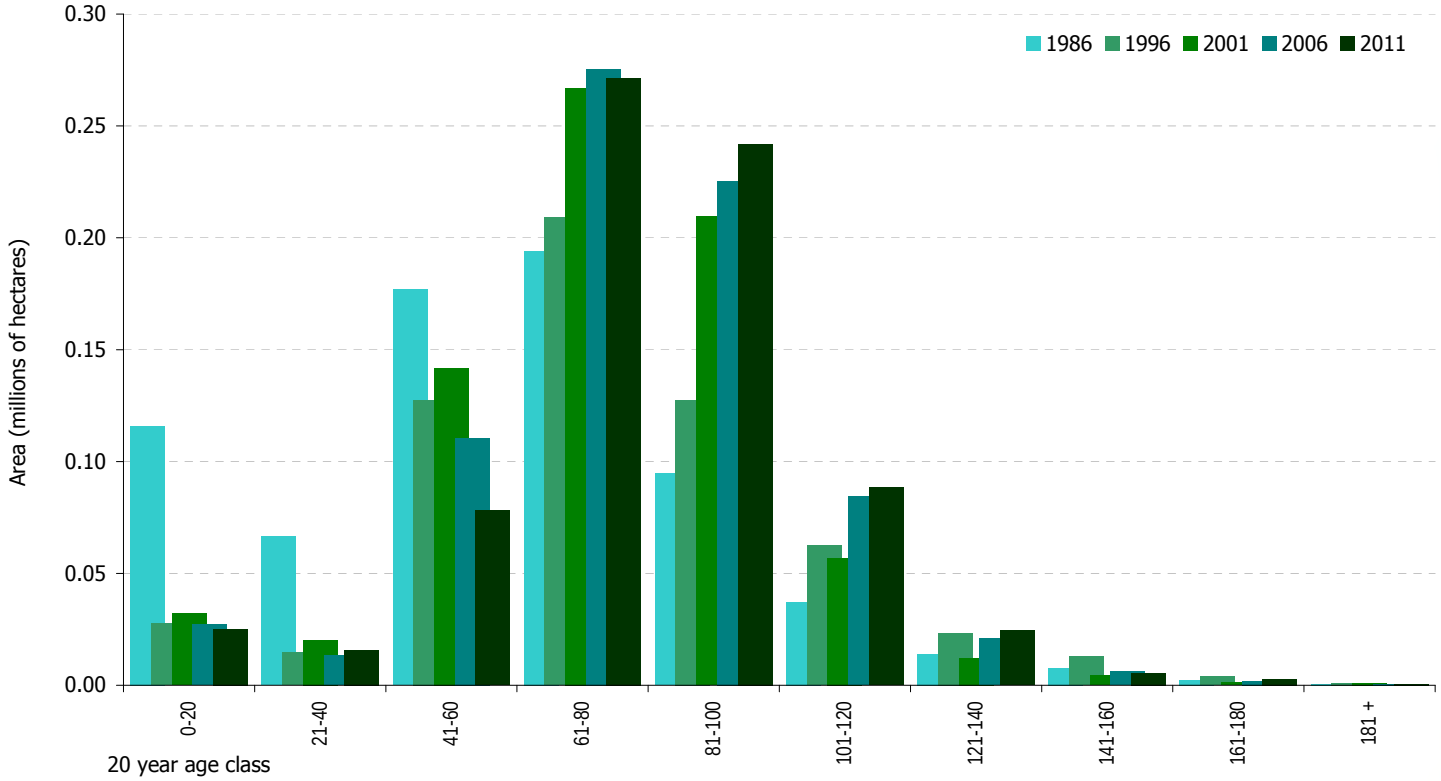
Historical Summaries by Working Group

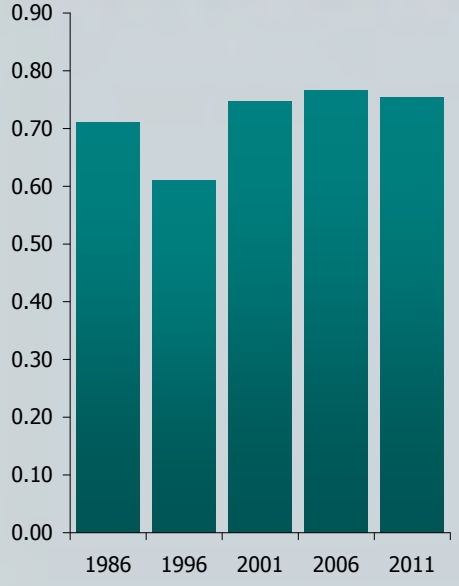
Index

Total Area by Age Class and Year - Other Hardwoods Working Groups

Area in hectares

Age Class	1986	1996	2001	2006	2011
0-20	116,030	27,646	32,117	27,156	25,111
21-40	66,567	14,713	20,142	13,273	15,631
41-60	176,869	127,468	141,869	110,503	78,122
61-80	194,022	209,002	267,020	275,470	271,359
81-100	94,664	127,492	209,436	225,508	241,988
101-120	37,105	62,406	56,947	84,316	88,424
121-140	14,043	23,297	12,057	20,859	24,467
141-160	7,780	12,907	4,281	6,068	5,433
161-180	2,394	3,971	1,256	1,852	2,798
181 +	647	1,074	1,014	526	579
Total Area	710,121	609,975	746,141	765,532	753,913





Total area by working group (millions of hectares)

Source: Historical Forest Resources Inventories within the AOU - Variation in area measured by inventories is approximately 0.3%

Growing Stock Summary

Index

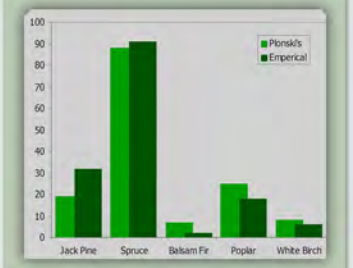
Interactive Chapter Index

Growing stock or volume is another method to measure forests. Traditionally, the FRO series reports on gross total and net merchantable volumes, as well as current annual increment.

Historical volumes are also included to give summary of changes in the forest based on tree volume by species rather than cover types.

select a topic

Volume Summary

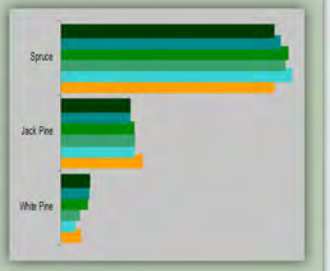


Biomass Categories

All Ontario

Forest Mgmt. Area

Historical Volumes



Growing Stock Summary

Index

Volumes are calculated in this version of the report as they were in the previous three reports using a modified version of Plonski's normal yield tables. The tables were developed in the 1950s using field sampling across the province, primarily the Boreal forest with some plots in the Great Lakes-St. Lawrence forest outside North Bay. The data for these tables came from fully stocked mature stands of black spruce, jack pine, poplar and white birch tables, first published in 1956. Over the next few decades, more plots and other species were added, including white pine, red pine, red pine plantations and tolerant hardwoods.

In 1958, Morawski, Turner and Basham published cull studies that refined the defects and flaw estimates in an average forest stand, and volume reductions were incorporated into net merchantable volume calculations.

These tables were commonly used until 1994, when an MNR initiative (Forest Resource Assessment Project) utilized extensive studies that targeted older or over-mature forest stands. Subsequently, these mortality volume reductions were incorporated into the current modified yield table set that this report has used since 1996.

An example of the 1981 Plonski's black spruce working group, site class 2 table is at right.

Normal Yield Table - Black Spruce Site Class 2

5 Year Age Class	Height *m*	Gross Total Volume *m3*	Net Merch. Volume *m3*	Current Annual Increment *m3/yr*	Mean Annual Increment *m3/yr*	Basal Area *m2*	Number of Trees *No./ha*
5	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-
20	2.4	15	-	-	2.1	6.4	11,532
25	3.4	26	-	2.2	2.6	10.0	10,037
30	4.4	40	-	2.8	3.0	13.3	8,589
35	5.5	55	-	3.0	3.4	16.2	7,351
40	6.5	71	-	3.2	3.7	18.7	6,427
45	7.4	88	-	3.4	3.9	21.0	5,616
50	8.2	105	-	3.4	4.1	23.1	5,031
55	9.0	121	-	3.2	4.2	25.0	4,599
60	9.7	137	21	3.2	4.2	26.8	4,308
65	10.4	153	36	3.2	4.3	28.2	3,896
70	11.0	167	53	2.8	4.2	29.7	3,706
75	11.6	181	71	2.8	4.2	31.0	3,578
80	12.2	194	88	2.6	4.2	32.2	3,405
85	12.6	206	104	2.4	4.1	33.3	3,254
90	13.1	217	119	2.2	4.0	34.2	3,099
95	13.5	227	134	2.0	4.0	35.0	2,983
100	13.9	237	146	2.0	3.9	35.7	2,866
105	14.2	245	158	1.6	3.8	36.3	2,753
110	14.5	252	169	1.4	3.8	36.8	2,649
115	14.8	259	179	1.4	3.7	37.2	2,550
120	15.0	264	187	1.0	3.6	37.5	2,454
125	15.3	268	194	0.8	3.5	37.7	2,367
130	15.5	271	196	0.6	3.4	37.8	2,286
135	15.7	274	199	0.6	3.4	37.9	2,219
140	15.8	276	200	0.4	3.3	37.9	2,162
145	16.0	277	201	0.2	3.2	38.0	2,113
150	16.1	278	201	0.2	3.1	38.0	2,073

Normal Yield Table (Metric) for Major Forest Species in Ontario - Plonski (1981)

Example Stand Attributes:

Working Group	Black Spruce
Site Class	2
Stocking	80%
Area (ha)	26
Age (yrs.)	39
Height (m)	6.5
Species	Sb 100%

Volume and Calculations

Gross Total Volume x stocking = GTV (m3)

71 m3 x 80% = 56.8 m3/ha

Volume per hectare x Total area = Total Stand Volume

56.8 m3/ha x 26 ha = 1,476.8 m3

Growing Stock Summary

A current project of the Growth and Yield Program at the Ontario Forest Research Institute (OFRI), in conjunction with the Forest Research Partnership and Dr. Margaret Penner is utilizing new data, and looking at existing data in a new way. This project is designed to better represent growing stock volumes in forest management models and tools used in the forest management planning process.

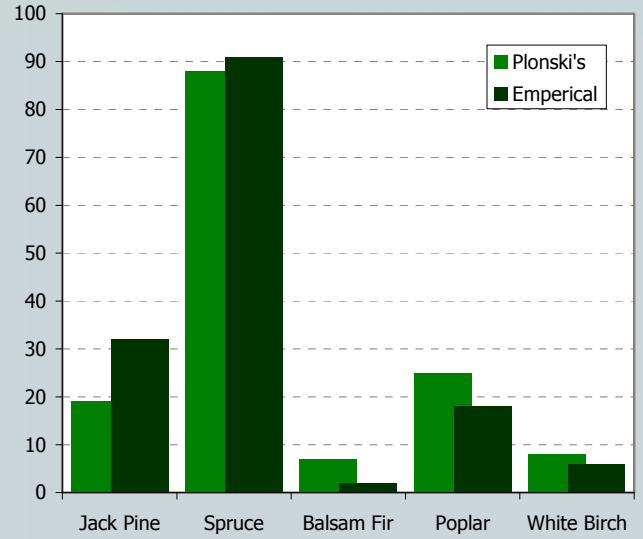
Plonski's work was based on working group, or dominant species, and most of his field sampling was in relatively homogenous forest stands. Any species outside the working group are calculated based on the height, stocking and site class of the dominant species in that stand. Dr. Penner's empirical yield approach has been to examine growth characteristics based on cover type or forest unit. This means that poplar in a spruce dominated stand will be calculated based on a poplar yield for that cover type, rather than a yield from a pure poplar stand.

There has also been research into better representing plantations, or intensively managed stands, as well as improved yields for mixedwood stands, which were not part of Plonski's original work.

Since the work is still in development, it has not been included in this version of the report, but preliminary results show subtle shifts in our previous estimates of growing stock.

An example of two conifer upland forest units in the Boreal forest is highlighted at right. The change in associated species such as balsam fir or poplar is evident in the new empirical yield curves.

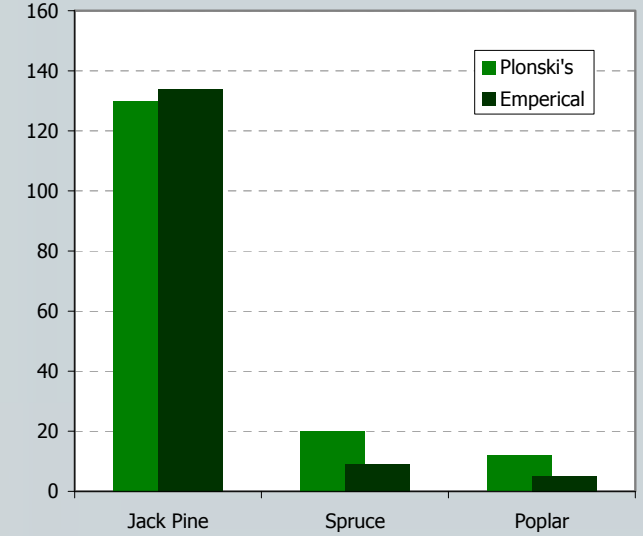
Net Merchantable Volume (NMV) - Sp1



Site Region 3E - Sp1 (Upland Spruce) NMV at Age 100 - m^3/ha

Species	Plonski's Modified Yield	Emperical Yield
Jack Pine	19	32
Spruce	88	91
Balsam Fir	7	2
Poplar	25	18
White Birch	8	6
Total:	147	149

Net Merchantable Volume (NMV) - PjDeep



Site Region 3W - PjDeep (Jack Pine Deep Soil) - NMV at Age 100 - m^3/ha

Species	Plonski's Modified Yield	Emperical Yield
Jack Pine	130	134
Spruce	20	9
Poplar	12	5
Total:	162	148

Growing Stock Summary

Index

Along with gross total and net merchantable volume, the empirical research project has also examined biomass curves to better quantify volumes of other material not normally calculated in a traditional volume table. These include volumes of:

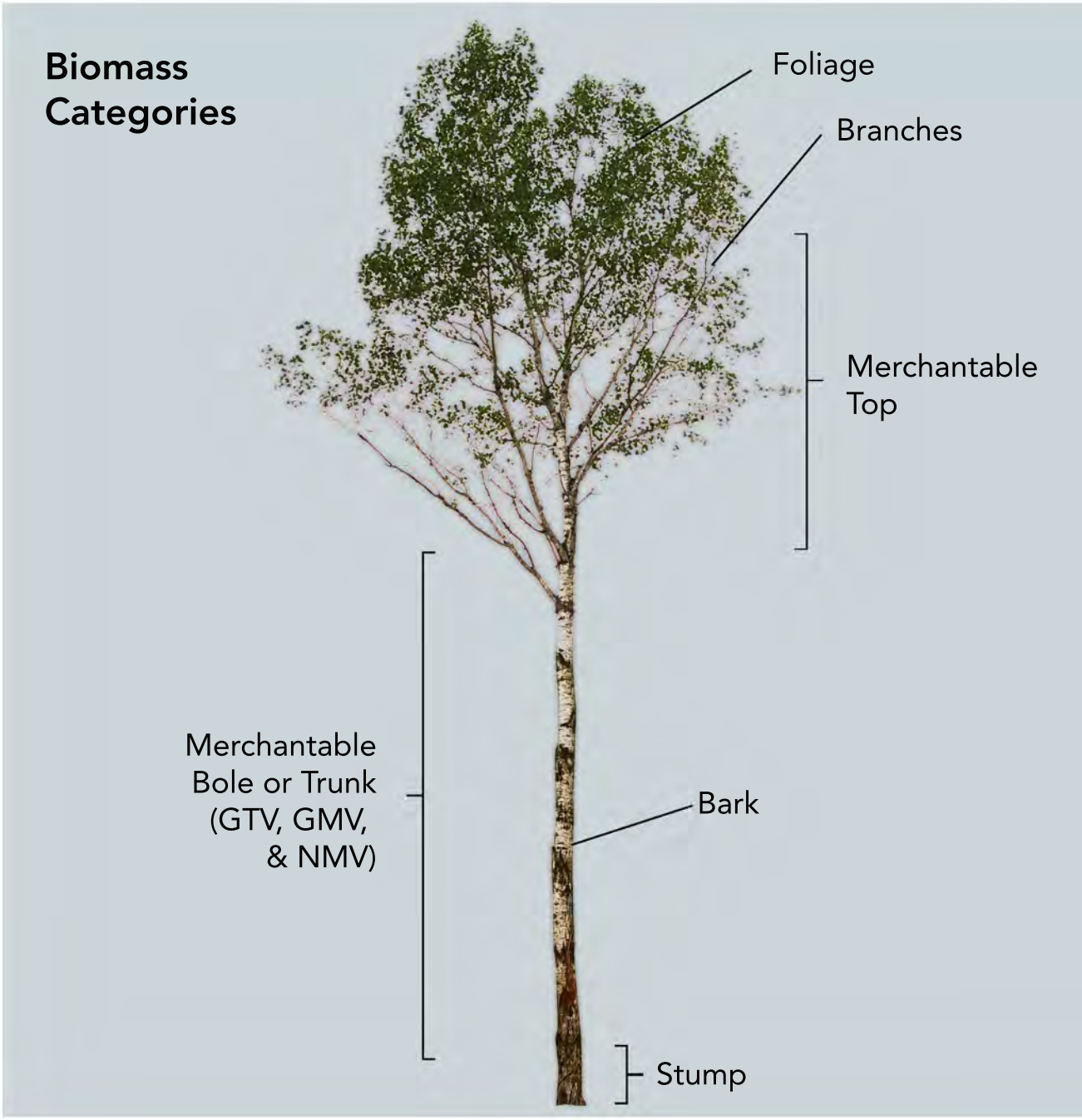
- bark
- tops
- foliage
- branches
- stumps
- waste and breakage

Site Region 4W
PoDom - Poplar Dominated
Volume at Age 100 - m^3/ha

Species/Category	Volume (m^3/ha)
Jack Pine	10.5
Black Spruce	4.4
White Spruce	1.2
Balsam Fir	2.7
Poplar	131.7
White Birch	5.3
Net Merchantable Volume:	155.8
Cull Volume:	69.2
Gross Merchantable Volume:	225.0

Site Region 4W
PoDom - Poplar Dominated
Biomass at Age 100 - m^3/ha

Category	Biomass (m^3/ha)
Stump	7.8
Bark	46.4
Top	30.6
Branches	34.8
Foliage	8.5
Waste/Breakage	7.8
Total:	135.8



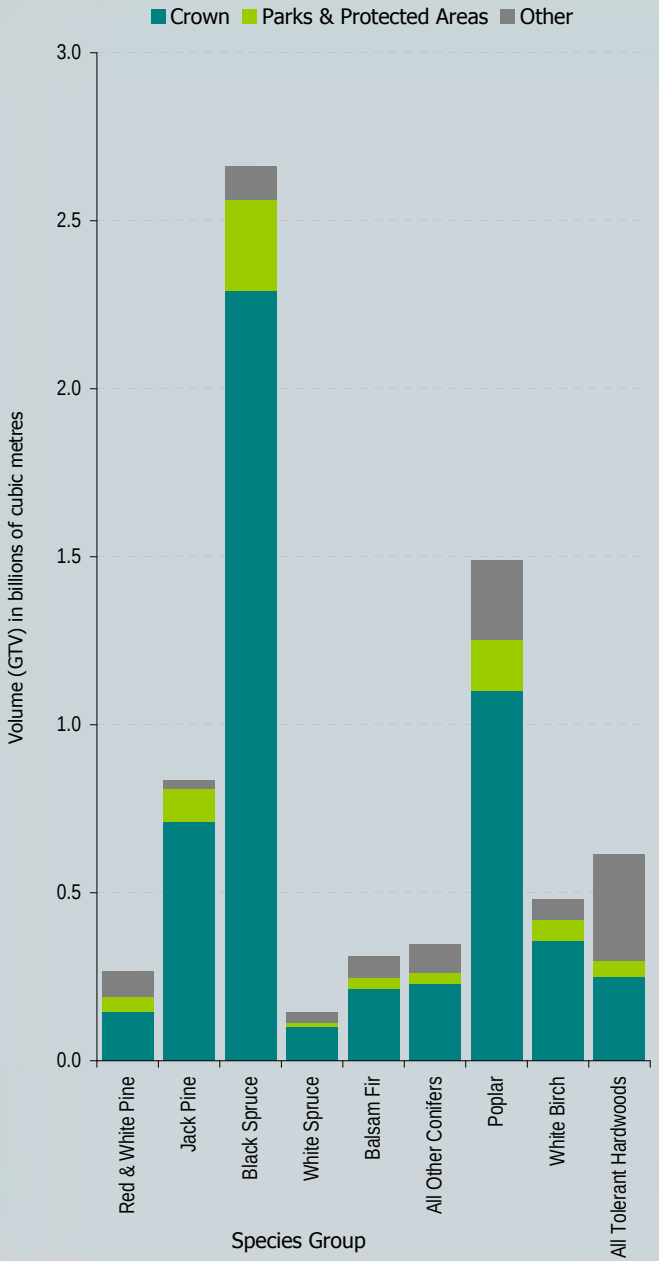
Growing Stock Summary - GTV

Gross Total Volume (GTV) - All Ontario
Volume by Tree Species and Ownership

Volume in thousands of cubic metres

Species	Crown	Parks & Protected Areas	Other	Total
White Pine	115,111.3	33,372.1	60,259.5	208,742.8
Red Pine	31,628.6	12,079.3	14,549.6	58,257.5
Jack Pine	711,603.7	97,799.8	24,318.1	833,721.6
Black Spruce	2,292,111.3	271,410.3	99,445.7	2,662,967.3
White Spruce	99,224.5	14,777.9	29,721.3	143,723.7
Balsam Fir	214,524.8	32,454.2	64,374.6	311,353.6
Cedar	112,028.4	16,446.0	50,319.9	178,794.4
Larch	95,915.7	10,784.0	11,598.9	118,298.7
Hemlock	21,010.7	6,738.5	21,292.0	49,041.2
Other Conifers	38.0	12.0	566.7	616.8
Poplar	1,101,433.2	152,848.3	235,626.0	1,489,907.4
White Birch	357,164.9	62,645.7	62,746.7	482,557.4
Hard Maple	124,994.1	22,438.9	150,051.9	297,484.9
Soft Maple	46,566.9	11,678.6	59,709.3	117,954.9
Yellow Birch	38,326.1	6,879.8	21,661.1	66,867.0
Ash	7,223.5	2,534.4	19,524.1	29,282.0
Oak	20,392.7	5,405.6	38,076.7	63,875.0
Basswood	2,747.2	382.6	10,649.9	13,779.8
Beech	7,843.5	1,214.1	15,486.1	24,543.8
Other Hardwoods	325.5	50.2	611.8	987.5
Total	5,400,214.8	761,952.2	990,590.2	7,152,757.2

Species Groups	Crown	Parks & Protected Areas	Other	Total
Softwoods	3,693,197.0	495,874.1	376,446.5	4,565,517.5
Intolerant Hardwoods	1,458,598.1	215,494.0	298,372.7	1,972,464.8
Tolerant Hardwoods	248,419.7	50,584.2	315,771.1	614,774.9
Total	5,400,214.8	761,952.2	990,590.2	7,152,757.2



Source: Forest Resources Inventories 2010 and Landcover 2008 Estimates

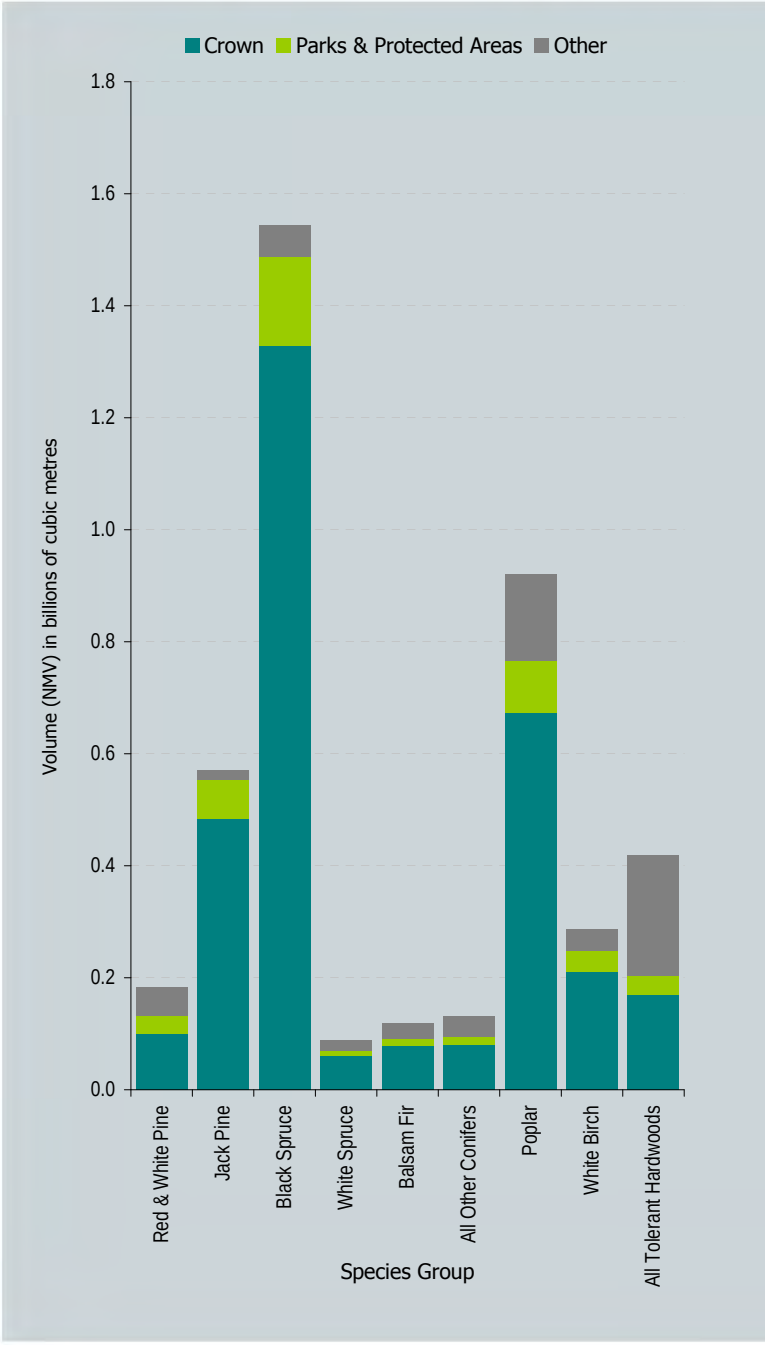
Growing Stock Summary - NMV

Net Merchantable Volume (NMV) - All Ontario
Volume by Tree Species and Ownership

Volume in thousands of cubic metres

Species	Crown	Parks & Protected Areas	Other	Total
White Pine	76,949.7	22,616.2	39,561.2	139,127.2
Red Pine	23,187.8	9,268.0	10,565.0	43,020.8
Jack Pine	483,875.6	68,950.0	17,539.7	570,365.2
Black Spruce	1,328,887.4	159,341.9	55,910.3	1,544,139.7
White Spruce	60,149.1	9,287.0	17,870.1	87,306.3
Balsam Fir	78,821.2	12,299.9	27,130.0	118,251.1
Cedar	35,375.5	5,311.7	18,028.8	58,716.0
Larch	31,404.0	3,623.6	4,238.4	39,265.9
Hemlock	14,357.2	4,618.5	14,821.2	33,796.9
Other Conifers	10.7	3.8	161.0	175.4
Poplar	672,647.9	93,682.1	153,567.2	919,897.2
White Birch	211,171.1	37,424.0	38,464.8	287,059.9
Hard Maple	79,267.0	14,154.8	96,209.6	189,631.4
Soft Maple	33,049.0	8,345.9	42,148.4	83,543.3
Yellow Birch	28,552.1	5,092.7	16,377.9	50,022.7
Ash	5,182.8	1,767.8	13,489.0	20,439.7
Oak	15,215.8	4,002.4	28,137.3	47,355.5
Basswood	2,032.9	282.7	7,790.3	10,105.9
Beech	5,802.6	894.9	11,651.8	18,349.3
Other Hardwoods	231.8	36.5	422.2	690.4
Total	3,186,171.2	461,004.5	614,084.0	4,261,259.7

Species Groups	Crown	Parks & Protected Areas	Other	Total
Softwoods	2,133,018.2	295,320.6	205,825.7	2,634,164.5
Intolerant Hardwoods	883,819.0	131,106.1	192,032.0	1,206,957.1
Tolerant Hardwoods	169,334.0	34,577.7	216,226.3	420,138.1
Total	3,186,171.2	461,004.5	614,084.0	4,261,259.7



Source: Forest Resources Inventories 2010 and Landcover 2008 Estimates

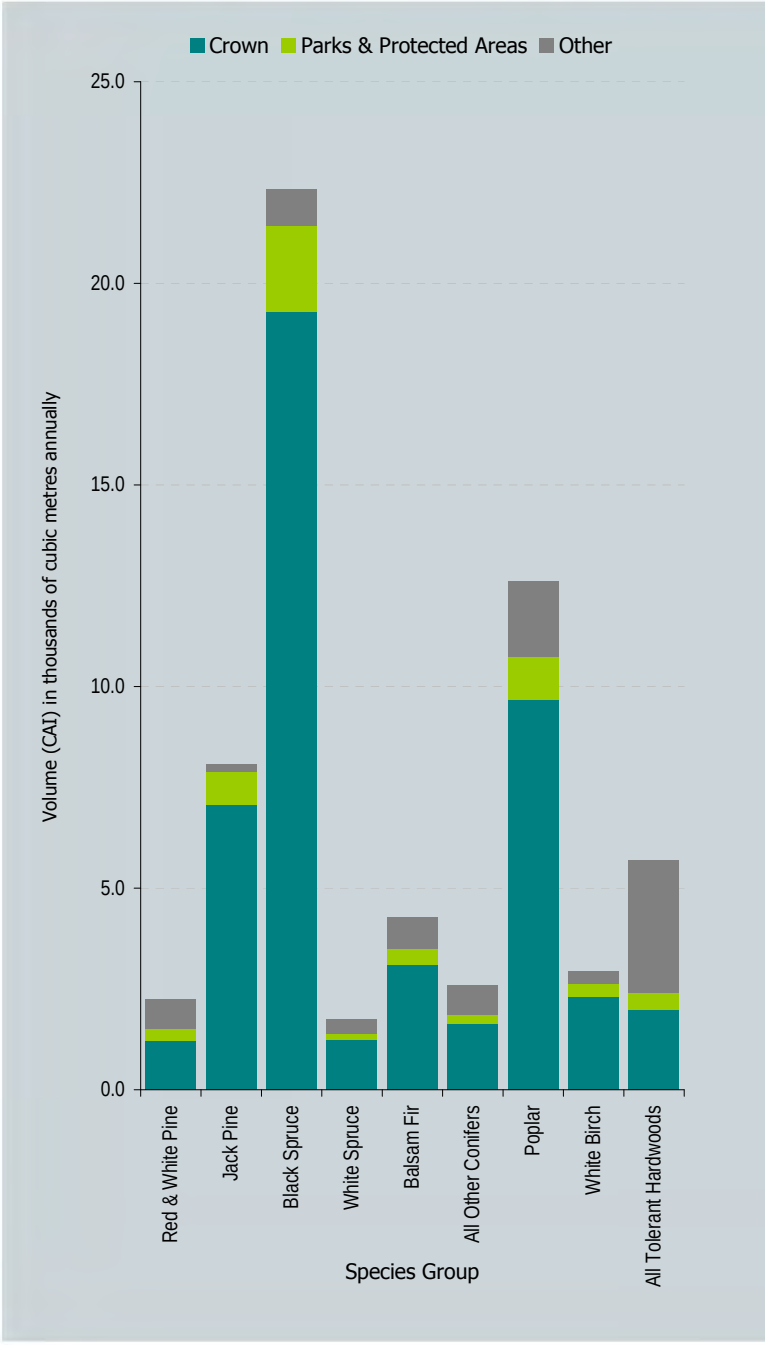
Growing Stock Summary - CAI

Current Annual Increment (CAI) - All Ontario
Volume by Tree Species and Ownership

Volume in thousands of cubic metres annually

Species	Crown	Parks & Protected Areas	Other	Total
White Pine	929.7	243.3	536.8	1,709.8
Red Pine	295.0	58.7	191.2	544.9
Jack Pine	7,071.8	803.1	194.4	8,069.3
Black Spruce	19,299.6	2,121.2	905.9	22,326.7
White Spruce	1,241.4	150.6	352.6	1,744.6
Balsam Fir	3,089.2	409.9	790.3	4,289.5
Cedar	763.3	119.2	438.9	1,321.3
Larch	756.2	75.9	105.5	937.6
Hemlock	108.7	35.1	174.2	318.0
Other Conifers	0.7	0.2	14.5	15.4
Poplar	9,672.3	1,078.2	1,865.7	12,616.1
White Birch	2,304.9	322.8	306.8	2,934.4
Hard Maple	878.1	141.8	1,478.4	2,498.3
Soft Maple	522.8	129.8	724.5	1,377.1
Yellow Birch	235.6	37.4	166.3	439.3
Ash	80.5	31.7	253.9	366.2
Oak	200.4	54.2	397.5	652.1
Basswood	27.4	3.8	118.5	149.8
Beech	48.2	6.7	141.7	196.6
Other Hardwoods	3.0	0.5	8.1	11.5
Total	47,528.5	5,824.1	9,165.7	62,518.3

Species Groups	Crown	Parks & Protected Areas	Other	Total
Softwoods	33,555.5	4,017.3	3,704.3	41,277.1
Intolerant Hardwoods	11,977.1	1,401.0	2,172.4	15,550.5
Tolerant Hardwoods	1,995.8	405.9	3,289.0	5,690.7
Total	47,528.5	5,824.1	9,165.7	62,518.3



Source: Forest Resources Inventories 2010 and Landcover 2008 Estimates

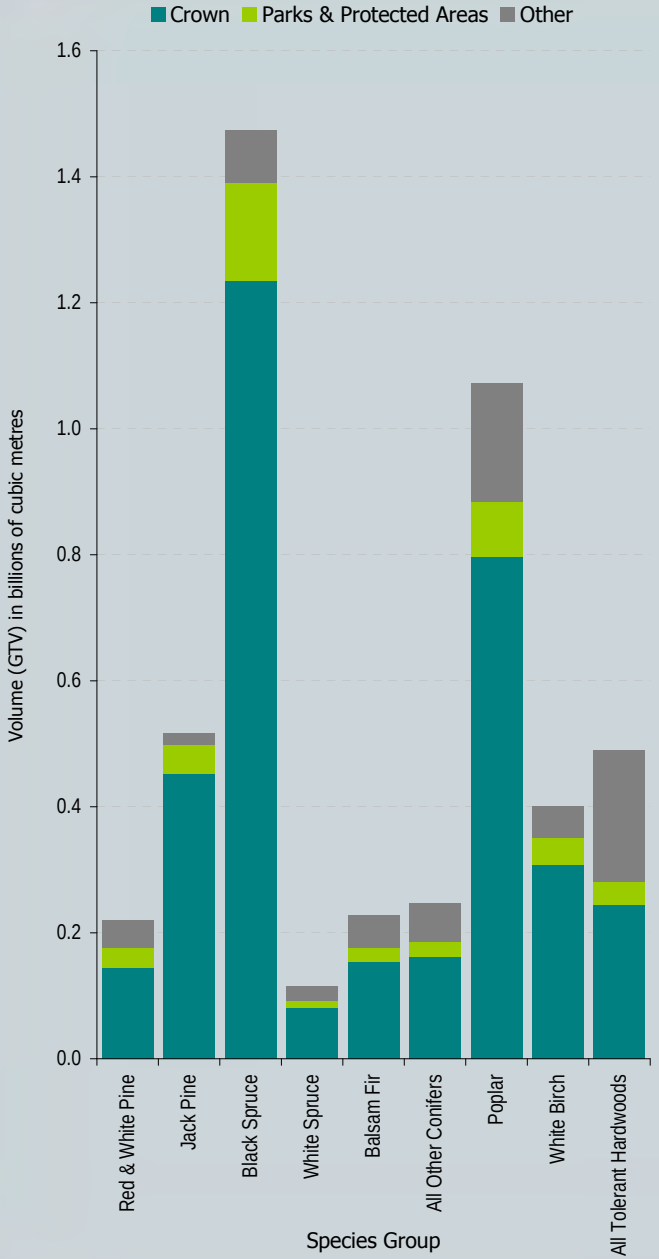
Growing Stock Summary - GTV

Gross Total Volume (GTV) - AOU
Volume by Tree Species and Ownership

Volume in thousands of cubic metres

Species	Crown	Parks & Protected Areas	Other	Total
White Pine	113,591.9	25,916.1	34,030.6	173,538.6
Red Pine	30,592.6	6,064.2	9,047.2	45,704.0
Jack Pine	451,288.1	47,522.8	18,729.9	517,540.8
Black Spruce	1,234,872.4	155,193.4	82,852.5	1,472,918.4
White Spruce	80,549.2	10,874.9	23,278.8	114,702.9
Balsam Fir	154,762.7	22,144.8	51,088.2	227,995.7
Cedar	86,419.1	11,025.6	35,678.5	133,123.2
Larch	55,173.0	6,057.5	9,969.2	71,199.7
Hemlock	20,705.4	5,872.8	14,534.0	41,112.2
Other Conifers	33.0	4.5	497.1	534.6
Poplar	796,703.4	87,757.2	188,120.6	1,072,581.2
White Birch	307,497.3	43,755.4	49,218.3	400,471.0
Hard Maple	123,285.0	15,737.0	101,814.1	240,836.1
Soft Maple	45,886.7	8,454.4	40,264.3	94,605.4
Yellow Birch	37,997.7	5,209.4	17,421.0	60,628.2
Ash	6,574.1	1,300.7	12,906.8	20,781.6
Oak	19,946.6	4,462.2	20,207.4	44,616.3
Basswood	2,646.4	207.5	6,051.4	8,905.4
Beech	7,682.7	762.4	9,449.6	17,894.7
Other Hardwoods	319.0	29.5	355.5	704.0
Total	3,576,526.5	458,352.3	725,515.2	4,760,394.0

Species Groups	Crown	Parks & Protected Areas	Other	Total
Softwoods	2,227,987.5	290,676.5	279,706.1	2,798,370.1
Intolerant Hardwoods	1,104,200.7	131,512.6	237,338.9	1,473,052.2
Tolerant Hardwoods	244,338.3	36,163.2	208,470.2	488,971.7
Total	3,576,526.5	458,352.3	725,515.2	4,760,394.0



Source: Forest Resources Inventories 2010 and Landcover 2008 Estimates

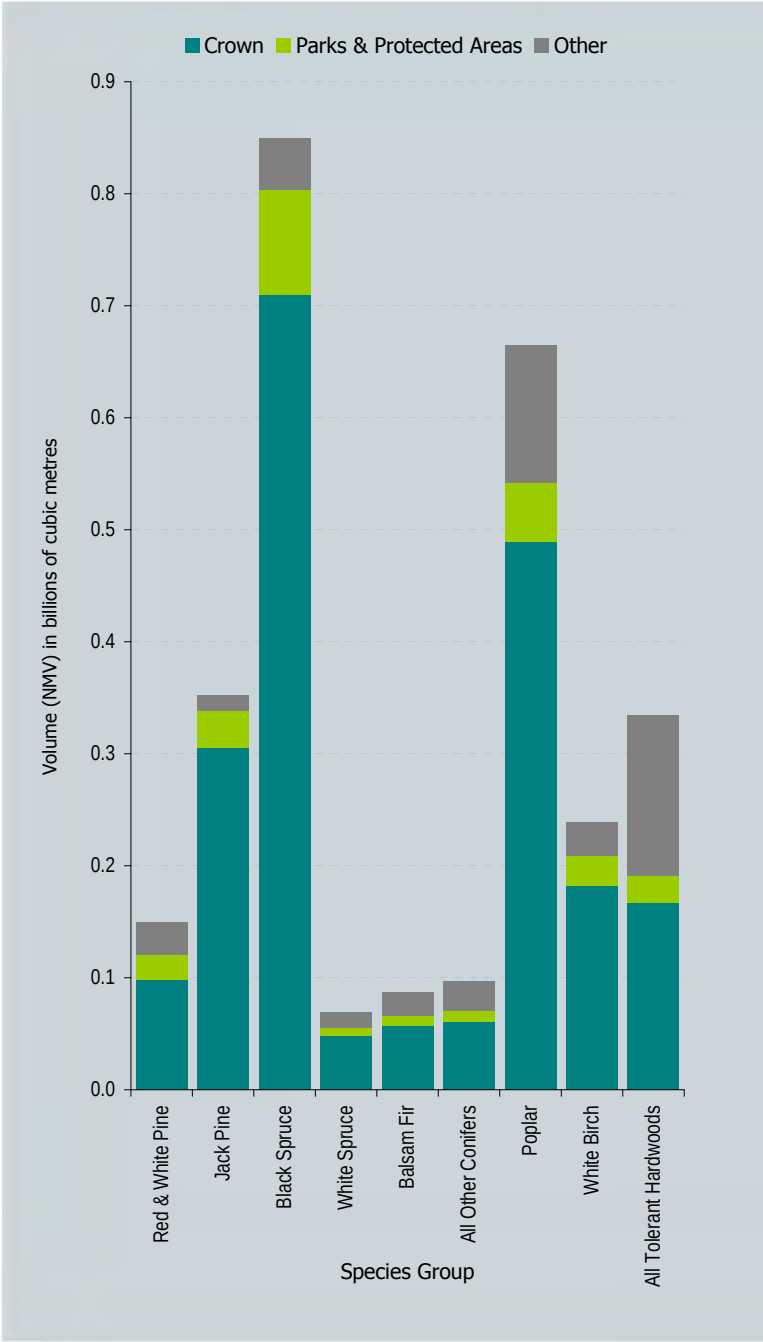
Growing Stock Summary - NMV

Net Merchantable Volume (NMV) - AOU
Volume by Tree Species and Ownership

Volume in thousands of cubic metres

Species	Crown	Parks & Protected Areas	Other	Total
White Pine	75,948.9	17,741.4	22,301.8	115,992.1
Red Pine	22,414.9	4,598.1	6,538.0	33,551.0
Jack Pine	304,923.9	33,582.4	13,589.3	352,095.5
Black Spruce	710,430.1	92,979.6	46,194.0	849,603.7
White Spruce	48,436.1	6,912.5	13,729.3	69,077.9
Balsam Fir	57,451.0	8,515.5	21,323.5	87,289.9
Cedar	28,004.1	3,581.0	12,693.3	44,278.3
Larch	18,337.2	2,027.9	3,636.8	24,001.8
Hemlock	14,147.3	4,021.2	10,177.4	28,345.9
Other Conifers	9.8	1.7	141.4	152.9
Poplar	488,916.7	53,402.2	122,668.9	664,987.8
White Birch	182,495.1	26,335.6	30,097.5	238,928.2
Hard Maple	78,182.4	9,897.2	65,562.7	153,642.3
Soft Maple	32,574.2	6,152.3	28,593.4	67,319.8
Yellow Birch	28,307.2	3,846.2	13,189.5	45,342.9
Ash	4,729.7	937.6	8,913.3	14,580.6
Oak	14,886.6	3,311.0	14,920.7	33,118.3
Basswood	1,959.2	153.7	4,431.6	6,544.5
Beech	5,682.1	555.5	7,134.2	13,371.8
Other Hardwoods	227.2	21.1	244.8	493.1
Total	2,118,063.5	278,573.5	446,081.3	2,842,718.4

Species Groups	Crown	Parks & Protected Areas	Other	Total
Softwoods	1,280,103.2	173,961.2	150,324.7	1,604,389.0
Intolerant Hardwoods	671,411.9	79,737.7	152,766.4	903,916.0
Tolerant Hardwoods	166,548.5	24,874.6	142,990.3	334,413.4
Total	2,118,063.5	278,573.5	446,081.3	2,842,718.4



Source: Forest Resources Inventories 2010 and Landcover 2008 Estimates

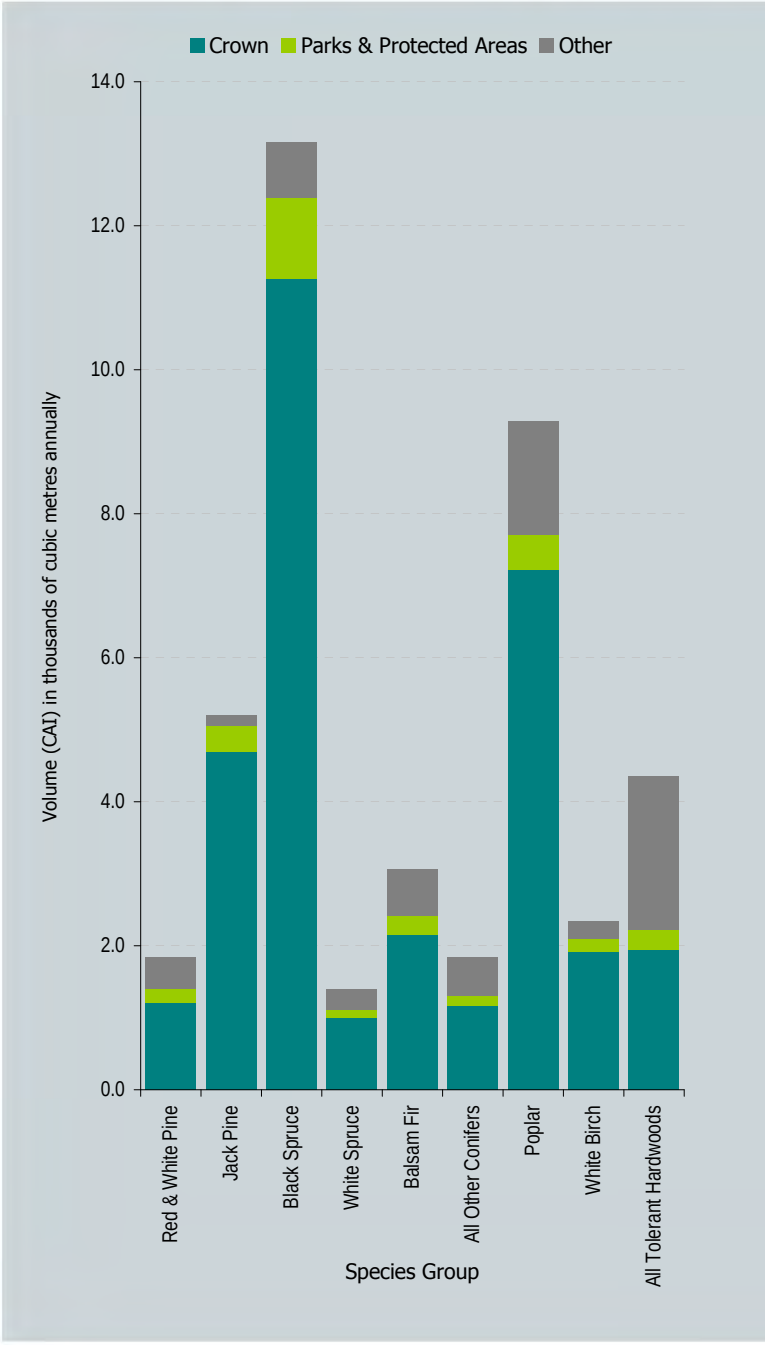
Growing Stock Summary - CAI

Current Annual Increment (CAI) - AOU
Volume by Tree Species and Ownership

Volume in thousands of cubic metres annually

Species	Crown	Parks & Protected Areas	Other	Total
White Pine	916.5	174.3	308.5	1,399.3
Red Pine	287.5	25.5	130.9	443.9
Jack Pine	4,698.4	349.9	150.6	5,199.0
Black Spruce	11,270.3	1,113.6	771.4	13,155.3
White Spruce	1,003.6	103.3	284.4	1,391.3
Balsam Fir	2,150.7	261.8	642.4	3,054.8
Cedar	607.2	74.5	310.0	991.6
Larch	455.4	37.5	91.4	584.3
Hemlock	106.6	29.2	116.4	252.2
Other Conifers	0.6	0.1	12.6	13.3
Poplar	7,219.8	490.9	1,571.7	9,282.5
White Birch	1,917.9	175.9	244.4	2,338.2
Hard Maple	862.5	87.6	983.8	1,933.9
Soft Maple	514.5	86.6	477.6	1,078.7
Yellow Birch	233.3	25.6	133.3	392.3
Ash	72.1	14.3	167.8	254.1
Oak	195.7	44.3	211.3	451.3
Basswood	26.3	2.0	67.0	95.2
Beech	46.8	3.5	85.3	135.6
Other Hardwoods	2.9	0.3	4.7	7.8
Total	32,588.4	3,100.7	6,765.3	42,454.5

Species Groups	Crown	Parks & Protected Areas	Other	Total
Softwoods	21,496.8	2,169.6	2,818.5	26,484.9
Intolerant Hardwoods	9,137.7	666.8	1,816.1	11,620.7
Tolerant Hardwoods	1,954.0	264.3	2,130.6	4,348.9
Total	32,588.4	3,100.7	6,765.3	42,454.5



Source: Forest Resources Inventories 2010 and Landcover 2008 Estimates

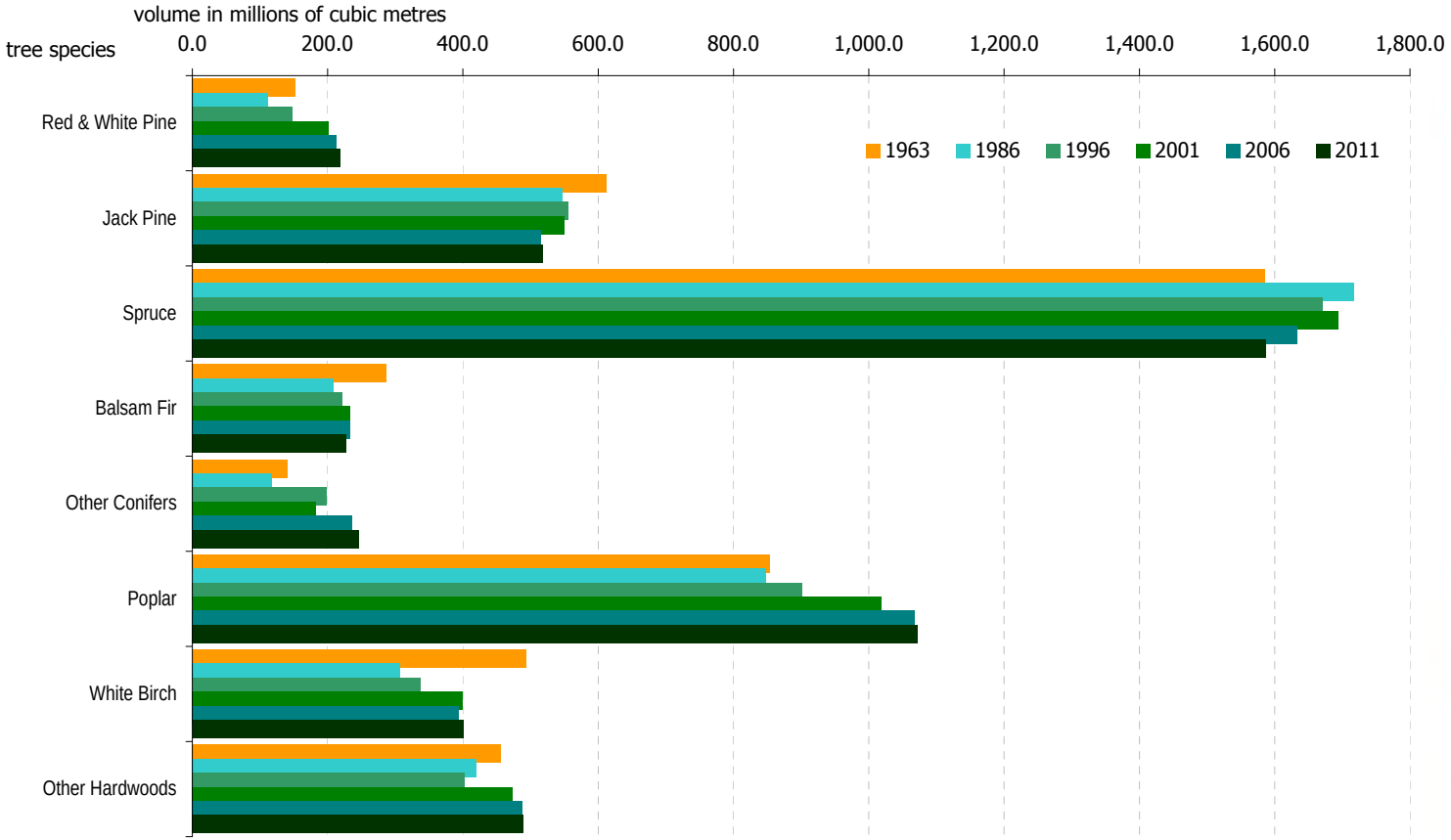
Historical Summaries by Species Volumes - GTV

Index

Gross Total Volume by Species and Year - AOU

Volume in millions of cubic metres

Species	1963	1986	1996	2001	2006	2011
Red & White Pine	152.5	112.2	147.7	201.1	212.7	219.2
Jack Pine	611.5	547.2	555.7	549.4	515.6	517.5
Spruce	1,585.0	1,716.8	1,670.3	1,693.6	1,633.7	1,587.6
Balsam Fir	286.4	208.3	221.5	233.7	233.8	228.0
Other Conifers	140.8	117.9	198.0	182.2	236.0	246.0
Poplar	853.3	847.3	901.9	1,017.7	1,067.3	1,072.6
White Birch	492.7	306.7	336.8	399.9	393.7	400.5
Other Hardwoods	456.4	419.5	401.9	473.8	487.4	489.0
Total:	4,578.6	4,276.0	4,433.7	4,849.6	4,780.4	4,760.4



Source: Historical Forest Resources Inventories within the AOU

Landscape Pattern Indices

Index

Interactive Chapter Index

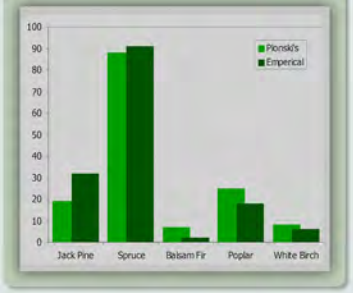
Landscape pattern indices offer a statistical view of the pattern and arrangement of forests. Indices in this chapter are calculated at the ecoregion and ecozone levels, and then displayed in graph and map form.

select a topic

Definitions

Total Land Area

Indices



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Landscape Pattern Indices

Landscape ecology is based on the idea that patterns exist within and influence nature (Turner 1989). Wildlife habitat based on spatial arrangement of forest or non-forest classes is sensitive to these patterns. Changes in landscape patterns can be natural and man made, as well as either short or long term in nature. A forest fire or harvest will change the pattern within an area of forest but will be followed by the establishment of young trees. The disturbed area will eventually become mature forest again. Conversely, an area of forest that is converted to urban uses or agriculture tends to be a much more permanent change. These concepts influence the classes used to measure landscape pattern in this chapter.

Landscape pattern indices, or measurements of pattern, were calculated for the 2001 and 2006 versions of FRO. Statistics were calculated based on the Landsat satellite imagery available at that time. This report utilizes the Landcover 2008 imagery discussed in the "Measuring Ontario's Forests" chapter. Since the 2002 and 2008 imagery sets have very similar inputs, they are more directly comparable than the 1996 set used previously.

The indices in this chapter were calculated for ecodistricts (72), ecoregions (14) and Ecozones (4) using Patch Analyst (MNR Centre for Northern Forest Ecosystem Research).

The land class set used for this analysis is the same as the 2006 simple forest set at 200 metre resolution:

- productive forest
- disturbed forest
- non-productive forest (treed fen/swamp)
- non-forest

The metrics calculated for each class and class set (and landscape) are:

- Mean patch size (MPS)
- Edge density (ED)
- Total Core Area Index (TCAI)
- Isolation distance or Mean Nearest Neighbour (MNN)
- Interspersion (IJI)
- Complexity or shape index (MSI)

fragmented forest and agriculture north of Toronto

Landscape Pattern Indices

Landscape metrics definitions, as well as some common terminology for this chapter are listed below, and the actual metrics are highlighted in the following pages with example metric maps based on the analysis.
Definitions

Landscape: a landscape is the total area under analysis, and is the sum of all patches in the landscape. In this analysis it is the ecodistrict, ecoregion and ecozone areas of Ontario.

Class: a class is made up of all patches in a landscape that have the same value, such as forest or non-forest.

Patch: each individual group of identical class values is a patch, such as a forest stand or group of stands similar in composition based on the inputs of the analysis.

Mean Patch Size (MPS): mean patch size is the total landscape area divided by the number of patches, and is expressed in hectares. Mean patch size landscape fragments are an important piece of information relating to fragmentation. A landscape with a smaller patch size than another might be considered more fragmented.

Mean patch size provincially varies, but is generally very low and extremely variable in the far north, becoming higher within the AOU, and very low in southern Ontario. Fire suppression and management practices within the AOU have contributed to the dramatic increase in patch size when compared to the northern boreal forest.

Edge Density (ED): edge density is an expression of the length of edge in a landscape divided by the total area of that landscape (metres of edge per hectare of landscape). Edge density is an important factor in assessing wildlife habitat. Many species of songbirds for example require a complex landscape of edges between forest classes and disturbance as part of their preferred habitat. An increase in edge however is not simply better for all wildlife, as some species require large forest interior patches.

Edge density is a critical component of any study of fragmentation, as most of the adverse effects of forest fragmentation on wildlife appear to be related in some way to edge effects.

Provincially, edge density for forests is highest in those areas that have a very fragmented nature such as the site region 2W, which has a very complicated mix of forest and disturbed forest caused by fire.

forest and field patches
near Kapuskasing

Landscape Pattern Indices

Mean Shape Index (MSI): mean shape index is a measure of shape complexity. Mathematically, MSI is an expression of the sum of the patch perimeter (in metres) divided by the square root of patch area (m^2) for each patch in the landscape, adjusted for a square standard, divided by the number of patches.

Provincially, MSI for the forest class ranges from low values in the far north (site regions 0E and 1E), to a gradual increase through to the southern extent of the AOU (site region 5E). MSI drops dramatically in site region 6E and 7E for the forest class.

Interspersion Juxtaposition Index (IJI): interspersion juxtaposition index is a measure of patch adjacency or an expression of the observed interspersion over the maximum possible interspersion for the given number of patch types. Mathematically, it is minus the sum of the length (m) of each unique edge type divided by the total landscape edge (m), multiplied by the logarithm of the same quantity, summed over each unique edge type; divided by the logarithm of the number of patch types times the number of patch types minus 1 divided by 2; multiplied by 100 (to convert to a percentage).

Provincial interspersion values range from very low in the far north to very high in the forested areas within the boreal forest. Southern Ontario has a very high IJI value as a result of the mix of agriculture, nonforest and forest patches.

Mean Nearest Neighbour (MNN): mean nearest neighbour is a measure of patch isolation, or the measure of the shortest distance to a similar patch. This metric is an indication of forest connectedness. Mathematically, MNN is an expression of the sum of the distance (m) to the nearest patch of the same type, based on nearest edge-to-edge distance, for each patch in the landscape with a neighbor, divided by the number of patches with a neighbor.

Provincially, this metric displays a dramatically different result than mean patch size. Site regions with less forest in the far north (0E, 1E, 2E) and the south (6E, 7E) have the highest values for MNN, indicating the largest distance between forest patches. The lowest values for MNN occur in the clay belt (3E), and the Great Lakes forest region (4E and 5E), where large patch sizes of forest occur.

Total Core Area Index (TCAI): total core area index is a measure of core area, or forest interior. Mathematically, TCAI is an expression of the sum of the core areas of each patch, divided by the total landscape area, multiplied by 100 (to convert to a percentage). TCAI equals the percentage of the landscape that is core area.

Provincially, TCAI increases as forest cover increases, having the lowest values in site regions 0E, 1E and 2E, and the highest values in the AOU, 2W through to 5E.

forest edge created by natural disturbance (fire)

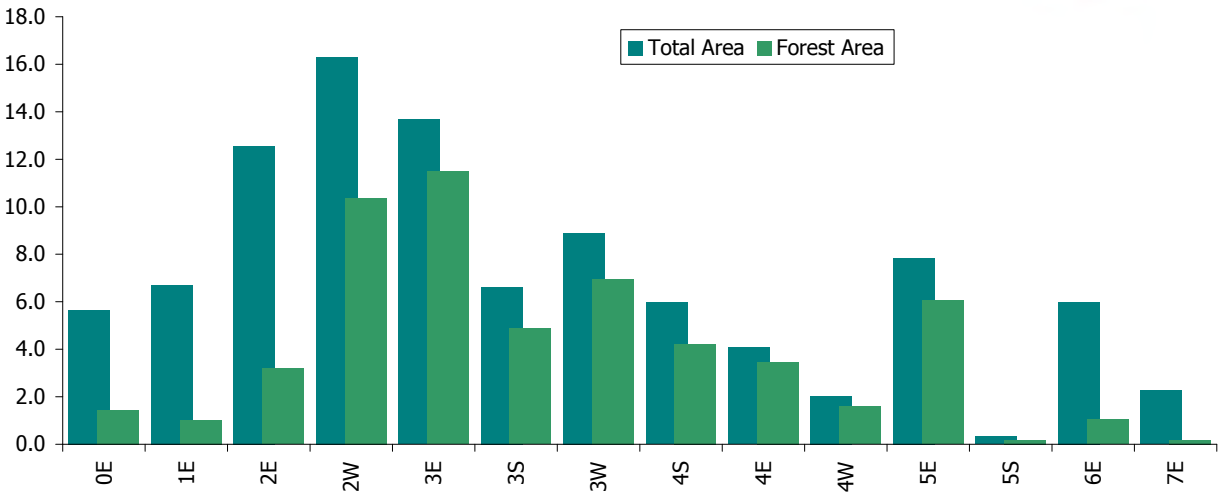
Landscape Pattern Indices

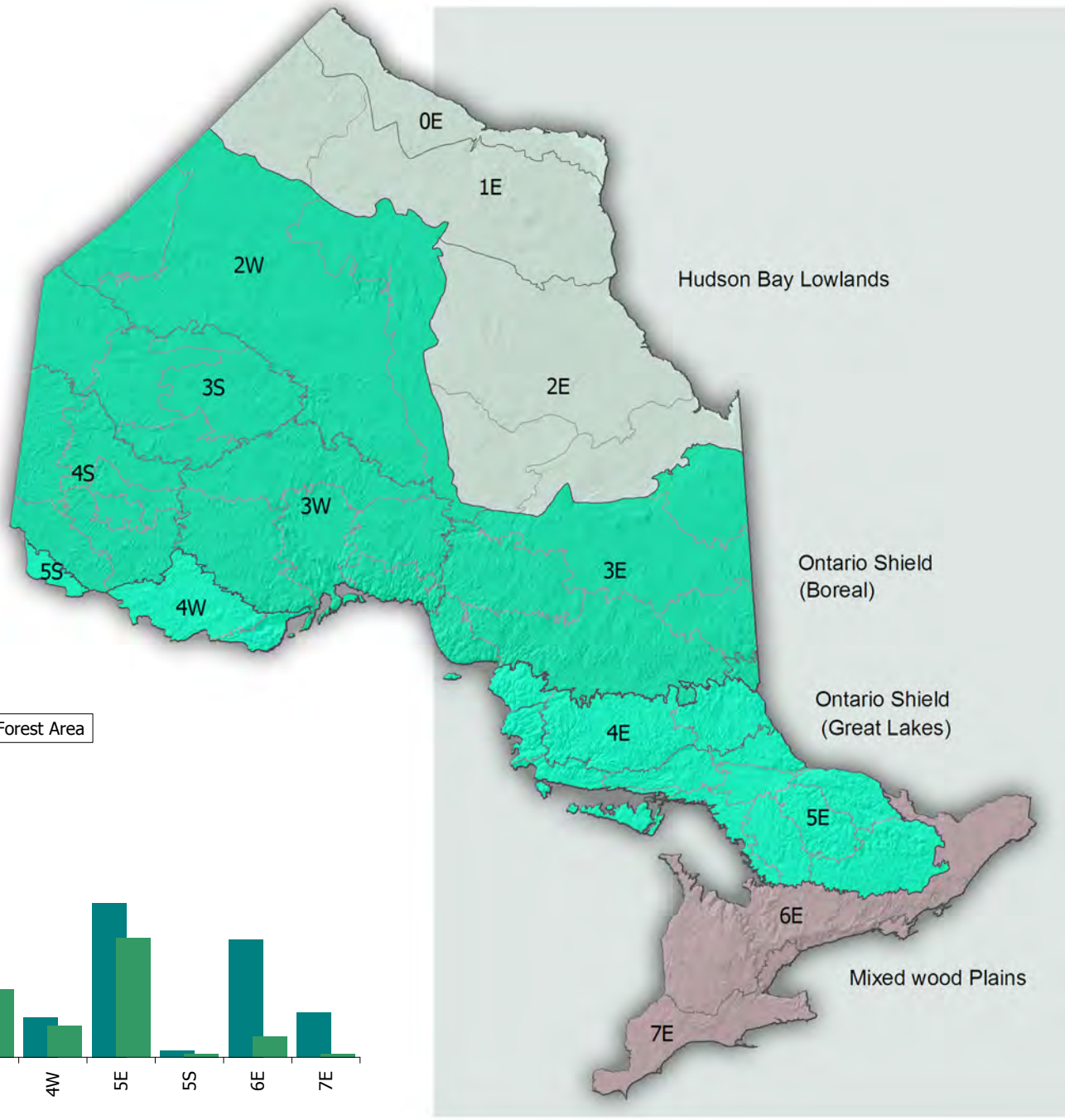
Index

Total Land Area by Ecoregion and Ecozone

Area in millions of hectares

Ecoregion	Total Area	Forest Area
0E	5.66	1.44
1E	6.71	1.03
2E	12.55	3.19
Hudson Bay Lowlands	24.92	5.66
2W	16.30	10.37
3E	13.68	11.48
3S	6.62	4.87
3W	8.88	6.95
4S	5.97	4.23
Ontario Shield (Boreal)	51.45	37.90
4E	4.07	3.46
4W	2.03	1.59
5E	7.84	6.05
5S	0.33	0.19
Ontario Shield (GLSL)	14.27	11.29
6E	6.00	1.03
7E	2.26	0.19
Mixedwood Plains	8.26	1.23
Provincial Total	98.91	56.08



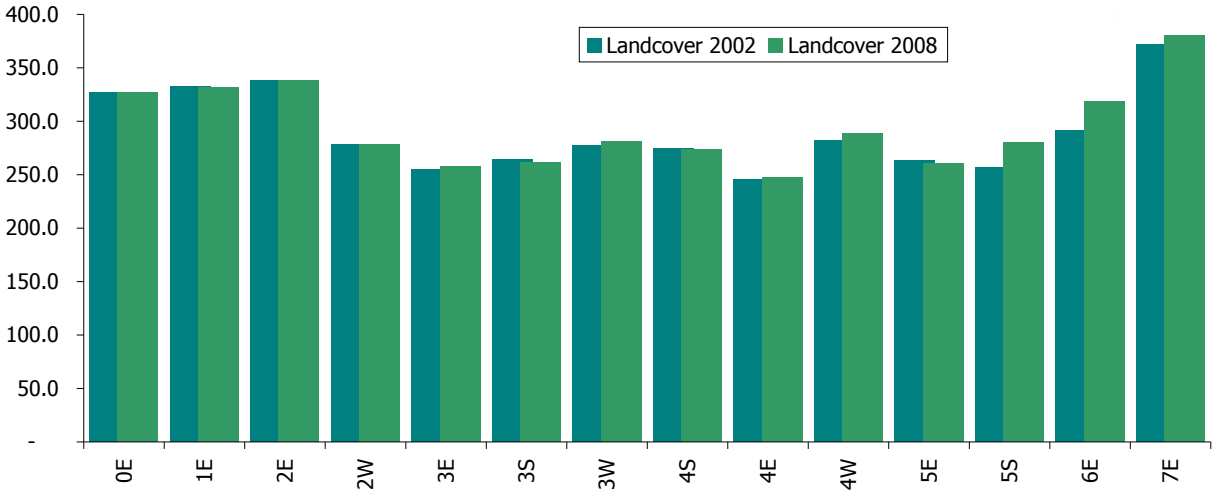


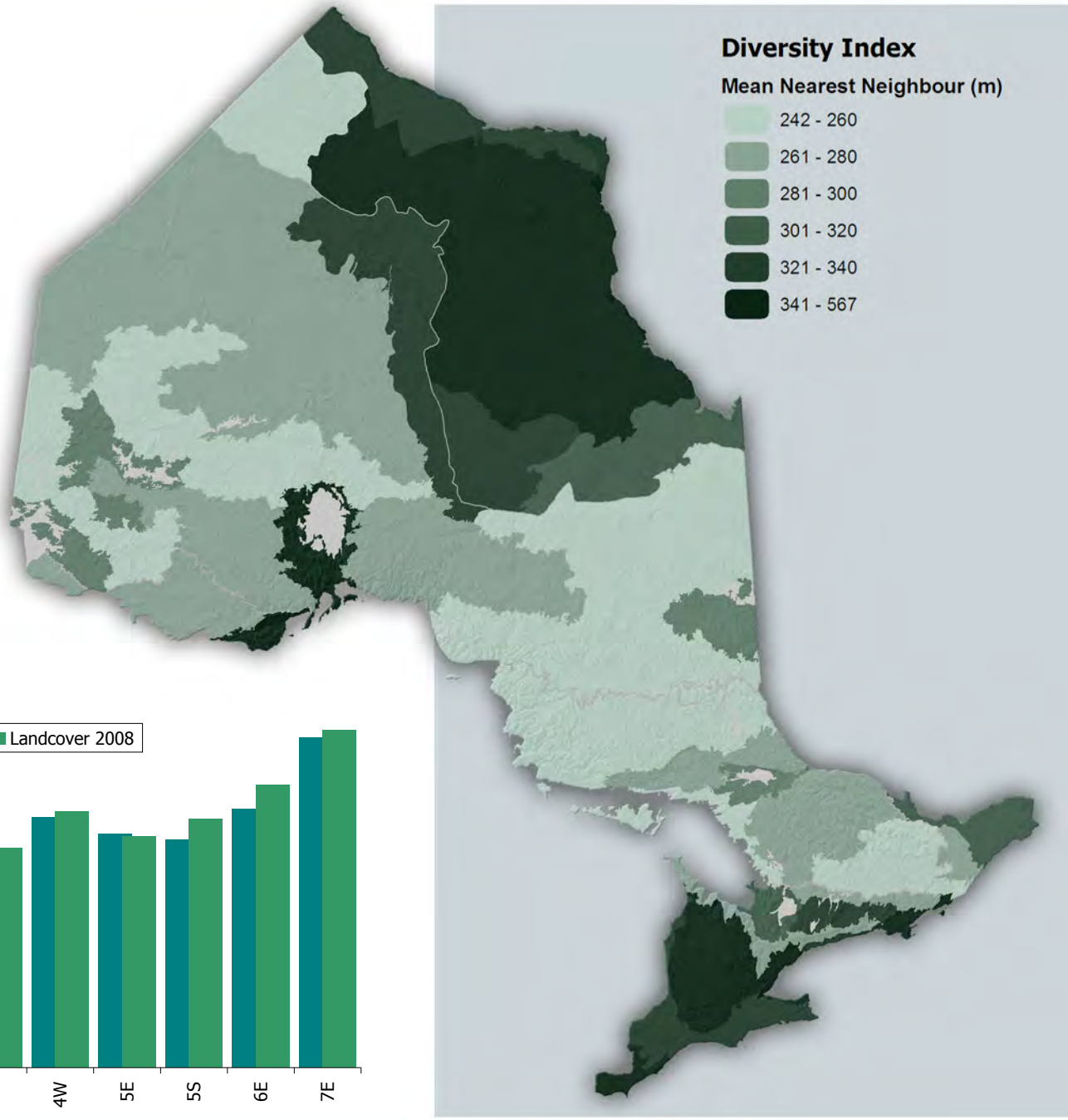
Source: Classified Imagery and Patch Analyst

Landscape Pattern Indices

Mean Nearest Neighbour (MNN) by Ecoregion and Ecozone

Ecoregion	Landcover 2002	Landcover 2008
0E	326.7	326.9
1E	332.6	331.7
2E	338.0	338.1
Hudson Bay Lowlands	334.6	334.3
2W	278.0	277.9
3E	254.7	257.7
3S	264.2	261.9
3W	277.3	281.4
4S	274.6	273.4
Ontario Shield (Boreal)	269.5	270.5
4E	245.6	247.2
4W	282.0	288.3
5E	263.0	260.5
5S	257.3	279.7
Ontario Shield (GLSL)	260.8	261.3
6E	291.3	318.7
7E	371.5	380.7
Mixedwood Plains	312.7	335.2
Provincial Average	288.3	290.6



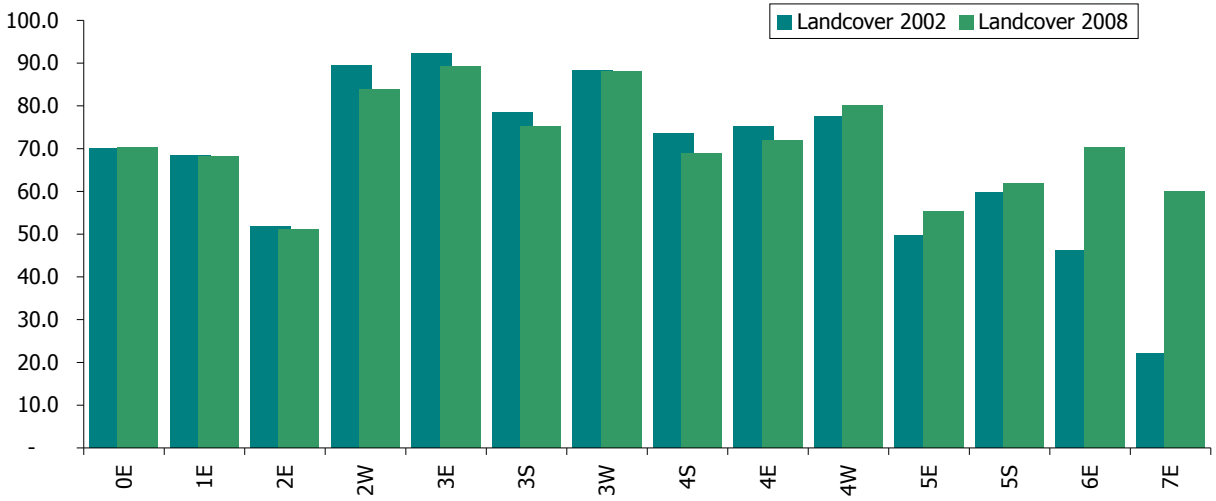


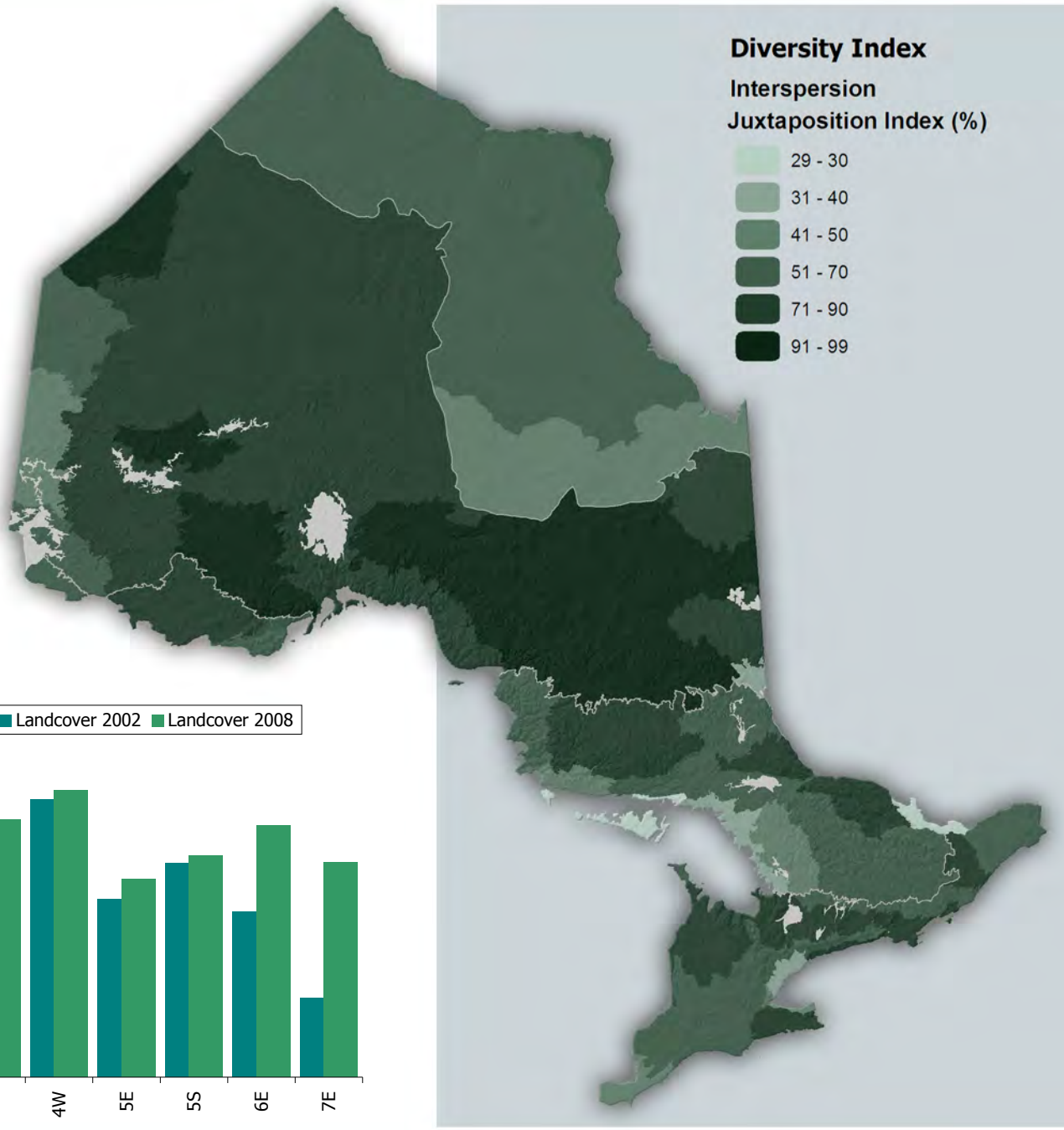
Source: Classified Imagery and Patch Analyst

Landscape Pattern Indices

Interspersion Juxtaposition Index (IJI) by Ecoregion and Ecozone

Ecoregion	Landcover 2002	Landcover 2008
0E	70.2	70.4
1E	68.4	68.1
2E	51.7	51.2
Hudson Bay Lowlands	60.2	59.9
2W	89.5	83.9
3E	92.2	89.2
3S	78.5	75.2
3W	88.3	88.2
4S	73.6	68.9
Ontario Shield (Boreal)	86.8	83.2
4E	75.2	71.9
4W	77.6	80.1
5E	49.7	55.3
5S	59.8	61.9
Ontario Shield (GLSL)	61.1	63.6
6E	46.2	70.4
7E	22.1	59.9
Mixedwood Plains	39.8	67.6
Provincial Average	72.5	73.2



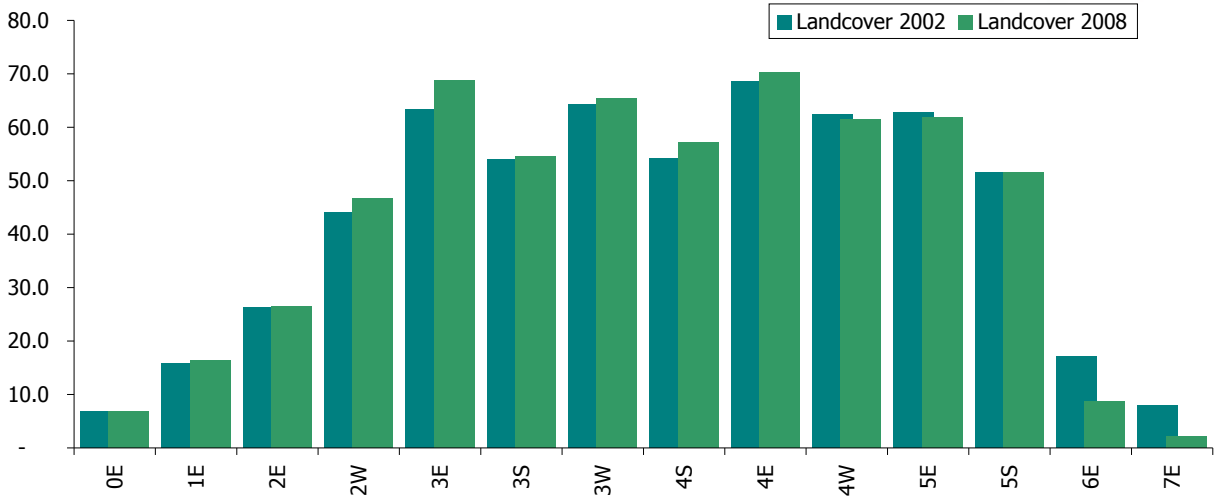


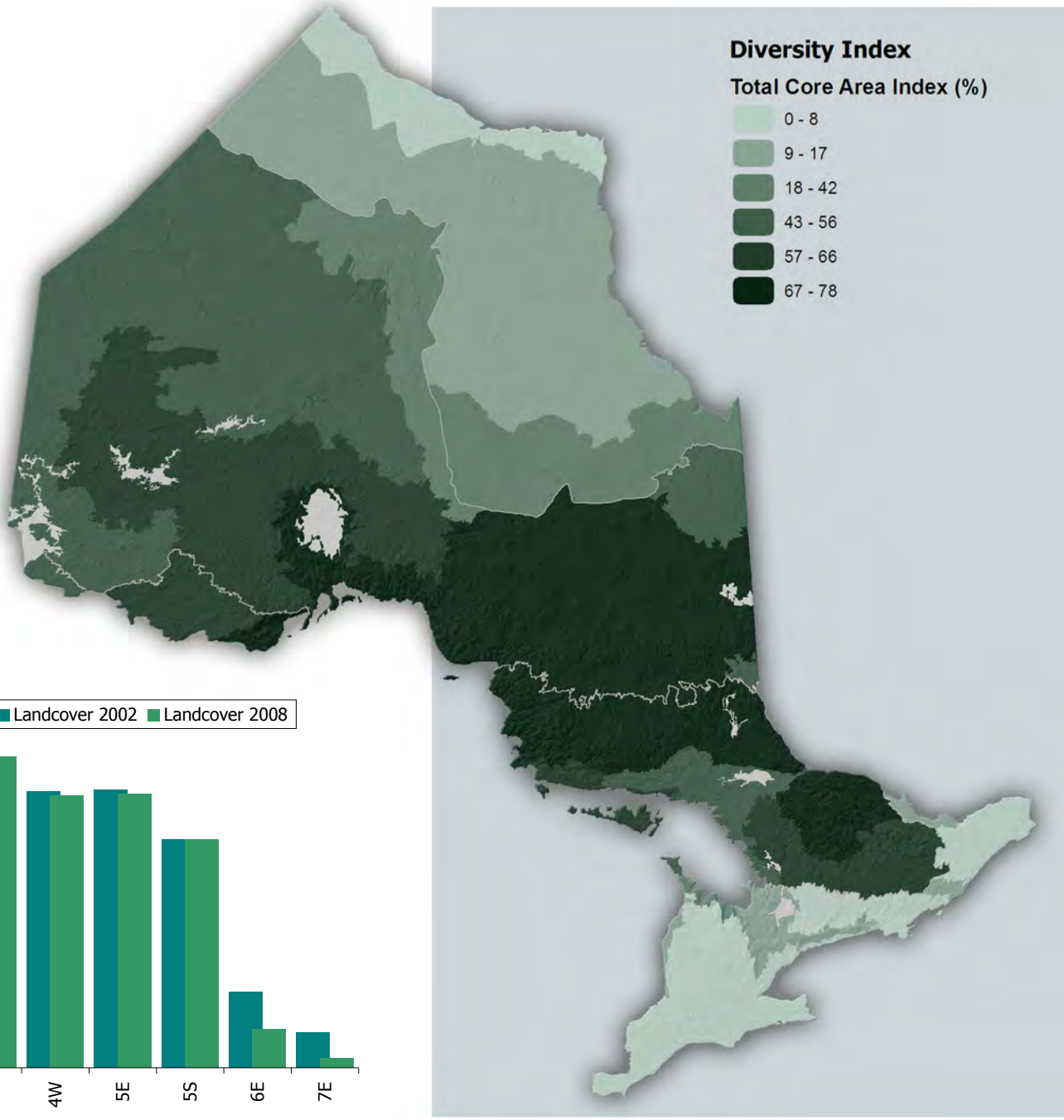
Source: Classified Imagery and Patch Analyst

Landscape Pattern Indices

Total Core Area Index (TCAI) by Ecoregion and Ecozone

Ecoregion	Landcover 2002	Landcover 2008
0E	6.9	6.9
1E	15.8	16.4
2E	26.3	26.4
Hudson Bay Lowlands	20.1	20.3
2W	44.0	46.8
3E	63.4	68.7
3S	53.9	54.5
3W	64.3	65.4
4S	54.2	57.1
Ontario Shield (Boreal)	55.2	58.1
4E	68.6	70.4
4W	62.5	61.5
5E	62.8	61.8
5S	51.7	51.5
Ontario Shield (GLSL)	64.1	63.9
6E	17.0	8.7
7E	7.9	2.3
Mixedwood Plains	14.6	7.0
Provincial Average	44.2	45.1



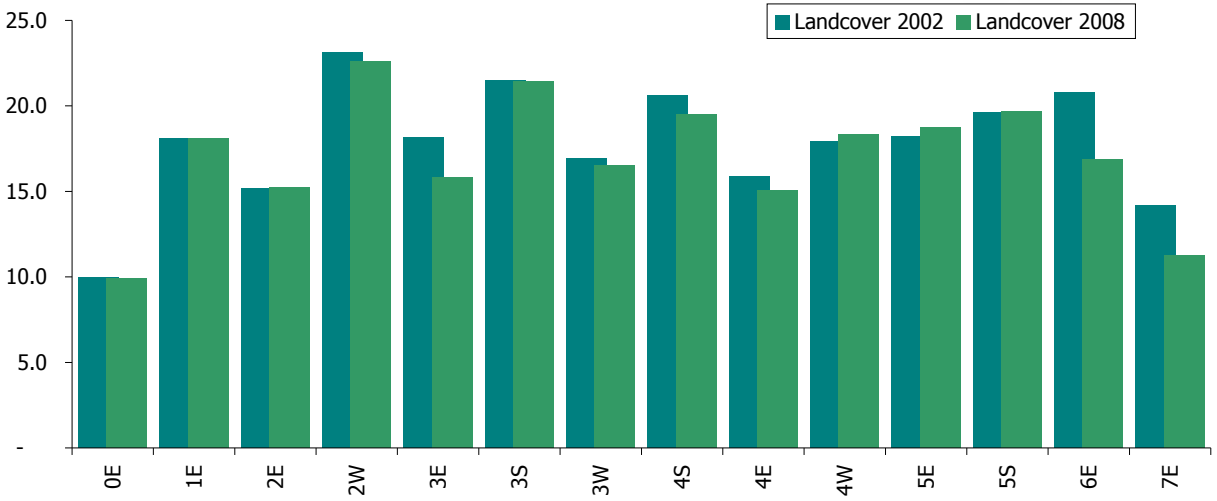


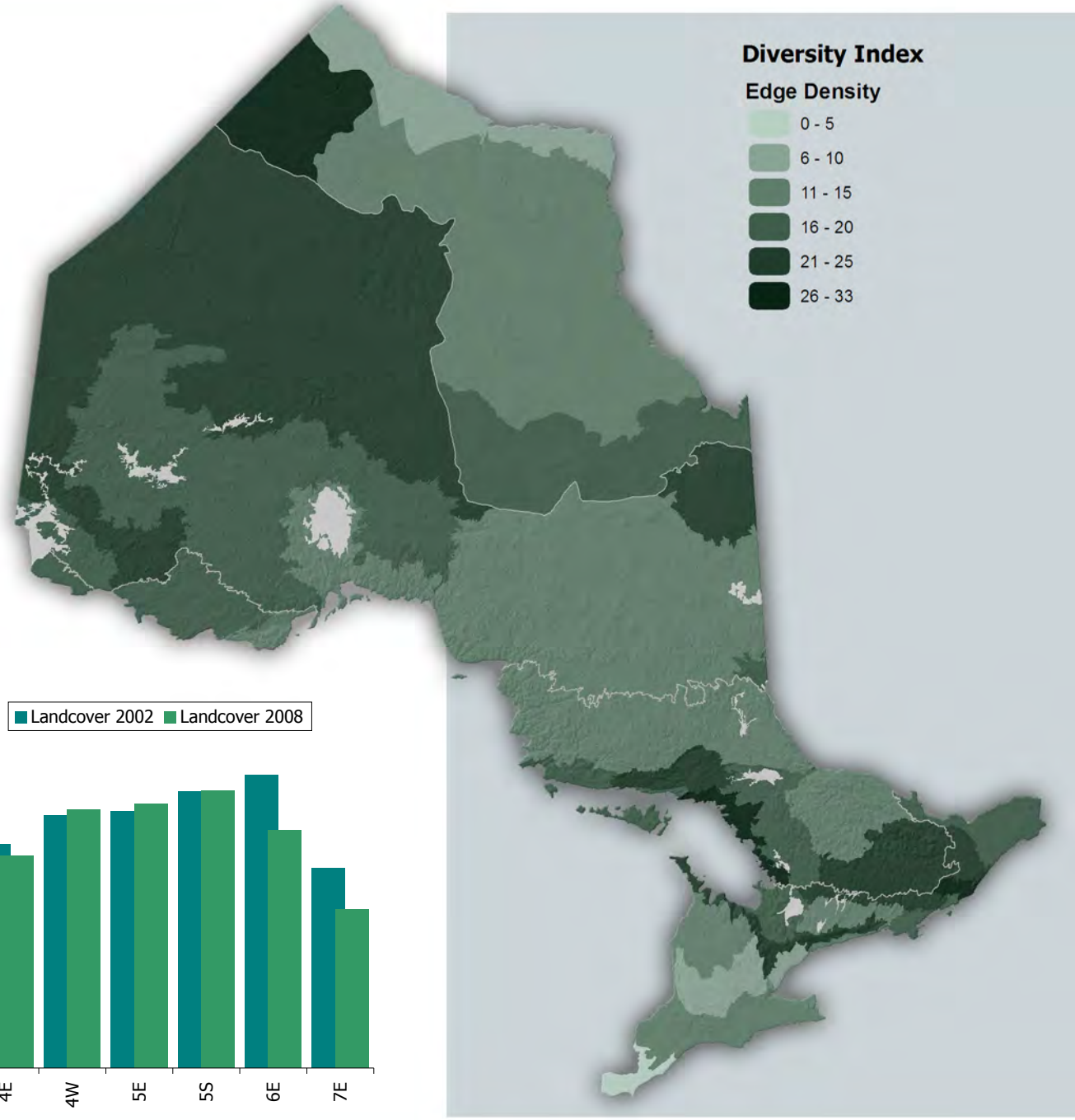
Source: Classified Imagery and Patch Analyst

Landscape Pattern Indices

Edge Density (ED) by Ecoregion and Ecozone

Ecoregion	Landcover 2002	Landcover 2008
0E	10.0	9.9
1E	18.1	18.1
2E	15.2	15.2
Hudson Bay Lowlands	15.7	15.7
2W	23.1	22.6
3E	18.2	15.8
3S	21.5	21.4
3W	16.9	16.5
4S	20.6	19.5
Ontario Shield (Boreal)	20.2	19.2
4E	15.9	15.1
4W	17.9	18.3
5E	18.2	18.7
5S	19.6	19.7
Ontario Shield (GLSL)	17.6	17.7
6E	20.8	16.9
7E	14.2	11.3
Mixedwood Plains	19.0	15.4
Provincial Average	18.6	17.8



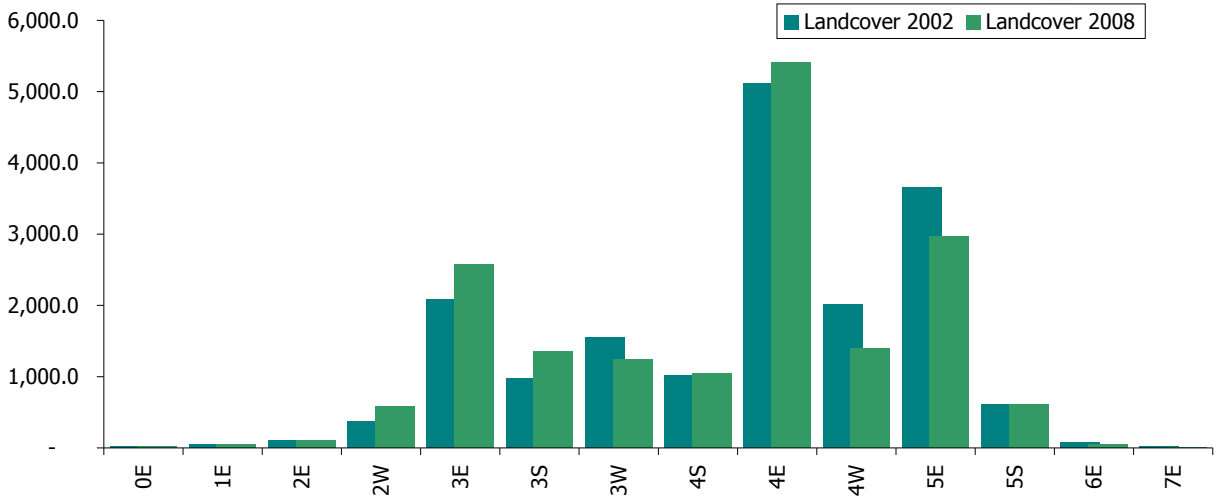


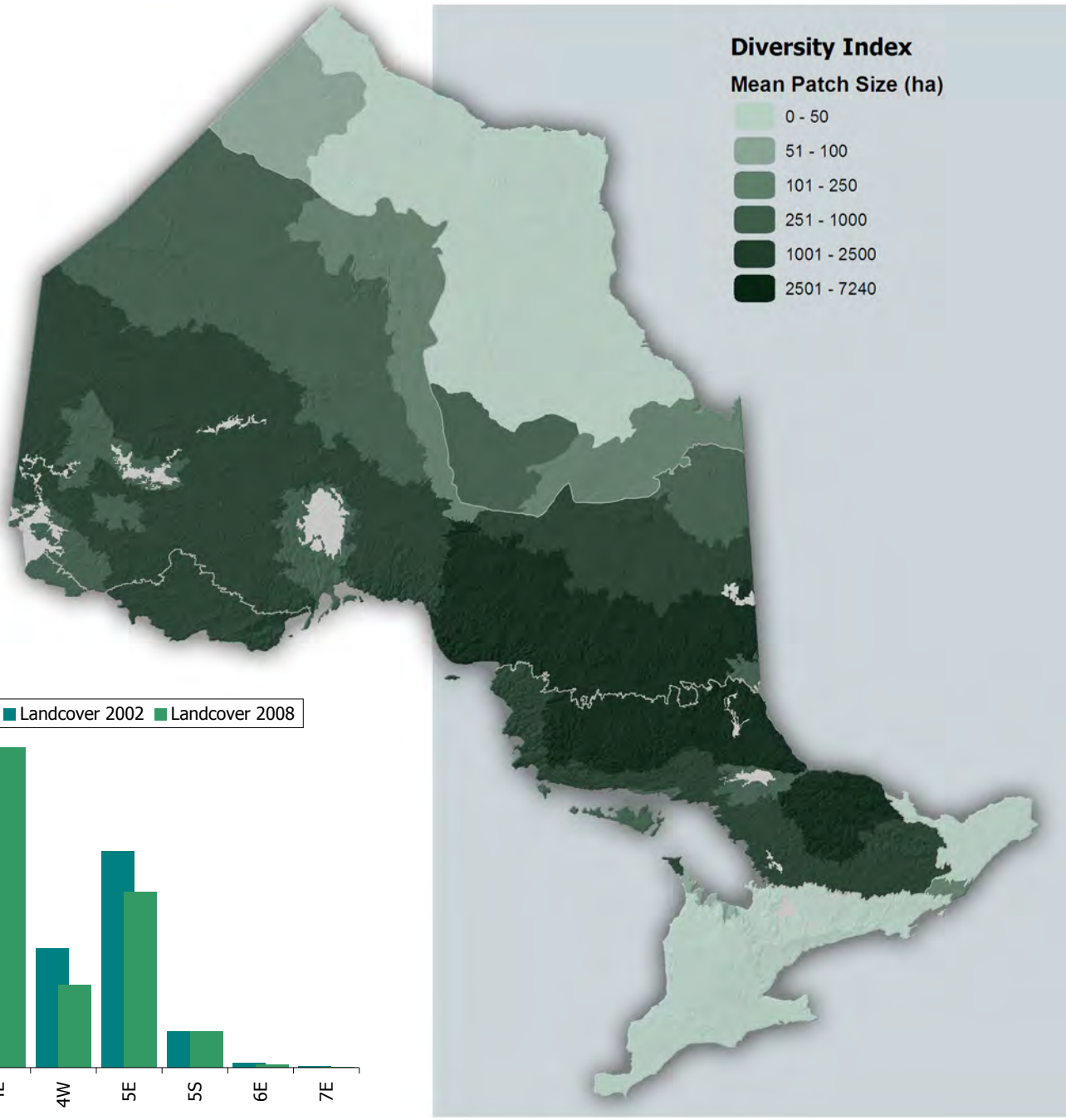
Source: Classified Imagery and Patch Analyst

Landscape Pattern Indices

Mean Patch Size (MPS) by Ecoregion and Ecozone

Ecoregion	Landcover 2002	Landcover 2008
0E	16.7	16.8
1E	43.8	44.2
2E	106.9	107.8
Hudson Bay Lowlands	72.4	73.0
2W	376.2	578.5
3E	2,082.4	2,583.4
3S	974.9	1,349.4
3W	1,555.8	1,244.2
4S	1,023.5	1,040.0
Ontario Shield (Boreal)	1,188.6	1,383.6
4E	5,110.1	5,412.4
4W	2,013.8	1,389.1
5E	3,651.8	2,961.4
5S	605.4	609.1
Ontario Shield (GLSL)	3,747.6	3,358.6
6E	79.5	42.1
7E	23.1	13.8
Mixedwood Plains	64.5	34.6
Provincial Average	1,177.3	1,221.8



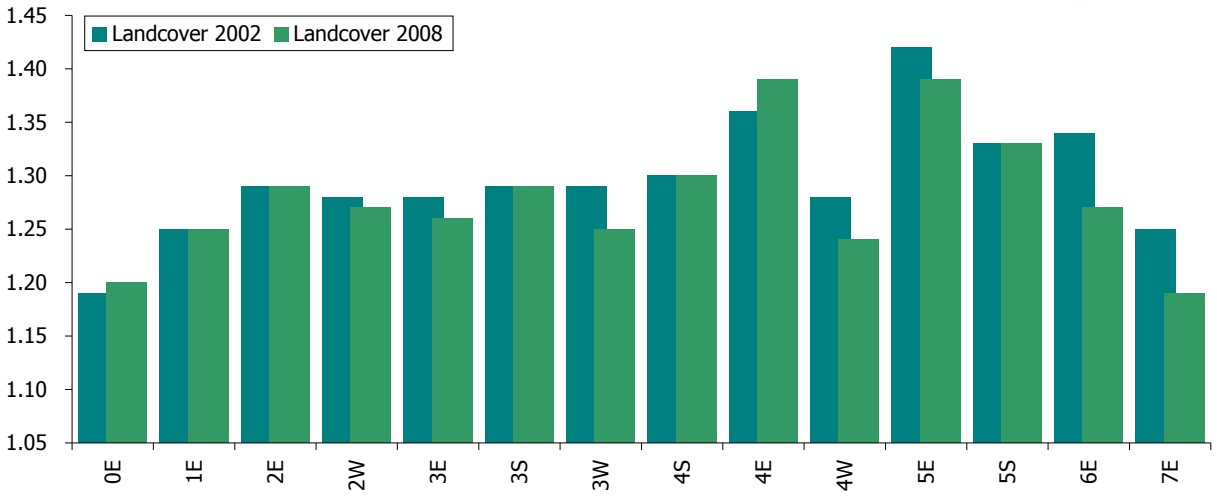


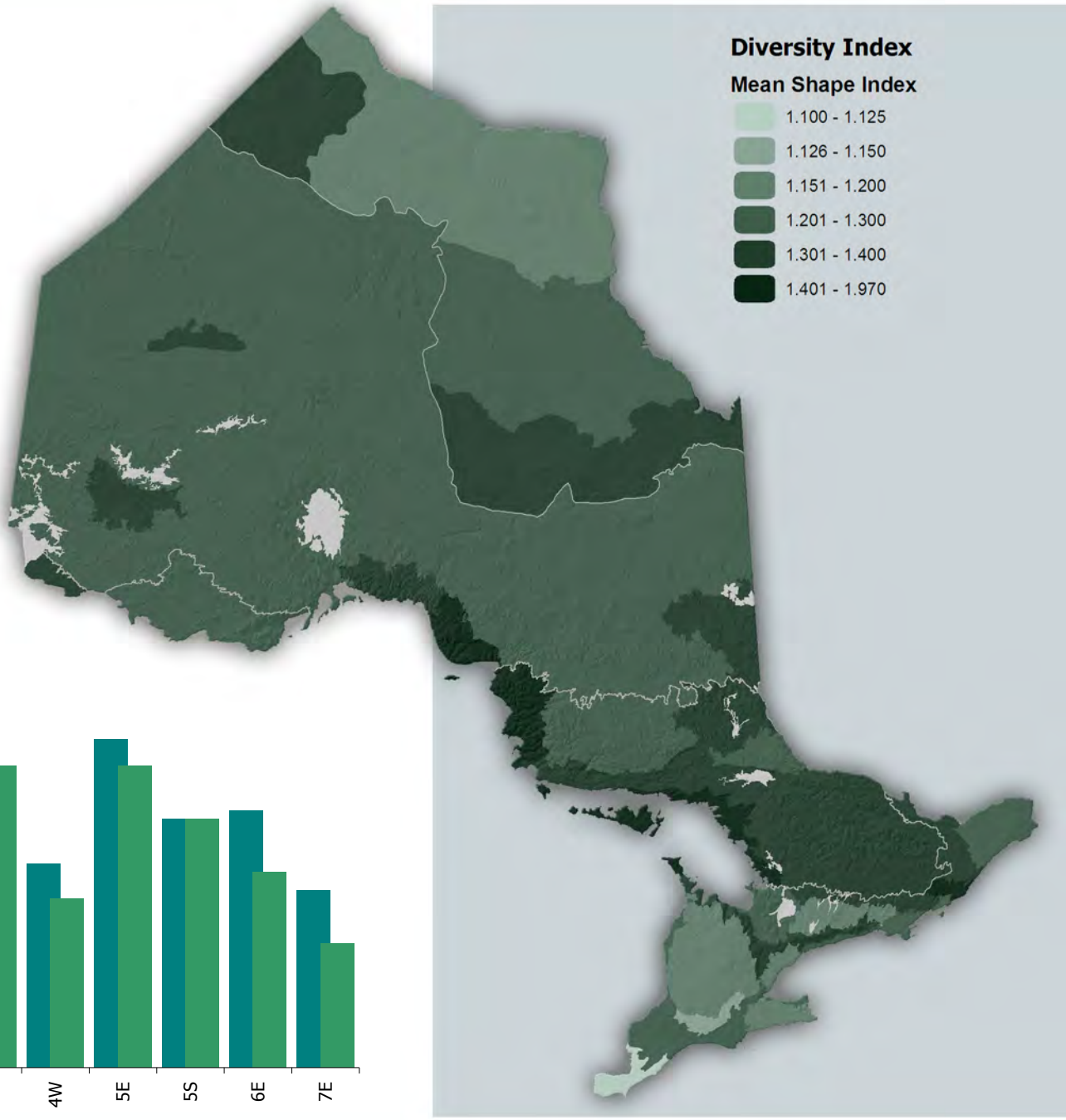
Source: Classified Imagery and Patch Analyst

Landscape Pattern Indices

Mean Shape Index (MSI) by Ecoregion and Ecozone

Ecoregion	Landcover 2002	Landcover 2008
0E	1.19	1.20
1E	1.25	1.25
2E	1.29	1.29
Hudson Bay Lowlands	1.26	1.26
2W	1.28	1.27
3E	1.28	1.26
3S	1.29	1.29
3W	1.29	1.25
4S	1.30	1.30
Ontario Shield (Boreal)	1.29	1.27
4E	1.36	1.39
4W	1.28	1.24
5E	1.42	1.39
5S	1.33	1.33
Ontario Shield (GLSL)	1.38	1.36
6E	1.34	1.27
7E	1.25	1.19
Mixedwood Plains	1.32	1.25
Provincial Average	1.30	1.28





Source: Classified Imagery and Patch Analyst

Forest Examples

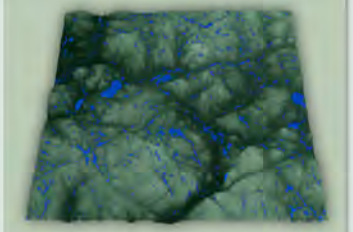
Index

Interactive Chapter Index

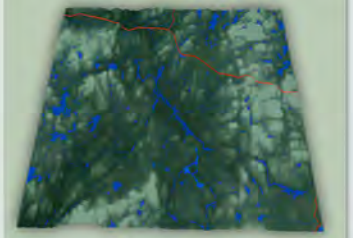
This section of the report shows two examples of Ontario's firests, Garden Lake near Sault Ste. Marie and Jack Pine River near Chapleau. It complares a remote sensing views (with photo images of the same forest).

select a topic

1 - Garden Lake



2 - Jack Pine River



Forest Examples - Garden Lake

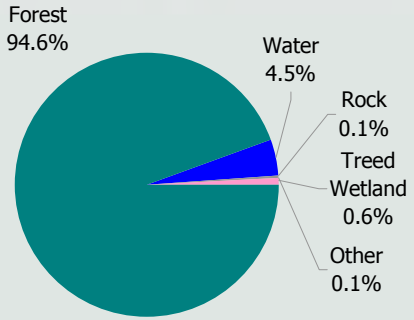
Example 1

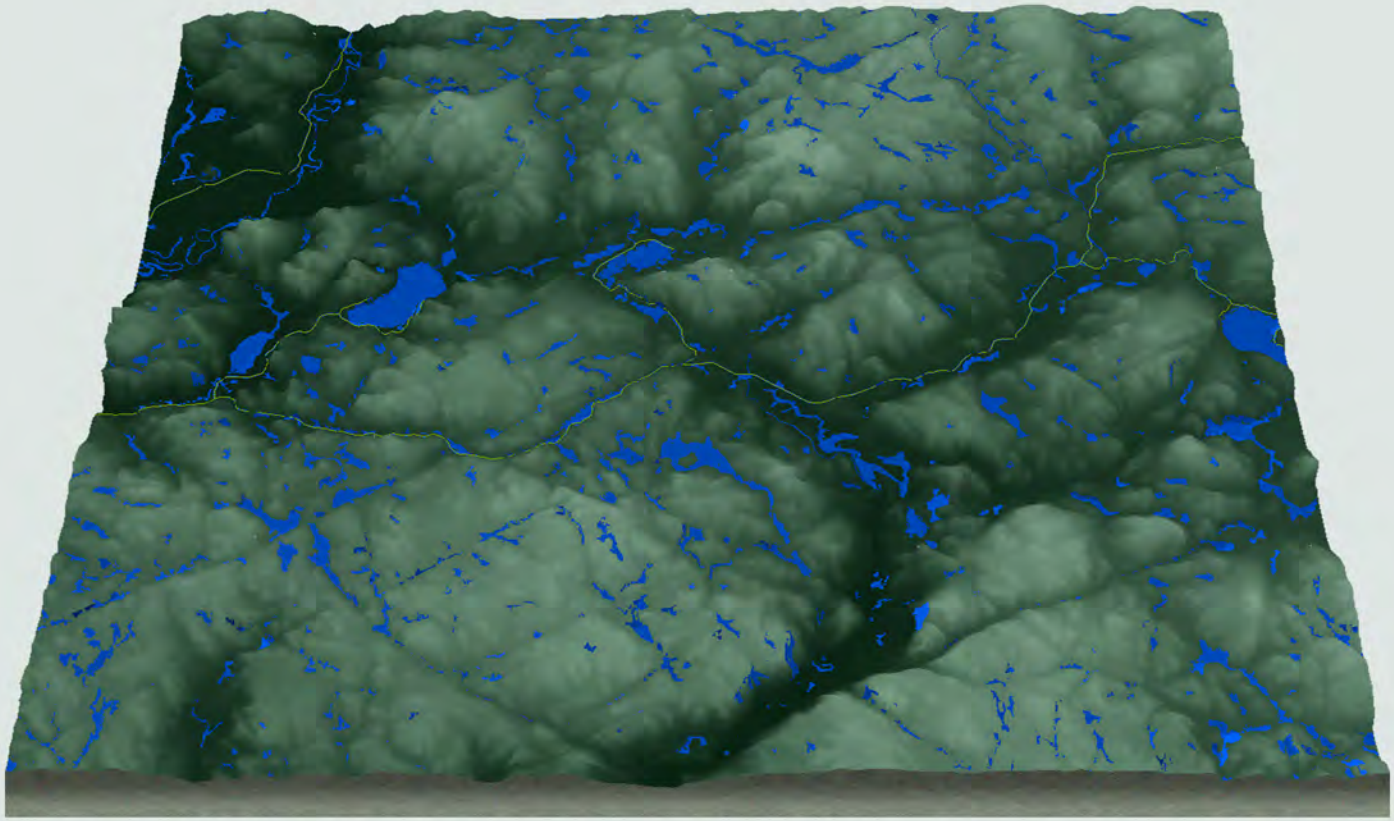
This forest example is located 45 minutes northeast of Sault Ste. Marie on Highway 556. The area is approximately 50,000 hectares or 21 by 24 kilometres in size.

Primarily deciduous forest, this area is representative of the Great Lakes transitional zone that occurs from Sudbury to Wawa. Maple, white and yellow birch make up over 60% of the species composition of this forest area.

Area in hectares

Area by Land Class	Landcover 2008	Forest Inventory
Water	2,273	1,972
Wetland	13	1,088
Rock	50	132
Other	67	337
Treed Wetland	313	708
Forest	47,284	45,763
Total	50,000	50,000





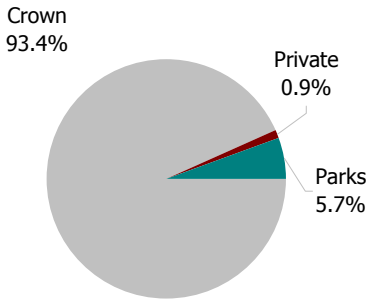
Forest Examples - Garden Lake

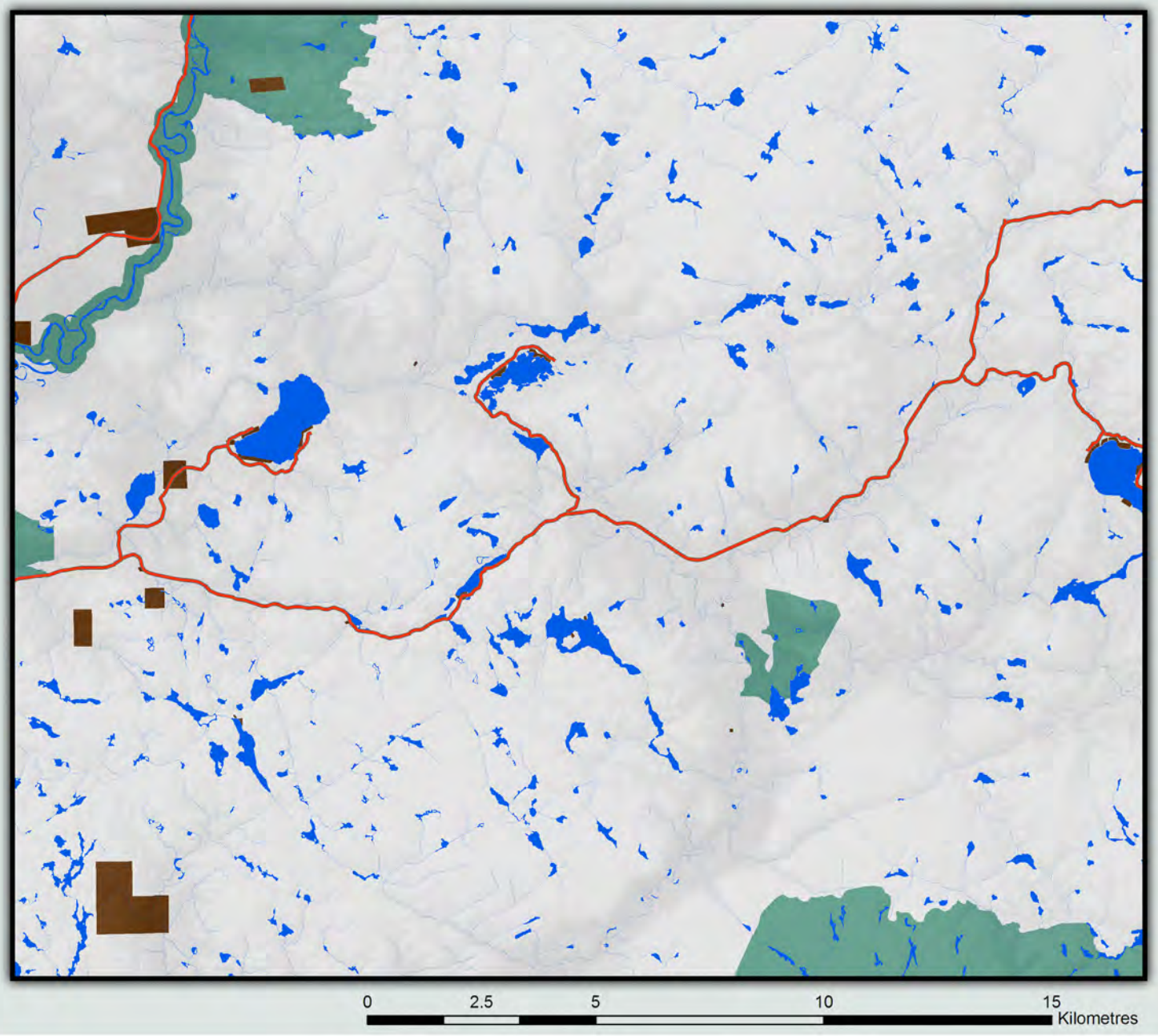
Overview

The bulk of the ownership in this example is crown, with a small amount of area in parks and conservation reserves and a lesser amount in private land.

Area by Ownership

Ownership	Hectares
Crown	46,721
Private	437
Parks	2,841
	50,000





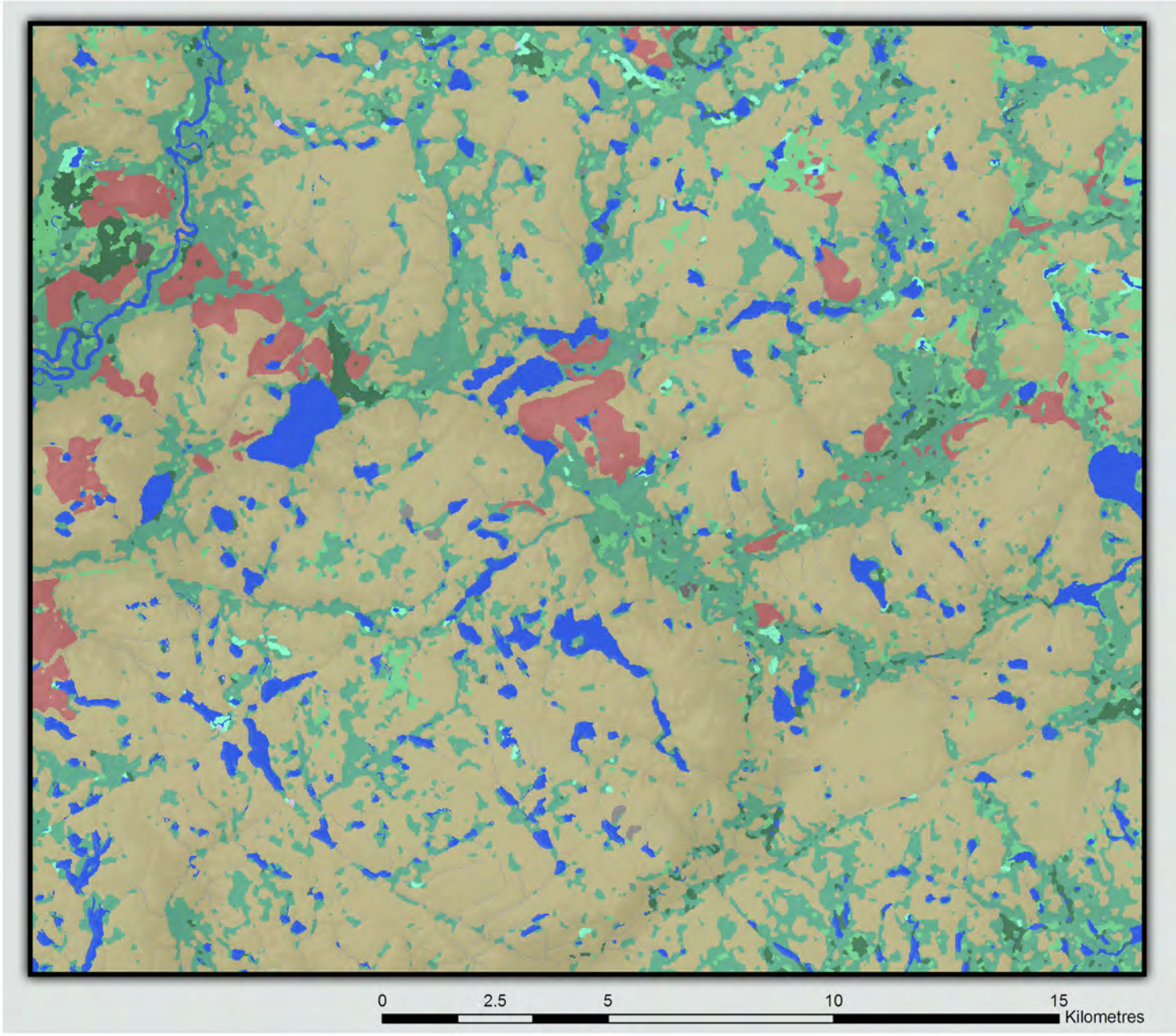
Forest Examples - Garden Lake

Landcover

The Landcover 2008 shows that 95% of this example area is forest. The disturbed class of forest refers to several shelterwood cuts in tolerant hardwoods which are highlighted in the images section of this example.

Area by Landcover Class

Land Class	Hectares
Water	2,273
Wetland	13
Rock	50
Other	67
Treed Wetland	313
Forest - Deciduous	31,040
Forest - Coniferous	1,061
Forest - Mixedwood	11,429
Forest - Sparse	2,002
Forest - Regenerating	390
Forest - Disturbed	1,362
	50,000



Forest Examples - Garden Lake

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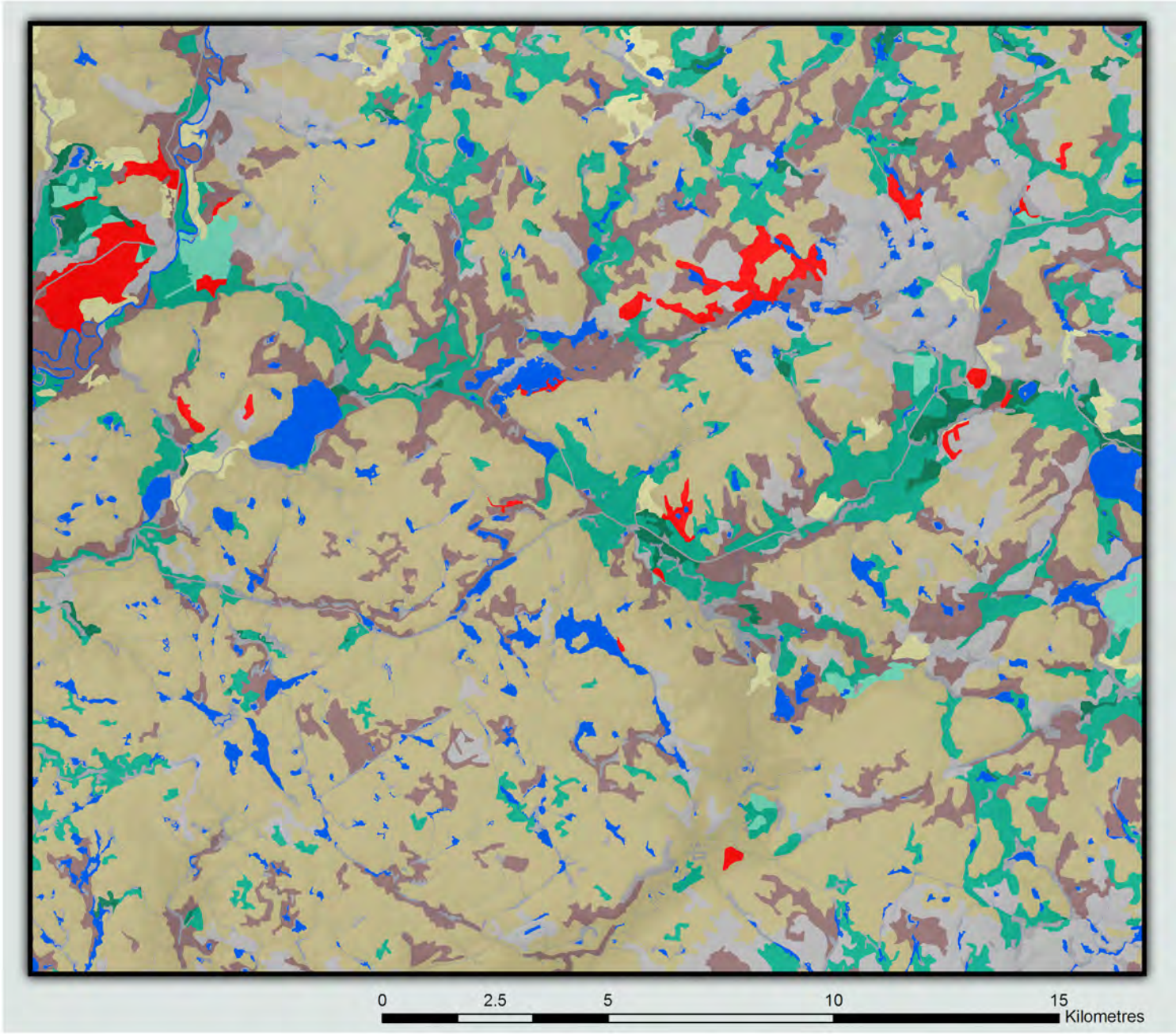


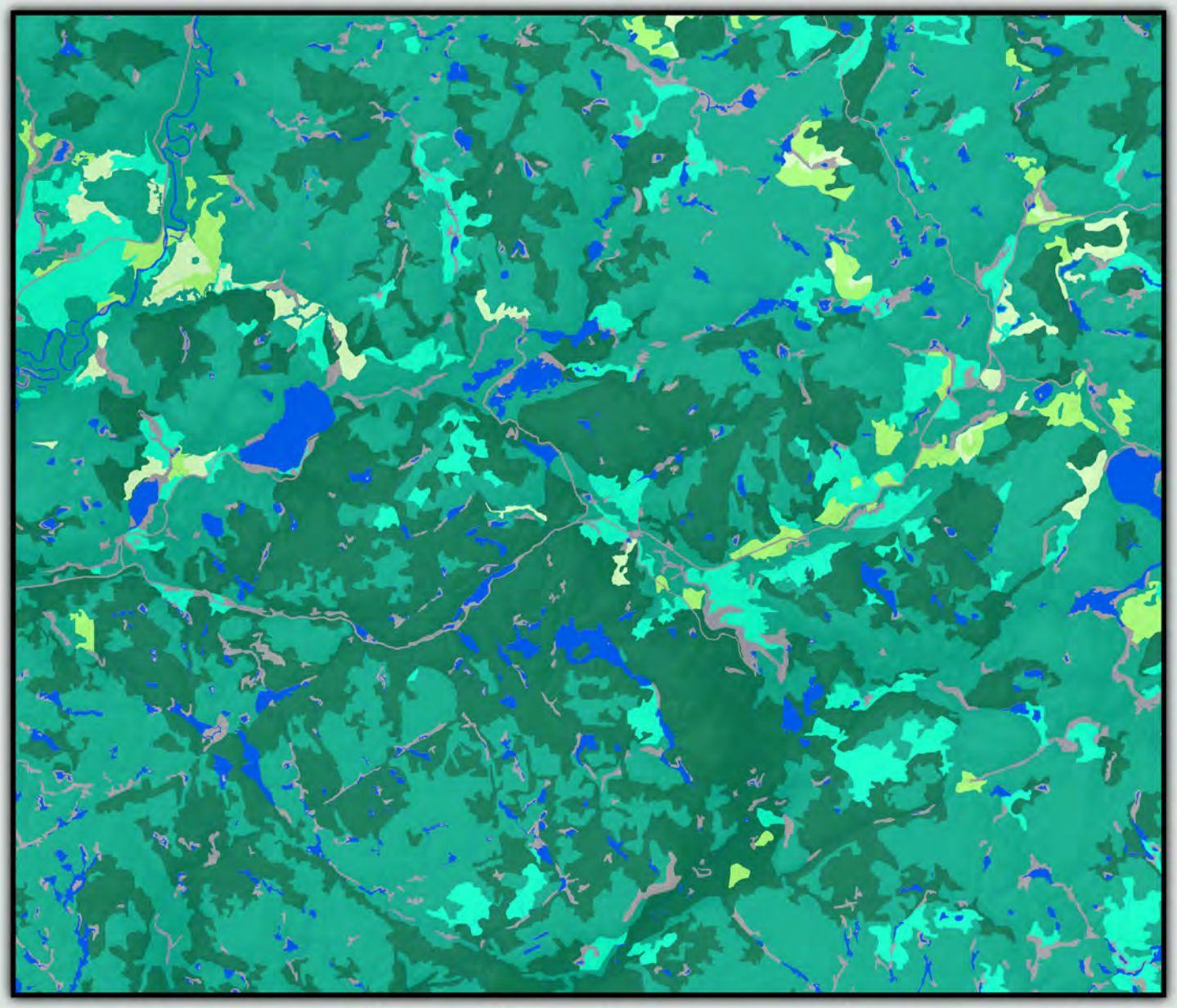
Forest Examples - Garden Lake

Seral Stages (Age Groups)

The example area has nearly 12,000 hectares of uneven-aged tolerant hardwoods (25% of all forest) but the bulk of the area is within the mature seral stage.

Area by Seral Stage

Seral Stage	Hectares
Pre-Sapling	650
Sapling	892
Immature	3,193
Mature	25,405
Late Successional	15,624
	45,763



Forest Examples - Garden Lake

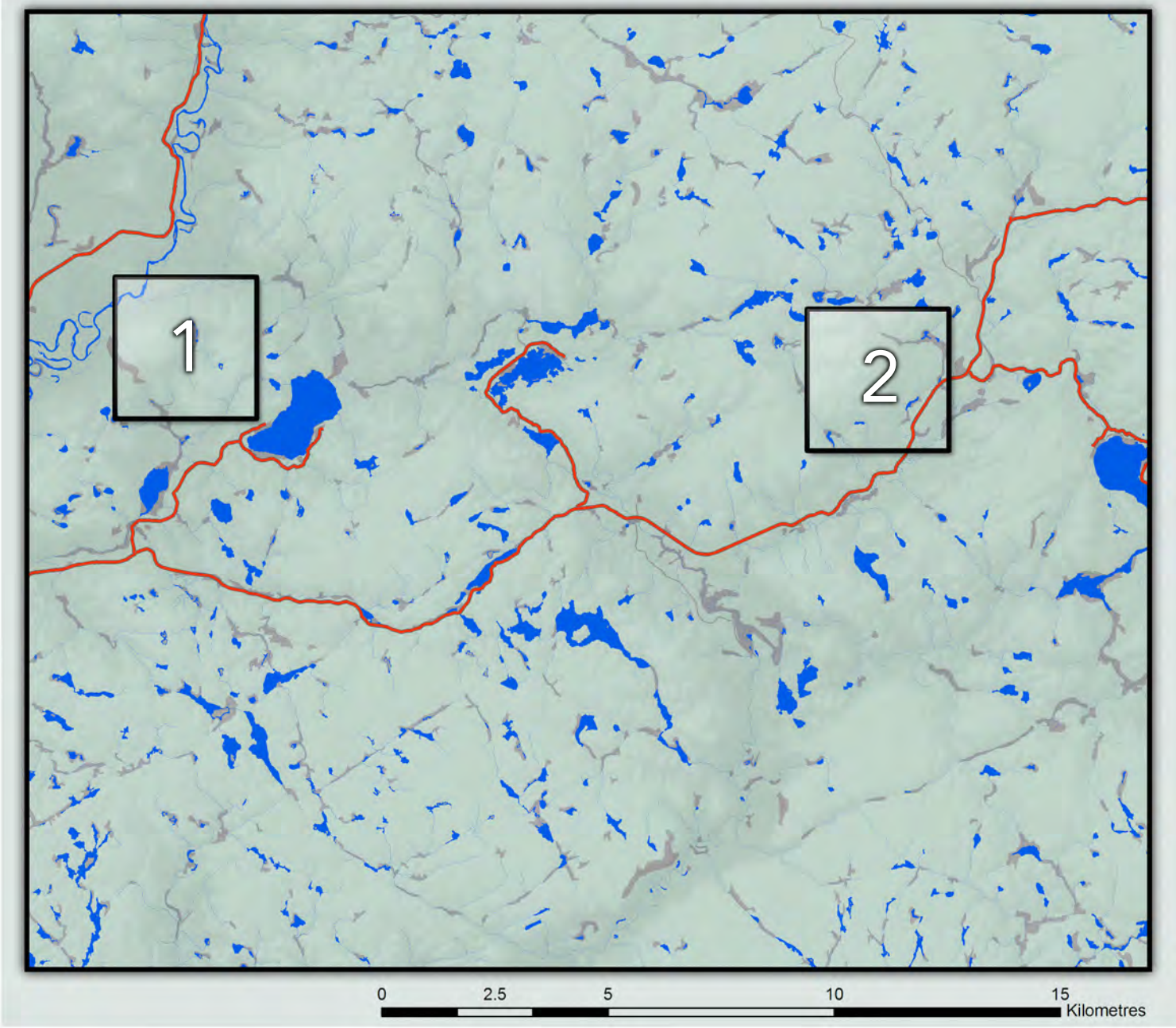
Aerial Photos

As part of the new enhanced FRI, high resolution photos of specific sites have been utilized as part of the forest examples. Each photo example is approximately 500 hectares in area.

Photo 1 is a tolerant hardwood area with selection and shelterwood harvest examples.

Photo 2 is a mixedwood and conifer area with less harvest and a greater variety of forest types.

Click on the photo on the map or use the tab index to navigate to those examples.



Forest Examples - Garden Lake

Aerial Photo 1

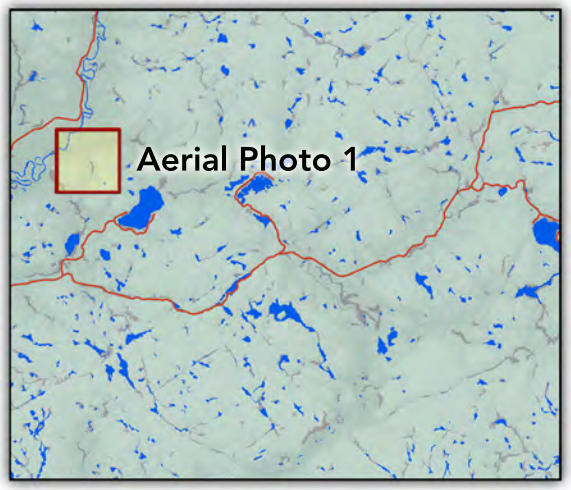
Photo 1 is a tolerant hardwood area with selection and shelterwood harvest examples. This image was captured in 2008.

Click the squares on the aerial photo to see the actual ground level stand information.

Site Photo 1: 30 metre riparian (watercourse) buffer around Whitman Creek.

Site Photo 2: 2006 selection harvest in maple and yellow birch.

Site Photo 3: looking down the forest access road through a yellow birch shelterwood, harvested in 2006.



Forest Examples - Garden Lake

Site Photo 1

This photo was taken in November 2009 at the edge of the 30 metre riparian buffer around Whitman Creek.

FRI Description

Forest Type:	mixedwood
Year of Origin:	1925
Stand Age:	86
Ecosite:	ES 18
Seral Stage:	mature
Species:	white birch 50% white spruce 20% poplar 20% white cedar 10%
Area:	64 Hectares

Satellite Description

Forest Class:	dense mixedwood

Forest Examples - Garden Lake

Site Photo 2

This photo was taken in September 2010, at the road edge of the selection harvest. This stand was treated successfully to increase the yellow birch component.

FRI Description

Forest Type:	tolerant hardwoods
Year of Origin:	1885
Stand Age:	126
Ecosite:	ES 29
Seral Stage:	late successional
Species:	hard maple 90%
	yellow birch 10%
Area:	84 Hectares

Satellite Description

Forest Class:	dense deciduous

Forest Examples - Garden Lake

Site Photo 3

This photo was taken in September 2010 looking down the road with the 2006 seed cut shelterwood harvest on either side.

FRI Description

Forest Type:	tolerant hardwoods
Year of Origin:	1865
Stand Age:	146
Ecosite:	ES 29
Seral Stage:	late successional
Species:	yellow birch 50% hard maple 30% white spruce 10% white cedar 10%
Area:	22 Hectares

Satellite Description

Forest Class:	dense deciduous

Forest Examples - Garden Lake

Aerial Photo 2

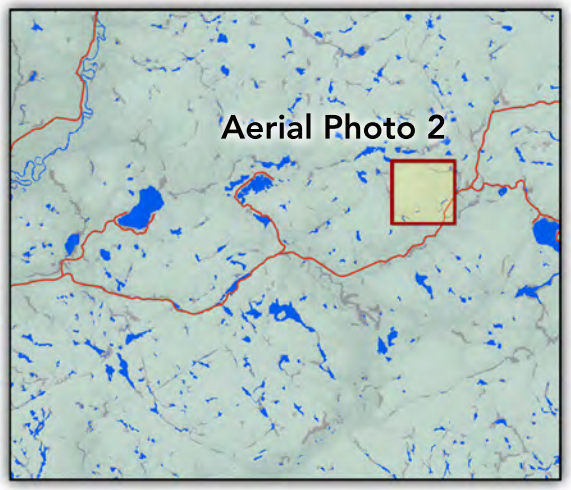
Photo 2 is a typical boreal area with older softwood and mixedwood examples. This image was captured in 2008.

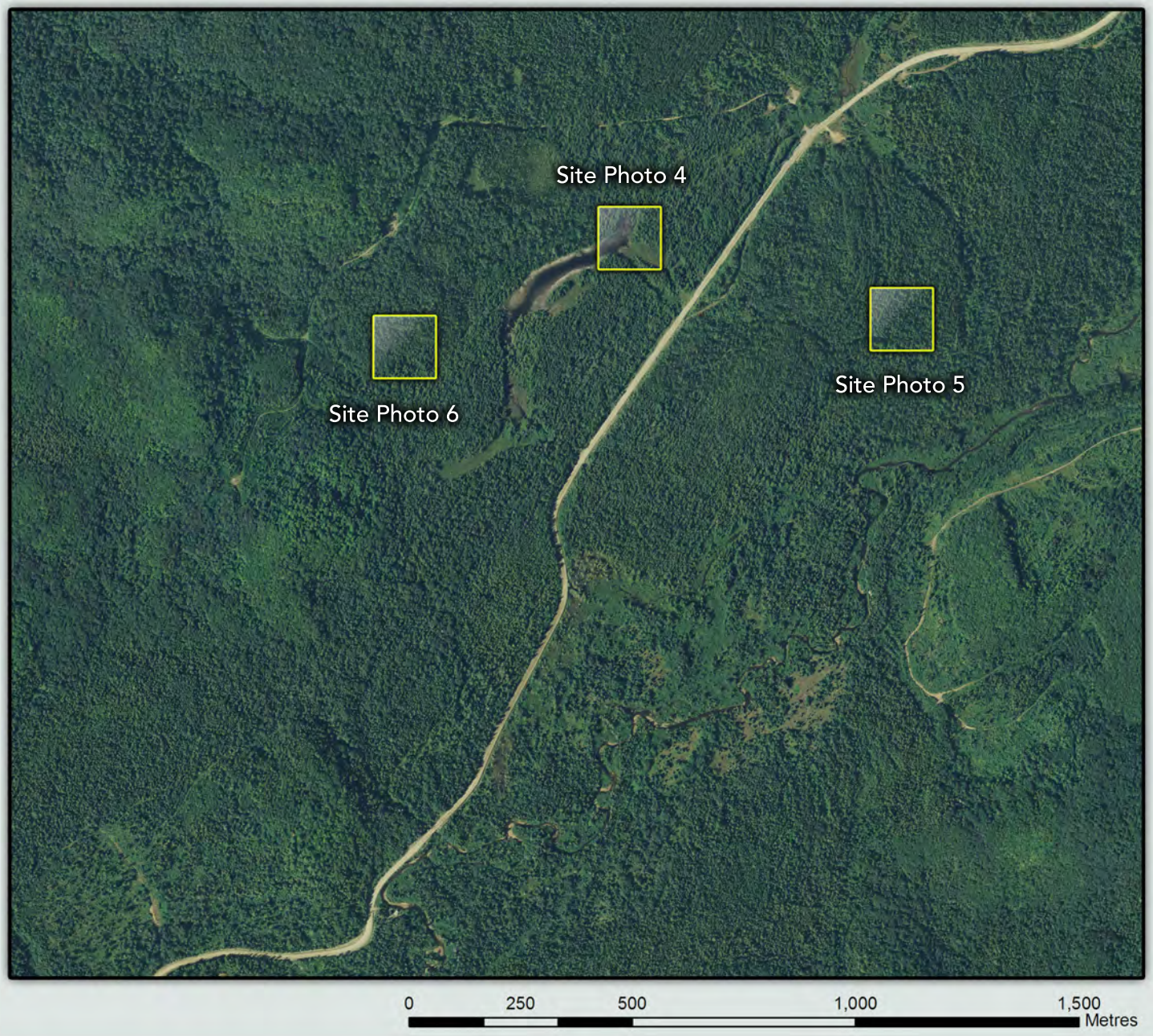
Click the squares on the aerial photo to see the actual ground level stand information.

Site Photo 4: small bog at the edge of a black spruce lowland forest.

Site Photo 5: black spruce lowland forest with sphagum moss and bunchberry ground cover.

Site Photo 6: 2010 harvest area of mixedwood white birch, balsam fir, jack pine forest.





Forest Examples - Garden Lake

Site Photo 4

This photo was taken in July 2010 at a small bog at the edge of a black spruce lowland forest.

FRI Description

Forest Type: open muskeg and water
Area: 4.2 hectares

Satellite Description

Class: water / treed muskeg

Forest Examples - Garden Lake

Site Photo 5

This photo was taken in July 2010 within a black spruce lowland forest with sphagum moss and bunchberry ground cover.

FRI Description

Forest Type:	conifer lowland
Year of Origin:	1920
Stand Age:	91
Ecosite:	ES 31
Seral Stage:	mature
Species:	black spruce 90% larch 10%
Area:	34 hectares

Satellite Description

Forest Class:	dense coniferous

Forest Examples - Garden Lake

Site Photo 6

This photo was taken in July 2010, at a harvested area of mixedwood white birch, balsam fir, jack pine forest.

FRI Description

Forest Type:	mixedwood
Year of Origin:	1939
Stand Age:	72
Ecosite:	ES 32
Seral Stage:	mature
Species:	white birch 30% balsam fir 30% poplar 20% black spruce 20%
Area:	28 hectares

Satellite Description

Forest Class:	dense mixedwood

Forest Examples - Jack Pine River

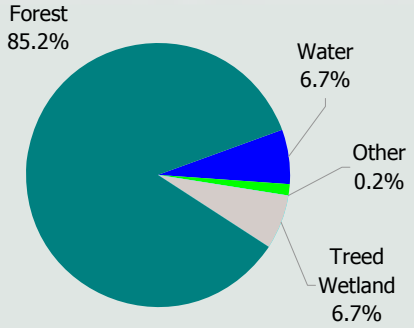
Example 2

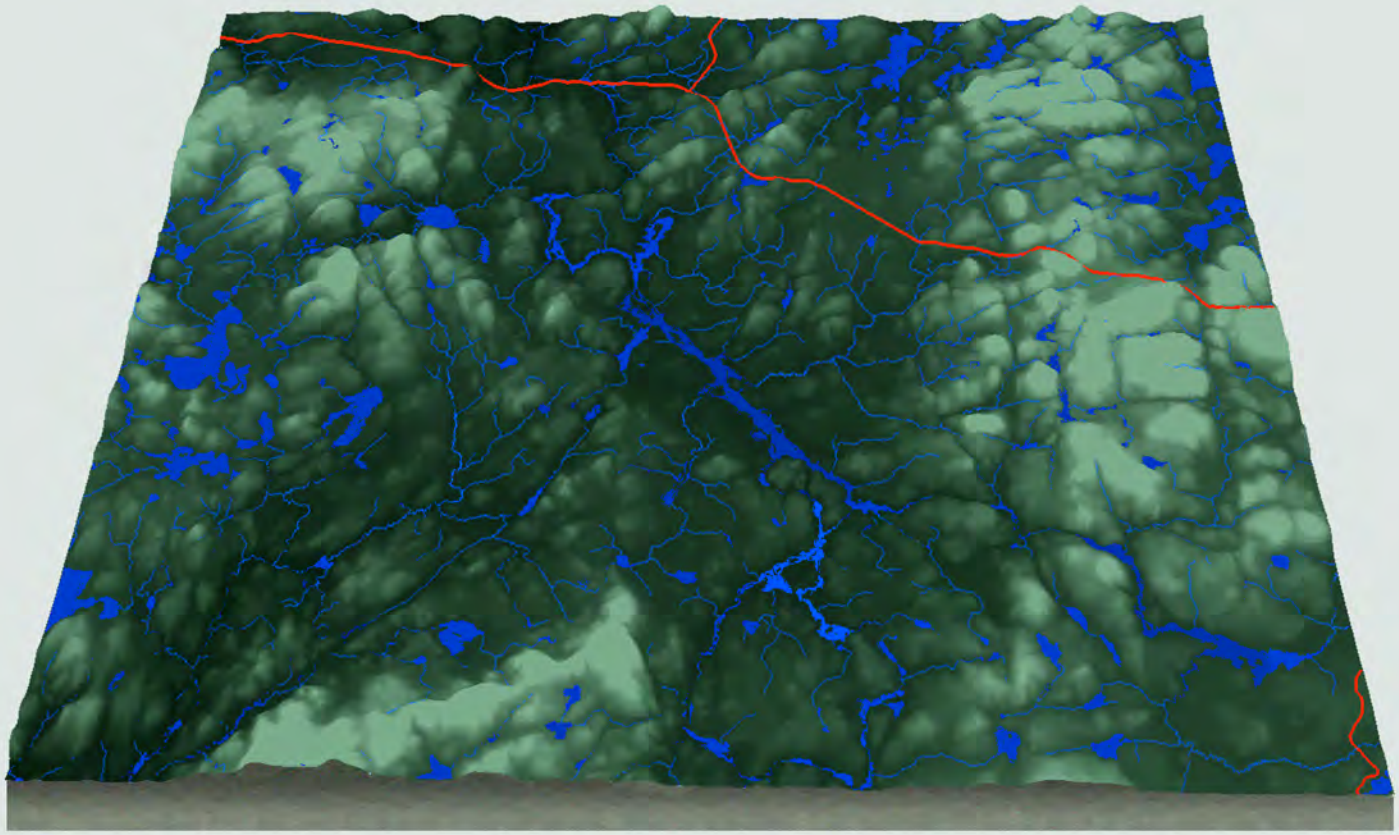
This forest example is located 45 minutes west of Chapleau on Highway 101. The area is approximately 50,000 hectares or 21 by 24 kilometres in size.

This area is representative of the northest Boreal forest that occurs between the Great Lakes transitional forest to the south, and the clay belt lowland spruce forests to the north. The area is dominated by white birch, jack pine, spruce and poplar.

Area in hectares

Area by Land Class	Landcover 2008	Forest Inventory
Water	3,328	2,875
Wetland	645	1,382
Rock	-	28
Other	82	433
Treed Wetland	3,351	2,036
Forest	42,594	43,246
Total	50,000	50,000





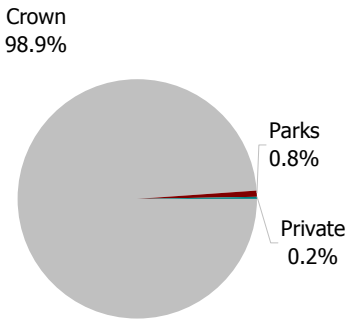
Forest Examples - Jack Pine River

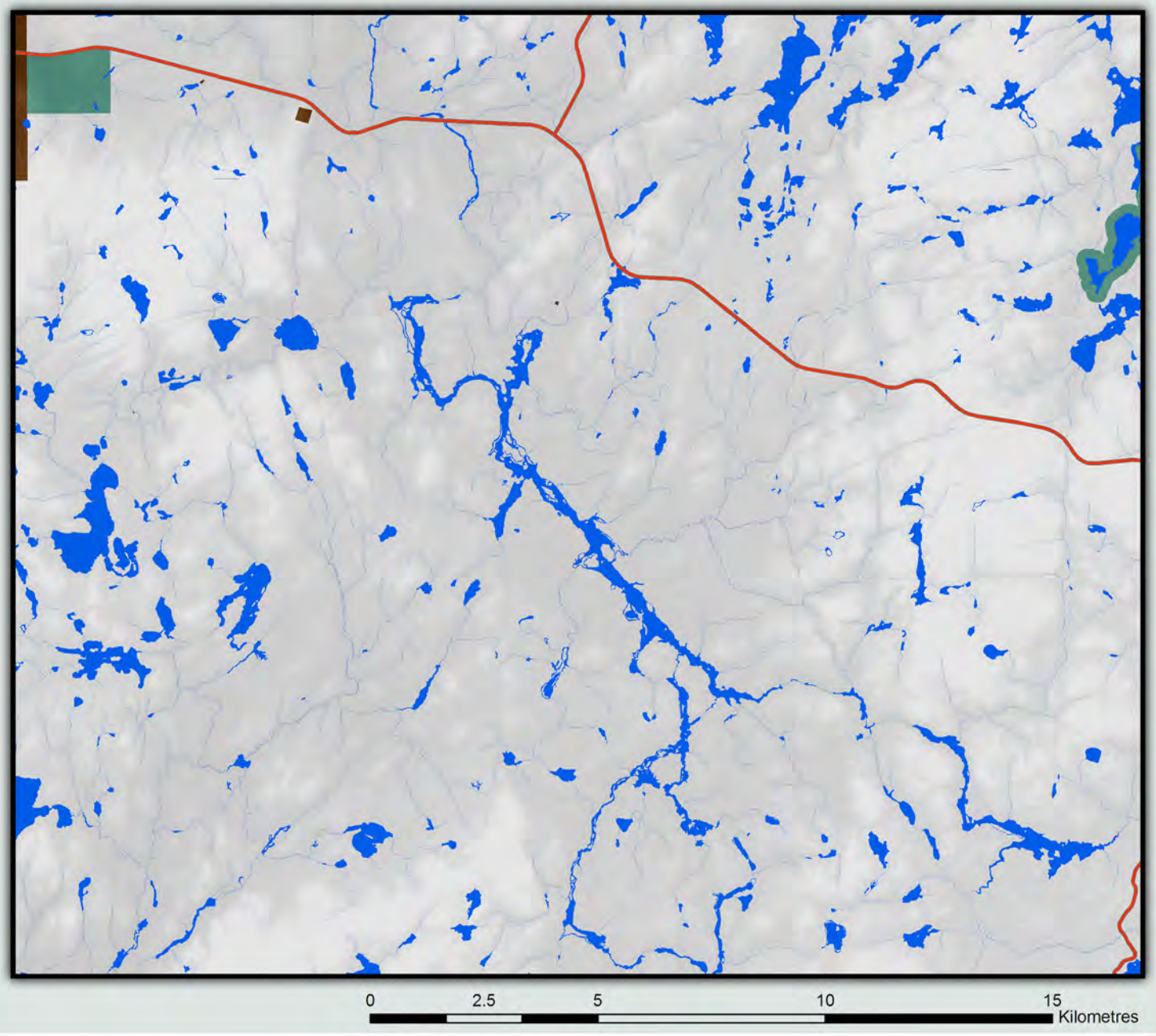
Overview

The bulk of the ownership in this example is crown with a small amount of area in parks and conservation reserves and a very small amount in private land.

Area by Ownership

Ownership	Hectares
Crown	49,467
Parks	416
Private	117
	50,000





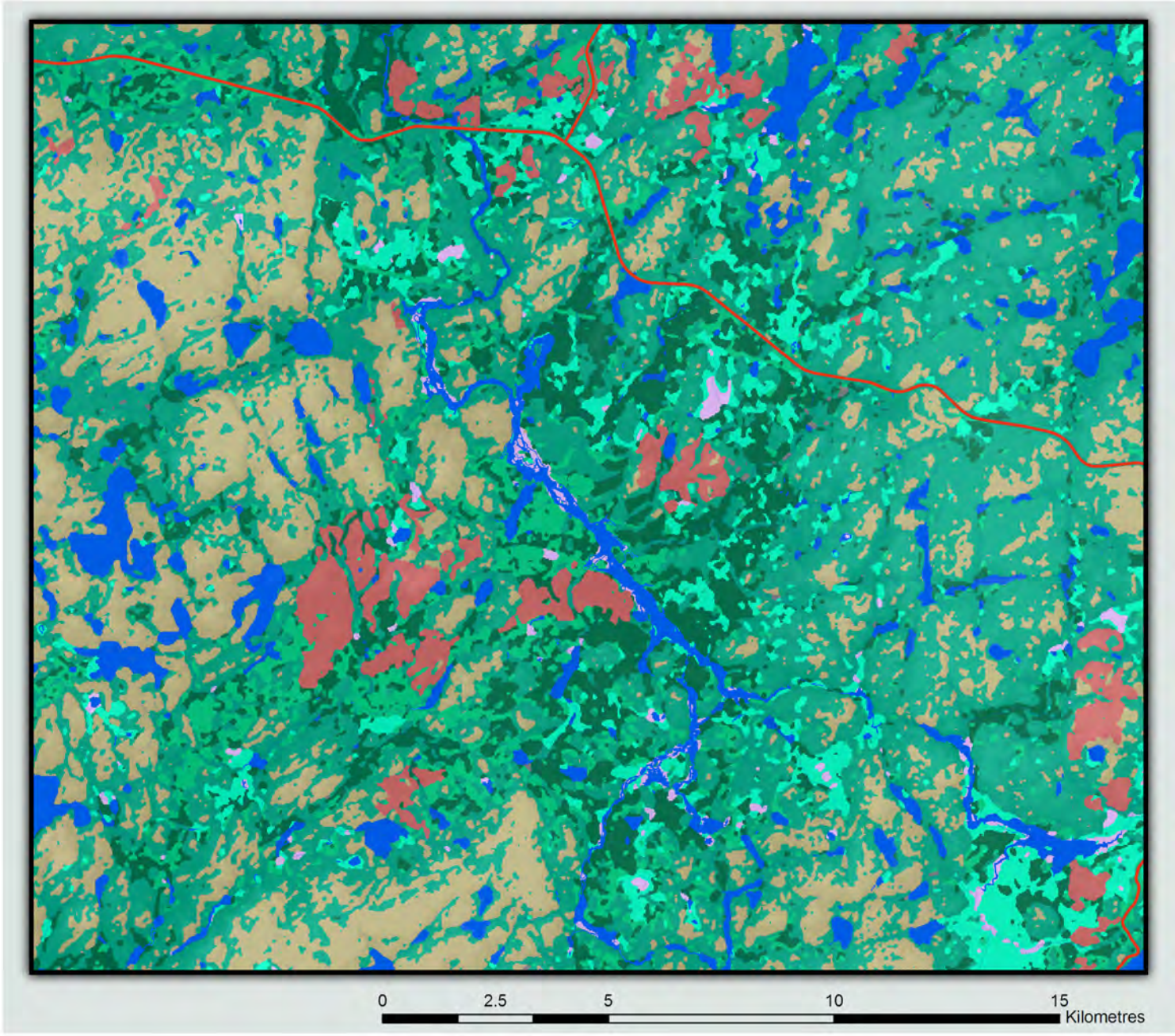
Forest Examples - Jack Pine River

Landcover

The Landcover 2008 shows that 85% of this example area is forest. The disturbed class of forest refers to several clear cut harvest areas in the centre of the example area. A recent burn (May 2010) is not yet in the imagery but is highlighted in this example.

Area by Landcover Class

Land Class	Hectares
Water	3,328
Wetland	645
Rock	-
Other	82
Treed Wetland	3,351
Forest - Deciduous	9,826
Forest - Coniferous	6,016
Forest - Mixedwood	21,512
Forest - Sparse	3,432
Forest - Regenerating	18
Forest - Disturbed	1,790
	50,000



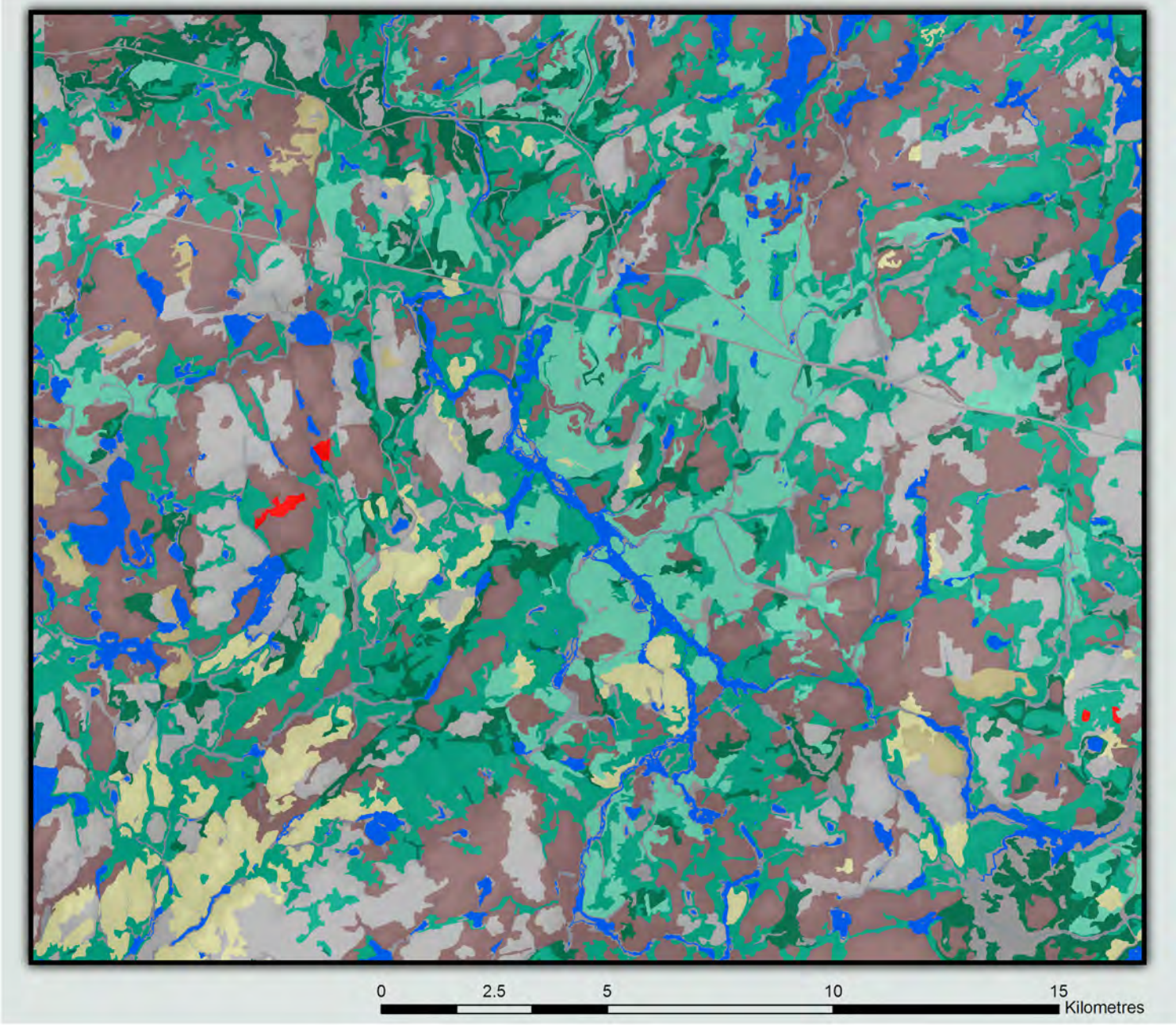
Forest Examples - Jack Pine River

Provincial Forest Types

The FRI for the example area shows a dominance of the conifer upland and mixedwood forest types with poplar and white birch in the southwest corner.

Area by Forest Type

Forest Type	Hectares
Red and White Pine	47
Jack Pine	4,525
Conifer Upland	12,034
Conifer Lowland	3,111
Mixedwood	13,602
Poplar	2,167
White Birch	7,222
Tolerant Hardwoods	539
	43,246



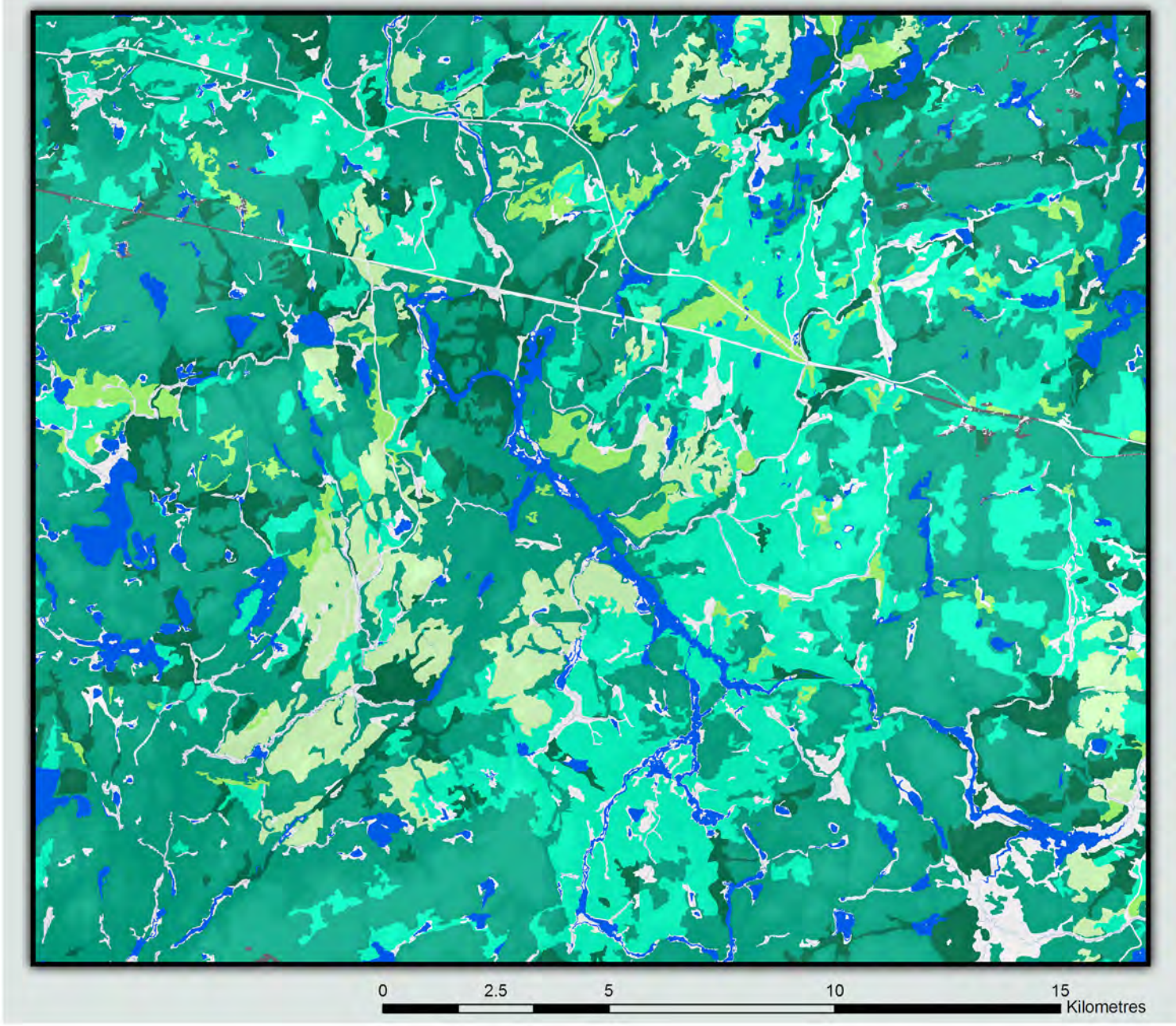
Forest Examples - Jack Pine River

Seral Stages (Age Groups)

The example area is dominated by mature forest. There are visible patterns on the landscape as a result of natural disturbance (fire).

Area by Seral Stage

Seral Stage	Hectares
Pre-Sapling	2,847
Sapling	1,292
Immature	10,334
Mature	24,465
Late Successional	4,307
	43,246



Forest Examples - Jack Pine River

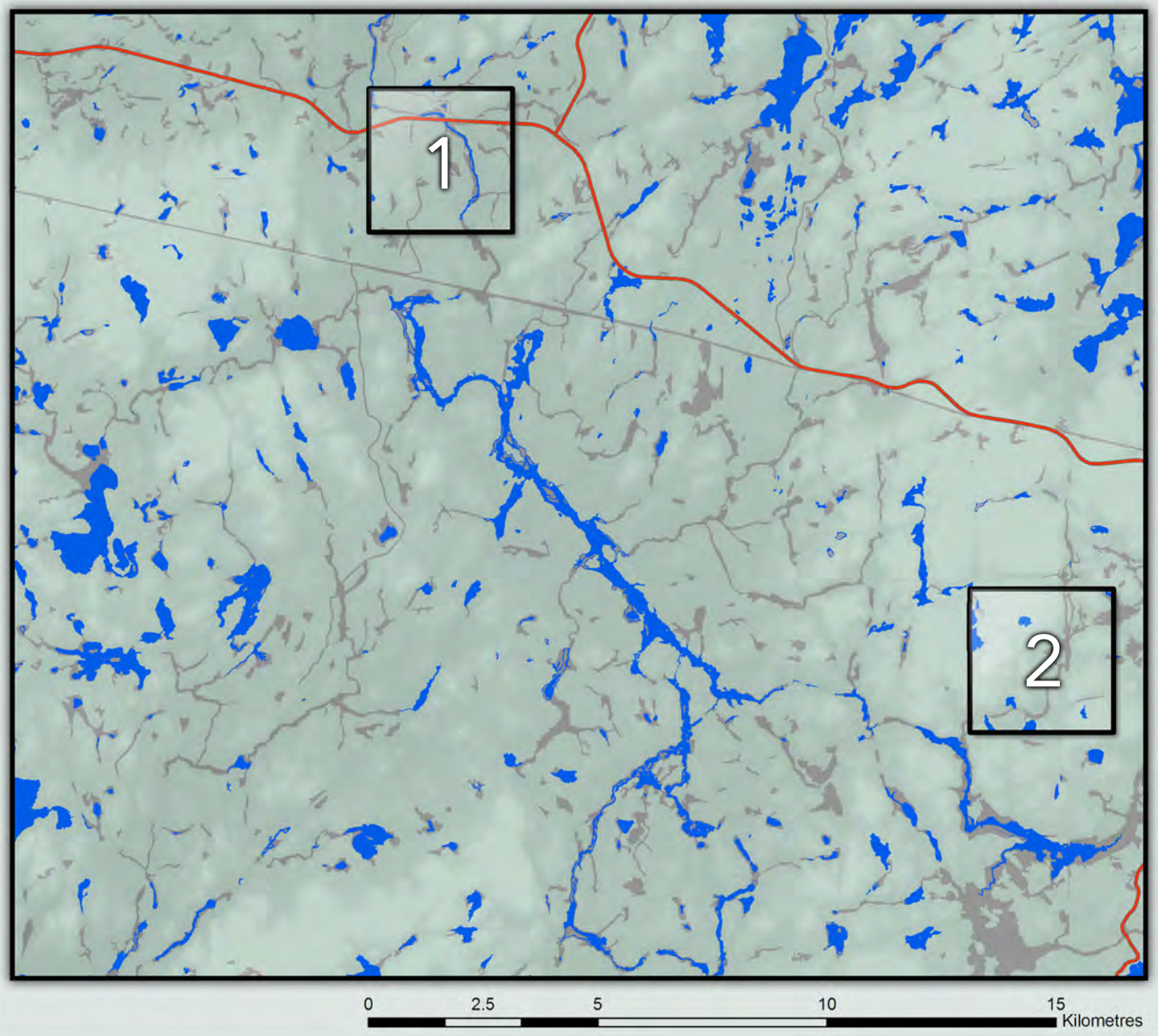
Aerial Photos

A component of the new enhanced FRI, high resolution photos of specific sites have been utilized as part of the forest examples. Each photo example is approximately 500 hectares in area.

Photo 1 is a 2008 image of the Jack Pine River where it crosses highway 101. A large portion of this area was burned in the May 2010 Wawa 18 fire.

Photo 2 is another 2008 image just west of the Shoals Provincial Park in an area of mature mixedwood and jack pine forest.

Click on the photo on the map or use the tab index to navigate to those examples.



Forest Examples - Jack Pine River

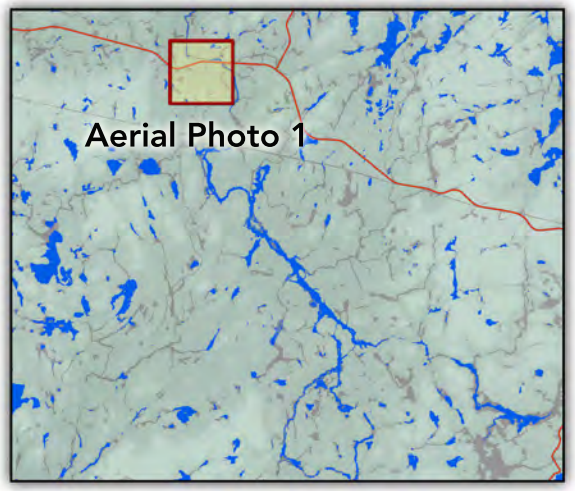
Aerial Photo 1

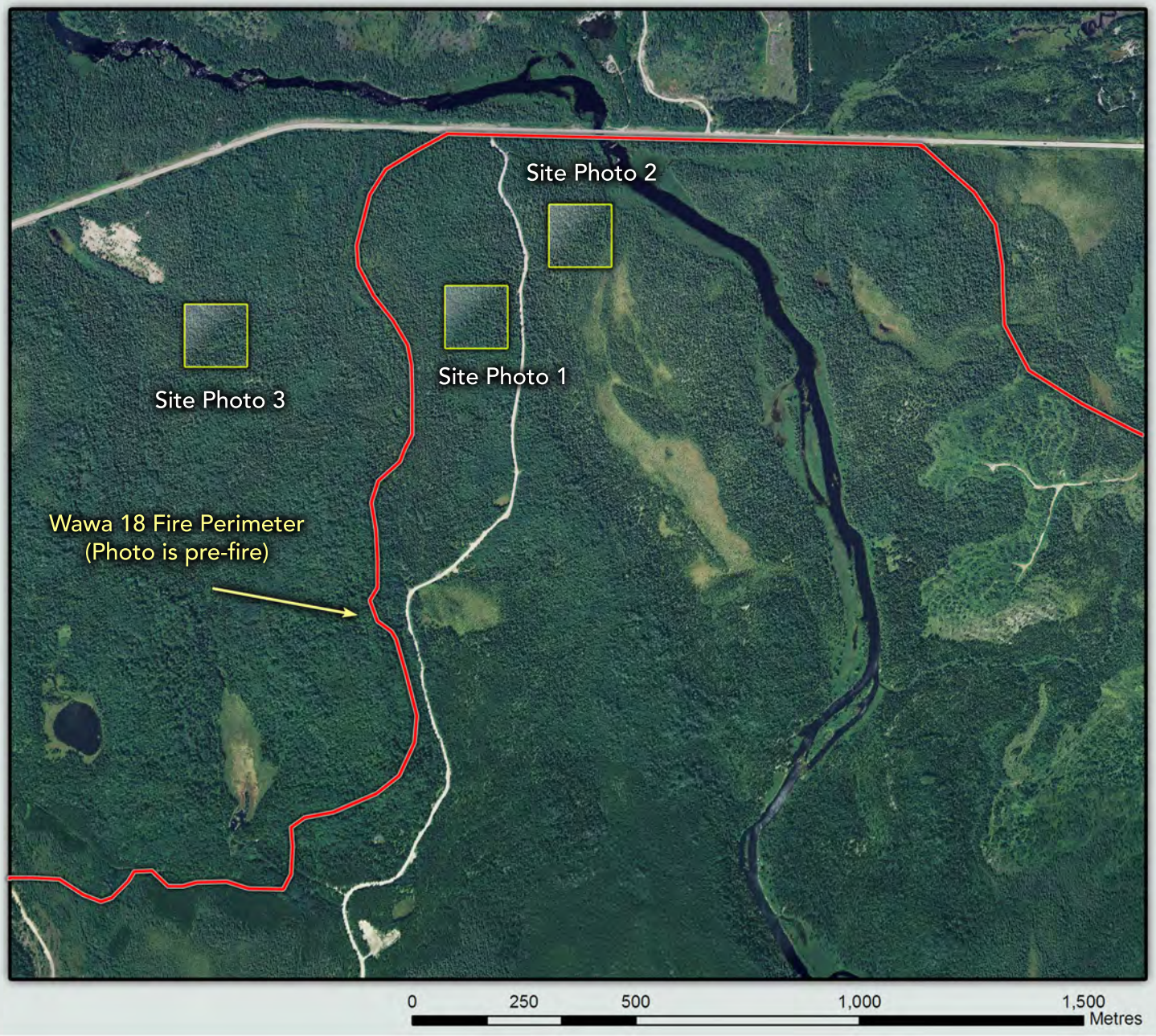
Aerial Photo 1 is a 2008 image of the Jack Pine River where it crosses highway 101. A large portion of this area was burned in the May 2010 Wawa 18 fire.

Site Photo 1: a spruce/fir/birch mixedwood stand that was within the fire perimeter.

Site Photo 2: a pure spruce stand that was within the fire perimeter.

Site Photo 3: a spruce/fir/birch stand that was outside the fire perimeter and left untouched.





Forest Examples - Jack Pine River

Site Photo 1

This photo was taken in October 2010 within the burned area. Note the new shrub growth and the extensive insect "frass" or chewed wood fibre at the base of each tee.

FRI Description

Forest Type:	mixedwood
Year of Origin:	1948
Stand Age:	63
Ecosite:	ES 1
Seral Stage:	mature
Species:	white spruce 40% black spruce 20% balsam fir 20% white birch 20%
Area:	70 hectares

Satellite Description

Forest Class:	dense coniferous

Forest Examples - Jack Pine River

Site Photo 2

This photo was taken in October 2010 within the burned area. Note that this stand had a higher intensity burn than most of the surrounding area.

FRI Description

Forest Type:	conifer upland
Year of Origin:	1940
Stand Age:	71
Ecosite:	ES 1
Seral Stage:	mature
Species:	black spruce 60% white spruce 20% balsam fir 20%
Area:	33 hectares

Satellite Description

Forest Class:	dense coniferous

Forest Examples - Jack Pine River

Site Photo 3

This photo was taken in October 2010 just west of the burned area in a black spruce stand that escaped the Wawa 18 fire.

FRI Description

Forest Type:	conifer upland
Year of Origin:	1940
Stand Age:	71
Ecosite:	ES 1
Seral Stage:	mature
Species:	black spruce 90%
	balsam fir 10%
Area:	53 hectares

Satellite Description

Forest Class:	dense coniferous

Forest Examples - Wawa 18 fire

Wawa 18 fire photos by Christine Rosche






Forest Examples - Jack Pine River

Aerial Photo 2

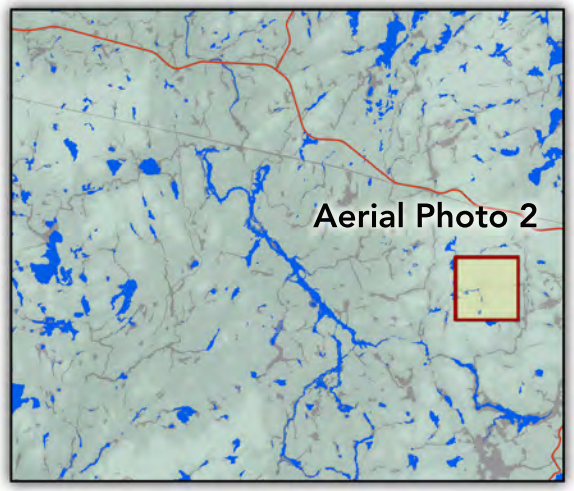
Photo 2 is a typical boreal area with older softwood and mixedwood examples. This image was captured in 2008.

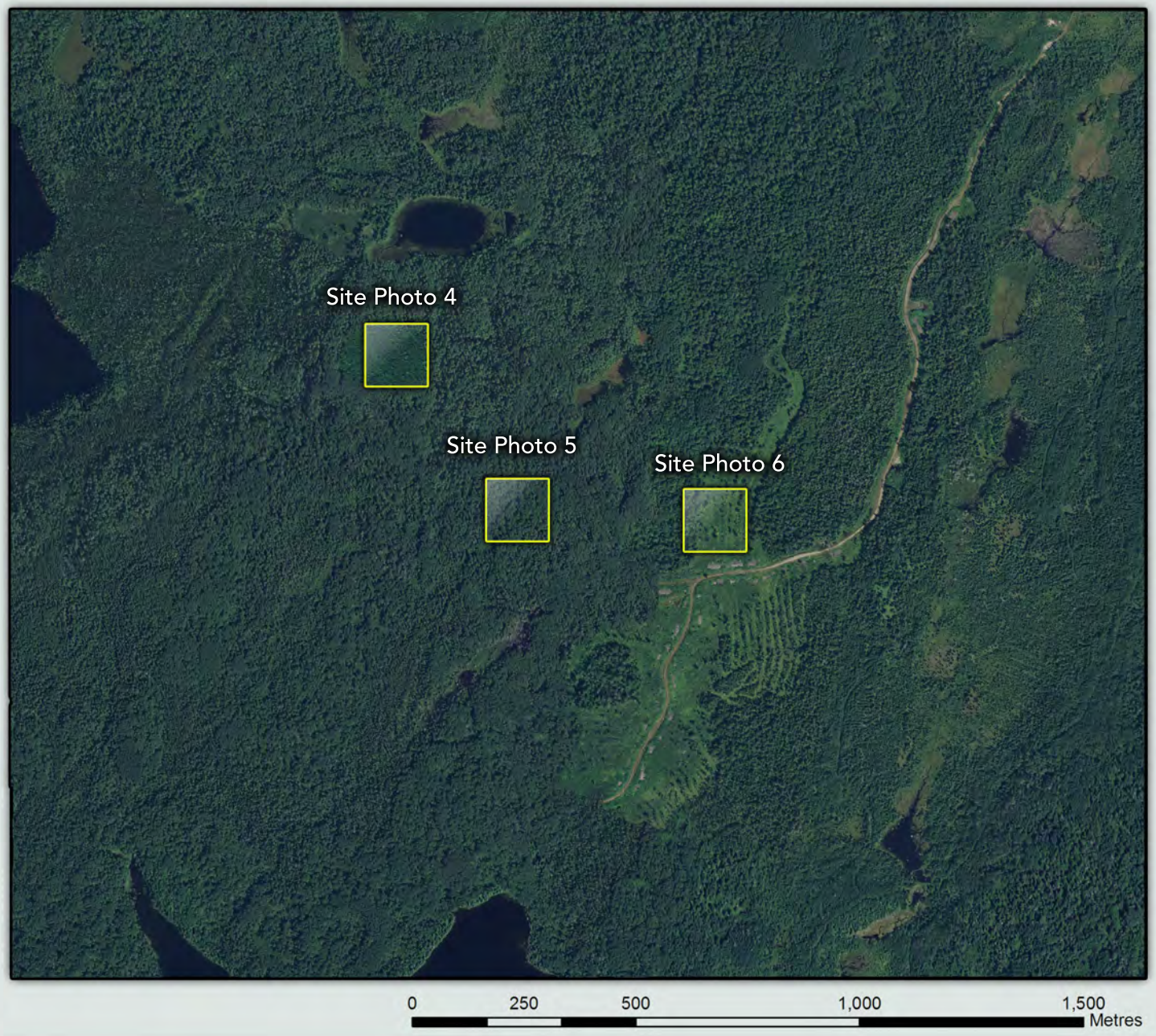
Click the squares on the aeral photo to see the actual ground level stand information.

Site Photo 4: a mature jack pine stand.

Site Photo 5: a mature poplar stand.

Site Photo 6: a recently planted site, this stand was harvested in 2001 and seeded to jack pine in 2003.





Forest Examples - Jack Pine River

Site Photo 4

This photo was taken in September 2009 within a mature pure jack pine stand.

FRI Description

Forest Type:	jack pine
Year of Origin:	1938
Stand Age:	73
Ecosite:	ES 2
Seral Stage:	mature
Species:	jack pine 100%
Area:	11 hectares

Satellite Description

Forest Class:	dense coniferous

Forest Examples - Jack Pine River

Site Photo 5

This photo was taken in September 2009 within a mature poplar stand.

FRI Description

Forest Type:	poplar
Year of Origin:	1958
Stand Age:	53
Ecosite:	ES 6
Seral Stage:	mature
Species:	poplar 80%
	balsam fir 20%
Area:	24 hectares

Satellite Description

Forest Class:	dense mixedwood

Forest Examples - Jack Pine River

Site Photo 6

This photo was taken in October 2010. The stand was harvested in 2001 and seeded to jack pine in 2003.

FRI Description

Forest Type:	mixedwood
Year of Origin:	2003
Stand Age:	8
Ecosite:	ES 2
Seral Stage:	mature
Species:	jack pine 90% white spruce 10%
Area:	48 hectares

Satellite Description

Forest Class:	disturbed - regenerating

Interactive Chapter Index

select a topic

Glossary

Tree Species

Appendices

Common Tree Species and Names

Common Name	Spp	Latin Name
Ash (all)	Ax	*Fraxinus spp.*
Balsam Fir	Bf	*Abies balsamea*
Basswood	Bd	*Tilia americana*
Beech	Be	*Fagus grandifolia*
Black Ash	Ab	*Fraxinus nigra*
Black Spruce	Sb	*Picea mariana*
Cedar	Ce	*Thuja occidentalis*
Cherry	Ch	*Prunus spp.*
Hemlock	He	*Tsuga canadensis*
Ironwood	Iw	*Ostrya virginiana*
Jack Pine	Pj	*Pinus banksiana*
Larch	La	*Larix laricina*
Oak	Qr	*Quercus spp.*
Poplar (Aspen)	Po	*Populus tremuloides*
Red Maple	Ms	*Acer rubrum*
Red Pine	Pr	*Pinus resinosa*
Spruce (all)	Sx	*Picea spp.*
Sugar Maple	Mh	*Acer saccharum*
White Ash	Aw	*Fraxinus americana*
White Birch	Bw	*Betula papyrifera*
White Pine	Pw	*Pinus strobus*
White Spurce	Sw	*Picea glauca*
Yellow Birch	Yb	Betula alleghaniensis

Glossary

Index

This glossary defines terms that appear in the text of *The Forest Resources of Ontario 2011*. Sources are identified by abbreviation in parentheses following the term definition. Where a definition has been listed in the glossary of the Forest Management Planning Manual for Ontario's Crown Forests (FMPM) as regulated under the Crown Forest Sustainability Act, 1994, the original source cited there is omitted. Where a definition was modified or adapted, from the indicated source, the abbreviation is prefaced with 'after'.

AGE CLASS

(1) One of the intervals into which the age range of forest stands is divided for classification and use. (FMPM)

(2) A category into which the average age or age range of trees or other vegetation is classified. Age class is usually used in reference to even-aged stands of trees. It represents the dominant age of the main body of trees in a stand. In mixed-age stands, age class can be used to describe the average age of specific cohorts of trees. (CCFM)

AREA OF THE UNDERTAKING

The area within the geographic boundaries of the area of the undertaking (environmental assessment) is all land and water within forest management unit boundary lines. The northern boundary is generally the northern limit of current commercial timber operations; the southern boundary is generally the limit of the forest on Crown Land. Crown land within that area is subject to the undertaking. (after FMPM)

CLEARCUT

(1) n. Area harvested under the clearcut silvicultural system.

(2) An area of forest land from which all (or most) merchantable trees have recently been harvested.

Verb. To harvest the merchantable trees in an area, normally in one operation. (Modified STC)

CONIFER

(1) Any of an order (Coniferales) of mostly evergreen trees and shrubs including forms (as pines) with true cones and others (as yews) with an arillate fruit. (FMPM)

(2) (Needle-bearing trees that produce seeds in cones. (FMPM)

CROWN FOREST

A forest ecosystem or part of a forest ecosystem that is on land vested in Her Majesty in right of Ontario and under the management of the Minister of Natural Resources. (CFSA)

CROWN FOREST SUSTAINABILITY ACT, 1994

An Act of the Ontario legislature to provide for the sustainability of Crown forests and, in accordance with that objective, to manage Crown forests to meet social, economic, and environmental needs of present and future generations. (after CFSA)

CROWN LAND

Land vested in Her Majesty in right of Ontario. (FMPM)

DECIDUOUS

Annual shedding of tree foliage (leaves or needles). see also Hardwood

DEFOLIATION

An unreasonable reduction in the foliage cover of a plant due to attacks by insects or fungal disease, or as a result of other factors such as drought, storms, or chemicals in the atmosphere. (CCFM)

DEPLETED AREA

Managed forest area on which merchantable volume has been decreased due to harvest, fire, insect, disease, or other causes, and where forest renewal is required. (FMPM)

Glossary

DEPLETIONS
A decrease in growing stock:

(1) In the FRI recording process, a reduction in the free-to grow area because of reclassification into barren and scattered due to harvest, burning, flooding, wind damage, or insects and disease. (after TMPM)
(2) In the available harvest area control process, a recording against the currently allocated areas caused by harvest, burning, flooding, wind damage, or insects and disease, allocation to other ownership or uses, land declaration of inoperability (bypass). (after TMPM)
(3) Reductions to the forest due to harvest, fire, insect, disease, or other causes. (FMPM)

DISTURBANCE
A significant change in the structure and/or composition of ecosystems, communities or populations through natural or human-induced events. (CCFM)

EA DECISION
Environmental Assessment Board's Reason for Decision and Decision: Class Environmental Assessment by the Ministry of Natural Resources for Timber Management on Crown Lands in Ontario (EA-87-02), released April 20, 1994.

ECODISTRICT
An ecological land classification unit. A subunit of an ecoregion, based on distinct assemblages of relief, geology, landform, soils, vegetation, water, and fauna. The subdivision is based on distinct physiographic and/or geological patterns. (after TELC)

ECOELEMENT
An ecological land classification unit. A subdivision of an ecosite displaying uniform soil, topography, vegetation, and hydrology. (after TELC)

ECOLOGICAL LAND CLASSIFICATION (System)

(1) A hierarchical approach to classifying land that is based on a consistent framework of landscape-scale through sitescale ecosystems by combinations of geologic, climatic, vegetative, soil, and landform features. (after FMPM).
(2) An approach that attempts to identify ecologically similar areas. The system has seven hierarchical levels that are currently called, from largest to smallest: ecozone, ecoprovince, ecoregion, ecodistrict, ecosection, ecosite, and ecoelement. (after TELC).

ECOREGION

(1) An ecological land classification unit. An area characterized by a distinctive regional climate as expressed by vegetation. (after TELC)
(2) An ecological landscape unit (ranging in resolution from hundreds of thousands to tens of thousands of square kilometres) characterized by distinct patterns of responses to climate as expressed by soils, hydrology, vegetation (species ranges and productivity), and fauna. (FMPM)

ECOSITE

(1) An ecological land classification unit. A subdivision of an ecosection that consists of an area of land with a particular parent material, having a homogeneous combination of soils and vegetation. (after TELC)
(2) An ecological landscape unit (ranging in resolution from thousands to hundreds of hectares) comprised of relatively uniform geology, parent materials, soils, topography, and hydrology, occupied by a consistent complex of successionally related vegetation conditions. (FMPM)

ECOSYSTEM
The sum of the plants, animals, environmental influences, and their interactions within a particular habitat. (FMPM)

Glossary

ECOZONE
An ecological land classification unit, and the most general level. An area of the earth's surface representing large and very generalized ecological units characterized by interacting abiotic and biotic factors. (after TELC)

FOREST COVER
All trees as described by the Forest Resources Inventory. (FMPM)

FOREST DYNAMICS
The natural processes involved in the development of a forest and associated with growth and changes to its structure and composition through time. (FMPM)

FOREST ECOSYSTEM
An ecosystem in which trees are, or are capable of, being a major biological component. (CFSA)

FOREST INFORMATION MANUAL
A manual prepared under section 68 of the Crown Forest Sustainability Act and approved by the regulations, including amendments to the manual approved by the regulations. (CFSA)

FOREST INVENTORY
A survey of an area to determine such data as area, condition, timber, volume, and species, for specific purposes such as planning, purchase, assessment, evaluation, management, or harvesting. (FMPM)

GEOGRAPHIC INFORMATION SYSTEM
An information system that uses a spatial database to provide answers to queries of a geographical nature through a variety of manipulations, such as sorting, selective retrieval, calculation, spatial analysis, and modelling. (FMPM)
see also Geographically Referenced
see also Spatial or Spatial Database

GROSS MERCHANTABLE VOLUME
see at Volume

GROSS TOTAL VOLUME
see at Volume

GROWING STOCK
All the trees growing in a forest or in a specified part of it, generally expressed in terms of number or volume. (STC)

HARDWOOD
The wood of an angiospermous tree as distinguished from that of a coniferous tree. (FMPM)

HARVEST METHOD
An adjective used to further define or modify one of the three basic silvicultural systems, specifically the harvesting component/technique (e.g., strip clearcut, group shelterwood). (FMPM)

INVENTORY
see Forest Inventory

LANDSCAPE
A heterogeneous land area composed of a cluster of interacting ecosystems that is repeated in similar form throughout. (FMPM)
see also Ecological Land Classification

MANAGED FOREST
Crown forest for which there is no legal or land use planning decision which prevents the land from being managed for timber production. (FMPM)

MANAGEMENT UNIT
All or part of a Crown forest that has been designated as a management unit for the purposes of the Crown Forest Sustainability Act. (FMPM)

Glossary

MATURE
In even-aged management, those trees or stands that are sufficiently developed to be harvestable and that are at or near rotation age (includes overmature trees and stands for which an overmature class has not been recognized). (STC)

MEAN ANNUAL INCREMENT
see at Volume

MERCHANTABLE TIMBER (MERCHANTABLE TREE)
(1) A (standing) conifer, poplar, or white birch log (tree) of which more than one-half of the total content is sound wood. (after FMPM)
(2) A (standing) hardwood log (tree) other than poplar or white birch of which more than one-third of the total content is sound wood when the content is measured in cubic metres. (after FMPM)

MIXEDWOOD(S)
A forest type in which 26-75% of the canopy is softwood. (FMPM)

NATURAL REGENERATION
see at Regeneration

NET MERCHANTABLE VOLUME
see at Volume

NON-SPATIAL
(1) Information stored in a form or format that is not directly usable by geographic information systems (e.g., hard-copy maps or tabular datasets). (FIM)
(2) Records of physical attribute information that do not have a parameter/variable(s) for geographic location in a recognized standardized map coordinates system, and compatible with vector or raster geographic information systems.
see also Geographic Information System
see also Spatial or Spatial Database

OLD GROWTH
A stand of mature or overmature trees relatively uninfluenced by human activity. (FMPM)

OLD GROWTH FORESTS
(1) Old growth forests are well past the age of maximum growth, frequently showing great horizontal and vertical density of structure and plant species composition, and possessing one or more features not seen in much younger forests such as snags, downed woody material, or arboreal lichens. (FMPM)
(2) Ecosystems characterized by the presence of old trees with their associated plants, animals, and ecological processes. They show little or no evidence of human disturbance. (FMPM)

ORGANIC SOIL
Soil containing a high proportion (greater than 20 or 30 percent) of organic matter. (GOFT)

OVERMATURE
In even-aged management, those trees or stands past the mature stage. (FMPM)

PHOTO INTERPRETATION
The detection, identification, description, and assessment of significance of objects and patterns imaged on a photograph. (FITC)

PLANNING AREA
This area was defined during the Ontario's Living Legacy process encompassing the Area of the Undertaking and includes the addition of five large parks bordering this area.

PRODUCTIVITY
A change in biomass (volume) per unit area and time (yield, increment). (FMPM)

Glossary

PROTECTED AREAS
Areas such as provincial parks, federal parks, wilderness areas, ecological reserves, and recreation areas that have protected designations according to federal and provincial statutes. Protected areas are land and freshwater or marine areas set aside to protect the province's diverse natural and cultural heritage. (GOFT)

PROTECTION
Forest management operations which are carried out to prevent, control, or manage the spread of, and/or the damage caused by, insects and diseases. Protection may involve the use of insecticides or manual treatments. (FMPM)

PROTECTION FOREST
Productive forest land on which forest management activities cannot normally be practiced without incurring deleterious environmental effects because of obvious physical limitations such as steep slopes and shallow soils over bedrock. (FMPM)

REMOTE SENSING
Any data or information acquisition technique that uses airborne techniques and/or equipment to determine the characteristics of an area. (GOFT)

SILVICULTURAL SYSTEM
A process, following accepted silvicultural principles, whereby crops constituting a forest are tended, harvested, and regenerated, resulting in the production of crops of distinctive form. Systems are conveniently classified according to the method of harvesting the mature stands with a view to regeneration and according to the type of crop produced thereby:

(1) Clearcut System: A silvicultural system of regenerating an even-aged forest stand in which new seedlings become established in fully exposed micro-environments after most or all of the existing trees have been removed. Regeneration can originate naturally or artificially. Clearcutting may be done in blocks, strips, or patches. (FMPM)
(2) Seed-Tree: A method of harvesting and regenerating a forest stand in which all trees are removed from the area except for a small number of seed-bearing trees that are left singly or in small groups. The objective is to create an even-aged stand. (FMPM)
(3) Shelterwood System: An even-aged silvicultural system, where mature trees are harvested in a series of two or more cuts (preparatory, seed, first removal, final removal) for the purpose of obtaining natural regeneration under shelter of the residual trees, whether by cutting uniformly over the entire stand area, or in narrow strips, or groups. Regeneration is natural (the seeding cut) or artificial. Regeneration interval determines the degree of even-aged uniformity. (after FMPM)
(4) Selection System: An uneven-aged silvicultural system where mature and/or undesirable trees are removed individually or in small groups over the whole area, usually in the course of a cutting cycle. Regeneration is generally natural. (FMPM)

SILVICULTURE
Generally, the science and art of cultivating forest crops, based on a knowledge of silvics. More particularly, the theory and practice of controlling the establishment composition, constitution, and growth of forests. (FMPM)

SITE
An area considered in terms of environment, particularly as this determines the type and quality of the vegetation the area can carry. (FMPM)

SITE CLASS
Any interval into which the site index range is divided for purposes of classification and use. (STC)

SITE DISTRICT
see syn. Ecodistrict

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SITE INDEX
An expression of forest site quality based on the height, at a specified age, of dominant and codominant trees in a stand. May be grouped into site classes. Expressed in metres. Usually refers to a particular species. (FITC)

SITE REGION
see syn. Ecoregion

SITE TYPE
see Ecosite

SOFTWOOD(S)
Cone-bearing trees with needles or scalelike leaves belonging to the botanical group Gymnospermae. Also, stands of such trees and the wood produced by them. (FMPM)

SPATIAL or SPATIAL DATABASE
A collection of interrelated geographically referenced data stored without unnecessary redundancy to serve multiple applications as part of a geographic information system. (FITC) see also Geographic Information System
see also Geograhically Referenced
see also Non-spatial (aspatial)

SPECIES
A singular or plural term for a population or series of populations of organisms that are capable of interbreeding freely with each other but not with members of other species. (FMPM)

STAND
A community of trees possessing sufficient uniformity in composition, constitution, age, arrangement, or condition to be distinguishable from adjacent communities. (FMPM)

STOCKING
An expression of the adequacy of tree cover on an area, in terms of crown closure, percentage of stocked quadrats, number of trees, basal area, or volume, in relation to pre-established managerial norm. (FMPM)
see also Not Satisfactorily Regenerated

SUCCESSION
Changes in species composition in an ecosystem over time, often in a predictable order. (FMPM)

SUSTAINABLE FOREST MANAGEMENT
The management of forest ecosystems to maintain a healthy forest ecosystem which provides a continuous, predictable flow of benefits. Indicators of forest sustainability criteria are incorporated into strategic decision-making and into the periodic assessments of both forest and socio-economic conditions. Forest operations are conducted in a manner that conserve forest health and minimize undesirable effects on the physical and social environments. (FMPM)

UNMERCHANTABLE
A tree or stand that has not attained sufficient size, quality, and/or volume to make it suitable for harvesting. (STC)

VOLUME
(1) The amount of wood in a tree, stand, or other specified area, according to some unit of measurement or some standard of use. (FMPM)
(2) Gross merchantable volume: Volume of the main stem, excluding stump and top but including defective and decayed wood, of trees or stands. (FMPM)
(3) Gross total volume: Volume of the main stem, including stump and top as well as defective and decayed wood, of trees or stands. (FMPM)

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(4) Net merchantable volume: Volume of the main stem, excluding stump and top as well as defective and decayed wood, of trees or stands. (FMPM)

(5) Mean Annual Increment: Average annual timber volume growth per unit area, for example, in cubic feet per year. Assuming even-aged management with clearcutting. (after FREF)

WETLAND

Land that is seasonally or permanently covered by shallow water, as well as land where the water table is close to or at the surface. In either case, the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic or water-tolerant plants. The four major types of wetlands are swamps, marshes, bogs, and fens. (FMPM)

WORKING GROUP

An aggregate of stands, including potential forest areas assigned to this category, having the same predominant species, and managed under the same broad silvicultural system. (FMPM)

YIELD

The actual or estimated harvest of forest products over a given period of time. (FMPM)

Glossary

Glossary of Terms Sources

CBS Environment Canada. 1994. Canadian Biodiversity Strategy, Working Document For Internal Discussion. Prepared by the Federal-Provincial-Territorial Biodiversity Working Group (September 30,1994).

CCFM Canadian Council of Forest Ministers. 2000. Criteria and Indicators of Sustainable Forest Management in Canada, National Status 2000. Ottawa, ON.

CFSA Statutes of Ontario. 1995. Crown Forest Sustainability Act, 1994. Queens Printer for Ontario. Toronto, ON.

EA Ontario Environmental Assessment Board. April 1994. Reasons for Decision and Decision. Class Environmental Assessment by the Ministry of Natural Resources for Timber Management on Crown Lands in Ontario. Ontario Environmental Assessment Board, Toronto, ON. Rep. No. EA-87-02.

FIM OMNR. Forest Information Manual, 2001. Ont. Ministry of Natural Resources, Toronto. ON.

FITC Forestry Canada. 1988. Forest Inventory Terms in Canada. Canadian Forest Inventory Committee, Forestry Canada, Ottawa, ON.

FMM OMNR. 1980. Forest Management Manual for the Province of Ontario. Ont. Min. Nat. Resour., Toronto, ON.

FMPM OMNR. 2004. Forest Management Planning Manual for Ontario's Crown Forests. Toronto: Queens Printer for Ontario.

FREF Klemperer, W. D. 1996. Forest Resource Economics and Finance. McGraw-Hill, Inc., New York, NY.

GOFT B.C. Min. For. Glossary of Forestry Terms. http://www.for.gov.bc.ca/pab/publctns/glossary/glossary.htm Oct. 2, 2001.

STC Forestry Canada. 1992. Silvicultural Terms in Canada. Science and Sustainable Development Directorate, Forestry Canada, Ottawa, ON.

STC Natural Resources Canada. 1995. Silvicultural Terms in Canada, 2nd. ed.. Policy, Economics, and International Affairs Directorate, Can. For.Serv., Ottawa, ON.

TELC Cauboue, M., W. L. Strong, L. Archambault and R. A. Sims. 1996.Terminology of ecological land classification in Canada. Nat. Resour. Can., Can. For. Serv.. Sainte-Foy, QC. Inf. Rep. LAU-X-114E.

TMPM OMNR. 1985. Timber Management Planning Manual for Crown Land in Ontario. Ont. Min. Nat. Resour., Toronto, ON.

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