



SIMCOE COUNTY FOREST

Five-Year Management Plan Review

2012 – 2016

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Introduction / Scope

The Simcoe County Forest Management Plan (SCFMP) was approved for the period 2011 – 2030, establishing the desired state of the future forest and the strategies to move forward. The SCFMP reaffirms the County's commitment to the continued growth of the Simcoe County Forest (SCF), balancing economic viability with the protection and enhancement of natural heritage features while providing for substantial social benefits. Key principles in the plan highlight the need to ensure that the sustainability of the SCF is paramount. This includes the maintenance of ecological processes and conservation of biological diversity, which is carefully considered as part of all management decisions and operations.

This report provides a summary of management activity for the first five-year interval of the plan in order to gauge performance, identify trends and adjust annual work plans to ensure that projections remain on target. This report does not consider changes to the strategic direction or implementation plans identified within the SCFMP. For further detail regarding the goals, objectives, implementation strategy and expected outcomes for the Simcoe County Forest, please refer to the SCFMP.

As the SCFMP was approved in late 2011, data used for this review consists of figures taken from the period of 2012 to 2016 inclusive.

Executive Summary

The continued expansion of the Simcoe County Forest was identified as a key strategy within the SCFMP to achieve several key objectives. Over this five-year period, substantial success was achieved with the land base expanding by a total of 533 ha (1,317 acres). The addition of some non-forested lands also provided opportunities for expanded reforestation activity with trees planted over this period totaling 243,675.

Continuous improvements and enhancements to the forestry mapping and associated information is critical to ensure that sound management decisions are made. This may include newly identified sensitive features, rare or endangered species or habitat conditions, or adjustments due to ongoing forest inventories. The collective impact of these adjustments combined with the additional land base now under management is assessed in this report to adjust work plans accordingly and to ensure continued sustainability.

The historical development of today's Simcoe County Forest, with the largest accumulation of lands and associated reforestation occurring from the 1920's through the 1970's, resulted in a significant proportion of lands dominated by coniferous plantations. Of these, red pine is by far the largest contributor at over 4,000 ha. Red pine has not only proven effective at surviving on and stabilizing dry, sandy soils and initiating the natural regeneration of other species, but through wise management has become an extremely valuable timber resource. With the preponderance of these plantations now between 60 and 90 years of age, final harvests of red pine are accelerating and as a result the total area has begun to decline. An assessment of the wood flow projections made in the SCFMP still appear to be valid, however with the importance of revenue generated from red pine and its importance to local mills, continued monitoring will be required.

Updates to the hardwood component of the SCF and an assessment of activity during this review period has resulted in planned increases in management levels. The average harvest area will increase to over 350 ha annually from the previous annual average of 137 ha in order to achieve long term objectives.

Monitoring the impacts to forest health from insects, disease, invasive species, and our changing weather patterns from climate change remain important, as does remaining current with emerging science and management recommendations. Since the adoption of the SCFMP, emerald ash borer has had an impact on resources and management decisions, and other invasive species which are anticipated to arrive in coming years remain a concern. Significant resources have been directed into the management of several invasive plants, with considerable success in most cases. The continuation of an adaptive management approach to mitigating the effects of a changing climate and invasive species will be required moving forward.

Land Acquisition and Tree Planting

The reasons for the continued growth of the Simcoe County Forest have changed over the decades, yet it remains an important priority today. The public ownership of lands which protect a range of natural heritage features and functions continues to grow in importance, as does the availability of these lands for recreation as the population increases. Continued expansion will also help to ensure the economic sustainability of the SCF into the future. It is for these reasons that continued expansion through the strategic investment of the Forestry Reserve was also identified as a key strategy within the SCFMP. Simcoe County is in a unique and enviable position in Ontario. A very long commitment to the

reinvestment of all revenues back into the SCF, combined with practicing sustainable, science-based forest management principles, has enabled growth far surpassing similar jurisdictions.

For the period 2012–2016, a total investment of \$4,483,300 was made from the Forestry Reserve to acquire 14 properties, expanding the SCF by 533 ha (1,317 acres).

The addition of some non-forested lands also provided opportunities for expanded reforestation activity with trees planted over this period totaling 243,675.

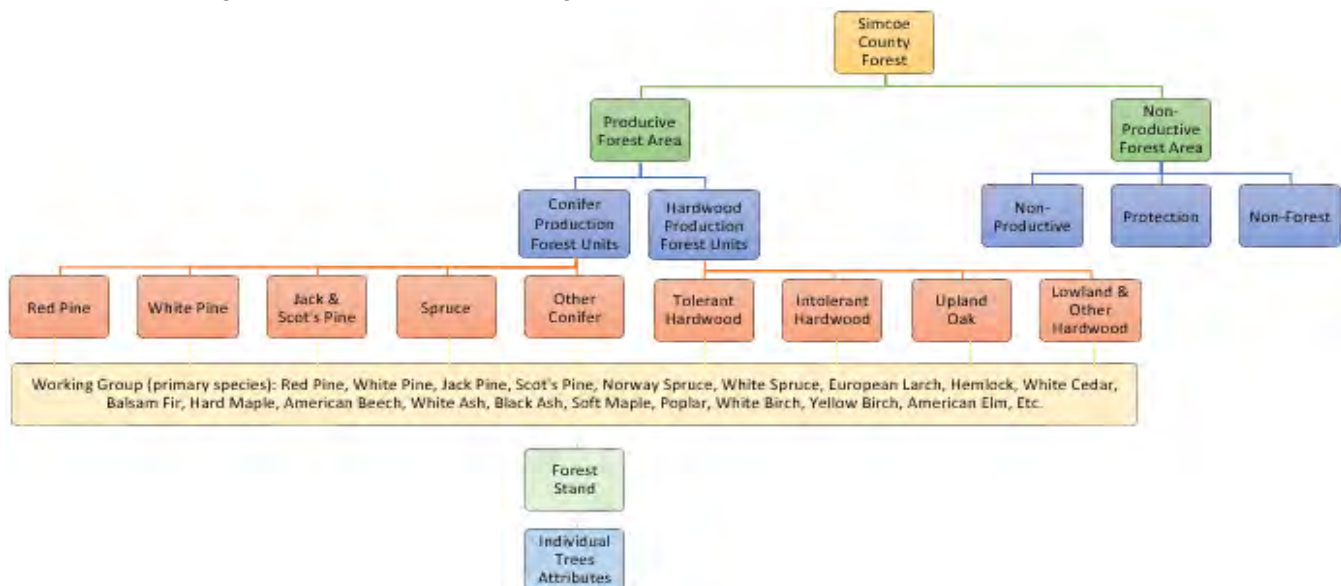
Details of historical land acquisition and tree planting are found in Appendix A.

Forest Classification Updates

Simcoe County Forest Classification System

The land base of the SCF is classified into several categories to enable effective management and monitoring. At the micro scale, individual tree and site attributes are gathered to compile a forest inventory. Trees of similar age, species, and management objective are grouped together into a forest stand. The primary species within a forest stand (or the primary species being managed) is referred to as a working group. Similar working groups are combined to make a production forest unit. Some production forest units consist of only one working group while other production forest units consist of several working groups. On the macro scale, the SCF land base is categorized into non-productive and productive lands.

Simcoe County Forest Classification System



As the forest grows and changes, updating and re-evaluating these classifications provides the framework for operational planning and monitoring.

Productive and Non-Productive Area

Within productive forest areas, forest stands are actively managed including regularly scheduled harvesting. Although non-productive areas may be managed for social or environmental benefits, timber harvesting is not conducted.

Adjustments to the SCF productive and non-productive classifications over the review period are due to the addition of new lands, changes due to natural processes and/or improved forest inventories.

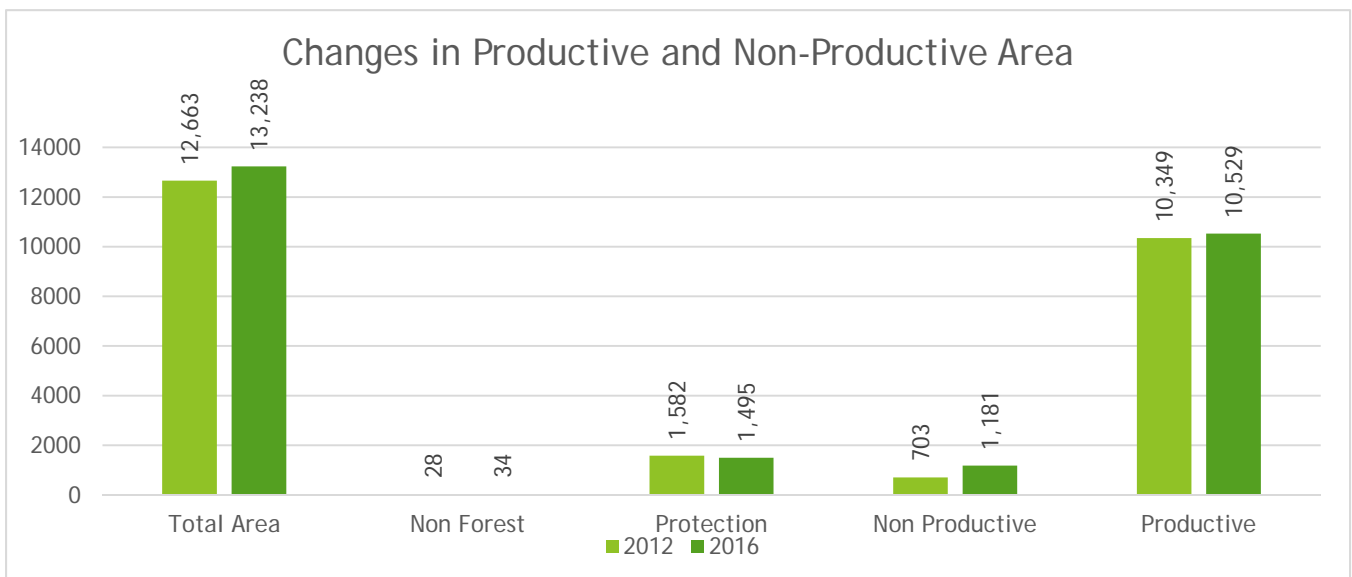
Historic Changes in Productive and Non-Productive Areas

Year	SCF Total Area (ha)	Non-Forest (ha)	Protection (ha)	Other Non-Productive (ha)	Productive (ha)	% Productive Area
1962	6,400	208	60	45	6,088	95
1982	11,157	175	7	442	10,533	94
2010	12,663	28	1,582	703	10,349	82
2016	13,246	34	1,495^(a)	1,180	10,536	80

Notes:

- non-forest includes hydro and pipeline easements and gravel pits
- protection includes wetland, riparian, steep slopes and other significant natural features
- non-productive includes poorly drained sites, shallow soils, non-accessible areas
- ^(a) protection area has changed primarily due to improved mapping

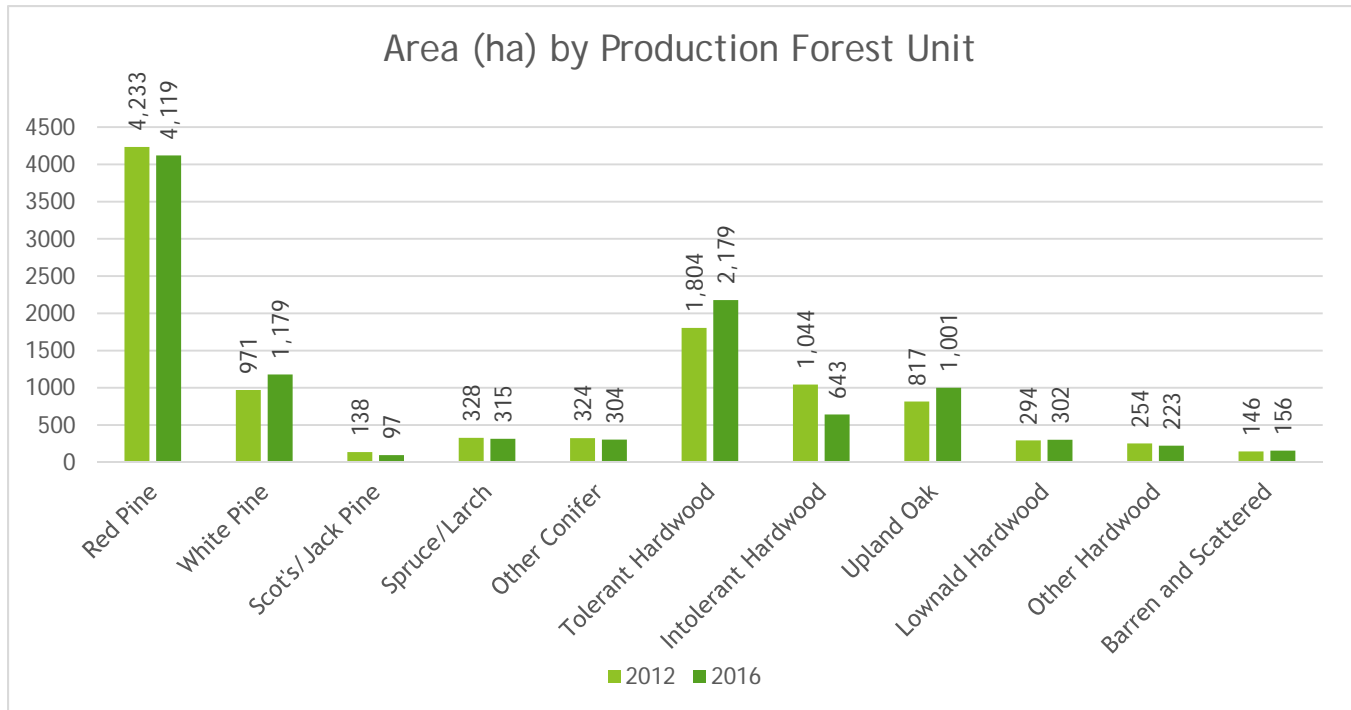
Five-year Changes in Productive and Non-Productive Areas



Production Forest Units and Working Groups

Changes over time, either from natural processes, forest management activities or improved forest inventories can result in reclassifications within working groups or production forest unit. Tracking these classification changes is vital in refining future management projections, priorities and planning.

Five-year Changes in Production Forest Units



Notes:

- Red pine area is decreasing due to final over-story removals. This trend will accelerate and become increasingly significant to wood flow and associated revenues.
- White pine is increasing primarily due to red pine removal in mixed red and white pine stands.
- Changes to hardwood working groups are the result of improved inventories, management activities and acquisitions.

Projected Vs Actual Harvest

Harvest Projections

In order to ensure sustainability, the harvest levels of a managed forest must remain below projected growth rates. Additionally, a buffer is required to account for losses which may occur due to natural processes including insects, disease and extreme weather events. The SCFMP provides annual harvest projections for the 2011-2020 timeframe based on production unit areas and using available growth and yield data and historical records. As noted in the SCFMP, due to changes in the total land base and production forest units, potential impacts from changing market conditions, unanticipated

losses, or as improved data becomes available, harvest levels must be reassessed at five-year intervals.

2012 to 2016 Conifer Harvest Analysis

The conifer production forest units consist of pine, spruce, larch, cedar and other minor conifer species. These units make up 57% of the productive forest area within the SCF (down from 58% in 2012). Red pine in particular makes up 39% of the productive forest area in the SCF (down from 41% in 2012).

Analysis shows that during this period, annual area and volume harvested was very close to projections from the SCFMP. Although overall projections were very close it should be noted that within the white pine and other conifer forest units volumes were well below average, however following the next review period this should normalize. Within the red pine unit, volumes were 24% above projections, primarily due to an increasing number of stands reaching final rotation age.

Conifer Projected Average Annual Harvest 2011 - 2020 and Actual Annual Harvest 2012 – 2016

Working Group	2011 – 2020 Projected Average Annual Harvest Area (ha)	2012 – 2016 Actual Average Annual Harvest Area (ha)	2011 – 2020 Projected Average Annual Harvest Volume (m ³) ^(e)	2012 – 2016 Actual Average Annual Harvest (m3)	2011 – 2020 Projected Annual Growth (m3)
Red pine	456	469	20,550	25,421	30,901
White pine	103	74	4,600	3,126	7,088
Other conifer ^(a)	88 ^(b)	20	3,800 ^(b)	953	5,767 ^(b)
Total conifer	647^(c)	563	28,950^(c)	29,500	43,756^(c)

- ^(a) other conifer production forest unit was excluded in 2011 but added for 2017
- ^(b) figures projected retroactively as not originally included in SCFMP
- ^(c) total includes other conifer

2017 to 2021 Conifer Harvest Projections

Analyzing conifer harvest levels over the review period and using updated figures for each working group area provides the framework to recalculate growth and harvest projections for the upcoming five-year period. These updated figures are calculated using the same methods within the SCFMP except where noted.

Revised Conifer Harvest Projections 2017-2021

Working Group	2011 – 2020 Projected Average Annual Harvest Area (ha)	2017 – 2021 Projected Average Annual Harvest Area (ha)	2011 – 2020 Projected Average Annual Harvest Volume (m ³)	2017 – 2021 Projected Average Annual Harvest Volume (m ³)	2011 – 2020 Projected Annual Growth (m ³)	2017 – 2021 Projected Annual Growth (m ³)
Red pine	456	439	20,550	19,755	30,901	30,069
White pine	103	139	4,600	6,255	7,088	8,607
Other Conifer	88 ^(a)	81	3,800 ^(a)	3,645	5,767 ^(a)	5,227
Total	647	659	28,950	29,655	43,756	43,903

- ^(a)Figures projected retroactively as not originally included in the SCFMP

As detailed within the SCFMP, the history of property acquisition and reforestation has resulted in a large proportion of red pine plantations over 60 years of age. As red pine is the most significant production forest unit (41% of all productive area in 2011) an aging red pine cohort will have a significant impact on resources and revenues in coming decades. Projections in the SCFMP assumed an average final rotation age of 90 years, and insufficient data exists at this time to revise this forecast. However, with an increasing number of red pine stands reaching final rotation age earlier, continued monitoring of wood flow projections will be required. Further details on red pine age class structure, anticipated area and projected long term volumes can be found in Appendix B.

2012 to 2016 Hardwood Harvest Analysis

The hardwood production forest units consist primarily of stands dominated by maple, oak, ash, poplar, beech, birch, cherry and basswood, which collectively make up 43% of the productive forest area within the SCF (up from 42% in 2012). For management purposes, these forest types are grouped into the 'tolerant hardwood' (sugar maple, beech, etc.), 'intolerant hardwood' (red maple, birch, cherry, poplar, etc.), 'upland oak', and 'other hardwood' working groups.

Area and volume harvested during this period was 39% (by area) and 47% (by volume) below projections, which was primarily due to hardwood markets being generally depressed until the latter part of this review period.

Hardwood Projected Average Annual Harvest 2011 - 2020 and Actual Annual Harvest 2012 – 2016

Working Group	2011 – 2020 Projected Average Annual Harvest Area (ha)	2012 – 2016 Actual Annual Harvest Area (ha)	2011 – 2020 Projected Average Annual Harvest Volume (m ³) ^(e)	2012 – 2016 Actual Annual Harvest (m ³)	2011 – 2020 Projected Annual Growth (m ³)
Tolerant hardwood	114	81	4,674	2,898	5,953
Intolerant hardwood	50	4	2,050	67	3,445
Upland oak	38	48	1,558	1,820	2,696
Other hardwood ^(d)	22	4	902	140	1,808
Total hardwood	224	137	9,184	4,925	13,902

- ^(d) includes all other hardwood working groups
- ^(e) based upon historical average volumes per type and age class

2017 to 2021 Hardwood Harvest Projections

Hardwood harvest area, volume and growth projections have been recalculated for the period 2017-2021 using updated working group areas. Annual growth figures and projected volumes are calculated using the same methods used in the SCFMP.

Revised Hardwood Harvest Projections 2017-2021

Working Group	2011 – 2020 Projected Average Annual Harvest Area (ha)	2017 – 2021 Projected Average Annual Harvest Area (ha)	2011 – 2020 Projected Average Annual Harvest Volume (m ³)	2017 – 2021 Projected Average Annual Harvest Volume (m ³)	2011 – 2020 Projected Annual Growth (m ³)	2017 – 2021 Projected Annual Growth (m ³)
Tolerant hardwood	114	132	4,674	5,412	5,953	7,191
Intolerant hardwood	50	40	2,050	1,640	3,445	2,122
Upland oak	38	46	1,558	1,886	2,696	3,303
Other hardwood	22	22	902	902	1,808	1,808
Total	224	240	9,184	9,840	13,902	14,424

The annual projected harvest area identified above of 240 ha annually represents the 20-year average given current area classifications. Operational plans for the next several years are substantially higher (in excess of 350 ha annually, see Appendix C). This shorter term operational increase will compensate for the lower than anticipated hardwood management achieved over the 2012-2016 review period. Meeting long-term management objectives for the hardwood forest component will improve value over time, diversify the revenue stream from the SCF, help to offset the future decline of revenue from red pine, and contribute more substantially to the local economy. Sustainable forest management practices also contribute to climate change initiatives, resulting in additional GHG reductions over the long-term by improving growth rates and storing carbon in various wood products. Biodiversity is also enhanced not only at the individual site level, but the maintenance of a variety of forest stand types, structures and ages across the landscape can be achieved.

Identification & Protection of Natural & Cultural Heritage Features

As detailed within the SCFMP, a multi-faceted approach to identify, protect, and where possible enhance natural heritage features has been adopted for the Simcoe County Forest. Land acquisition is prioritized where opportunities exist to increase contiguous forest cover in key areas. Forest management is designed to mimic natural disturbance patterns in order to maintain or increase the diversity of forest types across the landscape, and improve structure (habitat) within each managed forest stand.

In addition to these broader objectives and strategies, specific stand level adjustments are required where sensitive features are known to exist including nesting birds, identified species at risk or associated habitat. All identified features are added to forest inventory information to ensure that appropriate protections are in place including timing restrictions and buffer requirements. Certain criteria are also used to identify entire forest stands with 'High Conservation Values'.

High Conservation Value Forests

High Conservation Value Forests (HCVFs) are forests that possess specific values as defined in accordance with Principle 9 of the Forest Stewardship Council (FSC) document 'Forest Certification Standards for the Great Lakes / St. Lawrence Forest Region; 2007. Within HCVFs the forest manager must assure that any prescribed forest operations do not adversely impact identified values. Generally, timber extraction within these forests is of secondary significance.

High Conservation Value Forest Area – Changes from 2012 to 2016

High Conservation Value Forest Type	2012 Area (ha)	2016 Area (ha)
Wetlands	1,364	1,524
Areas of Natural or Scientific Interest (ANSI's)	771	675 ^(a)
Culturally Significant	130	246 ^(b)
Riparian Areas	97	117
Species at Risk / Regionally Rare Species	71	442
Seeps / High Water Table	21	34
Old Growth Features	15	15
Total HCVF Area	2,469	3,053
Total SCF Area	12,663	13,246

- Changes in classification of ANSI's^(a) that are recognized for cultural importance are now placed into the culturally significant category^(b). This reclassification is responsible for the decrease in ANSI area

Appendix D details HCVF areas that were harvested within the five-year review period.

Forest Health

Forest health is typically measured in relation to biotic and abiotic factors that affect the value, growth and survival of trees and forests as a whole. Biotic factors affecting forest health include forest insects and diseases, while abiotic factors include weather events and fire (to name a few). The overall health of the SCF is generally good, but there are stress agents that have the potential to cause a decline in health and mortality. The vast majority of these agents are of minor concern; others may have higher impacts on a cyclical basis. Most of these agents are part of the natural disturbance patterns characteristic of a forest ecosystem. However, situations that cause larger impacts can occur which require some level of intervention or altered management in order to mitigate impacts. These situations that have the largest impacts are most commonly associated with the introduction of exotic diseases and invasive species or weather events related to a changing climate.

Promoting vigor and diversity within the forest continues to be the best method to maintain forest health. Forest management practices strive to maintain overall forest health by targeting removal of

poorer trees while retaining those of high health and vigour. Management objectives strive to maintain a diversity of tree species growing on suitable sites and to favour natural regeneration.

Forest Insects and Disease

Many insects and diseases are native to the SCF and have evolved naturally as a fundamental part of the forest ecosystem. Generally native insects and diseases are cyclical and the ecosystem has the capacity to manage these threats. However, there are many non-native insects and diseases that have the ability to pose significant negative impacts to the SCF. When introduced, these non-native insects and diseases are incorporated into an ecosystem that has not evolved and developed natural defenses against these new pressures. Without natural defenses, forest structure, productivity and biodiversity can be severely impacted. Understanding potential threats allows SCF staff to monitor, manage and mitigate the effects of these impacts to forest health. Details outlining current threats and management considerations can be found in Appendix E.

Weather and Climate

Consistent evidence and research details the many effects of climate change on ecosystems and science continues improving to help predict with greater certainty, future impacts. These changes in temperature and precipitation are however already impacting our forests today and are expected to continue to increase in frequency the future. Within the review period of 2012-2016, the SCF has seen two significant droughts in 2012 and in 2016 (Appendix F), which have impacted the forest in many ways including:

- lower survival in tree planting activities;
- added stress to mature trees;
- loss of productivity;
- increases in red pine decline; and
- increased fire risk.

Severe weather in the form of wind events and ice storms also has the potential to damage trees resulting in losses and changes in resource needs (as occurred in the 2013 & 2015 ice storms). Long-term effects of climate change suggest that dryer, hotter conditions will become more common. These changes are, and will, continue to have significant effects on forest health and forest species composition. Climate change is predicted to impact plant distributions and research suggests that the natural ranges of many species will change beyond any normal seed migration rates. Climate projection models suggest that species within the SCF will either be retreating, persisting or advancing in a changing climate (see Appendix G). Long term changes in species ranges is an important

consideration in the preparation of silvicultural prescriptions, long term forest management objectives and particularly important during species selection for tree planting.

These changing ranges of species doesn't necessarily mean that a species will disappear from their historic range, what they suggest is that these trees will be growing in a climate that is not one that they naturally evolved in. This will affect health and productivity in the future.

Considering the long-term planning horizon in forest management of up to 100 years or more, it is important to keep up to date with future projections and make management decisions based on up to date science and methods.

Invasive Plant Management

The management of invasive exotic plants continues to be a significant focus of the forestry department. Invasive species are identified as one of the biggest threats to biodiversity. If left unchecked they have the ability to clog wetlands, displace native plants and animals, devalue recreational opportunities, impact forest health and reduce tree growth.

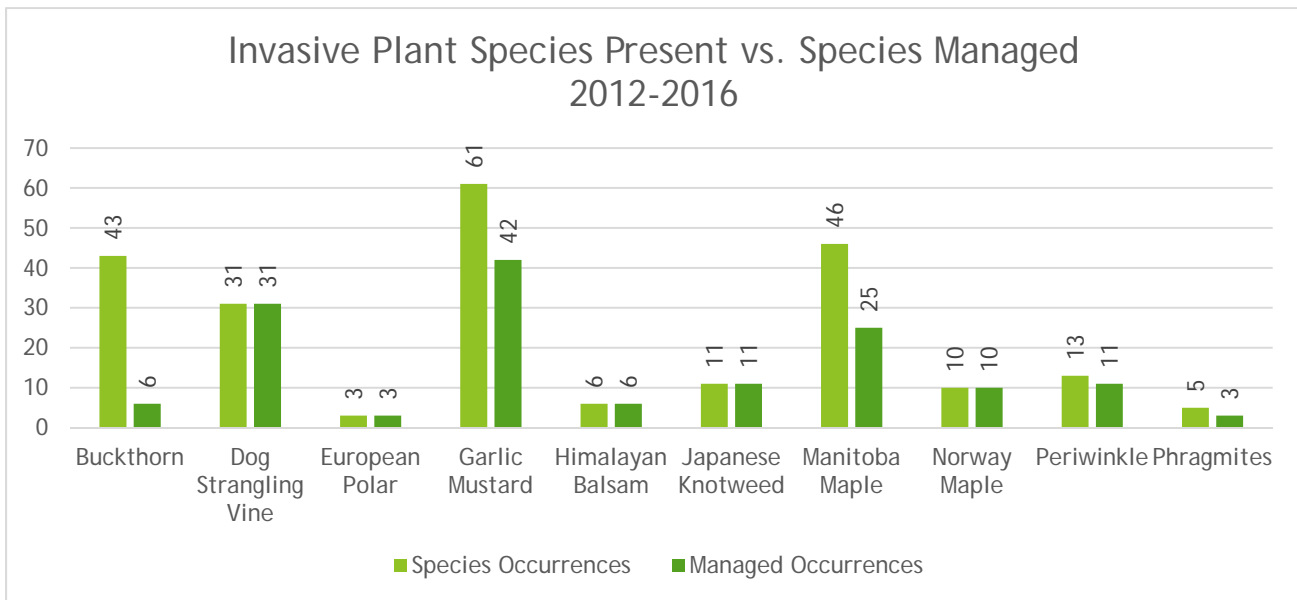
Figure 17. Dog Strangling Vine: Unmanaged vs. Managed



The introduction of the provincial Invasive Species Act in November 2016 reflects the importance of management of these species and aids in future management by restricting movement and possession of some invasive species.

The SCFMP discusses the importance and general implementation of an increase in invasive species management. Significant enhancements have been made since the plan was approved, with further emphasis on controlling and limiting the introduction of these invasive species. Invasive species resources now extend well beyond the physical control of invasive plants and include public and recreational user education, consultation, signage and liaison.

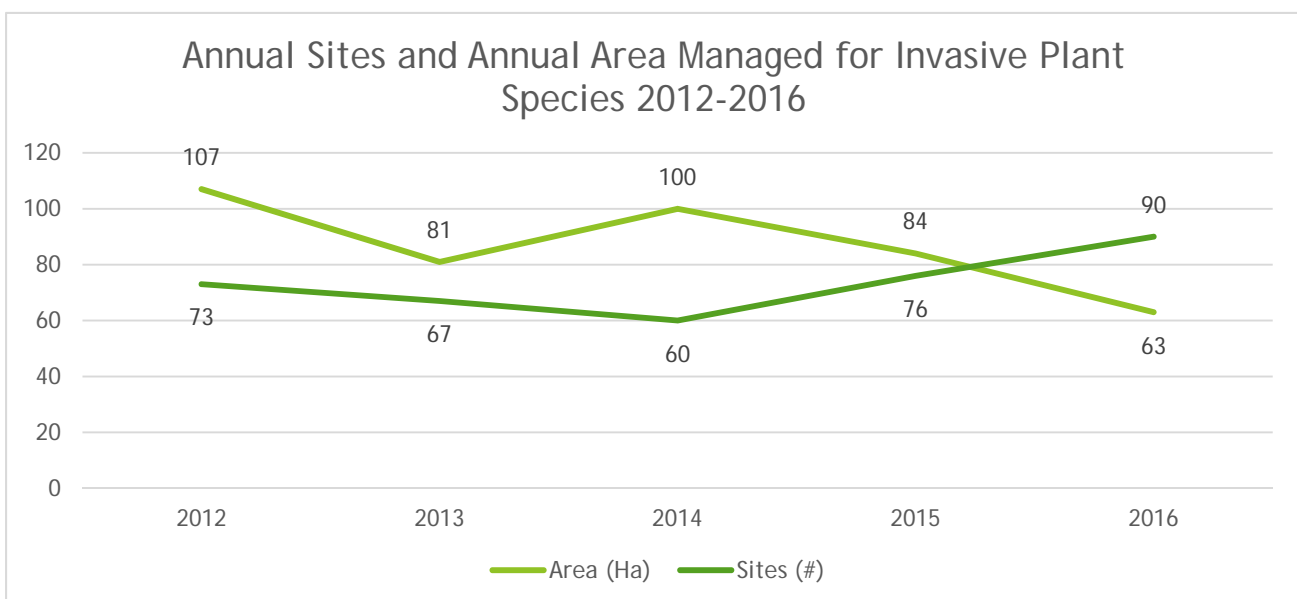
Figure 13. Invasive Species Present vs. Managed



Notable success in management of Manitoba Maple, Dog Strangling Vine, Japanese Knotweed and Scot's Pine over the last five-years now allow resources to be directed to other species. Management of Common and Glossy Buckthorn and Phragmites are now being increased with the latter being treated for the first time in 2016 within the SCF.

Approximately 90 sites were managed for invasive species in 2016 which encompassed approximately 63 ha. Compared to annual averages this continues to follow a trend of less area but more sites managed. With many sites now being smaller in size due to management success, this has enabled

Figure 14. Annual Sites and Area Managed



more sites to be visited and managed annually. It also highlights better success at locating smaller infestations earlier, primarily due to increased awareness by county staff, forestry contractors, recreational groups and the general public. Managing initial and small invasive species introductions correlates to a higher probability of eradication and limits these plants from spreading over large areas. This focus on sites that have the best chance of successful management will continue to be a strategy moving forward.

Appendices

Appendix A – Historical Land Acquisition and Tree Planting

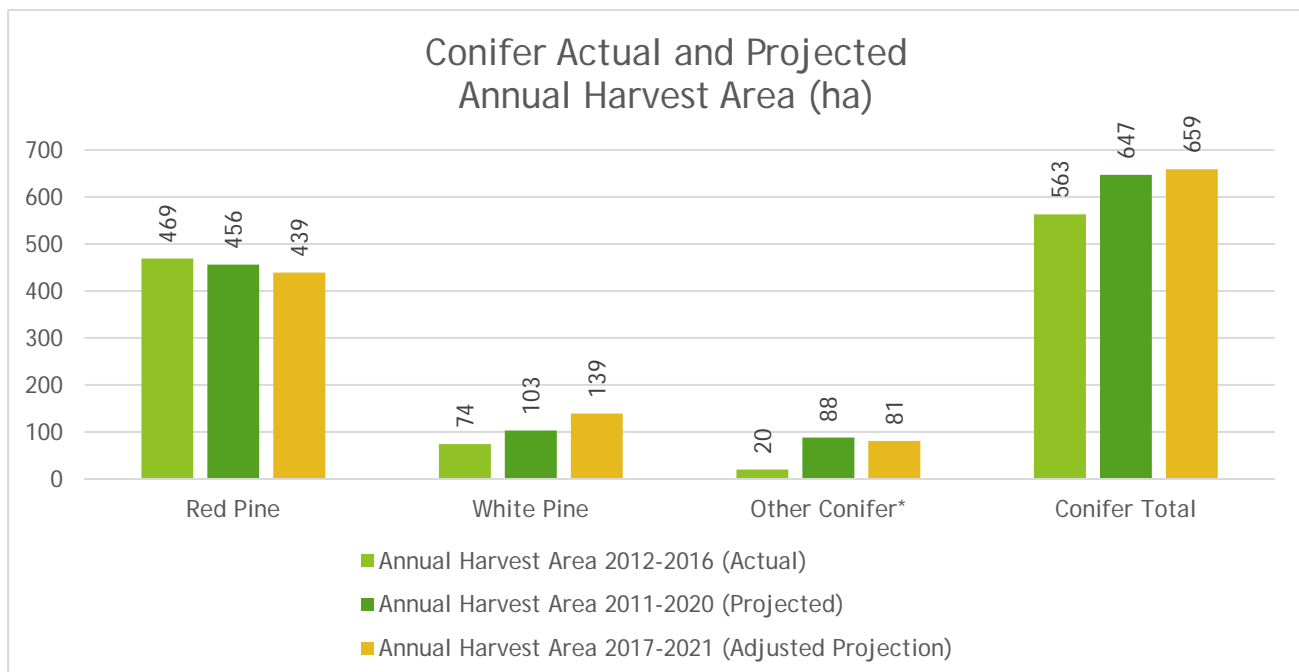
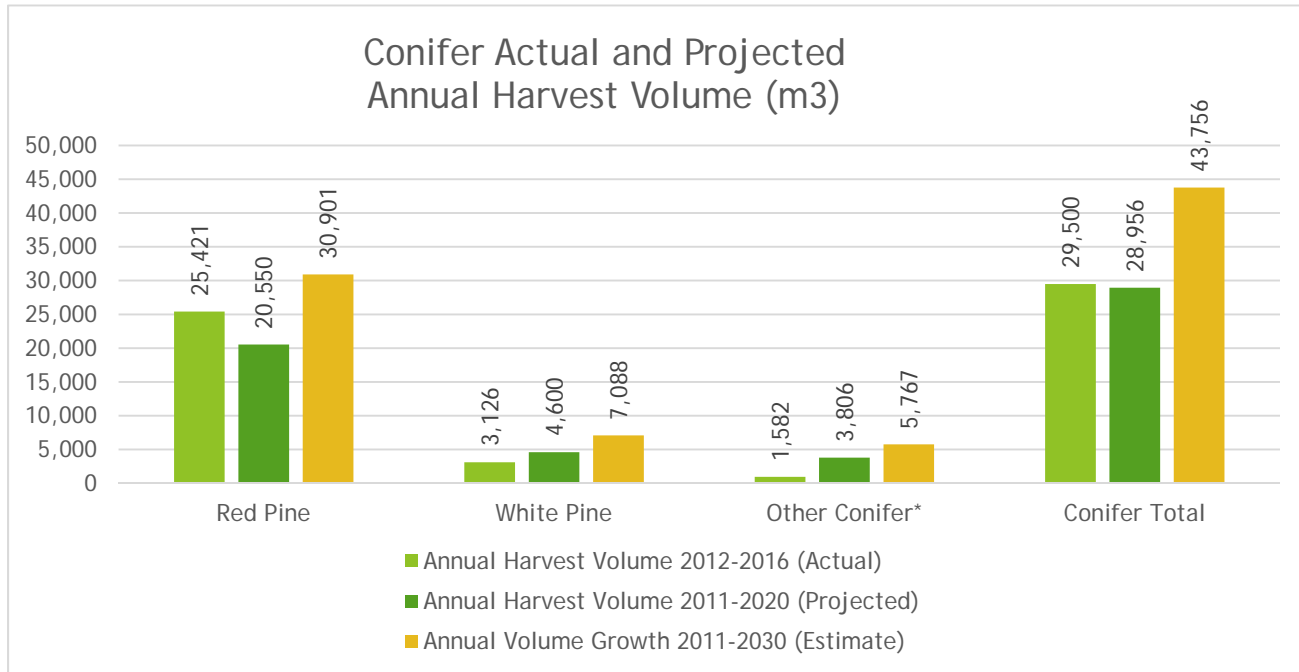
Decade	Land Purchased		Average Price		Trees Planted
	Hectares	Acres	\$/ha	\$/acre	
1920 – 1929	575	1,420	16.40	6.64	2,014,200
1930 - 1939	1,539	3,800	15.61	6.32	4,079,855
1940 - 1949	2,152	5,314	20.43	8.27	5,050,270
1950 - 1959	1,992	4,919	59.60	24.13	3,686,450
1960 - 1969	1,944	4,800	96.38	39.02	3,191,245
1970 - 1979	1,301	3,213	312.50	126.52	1,715,240
1974*	1,428	3,525			
1980 - 1989	208	514	1,217.41	492.88	406,350
1990 - 1999	488	1,206	1,537.08	622.30	49,400
2000 - 2009	1,119	2,763	7,484.10	3,030.00	47,600
2010 - 2016	727	1,796	8,285.56	3,352.40	270,820

*area added due to inclusion of Rama and Mara townships

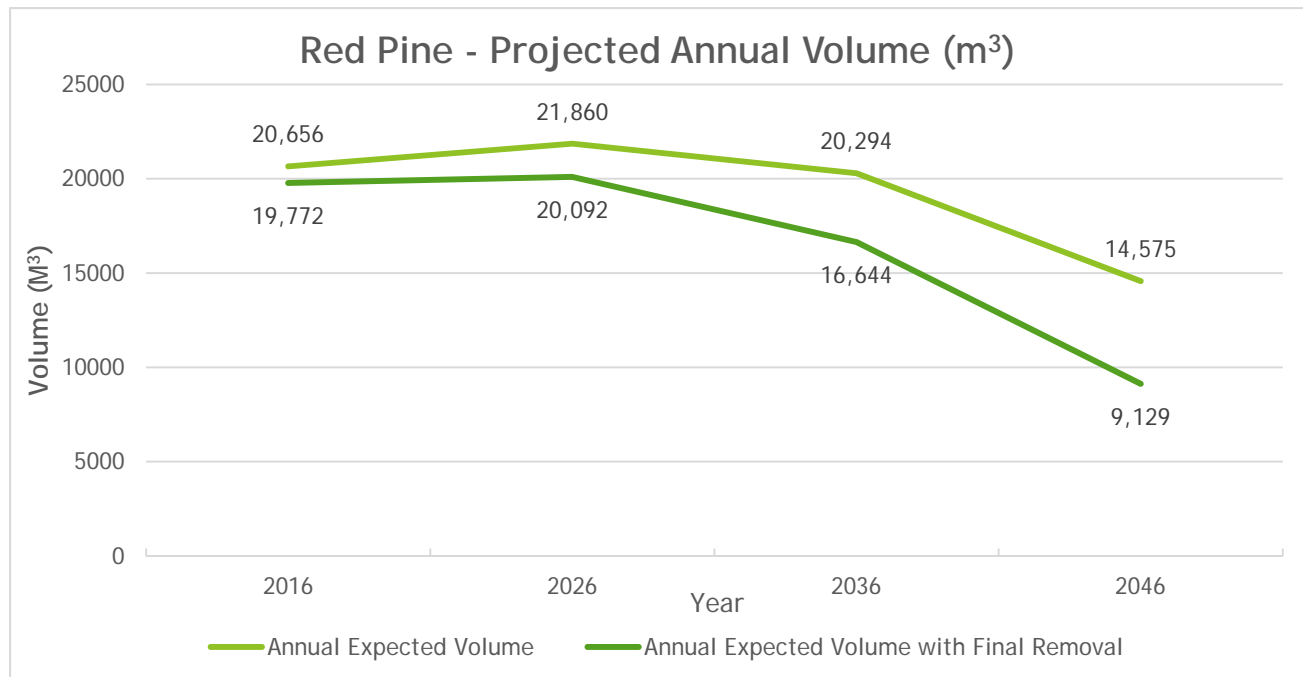
Appendix B – Conifer Harvest Analysis

Conifer 2012-2016 actual vs. projected annual volume harvested and annual estimated growth by working group

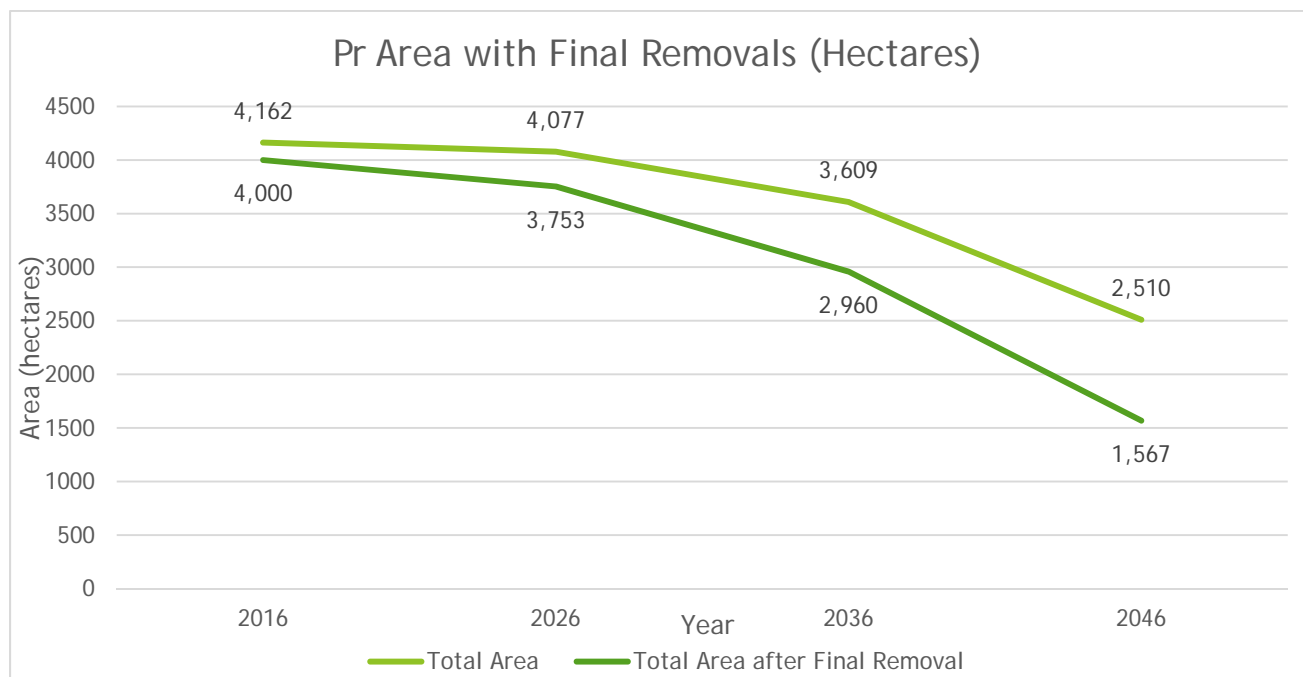
Conifer 2012-2016 actual vs. projected annual area harvested and 2017-2021 annual area targets by working group



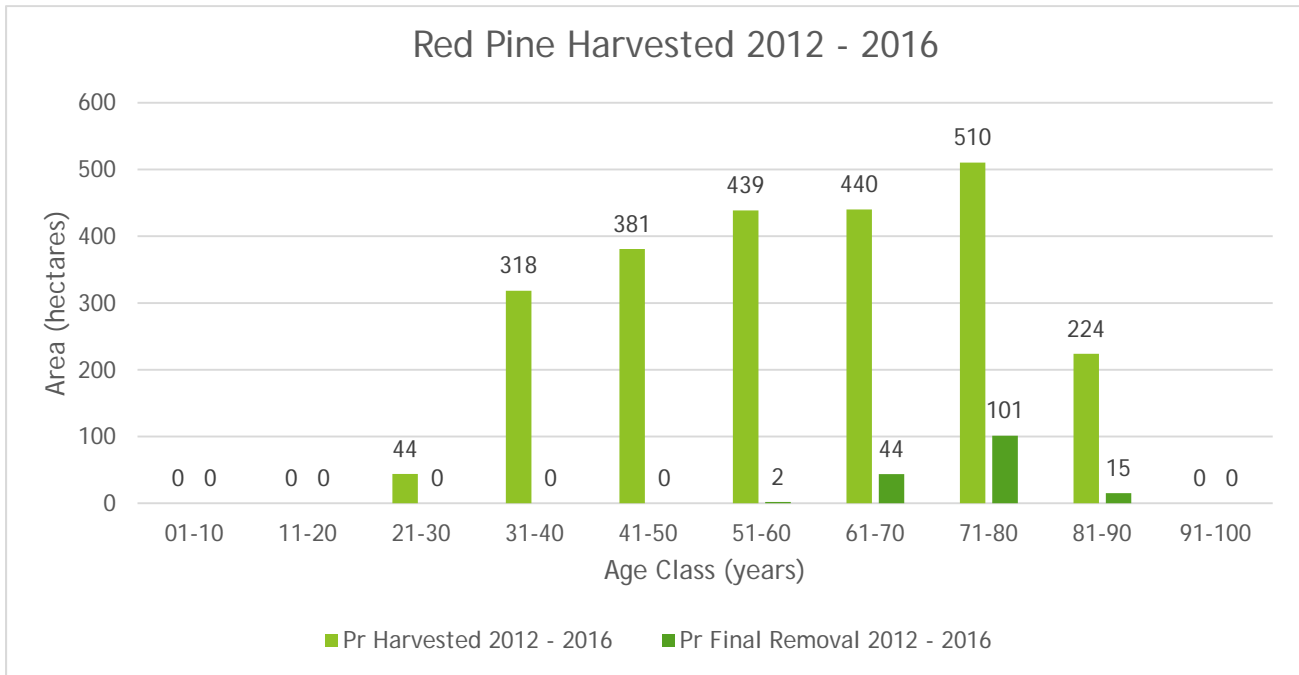
Red pine projected annual volume changes related to final removals over a 30 year planning horizon



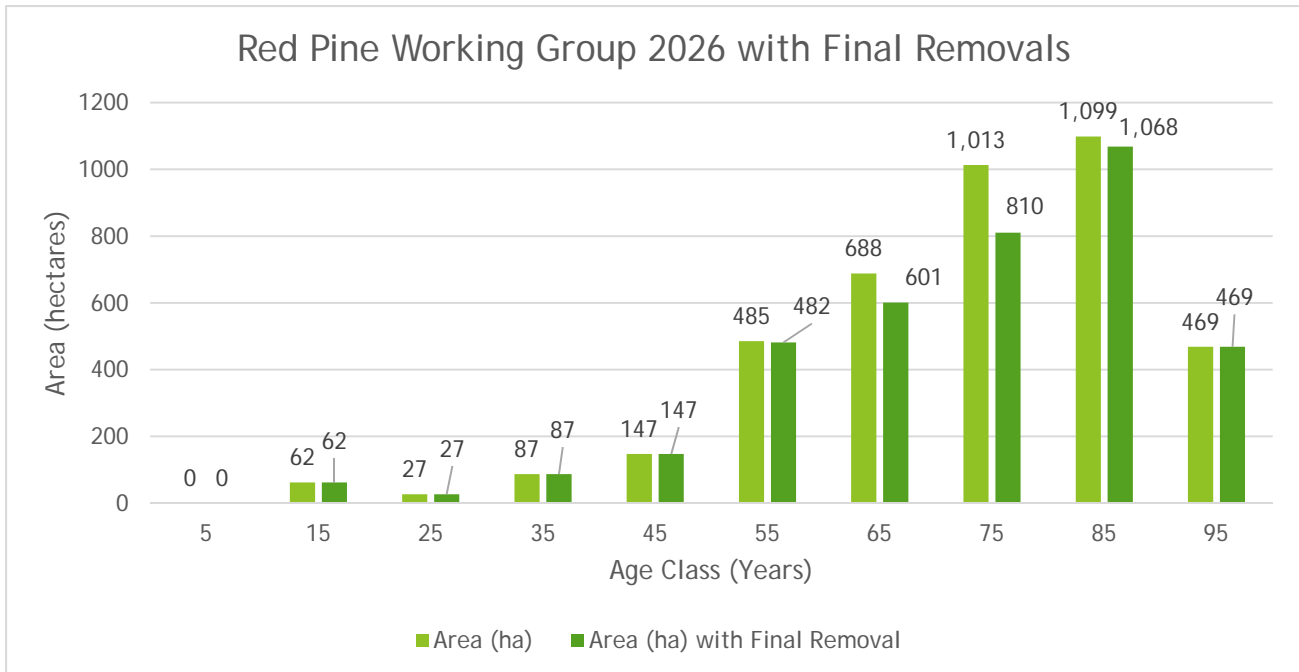
Red pine projected annual area changes due to final removals over a 30 year planning horizon



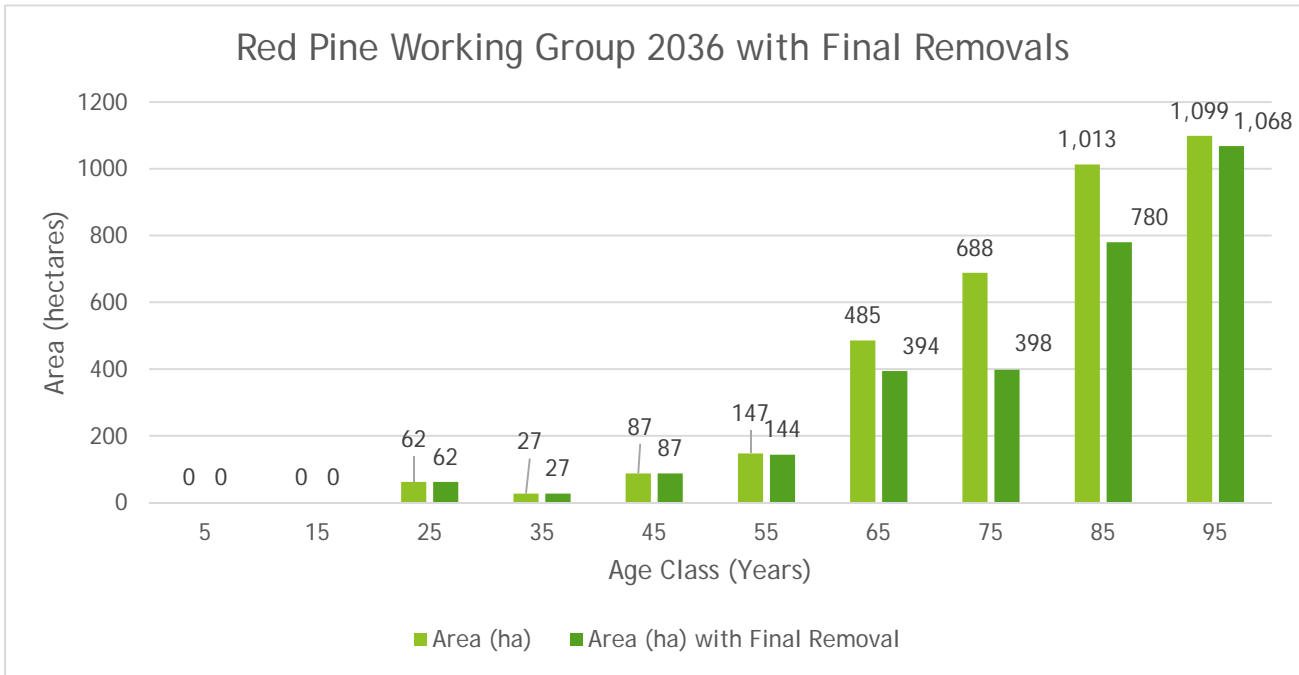
2016 changes in red pine age class relating to final removals and shortened rotational age



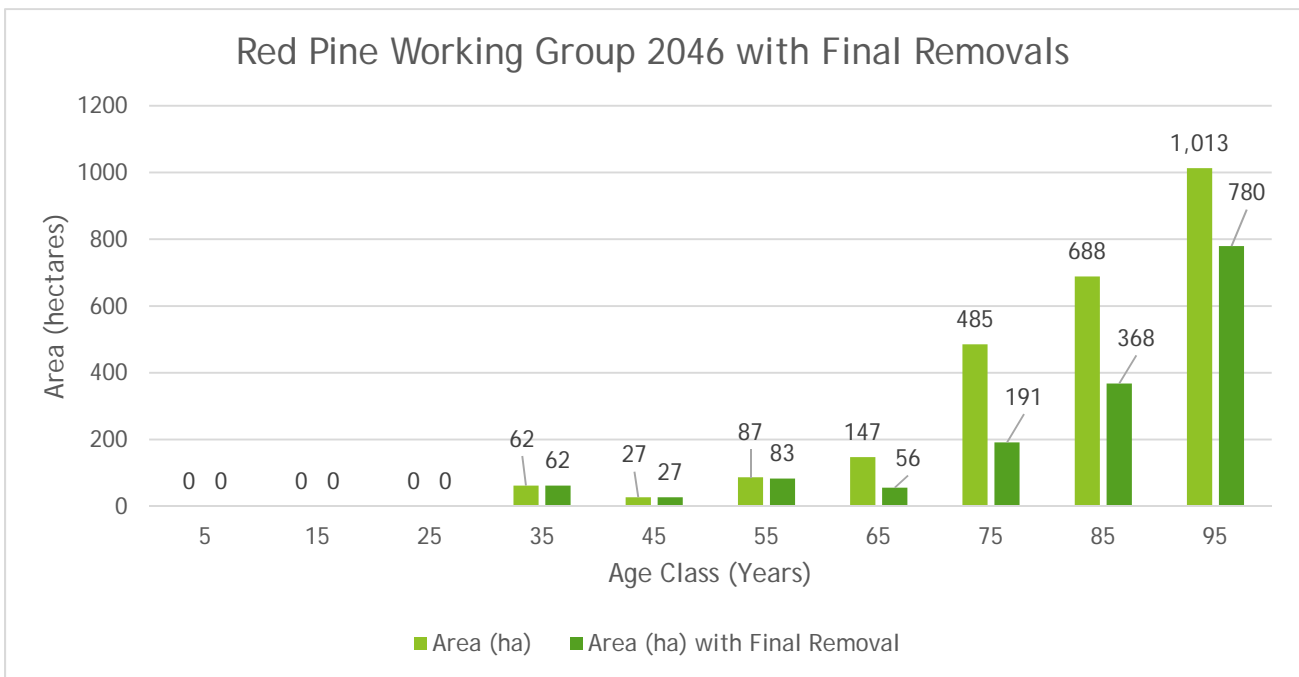
2026 projected changes in red pine age class and working group area due to final removals and shortened rotational age



2036 projected changes in red pine age class and working group area due to final removals and shortened rotational age

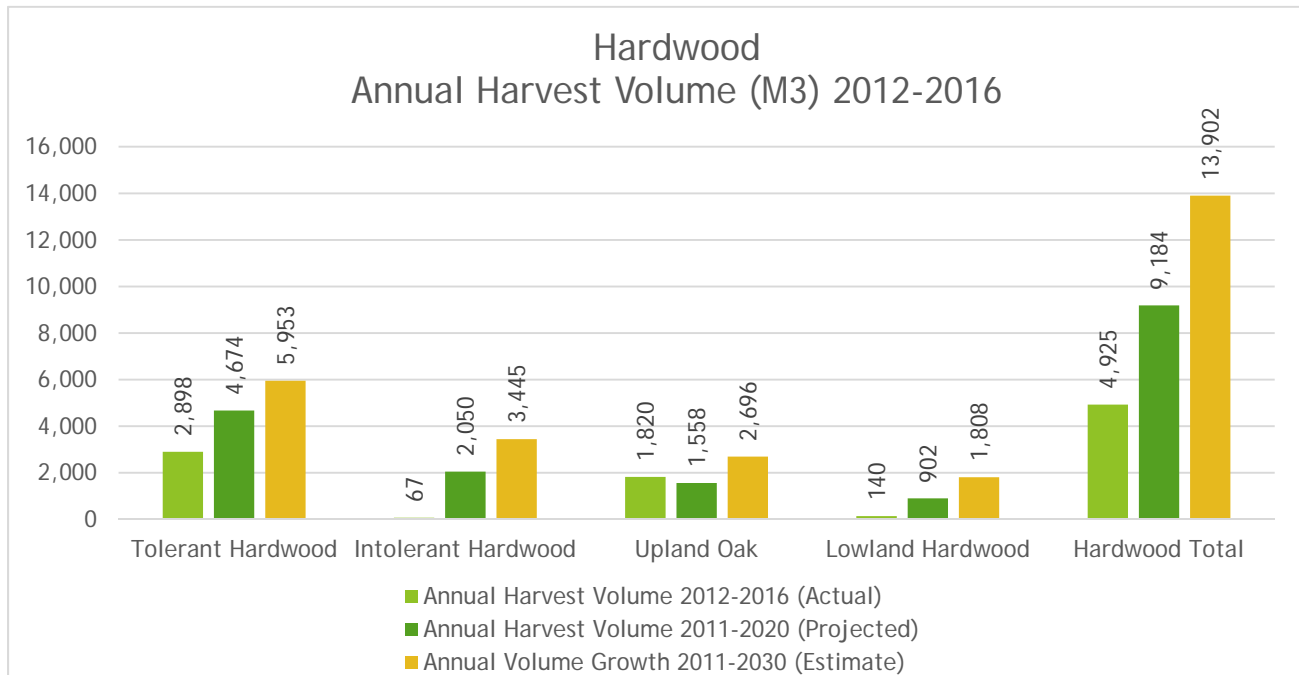


2046 projected changes in red pine age class and working group area due to final removals and shortened rotational age

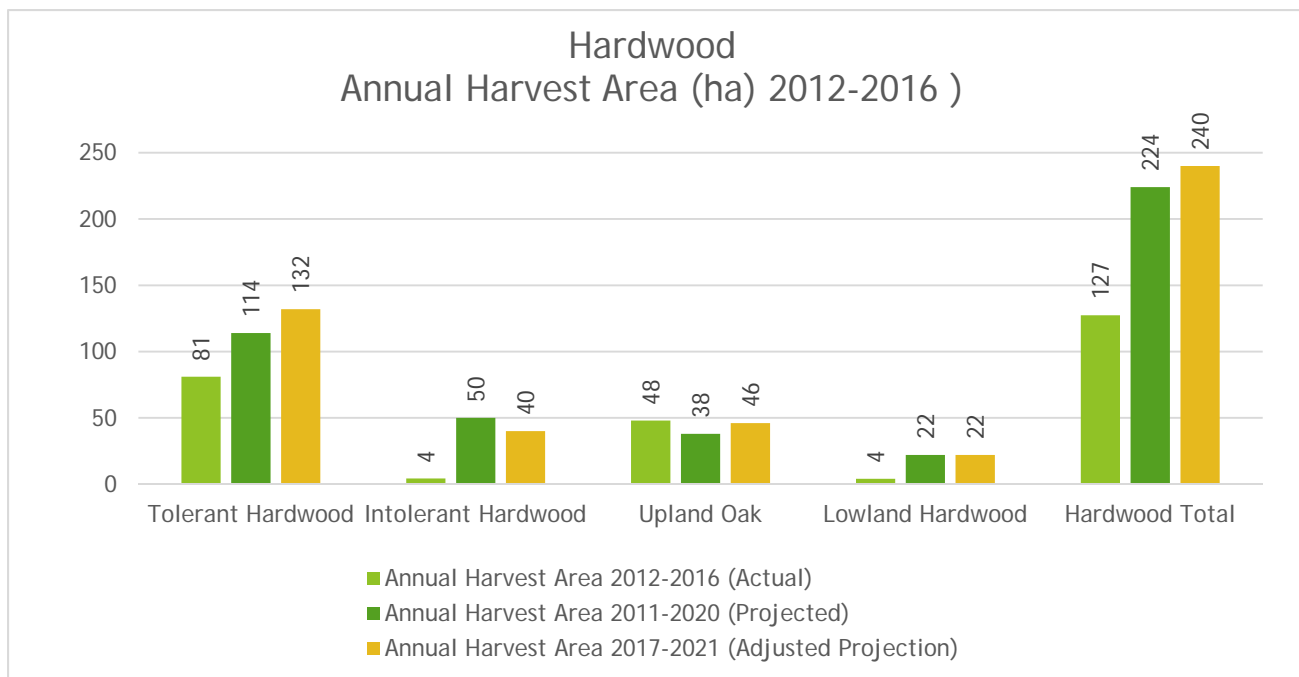


Appendix C – Hardwood Harvest Analysis

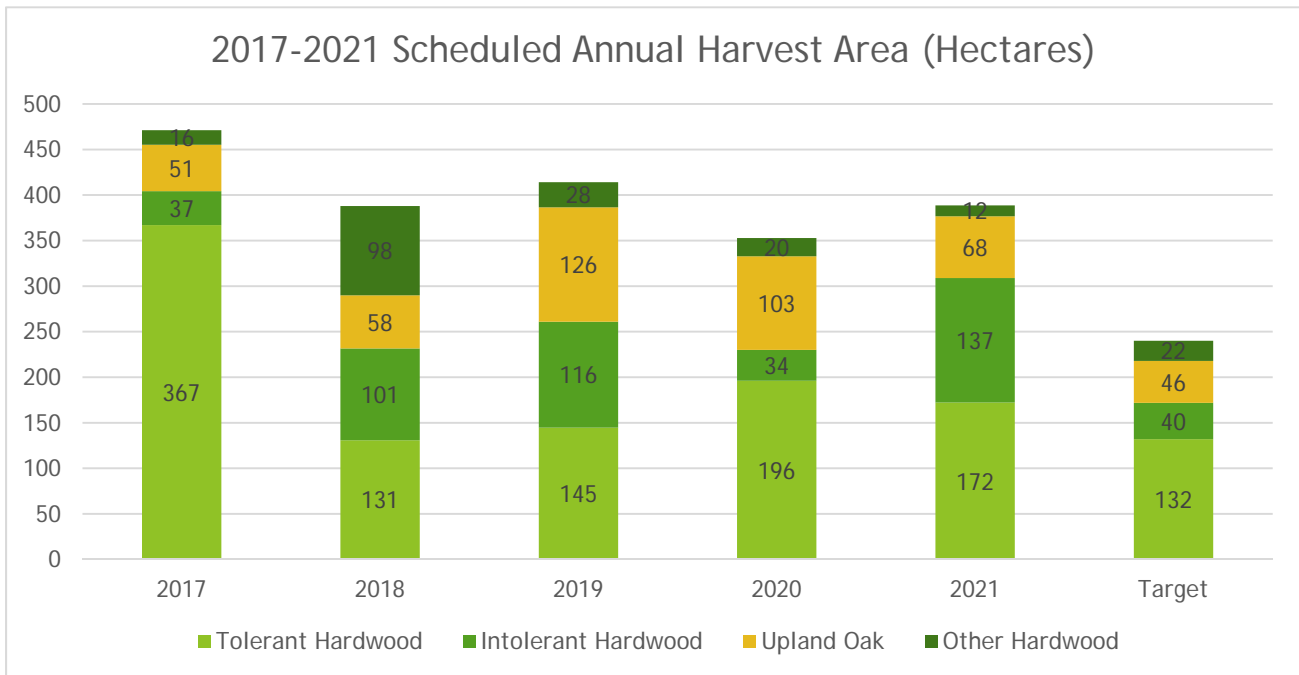
Hardwood 2012-2016 actual vs. projected annual volume harvested and annual estimated growth by working group



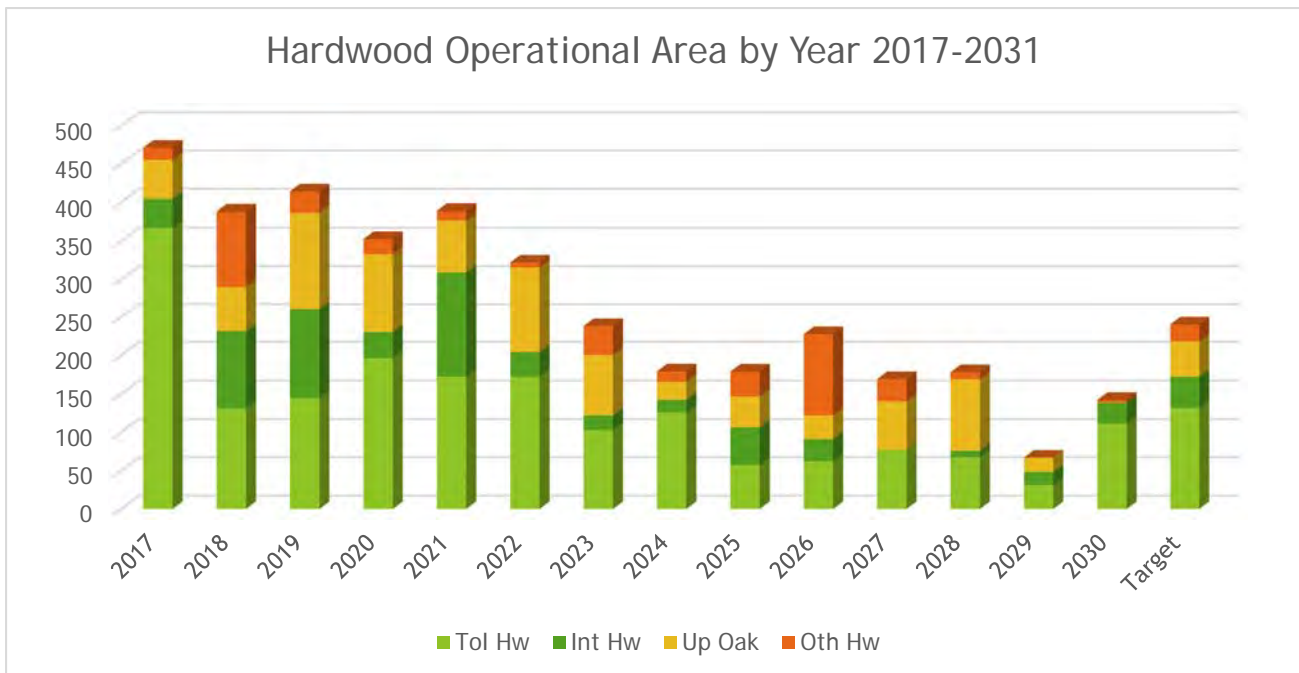
Hardwood 2012-2016 actual vs. projected annual area harvested and 2017-2021 annual area targets by working group



2017-2021 scheduled hardwood forest management



Long term hardwood forest management schedule



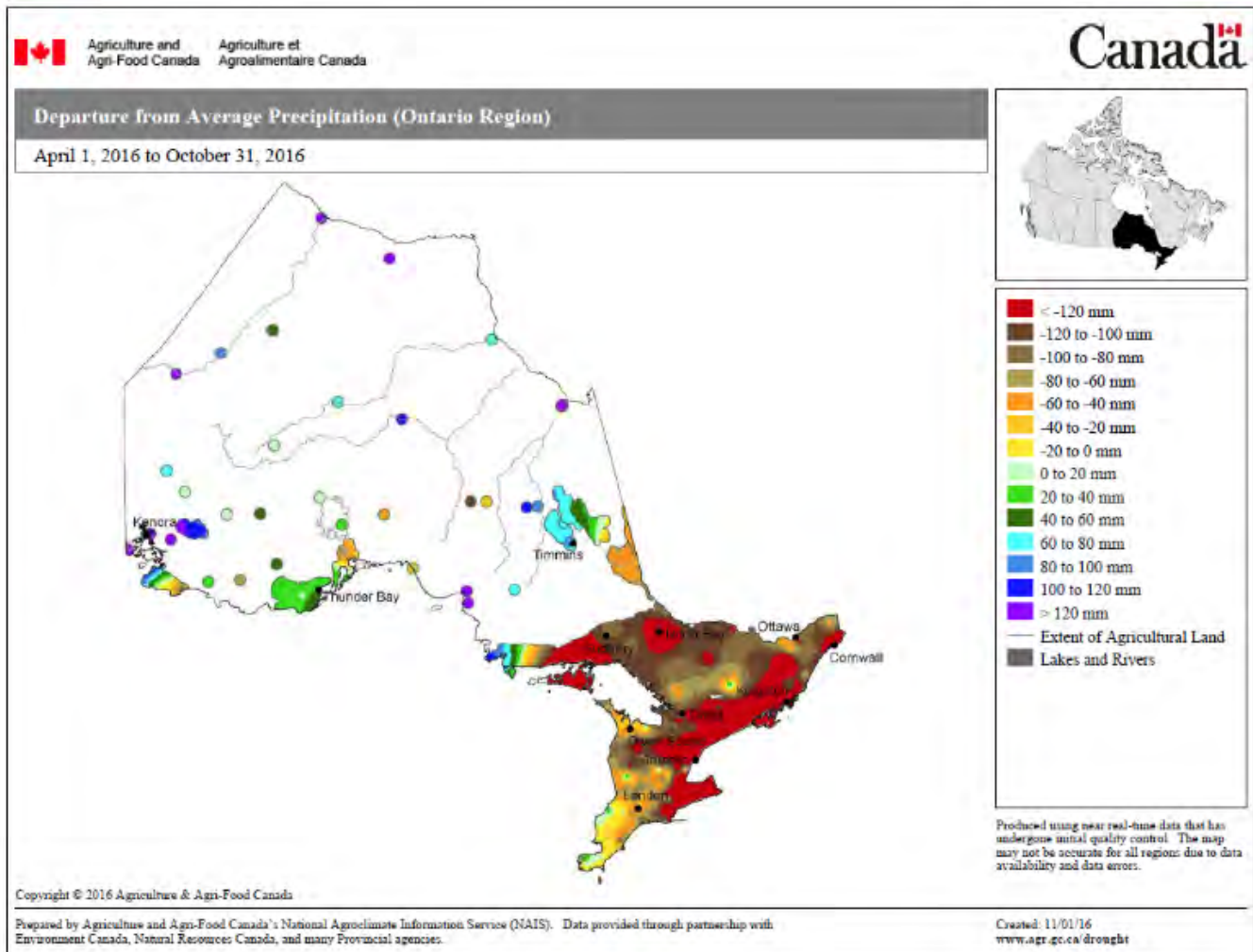
Appendix D – Areas Harvested within High Conservation Value Forests

Tract	Stand	HCV Type	Notes	Area Ha	Year Cut
Baxter	247B, 248C	SAR/REGIONALLY RARE SPECIES	Butternut	13.6	2016
Breedon	132A	SAR/REGIONALLY RARE SPECIES	Butternut	17.4	2013
Cedar Point	380D, 380E	ANSI	Thunder Beach West Regional Life Science	17.2	2015
Cedar Point	1B	ANSI	Thunder Beach West Regional Life Science	4.8	2016
Charcoal	403C, 403D	SAR/REGIONALLY RARE SPECIES	Hine's Emerald Dragonfly	5.5	2013
Hickling	211B	SAR/REGIONALLY RARE SPECIES	Butternut	9.5	2016
Huronia	454C, 454D	SAR/REGIONALLY RARE SPECIES	Hine's Emerald Dragonfly	3	2013
Miller	372A, 372C, 373B, 373C	SAR/REGIONALLY RARE SPECIES	Hine's Emerald Dragonfly	30.1	2014
Phelpston	320B	SAR/REGIONALLY RARE SPECIES	White Oak	6.4	2013
Rogers	313C	ANSI	Rugby West Provincial Life Science	9.4	2012
Sandford	140B, 141A	CULTURAL	Exclusive Use Agreement	37.9	2013
Silver Creek	90A	ANSI	Ardrea Island Provincial Earth Science	6.7	2013
Sinclair	273A	OLD GROWTH	Old growth characteristics	1.2	2014
Sinclair	272B, 274A	SAR/REGIONALLY RARE SPECIES	Butternut	7.3	2014
Smith	378B	WETLAND	Section of stand Evaluated wetland	9	2015
Stoney	471C	ANSI	Fergusonvale North Provincial Life Science	12.2	2014
Strachan	110D, 110E	SEEPS/HIGH WATER TABLE		6.6	2012
Thompson	8D	CULTURAL	Archeological site - BeGx-7	11.3	2016
Tiffin	441C	SAR/REGIONALLY RARE SPECIES	Butternut	1.2	2014
Tosorontio	267C, 268C, 269B, 270B	ANSI	Oak Ridges South Slope Forests Provincial Life Science	24.8	2014
Walker	289A, 290A	ANSI	Moonstone Northeast Regional Life Science	36.8	2015
Webb	376A	OLD GROWTH	Old growth characteristics	5.3	2016
Woods	96D	SAR/REGIONALLY RARE SPECIES	Butternut	4.5	2013
Total				281.70	

Appendix E – Forest Health Insect and Disease Summary

Name	Type	Native or Non-native	Common, uncommon or threat	Impact	SCF species impacted	Current status/management considerations
Armillaria Root Rot	disease	native	common	moderate	various conifer and deciduous	Common in SCF, affects many species but specifically red oak and red pine. Generally infects stressed trees, maintaining health of forests is important.
Asian Long Horned Beetle	insect	non-native	threat	high	maples, poplars, birches and willows	Current infestations in Toronto, Ohio, New York and Massachusetts. Infestations generally successfully quarantined or eradicated. If ever became widespread is a significant threat
Beech Bark Disease	disease	non-native	common	high	American beech	Widespread, infects many beech in SCF. Management of beech regeneration is a continuing issue.
Butternut Canker	disease	non-native	common	moderate	butternut	Disease impacts most butternut but the species isn't common. Management considerations regarding species at risk.
Cedar Leafminer	insect	native	uncommon	low	eastern white cedar	Damage is cyclical, impacts are generally low.
Emerald Ash Borer	insect	non-native	uncommon	high	white ash, black ash, green ash	Insect expected to kill most ash within the SCF. Management to mitigate effects began prior to 2011 and continues.
Forest Tent Caterpillar	insect	native	common	Low to moderate	many hardwood species	Low and cyclical impact to hardwood trees. Rarely results in tree mortality
Gypsy Moth	insect	non-native	common	low	red oak, white oak, bur oak, butternut, poplar	Low and cyclical impact.
Hemlock Wholly Adelgid	insect	non-native	threat	moderate	eastern hemlock	Spread is slow but currently in Nova Scotia and New York. Potential threat to hemlock in SCF. Spread will continue to be monitored. Future management should consider future impacts.
Heterobasidion Root Disease	disease	native	common	high	red pine, white pine, white spruce	Largest impact to red pine. Causes decline and mortality. Large impact to SCF health. Can be managed with a fungicide.
Larch Casebearer	insect	non-native	uncommon	Low to moderate	tamarack, European larch	Affected species are present but are overall low percentage in the SCF. Impact is low and cyclical
Oak Wilt	disease	non-native	threat	high	red oak, white oak, bur oak	Not in Canada but within 500m of border. Impacts could be significant. Spread will continue to be monitored
Spruce Budworm	insect	native	uncommon	moderate	balsam fir, white spruce	Spruce and Balsam Fir are not heavily managed species in the SCF but are common. Climate change predicted to make spruce budworm more common.
Thousand Canker Disease	disease	non-native	threat	low	black walnut	Present in Pennsylvania and Ohio. Walnut is not a predominate species in SCF. Spread will be monitored but impact potential is low.
White Pine Blister Rust	disease	non-native	common	low	white pine	Impacts are generally low.

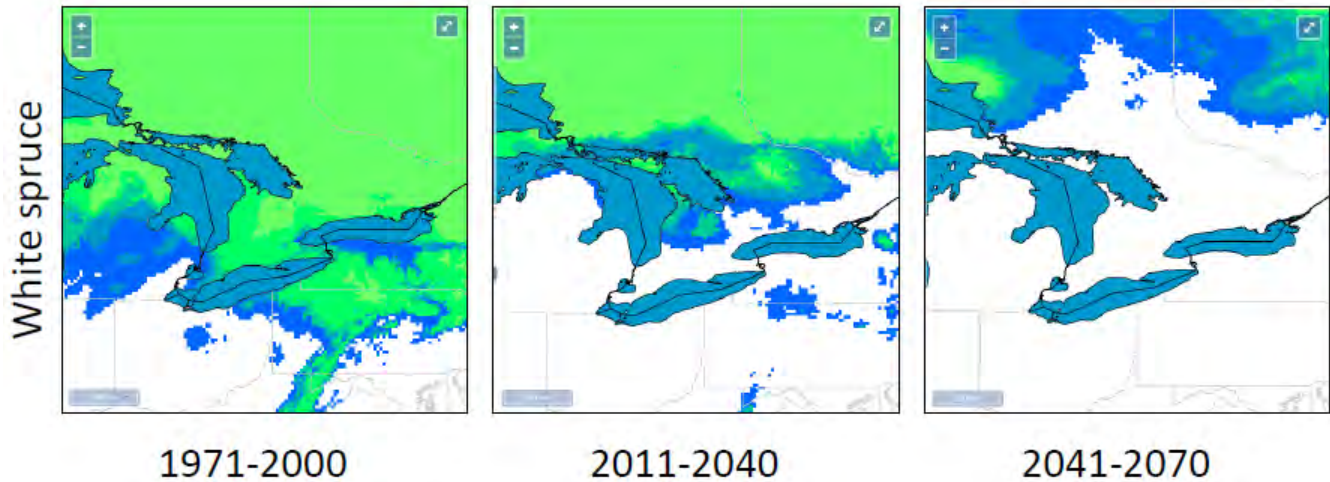
Appendix F – 2016 drought conditions in southern Ontario



Appendix G – Changes to species ranges due to climate change

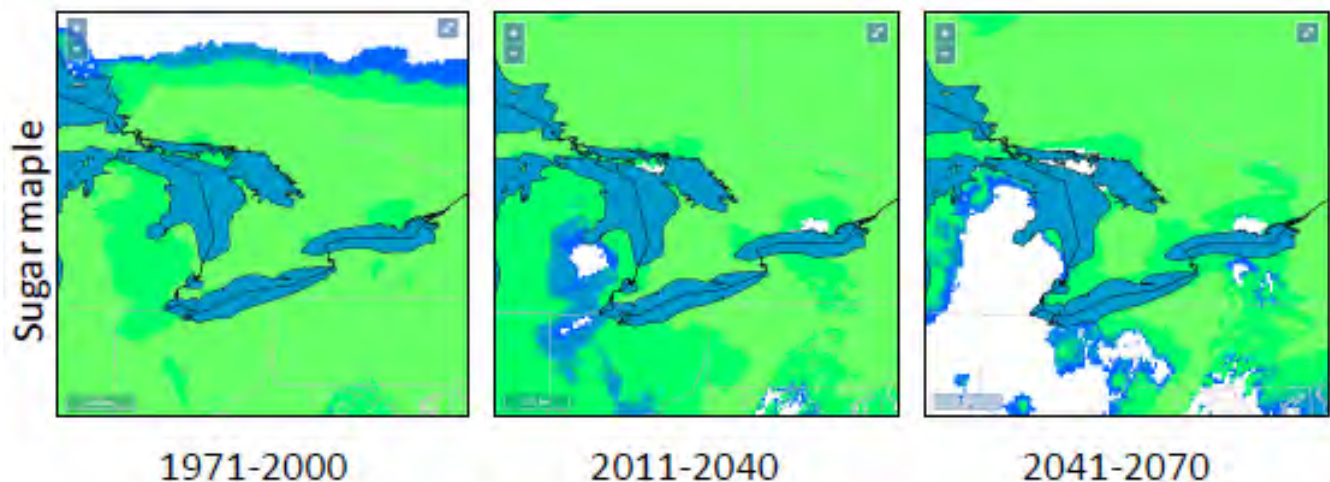
Retreating species ranges

The projected natural range of white spruce is expected to move north of Simcoe County in coming decades. Green is core range, blue is marginal range, white is outside of range for the given time period. Data also suggests that balsam fir, eastern white cedar, white birch, tamarack and trembling aspen ranges are moving north due to climate change.



Persisting species ranges

Some tree species are expected to persist including maple (sugar, red, silver), Oak (red, white, bur), white pine, beech, black cherry and ash.



Advancing species ranges

It is projected that species such as hackberry, hickories, southern oak species, sycamore, tulip tree and blackgum retreating from their core range in the south will advance into the SCF region.

