

A **Report** from:

Innovative Natural Resource Solutions, LLC

FINAL September 10, 2015

For an Initial Wood Supply Analysis

For the **Windham Wood Heat Initiative**

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Executive Summary

The Windham Wood Heat Initiative (WWHI) is designed to help at least 20 municipal and school buildings in the County convert facility heating to local, sustainable wood fuel using advanced wood heating systems over the next several years. It seeks to do this while addressing building energy efficiency and durability needs in the buildings where assistance is to be provided as well as assuring that the wood fuel supply which will feed these new users of wood fuel, is available and sustainable.

In this report, Innovative Natural Resource Solutions, LLC, one of the WWHI partners, presents an initial wood supply analysis that will serve to inform the WWHI team and the users of WWHI's services.

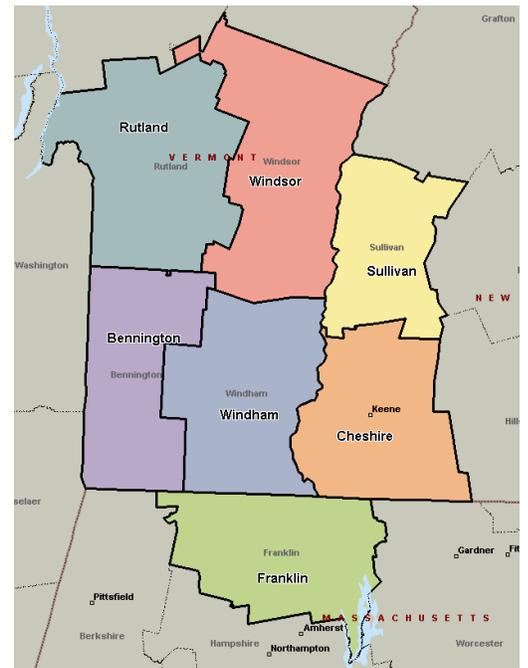
For the purposes of this wood supply analysis, we are concentrating on the 7-county area in Vermont, New Hampshire and Massachusetts depicted at right. This area contains over 2.2 million acres of timberland¹, over 80% of which is privately owned.

It is anticipated that the 20 schools and municipal buildings that may switch to wood fuel may use - on the high end - 8,000 new green tons of wood fuel per year.

Should the WWHI be successful in reaching its goal, our analysis indicates that there is ample additional supply of low grade wood resource available.

Our analysis, which excludes all public land and additional acreage due to regulatory and physical constraints, shows that between 252,000 green tons and 578,000 green tons are currently available in the Region.

A series of computer model runs suggest between 589,000 and 982,000 green tons will be available in the year 2035 - much larger volumes than today - because the forests of the seven-county region are growing much more wood than is being used each year.



¹ Timberland - forest capable of producing commercial timber crops on a continued basis.

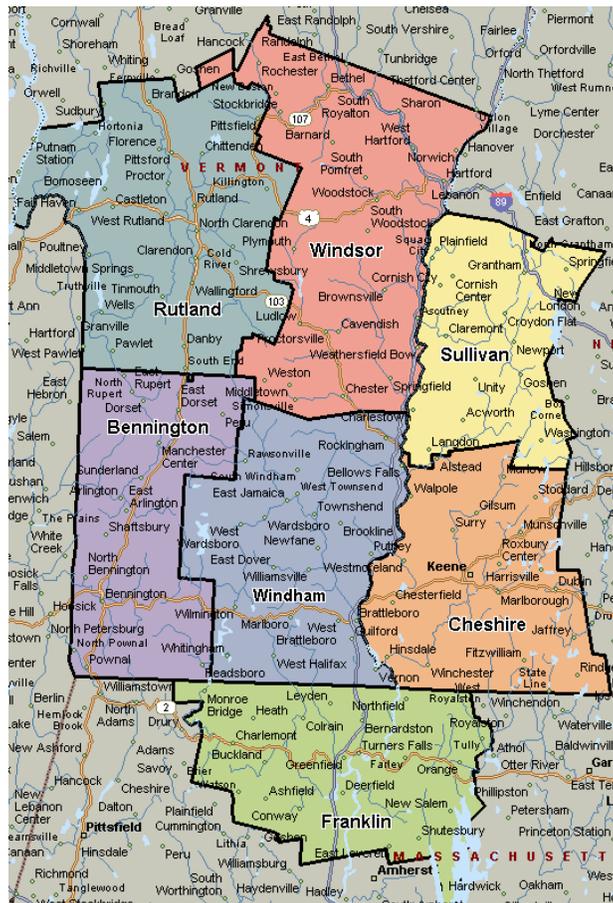
I. Introduction

The Windham Wood Heat Initiative (WWHI) is designed to help at least 20 municipal and school buildings in the County convert to heating with local, sustainable wood fuel using advanced wood heating systems over the next several years. It seeks to do this while addressing building energy efficiency and durability needs in the buildings where assistance is to be provided as well as assuring that the wood fuel supply which will feed these new users of wood fuel, is available and sustainable.

Innovative Natural Resource Solutions, LLC, one of the WWHI partners, is an expert in wood supply analyses, having conducted over 100 such analyses throughout the continental United States and Alaska in the last 20 years. This report represents an initial wood supply analysis that will serve to inform the WWHI team and the users of WWHI's services.

Given the goals of the WWHI, it is important to develop a clear understanding of the available wood supply from the forests of the WWHI region. For the purposes of this wood supply analysis, we are concentrating on the 7-county area in Vermont, New Hampshire and Massachusetts depicted in Figure 1 below.

Figure 1. Windham
Wood Heat Wood
Supply Analysis Area



This study evaluates and draws its conclusions from four different data and information sources:

- Existing information previously generated on the topic;
- Current data and information from the USDA Forest Service Forest Inventory and Analysis (FIA);
- Possible future scenarios using the Biomass Project Evaluator tool; and
- A review of large low-grade wood users in the project wood supply area.

II. Review of existing work

The relevant recent work on the topic of timber resource availability for use in Windham County, Vermont includes the following three analyses:

- a. Master's thesis (2012) entitled "The Forest Products Industry of Windham County, Vermont: Status, Challenges, and Opportunities", Doug Morin

In this study, the author, a Master's candidate at the University of Vermont in Natural Resources at the time, reviewed the full spectrum of the forest resources and forest products industry in Windham County. The thesis looked at all uses of timber resources in the County, not just the use of low-grade woody material or wood fuel. Morin's 86-page study's purpose was stated in the document:

"Through the synthesis of existing data and key-informant interviews, this study seeks to provide a foundation of information on the condition of Windham County's forests and forest industry, and to explore the important factors, challenges, and opportunities for the industry."

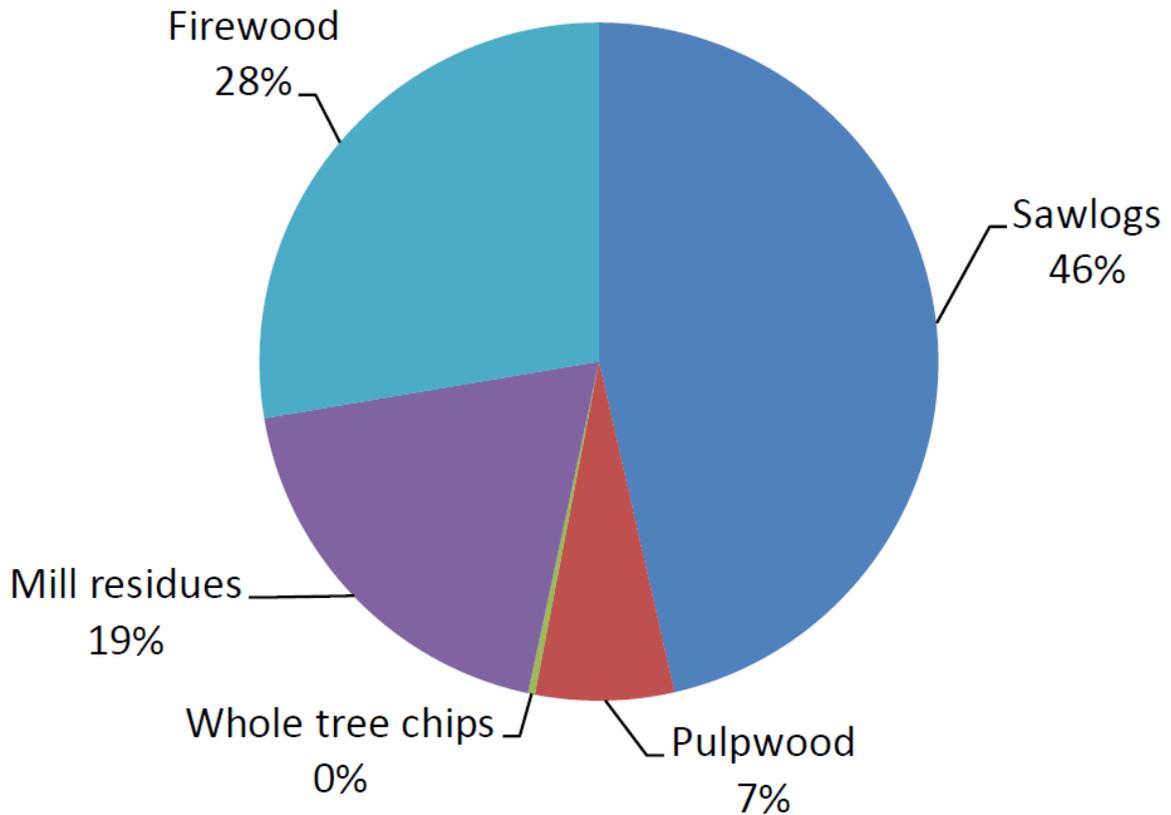
Morin used 2008 vintage data from the USDA Forest Inventory and Analysis (FIA) in his study. Our study (see Sections III & IV) uses the latest data set from FIA, providing the basis for more accurate and relevant conclusions.

Morin concluded that Windham County has the most volume of standing trees of any Vermont county at 1.6 billion cubic feet and grows over 20 million cubic feet per year (approximately 250,000 cords). The forests in Windham County are more productive than other Vermont counties because they are found at lower elevations characterized by richer soils.

Morin also used data on harvest levels in Windham County from the annual surveys conducted by the Vermont Department of Forests, Parks and Recreation. From these data, he concludes that harvest volume for all products in Windham County in the year 2008 was 108,000 cords or 43% of growth. As a result, he concludes that forests in the County are gaining in volume.

Of that 2008 harvest level, Morin shows the breakdown of products from data provided by the VT Dept. of Forests, Parks and Recreation (Figure 2). We should note that we do not believe the "Whole tree chips 0%" is accurate.

Figure 2 Windham County 2008 timber harvest by product



Source: VT Department of Forests, Parks & Recreation, graph by Doug Morin 2012

Morin completed his study with a review of the wood using manufacturing sectors in the County and the workforce that harvests the wood and transports it to the manufacturing markets. He concluded that within the County there were 33 loggers and firewood producers, 14 foresters, 1 log yard, 30 primary wood using mills, 43 secondary processors, 4 lumber yards, and 5 biomass heating facilities. The primary wood chip users in the County then included four schools: Brattleboro Union, Whitingham Elementary, Leland & Gray Union, and Westminster Center.

Morin concludes by saying that the County's forests, though covering over 90% of the land area, have been high graded² due to lack of low-grade wood markets. He believed that the "...best prospect for creating low-grade wood markets in Windham County may be biomass energy."

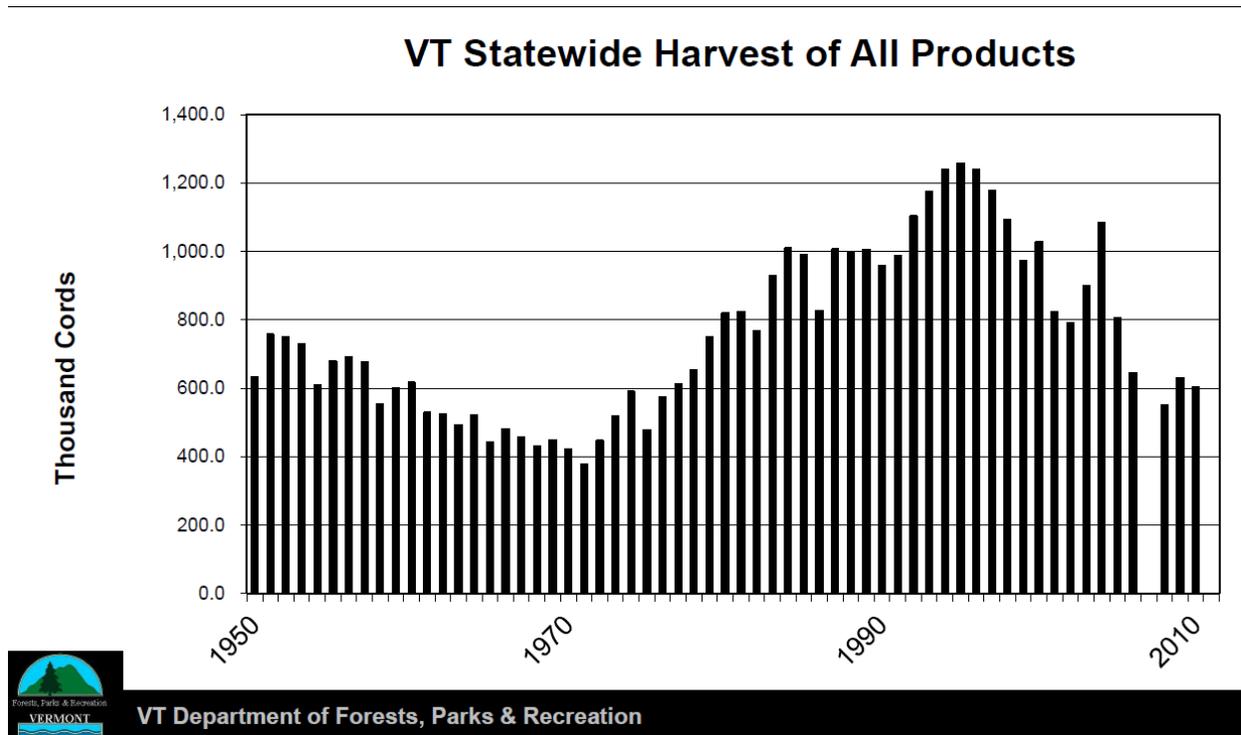
² High grading means harvesting the best quality trees while leaving the lower quality trees resulting in a lower quality forest after the harvest compared to pre-harvest.

b. Paul Frederick, VT Dept. of Forests, Parks & Recreation presentation on Windham County wood supply, January, 2014

Paul Frederick, the Forest Markets and Utilization Forester for the Vermont Department of Forests, Parks and Recreation, produced a PowerPoint presentationⁱⁱ and delivered it to a group of the Sustainable Energy Outreach Network in January, 2014.

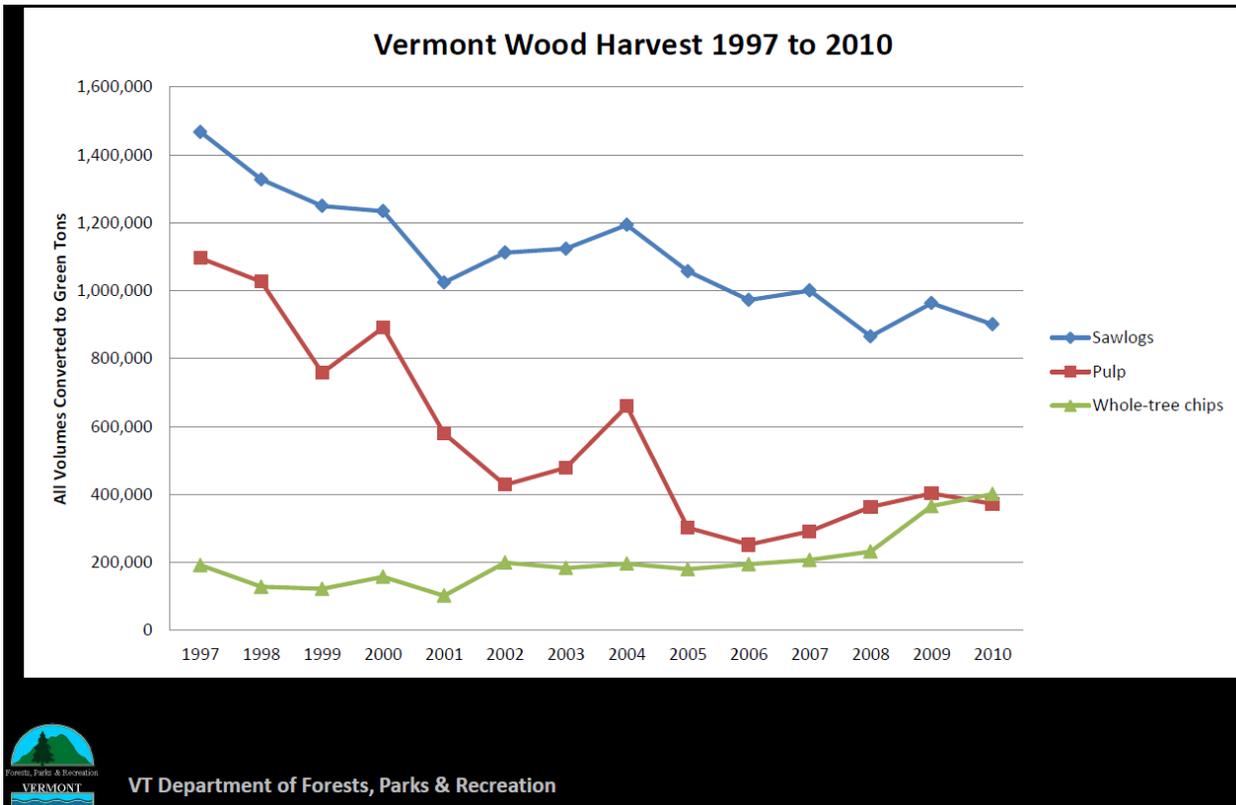
In Figures 3 and 4 of his presentation, Frederick reviewed harvesting trends from data his agency collects.

Figure 3 Timber Harvesting Trends in Vermont



According to Frederick, in 2010, Windham County grew over 275,000 cords of wood per year while over 80,000 cords (including firewood harvest) were removed through harvesting. Harvest volume could be higher than 80,000 cords but good county data on firewood harvests is lacking.

Figure 4 VT timber harvesting trend by product



Frederick also reviewed Windham County specific data and information. The most relevant of these for the WWHI are contained in the Figures below.

Figure 5 Windham County major wood users

Sawmills

- **Allard Lumber**
- **Cersosimo Lumber**
- **13 small commercial mills**

Wood Fuel Users

- **3 Dry Kiln Operations**
- **4 Wood Chip Heated Schools**
- **3 Pellet Heated Schools**
- **1 Pellet Heated Housing Project**
- **1 Elderly Housing Project**

Source: Paul Frederick,
VT Dept. of Forests, Parks
and Recreation

Frederick concluded his presentation with the results of a model run using the Biomass Project Evaluator. Please see Section IV of this report for a more up-to-date set of runs using the model.

c. BERC 2010 Vermont Wood Supply Study³.

The Biomass Energy Resource Center (BERC) conducted a study in 2007 entitled “*The Vermont Wood Fuel Supply Study: An Examination of the Availability and Reliability of Wood Fuel for Biomass Energy in Vermont*”. The 2010 study is an update of the 2007 work using updated data from the USDA Forest Service, FIA dataset.

The purpose of the original 2008 study and the update are summarized from the report's executive summary:

“While the original 2007 study examined a wide spectrum of issues affecting the supply of wood fuel, this update focuses solely on the recalculation of the potential for further wood fuel from Vermont's forests using updated data made available by the USDA Forest Service in the time since the completion of the 2007 study.

The original 2007 study utilized the most up to date data available at that time (from 1997) for forestland area, ownership, inventory, and growth data; newer data (using slightly different methods) are now available from the USDA Forest Service Forest Inventory and Analysis (FIA) program. This is the primary reason for conducting an updated study.

The objective of this study was to calculate supply of Net Available Low-grade Growth (NALG) wood—wood that would be appropriate for use as biomass fuel above and beyond current levels of harvesting—available annually in the State of Vermont, including assessment of both Vermont's counties alone and a larger study area comprising Vermont and the adjoining 10 counties of New Hampshire, Massachusetts, and New York.”

The update is a statewide report, as was the 2007 study, and makes some major conclusions about availability of additional wood from the forest for energy purposes. These are best captured in the following two Figures (6 & 7). The study concluded that Windham County had the largest net available low-grade growth of any VT county.

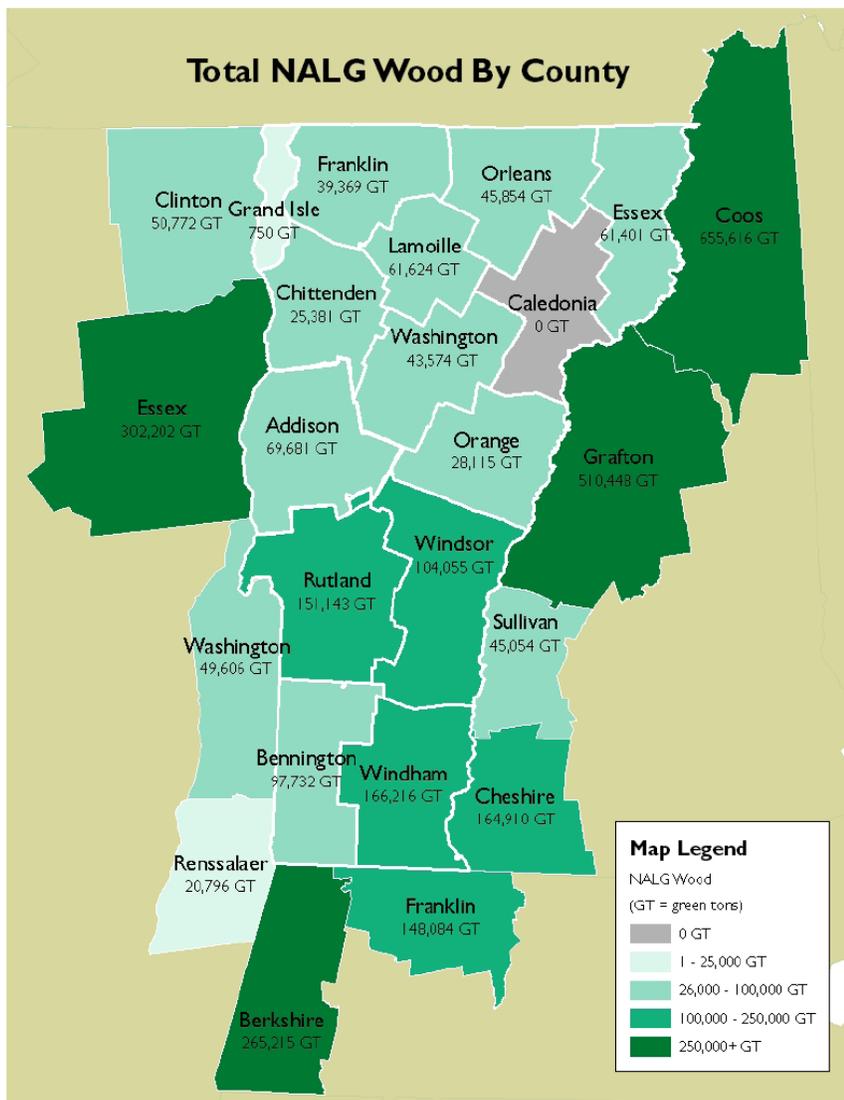
³ It should be noted that the Northern Forest Biomass Project Evaluator (BPE) referenced above in the Frederick presentation and in much more detail below in Section IV with new model runs, had its origins in the methodology of the BERC 2007 study. Though similar in approach to the BERC study, which was innovative in its approach, the BPE model design and approach was changed from the original BERC study design for a variety of reasons with the intent of delivering results that were more accurate, more user-friendly and interactive for the user.

Figure 6 BERC 2010 Study update – Net Available Low-grade Growth (green tons)

Green Tons of NALG Wood			
	Conservative Scenario	Moderate Scenario	Intensive Scenario
Vermont Counties	246,800	894,900	1,940,700
Vermont and 10 Surrounding Counties of NH, MA & NY	1,332,400	3,107,600	5,822,500

Source: Biomass Energy Resource Center, 2010

Figure 7 BERC 2010 Study update - spatial distribution of the NALG wood resource



Source: Biomass Energy Resource Center, 2010

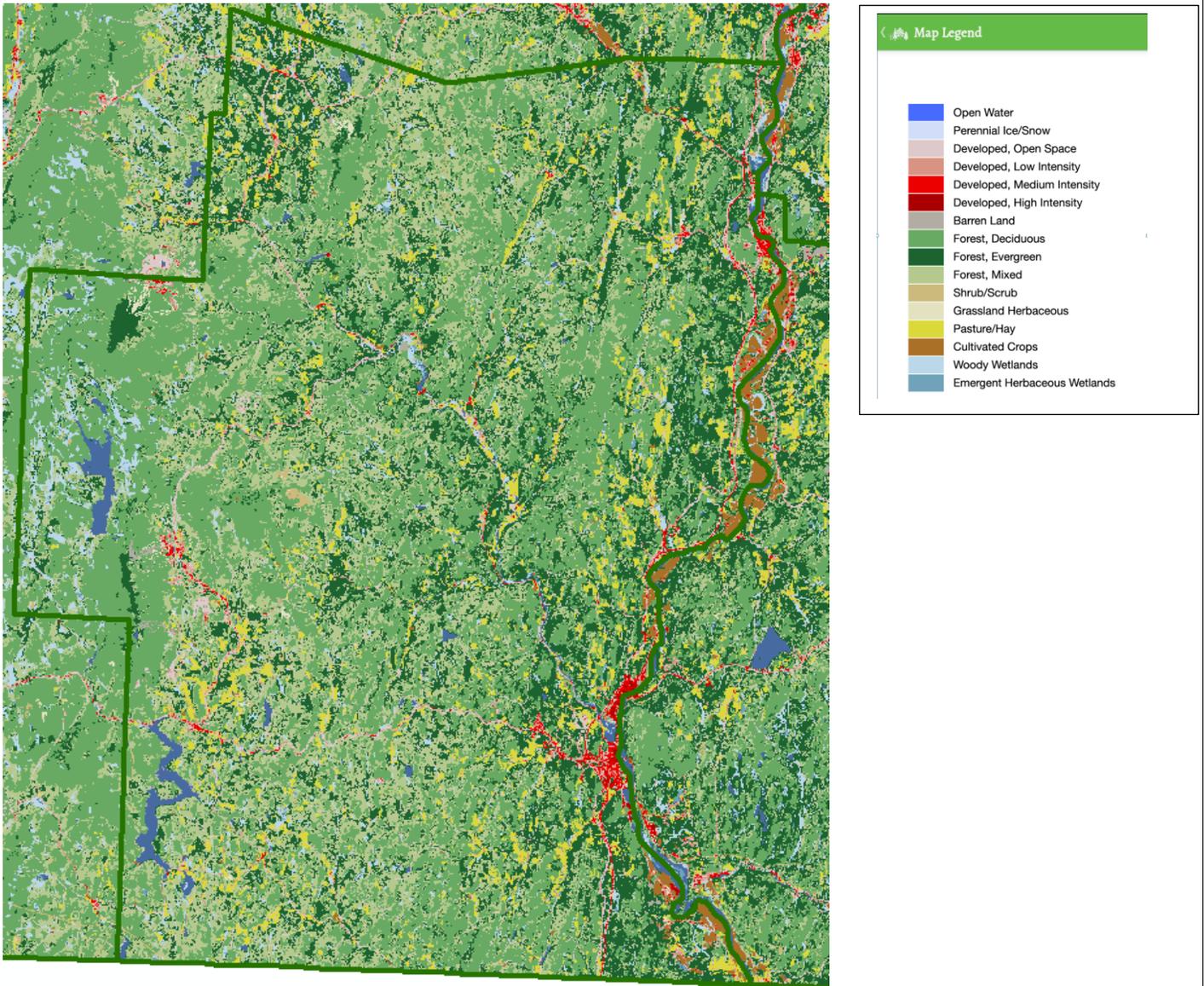
III. New analysis using FIA data

In this section we use the most updated information and data from the USDA Forest Service, FIA dataset to run an analysis of forest acreage, standing volume and growth and removals in the WWHI seven-county wood supply area. The goal is to provide the most up-to-date analysis of wood availability to assure clear understanding of the wood fuel availability for new users of wood fuel that will result from the WWHI.

A good place to start this review is to gain an understanding of the characteristics of the forests of the WWHI wood supply region, first starting with Windham County itself.

A very helpful way to get a snapshot of the forests of Windham County is to review an image of land cover data for the area. Land cover data, used in Geographic Information System (GIS) analyses, comes from a national dataset developed by the U.S. Geological Survey of the U.S. Dept. of Interior. These data are easier to read than looking at satellite photography since the color gradations in such a photograph are subtle compared to those in the Land Cover image. Below, in Figure 8, the Land Cover image shows a county dominated by 93% forests (all shades of green) and, particularly, hardwood forests (medium green).

Figure 8 Land Cover map – Windham County, Vermont

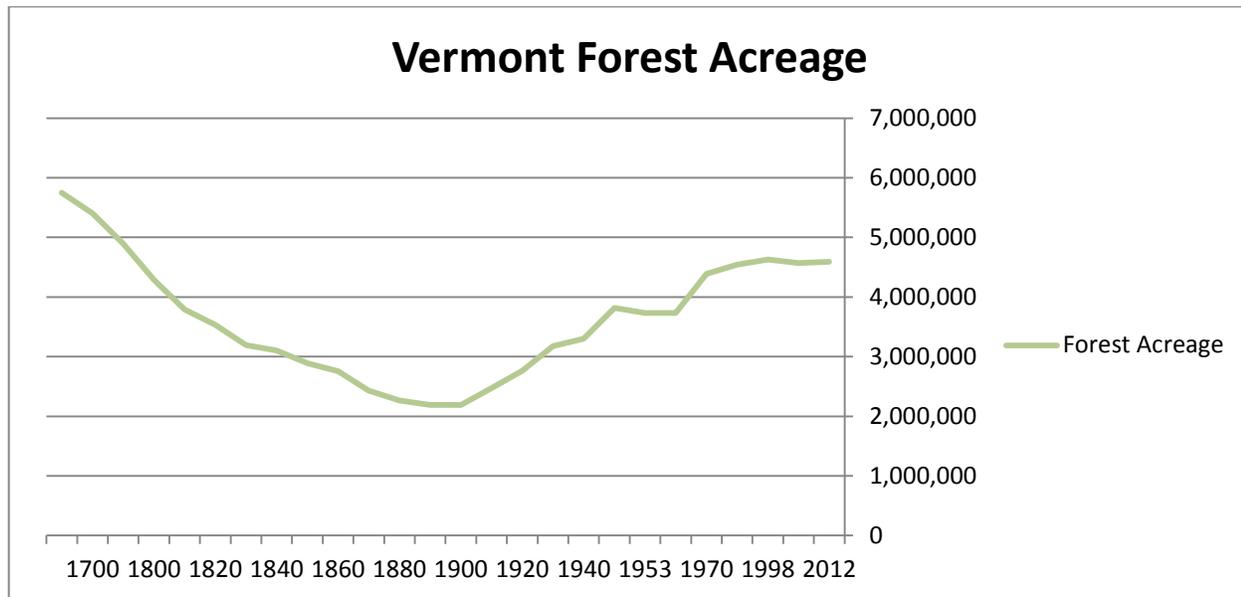


Source: U.S. Geological Survey

Compared to the distant past, Windham County's forests have rebounded from much lower acreage in the mid-1800s when much more farm land existed. Figure 9 shows the trend of forestland cover in Vermont since the 1600s from a dataset developed and maintained by the Harvard Forest in Petersham, Massachusetts.

Windham County has mirrored this statewide Vermont trend.

Figure 9 Forest Acreage Trends – Vermont



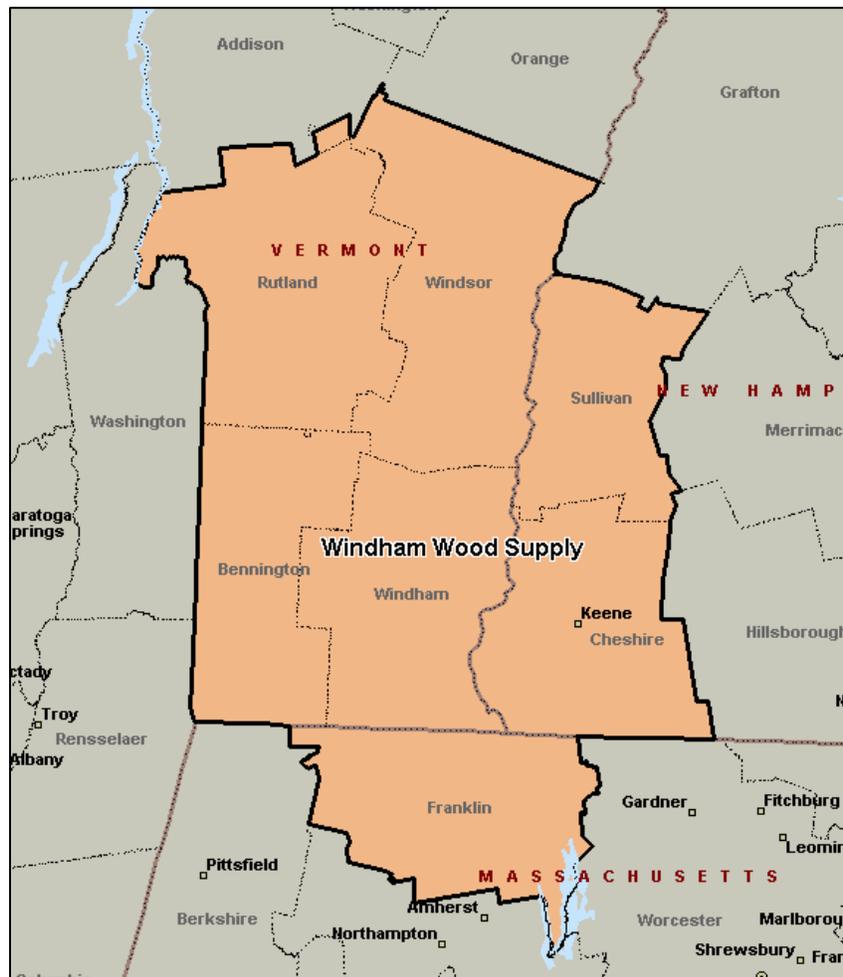
Source: Harvard Forest – multiple data sources

Area of Analysis

This FIA-based analysis focuses on the wood supply for Windham County, Vermont, as well as the counties surrounding Windham County (the “Region” see Figure 10):

- Bennington, Rutland and Windsor Counties in Vermont;
- Cheshire and Sullivan Counties in New Hampshire; and
- Franklin County in Massachusetts.

Figure 10. Area of Analysis



INRS used the FIA EVALIDator tool (version 1.6.0.01ⁱⁱⁱ) to estimate for the Region:

- Land ownership;
- Annual forest growth (how much wood grows each year, less mortality);
- Annual forest removals (how much wood is currently harvested annually); and
- Volumes of low-grade material (wood not suitable for sawlog or other higher value markets).

The factors above allow INRS to calculate the volume of woody biomass that is growing in the region that can be harvested and used as biomass fuel today, while recognizing that some material is of a higher quality such that landowners and loggers will not chip it for forest-derived biomass fuel.

In Section IV, we expand these FIA analyses with use of the Biomass Project Evaluator which uses the same data as we have used in this Section and further analyzes them to better understand likely future projections based on various assumptions.

Forest Growth and Removals

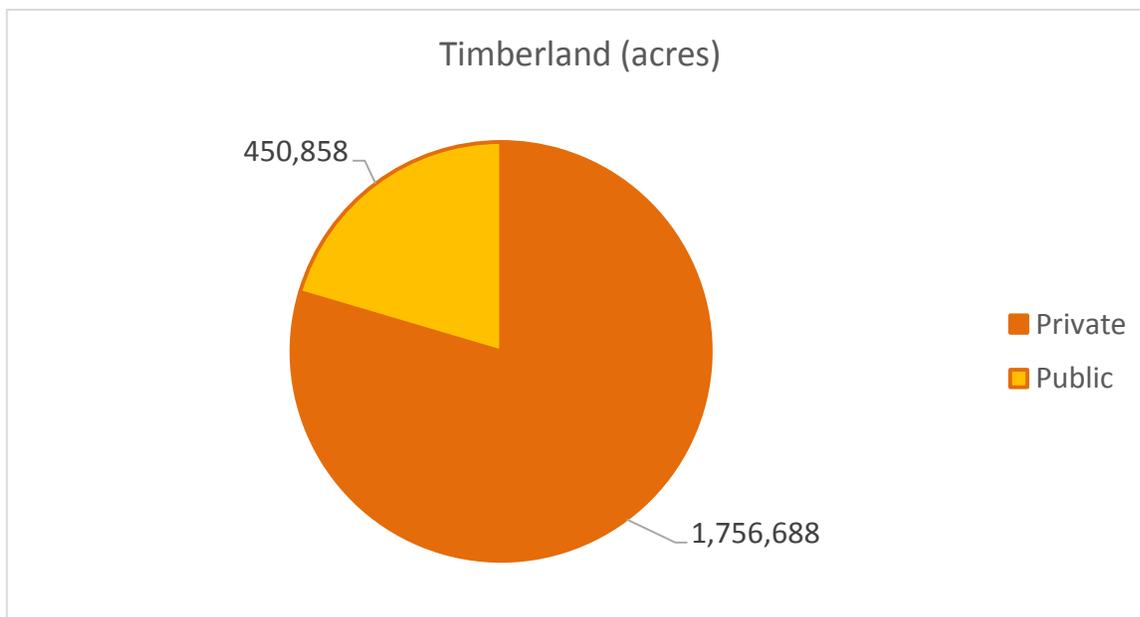
Using the FIA database, INRS determined the growth and loss (harvest and mortality) for the Region.

The FIA database is developed from information collected annually from a subset of permanent plots, and is used to provide an estimate of changes in the forest resource over time. A complete re-inventory of all plots occurs approximately every five years. INRS used the most recent complete FIA information, which uses data collected between 2009 and 2013^{iv}. The FIA data accessed includes estimates of the area of timberland, ownership type, and annual growth and removals of wood by species group.

Using the FIA database described above, INRS estimates that over 2.2 million acres of “timberland” - land capable and legally available for growing commercial forest products - are within the Region of analysis.

Of this, the vast majority of this timberland – 1,756,688 acres (80%)- is owned by private landowners. Private landowners are a highly preferable landownership class for a wood using facility to locate near, as they are able to harvest timber absent most political and government budget considerations, and generally react rationally to market signals. Importantly, timberland excludes any lands where commercial timber harvesting is prohibited by statute or regulation, so that these lands are excluded from the analysis below.

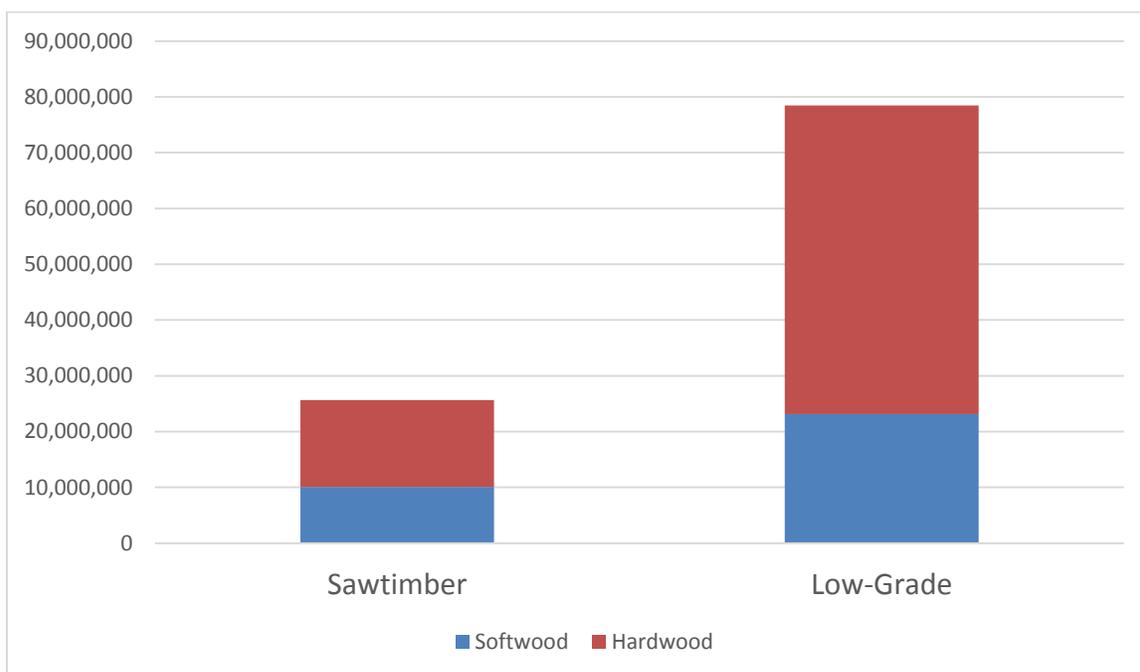
Figure 11. Regional Timberland Ownership (acres)



In an effort to evaluate only those lands likely to be available for timber harvesting, INRS limited this analysis to only private lands with a slope of less than or equal to 35 percent. It is possible that biomass fuel for thermal applications will come from public lands or lands with steep slopes, but this analysis is conservative and assumes that this will not occur.

On these lands, about three quarters of the standing timber is low-grade, unsuitable for use in lumber manufacturing or other high-value applications.

Figure 12. Standing Volume, by Species Type, in Green Tons⁴



⁴ Green tons – means tons of wood in its live or recently live state. Live or recently live timber contains as much as 55% of its weight in water.

With all current area markets in place and operating in the Region of analysis, additional annual growth levels of low-grade material⁵ that can be used as forest-derived fuel (and are not currently being used) exceed harvest (removal) levels by +/- 578,000 green tons.

Table 1. Standing Timber and Annual Net Growth⁵ - Removals for Region (green tons)

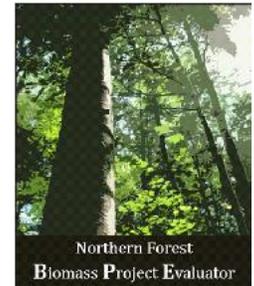
	Softwood	Hardwood <i>Green tons</i>	Total
Standing Volume			
all	33,219,504	70,912,195	104,131,700
sawlog	10,094,121	15,574,148	25,668,269
non sawlog	23,125,383	55,338,047	78,463,430
Net Growth			
all	846,553	1,346,931	2,193,484
sawtimber	339,291	589,276	928,567
non-sawtimber	507,263	757,655	1,264,917
Removals			
all	286,414	611,816	898,230
sawtimber	78,876	132,702	211,578
non-sawtimber	207,538	479,113	686,652
Net Growth - Removals			
all	560,139	735,115	1,295,255
sawtimber	260,415	456,574	716,989
non-sawtimber	299,724	278,541	578,266

It should be noted that the above estimate does not include the volume of the tops and branches of the trees in the Region although an estimate of those additional volumes could be developed. Given the size of the facilities likely to switch to wood fuel heat as a result of WWHI efforts, the probable fuels will be wood pellets, green bole wood chips (no tops) and semi-dry wood chips (no tops). Top wood material (so-called whole tree chips), produced as part of whole tree harvesting operations, are generally unsuitable for use in these smaller facility biomass heating systems.

⁵ Net Growth – annual growth of wood in the forest area less mortality

IV. Possible Future Forest Biomass Availability Scenarios – Biomass Project Evaluator

The Northern Forest Biomass Project Evaluator (BPE) model was created by INRS on behalf of the North East State Foresters Association⁶ (www.nefainfo.org) through grant support from the USDA Forest Service. The BPE tool is intended to be used as a decision support tool for analyses of wood supply under different conditions for a geographic area, including the supply of low-grade wood for energy projects.



The power of the BPE model is its ability to project possible forest future scenarios using varying assumptions. All three scenarios outlined below are conservative in that they do not include any public land and they further discount 9% of the private timberland remaining for various factors (see Appendix for details). These are more conservative assumptions than provided for in Section III above and, hence, the available biomass material is less in the current year compared to the Section III results. All scenarios here look at the next 20 years. For the purpose of this report, we have chosen to conduct three “runs” of the model⁷.

Run 1 Reduced growth run – assumes that wood use remains constant but that forest growth is reduced by .2 % per year over the run period. This choice reflects factors such as insects and diseases (hemlock wooly adelgid, emerald ash borer) or invasive plants and their possible future effects on forest growth. The land acreage available for timber harvesting with this run is as follows –

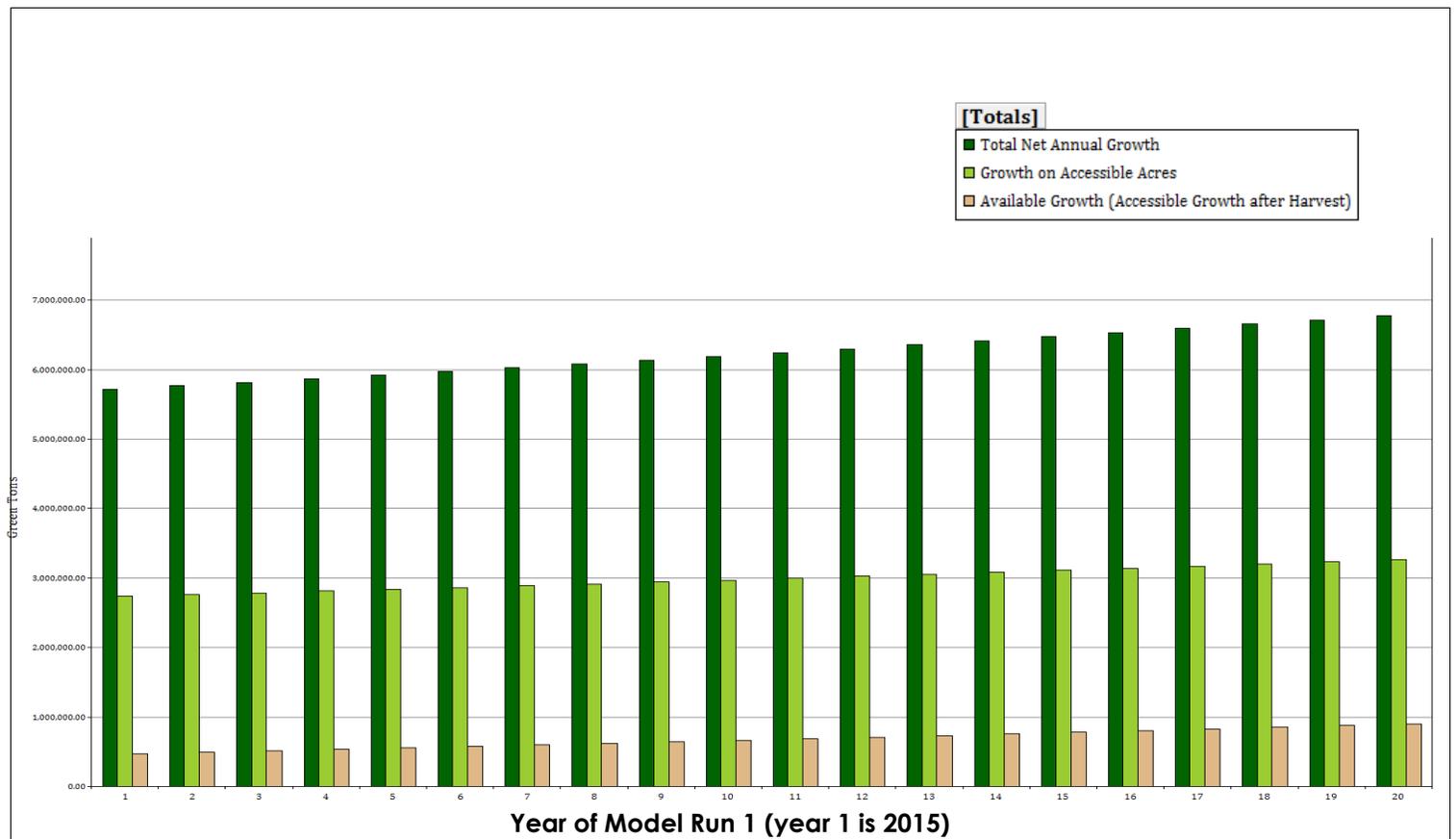
Ownership Category	Total Acres of Timberland	Accessible Acres	
Federal	263,105.84	0.00	
State	170,483.18	0.00	
Municipal	78,973.31	0.00	
Corporate	106,172.35	95,555.12	
Farm	42,468.94	21,234.47	
Other Private:			
Parcels 1-50acres	592,441.73	296,220.87	
Parcels 50+acres	1,382,364.05	967,654.83	
Total:	2,636,009.41	1,380,665.29	→ Net Accessible Timberland: 1,256,405.41
		Percent Discount:	52.3%

Available⁸ woody biomass for energy in year 2015 – 474,281 green tons
 Available woody biomass for energy in year 2035 – 902,093 green tons

⁶ The North East State Foresters Association is: The State Foresters of Maine, New Hampshire, Vermont, and New York cooperating with the US Forest Service State & Private Forestry.

⁷ More details about the assumptions in these BPE model runs can be found in the Appendix.

⁸ After existing harvests are accounted for and not accounting for available sawlog (high value) material.



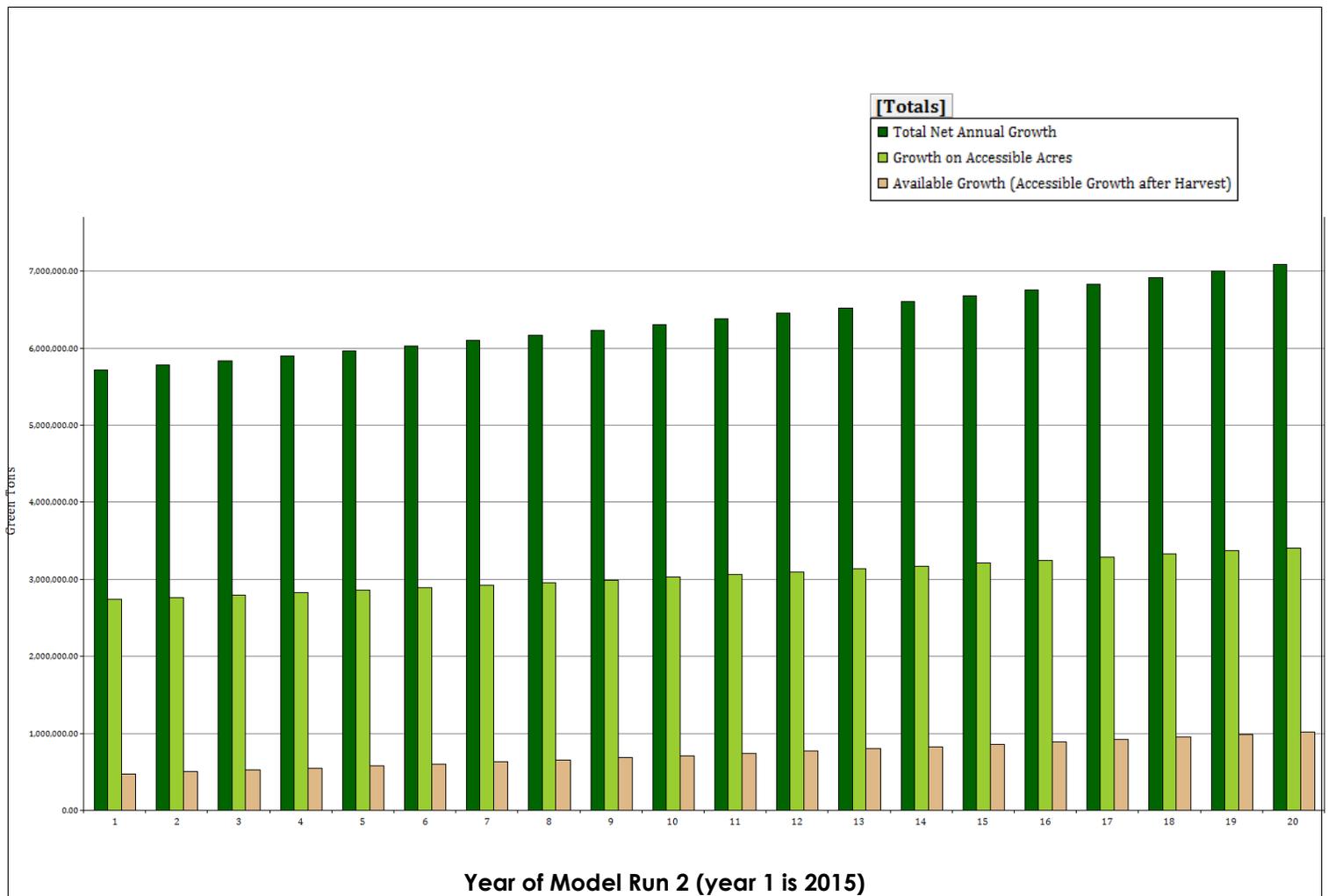
Run 2 **The constant run** – assumes that wood use from the Region will continue at the same levels as are experienced today and that growth and mortality of trees will continue as today. The land acreage available for timber harvesting with this run is as follows –

Ownership Category	Total Acres of Timberland	Accessible Acres
Federal	263,105.84	0.00
State	170,483.18	0.00
Municipal	78,973.31	0.00
Corporate	106,172.35	95,555.12
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1,256,405.41

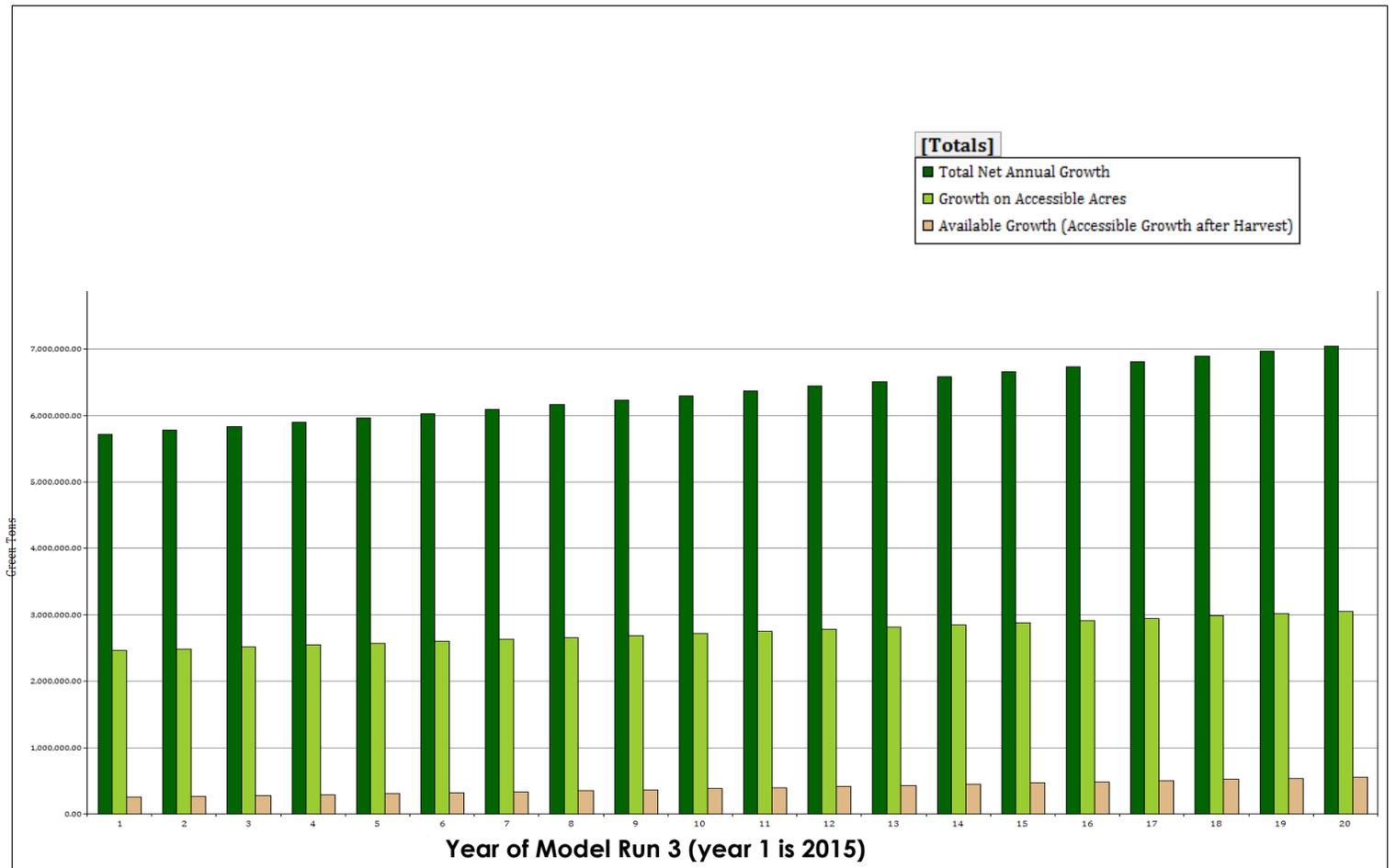
Percent Discount: 52.3%

Available woody biomass for energy in year 2015 – 474,281 green tons
 Available woody biomass for energy in year 2035 – 1,021,026 green tons



Run 3 **Increased demand run** – assumes an annual increase of .5 % wood use in the Region while keeping growth and mortality at current levels and reducing forest land available by 10% for the Region. While significant and not currently anticipated, a .5% per year increase in wood consumption might occur if, for instance, one or two large-scale (such as the Ryegate wood-fired power plant) power plants were built in the region, or several large sawmills of the size of the Cersosimo mill in Brattleboro were to locate in the area.

Available woody biomass for energy in year 2015 – 252,037 green tons
 Available woody biomass for energy in year 2035 – 588,897 green tons



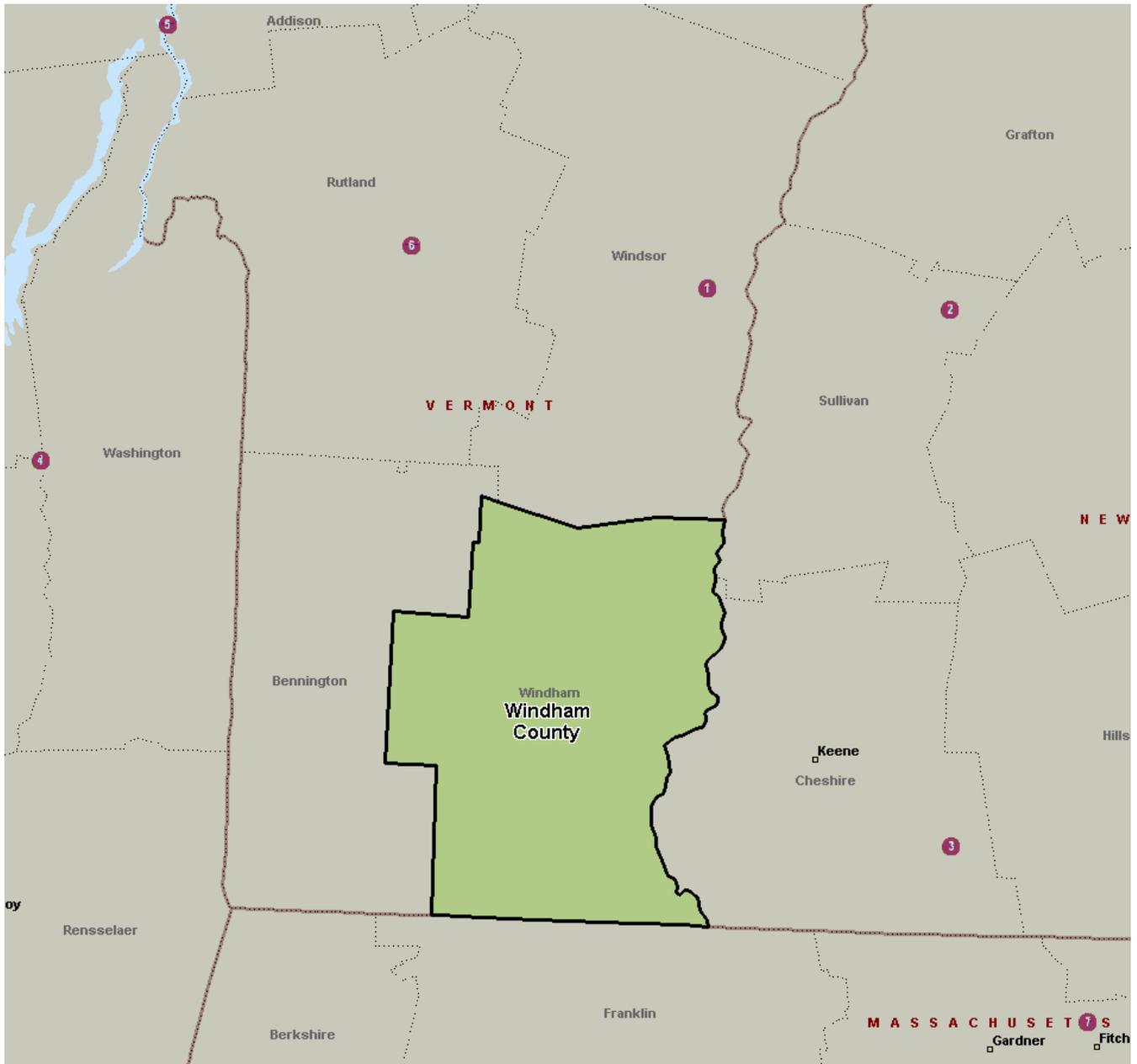
V. Large wood users in the WWHI area

Understanding the population of existing large users of wood from the forests of the WWHI Region is important to the project goals. In Section I on page 10 we excerpted the list of wood users in Windham County from the Frederick presentation. Only two of those in the county are significant users of the timber resource in the region: Cersosimo Lumber and Allard Lumber. The remaining on that list are very small wood users.

Below is a listing and map of the largest facilities using lower grade wood in the region and their approximate annual wood use. Collectively, these seven (7) facilities use approximately 2.1 million tons of wood from within and outside the Region. While some of these facilities have been operating for many decades and some for a shorter time, during the last 50 years the FIA data shows significantly increasing standing timber supplies throughout the region over and above the wood used by all facilities and as documented in Sections III and IV above.

The volumes of wood that might be used by the 20+ new facilities switching to wood from fossil fuel at the encouragement of the WWHI would be in the 5,000 - 8,000 tons per year range, relatively insignificant relative to the continued growth in the forest inventory in the region (see section IV. above).

Figure 13. Location of large users of low grade wood in WWHI region



Tally of large wood using facilities in the WWHI Region:

1.	Queston Wood Pellets, http://www.questonwoodpellets.com/
Location	West Windsor, Vermont
Product	Wood pellets
Wood Use	+/- 38,000 green tons of pine per year
Wood quality	Mill residue and clean chips

2.	Springfield Power (formerly Hemphill Power)
Location	Springfield, NH
Product	Electricity (19 MW)
Wood Use	+/- 200,000 green tons per year
Wood quality	Whole-tree chips, wood chipped on site, and sawmill residue

3.	New England Wood Pellet, www.pelletheat.com
Location	Jaffrey, New Hampshire
Product	Wood pellets
Wood Use	+/- 200,000 green tons (less when accounting for purchase of dry material)
Wood quality	Sawmill and secondary manufacturing residues, pulp quality chips, roundwood bole chips

4.	Finch Paper, www.finchpaper.com
Location	Glens Falls, New York
Product	Paper
Wood Use	+/- 640,000 green tons of pulpwood (primarily roundwood) +/- 50,000 tons of biomass fuel
Wood quality	Roundwood, pulp quality chips and whole-tree chips

5.	International Paper – Ticonderoga Mill
Location	Ticonderoga, NY
Product	Paper
Wood Use	+/- 700,000 green tons of pulpwood (~2/3 hardwood) +/- 80,000 green tons of biomass
Wood quality	Roundwood, pulp quality chips and whole-tree chips

6.	Vermont Wood Pellets
Location	North Clarendon, VT
Product	Wood Pellets
Wood Use	+/- 40,000 green tons per year
Wood quality	Mill residue and clean chips

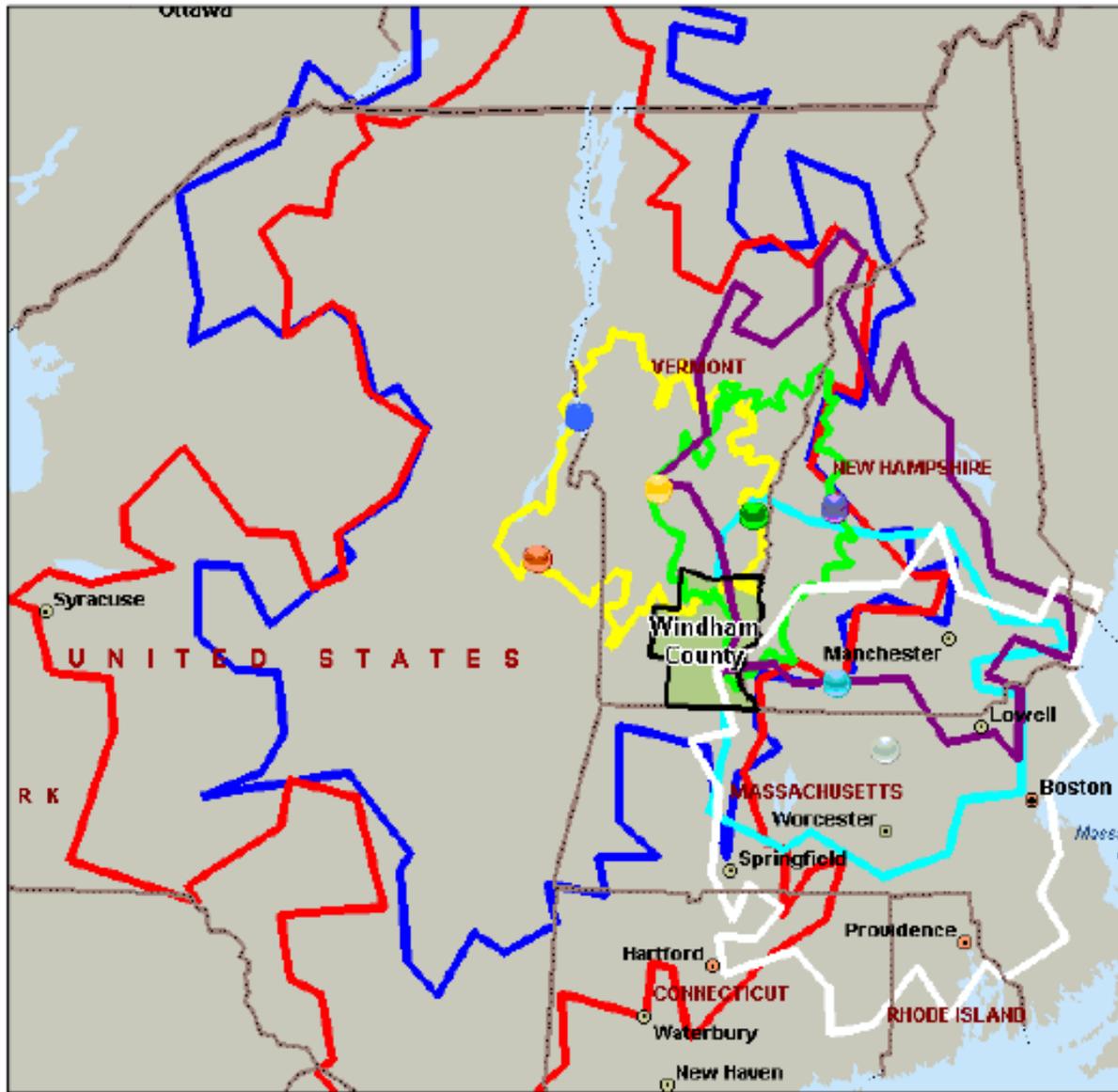
7.	Pinetree Power Fitchburg
Location	Fitchburg, MA
Product	Electricity
Wood Use	+/- 225,000 green tons per year
Wood quality	Whole tree chips and other wood sources

Though not direct competitors for lower grade wood material that might be destined for wood chips or wood pellets, the two large sawmills located in the county, both in Brattleboro, Cersosimo Lumber and Allard Lumber, produce high quality sawed wood products and together procure between 15 and 25 million board feet of logs a year for lumber products while also procuring other timber products and supplying low grade wood fuel material as residue from the sawmilling process and some additionally as large buyers of standing timber. Cersosimo also has a chipping facility that procures low-grade logs for chipping. Overall, these two mills account for the use of over 125,000 tons of timber per year. This timber comes from within Windham County and the surrounding counties as identified in this analysis as well as counties beyond the seven chosen for the WWHI Region.

Figure 14 shows the extent to which each of these large low-grade markets reach for their wood supply.

Figure 14 Wood Supply Procurement areas for major low-grade wood users

Estimated Annual Wood Use and Assumed Procurement Drive Time Shown



Color	Facility	Wood Use (g tons, est.)	Drive Time (min)
Green	Queston Wood Pellets	38,000	60
Purple	Springfield Power	200,000	90
Cyan	New England Wood Pellets	200,000	90
Red	Finch Paper	690,000	180
Blue	International Paper - Ticonderoga	1,500,000	180
Yellow	Vermont Wood Pellets	40,000	60
White	Pinetree Power – Fitchburg	225,000	90

VI. Conclusions

Given the relatively small amount of new timber resource that might be needed if WWHI is successful in its goal to encourage at least 20 schools and municipal buildings in the County to switch to advanced wood fueled heating systems – fuel needs for these are estimated on the high end at 8,000 green tons per year – there is ample additional supply of low grade wood resource available.

Our analyses show that between 252,000 green tons and 578,000 green tons are currently available in the Region. The BPE model runs suggest between 589,000 and 982,000 green tons will be available in the year 2035 because the forests of the Region are growing much more wood than is being used each year and will continue to do so into the future.

Though not included as a separate model run, a constant model run (like BPE model run #2) with only Windham County, VT included yielded well over 100,000 green tons of low grade wood material available today. Though it is unrealistic that all new wood fuel for the WWHI-encouraged wood heat projects would come from only Windham County, it is helpful to understand what the County is potentially capable of producing.

Appendix

End Notes

ⁱ Morin, Douglas, The Forest Products Industry of Windham County, Vermont: Status, Challenges, and Opportunities, pg 5.

ⁱⁱ Frederick, Paul, Forests, Forests Products & Wood Energy in Windham County Biomass Energy Opportunities in Windham County , [for the] Sustainable Energy Outreach Network , January 28, 2014

ⁱⁱⁱ <http://apps.fs.fed.us/Evalidator/evaluator.jsp>

^{iv} USDA Forest Service data is presented in cubic feet. INRS calculated green tons assuming 85 cubic feet of solid wood per cord, and that a green cord of wood weighs 2.6 tons for hardwood and 2.3 tons for softwood.

^v For purposes of this discussion, “low-grade” is material unable to meet a sawlog specification.

BPE Model Run Assumptions:

Run 1 Reduced growth run – assumes that wood use (harvest levels) remains constant but that forest growth is reduced by .2 % per year over the run period;

- All 7 counties
- No public land is available for harvesting
- Private landownership data (percentages etc) is the default
- Reduced growth by .2% per year (compounded)
- Accessible for harvesting: Farmer 50%; Corporate 90%; Private 1-50ac 50%; Private 50+ ac 70%
- Other deductions (% of acres removed from availability):
 - Slope 5%
 - Elevation 1%
 - Wetlands .5%
 - Distance to Roads 1%
 - Deer yards 0%
 - Stream Buffers 1%
 - Easements .5%
 - TOTAL 9%

Run 2 The constant run – assumes that wood use (harvest levels) from the Region will continue at the same levels as are experienced today and that growth and mortality of trees will continue as today;

- All 7 counties
- No public land is available for harvesting
- Private landownership data (percentages etc) is the default
- Accessible for harvesting: Farmer 50%; Corporate 90%; Private 1-50ac 50%; Private 50+ ac 70%
- Other deductions (% of acres removed from availability):
 - Slope 5%
 - Elevation 1%
 - Wetlands .5%
 - Distance to Roads 1%
 - Deer yards 0%
 - Stream Buffers 1%
 - Easements .5%
 - TOTAL 9%

Run 3 Increased demand run – assumes an annual increase of .5 % wood use (harvest levels) in the Region while keeping growth and mortality at current levels and reducing available acres by 10% over the run period.

- All 7 counties
- No public land is available for harvesting
- Private landownership data (percentages etc) is reduced by 10%
- Accessible for harvesting: Farmer 50%; Corporate 90%; Private 1-50ac 50%; Private 50+ ac 60%
- Other deductions (% of acres removed from availability):
 - Slope 5%
 - Elevation 1%
 - Wetlands .5%
 - Distance to Roads 1%
 - Deer yards 0%
 - Stream Buffers 1%
 - Easements .5%
 - TOTAL 9%