

# Long term study of exotic larch in Vermont

New England Society of American Foresters

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Justin Waskiewicz, Ralph Tursini, and Lindsay Cotnoir



*The*  
**UNIVERSITY**  
*of* **VERMONT**

Larch Virtual Research Station: [larchresearch.com](http://larchresearch.com)



# INTRODUCTION

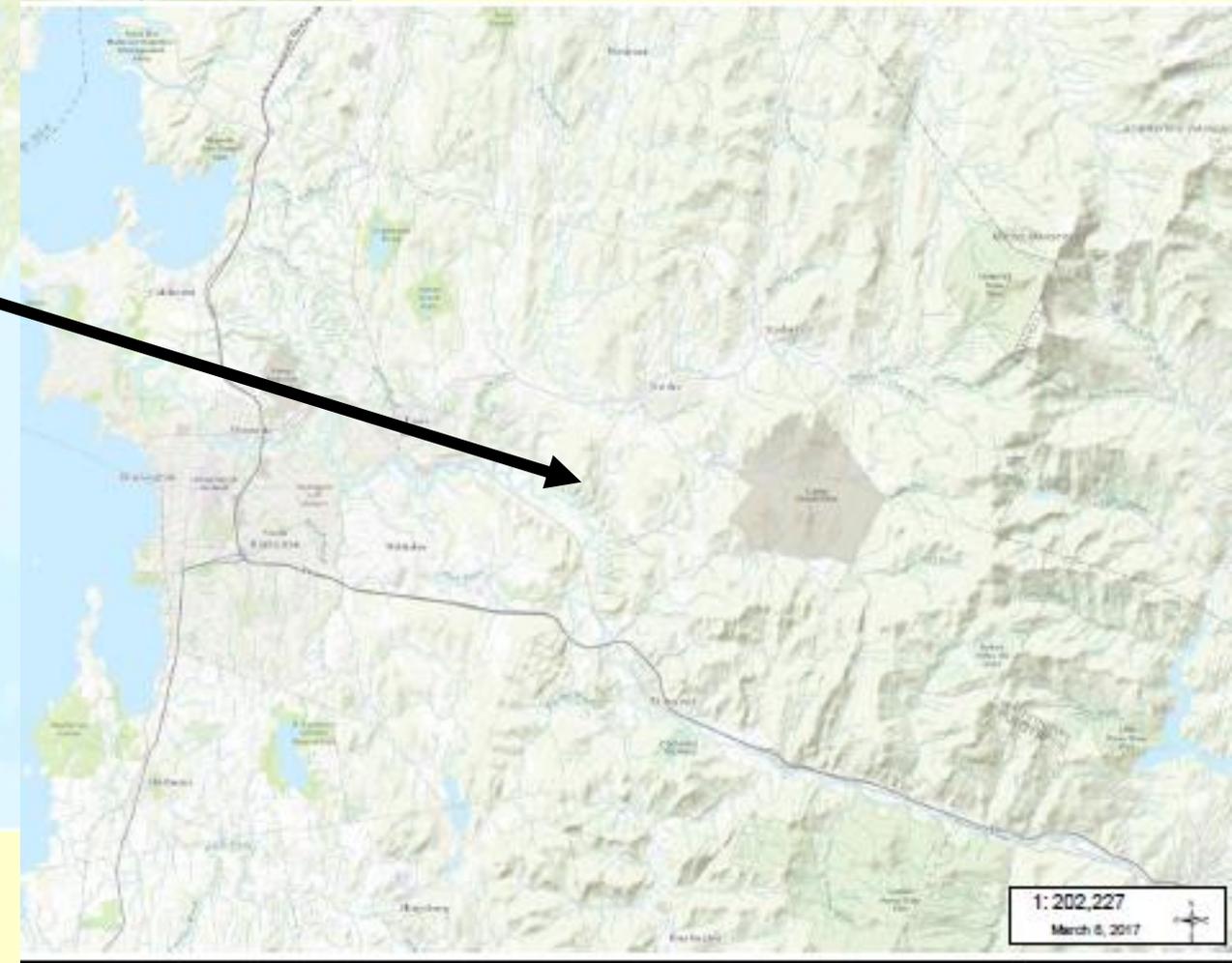
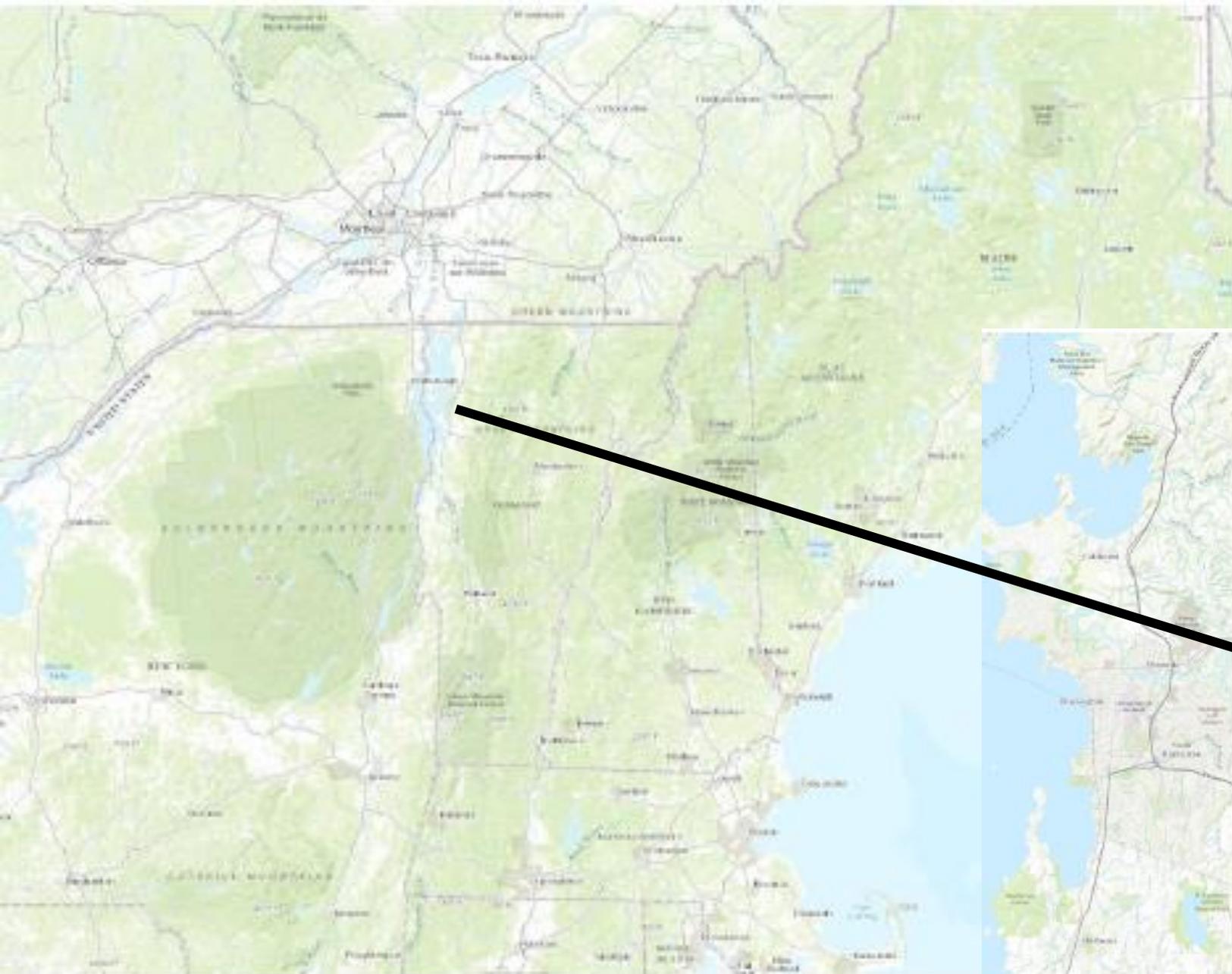
- in 1941, University of Vermont began experimenting with exotic tree species at its Jericho Research Forest (JRF; then Vermont Research Forest)
  - species including European and Japanese larch.
- JRF now contains three larch-dominated plantations – two over 75 years old and a third, much smaller, at 52 years.
- These represent some of the oldest larch trials with a long-term record of measurement
- **HOWEVER**, before we visit them:

# INTRODUCTION

- “The” Marsh-Billings-Rockefeller NHP holds the distinction of being the oldest professionally managed forest in the United States and many of the forest stands throughout the park are still harvested for their wood.” (NPS)
- Fredrick Billings created extensive plantations of both native and European species, including a 7-ac stand of European larch, planted 1887 (130 yrs)
  - Stand was thinned in 1912, 1985, 2010
  - Currently just above B-line stocking , QMD ~13
  - Permanent sampling plots now established, remeasured 2003, 2013



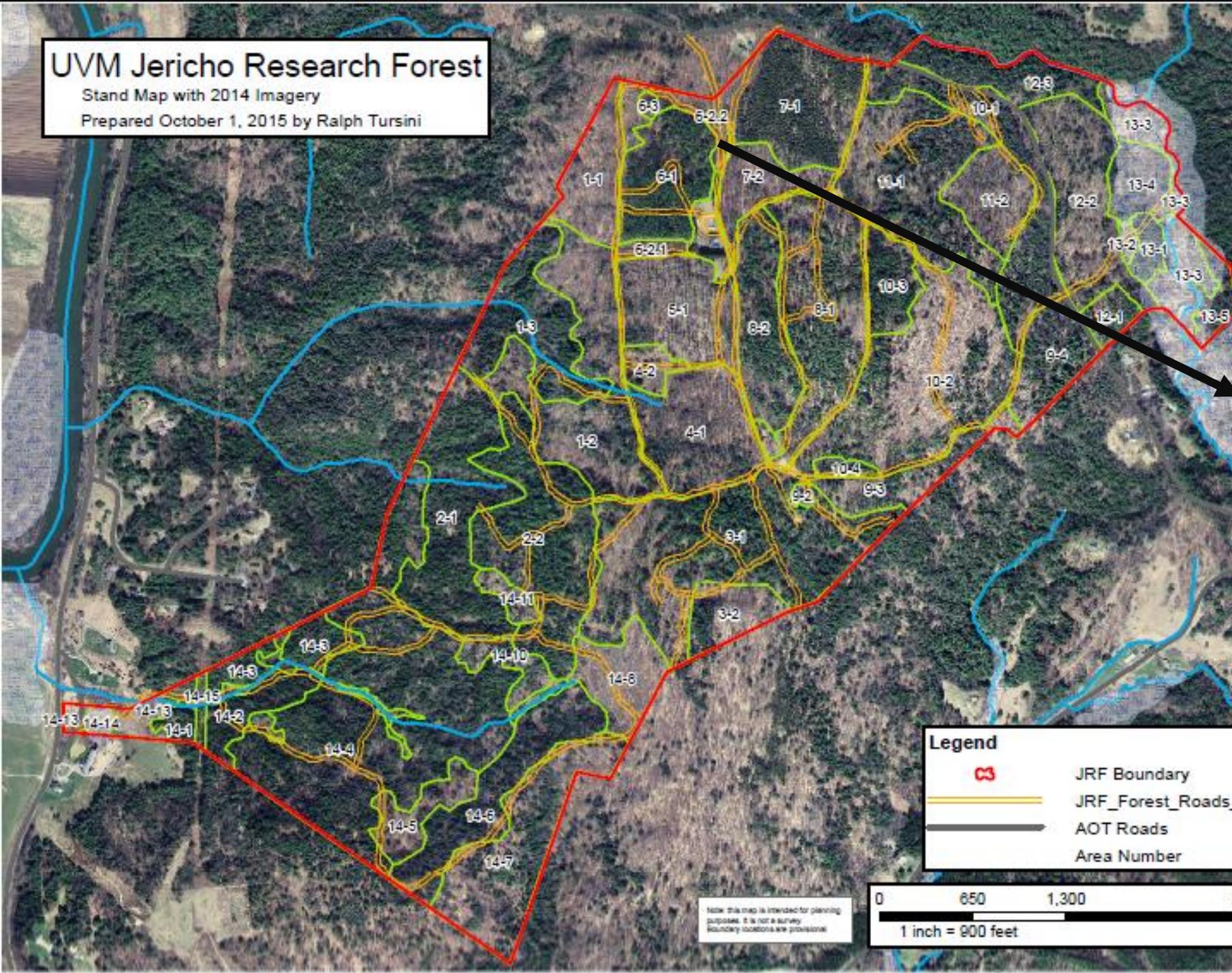
# UVM's Jericho Research Forest, Jericho, VT



# UVM Jericho Research Forest

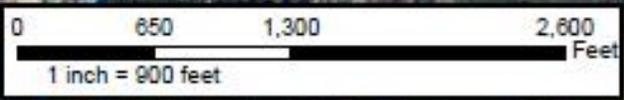
Stand Map with 2014 Imagery

Prepared October 1, 2015 by Ralph Tursini



## Legend

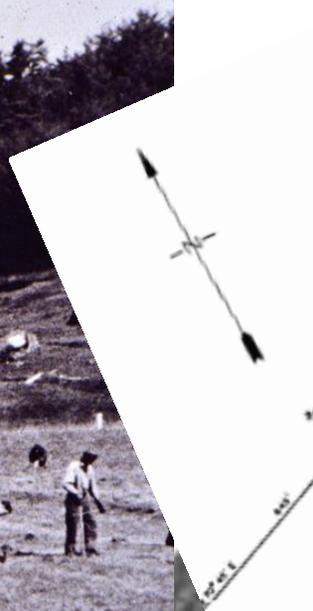
-  JRF Boundary
-  JRF\_Forest\_Roads\_Trails
-  AOT Roads
-  Area Number



Note: this map is intended for planning purposes. It is not a survey. Boundary locations are provisional.



- 450 Acres, near Green Mt. foothills



Land settled, farmed, since 1790

Early 1800s farmhouse on site, more recent barns

Succession of ownerships to 1940

Soil Conservation Service Plan in place from 1937

# JRF larch plantations

- Japanese larch
  - Planted 1941
  - 7x7 spacing with alternate rows of Douglas-fir
    - Most D-f died shortly after planting, many larch, too, in S, W part of plantation; replanted failed areas in 1956
    - Northeasternmost two (1/2-ac) plots had good survival
  - Measurements began in 1954, with numbered trees
  - Adams and Hutchison had trees climbed, measured at stump, bh, first log, and 35' / 4" in 1959
    - Study of form and early growth and yield, published 1961
- Now age 18, trees averaged 7.5" dbh, 47' tall
  - 7.2 ft<sup>3</sup> on average, totaling 1,850 ft<sup>3</sup>/ac

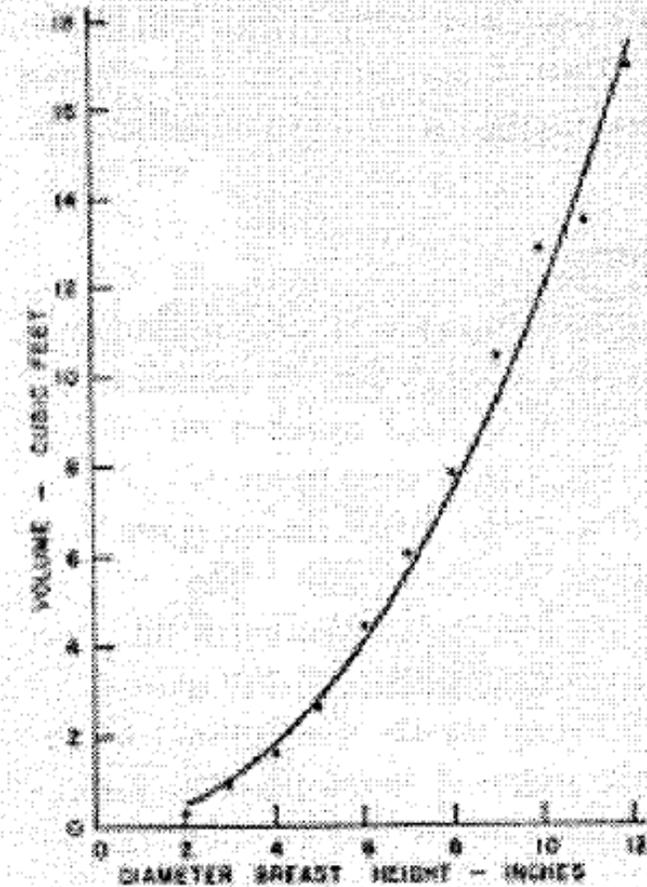
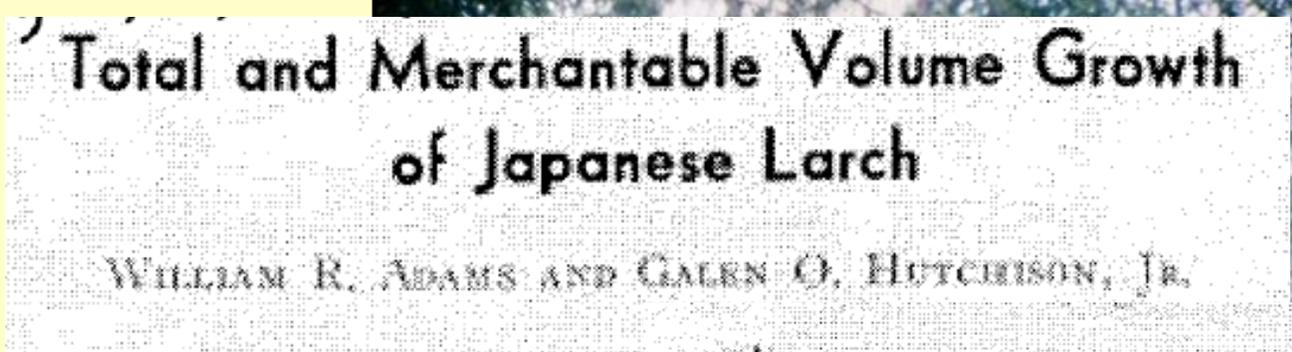


Fig. 2. Curve of average total cubic foot volume of wood for diameter measured outside the bark, breast high.

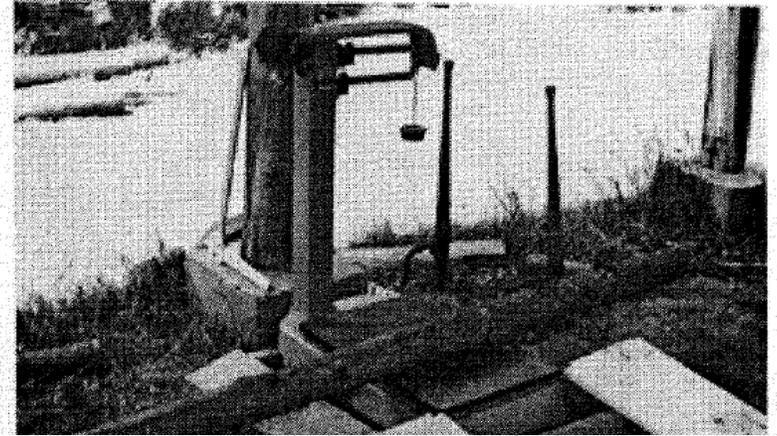
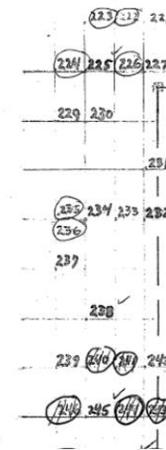
# JRF larch plantations

- Mixed conifer stand
  - European larch (25%) planted with ponderosa pine (50%), and Austrian pine
    - just north of Japanese larch, also 1941
  - Trees numbered and periodically re-measured, as with Japanese larch, but only 1954 -1969
  - Pine mostly died off (larch outgrew them anyway)
  - European larch now much bigger than Japanese
    - Some ~30"
    - Grew at lower effective density most of lives



# JRF larch plantations

- Select trees in both stands were pruned
  - Japanese larch to 7' in 1953
    - (18 trees / hour)
  - Then to 18' in 1960
- Stems were mapped in Japanese larch
- Measurements continued on 5-year intervals
- First thinning (Japanese only) took place 1970
  - Stems carefully weighed and volume-measured with xylometer
  - Turner and Myers 1972
    - 2.6 cords/acre/year
    - Outgrowing other planted spp.



Species	Height (feet)	Species	Height (feet)
Austrian pine	40	Red pine	50
Ponderosa pine	45	European larch	65
White pine	46	Japanese larch	76

Tree  
Tr  
B

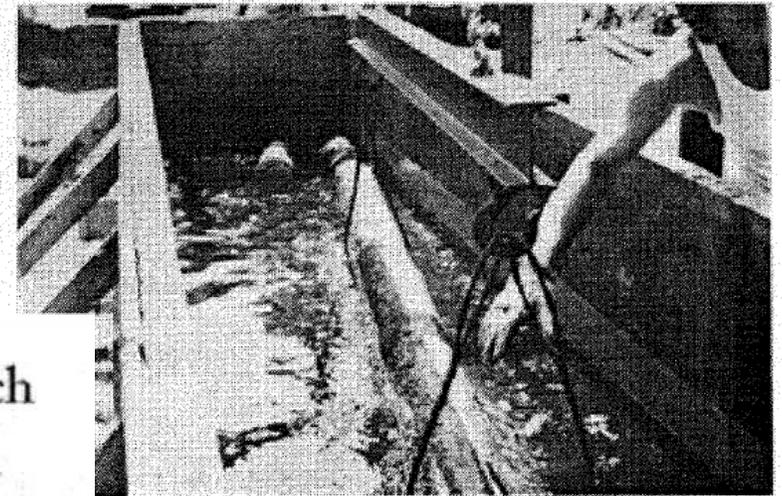


Figure 2. Obtaining xylometer data on Japanese larch.

## Growth of Japanese Larch In a Vermont Plantation

TERRY L. TURNER AND CHARLES C. MYERS  
Department of Forestry

# JRF larch plantations

- Mill Brook stand (Japanese larch)
  - Grown from seed collected in 1961 from 1941 stand
  - Planted 0.8-ac near brook in 1964
  - Studied persistence of size advantage of large seedlings, timing of bud development
  - Now overstocked, high H:D ratios



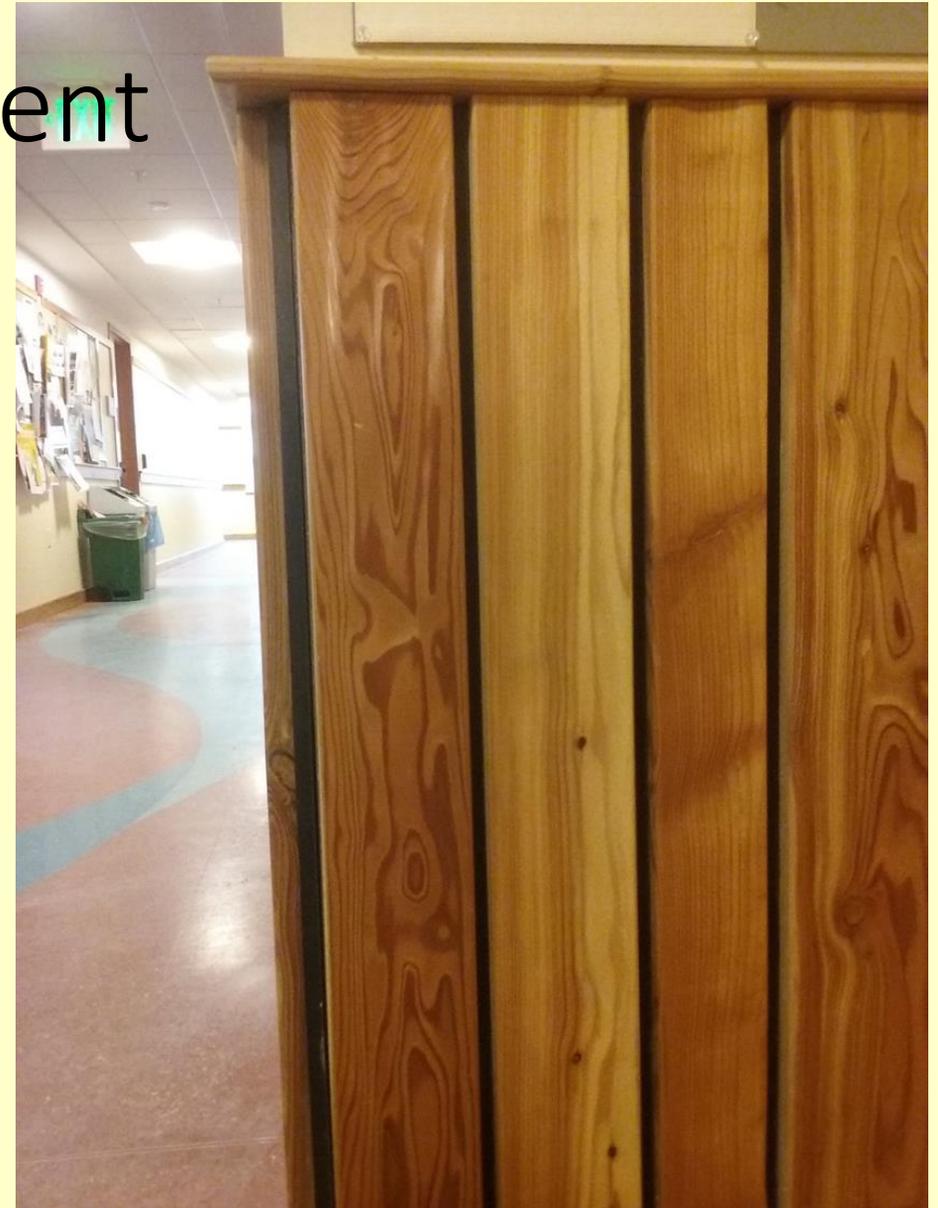
# JRF larch plantations

- Time passes
- Trees grow...
- People forget...
- Less frequent measurement
  - 1974... 1984, 1988... 1996... ..
- At least one harvest occurred after 1988, before 1996
  - Possibly coursework – records are not clear
- Prescribed burns conducted in 1978, 1980, at least



# JRF Japanese larch management

- 2007 harvest removed 0.8 ac of JL overstory in 0.1 – 0.25-ac gaps
  - (goal: eventually transform stand to uneven-aged northern hardwoods managed by group selection)
- 8,900 bf milled on site
  - Built cabin on another research forest
  - Sold locally for small projects
  - Some as paneling in Aiken building on campus
  - Some retained on site still under cover
- Gaps were in W side on stand – did not affect plots used by earlier studies (3, 4)



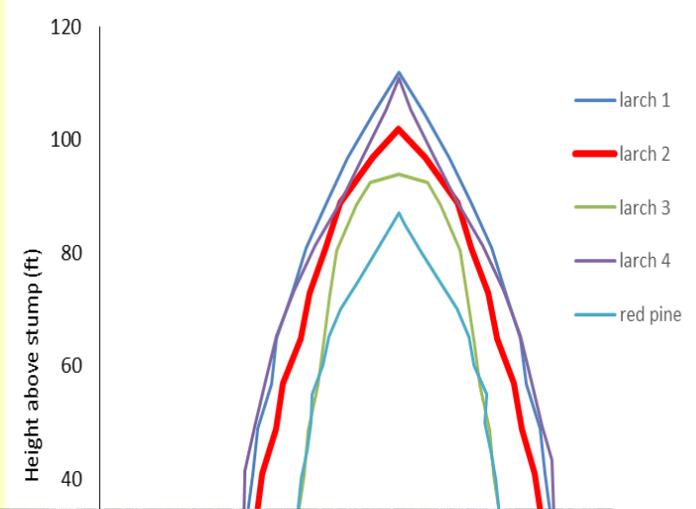
# JRF Japanese larch management

- Fall 2014 harvest removed 1 more ac of JL overstory in two 0.25-ac gaps, one 0.5-ac 'shelterwood'
  - (goals: continuation of 2007 management; create gaps for planting chestnut hybrids)
  - 18,100 bf harvested
    - 12,100 sent away for milling, to be used in UVM Alumni House building project
    - 6,000 milled on site, some sold for small projects internally and locally
  - This harvest *did* impact the well-recorded plots, 3 & 4



# JRF JL re-measurement

- Winter 2016 (~1 year since harvest)
  - Examined 4 logs left in woods
    - 94 – 112' long x 12.4 – 19.2" dbh
    - 41 – 104 ft<sup>3</sup> / 250 – 680 bf
    - FC low-mid 80s
    - Significantly larger than contemporary red pine in 1941 plantation nearby
  - Began re-measurement of plots 3 and 4
    - Starting with re-locating plot corner monuments



# JRF JL re-measurement

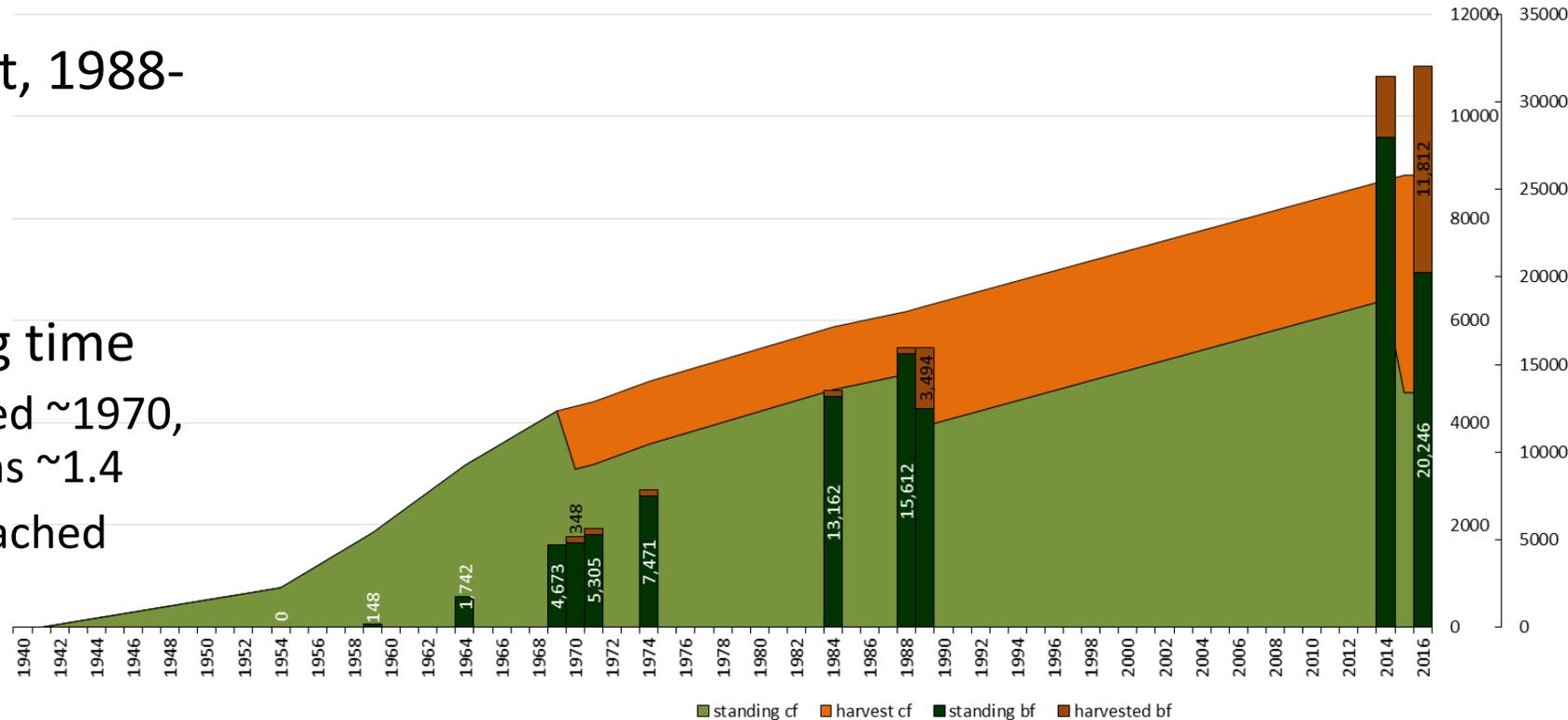
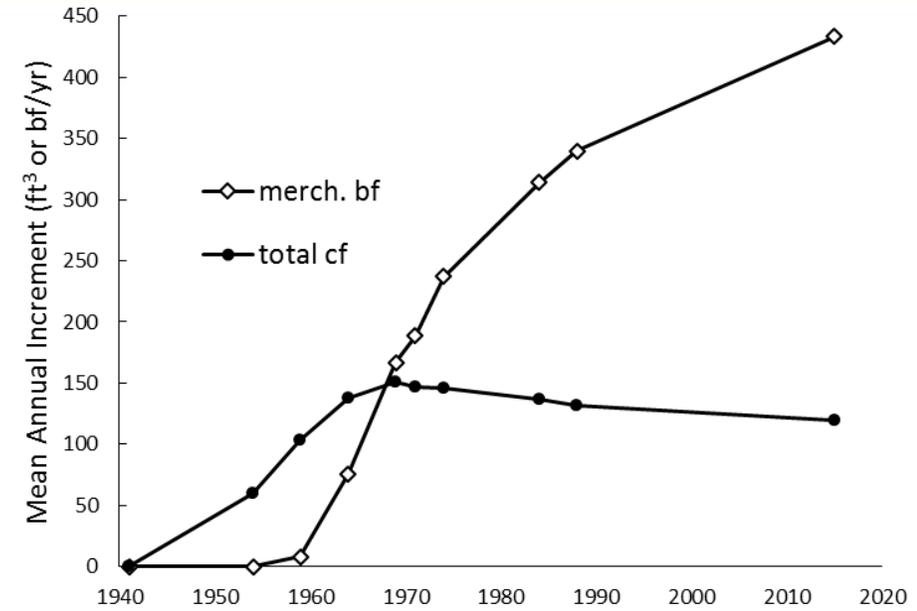
- Tree numbers still (mostly) readable
- Stem maps helped
  - This is tree 147, plot 4 – blew down in 1974



# JRF JL re-measurement

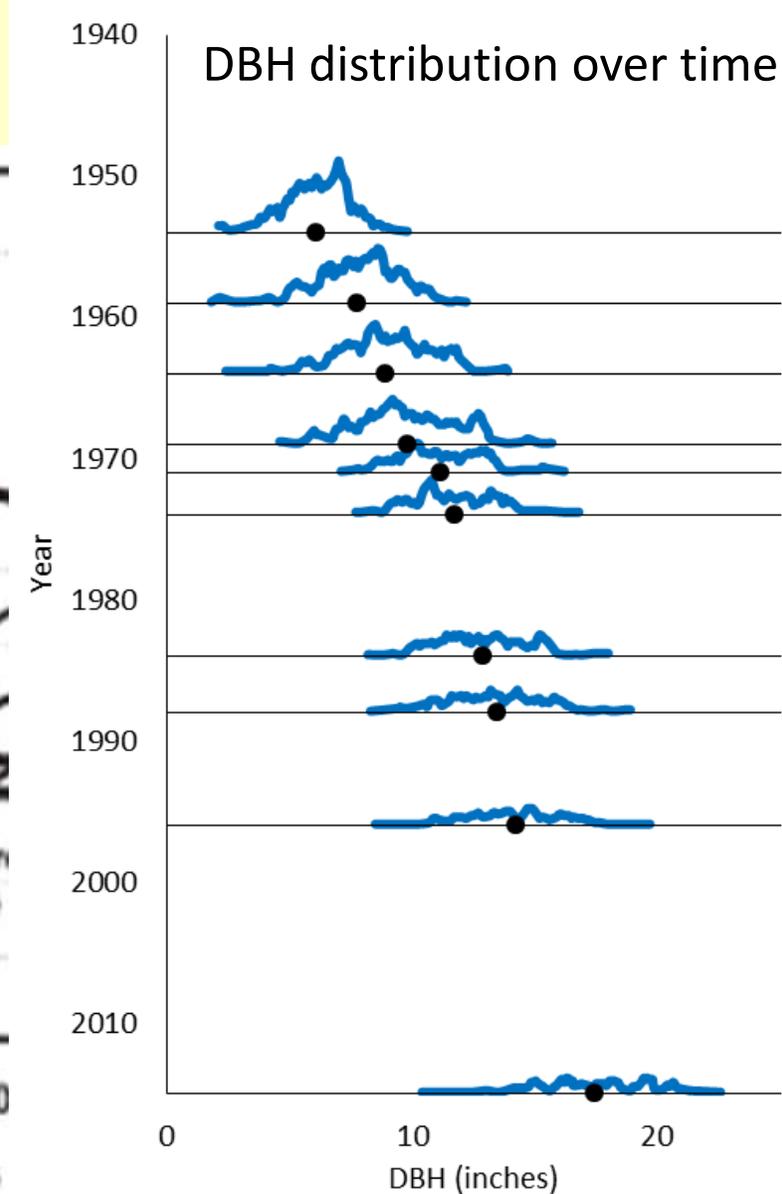
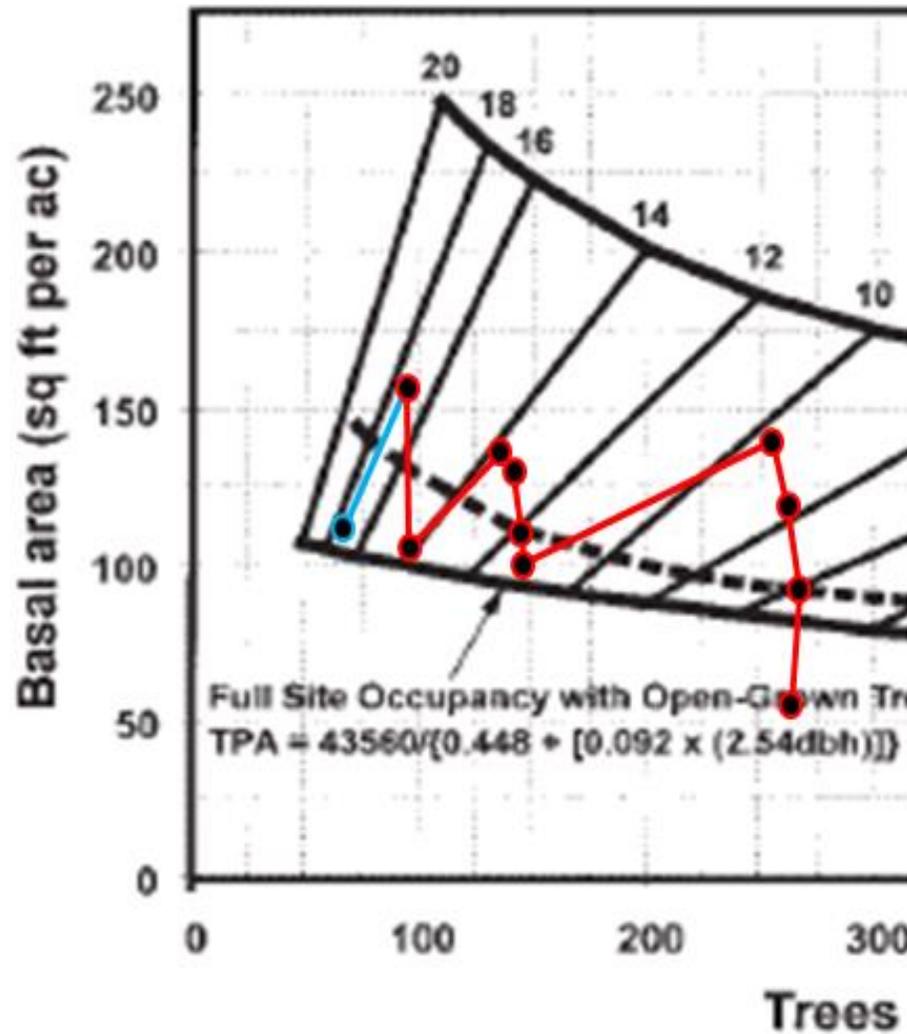
## • Results

- JL can accumulate high volumes
  - 8,900 net ft<sup>3</sup>/ac
  - 32,000 net bf/ac
- Can grow fast (most recent, 1988-2015 period)
  - near 100 ft<sup>3</sup>/ac/yr
  - near 600 bf/ac/yr
- Can keep up growth a long time
  - MAI for total volume peaked ~1970, 1.6 cords/ac/yr, but remains ~1.4
  - Sawtimber MAI still not reached
    - Currently > 430bf/ac/yr



# JRF JL re-measurement

- Results
  - Value in long-term data on stand development and response to management (as a teacher)



# Thanks

- Co-authors Ralph Tursini and Lindsay Cotnoir
- David Maass
- Lloyd Irland
- Brian Roth
- Bill Keeton
- Kyle Jones

