

# AMERICAN CHESTNUT RESTORATION



APRIL 10, 2014

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# AMERICAN CHESTNUT: THE TREE



PRE-BLIGHT USES,  
BLIGHT INTRODUCTION AND SPREAD,  
EARLY SPECIES RESTORATION WORK



# American Chestnut: The Tree



- Major component of eastern forests
- Fast growth, large size, extremely rot resistant



# American Chestnut: The Tree



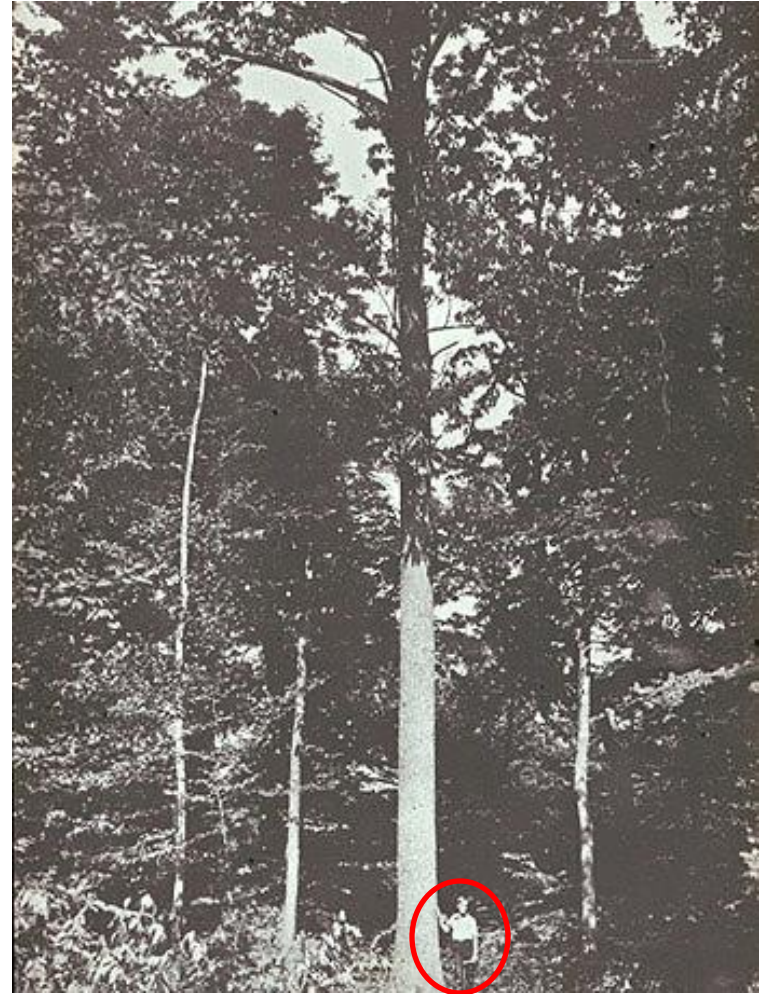
- High-value timber species
- Tannins used in tanning leather



# American Chestnut: The Tree



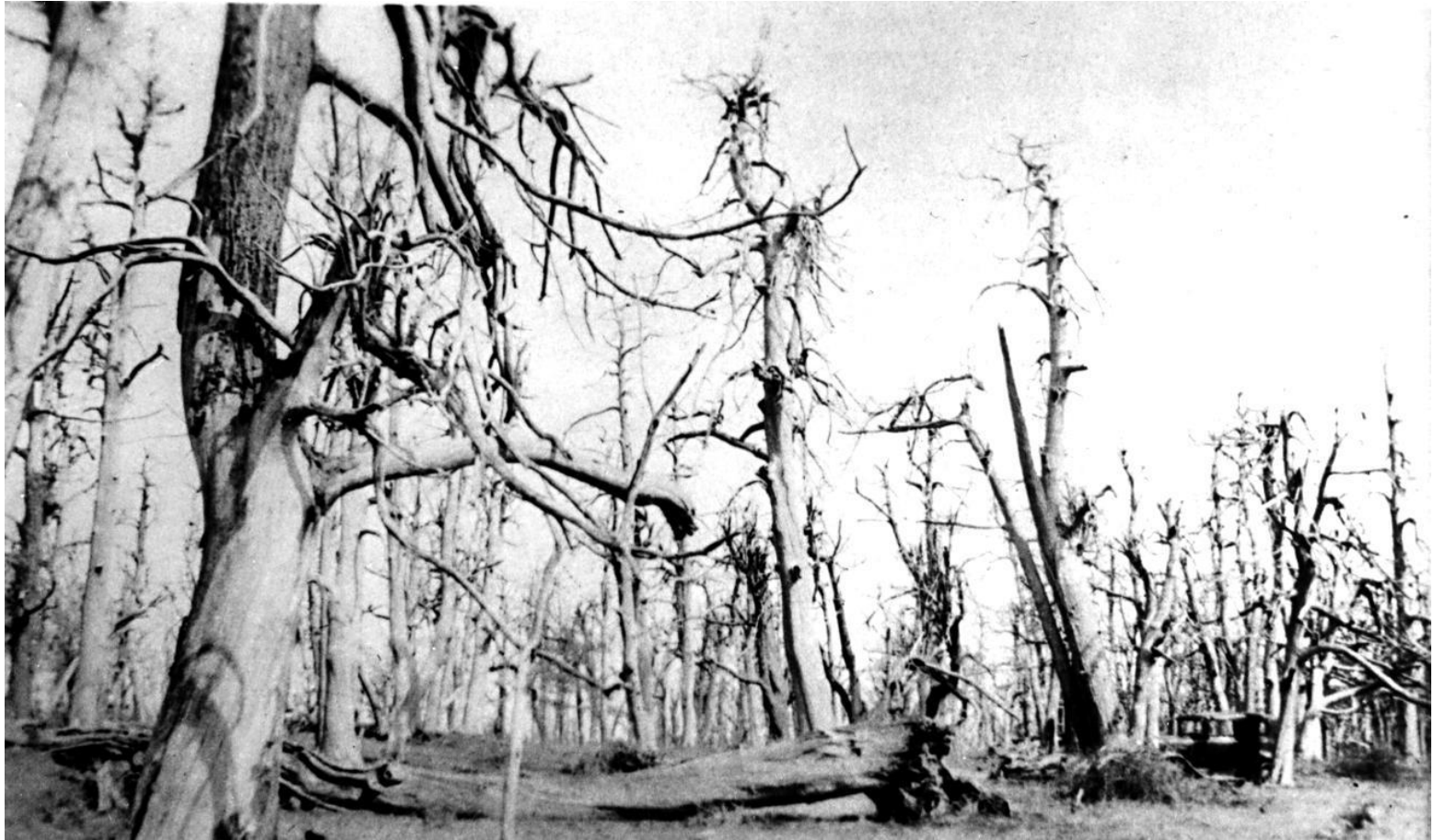
- Nuts valuable to wildlife
- Nuts also valuable to people and livestock
- Culturally significant



# Chestnut Blight



- Blight first identified in New York City in 1904

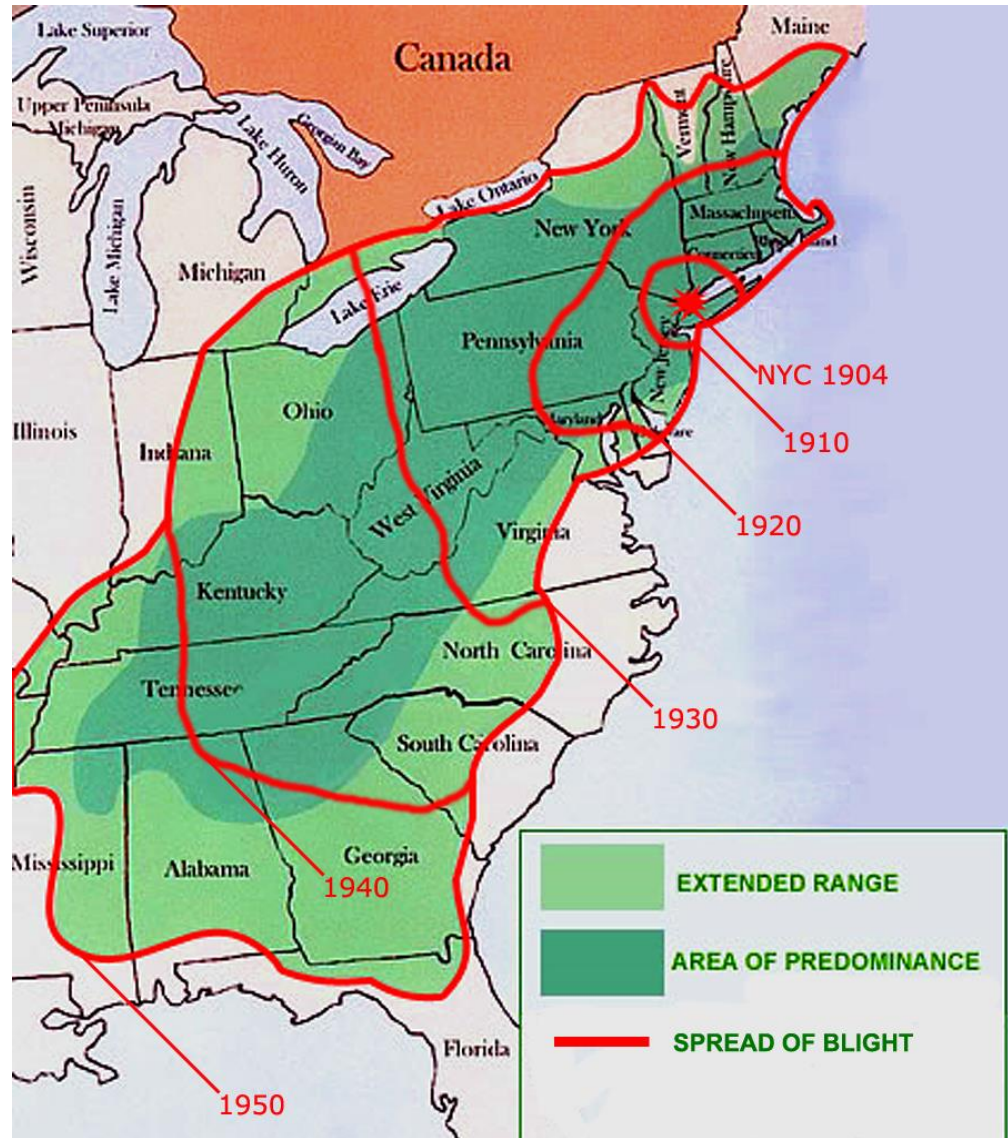




# Chestnut Blight

Spread very quickly

Functionally wiped out chestnut as over-story tree by 1950's



# Early Restoration Attempts



- Cultural methods
- Identifying natural resistance among American chestnuts
- Replacement tree to fill niche
- Breeding programs
  - USDA – abandoned by the 1960's
  - CAES – on-going today







# TACF's Breeding Plan

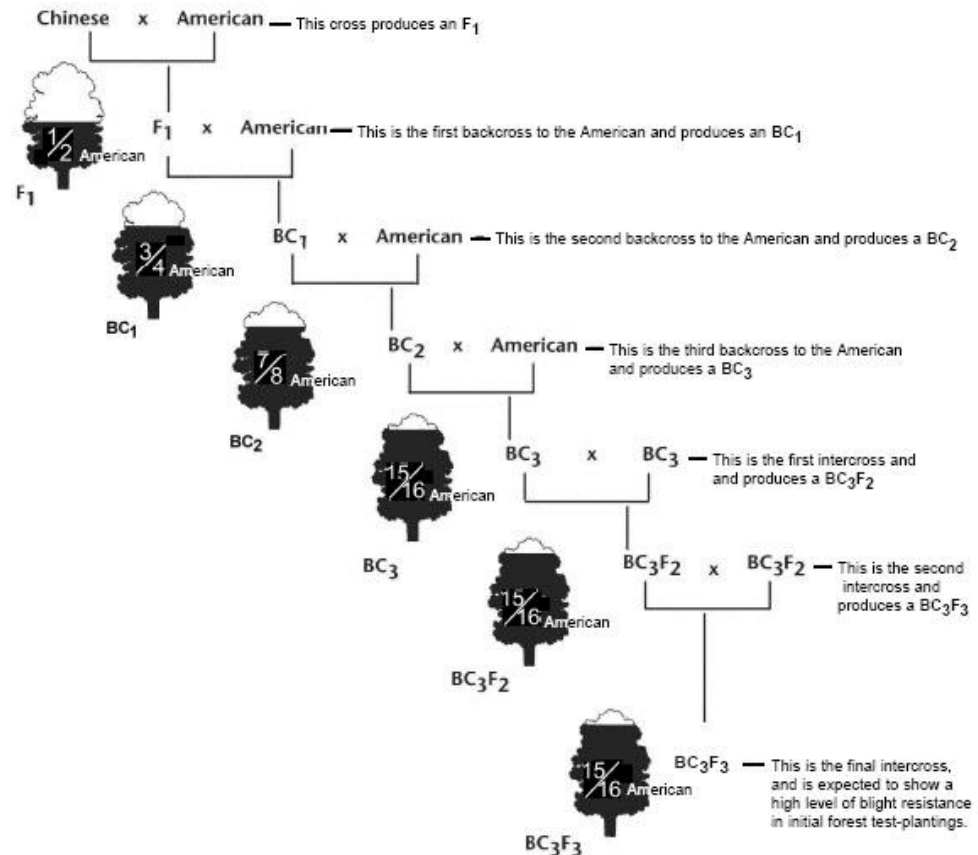
Expect to produce a tree with a high level of blight-resistance and American chestnut character and the ability to survive and compete in the forest.



## THE AMERICAN CHESTNUT FOUNDATION BACKCROSS BREEDING PROGRAM

### ADDITIONAL AMERICAN CHESTNUT CHARACTERISTICS ARE REGAINED WITH EACH BACKCROSS

TACF expects a high level of blight resistance and American characteristics to be present in selected  $BC_3F_2$  seed orchard parents. Their  $BC_3F_3$  progeny will be extensively tested by TACF for blight resistance and ability to compete in the forest.



**Note:** In each step, the backcross is selected for resistance. Trees indicate average fraction of American genes with no selection.

# Lessons Learned



- Germplasm reservoir
  - American chestnut germplasm is not lost by cutting
  - Other methods may be more applicable to other species
    - ✦ Seed banks
    - ✦ Germplasm conservation plantings
- Multiple approaches
  - American chestnut has benefited from a variety of approaches and levels of follow-through – and still does
  - Continued interest in species restoration



# RESTORING THE AMERICAN CHESTNUT



The mission of TACF is  
to restore the American  
chestnut tree to our  
eastern woodlands to  
benefit our environment,  
our wildlife and our  
society.





# Goals:

To develop  
blight-resistant  
American  
chestnuts

To ensure  
regional  
adaptability

To ensure long-  
term resistance



## TACF Backcross Breeding Program





# Meadowview Research Farms

## *Location:*

Meadowview, VA

## *Support:*

TACF's Chief  
Scientist, Director of  
Farm Operations,  
Pathologist, Research  
Technician and a  
growing farm staff

- Established in 1989
- Started with 2 advanced sources of resistance
  - 'Clapper' – from USDA breeding program
  - 'Graves' – from CAES breeding program
- Adapted cultural methods to reduce generation times
  - Flowering and selection size achieved in 2-4 years
- Currently home to 41,870 trees on over 150 acres





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## TACF Backcross Breeding Program





## TACF State Chapters

Currently 17 state chapters from Maine to Georgia

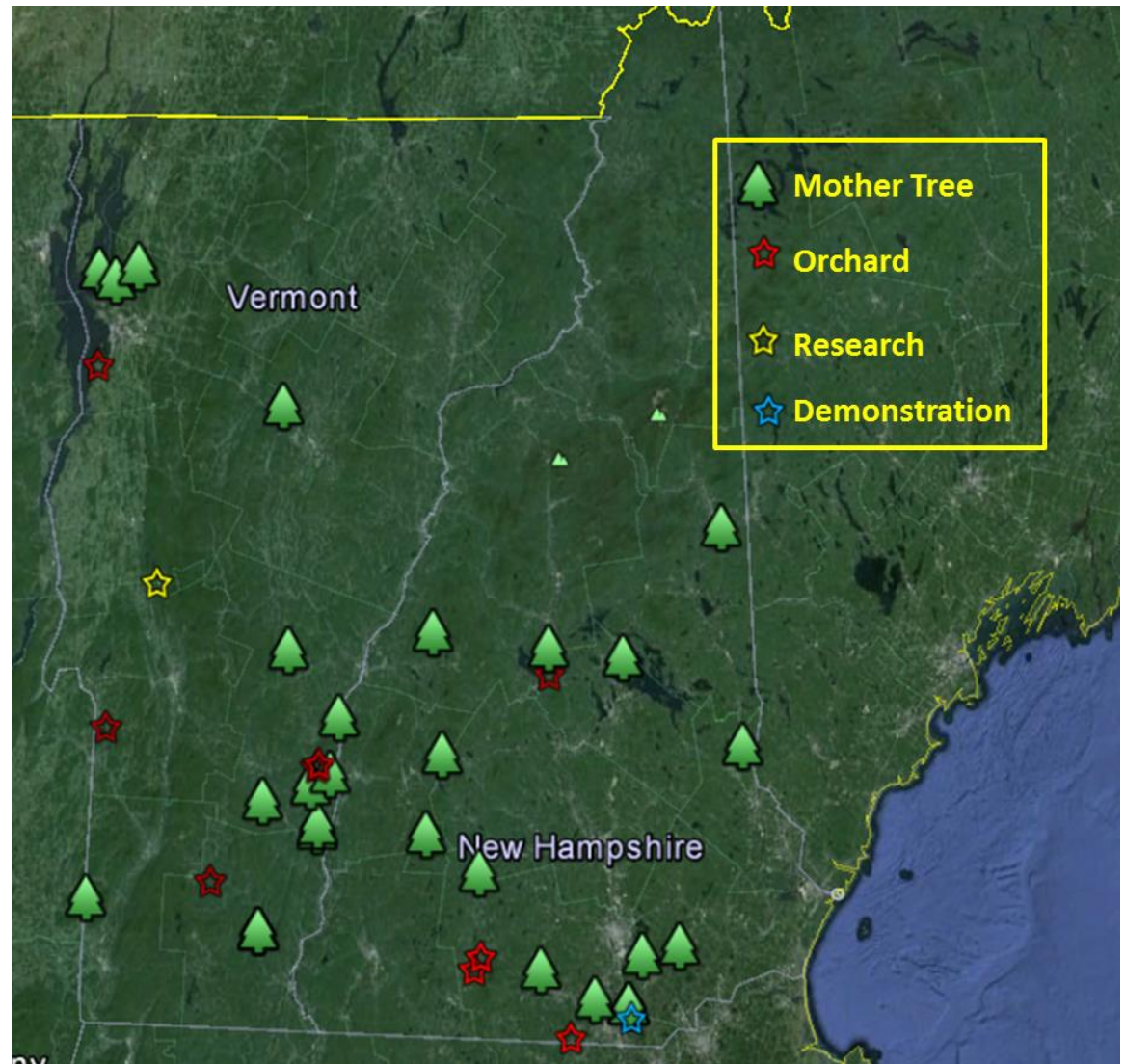


- Carry out the TACF breeding program locally
- Tasked with inventorying local, wild American chestnuts
- Conducting controlled pollinations and harvesting nuts
- Planting and maintaining orchards
- Educating the public
- **All-volunteer** with regional staff support



## VT/NH Breeding Program

Our goal is to pollinate at least 20 different American chestnut trees, plant orchards and continue the TACF breeding program locally.







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## TACF Backcross Breeding Program





TACF has been producing potentially blight-resistant nuts at our Meadowview Research Farms since 2007

Progeny testing began in 2009

This effort will require a range of partners to complete



## Progeny Testing – Forest and Orchard



# RESTORATION – WHAT COULD IT MEAN FOR VERMONT



## POTENTIAL AGRICULTURAL AND MARKET VALUES

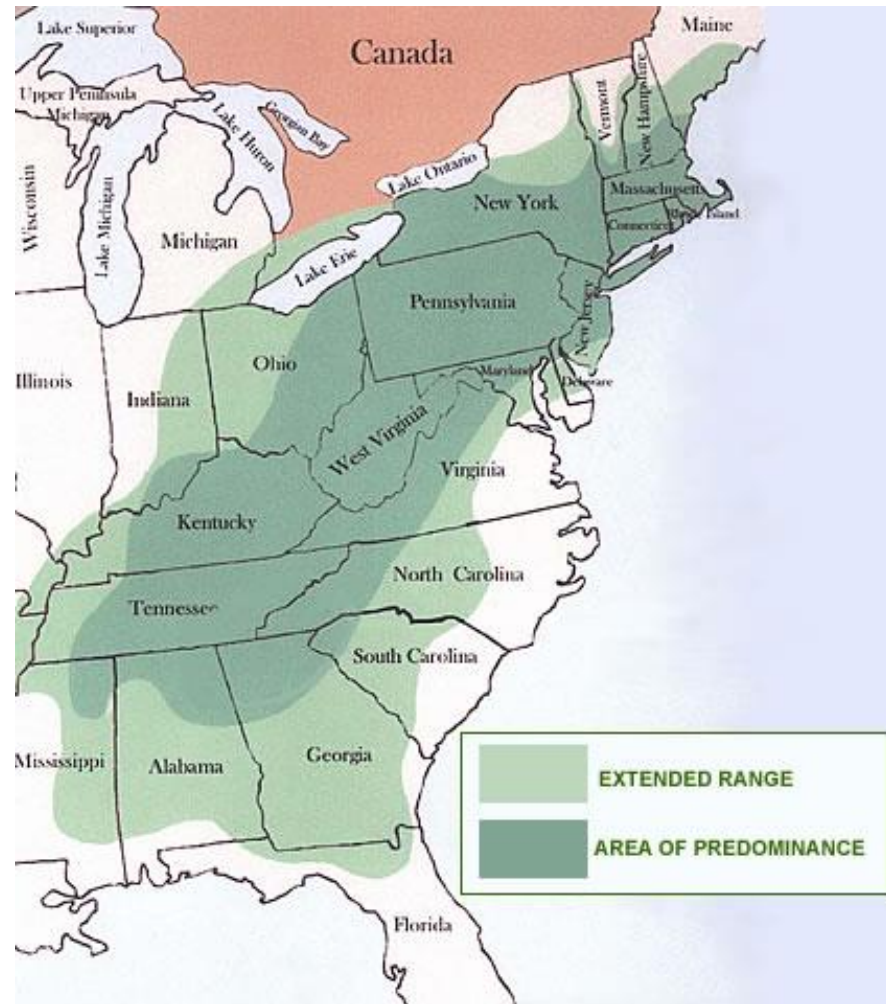




# Range in Vermont

Northern edge of the range – some of the state within the extended range

Predictions for future climate – Vermont could prove more suitable for chestnut



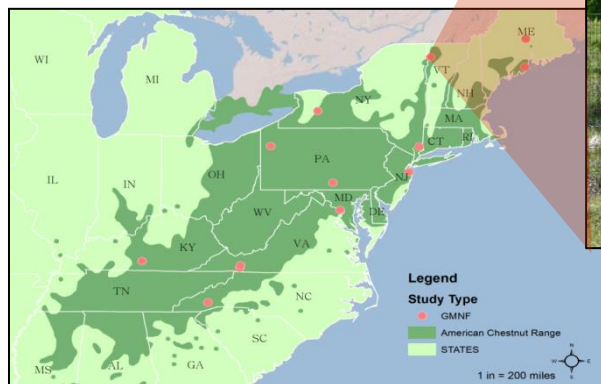
# GMNF Study: Growth and Winter Injury



- US Forest Service, University of Vermont and TACF
- 3 species: American chestnut, Chinese chestnut, red oak
  - ~900 trees planted
- Assess growth and winter injury in relation to silvicultural treatment and genetic source
- Develop BMPs for species restoration in the north

All sources growing in common garden

Source sites throughout native range





# Big Trees!

We find some of the largest remaining American chestnuts in northern New England

Can observe natural regeneration – important for species restoration



Large, mature American chestnut (above) and resulting seedling (right) in Berlin, VT





## Wildlife

Highly nutritious  
nuts

Preferred over  
acorns and other  
local nut trees

Reliable producer



# Current Markets



- Current markets are niche markets
- Nuts –
  - Fresh culinary chestnuts sell for approximately \$5-10/lbs.
  - Chestnut flour, dried/canned/frozen nuts
- Wood –
  - Antique/reclaimed wood: \$8-15/board foot
  - Fresh wood: \$5-10/board foot





# Developing New Markets - Nuts



- Growers cooperatives are developing in mid-west with Chinese chestnut
  - Chestnut Growers, Inc/Michigan State University
  - Route 9 Cooperative in Ohio
- Building off industry experience in Europe, China and other parts Asia, where chestnut is a staple food
- Prior to species decline, American chestnut had been a value-added species for farmers, especially in the central and southern Appalachians

# Developing New Markets - Wood



- Wood had been highly prized and utilized for a variety of wood products, paper products and tannin extraction
  - Could easily fill those or similar roles again
- Very fast-growing and rot resistant hardwood
  - Fast rotation time
  - Value-added to diversify wood lots
  - Could become a replacement for pressure-treated wood
  - Could play a role in carbon credits market
- Need a population to support market creation
  - Probably 80-100 years out



# How Do We Get There?



- Species restoration is a long process
  - Next steps locally – complete breeding and begin forest testing and reintroductions
  - Partnership with VT Forests, Parks and Recreation at Lake St. Catherine State Park and Essex State Office Complex, and developing partnership with VT Fish and Wildlife
- Public education is important
  - Very few people still alive that remember the American chestnut or appreciate it's former importance on the landscape
- Find a Tree Program
  - Maintain an inventory of existing chestnuts throughout Vermont and across the native range



# Got Chestnuts?

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- **Tree Locator Form**

[http://www.acf.org/ChapterNews\\_vt.php](http://www.acf.org/ChapterNews_vt.php)

- Report an existing tree or sprout

- **VT/NH TACF Newsletter**

[http://www.acf.org/ChapterNews\\_vt.php](http://www.acf.org/ChapterNews_vt.php)

- VT and NH TACF members are automatically on the mailing list
- Learn how to get involved and about chapter accomplishments