

AMERICAN CHESTNUT RESTORATION



APRIL 10, 2014

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THE
AMERICAN
CHESTNUT
FOUNDATION®

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



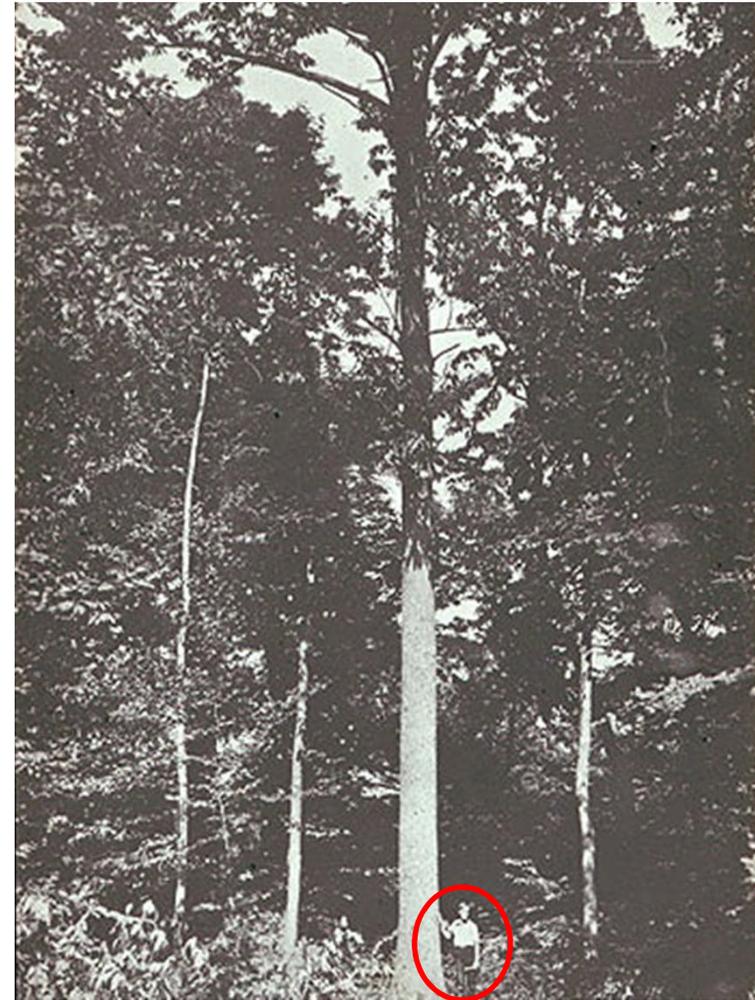
- High-value timber species
- Tannins used in tanning leather



American Chestnut: The Tree



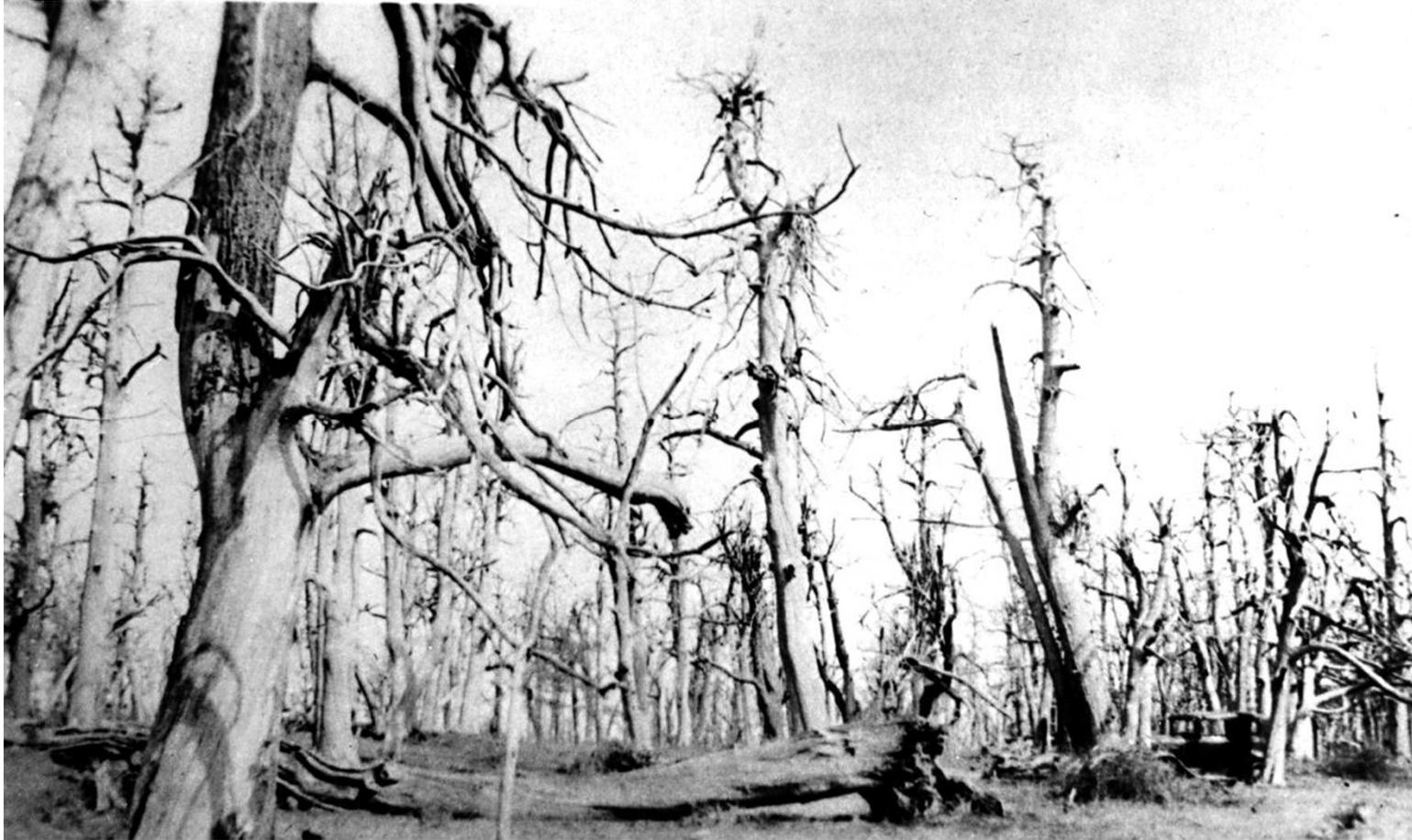
- Nuts valuable to wildlife
- Nuts also valuable to people and livestock
- Culturally significant



Chestnut Blight



- Blight first identified in New York City in 1904

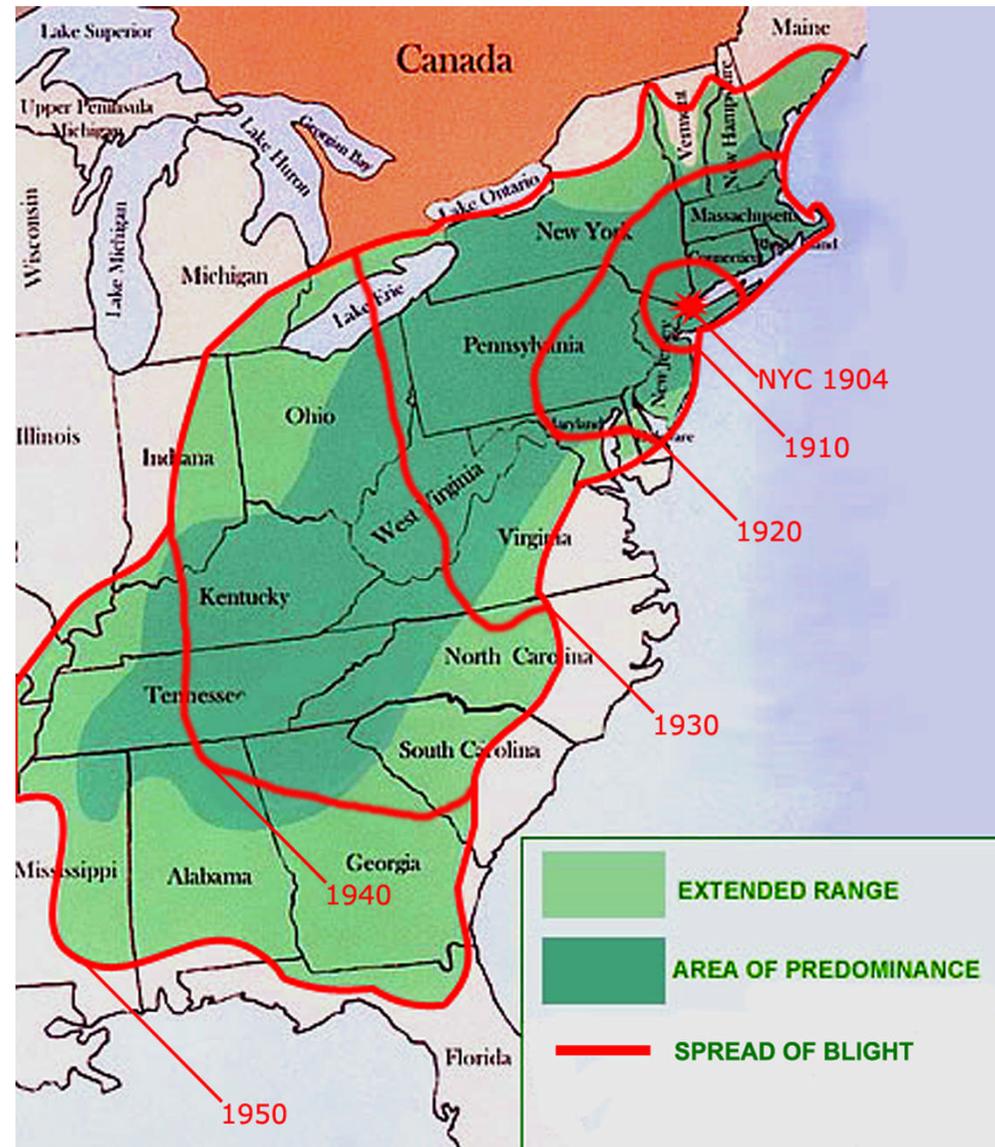




Chestnut Blight

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

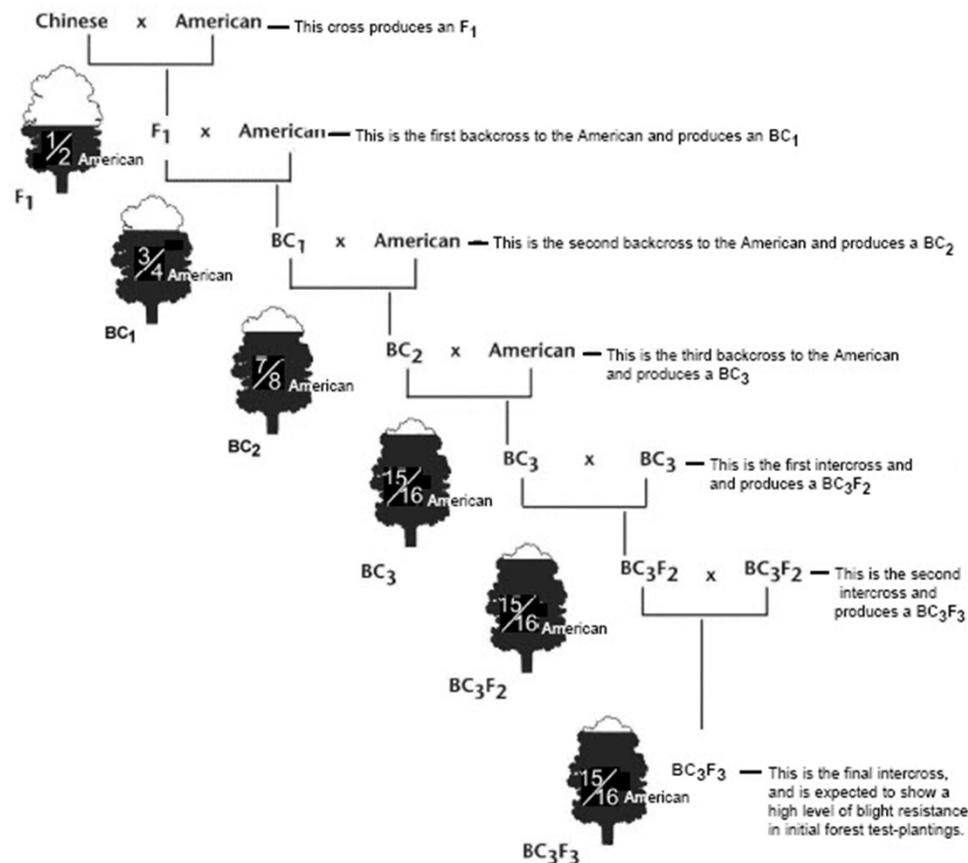
Expect to produce a tree with a high level of blight-resistance and American chestnut character and the ability to survive and compete in the forest.



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



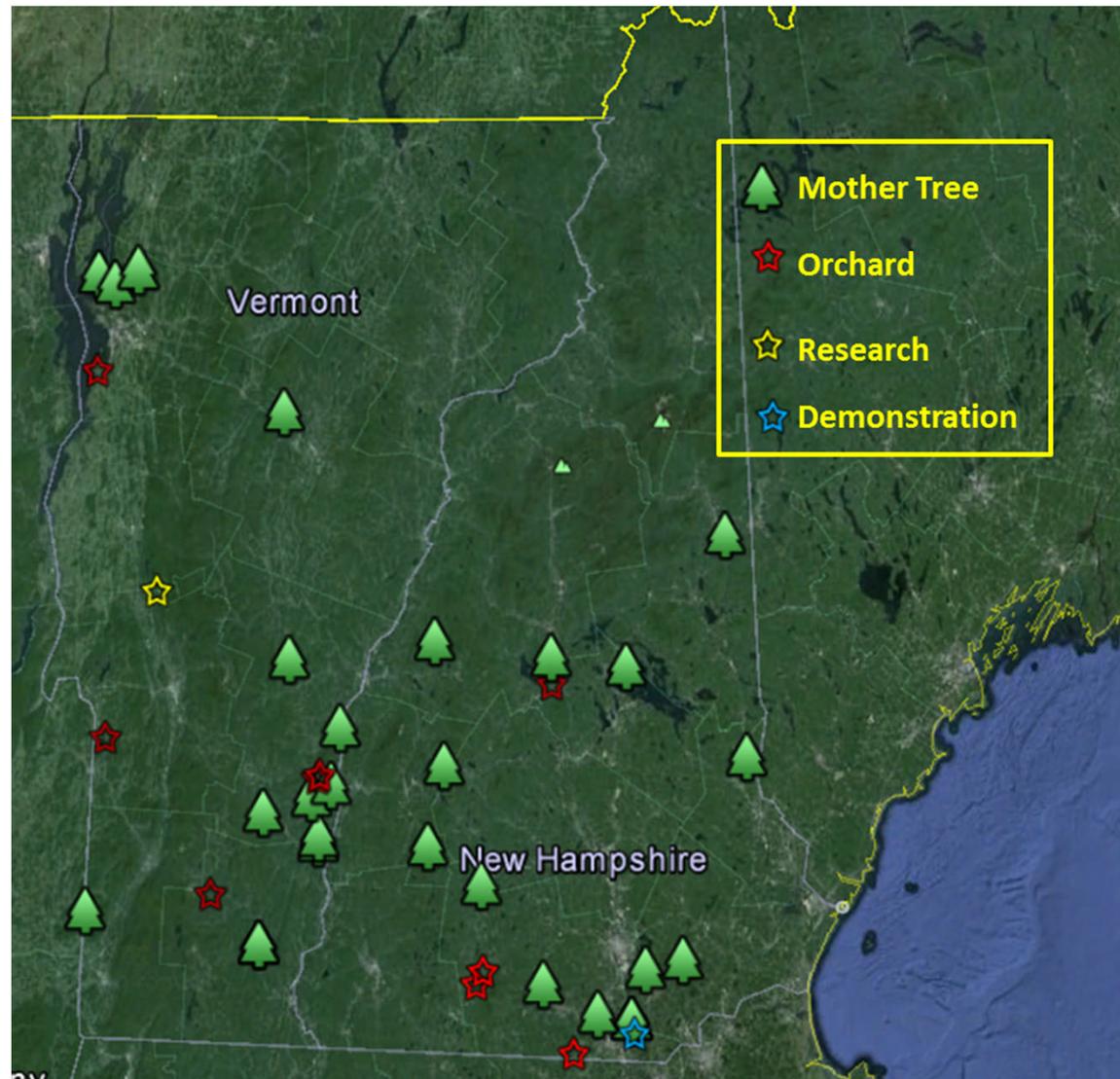
- Carry out the TACF breeding program locally
- Tasked with inventorying local, wild American chestnuts
- Conducting controlled pollinations and harvesting nuts
- Planting and maintaining orchards
- Educating the public
- **All-volunteer** with regional staff support





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

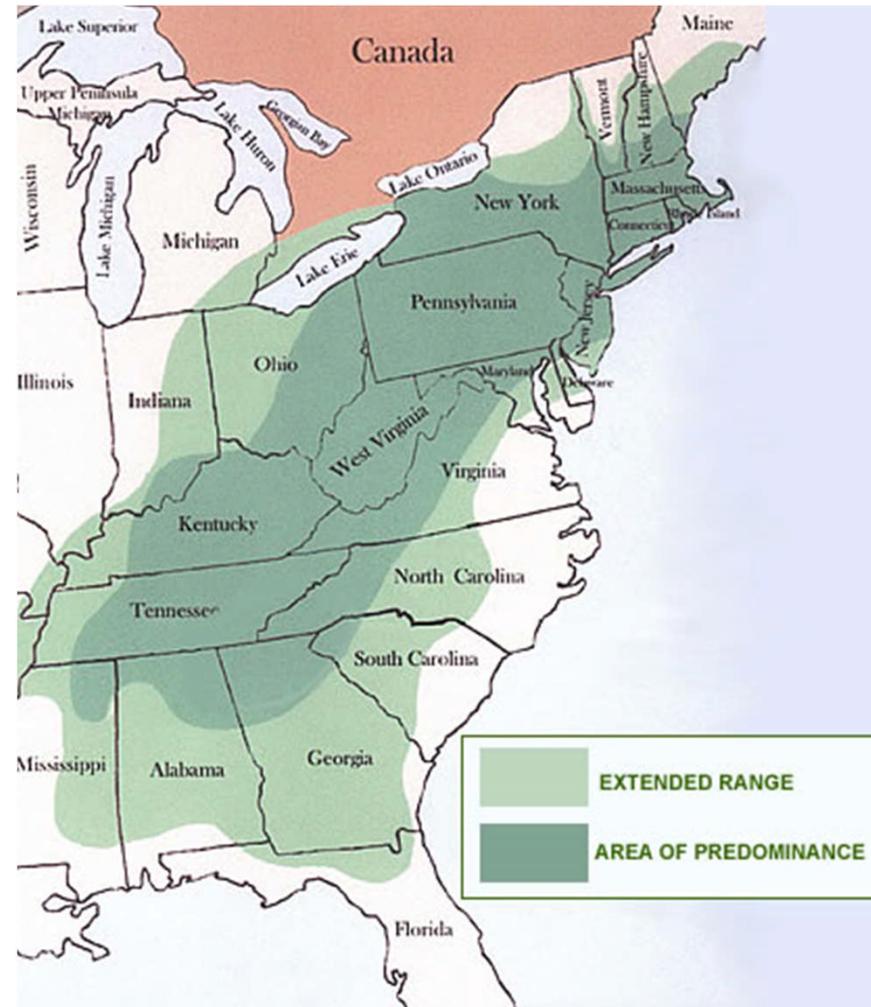




Range in Vermont

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

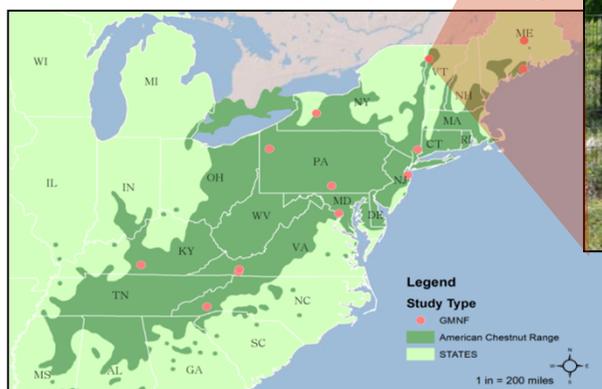


- US Forest Service, University of Vermont and TACF
- 3 species: American chestnut, Chinese chestnut, red oak
 - ~900 trees planted
- Assess growth and winter injury in relation to silvicultural treatment and genetic source
- Develop BMPs for species restoration in the north

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

- Report an existing tree or sprout

- VT/NH TACF Newsletter

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