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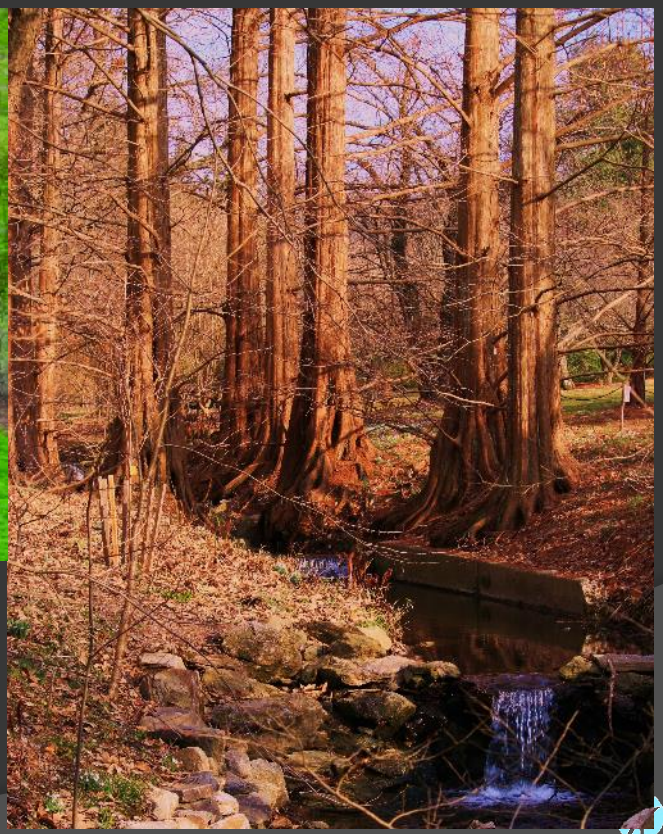
www.morrisarboretum.org



Jason Lubar

Associate Director of Urban Forestry

Morris Arboretum
University of Pennsylvania

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Climate Change is Inevitable

25 million years ago

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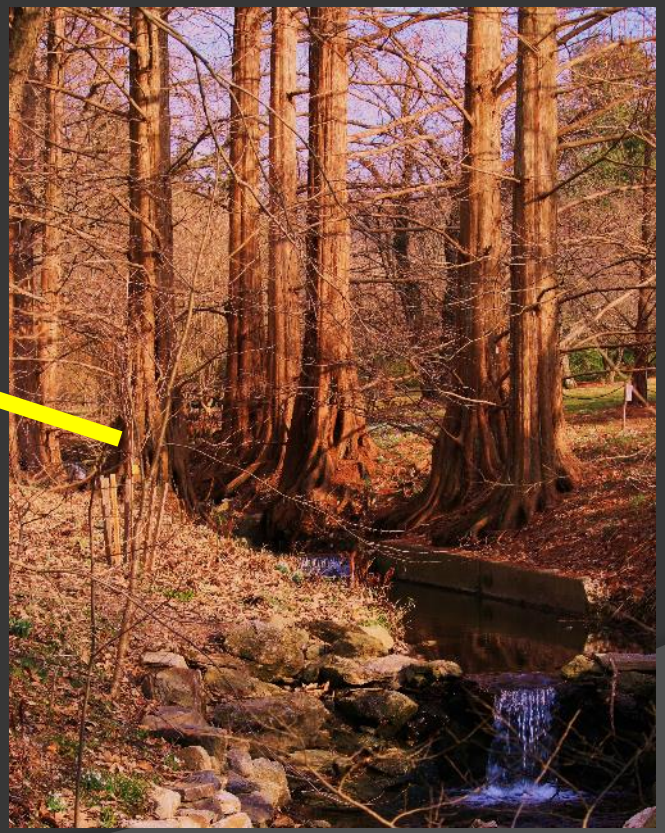
Climate Change is Inevitable

25 million years ago

100 million years ago



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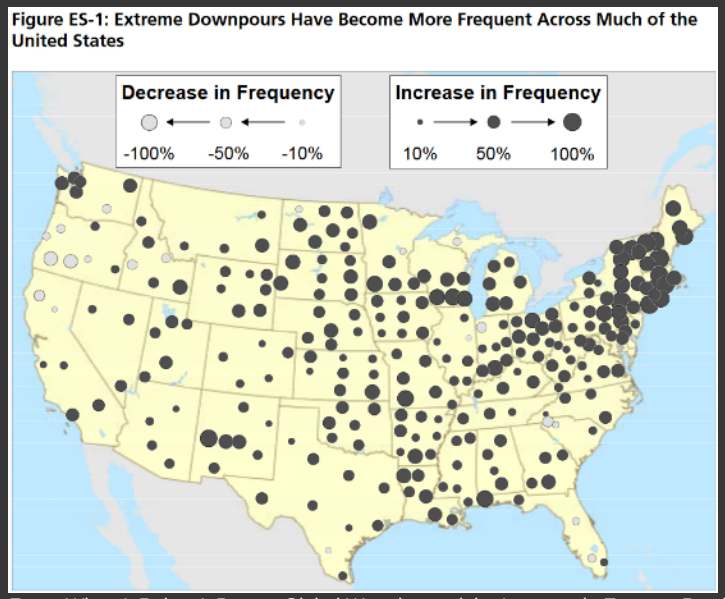
Climate Change is Inevitable

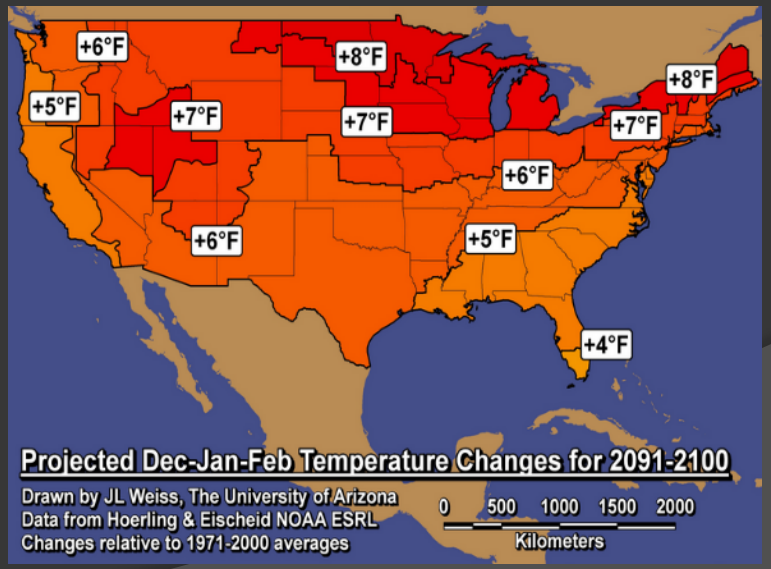
Progress is Optional

We don't know Nature's intent - but -
The weather seems to be getting more severe

Extreme in cities - hotter - drier



From: When It Rains, It Pours: Global Warming and the Increase in Extreme Precipitation from 1948 to 2011



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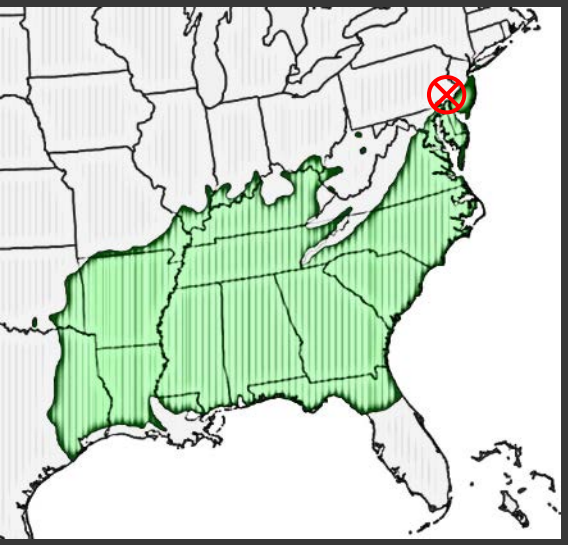
(Tree) Diversity is necessary for resiliency

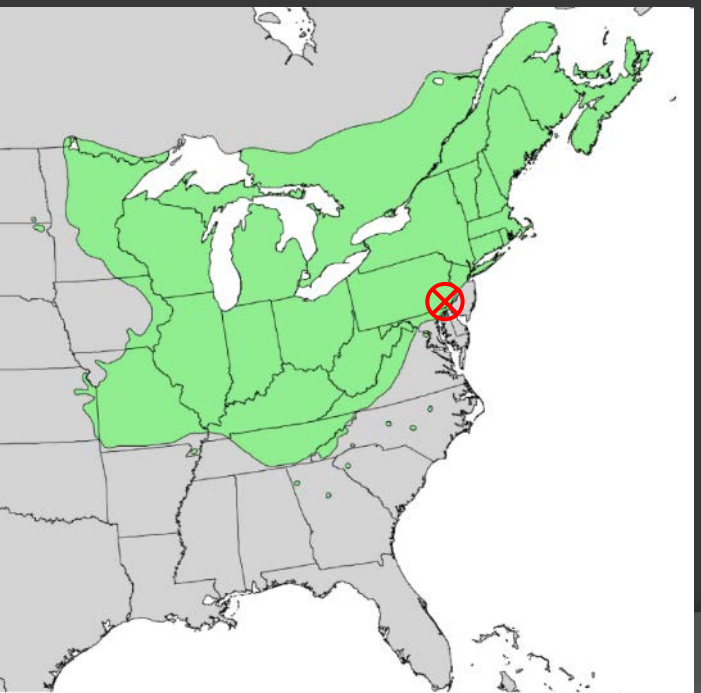
Where to start?

Identify most at risk; e.g. sugar maple, dogwood, hemlock, ash, red oak group

Plant species & range

Southern red oak





Sugar maple range

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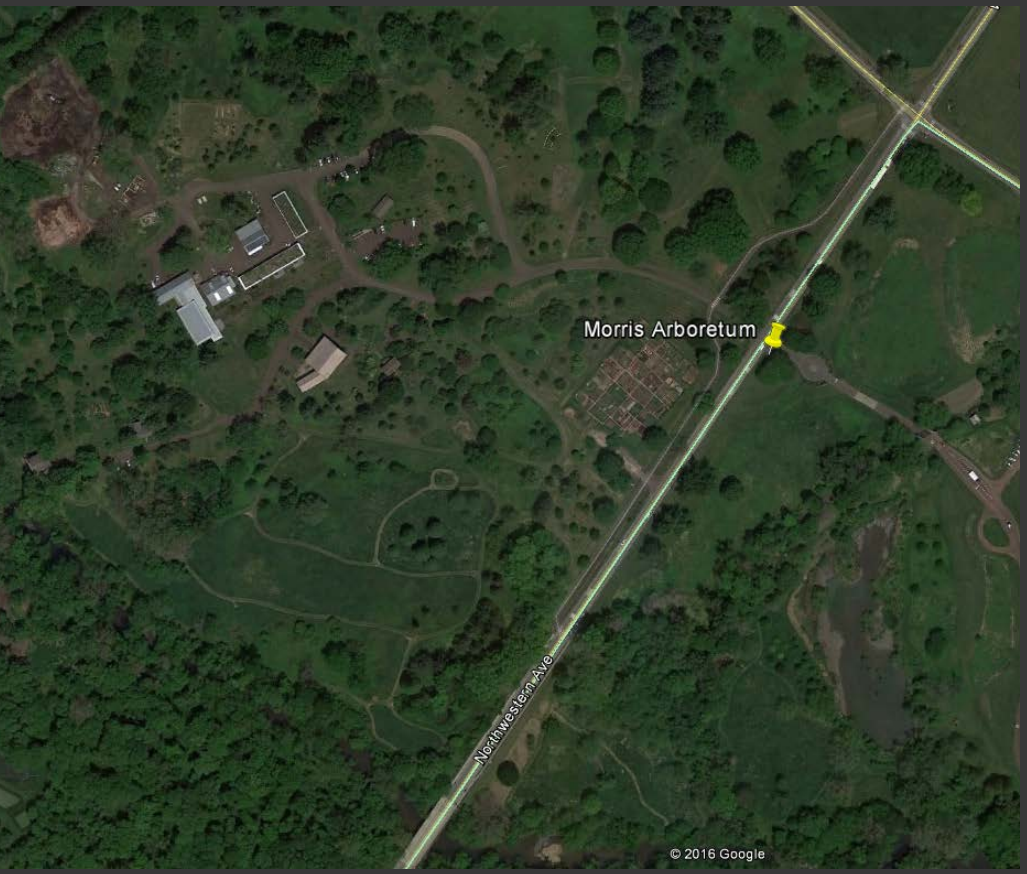
Arboreta and Colleges Campuses (many of which are now registered as Arboreta), can play an important role…
Testing – research - germplasm reservoir- collection expeditions, etc.



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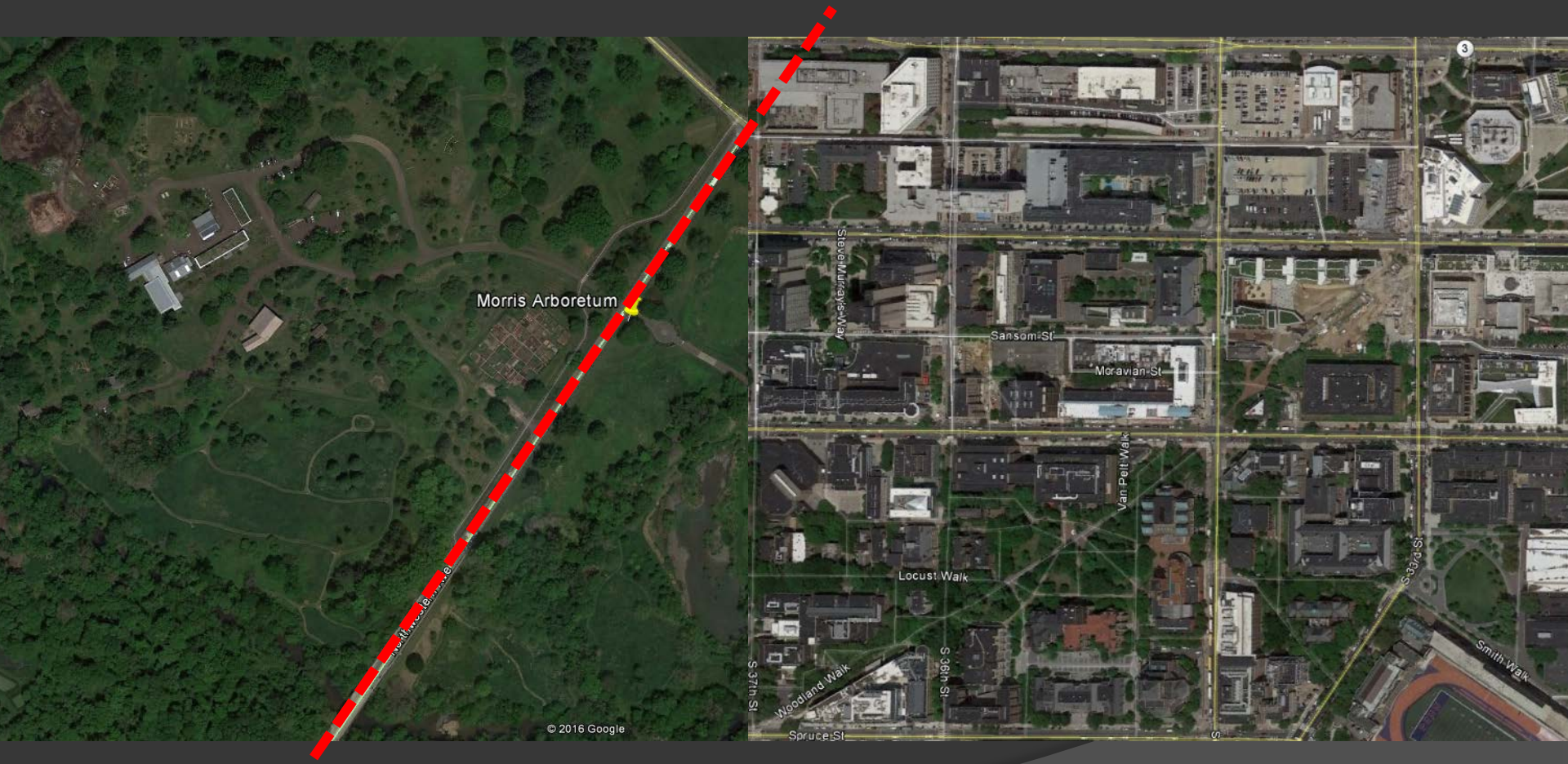

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Gather seeds from sources from hot, dry regions, around the globe – Chinese hemlock, chestnut at Independence Hall, collect ash from China…

… look in the range and anticipate, e.g. baldcypress, blackgum, live oaks

…Involve plant breeders and nursery folks, use phenotypic plasticity to develop broadly adaptable cvs. (more stomata, leaf thickness, etc.)

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Goal: World wide - work deliberately in unison

One vehicle: The global network of public gardens and arboreta

The Global Trees Campaign (GTC): joint initiative between Fauna & Flora International (FFI) and Botanic Gardens Conservation International (BGCI) to conserve the world's threatened tree species.

The North American Plant Collections Consortium (NAPCC): network of botanical gardens and arboreta coordinating a continent-wide effort to preserve threatened plant germplasm

Continue research –genetic engineering, resiliency

Caveats……

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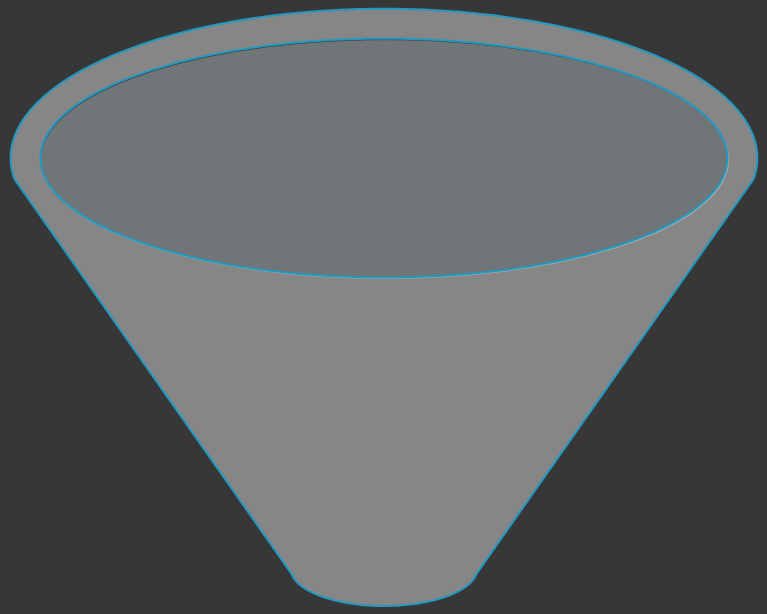

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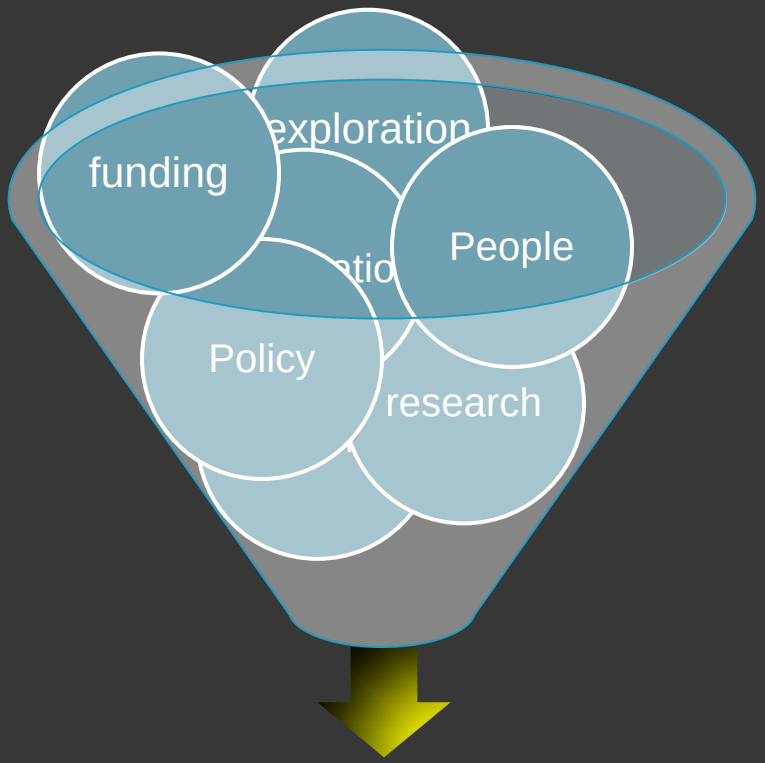

Resilient Ecosystem

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The Future ??

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The Future ??

New genetically engineered American chestnut will help restore the decimated, iconic tree

January 19, 2016 3.46am EST

Transgenic American chestnuts could soon take root. Claire Dunn, CC BY-ND

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American chestnut trees were once among the most majestic hardwood trees in the eastern deciduous forests, many reaching 80 to 120 feet in height and eight feet or more in diameter.

The "then boundless chestnut woods" Thoreau wrote about in Walden once grew throughout the Appalachian mountains. They provided habitat and a mast crop for wildlife, a nutritious nut crop for humans and a source of valuable timber. Because of their rapid growth rate and rot-resistant wood, they also have significant potential for carbon sequestration, important in these days of climate change.

The species has a sad story to tell. Of the estimated four billion American chestnut trees that once grew from Maine to Georgia, only a remnant survive today.

Historic picture of a large American chestnut tree

Author

William Powell
Professor in the Department of Environmental and Forest Biology, State University of New York College of Environmental Science and Forestry

Disclosure statement

William Powell is a non-paid consultant to The American Chestnut Foundation. Current external funding includes The American Chestnut Foundation (National and NY Chapter), USDA NIFA Biotechnology Risk Assessment Grant (BRAG), 10,000 Chestnut Challenge Crowd Funding Campaign, New York State Legislature Grant, Mississippi Fish and Wildlife Foundation, Camp Fire Club of America and public donations. Additional past funders are listed on our chestnut website pages: http://www.esf.edu/chestnut/ Dr. Powell is also a member of The American Chestnut Foundation, the Arbor Day Foundation, the American Phytopathological Society, the American Society for Microbiology, and the International Society for Horticultural Science.

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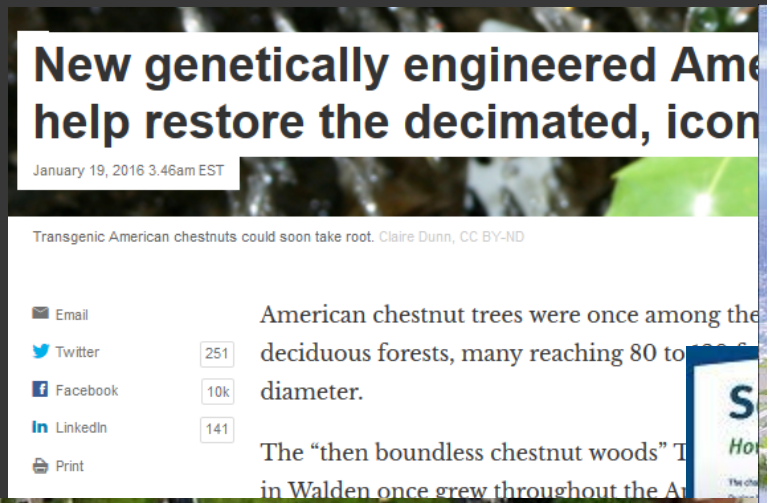

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Plan for and Plant for the Future!

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