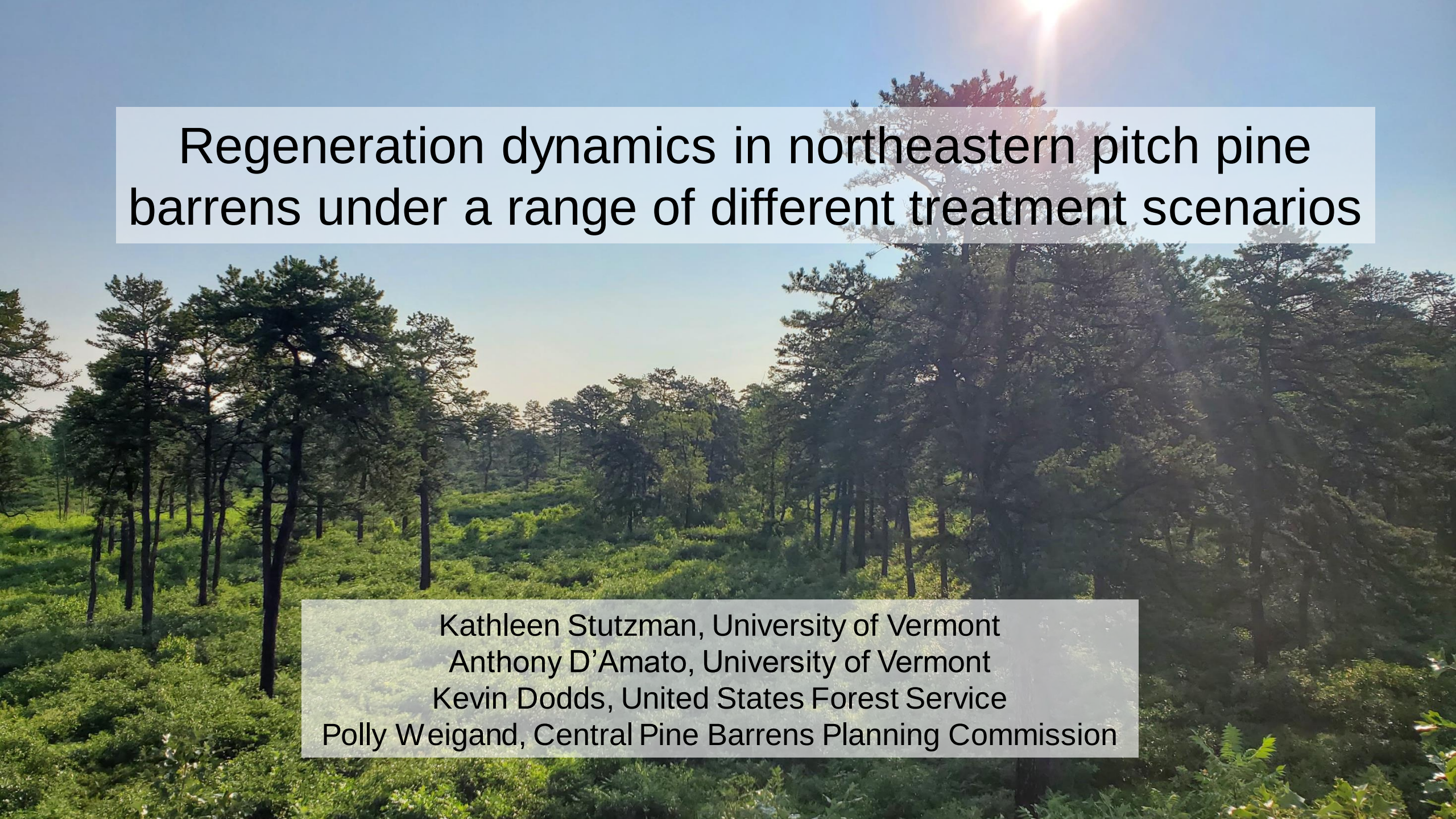
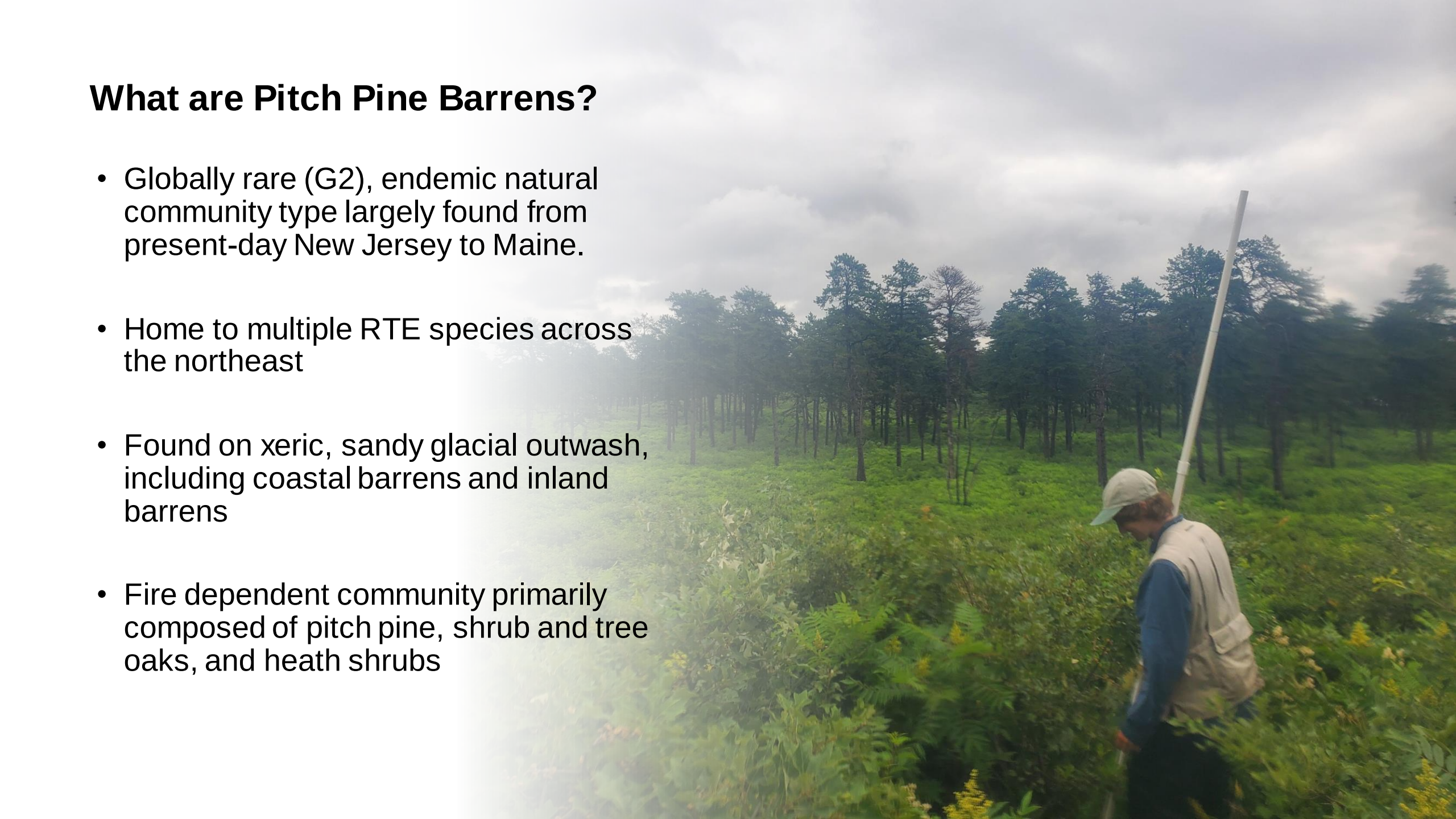
Regeneration dynamics in northeastern pitch pine barrens under a range of different treatment scenarios



Kathleen Stutzman, University of Vermont
Anthony D'Amato, University of Vermont
Kevin Dodds, United States Forest Service
Polly Weigand, Central Pine Barrens Planning Commission

What are Pitch Pine Barrens?

- Globally rare (G2), endemic natural community type largely found from present-day New Jersey to Maine.
- Home to multiple RTE species across the northeast
- Found on xeric, sandy glacial outwash, including coastal barrens and inland barrens
- Fire dependent community primarily composed of pitch pine, shrub and tree oaks, and heath shrubs



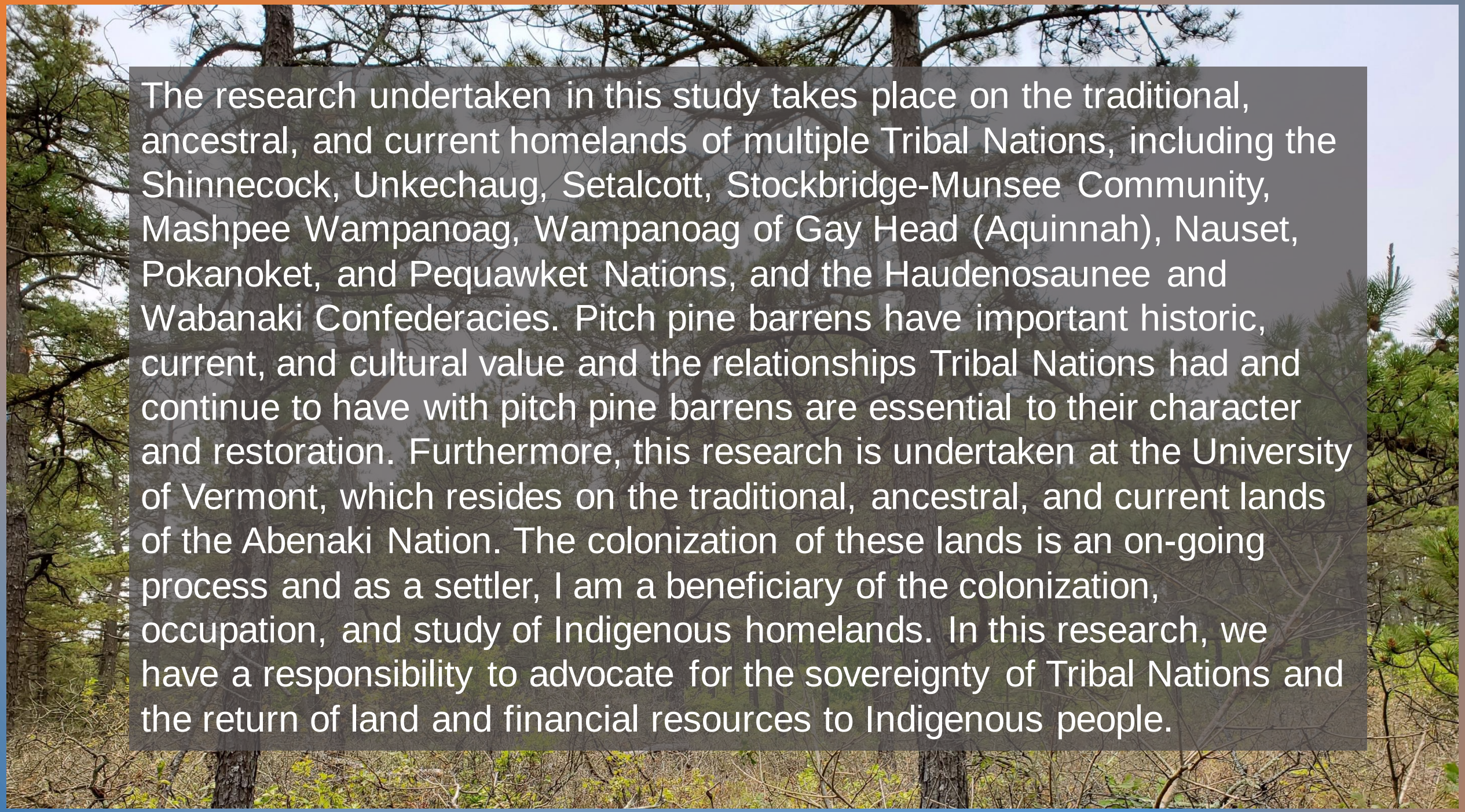
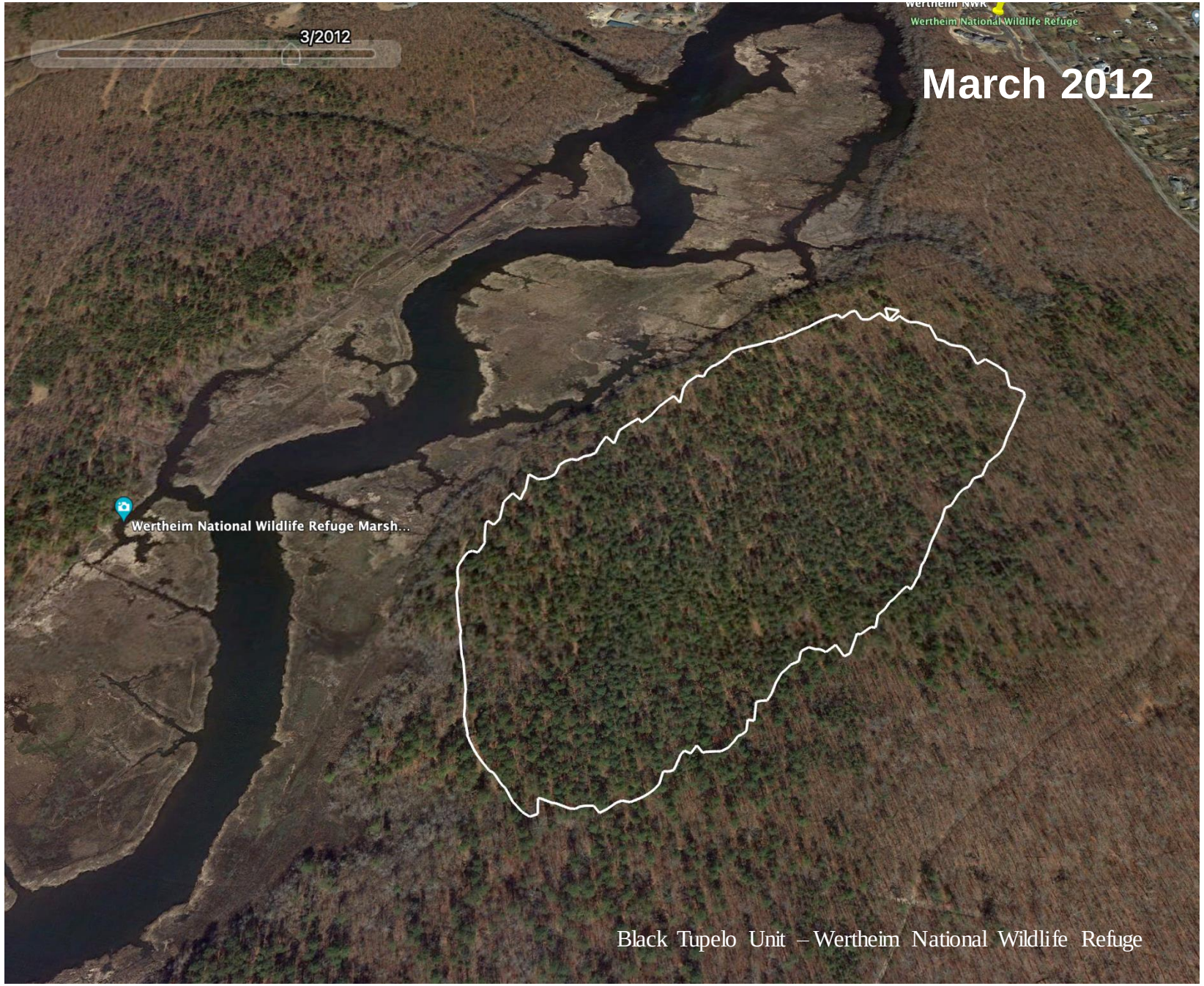
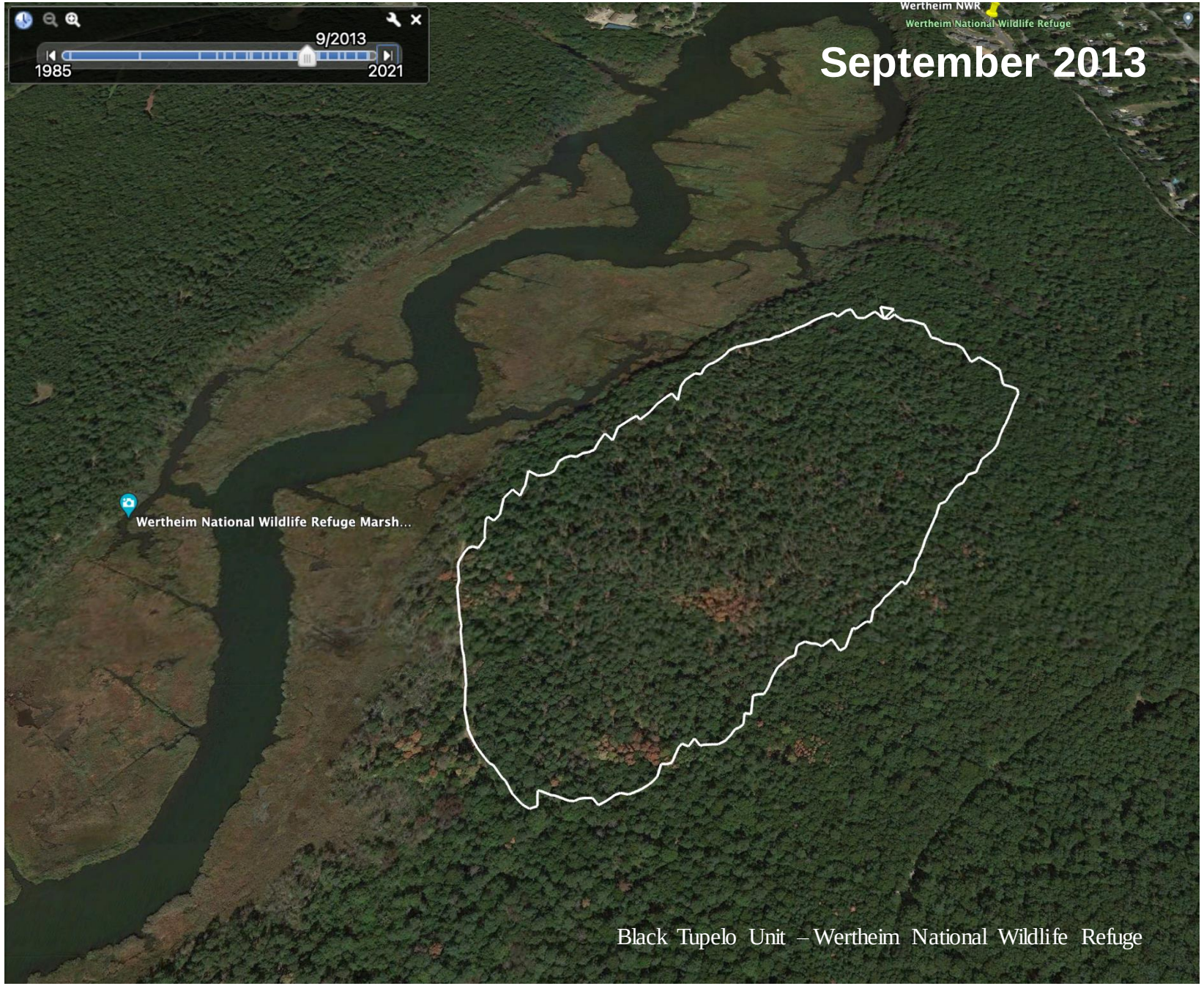

The research undertaken in this study takes place on the traditional, ancestral, and current homelands of multiple Tribal Nations, including the Shinnecock, Unkechaug, Setalcott, Stockbridge-Munsee Community, Mashpee Wampanoag, Wampanoag of Gay Head (Aquinnah), Nauset, Pokanoket, and Pequawket Nations, and the Haudenosaunee and Wabanaki Confederacies. Pitch pine barrens have important historic, current, and cultural value and the relationships Tribal Nations had and continue to have with pitch pine barrens are essential to their character and restoration. Furthermore, this research is undertaken at the University of Vermont, which resides on the traditional, ancestral, and current lands of the Abenaki Nation. The colonization of these lands is an on-going process and as a settler, I am a beneficiary of the colonization, occupation, and study of Indigenous homelands. In this research, we have a responsibility to advocate for the sovereignty of Tribal Nations and the return of land and financial resources to Indigenous people.

Photo credit: Alex Entrup, MassWildlife

Changes to Disturbance Regimes

- Forced removal & eradication of Tribal Nations
- Colonization increased & decreased fire in spatial and temporal scales
- Land clearing for Ag & subsequent abandonment
- Federal, State, & Local Policies to control & prevent fire
- Fragmentation & Development
- Novel threats from climate change
  - Recent range expansion of southern pine beetle


3/2012
Wertheim National Wildlife Refuge
March 2012
Wertheim National Wildlife Refuge Marsh...
Black Tupelo Unit – Wertheim National Wildlife Refuge


9/2013
1985
2021
Wertheim NWR
Wertheim National Wildlife Refuge
September 2013
Wertheim National Wildlife Refuge Marsh...
Black Tupelo Unit – Wertheim National Wildlife Refuge


6/2014
1985
2021
Wertheim NWR
Wertheim National Wildlife Refuge
June 2014
Wertheim National Wildlife Refuge Marsh...
Black Tupelo Unit – Wertheim National Wildlife Refuge

- Overstory mortality

- Underlying issues of mesophication & densification

- Loss of seed source & genetic diversity

- Community transition

SpringRx FallRx Mow & Rx Harvest SPB Outbreak Control

Study Design

- **Replicate treatment type across 3 regions**; 2 available for Harvest

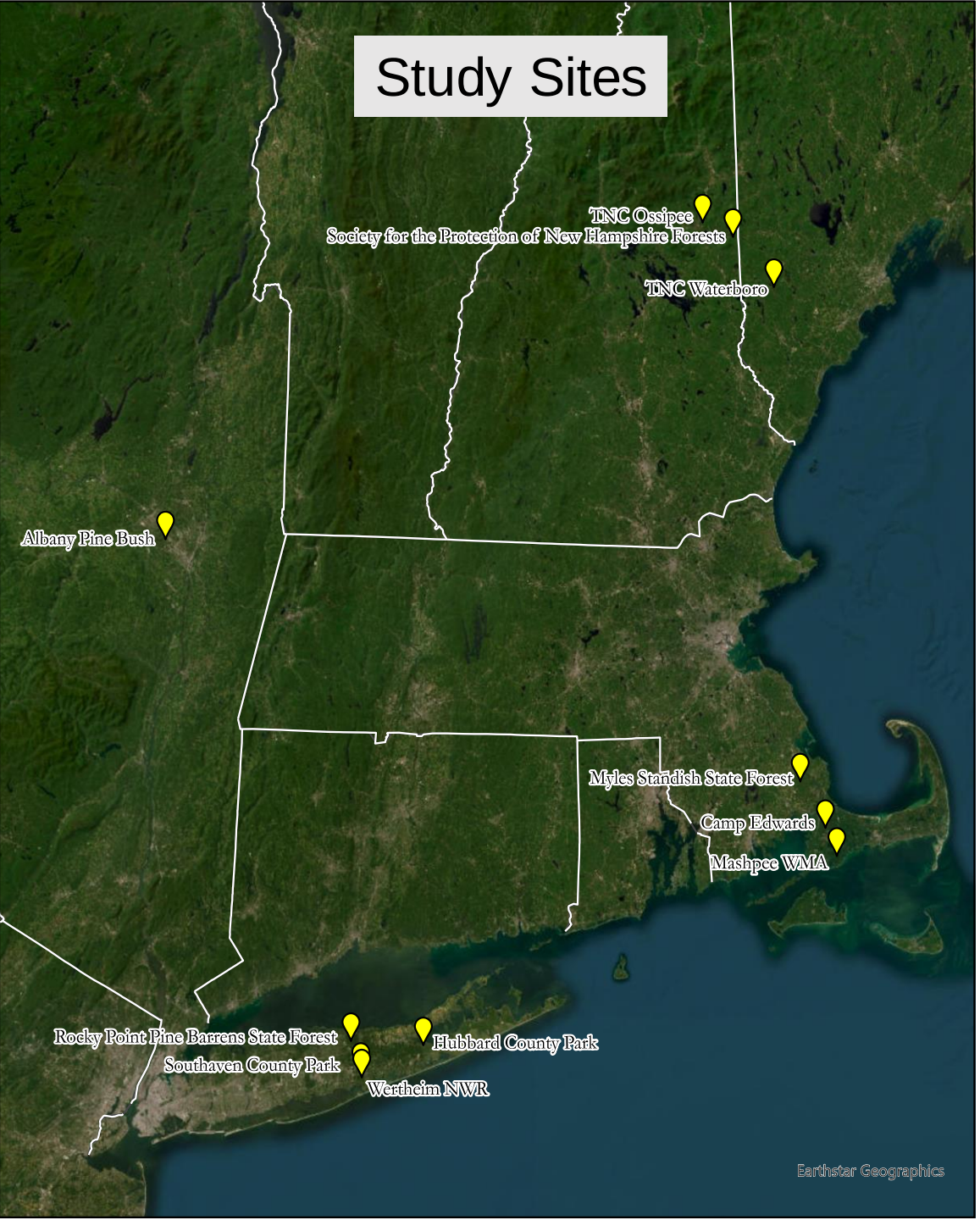
- **Replicates of 3 of each treatment type were sampled; 2 for 'Control' sites**

- Sampling areas treated between **2015 & 2022**

- Management units at least **1.21 HA** with a buffer of at least **30m**; large units subsampled

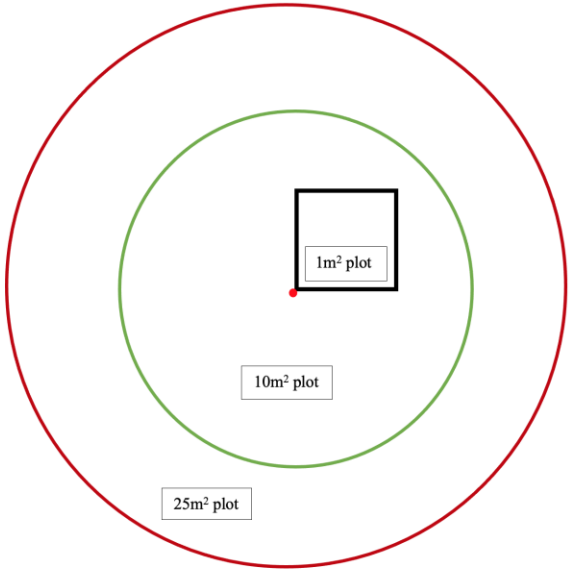
- Plots were taken using a systematic sampling grid with 18 – 25 subplots. Inter-plot distance is a minimum of 10m

	Albany, NY	Cape Cod, MA	Long Island, NY	Ossipee, NH	Waterboro, ME
Fall RxFire		X		X	X
Spring RxFire	X	X	X		
Harvest		X	X		
Mow & RxFire	X	X		X	
Control	X	X	X	X	X

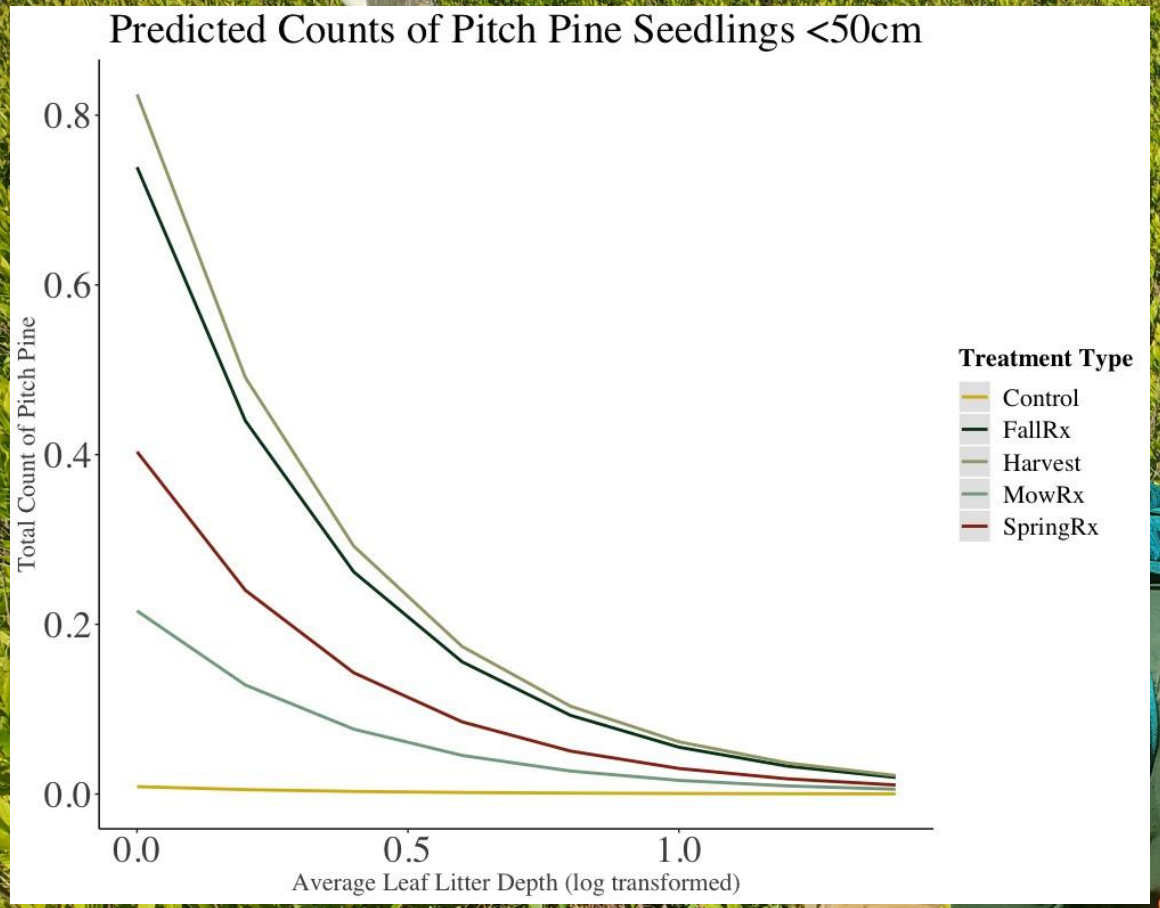


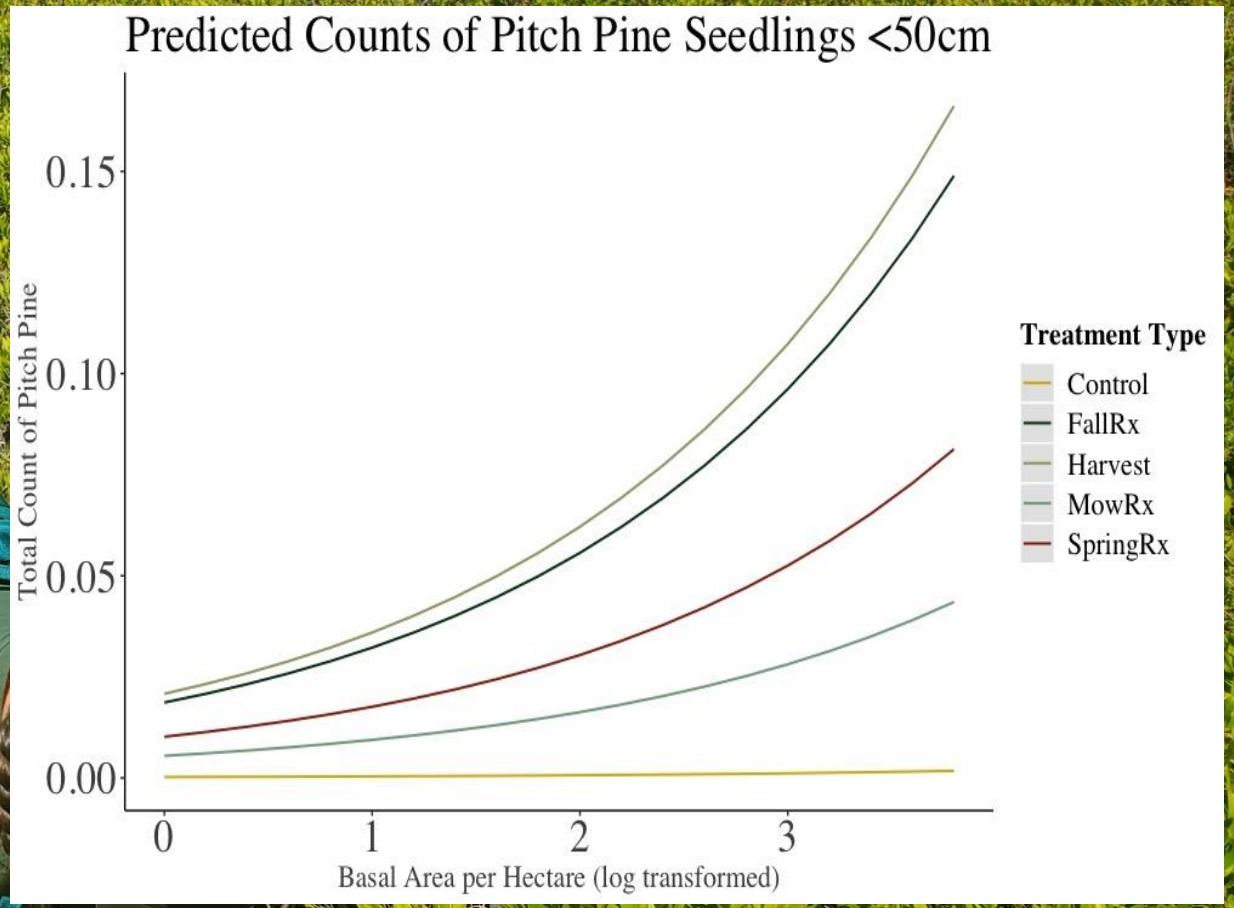
Sampling Methodology

- Site-level data
- Plot-level data
- Regeneration
  - Seedlings <50cm in $1m^2$
  - Seedlings >/=50cm to <2.5cm DBH in $10m^2$
  - Saplings >/=2.5cm to <10cm DBH in $25m^2$
- Understory vegetation diversity & abundance $1m^2$
- Ground cover classes & abundance $1m^2$
- Leaf litter depth at 2 locations $1m^2$



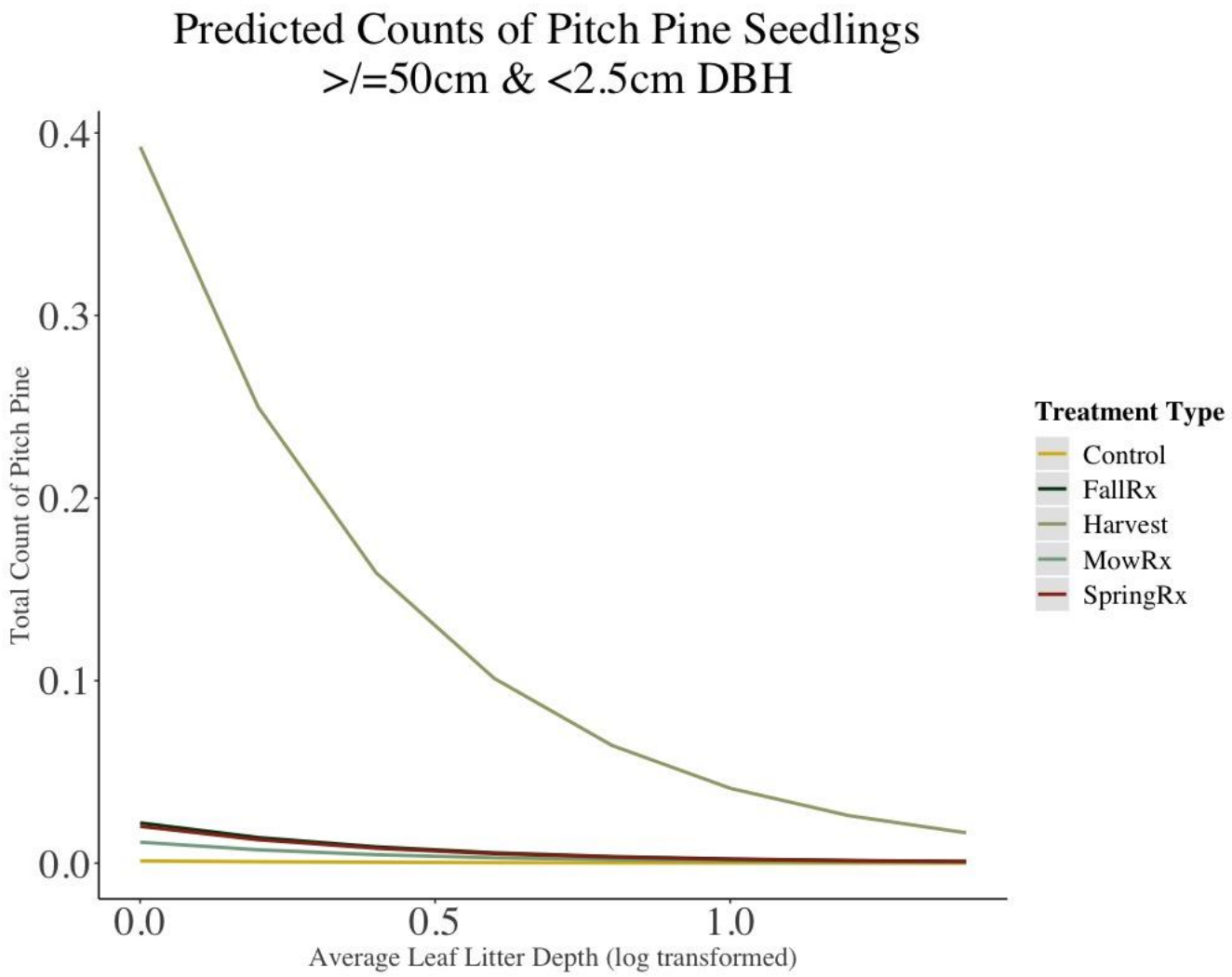
Plot Design



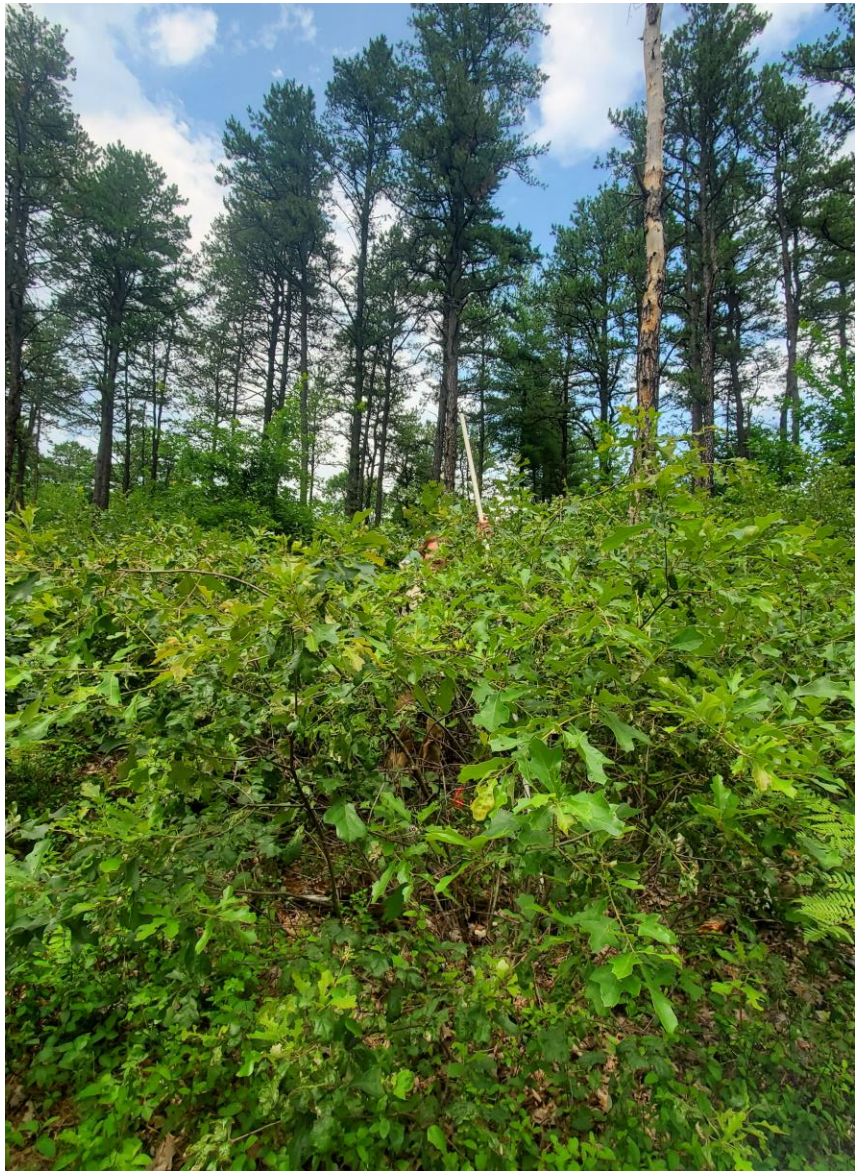


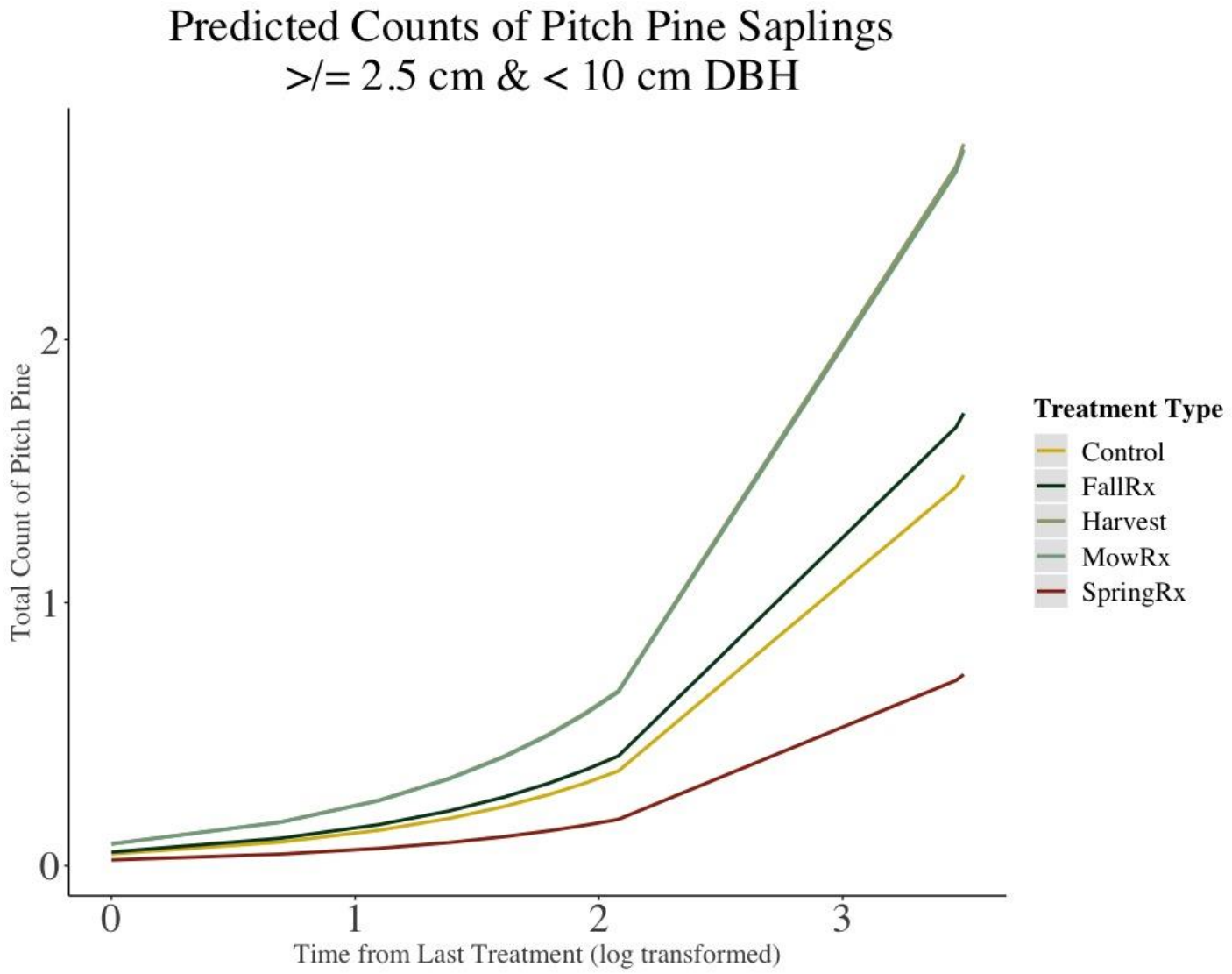
Pitch pine seedling counts decrease as leaf litter depth increases

Pitch pine seedling counts increase with basal area



Large seedling counts decline as leaf litter depth increases





Sapling counts increase with distance from treatment year

Conclusions & Next Steps

- Harvest & FallRx showing early signs of success

- Exposed mineral soil very important

- Sweet spot for overstory basal area

- Investigate relationship between silvicultural treatments and other characteristic plants (i.e., scrub oak, blueberry)

Thanks to all my incredible field help!

Will Rockett
Ryan Hawley
Sam Acampora
Sabrina Cohn
Rachael Munroe
Sofia Young
Chris Steigerwalk
Jamie Kaplan

QUESTIONS?


Protected Clam
Shrimp Puddles
NORMAL DRIVING USE ONLY
No digging
No filling
By order of the Camp Commander
Range Control 330-202-9313
Natural Resources 330-202-9343


CONSIDER
WEARING
MASK