Brookhaven National Laboratory

U.S. DEPARTMENT OF ENERGY

Keeping the Pine in the Pine Barrens on Long Island

Kathy L. Schwager

November 20, 2025

@BrookhavenLab

Long Island Central Pine Barrens Region

Forest Health & the Decline of the LI Pine Barrens

Long Island forests are NOT healthy!

- Never been actively managed.
- Fire has been removed from the ecosystem.
- Forests are overstocked.
- Reduced resistance to additional stressors.

Brookhaven National Laboratory

Southern Pine Beetle

Native to southern US

- Expanding range northward.
- Discovered on LI in 2014.

One of the most destructive forest pests in the US.

Pitch pine is a preferred host, but it will attack most conifer species.

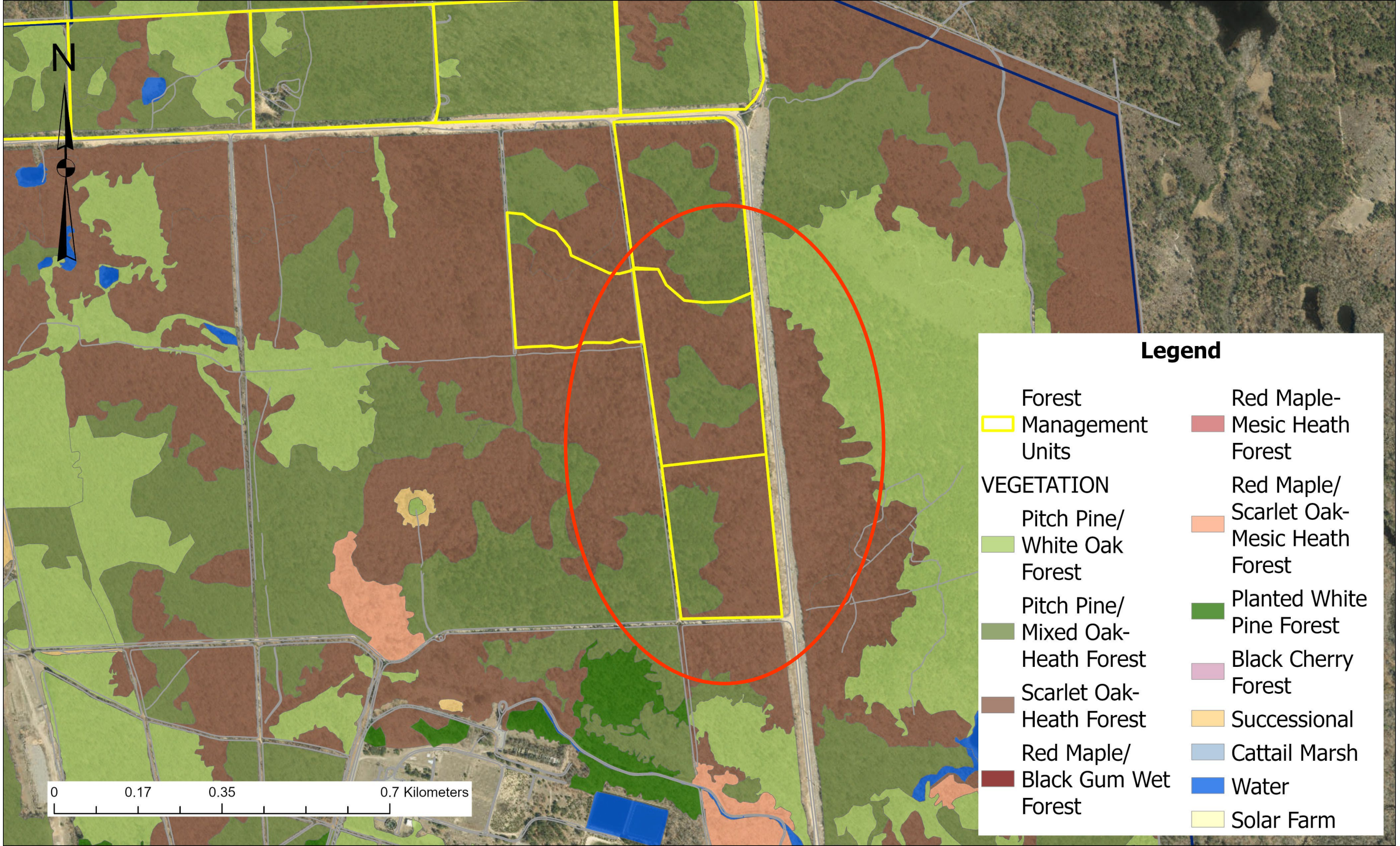
- Trees are killed by being overwhelmed by sheer numbers.
- Trees die in 2-4 months.
- Infestations can advance up to 50 ft./day.
- Can have up to 5 generations/year.
- Millions of trees killed.

Southern pine beetle

Black turpentine beetle

Impacts

- **Safety**
  - Creation of hazard trees.
    - SPB-killed trees decay and shed branches quickly.
  - Access issues.
    - Large increase in large-diameter dead and downed material impedes access for responding brush trucks.
- **Fire Risk**
  - Tree mortality does not increase fire risk in the short term.
    - Opened tree canopy results in:
      - A flush of understory growth—increase in live fuels.
      - Increased drying of fuels due to winds and heating of fuels by the sun.


N
0
0.17
0.35
0.7 Kilometers
Legend
Forest Management Units
VEGETATION
Pitch Pine/ White Oak Forest
Pitch Pine/ Mixed Oak-Heath Forest
Scarlet Oak-Heath Forest
Red Maple/ Black Gum Wet Forest
Red Maple-Mesic Heath Forest
Red Maple/ Scarlet Oak-Mesic Heath Forest
Planted White Pine Forest
Black Cherry Forest
Successional
Cattail Marsh
Water
Solar Farm

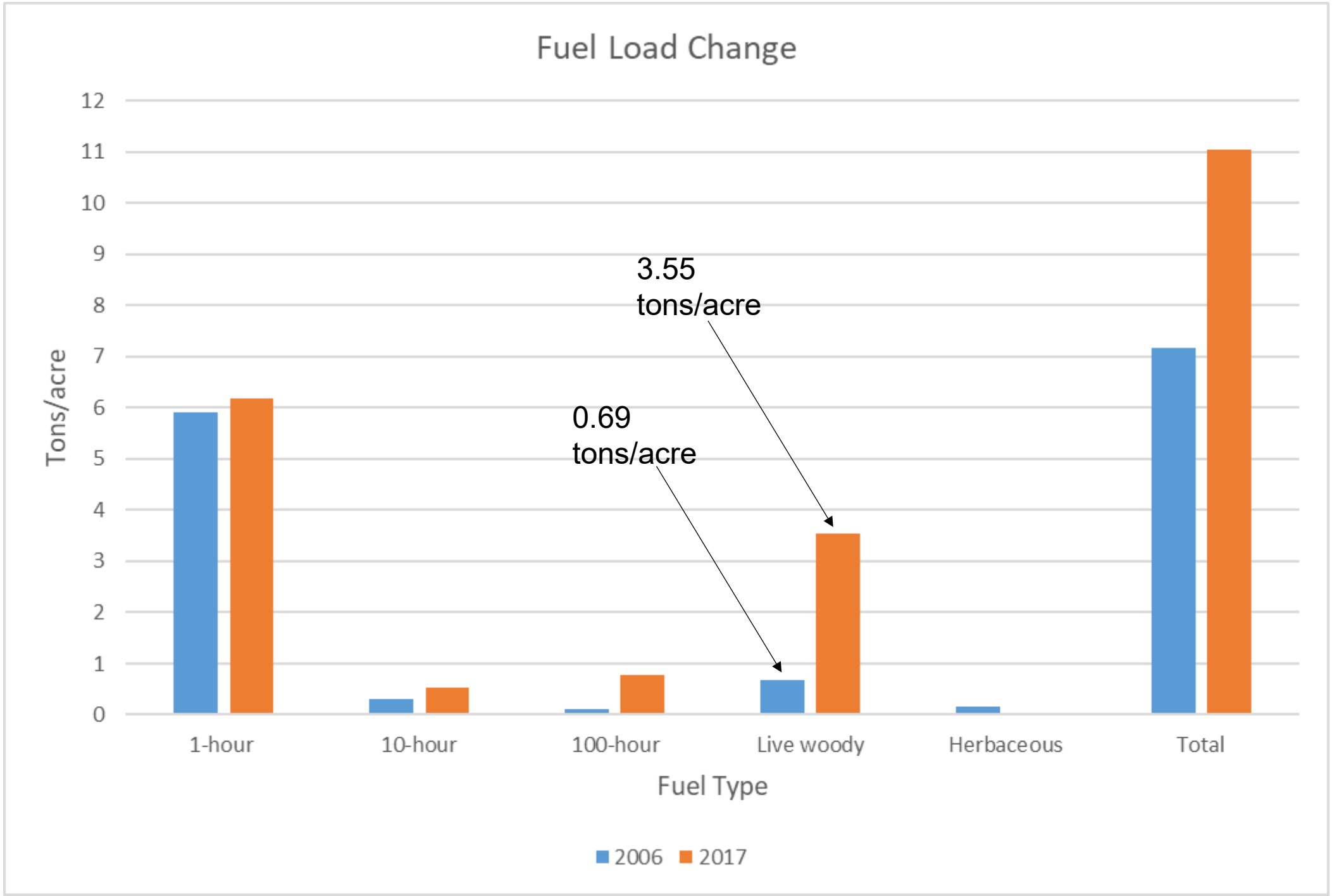
Fuels Monitoring

Inventories conducted in 2006 and 2016-17

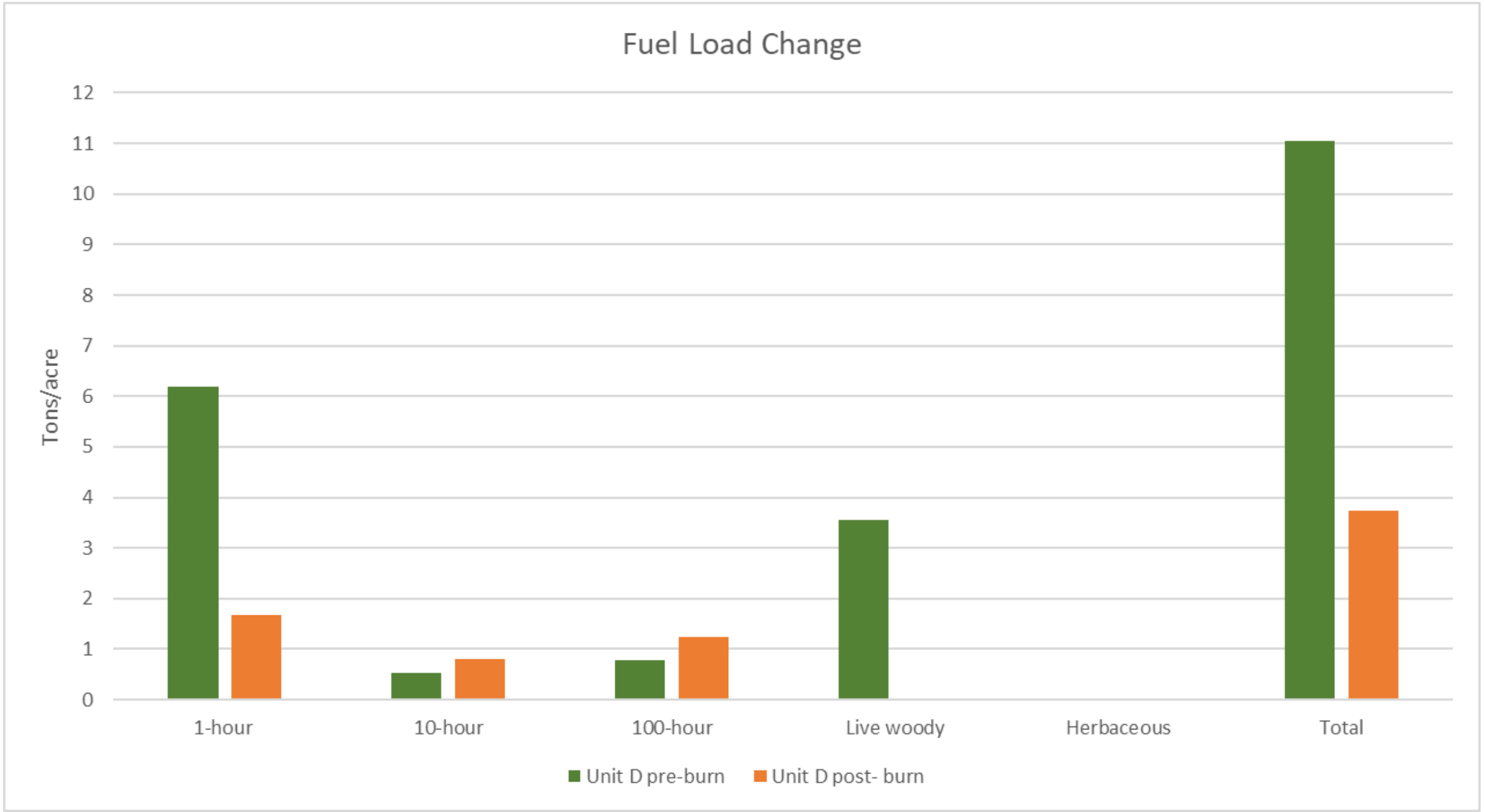
- Brown's downed woody fuel lines
- 40 x 40cm harvest plots
- Duff & litter measurements
- Additional stand data – (e.g., BA, crown closure, species composition)

Brookhaven National Laboratory

https://www.umass.edu/nebarrensfuels/methods/index.html


Fuel Load Change
12
11
10
9
8
7
6
5
4
3
2
1
0
Tons/acre
3.55
tons/acre
0.69
tons/acre
1-hour
10-hour
100-hour
Live woody
Herbaceous
Total
Fuel Type
2006
2017

Post-burn Monitoring



Fire Effects Monitoring

Determine whether burn objectives were met quantitatively vs. qualitatively

- Evaluate changes in fuel loading and composition (quantitative)
- Composite Burn Index (CBI)(qualitative)
  - Assess effects of fire on soil and vegetation to determine overall fire severity.
  - Rating of fire effects within five strata on a scale of 0.0 to 3.0, then averaged.
    - Substrates
    - Herbs, low shrubs, trees <1m
    - Tall shrubs, trees 1-5m
    - Sub-canopy trees
    - Dominant and codominant trees
  - Photo points
  - Change over time, first order vs. second order fire effects

CBI - Photo Points

Pre-burn

CBI - Photo Points

Immediately Post-burn

CBI - Photo Points

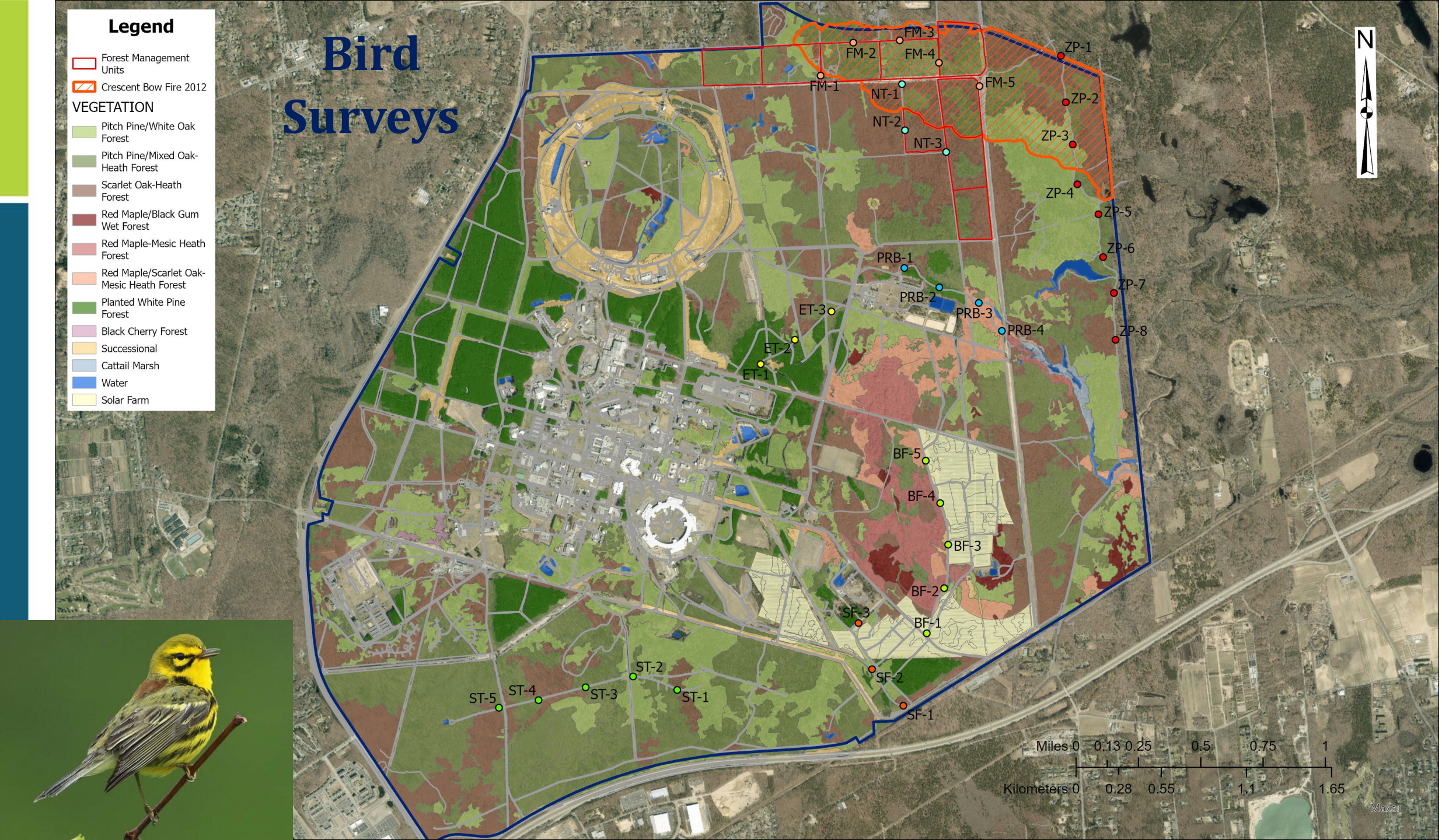
3 months Post-burn

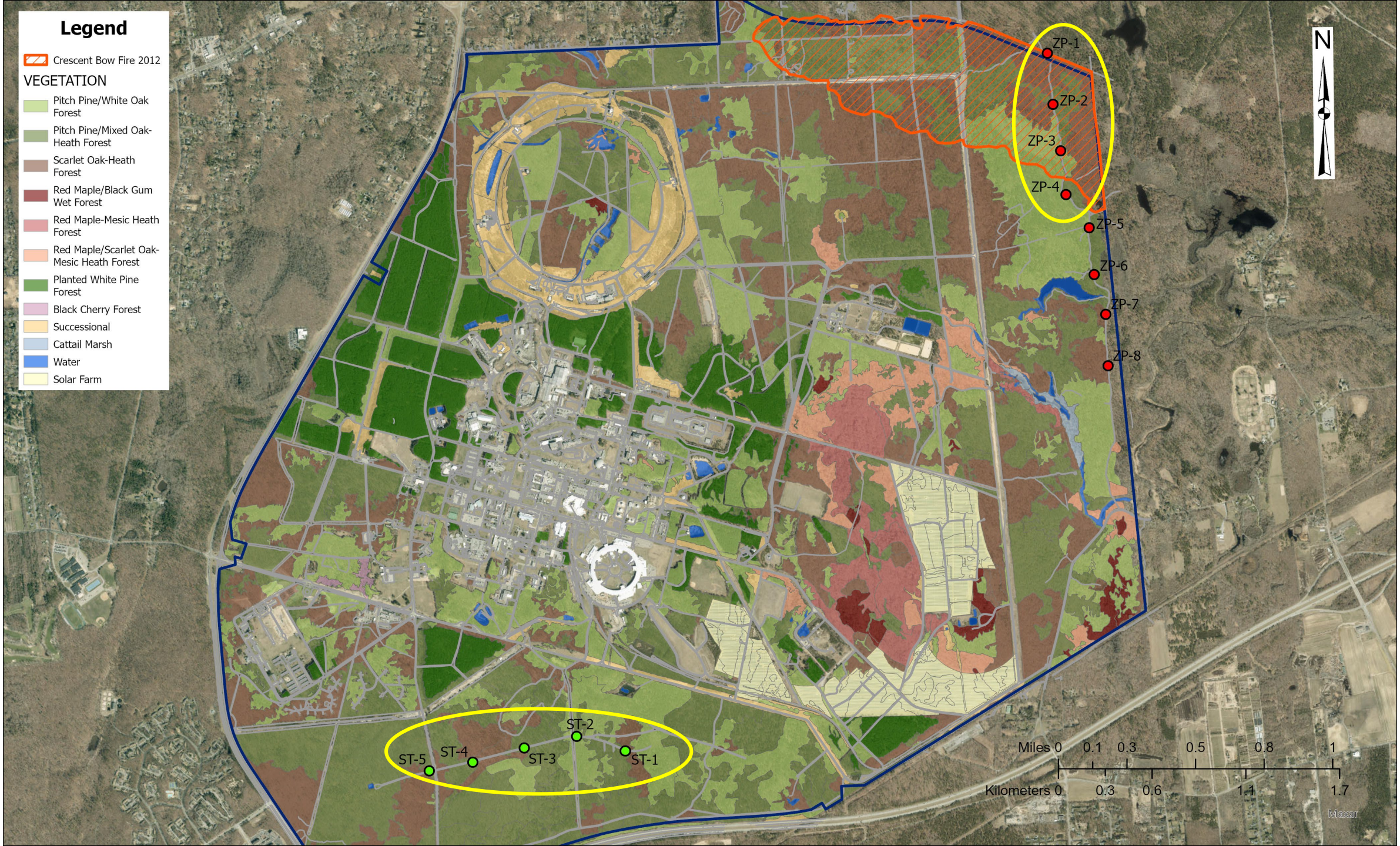
CBI - Photo Points

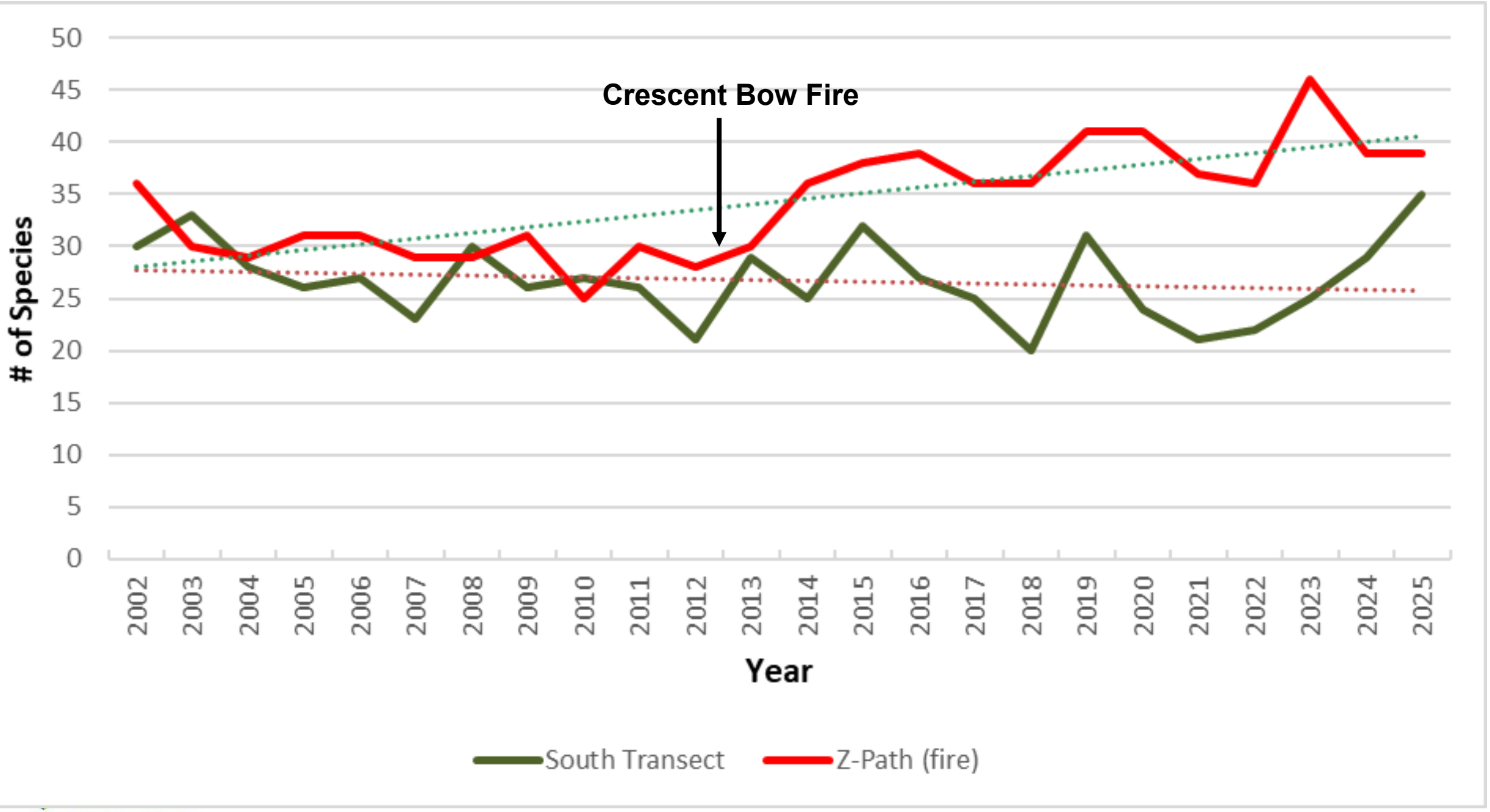
1 year Post-burn

CBI – Total Plot
1.34
Low-Moderate Severity

Bird Surveys




Legend
Crescent Bow Fire 2012
VEGETATION
Pitch Pine/White Oak Forest
Pitch Pine/Mixed Oak-Heath Forest
Scarlet Oak-Heath Forest
Red Maple/Black Gum Wet Forest
Red Maple-Mesic Heath Forest
Red Maple/Scarlet Oak-Mesic Heath Forest
Planted White Pine Forest
Black Cherry Forest
Successional
Cattail Marsh
Water
Solar Farm
ZP-1
ZP-2
ZP-3
ZP-4
ZP-5
ZP-6
ZP-7
ZP-8
ST-1
ST-2
ST-3
ST-4
ST-5
N
Miles 0 0.1 0.3 0.5 0.8 1
Kilometers 0 0.3 0.6 1.1 1.7
Maxar


Crescent Bow Fire
# of Species
50
45
40
35
30
25
20
15
10
5
0
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
Year
South Transect
Z-Path (fire)

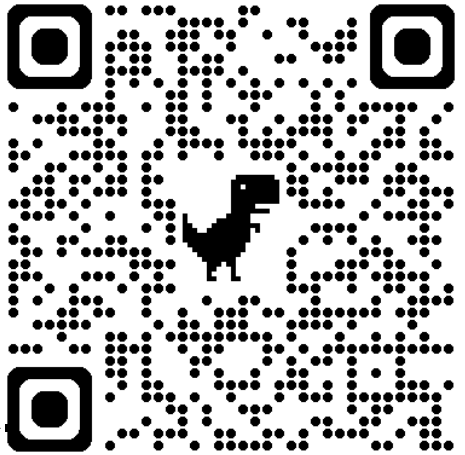
Internships

Science Undergraduate Laboratory Internships (SULI)

- Spring & Fall (16 weeks), Summer (10 weeks)
- Summer 2026 Application period open now – Oct. 15 to Jan. 7
  https://science.osti.gov/wdts/suli/How-to-Apply

  - Currently enrolled full-time at an accredited U.S. institution AND have completed at least one semester as an undergraduate (at the time of application)
  - Recent graduate from an undergraduate program (eligible for up to 2 years post graduation)
  - At least 18 years of age
  - Minimum GPA of 3.0
  - U.S. citizen or lawful permanent resident (green card holder) of the U.S.
  - Active health insurance for the duration of the program

Visiting Professor Program



Provides selected college faculty the opportunity to collaborate with scientific and engineering staff on a project of mutual interest.

- Spring, Summer, & Fall (10 weeks)
- Faculty plus two undergraduate or graduate students (Summer Term only) collaborate with BNL STEM staff on a project.
- Funded by DOE-WDTS. Faculty can participate in up to five terms.

  - Must be a full-time faculty member at an accredited U.S. college or university that is also an emerging research institution. The applicant cannot be a faculty member at a university categorized as “Doctoral Universities: Very High Research Activity” or “Doctoral Universities: High Research Activity”. All HBCUs are eligible to apply.
  - U.S citizen or Legal Permanent Resident (green card holder)

Burning Questions?

kschwager@bnl.gov