Restoring Ecosystem Health with Fire in a Rare Inland Pine Barrens

ALBANY PINE BUSH PRESERVE COMMISSION

The Forest Ecosystem Monitoring Cooperative

FEMC

20 November 2025

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Northeastern Pine Barrens

- -Suite of globally-rare, isolated, fire dependent ecological communities
- - Important biodiversity and habitat for early-successional wildlife species
- > 50% loss since the 1960s
- Conservation reliant

No Reference Community

Relics of soils and Indigenous Fire Stewardship

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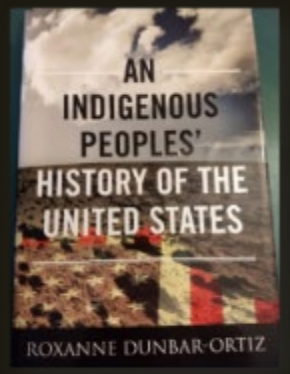

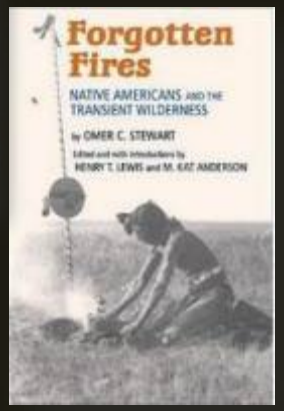

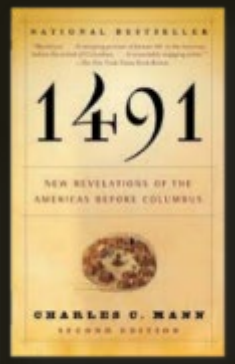

6,400 years of fire history in 1M of sediment

Stockbridge-Munsee Band of Mahicon Indians

Muh-he-conneok:
People of the Never Still Waters-
Mahicannitock (Hudson River)

STILL HERE, IN WI

New York Natural Heritage Program

Albany Pine Bush Preserve

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- Pitch Pine-Scrub Oak Barrens (S1/G2)
- Karner blue butterfly type locality

Audubon IMPORTANT BIRD AREA

New York State Bird Conservation Area

National Natural Landmarks Program
www.nature.nps.gov/nnl

Preserve Goals

- Ecological (Ecosystem Dynamics & Species)
- Programmatic (Recreation, Education, Wildfire mitigation)

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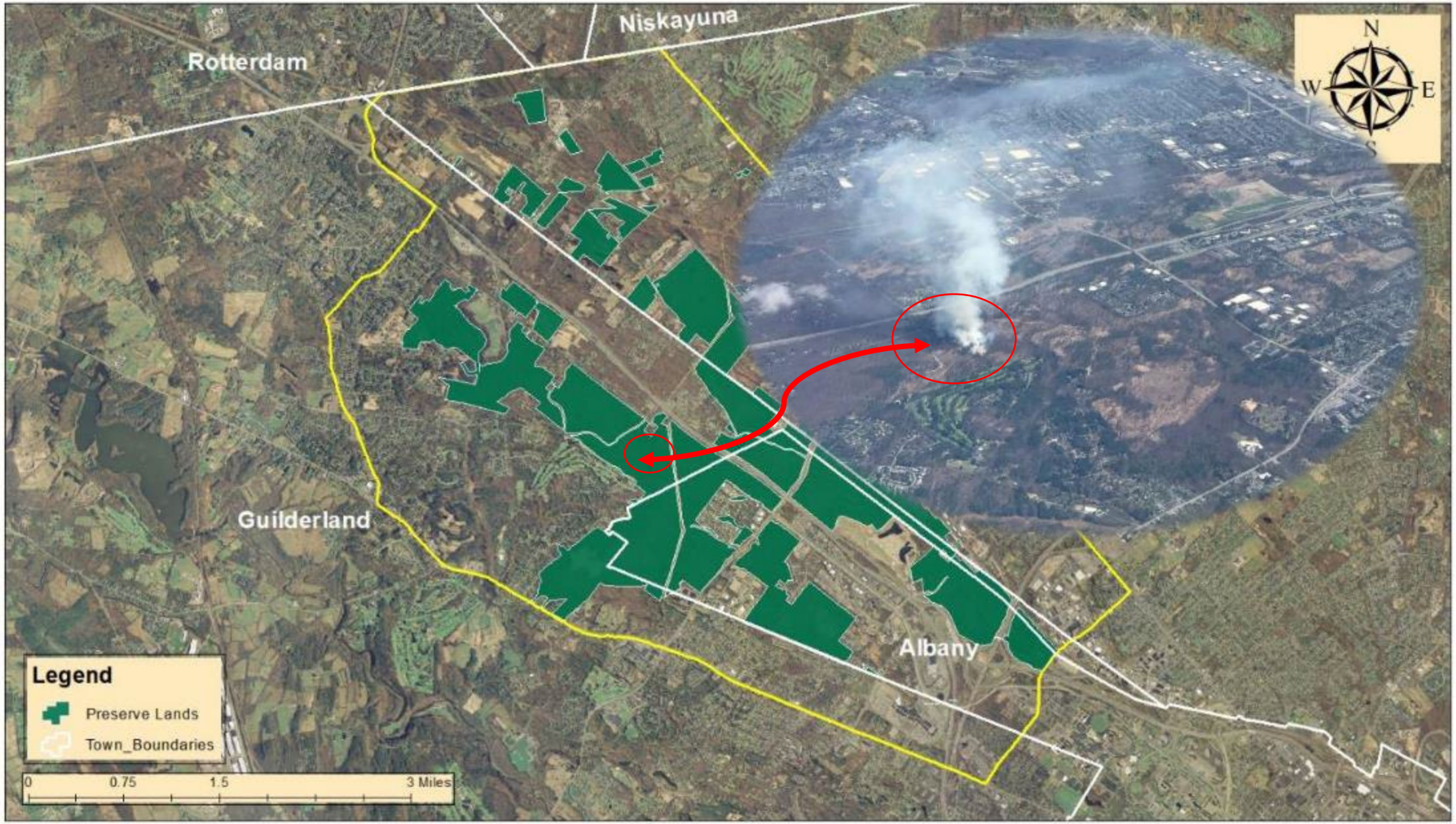
NYS ENVIRONMENTAL CONSERVATION LAW ARTICLE 46

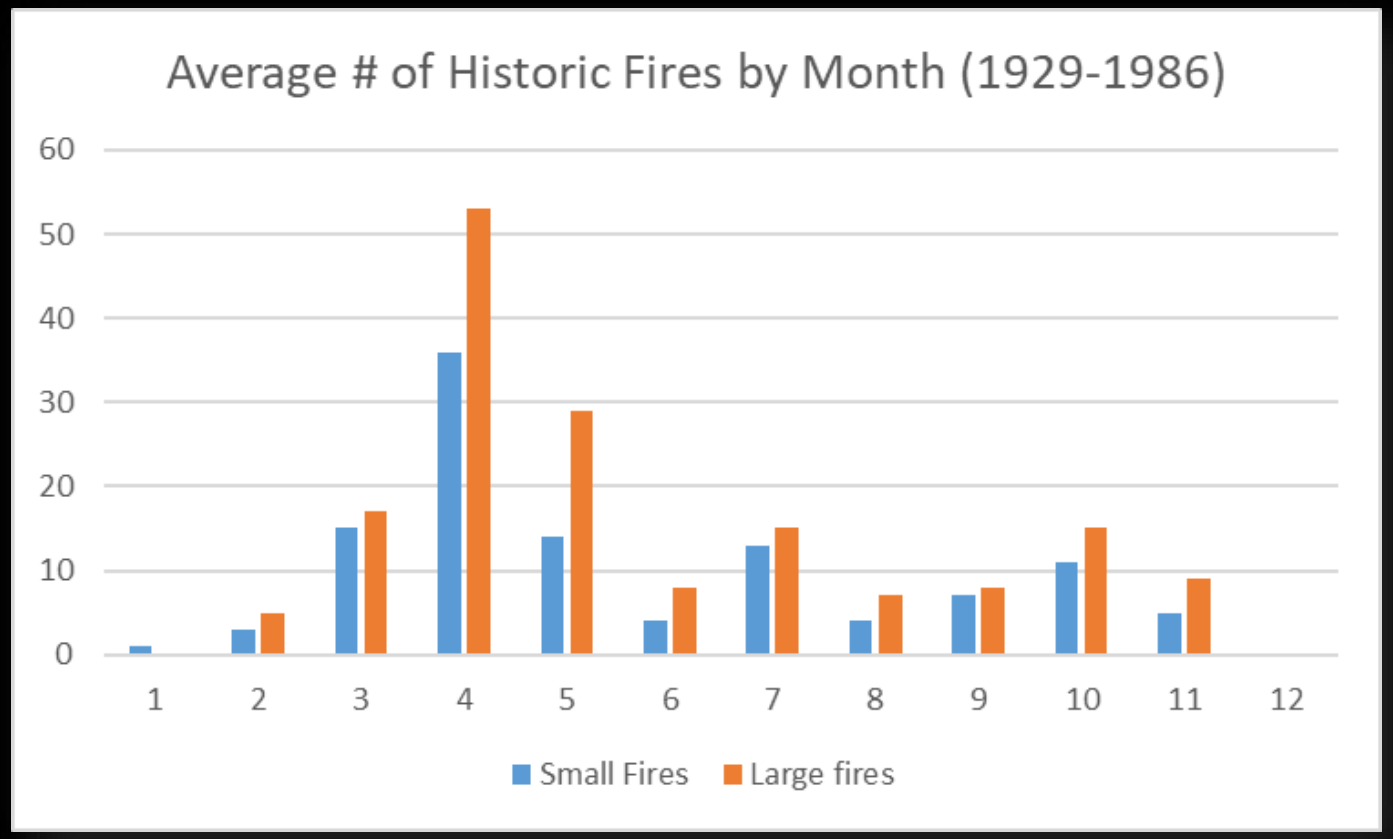
2010 MANAGEMENT PLAN AND FINAL ENVIRONMENTAL IMPACT STATEMENT

Albany Pine Bush Preserve (3,407 acres)



What did we know?

- Zaremba et al. 1991. 20th Century Fire History
- 1-15 fires /year
- <1 - >300 acres



- Rare Species Occurrences
  - Kbb
  - PRAW
  - GWWA
  - EWPW

- Human Element
  - Questionable support
  - Management needed
  - Need 2,000 burnable acres
  - Burn 200 acres/year
    - Givnish et al. 1988.

Prescribed Fire 1991 – 1997 in practice

- Logistics:
  - 8 wk dormant window
  - High ROS and FL
  - Lots of smoke
  - Stressful
- Effects:
  - Top-kill only
  - Exacerbate invasive spp
  - Little exposed soil
  - No lupine expansion
  - No pitch pine regen.

Experiment and Evaluate

Before

July Mow –USFWS

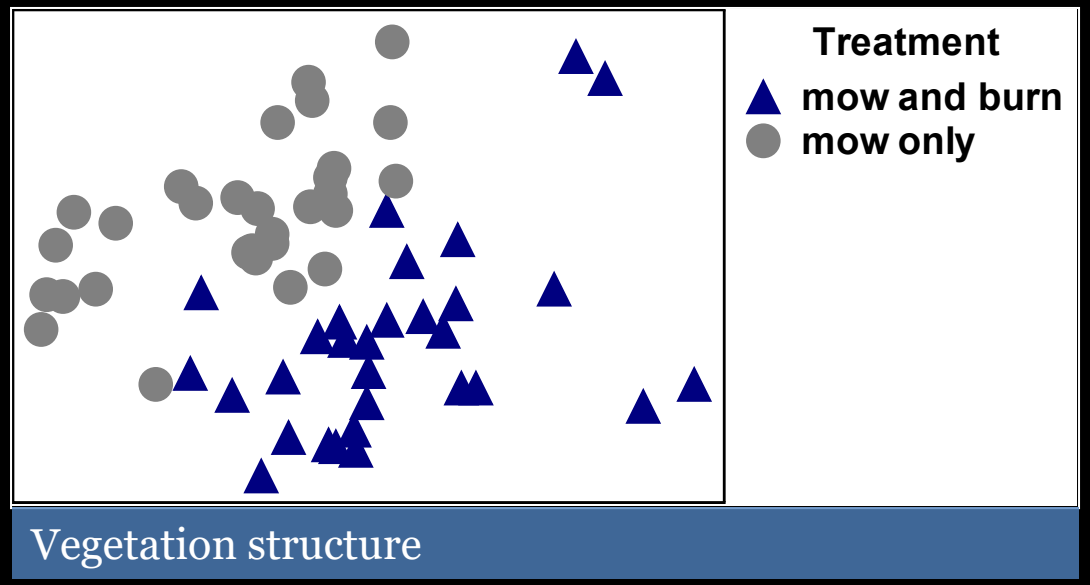
August Burn 4-acres

Complete Consumption

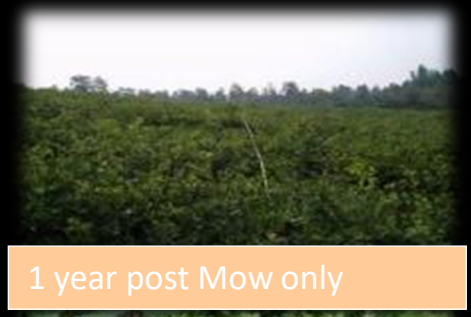
6 Days Post

3 Weeks Post

5 Weeks Post

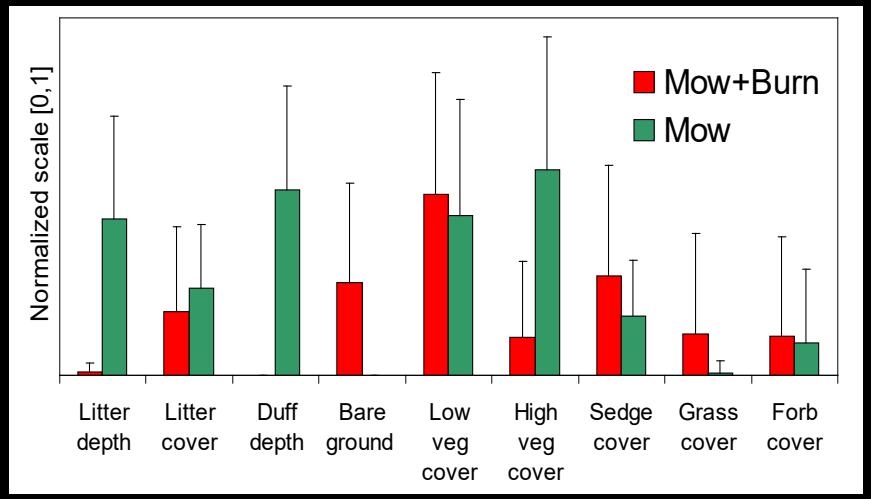


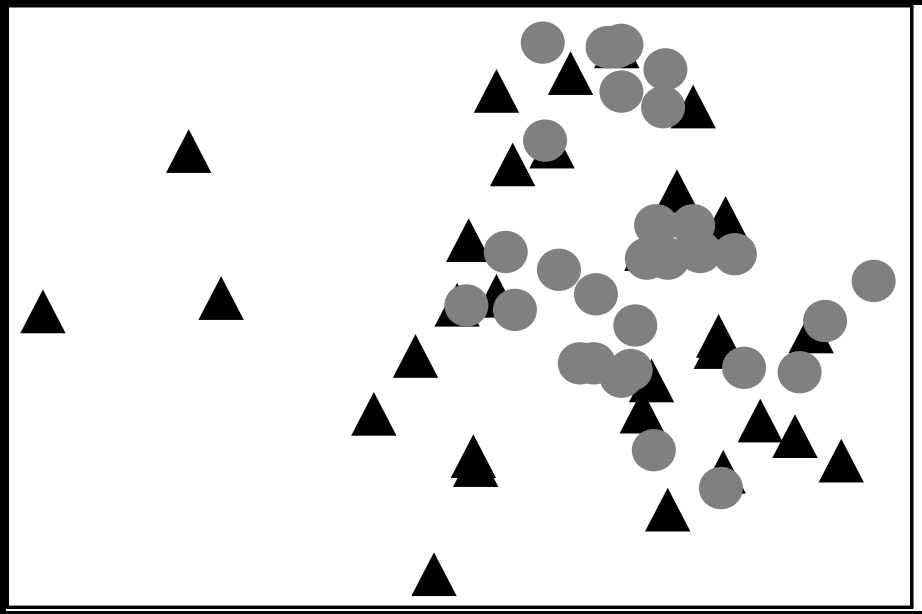
Vegetation structure

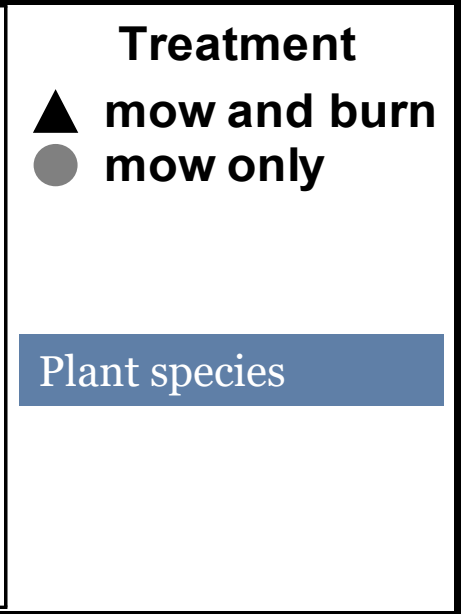


1 year post Mow only

1 year post Mow+Burn







Plant species

Preserve Management

Prescribed Fire

Mowing

Herbicide

Restoration Seeding

Silviculture

Mechanical Management >1,800 acres

Native Forest Thinning

1,000 acres

Black Locust Clearing

400 acres

Scrub Oak Mow

350 acres

Before

After

FOREST SERVICE
U S
DEPARTMENT OF AGRICULTURE

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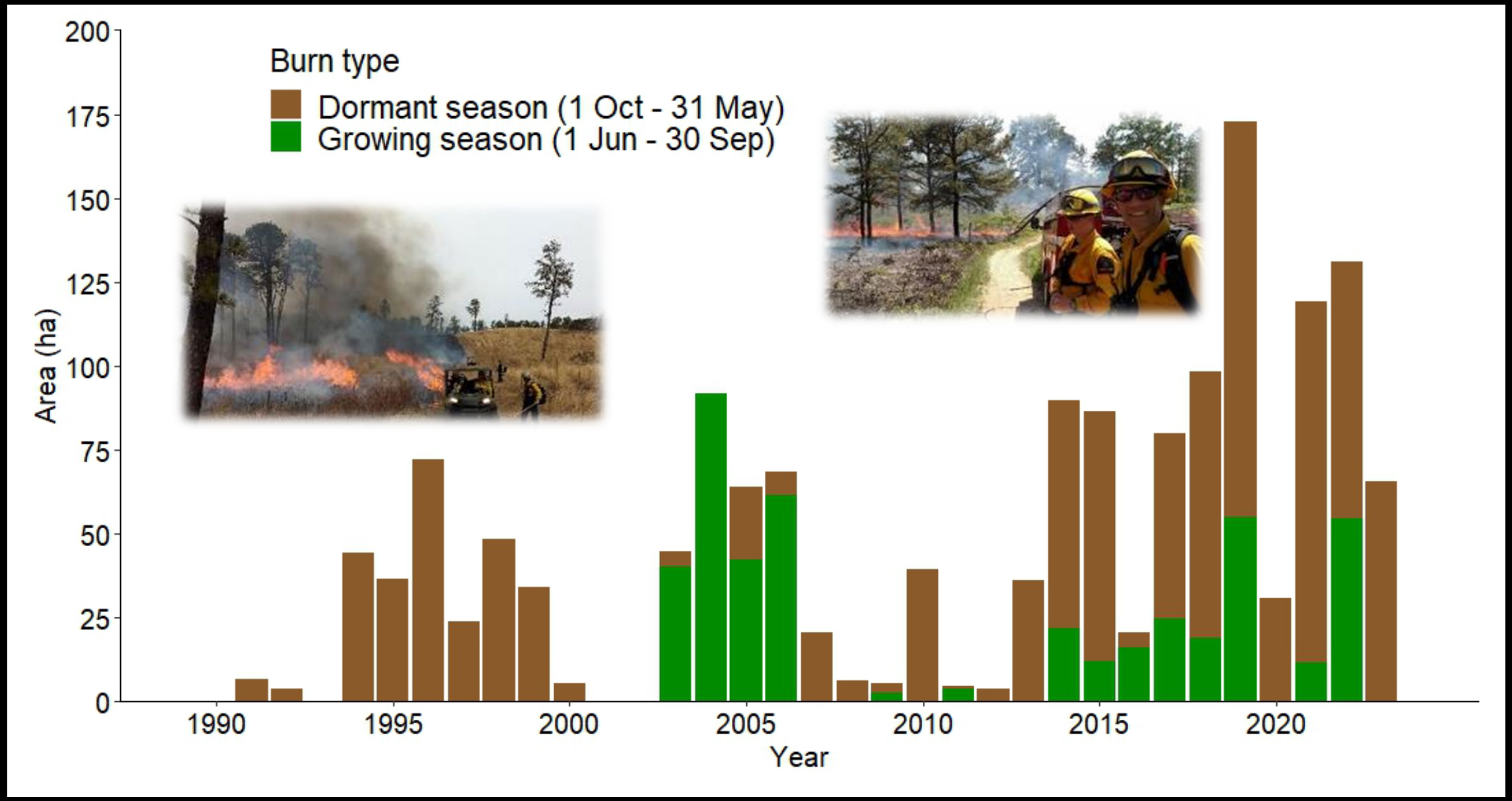
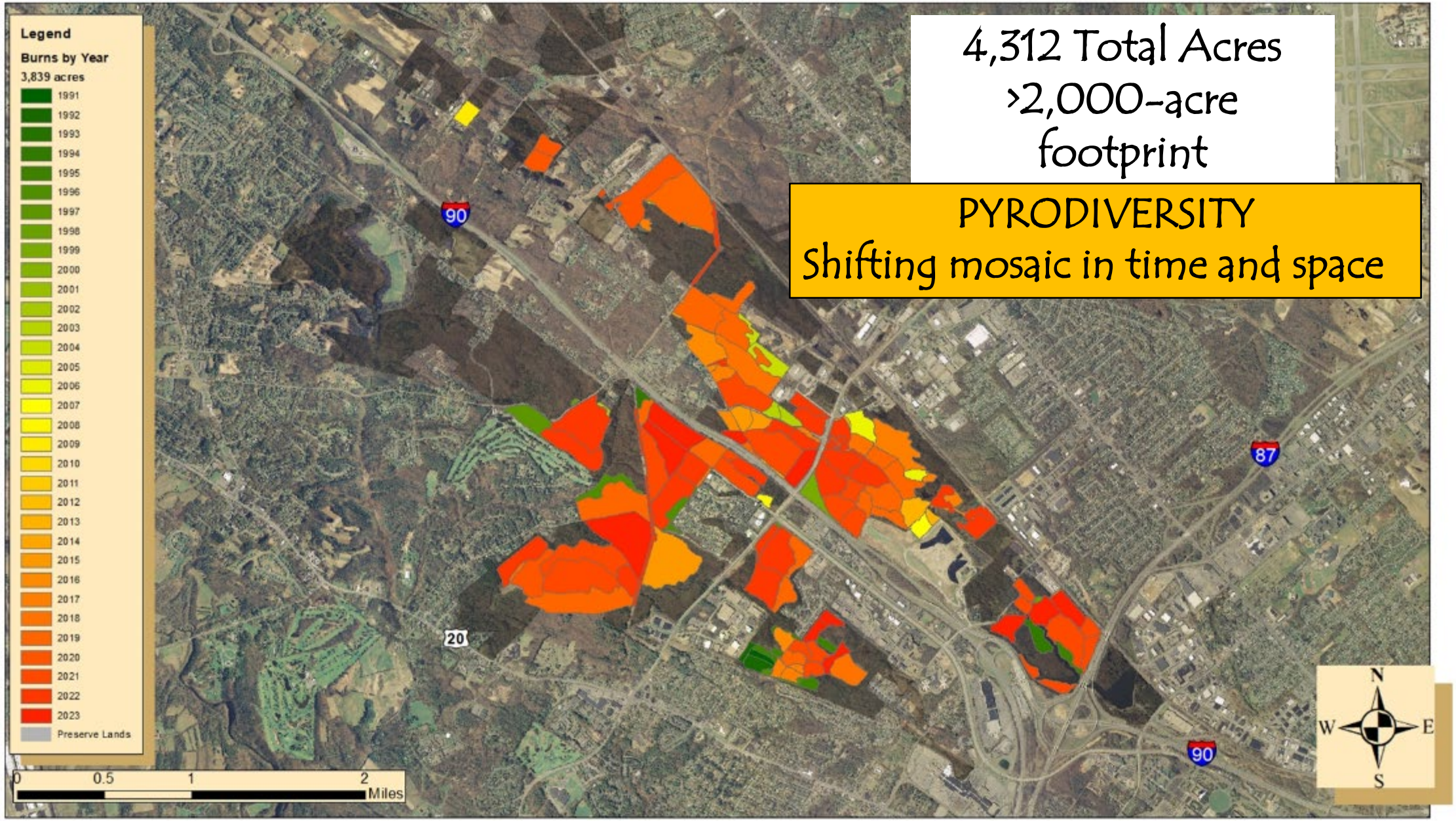
Rx Fire Results - Area



Albany Pine Bush Preserve
Burns from 1991-2023



4,312 Total Acres
>2,000-acre footprint

PYRODIVERSITY
Shifting mosaic in time and space

Are we advancing ecosystem health?

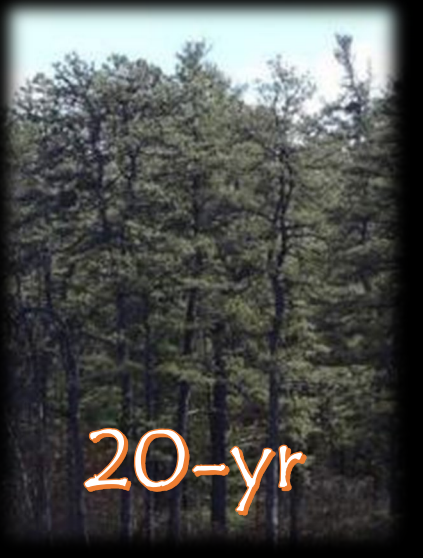
1. Distribution and area of PPSOB seral stages and their fire regimes.
2. Distribution and abundance of key plant and animal species.
3. Mitigating risks in a measurable able way. (e.g. wildfire risk, invasive spp, etc.)

Absent a reference community wildlife population dynamics are our best vital signs of ecosystem health.

Seral Stages – a.k.a.- Pyrodiversity

Inland Pine Barrens consists of four Ecological communities:

Maintenance Fire Frequency = ?

Successional northern sandplain grassland	Pitch pine-scrub oak barrens	Pitch pine-scrub oak thicket	Pitch pine-oak forest
			
• predominantly grasses • < 25% shrub cover • < 25% tree cover	• 20-60% PP cover • 25-50% SO cover • grassland matrix	• < 60% PP cover • > 50% SO cover	• > 60% PP and tree cover • well-developed shrub layer
2020	**100 acres**	**800 acres**	**423 acres**	**2000 acres**
	successional variants			
1990:	0.0 acres	13 acres	410 acres	1000 acres

Fire Effects Monitoring

Plant Response

Lupine Expansion

NJ Tea Explosion

Pitch Pine Recruitment

Virginia Marble seed

(Absent for >100 years)

Karner blue butterfly locally recovered!

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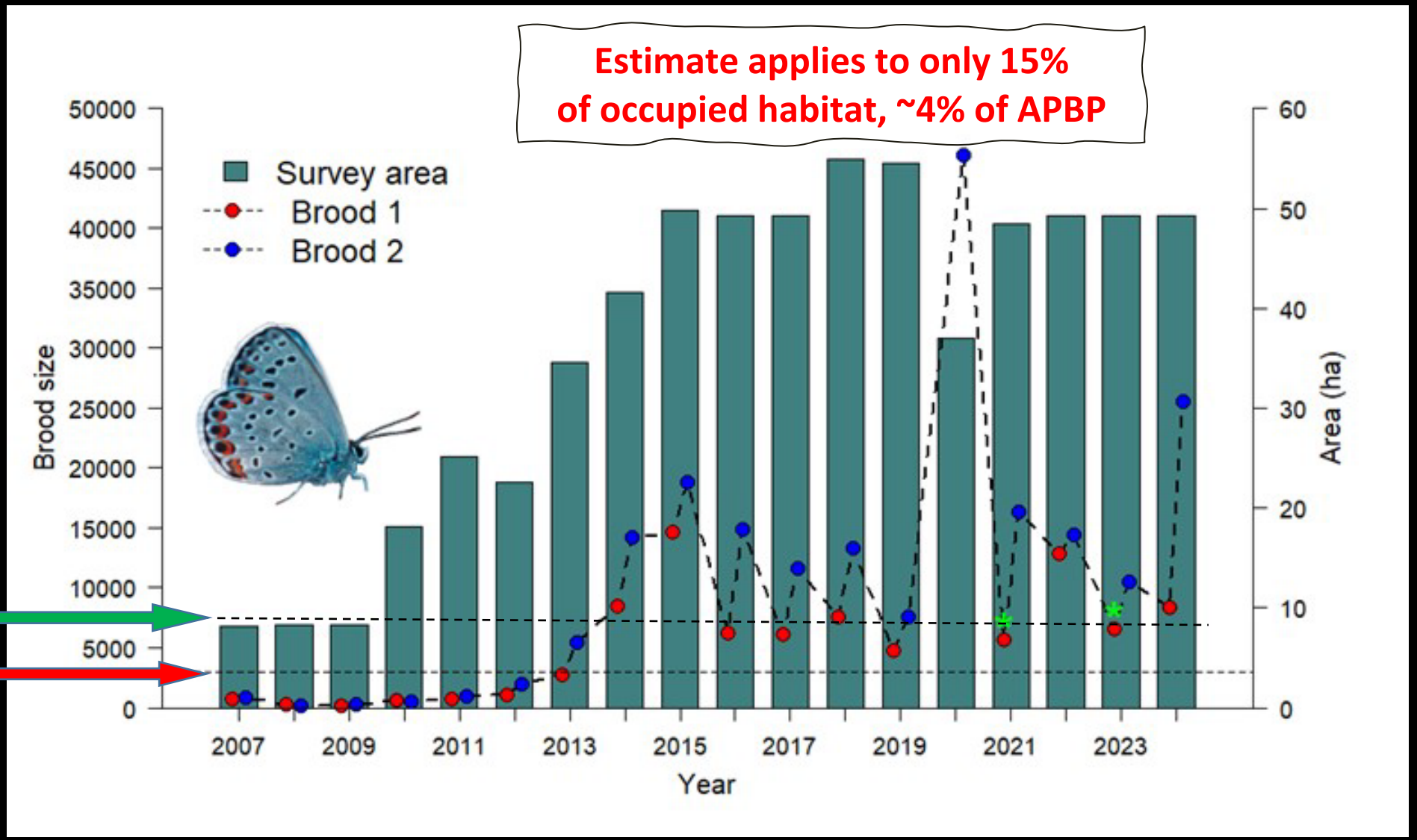
NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

APBPC Metapopulation Target

USFWS Recovery Threshold



Brood size estimates of the Karner blue butterfly metapopulation at the Albany Pine Bush recovery unit, 2007-2024.

Patch Dynamics & Growing Season Rx Fire

- 1/3 rule
- Mosaic fire effects
- Extend growing season
- Improves plant nutrition

- Greater resilience

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MAY 20, 2018
Maintenance Rx FIRE

Other Invertebrates

- Inland barrens buck moth, *Hemileuca maia*
  - *SUNY-ESF* Dylan Parry, PhD, Brian Hoven, Georgia Keene

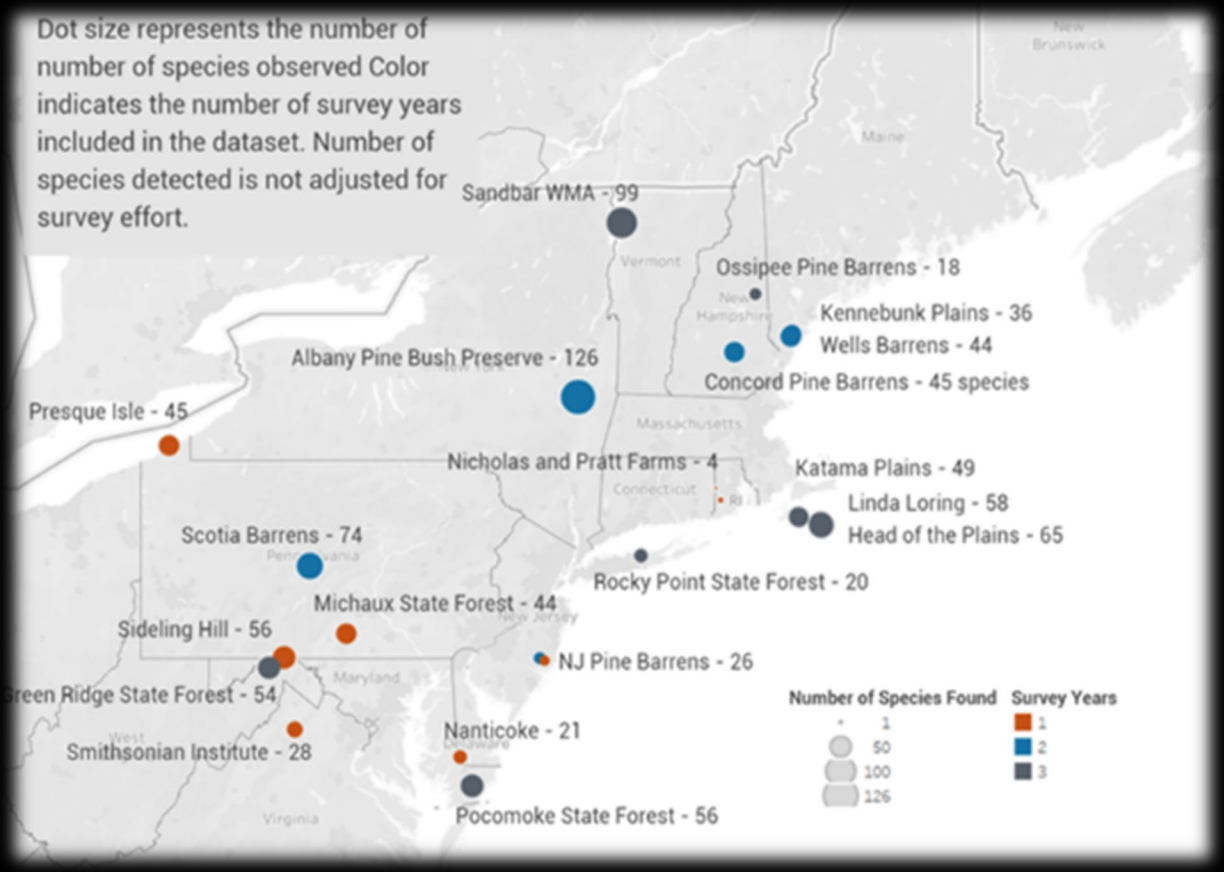
- Solitary Bees (>206 SPP!!!)
  - *APBPC* A.M. Dillon,

- Ants (>50 SPP)
  - *UMASS Amherst* Grace Barber

- Moths (>300 SPP)
  - *SUNY-ESF* Neil Schopmann
    - 15 PPSOB obligates
    - Waxed Sallow Moth, rediscovered after >20 years

- *NYSM* Tim McCabe
  Henry's Elfin, thought extirpated, rediscovered in 2012

NEAFWA Regional Conservation Needs Xeric Habitats Pollinator Project



- 5-year Study Of Managed Barrens And Grasslands
  - APB stands out among >20 study sites
  - Exceptionally high species richness
  - Highest abundance of rare native bees
  - Highest moth species richness

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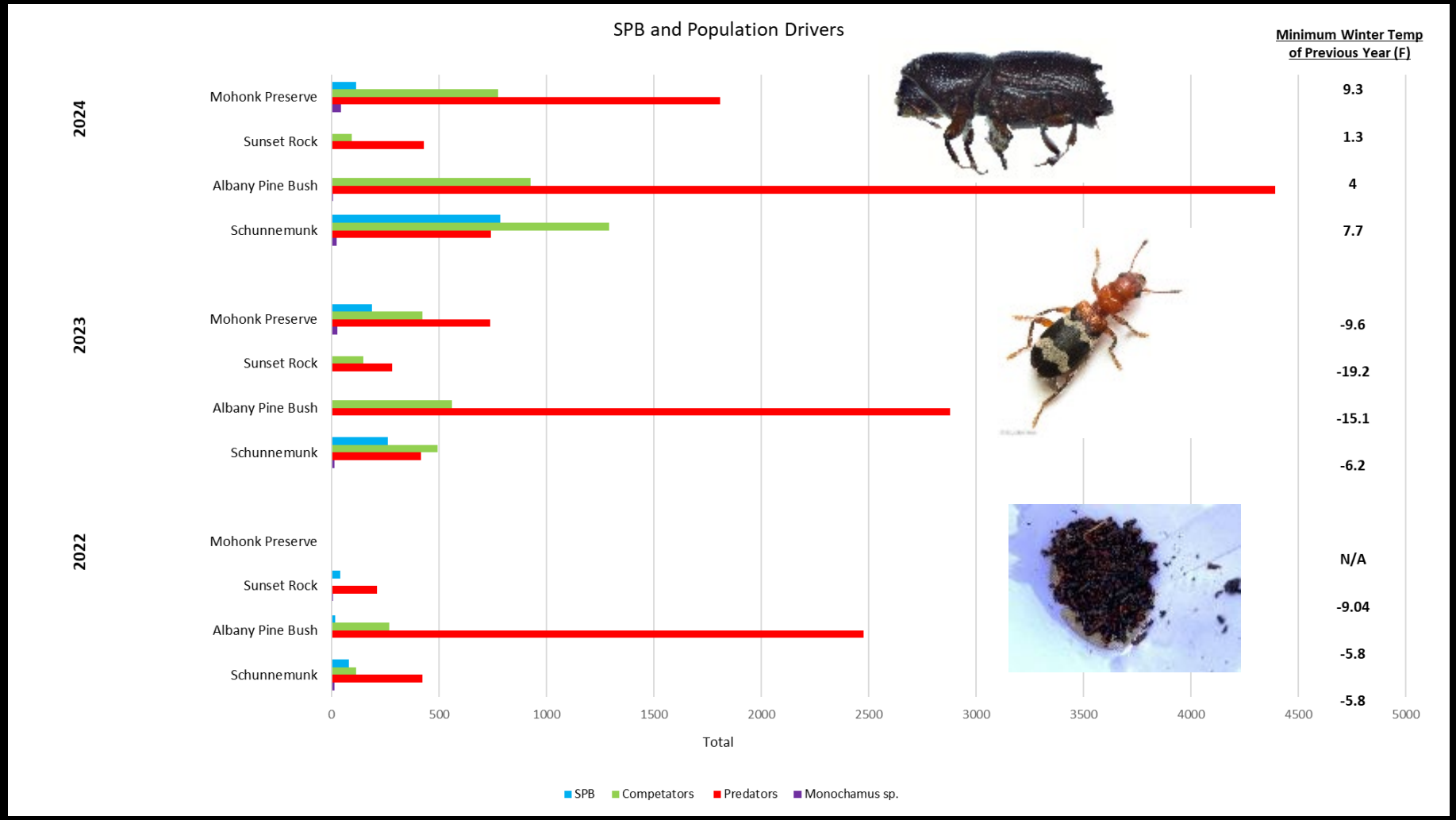
Climate & Pest Resilience



APBP Bark Beetle Community

4x Cleridae count than other sites

Thanasimus dubius most abundant predator

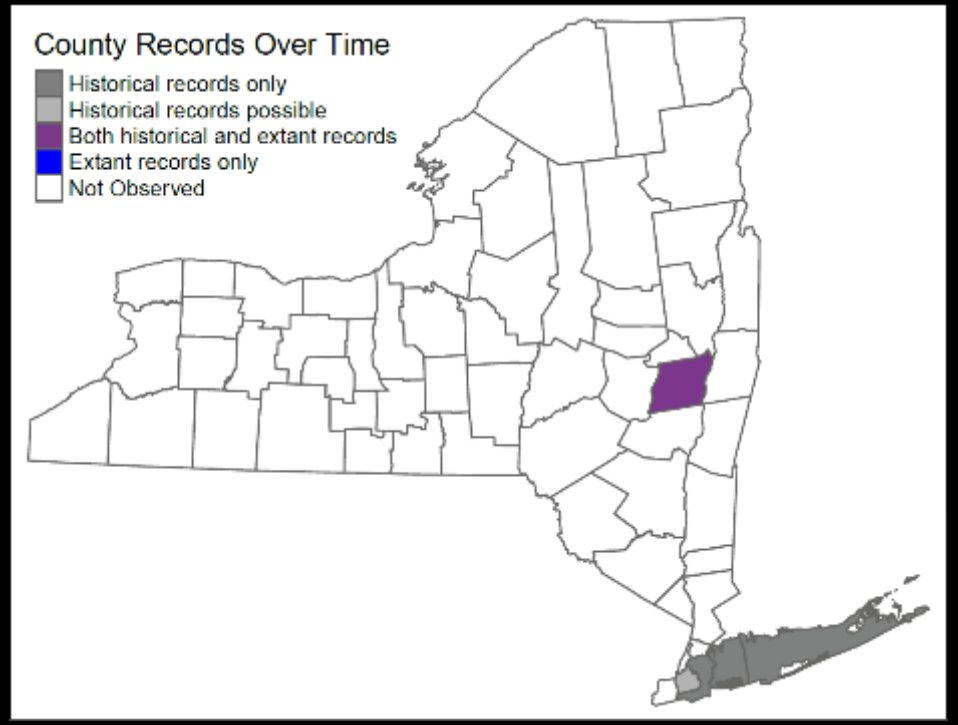
Highest abundance of pine engraver beetles (*Ips* sp.)

Data and analysis provided by NYSDEC Forest Health Research Lab; Liam Somers, Entomologist (Liam.somers@dec.ny.gov)

Discoid Long-horned Beetle

Acmaeops discoideus

- Pine Barrens specialist
- Historically on Long Island
- Critically Imperiled (S1)



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Bird Research and Monitoring at APBP

Community level

Changes in distribution and abundance
- POINT COUNTS

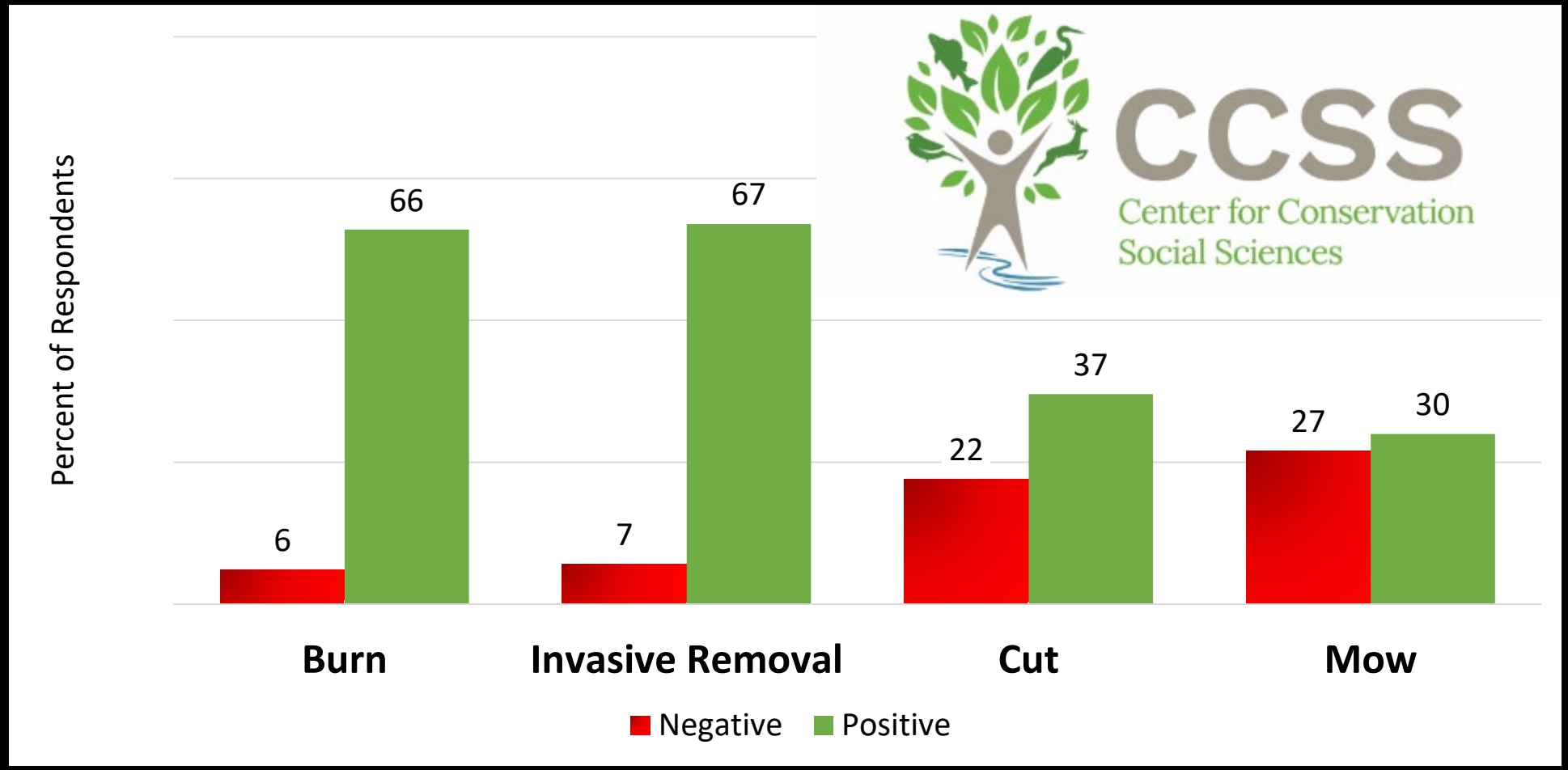
Survival and reproduction
- Monitoring Avian Productivity and Survivorship (MAPS)

Species level

Survival and territory fidelity
- Prairie warbler

Habitat use
- Eastern whip-poor-will
- Eastern towhee

Public Attitudes towards Management Practices



Naiman, S.M., S.B. Allred, N. Gifford, E. Kinal, and C. Buckler. 2018. Understanding Support for Actively Managed Protected Areas: The Case of the Albany Pine Bush Preserve. Center for Conservation Social Sciences Publ. Series 18-2. Dept. of Nat. Resources., Coll. Agric. and Life Sci., Cornell Univ., Ithaca, NY. 137 pp.

This report is available electronically at: https://ccss.dnr.cals.cornell.edu/

Conclusions

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- Systems support communities;

  Communities support species!
- Management is essential.
- Restoration is not maintenance.
- Monitor fire effects and wildlife.
- Community engagement is critical.
- Rx fire essential to climate resilience
  - Wildfire mitigation
  - Biodiversity conservation
- IF WE CAN DO IT HERE,
  YOU CAN DO IT ANYWHERE

Thank You

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Globally Rare, Nationally Significant & Locally Distinct