

National Park Service  
U.S. Department of Interior

Northeast Temperate Network



# Why Monitoring Matters

## *Tracking the Health of Weir Farm NHS*

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Northeast Temperate Network  
Inventory & Monitoring Program

# What is Monitoring?

"The collection and analysis of repeated observations or measurements to evaluate changes in condition and progress toward meeting management goals."

- Measurements are repeated to determine trend
- Monitoring is done for a specific purpose
- Results will effect an action of some kind

# Why Monitor?

- Better understanding of ecological systems.
- Improve management and preservation of natural resources
- Share knowledge to engage, educate, and involve decision makers, stakeholders, and the public in managing and protecting park



# Vital Signs



# Weir Farm's Vital Signs

- Air Quality
- Breeding Birds
  - Forest Breeding Birds
  - eBird
- Forest Health
- Forest Salamanders
- Invasives—Early Detection
- Freshwater Wetlands
- Water Chemistry/Water Quality
- Landscape Change
- Phenology
- Climate

# Weir Farm's Vital Signs

- Air Quality
- **Breeding Birds**
  - Forest Breeding Birds
- **Forest Health**
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- Invasives—Early Detection
- Freshwater Wetlands
- **Water Chemistry/Water Quality**
- **Landscape Change**
- **Phenology**
- Climate

# Breeding Birds

- 2008 Annual Report available online



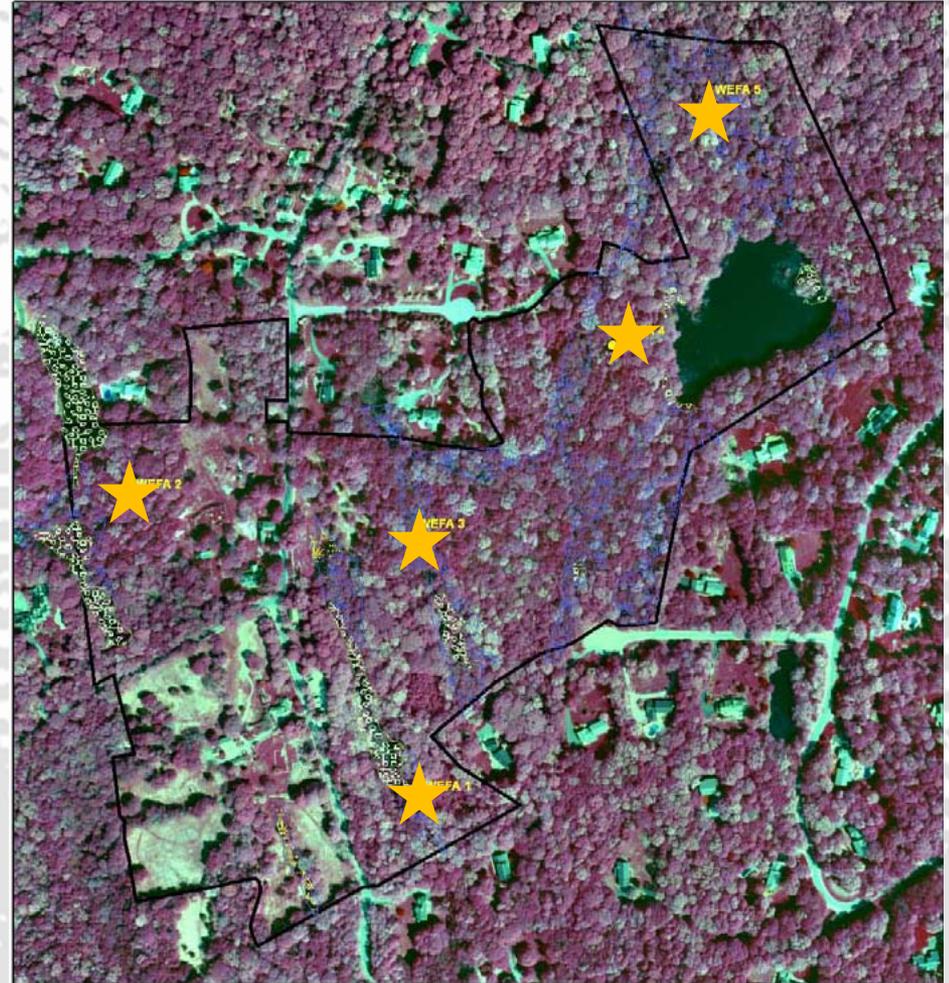


# Who's twittering at the park?

*Forest breeding bird diversity at Weir Farm.*

# Who's twittering at the park?

- Citizen science monitoring project
- Early morning point counts-listen and look for birds
- Track trends in abundance and diversity; evaluate habitat condition.
- Species list for each park

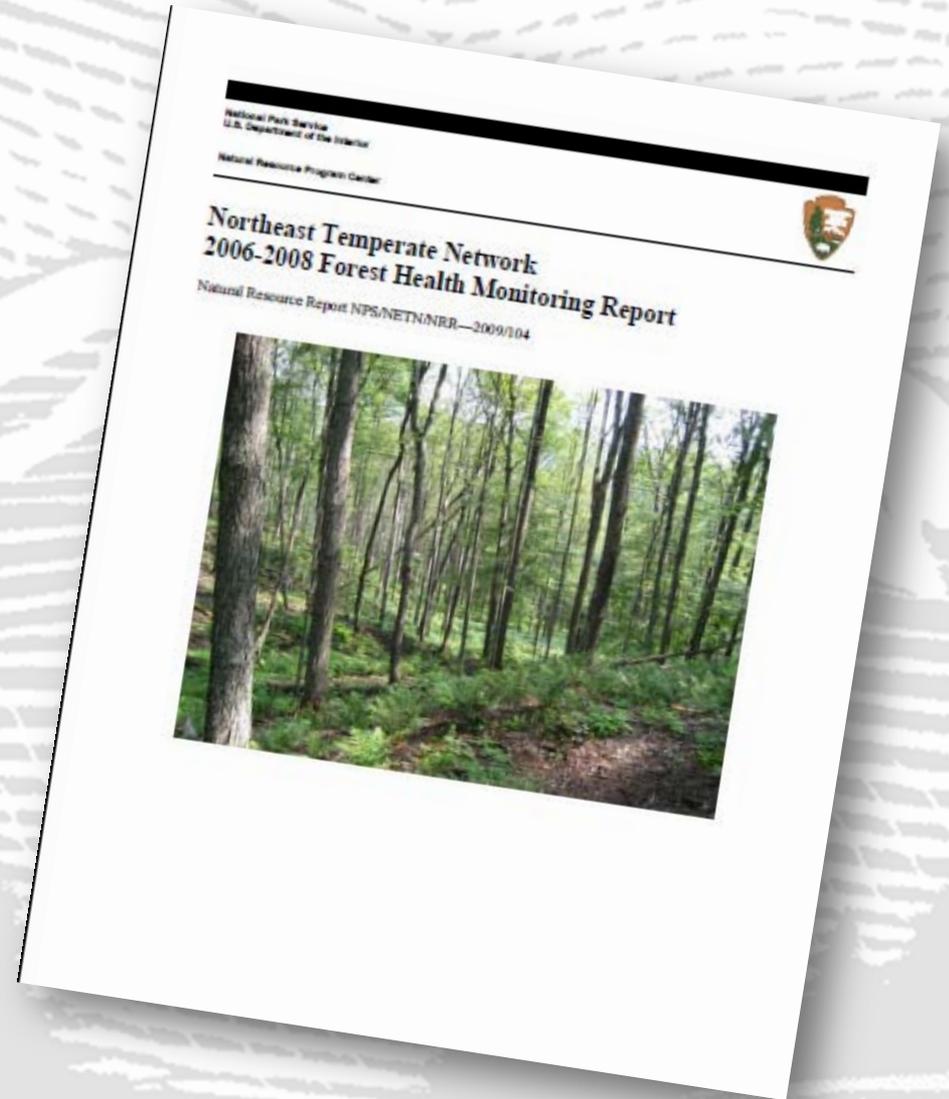


# Who's twittering at the park?



- 10 Most Common Birds:
  - Red-winged Blackbird
  - Eastern Tufted Titmouse
  - American Crow
  - Black-capped Chickadee
  - White-breasted Nuthatch
  - Blue Jay
  - Northern Cardinal
  - House Wren
  - Downey Woodpecker
  - American Robin

# Forest Health





**Clean your room, but not your forest.**

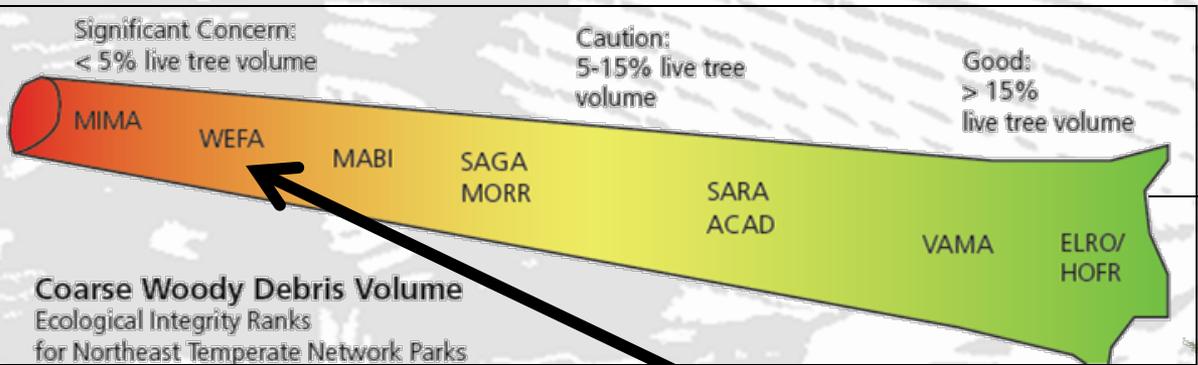
*Forests at Weir Farm might not be “messy” enough!*

# Clean your room, but not your forest.

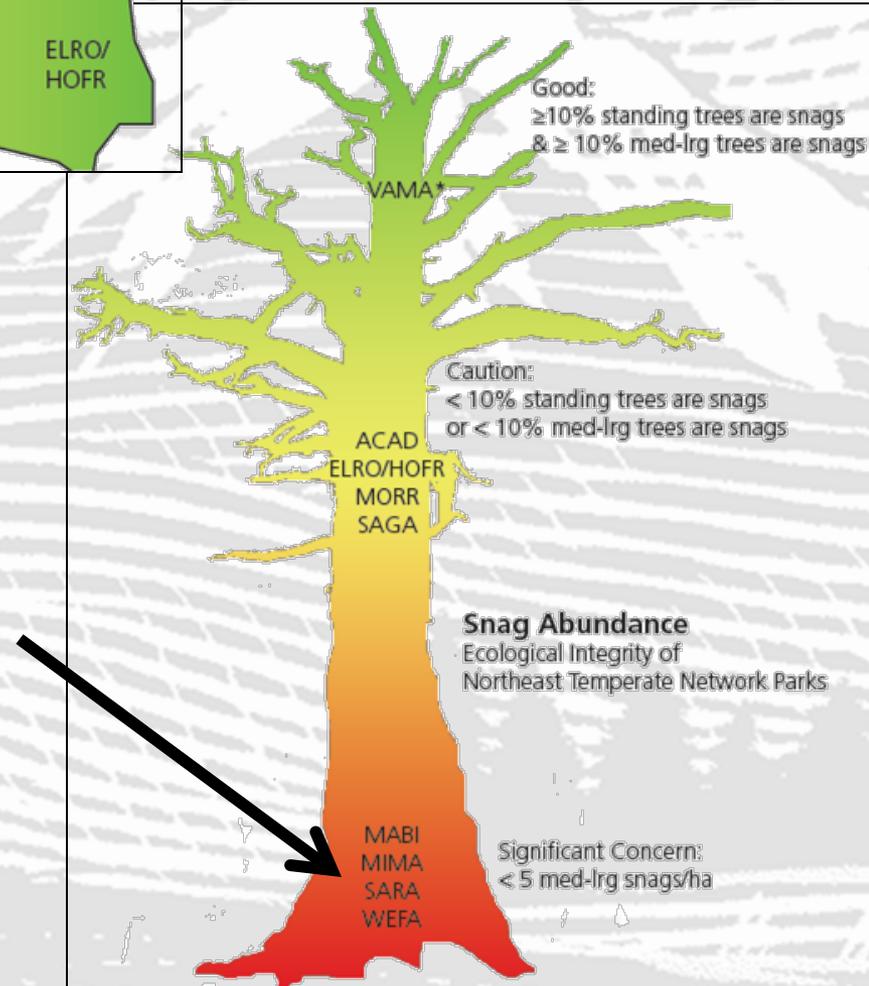


- “Messy” means standing dead trees (*snags*) and down dead trees/tree parts (*coarse woody debris*)
- What causes forest stands to be “messy”?
- Why is “messy” better?

# Clean your room, but not your forest.



- SARA has younger forests which often lack snags and CWD.
- Management actions can make forests more "messy".

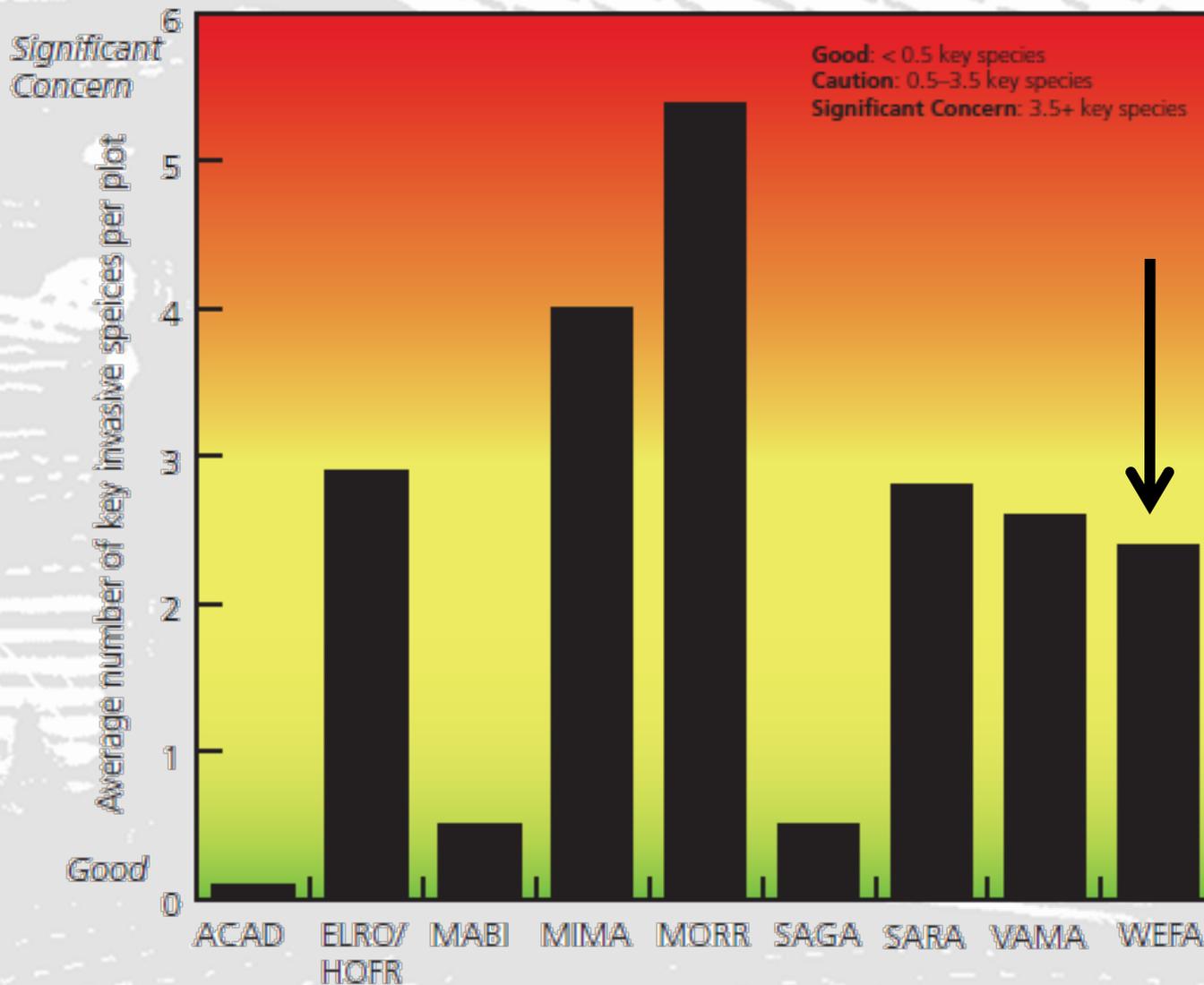




# **Weir Farm's Most Wanted.**

*Monitoring the spread of invasive plants and forest pests—status and what to watch for.*

# Weir Farm's Most Wanted



# Weir Farm's Most Wanted



# Weir Farm's Most Wanted

- Help Stop the Spread!
  - Parks specific “watch list” of plants and insects
  - ID booklet for field crews, park staff and volunteers of “watch list” species
  - Develop an efficient and speedy process for reporting and responding to new sightings of invasive species



## EMERALD ASH BORER [*Agrilus planipennis* Fairmaire]



UGA1241011



UGA 5016058

**Problem:** A native of Asia, emerald ash borer (EAB) infests and kills North American ash species (*Fraxinus* sp.) including green, white, black and blue ash. Damage is caused by the larvae, which feed in the cambium between the bark and wood, producing galleries that eventually girdle and kill branches and entire trees.

**Identification:** Adults are roughly 7.5 to 13.5 mm long (3/8 to 5/8 inches) with metallic green wing covers and a coppery red or purple abdomen. Larvae reach a length of 26 to 32 mm long (1 to 1 1/4 inches), are white to cream-colored and dorso-ventrally flattened.

**Signs and Symptoms:** Irregular holes excavated by woodpeckers feeding on pre-pupal larvae (Fig. 1) may be the first sign that a tree has become infested. After at least one year of infestation, D-shaped exit holes in the outer bark of the branches and trunk (Fig. 2) indicate adult emergence, which can occur from late May through early September.



Fig. 1

UGA 1372003 Fig. 2

UGDA Forest Service, Deborah McCullough, MSU

## EMERALD ASH BORER *Agrilus planipennis* Fairmaire



Fig. 3

UGA 5016055

Fig. 4

UGA 1301042

Vertical bark fissures (Fig. 3), crown dieback (Fig. 4) and epicormic sprouting and suckering are also prevalent.



UGA 5142090

**Similar Species:** Adult EAB beetles are generally larger and a brighter green than native North American species of *Agrilus*, like the bronze birch borer. The six-spotted tiger beetle and ground beetle are larger in size, are both predators of other insects, and are ground dwelling.



UGA 5016041



UGA 2133022

**Above:**  
six-spotted tiger beetle  
*Cicindela sexguttata* Fabricius

**Upper left:**  
bronze birch borer  
*Agrilus anxius* Gory

**Lower left:**  
ground beetle  
*Calosoma scrutator* Fabricius



UGA 5022083

## EARLY DETECTION PEST SPECIES REPORTING FORM

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### DIRECTIONS

- 1) Fill out this form.
- 2) Flag location with pink flagging and write "EDRR" on flag.
- 3) Take a photo(s) and make sure species and any distinguishable features are visible in the photo(s). Include additional photos of signs and symptoms.
- 4) ASAP, send card and/or information on card and photos to designated park contact (see park Species page) or Jennifer Stingelin Keefe at the ERMN office:

422 Forest Resources Bldg.  
University Park, PA 16802  
Phone: 814-865-8497  
Fax: 814-863-4710

Jennifer\_Stingelin\_Keefe@partner.nps.gov

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### GENERAL INFORMATION

Name(s): \_\_\_\_\_

Email: \_\_\_\_\_

Phone: \_\_\_\_\_

Date: \_\_\_\_\_

Time: \_\_\_\_\_

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### SPECIES INFORMATION

Species name: \_\_\_\_\_

GPS Coordinates (UTMs or DD's--circle):

Y (Northing): \_\_\_\_\_

X (Easting): \_\_\_\_\_

UTM Zone: \_\_\_\_\_

Datum: \_\_\_\_\_

Coordinate error (meters): \_\_\_\_\_ (Over)

PEST

## EARLY DETECTION PEST SPECIES REPORTING FORM

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### SPECIES INFORMATION (cont.)

Location Description (be as specific as possible):

Tree Species Involved: \_\_\_\_\_

Type of evidence present (circle):

1. Crown dieback
2. Foliar injury (chlorosis, necrosis, other discoloration)
3. Sawdust
4. Exit holes
5. Other \_\_\_\_\_

Certainty of identity (circle one):

Extremely confident  
Moderately confident  
Not very confident

Other comments (habitat, # individuals, site accessibility etc):

A black and white photograph of a forest. In the foreground, a large, textured tree trunk is visible on the right side. The background shows a dense forest of trees, with a stream or path winding through it. The overall scene is somewhat overcast and has a grainy, high-contrast appearance.

**I'm, like, totally stressed out!**

*Tree condition in forests at Weir Farm.*

# I'm, like, totally stressed out!

- Causes of stress:
  - Invasive insects
  - Damage from native insects
  - Disease
- Visible damage
- Pest detection
- Beech bark disease severity



# I'm, like, totally stressed out!

- Weir Farm's trees are in mostly good condition.
- Beech bark disease detected.
- Hemlock woolly adelgid detected.



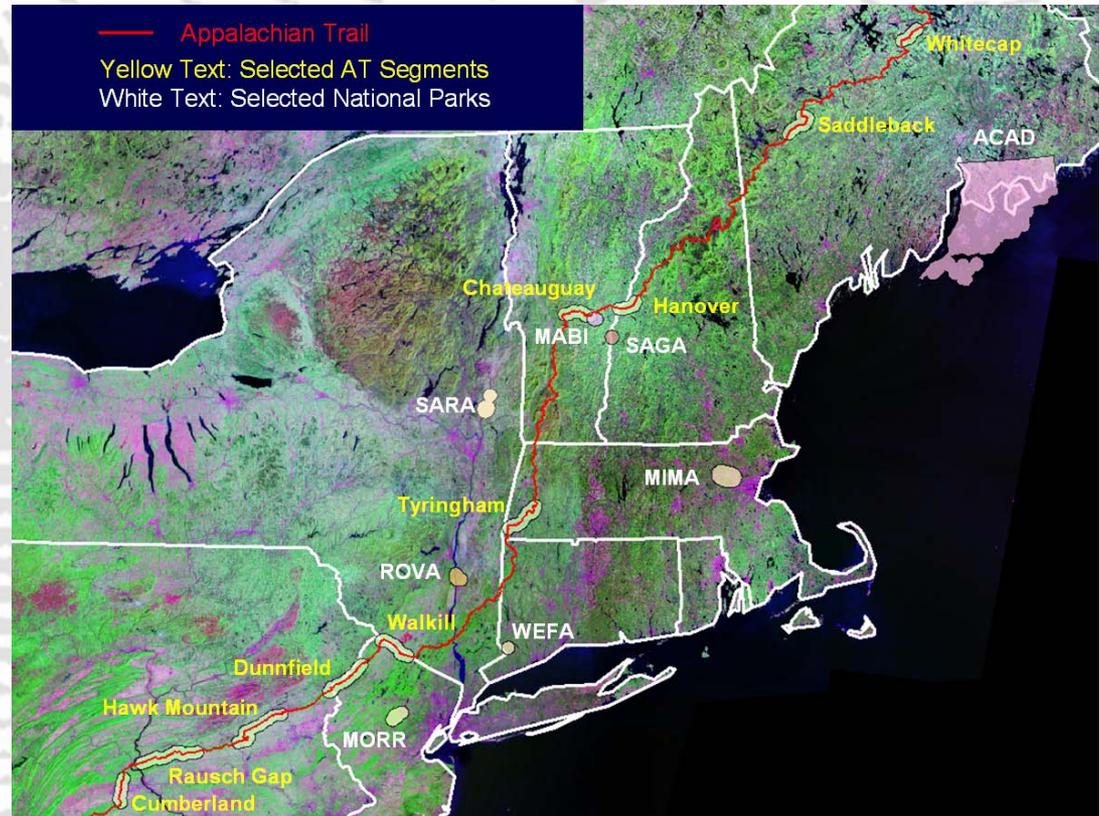
An aerial photograph of a landscape, likely a farm or agricultural field, showing a grid pattern of rows. A road and a building are visible in the upper left. The text is overlaid on the image.

# The lands, they are a-changing!

*Dynamic landscapes in and around Weir Farm.*

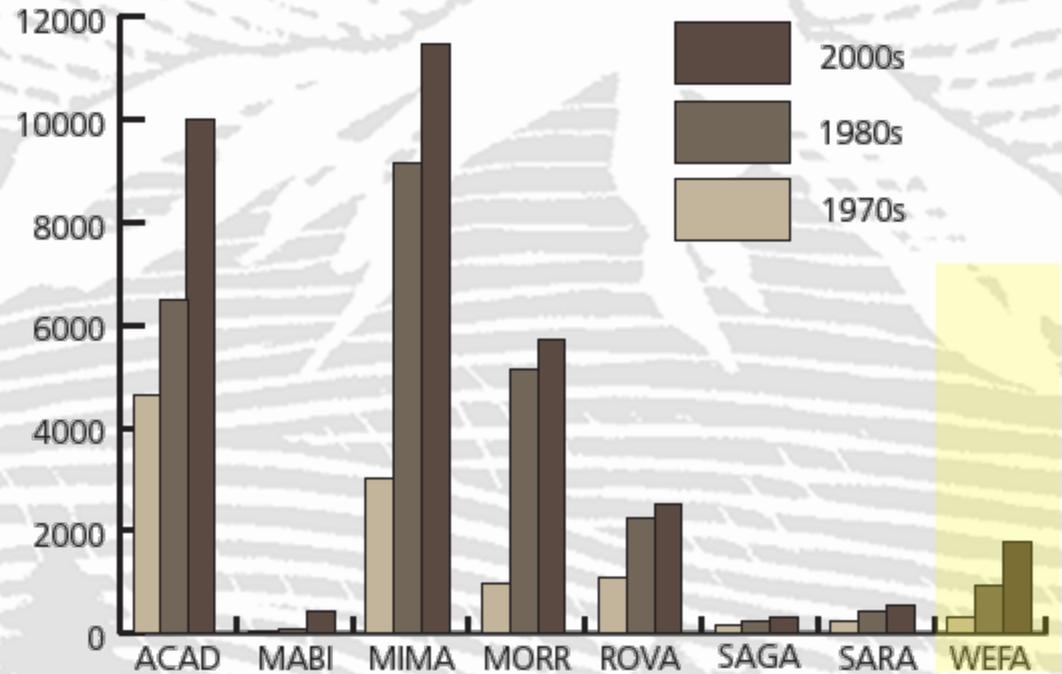
# Dynamic Landscapes

- Landscape change analysis
- Remote sensing data from the
  - 1970s
  - 1980s
  - 2000s



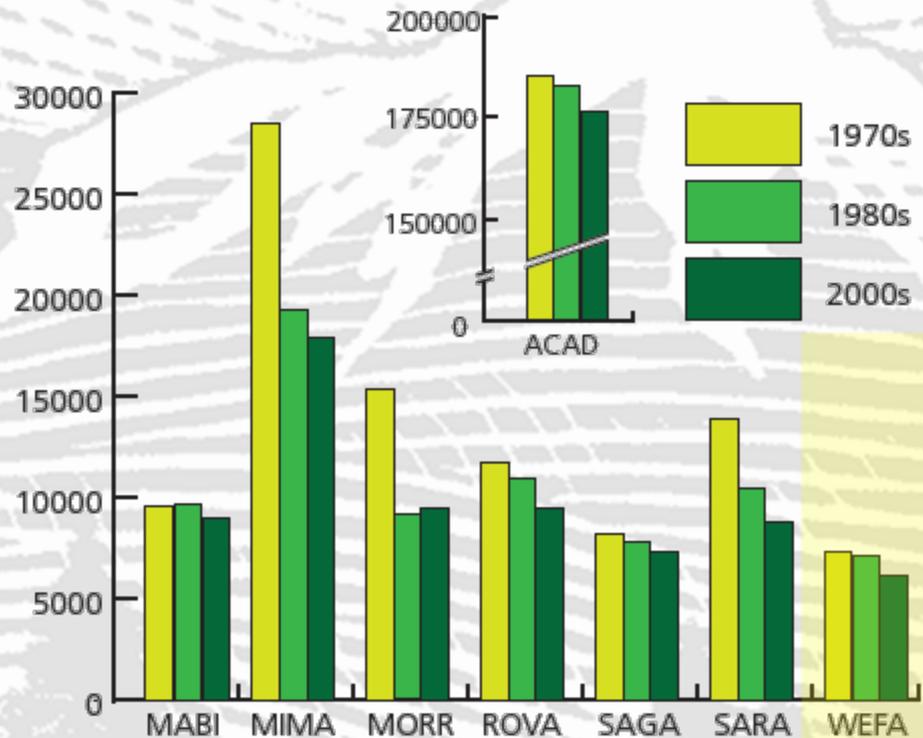
# Dynamic Landscapes

- In and around WEFA, urban areas are up...
  - ↑3597 acres (1973-2002)



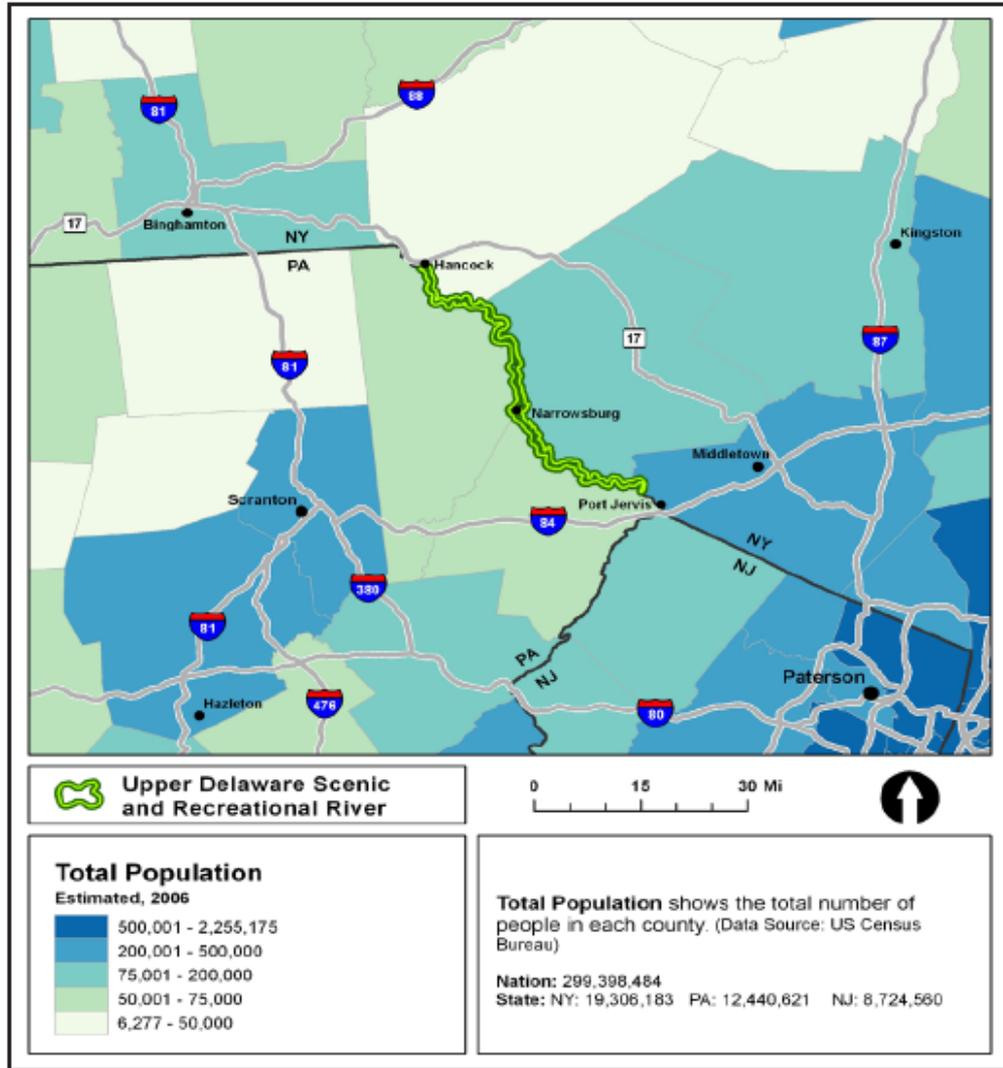
# Dynamic Landscapes

- ...and acres of deciduous forest are down.
  - ↓ 608 acres between 1973 and 2002.



# Dynamic Landscapes

- Future monitoring:
  - National I&M
  - Key indicators of landscape dynamics
  - Socioeconomic conditions in adjacent communities



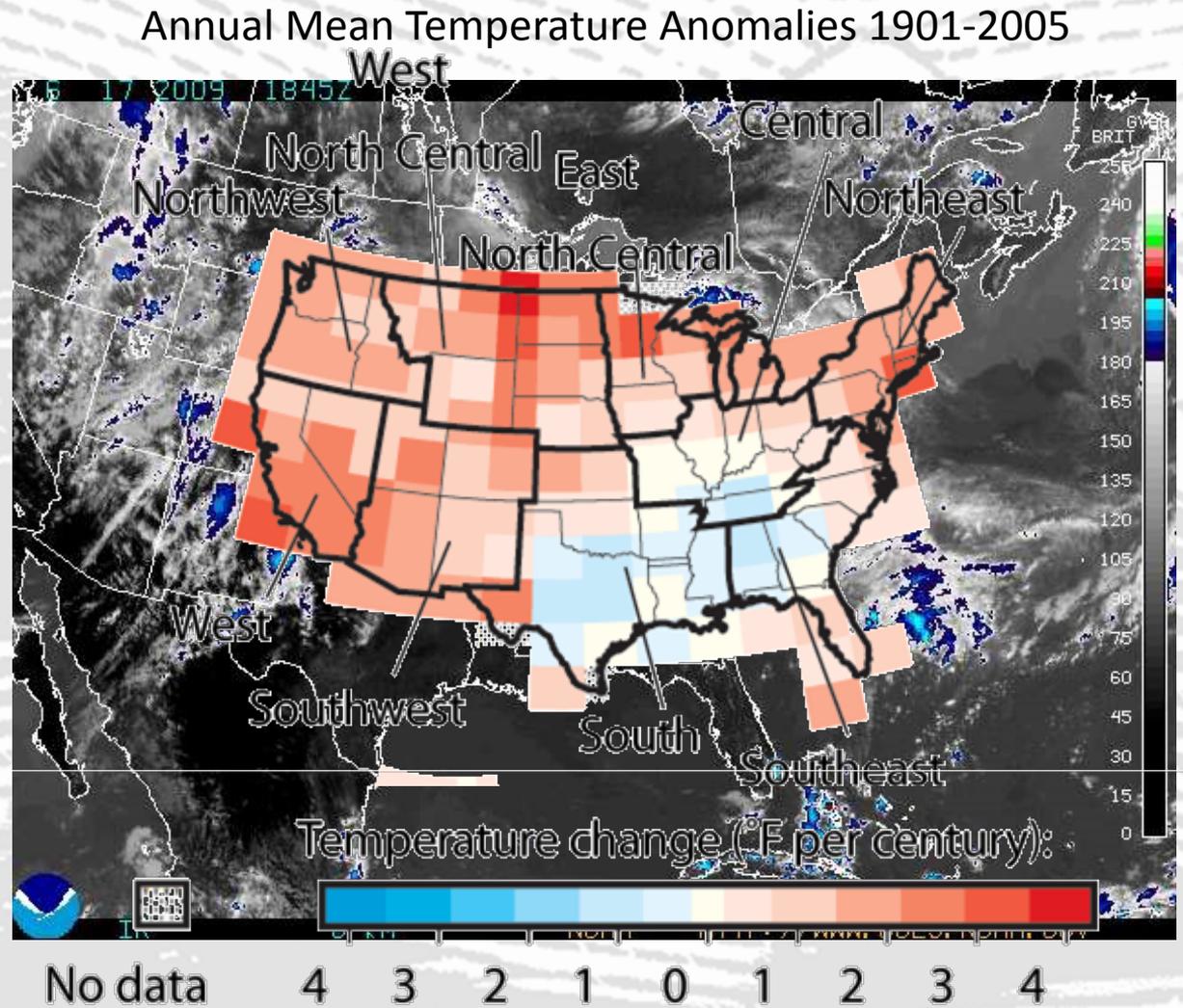


# Phenology Monitoring

*Watching climate change.*

# Phenology: watching climate change

- Weather
- Climate



# Phenology: watching climate change

- Study of periodic biological events correlated with seasonal change.
  - Animal migrations
  - Flower budding



# Phenology: watching climate change

- Draft protocol developed.
- Citizen-science monitoring program.
- July-November 2009 pilot program.
- March-November 2010 at a wider range of sites.



- = First Leaf
- = All Leaves Unfolded
- = First Flower
- = Full Flower
- = End of Flowering
- = First Ripe Fruit
- = 50% Color
- = 50% Leaf Fall

# Phenology: watching climate change

- Three animals

- Butterfly

- Ebony jewelwing
- Common green darner
- Monarch butterfly
- Tiger swallowtail

- Bird

- Black-capped chickadee
- Barn swallow
- Red-winged blackbird
- American robin

- Frog (2010)

- Bullfrog
- Pickerell frog

- Three plants

- Red maple

- Paper birch

- Poplar

- Sugar maple

- Common elderberry

- Hobblebush

- Common milkweed

- Rough-stemmed goldenrod

- Asters

# Why Monitoring Matters

- Who's twittering at the park?
- Clean your room, but not your forest.
- Marsh-Billings-Rockefeller's Most Wanted.
- I'm, like, totally stressed out!
- Phenology: Watching climate change

# Why Monitoring Matters

- Who's twittering at the park?
- Clean your room, but not your forest.
- Weir Farm's Most Wanted.
- I'm, like, totally stressed out!
- Dynamic landscapes.
- Phenology: What does climate change look like?
- *Spreading the word about monitoring...*

# Spreading the Word

- 11 Resource Briefs
- 4 Program Briefs
- Presentations like this one
  - Information for managers and decision-makers
  - Encourage integration into interpretive programming

# Spreading the Word

- Science Communication Summer Intern program with SERC and Acadia
- Blog
  - Field Notes: Observations on science and nature in northeastern national parks
    - <http://northeastparkscience.wordpress.com>

# http://science.nature.nps.gov/im/units/netn/

NPS: Nature & Science » Networks: Northeast Temperate Network - Mozilla Firefox

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## National Park Service Inventory & Monitoring Program

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**Vital Signs**



## Northeast Temperate Network

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### Inventory and Monitoring Program

**The Northeast Temperate Network (NETN)** was established by the US National Park Service (NPS) to monitor ecological conditions in 11 parks located in seven northeastern states as well as six additional states through which the Appalachian National Scenic Trail passes. The NETN operates with the mandate to preserve park natural resources "unimpaired for future generations." These resources include water, air, geological, faunal and floral, and the various ecological, biological, and physical processes that act on these resources. The broad-based, scientifically sound information obtained through long term natural resource monitoring will have multiple applications for management decision-making, research, education, and promoting public understanding of park resources.

Knowing the condition of natural resources in national parks is fundamental to the Service's ability to manage park resources. Historically, managers and scientists have sought a way to characterize and determine trends in the condition of parks and other protected areas to provide early warning of impending threats and to assess the

**Parks in this Network**

Please select a park



**Northeast Temperate Network Map**

**National I & M Map**