

FoRests Among Managed Ecosystems of the Megalopolis



Vince D'Amico: US Forest Service, NRS-08

Tara Trammell: U. of DE Plant & Soil Science

Greg Shriver & Zach Ladin: U. of Delaware E&WE

Steve Frank: NC State University, Raleigh

Jason Henning: Davey Institute, Phila. PA

Megalopolis
Pop. Density:
359/km²
931/mile²

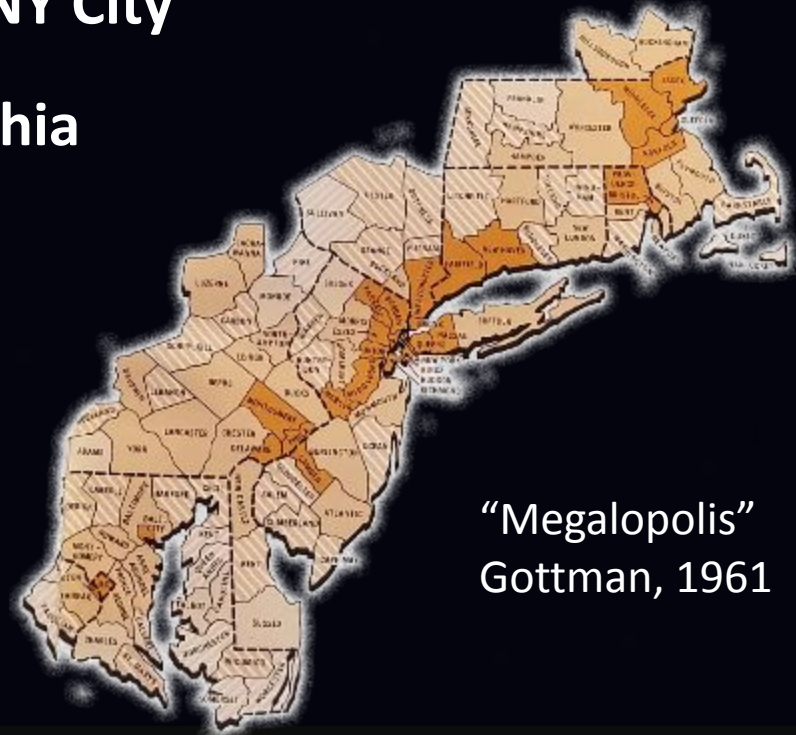
Boston

NY City

Philadelphia

Baltimore

Washington DC



"Megalopolis"
Gottman, 1961

A Brief History of Forests in the Megalopolis

An aerial photograph of a vast, green, mountainous landscape. A winding river flows through the center of the image. The terrain is rugged with many small peaks and valleys. Some patches of lighter green and brown are visible, possibly indicating different vegetation or cleared areas.

Megalopolitan Landscape of the past

Future site of
Philadelphia

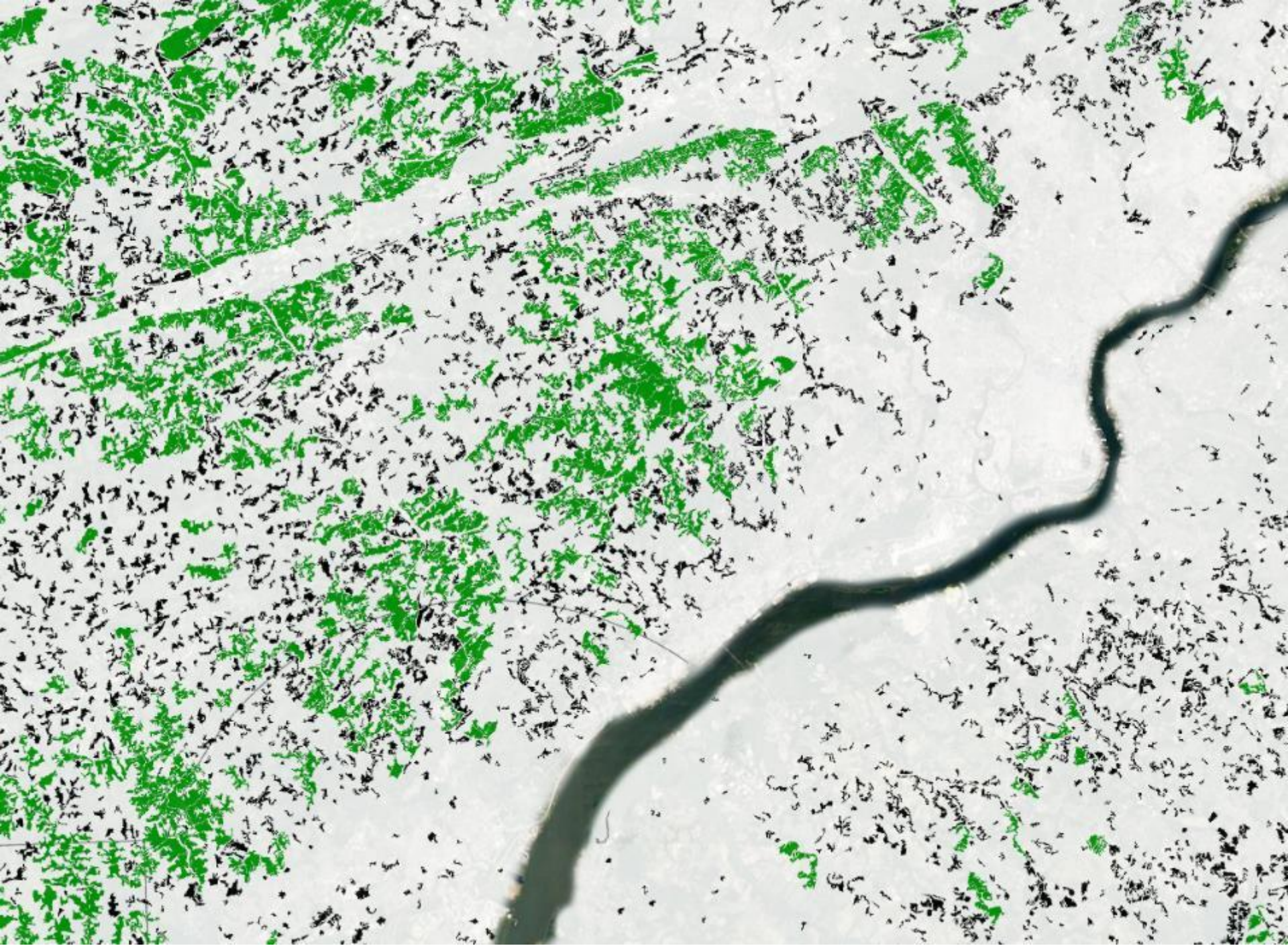


Area shown = 129,000 ha

2021

Philadelphia

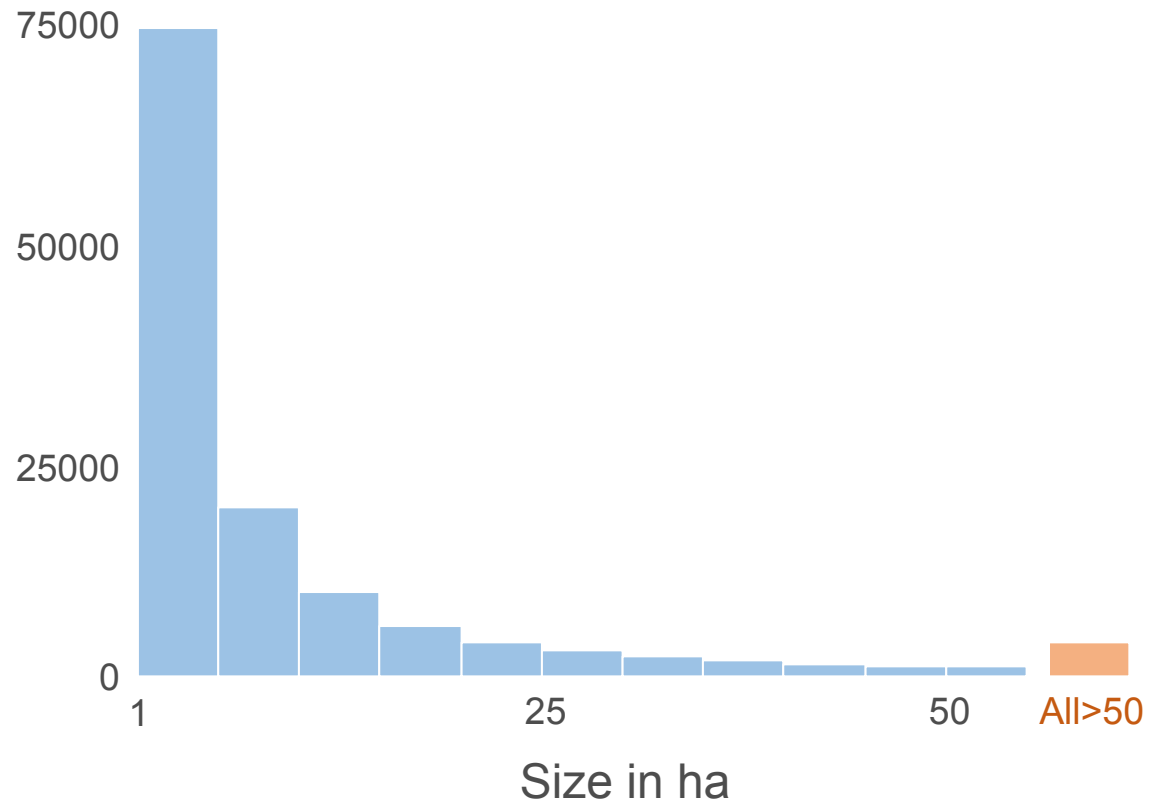






Most temperate deciduous forests are under 20 ha: this is true worldwide.

Number of forests in the Megalopolis



Which forest is “my forest”?



An aerial photograph of a landscape, possibly a coastal or urban area, overlaid with a complex network of colored polygons. These polygons represent a 'proximity footprint' or a spatial analysis of the area. The colors used include various shades of green, blue, purple, red, orange, and yellow. The polygons are of various sizes and shapes, some following linear features like roads or rivers, and others covering larger, more irregular areas. The text 'Proximity footprint' is centered in the lower half of the image.

Proximity
footprint

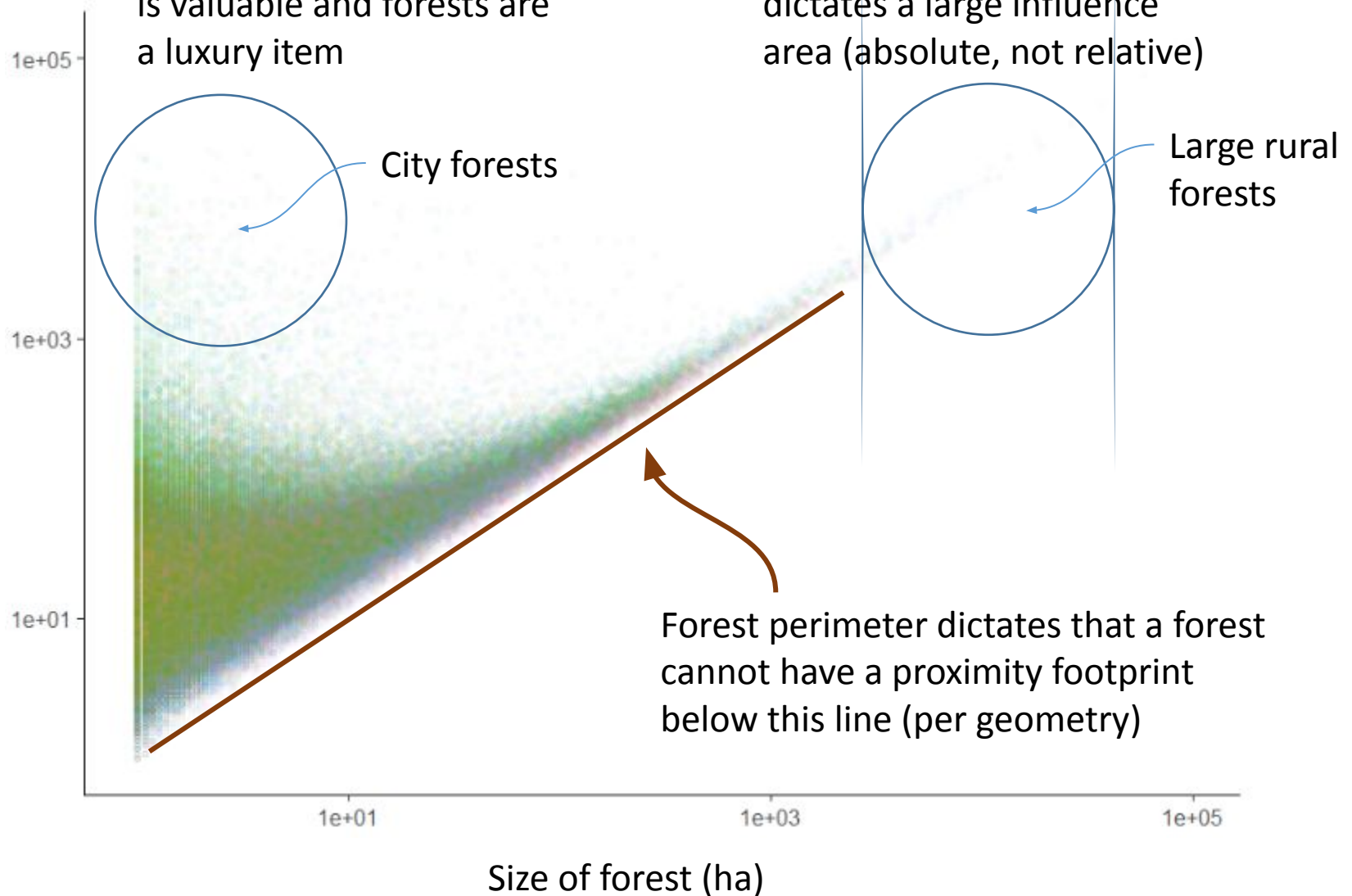
Forests with large proximity footprints

are

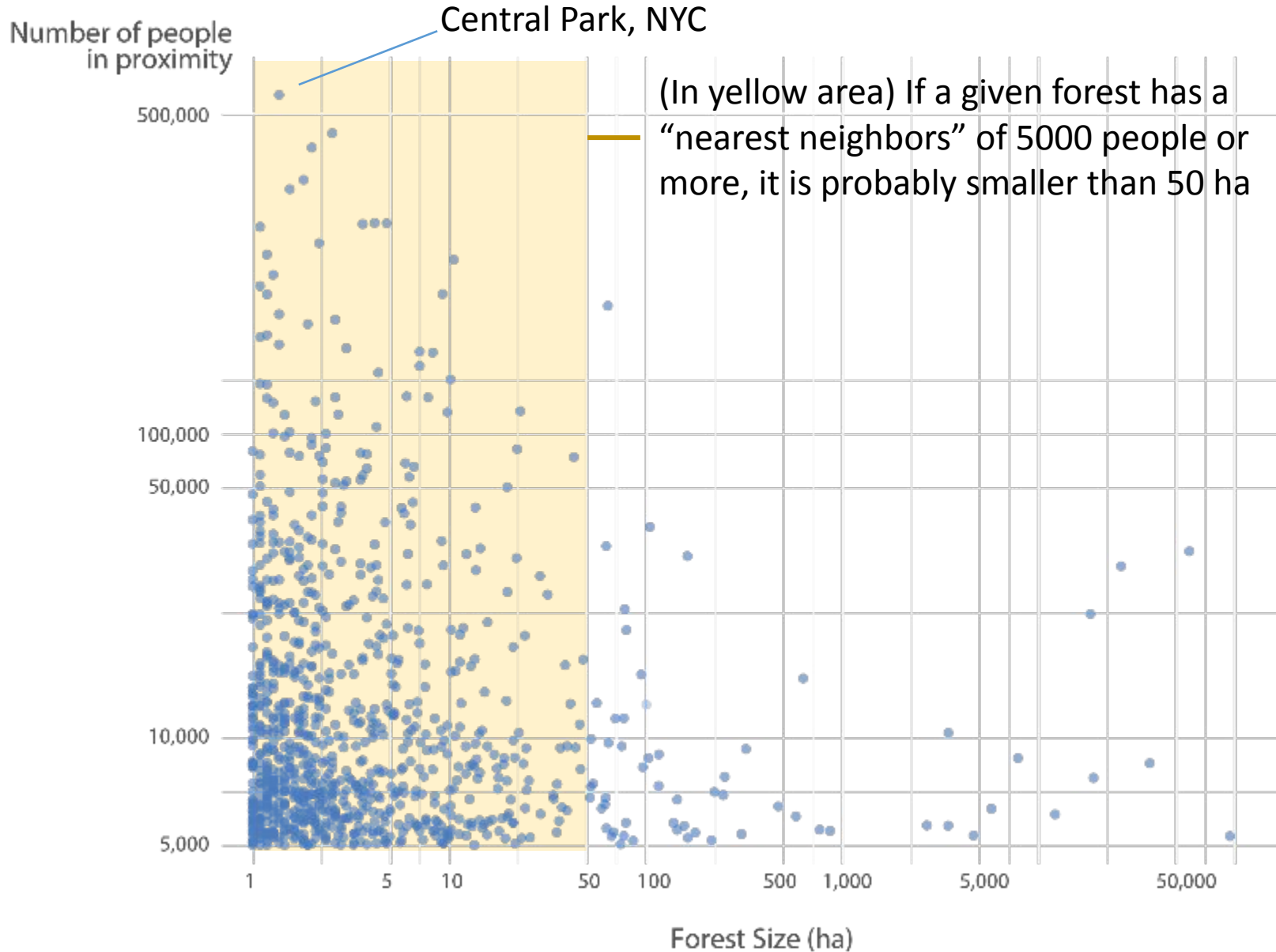
Small: in areas where land is valuable and forests are a luxury item

Large: the size of the forest dictates a large influence area (absolute, not relative)

Size of proximity footprint (ha)



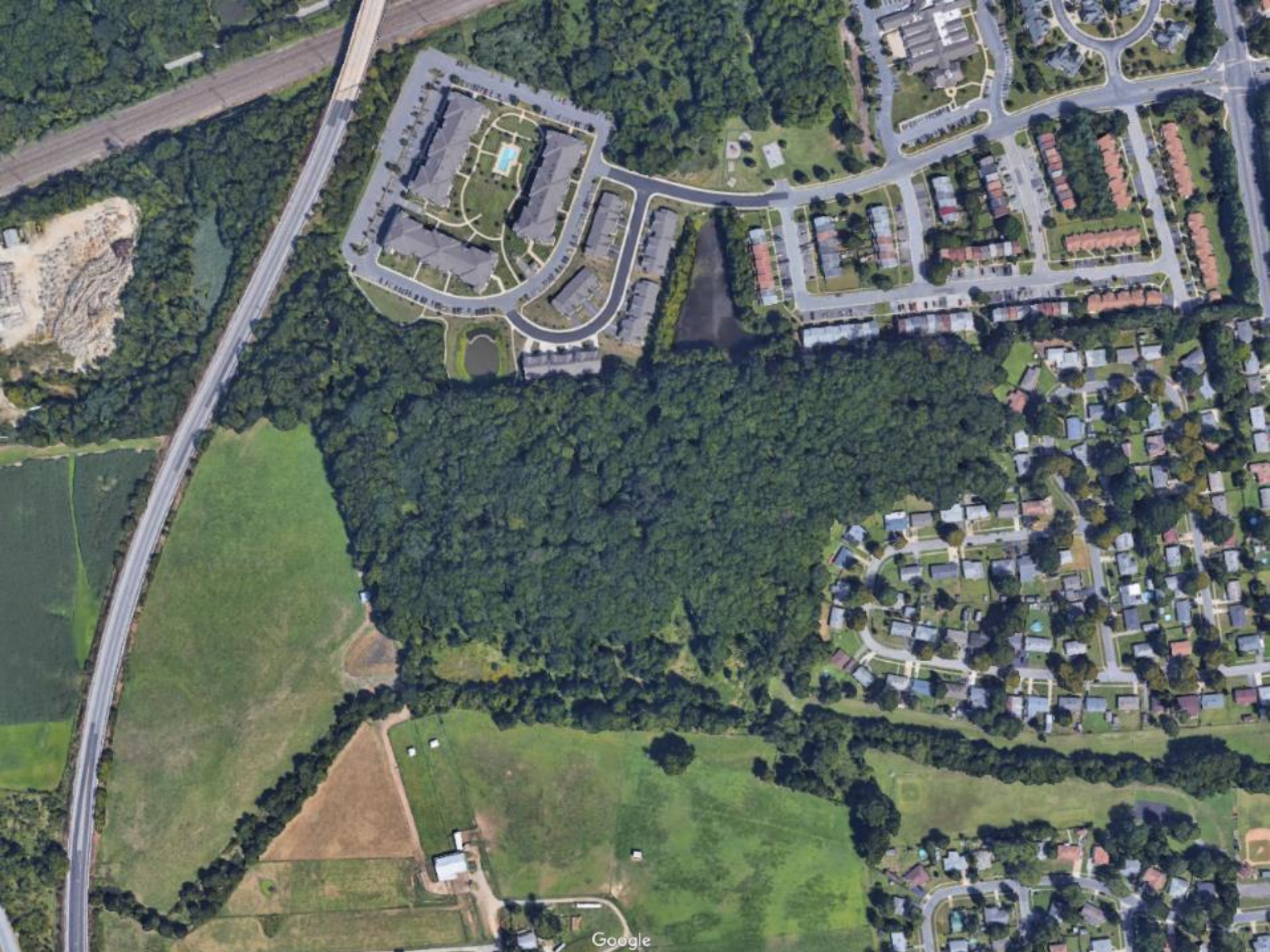
Most people live near small forests



Creating the **FRAME** network

FRAME long-term sites in the Megalopolis

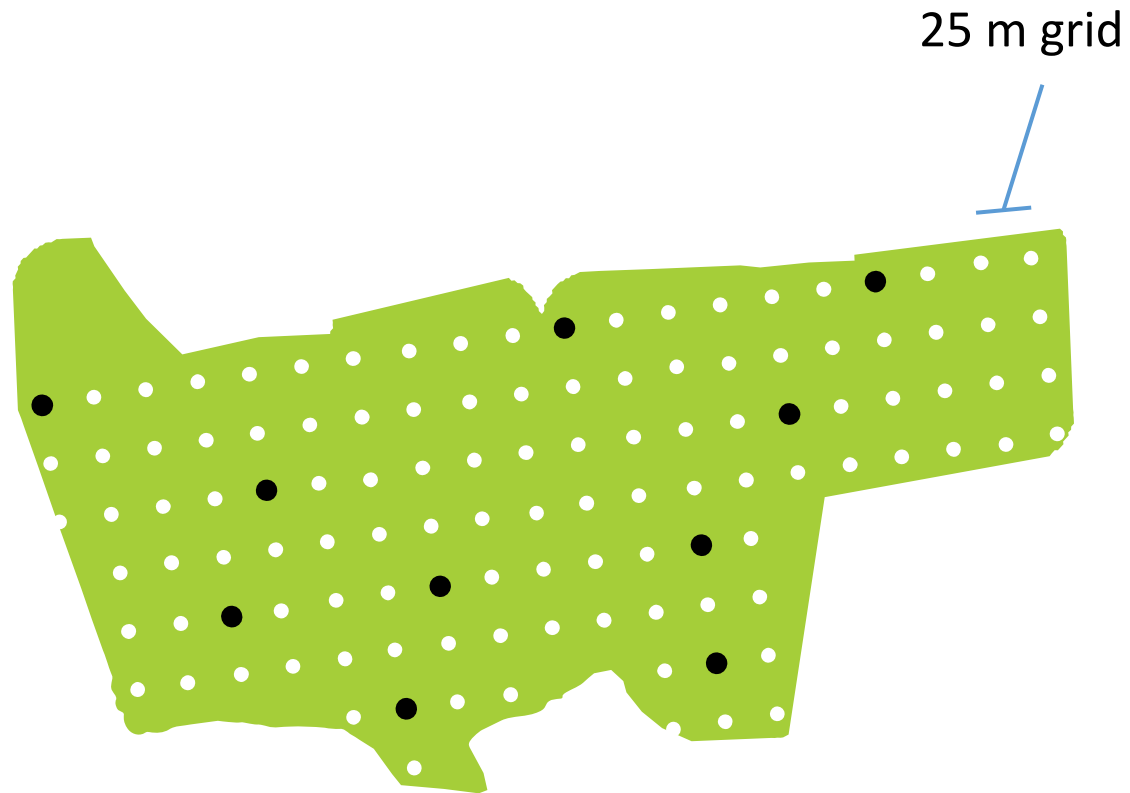






WEBB FARM: 8.73 ha

perimeter:area = 0.026791



Landscape
variables



Canopy



Understory

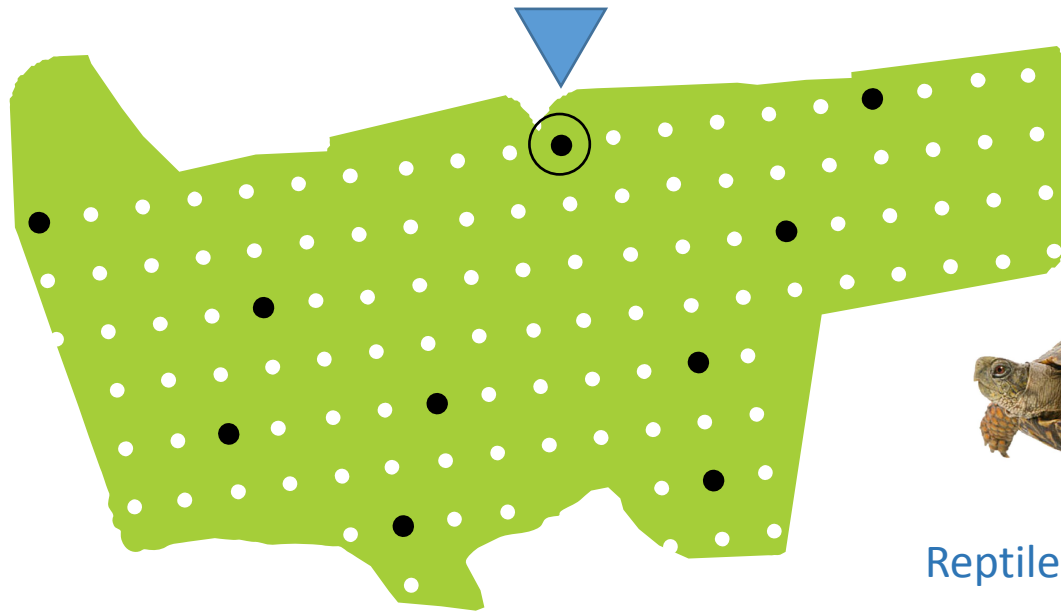


Soil chemistry



Arthropods

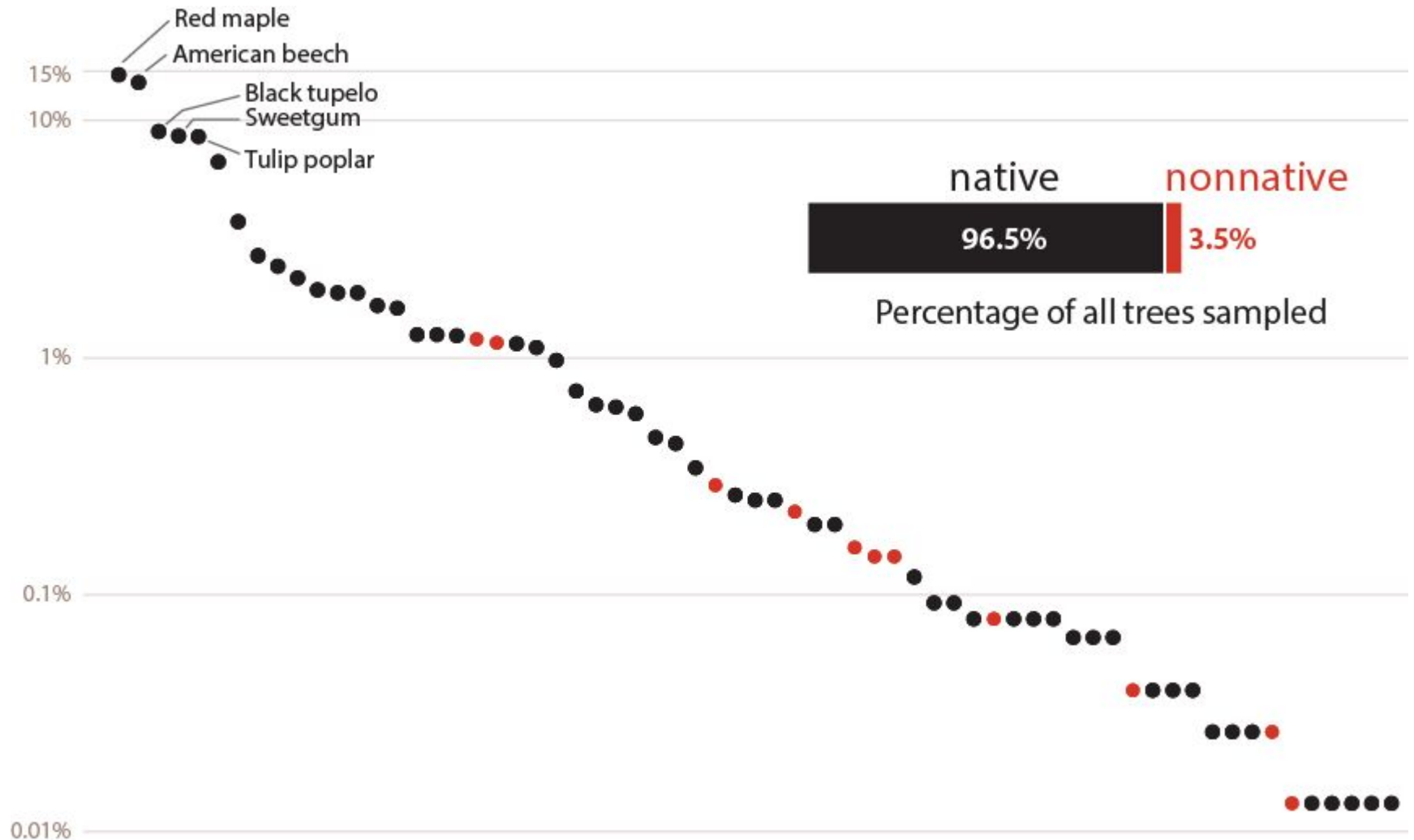
Molluscs



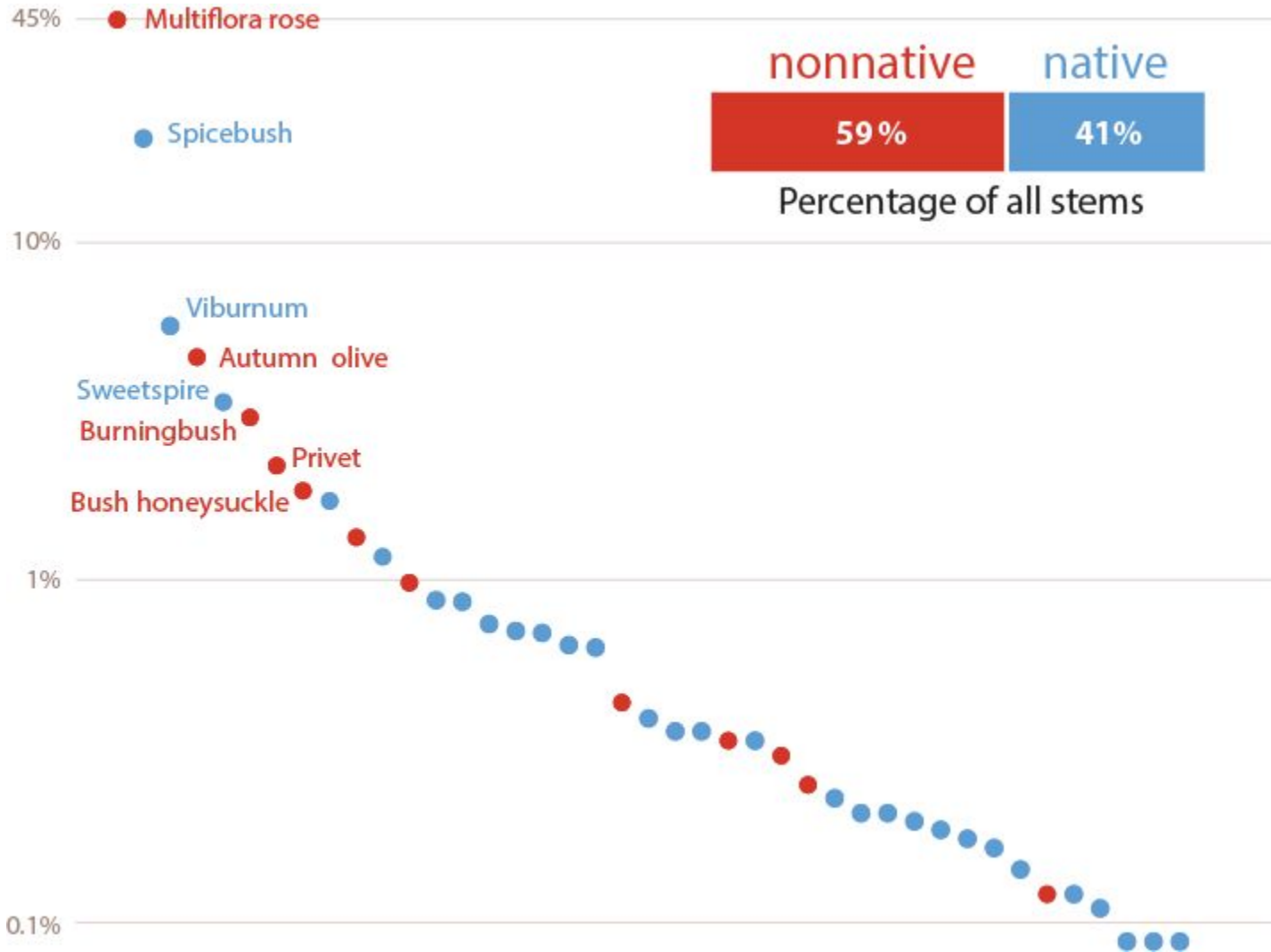
Reptiles and Amphibians

**Base Layer Results
from
US FRAME Sites**

CANOPY (~10,000 trees)



UNDERSTORY



Stems per 20 m²

120—

100—

80—

60—

40—

20—

0

Woody Understory Plants

Liters of litter per 0.5 m²

— 10

— 8

— 6

— 4

— 2

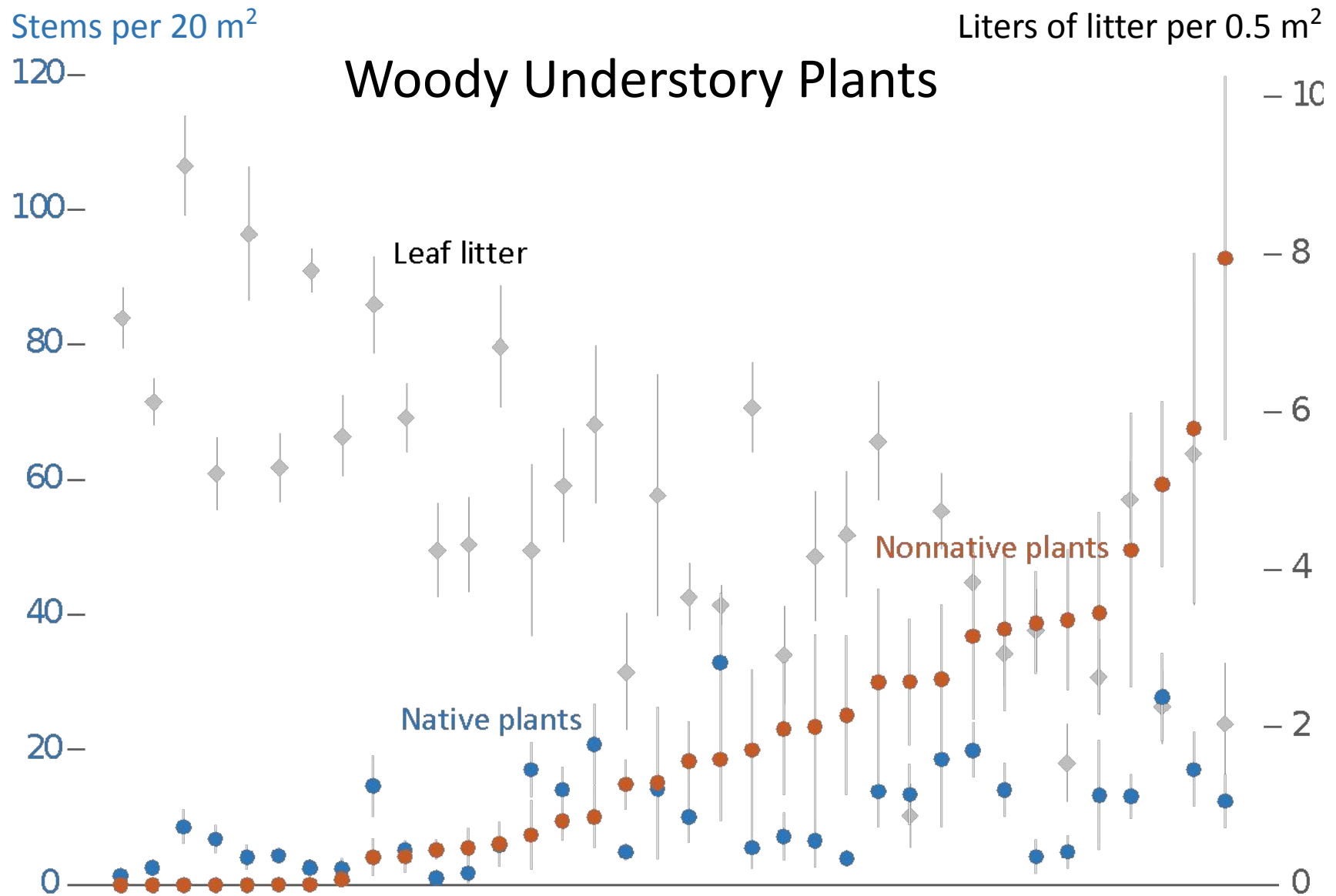
0

Leaf litter

Native plants

Nonnative plants

Each point represents the mean of sample points in a single FRAME site
(n = 10-20 sample points depending on area of FRAME site)



Sites that are close to each other have very different histories and ages

