The Coupled Effects of Land Use and Climate Change on Carbon Flux in a Forest Landscape

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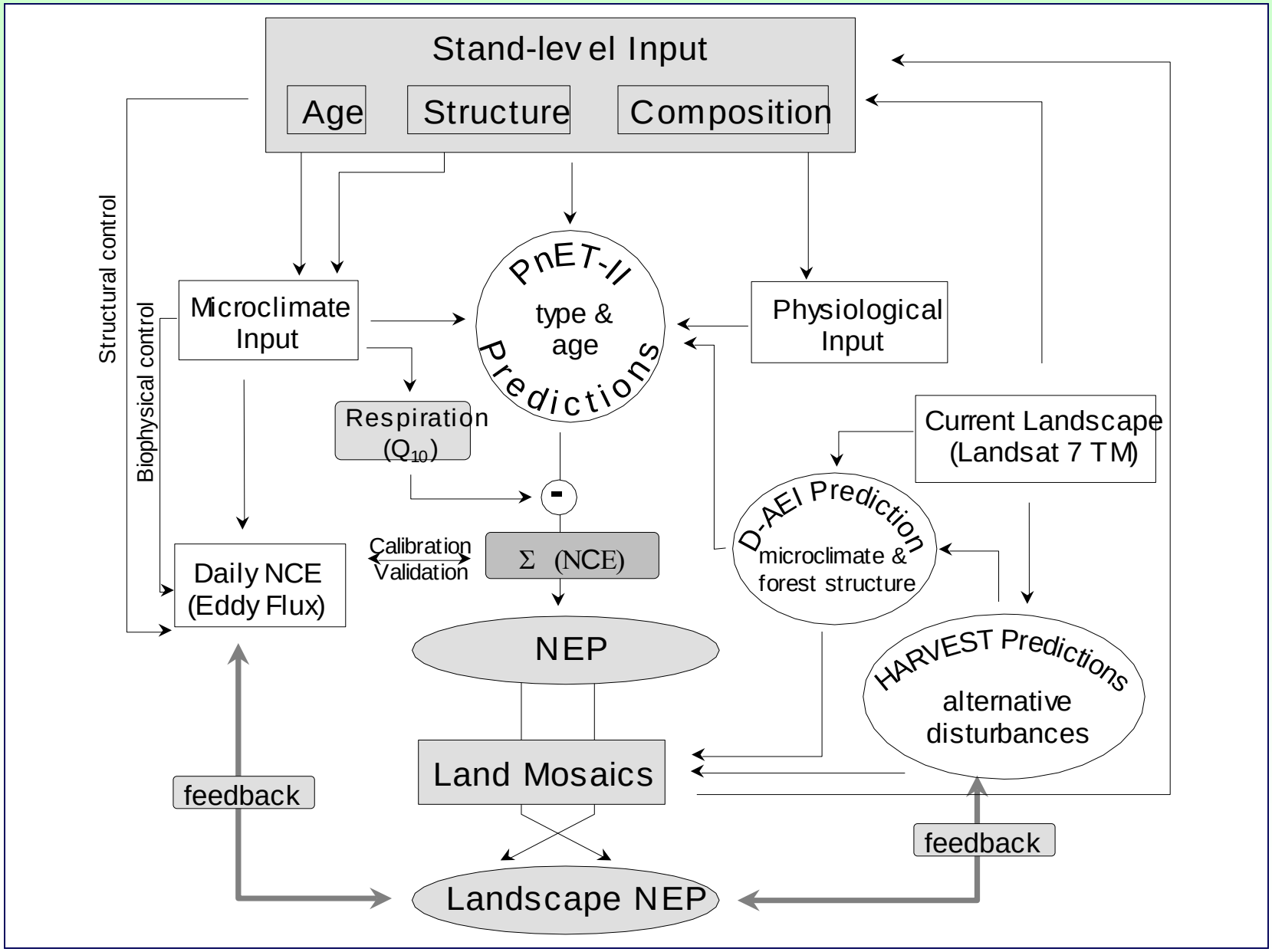
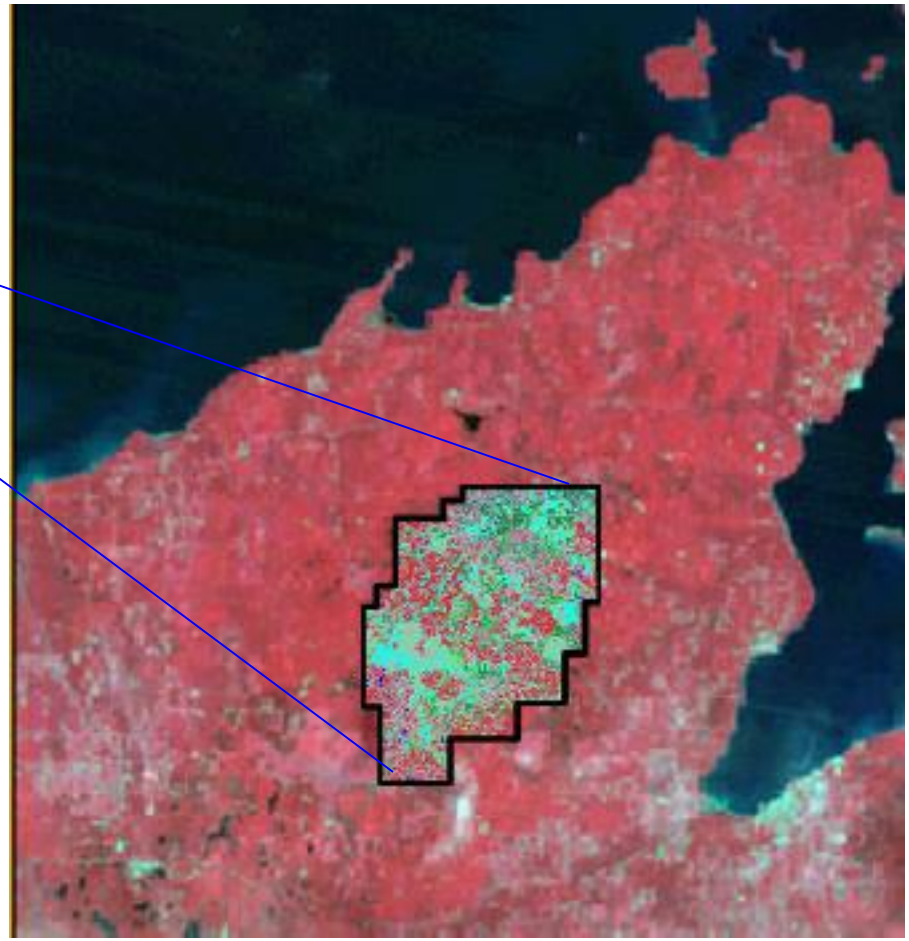
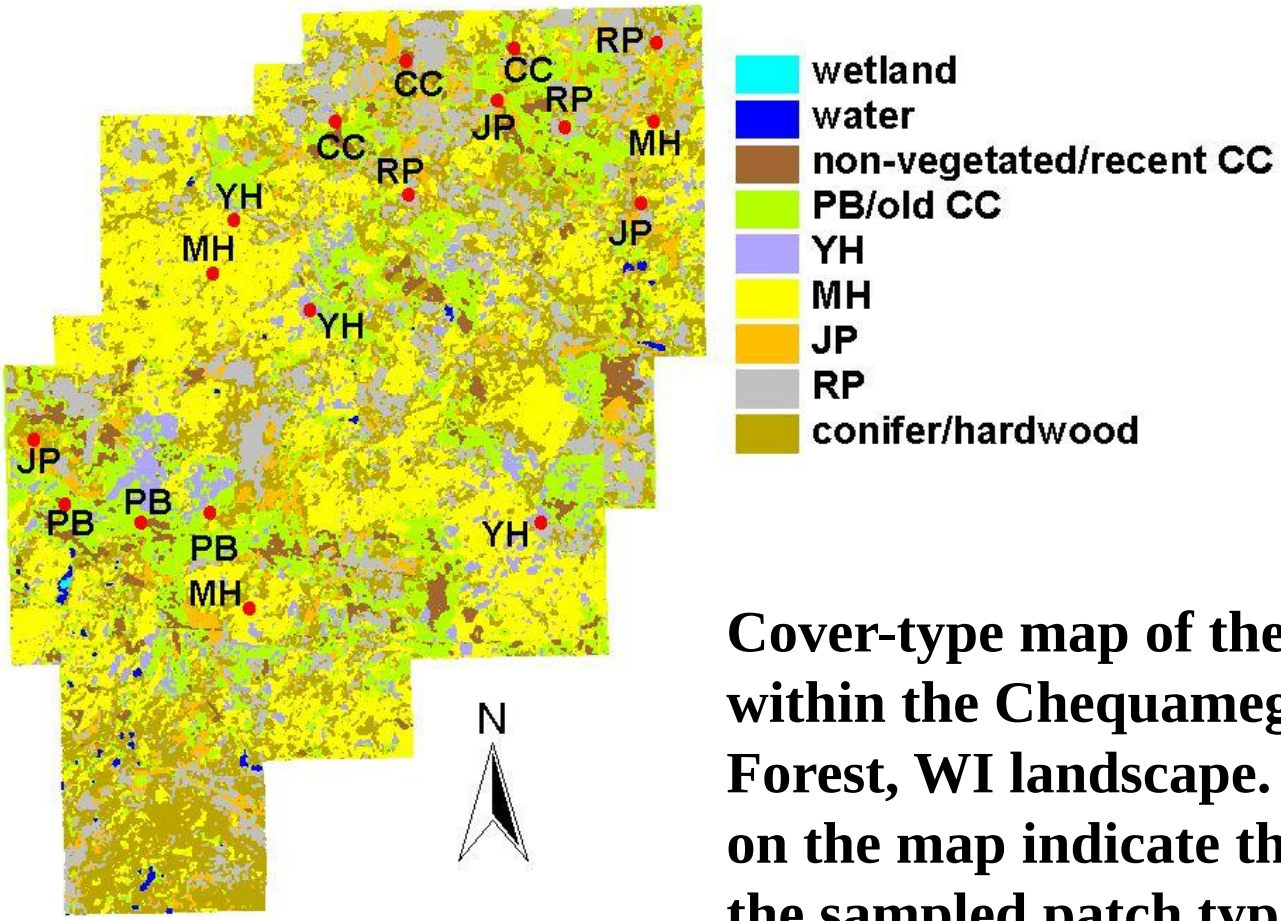
Conceptual Framework



Study Area

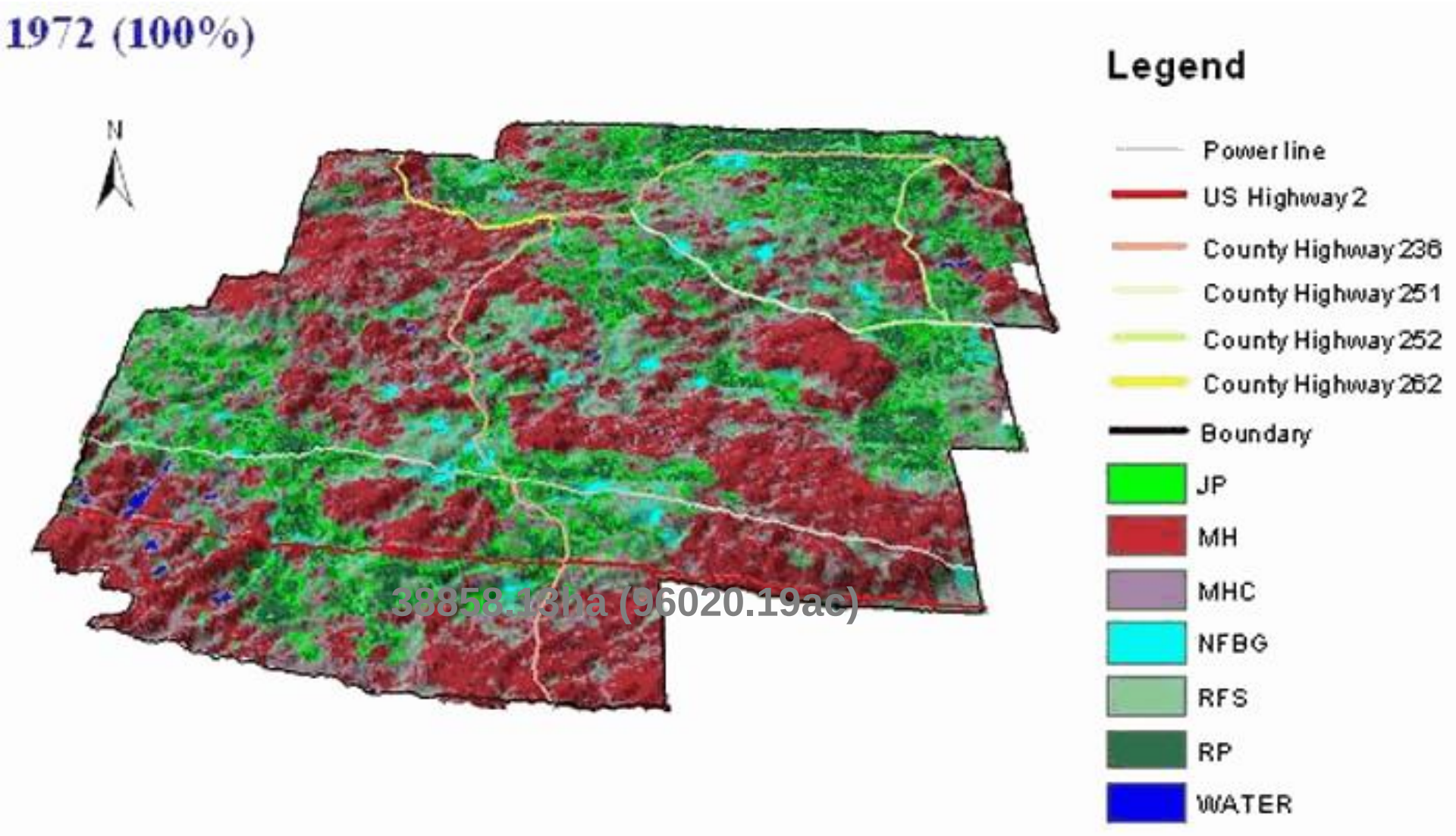


LandSAT ETM+

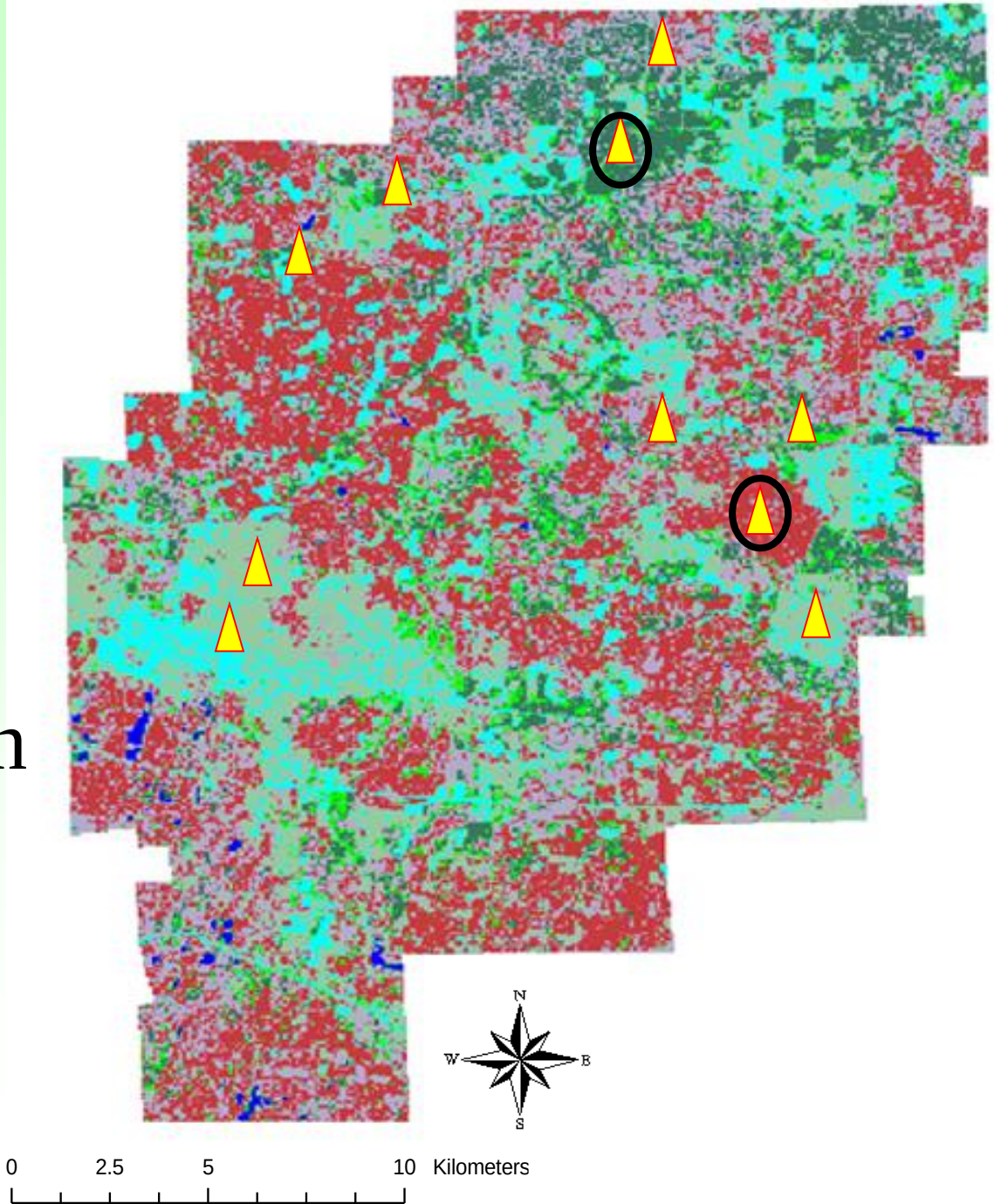


Cover-type map of the study area within the Chequamegon National Forest, WI landscape. The labels on the map indicate the location of the sampled patch types for soil respiration measurements. CC = clearcuts, JP = Jack pine, MH = mature hardwoods, PB = pine barrens, RP = red pine, YH = young hardwoods.

Visualization of a landscape in N. Wisconsin from 1972 to 2001



Spatial locations of eddy-covariance systems on a classified land cover map in the Chequamegon National Forest in Northern Wisconsin.



Methods

A combination of direct measurements, remote sensing images, and ecosystem models.

Pine Barrens

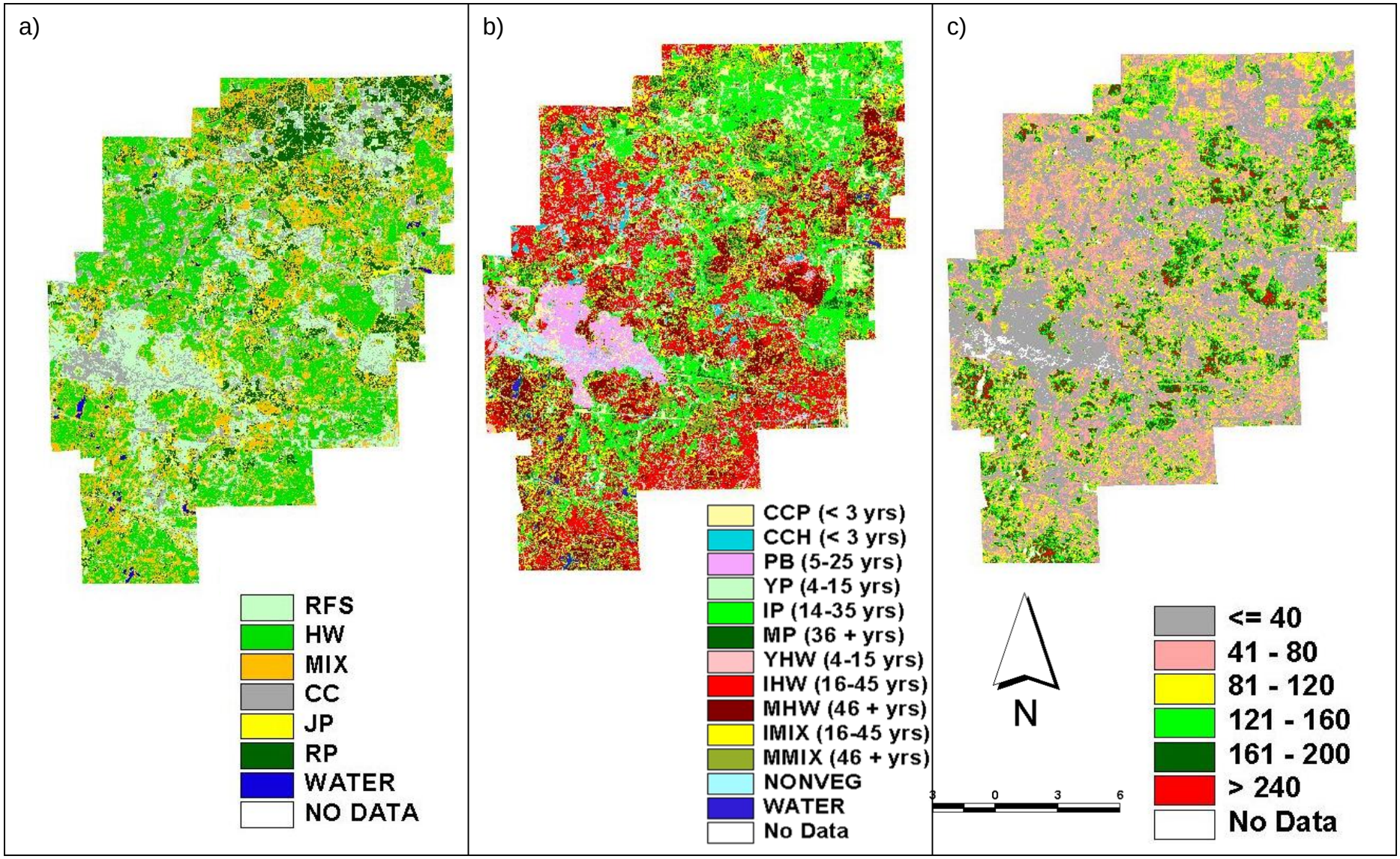
Mature red pine

Mature hardwood

Young red pine

Mature red pine

(a) land cover, (b) stand age, and (c) aboveground biomass (Mg/ha) derived from 2001 Landsat 7 ETM+ data for the CNF .



Roots and Biomass

ABG and Age

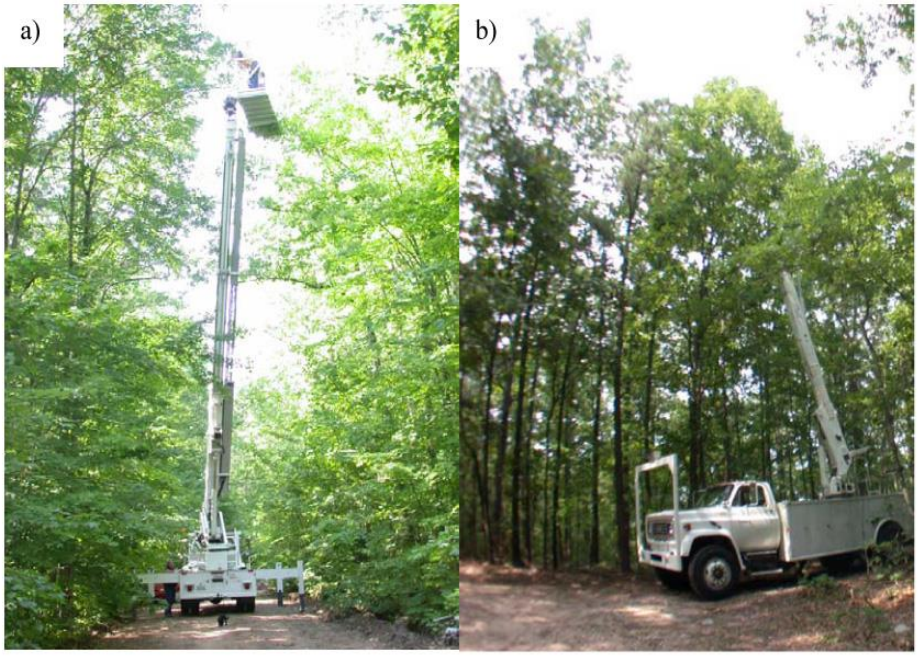


Figure 7. Aerial lifts used in measuring photosynthesis of mature dominant species in a) CNF and b) the Ozarks.

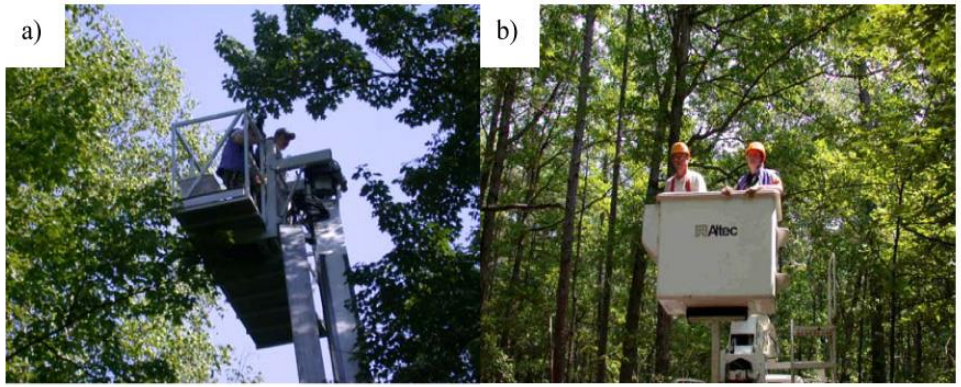
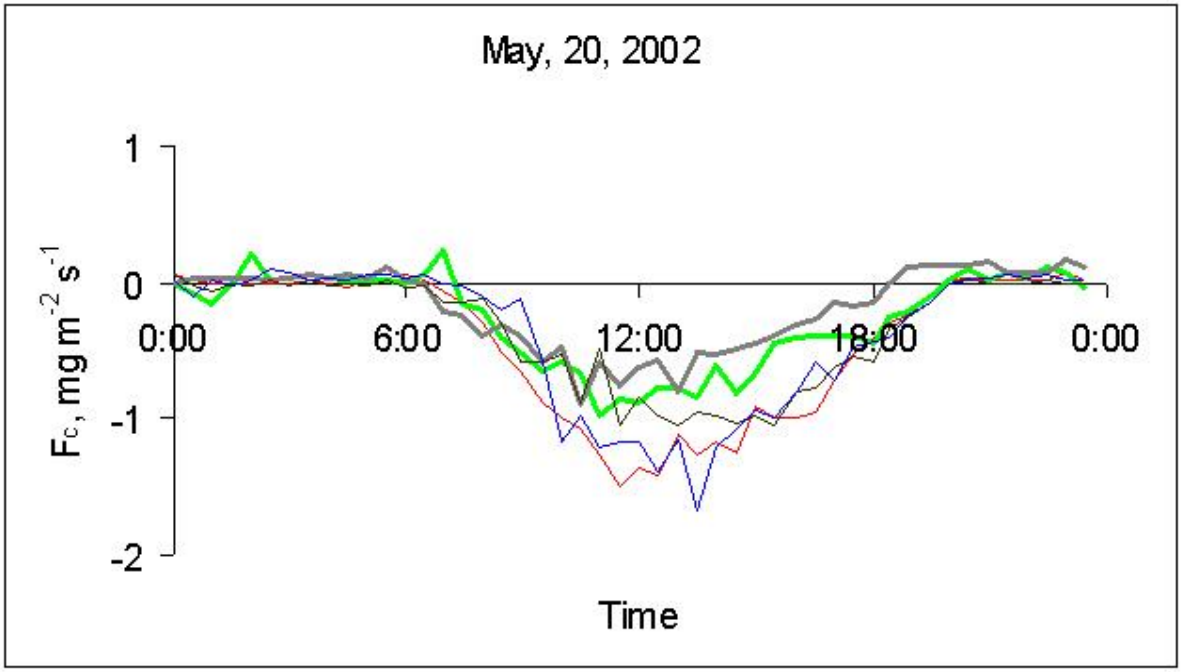
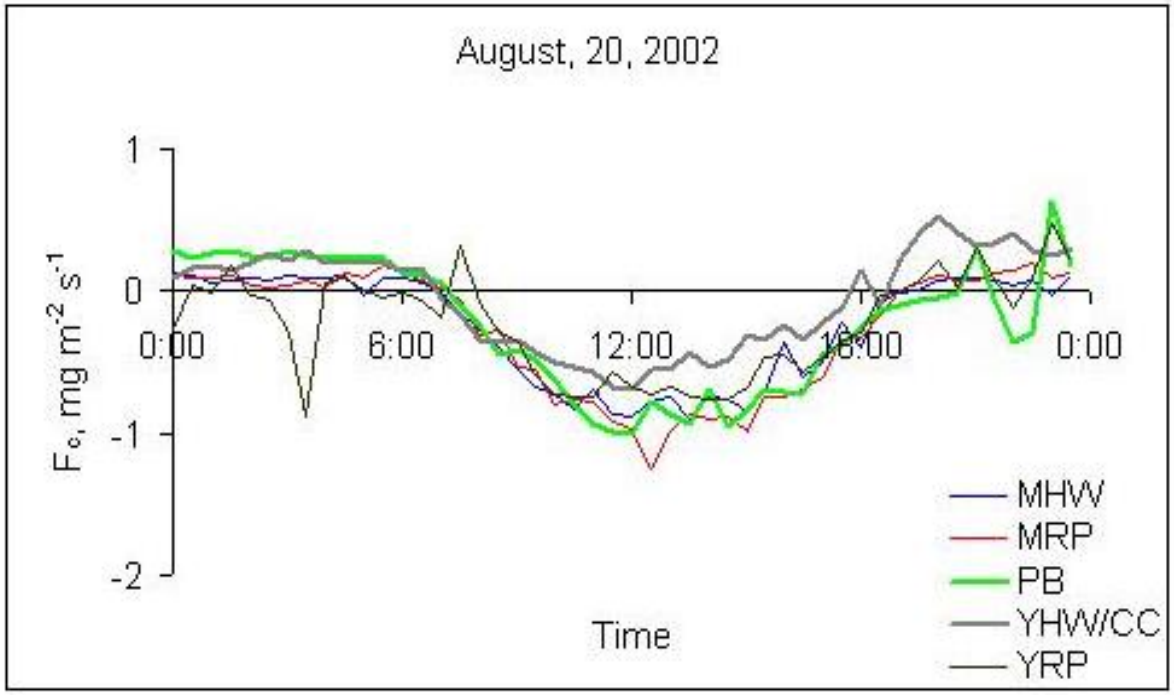


Figure 8. Aerial lifts a) while photosynthesis measurements were being taken of mature red maple in CNF and b) in the Ozarks Randy and Mary preparing to measure Hickory.

Soil respiration and moisture (TDR)

Soil temperature (HOBO syster

Results

Diurnal net exchange of CO_2 (with WPL corrections) at five forest ecosystems in the Chequamegon National Forest, N. Wisc.