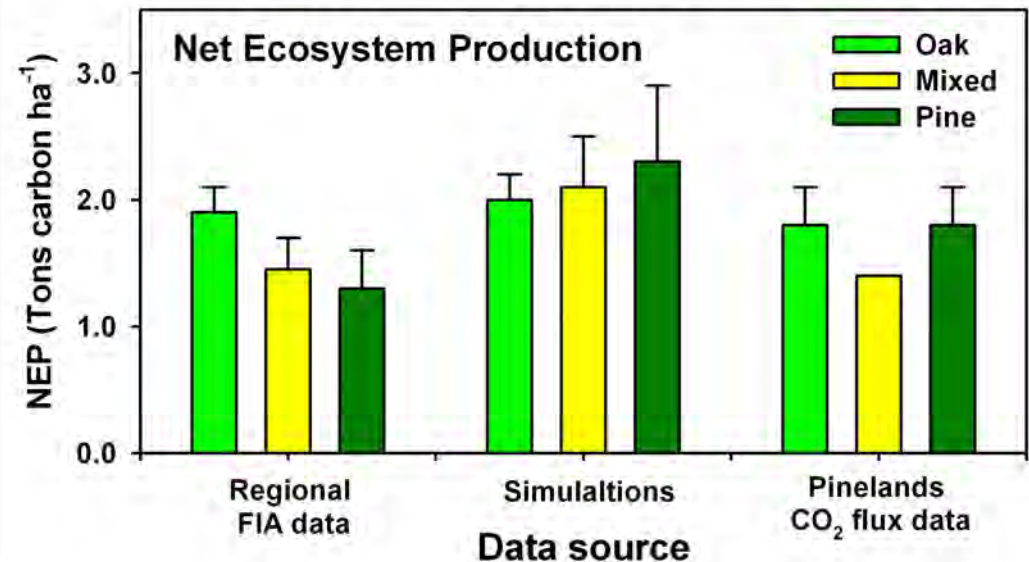
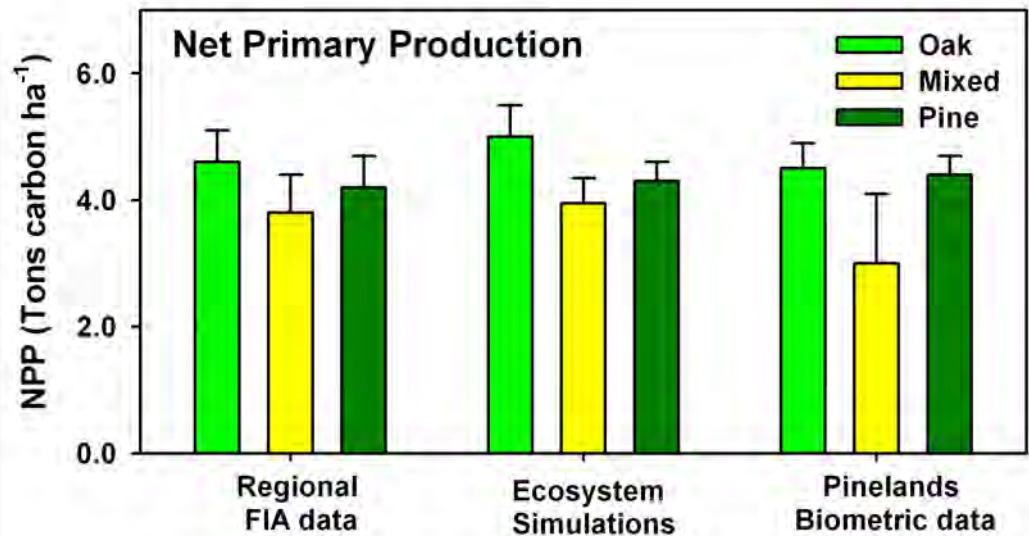


***Mitigation Options and Management:  
Prescribed Fire and Climate Change in the  
Pineland National Reserve***





# Productivity of undisturbed forests in the mid-Atlantic region



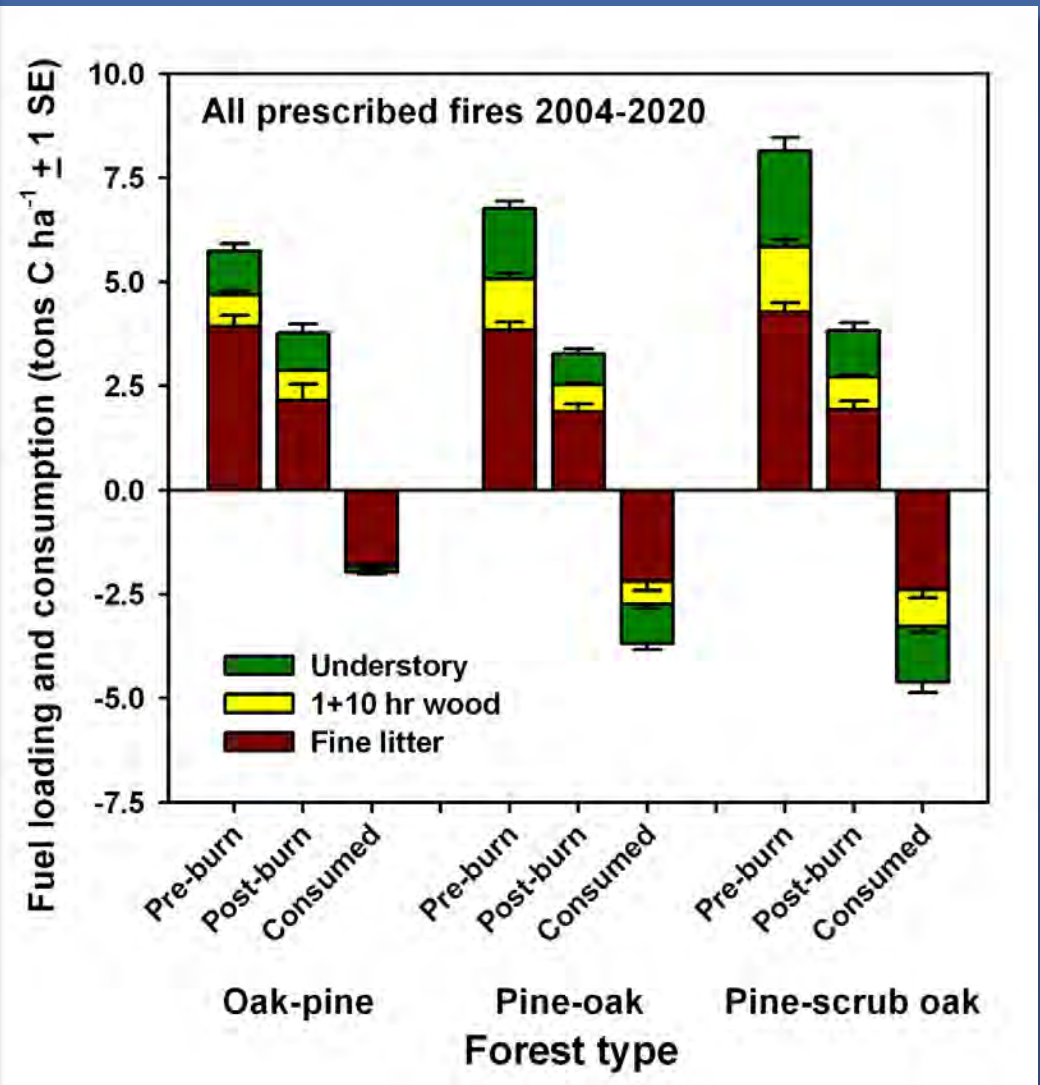


# *Carbon flux towers in upland forests in the Pinelands*

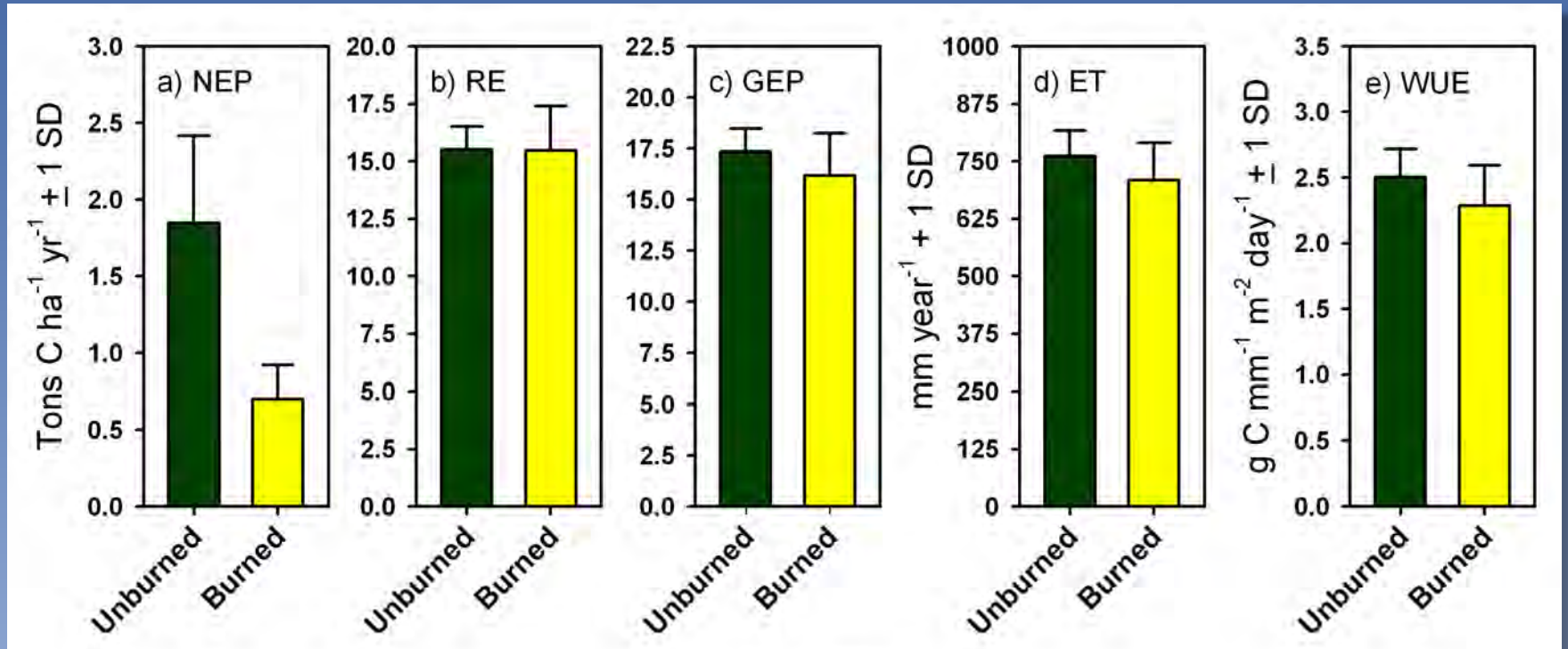




# Carbon release during prescribed burns



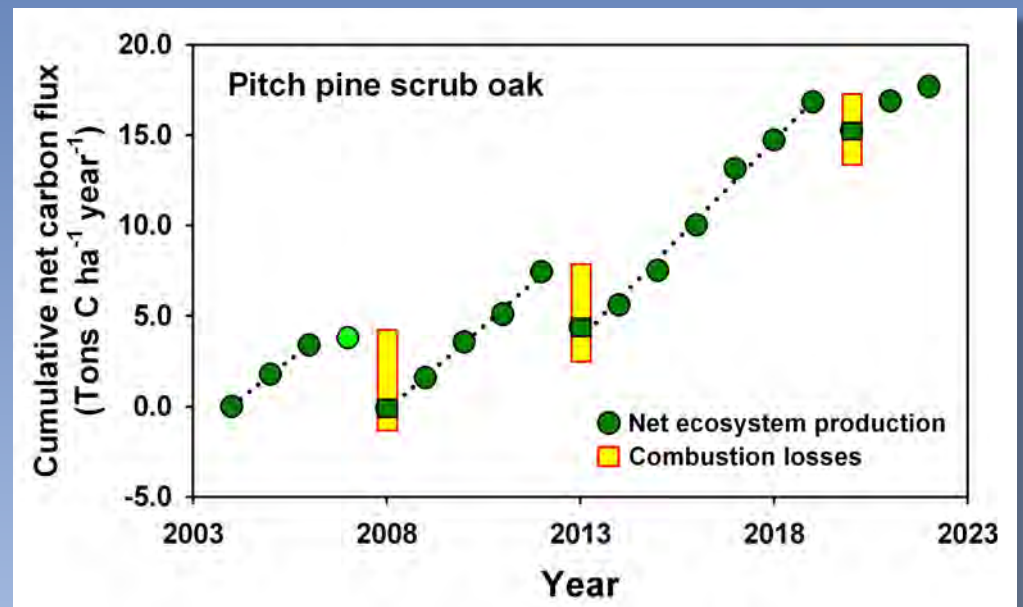
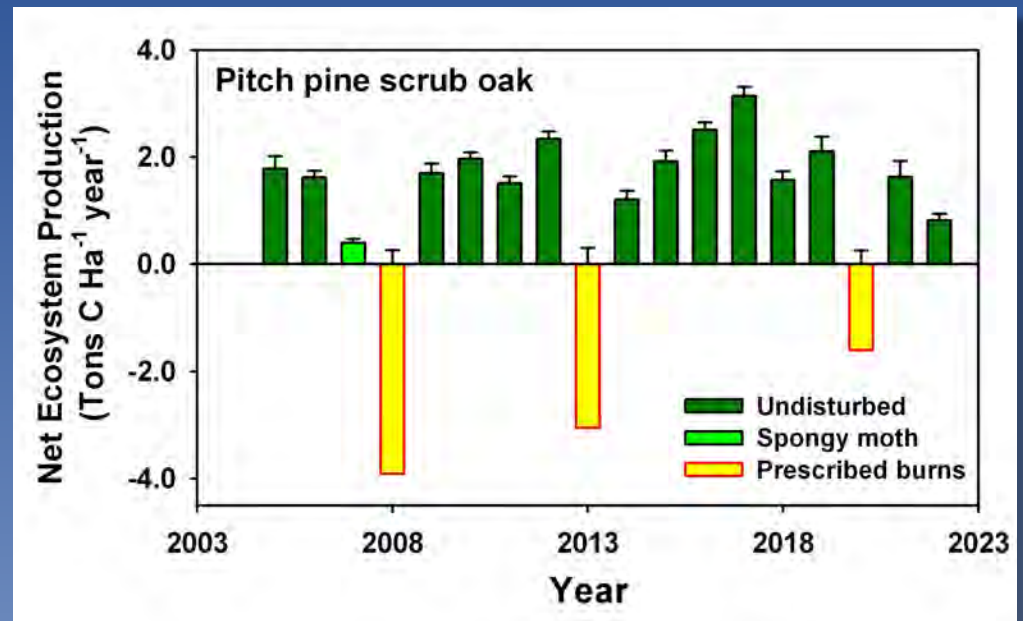
# Annual carbon and hydrologic fluxes at the pitch pine – scrub oak stand



Values are net ecosystem production (NEP), ecosystem respiration (RE), gross ecosystem production (GEP;  $\text{tons C ha}^{-1} \text{ yr}^{-1}$ ), evapotranspiration (ET,  $\text{mm year}^{-1}$ ), and e) ecosystem water use efficiency during the summer months (WUE,  $\text{g C mm H}_2\text{O}^{-1} \text{ m}^{-2} \text{ day}^{-1}$ ).

*Annual and cumulative carbon fluxes at the pitch pine – scrub oak stand.*

*Positive CO<sub>2</sub> sequestration occurs with 5-to-8-year prescribed burn rotations*

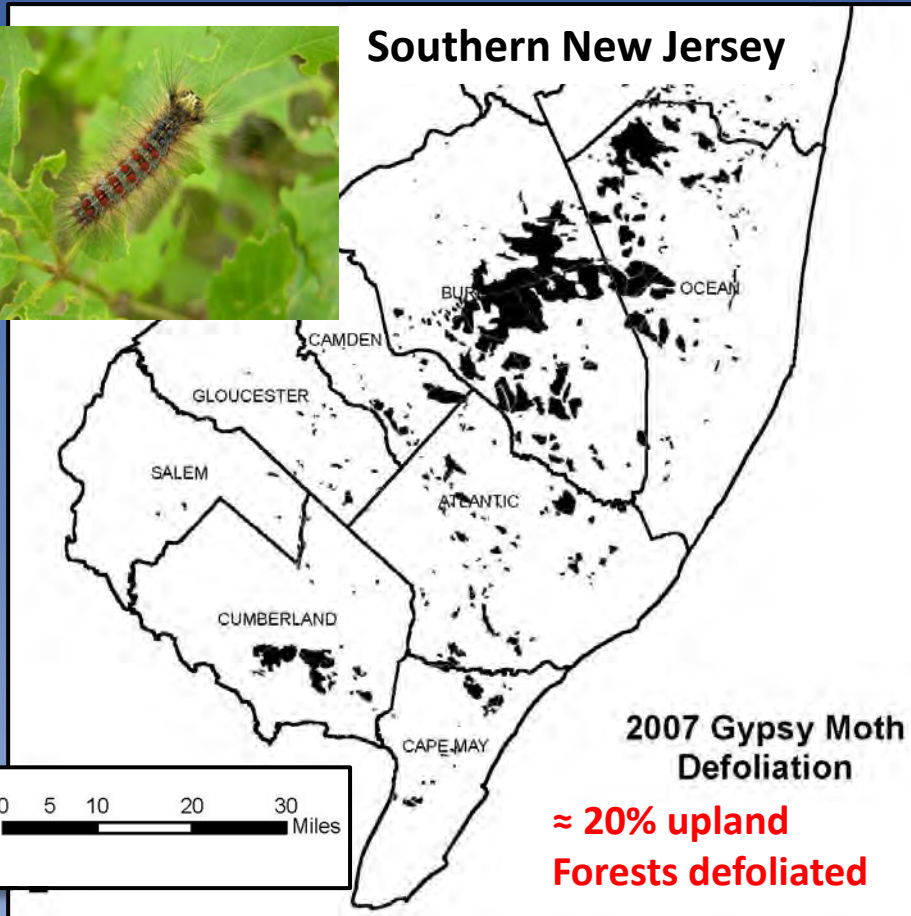




# Spongy moth infestations in mid-Atlantic forests

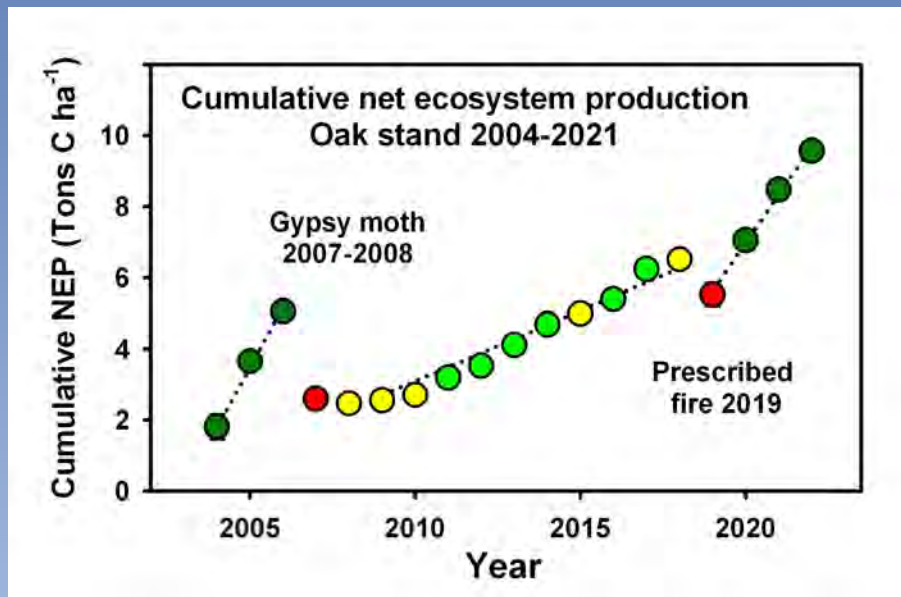
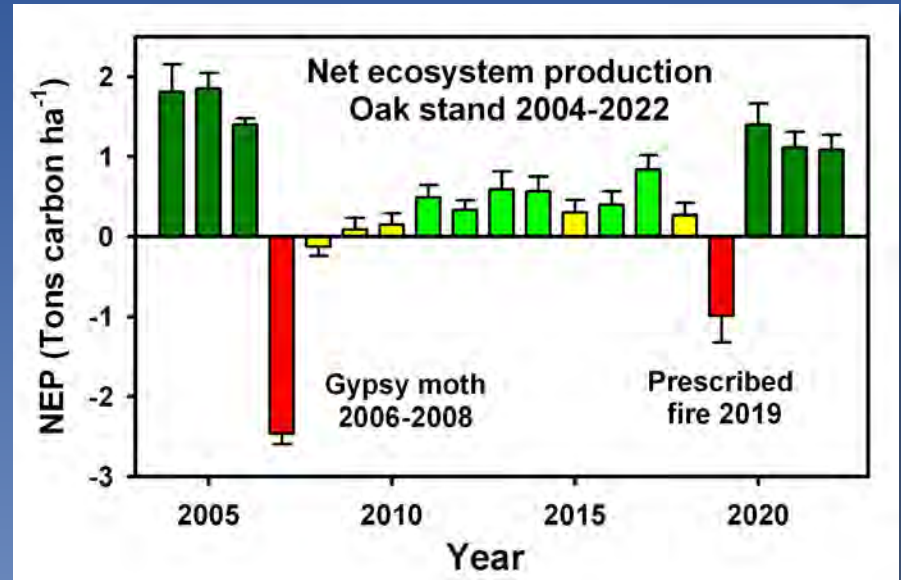


Southern New Jersey



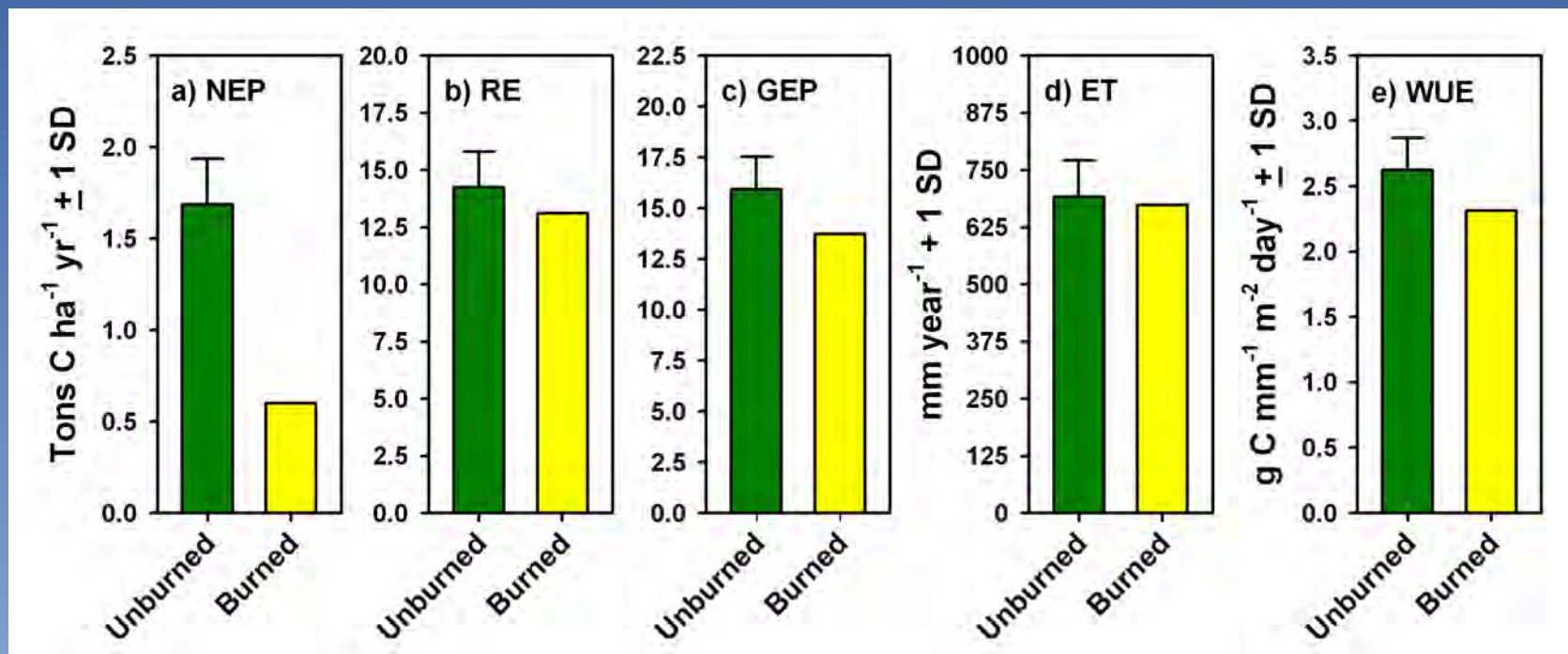


# Cumulative annual net ecosystem production at the oak stand





## Annual carbon and hydrologic fluxes at the oak stand



Values are net ecosystem production (NEP), ecosystem respiration (RE), gross ecosystem production (GEP; tons C ha<sup>-1</sup> yr<sup>-1</sup>), evapotranspiration (ET, mm year<sup>-1</sup>), and ecosystem water use efficiency during the summer months (WUE, g C mm H<sub>2</sub>O<sup>-1</sup> m<sup>-2</sup> day<sup>-1</sup>).

## *A few conclusions...*

- Prescribed fires are releasing 1 to 3 years of accumulated C, primarily from consumption of the forest floor and understory vegetation
- “Carbon neutrality” is achieved within 3 years; burning at 5 to 8-year intervals results in positive C accumulation and reduces wildfire risk
- Can prescribed burning be used to restore ecosystem functioning in insect damaged stands?



# Conceptual model of disturbance and persistence of mixedwood stands in the Pinelands National Reserve, New Jersey

