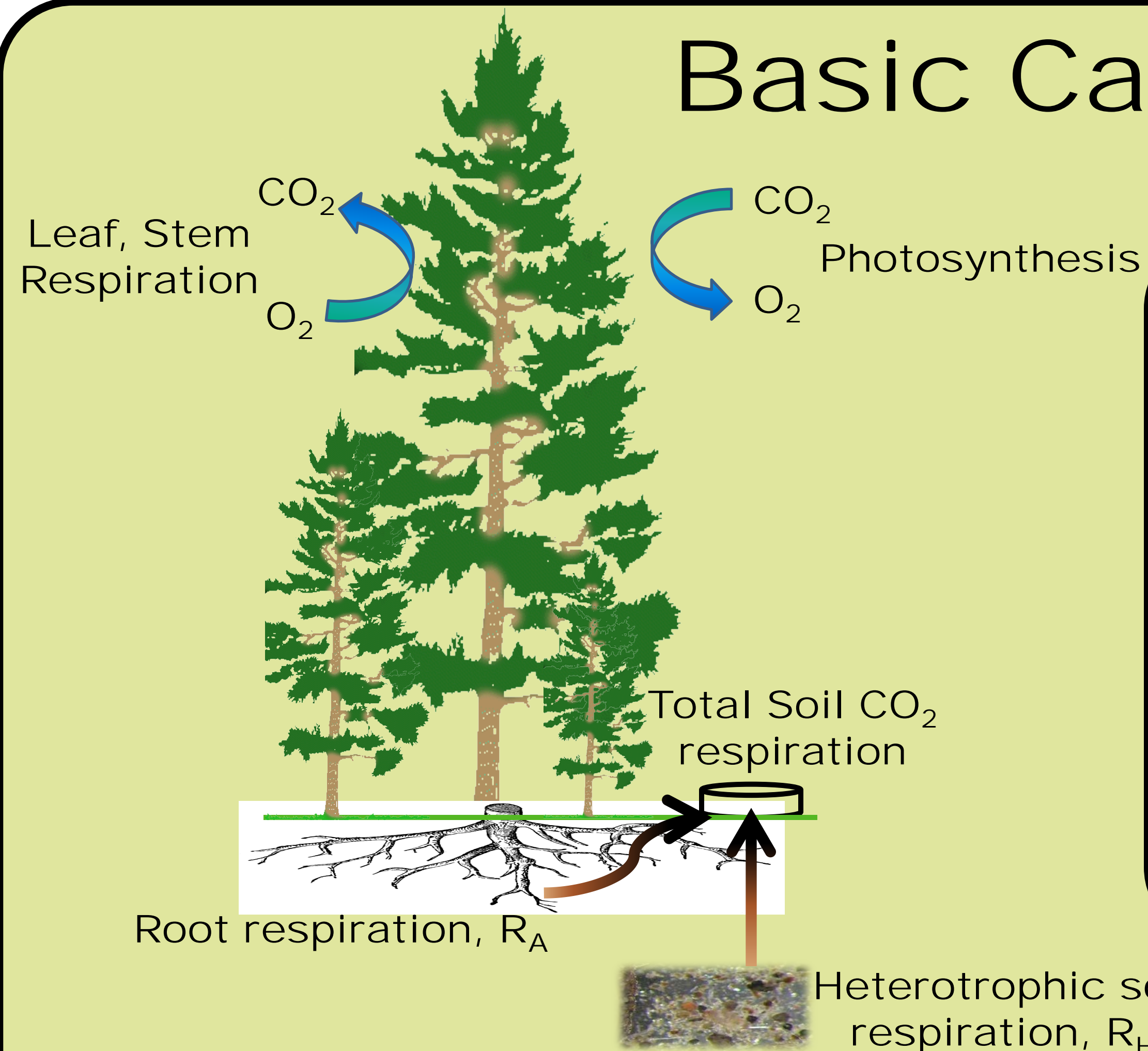




Soil CO₂ Efflux and Carbon Cycling

PINEMAP 2013 Annual Meeting Field Tour
Tier III site, Taliaferro County, GA

Basic Carbon Cycle



- To estimate Net Ecosystem Productivity (NEP), silviculture and ecophysiology team researchers require a separate estimate of **heterotrophic soil respiration (R_H)**.
- Deep root isolation cores** result in root respiration falling to zero as root carbohydrates are depleted. A measure of soil CO₂ respiration above these cores is used to **estimate R_H**.
- NEP is used by the modeling team to produce estimates of carbon sequestration.

Figure 1. Terrestrial carbon cycle showing key CO₂ flux rates being measured by the PINEMAP silviculture and ecophysiology team. These numbers are being used by the modeling team to prepare estimates of carbon sequestration.



Soil CO₂ efflux or soil respiration (R_S) is the second largest flux in the C cycle.

Figure 3. Soil CO₂ efflux is measured with a chamber sealed over the soil surface and an infrared gas analyzer. Measurements are taken over root isolation cores (R_H estimate) and adjacent to cores (R_H plus R_A)

Root Isolation Cores



Figure 2. Installation of root isolation cores. Over time, respiration of roots in the chamber falls to zero and CO₂ emissions at this point are from soil heterotrophic organisms only (R_H).



Figure 4. Soil moisture and temperature are measured at each sampling point. These measures are used to standardize soil CO₂ efflux rates.