

Current and Potential Carbon Sequestration by Northeastern Forests and Forest Products



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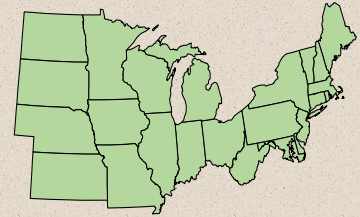


USDA Forest Service
Northern Research Station
Forest Carbon Accounting and Research
Durham, NH

New England SAF and New York SAF – Joint Annual Meeting
February 27–29, 2008
Saratoga Springs, New York

Forest Inventory and Analysis Program (FIA) Northern Research Station USDA Forest Service

Carbon summaries
according to entire region,
the Northeast, or New
York and New England



Principal FIA data sources:

- FIADB 3.0 database, Phase 2 data tables
- The RPA forest resource statistics
- Timber Products Output (TPO) data

To sequester forest carbon:

- Increase carbon in forest ecosystems
- Increase carbon retained in harvested wood products

Change in forest ecosystem carbon is affected by growth and removals as well as any change in area of forestland.

Retention of carbon in harvested wood depends on factors such as efficiency of utilization, recycling, and life of end use products.

Identify emissions associated with energy capture

Basic estimation of stocks and stock changes of forest carbon if you have “field” inventory data

- Carbon stock (t ha) = Carbon/Area x Area
- Carbon change (t/ha/yr) = Stock at time 2 minus stock at time 1 divided by length of the interval between stocks
- Carbon in harvested wood estimates are based on different data and methods

Forest carbon trends for the Northeast

- Forest ecosystem carbon stocks are increasing
 - Carbon densities are generally increasing
 - Change in forest area is mixed
- Carbon removed as roundwood has generally decreased

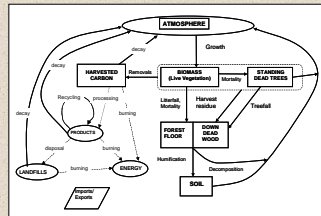
Determining inventory-based ecosystem stocks and stock change

- FORCARB carbon factors
- FIA permanent-plot data

FORCARB: Regional and National Estimates of Carbon in Forest Ecosystems and in Harvested Wood

Developed to link with ATLAS (an aggregated timberland projection system) and subsequently modified for FIA inventory data

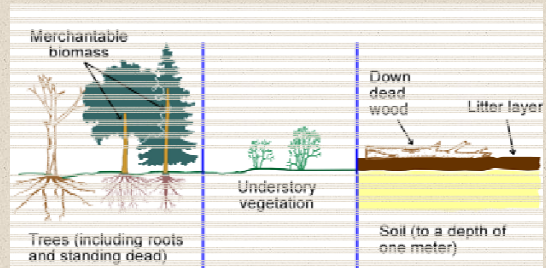
Based on process or empirical models to simulate specific carbon pools or transfer between pools

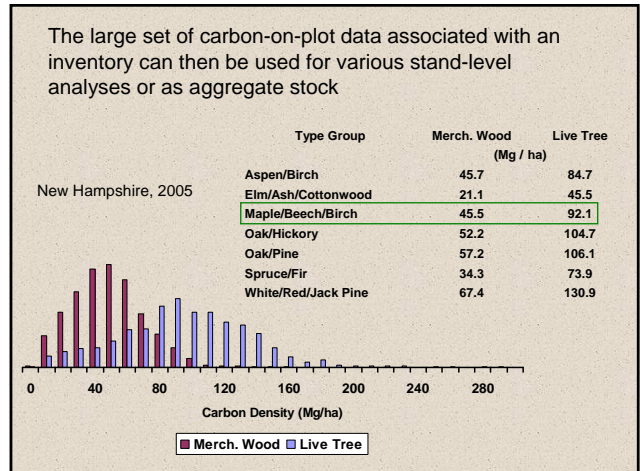
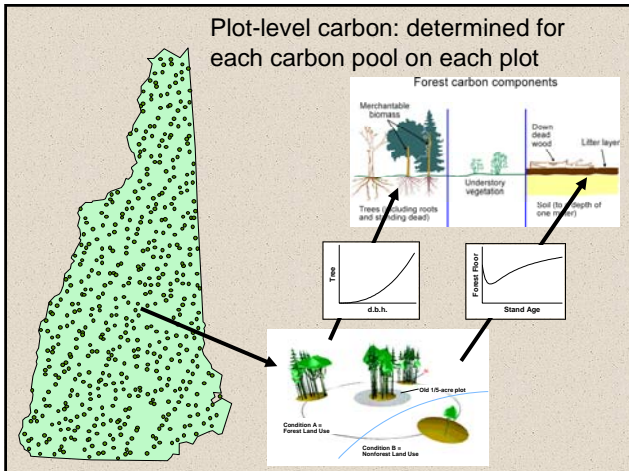
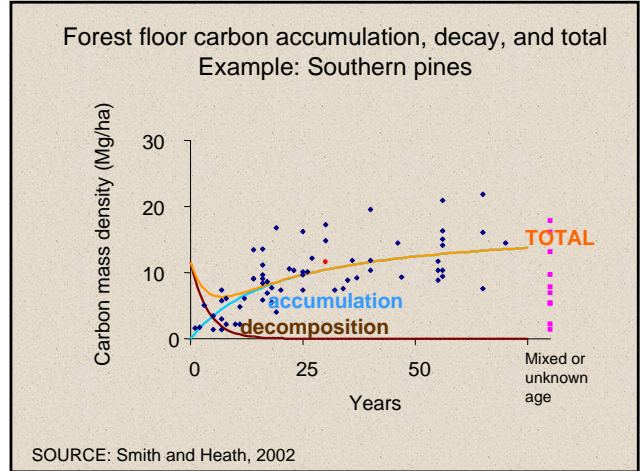
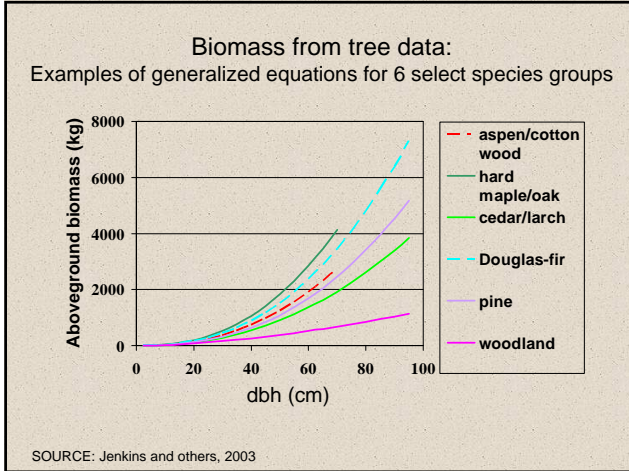


Inventory data from FIA Phase 2 permanent plots

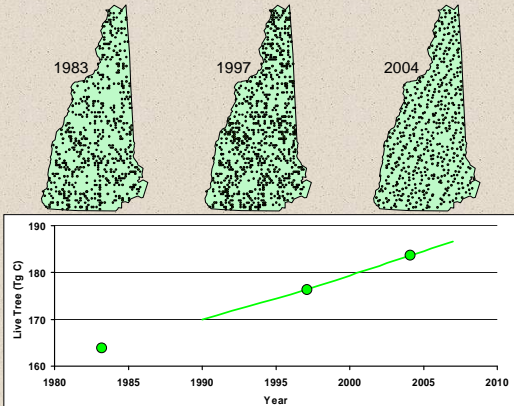


Carbon estimates are based on tree species and dimensions, forest type, volume of growing-stock, and stand age.





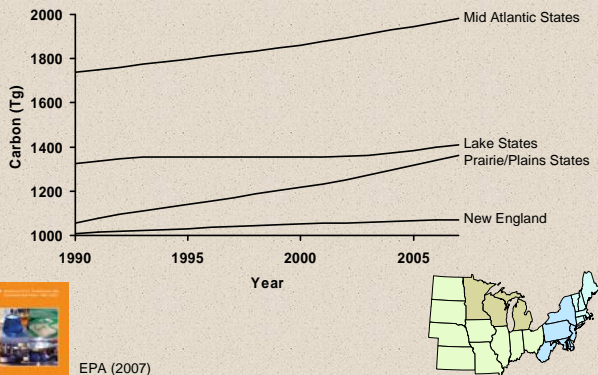
State-level annual carbon stock and net stock change are from successive inventories



Carbon summaries

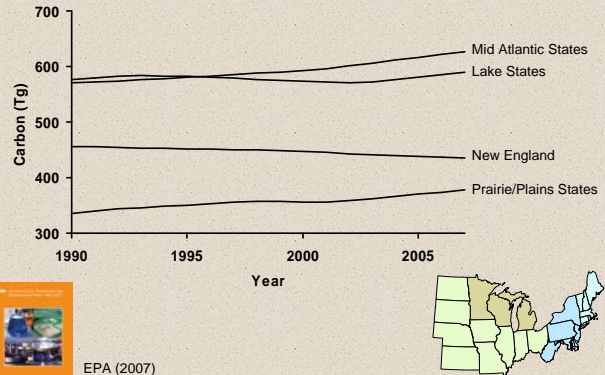
- 1990-2007, recent trends based on state level carbon stocks and stock change from FIADB as included in EPA (2007)
- 2000-2050, projections from TAMM-ATLAS-FORCARB simulations, baseline projections of Haynes and others (2007)
- Area, carbon stock, and density summaries for recent inventories of New England and New York

Carbon in biomass, 1990-2007
(live vegetation)

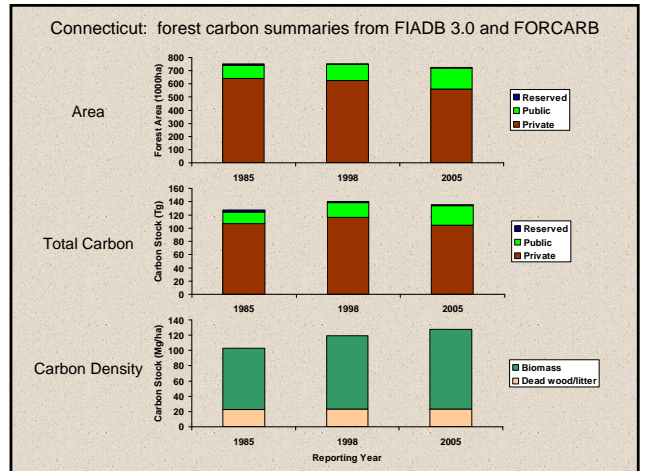
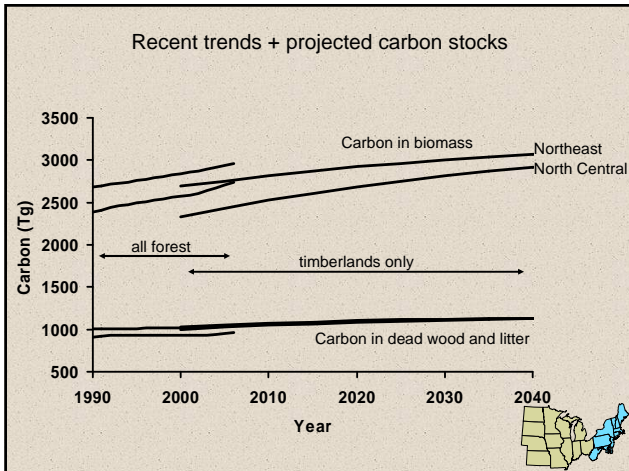
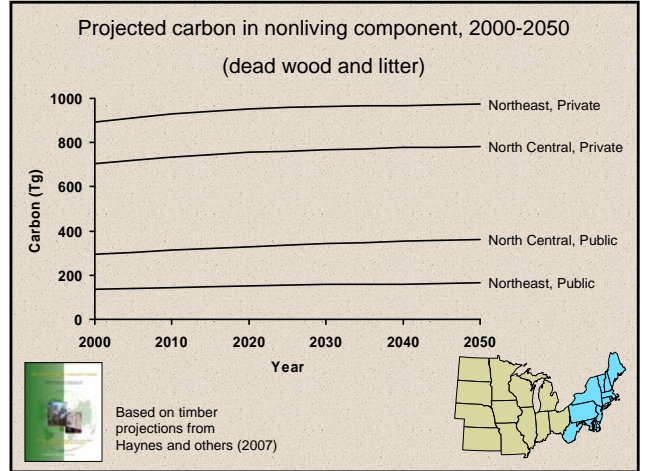
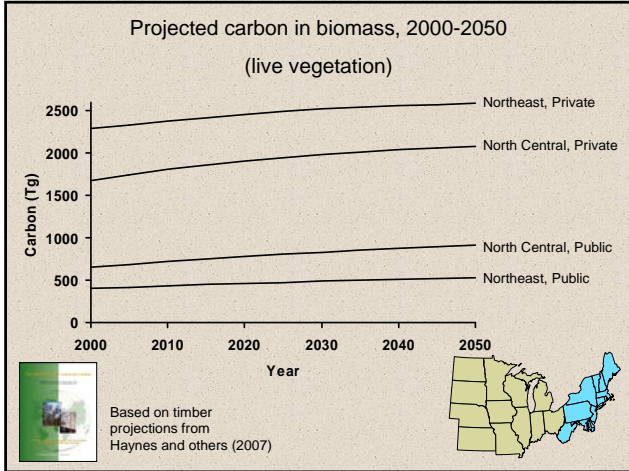


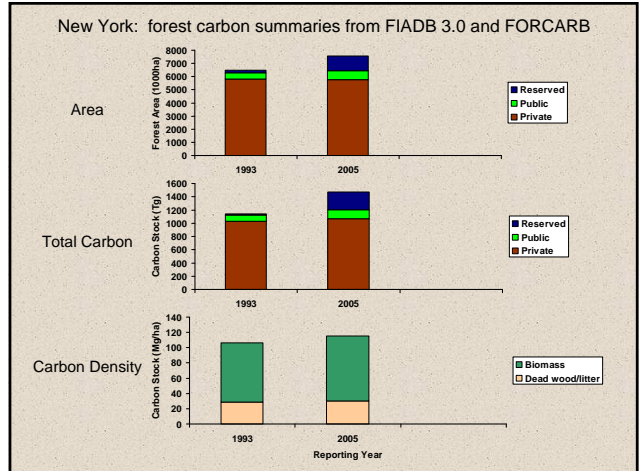
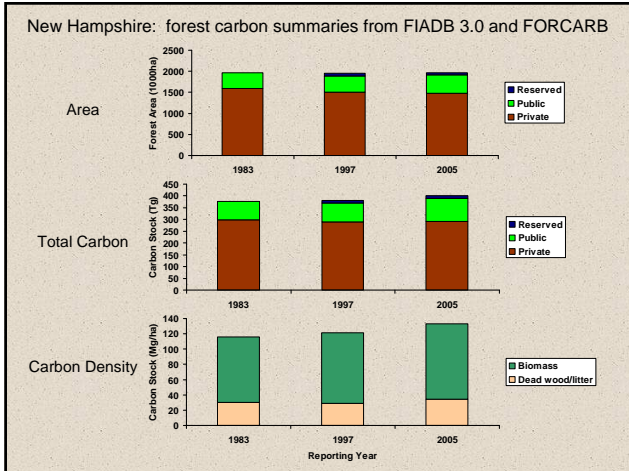
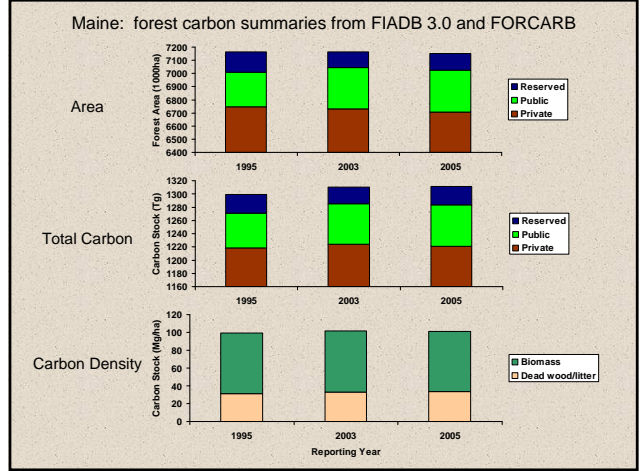
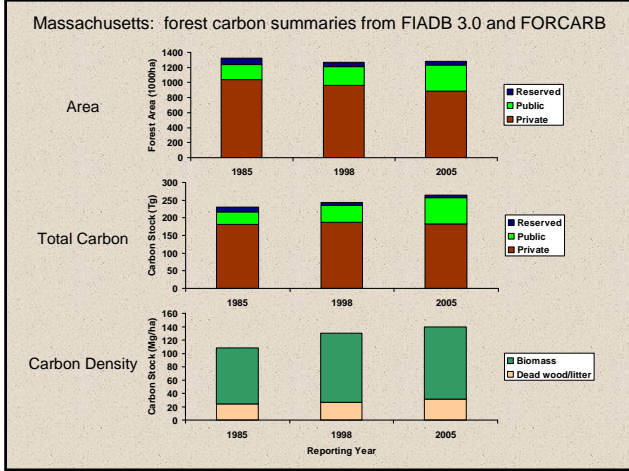
EPA (2007)

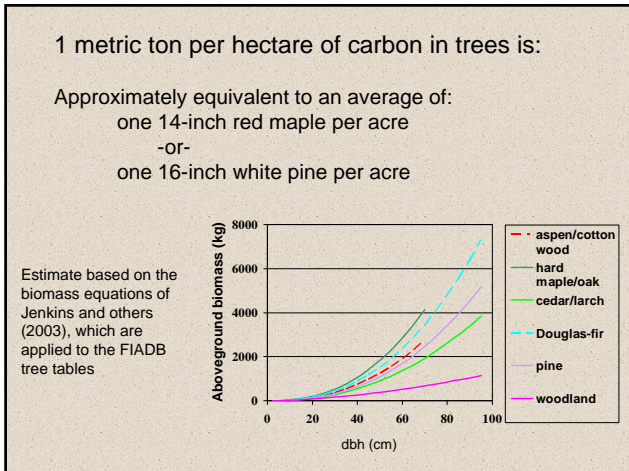
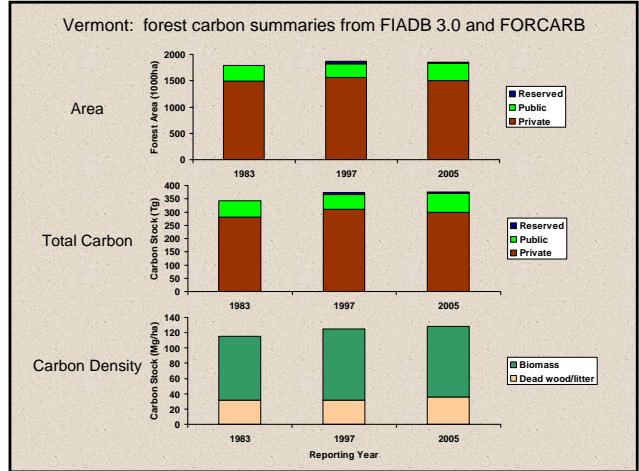
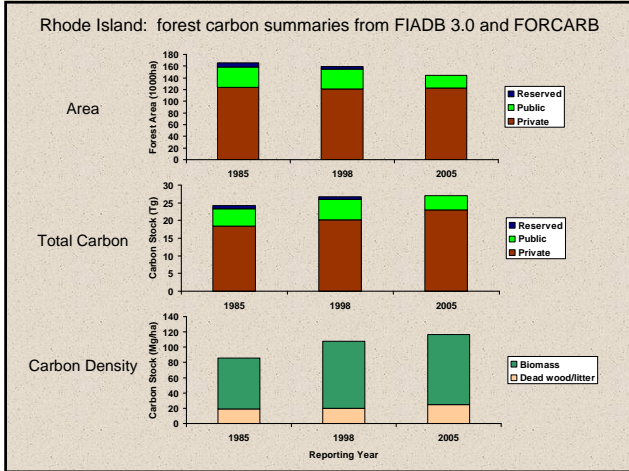
Carbon in nonliving component, 1990-2007
(dead wood and litter)



EPA (2007)



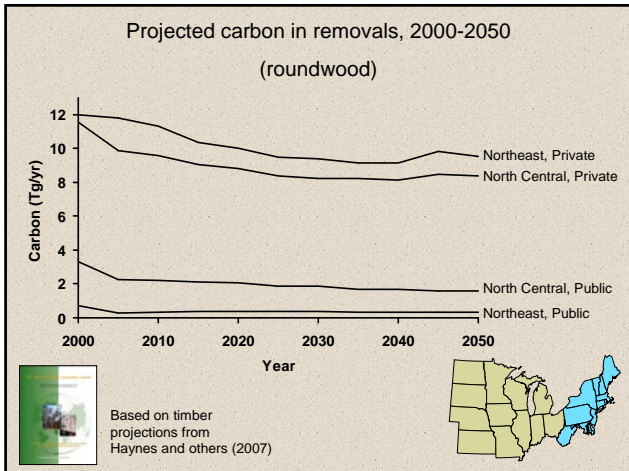
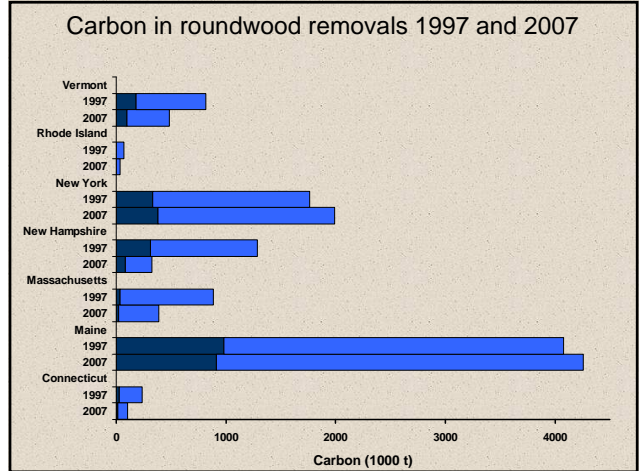
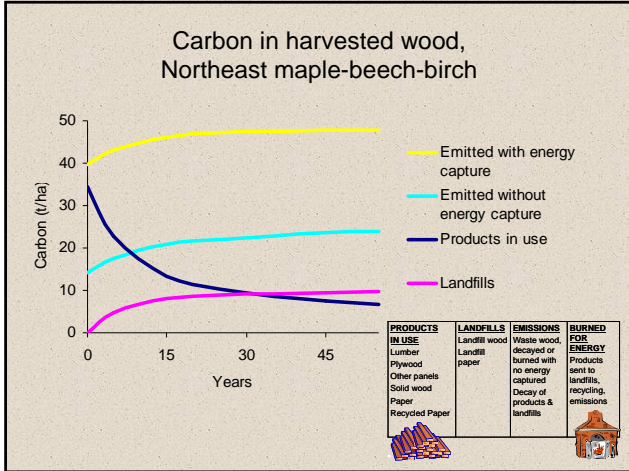




Determining carbon in harvested wood and fate of carbon in subsequent years – one approach based on TPO data

- Timber product roundwood volumes are converted to carbon according to wood density and carbon content
- Roundwood is allocated to primary wood products according to harvest type and mill statistics
- Primary products are then distributed to final, or end use, products
- A half-life and means of disposal is also associated with each product

Based on Timber Products Output Mapmaker volumes and methods in Smith and others (2006)



Forest carbon trends for the Northeast

- Forest ecosystem carbon stocks are based on carbon density and area; the net effect is that stocks are increasing
 - Carbon densities are increasing very slightly for most states
 - Change in forest area is mixed, but increasing for the Northeast
- Carbon removed as roundwood has generally decreased for 2007 as compared with 1997

For further information and methods on
forest carbon, see publications and
applications at

www.nrs.fs.fed.us/carbon/tools/