

Regional Impacts of a National Program for Forest Carbon Offset Sales

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FOREST CARBON OFFSET SALES

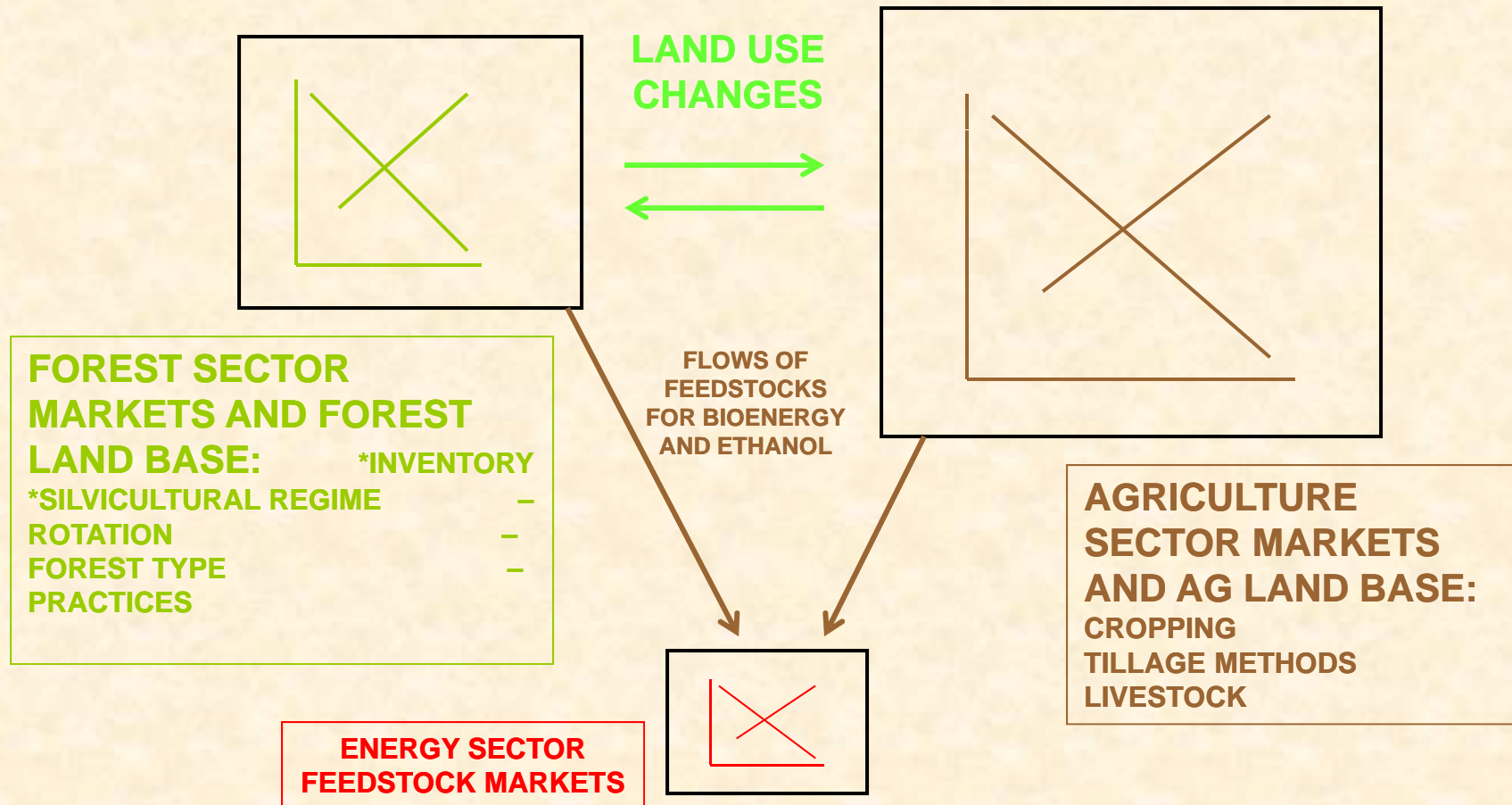
- Recent discussion of federal legislation
 - Boxer-Kerry (Senate): **The Clean Energy Jobs and American Power Act**
 - Waxman-Markey (House): **American Clean Energy and Security Act**
- Cap and Trade
 - Forest sector not capped
 - Sell offsets as carbon sequestered or emissions avoided

Characteristics and Complexities of a Carbon Offset Sales Program

- What counts?
 - additionality
- Cut or not cut?
- How is uncertainty recognized?
 - leakage
 - catastrophic losses
- For how long? And what guarantee?
- Who gets paid?
 - voluntary or mandatory
- How do owners pay or get paid?
 - asymmetric or symmetric payments

Modeling Forest Carbon Sequestration Opportunities

FOREST AND AGRICULTURE SECTOR OPTIMIZATION MODEL with GREENHOUSE GASES (FASOM-GHG)

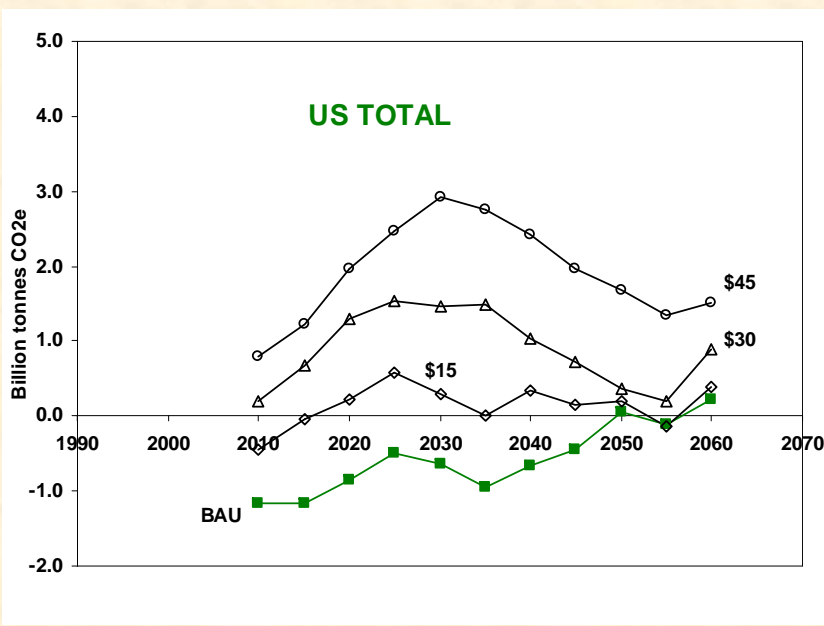
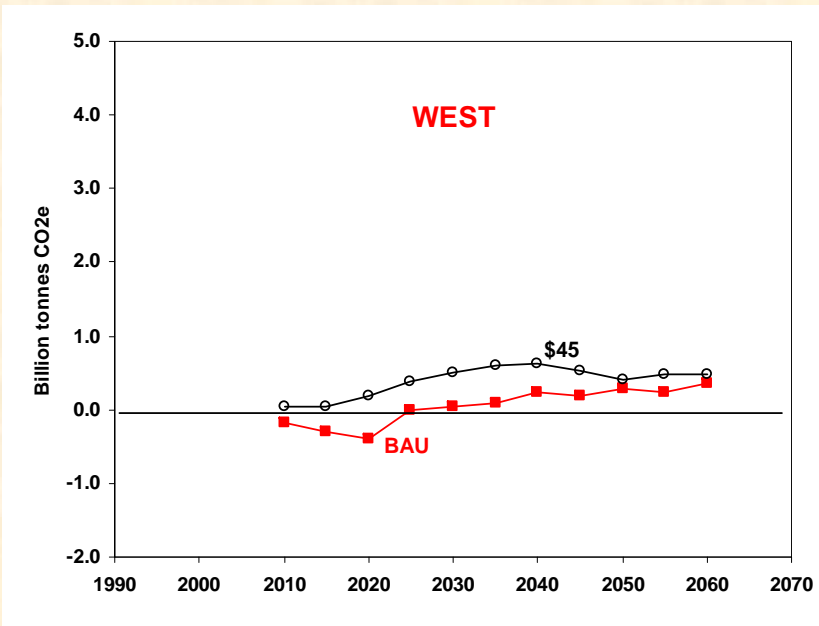
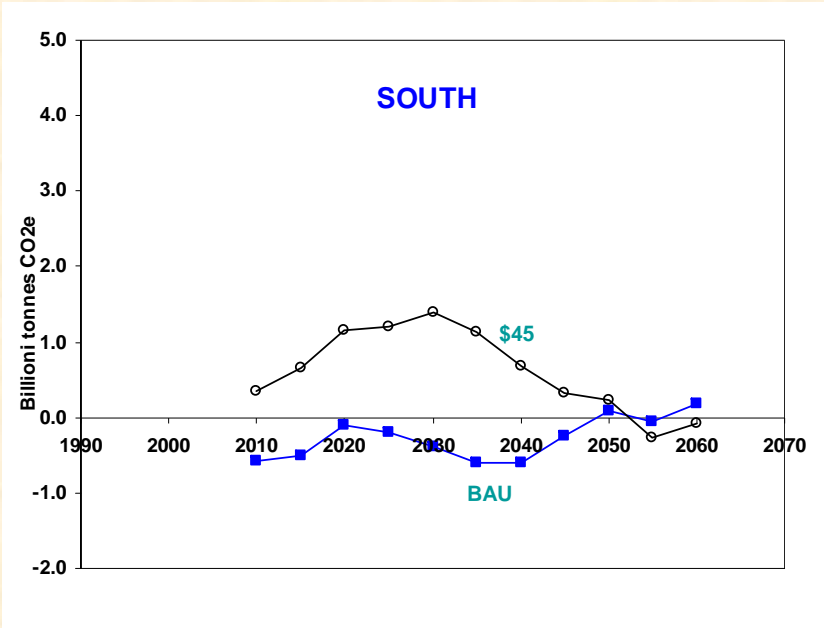
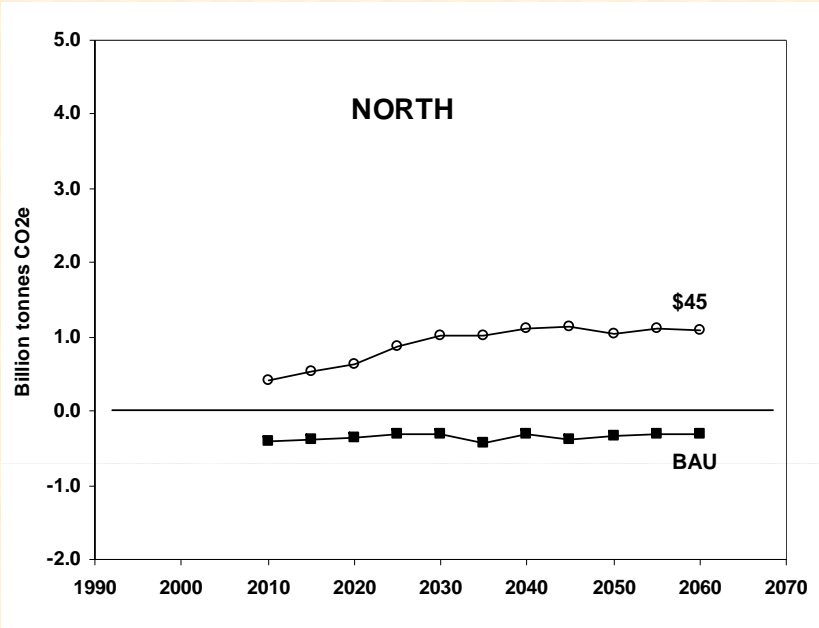


POLICY SCENARIOS

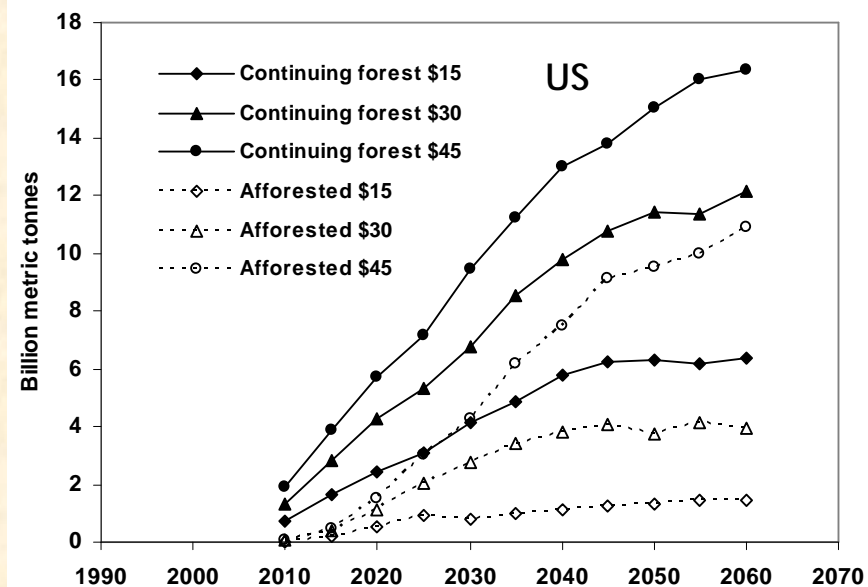
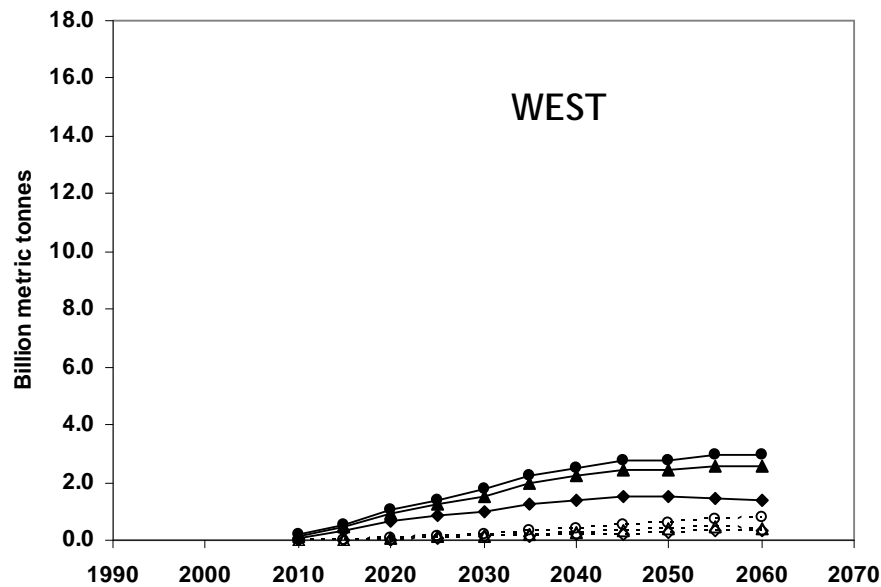
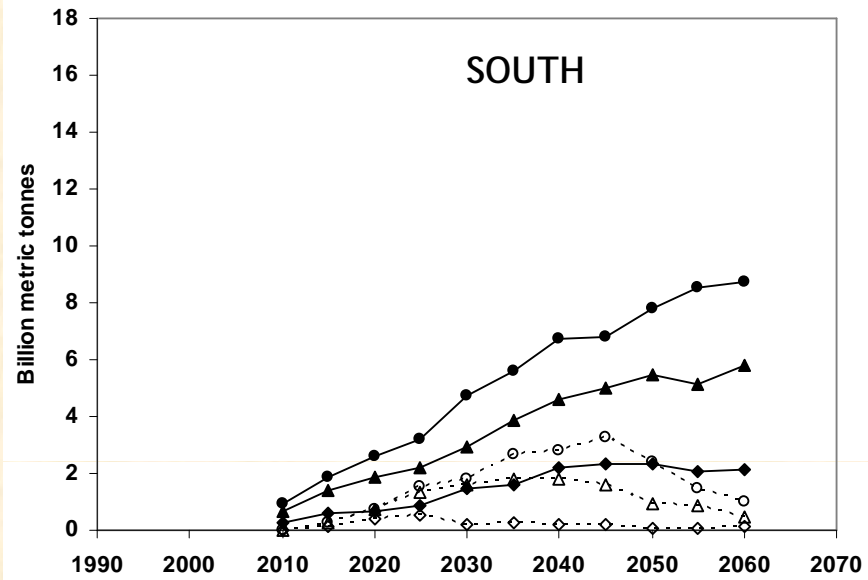
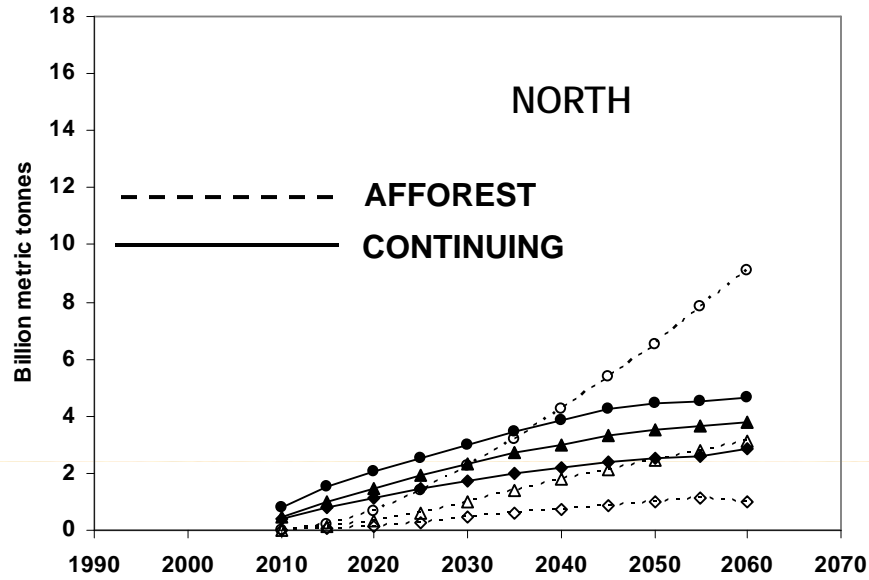
- **“Ideal COSP”**
- **Count incremental carbon from afforestation and changes in management of existing forest stands**
- **Cutting at the owner’s discretion**
- **No minimum period for retention (net increment only)**
- **Mandatory program that enrolls all owners**
- **Payments are symmetric**
- **No payment adjustments for leakage at the ownership level**
- **No discount for unforeseen losses: outcomes certain**
- **No credit for wood products**
- **Agricultural sector has similar “ideal” program (net increments)**

- **Vary CO₂e prices from 0 \$/tonne to \$45/tonne by \$15 increments**

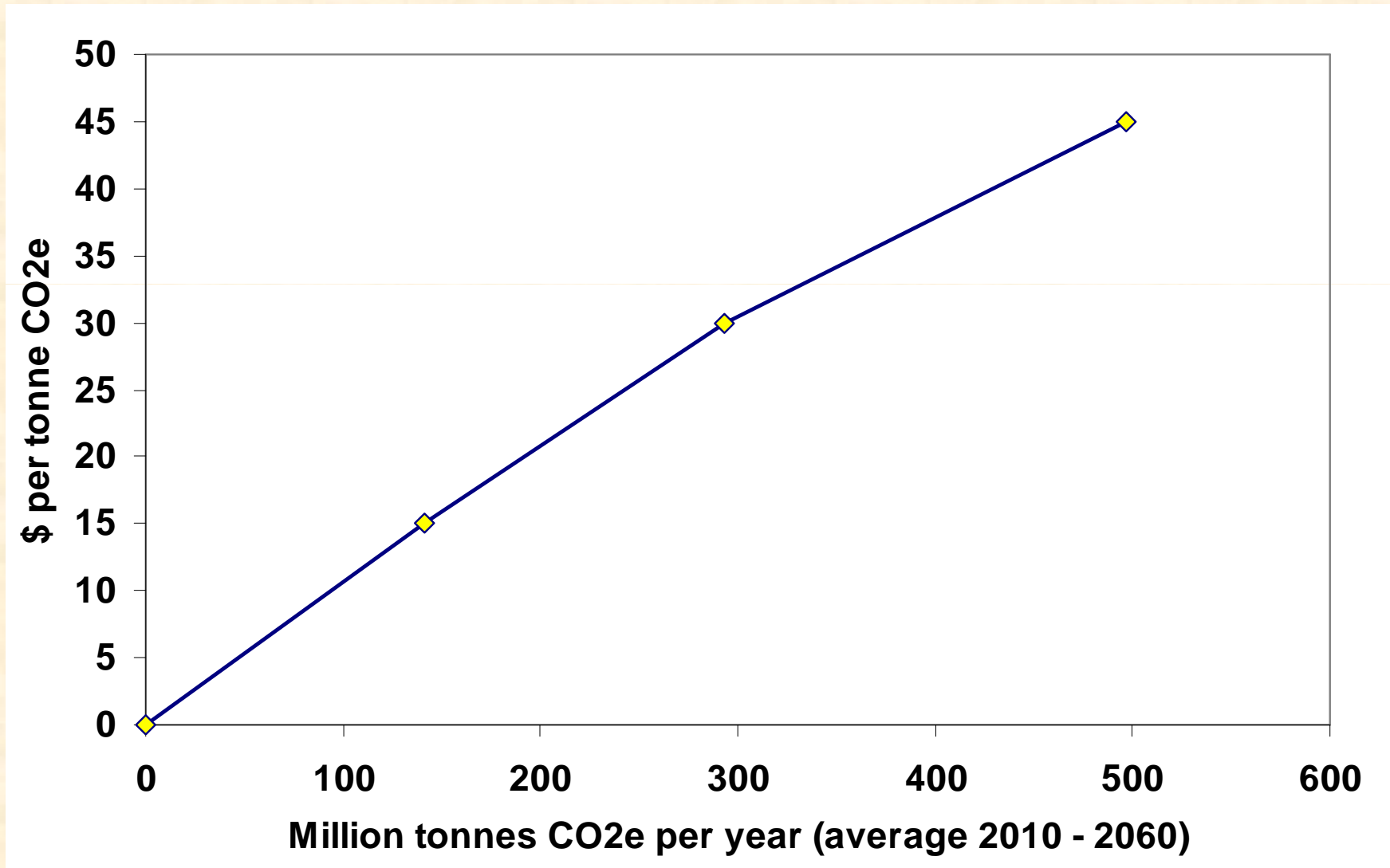
PRIVATE FOREST CARBON FLUX



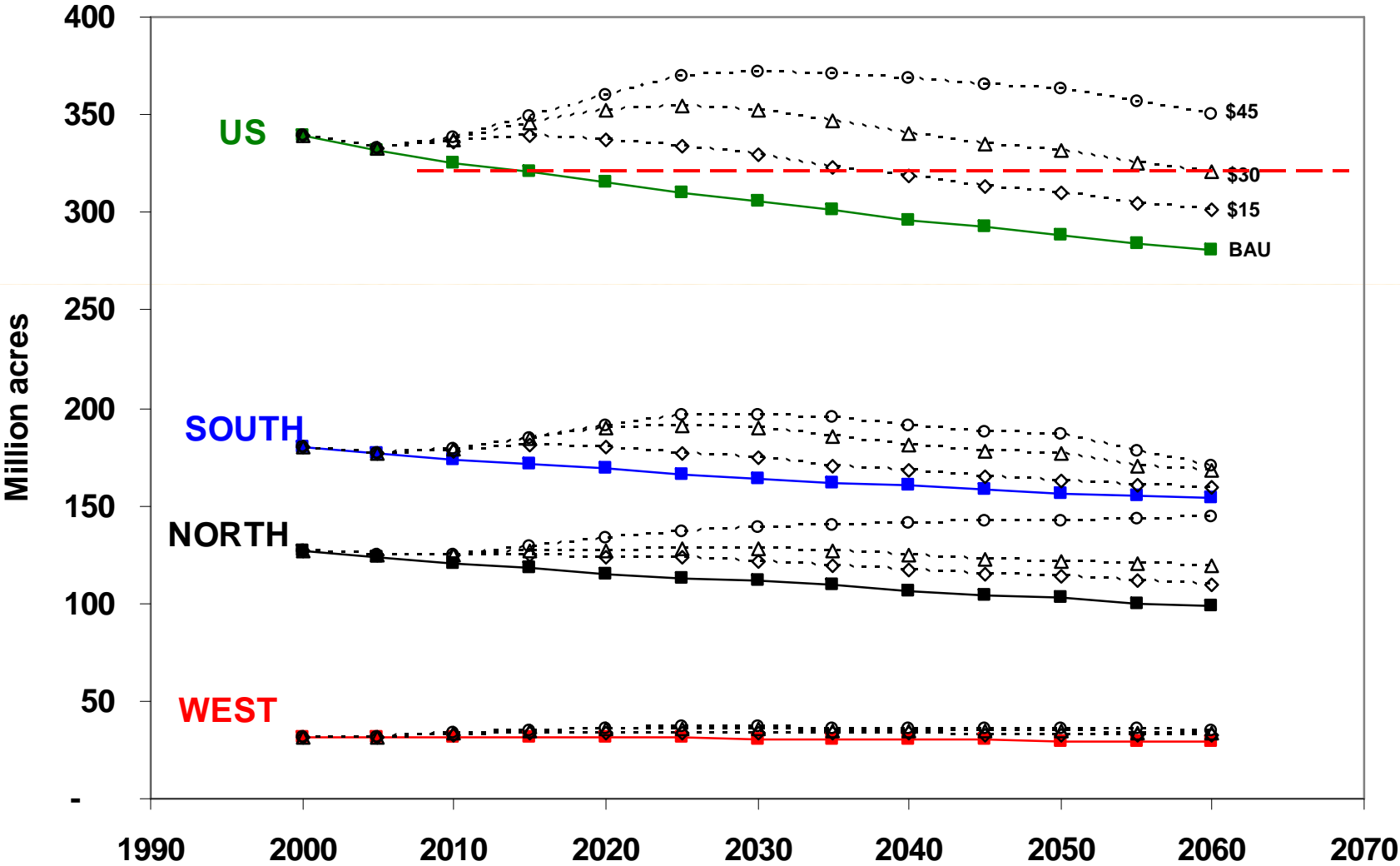
CHANGE IN CARBON STOCKS FROM BASE CASE

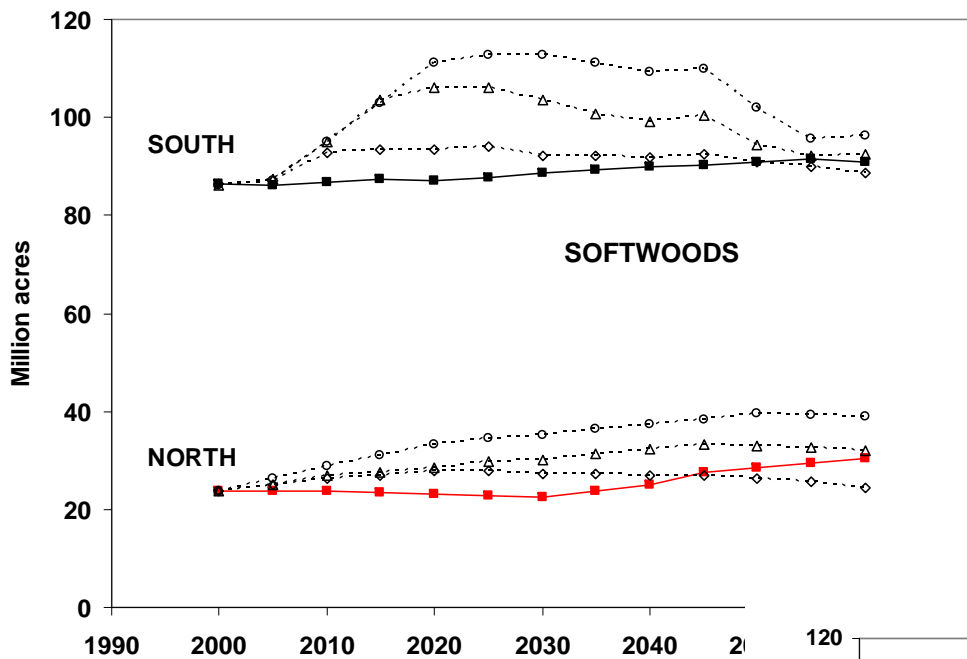


MARGINAL COST OF INCREMENTAL PRIVATE FOREST CARBON FLUX

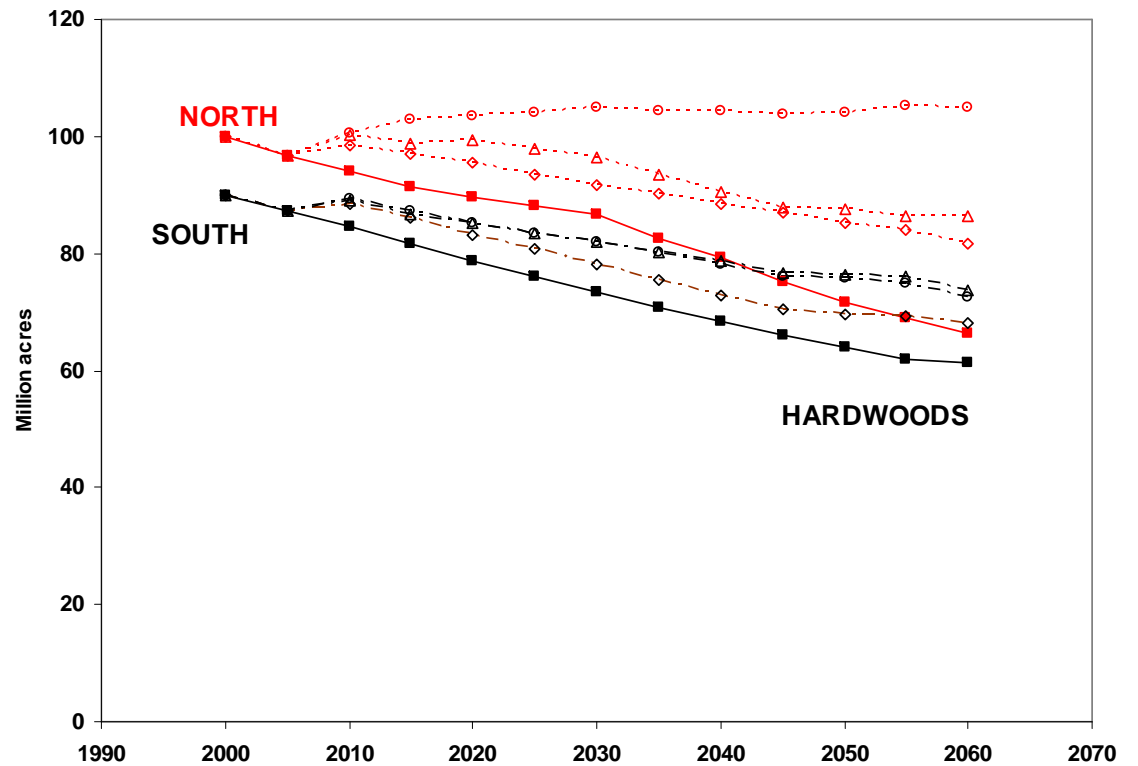


PROJECTED PRIVATE TIMBERLAND AREA





PRIVATE TIMBERLAND AREA BY BROAD FOREST TYPE

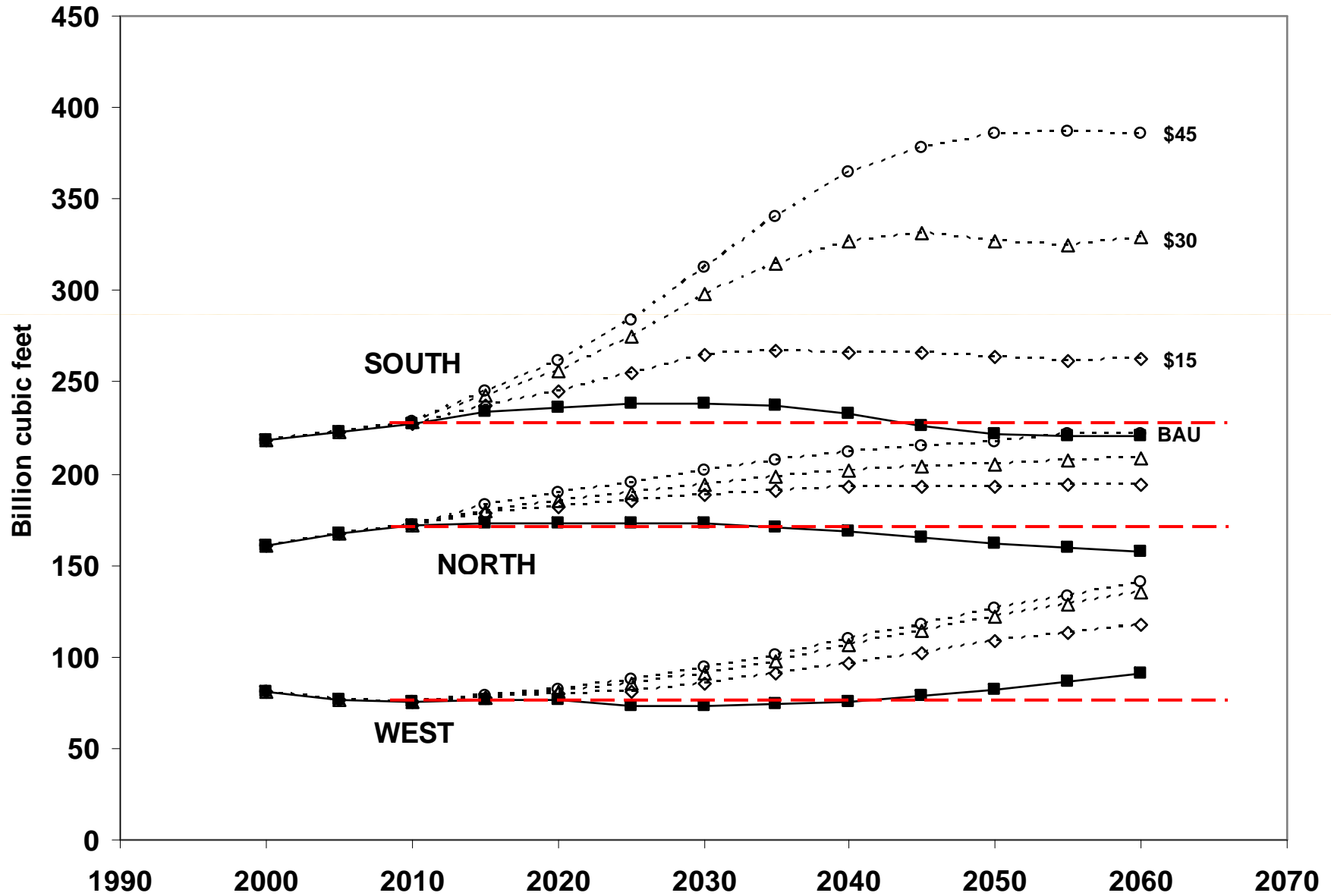


CHANGE IN AVERAGE AGE OF FOREST

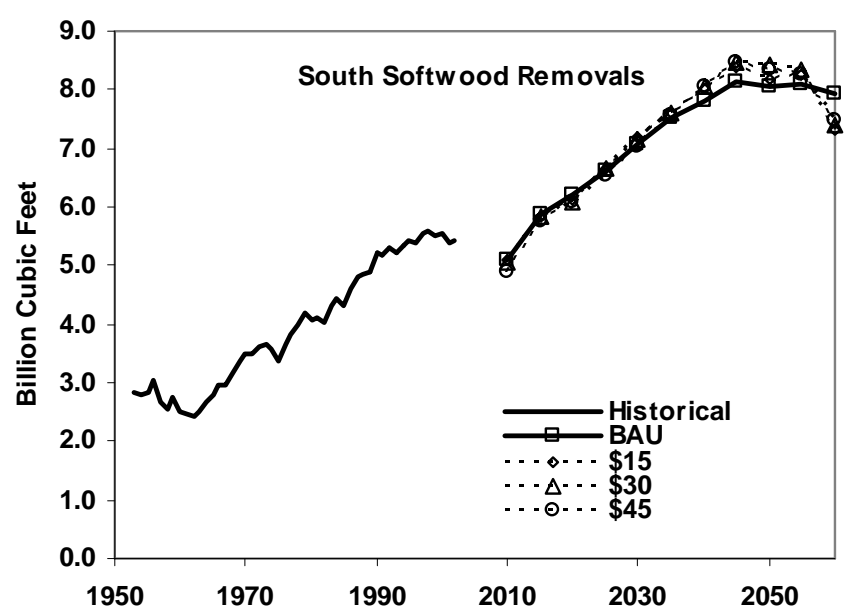
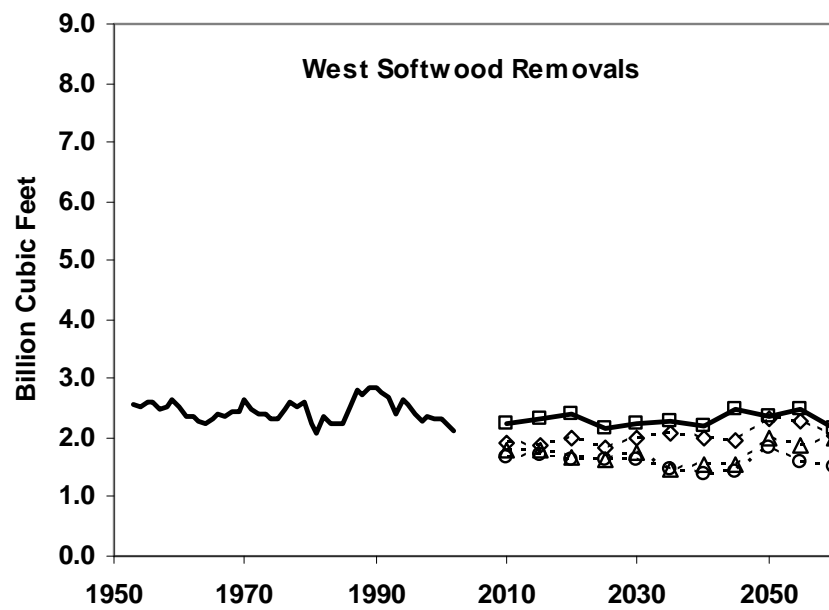
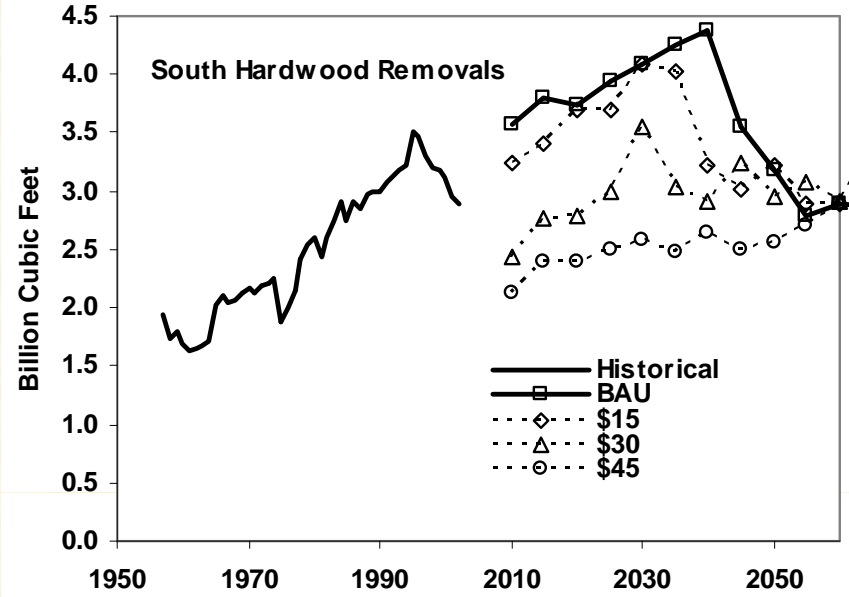
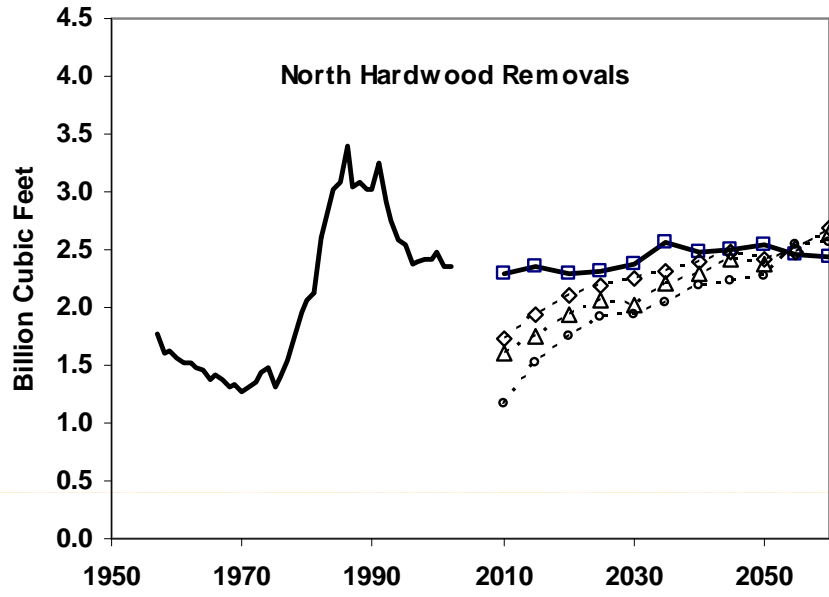
AVERAGE AGE OF PRIVATE FOREST IN YEARS OVER 2010 - 2060 PROJECTION

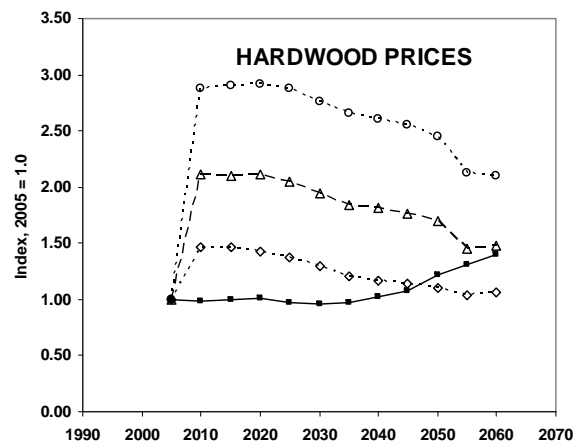
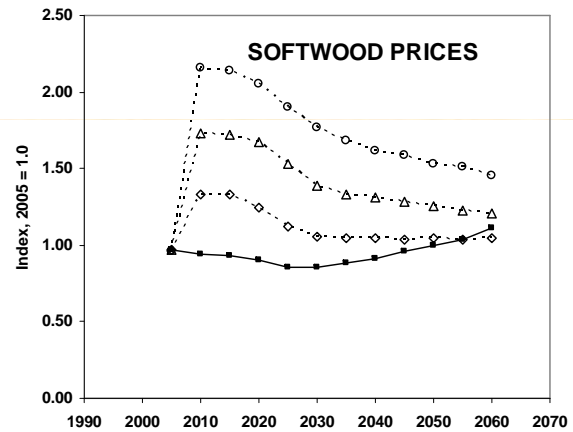
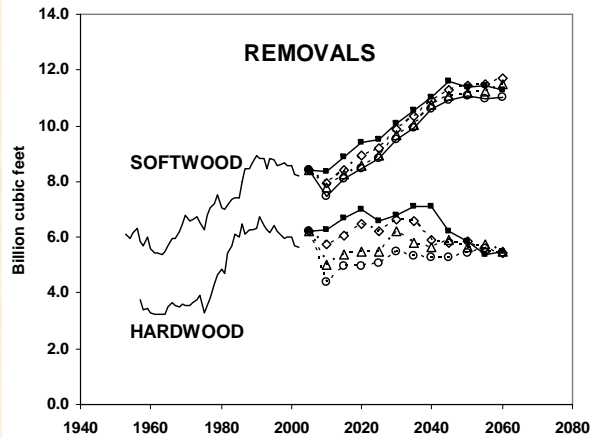
	BAU	\$15	\$30	\$45
NORTH	55	58	57	53
SOUTH	30	33	35	37
WEST	46	50	54	55

PRIVATE GROWING STOCK INVENTORY



SELECTED HARVESTS BY REGION





IMPACTS ON FOREST PRODUCTS MARKETS: REMOVALS AND LOG PRICES

- LARGE CHANGE IN HARDWOOD VOLUMES
- SCENARIO VOLUMES AND PRICE CONVERGE TO BASE CASE

SUMMARY

- **\$15 C price would eliminate declining private C stock**
- **Largest component of flux increments comes from changes in management of existing stands**
- **Afforestation largest in North: mostly from “cropland”**
- **\$15 price stabilizes ag \Rightarrow forest and forest \Rightarrow ag shifts**
- **\$30 price stabilizes total private timberland base (shifts from ag to forest offset losses to development)**
- **Non-zero C prices encourage retention of hardwoods in East**
- **Growing stock inventories (CF volume) rise steadily with higher C prices—particularly rapid in the South**
- **Harvests decline and prices rise: rapid at outset, gradual convergence to Base case over time**
- **North produces largest afforestation C increment**
- **South produces largest management C increment**
- **West has largest total increment per unit area**

SUMMARY, concluded

- **Caveats:**
 - Private reactions may be more muted than shown by model
 - Voluntary versus mandatory
 - Projections suggest **POTENTIAL**
- **Leakage from shift to imports: Canada and off-shore**