

Bob Abt

Forest Resource Economist

NC State University

bobabt@ncsu.edu

- Caveats

- I'm an economist (*not an engineer*) – the perceived importance of markets seems correlated with disciplinary background.
- I know about southern U.S. timber resources and markets, but I have opinions about lots of things. *My resource comments are specific to the U.S. South.*
- I believe that carbon scoring of wood energy use in a market economy has to consider market impacts (*but not necessarily model everything*)

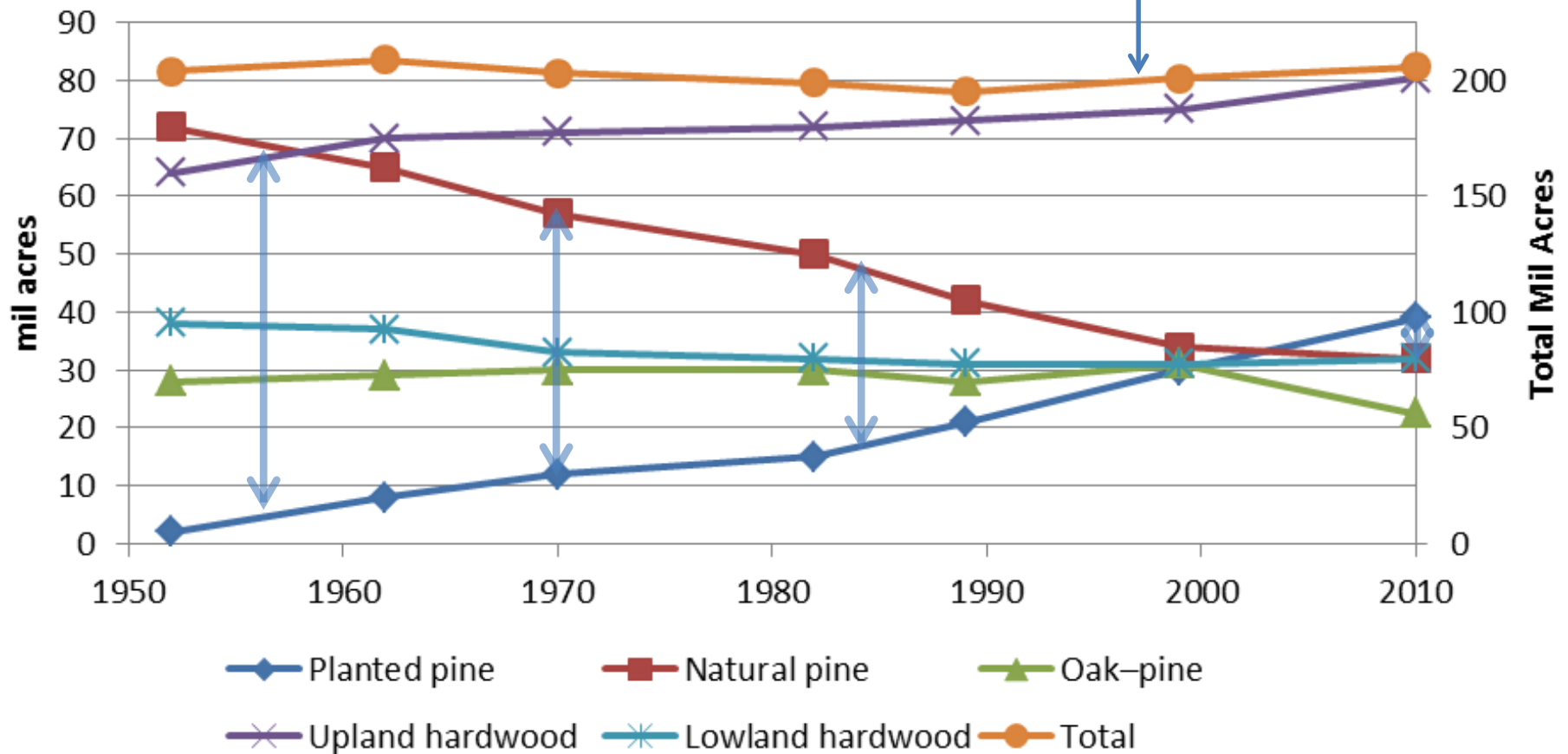
Key Points

- **Points I'll try to make in the next few minutes**
 - Market characteristics and how they drive forest carbon
 - Both short- and long-run carbon impact of wood energy is driven by markets
 - Restricting use to certain feedstocks might be justified, but usually leads to perverse outcomes

WHAT DOES A DYNAMIC TIMBERLAND BASE LOOK LIKE IN A MARKET ECONOMY?

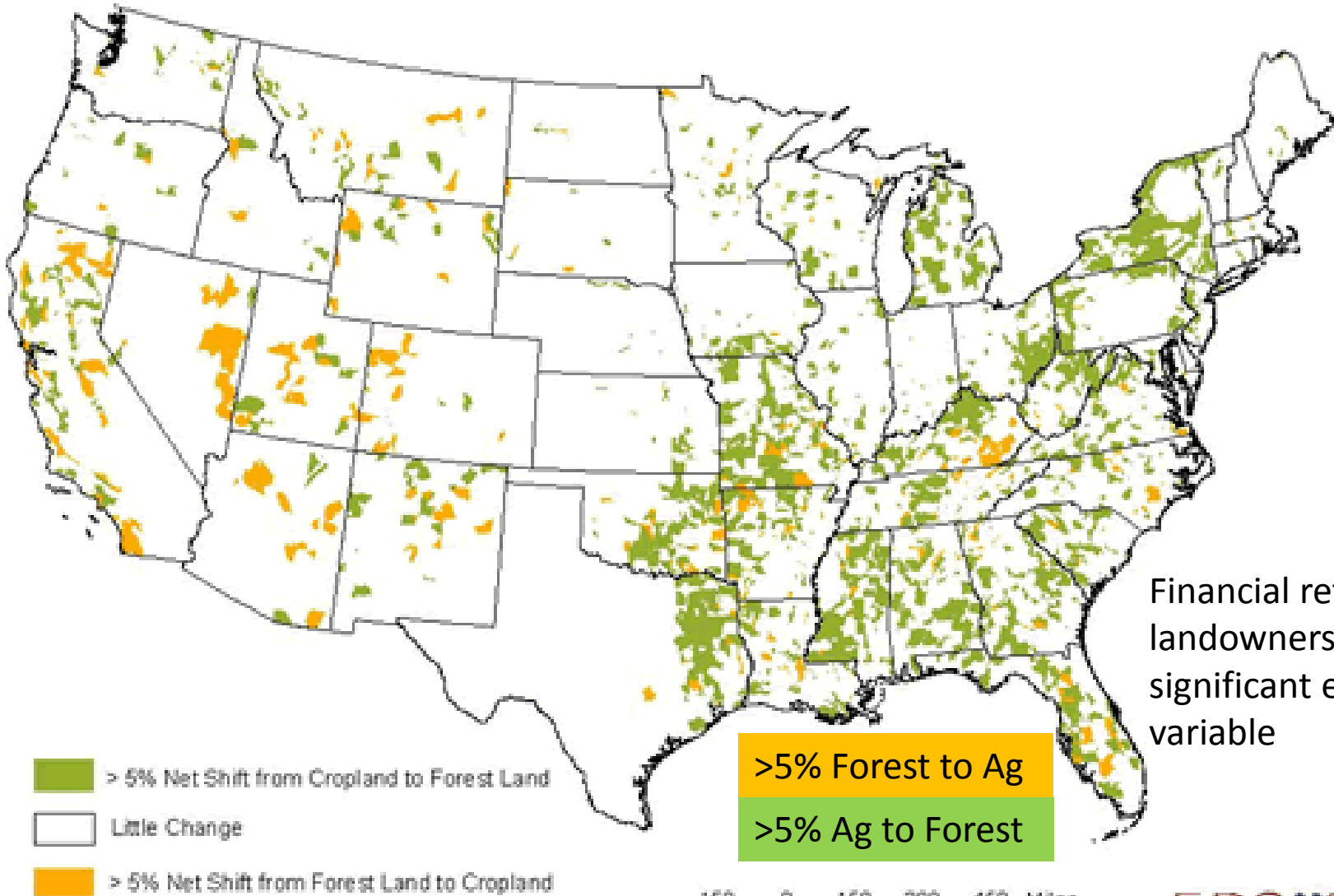
Total Timberland Stable but Not Static

Forest Acres by Type



Forestland trend stable, but not static

Net shifts between cropland and forest land, 1982-97

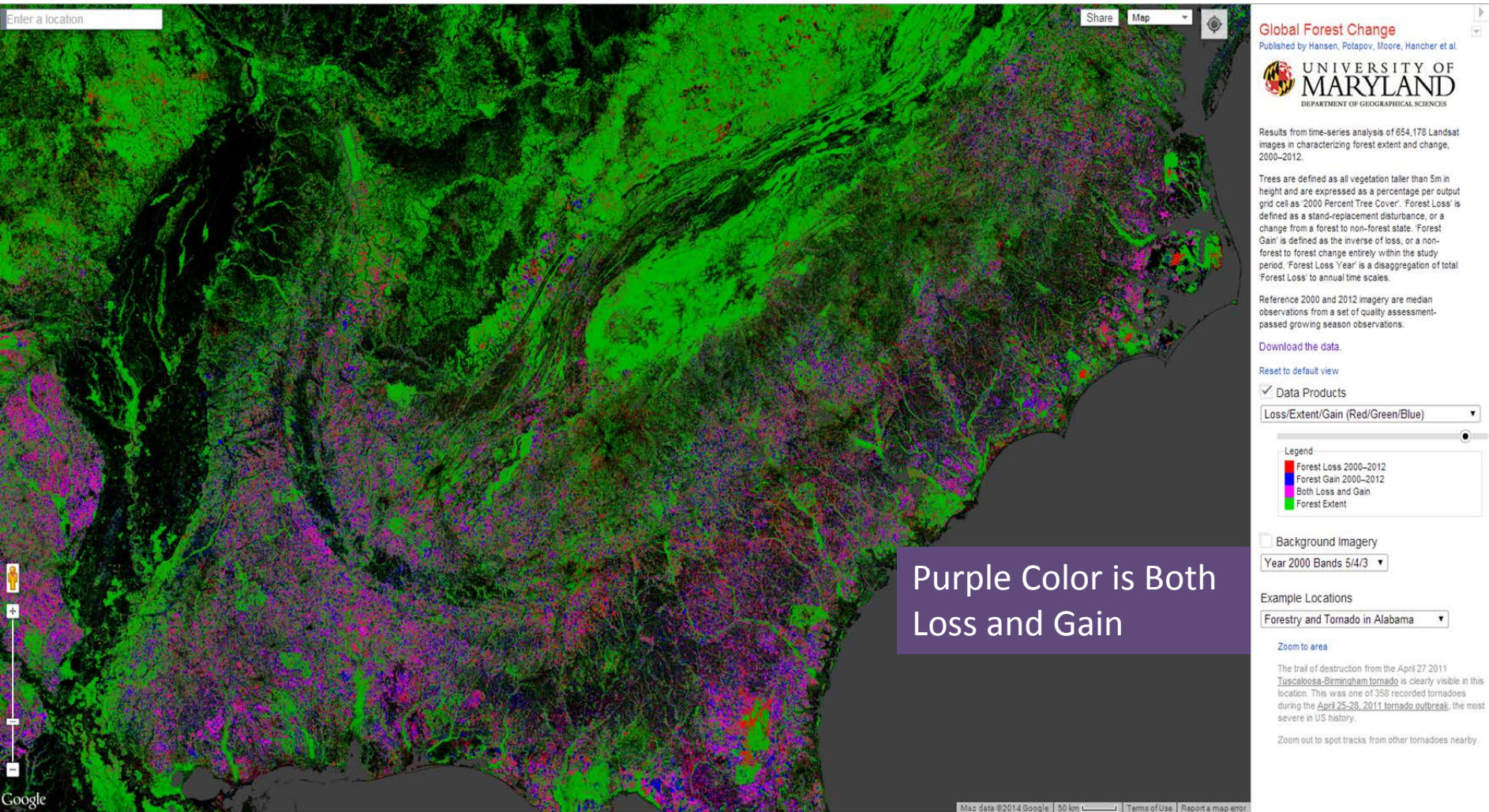


Financial returns to landowners empirically significant explanatory variable

>5% Forest to Ag

>5% Ag to Forest

Recent Article in Journal “Science” on Global Forest Change

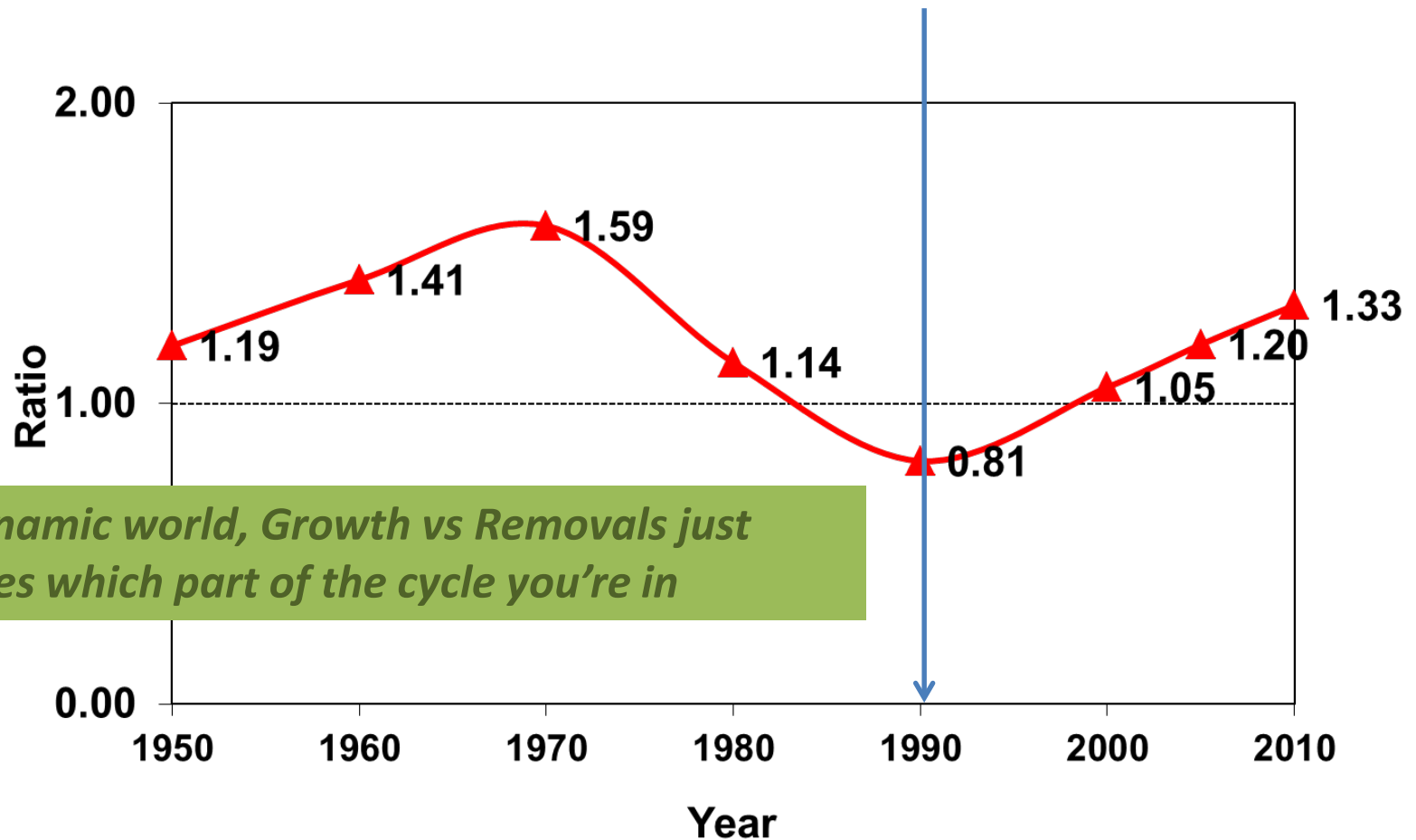


What causes this?

- *“...we identified the rise in timber net returns as the most important factor driving the increase in forest areas between 1982 and 1997. This is consistent with reports that the increase in forests largely involved timberland acreage.” (Lubowski et al. 2008)*
- This is a privately owned landscape where marginal agriculture competes with forest land both at the intensive (plantations) and the extensive (fallow agriculture) margins.

WHAT DOES A DYNAMIC FOREST INVENTORY LOOK LIKE IN A MARKET ECONOMY?

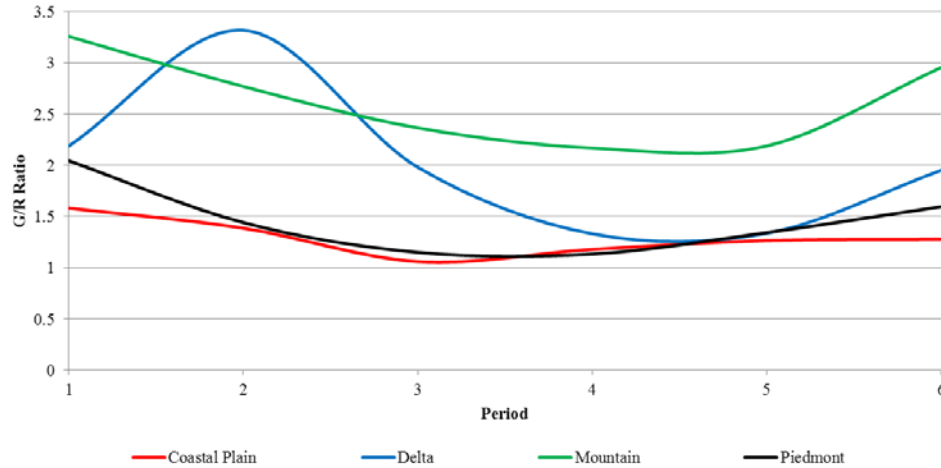
Regions with Growth/Removals < 1 in 1990 (21 survey units)



In a dynamic world, Growth vs Removals just indicates which part of the cycle you're in

In the long run harvest shifts to lower price regions (*vice versa*) so that growth drain moves through cycles. SRTS captures this effect since inventory decreases lead to higher prices and less harvest over time (*vice versa*). Ray Sheffield

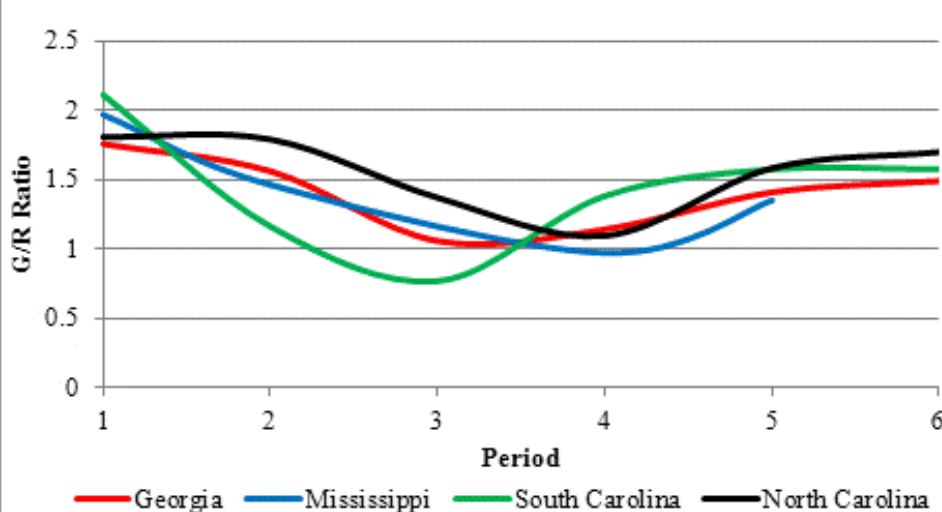
Physiographic Regions Growth to Removals Ratio



Growth vs. Removals is Not Static

- Means little in terms of long term sustainability.
- In an active market – decreasing inventory means less supply which means higher prices.
- Higher prices means production moves elsewhere (*demand adjusts*).
- Forest management intensifies (*supply adjustment*).
- Takes about 20 years.

Growth to Removals Ratio for Selected States

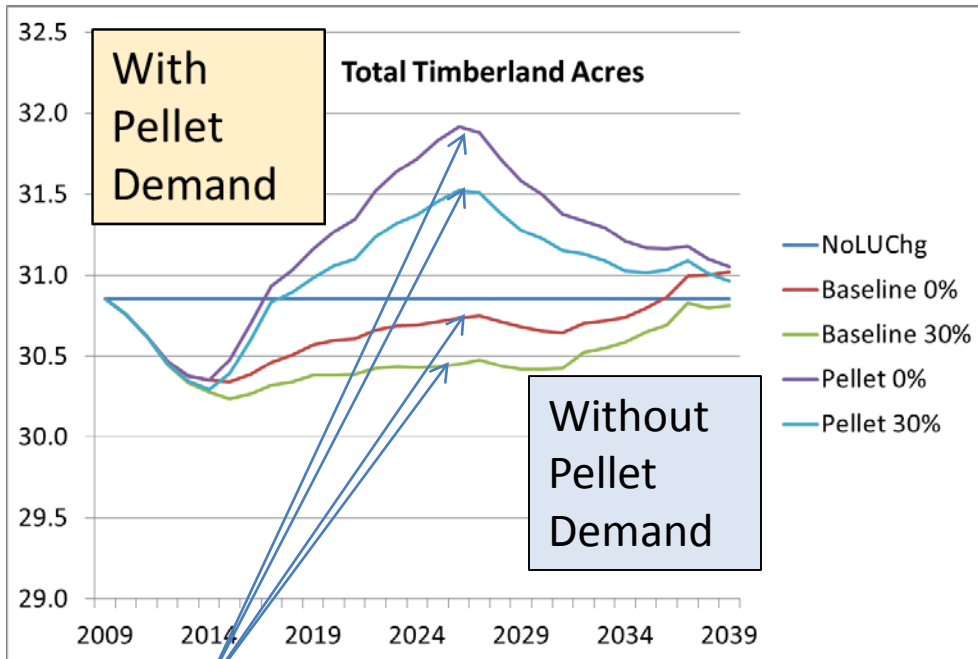


WHAT DOES THIS MEAN FOR THE CARBON IMPACTS OF PELLET DEMAND?

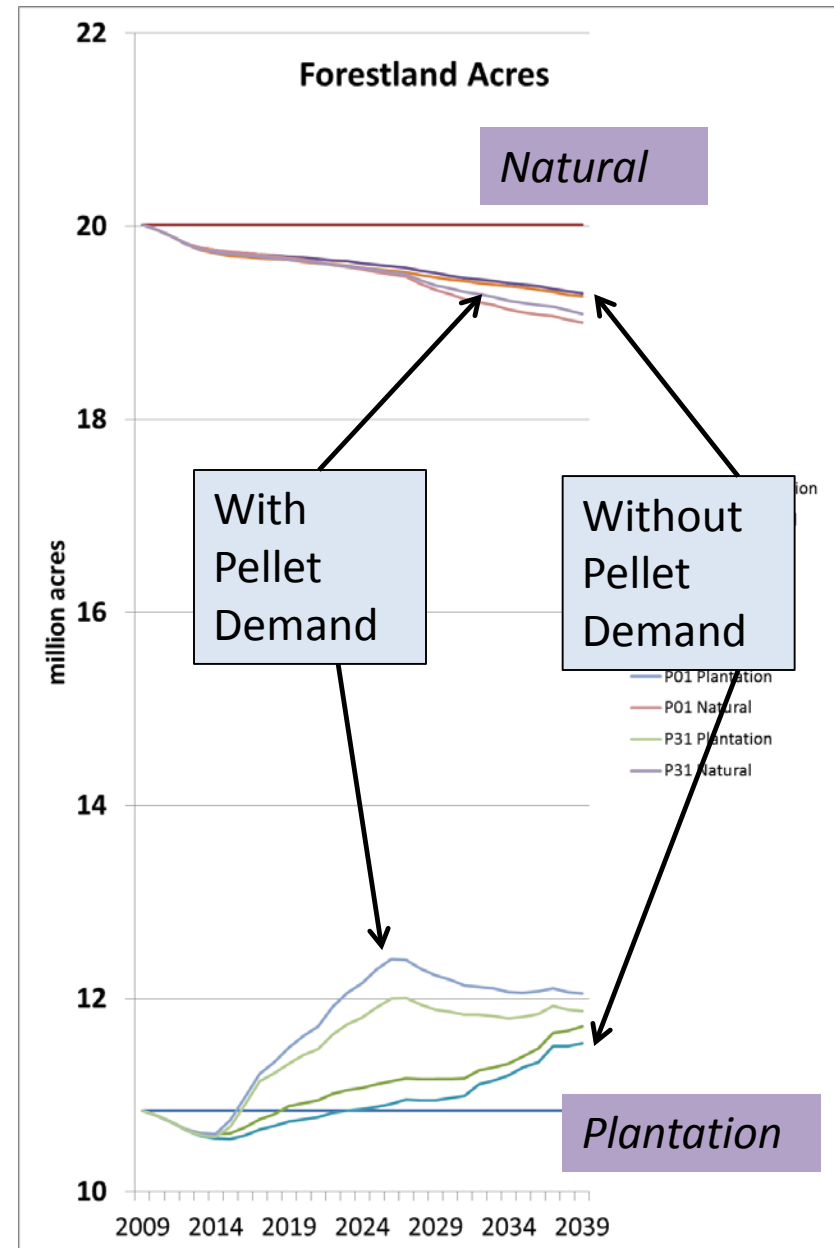
Timberland

Natural Forests

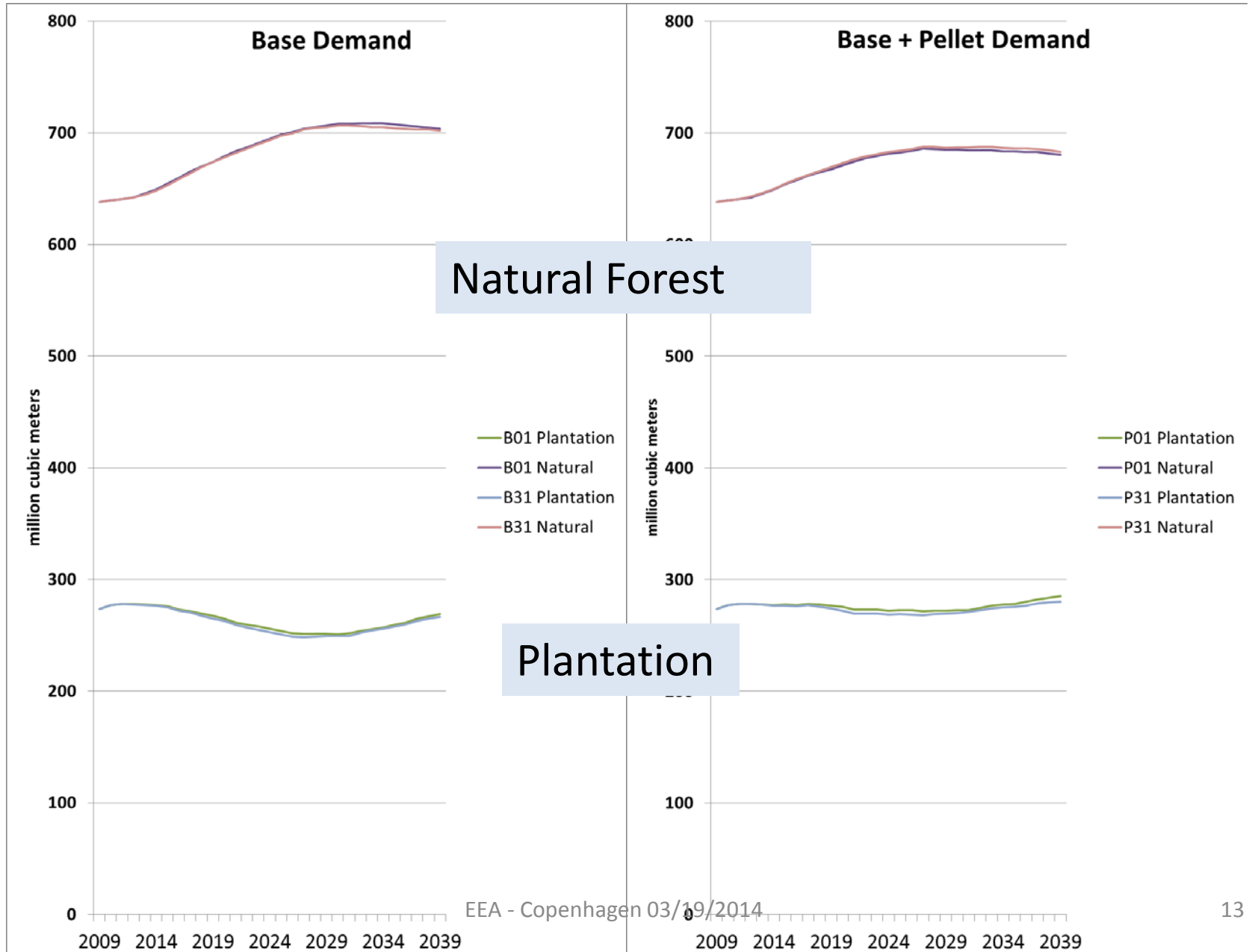
- Natural Pine
- Mixed Pine Hardwood
- Upland Hardwood
- Lowland Hardwood

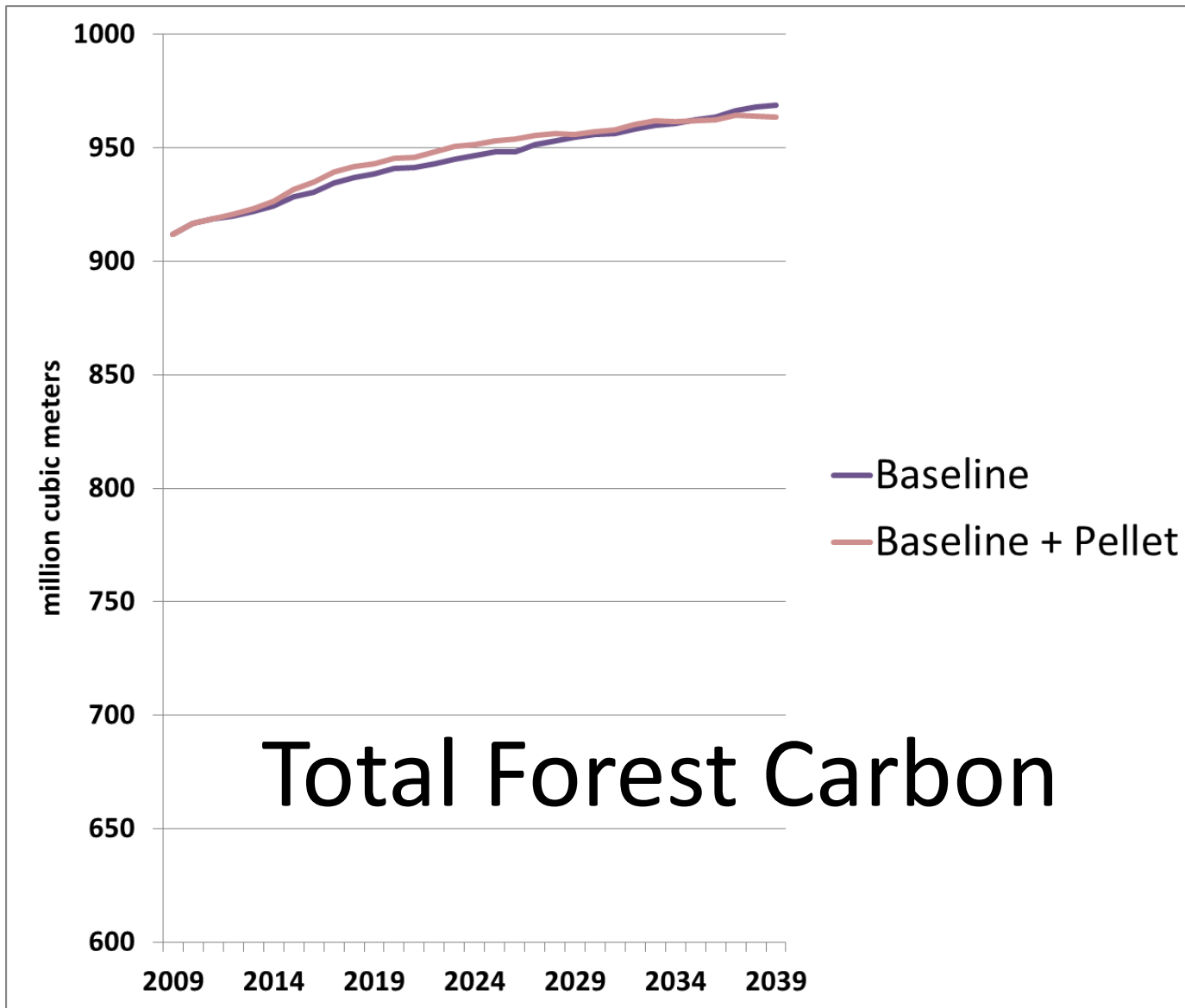


Wedge Driven by SAWMILL
Residue Utilization



FOREST CARBON





What does this mean for the carbon impacts of pellet demand?

- Is wood carbon neutral?
 - Not necessarily, but without considering markets you're likely to be more wrong than usual.
 - Hardwood/pine and regional variation are important
- Leakage and Displacement are important
 - Pellets are competing for stemwood with pulp and composite board mills and spatially reorganizing procurement
- What about restricting use to thinning or residues?
 - Large incentivized markets often lead to perverse impacts:
 - All “thinnings” leads to less planting and planting denser (trees per area) stands
 - All “residues” dampens the supply response and expands the economic definition of residue.

What does this mean for the carbon impacts of pellet demand?

- In the U.S. South - Markets Matter
- Further, I think pairwise ALCA counterfactuals miss the point.
- IMHO, it is like trying to estimate the impact of climate change on biodiversity. We don't follow the ecological path of an individual tree with and without climate change. For biodiversity and carbon impact the impact depends more on system responses than the path of a tree.