Nicholas Institute for Environmental Policy Solutions
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Biomass in the Southeast: Contexts and Complexities

Christopher S. Galik
Robert C. Abt

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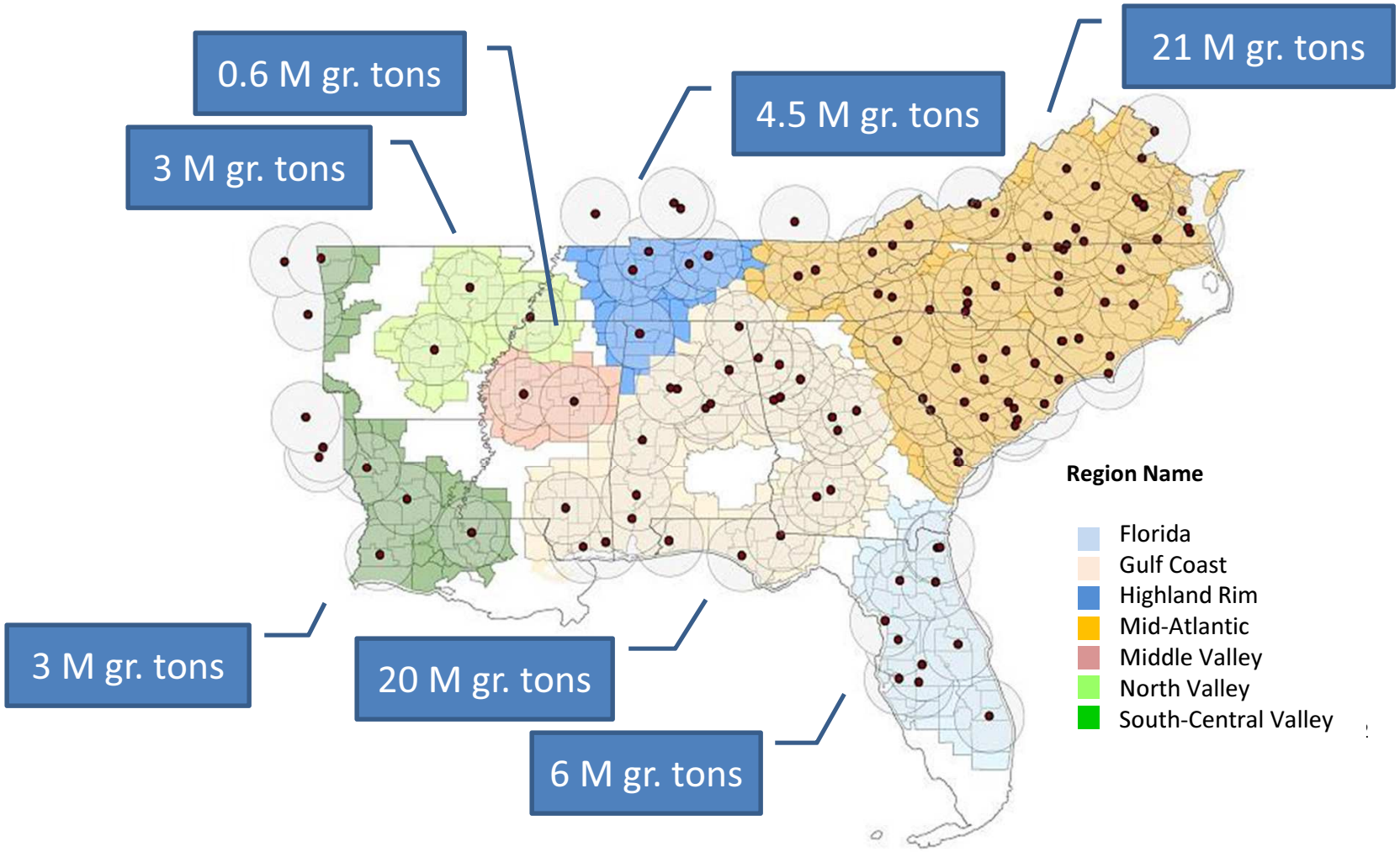
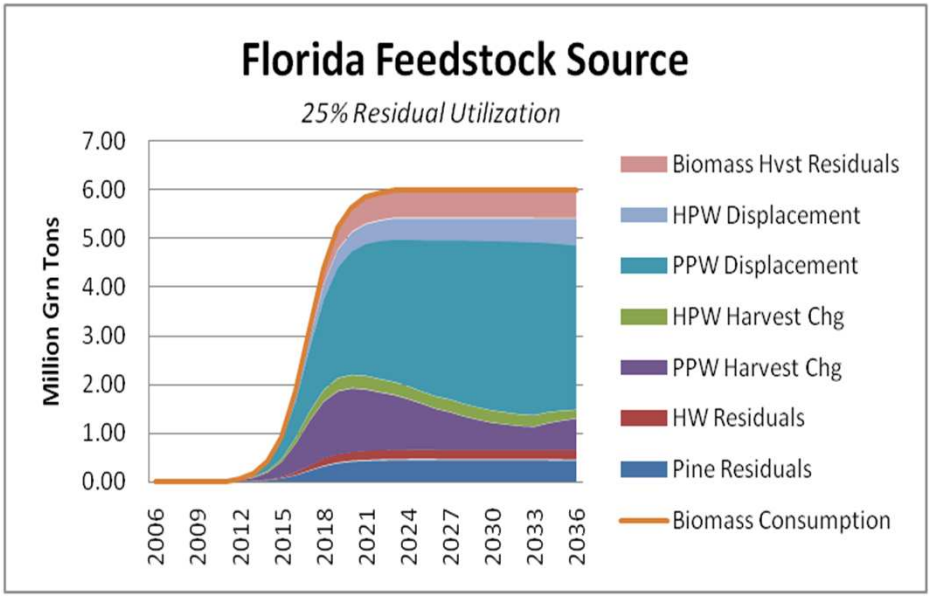
Outline

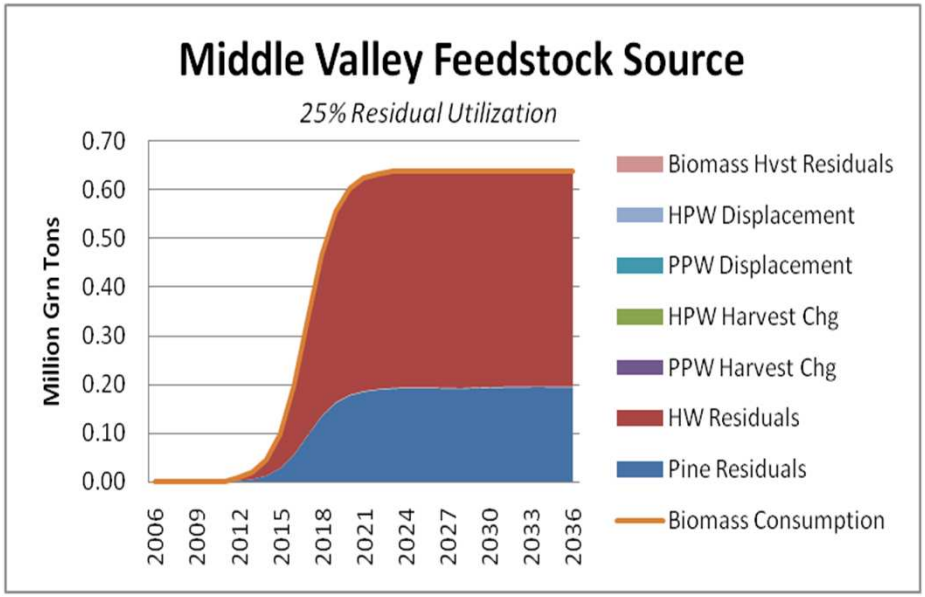
- Biomass potential, generally speaking
- The importance of greenhouse gas accounting
- A few examples…

Biomass Potential in the SE

- Estimates of raw potential depend on assumptions;
  - Achievable
  - Economic
  - Technical


0.6 M gr. tons
3 M gr. tons
4.5 M gr. tons
21 M gr. tons
3 M gr. tons
20 M gr. tons
6 M gr. tons
Region Name
Florida
Gulf Coast
Highland Rim
Mid-Atlantic
Middle Valley
North Valley
South-Central Valley

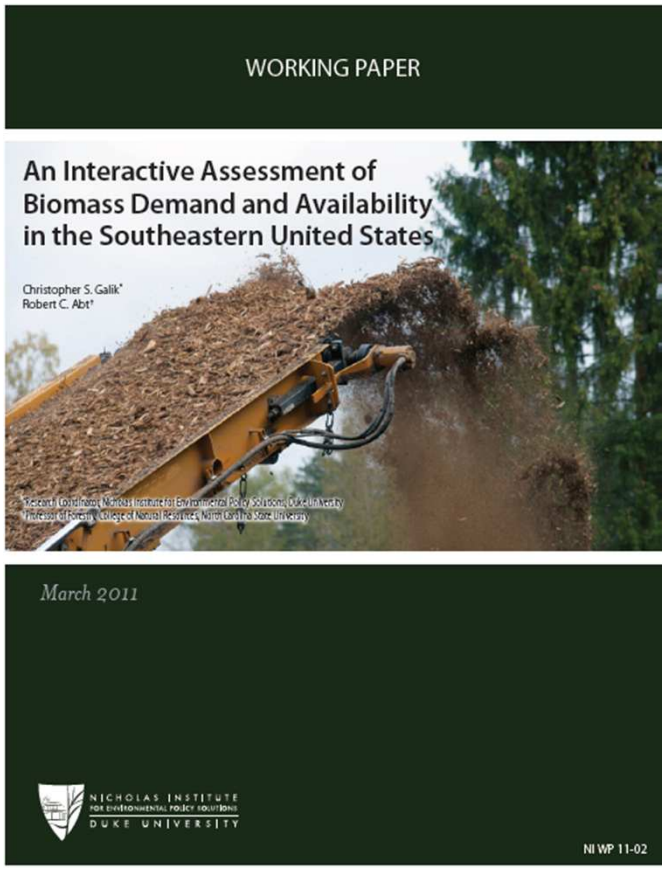

Florida Feedstock Source
25% Residual Utilization
Million Grn Tons
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
2006
2009
2012
2015
2018
2021
2024
2027
2030
2033
2036
Biomass Hvst Residuals
HPW Displacement
PPW Displacement
HPW Harvest Chg
PPW Harvest Chg
HW Residuals
Pine Residuals
Biomass Consumption


Middle Valley Feedstock Source
25% Residual Utilization
Million Grn Tons
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
2006
2009
2012
2015
2018
2021
2024
2027
2030
2033
2036
Biomass Hvst Residuals
HPW Displacement
PPW Displacement
HPW Harvest Chg
PPW Harvest Chg
HW Residuals
Pine Residuals
Biomass Consumption

Biomass Potential in the SE

- So, it depends;
- Impacts of increased bioenergy demand for woody biomass vary over time and space;
- Demand (and resulting pricing effects) influence-
  - harvest response
  - planting response
  - land use change
  - displacement

Enter the Decision Tool…



An interactive document to simultaneously evaluate dozens of demand scenarios for multiple issues for three southeastern states.

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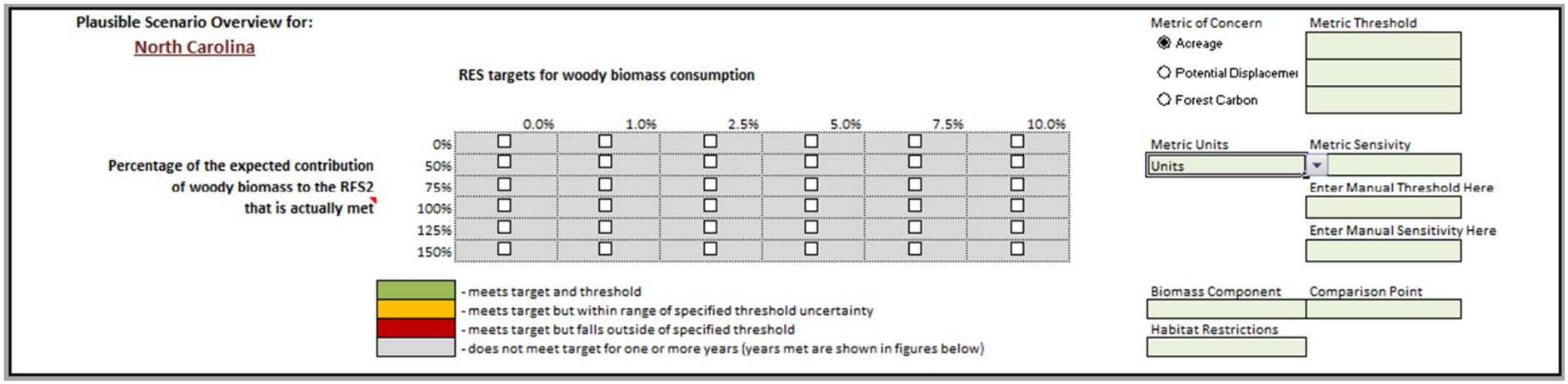
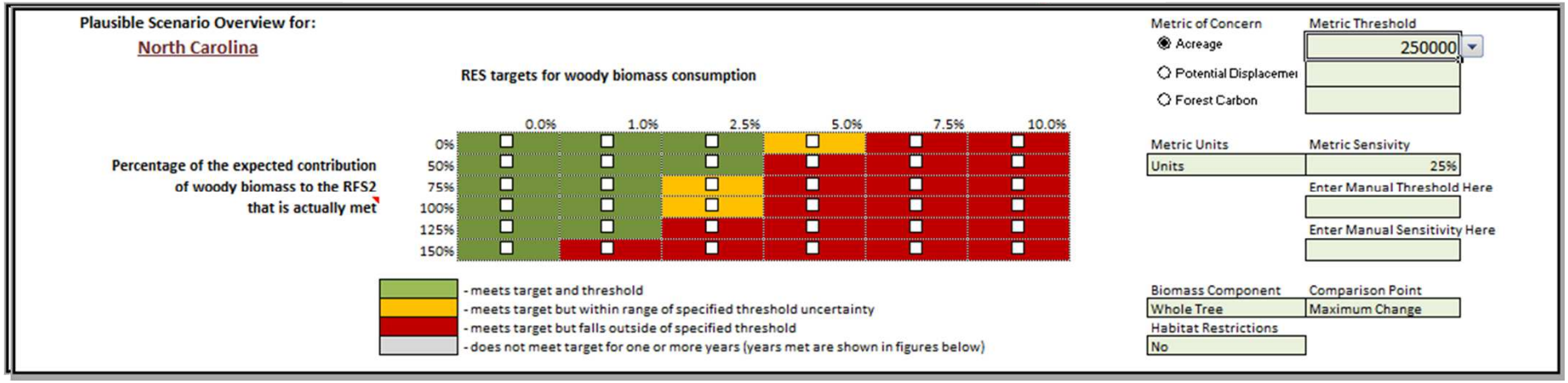
Enter the Decision Tool…



…more than 400 scenarios to weigh the environmental and economic trade-offs.

http://www.nicholasinstitute.duke.edu/events/Biomass-Model

An Example

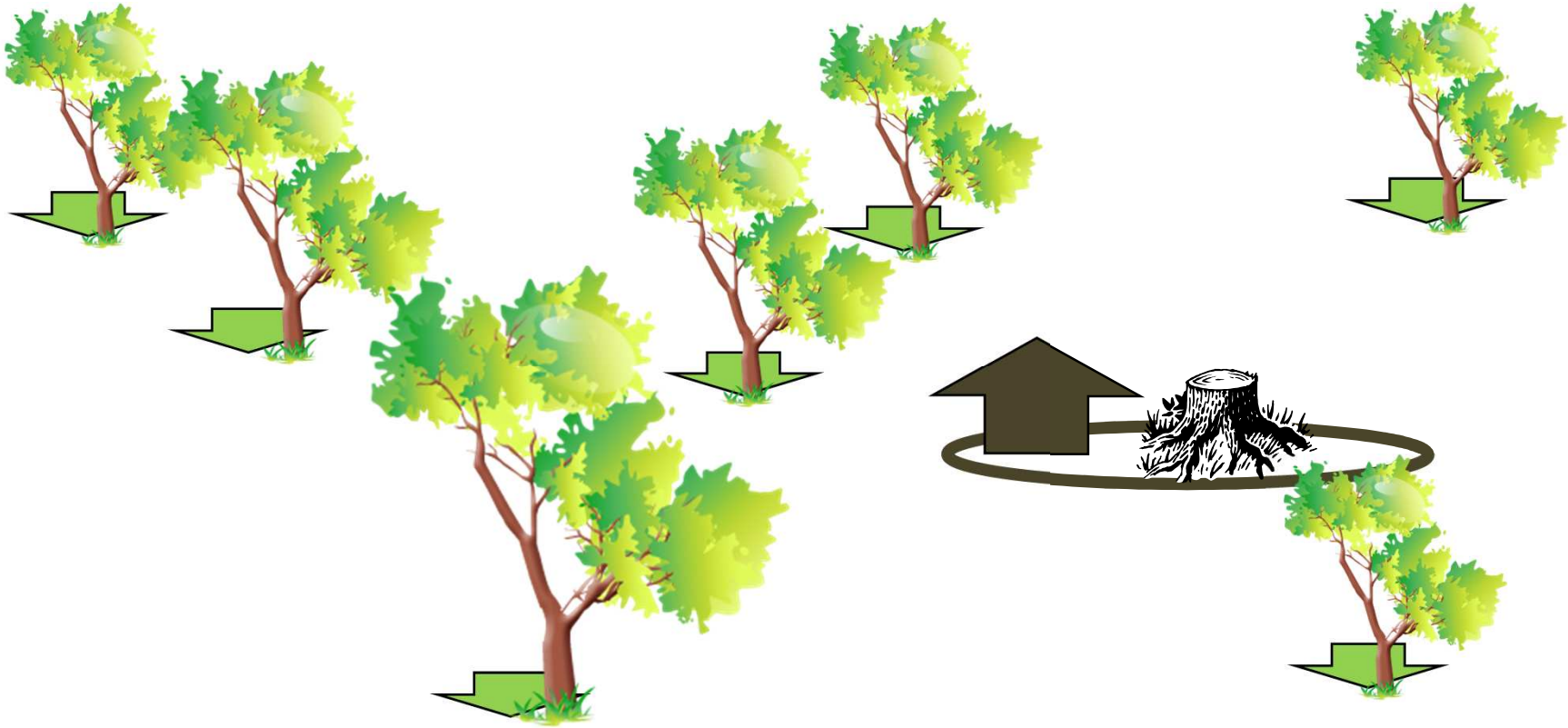


Total Change in Mature Forest (AC>8) Acreage

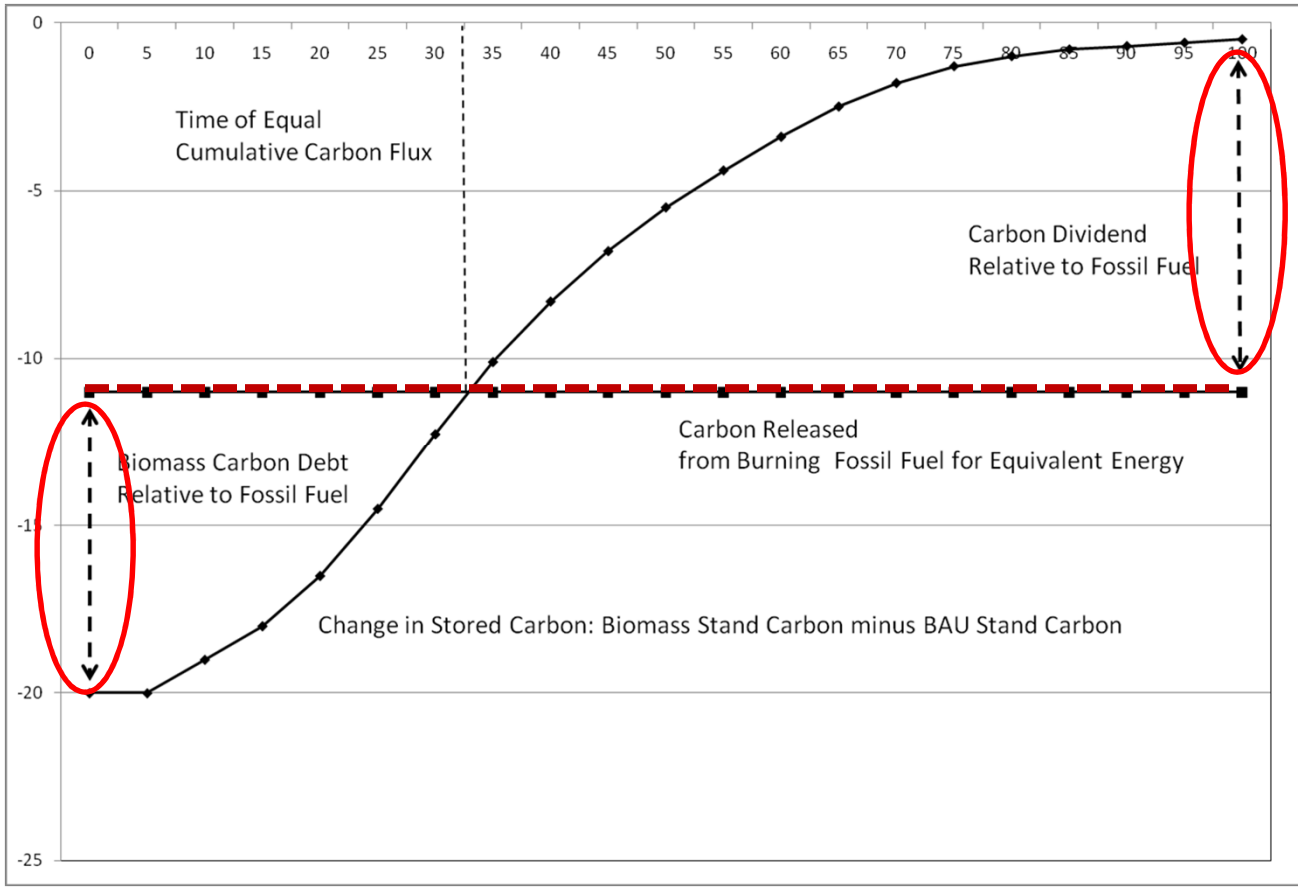
Relevance to Carbon Accounting

- Net GHG effects of biomass use will depend on:
  - Harvest response;
  - Planting response;
  - Land use change;
  - Displacement;
  - Spatial and temporal dynamics
- Reported GHG effects of biomass depend on these plus the accounting framework.

What and when to count…

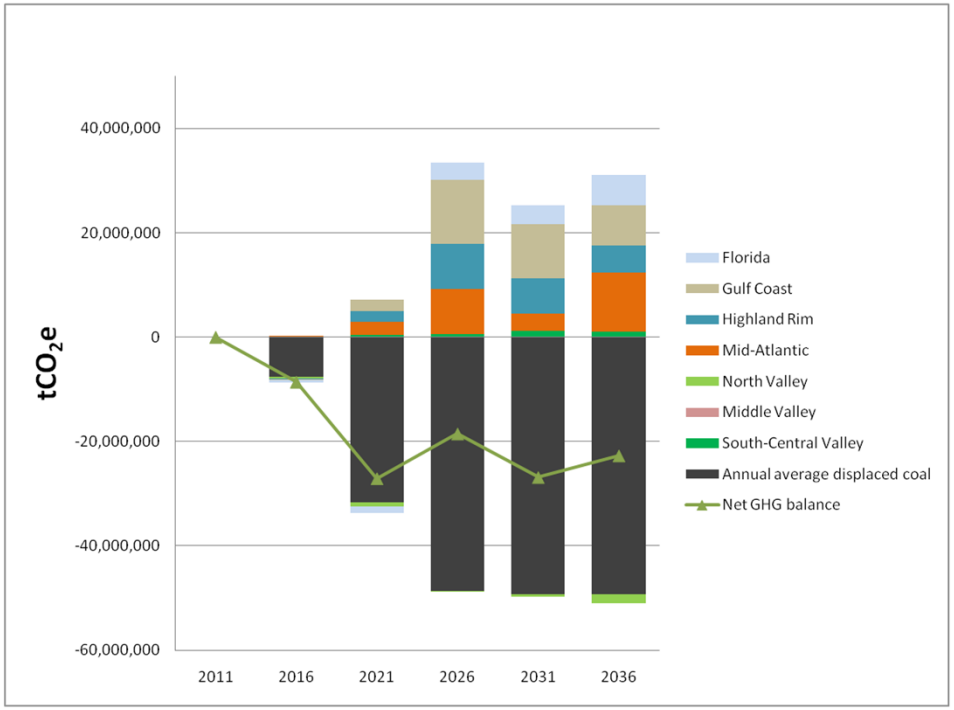


Manomet - The stand-level view



Source: Manomet 2010

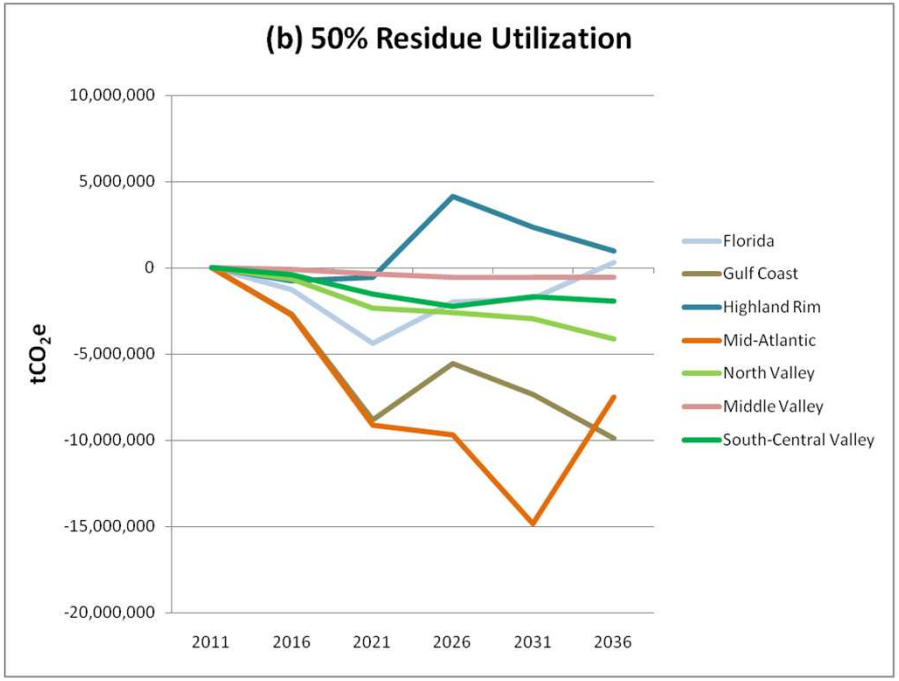
Aggregate Net GHG Implications



Net flux and source of GHG emissions from maximizing co-firing in the Southeast 50% residue utilization. Negative values indicate net emission reductions relative to baseline scenario coal combustion; positive values indicate net increases. Values for each supply subregion indicate annual average forest flux.

Source: Abt et al. 2010

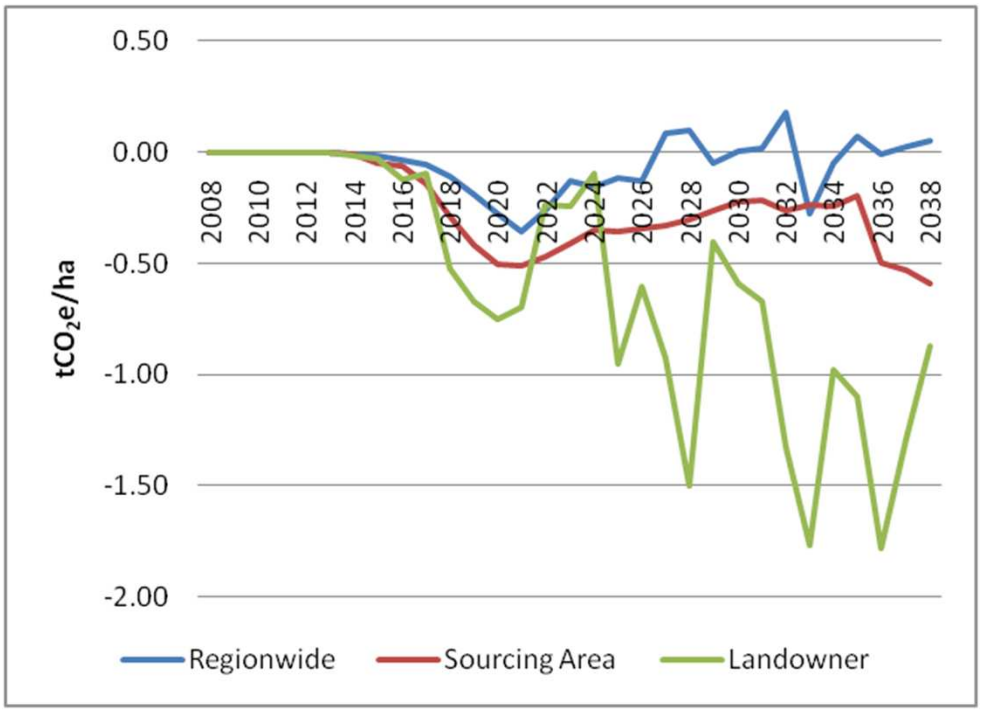
Disaggregated Net GHG Implications



Net GHG emission flux from maximizing co-firing in the Southeast, by supply subregion, assuming 50% residue utilization. Negative values indicate net emission reductions relative to baseline scenario coal combustion; positive values indicate net increases.

Source: Abt et al. 2010

Relative Net GHG Implications



Net GHG balance at three different levels of assessment, assuming 50% residue utilization. Negative values indicate net emission reductions relative to baseline scenario coal combustion; positive values indicate net increases.

Preliminary data – do not cite

Are They Compatible?

- Again, it depends…
- Potentially compatible in the absence of markets
  - Trees would not be otherwise harvested
  - Relative inefficiencies of wood requires a long time for the stand to "recover" from the extra harvest
- Largely irrelevant in the South
  - Active market repsonses (management, land use change, displacement)
  - Faster growing trees

Conclusions

- Generally
  - no single answer on potential or sustainable supply;
  - Same holds true for GHG benefits.
- This is because
  - Markets Matter;
  - Accounting Matters.

Questions…?

christopher.galik@duke.edu

+919.681.7193

bob_abt@ncsu.edu

+919.515.7791

http://www.nicholasinstitute.duke.edu/events/Biomass-Model

Selected References

Abt, R.C., F.W. Cubbage, and K.L. Abt. 2009. Projecting southern timber supply for multiple products by subregion. *Forest Products Journal 59:7-16.*

Abt, R.C., C.S. Galik, and J.D. Henderson. 2010. The Near-Term Market and Greenhouse Gas Implications of Forest Biomass Utilization in the Southeastern United States. Climate Change Policy Partnership, Duke University, and College of Natural Resources, North Carolina State University. 49pp.

Galik, C.S., R.C. Abt., and Y. Wu. 2009. Forest biomass supply in the Southeastern United States -- implications for industrial roundwood and bioenergy production. *Journal of Forestry* 107: 69-77.

Manomet Center for Conservation Sciences. (2010) Massachusetts Biomass Sustainability and Carbon Policy Study: Report to the Commonwealth of Massachusetts Department of Energy Resources. Walker T. (Ed.). Contributors: Cardellichio P., Colnes A., Gunn J., Kittler B., Perschel R., Recchia C., Saah D., Walker T. Natural Capital Initiative Report NCI-2010-03. Brunswick, ME. 182p.

Extra Material

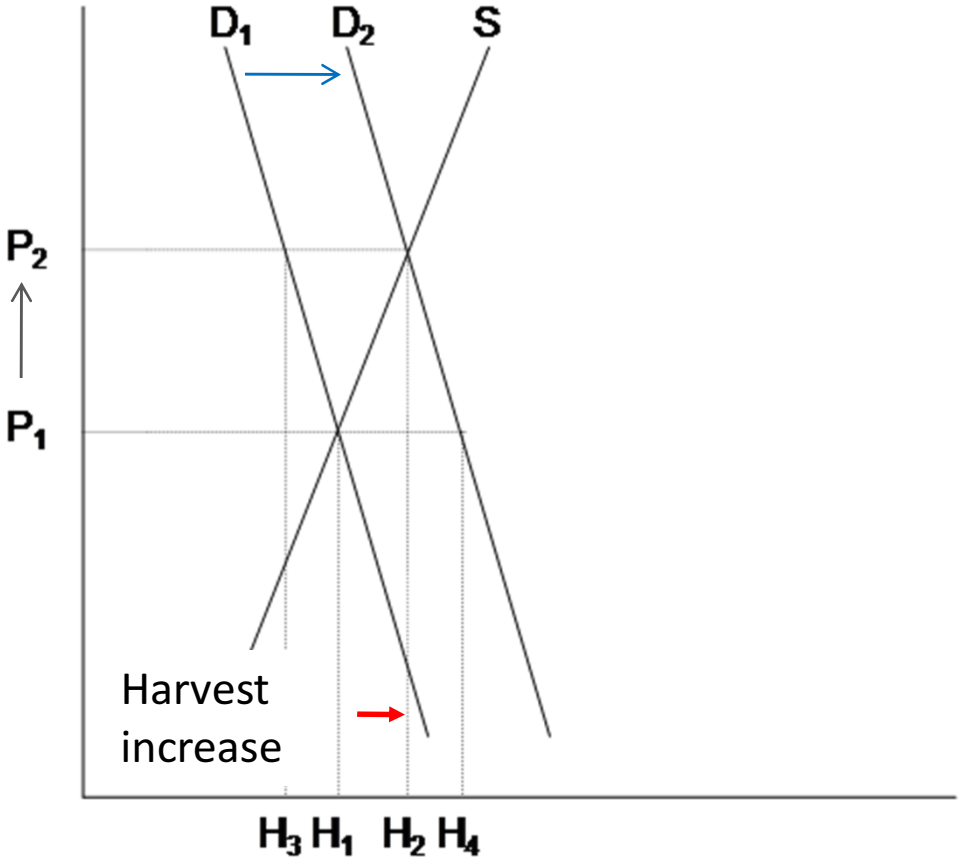
Sub-**R**egional **T**imber **S**upply Model:

- A simulation tool that provides detailed forest resource supply projections in response to user-defined demands
  - For this application, 3 key components
    - Supply
    - Demand Shifts and "Displacement"
    - Landuse Change

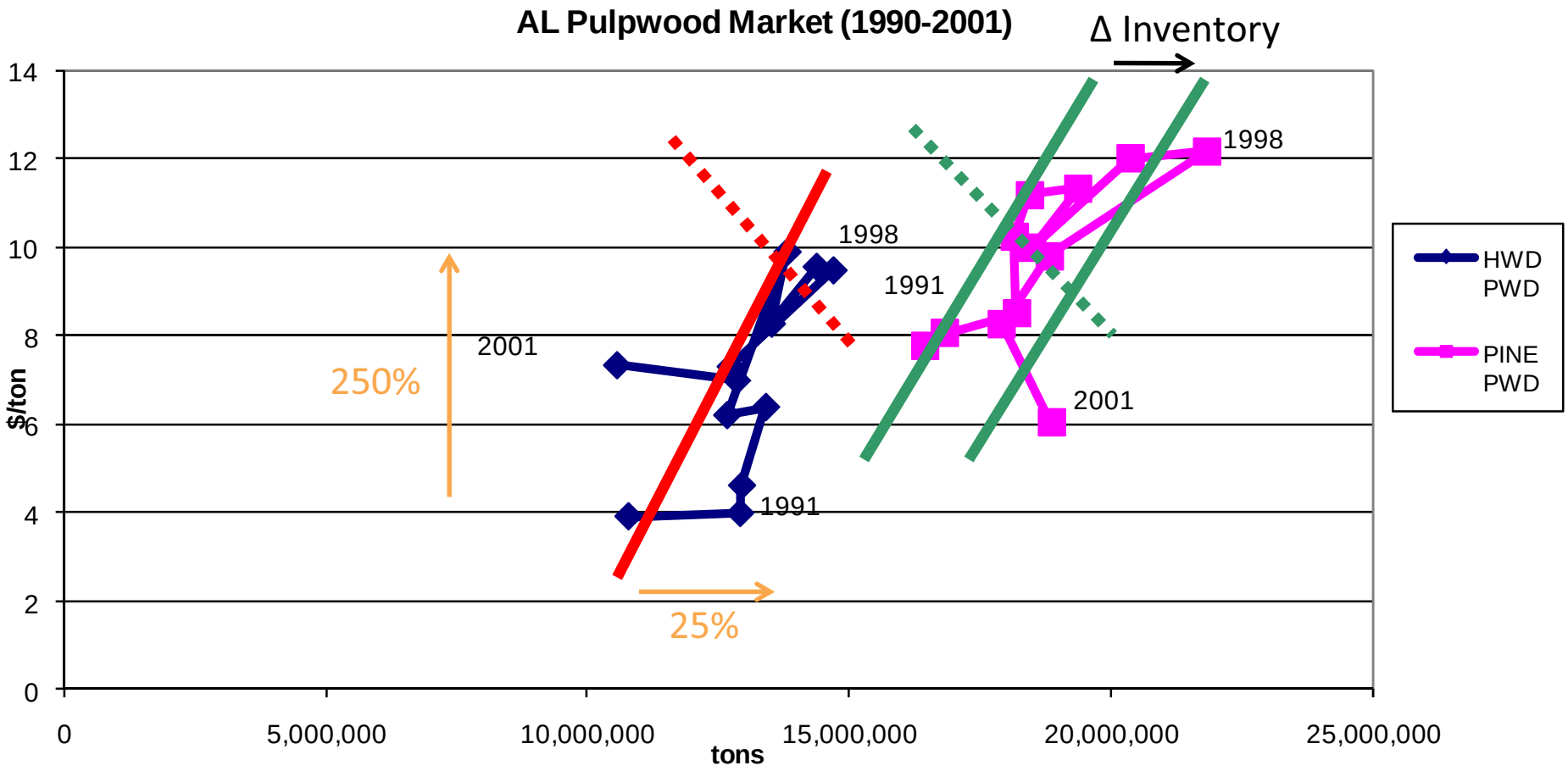
See also: Abt et al. 2009

Biomass
Demand Shift

Price
increase



Inelastic Supply Curves



Relevance of Carbon Accounting

The New York Times

Environment

WORLD | U.S. | N.Y. / REGION | BUSINESS | TECHNOLOGY | SCIENCE | HEALTH | SPORTS | OPINION

ENVIRONMENT | SPACE & COSMOS

Net Benefits of Biomass Power Under Scrutiny

//www.nytimes.com/privacy

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 51, 52, 70, and 71

[EPA–HQ–OAR–2011–0083; FRL–9283–8]

RIN 2060–AQ79

Deferral for CO_2 Emissions From Bioenergy and Other Biogenic Sources Under the Prevention of Significant Deterioration (PSD) and Title V Programs: Proposed Rule

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: This action proposes to defer for a period of three (3) years the application of the Prevention of Significant Deterioration (PSD) and Title V permitting requirements to biogenic carbon dioxide (CO_2) emissions from bioenergy and other biogenic stationary sources. This action is being taken as part of the process of granting the Petition for Reconsideration filed by the National Alliance of Forest Owners (NAFO) on August 3, 2010, related to the PSD and Title V Greenhouse Gas Tailoring Rule.

DATES: *Comments.* Comments must be received on or before May 5, 2011.