

US Pellet Exports: Perspectives on Environmental Risks and Risk Mitigation Methodologies

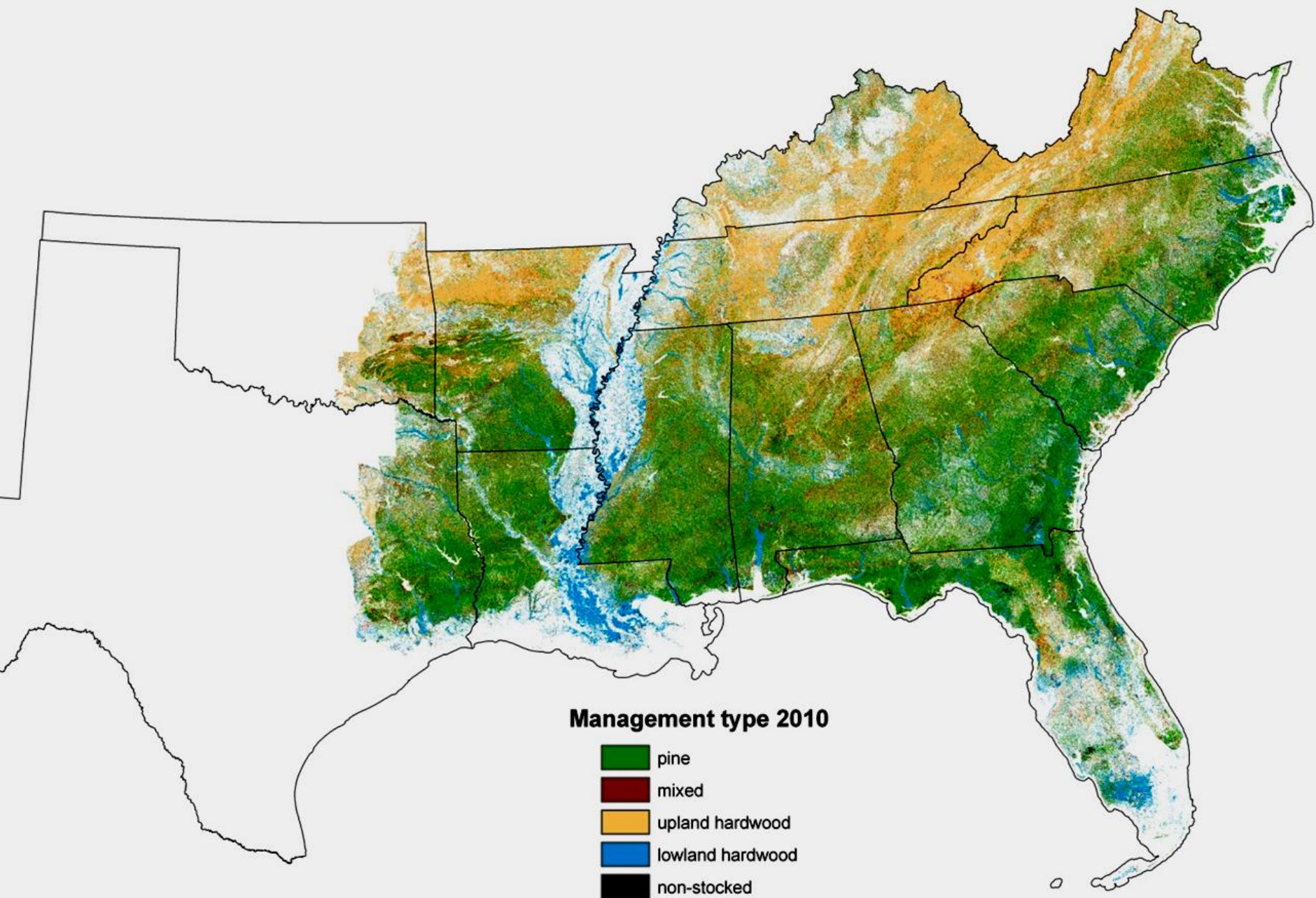
BioGrace II
March 06, 2015
Brussels

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Pinchot Institute for Conservation

A photograph of a pine forest with a semi-transparent text overlay. The forest consists of many tall, thin pine trees with green needles. The ground is covered with pine needles and some green vegetation. The text is centered in the middle of the image.

CONTEXT:

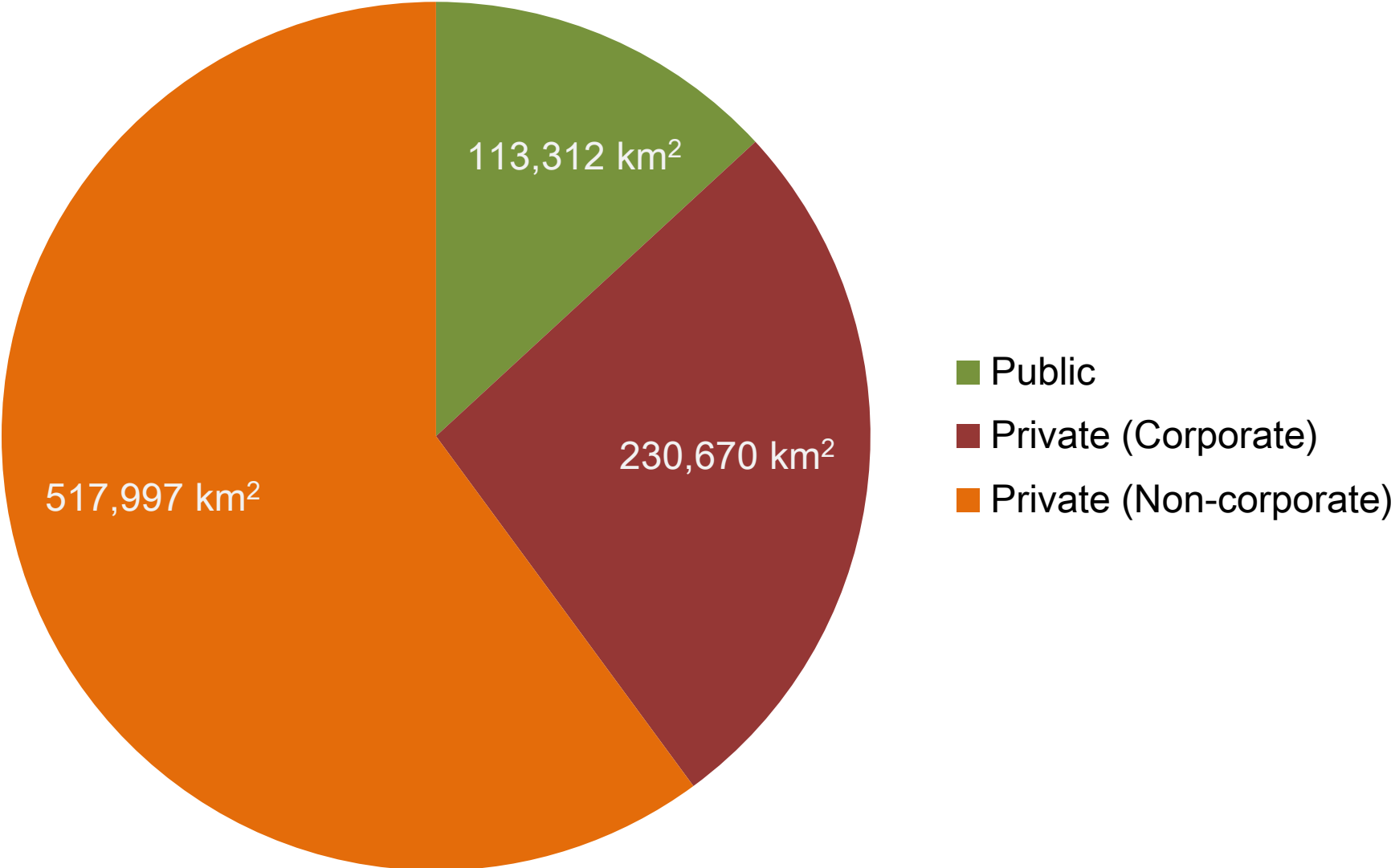
Trends, Projections, and Frequently Cited Risks



US Southeast Forest Statistics

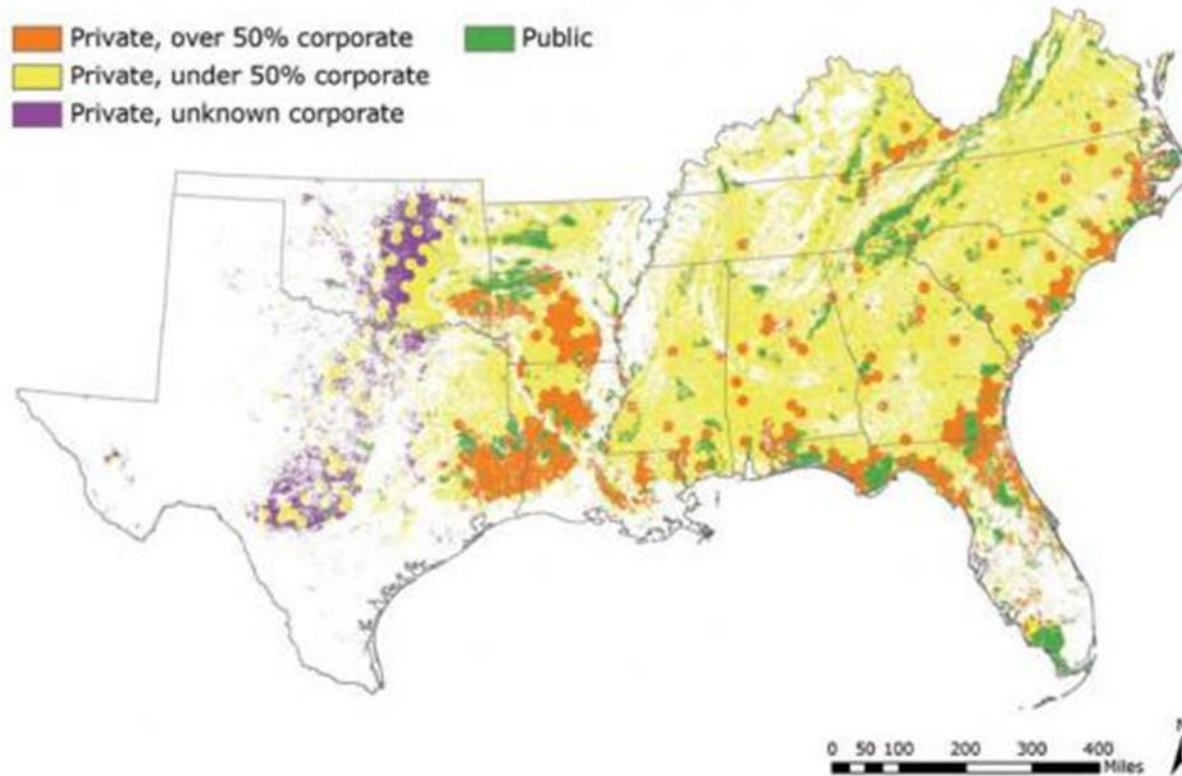
- The US Southeast represents 15% of global industrial wood production.
- > 60% of US timber is produced in the South.
- Strong pulpwood and sawtimber markets drove forest inventory growth during last 60 years (increasing carbon sinks).
- Going forward urbanization and climate change are expected to be big factors (potential for forest carbon sink to decrease).
- Forest growth-to-drain (G:D) ratio is positive at a broad regional level but G:D ratios at the level of individual pellet plants vary. If not carefully planned, pellet plants may contribute to G:D ratios at the supply-base level that are less than 1 (i.e. fiber removals exceeding forest growth), particularly if there is a significant clustering of facilities seeking the same fiber supply.

Forest Ownership in the Southeast US

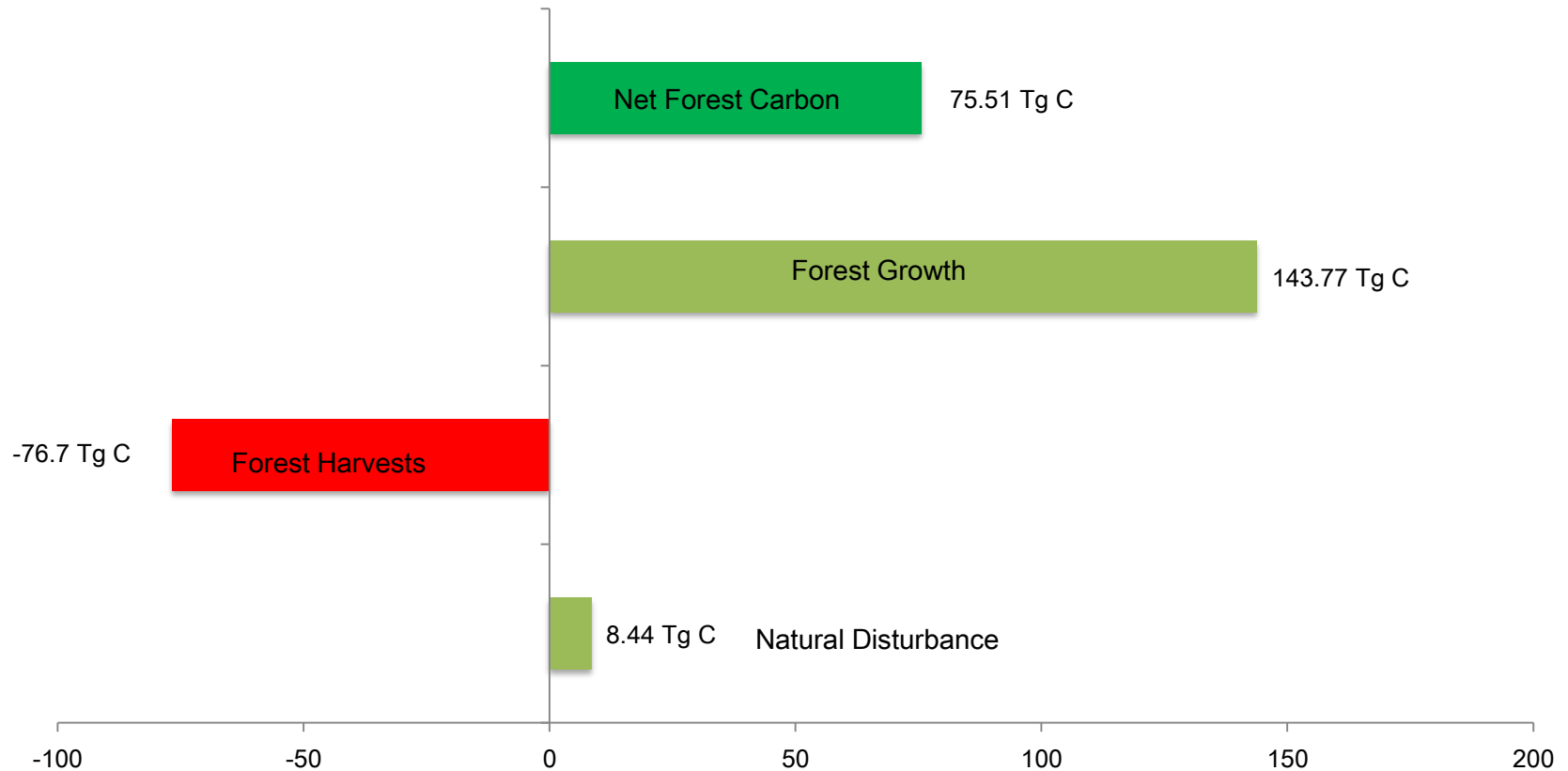


Southeast US Forest Ownership

Figure 5.5 Geographic Distribution of Southern Forest Ownership (2009)

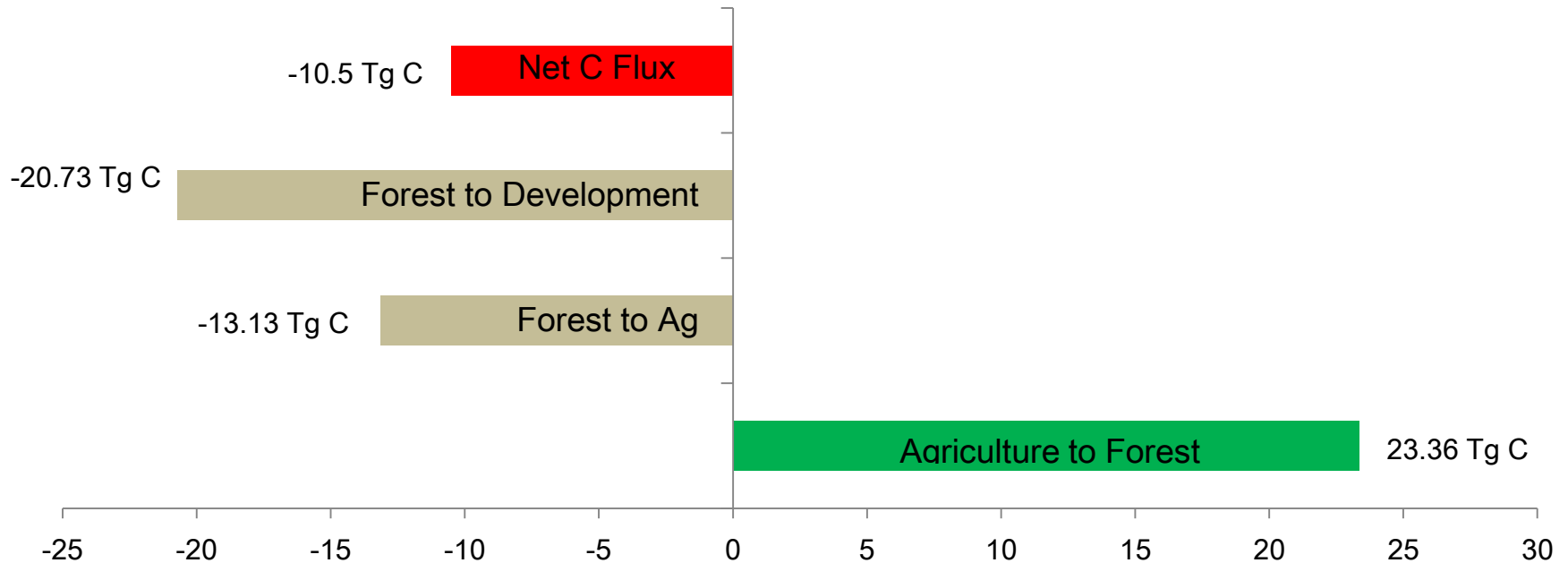


Forest Carbon Flux Southeast US (2007 – 2012)



- Timber harvests occurred on 3% of beginning forest area during time period.
- Natural Disturbance occurred on 2% of beginning forest area.

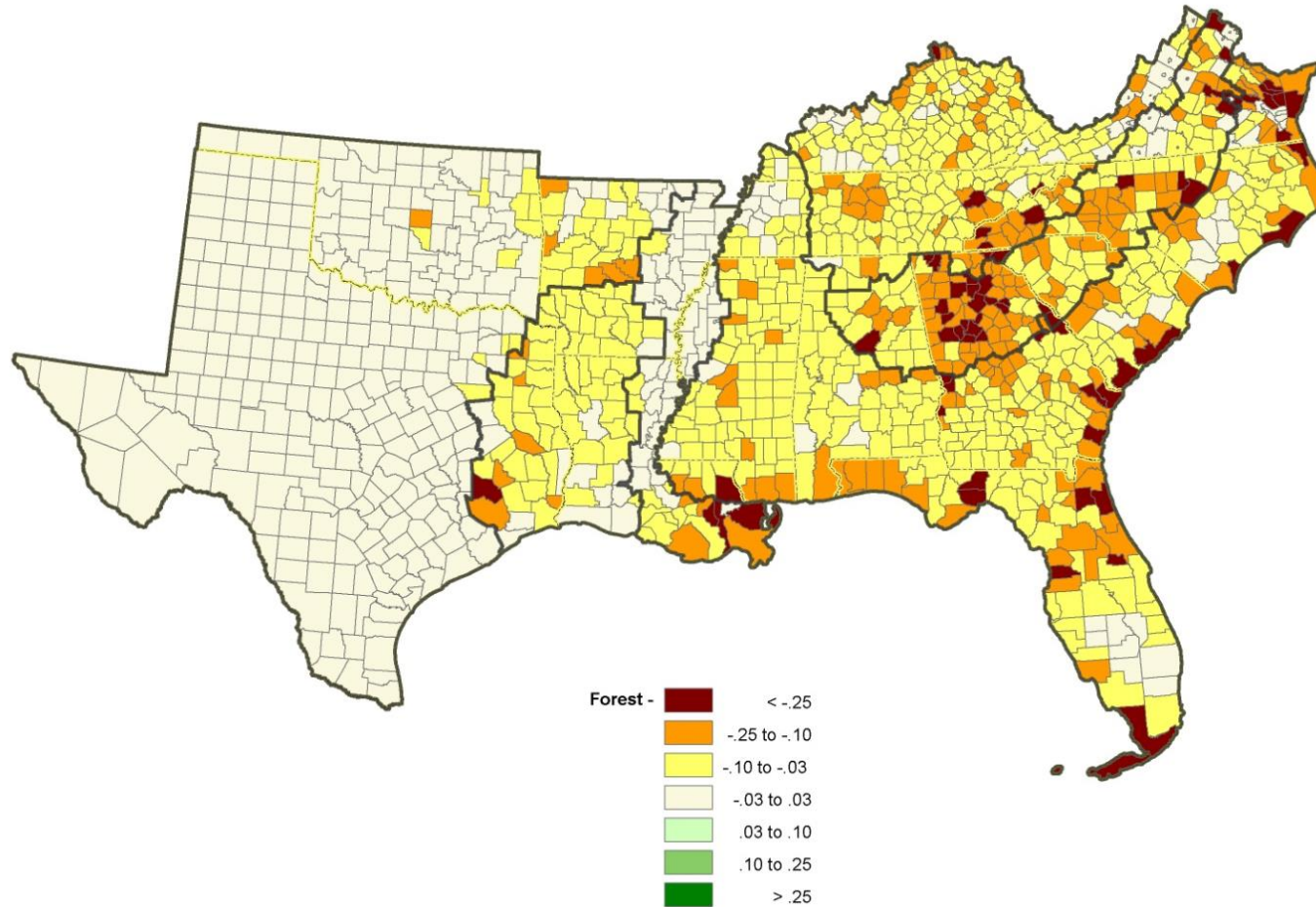
Total Carbon Flux from Land Use Change in Southeastern US (2007 – 2012)



- Total forest loss = 4,061 km² (59% was for development, 41% for agriculture).
- As a counter to this forest area expanded by 2,701 km²

Projected Forest Loss by 2060

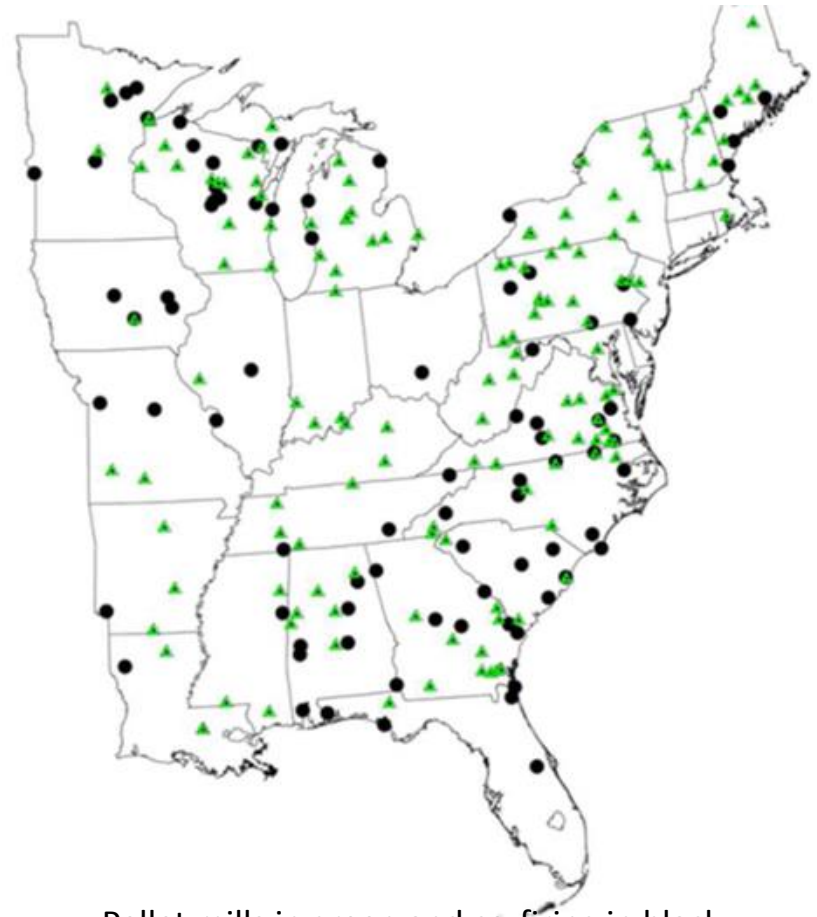
Figure 11: Change in Proportion of County in Forest Land Use for Cornerstone B, 1997-2060.



- Projected forest loss could grow as large as 93,000 km² by 2060, which is about the size of Hungary. Most significant loss expected in areas where development pressures are strong and fiber markets weak.

Current and Projected Role of Wood in the US Energy Mix

- Wood energy is **23% of U.S. renewable energy**. (2.2% of total).
- DOE predicts a **47% increase by 2030** .
- Pellets: household use has increased significantly, forecasted demand for industrial pellets from the US South and Canada is **25 – 50 million metric tons**.
- In 2013, US exports = **2.9 million metric tons**,
- Transportation fuels and biochemicals: ?



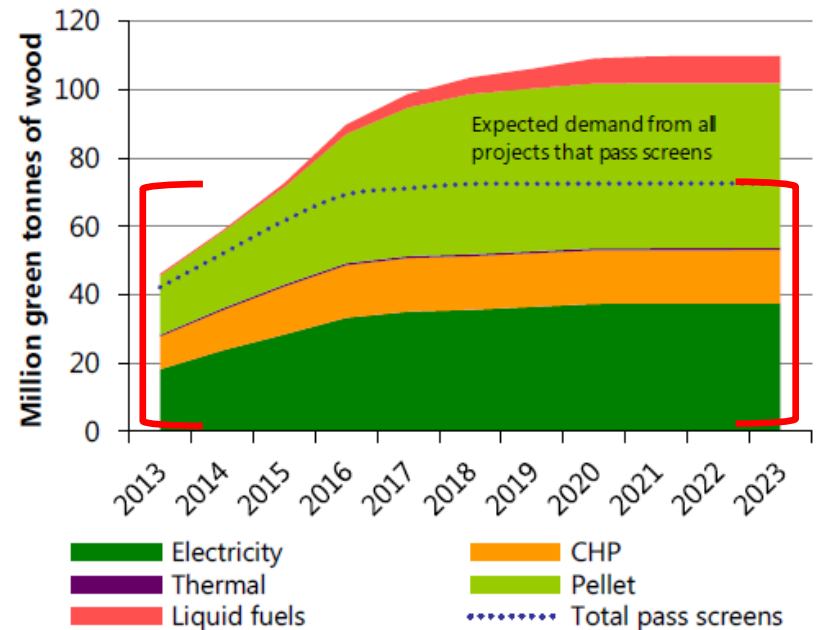
Pellet mills in green and co-firing in black

Source: Goerndt et al., in press.

Projected Role of Wood in the US Energy Mix

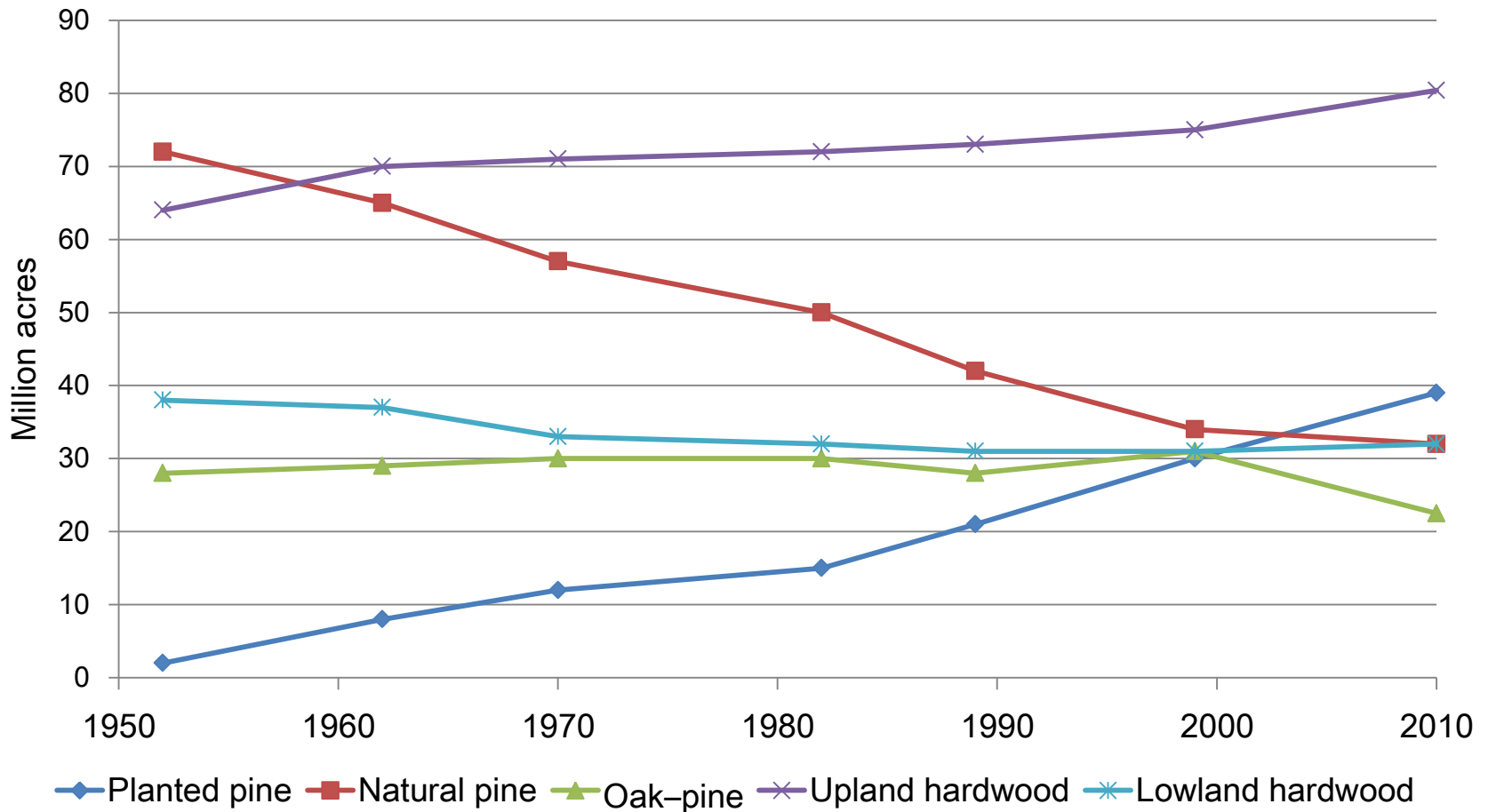
- Additional annual demand of 70 million green tonnes equals:
 - Harvests from 15 million ha of sustained yield forestry in the US South (about the size of Georgia), or 647,000 ha of southern forests clear cut (about the size of Delaware), or harvests from 25 million ha of sustained yield forestry in the US North (about the size of Oregon)
 - Where will the wood come from? It helps to look at past decades to predict possible futures.

Forecasted use of wood by announced facilities in the US, 2013-2023



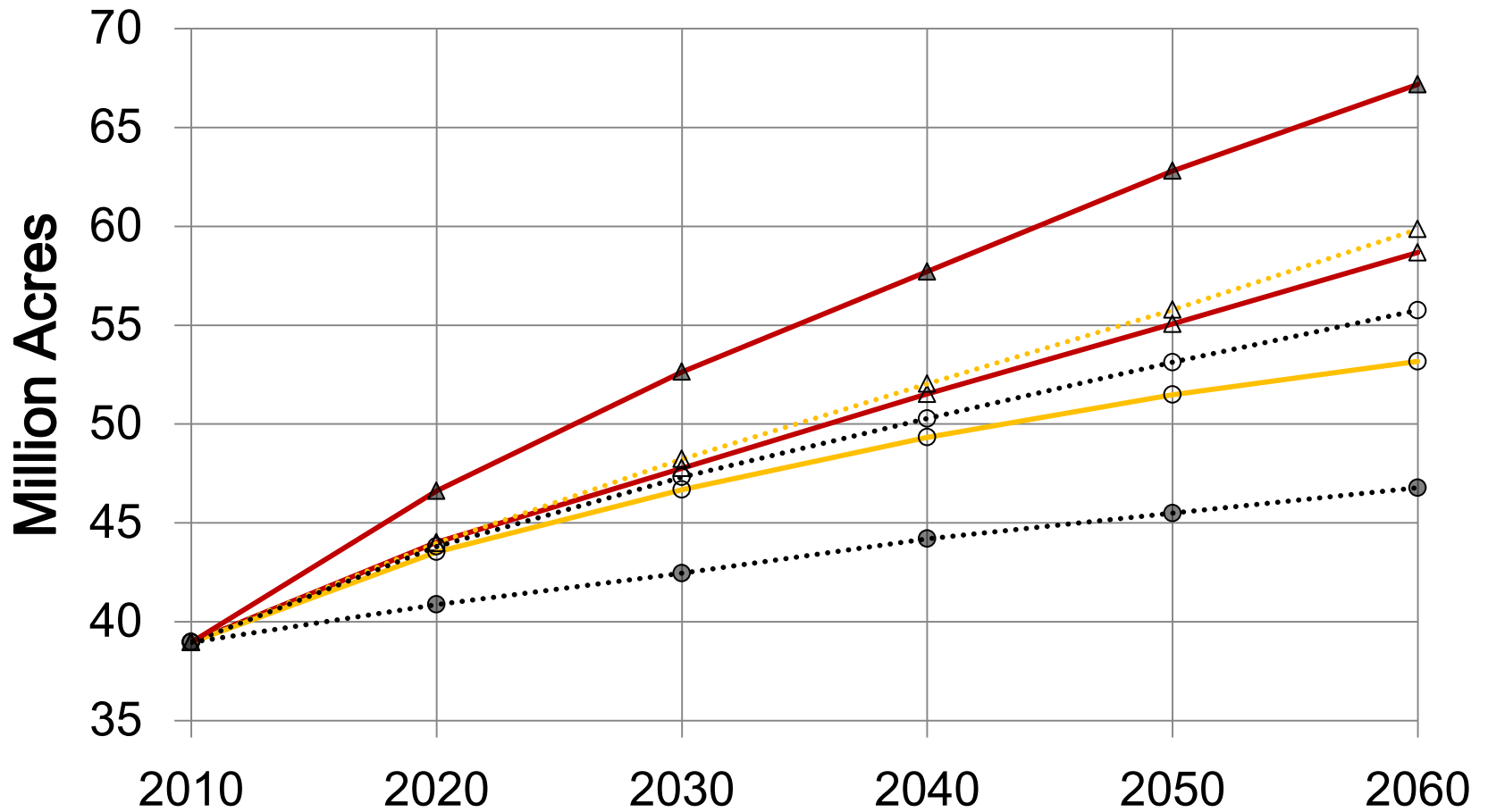
Source: Forisk Consulting.

Forest Area by Forest Types (1952-2010)



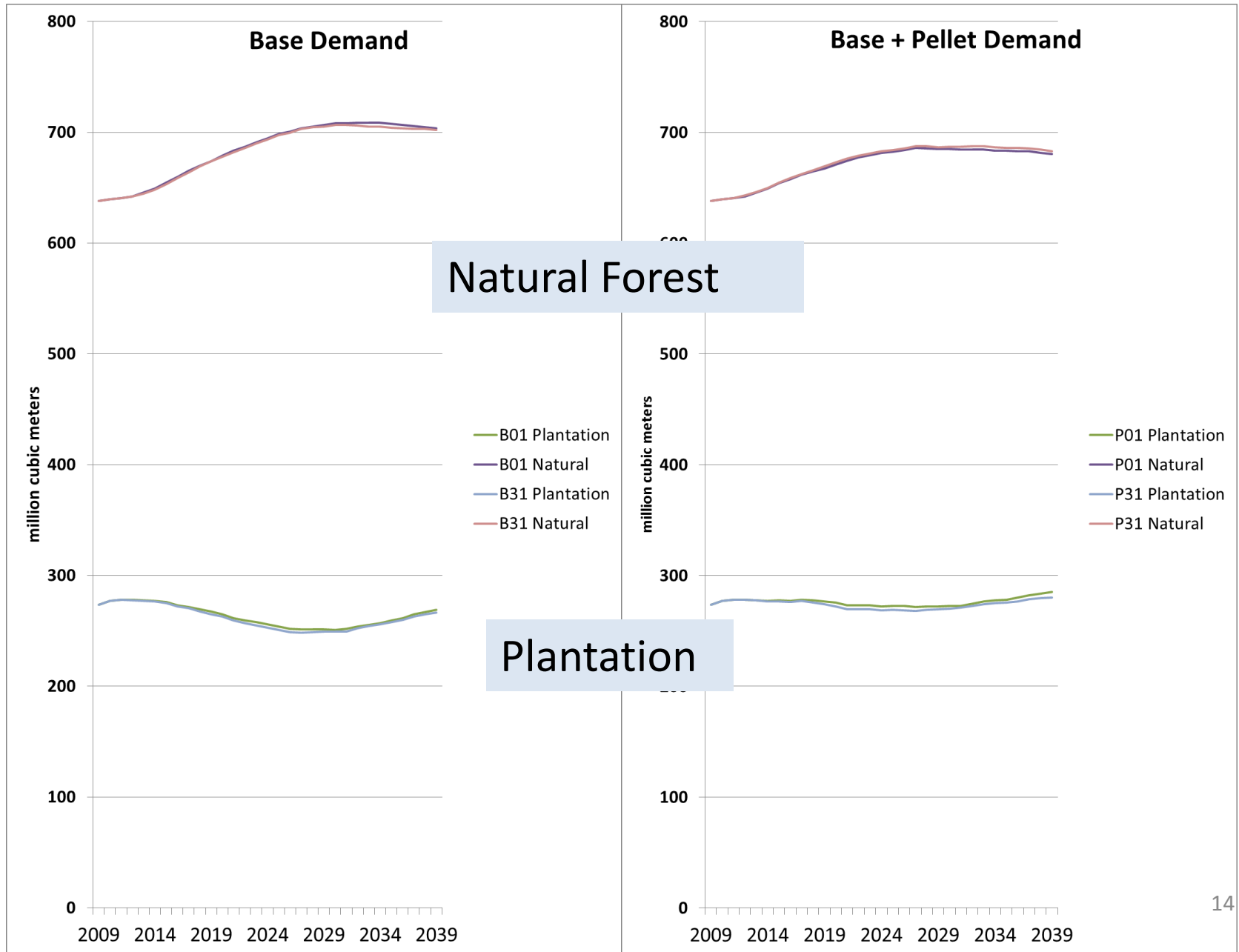
- Between 1990 and 2010 the amount of pine plantations doubled, from 20 million acres to 40 million

US Forest Service Forecast of Planted Pine

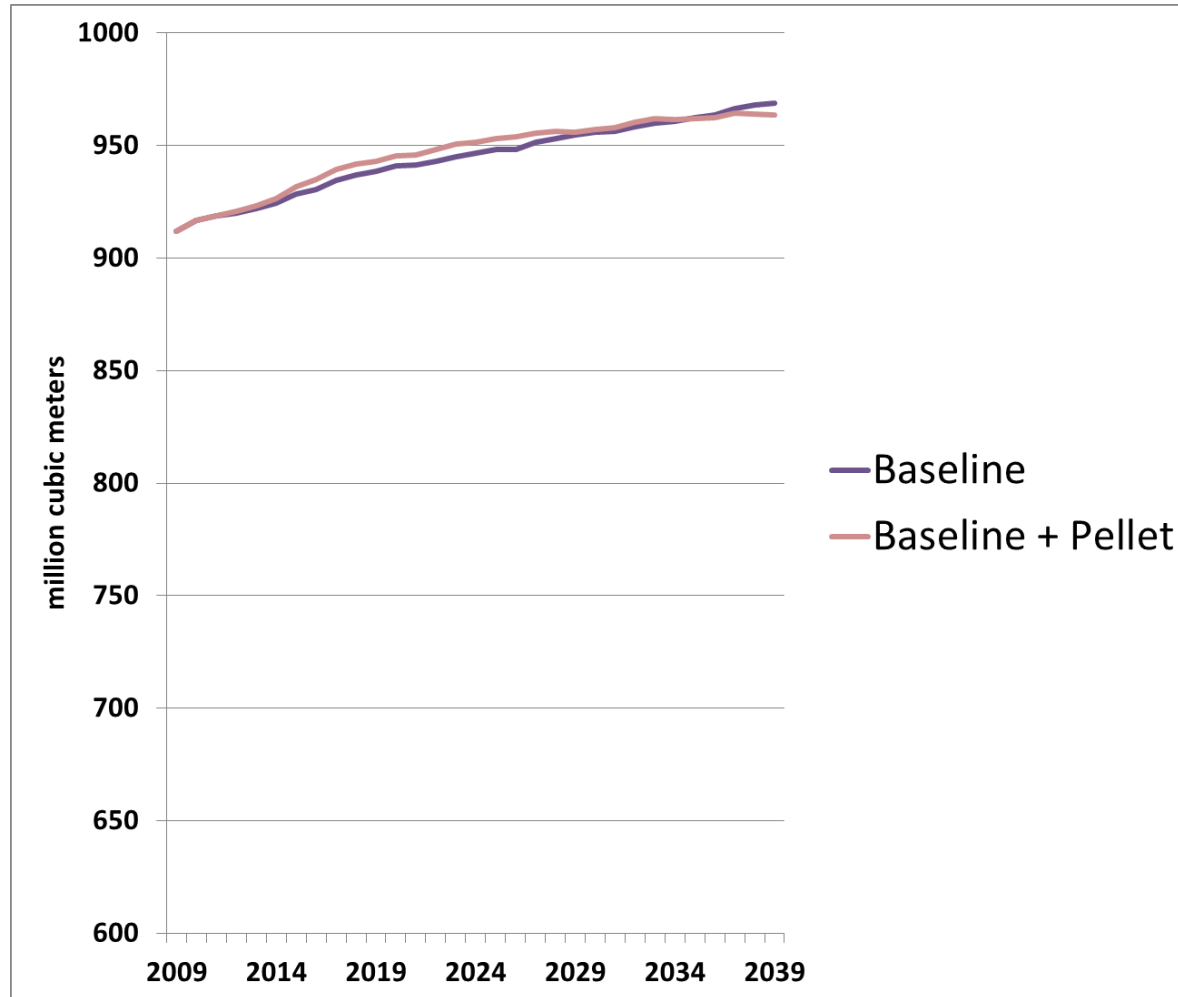


- 7 – 27 million acre increase in planted pine expected over the next 45 years.

Southeast Regional Forest Carbon Projections (Abt, 2013)



Southeast Regional Forest Carbon Projections (Abt, 2013)

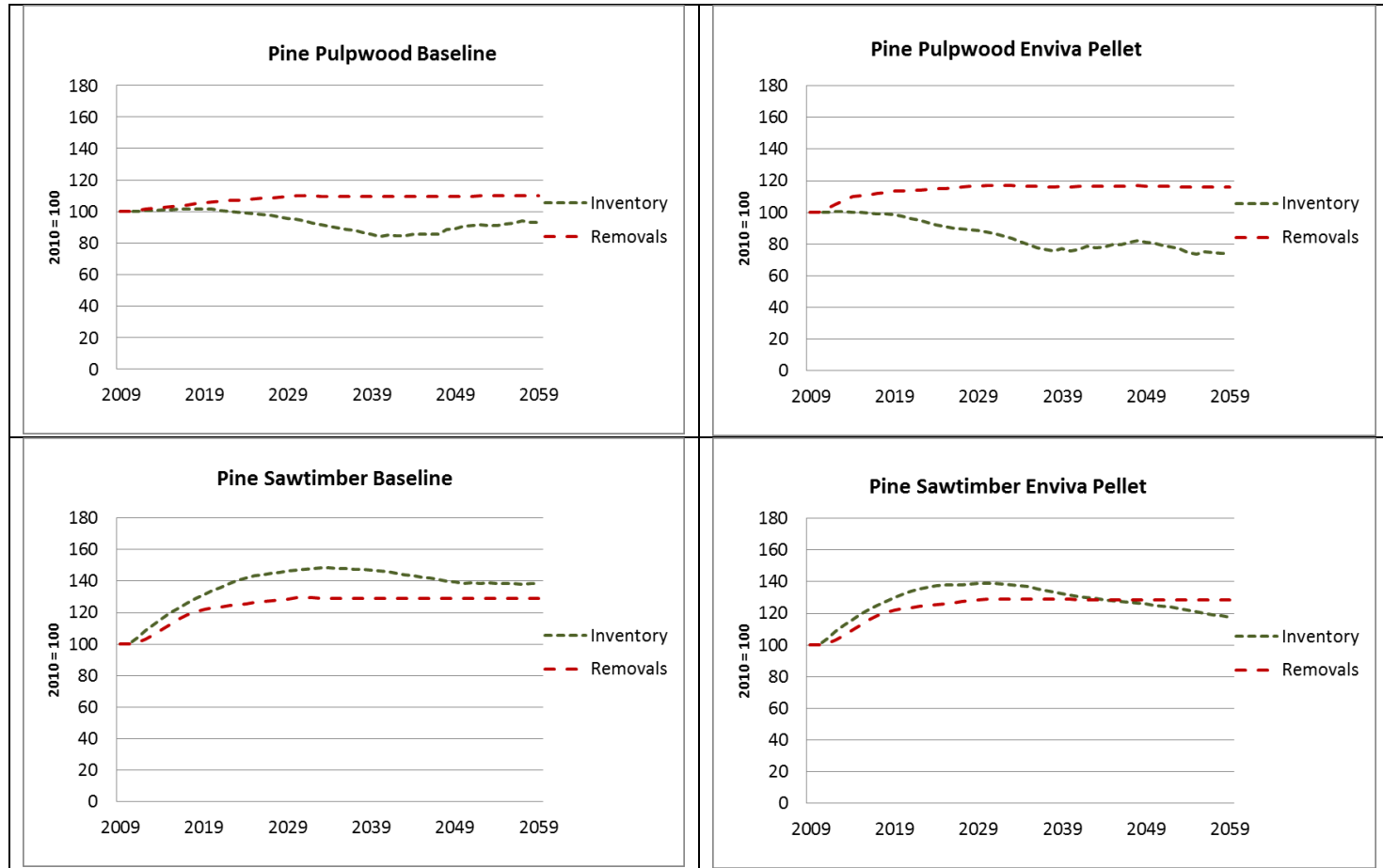




FACTORING IN RISK:

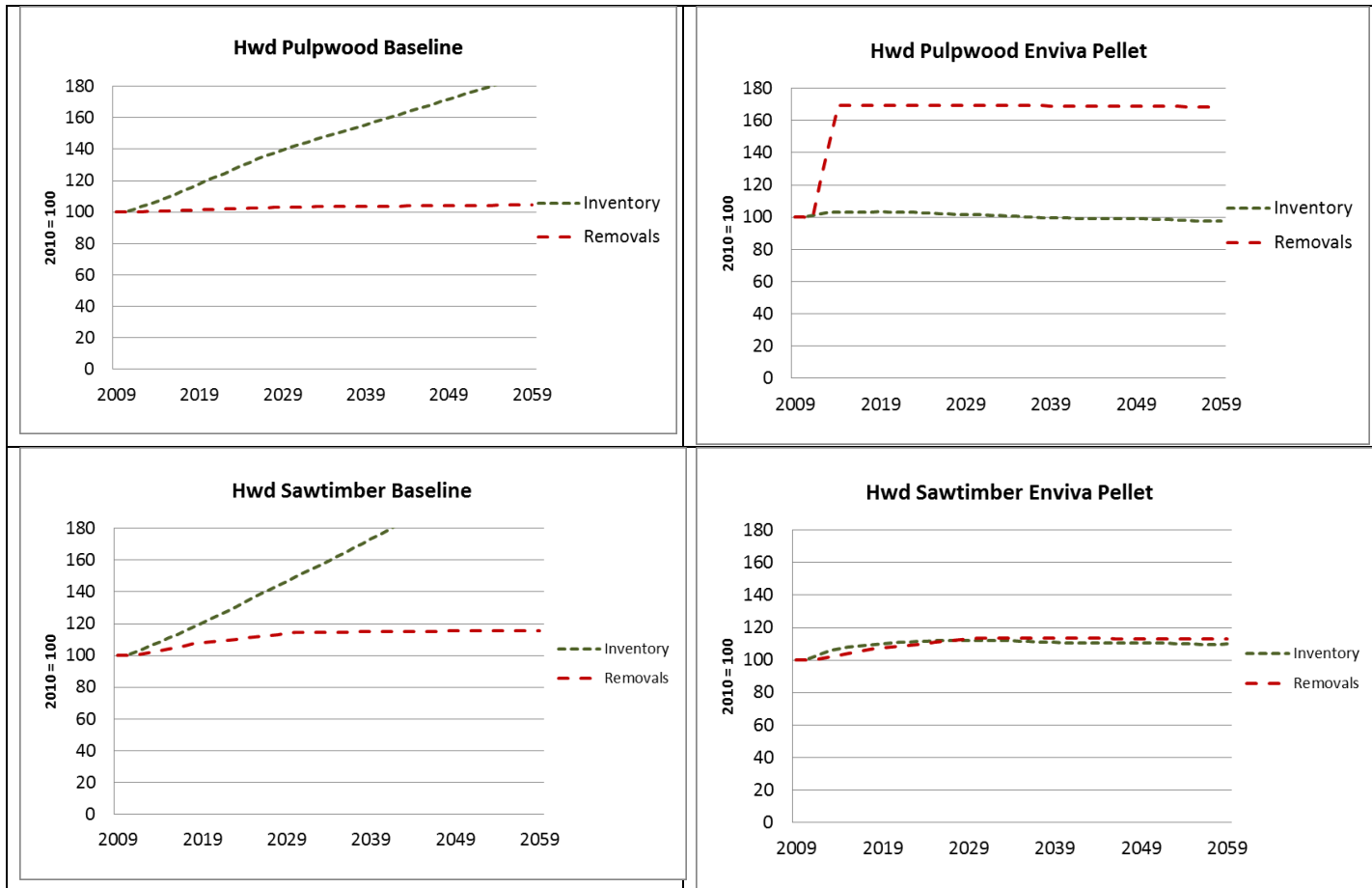
Environmental Risks Involved with Sourcing Pellets from the Southeast

Case Example: Marginal Impact of Clustered Pellet Plants



- In the case example three pellet mills were built in close proximity under the premise of utilizing the supply-base of a very large pulp and paper facility that was decommissioned about 5 years ago.

Case Example: Marginal Impact of Clustered Pellet Plants

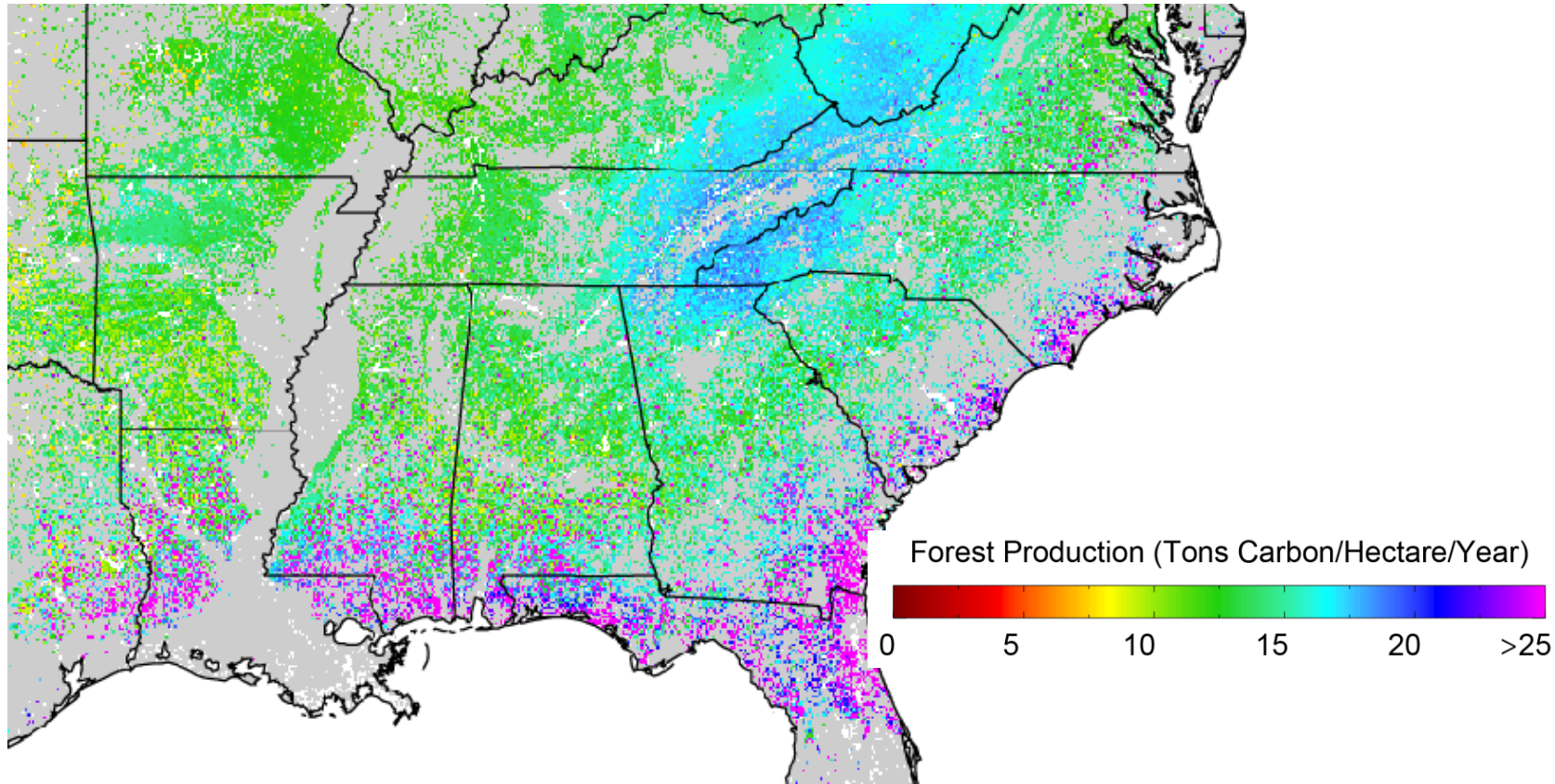


- In the case example the combined demand from 3 regional pellet plants is expected to lead to a situation where removals exceed growth within the catchment area for these three pellet plants.

Case Example

- In the case example the pellet mills will continue to utilize hardwood pulpwood coming from a high proportion of low-grade volume available from harvesting hardwood sawtimber stands.
- The case example may illustrate a growing theme in the southeast. The consulting firm Forest2Market has identified a tightening of pine fiber as a theme across many wood-baskets in the southeast, suggesting that “there will be no easy way out of tight pine fiber markets in 2015. Pine fiber demand from pulp/paper mills, OSB mills, small log sawmills and pellet manufacturers will ratchet higher. It will be at least a decade, when trees planted after years of delayed sawtimber harvests will be ready for a first thinning, before supply restrictions abate.”
- Additionally Forest2Market predicts that US housing starts to remain low for at least the next year meaning that mill residuals will be in sort supply for new pellet mills and other uses.

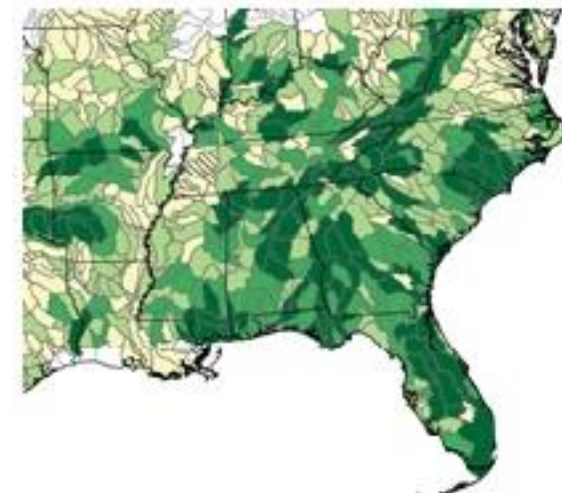
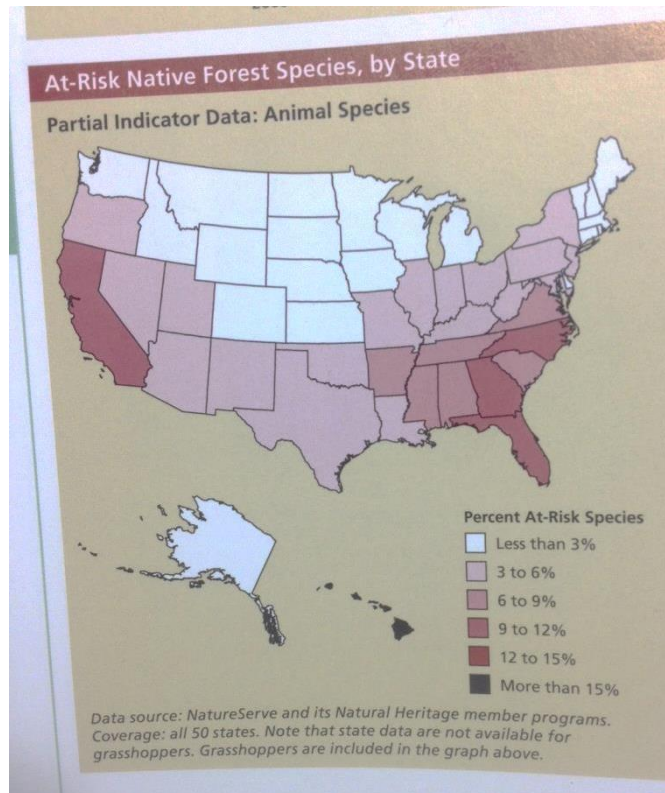
Forest Carbon Sequestration Rates in the Southeast



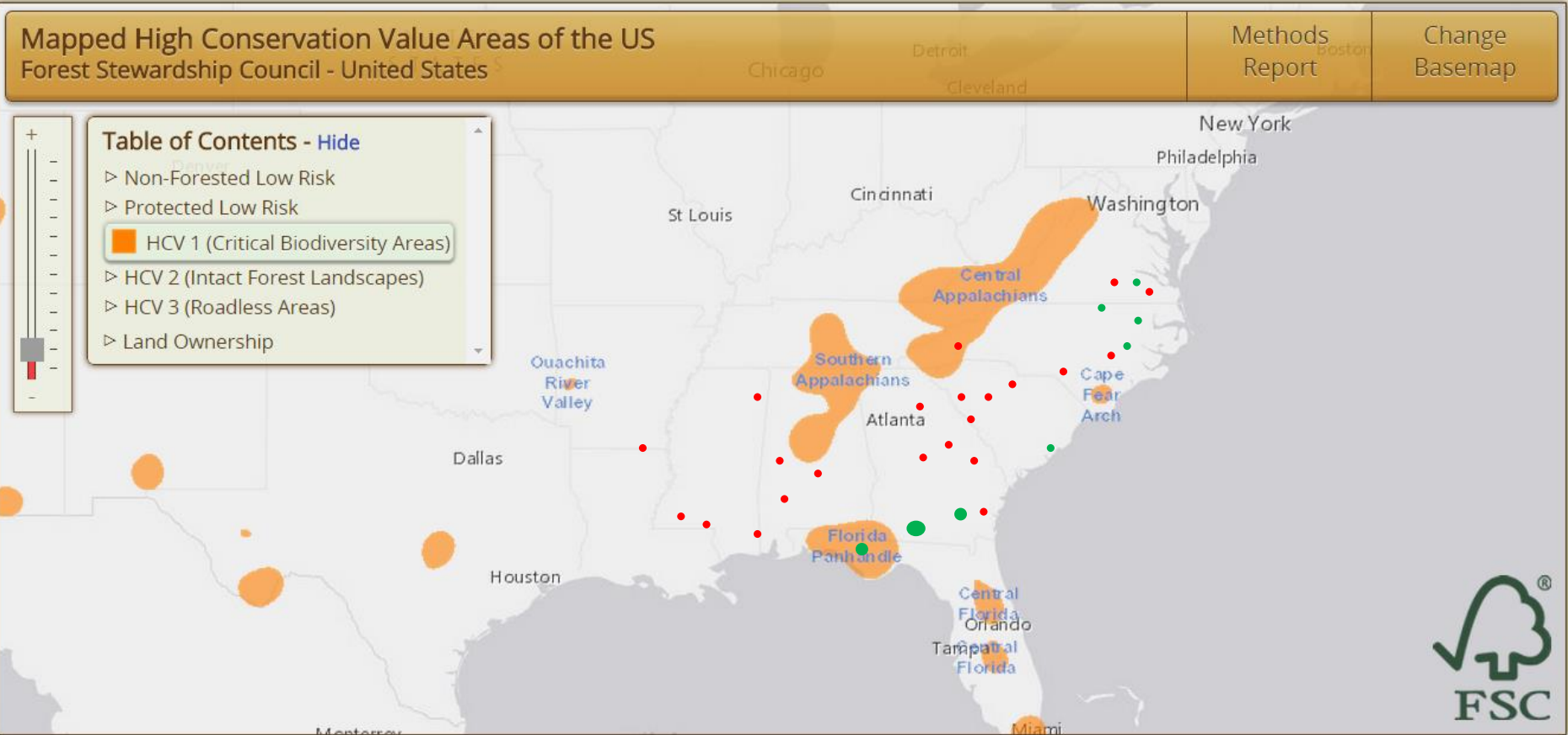
- Can European sustainability criteria for carbon dense lands be reconciled with carbon storage in the southeast?

At-Risk Native Forest Species

- As of 2008, 19% of native forest animals in the U.S. are considered at-risk (i.e. vulnerable, imperiled, critically imperiled, or thought to be extinct)



FSC High Conservation Value Areas



Green dots = existing pellet mills with annual production of over 250,000 tons. Red dots = planned pellet mills

Source: FSC DRAFT national risk assessment.

Consistency and Diversity in Concerns Voiced by Environmental Organizations

Org A	<ul style="list-style-type: none">● Sees role for bioenergy but does not want to see unfettered growth.● Main concern is carbon accounting. Thinks a positive G:D ratio (within facility catchment zones) means expand bioenergy is OK, so long as there is land-base and supply chain accounting + verification.● Believed NGO community agrees on 90% of the carbon issue (OK=residues, thinnings in certain instances)● Believes that SFM and C accounting need to be separate discussions.
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Frequently Voiced Concerns from Environmental Organizations

Org B	<ul style="list-style-type: none">● Positive G:D is not enough to offset potential climate damages.● Taking credit for carbon storage in stock expansion at a regional level does as justify expanded bioenergy. It's "an accounting error" to think otherwise.● Sourcing whole trees is bad for the climate. Sourcing short-rotation crops, wood waste, and harvest residues provides short debt periods.● Does not like co-firing (extends life of coal).● Not comfortable with long-term benefits of biomass i.e. "35 - 50 year" carbon payback periods.● Sourcing from wetlands is "ecologically indefensible."
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Frequently Voiced Concerns from Environmental Organizations

Org C	<ul style="list-style-type: none">● Bottomland wetland forests (ecological and carbon sink value)● Believes that there are localized problems with growth-to-drain● Concerned about “type conversation” (i.e. expanding plantations at expense of hardwoods and Longleaf Pine)● Believes that HCVF for the SE is not comprehensive enough.● Concerned about overall pressure increasing on at-risk species and ecological communities in the region● Concerned and frustrated about limited regulatory framework for SFM
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Frequently Voiced Concerns from Environmental Organizations

Org D	<ul style="list-style-type: none">● Believes that some types of forest bioenergy can be good for the climate.● Believes that SFM practices are paramount and that assessment of supply chains must be 3rd party● Strong supporter of FSC and draws the line on FSC vs. SFI related to conversion of natural forests● Supportive of the idea of a solutions focused dialogue● Believes that direct and indirect land use change are difficult to predict and control (cites RFS).
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A photograph of a pine forest with a semi-transparent text overlay. The forest consists of tall, thin pine trees with green needles. The ground is covered with pine needles and some green undergrowth. The text is centered in the middle of the image.

SFM & RISK MITIGATION FRAMEWORKS

SFM in the Southeast

- Forest management mostly influenced by voluntary practices, incentives, and of course markets.
- Corporate lands mostly certified (SFI).
- Only 3% of family owned lands have an FMP, let alone certification.
- Only 13% receive advice from professionals (link to SFI Fiber Sourcing).
- BMPs, Seed Tree/reforestation laws



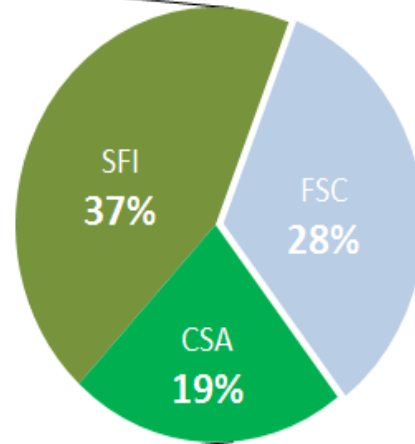
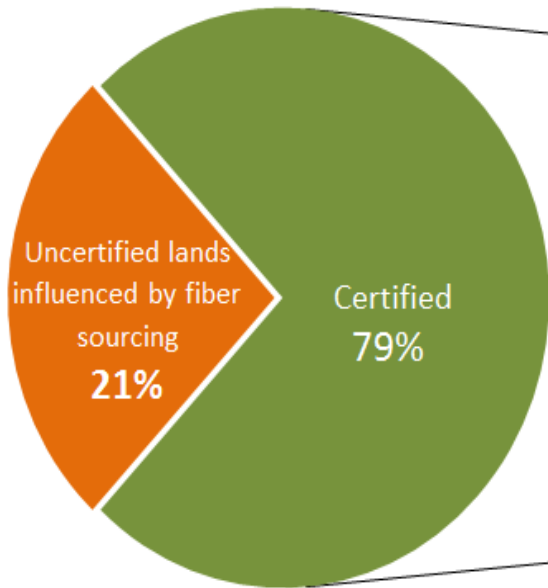
Best Management Practices (BMPs)

Forestry BMP Program Classification in Southeastern States.

Alabama	Non-regulatory (voluntary BMPs) with potential enforcement
Arkansas	Non-regulatory (voluntary BMPs) with potential enforcement
Florida	Combination of regulatory and non-regulatory
Georgia	Combination of regulatory and non-regulatory
Louisiana	Non-regulatory (voluntary BMPs) with potential enforcement
Mississippi	Non-regulatory (voluntary BMPs) with potential enforcement
North Carolina	Combination of regulatory and non-regulatory
South Carolina	Non-regulatory (voluntary BMPs) with potential enforcement
Tennessee	Non-regulatory (voluntary BMPs) with potential enforcement
Texas	Combination of regulatory and non-regulatory
Virginia	Non-regulatory (voluntary BMPs) with potential enforcement

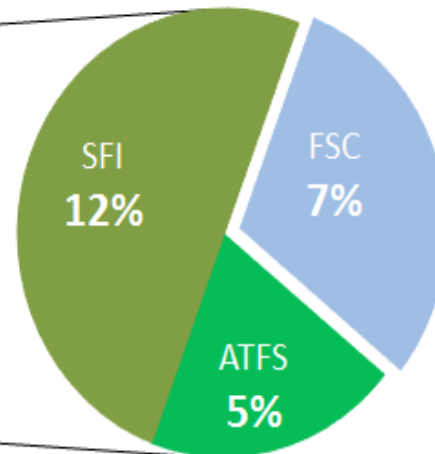
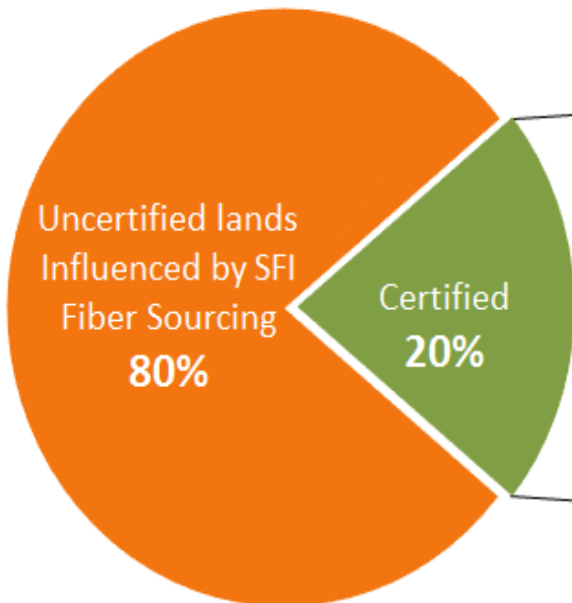
Source: (Shepard 2006)

Criteria		BMPs Programs											BHG's	
		TX	LA	MS	AL	TN	KY	VA	NC	SC	GA	FL	South Carolina	Forest Guild SE
1	Conservation of Biological Diversity													
1.1	Species Diversity	N	N	N	N	N	N	N	N	P	N	N	N	P
1.1.1	Important Species (i.e. state natural heritage) identified in a forest management plan.	N	N	N	N	N	N	P	N	P	N	N	P	P
1.2	Provisions for Genetic Diversity	N	N	N	N	N	N	N	N	N	N	N	N	N
1.3	Important Wildlife Habitat Across Landscape	N	N	N	N	N	N	N	N	P	N	N	N	P
1.4	Important Wildlife Habitat at the Stand Level	N	N	N	N	N	N	N	N	P	N	P	A	A
1.5	Amount and distribution of organic matter present on forest floor.	N	N	N	N	N	N	P	N	N	N	N	A	A
1.6	Ecological Reserves/Special Area/Protected Areas	N	N	N	N	N	N	P	N	N	N	P	P	P
1.7	Rare forest types (e.g. old growth)	N	N	N	N	N	N	N	N	N	N	N	P	A
1.8	Riparian & Aquatic System Biological Resources	N	N	N	N	N	N	P	N	N	N	N	N	P
2.1	Ecological Function/Maintenance of Forest Nutrient Capital over the Long-term	N	N	N	N	N	N	N	N	N	N	N	P	P
2.2	Landscape-Scale Spatial Patterns (e.g. fragmentation & connectivity)	N	N	N	N	N	N	N	N	N	N	N	N	P
2.3	Representation of Regionally-Appropriate Forests and Structural Diversity	N	N	N	N	N	N	N	N	N	N	N	N	A
2.4	Retention of deadwood (Coarse Woody Debris, Fine Woody Debris, Snags)	N	N	N	N	N	N	P	N	N	N	N	A	A
3.1	Forest Protection/Health: Fire	P	P	P	P	P	P	P	P	P	P	P	N	P
3.2	Forest Protection/Health: Exotic Species/ Noxious Weeds	N	N	N	N	N	N	N	N	N	N	N	N	P
3.3	Forest Protection/Health: Pests & Pathogens	N	N	N	N	N	N	P	N	N	N	N	N	P
3.4	Forest Protection/Health: Hazardous Materials/Debris/Waste	A	A	A	A	A	A	A	A	A	A	A	N	N
3.5	Harvest Operations & Access: Forest Roads	A	A	A	A	A	A	A	A	A	A	A	N	N
3.5	Vehicles and machinery used in harvest should cause minimal damage to ecosystem	P	N	N	N	N	N	P	N	N	N	N	N	A
4.1	Resource Conservation: Water Yield and Water Quality	A	A	A	A	A	A	A	A	A	A	A	P	P
4.2	Resource Conservation: Soil Nutrient Status/Erosion	P	P	P	P	P	P	P	P	P	P	P	P	P
4.2.1	Resource Conservation: Soil Erosion	P	P	P	P	P	P	P	P	P	P	P	P	P
4.3	Practices in place to protect chemical, biological, and physical properties of soils	P	P	P	P	P	P	P	P	P	P	P	P	P
4.4	Best Management Practices	A	A	A	A	A	A	A	A	A	A	A	P	P
4.5	Minimize biomass harvest in nutrient poor, shallow , or steep sloped soils	N	N	N	N	N	N	N	N	N	N	N	P	P
5.2	Management of bioegenic carbon flows in forest ecosystems	N	N	N	N	N	N	N	N	N	N	N	N	P
7.1.9	Forest Practices Regulations & Guidelines: Compliance Provisions	N	N	N	N	N	N	A	N	N	N	N	N	N
7.2.6	Forest Planning: Management Plan	N	N	Y	N	N	N	P	N	P	N	N	P	P
7.2.7	Forest Planning: Mapping	A	A	A	A	A	A	A	A	A	A	A	N	A
7.2.8	Forest Planning: Timber Inventory	N	N	P	N	N	N	P	N	N	N	N	N	N
7.2.9	Forest Planning: Sustained Yield	N	N	P	N	N	N	N	N	N	N	N	N	N
7.2.11	Silviculture: Reforestation--Regeneration	P	P	P	P	P	P	P	P	P	P	P	P	N
7.2.12.1	Silviculture: Clearcutting	N	N	N	N	N	N	P	N	N	N	P	N	N
7.2.13	Silviculture: Retention & Residual Trees/Stand	P	P	P	P	P	N	P	N	N	N	N	A	A
7.2.14	Silviculture: Reforestation--Site Preparation	A	A	A	A	A	A	A	A	A	A	A	P	N
7.2.18	Silviculture: Stand Management--Application of Pesticides	A	A	A	A	A	A	A	A	A	A	A	N	N
7.2.19	Silviculture: Stand Management--Prescribed Fire	A	A	A	A	A	A	A	A	A	A	A	N	N
7.2.20	Special Treatments: Salvage Harvests	N	N	N	N	N	N	P	N	N	N	N	N	A



Canada

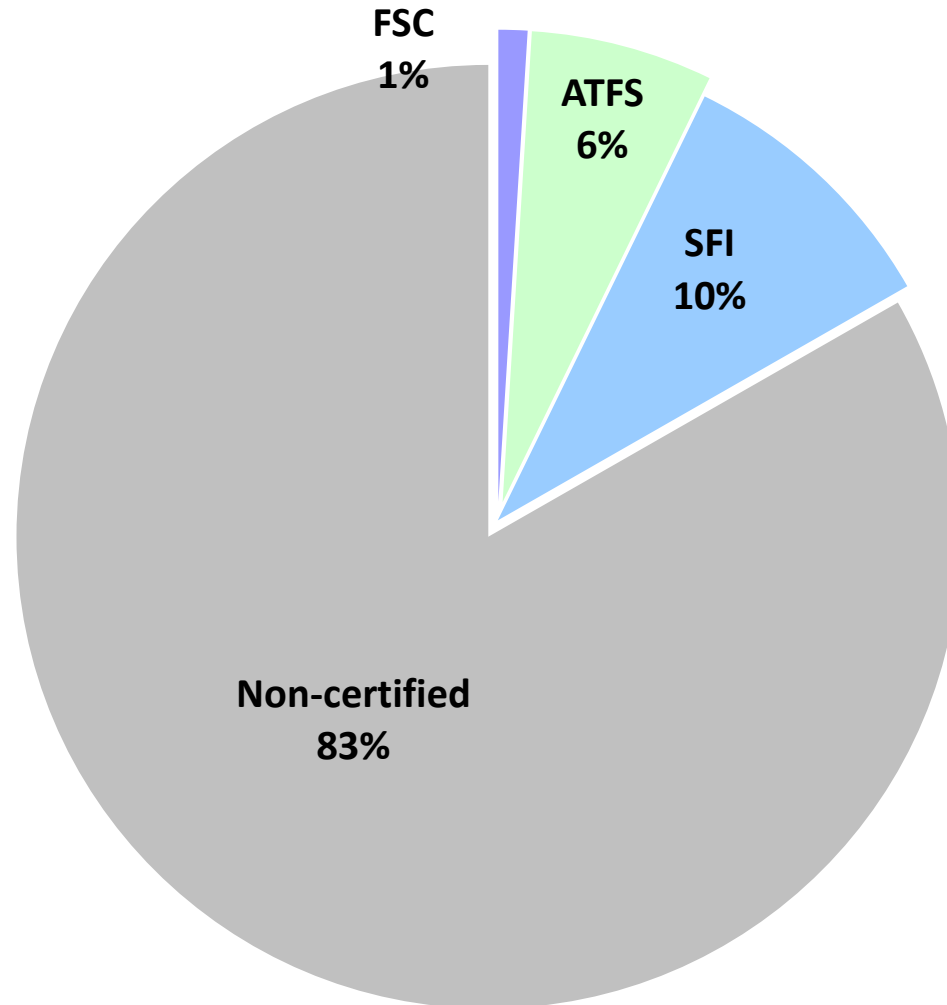
Dual certified area taken into account so percentages add up to more than 79%



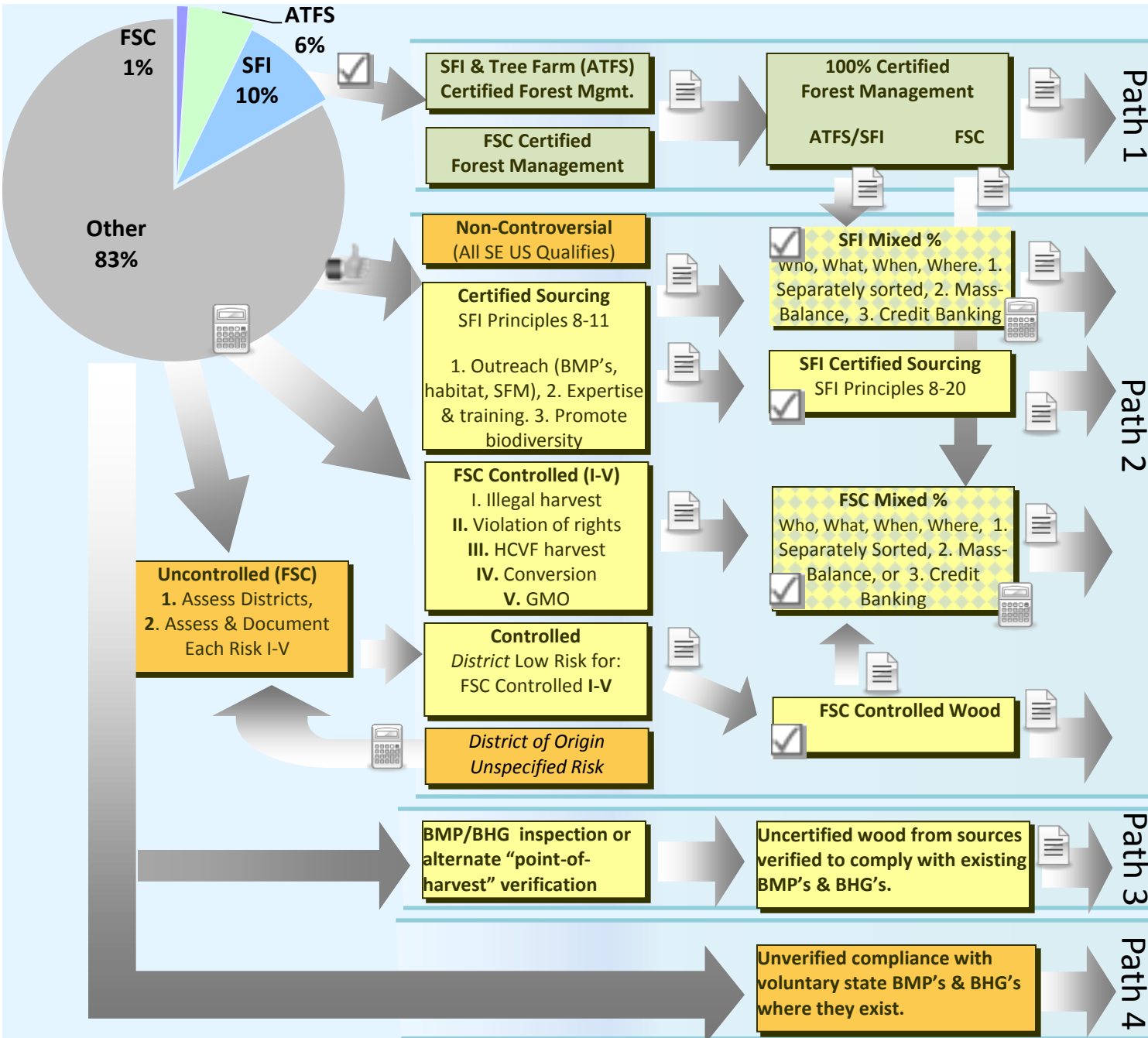
United States

Dual certified area taken into account so percentages add up to more than 20%

Certified Forests in the Southeast US



Southeastern U.S.



Pellet Export Market

Area of Certified Forestland as Compared to Total Forest Size in Southern States.

	Total Forestland	Ha SFI	Ha ATFS	Ha FSC
Louisiana	5,755,336	1,266,264	651,625	244,262
Alabama	9,183,465	1,317,604	1,287,475	2,458
Arkansas	7,620,193	1,135,263	465,662	218,341
Mississippi	7,940,917	787,732	531,476	256,597
Georgia	10,029,634	1,024,902	843,219	-
South Carolina	5,158,085	439,806	425,066	2,778
Texas	6,990,257	958,630	23,942	10,849
Florida	6,534,426	453,780	435,464	49
Virginia	6,380,161	164,526	357,911	84,856
North Carolina	7,465,079	431,387	126,111	4,231
Tennessee	5,859,966	93,834	161,437	17,147
Kentucky	4,844,272	61,512	100,275	63,437
Source: (Lowe, et al. 2011)				

Cost of Certification Assessment

19 Landowner Certification Test Audits Across the US (Pinchot Institute, early 2000s)

Average ownership assessed (acres) Average organization price Average cost per acre

FSC Certification Assessment	534,249	\$ 79,394	\$ 0.33
FSC/SFI Certification Assessment	973,064	\$ 86,791	\$ 0.09

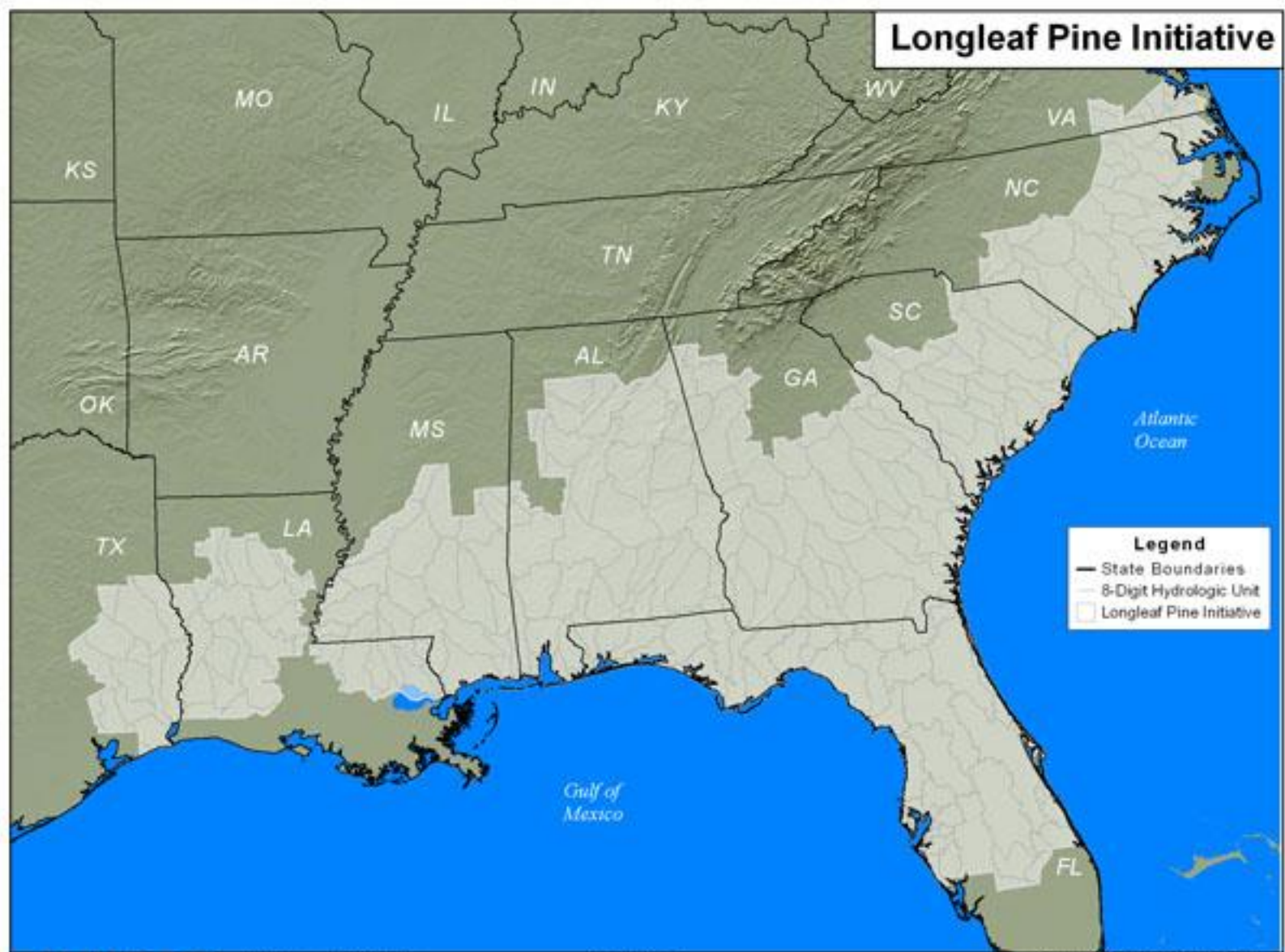
SFI and FSC Differences

- SFI focused largely on **water quality**. FSC does too and in some cases goes beyond state and federal requirements.
- Both address T&E species, but FSC's standards require more extensive **biodiversity protection** (S1, S2, some S3, G1, G2).
- They approach **conversion** differently. In SFI, conversion to plantations is allowed unless any unique values are lost (in the landscape). FSC almost no conversion allowed after 1994.
- **Size of clearcuts**. FSC's upper limited for the US are smaller than SFI nationally, but regional guidance for FSC allows larger clearcuts in SE in certain instances.
- SFI also has a focus on **logger training** and promoting conservation planning and action with landowners.
- **Treatment and mixing of non-certified context**. (Controlled Wood vs. Fiber Sourcing) and variation in percentage mix requirements.

FSC Controlled Wood

- A facility must develop systems such as a Controlled Wood Policy and supplier agreements, specifying how to control risk related to where the material is coming from.
 - ✓ Forest conversion i.e. land where natural forest cover is being converted to non-forest uses or plantations.
 - ✓ Legality
 - ✓ Violation of rights
 - ✓ HCVF harvests
 - ✓ GMOs
- The draft FSC national risk assessment for the US identifies a need to control risk of impacting Longleaf Pine and late successional bottomland hardwoods (80yrs and older) in facility supply areas in addition to HCVs identified at national level (see map on previous slide).

Longleaf Pine Initiative



Legend

- State Boundaries
- 8-Digit Hydrologic Unit
- Longleaf Pine Initiative



U.S. Department of Agriculture
Natural Resources Conservation Service
Resource Assessment Division
Washington, D.C. April 2011

Map ID: 11571

Source: US Department of Agriculture
Farm Service Agency
Natural Resources Conservation Service

Does FSC Address NGO Concerns?

“FSC is the strongest system to protect biodiversity.”

– NGO representative

“There is no certification system that precludes bottomland hardwood harvests.” – NGO representative

“Forest certification does not address the climate piece of the bioenergy issue.” – NGO representative

Final Thoughts

- Cultural context of the Southeast needs to be taken into account.
 - The way to address this is through deliberate and sustained consultative process.
- European buyers need to drive change.
- Need to acknowledge and address data limitations.
- Successful models exist for how to get a lot of lands certified (e.g. The state of Wisconsin's Managed Forest Lands program – landowners get certified and they receive property tax benefits)
- US Government Communications.
- EPA and biogenic accounting.

Thank You!

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