

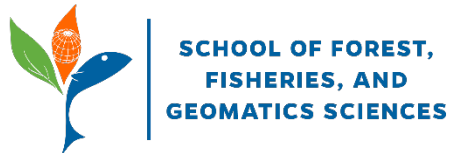
Forest Carbon Opportunity Overview

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9/1/2021

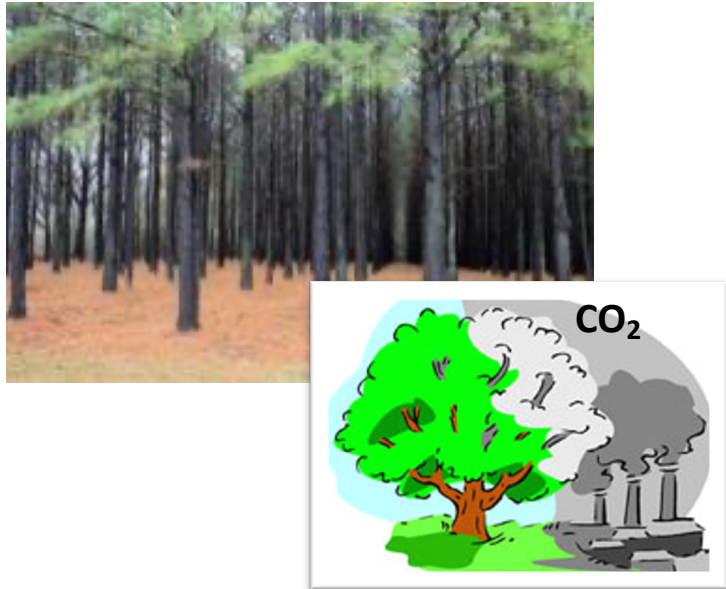
Florida Forestry Association



Southern US Forests Provide...

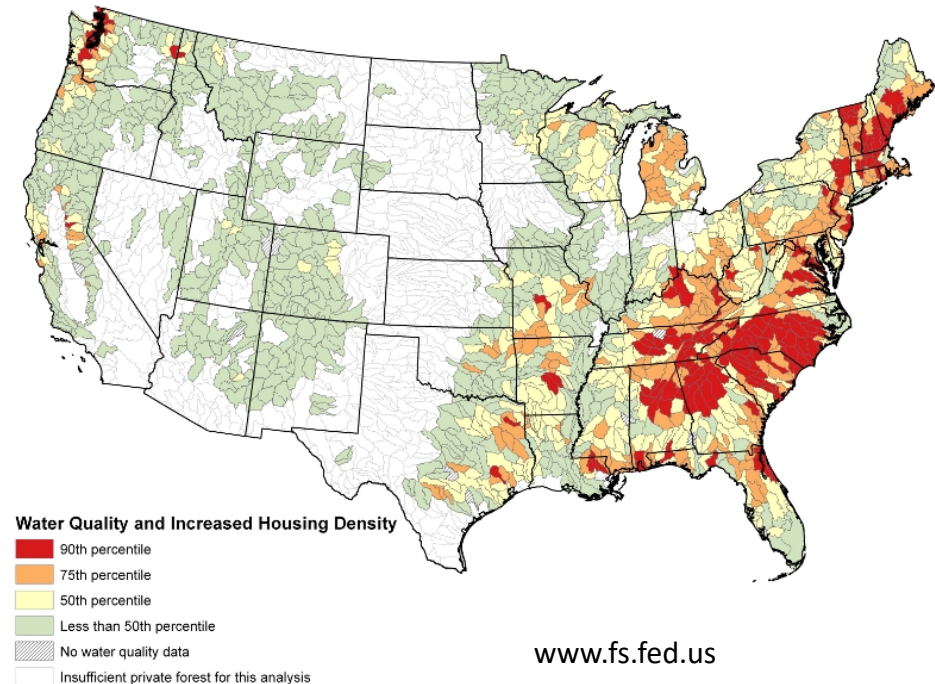
- Southern forests as 'fiber basket' and economic engine

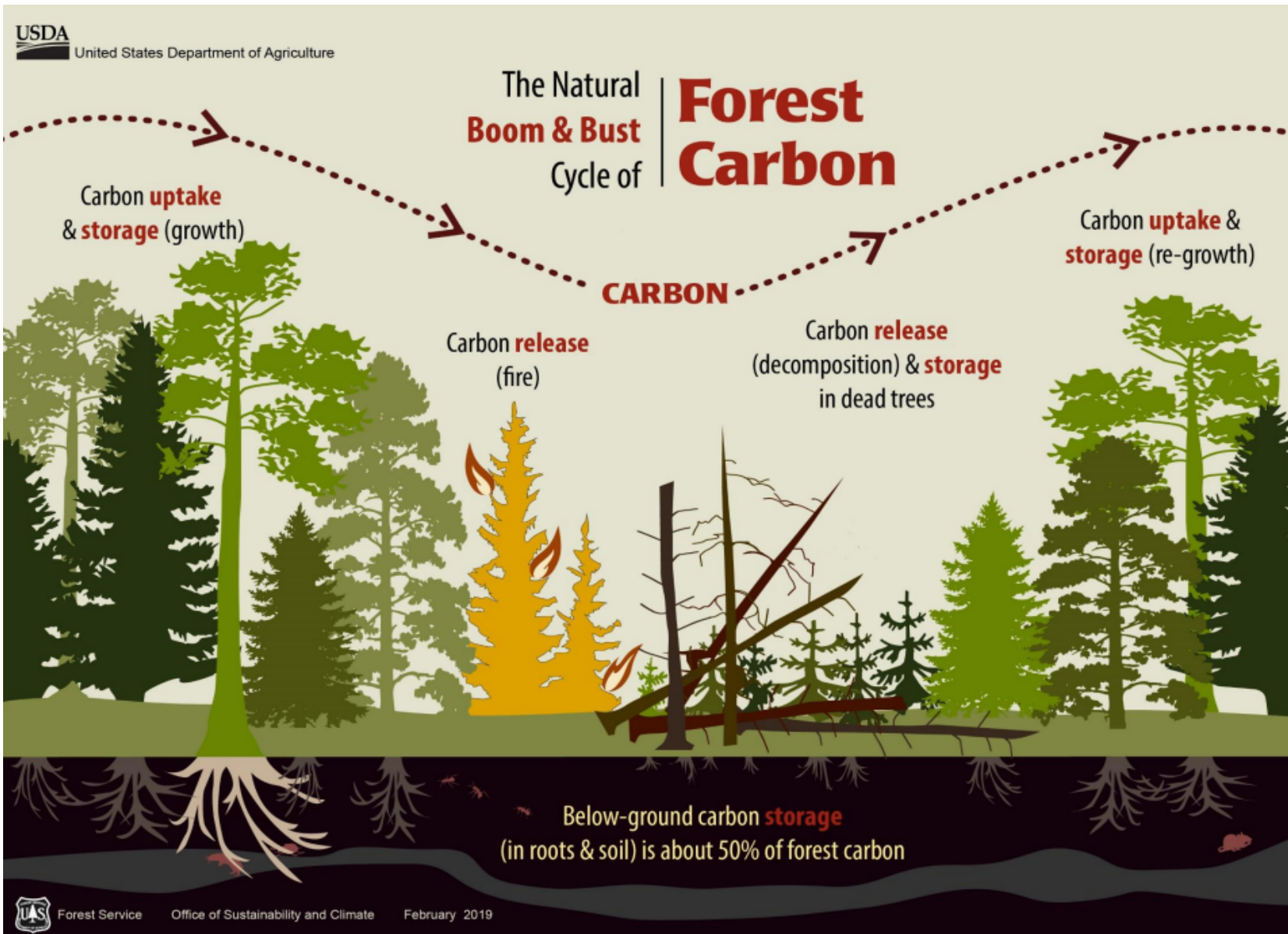
- ~250mn acres of forest, 63% of US wood harvest, 16% of global industrial wood
- 5.5% of jobs and 7.5% of the industrial economic activity



- Numerous ecosystem services

- Sequester 23% of the region's greenhouse gas emissions
- 36% (322bn m³/yr) of total available water supply, 48mn people in SE Region receive water
- Support biodiversity, wildlife habitat, etc.

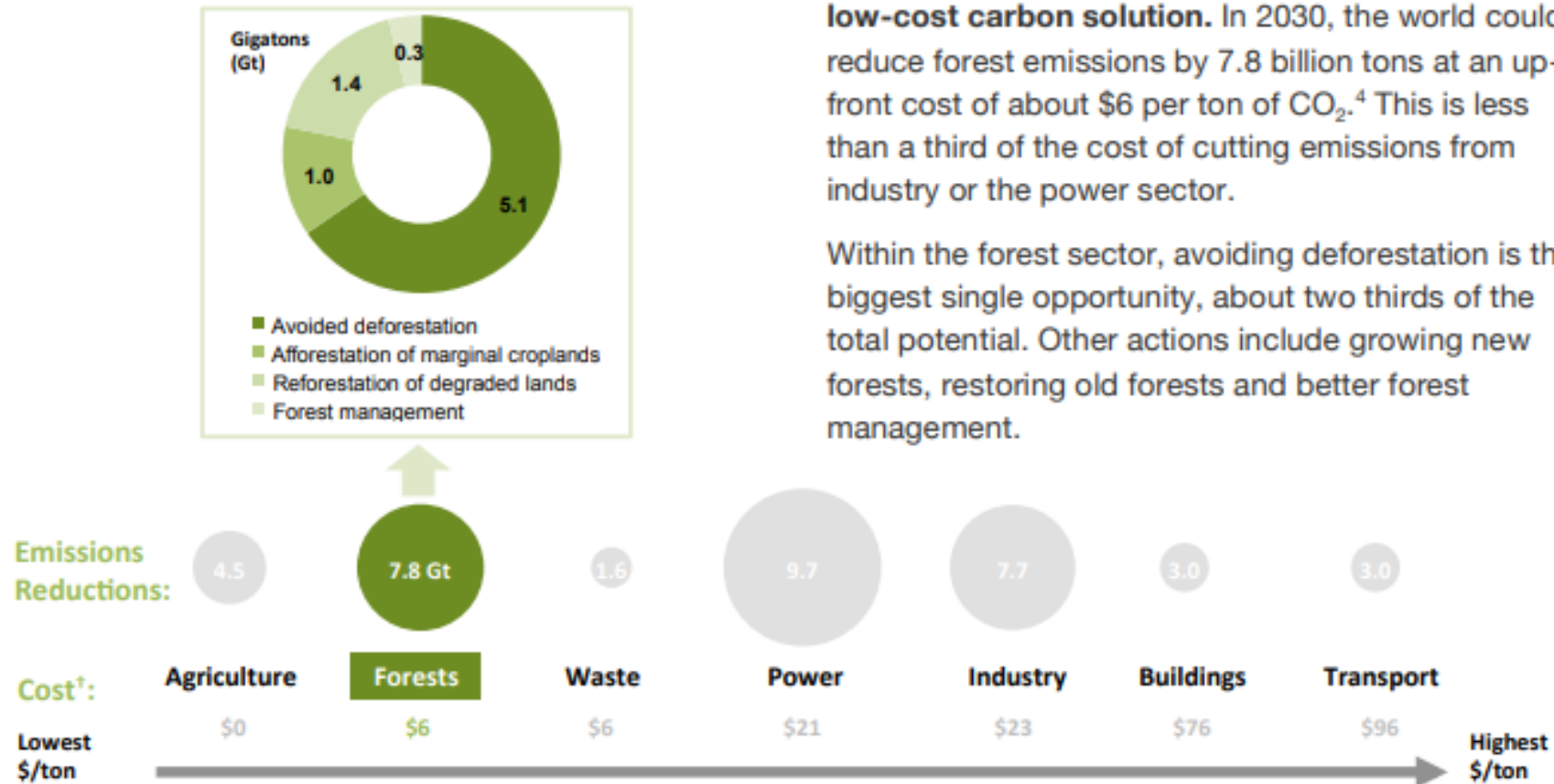




- Below-ground storage ~50% of forest carbon

Forests/Ag Lowest Cost Mitigation Solution

Figure 1. Abatement Opportunity Versus Cost, in 2030[†]



Forests offer one of the best chances to cut climate emissions, and they are by far the biggest low-cost carbon solution. In 2030, the world could reduce forest emissions by 7.8 billion tons at an up-front cost of about \$6 per ton of CO₂.⁴ This is less than a third of the cost of cutting emissions from industry or the power sector.

Within the forest sector, avoiding deforestation is the biggest single opportunity, about two thirds of the total potential. Other actions include growing new forests, restoring old forests and better forest management.

[†] "Cost" reflects capital cost only and does not account for financial savings through, for example, lower energy use.

Forest Carbon Projects

- Types of projects:
 - Afforestation/Reforestation
 - Avoided Conversion
 - Improved Forest Management
- Eligibility
 - Additionality
 - Non-leakage
 - Permanence



Project Development

- Private groups work with landowners to develop projects and carbon credit trading
- Establish project type, location, ownership, forest types, and condition and estimated performance
- Difference from baseline is modeled, net C sequestered in the forest is measured, verified, and sold as offsets
- 3rd party auditors verify
- Major players are Finite Carbon, TerraCarbon, Natural Capital Exchange (NCX; formerly SilviaTerra)

US Carbon Credit Registries – Track credit ownership

Example Carbon Project Registries	Description
American Carbon Registry (ACR)	<ul style="list-style-type: none">•The first private registry in the voluntary market, founded in 1996.•Offset projects registered with ACR can trade their credits on California’s cap-and-trade market and .•ACR includes all three types of forest carbon projects.
Climate Action Reserve (CAR)	<ul style="list-style-type: none">•CAR operates in the voluntary market but projects registered with CAR can trade their offset credits on California’s cap-and-trade market.•CAR was formed in 2001 by the State of California to serve the voluntary market. Since CAR is tied to California’s regulatory body overseeing the cap-and-trade marketplace, it makes it a good candidate for projects developed in North America.•CAR also allows all three types of forest carbon projects.
Verified Carbon Standard/Verra (VCS)	<ul style="list-style-type: none">•The Verified Carbon Standard is the most widely used registry in the voluntary market, worldwide.•VCS registers offsets for IFM, AC, and reforestation projects.•Once a carbon project is validated under VCS protocols the project developers are issued Verified Carbon Units (VCUs), which can then be traded.

Forest Carbon Markets

- Types of Markets
 - Voluntary
 - Compliance (none in FL)
- Notable example: CA's cap & trade program
 - Only private forestland
 - Management plan certified by FSC, SFI, or ATFS (Tree Farm)
 - >95% native species
 - Must demonstrate additionality, permanence, and non-leakage
 - Across the US, with notable projects in VA, WV, ME, and NC

Economic viability

- Contracts can be *very* long (e.g., 100 years)
- Upfront costs can be high (>\$100k); project size a major factor for ROI
- Verification, audit, and long-term monitoring can be burdensome
- Legislative uncertainty, price risk, etc.

Policy Framework

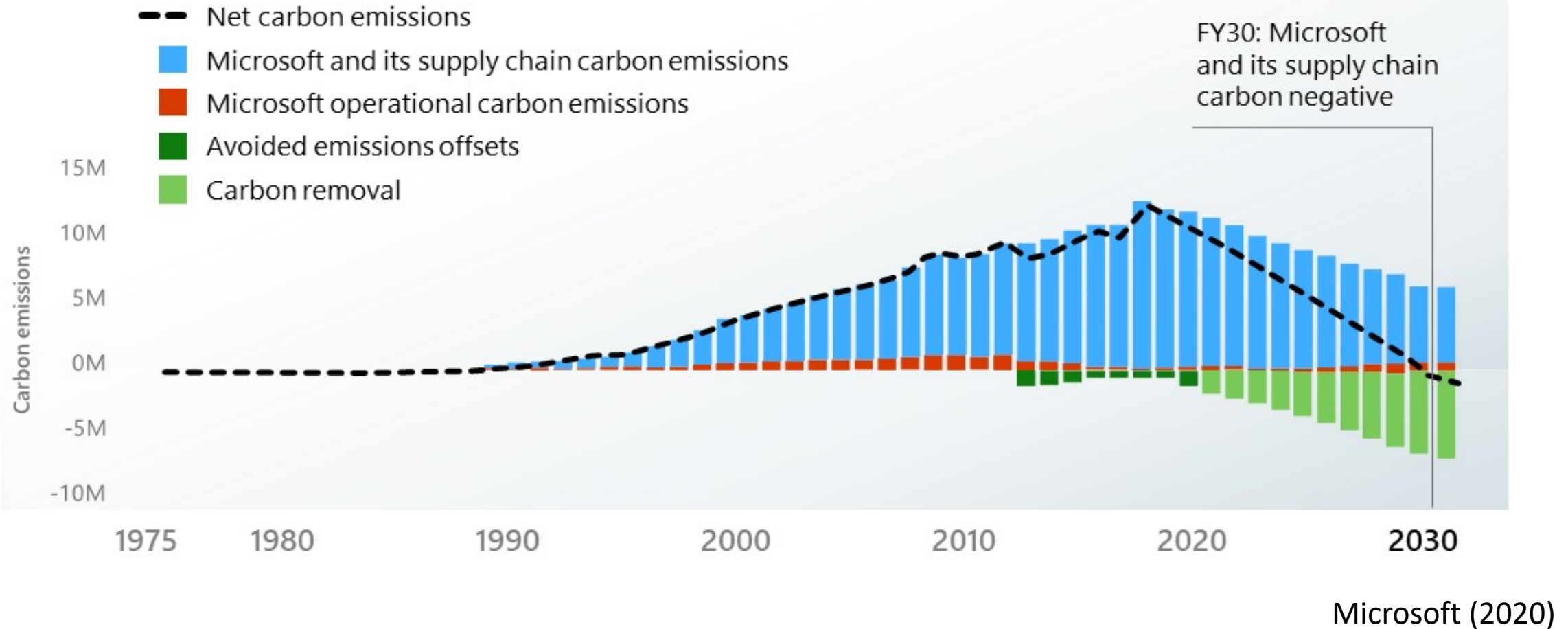
- Historically, C payments and incentives have been *policy*-driven
- US Clean Power Plan (2015)
 - Reduce power sector emissions by 32% below 2005 levels by 2030 (or 12% from 2013 levels)
 - Court challenges and roll back; Biden EPA chose not to resurrect
- UN's Paris Agreement (2016)
 - Substantially reduce GHG to keep global temp increase to 2 degrees C above pre-industrial levels and strive for 1.5; 194 nations signed, including the US
 - Significant opportunities for forestry in the US?
 - Clean Power Plan as underreach for meeting Paris Agreement
- Several unsuccessful attempts on state level in FL

What's different now? *Major* corporate backing

- Half of all S&P 500 utilities have carbon neutrality pledges
 - Net zero by 2040: Walmart, Amazon, Visa, Pepsi, Heineken, Burger King, 49 other companies
 - US Steel, Duke Energy, BP, American Airlines, Shell by 2050
 - “Green companies’ trading at 30% premium for stocks
- Science-Based Targets Initiative
 - ‘science-based’ if they are in line with what the latest climate science deems necessary to meet the goals of the Paris Agreement
 - Limiting global warming to well-below 2°C above pre-industrial levels and pursuing efforts to limit warming to 1.5°C.
 - Includes WestRock and Int’l Paper

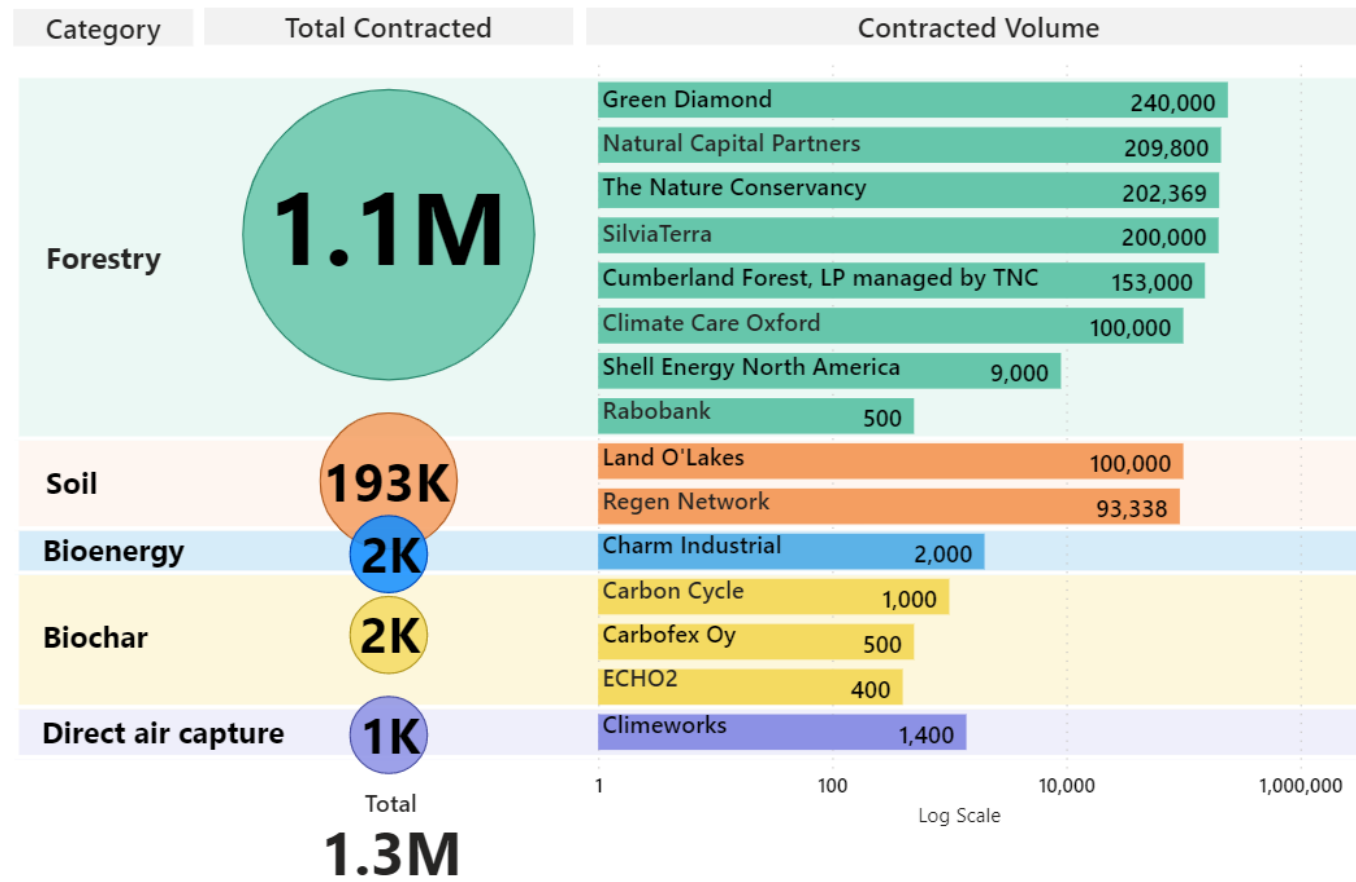
Microsoft's pathway to carbon negative by 2030

Annual carbon emissions

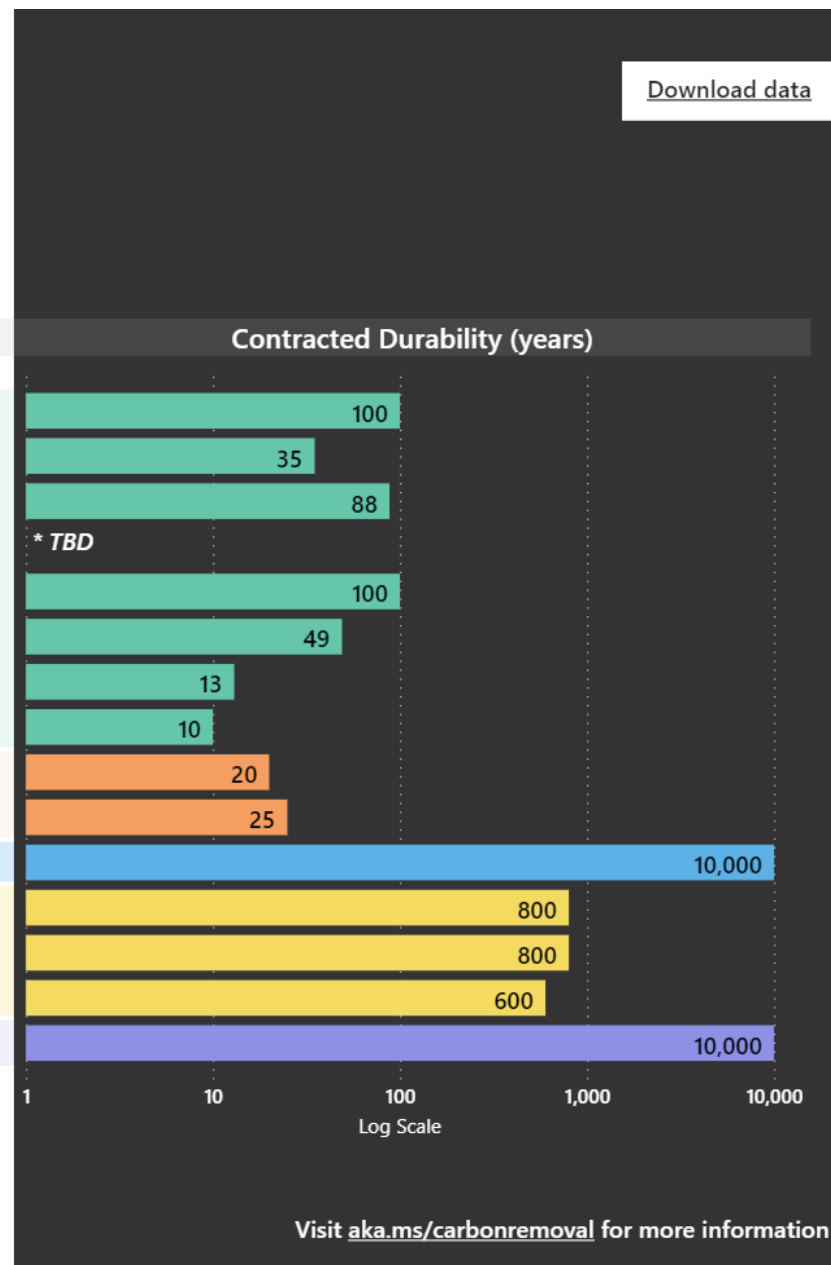


Microsoft's FY21 Carbon Removal Portfolio

Carbon negative **Contracted projects** Worldwide map Project details

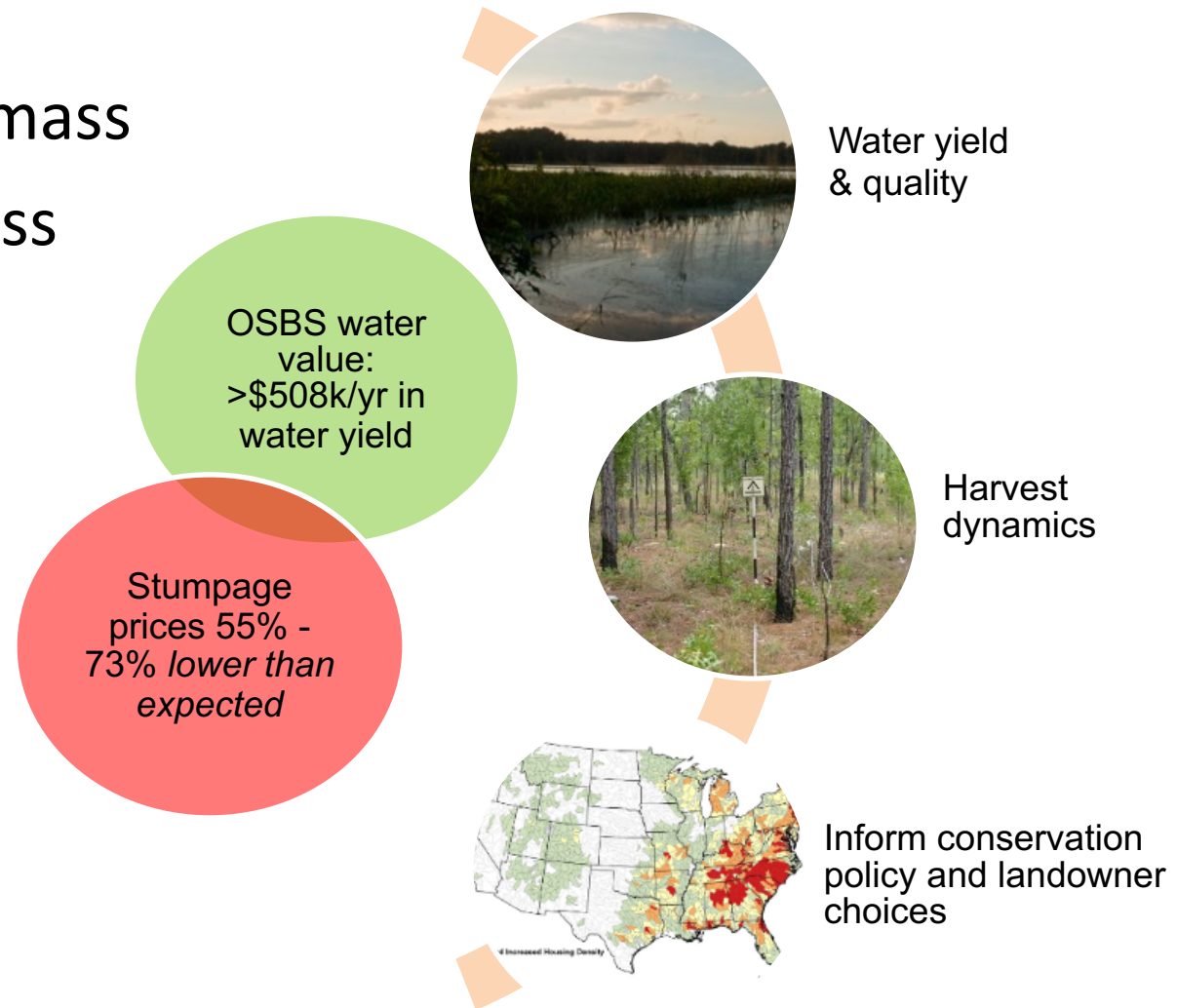


[Learn more](#)



Tradeoffs a Major Concern: Ordway-Swisher site example

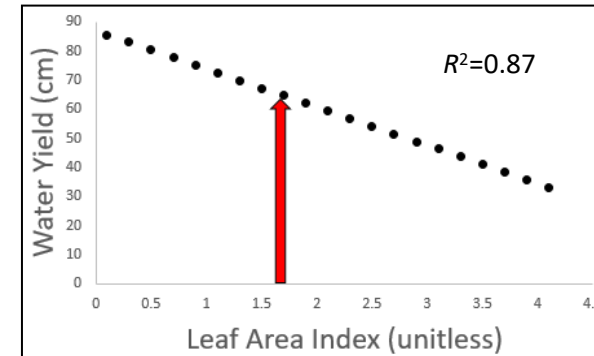
- Carbon → increase biomass
- Water → reduce biomass



Water Yield Value

Water yield: difference between precipitation and evapotranspiration

$$\text{Water yield} = 337.7 - 277.9\text{AR} - 13.1\text{LAI}$$



	AR (Aridity Index)	LAI (m2 m-2)	Water yield (ml/ha)	Difference	Value (\$/ha)	\$/yr range OSBS
Intensive	0.9	3.5	3,900	n/a	n/a	n/a
Anderson Cue	0.9	2.3	5,746	1,846	184.6	710,000
Triangle	0.9	2.7	5,222	1,322	132.2	508,462
Smith	0.9	5.2	1,947	-1,953	-195.3	n/a
Hardwood	0.9	2.0	6,139	2,239	223.9	861,154



Estimated Value of Ecosystem Services from Florida Forest Stewardship Program Lands (~437k acs)

Ecosystem Service	Description	Average Present Value (2010\$)			
		All FSP lands	Per hectare	Per acre	Percent of total
Water purification	Value of maintaining water quality**	\$1,446,357,500	\$8,160	\$3,300	66%
Carbon stocks***	Value of carbon stocks, assuming \$19 per MgC	\$558,827,870	\$3,150	\$1,280	25%
Timber****	Value of timber using the InVEST model	\$10,100,550	\$825	\$330	7%
Wildlife (Non-use value)	Value of preventing up to 5% loss in populations of 5 charismatic species	\$46,000,000	\$260	\$100	2%
Total (rounded)		\$2.06m	\$12,400	\$5,000	100%

* Baseline is 437,823 acres of FSP lands converted to land uses that reduces these ecosystem service values to zero. ** Value shown is based on estimated household Willingness To Pay (WTP) in north Florida, where most FSP lands are located; Assumes a 3% discount rate and 1/3 of the total WTP for water quality protection is allocated to least-cost water quality protection programs like the FSP. *** Assumes average per acre value in northwest Florida and a 3% discount rate; similar to the average \$/acre value for the 4 USDA-FS Forest Inventory and Analysis regions. ****Total per acre average present value for northeastern Florida.

Participation barriers

- Managers know how to grow trees, but ecosystem services?
- Uncertainty and risk
- Accounting and verification (red tape)
- Additionality, tradeoffs
 - Estimating the capturable value?
 - What impacts on timber production, hunting, etc.?
 - Future generations?





COMMODITIES

New Carbon Market Pays Southern Pine-Growers Not to Cut

Companies such as Microsoft, Royal Dutch Shell pay timberland owners to keep trees standing in an effort to offset emissions

By [Ryan Dezember](#) / Photographs and Video by Rory Doyle for The Wall

Street Journal

April 20, 2021 5:33 am ET



Listen to this article
8 minutes

Here is a new way for Southern pine growers to get paid for their timber: Leave it standing.

Companies eager to offset their emissions are paying Southern timberland owners not to cut more than a million acres of mill-bound pine trees until next year.

Viable market solution? NCX

- 1-year contract
- Low red tape
- Mostly large tracts

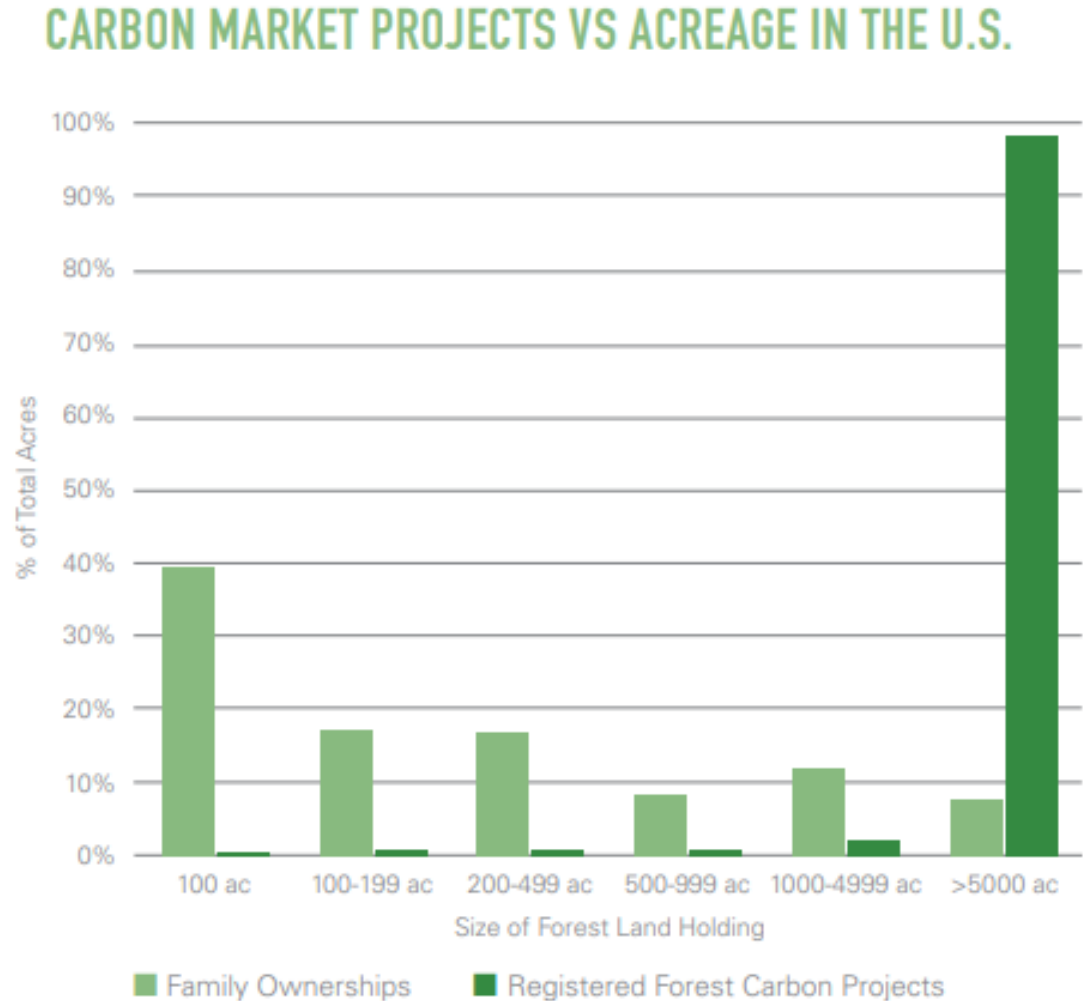


SilviaTerra's computers told Keith McDaniel he could sell 43 offsets if he didn't log his 133 acres in Mississippi. He considered thinning his 17-year-old loblolly pine and selling logs to the pulp mill. But after subtracting logging and trucking costs, Mr. McDaniel estimates that low pulpwood prices would have left him with just \$3 a ton. A carbon sale would offset his property taxes and leave the trees for a future harvest.

"It was a no-brainer," he said. "Every year they grow they're putting on volume."

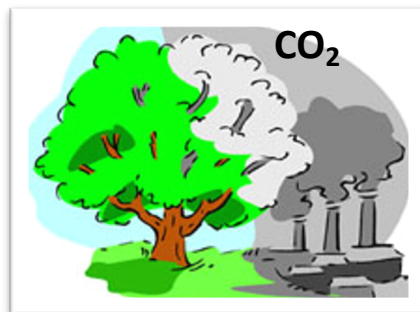
Viable market solution? FFCP

- More than 98% of forest C projects >5,000 acres
- Family Forest Carbon Program (American Forest Foundation and The Nature Conservancy)
- Project baselines generated from similar properties found in FIA data
- Pending approval by Verra's Verified Carbon Standard (VCS) summer 2021
- Amazon \$7.3mn commitment to the program



State and Federal Policy Solutions?

- Policy-driven markets for forest ecosystem services *that recognize tradeoffs*
- Improve market conditions
- Cost-share, technical assistance, changes to tax policy... all help
 - Too inflexible for many landowners; trust in government
 - Conservation easements and “working forest” concept
- Better information on \$\$ impacts to landowners
- Proactively reduce disturbance risk
- Right-size our investment in forests



Incentives and Cost-share Programs: Suggested Contacts

- State programs
 - Joshua Faylo, Conservation Programs Manager, Florida Forest Service;
Joshua.Faylo@FDACS.gov
- UF/IFAS Florida Land Steward Program
 - Chris Demers, Extension Program Manager, UF/SFFGS; cdemers@ufl.edu
- Florida Tree Farm
 - Anthony Grossman, FL Tree Farm Program President,
Anthony.Grossman@MyFWC.com
- Federal programs (e.g., Farm Bill/NRCS EQIP, CSP)
 - Chakesha Harvey, NRCS Asst. State Conservationist for Programs;
chakesha.harvey@usda.gov

Thank you!

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