Forest Ecosystem Services

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Background

• Ecosystem services
• Market and non-market valuation
• Markets and programs
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.
Private Forest Lands in Florida
# Estimated Value of Ecosystem Services from Florida Forest Stewardship Program Lands (~437k acs)

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

* 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.
Problem?
Factors that Impact the Forest Estate

**Government**
- Regulations
- Taxes
- Technical/financial assistance
- BMPs
- Market-based schemes

**Markets**
- Real estate
- Timber
- Non-timber products
- Ecosystem Services

**Environment**
- Parcel fragmentation
- Climate change
  - Disturbance
    - Disease
    - Wildfire
    - Weather/storms

**Landowner Values**
- Land use objectives
- Ideologies
- Sense of duty (e.g., to rules of society)
- Skepticism about government
Key Questions

• What are ecosystem services?
• What is the value of ecosystem services (ES) from working and natural lands?
  – Property rights (who owns the services provided by the land?)
• What affects ES value, and by how much?
• What policies or programs help capture the value?
  – Monetary implications
  – Non-monetary implications

https://www.fs.fed.us/ecossystemservices/
Forest Water Quality Value

- WTP is sensitive to resource type, information, scale, valuation method, time, demographics (income, location)
- Statewide survey:
  - Attitudes toward government and forests affect WTP
  - Household WTP $6 to $12 annually or $43m to $86m statewide
Mapping Ecosystem Services: Suwannee River InVEST Example

Note: Integrated Valuation of Environmental Services and Tradeoffs (InVEST) output using FFWCC 2003 Land Cover GIS data at 30m resolution; Assumes $13.60/tCO2e for Certified Emissions Reductions; Includes total carbon stored (Mg/ha), carbon aboveground (Mg/ha), carbon belowground (Mg/ha), carbon soil (Mg/ha), and carbon dead (Mg/ha) from USDA Forest Inventory and Analysis national program data; Source: Delphin, Escobedo, Adams, et al. unpublished.
**Water yield value**

*Water yield*: difference between precipitation and evapotranspiration

Water yield = 337.7 - 277.9AR - 13.1LAI

<table>
<thead>
<tr>
<th>AR (Aridity Index)</th>
<th>LAI (m² m⁻²)</th>
<th>Water yield (ml/ha)</th>
<th>Difference</th>
<th>Value ($/ha)</th>
<th>$/yr range OSBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensive</td>
<td>0.9</td>
<td>3.5</td>
<td>3,900</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Anderson Cue</td>
<td>0.9</td>
<td>2.3</td>
<td>5,746</td>
<td>1,846</td>
<td>184.6</td>
</tr>
<tr>
<td>Triangle</td>
<td>0.9</td>
<td>2.7</td>
<td>5,222</td>
<td>1,322</td>
<td>132.2</td>
</tr>
<tr>
<td>Smith</td>
<td>0.9</td>
<td>5.2</td>
<td>1,947</td>
<td>-1,953</td>
<td>-195.3</td>
</tr>
<tr>
<td>Hardwood</td>
<td>0.9</td>
<td>2.0</td>
<td>6,139</td>
<td>2,239</td>
<td>223.9</td>
</tr>
</tbody>
</table>

\[ R^2 = 0.87 \]
Ordway-Swisher site example

OSBS water value: >$508k/yr in water yield

Stumpage prices 55% -73% lower than expected

Water yield & quality

Harvest dynamics

Inform conservation policy and landowner choices
The stated-preference willingness-to-pay (WTP) per household/month = $1.75 average median
Median WTP = $21 per year
> $156m per year in Florida
Compare to Amendment 1 spending ($17.4m) to acquire parks and habitat
Markets/programs for Ecosystem Services

• Markets (emerging, but not well-established)
  – Carbon sequestration
  – Conservation banking
  – Wiregrass seed, palmetto berries

• Cost share, incentive programs, and other arrangements
  – Conservation Reserve Program, Wetlands Reserve Program, etc.
  – Easements (development rights?)
  – Reduced taxes (property, estate)
  – Contracts/boutique agreements
Available Programs

Forest Incentive Programs Available in Florida

Select a listing

Federal
State
Private

select a state Go

Florida Department of Agriculture and Consumer Services

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You are here: Home > Divisions & Offices > Florida Forest Service > For Landowners > Programs

Programs

Rural and Family Lands Protection Program
The Rural and Family Lands Protection Program is an agricultural land preservation program designed to protect important agricultural lands through. Read more

Cogongrass Treatment Cost-Share Program
A Cogongrass Treatment Cost-Share Program was offered to eligible non-industrial private landowners by the Florida Forest Service (FFS) through. Read more

Southern Pine Beetle Prevention
The goal of this program is to minimize Southern Pine Beetle damage in Florida by helping forest landowners conduct management

- http://www.freshfromflorida.com/Divisions-Offices/Florida-Forest-Service/For-Landowners/Programs
<table>
<thead>
<tr>
<th>Level</th>
<th>Program Name</th>
<th>Organization</th>
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<tbody>
<tr>
<td>Federal</td>
<td><strong>Biomass Crop Assistance Program (BCAP)</strong></td>
<td>Farm Service Agency</td>
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<td></td>
<td><strong>Conservation Reserve Program (CRP)</strong></td>
<td>Farm Service Agency</td>
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<td></td>
<td><strong>Conservation Stewardship Program (CSP)</strong></td>
<td>Natural Resources Conservation Service</td>
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<td></td>
<td><strong>CRP Continuous Sign-Up</strong></td>
<td>Farm Service Agency</td>
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<td></td>
<td><strong>Emergency Watershed Protection Program (EWP)</strong></td>
<td>Natural Resources Conservation Service</td>
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<td></td>
<td><strong>Environmental Quality Incentives Program (EQIP)</strong></td>
<td>Natural Resources Conservation Service</td>
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<td></td>
<td><strong>Forest Legacy Program (FLP)</strong></td>
<td>Florida Division of Forestry</td>
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<tr>
<td></td>
<td><strong>Forest Stewardship Program (FSP)</strong></td>
<td>Florida Division of Forestry</td>
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<td></td>
<td><strong>Healthy Forest Reserve Program (HFRP)</strong></td>
<td>Natural Resources Conservation Service</td>
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<td></td>
<td><strong>Landowner Incentive Program (LIP)</strong></td>
<td>Fla. Fish &amp; Wildlife Conservation Comm.</td>
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<td></td>
<td><strong>Longleaf Pine Ecosystem Restoration Private Landowner Incentive Program</strong></td>
<td>Florida Division of Forestry</td>
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<td></td>
<td><strong>Partners for Fish and Wildlife</strong></td>
<td>U.S. Fish and Wildlife Service</td>
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<td></td>
<td><strong>Private Individual Grants</strong></td>
<td>U.S. Fish and Wildlife Service</td>
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<td></td>
<td><strong>Red-Cockaded Woodpecker Recovery Program</strong></td>
<td>U.S. Fish and Wildlife Service</td>
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<tr>
<td></td>
<td><strong>Southern Pine Beetle Prevention Program (SPBP)</strong></td>
<td>Florida Division of Forestry</td>
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<td></td>
<td><strong>Wetlands Reserve Program (WRP)</strong></td>
<td>Natural Resources Conservation Service</td>
</tr>
<tr>
<td></td>
<td><strong>Wildlife Habitat Incentives Program (WHIP)</strong></td>
<td>Natural Resources Conservation Service</td>
</tr>
<tr>
<td>State</td>
<td><strong>Florida Rural Development Program</strong></td>
<td>Florida Division of Forestry</td>
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<tr>
<td></td>
<td><strong>Property tax: Agricultural lands</strong></td>
<td>Florida Division of Forestry</td>
</tr>
<tr>
<td></td>
<td><strong>Rural and Family Lands Recovery Program</strong></td>
<td>Florida Division of Forestry</td>
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<tr>
<td>Private</td>
<td><strong>Florida Tree Farm Program</strong></td>
<td>Florida Forestry Association</td>
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<td></td>
<td><strong>Longleaf Restoration Program</strong></td>
<td>Longleaf Alliance</td>
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<td></td>
<td><strong>Statewide Forest Trust</strong></td>
<td>Community Open Land Trust</td>
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Wildlife Best Management Practices

• Recognize habitat services provided by private forest lands; Minimize impact on 16 state listed species
• Provide regulatory assurance (Incidental Take Permit [ITP])
• >90% say listed wildlife species likely use their lands, but no respondents applied for ITP
  – Forestry will not harm species (50%)
  – Not familiar with the ITP process (36%)
  – >75% prefer voluntary to regulatory approaches
  – NIPF owners unwilling to adopt more rigorous WBMPs (e.g., managing for two age classes) to help with species recovery
  – May need incentives
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? [Link](http://carbon.sref.info/estimating/calculator)
  – What impacts on timber production, hunting, etc.?
  – Future generations?
Policy Solutions

• Policy-driven markets for forest ES *that recognize tradeoffs*
• Improve market conditions
• Cost-share, technical assistance, changes to tax policy... all help
  • Too inflexible for many landowners; trust in gov’t
  • Cons. easements and “working forest” concept
• Better information on $$ impacts to landowners
• Proactively reduce disturbance risk
• Right-size our investment in forests
Sustained Effort by stakeholders

• FFA 2015, 2016 Working Forest Partners meetings, 2018 annual meeting, Roundtable 2020, Working Forests Week
  – Conservation, industry, state agency stakeholders
SB1772 – Environmental Value of Agricultural Lands and Timberlands

• SB1772

  – FDACS must "find a formula to determine the value that agricultural lands and timberlands in this state provide for water recharge, stormwater filtration, wildfire habitat, and water quality benefits"

  – Funding mechanism TBD, but no taxes or fees
SB286 – A Tax Credit to Encourage Carbon Farming

- Property tax credit for qualified carbon farming activities
  - NRCS COMET-Planner system
- IFAS statement authored by Adams, Bi, and Grogan
  - Tradeoffs and synergies
  - Durability of C storage, additionality
  - Florida-relevant data on C sequestration rates and SCC
  - Impacts on rural economy and timber economy
  - Agency/office in charge
  - Overhead and transactions costs
HB1311 – Agriculture and Timber Operations Cost-share Program

• New cost-share program in FDACS, up to 75%
• Office of Ag Water Policy, FFS, and FDEP
  – “determine the value of water recharge, stormwater filtration, wildlife habitat, carbon sequestration, and air quality benefits provided by the agriculture and timber industries”
  – work with UF/IFAS and agriculture and timber industries “to identify industry research that is needed and determine the value of environmental services provided by such industries”
Major policy challenges

- Ecosystem services
- Forest health
- Climate change and disturbance risk
- Tax treatment for disasters (e.g., Michael)
- Intergenerational transfers
- Agricultural in-migration
- Oversupply and stumpage prices declining