

MONETIZING POPLAR ECOSYSTEM SERVICES: ADVANCING THE PACIFIC NORTHWEST FEEDSTOCK PRODUCTION INDUSTRY

TREES Workshop – April 25, 2017

WOODINVILLE, WASHINGTON

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Poplar Ecosystem Service Values

Objective

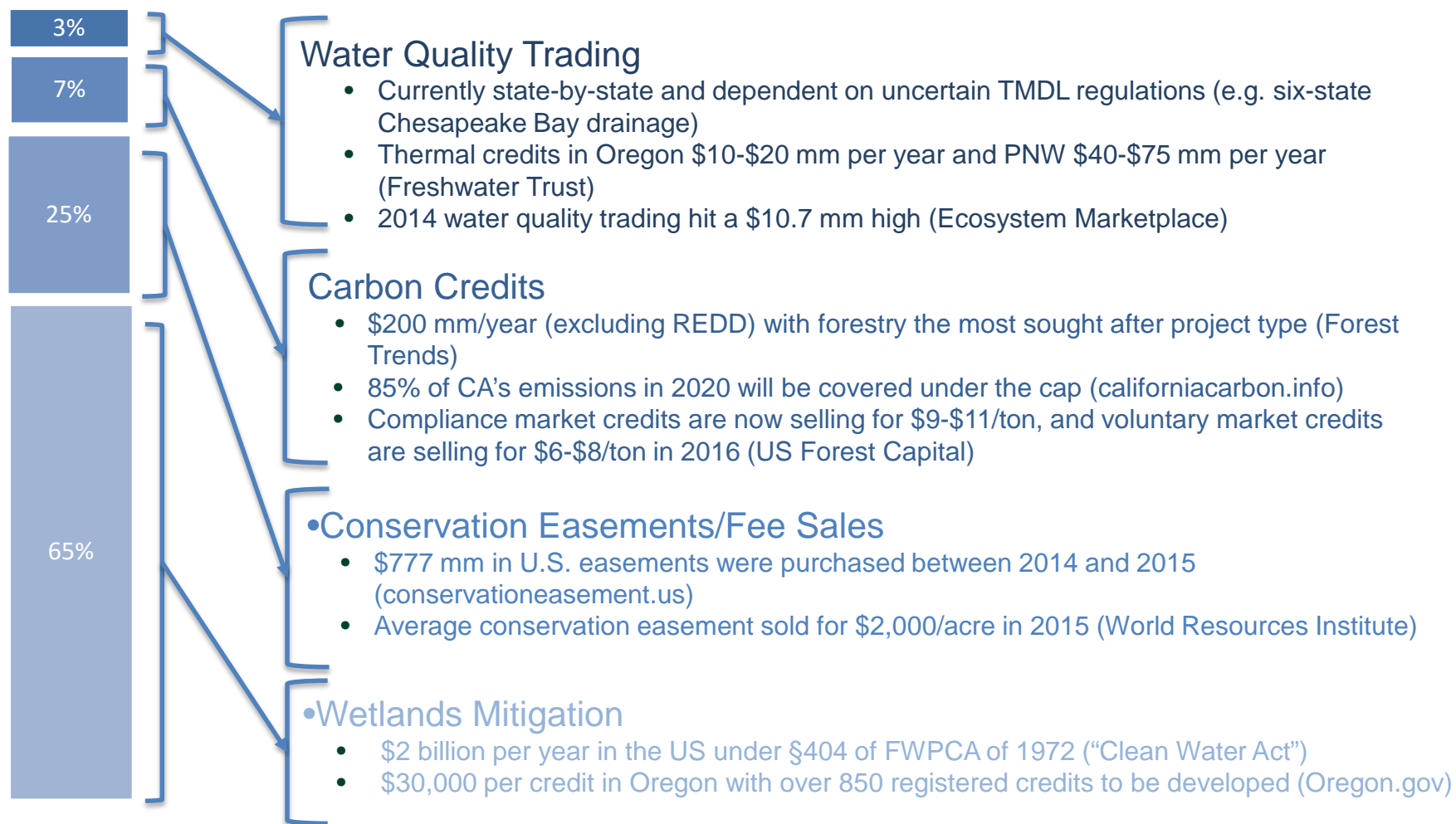
Show how leveraging ecosystem service values moves us closer to the development of the biofuels industry in the Pacific Northwest.

Topics

1. A case study of poplar plantations jointly providing commercial timber and ecosystem services.
2. A proposal for the Pacific Northwest poplar community to improve access to ecosystem service markets.



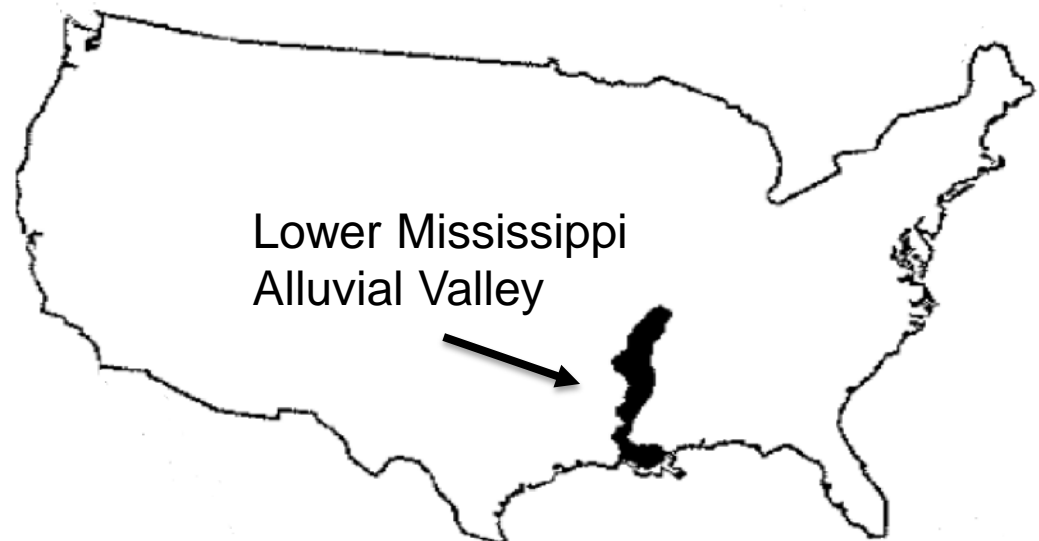
U.S. Payments for Ecosystem Service (PES) Total in 2015 = \$3.1 billion





Poplar Case Study

**Intercropping Bottomland Hardwood
Forests for Timber and Carbon
Sequestration**





Poplar Case Study

Afforestation System For Restoring Bottomland Hardwoods: Biomass accumulation of Nuttall oak seedlings interplanted beneath eastern cottonwood



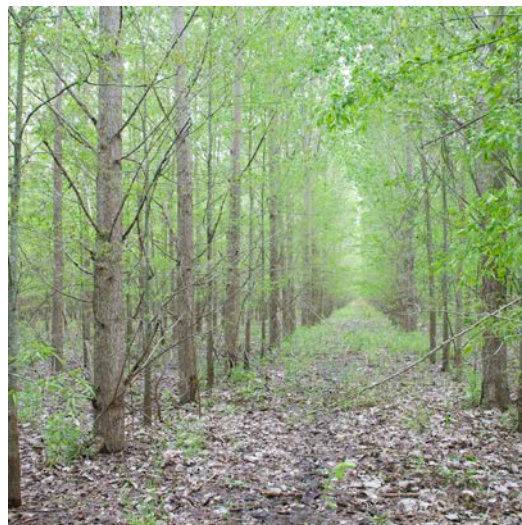
Restoration Ecology 2004 12: 525-532. Emile Gardiner, USFS; John Stanturf, USFS; Callie Schweitzer, USFS.



Poplar Case Study



Seven-year-old cottonwood stand interplanted with 5-year-old Nuttall oak



Age 12 interplanted cottonwood-oak stand



Thinning 12-year-old cottonwood in releasing 10-year-old Nuttall oak

Images courtesy of Emile Gardiner and John Stanturf, USFS and Sarah McDonough, GreenTrees



Economic Potential of Agroforestry and Forestry in the Lower Mississippi Alluvial Valley with Incentive Programs and Carbon Payments

■ Gregory E. Frey, D. Evan Mercer, Frederick W. Cabbage, and Robert C. Abt

Southern Journal of Applied Forestry 2010.

- Conversion of bottomland hardwood forests to agricultural land has caused a loss of ecosystem services.
- Financial returns from agroforestry, forestry and annual cropping estimated to determine relative profitabilities.
- Systems that maintain large carbon stocks by the avoidance of clearcutting perform better financially when carbon credits are sold.



Poplar Case Study

GreenTrees...

Consolidating ecosystem services in the Lower Mississippi Alluvial Valley:



- Sustainable management and joint marketing of timber and ecosystem service values
- Afforestation of 120,000 acres formally in soybeans, corn, and cotton.
- Transacted 2.5 million tons of sequestered carbon in voluntary markets; credits registered through the American Carbon Registry.
- Afforestation goal on one million acres.



Poplar Case Study

1. Ecosystem values



Background:

GreenTrees is the Nation's leading Originator of Reforestation Carbon with over 2.5 million tons under contract for Duke Energy, Norfolk Southern Railways and others. GreenTrees was the first to register Afforestation Reforestation Carbon on Winrock International's American Carbon Registry. Last year, GreenTrees accounted for 98% of all Afforestation Reforestation Carbon contracted in North America.

While GreenTrees focuses on Reforestation in the Mississippi Alluvial Valley utilizing its cottonwood hardwood interplanting approach ("The GreenTrees Approach"), the company has a service to help landowners bring to market tons from other bottomland hardwood planting regimes. We call this our GreenTrees Program.

Endorsement and Awards:

- National Wildlife Federation
- The 2009 Southern Governors Innovation Award
- The Innovation Award for American Carbon Registry

Registry:

American Carbon Registry, Forest Carbon Project Standard v2.1

Transaction History:

GreenTrees has sold all 2.5 million tons of carbon in a price range of \$5 to \$10 per ton.

Eligible Lands:

For lands that have been reforested in WRP or CRP in the last several years, we propose to bring to market the unsold tons that have accrued on your lands.

Term of Contract:

15 years with an option to renew

Business Terms:

We strongly believe in aligning our interest with that of our landowners. Carbon proceeds are split 50/50 after buffer requirements and transaction expenses. A 40¢ per ton surcharge is applied to help pay for registration and verification costs.

Carbon Process:

Measure the Forest

Convert to Carbon

Verify

Send Verification Report to Registry

Get Serial Numbers for Each Ton of Carbon Verified

Timeline:

As the tons of carbon are verified and registered, we are free to transact with buyers.

To be part of the next verification, we ask for approval and a signed contract as soon as possible.

Contact Information:

In Mississippi:
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662.458.5256
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In Louisiana, Arkansas and Tennessee:
Andy Johnson
870.403.3885
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Additional Information:
www.green-trees.com or
http://vimeoopro.com/greentrees/planting

GreenTrees Delivers...

The Delta's Future Looks Green

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GREEN TREES
ONE ACRE AT A TIME

2. Corporate buyers of carbon...

3. Landowner participation...



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Consideration	Terms
Eligibility	Lands meeting CREP requirements for poplar/hardwood interplanting
Upfront payment	Fixed per-acre fee paid to landowner at time of contract closing
Ecological Easement	25 year lease; 70 year covenants that the land remain as a forest
Establishment	Developer pays landowner's federal cost share
Poplar Thinning	All stumpage value retained by landowner for each thinning
Hardwood Selection Cutting	Landowner retains all stumpage value and right to thin beginning at age 25; mandated basal area threshold to ensure carbon stocks
Carbon and Ecological Assets	GreenTrees retains exclusive right to market carbon and other ecosystem assets. Proceeds split with landowner
Recreation Payments	Landowner retains 100% of all recreation income



PNW Ecosystem Service Markets

Supply

- Requires methods for quantifying ecosystem service benefit with appropriate documentation, third-party verification, credit registration and sales, ongoing monitoring.

Demand

- Compliance market demand
 - Mandated by a governmental regulatory body for covered businesses in that region to achieve an environmental target.
 - Carbon – California Air Resources Board (ARB) is currently the only US compliance market.
 - Water Quality – Medford Regional Thermal Credit Trading Plan
 - 2016 Oregon DEQ Internal Management Directive on Water Quality Trading
- Voluntary market demand
 - The majority of voluntary buyers purchased transacted offsets in 2013 to meet corporate social responsibility commitments, establishing industry leadership in battling climate change.
 - American Carbon Registry (ACR) is most commonly recognized voluntary market

Price

- Market sets the economic value of ecosystem service.
- Carbon offset pricing \$8 - \$12/Ton CO₂e in compliance markets and \$5-\$7/Ton CO₂e in voluntary markets (both as of June 2016).



Entering the Market:

Who and where are ecosystem values generated?

1. Private equity investments into commercial/production plantations of moderate scale.
2. Publicly-owned treatment works processing municipal effluent.
3. Individual farmers managing riparian plantings, shelterbelts, agroforestry fields.





The Case for NW Poplar Cooperative

- Access to ecosystem markets vastly improved through the coordination of many moderate and small poplar plantation landowners to achieve scale.
- Precedents exist
 - Southwest Washington Poplar Cooperative
 - Minnesota Agro-Forestry Cooperative.
- Coop benefits
 - Market access often requires minimum transaction size
 - Cost-sharing (e.g., administration, monitoring, management, harvesting)
 - Technology sharing, improved negotiating position for crop care and harvesting contracts
- Next step
 - Feasibility study and business plan





Impact of Ecosystem Services:

An example with carbon markets

Farm	Yield ¹	Carbon Component ²	Carbon Dioxide Equivalent	Required Ecosystem Service Payment ³	Carbon Sequestration Ecosystem Service Value ⁴	Difference
Jefferson	8.00	3.68	13.51	\$ 40	\$ 149	\$ 109
Hayden	7.00	3.22	11.82	\$ 196	\$ 130	\$ -66
Clarksburg	9.00	4.14	15.19	\$ 502	\$ 167	\$ -335
Pilchuck	6.33	2.91	10.69	\$ 104	\$ 118	\$ 14



- 1/ Bone dry tons/Acre/Year. Production of above ground leafless biomass achieved on a sustainable basis by three-coppice management.

2/ Bone dry tons/Acre/Year. Assumed carbon ratio of above-ground biomass to be 0.46.

3/ Dollars/Acre/Year. Required ecosystem service payment to achieve a to 5% return when biomass sold for \$70/BTD.

4/ Dollars/Acre/Year. Yearly proceeds for sequestered carbon per acre per year at current market value of \$11/BDT.

