



Conservation Biomass

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Advanced Bioeconomy Feedstocks Conference

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About The Earth Partners LP (TEP)

The Earth Partners LP is a land restoration company

- **Portfolio of businesses and assets reflect a commitment to land restoration and economic value creation**
 - Insect infested forest management
 - Invasive removal and mitigation of encroachment
 - Wetlands mitigation
- **Investors, partners, and management team focused on building a world class bio energy**
 - Extensive experience in a variety of crops and commercialization technologies
 - Partnerships with top companies across a number of pathways/technologies
 - Strong policy capability with on-going affiliations (Forest Trends, Rocky Mountain Institute, White House)
- **Integrated financing strategy**
 - Long-term investor group, Vision Ridge, with capacity and interest to fund catalytic projects
 - Sustainable Asset Fund managed by Vision Ridge



- Staff and operating assets spread across the US
- Developing sustainable business models around conservation activities, including biomass

Partner Organizations

VISION RIDGE
P A R T N E R S



Portfolio of The Earth Partners Activities



Mountain Pine Management
Rapid City, South Dakota
Beetle-kill pine wood pellets



Mitigation Capital
1st Investment, Houston, TX
Wetlands Mitigation Fund



**Texas Conservation
Bioenergy**



**Rangeland brush
pellets & wood chips**



Louisiana RCPP

"Restoring Coastal Prairie through Biofuels"

**Warm season perennial grass
establishment**

Undisclosed
*Branded marketer of wood fiber
products (animal bedding, litter)*

The production of “conservation biomass” feedstock is a pathway restore degraded landscapes at scale

What is conservation biomass?

- Biomass feedstock that has land restoration benefits *and* can be used in the production of bioproducts (i.e., industrial, energy, and consumer products)
- Production and harvest creates environmental benefits
 - Enhanced water resources
 - Soil carbon
 - Reduced soil erosion
 - Improved biodiversity
 - Improved wildlife habitat
 - Reduced wildfire risks
- Also produces economic value to landowners and rural communities

Example conservation biomass models



Harvesting
invasive brush/
diseased trees

**Biomass
Feedstock**

Growing
perennial
native grasses



The target markets include existing and growing non-regulated markets, plus large-scale energy & commodities

Size of US market, \$million

ILLUSTRATIVE
ESTIMATES

Non-regulated

\$0 \$1,000 \$2,000 \$3,000 \$4,000 \$5,000 \$6,000



Heating

\$800



Animal litter

\$2,000



Animal bedding

\$200



Absorbents

\$100



Packaging

\$2,000



Soil amendment

\$1,000

**\$6bn market
(more with
add'l product
conversions)**

Regulated energy or commodity market allow for scaling 100x



Bioenergy & chemical

\$25,000

\$25bn includes current US biofuel market—category would exceed \$100bn with cellulosic biofuels, biopower, biochemical

TEP is promoting Conservation Biomass in national policy to build this market

UK

- Recognized “**biomass removed for ecological reasons**”
- Not required to meet sustainable forest management or UK Timber Standard requirements

Netherlands

- Recognized “**biomass residues from landscape and natural restoration**”
- Not required to meet land use change/carbon debt; sustainable forest management; soil quality criteria

Belgium

- Considering additional incentives for power plants burning conservation biomass
- Avoids conflict with the local wood products industry

United States

- Strong White House and EPA engagement around domestic co-fire and 111(d)
- California/Washington state beginning to recognize incremental value of bioenergy and ecosystem services (i.e., conservation biomass) for LCFS and cap-and-trade

TEP is in continuing conversations with governments to recognize and provide incentives for conservation biomass categories

Texas Conservation Bioenergy

- Grassland invasion by woody species (Mesquite, Juniper, Huisache)
- Density increases due to (1) reduction of natural fires, (2) decimation of prairie dogs and (3) overgrazing
- Large negative impacts on water availability by extending long tap roots and outcompeting native grasses
- Objective - Manage woody invasives through biomass markets
 - European Co-Firing
 - Domestic Co-Fire (CPP?)
 - Other novel opportunities
 - Bedding, Roughage, etc...



Degraded, brush invaded grassland



Healthy, restored grassland



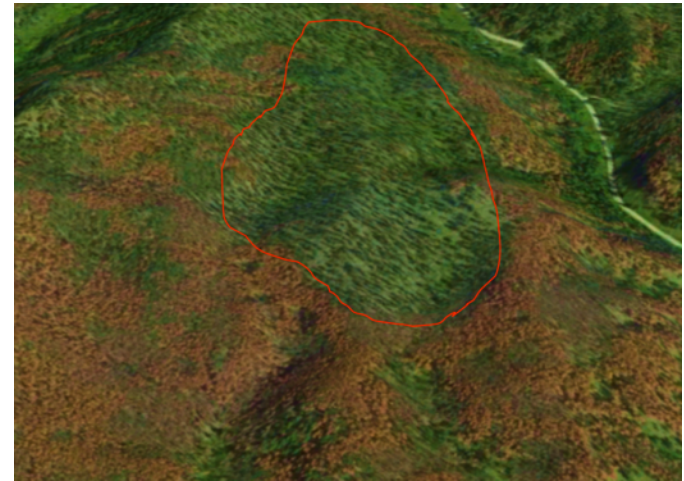
Invasive Juniper, Mesquite or Huisache



Wood is processed into a biomass product that is sold to power plants for heat and power production

Mountain Pine Management

- Pellet mill in Rapid City, SD
<http://mountainpinemgmt.com>
 - Work with USFS to thin pine beetle infested trees to increase stand resilience
- Moving from energy markets to consumer branded products
- Market partnerships to increase consumer sales channels



Contrast between a thinned ponderosa pine stand (outlined in red) and surrounding high density stands with insect-inflicted mortality

SW Louisiana - A True Marginal and Degraded Land Opportunity

- In Feb 2016 TEP was awarded a \$612,000 NRCS RCPP grant to cover establishment costs of warm season grasses in SW Louisiana
- Thousands of acres idle, creating an ecosystem problem due to invasive pressure
- Land lease rates at **\$15/acre**, large tracts can be aggregated
- TEP is working with FDC Enterprises and USDA to establish polyculture, warm season grasses (switchgrass, big bluestem and forb buffers) outside of Lake Charles, LA
- Primary purpose is to prevent invasive encroachment, biomass markets being developed to expand the program and support a long-term presence



Historical Coastal Prairie



- Prior to the late 1800s, approximately 2.5 million acres of coastal prairie existed in SW Louisiana
- Only ~1,000 acres left in their natural state

A converted landscape...

- Coastal prairie consisted mostly of grasses and a diversity of wildflowers (1,000+ species).
- Over the past 100 years the ecosystem was converted to agriculture (primarily sugarcane, rice, soy and cattle grazing).
- Region was unable to compete with global agricultural markets, with ag land abandonment beginning when rice prices hit historical lows in the 80s
- As land use was abandoned, large tracks of land were invaded by non-native woody species (e.g. Chinese Tallow)
- Large tracks of land in southwest LA are underutilized due to lack of competitiveness, poor land quality, and invasive species overtaking field.

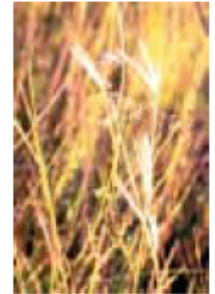
Grasses and grasslike plants of the Coastal Prairie



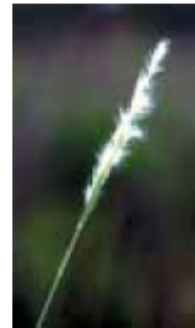
little bluestem



big bluestem



split-beard bluestem



silver bluestem



bushy bluestem



switchgrass

...leading to Chinese Tallow invasion

- Chinese tallow is an aggressive, invasive tree from China that has rapidly spread through the SE USA.
- On TNC list of “Dirty Dozen,” most harmful alien plant & animal species
- Outcompetes native plants and destroys local fauna native habitat
- From 1991 to 2005, Chinese tallow invasion in LA increased over 500%.
- Prairie grass restoration coupled with a regular mowing/harvest regimen is an effective strategy to reduce tallow encroachment.

The Dirty Dozen: America's Least Wanted

Chinese Tallow

Sapium sebiferum

It's easy to see why Chinese tallow (*Sapium sebiferum*) was introduced to the United States. The fast-growing tree reaches heights of 30 to 40 feet, sports lovely leaves that turn from green to yellow to red in autumn, and produces seeds with an oil that was useful to industry. Native to eastern Asia, where it has been cultivated for 14 centuries as an oilseed crop, Chinese tallow first was introduced to South Carolina in the late 1700s. In the early 1900s, the Foreign Plant Introduction Division of the U.S. Department of Agriculture promoted tallow planting in Gulf Coast states to establish a local soap industry. But Chinese tallow is yet another example of a species brought intentionally to North America with unforeseen—and unwelcome—consequences.

Chinese tallow has flourished in its new home, spreading from South Carolina to Florida and Texas. Capable of flowering and fruiting at only three years of age and three feet in height, the plant produces an abundant seed crop that is dispersed by birds and moving waters. It has been described as the “happy invader” for its ability to become established in a wide range of environments; it can thrive not only in developed and degraded areas near human habitation, but also in more natural wet prairies and bottomland forests. Able to grow in both full sunlight and shade, the tree is also more



Chinese tallow does more than just invade natural habitats in the Southeast: it releases toxins that alter soil chemistry and prevent re-establishment of native plants.

tolerant of salinity than many native competitors. The final blow? Chinese tallow wields a hidden weapon against competitors: the leaves it sheds contain toxins that alter soil chemistry and make it difficult for native vegetation to become established.

This jack-of-all-trades of the plant kingdom has displaced native species and changed natural community structures in the lands it has invaded. Formerly natural coastal habitats are becoming infested with stands of Chinese tallow. Large parts of the Texas Gulf coastal prairie have been transformed from native grassland or abandoned cropland into Chinese tallow woodland. Although the plant is a serious and growing threat to the native plants and habitats of the Southeast, it is still in demand from nurseries there, many of which continue to stock it as an ornamental. Educating both plant consumers and nursery owners could help control the spread of such invasive exotics as Chinese tallow, which should no longer be used for landscaping.

U.S. Chinese Tallow Distribution



Origin: Asia

■ affected states

Prairie Grass Establishment Benefits

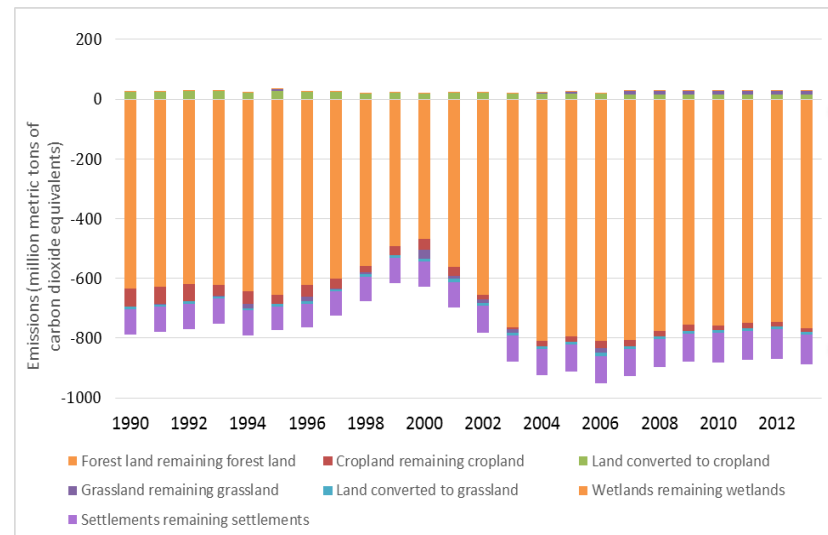
- Prevents further encroachment of Chinese Tallow and other invasive species
- Improves the ecological quality of the land, preventing erosion and building soil health
- Improves the economic productivity of the land, providing near-term improved grazing, while TEP works to build higher value long-term markets



The bioeconomy's role in climate change policy

A strong bioeconomy can reduce emissions and increase soil carbon sequestration to build a national carbon sink & meet US carbon reduction goals

- The US made a climate commitment in Paris to reduce carbon emissions by 26-28%, compared to 2005 levels
- The scientific consensus is that bioenergy and bioproducts are a critical part of a CO₂ mitigation strategy, assuming the right sustainability frameworks and rigorous lifecycle greenhouse gas accounting
- Land sector offsets 16 percent of all U.S. emissions (i.e., a “carbon sink”) and USDA released a roadmap, *Ten Building Blocks for Climate Smart Agriculture and Forestry*, committing to reduce GHG emissions and increasing carbon in forests and soils by over 120 million tons/year by 2025
- The bioeconomy is one of the major levers within existing policy frameworks to incentivize land-based carbon sequestration





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