Cattail biofuel research in northwest Minnesota

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- Estimate coverage of cattail in patches over 20 acres.

- Evaluate the logistical feasibility and sustainability of harvesting cattails to achieve a 50:50 ratio of open water to emergents.

- Preliminarily assess the market feasibility of cattails as a bioenergy source.
  - Economics of harvesting, densification, transportation, and storage of the feedstock.

(David Ripplinger-NDSU)
Murkin, et al. Emergent cover management at Delta Marsh

Fig. 1. Design of cover-removal plots. Stippled and clear areas represent cattail and open water, respectively.
The Goal: Hemi-marsh
Total units: 903
Total area: 95,500 acres

Cattail cover in northwest Minnesota

Area of cattails in patches of 20+ acres

Public Ownership
Private Ownership

Counties
Perhaps 8 tons of biomass per acre at Glacial Ridge
Northwest Manufacturing, maker of Woodmaster stoves. Red Lake Falls, MN
Pilot scale processing at Northwest Research and Outreach Center
Issues to address

- Getting material out of the marsh-logistically and economically.

- Cost to transport to processing site. (No pellet plants in northern Minnesota.)

- Cost and logistics to produce a fuel that is usable in existing burners, economically competitive, and has consistent quantity and quality.
Richard Grosshans hand harvesting in Manitoba in the pilot phase.
Argo used in Netley-Libau Marsh, Manitoba
Manitoba cattail harvest by MacDon units. Sept-Oct, 2012
Mattracks from MN
## Comparative cost of energy sources

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>Btu/lb</th>
<th>Cost per ton</th>
<th>Cost per MMBtu</th>
</tr>
</thead>
<tbody>
<tr>
<td>UMC Coal (Sub-Bituminous, delivered)</td>
<td>9,500</td>
<td>$70</td>
<td>$3.68</td>
</tr>
<tr>
<td>Wood pellets picked up (Hayward, WI)</td>
<td>8,000 to 9,000</td>
<td>$150</td>
<td>$8.82</td>
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<tr>
<td>Wood pellets delivered to Red Lake Falls (Ladysmith, WI)</td>
<td>8,000 to 9,000</td>
<td>$175</td>
<td>$10.29</td>
</tr>
<tr>
<td>Cattail pellets</td>
<td>8,551</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>
UMC’s heating plant receives coal by truck
Mow area.
Manitoba Cattail Harvest. October 2014. Peely Lake Marsh, west of Winnipeg.
Home-Farm-School heating with grass biomass!

Grass Pellet Production using two American Made Mobile Pelletizing Units
Top – HVGE Mobile Pelleter 1,800 to 2,200 LBS Per Hour
Bottom – Buskirk Engineering Mobile Pelletizer 600 to 1600 LBS PH
Size Reduction

Chopped Grasses – ¼ inch grind – ¼ pellet
Arcadia Farm Production Goshen, NY
- 10,000 pounds of grass pellets each year
- Reduced heating oil by 50%
Orangetown DPW Garage
• Multi-Fuel Boiler
• Central Boiler Maxim
• 7 to 12 tons per season
Arcadia Farm grass pellet stove is an Enviro Multi-Fuel Maxx-M
• 60,000 BTUs
• 4 to 5 tons per year
Enviro Multi-Fuel M55 Cast
- 55,000BTUs
- 2 to 3 ton per year
Persoon Farm
• Ashley Multi-Fuel Pellet Stove
• 52,000 BTUs
• 4 to 5 tons per year
Persoon Farm Production 20,000 Lbs
• His Farm 5 Tons
• Pennings Market 3 Tons
• TAM Enterprises 2 Tons
LMF Multi-Fuel Furnace
• 170,000 BTUs
• 10 tons per year
• Power Vented
• Made in America
• All Pellet Fuels
• Heats 3,000 to 4,500 sq ft
Local Appliance Retailer
• Public Demonstration
1.9 Million BTU Multi-Fuel Boiler
operating on grass pellet fuel

BIOMASS BOILER PROJECT

The Virginia United Methodist Assembly Center Inc.
707 Fourth Street, Blackstone, VA.

Langseth Engineering
3860 Peakland Place, Lynchburg, VA 24503

Frankie Williamson General Contractor
800 Woodland Lane, Blackstone, VA 23824

United States Department of Agriculture

USDA

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