SUPPLY PRICE FOR SWITCHGRASS IN SOUTH-CENTRAL NORTH DAKOTA

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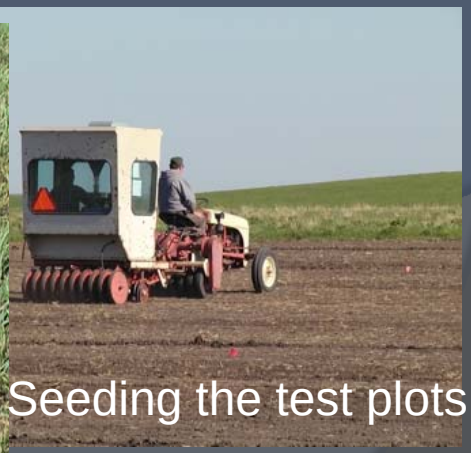
North Dakota Agricultural Experiment Station Biofuel Feedstocks Project

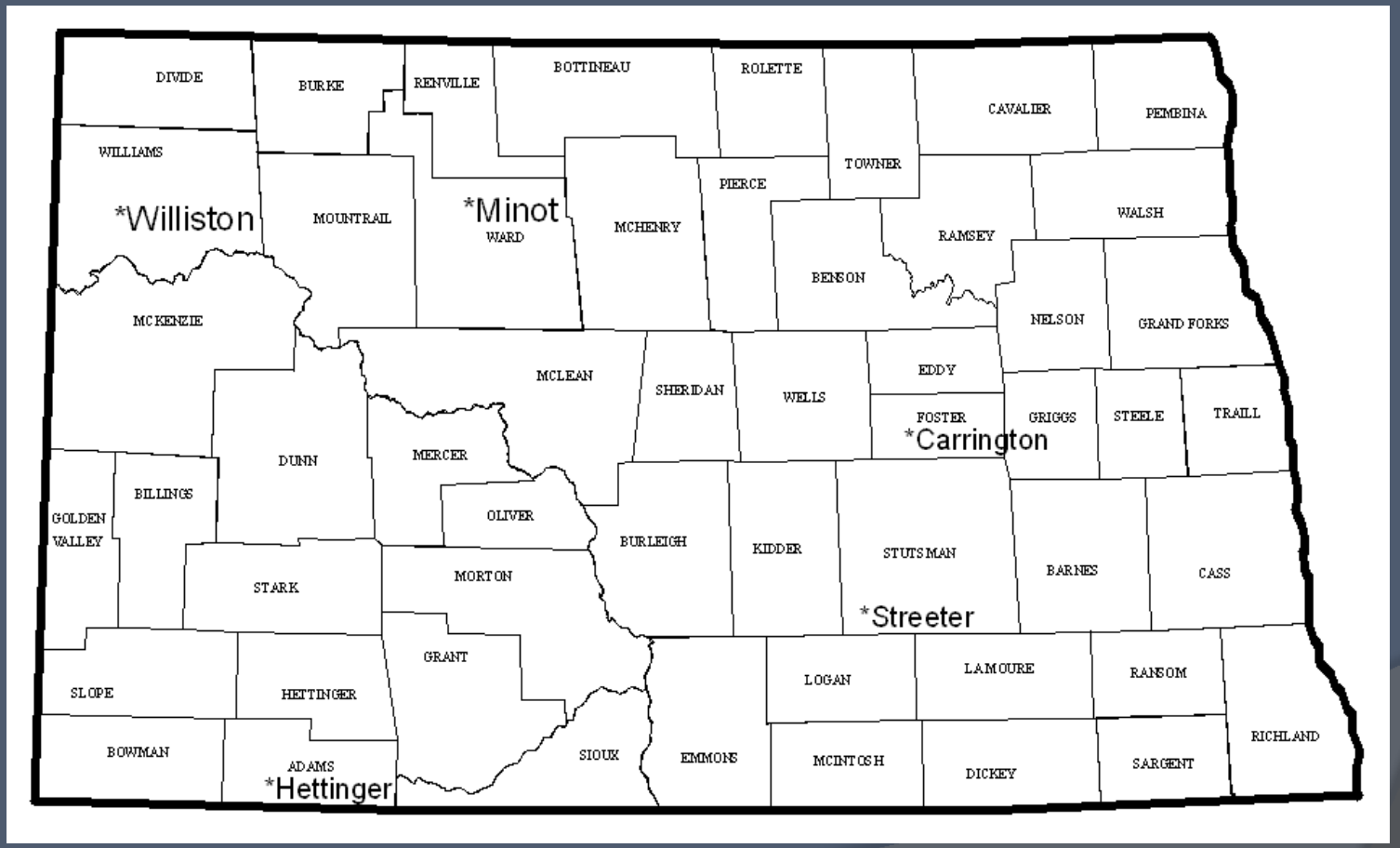
- 6 sets of plots at 5 sites in Central and Western North Dakota
- Planted in spring of 2006
- Plots added at a sixth site in 2007
- Initial harvest in fall (September) of 2007

Williston Test Plot



Seeding the test plots

Location of Plots*



Species and Combinations

- Switchgrass (Sunburst)
- Switchgrass (Trailblazer or Dakota*)
- Tall Wheatgrass (Alkar)
- Intermediate wheatgrass (Haymaker)

- CRP mix (intermediate + tall wheatgrass)
- CRP mix (intermediate + tall + alfalfa + sweetclover)
- Sunburst switchgrass + tall wheatgrass
- Sunburst switchgrass + Sunnyview big bluestem
- Sunburst switchgrass + Mustang Altai wildrye
- Magnar Basin wildrye + Mustang Altai wildrye

*Trailblazer was seeded at Carrington, Streeter, and Hettinger

Preliminary Findings

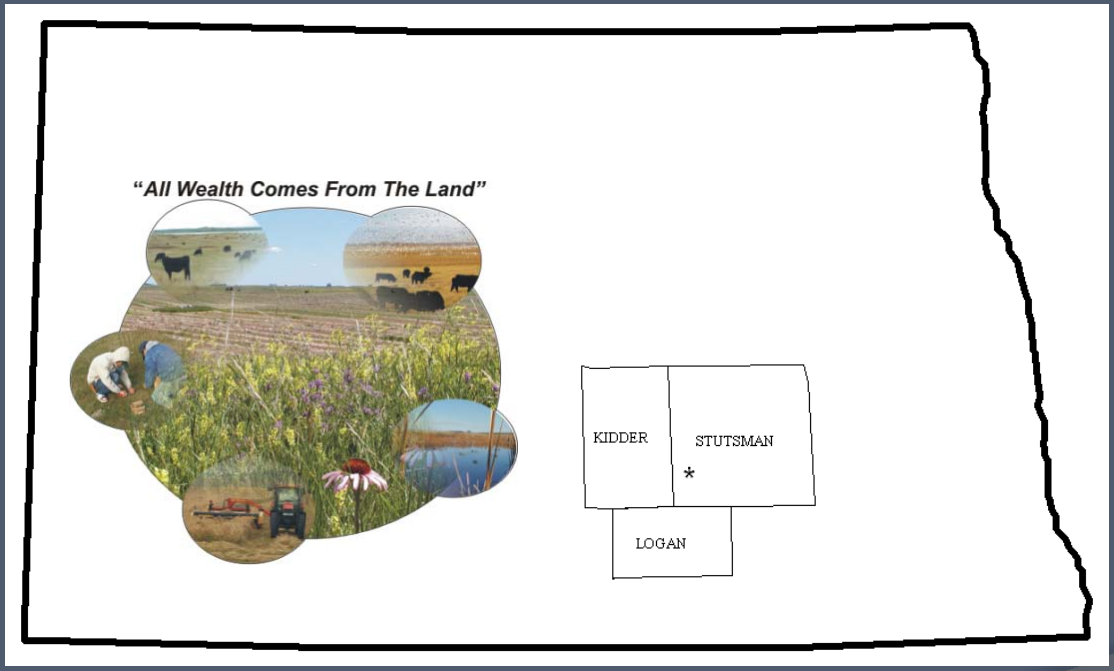
- First harvest was in 2007
- Dry conditions in 2006 hindered stand establishment
- Switchgrass or switchgrass mixes did best at Carrington and on irrigated plots at Williston
- Wheatgrass did best at other sites

Economic Analysis

- Objective – determine the price/ton for switchgrass that would make it as economically attractive as a competing cropmix
- Study area – 3 counties surrounding the Central Grasslands Research/Extension Center, which had yield data from a 5-year switchgrass study

Economic Analysis

- Study area – Kidder, Logan, and Stutsman counties



*Central Grasslands Research/Extension Center

Study Area

- Missouri Coteau
- Substantial variability in soils and their suitability for annual crop production

Competing Crop Mix (based on 2002-2006)

Crop	Avg Annual Planted Acreage	Percent of Competing Crop Mix
Soybeans	343,867	32.2
Spring Wheat	288,667	27.0
Alfalfa	177,333	16.6
Corn	111,333	10.4
Sunflower, Oil	84,833	7.0
Barley	73,833	6.8

Soil Productivity Analysis

- Average productivity – soils with spring wheat yields within 5 bushels (+/- 15%) of regional average (based on NRCS data)

switchgrass plots at Carrington

Estimated Yields by Soil Class

Soil Class

Crop	Marginal	Average	High
Wheat (bu./acre)	20.8	33.1	43.8
Barley (bu./acre)	35.5	56.2	74.5
Sunflower (#/acre)	778.0	1,241.6	1,632.2
Alfalfa (tons/acre)	1.57	1.76	2.06
Soybeans (bu./acre	19.0	30.3	39.8
Corn (bu./acre)	55.5	89.6	116.5
Switchgrass (tons/acre)	2.67	3.01	3.51

Switchgrass Establishment Budget, Average Productivity Soils

Item	Value
Gross Revenue:	
Cover crop (oats hay) (1.29 tons x $25)	$32.14
Direct Expenses:	
Seed	$61.40
Chemical	19.20
Fuel and Lubrication	12.04
Repairs	12.56
Reseeding charge	8.35
Interest	4.40
Misc.	1.37
Total Direct	$119.32
Indirect Expenses	22.44
Net returns to unpaid labor, mgmt & land	($109.62)
Foregone returns	($52.95)
Total cost of establishment	($162.57)
Amortization of establishment costs	$21.05

Switchgrass Production Costs, Average Production

Item	Value
Yield (tons/acre)	3.01
Direct Expenses:	
Herbicide	$7.69
Fertilizer	28.80
Fuel and Labor	14.47
Repairs	8.19
Misc.	7.80
Operating Interest	2.51
Total Direct	$69.46
Indirect Expenses	20.63
Establishment Costs	21.05
Net Returns	$(112.33)

Returns from Competing Crops

- 2008 crop prices and costs from NDSU Extension
- Prices and costs for 2009-2017 projected using FAPRI price forecasts and past changes in costs
- Separate budgets for 3 soil classes
- Breakeven switchgrass price would cover production expenses and provide the same net return as the crop mix

Crop Prices Used

Year	Spring Wheat	Soybeans	Corn	Alfalfa
2008	8.35	10.85	5.15	61.00
2009	7.26	7.58	3.45	61.00
2017	7.38	7.75	3.47	60.00

Switchgrass Breakeven Prices

Soil Productivity Class	Switchgrass		Net Return from Competing Crops	Breakeven Price
	Yield tons/acre	Production Cost $/ton		
			$/acre	$/ton
Low	2.67	40.26	18.40	47.14
Average	3.01	38.27	86.40	67.02
High	3.51	34.80	145.27	76.16

Conclusions

- Changes in input costs and net returns from competing crops have increased the supply price for switchgrass
- Switchgrass will compete best on lands that are marginal for annual crop production
- Northern Great Plains region has substantial land in this category – 567,000 acres or 30% of cropland in study area

Conclusions

- These lands could produce 1.5 million tons of switchgrass with a farmgate value of $71.2 million
- This would produce 112.5 million gallons of ethanol (at 75 gallons/ton)
- Switchgrass may not be the most attractive energy crop in all locations

Questions?

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