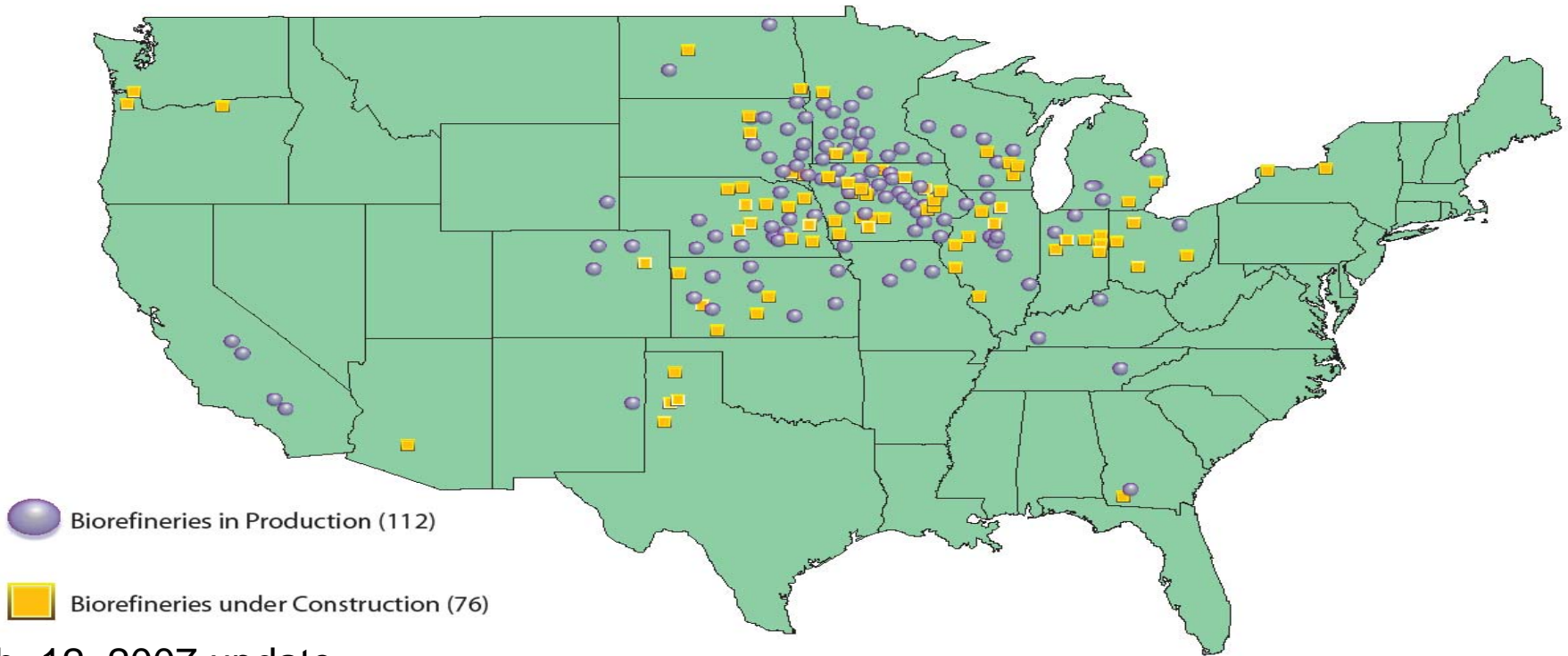


Expanding Ethanol Industry: Implications for MI Livestock

Glynn Tonsor
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Michigan State University

Michigan Winter Poultry Seminar
Zeeland, MI
February 15, 2007

U.S. Ethanol Biorefinery Locations

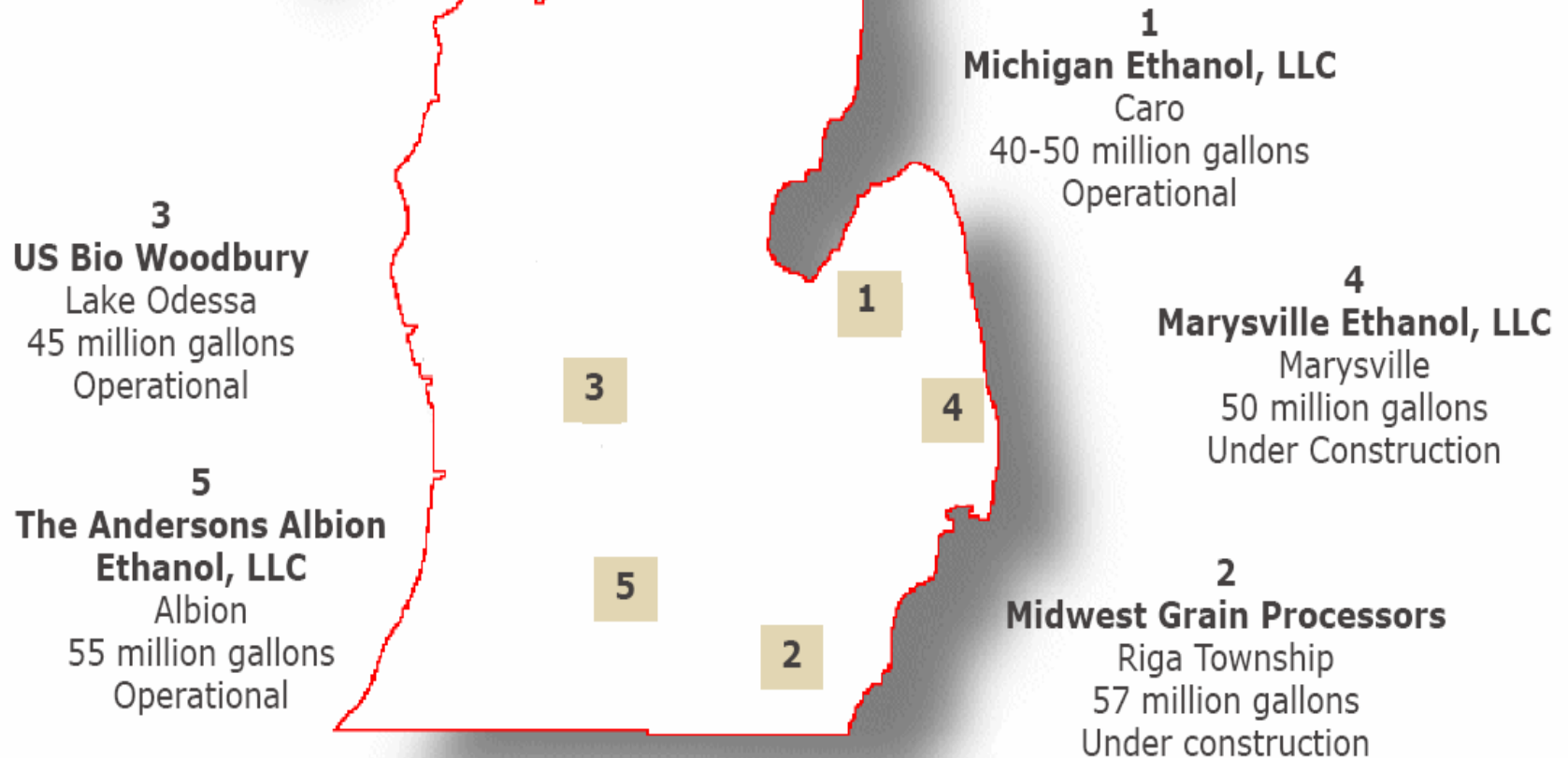


Source: Renewable Fuels Association
1.29.07

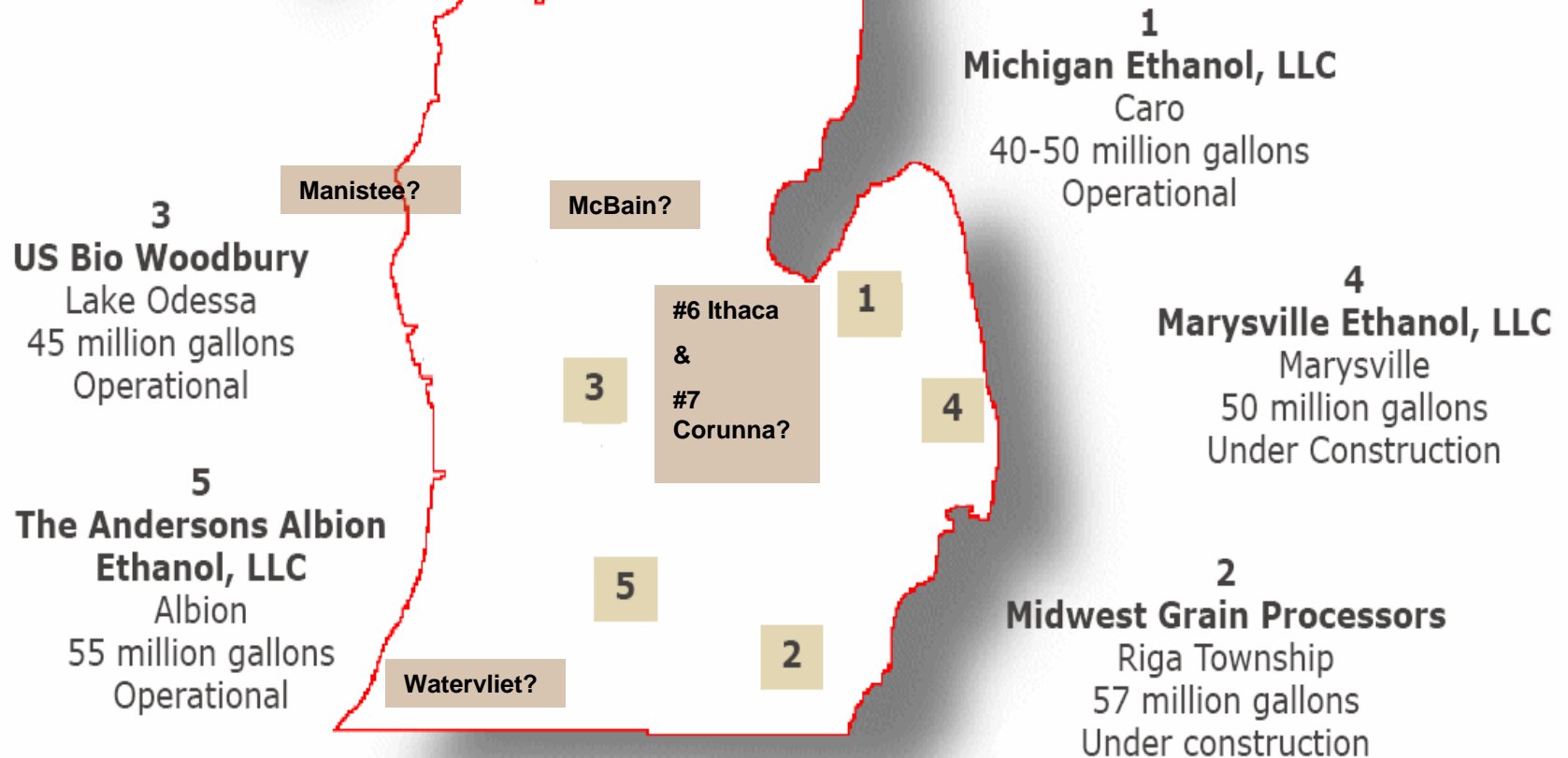
Feb. 12, 2007 update

Total operating plants:	113	Current	5,583.4
Under construction:	78		
Expansions:	<u>7</u>	Under Construction & Expansion	<u>6,243.5</u>
Total:	198	Total Capacity:	11,826.9

Michigan Ethanol Plant Information



Michigan Ethanol Plant Information

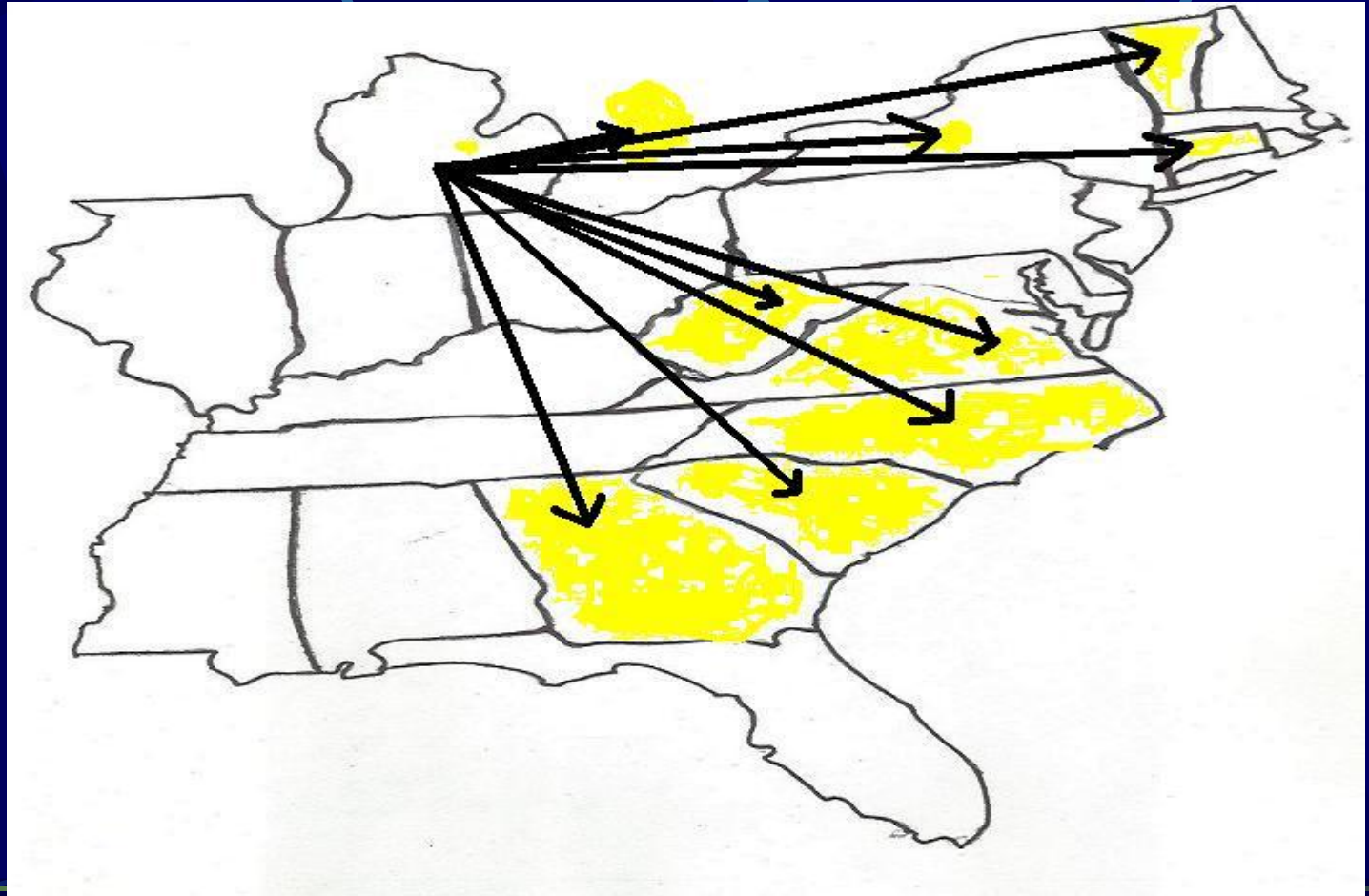


Ethanol Plants

Bu/Millions Running Sum

Caro	19.5	19.5	2006/07
Woodbury	19.5	39.0	
Albion	21.0	60.0	
Rega 06/07	12.0	72.0	6/7 months
Rega 07/08	21.0	81.0	2007/08
Maryville	21.0	102.0	
Ithaca	40.0	142.0	2008/??
Rega II ?	21.0	163.0	
Corona	40.0	203.0	
Watervliet	19.0	222.0	
McBain	19.0	241.0	
Manistee	19.0	260.0	
Alma	19.0	279.0	

Corn Flow Now

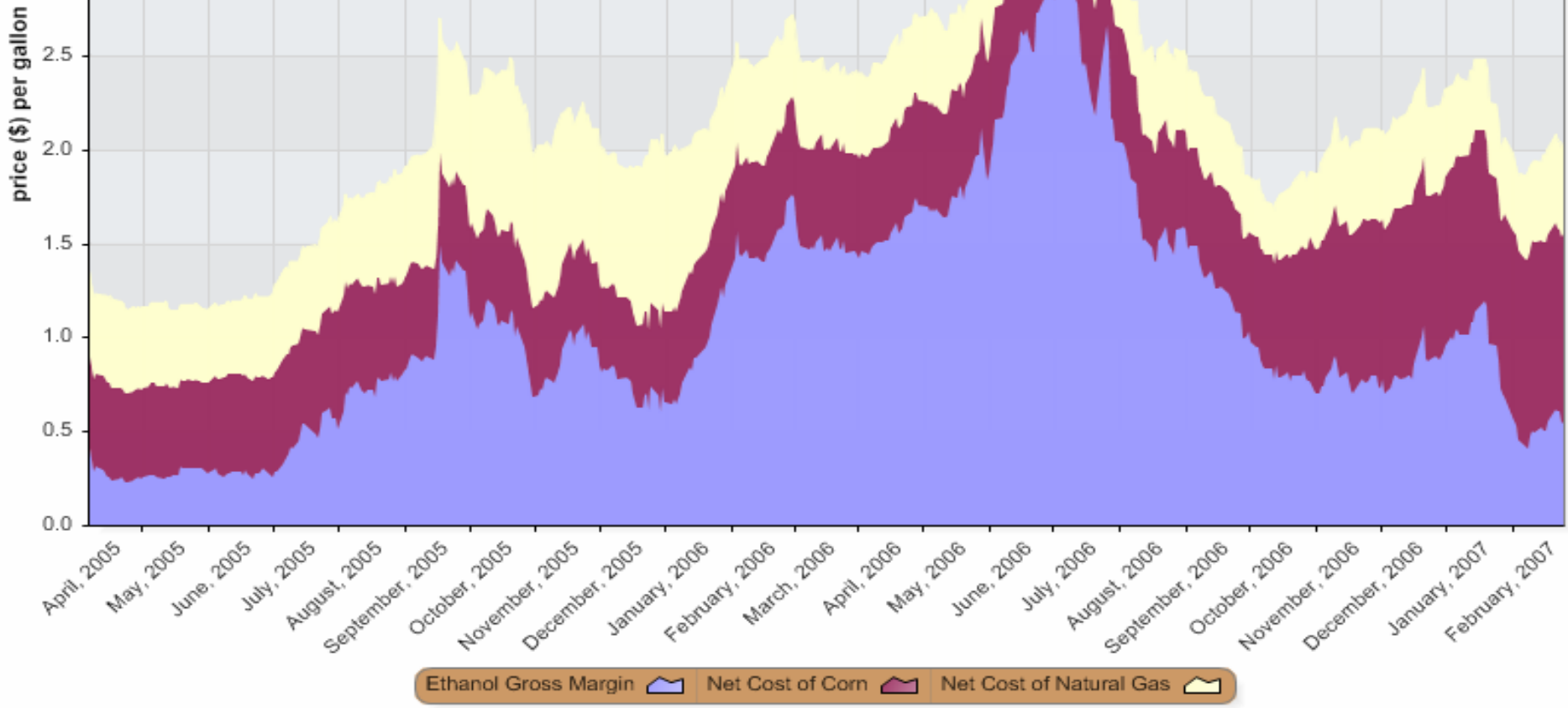


Historical Ethanol Gross Margins

Ethanol Gross Margins based on nearby futures prices

Center for Agricultural and Rural Development (CARD), <http://www.card.iastate.edu/>, Iowa State University, Ames, Iowa

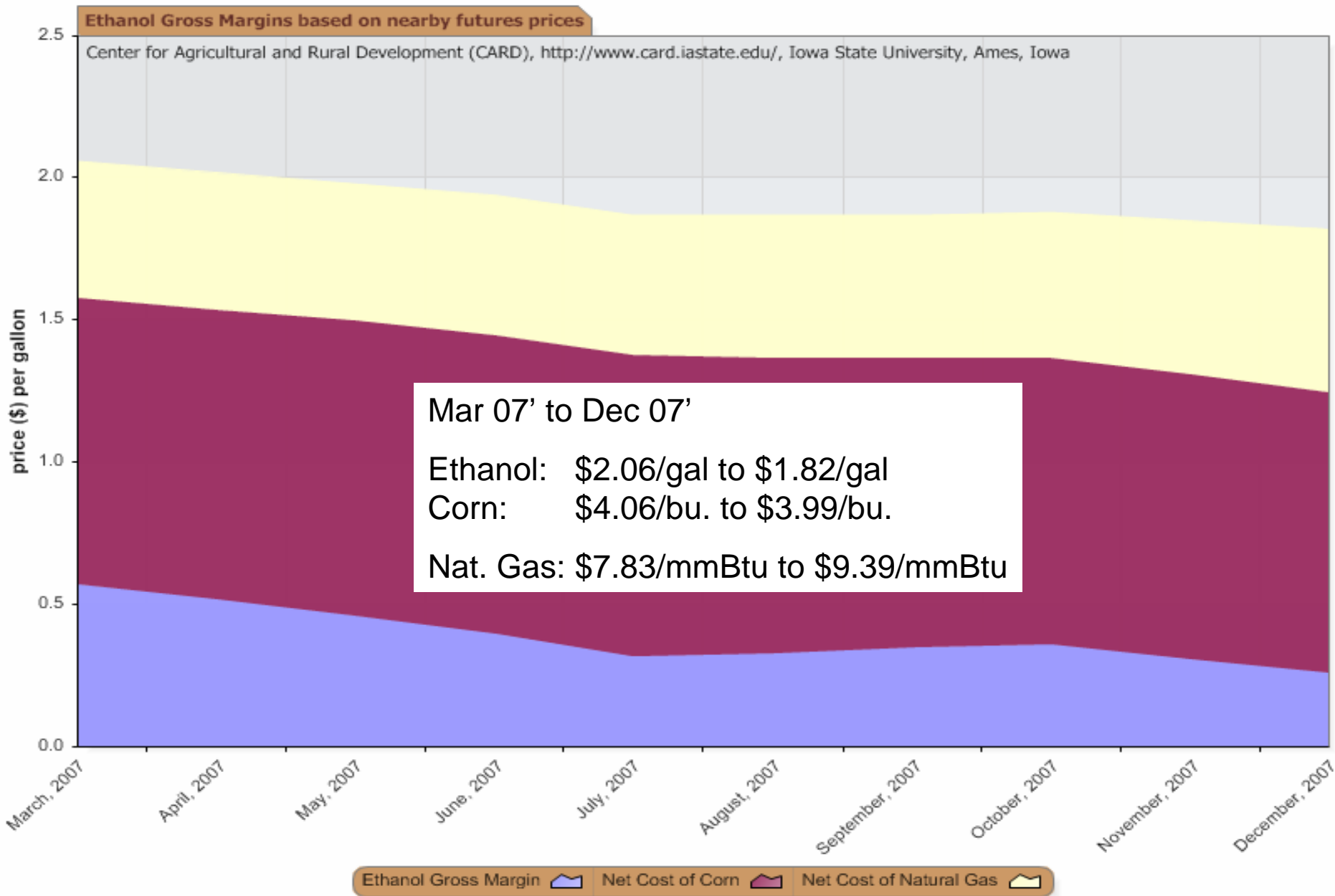
Feb. 9, 2007
Ethanol Price: \$2.06/gal
Corn Price: \$4.06/bu.
Nat. Gas Price: \$7.83/mmBtu



Ethanol Gross Margin Net Cost of Corn Net Cost of Natural Gas

Source: CARD: http://www.card.iastate.edu/research/bio/tools/hist_eth_gm.aspx
Assumes 1 corn bu. & 165,000 British thermal units of natural gas are required to create 2.7 gallons of ethanol and 17 DDGS lbs.

Projected 2007 Ethanol Gross Margins



Source: CARD: http://www.card.iastate.edu/research/bio/tools/proj_eth_gm.aspx

Assumes 1 corn bu. & 165,000 British thermal units of natural gas are required to create 2.7 gallons of ethanol and 17 DDGS lbs.

Monthly Corn Futures

Corn Monthly

updated Jan 30



Corn Futures (as of 2/14/07)

Mar-07	408'2
May-07	420'6
Jul-07	428'6
Sep-07	412'4
Dec-07	401'2
Mar-08	407'2
May-08	410'0
Jul-08	414'0
Sep-08	389'0
Dec-08	378'2
Jul-09	386'4
Dec-09	361'4
Jul-10	367'0
Dec-10	354'0

Corn Futures Volatility

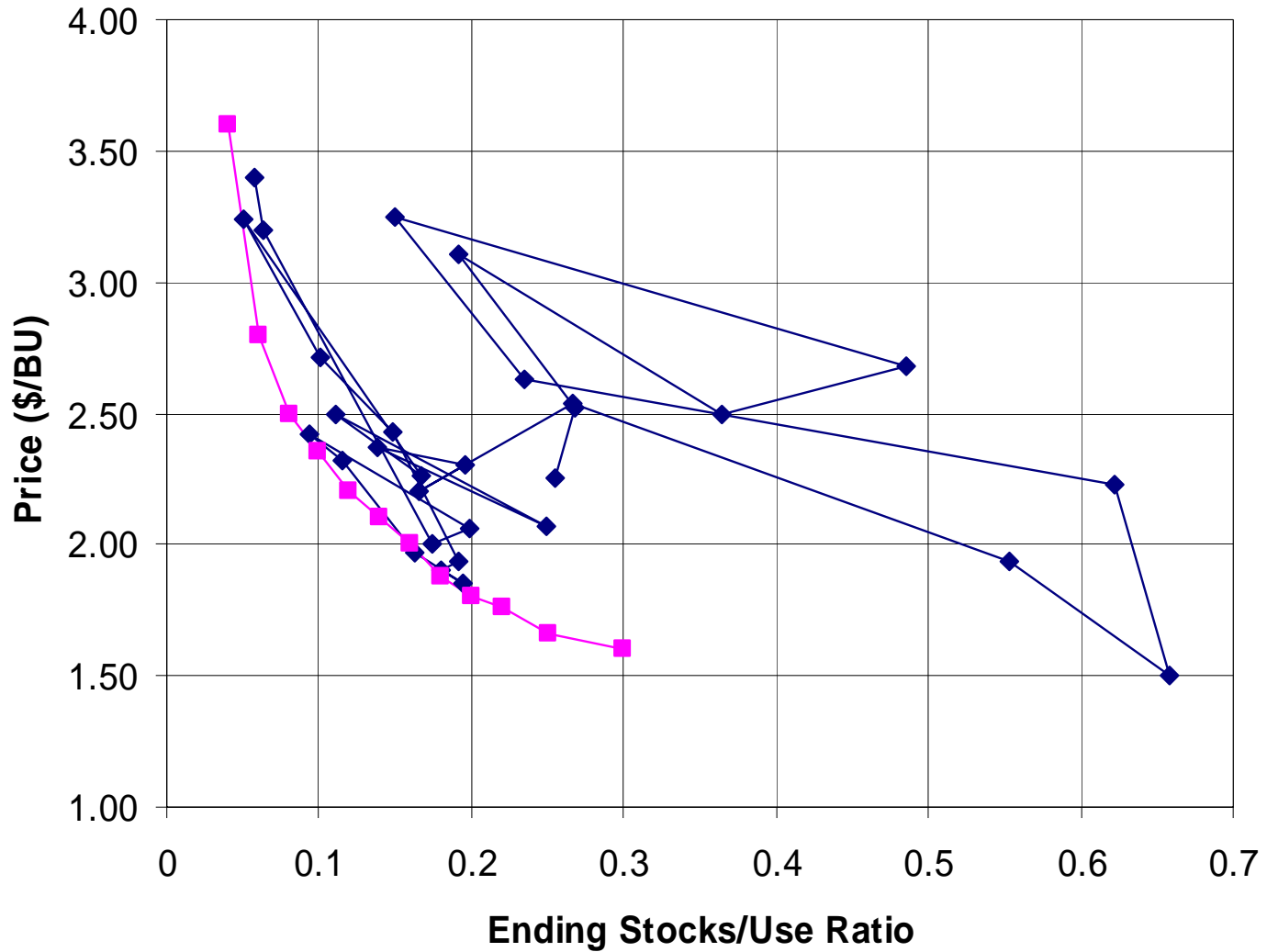
- CBOT Corn Volatility:
 - 2001-2005 average volatility
 - Ranged from 19.4% to 21.9%
 - 2006 average volatility of 28.8%
 - 7 of 12 months in 2006 were highest since 1980

**TABLE 1
SUPPLY/DEMAND BALANCE SHEET FOR CORN**

	2002-03	2003-04	2004-05	Estimated 2005-06	Projected 2006-07	Hilker 2007-08
(million acres)						
Acres Planted	78.9	78.6	80.9	81.8	78.6	87.6
Acres Harvested	69.3	70.9	73.6	75.1	70.6	80.4
Bu./Harvested Acre	129.3	142.2	160.4	148	149.1	151
(million bushels)						
Beginning Stocks	1596	1087	958	2114	1967	752
Production	8967	10089	11807	11114	10535	12140
Imports	14	14	11	9	10	10
Total Supply	10578	11190	12776	13237	12512	12903
Use:						
Feed and Residual	5563	5798	6158	6141	5975	5750
Food, Seed and Ind.	2340	2537	2686	2981	3535	4450
Ethanol for fuel	996	1168	1323	1603	2150	3100
Total Domestic	7903	8335	8844	9122	9510	10200
Exports	1588	1897	1818	2147	2250	2000
Total Use	9491	10232	10662	11270	11760	12200
Ending Stocks	1087	958	2114	1967	752	702
Ending Stocks, %of Use	11.5	9.4	19.8	17.5	6.4	5.8
U.S. Loan Rate	\$1.98	\$1.98	\$1.95	\$1.95	\$1.95	\$1.95
U.S. Season Average Farm Price, \$/Bu.	\$2.32	\$2.42	\$2.06	\$2.00	\$3.20	\$3.40

Source: USDA and Jim Hilker. (02 - 09 - 07)

U.S. Corn Price vs Ending Stocks/Use Ratio 1978 - 2007



SUPPLY/DEMAND BALANCE SHEET FOR CORN

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(million acres)							
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Acres Harvested	69.3	70.9	73.6	75.1	70.6	80.4	84.4
Bu./Harvested Acre	129.3	142.2	160.4	148	149.1	151	153
(million bushels)							
Beginning Stocks	1596	1087	958	2114	1967	752	702
Production	8967	10089	11807	11114	10535	12140	12913
Imports	14	14	11	9	10	10	10
Total Supply	10578	11190	12776	13237	12512	12903	13626
Use:							
Feed and Residual	5563	5798	6158	6141	5975	5750	5550
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U.S. Season Average Farm Price, \$/Bu.	\$2.32	\$2.42	\$2.06	\$2.00	\$3.20	\$3.40	\$3.40

Source: USDA and Jim Hilker. (02 - 09 - 07)

SBM Futures (as of 2/14/07)

Mar-07	222'6
May-07	227'3
Jul-07	230'8
Aug-07	232'5
Sep-07	233'7
Oct-07	234'5
Dec-07	237'2
Jan-08	238'0
Mar-08	239'5
May-08	239'5
Jul-08	239'0
Aug-08	238'0
Sep-08	237'0
Oct-08	233'0
Dec-08	233'0

SBM Rally (Dec 07)

SM Z7 [10] - SOYBEAN MEAL (DAY) LAST: 237.2 CHANGE: ▼ 1.3 HIGH: 240.0 LOW: 236.8 2/14/2007

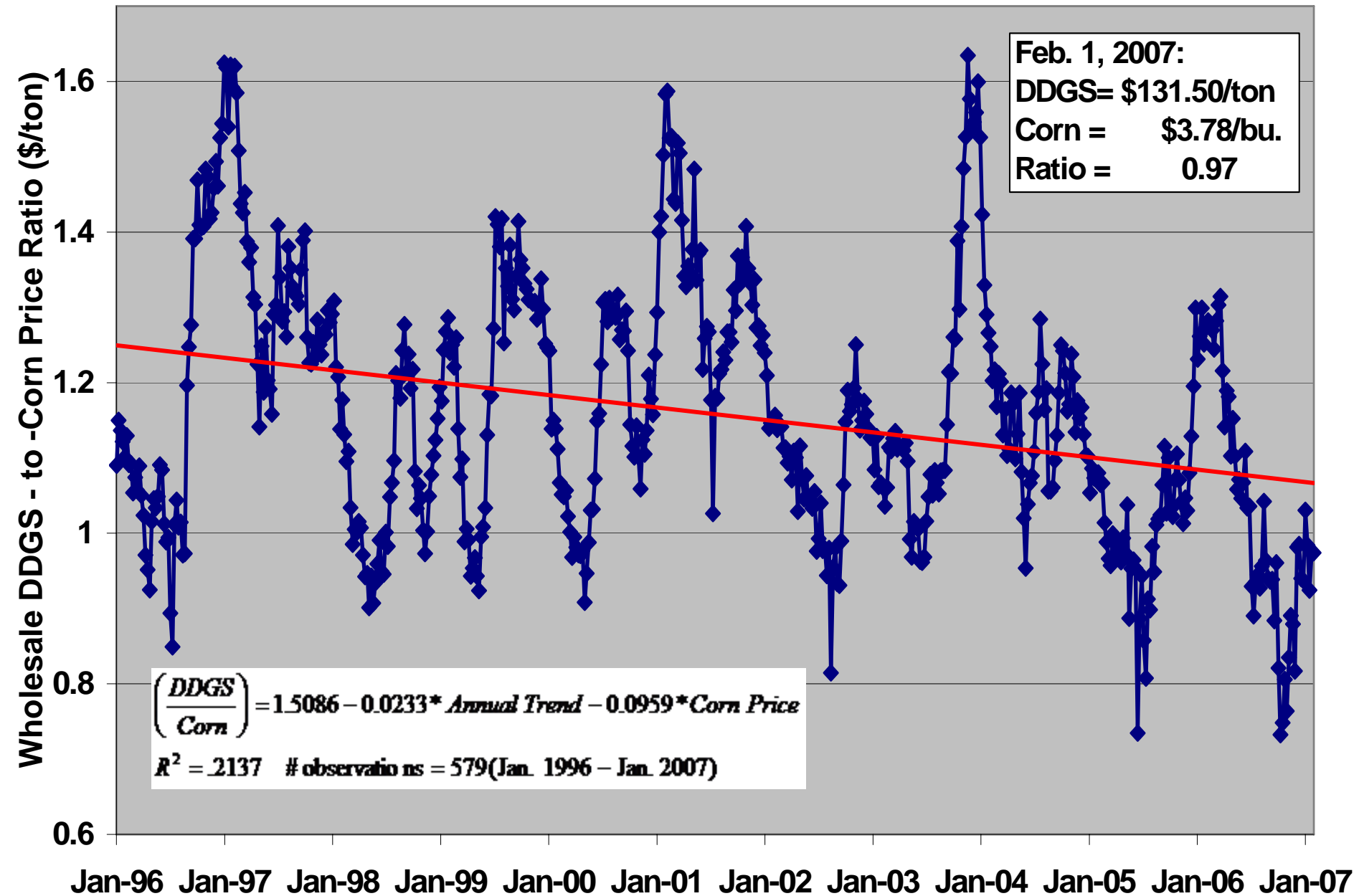


CBOT ADVANTAGE

Distillers Grains w/ Solubles (DGS) Issues:

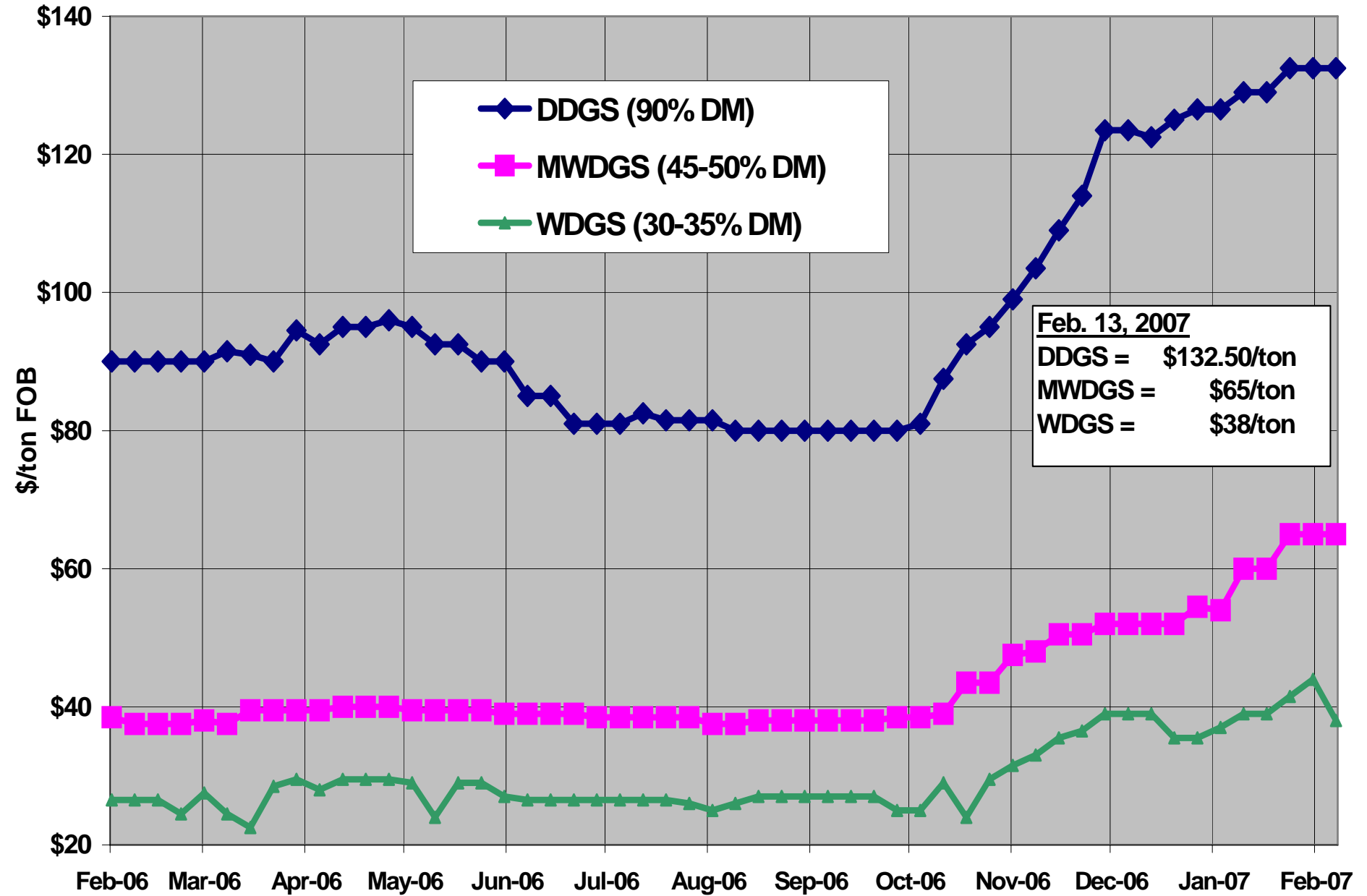
- Can by-products offset corn prices?
- What implications does DGS use have?
- As DGS market matures:
 - Which producers will have DGS access?
 - What type of purchasing arrangement?

Chicago Wholesale DDGS - to - Corn Ratio (\$/ton)



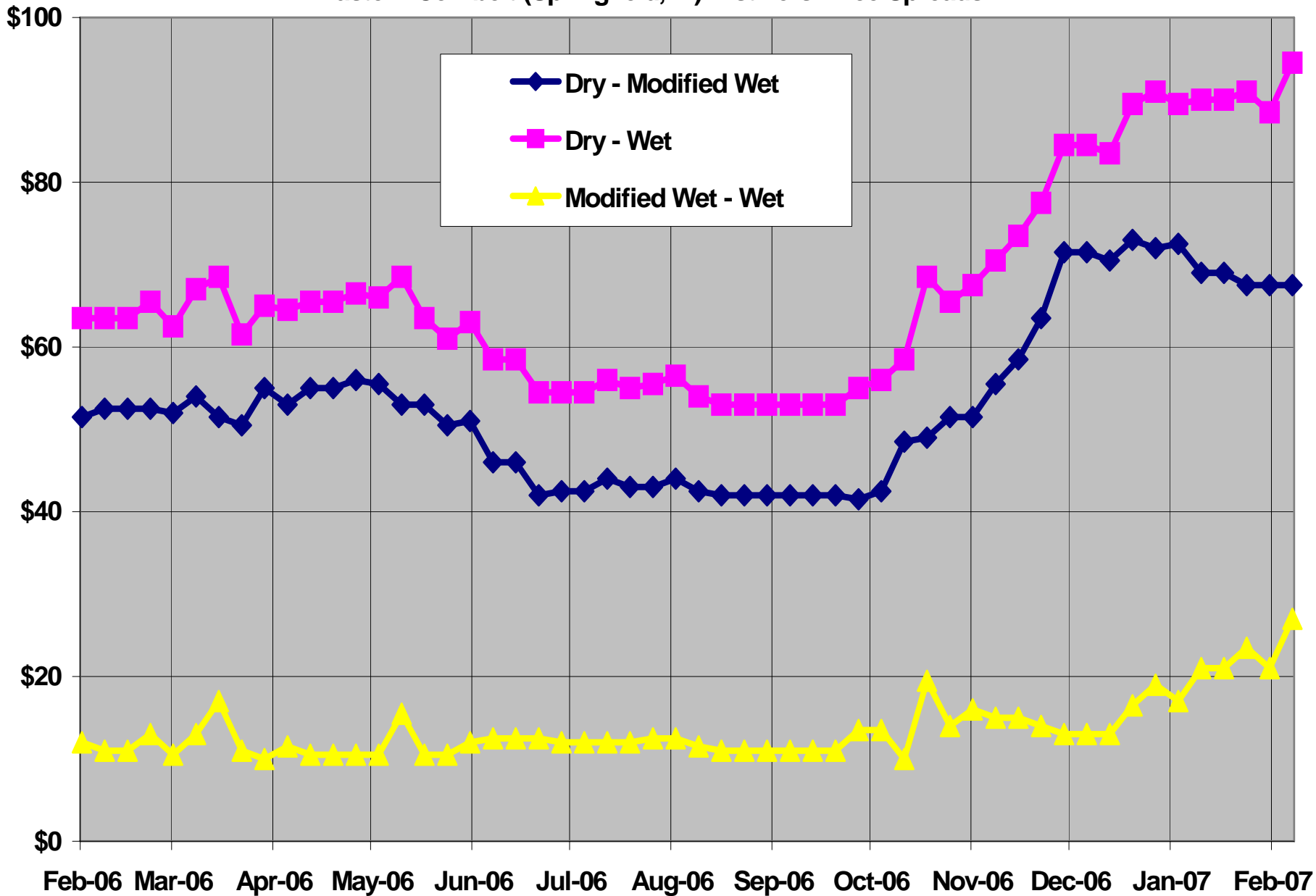
Jan-96 Jan-97 Jan-98 Jan-99 Jan-00 Jan-01 Jan-02 Jan-03 Jan-04 Jan-05 Jan-06 Jan-07

Eastern Cornbelt (Springfield, IL) Distillers Prices



Feb. 13, 2007
DDGS = \$132.50/ton
MWDGS = \$65/ton
WDGS = \$38/ton

Eastern Cornbelt (Springfield, IL) Distillers Price Spreads



Source: Livestock Marketing Information Center and USDA-AMS; Last updated 2/14/2007

Increasing Risk Exposure

- DGS risk management?
 - Increases in importance with inclusion rates
 - Cross-hedging of price risk?

NASS/Nebraska Corn Board Co-Product Study

- 12 state survey of livestock producers (Jan/Feb)

- Identify:
 - Co-product use
 - Inclusion levels
 - Channel of purchase (plant, feed co., broker)
 - Available/desired services (nutrient profile,..)
 - Purchase type
 - Spot or contract (several lengths)
 - Reference point of price (corn, soybean meal, other?)

Past NASS DGS Survey

- 721 Iowa & Minnesota Producers & 25 Ethanol Plants
- Ethanol Plants (2004)
 - 30% had minimum order for DGS; avg. min = 9.8 tons
 - DGS sales agreements:

<u>Monthly</u>		<u>Quarterly</u>		<u>6-Month</u>		<u>Yearly</u>	
2002	2003	2002	2003	2002	2003	2002	2003
10%	15%	10%	13%	9%	12%	NA	20%

<u>Spot</u>		<u>Clock</u>		<u>No Contract</u>	
2002	2003	2002	2003	2002	2003
38%	18%	11%	10%	19%	13%

Past NASS DGS Survey: Ethanol Plants (2004)

Transportation of DDGS, 2003

	% Plants Using Transport Mode	% Product Hauled by Transport Mode	Average Miles Hauled	Average Transport Costs/Ton
Paid by Plant				
Rail	100	16	1,550	30
Truck	67	10	82	4
Paid by Buyer				
Rail	50	16	1,812	40
Truck	100	58	133	7

Transportation of WDGS, 2003

	% Plants Using Transport Mode	% Product Hauled by Transport Mode	Average Miles Hauled	Average Transport Costs/Ton
Paid by Plant				
Rail	0			
Truck	100	23	61	4
Paid by Buyer				
Rail	0			
Truck	100	77	60	4

Past NASS DGS Survey

- Livestock Producers (2003)
 - Cow/calf, dairy, cattle on feed, hogs, turkeys (721 total)

Operations Profile

	<u>All Operations</u>		<u>Feeding Distillers Grains</u>		<u>Not Feeding Distillers Grains</u>	
	Avg Peak Inventory (head)	Operations Feeding DGS (%)	Avg Peak Inventory (head)	Avg Years Feeding DGS	Avg Peak Inventory (head)	% Considered Feeding DGS
Cow/Calf	121	24	359	4	91	27
Dairy	202	56	214	7	183	51
Cattle on Feed	2,074	72	2,302	6	1,399	74
Hogs	15,373	22	16,523	2	14,994	37
Turkeys	124,301	8	180,000	---	118,534	22

DDGS Use: Feed Cost Analysis

- Assumption:
 - 10% DDGS inclusion
 - Replaces 5% Corn & 5% SBM
- 13% "other ingredients" unchanged

Cost Savings (\$/ton) of DDGS

Cost Savings of 10% DDGS Inclusion (\$/ton) Relative to 0% DDGS Inclusion (\$200/ton SBM)

DDGS (\$/ton)	Corn (\$/bu.)							
	\$ 2.00	\$ 2.50	\$ 3.00	\$ 3.50	\$ 4.00	\$ 4.50	\$ 5.00	
\$ 100	\$ 3.91	\$ 4.80	\$ 5.69	\$ 6.59	\$ 7.48	\$ 8.37	\$ 9.26	
\$ 125	\$ 1.47	\$ 2.36	\$ 3.25	\$ 4.14	\$ 5.03	\$ 5.93	\$ 6.82	
\$ 150	\$ (0.98)	\$ (0.09)	\$ 0.81	\$ 1.70	\$ 2.59	\$ 3.48	\$ 4.37	
\$ 175	\$ (3.42)	\$ (2.53)	\$ (1.64)	\$ (0.75)	\$ 0.15	\$ 1.04	\$ 1.93	

Cost Savings of 10% DDGS Inclusion (\$/ton) Relative to 0% DDGS Inclusion (\$3.50/bu. Corn)

DDGS (\$/ton)	SBM (\$/ton)							
	\$ 180	\$ 190	\$ 200	\$ 210	\$ 220	\$ 230	\$ 240	
\$ 100	\$ 5.57	\$ 6.08	\$ 6.59	\$ 7.09	\$ 7.60	\$ 8.10	\$ 8.61	
\$ 125	\$ 3.13	\$ 3.64	\$ 4.14	\$ 4.65	\$ 5.15	\$ 5.66	\$ 6.17	
\$ 150	\$ 0.69	\$ 1.19	\$ 1.70	\$ 2.20	\$ 2.71	\$ 3.22	\$ 3.72	
\$ 175	\$ (1.76)	\$ (1.25)	\$ (0.75)	\$ (0.24)	\$ 0.27	\$ 0.77	\$ 1.28	

Assumptions: all prices are "delivered prices," and including DGS results in no changes in carcass composition, days on feed, or changes in manure handling costs.

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Michigan Supply/Use Balance Sheet for Corn

Corn Marketing Year	2004/05	2005/06	2006/07	20%	10%	
				% Below Trend	Trend Yield	% Above Trend
				2007/08	2007/08	2007/08
					Acres % Up	
Corn Grain Production					15%	
	<u>Thousand Acres</u>					
Planted Acres	2200	2250	2200	2530	2530	2530
Harvested Acres	1920	2010	1960	2250	2290	2320
Yield bushels/acre	134	143	147	108	135	148.5
	<u>Million Bushels</u>					
Beginning stocks	29.2	38.9	49.6	23.7	23.7	23.7
Production	257.3	287.4	288.1	243.0	309.2	344.5
Total Supply	286.5	326.3	337.7	266.7	332.9	368.3
Corn Use						
Livestock Feed	78.0	78.0	73.0	71.0	71.0	71.0
Ethanol	16.0	19.5	72.0	102.0	102.0	102.0
Canada for Ethanol	0.0	5.0	15.0	15.0	15.0	15.0
Other Exports to Canda	10.0	10.0	10.0	5.0	10.0	10.0
Exports out of Michigan to U.S.	138.6	159.2	139.0	60.0	107.0	132.0
Other Uses and Residual	5.0	5.0	5.0	3.0	4.0	5.0
Total Use	<u>247.6</u>	<u>276.7</u>	<u>314.0</u>	<u>256.0</u>	<u>309.0</u>	<u>335.0</u>
Ending Stocks	38.9	49.6	23.7	10.7	23.9	33.3
				Previous low ending stocks 11.0		
DGS Production and Use:	Million bushels (56 lbs)					
Production			23.1	32.8	32.8	32.8
Estimated use by MI livestock and poultry			6.0	8.0	8.0	8.0
Production less estimated use			<u>17.1</u>	<u>24.8</u>	<u>24.8</u>	<u>24.8</u>

1/31/2007

Michigan Supply/Use Balance Sheet for Corn

Corn Marketing Year	2004/05	2005/06	Estimated 2006/07	Projected 2007/08	Projected 2008/09
Corn Grain Production			<u>Thousand Acres</u>		
Planted Acres	2200	2250	2200	2530	2640
Harvested Acres	1920	2010	1960	2290	2400
Yield bushels/acre	134	143	147	135	137
			<u>Million Bushels</u>		
Beginning stocks	29.2	38.9	49.6	23.7	23.9
Production	257.3	287.4	288.1	309.2	328.8
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