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DISTILLERS DRIED GRAINS AND THEIR IMPACT ON CORN, SOYMEAL, AND LIVESTOCK MARKETS

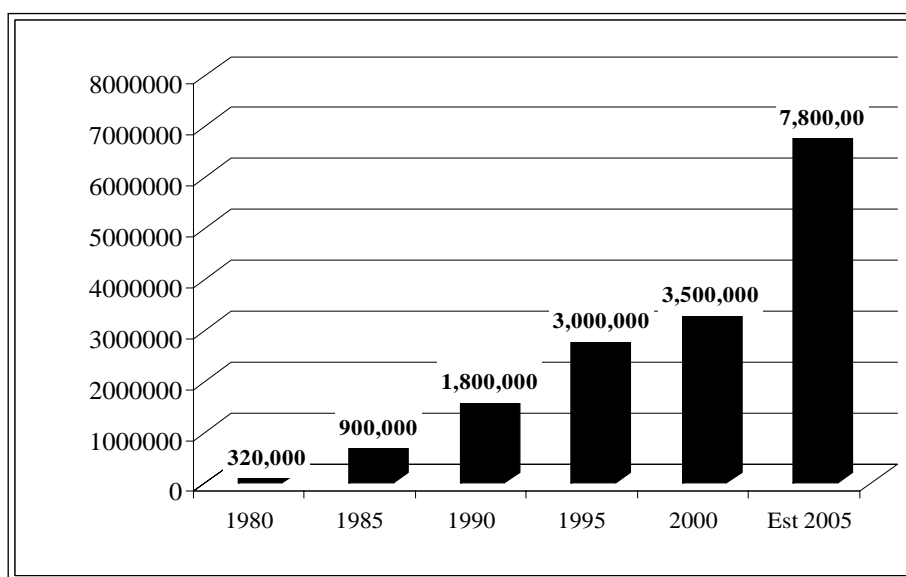
Steve Markham
Senior Merchandiser at Commodity Specialists Company

Introduction

In 2004 the U.S. Ethanol industry produced 3.41 billion gallons, more than twice as much as in 2000. There are 88 ethanol plants in production or under construction. Approximately 75% of this production and the majority of the industry's growth over the last five years come from dry grind corn facilities. The bulk of the remaining production comes from the corn wet milling industry. Because a dry grind plant is cheaper to build and generally more efficient to operate with respect to ethanol production, it seems logical that future growth will come in the form of dry grind corn plants. And come it will - currently 14 new dry grind facilities/expansions are in various stages of development in Iowa alone. Iowa is presently the top ethanol producing state at 1.265 billion gallons annually. If all 14 potential new plants are built, Iowa will increase its capacity by about 70%. Fortunately it appears we lack the ability to build that much capacity in 18 months.

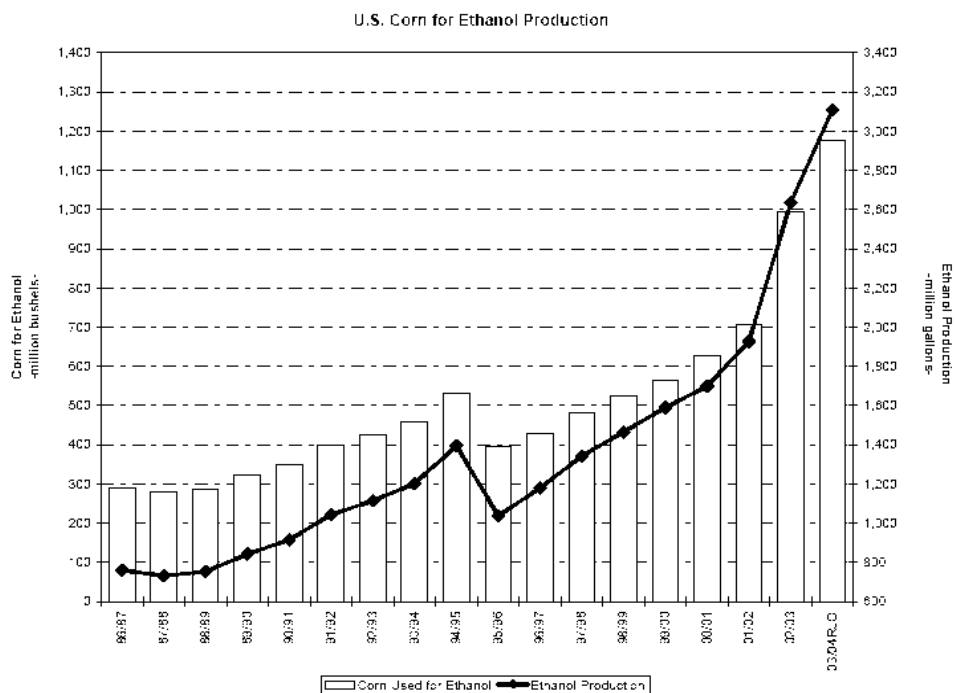
Approximately 40% of dry grind coproduct, referred to as wet distiller's grains with solubles are sold in various moisture contents ranging from 45% to 70%. Wet distiller's grain with solubles is marketed to ruminants relatively close to production facilities. It has a short shelf life because it is directly affected by ambient temperature, and requires increased handling costs. Current dryer technology suggests efficiencies of 1,200 BTUs to dry a pound of water. Distillers dryers, generally natural gas fired, are the single largest consumer of energy and the largest source of pollution in a dry grind corn plant.

Approximately 60% of dry grind production is marketed as distillers dried grains with solubles (DDGS) at 10% moisture. DDGS has a very long shelf life, and is easily transported all over the world. In the past, DDGS traditionally has been consumed by ruminants that are able to capitalize nutritionally on DDGS' high bypass protein. Rapidly increasing freight costs in the domestic and export markets have forced DDGS into monogastric rations in the Corn Belt where ethanol is produced.

North American DDGS Production

Supply (See Figure 1)

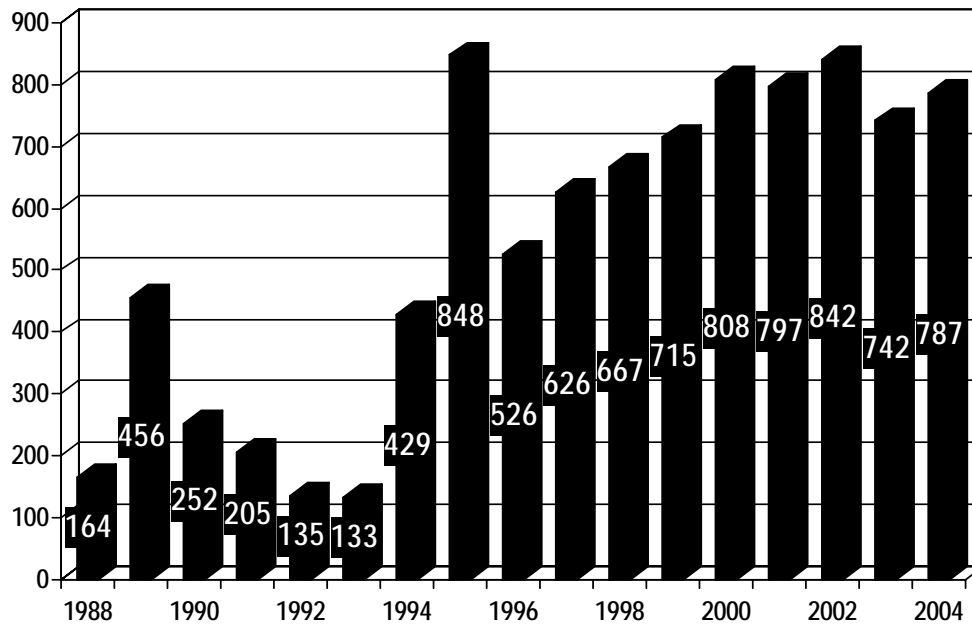
For the sake of comparison, all of the numbers in my presentation are based on 100% of the production sold as DDGS. Trying to compare supply and demand with variable moisture content would be confusing. Current North American production is around 7.5 mmt. Canada is included in this number as DDGS flows into Canada in the Western provinces and into the U.S. from the Eastern Provinces. Current industry forecasts call for North America production to grow to 10 mmt within two to three years. With approximately 1.26 billion bu. of U.S. corn used in ethanol production in 2004, the industry consumed 11% of the 2004 corn crop. Assuming the industry grows to 5 billion gallons, which is on the low side of most projections, ethanol will consume 1.83 billion bu. of corn annually.



DDGS has been predominantly a corn replacer (See Figure 2)

One can see how ethanol production per processed bushel has increased over the last 17 years. Currently, every bushel ground in a dry grind plant produces about 17 pounds of DDGS. Even with increasing efficiencies, we must grind three bushels of corn to produce one bushel of DDGS.

U.S. DDGS Exports 1988-2004



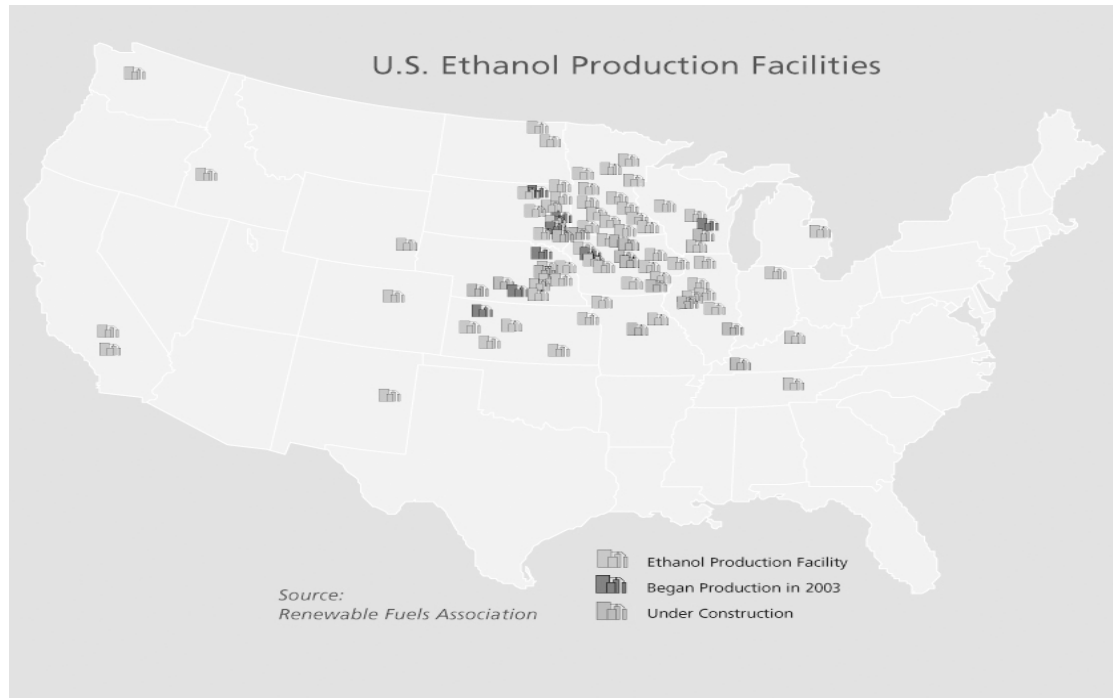
UNITED STATES DEPARTMENT OF AGRICULTURE FOREIGN AGRICULTURAL SERVICE

AREA/COUNTRIES OF DESTINATION	1999	2000	2001	2002	2003	2004
AUSTRALIA(*)		5		28		
BERMUDA				5		
BAHAMAS, THE				30		
CANADA	18305	21728	21260	30332	30898	82674
CHINA, PEOPLES REPUB					60	54
CHILE			33		3652	
COLOMBIA		40442	48495	37702	10140	3849
COSTA RICA				26323	1779	6600
DENMARK(*)	144317	127901	162543	106103	72265	NA
IRELAND	254127	219356	267265	297722	255398	185007
EL SALVADOR				192	380	129
FINLAND					380	2072
FRANCE(*)	20336	27427	2679	3000		
GERMANY(*)		47708	16168	28333	580	5144
GUATEMALA		3065	10070	3849	13131	3998
HONG KONG		88				
HONDURAS		912			1391	8024
INDONESIA						11516
ISRAEL(*)		2786			12380	6366
ITALY(*)	8085	12746		22032		
JAPAN	608	1466	26	40	15	
JAMAICA		4914				1490
KOREA, REPUBLIC OF			14		70	625
MALAYSIA						12682
MEXICO	22255	35718	31319	30751	45721	66894
MOZAMBIQUE				87		
NETHERLANDS	22697	16816	19439	14793	16445	36536
NICARAGUA						863
PANAMA				1247		1184
PORTUGAL	69614	97039	67666	74209	52221	73396
PHILIPPINES						958
QATAR		37				
PHILIPPINES				51		
SINGAPORE						163
SOUTH AFRICA, REPUBLIC OF						546
SPAIN	63040	69199	39324	74677	40169	77176
UNITED ARAB EMIRATES					82	
THAILAND	62				61	10
TAIWAN	57	80				7451
UNITED KINGDOM	91272	69235	111165	86612	184742	188857
VENEZUELA		9240		4023		1726
VIETNAM						633
TOTAL	714775	807908	797466	842141	741960	786603



DDGS exports (See Figures 3 and 4)

DDGS exports continue to grow although not nearly as fast as the accelerated supply growth. Although decreasing in consumption due to cheaper competitive ingredients, the European Community continues to be our largest customer. Significant growth is expected and being realized in Mexico, Central America, South America, and Asia. Rail cars and trucks cross the Mexican and Canadian borders. Bulk vessels loaded in New Orleans and Duluth make their way to Europe, Mexico, Central and South America, and even Cuba. Containers loaded all over the Corn Belt and West Coast are stuffed with DDGS to be returned to their Asian origins at very competitive rates. The U.S. Grains Council continues to assist our industry with developing export markets.

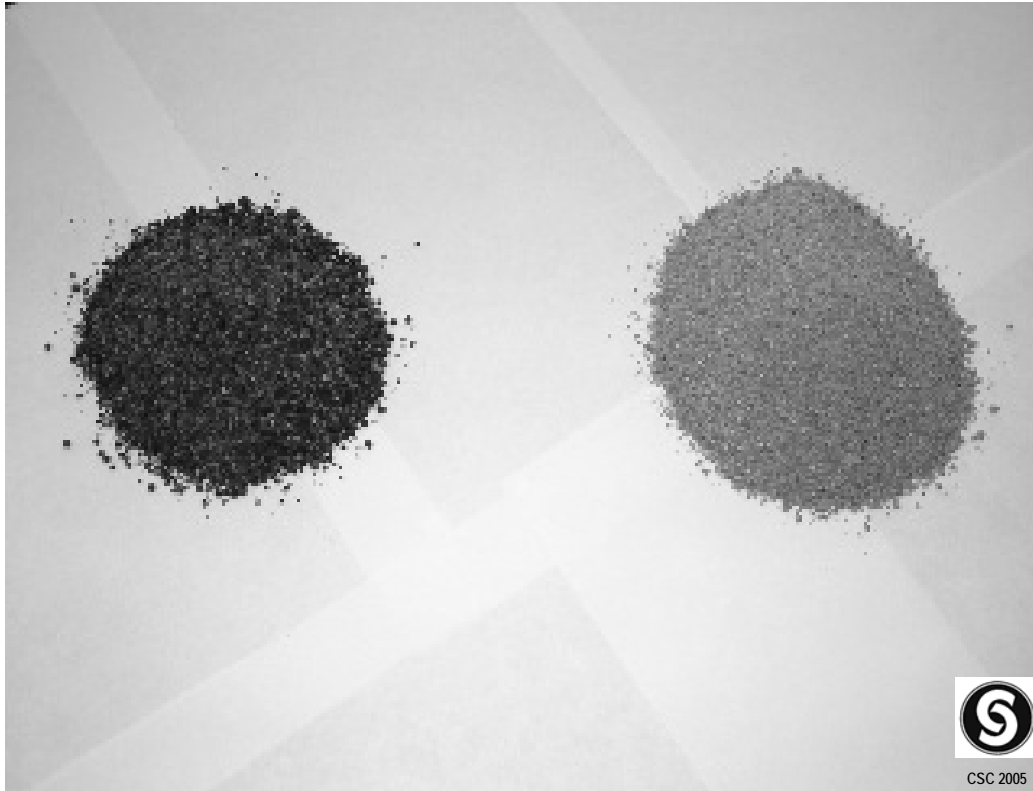


Building Energy Security One Ethanol Plant At A Time



Current production and growth located in the Corn Belt (See Figure 5)

Significant monogastric consumption is found in the Corn Belt with significant dairy consumption outside of the Corn Belt. Nutritionally, dairy farmers can pay roughly 1/3 more for DDGS than hog producers can. However, CSC's average freight to hogs and poultry is less than \$6.00 per short ton, while our average cost all the way to the dairy is almost \$50.00 per short ton.



Improving technology continues to improve handling characteristics and digestibility of DDGS (See Figure 6)

New golden DDGS is far superior in handling characteristics and digestibility, especially for monogastrics. The dry grind corn plant essentially converts the starch found in corn to sugar, which is then fermented to alcohol. Older technologies left significant unfermented starch and sugars in the feed creating a dark, burnt smelling, sticky feed, with a low digestibility of the amino acids. Sugars dried with conventional gas dryers caramelize causing the maillard reaction, a degrading of the digestibility of protein. This degradation of protein is more significant in monogastric diets. Newer technology has been able to convert more of the starch and sugar to ethanol, allowing plants to get more alcohol per bushel and significantly improving the quality of the DDGS.

Rail Rates from the Central Corn Belt to the San Joaquin Valley in California

	<u>Feb. '04</u>	<u>Feb. '05</u>
Tariff Rate:	\$3,682.00	\$3,615.00
Fuel Surcharge:	2.5%	8.0%
Mileage Allowance:	(\$ 520.00)	\$ 0.00
Current Lease Cost of 6351 Cu. Ft. Capacity Hopper:	\$ 450.00/mo.	\$ 630.00/mo.
Average Round Trip:	24 days	50 days
<hr/>		
Actual Cost of Shipping:	\$3,614.00	\$4,984.00 (diff. = \$1,340.00)

\$14.00 per ton or a 27% freight increase in one (1) year

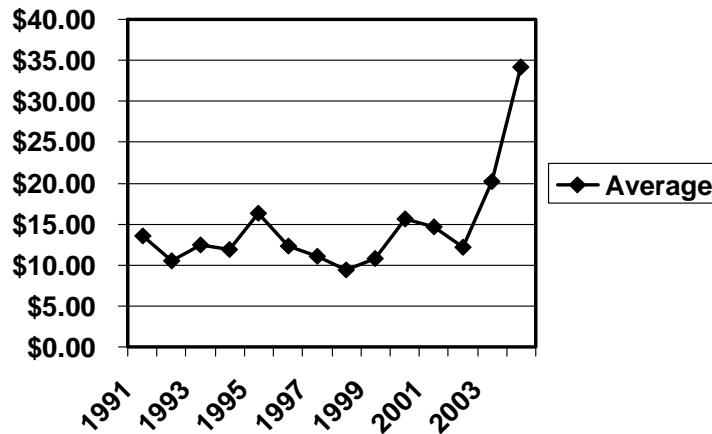


27% freight increases in one year (See Figure 7)

DDGS has a bulk density on average of 32 pounds per cubic foot. As a result, most shippers lease a specialized high cube car that is only available from one manufacturer with a 16-month lead-time. Railroads have raised rates by eliminating mileage payments on private cars. Railroad owned cars are not available for the transportation of DDGS. Fuel surcharges have gone from 2.5% to 8% in one year, but have finally begun to decrease. Five-year full service lease rates on new 6351 cu. ft. capacity cars have gone from \$450.00 to \$630.00 per month due to increased steel costs and increased demand from our growing industry and others. The significantly overburdened rail system has slowed to a crawl, more than doubling the time it takes for these expensive cars to make a round trip, further adding to the demand for cars. One viable solution has been 75 and 100 car units that drive efficiency at railroads, effectively decreasing rates by improving velocity. For units to become a consistent option, there needs to be a wider variety of destinations that can perform.

Average Monthly Freight Rates U.S. Gulf to Holland

January 1991 – December 2004



Basis: 55,000 mt vessels
55 cu. ft. per long ton stowage (HSS)
Dollars per mt

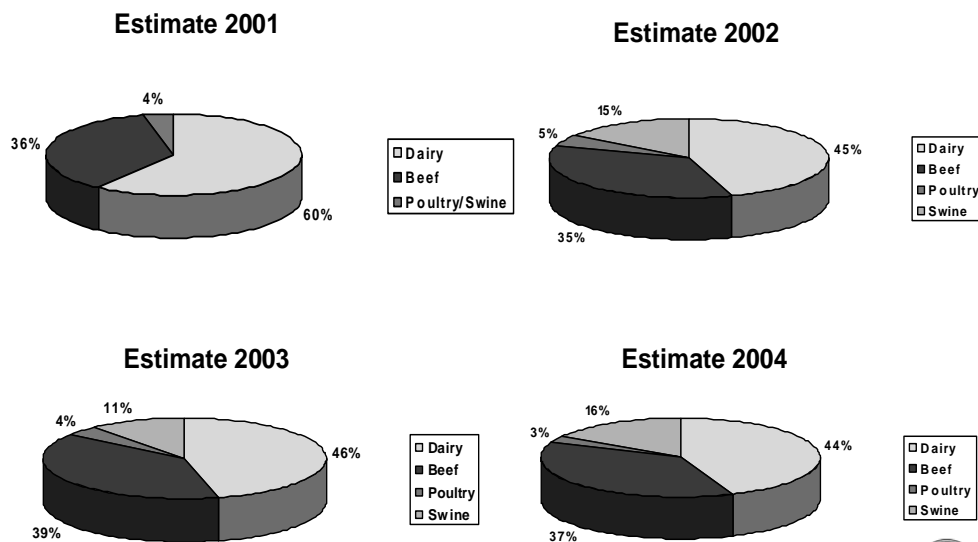
Credit to Don Morrison,
The Rice Company-Krohn Div.



Export demand will continue to be hindered as long as freight stays relatively high (See Figure 8)

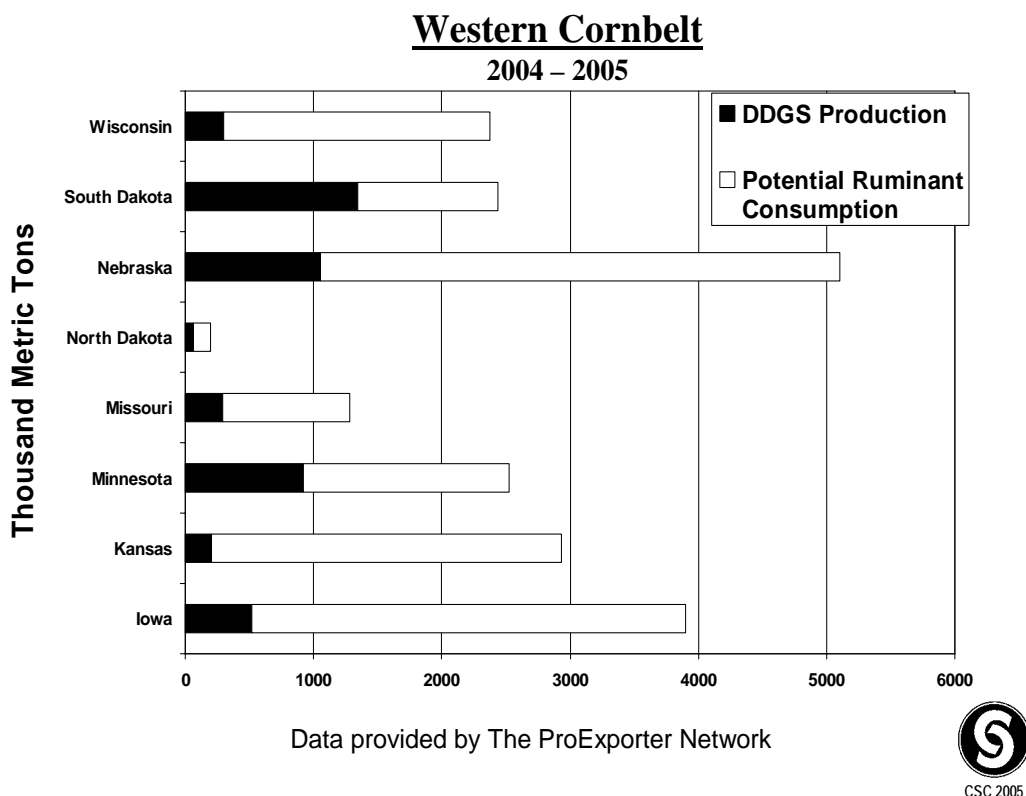
Demand for vessel freight especially from China, retirement of older small vessels for scrap, and fewer bulk vessels being built, has created a real freight shortage. High steel costs and big demand for containerships and tankers will slow the correction of this problem.

U.S. DDGS Consumption



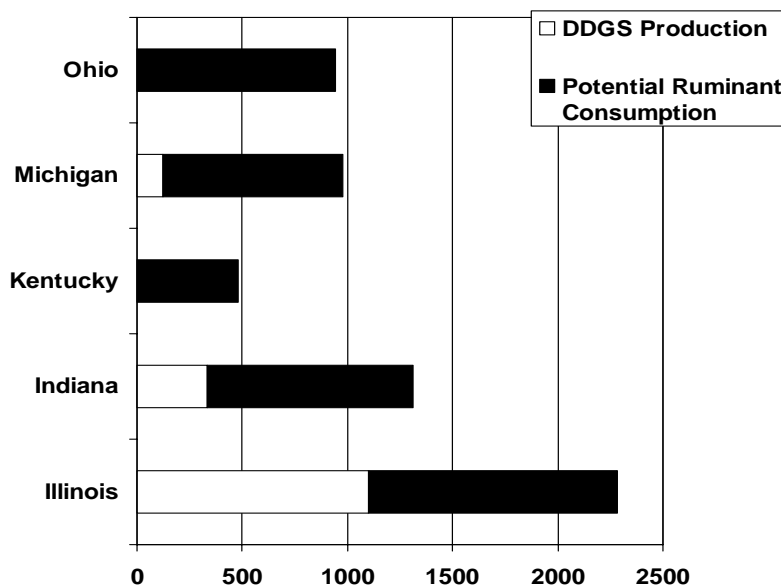
With all the recent nutrition research on newer process DDGS, the amount of DDGS going to monogastrics continues to climb (See Figure 9)

These pie charts represent our estimates on species consumption by calendar year. Keep in mind the rapidly growing supply during this time frame. Dairy consumption remained fairly consistent from 2001 to 2002 while supplies grew. Increased beef consumption for wet distillers grains was spurred on by increasing natural gas costs and tighter pollution regulations on dryer emissions. The crop year 2003-2004 showed a rapid increase in dairy consumption, a direct result of higher protein costs, tight canola meal supply, and a small cotton crop with almost no imported cotton seed.



Eastern Cornbelt

2004 – 2005



Data provided by The ProExporter Network

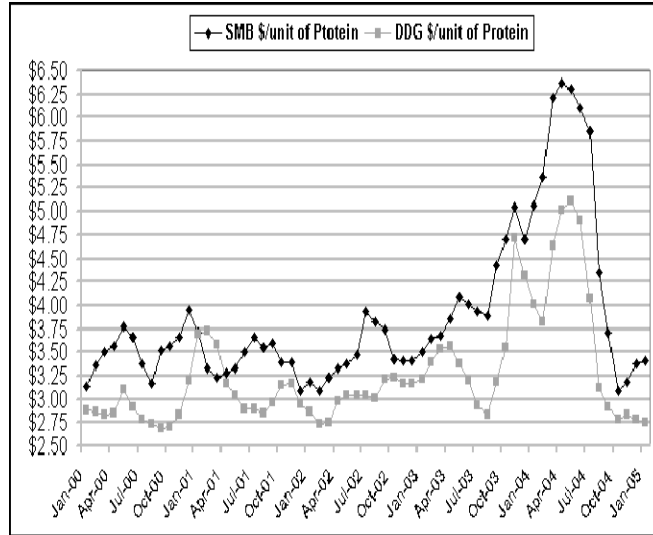


At 100% penetration in rumen diets, corn belt states have significant in-state consumption available (See Figures 10 and 11)

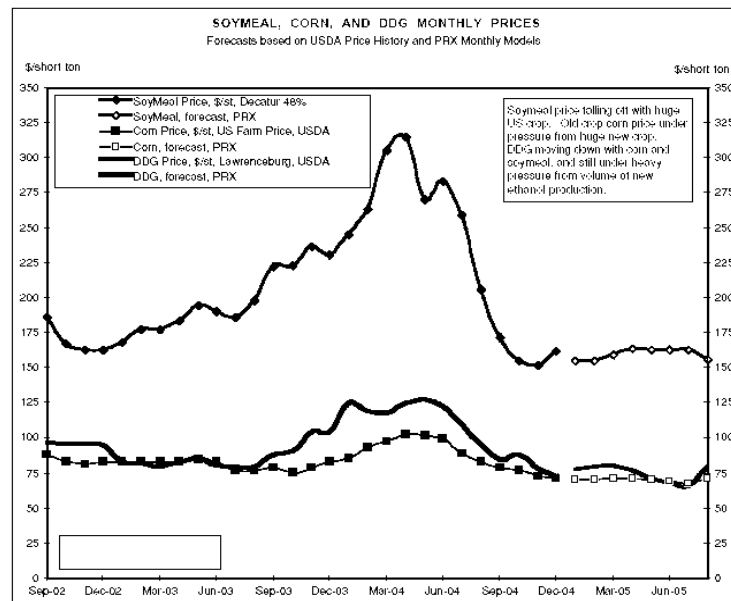
100 percent penetration in any market is nearly impossible, especially with available homegrown feeds and locally produced competitive ingredients, like corn gluten feed, brewers grains, wheat midds, malt sprouts, bakery byproduct, and linseed meal.

DDGS Comparison to Hi Pro Soybean Meal per Unit of Protein

	SMB \$/unit of Protein	DDGS \$/unit of Protein
SMB \$/unit of Protein	1	
\$0.47DDGS \$/unit of Protein	0.871915	1



Soymeal, Corn, and DDG Monthly Prices



DDG Price Spreads vs. Lawrenceburg: IL, +0 to +5; MN, -5 to -7; NE, +10 to +15. USDA Grain Market News.

Data provided by The ProExporter Network



Once considered a corn replacement, it is easy to see that DDGS trends with Soybean Meal (See Figures 12 and 13)

In the last year, synthetic lysine prices have fallen more than 50%, thanks to significant imports from China. The lysine deficiency of corn is multiplied by a factor of 3 in DDGS. Monogastric diets can now be cheaply fortified with synthetic lysine. As long as synthetic lysine is readily available, DDGS will compete with the other oilseed proteins in all animal diets.

AGRI-NUTRITION SERVICES SHAKOPEE, MN

A typical swine Grower-Finisher Diet – 0.90% Lysine (Total) – Diet 1

INGREDIENTS	1	2	3	4	5
	(LB/TON)	(LB/TON)	(LB/TON)	(LB/TON)	(LB/TON)
Corn	1546	1367	1405	1416	1301
44% Soybean Meal	406	387	348	347	299
DDGS	---	200	200	200	364
18 ½ Dicalcium Phosphate	22	16	16	5	---
Limestone	14	18	18	18	21
Salt	6	6	6	6	6
Swine G-F Premix	3	3	3	3	3
L-Lysine, HCL	3	3	4.1	4.1	5.1
Phytase -- 1000	---	---	---	1.0	1.0
Total	2000	2000	2000	2000	2000



AGRI-NUTRITION SERVICES SHAKOPEE, MN

Typical lactating dairy cow rations

	DIET 1		DIET 2		DIET 3	
INGREDIENTS	(As-Is)	(Dry Matter)	(As-Is)	(Dry Matter)	(As-Is)	(Dry Matter)
	(lb/day)	(lb/day)	(lb/day)	(lb/day)	(lb/day)	(lb/day)
Alfalfa Haylage	20.6	9.3	19.0	8.6	20.7	9.3
Corn Silage	20.7	7.3	18.9	6.6	20.4	7.2
Alfalfa Hay	5.0	4.5	5.0	4.5	5.0	4.5
Corn, High Moisture	17.5	13.8	16.0	12.7	15.5	12.2
44% Soybean Meal	3.8	3.3	3.5	3.1	3.5	3.1
Whole Cottonseed Meal	5.0	4.6	5.0	4.6	4.0	3.7
DDGS	---	---	4.0	3.5	4.0	3.5
Blood Meal	0.8	0.7	---	---	0.1	0.1
Sodium Bicarbonate	0.3	0.3	0.3	0.3	0.3	0.3
18 ½% Dicalcium Phosphate	0.3	0.3	0.2	0.2	0.2	0.2
Limestone	0.4	0.4	0.5	0.5	0.5	0.5
Salt	0.2	0.2	0.2	0.2	0.2	0.2
Magnesium Oxide	0.1	0.1	0.1	0.1	0.1	0.1
Dairy Premix & Yeast	0.1	0.1	0.1	0.1	0.1	0.1
Total lb/cow/day	74.9	45.0	72.9	45.0	74.6	45.0



As more DDGS finds its way into monogastric diets, it replaces increasing amounts of oilseed proteins (See Figures 14 and 15)

Inclusion of DDGS in ruminant rations has negligible effect on oilseed protein consumption. Inclusion of DDGS in monogastric rations significantly affects oilseed protein consumption. Notice the need to supplement monogastrics with synthetic lysine. Another important factor is the reduced need for dicalcium phosphate in monogastric diets, significantly reducing ration costs. Research at the University of Minnesota suggests phosphorus, a nutritional requirement for all animals, found in corn is not available to monogastrics and is excreted in the manure. Phosphorus found in DDGS is three times the level of corn and nutritionally available to monogastrics. Further research at the University of Minnesota also suggests that feeding DDGS to monogastrics can reduce phosphorus in the manure as it reduces the amount of corn used in the diet. Iowa, the number one hog state in the nation, has adopted a phosphorus manure management program. Many other states and provinces in Canada have enacted legislation to follow. In areas of high phosphorus soil concentration, the feeding of some DDGS to replace corn will be the only option to meet new phosphorus manure regulations other than eliminating or reducing herd size. More groundbreaking research from Minnesota demonstrates the nutraceutical effect DDGS has on hogs. Gut health is the single biggest concern facing hog growers today. With growing consumer concern about medications and antibiotics in the food chain, many pig feeders are using DDGS in their rations to improve gut health without the use of medications or antibiotics.

www.ddgs.umn.edu



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The best website on DDGS (See Figure 14)

This University of Minnesota web site, translated into several languages, contains all of the recent nutritional research on wet and dried distiller's grains done at Minnesota and many other universities. It also contains complete nutrient profiles on each plant CSC markets for, with pictures of the feed. Many feed nutritionists domestic and abroad rely on this web site for accurate, dependable nutritional specifications on DDGS produced at specific locations. The website also includes many supply and demand presentations.

Conclusion

Rapid supply growth, improved quality, slow export growth, increased freight costs, sound nutritional research, and dependable nutritional information will force more distillers' products into all rations. Gut health concerns, phosphorus manure regulations, and close geographic proximity to supply have and will continue to increase consumption of DDGS in monogastric rations at the expense of oilseed protein. New corn varieties are being developed with significantly higher fermentable starch. These new varieties will produce more ethanol per acre and higher protein distillers products. Technology marches on; a new enzyme process just announced a few months ago will replace the cook process in dry grind plants. This new technology reduces energy costs, increases alcohol production per bushel, and increases the protein content and digestibility of the DDGS. With cheap corn and high priced petroleum, record margins are at hand. The future is bright for ethanol, and we like the rest of the agricultural world, expect the pace of new plant construction to continue. Ethanol's expected growth will continue to have a dramatic effect on feed markets from coast to coast. These effects will become even more apparent in the months ahead as the U.S. deals with the huge 2004-2005 crop and expectations for the 2005-2006 crop.



COMMODITY SPECIALISTS COMPANY

Agricultural Commodity Experts

www.csc-world.com

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Sean Broderick Jim Montbriand Cole Butler

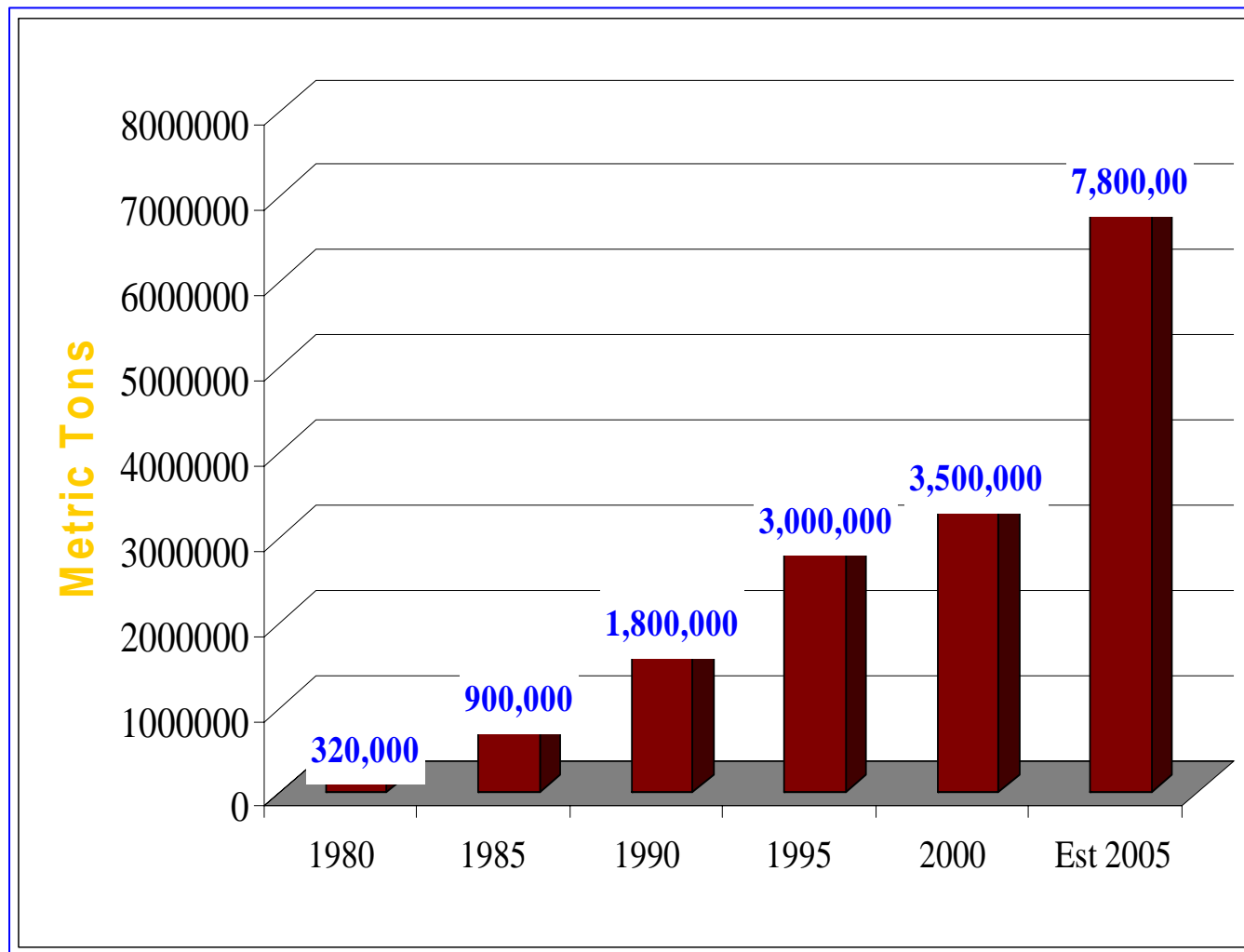
400 So. 4th St., 310 Grain Exchange Bldg., Mpls., MN 55415

612-330-9130 1-800-769-1066

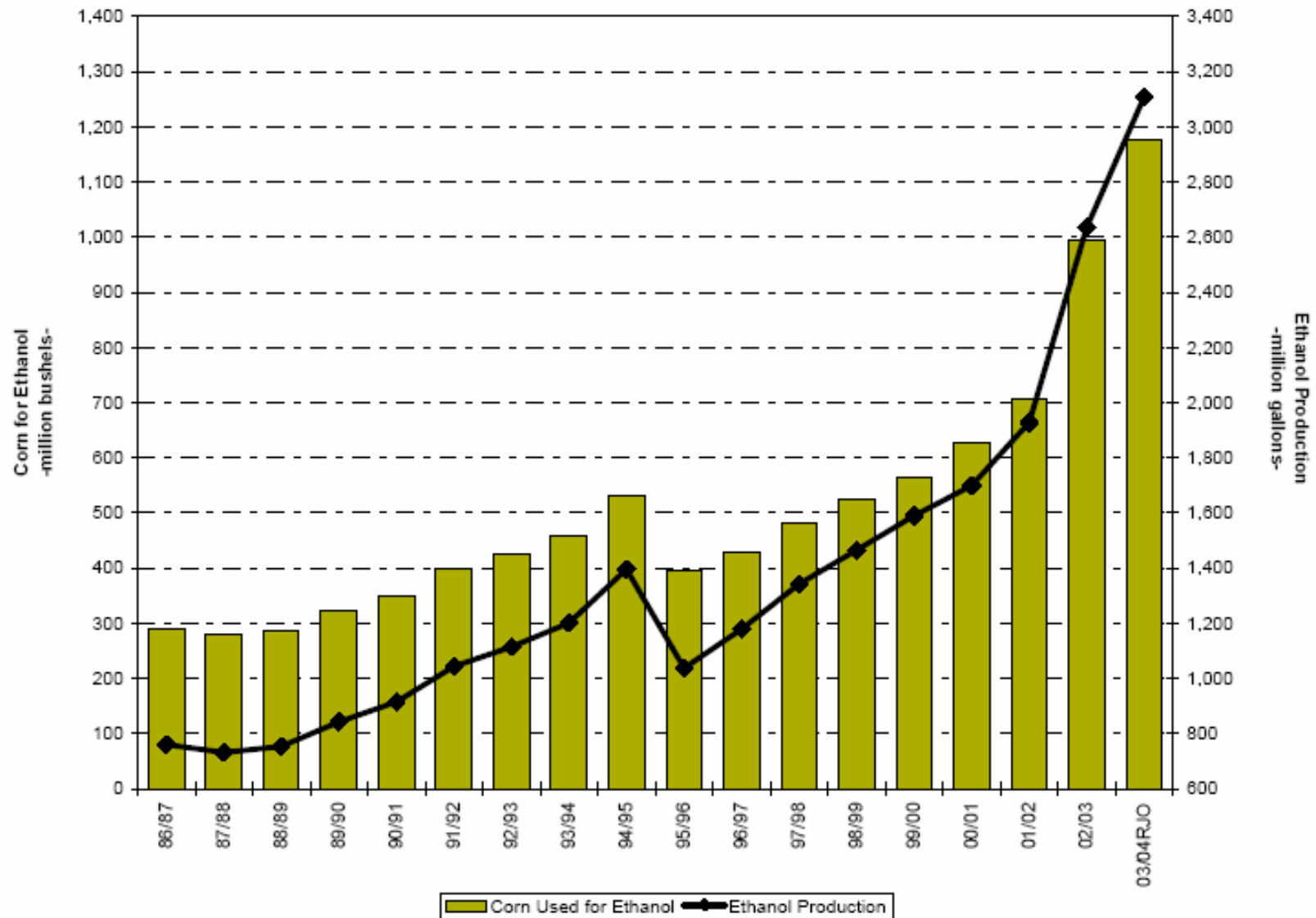
smarkham@csc-world.com



North American DDGS Production

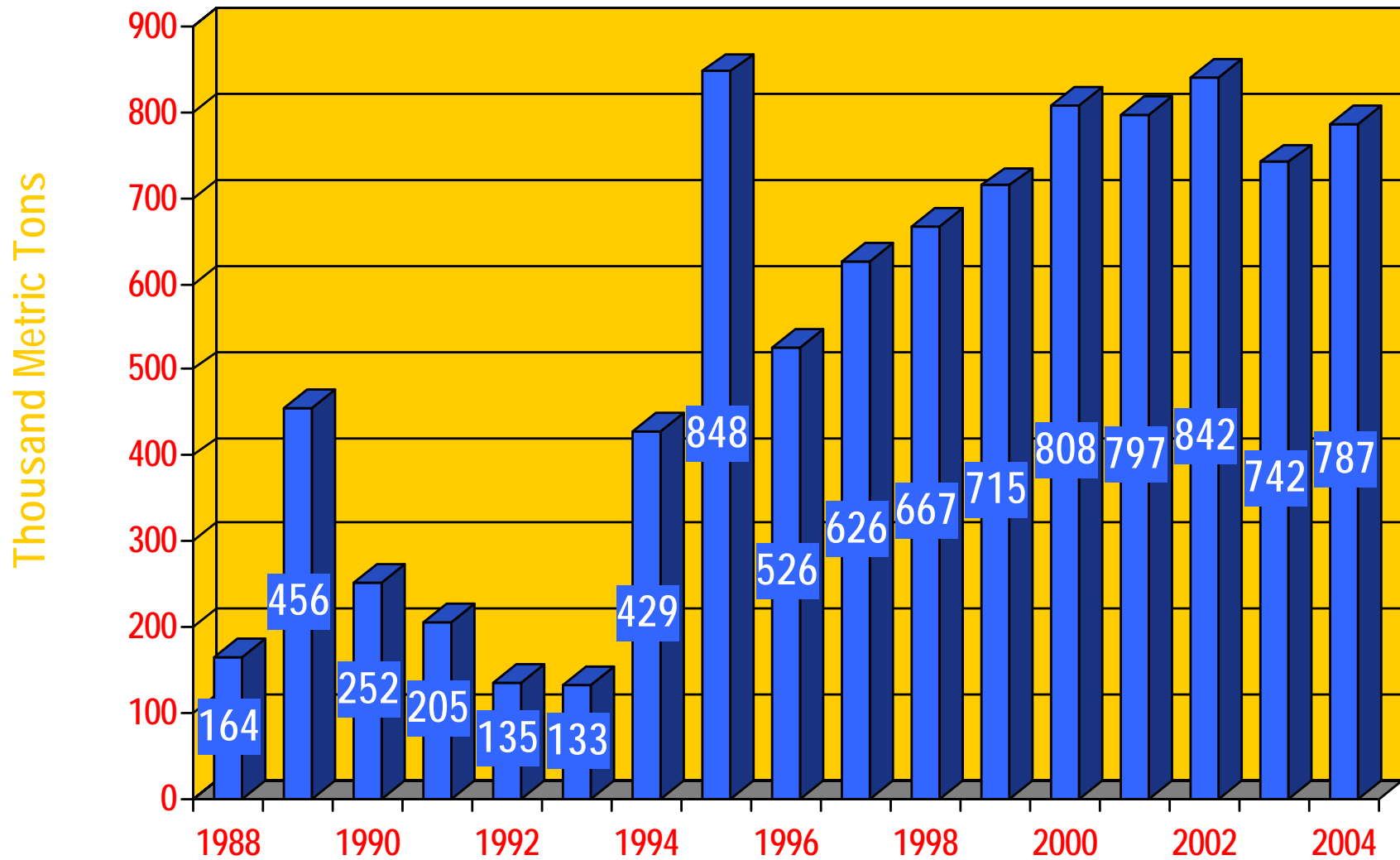


U.S. Corn for Ethanol Production



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U.S. DDGS Exports 1988-2004

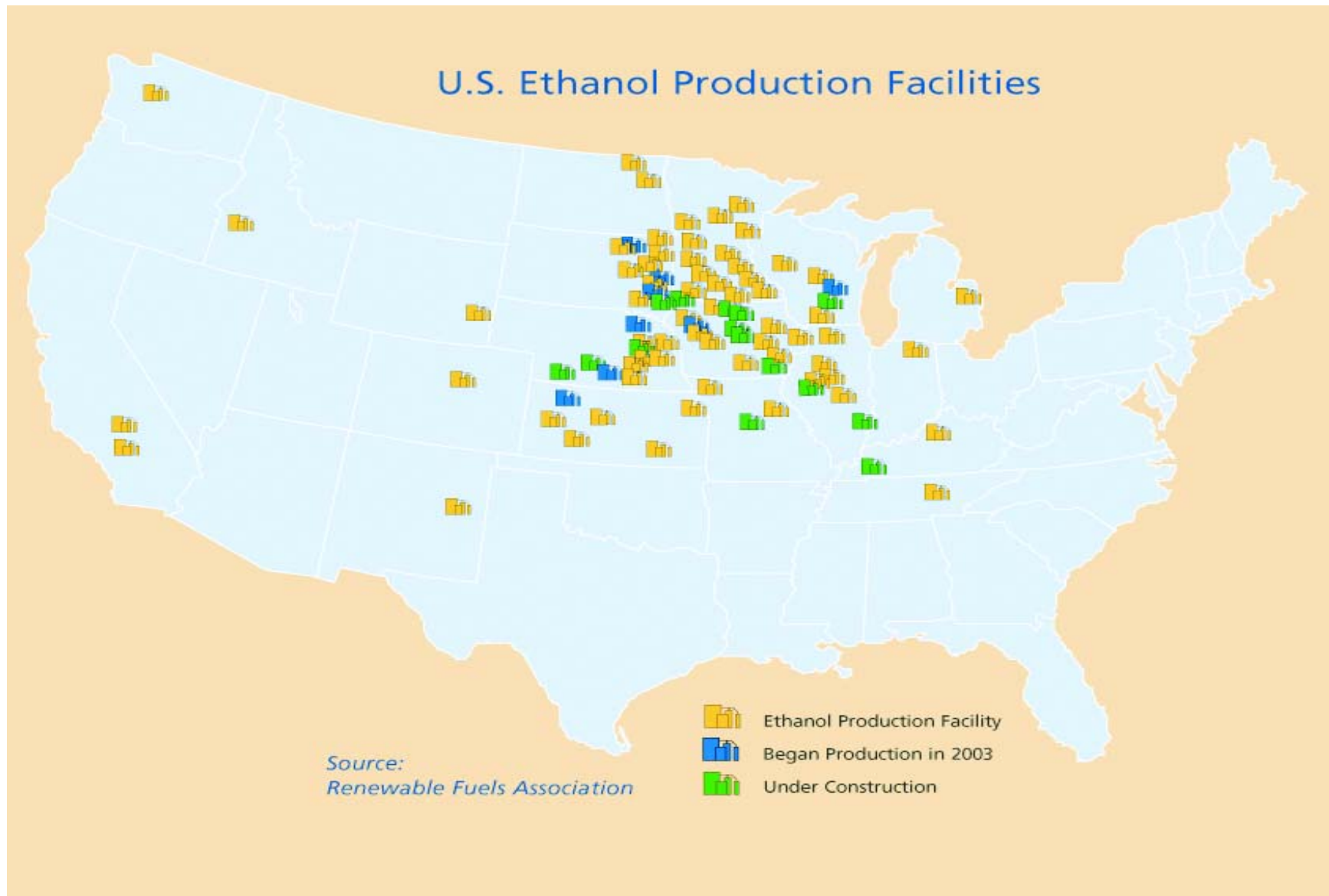


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Building Energy Security One Ethanol Plant At A Time



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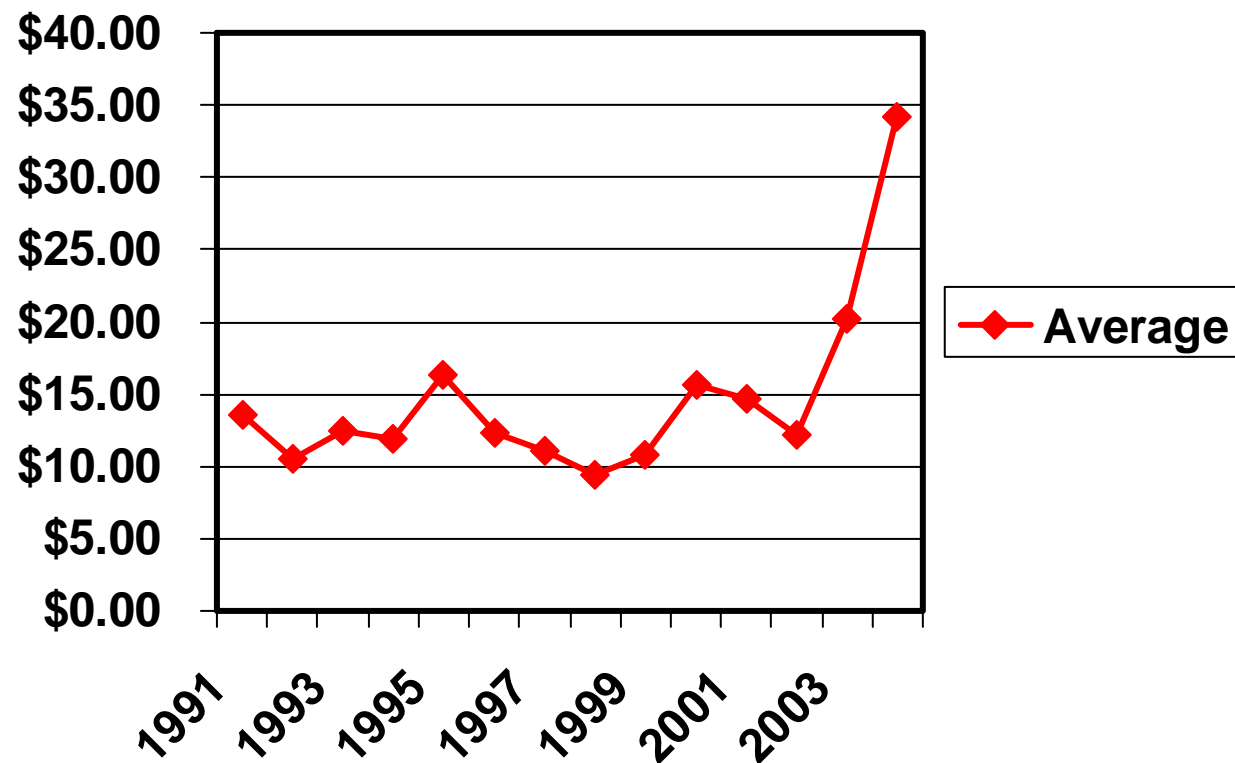
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Average Monthly Freight Rates U.S. Gulf to Holland

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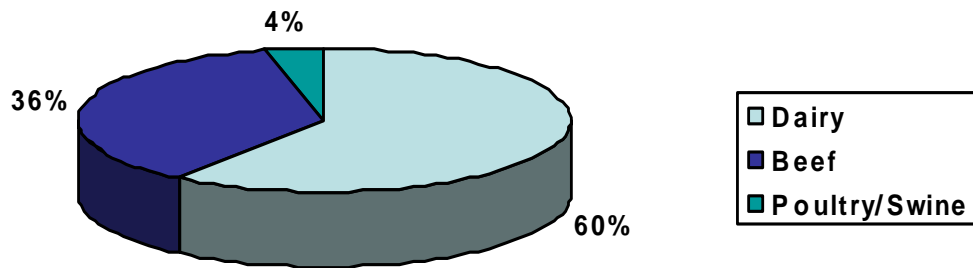
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55 cu. ft. per long ton stowage (HSS)
Dollars per mt

Credit to Don Morrison,
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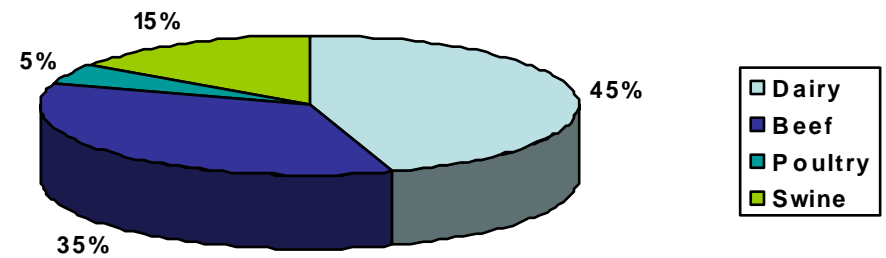


U.S. DDGS Consumption

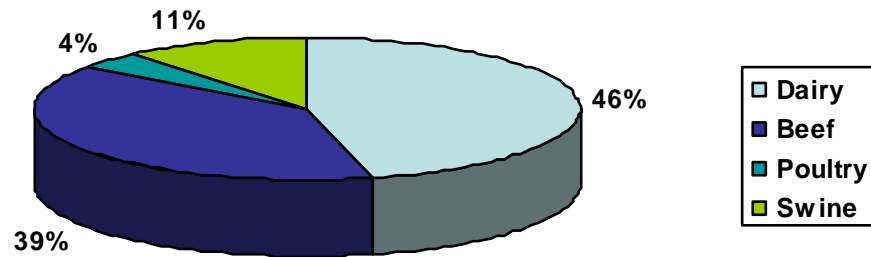
Estimate 2001



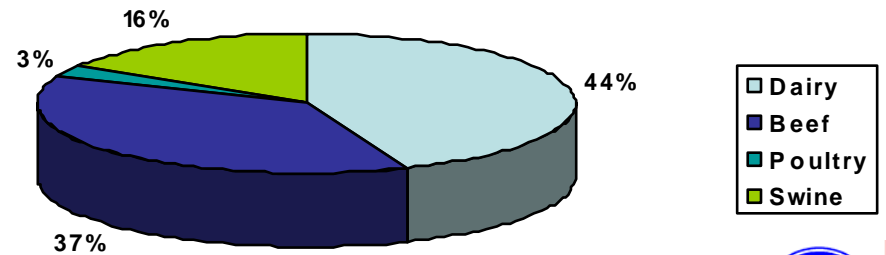
Estimate 2002



Estimate 2003



Estimate 2004

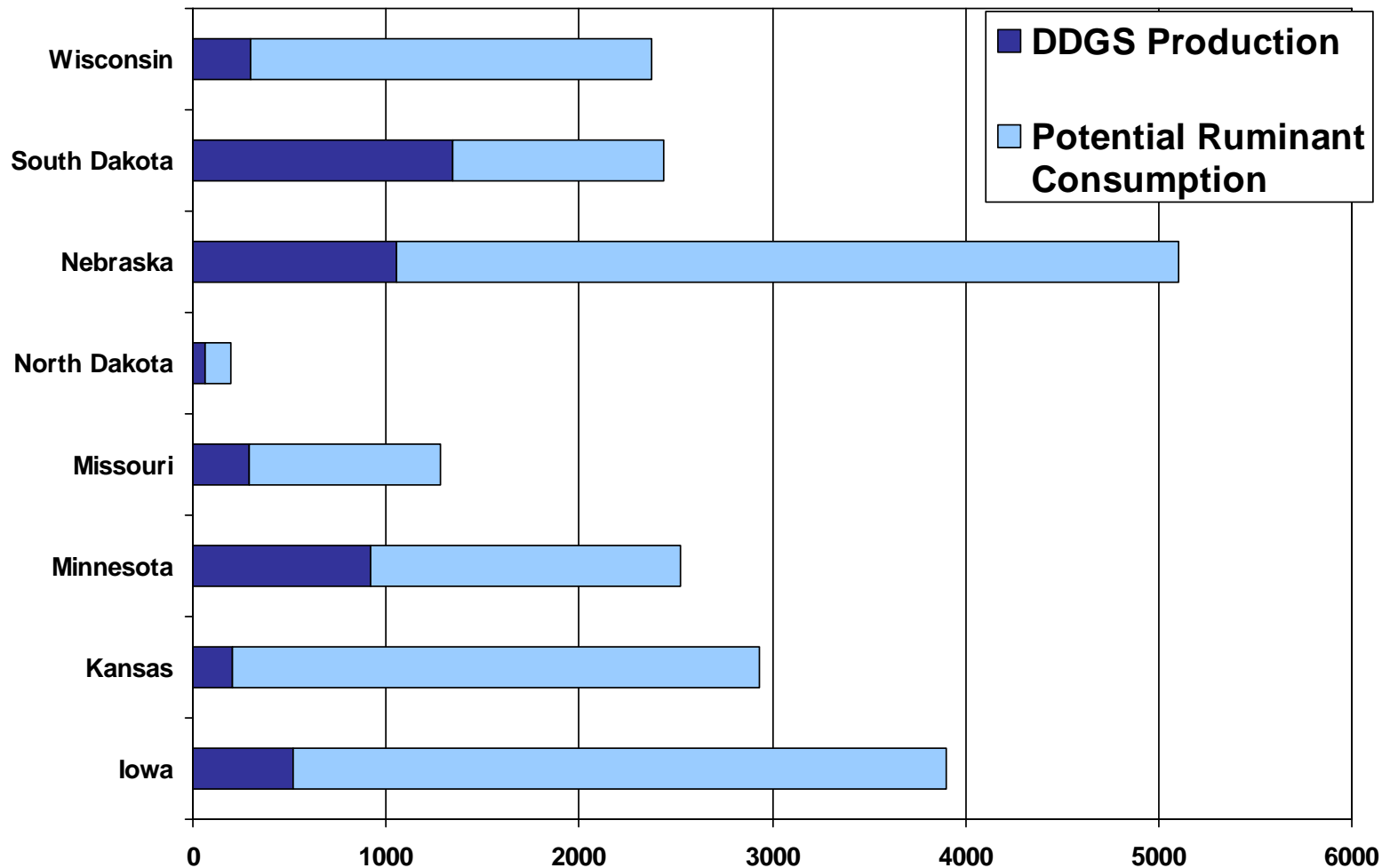


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Western Cornbelt

2004 – 2005

Thousand Metric Tons



Data provided by The ProExporter Network

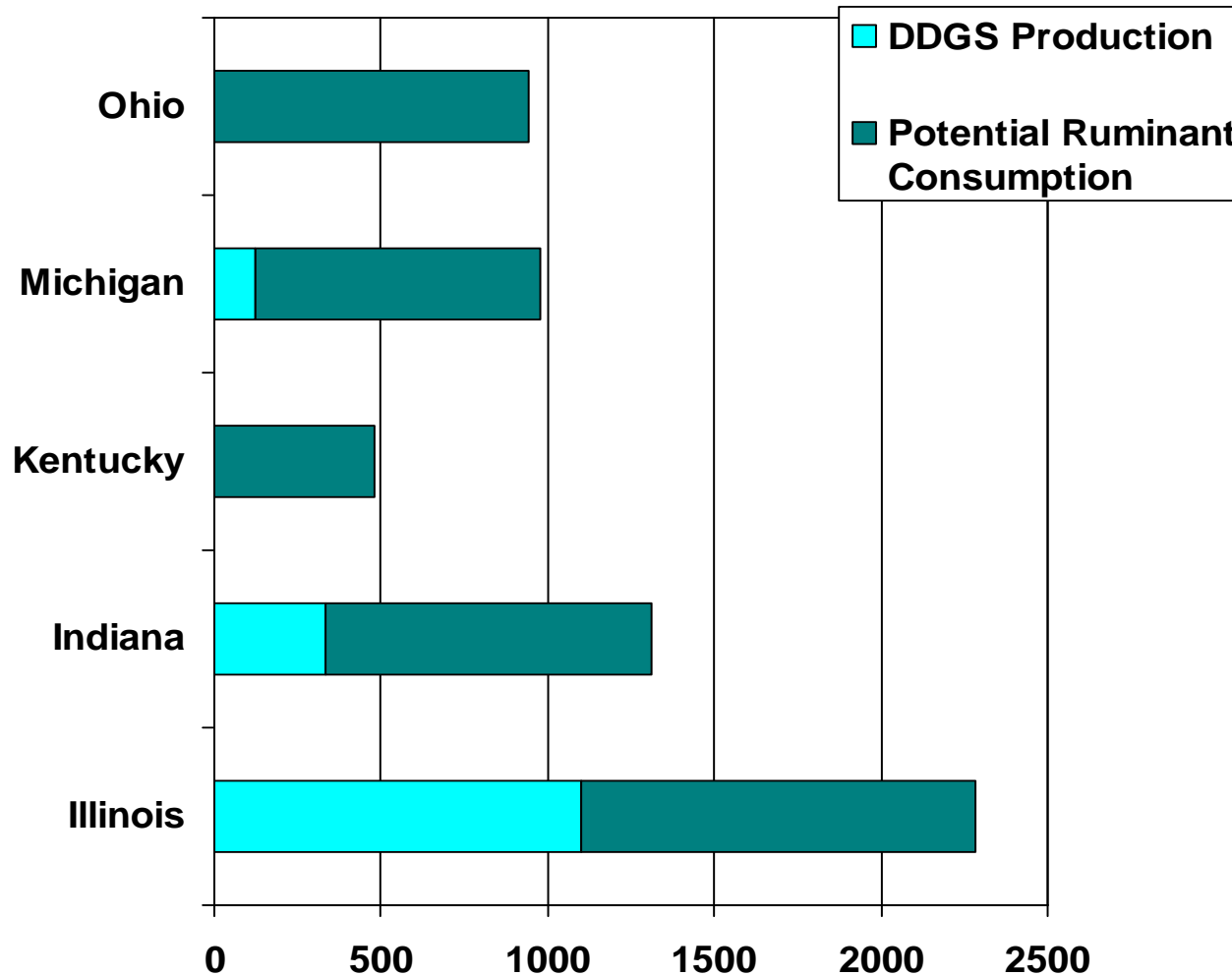


CSC 2005

Eastern Cornbelt

2004 – 2005

Thousand Metric Tons



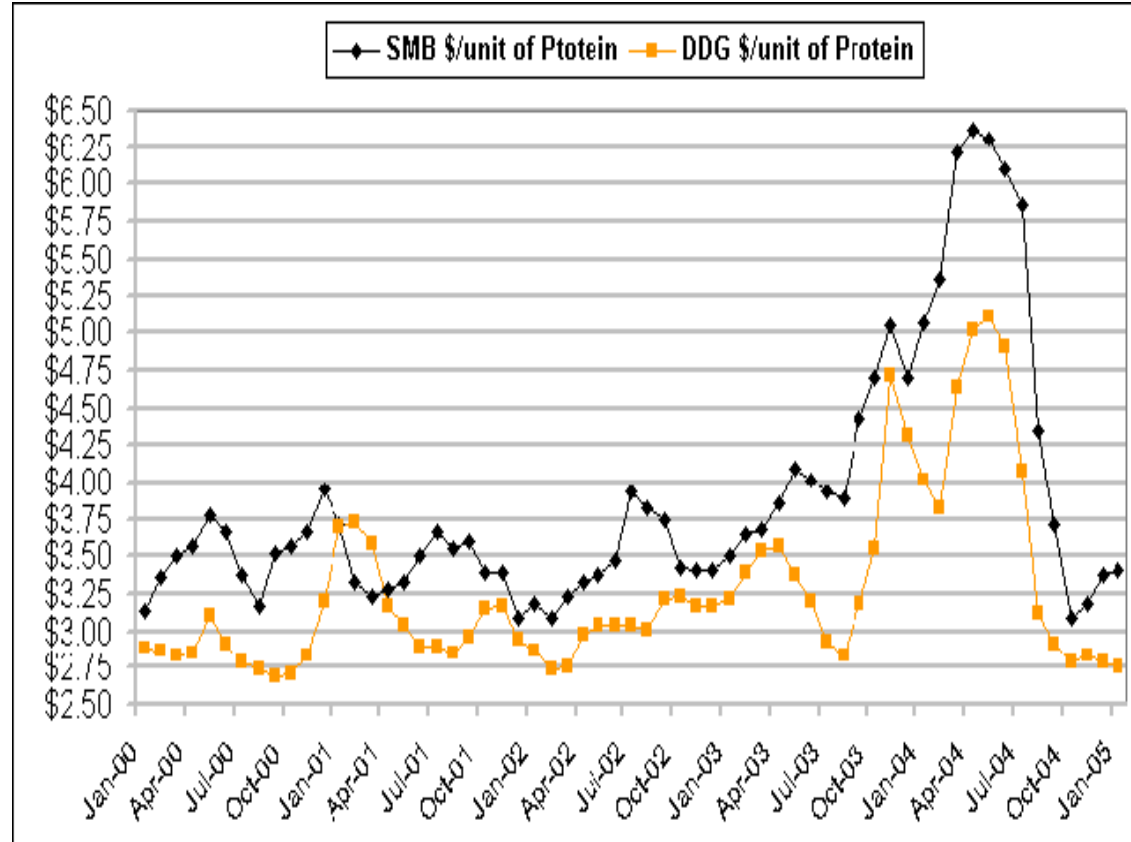
Data provided by The ProExporter Network



CSC 2005

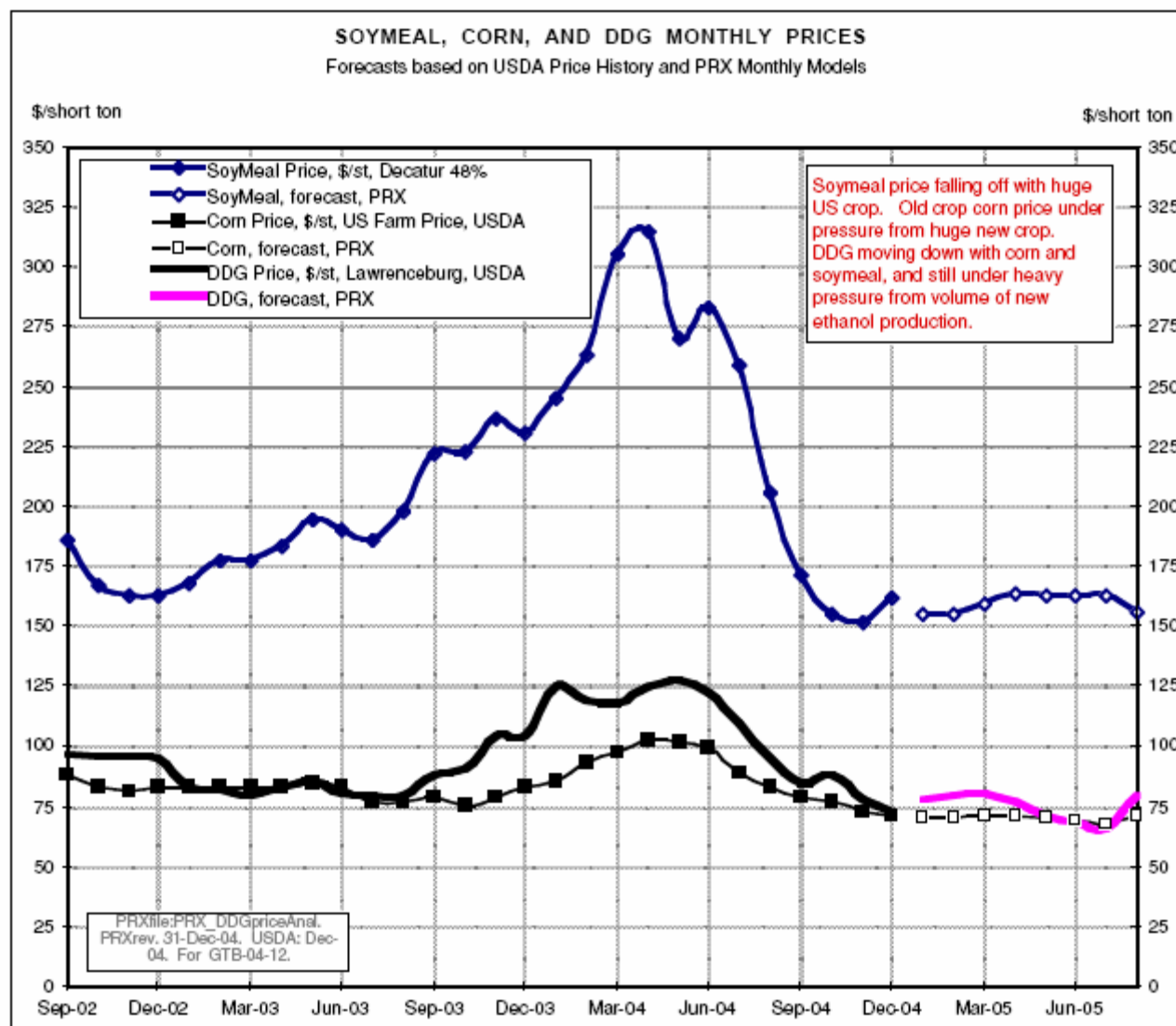
DDGS Comparison to Hi Pro Soybean Meal per Unit of Protein

	SMB \$/unit of Ptoein	DDGS \$/unit of Protein
	1	1
\$0.47	0.871915	1



CSC 2005

Soymeal, Corn, and DDG Monthly Prices



DDG Price Spreads vs. Lawrenceburg: IL, +0 to +5; MN, -5 to -7; NE, +10 to +15. USDA Grain Market News.

Data provided by The ProExporter Network



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SHAKOPEE, MN

A typical swine Grower-Finisher Diet – 0.90% Lysine (Total) – Diet 1

INGREDIENTS	1	2	3	4	5
	(LB/TON)	(LB/TON)	(LB/TON)	(LB/TON)	(LB/TON)
Corn	1546	1367	1405	1416	1301
44% Soybean Meal	406	387	348	347	299
DDGS	---	200	200	200	364
18 ½ Dicalcium Phosphate	22	16	16	5	---
Limestone	14	18	18	18	21
Salt	6	6	6	6	6
Swine G-F Premix	3	3	3	3	3
L-Lysine, HCL	3	3	4.1	4.1	5.1
Phytase -- 1000	---	---	---	1.0	1.0
Total	2000	2000	2000	2000	2000



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SHAKOPEE, MN

Typical lactating dairy cow rations

	DIET 1		DIET 2		DIET 3	
INGREDIENTS	(As-Is)	(Dry Matter)	(As-Is)	(Dry Matter)	(As-Is)	(Dry Matter)
	(lb/day)	(lb/day)	(lb/day)	(lb/day)	(lb/day)	(lb/day)
Alfalfa Haylage	20.6	9.3	19.0	8.6	20.7	9.3
Corn Silage	20.7	7.3	18.9	6.6	20.4	7.2
Alfalfa Hay	5.0	4.5	5.0	4.5	5.0	4.5
Corn, High Moisture	17.5	13.8	16.0	12.7	15.5	12.2
44% Soybean Meal	3.8	3.3	3.5	3.1	3.5	3.1
Whole Cottonseed Meal	5.0	4.6	5.0	4.6	4.0	3.7
DDGS	---	---	4.0	3.5	4.0	3.5
Blood Meal	0.8	0.7	---	---	0.1	0.1
Sodium Bicarbonate	0.3	0.3	0.3	0.3	0.3	0.3
18 ½% Dicalcium Phosphate	0.3	0.3	0.2	0.2	0.2	0.2
Limestone	0.4	0.4	0.5	0.5	0.5	0.5
Salt	0.2	0.2	0.2	0.2	0.2	0.2
Magnesium Oxide	0.1	0.1	0.1	0.1	0.1	0.1
Dairy Premix & Yeast	0.1	0.1	0.1	0.1	0.1	0.1
Total lb/cow/day	74.9	45.0	72.9	45.0	74.6	45.0



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