Review of Historic and Projected Grain Traffic on the Upper Mississippi River and Illinois Waterway: An Addendum

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Draft Report

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I. INTRODUCTION

In April 1997, Jack Faucett Associates (JFA) submitted a nine volume report to the U.S. Army Corps of Engineers. The report contained freight traffic forecasts to 2050 for the Upper Mississippi River and Illinois Waterway. It was a small part of the Corps large Navigation Study to examine the feasibility of navigation improvements on these river systems. The forecasts were used as inputs into a benefit-cost model specifically designed to evaluate and prioritize capital improvement proposals for the rivers.

Opponents of the capital expansion plans have charged that the freight projections are too high and will lead to incorrect planning decisions. Criticism has focused primarily on the forecast of the grain movements, which in the past have comprised 40% - 50% of the freight tonnage that moves on the Upper Mississippi River and Illinois Waterway. The arguments are based on the observation that corn exports between 1995 and 1999 were 26.8% lower on average than predicted by Sparks Companies, Inc. (SCI) in our original report (See Exhibit 1). Almost all of the corn transported on the Upper Mississippi River and Illinois Waterway is destined for export markets in Southern Louisiana, hence the concern about the over-estimation. As shown in Exhibits 2 and 3, this did translate into waterway traffic projections that were higher than observed.

Corn is by far the largest single commodity that moves on the two river systems, comprising an average of 34% of the total traffic that moves on the Upper Mississippi River and 27% of the traffic on the Illinois Waterway. This fact combined with relatively high growth rates that were predicted for corn (161% on the Upper Mississippi River and 184% on the Illinois Waterway) had the following implication for the total traffic forecasts: growth in corn tonnage was expected to account for 59.8% of the total growth between the base year and 2050 on the Upper Mississippi River, and 56.7% of the total growth on the Illinois Waterway. The lower than expected export numbers over the last five years naturally raises the question of whether the prospect for such strong growth is warranted.

The purpose of this study is to address that question. We have been asked to evaluate the original grain forecasts and to develop new ones if appropriate. Since the short-term forecasts are not used in the benefit-cost calculations, our focus is on whether or not recent export volumes are due to short-term phenomenon or reflect long-term effects that were not captured in our initial projections. We also concentrate predominately on corn and soybeans, since the other grains constitute such a small percentage of the traffic that moves on the two river systems.

Section II reviews the methodology that was used to develop the original grain forecasts and attempts to ascertain reasons for the discrepancy between what was predicted and what was observed. Section III presets a revised grain forecast based on export projections published by the U.S. Department of Agriculture.

Exhibit 1

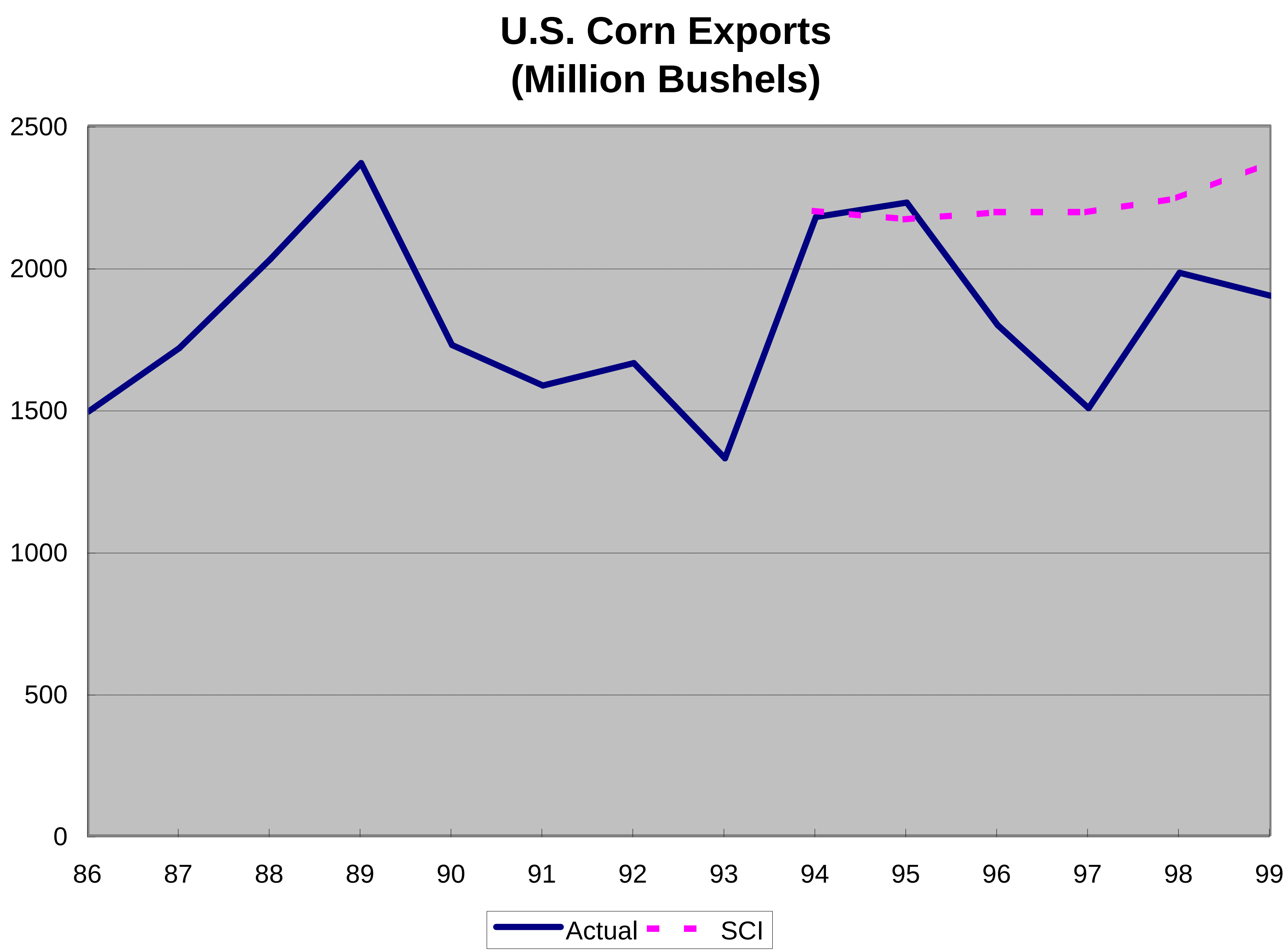
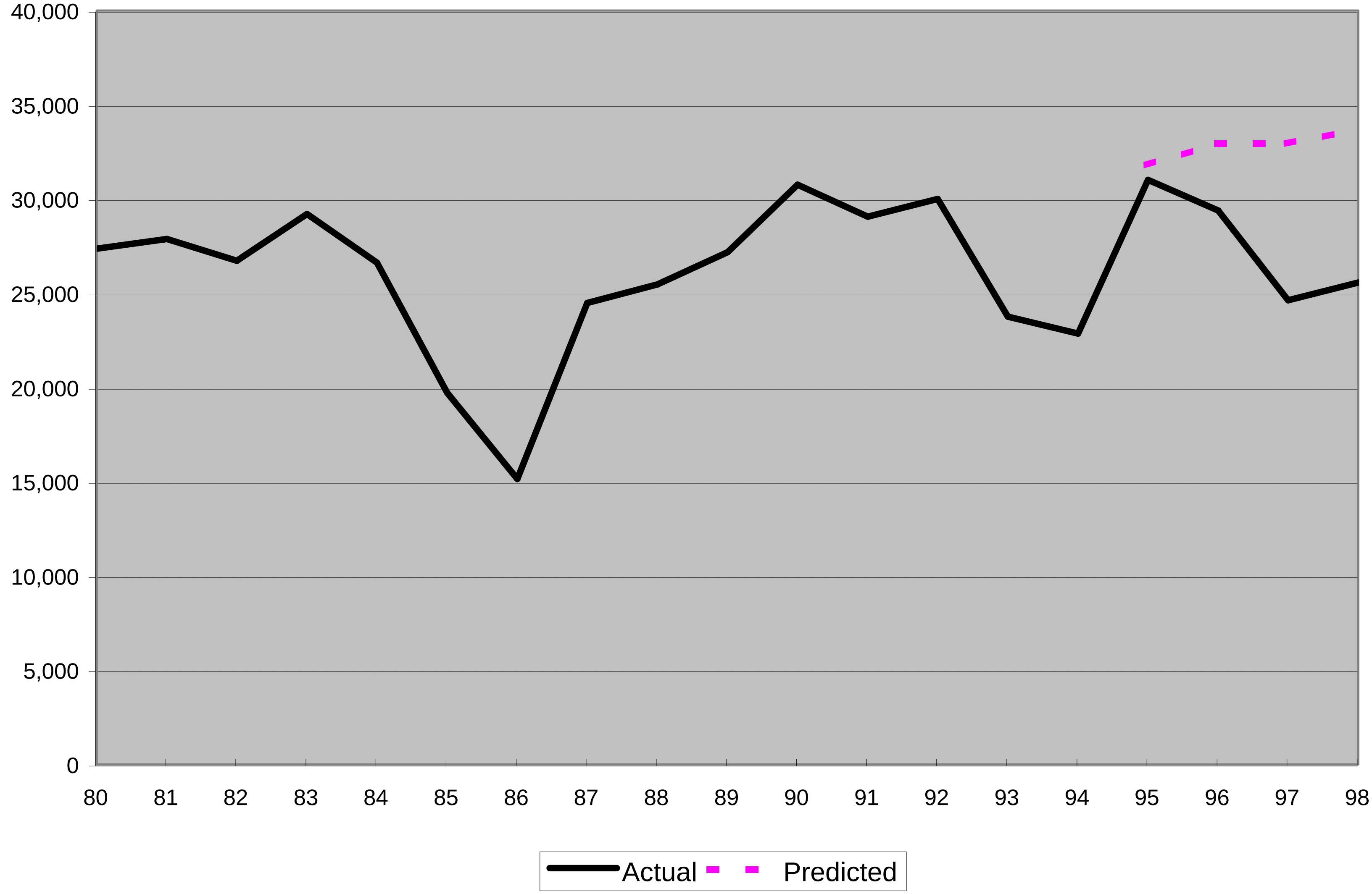

U.S. Corn Exports
(Million Bushels)
2500
2000
1500
1000
500
0
86
87
88
89
90
91
92
93
94
95
96
97
98
99
Actual
SCI

Exhibit 2

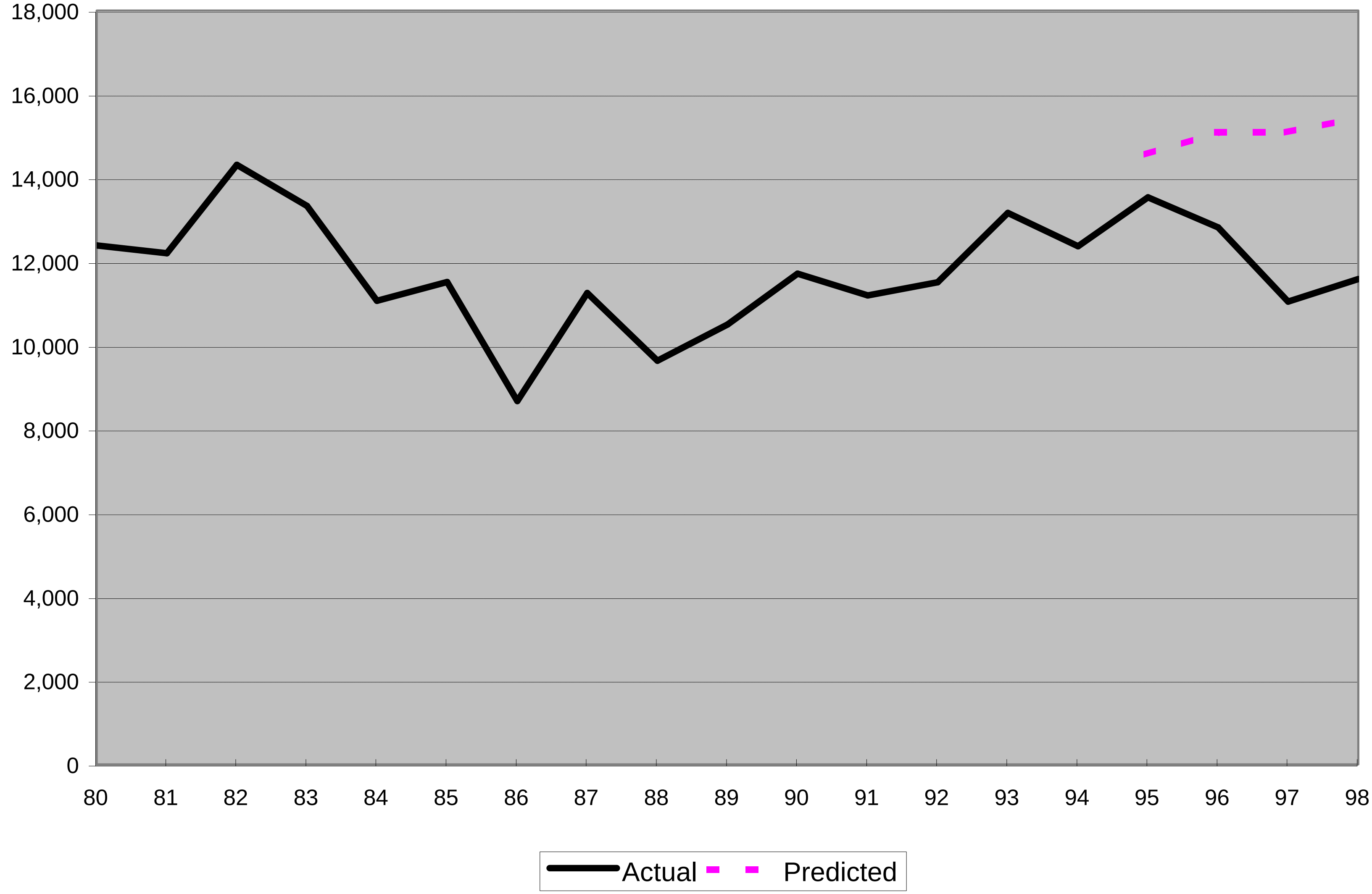
Corn Tonnage from Minneapolis to St. Louis
(Thousand Tons)



Source: Waterborne Commerce Statistics

Exhibit 3

Corn Tonnage on the Illinois Waterway (Thousand Tons)



Source: Waterborne Commerce Statistics

II. REVIEW OF FORECASTING METHODOLOGY AND ACCURACY OF PROJECTIONS

II.A Overview of Methodology

The waterway traffic forecasts are based on a four-step process. The first step entailed forecasting U.S. grain exports by crop. These estimates were then allocated to U.S. port areas (e.g., Pacific Northwest). Third, a certain percentage of the U.S. grain exports out the of the central Gulf of Mexico region was assumed to originate in the Study Area as barge freight. This quantity was then adjusted upward slightly to take into account non-export traffic that moves on the river.

As noted in the original report, the forecasts of U.S. grain exports were calculated as a residual. The quantity of grain available for export in any given year was equal to the quantity remaining after domestic use and stock changes were subtracted from potential supply: i.e.,

Production + Imports = Exports + Domestic Consumption + Change in Stocks

While the approach ensured that we maintained the proper balance between the supply and demand forecasts, there have been some criticisms that the method did not explicitly address world demand and foreign competition. Consideration of these issues were incorporated in SCI's acreage forecasts.

Export shipments of grains and soybeans by major port areas were projected by SCI using an estimated port share to allocate the total U.S. export forecast of the different grain commodities. The port shares that were used to make these allocations were based on each port's average share of the respective commodity inspections during the 1992-1995 period. Consideration was also given to the respective port's historic share of inspections during the previous twenty year time frame.

Historical shares were also used to assign a portion of the Mississippi River export projections to the study area.

II.B Review of Recent U.S. Exports Levels

As we noted in our original reports, almost all of the corn and soybean movements on the Upper Mississippi River and Illinois Waterway are bound for export markets. It was for this reason that SCI's export forecasts were used to drive the initial waterway traffic projections. Therefore, a review of export data since 1993 will help us to understand some of the changes in the waterway traffic levels that have occurred since that time.

Exhibits 4 and 5 present comprehensive sets of supply and use data for U.S. corn and soybeans. The export figures are graphically presented in Exhibits 6 and 7.

Exhibit 4 -- U.S. Corn: Supply, Disappearance, and Price, 1975/76 to 1999/00[1]

	Supply			Disappearance							Average
Year Beginning September 1	Beginning Stocks	Production	Total	Food, Alcohol, & Industrial	Seed	Feed and Residual	Total Domestic	Exports	Total	Ending Stocks	Farm Price $/bu.
1975	558	5,841	6,400	501	20	3,582	4,103	1,664	5,767	633	2.54
1976	633	6,289	6,925	522	20	3,602	4,144	1,645	5,789	1,136	2.15
1977	1,136	6,505	7,643	562	20	3,730	4,311	1,896	6,207	1,436	2.02
1978	1,436	7,268	8,705	589	20	4,274	4,882	2,113	6,995	1,710	2.25
1979	1,710	7,928	9,638	620	20	4,563	5,203	2,402	7,604	2,034	2.48
1980	2,034	6,639	8,675	639	20	4,232	4,891	2,391	7,282	1,392	3.12
1981	1,392	8,119	9,511	714	19	4,245	4,978	1,997	6,975	2,537	2.47
1982	2,537	8,235	10,772	840	15	4,573	5,428	1,821	7,249	3,523	2.55
1983	3,523	4,174	7,699	911	19	3,876	4,806	1,886	6,693	1,006	3.21
1984	1,006	7,672	8,680	1,046	21	4,115	5,182	1,850	7,032	1,648	2.63
1985	1,648	8,875	10,534	1,133	20	4,114	5,267	1,227	6,494	4,040	2.23
1986	4,040	8,226	12,267	1,217	17	4,659	5,893	1,492	7,385	4,882	1.50
1987	4,882	7,131	12,013	1,234	17	4,789	6,041	1,716	7,757	4,259	1.94
1988	4,259	4,929	9,188	1,279	18	3,934	5,232	2,028	7,260	1,930	2.54
1989	1,930	7,532	9,462	1,351	19	4,382	5,753	2,367	8,120	1,344	2.36
1990	1,344	7,934	9,278	1,406	19	4,609	6,034	1,727	7,761	1,521	2.28
1991	1,521	7,475	8,996	1,513	20	4,798	6,331	1,584	7,915	1,100	2.37
1992	1,100	9,477	10,577	1,537	19	5,252	6,808	1,663	8,471	2,113	2.07
1993	2,113	6,338	8,451	1,593	20	4,680	6,293	1,328	7,621	850	2.50
1994	850	10,051	10,901	1,697	18	5,460	7,175	2,177	9,352	1,558	2.26
1995	1,558	7,400	8,958	1,608	20	4,693	6,321	2,228	8,548	426	3.24
1996	426	9,233	9,658	1,694	20	5,277	6,991	1,797	8,789	883	2.71
1997	883	9,207	10,090	1,784	20	5,482	7,287	1,504	8,791	1,308	2.43
1998[2]	1,308	9,759	11,066	1,826	20	5,472	7,318	1,981	9,298	1,787	1.94
1999[3]	1,787	9,437	11,224	1,910	20	5,650	7,580	1,900	9,480	1,759	1.85-1.95

1/ All figures except price are in millions of bushels. 2/ Preliminary. 3/ Projected.

Source: National Agricultural Statistics Service and Economic Research Service, USDA.

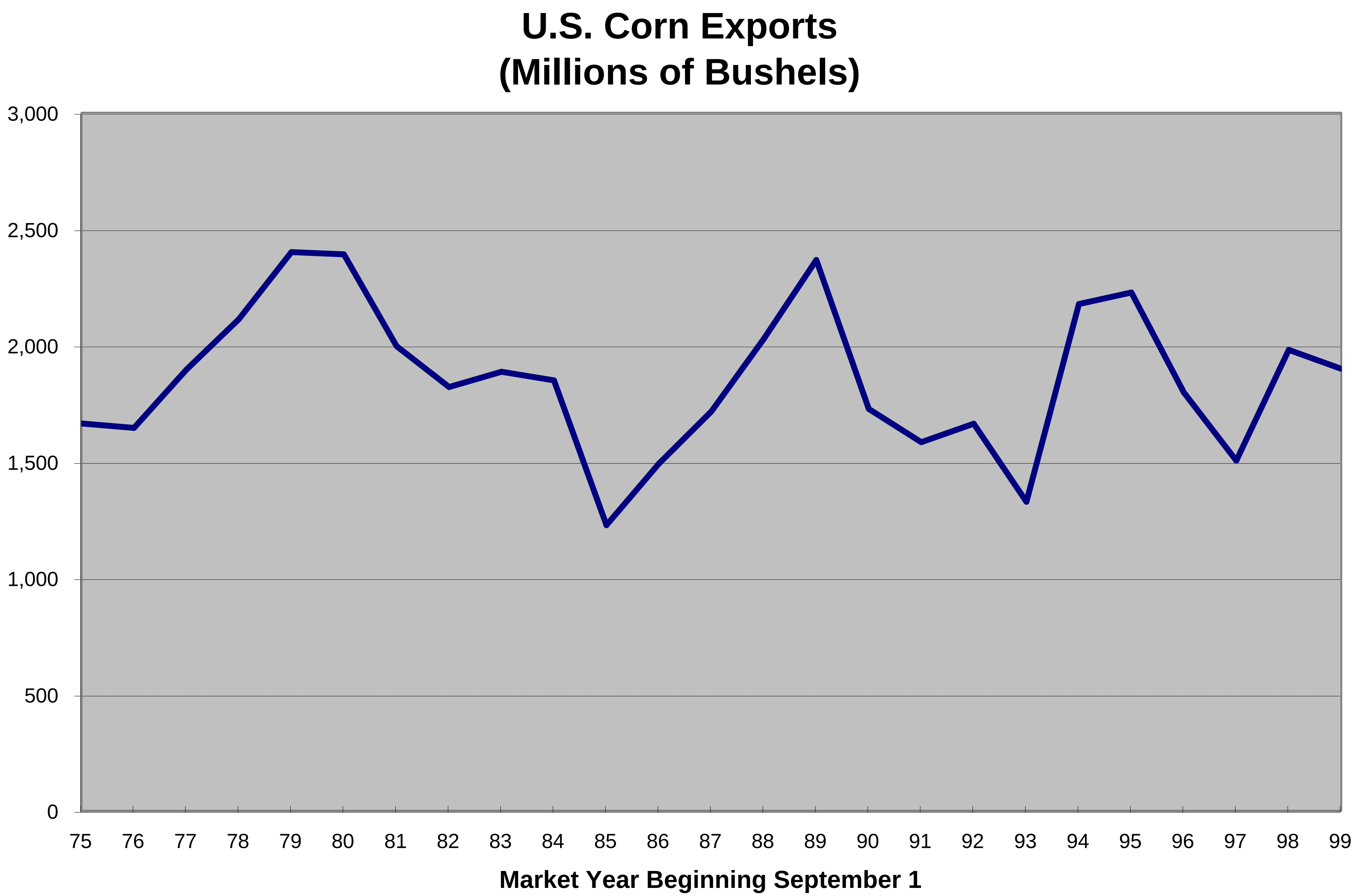
Exhibit 5 -- U.S. Soybeans: Supply, Disappearance, and Price, 1968/69-1999/00[1]

Year Beginning September 1	Supply: Beginning Stocks	Supply: Production	Supply: Total[2]	Disappearance: Crush	Disappearance: Expor	Disappearance: Seed, Feed & Residual	Disappearance: Total	Ending Stocks	Average Farm Price ($/Bushel)
1970	230	1,127	1,357	760	434	64	1,258	99	2.85
1971	99	1,176	1,275	721	417	65	1,203	72	3.03
1972	72	1,271	1,343	722	479	82	1,283	60	4.37
1973	60	1,548	1,608	821	539	77	1,437	171	5.68
1974	171	1,216	1,387	701	421	77	1,199	188	6.64
1975	188	1,549	1,736	865	555	71	1,491	245	4.92
1976	245	1,289	1,534	790	564	77	1,431	103	6.81
1977	103	1,767	1,870	927	700	82	1,709	161	5.88
1978	161	1,869	2,030	1,018	739	97	1,854	176	6.66
1979	176	2,261	2,437	1,123	875	81	2,079	358	6.28
1980	358	1,798	2,156	1,020	724	99	1,843	313	7.57
1981	313	1,989	2,302	1,030	929	89	2,048	254	6.07
1982	254	2,190	2,444	1,108	905	86	2,099	345	5.71
1983	345	1,636	1,981	983	743	79	1,805	176	7.83
1984	176	1,861	2,037	1,030	598	93	1,721	316	5.84
1985	316	2,099	2,415	1,053	740	86	1,879	536	5.05
1986	536	1,943	2,479	1,179	757	106	2,042	436	4.78
1987	436	1,938	2,375	1,174	804	95	2,073	302	5.88
1988	302	1,549	1,855	1,058	527	87	1,673	182	7.42
1989	182	1,924	2,109	1,146	622	101	1,870	239	5.69
1990	239	1,926	2,169	1,187	557	95	1,840	329	5.74
1991	329	1,987	2,319	1,254	684	103	2,041	278	5.58
1992	278	2,190	2,471	1,279	770	130	2,179	292	5.56
1993	292	1,870	2,168	1,276	589	95	1,959	209	6.4
1994	209	2,515	2,729	1,405	838	151	2,395	335	5.48
1995	335	2,174	2,514	1,370	851	109	2,330	183	6.72
1996	183	2,382	2,575	1,436	882	123	2,441	132	7.35
1997	132	2,703	2,839	1,597	870	158	2,626	200	6.47
1998[3]	200	2,741	2,944	1,590	801	205	2,596	348	5.02
1999[4]	348	2,696	3,049	1,630	880	154	2,664	385	4.75-5.25

1/ All figures except price are in millions of bushels. 2/ Total supply includes imports. 3/ Preliminary. 4/ Forecast.

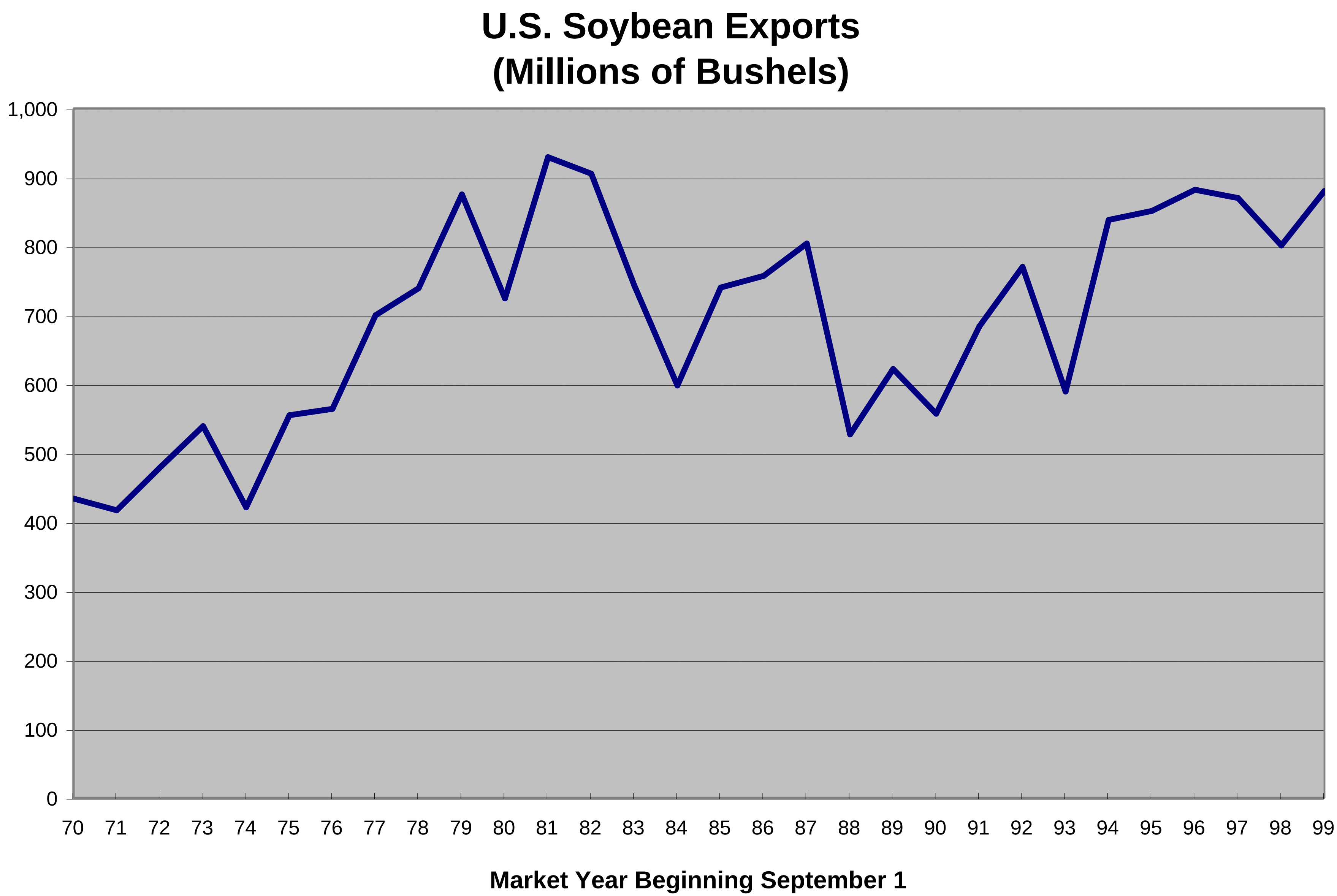
Source: Bureau of the Census.

Exhibit 6



Source: U.S. Department of Agriculture

Exhibit 7



Source: U.S. Bureau of Census

Both charts show a large drop in exports between 1992 and 1993. Those declines were the result of severe flooding in the Midwest in the summer of 1993. The severity of the flooding was unprecedented, affecting 260,000 square miles and inundating 6.6 million acres along the inland waterways. As a result, the Coast Guard closed a total of 1,250 river miles between June through August. On the Upper Mississippi River, the section between mile 0 and mile 175 was closed for 45 days. On the Illinois River, mile 0 to mile 118 was closed for 23 days. These closures limited export deliveries during the months of July and August. In addition, there were loaded barges that became trapped above the lock system; some grain was immobilized in barges for 30-60 days during the heart of summer. This led to quality deterioration as much of this grain developed "hot spots" due to bacterial activity. Some of this became completely unsuitable for loading at the Gulf.

Another repercussion of the flooding was that a sizable amount of cropland and crops were lost during the 1993/94 market year (September - August). For the five states that comprise the Upper Mississippi region (Illinois, Iowa, Minnesota, Missouri, and Wisconsin), the ratio of harvested acreage to planted acreage historically had been 96% for corn and 99% for soybeans. In 1993, those figures dropped to 84% for corn and 85% for soybeans. It is estimated that the flooding decimated 2.8 million acres of corn and 1.4 million acres of soybeans. The associated decline in production resulted in higher grain prices, precipitated a withdrawal of stocks, and reduced the amount of grain available for export.

Export levels of both crops jumped considerably in 1994, aided by record production levels in the 94/95 market year (see Exhibits 4 and 5). Most of the growth in corn exports was due to substantially higher shipments to North Asia (China, Japan, Korea, and Taiwan): up by over 15 million metric tons from 1993. Korea recorded the largest gain with a 7.5 million metric ton increase; high wheat prices brought about a shift from wheat to corn in their feed rations. In addition, China and Japan each increased their purchases of U.S. corn by over 3 million metric tons. The large Chinese procurement was particularly noteworthy as it reflected a major shift in China's trade stance: from being a net exporter since the early 1980s to being a net importer.

For the most part, 1994 soybean exports rebounded from the low 1993 volumes to trend levels set in 1988. Growth in the European market amounted to 4.1 million metric tons, or 58% of the total increase in U.S. soybean exports. This is very consistent with the historical data as European markets also accounted for 58% of the decline in soybean exports between 1992 and 1993. Soybean exports to South America were pushed up by an unusual 0.7 million metric ton acquisition from Brazil.

Although corn witnessed a production slump in 1995, exports were bolstered by large beginning stocks created from the record production in the previous year. For a second year in a row, China and Korea both imported large quantities of U.S. corn. In addition, U.S. exports to Mexico grew by over 2.5 million metric tons, raising Mexico's share of U.S. corn exports to 9.4%. Soybean exports continued to increase steadily, aided by normal production levels, reduced South American competition, and strong demand from Asia and Mexico. However, soybean exports to Europe declined slightly as they began to import relatively more meal at the expense of soybeans. This adjustment would continue over the next four years.

In 1996/97, the U.S. faced intense international competition in world corn markets. Corn prices set record highs in 1995/96, over 30% higher than 1994/95 average prices. This caused world production to surge by 14.5% in 1996/97. A relatively larger percent of foreign demand was met by increased domestic production, causing net import requirements to recede. In addition, net exporters became more competitive and were able to capture market share. Argentina, the main U.S. competitor, increased its share by almost 5 percentage points. At the same time, China reasserted itself as a net exporter and was able to capture over 5% of world trade. This change was the result of several changes in Chinese policy designed to establish government control over grain markets and promote self-sufficiency. As a result of the increased competition, U.S. market share of world corn trade dropped from over 80% in 1994/95 to just under 65%. Since world trade levels changed little between 1995/96 and 1996/97, the fall in market share caused a substantial decline in U.S. export levels.

In contrast to the sharp drop in corn exports, 1996/97 U.S. soybean exports grew by 5.2% over the previous year and achieved the third highest level since 1980. Exports to most regions of the world were up, except for Europe which continued the trend in substituting soybean imports for meal imports. With the implementation of policies designed to encourage domestic soybean processing, as opposed to importing meal, China started to importing considerably more soybeans in 1996/97. World trade jumped significantly, by 15.3%, and the U.S. was able to maintain a 65% market share which has been its historical average (1988-1998). The U.S. share could have been higher; however, the Brazilian government reduced export levies intended to protect domestic processors. As a result, there was substantial growth in Brazilian soybean exports and their market share jumped by over ten percentage points to 22.8%.

In 1997/98, several factors contributed to the further erosion of U.S. corn exports. First, the international financial crisis began in the summer of 1997 and resulted in economic contractions throughout Asia, Russia, and Brazil. Declining incomes and higher grain prices resulting from currency devaluations reduced the demand and production of meat in the region. This in turn negatively affected U.S. grain exports. At the same time, Argentina and China continued to provide stiff competition as both increased their export volumes between 1996/97 and 1997/98. It should be noted that even though U.S. corn exports fell in 1997/98, total world trade slightly increased. U.S. lost market share in Southeast Asia, Korea, and Europe. The 1.7 million metric ton decline in exports to European markets was due to a ban on imports of genetically modified corn. As a result of the restriction, the European Union has substituted U.S. corn imports with corn out of Argentina. Finally, the Federal Agriculture Improvement and Reform Act (1996 Farm Act) also started to take effect in 1997/98. This legislation has reduced the government's role in the agricultural sector and has given farmers significant flexibility in making planting decisions. The amount of acreage planted is now more closely linked to commodity prices. The relationship between planted acreage and world markets has also been enhanced since freer trade, due to GATT and NAFTA, has established a closer relationship between domestic and world prices. In response to these events, farmers have started to plant more soybean acreage at the expense of wheat and corn acreage. This shift has affected relative production levels and, hence, comparative export volumes.

U.S. soybean exports remained fairly flat between 1996/97 and 1997/98. Although Asian demand for U.S. soybean exports slackened, this weakness was offset by increased exports to South America brought about by Argentine crop failures. In addition, the international financial crisis had a relatively smaller impact on soybeans than it did on corn. As meat became more expensive due to the higher grain prices, some countries reverted to consuming tofu as a meat substitute. Finally, as mentioned above, the 1996 Farm Bill started to bring about a shift from U.S. production of wheat and corn to soybeans.

U.S. corn exports rebounded in 1998/99, due a large crop in conjunction with reduced competition from Argentina and China. World trade grew by 5.4% whereas U.S. exports grew by over 32%; in other words, the U.S. was able to recapture market share that was lost in 1996 and 1997. In response to the diminished competition, U.S. exports to South Korea and Venezuela were both much higher than comparable levels in 1996 and 1997. Mexico boosted its demand for U.S. corn by 37% or over 1.5 million metric tons. Exports to Spain and Portugal, the main European markets, continued to be insignificant due to the import restrictions on genetically modified corn.

U.S. soybean exports registered a 7.9% decline between 1997/98 and 1998/99. Part of the decline was due to a resumption of normal export levels to South America (1997/98 exports to South American were considerably above trend due to Argentine crop failures). In fact, the three South American competitors to the U.S. (Brazil, Argentina, and Paraguay) all achieved record export levels in 1998/99. Competitive pressure was felt not only in South American markets, but also in Europe where imports of U.S. soybeans declined by over 2.3 million metric tons. U.S. exports to other regions of the world were up modestly.

As described above, several factors contributed to the relatively low export volumes of corn over the last five years. These include the international financial crisis, increased foreign supply and competition, and European import restrictions on genetically modified corn. The resulting impacts on U.S. corn exports have recently been considerable; however, long term repercussions are unlikely. The world economy has already made a significant recovery from the international financial crisis, which was much shorter than originally anticipated. While there are still uncertainties about how China will fit into the picture of global corn trade, it is anticipated that they will enter the WTO and will have to stop supporting domestic corn prices. As a result, they will probably start importing more corn than they export. Although Argentina will continue to be a strong competitor, we probably will not experience the same degree of foreign competition that was seen in 1996 and which was induced by extremely high prices in the previous year. As a low cost producer, the U.S. should retain a large market share when prices are at trend levels or below. Finally, there does continue to be uncertainty about whether or when the EU will lift its ban on the importation of genetically modified corn. In the long run, it is likely that the U.S. will be able to recapture some of EU market regardless of whether or not they remove the import restriction. In addition, the U.S. may be able to backfill lower profit niches abandoned by Argentina.

II.C Forecast of U.S. Exports

Below we review the components of the residual equation used to forecast U.S. grain exports. SCI's forecast of each component is compared with what actually happened between 1995 and 1999. We then consider how the deviations impacted SCI's export forecasts. This is accomplished in the following way. The residual equation is used to construct an alternate export forecast. Each equation component except for the one being examined is based on actual data. The examined variable is composed of SCI's forecast. The impact is then calculated as the difference between the reconstructed forecast and the actual export data. Note that production is further divided into area and yield components.

Acreage

As noted in the original grain report, it was assumed that the total land available for crop production would be fully utilized throughout the forecast horizon: a full production scenario. Since there is a finite number of acres that can be utilized for crops, the high area levels of the late 1970s and early 1980s were used to represent an upper limit on crop area. During this time period, the level of land withheld from production was negligible.

The stipulation of a full production scenario was based on upon other assumptions about world demand and the ability of the U.S. to compete in world markets. Based upon rising per capita incomes and the associated increase in meat consumption, SCI projected strong growth in the demand for grain. They also assumed that the U.S. would remain competitive in world markets and that increases in foreign supply would not be able to offset U.S. production.

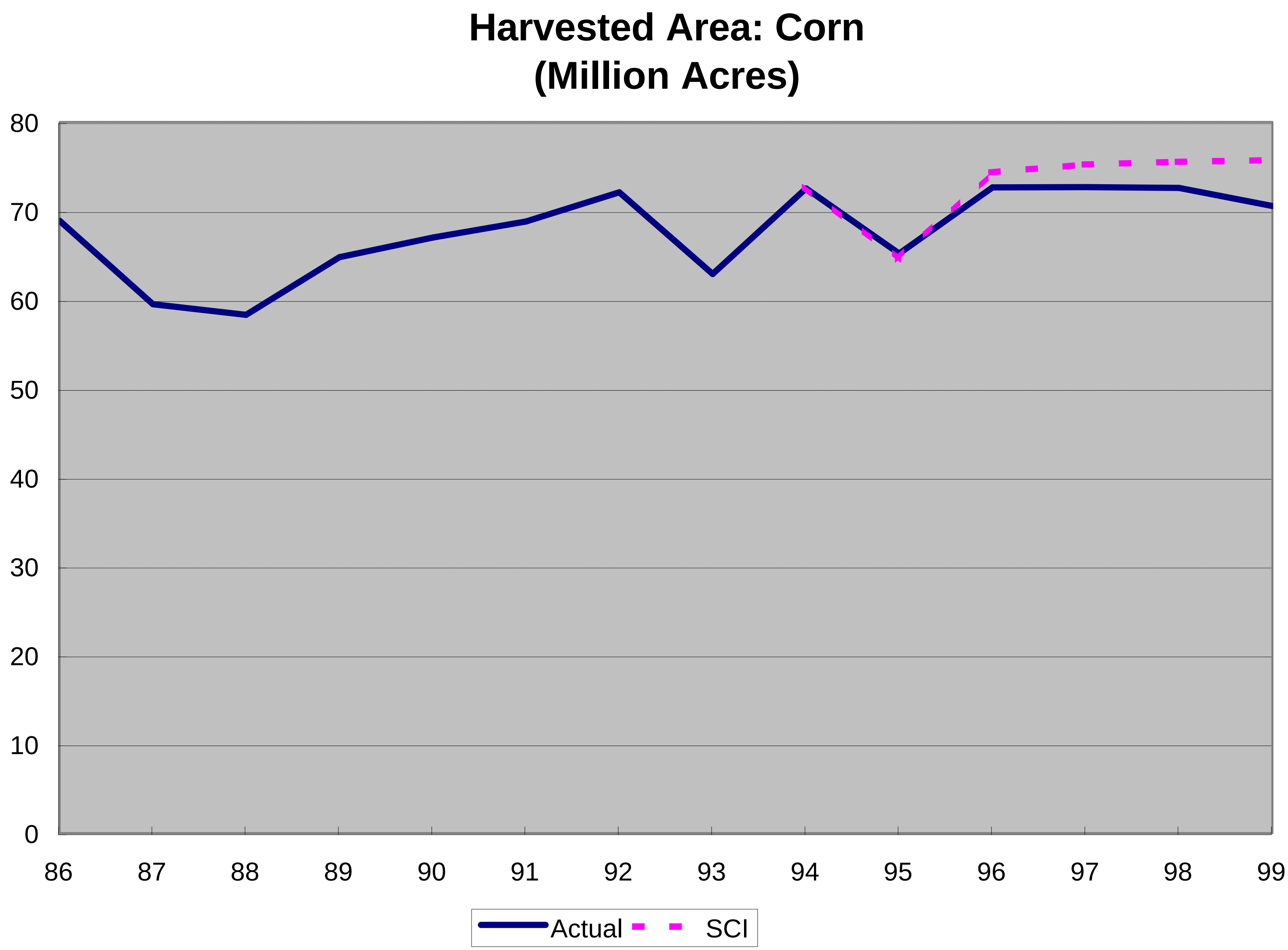
Exhibit 8 graphically presents SCI's forecast of harvested corn acreage and the amount of corn acreage that was actually harvested. On average, SCI's forecast were 3.5% higher than what was observed between 1995 and 1999. The over-estimation made projected exports 23.7% higher than the volumes observed over the period.

Exhibit 9 compares SCI's forecast of harvested soybean acreage and the amount that was actually harvested. On average, SCI's forecast were 8.6% lower than what was observed between 1995 and 1999. This resulted in export forecasts that were s 26.8% lower than the volumes observed over the period.

SCI's acreage forecast were developed using a two step process. First, total harvested acreage for all crops was projected. These projections were then allocated to individual crops based upon historical shares and evaluations of possible changes in those shares.

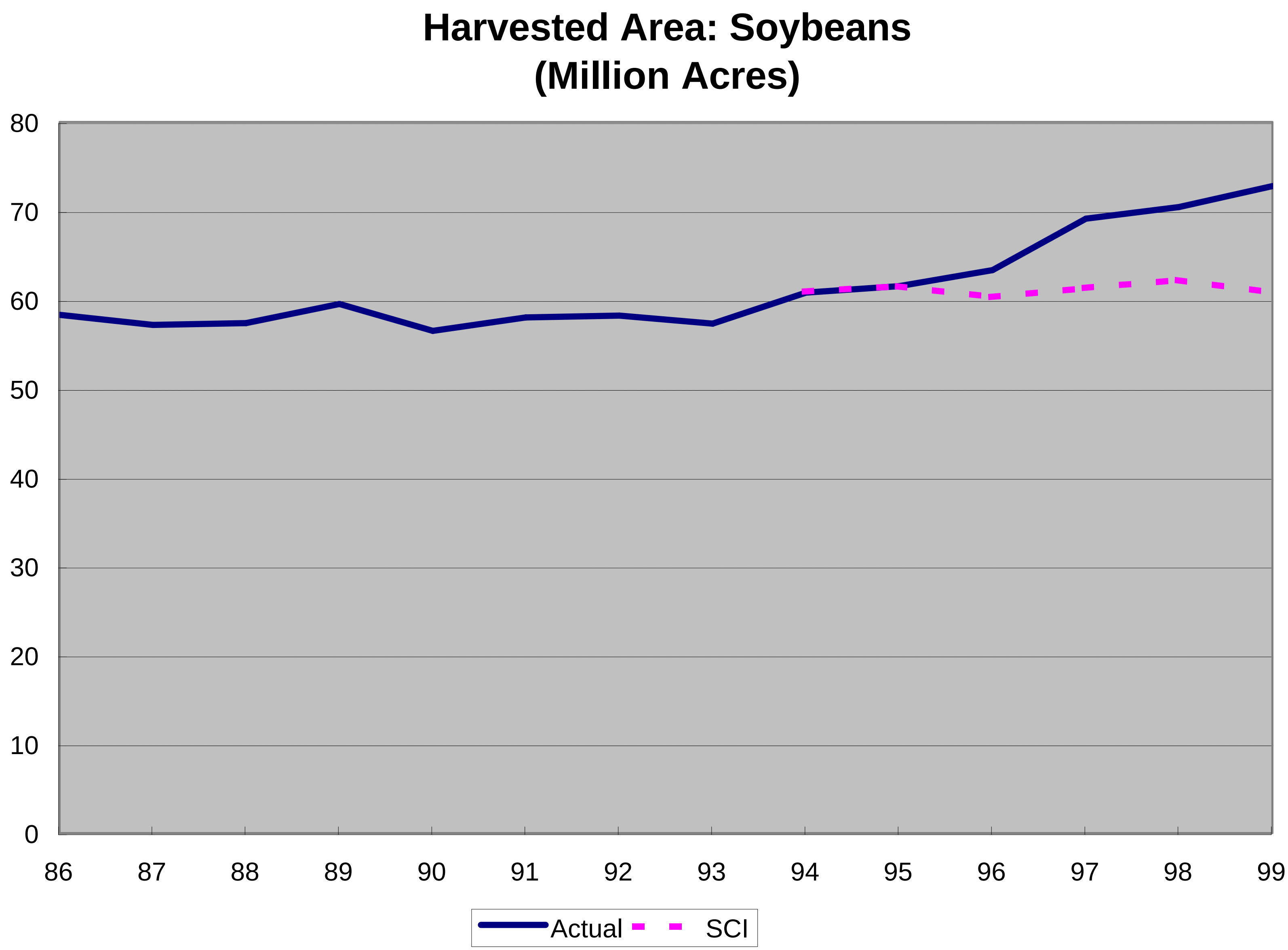
Several considerations were used to make the forecast of total harvested acreage: world demand, foreign supply, and availability of land. SCI's projections of world demand for corn exhibit an average annual growth rate of 3.1% between 1995 and 1999. The actual growth rate was 2.6%, somewhat lower due to the slack demand between 1996 and 1998 that resulted from the international financial crisis.

Exhibit 8



Harvested Area: Corn
(Million Acres)
80
70
60
50
40
30
20
10
0
86
87
88
89
90
91
92
93
94
95
96
97
98
99
Actual
SCI

Exhibit 9



Harvested Area: Soybeans
(Million Acres)
80
70
60
50
40
30
20
10
0
86
87
88
89
90
91
92
93
94
95
96
97
98
99
Actual
SCI

As mentioned above, GATT and the 1996 Farm Bill both have supply implications. The 1995 GATT settlement (activated January 1, 1995) will reduce distorting trade practices and will continue to lead to freer trade. This step should favor low cost producers at the expense of high cost producers who have been protected and subsidized in the past. At the same time, the 1996 Farm Bill has removed some of USDA's authority to idle land and limit production.

The average annual growth rate in SCI's projections of foreign exports was 6.7%, considerably lower than the 13.7% growth that was observed over the period. SCI's assumptions about China explain part of the difference. SCI assumed that China would remain a net importer whereas they reverted to being a net exporter in 1996/97. Extremely high prices and foreign import restrictions on U.S. genetically modified corn also increased competition.

In terms of land availability, SCI's projection of total harvested land was 1.73% higher, on average, than what was observed between 1995 and 1999. Significant differences in crop composition were also noted. Over the period, SCI assumed that wheat and corn together would comprise approximately 63% of the harvested area. In reality, this figure dropped from 61.6% in 1996 to 58.5% in 1999. The loss in this share was more than offset by a five percentage point gain in the share of area dedicated to soybeans: from 28.8% in 1996 to 34.1% in 1999. SCI assumed that this share would remain fairly constant at just over 27%. Exhibits 10 - 12 contrast the SCI's forecast with the actual distribution of these crop areas.

Yield

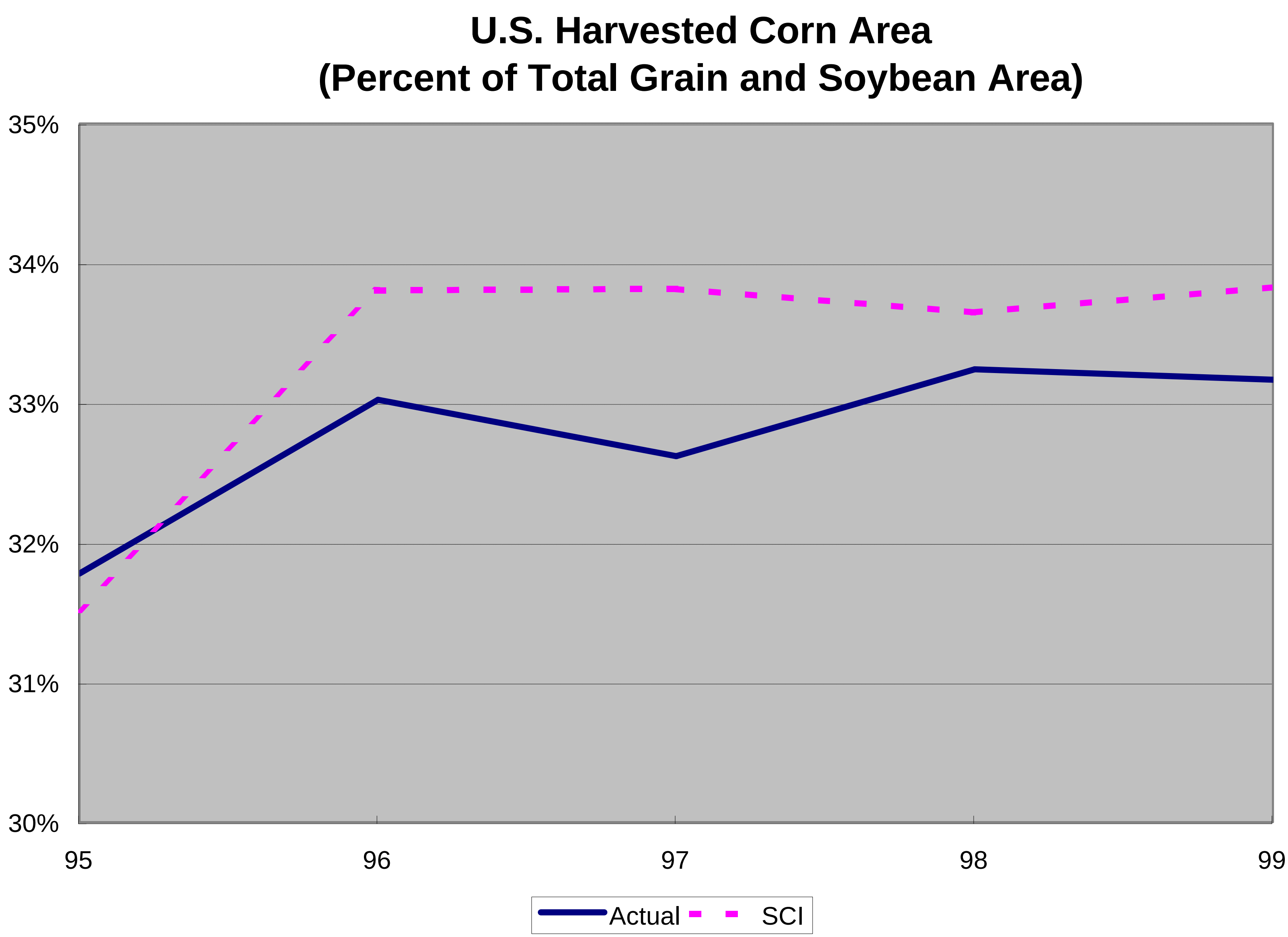
Exhibit 13 graphically presents SCI's forecast of harvested corn yields and corn yields actually harvested. On average, SCI's forecast were 2.3% higher than what was observed between 1995 and 1999 (The average is significantly biased by the 1995 forecast which is 10.7% higher than the actual. Excluding the outlier, the deviation is only 0.15%). The over-estimation made projected exports 1.5% higher than the volumes observed over the period.

Exhibit 14 compares SCI's forecast of harvested soybean yields and yields actually harvested. On average, SCI's forecast were 1.1% lower than what was observed between 1995 and 1999. As a result, the soybean export forecasts were 3.8% lower than the volumes observed over the period.

Domestic Consumption

Exhibit 15 compares SCI's forecast of domestic corn consumption with the quantities actually consumed. On average, SCI's forecast were 1.2% higher than what was observed between 1995 and 1999 (Again, the average is significantly biased by the 1995 forecast; excluding the outlier, the deviation is 0.44%). The over-estimation had the effect of making the projected export volumes 1.5% lower than the volumes observed over the period.

Exhibit 10



U.S. Harvested Corn Area
(Percent of Total Grain and Soybean Area)
35%
34%
33%
32%
31%
30%
95
96
97
98
99
Actual
SCI

Exhibit 11

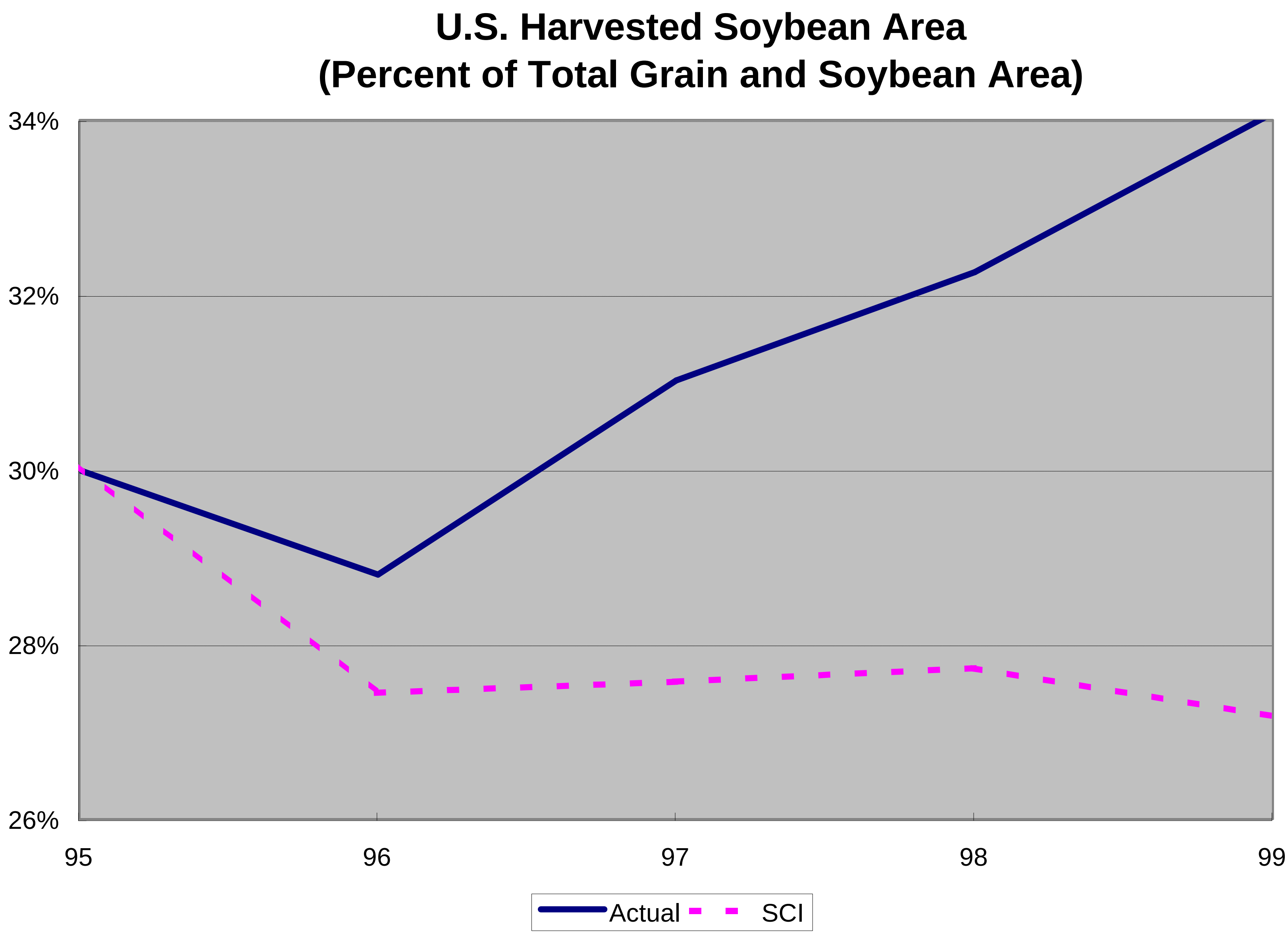

U.S. Harvested Soybean Area
(Percent of Total Grain and Soybean Area)
34%
32%
30%
28%
26%
95
96
97
98
99
Actual
SCI

Exhibit 12

U.S. Harvested Wheat Area
(Percent of Total Grain and Soybean Area)

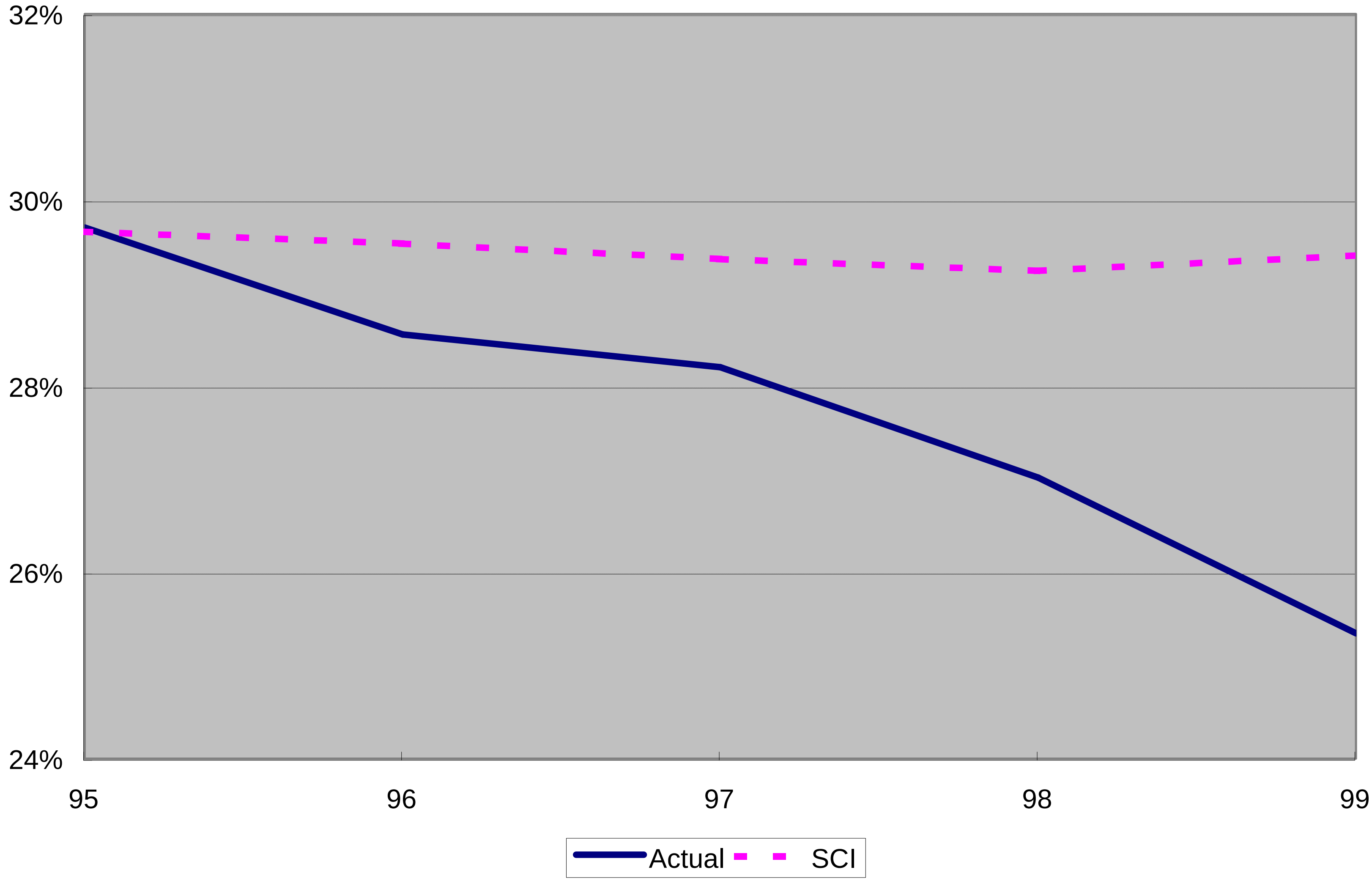
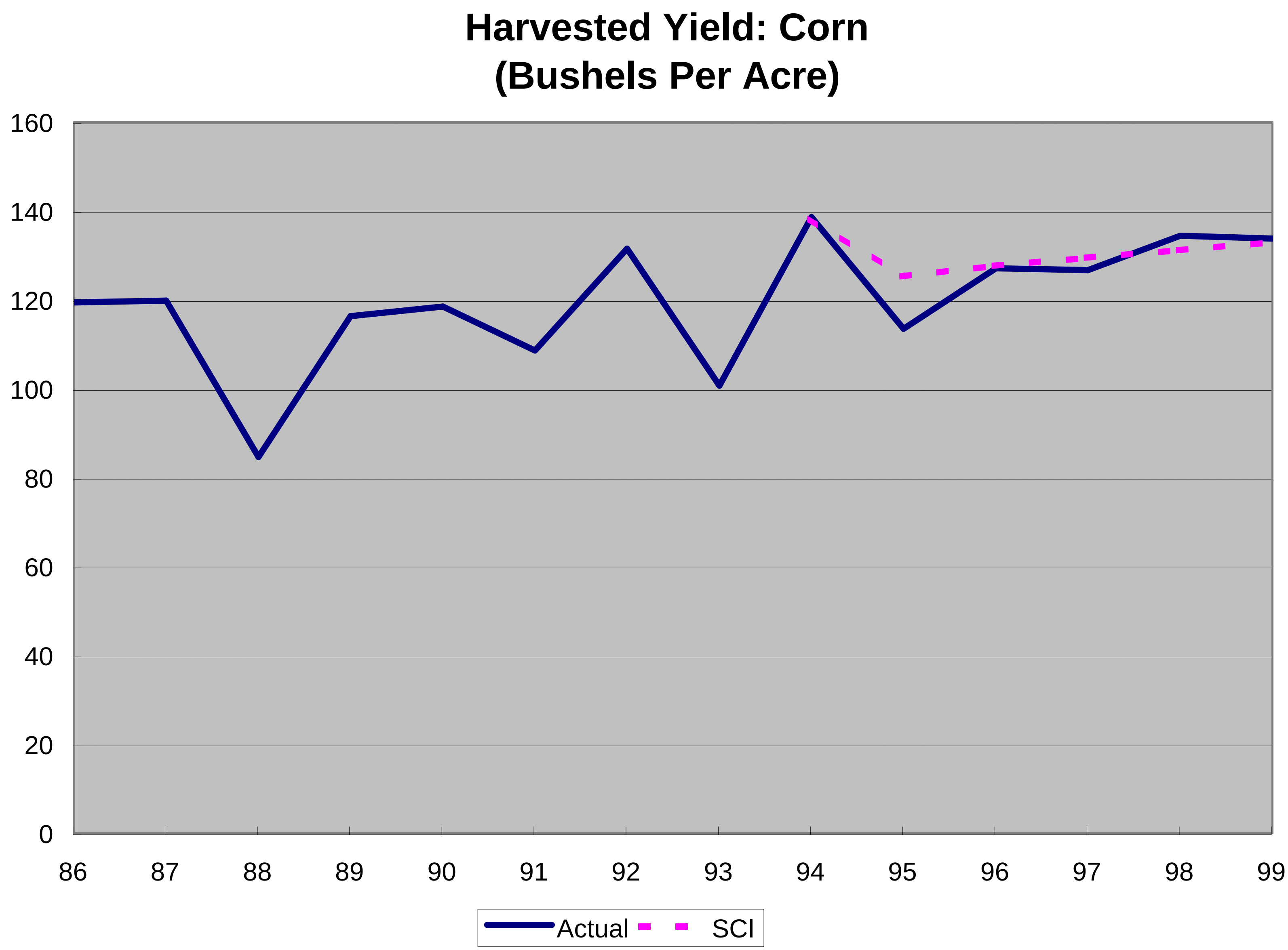
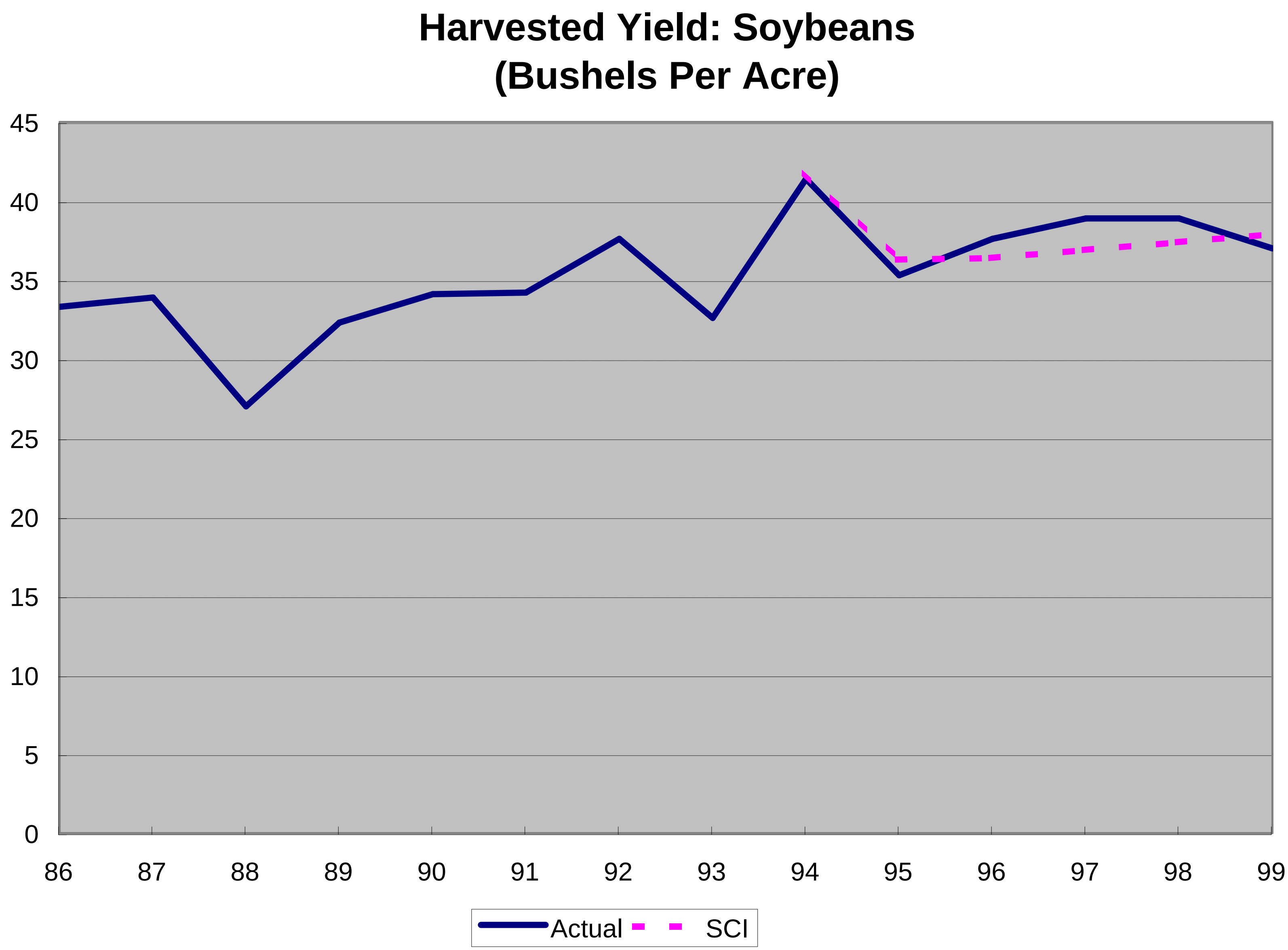


Exhibit 13



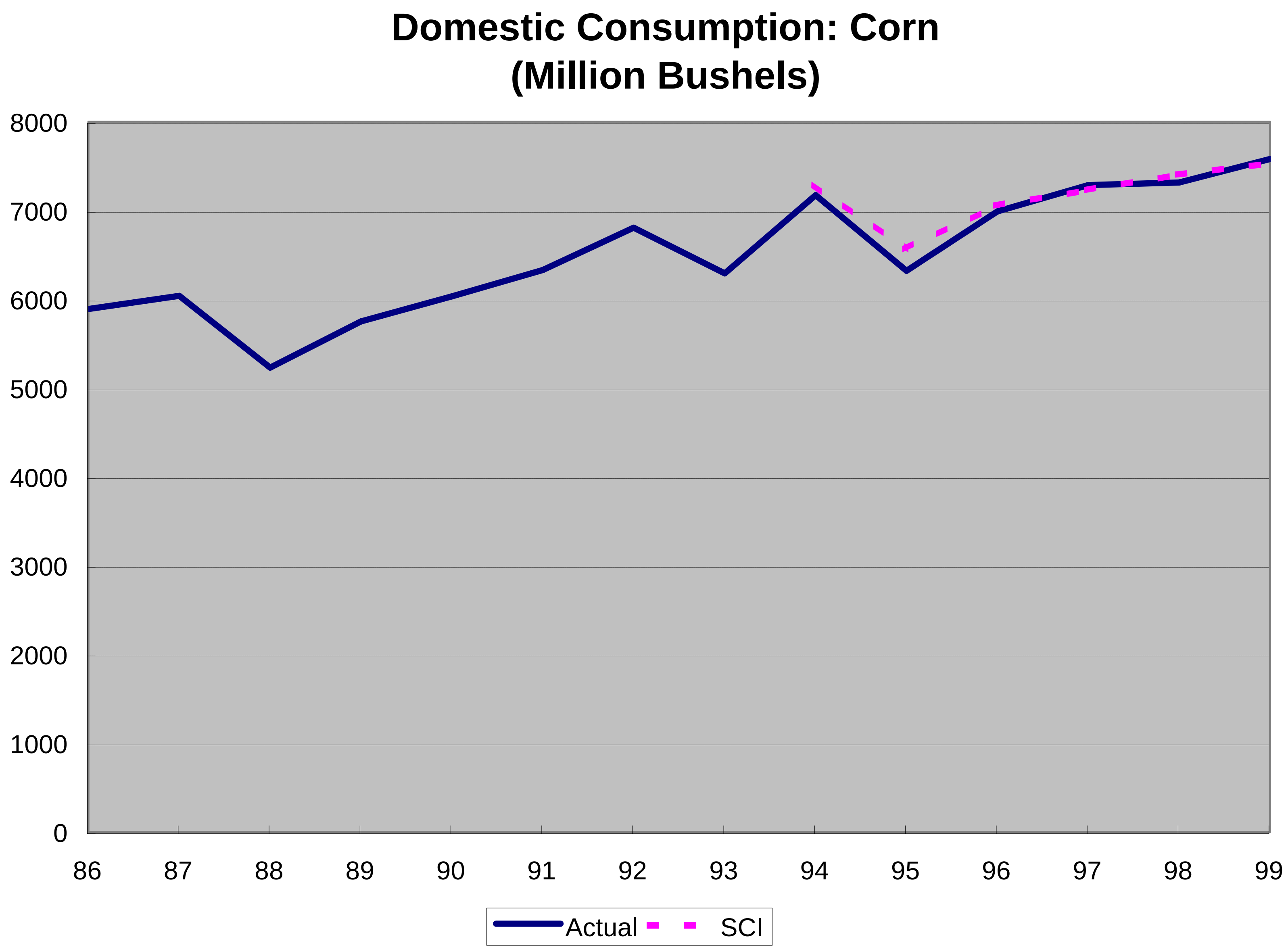
Harvested Yield: Corn
(Bushels Per Acre)
160
140
120
100
80
60
40
20
0
86
87
88
89
90
91
92
93
94
95
96
97
98
99
Actual
SCI

Exhibit 14



Harvested Yield: Soybeans
(Bushels Per Acre)
45
40
35
30
25
20
15
10
5
0
86
87
88
89
90
91
92
93
94
95
96
97
98
99
Actual
SCI

Exhibit 15



Domestic Consumption: Corn
(Million Bushels)
8000
7000
6000
5000
4000
3000
2000
1000
0
86
87
88
89
90
91
92
93
94
95
96
97
98
99
Actual
SCI

Exhibit 16 compares SCI's forecast of domestic soybean consumption with the quantities actually consumed. On average, SCI's forecast were 8.4% lower than what was observed between 1995 and 1999. The under-estimation had the effect of making the projected export volumes 17.5% higher than the volumes observed over the period.

Change in Stocks

Exhibit 17 compares SCI's forecast of changes in corn stocks with the changes that actually occurred. On average, SCI's forecast were 154.3% higher than what was observed between 1995 and 1999 (The average is significantly biased by the 1999 forecast which is 825% higher than the actual; excluding the outlier, the deviation is 13.4%). The over-estimation had the effect of making the projected export volumes 3.2% higher than the volumes observed over the period.

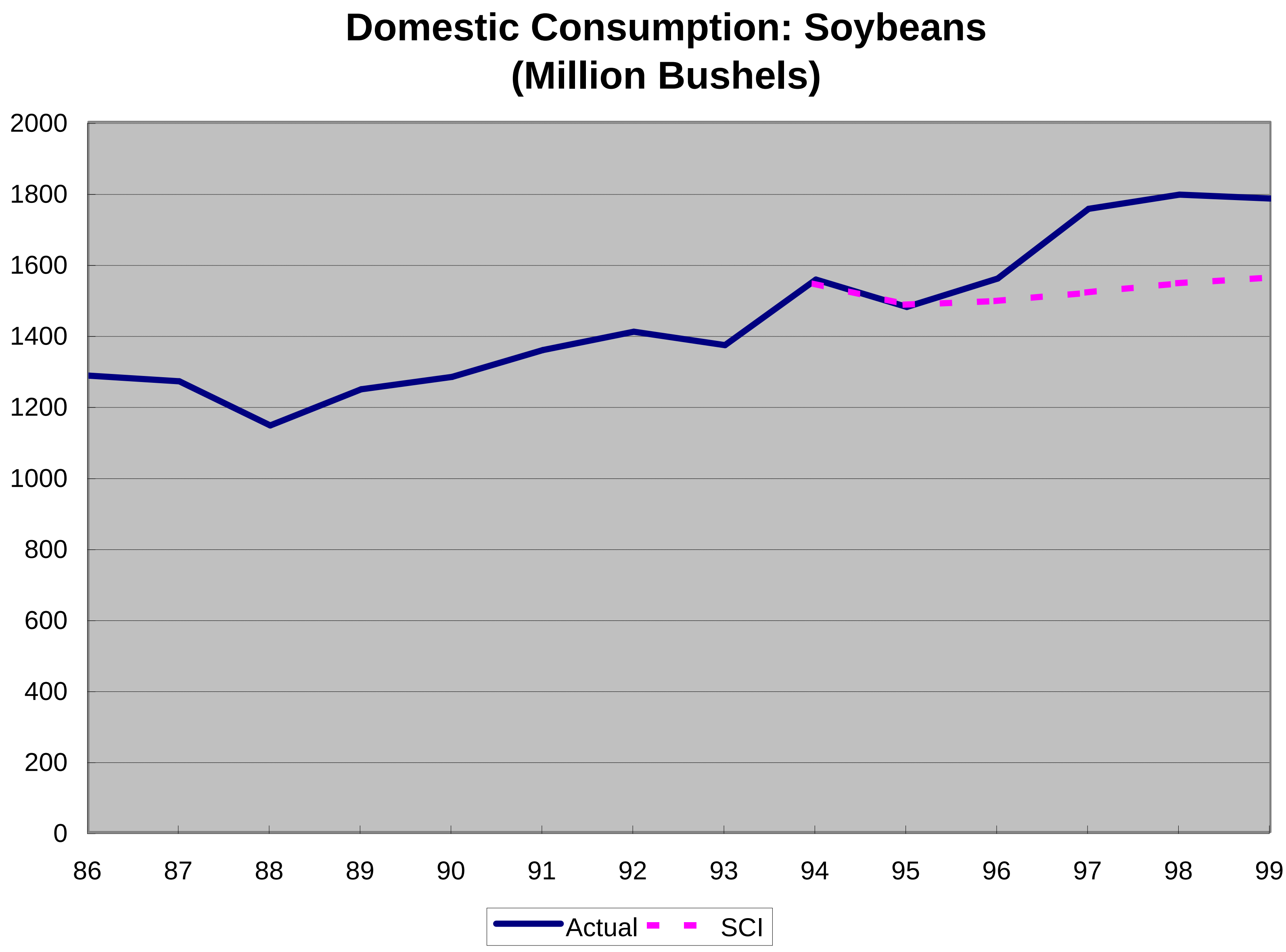
Exhibit 18 compares SCI's forecast of changes in soybean stocks with the changes that actually occurred. On average, SCI's forecast were 9.3% lower than what was observed between 1995 and 1999. Given the relatively small size of the numbers, this no effect on the projected export volumes.

Exports

Exhibit 19 compares SCI's forecast of corn exports with the changes that actually occurred. On average, the SCI's forecast was 26.8% higher than what was observed between 1995 and 1999. 23.7% of this was explained by the acreage over-estimate, with the over-estimated change in stocks accounting for the remaining 3.2%. Impacts due to deviations in the yields and domestic consumption offset each other.

Exhibit 20 compares SCI's forecast of soybean exports with the changes that actually occurred. On average, the SCI's forecast was 13.9% lower than what was observed between 1995 and 1999. Under-estimated yield and acreage numbers added a 30.6% downward bias to the export forecast. SCI also underestimated domestic consumption of soybeans; this added a 17.5% upward bias to the projected export volumes, somewhat offsetting the downward bias resulting from the production forecasts.

Exhibit 16



Domestic Consumption: Soybeans
(Million Bushels)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
86
87
88
89
90
91
92
93
94
95
96
97
98
99
Actual
SCI

Exhibit 17

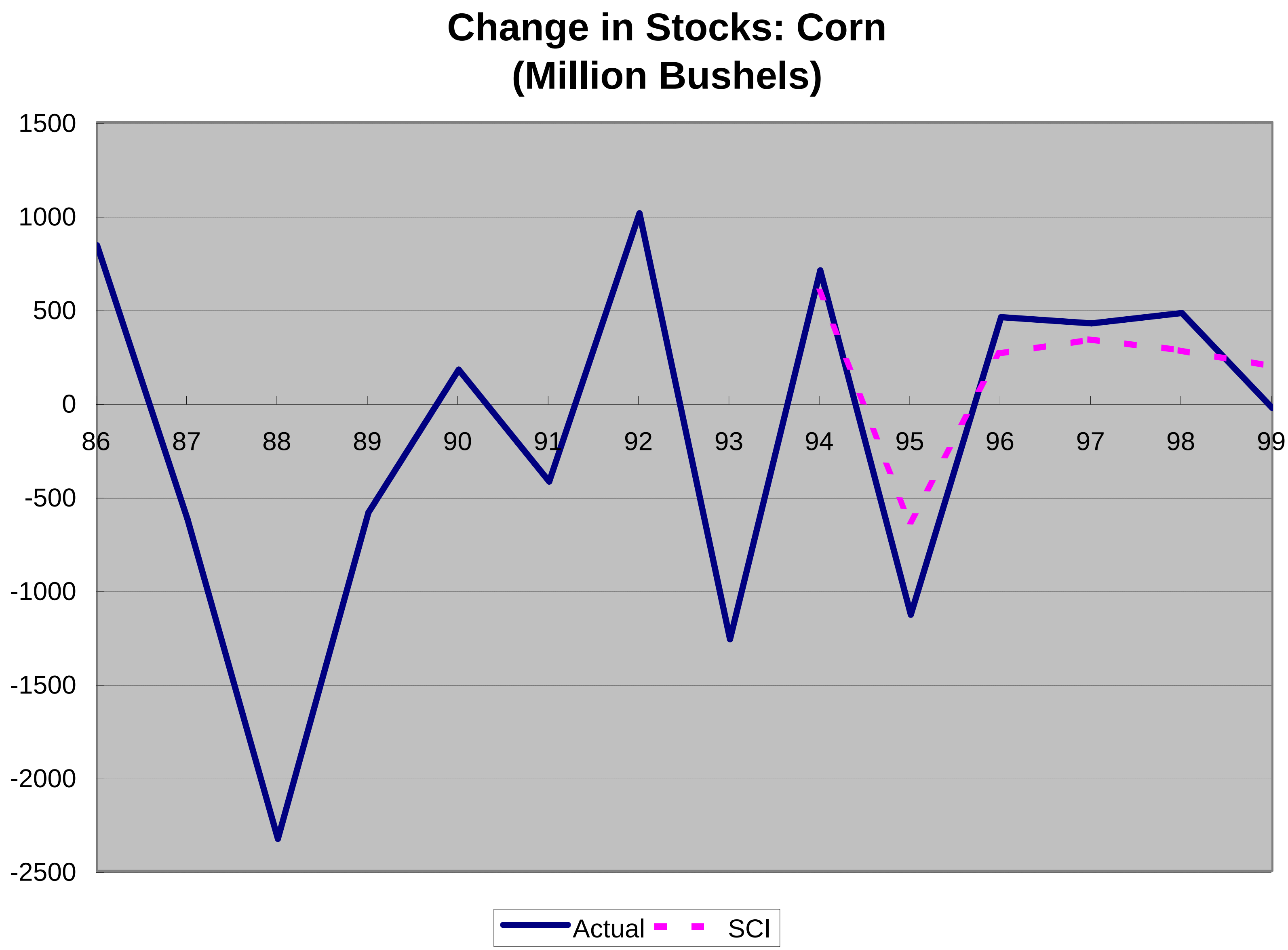
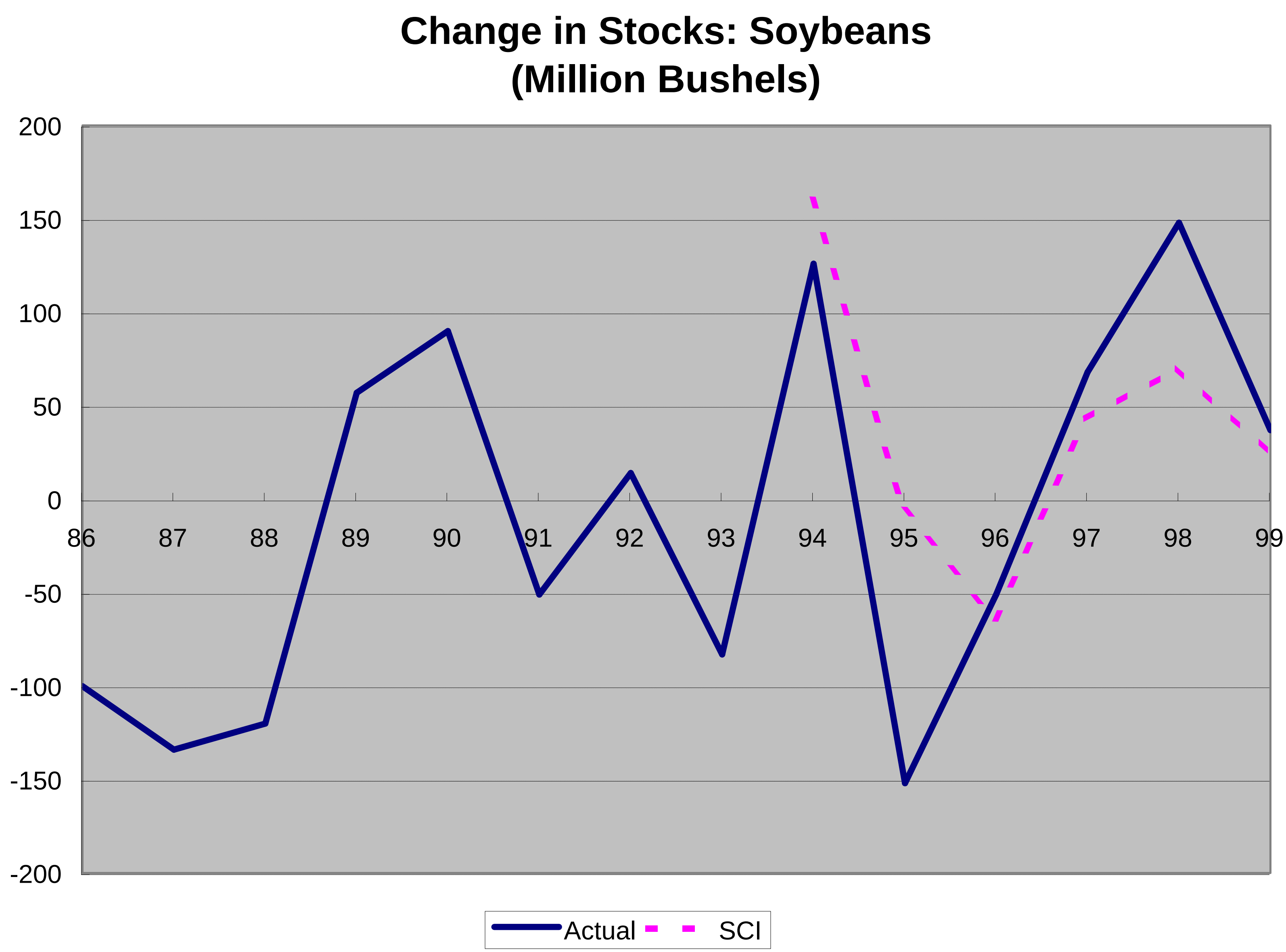

Change in Stocks: Corn
(Million Bushels)
1500
1000
500
0
-500
-1000
-1500
-2000
-2500
86
87
88
89
90
91
92
93
94
95
96
97
98
99
Actual
SCI

Exhibit 18



Change in Stocks: Soybeans
(Million Bushels)
200
150
100
50
0
-50
-100
-150
-200
86
87
88
89
90
91
92
93
94
95
96
97
98
99
Actual
SCI

Exhibit 19

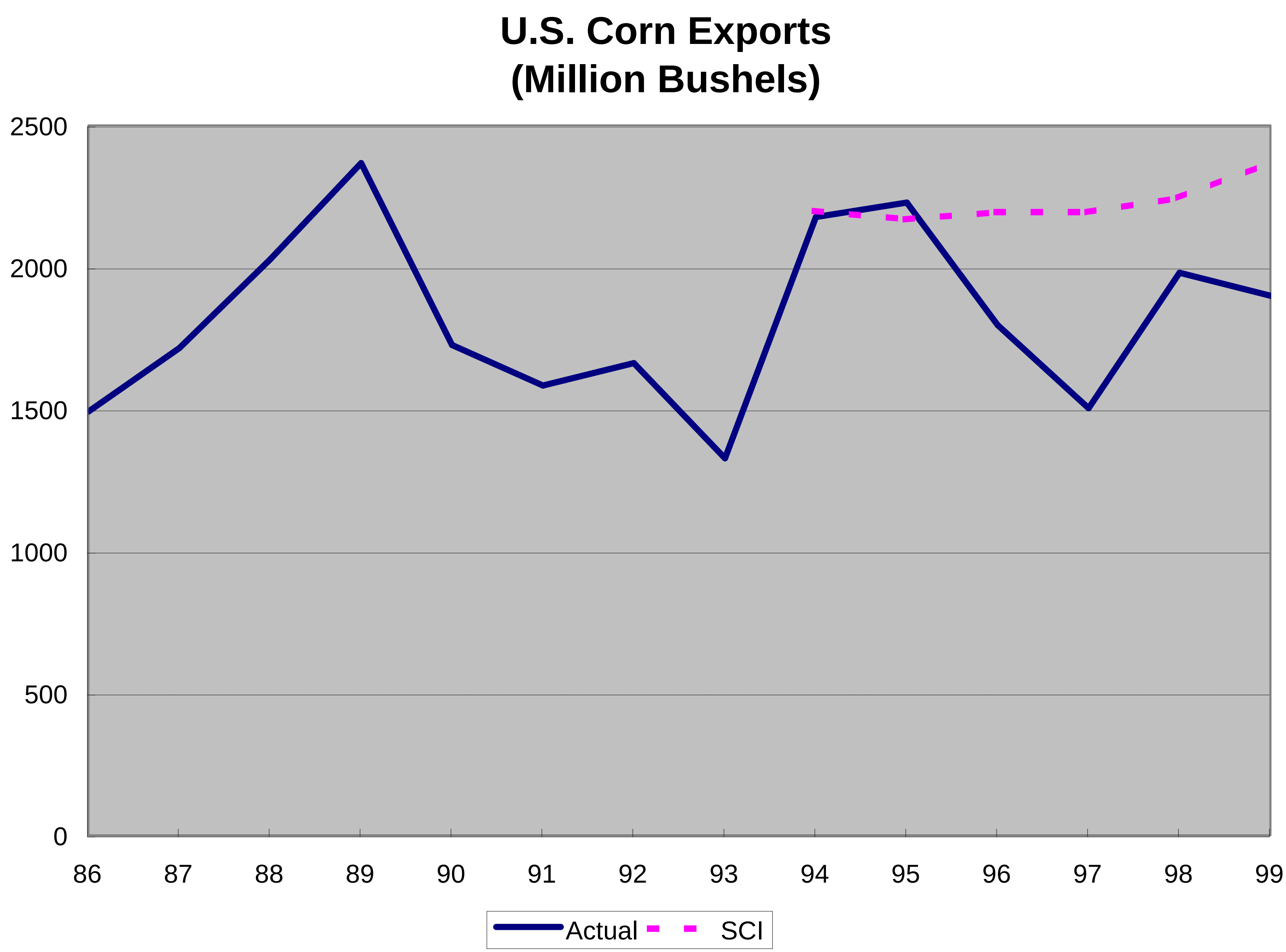
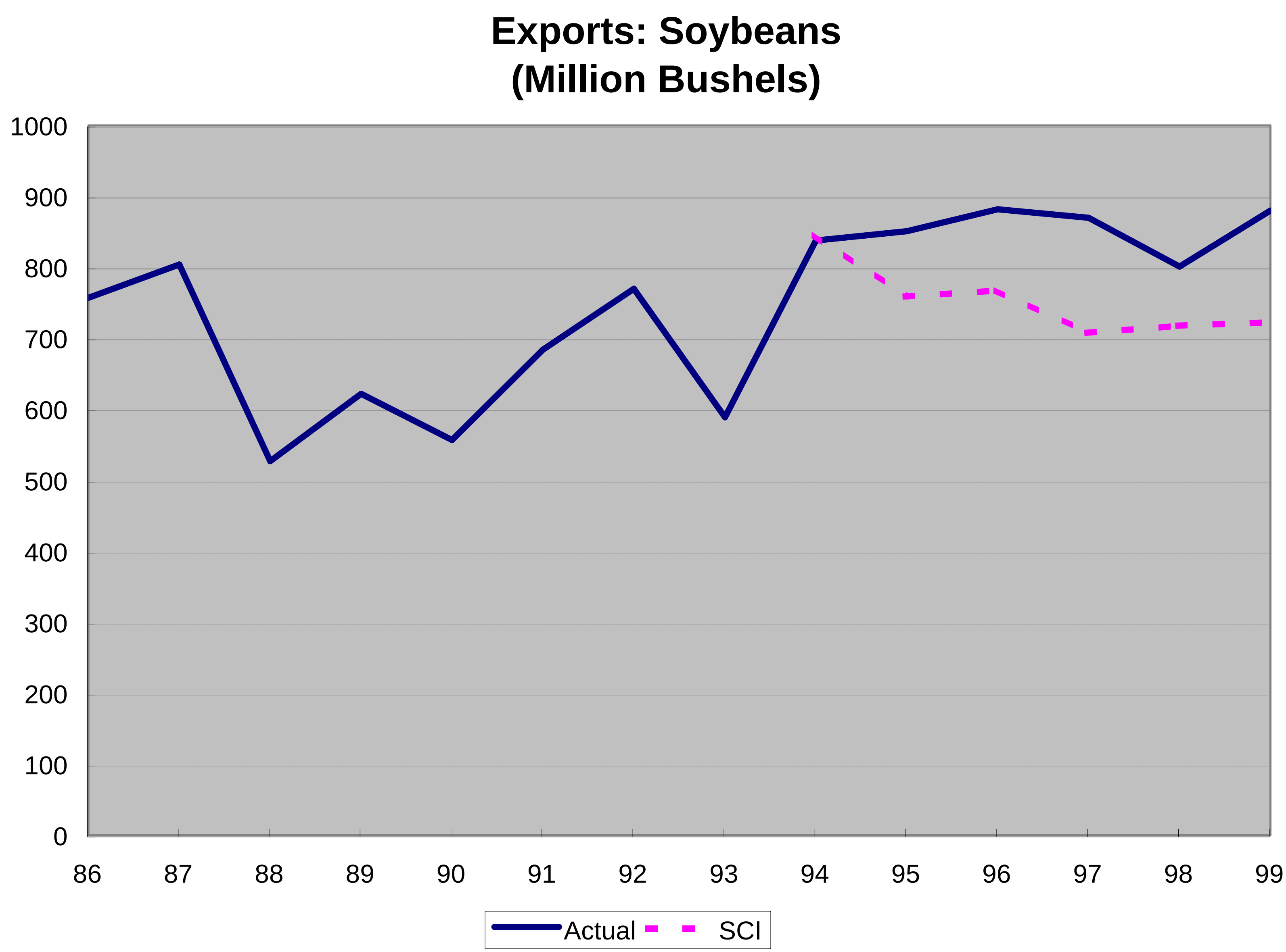

U.S. Corn Exports
(Million Bushels)
2500
2000
1500
1000
500
0
86
87
88
89
90
91
92
93
94
95
96
97
98
99
Actual
SCI

Exhibit 20



Exports: Soybeans
(Million Bushels)
1000
900
800
700
600
500
400
300
200
100
0
86
87
88
89
90
91
92
93
94
95
96
97
98
99
Actual
SCI

II.D Review of Port Shares

In addition to total U.S. export levels, the waterway traffic projections were also based on assumptions about the percentage of export grain that would be handled by ports in southern Louisiana (Central Gulf). A thorough analysis of competition between ports (primarily between the Gulf and the Pacific Northwest (PNW)) is contained in the original grain report (Chapter 4). Nonetheless, it is instructive to examine the amount of grain that has moved through the Central Gulf since the report was published.

<u>Corn</u>

Exhibit 21 shows the percentage of U.S. corn exports handled by ports in the Central Gulf of Mexico. These ports are located predominately in southern Louisiana, although insignificant amounts handled by Alabama ports are also included in the data. As can be seen, the data reveal a steady upward trend. The decline in the Gulf's share evident in 1994 and 1995 can be attributed to the large export volumes that occurred at that time. As noted in our original grain report, the PNW is generally able to increase its share as export volumes increase. With respect to corn, the PNW ports are often referred to as overflow ports because they tend to draw some of the excess when export volumes are high and/or grain handling capacity is tight in the Gulf.

On average the Gulf captured 71.39% of the U.S. corn exports during the five year period between 1994 through 1998; this is just over one percentage point greater than 70.37%, the share used in making the original traffic forecasts.

<u>Soybeans</u>

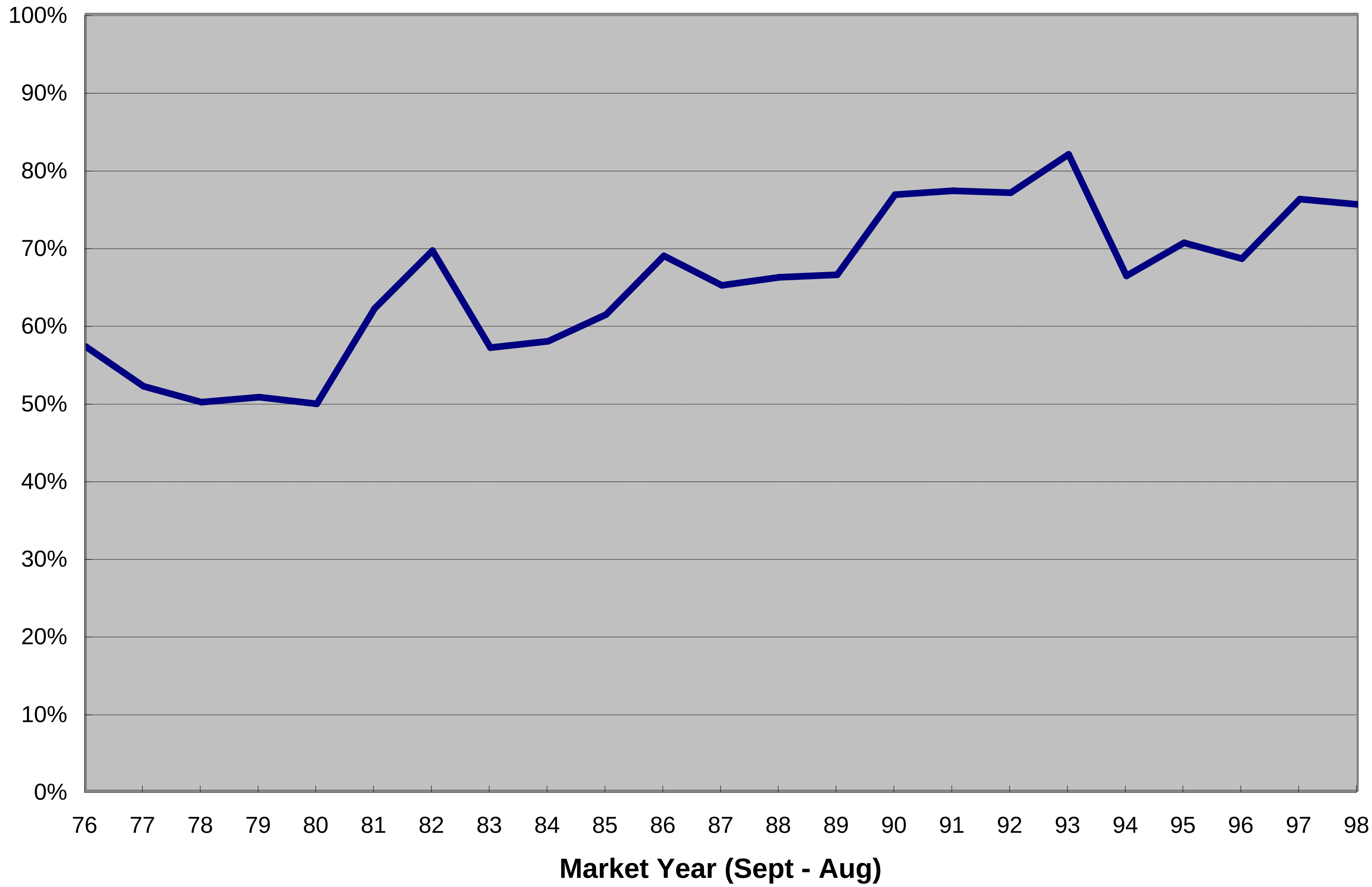
Exhibit 22 graphically presents the percentage of U.S. soybean exports handled by the Gulf. As can be seen, the Gulf's share has been relatively stable over the five last years. On average, the Gulf handled 72.64% of the U.S. soybean exports between 1994 and 1998. This is three and a half percentage points lower than the 76.16% figure used to develop the original traffic projections.

As we noted in our previous analysis, the distribution of soybean exports across U.S. ports is more dispersed than the respective distribution for corn, which is dominated by Louisiana and the PNW.

As with corn, the grain report examined several factors that affect U.S. port competitiveness for soybean exports. Among those was the relationship between the Gulf's share and the level of South American export levels. At the time, a slight negative relationship could be seen. The explanation was that South American export levels impact the ocean freight rates of shipments originating in the Gulf, since the Gulf and South American ports essentially compete for the same ocean vessels. We wanted to take another look at this issue given the increased volume of soybeans coming out of South America. Our analysis found no relationship between the South American export levels and the Gulf's share of U.S. soybean exports between 1992-1998.

Exhibit 21

Central Gulf Corn Exports
Percent of U.S. Corn Exports

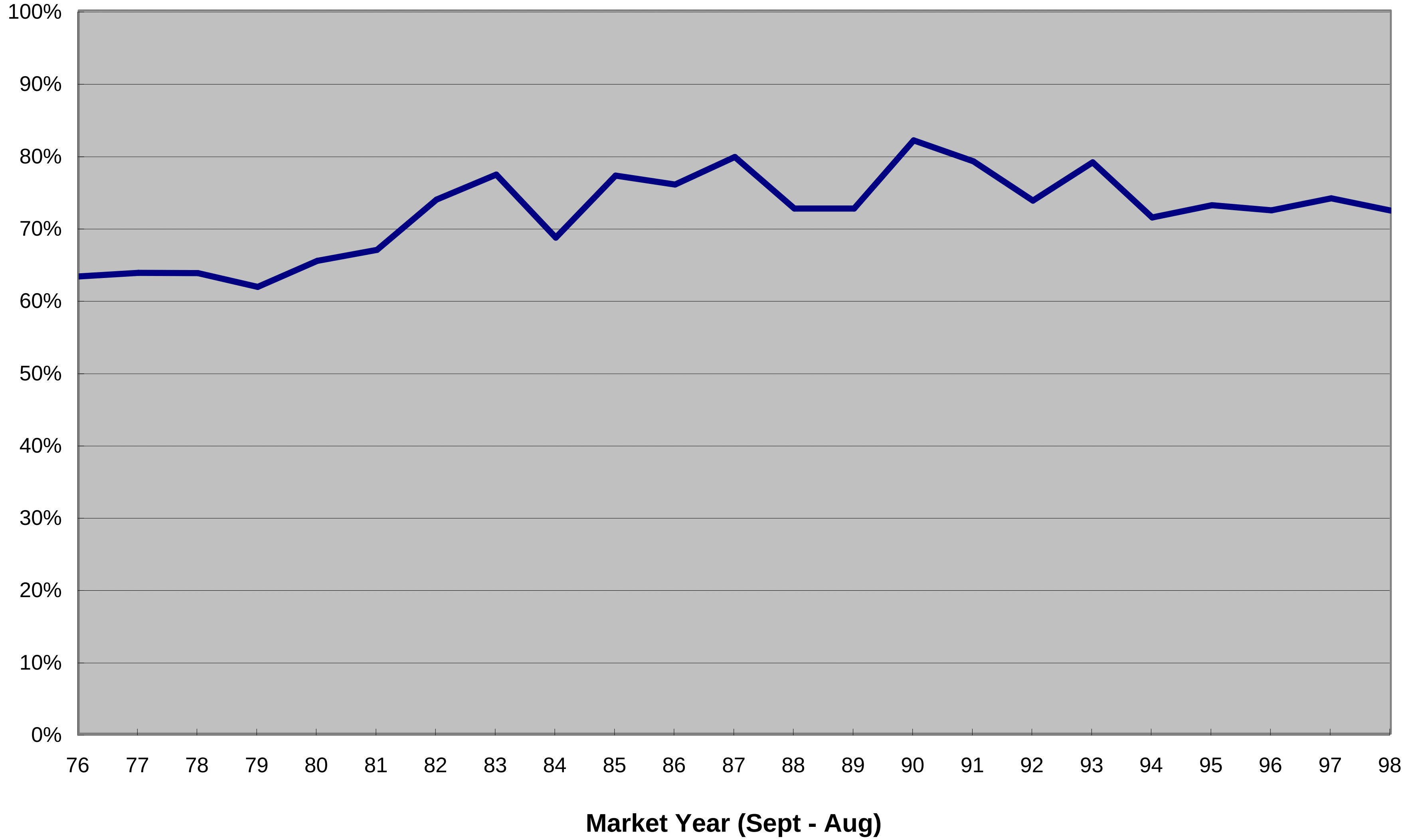


Source: Federal Grain Inspection Service

Exhibit 21

Exhibit 22

Central Gulf Soybean Exports
(Percent of U.S. Soybean Exports)



Source: Federal Grain Inspection Service

Another important issue that was addressed in the grain report concerned the impact of regional production shifts on port shares. Between 1975 and 1994, the plains states (Kansas, Nebraska, North Dakota, Oklahoma, South Dakota, and Texas) steadily increased their share of U.S. soybean production, gaining seven percentage points over the period. This appeared to have had somewhat of a negative impact on the Gulf's share of soybean exports, especially between 1986 and 1994. Up until that time, the soybean production increases in the Plains had outpaced its crushing capacity, resulting in surpluses that moved into export channels that competed with the Gulf.

The 1996 Farm Bill has led to further geographic shifts as farmers outside the corn belt and main soybean cropping area have started to convert wheat and corn acreage into soybeans. This has not produced the expected impact on the Gulf's export share. Since 1988, the Southern Plains (Kansas, Oklahoma, and Texas) has not exhibited any upward or downward trend in its share of U.S. soybean production. The Northern Plains (Nebraska, North Dakota, and South Dakota) production share, on the other hand, has increased steadily since 1993, gaining over five percentage points. One would have thought that the increased production in the Northern Plains would have raised the PNW's export share at the expense of the Gulf. In fact, a surprising result can be seen in Exhibit 23, which shows a strong negative relationship between the PNW's export share and the increased production in the Northern Plains. There is no discernible relationship between the Gulf's export share and the Northern Plains' production share.

It should be noted that the Gulf has benefited from the increased soybean exports to Mexico, which received over 15% of U.S. soybean exports in 1998 compared with 9% in 1992.

II.E Percent of Gulf Exports from Study Area

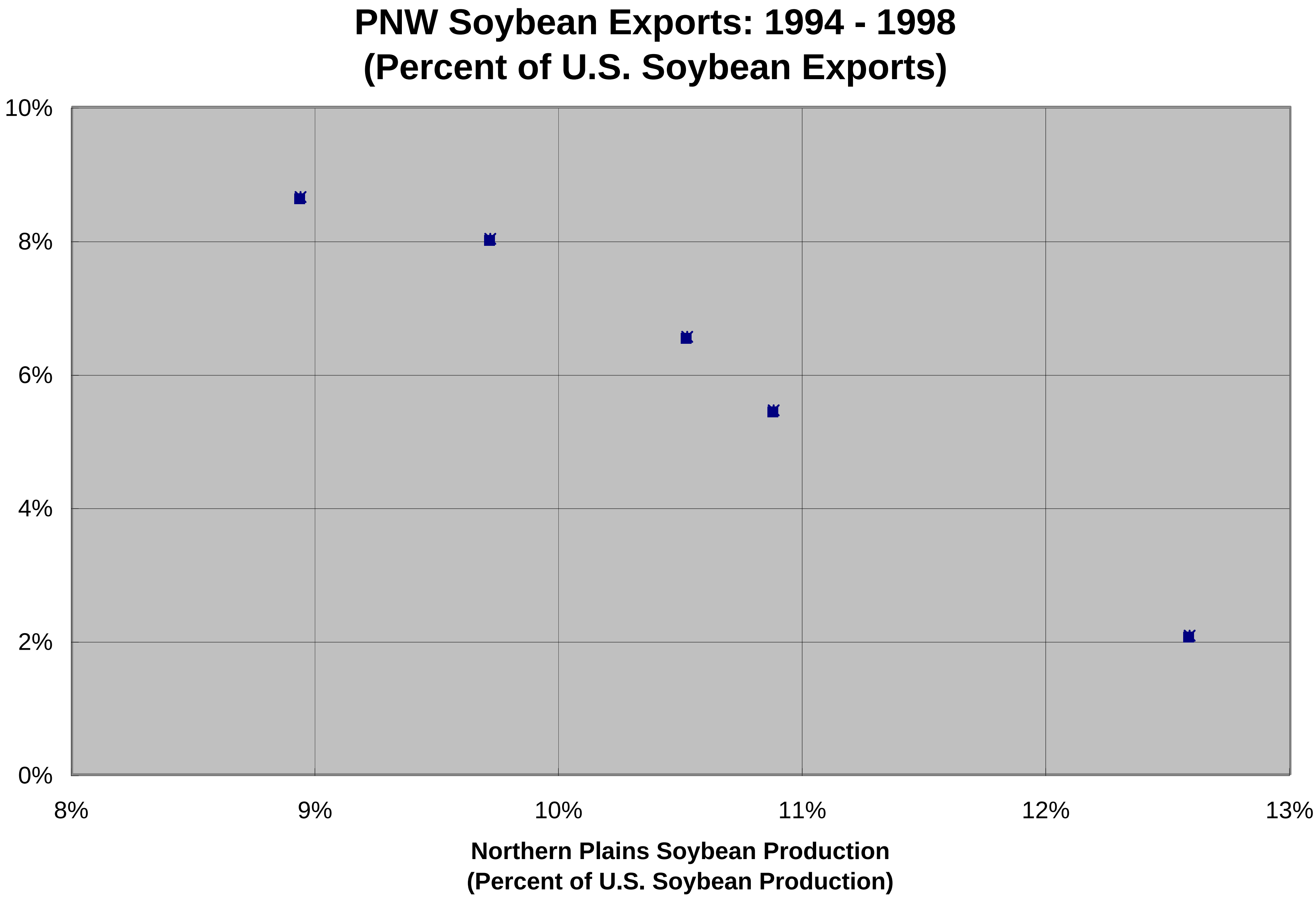
Exhibits 24 and 25 shows the percentage of Gulf exported grain that is transported on the Upper Mississippi River[1] and Illinois Waterway. In all cases the trends have been fairly flat over the last ten years. For this reason, we don't see a problem with using constant shares to distribute the forecasts of port export traffic to these river systems.

II.F Adjustment for Non-Export Traffic

As mentioned earlier, almost all of the grain that is transported on the river systems is bound for Louisiana export markets. It is estimated that over 90% of the corn and soybean traffic on both river systems has been export related since 1980. These shares have been fairly constant with minimal deviation. No discernible changes were evident over the last five years.

[1] Note that traffic on the Upper Mississippi River includes through traffic from the Illinois Waterway.

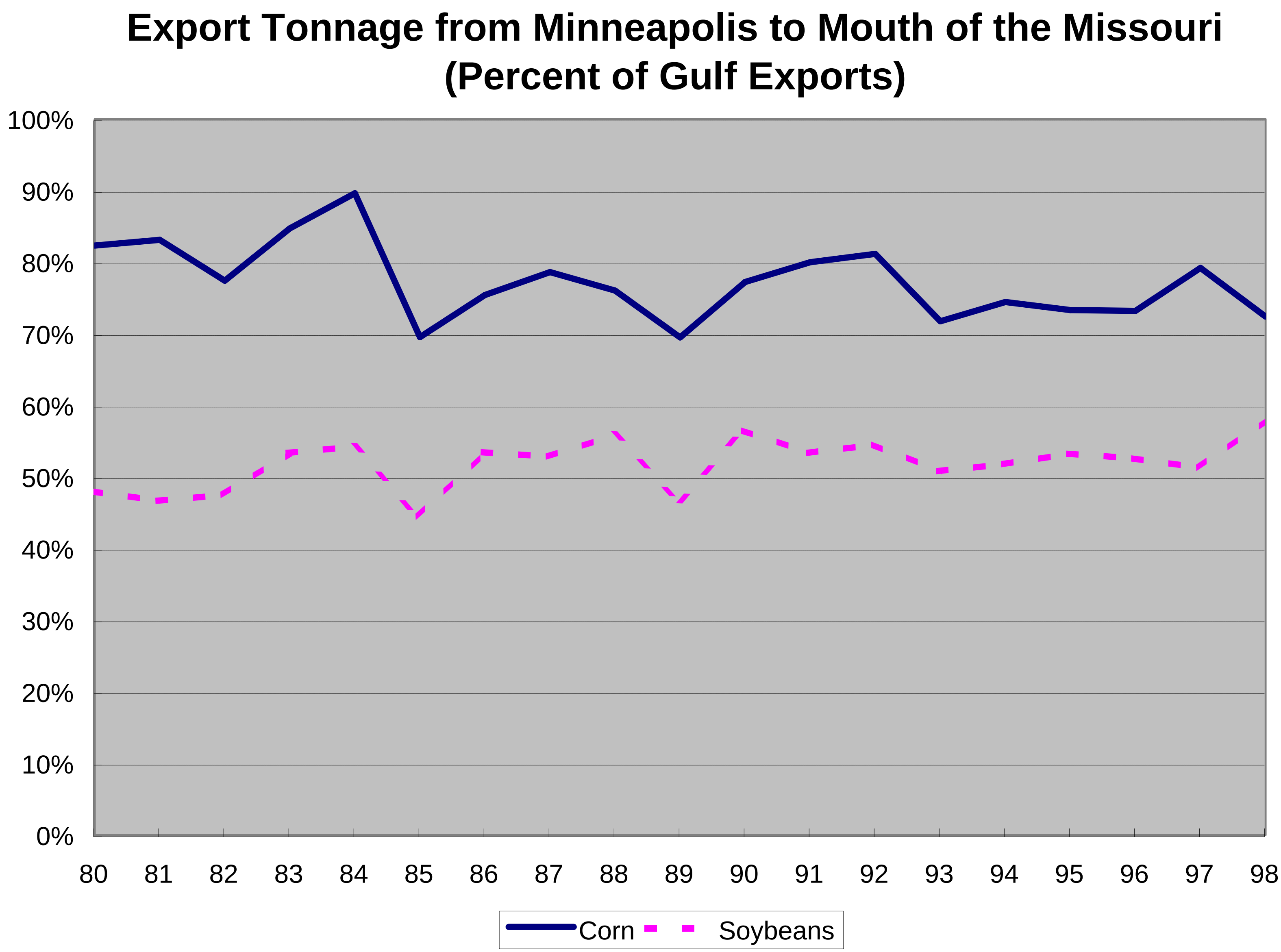
Exhibit 23



*Nebraska, North Dakota, South Dakota

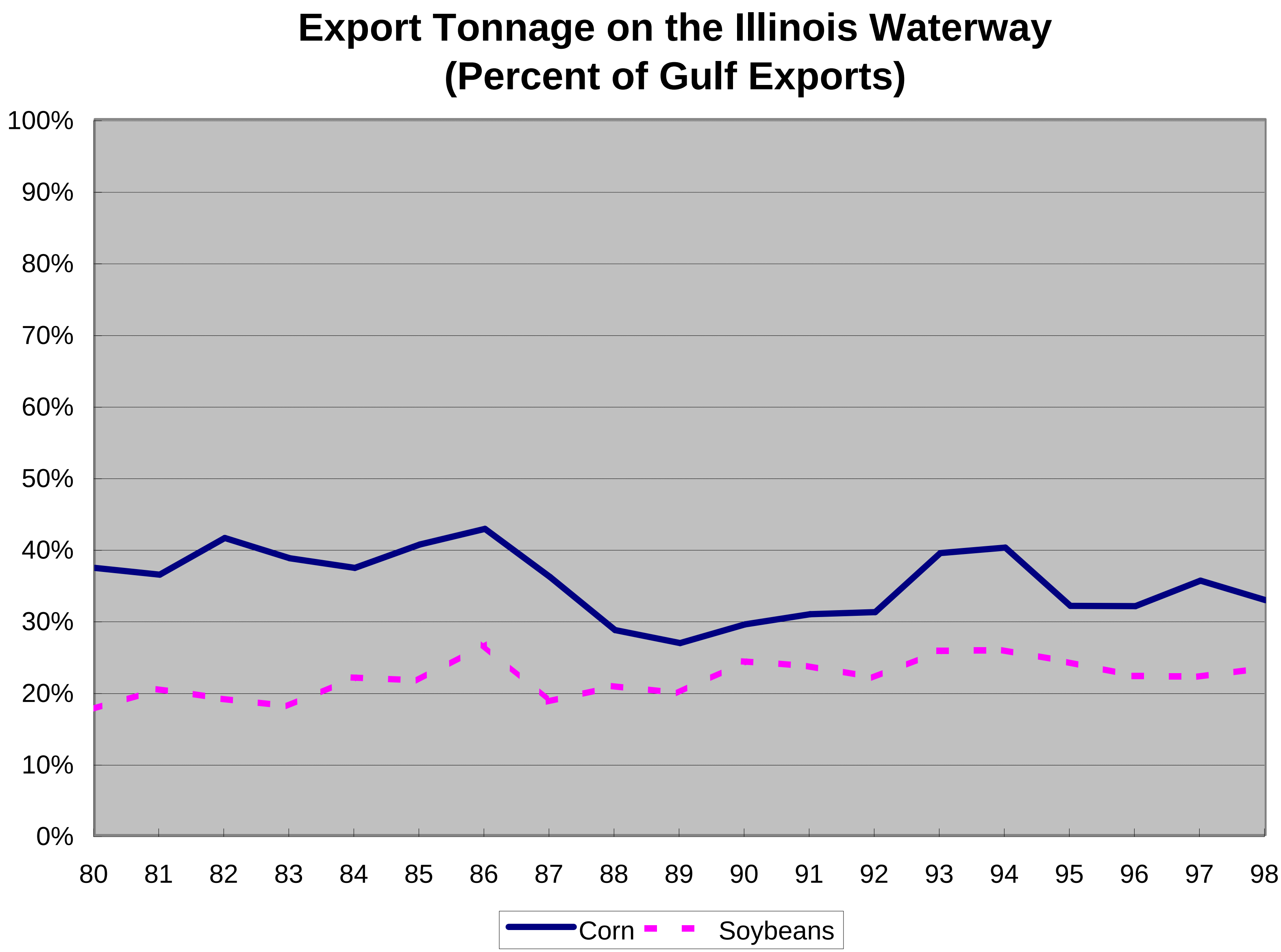
Source: U.S. Department of Agriculture

Exhibit 24



Source: Waterborne Commerce Statistics

Exhibit 25



Source: Waterborne Commerce Statistics

III. DEVELOP REVISED FORECAST OF WATERBORNE GRAIN MOVEMENTS

As pointed out in the grain report, the simultaneous occurrence GATT and the Farm Bill significantly altered the economic environment with which world grain production and trade take place. These dramatic changes made forecasting difficult since they were just starting to occur when the projections were being developed.

Other notable events that were difficult to foresee include China's return to being a net exporter, the international financial crisis, and consumer response to genetically modified grain. While these occurrences have dampened U.S. corn exports over the last few years, it is unlikely that they will have a long term implications.

A factor which was not adequately taken into account and which probably will affect the long-term accuracy of the forecasts is the crop shift that has occurred between corn/wheat and soybeans. As shown in Exhibits 19 and 20, although SCI over-estimated U.S. corn exports they under-estimated U.S. soybean exports. This trade-off is important and has implications for future waterway traffic levels.

Construct Forecast of U.S. Export Volumes

The procedure used to develop the revised forecast is similar to the one previously used: i.e., an exogenous forecast of U.S. exports drives the waterway traffic projections. Given the politically charged atmosphere surrounding the Navigation Study, we decided to rely upon forecasts of corn and soybean exports contained in *USDA's Agricultural Baseline Projections to 2009*, a source which was considered to be both neutral and credible.

USDA's baseline projections were extended to 2050 using logarithmic trends. Exhibits 26 and 27 present the regression results. The extrapolation of USDA's corn forecast was based upon the projections in the period 2001 to 2009. Extension of the soybean export forecast, on the other hand, was based upon historical data between 1988 and 1999.

USDA's baseline projections do not include the potential impacts on trade that will result if China is granted access to the WTO. Given the high probability of this occurring and the relatively large implications for trade, we adjusted the projections to account for this possibility.

As a condition for membership in the WTO, China has agreed to reduce a number of agricultural trade barriers. Part of the terms include the establishment of a tariff-rate quota (TRQs) schedule for corn. The TRQ establishes an import threshold for assessing different duties. Quantities below the threshold are charged a low duty whereas the remaining imports are charged a higher duty. As agreed, the corn TRQ in the year 2000 is 4.5 million metric tons (MMT). This gradually increases to 7.2 MMTs in 2004 and is assumed to remain at that level through 2009.

Exhibit 26

Regression Statistics for Extrapolating USDA's Corn Export Forecast

Equation: Exports = A + B * LN (Year - 1990)

Regression Statistics	
Multiple R	0.9990
R Square	0.9980
Adjusted R Square	0.9977
Standard Error	8.4643
Coefficient of Variation	0.0038
Observations	9
Period	2001 - 2009

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	248,248.49	248,248.49	3,465.04	1.07E-10
Residual	7	501.51	71.64		
Total	8	248,750			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-319.23	43.31	-7.37	0.0002	-421.65	-216.81
X Variable 1	944.82	16.05	58.86	1.07E-10	906.86	982.77

Exhibit 27

Regression Statistics for Extrapolating USDA's Soybean Export Forecast

Equation: Exports = A + B * LN (Year - 1982) - 35

Regression Statistics	
Multiple R	0.8631
R Square	0.7449
Adjusted R Square	0.7194
Standard Error	71.0504
Coefficient of Variation	0.0963
Observations	12
Period	1988 - 1999

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	147,424.41	147,424.41	29.20	0.0003
Residual	10	50,481.59	5,048.16		
Total	11	197,906			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-86.53	153.95	-0.56	0.5865	-429.55	256.49
X Variable 1	344.54	63.76	5.40	0.0003	202.48	486.60

To make our adjustment we assumed that China will increase its import levels by the amount of the TRQs. We also assume that the U.S. will be able to supply 70% of China's increased import demand, a figured based on USDA's estimate of U.S. market share in world corn trade in 2009. Assuming that China's entry into the WTO causes their corn imports to increase by 7.2 MMTs in 2009, U.S. exports in 2009 should be 8.2% higher than projected in the USDA baseline. We then assume that this 8.2% impact on U.S. corn exports will continue throughout the remainder of the forecast horizon (2010 - 2050). Exhibit 28 contrasts the baseline forecast with the WTO adjustment.

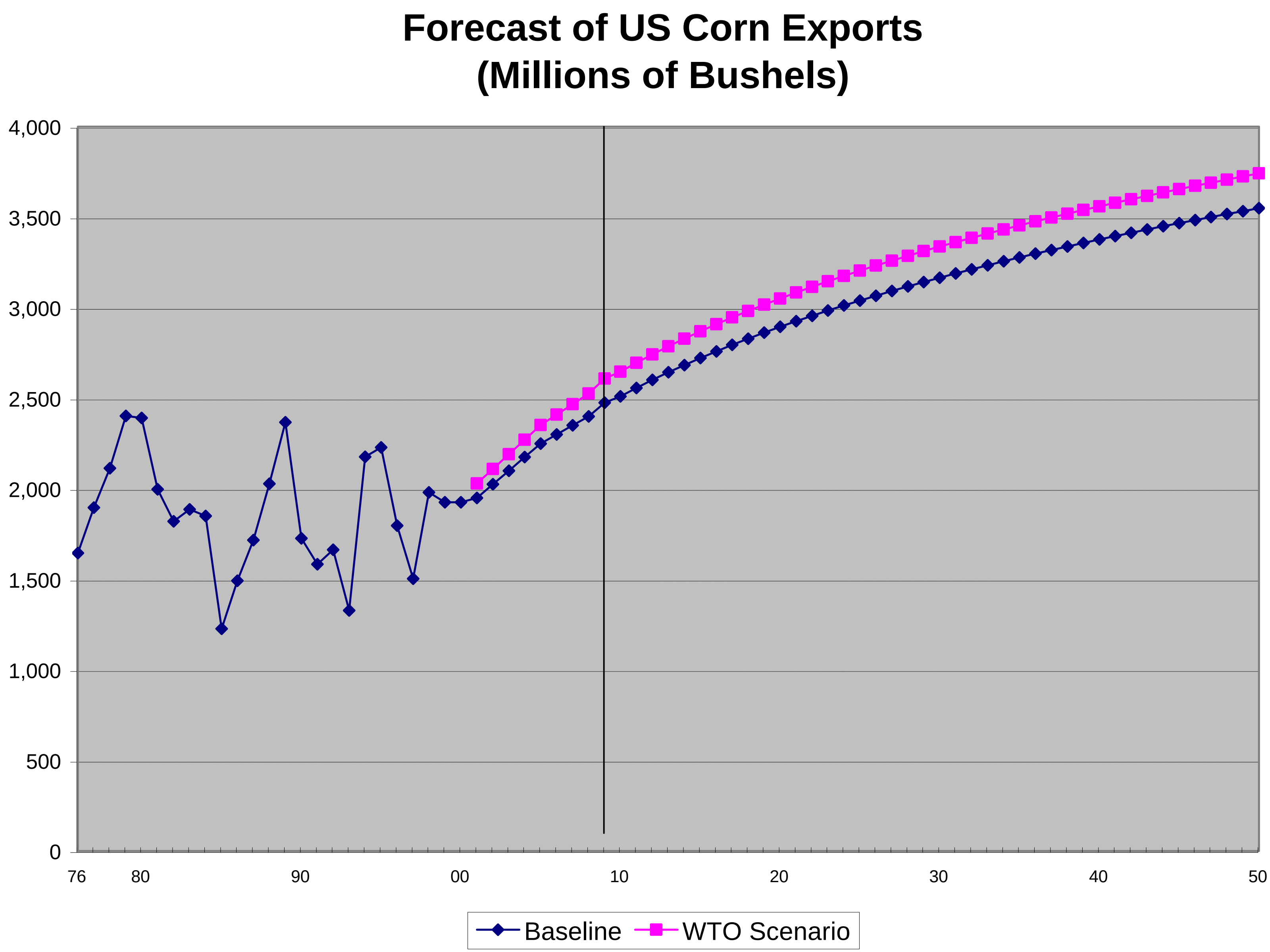
Given the large quantity of stocks in China, it is acknowledged that corn imports probably will not achieve the TRQ levels over the next several years. While this may add a slight upward bias to the forecast between now and 2009, it should be noted that we have not addressed China's export volumes, which may fall after joining the WTO. In addition, the forecasts beyond 2009 (the period when the benefits of lock improvements would start to accrue) are believed to be reasonable.

In contrast to corn, China's entry into the WTO is expected to have a negative impact on its soybean imports. China currently protects its domestic processing facilities and encourages the importation of raw soybeans over processed goods. As those protections subside, it is likely that they will begin to import more meal and oil at the expense of raw beans. This will be to the detriment of the U.S. which is not as competitive in meal and oil trade as it is in soybean trade.

To estimate the impact, we started with USDA's estimate of how WTO membership would affect the value of Chinese soybean imports in 2005 (obtained from *Agriculture Outlook, March 2000*). To convert this value ($394 million) into bushels, we divided it by $5.55, USDA's projected average annual price for 2005. The result was then multiplied by the U.S. trade share forecast for 2005, yielding a negative impact on U.S. soybean exports of 46.43 million bushels. To convert the impact into a percentage basis, we divided it by the 2005 export projection; this turned out to be approximately 4.5%. Finally, USDA's baseline soybean export forecast was reduced by this percentage. Unlike the corn adjustment, the early period forecast probably will not be understated. There is a high probability that Chinese soybean oil imports will meet or exceed the TRQ due to strong domestic demand. Exhibit 29 contrasts the baseline forecast with the WTO adjustment.

In their March 2000 Agricultural Outlook, USDA estimated that U.S. soybean meal exports would increase by 12% and soybean oil exports by 23%. As a result, we adjusted our forecast of prepared animal feeds to take into account the expected increase in meal exports. The quantity of soybean oil that moves on the Upper Mississippi River and Illinois Waterway is negligible; therefore, we did not make an adjustment for an increase in U.S. soybean oil exports.

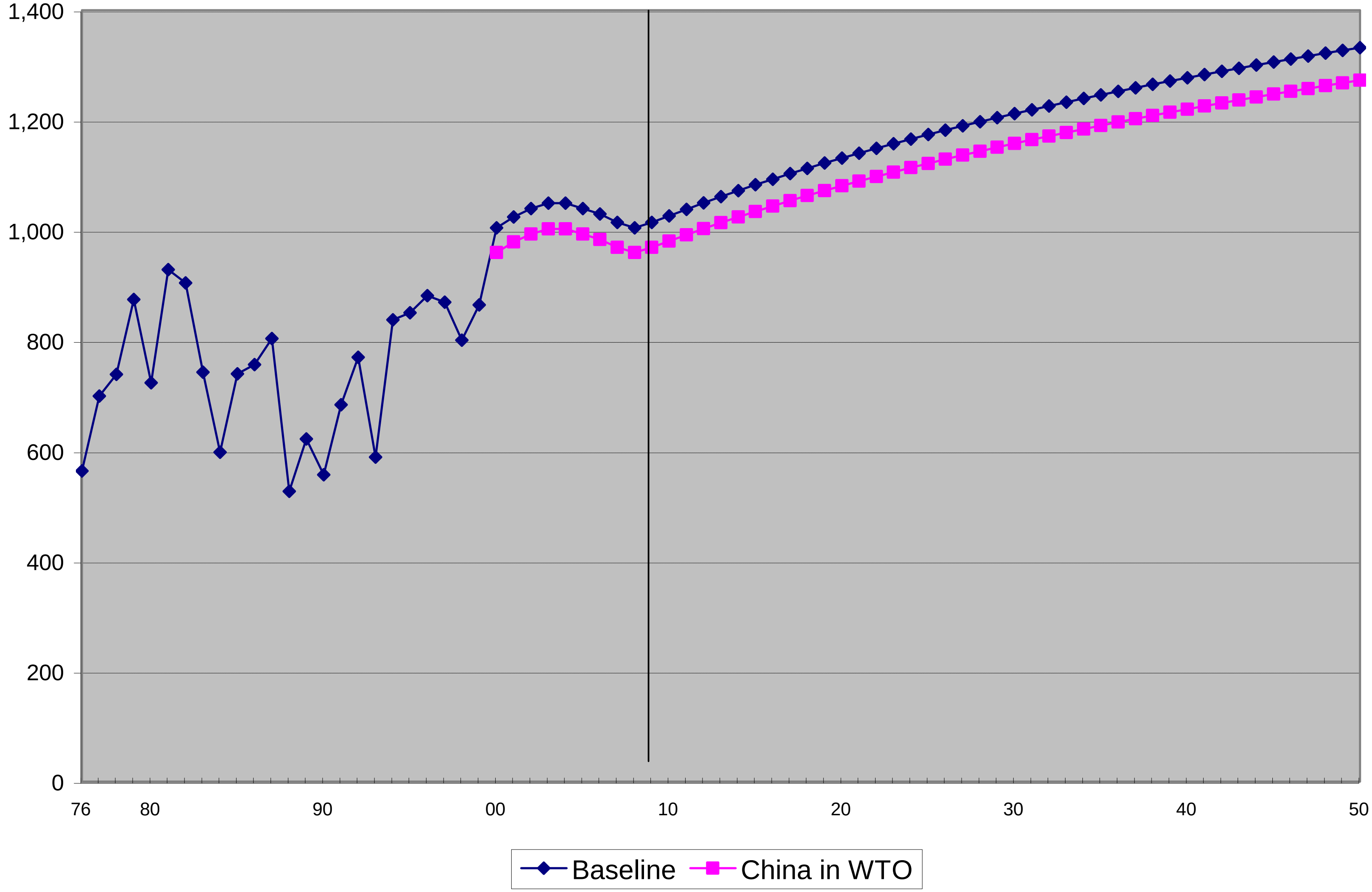
Exhibit 28



Forecast of US Corn Exports
(Millions of Bushels)
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
76
80
90
00
10
20
30
40
50
Baseline
WTO Scenario

Exhibit 29

Forecast of US Soybean Exports
(Millions of Bushels)



USDA's forecast of U.S. wheat exports are also considerably different than the original projections. SCI's numbers are higher in the early period but manifest a fairly flat trend. USDA's projection shows strong accelerating growth to 2009 and would surpass SCI 's forecast in 2013 if exports held to the same trend. Due to the relatively small quantities of wheat that move on the two rivers, as well as uncertainty about how to extend USDA's accelerating forecast, we decided not to tinker with our original wheat forecast. And although it is true that China's entry into the WTO may boost U.S. exports, we expect that much of this will be pulled out of the PNW and ports other than the Central Gulf.

<u>Construct Waterway Traffic Forecast</u>

To assign a portion of the U.S. corn export forecast to the Central Gulf, we used the port share developed by SCI and used in the original forecast. This share is just over one percentage point less than the average share over the last five years. With soybeans, on the other hand, we decided to use the percent of exports handled by the Central Gulf between 1994 and 1998. This share is three and a half percentage points lower than the 76.16% figure used to develop the original traffic projections. It has also exhibited a minimal amount of variance.

Assignment of Central Gulf export volumes to origins on the Upper Mississippi River and Illinois Waterway was based on each river's average historical share of Louisiana exports. A slight upward adjustment for non-export related traffic was also based on average historical ratios. In both cases, the percentages were computed using *Waterborne Commerce* data.

Exhibits 30 and 31graphically present the revised forecast of the corn and soybean traffic volumes on the Upper Mississippi River and Illinois Waterway. Exhibits 32 and 33 contain these data in tabular form along with the forecasts of the other commodity groups. The revised total traffic forecasts for the Upper Mississippi River and Illinois Waterway are shown in Exhibits 34 and 35. The bands were developed using a random walk procedure, the method used in the initial report.

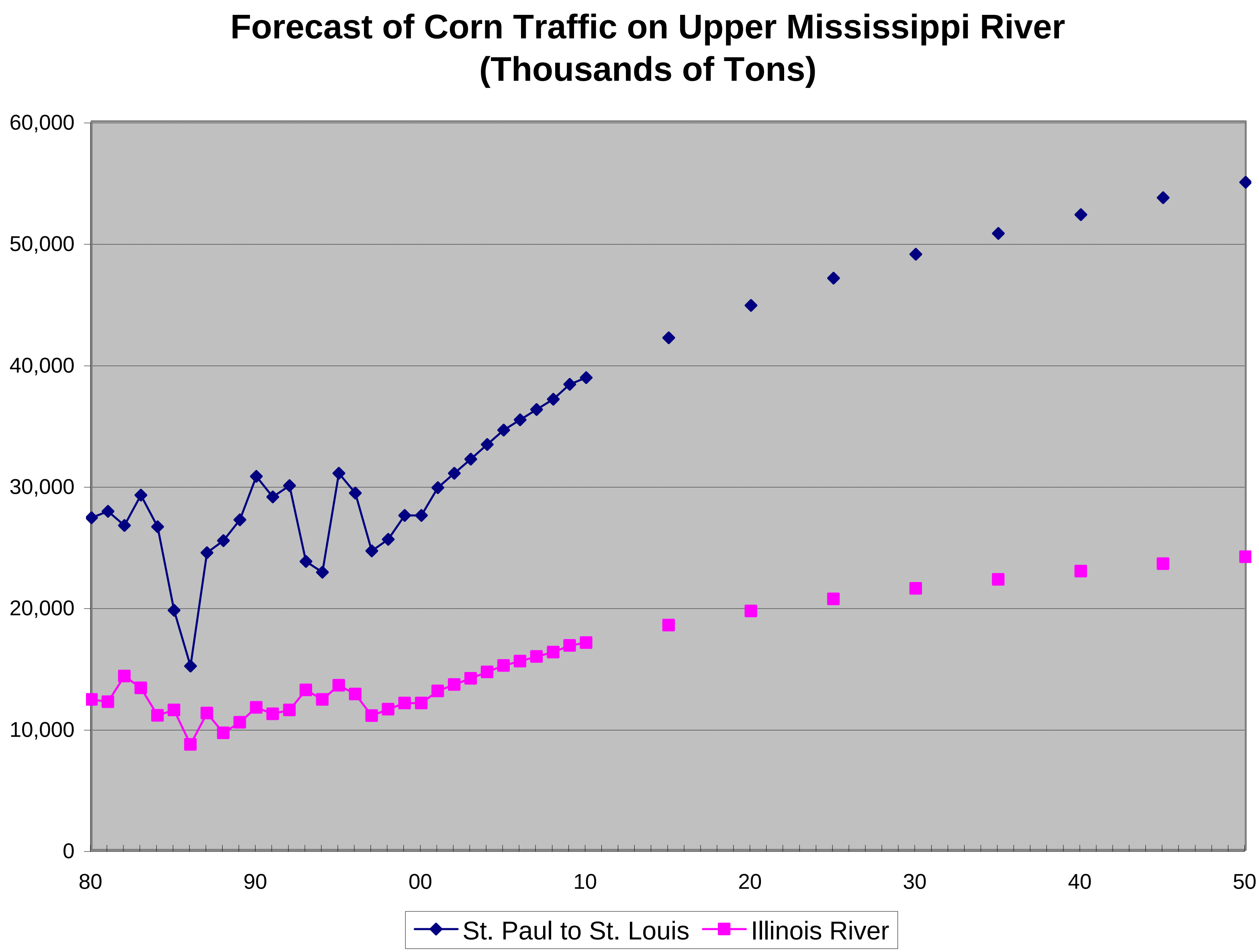
<u>Comparison of the Original and Revised Forecasts</u>

Exhibit 36 compares the revised forecast of U.S. corn exports with SCI's original forecast. On average, SCI's forecast was about 590 million bushels higher than the revised forecast: a 19% difference. It can be seen that the gap between the two starts to widen in 2015. By 2050, the difference between the forecasts amounts to over 1 billion bushels.

Exhibit 37 makes the same comparison for U.S. soybean exports. In this case the forecasts are somewhat closer. Between 2010 and 2034, SCI's forecasts is about 5% lower (55 million bushels) on average than the revised forecast. This changes in 2035 when the SCI forecast overtakes the revision: between 2035 and the end of the period SCI's forecast is about 5% higher.

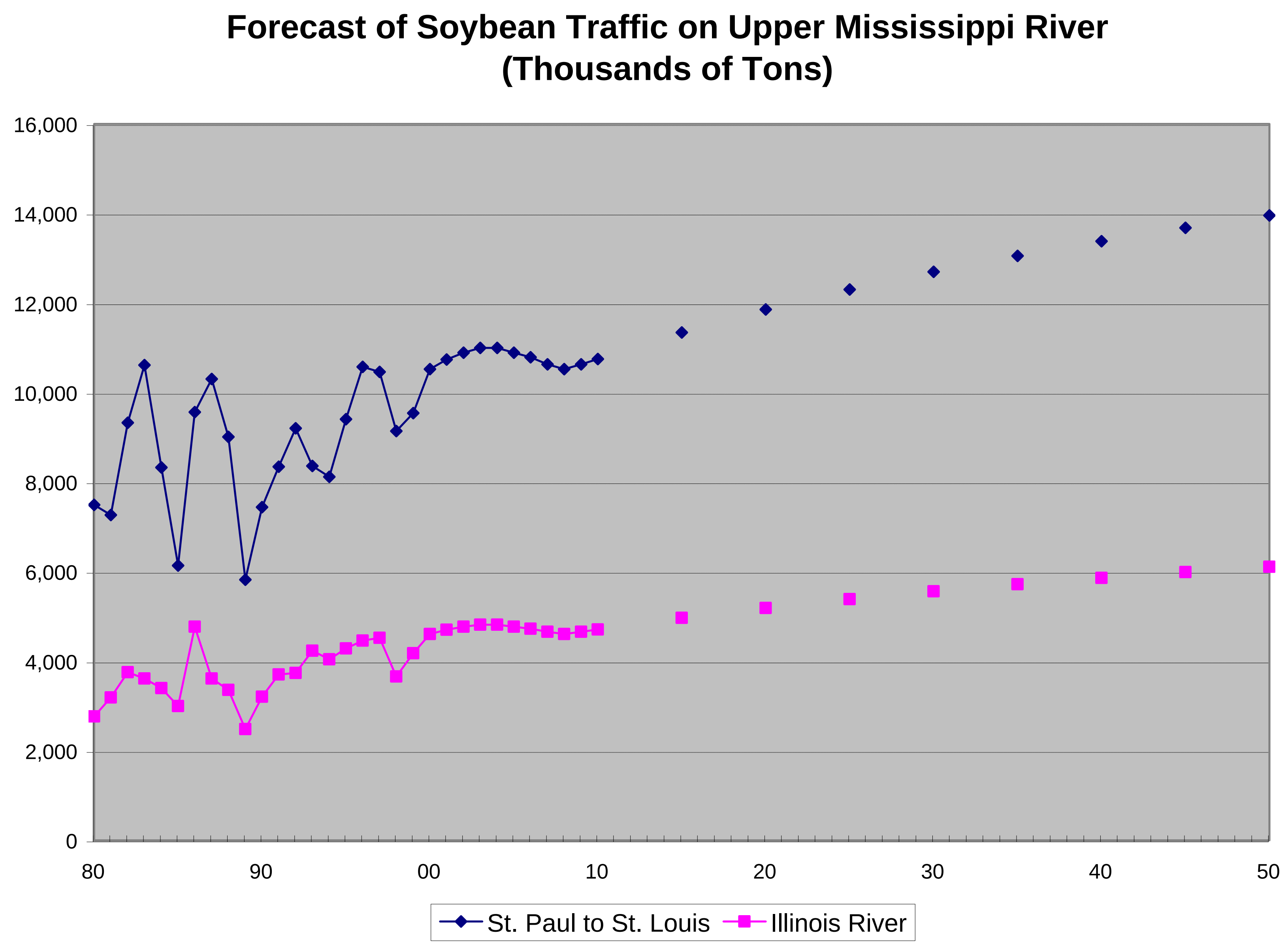
Exhibits 38 and 39 contrast the revised total waterway traffic projections with the original forecasts and uncertainty bands. As can be seen, the revisions fall between the original base forecast and the original lower bound on both rivers.

Exhibit 30



Forecast of Corn Traffic on Upper Mississippi River
(Thousands of Tons)
60,000
50,000
40,000
30,000
20,000
10,000
0
80
90
00
10
20
30
40
50
St. Paul to St. Louis
Illinois River

Exhibit 31



Forecast of Soybean Traffic on Upper Mississippi River
(Thousands of Tons)
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
80
90
00
10
20
30
40
50
St. Paul to St. Louis
Illinois River

Exhibit 32
Waterway Traffic Forecasts: Twin Cities to the Mouth of the Missouri River

Year	Corn	Soybeans	Wheat	Agricultural Chemicals	Prepared Animal Feed	Coal and Coke	Industrial Chemicals	Petroleum Products	Construction Materials	Iron and Steel	Other	Total Forecast
Thousands of Tons												
91-93 avg	27,611	8,637	1,567	4,567	3,480	9,200	3,356	5,917	5,884	2,421	7,665	80,306
2000	27,553	10,526	2,892	3,998	3,545	9,700	3,440	5,972	5,628	2,831	9,016	85,101
2005	34,572	10,893	3,122	4,002	3,736	9,900	3,717	5,983	5,888	2,957	9,717	94,486
2010	38,902	10,752	3,315	4,008	3,884	9,900	3,989	5,976	6,144	3,100	10,238	100,209
2015	42,168	11,345	3,512	4,014	4,063	9,600	4,252	5,952	6,350	3,265	10,685	105,207
2020	44,837	11,854	3,709	4,018	4,235	9,900	4,503	5,927	6,531	3,435	11,174	110,123
2025	47,093	12,300	3,911	4,021	4,402	10,100	4,754	5,902	6,719	3,610	11,673	114,485
2030	49,048	12,697	4,120	4,027	4,564	10,300	5,129	5,878	7,100	3,749	12,236	118,848
2035	50,772	13,054	4,337	4,031	4,721	10,600	5,504	5,826	7,507	3,892	12,841	123,086
2040	52,314	13,380	4,557	4,034	4,875	10,800	5,879	5,746	7,943	4,038	13,455	127,021
2045	53,709	13,678	4,780	4,039	5,024	11,100	6,254	5,637	8,409	4,187	14,086	130,904
2050	54,983	13,954	5,002	4,041	5,168	11,400	6,629	5,502	8,908	4,336	14,704	134,627
Percent of Total Traffic												
91-93 avg	34.38%	10.76%	1.95%	5.69%	4.33%	11.46%	4.18%	7.37%	7.33%	3.01%	9.55%	100.00%
2000	32.38%	12.37%	3.40%	4.70%	4.17%	11.40%	4.04%	7.02%	6.61%	3.33%	10.59%	100.00%
2005	36.59%	11.53%	3.30%	4.24%	3.95%	10.48%	3.93%	6.33%	6.23%	3.13%	10.28%	100.00%
2010	38.82%	10.73%	3.31%	4.00%	3.88%	9.88%	3.98%	5.96%	6.13%	3.09%	10.22%	100.00%
2015	40.08%	10.78%	3.34%	3.82%	3.86%	9.12%	4.04%	5.66%	6.04%	3.10%	10.16%	100.00%
2020	40.72%	10.76%	3.37%	3.65%	3.85%	8.99%	4.09%	5.38%	5.93%	3.12%	10.15%	100.00%
2025	41.14%	10.74%	3.42%	3.51%	3.85%	8.82%	4.15%	5.16%	5.87%	3.15%	10.20%	100.00%
2030	41.27%	10.68%	3.47%	3.39%	3.84%	8.67%	4.32%	4.95%	5.97%	3.15%	10.30%	100.00%
2035	41.25%	10.61%	3.52%	3.27%	3.84%	8.61%	4.47%	4.73%	6.10%	3.16%	10.43%	100.00%
2040	41.19%	10.53%	3.59%	3.18%	3.84%	8.50%	4.63%	4.52%	6.25%	3.18%	10.59%	100.00%
2045	41.03%	10.45%	3.65%	3.09%	3.84%	8.48%	4.78%	4.31%	6.42%	3.20%	10.76%	100.00%
2050	40.84%	10.36%	3.72%	3.00%	3.84%	8.47%	4.92%	4.09%	6.62%	3.22%	10.92%	100.00%
Average Annual Percentage Change												
2000	-0.03%	2.87%	7.96%	-1.65%	-0.31%	0.66%	0.31%	0.12%	-0.55%	1.97%	2.05%	2.05%
2005	4.64%	0.69%	1.54%	0.02%	1.01%	0.41%	1.56%	0.04%	0.91%	0.87%	1.51%	1.51%
2010	2.39%	-0.26%	1.21%	0.03%	0.75%	0.00%	1.43%	-0.02%	0.85%	0.95%	1.05%	1.05%
2015	1.63%	1.08%	1.16%	0.03%	0.87%	-0.61%	1.28%	-0.08%	0.66%	1.04%	0.86%	0.86%
2020	1.23%	0.88%	1.10%	0.02%	0.80%	0.62%	1.15%	-0.09%	0.56%	1.02%	0.90%	0.90%
2025	0.99%	0.74%	1.07%	0.01%	0.74%	0.40%	1.09%	-0.08%	0.57%	1.00%	0.88%	0.88%
2030	0.82%	0.64%	1.05%	0.03%	0.70%	0.39%	1.53%	-0.08%	1.11%	0.76%	0.95%	0.95%
2035	0.69%	0.56%	1.03%	0.02%	0.66%	0.58%	1.42%	-0.18%	1.12%	0.75%	0.97%	0.97%
2040	0.60%	0.49%	1.00%	0.01%	0.62%	0.37%	1.33%	-0.28%	1.14%	0.74%	0.94%	0.94%
2045	0.53%	0.44%	0.96%	0.02%	0.58%	0.55%	1.24%	-0.38%	1.15%	0.73%	0.92%	0.92%
2050	0.47%	0.40%	0.91%	0.01%	0.55%	0.53%	1.17%	-0.49%	1.16%	0.70%	0.86%	0.86%

Exhibit 33
Waterway Traffic Forecasts: Illinois Waterway

Year	Corn	Soybeans	Wheat	Agricultural Chemicals	Prepared Animal Feed	Coal and Coke	Industrial Chemicals	Petroleum Products	Construction Materials	Iron and Steel	Other	Total Forecast
Thousands of Tons												
91-93 avg	11,960	3,890	288	1,620	1,939	7,800	3,990	5,526	2,134	2,233	2,882	44,263
2000	12,092	4,610	510	1,379	1,951	7,000	4,167	6,008	2,234	2,582	3,335	45,867
2005	15,172	4,770	550	1,377	2,057	6,900	4,514	6,293	2,371	2,709	3,571	50,284
2010	17,073	4,708	584	1,372	2,138	7,000	4,854	6,481	2,506	2,853	3,768	53,337
2015	18,506	4,968	619	1,371	2,236	7,000	5,181	6,597	2,615	3,018	3,940	56,052
2020	19,677	5,191	654	1,370	2,331	7,100	5,494	6,698	2,712	3,188	4,112	58,527
2025	20,668	5,386	689	1,368	2,423	7,200	5,807	6,791	2,810	3,363	4,289	60,794
2030	21,525	5,560	726	1,367	2,512	7,400	6,273	6,842	3,019	3,503	4,497	63,224
2035	22,282	5,717	764	1,366	2,599	7,500	6,739	6,865	3,241	3,647	4,706	65,426
2040	22,959	5,859	803	1,366	2,683	7,700	7,205	6,864	3,481	3,793	4,928	67,641
2045	23,571	5,990	842	1,363	2,765	7,900	7,672	6,838	3,740	3,942	5,151	69,774
2050	24,130	6,111	881	1,363	2,845	8,000	8,138	6,789	4,018	4,092	5,363	71,730
Percent of Total Traffic												
91-93 avg	27.02%	8.79%	0.65%	3.66%	4.38%	17.62%	9.01%	12.48%	4.82%	5.04%	6.51%	100.00%
2000	26.36%	10.05%	1.11%	3.01%	4.25%	15.26%	9.09%	13.10%	4.87%	5.63%	7.27%	100.00%
2005	30.17%	9.49%	1.09%	2.74%	4.09%	13.72%	8.98%	12.52%	4.72%	5.39%	7.10%	100.00%
2010	32.01%	8.83%	1.10%	2.57%	4.01%	13.12%	9.10%	12.15%	4.70%	5.35%	7.06%	100.00%
2015	33.02%	8.86%	1.10%	2.45%	3.99%	12.49%	9.24%	11.77%	4.67%	5.38%	7.03%	100.00%
2020	33.62%	8.87%	1.12%	2.34%	3.98%	12.13%	9.39%	11.44%	4.63%	5.45%	7.03%	100.00%
2025	34.00%	8.86%	1.13%	2.25%	3.99%	11.84%	9.55%	11.17%	4.62%	5.53%	7.05%	100.00%
2030	34.05%	8.79%	1.15%	2.16%	3.97%	11.70%	9.92%	10.82%	4.78%	5.54%	7.11%	100.00%
2035	34.06%	8.74%	1.17%	2.09%	3.97%	11.46%	10.30%	10.49%	4.95%	5.57%	7.19%	100.00%
2040	33.94%	8.66%	1.19%	2.02%	3.97%	11.38%	10.65%	10.15%	5.15%	5.61%	7.29%	100.00%
2045	33.78%	8.58%	1.21%	1.95%	3.96%	11.32%	10.99%	9.80%	5.36%	5.65%	7.38%	100.00%
2050	33.64%	8.52%	1.23%	1.90%	3.97%	11.15%	11.34%	9.47%	5.60%	5.70%	7.48%	100.00%
Average Annual Percentage Change												
2000	0.16%	2.46%	7.37%	-1.99%	-0.47%	-1.34%	0.55%	1.05%	0.57%	1.83%	1.84%	1.84%
2005	4.64%	0.69%	1.54%	-0.03%	1.01%	-0.29%	1.61%	0.93%	1.20%	0.96%	1.38%	1.38%
2010	2.39%	-0.26%	1.21%	-0.07%	0.75%	0.29%	1.46%	0.59%	1.11%	1.04%	1.08%	1.08%
2015	1.63%	1.08%	1.16%	-0.01%	0.87%	0.00%	1.31%	0.35%	0.86%	1.13%	0.90%	0.90%
2020	1.23%	0.88%	1.10%	-0.01%	0.80%	0.28%	1.18%	0.31%	0.73%	1.10%	0.86%	0.86%
2025	0.99%	0.74%	1.07%	-0.03%	0.74%	0.28%	1.11%	0.28%	0.71%	1.07%	0.85%	0.85%
2030	0.82%	0.64%	1.05%	-0.01%	0.70%	0.55%	1.56%	0.15%	1.45%	0.82%	0.95%	0.95%
2035	0.69%	0.56%	1.03%	-0.01%	0.66%	0.27%	1.44%	0.07%	1.43%	0.81%	0.91%	0.91%
2040	0.60%	0.49%	1.00%	0.00%	0.62%	0.53%	1.35%	-0.01%	1.44%	0.79%	0.92%	0.92%
2045	0.53%	0.44%	0.96%	-0.04%	0.58%	0.51%	1.26%	-0.07%	1.45%	0.77%	0.89%	0.89%
2050	0.47%	0.40%	0.91%	0.00%	0.55%	0.25%	1.19%	-0.14%	1.44%	0.75%	0.81%	0.81%

Exhibit 34

Revised Upper Mississippi River Basin Waterway Traffic Forecast

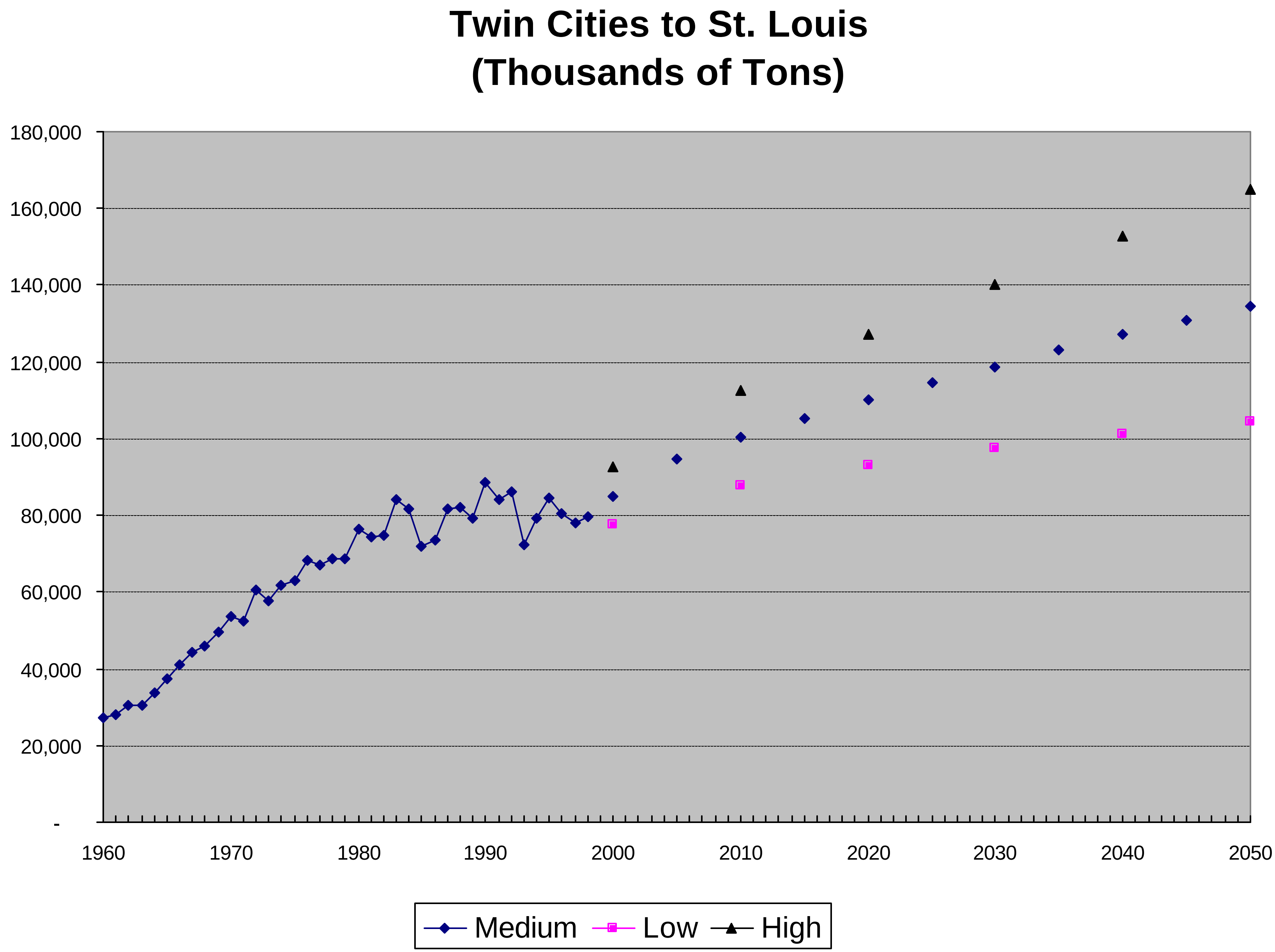


Exhibit 35

Revised Upper Mississippi River Basin Waterway Traffic Forecast

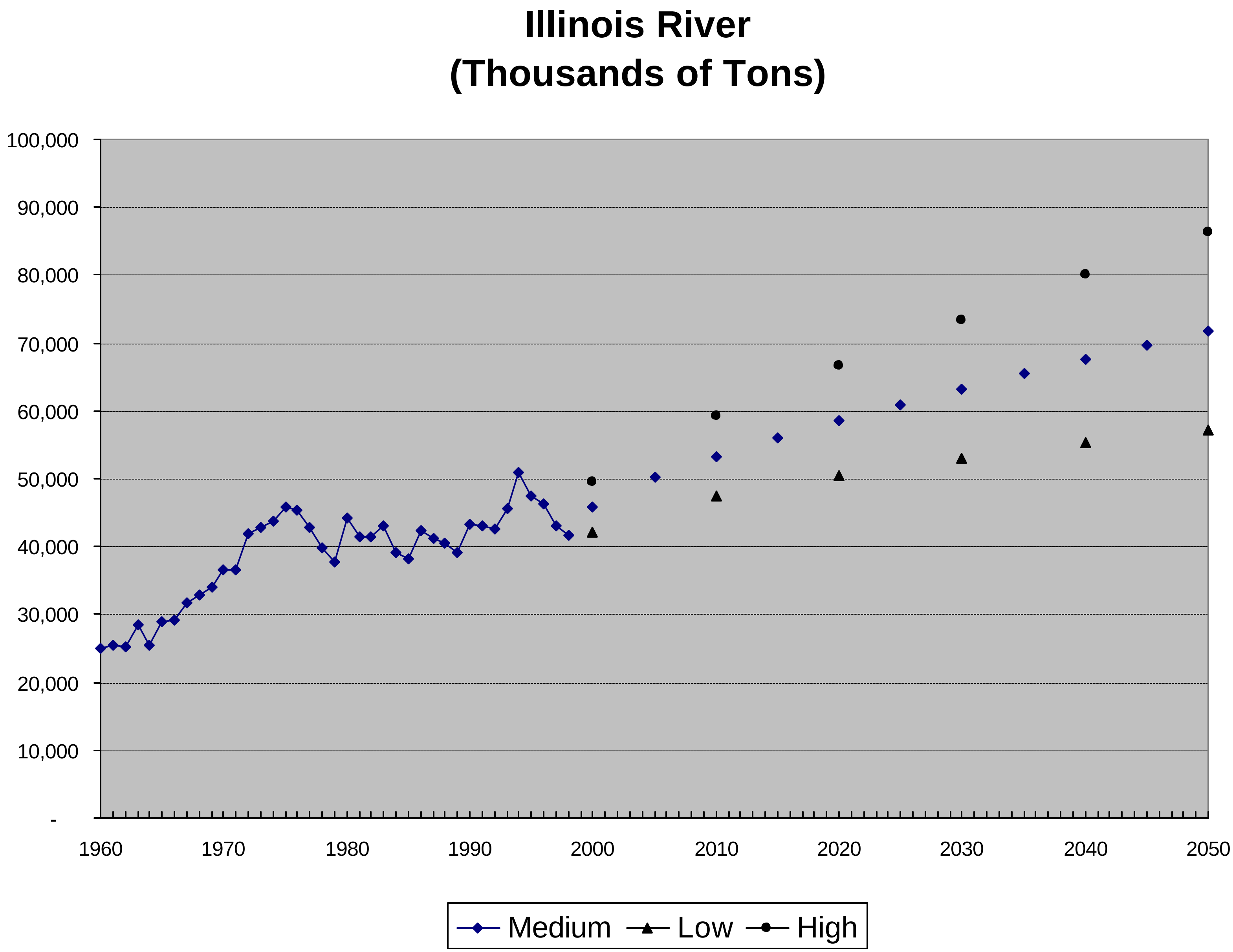
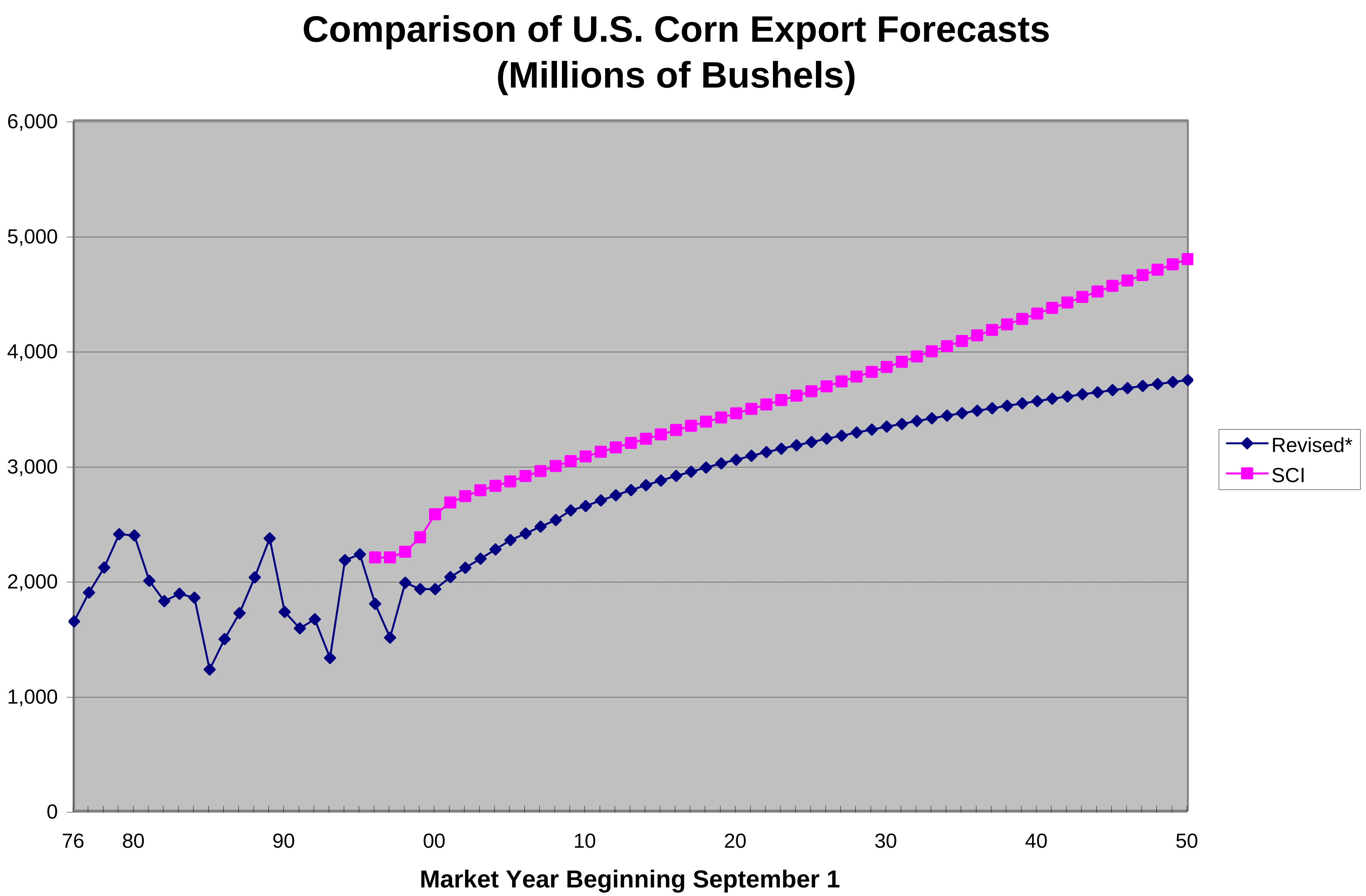
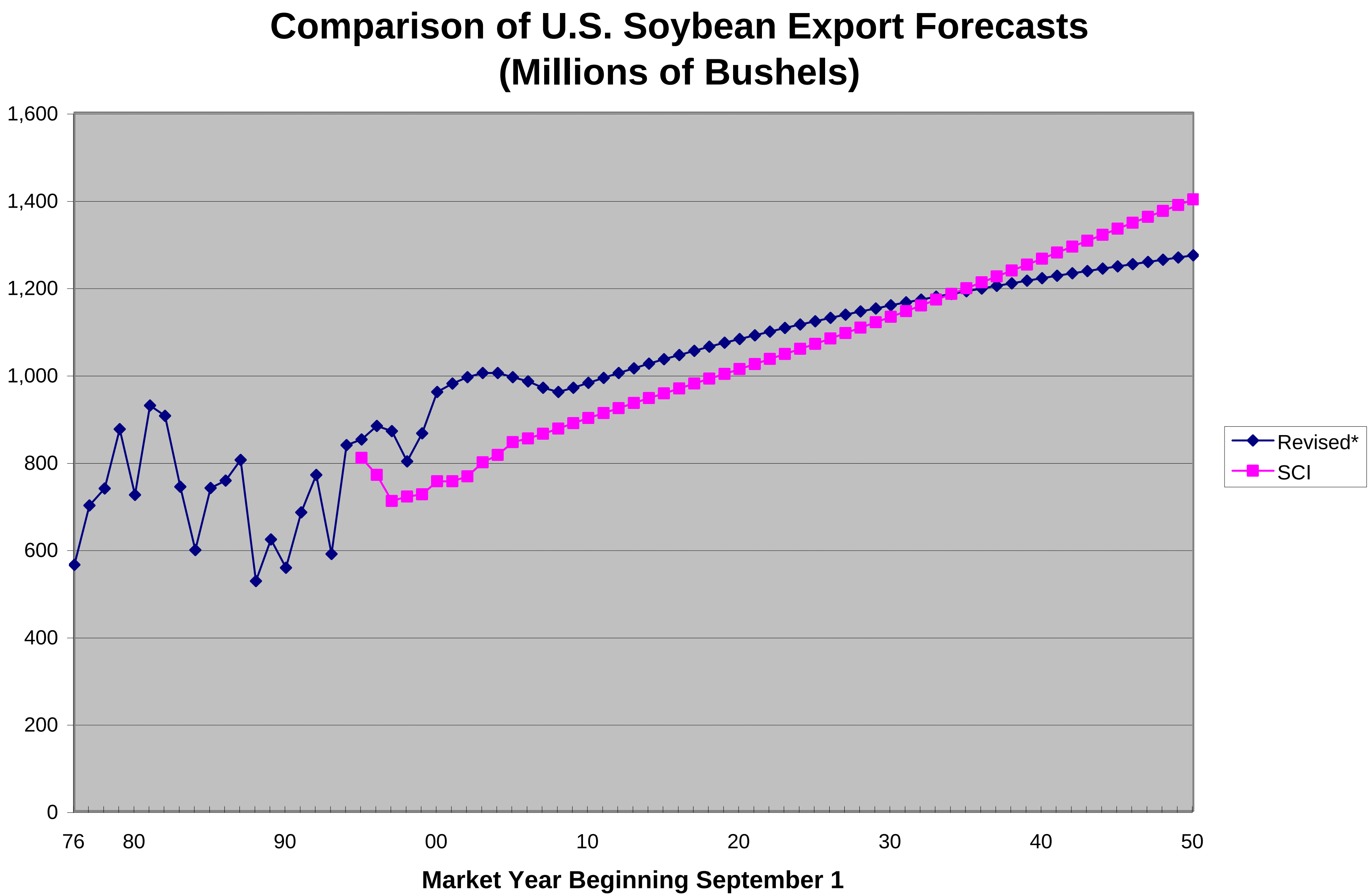


Exhibit 36



*USDA Forecasts to 2009 were extrapolated using a logarithmic trend

Exhibit 37



* USDA Forecasts to 2009 were extrapolated using a logarithmic trend

Exhibit 38
Upper Mississippi River Basin Waterway Traffic Forecast

Twin Cities to St. Louis
(Thousands of Tons)

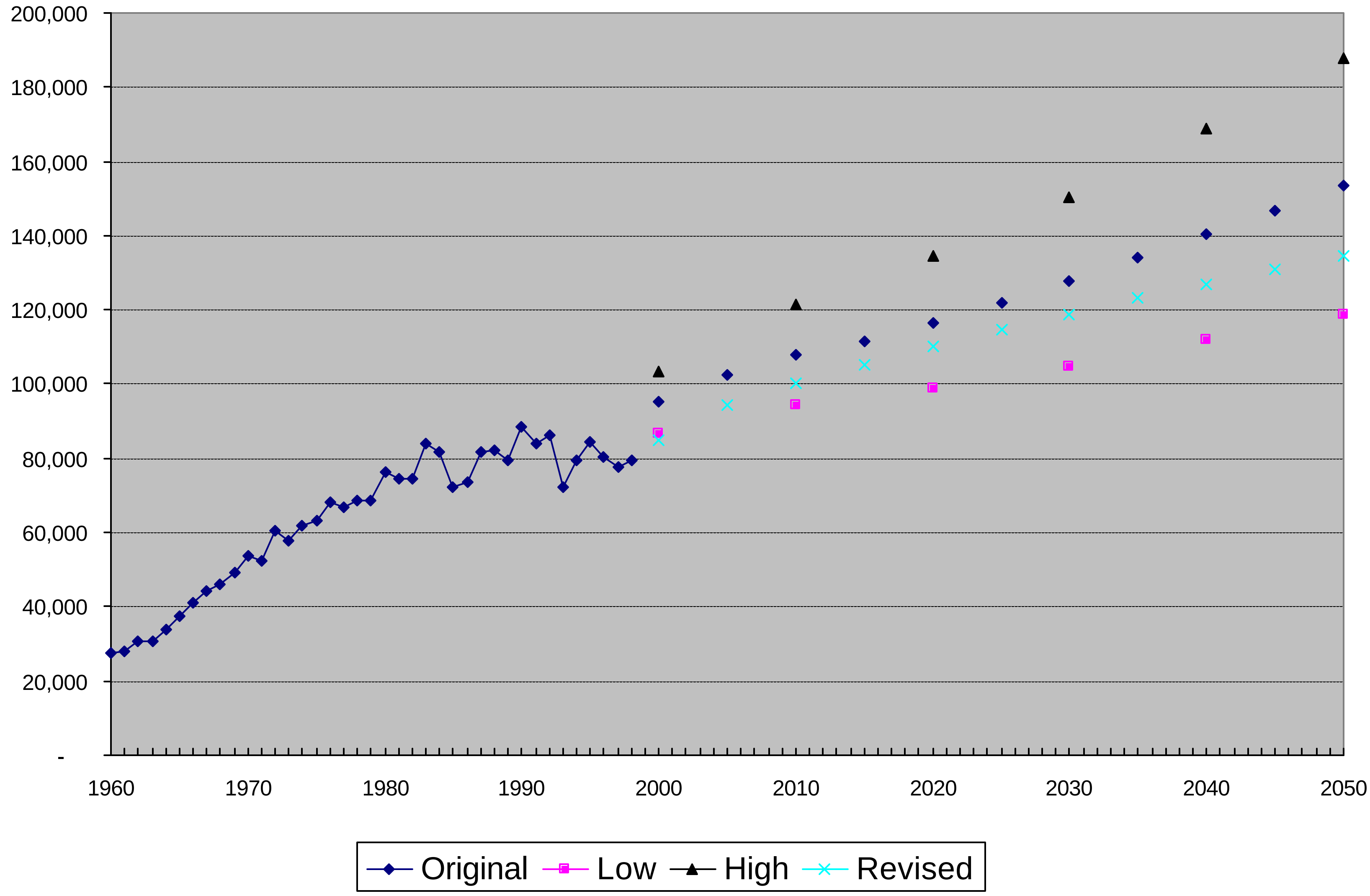
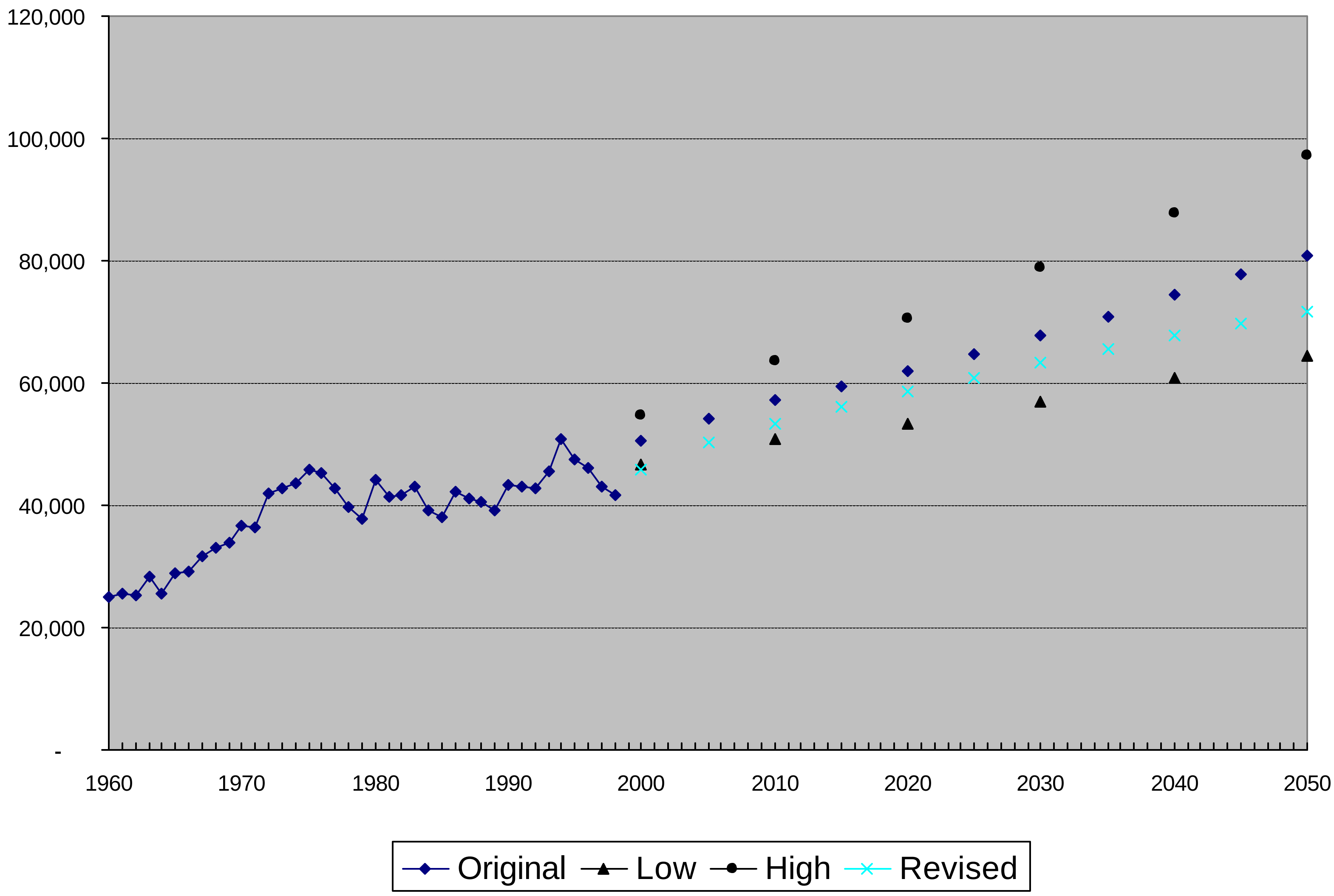


Exhibit 39
Upper Mississippi River Basin Waterway Traffic Forecast

Illinois River
(Thousands of Tons)



Appendix A

Critical Review of Study

August 2000

REVIEW OF WATERWAY GRAIN TRAFFIC FORECASTS FOR THE UPPER MISSISSIPPI RIVER BASIN

Submitted to

U.S. Army Corps of Engineers
New Orleans District
New Orleans, Louisiana

Submitted by

Federal Programs Division
Economics Department
Baton Rouge, Louisiana

Prepared by

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INTRODUCTION

The purpose of this work effort is to: (1) conduct an Independent Technical Review of *Waterway Traffic Forecasts for the Upper Mississippi River Basin, April, 1997, Volume I Summary and Volume II Grain*; (2) conduct a review of the *Review of Historic and Projected Grain Traffic on the Upper Mississippi River and Illinois Waterway*: *An Addendum, July 10, 2000*; and (3) develop a recommended approach for forecasting grain traffic for the Upper Mississippi River Basin.

Jack Faucett Associates (JFA) was asked by the U.S. Army Corps of Engineers to forecast waterway traffic on the Upper Mississippi River/Illinois Waterway (UMIW) to be used in evaluating the benefits and costs of making navigational improvements in the system. The Corps asked JFA to forecast traffic levels on the system out to the year 2050, under the assumption that navigation improvements would be made to accommodate any increased traffic.

The original forecasts (completed in 1997) predicted that traffic on the Upper Mississippi would increase by more than 90 percent between 1991-1993 and 2050, and that traffic on the Illinois Waterway would increase by approximately 86 percent over this time period. Moreover, grain traffic was expected to account for a large portion of the increase (corn traffic alone was expected to increase by 161 percent on the Upper Mississippi and 184 percent on the Illinois Waterway, and account for approximately 60 percent and 57 percent of the traffic increases on the two systems, respectively).

Because of the dominant role played by grain in forecasts of future traffic increases, the grain forecasts have been scrutinized more closely than some of the other forecasts. From 1995 through 1999 (the first five years of the forecast) the forecasted corn exports, that drive the projected increases in Upper Mississippi/Illinois Waterway traffic, have consistently outpaced actual exports. As a result, JFA was asked to review the forecasting methodology, and come up with a revised set of forecasts, if appropriate. JFA subsequently scrapped the original forecasts, and came up with a new set of grain traffic forecasts.

We were asked by the U.S. Army Corps of Engineers to review the original grain traffic forecasts and the revised methodology. Our review is separated into three basic sections. First, we review the original methodology presented by JFA. Second, we review the revised methodology and the reasonableness of projections. Finally, we present some suggestions as to methodologies that might be used to provide forecasts that are more technically sound and reliable.

It is apparent that JFA did a great deal of work, and that the task of forecasting traffic flows out to the year 2050 is large. In reviewing the 1997 report, we found detailed descriptions of domestic and export markets for major crops, a great deal of information about U.S. production, and a detailed analysis of port competition. However, we found flaws in the methodology, several unexplained portions of forecasts that are crucial to the final forecasts, and an apparent inclusion of analysis that is not used in any direct linkage to the forecasts.

Although the revised study presents forecasts that are somewhat more in line with recent export trends, we find the methodology used to obtain the forecasts unacceptable. In general, the approach used in the original forecasts (although it contained some assumptions that are unacceptable and did not go far enough in analyzing foreign supply or demand) is closer to the general approach that we recommend than the revised forecasts.

As an alternative to the forecasting methodologies used in these studies, we recommend a two-pronged approach. First, while it would be a large task, we believe that a more direct account of foreign supply and demand conditions should be taken in a spatial equilibrium approach. The forecasts obtained from the spatial equilibrium approach would be supplemented with a delphi survey of experts on world food supply and demand. A brief discussion of our recommended approach will follow our critique.

COMMENTS ON 1997 STUDY

The 1997 JFA study forecasts UMIW traffic using the following three step process:

1. Forecast U.S. Grain Exports by Commodity

    - Exports are the residual of grain available (production+imports+beginning stocks) less domestic use and the ending year stocks, i.e.
      Exports=Production+Imports-Domestic Consumption-Change in stocks.

    - Production is estimated by a forecasted yield trend and by setting cultivated acreage at late 1970s - early 1980s levels.

    - Domestic consumption is forecasted using historical per capita consumption trends since 1970 and consideration of long term food and feed sector needs (although the explicit method used to forecast domestic consumption is unclear).

2. Forecasted U.S. grain exports by Commodity are allocated to different ports using forecasts of port shares by Sparks Commodities, Inc. X again it is unclear exactly how the forecasted port shares were estimated, although the shares appear to be fairly close to historical shares.

3. Forecasted U.S. grain exports are allocated to the Business Economic Analysis Areas (BEAs) that border the Upper Mississippi River or Illinois Waterway by using the historic share of Mississippi River exports accounted for by the BEAs and historic modal shares.

It is apparent when examining the above process that the accuracy of the entire forecast of waterway traffic depends on the accuracy of the export forecasts. Unfortunately, the way that exports are forecasted is perhaps the weakest part of the entire study. The following discussion focuses on the methodology used to forecast exports.

Exports as the Residual

The first major problem with the export forecast is its assumption that exports are the residual of grain available. The assumption is that if you can figure out how much can be produced by U.S. farmers and you can estimate domestic consumption, then you can figure out how much will be exported. This is an unrealistic assumption, not taking into account foreign supply and demand (more discussion on this point will follow).

The authors say that this is the correct approach given four critical assumptions:

1. U.S. producers are among the world's low cost producers;

2. U.S. producers are free to produce those crops they choose to produce;

3. Trade barriers do not prevent deficit-producing countries from satisfying their needs from low cost suppliers; and

4. U.S. consumers are economically able to out bid non-U.S. consumers for the commodity in question.

However, the authors seem to go a little bit further than these critical assumptions by assuming exports are the residual. They seem to suggest that U.S. producers are the world's lowest cost producers (and will remain so), and that the only limiting factor on U.S. exports is our production capacity. The practice of basing export projections on production capability alone appears to completely disregard foreign supply and demand conditions.

Foreign Yield Growth vs. U.S. Yield Growth

In particular, the possibility that foreign producers may improve (or maintain) their competitive positions relative to the U.S. seems to be ignored. The authors state that "foreign production forecasts were also made with the assumption that historical trends in adoption of technology would continue in the future." (These forecasts - not shown in the paper - are considered in forecasts of U.S. acreage cultivated, according to the authors.)

However, it should be clear that foreign producers are likely to have a higher rate of technological adoption than U.S. producers. There are several reasons that foreign yields might be expected to increase more rapidly than U.S. yields. Some of these reasons include:

- Many developing countries do not currently use available technologies - increased yields through technology adoption may result from herbicide and pesticide application, as well as the gains from biotechnology expected by U.S. farmers.

- In the era of open trade discussed by JFA, the rate of technological diffusion should be greater - U.S. producers of biotechnology will look for new markets in foreign countries, accelerating the transfer of technology to foreign producers.

- Increased income and increased food needs in foreign countries may stimulate more government sponsored biotechnology research throughout the world to develop increased yields for the specific soil, water, and weather conditions of the sponsoring country.

In an attempt to gain some insight into differential yield growth among countries, we estimated a log linear time trend on corn yield for 15 out of the world's 17 major corn producers, as identified by the Corn Refiners Association.[2] Although we should not necessarily expect yield trends to continue long into the future (this is argued in a subsequent section), the trends still provide some suggestion as to how yield trends might continue in the short run.[3] Table 1 shows the estimated corn yield trend for each country, along with the adjusted R-Square obtained in the estimation. As the table shows, the annual percentage increases in yields are much larger for most parts of the world than they are for North America.[4] This is consistent with what one would expect. Moreover, given the transition to more free trade and increased world incomes, it could be argued that future annual gains in yields by the rest of the world will accelerate even more relative to those realized by the U.S.

Table 1: Estimated Annual Increases in Corn Yield - 1970-1999

Country or Region	Estimated Annual Percent Increase in Yield (1970-1999)	Adjusted R-Square
European Union	2.76%	0.9530
Argentina	2.73%	0.7520
Brazil	2.43%	0.8500
Canada	1.48%	0.7633
China	3.40%	0.9427
Egypt	2.69%	0.9329
Hungary	1.01%	0.1247
India	2.03%	0.7199
Indonesia	3.64%	0.9827
Mexico	2.72%	0.8760
Philippines	2.79%	0.9742
Romania	0.49%	0.0216
South Africa	0.79%	0.0065
Thailand	1.89%	0.5546
USA	1.65%	.6073

Source: Reviewers' Calculations – data are from Food and Agricultural Organization of the United Nations.

[2]Yield data is not available for Ukraine and Yugoslavia until 1992.

[3]The yield trend estimation is very similar to the estimation of a yield trend for the United States performed by JFA in the 1997 study. However, JFA estimated a linear yield trend, while these trends are nonlinear, i.e., ln(yield)=f(time).

[4]Exceptions include Hungary, Romania, and South Africa. All of these countries showed extremely erratic yield data over the 1970 through 1999 time period.

As an illustration of the importance of these relative differences in annual yield increases, we plotted future annual yields for the U.S. and China under an assumption that the yield trends will continue.[5] As Figure 1 shows, China would match the yield of the U.S. by the year 2022 if these trends were to continue.

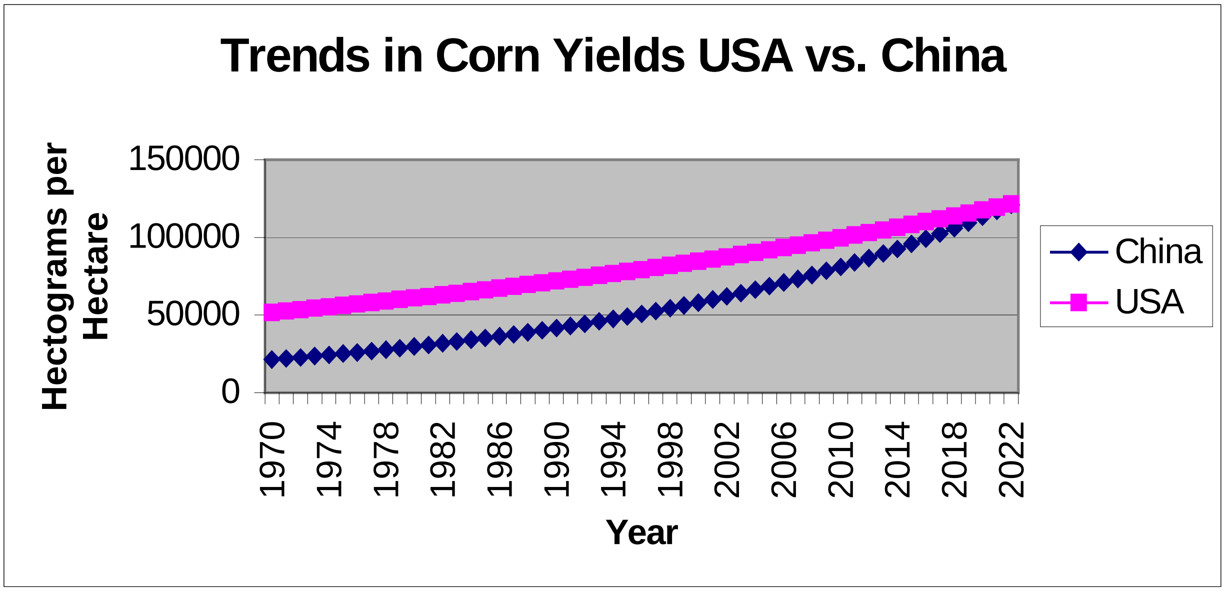

Figure 1

Forecasts of Production

Forecasts of grain production use separate forecasts of harvested acreage and yields for each state bordering the Upper Mississippi River or Illinois Waterway.

Area Harvested

In developing acreage forecasts for Corn, Soybeans, and Wheat, the study discusses using forecasts of world demand and world supply as determinants of U.S. production, but does not appear to use them at all (see pages 2-10 through 2-12 of the 1997 study). The study provides a discussion of each of these, but then determines production by setting acres harvested to a "full production scenario" similar to the number of acres harvested in the late 1970s and early 1980s. Moreover, there is a discussion of foreign demand forecasts and foreign supply forecasts, but no forecasts are shown. The only indication of the forecasts used are general statements like: (1) "the strong growth forecast in world food demand implies the U.S. will increase production in an attempt to fill this demand" and (2) "it might be argued that several foreign producers could experience production increases larger than currently forecast." It is not clear what is meant by forecasts in this area: Are the forecasts statistical forecasts? Are they hypotheses by the authors? If numerical forecasts exist, they should be explicitly shown in the document.

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[5] Again, this may not be a good assumption. The plot is only for illustrative purposes.

Yield

In forecasting future yields for corn, soybeans, and wheat, the authors estimate a linear trend in yields for each state bordering the UMIW. Although the authors' yield trend appears to be fairly accurate, it is somewhat questionable to expect the yield trends that occurred since 1970 to occur for another 50 years. Eventually there are likely to be diminishing returns to biotechnology and other technology efforts in the agricultural industry. Moreover, it is difficult to gain confidence in a 50+ year forecast that is based on 25 years of data.

The yield trends estimated by the authors were estimated by separate regressions for each state and commodity of yield on a linear time trend, using 1970 through 1994 data. Thus, a total of 25 observations were present for each regression. Because we had some questions about the accuracy of a yield trend based on 25 observations with one independent variable, we developed our own regression of corn yield in Illinois for comparison. We obtained data on yield, acres harvested, rainfall, and a Palmer Drought Index for Illinois[6] counties from 1970 through 1994. Our estimating equation is as follows:

$$Yield = \beta_0 + \beta_1 Harvest + \beta_2 Rain + \beta_3 Drought + \beta_4 Flood + \beta_5 Time$$

where:	Yield	=	Bushels per Acre
	Harvest	=	Harvested Acres
	Rain	=	Annual Rainfall
	Drought	=	Palmer Index below -3 any time between May and Sept.
	Flood	=	Palmer Index above 3 any time between May and Sept.
	Time	=	1970=0, 1971=1,..., 1999=29

The results of the estimation are shown in Table 2. As the table shows, our estimated linear time trend of 1.55 is just slightly lower than the JFA estimate of 1.64. Thus, the JFA estimated time trend for Illinois Corn appears to be fairly reasonable according to our estimate.

[6]The Palmer Drought Severity Index is a standardized measure of moisture conditions allowing comparisons between locations and months. Its classifications are as follows: 4 or more - extremely wet; 3 to 3.99 - very wet; 2 to 2.99 - moderately wet; 1 to 1.99 - slightly wet; .5 to .99 - incipient wet spell; .49 to -.49 - near normal; -.5 to -.99 - incipient dry spell; -1 to -1.99 mild drought; -2 to -2.99 - severe drought; -4 or less - extreme drought.

Table 2: Estimation of Linear Yield Trend for Illinois Corn (1970-1999)	
Variable	**Parameter Estimate**
Intercept	71.1709* (3.1011)
Harvest	0.0002* (0.000007)
Rain	0.0125 (0.0698)
Drought	-22.1208* (1.8790)
Flood	-3.2907* (1.2310)
Time	1.5526* (0.0611)

Standard errors in parentheses.
*significant at the 1 % level.
Adj. R-Square = .4014
F = 271.99
Number of Observations = 2,022

However, we still do not feel that this 30 year estimate is necessarily representative of what is likely to happen to yields in the next 50 years. There are at least two points made by the authors that point to the uncertainty of future yield growth in the U.S. First, the authors state that future technological improvements may not necessarily increase yields much; rather they will decrease costs (the example they give is Round-Up resistant plants). If future technological improvements result in cost savings rather than yield improvements for U.S. farmers, the limit on arable land in the U.S. may prevent the large export gains predicted. Second, the authors believe that future technological advances in the U.S. will come primarily from biotechnology and improved cultivation practices. Because it is unknown to what extent biotechnologically enhanced grains will be accepted around the world by consumers, yield or cost gains resulting from biotechnology may not result in a competitive advantage. As a result of these types of uncertainties, we recommend the involvement of a Delphi Panel in a revised study that uses a true spatial equilibrium approach.

Domestic Consumption

Another critical element to the JFA forecasts of exports is their forecasts of domestic consumption. Because the study treats exports as a residual, the amount of domestic consumption and the amount of exports have an inverse relationship.

In Chapter 3 of the 1997 study, the authors included a great deal of analysis related to the domestic uses and locations of usage for corn, soybeans, and wheat. For example, in analyzing corn consumption, they examined the locations of wet corn millers in the U.S., the locations of ethanol production, the locations of distillers, the locations of dry milling, the locations of animal feeding, and the amounts of corn used at various locations for each use. However, when they forecasted domestic consumption of corn, wheat, and soybeans, they completely discarded all of this analysis, using nationwide historic per capita consumption trends since 1970 as the basis for their forecast. In addition, they said that they considered long-term needs of the food and feed sectors in their forecasts, and used "professional judgement" as their final criterion. It is not clear what this means, exactly.

Because domestic consumption forecasts are crucial to the forecasts of exports, and in turn, to the forecasts of waterway traffic on the UMIW, the exact method of forecasting should be shown - and the forecasts should be shown. Moreover, the inclusion of the detailed analysis of domestic markets gives the impression that the analysis was used in forecasts. However, it is not clear how (or if) they were used.

Port Shares of Exports

Once the amount of exports are forecasted, the next crucial element in the waterway forecasts is the estimation of the allocation of exports among ports. The study allocates exports among ports using average percentages of commodity inspections at each port over the 1992-1995 period. Why was the 1992 through 1995 time period used, when 1970 through 1995 data are used to estimate domestic consumption and yield trends? Some justification for using this time period should be made.

In addition the study includes a half page description of a process to forecast imports of U.S. grains by country to the year 2050. The authors state that these forecasts were made using historical trends. However, it is not completely clear how these were estimated. Moreover, they are not used to predict total U.S. exports of any commodity or the predicted port shares. Thus, like other areas of the paper, the forecasting process is not transparent, the relationship of the forecast to the rest of the paper is not clear, and the purpose of the forecast is unknown.

Modal Split Analysis

The fourth section of the paper presents an analysis of port competition and modal shares. The analysis includes several plots that show very weak relationships between port shares and other variables. The analysis is interesting, but like other sections of the report, its relationship to the actual forecasts is somewhat ambiguous.

The apparent conclusion of the analysis is that port shares won=t change much in the future. However, this is based on assumptions that are tenuous at best. For example, how much confidence can we have that Pacific Rim countries will continue to demand smaller vessel sizes out to the year 2050?

Risk Analysis

After completing their forecasts, the authors discuss factors that could influence the accuracy of forecasts. Some of the factors discussed include uncertainty over the competitiveness of foreign suppliers, uncertainty over the future of trade barriers, uncertainty over the future of the farm program, uncertainty over whether foreign countries will import meat or feed, uncertainty over the future of the ethanol subsidy and sugar program, uncertainty over the growth of western feed lots, and uncertainty over the size of vessels demanded by Asian countries. The authors state that they don=t consider the possibility of these events occurring because it would be difficult to estimate probabilities. However, they are implicitly imposing probabilities of zero by not considering the events in forecasts or in their confidence bands. These problems highlight the need to include a Delphi Survey Process in a revised methodology. This process will be discussed at the end of the review.

Confidence Intervals

The authors develop uncertainty bands for their traffic forecasts "based upon the ratio of the historical variance (defined in terms of a 95 percent confidence interval) in the corn shipments from the study area to the historical mean of that series." It does not appear that these uncertainty bands cover the true uncertainties of grain waterway forecasts out to the year 2050. They do not capture uncertainties in vessel sizes demanded by Asian countries, uncertainty over ethanol and sugar programs, or any of the other uncertainties covered above.

COMMENTS ON THE UPDATED STUDY

The revised study forecasts UMIW traffic by making new corn and soybean export forecasts, and applying the 1997 study's estimated port shares and BEA shares of Gulf traffic to these shares. The study extends *USDA Agricultural Baseline Projections to 2009* using a logarithmic trend.[7]

This was an interesting choice by the authors, given their statements about *USDA Agricultural Baseline Projections to 2005* in their 1997 study. They note that:

[7]They also add a projected impact from China obtaining membership in the WTO.

> *The USDA further states in this publication that 'the projections are not intended to be a Departmental forecast of what the future will be, but instead a description of what would be expected to happen with an extension of 1990 agricultural law as amended.' These statements are reflective of existing long-term materials to which comparisons might be made and also indicative of the problems in doing so.*

Although the *USDA Baseline Projections to 2009* do not assume an extension of 1990 agricultural law, the USDA makes a similar statement about the projections not being intended as a forecast: "The scenario presented in this report is not a USDA forecast about the future. Instead, it is a conditional, long-run scenario about what would be expected to happen under the 1996 Farm Act and specific assumptions about external conditions.≅ Even though USDA is assuming current U.S. farm law, the same type of problems with extending USDA=s forecasts out to the year 2050 exist with the current baseline projections as existed with the previous baseline projections. USDA=s projections are based on assumptions over the next 10 years - not the next 50 years.

The fact that USDA's projections are not meant to portray an ongoing trend is apparent in their practice of making new 10 year projections each year. To illustrate the fact that USDA's projections cannot be considered a long term trend, we applied the JFA regressions for corn exports to three years of USDA baseline projections (2007, 2008, and 2009). Table 3 shows the parameter estimates using the same methodology for each year.[8]

Table 3: Comparison of JFA Corn Export Regressions Using Different USDA Baseline Projections

	2007 (1999-2007)	**2008 (2000-2008)**	**2009 (2001-2009)**
Intercept	-1096.26* (45.87)	-663.26* (84.76)	-319.23* (43.31)
LN(time - first year is always 11 as in JFA)	1401.51* (17.00)	1069.48* (31.41)	944.82* (16.05)
Adjusted R-Square	0.9988	0.9931	.9977

standard errors in parentheses
*significant at the 1% level

As the table shows, each year=s USDA projections results in vastly different parameter estimates. The impact on forecasts out to the year 2050 is shown in Figure 2. The figure shows that the projections for corn exports out to the year 2050 vary greatly depending on which year of USDA baseline projections are used.

[8]Each regression uses the 8 most recent observations in the USDA baseline projections, and the time variable is always specified to begin at year 11.

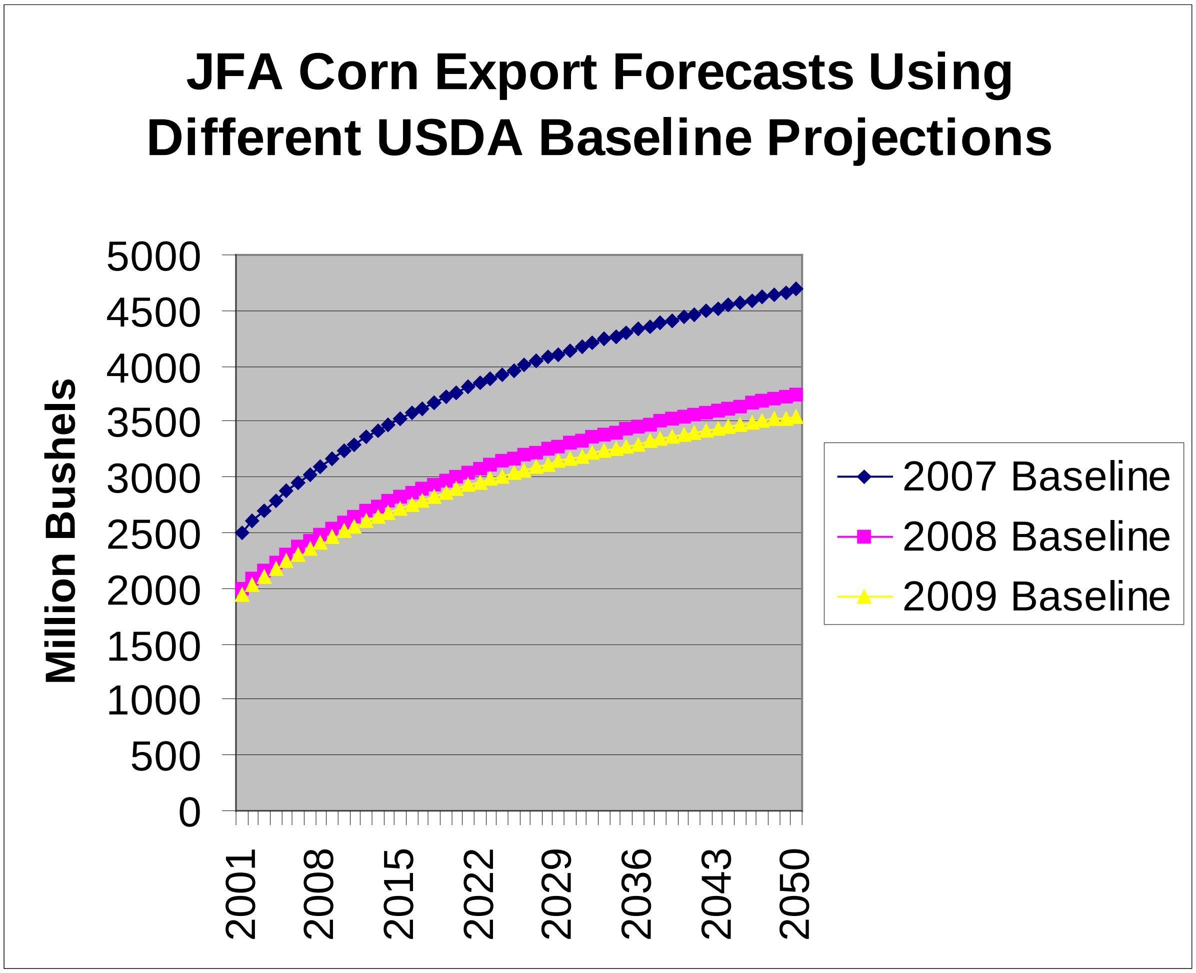

Figure 2

It is apparent that the USDA forecasts reflect a great deal of uncertainty about the future of corn exports over 10 year periods. Any attempt to use these projections to make 50 year forecasts is likely to be greatly in error, with the forecasts depending heavily on which 10 year projection is used. One might wonder what these forecasts would look like using USDA=s forthcoming projections to 2010. Our best guess is that they will again look much different than the forecasts made using projections to 2009.

In addition to the problems associated with using these 10 year projections to infer some kind of long-range trend, there is also a problem with JFA's estimating procedure. JFA specifies its estimating equation for corn by taking the natural logarithm of time defined as the year minus 1990. What is the basis for this specification, and for defining time in this way (why is time=year-1990)? To illustrate the sensitivity of this specification to the way in which time is defined, we estimated the JFA corn export regressions by defining time in three different ways: (1) time=year-1990, (2) time=year-1997, and (3) time=year-2000. Table 4 shows the resulting parameter estimates, and Figure 3 shows the resulting forecasts. The figure shows the extreme sensitivity of the forecasts to the way that time is defined. Some justification for this specification would need to be made, although we do not believe that estimating such a trend is a useful exercise anyway.

Table 4: Comparison of JFA Corn Export Regressions Using Different Time Specifications

	Year-1990	Year-1997	Year-2000
Intercept	-319.23*	1268.56*	1886.19*
	(43.31)	(34.95)	(34.57)
LN(time)	944.82*	473.09*	238.19*
	(16.05)	(17.03)	(21.94)
Adjusted R-Square	0.9977	0.9897	0.9359

standard errors in parentheses
*significant at the 1% level

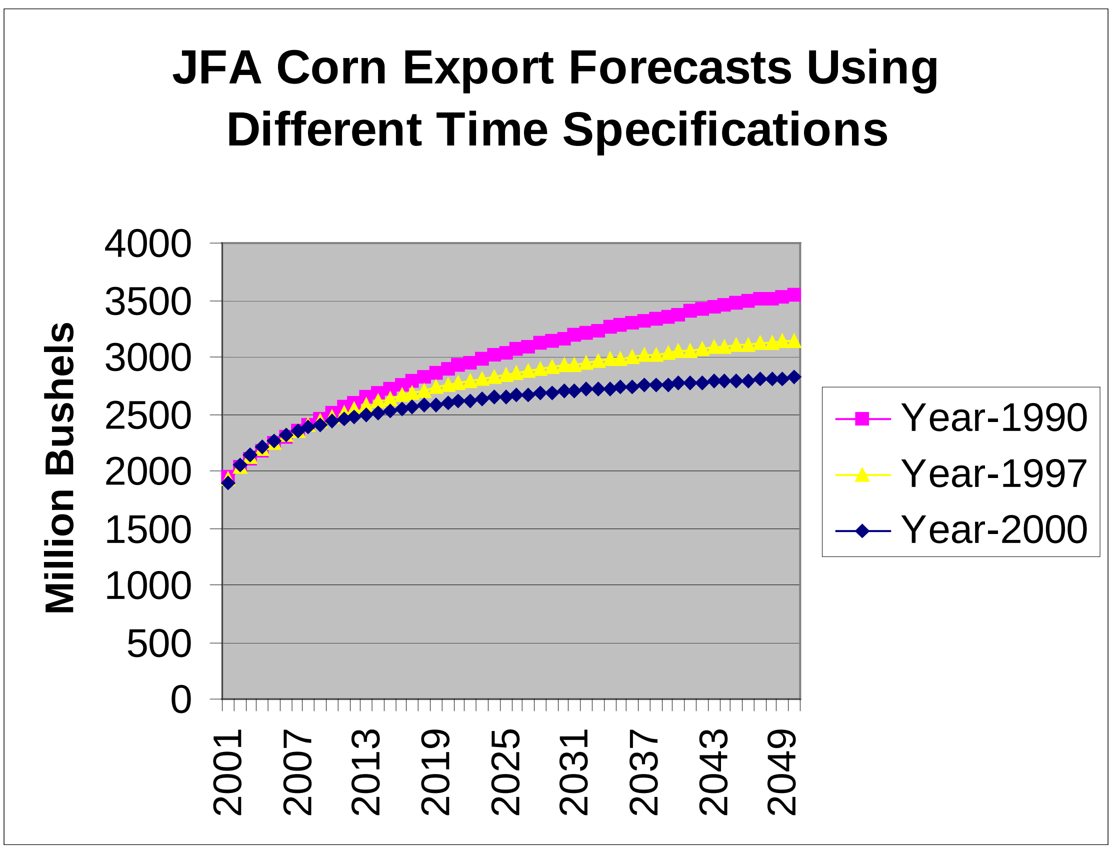

Figure 3

In summary, we believe that the entire approach to the revised forecasts is flawed. Although it is possible to discuss various specifications and make revisions in the estimating equation, we do not find any merit in continuing with such an approach. The next section of the review suggests an improved methodology.

RECOMMENDED APPROACH

As an alternative to the approaches used by JFA in forecasting grain exports to the year 2050, we recommend a comprehensive spatial equilibrium approach that takes into account worldwide supply and demand conditions. Worldwide supply conditions would include:

- Expected yield growth in the U.S. and in other major grain producing countries,
- Production costs (including expected changes) for different levels of grain output (considering the possibility of expanding acreage) for major grain producing countries and those where a large expansion in grain production is possible,
- Inland transportation and distribution costs to bring grain to export terminals for each country
- Future changes in subsidies, and
- Other factors affecting worldwide supply and the relative supply conditions in competing countries.

Upon considering these factors affecting supply, a series of supply curves could be constructed (one for each country) showing the amount of grain that each country would produce at various prices at export points.

Worldwide demand conditions would consider the spatial distribution of demand, in addition to considering worldwide demand. That is it would take into account:

- Expected income changes in major grain consuming countries and those expected to become major grain consuming countries,
- Expected changes in tastes and preferences, including those for different types of food and expected changes in the acceptability of genetically modified grains,
- Expected changes in import restrictions, and
- Other factors affecting worldwide demand and the relative distribution of demand

Upon considering these conditions affecting demand, a series of demand curves could be constructed in a similar manner.

A mathematical program could be constructed that integrates each supply and demand curve taking into account international water transportation costs for all possible origin-destination trading possibilities.

Because of the many uncertainties affecting worldwide supply and demand conditions, the Delphi technique could be used in conjunction with the spatial equilibrium model. Delphi committee forecasts can consider a wide variety of future events and scenarios, such as future trade and agricultural policies, income shifts, technological innovations, etc.. Moreover, high, low, and "most-likely" forecasts can be used to define a range and expected value of future activity levels.

The Delphi technique was developed by the Rand Corporation in the late 1960s. Since then, it has been applied to many difficult forecasting problems.[9] The technique is often used when the probabilities of future events are unknown and cannot be extrapolated from historical trends. It is particularly useful when future changes in technology and policy are likely to occur during the forecast period, but cannot be predicted from historical data. It is also appropriate for longer forecasting periods, when less confidence can be placed on the continuation of historical trends.

The Delphi technique offers a structured, well-documented process that encompasses the views of experts from many different agencies and groups. Thus, it avoids potential bias that may result from the forecast of a single agency or person, and enhances the credibility of a forecast. Delphi utilizes a series of questionnaires or surveys, in conjunction with controlled feedback, to derive consensus forecasts from a panel of experts.

In this case, a panel of experts could be established from USDA, state agencies, universities, agribusiness companies, etc. In the Delphi process, committee members do not know who the other committee members are. Moreover, each person=s comments and responses are anonymous, thus ensuring the confidentiality of proprietary information. These Delphi features make it easier to get agribusiness, transportation, and other private-sector input during the forecasting process.

The combined Delphi-Spatial Equilibrium model would provide forecasts that incorporate consensus beliefs on future yield variations among countries, future technological change and the distribution of such change, future changes in demand and preferences, future changes in quotas and subsidies, future changes in transportation infrastructure, and a variety of other uncertainties into a model that is technically and theoretically sound. Moreover, sensitivity analysis could be applied to come up with confidence bands that reflect future uncertainties.

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[9]The Delphi technique has been used for: (1) forecasting future changes in land-use and socioeconomic activity levels (e.g., NCHRP Report 328. *Forecasting the Basic Inputs to Transportation Planning at the Zonal Level*, Transportation Research Board, 1990); (2) population forecasting (e.g., C. M. Badger, Higgins, and Ketron. *Population Forecasting in Small Urban Areas by a Delphi Process,* Transportation Research Record 617, Transportation Research Board, 1976.); (3) forecasting the future state of logistics and transportation systems (e.g., M. E. Lynch, Imad and Bookbinder. *The Future of Logistics in Canada: A Delphi-Based Forecast*, The Logistics and Transportation Review, 1994); and (4) many other uses as described in the following sources: (a) H. A. Linestone and Turoff. *The Delphi Method, Techniques and Applications,* Addison-Wesley Publishing, 1975 and (b) J. W. Dickey and Watts, *Analytical Techniques in Urban and Regional Planning,* McGraw-Hill, 1978.

Appendix B

Response to Comments

Response to Comments on Waterway Traffic Update

I will respond to the comments on the updated study which begin on page 9 of the review. The criticisms boil down to two points of concern: (1) the authors do not think that USDA's export forecast were appropriate to use, and (2) they do not like/understand the extrapolation procedure.

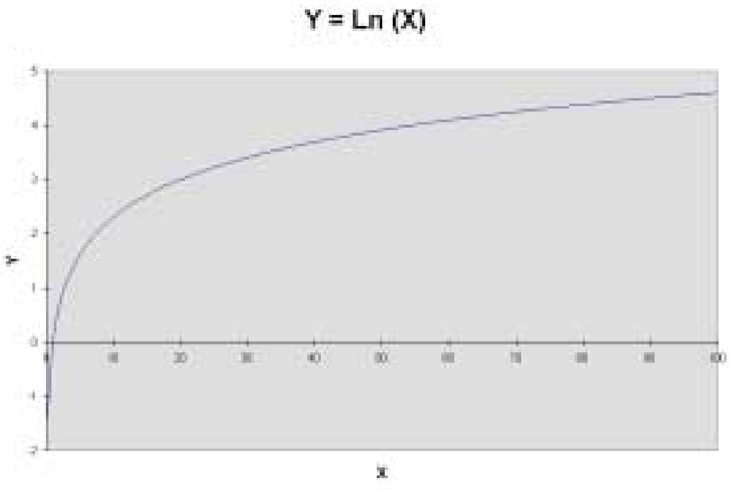
Regarding the first point, we believe that USDA's projections are the most credible source of long-term agricultural forecast available. An enormous amount of work goes into the development of the forecasts as they analyze production, consumption, and the policies of individual countries around the world. In developing the projections, USDA attempts to incorporate as much information as possible that can be reliably forecast. The number of variables they do take into consideration is immense. Nonetheless, they explicitly recognize that some variable cannot be addressed due to large uncertainties and timing issues surrounding them. The baseline projections provide a basis from which it is possible to analyze potential scenarios that consider these uncertain issues.

USDA's approach really treats these issues as unknowns by assuming that they don't happen. Another approach may assume that they do happen at a certain point in time. Depending on the assumptions, that can be a very risky approach to take and may severely compromise the accuracy of the forecasts if the assumptions turn out to be wrong. It needs to be recognized that the amount of uncertainty surrounding an issue is the same regardless of the approach used.

We do not believe that the authors would be able to develop a forecast of US grain exports that is as accurate as that published by USDA. Given that the amount of uncertainty increases significantly with the length of the forecast horizon, we also think it was reasonable to assume that the future would evolve along the same trend as predicted by USDA's ten year forecast, which we believe is the most accurate available.

Each year, USDA revises its forecast by incorporating new information. This is done to make it as accurate as possible. If you look at Figure 2 in the critique, you can see that the 2008 and 2009 baselines are fairly close but that both differ significantly from the 2007 baseline which was published in early 1998. However, it's not really a fair comparison to make. As noted in our update, significant changes in U.S. farm policy **started** to have an impact on cropping decisions in 1997. These impacts were accompanied by other significant changes in the world economy which made prediction difficult at that time. As farmers' responses to the 1996 Farm Act become better understood, we expect that the deviation in USDA's annual forecast will decline.

The second point deals with the question of why we subtracted 1990 from the year in our corn export extrapolation equation. We used a logarithmic function to do the extrapolation. A logarithmic curve is a continuous function of positive numbers: in other words, for each positive value you can define a corresponding logarithm. You cannot define logarithms for negative values or zero. If you create a two-dimensional plot with positive values on one axis (the "x" axis) and corresponding logarithms on the other axis (the "y" axis), you can see that the function is characterized by different degrees of curvature at different points. There is a large amount of curvature for values of x between 1 and 10, but it becomes more linear as x increases. This is shown below.



When using a logarithmic functional form to extrapolate data, the trick is finding that segment of the logarithmic function where its curvature matches the data. For corn, we analyzed different segments of the function and found that the curvature between 11 and 19 (i.e., between 2001-1990 and 2009-1990) had the best match with the trend found in USDA's corn export forecast. That determination was based on a comparison of R^2s. As shown in Exhibit 26, the R^2 is almost one, meaning that the trend in the extrapolated forecast is almost perfectly matched with the trend in USDA's forecast to 2009.

UPPER MISSISSIPPI RIVER - ILLINOIS WATERWAY SYSTEM NAVIGATION STUDY

COMPLETION OF INDEPENDENT TECHNICAL REVIEW FOR INTERIM PRODUCT:

"Review of Historic and Projected Grain Traffic on the Upper Mississippi River and Illinois Waterway: An Addendum", July 10,2000.

Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project, as defined in the Quality Control Plan. During the independent technical review, compliance with established policy and technical principles and procedures, utilizing justified and valid assumptions, was verified. This included review of assumptions; methods, procedures, and material used in analyses; alternatives evaluated; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets existing Corps policy. The independent technical review was accomplished by:

	NAME	OFFICE/ORGANIZATION
1.	John Bitzan, Ph.D.	North Dakota State Univ.
2.	Denver Tolliver, Ph.D.	North Dakota State Univ.

CERTIFICATION OF INDEPENDENT TECHNICAL REVIEW:

Significant concerns and the explanation of the resolution are as follows:

See attached comments and responses.

As noted above, all concerns resulting from independent technical review of the subject interim product have been considered and appropriately resolved within the context of this system feasibility study.

(Signature)
Chief, Planning, Programs, and
Project Management Division (CEMVR-PM)

9/20/00
(Date)

RECORD OF TELEPHONE CONVERSATION **6 September 00**

SUBJECT: Upper Miss Nav Study, Revised Faucett Traffic Forecasts - Reaction of Reviewers to Comment Responses

PARTICIPANTS: Dr. Denver Tolliver
Jack Carr
Rich Manguno

Jack Carr and I spoke with one of our reviewers, Dr. Denver Tolliver, today to obtain his react to the comment responses prepared by Faucett. Our other reviewer, Dr. John Bitzan, will be out of the office and unavailable until 11 September.

We discussed the main points of the review as identified by Faucett. Dr. Tolliver agreed that Faucett had captured the main concerns. Those concerns were, 1) using a short-term forecast (10-years) as the basis for making much longer-term projections, and 2) understanding why the function used to fit the USDA data was used in the manner selected.

With respect to the first concern, Dr. Tolliver stated that he would be more comfortable if there was an underlying model to the forecasts with explicit parameters that could be changed to evaluate sensitivity. He also raised the question as to whether the "baseline projections" produced by USDA were intended by USDA to be used as a forecast. With respect to the second concern, Dr. Tolliver indicated that the comment response provided by Faucett satisfied his need for further explanation.

We also asked Dr. Tolliver if he felt that the revised forecasts contained a bias in either direction, up or down. He said he did not intend for any of his comments to suggest a systematic bias in any direction. We discussed one final point with Dr. Tolliver, the time and budget requirements for the alternative procedure suggested in the review. He was not able to estimate a budget requirement, but did indicate that the effort would likely require a couple of years.

Rich Manguno

RECORD OF TELEPHONE CONVERSATION **7 September 00**

SUBJECT: Upper Miss Nav Study, Revised Faucett Traffic Forecasts – USDA Reaction to Comment

PARTICIPANTS: Nick Marathon
Jack Carr
Rich Manguno

Jack Carr and I spoke with Nick Marathon of USDA this afternoon to obtain his reaction to the comments generated by the ITR process. Marathon said his initial reaction was that extending the forecasts to cover a 50-year period was a concern. The USDA forecast only covers a 10-year period. He felt that the forecasts shouldn't go beyond that. (I think he has concerns with any forecast that covers a 50-year period.)

We also asked him to address the point raised in the ITR comments that indicated that the USDA forecasts were not actually intended to be used as forecasts. Marathon said that he has always considered what USDA prepared to be a forecast. Marathon is in the process of obtaining the opinion of the Office of the Chief Economist on this point, as well as the appropriateness of extending the projections beyond 10 years. Marathon indicated that he would call Jack on Monday to let us know what the Office of the Chief Economist has to say regarding these points.

Rich Manguno

RECORD OF TELEPHONE CONVERSATION **12 September 00**

SUBJECT: Upper Miss Nav Study, Revised Faucett Traffic Forecasts - Reaction of Reviewers to Comment Responses

PARTICIPANTS: Dr. Denver Tolliver
Dr. John Bitzan
Jack Carr
Rich Manguno

Jack Carr and I spoke with our reviewers, Dr. John Bitzan and Dr. Denver Tolliver, to obtain the reaction of Dr. Bitzan to the comment responses prepared by Faucett and also to the feedback that we've received from USDA.

Dr. Bitzan indicated that he accepts the notion that USDA intended their 10-year "forecast" to actually represent a forecast. He said he now also understands what Faucett did with the function to fit the USDA data. However, Dr. Bitzan said that the Faucett responses and the USDA position don't change the basic comments of the critique. He still questions the appropriateness of extending the 10-year forecast to a 50-year period. He is also concerned that the USDA methodology does not assign probabilities to specific events/assumptions and the methodology does not describe the uncertainties, especially as the forecast period is extended for 50 years. He commented that the revised forecasts produced by Faucett transfer all the responsibilities to USDA.

Dr. Tolliver and Dr. Bitzan restated the conclusion of the critique that an alternative approach incorporating a comprehensive spatial equilibrium approach and Delphi techniques would be a superior methodology.

At this point we do not feel that it is would add to the ITR process to have additional discussion between Faucett and Tolliver/Bitzan. We intend to follow up with USDA, as a parallel effort to the ITR, on their offer to review the revised forecasts.

Rich Manguno

From: Marathon, Nick[SMTP:Nick.Marathon@usda.gov]
Sent: Thursday, October 26, 2000 11:55 AM
To: 'Carr, John P MVR'; 'Tipple, David A MVR'; 'Manguno, Richard J MVN'
Subject: USDA (ERS) REVIEW OF FAUCETT ADDENDUM

I don't know if this is too late, but here it is ---

The ERS review is thorough without being too critical.

The major complaint is that the Corps used the USDA baseline for corn and not for soybeans (& wheat).

The soybean forecast used historical data (1988-99). ERS suggests a consistent procedure.

Also, ERS cautions about China's trade effects due to WTO.

ERSREVIEW.doc

Dave- I see that you are on the IWUB agenda, Nov 3, Pitts. – I will be at the meeting and could discuss this with you.

Nick Marathon
USDA, AMS, TMD
(202) 690-0331

ERS COMMENTS ON "REVIEW OF HISTORIC AND PROJECTED GRAIN TRAFFIC ON THE UPPER MISSISSIPPI RIVER AND ILLINOIS WATERWAY: AN ADDENDUM"

Our review of this report focuses on Section III, entitled, "Develop Revised Forecast of Waterborne Grain Movements." Section III begins by citing events that changed the economic environment since the first set of export forecasts were made by the Corps in 1997. They include the implementation of the Uruguay Round Agreement on Agriculture (URAA), the enactment of the FAIR Act of 1996, the return of China to a net exporter status, the international financial crisis, and the response by consumers to genetically modified grain. These events were deemed to affect export forecasts mostly in the short run but the change in U.S. crop mix as a result of the FAIR Act of 1996 also affects the long-term accuracy of the agriculture-related waterway traffic levels, especially for corn, soybeans, and fertilizer. Specifically we examine the revised trade forecasts and their consistency with the U.S. baseline projections. Although alternative forecasting approaches may exist, we have not discussed them in this review.

We have found some differences between the Corps' revised set of export forecasts for the years 2000 to 2009 and USDA's baseline projections for those years. These differences are for soybeans and wheat but not for corn. We have provided comments on the adjustments to U.S. trade projections due to China's likely accession to the WTO. USDA projections imply a shift in the destination of U.S. exports over time, but implications are unclear about more or less use of the Gulf Port and the Mississippi and Illinois Rivers. The February 2000 USDA baseline publication entitled, *USDA's Agricultural Baseline Projections to 2009* is available on the ERS website (http://www.ers.usda.gov/briefing/baseline). Detailed comments are listed below.

Original Forecast Methodology

The Corps' methodology used to forecast the first set of grain and soybean exports differed from USDA's baseline approach. USDA's approach computes an annual world import need for grain and oilseeds based on income and prices, which is then converted into an export projection for the U.S. and other exporting countries at market clearing prices. In particular, such an approach takes into account needs for both developed and developing countries. In contrast, the Corps' approach treated U.S. exports as a residual, U.S. trend production less U.S. trend consumption, hence a supply-driven forecast. Although the Corp's study talks about world demand conditions, they simply state that a strong world demand for grain is assumed along with rising prices.

Revised Forecast Methodology

The Corps' revised forecasts are stated to rely upon export projections contained in *USDA's Agricultural Baseline Projections to 2009.* Due to the politically charged atmosphere surrounding the Corp's study, the baseline source was considered to be both neutral and credible. USDA projections are used in the early part of projection period. A logarithmic trend is fitted to the 2001 to 2009 export projections and trend forecasts are computed to 2050. However, this procedure was only used for corn and not for soybeans or wheat. We suggest the Corps follow a consistent procedure to provide export forecasts. A recommended approach is to rely upon USDA's baseline export projections to 2009 in order to establish a trend projection for all the commodities.

The Corps based its soybean export forecasts upon historical exports between 1988 and 1999 instead of the baseline projections of 2001 to 2009. The historical numbers might provide too large a growth rate compared to the baseline's flat or no growth scenario. A suggested alternative method to forecast U.S. soybean exports is to extend the baseline's world soybean trade projections beyond 2009, using the 2001-09 projections, and then apply a U.S. market share of 60 - 61 percent for years beyond 2009. Although this market share is lower than the current market share of 66 percent, it is believed that a share of 60 - 61 percent would be more appropriate because of increasing global competition from countries such as Brazil. Such a procedure would provide a more realistic positive growth pattern for U.S. soybean exports.

We did not see any mention of an export forecast for soybean meal. Based on USDA's baseline projections, U.S. soybean meal exports are expected to increase by 13.9 percent between 2000 and 2009.

Furthermore, the Corps did not change its original wheat export forecast because of its uncertainty over an extension of USDA's accelerating wheat export projections. If the Corps had used USDA's projections between 2001 and 2009, there would have been a 33 percent growth rate in U.S. wheat exports between those years. An alternative approach with a smaller growth rate, 19 percent, is to extend the world export projections between 2001 and 2009 and apply a current U.S. export market share of 30 percent to the global trade projections through 2050.

Adjusting USDA's baseline projections to include trade with China

USDA's baseline projections do not include the potential impacts to trade due to China's likely accession to the WTO. Because of the high probability of this occurrence, the Corps adjusted their forecasts to account for this. Many of these adjustments were based on an article entitled, "China's WTO Accession Would Boost U.S. Ag Exports and Farm Income," published in the *Agricultural Outlook*, March 2000. However, caution should be exercised in assessing China's trade effects, due to its accession to the WTO, as the economics of this situation may change rapidly.

Corn

In the near-term, China's TRQ's of 4.5 MMT for 2000 and 7.2 MMT for 2004 may not be met. However, the Corps assumes these TRQ's will be met and that the U.S. will supply a 70 percent share. Assuming that China's entry into the WTO causes their imports to increase to 7.2 MMTs in 2009, U.S. exports in 2009 were computed to be 8.2 percent higher than the projected USDA baseline. The Corps assumed that this impact would continue throughout the remainder of the forecast horizon, 2010 to 2050 by increasing the forecasts throughout the projection period by 8.2 percent. This tends to overstate U.S. corn exports in the earlier part of the projection period. In the near-term, as acknowledged by the Corps, imports may not reach the TRQ level because high stocks and a weakening livestock sector are likely to reduce import demand. Also, farmers in Northeast China, the most important corn-producing region, are unlikely to significantly reduce production in the near future. Prospects for filling the quota improve in the longer term because of rapid projected growth in meat consumption and feed demand.

Soybeans

China's entry into the WTO is expected to have a negative impact on U.S. soybean exports. China's annual average soybean imports under WTO accession are projected to be $398 million lower than the Baseline projection, in response to a change in the current trade policy that favors bean imports over imports of oil and meal. With liberalized trade in meal and oil, inefficiencies of the domestic crushing industry will reduce the competitiveness of soybean products relative to direct imports. Thus, soybean product imports are expected to increase to meet rising demand for soy meal for livestock feed and soy oil for the food processing industry and for cooking.

The Corps estimated a negative effect to U.S. soybean exports of 46.43 million bushels for the year 2005, about 4.5 percent of the export projection for the year. USDA's baseline soybean export projections were reduced by this percentage, including the forecasts to 2050. As an alternative, an average effect for the years 2000 to 2009 could have been computed instead of the one year, 2005. Such a computation would bring about a slightly larger reduction in exports.

USDA estimated that exports of U.S. soybean meal would increase an average 12 percent over the 2000 to 2009 period. The Corps adjusted the forecast of prepared animal feeds to take into account this expected increase in meal exports. Since March, it has been learned that China may invest more in its crushing sector, which may make this estimate appear optimistic.

China's entry into the WTO is expected to lead to increased imports of wheat. The TRQ is 7.3 million tons in 2000, rising to 9.6 million in 2004. However, several factors suggest actual trade gains will be below the TRQ amount. Key factors are high current Chinese wheat stocks that are likely to depress domestic prices and dampen import demand, continued government incentives for wheat producers, and slowing growth in domestic wheat use. USDA expects that, on average, the value of increased wheat imports will be $484 million. The Corps states that although China's entry into the WTO may boost U.S. exports, they expect that much of this will be pulled out of the PNW and ports other than the Central Gulf. However, despite this expectation, little wheat has moved from the PNW into China and most of the U.S. wheat destined for China is moving out of the Central Gulf. Thus, some additional river traffic could be generated due to China's entry into the WTO.

Construct Waterway Traffic Forecast

The Central Gulf port share of U.S. corn exports was not changed from the original Corps forecast. However, it is not clear why they changed the Central Gulf port share for U.S. soybean exports simply based on five years of data when the forecast period is for fifty years.

An assignment of Central Gulf export volumes to origins on the Upper Mississippi River and Illinois Waterway was based on each river's average historical share of this port area. The study's forecast of river traffic growth should consider the shipment of Canadian grain and oilseeds by barge on the Mississippi River and by rail to the Gulf. These developments are a result of the CFTA and NAFTA and have the potential to affect forecasts for both river traffic as well as port traffic.

The original report assumed that the destinations of U.S. exports wouldn't change enough to significantly alter the share of U.S. exports using the Mississippi River. We basically agree with this assumption. While our projections imply a shift in the destination of U.S. exports over time, it's not clear whether this implies a future trend toward more or less use of the Mississippi River and the Gulf port. For example, our projections suggest that at least over the next 10-20 years, most export growth for these commodities will be to developing regions: North Africa, the Middle East, Latin America, South and Southeast Asia, and China. The traditional large markets in East Asia and Western Europe will remain large, but will not grow as much. Further, the FSU, a traditional large U.S. market, is not likely to be a major destination for U.S. exports of these commodities over the next 10-20 years.

From: Chris Holleyman[SMTP:holleyman@jfaucett.com]
Sent: Thursday, October 26, 2000 5:28 PM
To: Carr, John P MVR; Manguno, Richard J
Subject: Re: FW: USDA (ERS) REVIEW OF FAUCETT ADDENDUM

Rich and Jack,

There is no inherent value to using consistent procedures. The object is to use the procedures that you believe will provide the most accurate projections. In this case, if we used the same procedure that was used for corn, we would have ended up with an extremely flat soybean export projection at just over 1 billion bushels. That really doesn't make sense.

The problem is that USDA's forecasts takes into account a short run problem of over abundance of soybeans. This is predicted to suppress prices over the next four years, which would be to the US advantage and allow us to capture market share. As stocks are used up and supply begins to come in line more with demand, prices should begin to rise. This is predicted to happen between 2005 and 2009. This will allow foreign countries to compete and US market share and export levels are predicted to fall as a result.

US market share is expected to stabilize at the end of the period. Given that there will probably be continued growth in world trade out to 2050, our thought was that US export levels would resume growth after 2009 and the US market share had stabilized. That is why we rejected using an approach that would have resulted in no growth after 2009.

In their review, USDA did offer an alternative approach for extrapolating their US soybeans export projections. We are evaluating that now. The suggested approach is still not consistent with the one that was used for corn, which we feel was appropriate.

Overall, it was a good review. We will plan on addressing several of the points in our presentation.

At 03:16 PM 10/26/2000 -0500, you wrote:
>Chris
>
>Can you give your reaction to what Nick says in his cover email below about
>using consistent proceedure for both corn and sybean forecasts. I'll be out
>of the office on Friday the 27th but Rich Manguno will be at his office.
>Rich's number is 504-862-1923.
>
>Thanks
>
>Jack
>
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