

**ESTIMATED VALUE OF BARGE FREIGHT RATES FOR
COMMODITIES SHIPPED ON THE
MISSOURI RIVER AND IMPLIED FREIGHT SAVINGS**

**A Survey by the Food and Agricultural Policy Research Institute
At the University of Missouri—Columbia**

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FAPRI
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Estimated Value of Barge Freight Rates for Commodities Shipped on the Missouri River and Implied Freight Savings

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The Food and Agricultural Policy Research Institute at the University of Missouri conducted a survey of 39 terminals and businesses along the Missouri River from Sioux City, Iowa to the mouth of the river at St Louis during the first quarter of 2004. The purpose of the survey was to ascertain the economic value of barge traffic—freight rates on the river relative to alternative transportation (train and truck). Terminals reflecting the greatest volume of business were specifically surveyed for shipment of products associated with grains and oilseeds, fertilizer, cement, asphalt, and sand and gravel. As a result, this survey should not be viewed as a complete set of business along the river; however, considerable effort was made to insure that all regions of the river were adequately represented.

Survey Questions and Method of Data Collection

The survey was conducted from the “terminal list” provided by the Corps of Engineers. This list includes terminals beginning at mile marker 27.8 and ends at marker 731.2 at Sioux City, Iowa. Considerable attention was paid to the businesses reflecting the greatest volume of traffic. Most of this information was gained by telephone interviews as these businesses were very helpful in identifying the most significant uses of barge transportation.

In each case, terminals were asked to provide the following information:

- Amount of barge traffic by commodity and tonnage for the average in a year when river traffic was viable.
- Amount of barge traffic shipped in 2003 by commodity and tonnage
- Differential freight rate for transportation delivered by either truck or train or both—specifically the additional cost by commodity per ton, for alternative shipments not delivered on the river in 2003.

Data reflect the survey results by category. In many cases these data have been cross-referenced and double checked as consolidations have occurred since the publication of the original “terminal list.” Also, back-up calls have been made to insure that collected data were correctly interpreted and appropriately categorized. Obviously, any mistakes or misinterpretation are solely the responsibility of the authors.

In all cases each of the terminal operations was extremely cooperative. Each individual terminal was carefully interviewed and tabulated with the specific agreement that data would be aggregated to the extent that no individual firm, business, or terminal could specifically be identified. We sincerely appreciate all the cooperation received and the very careful attention paid to the specific estimation of alternative transportation rates. In many cases specific

statements were collected regarding river traffic and reliability. Many of these comments are also contained in this report.

Aggregate Survey Results by Major Category

Table 1 reflects summary data aggregated across responding terminals and businesses along the river. In this survey, commercial traffic is considered to be all commodities reported as grain oilseeds, fertilizer, cement, and asphalt less sand and gravel. However, several sand and gravel companies were surveyed and their differential cost reflecting the shorter season and low flows is also reported for 2003. Commodities not included in the survey averaged about 150,000 tons over the 1998-2002 period. Metals, coke, and chemicals other than fertilizer make up the majority of the “other” category.

Table 1. Comparison of reported Corps of Engineers data relative to FAPRI Survey

	Corps of Engineers Estimates					FAPRI Survey*		
	1998	1999	2000	2001	2002	1998-2002 Average	2003	
	(Tons)							
Grains and Oilseeds	654,000	673,000	487,000	471,000	352,000	527,400	112,500	
Fertilizer	457,000	325,000	281,000	328,000	241,000	326,400	109,200	
Asphalt	239,000	253,000	250,000	211,000	173,000	225,200	236,500	
Cement	120,000	121,000	163,000	193,000	189,000	157,200	214,800	
Sub-total Commercial	1,470,000	1,372,000	1,181,000	1,203,000	955,000	1,236,200	673,000	
Sand and gravel	6,644,000	7,676,000	7,390,000	8,444,000	7,242,000	7,479,200	7,899,650	
Sub-total	8,114,000	9,048,000	8,571,000	9,647,000	8,197,000	8,715,400	8,572,650	
Other**	228,000	204,000	162,000	85,000	69,000	149,600	not surveyed	
Total	8,342,000	9,252,000	8,733,000	9,732,000	8,266,000	8,865,000		

*Based on a survey of 39 terminals along the Missouri River conducted between January and April 2004.

** Commodities not included in the FAPRI survey, such as coke, metals, and chemicals other than fertilizer.

Respondents reported that a total of 673,000 commercial tons were shipped in 2003, about 54 percent of the average tonnage reported by the Corps of Engineers for the period 1980-2002.

The estimated change in transportation cost per ton from the survey represents a weighted average to insure that specific operation size is taken into consideration. Fertilizer differential transportation cost is estimated to be the highest per ton at \$13.16 followed by cement at \$13.05, asphalt at \$6.76, and grains and oilseeds at \$4.85 or approximately 15 cents per bushel.

Extrapolation for Total River Value of Transportation

Table 2 is constructed to reflect estimated differential transportation savings associated with the ability to move the entire commercial average tonnage (1,236,200 tons as reported by the Corps of Engineers for the period 1998-2002) by barge—a river situation that is viable for barge transportation of commercial commodities. In this case, the industry is estimated to save \$10,427,126 as this reflects the differential cost of shipping 1,236,200 tons via rail and truck.

Table 2. Cost savings associated with availability of river transportation based on 1998-2002 Corps of Engineers estimates of shipments and FAPRI survey estimates of cost savings per ton

	Corps of Engineers Average Shipments 1998-2002	FAPRI Survey* Estimates of Savings vs. Alternative Transport	Total Cost Savings Using Corps Shipments and FAPRI Survey Costs
	(Tons)	(per ton)	
Grains and Oilseeds	527,400	\$4.85	\$2,557,890
Fertilizer	326,400	\$13.16	\$4,295,424
Asphalt	225,200	\$6.76	\$1,522,352
Cement	157,200	\$13.05	\$2,051,460
Sub-total Commercial	1,236,200	\$8.43	\$10,427,126

* Conducted between January and April 2004

These differential rates suggest that river availability is extremely important to the industry. Applying Corps of Engineers average data and FAPRI estimated saving per ton, the fertilizer industry is faced with the highest total estimated industry differential, \$4,295,424. Grain and oilseeds are second at \$2,557,890 followed by cement at \$2,051,460 and asphalt at \$1,522,352.

A lower limit estimate can be expected by applying the transportation differentials obtained from the survey as reported in Table 2. The main reason that this may reflect a lower limit estimate is that competition can be expected in the transportation industry. As reported in other studies (TVA) the train freight rates tend to become lower as the river is approached. If this is the case, then a no barge traffic situation could be expected to result in transportation differentials that are greater than reported in Table 2. These additional costs are not addressed in this study as the primary focus was on estimating an aggregate set of estimates of transportation cost in a low river year as a point of reference for the value of barge traffic.

Sand and gravel companies along the river were also included in the survey to ascertain whether alternative transportation was necessary during the 2003 low flow season. In all cases, these companies were able to continue barge movement, however at a higher differential cost reflecting a shorter season and low water flows. These costs were specifically associated with

- overtime work to make up for a shorter season,
- lighter loads requiring more loads, and
- higher maintenance and repair and replacement associated with damages sustained from low flows.

Additional cost experience by the companies moving 7,899,650 tons of sand and gravel was \$0.35 per ton. If this expense is applied to the Corps' average of 8,175,400 tons shipped between 1998 and 2002, this reflects an additional \$2,617,720 for the industry. This may reflect savings relative to the low flow in 2003. However, it is difficult to extrapolate beyond 2003 conditions, especially for an entire season of low flows and tighter restrictions. Therefore, it is implicit that the estimate of \$2,617,720 does reflect the value of a viable river for barge traffic relative to low flow conditions experienced in 2003. Although no estimates were given for a complete transition from use of the river, several operators indicated cost of transition substantially higher than \$0.35 per ton.

Summary

Utilizing Corps of Engineers average data on river tonnage from 1998-2002 and the differential freight rates estimated from the FAPRI survey, an implied value of river transportation availability is approximately \$10.4 million per year or approximately \$8.43 per ton for commercial commodities shipped on the river.

It is difficult to place an equivalent value on the river for the sand and gravel industry. It is apparent that differentials will vary with river flow levels and months of restricted operation. As all companies attempt to sustain normal tonnage each year, it is apparent that shorter seasons and lower river flows will create variances around tonnage barged. As these differentials were not obtained in the survey it is implicit that the estimated shipping value of \$2,617,720 relates specifically to conditions that defined the 2003 season. More severe restrictions and lower flows will result in higher numbers; however, it is not possible to generalize these differences from the survey.

As previously indicated, this is likely a low side value as the transportation industry is competitive and converting to truck and rail transport would be an added expense not addressed in this survey. Finally, it is likely that river traffic influences competitive freight rates as the river is approached. If this is the case, additional savings can be expected from the availability of the river. Also, these savings are not addressed in this report.

Summary of Survey Comments by Commodity

Grains

- When the river isn't viable, rail is an alternative; however, we are finding available cars to be a constraint. Rail rates have gotten more expensive without the barge alternative.
- Would like to have the option but the river has become less viable, can't always get good draft.
- Viable river gives more negotiation power on freight rates.
- Barge transportation has had excess capacity for many years. Like rail, the industry was retiring about three barges for each new one built. This reduced the excess and when the economy heated up and grain shipments jumped we saw freight levels higher than ever in the last five to seven years.

Fertilizer

- Imported fertilizer—added expense to off-load from barge to rail as rail terminals are on the east side of the Mississippi in New Orleans. Have to off-load in St Louis to barge which doubles handling cost as well as differential freight rates.
- All railroads are behind in orders. Anyone relying on standby car orders is last in the matrix. Simply put, increased demand for rail transportation and poor planning by carriers created the shortage we now experience.
- As the river is lowered the channel will narrow. Have spent money to increase efficiency with rail.

Cement

- Average shipments are most difficult to determine as the Missouri River has been a wild card to not only sourcing but the uncertainty for reliability of the river.
- There is large business to be had on the Missouri River. The key to our success is to be creative in achieving objectives.
- If river is not stabilized, cannot rely on barging will be forced to switch to trucking to meet customer needs. One barge hauls 1400 tons compared to a truck at 25 tons. This implies 56 trucks per barge costing a roundtrip distance of about 300 miles or 16,800 miles of highway travel. At 60 mph this implies 280 hours of highway driving per barge lost.

Sand and Gravel

- Low river means a shorter season. Worked overtime to make up the difference.
- More trips at a lighter load as draft was reduced from 8 feet to 6 feet.
- More maintenance required as barges are damaged in lower flow conditions.

Asphalt

- The financial impact is far greater if the river is non-navigable for six weeks in the summer, the height of the asphalt season.
- A Missouri River that is non-navigable year-round is the biggest financial impact to us, and the consequences can reach further out than just a freight difference.