

# Current Report

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## BARGE SHIPMENT OF WHEAT THROUGH THE PORT OF CATOOSA

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Introduction of inland water navigation to Oklahoma has opened new means by which to move wheat from Oklahoma and Kansas to domestic and export markets. Country grain elevator managers now have one more marketing alternative to evaluate.

It is important to the wheat industry to identify the region within which wheat movements may be influenced by the water transport alternative at the Port of Catoosa, near Tulsa, Oklahoma, under current transportation rates. Since grain temporarily stored in terminal elevators is typically destined for subsequent movement over land, only shipments made directly from country elevators to export or domestic markets are considered here. To identify the potentially affected region, the assumption is made that mode of shipment is determined solely by price considerations without regard to individual manager preferences between transportation modes.

### The Law of Market Areas

Elevator managers are interested in wheat prices which represent net income per bushel after subtracting costs of transfer to final markets. These prices are equal to a base market price offered at a distant location, less transportation costs and less marketing service charges. Export price offered at Gulf of Mexico port terminals is typically used as the base market price in Oklahoma and Kansas.

The Gulf export price establishes a structure of wheat prices throughout the wheat belt, even for domestic usage.

During the peak receiving months of harvest, wheat may be routed by truck or railroad to inland terminal elevators for later shipment to Gulf ports and domestic mills. Once this grain is in the terminal elevators, country elevator managers usually do not take part in subsequent marketing or transportation routing decisions.

Elevator managers hold control of the market selection decision for grain sold at harvest time and that retained in the country elevator. Transportation routing may be decided by the manager or dictated by the buyer. Local elevator price received for direct shipments by railroad or truck is equal to the base Gulf export price less railroad or truck rates from local storage facilities to the final destination. The various pricing arrangements, such as F.O.B. origin and F.O.B. destination, will yield relatively slight differences in net local price received for grain.

River grain terminals offer a bid equal to the base Gulf price less barge transportation rate and less a port margin. Local elevators pay the cost of trucking grain from local storage to river port facilities. Therefore, use of the water transportation alternative for direct shipments leaves a local

price to elevators equal to the base Gulf price less the river port discount (for barge rate and port margin) and less trucking cost from local storage to river port facilities.

Elevator operators will ship grain by the means which yields the highest local price. Disregarding service differences, managers will be indifferent between shipping modes only when equal local prices can be realized. Since transportation rates depend chiefly upon distance of movement, locations where local prices are equal for two shipping alternatives represent geographical boundaries of transportation market areas.

Since the Gulf export price serves as the base market price for each transport alternative, the choice of transportation routing is determined only by relative transportation prices and the river port discount. Where river port discount plus trucking cost to the river is greater than railroad or direct trucking freight rates, grain will move by railroad or trucks because of their relatively low transfer costs. On the other side of the boundary, where river port discount plus trucking cost to the river is less than railroad or direct trucking freight rates, the water mode will be chosen. Equivalently, from locations where railroad (or direct trucking) rate less the cost of truck transport to the river is greater than the river port discount, grain will be moved by water transport.

#### Market Area for the Port of Catoosa

There is a price advantage of shipping wheat through Catoosa if the railroad rate to the Gulf less the truck rate to the river port is greater than the spread between the Gulf bid and the river port bid. This spread is calculated as the difference between Gulf bid and river port bid. Railroad rates to the Gulf and trucking rates to the Port of Catoosa,

applicable during October, 1975 were used to compose market boundaries within which the Port of Catoosa potentially affects direct shipments of grain. Transportation rates for each county are those applicable to the county seat town. Market boundaries for the Port of Catoosa are shown for three different Gulf-Catoosa bid spreads in Figure 1.

The entire shaded area following county boundaries in Figure 1, denotes the region from which the Port of Catoosa might draw wheat if the port terminal bid is 25 cents under the Gulf bid. For example, if the Gulf-Catoosa bid spread is 25 cents per bushel, a country elevator located in Noble county would receive a higher net income by shipping wheat with water transport. An elevator in Garfield county, however, would elect to make direct shipments by railroad in order to receive maximum local grain price after transfer expenses. The market boundary lying between the two counties represents critical points where one transport mode loses its cost advantage to another mode. The intermediate and striped shaded areas demarcate the counties from which direct wheat shipments would move through the Port of Catoosa with a Gulf-Catoosa bid spread of 27 cents per bushel. At a 29 cent Gulf-Catoosa bid spread, wheat from only the striped shaded counties will move through the river port.

With a 29 cent per bushel river port discount, the water transport alternative loses attraction to nearly all of the major wheat growing counties of Oklahoma and Kansas. As the port terminal reduces its discount by two cents per bushel, from 29 to 27 cents, the water transport market area expands broadly into the wheat growing region. Another two cent reduction in the river port discount, from 27 to 25 cents, expands the water transport market area by one county on the southern and western boundaries and by several counties on the northern boundary.

The nine northwestern counties of Kansas lie within reach of the Port of Catoosa with port terminal discounts of 25 to 27 cents per bushel. As one moves toward the northwest, in Kansas, railroad rates for wheat shipments to the Gulf increase faster than do trucking costs for movement to the Port

- Market Area at 29¢ Gulf-Catoosa Bid Spread
- ▨ Additional Market Area at 27¢ Gulf-Catoosa Bid Spread
- ▤ Additional Market Area at 25¢ Gulf-Catoosa Bid Spread

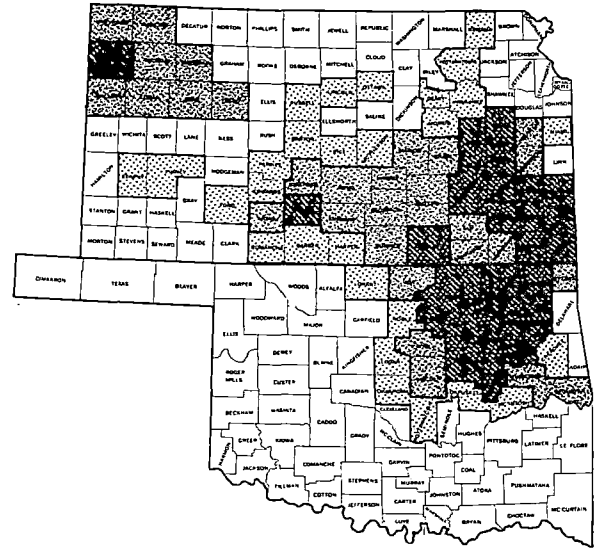


Figure 1 is a copy. The original was developed and used on Page 17, Oklahoma Current Farm Economics, Vol. 49, No. 1, March 1976.

of Catoosa, consequently, the port has potential influence on grain movements in northwestern Kansas, after a geographical break in which the railroad gains the competitive transportation advantage. When the river port discount increases to 29 cents per bushel, northwestern Kansas counties have little advantage in shipping wheat through the Port of Catoosa.

The advantage of moving northwestern Kansas wheat through Kansas City and to west coast export points was evaluated to test the conclusion that northwestern Kansas wheat may be drawn to the Port of Catoosa. Wheat for export moves through Kansas City by railroad on a transit balance. That is, elevators pay domestic rail rates to Kansas City and owners of grain make subsequent rail shipments at a rate equal to the difference between the direct Gulf shipment rate from the elevator and the domestic rates already paid to Kansas City. Consequently, northwestern Kansas elevators will perceive no wheat price difference by shipping through Kansas City than by shipping directly to the Gulf. Elevators may find price advantages at Kansas City

where wheat processor offer quality premiums, however.

The northwestern Kansas portion of the water transportation market area is not encroached upon by west coast marketing alternatives, either. During the period July 1, 1974, to June 30, 1975, shipment of wheat to the west coast by railroad competed with movement through the Port of Catoosa during only one week at the 27 cent river port discount and at no time with a 25 cent discount. During ten weeks of the year, a better price was obtained by shipping to the west coast than by shipping to the Gulf by railroad.

Total 1975 wheat production in counties lying within the Catoosa market boundary are shown for 25, 27, and 29 cent river port discounts, in Table 1. Table 1 does not represent quantities of grain actually moved on the river. Some is consumed in local counties as feed and seed. Some is shipped directly to processors within the region. Some is shipped to inland terminal elevators for temporary storage, such as those located in Kansas City, Salina, Topeka,

Hutchinson, Wichita, Enid, Amarillo, and Fort Worth. However, Table 1 does reflect total volume of grain produced in the region where water transportation has a competitive influence along with railroad transportation.

Table 1 reveals that a rise in river port wheat discount from 25 to 27 cents per bushel decreases total wheat volume for which the Port of Catoosa competes by more than 100 million bushels or by 42 percent. Raising the river port discount to 29 cents per bushel nearly withdraws water transportation from competition for wheat movement.

TABLE 1. TOTAL WHEAT PRODUCTION IN THE PORT OF CATTOSA MARKET AREAS, 1975.

Area	River Port Discout (¢/bu.)		
	25¢	27¢	29¢
	(Million-Bushels)		
Oklahoma	32	14	3
Kansas	208	125	26
Total	240	139	29

Source: Kansas and Oklahoma Crop and Livestock Reporting Services.

Figure 1 and Table 1 also reveal that the grain facility at the Port of Catoosa tends to have little competitive strength for movement of Oklahoma wheat. Few Oklahoma counties typically considered as part of the wheat belt are influenced by water transportation advantages. By far the largest volume of wheat production lying within the water transportation market boundary represents Kansas production.

### Conclusions

Under current transportation policies and relative transportation rates, water transportation from the Port of Catoosa has wide potential influence on direct shipments of wheat from country elevators

to final markets. Most of this competitive influence is upon Kansas-produced grain. The water transport market area is very sensitive to the spread between Gulf bid and river port bid.

Market boundaries for water transport of wheat have been developed only for direct shipments from country grain elevators. Direct shipments from on-farm storage through the Port of Catoosa are not yet common practice. As more river port grain facilities are established, creating more competition in the water transport market area, port terminals may begin seeking wheat directly from farms. The farmer's decision will also be based upon maximizing local wheat prices. The farmer is left with three basic options: truck to the Gulf, move to the local country elevator, or move through the river port. The local price of the first option is the Gulf wheat bid with truck delivery less truck rate to the Gulf. The price received at the country elevator is simply the bid offered by the elevator, which is typically 45 to 55 cents per bushel below the Gulf bid. The local price received when using water transport remains the river port bid less truck rate to the river port. The river port bid for farm deliveries may be lower than that for country elevator deliveries due to added costs of paper work and risk associated with smaller volume shipments.

Sensitivity of the water transportation market area to the river port discount means that the influence of water transportation on wheat movements is ultimately sensitive to barge transportation rates. Recommendations currently being considered to place user charges on barge movements will have the effect of raising barge rates. A significant increase in barge rates would force river port terminals to widen the spread between Gulf and river port bids to account for higher barge freight costs. The effect would be to shrink the water transportation market area thereby reducing its influence on wheat shipments.

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