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Water Hauling by Trucks in Illinois

by W. J. ROBERTS

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ABSTRACT

Water hauling is a year-round business for about 500 commercial truckers and a seasonal as well as drought-period activity for nearly 6000 rural dwellers in Illinois. In 1970 they purchased 72 million gallons of treated water from municipal water plants and hauled it an average distance of 10 miles for a variety of uses including livestock watering, agricultural applications, road construction, and swimming pools. In addition, about 500 truckers in the fertilizer industry bought 10 million gallons of treated water for solubilizing fertilizers and applying to cultivated fields.

Information on annual sales of water to truckers, methods of vending, costs, and destination of the water was obtained from 448 water plants throughout Illinois through responses to a questionnaire. Although minor in the total use of water, truck hauling of water has increased about 10 times in the last 15 years and has changed from a primarily drought-related activity to a more regular service. Much of the increase is attributed to growth in use of liquid fertilizers and in demand for water-using devices in rural homes.

INTRODUCTION

In 1970 the Illinois State Water Survey collected information on water hauling by trucks as part of its continuing analysis of water use in Illinois. Questionnaires were mailed to 635 municipal water-supply plants within the state requesting information on annual sales to truck haulers, the various procedures involved, and costs. Approximately 70 percent responded and some additional information was obtained from individual truckers listed by the respondees. This report presents an analysis of these returns to illuminate an important water service in Illinois.

Historically, the practice of hauling water to drought-parched areas has been common. Variability is a significant characteristic of precipitation in Illinois,[1]

and precipitation droughts affecting agricultural water are relatively frequent though irregular occurrences. Extensive, severe droughts of longer than *2k* months are infrequent in Illinois.[2] However, since the turn of the century there have been at least four major droughts that have curtailed water supplies especially in southern Illinois.

During such serious droughts, many communities have been forced to obtain supplemental water. As one example, Mount Vernon had to import drinking water by railroad tank cars in 1905, 1925, and 1945. Starting in January 1945, 100 tank cars were used to ship 4.5 million gallons of treated water by rail from Evansville, Indiana. This operation extended through 45 days and cost over $50,000.

The most recent was the severe drought of 1952-1955 which affected large parts of southern and central Illinois and caused water-supply shortages in 75 communities.[3] Truck hauling of water was often used in these emergencies. Early in 1953, Pittsfield's municipal reservoir was nearly empty and the city was buying 100,000 gallons per day of treated water from Louisiana, Missouri, and transporting it 21 miles by truck at a cost of $6 per 1000 gallons. By 1954 Bunker Hill and Greenfield were depending on trucked-in water. Bunker Hill purchased water from Alton and transported it 23 miles at $5 per 1000 gallons. During the worst three months of the drought, 40,000 gallons *or* 60 percent of the normal city demand was trucked over the road daily. Greenfield trucked 230,000 gallons of water per month from Brighton, 25 miles to the south.

Sales of municipal water to truck haulers were typical during the drought years of 1953 and 1954. For example, at Paris 100 tank loads (approximately 20,000 gallons) were sold daily at a charge of 50 cents per 1000 gallons. Carrollton charged $1 per 1000 and sold about 15,000 gallons per day. It was estimated that the annual sales volume was about 8 million gallons.

Although the demand eased after 1955, many commercial haulers continued regular service to rural homes and farms that had no reliable water sources. This service has expanded in recent years even though the growth of water distribution districts has provided city water to many homes that formerly depended on truckers. Some of the reasons for this expansion were indicated by the questionnaire responses.

Regular inventories for municipal water systems in Illinois are limited to the broad categories of residential, commercial, and industrial uses. Since fragmentary information had indicated an increase in truck hauling sales, this survey of water hauling in Illinois was undertaken. The study was carried out under the direction of H. F. Smith, Head of the Hydrology Section, and Dr. William C. Ackermann, Chief of the Illinois State Water Survey. The cooperation of the water-plant representatives and truckers in providing information is gratefully acknowledged.

ANALYSIS OF QUESTIONNAIRE RETURNS

Description of Questionnaire

The questionnaire, designed to go to municipal water plants, asked for four types of information. The first was for the method of vending and location of the vending facility, specifically whether the truck hydrant was located at the water treatment plant or at some other location such as city hall or a privately owned site. Also requested was information on the method of payment, whether by coin-operated meter, by the load, or by other means, and the prices charged to the hauler.

The third type of information requested was the number of haulers serviced per year, with a breakdown of this as to commercial haulers, fertilizer truckers, and individual truck haulers. The commercial category includes truckers who consider water hauling their main business and operate throughout the year, whereas individual truckers haul water for themselves or others as a sideline usually only during drought periods or seasonal agricultural activities. The fertilizer trucker category refers to those who purchase water exclusively for distribution or application of fertilizers.

The fourth type of data desired was the amount of water hauled. this included seasonal activity as to number of loads per day in spring and summer, as well as annual sales of water, in gallons, to truck haulers. The questionnaire also provided space for remarks, and this elicited valuable comments concerning the water hauling service. Several replies contained names of regular haulers who might provide additional information, and 10 of these were contacted.

During January 1970, 635 questionnaires were mailed. It was decided that in most cases the city clerk would be the logical person to contact for information because he would be responsible for money collected from sales at municipal water facilities. For those towns served by private water companies or water distribution agencies, the owners or superintendents were contacted.

Information obtained from the 448 replies was tabulated, and a summary of the data is presented in table 1. The regional analysis was based on major river basin regions (figure 1), a division of the state that has been useful in previous water use studies. The average costs given in table 1 represent charges made by the water vendor to the hauler, but in a few cases no charge is made. As will be discussed, several comments concerning varying costs were supplied by the respondents, and some of the truckers contacted gave information on charges to the consumer.

Methods of Vending and Costs

Over 100 of the larger municipal water systems have installed coin-operated meters for servicing tank water haulers. Most of these meters are located at water plants but some are at another location for convenience. Since truckers prefer to transport full tanks, most meters are equipped with quick-closing valves to stop the flow when the tank is full.

The metered hydrant is the most efficient way to service water haulers since it allows truckers to load water throughout the day and night and does not require an attendant. Money is collected by the city clerk and accurate records can be maintained with a minimum of effort. Figure 2 depicts a commercial hauler filling his truck tank at a water plant hydrant.

At approximately 300 plants, water works personnel operate the hydrants serving the haulers, and collect the money. One town arranged for two local commercial establishments to sell water to truck haulers through their own meters, thus relieving the town of the bother and expense of providing the service.

At one town, there is no charge to water haulers, the theory being that it is cheaper to give it away than pay wages to an attendant. Another lets haulers

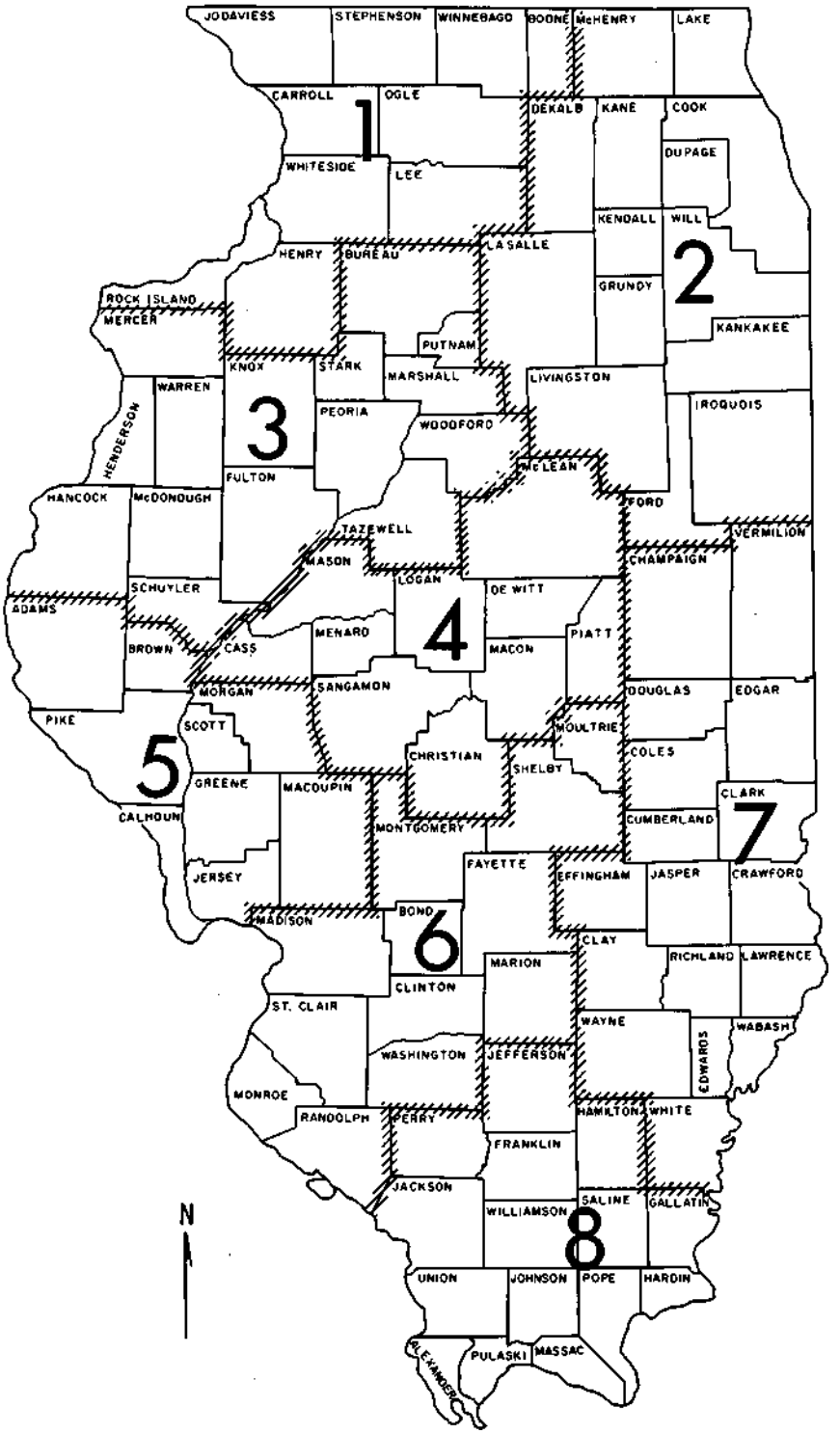

Figure 1. Major river basin regions used in this study

Table 1. Summary of Water Hauling by Trucks, 1970

	Major river basin region (*figure 1*)								
	1	2	3	4	5	6	7	8	Total
Number of truck hydrants									
At treatment plant	4	15	47	22	10	18	22	18	156
At another location	15	25	13	25	12	16	21	3	130
Method of payment									
Coin-operated meter	0	3	27	19	16	19	12	4	100
Per load	10	16	25	22	6	14	10	13	124
Other	3	12	7	5	2	2	6	2	39
Average cost to haulers ($/1000 *gallons*)	1.65	1.77	1.82	1.60	1.52	1.37	1.60	1.68	1.64 (*avg*)
Haulers serviced per year									
Commercial haulers	5	20	106	42	24	66	111	22	510
Fertilizer truckers	7	11	112	223	4	25	68	20	470
Individual haulers	10	43	580	930	188	1056	2053	966	5826
Number of loads per day									
Spring	12	13	246	179	90	75	108	56	779
Summer	50	35	416	214	59	147	142	141	1204
Annual sales to haulers (*million gallons*)	1.6	3.0	7.2	14.7	7.1	13.8	8.5	26.2	82.3

Figure 2. Commercial hauler fills truck tank at a water plant hydrant

take raw water from the city reservoir at no charge. Some of the water works superintendents said that they look upon this type of service as humanitarian, and do not expect to make a profit when they are servicing area farmers who have no reliable sources of water supply. However, many water plants service over 100 tank trucks daily during the spring and summer, making it important that the water be readily available and efficiently loaded from the standpoint of both the hauler and the service facility. Less than one-fourth of the replies attached significance to a businesslike approach to the selling of water to tank haulers.

Replies from 350 water treatment plants showed a range in price for treated water from 36 cents to $6 per 1000 gallons. Practically all the coin-operated hydrants are set to charge 25 cents for 250 gallons, but at most of the hydrants supervised by water works personnel the charge is double that amount. Some of the higher rates are enforced in order to discourage haulers, whose business may not be wanted either because the plant cannot supply additional water above the local municipal demand, or because the cost of an attendant is more than the income from sales.

A variety of pricing policies and charges was indicated by the replies. In water-short counties, the price varies around $2 per 1000 gallons. At Mt. Vernon (region 8 on figure 1), where annual sales exceed 5 million gallons, the price is $1.85 per 1000 gallons. The Elburn (region 2) water plant has little call for this service and discourages it by charging $5 for a minimum load of 1000 gallons. However, each additional 1000 gallons is sold for $2. Also in this northeastern region, Elgin has water hauling sales only for filling rural private swimming pools and charges $1.30 per 1000 gallons. The low rate of 36 cents per 1000 gallons is charged at Waukegan where the water is sold to contractors for construction jobs. Buckley charges $6 per 1000 gallons for the approximately 30 sales handled per year.

At Carlinvilie (region 5) the city allows a local resident to have a metered coin-operated hydrant, which is the only outlet for bulk water. He sells on the average 350,000 gallons per quarter and he is charged the regular residential rate of 94 cents per 1000 gallons for the first 30,000 gallons, 56 cents for the next 270,000, and 25 cents per 1000 for all water over 300,000 gallons sold per quarter.

The vendor charges 25 cents per 200 gallons, and sells mostly to farmers who have their own tank trucks. He also operates his own 1200-gallon capacity tank truck which is used only for hauling water to replenish farm water supplies.

Although sales to water haulers are largely seasonal, and then usually when lack of rainfall has affected wells and cisterns, there are some areas in southern Illinois where hauling is a year-round activity. At Carrier Mills (Saline County, region 8) sales average 10,000 gallons per day, six days a week throughout the year. The charge is $1.50 per 1000 gallons. At Harrisburg in the same county, where 4800 loads varying from 300 to 1000 gallons are sold annually, the activity increases from about 10 loads per day in spring to 30 per day during the summer. The price there is also $1.50 per 1000 gallons.

Although water hauling activity is greatly affected by weather conditions, several regular haulers indicated that there has been a gradual increase in the amount of water being hauled in their areas even though practically all new homes are located along city water main extensions. They attributed this increase to modern plumbing installations on farms and to demand for more water-using devices in water-short rural homes.

Water Haulers

Information on number of haulers in the three categories (commercial, fertilizer, individual) was inconsistent, and no great accuracy can be attributed to the estimates for these categories in table 1. Apparently, there has been little attempt to keep such records, and in fact the hauler or number of haulers using a coin-operated hydrant would not be known. However, the questionnaire replies did clearly indicate a preponderance of individual haulers. Contacts with 10 of the haulers mentioned on the replies provided related information concerning the water hauling business.

Commercial haulers who transport water throughout the year number over 500, and it is estimated they haul about 40 million gallons per year. As previously mentioned, some of these provide regular service to water-short rural areas primarily for home and livestock uses. Others haul water for specialized uses such as road construction or filling swimming pools. The haulers contacted estimated

they transport the water an average distance of 10 miles from the water plant (any greater distance would place them nearer the next water supply). The water hauler derives maximum profit when he delivers a load of water to a rural cistern located near the city limits. He charges up to $20 (from limited reports, charges to consumers averaged $15) for a 1000-gallon load and could make as much as 75 percent profit. However, when demand is greatest during drought conditions, water hauling trucks are sometimes lined up at the hydrant and he might experience a half day delay in loading his tank.

The commercial hauler's equipment varies from 200-gallon capacity tanks that are strapped on the bed of a small truck to monel steel tanks of several thousand gallons capacity. Equipment costs vary from a few hundred dollars for a small hauler to several thousand dollars for stainless steel tanks and trailers. Haulers can purchase used stainless steel milk tanks having capacities varying from 1500 to 2500 gallons from $750 to $2500. Even larger used semitrailers with capacities from 2500 to 6000 gallons are available for upwards of $1000.

From April 1 to July 1 fertilizer companies buy tank loads of water to apply with or after fertilizer application to fields. This specialized type of hauling involves almost 500 tank trucks. A trucker with a tank capacity of 1000 gallons accomplishes one spraying operation in a day. He can cover 50 acres in an 8-hour day with an application rate of 20 gallons per acre. Some modern spreaders (figure 3) have a 1000-gallon capacity tank and can apply liquid fertilizer at a rate of 60 acres per hour. The number of applications to a field depends on the occurrence and distribution of rainfall. Generally this type of water hauling drops off after June, and tank trucks used for this purpose cannot be used for hauling water for household use because of the possible toxic carry-over effect of residual fertilizer chemicals.

The hauler receives about $75 per day for this type of fertilizer service, but must balance his charge against the cost of operation which is roughly 65 cents per mile for fuel and amortization of equipment costs. If he drives a total of 55 miles during a day on one job his profit is $40 after deducting his cost of water and chemicals. Since he averages only four such jobs a week his take-home pay is relatively small, especially if he confines his activity only to the fertilizer business, which is seasonal.

Figure 3. Water-mixed fertilizer is applied by modern 18-foot spreader

Part of the increase in water hauling by trucks in recent years is attributed to the rapidly expanding liquid feed and fertilizer business.[4] The estimated 10 million gallons of treated water purchased in 1970 by truck haulers for solubilizing fertilizers and applying to fields represents about 17 percent of the water volume delivered by city water mains directly to liquid fertilizer batching plants.

By far the largest group of water truckers are the individual haulers, who haul an estimated 32 million gallons of water each year. There are nearly 6000 privately owned tank trucks that are used throughout the state by farmers and other rural dwellers who have inadequate private water supplies. Generally they own a small tank mounted on a pick-up truck and haul water to dump in their well or cistern. This type of hauling varies with the amount of precipitation, and may fall off to a negligible amount during wet years. However, in parts of southern Illinois farmers haul regularly to service farm animals as well as their homes. Some rural dwellers have large tanks which they use as reservoirs to avoid dumping treated water into leaking wells or cisterns.

A number of rural home owners now have swimming pools. One such owner lives 15 miles from Pana and has a swimming pool with a volume of 30,000 gallons. He purchases all the water for this pool from the Pana water plant at $1 per 1000

gallons and transports it in his own tank truck, which costs 20 cents per mile to operate, for a total cost of $7 per 1000 gallons. If he had to have the water delivered by commercial hauler at the average of $15 per 1000 gallons, he would probably have to pay over $450 a season to fill the pool and replenish water lost through evaporation and recreational use.

Although the number of people served by water haulers represents only a small percentage of the state's population, the area coverage is large. These are rural areas whose population is increasing despite water-supply difficulties, and the newcomers demand adequate water at any cost.

Annual Sales to Water Haulers

The 448 questionnaires that were returned indicated that more than 82 million gallons of treated water were hauled by tank trucks in Illinois during 1970. Since nearly 30 percent of the municipalities did not respond, it is reasonable to assume that the annual total is probably more than 100 million gallons. However, many of the towns that failed to respond *are* located in areas where there is ample groundwater and therefore little need by farmers and rural residents for trucked water.

At least 42 Illinois communities sell more than 500,000 gallons to haulers annually, and one-half of these cities show sales of more than 1 million gallons annually. Both Mount Vernon and Decatur each sell more than 5 million gallons a year. Harrisburg, Carrier Mills, and Benton each show sales of over 3 million gallons, while McLeansboro, Carbondale, Atlanta, and Columbia each account for over 2 million gallons of sales annually.

If we assume average annual sales to haulers within the state of 100 million gallons at an average cost of $1.64 per 1000 gallons, the yearly revenue to water suppliers amounts to $164,000. By the time the water reaches the consumer, assuming an average charge of $15 per 1000 gallons delivered, the value of this water has increased to $1,500,000. A 1969 University of Illinois study[5] has revealed that Illinois homeowners pay an average of $4 per month for 5000 gallons of city water delivered at the faucet. A similar amount of truck-hauled water would cost the rural dweller $75.

Even though the cost is relatively high, water-short buyers are keeping a large number of truckers busy especially during summer and times of drought. The

1970 total of 82 million gallons hauled is over 10 times the 1954 drought-year estimated total of 8 million gallons. Part of this expansion in water hauling has been attributed to demands by rural homeowners for water-using devices long taken for granted by city dwellers. Another sizeable part of the growth has been from increased use of liquid feeds and fertilizers, and this use is growing rapidly as the industry develops sophisticated application equipment with its attendant savings in time and labor costs.

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