

UNITED STATES DEPARTMENT OF AGRICULTURE  
*Agricultural Marketing Service  
Dairy Programs*

MIDEAST MARKETING AREA  
*Federal Order 33*

**TRANSPORTATION ANALYSIS FOR PRODUCER MILK  
ASSOCIATED WITH THE MIDEAST ORDER**

**MAY 2009**

Staff Paper  
11-01

Prepared by:  
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February 2011

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# **Transportation Analysis for Producer Milk Associated With the Mideast Order May 2009**

**John Newton**

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This staff paper details the hauling assessments paid by producers, and the delivery distance to the first delivery point, of milk marketed by producers associated with the Mideast Marketing Area, Federal Order 33, for May 2009. The results show that hauling assessments vary significantly due to multiple factors including delivery volume and competitive groups of producers and handlers. Large farms pooled on the Mideast Marketing Area face diminishing marginal costs relating to transportation charges.

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# **TRANSPORTATION ANALYSIS FOR PRODUCER MILK ASSOCIATED WITH THE MIDEAST ORDER MAY 2009**

By John Newton

## **Introduction**

This study analyzes the hauling assessments paid by milk producers and the delivery distance to the first delivery point for milk marketed by producers associated with the Mideast Marketing Area, Federal Order 33, for May 2009.<sup>1</sup>

The hauling assessments and delivery distances were analyzed to determine the weighted average hauling assessment, the weighted average hauling assessment per hundredweight (cwt), the weighted average delivery distance, and the weighted average mileage rate factor (MRF). Additionally, the transportation variables were evaluated using production region (state) and producer size characteristics. An effort was also made to identify a statistical relationship among the hauling assessments as a function of delivery volume, delivery distance, and the competition among other variables.

In May 2009, there were a total of 7,230 producer farms associated with the market; hauling information was analyzed for 5,933 of these producer farms. The geographical region encompassed in this population includes: Ohio, Michigan, Indiana, West Virginia, Pennsylvania, Kentucky, Illinois, Maryland, New York and Wisconsin.

## **Background**

This staff paper builds on previous work performed by Mideast staff. In April 2008 the Mideast Market Administrator's Office released staff paper 08-02 which included hauling assessment per cwt, delivery distance and mileage rate factor statistics for April 2007. A subsequent transportation analysis for May 2008 was also conducted detailing the hauling assessment, delivery distance and mileage rate factor among other statistics. Results of both

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The author would like to thank Paul Huber, Sharon Uther and William Pollock for their comments on earlier versions of this paper and Ron Gjurkovitsch for his assistance with data collection.

<sup>1</sup> Hauling assessments represent the transportation costs incurred by the milk producer when transporting milk from the farm to the processor. Hauling assessments may not represent the total costs of milk delivery from the farm, as hauling assessments reflected on producer payrolls are often subsidized.

analyses indicated that hauling assessments paid by producers were subject to delivery volume, delivery distance and competition for milk supplies.

Variations of this study are performed by Dairy Programs staff in both the Upper Midwest and Pacific Northwest Orders for producers associated with those marketing areas.

At the time of this analysis the staff paper published by the Pacific Northwest indicated that the weighted average hauling assessment was 53.40 cents per cwt for May 2009. Similarly, Upper Midwest research indicated that the weighted average hauling assessment was 29.84 cents per cwt for May 2009.<sup>2</sup>

In addition to the staff papers published by the Upper Midwest and Pacific Northwest, the New York Department of Agriculture and the California Department of Food and Agriculture conduct similar hauling analyses.

The Milk Hauling Study conducted by the New York Department of Agriculture (2008) indicated that milk hauling costs in New York are partially determined by the number of farm pickups per day and the delivery distance. Annual average hauling assessments ranged from 50 to 60 cents per cwt from 1991 through 2008. More recent information, calculated using January through March 2009 data, indicated that producer hauling and stop charges averaged 58 cents per cwt in the New York marketing area.

The ranch-to-plant portion of the California milk hauling study (2009) indicated that hauling assessments per cwt averaged 44.53 cents per cwt in March 2008 and 44.73 cents per cwt in October 2008. The California hauling study is based on hauler invoices supplied by the dairy cooperatives operating in that market. The per cwt assessment calculated included stop charges, surcharges and weight charges paid by producers at the ranch.

Comparisons made to hauling and stop charge assessments in other marketing areas/states do not indicate a difference in the actual milk hauling costs; rather, they serve only to denote the differences in assessments paid by producers in each marketing area/state.

### *Related Studies*

Over the years economists have conducted analyses relating to hauling costs and bulk milk assembly costs. Jacobson and Fairchild (1969) defined the hauling assessments as a linear function of the volume of milk transported, where the intercept represented the stop charge paid by the producer and costs increased uniformly per cwt delivered. This analysis estimated that transportation costs were linear and that average costs and marginal costs were equal.

In 1993 Gallagher, Thraen and Schnitkey estimated a translogarithmic total cost function using survey data from Ohio producers and found that total cost is substantially lower for delivery volume output relative to delivery distance output. Gallagher et al. found that cost functions based strictly on delivery volume or on volume per mile driven would substantially over-charge large volume producers and under-charge small volume producers – representing a situation where large producers would subsidize the transportation of their smaller counterparts.

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<sup>2</sup> The geographical region represented in the analysis conducted by the Pacific Northwest office includes California, Idaho, Oregon, Utah and Washington. The geographical region represented in the 2009 analysis conducted by the Upper Midwest office includes Illinois, Iowa, Michigan, Minnesota, North Dakota, South Dakota and Wisconsin.

By arguing that a majority of the costs of transporting milk are incurred prior to and during milk pickup, Gallagher et al. suggested that the milk assembly process, not transportation, was the most expensive part of milk transportation; thus, stop charges were significantly undervalued and volume assessments were overvalued.

In 1996, a report issued by the Agricultural, Resource and Managerial Economics Department at Cornell University provided a detailed assessment of the milk hauling sector of the United States. In that publication Pratt and Guiguet concluded that the structure of the hauling industry reflected not only technological changes in the industry, but also industry consolidation where fewer and larger farms were serviced by fewer and larger hauling firms.

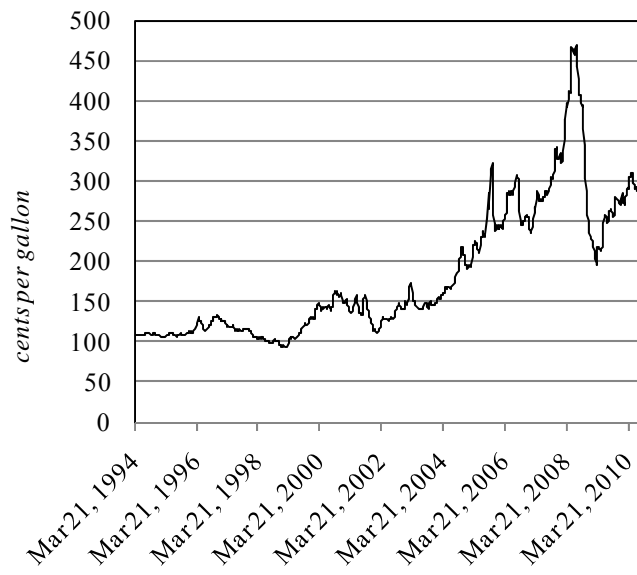
Several problem areas that constrain hauling efficiency were also identified. Such constraints include but are not limited to: government limitations on load size and labor hours, limitations related to haulers “owning” their routes, road conditions, milk co-mingling, route overlapping and milk unloading and rinsing times. Due to the constraints identified as well as other hauling limitations such as unreliable daily processor demand, milk hauling continues to be an expensive component in the dairy product supply chain.

In a subsequent report examining the characteristics of milk assembly Erba along with Pratt, Wasserman and Alexander (1998) noted that milk hauling assessments were determined through negotiations based on factors such as route mileage, number of farm pickups, farm location and delivery point. Erba et al. noted, however, that when contracting a hauler for a milk route, producers may not choose the best available rate; instead choosing a hauler based on a hauler’s performance, personal relationship, accuracy of milk weights, delivery time and sampling techniques.

Collectively, the results of the aforementioned studies indicate that while hauling assessments vary depending on factors such as delivery volume, route mileage, and farm pickups; hauling assessments also are subject to discrete factors such as the hauler-producer relationship.

Another factor influencing transportation costs is the price of fuel. Diesel prices represent only a fraction of the total transportation costs; but the volatility in diesel prices makes the costs of supplying milk very unpredictable. When fuel prices soared in 2006-2008 there was industry pressure to address diesel prices and their impact on milk transportation. Results of that pressure lead to industry hearings to adjust the Class I differential price surface in southeastern U.S. and implementation of a variable mileage rate factor for transportation credits in the Southeast and Appalachian orders.

Figure 1 displays the weekly average diesel rates for the Midwest Petroleum Administration for Defense Districts (PADD II Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota,



Source: Energy Information Administration

**Figure 1. Midwest (PADD II) Diesel Retail Price by All Sellers**

Missouri, Nebraska, North Dakota, Ohio, Oklahoma, South Dakota, Tennessee and Wisconsin).<sup>3</sup> PADD II most accurately represents the states included in the Mideast Marketing Area. Announced PADD I (Sub district IC) and PADD III are used to determine the variable mileage rate factor for the Appalachian, Southeast and Florida Orders.<sup>4</sup>

Volatile transportation costs and shifting supply and demand conditions make transporting milk very expensive. Producers, handlers, haulers and cooperatives all share in the costs of moving raw milk and finished goods along the supply chain through assessments, the class I differential price surface, surcharges, premiums and transportation credits. For the purpose of this study no attempt was made to analyze fuel surcharges, premiums, or transportation credits.

## Data and Methodology

The data was collected from producer payrolls submitted by handlers and cooperatives to the Mideast Market Administrator's Office. As handlers and cooperatives generally submit their entire payrolls, the data not only includes producer milk pooled on the Mideast Order, but also milk pooled on other Orders and milk associated with the market but not pooled due to price fluctuations and/or price relationships among Federal Orders. For the purpose of this study, the hauling and delivery data associated with those producers with de-pooled milk was included. Producers who appeared on the payrolls submitted to this office but who did not pool milk on Federal Order 33 were not included in this analysis. Several of the cooperatives pooling on the

<sup>3</sup> Published by the Energy Information Administration ([www.eia.doe.gov](http://www.eia.doe.gov))

<sup>4</sup> The variable mileage rate factor shifts in relation to fuel prices and determines the monthly payout per cwt for milk eligible to receive transportation credits in the Appalachian and Southeast Orders.



Mideast Order do not submit their payrolls electronically. Data not submitted electronically was omitted from this analysis. As a result, there is a significant difference in the number of producers and delivery volume in this study and the number of producers and delivery volume as pooled on the Mideast Federal Order during May 2009.

Hauling assessments are identified as the hauling deductions shown on the producer payrolls submitted to the Market Administrator's Office. The hauling deductions represent the transportation costs incurred by the milk producer when transporting raw milk from the farm. Many of the observed assessments likely include stop charges incurred by the milk producer - stop charges are a function of farm pickups and do not represent farm to plant transportation expenses. The hauling assessments appearing on the producer payrolls do not reflect the actual cost of milk transportation; nor do they necessarily reflect the total costs of farm pickup and delivery to the plant. As observed by Freije (2008), hauling assessments reflected on producer payrolls often are subsidized to some extent.

For this study delivery distances were approximated using the shortest hard surface highway distance from the county seat of the applicable producer to the actual location of the receiving plant. No attempt was made to account for milk reloads or to estimate milk assembly miles. Assembly miles are miles traveled to collect the raw milk, assembly miles plus the distance from the last farm pickup to the receiving plant would represent total delivery miles (Gallagher et al.).

The MRF was calculated by dividing the hauling assessments per cwt by the delivery distance. The MRF represents the per cwt per mile assessments paid by producers for transporting milk. For the purposes of this analysis weighted average MRFs are given by the equation:

$$m_i = 100 \left( \frac{\sum_{i=1}^n \frac{y_i}{z_i}}{\sum_{i=1}^n x_i} \right);$$

where for producer  $i$ ,

$x$  = delivery pounds

$y$  = hauling assessment

$z$  = delivery distance

$m$  = is the weighted average mileage rate factor. It is the opinion of this researcher that calculating the MRF for each producer provides a more accurate measurement of per cwt per mile hauling assessments.

The descriptive statistics detailed in this analysis include weighted average, mean, standard deviation and where applicable the minimum and maximum values observed in the data population. Weighted averages are given by the equation:

$$\bar{x} = \frac{p_1x_1 + p_2x_2 + \dots + p_ix_i}{p_1 + p_2 + \dots + p_i}$$

where for producer  $i$

$x$  = the applicable transportation variable (hauling assessment, delivery distance or mileage rate factor)

$p$  = delivery volume

Calculating the weighted average allows producers with little or no production volume to contribute less to the weighted mean than producers with a high production volume.

The data population was also analyzed using Ordinary Least Squares (OLS) regression analysis. OLS was used to determine the hauling assessment as a function of delivery volume, delivery distance, quantity of surrounding producers and the effect of surrounding plants (pool and non pool) among other variables.

### Descriptive Statistics for May 2009

For May 2009, total hauling assessments paid by producers included in this analysis was approximately 5.8 million dollars, a reduction of 4.6 percent from May 2008 assessments of 6.0 million dollars.

**Table 1. Descriptive Statistics**

| Variable                          | May 2009  | May 2008  | April 2007 |
|-----------------------------------|-----------|-----------|------------|
| Hauling Assessment (\$)           |           |           |            |
| <i>Weighted Average</i>           | 4,230.05  | 4,332.92  | 3,205.74   |
| <i>Mean</i>                       | 1,024.39  | 1,019.42  | 850.53     |
| <i>SD</i>                         | 1,603.54  | 1,672.21  | 1,225.22   |
| <i>Max</i>                        | 31,564.29 | 45,431.98 | *          |
| <i>Min</i>                        | 3.03      | 15.77     | *          |
| Hauling Assessment (\$/cwt)       |           |           |            |
| <i>Weighted Average</i>           | 0.4772    | 0.5032    | 0.4587     |
| <i>Mean</i>                       | 0.6876    | 0.6909    | 0.6095     |
| <i>SD</i>                         | 0.3729    | 0.3676    | 0.2659     |
| <i>Max</i>                        | 8.5121    | 6.3142    | *          |
| <i>Min</i>                        | 0.0060    | 0.0100    | *          |
| Delivery Distance (miles)         |           |           |            |
| <i>Weighted Average</i>           | 102.7     | 88.4      | 86.8       |
| <i>Mean</i>                       | 80.8      | 68.0      | 69.2       |
| <i>SD</i>                         | 78.5      | 58.2      | 58.4       |
| <i>Max</i>                        | 524.1     | 413.7     | *          |
| <i>Min</i>                        | 0.2       | 0.7       | *          |
| Mileage Rate Factor (\$/cwt/mile) |           |           |            |
| <i>Weighted Average</i>           | 0.01609   | 0.01582   | 0.00529    |
| <i>Mean</i>                       | 0.02837   | 0.02629   | 0.00880    |
| <i>SD</i>                         | 0.11459   | 0.08219   | 0.00455    |
| <i>Max</i>                        | 3.67799   | 2.82251   | *          |
| <i>Min</i>                        | 0.00004   | 0.00005   | *          |

\* Information unavailable.

The market wide May 2009 weighted average hauling assessment was \$4,230.05, \$102.87 less than May 2008. The weighted average hauling assessment per cwt was 47.72 cents, 2.6 cents less than May 2008.

The weighted average delivery distance was 102.7 miles, 14.3 miles greater than the May 2008 weighted average.

The weighted average MRF was 1.61 cents per cwt per mile, marginally higher than May 2008. For comparative purposes Table 1 contains descriptive statistics for May 2009 and 2008 as well as April 2007. The weighted average calculation puts comparatively less weight on producers with little delivery volume. Therefore, when comparing the weighted average and the mean for each category it becomes apparent that smaller producers tend to have lower hauling assessments, higher hauling assessments per cwt, shorter delivery distances and higher per cwt per mile hauling assessments.

## Transportation Analysis by State

For this section transportation statistics were analyzed by the production region. Milk from ten states was included in this analysis; of the ten states, Ohio, Michigan, Indiana, West Virginia, Kentucky and Pennsylvania are states located or partially located within the Mideast Marketing Area.

Producer size varies dramatically throughout the region. Producer size is estimated using average delivery volume. Average delivery volume ranges from 66,022 pounds for producers in Maryland to 327,868 pounds for Michigan producers.

**Table 2. State Transportation Statistics**

| State            | Total<br>Delivery Pounds | Average<br>Delivery Pounds | Hauling<br>Assessment<br>(\$) | Hauling<br>Assessment<br>(\$/cwt) | Delivery<br>Distance<br>(miles) | Mileage Rate<br>Factor<br>(\$/cwt/mile) |
|------------------|--------------------------|----------------------------|-------------------------------|-----------------------------------|---------------------------------|---|
| Illinois         | 6,451,463                | 161,287                    | 2,533.88                      | 0.435                             | 42.28                           | 0.0108                                  |
| Indiana          | 149,690,900              | 154,003                    | 3,016.43                      | 0.572                             | 88.10                           | 0.0274                                  |
| Kentucky         | 2,649,627                | 75,704                     | 1,057.57                      | 0.841                             | 89.77                           | 0.0123                                  |
| Maryland         | 2,508,833                | 66,022                     | 907.54                        | 1.058                             | 103.46                          | 0.0180                                  |
| Michigan         | 598,358,560              | 327,868                    | 5,327.68                      | 0.419                             | 117.02                          | 0.0100                                  |
| New York         | 25,249,753               | 290,227                    | 4,391.63                      | 0.564                             | 80.96                           | 0.0120                                  |
| Ohio             | 321,270,630              | 190,439                    | 3,805.18                      | 0.498                             | 87.10                           | 0.0160                                  |
| Pennsylvania     | 60,754,499               | 97,519                     | 1,677.32                      | 0.800                             | 129.67                          | 0.0212                                  |
| West Virginia    | 6,042,774                | 92,966                     | 1,290.93                      | 0.815                             | 142.84                          | 0.0189                                  |
| Wisconsin        | 36,353,265               | 139,285                    | 319.68                        | 0.143                             | 39.65                           | 0.0656                                  |
| Total            | 1,209,330,304            |                            |                               |                                   |                                 |   |
| Weighted Average |                          |                            | 4,230.05                      | 0.477                             | 102.69                          | 0.0161                                  |

Maryland had the smallest volume of milk included in this analysis with only 2.5 million pounds, 0.21 percent of the total. Michigan had the largest volume of milk included in this analysis with 598 million pounds, 49.48 percent of the total. The states included in the Mideast marketing area represented approximately 94 percent of the milk included in this analysis.

Table 2 details the transportation statistics by state for May 2009. Michigan had the highest weighted average hauling assessment at \$5,327.68, which was \$1,097.63 more than the market weighted average. Wisconsin had the lowest weighted average hauling assessment at \$319.68, which was \$3,910.37 less than the market weighted average.

Weighted average hauling assessments per cwt ranged from \$0.14 for Wisconsin producers to \$1.06 for producers in Maryland. The low weighted average hauling assessment observed for Wisconsin is supported by the findings of the Upper Midwest marketing area. Research by the Upper Midwest indicated that weighted average hauling assessments per cwt for Wisconsin producers ranged from 6.74 to 26.83 cents depending on delivery volume. There is a significant difference in the hauling assessment for Wisconsin producers compared to producers in other states. Stop and volume assessments often are used as negotiating tools by cooperatives, handlers and haulers when attempting to procure additional milk supplies. Since Wisconsin has a large population of dairy producers within close proximity of each other it is likely that the competitive landscape (agglomeration effect) has helped to drive down hauling assessments for producers in that region.<sup>5</sup> Another contributor to the low hauling assessments could be the low weighted average delivery distance associated with Wisconsin milk.

Weighted average delivery distances ranged from a low of 39.65 miles for producers in Wisconsin to 142.84 miles for producers in West Virginia. Delivery distance is a function of pooling practices and supply locations. For example, a portion of the milk from states outside the marketing area is diverted milk pooled on the Mideast Order but not delivered to facilities located within the Mideast geographical region, which may result in a lower weighted average delivery distance. Additionally, Michigan and Indiana historically have high weighted average delivery distances because they contain the reserve supplies of milk needed to meet the fluid milk demands in southern portions of the Mideast marketing area and in the southeastern portions of the U.S.

Weighted average MRF ranged from a low of 1.0 cents per cwt per mile for Michigan producers to a high of 6.5 cents per cwt per mile for Wisconsin producers.

When interpreting the state statistics consider that the data only applies to milk associated with the Mideast marketing area; as a result, transportation statistics presented in this analysis may not be representative of all milk marketed in a particular state.

### **Transportation Analysis by Producer Size**

In order to examine the impact producer size has on hauling assessments and delivery distance, producers associated with the marketing area were divided into 10 equally sized

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<sup>5</sup> For May 2009 there were approximately 13,418 Wisconsin producers associated with the Upper Midwest marketing area.

**Table 3. Percentile Group Transportation Statistics**

| Percentile Group | Delivery Pounds | Average<br>Delivery Pounds | Hauling<br>Assessment<br>(\$) | Hauling<br>Assessment<br>(\$/cwt) | Delivery<br>Distance<br>(miles) | Mileage Rate<br>Factor<br>(\$/cwt/mile) |
|------------------|-----------------|----------------------------|-------------------------------|-----------------------------------|---------------------------------|---|
| One              | 10,146,627      | 18,054                     | 210.03                        | 1.091                             | 91.79                           | 0.0531                                  |
| Two              | 19,270,441      | 34,228                     | 271.37                        | 0.788                             | 85.30                           | 0.0329                                  |
| Three            | 26,376,678      | 46,850                     | 344.00                        | 0.731                             | 74.33                           | 0.0251                                  |
| Four             | 34,394,465      | 61,091                     | 440.62                        | 0.718                             | 79.59                           | 0.0285                                  |
| Five             | 44,520,295      | 79,077                     | 529.02                        | 0.667                             | 76.41                           | 0.0257                                  |
| Six              | 58,261,350      | 103,484                    | 657.97                        | 0.634                             | 70.84                           | 0.0308                                  |
| Seven            | 76,752,244      | 136,327                    | 824.00                        | 0.600                             | 80.32                           | 0.0223                                  |
| Eight            | 108,282,559     | 192,331                    | 1,072.86                      | 0.551                             | 77.26                           | 0.0213                                  |
| Nine             | 169,532,410     | 301,123                    | 1,664.00                      | 0.541                             | 79.62                           | 0.0206                                  |
| Ten              | 661,793,235     | 1,167,184                  | 6,891.17                      | 0.367                             | 122.93                          | 0.0094                                  |
| Total            | 1,209,330,304   |                            |                               |                                   |                                 |   |
| Weighted Average |                 |                            | 4,230.05                      | 0.477                             | 102.69                          | 0.0161                                  |

percentile groups. Percentile groups were determined using producer identification codes and delivery volume.

There were 5,933 producers included in this study, so each percentile group contained 593 producers based on milk volume. Percentile group one represents producers with the smallest delivery volume and group ten represents producers with the largest delivery volume. In order to put the percentile group measurements into perspective it must be considered that producers in percentile group one averaged deliveries of 18,054 pounds and supplied 0.84 percent of the milk in this analysis; while producers in percentile group ten averaged deliveries of 1,167,184 pounds and supplied 54.72 percent of the milk in this analysis. Additionally, the top three percentile groups supplied approximately 77.7 percent of the milk included in this analysis.

Weighted average hauling assessments by percentile group ranged from \$210.03 for producers in percentile group one to \$6,891.17 for producers in percentile group ten. Of the 5.8 million dollars paid by the producers included in this study, producers in the largest percentile group paid 2.4 million dollars, approximately 42 percent of the total.

Weighted average hauling assessments per cwt ranged from \$1.09 per cwt for producers in percentile group one to 36.69 cents per cwt for producers in percentile group ten. Hauling assessments per cwt decreased incrementally from percentile group one to percentile group ten.

Similar relationships between the hauling assessment and delivery volume were also observed in the findings of Freije and Espe.

Weighted average delivery distances ranged from a low of 70.84 miles for producers in percentile group six to 122.93 miles for producers in percentile group ten. Weighted average delivery distances did not vary considerably among percentile groups one through nine. The significant increase in the weighted average delivery distance for producers in percentile group ten is likely a function of multiple factors such as their ability to deliver by the tanker.

Weighted average MRF ranged from 0.94 cents per cwt per mile for producers in percentile group ten to 5.31 cents per cwt per mile for producers in percentile group one.

### **Transportation Analysis by Subgroup<sup>6</sup>**

For this section, the data was divided into multiple subgroups. Each subgroup was analyzed to determine the weighted average hauling assessments and the weighted average delivery distance. Specifically of interest was how the transportation statistics varied from state to state among homogenously sized producer groups.

Producers were grouped within each state based on the following aggregate delivery criteria less than 60,000 pounds; between 60,000 and 90,000 pounds; between 90,000 and 125,000 pounds; between 125,000 and 190,000 pounds; between 190,000 and 250,000 pounds; between 250,000 and 500,000 pounds; between 500,000 and one million pounds; between one million and two million pounds and more than two million pounds.

The weighted average hauling assessment by subgroup ranged from a low of \$158.23 for Wisconsin producers shipping less than 60,000 pounds to a high of \$12,417.93 for Ohio producers delivering more than 2 million pounds. In all states except Illinois the weighted average hauling assessment increased as delivery volume increased.

The weighted average hauling assessment per cwt ranged from a low of \$0.068 for Wisconsin producers delivering between 500,000 and one million pounds to a high of \$1.199 for Maryland producers delivering less than 60,000 pounds. When analyzing hauling assessments per cwt it is apparent that as delivery volume increases, per cwt fees decrease.

Weighted average delivery distance did not have an observable correlation with delivery volume. Weighted average delivery distance ranged from a low of 28.26 miles for Illinois producers delivering 250,000 to 500,000 pounds to a high of 191.13 miles for Indiana producers delivering more than two million pounds.

The MRF is a function of the ability to spread the transportation costs over a quantity of miles. The higher the denominator the lower the MRF will be. Therefore, when comparing weighted average hauling assessments per cwt and weighted average delivery distances, weighted average MRF values by subgroup are not surprising. Since the largest producer groups have the lowest weighted average hauling assessments per cwt, and they generally have the longest weighted average delivery distance, their MRF are expected to be very small. Weighted average MRFs range from 0.14 cents per cwt per mile for Indiana producers delivering more than two million pounds to 17.62 cents per cwt per mile for Wisconsin producers delivering less than 60,000 pounds.

The transportation disparities among homogenously sized producers from state to state are likely due to multiple factors within each state. Factors could include transportation regulations, distance to the Class I market, pooling practices of producers within each state, and the competition for milk supplies in the market among others.

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<sup>6</sup> Appendix B contains a table detailing select transportation statistics by subgroup.

## Assessment Models

For this section OLS regression analysis was used to quantify the relationship between hauling assessments and delivery volume, delivery distance, quantity of surrounding producers, proximity of the nearest fluid or manufacturing plant and topography. The model included a squared coefficient for delivery volume to capture the diminishing marginal cost of hauling assessments relative to milk pounds delivered.

The hauling equation is given by:

$$ha_i = \beta_0 + \beta_1 p_i + \beta_2 p_i^2 + \beta_3 m_i + \beta_4 cl_i + \beta_5 t + \beta_6 U_{10i} + \beta_7 U_{50i} + \varepsilon_i$$

where for producer  $i$  ( $i = 1, \dots, 5,633$ ):

$ha$  = represents the hauling assessment as reflected on the producer payroll

$p$  = represents total delivery pounds

$m$  = represents delivery distance in miles

$cl$  = represents the quantity of producers in the same county

$t$  = (discrete variable to capture the effect of topography, 1 = sloped terrain, 0 = flat terrain)

$U_{10}$  = (discrete variable to capture the effect proximity of a processing plant (1 = plant within ten miles; 0 = no handler within ten miles)

$U_{50}$  = (discrete variable to capture the effect proximity of a processing plant (1 = plant within 10-50 miles; 0 = no handler within 10-50 miles)

### *White's Test*

As producer delivery volume increases the variability in hauling assessments increases, indicating that the variance of the error term is not constant across the data population. The possibility of heteroskedasticity must be considered for this analysis. Results of a White's Heteroskedasticity Test were greater than the critical chi squared value, so the null hypothesis of constant error terms was rejected, indicating the presence of heteroskedasticity. In order to account for this problem, White's heteroskedasticity corrected standard errors were estimated. Since heteroskedasticity does not bias the OLS estimates, the coefficients values did not change as a result of this correction.

**Table 4. Determinants of Hauling Assessment**

| Equation | Intercept | P          | P <sup>2</sup> | M       | M*T    | T       | CL        | U <sub>10</sub> | U <sub>50</sub> | Adjusted R <sup>2</sup> | F-statistic |
|----------|-----------|------------|----------------|---------|--------|---------|-----------|-----------------|-----------------|-------------------------|-------------|
| 1        | 480.59 *  | 0.002798 * |                | 0.0983  |        |         | -0.8348 * |                 |                 | 0.724                   | 4,931.8     |
| 2        | 231.50 *  | 0.004428 * | -3.78E-10 *    | 0.2013  |        |         | -0.7441 * |                 |                 | 0.794                   | 5,437.1     |
| 3        | 345.89 *  | 0.004435 * | -3.79E-10 *    | 0.0010  |        |         | -0.7079 * | -195.43 *       | -95.73 *        | 0.795                   | 3,648.7     |
| 4        | 190.22 *  | 0.004456 * | -3.81E-10 *    | 0.1516  |        | 125.7 * | -0.7522 * |                 |                 | 0.796                   | 4,384.4     |
| 5        | 192.95 *  | 0.004458 * | -3.81E-10 *    | 0.1033  | 0.1466 | 113.5 * | -0.7408 * |                 |                 | 0.796                   | 3,653.2     |
| 6        | 320.40 *  | 0.004468 * | -3.82E-10 *    | -0.1675 | 0.3028 | 105.8 * | -0.6907 * | -209.77 *       | -107.58 *       | 0.797                   | 2,760.5     |

Note: Single (\*) asterisk indicates a computed t-value greater than the critical t-value at  $\alpha=0.05$ .

*Model Result*

The higher hauling assessments paid by large producers appears to be a function of the volume of milk being transported. The results of model one indicates a volume assessment of approximately \$0.2798 per cwt. When the pounds squared term is included in the model estimation the volume assessment increases to approximately \$0.44 per cwt. Pounds squared carries a negative coefficient, indicating that there is a marginal decrease in hauling assessments as delivery volume increases. The scale of the pounds squared coefficient is very small, but non zero. Using the mean terms for the hauling assessment and the delivery volume the elasticity of the hauling assessment with respect to the delivery volume is given below:

$$E_{ha,p} = \frac{\partial ha}{\partial p} \times \frac{p}{ha} = (0.004468 - 7.64E - 10(214,687)) \times \frac{214,687}{1,024.39} = 0.9020$$

where:

$$\frac{\partial ha}{\partial p} = (\beta_1 + 2\beta_2 p),$$

and  $p$  and  $ha$  are the respective mean values for delivery volume and the hauling assessment. A one percent change in delivery volume results in a 0.902 percent change in the hauling assessment, holding all else constant.

In order to quantify the effect delivery distance has on hauling assessments, a variable capturing delivery distance was incorporated into the models. In previous hauling analyses conducted by this office delivery distance was statistically positive, with coefficients ranging from \$0.39 to \$1.81 per mile, holding all else constant. Unlike previous assessment models, delivery distance was not statistically significant at the 95 percent confidence level. The calculated p-values for delivery distance were generally greater than 29 percent depending on the



model. Using the same methodology to calculate the elasticity of hauling assessments with respect to delivery volume, the hauling assessment-elasticity of delivery distance was calculated at 0.0107 (if  $t=1$ ) and -0.013 (if  $t=0$ ); indicating that for May 2009 hauling assessments are not significantly impacted by changes in delivery distance.

In the previous transportation analyses the hypothesis was made that distance was not homogenous (e.g. one mile traveled in eastern Ohio which borders the Appalachian Mountains does not equate to one mile traveled in the western Ohio plains). In order to test this hypothesis, a discrete variable capturing topography and an interaction term with delivery distance were incorporated into the model. The discrete variable measuring topography was statistically positive with coefficients ranging from \$105.80 to \$130.00, holding all else constant. The statistically positive coefficient for topography indicates that hauling assessments increase for producers located in counties with sloped terrain. The interaction term (mileage and topography) was included in two of the assessment models. In both models the interaction term was not statistically significant at the 95 percent confidence level.

It is appropriate that counties with a large population of milk producers have lower hauling assessments due to increased competition - the significantly negative coefficient for producer cluster supports this conclusion. The coefficients measuring the impact of an additional producer in a county range from -0.8348 to -0.6907; the significantly negative values indicate that the presence of an additional dairy producer in a county will lower the total hauling assessment paid by a producer in the same county by approximately 69-83 cents, holding all else constant. This relationship is identified as the agglomeration or network effect, where the benefits obtained when locating near each other can be used to drive down prices (hauling assessments) through competition. Concentrated groups of farmers attract more handlers, haulers or cooperatives attempting to procure the milk than a single farm alone. For future analysis the network effect will be tested to determine if delivery volume significantly changes the network effect. Including a volume and producer count interaction term will allow for the network externality to benefit each producer differently based on their unique delivery volume. The results will identify whether or not large producers receive greater positive externalities (benefits of location) than their smaller counterparts operating in the same region.

In order to capture the effect of a nearby processing facility, discrete variables were incorporated for plants located within 10 miles and for plants located with 10-50 miles. The presence of a processing plant within 10 miles was statistically negative with coefficients ranging from -\$195.43 to -\$209.52, holding all else constant. The presence of a processing plant between 10 and 50 miles was also statistically negative with coefficients ranging from -\$95.73 to -\$107.58, holding all else constant. The inclusion of the discrete variables capturing nearby processing facilities, and a comparison of the coefficients for both discrete terms, indicates that hauling assessments decrease the closer a producer is to a processing facility, holding all else constant.

In summary, OLS regression analysis indicated that hauling assessments were statistically dependent on delivery volume, topography, number of surrounding producers and proximity to a

processing plant; delivery volume and topography increased hauling assessments, while the number of surrounding producers and the proximity to a processing plant reduced hauling assessments, holding all else constant. For this analysis, delivery distance did not have significant explanatory power for determining the hauling assessment.

## **Conclusion**

This study determined the weighted average transportation statistics for producers associated with the Mideast Marketing Area for May 2009. Additionally, this study attempted to quantify the statistical relationship between hauling assessments and variables such as delivery volume and delivery distance among others.

The hauling assessments assessed to producers included in this analysis were approximately 5.8 million dollars for May 2009, a reduction of 4.6 percent from May 2008 assessments of 6.0 million dollars.

The weighted average hauling assessment was \$4,230.05; the weighted average hauling assessment per cwt was 47.72 cents; the weighted average delivery distance was 102.7 miles; and the weighted average MRF was 1.609 cents per cwt per mile.

The data included in this analysis indicates that hauling assessments vary significantly due to multiple factors. Factors influencing hauling assessments include delivery pounds, topography, competitive groups of producers and the proximity to a processing plant. Factors influencing milk transportation but not quantified in this analysis include fuel prices, state regulations, weight restrictions, taxes, nature of milk supply and processor demand among others.

While transportation costs continue to be an important concern throughout the industry, what is apparent is that producers, cooperatives, consumers and handlers all share in the cost of moving raw milk, intermediate goods and finished products along the supply chain. Effectively managing these costs is essential in order to ensure that an adequately supply of milk is available to meet the demands of the consumer.

Possible alleviations for the high transportation costs include technological improvements in transportation, improvements in fuel efficiency, more efficient transportation routes, incentives to increase the quantity of milk being produced in deficit areas, more efficient packaging, and additional cooperation among marketing agencies when procuring farm milk

## **Future Publications**

This analysis will be updated annually by the Mideast Market Administrator's Office using May data. For comparative purposes, May data is also used in staff papers published by the Upper Midwest and Pacific Northwest Orders.

For questions, comments or more information concerning this analysis, please contact:

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**MIDEAST MARKETING AREA WEIGHTED AVERAGE TRANSPORTATION STATISTICS  
BY STATE AND COUNTY FOR MAY 2009**

| <b>State</b> | <b>County</b> | <b>Delivery Pounds</b> | <b>Delivery Distance</b><br><i>(miles)</i> | <b>Hauling Assessment</b><br><i>(\$)</i> | <b>Hauling Assessment</b><br><i>(\$/cwt)</i> | <b>Mileage Rate Factor</b><br><i>(\$/cwt/mile)</i> |
|--------------|---------------|------------------------|--|--|--|--|
| Illinois     | Carroll       | 784,652                | 20.64                                      | 122.26                                   | 0.097  | 0.0047   |
|              | Champaign     | R                      | R  | R  | R  | R  |
|              | Grundy        | R                      | R  | R  | R  | R  |
|              | Iroquois      | 774,327                | 127.20                                     | 1,330.24                                 | 1.094  | 0.0094   |
|              | Kankakee      | 463,946                | 87.04                                      | 1,664.75                                 | 0.873  | 0.0130   |
|              | Ogle          | R                      | R  | R  | R  | R  |
|              | Stephenson    | 3,678,249              | 22.00                                      | 3,768.56                                 | 0.229  | 0.0104   |
|              | Vermilion     | R                      | R  | R  | R  | R  |
|              | Will          | 503,723                | 37.70                                      | 996.25                                   | 0.856  | 0.0240   |
|              | Winnebago     | R                      | R  | R  | R  | R  |
| Indiana      | Adams         | 7,901,981              | 126.64                                     | 2,463.79                                 | 0.402  | 0.0089   |
|              | Allen         | 3,173,492              | 65.80                                      | 1,894.38                                 | 0.718  | 0.0742   |
|              | Bartholomew   | 244,203                | 148.34                                     | 677.71                                   | 0.667  | 0.0045   |
|              | Benton        | R                      | R  | R  | R  | R  |
|              | Boone         | 303,327                | 43.80                                      | 1,257.83                                 | 1.026  | 0.0234   |
|              | Carroll       | R                      | R  | R  | R  | R  |
|              | Cass          | 2,401,694              | 49.26                                      | 8,073.14                                 | 0.519  | 0.0106   |
|              | Clay          | R                      | R  | R  | R  | R  |
|              | Clinton       | R                      | R  | R  | R  | R  |
|              | Decatur       | 380,092                | 118.71                                     | 827.63                                   | 0.769  | 0.0087   |
|              | DeKalb        | 2,952,097              | 153.31                                     | 4,313.45                                 | 0.625  | 0.0076   |
|              | Delaware      | 578,382                | 28.27                                      | 1,343.52                                 | 0.633  | 0.0254   |
|              | Elkhart       | 24,750,948             | 42.23                                      | 1,554.14                                 | 0.580  | 0.0738   |
|              | Fayette       | 762,315                | 217.04                                     | 2,187.20                                 | 0.658  | 0.0031   |
|              | Fountain      | R                      | R  | R  | R  | R  |
|              | Franklin      | 541,044                | 127.33                                     | 1,823.09                                 | 0.659  | 0.0052   |
|              | Fulton        | 3,662,412              | 30.17                                      | 1,298.17                                 | 0.650  | 0.0675   |
|              | Grant         | 235,684                | 30.63                                      | 882.44                                   | 0.868  | 0.0283   |
|              | Hamilton      | R                      | R  | R  | R  | R  |
|              | Hancock       | R                      | R  | R  | R  | R  |
|              | Hendricks     | 415,652                | 57.11                                      | 1,780.74                                 | 1.167  | 0.0205   |
|              | Henry         | 3,944,779              | 101.81                                     | 7,026.29                                 | 0.312  | 0.0050   |
|              | Howard        | 520,914                | 47.30                                      | 801.22                                   | 1.043  | 0.0221   |
| Huntington   | 5,237,366     | 151.65                 | 2,892.14                                   | 0.372                                    | 0.0128                                       |  |
| Jackson      | 854,000       | 97.16                  | 2,050.12                                   | 0.704                                    | 0.0074                                       |  |
| Jasper       | R             | R                      | R  | R  | R  |  |

R: Restricted information.

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**MIDEAST MARKETING AREA WEIGHTED AVERAGE TRANSPORTATION STATISTICS  
BY STATE AND COUNTY FOR MAY 2009**

| <b>State</b> | <b>County</b> | <b>Delivery Pounds</b> | <b>Delivery Distance</b><br><i>(miles)</i> | <b>Hauling Assessment</b><br><i>(\$)</i> | <b>Hauling Assessment</b><br><i>(\$/cwt)</i> | <b>Mileage Rate Factor</b><br><i>(\$/cwt/mile)</i> |
|--------------|---------------|------------------------|--|--|--|--|
| IN (cont.)   | Jay           | 2,035,667              | 55.10                                      | 1,230.36                                 | 0.522  | 0.0117   |
|              | Jefferson     | 341,715                | 104.31                                     | 734.00                                   | 0.478  | 0.0046   |
|              | Johnson       | R                      | R  | R  | R  | R  |
|              | Kosciusko     | 6,155,855              | 62.19                                      | 3,935.25                                 | 0.613  | 0.0130   |
|              | LaGrange      | 11,646,908             | 57.76                                      | 855.23                                   | 0.696  | 0.0166   |
|              | Lake          | 615,748                | 24.30                                      | 1,797.34                                 | 0.654  | 0.0270   |
|              | LaPorte       | 7,564,508              | 105.80                                     | 4,810.66                                 | 0.654  | 0.0070   |
|              | Madison       | R                      | R  | R  | R  | R  |
|              | Marshall      | 13,218,984             | 94.53                                      | 3,416.66                                 | 0.474  | 0.0086   |
|              | Miami         | 1,471,784              | 31.19                                      | 1,206.31                                 | 0.625  | 0.0207   |
|              | Montgomery    | 419,408                | 67.69                                      | 1,263.86                                 | 1.385  | 0.0205   |
|              | Morgan        | 251,709                | 35.03                                      | 689.23                                   | 0.949  | 0.0271   |
|              | Noble         | 6,620,264              | 87.80                                      | 2,270.35                                 | 0.565  | 0.0121   |
|              | Owen          | R                      | R  | R  | R  | R  |
|              | Parke         | 2,103,840              | 97.36                                      | 1,074.32                                 | 1.405  | 0.0147   |
|              | Porter        | 461,648                | 89.01                                      | 1,055.91                                 | 0.699  | 0.0135   |
|              | Pulaski       | 2,835,008              | 75.42                                      | 6,953.29                                 | 0.529  | 0.0114   |
|              | Randolph      | 2,803,293              | 136.39                                     | 5,191.52                                 | 0.282  | 0.0024   |
|              | Ripley        | R                      | R  | R  | R  | R  |
|              | Rush          | 1,044,170              | 93.90                                      | 1,271.77                                 | 0.682  | 0.0097   |
|              | Shelby        | 1,001,669              | 76.72                                      | 1,201.10                                 | 0.740  | 0.0116   |
|              | St. Joseph    | 2,556,622              | 60.16                                      | 1,372.70                                 | 0.500  | 0.0107   |
|              | Starke        | R                      | R  | R  | R  | R  |
|              | Steuben       | 4,683,660              | 120.66                                     | 2,421.74                                 | 0.637  | 0.0077   |
|              | Switzerland   | R                      | R  | R  | R  | R  |
|              | Tippecanoe    | 599,387                | 81.50                                      | 2,337.67                                 | 0.790  | 0.0109   |
|              | Tipton        | R                      | R  | R  | R  | R  |
|              | Union         | R                      | R  | R  | R  | R  |
|              | Wabash        | 5,210,956              | 224.92                                     | 6,901.08                                 | 0.366  | 0.0056   |
|              | Wayne         | 2,820,761              | 23.84                                      | 951.52                                   | 0.708  | 0.1826   |
|              | Wells         | 6,943,490              | 155.55                                     | 6,346.71                                 | 0.384  | 0.0088   |
|              | White         | 660,377                | 76.76                                      | 1,630.13                                 | 0.631  | 0.0082   |
|              | Whitley       | 2,603,667              | 30.01                                      | 3,083.52                                 | 0.763  | 0.0373   |
| Kentucky     | Boone         | R                      | R  | R  | R  | R  |
|              | Bracken       | 301,840                | 39.87                                      | 654.54                                   | 1.147  | 0.0288   |
|              | Christian     | R                      | R  | R  | R  | R  |
|              | Fleming       | 631,707                | 83.22                                      | 1,350.77                                 | 0.772  | 0.0093   |

R: Restricted information.

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|--------------|----------------|------------------------|--|--|--|--|
| KY (cont.)   | Gallatin       | R                      | R  | R  | R  | R  |
|              | Henry          | R                      | R  | R  | R  | R  |
|              | Mason          | 755,335                | 57.36                                      | 1,418.25                                 | 0.923  | 0.0161   |
|              | Montgomery     | R                      | R  | R  | R  | R  |
|              | Shelby         | 278,644                | 129.20                                     | 380.95                                   | 0.716  | 0.0057   |
|              | Todd           | R                      | R  | R  | R  | R  |
| Maryland     | Allegany       | R                      | R  | R  | R  | R  |
|              | Garrett        | 2,477,760              | 104.01                                     | 913.63                                   | 1.054  | 0.0180   |
| Michigan     | Alcona         | 2,039,705              | 182.32                                     | 2,679.39                                 | 0.722  | 0.0045   |
|              | Alger          | 436,989                | 42.99                                      | 1,046.17                                 | 0.800  | 0.0186   |
|              | Allegan        | 24,702,350             | 88.47                                      | 3,753.20                                 | 0.390  | 0.0072   |
|              | Alpena         | 6,445,836              | 183.73                                     | 1,950.64                                 | 0.542  | 0.0030   |
|              | Antrim         | 813,204                | 101.55                                     | 1,871.66                                 | 0.821  | 0.0081   |
|              | Arenac         | 6,518,308              | 157.30                                     | 2,769.26                                 | 0.514  | 0.0053   |
|              | Baraga         | 424,305                | 60.78                                      | 1,724.59                                 | 0.829  | 0.0136   |
|              | Barry          | 23,899,360             | 75.16                                      | 5,786.03                                 | 0.391  | 0.0116   |
|              | Bay            | 1,974,557              | 61.10                                      | 1,906.98                                 | 0.561  | 0.0093   |
|              | Berrien        | 5,438,707              | 235.48                                     | 4,873.03                                 | 0.316  | 0.0075   |
|              | Branch         | 8,299,899              | 98.61                                      | 5,037.11                                 | 0.349  | 0.0050   |
|              | Calhoun        | 9,634,627              | 87.14                                      | 9,874.86                                 | 0.528  | 0.0093   |
|              | Cass           | 345,211                | 26.12                                      | 442.66                                   | 0.670  | 0.0257   |
|              | Charlevoix     | 1,025,661              | 107.60                                     | 1,746.74                                 | 0.643  | 0.0060   |
|              | Cheboygan      | 1,053,144              | 163.21                                     | 2,496.81                                 | 0.853  | 0.0052   |
|              | Chippewa       | 1,089,671              | 232.21                                     | 1,675.76                                 | 0.898  | 0.0039   |
|              | Clare          | 2,762,164              | 61.52                                      | 1,027.76                                 | 0.565  | 0.0118   |
|              | Clinton        | 51,086,477             | 59.02                                      | 8,345.22                                 | 0.334  | 0.0157   |
|              | Delta          | 1,145,407              | 65.18                                      | 1,021.00                                 | 0.661  | 0.0101   |
|              | Dickinson      | 1,172,911              | 72.66                                      | 1,146.26                                 | 0.184  | 0.0025   |
|              | Eaton          | 3,372,325              | 61.06                                      | 883.68                                   | 0.483  | 0.0084   |
|              | Emmet          | 770,064                | 132.45                                     | 2,051.14                                 | 1.004  | 0.0076   |
|              | Genesee        | 2,277,147              | 18.48                                      | 1,767.33                                 | 0.547  | 0.1776   |
|              | Gladwin        | 1,375,114              | 79.21                                      | 1,434.40                                 | 0.574  | 0.0080   |
|              | Grand Traverse | 489,976                | 73.41                                      | 579.16                                   | 0.759  | 0.0103   |
|              | Gratiot        | 38,339,794             | 131.06                                     | 5,392.65                                 | 0.217  | 0.0051   |

R: Restricted information.

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|--------------|---------------|------------------------|--|--|--|--|
| MI (cont.)   | Hillsdale     | 11,417,521             | 124.74                                     | 3,326.93                                 | 0.540  | 0.0061   |
|              | Huron         | 64,142,118             | 172.91                                     | 8,041.60                                 | 0.323  | 0.0027   |
|              | Ingham        | 10,541,345             | 137.38                                     | 4,141.07                                 | 0.555  | 0.0084   |
|              | Ionia         | 24,691,992             | 110.53                                     | 6,232.82                                 | 0.354  | 0.0076   |
|              | Iosco         | 4,018,866              | 135.82                                     | 2,213.72                                 | 0.585  | 0.0047   |
|              | Isabella      | 12,663,154             | 48.79                                      | 3,398.74                                 | 0.479  | 0.0108   |
|              | Jackson       | 6,090,925              | 144.34                                     | 2,840.80                                 | 0.504  | 0.0056   |
|              | Kalamazoo     | 2,408,082              | 20.14                                      | 6,464.23                                 | 0.558  | 0.0288   |
|              | Kalkaska      | R                      | R  | R  | R  | R  |
|              | Kent          | 15,777,729             | 143.98                                     | 3,917.59                                 | 0.357  | 0.0151   |
|              | Lake          | 398,585                | 31.17                                      | 876.50                                   | 0.567  | 0.0182   |
|              | Lapeer        | 4,969,146              | 46.46                                      | 1,255.60                                 | 0.523  | 0.0151   |
|              | Leelanau      | 383,743                | 96.32                                      | 896.14                                   | 0.915  | 0.0099   |
|              | Lenawee       | 24,659,812             | 226.91                                     | 16,424.24                                | 0.437  | 0.0022   |
|              | Livingston    | 5,776,549              | 97.57                                      | 3,717.07                                 | 0.485  | 0.0092   |
|              | Mackinac      | 1,264,275              | 210.26                                     | 2,194.01                                 | 0.574  | 0.0027   |
|              | Macomb        | 596,115                | 37.26                                      | 498.24                                   | 0.655  | 0.0185   |
|              | Marquette     | R                      | R  | R  | R  | R  |
|              | Mason         | 4,007,703              | 82.51                                      | 2,660.38                                 | 0.731  | 0.0089   |
|              | Mecosta       | 5,729,924              | 49.27                                      | 2,237.91                                 | 0.536  | 0.0132   |
|              | Menominee     | 4,554,770              | 42.85                                      | 1,474.57                                 | 0.335  | 0.0081   |
|              | Midland       | R                      | R  | R  | R  | R  |
|              | Missaukee     | 25,506,404             | 92.40                                      | 5,379.25                                 | 0.522  | 0.0093   |
|              | Monroe        | 937,828                | 105.71                                     | 904.93                                   | 0.352  | 0.0079   |
|              | Montcalm      | 13,533,676             | 97.96                                      | 2,384.35                                 | 0.478  | 0.0101   |
|              | Montmorency   | 1,227,430              | 134.11                                     | 1,757.88                                 | 0.691  | 0.0052   |
|              | Muskegon      | 3,943,060              | 80.56                                      | 2,543.20                                 | 0.471  | 0.0062   |
|              | Newaygo       | 15,585,187             | 38.08                                      | 3,206.37                                 | 0.527  | 0.0143   |
|              | Oakland       | R                      | R  | R  | R  | R  |
|              | Oceana        | 1,389,327              | 69.99                                      | 1,392.49                                 | 0.722  | 0.0103   |
|              | Ogemaw        | 10,801,880             | 165.47                                     | 2,587.89                                 | 0.529  | 0.0047   |
|              | Osceola       | 13,862,954             | 42.76                                      | 2,864.79                                 | 0.531  | 0.0603   |
|              | Oscoda        | 909,125                | 110.60                                     | 1,029.55                                 | 0.716  | 0.0065   |
|              | Ottawa        | 24,020,294             | 107.47                                     | 2,394.30                                 | 0.367  | 0.0053   |
|              | Presque Isle  | 1,635,539              | 177.82                                     | 2,135.04                                 | 0.687  | 0.0039   |
|              | Saginaw       | 4,849,495              | 178.88                                     | 2,145.44                                 | 0.532  | 0.0104   |
|              | Sanilac       | 38,320,614             | 172.66                                     | 6,190.04                                 | 0.408  | 0.0036   |
|              | Schoolcraft   | R                      | R  | R  | R  | R  |
|              | Shiawassee    | 5,200,312              | 89.05                                      | 2,006.54                                 | 0.508  | 0.0181   |
|              | St. Clair     | 2,590,948              | 71.58                                      | 1,321.72                                 | 0.519  | 0.0075   |

R: Restricted information.

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**APPENDIX A**

**MIDEAST MARKETING AREA WEIGHTED AVERAGE TRANSPORTATION STATISTICS  
BY STATE AND COUNTY FOR MAY 2009**

| <b>State</b> | <b>County</b> | <b>Delivery Pounds</b> | <b>Delivery Distance</b><br><i>(miles)</i> | <b>Hauling Assessment</b><br><i>(\$)</i> | <b>Hauling Assessment</b><br><i>(\$/cwt)</i> | <b>Mileage Rate Factor</b><br><i>(\$/cwt/mile)</i> |
|--------------|---------------|------------------------|--|--|--|--|
| MI (cont.)   | St. Joseph    | 10,251,974             | 165.54                                     | 1,406.57                                 | 0.167  | 0.0102   |
|              | Tuscola       | 12,069,491             | 137.49                                     | 4,951.72                                 | 0.412  | 0.0062   |
|              | Van Buren     | 3,034,813              | 45.01                                      | 2,871.84                                 | 0.552  | 0.0141   |
|              | Washtenaw     | 4,480,962              | 41.52                                      | 1,834.35                                 | 0.578  | 0.0228   |
|              | Wexford       | 1,183,650              | 38.85                                      | 1,713.23                                 | 0.571  | 0.0172   |
| New York     | Cattaraugus   | 2,763,161              | 61.61                                      | 2,450.70                                 | 0.574  | 0.0123   |
|              | Chautauqua    | 4,102,407              | 169.37                                     | 1,049.63                                 | 0.643  | 0.0046   |
|              | Erie          | 616,422                | 14.04                                      | 1,095.80                                 | 0.610  | 0.0971   |
|              | Livingston    | R                      | R  | R  | R  | R  |
|              | Steuben       | R                      | R  | R  | R  | R  |
|              | Wyoming       | 16,667,918             | 68.05                                      | 5,772.33                                 | 0.539  | 0.0096   |
| Ohio         | Adams         | 1,700,160              | 99.02                                      | 765.32                                   | 0.731  | 0.0075   |
|              | Allen         | 697,986                | 83.16                                      | 1,371.68                                 | 0.607  | 0.0074   |
|              | Ashland       | 9,473,923              | 62.20                                      | 2,904.32                                 | 0.562  | 0.0105   |
|              | Ashtabula     | 4,072,912              | 38.98                                      | 2,801.51                                 | 0.548  | 0.0157   |
|              | Athens        | 1,559,897              | 87.53                                      | 1,051.68                                 | 0.920  | 0.0108   |
|              | Auglaize      | 6,426,182              | 166.13                                     | 899.76                                   | 0.492  | 0.0086   |
|              | Belmont       | 1,773,700              | 99.29                                      | 887.57                                   | 0.817  | 0.0317   |
|              | Brown         | 180,848                | 90.87                                      | 662.95                                   | 0.881  | 0.0105   |
|              | Butler        | 523,784                | 149.42                                     | 820.82                                   | 0.757  | 0.0054   |
|              | Carroll       | 2,700,637              | 79.95                                      | 770.15                                   | 0.707  | 0.0157   |
|              | Champaign     | 1,937,874              | 40.98                                      | 1,031.07                                 | 0.551  | 0.0224   |
|              | Clark         | 6,610,653              | 140.40                                     | 8,601.31                                 | 0.273  | 0.0050   |
|              | Clermont      | R                      | R  | R  | R  | R  |
|              | Clinton       | 270,844                | 68.88                                      | 728.40                                   | 0.741  | 0.0130   |
|              | Columbiana    | 11,395,542             | 63.61                                      | 1,779.05                                 | 0.631  | 0.0125   |
|              | Coshocton     | 2,384,296              | 44.08                                      | 890.35                                   | 0.643  | 0.0154   |
|              | Crawford      | 1,289,926              | 77.93                                      | 2,095.70                                 | 0.678  | 0.0091   |
|              | Darke         | 9,637,824              | 46.54                                      | 1,537.64                                 | 0.481  | 0.0129   |
|              | Defiance      | 7,315,037              | 136.36                                     | 13,377.42                                | 0.470  | 0.0041   |
|              | Delaware      | 423,308                | 38.49                                      | 538.97                                   | 0.646  | 0.0168   |
|              | Fairfield     | 1,057,358              | 37.28                                      | 797.17                                   | 0.641  | 0.0211   |
| Fayette      | R             | R                      | R  | R  | R  |  |
| Franklin     | R             | R                      | R  | R  | R  |  |

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**MIDEAST MARKETING AREA WEIGHTED AVERAGE TRANSPORTATION STATISTICS  
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| <b>State</b> | <b>County</b> | <b>Delivery Pounds</b> | <b>Delivery Distance</b><br><i>(miles)</i> | <b>Hauling Assessment</b><br><i>(\$)</i> | <b>Hauling Assessment</b><br><i>(\$/cwt)</i> | <b>Mileage Rate Factor</b><br><i>(\$/cwt/mile)</i> |
|--------------|---------------|------------------------|--|--|--|--|
| OH (cont.)   | Fulton        | 3,833,539              | 183.55                                     | 6,244.42                                 | 0.600  | 0.0042   |
|              | Gallia        | 888,387                | 79.19                                      | 1,561.26                                 | 0.800  | 0.0117   |
|              | Geauga        | 1,861,970              | 27.41                                      | 1,372.51                                 | 0.648  | 0.0382   |
|              | Greene        | 374,833                | 74.64                                      | 625.91                                   | 0.680  | 0.0106   |
|              | Guernsey      | 741,759                | 62.26                                      | 1,006.10                                 | 0.700  | 0.0152   |
|              | Hamilton      | R                      | R  | R  | R  | R  |
|              | Hancock       | 981,203                | 134.48                                     | 2,374.26                                 | 0.574  | 0.0045   |
|              | Hardin        | 10,475,322             | 193.20                                     | 16,554.71                                | 0.312  | 0.0020   |
|              | Harrison      | 988,117                | 124.12                                     | 846.65                                   | 0.770  | 0.0132   |
|              | Henry         | 3,733,094              | 147.49                                     | 2,623.89                                 | 0.310  | 0.0048   |
|              | Highland      | 1,014,273              | 76.61                                      | 944.41                                   | 0.736  | 0.0110   |
|              | Holmes        | 12,056,381             | 21.10                                      | 1,528.59                                 | 0.536  | 0.0460   |
|              | Huron         | 3,665,480              | 67.95                                      | 980.88                                   | 0.798  | 0.0119   |
|              | Jackson       | 108,753                | 88.14                                      | 541.04                                   | 1.117  | 0.0127   |
|              | Jefferson     | 1,169,711              | 60.94                                      | 1,038.18                                 | 0.842  | 0.0293   |
|              | Knox          | 5,134,734              | 74.70                                      | 2,117.70                                 | 0.642  | 0.0153   |
|              | Lawrence      | R                      | R  | R  | R  | R  |
|              | Licking       | 2,276,779              | 40.88                                      | 1,207.64                                 | 0.604  | 0.0939   |
|              | Logan         | 4,520,521              | 113.62                                     | 1,361.04                                 | 0.508  | 0.0085   |
|              | Lorain        | 210,972                | 61.39                                      | 784.33                                   | 0.812  | 0.0132   |
|              | Madison       | 9,274,634              | 141.60                                     | 8,871.42                                 | 0.297  | 0.0030   |
|              | Mahoning      | 7,832,575              | 55.13                                      | 3,808.00                                 | 0.511  | 0.0111   |
|              | Marion        | 6,206,761              | 274.63                                     | 19,710.23                                | 0.486  | 0.0029   |
|              | Medina        | 2,996,201              | 151.68                                     | 1,857.75                                 | 0.527  | 0.0058   |
|              | Meigs         | 1,059,429              | 93.75                                      | 2,049.38                                 | 0.853  | 0.0094   |
|              | Mercer        | 30,447,654             | 59.24                                      | 1,792.70                                 | 0.415  | 0.0108   |
|              | Miami         | 1,737,876              | 58.70                                      | 1,017.32                                 | 0.559  | 0.0168   |
|              | Monroe        | 1,356,723              | 78.19                                      | 893.63                                   | 0.819  | 0.0124   |
|              | Montgomery    | 367,490                | 97.08                                      | 493.29                                   | 0.620  | 0.0073   |
|              | Morgan        | 745,023                | 67.87                                      | 1,240.00                                 | 0.648  | 0.0095   |
|              | Morrow        | 2,833,091              | 64.19                                      | 3,291.78                                 | 0.800  | 0.0125   |
|              | Muskingum     | 868,432                | 43.55                                      | 835.75                                   | 0.747  | 0.0179   |
|              | Paulding      | 10,779,261             | 126.51                                     | 10,405.21                                | 0.271  | 0.0032   |
|              | Perry         | R                      | R  | R  | R  | R  |
|              | Pickaway      | 2,284,485              | 128.27                                     | 5,367.14                                 | 0.406  | 0.0040   |
| Pike         | 1,060,744     | 140.91                 | 1,748.18                                   | 0.888                                    | 0.0073                                       |  |
| Portage      | 2,067,577     | 29.87                  | 1,742.69                                   | 0.511                                    | 0.0173                                       |  |
| Preble       | 1,509,451     | 77.16                  | 1,163.39                                   | 0.670                                    | 0.0145                                       |  |
| Putnam       | 6,138,507     | 120.79                 | 4,331.76                                   | 0.270                                    | 0.0028                                       |  |
| Richland     | 9,223,735     | 54.64                  | 1,196.99                                   | 0.796                                    | 0.0160                                       |  |

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|--------------|---------------|------------------------|--|--|--|--|
| OH (cont.)   | Ross          | 220,362                | 83.41                                      | 539.51                                   | 0.832  | 0.0112   |
|              | Sandusky      | R                      | R  | R  | R  | R  |
|              | Scioto        | 234,958                | 106.90                                     | 1,186.46                                 | 0.719  | 0.0067   |
|              | Seneca        | 473,561                | 88.03                                      | 1,273.44                                 | 0.799  | 0.0091   |
|              | Shelby        | 11,488,785             | 195.96                                     | 3,283.59                                 | 0.438  | 0.0079   |
|              | Stark         | 15,604,568             | 26.30                                      | 2,076.56                                 | 0.505  | 0.0704   |
|              | Summit        | R                      | R  | R  | R  | R  |
|              | Trumbull      | 2,403,896              | 21.63                                      | 1,686.75                                 | 0.662  | 0.0305   |
|              | Tuscarawas    | 9,380,404              | 30.23                                      | 2,091.78                                 | 0.578  | 0.0218   |
|              | Union         | 1,238,379              | 59.86                                      | 922.19                                   | 0.575  | 0.0107   |
|              | Van Wert      | 3,055,396              | 95.98                                      | 1,907.66                                 | 0.308  | 0.0033   |
|              | Warren        | R                      | R  | R  | R  | R  |
|              | Washington    | 4,758,967              | 99.48                                      | 2,147.10                                 | 0.526  | 0.0053   |
|              | Wayne         | 37,456,848             | 48.87                                      | 1,528.23                                 | 0.453  | 0.0198   |
|              | Williams      | 5,050,120              | 82.05                                      | 7,339.40                                 | 0.261  | 0.0033   |
|              | Wood          | R                      | R  | R  | R  | R  |
| Wyandot      | 90,025        | 77.48                  | 268.08                                     | 0.804                                    | 0.0104                                       |  |
| Pennsylvania | Adams         | R                      | R  | R  | R  | R  |
|              | Allegheny     | R                      | R  | R  | R  | R  |
|              | Armstrong     | 2,760,566              | 169.49                                     | 1,938.45                                 | 0.787  | 0.0067   |
|              | Beaver        | 1,118,287              | 92.12                                      | 813.03                                   | 0.784  | 0.0099   |
|              | Bedford       | R                      | R  | R  | R  | R  |
|              | Blair         | R                      | R  | R  | R  | R  |
|              | Butler        | 1,416,804              | 153.56                                     | 1,004.58                                 | 0.853  | 0.0081   |
|              | Cambria       | 345,974                | 214.63                                     | 1,061.68                                 | 0.856  | 0.0040   |
|              | Cameron       | R                      | R  | R  | R  | R  |
|              | Centre        | 2,416,732              | 121.27                                     | 1,270.57                                 | 0.850  | 0.0084   |
|              | Clarion       | 2,213,050              | 144.05                                     | 1,690.45                                 | 0.795  | 0.0077   |
|              | Clearfield    | 1,237,732              | 175.86                                     | 1,331.70                                 | 1.007  | 0.0061   |
|              | Clinton       | 1,494,885              | 128.81                                     | 707.39                                   | 0.802  | 0.0066   |
|              | Crawford      | 7,153,830              | 92.10                                      | 2,146.24                                 | 0.686  | 0.0091   |
|              | Elk           | 616,896                | 226.68                                     | 891.78                                   | 1.037  | 0.0046   |
|              | Erie          | 4,642,842              | 119.28                                     | 1,747.67                                 | 0.730  | 0.0207   |
|              | Fayette       | 2,389,692              | 115.42                                     | 1,417.85                                 | 0.790  | 0.2469   |
|              | Forest        | R                      | R  | R  | R  | R  |
|              | Greene        | 471,103                | 127.35                                     | 1,192.35                                 | 0.864  | 0.0199   |
|              | Huntingdon    | 939,635                | 82.78                                      | 4,797.75                                 | 0.821  | 0.0102   |

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| <b>State</b>  | <b>County</b> | <b>Delivery Pounds</b> | <b>Delivery Distance</b><br><i>(miles)</i> | <b>Hauling Assessment</b><br><i>(\$)</i> | <b>Hauling Assessment</b><br><i>(\$/cwt)</i> | <b>Mileage Rate Factor</b><br><i>(\$/cwt/mile)</i> |
|---------------|---------------|------------------------|--|--|--|--|
| PA (cont.)    | Indiana       | 4,055,850              | 143.77                                     | 1,684.05                                 | 0.924  | 0.0082   |
|               | Jefferson     | 1,529,604              | 139.52                                     | 1,255.53                                 | 0.948  | 0.0075   |
|               | Juniata       | R                      | R  | R  | R  | R  |
|               | Lawrence      | 3,237,501              | 135.15                                     | 1,037.31                                 | 0.724  | 0.0078   |
|               | Lycoming      | R                      | R  | R  | R  | R  |
|               | McKean        | R                      | R  | R  | R  | R  |
|               | Mercer        | 4,293,959              | 87.19                                      | 1,295.96                                 | 0.641  | 0.0349   |
|               | Schuylkill    | 399,715                | 52.33                                      | 897.12                                   | 0.900  | 0.0172   |
|               | Somerset      | 8,369,238              | 149.07                                     | 2,158.89                                 | 0.816  | 0.0106   |
|               | Venango       | 783,216                | 128.45                                     | 1,725.72                                 | 0.778  | 0.0123   |
|               | Warren        | 844,806                | 142.24                                     | 2,026.66                                 | 0.643  | 0.0046   |
|               | Washington    | 2,029,299              | 145.04                                     | 1,603.20                                 | 0.918  | 0.0166   |
|               | Westmoreland  | 4,727,289              | 128.43                                     | 1,537.56                                 | 0.895  | 0.0106   |
| West Virginia | Barbour       | 137,913                | 129.93                                     | 692.50                                   | 1.232  | 0.0095   |
|               | Brooke        | R                      | R  | R  | R  | R  |
|               | Grant         | R                      | R  | R  | R  | R  |
|               | Greenbrier    | R                      | R  | R  | R  | R  |
|               | Hardy         | R                      | R  | R  | R  | R  |
|               | Harrison      | R                      | R  | R  | R  | R  |
|               | Jackson       | 414,474                | 65.74                                      | 1,502.79                                 | 0.841  | 0.0165   |
|               | Marshall      | 112,893                | 13.70                                      | 367.76                                   | 0.907  | 0.0662   |
|               | Mason         | 1,501,955              | 107.18                                     | 1,097.01                                 | 0.681  | 0.0071   |
|               | Monongalia    | 238,835                | 155.48                                     | 655.08                                   | 0.740  | 0.0048   |
|               | Ohio          | 459,143                | 178.50                                     | 606.84                                   | 0.973  | 0.1362   |
|               | Preston       | 1,402,892              | 218.68                                     | 1,597.86                                 | 0.746  | 0.0075   |
|               | Randolph      | R                      | R  | R  | R  | R  |
|               | Roane         | R                      | R  | R  | R  | R  |
|               | Taylor        | 94,168                 | 138.58                                     | 485.52                                   | 1.429  | 0.0103   |
|               | Wetzel        | R                      | R  | R  | R  | R  |
|               | Wirt          | R                      | R  | R  | R  | R  |
|               | Wood          | R                      | R  | R  | R  | R  |
| Wisconsin     | Brown         | R                      | R  | R  | R  | R  |
|               | Calumet       | 250,821                | 26.69                                      | 172.43                                   | 0.199  | 0.0075   |
|               | Clark         | 708,148                | 44.27                                      | 167.44                                   | 0.160  | 0.0038   |

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|--------------|---------------|------------------------|--|--|--|--|
| WI (cont.)   | Columbia      | R                      | R  | R  | R  | R  |
|              | Crawford      | R                      | R  | R  | R  | R  |
|              | Dane          | 7,264,561              | 64.65                                      | 176.46                                   | 0.119  | 0.0019   |
|              | Dodge         | 897,060                | 75.53                                      | 250.19                                   | 0.234  | 0.0034   |
|              | Florence      | R                      | R  | R  | R  | R  |
|              | Green         | R                      | R  | R  | R  | R  |
|              | Iowa          | 1,761,426              | 45.83                                      | 139.97                                   | 0.087  | 0.0020   |
|              | Jefferson     | R                      | R  | R  | R  | R  |
|              | Juneau        | 2,418,557              | 31.57                                      | 309.81                                   | 0.162  | 0.0051   |
|              | Langlade      | 471,435                | 63.39                                      | 223.37                                   | 0.134  | 0.0021   |
|              | Lincoln       | R                      | R  | R  | R  | R  |
|              | Manitowoc     | 205,757                | 187.16                                     | 152.21                                   | 0.224  | 0.0012   |
|              | Marathon      | 532,396                | 37.30                                      | 152.63                                   | 0.259  | 0.0069   |
|              | Marinette     | 2,125,752              | 37.13                                      | 1,599.11                                 | 0.154  | 0.0045   |
|              | Oconto        | 327,618                | 53.63                                      | 143.16                                   | 0.260  | 0.0051   |
|              | Outagamie     | 1,977,848              | 6.19                                       | 314.67                                   | 0.125  | 0.0823   |
|              | Portage       | 494,703                | 43.81                                      | 155.44                                   | 0.251  | 0.0058   |
|              | Richland      | 1,840,995              | 1.02                                       | 233.00                                   | 0.140  | 0.1377   |
|              | Sauk          | 7,433,160              | 30.87                                      | 274.59                                   | 0.139  | 0.2516   |
|              | Shawano       | 1,042,882              | 53.68                                      | 377.48                                   | 0.146  | 0.0030   |
|              | Vernon        | R                      | R  | R  | R  | R  |
| Washington   | R             | R                      | R  | R  | R  |  |
| Waupaca      | 2,175,839     | 22.98                  | 212.60                                     | 0.170                                    | 0.0104                                       |  |
| Winnebago    | 592,206       | 22.81                  | 255.24                                     | 0.121                                    | 0.0054                                       |  |
| Wood         | 1,179,786     | 30.50                  | 190.35                                     | 0.158                                    | 0.0052                                       |  |

R: Restricted information.

**APPENDIX B**

| Subgroup               | Delivery Pounds | Average Delivery Pounds | Hauling Assessment (\$) | Hauling Assessment (\$/cwt) | Delivery Distance (miles) | Mileage Rate Factor (\$/cwt/mile) |
|------------------------|-----------------|-------------------------|-------------------------|-----------------------------|---------------------------|-----------------------------------|
| <b>Illinois</b>        |                 |                         |                         |                             |                           |                                   |
| less than 60,000       | 368,500         | 33,500                  | 422.26                  | 1.147                       | 80.69                     | 0.0187                            |
| 60,000 to 90,000       | 656,114         | 72,902                  | 295.43                  | 0.439                       | 49.58                     | 0.0076                            |
| 90,000 to 125,000      | 425,764         | 106,441                 | 559.12                  | 0.528                       | 70.71                     | 0.0083                            |
| 125,000 to 190,000     | 1,375,520       | 152,836                 | 738.10                  | 0.486                       | 63.40                     | 0.0065                            |
| 190,000 to 250,000     | R               | R                       | R                       | R                           | R                         | R                                 |
| 250,000 to 500,000     | 1,579,373       | 315,875                 | 523.99                  | 0.194                       | 28.26                     | 0.0049                            |
| 1 million to 2 million | R               | R                       | R                       | R                           | R                         | R                                 |
| <b>Indiana</b>         |                 |                         |                         |                             |                           |                                   |
| less than 60,000       | 15,835,079      | 38,717                  | 383.99                  | 0.792                       | 72.66                     | 0.0381                            |
| 60,000 to 90,000       | 12,579,159      | 71,069                  | 568.49                  | 0.780                       | 59.58                     | 0.0426                            |
| 90,000 to 125,000      | 10,882,103      | 104,636                 | 769.05                  | 0.728                       | 51.98                     | 0.0545                            |
| 125,000 to 190,000     | 15,032,028      | 144,539                 | 983.99                  | 0.657                       | 61.18                     | 0.0296                            |
| 190,000 to 250,000     | 12,237,318      | 210,988                 | 1,355.02                | 0.626                       | 55.69                     | 0.0303                            |
| 250,000 to 500,000     | 24,557,087      | 341,071                 | 2,015.69                | 0.564                       | 57.68                     | 0.0422                            |
| 500,000 to 1 million   | 16,305,017      | 652,201                 | 3,921.83                | 0.576                       | 82.90                     | 0.0179                            |
| 1 million to 2 million | 26,540,535      | 1,474,474               | 6,195.60                | 0.410                       | 126.12                    | 0.0075                            |
| more than 2 million    | 15,722,574      | 3,144,515               | 7,675.49                | 0.233                       | 191.13                    | 0.0014                            |
| <b>Kentucky</b>        |                 |                         |                         |                             |                           |                                   |
| less than 60,000       | 766,500         | 36,500                  | 355.49                  | 0.894                       | 100.15                    | 0.0135                            |
| 60,000 to 90,000       | 495,760         | 82,627                  | 730.96                  | 0.880                       | 68.31                     | 0.0159                            |
| 90,000 to 125,000      | 344,056         | 114,685                 | 879.51                  | 0.764                       | 134.02                    | 0.0064                            |
| 125,000 to 190,000     | R               | R                       | R                       | R                           | R                         | R                                 |
| 190,000 to 250,000     | R               | R                       | R                       | R                           | R                         | R                                 |
| 250,000 to 500,000     | R               | R                       | R                       | R                           | R                         | R                                 |
| <b>Maryland</b>        |                 |                         |                         |                             |                           |                                   |
| less than 60,000       | 1,050,042       | 42,002                  | 543.88                  | 1.199                       | 99.75                     | 0.0202                            |
| 60,000 to 90,000       | 456,136         | 76,023                  | 918.81                  | 1.192                       | 68.42                     | 0.0227                            |
| 90,000 to 125,000      | 445,040         | 111,260                 | 1,070.17                | 0.954                       | 98.48                     | 0.0168                            |
| 125,000 to 190,000     | R               | R                       | R                       | R                           | R                         | R                                 |
| 190,000 to 250,000     | R               | R                       | R                       | R                           | R                         | R                                 |
| <b>Michigan</b>        |                 |                         |                         |                             |                           |                                   |
| less than 60,000       | 19,168,739      | 35,302                  | 280.52                  | 0.704                       | 85.23                     | 0.0193                            |
| 60,000 to 90,000       | 16,553,012      | 77,351                  | 445.71                  | 0.572                       | 81.44                     | 0.0147                            |
| 90,000 to 125,000      | 21,391,387      | 110,265                 | 623.83                  | 0.564                       | 76.84                     | 0.0164                            |
| 125,000 to 190,000     | 35,230,665      | 164,629                 | 910.37                  | 0.540                       | 96.03                     | 0.0123                            |
| 190,000 to 250,000     | 33,603,703      | 227,052                 | 1,203.99                | 0.524                       | 82.83                     | 0.0138                            |
| 250,000 to 500,000     | 100,645,579     | 372,761                 | 1,995.86                | 0.512                       | 90.70                     | 0.0145                            |
| 500,000 to 1 million   | 95,252,755      | 721,612                 | 3,448.15                | 0.458                       | 89.85                     | 0.0127                            |
| 1 million to 2 million | 87,588,820      | 1,435,882               | 5,875.34                | 0.398                       | 127.89                    | 0.0080                            |
| more than 2 million    | 188,923,900     | 3,855,590               | 10,826.03               | 0.260                       | 160.58                    | 0.0040                            |

R: Restricted information not included.

*(continued on the following page)*

**APPENDIX B**

| Subgroup               | Delivery Pounds | Average<br>Delivery Pounds | Hauling<br>Assessment<br>(\$) | Hauling<br>Assessment<br>(\$/cwt) | Delivery<br>Distance<br>(miles) | Mileage Rate<br>Factor<br>(\$/cwt/mile) |
|------------------------|-----------------|----------------------------|-------------------------------|-----------------------------------|---------------------------------|---|
| <b>New York</b>        |                 |                            |                               |                                   |                                 |   |
| less than 60,000       | 903,584         | 39,286                     | 321.16                        | 0.738                             | 127.41                          | 0.0139                                  |
| 60,000 to 90,000       | 999,225         | 76,863                     | 498.99                        | 0.642                             | 118.29                          | 0.0166                                  |
| 90,000 to 125,000      | 1,173,433       | 106,676                    | 675.32                        | 0.626                             | 114.37                          | 0.0073                                  |
| 125,000 to 190,000     | 909,752         | 151,625                    | 958.98                        | 0.627                             | 96.88                           | 0.0240                                  |
| 190,000 to 250,000     | 1,505,415       | 215,059                    | 1,257.29                      | 0.577                             | 138.16                          | 0.0063                                  |
| 250,000 to 500,000     | 4,224,765       | 384,070                    | 2,296.20                      | 0.583                             | 80.85                           | 0.0195                                  |
| 500,000 to 1 million   | 7,277,701       | 727,770                    | 4,188.94                      | 0.541                             | 81.65                           | 0.0092                                  |
| 1 million to 2 million | 5,899,144       | 1,179,829                  | 6,299.57                      | 0.529                             | 55.93                           | 0.0102                                  |
| more than 2 million    | R               | R                          | R                             | R                                 | R                               | R                                       |
| <b>Ohio</b>            |                 |                            |                               |                                   |                                 |   |
| less than 60,000       | 19,904,684      | 38,205                     | 366.32                        | 0.772                             | 60.20                           | 0.0254                                  |
| 60,000 to 90,000       | 19,953,948      | 75,583                     | 516.84                        | 0.662                             | 60.88                           | 0.0218                                  |
| 90,000 to 125,000      | 27,806,491      | 108,196                    | 726.00                        | 0.654                             | 59.21                           | 0.0219                                  |
| 125,000 to 190,000     | 39,379,255      | 157,517                    | 975.86                        | 0.586                             | 71.46                           | 0.0209                                  |
| 190,000 to 250,000     | 28,844,576      | 220,188                    | 1,238.54                      | 0.552                             | 71.87                           | 0.0219                                  |
| 250,000 to 500,000     | 56,354,875      | 335,446                    | 1,851.33                      | 0.531                             | 63.08                           | 0.0192                                  |
| 500,000 to 1 million   | 40,030,622      | 678,485                    | 2,972.47                      | 0.426                             | 61.72                           | 0.0178                                  |
| 1 million to 2 million | 29,225,258      | 1,328,421                  | 4,961.22                      | 0.362                             | 88.25                           | 0.0074                                  |
| more than 2 million    | 59,770,921      | 3,984,728                  | 12,417.93                     | 0.277                             | 174.51                          | 0.0018                                  |
| <b>Pennsylvania</b>    |                 |                            |                               |                                   |                                 |   |
| less than 60,000       | 10,140,473      | 36,477                     | 396.10                        | 0.988                             | 139.31                          | 0.0273                                  |
| 60,000 to 90,000       | 11,032,177      | 72,106                     | 627.49                        | 0.864                             | 136.29                          | 0.0110                                  |
| 90,000 to 125,000      | 6,554,713       | 105,721                    | 876.59                        | 0.822                             | 121.48                          | 0.0274                                  |
| 125,000 to 190,000     | 9,475,984       | 150,412                    | 1,160.62                      | 0.761                             | 135.04                          | 0.0242                                  |
| 190,000 to 250,000     | 5,915,947       | 211,284                    | 1,635.87                      | 0.770                             | 111.89                          | 0.0462                                  |
| 250,000 to 500,000     | 10,670,426      | 344,207                    | 2,674.52                      | 0.750                             | 123.74                          | 0.0143                                  |
| 500,000 to 1 million   | 4,431,776       | 738,629                    | 4,416.27                      | 0.584                             | 118.66                          | 0.0102                                  |
| 1 million to 2 million | R               | R                          | R                             | R                                 | R                               | R                                       |
| <b>West Virginia</b>   |                 |                            |                               |                                   |                                 |   |
| less than 60,000       | 1,398,033       | 39,944                     | 598.63                        | 0.986                             | 143.75                          | 0.0360                                  |
| 60,000 to 90,000       | 621,435         | 69,048                     | 645.80                        | 0.929                             | 87.60                           | 0.0572                                  |
| 90,000 to 125,000      | 513,649         | 102,730                    | 791.78                        | 0.770                             | 169.35                          | 0.0051                                  |
| 125,000 to 190,000     | 1,052,167       | 150,310                    | 1,142.90                      | 0.762                             | 146.24                          | 0.0089                                  |
| 190,000 to 250,000     | 891,439         | 222,860                    | 1,820.90                      | 0.812                             | 107.73                          | 0.0077                                  |
| 250,000 to 500,000     | 1,566,051       | 313,210                    | 2,126.47                      | 0.670                             | 172.96                          | 0.0062                                  |

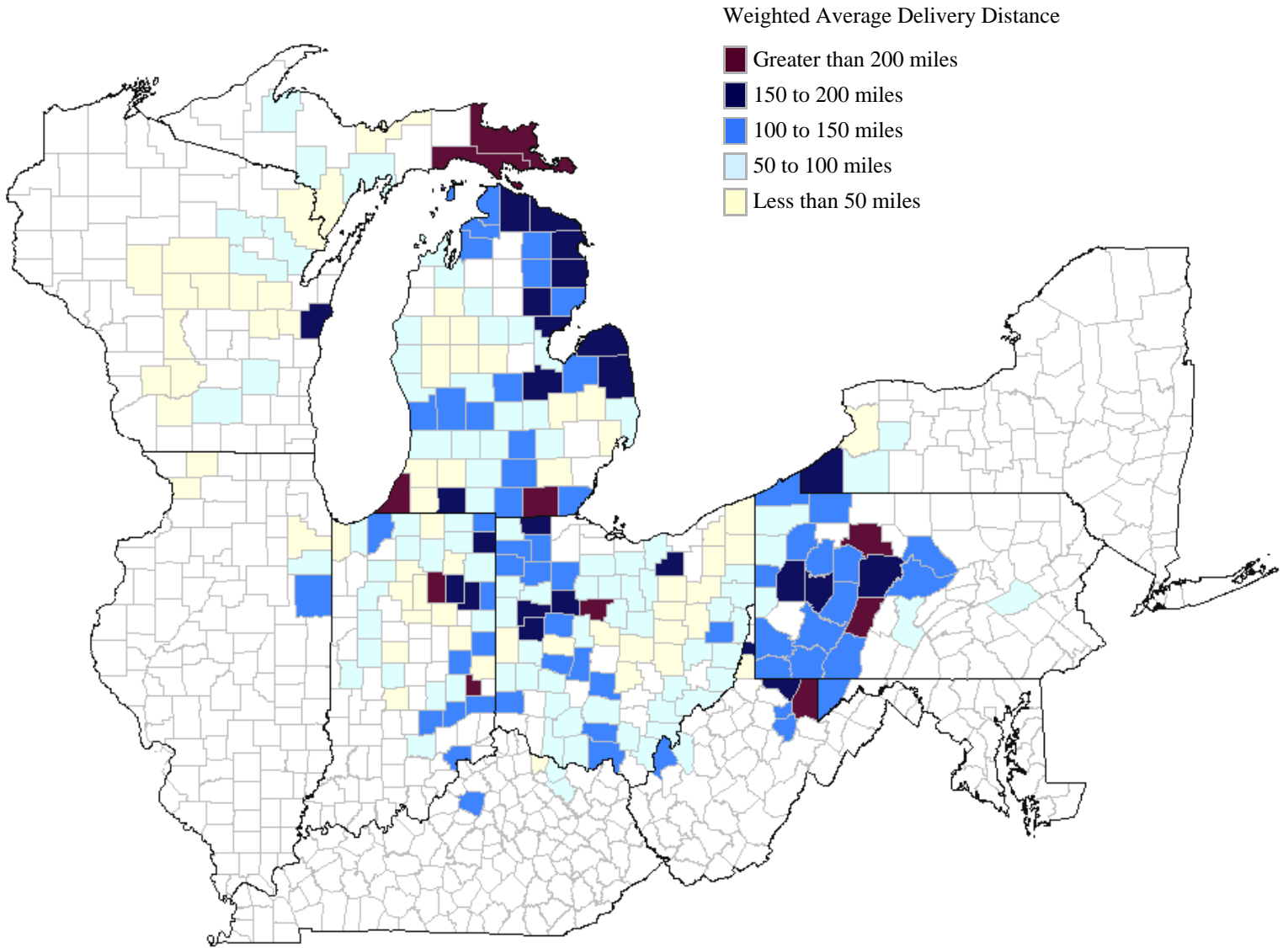


## APPENDIX B

| Subgroup               | Delivery Pounds | Average<br>Delivery Pounds | Hauling<br>Assessment<br><i>(\$)</i> | Hauling<br>Assessment<br><i>(\$/cwt)</i> | Delivery<br>Distance<br><i>(miles)</i> | Mileage Rate<br>Factor<br><i>(\$/cwt/mile)</i> |
|------------------------|-----------------|----------------------------|--------------------------------------|--|--|--|
| Wisconsin              |                 |                            |                                      |  |  |  |
| less than 60,000       | 2,367,278       | 38,808                     | 158.23                               | 0.397                                    | 46.87                                  | 0.1762   |
| 60,000 to 90,000       | 3,495,164       | 69,903                     | 163.40                               | 0.230                                    | 40.55                                  | 0.0622   |
| 90,000 to 125,000      | 5,129,754       | 109,144                    | 179.51                               | 0.158                                    | 37.43                                  | 0.0938   |
| 125,000 to 190,000     | 7,160,159       | 149,170                    | 200.07                               | 0.131                                    | 39.23                                  | 0.0702   |
| 190,000 to 250,000     | 4,914,192       | 213,661                    | 240.22                               | 0.111                                    | 40.69                                  | 0.0255   |
| 250,000 to 500,000     | 7,484,064       | 311,836                    | 298.28                               | 0.088                                    | 36.71                                  | 0.0352   |
| 500,000 to 1 million   | 4,178,806       | 596,972                    | 397.65                               | 0.068                                    | 44.61                                  | 0.0891   |
| 1 million to 2 million | R               | R                          | R                                    | R  | R                                      | R  |

# APPENDIX C

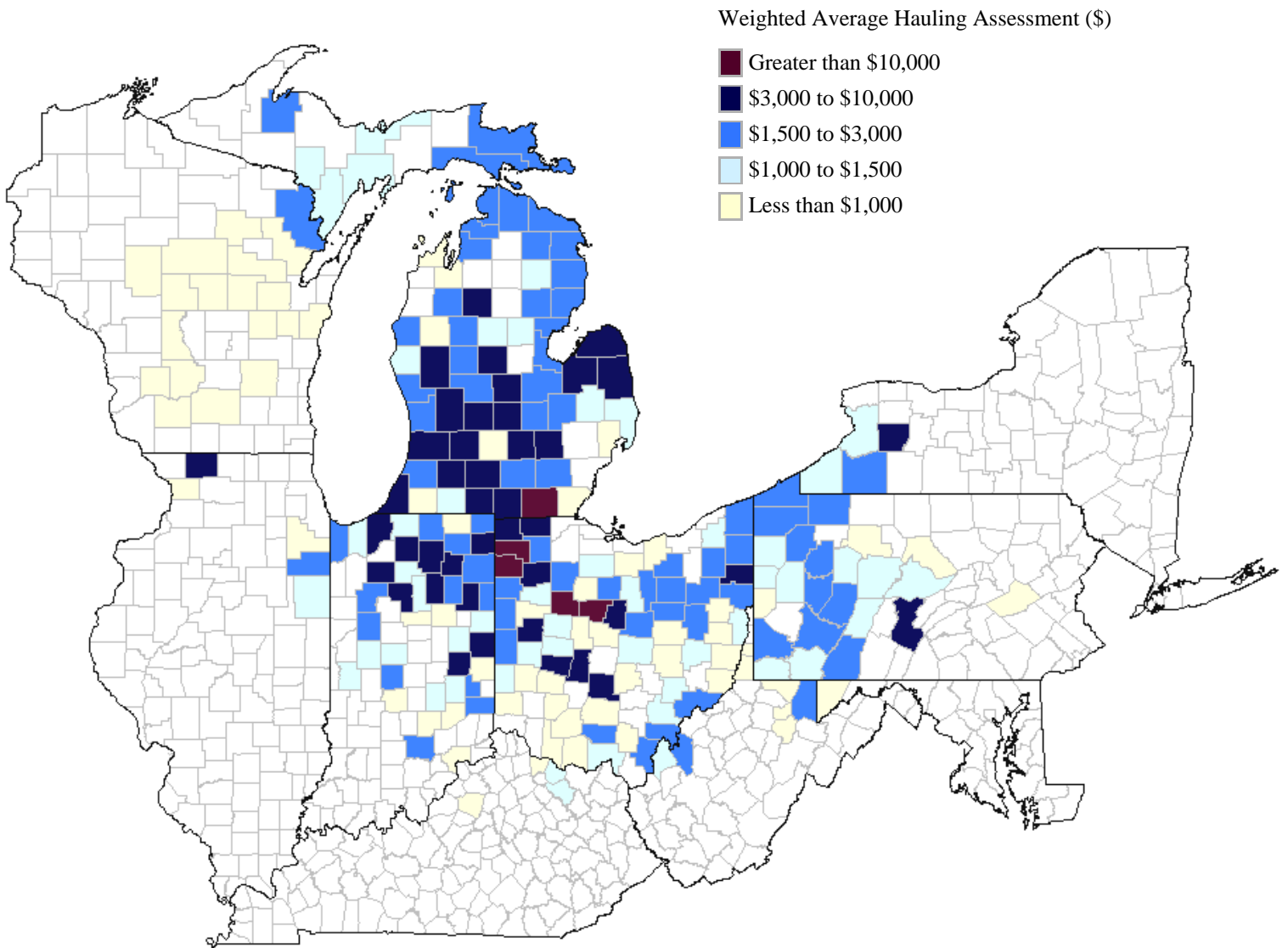
## WEIGHTED AVERAGE DELIVERY DISTANCE BY STATE AND COUNTY FOR MAY 2009 1/



1/ Restricted information not included.

# APPENDIX C

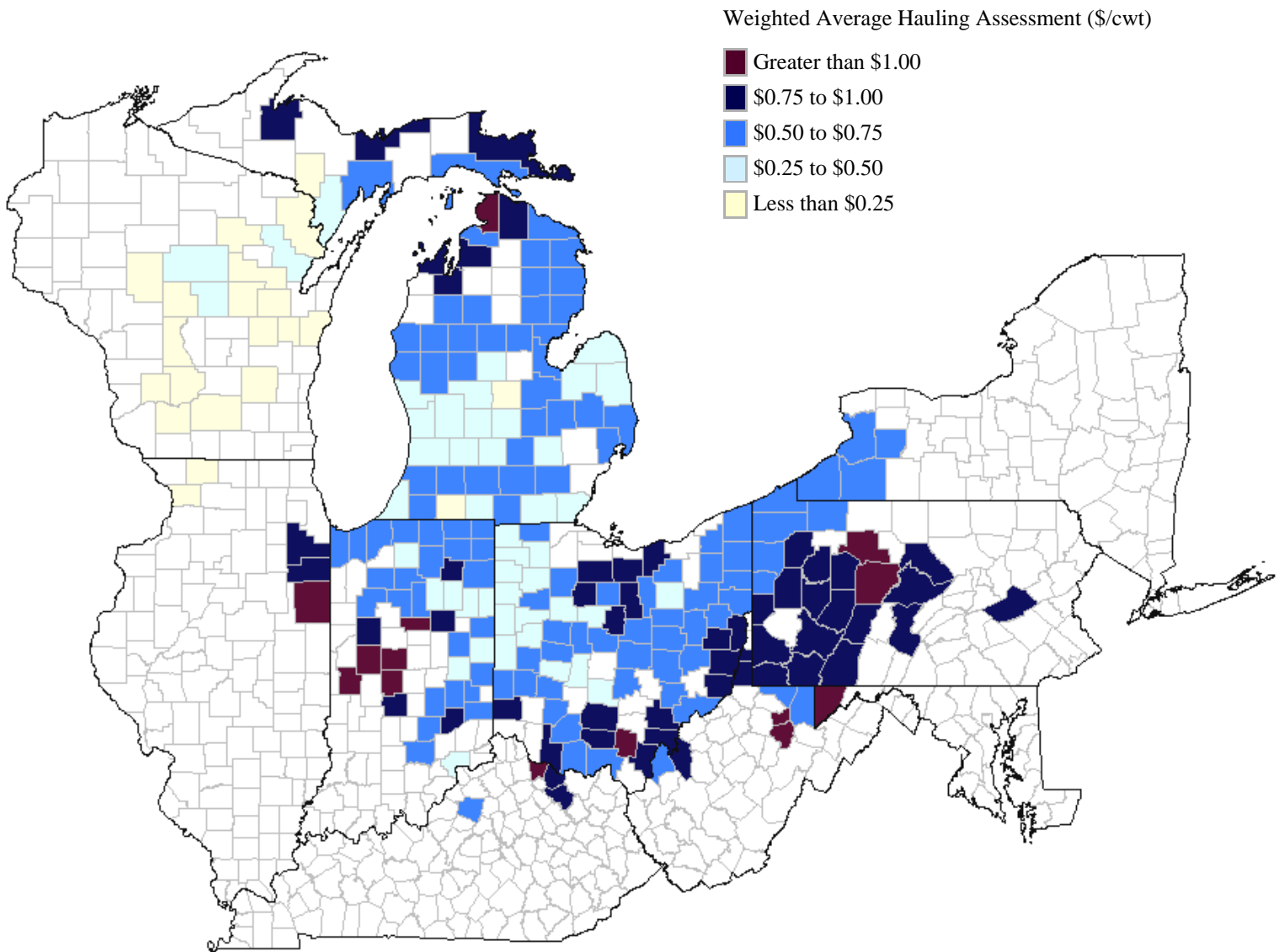
## WEIGHTED AVERAGE HAULING ASSESSMENT BY STATE AND COUNTY FOR MAY 2009 1/



1/ Restricted information not included.

# APPENDIX C

## WEIGHTED AVERAGE HAULING ASSESSMENT PER CWT BY STATE AND COUNTY FOR MAY 2009 1/



1/ Restricted information not included.

## APPENDIX D Model Output

Dependent Variable: HA  
 Method: Least Squares  
 Date: 09/16/09 Time: 13:54  
 Sample: 1 5633  
 Included observations: 5633  
 White Heteroskedasticity-Consistent Standard Errors & Covariance

| Variable           | Coefficient | Std. Error            | t-Statistic | Prob.    |
|--------------------|-------------|-----------------------|-------------|----------|
| C                  | 480.5854    | 40.49187              | 11.86869    | 0.0000   |
| P                  | 0.002798    | 0.000205              | 13.63684    | 0.0000   |
| M                  | 0.098338    | 0.138367              | 0.710703    | 0.4773   |
| CL                 | -0.834806   | 0.114967              | -7.261247   | 0.0000   |
| R-squared          | 0.724400    | Mean dependent var    |             | 1024.388 |
| Adjusted R-squared | 0.724253    | S.D. dependent var    |             | 1603.542 |
| S.E. of regression | 842.0464    | Akaike info criterion |             | 16.31026 |
| Sum squared resid  | 3.99E+09    | Schwarz criterion     |             | 16.31497 |
| Log likelihood     | -45933.84   | Hannan-Quinn criter.  |             | 16.31190 |
| F-statistic        | 4931.832    | Durbin-Watson stat    |             | 1.750405 |
| Prob(F-statistic)  | 0.000000    |                       |             |          |

Dependent Variable: HA  
 Method: Least Squares  
 Date: 09/16/09 Time: 13:56  
 Sample: 1 5633  
 Included observations: 5633  
 White Heteroskedasticity-Consistent Standard Errors & Covariance

| Variable           | Coefficient | Std. Error            | t-Statistic | Prob.    |
|--------------------|-------------|-----------------------|-------------|----------|
| C                  | 231.4984    | 27.05725              | 8.555873    | 0.0000   |
| P                  | 0.004428    | 0.000179              | 24.72552    | 0.0000   |
| P <sup>2</sup>     | -3.78E-10   | 6.68E-11              | -5.660387   | 0.0000   |
| M                  | 0.201298    | 0.125548              | 1.603356    | 0.1089   |
| CL                 | -0.744129   | 0.104271              | -7.136513   | 0.0000   |
| R-squared          | 0.794423    | Mean dependent var    |             | 1024.388 |
| Adjusted R-squared | 0.794277    | S.D. dependent var    |             | 1603.542 |
| S.E. of regression | 727.3141    | Akaike info criterion |             | 16.01748 |
| Sum squared resid  | 2.98E+09    | Schwarz criterion     |             | 16.02337 |
| Log likelihood     | -45108.24   | Hannan-Quinn criter.  |             | 16.01953 |
| F-statistic        | 5437.148    | Durbin-Watson stat    |             | 1.766031 |
| Prob(F-statistic)  | 0.000000    |                       |             |          |

# APPENDIX D

## Model Output

Test Equation:  
 Dependent Variable: RESID^2  
 Method: Least Squares  
 Date: 09/10/09 Time: 14:36  
 Sample: 1 5633  
 Included observations: 5633  
 Collinear test regressors dropped from specification

| Variable           | Coefficient | Std. Error            | t-Statistic | Prob.  |
|--------------------|-------------|-----------------------|-------------|--------|
| C                  | -1388651.   | 596723.0              | -2.327128   | 0.0200 |
| P                  | 13.95825    | 1.323113              | 10.54956    | 0.0000 |
| P^2                | -1.33E-05   | 6.99E-07              | -19.04249   | 0.0000 |
| P*(P^2)            | 4.10E-12    | 1.66E-13              | 24.68808    | 0.0000 |
| P*M                | -0.040044   | 0.003559              | -11.25026   | 0.0000 |
| P*CL               | 0.056116    | 0.007372              | 7.612130    | 0.0000 |
| P*T                | -3.111744   | 1.159769              | -2.683073   | 0.0073 |
| P*U10              | -6.920188   | 1.089105              | -6.354016   | 0.0000 |
| P*U50              | -4.876895   | 0.957283              | -5.094519   | 0.0000 |
| (P^2)^2            | -3.80E-19   | 1.24E-20              | -30.66819   | 0.0000 |
| (P^2)*M            | 1.85E-08    | 7.66E-10              | 24.13350    | 0.0000 |
| (P^2)*CL           | -2.60E-08   | 1.69E-09              | -15.34156   | 0.0000 |
| (P^2)*T            | 1.22E-06    | 5.56E-07              | 2.188727    | 0.0287 |
| (P^2)*U10          | 2.62E-06    | 2.18E-07              | 11.99767    | 0.0000 |
| (P^2)*U50          | 2.50E-06    | 1.73E-07              | 14.48869    | 0.0000 |
| M                  | 8845.207    | 4474.927              | 1.976615    | 0.0481 |
| M^2                | -15.52379   | 7.566319              | -2.051696   | 0.0402 |
| M*CL               | -12.48566   | 19.31767              | -0.646334   | 0.5181 |
| M*T                | -5922.720   | 2113.417              | -2.802438   | 0.0051 |
| M*U10              | 5237.422    | 3419.828              | 1.531487    | 0.1257 |
| M*U50              | 5708.809    | 2604.836              | 2.191620    | 0.0284 |
| CL                 | -9436.785   | 6083.754              | -1.551145   | 0.1209 |
| CL^2               | 26.21483    | 21.91213              | 1.196362    | 0.2316 |
| CL*T               | -4878.977   | 2769.663              | -1.761578   | 0.0782 |
| CL*U10             | -3372.550   | 5169.871              | -0.652347   | 0.5142 |
| CL*U50             | 1367.179    | 4493.571              | 0.304252    | 0.7609 |
| T                  | 1204635.    | 529869.0              | 2.273458    | 0.0230 |
| T*U10              | -420285.1   | 582511.3              | -0.721506   | 0.4706 |
| T*U50              | -210962.1   | 498975.7              | -0.422790   | 0.6725 |
| U10                | 898582.5    | 626524.2              | 1.434234    | 0.1516 |
| U50                | 112369.4    | 532249.0              | 0.211122    | 0.8328 |
| R-squared          | 0.568618    | Mean dependent var    | 521940.0    |        |
| Adjusted R-squared | 0.565921    | S.D. dependent var    | 7495300.    |        |
| S.E. of regression | 4938255.    | Akaike info criterion | 33.66752    |        |
| Sum squared resid  | 1.36E+17    | Schwarz criterion     | 33.70404    |        |
| Log likelihood     | -94793.56   | Hannan-Quinn criter.  | 33.68024    |        |
| F-statistic        | 245.9196    | Durbin-Watson stat    | 1.884233    |        |
| Prob(F-statistic)  | 0.000000    |                       |             |        |

## APPENDIX D Model Output

Dependent Variable: HA  
 Method: Least Squares  
 Date: 09/16/09 Time: 13:52  
 Sample: 1 5633  
 Included observations: 5633  
 White Heteroskedasticity-Consistent Standard Errors & Covariance

| Variable           | Coefficient | Std. Error            | t-Statistic | Prob.    |
|--------------------|-------------|-----------------------|-------------|----------|
| C                  | 345.8918    | 42.25008              | 8.186772    | 0.0000   |
| P                  | 0.004435    | 0.000178              | 24.87649    | 0.0000   |
| P^2                | -3.79E-10   | 6.65E-11              | -5.693010   | 0.0000   |
| M                  | 0.001036    | 0.140558              | 0.007369    | 0.9941   |
| CL                 | -0.707852   | 0.105386              | -6.716784   | 0.0000   |
| U10                | -195.4305   | 35.23528              | -5.546445   | 0.0000   |
| U50                | -95.72763   | 31.05040              | -3.082976   | 0.0021   |
| R-squared          | 0.795554    | Mean dependent var    |             | 1024.388 |
| Adjusted R-squared | 0.795336    | S.D. dependent var    |             | 1603.542 |
| S.E. of regression | 725.4388    | Akaike info criterion |             | 16.01267 |
| Sum squared resid  | 2.96E+09    | Schwarz criterion     |             | 16.02092 |
| Log likelihood     | -45092.69   | Hannan-Quinn criter.  |             | 16.01555 |
| F-statistic        | 3648.720    | Durbin-Watson stat    |             | 1.768681 |
| Prob(F-statistic)  | 0.000000    |                       |             |          |

Dependent Variable: HA  
 Method: Least Squares  
 Date: 09/16/09 Time: 13:54  
 Sample: 1 5633  
 Included observations: 5633  
 White Heteroskedasticity-Consistent Standard Errors & Covariance

| Variable           | Coefficient | Std. Error            | t-Statistic | Prob.    |
|--------------------|-------------|-----------------------|-------------|----------|
| C                  | 192.9485    | 28.94659              | 6.665671    | 0.0000   |
| P                  | 0.004458    | 0.000180              | 24.74579    | 0.0000   |
| P^2                | -3.81E-10   | 6.69E-11              | -5.697499   | 0.0000   |
| M                  | 0.103322    | 0.182620              | 0.565775    | 0.5716   |
| CL                 | -0.740750   | 0.106475              | -6.957009   | 0.0000   |
| T                  | 113.5142    | 19.01423              | 5.969960    | 0.0000   |
| M*T                | 0.146588    | 0.202823              | 0.722740    | 0.4699   |
| R-squared          | 0.795755    | Mean dependent var    |             | 1024.388 |
| Adjusted R-squared | 0.795537    | S.D. dependent var    |             | 1603.542 |
| S.E. of regression | 725.0828    | Akaike info criterion |             | 16.01169 |
| Sum squared resid  | 2.96E+09    | Schwarz criterion     |             | 16.01994 |
| Log likelihood     | -45089.93   | Hannan-Quinn criter.  |             | 16.01456 |
| F-statistic        | 3653.224    | Durbin-Watson stat    |             | 1.766123 |
| Prob(F-statistic)  | 0.000000    |                       |             |          |

## APPENDIX D

### Model Output

Dependent Variable: HA  
 Method: Least Squares  
 Date: 09/16/09 Time: 13:36  
 Sample: 1 5633  
 Included observations: 5633  
 White Heteroskedasticity-Consistent Standard Errors & Covariance

| Variable           | Coefficient | Std. Error            | t-Statistic | Prob.    |
|--------------------|-------------|-----------------------|-------------|----------|
| C                  | 320.4026    | 45.23756              | 7.082667    | 0.0000   |
| P                  | 0.004468    | 0.000179              | 24.91695    | 0.0000   |
| P^2                | -3.82E-10   | 6.67E-11              | -5.734536   | 0.0000   |
| M                  | -0.167511   | 0.204091              | -0.820767   | 0.4118   |
| M*T                | 0.302792    | 0.212161              | 1.427185    | 0.1536   |
| T                  | 105.7550    | 19.20563              | 5.506461    | 0.0000   |
| CL                 | -0.690689   | 0.108465              | -6.367843   | 0.0000   |
| U10                | -209.7685   | 36.18125              | -5.797715   | 0.0000   |
| U50                | -107.5780   | 32.08527              | -3.352877   | 0.0008   |
| R-squared          | 0.797028    | Mean dependent var    |             | 1024.388 |
| Adjusted R-squared | 0.796739    | S.D. dependent var    |             | 1603.542 |
| S.E. of regression | 722.9489    | Akaike info criterion |             | 16.00615 |
| Sum squared resid  | 2.94E+09    | Schwarz criterion     |             | 16.01675 |
| Log likelihood     | -45072.32   | Hannan-Quinn criter.  |             | 16.00984 |
| F-statistic        | 2760.524    | Durbin-Watson stat    |             | 1.769286 |
| Prob(F-statistic)  | 0.000000    |                       |             |          |

Dependent Variable: HA  
 Method: Least Squares  
 Date: 09/16/09 Time: 14:37  
 Sample: 1 5633  
 Included observations: 5633  
 White Heteroskedasticity-Consistent Standard Errors & Covariance

| Variable           | Coefficient | Std. Error            | t-Statistic | Prob.    |
|--------------------|-------------|-----------------------|-------------|----------|
| C                  | 303.1780    | 33.49239              | 9.052147    | 0.0000   |
| P                  | 0.004464    | 0.000179              | 24.92114    | 0.0000   |
| P^2                | -3.82E-10   | 6.66E-11              | -5.735769   | 0.0000   |
| T                  | 129.9948    | 11.72463              | 11.08733    | 0.0000   |
| CL                 | -0.708969   | 0.107364              | -6.603416   | 0.0000   |
| U10                | -200.5206   | 31.67689              | -6.330187   | 0.0000   |
| U50                | -100.7714   | 27.19818              | -3.705078   | 0.0002   |
| R-squared          | 0.796972    | Mean dependent var    |             | 1024.388 |
| Adjusted R-squared | 0.796756    | S.D. dependent var    |             | 1603.542 |
| S.E. of regression | 722.9184    | Akaike info criterion |             | 16.00571 |
| Sum squared resid  | 2.94E+09    | Schwarz criterion     |             | 16.01396 |
| Log likelihood     | -45073.09   | Hannan-Quinn criter.  |             | 16.00858 |
| F-statistic        | 3680.755    | Durbin-Watson stat    |             | 1.770358 |
| Prob(F-statistic)  | 0.000000    |                       |             |          |