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# ANALYSIS OF MILK MOVEMENTS FROM DAIRY FARMS TO MILK PROCESSING PLANTS: MAY 2016

## PACIFIC NORTHWEST ORDER

Staff Paper 17-02

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## PACIFIC NORTHWEST ORDER

**John Mykrantz**

Abstract

In the Pacific Northwest, milk is a particularly local agricultural commodity, i.e., it is processed close to where it is produced. The economics of milk, milk production, and milk processing reinforce the localness of milk. Fresh raw milk is very bulky and highly perishable and typically moves from a dairy farm to a milk processing plant on the same day it is produced. This study analyzes milk movements (distances) between dairy farms and milk processing plants. The data represented in this analysis are based on handler records of milk movements from dairy farms to milk processing plants and estimated mileages from dairy farms to plants. The dairy farms represented in this analysis are producers associated with the Pacific Northwest (FO 124) Federal Milk Marketing Order during May 2016. This analysis examines various subsets of milk movements, including: 1) the milkshed of the Pacific Northwest Order; 2) type of plant (distributing vs. manufacturing); 3) class of utilization at plant; 4) location adjustment zone of plant; 5) region of farm; 6) region of plant; 7) size-range of average daily delivery of dairy farm; and 8) size-range of average daily receipt of plant. In addition, comparing distances based on dairy farm region and on plant region can reveal nominal surplus and deficit regions. Basic statistical measures are used to analyze the character of farms delivering milk to plants and distances from dairy farms to the plant, including: weighted averages, medians, percentiles, and standard deviations.

## TABLE OF CONTENTS

# ANALYSIS OF MILK MOVEMENTS FROM DAIRY FARMS TO MILK PROCESSING PLANTS: MAY 2016

## PACIFIC NORTHWEST ORDER

John Mykrantz [1]

## I. INTRODUCTION

In the Pacific Northwest, milk is a particularly local agricultural commodity, i.e., it is processed close to where it is produced. The economics of milk, milk production, and milk processing reinforce the localness of milk. Fresh raw milk is very bulky and highly perishable and typically moves from the dairy farm to a milk processing plant on the same day it is produced. In the case of smaller farms which produce less than a typical load of milk per day, pickups may occur every other day. Once received at a milk processing plant, the raw milk is quickly processed into the dairy products consumers are demanding which can vary considerably across the weeks and seasons. Milk production also varies significantly across the seasons and due to the bulky and perishable nature of milk, the marketing solution which optimizes milk's value changes from day to day, week to week, and season to season. In essence, the dairy industry is tasked with efficiently moving each day's milk production from the right farm to the right plant at the right time, where it can be made into fresh dairy products consumers want when they want them.

This study analyzes milk movements (distances) between dairy farms and milk processing plants. The data represented in this analysis are based on handler records of milk movements from dairy farms to milk processing plants and estimated mileages from dairy farms to plants. The dairy farms represented in this analysis are producers associated with the Pacific Northwest (FO 124) Federal Milk Marketing Order during May 2016. This analysis examines various subsets of milk movements, including: 1) the milkshed of the Pacific Northwest Order; 2) type of plant (distributing vs. manufacturing); 3) class of utilization at plant; 4) location adjustment zone of plant; 5) region of farm; 6) region of plant; 7) size-range of average daily delivery of dairy farm; and 8) size-range of average daily receipt of plant. Basic statistical measures are used to analyze the character of farms delivering milk to plants and distances from dairy farms to the plant, including: weighted averages, medians, percentiles, and standard deviations

## II. DATA

The data set includes the milk of 553 Grade A dairy farms located in Idaho, Oregon, and Washington and pooled on the Pacific Northwest Order for May 2016. General characteristics of the data set are shown in the following table.

[1] John Mykrantz is an Agricultural Economist with the Market Administrator's Office, Bothell, Washington. This research is a part of the MA offices mission to provide market information per 1000.25 (c)(8). Special thanks are due Bill Wise for his comments on preliminary drafts.

**General Characteristics of Dataset: May 2016 1/**

| Pounds of Milk (Million) | Average Production Per Day (Million) | Number of Producers | Average Daily Delivery Per Producer | | | |
|---|---|---|---|---|---|---|
| | | | Average | Median | Smallest 10% | Largest 10% |
| 773.6 | 24.95 | 553 | 45,124 | 19,439 | 3,608 | 105,589 |

1/ Data represents partially audited producer payrolls and may differ from pool totals.

The data set consists of over 20,000 electronic handler records of daily farm pickups which identify the location of dairy farms, the plant of first receipt (destination), and the quantity of milk delivered. The mileage associated with each farm's delivery is estimated as the distance via the shortest hard surface highway between the farm and the receiving (destination) plant. Deliveries of milk from dairy farms to milk processing plants vary depending upon the size and location of each dairy in relation to a farm's proximity to other dairy farms and the size of a farm's bulk tank. Milk production of some of the smallest dairy farms may be delivered to milk processing plants every other day. Typically, milk deliveries from dairy farms occur daily, sometimes with multiple farms' milk on the same tanker. Some farms deliver full or multiple full and/or partial loads of milk daily. This analysis does not measure the exact mileage each milk tanker may travel from dairy farm to plant, but mileage measurements may be relatively more precise in the case where a dairy farm's milk production is the only milk on a load. While this analysis uses estimates of miles between farm and plant, the estimated distances are sometimes referred to as "miles traveled" as short hand. Excluded from this analysis are subsequent movements (bulk transfers) of milk, standardized milk, skim milk, cream, concentrated milk from the plant of first receipt to other plants for further processing.

## III. METHODOLOGY

Mileages used in this analysis are not actual mileages as driven by the hauler but estimated mileages as measured from each dairy farm to the plant of first receipt using two computer programs: *Maptitude*® and *MileCharter*®. [2] Mileages are measured from each dairy farm to the plant of first receipt via the shortest hard surface highway distance. Weighted average mileages (distances) are calculated as:

$$\text{Weighted Average Mileage} = \left(\sum_{i=1}^{n} \quad \sum_{t=1}^{31} \quad \sum_{j=1}^{p} x_{it}\, m_{ij}\right) / \sum_{i=1}^{n} x_i,$$

where: $n$ is the number of delivery observations in the data set; $t$ is the delivery day; $x$ is the pounds of milk of farm $i$ delivered on day $t$; $m$ is a measurement of miles from farm $i$ to plant $j$; and $p$ is the number of plants at which milk is received in the subset of dairy farms.

In this analysis, several different subsets of milk movements are used to examine the data set from different perspectives. The various subsets are as follows:

1) Milkshed of the Pacific Northwest Order;
2) Plant type (distributing vs. manufacturing);

[2] *Maptitude*®, Caliper Corporation (http://www.caliper.com/Maptitude/MappingSoftware.htm). *MileCharter*®, (http://www.milecharter.com/).

3) Class of utilization at plant;
4) Location adjustment zone of plant;
5) Subregion by source - dairy farm;
6) Subregion by destination - plant of first receipt;
7) Size-range of average daily delivery of dairy farm; and
8) Size-range of average daily receipt of plant.

**Milkshed**

In May 2016, the milkshed of the Pacific Northwest Order consists of 553 Grade A dairy farms located in Idaho, Oregon, and Washington. Each dairy farm qualifies as a "producer" under the order with producer milk pooled on the order. All Grade A milk commercially marketed by each dairy farm is represented in the data set.

**Plant Type**

There are two basic plant types defined in this analysis: distributing plants and manufacturing plants. [3] Both types of plants receive producer milk from producers. Distributing plants qualify under §1124.7(a/b) of the Pacific Northwest Order and represent plants that produce fluid milk products (beverage milk) which are considered Class I products. [4] Distributing plants typically also produce a variety of Class II products, but may also have small amounts of Class III and IV utilization.[5] As defined here, manufacturing plants do not process milk into Class I products, only Class II, III, and IV products. A description of the primary products in each class follows.

**Class of Utilization**

Federal orders classify the use of producer milk at each plant based on what dairy products are made at the plant. [6] Federal orders have four classes of utilization of milk, which are as follows:

- Class I: Fluid milk products (Beverage milk), Buttermilk, Eggnog;
- Class II: Cream, Half&Half, Cottage Cheese, Ice Cream, Sour Cream, Yogurt;
- Class III: Cheese/Whey;
- Class IV: Butter, Nonfat dry milk and other dry milk products

Class I and II represent the fresh milk market and products which are generally more perishable. Class III and IV represent manufacturing milk uses and products that are, by design, less perishable. Milk not needed for the fresh market is sent to plants that manufacture milk into more storable products.

**Location Adjustment Zone of Plant**

Plants receiving producer milk which is pooled on the Pacific Northwest Order have associated location adjustments based on the county in which they are located. Plants located in Western Oregon and Washington and several counties near Spokane, Washington, are in the $1.90 zone. The remaining plants are located in the $1.75 and $1.60 zones. Generally, higher location adjustment zones are associated with regions closer to larger urban populations.

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[3] A partial list of plants included in this analysis can be found at: http://fmmaseattle.com/plantshandlerslist.html. Nonpool plants with only Class II/III/IV product production are not listed.

[4] The criteria by which plants qualify as pool distributing plants can be found at: http://www.fmmaseattle.com/orderlanguage/fo124lang.pdf.

[5] A plant's utilization can be affected by the classes of utilization at secondary plants when it transfers or diverts milk to those secondary plants. Transfers of milk are not related to the farm to plant mileages while diversions are. Plant diversions are not common in the Pacific Northwest.

[6] The classification of producer milk and other source receipts can be affected by certain accounting procedures defined in Federal order language.

**Subregion of the Milkshed - Source and Destination**
For this analysis, the Pacific Northwest Order's milkshed is divided into four subregions. These subregions are used to aggregate the data by the location of the dairy farms delivering milk to the market and by the location of the plant of first receipt. The four subregions are: 1) Eastern Washington; 2) Western Washington; 3) Eastern Oregon; and 4) Western Oregon. Farms located outside of Oregon and Washington are assigned to Eastern Washington.

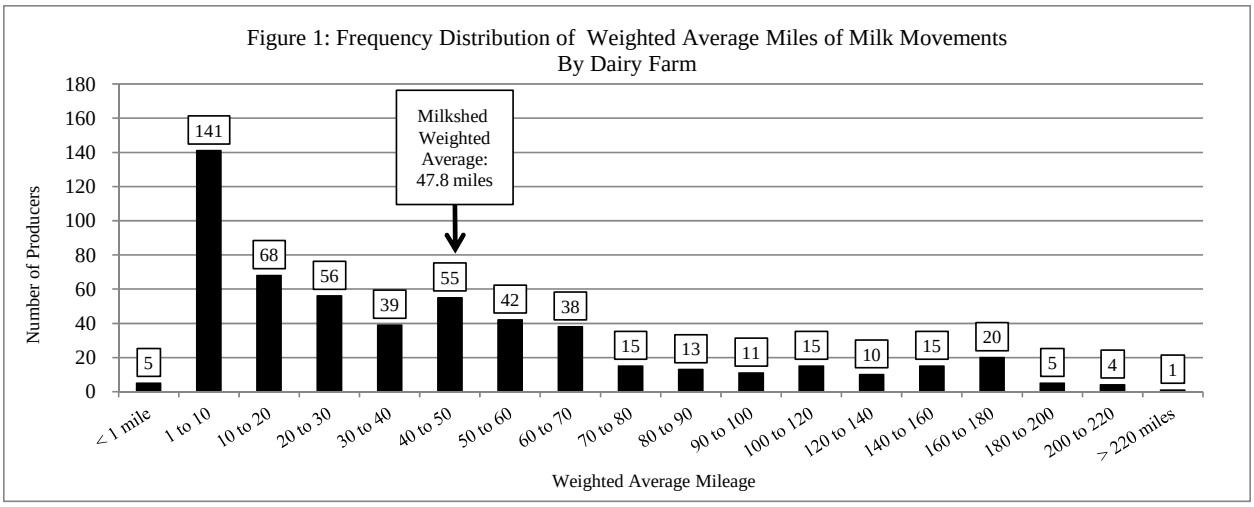
**Size-Range of Average Daily Delivery of Dairy Farm**
The average daily delivery is defined as the pounds of milk delivered by a dairy farm during the month divided by 31, i.e., the number of days in May. Sixteen categories of size-ranges are defined, ranging from dairy farms with less than 1,000 pounds delivered per day to dairy farms delivering 250,000 pounds or more per day. Smaller dairy farms' milk production may be picked up every other day or every day. Larger dairy farms' milk production is typically picked up every day.

**Size-range of Average Daily Receipt of Plant**
The average daily receipt is defined as the pounds of producer milk received at a plant during the month divided by 31, i.e., the number of days in May. Six categories of size-ranges are defined, ranging from plants with less than 1,000 pounds received per day to plants receiving 1,000,000 pounds or more per day. Smaller plants may not receive milk every day. Medium-sized plants may receive milk from a couple of times per week to every day. Larger plants typically receive milk every day.

## IV. RESULTS

This analysis provides a breakdown of the market from a variety of perspectives relating to characteristics of milk processing plants and dairy farms. Results are summarized in the Appendix.

**Milkshed**
In May 2016, 773.6 million pounds of producer milk pooled under the Pacific Northwest order was received at 38 plants from 553 producers. These 553 producers had an average daily delivery of about 45,000 pounds, but ranged from under 1,000 pounds each day to well over 250,000 pounds. A few farms have average daily deliveries of over 400,000 pounds per day. On average, each pound of milk traveled an estimated 48 miles from farm to plant. The shortest 10 percent of mileages from farm to plant were about 4 miles while the largest 10 percent of mileages were about 160 miles. Figure 1 shows a frequency distribution of the weighted average miles each dairy farm's milk traveled.




## Plant Type

Milk pooled on the Pacific Northwest Order was received at two types of plants: distributing plants and manufacturing plants. Distributing plants typically process milk into perishable fluid dairy products while manufacturing plants do not. In May 2016, there were 12 distributing plants and 26 manufacturing plants which received milk from producers. A little over 25 percent of milk was received at distributing plants while about 75 percent was received at manufacturing plants. Producers delivering to manufacturing plants had daily deliveries which were, on average, about 60% larger than daily deliveries to distributing plants. Mileages between farms and plants were longer on average for distributing plants than manufacturing plants. This reflects the fact that manufacturing plants are typically in rural areas, closer to dairy farms, while distributing plants are typically located in urban areas, closer to consumers.

## Class of Utilization

The Pacific Northwest Order categorizes milk uses into four classes: Class I, Class II, Class III, and Class IV. Distributing plant milk utilizations are characterized primarily by Class I uses, but often have Class II uses as well. Some distributing plants may also have small amounts of Class III and Class IV uses. [7] Manufacturing plants, as defined here, do not have any processing of Class I products, only Class II, III and IV. Receipts of milk classified as Class I and Class IV occurred at the fewest plants during the month. Class I utilization, about 21 percent of the market, occurred at 13 plants and Class IV utilization occurred at 14 plants and represented about 30 percent of the market. [8] Class II utilization occurred at 21 plants but only represented about seven percent of all utilization. Class III utilization occurred at nearly all plants and represented about 42 percent of the market.[9] Milk utilized in plants with Class I utilization traveled the furthest at 106 miles on average. Milk utilized in plants with Class II utilization traveled the next furthest at about 80 miles on average. Milk utilized at plants with Class III and IV utilization traveled the least distance on average at 23 and 34 miles, respectively. As with the relationship of miles traveled for distributing plants and manufacturing plants, the above reflects the fact that

[7] Distributing plants typically have only small amounts of Class III and IV utilizations due to pool accounting factors such as: 1) shrinkage and product returns sold as animal feed, which are assigned to the lowest priced Class for the month; 2) bulk inventory; and 3) surplus cream movements to plants making Class III/IV products.

[8] While there were 12 distributing plants, which by definition have Class I utilizations, there was one nonpool manufacturing plant that had Class I utilizations by virtue of transfers to a secondary plant which had Class I utilizations.

[9] Class III utilization occurred at most plants due to the fact that plant shrinkage is assigned to the lowest priced Class for the month, which, in May 2016, was Class III.

manufacturing plants are typically located in rural areas, closer to dairy farms, while distributing plants are typically located in urban areas, closer to consumers.

**Location Adjustment Zone of Plant**

The Pacific Northwest Order defines location adjustment zones which reflect the relative value of milk at the county in which a milk processing plant is located. There are three location adjustment zones represented in the Pacific Northwest Order's milkshed: $1.90, $1.75 and $1.60. The $1.90 zone covers plants located in Western Oregon and Western Washington and several counties near Spokane, Washington. Milk moving to plants in the $1.90 zone traveled an average of just under 68 miles. The remaining plants receiving milk pooled on the Pacific Northwest Order are located in the $1.75 and $1.60 zones. Milk moving to plants in the $1.75 and $1.60 zones traveled only about 24 miles on average. A comparison of the results of miles traveled by type of plant and class of utilizations in Western Oregon and Western Washington suggests that the average mileage from farms to manufacturing plants is less than the average mileage from farms to distributing plants in this same region.

**Subregion of the Milkshed - Source and Destination**

Milk delivery patterns can change across the month with milk of a particular dairy farm being received by two or more different plants during the month which may be in more than one region. To discern these types of regionally defined milk movements, the Pacific Northwest Order was divided into subregions based on the location of dairy farms delivering milk to plants and also based on the location of plants receiving milk from dairy farms. Regions were demarcated by the Cascade mountain range and state borders. Milk from farms located in Eastern Washington traveled the furthest of all the regions, moving 64 miles on average. It is worth noting that the nearly half of all milk associated with the order is produced by farms in Eastern Washington. Milk from farms in the other regions traveled a little over 30 miles on average or roughly half the distance traveled by milk from Eastern Washington.

Mileages associated with the location of the receiving plant reveals some contrasting results to mileages associated with the location of farms. While milk from farms in Eastern Washington traveled over 60 miles on average, the milk associated with plants in this region traveled less than half as far, about 25 miles on average. Milk from farms in Eastern Oregon traveled about the same as the milk associated with plants in that region. Western Oregon and Western Washington show a different pattern, with milk movements from the farm traveling only half as far as milk moving to the plants. Relationships between miles traveled by farm region (Source) relative to miles traveled by plant region (Destination) reveal evidence of nominal regional deficits and surpluses.[10] Deficit regions include Western Washington (Source-31; Destination-66) and Western Oregon (Source-36; Destination-66). Eastern Oregon is roughly in balance (Source-31; Destination-33). The surplus region, which supplies the deficit regions of Western Washington and Western Oregon, is Eastern Washington (Source-64; Destination-25).

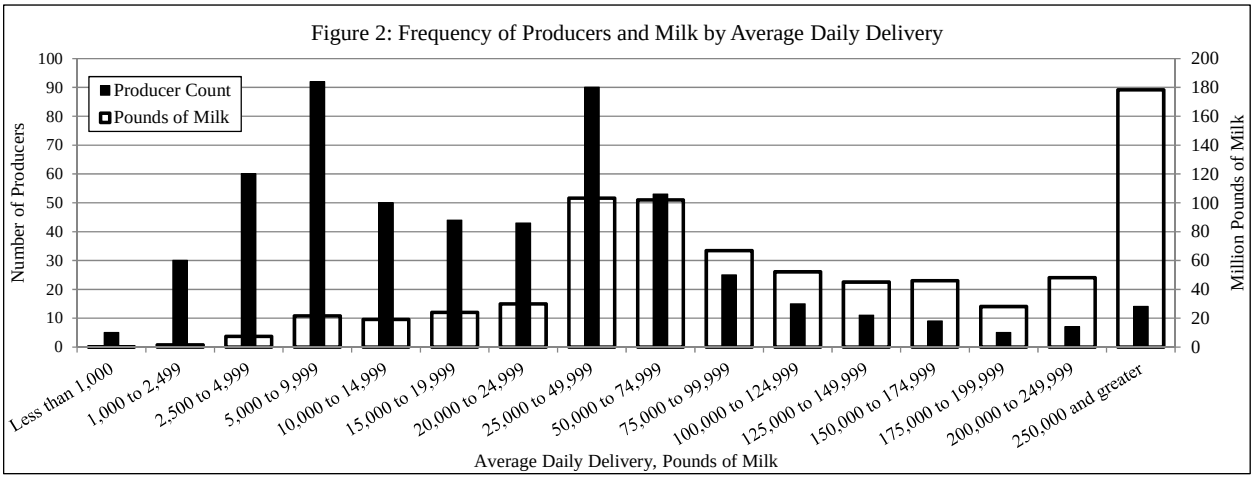
**Size-Range of Average Daily Delivery of Dairy Farm**

Dairy farms vary considerably in size in the Pacific Northwest, delivering on average less than 1,000 pounds a day to over 250,000 pounds a day. The distribution of dairy farms by size of average daily delivery can be broken down into three basic groupings: 1) a small number of larger producers who are the source of most of the milk; 2) mid-sized farms that represent

[10] The use of the word "nominal" is used to highlight that the deficit/surplus is a function of how milk moves and does not reflect how plant capacity is utilized.

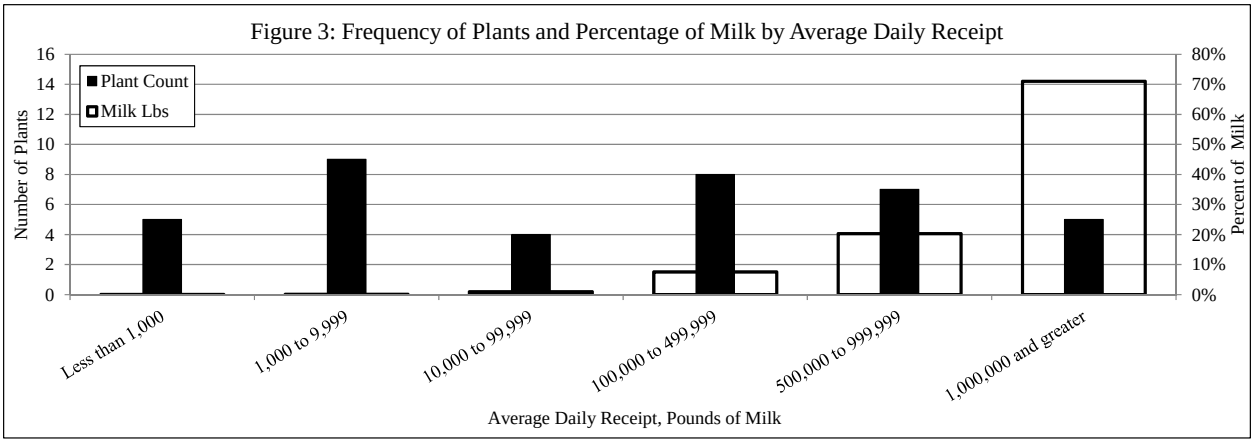
roughly a third of the market as a percent of milk and number of producers; and 3) a large number of smaller producers who are the source of the least milk (See Figure 2).

Large farms delivered more milk in total than smaller farms. Over 50 percent of milk was delivered by those with average daily deliveries of over 100,000 pounds per day. These larger farms represented only 11 percent of all producers. Producers having average daily deliveries of between 25,000 pounds and 100,000 pounds, delivered about 35 percent of all milk and represented 30 percent of all producers. Dairy farms with average daily deliveries of less than 25,000 pounds represented only 13 percent of all milk but nearly 60 percent of dairy farms. With respect to miles traveled, the smallest farms with average daily deliveries of less than 1,000 pounds per day were furthest on average from the plants that received their milk, while most other farms were within 30-60 miles of the receiving plants on average.




**Size-Range of Average Daily Receipt of Plant**

Milk processing plants vary considerably in size in the Pacific Northwest, receiving on average less than 1,000 pounds a day to over 1,000,000 pounds a day. Included in the category of the largest plants are a few which receive over 3,000,000 pounds per day. The distribution of plants by size of average daily receipt can be broken down into four basic groupings: 1) a small number of large plants that receive most of the milk; 2) medium-sized plants that represent roughly two fifths of the plants and receive about a quarter of the milk; 3) a few small plants that receive about one percent of all milk; and 4) a large number of very small plants which receive a fractional percent of all milk (See Figure 3 and Appendix).



Large plants are common in the region. Over 70 percent of milk was received by those plants with an average daily receipt of over 1,000,000 pounds. These larger plants represented less than 15 percent of all plants. Plants having average daily receipt of between 100,000 pounds and 1,000,000 pounds, received about 30 percent of all milk. Plants with average daily receipts of less than 100,000 pounds represented about one percent of all milk. With respect to miles traveled, the smaller plants with average daily receipt of less than 100,000 pounds per day ranged from zero miles for farms with farmstead cheese operations to the furthest miles traveled of all plants of just under 200 miles. The distance between the very largest plants and the farms that supplied them was the lowest of all plant size-ranges at about 30 miles on average, with the exception of the small farmstead cheese operations. For plants with average daily receipt of more than 100,000 pounds, the average distance to their supplying farms generally decreased roughly as the size of plant increased.

## V. CONCLUSION

In the Pacific Northwest, milk is a particularly local agricultural commodity, i.e., it is processed close to where it is produced. The economics of milk, milk production, and milk processing reinforce the localness of milk. Fresh raw milk is very bulky and highly perishable and typically moves from the farm to a processing plant on the same day it is produced.

On average, the milk of dairy farms in the Pacific Northwest region travels less than 50 miles to processing plants. Milk moving to distributing plants travels a little under four times as far (105 miles) as milk moving to manufacturing plants (28 miles) due to the fact that distributing plants are located near urban centers, close to the majority of consumers, and manufacturing plants are typically in rural areas, closer to the dairy farms (and cows) that supply them. And for similar reasons, milk moving to plants in the $1.90 location adjustment zone, where most consumers are, travels about three and a half times the distance of milk moving to plants in the region of the $1.75 and $1.60 zones where most of the dairy farms (and cows) are located. The presence of manufacturing plants in the rural areas of the $1.90 zone, closer to the farms, reduces the average mileage traveled as compared to distributing plants.

Most milk is within 30-60 miles of the receiving plants on average. A comparison of average farm to plant miles based on farm origin relative to average farm to plant miles based on plant destination reveals nominal regional surpluses and deficits of milk production relative to plant processing. A nominal regional deficit is indicated by lower average miles from farm to plant based on the region of the farm relative to higher average miles based on the region of the receiving plant. A nominal regional surplus is defined as the reverse. The pattern of milk movements for Western Oregon and Western Washington effectively show a nominal deficit of nearby milk that is supplied by more distant milk. Similarly, the pattern for Eastern Washington suggests a nominal surplus which balances the nominal deficit in Western Oregon and Western Washington. Eastern Oregon is nominally in balance, with miles traveled by farm roughly the same as miles traveled by plant.

Lastly, the largest plants (>1,000,000 pounds of average daily receipt) received milk from less than 30 miles away on average. Plants receiving between 100,000 and 1,000,000 million pounds drew milk from about 95 miles away on average. With the exception of farmstead cheese operations, the remaining plants drew milk from about 60 to 75 miles away on average.

**Appendix** **Page Number**

Characteristics of Various Subsets of the Dataset: May 2016

**Appendix**

**Characteristics of Various Subsets of the Dataset: May 2016 1/**

| Aggregation Criteria | Number of Plants Receiving Producer Milk | Pounds 1/ | Percent of Total Pounds 2/ | Average Daily Delivery of Dairy Farm | Number of Producers | Percent of Total Producers 2/ | Mileage From Farm to Plant | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Weighted Average | Median | Shortest 10% | Longest 10% | Standard Deviation |
| **Milkshed** | 38 | 773,553,894 | 100.0% | 45,124 | 553 | 100.0% | 47.8 | 22 | 4 | 162 | 58 |
| **Type of Plant** | | | | | | | | | | | |
| Distributing Plants | 12 | 202,321,571 | 26.2% | 22,199 | 294 | 53.2% | 104.9 | 85 | 23 | 183 | 61 |
| Manufacturing Plants | 26 | 571,232,323 | 73.8% | 36,417 | 506 | 91.5% | 27.6 | 11 | 4 | 71 | 41 |
| **Class of Utilization 1/** | | | | | | | | | | | |
| Class I | 13 | 164,413,338 | 21.3% | 17,332 | 306 | 55.3% | 106.5 | 78 | 22 | 183 | 62 |
| Class II | 21 | 51,657,441 | 6.7% | 3,058 | 545 | 98.6% | 79.8 | 23 | 4 | 164 | 59 |
| Class III | 34 | 325,969,152 | 42.1% | 19,223 | 547 | 98.9% | 23.0 | 20 | 4 | 157 | 56 |
| Class IV | 14 | 231,513,963 | 29.9% | 13,907 | 537 | 97.1% | 33.9 | 18 | 4 | 143 | 55 |
| Class II/III/IV | 38 | 609,140,556 | 78.7% | 35,533 | 553 | 100.0% | 32.0 | 22 | 4 | 162 | 58 |
| **Location Adjustment Zone of Receiving Plant** | | | | | | | | | | | |
| $1.90 Zone | 33 | 423,412,634 | 54.7% | 26,625 | 513 | 92.8% | 67.8 | 33 | 4 | 170 | 63 |
| $1.60 & $1.75 Zone | 5 | 350,141,260 | 45.3% | 93,346 | 121 | 21.9% | 23.6 | 12 | 5 | 65 | 28 |
| **Region of Dairy Farm 3/ 4/** | | 4/ | | | | | 3/ | | | | |
| Western Washington | 23 | 181,900,552 | 23.5% | 25,292 | 232 | 42.0% | 31.4 | 20 | 4 | 82 | 40 |
| Eastern Washington | 19 | 377,643,940 | 48.8% | 96,683 | 126 | 22.8% | 63.5 | 33 | 6 | 179 | 72 |
| Western Oregon | 20 | 133,603,631 | 17.3% | 23,423 | 184 | 33.3% | 36.1 | 23 | 3 | 76 | 37 |
| Eastern Oregon | 5 | 80,405,771 | 10.4% | 235,794 | 11 | 2.0% | 30.5 | 18 | 18 | 168 | 59 |
| **Region of Receiving Plant 5/** | | | | | | | | | | | |
| Western Washington | 17 | 238,863,983 | 30.9% | 25,684 | 300 | 54.2% | 65.9 | 32 | 5 | 172 | 64 |
| Eastern Washington | 4 | 257,113,905 | 33.2% | 70,889 | 117 | 21.2% | 25.4 | 11 | 5 | 88 | 36 |
| Western Oregon | 14 | 169,775,572 | 21.9% | 19,915 | 275 | 49.7% | 65.8 | 29 | 4 | 172 | 64 |
| Eastern Oregon | 3 | 107,800,434 | 13.9% | 128,794 | 27 | 4.9% | 32.8 | 18 | 18 | 74 | 37 |

**Appendix (Continued)**

**Characteristics of Various Subsets of the Dataset: May 2016 (Continued)**

| Aggregation Criteria | Number of Plants Receiving Producer Milk | Pounds 1/ | Percent of Total Pounds 2/ | Average Daily Delivery of Dairy Farm | Number of Producers | Percent of Total Producers 2/ | Mileage From Farm to Plant | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Weighted Average | Median | Shortest 10% | Longest 10% | Standard Deviation |
| **Size-Range of Average Daily Delivery of Dairy Farm** | | | | | | | | | | | |
| Less than 1,000 pounds | 8 | 75,252 | * | 485 | 5 | 0.90% | 109.1 | 26 | 15 | 168 | 75 |
| 1,000 to 2,499 | 12 | 1,582,197 | 0.2% | 1,701 | 30 | 5.4% | 40.2 | 24 | 5 | 78 | 32 |
| 2,500 to 4,999 | 19 | 7,371,287 | 1.0% | 3,963 | 60 | 10.8% | 54.1 | 32 | 4 | 128 | 56 |
| 5,000 to 9,999 | 15 | 21,524,607 | 2.8% | 7,547 | 92 | 16.6% | 47.0 | 23 | 4 | 103 | 50 |
| 10,000 to 14,999 | 17 | 19,144,155 | 2.5% | 12,351 | 50 | 9.0% | 38.2 | 16 | 4 | 90 | 48 |
| 15,000 to 19,999 | 20 | 24,102,850 | 3.1% | 17,671 | 44 | 8.0% | 31.1 | 20 | 3 | 65 | 40 |
| 20,000 to 24,999 | 16 | 29,985,443 | 3.9% | 22,495 | 43 | 7.8% | 38.5 | 32 | 4 | 96 | 45 |
| 25,000 to 49,999 | 30 | 103,301,763 | 13.4% | 37,026 | 90 | 16.3% | 43.5 | 17 | 4 | 150 | 55 |
| 50,000 to 74,999 | 23 | 101,918,976 | 13.2% | 62,032 | 53 | 9.6% | 46.4 | 16 | 3 | 168 | 58 |
| 75,000 to 99,999 | 16 | 66,815,946 | 8.6% | 86,214 | 25 | 4.5% | 57.7 | 25 | 4 | 162 | 64 |
| 100,000 to 124,999 | 20 | 52,155,787 | 6.7% | 112,163 | 15 | 2.7% | 52.2 | 20 | 8 | 163 | 59 |
| 125,000 to 149,999 | 17 | 45,094,555 | 5.8% | 132,242 | 11 | 2.0% | 68.3 | 65 | 6 | 184 | 73 |
| 150,000 to 174,999 | 14 | 45,911,413 | 5.9% | 164,557 | 9 | 1.6% | 56.2 | 28 | 3 | 179 | 72 |
| 175,000 to 199,999 | 10 | 28,112,232 | 3.6% | 181,369 | 5 | 0.9% | 79.2 | 45 | 6 | 185 | 70 |
| 200,000 to 249,999 | 10 | 48,067,625 | 6.2% | 221,510 | 7 | 1.3% | 41.1 | 12 | 5 | 158 | 60 |
| 250,000 and greater | 12 | 178,389,806 | 23.1% | 411,036 | 14 | 2.5% | 40.3 | 18 | 11 | 135 | 47 |
| Less than 25,000 pounds | 28 | 103,785,791 | 13.4% | 10,333 | 324 | 58.6% | 39.7 | | | | |
| 25,000 to 99,999 | 31 | 272,036,685 | 35.2% | 52,234 | 168 | 30.4% | 48.1 | | | | |
| 100,000 and greater | 23 | 397,731,418 | 51.4% | 210,329 | 61 | 11.0% | 49.7 | | | | |

**Appendix (Continued)**

**Characteristics of Various Subsets of the Dataset: May 2016 (Continued)**

| Aggregation Criteria | Number of Plants Receiving Producer Milk | Pounds 1/ | Percent of Total Pounds 2/ | Average Daily Receipt of Plant | Percent of Total Plants 2/ | Mileage From Farm to Plant | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Weighted Average | Median | Shortest 10% | Longest 10% | Standard Deviation |
| **Size-Range of Average Daily Receipt of Plant** | | | | | | | | | | |
| Less than 1,000 | 5 | 44,071 | * | 284 | 13.2% | 7.9 | 1 | 0 | 1 | 12 |
| 1,000 to 9,999 | 9 | 1,108,924 | 0.1% | 3,975 | 23.7% | 62.9 | 29 | 0 | 119 | 53 |
| 10,000 to 99,999 | 4 | 7,776,862 | 1.0% | 62,717 | 10.5% | 75.7 | 29 | 4 | 196 | 70 |
| 100,000 to 499,999 | 8 | 58,287,387 | 7.5% | 235,030 | 21.1% | 101.4 | 76 | 10 | 183 | 68 |
| 500,000 to 999,999 | 7 | 156,953,114 | 20.3% | 723,286 | 18.4% | 92.6 | 63 | 20 | 178 | 65 |
| 1,000,000 and greater | 5 | 549,383,536 | 71.0% | 3,544,410 | 13.2% | 28.9 | 11 | 4 | 73 | 39 |
| Less than 10,000 pounds | 14 | 1,152,995 | 0.1% | 2,657 | 36.8% | 60.8 | | | | |
| 10,000 to 99,999 | 4 | 7,776,862 | 1.0% | 62,717 | 10.5% | 75.7 | | | | |
| 100,000 to 999,999 | 15 | 215,240,501 | 27.8% | 462,883 | 39.5% | 95.0 | | | | |
| 1,000,000 and greater | 5 | 549,383,536 | 71.0% | 3,544,410 | 13.2% | 28.9 | | | | |



1/ Partially audited payroll information. Differs slightly from published pool totals.

2/ May not add due to rounding.

3/ Farms located in States other than Oregon and Washington are included in Eastern Washington. Data for the calculation of mileage statistics are not affected by changes to County-region defintions shown in footnote 4/.

4/ To avoid releasing restricted data, pound totals and producer counts reflect the following: a) producers in Pierce and Wahkiakum Counties, Washington, were moved to Eastern Washington; and b) producers in Deschutes and Umatilla Counties, Oregon, were moved to Western Oregon. These adjustments to the data do not substantively affect the results.

5/ To avoid releasing restricted data, pound totals and plant counts reflect the following: a) one plant in Western Oregon was moved to Eastern Oregon; b) plants not located in Oregon or Washington were moved to the closest region. These adjustments to the data do not substantively affect the results.

* less than 0.05%