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**ANALYSIS OF COMPONENT LEVELS IN INDIVIDUAL
HERD MILK AT THE FARM LEVEL**

**PACIFIC NORTHWEST AND ARIZONA
FEDERAL MILK MARKETING ORDERS**

2011

Staff Paper 12-02

Lori Espe

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ANALYSIS OF COMPONENT LEVELS IN INDIVIDUAL HERD MILK AT THE FARM LEVEL

PACIFIC NORTHWEST AND ARIZONA FEDERAL MILK MARKETING ORDERS

2011

Lori Espe

Abstract

Component levels in producer milk pooled on the Pacific Northwest (FO 124) and Arizona (FO 131) Federal Milk Marketing Orders were analyzed for 2011 to determine average levels, regional and seasonal variation, and, when possible, the statistical relationship between components. Handlers regulated under the Pacific Northwest Order report butterfat, protein, and other solids. Handlers regulated under the Arizona Order report butterfat only. Producer milk pooled was also valued using Federal order minimum producer prices for the respective orders. For 2011, a monthly average total of 709 producers were pooled on the Pacific Northwest and Arizona Orders. During 2011, these producers delivered 12.5 billion pounds to the two markets. The milk shed of the two Federal orders includes Arizona, California, Idaho, Oregon, Texas, Utah, and Washington.

Major findings of this study include:

1. The 2011 average component levels for the Pacific Northwest Order were 3.77% butterfat, 3.17% true protein, and 5.73% other solids. The 2011 average butterfat level for the Arizona Order was 3.55%.
2. In both orders, butterfat levels decrease during the summer months and increase in the late fall and winter. In the Pacific Northwest Order, protein shows similar seasonality as butterfat.
3. Although the volume of producer milk, number of producers, and average milk production per producer varies greatly between geographic regions, there are relatively small differences in aggregate component levels between these geographic regions within the milk sheds of the two orders.
4. The Pacific Northwest Order's linear regression in 2011 for protein is $PRO\% = 1.559 + 0.414 * BF\%$, with an R-squared of 0.65.
5. The Pacific Northwest Order's regressions for estimating other solids using butterfat have a very poor correlation, having an R-squared of 0.17. The monthly regressions show a negative relationship; other solids levels appear to be independent of butterfat levels.
6. Long term observations indicate a trend of increased butterfat and protein levels on the Pacific Northwest Order for the 2000-2011 time period. Other solids levels have remained steady. On the Arizona Order, the butterfat level has steadily decreased over the same time period.

TABLE OF CONTENTS

Section	Page Number
I. INTRODUCTION	1
II. DATA AND METHODOLOGY	2
III. SEASONAL VARIATION IN MILK COMPONENT LEVELS	3
Table 1: Monthly Component Levels, Pacific Northwest Order, 2011	3
Table 2: Monthly Component Levels, Arizona Order, 2011	4
Table 3: Component Levels: Weighted Average, Mean, Median, Standard Deviation, Minimum, and Maximum, Pacific Northwest Order, 2011	5
Table 4: Component Levels: Weighted Average, Mean, Median, Standard Deviation, Minimum, and Maximum, Arizona Order, 2011	5
IV. REGIONAL VARIATION IN MILK COMPONENT LEVELS	5
Table 5: Various Statistics by Region for 2011	6
Table 6: Producer Milk and Producers by Region for November 2011 and 2010 ...	7
V. STATISTICAL RELATIONSHIP AMONG MILK COMPONENTS	8
Table 7: Pacific Northwest Order, Comparison of Regression Results: Butterfat Level as a Predictor of Protein Levels, 2000 through 2011	8
VI. MINIMUM ORDER VALUE OF PRODUCER MILK.....	9
VII. LONG TERM TRENDS	10
VIII. SUMMARY	10

Tables:	A-1	Statistical Data for Producers on the Pacific Northwest Order Included in Component Analysis, 2011	12
	A-2	Statistical Data for Producers on the Arizona Order Included in Component Analysis, 2011	14
	A-3	Weighted Average Component Levels by Region, 2011	15
	A-4	Linear Relationships between Various Milk Components, 2011 Butterfat Levels as a Predictor of Protein	18
	A-5	Linear Relationships between Various Milk Components, 2011 Butterfat Levels as a Predictor of Other Solids	19
	A-6	Monthly Producer Component Prices, 2011	20
	A-7	Aggregated Component Tests by Size-Range of Producer Milk Deliveries, 2011	21
	A-8	Aggregated Component Values by Size-Range of Producer Milk Deliveries, 2011	23
	A-9	Statistical Data for Producers on the Pacific Northwest Order Included in Component Analysis, Long Term Trends 2000-2011 ...	25
	A-10	Statistical Data for Producers on the Arizona Order Included in Component Analysis, Long Term Trends 2000-2011	27
Figures:	A-1	Frequency Distribution of Monthly Average Butterfat Levels, Pacific Northwest Order, 2011	28
	A-2	Frequency Distribution of Monthly Average Protein Levels, Pacific Northwest Order, 2011	28
	A-3	Frequency Distribution of Monthly Average Other Solids Levels, Pacific Northwest Order, 2011	29
	A-4	Frequency Distribution of Monthly Average Butterfat Levels, Arizona Order, 2011	29
	A-5	Scatter Plot of Protein and Butterfat, Pacific Northwest Order, May and November, 2011	30
	A-6	Scatter Plot of Other Solids and Butterfat, Pacific Northwest Order, May and November, 2011	31
	A-7	Weighted Average Component Levels by Size-Range of Producer Milk Deliveries, 2011	32
	A-8	Weighted Average Values and Percent of Producers and Producer Milk by Size-Range of Producer Milk Deliveries, 2011	33
Maps:	A-1	Marketing Areas of the Pacific Northwest and Arizona Orders	34
	A-2	Geographic Regions Encompassing the Pacific Northwest and Arizona Order Milk Sheds, 2011	35

ANALYSIS OF COMPONENT LEVELS IN INDIVIDUAL HERD MILK AT THE FARM LEVEL

PACIFIC NORTHWEST AND ARIZONA FEDERAL MILK MARKETING ORDERS

2011

Lori Espe¹

I. INTRODUCTION

This study examines milk component levels in milk pooled on the Pacific Northwest (FO 124) and Arizona (FO 131) Milk Marketing Orders during 2011. Long term trends are also shown for the 2000-2011 time period. The milk components for the Pacific Northwest Order include butterfat, protein, and other solids and butterfat only for the Arizona Order. Protein and other solids were not included in any analyses concerning the Arizona Order because they were not used as a basis for pricing milk in 2011, and handlers were not obligated under the order to report information on protein and other solids levels.

Component levels in producer milk pooled on the Pacific Northwest and Arizona Orders were analyzed to determine average component levels, regional and seasonal variation, and the statistical relationship between components. Producer milk pooled on each order in 2011 was valued using Federal order minimum producer prices for the respective orders.

For 2011, a monthly average total of 709 producers were pooled on the Pacific Northwest and Arizona Orders. During 2011, these producers delivered 12.5 billion pounds to the two markets.

True protein was used as a basis for pricing milk under the Pacific Northwest Order. Unlike crude protein, true protein does not include non-protein nitrogen. In general, crude protein test levels are about 0.19 percentage points higher than true protein test levels. In a like manner, other solids levels associated with true protein levels are about 0.19 percentage points higher than those associated with crude protein test levels.

During 2011, the Pacific Northwest Order milk shed was comprised of producers located in Washington, Oregon, California, Idaho, and Utah. The Arizona Order milk shed was comprised of producers located in Arizona, California, and Texas. The milk shed of the two orders includes various geographic and climatic regions. These regions range from very dry climates (Arizona, Texas, Central Washington, Southern Idaho, and Eastern Oregon) to very wet climates (western and coastal regions of Oregon and Washington). Geographically, the Cascade Mountain Range, Pacific Ocean, and Columbia River provide general geographic and climate demarcations that may impact how dairy operations are managed.

¹ Lori Espe is an Agricultural Economist with the Market Administrator's Office, Bothell, Washington. Assisting Ms. Espe were John Mykrantz and Dan Nguyen of the Pacific Northwest (FO 124) and Arizona (FO 131) Orders' staff.

II. DATA AND METHODOLOGY

The data included in this study comprises all producer milk pooled on the Pacific Northwest and Arizona Orders. The data was collected from producer payrolls submitted by handlers to the market administrator's office. Components available for the Pacific Northwest Order were butterfat, protein, and other solids (other solids is nonfat solids less protein). Protein and other solids were not included for the Arizona Order because they were not used as a basis for pricing milk in 2011, and handlers were not obligated under the order to report information on protein and other solids levels.

In May, August, and December 2011, milk production that historically qualified to be pooled on the Pacific Northwest Order was not pooled due to price relationships. This historically eligible producer milk was not included in this analysis. The exclusion of milk not pooled was due to the unavailability of the information, and it almost always represented less than three handlers and was, therefore, restricted.

The Pacific Northwest and Arizona Orders were divided into seven regions. (See Map A-2.) The small number of producers in Northern California pooled on the Pacific Northwest Order made it necessary to combine them with another region (Western Oregon, Region 5). Region 5 has a similar climate and was geographically adjacent to the Northern California county. Small amounts of milk from producers in Utah were associated with the Pacific Northwest Order in 2011; those producers have been combined with Central/Eastern Oregon data (Region 6). Arizona and Southern California producers were also combined for reasons of confidentiality. Other than the identified exceptions, order and/or state lines were considered as primary boundaries. The regions within states were defined based on climate conditions and geography. The regions are as follows: Western Washington (Region 1); Central Washington (Region 2); Eastern Washington (Region 3); Northern Idaho (Region 4); Western Oregon and Northern California (Region 5); Central/Eastern Oregon, Southern Idaho, and Utah (Region 6); and Arizona, Southern California, and Texas (Region 7).

In Oregon and Washington, the west side of the Cascade Mountain Range has more precipitation and is characterized by a milder climate than the eastern side of the states.² The region east of the Cascade Mountain Range has a drier climate with warmer summers and colder winters. In Eastern Washington, the precipitation rate begins to increase slightly. Idaho was split into Northern and Southern Idaho. Northern Idaho is wetter and more mountainous compared to Southern Idaho. Arizona is very dry year round with much less precipitation and has many days with average temperatures much higher than the other regions studied.

Ordinary Least Squares regression analysis was used to determine relationships between components.

² Climate information based on Western Regional Climate Center precipitation maps.

III. SEASONAL VARIATION IN MILK COMPONENT LEVELS

In 2011, producers associated with the Pacific Northwest Order delivered 7.98 billion pounds. For 2011, producer milk tested, on average, 3.77% butterfat, 3.17% protein, and 5.73% other solids.

In the Pacific Northwest Order, producer milk butterfat percentages decrease in the spring and increase in the fall and winter. Table 1 shows the monthly and annual average component levels for the Pacific Northwest Order. Milk production per cow typically is less, and animals are fed more stored feed in the fall and winter. In the spring, during the flush of milk production, the feeding of more fresh grass increases the total pounds produced but decreases the percentage of butterfat and protein content of milk. The spring flush is additionally impacted by the biological cycle of cows and the increase in temperature in the spring. Butterfat levels in the Pacific Northwest Order in 2011 were the highest in November at 3.92% and lowest in August at 3.62%.

The seasonal cycle of protein levels is similar to butterfat but with a lesser degree of variation. Protein levels in 2011 were highest in November at 3.32% and lowest in August at 3.06%. Other solids levels were much more consistent throughout the year when compared to the seasonal changes in butterfat and protein levels. Other solids levels reached a peak of 5.75% in May, June, and August, a low of 5.71% in November, and showed very little seasonality.

Table 1 Monthly Component Levels Pacific Northwest Order 2011			
Month	Butterfat - percent -	Protein - percent -	Other Solids - percent -
January	3.90	3.20	5.72
February	3.85	3.17	5.72
March	3.83	3.16	5.73
April	3.79	3.15	5.73
May	3.71	3.14	5.75
June	3.67	3.11	5.75
July	3.64	3.10	5.74
August	3.62	3.06	5.75
September	3.69	3.15	5.73
October	3.81	3.25	5.73
November	3.92	3.32	5.71
December	3.88	3.25	5.73
Weighted Average	3.77	3.17	5.73

Table 2 Monthly Component Levels Arizona Order 2011	
Month	Butterfat - percent -
January	3.69
February	3.62
March	3.55
April	3.50
May	3.47
June	3.49
July	3.46
August	3.48
September	3.46
October	3.55
November	3.61
December	3.68
Weighted Average	3.55

In 2011, producers associated with the Arizona Order delivered 4.52 billion pounds. For 2011, producer milk tested, on average, 3.55% butterfat. Butterfat levels in the Arizona Order follow a similar seasonal pattern as the Pacific Northwest Order. The butterfat levels decrease in the spring and rise again in the fall. (See Table 2 above.) Butterfat levels in the Arizona Order in 2011 were highest in January at 3.69% and lowest in July and September at 3.46%.

For 2011, the monthly and annual weighted average butterfat levels were less than the mean averages for both orders; the same is true for the Pacific Northwest Order's protein levels. (See Tables 3 and 4 and Appendix Tables A-1 and A-2.) This difference in relative levels of the weighted average and the mean would indicate that individual producers who deliver smaller amounts of milk (on a monthly basis) have higher levels of these components in their milk than their larger counterparts. Conversely, on the Pacific Northwest Order, the other solids weighted average is higher than the mean, indicating that producers who deliver larger amounts of milk have higher levels of other solids in their milk than their smaller counterparts.

During 2011, for the Pacific Northwest Order, producers' individual monthly average butterfat tests ranged from 2.70% to 6.21%; protein tests ranged from 2.58% to 4.43%, and other solids levels ranged from 4.86% to 6.01%. (See Table 3.) Most monthly average component tests are within one standard deviation of the mean.³ Based on the definition of a standard deviation, most producers had butterfat tests ranging from 3.49% to 4.35%. Similarly, most protein tests ranged from 2.96% to 3.40%, and most other solids tests ranged from 5.61% to 5.79%. (See Appendix Table A-1 for monthly component statistics.)

³ By definition, for a *normal distribution*, approximately 68% of observations are within one standard deviation of the mean.

In 2011, Arizona Order producers' butterfat tests ranged from 2.48% to 4.99%. (See Table 4.) Based on the definition of a standard deviation, most producers had butterfat tests ranging from 3.28% to 3.94%. (See Appendix Table A-2 for monthly component statistics.)

Table 3 Component Levels: Weighted Average, Mean, Median, Standard Deviation, Minimum, and Maximum Pacific Northwest Order 2011			
	Butterfat	Protein	Other Solids
	%	%	%
Weighted Average	3.77	3.17	5.73
Mean	3.92	3.18	5.70
Median	3.82	3.13	5.72
Standard Deviation	0.43	0.22	0.09
Minimum	2.70	2.58	4.86
Maximum	6.21	4.43	6.01

Table 4 Component Levels: Weighted Average, Mean, Median, Standard Deviation, Minimum, and Maximum Arizona Order 2011	
	Butterfat
	%
Weighted Average	3.55
Mean	3.61
Median	3.54
Standard Deviation	0.33
Minimum	2.48
Maximum	4.99

IV. REGIONAL VARIATION IN MILK COMPONENT LEVELS

Differences in climate, breeds of cattle, common management practices, feeds, and other characteristics of dairy operations can reveal varying milk component levels on a geographic basis. The data was divided into seven regions based on the geographic location of the dairy farms. The seven regions are primarily based on a combination of relatively homogeneous climates and state and Federal order borders.

Regions 1 through 6 are associated with the Pacific Northwest region and are defined in Appendix Map A-2. Region 7 represents the Arizona Order. In 2011, the region with the most milk associated with the Pacific Northwest Order was Region 2 followed by Regions 1, 5, 6, 3

and 4. Component levels for Regions 1-3 appear to vary only slightly. Table 5, below, provides 2011 milk production, average number of producers, and component tests for each region.

Table 5			
Various Statistics by Region For 2011			
Region 1 (Western Washington)		Region 2 (Central Washington)	
Milk Production	2,032,208,675	Milk Production	3,190,836,234
Average Number of Producers	265	Average Number of Producers	102
Average Pounds Per Producer	7,668,712	Average Pounds Per Producer	31,282,708
Butterfat Test	3.76%	Butterfat Test	3.68%
Protein Test	3.12%	Protein Test	3.13%
Other Solids Test	5.71%	Other Solids Test	5.74%
Region 3 (Eastern Washington)		Region 4 (Northern Idaho)	
Milk Production	679,817,556	Milk Production	4,774,002
Average Number of Producers	35	Average Number of Producers	3
Average Pounds Per Producer	19,423,359	Average Pounds Per Producer	1,591,334
Butterfat Test	3.66%	Butterfat Test	3.80%
Protein Test	3.15%	Protein Test	3.18%
Other Solids Test	5.74%	Other Solids Test	5.69%
Region 5 (Western Oregon, Northern California)		Region 6 (Central/Eastern Oregon, Southern Idaho)	
Milk Production	1,334,126,255	Milk Production	739,559,901
Average Number of Producers	188	Average Number of Producers	16
Average Pounds Per Producer	7,096,416	Average Pounds Per Producer	46,222,494
Butterfat Test	3.94%	Butterfat Test	4.01%
Protein Test	3.20%	Protein Test	3.45%
Other Solids Test	5.75%	Other Solids Test	5.73%
Region 7 (Arizona, Southern California, Texas)			
Milk Production	4,517,423,654		
Average Number of Producers	100		
Average Pounds Per Producer	45,174,237		
Butterfat Test	3.55%		
Protein Test	n/a		
Other Solids Test	n/a		

n/a = not applicable

In general, comparing all the regions, Region 7 had the most milk pooled in 2011, with 4.52 billion pounds, while Region 1 had the most producers (265 producers on average). Average milk production per producer was the highest in Region 6 with an average of 46.2 million pounds per producer for the year. The highest butterfat levels in 2011 were in Region 6 with annual tests of 4.01%, while Region 7 had the lowest annual butterfat test of 3.55%. Protein levels in Region 6 (3.45%) and other solids levels in Region 5 (5.75%) were the highest for each of those components.

Producer milk, number of producers, and average milk production per producer varied greatly between regions. Some comparatively small differences in component levels were also evident.

In 2011, butterfat levels in Regions 4, 5, and 6 were noticeably higher than the other regions, while Region 7 was much lower than the other regions. Protein levels in Region 6 were 0.33% higher than Region 1. Other solids levels by region varied only 0.06% between the high and low for the year 2011; ranging from 5.69% in Region 4 to 5.75% in Region 5.

On the Pacific Northwest Order, changes in producer numbers and milk marketed between November 2010 and November 2011 followed the national trend of increased milk production by fewer producers. The Arizona Order's producer milk marketed was also higher in November 2011 when compared to previous year levels, with a slight decrease in producer numbers. Table 6, below, provides a brief comparison of producer numbers and milk marketed for November 2010 and 2011. On a regional basis, the historical shift of movement of milk production in Washington State from Western Washington (Region 1) to Central Washington (Region 2) continued. Region 1's production increased by only 2.1 million pounds, while production in Region 2 increased by 13.1 million pounds. Production in Eastern Washington (Region 3) increased milk production by 4.7 million pounds between November of 2010 and 2011, with only a slight increase in the number of producers. The number of producers in Northern Idaho (Region 4) remained at three, and production dropped slightly to 336,199 pounds for November 2011. Region 5, Western Oregon, faces many of the same environmental issues and urban encroachment problems as Region 1, Western Washington; similar to Region 1, the producer milk marketed increased modestly in November 2011 for Region 5, although the producer count for Region 5 was down slightly. The area covering Central/Eastern Oregon, Southern Idaho and Utah (Region 6) showed the greatest decrease in producer numbers on the Pacific Northwest Order, falling from 30 producers in November 2010 to 16 producers in 2011. Despite the large decrease in producers, the production in Region 6 increased 1.4 million for November 2011 compared to the same month a year ago. Producer milk in Arizona, Southern California and Texas, grouped as Region 7, increased by 12.9 million pounds in 2011 and the number of producers decreased by three.

Table 6 Producer Milk and Producers by Region for November 2011 and 2010						
	Producer Milk			Producers		
	November 2011	November 2010	Change	November 2011	November 2010	Change
Region 1	167,388,229	165,327,358	2,060,871	274	276	-2
Region 2	258,078,347	244,994,750	13,083,597	102	104	-2
Region 3	56,284,837	51,632,400	4,652,437	35	34	1
Region 4	336,199	355,400	-19,201	3	3	0
Region 5	110,173,276	108,076,403	2,096,873	195	200	-5
Region 6	68,516,115	67,075,763	1,440,352	16	30	-14
Region 7	359,866,729	347,002,138	12,864,591	98	101	-3
Total	1,020,643,732	984,464,212	36,179,520	723	748	-25

V. STATISTICAL RELATIONSHIP AMONG MILK COMPONENTS

Regression analysis was used to analyze the linear relationship between milk component levels. The analysis revealed that the only significant relationship between components was between butterfat (BF) and protein (PRO). Regressions of nonfat solids and protein and nonfat solids and butterfat were found to be insignificant and not included in this study. This latter finding was expected and is due to: (1) the nonfat solids level is, by definition, protein plus other solids; and (2) other solids levels appear random and show little seasonal variation. (See Appendix Tables A-4 and A-5 and Figures A-5 and A-6.)

The Pacific Northwest Order had 7,314 observations in 2011. Appendix Figures A-5 and A-6 show graphical representations of the linear regressions for May and November 2011.

The butterfat and protein regression equations for the Pacific Northwest Order were calculated for 2000 through 2011. (See Table 7 below.) Over the 2000 - 2009 periods, the general trend of the regression is toward a lower intercept but a steeper slope, suggesting that, in general, for those years a change in the butterfat level is associated with a larger change in the protein level. The data for 2010 and 2011, though, indicates a higher intercept with a slope similar to ten years ago. The reversed trend is likely due to handler pooling patterns that were different in 2010 and 2011 than previous years.

Table 7
Pacific Northwest Order
Comparison of Regression Results: Butterfat Level as a Predictor of Protein Levels
2000 through 2011

<u>Year</u>	<u>Equation</u>	<u>Correlation</u>
2000	TRUE PRO% = 1.526 + 0.414 BF%	R ² = 0.600
2001	TRUE PRO% = 1.535 + 0.417 BF%	R ² = 0.599
2002	TRUE PRO% = 1.488 + 0.426 BF%	R ² = 0.649
2003	TRUE PRO% = 1.452 + 0.432 BF%	R ² = 0.661
2004	TRUE PRO% = 1.434 + 0.439 BF%	R ² = 0.652
2005	TRUE PRO% = 1.438 + 0.438 BF%	R ² = 0.663
2006	TRUE PRO% = 1.418 + 0.444 BF%	R ² = 0.626
2007	TRUE PRO% = 1.424 + 0.447 BF%	R ² = 0.679
2008	TRUE PRO% = 1.488 + 0.430 BF%	R ² = 0.660
2009	TRUE PRO% = 1.486 + 0.431 BF%	R ² = 0.657
2010	TRUE PRO% = 1.546 + 0.419 BF%	R ² = 0.678
2011	TRUE PRO% = 1.556 + 0.414 BF%	R ² = 0.652

VI. MINIMUM ORDER VALUE OF MILK PRODUCTION

The use of monthly component prices allows for the evaluation of the minimum order value of milk components in a hundredweight of milk.

The minimum order value at test of producer milk pooled on the Pacific Northwest Order in 2011 averaged \$20.35 per hundredweight. The weighted average value of each component comprising the \$20.35 per hundredweight was: \$8.13 for butterfat; \$9.41 for protein; \$1.97 for other solids; and a producer price differential of \$0.84.⁴

The value of producers' milk at test pooled on the Arizona Order in 2011 averaged \$19.76 per hundredweight. The weighted average value of skim and butterfat portions of the \$19.76 per hundredweight was: \$7.65 for butterfat; and \$12.11 for skim.⁵

There is an apparent inverse relationship between the size-range of producers' production and the butterfat and protein levels in their milk. An inverse relationship between size-range and certain component levels may be due to the relative prevalence of high component testing breeds among smaller herd sizes (e.g. Jerseys) compared to lower component testing breeds (e.g. Holsteins). Another possible reason for this inverse relationship is that smaller herds may be fed differently than larger herds. The weighted average component levels by size-range of milk production are summarized in Appendix Table A-7 and Figure A-7. The inverse relationship between size-range and producer butterfat and protein levels is more apparent on the Pacific Northwest Order than in the levels of butterfat on the Arizona Order. On the Pacific Northwest Order, there appears to be a positive relationship between the size-range of a producer's production and the other solids levels in their milk. The difference in component levels, in turn, translates to an inverse relationship between size-range and minimum order value per hundredweight.

The aggregated value of milk production by size-range of milk production is summarized in Appendix Table A-8 and Figure A-8. For the Pacific Northwest Order, on average, using 2011 Federal order prices, producers in the less than 50,000 pounds range of production were valued more per hundredweight, \$21.33, than other producers. Producers with 4-6 million pounds of production averaged the lowest amount per hundredweight, at \$20.00. This relationship, as earlier mentioned, is generally indicative of the fact that smaller herds typically have higher component levels than larger herds. On the Arizona Order, using skim-butterfat values, a relationship between size-range and value per hundredweight was less evident. The Arizona Order data was broken down further for producers over one million pounds into smaller increments (e.g. 4-5 million pounds, 5-6 million pounds, 6-7 million pounds) to determine whether the size-range categories used masked any relationships. Using smaller increments does not indicate producers pooled on the Arizona Order who have more milk deliveries have a lower value of milk per hundredweight.

⁴ The producer price differentials for the Pacific Northwest Order are subject to applicable location adjustments. The effects of location adjustments are not dealt with in this study.

⁵ The producer prices for the Arizona Order are subject to applicable location adjustments. The effects of location adjustments are not dealt with in this study.

VII. LONG TERM TRENDS

While month-by-month comparisons show the seasonal cycles of component levels, year-by-year comparisons demonstrate the long term trends of component levels. Appendix Tables A-9 and A-10 show selected statistical data for 2000-2011.

For butterfat on the Pacific Northwest Order, the levels have, in general shown an increase over the 2000-2011 period. The annual average increased 0.12 percentage points, from 3.65 percent in 2000 to 3.77 percent in 2011. In contrast, the butterfat levels on the Arizona Order have shown a steady decline from 3.62 percent in 2000 to an annual average of 3.55 percent in 2011. For the Arizona Order overall, the annual average was highest in 2002 at 3.63 percent and lowest in 2009 at 3.49 percent, a difference of 0.14 percentage points.

Protein levels on the Pacific Northwest Order have shown steady year-to-year increases over the 2000-2011 period. Current levels have exceeded 3.2 percent in the late fall months, with an annual average of 3.17 percent in 2011. In 2000, there were some summer months where the monthly average fell below 3.0 percent resulting in an annual average of 3.02 percent. Overall, the annual average protein test increased 0.15 percentage points between 2000 and 2011.

Other solids levels have remained fairly steady over the 2000-2011 time period, ranging from 5.69 to 5.73 percent.

VIII. SUMMARY

This paper analyzes milk components associated with the Pacific Northwest and Arizona Orders. Handlers regulated under the Pacific Northwest Order report butterfat, protein, and other solids. Handlers regulated under the Arizona Order report butterfat, only. For each order, producer information was collected from handler payrolls submitted to the market administrator's office. Component levels were examined using a variety of measures including: annual averages, seasonal and regional averages, relationships between components, frequency distributions and scatter plots of regressions, and the value of milk components by size-range of production.

Weighted average component levels for the Pacific Northwest Order in 2011 were: 3.77% butterfat, 3.17% protein, and 5.73% other solids. Butterfat percentages peaked in November and reached a low in August. Protein percentages also peaked in November and reached a low in August. Other solids demonstrated very little seasonal change.

Although the volume of producer milk, number of producers, and average milk production per producer varies greatly between regions, differences in aggregate component levels between geographic regions within the milk sheds of the two orders are comparatively small.

The linear relationship between butterfat and protein on the Pacific Northwest Order was:

$$\text{Protein} = 1.55866 + 0.4143 * \text{Butterfat} \quad (R^2 = 0.6516)$$

In 2011, the Pacific Northwest Order's weighted average price received for milk was \$20.35 per hundredweight, at test.

The annual average butterfat level for the Arizona Order in 2011 was 3.55%. Butterfat levels peaked in January and reached a low in July and September. In 2011, the Federal order weighted average price received for milk was \$19.76 per hundredweight, at test.

In general, for the Pacific Northwest Order, as producers' monthly deliveries increase, the weighted average value of the milk, at Federal order prices, decreases.

Long term observations indicate a trend of increased butterfat and protein levels on the Pacific Northwest Order for the 2000-2011 time period. Other solids levels have remained steady. On the Arizona Order, the butterfat level has steadily decreased over the same time period.

APPENDIX

Table A-1

**STATISTICAL DATA FOR PRODUCERS ON THE
PACIFIC NORTHWEST ORDER INCLUDED IN COMPONENT ANALYSIS**

2011

Butterfat

<u>Month</u>	<u>Weighted Average</u> - % -	<u>Mean</u> - % -	<u>Standard Deviation</u> - % -	<u>Median</u> - % -	<u>Minimum</u> - % -	<u>Maximum</u> - % -	<u>Number of Observations</u>
January	3.90	4.04	0.43	3.93	3.22	6.21	630
February	3.85	3.98	0.41	3.87	2.99	5.61	628
March	3.83	3.96	0.41	3.85	2.94	5.60	630
April	3.79	3.92	0.41	3.80	2.90	5.59	631
May	3.71	3.83	0.41	3.71	2.70	5.18	515
June	3.67	3.78	0.38	3.68	2.97	5.17	632
July	3.64	3.77	0.38	3.66	2.77	5.00	631
August	3.62	3.79	0.39	3.68	2.81	5.22	619
September	3.69	3.88	0.42	3.78	2.99	5.48	629
October	3.81	4.00	0.44	3.88	2.94	5.73	626
November	3.92	4.10	0.46	3.97	2.76	5.96	625
December	3.88	4.06	0.43	3.94	2.80	5.71	518
For the Year	3.77	3.92	0.43	3.82	2.70	6.21	7,314

Protein

<u>Month</u>	<u>Weighted Average</u> - % -	<u>Mean</u> - % -	<u>Standard Deviation</u> - % -	<u>Median</u> - % -	<u>Minimum</u> - % -	<u>Maximum</u> - % -	<u>Number of Observations</u>
January	3.20	3.20	0.23	3.14	2.67	4.43	630
February	3.17	3.18	0.22	3.13	2.58	4.43	628
March	3.16	3.16	0.21	3.12	2.64	3.99	630
April	3.15	3.15	0.20	3.11	2.68	3.95	631
May	3.14	3.16	0.20	3.11	2.74	3.86	515
June	3.11	3.12	0.19	3.07	2.72	3.81	632
July	3.10	3.11	0.19	3.06	2.66	3.80	631
August	3.06	3.12	0.20	3.06	2.66	3.77	619
September	3.15	3.17	0.21	3.12	2.69	3.95	629
October	3.25	3.26	0.22	3.20	2.77	4.15	626
November	3.32	3.32	0.24	3.26	2.83	4.23	625
December	3.25	3.27	0.22	3.21	2.77	4.12	518
For the Year	3.17	3.18	0.22	3.13	2.58	4.43	7,314

**STATISTICAL DATA FOR PRODUCERS ON THE
PACIFIC NORTHWEST ORDER INCLUDED IN COMPONENT ANALYSIS**

2011

Other Solids

<u>Month</u>	<u>Weighted Average</u> - % -	<u>Mean</u> - % -	<u>Standard Deviation</u> - % -	<u>Median</u> - % -	<u>Minimum</u> - % -	<u>Maximum</u> - % -	<u>Number of Observations</u>
January	5.72	5.69	0.09	5.71	5.09	5.89	630
February	5.72	5.70	0.08	5.71	5.16	5.86	628
March	5.73	5.71	0.08	5.72	5.31	5.88	630
April	5.73	5.71	0.08	5.72	5.38	6.01	631
May	5.75	5.73	0.07	5.74	5.41	5.92	515
June	5.75	5.72	0.08	5.73	5.35	5.89	632
July	5.74	5.71	0.08	5.72	5.30	5.89	631
August	5.75	5.71	0.08	5.72	5.31	5.88	619
September	5.73	5.69	0.09	5.71	5.23	5.87	629
October	5.73	5.69	0.10	5.70	5.05	5.94	626
November	5.71	5.68	0.10	5.69	5.02	5.92	625
December	5.73	5.70	0.10	5.72	4.86	5.96	518
For the Year	5.73	5.70	0.09	5.72	4.86	6.01	7,314

Table A-2

**STATISTICAL DATA FOR PRODUCERS ON THE
ARIZONA ORDER INCLUDED IN COMPONENT ANALYSIS**

2011

Butterfat

<u>Month</u>	<u>Weighted Average</u> - % -	<u>Mean</u> - % -	<u>Standard Deviation</u> - % -	<u>Median</u> - % -	<u>Minimum</u> - % -	<u>Maximum</u> - % -	<u>Number of Observations</u>
January	3.69	3.77	0.33	3.68	3.11	4.99	100
February	3.62	3.68	0.33	3.62	2.76	4.87	100
March	3.55	3.59	0.31	3.54	2.73	4.68	98
April	3.50	3.54	0.32	3.51	2.61	4.65	100
May	3.47	3.51	0.32	3.46	2.48	4.58	100
June	3.49	3.52	0.32	3.49	2.53	4.56	101
July	3.46	3.51	0.31	3.48	2.79	4.94	97
August	3.48	3.54	0.30	3.50	3.01	4.98	101
September	3.46	3.52	0.32	3.47	2.98	4.90	99
October	3.55	3.64	0.32	3.58	3.16	4.83	100
November	3.61	3.69	0.33	3.66	3.08	4.78	98
December	3.68	3.76	0.35	3.72	2.93	4.98	101
For the Year	3.55	3.61	0.33	3.54	2.48	4.99	1,195

Table A-3

WEIGHTED AVERAGE COMPONENT LEVELS BY REGION

2011

Butterfat

	<u>Region 1</u>	<u>No.*</u>	<u>Region 2</u>	<u>No.*</u>	<u>Region 3</u>	<u>No.*</u>	<u>Region 4</u>	<u>No.*</u>
	-% -		-% -		-% -		-% -	
January	3.83	274	3.84	103	3.85	35	3.73	3
February	3.80	273	3.77	102	3.77	35	3.79	3
March	3.78	275	3.72	102	3.74	35	3.75	3
April	3.75	274	3.66	102	3.67	35	3.80	3
May	3.65	159	3.59	102	3.55	35	3.71	3
June	3.65	277	3.56	102	3.52	35	3.68	3
July	3.65	277	3.51	102	3.48	35	3.66	3
August	3.67	276	3.52	101	3.51	33	3.68	3
September	3.71	276	3.57	102	3.52	35	3.89	3
October	3.82	275	3.72	102	3.66	35	3.97	3
November	3.91	274	3.83	102	3.81	35	4.04	3
December	3.91	274	3.86	101	3.89	35	4.07	3
For the Year	3.76	265	3.68	102	3.66	35	3.80	3

	<u>Region 5</u>	<u>No.*</u>	<u>Region 6</u>	<u>No.*</u>	<u>Region 7</u>	<u>No.*</u>
	-% -		-% -		-% -	
January	4.01	199	4.16	16	3.69	100
February	3.98	198	4.17	17	3.62	100
March	3.99	198	4.14	17	3.55	98
April	3.97	199	4.12	18	3.50	100
May	3.92	198	3.99	18	3.47	100
June	3.88	197	3.93	18	3.49	101
July	3.84	196	3.84	18	3.46	97
August	3.85	194	3.54	12	3.48	101
September	3.92	195	3.85	18	3.46	99
October	3.96	195	3.93	16	3.55	100
November	4.05	195	4.14	16	3.61	98
December	3.89	94	3.98	11	3.68	101
For the Year	3.94	188	4.01	16	3.55	100

Table A-3 (Continued)

WEIGHTED AVERAGE COMPONENT LEVELS BY REGION

2011

	Protein							
	<u>Region 1</u>	<u>No.*</u>	<u>Region 2</u>	<u>No.*</u>	<u>Region 3</u>	<u>No.*</u>	<u>Region 4</u>	<u>No.*</u>
	-% -		-% -		-% -		-% -	
January	3.13	274	3.18	103	3.19	35	3.21	3
February	3.10	273	3.14	102	3.15	35	3.21	3
March	3.10	275	3.12	102	3.13	35	3.15	3
April	3.09	274	3.11	102	3.12	35	3.15	3
May	3.07	159	3.07	102	3.10	35	3.13	3
June	3.06	277	3.06	102	3.07	35	3.10	3
July	3.06	277	3.03	102	3.05	35	3.09	3
August	3.08	276	3.01	101	3.03	33	3.11	3
September	3.11	276	3.08	102	3.11	35	3.16	3
October	3.18	275	3.20	102	3.22	35	3.25	3
November	3.24	274	3.29	102	3.29	35	3.33	3
December	3.21	274	3.27	101	3.27	35	3.29	3
For the Year	3.12	265	3.13	102	3.15	35	3.18	3
	<u>Region 5</u>	<u>No.*</u>	<u>Region 6</u>	<u>No.*</u>	<u>Region 7</u>	<u>No.*</u>		
	-% -		-% -		-% -			
January	3.21	199	3.44	16	N/A	N/A		
February	3.21	198	3.44	17	N/A	N/A		
March	3.20	198	3.43	17	N/A	N/A		
April	3.20	199	3.42	18	N/A	N/A		
May	3.19	198	3.39	18	N/A	N/A		
June	3.15	197	3.37	18	N/A	N/A		
July	3.14	196	3.37	18	N/A	N/A		
August	3.15	194	3.09	12	N/A	N/A		
September	3.20	195	3.44	18	N/A	N/A		
October	3.28	195	3.57	16	N/A	N/A		
November	3.32	195	3.65	16	N/A	N/A		
December	3.24	94	3.30	11	N/A	N/A		
For the Year	3.20	188	3.45	16	N/A	N/A		

Table A-3 (Continued)

WEIGHTED AVERAGE COMPONENT LEVELS BY REGION

2011

Other Solids

	<u>Region 1</u>	<u>No.*</u>	<u>Region 2</u>	<u>No.*</u>	<u>Region 3</u>	<u>No.*</u>	<u>Region 4</u>	<u>No.*</u>
	-% -		-% -		-% -		-% -	
January	5.72	274	5.72	103	5.73	35	5.69	3
February	5.71	273	5.72	102	5.73	35	5.70	3
March	5.71	275	5.73	102	5.74	35	5.70	3
April	5.72	274	5.73	102	5.74	35	5.70	3
May	5.73	159	5.76	102	5.76	35	5.71	3
June	5.73	277	5.76	102	5.77	35	5.72	3
July	5.72	277	5.75	102	5.76	35	5.71	3
August	5.72	276	5.76	101	5.75	33	5.70	3
September	5.70	276	5.74	102	5.75	35	5.67	3
October	5.69	275	5.72	102	5.73	35	5.66	3
November	5.69	274	5.71	102	5.72	35	5.67	3
December	5.72	274	5.73	101	5.73	35	5.68	3
For the Year	5.71	265	5.74	102	5.74	35	5.69	3

	<u>Region 5</u>	<u>No.*</u>	<u>Region 6</u>	<u>No.*</u>	<u>Region 7</u>	<u>No.*</u>
	-% -		-% -		-% -	
January	5.74	199	5.69	16	N/A	N/A
February	5.74	198	5.71	17	N/A	N/A
March	5.75	198	5.72	17	N/A	N/A
April	5.75	199	5.72	18	N/A	N/A
May	5.76	198	5.73	18	N/A	N/A
June	5.75	197	5.74	18	N/A	N/A
July	5.75	196	5.74	18	N/A	N/A
August	5.76	194	5.75	12	N/A	N/A
September	5.76	195	5.76	18	N/A	N/A
October	5.76	195	5.77	16	N/A	N/A
November	5.75	195	5.69	16	N/A	N/A
December	5.76	94	5.73	11	N/A	N/A
For the Year	5.75	188	5.73	16	N/A	N/A

* Number of producers included in monthly average component level.

N/A = not applicable, Arizona Order, Area 7, did not use protein and other solids.

Table A-4

LINEAR RELATIONSHIPS BETWEEN VARIOUS MILK COMPONENTS

2011

Butterfat Levels as a Predictor of Protein
 $\text{Protein} = c + b (\text{Butterfat})$

Pacific Northwest Order

	<u>c</u> <u>Constant</u>	<u>b</u> <u>Butterfat</u> <u>Coefficient</u>	<u>Standard</u> <u>Error of b</u>	<u>R-Squared</u> <u>(Adjusted)</u>	<u>Standard</u> <u>Error</u>	<u>Number of</u> <u>Comparisons</u>
January	1.48359	0.42554	0.01190	0.67025	0.12938	630
February	1.48231	0.42558	0.01308	0.62794	0.13263	628
March	1.58012	0.39955	0.01247	0.61982	0.12790	630
April	1.64162	0.38584	0.01199	0.62152	0.12275	631
May	1.67030	0.38844	0.01275	0.64337	0.11886	515
June	1.58908	0.40462	0.01208	0.63977	0.11613	632
July	1.58582	0.40519	0.01183	0.65057	0.11384	631
August	1.51153	0.42406	0.01132	0.69412	0.10903	619
September	1.57628	0.41181	0.01144	0.67323	0.11921	629
October	1.62055	0.41064	0.01192	0.65476	0.13015	626
November	1.65614	0.40603	0.01259	0.62493	0.14528	625
December	1.64466	0.40014	0.01458	0.59273	0.14096	518
For the Year	1.55866	0.41434	0.00354	0.65161	0.12959	7,314

Table A-5

LINEAR RELATIONSHIPS BETWEEN VARIOUS MILK COMPONENTS

2011

Butterfat Levels as a Predictor of Other Solids

$$\text{Other Solids} = c + b (\text{Butterfat})$$

Pacific Northwest Order

	c	b				
	<u>Constant</u>	<u>Butterfat</u> <u>Coefficient</u>	<u>Standard</u> <u>Error of b</u>	<u>R-Squared</u> <u>(Adjusted)</u>	<u>Standard</u> <u>Error</u>	<u>Number of</u> <u>Comparisons</u>
January	6.10580	-0.10191	0.00707	0.24735	0.07690	630
February	6.02132	-0.08150	0.00749	0.15770	0.07597	628
March	5.98118	-0.06923	0.00718	0.12742	0.07369	630
April	5.96910	-0.06552	0.00718	0.11538	0.07355	631
May	5.93575	-0.05446	0.00727	0.09692	0.06775	515
June	5.99900	-0.07398	0.00737	0.13658	0.07083	632
July	5.99051	-0.07571	0.00784	0.12779	0.07546	631
August	5.98105	-0.07179	0.00808	0.11190	0.07786	619
September	5.96640	-0.07029	0.00802	0.10775	0.08352	629
October	6.02900	-0.08597	0.00873	0.13312	0.09530	626
November	6.10077	-0.10382	0.00737	0.24048	0.08504	625
December	6.28676	-0.14520	0.00818	0.37797	0.07909	518
For the Year	6.03352	-0.08457	0.00217	0.17210	0.07932	7,314

Table A-6

MONTHLY PRODUCER COMPONENT PRICES

2011

Pacific Northwest Order

<u>Month</u>	<u>Butterfat Price</u> \$ / pound	<u>Protein Price</u> \$ / pound	<u>Other Solids Price</u> \$ / pound	<u>Producer Price Differential 1/</u> \$ / hundredweight
January	2.0239	1.7590	0.2002	2.09
February	2.2967	2.5586	0.2310	0.78
March	2.2859	3.3024	0.2665	0.03
April	2.2113	2.4984	0.2902	2.08
May	2.2497	2.3133	0.3026	2.50
June	2.3702	2.9807	0.3339	1.49
July	2.2511	3.8292	0.3608	(0.05)
August	2.2985	3.8305	0.3811	(0.01)
September	2.2005	3.0282	0.4053	1.33
October	1.9592	2.9211	0.4286	0.77
November	1.9508	3.2341	0.4521	(0.30)
December	1.7443	3.3404	0.4683	(0.72)
Simple Average	2.1535	2.9663	0.3434	0.83
Wtd. Average	2.1548	2.9681	0.3430	0.84

1/ The producer price differentials for the Pacific Northwest Order are subject to applicable location adjustments. The effects of location adjustments are not dealt with in this study.

Arizona Order

<u>Month</u>	<u>Skim Price 2/</u> \$ / hundredweight	<u>Butterfat Price 2/</u> \$ / pound
January	9.61	1.9878
February	10.73	2.2357
March	12.09	2.2956
April	12.20	2.2235
May	12.45	2.2473
June	13.22	2.3602
July	14.10	2.2788
August	14.55	2.2961
September	13.63	2.2273
October	12.81	2.0088
November	12.93	1.9512
December	12.74	1.7944
Simple Average	12.59	2.1589
Wtd. Average	12.55	2.1562

2/ The producer prices for the Arizona Order are subject to applicable location adjustments. The effects of location adjustments are not dealt with in this study.

Table A-7

**AGGREGATED COMPONENT TESTS BY SIZE-RANGE OF
PRODUCER MILK DELIVERIES**

2011

(See Figure A-7)

Pacific Northwest Order

<u>Size Range</u>		<u>Butterfat</u>	<u>Protein</u>	<u>Other Solids</u>	<u>Producers</u>
<u>Equal to or</u> <u>more than</u> - pounds -	<u>Less</u> <u>than</u> - pounds -				
	50,000	4.19	3.26	5.58	366
50,000	100,000	4.12	3.24	5.65	509
100,000	200,000	4.10	3.22	5.67	1,092
200,000	300,000	4.02	3.20	5.69	821
300,000	400,000	3.98	3.18	5.71	492
400,000	500,000	3.96	3.20	5.71	419
500,000	600,000	3.97	3.21	5.71	405
600,000	700,000	3.88	3.20	5.72	403
700,000	1,000,000	3.80	3.13	5.73	653
1,000,000	2,000,000	3.73	3.13	5.74	1,132
2,000,000	3,000,000	3.70	3.13	5.73	448
3,000,000	4,000,000	3.85	3.19	5.74	177
4,000,000	6,000,000	3.68	3.12	5.74	218
6,000,000		3.73	3.23	5.74	179
Weighted Average		3.77	3.17	5.73	7,314

Table A-7 (Continued)

**AGGREGATED COMPONENT TESTS BY SIZE-RANGE OF
PRODUCER MILK DELIVERIES**

2011

(See Figure A-7)

Arizona Order

<u>Size Range</u>		<u>Butterfat</u>	<u>Producers</u>
<u>Equal to or</u> <u>more than</u> - pounds -	<u>Less</u> <u>than</u> - pounds -		
	200,000	2.92	5
200,000	300,000	3.72	3
300,000	400,000	3.96	15
400,000	500,000	3.75	20
500,000	600,000	3.70	14
600,000	700,000	3.47	6
700,000	1,000,000	3.60	54
1,000,000	2,000,000	3.70	274
2,000,000	3,000,000	3.66	239
3,000,000	4,000,000	3.59	176
4,000,000	5,000,000	3.49	107
5,000,000	6,000,000	3.51	98
6,000,000	7,000,000	3.53	46
7,000,000		3.48	138
Weighted Average		3.55	1,195

Table A-8

**AGGREGATED COMPONENT VALUES BY SIZE-RANGE OF
PRODUCER MILK DELIVERIES**

2011

(See Figure A-8)

Pacific Northwest Order

<u>Size Range</u>		<u>Aggregated Component Values 1/</u> - dollars -	<u>Producer Milk</u> - pounds -	<u>Percent of Producer Milk</u> - % -	<u>Producers</u>	<u>Percent of Producers</u> - % -	<u>Weighted Average Value</u> - dollars/cwt. -
<u>Equal to or more than</u> - pounds -	<u>Less than</u> - pounds -						
	50,000	\$ 2,504,361.32	11,743,246	0.15%	366	5.00%	21.33
50,000	100,000	8,002,204.50	37,686,608	0.47%	509	6.96%	21.23
100,000	200,000	33,811,631.44	159,865,933	2.00%	1,092	14.93%	21.15
200,000	300,000	42,603,185.33	203,285,394	2.55%	821	11.23%	20.96
300,000	400,000	35,272,756.66	168,955,136	2.12%	492	6.73%	20.88
400,000	500,000	39,131,839.58	188,634,634	2.36%	419	5.73%	20.74
500,000	600,000	46,460,949.37	223,425,980	2.80%	405	5.54%	20.79
600,000	700,000	54,308,712.33	262,533,509	3.29%	403	5.51%	20.69
700,000	1,000,000	110,641,936.98	543,571,488	6.81%	653	8.93%	20.35
1,000,000	2,000,000	329,271,240.38	1,639,185,617	20.54%	1,132	15.48%	20.09
2,000,000	3,000,000	217,940,513.99	1,082,019,866	13.56%	448	6.13%	20.14
3,000,000	4,000,000	128,076,379.74	624,303,764	7.82%	177	2.42%	20.52
4,000,000	6,000,000	203,917,877.95	1,019,551,237	12.77%	218	2.98%	20.00
6,000,000		372,019,086.39	1,816,560,211	22.76%	179	2.45%	20.48
Total/Weighted Average		\$ 1,623,962,675.97	7,981,322,623	100.00%	7,314	100.00%	20.35

Table A-8 (Continued)

**AGGREGATED COMPONENT VALUES BY SIZE-RANGE OF
PRODUCER MILK DELIVERIES**

2011

(See Figure A-8)

Arizona Order

<u>Size Range</u>		<u>Aggregated Component Values 1/</u>	<u>Producer Milk</u>	<u>Percent of Producer Milk</u>	<u>Producers</u>	<u>Percent of Producers</u>	<u>Weighted Average Value</u>
<u>Equal to or more than</u>	<u>Less than</u>						
- pounds -	- pounds -	- dollars -	- pounds -	- % -		- % -	- dollars/cwt. -
	200,000	\$ 43,830.84	221,720	0.00%	5	0.42%	19.77
200,000	300,000	165,108.40	850,990	0.02%	3	0.25%	19.40
300,000	400,000	1,107,111.85	5,292,053	0.12%	15	1.26%	20.92
400,000	500,000	1,845,330.28	9,158,745	0.20%	20	1.67%	20.15
500,000	600,000	1,479,368.90	7,691,374	0.17%	14	1.17%	19.23
600,000	700,000	794,168.18	3,953,051	0.09%	6	0.50%	20.09
700,000	1,000,000	9,393,778.68	46,894,047	1.04%	54	4.52%	20.03
1,000,000	2,000,000	82,153,341.14	406,808,955	9.01%	274	22.93%	20.19
2,000,000	3,000,000	118,169,790.06	593,771,366	13.14%	239	20.00%	19.90
3,000,000	4,000,000	123,380,974.00	615,901,303	13.63%	176	14.73%	20.03
4,000,000	5,000,000	93,608,449.36	477,548,573	10.57%	107	8.95%	19.60
5,000,000	6,000,000	105,021,576.66	538,439,007	11.92%	98	8.20%	19.50
6,000,000	7,000,000	57,398,068.84	297,124,199	6.58%	46	3.85%	19.32
7,000,000		298,040,880.21	1,513,768,271	33.51%	138	11.55%	19.69
Total/Weighted Average		\$ 892,601,777.40	4,517,423,654	100.00%	1,195	100.00%	19.76

1/ Based on Federal order minimum prices. Producer prices for the two orders are subject to location adjustments. The effects of location adjustments are not dealt with in this study.

Table A-9

**STATISTICAL DATA FOR PRODUCERS ON THE
PACIFIC NORTHWEST ORDER INCLUDED IN COMPONENT ANALYSIS**

LONG TERM TRENDS: 2000-2011

Butterfat

<u>Year</u>	<u>Weighted Average</u> - % -	<u>Mean</u> - % -	<u>Standard Deviation</u> - % -	<u>Median</u> - % -	<u>Minimum</u> - % -	<u>Maximum</u> - % -	<u>Number of Observations</u>
2000	<u>3.65</u>	3.78	0.37	3.71	2.39	6.27	12,872
2001	3.66	<u>3.76</u>	<u>0.36</u>	<u>3.69</u>	<u>2.14</u>	<u>6.47</u>	<u>14,106</u>
2002	3.68	3.78	<u>0.36</u>	3.70	2.38	6.11	12,321
2003	3.66	3.77	<u>0.36</u>	<u>3.69</u>	<u>2.74</u>	5.76	9,947
2004	3.68	3.79	0.37	3.71	2.43	5.66	9,946
2005	3.67	3.80	0.37	3.72	2.36	5.57	9,808
2006	3.69	3.82	<u>0.36</u>	3.75	2.49	<u>5.47</u>	9,352
2007	3.70	3.85	0.39	3.76	2.60	5.86	8,454
2008	3.67	3.84	0.39	3.75	2.60	5.65	7,319
2009	3.71	3.87	0.41	3.78	2.62	5.83	7,487
2010	3.73	3.89	<u>0.43</u>	3.79	<u>2.74</u>	6.10	7,588
2011	<u>3.77</u>	<u>3.92</u>	<u>0.43</u>	<u>3.82</u>	2.70	6.21	<u>7,314</u>

Difference between **maximum** and minimum:

0.12	0.16	0.07	0.13	0.60	1.00	6,792
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Protein

<u>Year</u>	<u>Weighted Average</u> - % -	<u>Mean</u> - % -	<u>Standard Deviation</u> - % -	<u>Median</u> - % -	<u>Minimum</u> - % -	<u>Maximum</u> - % -	<u>Number of Observations</u>
2000	<u>3.02</u>	3.09	0.20	<u>3.04</u>	2.54	4.37	12,872
2001	3.04	3.10	0.20	3.06	2.35	<u>4.48</u>	<u>14,106</u>
2002	3.05	3.10	<u>0.19</u>	3.06	2.51	4.31	12,321
2003	3.04	<u>3.08</u>	<u>0.19</u>	<u>3.04</u>	2.56	4.14	9,947
2004	3.05	3.10	0.20	3.06	2.36	4.20	9,946
2005	3.05	3.10	0.20	3.06	2.55	4.14	9,808
2006	3.07	3.11	0.20	3.07	2.21	<u>4.09</u>	9,352
2007	3.09	3.14	0.21	3.10	2.17	4.42	8,454
2008	3.09	3.14	0.21	3.10	2.58	4.28	7,319
2009	3.11	3.16	<u>0.22</u>	3.11	<u>2.63</u>	<u>4.09</u>	7,487
2010	3.15	<u>3.18</u>	<u>0.22</u>	<u>3.13</u>	<u>2.13</u>	4.40	7,588
2011	<u>3.17</u>	<u>3.18</u>	<u>0.22</u>	<u>3.13</u>	2.58	4.43	<u>7,314</u>

Difference between **maximum** and minimum:

0.15	0.10	0.03	0.09	0.50	0.39	6,792
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Table A-9 (Continued)

**STATISTICAL DATA FOR PRODUCERS ON THE
PACIFIC NORTHWEST ORDER INCLUDED IN COMPONENT ANALYSIS**

LONG TERM TRENDS: 2000-2011

Other Solids

<u>Year</u>	<u>Weighted Average</u> - % -	<u>Mean</u> - % -	<u>Standard Deviation</u> - % -	<u>Median</u> - % -	<u>Minimum</u> - % -	<u>Maximum</u> - % -	<u>Number of Observations</u>
2000	5.71	5.69	<u>0.07</u>	5.70	4.86	5.98	12,872
2001	5.70	5.68	0.08	5.69	4.55	6.05	<u>14,106</u>
2002	5.71	5.68	0.09	5.69	4.61	6.04	12,321
2003	<u>5.69</u>	<u>5.66</u>	0.10	<u>5.67</u>	4.56	6.00	9,947
2004	<u>5.69</u>	<u>5.66</u>	0.10	<u>5.67</u>	4.48	5.94	9,946
2005	5.71	5.67	0.10	5.69	<u>4.23</u>	5.95	9,808
2006	5.70	5.67	<u>0.11</u>	5.69	4.84	<u>6.15</u>	9,352
2007	5.71	5.68	0.09	5.70	4.78	5.93	8,454
2008	5.70	5.67	0.09	5.69	4.86	5.99	7,319
2009	<u>5.69</u>	5.67	0.09	5.68	<u>4.96</u>	<u>5.87</u>	7,487
2010	5.71	5.68	0.09	5.70	4.71	5.92	7,588
2011	<u>5.73</u>	<u>5.70</u>	0.09	<u>5.72</u>	4.86	6.01	<u>7,314</u>
Difference between <u>maximum</u> and <u>minimum</u> :							
	0.04	0.04	0.04	0.05	0.73	0.28	6,792

Table A-10

**STATISTICAL DATA FOR PRODUCERS ON THE
ARIZONA ORDER INCLUDED IN COMPONENT ANALYSIS**

LONG TERM TRENDS: 2000-2011

Butterfat

<u>Year</u>	<u>Weighted Average</u> - % -	<u>Mean</u> - % -	<u>Standard Deviation</u> - % -	<u>Median</u> - % -	<u>Minimum</u> - % -	<u>Maximum</u> - % -	<u>Number of Observations</u>
2000	3.62	<u>3.65</u>	<u>0.27</u>	<u>3.62</u>	2.91	4.96	<u>1,464</u>
2001	3.62	3.63	0.28	3.60	2.76	5.01	1,378
2002	<u>3.63</u>	<u>3.65</u>	<u>0.27</u>	<u>3.62</u>	<u>2.99</u>	4.92	1,298
2003	3.59	3.62	0.30	3.57	2.38	4.94	1,268
2004	3.61	3.64	0.30	3.59	2.81	4.87	1,136
2005	3.59	3.63	0.33	3.58	2.62	4.92	<u>1,048</u>
2006	3.59	3.62	0.32	3.56	2.94	4.88	1,099
2007	3.59	3.63	0.32	3.58	2.62	<u>4.86</u>	1,112
2008	3.56	3.59	0.33	3.53	2.87	5.07	1,187
2009	<u>3.49</u>	<u>3.54</u>	0.33	<u>3.48</u>	2.59	<u>5.60</u>	1,162
2010	3.50	3.55	<u>0.36</u>	3.51	<u>2.36</u>	5.45	1,157
2011	3.55	3.61	0.33	3.54	2.48	4.99	1,195
Difference between <u>maximum</u> and <u>minimum</u> :							
	0.14	0.11	0.09	0.14	0.63	0.74	416

Figure A-1
FREQUENCY DISTRIBUTION OF MONTHLY AVERAGE BUTTERFAT LEVELS
2011
Pacific Northwest Order

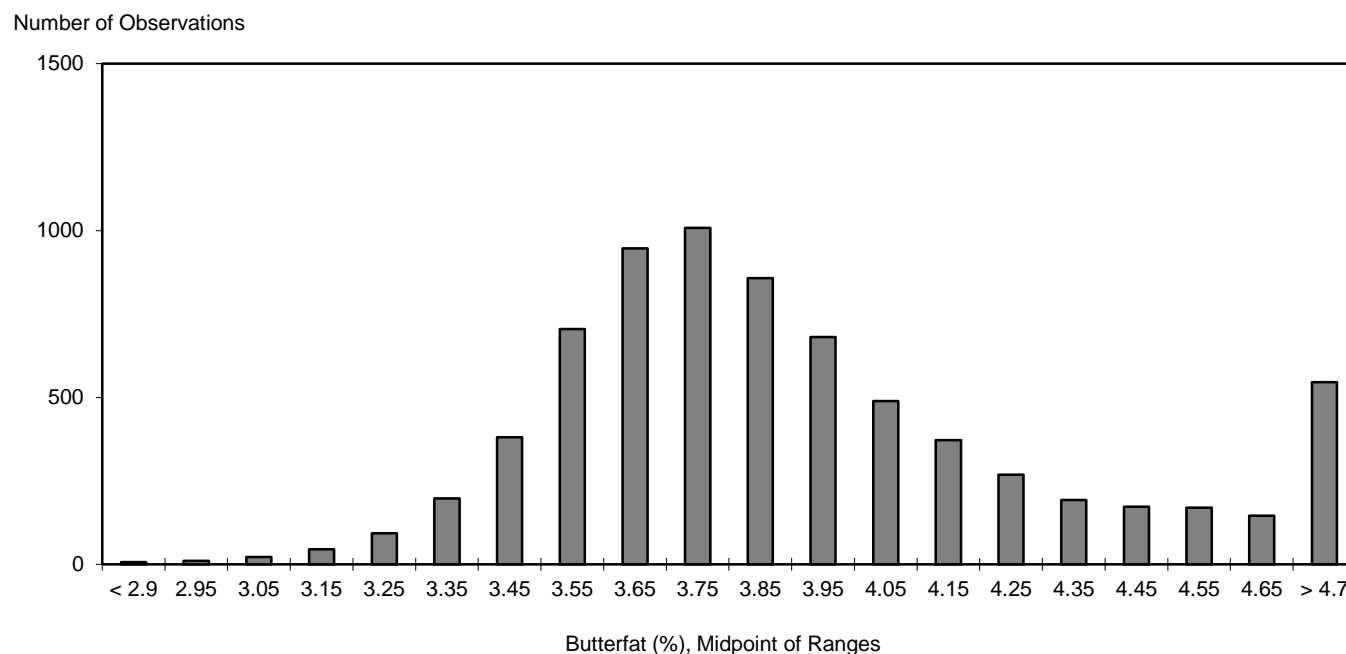


Figure A-2
FREQUENCY DISTRIBUTION OF MONTHLY AVERAGE PROTEIN LEVELS
2011
Pacific Northwest Order

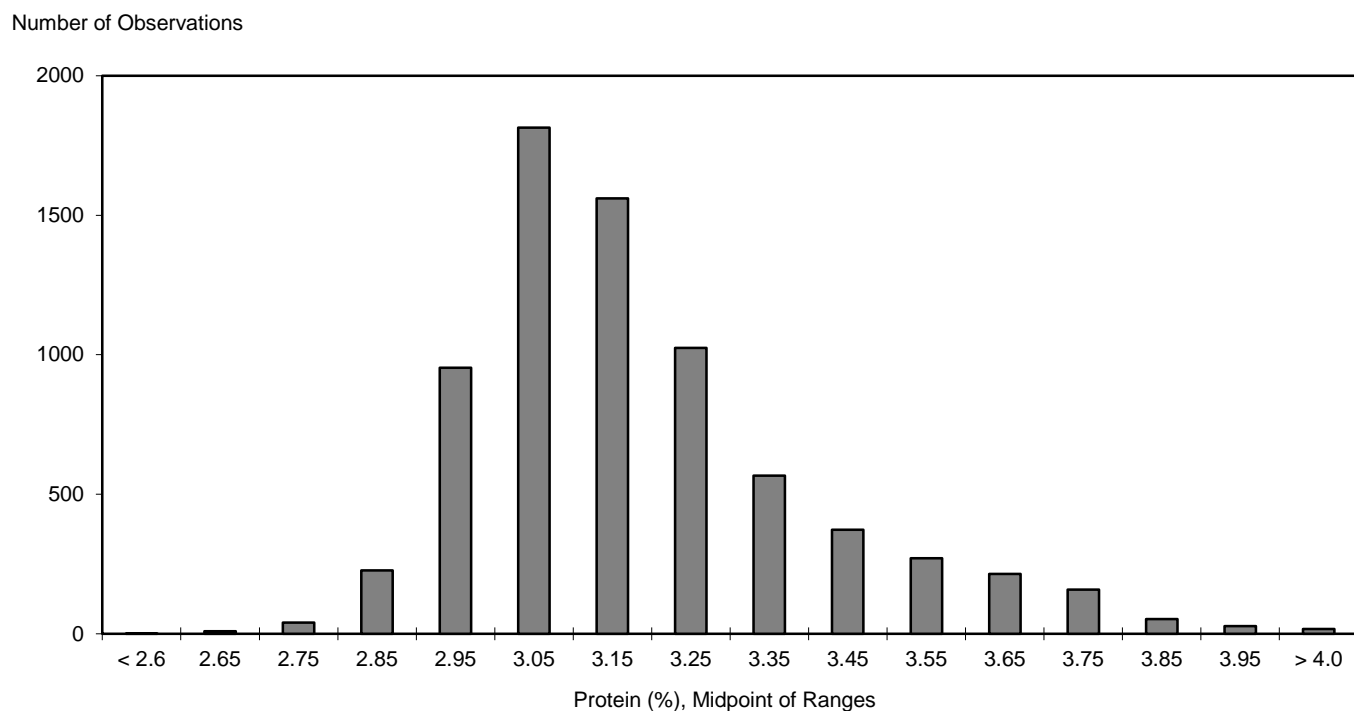


Figure A-3
FREQUENCY DISTRIBUTION OF MONTHLY AVERAGE
OTHER SOLIDS LEVELS
2011
Pacific Northwest Order

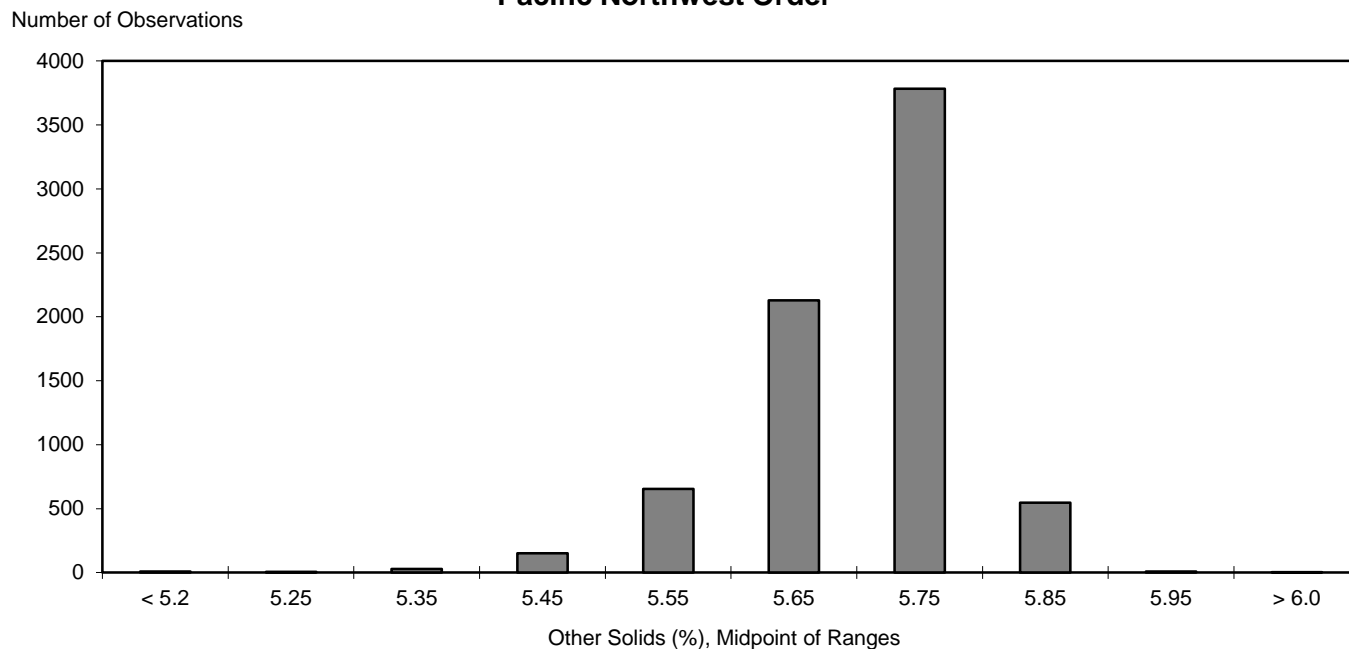


Figure A-4
FREQUENCY DISTRIBUTION OF MONTHLY AVERAGE BUTTERFAT LEVELS
2011
Arizona Order

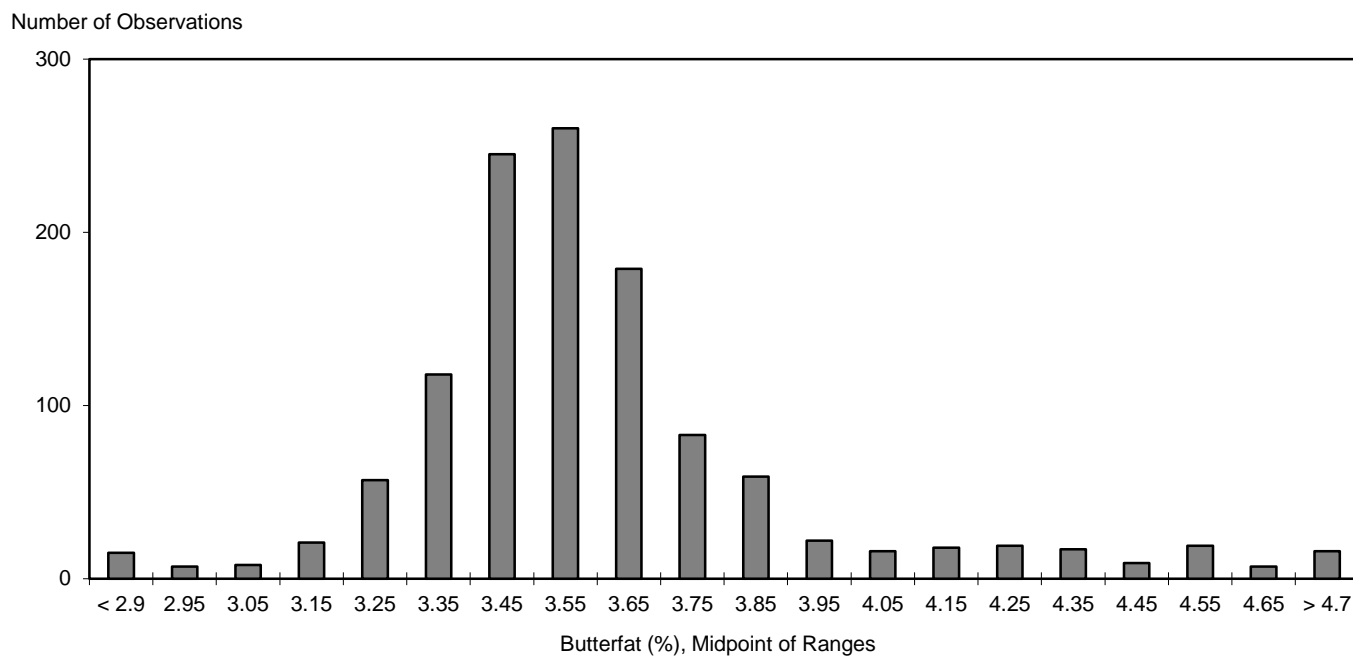


Figure A-5
SCATTER PLOT OF PROTEIN AND BUTTERFAT
MAY AND NOVEMBER 2011
Pacific Northwest Order

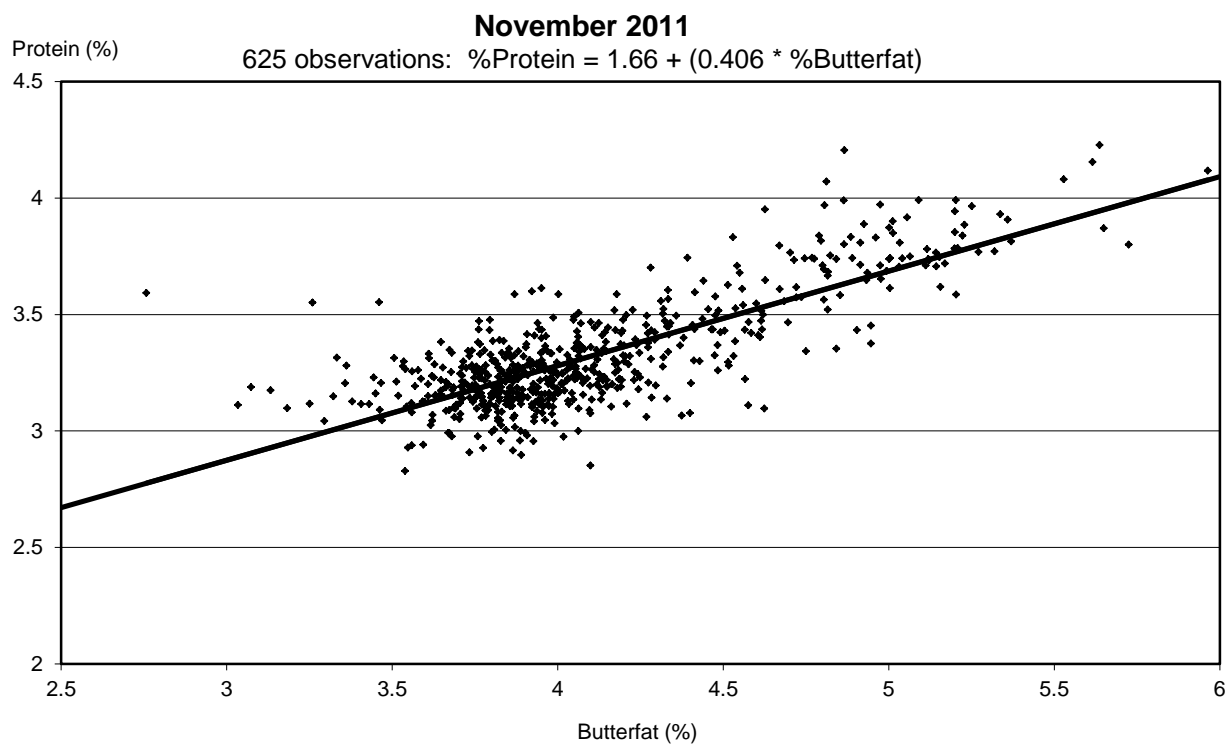
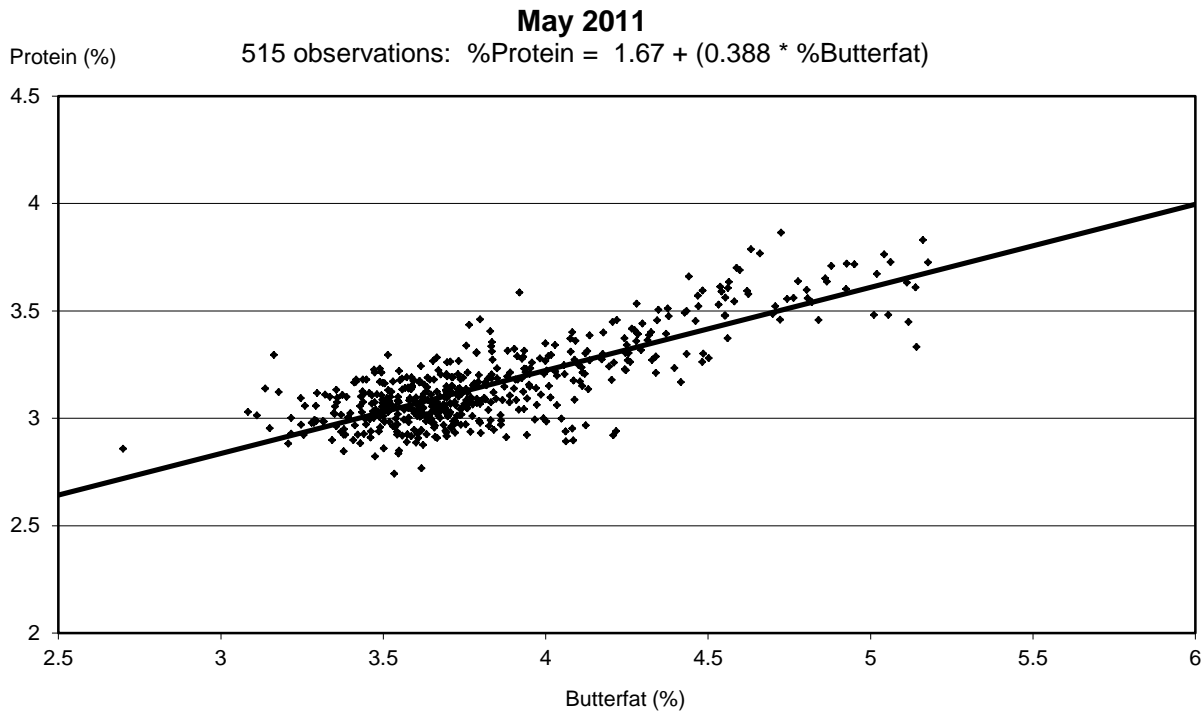


Figure A-6
SCATTER PLOT OF OTHER SOLIDS AND BUTTERFAT
MAY AND NOVEMBER 2011
Pacific Northwest Order

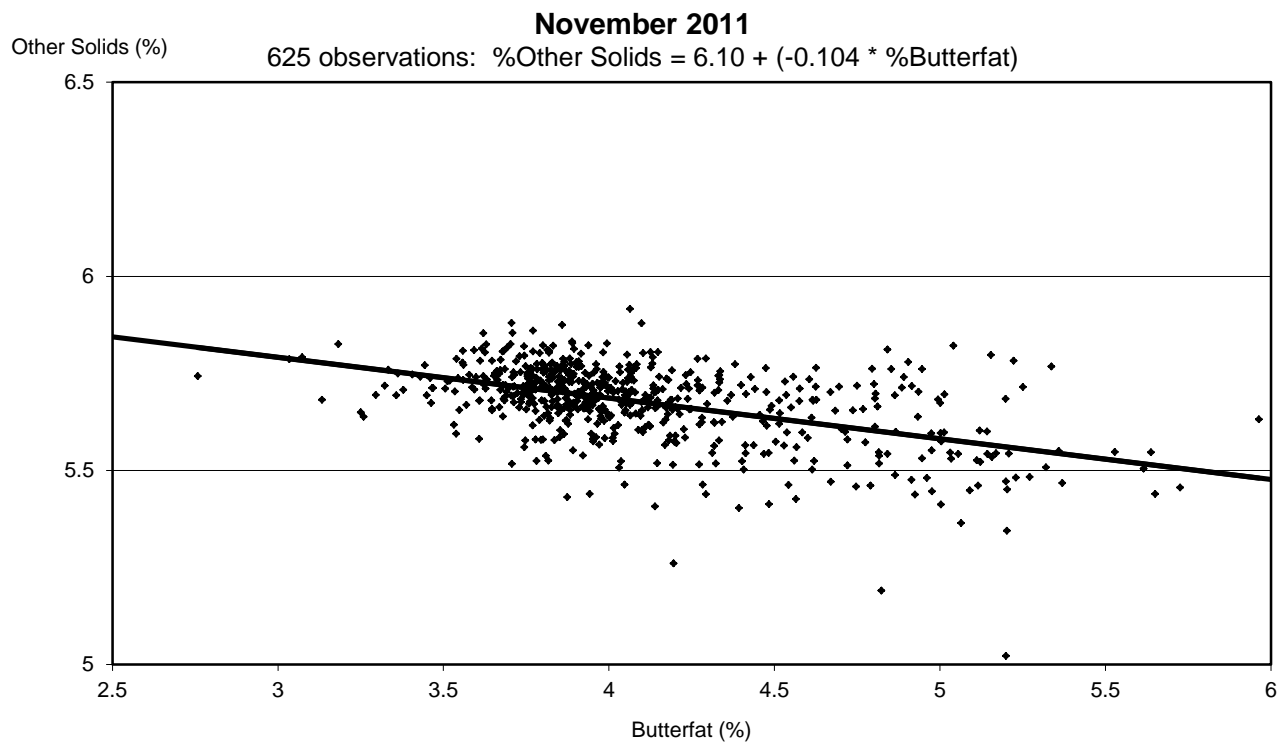
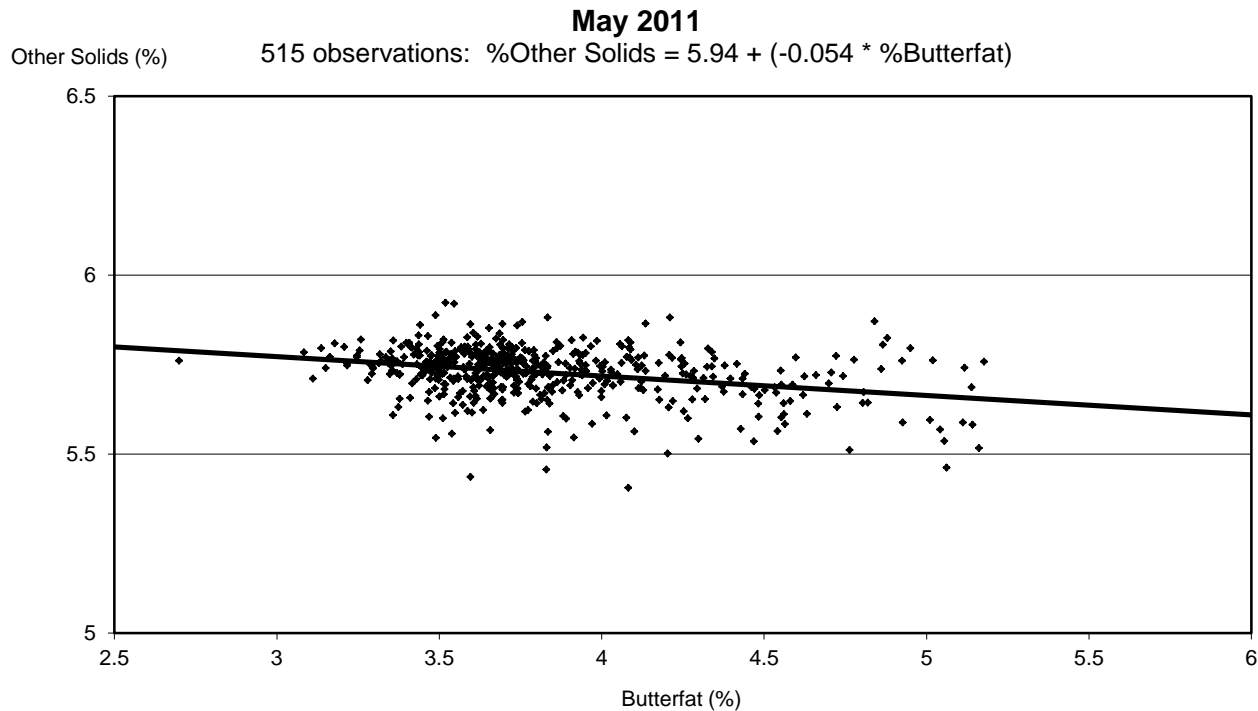


Figure A-7
WEIGHTED AVERAGE COMPONENT LEVELS
BY SIZE-RANGE OF PRODUCER MILK DELIVERIES
2011

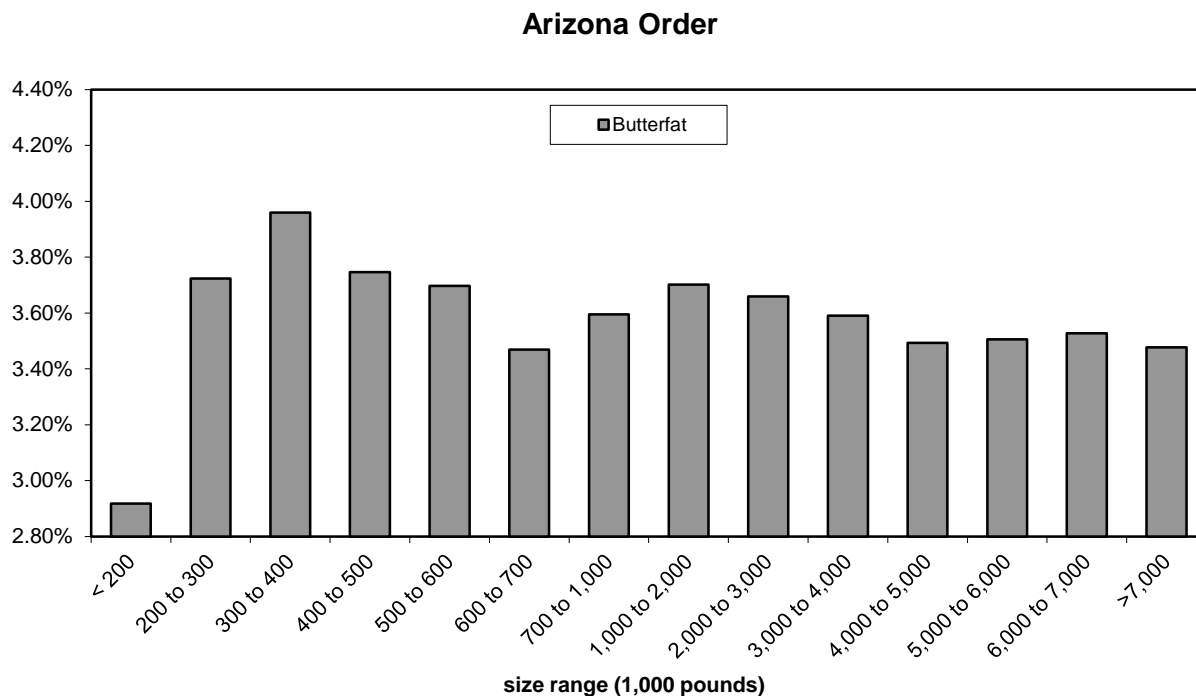
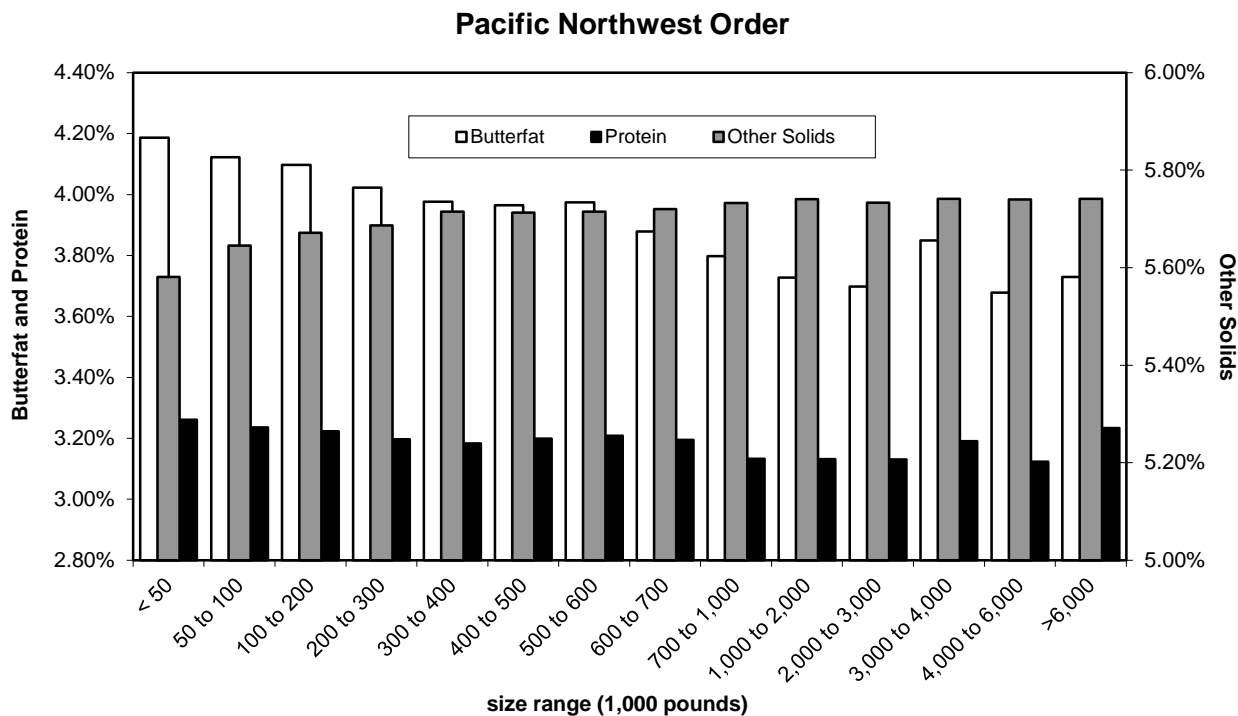
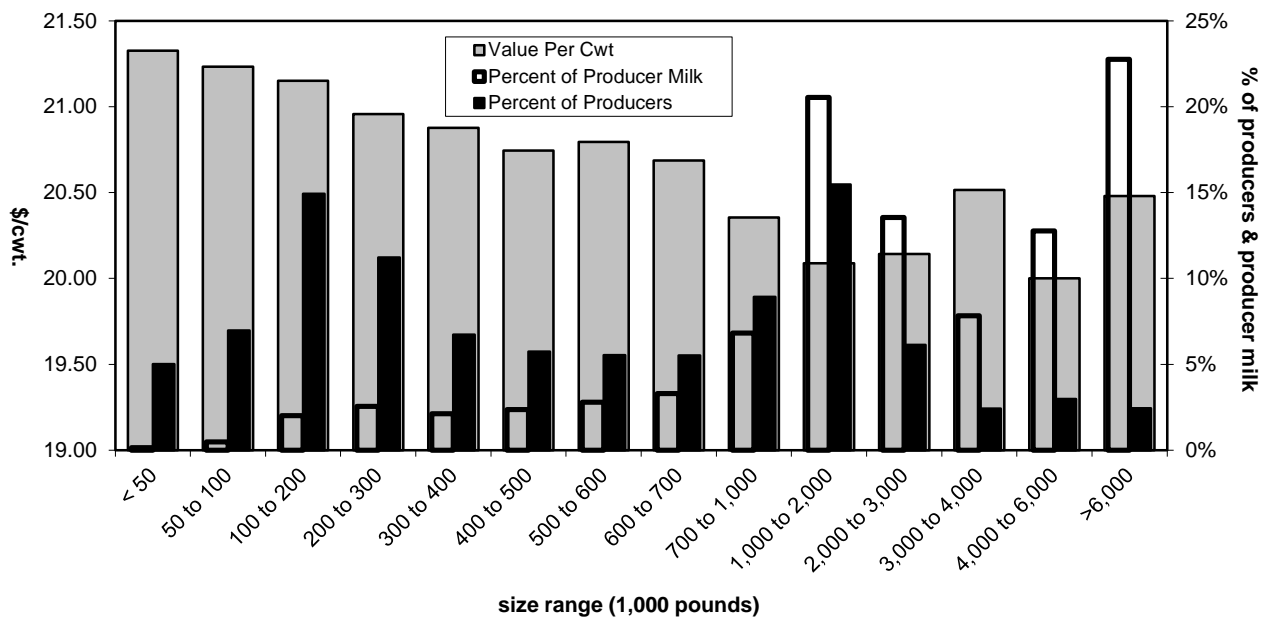
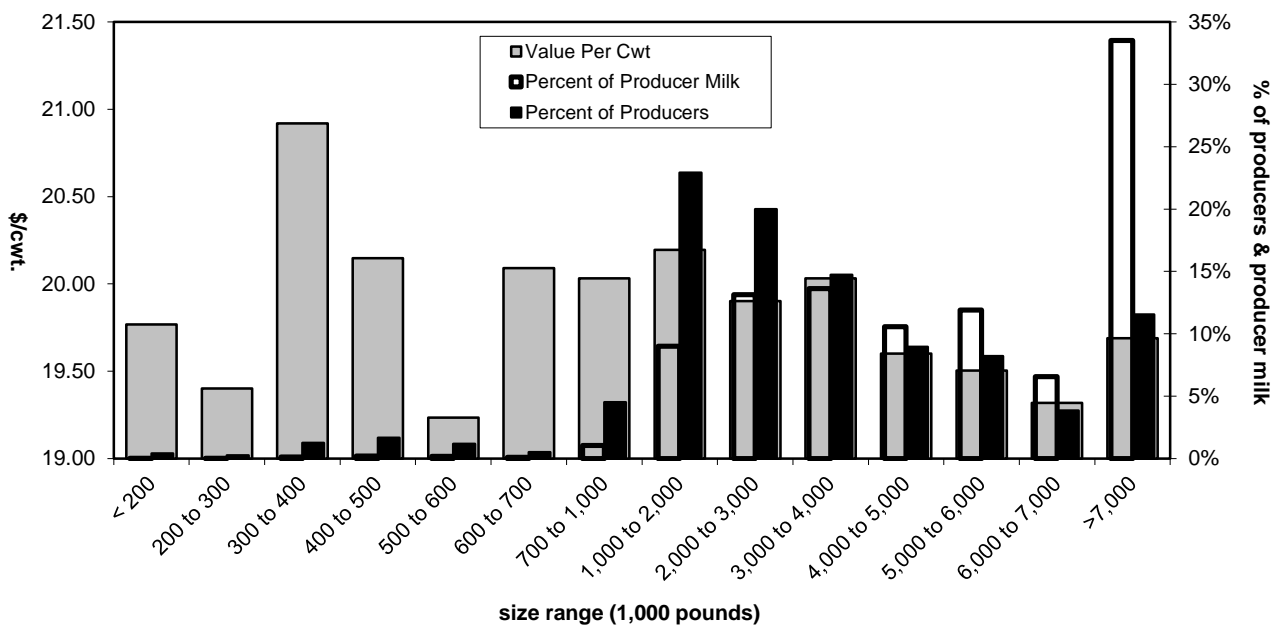


Figure A-8
WEIGHTED AVERAGE VALUES AND PERCENT OF PRODUCERS & PRODUCER MILK
BY SIZE-RANGE OF PRODUCER MILK DELIVERIES
2011

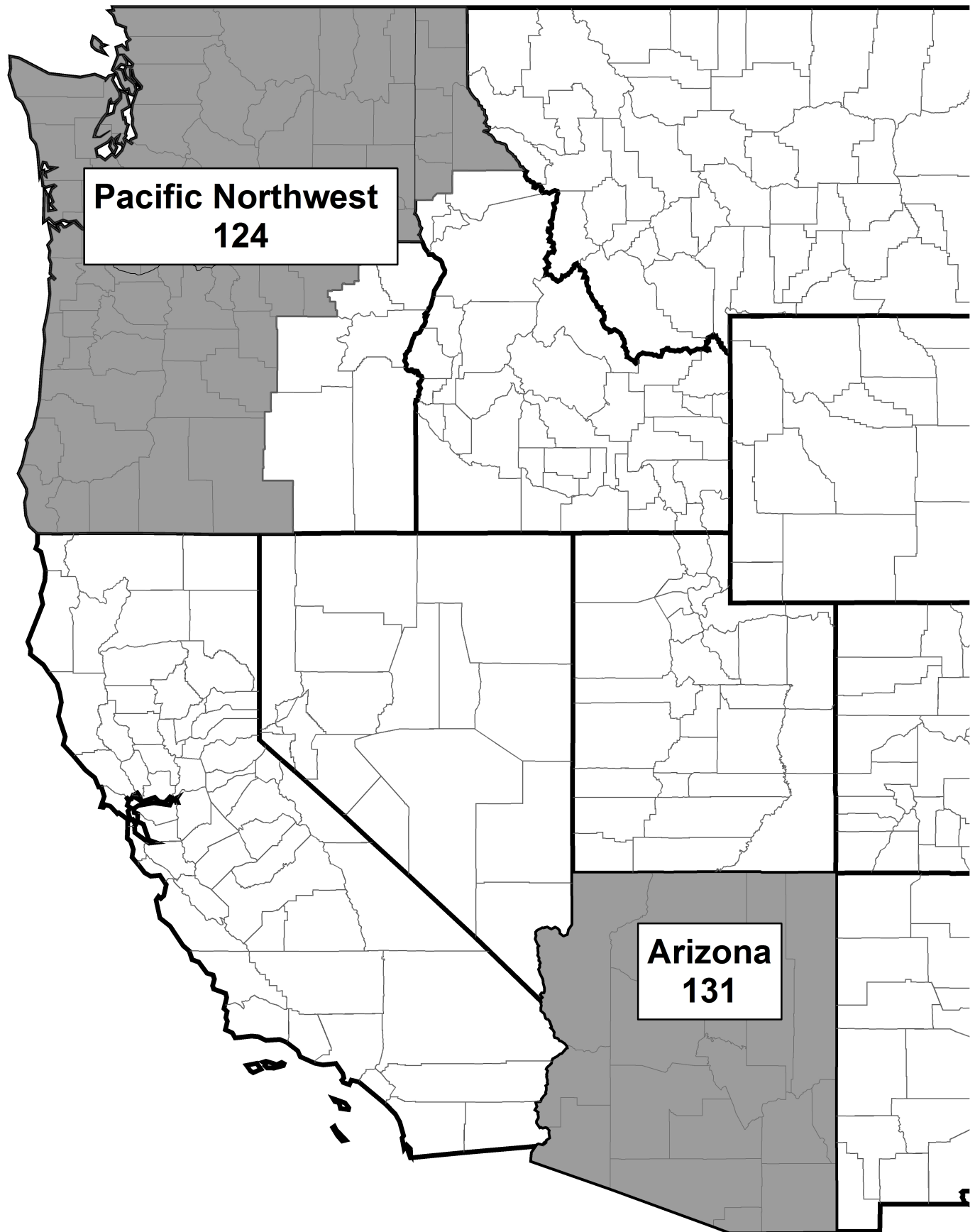
Pacific Northwest Order



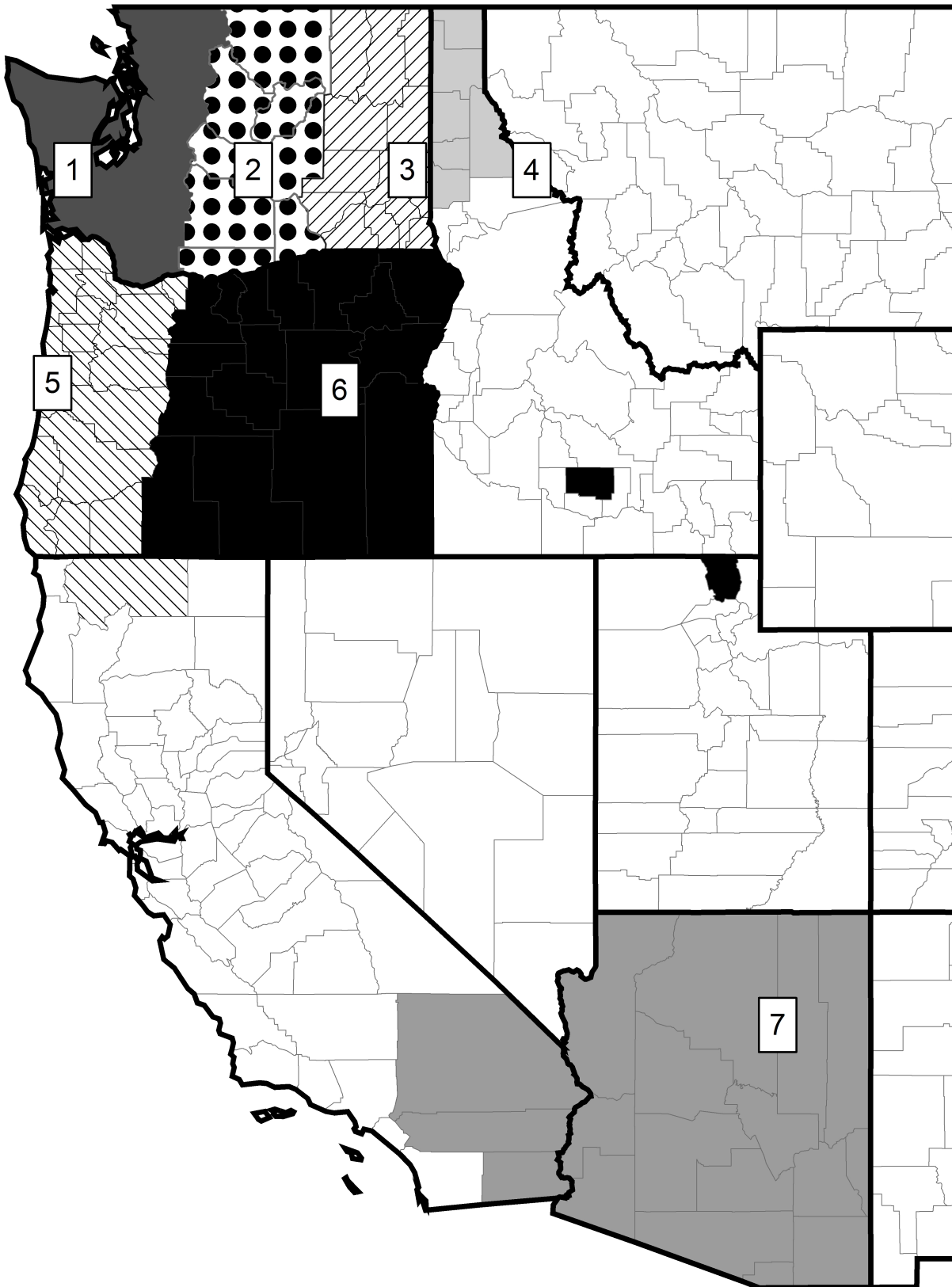
Arizona Order



MAP A-1
Marketing Areas of the Pacific Northwest (FO 124)
and Arizona (FO 131) Orders



MAP A-2
Geographic Regions Encompassing The Pacific Northwest and
Arizona Order Milk Sheds, 2011



* Note: Region 7 also includes Lamb and Parmer Counties, Texas. They were not included on this map due to space limitations.