Economics of Hay Exports Patterns

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Starting points, Main ideas and Outline

- **Exports have become important to the hay business**
- **Dairy production is key to hay demand in the West and to hay demand to Asia**

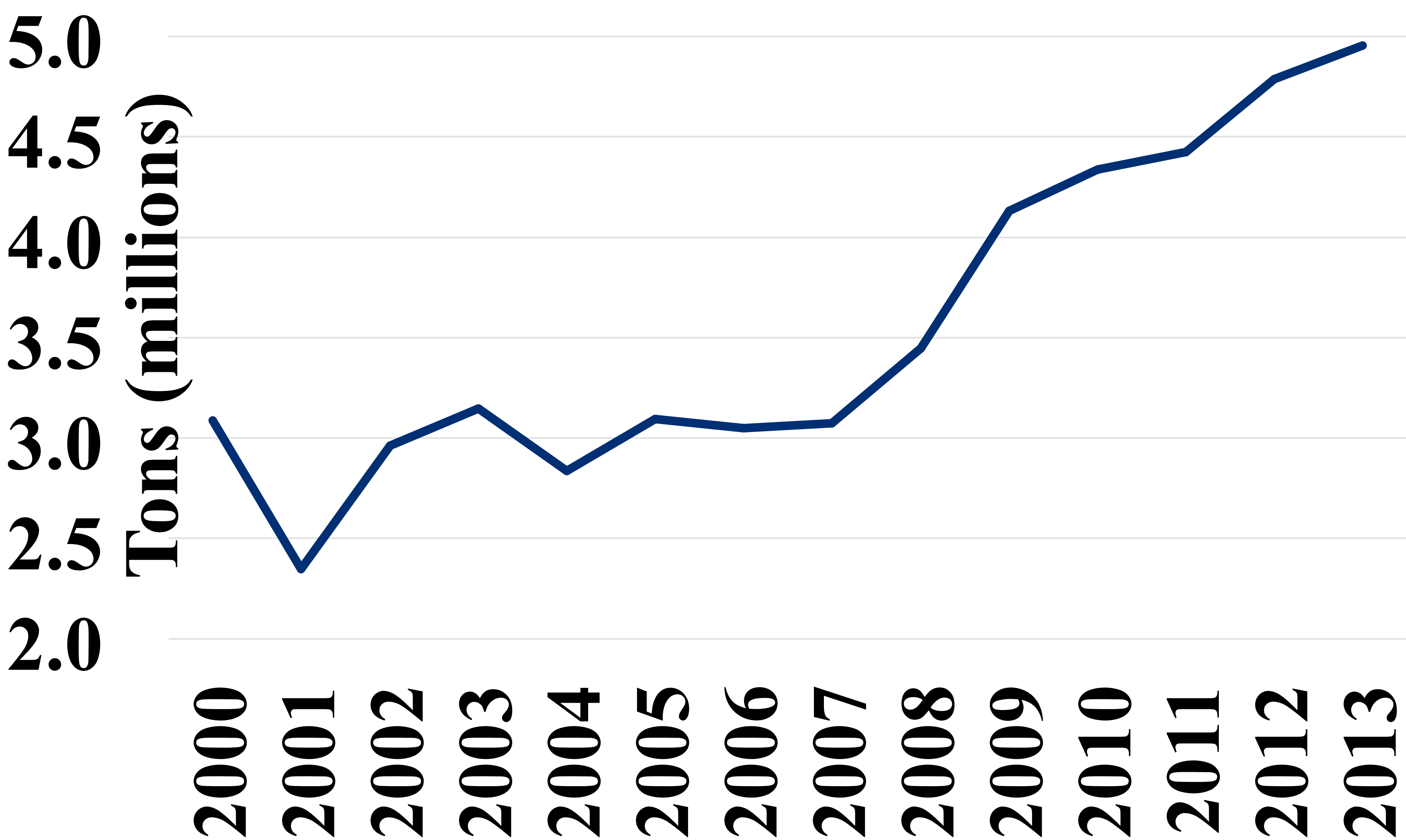
Here in California, milk production and hay go together; in Asia imported hay imports and dairy production go together

- **Hay and dairy production grow when export demand for dairy grows.**
- **Hay exports and dairy exports are substitutes in the export market.**

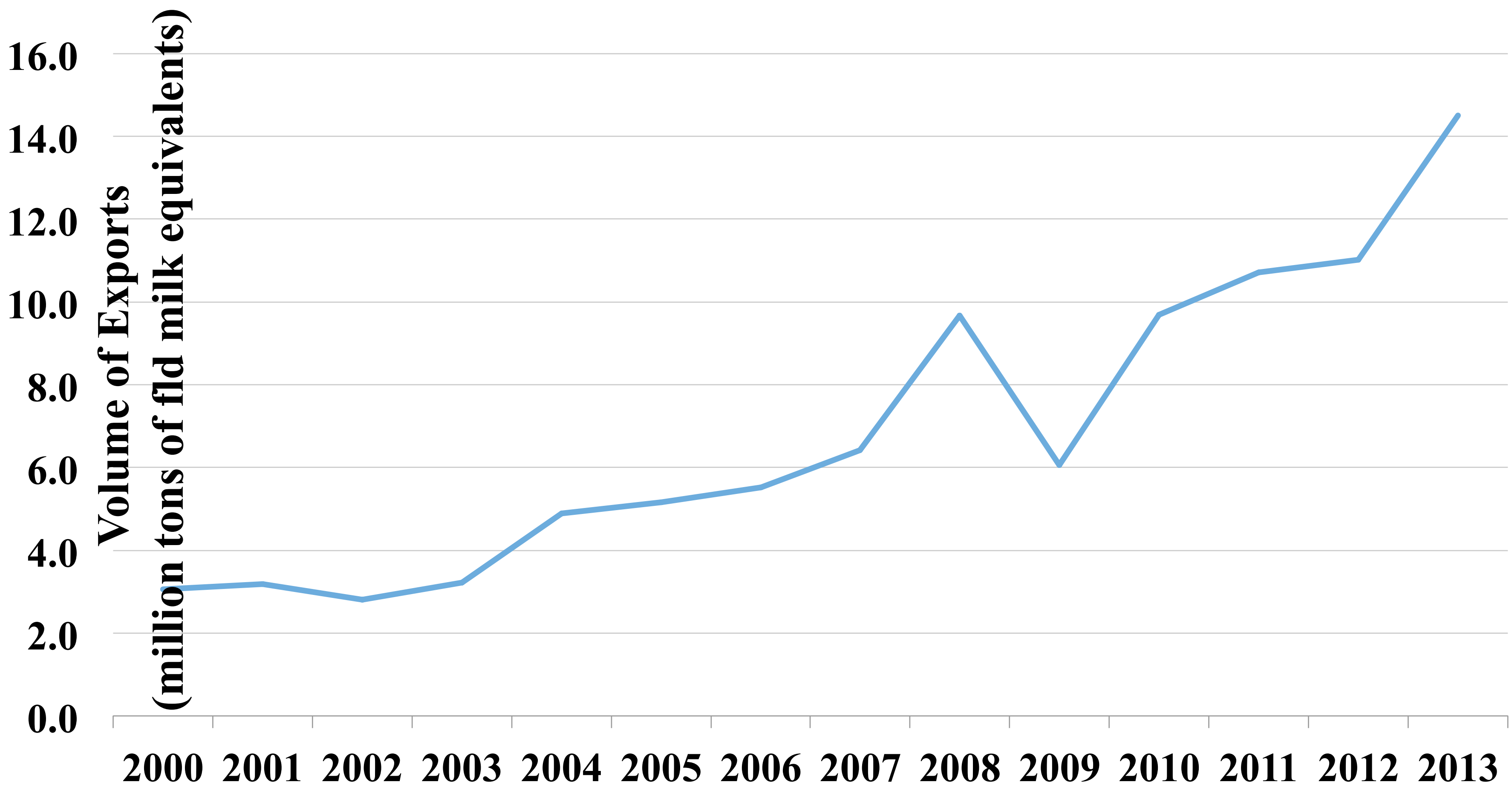
Review 2014 in the context of western dairy demand and export demand

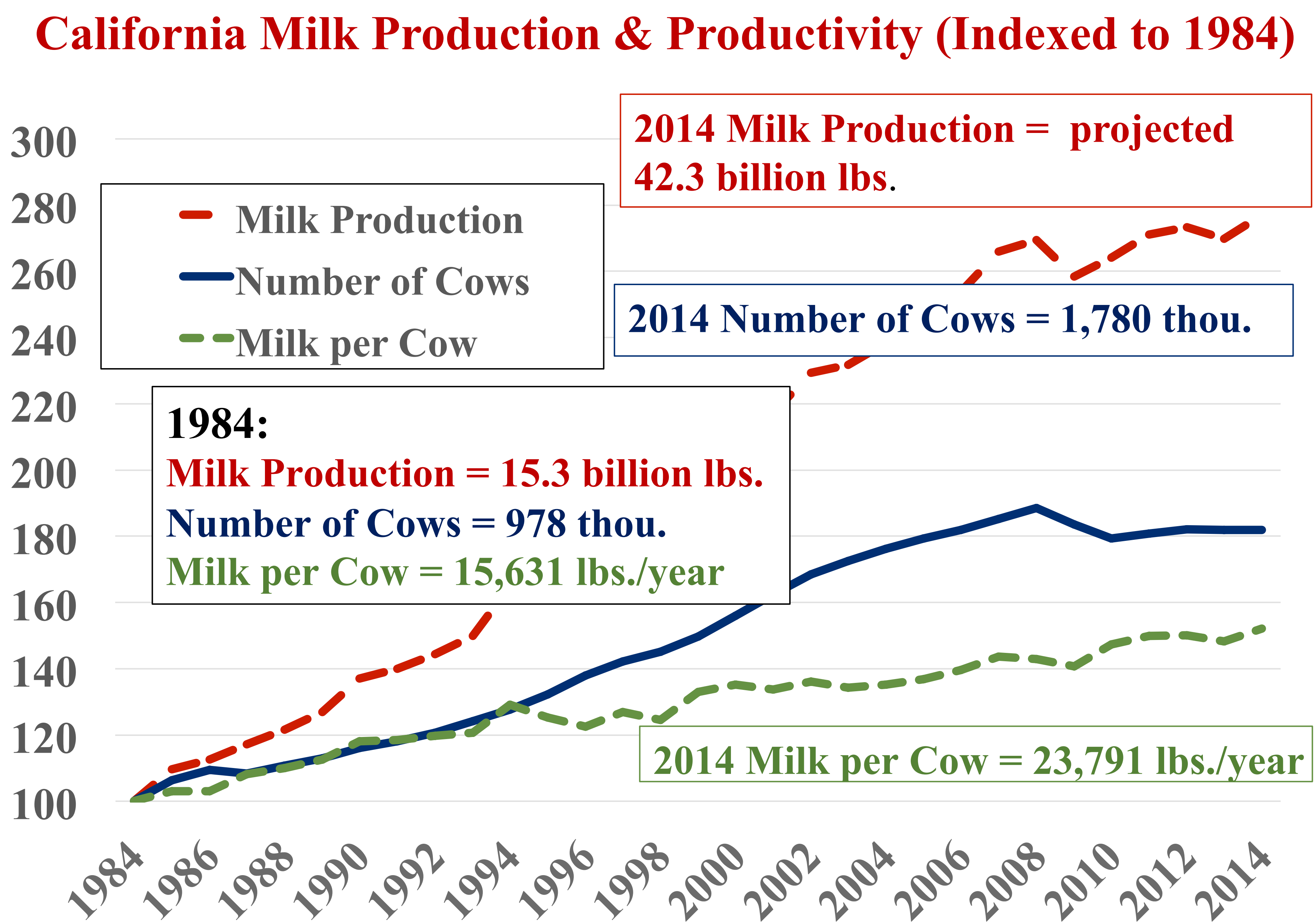
1. **Hay exports grew until the drought made hay less available and more expensive**
2. **Dairy exports grew until high prices, exchange rates and other drivers kicked in**
3. **Hay export have declined in 2014 for the first time in a decade, but dairy exports in the first 8 months kept the "hay-equivalent" exports strong until the end of the year.**
4. **Hay-equivalent exports will likely be down in 2015, but …**

Volume of Western Ports Hay Exports, 2000 to 2013

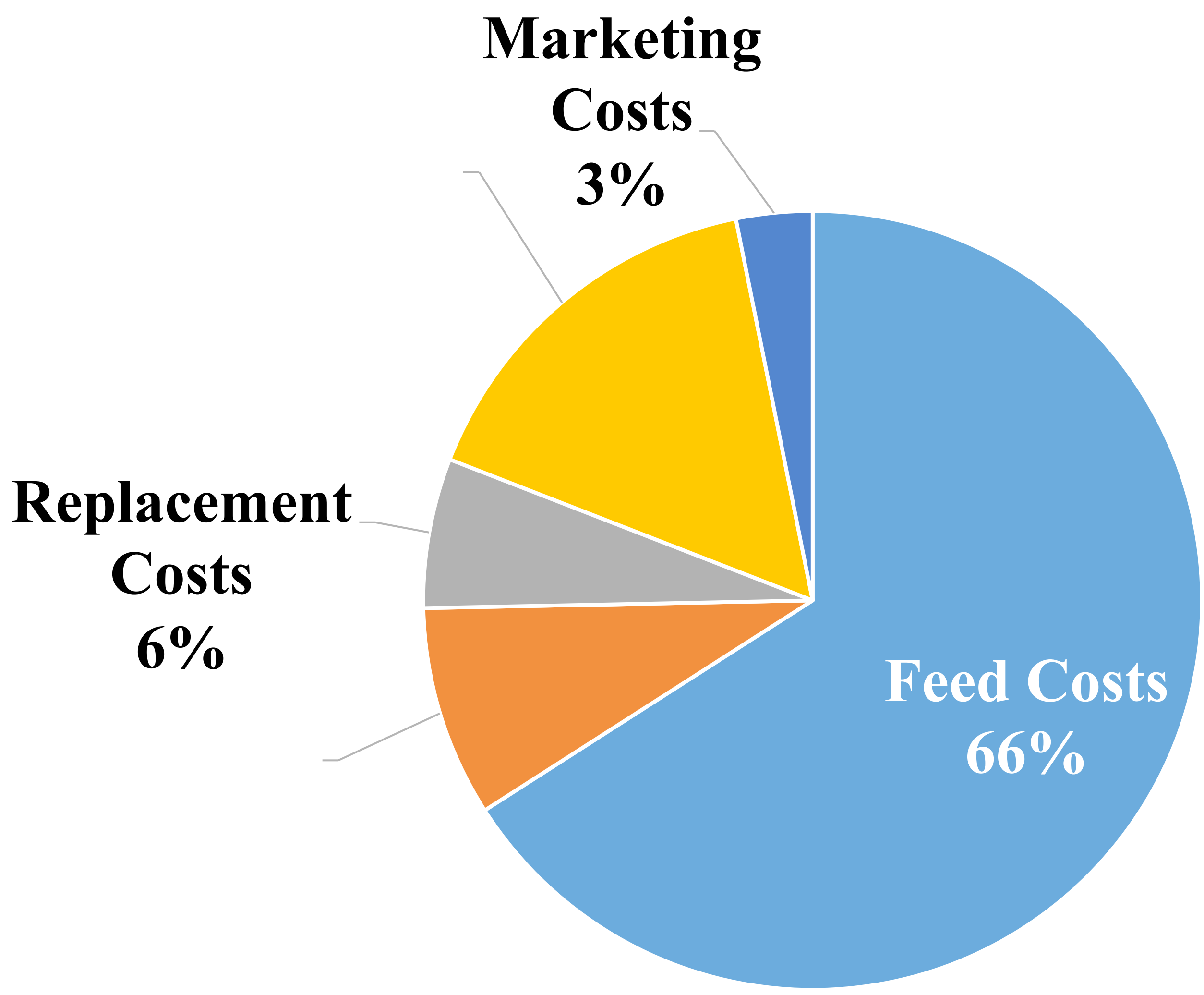


Volume of U.S. Dairy Exports, 2000 to 2013




California Milk Production & Productivity (Indexed to 1984)
2014 Milk Production = projected 42.3 billion lbs.
Milk Production
Number of Cows
Milk per Cow
2014 Number of Cows = 1,780 thou.
1984:
Milk Production = 15.3 billion lbs.
Number of Cows = 978 thou.
Milk per Cow = 15,631 lbs./year
2014 Milk per Cow = 23,791 lbs./year
300
280
260
240
220
200
180
160
140
120
100
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014

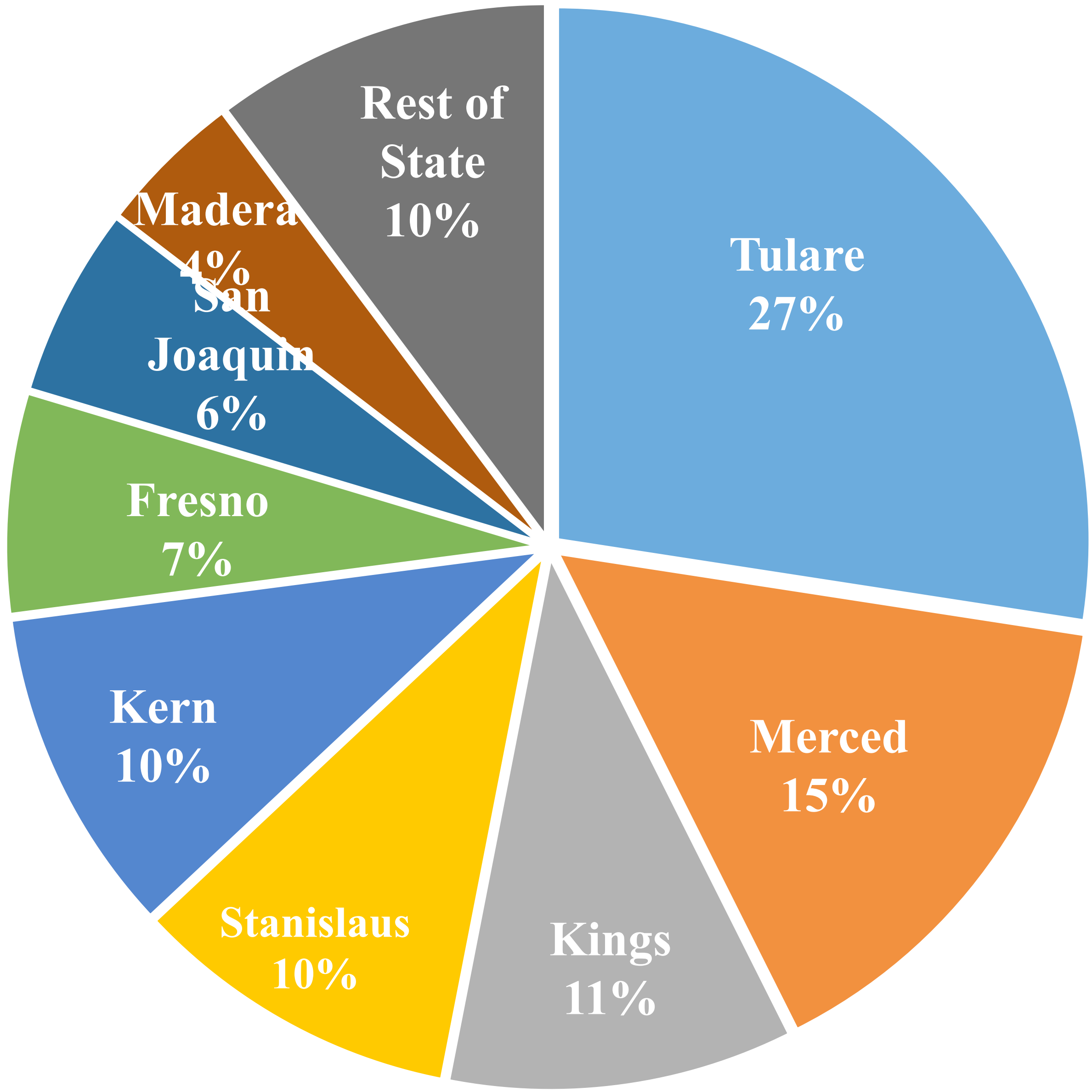
California Dairy Cost of Production, CDFA 2013



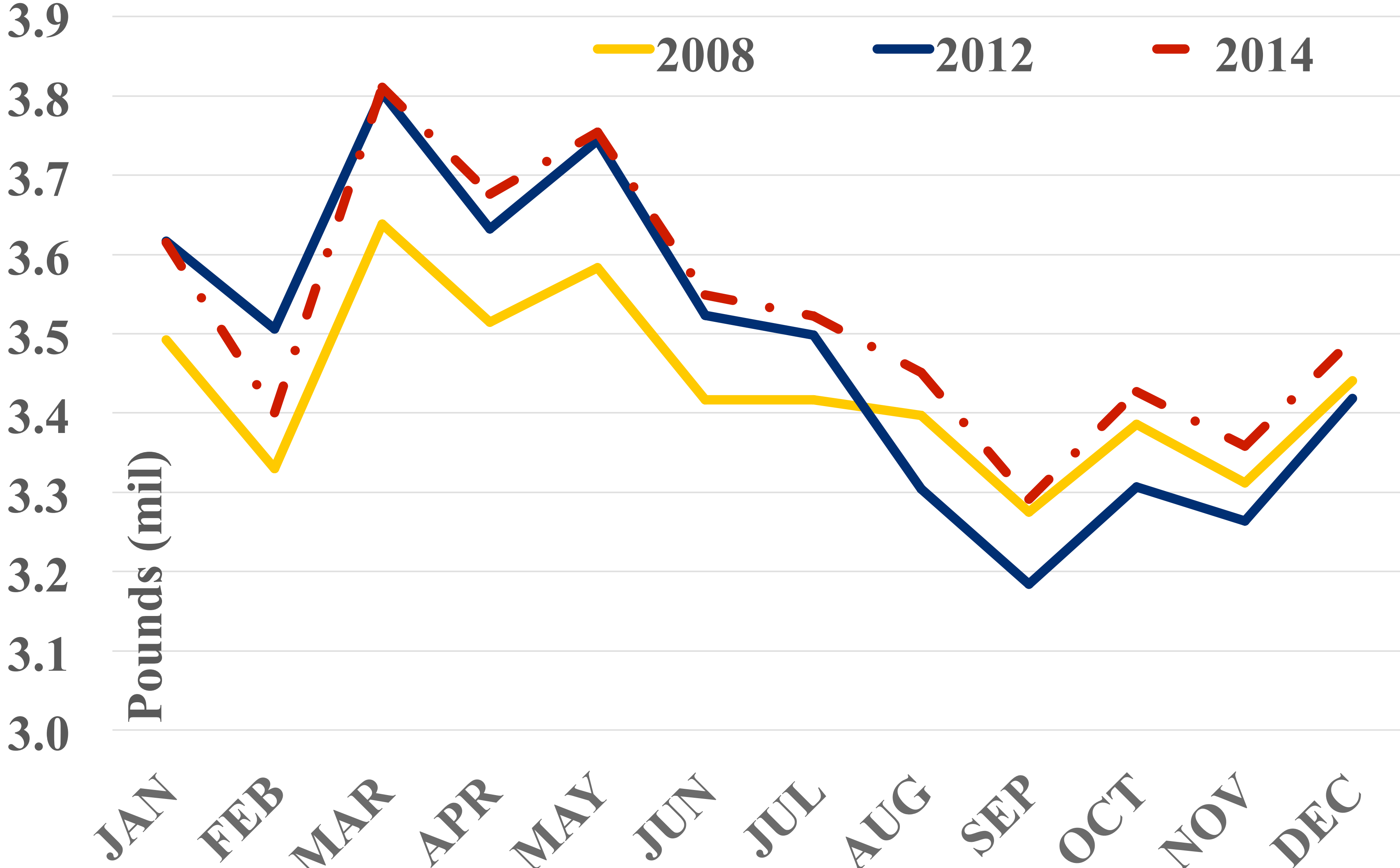
Weighted Average Pounds of Hay Consumed per Cow per Day (CDFA surveys)

	Jersey			**Holstein**		
	Milk Cows	***Dry Cows***	***Total Jersey***	***Milk Cows***	***Dry Cows***	***Total Holstein***
Alfalfa	**6.87**	**0.92**	**5.88**	**9.88**	**1.80**	**8.53**
Other Hay	**1.72**	**11.09**	**3.28**	**0.67**	**9.99**	**2.22**
Total Hay	**8.60**	**12.00**	**9.16**	**10.55**	**11.79**	**10.75**

Milk Production by County, 2014

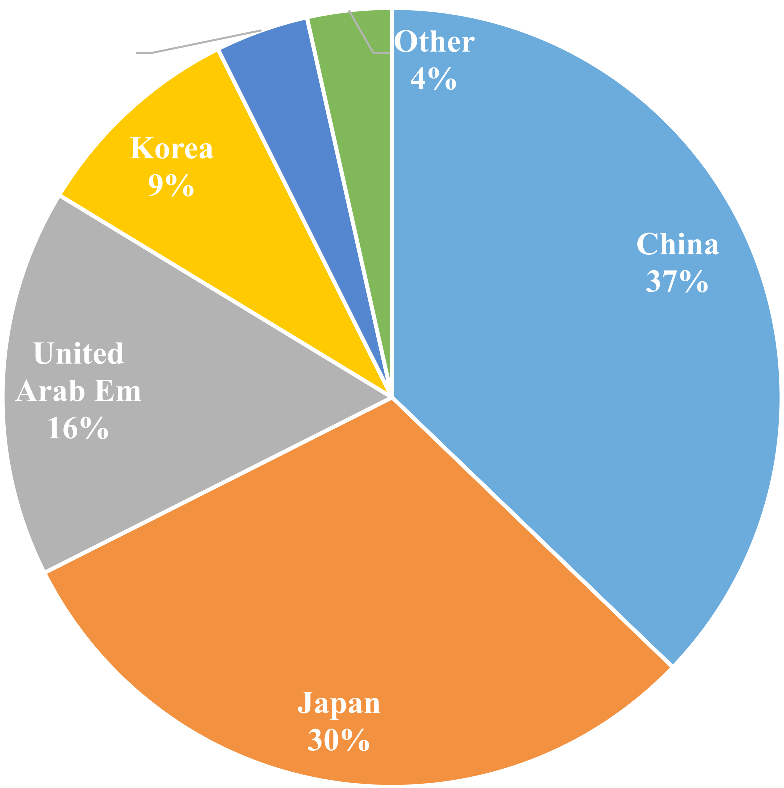


California Milk Production, 2008, 2010 and 2014*

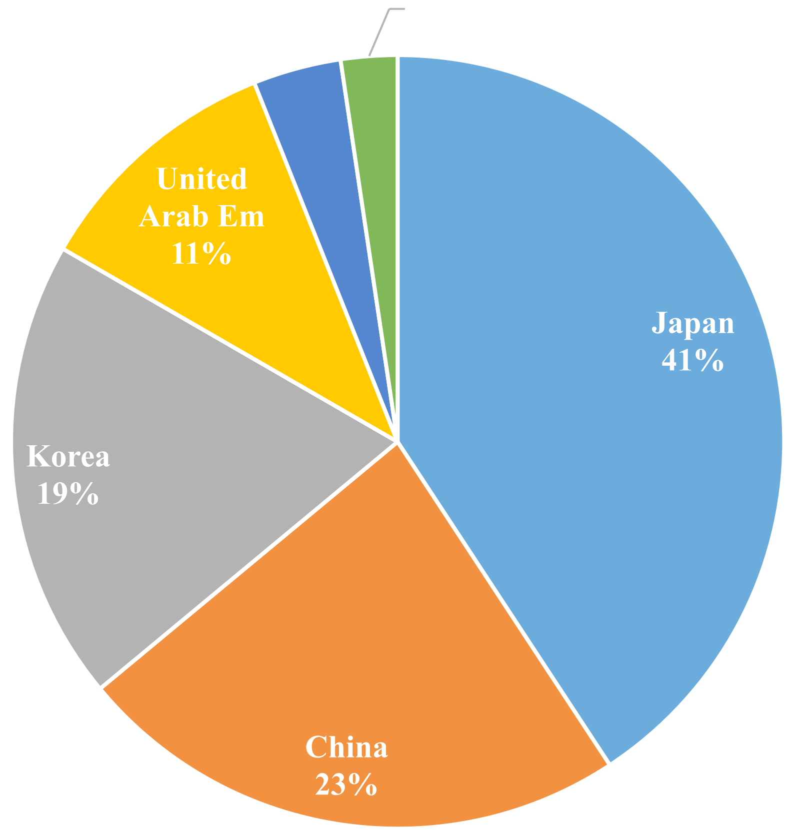


• November and December 2014 production numbers are forecasted

All Hay and Alfalfa Export Destinations, Western Ports, 2014 through September

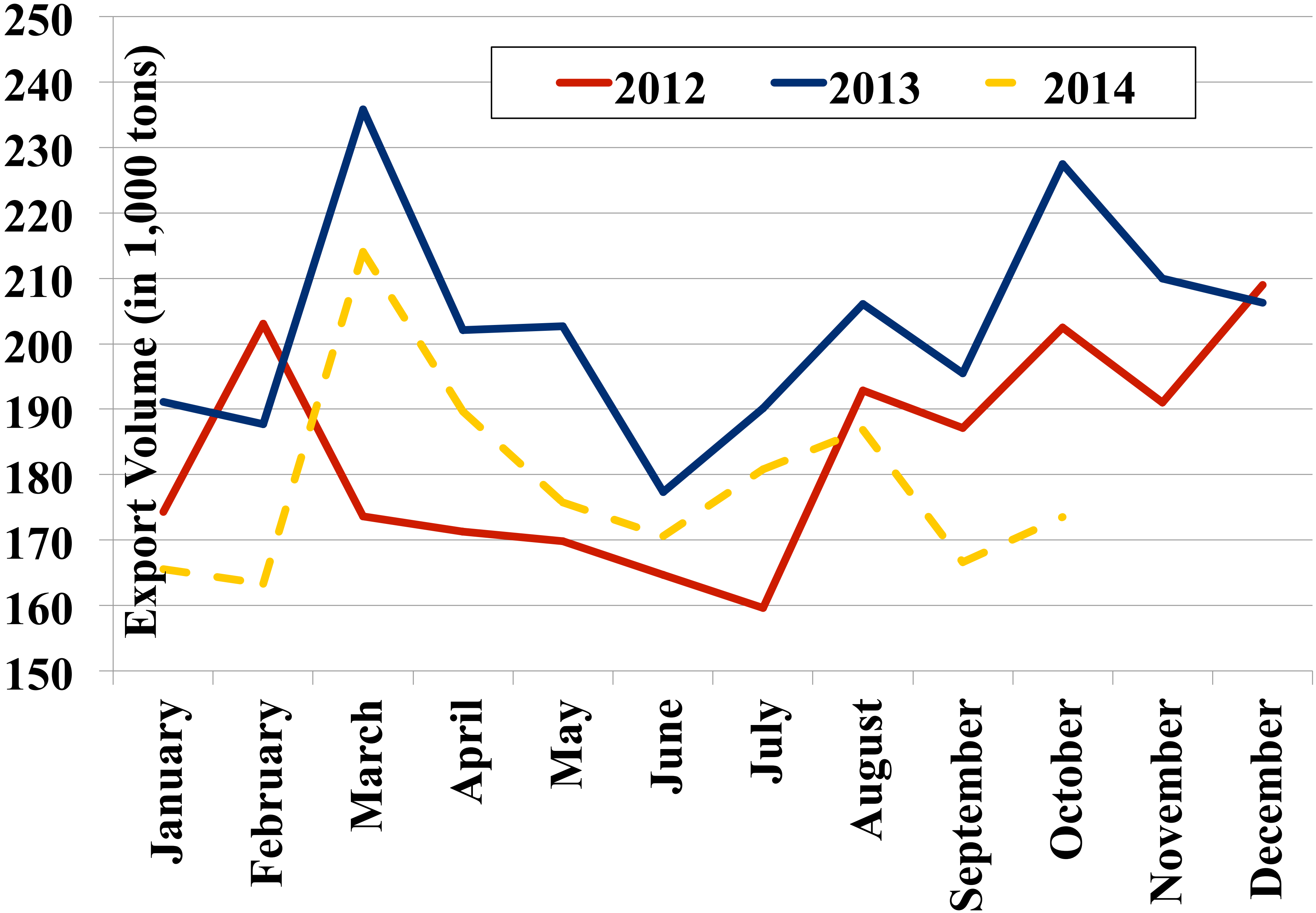


All Hay

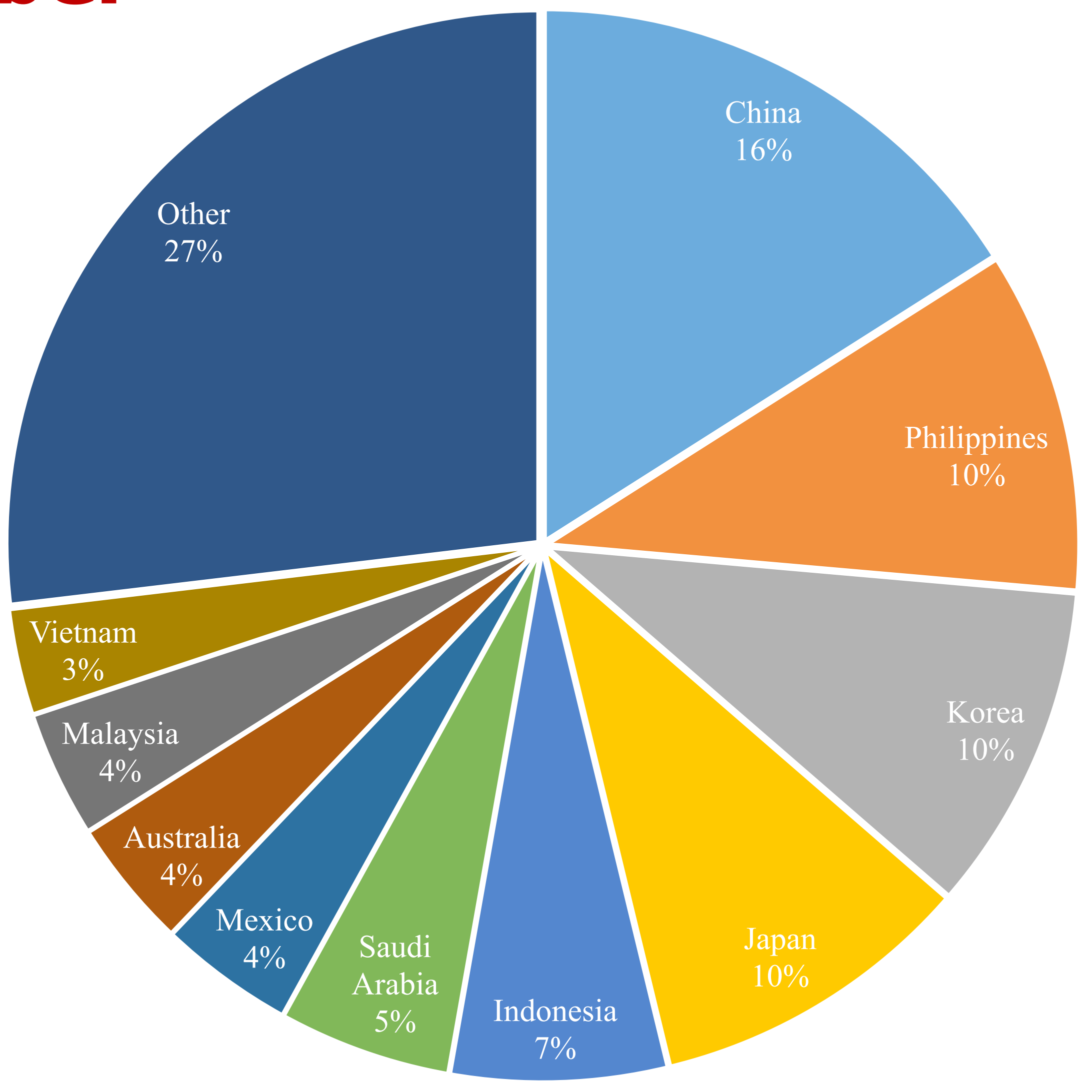


Alfalfa

Monthly Western Ports Hay Exports for 2012 to Oct. 2014



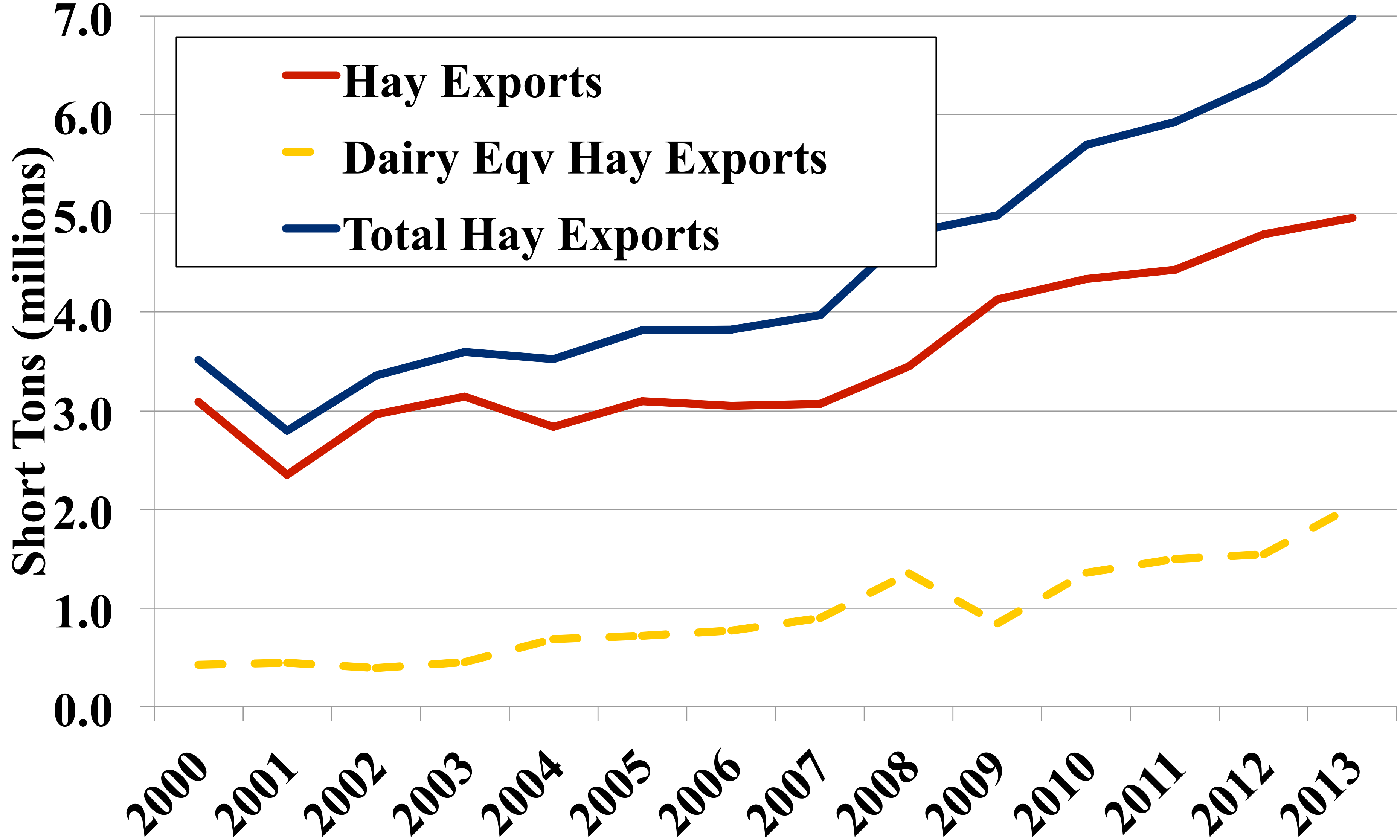
Dairy Export Destinations, 2014 though September



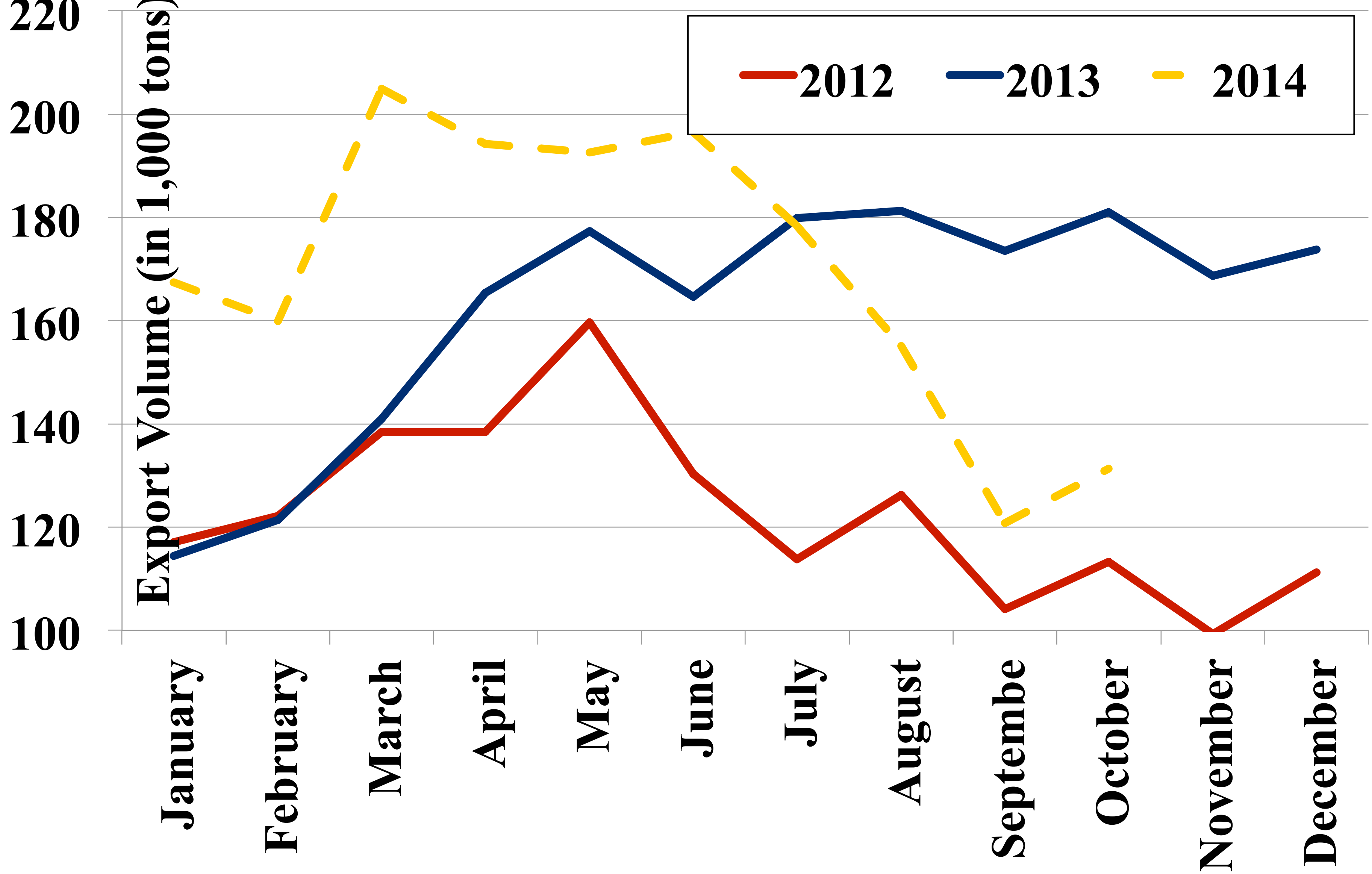
Calculation of Hay Pounds Consumed per Milk Pound Produced

	Jersey	*Holstein*
Pounds of Milk Produced Per Cow-Per Day	**61.54**	**79.76**
Total Hay Consumed Per Cow-Per Day	**9.16**	**10.75**
Hay Pound/Milk Pound	**0.149**	**0.135**

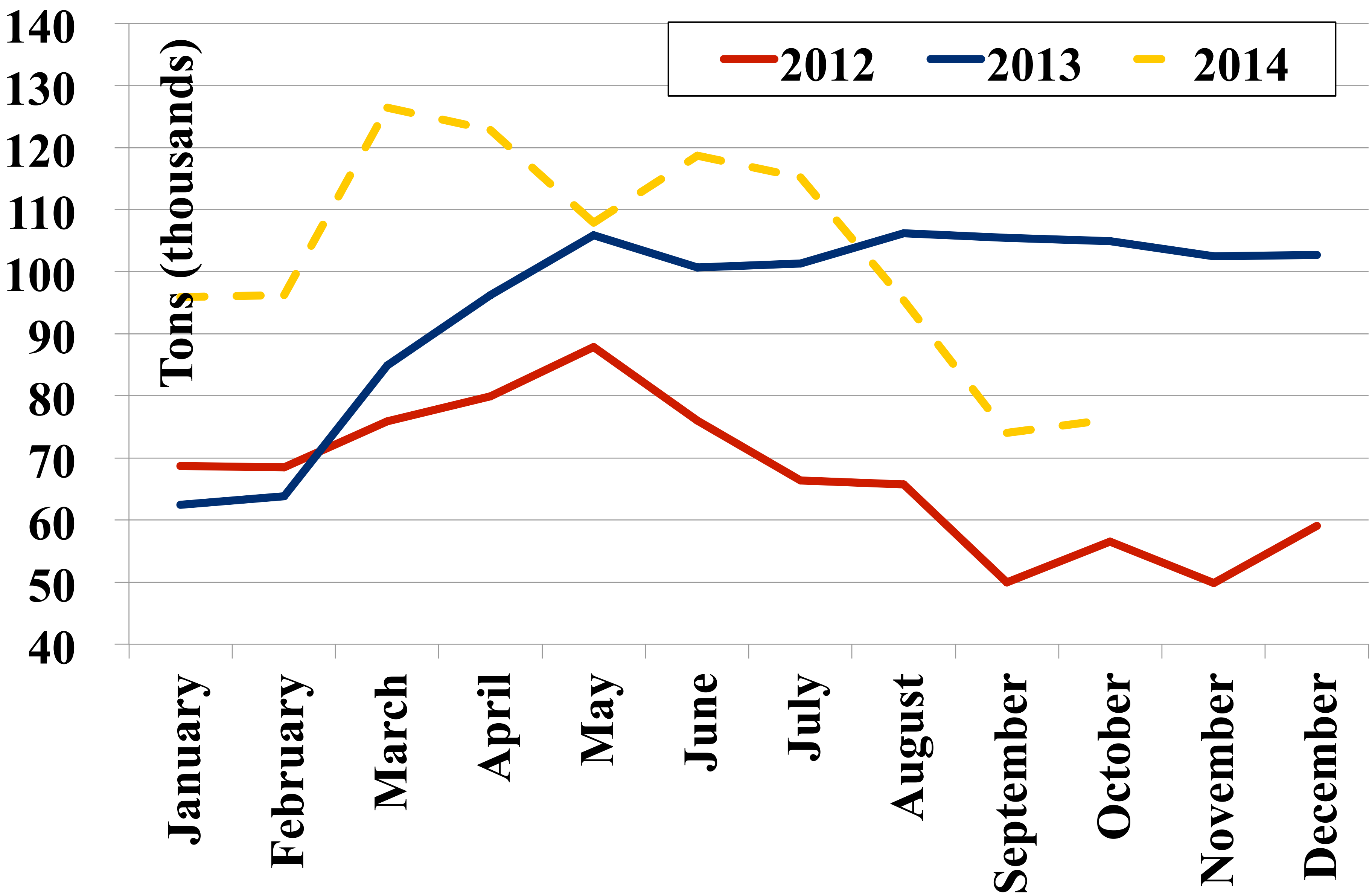
Western Ports Export Volume of Hay and Hay via U.S. Dairy Product Exports, 2000 to 2013

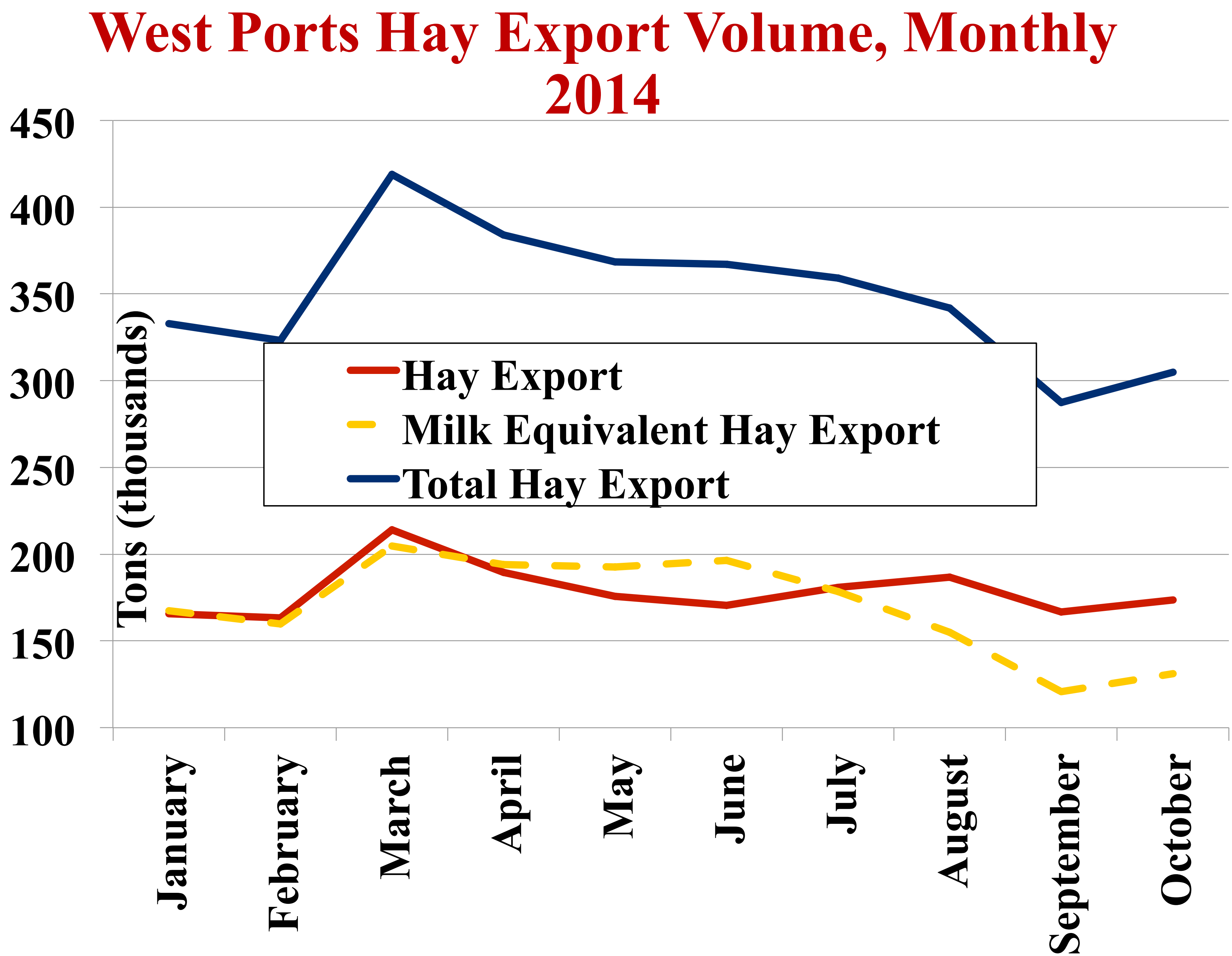


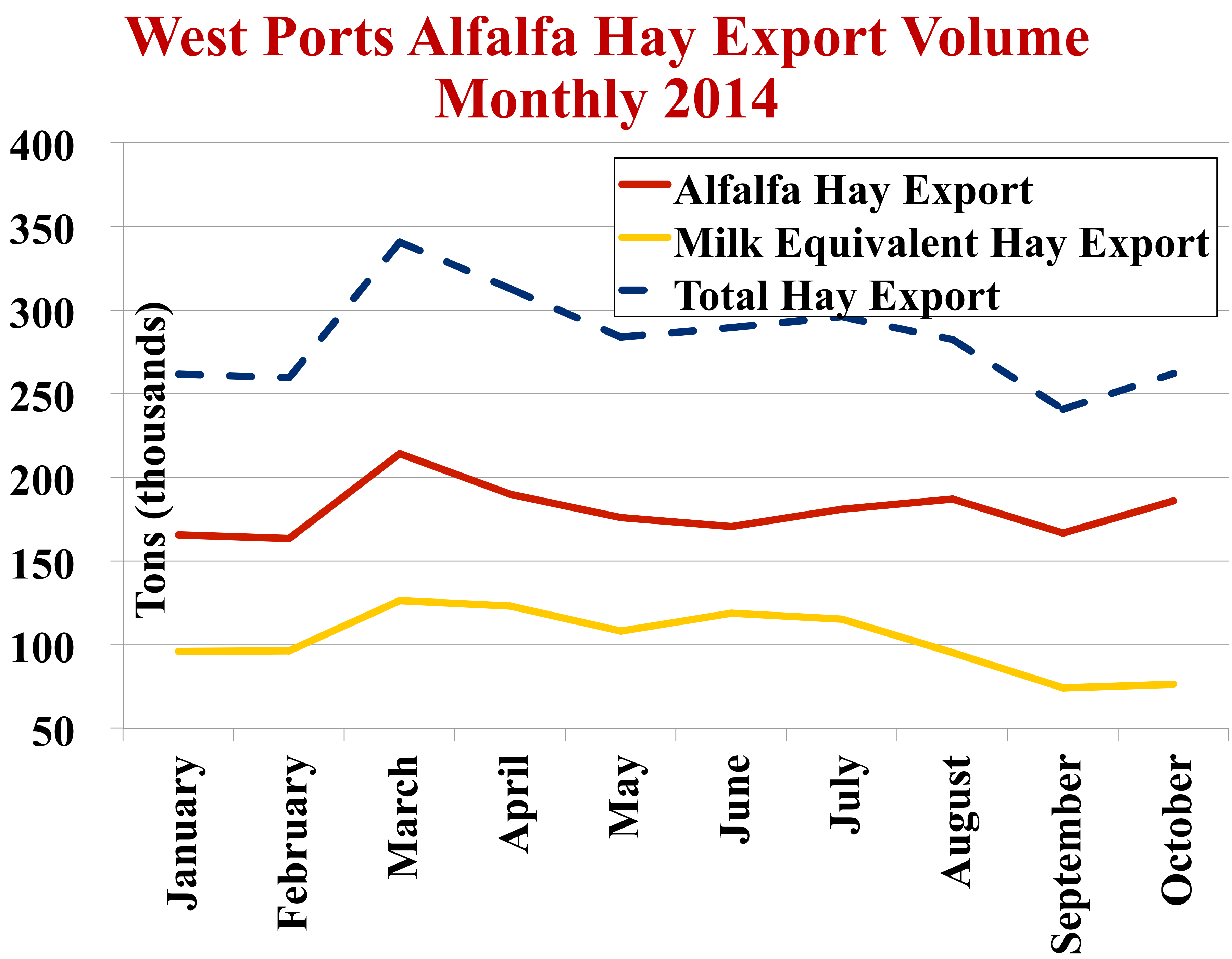
Western Ports Hay Equivalent Exports via U.S. Dairy Products, Monthly 2012 through October 2014



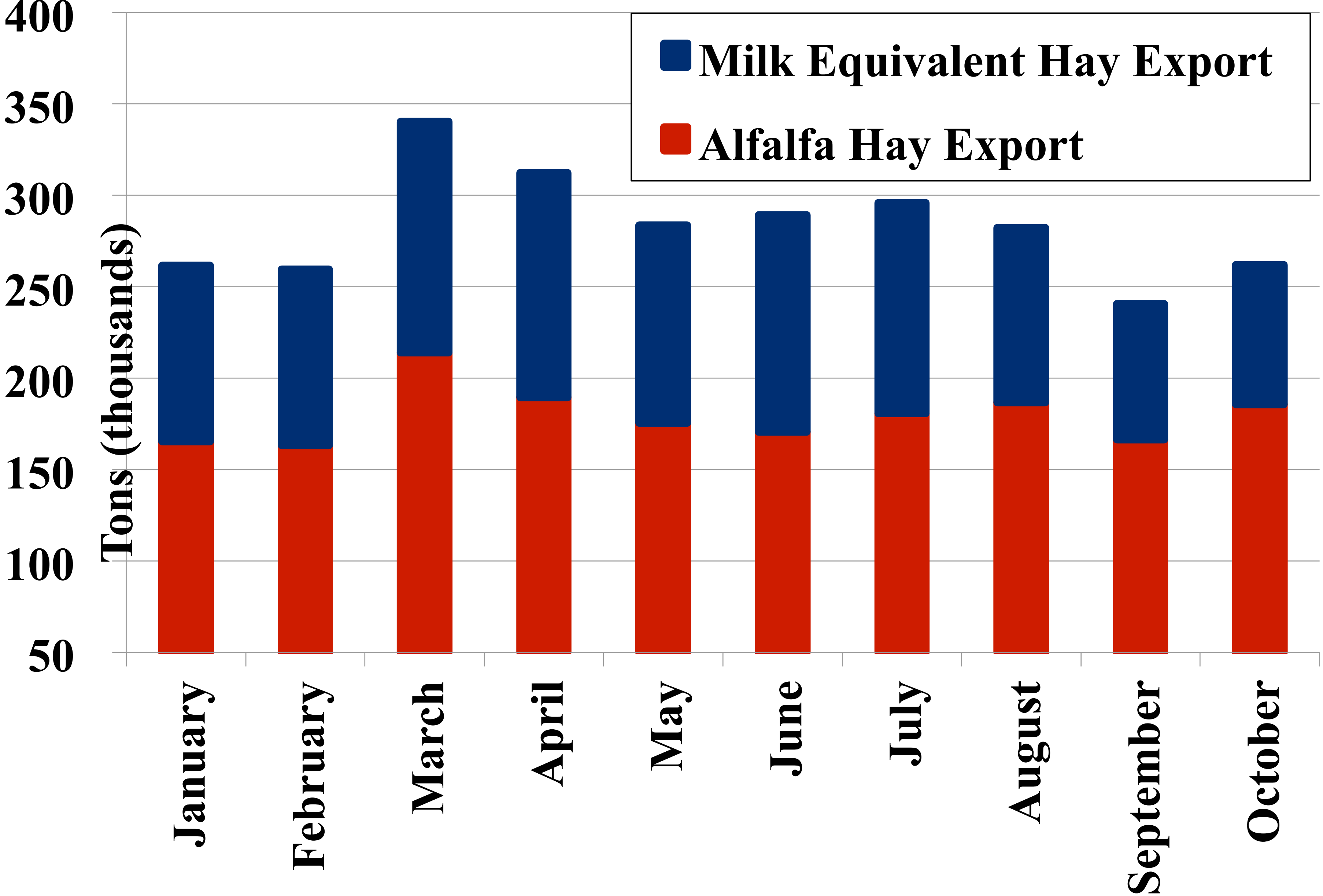
West Ports Alfalfa Hay Equivalent Exports, Monthly 2012 through October 2014




West Ports Hay Export Volume, Monthly
2014
450
400
350
300
250
200
150
100
Tons (thousands)
Hay Export
Milk Equivalent Hay Export
Total Hay Export
January
February
March
April
May
June
July
August
September
October


West Ports Alfalfa Hay Export Volume
Monthly 2014
400
350
300
250
200
150
100
50
Tons (thousands)
Alfalfa Hay Export
Milk Equivalent Hay Export
Total Hay Export
January
February
March
April
May
June
July
August
September
October

West Ports Alfalfa Hay Export Volume Monthly 2014



FINAL REMARKS

- Many factors drive California and other western dairy and hay production and exports
  - competition from other regions,
  - exchanged rates, and
  - market or government-led events as the GMO controversy

- Resource availability and costs, and production constraints limits also drive costs, production and exports
  - Reduced access to surface water reduces supply and raises costs
  - Higher pumping costs and lack of ground water also reduces supply and raises costs
  - Such forces were one part of export declines in 2014.