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These comments address the economic analysis used by the State Water Resources Control Board to balance the needs of the California human population with the needs of Sacramento River salmon runs and the imperiled Delta ecosystem. The Board has relied on projections of the 2014 and 2015 economic impacts of the drought by the UC Davis Center for Watershed Sciences in granting Temporary Urgency Change Petitions by the projects.[1]

Statewide Agricultural Impacts of the Drought

The UC Davis Center for Watershed Sciences published a preliminary analysis of the economic effects of the 2015 drought on May 31, 2015. The 2015 preliminary analysis noted that 70% of the lost surface water supplies for agriculture are expected to be made up by groundwater. Growers are also responding to the water shortages by shifting to less water intensive crops. As a result of these adaptive measures, only 6-7% of statewide irrigated acreage is expected to be fallowed or dry-farmed in 2015. [2]

Table 3 below is from the 2015 preliminary analysis. It shows that 87% of the acreage expected to be taken out of irrigated production in 2015 was previously planted in low value field crops,

[1] Howitt RE, Medellín-Azuara J, MacEwan D, Lund JR and Sumner DA. 2014. "Economic Analysis of the 2014 Drought for California Agriculture." UC Davis Center for Watershed Sciences. Available at https://watershed.ucdavis.edu/files/content/news/Economic_Impact_of_the_2014_California_Water_Drought.pdf Accessed on June 10, 2015.
[2] Howitt RE, Medellín-Azuara J, MacEwan D, Lund JR and Sumner DA. 2015. "Preliminary Analysis: 2015 Drought Economic Impact Study," UC Davis Center for Watershed Sciences. Available at https://watershed.ucdavis.edu/files/biblio/2015Drought_PrelimAnalysis.pdf Accessed on June 10, 2015.

including animal feed, and grain. Cotton and oilseed are included in "Other Field." The fact that most of the fallowed acreage is in low value field crops, which require relatively little labor, is a likely reason that statewide farm employment actually increased last year.

Table 3. Estimated Change in Irrigated Crop Acreage Due to 2015 Drought, Relative to an Average Year (acres in thousands)

Region	Feed Crops	Vegetables	Orchard & Vines	Grain	Other Field	Total
Sacramento	-84.9	-3.4	-7.9	-77.9	-3.4	**-177.6**
San Joaquin	-42	-0.2	-6.6	-18.7	-12.9	**-80.5**
Tulare	-59.4	-23	-31.6	-97.6	-91.6	**-303.2**
Central Coast and Southern CA	2.8	-1.4	0.2	-1.8	-2.3	**-2.5**
Total	**-183.6**	**-28**	**-45.9**	**-196**	**-110.2**	**-563.8**

1 Source: Howitt et. al., Preliminary Analysis: 2015 Drought Economic Impact Study

Central Valley Export Impacts

For the Central Valley Project, any reduction in Central Valley Project exports due to need to conserve water in Shasta Dam will impact allocations for the San Joaquin River Exchange contractors.

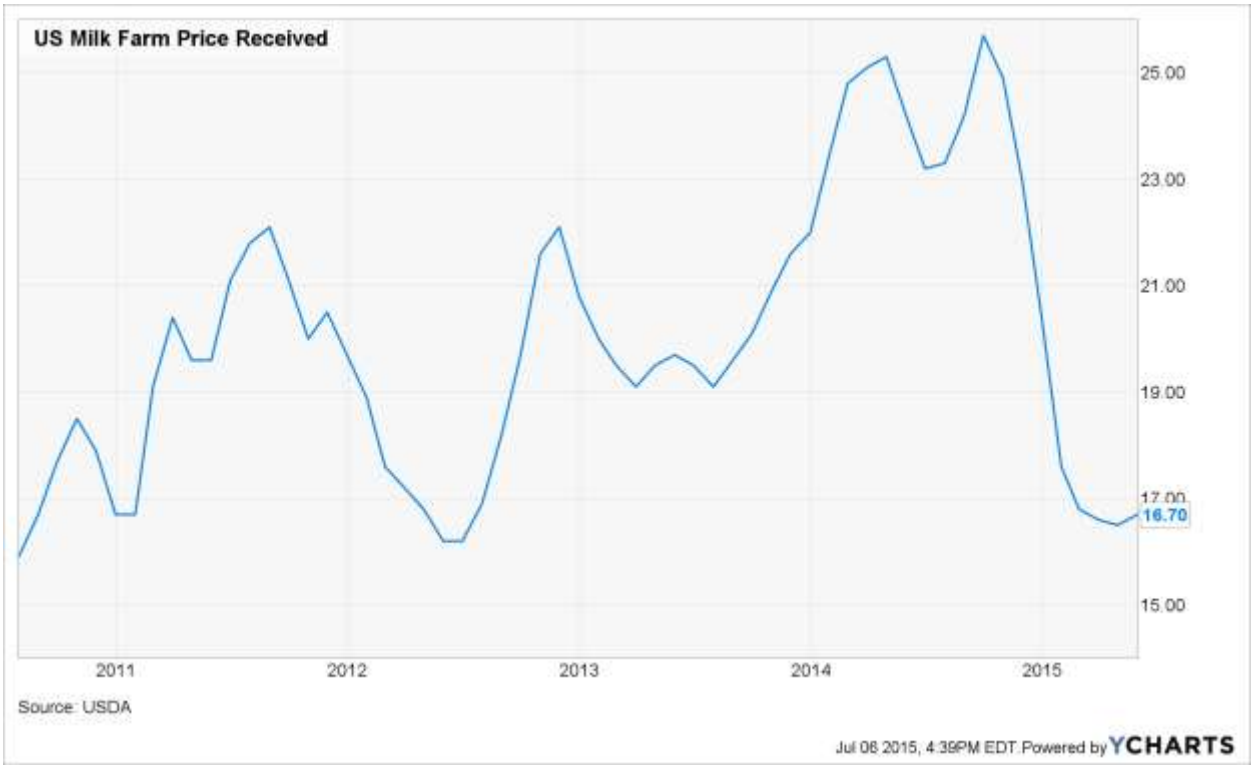
While the San Joaquin River Exchange Contractors Water Authority (SJRECWA) has not made crop data available, one can estimate it from the LandSat data collected and analyzed by the National Agricultural Statistics Service under the Cropscape program. Todd Schuman constructed an approximation of the SJRECWA region and used it to analyze the 2014 Cropscape data. He found that about half of the crop acreage in the SJRECWA area produced livestock feed in 2014. Nearly 30 percent of all SJRECWA acreage was planted with alfalfa in 2014.

If water is first allocated to permanent crops in the Exchange Contractors' area, and then to more profitable vegetable crops, most reductions in water supplies will be allocated to low value field crops. For growers, federal crop insurance programs can compensate for direct losses of these crops. For losses to planted crops, FCIC rules require that growers be able to show a "reasonable expectation" of adequate irrigation water at the time the crop is planted. The announced operations and allocations by the US Bureau of Reclamation likely created that "reasonable expectation."

Given crop insurance and the low amount of labor in producing field crops, one of the main impacts of reductions in water supplies may be reduced local supplies of alfalfa, other hay, and silage for the dairy industry.

Dairy Industry Impacts

Drought impacts to California's dairy industry in 2014 appear to have been overstated in the 2014 UC Davis study. USDA reports show the number of dairy cows in California in 2014 was 1.78 million, unchanged from 2013. [3,4] Milk production actually went up by 3% over 2013. Profits in 2014 were also significantly better than previous years. While hay and silage prices went up, milk prices went up even more, reaching record levels in September of 2014, fueled by growth in overseas demand. [5]



Source: YCharts. Data from USDA NASS.

In October of 2014, dairy owners in the northern San Joaquin Valley were celebrating. "There's never been a time that San Joaquin County has known like this year," said Jack Hamm, owner of a Lodi dairy and President of the San Joaquin Farm Bureau Federation.[6]

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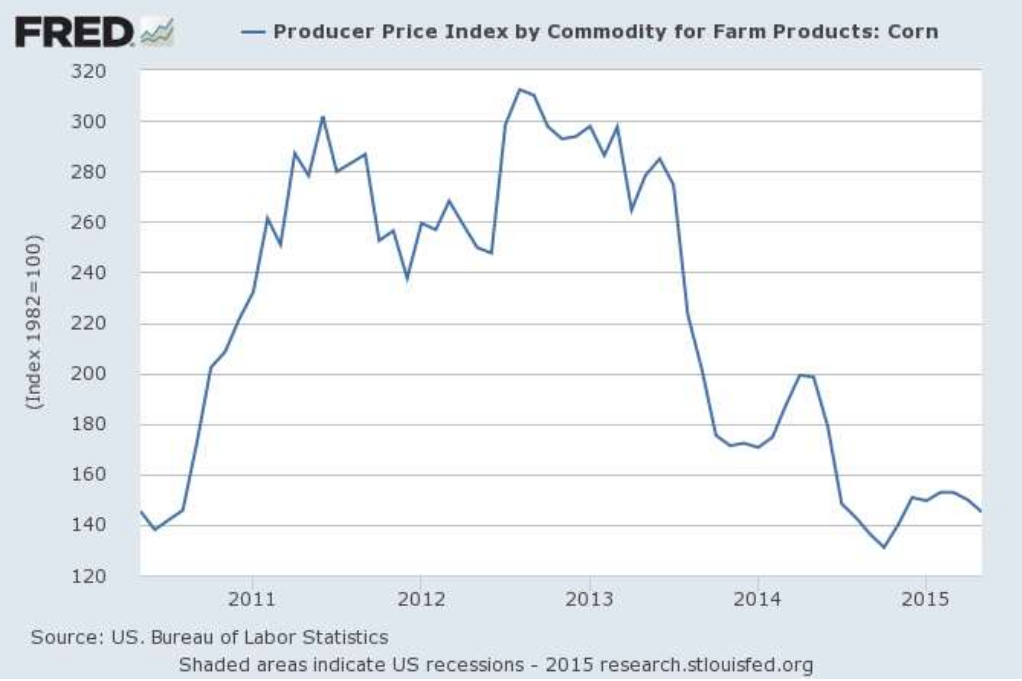
[3] USDA-NASS Cattle Report, January 1, 2015. Available at http://usda.mannlib.cornell.edu/usda/current/Catt/Catt-01-30-2015.pdf Accessed on June 17, 2015.
[4] USDA-NASS Cattle Report, January 1, 2014. Available at http://usda.mannlib.cornell.edu/usda/nass/Catt//2010s/2014/Catt-01-31-2014.pdf Accessed on June 17, 2015.
[5] USDA Economic Research Service, "California Drought: Livestock, Dairy, and Poultry Sectors," Available at http://www.ers.usda.gov/topics/in-the-news/california-drought-farm-and-food-impacts/california-drought Accessed on June 17, 2015.
[6] Fuji, R. "High milk prices helping dairies cover past losses," Stockton Record, October 11, 2014. Available at http://www.recordnet.com/article/20141011/NEWS/141019953. Accessed on July 1, 2015.

In 2015, dairy prices fell, due to a worldwide glut of milk production.[7] But US exports of dairy products have continued to be strong. In April of 2015, US dairy exports were at the second highest level ever.[8] California had 40% of US dairy product exports in 2012.

Dairy operating margins are being squeezed in 2015 by falling milk prices and increased costs of hay and silage, but these impacts are mitigated by the new dairy Margin Protection Program from the USDA. This voluntary program, established by the 2014 Farm Bill, provides assistance when the difference between the price of milk and feed falls below a selected level. Nationwide, more than half of dairy producers enrolled in the program for 2015.[9]

Feed prices

Corn is a major component of cattle feed. The 2012 drought in the Midwest sent corn prices up significantly, which impacted feed prices nationwide. However, in 2014 there was a record corn crop in the Midwest, and both corn and cattle feed prices fell to levels not seen for five years. This partly compensated for increased hay and silage prices in California.



Source: FRED Economic Data, Federal Reserve Bank of St. Louis

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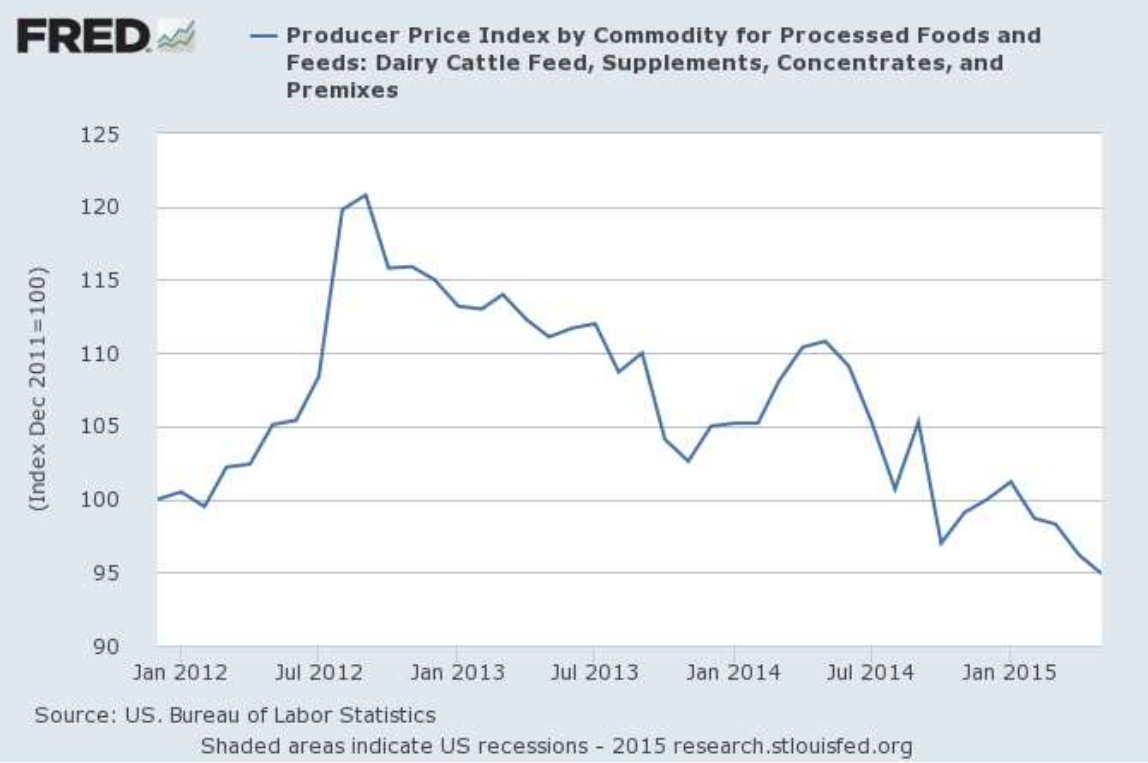
[7] Rabobank Food and Agribusiness Research, Dairy Quarterly, "Still More Milk than Market," June 22, 2015. Available at http://rabobank-food-agribusiness-research.pr.co/104667-rabobank-dairy-quarterly-q2. Accessed on June 30, 2015.

[8] Levitt, A. U.S. Dairy Export Council, U.S. Export Data. Available at https://www.usdec.org/research-and-data/market-data/us-export-data. Accessed on June 17, 2015.

[9] Richardson, W. "New program offers safety net for dairy farmers: The Margin Protection Program gets a boost from U.S. Agriculture Deputy Secretary Krysta Harden." Portland Press Herald, June 30, 2015. Available at http://www.pressherald.com/2015/06/30/new-program-offers-safety-net-for-dairy-farmers/ Accessed on July 2, 2015.



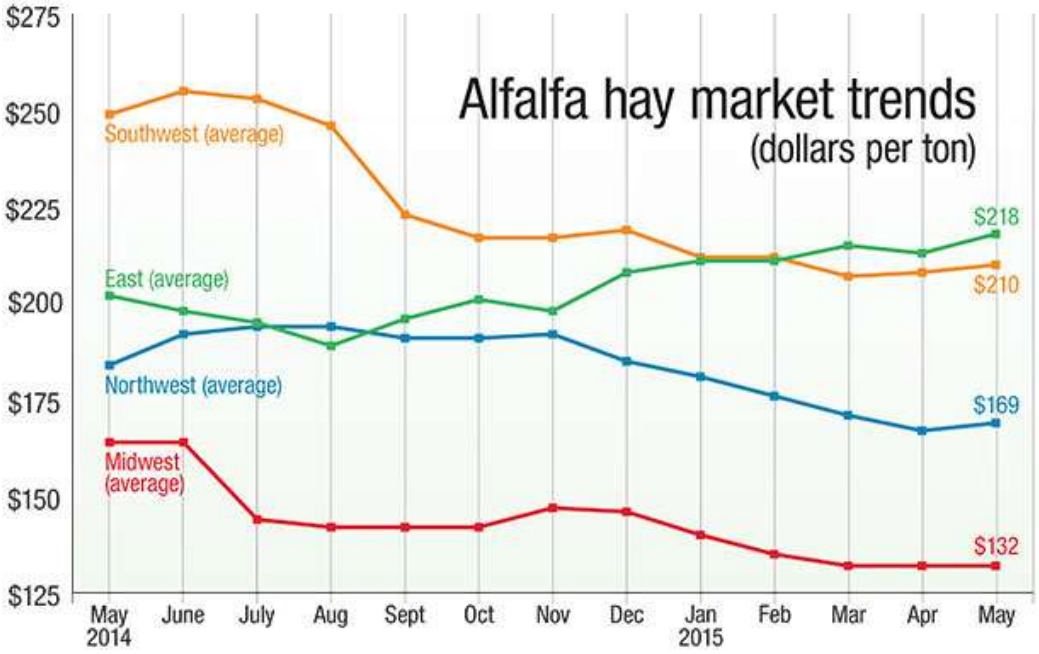
Source: FRED Economic Data, Federal Reserve Bank of St. Louis[10]

Hay production and hay markets in California

1. Alfalfa Hay

Hay prices in the Southwest U.S. increased significantly in 2014. Prices for alfalfa in California and the northern San Joaquin Valley were even higher, peaking at around $350 a ton in 2014.[11] USDA statistics show that the total amount of alfalfa grown in the state increased from 865,000 acres in 2013 to 900,000 acres. This was down 4% from the 2012 total of 940,000 acres. The yield per acre in California went down from 7.0 tons per acre in 2013 to 6.6 tons per acre in 2014. Because of the reduced yield, the total amount of dry alfalfa hay produced decreased from 5.81 million tons in 2013 to 5.69 million tons in 2014. This was down 5.6% from the 6.03 million tons produced in 2012.[12]

[10] Data from the Economic Research Division of the Federal Reserve Bank of St. Louis is available at https://research.stlouisfed.org. Accessed on July 3, 2015.
[11] Anderson, C. "High feed prices hamper dairy industry," San Joaquin Farm Bureau Federation, Available at http://www.sjfb.org/news/388-high-feed-prices-hamper-dairy-industry.html.
[12] Crop Production 2014 Summary, USDA National Agricultural Statistics Service, January 2015. Available at http://www.usda.gov/nass/PUBS/TODAYRPT/cropan15.pdf

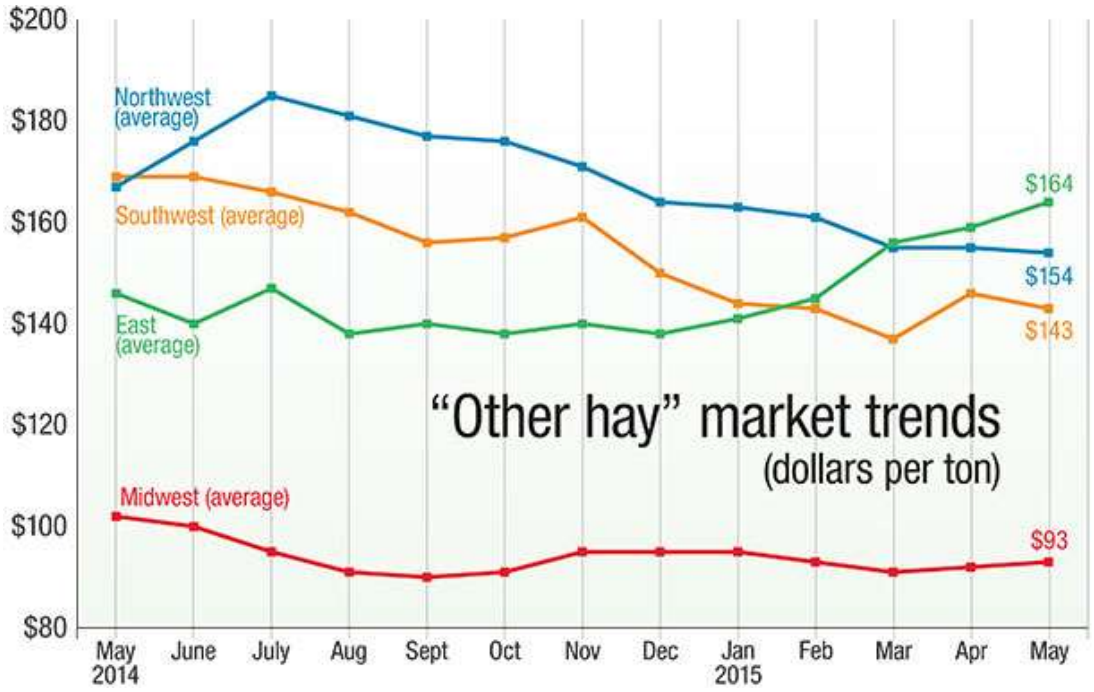


Source: Lynn Jaynes, Progressive Forage Grower.[13] *Data from USDA NASS.*

2. Other Hay

USDA statistics show that production of other hay in California decreased from 540,000 acres in 2013 to 500,000 acres in 2014, down from 600,000 acres in 2012. Yield was the same in 2013 and 2014, at 3.4 tons per acre, down slightly from 3.5 tons per acre in 2012. Total production was 1.70 million tons, down 7 % from 1.83 million tons produced in 2013. Production was down by 19% from the 2.10 million tons produced in 2012.[14]

[13] Lynn Jaynes, "Charting hay market trends," Progressive Forage Grower, May 4, 2015. Available at http://www.progressiveforage.com/news/industry-news/charting-hay-market-trends. Accessed on June 30, 2015.
[14] Crop Production 2014 Summary, USDA, Ibid.



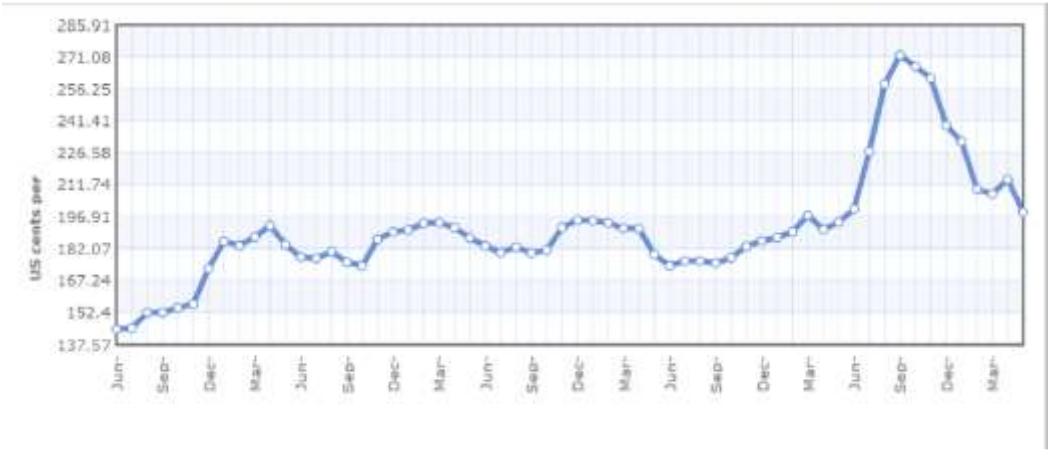
Source: Lynn Jaynes, Progressive Forage Grower.[15] *Data from USDA NASS.*

Pasture and Beef Industry Impacts

The poor quality of rangeland in California in 2014 did increase the need for hay. However, record beef prices compensated for increased costs. Beef producers were also eligible for the USDA Livestock Forage Disaster Program, which pays for 60% of feed costs for up to five months, up to a total of $125,000 per year. [16] In 2014, the USDA Livestock Forage Disaster Program paid 3721 claims in California, worth a total of $68,625,296.

As a result, the severe drought had a relatively small effect on beef production. There was no reduction in the number of beef cows in California between January of 2014 and January of 2015, but there were 70,000 fewer steers, a loss of about 11%.[17,18]

[15] Lynn Jaynes, "Charting hay market trends," Ibid.
[16] USDA, Disaster Assistance: Livestock Forage Disaster Program fact sheet, February 2014. Available at http://www.fsa.usda.gov/Internet/FSA_File/lfp_2014_fbill.pdf
[17] USDA-NASS Cattle Report, January 1, 2015. Available at http://usda.mannlib.cornell.edu/usda/current/Catt/Catt-01-30-2015.pdf Accessed on June 17, 2015.
[18] USDA-NASS Cattle Report, January 1, 2014. Available at http://usda.mannlib.cornell.edu/usda/nass/Catt//2010s/2014/Catt-01-31-2014.pdf Accessed on June 17, 2015.



Daily beef prices 2010-2015, cents per pound. Source: Index Mundi[19]

Hay exports and surplus hay in Western States

Although the drought did reduce California hay production, Western states have a surplus of hay, which has been exported overseas. About 12% of all alfalfa grown in the Western U.S. was exported overseas in 2012 and 2013, and 30-35% of other hay.[20]

Seth Hoyt, an agricultural analyst, explained the changes in hay markets in 2014. Exports went down 14% in the first 9 months of 2014, and a large amount of hay was imported into California from Washington, Oregon, and Arizona. The Imperial Valley also shipped hay to other areas of California. The price of alfalfa hay shot up, but the dairies worked with their nutritionists and came up with a plan to use wheat straw and by-product feeds to lower the price of feeding their cows. [21]

In sum, the results of fallowing of field crops in 2014 were local shortages and an increase in the price of hay and other animal feed. Shortages for the dairy industry were mitigated by imports of hay from other Western states and the Imperial Valley, as well as substituting less water intensive feed. There was a reduction of exports of hay, and also a reduction of about 11% in the number of steers. These were all appropriate adaptations to a severe drought.

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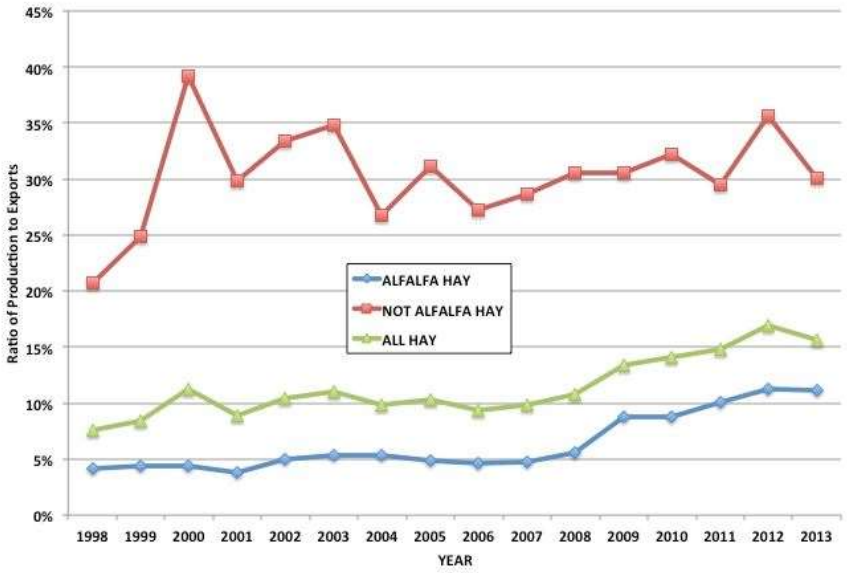
[19] Index Mundi, Beef daily prices. (Prices are for New Zealand beef shipped to East Coast, only generally representative of commodity price.) Available at http://www.indexmundi.com/commodities/?commodity=beef&months=60

[20] Putnam, D., Matthews, W. and Sumner, D., "Hay Exports from Western States Have Increased Dramatically," Alfalfa and Forage News, UC Cooperative Extension, November 1, 2013. Available at http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=11947. Accessed on June 17, 2015.

[21] Hoyt, S., "Hay Market Situation in Western States," UC Davis, 2014. Available at http://alfalfa.ucdavis.edu/+symposium/proceedings/2014/14CAS01_Hoyt_HayMarkets.pdf. Accessed on June 17, 2015.



2 Hay Exports from Western States as a Percentage of Total Production

Source: Putnam, Matthews, and Sumner, Hay Exports from Western States Have Increased Dramatically

Water Transfers and Permanent Crops

The SWAP model used by UC Davis did not take into account the effects of water transfers, and so likely overestimated losses to permanent crops. Harvested acreage of many permanent crops actually increased from 2013 to 2014, although yields were down. This was largely compensated for by increased commodity prices.

Almond acreage increased from 840,000 acres in 2013 to 860,000 acres in 2014, and the value of the crop increased from $5.8 billion to $6.5 billion. Orange acreage decreased from 175,000 acres to 169,000 acres, but the value of the crop increased from $724 million to $871 million.

Orchards that lose more than 15% of trees are also eligible for the federal Tree Assistance Program. The TAP pays for replacement of up to 500 acres of trees, up to a maximum of $125,000 per grower.[22]

[22] USDA 2014 Farm Bill Fact Sheet, "Tree Assistance Program." Available at http://www.fsa.usda.gov/Internet/FSA_File/tap_2014.pdf