

*Effects of 2013/14 Rail Transportation Problems on  
North Dakota Farm Income*  
**Executive Summary to Senator Heidi Heitkamp**

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Many North Dakota farmers are expressing concerns about the high cost of hopper bottom rail cars and the economic implications of delayed rail transportation on local grain prices. This report is in response to a request from North Dakota Senator Heidi Heitkamp's office to conduct a preliminary economic assessment of this issue.

**Background and Methods:**

The primary approach used to measure the economic implications of the rail transportation problems in North Dakota was to measure changes in local cash market basis levels. The *nearby basis* value was used within this assessment. The nearby basis is the difference between the local cash price, for immediate grain delivery, and the price for the corresponding futures market contract, which is closest to today's date. The nearby basis reflects the difference in the local supply and demand conditions, which includes transportation costs to markets beyond the local area, and the national and international supply and demand conditions, reflected in futures market prices. Basis values in North Dakota are typically negative, which indicates that local cash prices are lower than the corresponding futures market prices.

There are three main advantages for using basis values to measure the economic implications of transportation problems. First, the basis calculation removes the impacts of overall price changes from the study. This focuses the analysis on changes in local market conditions relative to national/international market conditions and allows for a more accurate comparison of changes over time. Second, basis values also provide an easy way to evaluate and compare farm level cash prices at alternative locations. Third, changes in basis levels capture both the impacts of delayed rail car deliveries/shipments and the higher cost of hopper bottom rail cars.

**Estimation Process:**

Daily nearby basis data from April 22, 2009 to April 21, 2014 for hard red spring wheat, corn and soybean were collected for nine key elevators located across North Dakota, where historical data were available. These daily basis rates were used to calculate a monthly average North Dakota basis value for each crop and each marketing year (MY)<sup>1</sup>.

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<sup>1</sup> The marketing year for hard red spring wheat begins on June 1 and ends on May 31. The marketing year for corn and soybean begins on September 1 and ends on August 31.

The monthly average basis levels for the 2013/14 MY were compared to the monthly average basis levels for each of the individual 2009/10 through 2012/13 marketing years. There was no discernable difference between the 2013/14 MY monthly average basis levels and other marketing years for June through December for spring wheat, and September through December for corn and soybeans. However, a difference between the average basis levels did appear in January, February, March and April 2014. Please see Tables 1 through 3 below for a list of monthly average basis levels for each of the marketing years.

The 2009/10 MY was chosen as the reference period for this analysis because the national and state level grain production levels, measured in bushels, for wheat, corn and soybeans are similar to the levels produced in 2013/14. Using comparable production levels reduces the impact of crop size on basis levels and provides a more accurate representation of the influence of rail transportation issues.

The differences between the 2013/14 MY and 2009/10 MY monthly average basis levels for January through April were calculated. These monthly differences in basis levels were then multiplied by the estimated sales volume, measured in bushels, for each crop during each month. The estimated monthly sales volume was calculated by multiplying the average percent sales for each crop from 2008 through 2011<sup>2</sup> by the 2013 state level production for each crop<sup>3</sup>. The result is an estimate of the lost farm revenue for grain sales made from January through April 2014. Please see Table 4 below for a summary of these calculations.

The state level on-farm grain inventory values for each crop were obtained from the March 31, 2014 Grain Stocks report<sup>4</sup>. The estimated April sales volume for each crop, calculated above, was subtracted from the March Grain Stocks values to derive an estimate of remaining on-farm grain inventories. These estimated inventory levels were multiplied by the difference between the 2013/14 MY and 2009/10 MY monthly average basis levels for April. The assumption was made that the April average basis differential would remain for the rest of the 2013/14 MY. The result is an estimate of the lost farm revenue for future sales of the remaining 2013 on-farm inventories. Please see Table 5 below for a summary of these calculations.

### **Results:**

This analysis suggests that there has been an approximately \$66.6 million dollar loss in North Dakota farm level revenue for crops that were sold from January through April, 2014. There is the potential for an additional \$95.4 million dollars in lost farm revenue, from the sale of on-farm

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<sup>2</sup> Annual percent sales volume was obtained from the 2013 North Dakota Annual Statistical Bulletin prepared by USDA-National Agricultural Statistics Service.

<sup>3</sup> North Dakota crop production levels were obtained from the 2013 Crop Production Summary prepared by USDA-National Agricultural Statistics Service.

<sup>4</sup> Report prepared by USDA-National Agricultural Statistics Service.

grain stocks, if crop basis levels remain at current levels. No estimates of potential lost farm revenue were made for 2014 grain production.

These are conservative estimates because this analysis was limited to spring wheat, corn and soybean, and does not include potential losses for the sale of durum wheat, barley, sunflower, canola, field pea, lentils, dry edible beans, flax, oats or food grade soybeans. There was not enough readily available information to include these extra crops in the analysis.

In addition, this analysis does not include the increased costs incurred by North Dakota agricultural businesses to transport processed agricultural products out of the state. Examples include refined sugar, ethanol, dried distillers grains, high fructose corn syrup, wheat flour, semolina flour and pasta, barley malt, canola and sunflower oil, and canola and sunflower meal.

**Summary:**

North Dakota agriculture is heavily dependent upon an efficient and timely logistics and transportation system. A reliable railroad infrastructure is a key element within that system. The state's agriculture is more dependent upon rail transportation than many other states. This is because a large portion of the production is shipped to processors and end users outside of North Dakota, and there are limited alternatives for high volume bulk shipments.

A high demand for grain shipments, an extremely cold winter, which slowed train speeds, and the increasing needs of the energy sector have resulted in delayed grain deliveries and increased the cost of rail transportation. This has resulted in economic challenges for farmers, elevators and agricultural processors. Determining the size and scope of these economic challenges is problematic, because of the many forces that influence commodity prices, grain flows and transportation costs. This study has made a preliminary estimate of the lost farm revenue due to delayed grain deliveries and the increased cost of hopper bottom rail cars. It is unclear whether the factors that have led to these conditions will improve or continue, or what adjustments can be made to improve the current conditions. The answer to these issues will determine the total economic impact to the state's economy.

Table 1 – Monthly Average Basis Levels for Hard Red Spring Wheat for Nine Elevators across North Dakota

Month	2009	2010	2011	2012	2013	Average 2009 - 2013	2014	5 Trading Day Average - April 14- 21	Difference between 2010 and 2014	Difference between 2014 and Average
January		-0.138	-0.153	-0.175	-0.610	-0.269	-0.280		0.142	0.011
February		0.134	0.162	-0.155	-0.498	-0.089	-0.282		0.416	0.192
March		0.137	0.649	-0.095	-0.379	0.078	-0.442		0.580	0.521
April	-0.015	0.139	0.865	-0.063	-0.384	0.109	-0.671	-0.751	<b>0.811</b>	<b>0.780</b>
May	-0.149	-0.202	0.910	-0.065	-0.380	0.023				
June	-0.451	-0.184	1.004	-0.322	-0.489	0.012				
July	-0.397	-0.653	0.606	-0.739	-0.437	-0.296				
August	-0.485	-1.026	-0.391	-0.965	-0.623	-0.717				
September	-0.285	-0.836	-0.337	-1.048	-0.594	-0.626				
October	-0.171	-0.718	-0.448	-0.853	-0.593	-0.548				
November	-0.128	-0.550	-0.218	-0.713	-0.480	-0.402				

Table 2 – Monthly Average Basis Levels for Corn for Seven Elevators across North Dakota

Month	2009	2010	2011	2012	2013	Average 2009 - 2013	2014	5 Trading Day Average - April 14- 21	Difference between 2010 and 2014	Difference between 2014 and Average
January		-0.671	-0.671	-0.491	-0.480	-0.578	-0.666		-0.005	0.087
February		-0.748	-0.822	-0.435	-0.435	-0.610	-0.746		-0.002	0.137
March		-0.791	-0.878	-0.410	-0.344	-0.606	-1.041		0.250	0.435
April	-0.592	-0.709	-0.829	-0.436	-0.481	-0.609	-1.122	-1.168	<b>0.412</b>	<b>0.512</b>
May	-0.677	-0.743	-0.731	-0.140	-0.214	-0.501				
June	-0.671	-0.731	-0.630	-0.189	-0.202	-0.484				
July	-0.639	-0.818	-0.220	-0.482	0.661	-0.300				
August	-0.607	-0.905	-0.135	-0.643	0.391	-0.380				
September	-0.640	-1.075	-0.507	-0.686	-0.392	-0.727				
October	-0.645	-1.045	-0.615	-0.759	-0.587	-0.766				
November	-0.654	-0.817	-0.404	-0.630	-0.594	-0.627				
December	-0.871	-0.753	-0.402	-0.545	-0.635	-0.643				

Table 3 – Monthly Average Basis Levels for Soybean for Six Elevators across North Dakota

Month	2009	2010	2011	2012	2013	Average 2009 - 2013	2014	5 Trading Day Average - April 14- 21	Difference between 2010 and 2014	Difference between 2014 and Average
January		-0.803	-0.995	-0.744	-0.391	-0.733	-0.657		-0.145	-0.076
February		-0.683	-0.928	-0.618	-0.529	-0.690	-1.027		0.344	0.337
March		-0.774	-0.975	-0.689	-0.542	-0.745	-1.631		0.856	0.886
April	-0.787	-0.878	-1.039	-0.664	-0.771	-0.828	-1.249	-1.525	<b>0.370</b>	<b>0.421</b>
May	-0.734	-0.916	-1.004	-0.623	-0.413	-0.738				
June	-0.903	-0.847	-0.951	-0.817	-1.021	-0.908				
July	-0.034	-0.558	-0.875	-0.716	0.741	-0.288				
August	-0.660	-0.745	-0.940	-0.966	-0.422	-0.747				
September	-0.557	-0.907	-0.964	-0.864	-0.464	-0.823				
October	-0.618	-1.058	-0.967	-0.870	-0.593	-0.878				
November	-0.947	-0.968	-0.715	-0.692	-0.566	-0.831				
December	-0.974	-0.860	-0.612	-0.482	-0.651	-0.732				

Table 4 – Estimated Lost Farm Revenue for Previous Crop Sales

<b>Wheat</b>		Estimated	Estimated	
	Percent	Basis	Bushels Sold	
<u>Month</u>	<u>Sold</u>	<u>Difference</u>	<u>(1,000 Bu.)</u>	
		(\$/bu)		
January	12.00%	<b>0.14</b>	32,850	4,599,000
February	7.00%	<b>0.42</b>	19,163	8,048,250
March	8.00%	<b>0.58</b>	21,900	12,702,000
April	5.50%	<b>0.81</b>	15,056	12,195,563
Sub-Total				<u>37,544,813</u>
<b>Corn</b>		Estimated	Estimated	Estimated
	Percent	Basis	Bushels Sold	Farm
<u>Month</u>	<u>Sold</u>	<u>Difference</u>	<u>(1,000 Bu.)</u>	<u>Revenue</u>
		(\$/bu)		<u>Loss</u>
January	14.50%	<b>0.00</b>	57,420	-
February	8.50%	<b>0.00</b>	33,660	-
March	8.50%	<b>0.25</b>	33,660	8,415,000
April	5.50%	<b>0.41</b>	21,780	8,929,800
Sub-Total				<u>17,344,800</u>
<b>Soybean</b>		Estimated	Estimated	Estimated
	Percent	Basis	Bushels Sold	Farm
<u>Month</u>	<u>Sold</u>	<u>Difference</u>	<u>(1,000 Bu.)</u>	<u>Revenue</u>
		(\$/bu)		<u>Loss</u>
January	15.00%	<b>-0.14</b>	20,790	(2,910,600)
February	8.50%	<b>0.34</b>	11,781	4,005,540
March	7.00%	<b>0.86</b>	9,702	8,343,720
April	4.50%	<b>0.37</b>	6,237	2,307,690
Sub-Total				<u>11,746,350</u>
<b>Total</b>				<b>66,635,963</b>

Table 5 – Estimated Lost Farm Revenue for Sales of Remaining On-Farm Inventories

<u>Crop</u>	March		Estimated	Estimated
	N.D. On-	Less		
	Farm	Estimated	Difference	Revenue
	Grain	April	(\$/bu)	Loss
	Stocks	Marketings		
	(1,000 bu)			
Wheat	87,000	15,056	<b>0.81</b>	58,274,438
Corn	110,000	21,780	<b>0.41</b>	36,170,200
Soybean	8,700	6,237	<b>0.37</b>	911,310
<b>Total</b>				<u><b>95,355,948</b></u>

Figure 1 – Historical Hard Red Spring Wheat Basis Values for Selected North Dakota Elevators

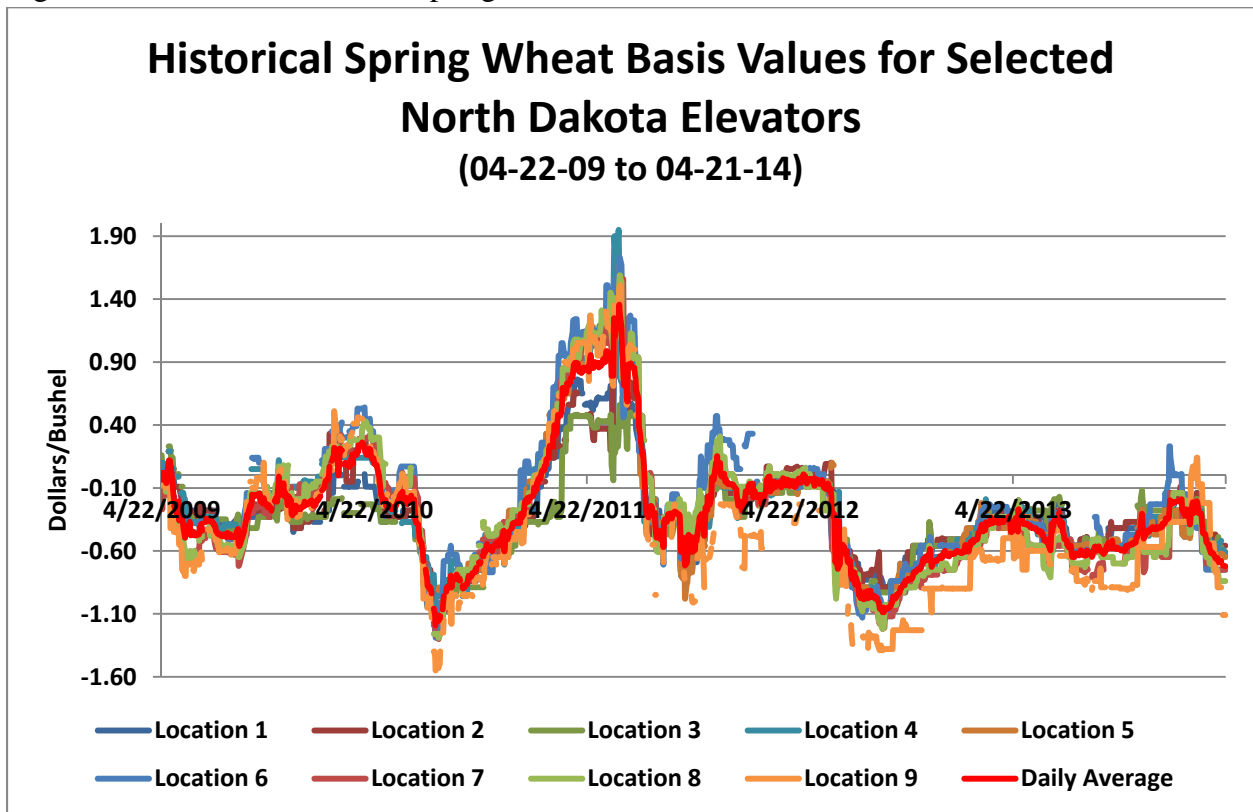




Figure 2 – Historical Corn Basis Values for Selected North Dakota Elevators

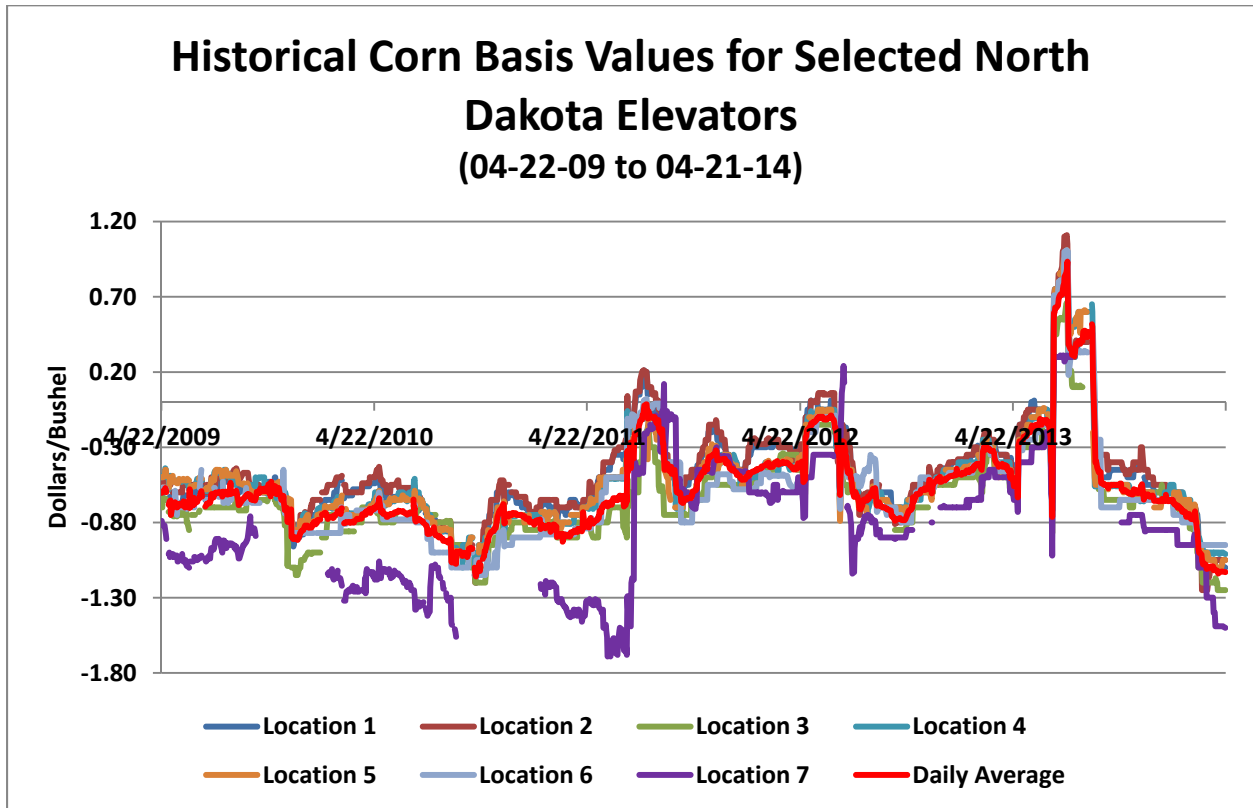


Figure 3 – Historical Soybean Basis Values for Selected North Dakota Elevators

