RENEWABLE FUELS ASSOCIATION

Review of

Corn Ethanol and Wildlife: How increases in corn plantings are affecting habitat and wildlife in the Prairie Pothole Region (Brooke et al. for the National Wildlife Federation)

Summary

The National Wildlife Federation (NWF) recently published a report alleging that growth in corn ethanol production has caused the loss of native prairie and other important wildlife habitat in four key corn producing states *(1)*. Aside from failing to establish a credible causal link between ethanol expansion and agricultural land use decisions in the region, the paper's conclusion that corn area expansion has led to a net loss in grassland in the "Prairie Pothole" region is not supported by cropland data from the U.S. Department of Agriculture (USDA). USDA data clearly show that *total* cropland in the four-state region (and in the U.S.) did not expand during the report's study period, meaning growth in corn acreage was accomplished through crop switching. Further, the authors deliberately use outlier data from abnormal years in an attempt to strengthen their disputable findings.

Selective Use of Data

The authors deliberately pick and choose certain data from certain years to support their conclusions. In many cases, the authors selected agricultural data points that are obvious outliers when viewed in the context of both mid- and long-term historical trends. As one example, the paper uses 2004 and 2007 data for comparisons of planted corn acres, but uses 2007 and 2009 data for a comparison of acreage enrolled in the Conservation Reserve Program (CRP). Not coincidentally, 2007 was an outlier year for corn acres (93.5 million), as farmers planted the highest level of corn acres since 1944. Corn plantings dropped 7.5 million acres (8%) to 86 million acres in 2008 (the report's authors call this a "slight decrease") and remained near that level in 2009 (86.5 million). A 20-year high for acres enrolled in CRP also occurred in 2007. So, not surprisingly, the authors chose 2007 as the benchmark year for CRP acres to show that enrollments have decreased in subsequent years. When placed in historical context, however, it becomes clear that 2008 CRP acreage was above the 20-year average. And while 2009 CRP acreage was 1% below the 20-year average, CRP enrollments were higher than the levels commonly seen in the late 1990s.

The report also relies on data that is inconclusive or limited in scope. For example, in an attempt to suggest that native grassland was converted to crops in the four-state region between 2002 and 2007, the report cites USDA Farm Service Agency data on "new breakings" in North and South Dakota. Not only is that data set unavailable to the public, its reliability for the purpose of decision-making has been questioned by the Congressional Research Service (CRS), among others. A 2007 CRS report suggests only the "new breakings" data collected in 2005 and 2006 is "confirmable" and characterizes data from previous years as "inconsistent" (incidentally, the confirmable data shows a decline in new breakings from 2005 to 2006). The CRS report further suggests the entire "new breakings" data set is "limited" and says "…speculations on the future rate of conversion using this data could be inconclusive." *(2)* The NWF report authors acknowledge the limitations of these data, but proceed to use the information as a key parameter for the "land use change indexes." All of the raw data used to establish the land use change indexes and other calculations should be provided as supplemental material. Further, because 2007 was an outlier year for corn and CRP acres, the authors should have considered using three-year averages to establish the comparison periods for the indexes.

Conclusions at Odds with USDA Data

USDA data clearly show that recent expansion of corn acres nationally and in the four-state region examined in the NWF report came through crop

switching, not through the conversion of native grassland *(3)*. It is true that corn acreage increased in the four-state region between 2004 and 2007, which is the apparent study period used by the authors to establish the land use change indexes. However, according to USDA data, *total* crop acres in the four states actually *declined* slightly from 2004 to 2007 (Fig. 1). Thus, it can be argued the increase in corn acreage in the region was exclusively accommodated through crop switching. The 2007 increase in corn acres was more than offset by decreases in acreage for other crops.

Figure 1.
CORN & OTHER PRINCIPAL CROP ACRES: IA, MN, ND, SD

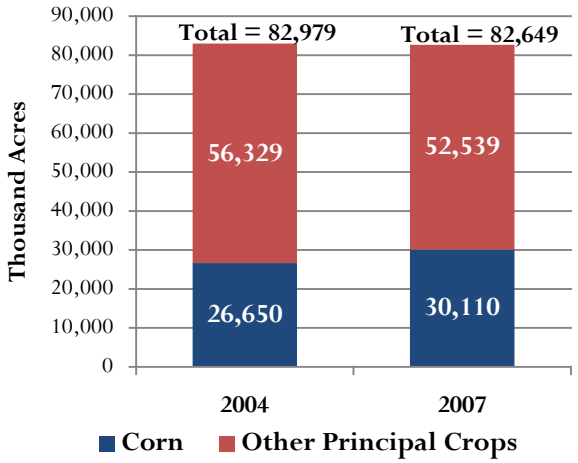


Figure 2. South Dakota Crop Switching, 2004-2007
(all figures in thousands of acres, unless otherwise noted)

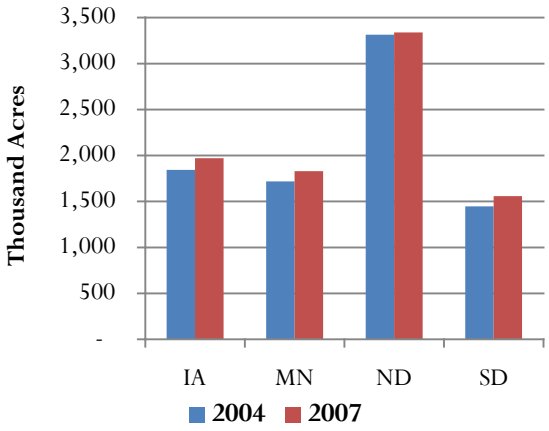
	2004	2007	Change	% Chng
Corn	4,650	5,000	350	8%
Sorghum	250	210	-40	-16%
Oats	380	330	-50	-13%
Barley	70	56	-14	-20%
Proso Millet	180	155	-25	-14%
Alfalfa Hay	2,250	2,250	0	0%
Soybeans	4,150	3,200	-950	-23%
Sunflower	435	415	-20	-5%
Wheat	3,270	3,509	239	7%
Net Total	**15,635**	**15,125**	**-510**	**-3%**

To demonstrate the effect of crop switching on overall land use, an example showing South Dakota major crop plantings in 2004 and 2007 is presented in Figure 2. Because 2007 corn plantings were supported by existing cropland, conversion of grassland or CRP was unnecessary and likely did not occur. And, as the NWF report itself states, "…crop switching does not reduce the quantity of available habitat…"

While current CRP acres in the four states have declined slightly since the 20-year high in 2007, CRP enrollments actually *increased* in each of the four states during the NWF study period of 2004 to 2007. As such, there is absolutely no basis for a conclusion that corn plantings in the four states in 2007 came at the expense of CRP acres. CRP acres in the four states for 2004 and 2007 are shown in Figure 3.

The crop switching trends observed in the four-state region are reflected at the national level as well. Recent increases in U.S. corn and soybean acres have been offset by decreases in other feed grains, wheat, and cotton. While U.S. CRP acreage levels were slightly lower in 2009 than the preceding several years, they were just 1% below the 20-year average and well above levels commonly seen in the late 1990s.

Figure 3.
IA, MN, ND, SD CRP ACRES, 2004 V. 2007



The 20-year U.S. average total acreage for the nine major U.S. crops plus CRP is 285.3 million acres *(4)*. In 2009, acreage for those crops and CRP totaled 282.5 million acres, or 1% below the average. Historical acreage for the nine major crops and CRP is shown in Figure 4. Only once (2008) in the last nine years did major crop acreage plus CRP exceed the 20-year

average. Deviations from the 20-year average are shown in Figure 5. Figures 4 and 5 demonstrate that increasing demand for corn and soybeans has been met through reallocation of existing cropland, not through expansion into native grassland or pasture.

Figure 4.
U.S. MAJOR CROP AREA + CRP, 1990-2009

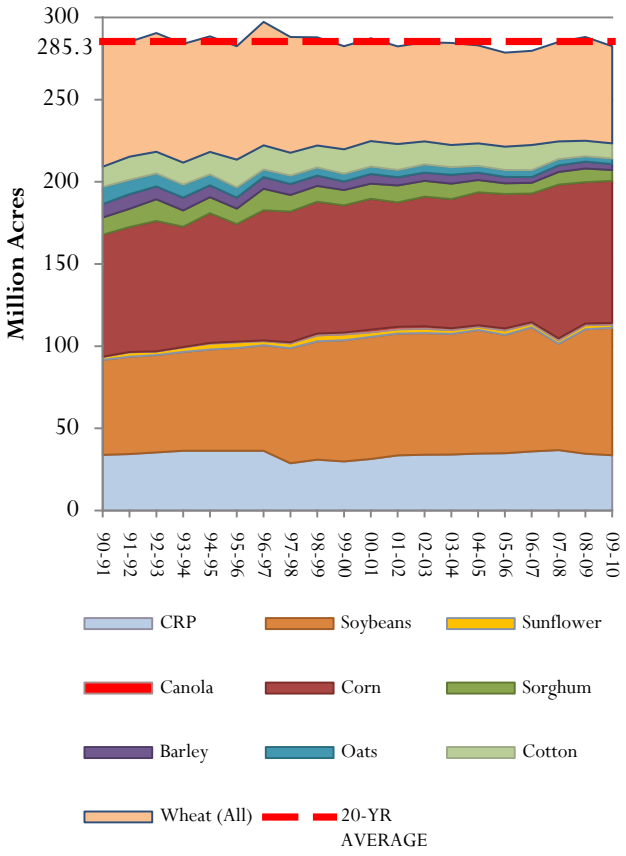
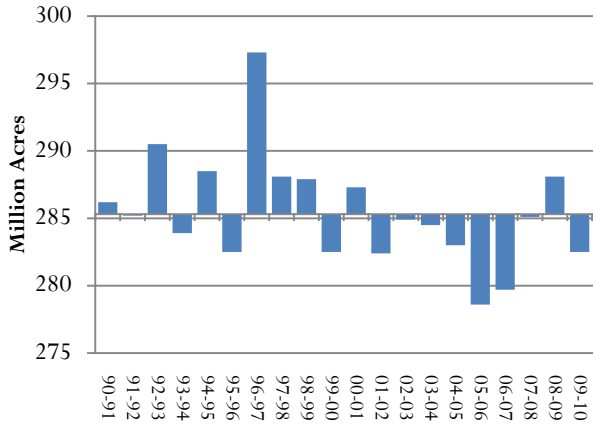


Figure 5. U.S. MAJOR CROP AREA DEVIATION FROM 20-YR AVERAGE



2015 Projections Based on Significantly Outdated Assumptions

Two sidebars in the NWF report suggest the biofuel requirements of the expanded Renewable Fuels Standard will demand an additional 10.69 million acres of corn by 2015 over 2009 levels. This calculation is based on grossly outdated assumptions about growth in average corn yield per acre and the amount of ethanol yielded per bushel of corn. The authors assume corn yield will average 150.68 bushels/acre between 2010 and 2015. Average corn yield has already surpassed that level in each of the past three years, including a record yield of 165.2 bushels/acre in 2009 *(5)*. Even the most conservative estimates of future yield growth, such as USDA's annual baseline projections, put average corn yield at approximately 169 bushels/acre by 2015 *(6)*. A more realistic view of future yields, based on the trend since 1995, puts average yield at 177 bushels/acre by 2015 *(7)*.

The NWF report's 2015 projection also assumes an average ethanol conversion rate of 2.75 gallons/bushel. Today's industry average rate is 2.8 gallons/bushel and, based on historical trends and emerging technologies, ethanol yields are likely to approach an average of 2.9 gallons/bushel by 2015 *(8)*. In many cases, newer facilities are already producing at that level.

Adopting the more realistic assumptions for 2015 (Fig. 6) results in a significantly different estimate of the incremental land needed to satisfy the 2015 RFS target.

Figure 6. PROJECTIONS TO 2015 WITH UPDATED ASSUMPTIONS

		2009	2015	Change
Corn Ethanol	m. gals.	10,600	15,000	4,400
Ethanol Conv. Rate	gal./bu.	2.80	2.90	0.10
Corn Required	m. bu.	3,786	5,172	1,387
Corn Yield	bu./acre	165.2	177.6	12.4
Gross Land Required	m. acres	22.9	29.1	6.2
Net Land Required	m. acres	15.4	19.5	4.2

Rather than the report's estimate of 10.69 million incremental acres, the 2015 RFS would demand 6.2 million incremental acres (gross basis) over the level of corn acreage used for ethanol in 2009 (42% lower than the NWF report's estimate). Because one-third of every bushel of corn processed into ethanol returns to the animal feed market in the form of distillers grains, the net incremental acreage requirement in 2015 is 4.2 million acres. If corn yield growth or ethanol yield improvements occur more rapidly, the actual incremental land requirement would be even less.

Due to continued yield growth and additional crop switching, it is highly unlikely that native grassland will be converted to cropland as a result of increasing ethanol demand. This finding is supported by a recent analysis conducted by Air Improvement Resource, which concluded "…neither forest nor pasture will be converted to crops as a result of the increase in the biofuel mandate to 15 [billion gallons per year] in 2015." *(9)* At a maximum, marginal amounts of CRP may transition back into cropland. However, as discussed earlier, ethanol growth to date has not caused CRP acreage to deviate from the long-term trend.

Findings on Wildlife Impacts at Odds with Other Studies and Data

While the NWF study focuses on five species of birds in the Prairie Pothole region, it should be noted that populations of many other wildlife species have increased in the area. A 2008 report by the Minneapolis Federal Reserve says the Prairie Pothole Region of the Dakotas has experienced "measurable gains in wildlife populations" in recent years. *(10)* The report highlights a 2007 FSA-commissioned study of grassland bird populations in the region that credited CRP with increases of roughly 1.1 million bobolinks and 320,000 sedge wrens. The NWF study itself suggests an increase in "generalist" bird populations in the region. Further, populations of deer, wild turkeys, waterfowl, and many other species have generally increased in recent years in the four states. *(11)*

Conclusion

There is no disagreement that the issues raised in the NWF report are important and merit the attention of agricultural producers, biofuel processors, and conservationists alike. However, the NWF report's selective and questionable use of data, unclear research methods, and emotional arguments cast doubt on the reliability of the conclusions and recommendations. Because the analysis upon which the report's policy proposals are based is debatable, decision makers and policy advocates should exercise caution and skepticism in interpreting the report's policy recommendations.

References and Notes

1. R. Brooke, G. Fogel, A. Glaser, E. Griffin, K. Johnson, "Corn Ethanol and Wildlife: How increases in corn plantings are affecting habitat and wildlife in the Prairie Pothole Region" (published by the National Wildlife Federation, Reston, VA 2010). The four states examined are Iowa, Minnesota, North Dakota and South Dakota.
2. M. Stubbs. "Land Conversion in the Northen Plains", Congressional Research Service, Washington, DC (April 15, 2007)
3. All acreage figures cited in this report are from USDA National Agriculture Statistics Service (NASS) Crop Production Annual Summary reports. These reports are published annually in January and provide estimates for all principal (or "major") crop acres by state. As defined by USDA, principal crops are corn, sorghum, wheat, rye, rice, soybeans, proso millet, peanuts, sunflower, cotton, dry beans, potatoes, canola, sugar beets, sugar cane, hay, tobacco.
4. Crops examined are corn, barley, oats, sorghum, soybeans, canola, sunflower, wheat, and cotton. With the exception of cotton, all of these crops are cultivated in the four-state region.
5. USDA, NASS, "Crop Production" (January 2010)
6. USDA, "Agricultural Long-Term Projections to 2018" (February 2009)
7. 1995 was the first growing season in which biotech-derived hybrids were available commercially to farmers. Thus, there is strong argument to be made that yield projections based on historical trends should use the period of 1995-current to estimate the trend line for future yields.
8. M. Wu, Center for Transportation Research, Argonne National Laboratory, "Analysis of the. Efficiency of the U.S. Ethanol Industry 2007." (March 2008). This report showed an average ethanol yield per bushel of 2.81 gals., ranging as high as 2.96 gals.
9. T. Darlington, Air Improvement Resource, Inc., "Land Use Effects of U.S. Corn-Based Ethanol", study commissioned by RFA(February 2009)
10. H. Hampton, "CRP: Green is good, but more green is preferred" (November 2008) Fed Gazette (Published by Minneapolis Federal Reserve)
11. See, for example, Iowa Dept. of Natural Resources, "Trends in Iowa Wildlife Populations and Harvest 2008" (September 2009)