

## The Unintended Environmental Impacts of the Renewable Fuels Standard Time to Change Direction in Biofuel Policy

The Renewable Fuels Standard (RFS) in the Energy Independence and Security Act of 2007 mandates a dramatic increase in the use of biofuels in transportation. The RFS mandates significant increases in biofuels – corn, advanced, cellulosic and biodiesel. A “conventional biofuel” is ethanol derived from corn. “Advanced biofuels” are renewable fuels derived from feedstocks other than corn and that reduce lifecycle greenhouse gas emissions by at least 50 percent. Cellulosic biofuels include lignin and require a 60 percent reduction in greenhouse gas emission. Biomass-based biodiesel must reduce greenhouse gas emissions by 50 percent.

The RFS requires almost quadrupling biofuels production from 4 billion gallons a year in 2006 to 15.2 billion gallons in 2012, all of which is expected to be corn-ethanol. Ethanol production is exploding in response to these mandates and to other subsidies including tax credits provided to companies that blend ethanol into gasoline. By 2007, corn-ethanol production reached 6.5 billion gallons, 1.8 billion gallons more than the renewable fuel standard mandates.<sup>1</sup>

Ethanol production used 20 percent of the corn produced in the United States during the last crop-marketing year (2007-2008).<sup>2</sup> The World Agricultural Outlook Board projects ethanol will use up 34 percent of all the corn produced in the United States in the current marketing year (2008-2009).<sup>3</sup> Farmers planted 13.8 million more corn acres in 2007 than they had on average between 2002 and 2006—a 17 percent increase in one year.<sup>4</sup> In 2008 the number of acres planted to corn dropped, but were still 7.1 million acres (or 9 percent) higher than the average during the five years prior to 2006.<sup>5</sup>



Ethanol plant in South Dakota.

Source: istock.com

U.S. farmers are planting fence-row-to-fence-row to produce enough corn to supply ethanol plants and at the same time meet burgeoning demand for food and feed crops. The intensification of corn production—spurred in large part by exploding ethanol production—threatens to exacerbate global warming, and harm water quality, water supply, and wildlife.

- **Global Warming:** The most recent peer-reviewed science indicates that corn-ethanol exacerbates global warming when the full life-cycle effects are taken into account, such as the emissions from fertilizer use to grow the extra corn and the massive amount of carbon that is released when grasslands and forests are converted to corn production.<sup>6</sup> By failing to consider these potentially devastating adverse consequences the RFS could actually result in significant increases in greenhouse gas emissions that could take decades to reverse.
- **Water Pollution:** Corn production uses more fertilizer than any other grain crop produced in the United States. Achieving the 15 billion gallons per year mandate for corn ethanol would cause a 10 to 18 percent increase in nitrogen export to the Gulf of Mexico.<sup>7</sup> A 16.1 million acre increase in corn acreage—slightly more than the 15.3 million acre increase that occurred between 2006 and 2007—would result in a 37 percent increase in nitrogen and a 25 percent increase in phosphorus load.<sup>8</sup> Experts conclude that the corn ethanol mandate makes it “practically impossible” to reduce the Dead Zone.<sup>9</sup>
- **Water Supplies:** Ethanol production requires large amounts of water both at the facilities that convert corn to ethanol and to grow the corn itself. Most estimates indicate that it takes 4 gallons of water to produce 1 gallon of ethanol during the conversion process. To put that estimate in perspective, an ethanol facility that produces 100

million gallons of ethanol per year would use the equivalent amount of water as would a town of 5,000 people.<sup>10</sup> Corn itself is a thirsty plant. For example, about 2,100 gallons of irrigation water were applied to grow one bushel of corn in Nebraska in 2003.<sup>11</sup> Nationally, the United States is a water-rich country, but at local and regional scales, ethanol production has the potential to compromise water supplies.

- **Wildlife:** Taxpayers have invested \$32 billion since 1986 to convert environmentally sensitive cropland to grasses and trees through the Conservation Reserve Program (CRP)<sup>12</sup> to create critical wildlife habitat, particularly for grassland birds and waterfowl.<sup>13</sup> High prices and the push to ramp up production are leading farmers to take land out of the Reserve and plant it with crops. In September of 2007, 2.6 million acres left CRP, bringing the amount of land protected by CRP down to 34.7 million acres in 2008. The U.S. Department of Agriculture estimates another 9.3 million acres will be taken out of the Reserve by 2010. If these predictions come true, CRP will have lost one-third of the acres enrolled in the program in just four years, and taxpayers will have lost much of their \$32 billion investment in wildlife habitat and cleaner water.



A family of greese on the Fox River, Illinois.  
Source: Ducks Unlimited. Credit: R. Dickenson, Batavia IL.

## Time to Change Direction

It is time for biofuel policy to change direction given these unintended environmental impacts of corn production. Current policy is driving a rapid increase in corn ethanol production with little regard for the environmental side effects of that expansion. For biofuels to make an important contribution to reducing dependence on fossil fuels, cutting greenhouse gas emissions, and enhancing soil, water, and wildlife, we need to change direction; our current policy will not get us there. To change direction, we need to:

- Freeze the Renewable Fuel Standard for conventional biofuels at 9 billion gallons.
- Establish minimum environmental standards, including life-cycle greenhouse gas emission reductions, for production of all renewable fuels.
- Provide a mechanism and authority to mitigate adverse effects that may arise.
- Transform the current tax credit for companies that blend ethanol with gasoline into incentives for ethanol producers to improve the environmental performance of their facilities and to ensure their feedstocks are produced sustainably.
- Strengthen and fully enforce farm bill conservation compliance provisions to reduce soil erosion during production of biofuel feedstocks that receive farm bill subsidies.

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<sup>1</sup> Renewable Fuels Association <http://www.ethanolrfa.org/industry/statistics/>

<sup>2</sup> World Agricultural Outlook Board. 2008. World Agricultural Supply and Demand Estimates. WASDE-461, August 12, 2008.

<sup>3</sup> Ibid.

<sup>4</sup> National Agricultural Statistics Service <http://www.nass.usda.gov/QuickStats/index2.jsp>

<sup>5</sup> Ibid.

<sup>6</sup> Farrell, F.E., et al. 2006. Ethanol can contribute to energy and environmental goals. *Science* 311: January 27, 2006; Crutzen, P.J., et al. 2008. N2O release from agro-biofuel production negates global warming reduction by replacing fossil fuels; and Gallagher, E. 2008. The Gallagher review of the indirect effects of biofuels production. Renewable Fuels Agency, U.K.

<sup>7</sup> Donner, S.D. and C.J. Kucharik. "Corn-based ethanol production compromises goal of reducing nitrogen export by the Mississippi River." March 18, 2008.

<sup>8</sup> Simpson, T.W., A.N. Sharpley, R.W. Howarth, H.W. Pearl, and K.R. Mankin. 2008. The New Gold Rush: Fueling Ethanol Production while Protecting Water Quality. *Journal of Environmental Quality* 37:318-324.

<sup>9</sup> Donner and Kucharick. 2008.

<sup>10</sup> National Research Council. 2008. Water Implications of Biofuels Production in the United States. National Academies Press, Washington D.C., 76 p.

<sup>11</sup> Ibid.

<sup>12</sup> The CRP pays farmers annual rental payments to take their land out of production under 10 to 15 year contracts.

<sup>13</sup> FSA. Press Release No. 1448.07. "Studies show CRP supports millions of ducks and grassland birds in prairie pothole region."