

# Agricultural Nutrient Pollution and Hypoxia in the Gulf of Mexico

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Nutrient Pollution is one of the most serious water quality problems in the nation and is a major threat to coastal water quality. I am here today to speak to you because I am concerned about the impact nutrient pollution is having on the health of our coastal areas – and in particular the impact that nutrient pollution from Iowa and the upper Midwest is having on the Gulf of Mexico. But I am also here because I am concerned about the impact of nutrient pollution on the health of Iowa's water resources.

Nutrient pollution is a leading cause of pollution of Iowa's surface water and groundwater. This pollution has a serious impact on the health of aquatic life in our rivers and streams and also on our drinking water sources. The City of Des Moines where I live obtains drinking water from the Raccoon and Des Moines Rivers that flow through some of the richest farmland in the world. Both of these rivers have high nitrate levels that often exceed the safe drinking water standard. The Des Moines waterworks has the distinction of operating the largest nitrate removal system in the world in order to assure safe drinking water for the citizens of Des Moines. High nitrate levels also affect many other public and private water supplies in Iowa.

According to recent studies of Iowa water quality, we have learned that Iowa has some of the most nutrient rich waters in the world – which includes both nitrogen and phosphorus. While Iowans boast about our productive farmland from which we export feed grains to much of the nation and the world, we are now finding that we must apologize to our downstream neighbors for our export of nitrogen pollution from our “fertile” rivers into the Mississippi River and the Gulf of Mexico. Iowa must do something about its contribution to the Dead Zone in the Gulf. Doing so is necessary to respond to the hypoxia that threatens the complex marine ecosystem of the Gulf -- and one of the most productive fisheries of the United States. Doing so also is necessary to protect the quality of Iowa's water resources.

In all of the studies I have reviewed on hypoxia in the Gulf of Mexico, Iowa and the upper Midwest are looked at as one of the major source areas for the nitrogen that ends up in the Gulf of Mexico. In fact, the 1999 Committee on Environment and Natural Resources (CENR) hypoxia report credited Iowa and Illinois with as much as 35% of the nitrogen pollution ending up in the Gulf of Mexico.

In Iowa, most of that nitrogen pollution is coming from agricultural sources. When I talk about water pollution issues in Iowa, it seems that we are always pointing the finger at agriculture as the major source of our pollution problems. My friends who are farmers object to getting all the blame, so I always start any discussion of Iowa's water pollution problems with a map showing the Land Cover of Iowa. (Slide 2). The gray area of the map is the area covered by row crop agriculture – primarily corn and soybeans. This is 60% of the state. Grassland areas, which are

mostly used as pastureland for livestock, are shown in tan. They represent 30% of the state. Our cropland and pastureland together make up 90% of the land use in the state. Let me repeat that – 90% of the land area of the state of Iowa is working agricultural land. The remaining areas are forest (green) 7%, urban areas (pink) 1%, water (blue) 1% and other (brown) 1%.

This map helps illustrate why agriculture is the dominant source of water pollution in Iowa. Iowa's water quality problems are simply a reflection of our dominant agricultural land use. The rest of my comments will focus on agricultural sources of nitrogen pollution. But before I do, I want to acknowledge that there are other sources of nutrient pollution in Iowa that need to be addressed including wastewater discharges and burning of fossil fuels. The Iowa Environmental Council is working on strategies to reduce these sources as well.

To set the stage for our discussion, I want to start with three maps that show nitrogen sources in Iowa and the Upper Midwest compared to other regions of the country. The source for these maps is the USDA report *A Geography of Hope* published in 1996 while Iowa's Paul Johnson, was Chief of the USDA Natural Resources Conservation Service.

The first map (Slide 3) shows the potential for nitrogen fertilizer loss from farm fields – that is fertilizer that is applied to cropland, but not used by harvested crops. In Iowa this cropland is mostly corn and soybeans. Looking at this map it is clear that a lot of nitrogen fertilizer in Iowa and the Upper Midwest is available for loss to the environment. Much of that nitrogen ends up moving downstream to the Gulf.

Another big source of nutrients in Iowa is livestock manure. This map (Slide 4) shows the number of animal units per county in the US, with the highest quartile shown in red. Again Iowa and the Upper Midwest have a lot of livestock and a lot of manure. We are #1 in hogs, #1 in layer hens, and in the top ten on beef cattle and our dairy industry is growing. Again, a lot of potential sources for nitrogen loss to the environment if not managed properly.

A final map from this report (Slide 5) shows patterns of agricultural diversity across the US. In the east and southeast we see a smaller more diverse mix of agricultural activities, while in Iowa and the Upper Midwest we see corn, soybeans and hogs. The intensive production of these three agricultural products leads to large losses of nitrogen from our agricultural landscape, even with the application of accepted best management practices.

Since we are losing all this nitrogen from our cropland, what is the impact on water quality in Iowa – and how does it compare to other regions of the country? The USGS just recently completed a study of Water Quality in the Eastern Iowa Basins as part of their NAWQA program (Slide 6). As part of their report of findings published in 2000, they compared nitrogen levels in groundwater and surface water in eastern Iowa to other corn belt states and to the US as a whole (Slide 7). This study found that the nitrogen concentrations in the groundwater and surface water of eastern Iowa are among the highest in the nation, and even higher than in other corn belt states.

What is happening in areas of the state with large concentrations of animal feeding operations? The USGS Eastern Iowa Basins study looked in detail at two adjacent watersheds in eastern Iowa that have similar crop coverage, but a significant difference in livestock density (Slide 8). Water monitoring data found that the watershed with the higher concentration of hogs had a

significantly higher nitrogen yield. This suggests that concentration of livestock may lead to over-application of manure and increased nitrogen pollution downstream.

Another question that is frequently asked is how much of the nutrients in the water is natural and how much is due to human activity? Fortunately, we have a little data that helps us answer this important question (Slide 9). Average nitrate concentrations from the early 1900's were compared with nitrate concentration in the 1980's and 90's by Don Goolsby of the USGS in a paper published in EOS in July 2000. All of the rivers in the Upper Midwest included in this comparison show significant increases in nitrate concentrations and this is particularly evident for the Cedar River and Des Moines River in Iowa. This suggests that the high nitrate levels in our rivers and streams are primarily the result of human activity and therefore it is possible for us to reduce these nutrient levels.

As we have discussed, Iowa and the Upper Midwest have lots of nutrient sources related to our intense agricultural landuse. We know that we lose a lot of nitrogen when we grow corn and soybeans, even when good management practices are followed. And livestock manure from the large numbers of animals raised in Iowa contributes to our nitrogen pollution problem, especially when the manure is overapplied. This nutrient pollution is causing water quality problems in Iowa, and downstream in the Gulf of Mexico.

This is the bad news.

The good news is that we have recognized the problem and we have a lot of good people working to find solutions. There are many partnerships that have formed both in Iowa and throughout the Mississippi Basin that are ready to meet the challenge. We have *an Action Plan for Reducing, Mitigating, and Controlling Hypoxia in the Northern Gulf of Mexico* that was developed and agreed upon by a state-federal Task Force in the fall of 2000.

We need to move forward with funding and implementation of this Action Plan and we need the state-federal Hypoxia Task Force to continue to oversee this work. We also need to reach out to form new state and regional watershed groups within the Mississippi Basin to begin the process of developing and implementing nutrient reduction goals and strategies within the framework of the basin-wide plan.

I am also encouraged by some of the changes that have been proposed in the new Farm Bill, in particular the increased conservation program funding and the new Conservation Security Program that would provide incentive payments to farmers who practice good stewardship on working agricultural land.

In Summary, I would like to offer three recommendations that I believe represent the most promising strategies to reduce nutrient pollution from Iowa and the upper Midwest that is contributing to hypoxia in the Gulf of Mexico.

- 1) The most promising strategy in my opinion is to adopt policies that encourage diversification of the agricultural landscape. In the short term, we need to add new crops to the corn-soybean rotation, especially perennial crops such as alfalfa and grass. We need to move away from the concentration of livestock in large confinement facilities and re-integrate our livestock production back into the hands of smaller diversified farms. In the long term I

believe we need to completely reshape our agricultural focus away from grain production to a wider diversity of food and fiber products including fruits and vegetables. To accomplish this we will need to make significant changes to our farm policy to provide more incentives for a wide variety of agricultural crops, not just subsidies for commodity crops.

- 2) Also essential is improved farm management practices including applying fertilizer at the right time and in the right amount. We should not allow fertilizer to be applied in the fall, a practice that often leads to as much as a 50 percent loss of nitrogen before the crop is even planted. Livestock manure must be treated as a valuable fertilizer to be used for crop production and not as a waste product to be disposed of on the land or in the water. All farms should be required to develop nutrient management plans that look at nitrogen and phosphorus budgets for inputs and outputs, with analysis and accounting of all nutrient losses. Incentives should be established for demonstrated efficiency in nutrient utilization through record keeping and monitoring of air and water.
- 3) In Iowa, we have lost over 90 percent of our original wetland acres. We must put back the natural filters into the landscape that will reduce nitrogen pollution through restoration of riparian zones along our rivers and streams and created or restored wetlands. These wetland and riparian areas must be placed in optimum locations in targeted watersheds that discharge high amounts of nitrogen, especially in the intensively tile drained area of the upper Midwest.

## Background on the Iowa Environmental Council

The Iowa Environmental Council is an alliance of diverse organizations and individuals working with all Iowans to protect our natural environment. The Council currently has 65 nonprofit organizational members and 11 cooperator members that are governmental or quasi-governmental organizations. The Council's Board of Directors includes representatives of each member organization as well as 21 at-large directors that include well-respected business people, farmers, scientists, educators, and former legislators from both political parties. The Council draws on the experience of its organizations, individual members, cooperators, and staff in environmental policy making. Because of our strong record, our research and partnership approach, and the breadth of our board, we are seen as a balanced and credible voice for strong environmental policies in Iowa.