

Paying for the Nutrient Reduction Strategy – A Nutrient Management Strategy Fee

Iowa released its draft nutrient reduction strategy in 2012. Since then, dealing with high levels of nutrients in Iowa's waters has been an on-going issue, plagued by the lack of financial resources. It has been estimated that the cost of implementing the Nutrient Reduction Strategy is 5 billion dollars.¹ Finding a source for that amount of money has been challenging. But this paper suggests an easy way of paying for the nutrient reduction strategy. But first, let's explore the background of the Nutrient Reduction Strategy.

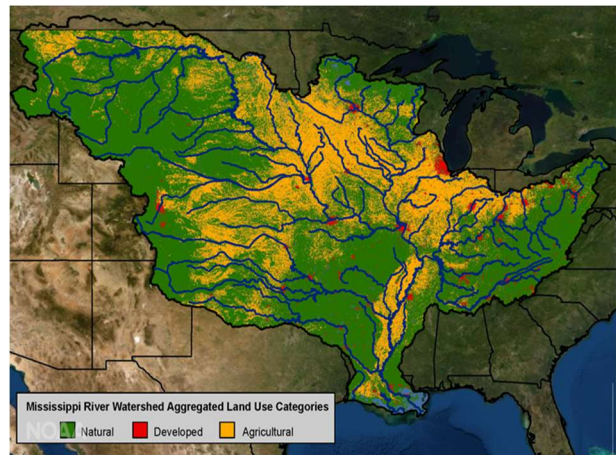
The Goal and Where Are We?

Each state in the Mississippi River watershed is responsible for reducing their share of nutrients being sent to the Gulf of Mexico; that is what led to Iowa's Nutrient Reduction Strategy and its goal of a 45% reduction in nutrients entering the waterways of the state.

In 2008, the goal of the national effort to reduce the dead zone in the Gulf of Mexico was to cut the nitrate and phosphorus pollution reaching the Gulf by 45 percent by 2015 and reducing the dead zone to 1,900 square miles. That goal was not met.² Instead, the average size of the dead zone is 5,772 square miles, three times larger than the goal.³

In 2014, the goal was changed to include an interim goal:⁴

"The updated Coastal Goal, including an Interim Target, is as follows: We strive to reduce the five-year running average areal extent of the Gulf of Mexico hypoxic zone to less than 5,000 square kilometers by the year 2035. Reaching this final goal will require a significant commitment of resources to greatly accelerate implementation of actions to reduce nutrient loading from all major sources of nitrogen and phosphorus in the Mississippi/Atchafalaya River Basin (MARB). An Interim Target of a 20% reduction⁵ of nitrogen and phosphorus loading by 2025 is a milestone for immediate planning and implementation



Map of the Mississippi River Watershed is from National Oceanic and Atmospheric Administration

¹ Perry Beeman, "Experts: Fixing Iowa waterways will take legislation, legal action and \$5B", *Iowa Capital Dispatch*, June 18, 2021

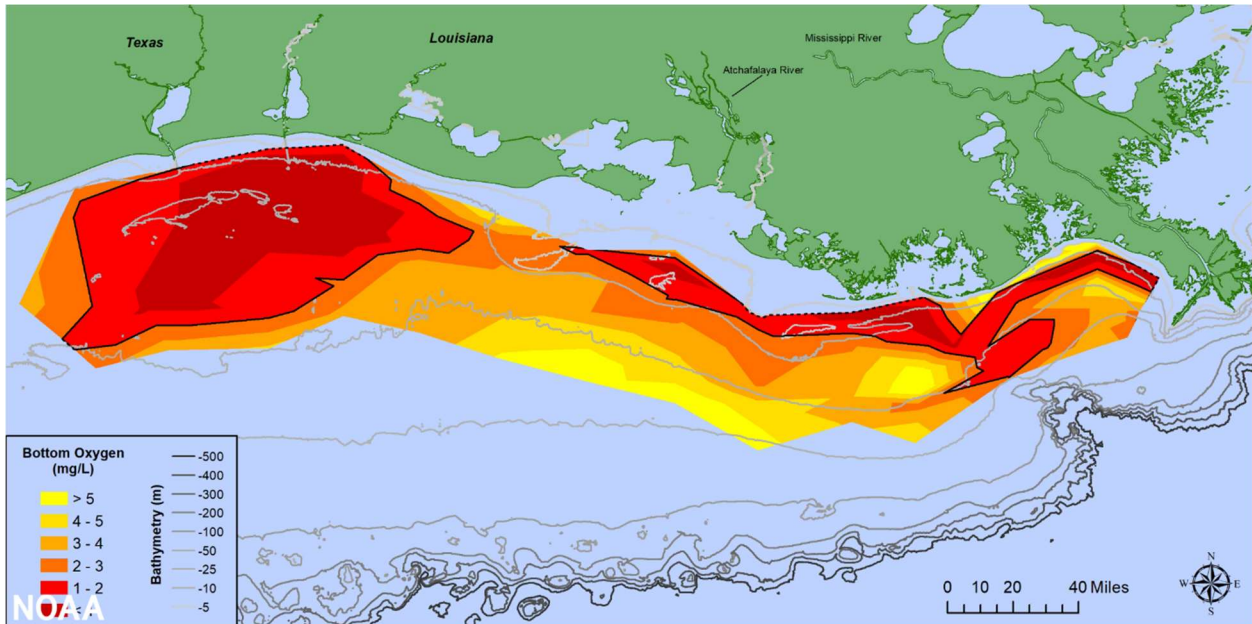
² "Mississippi River Gulf of Mexico Watershed Nutrient Task Force New Goal Framework", December 3, 2014, www.epa.gov/sites/production/files/2015-07/documents/htf-goals-framework-2015.pdf

³ Erin Jordan, "Treading Water: Unfocused and underfunded, clean water goal falters", *Cedar Rapids Gazette*, December 2, 2018

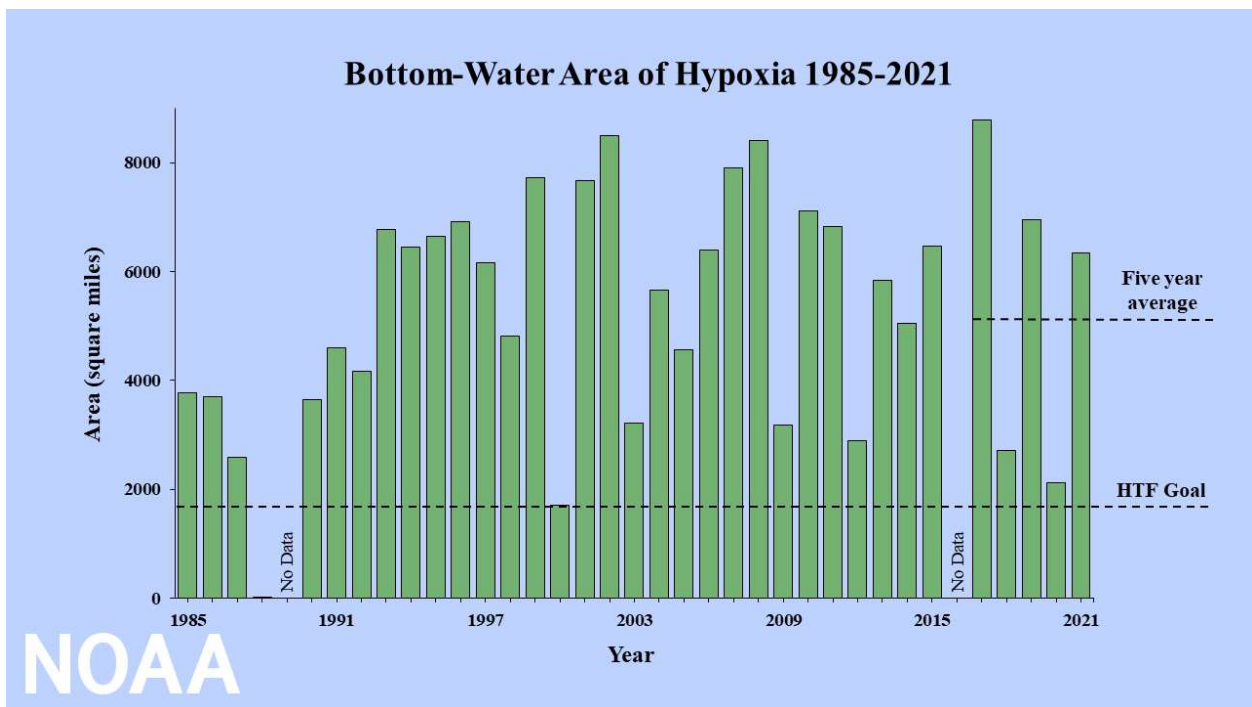
⁴ "Mississippi River Gulf of Mexico Watershed Nutrient Task Force New Goal Framework", December 3, 2014, www.epa.gov/sites/production/files/2015-07/documents/htf-goals-framework-2015.pdf

⁵ "The percent reduction is relative to the average MARB nutrient loading to the Gulf of Mexico during the 1980-1996 period.", from "Mississippi River Gulf of Mexico Watershed Nutrient Task Force New Goal Framework"

actions, while continuing to develop future action strategies to achieve the final goal through 2035. Federal agencies, States, Tribes and other partners will work collaboratively to plan and implement specific, practical and cost-effective actions to achieve both the Interim Target and the updated Coastal Goal.”



The Dead Zone in the Gulf of Mexico, provided by National Oceanic and Atmospheric Administration



Average size of the dead zone in the Gulf of Mexico, provided by National Oceanic and Atmospheric Administration

In other words, the goal is a 45% reduction by 2035 with an interim goal of 20% reduction by 2025. 2025 will arrive soon; 2035 is not that far way. In the meantime, we have a lot of work to do in reducing nutrients. The longer we

wait, the harder it will be to meet the goal. Unfortunately, according to Dr. Christopher Jones' research, "nitrate loss in Iowa has increased more than 70 percent since 2003."⁶

We have already spent money on the Nutrient Reduction Strategy. Have we used the money wisely?

In the "Iowa Nutrient Reduction Strategy 2018-19 Annual Progress Report", the authors indicated that "The total funding for NRS-related efforts in the 2019 reporting period – including education and outreach, research, practice implementation, and water monitoring – was an estimated \$560 million. This is an increase from \$512 million in 2018 and \$438 million in 2017". The expenditures were from both public and private funding sources. The report continues with, "The majority of public programs described in this report are considered base programs and have, in general, been in existence for decades. In addition, these estimates include the farmer and landowner contribution to the implementation of cover crops, terraces, water and sediment control basins (WASCOBs), and grade stabilization structures that received cost-share funding; other practices were not included due to insufficient financial cost-share data." The report indicated that \$20,120,000 was spent in 2019 on publicly-funded projects that were focused on the Nutrient Reduction Strategy.⁷

The amount that was spent on the Nutrient Reduction Strategy in 2017, 2018, and 2019, reached a total of \$1,510,000,000 – 30.2% of the estimated 5 billion dollars needed to implement the strategy.

As mentioned above, Dr. Christopher Jones' research found "nitrate loss in Iowa has increased more than 70 percent since 2003."⁸

Obviously the investments to date in the Nutrient Reduction Strategy have failed to reduce the nutrients Iowa is contributing to our waterbodies. Or additional sources of nutrients are entering the waterbodies at a greater pace than our reduction efforts.



Swimmers at Lake Macbride State Park

Evaluation of the Problem

Most of us were taught by our parents and teachers to pick up and clean up after ourselves. We were taught that we should not leave a mess for someone else to clean up. The same set of values should apply to our rivers, streams, and lakes.

We have all heard of the phrase, "the polluter should pay".

- Those who live in urban areas pay for the sewage treatment plant to keep nutrient pollution out of the processed wastewater.
- Today manufacturers are assessed a fee for each ton of nitrogen fertilizer that they manufacture. That fee is deposited in the groundwater protection fund, where the funds are used to protect Iowa's groundwater.⁹

Unfortunately there is a group of polluters that is not assessed a fee to deal with their pollution - the owners of livestock raised in animal feeding operations. Further, animal feeding operations continue being built in Iowa, continuing the discharge of nutrients largely unabated. By definition in the Iowa Code, an animal feeding operation

⁶ Christopher S. Jones, "Elephants in the room", The Gazette Iowa Ideas, Cedar Rapids, Iowa, August 25, 2019

⁷ Iowa Department of Agriculture, Iowa Department of Natural Resources, Iowa State University, "Iowa Nutrient Reduction Strategy 2018-19 Annual Progress Report", June, 2020, page 10

⁸ Christopher S. Jones, "Elephants in the room", The Gazette Iowa Ideas, Cedar Rapids, Iowa, August 25, 2019

⁹ See Iowa Code Chapter 200 – Fertilizers and Soil Conditioners and Iowa Code Chapter 455E – Groundwater Protection.

“means a lot, yard, corral, building, or other area in which animals are confined and fed and maintained for forty-five days or more in any twelve-month period”.¹⁰ We often call them concentrated animal feeding operations, or CAFOs.

Further, most of the nutrient pollution comes from Iowa’s farmland:

- Ninety-two percent of the nitrogen and eighty percent of the phosphorus in Iowa’s waters originates from non-point sources,¹¹ which includes runoff from farm fields and lawns.
- The remaining eight percent of the nitrogen and twenty percent of the phosphorus comes from sewage treatment plants and industries that are directly discharging into rivers and streams.¹²
- Ninety percent of the nitrates in Iowa’s waters come from Iowa’s crop land.
- Seventy-two percent of Iowa’s landmass is dedicated to crops.¹³

Developing an Easy Solution for Raising Money to Fund the Nutrient Reduction Strategy

Every large and medium-sized animal feeding operation must file either a Manure Management Plan or a Nutrient Management Plan with the Iowa Department of Natural Resources. They have to be updated every five years. When a Manure Management Plan or Nutrient Management Plan is filed, the owner/operator must list species of animal, plus the number of animals and animal units that will be housed in the facility.



Part of the DNR regulations is a concept called an animal unit. The intent of the animal unit is to set a value for each animal species that equates the amount of manure each animal excretes in relationship to the other species. A slaughter or feeder steer or heifer is given the animal unit of 1, while a finished market hog is given the animal unit of .4 which means that a market hog generates .4 of the manure as a feeder cow.

The United States Department of Agriculture publishes an inventory of the animals growing in each state, including Iowa.¹⁴ Not all animal species are tracked, nor are the animals raised in animal feeding operations counted separately from those not raised in animal feeding operations. However, most of the pigs, chickens, turkeys, and cattle in Iowa are raised in animal feeding operations, either in an enclosed building or an open feedlot.

¹⁰ Iowa Code 459.102(4)

¹¹ Craig Cox and Andrew Hug, “Murky Waters: Farm Pollution Stalls Cleanup of Iowa Streams,” Environmental Working Group, December, 2012, page 5.

And

Marie-Pier Hebert, Vincent Fugere, and Andrew Gonzalez, “The overlooked impact of rising glyphosate use on phosphorus loading in agricultural watersheds”, *Frontiers in Ecology and the Environment*, December 5, 2018

¹² Craig Cox and Andrew Hug, “Murky Waters: Farm Pollution Stalls Cleanup of Iowa Streams,” Environmental Working Group, December, 2012, page 5.

And

Christopher S. Jones, Chad W. Drake, Claire E. Hurby, Keith E. Schilling, Calvin F. Wolter, “Livestock manure driving stream nitrate”, *Royal Swedish Academy of Sciences*, December 19, 2018

And

Chris Jones, “Iowa’s Real Population”, Blog post on March 14, 2019. See www.iihr.uiowa.edu/cjones/iowas-real-population/

¹³ Christopher S. Jones, Jacob K. Nielsen, Keith E. Shilling, and Larry J. Weber, “Iowa stream nitrate and the Gulf of Mexico”, *PLOS One*, April 12, 2018, page 2.

¹⁴ “2020 Iowa Agricultural Statistics”, compiled by USDA, National Agricultural Statistics Service, October, 2020; “Iowa Ag News – Chickens & Eggs”, compiled by USDA, National Agricultural Statistics Service, December 23, 2019; “Iowa Ag News – Cattle on Feed”, compiled by USDA, National Agricultural Statistics Service, March 19, 2021; “Iowa Ag News – Hogs & Pigs”, compiled by USDA, National Agricultural Statistics Service, March 26, 2020; “2020 State Agricultural Overview - Iowa”, compiled by USDA, National Agricultural Statistics Service

Table 1 below shows the animal units identified in the Iowa Department of Natural Resources regulations, the inventory of animals counted by the United States Department of Agriculture, and a calculation of the total animal units living in the state.

Table 1 – Total Animal Units in Iowa

Animal Species	animal unit factor	inventory of animals	total animal units = factor * inventory	source of info
Slaughter or feeder cattle	1	1,380,000	1,380,000.00	includes bulls, 2020 Iowa Agricultural Statistics, page 7, 44
Immature dairy cattle	1	0	0.00	could not determine the numbers
Mature dairy cattle	1.4	218,000	305,200.00	2019 Iowa Agricultural Statistics, page 7
Gestating sows	0.4	2,150,000	860,000.00	2020 Iowa Agricultural Statistics, page 7
Farrowing sows & litter	0.4	0	0.00	could not determine the numbers
Boars	0.4		0.00	could not determine the numbers
Gilts	0.4		0.00	could not determine the numbers
Finished (Market) hogs	0.4	17,700,000	7,080,000.00	USDA Iowa Ag News - Hogs & Pigs
Nursery pigs 15 lbs to 55 lbs	0.1	5,920,000	592,000.00	USDA Iowa Ag News - Hogs & Pigs
Sheep and lambs	0.1	151,000	15,100.00	2020 Iowa Agricultural Statistics, page 7, 63
Goats	0.1	64,000	6,400.00	2020 Iowa Agricultural Statistics, page 66
Horses	2		0.00	could not determine the numbers
Turkeys 7 lbs or more	0.018	11,700,000	210,600.00	2020 State Agriculture Overview
Turkeys less than 7 lbs	0.0085		0.00	could not determine the numbers
Broiler/Layer chickens 3 lbs or more	0.01	58,698,000	586,980.00	2020 Iowa Agricultural Statistics, page 60
Broiler/Layer chickens less than 3 lbs	0.0025	13,185,000	32,962.50	2020 Iowa Agricultural Statistics, page 60, difference between all chickens and layers
Ducks	0.04		0.00	could not determine the numbers
Fish 25 grams or more	0.001		0.00	could not determine the numbers
Fish less than 25 grams	0.00006		0.00	could not determine the numbers
totals		111,166,000	11,069,242.50	

Under the CAFO model, the animals are owned by the integrator.

The integrator contracts with the operator to raise the animals and take care of the pollution. The integrator makes the decisions, including selecting where to put the CAFO – which watershed, county, community, neighborhood; sells the animal to the slaughterhouse or owns the slaughterhouse; provides feed; and sets the rules on how the animals are to be taken care of. Integrators operating in Iowa include Iowa Select and Prestage Farms.

The operator feeds the animals, disposes of the manure and deceased animals, and provides the buildings.

Nutrient Management Strategy Fee

Given the information that is already collected on the Manure Management Plans and the Nutrient Management Plans, it would be very easy to use those animal units to assess a Nutrient Management Strategy Fee each year for the animals living in the animal feeding operation.

Table 2, below, shows how much would be needed in a Nutrient Reduction Strategy fee

Total animal units – slaughter or feeder cattle, mature dairy cattle, finished (market) hogs, gestating sows, broiler/layer chickens, turkeys 7 pounds or more	10,455,742.50
Amount of money to be collected annually for the next 15 years to reach a \$5 billion investment	\$333,333,333.33
Annual public investment on the Nutrient Reduction Strategy, using the 2019 amount	\$20,120,000
Annual amount to be collected by the Nutrient Reduction Strategy fee	\$313,213,333.33
Amount to be collected annually for each animal unit	\$29.96

- It makes sense that the owner of the animals – the integrator – pay the Nutrient Management Strategy Fee.
- It also makes sense that the owner not be allowed to pass that fee to the operator who is contracted to raise the animals and take care of the manure, all the while most of the profits go upstream to the integrator.
- Finally it makes sense that the consumer not be charged for the Nutrient Management Strategy Fee.
- In other words, the integrator should pay to internalize the costs of cleaning up the manure and its constituent nutrients that are entering Iowa’s waterbodies.
- The fee is simple and easy to calculate.
- It is a simple and easy way to assess the fees and to collect those fees.
- The fees collected would be used to implement the Nutrient Reduction Strategy and could fully fund the Strategy in a reasonable period of time.
- The fee follows the “polluter pays” concept.
- It would supplement the money that is already being spent to reduce nutrients.

Other Policies Needed

It is obvious that Iowans will need to work diligently to reduce the overall contribution of nutrients into the waters flowing to the Gulf of Mexico. The collection of the Nutrient Management Strategy Fee is not the only set of policy that is needed to reduce nutrients in Iowa’s waterbodies. These policies include:

- Numerical standards for nutrients for Iowa’s rivers, streams, and lakes should be established, including a reasonable date for each water body to meet the standards. Other states around us have already begun establishing numerical standards for nutrients, including Wisconsin, Minnesota, Illinois, Missouri, and Nebraska.¹⁵ Numerical standards provide a target to meet. If you don’t have a measurable target, you don’t know if you are hitting the target or if you need to continue working on improvements. Regular monitoring tells if the targets are being met.
- Each of the major watersheds and lakes should be regularly monitored for nutrients throughout the year. Iowa needs to expand the network of water quality monitoring sensors. Currently 88 percent of the land in Iowa drains into a location with water quality sensors¹⁶; this needs to reach 100 percent.

¹⁵ See “State Progress Toward Developing Numeric Nutrient Water Quality Criteria for Nitrogen and Phosphorus”, www.epa.gov/nutrient-policy-data/state-progress-toward-developing-numeric-nutrient-water-quality-criteria

¹⁶ “Summary of Progress of the Iowa Nutrient Reduction Strategy, 2017-18 Reporting Period”, Iowa Department of Agriculture and Land Stewardship, Iowa Department of Natural Resources, and Iowa State University College of Agriculture and Life Sciences

- Regular updates of the LIDAR maps showing nutrient-reducing techniques should be produced, along with evaluations of the changes on the landscape versus how successful the techniques are in reducing the nutrient contribution by the state.
- It is time to require mandatory nutrient reduction strategies to be implemented on farms, along with the financial assistance to pay for the work and to compensate the landowner for the idling of farm land. Projects should be monitored to insure that the investment in the strategies is actually working. The practices that should be banned include:¹⁷
 - Banning planting crops in the 2-year floodplain. That would affect about 400,000 acres of farmland.
 - Banning fall tillage.
 - Banning the application of manure on snow and frozen ground. Current Iowa laws allow manure to be applied beginning on March 1, a time when the ground can still be covered with snow. Further, the Department of Natural Resources allows exceptions which allow winter application of manure; those exceptions need to end.
 - Requiring farmers to adhere to the Iowa State University fertilization guidelines.
- Many of Iowa's waterbodies have a water quality improvement plan, called a Total Maximum Daily Load (TMDL). Part of the process of implementing the Nutrient Reduction Strategy should be to implement the TMDLs, following the plans that the Department of Natural Resources has already prepared.
- Experts need to be available to assist landowners in determining what nutrient reduction strategies are best for a particular farm. Taxpayers expect that their taxes will be wisely spent on projects to reduce nutrients. Farmers need to be able to identify practices that effectively reduce those nutrients.
- The Department of Natural Resources needs to monitor the application of manure onto farm fields and must take enforcement action if the operator is over-applying manure to the fields.
- The funding for the Leopold Center for Sustainable Agriculture at Iowa State University needs to be restored. This department was responsible for ground-breaking research on nutrient reduction and ensuring that farmers can continue farming profitably. Unfortunately the legislature removed the funding for the Leopold Center.
- Once the Nutrient Reduction Strategy is implemented and Iowa has reduced its nutrient contribution to the Gulf of Mexico, we cannot let down our guard and go back to our old ways. Stream monitors should be maintained. When waterbodies start edging to higher levels of nutrient pollution, efforts should be made to reduce the nutrient load.
- It is time to implement a moratorium on building new and expanding existing animal feeding operations in the state of Iowa.



Manure tank and injectors, photo by Mike Carberry

Implementing the Nutrient Reduction Management Fee and the additional policies will result in Iowa meeting its goal to reduce nutrients by 45% in the next 15 years.

¹⁷ Dr. Chris Jones "The State of Iowa's Water", February, 2021, www.youtube.com/watch?v=DibLwrVebuA
 Dr. Chris Jones works at the University of Iowa in the IIHR—Hydroscience & Engineering department. His research involves studying water quality.