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Iowa Farmers Help Restore the Gulf of Mexico

Since the 1970s, when it was first discovered, there has been a disturbing and growing area of the Gulf of Mexico known as a hypoxic zone. A more abrupt, disturbing and perhaps accurate term is 'Dead Zone.' A hypoxic area is created when the concentration of oxygen in the water falls so low that it can no longer support aquatic life. In August, 2017 the dead zone in the Gulf was declared the largest in the world.

What's causing the oxygen levels to fall? Massive amounts of nitrogen are spread as fertilizer on farm fields across the entire center of the country. Runoff from those fields finds its way into the streams and rivers that feed into the Mississippi and eventually drain into the Gulf of Mexico. It's a problem that can only be tackled at the source.

In an effort to reduce this runoff, the Conservation Reserve Enhancement Program (CREP) is a joint federal and state program that targets high-priority conservation concerns. In Northern Iowa, it provides financial incentives to private landowners to develop and restore wetlands that intercept drainage from agricultural watersheds.

Over many decades, the standard agricultural practice was to drain fields straight to the nearest stream using buried tiles. This improved drainage, made fields more manageable, and increased available land by eliminating marshes, sloughs and other wetlands. The discovery of hypoxic zones revealed the shortcomings of that approach.

A wetland is typically an area of relatively shallow, mostly standing water. It's characterized by the presence of many forms of aquatic plants, all of which thrive on nitrogen. By restoring and replacing the vanished wetlands, and directing the farm runoff through them, the CREP program inserts a pause between the runoff and the river. This lets the wetland plants feed on the nitrogen, removing it from the runoff, while controlling large influxes of floodwater from storms and reducing erosion from fast-moving waterways. Healthy wetlands also provide shelter and food for countless waterfowl and other wildlife and recreation opportunities for hunters and naturalists.

WHKS engineers have been asked to participate in a number of CREP projects. The process of creating or restoring a wetland begins by identifying an eligible site, which is normally located at the bottom of a watershed. Since, under the program, the land remains in the ownership of the farmer, they have a great deal of say in setting out the objectives for the project.

Most often a CREP project will involve the construction of a low dam in order to flood a large area to a depth of less than three feet. Engineering design includes a study of the hydraulics, a geotechnical analysis of the underlying soil and the design of the dam structure, often constructed from sheet pile weirs. Since, over decades, much of the drainage has been put into buried tiles, these drain lines have to be located and then diverted to discharge into the new wetland area.

Government programs often get a bad rap, but the CREP is an example of a win-win for everyone. In exchange for removing environmentally sensitive land from production and establishing permanent resource conserving plant species, farmers are paid an annual rental rate along with other federal and state incentives. The projects have proven very popular as the landowners keep their land and receive revenue. Hunters and naturalists have a new play area and wildlife can thrive.

And what about the Dead Zone? Monitoring by researchers at Iowa State University has confirmed that CREP wetlands remove 40-90% of the nitrate and 90+% of the herbicide in tile drainage water from upper-lying croplands. Definitely heading in the right direction.