



Ten Ways to Reduce Nitrate Loss from Drained Lands

A Comprehensive Multimedia Outreach Package

Background

Modern crop production in many parts of the North Central Region would not be possible without artificial subsurface drainage. However, drainage is associated with an increase in nitrate loads to streams, rivers, and the Gulf of Mexico, where it contributes to the low oxygen or hypoxic zone.

Across the Mississippi River Basin, 45% reductions in nitrogen and phosphorus loads are necessary to meet national goals established to reduce the size of the Gulf of Mexico hypoxic zone. The economic and environmental impacts of this ‘dead’ zone is one of the United States’ largest national water quality concerns, making reducing nitrate loads from drained land of great interest to a large number of stakeholders. The loss of nitrogen for crop production also results in significant economic loss for farmers.

Keeping excess nitrogen on the land and out of the water will take a multi-faceted approach. A team of Extension professionals and industry scientists came together to ensure educators, Extension professionals, agriculture leaders, and farmers 1) understand the relationship between nitrate runoff and the Gulf of Mexico hypoxic zone and 2) have researched-based information on the different ways to address this issue.

Goals

The goal of the *Ten Ways* project was to develop a free, open, up-to-date, multi-state outreach product with

clear, informative education materials on the critical issues associated with agriculture drainage. The *Ten Ways* team is dedicated to providing education on nitrate loss in the region that works for the different land and water management situations faced by users.

Addressing the Challenge

The “ten” in the *Ten Ways* educational materials addresses the many ways nitrate can be reduced across the region in varying conditions.

The *Ten Ways* team drew from a diverse collection of science-based, empirical research and relied on the expertise of collaborators and researchers across the region who focus on climate science, agronomy, agricultural engineering, and other disciplines to create comprehensive education materials that are useful for a variety of different situations and needs.

By collaborating and bringing together multiple disciplines, the *Ten Ways* team was able to develop a set of practices that pertain to the diversity of different cropping systems across the region.

Program Outcomes and Impacts

To reach a broad range of audiences, the *Ten Ways* team created a number of products and online materials, which together make-up the *Ten Ways* Outreach Kit. The kit is available for download and use through the North Central Region Water Network website, the

Ten Ways to Reduce Nitrate Loss from Drained Lands

A Comprehensive Multimedia Outreach Package

Illinois Drainage Research and Outreach Program (I-DROP) website, and other *Ten Way* team partner sites.

The components of the *Ten Ways* Outreach Kit include:

- The 48-page booklet, “*Ten Ways* to Reduce Nitrate Loads from Drained Cropland in the Midwest”, is a thorough examination of nitrate loss and solutions based on a plethora of empirical, scientific-based research from a variety of disciplines. Since it debuted in 2016, the booklet has been accessed over 1,900 times on the I-DROP website and over 4,000 copies of the booklet have been distributed across the region.
- The *Ten Ways* PowerPoint deck helps educators explain nitrate loss and the different strategies to reduce nitrate in presentation settings. To date, 32 educators have accessed the deck and 100% reported the slides were of ‘good’ or excellent’ quality.
- The *Ten Ways* Summary Factsheet is a 4-page overview of the ten strategies that reduce nitrate that is easy to carry to site-visits and distribute at field days. Over 20,000 copies of the Summary Factsheet have been distributed and utilized across the Midwest.
- The *Ten Ways* Walk-through Guide is a self-paced overview of the different strategies to reduce nitrate designed to be used on a tablet or phone with producers and advisors on-site. The guide was released in early 2018 in tandem with project completion.

RESOURCES

The *Ten Ways* booklet, PowerPoint deck, summary factsheet, and walk-through guide can be accessed via the Illinois Drainage Research and Outreach Program (I-DROP) website (<http://draindrop.cropsci.illinois.edu/>) or via the NCRWN website (<http://northcentralwater.org/ten-ways/>).

CONTACT

Laura Christianson
Professor of Crop Sciences
University of Illinois
(217) 244-6173
LEChris@illinois.edu

The North Central Region Water Network comprises 12 Land-grant colleges and universities:

