COVER CROPS & NITRATE LOSS

Laboratory of Jennifer L. Tank, Dept. of Biological Sciences, University of Notre Dame

www.indianawatershedinitiative.com

the CHALLENGE: reducing nitrate loss from agricultural land and improving water quality

Agricultural streams and ditches export excess nitrogen (N), phosphorus (P), and sediments to sensitive downstream ecosystems. This contaminates drinking water, fuels algal blooms with "dead zones" and harms fish and mussels.

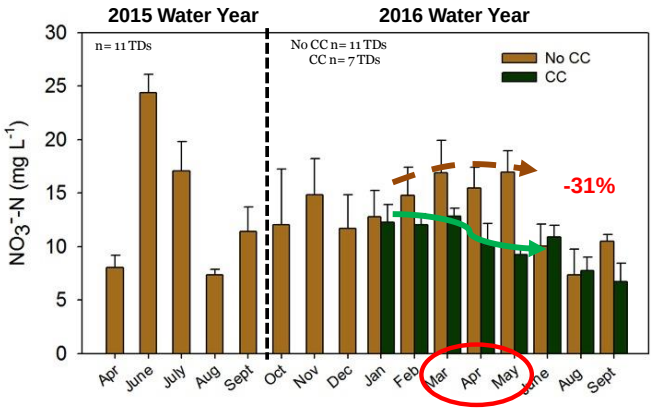
Fertilizer nutrients enter streams/ditches via tile drains, especially in Winter and Spring when fields are bare.

our STRATEGY

GOAL: Retain nutrients/soils on fields and reduce stream export.

Cover crops are planted after cash crop harvest and their growth coincides with critical times for nutrient export from tiles to streams/ditches. We are measuring their impact in two watersheds: Shatto Ditch and Kirkpatrick Ditch.

Kirkpatrick Ditch RESULTS so far

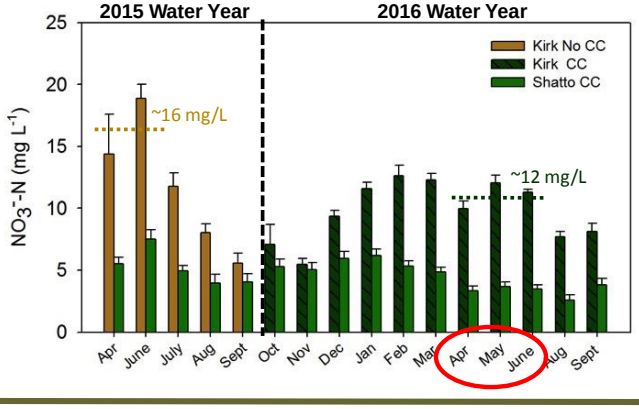


Cover crops reduce tile drain nitrate concentrations during Spring

- Before cover crops (2015), tile nitrate was higher in early summer; lower in fall/winter.
- After cover crop planting (2016), tile drain nitrate was lower especially during Spring, representing 31% reduction in nitrate concentrations.
- Reductions in tile drain N loss reflect farmer practices; indicating "success" of cover crops.

Stream nitrate varies seasonally in Kirkpatrick Ditch

- Stream water nitrate concentrations in the Kirkpatrick Ditch before and after planting ~23% of the watershed with cover crops. By comparison, Shatto Ditch Watershed has had ~67% cover crops since Oct 2013.
- Both streams show seasonal trends, but concentrations are generally higher in Kirkpatrick Ditch.
- Similar to tile drains, stream water nitrate concentrations in Spring 2016, after cover crops, were lower, compared to Spring 2015, before cover crops.



CONCLUSIONS: Cover crops provide a farmer-initiated solution to fertilizer management. We expect to see continuing nitrate loss reduction in Kirkpatrick Ditch Watershed as cover crop coverage increases.

UNIVERSITY OF NOTRE DAME
USDA
INDIANA UNIVERSITY
WALTON FAMILY FOUNDATION
INDIANA SOYBEAN ALLIANCE
INDIANA CORN Marketing Council
USGS science for a changing world
The Nature Conservancy nature.org

Contact: Elizabeth Willows, Indiana Watershed Initiative Project Coordinator (ewillows@nd.edu) **Version: June 2017**