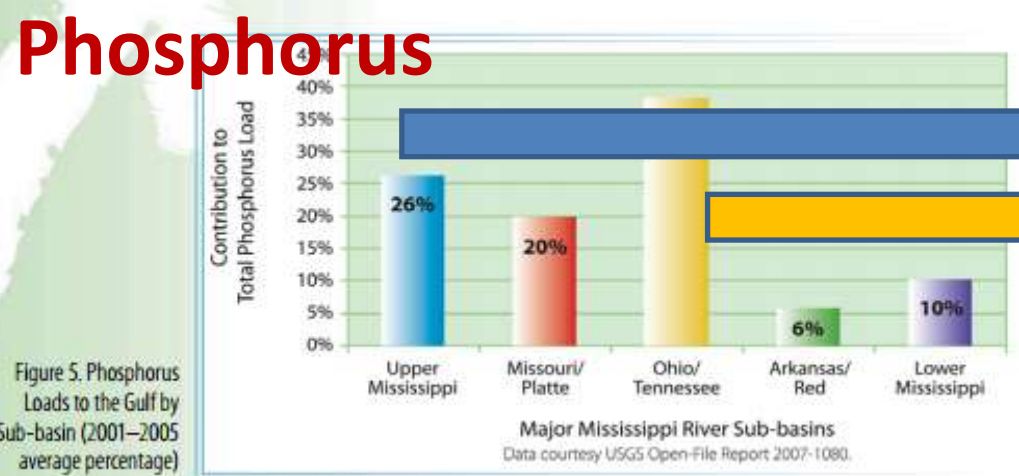
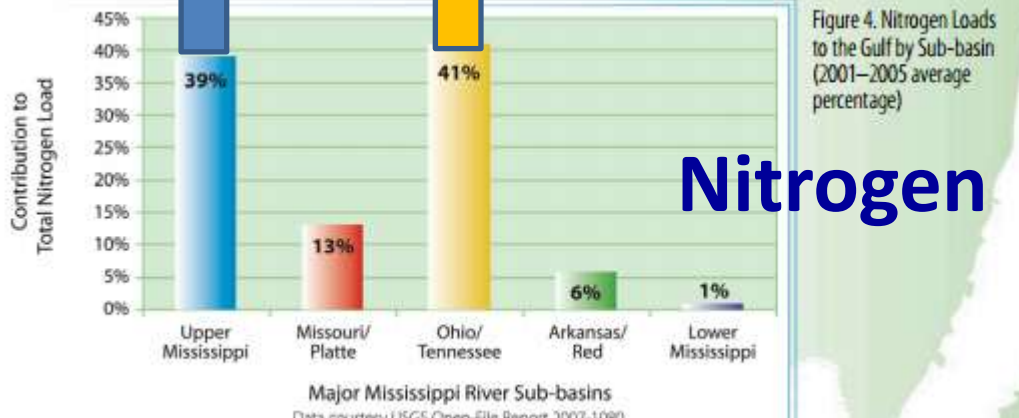
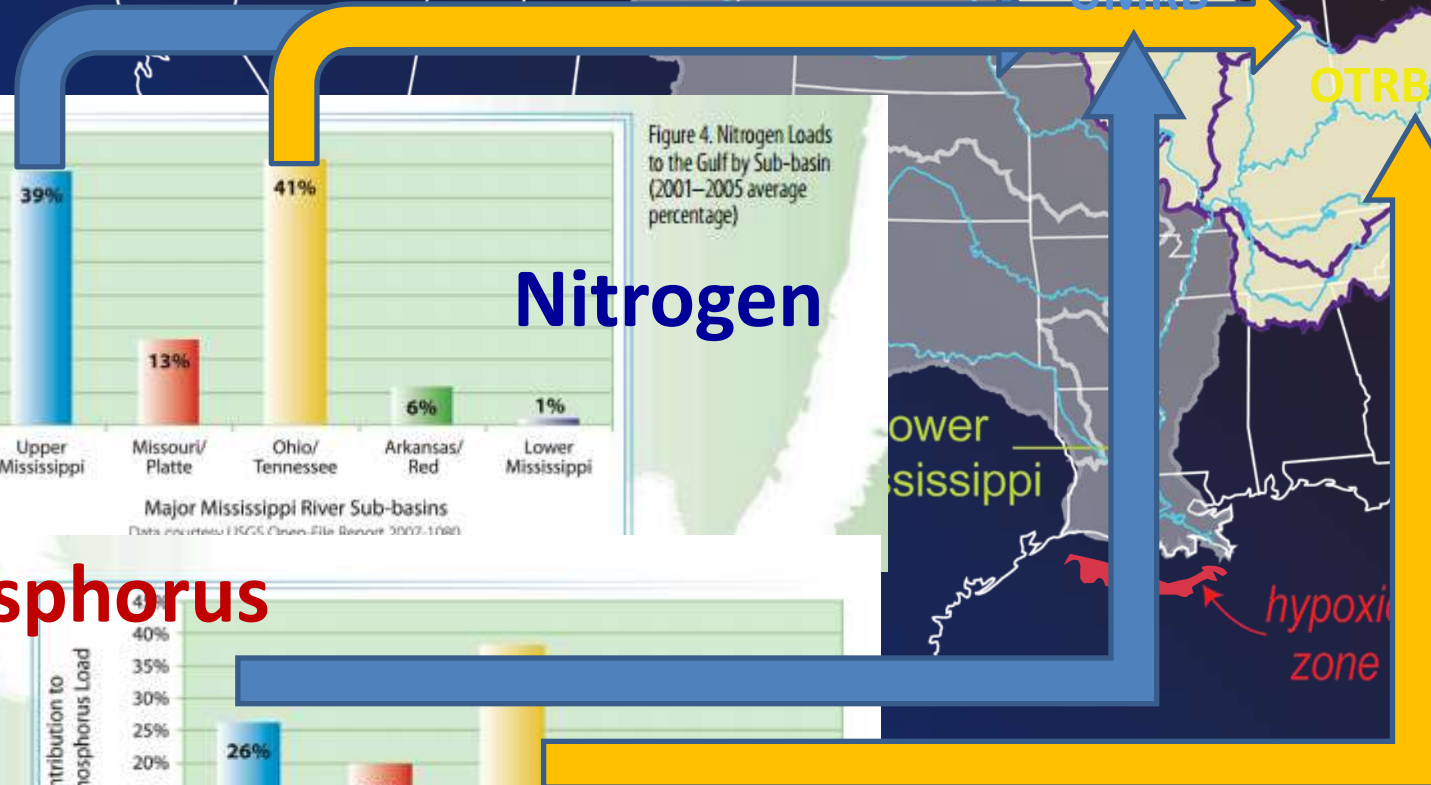


N and P sources to the hypoxic zone



Source: http://water.epa.gov/type/watersheds/named/msbasin/upload/2008_8_28_msbasin_ghap2008_update082608.pdf

U.S. Water Quality: Lakes

- Lakes, Reservoirs, Ponds:
 - 42% assessed, 65% inadequate water quality to support uses.
 - Over 11 million acres are “impaired.”
 - Agriculture third highest source of impairment.



**A cyanobacteria bloom in a
Midwestern lake**

Water Quality: Rivers and Streams



Photos courtesy Iowa DNR

- Rivers and streams:
 - 26% assessed, 50% inadequate water quality to support designated uses.
 - Nearly ½ million stream miles are “impaired.”
 - **Agriculture** is the leading source of impairment (identified as cause of 22%; unknown sources are second highest cause)

Source: EPA National Summary of Assessed Waters Report. Available at:
http://ofmpub.epa.gov/waters10/attains_nation_cy.control#causes

Des Moines water quality suit slated for trial in 2016

[Donnelle Eller, deller@dmreg.com](#)

11:56 a.m. CDT July 15, 2015



(Photo: Michael Zamora/The Register)

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The Des Moines Water Works lawsuit against three northwest Iowa counties over water quality is scheduled to be heard by a federal trial judge, beginning Aug. 8, 2016, unless a continuance is sought, a court document indicates.

U.S. District Court Judge Mark Bennett expects the bench trial in Sioux City to last up to two weeks.

The Des Moines utility is suing Buena Vista, Calhoun and Sac counties, claiming drainage districts there act as conduits for nitrates to move from farm fields into the Raccoon River, one of two sources of drinking water for 500,000 residents in the Des Moines metro area.

The utility seeks federal oversight of the drainage districts, and indirectly farmers, under the Clean Water Act. Attorneys for the counties have denied the field tiles are

MORE STORIES



Political ad onslaught has only just begun

Oct. 12, 2015, 6:52 a.m.



2016 Candidate Match Game: Who should you vote for?

Oct. 12, 2015, 11:32 a.m.



Largely white police forces fuel minority distrust



109



26



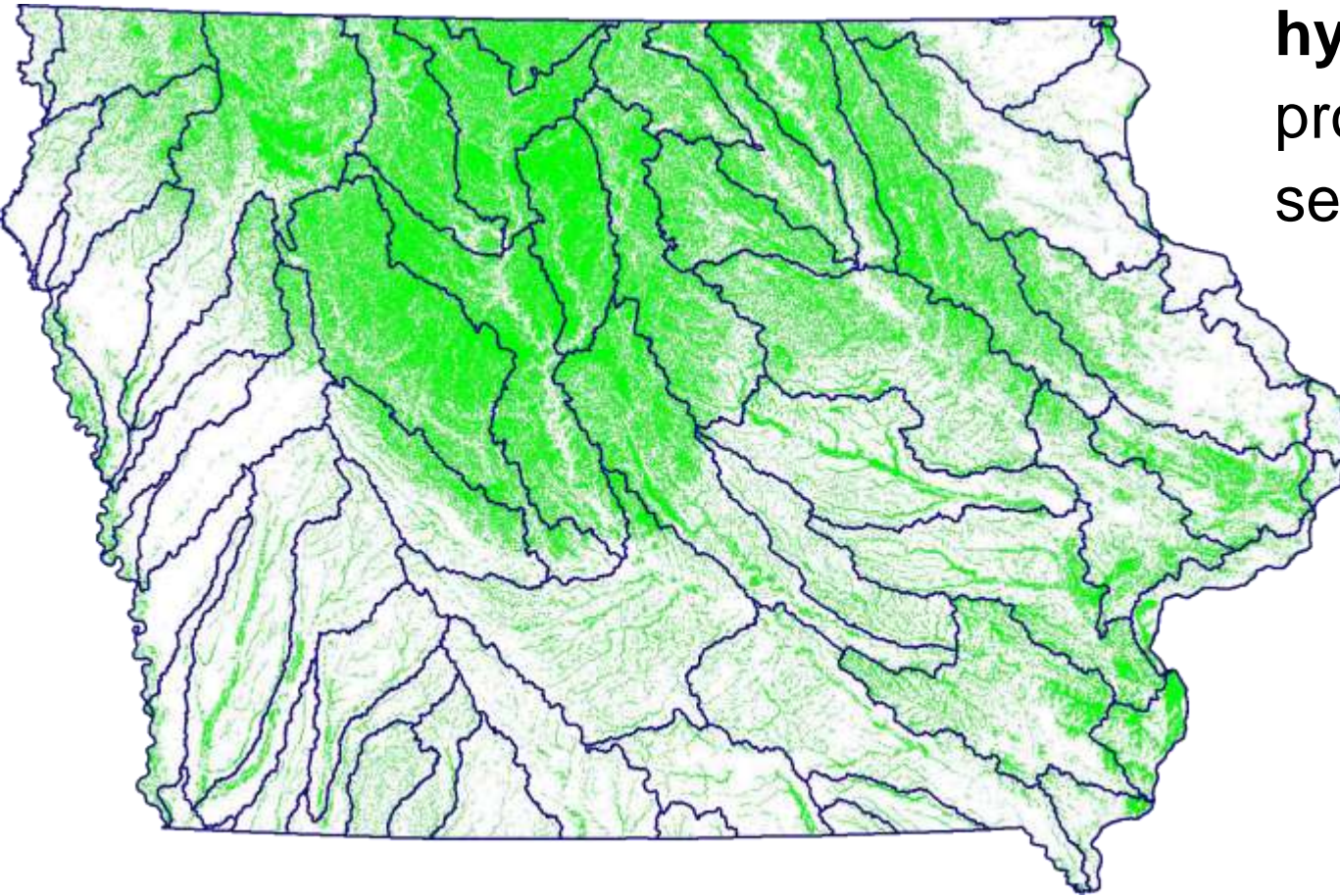
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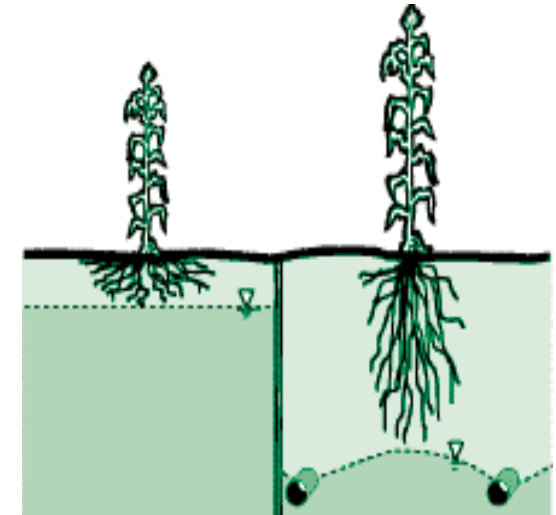
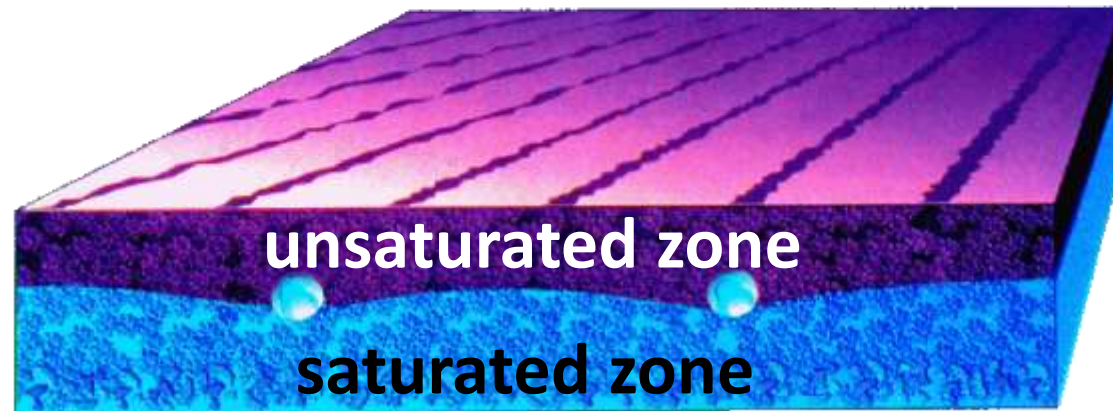
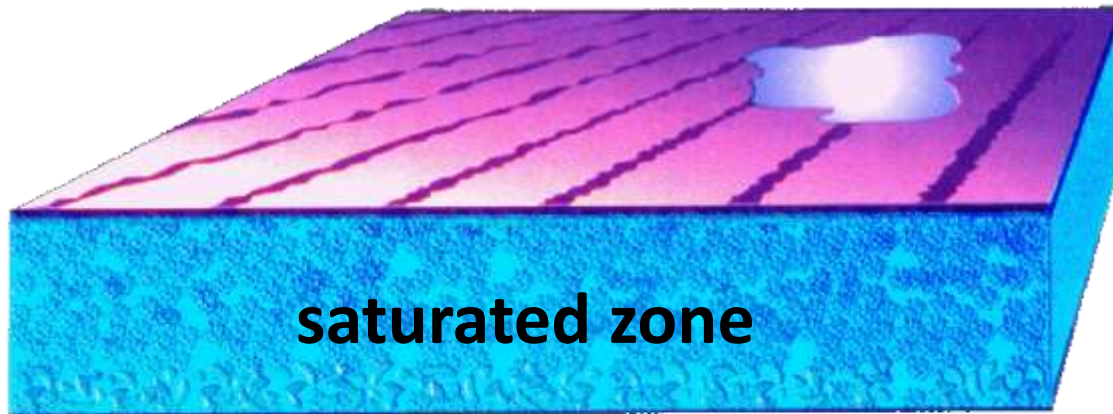
Locations of hydric soils in Iowa



hydric soils are prone to annual or seasonal saturation

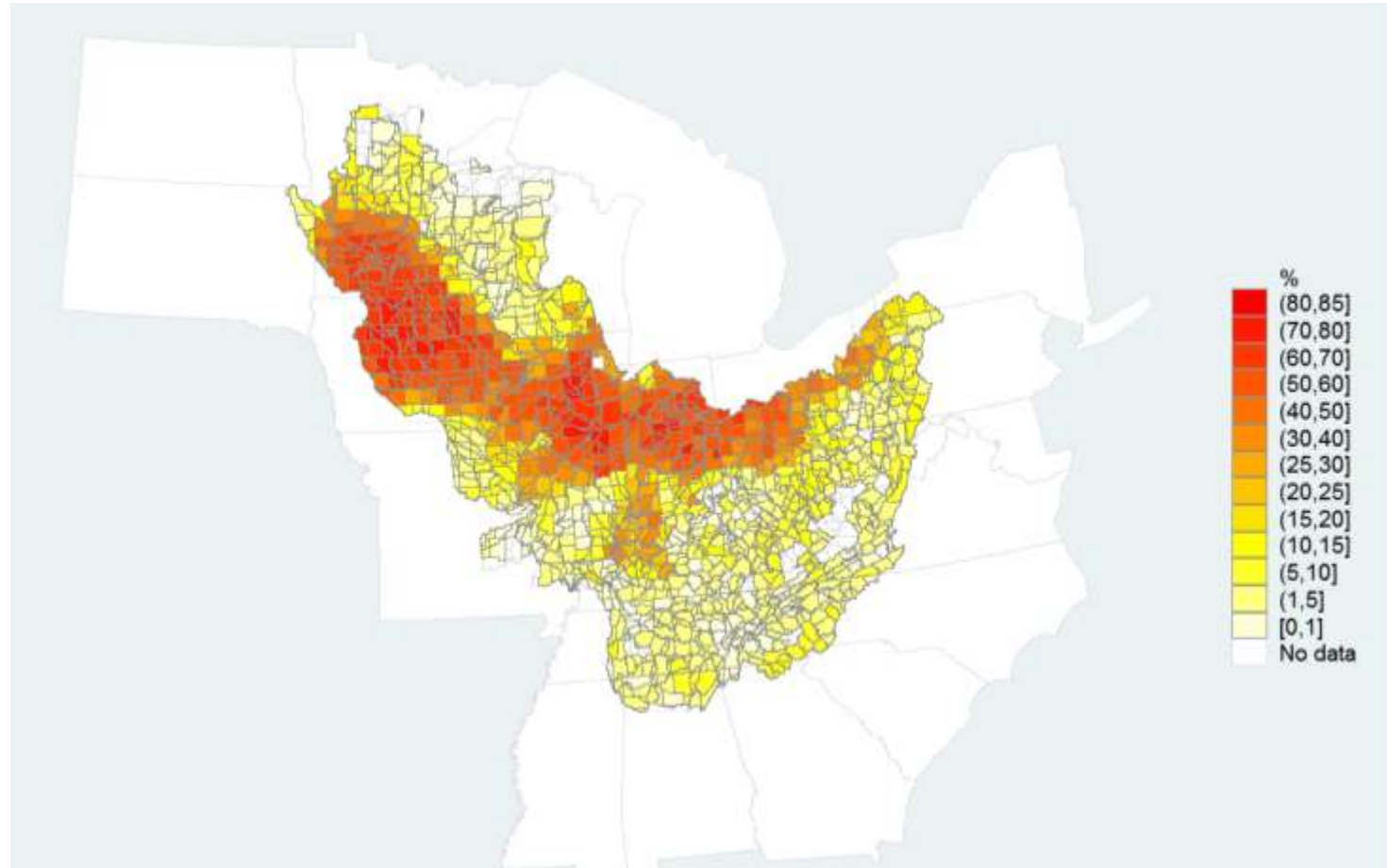
Data generated by C. Wolter, Geological Survey, Iowa Dept. of Natural Resources, Iowa City, Iowa;
Software developed by D. James, USDA Natl Laboratory for Agriculture and the Environment, Ames, Iowa

Tile drainage allows crops to be grown on soils prone to saturation

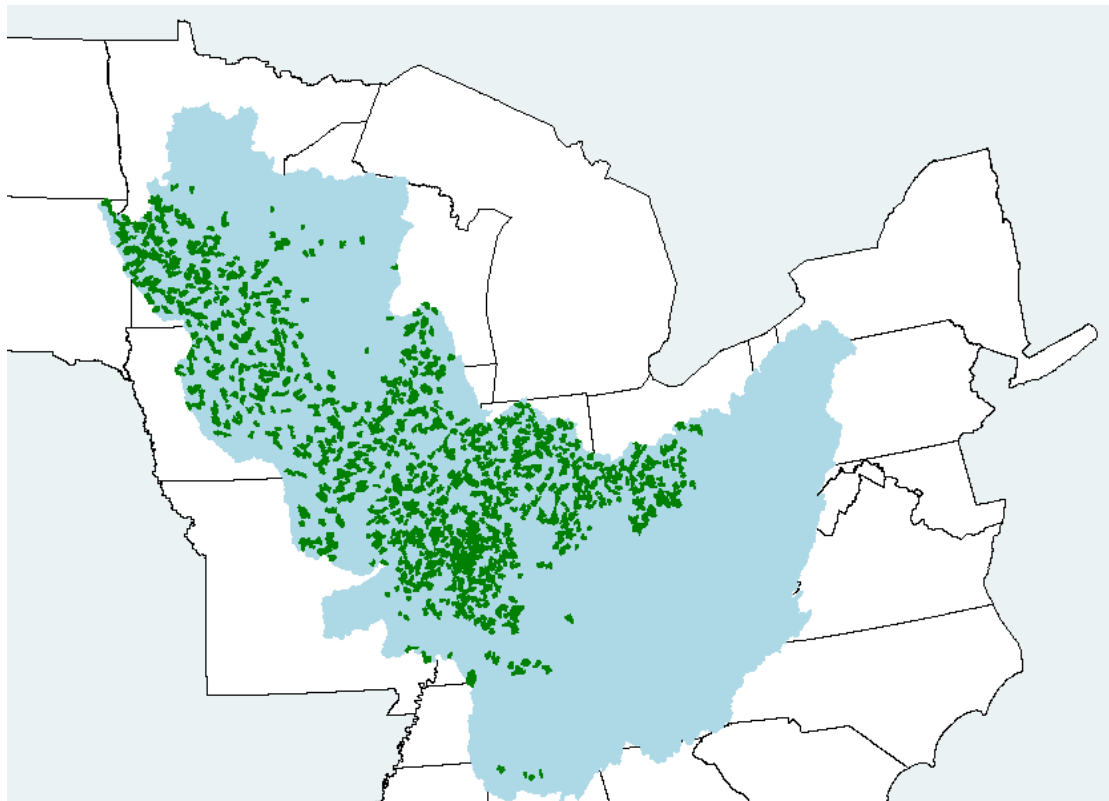


P. Gassman, Iowa State Univ. Adapted from: Zucker, L.A. and L.C. Brown (eds.). 1998. Agricultural Drainage: Water Quality Impacts and Subsurface Drainage Studies in the Midwest. Extension Bulletin 871, The Ohio State University.

Percentage of cropland with tile drainage



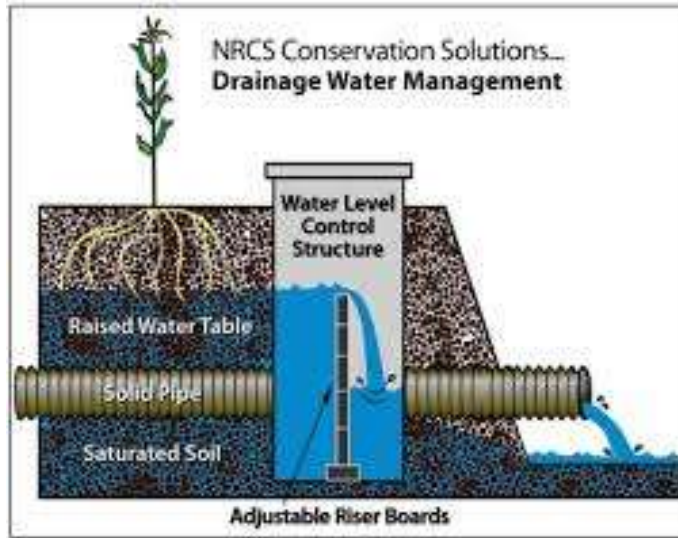
Farmer plans for additional tile drainage



A. Valcu, based on survey data from J.G. Arbuckle, Jr.

Nitrate reduction methods

Controlled drainage

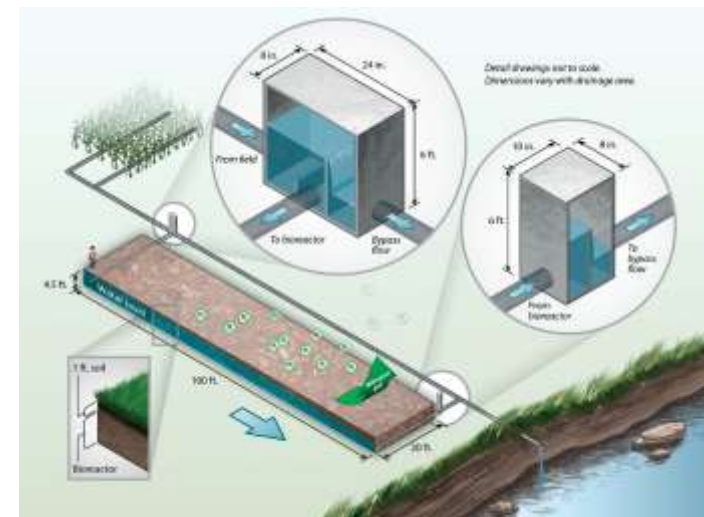


Constructed wetlands

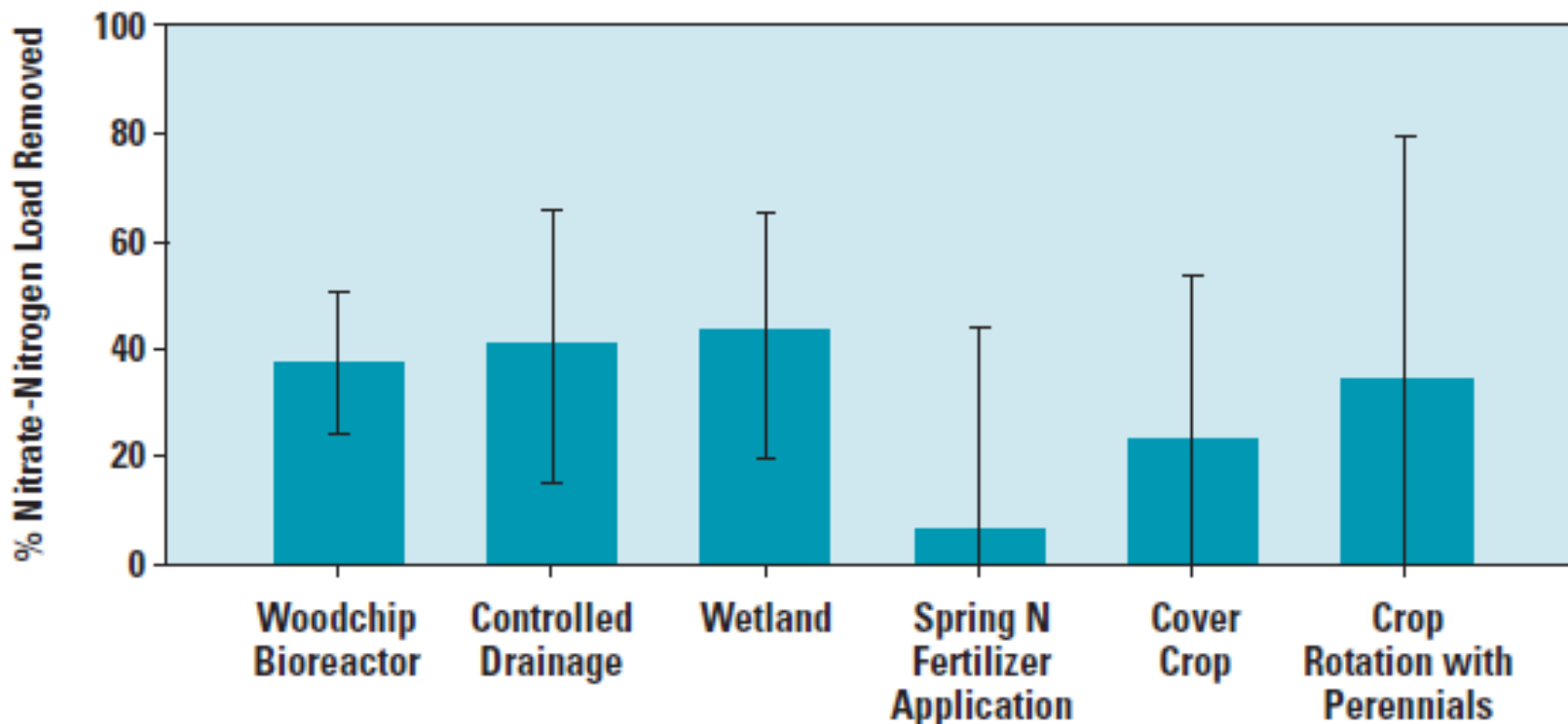


Woodchip bioreactors

Cover crops



Effectiveness of nitrate removal practices



Source: Christianson, L. and M. Helmers. 2011. Woodchip bioreactors for Nitrate in Agricultural Drainage. PMR 1008. Iowa State Univ. Extension & Outreach. Available at: <http://www.sare.org/Learning-Center/Project-Products/North-Central-SARE-Project-Products/Woodchip-Bioreactors-for-Nitrate-in-Agricultural-Drainage>