From:	graincom@hickorytech.net
To:	Gunderson, Larry (MDA)
Subject:	Fwd: Bold new approaches needed to shrink Gulf of Mexico dead zone and meet elusive goals -- ScienceDaily
Date:	Thursday, August 24, 2017 10:09:18 AM
Attachments:	Hypoxic Area.pdf Scavia et al. PNAS Hypoxia.pdf

I would like to include this letter and reports as a reply to comments on the proposed nitrogen rule thanks

Sent from my iPhone

Begin forwarded message:

From: Satish Gupta <gupta002@umn.edu>
Date: August 2, 2017 at 10:04:32 AM CDT
To: David A Craigmile <dacmile@farmerstel.net>
Cc: Chuck Wingert <charles@wingertrealty.com>, Dan Roberts <rober710@umn.edu>, Duane Kroll <krollfarms.mn@gmail.com>, Gary Joachim <soygary@charter.net>, Greg Bartz <gbartz@sleepyeyetel.net>, Greg Mikkelson <graincom@hickorytech.net>, Ron Jacobson <rcj56@hotmail.com>, Steve Commerford <comagro@comcast.net>, Stu Frazeur <stufrazeurtiling@gmail.com>, Tim Dritz <dritzfarm@gmail.com>, Willis Anthony <anthony@mvtvwireless.com>, Adam S Birr <abirr@mncorn.org>, David Kee <david@mnsoybean.com>, Drew Kessler <dkessler@houstoneng.com>, George Rehm <rehmx001@umn.edu>, Jeremy Geske <jeremy@mawrc.org>, Joe Smentek <Joe@mnsoybean.com>, Mike Youngerberg <mike@mnsoybean.com>, Paul Meints <pmeints@mncorn.org>, "Steve & Sue Sodeman" <ssodeman@mvtvwireless.com>, Warren Formo <warren@mawrc.org>
Subject: Re: Bold new approaches needed to shrink Gulf of Mexico dead zone and meet elusive goals -- ScienceDaily

Hi Dave,

Many thanks for sharing the Science article. I saw that recently but I have not had chance to read it yet. Also, thanks for the link to PNAS article. I have attached a copy of PNAS article in case you do not have access to this article.

Kari Wolf and Nathaniel Baeumler, my two students have been looking at Iowa and Minnesota River N data and we are coming to the conclusion that N loads are primarily driven by climate i.e. higher rainfall, higher streamflow, higher baseflow and thus higher N loads. Flow weighted concentrations are in the narrow range and will be difficult to manipulate (lower) using management practices.

As long as water percolates through soil, it will carry soluble salts including nitrate. If water percolation is stopped or reduced, it will lead to more sediment and phosphorus losses in overland flow to rivers. This is mainly the consequence of changing climate - more precipitation in recent years. We are also finding that in dry years, we have small N loss but if there is higher rainfall in subsequent years, stored N is also finding its way to the rivers. This is very similar to what Gyles had found in his drainage plots.

The distribution of hypoxic area in the Gulf of Mexico (Figure attached) shows the same pattern. Dry years, there is less hypoxic area and vice versa. Examples of dry years are 1988, 1989, 2000, 2012. When precipitation is higher like in 1993, there is substantial increase in the hypoxic zone. If a dry year is followed by a regular or a higher precipitation year like in 2001 and 2002, there are even higher losses due to stored N. In this changing climate (higher precipitation), it is a challenging problem to solve.

It will be interesting to see what these two articles conclude in terms of climate vs. management practices.

Satish

On Wed, Aug 2, 2017 at 9:15 AM, David A Craigmile <dacmile@farmerstel.net> wrote:

> https://www.sciencedaily.com/releases/2017/07/170731164432.htm
>
> Recent info on the N issue from Science Daily and AAAS.....

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