

## NREC January 2017 One-Year Report

### **Dissolving uncertainty: A comprehensive evaluation of dissolved P in tile drainage**

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#### 1. List of objectives

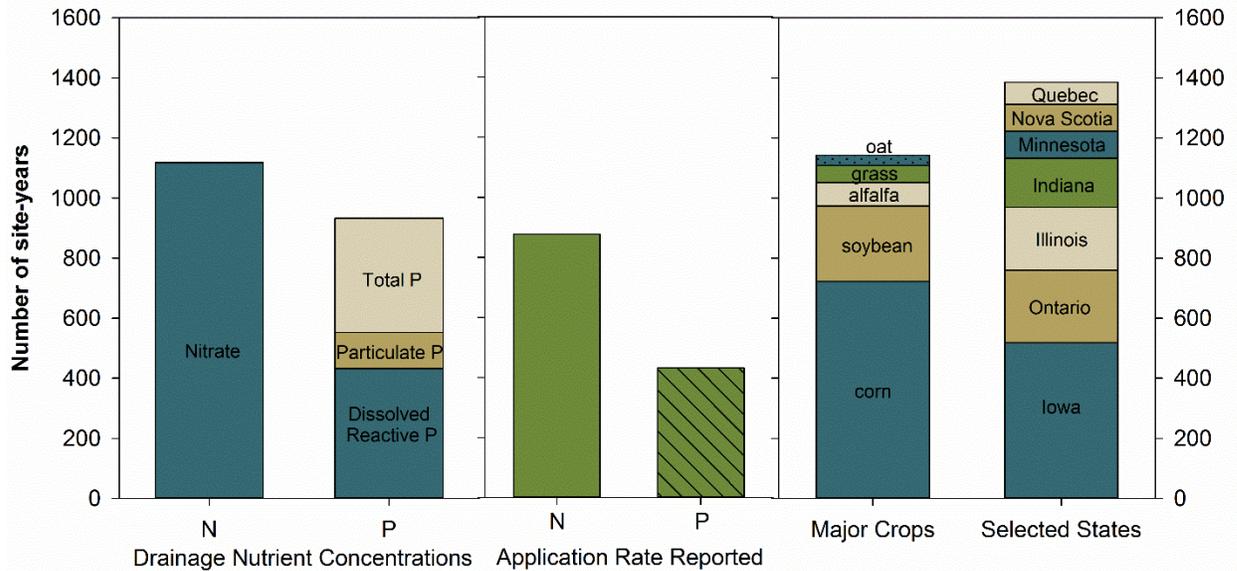
The specific assessable objectives are to:

1. Further develop the Measured Annual Nutrients for Agricultural Environments (MANAGE) database through addition of drainage nutrient concentration data, specifically dissolved reactive P but also including other forms of P and N.
2. Statistically analyze the newly assembled nutrient concentration database to determine the effect of controllable factors and uncontrollable factors (e.g., precipitation, soil drainage class) upon P concentrations in drainage water
3. Per the RFP, the final objective is *“to include a final report at the conclusion of this project to address each of the objectives stated above.”*

#### 2. Length of project - number of years completed: 1.0 years

#### 3. Accomplishments

- a. More than 400 total publications were reviewed and 80 were found to be suitable for the new MANAGE Drain Concentration database.
- b. A total of 1,575 site-years have been entered into the new MANAGE Drain Concentration database. Included are over 1,000 and over 400 site-years of nitrate and dissolved reactive phosphorus concentrations, respectively (Fig. 1).
  - i. Substantial site, cropping, and agronomic management data have also been collected in the database (Fig. 1)
- c. Mr. Allan Hertzberger, the graduate student project lead, presented early results at:
  - i. ASABE’s 10<sup>th</sup> Int’l Drainage Symposium in Minneapolis, MN in Sept. 2016
  - ii. The Illinois Water Conference in Urbana, IL in October 2016
  - iii. The annual ASA-CSSA-SSSA meeting in Phoenix, AZ in Nov. 2016
- d. The project webpage is being maintained at:  
<http://draindrop.cropsci.illinois.edu/index.php/i-drop-research/dissolving-uncertainty-a-comprehensive-evaluation-of-dissolved-p-in-tile-drainage/>



**Figure 1. Summary counts of nutrient concentration type, fertilizer application rate, major crop, and location of site-years in the MANAGE Drain Concentration database.**

4. For first year projects, provide evidence of progress.

This project is very much on track for successful completion. Now that the database is completed, the next major task is data analysis (Table 1).

**Table 1. Up-to-date timeline for “Dissolving uncertainty...” project**

	2016				2017				2018			
	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F
Recruit graduate student	✓	✓										
<b>Objective #1: MANAGE Drain Concentration table</b>												
Task #1: Review literature			✓	✓	✓							
Task #2: MANAGE data entry				✓	✓							
<b>Objective #2: Drainage concentration data analysis (Task #3)</b>												
<b>Task #4: Writing and communicating findings</b>												
Creation/updating of project webpage			✓	✓	✓							
Graduate student matriculation (MS thesis complete)												
Submission of manuscript for peer-review												
Present results at field event in Illinois												
Present results at scientific conference												
Funders reports ( <b>Objective #3</b> )			✓	✓	✓							
<b>Educational/Administrative activities</b>												
<b>Research activities</b>												
<b>Communication/Outreach activities</b>												

How will the research benefit the environment and/or crop production, etc.? Eventually, we anticipate findings based on data aggregated in the MANAGE Drain Concentration table will be able to better inform practitioners and scientists about (1) the extent of dissolved reactive P in drainage, (2) controllable and uncontrollable factors impacting its presence, and (3) yield consequences of practices impacting its presence.

New questions created by this work: It is early to identify follow-up questions based on this project, but we're excited to have the database built so we can begin the analysis.

**Table 2. Budget analysis showing expenditures aligned with budget categories.**

	<b>Budgeted</b>	<b>Spent through 12/2016</b>
A. Personnel		
1 UIUC MS Graduate Student	\$11,308	\$10,760
2 PI Dr. L. Christianson	\$4,556	\$3,827
B. Fringe Benefits	\$2,740	\$2,210
C. Travel	\$0	\$0
D. Equipment	\$0	\$0
E. Supplies		
1 Printing (lit. review articles; handouts)	\$100	\$0
2 End Note (one time license x two users)	\$200	\$78
3 Data Thief® (one time license x two users)	\$100	\$50
4 Sigma Plot (annual license x two users)	\$400	\$178
F. Contractual Services	\$0	\$0
G. Other	\$0	\$0
H. Indirect Charges	\$2,156	\$1,900
	<b>TOTAL COST (Year 1)</b>	<b>\$21,559</b>
	<b>BALANCE REMAINING FOR FALL 2016</b>	<b>\$2,558</b>