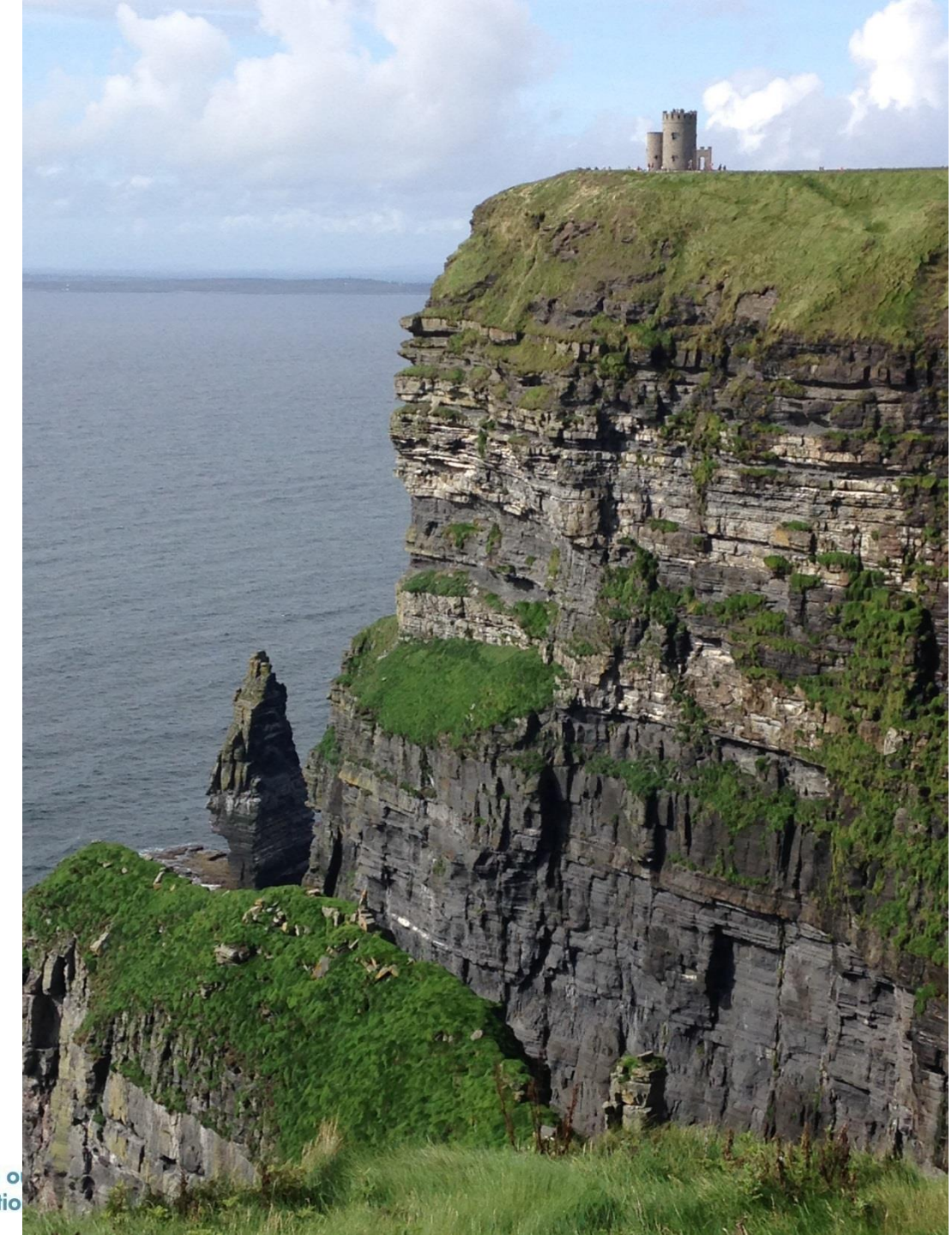
Illinois Nutrient Loss Reduction Strategy

Nutrient Monitoring Council

6th Meeting, September 13, 2016, Springfield, IL

Leprechaun
crossing
VOLVO
161-D-38573

GUINNESS



48
THE TEMPLE BAR
48
THE TEMPLE BAR
LADY MARTHA TEMPLE
THIS IS OUR WHISKEY. ENJOY IT.
"Straker Squire truck at St. James's Gate Brewery" - 1912 -
GUINNESS MADE OF MORE
"Guinness town messenger's cart with driver in uniform" - 1910's -
GUINNESS MADE OF MORE
POWERS P WHISKEY

Nutrient Monitoring Council Members (9/13/16)

Illinois EPA
Gregg Good, Rick Cobb

Illinois State Water Survey
Laura Keefer

Aqua Illinois
Kevin Culver

Illinois Natural History Survey
Andrew Casper

Illinois Dept. of Natural Resources
Ann Holtrop

University of Illinois
Paul Davidson

Sierra Club
Cindy Skrukrud

MWRDGC
Justin Vick

Illinois Corn Growers Association
Laura Gentry

U.S. Army Corp of Engineers-Rock Island
Chuck Theiling

U.S. Geological Survey
Kelly Warner

National Center for Supercomputing Apps
Jong Lee

Today's Guests???

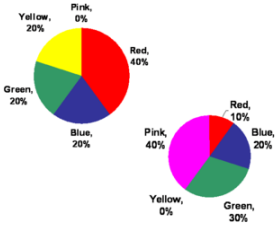
NMC Charges (Revised 10/26/15)

1. Coordinate the development and implementation of monitoring activities (e.g., collection, analysis, assessment) that provide the information necessary to:

   a. Generate estimations of 5-year running average loads of Nitrate-Nitrogen and Total Phosphorus *leaving the state of Illinois* compared to 1980-1996 baseline conditions; and
   b. Generate estimations of Nitrate-Nitrogen and Total Phosphorus loads *leaving selected NLRS identified priority watersheds* compared to 1997-2011 baseline conditions; and
   c. Identify Statewide and NLRS priority watershed *trends in loading over time* using NMC developed evaluation criteria.

2. Document *local water quality outcomes* in selected NLRS identified priority watersheds, or smaller watersheds nested within, where future nutrient reduction efforts are being implemented (e.g., increase in fish or aquatic invertebrate population counts or diversity, fewer documented water quality standards violations, fewer algal blooms or offensive conditions, decline in nutrient concentrations in groundwater).

3. Develop a *prioritized list of nutrient monitoring activities and associated funding* needed to accomplish the charges/goals in (1) and (2) above.



USGS Super Gage Operational Update and Web Display of Nutrient Information

Nutrient Monitoring Council

September 13, 2016

Springfield, IL

Kelly Warner, USGS

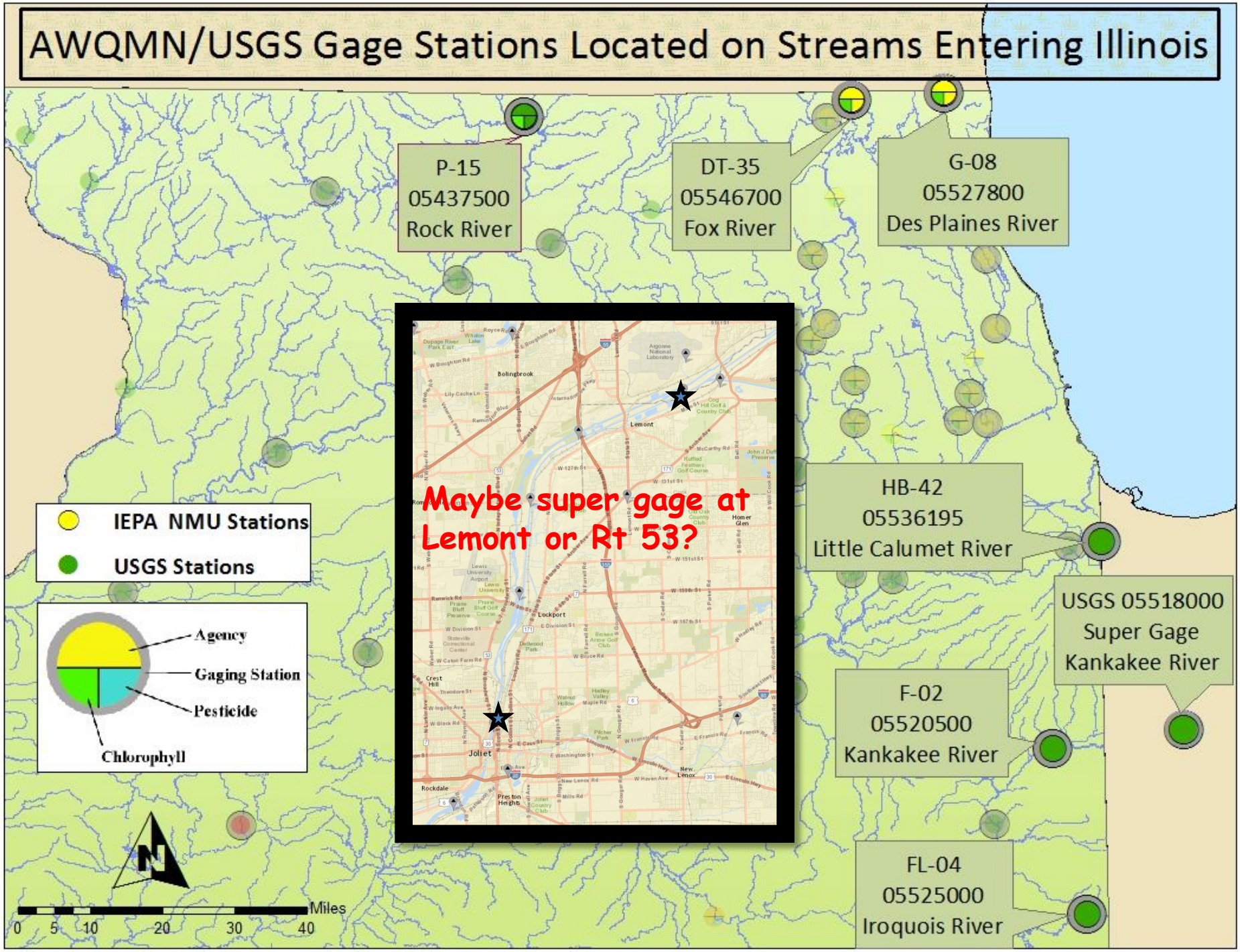
U.S. Department of the Interior
U.S. Geological Survey

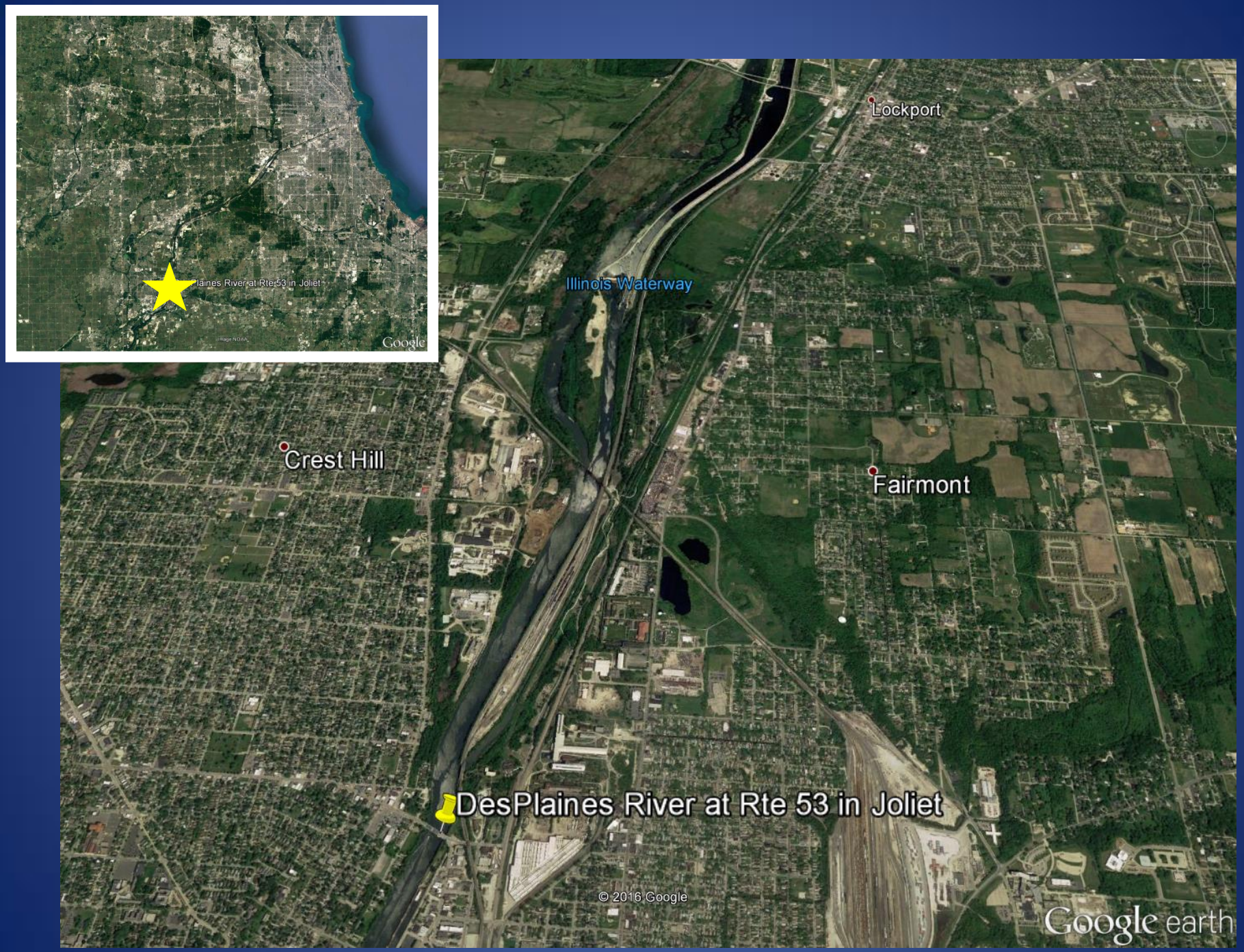
Basins cover almost 75% of the land area in the State

Stream Name	Location	Station Drainage Area in Illinois only, in mi^2	Mean Nitrate-nitrite mg/l
Rock River	Joslin	3,973	3.6
Green River	Geneseo	1,000	4.1
Illinois River	Florence	22,651	4.3
Kaskaskia River	New Athens	5,189	0.89
Big Muddy River	Murphysboro	2,168	0.35
Vermilion River	Danville	1,199	6.9
Embarras River	Lawrenceville	2,348	4.6
Little Wabash River	Carmi	3,102	0.9

USGS science for a changing world

AWQMN/USGS Gage Stations Located on Streams Entering Illinois



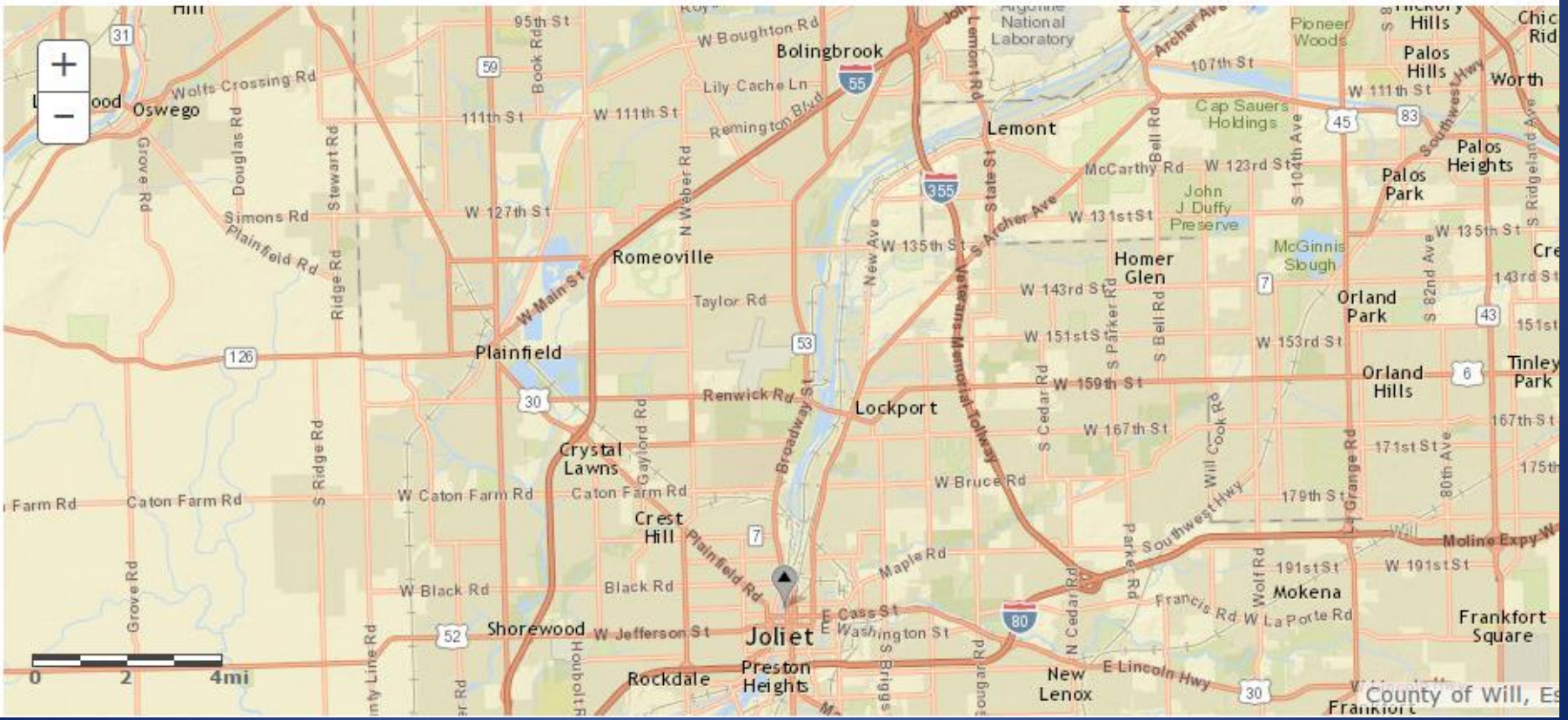

Lockport
Illinois Waterway
Crest Hill
Fairmont
DesPlaines River at Rte 53 in Joliet
© 2016 Google
Google earth

USGS 05537980 DES PLAINES RIVER AT ROUTE 53 AT JOLIET, IL

Available data for this site Location map

Will County, Illinois
Hydrologic Unit Code 07120004
Latitude 41°32'11", Longitude 88°04'57" NAD83
Drainage area 1,502 square miles
Gage datum 0.00 feet above NGVD29

Location of the site in Illinois



New Super Gage Questions

- Cost?
- How to Fund?
- Specific Recommendation to the Policy Working Group?

GROUNDWATER ASSESSMENT FOR NITRATES

Nutrient Monitoring Council
September 13, 2016 Update

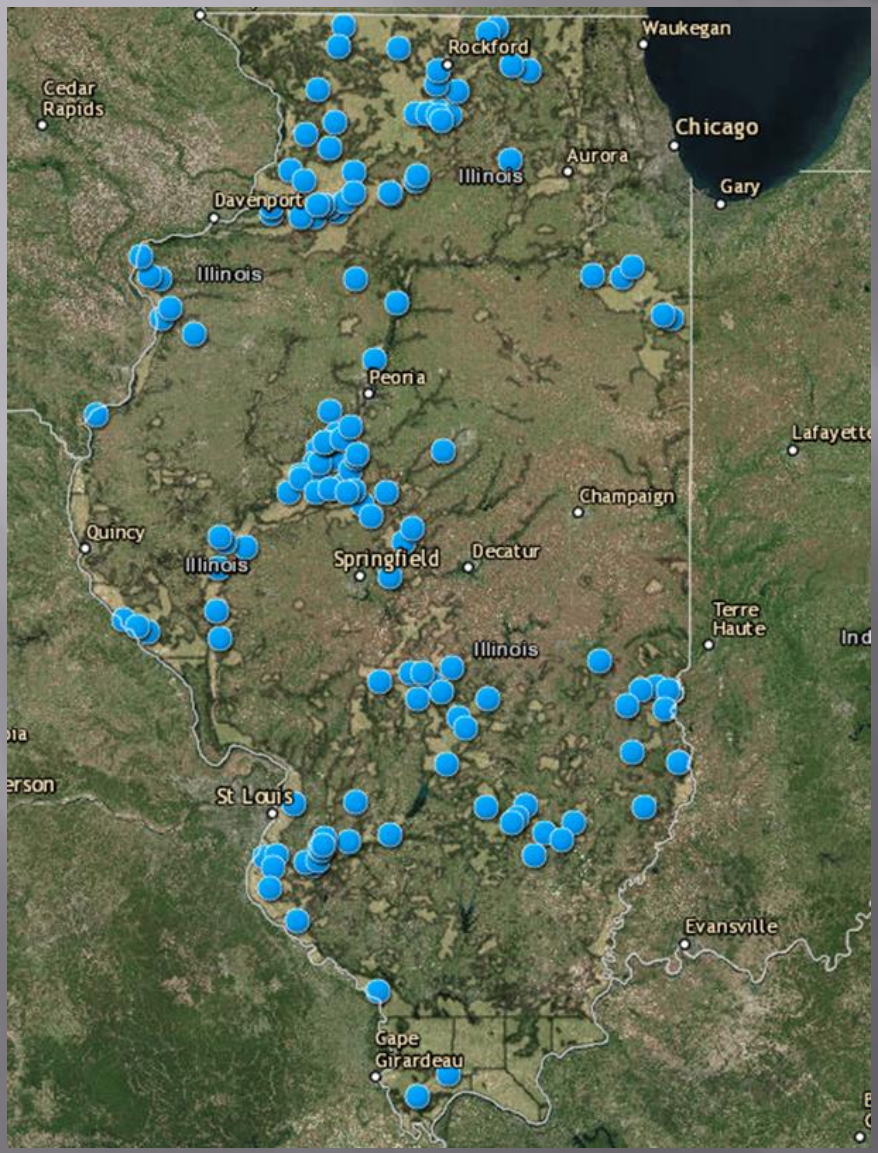
Rick Cobb, P.G.
Deputy Division Manager
Division of Public Water Supplies
and Manager, Groundwater Section

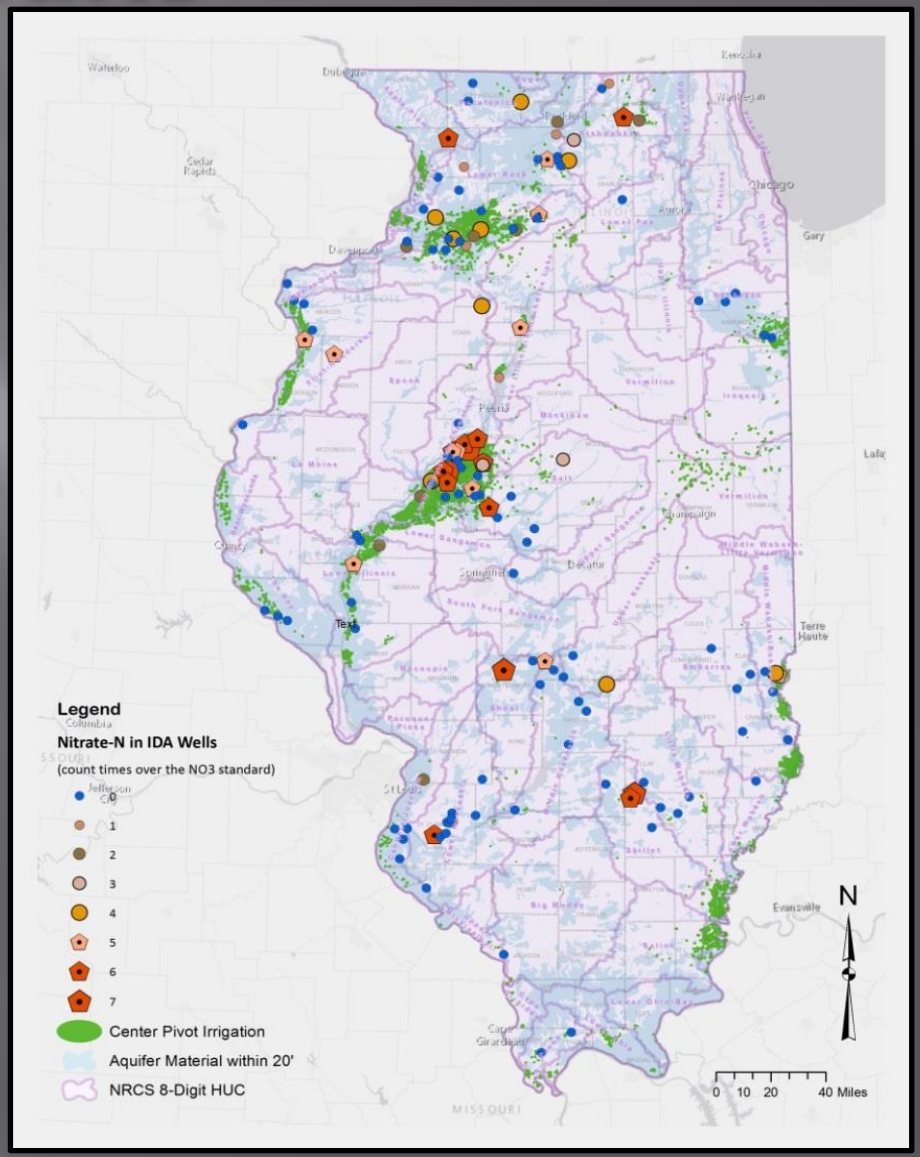
Illinois EPA

ICCG & GAC Coordinated GW Monitoring

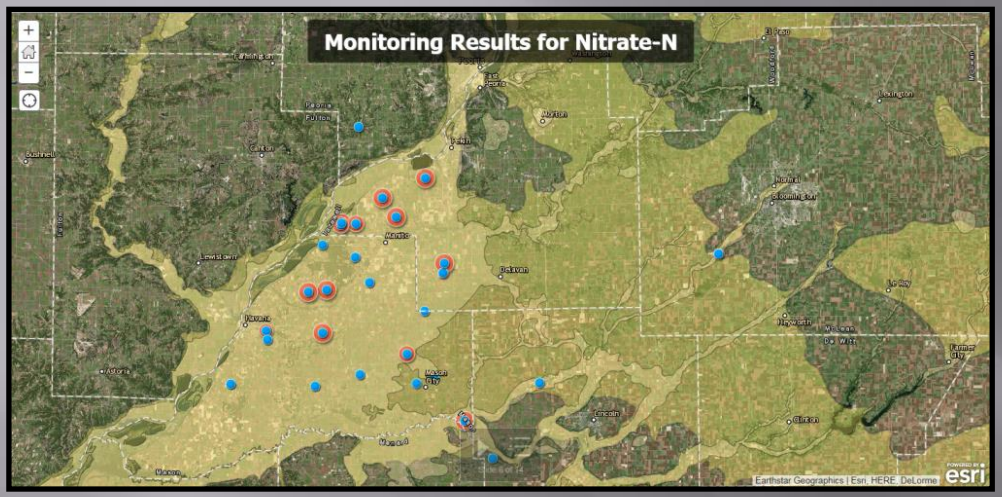
- An ongoing Illinois EPA nitrate trend study of Community Water Supply Wells (reported in the 2014 Integrated Water Quality Report require under the Clean Water Act); and
- The Illinois EPA received a Supplemental Clean Water Act Section 106 Monitoring Grant on July 19, 2016 from U.S. EPA Region V to begin the assessment of the nitrate hot spots in the Havana Lowlands.

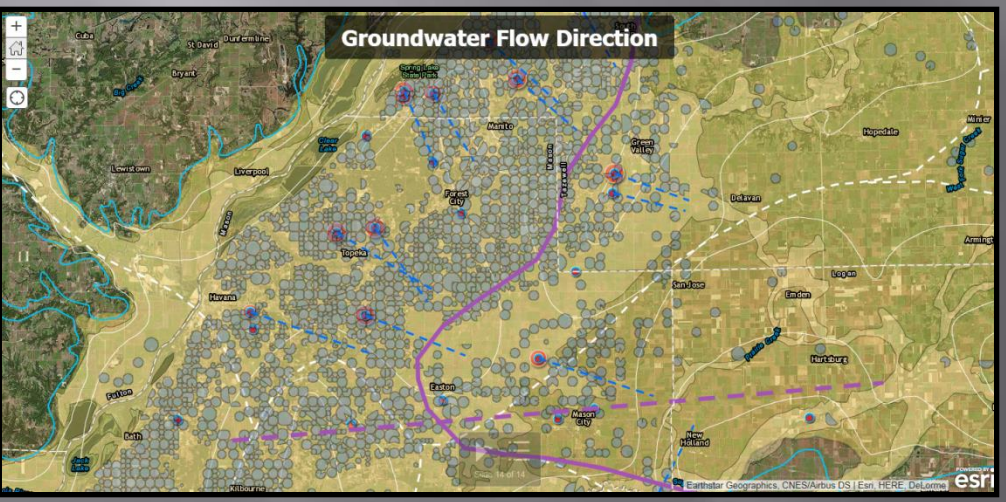
IDA Monitoring Network Nitrate Results





Havana Lowlands (HL)





- 99 of 212 (46.6 %) samples analyzed in the HL had Nitrate-N concentrations greater than the numerical Class I GWQS of 10 mg/L;
- 9.2 mg/L of Nitrate-N is the median value of the area; and
- The individual well with the highest detected concentrations of Nitrate-N ranged from 18 to 48 mg/L with a median value concentration of 32 mg/L.

Fertigation

- Means injection of fertilizers, soil amendments, and other water-soluble products into an irrigation system.

Section 106 Monitoring Grant

- This will help provide key beneficial NLRS information in assessing and managing nitrate in groundwater by:
  - Determining fluctuations in nitrate concentrations resulting from seasonal climatic changes or groundwater conditions such as dissolved oxygen or pH.
  - Assessing the amount of de-nitrification and source indication by conducting nitrogen gas and nitrogen isotope work.
  - Determining temporal nitrate concentrations resulting from agricultural practices such as irrigation or fertigation and possible best management practices that could mitigate these changes.

Exploring IEPA Ambient Water Quality Monitoring Network Data with Great Lakes To Gulf Virtual Observatory Part 2

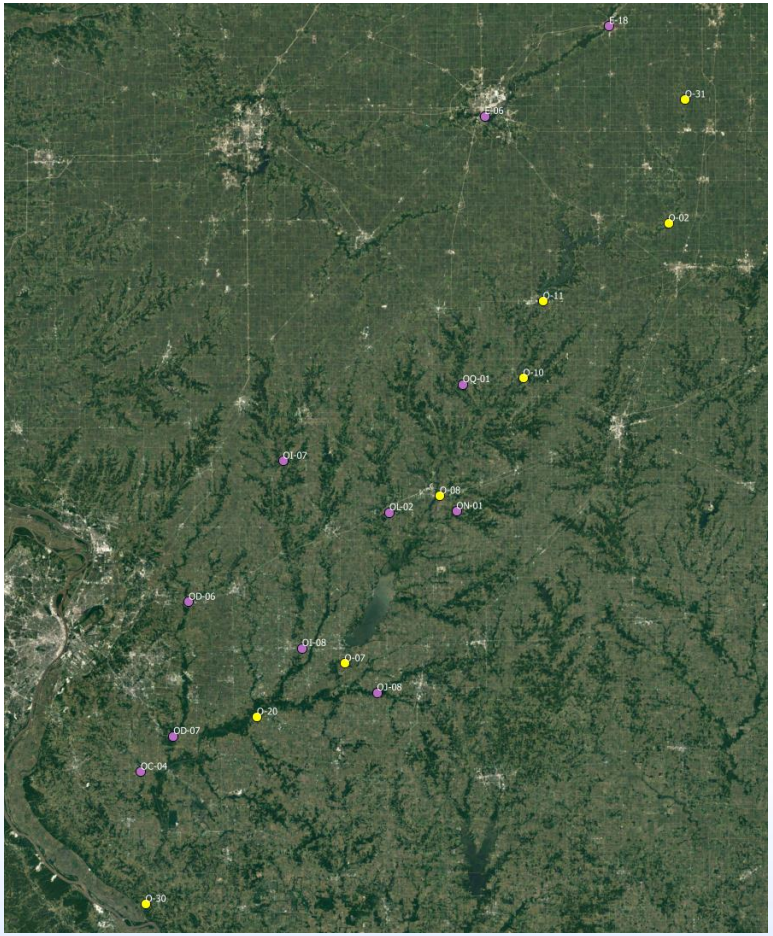
Jong Sung Lee (jonglee1@illinois.edu)
Senior Research Scientist, NCSA

Sep 13, 2016 @ 6th Nutrient Monitoring Council Meeting

National Center for Supercomputing Applications
University of Illinois at Urbana-Champaign

Data

- The requested data is acquired via STORET
  - https://ofmpub.epa.gov/storpubl/dw_pages.querycriteria
- Additional stations
  - Loaded 8 stations on Kaskaskia river
  - Same variable as before
    - Phosphorus
    - Nitrogen



Progress

- Two methods to acquire the data
  - 1. Creating a query on STORET web interface and downloading the results
  - 2. Acquiring data (results) directly via STORET web service
- We are working on #2.
- For this exercise, we used #1 method still.

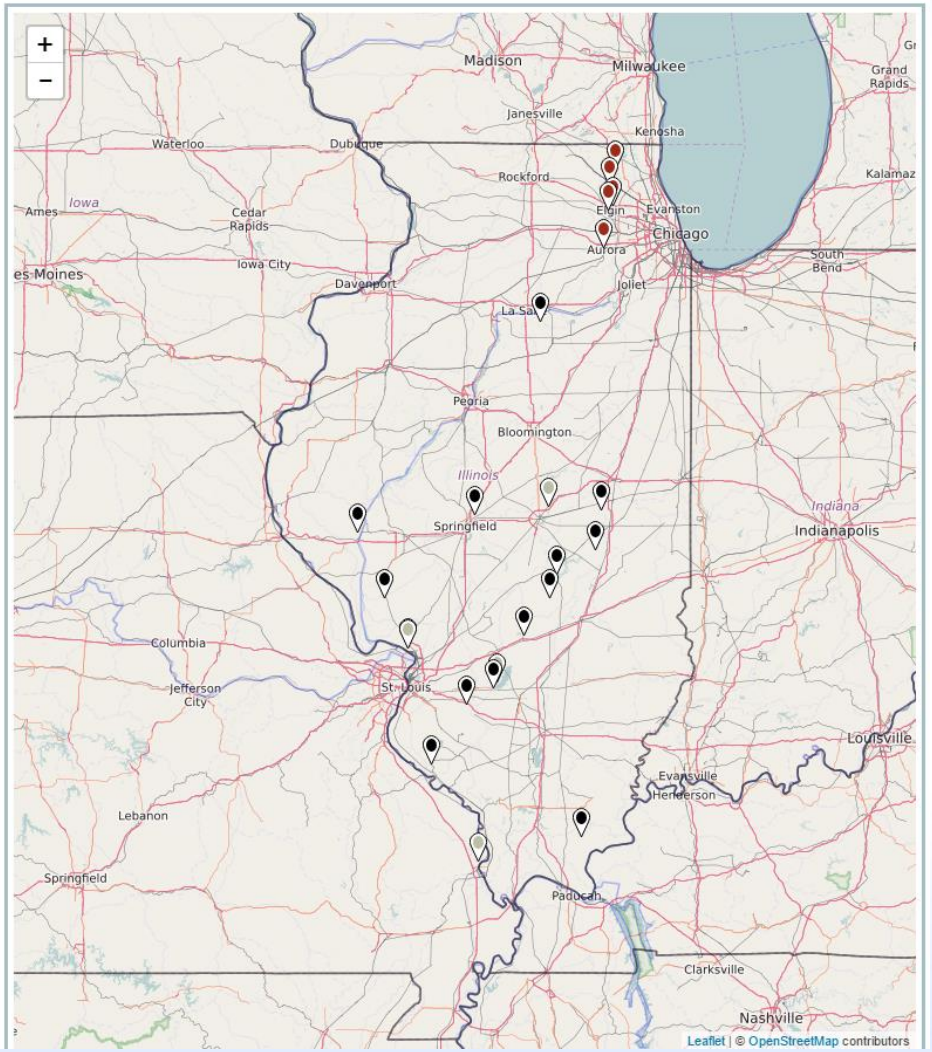
Acquiring Data via Web Service

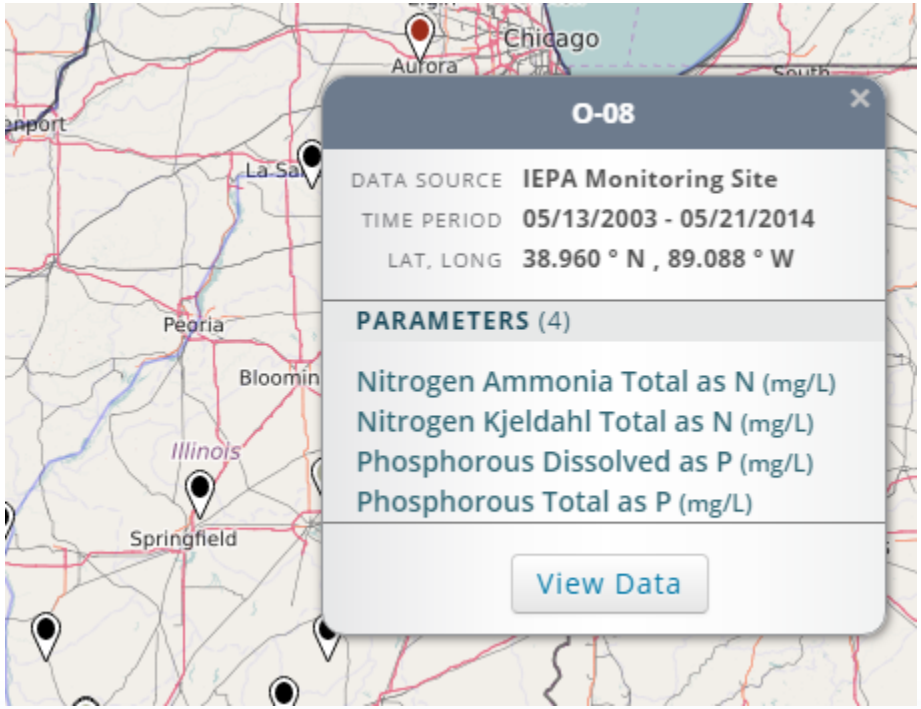
- STORET web service: SOAP
- We has developed a data fetcher to acquire data without using web interface in python.
- Limitation: maximum number of results is 20,000
- We are able to get the data in XML
  - We needs some help to understand the XML

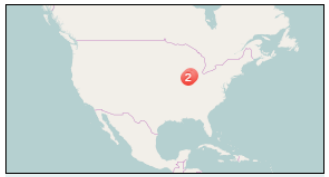
Great Lakes to Gulf
VIRTUAL OBSERVATORY

HOME | COMPARE | DOWNLOAD | ABOUT

- Explore Layers
- Explore Data by Source
- Explore Data by River Reaches
- Explore Data by Watershed
- Featured Watersheds




Chicago
Aurora
Peoria
Bloomin
Illinois
Springfield
O-08
DATA SOURCE IEPA Monitoring Site
TIME PERIOD 05/13/2003 - 05/21/2014
LAT, LONG 38.960 ° N , 89.088 ° W
PARAMETERS (4)
Nitrogen Ammonia Total as N (mg/L)
Nitrogen Kjeldahl Total as N (mg/L)
Phosphorous Dissolved as P (mg/L)
Phosphorous Total as P (mg/L)
View Data



SELECT STATIONS

Epa Polutant Loading (EPA)

0714 MO0025151
0701 MN0029815
0709 IL0027201
0712 IL0020818 IL0028053 IL0028061 IL0028088 IL0032760 IL0069744
0708 IA0042650

Great Rivers Ecological Observation Network (GREON)

0713 GREON-07
0706 GREON-05
0714 GREON-04 GREON-06
0704 GREON-03
0711 GREON-01 GREON-02

Iepa Ambient Water Quality Monitoring Network (Awqmn) (IEPA)

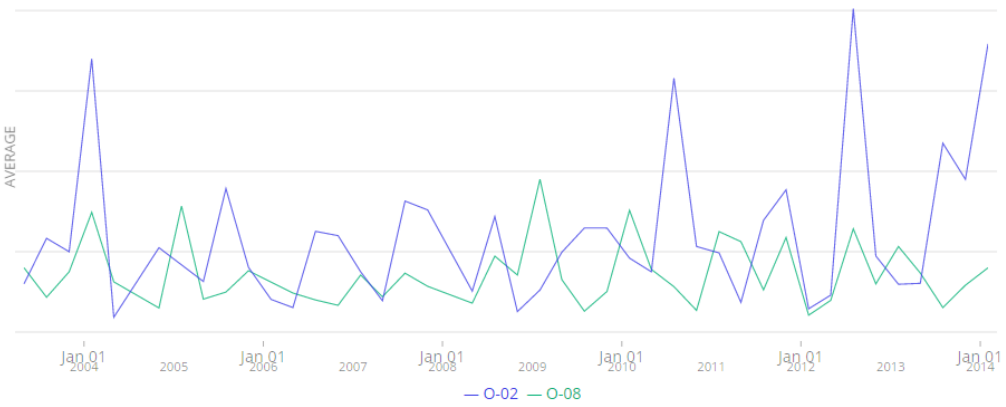
0714 O-02 O-07 O-08 O-10 O-11 O-20 O-30 O-31

COMPARING PARAMETERS AT O-02 & O-08

Date Range 2003-02-01 2014-05-01

Phosphorous Dissolved as P | Additional Parameter | Additional Parameter

Phosphorous Dissolved as P mg/L



Parameter

Click a sensor to generate a graph

Demo

- http://gltg-dev.ncsa.illinois.edu/geodashboard/

http://criticalzone.org/iml/people/person/kumar-praveen/

Civil and Environmental Engine... | Kumar, Praveen | IML Critica...

SWITCH OBSERVATORY

CZO | INTENSIVELY MANAGED LANDSCAPES
CRITICAL ZONE OBSERVATORY

About | News | Events | Opportunities | Con

Research | Infrastructure | Data | Models | Publications | **People** | Education/Outreach

Praveen Kumar

INVESTIGATOR, Lead-PI

Director and Sangamon Site Coordinator

Email, 217-333-4688

IML

Hydrologic processes, including hydroclimatology, ecohydrology, geomorphology, and hydroinformatics

- Biogeochemistry
- Engineering / Method Development
- Modeling / Computational Science
- Hydrology

Colonel Harry F. and Frankie M. Lovell Endowed Professor of Civil and Environmental Engineering, Univ. of Illinois, Urbana-Champaign
Univ of Illinois - University of Illinois at Urbana-Champaign
Kumar's Univ of Illinois page

PhD, Civil Engineering, University of Minnesota , 1993

Serves as director of the IML-CZO; Short- and Long-Term Dynamics of Soil Organ Matter; Coupled Surface Water – Groundwater Hydrology and Biogeochemistry; Integrated Modeling and Critical Zone Services

Three lunch options. This, or…..

DENTON B & B
Tel: 066 71 27637
40 TRALEE
SOUTH POLE INN
Historic pub owned by
Antarctic hero Tom Crean
Tel: 0669157388
BENNERS
Tel: 066 712 9486

Our Collective Goal in *Priority Watersheds*

- *"To hopefully show nutrient reduction and water quality progress through monitoring."*
  - N and P reduction in NLRS Priority Watersheds or Sub-Watersheds (Charge 1b)
  - Loading Trends Over Time (Charge 1c)
  - Local Water Quality Outcomes (Charge 2)
- Want to ultimately develop ***Watershed Nutrient Monitoring Plans*** in all priority watersheds, *but where do we start*?

Discussion: Where do we go from here?

- If needed, refine the WQ and Biological data parameters documents, then combine into one.
- Pick a pilot watershed, meet with WQ and Biology partners, ID current programs and likely continuance.
- Develop a template for development of a ***Watershed Nutrient Monitoring Plan.***

- Develop the plan.
  - Um, do we, the NMC, develop the plan?
  - Do we contract development of the plan out to someone, and we, the NMC, provide review and approval/blessing?
  - If contracted out, any idea what one might cost?
  - Potential funding sources (e.g., CWA Section 106)?

- Implement the plan.

Today's Exercise – Brainstorm the Development of a *Watershed Nutrient Monitoring Plan* "Template"

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1.1 First section . . . 3
1.2 Second section . . . 3
1.3 Last section . . . 3

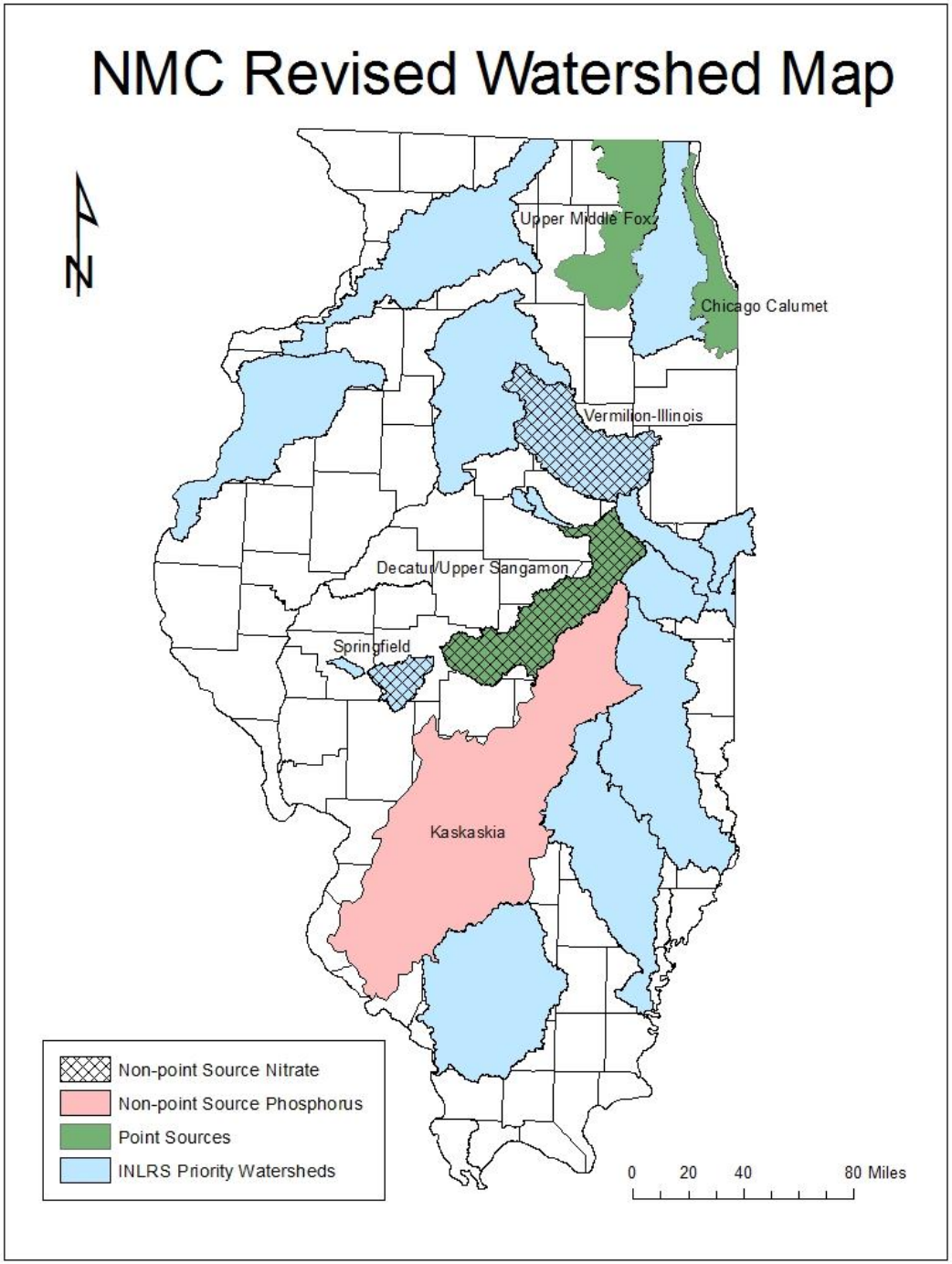
2 Second chapter 5
2.1 First section . . . 5
2.2 Second section . . . 5
2.3 Last section . . . 5

3 Last chapter 7
3.1 First section . . . 7
3.2 Second section . . . 7
3.3 Last section . . . 7

Examples of Template Elements

- Executive Summary
- Introduction
- Goals/Objectives
  - N & P Load Estimation
  - Trends in Loads Over Time
  - Resource Quality Outcomes
- Public Participation
- Study Area Description
- Historic/Existing Monitoring and Baseline Data
- Needed Additional Monitoring
- Monitoring Design
- Implementation
- Data Management
- Quality Assurance/Control
- Assessment and Evaluation Methodologies
- Results and Reporting
- Monitoring Entities
- Monitoring Costs
- Potential Funding/In-Kind
- Milestones/Timelines
- Limitations/Constraints
- Next Steps
- Appendices
- Other_____

Watersheds selected at April 5, 2016, Nutrient Monitoring Council meeting as places to start with the development of ***Watershed Nutrient Monitoring Plans.***



Pick a Pilot Watershed to Start in!

July 28, 2016, NMC Meeting ideas:

- Upper Middle Fox
- Chicago/Calumet
- Kaskaskia
- Lake Springfield

“Next Steps” Summary
(NMC September 13, 2016)

- Summarize today’s action items
  - A.
  - B.
  - C.
- Future topics for the December 6, 2016 meeting?
- Other (TBD)

Next NMC Meetings

- December 6, 2016
- *March 14, 2017?*
- *June 6, 2017?*
- *September 12, 2017?*
- *December 5, 2017?*