

# USGS Super Gage Network Update

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#### 2021 NLRS Conference

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😥 Alyza IQ<sub>10</sub>

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### **Network Purpose and Sites**

• Data is used to characterize nutrient concentrations and compute constituent loadings that are exported from the State.



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| River         | USGS ID  |  |  |  |
|---------------|----------|--|--|--|
|               |          |  |  |  |
| Vermilion     | 03339000 |  |  |  |
| Embarras      | 03346500 |  |  |  |
| Little Wabash | 03381495 |  |  |  |
| Rock          | 05446500 |  |  |  |
| Green         | 05447500 |  |  |  |
| Illinois      | 05586300 |  |  |  |
| Kaskaskia     | 05595000 |  |  |  |
| Big Muddy     | 05599490 |  |  |  |



## Example Data

 Gage height, nitrate, and turbidity dynamics at the Illinois River at Florence (top) and

Embarras River at Lawrenceville (bottom).



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Red circles indicate discharge measurements.

# **Data and Loadings**

- Water Year 2016-2020
- Percent of record with continuous data coverage during the study period.

| River         | Temp. | SC | DO | pН | Turbidity<br>(YSI) | Turbidity<br>(Hach) | NO23 | PO4 |
|---------------|-------|----|----|----|--------------------|---------------------|------|-----|
| Vermilion     | 80    | 80 | 79 | 75 | 79                 | 76                  | 77   | 781 |
| Embarras      | 99    | 99 | 99 | 89 | 99                 | 85                  | 87   | 9   |
| Little Wabash | 53    | 52 | 41 | 41 | 49                 | 61                  | 62   | 5   |
| Rock          | 69    | 67 | 67 | 64 | 58                 | 57                  | 68   | 2   |
| Green         | 75    | 73 | 65 | 69 | 61                 | 58                  | 73   | 3   |
| Illinois      | 98    | 93 | 98 | 89 | 97                 | 90                  | 94   | 29  |
| Kaskaskia     | 98    | 95 | 96 | 95 | 98                 | 94                  | 95   | 32  |
| Big Muddy     | 91    | 91 | 91 | 82 | 86                 | 84                  | 78   | 25  |

<sup>1</sup>Orthophosphate analyzer upgraded to YSI P-700 on November 1, 2017.

Hodson and others, 2021, Continuous Monitoring and Bayesian Estimation of Nutrient and Sediment Loads from Illinois Watersheds, 2016–2020 Water Years







#### **Yields**

• Mean annual yields in metric tons per square kilometer for WY 2016–2020; estimate based on continuous monitoring with Bayesian imputation.



Hodson and others, 2021, Continuous Monitoring and Bayesian Estimation of Nutrient and Sediment Loads from Illinois Watersheds, 2016–2020 Water Years

#### Instrumentation

YSI EXO 2 multi-parameter sondes

Hach Nitratax nitrate sensors

Hach Solitax turbidity sensors





#### Instrumentation

# Ordered Left to Right:

YSI – Alyza (OP) Seabird – Hydrocycle (OP) Hach – Phosphax (OP) Hach – EZ7800 TOPHO (TP)





## Next Steps

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| Site                     | Nitrate | Turbidity | Phosphate | DO | рН | Spec Cond | Temp |
|--------------------------|---------|-----------|-----------|----|----|-----------|------|
| Big Muddy (05599490)     | Х       | Х         |           |    |    |           |      |
| Kaskaskia (05595000)     | Х       | Х         | Х         |    |    |           |      |
| Illinois (05586300)*     | Х       | Х         | Х         | Х  | Х  | Х         | Х    |
| Green (05447500)         | Х       | Х         |           |    |    |           |      |
| Rock (05446500)          | Х       | Х         |           |    |    |           |      |
| Little Wabash (03381495) | Х       | Х         |           |    |    |           |      |
| Embarras (03346500)      | Х       | Х         |           |    |    |           |      |
| Vermillion (03339000)    | Х       | Х         |           |    |    |           |      |

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# Questions

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