#### **Intensive Streamflow, Sediment, and Water Quality** Monitoring of a Small Watershed in Bloomington, IL

15<sup>th</sup> Illinois River Governor's Conference October 29, 2015

**USEPA National Nonpoint Source Pollution monitoring project** using funds under Section 319 of the distributed through the IEPA

Additional monitoring and(or) implementation funds were provided by city, State and Federal agencies













#### **Kickapoo Creek Stream and Wetland Restoration**

McLean Count

ILLINOIS

- Located in McLean County, just east of Bloomington, Illinois
- Restoration in a 90 acre park downstream of two ag ditches and 9000 acres of row crops



#### **Kickapoo Creek Stream and Wetland Restoration**



#### Components

- Connected floodplain and detention
- Gently remeandered stream
- Rock riffles
- Wetlands

#### Benefits

- Flood detention
- Limit sediment deposition
- Increase nutrient uptake
- Habitat and fishery enhancement





IEPA – Macroinvertebrates and habitat



**Prairie Engineers of Illinois – Vegetation** 



#### Intensive Streamflow, Sediment, and Water Quality Monitoring

- Streamflow Flood Detention?
- Sediment Limit Sediment Deposition?
- Nitrate Decrease Nitrate Load?

#### **Undersized Park Bridge**

- Built at the downstream end of the park
- Passes 5-year flood
- Detains larger floods
- Limits sediment deposition



### **Connected Floodplain**

- Excavated floodplain
- Lowered banks (to 2-yr flood elevation)
- Created riparian wetlands



Area shown in pho

## FOOD! (photos are looking upstream from park bridge)

#### -Reduced flood peak -Limited sedimentation



#### Site Map and Monitoring Locations



#### **Connected Floodplain and Stormwater Detention**



#### Site Map and Monitoring Locations



#### PRE-Restoration Conditions January 2008



#### Post Restoration Conditions September 2008



#### **Streamflow at the Downstream Gage**



USGS 05579630 KICKAPOO CREEK NEAR BLOOMINGTON, IL



#### **SEDIMENT** at the Downstream Gage



USGS 05579630 KICKAPOO CREEK NEAR BLOOMINGTON, IL



# June 1, 2009Image: state of the state of the

이 그는 것 같아요. 집 같아요. 집 같아요. 집 같이 많이		
Gage	Peak Flow (cfs)	Peak Sediment Conc. (mg/L)
<-2100	615	13,700
Ktrib-OaklandRd	516	43,600
K-IrelandGrRd	1069	41,300

#### Intensive Streamflow, Sediment, and Water Quality Monitoring

- Streamflow Flood Detention?
- Sediment Limit Sediment Deposition?
- Nitrate Decrease Nitrate Load?

#### **Sediment Load**

Paratesta



#### **Sediment Yield**

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#### 90% of sediment load occurs in what percent of days?

utilizing daily values from 2007-2012

Gage	Percent days for 90% of sediment
K-2100	13.6
Ktrib-OaklandRd	7.4
K-IrelandGrRd	13.7

Surface runoff and flood dominated process

# Streamflow and Nitrate

March-November 2013

4/15

5/16

6/16

7/16

8/16



11/16

10/16

9/16

#### Nitrate Yield (24 percent decrease overall)



#### Nitrate Load (24 percent decrease overall)



#### Nitrate Load Rate



#### Agricultural Runoff April 2013



#### **Nitrate Summary**

- 24% overall decrease in nitrate load
- 67% of decrease in low flow
- Greatest rate of nitrate load occurred in high flow



#### Summary

- Streamflow Flood Detention
- Sediment Limit Sediment Deposition
- Nitrate Decrease Nitrate Load

# **Questions?**