Indian Creek Watershed Project

Livingston County
Soil & Water Conservation District

Topics of Discussion

- Meet the team
- Indian Creek by the numbers
- Building the project
- Initiating farmer involvement
- Engaging farmers in a meaningful way
- Considerations for success

Introductions

Karen Scanlon

Executive Director,
Conservation Technology
Information Center
(CTIC)

Chad Watts

Project Director,
Conservation
Technology
Information Center
(CTIC)

Introductions

Marcus Maier

Director,
Livingston County
Soil and Water Conservation District

Conserving Natural Resources for Our Future

Livingston County
Soil & Water Conservation District

Introductions

Amy Walkenbach

Watershed Management Section Manager, Illinois Environmental Protection Agency

Trevor Sample

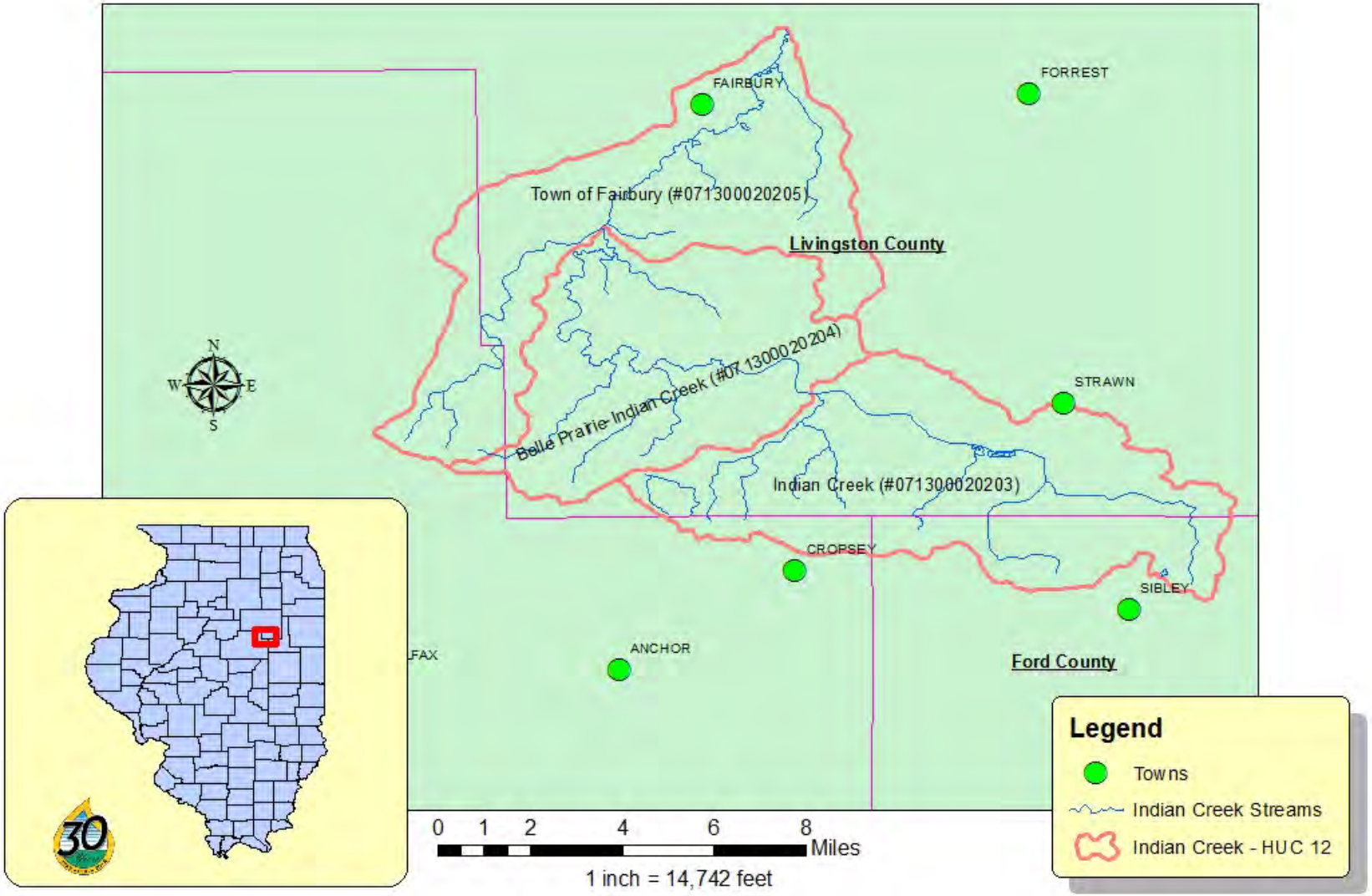
Environmental Protection Specialist, Illinois Environmental Protection Agency

Indian Creek by the numbers…

100%	of farmers contacted
55%	of producers enrolled in programs
41%	of farmland currently enrolled in conservation programs (CSP)
150+	attended 2012 summer field tour
100+	winter meeting attendance
20+ac	nutrient-use efficiency plots
14	Active sponsors showcasing products, technologies and equipment

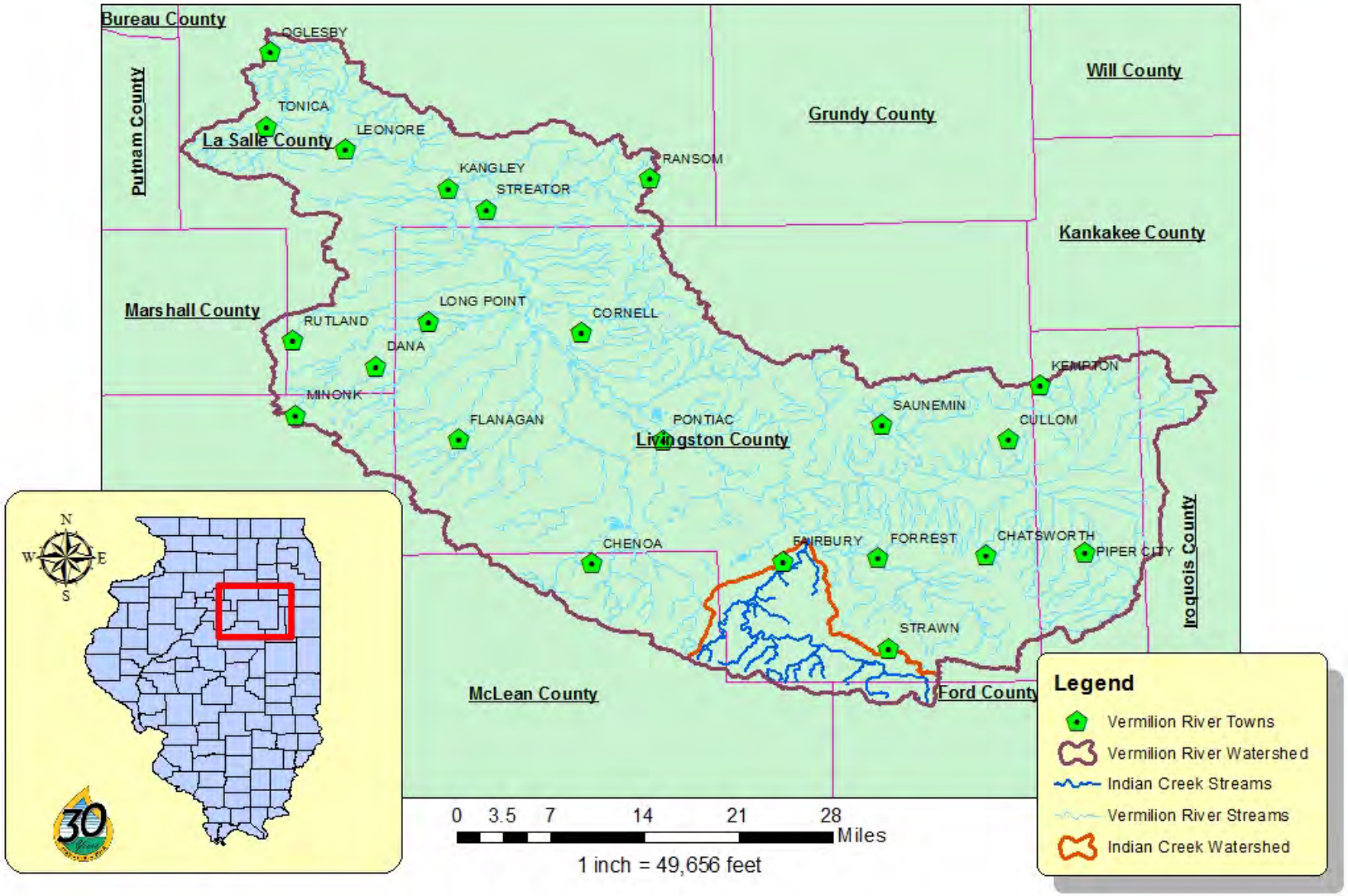
INDIAN CREEK WATERSHED

Livingston County, Illinois



INDIAN CREEK WATERSHED

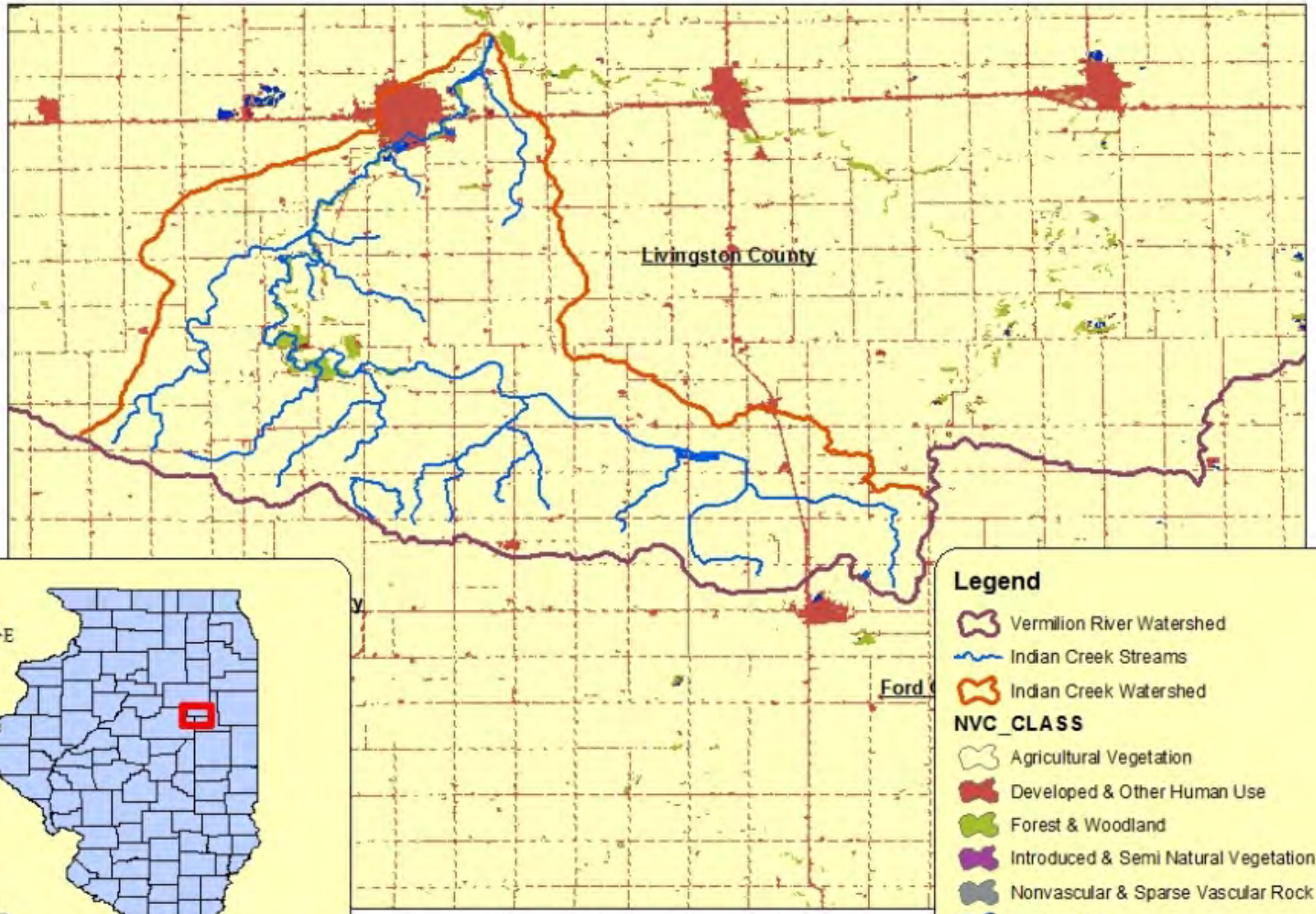
Vermilion River Watershed
Illinois River



INDIAN CREEK WATERSHED

- 51,243 acres (80 sq mi) drainage area
- Primarily cropland
- 104 farms
- Part of Vermilion River Watershed that flows to Illinois River
  - Aquatic life use and public water supply impairments
  - MRBI target watershed

Indian Creek Watershed



Indian Creek Watershed

0 0.75 1.5 3 4.5 6
Miles

1 inch = 12,500 feet

Legend

- Vermilion River Watershed
- Indian Creek Streams
- Indian Creek Watershed

Indian Creek Project – 319 Grant

- Partners:
  - CTIC
  - Illinois EPA
  - Livingston County SWCD
  - Illinois NRCS
  - Industry Partners / Sponsors

CTIC
319
Efforts

Livingston County
Soil & Water Conservation District

- Goal:
  - Determine water quality impacts that result when 50% of farms and acres in watershed adopt conservation systems

Indian Creek Project - MRBI

- Partners:
  - Livingston County SWCD
  - Illinois NRCS
  - CTIC
  - Illinois EPA

SWCD
MRBI
Efforts

- Goals:
  - Improve water quality throughout watershed
  - Decrease soil erosion and sediment
  - Maintain and enhance wildlife
  - Maintain small- to medium-size farming operations

Livingston County
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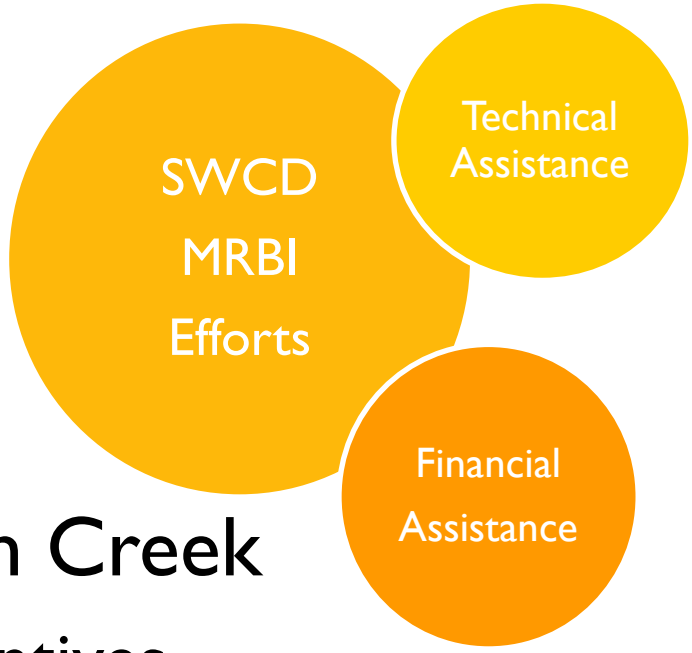
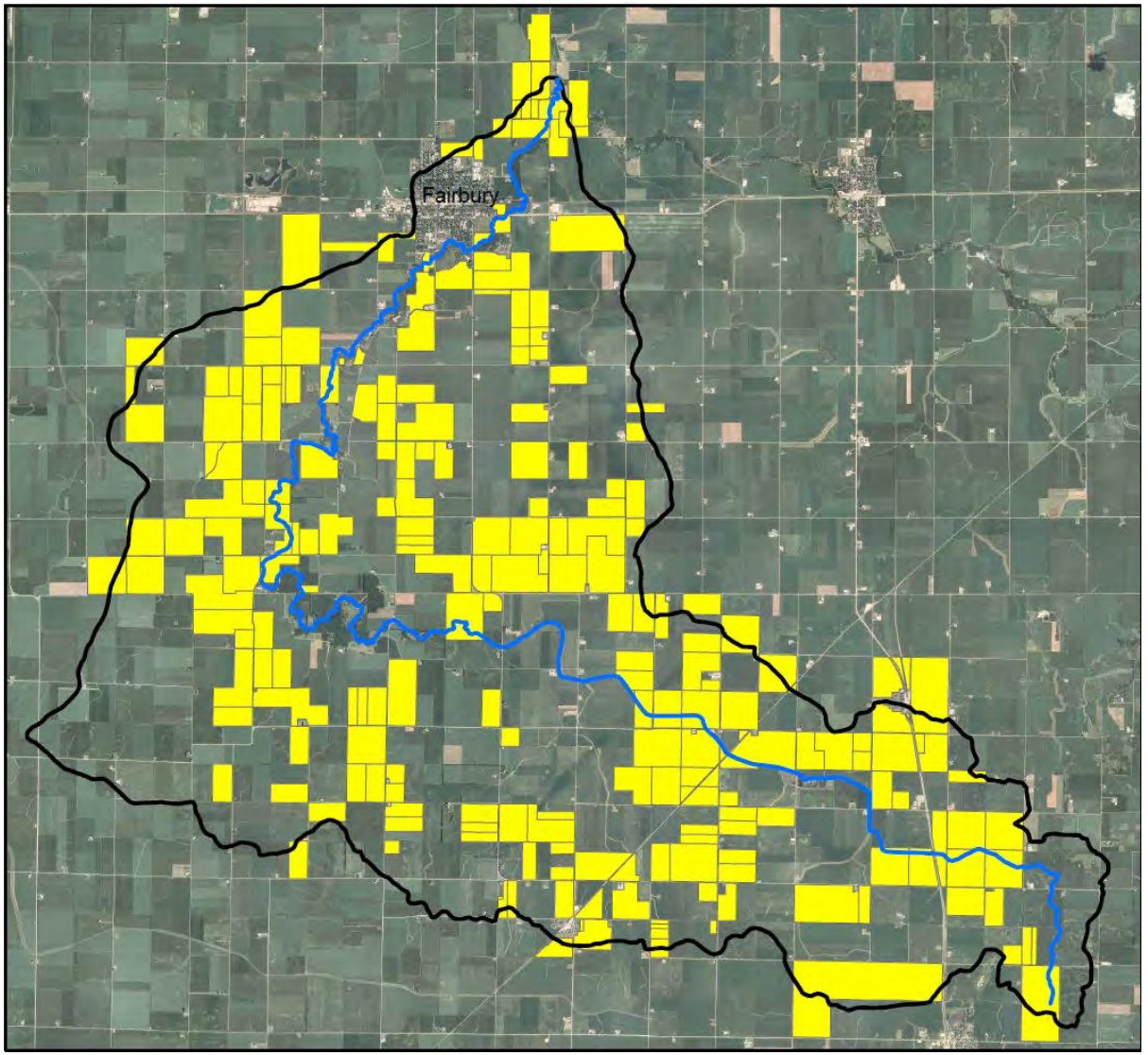
USDA NRCS

MRBI Funding



- Funding targeted to Indian Creek
  - Environmental Quality Incentives Program (EQIP)
    - $50,000 Annually
  - Conservation Stewardship Program (CSP)
    - $200,000 Years 1 and 2
    - $100,000 Years 3 and 4
    - $50,000 Year 5

Indian Creek CSP Coverage

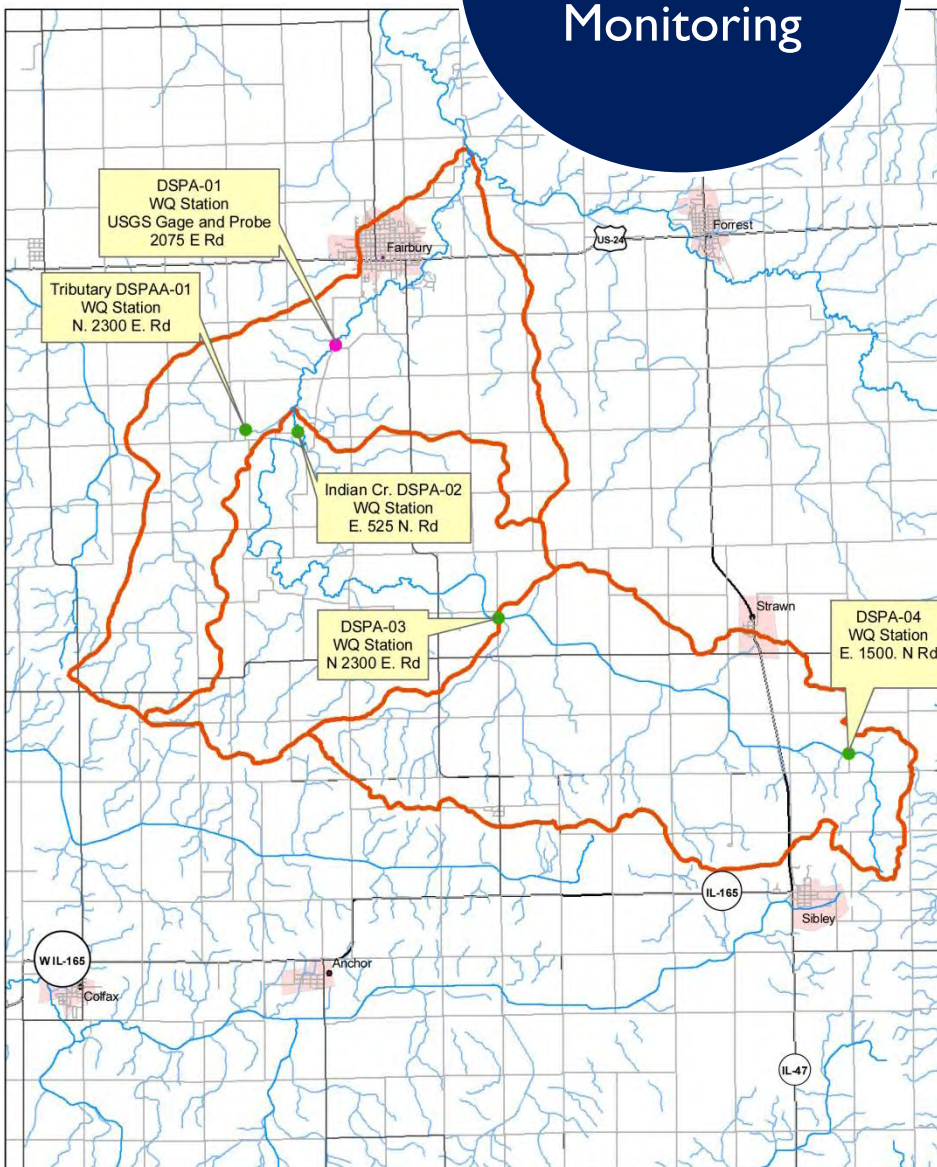


Livingston County CSP

Water Quality Monitoring

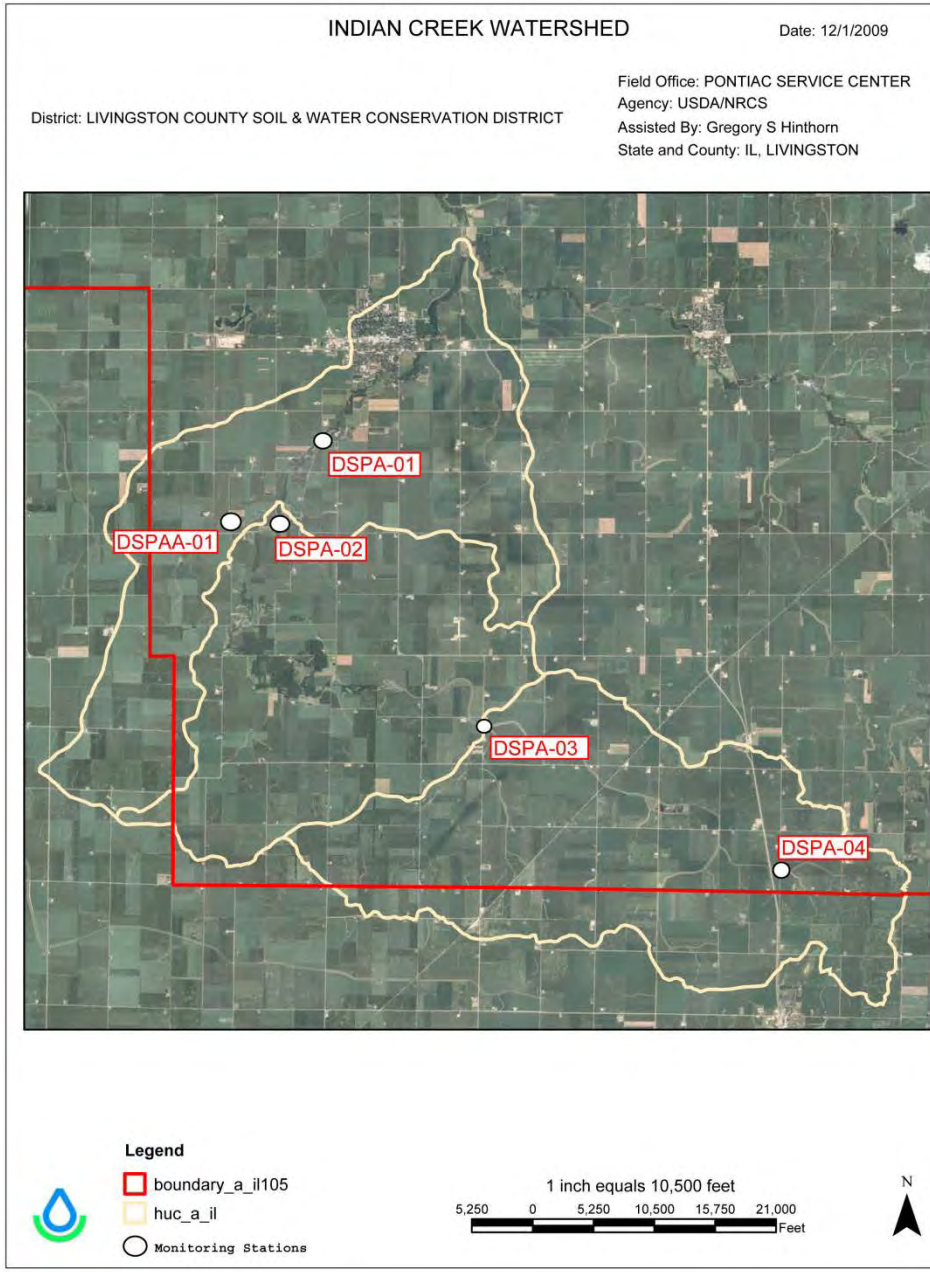
- USGS stream gage installed July 2011 at watershed outflow to collect
  - Stage levels
  - Discharge

- Continuous nitrate+nitrite sensor installed Sept. 2011

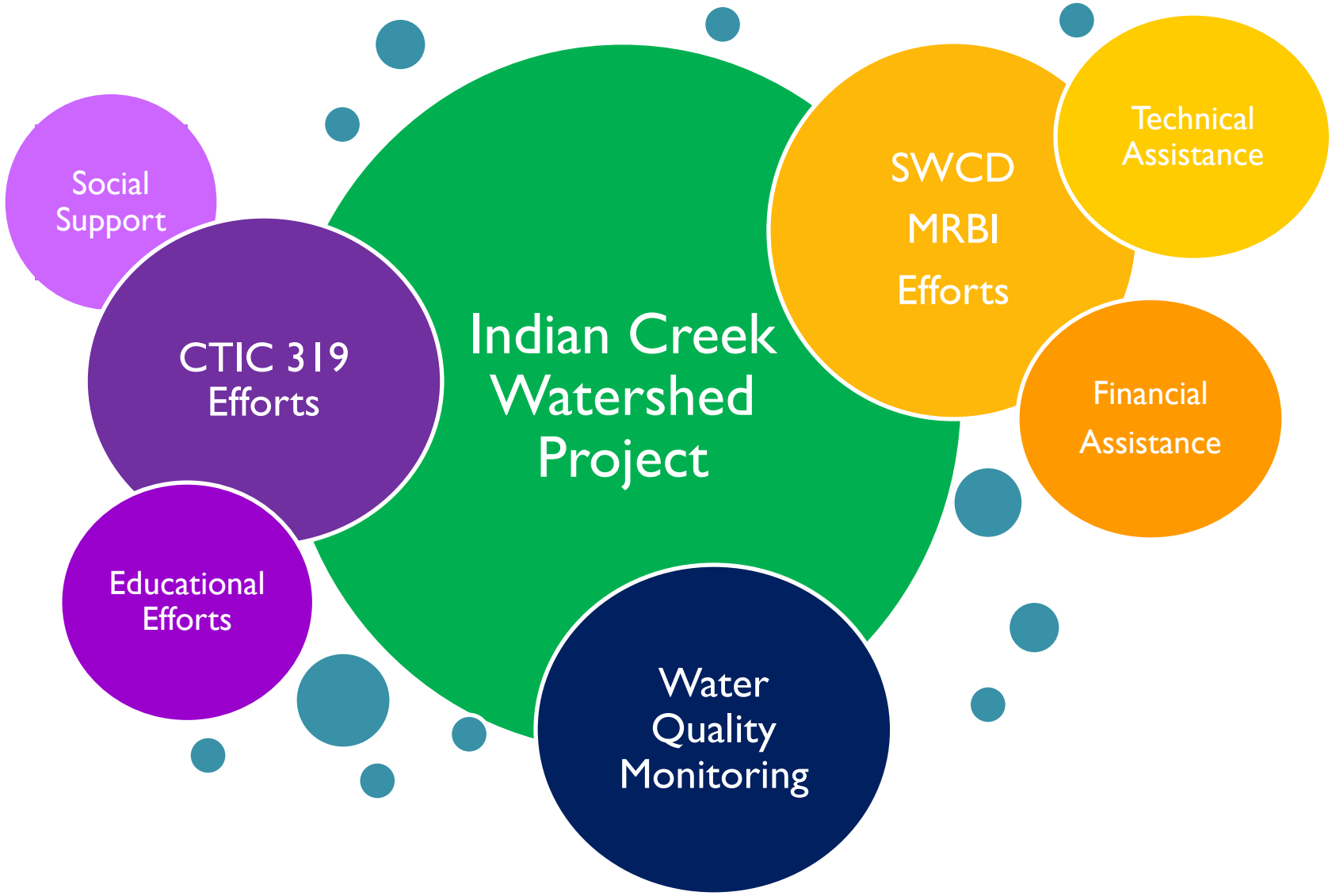


Water Quality Monitoring

- 5 sites sample schedule
  - May-June weekly grab samples analyzed for nitrate-nitrite
  - Monthly samples for Total P and Total Suspended Solids
  - July-Feb monthly grab samples for Total P, Total Suspended Solids, nitrate-nitrite
- Quanta probe measures pH, conductivity, dissolved oxygen and temperature



Fitting it all together



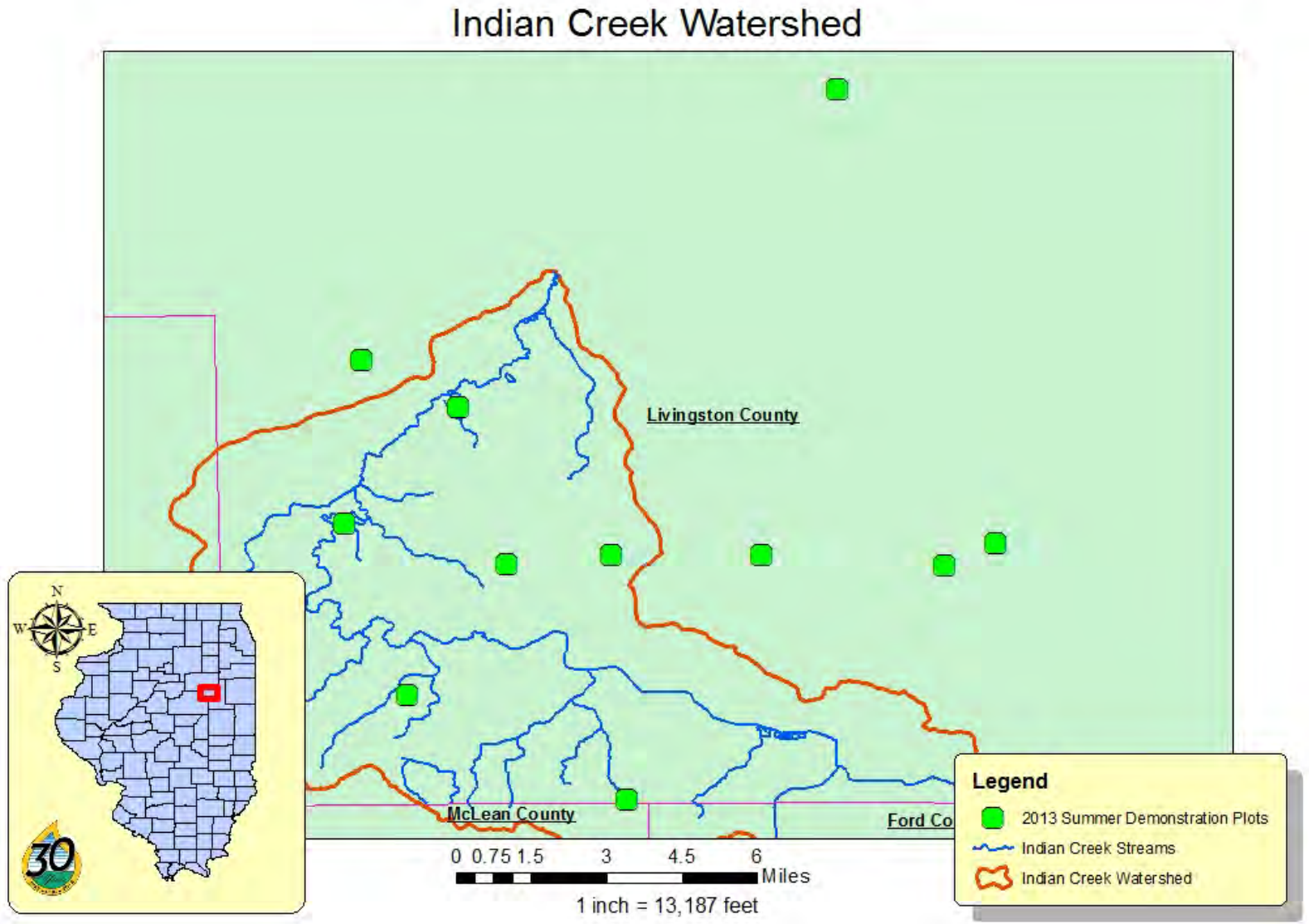
Steering Committee

- Participants Identified
  - Past cooperator
  - Interest in conservation
  - Various walks of life
- Personal Invitations
- Seek and act on their input
- Keep members engaged

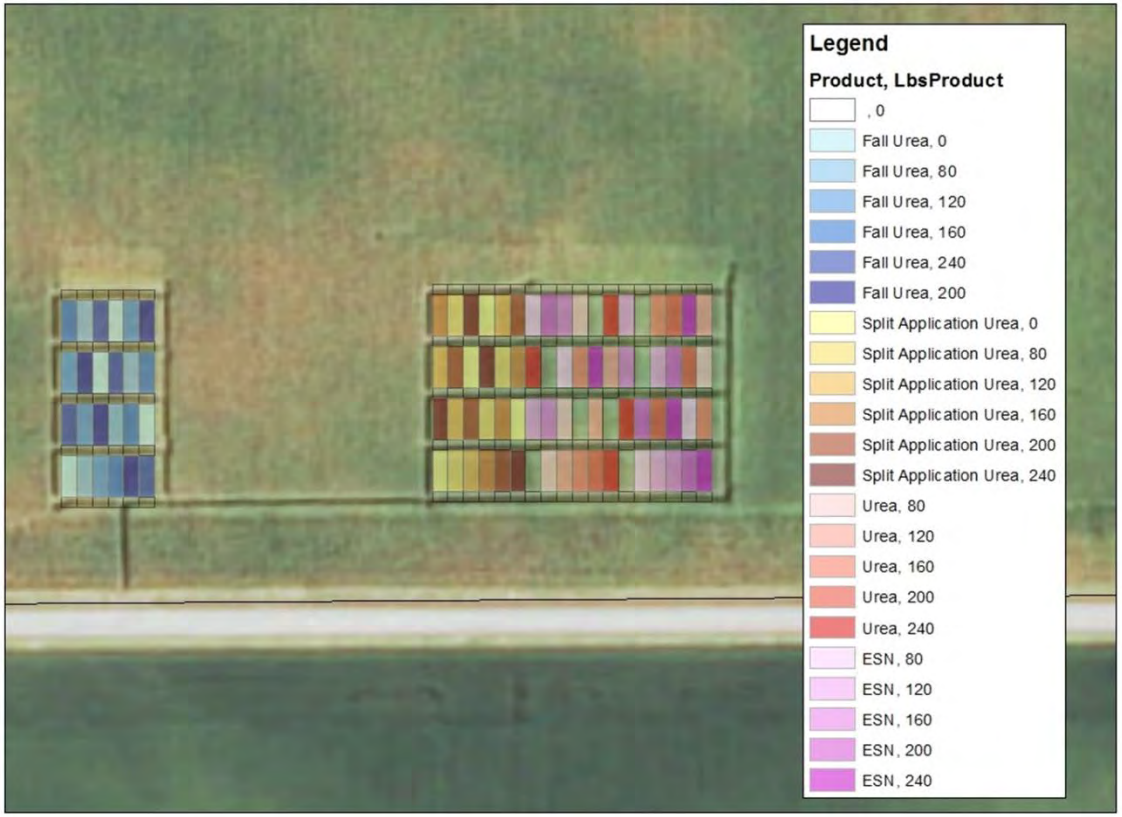
Demonstrations and NUEs

- 2011 Demonstrations - 3
- 2012 Demonstrations – 7
- 2013 Demonstrations – 13
  - Nitrogen use
    - Spring vs. fall vs. split applications
    - Use of denitrification inhibitors
      - Instinct and N-serve
    - Rate, formulation and placement differences between fertilizer applications
  - Cover Crops
  - Controlled Drainage

Demonstration Locations



Indian Creek Demonstrations and NUE Plots



Demonstrations

- Most demonstrations consisted of 20 + acre blocks where different trials were compared
  - Different conservation technologies, nutrient application methods, nutrient formulations or application timings evaluated
  - Results were calculated for each trial plot and are annually summarized

Nutrient Use Efficiency (NUE) Plots

- Calculating a "mass balance" for nutrient usage
- Smaller, replicated plots with varying rates of Nitrogen applied
  - N rates between 0 and 240 pounds per acre were evaluated and compared
  - Maximum Economic Rate for Nitrogen (MERN) calculated for each plot.
    - A measure of the maximum return on investment of applied nitrogen

MERN Calculation

Crop Nutrient Response Tool (CNRT) v4.1

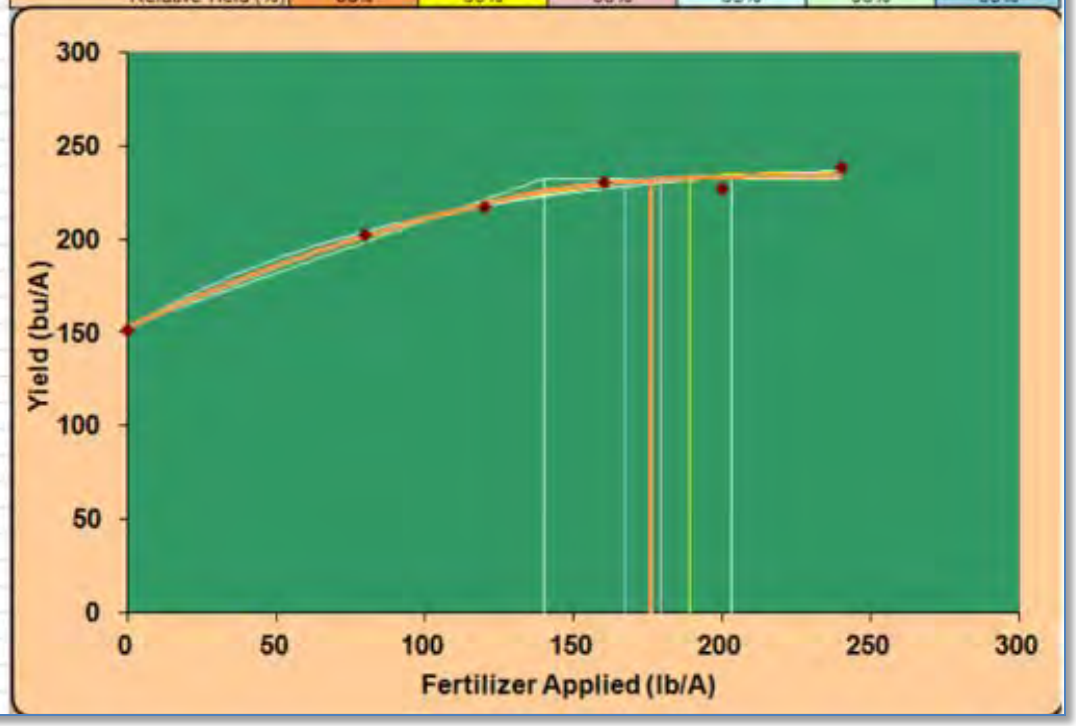
Step 1: Enter rate and yield data.
Step 2: Click the Fit button.
Step 3: Adjust crop and fertilizer prices.
Step 4: Click to append information to summary.

Site Details	
Site	Harms Spring ESN
Year	2011
Town	
County	
State or province	
Latitude	
Longitude	
Altitude	
Soil texture class	
Preceding crop	
Expected Yield (bu/A)	
Timing and placement	
Tillage	
Site degree-days	
Crop species	
Cultivar	
PSNT (ppm)	
Manure N (lb/A)	
Planting date	
Harvest date	
Crop ($/bu)	6.00
Fertilizer ($/lb)	0.70
Price ratio (f/c)	0.117
Crop N content (lb/bu)	0.70
N harvest index	0.67
Fertilizer source	

Append site information to summary

Fertilizer rate, lb/A	Crop Yield, bu/A
0	152
80	203
120	218
160	231
200	227
240	239

Fit		R^2-weighted Mean	Quadratic (Q)	Quadratic-Plateau (QP)	Mitscherlich (M)	Linear-Plateau (LP)	Spherical (SP)
	A:		153	152	244	153	152
	B:		0.73	0.77	-93	0.56	81
	C:		-0.0016	-0.0018	-0.010	232	185
R^2:			99%	99%	99%	98%	99%
MERN (lb/A):		176	189	180	203	140	168
Yield @ MERN (bu/A)		232	233	232	233	232	232
Partial Factor Productivity (PFP)			1.23	1.29	1.15	1.66	1.38
Agronomic Efficiency (AE_N)		0.45	0.43	0.44	0.40	0.56	0.47
Partial N Balance (PNB):		92%	86%	90%	80%	116%	97%
Recovery Efficiency (RE_N)		47%	44%	46%	42%	59%	49%
Delta Yield (bu/A)		79	80	80	81	79	79
Relative Yield (%)		66%	66%	66%	65%	66%	66%



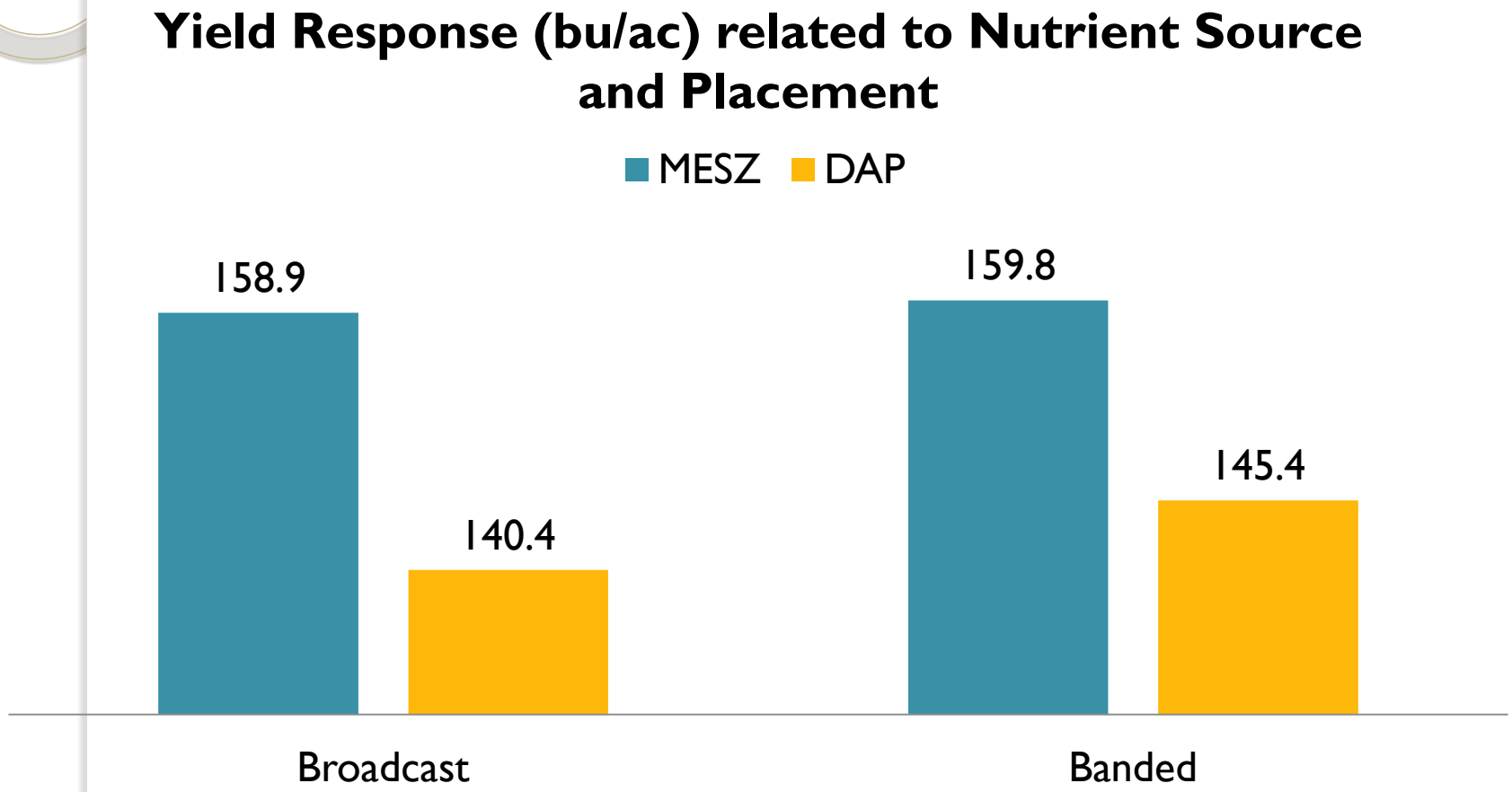
4R Principles of Nutrient Management

- *Right Fertilizer **Source** at the*
- *Right **Rate**, at the*
- *Right **Time**, and in the*
- *Right **Place***

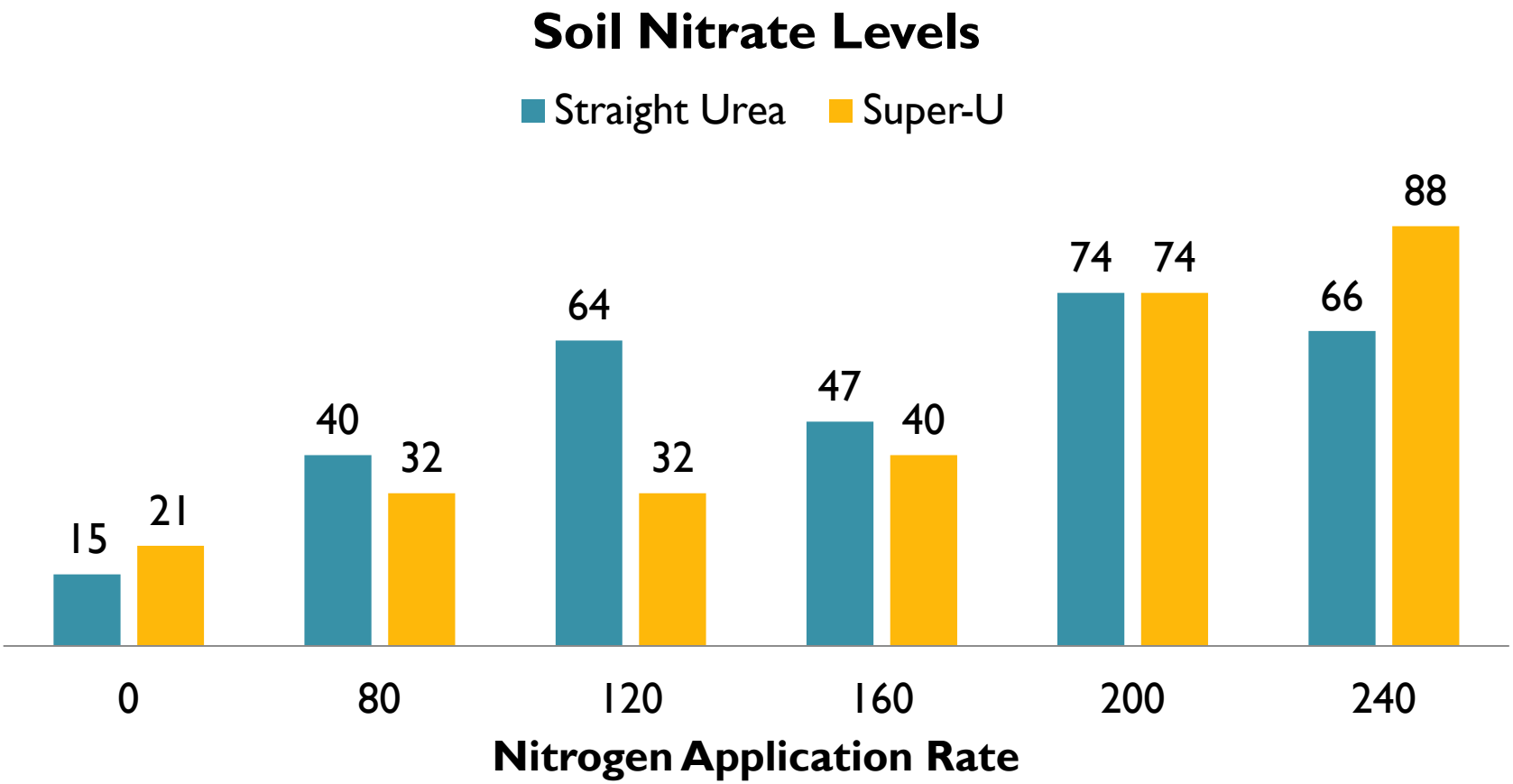
Right Source

- Fertilizer source can make a significant difference in yield.
  - 2011 results showed a 7 bushel yield response to MicroEssentials® (MESZ - from the Mosaic Company)as a phosphorous source over DAP (18-46-0) fertilizer applied in the same manner
- Nitrogen technologies and forumulations impact nitrogen breakdown and increase profits due to nutrient use efficiencies

Phosphorous Sources



Nitrogen Source



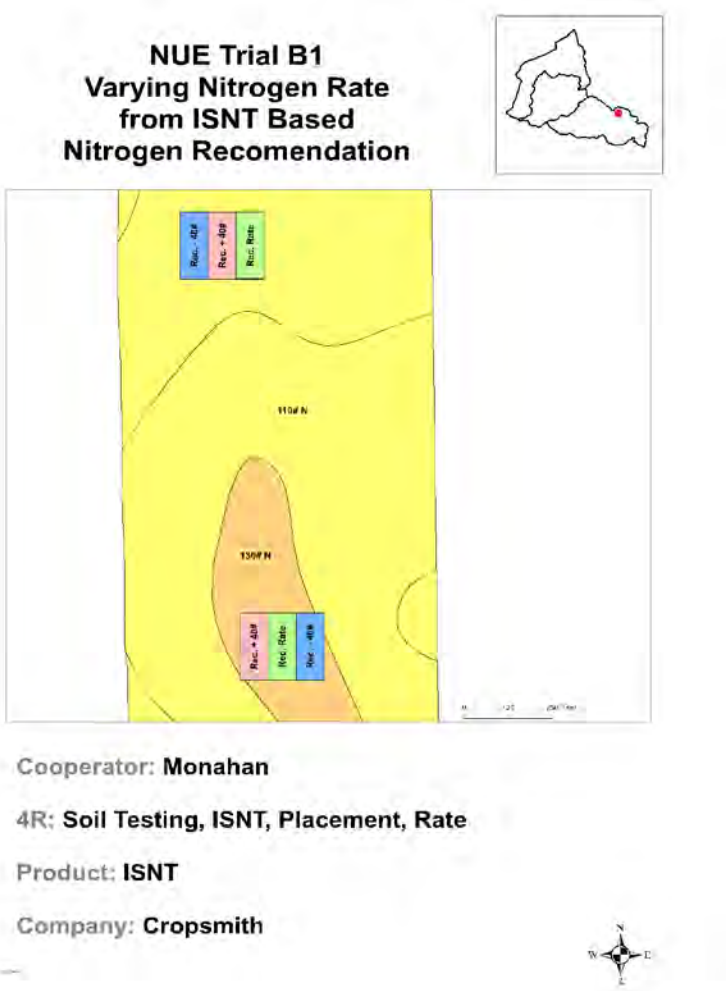
Right Rate

- Technologies that slow the breakdown of N fertilizers to nitrate showed promise for N use efficiency
- Later season application of N increases planning flexibility and maximizes efficiency
- Variable rate technologies (VRT) allow fertilizer savings and greater nutrient use efficiencies
  - Automatically applies higher fertilizer rates to high production areas and decreases rates in areas of lower production

Right Rate

- In a drought year, water is a greater limiting factor than nitrogen rate and availability
- Pre-sidedress Nitrate Testing (PSNT) can guide late season Nitrogen application rates
  - Producer adaptively manage according to available nitrogen in the soil
- The Illinois Soil Nitrogen Test (ISNT) evaluates nitrogen mineralization across a field to guide variable rate application technology (VRT)
  - Soil mineralization is responsible for the majority of N taken up by corn

Nitrogen Rate

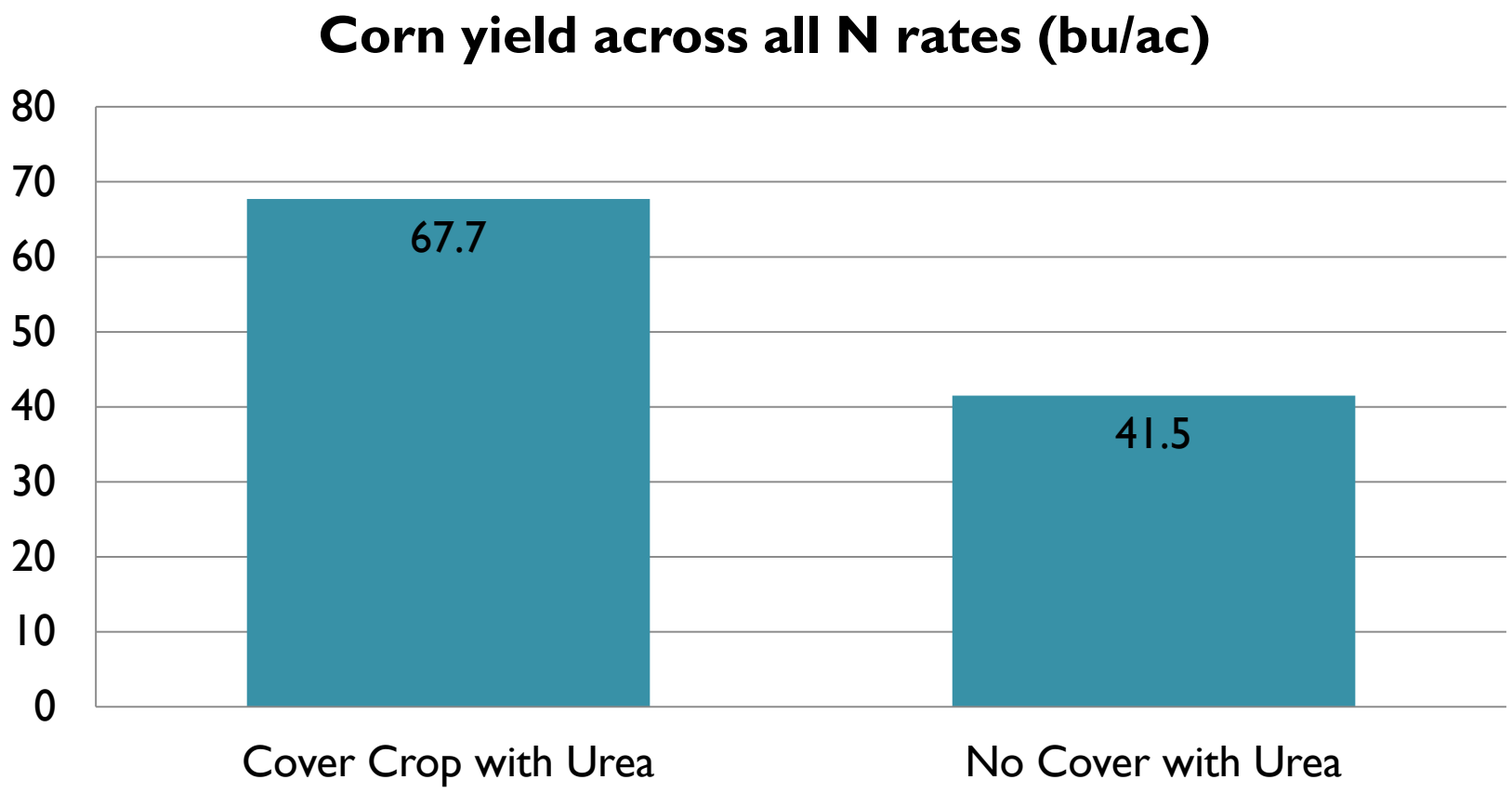


- Illinois Soil Nitrate Testing (ISNT) and variable rate technology (VRT) influence site-specific nutrient applications

Right Time

- Splitting application between fall and spring showed promise for yield and efficiency gains
- Cover crops can increase soil nitrogen availability at the right time and increase crop yields
  - When properly planned, N credits can reduce inputs

2012 Cover Crop Plot



Right Place

- Satellite guidance systems (RTK) allow precision placement of nutrients for maximum use efficiency
  - Important in strip-till systems to place fertilizer within pre-tilled locations to maximize crop uptake
- Placement of fertilizer (surface banded vs. incorporated) can protect fertilizer loss from surface runoff

Personal Contacts

- One-on-one visits with all 104 producers
  - Discuss conservation systems
  - Offer financial assistance
- Conduct perception survey
  - Water quality, pollutants and attitudes

Winter Meetings

- Promote to watershed and beyond
- Attendance
  - 100+ per meeting
- Timely topics including:
  - Soil health / Cover crops
  - Financial assistance programs
  - Producer panel discussions
- Outcomes
  - Increased awareness

Summer Field Tour

- 150+ attendees July 2012
- Highlight Demonstrations and conservation innovation in the watershed

2013 Conservation In Action Tour

- July 9-10, 2013
- 250+ attendees
- Tour stops
  - Soil Health
  - Nutrient Management
  - Drainage Water Management

Considerations for Success

- Good things don't just happen overnight
  - Must be patient
- Strong local champion
- Give producers a real voice
  - … and listen to that voice!
- Leveraging partnerships and resources
  - You don't have to bring everything to the table for the project to be successful

More Considerations

- Be inclusive
- Be up-front with your motives
  - No hidden agendas
- Recognize people's desire to protect things in their own back yards
- Respect and engage the community

Community

- The more "community" you create around your watershed effort, the more local buy-in, more impact, more success

Any Questions?