Financial and Environmental Impact of Conservation Practices

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Precision Conservation Management

College of Agricultural, Consumer & Environmental Sciences

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

Gary Schnitkey

farmdoc

Greg Goodwin


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Precision Conservation Management

Precision Conservation Management

Understand how conservation practices impact farm net returns

Address water quality concerns. Prevent agricultural regulation

Position farmers to benefit from positive conservation outcomes

Farmers get access to:

- 1-on-1 technical support
- Data collection platform
- Agronomy resources & expertise

Provide farmers individualized yearly RAAP report featuring:

- Financial and Sustainability benchmarking
- Economic cost tables
- Environmental assessments

How we work with Farmers:

- $750 participation payment
- Exclusive program offers cost share, other practice assistance
- Peer to Peer education and networking opportunities

About PCM

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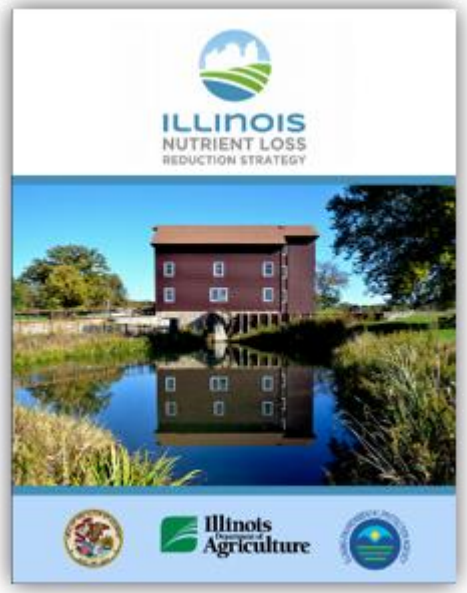
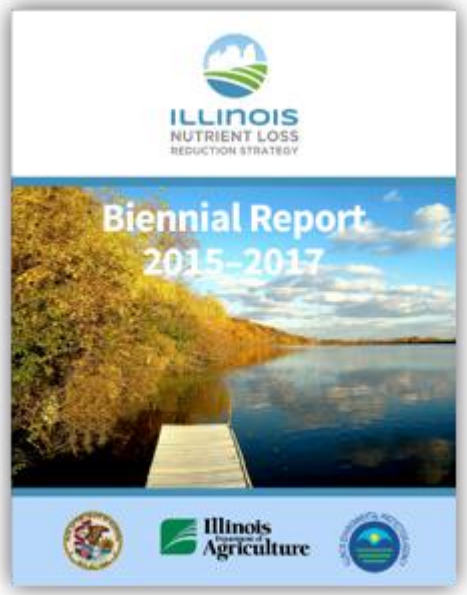
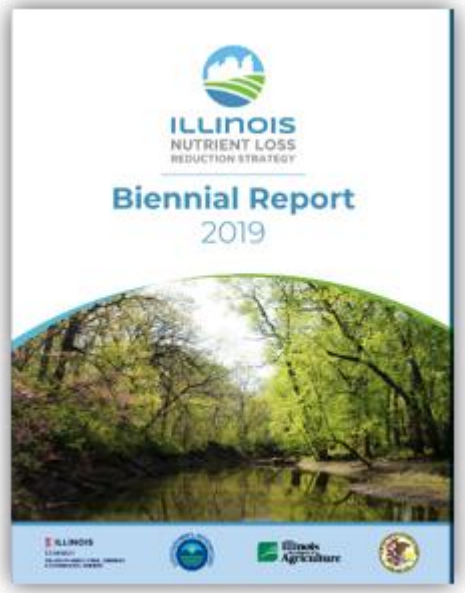
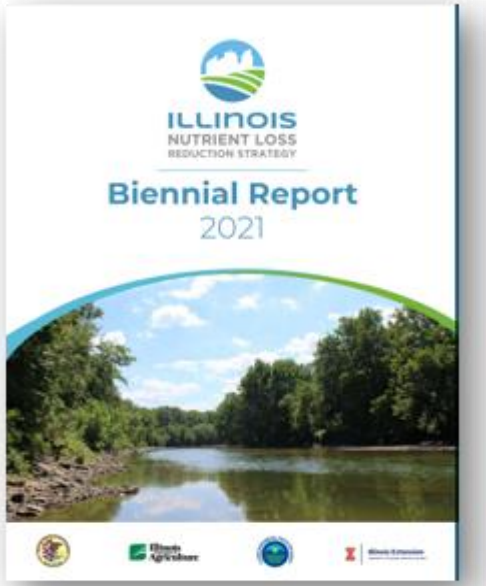
Precision Conservation Management

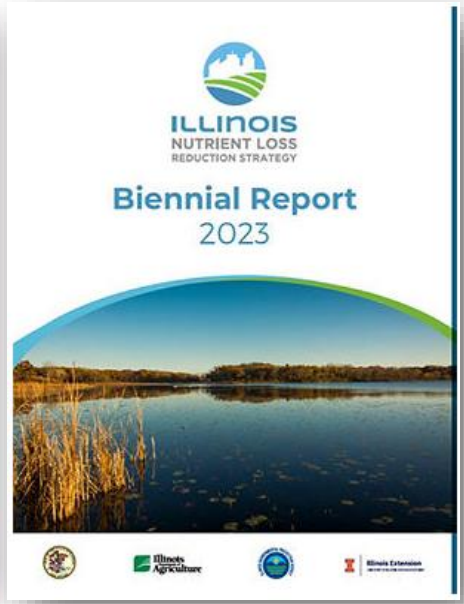
Created as a response to the Illinois Nutrient Loss Reduction Strategy











Goal: 45% Reduction in **Total N & Total P** Losses by **2035**

Interim: 15% Reduction in NO_3-N & 25% Reduction in Total P by 2025

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THE ZEA MAYS FOUNDATION
Walmart
C-BMP
Illinois Council on Best Management Practices
The Nature Conservancy
PEPSICO
American Farmland Trust
SAVING THE LAND THAT SUSTAINS US
ILLINOIS CHAPTER
Land Improvement Contractors of America
LICA
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NATIONAL FISH AND WILDLIFE FOUNDATION
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ILLINOIS SOYBEAN ASSOCIATION

Participation Stats

Precision Conservation Management

PCM – Growing Stronger Every Day

519+
FARMERS

8,573+
FIELDS

513,893+
ACRES

30+
PARTNERS

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Illinois

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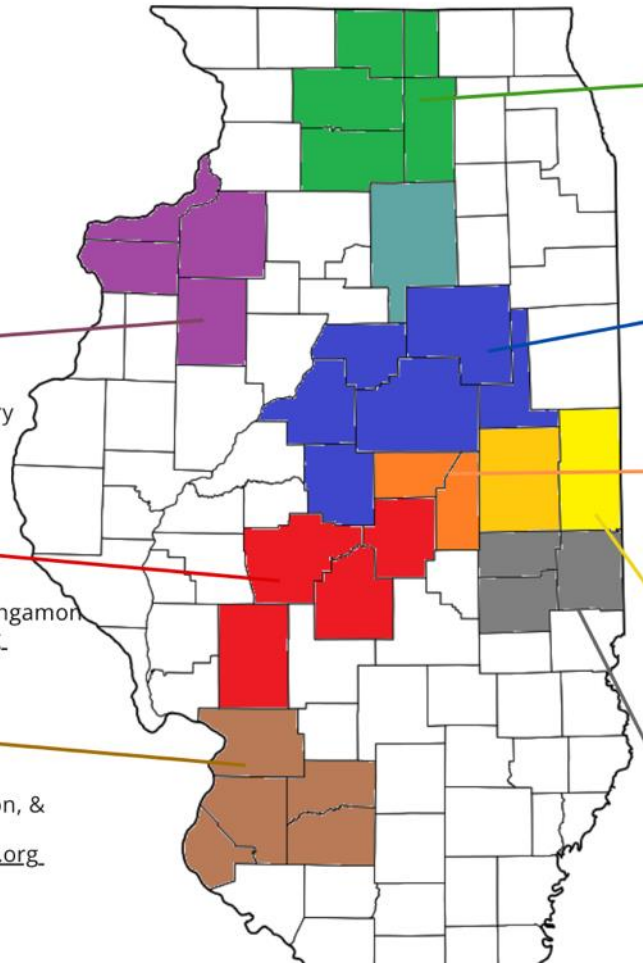

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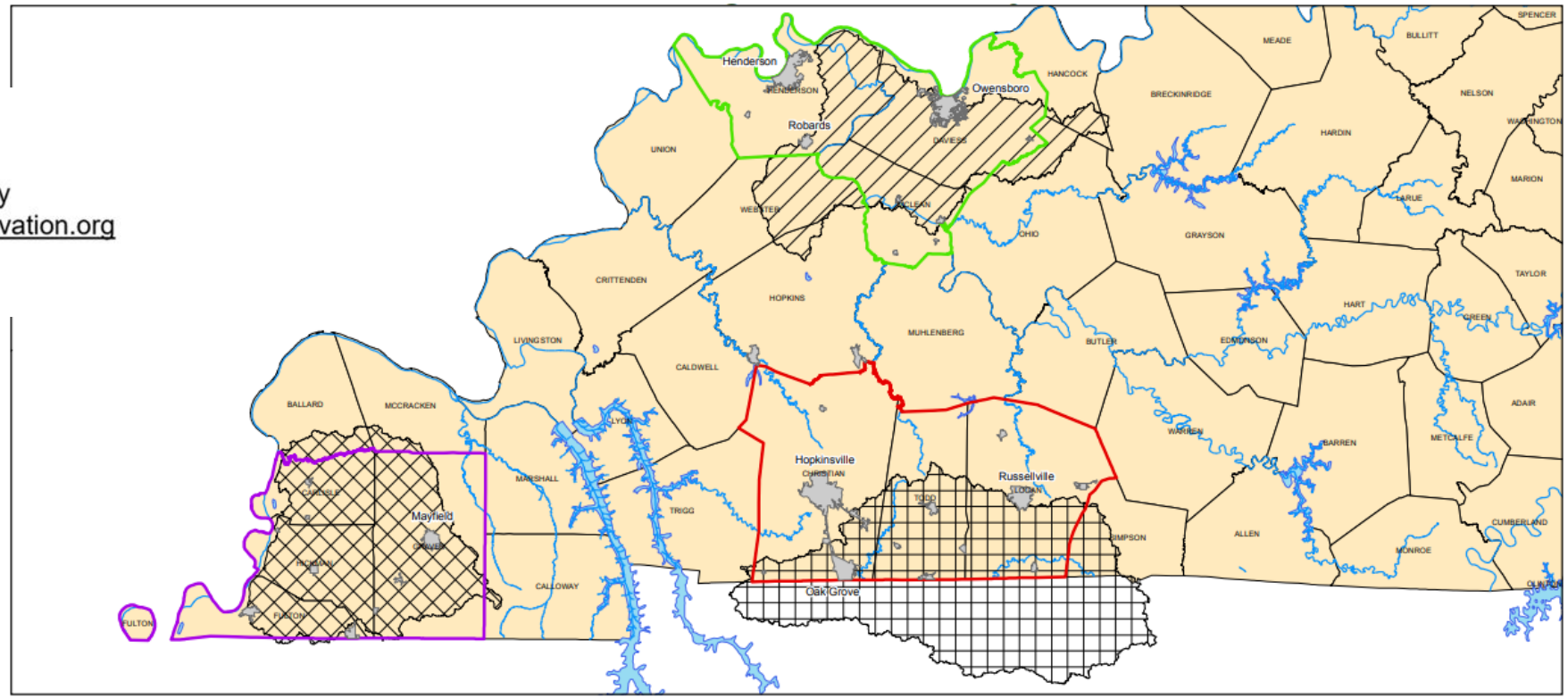

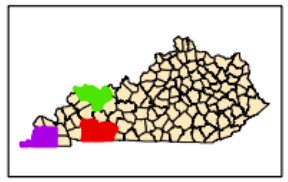

	Total Acres	Total Ag Acres	# of Farms
Lower Cumberland	1,061,327	817,113	2,842
Lower Green	767,272	537,527	1,715
Purchase	793,407	614,946	2,243

Source: NRCS, NHD, NASS
Map Produced November 2015

Legend
- Lower Cumberland
- Lower Green
- Purchase

Map created by:
Heartland GIS

Nebraska

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Farmer-First

Precision Conservation Management

- Access to experts
- Exclusive cost-share opportunities
- Data security
- Personalized data analysis
- No practice change required

One of the most important parts of PCM that I appreciate is the ability to use it as a resource. If I have a question about a new tillage practice or whether I could get some funding to adopt a new practice, I can call Leyton to direct me.

Darrin Tate, Champaign County, Illinois

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Incentives through Partnerships

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Field to Market®
The Alliance for Sustainable Agriculture

PEPSICO

USDA

Payments coming from USDA and PepsiCo/Walmart.

PepsiCo and Walmart share claim on the carbon asset.

Cover Crops	No-Till/Strip Till	MRTN/10% N Reduction
$15/acre 1st and 2nd year	$10/acre 1st and 2nd year	$10/acre 1st year
$10/acre 3rd year and beyond	$5/acre 3rd year and beyond	

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Incentives through Partnerships

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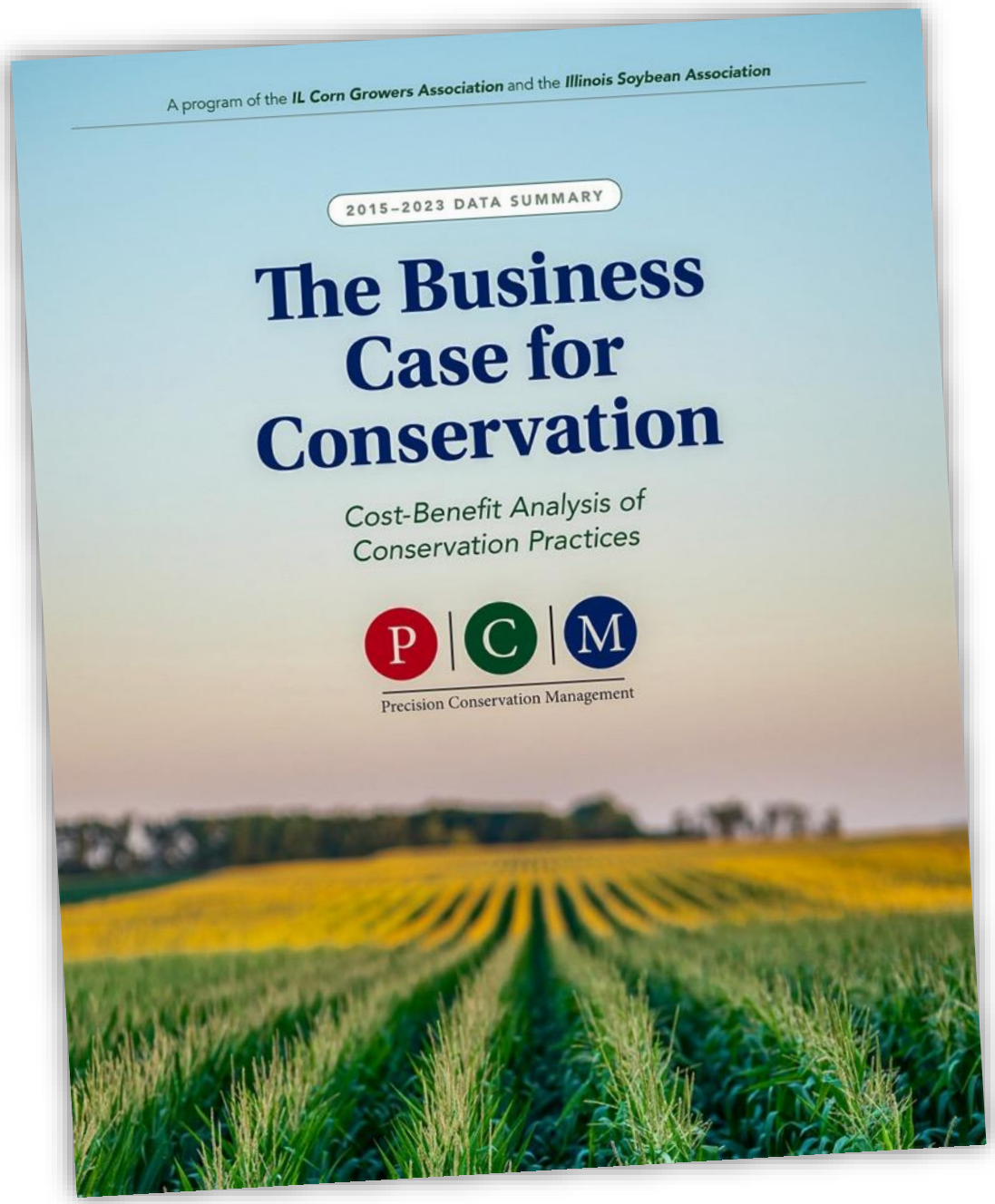
Statewide Cover Crop Incentive Program

- Payments available for new & existing cover crop acres
- Access to DTN's Digital Marketplace connecting you to other ecosystem service opportunities

FARMERS FOR SOIL HEALTH

Year 1	Year 2	Year 3
$25/acre	$15/acre	$10/acre



HOT OFF THE PRESS!

JUNE EDITION

PRAIRIE FARMER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Practice Standards
• Tillage
• Cover Crops
• Nitrogen Management
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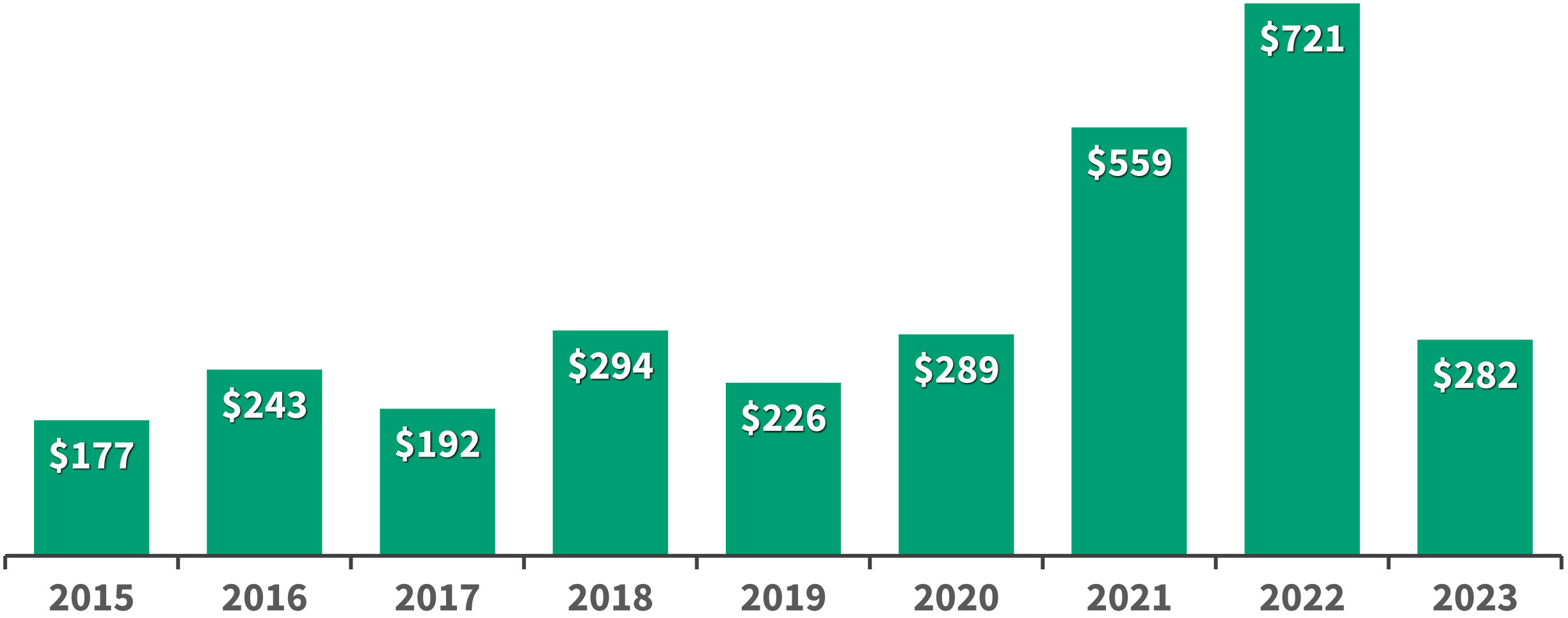
Operator and Land Return (OLR), Corn, East Central Illinois, High SPR



Tillage

Tillage Benchmark

- No-tillage: no tillage passes
- One-tillage: one tillage pass
- Two-tillage – light: two tillage passes
- 2-pass-moderate: No deep tillage
- 2+ pass: One pass a deep tillage
- Strip tillage: run a strip bar

Note:
Tillage Benchmark relates to number of tillage pass

Most field passes relate to something else: pesticide app, fertilizer app, planting, harvest.

Results per acre for Corn, High SPR, 2015-2023

	No-Till	1-pass
Yield (bushels)	219	222
Revenue	$944	$952
Direct costs	$437	$432
Power costs	$108	$116
Overhead costs	$39	$39
Total non-land costs	$584	$587
Operator and land return	$360	$365

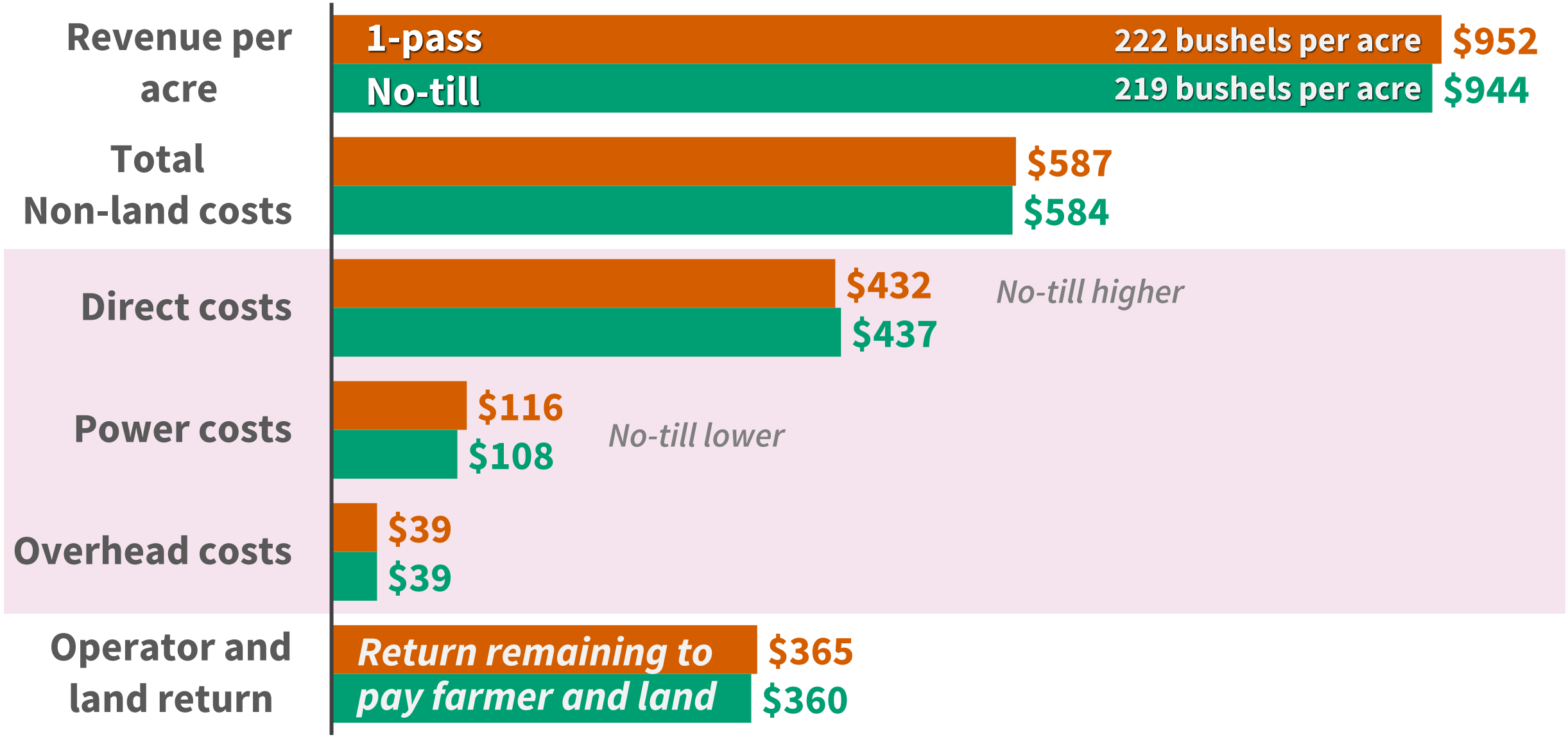
Direct costs:
Seed, chemicals, fertilizer, drying, storage, crop insurance

Power costs:
All costs related to machinery

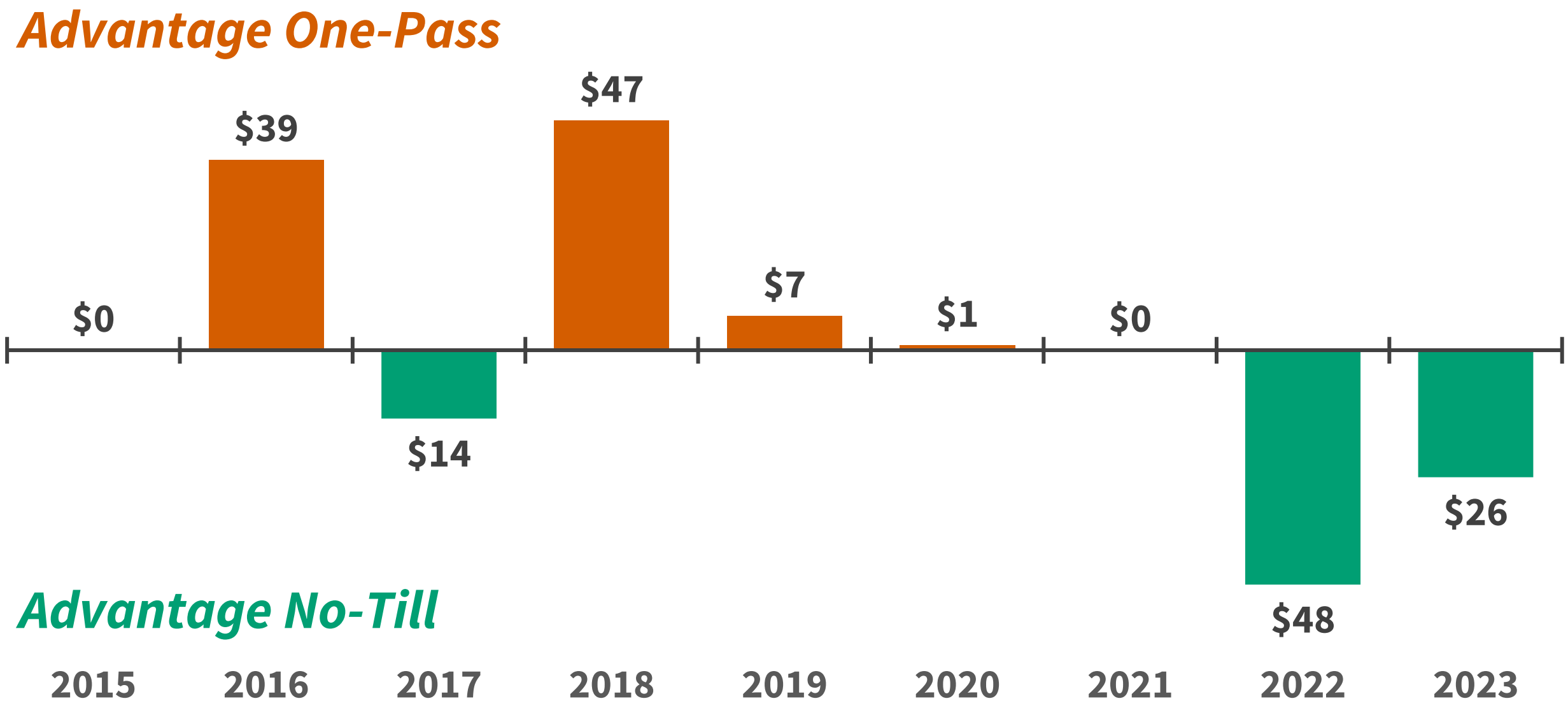
Overhead costs: Hired labor, general insurance, buildings, interest

Return remaining to pay farmer and land.

Results, Corn, High SPR, 2015-2023



Operator and land return



Results per acre for Corn, High SPR, 2015-2023

	1-pass	2-pass Light	2-pass Moderate	2+
Yield (bushels)	222	227	227	223
Revenue	$952	$976	$975	$963
Direct costs	$432	$442	$450	$446
Power costs	$116	$128	$131	$147
Overhead costs	$39	$39	$39	$39
Total non-land costs	$587	$609	$620	$632
Operator and land return	$365	$367	$355	$331

Higher yields with more tillage but

- Power costs increase
- Direct costs increase

Farmer with more tillage had lower returns

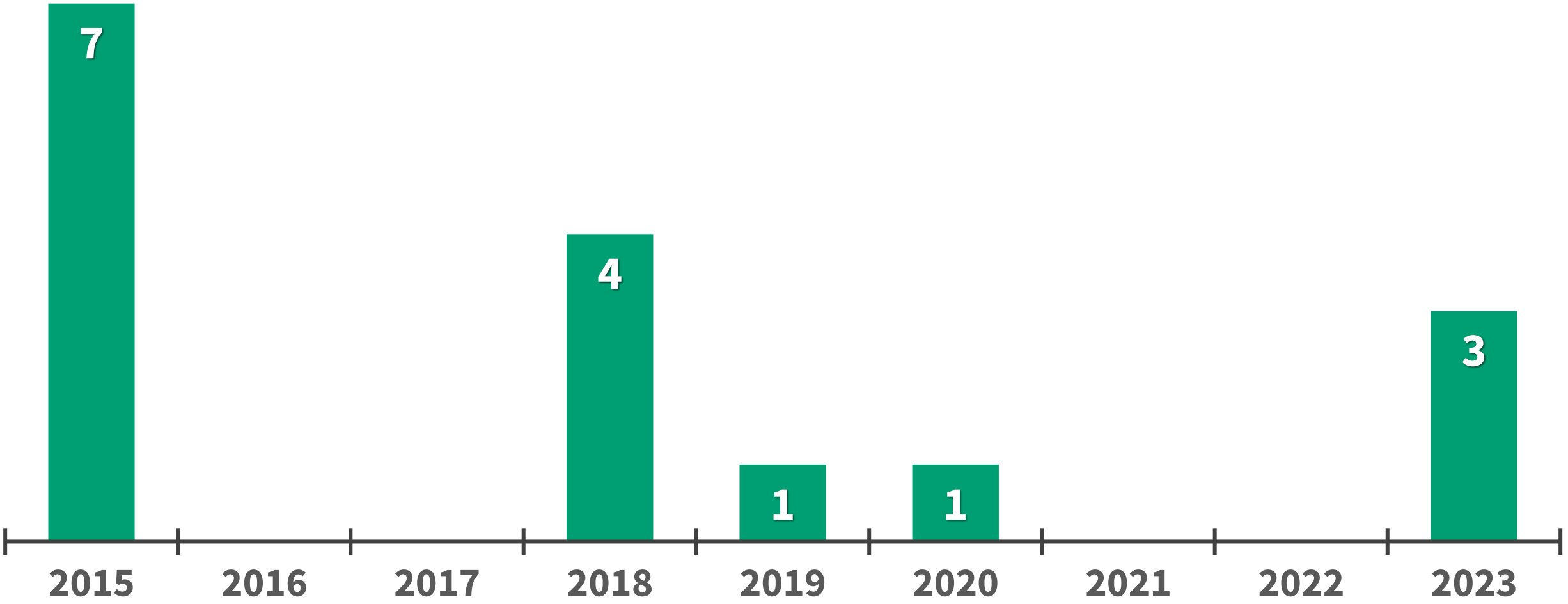
Results per acre Soybeans, High SPR, 2015-2023

	No-till	1-pass
Yield (bushels)	68	70
Revenue	$724	$748
Direct costs	$176	$171
Power costs	$82	$92
Overhead costs	$33	$33
Total non-land costs	$290	$296
Operator and land return	$434	$452

Notes:

- No-till has slight decrease in yield per acre with tillage
- No-till has a slight increase in direct costs
- No-till has slightly lower power costs
- There is a yield advantage to some tillage

Yields: One-Pass minus No-Till



Results per acre for Soybeans, High SPR, 2015-2023

	1-pass	2-pass Light	2-pass Moderate	2+
Yield (bushels)	70	70	72	70
Revenue	$748	$749	$769	$749
Direct costs	$171	$165	$178	$159
Power costs	$92	$99	$103	$122
Overhead costs	$33	$33	$33	$33
Total non-land costs	$296	$297	$314	$314
Operator and land return	$452	$452	$455	$435

Farmers with more tillage have higher yields but

- Power costs increase
- Total non-land costs increase

The Case of Strip Till

Results per acre for Corn, High SPR, 2015-2023

	1-pass	Strip-Till
Yield (bushels)	222	221
Revenue	$952	$953
Direct costs	$432	$456
Power costs	$116	$123
Overhead costs	$39	$39
Total non-land costs	$587	$618
Operator and land return	$365	$335

Note:

- Higher direct costs and power costs for strip-till
- More profitable strip tillers:
  - have same direct costs as 1-pass
  - do not generally have two tillage pass

Results per acre for Soybeans, High SPR, 2015-2023

	1-pass	Strip-Till
Yield (bushels)	70	73
Revenue	$748	$779
Direct costs	$171	$225
Power costs	$92	$97
Overhead costs	$33	$33
Total non-land costs	$296	$355
Operator and land return	$452	$424

Note:

- Higher direct costs and power costs for strip-till that negate the yield advantage:
  - Pesticides
  - P+K fertilizer
- More profitable strip tillage farmers
  - Have the same direct costs as 1-pass system farmers

Summary of Tillage

- Some advantage to tillage for yields, but may not cover the costs of additional tillage.
- Little advantage to more than one-tillage pass
- Cost control is important with strip tillage

Cover Crops

Soybean, High Soil Productivity Rating (SPR) 2015-23 Average Values

	Overwintering	Winter Terminal	No Cover Crop
# Fields	1,340	44	4,554
Yield Per Acre	68	71	70
Soil Productivity Rating	139	139	140
Gross Revenue	$723	$762	$747
Cover Crop Seed	$14	$16	$0
Total Direct Costs*	$180	$180	$173
Cover Crop Planting	$11	$16	$0
Other Power Costs**	$95	$75	$89
Total Power Costs	$106	$91	$89
Overhead Costs	$33	$33	$33
Total Non-land Costs	$318	$304	$295
Operator & Land Return	$375 to $425	$435 to $485	$452
Estimated Soil Loss (Tons/A)	1.24	1.12	2.03
GHG Emissions (Metric Tons CO_2e/A)	-0.42	-0.42	-0.02

Managing Risks with Cover Crops

A case-study of the most profitable Illinois farms using cover crops

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A program of the IL Corn Growers Association and the Illinois Soybean Association

nded Starter Program & Budget

5

NCIAL ANALYSIS: KEEPING COSTS LOW IS KEY EMAINING PROFITABLE WITH COVER CROPS. $

lows suggest that farmers without experience with cover crops start with cover ybeans. A low cost, low risk plan is to:

or broadcast cereal rye without poration after corn harvest.

✓ Terminate before planting and/or when cereal rye is relatively small.

ce in yield between fields with cover crops and those without.

p systems generally come from reduced herbicide cost,

costs.

erbicide costs do not entirely offset the cost of cover crop

t revenue from another source should be used to cover the le 1) EQIP and CSP, 2) pay-for-practice programs like PCM, and

hese programs dget below.

Central Illinois, Average Values

		One-pass No Cover Crops	
		68.0	
		$786	
		$174	
		$87	
	$25	$33	$33
TOTAL NON-LAND COSTS	$308	$297	$0
OPERATOR & LAND RETURN	$475	$486	$294
			$492

Includes cover crop fields with cereal rye as the species and seeded after harvest using drill or broadcast without incorporation. Fields that were no-tilled and did not have a cover crop. Fields with one pass of a tillage implement and no cover crops.

Patience is needed on your first attempts with cover crops, but long-term soil conservation and carbon sequestration is worth the effort.

JASON LAY

MCLEAN COUNTY

Courtesy of Soil Health Partnership

www.precisionconservation.org/managing-risks-with-cover-crops/

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Cover Crops
Corn-to-Soybeans

Specifications

1. Cover-crop species
2. Timing of cover-crop planting
3. Timing of cover-crop termination and planting of crop

Species of Choice: Cereal Rye

1. Generally low cost choice of cover crop
2. Relatively easy to establish with timing in fall being less of a concern
3. Consistently overwinters

Planting timing and method

Plant after corn harvest

Method varies

- **Broadcast with dry fertilizer**
  Low cost but poorer
- **Broadcast and then light tillage pass with vertical tillage**
  Moderate costs, better establishment
- **Drill or plant**
  High costs, but good establishment, more labor/time intensive
- Attachments to combine
  Eliminates tillage pass, generally lower costs, slows/complicates harvest

Termination of cover crops

- **Plant soybeans early!!**

- Termination:
  - Before planting (Reduces risk of cover crop competing with soybeans, decreases chance of eliminating herbicide passes)
  - After planting (Increases risk of cover crop competing with soybeans, increases chance of eliminating herbicide passes)

Reduction in herbicide costs and increase in weed control is a benefit of planting cover crops

Reduced Risk Cover Crop System for Soybeans

Harvest Corn

Plant Cover Crops
1. Species: Cereal rye
2. Planting method
   a) Drill
   b) Broadcast incorporate or not
   c) plant with attachments on combine

Terminate (either place)

Plant Soybeans

Fall

Winter

Spring

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Per Acre Soybean Results from Precision Conservation Management, Central Illinois, High-Productivity Farmland, Average from 2019 to 2022.

	Cover Crops	No cover crops	No cover crops
	No-till	No-till	One Tillage Pass
Yield (bushels/acre)	67.3	67.8	68.0
Gross Revenue ($ per acre)	$783	$783	$786
Direct costs[4]	177	189	174
Power costs[5]	73	75	87
Overhead costs	33	33	33
Cover crop costs[6]	25	0	0
Total non-land costs	$308	$297	$294
Operator and Land Return	$475	$486	$492

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Summary findings (Cover Crop before Soybean)

- There is no statistical difference in soybean yield between fields with cover crops and those without.
- Lower direct costs in cover crop systems generally come from reduced herbicide cost, and occasionally lower fertilizer costs.
- Yield differences and reduced herbicide costs do not entirely offset the cost of cover crop seed and planting.

Summary findings

Interviewed farmers indicated that revenue from another source should be used to cover the costs of cover crops. These include:

- EQIP and CSP
- Pay-for-practice programs like PCM
- Carbon markets

Cover Crops
Soybeans-to-Corn

Why More Challenging?

Agronomics make cover crops more difficult

- Corn is less tolerant of stress compared to soybeans
- Cover crops sequester nitrogen, needed by corn

Timing of cover crop planting and termination becomes more difficult

Costs are more difficult to control

Three systems show promise

1. Clovers – seed before harvest
2. Cereal rye – after harvest
3. Winter terminal cover crops

Clovers

Seed before soybean harvest
generally in late September
(need to have time for clovers to establish)

Aerial seeding method

Advantage: Clovers sequester nitrogen which may be available for corn

Disadvantage: Higher costs:
1) cover crop seed and 2) seeding method

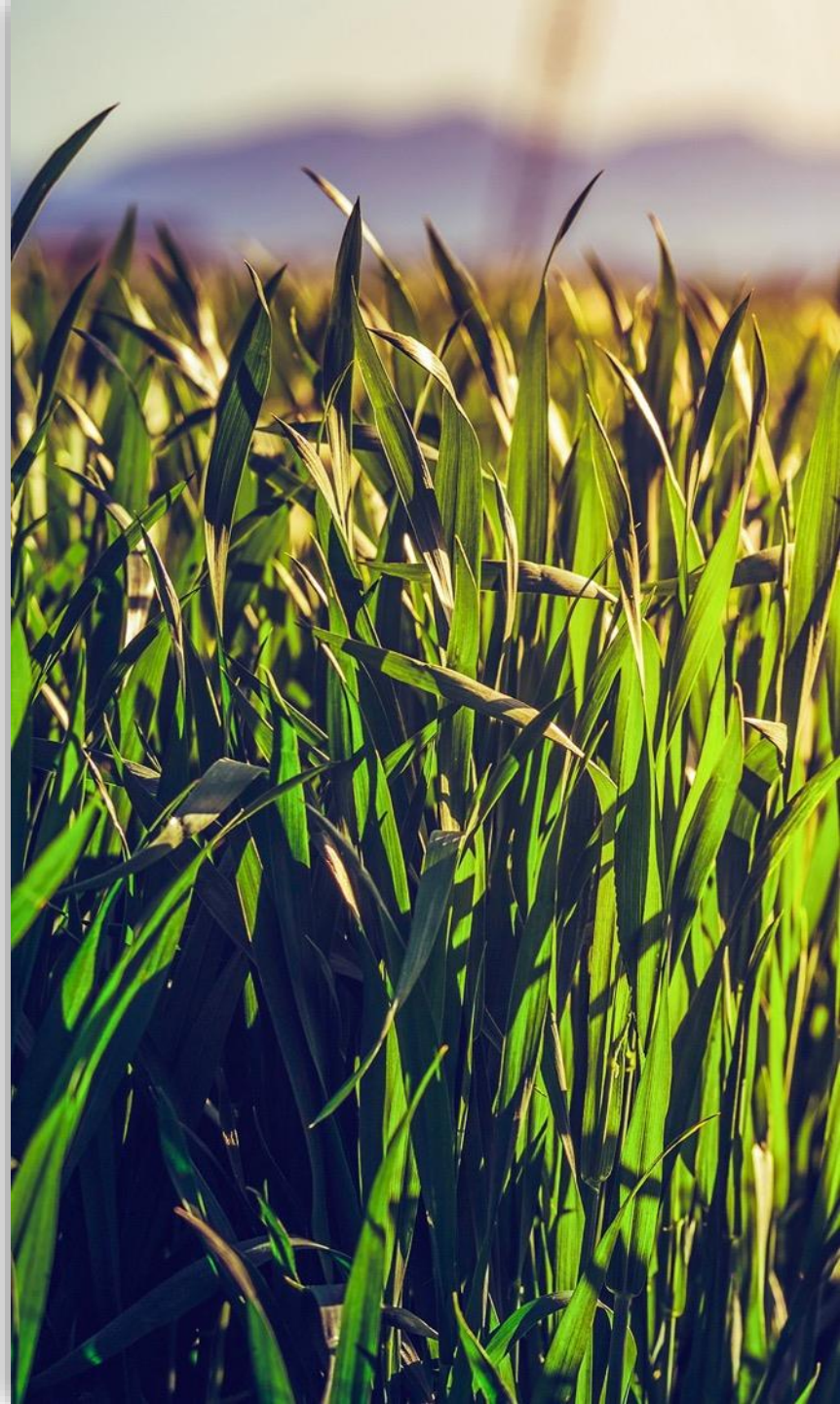
Cereal Rye

Plant after soybeans are harvested using low seeding rates (strip till may have advantages)

Terminate early before corn planting

Advantage: Lower cover crop costs

Disadvantages: Reliance on cereal rye, concerns with successive planting of grasses



Terminal Cover Crop

Cover crop planted in fall that then is terminated by frost (e.g., oats, turnips)

Plant after soybean harvest

Advantage: Does not require special termination in spring

Disadvantage: No spring growth with its advantages (i.e., sequestration of nitrates)

Upcoming August 1st webinar

Nitrogen in Corn

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Results per acre for Corn, High SPR, 2015-2023

	Mostly PrePlant	Mostly Sidedress	>40% Fall	50% Pre 50% Side
Yield (bushels)	220	227	227	223
Operator and land return	$370	$362	$351	$339
N Fertilizer costs	$96	$95	$102	$109
N applied (lbs of N)	200	200	217	205

Higher yields with more tillage but

- Power cost increases
- Direct costs increase

Farmer with more tillage had lower returns

Returns for different N Rate

Corn N RATE, HIGH SPR, LBS PER ACRE I 2015-23 AVG VALUES	<150	151-175	176-200	201-225	>225
# fields	181	599	1,854	2,558	1,430
AVG Corn Yield (bu/a) 2015-23	208	218	220	223	229
OPERATOR & LAND RETURN	$361	$371	$365	$354	$346
GHG emissions (metric tons CO2e/a)	0.38	0.61	0.66	0.74	0.9

THANK YOU!

Learn more at www.precisionconservation.org

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Director, WQ Research
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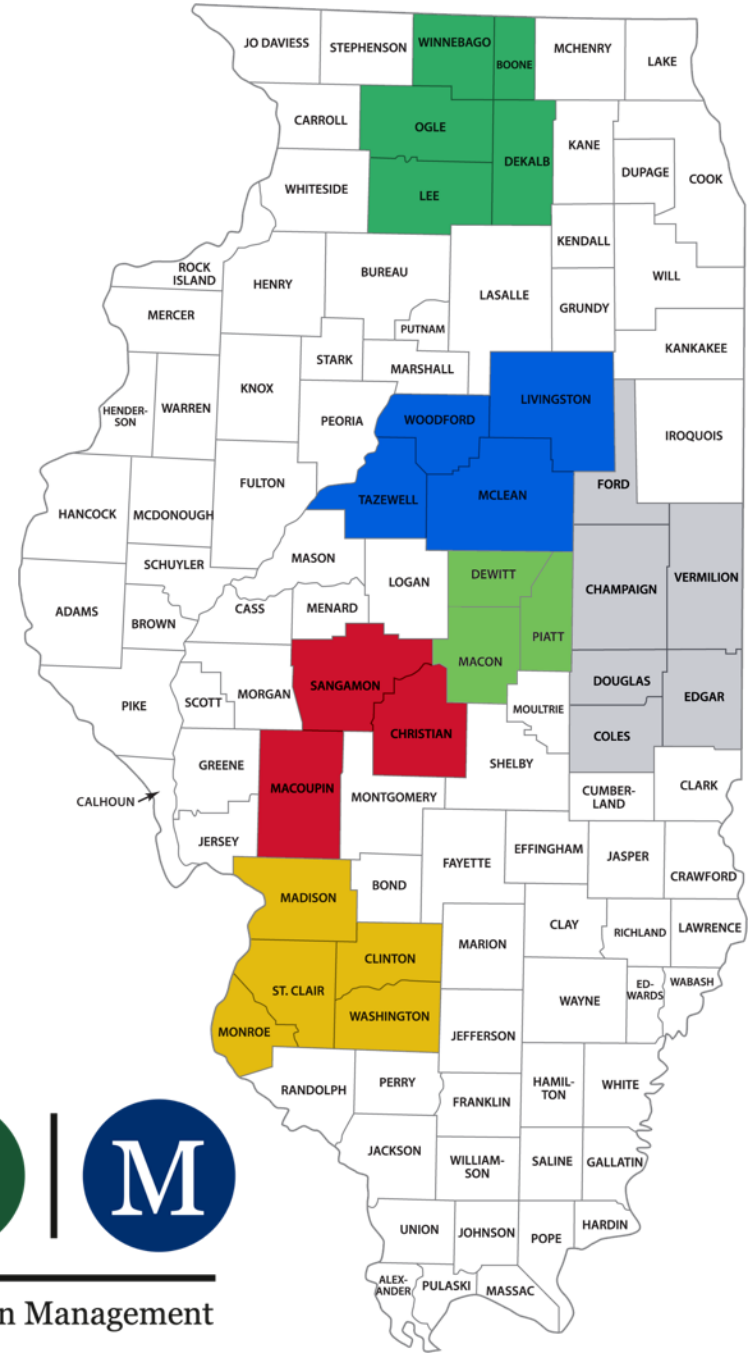
Are you interested in enrolling in the PCM program?

- Already a member
- Yes, please have a PCM staff member contact me
- Yes, when it is available in my area
- No, thanks for asking



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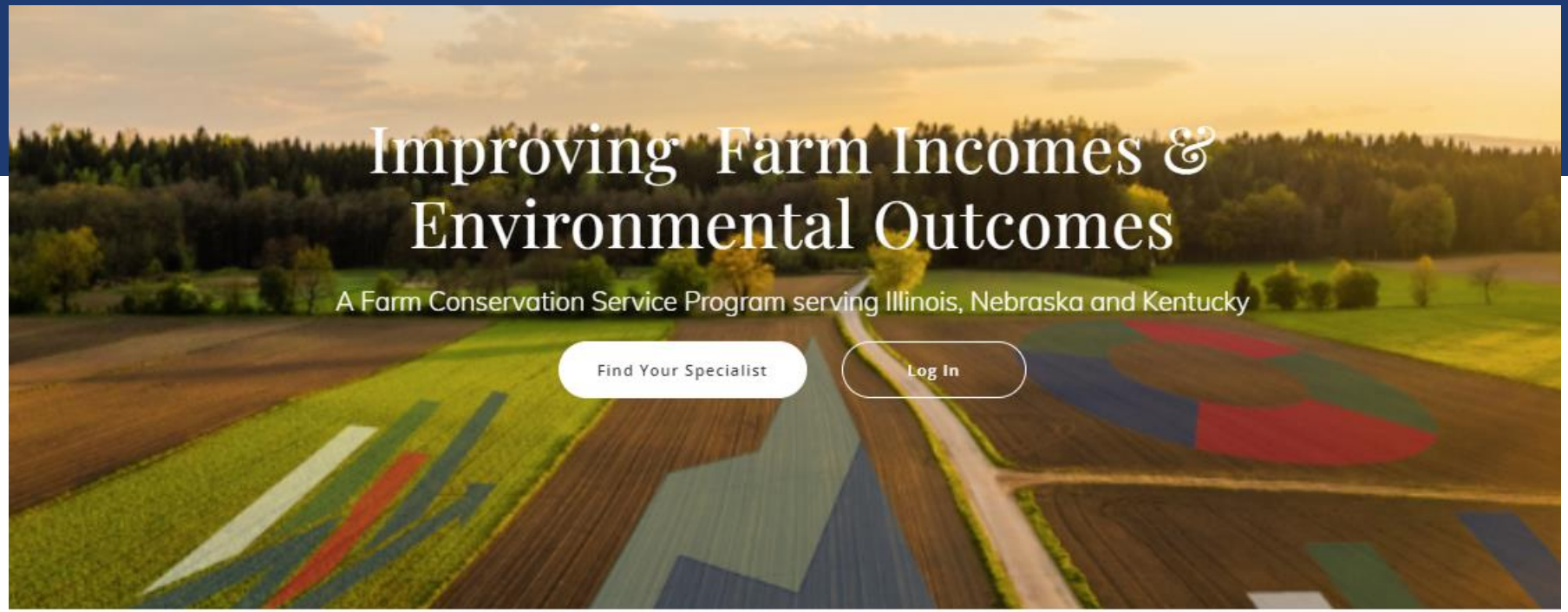


ACCESS TO EXPERTS

PCM Farmers recieve ongoing one-on-one consultations with conservation experts in their region to identify the best opportunities for their farm.

COST-SHARE OPPORTUNITIES

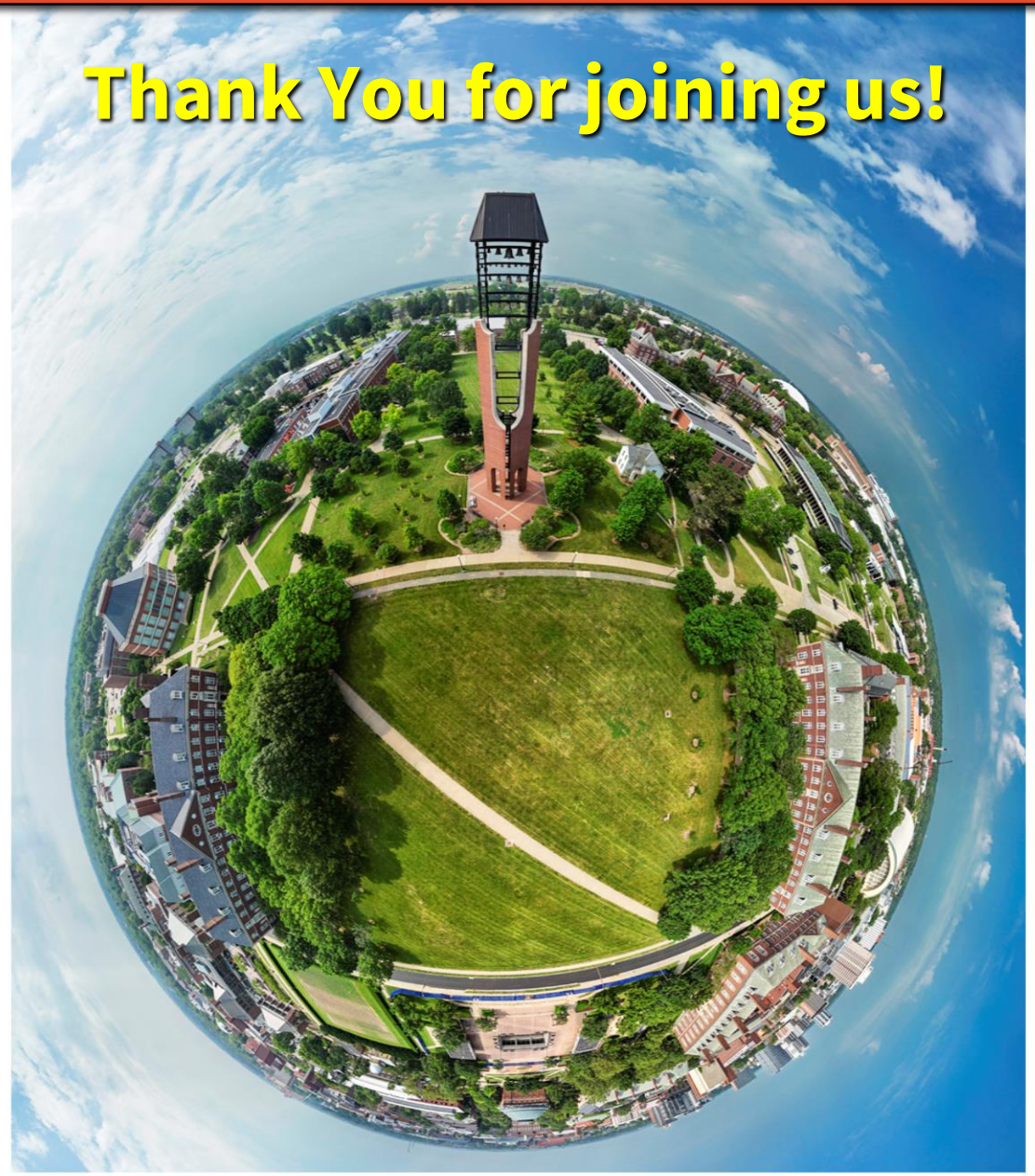
PCM Supply Chain Partnerships create a financial advantage for farmers who use regenerative farming practices.

DATA ANALYSIS

The Farmer Portal collects aggregated, anonymized farm data to demonstrate the financial and environmental impact of conservation practices.

www.precisionconservation.org

2024 farmdoc Webinar



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