
IowaNREC.org
Agriculture. Science. Environment.

Iowa Nutrient Research & Education Council

Targeted Missions:

- Progress measurement
- New technology development
- Enhance environmental impact of ag retailers and crop advisers.

Structured to Bring Together:

- Major farm & commodity organizations
- Major fertilizer & crop production companies
- Ag retailers & crop advisers

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CHAD INGELS
Regional Liaison

Ingels lives in Randalia and serves the northeast portion of the state. He most recently worked as a water quality specialist for Iowa State University Extension and Outreach and is a nutrient management consultant.

ROGER WEBSTER
Regional Liaison

Webster lives in Treynor and serves the southern counties in Iowa. Roger is an instructor at Iowa Western Community College, is the General Manager at Treynor Ag Supply, and is a past Chair of AAI Services.

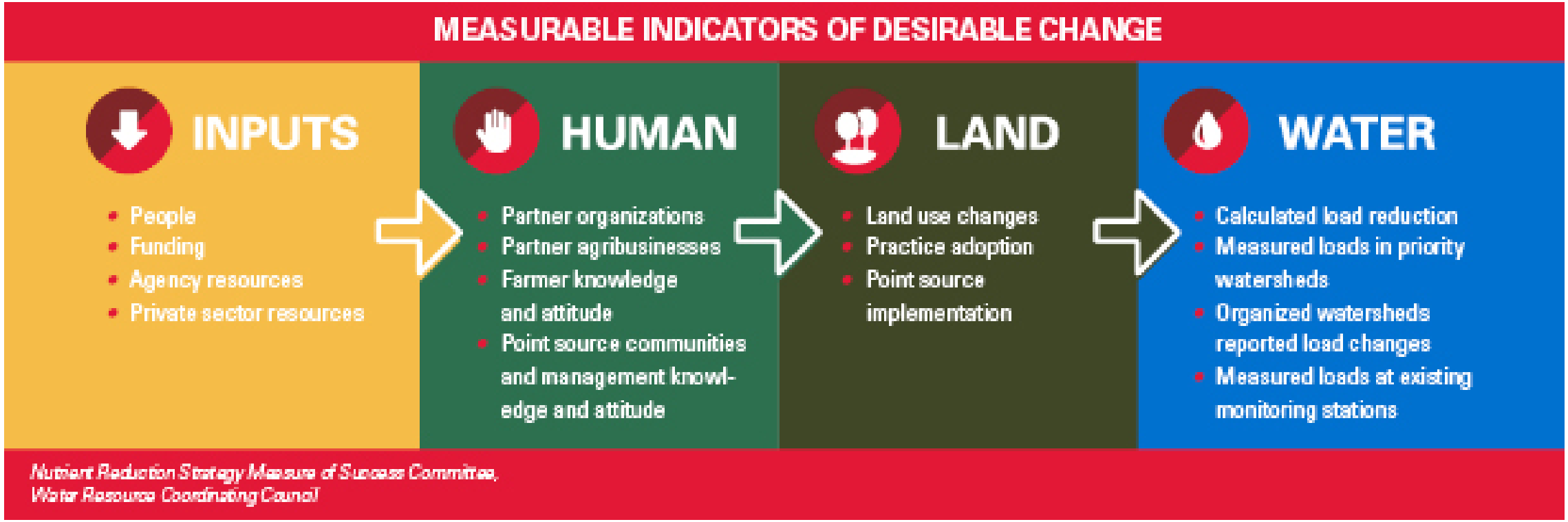
VINCE DAVIS
Regional Liaison

Davis lives in Spirit Lake and serves the Northwest portion of Iowa. He is a retired Farm Bureau regional manager and has more than 30 years of experience working with farmers.

DAVE HANSEN
Regional Liaison

Hansen lives in Spirit Lake and serves the northwest portion of the state. He most recently worked as an agricultural equipment manager for Ziegler Ag Products in Minnesota.

How do you know when the Nutrient Reduction Strategy is successful?



INREC Progress Tracking Projects

INREC Survey

ISU Baseline Assessment & Land Use Info

Iowa Strategy to Reduce Nutrient Loss: Nitrogen Practices

This table lists practices with the largest potential impact on nitrate-N concentration reduction (except where noted). Corn yield impacts associated with each practice also are shown as some practices may be detrimental to corn production. If using a combination of practices, the reductions are not additive. Reductions are field level results that may be expected where practice is applicable and implemented.

	Practice	Comments	% Nitrate-N Reduction*	% Corn Yield Change**
			Average (SD†)	Average (SD†)
Nitrogen Management‡	Timing	Moving from fall to spring pre-plant application	6 (25)	4 (16)
		Spring pre-plant/sidedress 40-60 split Compared to fall-applied	5 (28)	10 (7)
		Sidedress – Compared to pre-plant application	7 (37)	0 (3)
		Sidedress – Soil test based compared to pre-plant	4 (20)	13 (22)††
	Source	Liquid swine manure compared to spring-applied fertilizer	4 (11)	0 (13)
		Poultry manure compared to spring-applied fertilizer	-3 (20)	-2 (14)
	Nitrogen Application Rate	Nitrogen rate at the MRTN (0.10 N:corn price ratio) compared to current estimated application rate. (ISU Corn Nitrogen Rate Calculator – http://cnrc.agron.iastate.edu can be used to estimate MRTN but this would change Nitrate-N concentration reduction)	10	-1
	Nitrification Inhibitor	Nitrapyrin in fall – Compared to fall-applied without Nitrapyrin	9 (19)	6 (22)
	Cover Crops	Rye	31 (29)	-6 (7)
		Oat	28 (2)	-5 (1)
	Living Mulches	e.g. Kura clover – Nitrate-N reduction from one site	41 (16)	-9 (32)
Land Use	Perennial	Energy Crops – Compared to spring-applied fertilizer	72 (23)	
		Land Retirement (CRP) – Compared to spring-applied fertilizer	85 (9)	
	Extended Rotations	At least 2 years of alfalfa in a 4 or 5 year rotation	42 (12)	7 (7)
	Grazed Pastures	No pertinent information from Iowa – assume similar to CRP	85	
Edge-of-Field	Drainage Water Mgmt.	No impact on concentration	33 (32)	
	Shallow Drainage	No impact on concentration	32 (15)	
	Wetlands	Targeted water quality	52	
	Bioreactors		43 (21)	
	Buffers	Only for water that interacts with the active zone below the buffer. This would only be a fraction of all water that makes it to a stream	91 (20)	
	Saturated Buffers	Divert fraction of tile drainage into riparian buffer to remove Nitrate-N by denitrification.	50 (13)	

INREC Progress Tracking Projects

INREC Survey

ISU Baseline Assessment & Land Use Info

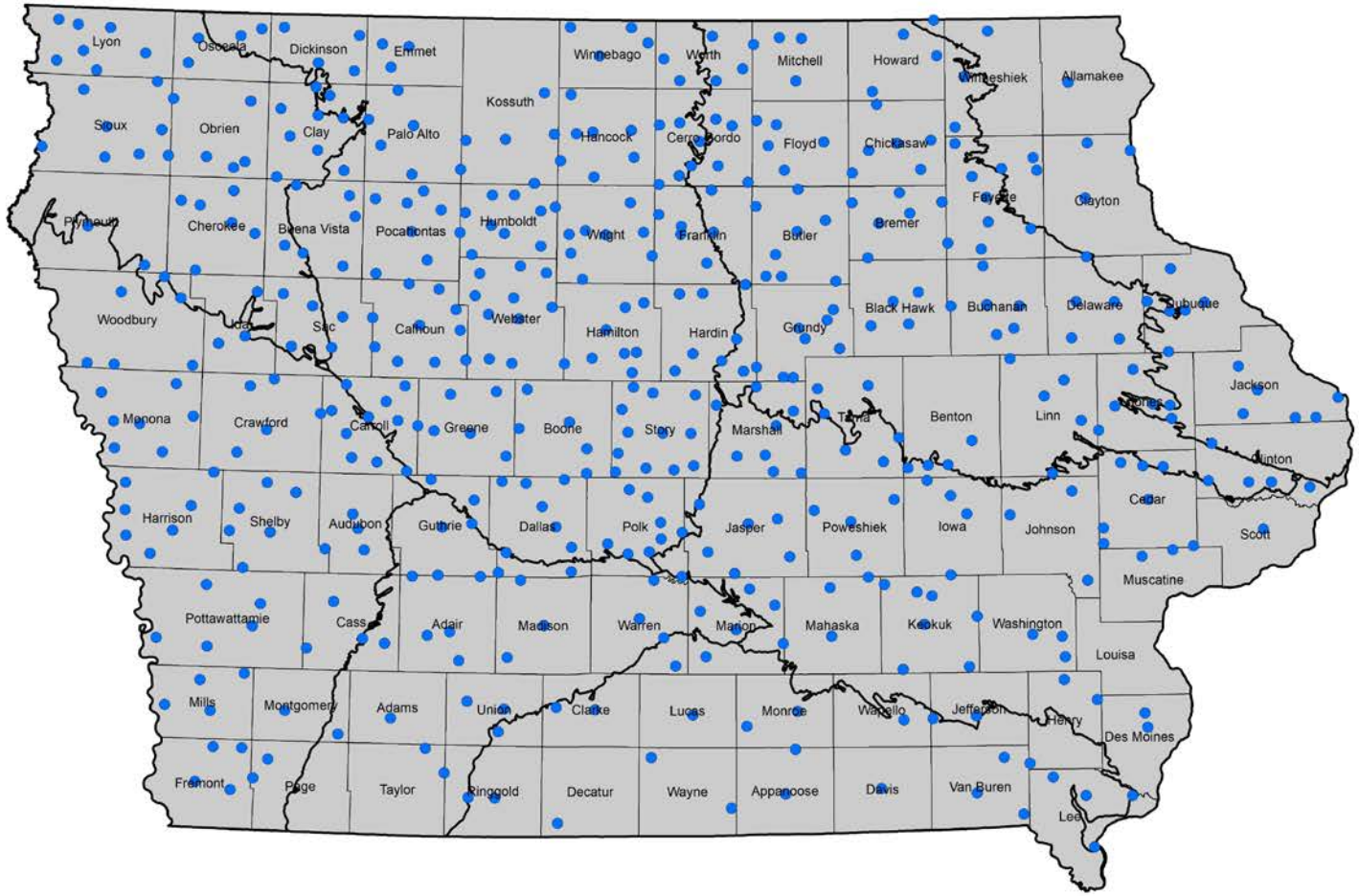
GIS Mapping Project

Iowa Strategy to Reduce Nutrient Loss: Phosphorus Practices

Practices below have the largest potential impact on phosphorus load reduction. Corn yield impacts associated with each practice also are shown, since some practices may increase or decrease corn production. If using a combination of practices, the reductions are not additive. Reductions are field level results that may be expected where practice is applicable and implemented.

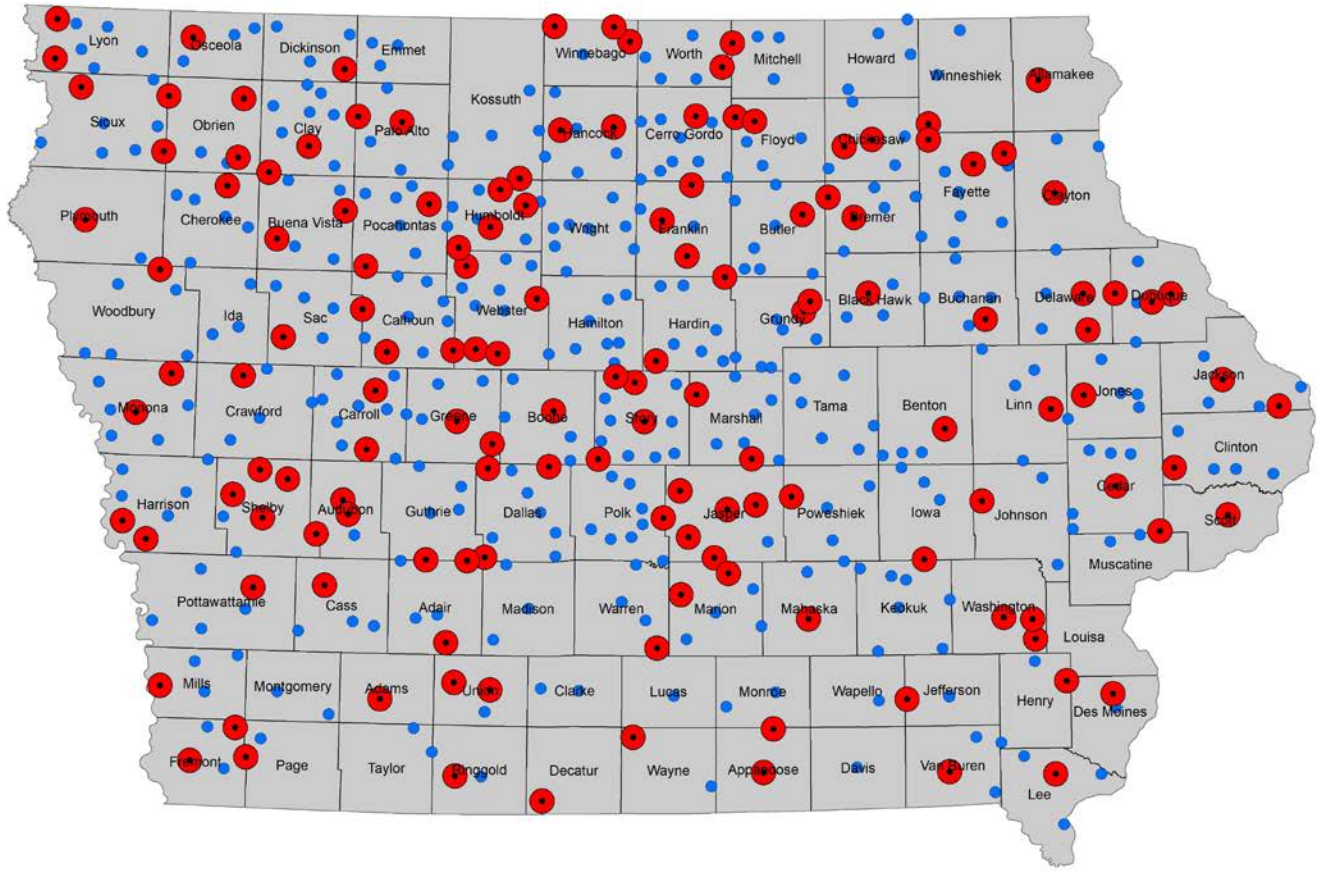
	Practice	Comments	% P Load Reduction[a]	% Corn Yield Change[b]
				(SD[c])
Phosphorus Management[‡]	Phosphorus Application	Applying P based on crop removal – Assuming optimal STP level and P incorporation	0.6[d]	0
		Soil-Test P – No P applied until STP drops to optimum or, when manure is applied, to levels indicated by the P Index[f]	17[e]	0
	Source of Phosphorus	Liquid swine, dairy, and poultry manure compared to commercial fertilizer – Runoff shortly after application[‡]	46 (45)	-1 (13)
		Beef manure compared to commercial fertilizer – Runoff shortly after application[‡]	46 (96)	
	Placement of Phosphorus	Broadcast incorporated within 1 week compared to no incorporation, same tillage	36 (27)	0
		With seed or knifed bands compared to surface application, no incorporation	24 (46)	0
	Cover Crops	Winter rye	29 (37)	-6 (7)
	Tillage	Conservation till – chisel plowing compared to moldboard plowing	33 (49)	0 (6)
		No till compared to chisel plowing	90 (17)	-6 (8)
and Use Change	Perennial Vegetation	Energy Crops	34 (34)	
		Land Retirement (CRP)	75	
		Grazed pastures	59 (42)	
Erosion Control and Edge-of-Field	Terraces		77 (19)	
	Buffers		58 (32)	
	Control	Sedimentation basins or ponds	85	
	Blind Inlet	Sediment control	50	

2017 Crop Year Survey



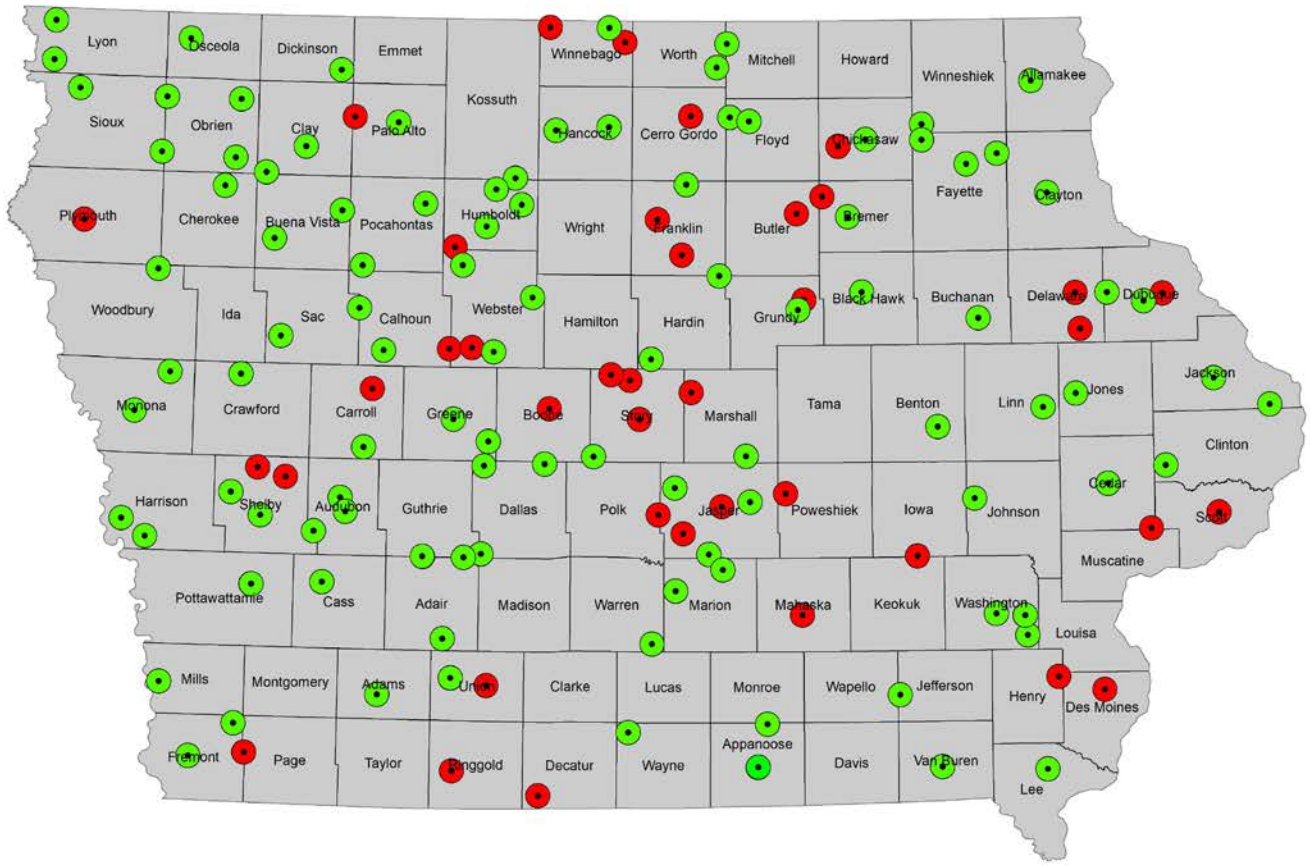
All Retailer Locations (580) with MLRAs

2017 Crop Year Survey



Randomly Selected Locations - 150

2017 Crop Year Survey Results



2017 Crop Year Survey Participating Locations - 103 Total

2017 Crop Year Survey Results

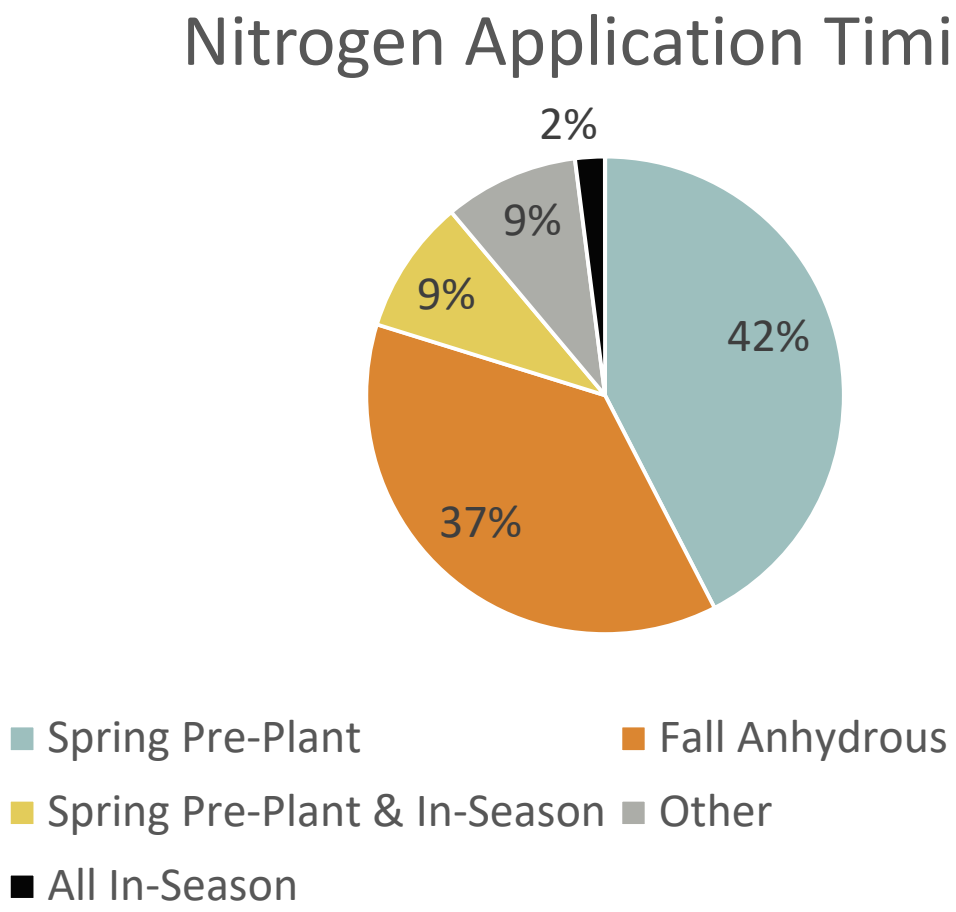
MLRA	2016 Corn/Soy Acres	% of State Acres	Total Samples Requested	Target for Samples Collected out of 500	Actual Samples Collected	Samples Requested per Retail Location	Total # Retailer Locations in MLRA	Number of Retailers Randomly Selected in MLRA	% of Locations Selected by MLRA	Number of Selected Retailers Participating	% of Selected Retailers Participating in MLRA
102C+107A	2,346,474	10.0%	150	50	130	10	47	15	32%	15	100.0%
103	6,122,471	26.2%	390	130	197	10	172	39	23%	23	59.0%
104	4,276,674	18.3%	270	90	153	10	131	27	21%	18	66.7%
105	1,228,670	5.3%	80	27	62	10	24	8	33%	7	87.5%
107B	3,558,958	15.2%	230	76	156	10	76	23	30%	17	73.9%
108C+115C	3,246,384	13.9%	210	70	76	10	69	21	30%	10	47.6%
108D	1,419,828	6.1%	90	30	57	10	34	9	26%	7	77.8%
109	1,197,373	5.1%	80	27	54	10	27	8	30%	6	75.0%
All MLRAs	23,396,832	100%	1500	500	885	10	580	150	26%	103	68.7%

2017 Crop Year Survey Demographics

- 27 of 33 companies participated (81.8%)
- 103 of 150 locations participated (68.7%)
- 885 surveys out of 1,500 possible collected (59.0%) –

  583 (66%) collected with new process in <3 months
- Average Field Size – 93.6 acres
- Average Farming Operation Size – 805.4 acres
- Owned land – 65.5%
- Rented Land – 34.5%
- Farmer Opt-Outs - 11

2017 Crop Year Survey Results



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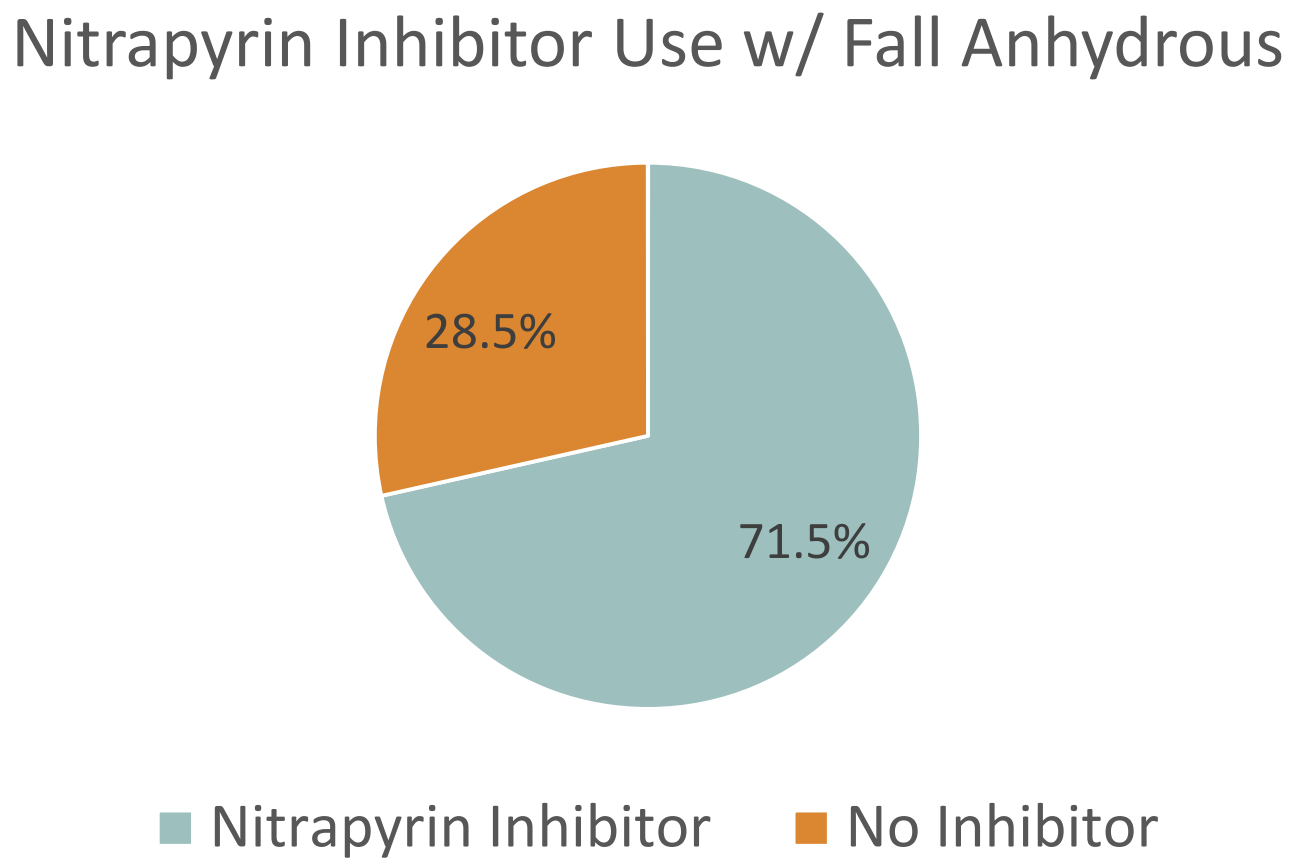

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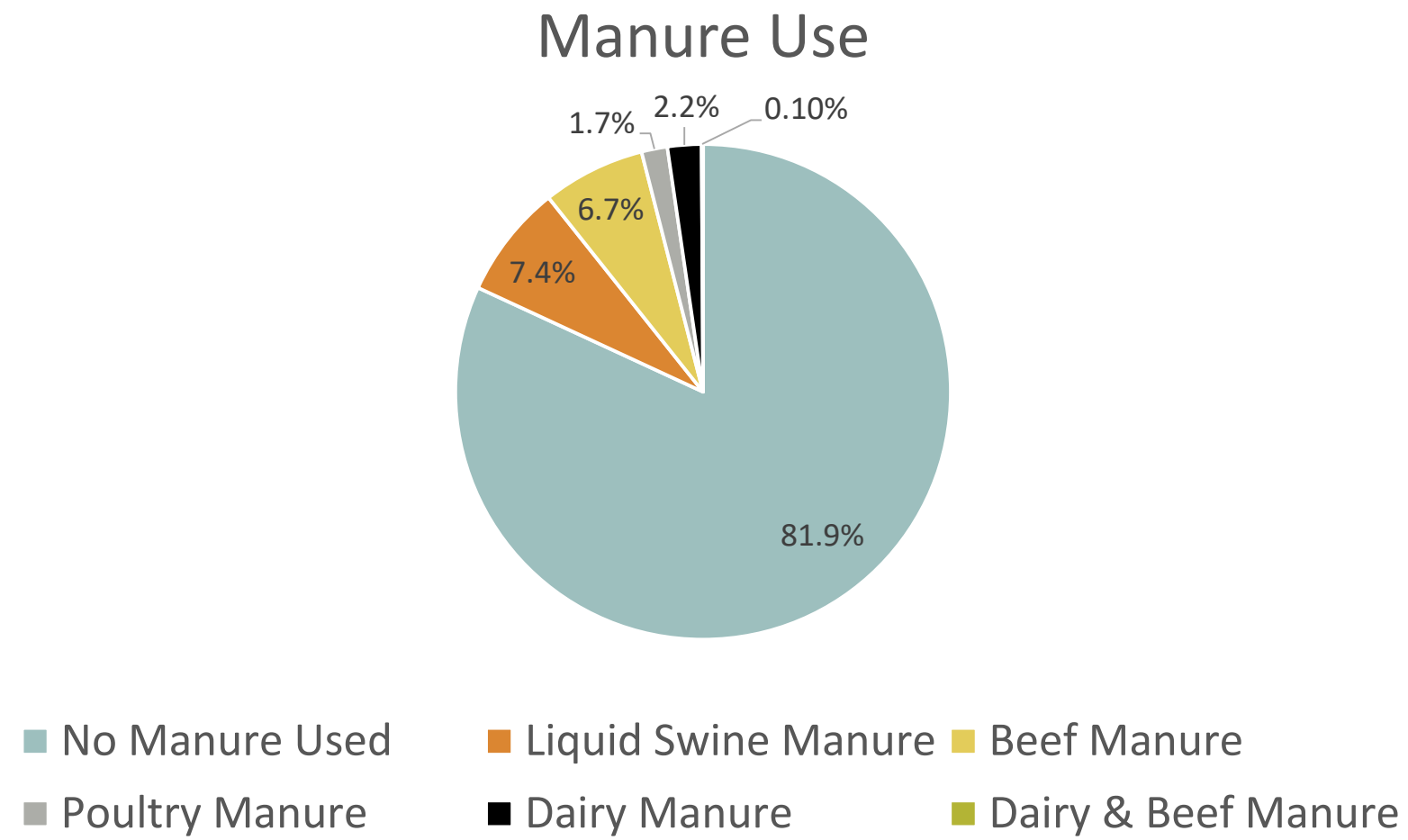

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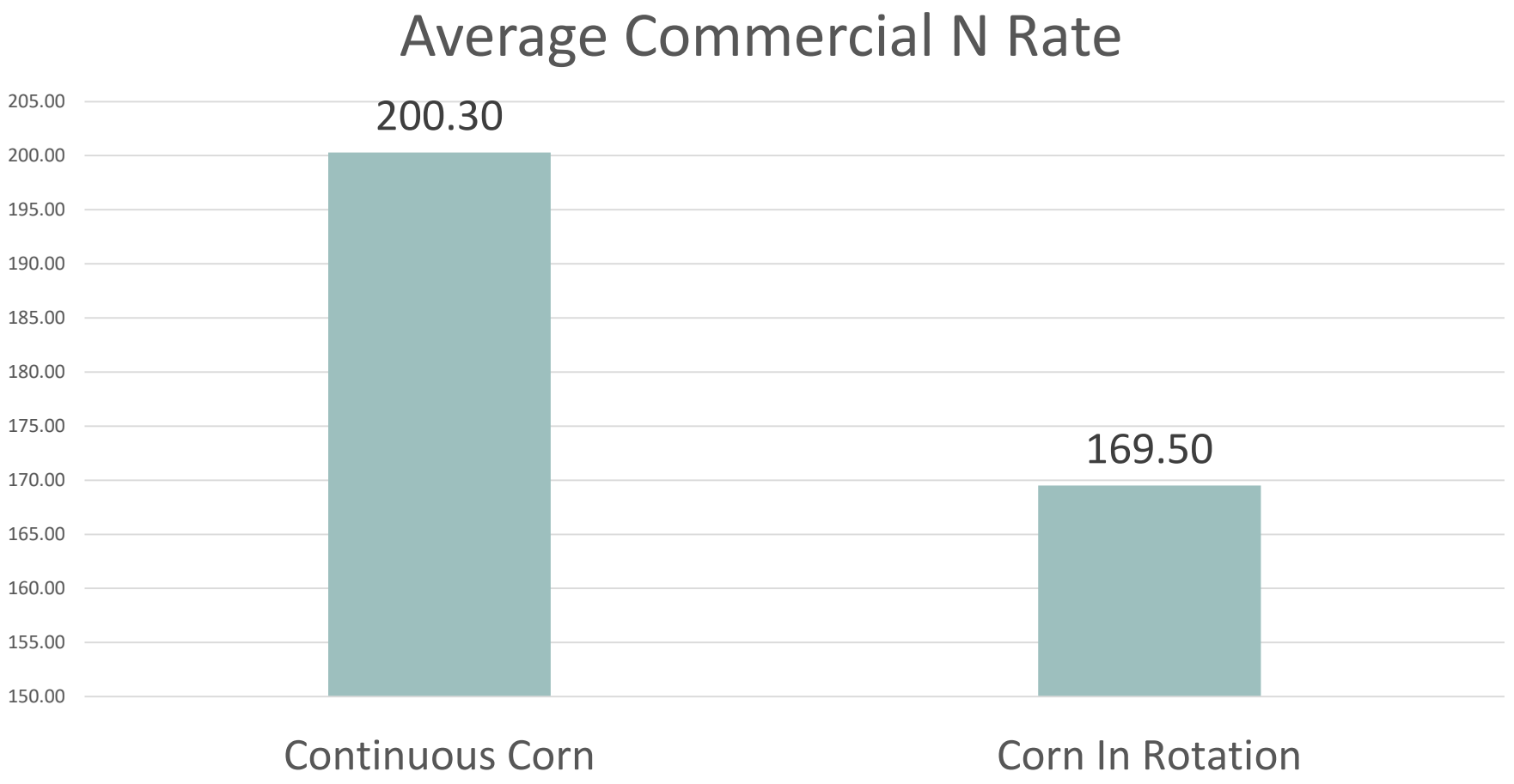

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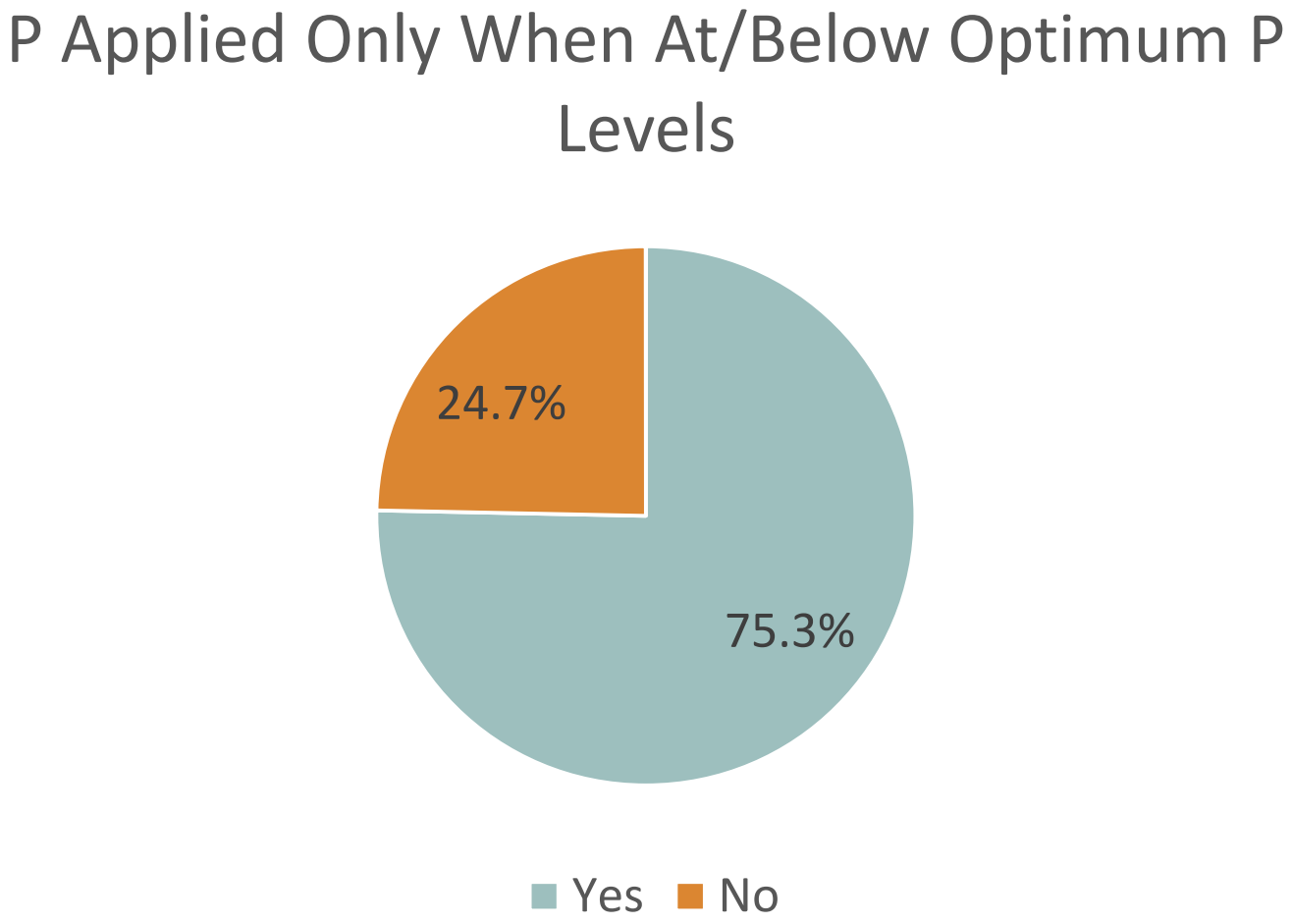

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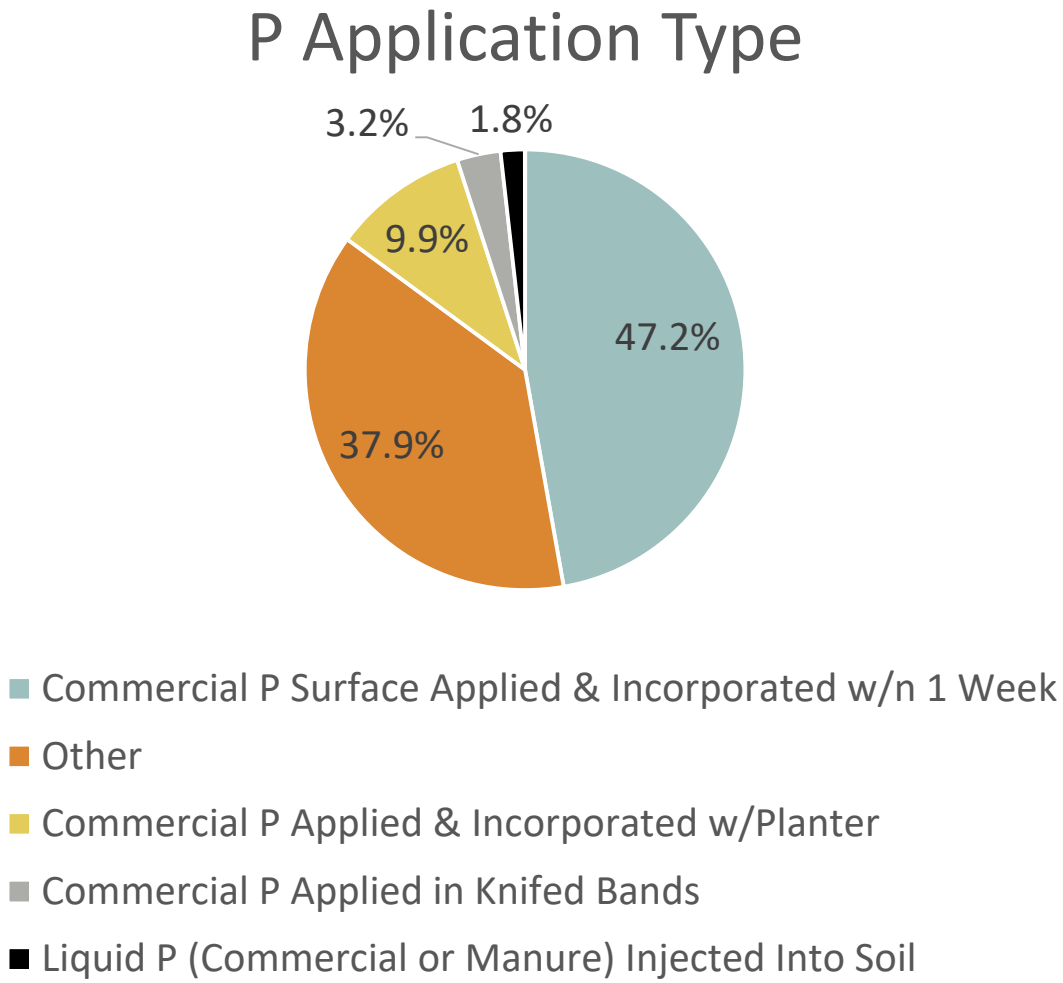

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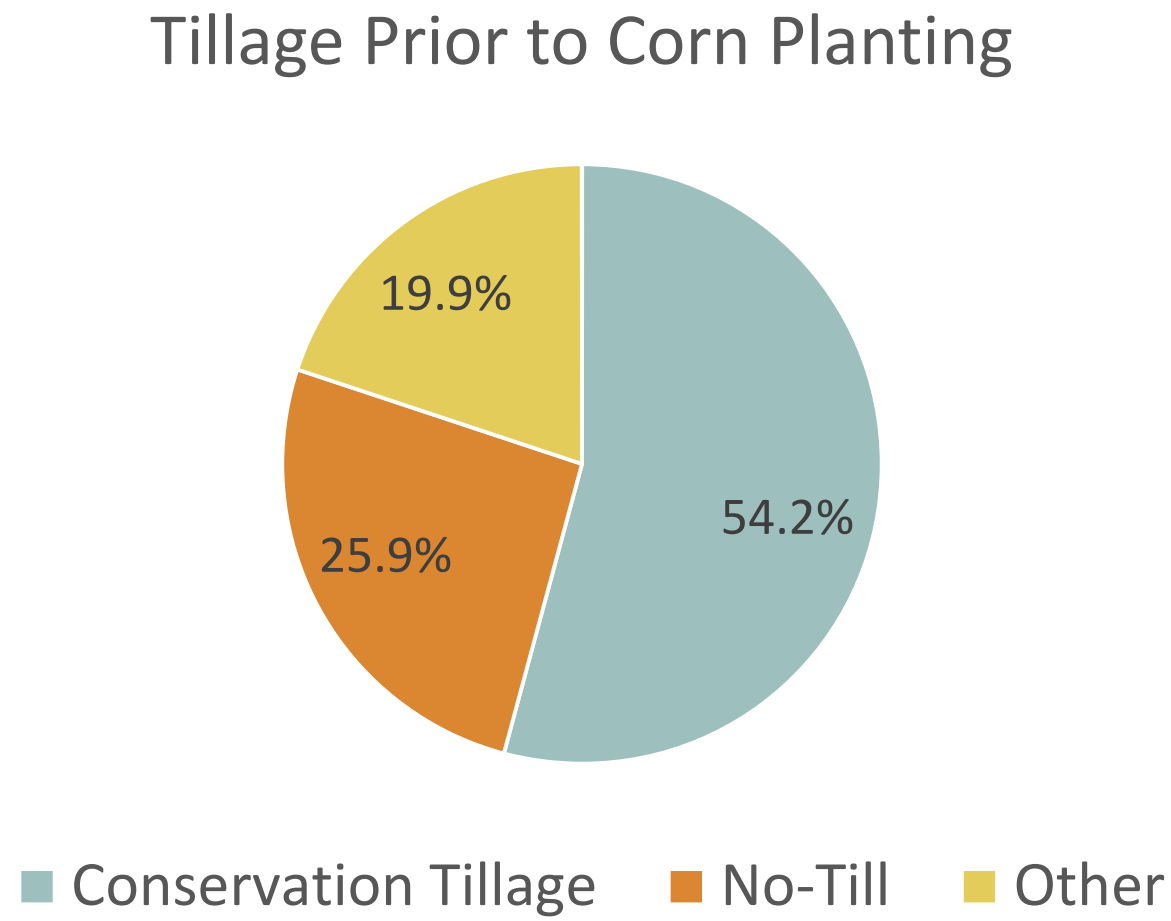

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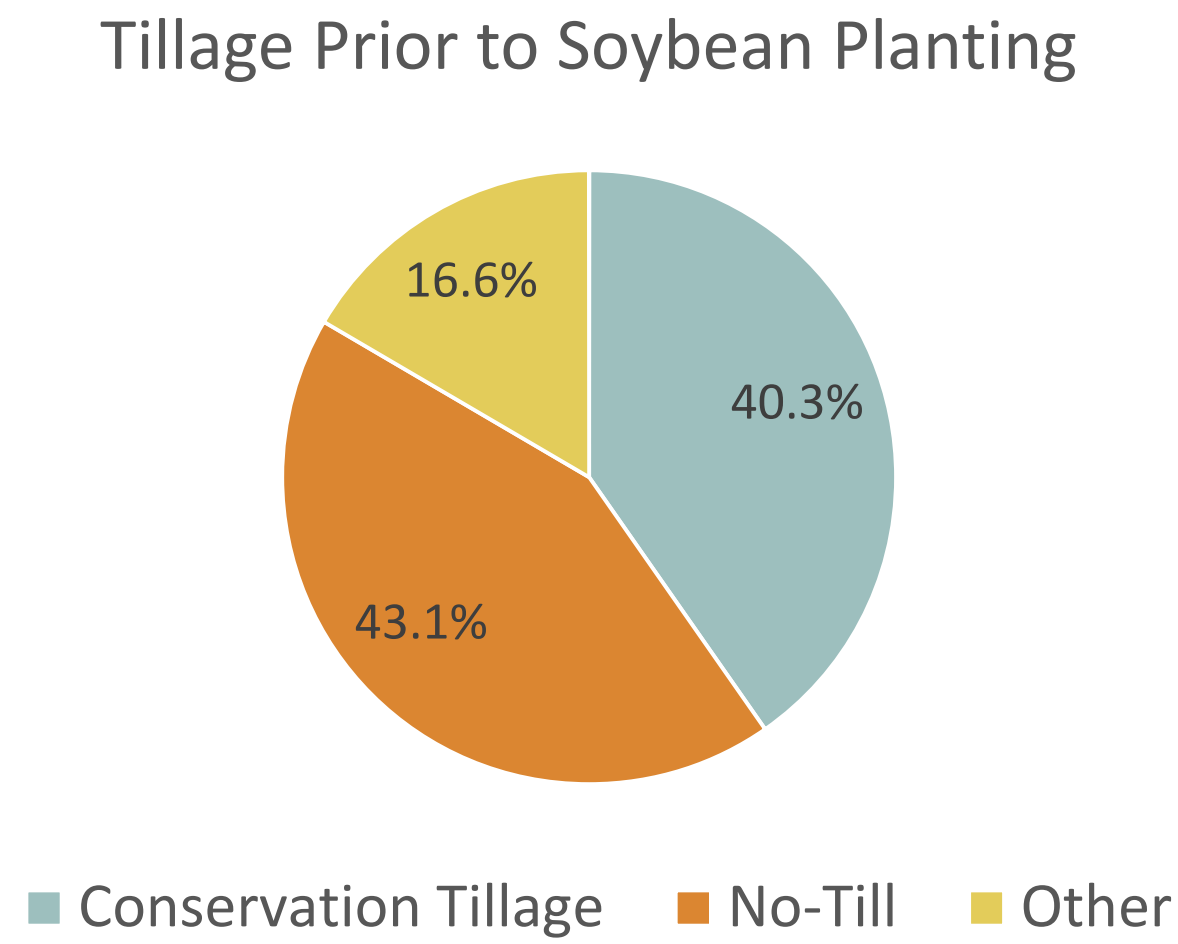

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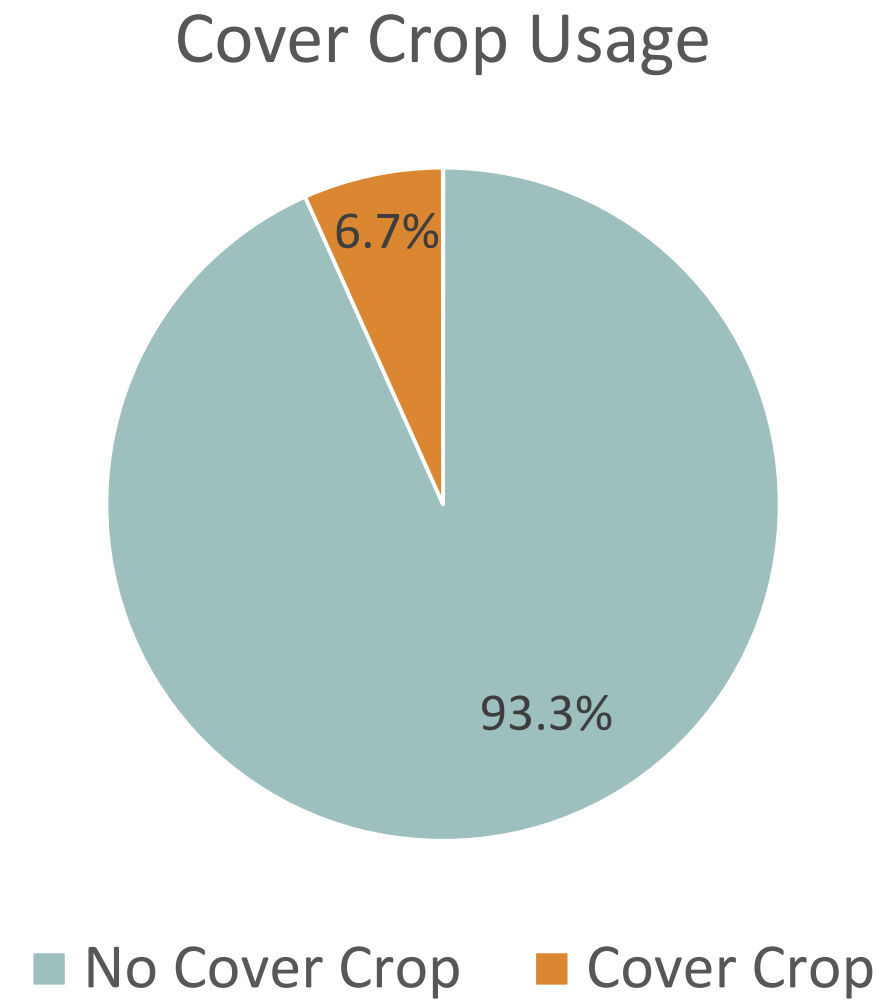

2017 Crop Year INREC Survey Data Extrapolation Example	
2017 Planted Corn Acreage (NASS)	13,300,000
2017 Planted Soybean Acreage (NASS)	10,000,000
2017 All Farmland Acreage (NASS)	30,500,000
Average N Rate on Corn in Rotation (lb/ac)	169.5
Averate N Rate on Continuous Corn (lb/ac)	200.3

Practice	% of Samples	Statewide Acreage
Cover Crop Planted	6.7%	1,561,100
Rye Cover Crop	74.5%	1,163,020
Oat Cover Crop	9.1%	142,060
Other Cover Crop	16.4%	256,020
Fall Anhydrous	37.4%	4,974,200
Nitrapyrin Inhibitor w/ Anhydrous	71.5%	3,556,553
All Spring Pre-Plant	42.5%	5,652,500
Spring Pre-Plant & In-Season	9.4%	1,250,200
All In-Season	1.9%	252,700
Other Timing	8.8%	1,170,400
No Manure Used	81.9%	10,892,700
Beef Manure Used	6.7%	891,100
Liquid Swine Manure Used	7.4%	984,200
Poultry Manure Used	1.7%	226,100
Dairy Manure Used	2.2%	292,600
Dairy & Beef Manure Used	0.1%	13,300

Practice	% of Samples	Statewide Acreage
Commercial P Incorporated w/Planter	9.9%	2,306,700
Commercial P Applied in Knifed Bands	3.2%	745,600
Commercial P Broadcast & Incorporated w/n 1 week	47.2%	10,997,600
Liquid P (commercial/manure) injected	1.8%	419,400
Other P Application Type	37.9%	8,830,700
Soil Testing for P	80.7%	18,803,100
P Application Only When At/Below Optimum Levels	75.3%	14,158,734
Conservation Tillage Before Corn	54.2%	7,208,600
No-Till Before Corn	25.9%	3,444,700
Other Tillage Before Corn	19.9%	2,646,700
Conservation Tillage Before Soy	40.3%	4,030,000
No-Till Before Soy	43.1%	4,310,000
Other Tillage Before Soy	16.6%	1,660,000
Combined Corn/Soy Conservation Tillage Acreage	48.2%	11,238,600
Combined Corn/Soy No-Till Acreage	33.3%	7,754,700
Combined Corn/Soy Other Tillage Acreage	18.5%	4,306,700

Example N Loss Reduction Calculation Using Survey Info

INREC Survey Information:

- 13,300,000 acres of corn in 2017 (NASS Data)
- 37.4% of corn had fall anhydrous (INREC survey) = 4,974,200 acres
- 71.5% of fall anhydrous acres used Nitrapyrin inhibitor = 3,556,553 acres

ISU Estimates from NRS Science Assessment:

- Average N loss of 25 lbs/ac
- 9% reduction (2.25lb/ac) in N losses when using inhibitor

- 3,556,553 ac x 25 lb/ac x 9% = **8,002,244 lbs N loss reduction**

Going Forward

- ISU recommended to legislature that INREC survey be “adopted as the official method for measuring, documenting and quantifying progress under the Iowa Nutrient Reduction Strategy”

- Achieved Development of Official Practice Tracking System
  - Public/Private Partnership for Measuring & Tracking Progress
  - Low-Cost
  - Expedient (1-2 hour location visit by liaison, once per year)
  - Confidential & Secure
  - Statistically Valid
  - Data Rich (accurate/credible information we’ve never had before)

- 2018 Crop Year Survey – Underway Now

- ISU Nutrient Loss Reduction Calculations – Spring 2019