Scenario Analysis

- costs per acre for various practices
- estimate each fully applied practice for N or P
- then combine for N or P to reach 20 or 45%
- finally, combine N and P scenarios together

Costs per acre

	Practice/Scenario	Cost Per Acre	Notes
In-field	Reduce tillage	-$16	Eliminate one pass of heavy equipment, no change in yield
	No P fertilizer on 12.5 million ac of CS fields with soil test P above maintenance level for average of 6 years	-$15	Cost of six years of P fertilizer averaged over 20 years.
	Cover crops on corn/soybean tile-drained acres	$29	Aerial applications of cereal rye
	Cover crops on corn/soybean non-tiled acres	$29	Aerial applications of cereal rye
Edge-of-field	Bioreactors on 50% of tile-drained land	$17	Upfront costs of $133 per acre
	Wetlands on 25% of tile-drained land	$60	5% of farmland out of production Major cost is land ($11,000)
	Buffers on all applicable crop land (reduction only for water that interacts with active area)	$294 per buffer acre	Land costs plus $50 planting, $10 yearly maintenance
Land use change	Perennial/energy crops equal to pasture/hay acreage from 1987	$86	Less profit compared to corn-soybean rotation
	Perennial/energy crops on 10% of tile-drained land	$86	Less profit compared to corn-soybean rotation

Example Statewide Results for N

	Practice/Scenario	Nitrate-N reduction per acre (%)	Nitrate-N reduced (million lb N)	Nitrate-N Reduction % (from baseline)	Cost ($/lb N removed)
	Baseline		410		
In-field	Reducing N rate from background to the MRTN (10% of acres)	10	2.3	0.6	-4.25
	Nitrification inhibitor with all fall applied fertilizer on tile-drained corn acres	10	4.3	1.0	2.33
	Split (50%) fall and spring (50%) on tile-drained corn acres	7.5 to 10	13	3.1	6.22
	Fall to spring on tile-drained corn acres	15 to 20	26	6.4	3.17
	Cover crops on all corn/soybean tile-drained acres	30	84	20.5	3.21
	Cover crops on all corn/soybean non-tiled acres	30	32	7.9	10.62
Edge-of-field	Bioreactors on 50% of tile-drained land	40	56	13.6	1.38
	Wetlands on 25% of tile-drained land	40	28	6.8	5.06
	Buffers on all applicable crop land (reduction only for water that interacts with active area)	90	36	8.7	1.63
Land use change	Perennial/energy crops equal to pasture/hay acreage from 1987	90	10	2.6	9.34
	Perennial/energy crops on 10% of tile-drained land	90	25	6.1	3.18
Point source	Point source reduction to 10 mg nitrate-N/L		14	3.4	3.04
	Point source reduction in N due to biological nutrient removal for P		8	1.8	

Example Statewide N Scenarios

Name	Combined Practices and/or Scenarios	Nitrate-N (% reduction)	Total P (% reduction)	Cost of N Reduction ($/lb)	Annualized Costs (million $/year)
N1	MRTN rate, all spring N application, cover crops 70% tile-drained & 45% non-tiled, bioreactors 50%, wetlands 25%, all ag streams have buffers	45	20	3.71	690
N2	MRTN rate, all spring N application, cover crops 100% tile-drained & 70% non-tiled, bioreactors 50%, perennial crops non-tiled, point source to 10 mg nitrate-N/L	45	33	4.30	800
N3	MRTN rate, cover crops 100% tile-drained & 70% non-tiled, wetlands 25%, perennial crops non-tiled, all ag streams have buffers, point source to 10 mg nitrate-N/L	45	24	4.51	838
N4	MRTN rate, all spring N application, cover crops 5% tile-drained, bioreactors 50%	20	0.3	1.99	163
N5	MRTN rate, cover crops 35% tile-drained, bioreactors 50%	20	2	2.00	162
N6	MRTN rate, cover crops 75% tile-drained, 55% non-tiled	20	8	4.62	382

Example Statewide Results for P

	Practice/Scenario	Total P reduction per acre (%)	Total P reduced (million lb P)	Total P Reduction % (from baseline)	Cost ($/lb P removed)
	Baseline		37.5		
In-field	Convert 1.8 million acres of conventional till eroding >T to reduced, mulch or no-till	50	1.8	5.0	-16.60
In-field	P rate reduction on fields with soil test P above the recommended maintenance level	7	1.9	5.0	-97.50
In-field	Cover crops on all corn/soybean acres	30	4.8	12.8	130.40
In-field	Cover crops on 1.6 million acres eroding>T currently in reduced, mulch or no-till	50	1.9	5.0	24.50
Edge-of-field	Wetlands on 25% of tile-drained land	0	0	0.0	
Edge-of-field	Buffers on all applicable crop land	25-50	4.8	12.9	11.97
Land use change	Perennial/energy crops equal to pasture/hay acreage from 1987	90	0.9	2.5	102.30
Land use change	Perennial/energy crops on 1.6 million acres>T currently in reduced, mulch or no-till	90	3.5	9.0	40.40
Land use change	Perennial/energy crops on 10% of tile-drained land	50	0.3	0.8	250.07
Point source	Point source reduction to 1.0 mg total P/L (majors only)		8.3	22.1	10.22

USLE method

Example Statewide P Scenarios

Name	Combined Practices and/or Scenarios	Nitrate-N (% reduction)	Total P (% reduction)	Cost of P Reduction ($/lb)	Annualized Costs (million $/year)
P1	No P fert. on 12.5 million ac above STP maintenance, reduced till on 1.8 million ac conv. till eroding > T, buffers on all applicable lands, point source to 1.0 mg TP/L	7	45	-4.50	-75
P2	No P fert. on 12.5 million ac above STP maintenance, reduced till on 1.8 million ac conv. till eroding > T, cover crops on all CS, point source to 1.0 mg TP/L	29	45	29.20	490
P3	No P fert. on 12.5 million ac above STP maintenance, reduced till on 1.8 million ac conv. till eroding > T, cover crops on 87.5% of CS, buffers on all applicable lands, perennial crops on 1.6 million ac >T, and 0.9 million additional ac.	38	45	36.30	615
P4	No P fert. on 12.5 million ac above STP maintenance, reduced till on 1.8 million ac conv. till eroding > T, buffers on 80% of all applicable land	6	20	-24.00	-181
P5	No P fert. on 12.5 million ac above STP maintenance, reduced till on 1.8 million ac conv. till eroding > T, point source to 1.0 mg TP/L on 45% of discharge	0	20	-24.10	-180
P6	No P fert. on 12.5 million ac above STP maintenance, reduced till on 1.8 million ac conv. till eroding > T, cover crops on 1.6 million ac eroding >T and 40% of all other CS	11	20	10.40	78

Example Statewide N & P Scenarios

Name	Combined Practices and/or Scenarios	Nitrate-N (% reduction)	Total P (% reduction)	Cost of Reduction ($/lb)	Annualized Costs (million $/year)
NP1	MRTN, fall to spring, bioreactors 50%, wetlands 25%, no P fert. on 12.5 million ac above STP maintenance, reduced till on 1.8 million ac conv. till eroding > T, buffers on all applicable lands, point source to 1.0 mg TP/L and 10 mg nitrate-N/L	35	45	**	258
NP2	MRTN, fall to spring, bioreactors 50%, no P fert. on 12.5 million ac above STP maintenance, reduced till on 1.8 million ac conv. till eroding > T, cover crops on all CS, point source to 1.0 mg TP/L and 10 mg nitrate-N/L	45	45	**	683
NP3	MRTN, fall to spring, bioreactors 15%, no P fert. on 12.5 million ac above STP maintenance, reduced till on 1.8 million ac conv. till eroding > T, cover crops on 87.5% of CS, buffers on all applicable lands, perennial crops on 1.6 million ac >T, and 0.9 million additional ac.	45	45	**	711
NP4	MRTN, fall to spring N, bioreactors 35%, no P fert. on 12.5 million ac above STP maintenance, reduced till on 1.8 million ac conv. till eroding > T, buffers on 80% of all applicable land	20	20	**	-9
NP5	MRTN, fall to spring N, bioreactors 30%, wetlands 15%, no P fert. on 12.5 million ac above STP maintenance, reduced till on 1.8 million ac conv. till eroding > T, point source to 1.0 mg TP/L and 10 mg nitrate-N/L on 45% of discharge	20	20	**	41
NP6	MRTN, fall to spring N, no P fert. on 12.5 million ac above STP maintenance, reduced till on 1.8 million ac conv. till eroding > T, cover crops on 1.6 million ac eroding >T and 40% of all other CS	24	20	**	151