

## Supplemental Information

**Table S1.** Partial budgets for stover collection scenarios modeled

### Scenario 1. Corn-Beans, 38% Stover Removal

Cost category	Description	Crop cost is allocated to	Cost	Source
Removal	Nutrient replacement		52.88	
	Stover harvest	Corn	8.42	1
	Storage		12.16	
	Transportation		12.40	
Yield change	Grain yield response from simulated N replacement	Corn	-36.02	Simulated
Total Cost			\$24.92 \$/ac	\$61.55 \$/ha

### Scenario 2. Corn-Beans, 52% Stover Removal

Cost category	Description	Crop cost is allocated to	Cost	Source
Removal	Nutrient replacement		73.24	
	Stover harvest	Corn	13.82	1
	Storage		16.95	
	Transportation		16.61	
Yield change	Grain yield response from simulated N replacement	Corn	-45.50	Simulated
Total Cost			\$37.56 \$/ac	\$92.76 \$/ha

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### Scenario 3. Continuous Corn, 38% Stover Removal

Cost category	Description	Crop cost is allocated to	Cost	Source
Removal	Nutrient replacement		52.88	
	Stover harvest	Corn	8.42	1
	Storage		12.16	
	Transportation		12.40	
Field operations	Disk		5.44	2
	Chisel		7.25	3
Yield change	Grain yield response from simulated N replacement	Corn	-33.18	Simulated
Additional cultivation	30 lb N due to lack of N credit		19.80	4
Total Cost			\$78.83	\$194.70
			\$/ac	\$/ha

### Scenario 4. Continuous Corn, 52% Stover Removal

Cost category	Description	Crop cost is allocated to	Cost	Source
Removal	Nutrient replacement		73.24	
	Stover harvest	Corn	13.82	1
	Storage		16.95	
	Transportation		16.61	
Field operations	Disk		5.44	2
	Chisel		7.25	3
Yield change	Grain yield response from simulated N replacement	Corn	-41.71	Simulated
Additional cultivation	30 lb N due to lack of N credit		19.80	4
Total Cost			\$105.05	\$259.47
			\$/ac	\$/ha

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### Scenario 5. NT Corn-Bean, 38% Stover Removal

Cost category	Description	Crop cost is allocated to	Cost	Source
Removal	Nutrient replacement		52.88	
	Stover harvest	Corn	8.42	1
	Storage		12.16	
	Transportation		12.40	
Field operations	Disk	Corn	-5.44	
	Chisel		-7.25	3
Yield change	Grain yield response from simulated N replacement	Corn	-32.71	Simulated
Additional cultivation	Extra herbicide	Beans	12.00	5
Total Cost			\$26.23 \$/ac	\$64.79 \$/ha

### Scenario 6. NT Corn-Bean, 52% Stover Removal

Cost category	Description	Crop cost is allocated to	Cost	Source
Removal	Nutrient replacement		73.24	
	Stover harvest	Corn	13.82	1
	Storage		16.95	
	Transportation		16.61	
Field operations	Disk	Corn	-5.44	
	Chisel		-7.25	3
Yield change	Grain yield response from simulated N replacement	Corn	-42.66	Simulated
Additional cultivation	Extra herbicide	Beans	12.00	5
Total Cost			\$38.63 \$/ac	\$95.42 \$/ha

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### Scenario 7. NT Continuous Corn, 38% Stover Removal

Cost category	Description	Crop cost is allocated to	Cost	Source
Removal	Nutrient replacement		52.88	
	Stover harvest	Corn	8.42	1
	Storage		12.16	
	Transportation		12.40	
Field operations	Disk		-5.44	
	Chisel		-7.25	3
Additional cultivation	30 lb N due to lack of N credit	Corn	19.80	4
Yield change	Grain yield response from simulated N replacement		-33.18	Simulated
Total Cost			\$66.14 \$/ac	\$163.35 \$/ha

### Scenario 8. NT Continuous Corn, 52% Stover Removal

Cost category	Description	Crop cost is allocated to	Cost	Source
Removal	Nutrient replacement		73.24	
	Stover harvest	Corn	13.82	1
	Storage		16.95	
	Transportation		16.61	
Field operations	Disk		-5.44	
	Chisel		-7.25	3
Additional cultivation	30 lb N due to lack of N credit	Corn	19.80	4
Yield change	Grain yield response from simulated N replacement		-41.71	Simulated
Total Cost			\$92.36 \$/ac	\$228.13 \$/ha

Note: Cost savings from simulated yield changes for scenarios 1-8 based on assumption of 1:1 stover to grain ratio

## Supplemental Information

**Table S2.** Management Simulation Details for Each Scenario

Baseline and Scenarios 1-2: Conventional till corn-bean rotation

Management input	Corn	Soybean
Planting	5/5	5/24
Harvesting	10/14	10/7
Tillage	Spring chisel plow (50% of area) 2 weeks before corn planting (Apr 15) Offset disk plow (Apr 30)	Fall Chisel Plow (50% of area) after soybean harvest (Nov 1)  No-till
Fertilizer application		
Nitrogen fertilizer	4/22	None
Phosphorus fertilizer	4/22	P2O5 56 kg/ha (May 10)
Herbicide application*	Atrazine 2.2 kg/ha (May 2)	--

Additional fertilizer application for stover removal (for corn only)

	CB No stover removal (scenario 1)	CB38 38% stover removal (scenario 2)	CB52 52% stover removal (scenario 3)
Fertilizer			
Anhydrous ammonia	212 kg/ha	244 kg/ha	256 kg/ha
P2O5	67 kg/ha	78 kg/ha	83 kg/ha

\* Herbicide application is not actually modeled in either SWAT or DAYCENT for the purposes of this exercise.

## Supplemental Information

### Scenarios 3-4: Conventional till continuous corn rotation

Management input	Corn
Planting	5/5
Harvesting	10/14
Tillage	Spring chisel plow (50% of area) 2 weeks before corn planting (Apr 15) Fall chisel plow (50% of area) after harvest (Nov 1) Offset disk plow (Apr 30)
Fertilizer application	
Nitrogen fertilizer	4/22
Phosphorus fertilizer	4/22
Herbicide application*	Atrazine 2.2 kg/ha (May 2)

### Additional fertilizer application for stover removal

	CC No stover removal (scenario 5)	CC38 38% stover removal (scenario 6)	CC52 52% stover removal (scenario 7)
Fertilizer			
Anhydrous ammonia	254 kg/ha	285 kg/ha	298 kg/ha
P2O5	67 kg/ha	78 kg/ha	83 kg/ha

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Scenarios 5-6: No-till corn-bean rotation

Management input	Corn	Soybean
Planting	5/5	5/24
Harvesting	10/14	10/7
Tillage	None	None
Fertilizer application		
Nitrogen fertilizer	4/22	None
Phosphorus fertilizer	4/22	P2O5 56 kg/ha (May 10)
Herbicide application*	Atrazine 2.2 kg/ha (May 2)	--

Additional fertilizer application for stover removal (for corn only)

Fertilizer	CBNT	CBNT38	CBNT52
	No stover removal (scenario 9)	38% stover removal (scenario 10)	52% stover removal (scenario 11)
Anhydrous ammonia	212 kg/ha	244 kg/ha	256 kg/ha
P2O5	67 kg/ha	78 kg/ha	83 kg/ha

\* Herbicide application is not actually modeled in either SWAT or DAYCENT for the purposes of this exercise.

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Scenarios 7-8: No-till continuous corn rotation

Management input	Corn
Planting	5/5
Harvesting	10/14
Tillage	None
Fertilizer application	
Nitrogen fertilizer	4/22
Phosphorus fertilizer	4/22
Herbicide application*	Atrazine 2.2 kg/ha (May 2)

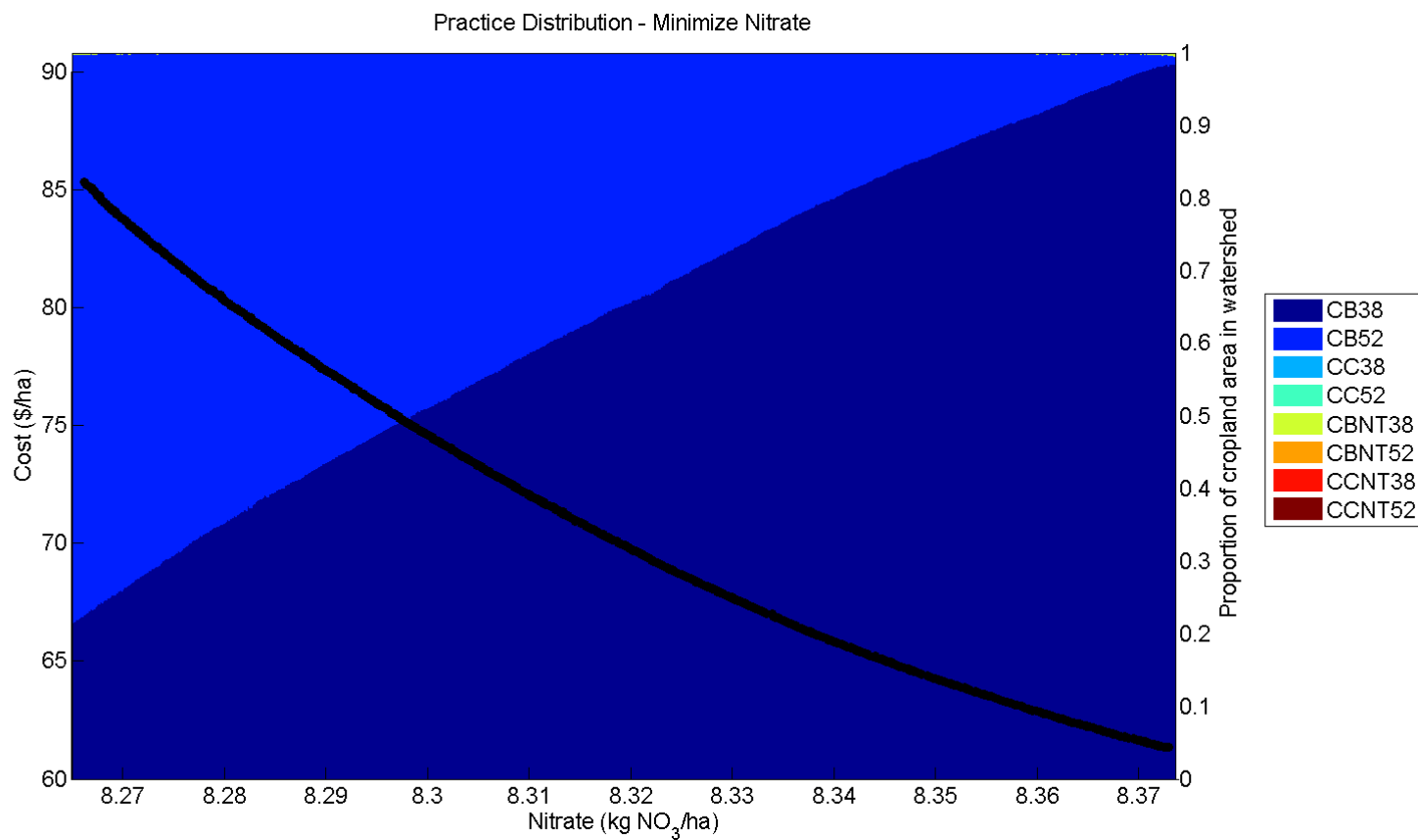
Additional fertilizer application for stover removal

	CCNT No stover removal (scenario 13)	CCNT38 38% stover removal (scenario 14)	CCNT52 52% stover removal (scenario 15)
Fertilizer			
Anhydrous ammonia	254 kg/ha	285 kg/ha	298 kg/ha
P2O5	67 kg/ha	78 kg/ha	83 kg/ha

\* Herbicide application is not actually modeled in either SWAT or DAYCENT for the purposes of this exercise.

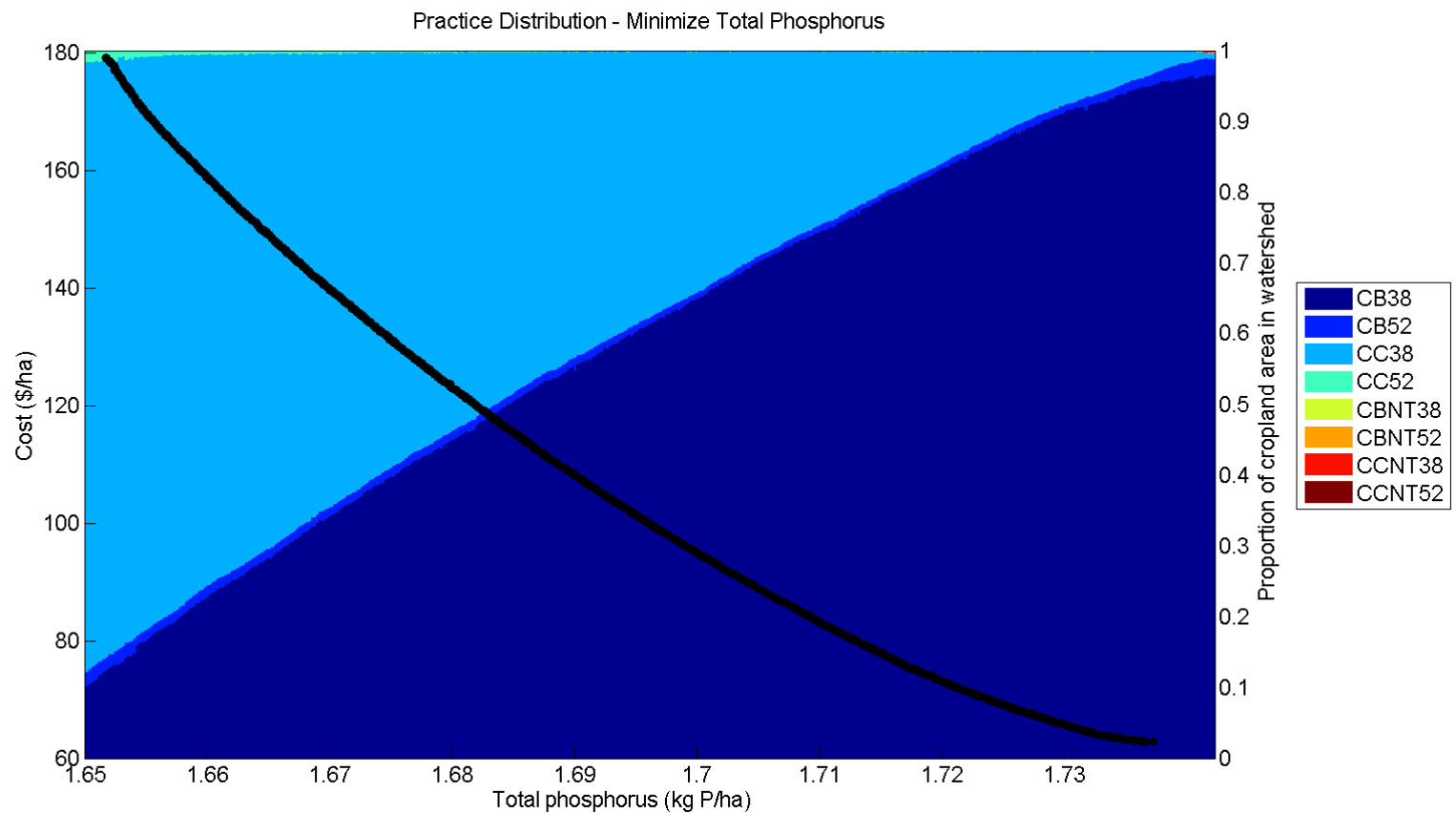


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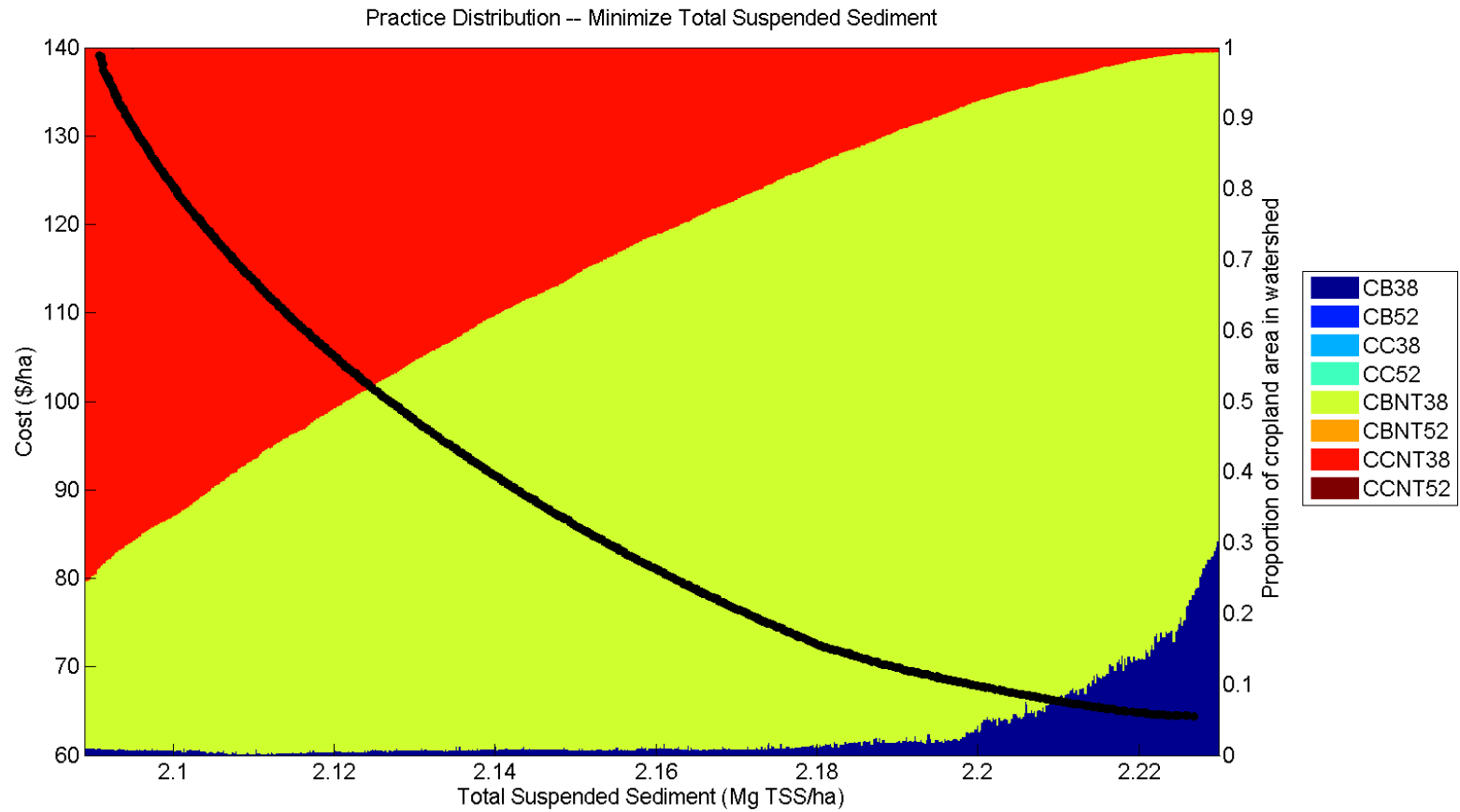
**Figure S1.** Nitrate (NO<sub>3</sub>)-Cost trade-off frontier and watershed distribution of cropping practices from joint minimization of NO<sub>3</sub> and cost

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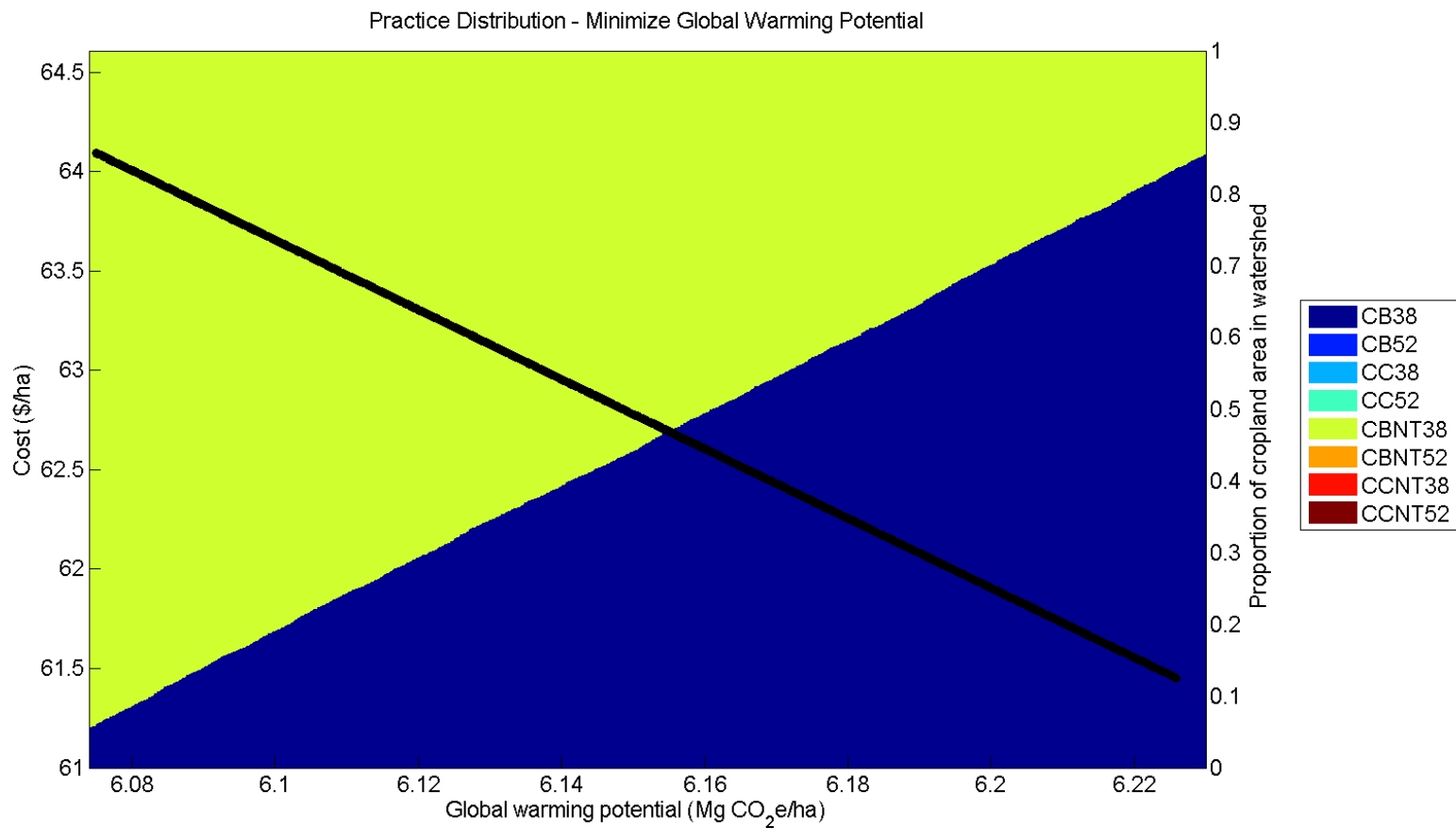
**Figure S2.** Total Phosphorus(TP)-Cost trade-off frontier and watershed distribution of cropping practices from joint minimization of TP and cost

## Supplemental Information



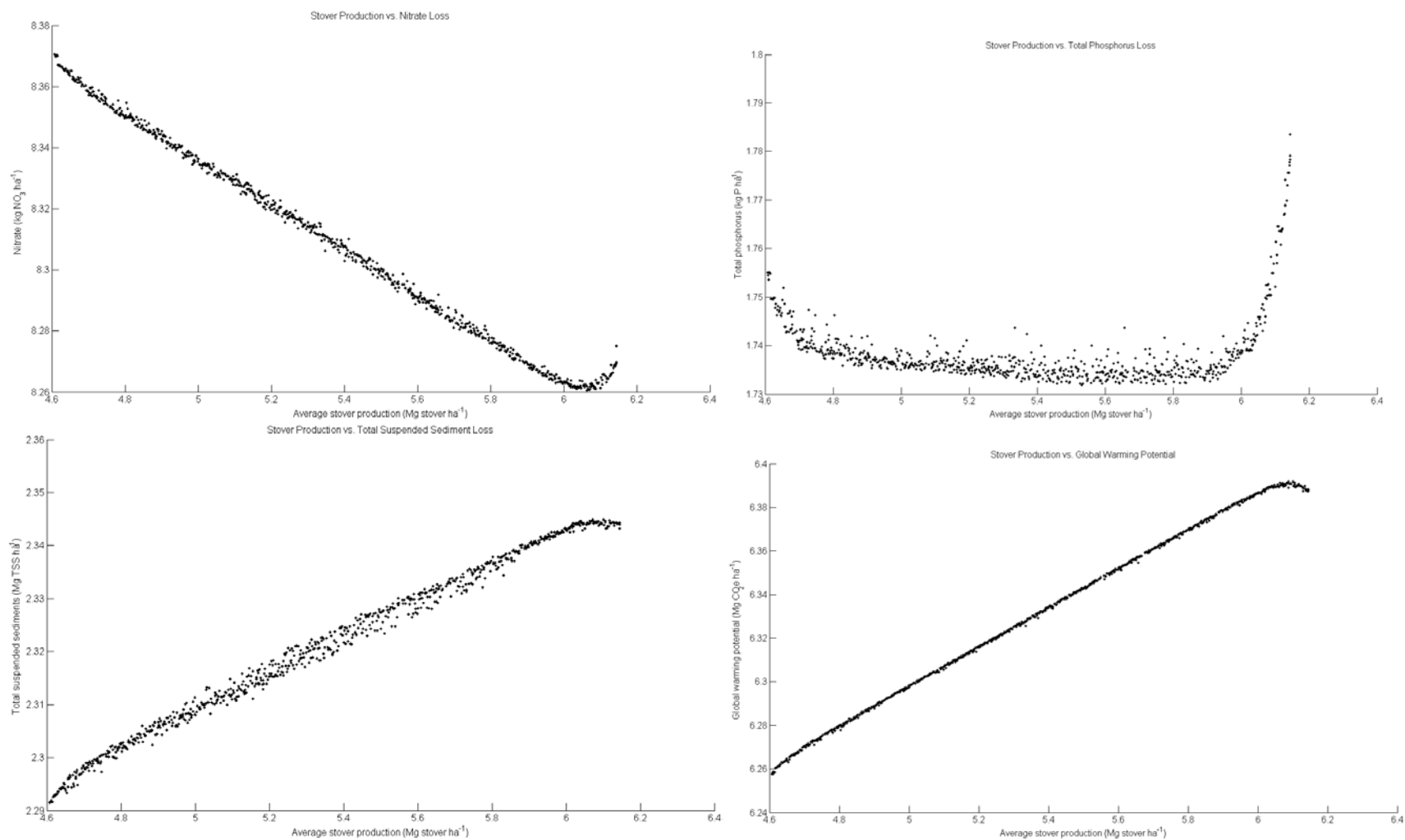
**Figure S3.** Total suspended sediment(TSS)-Cost trade-off frontier and watershed distribution of cropping practices from joint minimization of TSS and cost

## Supplemental Information



**Figure S4.** Global warming potential(GWP)-Cost trade-off frontier and watershed distribution of cropping practices from joint minimization of GWP and cost

## Supplemental Information



**Figure S5.** Relationship between stover removal and individual pollutants along the stover-cost trade-off frontier (Figure 2)

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### References

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2. Reeling, C. J. Using carbon offsets to fund agricultural conservation practices in a working-lands setting. Purdue University, West Lafayette, IN, 2011.
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