Improving Nutrient Management and Water Quality through Farmer Engagement: The Watershed Council Model

Awareness

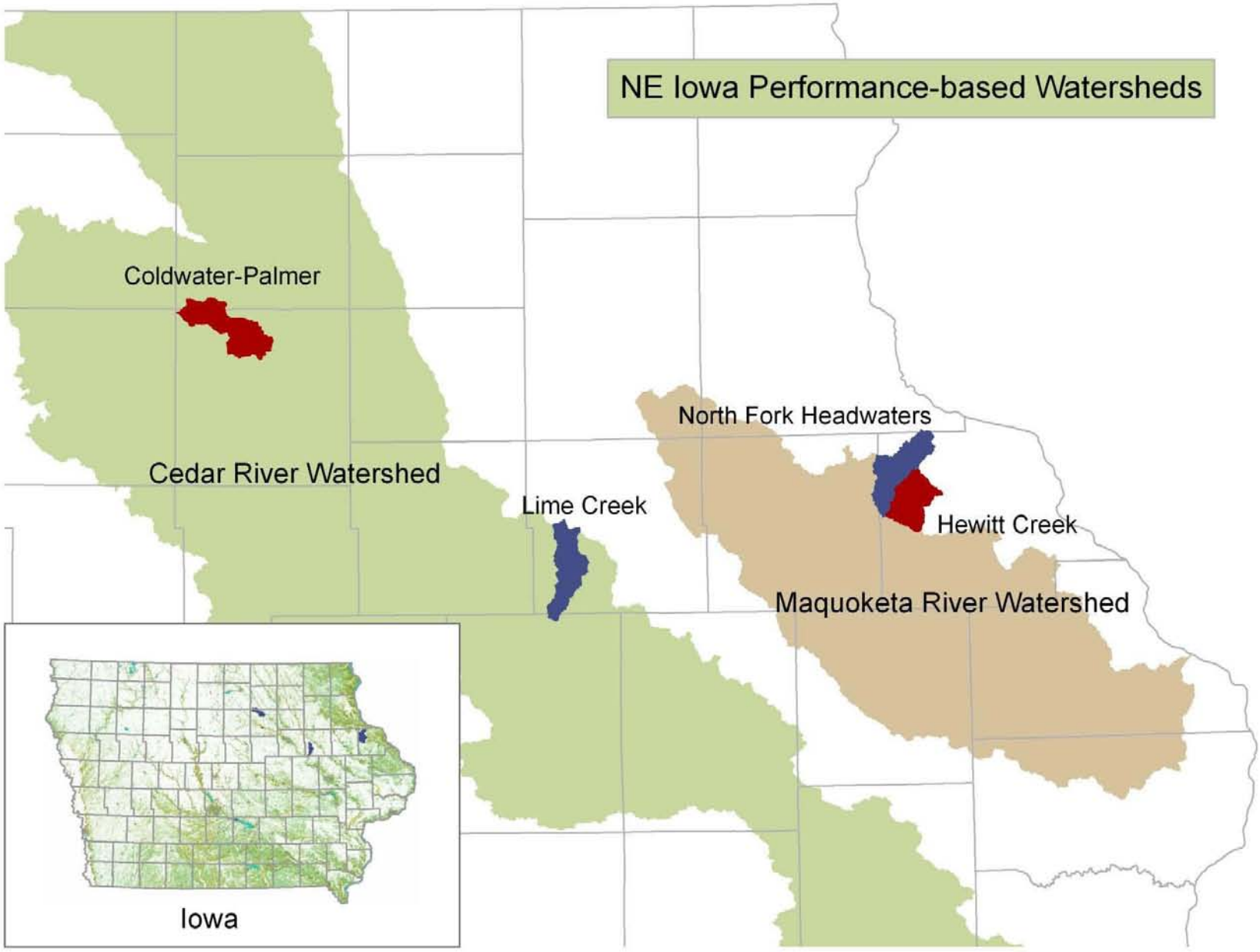
Assessment

Goals-Plans

Targeting

Performance

Evaluation

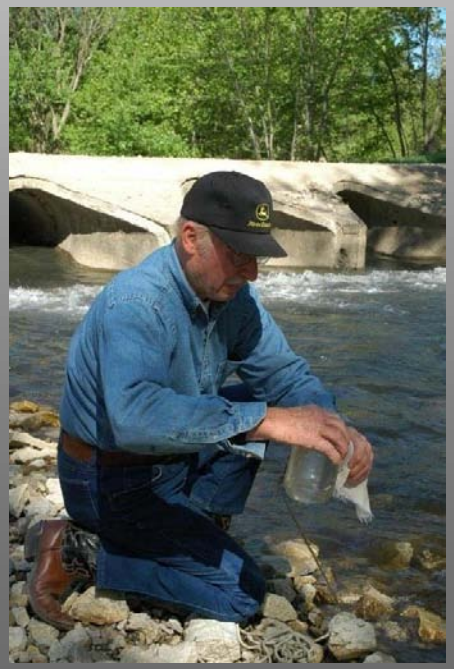

NE Iowa Performance-based Watersheds
Coldwater-Palmer
Cedar River Watershed
Lime Creek
North Fork Headwaters
Hewitt Creek
Maquoketa River Watershed
Iowa

Watershed Councils

Residents work together as a watershed community on environmental goals.

- Non-profit status
- Regular meetings
- Establish water monitoring
- Use outside information and gather local data
- Develop incentive structure

Water Monitoring



Performance Tools

- Iowa Phosphorus Index
  - Developed by ISU, Soil Tilth Lab, NRCS
  - Used in Iowa DNR MMPs
  - Incorporates soil loss, distance to stream, soil test P, management practices, P application
- Soil Conditioning Index
  - Product of RUSLE2 calculation
  - Eligibility standard for CSP enrollment
- Cornstalk Nitrate Test
  - Developed at ISU
  - Testing available at many Iowa labs
  - Recognized for use with CSP N management enhancements

Coldwater-Palmer Watershed
Phosphorus Index and Soil Conditioning Index examples

1 Corn/Soybean Rotation
fall chisel after corn, field cultivate, manure

			Acres	P Index	SCI value
1	178B	P=108	44.0	2.27	0.41
2	198B	P=59	12.7	1.59	0.46
3	214B	P=93	28.0	2.48	0.29
4	214B	P=31	71.1	1.41	0.29

total acres = 155.8

weighted average P Index = 1.86

weighted average soil conditioning index = 0.34

2 Continuous Corn
fall chisel, field cultivate, annual manure

			Acres	P Index	SCI value
1	178B	P=108	44.0	1.90	0.75
2	198B	P=59	12.7	1.25	0.78
3	214B	P=93	28.0	1.99	0.61
4	214B	P=31	71.1	1.15	0.61

total acres = 155.8

weighted average P Index = 1.52

weighted average soil conditioning index = 0.66

4 Corn/Corn/Soybean
fall chisel after corn, field cultivate, manure for 2nd corn

			Acres	P Index	SCI value
1	178B	P=108	44.0	2.06	0.59
2	198B	P=59	12.7	1.42	0.63
3	214B	P=93	28.0	2.19	0.47
4	214B	P=31	71.1	1.26	0.47

total acres = 155.8

weighted average P Index = 1.67

weighted average soil conditioning index = 0.52

2* CC for cellulose
field cultivate, annual manure, remove residue

			Acres	P Index	SCI value
1	178B	P=108	44.0	2.87	0.15
2	198B	P=59	12.7	2.02	0.23
3	214B	P=93	28.0	3.22	0.03
4	214B	P=31	71.1	1.81	0.03

total acres = 155.8

weighted average P Index = 2.38

weighted average soil conditioning index = 0.08

5 Continuous Corn w/buffer

			Acres	P Index	SCI value
1	178B	P=108	44.0	1.68	0.75
2	198B	P=59	12.7	1.09	0.78
3	214B	P=93	28.0	1.71	0.61
4	214B	P=31	71.1	0.97	0.61

total acres = 155.8

weighted average P Index = 1.31

weighted average soil conditioning index = 0.66

6 Corn/Soybean Rotation w/buffer

			Acres	P Index	SCI value
1	178B	P=108	44.0	1.96	0.41
2	198B	P=59	12.7	1.35	0.46
3	214B	P=93	28.0	2.08	0.29
4	214B	P=31	71.1	1.17	0.29

total acres = 155.8

weighted average P Index = 1.57

weighted average soil conditioning index = 0.34

8 No-till Corn/Soybean
low disturbance manure prior to corn

			Acres	P Index	SCI value
1	178B	P=108	44.0	1.40	0.91
2	198B	P=59	12.7	0.91	0.92
3	214B	P=93	28.0	1.36	0.82
4	214B	P=31	71.1	0.76	0.82

total acres = 155.8

weighted average P Index = 1.06

weighted average soil conditioning index = 0.85

2** No-till CC for cellulose
low distrubance manure, remove residue

			Acres	P Index	SCI value
1	178B	P=108	44.0	2.19	0.56
2	198B	P=59	12.7	1.53	0.61
3	214B	P=93	28.0	2.41	0.47
4	214B	P=31	71.1	1.32	0.47

total acres = 155.8

weighted average P Index = 1.78

weighted average soil conditioning index = 0.51

Hewitt Creek Watershed

PHOSPHORUS INDEX (PI) Maximum $10.00/A. See P-index explanation on back of this page.

____$300 first year payment if the weighted whole farm P-index is less than a phosphorus loss risk of 3 (2-5 is medium risk). All field scores weighted by the field size and risk of P loss from each field to attain a weighted average farm P-index.

____$50 paid for annual data and P-index review after the first year.

____$150 bonus if the P-index is 2 or less (low) or for each 0.3 reduction in P-index.

____$10 per management area or field tested for soil test P, 10 or more acres per sample.

SOIL CONDITIONING INDEX (SCI) Maximum $10.00/Ac. See back for SCI explanation.

____$200 first year payment per 0.1 SCI above 0. An average of all fields in farming operation. Example: A weighted average farm SCI of 0.4 will provide a payment of $800.

____$50 per 0.1 SCI for annual data and SCI review after the first year.

____$200 paid for each 0.1 improvement in the annual SCI.

NITROGEN PERFORMANCE MANAGEMENT (Corn Stalk Nitrate-Nitrogen analysis)

____$400 payment if the farm weighted average analyses does not exceed 1,700ppm.

____$200 bonus if the weighted average (Max. 50 acres/field) is less than 1,300ppm.

____$80 for the first two NO_3N samples analyzed and $30.00 for each additional field.

Coldwater-Palmer Watershed

NITROGEN PERFORMANCE (Cornstalk Nitrate-Nitrogen analysis) See back of this page.

____$400 payment if the farm weighted average analyses does not exceed 1,700ppm.
____$200 bonus if the weighted average (Max. 50 acres/field) is less than 1,300ppm.
____$80 for two Cornstalk NO_3N samples analyzed and $30.00 for each additional test.
____$80 for two Late Spring Nitrate Tests (LSNT) and $30.00 for each additional test.
____$500 for side-dress nitrogen application.
____$250 for moving N application from fall to spring, no fall application on watershed acres.
____$200 bonus for a wetland impoundment or if drainage tile management of spacing and depth or treatment system is used to reduce N delivery.

PHOSPHORUS INDEX (PI) Maximum $10/Ac. See P-index explanation on back of this page.

____$200 first year payment if the weighted whole farm P-index is less than a phosphorus loss risk of 3 (2-5 is medium risk). All field scores weighted by the field size and risk of P loss from each field to attain a weighted average farm P-index.
____$100 bonus for each 0.1 reduction in reviewed P-index and for P-index less than 1.0 (VL).

SOIL CONDITIONING INDEX (SCI) Maximum $10/Ac. See back for SCI explanation.

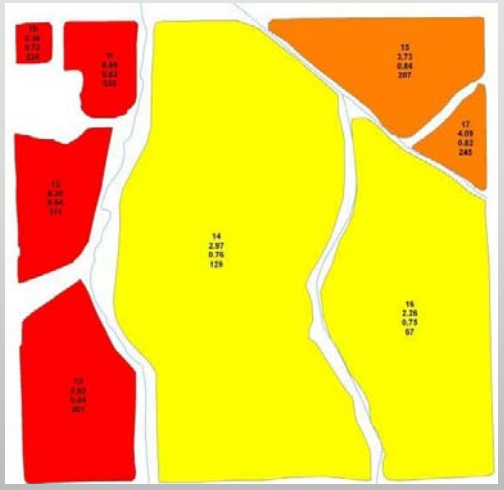
____$200 first year per 0.1 SCI above 0, based on acreage weighted average SCI of all fields.
____$100 per 0.1 SCI for annual data and SCI review after the first year.
____$400 paid for each 0.1 improvement in the annual SCI.
____$400 for fall strip till or no-till corn,(no spring tillage), 20 acres minimum.

Phosphorus Index listing

PRODUCER_ID	FIELD_ID	FIELD_ACRES	P_INDEX	SCI	SOILTEST_P	STALK_N	STREAM_DIS	ROTATION	CONTOUR	NOTILL
9	12	7.9	9.85	0.54	311	0	320	CCOHH	Y	
33	b2	17.6	9.56	0.46	399	0	570	CS	Y	
9	11	4.4	8.88	0.82	535	0	200	CCOHH	N	
19	H6	10.0	8.84	0.14	248	0	3230	CCCOMMM	N	
25	2	8.2	7.51	0.23	217	0	560	CCB	N	
41	4A	20.3	7.20	-0.04	145	0	800	CC	Y	
45	V-1	20.8	7.19	-0.31	23	0	260	CS	Y	
25	3	18.4	6.86	-0.11	130	0	1360	CCB	N	
44	H-2	36.5	6.65	-0.02	125	0	940	CS	Y	
25	4	64.7	6.61	-0.11	111	0	860	CCB	N	
9	13	13.8	6.52	0.54	201	0	440	CCOHH	Y	
44	K-3	7.9	6.51	-0.76	23	0	1610	CS	Y	
9	10	1.1	6.36	0.72	224	0	630	CCOHH	N	
13	1	38.3	5.90	0.25	105	0	330	CC	N	
31	5	6.6	5.84	0.56	148	0	480	CCOMMM	Y	
41	4B	9.5	5.82	0.42	145	0	185	CC	Y	
12	2	36.6	5.56	0.17	126	0	2120	CS	Y	
12	4	18.4	5.55	0.17	93	0	1075	CS	Y	
26	2	8.8	5.55	0.14	46	0	380	CCCOHHH	Y	
33	b1	12.7	5.43	0.66	399	0	300	CS		
26	8	5.8	5.42	0.49	45	0	280	CCCOHHH	N	
30	N4	20.7	5.26	0.06	22	0	220	CS	Y	
43	1	32.4	5.24	-0.23	32	0	1080	CC	Y	
6	B4	11.4	5.20	-0.02	73	0	740	CC	Y	
23	H-east	67.6	5.14	0.43	277	0	1550	CC	N	
35	W4	12.4	5.09	0.23	58	0	670	CCCOHHH	Y	
13	2	117.0	4.99	0.24	145	0	1090	CC	N	
26	7	8.4	4.96	0.35	58	0	990	CCCOHHH	N	
6	R3	19.9	4.92	0.49	99	0	600	CCCOHHH	Y	
21	6	5.4	0.44	1.00	21	0	500	RGraze	N	Y
14	a5	5.6	0.38	0.85	23	0	240	CS	N	Y
21	1	32.3	0.20	1.10	19	0	730	RGraze	N	Y
5	14	52.6	0.00	0.46	0	0	4200	CCCCS	Y	
38	P-fs	3.0	0.00	0.64	0	0	380	CS	N	Y
38	H-fsw	3.2	0.00	0.63	0	0	720	CS	N	Y

PI Category	# of fields	total acres	avg. PI	avg. SCI	avg. soil P	avg_N	avg. distance	% hay/graze	% contour	% no till
>5	26	513	6.24	0.13	150	0	958	35	62	0
3 to 5	98	2236	3.83	0.34	79	0	1488	52	48	2
2 to 3	112	3039	2.51	0.50	55	0	1693	65	57	5
1 to 2	83	2351	1.54	0.62	48	0	2534	34	48	30
0 to 1	50	1319	0.74	0.79	26	0	1569	28	22	80
No PI	3	59	0.00	0.48	0	0	3816			
	372	9516								
2007 Watershed Weighted Average			**2.54**	**0.51**	**60**	**0**	**1785**	**47**	**48**	**19**
>5	20	413	6.62	0.15	181	0	1054	45	40	0
3 to 5	84	1692	3.72	0.41	86	0	1661	58	52	1
2 to 3	106	2828	2.48	0.54	57	0	1572	67	57	7
1 to 2	70	2169	1.61	0.59	49	0	2336	47	50	27
0 to 1	36	1085	0.72	0.76	29	0	1380	24	26	91
	316	8187								
2006 Watershed Weighted Average			**2.48**	**0.54**	**63**	**0**	**1741**	**54**	**50**	**19**

Phosphorus Index



Soil Conditioning Index

Aerial Photos

P-Index list – Coldwater/Palmer

Coldwater-Palmer Watershed
Phosphorus Index Rating - 2007

PRODUCER_ID	FIELD_ID	FIELD_ACRES	P_INDEX	SCI	SOILTEST_P	STALK_N	STREAM_DIS	ROTATION	CONTOUR	NOTILL
26	4	4.7	6.12	0.15	401	0	1200	CS	N	
33	2	9.6	2.57	0.29	150	0	1240	CS	N	
12	5	53.9	2.54	-0.59	8	0	2500	CS	N	
33	3	8.9	2.52	0.42	149	0	1580	CS	N	
3	NW	18.1	2.29	0.17	68	0	380	CCS	N	
32	E Ty 1	11.2	2.28	0.01	47	0	320	CS	N	
1	3	28.0	2.24	0.12	93	0	500	CC	N	
1	4	71.1	2.13	0.12	80	0	1130	CC	N	
20	18-6	13.8	2.13	-0.18	40	0	6280	CS	N	
16	3e	18.8	2.03	0.33	138	0	990	CS	N	
16	3w	33.2	1.98	0.34	138	0	480	CS	N	
26	2	41.7	1.98	0.15	71	0	2610	CS	N	
14	H-south	148.3	1.97	-0.09	43	0	2010	CS	N	
32	Wag	173.2	1.96	0.38	145	0	3700	CS	N	
1	1	44.0	1.93	0.37	108	0	570	CC	N	
22	A-A	22.7	1.87	0.06	18	0	600	CS	N	
17	8	38.9	1.83	-0.01	35	0	470	CS	N	
32	Dol E2	2.6	1.82	0.56	48	0	270	CC	N	
26	5	52.8	1.81	0.15	58	0	2110	CS	N	
20	18-1	2.9	1.80	0.08	17	0	230	CS	N	
26	1	38.8	1.73	0.15	43	0	1530	CS	N	
32	W Ty	143.9	1.70	0.36	113	0	4000	CS	N	
18	L-2	36.2	1.69	0.58	20	0	480	CS	N	
23	D-D	5.0	1.68	-0.22	19	0	2320	CS	N	
4	3	3.8	1.65	0.13	31	0	500	CS	N	
22	A-B	14.6	1.62	0.10	23	0	830	CS	N	
25	BI	77.3	1.61	-0.09	20	0	2180	CS	N	
33	1	14.3	1.61	0.46	71	0	1020	CC	N	
34	M9	8.3	1.60	0.04	11	0	3270	CSCOAAA	N	
35	R2	17.6	0.00	0.66	0	0	1040	SOAAAA	N	
35	R3	19.1	0.00	0.66	0	0	660	SOAAAA	N	
35	R4	9.6	0.00	0.52	0	0	700	SOAAAA	N	
35	T2	34.4	0.00	0.16	0	0	4160	CS	N	
35	T3	22.6	0.00	0.07	0	0	3960	CS	N	
35	T1	37.9	0.00	0.16	0	0	3350	CS	N	

PI Category	# of fields	total acres	avg. PI	avg. SCI	avg. P test	avg N	avg. distance	% hay/graze	% contour	% no till
>5	1	4.7	6.12	0.15	401	0	1200	0		
3 to 5	0	0.0								
2 to 3	9	233.4	2.28	-0.03	70	0	1589	0		
1 to 2	111	4900.0	1.32	0.29	45	0	2265	5	1	1
0 to 1	105	5033.7	0.78	0.51	24	0	2513	19	1	4
no P Index	28	1486.8		0.37		0	3491	18	0	
	254	11658.6								
2007 Watershed weighted average			**1.08**	**0.39**	**35**	**0**	**2515**			
>5	0	0.0								
3 to 5	0	0.0								
2 to 3	1	18.8	2.03	0.33	138	0	990	0		
1 to 2	53	2288.4	1.25	0.31	41	0	1823	2	2	
0 to 1	74	3274.4	0.79	0.45	23	0	2268	7	1	1
no P Index	23	1277.6		0.44		0	2665	0		4
	151	6859.2								
2006 Watershed weighted average			**0.98**	**0.42**	**31**	**0**	**2187**			

P-Index list – Hewitt

PRODUCER_ID	FIELD_ID	FIELD_ACRES	P_INDEX	SCI	SOILTEST_P	STALK_N	STREAM_DIS	ROTATION	CONTOUR	NOTILL
9	12	7.9	9.85	0.54	311	0	320	CCOHH	Y	
33	b2	17.6	9.56	0.46	399	0	570	CS	Y	
9	11	4.4	8.88	0.82	535	0	200	CCOHH	N	
19	H6	10.0	8.84	0.14	248	0	3230	CCCOMMM	N	
25	2	8.2	7.51	0.23	217	0	560	CCB	N	
41	4A	20.3	7.20	-0.04	145	0	800	CC	Y	
45	V-1	20.8	7.19	-0.31	23	0	260	CS	Y	
25	3	18.4	6.86	-0.11	130	0	1360	CCB	N	
44	H-2	36.5	6.65	-0.02	125	0	940	CS	Y	
25	4	64.7	6.61	-0.11	111	0	860	CCB	N	
9	13	13.8	6.52	0.54	201	0	440	CCOHH	Y	
44	K-3	7.9	6.51	-0.76	23	0	1610	CS	Y	
9	10	1.1	6.36	0.72	224	0	630	CCOHH	N	
13	1	38.3	5.90	0.25	105	0	330	CC	N	
31	5	6.6	5.84	0.56	148	0	480	CCOMMM	Y	
41	4B	9.5	5.82	0.42	145	0	185	CC	Y	
12	2	36.6	5.56	0.17	126	0	2120	CS	Y	
12	4	18.4	5.55	0.17	93	0	1075	CS	Y	
26	2	8.8	5.55	0.14	46	0	380	CCCOHHH	Y	
33	b1	12.7	5.43	0.66	399	0	300	CS		
26	8	5.8	5.42	0.49	45	0	280	CCCOHHH	N	
30	N4	20.7	5.26	0.06	22	0	220	CS	Y	
43	1	32.4	5.24	-0.23	32	0	1080	CC	Y	
6	B4	11.4	5.20	-0.02	73	0	740	CC	Y	
23	H-east	67.6	5.14	0.43	277	0	1550	CC	N	
35	W4	12.4	5.09	0.23	58	0	670	CCCOHHH	Y	
13	2	117.0	4.99	0.24	145	0	1090	CC	N	
26	7	8.4	4.96	0.35	58	0	990	CCCOHHH	N	
6	R3	19.9	4.92	0.49	99	0	600	CCCOHHH	Y	
21	6	5.4	0.44	1.00	21	0	500	RGraze	N	Y
14	a5	5.6	0.38	0.85	23	0	240	CS	N	Y
21	1	32.3	0.20	1.10	19	0	730	RGraze	N	Y
5	14	52.6	0.00	0.46	0	0	4200	CCCCS	Y	
38	P-fs	3.0	0.00	0.64	0	0	380	CS	N	Y
38	H-fsw	3.2	0.00	0.63	0	0	720	CS	N	Y

PI Category	# of fields	total acres	avg. PI	avg. SCI	avg. soil P	avg N	avg. distance	% hay/graze	% contour	% no till
>5	26	513	6.24	0.13	150	0	958	35	62	0
3 to 5	98	2236	3.83	0.34	79	0	1488	52	48	2
2 to 3	112	3039	2.51	0.50	55	0	1693	65	57	5
1 to 2	83	2351	1.54	0.62	48	0	2534	34	48	30
0 to 1	50	1319	0.74	0.79	26	0	1569	28	22	80
No PI	3	59	0.00	0.48	0	0	3816			
	372	9516								
2007 Watershed Weighted Average			**2.54**	**0.51**	**60**	**0**	**1785**	**47**	**48**	**19**
>5	20	413	6.62	0.15	181	0	1054	45	40	0
3 to 5	84	1692	3.72	0.41	86	0	1661	58	52	1
2 to 3	106	2828	2.48	0.54	57	0	1572	67	57	7
1 to 2	70	2169	1.61	0.59	49	0	2336	47	50	27
0 to 1	36	1085	0.72	0.76	29	0	1380	24	26	91
	316	8187								
2006 Watershed Weighted Average			**2.48**	**0.54**	**63**	**0**	**1741**	**54**	**50**	**19**

Cornstalk nitrate test results

COLDWATER/PALMER CREEK CORNSTALK NITRATE TEST RESULTS – 2007

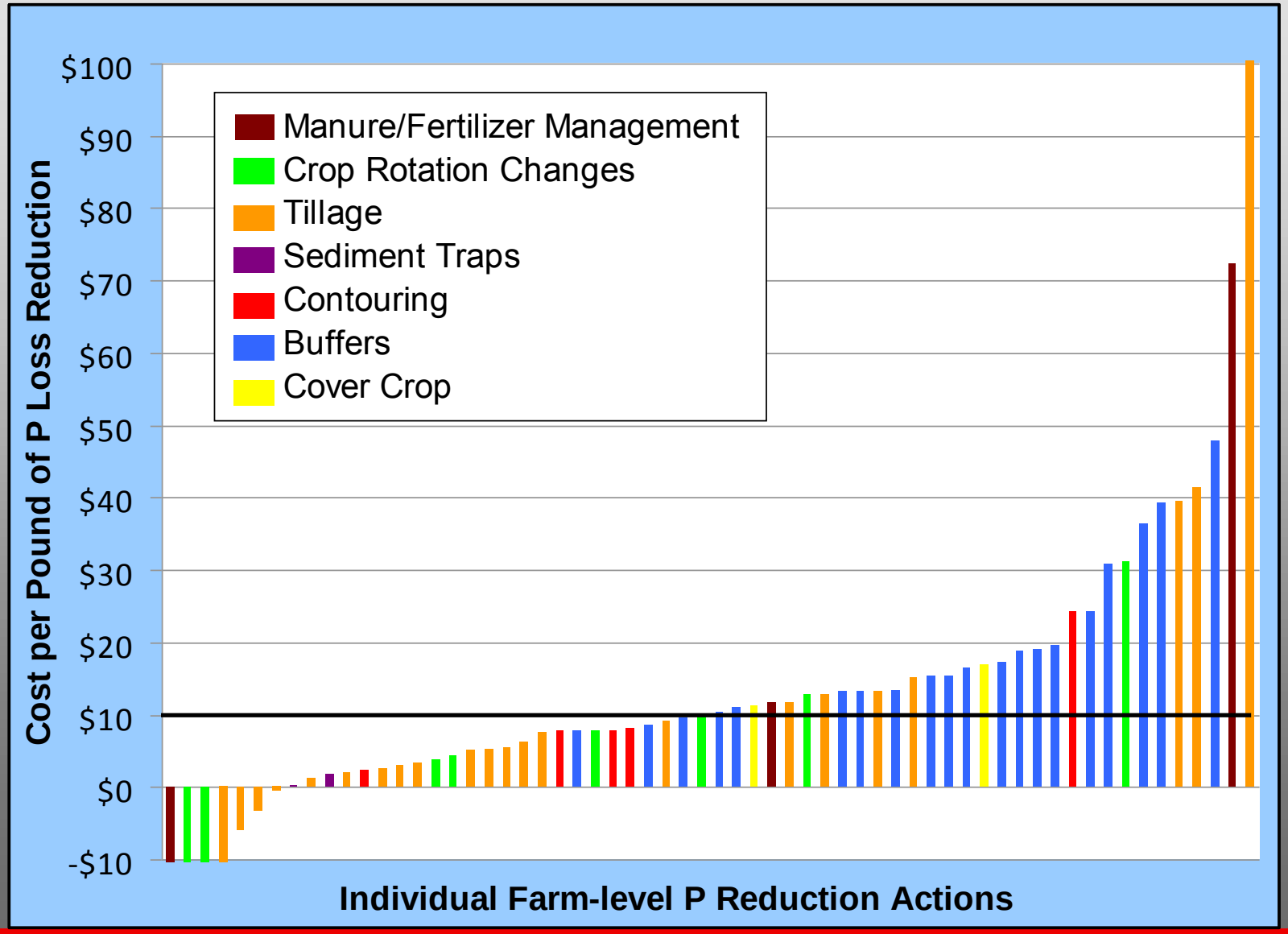
ID	Sample #	Stalk NO3-N (ppm)	Nitrogen application			Estimated N (lb/a)	Rotation	Yield (bu/a)
3	1	4,670	Ostrander - 394 soil					210
17	2 (8)	4,131	Spring - 130# as urea + Spring-Fall cattle manure			130 +	C-B-C	174
22	1	3,627	Sidedress 25# as 28% + Fall manure		Tiled	25 + manure	B-C-C	134
17	1 (5)	3,418	Spring - 130# as urea			130	C-B-C	161
22	2	2,935	Spring - 100# as 28% + Fall manure			130	C-B-C	178
17	3 (3)	2,935	Spring - 130# as urea			130	C-B-C	121
25	4	2,813	Spring - 190# as 32%		Tiled	190	C-C-C	168
21	1	2,626						227
14	2	2,437	Fall - 156# NH3		Tiled	156	C-B-C	139
4	2	2,281	Spring - 125# as urea	Rockton - 213 soil	No tile	125	C-B-C	197
17	4 (7)	2,030	Spring - 185 as urea + Spring-Fall cattle manure			130 +	C-C-C	231
5	1	2,026	Sp 49# as 28%+27# as DAP+77#as 28%SD 783,399,84 soil			153	C-B-C	164
14	1	1,880	Fall - 156# NH3		Tiled	156	C-B-C	204
12	1	1,735	Spring - 180# as urea		No tile	180	C-C-C	180
23	1	1,683	Spring - 140# + Fall-Spring 2-4T/A manure		Some tile	140 +	C-B-C	209
25	3	1,324	Fall - 156# NH3 + 3,000 gal liquid hog manure		Tiled	306	C-B-C	201
4	1	1,259	Spring - 125# as urea	Bassett - 171 soil	Tiled	125	C-B-C	176
23	4	1,203	Spring - 140# as liquid		Some tile	140 +	C-B-C	163
23	3	1,172	Spring - 140# as liquid		Some tile	140 +	C-B-C	184
20	2	1,003	Sidedress - 155# as 28% + Cattle man.; Heavy soil; som tile			155 +	B-C-C	128
8	3 S	961						155
1	2	932	Sp 35# as 32% + 3,000gal(56-32-38); 213, 178, 174; Tiled			204	C-C-C	160
8	3	810						157
23	2	711	Spring - 140# as liquid + Fall-Sp-2-4T/A manure		Some tile	140 +	C-B-C	207
6	4	705	Sp - 105# as NH3 + 40 as 28% over top; Ostrander soil; tile			145	C-B-C	180
15	2	691	Fall - 120# NH3 + 1T/A Dayton 30		No tile	120 +	C-B-C	179
1	3	682	Sp 35# as 32% + 3,000gal(56-32-38); 213, 178, 174; Tiled			204	C-C-C	133
6	3	681	Sp - 105# NH3 + 40 as 28%; Ostrander - 394 soil		Tiled	145	C-B-C	128
20	1	593	Sidedress - 130# as 28% + Fall 13#; Light to dark soil; Tiled			143	C-B-C	144
5	2	590	Sp 49# as 28%+27# as DAP+77#as 28%SD 783,399,84 soil			153	C-B-C	194
3	2	522	Waukee - 178 soil					248
6	1	493	Sp - 105# NH3 + 40# as 28% over top; Floyd - 198 soil; Tiled			145	C-B-C	206
8	2	396						187
12	2	381	Spring - 200# as urea		No tile	200	C-C-C	169
6	2	321	Sp - 105# NH3 + 40# as 28% over top; Cresco-783 soil; Tile			145	C-B-C	175
15	1	262	Fall - 120# NH3 + 1T/A Dayton 30		No tile	120 +	C-B-C	175
1	1	163	Sp 35# as 32% + 3,000gal(56-32-38); 213, 178, 174; Tiled			204	C-C-C	158
8	1	151						217
38		**1,506**	**38 samples from 2006 & 2007 cooperators**			**165**		**177**
28	3	7,275						155
28	2	7,015						145
34	1 (M2)	5,999	Spring - 130#NH3 + Fall cattle Manure: Kenyon-83 soil; Tile			130 + manure	C-B-C	174
26	2	4,763	150# as NH3			150	B-C	151
24	1	4,735						214
24	2	4,670						169
28	4	4,085						157
30	1	3,929						163
36	1 (RP)	3,710	183# N			183		159
28	1	3,432						189
31	1	3,059						199
36	3 (NE C)	3,052	183# N			183		203
31	4	2,975						128
30	2	2,727						147
26	1	2,611	150# as NH3			150	B-C	211
36	2 (NB)	2,586	183# N			183		143
31	3	2,216						160
34	3 (M9)	2,096	170# as NH3	Donnan - 782 soil	Tiled	170	C-C-C	142
31	2	2,081						185
34	2 (M7)	1,684	130# as NH3	Rockton - 213 soil	No tile	130	C-B-C	161
33	2	1,288						? ears
27	2-E	1,171	Sp - 110# as NH3 + 2T/A cattle manure; Kenyon-83		Tiled	134	C-B-C	160
34	4 (N2)	1,149	170# as NH3	Donnan - 782 soil	Tiled	170	B-C-C	152
37	3	940						215
29	1	863	Fall - 160 as NH3 + Spring 30# liquid; Ken.83, Cly.84		Tiled	190	C-C-C	186
27	1-W	805	Spring - 110# as NH3	Kenyon-83	Tiled	110	C-B-C	131
37	2	796						173
29	2	732	Fall - 160 as NH3 + Spring 30# liquid; Ken.83, Cly.84		Tiled	190	C-C-C	152
33	1	586						? ears
37	1	393						219
11	1	187	Spring - 100# as 32%		Tiled	100	C-B-C	204
		2,697	**31 samples from new 2007 cooperators**			**157**		**171**

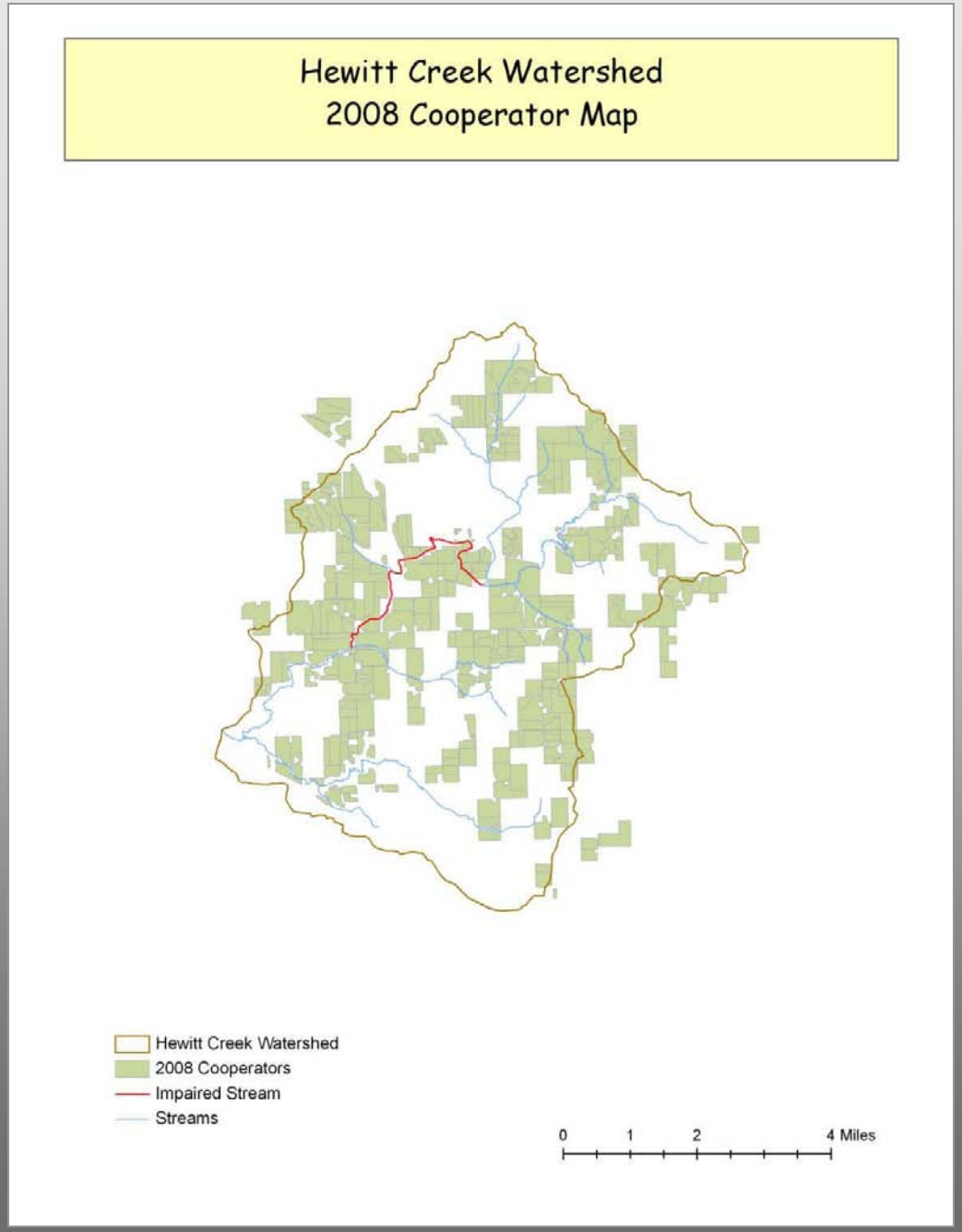
69 samples average 2,041ppm : average yield - 174 Bu/A

HEWITT CREEK CORNSTALK NITRATE TEST RESULTS – 2007

ID	Sample #	Stalk NO3-N (ppm)	Nitrogen application	Estimated N (lb/a)	Rotation	Yield (bu/a)
26	3	9,900	Spring - 92# as urea + 10T/A season Bed Pk	142	C-C	198
26	2	9,087	Spring - 92# as urea + 10T/A season Bed Pk	142	C-C-C	189
34	1	8,893	Fall - surface 3,000 hog + 30# as 28% W/plant	130	C-Rye -C	224
33	1	6,741	Spring - 100# as 28% + 20T/A shed manure	200	C-C	150
18	2 (3B)	6,719	Fall - 92# as urea + Seasonal 14.4T/A Bed Pk	164	H-C	171
28	3	6,705	Spring - 90# as 32% + 15,000 liquid dairy	390	C-C	197
18	4 (8A)	6,256	Fall - 148# as urea + 20T/A (6.4-4.2-9.0) Bedding Pk	248	C-C	170
28	2	5,997	Spring - 90# as 32% + 15,000 liquid dairy	390	HHHH-C	204
28	1	5,842	Spring - 90# as 32% + 15,000 liquid dairy	390	HHHH-C	204
9	14	5,791	Spring - 60# as Am S + Fall-Spring 22T/A Dairy	170	C-C	206
10	2	5,544	Fall-Spring 60T/A Dairy	300	H-C	175
3	1	5,316	Spring - 64# as 28% + 5T/A (20-17-14) Bed Pk in fall	164	C-C	175
29	3	5,028	Fall - 12,000 gal liquid dairy	240	C-C	198
35	1	5,004	Spring - 103# as 46% + 5T/A seasonal bedding pack	128	B-C	176
10	1	4,440	Fall-Spring 50T/A Dairy	250	C-C	175
9	11	4,262	Spring - 60# as Am S + Fall-Spring 22T/A Dairy	170	C-C	206
34	4	4,167	W/planter - 50# as 28% + 10T/A seasonal Bed Pack	100	C-C	169
6	2	4,082	Spring - 165# as urea	165	C-C	189
37	1	3,960	Spring - 140# N + Fall 15T/A cow pit	365	C-C	
18	1 (2A)	3,950	Fall - 148# as urea + 14.4T/A (6.4-4.4-9.0) Bed Pack	220	C-C	154
6	1	3,886	Spring - 140# as urea + 10T/A (12-7-7) dairy gutter	260	C-C	166
29	1	3,271	Spring - 15,000 gal liquid dairy	300	C-C	163
18	3 (4A)	3,249	Fall - 148# as urea + 20T/A (6.4-4.2-9.0) Bedding Pk	248	C-C	209
1	1	3,215	Spring - 120# as 28%	120	C-C	188
37	2	2,995	Spring - 100# + 15T/A pen pack	175	H-C	
28	4	2,984	Spring - 90# as 32% + 15,000 liquid dairy	390	C-C	197
34	2	2,859	W/planter - 50# as 28% + 8-10T/A seasonal Bed Pk	95	C-C	182
32	2	2,340	Spring - 100# as 28%	100	B-C	176
35	2	2,324	Spring - 103# as 46% + 5T/A seasonal bedding pack	128	B-C	180
26	1	2,209	Spring - 92# as urea + 10T/A seasonal bedding pack	142	C-C-C-C	189
26	4	2,179	Spring - 92# as urea + 10T/A seasonal bedding pack	142	C-C-C-C	161
19	1	2,100	Fall - 20T/A Dairy liquid	200	H-C	215
19	3	2,000	Spring - 50# as 28% + 20T/A Dairy liquid	250	C-C	175
19	4	2,000	Spring - 50# as 28% + 20T/A Dairy liquid	250	C-O cov-C	200
33	2	1,865	Spring - 100# as 28%	100	H-C	131
34	3	1,767	W/planter - 30# as 28% + 5,000 liquid hog	280	H-C	152
15	1	1,667	Planting - 45# as 28% + Seasonal 15T/A free stall	225	B-C	180
32	1	1,485	Spring - 100# as 28%	100	B-C	170
12	1	1,404	Post-plant - 120# as 28%	120	B-C	220
3	3	1,261	Spring - 180# as 28%	180	C-C	159
38	2	1,190	Spring - 165# as NH3	165	C-C	182
29	2	1,178	Spring - 15,000 gal liquid dairy	300	C-C	164
4	1 (H)	1,043	W/planter - 120# as 32% = Sp 3,000G/A (69-64-92)	120	C-C-C-C-C	170
15	2	1,006	Spring - 100# as ESN + 45# with planter as 28%	145	C-C	161
4	3-R	1,050	W/planter - 120# as 32% = Sp 3,000G/A (69-64-92)	120	B-C	167
3	2	957	Spring - 64# as 28% + Spring Bed Pk (20-17-14)	164	C-C	175
1	2	934	Spring - 120# as 28%	120	B-C	199
4	2 (H)	730	W/planter - 120# as 32% = Sp 3,000G/A (69-64-92)	120	Sod-C	167
13	4	599	Spring - 42# as A. Sulfate + Fall 2,700 Gal liquid hog	177	C-C	169
12	2	586	Post-plant - 120# as 28%	120	B-C	181
13	3	544	Spring - 42# as Ammonium Sulfate	42	C-C	142
4	2-R	540	W/planter - 150# as 32%	150	B-C	189
38	1	457	Sidedress 85# as 28% + Fall 2,650gal Hog 19.6#N	137	B-C	170
4	1-R	349	W/planter 80# as 32%	80	B-C	198
13	2	303	Spring - 42# as Ammonium Sulfate	42	C-C	125
3	4	289	Spring - 36# as 28% + 3,000 fall + 1,000 Sp (20 N)	116	B-C	175
13	1	228	Spring - 42# as A. Sulfate + Spring 2,700 G liquid hog	177	C-C	171
38	3	216	Spring - 110# as NH# + 3,500 gal liquid hog	179	C-C	182
38	4	192	Spring - 85# as 28% + Fall 2,650 gal hog 19.6#/1000	137	B-C	141
14	2	188	Spring - 100# as 28%	100	B-C	198
14	1	131	Spring - 100# as 28%	100	B-C	170
8	1	68				235
		2,860	Average of 62 samples from 21 multi-year cooperators	182		180
21	2	6625	Spring - 42# as A.S. + 95# as liquid pop-up	137	Past/H-C	154
30	1	5487	Spring - 140# as NH3	140	C-C	192
21	1	4945	Spring - 42# as A.S. + 95# as liquid pop-up	137	Past/H-C	153
23	2 - S	3995	Spring - 140 N + Fall 15T/A pen pack	175	C-C	
23	1 - E	3750	Spring - 140# N + 15,000 pig pit	515	C-C	
43	1	3272	Spring - 150# as 28%	150	C-C	185
30	2	3106	Winter - >20T/A Beef cattle dry manure	100	H-C	186
40	1	2897	Pre-emerge - 180# as liquid 32%	180	C-C	193
45	2	2150	Spring - 157 as 28% and starter Fertilizer	157	B-C	208
43	3	2062	Spring - 150# as 28%	150	C-C	196
43	2	1633	Spring - 150# as 28%	150	Grass-C	150
45	1	1600	Spring - 129# as 28% and starter fertilizer	129	B-C	180
40	2	1567	Pre-emerge - 120# as liquid 32%	120	B-C	190
45	3	1190	Spring - 129# as 28% and starter fertilizer	129	B-C	175
		3163	Average of 14 samples from 6 new 2007 cooperators	169		180

Cost of Specific P Reduction Actions per lb. of P Loss Reduced on Coffee Creek Farms





Participation

- Project activities 2005 to 2008
- Farm Bureau & WIRB
- 47 cooperators
- 9,893 acres in 396 fields

Baseline Performance levels

- 3 yr PI = 2.74 SCI = 0.53
- 2 yr PI = 2.58 SCI = 0.36
- 1 yr PI = 2.60 SCI = 0.45

Targeting

- 25% of cooperators received no 1st year P Index incentive
- 21 fields with P Index > 5
- 8 of 9 cooperators improved average farm P Index 22%
- 16 of 21 fields > 5 improved P Index 39%
- 8 of 9 cooperators improved average farm SCI 114%
- 16 of 21 fields > 5 PI improved SCI 91%
- 3 year cooperators improved P Index 14%
- 2 year cooperators improved P Index 13%

Hewitt Creek Watershed

	2005	2006	2007	2008
Phosphorus Index	$1,230	$13,400	$7,195	$7,830
Soil Conditioning Index	$0	$31,612	$17,835	$16,013
Nitrogen Performance	$1,945	$6,650	$8,560	$3,930
Other incentives	$20,465	$17,230	$9,725	$9,343
Watershed Performance	$0	$0	$5,700	$4,200
Total Incentives	**$23,640**	**$68,892**	**$54,765**	**$46,226**
No. of Cooperators	**33**	**38**	**47**	**50**

Participation

- Project activities 2006 to 2009
- Iowa Corn Growers & WIRB
- 41 cooperators
- 13,218 acres in 321 fields

Baseline Performance levels

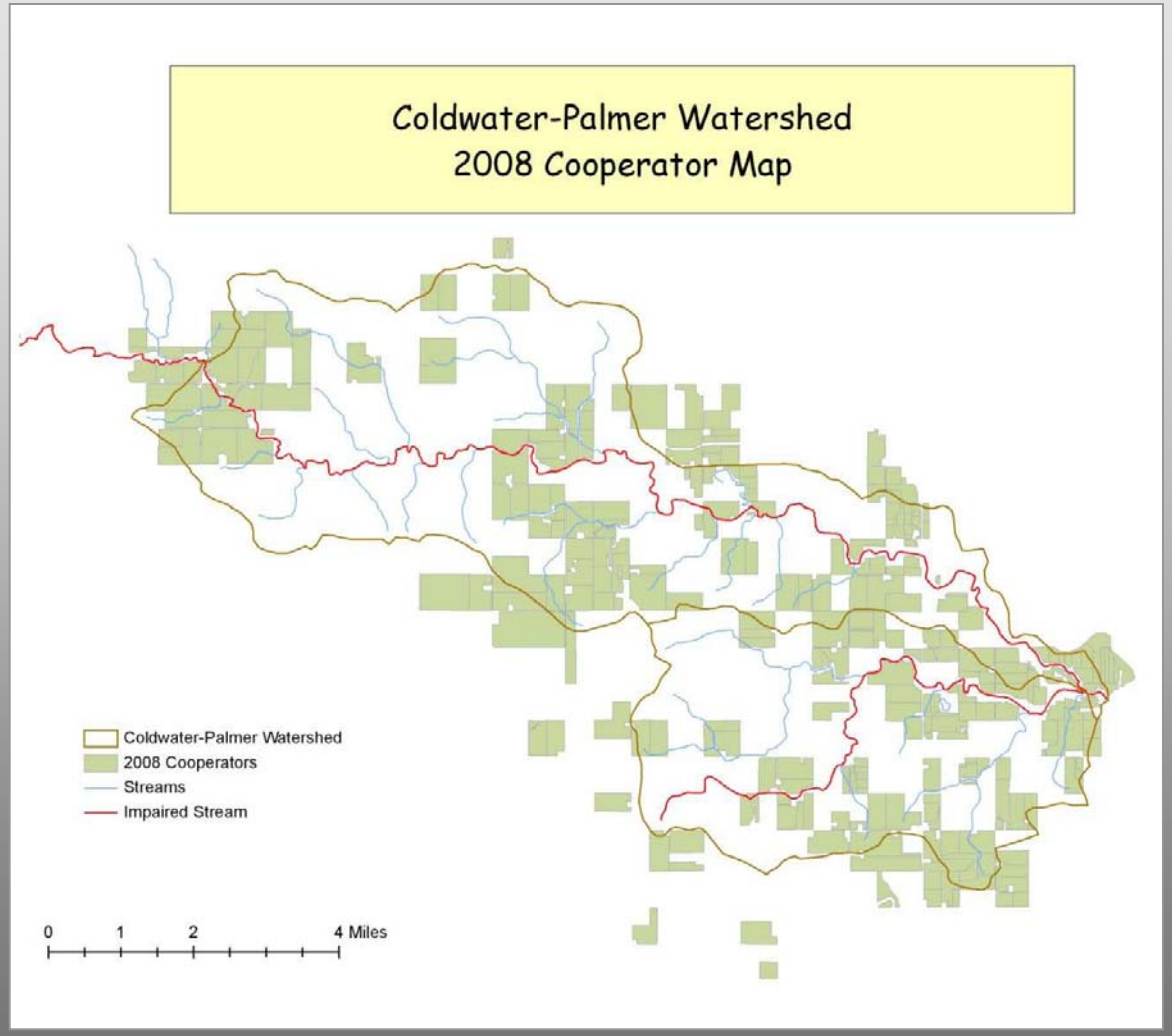
- 3 yr PI = 1.20 SCI = 0.29
- 2 yr PI = 1.09 SCI = 0.38
- 1 yr PI = 1.01 SCI = 0.41

Targeting SCI

- 3 year cooperators changing to notill soybean in rotation with corn improved SCI 134%
- 200+% increase in SCI when notill planting beans on low CSR soils

Nitrogen Management

- 76% of cooperators enrolled in stalk testing program
- 2007 - 44% improvement in stalk sampling results when comparing yr 2 cooperators vs yr 1 cooperators



Coldwater-Palmer Watershed

	2006	2007	2008	2009
Nitrogen Performance	$6,320	$11,425	$10,770	$15,098
Phosphorus Index	$2,300	$3,200	$2,580	$2,310
Soil Conditioning Index	$14,931	$19,780	$16,710	$11,370
Other incentives	$2,700	$4,463	$3,125	$11,062
Watershed Performance	$0	$880	$4,500	$9,200
Total Incentives	**$26,251**	**$39,748**	**$37,685**	**$49,040**
No. of Cooperators	**25**	**36**	**45**	**46**

Performance-based Watershed Management

Watershed-specific Outcomes

- Coldwater-Palmer – 30% reduction in stream nitrate
- Hewitt Creek – 44 lb/a reduction in nitrogen application, 27 miles of improved grassed waterways, improved macroinvertebrate scores
- Lime Creek – 19% reduction in stream nitrate with 2 consecutive years less than 10 mg/L
- North Fork Maquoketa – 8,400 reduction of sediment delivery and improved macroinvertebrate scores

Watershed Resident Leadership

Outcomes

- Developing policy recommendations (extending water project timelines)
- Evaluating performance-based approaches – Iowa/Vermont CIG
- Training watershed leader/technical specialist teams
- Defining the performance-based approach – Minnesota and Heartland Water Quality roundtable/webinar
- Engaging in larger watershed - Cedar River Coalition involvement
- Promoting MRBI project producer involvement

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