

Table 2-1
Summary of Nitrate Trend Analyses - Port of Morrow Farm 1
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location	Data Set Statistics								Trend Analysis Results		Trend Direction	LOWESS Pattern
	Starting Date	Ending Date	Min	Max	Mean	Median	n	% BDL	Slope (ppm/yr)	C.L.		
MW-1	Jun-87	Dec-09	11.2	42.6	24.1	22.9	92	0%	0.16	71%	No Significant Trend	Flat, increase, decrease
MW-2	Jun-87	Dec-09	4.81	65.8	26.8	27.3	83	0%	0.56	99%	Increasing	Increase, decrease, increase
MW-3	Jun-87	Nov-09	0.07	95.4	15.8	4.2	70	0%	0.33	99%	Increasing	Increase then decrease
MW-3a	Mar-02	Dec-09	2.99	6.0	4.2	4.0	32	0%	0.06	71%	No Significant Trend	Decrease, increase, decrease
MW-4	Jun-87	Sep-07	<0.08	43.2	9.4	6.2	79	1.2%	0.33	99%	Increasing	Increase, decrease, increase
MW-5	Jun-87	Nov-09	5.19	36.0	21.4	22.6	88	0%	0.05	47%	No Significant Trend	Increase, decrease, level off
MW-6	Jun-87	Jun-00	<0.08	9.7	0.8	0.5	47	15%	-0.03	82%	Decreasing	Decrease then increase
MW-7	Oct-91	Dec-09	9.75	39.9	22.6	21.0	73	0%	1.52	99%	Increasing	Increase, increase steeper, increase less steeply
MW-8	Oct-91	Dec-09	6.48	54.5	35.0	35.4	73	0%	0.19	42%	No Significant Trend	Increase then decrease
MW-9	Oct-91	Nov-09	5.2	34.5	21.6	22.6	75	0%	0.95	99%	Increasing	Increasing
MW-10	Oct-91	Dec-09	11.5	40.4	28.2	28.7	73	0%	0.69	99%	Increasing	Increase then decrease
MW-11	Oct-91	Nov-09	5.35	50.5	30.9	30.9	73	0%	0.59	99%	Increasing	Increase then decrease
MW-SP1	Mar-95	Dec-09	27.3	53.6	34.5	33.5	56	0%	-0.46	98%	Decreasing	Decrease, decrease steeper, level off
MW-SP2	Mar-96	Dec-09	29.8	50.3	38.4	37.5	56	0%	-0.42	98%	Decreasing	Decrease then increase

# of Increasing Trends (currently sampled wells only) ==>	6
# of Decreasing Trends (currently sampled wells only) ==>	2
# of Flat Trends (currently sampled wells only) ==>	0
# of Statistically Insignificant Trends (currently sampled wells only) ==>	4
Average slope of significant trends at currently sampled wells only (ppm/yr) ==>	0.47
Average slope of all trends at currently sampled wells only (ppm/yr) ==>	0.35

Notes:
Min = minimum, Max = maximum, n = number of samples
BDL = below detection limit, C.L. = confidence level
shaded cell means well is no longer sampled

**Table 2-2
Comparison of Nitrate Trends Between Analyses - Port of Morrow Farm 1
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA**

Well Identification	First Trend Analysis Results <small>(from well installation through 2001)</small>		Second Trend Analysis Results <small>(from well installation through 2005)</small>		Third Trend Analysis Results <small>(from well installation through 2009)</small>		Summary of Changes in Trends between Second and Third Trend Analyses
	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	
MW-11	2.24	99%	1.51	99%	0.59	99%	5 wells show improving trends (<i>increasing less steeply</i>)
MW-3	2.65	99%	1.22	99%	0.33	99%	
MW-10	1.51	99%	1.46	99%	0.69	99%	
MW-7	0.41	90%	1.90	99%	1.52	99%	
MW-9	1.41	99%	1.12	99%	0.95	99%	
MW-1	0.21	< 80%	0.64	99%	0.16	71%	3 wells suggest improving trends (<i>increasing less steeply</i>)
MW-5	0.67	99%	0.08	48%	0.05	47%	
MW-8	2.48	99%	0.99	98%	0.19	42%	
MW-6	-0.02	80%	ns	--	ns	--	1 well was not sampled enough to calculate trends twice
MW-2	1.65	99%	0.53	96%	0.56	99%	4 wells show worsening trends (<i>increasing trends getting steeper or decreasing trends getting less steep</i>)
MW-4	0.31	90%	0.29	98%	0.33	99%	
MW-SP1	0.67	< 80%	-0.80	99%	-0.46	98%	
MW-SP2	-0.25	< 80%	-1.51	99%	-0.42	98%	
MW-3a	ns	--	-0.10	39%	0.06	71%	1 well suggests a worsening trend (<i>switched from decreasing to increasing</i>)
Site-wide average trend slope (statistically significant trends only)	1.33		0.67		0.45		Site-wide average of statistically significant trend slopes shows improving trends (<i>decreases less steeply</i>)
Site-wide average trend slope (all trends)	1.07		0.56		0.35		Site-wide average of all trend slopes suggests improving trends (<i>decreases less steeply</i>)
# Increasing Trends	9 (69%)		9 (69%)		7 (54%)		There were fewer increasing trends, no change in decreasing trends, and more statistically insignificant trends.
# Decreasing Trends	1 (8%)		2 (15%)		2 (15%)		
# Flat Trends	0 (0%)		0 (0%)		0 (0%)		
# Stat. Insignif. Trends	3 (23%)		2 (15%)		4 (31%)		

Notes:

ns = well not sampled enough to calculate a trend

If both confidence levels are at least 80% (e.g., a statistically significant trend), then the change is termed as "showing" a change in trend.

If either confidence level is less than 80%, (e.g., a statistically insignificant trend), then the change is termed as "suggesting" a change in trend.

Table 2-3
Summary of Nitrate Trend Analyses - Port of Morrow Farm 2
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location	Data Set Statistics								Trend Analysis Results		Trend Direction	LOWESS Pattern
	Starting Date	Ending Date	Min	Max	Mean	Median	n	% BDL	Slope (ppm/yr)	C.L.		
MW-12	Dec-91	Dec-09	13	56.0	35.8	35.6	72	0%	1.47	99%	Increasing	Increasing
MW-12s	Oct-07	Dec-09	<0.08	70.7	38.9	50.7	9	22%	-6.45	60%	No Significant Trend	Decrease then increase
MW-13	Dec-91	Dec-09	16.8	61.6	43.1	43.2	73	0%	-0.03	12%	No Significant Trend	Increase then decrease
MW-14	Dec-91	Dec-09	<0.02	45.2	27.0	28.0	73	1%	0.37	72%	No Significant Trend	Increase then decrease
MW-14s	Jan-95	Dec-09	8.12	52.0	37.0	37.7	38	0%	0.16	19%	No Significant Trend	Increase, decrease, increase
MW-15	Dec-91	Dec-09	9.7	59.3	42.0	44.3	73	0%	1.39	99%	Increasing	Increase, then increase less steeply
MW-15s	Jan-95	Dec-09	15.5	55.4	42.9	43.8	37	0%	1.28	99%	Increasing	Increase, then increase less steeply
MW-16	Dec-91	Dec-09	6.06	58.3	37.8	36.1	73	0%	-1.66	99%	Decreasing	Increase then decrease
MW-17	Dec-91	Dec-09	5.89	53.4	42.1	44.8	73	0%	0.50	99%	Increasing	Increase then level off
MW-18	Dec-91	Dec-09	0.03	17.5	9.0	10.0	73	0%	0.82	99%	Increasing	Increasing

# of Increasing Trends ==>	5
# of Decreasing Trends ==>	1
# of Flat Trends ==>	0
# of Statistically Insignificant Trends ==>	4
Average slope of significant trends (ppm/yr) ==>	0.63
Average slope of all trends (ppm/yr) ==>	-0.21

Notes:

Min = minimum, Max = maximum, n = number of samples

BDL = below detection limit, C.L. = confidence level

E:\LUB\LandApp\Third Trend Analysis\All Trends.xlsx\POM Farm2 thru 2009

Table 2-4
Comparison of Nitrate Trends Between Analyses - Port of Morrow Farm 2
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location	First Trend Analysis Results (from well installation through 2001)		Second Trend Analysis Results (from well installation through 2005)		Third Trend Analysis Results (from well installation through 2009)		Summary of Changes in Trends between Second and Third Trend Analyses
	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	
MW-12	1.63	99%	1.10	99%	1.47	99%	1 well shows a worsening trend (increasing steeper)
MW-14s	2.27	80%	-0.03	0%	0.16	19%	1 well suggests a worsening trend (from decreasing to increasing)
MW-15	2.69	99%	1.94	99%	1.39	99%	4 wells show improving trends (increasing less steeply)
MW-15s	3.85	99%	3.02	99%	1.28	99%	
MW-18	0.89	99%	0.84	99%	0.82	99%	
MW-17	2.32	99%	1.22	99%	0.50	99%	
MW-16	2.63	99%	0.09	17%	-1.66	99%	3 wells suggest improving trends (switch from increasing to decreasing, or increasing less steeply)
MW-14	3.59	99%	0.88	98%	0.37	72%	
MW-13	2.73	99%	1.05	99%	-0.03	12%	
MW-12s	ns	--	ns	--	-6.45	60%	1 well was only evaluated once
Site-wide average trend slope (statistically significant trends only)	2.51		1.43		0.63		Site-wide average of statistically significant trend slopes shows improving trends (<i>increases less steeply</i>)
Site-wide average trend slope (all trends)	2.51		1.12		-0.21		Site-wide average of all trend slopes suggests improving trends (<i>switches from increasing to decreasing</i>)
# Increasing Trends	9 (100%)		7 (78%)		5 (50%)		There were fewer increasing trends, one decreasing trend, and more statistically insignificant trends.
# Decreasing Trends	0 (0%)		0 (0%)		1 (10%)		
# Flat Trends	0 (0%)		0 (0%)		0 (0%)		
# Stat. Insignif. Trends	0 (0%)		2 (22%)		4 (40%)		

Notes:

ns = well not sampled enough to calculate a trend

If both confidence levels are at least 80% (e.g., a statistically significant trend), then the change is termed as "showing" a change in trend.

If either confidence level is less than 80%, (e.g., a statistically insignificant trend), then the change is termed as "suggesting" a change in trend.

Table 2-5
Summary of Nitrate Trend Analyses - Port of Morrow Farm 3
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location	Data Set Statistics								Trend Analysis Results		Trend Direction	LOWESS Pattern
	Starting Date	Ending Date	Min	Max	Mean	Median	n	% BDL	Slope (ppm/yr)	C.L.		
MW-19	Mar-02	Dec-09	11.5	44.7	24.6	22.5	32	0%	2.89	99%	Increasing	Decrease, increase, then decrease
MW-20	Mar-02	Dec-09	5.05	42.3	18.0	17.6	32	0%	-2.02	99%	Decreasing	Decrease, level off, then decrease
MW-21	Mar-02	Dec-09	13.6	49.3	31.9	34.5	32	0%	3.17	99%	Increasing	Increase, level off, then increase less steeply
MW-22	Mar-02	Dec-09	19.2	68.8	44.9	47.5	32	0%	4.68	99%	Increasing	Increasing then leveling off
MW-23	Mar-02	Dec-09	38.9	68.0	53.7	53.3	32	0%	-0.16	34%	No Significant Trend	Increase then decrease
MW-24	Mar-02	Nov-09	42.1	72.0	53.6	52.0	32	0%	3.07	99%	Increasing	Decrease then increase
MW-25	Mar-09	Nov-09	35.3	43.6	39.9	40.4	4	0%	Not enough data to calculate trend		Decreasing	

# of Increasing Trends ==>	4
# of Decreasing Trends ==>	1
# of Flat Trends ==>	0
# of Statistically Insignificant Trends ==>	1
Average slope of significant trends (ppm/yr) ==>	2.4
Average slope of all trends (ppm/yr) ==>	1.9

Notes:
 Min = minimum, Max = maximum, n = number of samples
 BDL = below detection limit, C.L. = confidence level
 E:\LUB\LandApp\Third Trend Analysis\All Trends.xlsx\Port of Morrow Farm 3 thru 2009

Table 2-6
Comparison of Nitrate Trends Between Analyses - Port of Morrow Farm 3
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location	First Trend Analysis Results (from well installation through 2001)		Second Trend Analysis Results (from well installation through 2005)		Third Trend Analysis Results (from well installation through 2009)		Summary of Changes in Trends between Second and Third Trend Analyses
	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	
MW-19	ni	--	-2.00	97%	2.89	99%	1 well shows worsening trend (<i>switched from decreasing to increasing</i>)
MW-24	ni	--	-0.21	0%	3.07	99%	1 well suggests worsening trend (<i>switched from decreasing to increasing</i>)
MW-20	ni	--	-3.17	99%	-2.02	99%	1 well shows worsening trend (<i>decreasing less steeply</i>)
MW-22	ni	--	7.51	99%	4.68	99%	2 wells show improving trends (<i>increasing less steeply</i>)
MW-21	ni	--	6.92	99%	3.17	99%	
MW-23	ni	--	5.02	99%	-0.16	34%	1 well suggests improving trend (<i>switched from increasing to decreasing</i>)
MW-25	ni	--	ni	--	ns	--	1 well has not been sampled enough
Site-wide average trend slope (statistically significant trends only)	ni		2.86		2.36		Site-wide average of statistically significant trend slopes shows improving trends (<i>increases less steeply</i>)
Site-wide average trend slope (all trends)	ni		2.34		1.94		Site-wide average of all trend slopes suggests improving trends (<i>increases less steeply</i>)
# Increasing Trends	--		3 (50%)		4 (66%)		There were more increasing trends and fewer decreasing trends
# Decreasing Trends	--		2 (33%)		1 (17%)		
# Flat Trends	--		0 (0%)		0 (0%)		
# Stat. Insignif. Trends	--		1 (17%)		1 (17%)		

Notes:

ni = well not installed yet

ns = well not sampled enough to calculate a trend

If both confidence levels are at least 80% (e.g., a statistically significant trend), then the change is termed as "showing" a change in trend.

If either confidence level is less than 80%, (e.g., a statistically insignificant trend), then the change is termed as "suggesting" a change in trend.

Table 3-1
Summary of Nitrate Trend Analyses - ConAgra North Farm
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location	Data Set Statistics								Trend Analysis Results		Trend Direction	LOWESS Pattern
	Starting Date	Ending Date	Min	Max	Mean	Median	n	% BDL	Slope (ppm/yr)	C.L.		
MW-1	Oct-95	Nov-09	2.14	56.6	18.2	17.2	55	0%	0.10	24%	No Significant Trend	Decreasing then increasing
MW-2	Oct-95	Nov-09	13.7	46.1	18.8	18.4	55	0%	0.08	96%	Increasing	Slightly increasing then slightly decreasing
MW-3	Oct-95	Nov-09	7.14	50.4	9.3	8.3	57	0%	-0.08	99%	Decreasing	Slightly decreasing
MW-4	Oct-95	Nov-09	13.2	29.2	25.1	25.4	57	0%	0.20	99%	Increasing	Increase, level off, then increase
MW-5	Nov-95	Nov-09	19.2	50.6	28.4	28.2	57	0%	0.71	99%	Increasing	Increasing
MW-6	Nov-95	Nov-09	3.09	10.8	7.0	7.4	57	0%	0.57	99%	Increasing	Increasing
MW-7	Oct-95	Nov-09	11.4	62.8	41.2	43.9	57	0%	1.15	98%	Increasing	Increase then decrease
MW-8	Oct-95	Nov-09	9.12	129	51.4	49.5	57	0%	-0.24	58%	No Significant Trend	Increase, decrease, then level off
MW-9	Oct-95	Nov-09	3.86	8.1	6.6	6.6	57	0%	-0.13	99%	Decreasing	Decreasing
MW-10	Jan-96	Nov-09	9.08	64.7	47.2	48.6	54	0%	-0.12	67%	No Significant Trend	Increase, decrease, then level off
MW-11	Aug-06	Nov-09	46.6	43.5	59.3	59.8	14	0%	3.65	93%	Increasing	Increasing
MW-12	Aug-06	Nov-09	37.0	97.3	63.3	59.6	14	0%	19.7	99%	Increasing	Increasing
MW-13	Aug-06	Nov-09	19.0	44.0	35.8	37.5	14	0%	1.64	45%	No Significant Trend	Decrease, increase, decrease

# of Increasing Trends ==>	7
# of Decreasing Trends ==>	2
# of Flat Trends ==>	0
# of Statistically Insignificant Trends ==>	4
Average slope of significant trends (ppm/yr) ==>	2.9
Average slope of all trends (ppm/yr) ==>	2.1

Notes:

Min = minimum, Max = maximum, n = number of samples
BDL = below detection limit, C.L. = confidence level

Table 3-2
Comparison of Nitrate Trends Between Analyses - ConAgra North Farm
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location	First Trend Analysis Results (from well installation through 2001)		Second Trend Analysis Results (from well installation through 2005)		Third Trend Analysis Results (from well installation through 2009)		Summary of Changes in Trends between Second and Third Trend Analyses
	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	
MW-5	0.30	< 80%	0.61	99%	0.71	99%	1 well shows worsening trend (<i>by increasing steeper</i>)
MW-3	-0.33	99%	-0.17	99%	-0.08	99%	1 well shows worsening trend (<i>by decreasing less steeply</i>)
MW-1	0.43	< 80%	-0.36	75%	0.10	24%	1 well suggests worsening trend (<i>by switching from decreasing to increasing</i>)
MW-9	-0.03	80%	-0.13	99%	-0.13	99%	1 well shows no change in its decreasing trend
MW-4	0.76	99%	0.25	99%	0.20	99%	4 wells show improving trends (<i>by increasing less steeply</i>)
MW-6	0.60	99%	0.63	99%	0.57	99%	
MW-2	0.31	99%	0.18	99%	0.08	96%	
MW-7	6.93	99%	3.67	99%	1.15	98%	
MW-10	0.78	80%	0.04	7%	-0.12	67%	2 wells suggest improving trends (<i>by switching from increasing to decreasing</i>)
MW-8	1.66	< 80%	0.22	45%	-0.24	58%	
MW-11	ni	--	ni	--	3.65	93%	3 wells were only analyzed once
MW-12	ni	--	ni	--	19.69	99%	
MW-13	ni	--	ni	--	1.64	45%	

			MW-1 thru 10	MW-1 thru 13	
Site-wide average trend slope (statistically significant trends only)	1.99	0.72	0.35	2.32	Site-wide average of statistically significant trend slopes shows improving trends (<i>increases less steeply</i>)
Site-wide average trend slope (all trends)	1.14	0.50	0.22	2.09	Site-wide average of all trend slopes suggests improving trends (<i>increases less steeply</i>)

# Increasing Trends	5 (50%)	5 (50%)	7 (54%)	There were more increasing trends, fewer decreasing trends, and more statistically insignificant trends.
# Decreasing Trends	2 (20%)	2 (20%)	2 (15%)	
# Flat Trends	0 (0%)	0 (0%)	0 (0%)	
# Stat. Insignif. Trends	3 (30%)	3 (30%)	4 (31%)	

Notes:

ni = well not installed yet

ns = well not sampled enough to calculate a trend

If both confidence levels are at least 80% (e.g., a statistically significant trend), then the change is termed as "showing" a change in trend.

If either confidence level is less than 80%, (e.g., a statistically insignificant trend), then the change is termed as "suggesting" a change in trend.

Table 3-3
Summary of Nitrate Trend Analyses - ConAgra Madison Ranch
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location	Well Location	Data Set Statistics								Trend Analysis Results		Trend Direction	LOWESS Pattern
		Starting Date	Ending Date	Min	Max	Mean	Median	n	% BDL	Slope (ppm/yr)	C.L.		
MW-2	Onsite	Nov-95	Nov-09	0.05	0.47	0.2	0.2	51	0%	0.0003	< 80%	No Significant Trend	Basically flat
MW-3		Jan-96	Nov-09	2.68	13.2	4.7	3.7	53	0%	0.23	99%	Increasing	Flat then increasing
MW-4a		Nov-95	Nov-09	0.65	1.19	0.9	0.9	54	0%	0.001	< 80%	No Significant Trend	Basically flat
MW-6		Nov-95	Nov-09	8.37	41.1	25.1	26.1	53	0%	0.99	99%	Increasing	Increasing then decreasing
MW-7		Nov-95	Nov-09	0.32	3.54	0.9	0.4	54	0%	0.12	99%	Increasing	Flat then increasing
MW-8		Nov-95	Nov-09	3.52	6.2	5.0	5.0	54	0%	0.11	99%	Increasing	Increasing
MW-9		Nov-95	Nov-09	0.2	6.74	2.3	1.6	54	0%	0.36	99%	Increasing	Flat then increasing
MW-10		Nov-95	Nov-09	2.93	14.3	6.5	6.0	53	0%	-0.26	99%	Decreasing	Decrease then level off
MW-12/ MW-17		Nov-95	Nov-09	2.77	14.3	6.4	5.9	51	0%	0.20	99%	Increasing	Increasing
MW-13		Sep-06	Nov-09	6.7	9.1	8.3	8.4	14	0%	0.35	97%	Increasing	Increase then slight decrease
MW-14		Sep-06	Nov-09	2.26	5.1	4.3	4.6	14	0%	0.20	97%	Increasing	Basically flat
MW-15		Sep-06	Nov-09	4.64	6.0	5.2	5.2	13	0%	0.04	35%	No Significant Trend	Decrease, increase, then decrease
MW-16		Sep-06	Nov-09	3.13	4.0	3.4	3.3	14	0%	0.05	84%	Increasing	Basically flat
MW-5	Offsite	Nov-95	Nov-09	0.76	26.1	8.8	7.6	67	0%	-0.35	99%	Decreasing	Decrease then level off
MW-11		Nov-95	Nov-09	0.63	25.5	7.4	7.2	56	0%	-0.13	99%	Decreasing	Slight decrease then slight increase
# of Increasing Trends (current onsite wells only) ==>										9			
# of Decreasing Trends (current onsite wells only) ==>										1			
# of Flat Trends (current onsite wells only) ==>										0			
# of Statistically Insignificant Trends (current onsite wells only) ==>										3			
Average slope of significant trends (current onsite wells only) ==>										0.24			
Average slope of all trends (current onsite wells only) ==>										0.19			

Notes:

Min = minimum, Max = maximum, n = number of samples

BDL = below detection limit, C.L. = confidence level

Well MW-1 is no longer sampled and is not considered a current onsite well.

Well MW-12 was sampled until 07/08 when it was damaged beyond repair. Replacement well MW-17 was first sampled 11/08

Table 3-4
Comparison of Nitrate Trends Between Analyses - ConAgra Madison Ranch
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location		First Trend Analysis Results (from well installation through 2001)		Second Trend Analysis Results (from well installation through 2005)		Third Trend Analysis Results (from well installation through 2009)		Summary of Changes in Trends between Second and Third Trend Analyses	
		Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.		
MW-1	Onsite	-0.14	< 80%	abandoned	--	abandoned	--	well was only analyzed once	
MW-13		ni	--	ni	--	0.35	97%		
MW-14		ni	--	ni	--	0.20	97%		
MW-15		ni	--	ni	--	0.04	35%		
MW-16		ni	--	ni	--	0.05	84%		
MW-10			-0.68	< 80%	-0.47	99%	-0.26	99%	1 well shows worsening trend (by decreasing less steeply)
MW-9			0.04	95%	0.20	99%	0.36	99%	4 wells shows worsening trend (by increasing steeper)
MW-3			0.05	95%	0.11	99%	0.23	99%	
MW-7			0.00	< 80%	0.02	99%	0.12	99%	
MW-8			0.24	99%	0.08	99%	0.11	99%	2 wells show improving trend (by increasing less steeply)
MW-12/ MW-17			1.03	99%	0.22	95%	0.20	99%	
MW-6			3.16	99%	2.03	99%	0.99	99%	2 wells suggest improving trend (by increasing less steeply)
MW-4a			0.05	90%	0.003	20%	0.001	< 80%	
MW-2			0.012	95%	0.009	99%	0.0003	< 80%	
MW-5	Offsite	-0.32	< 80%	-0.48	99%	-0.35	99%	2 wells show worsening trend (by decreasing less steeply)	
MW-11		0.05	< 80%	-0.32	99%	-0.13	99%		
						MW-1 thru 12	MW-1 thru 16		
Site-wide average trend slope (statistically significant onsite trends only)		0.65		0.28		0.25	0.24	Site-wide average of statistically significant trend slopes shows improving trends (increases less steeply)	
Site-wide average trend slope (all onsite trends)		0.56		0.25		0.20	0.19	Site-wide average of all trend slopes suggests improving trends (increases less steeply)	
# Increasing Trends (onsite only)		7 (70%)		7 (78%)		9 (69%)		There were (proportionally) fewer increasing trends and more statistically insignificant trends	
# Decreasing Trends (onsite only)		0 (0%)		1 (11%)		1 (8%)			
# Flat Trends (onsite only)		0 (0%)		0 (0%)		0 (0%)			
# Stat. Insignif. Trends (onsite only)		3 (30%)		1 (11%)		3 (23%)			

Notes:

ni = well not installed yet

ns = well not sampled enough to calculate a trend

abandoned = well was abandoned (and no longer sampled) because it was damaged

If both confidence levels are at least 80% (e.g., a statistically significant trend), then the change is termed as "showing" a change in trend.

If either confidence level is less than 80%, (e.g., a statistically insignificant trend), then the change is termed as "suggesting" a change in trend.

Table 4-1
Summary of Nitrate Trend Analyses - Simplot Plant Site
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location	Data Set Statistics								Trend Analysis Results		Trend Direction	LOWESS Pattern
	Starting Date	Ending Date	Min	Max	Mean	Median	n	% BDL	Slope (ppm/yr)	C.L.		
MW-10S	Feb-92	Feb-09	0.05	44.9	4.6	1.6	58	26%	0.25	99%	Increasing	Increasing then increasing steeper
MW-10D	Feb-92	Feb-09	0.05	4.9	0.3	<1.0	55	55%	0.04	35%	No Significant Trend	Slight increase then level
MW-11S	Feb-88	Nov-09	6.0	18.0	11.2	11.1	84	0%	-0.15	99%	Decreasing	Decreasing, flat, then decreasing
MW-11D	Feb-88	Nov-09	0.5	3.5	1.1	0.9	84	24%	0.03	99%	Increasing	Flat, increasing, then leveling off
MW-12	Feb-88	Nov-09	12.5	46.7	20.9	19.6	82	0%	-0.02	29%	No Significant Trend	Increasing then decreasing
MW-13S	Nov-88	Nov-09	3.9	53.0	15.4	14.8	85	0%	0.10	92%	Increasing	Decreasing then increasing
MW-13D	Nov-88	Aug-05	0.4	17.0	2.2	1.7	67	0%	0.03	96%	Increasing	Basically level
MW-16	Nov-88	Aug-05	0.2	100	15.4	3.1	68	40%	-2.40	99%	Decreasing	Decreasing then level
MW-17	Nov-88	Aug-05	0.02	31.4	0.9	1.0	66	46%	0	26%	No Significant Trend	Slight increase
MW-18	Nov-88	May-96	0.50	99.3	8.2	2.6	31	29%	0.29	86%	Increasing	Increase then decrease
MW-19	Nov-88	Nov-09	0.05	1.9	0.2	<1.0	84	56%	0.0	59%	No Significant Trend	Slight increase then level
MW-20	Nov-88	Aug-05	<1.0	43.3	13.3	11.8	68	10%	-1.46	99%	Decreasing	Decreasing
MW-21	Nov-88	Aug-05	0.05	8.9	0.9	1.0	68	46%	-0.10	94%	Decreasing	Basically level
MW-45	Feb-92	Aug-05	<1.0	48.3	9.8	4.1	54	33%	-1.95	99%	Decreasing	Decreasing then level
MW-46	Feb-96	Nov-09	5.1	13.2	8.8	8.8	30	0%	0.10	81%	Increasing	Decreasing then increasing
MW-47	Feb-96	Nov-08	5.1	28.3	16.4	15.8	36	0%	-0.13	43%	No Significant Trend	Increasing then decreasing
MW-48	Feb-96	May-07	6.9	45.8	32.0	35.8	38	0%	-2.97	99%	Decreasing	Increasing then decreasing
MW-49	Feb-96	Aug-05	<0.5	1.2	0.6	0.5	39	77%	-0.09	84%	Decreasing	Flat
MW-50	Feb-96	Nov-09	0.5	1.3	<1.0	<1.0	56	84%	-0.03	99%	Decreasing	Flat
MW-56	Feb-96	Nov-04	<1.0	31.8	9.0	8.6	25	4%	0.33	92%	Increasing	Slight increase
MW-57	Feb-96	Aug-05	1.0	18.5	7.6	6.5	39	0%	-0.20	94%	Decreasing	Basically level with some fluctuation
MW-58	May-96	Feb-05	<1.0	18.2	8.5	5.6	36	25%	0	25%	No Significant Trend	Decrease then increase
MW-59	Aug-96	Aug-05	0.5	1.1	<1.0	<1.0	37	84%	0	59%	No Significant Trend	Flat
# of Increasing Trends (only onsite wells still being sampled) ==>									4			
# of Decreasing Trends (only onsite wells still being sampled) ==>									3			
# of Flat Trends (only onsite wells still being sampled) ==>									0			
# of Statistically Insignificant Trends (only onsite wells still being sampled) ==>									4			
Average slope of significant trends at onsite wells (ppm/yr) ==>									-0.38			
Average slope of all trends at onsite wells (ppm/yr) ==>									-0.25			

Notes:

Min = minimum, Max = maximum, n = number of samples

BDL = below detection limit, C.L. = confidence level

Wells MW-56 through MW-59 are offsite wells. All other wells are onsite wells.

shaded cell means the well is no longer sampled

Table 4-2
Comparison of Nitrate Trends Between Analyses - Simplot Plant Site
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location	First Trend Analysis Results (from well installation through 2001)		Second Trend Analysis Results (from well installation through 2005)		Third Trend Analysis Results (from well installation through 2009)		Summary of Changes in Trends between Second and Third Trend Analyses
	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	
MW-50	0.0	95%	-0.09	98%	-0.03	99%	1 well shows worsening trend (<i>by decreasing less steeply</i>)
MW-13S	-0.1	< 80%	0.05	31%	0.10	92%	2 wells suggests worsening trend (<i>by increasing steeper</i>)
MW-10D	0.0	< 80%	0	22%	0.04	35%	
MW-46	-0.1	< 80%	0.10	18%	0.10	81%	2 wells suggest no change in trend
MW-19	0.0	< 80%	0	40%	0.0	59%	
MW-11S	-0.1	80%	-0.12	93%	-0.15	99%	2 wells show improving trends (<i>by decreasing steeper</i>)
MW-48	-0.4	< 80%	-2.82	99%	-2.97	99%	
MW-11D	0.0	< 80%	0.07	99%	0.03	99%	1 well shows an improving trend (<i>by increasing less steeply</i>)
MW-12	0.1	< 80%	0.03	30%	-0.02	29%	2 wells suggest an improving trend (<i>by switching from increasing to decreasing</i>)
MW-47	1.5	95%	0.22	27%	-0.13	43%	
MW-10S	0.0	< 80%	0.59	99%	0.25	99%	1 well shows an improving trend (<i>by increasing less steeply</i>)
Site-wide average trend slope (statistically significant trends only)	0.46		-0.47		-0.38		Site-wide average of statistically significant trend slopes shows improving trends (<i>decreases steeper</i>)
Site-wide average trend slope (all trends)	0.08		-0.18		-0.25		Site-wide average of all trend slopes suggests improving trends (<i>decreases steeper</i>)
# Increasing Trends	1 (9%)		2 (18%)		4 (36%)		There were more increasing trends and fewer statistically insignificant trends.
# Decreasing Trends	1 (9%)		3 (27%)		3 (27%)		
# Flat Trends	1 (9%)		0 (0%)		0 (0%)		
# Stat. Insignif. Trends	8 (73%)		6 (55%)		4 (36%)		

Notes:

Only onsite wells that are still being sampled are included in this table.

If both confidence levels are at least 80% (e.g., a statistically significant trend), then the change is termed as "showing" a change in trend.

If either confidence level is less than 80%, (e.g., a statistically insignificant trend), then the change is termed as "suggesting" a change in trend.

Table 4-3
Summary of Nitrate Trend Analyses - Simplot Terrace Site
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location	Data Set Statistics								Trend Analysis Results		Trend Direction	LOWESS Pattern
	Starting Date	Ending Date	Min	Max	Mean	Median	n	% BDL	Slope (ppm/yr)	C.L.		
MW-14	Nov-88	Feb-09	9.0	46.6	28.8	29.3	72	0%	1.70	99%	Increasing	Increasing
MW-15	Nov-88	Feb-98	6.2	17.3	10.4	10.0	35	0%	0.73	99%	Increasing	Increasing with some fluctuation
MW-22	Nov-88	Nov-09	10.3	36.4	26.1	28.9	83	0%	0.77	99%	Increasing	Increasing then starting to decrease
MW-38	May-92	Aug-05	2.3	21.1	12.3	12.2	53	0%	0.97	99%	Increasing	Increasing with some fluctuation
MW-39	May-92	Feb-09	9.2	37.2	20.0	14.5	59	0%	-0.17	78%	No Significant Trend	Increase then decrease
MW-40	May-92	Nov-09	1.2	34.2	20.3	20.4	71	0%	1.20	99%	Increasing	Increasing then increase less steeply
MW-51	Feb-96	Feb-09	9.0	22.9	17.4	19.0	44	0%	0.35	99%	Increasing	Increase then slightly decrease
MW-52	Feb-96	Nov-09	10.7	35.2	24.6	24.9	56	0%	-0.30	97%	Decreasing	Increase then decrease
MW-53	Feb-96	Nov-09	20.8	72.3	52.0	53.3	56	0%	-1.68	99%	Decreasing	Flat, decrease, then flat again
MW-54	Feb-96	Nov-09	14.7	26.2	21.0	21.0	56	0%	0.66	99%	Increasing	Increasing
# of Increasing Trends (currently sampled wells only) ==>									5			
# of Decreasing Trends (currently sampled wells only) ==>									2			
# of Flat Trends (currently sampled wells only) ==>									0			
# of Statistically Insignificant Trends (currently sampled wells only) ==>									1			
Average slope of significant trends at currently sampled wells (ppm/yr) ==>									0.39			
Average slope of all trends at currently sampled wells (ppm/yr) ==>									0.32			

Notes:

Min = minimum, Max = maximum, n = number of samples

BDL = below detection limit, C.L. = confidence level

shaded cell means the well is no longer sampled

Table 4-4
Comparison of Nitrate Trends Between Analyses - Simplot Terrace Site
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location	First Trend Analysis Results (from well installation through 2001)		Second Trend Analysis Results (from well installation through 2005)		Third Trend Analysis Results (from well installation through 2009)		Summary of Changes in Trends between Second and Third Trend Analyses
	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	
MW-53	0.95	< 80%	-2.07	99%	-1.68	99%	1 well shows worsening trend (<i>by decreasing less steeply</i>)
MW-54	1.04	99%	0.62	99%	0.66	99%	1 well shows worsening trend (<i>by increasing steeper</i>)
MW-39	1.80	99%	-0.11	41%	-0.17	78%	1 well suggests an improving trend (<i>by decreasing steeper</i>)
MW-14	1.80	99%	1.80	99%	1.70	99%	4 wells show worsening trends (<i>by decreasing less steeply</i>)
MW-22	1.38	99%	0.96	99%	0.77	99%	
MW-51	1.68	99%	0.71	99%	0.35	99%	
MW-40	1.37	99%	1.70	99%	1.20	99%	
MW-52	2.25	95%	0.41	50%	-0.30	97%	1 well suggests improving trend (<i>by switching from increasing to decreasing</i>)
Site-wide average trend slope (statistically significant trends only)	1.62		0.62		0.39		Site-wide average of statistically significant trend slopes shows improving trends (<i>increases less steeply</i>)
Site-wide average trend slope (all trends)	1.53		0.50		0.32		Site-wide average of all trend slopes suggests improving trends (<i>increases less steeply</i>)
# Increasing Trends	7 (87.5%)		5 (62.5%)		5 (62.5%)		There were more decreasing trends and fewer statistically insignificant trends.
# Decreasing Trends	0		1 (12.5%)		2 (25%)		
# Flat Trends	0		0		0		
# Stat. Insignif. Trends	1 (12.5%)		2 (25%)		1 (12.5%)		

Notes:

Only onsite wells that are still being sampled are included in this table.

If both confidence levels are at least 80% (e.g., a statistically significant trend), then the change is termed as "showing" a change in trend.

If either confidence level is less than 80%, (e.g., a statistically insignificant trend), then the change is termed as "suggesting" a change in trend.

Table 4-5
Summary of Nitrate Trend Analyses - Simplot Expansion Site
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location	Data Set Statistics								Trend Analysis Results		Trend Direction	LOWESS Pattern
	Starting Date	Ending Date	Min	Max	Mean	Median	n	% BDL	Slope (ppm/yr)	C.L.		
MW-23	May-90	Nov-08	4.8	13.2	9.1	8.9	71	0%	0.07	87%	Increasing	Increase then decrease
MW-24	May-90	Aug-05	3.8	12.3	7.7	7.5	53	0%	0.20	98%	Increasing	Increase then slight decrease
MW-25	May-90	Aug-05	3.5	13.8	7.7	7.5	56	0%	0.25	99%	Increasing	Increase then slight decrease
MW-26	May-90	Aug-05	2.4	17.8	9.6	9.6	48	0%	0.51	99%	Increasing	Increase then slight decrease
MW-27	May-90	Aug-05	2.6	13.4	7.3	7.3	48	0%	0.41	99%	Increasing	Increase then start to level off
MW-28	May-90	Aug-05	2.1	22.1	11.5	11.5	59	0%	0.56	99%	Increasing	Increase then decrease
MW-29	May-90	Nov-09	1.7	11.7	7.1	7.1	78	0%	0.22	99%	Increasing	Increase then decrease
MW-30	May-90	Aug-05	0.1	26.5	8.3	8.4	57	2%	0.55	99%	Increasing	Increasing with some fluctuation
MW-31	May-91	Nov-08	0.6	20.0	9.5	9.7	66	2%	-0.18	98%	Decreasing	Increase then decrease
MW-32	May-91	Nov-08	<1	11.8	7.6	7.7	71	1%	0.05	79%	No Significant Trend	Increase then decrease
MW-33	May-91	Nov-08	3.6	13.1	8.1	8.5	70	0%	0.16	99%	Increasing	Increase then level off
MW-34	May-91	Aug-05	4.0	24.5	7.9	6.9	58	0%	0.05	58%	No Significant Trend	Slight increase then slight decrease
MW-35	May-91	Nov-09	2.0	57.6	8.6	7.5	75	0%	0.07	75%	No Significant Trend	Increase, decrease, then slight increase
MW-36	May-91	Nov-09	2.7	8.8	6.1	6.4	75	0%	0.14	92%	Increasing	Increase then decrease
MW-37	May-91	Aug-05	<2.0	37.2	9.3	7.3	56	2%	0.66	99%	Increasing	Increase then decrease
MW-41	May-92	Nov-08	1.5	24.8	10.0	9.7	67	0%	0.61	99%	Increasing	Increase then decrease
MW-42	May-92	Nov-09	2.0	19.8	11.6	10.2	68	1%	0.75	99%	Increasing	Increase then increase steeper
MW-43	May-92	Nov-09	2.1	42.8	8.7	7.6	70	0%	0.56	99%	Increasing	Increase
MW-44	May-92	Nov-09	1.6	26.6	6.4	6.1	71	0%	0.10	93%	Increasing	Increase, level off, then decrease
MW-55	Feb-96	Nov-08	<1	21.2	17.5	18.2	50	1%	0.30	99%	Increasing	Increase, level off, then increase
# of Increasing Trends (currently sampled wells only) ==>									9			
# of Decreasing Trends (currently sampled wells only) ==>									1			
# of Flat Trends (currently sampled wells only) ==>									0			
# of Statistically Insignificant Trends (currently sampled wells only) ==>									2			
Average slope of significant trends at currently sampled wells (ppm/yr) ==>									0.27			
Average slope of all trends at currently sampled wells (ppm/yr) ==>									0.24			

Notes:

Min = minimum, Max = maximum, n = number of samples

BDL = below detection limit, C.L. = confidence level

For these calculations, values reported as BDL and those reported as equal to or less than one-half the highest detection limit were counted as BDL.

Shaded cells indicate wells that have not been sampled since the previous trend analysis.

Table 4-6
Comparison of Nitrate Trends Between Analyses - Simplot Expansion Site
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location	First Trend Analysis Results (from well installation through 2001)		Second Trend Analysis Results (from well installation through 2005)		Third Trend Analysis Results (from well installation through 2009)		Summary of Changes in Trends between Second and Third Trend Analyses
	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	
MW-42	0.07	< 80%	0.44	99%	0.75	99%	3 wells show worsening trends <i>(by increasing steeper)</i>
MW-55	0.80	95%	0.22	93%	0.30	99%	
MW-43	0.75	99%	0.54	99%	0.56	99%	
MW-35	0.46	99%	0.05	54%	0.07	75%	1 well suggests a worsening trend <i>(by increasing steeper)</i>
MW-29	0.47	99%	0.30	99%	0.22	99%	6 wells show improving trends <i>(by increasing less steeply)</i>
MW-23	0.25	99%	0.15	99%	0.07	87%	
MW-33	0.53	99%	0.30	99%	0.16	99%	
MW-44	0.40	99%	0.24	99%	0.10	93%	
MW-36	0.56	99%	0.29	99%	0.14	92%	
MW-41	2.02	99%	1.04	99%	0.61	99%	
MW-31	0.58	99%	0.10	80%	-0.18	98%	1 well shows improving trend <i>(by switching from increasing to decreasing)</i>
MW-32	0.35	99%	0.15	99%	0.05	79%	1 well suggests an improving trend <i>(by increasing less steeply)</i>
Site-wide average trend slope (statistically significant trends only)	0.65		0.34		0.27		Site-wide average of statistically significant trend slopes shows improving trends <i>(increases less steeply)</i>
Site-wide average trend slope (all trends)	0.60		0.32		0.24		Site-wide average of all trend slopes suggests improving trends <i>(increases less steeply)</i>
# Increasing Trends	11 (92%)		11 (92%)		9 (75%)		There were fewer increasing trends, more decreasing trends, and more statistically insignificant trends.
# Decreasing Trends	0		0		1 (8%)		
# Flat Trends	0		0		0		
# Stat. Insignif. Trends	1 (8%)		1 (8%)		2 (17%)		

Notes:

Only onsite wells that are still being sampled are included in this table.

If both confidence levels are at least 80% (e.g., a statistically significant trend), then the change is termed as "showing" a change in trend.

If either confidence level is less than 80%, (e.g., a statistically insignificant trend), then the change is termed as "suggesting" a change in trend.

Table 4-7
Summary of Nitrate Trend Analyses - Simplot Levy Site
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location	Data Set Statistics								Trend Analysis Results		Trend Direction	LOWESS Pattern
	Starting Date	Ending Date	Min	Max	Mean	Median	n	% BDL	Slope (ppm/yr)	C.L.		
HL-3	May-02	Nov-09	7.2	25.6	11.9	9.3	31	0%	-0.23	60%	No Significant Trend	Flat, increasing, then decreasing
HL-4	May-02	Nov-09	4.1	11.1	8.3	9.7	31	0%	0.93	99%	Increasing	Increase then increase less steeply
HL-5	May-02	Nov-09	6.6	63.8	47.3	46.4	31	0%	4.75	99%	Increasing	Increasing
L-6	Nov-02	Nov-09	1.1	3.2	2.1	2.2	29	0%	0.10	49%	No Significant Trend	Decrease then increase then level off
L-8	Aug-02	Nov-09	<1	1.7	1.1	<1	30	60%	0.00	99%	Flat	Basically flat
L-9	May-02	Nov-09	14.0	40.1	22.1	19.7	31	0%	-0.13	20%	No Significant Trend	Increase, decrease, then increase
L-10	May-02	Nov-09	8.1	36.3	11.3	10.0	31	0%	0.70	99%	Increasing	Increasing
L-11	May-02	Nov-09	12.8	21.9	19.0	19.5	31	0%	0.27	76%	No Significant Trend	Increase then decrease
SP-1	Feb-03	Nov-09	7.5	33.8	16.7	16.3	27	0%	-0.20	91%	Decreasing	Slightly decreasing
# of Increasing Trends ==>									3			
# of Decreasing Trends ==>									1			
# of Flat Trends ==>									1			
# of Statistically Insignificant Trends ==>									4			
Average slope of significant trends (ppm/yr) ==>									1.24			
Average slope of all trends (ppm/yr) ==>									0.69			

Notes:

Min = minimum, Max = maximum, n = number of samples

BDL = below detection limit, C.L. = confidence level

For these calculations, values reported as BDL and those reported as equal to or less than one-half the highest detection limit were counted as BDL.

**Table 4-8
Comparison of Nitrate Trends Between Analyses - Simplot Levy Site
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA**

Sample Location	First Trend Analysis Results (from well installation through 2001)		Second Trend Analysis Results (from well installation through 2005)		Third Trend Analysis Results (from well installation through 2009)		Summary of Changes in Trends between Second and Third Trend Analyses
	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	
HL-5	ni	--	4.90	99%	4.75	99%	2 wells show improving trends (by increasing less steeply)
HL-4	ni	--	1.13	99%	0.93	99%	
L-10	ni	--	0.33	86%	0.70	99%	1 well shows a worsening trend (by increasing steeper)
L-8	ni	--	-0.20	70%	0.00	99%	1 well suggests a worsening trend (by switching from a decreasing to a flat trend)
SP-1	ni	--	-0.25	50%	-0.20	91%	1 well suggests a worsening trend (by decreasing less steeply)
L-11	ni	--	1.50	93%	0.27	76%	1 well suggests an improving trend (by increasing less steeply)
HL-3	ni	--	0.40	54%	-0.23	60%	2 wells suggest improving trends (by switching from increasing to decreasing trends)
L-9	ni	--	2.07	73%	-0.13	20%	
L-6	ni	--	-0.35	0%	0.10	49%	1 well suggests worsening trend (by switching from decreasing to increasing)
Site-wide average trend slope (statistically significant trends only)	ni		1.97		1.24		Site-wide average of statistically significant trend slopes shows improving trends (increases less steeply)
Site-wide average trend slope (all trends)	ni		1.06		0.69		Site-wide average of all trend slopes suggests improving trends (increases less steeply)
# Increasing Trends	--		4 (44%)		3 (33%)		There were fewer increasing trends, more decreasing trends, more flat trends, and fewer statistically insignificant trends.
# Decreasing Trends	--		0		1 (11%)		
# Flat Trends	--		0		1 (11%)		
# Stat. Insignif. Trends	--		5 (56%)		4 (44%)		

Notes:

ni = well not installed yet

If both confidence levels are at least 80% (e.g., a statistically significant trend), then the change is termed as "showing" a change in trend.

If either confidence level is less than 80%, (e.g., a statistically insignificant trend), then the change is termed as "suggesting" a change in trend.

Table 5-1
Summary of Nitrate Trend Analyses - Hermiston Foods Site
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location	Data Set Statistics								Trend Analysis Results		Trend Direction	LOWESS Pattern
	Starting Date	Ending Date	Min	Max	Mean	Median	n	% BDL	Slope (ppm/yr)	C.L.		
MW-1	Apr-91	Nov-09	6.8	13.0	9.9	9.7	69	0%	-0.13	99%	Decreasing	Decreasing
MW-2	Apr-91	Nov-09	0.8	16.6	7.9	7.7	60	0%	0.05	91%	Increasing	Increasing then gently decreasing
MW-3	Apr-91	Nov-09	2.4	9.2	3.8	3.7	63	0%	-0.09	99%	Decreasing	Flat, then decreasing
MW-4	Apr-91	Nov-09	0.6	8.1	6.2	6.4	64	0%	0.11	99%	Increasing	Increasing then gently decreasing
MW-5	May-97	Nov-09	4.5	13.0	7.0	6.8	46	0%	-0.07	88%	Decreasing	Decreasing then slight increase then decreasing
MW-6	May-97	Nov-09	7.5	14.5	10.2	9.7	51	0%	-0.15	96%	Decreasing	Decreasing then leveling off
MW-7	Aug-04	Nov-09	4.9	8.9	6.7	6.9	22	0%	0.61	99%	Increasing	Increasing then increasing less steeply

# of Increasing Trends ==>	3
# of Decreasing Trends ==>	4
# of Flat Trends ==>	0
# of Statistically Insignificant Trends ==>	0
Average slope of significant trends (ppm/yr) ==>	0.05
Average slope of all trends (ppm/yr) ==>	0.05

Notes:

Min = minimum, Max = maximum, n = number of samples

BDL = below detection limit, C.L. = confidence level

E:\LUB\LandApp\Third Trend Analysis[All Trends.xlsx]HF thru 2009

Table 5-2
Comparison of Nitrate Trends Between Analyses - Hermiston Foods Site
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location	First Trend Analysis Results (from well installation through 2001)		Second Trend Analysis Results (from well installation through 2005)		Third Trend Analysis Results (from well installation through 2009)		Summary of Changes in Trends between Second and Third Trend Analyses
	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	
MW-6	0.12	< 80%	-0.38	99%	-0.15	96%	2 wells show worsening trends (<i>by decreasing less steeply</i>)
MW-5	-0.01	< 80%	-0.16	99%	-0.07	88%	
MW-3	-0.01	< 80%	-0.09	99%	-0.09	99%	1 well shows no change in its decreasing trend
MW-1	-0.12	< 80%	-0.12	98%	-0.13	99%	1 well shows an improving trend (<i>by decreasing steeper</i>)
MW-2	0.29	99%	0.08	99%	0.05	91%	2 wells show improving trends (<i>by increasing less steeply</i>)
MW-4	0.29	99%	0.17	99%	0.11	99%	
MW-7	ni	--	ns	--	0.61	99%	1 well was analyzed only once
					MW-1 thru 6	MW-1 thru 7	
Site-wide average trend slope (statistically significant trends only)	0.29		-0.08		-0.05	0.05	Site-wide average of statistically significant trend slopes shows worsening trends (<i>decreases less steeply</i>)
Site-wide average trend slope (all trends)	0.09		-0.08		-0.05	0.05	Site-wide average of all trend slopes suggests worsening trends (<i>decreases less steeply</i>)
# Increasing Trends	2 (33%)		2 (33%)		3 (43%)		There was no change in the trend direction at wells sampled for both analyses. The newly installed well shows an increasing trend.
# Decreasing Trends	0		4 (67%)		4 (57%)		
# Flat Trends	0		0		0		
# Stat. Insignif. Trends	4 (67%)		0		0		

Notes:

ni = well not yet installed

ns = well not sampled enough to calculate trend

Only wells that are still being sampled are included in this table.

If both confidence levels are at least 80% (e.g., a statistically significant trend), then the change is termed as "showing" a change in trend.

If either confidence level is less than 80%, (e.g., a statistically insignificant trend), then the change is termed as "suggesting" a change in trend.

Table 6-1
Summary of Nitrate Trend Analyses - MorStarch Site
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location	Data Set Statistics								Trend Analysis Results		Trend Direction	LOWESS Pattern		
	Starting Date	Ending Date	Min	Max	Mean	Median	n	% BDL	Slope (ppm/yr)	C.L.				
MW-1S	Aug-89	Nov-09	<0.5	23.8	9.2	9.1	76	3%	0.37	99%	Increasing	Increasing then decreasing		
MW-1D	Aug-89	May-98	not sampled since previous trend analysis											
MW-2S	Aug-89	Nov-09	<0.02	4.5	0.8	0.5	77	8%	-0.02	99%	Decreasing	Increasing then decreasing		
MW-3S	Aug-89	Nov-09	<0.2	5.5	1.2	1.0	77	1%	-0.001	19%	No Significant Trend	Increasing then decreasing		
MW-3D	Aug-89	May-98	not sampled since previous trend analysis											
MW-4S	Aug-89	Nov-09	<0.5	10.0	3.7	3.7	77	3%	0.11	99%	Increasing	Increasing then decreasing		
MW-5S	Aug-89	Nov-09	<0.5	16.4	5.0	4.5	77	4%	0.08	96%	Increasing	Increasing then decreasing		
MW-6S	Apr-94	Nov-09	2.11	6.8	4.0	3.9	63	0%	0.08	99%	Increasing	Increase, decrease, increase		
MW-E1S	Apr-94	Nov-09	2.20	12.8	5.6	5.6	63	0%	0.13	99%	Increasing	Increasing then decreasing		
MW-E2S	Apr-94	Nov-09	0.30	8.4	3.9	3.5	63	0%	-0.01	99%	Decreasing	Increasing then decreasing		
# of Increasing Trends ==>									5					
# of Decreasing Trends ==>									2					
# of Flat Trends ==>									0					
# of Statistically Insignificant Trends ==>									1					
Average slope of significant trends (ppm/yr) ==>									0.10					
Average slope of all trends (ppm/yr) ==>									0.09					

Notes:

Min = minimum, Max = maximum, n = number of samples

C.L. = confidence level

Quarterly sampling is no longer required at wells MW-1D and MW-3D

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Table 6-2
Comparison of Nitrate Trends Between Analyses - MorStarch Site
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location	First Trend Analysis Results (from well installation through 2001)		Second Trend Analysis Results (from well installation through 2005)		Third Trend Analysis Results (from well installation through 2009)		Summary of Changes in Trends between Second and Third Trend Analyses
	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	
MW-E2S	0.25	99%	-0.12	92%	-0.01	99%	1 well shows a worsening trend (<i>by decreasing less steeply</i>)
MW-2S	0.06	99%	-0.01	66%	-0.02	99%	1 well suggests an improving trend (<i>by decreasing steeper</i>)
MW-3S	0.10	99%	0.03	93%	-0.001	19%	1 well suggests an improving trend (<i>by switching from increasing to decreasing</i>)
MW-6S	0.39	99%	0.11	99%	0.08	99%	5 wells show improving trends (<i>by increasing less steeply</i>)
MW-4S	0.28	99%	0.15	99%	0.11	99%	
MW-E1S	0.44	99%	0.26	99%	0.13	99%	
MW-5S	0.56	99%	0.21	99%	0.08	96%	
MW-1S	1.41	99%	0.62	99%	0.37	99%	
Site-wide average trend slope (statistically significant trends only)	0.44		0.18		0.10		Site-wide average of statistically significant trend slopes shows improving trends (<i>increases less steeply</i>)
Site-wide average trend slope (all trends)	0.44		0.16		0.09		Site-wide average of all trend slopes suggests improving trends (<i>increases less steeply</i>)
# Increasing Trends	8 (100%)		6 (75%)		5 (62.5%)		There were fewer increasing trends and more decreasing trends.
# Decreasing Trends	0		1 (12.5%)		2 (25%)		
# Flat Trends	0		0		0		
# Stat. Insignif. Trends	0		1 (12.5%)		1 (12.5%)		

Notes:

Only wells that are still being sampled are included in this table.

If both confidence levels are at least 80% (e.g., a statistically significant trend), then the change is termed as "showing" a change in trend.

If either confidence level is less than 80%, (e.g., a statistically insignificant trend), then the change is termed as "suggesting" a change in trend.

Table 7-1
Summary of Nitrate Trend Analyses - Snack Alliance Site
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location	Data Set Statistics								Trend Analysis Results		Trend Direction	LOWESS Pattern
	Starting Date	Ending Date	Min	Max	Mean	Median	n	% BDL	Slope (ppm/yr)	C.L.		
MW-1	Nov-94	Nov-09	0.7	11.1	4.6	4.2	61	0%	0.20	97%	Increasing	Decreasing then increasing
MW-2	Nov-94	Nov-09	1.3	16.3	9.7	9.6	61	0%	-0.19	99%	Decreasing	Increasing then decreasing
MW-3	Nov-94	Nov-09	4.2	20.0	9.0	8.8	61	0%	-0.35	99%	Decreasing	Decreasing
MW-4	Aug-99	Nov-09	5.4	128.2	13.6	8.2	42	0%	-0.90	99%	Decreasing	Decreasing

# of Increasing Trends ==>	1
# of Decreasing Trends ==>	3
# of Flat Trends ==>	0
# of Statistically Insignificant Trends ==>	0
Average slope of significant trends (ppm/yr) ==>	-0.31
Average slope of all trends (ppm/yr) ==>	-0.31

Notes:

Min = minimum, Max = maximum, n = number of samples

BDL = below detection limit, C.L. = confidence level

For these calculations, values reported as BDL and those reported as equal to or less than one-half the highest detection limit were counted as BDL.

Table 7-2
Comparison of Nitrate Trends Between Analyses - Snack Alliance Site
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Sample Location	First Trend Analysis Results (from well installation through 2001)		Second Trend Analysis Results (from well installation through 2005)		Third Trend Analysis Results (from well installation through 2009)		Summary of Changes in Trends between Second and Third Trend Analyses
	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	Slope (ppm/yr)	C.L.	
MW-4	-0.25	<80%	-1.14	97%	-0.90	99%	2 wells show worsening trends (<i>by decreasing less steeply</i>)
MW-3	-0.64	95%	-0.42	99%	-0.35	99%	
MW-1	-0.28	<80%	0.03	9%	0.20	97%	1 well shows worsening trend (<i>by increasing steeper</i>)
MW-2	0.01	<80%	-0.16	85%	-0.19	99%	1 well shows an improving trend (<i>by decreasing steeper</i>)
Site-wide average trend slope (statistically significant trends only)	-0.64		-0.42		-0.31		Site-wide average of statistically significant trend slopes shows worsening trends (<i>decreases less steeply</i>)
Site-wide average trend slope (all trends)	-0.29		-0.42		-0.31		Site-wide average of all trend slopes suggests worsening trends (<i>decreases less steeply</i>)
# Increasing Trends	0		0		1 (25%)		There were more increasing trends and fewer statistically insignificant trends
# Decreasing Trends	1 (25%)		3 (75%)		3 (75%)		
# Flat Trends	0		0		0		
# Stat. Insignif. Trends	3 (75%)		1 (25%)		0		

Notes:

Only wells that are still being sampled are included in this table.

If both confidence levels are at least 80% (e.g., a statistically significant trend), then the change is termed as "showing" a change in trend.

If either confidence level is less than 80%, (e.g., a statistically insignificant trend), then the change is termed as "suggesting" a change in trend.

**Table 8-1
Summary of Nitrate Trends and Average Concentrations by Site
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA**

Site	# of Wells	From Well Installation Through 2009 (variable lengths of time)										From 2005 through 2009			
		Increasing Trends		Decreasing Trends		Flat Trends		Statistically Insignificant Trends		Average slope of trends (ppm/yr)		Average of Average Nitrate Concentrations at Each Well (ppm)	Site Wide Trend		Site-Wide Average Concentration (ppm)
		#	%	#	%	#	%	#	%	Stat. Sig.	All		slope (ppm/yr)	C.L.	
Port of Morrow (Farm 1)	12	6	50%	2	17%	0	0%	4	33%	0.47	0.35	22.4	-0.69	99%	27.1
Port of Morrow (Farm 2)	10	5	50%	1	10%	0	0%	4	40%	0.63	-0.21	35.6	0.20	53%	35.3
Port of Morrow (Farm 3)	6	4	67%	1	17%	0	0%	1	17%	2.40	1.90	37.8	1.17	98%	41.1
ConAgra (North Farm)	13	7	54%	2	15%	0	0%	4	31%	2.90	2.10	31.7	0.31	99%	29.9
ConAgra (Madison Ranches)	13	9	69%	1	8%	0	0%	3	23%	0.24	0.19	6.0	0.13	99%	6.3
Simplot (Plant Site)	11	4	36%	3	27%	0	0%	4	36%	-0.38	-0.25	9.0	-0.21	92%	8.3
Simplot (Expansion Site)	12	9	75%	1	8%	0	0%	2	17%	0.27	0.24	9.0	0.20	36%	10.4
Simplot (Terrace Site)	8	5	63%	2	25%	0	0%	1	13%	0.39	0.32	23.3	0.10	88%	29.2
Simplot (Levy Site)	9	3	33%	1	11%	1	11%	4	44%	1.24	0.69	15.5	0.25	99%	16.1
Hermiston Foods	7	3	43%	4	57%	0	0%	0	0%	0.05	0.05	7.5	0.05	62%	7.3
MorStarch Site	8	5	63%	2	25%	0	0%	1	13%	0.10	0.09	4.2	-0.09	99%	4.1
Snack Alliance	4	1	25%	3	75%	0	0%	0	0%	-0.31	-0.31	9.2	-0.21	82%	7.1
Totals by Well	113	61	54%	23	20%	1	1%	28	25%						

Steepest Decreasing Trend At A Well = -2.97 ppm/yr
 Steepest Increasing Trend At A Well = 19.7 ppm/yr

In addition to the 113 wells indicated above, two former ConAgra Madison Ranch wells (now considered offsite) were also analyzed. Results indicated 2 decreasing trends.
 In addition to the 113 wells indicated above, one well at the Port of Morrow Farm 3 site does not yet have enough data to evaluate a trend.
 The site wide trends were calculated using the Regional Kendall Method.
 Because this comparison uses information from all onsite wells regardless of how long they were sampled, some values differ from those in Table 8-2.

Table 8-2
Comparison of Results From Wells Analyzed Three Times
Third Trend Analysis of Food Processor Land Application Sites in the LUBGWMA

Site	# Wells	# of Increasing Trends				# of Decreasing Trends				# of Flat Trends				# of Statistically Insignificant Trends				Average trend slope (ppm/yr)				Average of average Nitrate Concentration at Each Well (ppm)				
		thru 2001	thru 2005	thru 2009	2005 to 2009 Change	thru 2001	thru 2005	thru 2009	2005 to 2009 Change	thru 2001	thru 2005	thru 2009	2005 to 2009 Change	thru 2001	thru 2005	thru 2009	2005 to 2009 Change	thru 2001	thru 2005	thru 2009	2005 to 2009 Change	thru 2001	thru 2005	thru 2009	2005 to 2009 Change	
Port of Morrow (Farm 1)	11	8	8	6	-2	0	2	2	0	0	0	0	0	3	1	3	2	1.63	0.71	0.47	-0.24	26.2	27.1	27.2	0.1	
Port of Morrow (Farm 2)	9	9	7	5	-2	0	0	1	1	0	0	0	0	0	2	3	1	2.51	1.43	0.63	-0.80	33.6	34.5	35.2	0.7	
Port of Morrow (Farm 3)	4	--	3	4	1	--	2	1	-1	--	0	0	0	--	1	1	0	--	2.86	2.36	-0.50	--	33.0	37.8	4.8	
ConAgra (North Farm)	10	5	5	5	0	2	2	2	0	0	0	0	0	3	3	3	0	1.29	0.72	0.35	-0.37	24.2	25.1	25.3	0.2	
ConAgra (Madison Ranch)	9	7	7	6	-1	0	1	1	0	0	0	0	0	2	1	2	1	0.65	0.28	0.25	-0.03	4.7	5.3	5.8	0.5	
Simplot (Plant Site)	11	1	2	4	2	1	3	3	0	1	0	0	0	8	6	4	-2	0.46	-0.47	-0.38	0.09	10.8	10.3	10.1	-0.2	
Simplot (Expansion Site)	12	11	11	9	-2	0	0	1	1	0	0	0	0	1	1	2	1	0.65	0.34	0.27	-0.07	8.4	8.8	9.2	0.4	
Simplot (Terrace Site)	8	7	5	5	0	0	1	2	1	0	0	0	0	1	2	1	-1	1.62	0.62	0.39	-0.23	25.4	25.8	26.3	0.5	
Simplot (Levy Site)	6	--	4	3	-1	--	0	1	1	--	0	1	1	--	5	4	-1	--	1.97	1.24	-0.73	--	14.4	15.5	1.1	
Hermiston Foods	6	2	2	2	0	0	4	4	0	0	0	0	0	4	0	0	0	0.29	-0.08	-0.05	0.03	7.9	7.6	7.5	-0.1	
MorStarch Site	8	8	6	5	-1	0	1	2	1	0	0	0	0	0	1	1	0	0.44	0.18	0.10	-0.08	4.2	4.2	4.2	0.0	
Snack Alliance	4	0	0	0	0	1	3	3	0	0	0	0	0	3	1	1	0	-0.64	-0.57	-0.57	0.00	10.3	10.4	9.2	-1.2	
Total	98	58	60	54	-6	4	19	23	4	1	0	1	1	25	24	25	1									
Percentage		66%	58%	52%	-6%	5%	18%	22%	4%	1%	0%	1%	1%	28%	23%	24%	1%									

Summary		
Item	Result of Analysis through 2009	Difference Between Second and Third Analyses
Number of Increasing and Decreasing Trends	55 increasing trends; 23 decreasing trends	6% fewer increasing trends; 4% more decreasing trends
Average Trend Slope at 12 Sites	Increasing at 9 sites; decreasing at 3 sites	Improved at 9 sites; worsened at 2 sites; no change at 1 site
Average of average nitrate concentration at each well	Exceeded 7 ppm GWMA trigger level at 10 of 12 sites	Improved at 3 sites; worsened at 8 sites; no change at 1 site

Notes:
 Because this comparison uses information only from the onsite wells analyzed each time (i.e., 88 wells in 2001, 103 wells in 2005 and 2009), some values differ from those in Table 8-1.
 The average trend slope is the average of statistically significant trends only.
 The average of the average nitrate concentration at each well uses all onsite wells currently being sampled.