

Spokane County Water Resources
Appendix F : Nitrate Trend Analysis

Station 5213B01	
Sens	
n	97 Number of datapoints
N'	6786 Number of slopes
S	0 Median slope (Sen's slope estimate)
var(S)	180202 variance of S
M1	3043.847 Rank M1
Q(3043.847)	0 Lower confidence level of slopes
M2	3742.153 Rank M2
Q(3742.153)	0 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	97 Number of datapoints
S	-571 Mann Kendall test statistic
Var(S)	102945.3 Variance
Z, z(1-a)	-1.7765, 1.1 Normal approximation
Probability	0.0195 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted
Station 5304G01	
n	32 Number of datapoints
N'	528 Number of slopes
S	0.0004 Median slope (Sen's slope estimate)
var(S)	4163.333 variance of S
M1	210.9291 Rank M1
Q(210.9291)	-0.0031 Lower confidence level of slopes
M2	317.0709 Rank M2
Q(317.0709)	0.0087 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	32 Number of datapoints
S	36 Mann Kendall test statistic
Var(S)	3800.667 Variance
Z, z(1-a)	0.5677, 1.6 Normal approximation
Probability	0.2851 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Station 5307M01	
Sens	
N'	666 Number of slopes
S	-0.0091 Median slope (Sen's slope estimate)
var(S)	5845 variance of S
M1	270.1177 Rank M1
Q(270.1177)	-0.0117 Lower confidence level of slopes
M2	395.8823 Rank M2
Q(395.8823)	-0.0064 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted
Mann-Kendall	
n	36 Number of datapoints
S	-368 Mann Kendall test statistic
Var(S)	5389 Variance
Z, z(1-a)	-4.9993, 1.1 Normal approximation
Probability	1.0254 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted

Station 5415E03	
Sens	
n	7 Number of datapoints
N'	21 Number of slopes
S	-0.014 Median slope (Sen's slope estimate)
var(S)	44.3333 variance of S
M1	5.0235 Rank M1
Q(5.0235)	-0.029 Lower confidence level of slopes
M2	15.9765 Rank M2
Q(15.9765)	-0.0004 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted
Mann-Kendall	
n	7 Number of datapoints
S	-9 Mann Kendall test statistic
Var(S)	44.3333 Variance
Z, z(1-a)	-1.2015, 1.1 Normal approximation
Probability	0.1128 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Station 5426L01	
n	121 Number of datapoints
N'	9591 Number of slopes
S	0 Median slope (Sen's slope estimate)
var(S)	301580.7 variance of S
M1	4343.813 Rank M1
Q(4343.813)	0 Lower confidence level of slopes
M2	5247.187 Rank M2
Q(5247.187)	0 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	121 Number of datapoints
S	-256 Mann Kendall test statistic
Var(S)	199243.7 Variance
Z, z(1-a)	-0.5713, 1.1 Normal approximation
Probability	0.2839 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Station 5427L01	
Sens	
N'	3240 Number of slopes
S	-0.0025 Median slope (Sen's slope estimate)
var(S)	60119 variance of S
M1	1418.33 Rank M1
Q(1418.33)	-0.0113 Lower confidence level of slopes
M2	1821.67 Rank M2
Q(1821.67)	0 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	73 Number of datapoints
S	-742 Mann Kendall test statistic
Var(S)	44091 Variance
Z, z(1-a)	-3.5289, 1.1 Normal approximation
Probability	-3.0832 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted

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Station 5308A02	
Sens	
n	87 Number of datapoints
S	0 Median slope (Sen's slope estimate)
var(S)	166746.3 variance of S
M1	2884.635 Rank M1
Q(2884.635)	0 Lower confidence level of slopes
M2	3556.365 Rank M2
Q(3556.365)	0 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	87 Number of datapoints
S	-1940 Mann Kendall test statistic
Var(S)	74400.34 Variance
Z, z(1-a)	-7.1087, 1.6 Normal approximation
Probability	1 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted

Station 5308H01	
Sens	
n	38 Number of datapoints
S	-0.0062 Median slope (Sen's slope estimate)
var(S)	6832.667 variance of S
M1	302.5122 Rank M1
Q(302.5122)	-0.01 Lower confidence level of slopes
M2	438.4878 Rank M2
Q(438.4878)	-0.0016 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted
Mann-Kendall	
n	38 Number of datapoints
S	-211 Mann Kendall test statistic
Var(S)	6326 Variance
Z, z(1-a)	-2.6403, 1.6 Normal approximation
Probability	-0.212 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted

Station 5310Q10		
Sens		
Variable	Value	Comment
n	19	Number of datapoints
S	-0.0111	Median slope (Sen's slope estimate)
var(S)	950	variance of S
M1	69.6489	Rank M1
Q(69.6489)	-0.0225	Lower confidence level of slopes
M2	120.3512	Rank M2
Q(120.3512)	0	Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected	
Mann-Kendall		
n	19	Number of datapoints
S	-61	Mann Kendall test statistic
Var(S)	817	Variance
Z, z(1-a)	-2.0991, 1.6	Normal approximation
Probability	-0.0315	Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted	

Station 5505D01	
Sens	
n	43 Number of datapoints
S	0.004 Median slope (Sen's slope estimate)
var(S)	9775.333 variance of S
M1	391.6792 Rank M1
Q(391.6792)	0 Lower confidence level of slopes
M2	554.3208 Rank M2
Q(554.3208)	0.01 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	43 Number of datapoints
S	140 Mann Kendall test statistic
Var(S)	9130.333 Variance
Z, z(1-a)	1.4547, 1.6 Normal approximation
Probability	0.0729 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected

Station 5507A01	
Sens	
n	46 Number of datapoints
S	-0.0012 Median slope (Sen's slope estimate)
var(S)	16054.33 variance of S
M1	558.7845 Rank M1
Q(558.7845)	-0.0033 Lower confidence level of slopes
M2	767.2155 Rank M2
Q(767.2155)	0 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	46 Number of datapoints
S	-409 Mann Kendall test statistic
Var(S)	11150 Variance
Z, z(1-a)	-3.8639, 1.6 Normal approximation
Probability	-19.5856 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted

Station 5507H01	
Sens	
n	44 Number of datapoints
S	0 Median slope (Sen's slope estimate)
var(S)	11891 variance of S
M1	450.8098 Rank M1
Q(450.8098)	-0.0006 Lower confidence level of slopes
M2	630.1902 Rank M2
Q(630.1902)	0.0004 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	44 Number of datapoints
S	-7 Mann Kendall test statistic
Var(S)	9775.333 Variance
Z, z(1-a)	-0.0607, 1.6 Normal approximation
Probability	0.4758 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected

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Station 5311J05	
Sens	
n	51 Number of datapoints
N'	1326 Number of slopes
var(S)	16056.33 variance of S
M1	558.7781 Rank M1
Q(558.7781)	-0.0053 Lower confidence level of slopes
M2	767.2219 Rank M2
Q(767.2219)	-0.001 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted
Mann-Kendall	
n	51 Number of datapoints
S	-344 Mann Kendall test statistic
Var(S)	15155.33 Variance
Z, z(1-a)	-2.7862, 1.0 Normal approximation
Probability	-0.3144 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted

Station 5311J07	
Sens	
n	48 Number of datapoints
N'	1275 Number of slopes
var(S)	15157.33 variance of S
M1	536.2378 Rank M1
Q(536.2378)	-0.0041 Lower confidence level of slopes
M2	738.7622 Rank M2
Q(738.7622)	0 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	48 Number of datapoints
S	-292 Mann Kendall test statistic
Var(S)	12657.67 Variance
Z, z(1-a)	-2.5865, 1.0 Normal approximation
Probability	-0.1828 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted

Station 5312C01	
Sens	
n	39 Number of datapoints
N'	820 Number of slopes
var(S)	7926.667 variance of S
M1	336.7713 Rank M1
Q(336.7713)	-0.0019 Lower confidence level of slopes
M2	483.2287 Rank M2
Q(483.2287)	0.0015 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	39 Number of datapoints
S	-21 Mann Kendall test statistic
Var(S)	6833.667 Variance
Z, z(1-a)	-0.2419, 1.0 Normal approximation
Probability	0.4044 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected

Station 5508M01	
Sens	
n	45 Number of datapoints
N'	1225 Number of slopes
var(S)	14290.67 variance of S
M1	514.1754 Rank M1
Q(514.1754)	-0.0004 Lower confidence level of slopes
M2	710.8246 Rank M2
Q(710.8246)	0 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	45 Number of datapoints
S	-149 Mann Kendall test statistic
Var(S)	10449 Variance
Z, z(1-a)	-1.4479, 1.0 Normal approximation
Probability	0.0682 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected

Station 5508M02	
Sens	
n	48 Number of datapoints
N'	1326 Number of slopes
var(S)	16058.33 variance of S
M1	558.7716 Rank M1
Q(558.7716)	0 Lower confidence level of slopes
M2	767.2284 Rank M2
Q(767.2284)	0.0003 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	48 Number of datapoints
S	106 Mann Kendall test statistic
Var(S)	12657.67 Variance
Z, z(1-a)	0.9333, 1.0 Normal approximation
Probability	0.1754 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected

Station 5515C01	
Sens	
n	46 Number of datapoints
N'	1081 Number of slopes
var(S)	11891 variance of S
M1	450.8098 Rank M1
Q(450.8098)	-0.0183 Lower confidence level of slopes
M2	630.1902 Rank M2
Q(630.1902)	-0.0027 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted
Mann-Kendall	
n	46 Number of datapoints
S	-271 Mann Kendall test statistic
Var(S)	11155 Variance
Z, z(1-a)	-2.5564, 1.0 Normal approximation
Probability	-0.1681 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted

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Station 5312H01		
Sens		
Variable	Value	Comment
n	101	Number of datapoints
S	0.0002	Median slope (Sen's slope estimate)
var(S)	199244.7	variance of S
M1	3262.862	Rank M1
Q(3262.862)	0	Lower confidence level of slopes
M2	3997.138	Rank M2
Q(3997.138)	0.0029	Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected	
Mann-Kendall		
n	101	Number of datapoints
S	2274	Mann Kendall test statistic
Var(S)	116148	Variance
Z, z(1-a)	6.6695, 1.6	Normal approximation
Probability	0	Probability of no trend
Result	Hypothesis of increasing trend accepted Hypothesis of decreasing trend rejected	

Station 5315L01		
Sens		
n	39	Number of datapoints
N'	780	Number of slopes
S	-0.0162	Median slope (Sen's slope estimate)
M1	319.4054	Rank M1
Q(319.4054)	-0.0191	Lower confidence level of slopes
M2	460.5946	Rank M2
Q(460.5946)	-0.013	Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted	
Mann-Kendall		
n	39	Number of datapoints
S	-461	Mann Kendall test statistic
Var(S)	6833.667	Variance
Z, z(1-a)	-5.5646, 1.6	Normal approximation
Probability	1.0001	Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted	

Station 5322A01		
Sens		
n	53	Number of datapoints
N'	1540	Number of slopes
S	-0.0146	Median slope (Sen's slope estimate)
M1	653.6257	Rank M1
Q(653.6257)	-0.02	Lower confidence level of slopes
M2	886.3743	Rank M2
Q(886.3743)	-0.01	Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted	
Mann-Kendall		
n	53	Number of datapoints
S	-685	Mann Kendall test statistic
Var(S)	16994.33	Variance
Z, z(1-a)	-5.2469, 1.6	Normal approximation
Probability	1.0016	Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted	

Station 5517D05		
Sens		
n	56	Number of datapoints
S	-0.0054	Median slope (Sen's slope estimate)
var(S)	20019	variance of S
M1	653.6257	Rank M1
Q(653.6257)	-0.0084	Lower confidence level of slopes
M2	886.3743	Rank M2
Q(886.3743)	-0.0028	Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted	
Mann-Kendall		
n	56	Number of datapoints
S	-471	Mann Kendall test statistic
Var(S)	20019	Variance
Z, z(1-a)	-3.3218, 1.6	Normal approximation
Probability	-1.4563	Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted	

Station 5518R01		
Sens		
n	56	Number of datapoints
N'	2211	Number of slopes
S	0	Median slope (Sen's slope estimate)
M1	953.5095	Rank M1
Q(953.5095)	-0.0051	Lower confidence level of slopes
M2	1257.49	Rank M2
Q(1257.49)	0	Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected	
Mann-Kendall		
n	56	Number of datapoints
S	-548	Mann Kendall test statistic
Var(S)	20020	Variance
Z, z(1-a)	-3.8659, 1.6	Normal approximation
Probability	-19.9061	Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted	

Station 6211K01		
Sens		
n	43	Number of datapoints
N'	1176	Number of slopes
S	-0.0043	Median slope (Sen's slope estimate)
M1	492.5841	Rank M1
Q(492.5841)	-0.0067	Lower confidence level of slopes
M2	683.4159	Rank M2
Q(683.4159)	-0.0008	Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted	
Mann-Kendall		
n	43	Number of datapoints
S	-499	Mann Kendall test statistic
Var(S)	9129.333	Variance
Z, z(1-a)	-5.2121, 1.6	Normal approximation
Probability	1.0024	Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted	

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Station 5322A03

Sens

n 50 Number of datapoints
N' 1225 Number of slopes
S -0.0203 Median slope (Sen's slope estimate)
M1 514.172 Rank M1
Q(514.172) -0.0244 Lower confidence level of slopes
M2 710.828 Rank M2
Q(710.828) -0.0171 Upper confidence level of slopes
Result Hypothesis of increasing trend rejected
Hypothesis of decreasing trend accepted

Mann-Kendall

n 50 Number of datapoints
S -697 Mann Kendall test statistic
Var(S) 14291.67 Variance
Z, z(1-a) -5.8219, 1. Normal approximation
Probability 1 Probability of no trend
Result Hypothesis of increasing trend rejected
Hypothesis of decreasing trend accepted

Station 5322F01

Sens

n 96 Number of datapoints
N' 9730 Number of slopes
S 0 Median slope (Sen's slope estimate)
var(S) 308116.7 variance of S
Q(4408.44) 0 Lower confidence level of slopes
M2 5321.555 Rank M2
Q(5321.55) 0 Upper confidence level of slopes
Result Hypothesis of increasing trend rejected
Hypothesis of decreasing trend rejected

Mann-Kendall

n 96 Number of datapoints
S -1033 Mann Kendall test statistic
Var(S) 99813.34 Variance
Z, z(1-a) -3.2665, 1. Normal approximation
Probability -1.2201 Probability of no trend
Result Hypothesis of increasing trend rejected
Hypothesis of decreasing trend accepted

Station 53230E01

Sens

n 33 Number of datapoints
N' 561 Number of slopes
S -0.0358 Median slope (Sen's slope estimate)
var(S) 4550.333 variance of S
Q(225.017) -0.05 Lower confidence level of slopes
M2 335.9827 Rank M2
Q(335.982) -0.0185 Upper confidence level of slopes
Result Hypothesis of increasing trend rejected
Hypothesis of decreasing trend accepted

Mann-Kendall

n 33 Number of datapoints
S -217 Mann Kendall test statistic
Var(S) 4165.333 Variance
Z, z(1-a) -3.3468, 1. Normal approximation
Probability -1.5815 Probability of no trend
Result Hypothesis of increasing trend rejected
Hypothesis of decreasing trend accepted

Station 6320D01

Sens

n 36 Number of datapoints
N' 1225 Number of slopes
S 0 Median slope (Sen's slope estimate)
M1 514.1823 Rank M1
Q(514.1823) 0 Lower confidence level of slopes
M2 710.8177 Rank M2
Q(710.8177) 0 Upper confidence level of slopes
Result Hypothesis of increasing trend rejected
Hypothesis of decreasing trend rejected

Mann-Kendall

n 36 Number of datapoints
S -109 Mann Kendall test statistic
Var(S) 5387 Variance
Z, z(1-a) -1.4715, 1. Normal approximation
Probability 0.0644 Probability of no trend
Result Hypothesis of increasing trend rejected
Hypothesis of decreasing trend rejected

Station 6327N04

Sens

n 30 Number of datapoints
N' 465 Number of slopes
S -0.0118 Median slope (Sen's slope estimate)
var(S) 3461.667 variance of S
Q(184.1075) -0.034 Lower confidence level of slopes
M2 280.8925 Rank M2
Q(280.8925) 0 Upper confidence level of slopes
Result Hypothesis of increasing trend rejected
Hypothesis of decreasing trend rejected

Mann-Kendall

n 30 Number of datapoints
S -107 Mann Kendall test statistic
Var(S) 3141.667 Variance
Z, z(1-a) -1.8911, 1. Normal approximation
Probability 0.0029 Probability of no trend
Result Hypothesis of increasing trend rejected
Hypothesis of decreasing trend accepted

Station 6328H01

Sens

n 50 Number of datapoints
N' 1540 Number of slopes
S 0 Median slope (Sen's slope estimate)
var(S) 20018 variance of S
Q(653.6286) 0 Lower confidence level of slopes
M2 886.3714 Rank M2
Q(886.3714) 0 Upper confidence level of slopes
Result Hypothesis of increasing trend rejected
Hypothesis of decreasing trend rejected

Mann-Kendall

n 50 Number of datapoints
S -91 Mann Kendall test statistic
Var(S) 14289.67 Variance
Z, z(1-a) -0.7529, 1. Normal approximation
Probability 0.2256 Probability of no trend
Result Hypothesis of increasing trend rejected
Hypothesis of decreasing trend rejected

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Station 5324G01	
Sens	
n	106 Number of datapoints
N'	9730 Number of slopes
S	0 Median slope (Sen's slope estimate)
var(S)	308115.7 variance of S
Q(4408.44)	0 Lower confidence level of slopes
M2	5321.555 Rank M2
Q(5321.55)	0 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	106 Number of datapoints
S	-420 Mann Kendall test statistic
Var(S)	134177.3 Variance
Z, z(1-a)	-1.1439, 1.1 Normal approximation
Probability	0.1248 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected

Station 5404A01	
Sens	
n	7 Number of datapoints
N'	36 Number of slopes
S	0 Median slope (Sen's slope estimate)
var(S)	91 variance of S
Q(10.1539)	0 Lower confidence level of slopes
M2	25.8462 Rank M2
Q(25.8462)	0 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	7 Number of datapoints
S	2 Mann Kendall test statistic
Var(S)	43.3333 Variance
Z, z(1-a)	0.1519, 1.6 Normal approximation
Probability	0.4396 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected

Station 5405K01	
Sens	
n	25 Number of datapoints
N'	496 Number of slopes
S	0 Median slope (Sen's slope estimate)
var(S)	3802.667 variance of S
Q(197.279)	0 Lower confidence level of slopes
M2	298.7201 Rank M2
Q(298.720)	0 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	25 Number of datapoints
S	-37 Mann Kendall test statistic
Var(S)	1833.333 Variance
Z, z(1-a)	-0.8408, 1.1 Normal approximation
Probability	0.2 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected

Station 6330J01	
Sens	
n	35 Number of datapoints
N'	630 Number of slopes
S	-0.01 Median slope (Sen's slope estimate)
var(S)	5390 variance of S
Q(254.6148)	-0.015 Lower confidence level of slopes
M2	375.3852 Rank M2
Q(375.3852)	-0.005 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted
Mann-Kendall	
n	35 Number of datapoints
S	-237 Mann Kendall test statistic
Var(S)	4958.333 Variance
Z, z(1-a)	-3.3515, 1.1 Normal approximation
Probability	-1.6068 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted

Station 6331J01	
Sens	
n	31 Number of datapoints
N'	528 Number of slopes
S	-0.0067 Median slope (Sen's slope estimate)
var(S)	4165.333 variance of S
Q(210.9164)	-0.0088 Lower confidence level of slopes
M2	317.0836 Rank M2
Q(317.0836)	-0.0043 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted
Mann-Kendall	
n	31 Number of datapoints
S	-251 Mann Kendall test statistic
Var(S)	3461.667 Variance
Z, z(1-a)	-4.2491, 1.1 Normal approximation
Probability	-60593.19 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted

Station 6436N01	
Sens	
n	10 Number of datapoints
N'	45 Number of slopes
S	-0.04 Median slope (Sen's slope estimate)
var(S)	125 variance of S
Q(13.3042)	-0.475 Lower confidence level of slopes
M2	31.6958 Rank M2
Q(31.6958)	0.23 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	10 Number of datapoints
S	-1 Mann Kendall test statistic
Var(S)	125 Variance
Z, z(1-a)	0.00, 1.645 Normal approximation
Probability	0.5 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected

Spokane County Water Resources
Appendix F : Nitrate Trend Analysis

Station 5407C01	
Sens	
n	22 Number of datapoints
N'	703 Number of slopes
S	0 Median slope (Sen's slope estimate)
var(S)	6327 variance of S
Q(286.076)	0 Lower confidence level of slopes
M2	416.9236 Rank M2
Q(416.9236)	0 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	22 Number of datapoints
S	91 Mann Kendall test statistic
Var(S)	1257.667 Variance
Z, z(1-a)	2.5378, 1.6 Normal approximation
Probability	0.0056 Probability of no trend
Result	Hypothesis of increasing trend accepted Hypothesis of decreasing trend rejected

Station 5408N01	
Sens	
n	67 Number of datapoints
N'	3003 Number of slopes
S	0 Median slope (Sen's slope estimate)
M1	1310.866 Rank M1
Q(1310.866)	-0.0037 Lower confidence level of slopes
M2	1692.134 Rank M2
Q(1692.134)	0 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	67 Number of datapoints
S	-768 Mann Kendall test statistic
Var(S)	34146.67 Variance
Z, z(1-a)	-4.1507, 1.6 Normal approximation
Probability	-1048.062 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted

Station 5409C02	
Sens	
n	22 Number of datapoints
N'	253 Number of slopes
S	0 Median slope (Sen's slope estimate)
M1	95.357 Rank M1
Q(95.357)	-0.0071 Lower confidence level of slopes
M2	157.643 Rank M2
Q(157.643)	0.0029 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	22 Number of datapoints
S	-3 Mann Kendall test statistic
Var(S)	1257.667 Variance
Z, z(1-a)	-0.0564, 1.6 Normal approximation
Probability	0.4775 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected

Station 6524R01	
Sens	
n	36 Number of datapoints
N'	630 Number of slopes
S	-0.0098 Median slope (Sen's slope estimate)
var(S)	5390 variance of S
Q(254.6148)	-0.0188 Lower confidence level of slopes
M2	375.3852 Rank M2
Q(375.3852)	-0.0005 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted
Mann-Kendall	
n	36 Number of datapoints
S	-126 Mann Kendall test statistic
Var(S)	5390 Variance
Z, z(1-a)	-1.7026, 1.6 Normal approximation
Probability	0.03 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted

Station 6524R01	
Sens	
n	36 Number of datapoints
N'	630 Number of slopes
S	-0.0098 Median slope (Sen's slope estimate)
M1	254.6148 Rank M1
Q(254.6148)	-0.0188 Lower confidence level of slopes
M2	375.3852 Rank M2
Q(375.3852)	-0.0005 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted
Mann-Kendall	
n	36 Number of datapoints
S	-126 Mann Kendall test statistic
Var(S)	5390 Variance
Z, z(1-a)	-1.7026, 1.6 Normal approximation
Probability	0.03 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted

Station 6525R01	
Sens	
n	44 Number of datapoints
N'	990 Number of slopes
S	-0.0068 Median slope (Sen's slope estimate)
M1	410.9197 Rank M1
Q(410.9197)	-0.0089 Lower confidence level of slopes
M2	579.0803 Rank M2
Q(579.0803)	-0.005 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted
Mann-Kendall	
n	44 Number of datapoints
S	-565 Mann Kendall test statistic
Var(S)	9775.333 Variance
Z, z(1-a)	-5.7044, 1.6 Normal approximation
Probability	1 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted

Spokane County Water Resources
Appendix F : Nitrate Trend Analysis

Station 5411R02	
Sens	
n	45 Number of datapoints
N'	1176 Number of slopes
S	-0.0033 Median slope (Sen's slope estimate)
M1	492.5841 Rank M1
Q(492.5841)	-0.0056 Lower confidence level of slopes
M2	683.4159 Rank M2
Q(683.4159)	-0.0006 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted
Mann-Kendall	
n	45 Number of datapoints
S	-411 Mann Kendall test statistic
Var(S)	10449 Variance
Z, z(1-a)	-4.0109, 1.1 Normal approximation
Probability	-84.3016 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted

Station 5411R03	
Sens	
n	45 Number of datapoints
N'	1081 Number of slopes
S	-0.0049 Median slope (Sen's slope estimate)
M1	450.8098 Rank M1
Q(450.8098)	-0.0074 Lower confidence level of slopes
M2	630.1902 Rank M2
Q(630.1902)	-0.0024 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted
Mann-Kendall	
n	45 Number of datapoints
S	-413 Mann Kendall test statistic
Var(S)	10450 Variance
Z, z(1-a)	-4.0303, 1.1 Normal approximation
Probability	-108.9554 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend accepted

Station 5411R04	
Sens	
n	44 Number of datapoints
N'	1081 Number of slopes
S	0 Median slope (Sen's slope estimate)
M1	450.8098 Rank M1
Q(450.8098)	-0.0051 Lower confidence level of slopes
M2	630.1902 Rank M2
Q(630.1902)	0 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	44 Number of datapoints
S	-120 Mann Kendall test statistic
Var(S)	9775.333 Variance
Z, z(1-a)	-1.2036, 1.1 Normal approximation
Probability	0.1124 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected

Station 6631M04	
Sens	
n	68 Number of datapoints
N'	2415 Number of slopes
S	0 Median slope (Sen's slope estimate)
M1	1045.264 Rank M1
Q(1045.264)	-0.0009 Lower confidence level of slopes
M2	1369.736 Rank M2
Q(1369.736)	0.0011 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	68 Number of datapoints
S	-9 Mann Kendall test statistic
Var(S)	35686.67 Variance
Z, z(1-a)	-0.0423, 1.1 Normal approximation
Probability	0.4831 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected

Station 6631M07	
Sens	
n	45 Number of datapoints
N'	1035 Number of slopes
S	0 Median slope (Sen's slope estimate)
M1	430.6337 Rank M1
Q(430.6337)	-0.0027 Lower confidence level of slopes
M2	604.3663 Rank M2
Q(604.3663)	0.002 Upper confidence level of slopes
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected
Mann-Kendall	
n	45 Number of datapoints
S	-29 Mann Kendall test statistic
Var(S)	10449 Variance
Z, z(1-a)	-0.2739, 1.1 Normal approximation
Probability	0.3921 Probability of no trend
Result	Hypothesis of increasing trend rejected Hypothesis of decreasing trend rejected