Trending Well Data in the Rathdrum Prairie Aquifer

By Valena Berry
UI Environmental Science Program
Mentor: Gary Stevens, Idaho Department of Environmental Quality
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Abstract

Development of the Rathdrum Prairie and associated lands through both urbanization and agriculture may be exposing the Rathdrum Aquifer to water quality impacts. The aquifer was designated as a sensitive resource due to the coarse sand and gravels that compose the aquifer and the need for additional protection. Due to the potential risk from land use activities water quality data has been collected since 1975 on thirty-four wells within the region. This paper will present Mann-Kendall and Theil-Sen trend results on five water quality constituents; chloride, sodium, magnesium, nitrate, and electrical conductivity that may help indicate any potential anthropogenic effects on water quality. The results presented may help in further analysis of water quality impacts over time.

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Introduction

The following report interprets data collected by the Panhandle Health District from thirty-four wells on the Rathdrum Prairie Aquifer since 1975 for five constituents; sodium, magnesium, nitrogen-nitrate, chloride, and electrical conductivity. The Mann-Kendall and Theil-Sen trending tests were used on select data to isolate increases, decreases, and lack of trends, as well as the magnitude of any trends detected.

1.1 Background

The Spokane Valley- Rathdrum Aquifer (SVRPA) supports over 500,000 people in Spokane County, Washington, and Bonner and Kootenai counties in Idaho (Hsieh, Barber, Contor, Hossain, Johnson, Jones, and Wylie, 2007). In 1978, the United States Environmental Protection Agency (EPA) designated the SVRPA as a sole source aquifer to recognize that the aquifer is the principle drinking water supply of the area (Kahle, Rodney, and Bartolino, 2005). In 1997, the Rathdrum Prairie Aquifer (RPA) was also designated by the State of Idaho as a sensitive resource aquifer. Sensitive resource aquifers have higher water quality than state standards and must be protected at this level (IDAPA, 2001).

Historically, water use in Idaho originated with drawing from surface sources, like Hayden, Twin, and Coeur d'Alene Lake. Beginning in the 1950's with the advent of drilling technology, it became economically feasible to drill water wells in the Rathdrum Prairie. Today there are over 2,200 wells drilled into the RPA (Idaho Department of Environmental Quality, 2011a). The RPA supplies water for drinking, industrial, and agricultural purposes to the residents that mostly live over the aquifer itself. Well samples from thirty-four public wells have been sampled since 1975 by the Panhandle Health District. Sampling occurs three times yearly for specific

wells and is analyzed for constituents that are maybe indicative of land use activities and could impact water quality (Idaho Department of Environmental Quality, 2011b). Well samples have been analyzed for twenty-three different constituents that include inorganic and organic chemicals as well as other water quality parameters such as pH. Over time, the number of wells has been reduced to twenty-eight, all of which are public water systems (Panhandle Health District 1, 2008). Figures-1, 2, and 3 show the locations of the wells and their Panhandle Health District identification numbers.

1.2 Objectives

Of the twenty-three constituents monitored, five were suggested for the focus of this paper by the Idaho Department of Environmental Quality (IDEQ), for trending. The selections were chloride, magnesium, sodium, nitrogen-nitrate, and electrical conductivity. They were chosen in accordance with concern over land use activities that might be impacting the aquifer. Though some of the wells did not have enough data for proper trending results, they were nonetheless processed with the other wells for completeness. Mann-Kendall trending was used to isolate positive or negative trends within the data, and then the set was ran through a Theil-Sen trend to identify the magnitude, if there was one, of the increase or decrease (Brauner, 1997).

Study Area Description

2.1 Aquifer Hydrology

The aquifer is primarily composed of thick layers of coarse sediments such as gravel and boulders deposited during repeated flood outbursts from Glacial Lake Missoula (Bertz, 1930). The RPA's extent is approximately 211 square miles of land within an alluvium-covered valley surrounded by bedrock areas. This area extends south from Lake Pend Oreille to Coeur d'Alene Lake and west into Washington (Kahle et al., 2005). The perimeter of the aquifer has six lakes,

all of which have higher water levels than the groundwater and thus recharge it via seepage. The two largest lakes are Pend Oreille Lake and Coeur d'Alene Lake, whose water levels are regulated by dams on the rivers that drain them (Hsieh et al., 2007). Land elevation ranges from 1,500 to almost 2,600 feet (Kahle et al., 2005) and is coupled with weather that ranges from semiarid in the summer to moist cool winters (Molenaar, 1988).

The aquifer is a highly productive source of ground water, with wells yielding up to several thousand gallons per minute with little relative down draw (Hsieh et al., 2007). The primary uses of the land above the aquifer are for rural domestic, agriculture and urban areas. Agriculture takes the form mostly of hay production, wheat, grass seed, barley, oats, and pasture land for livestock (Kahle et al., 2005).

2.2 Well Location and Construction

Not all thirty-four wells have driller's reports archived for them. Table 6 is the compiled well construction characteristics with listed driller's reports. The well construction characteristics include well depth, top of screen and casing, and the length of the screen. The Panhandle Health District identification number is used in all tables and statistics. The Public Water System identification number is listed with the well construction. This is the number given to public water wells to identify what system they belong to in serving individual communities.

Water Quality Data

3.1 Statistical Procedures

The Panhandle Health District (PHD) continues a water sampling program that was started back in the 1970's to prevent contamination or to catch it in its early stages. PHD currently obtains water quality samples from twenty-eight wells. The number of wells used in PHD's sampling program is dependent on the operating status of wells at the time of the sampling.

The Mann-Kendall and Theil-Sen trending tests were calculated using ProUCL 4.1 (EPA, 2013). ProUCL 4.1 is a statistical software that is best known for its ability to handle environmental data with non-detect values. It is capable of trending, statistical analysis, and graphing involving data sets. The selected data was compiled and then formatted for use in ProUCL 4.1. The formatting process included providing data sets with unique identifiers and conversion of dates into fraction of years with zero as the year in which data was first collected. Estimates of non-detect values were completed using Regression on Order Statistics (ROS) lognormal estimation. Lognormal generally describes environmental data and it appeared closest to the values of the other data around each value. A log of all changes made to data and decisions on how to handle certain values can be found in Appendix A. A conversion factor of 0.2259 was used to change NO_3 values to NO_3 as N when needed for the data sets compiled by PHD focused on NO_3 as N (DDWEM/DWRL, 2011).

3.2 Water Quality Standards

The maximum contaminant level (MCL) is included with the analytical results, so that the results of the trend analysis can be compared to maintain drinking waters standards (EPA, 2013a). Of the five selected water quality impacts, only nitrogen-nitrate and chloride are regulated. Magnesium, sodium, and electrical conductivity are not regulated but are indicators of various land use activities that could impact water quality. Descriptions of the selected water quality constituents are below.

Chloride (Cl-)

Chloride can occur naturally as a component of minerals or be introduced through various human activities though fertilizers, landfills, animal feeds and other assorted sources (World Health Organization, 1996). Chloride is a useful indicator constituent because it is conservative. It is

considered a secondary constituent with a MCL standard of 250 mg/L (IDAPA, 2001). The results of the Mann-Kendall and Sen trending test can be seen in Table 1. The statistical calculations and ProUCL output for each well can be seen in Appendix B.

Sodium (Na)

Not currently regulated, sodium is nonetheless on the Contaminant Candidate List (CCL) due to the fact that while salt intake via water is usually low, high levels could contribute to hypertension in individuals susceptible to it. Sodium has a Drinking Water Equivalency Level of 20 mg/L that has met some criticisms due to how low it is. However, sodium was determined not to be a priority due to its low potential health risks compared to many other substances on the list (EPA, 2012b). With further study, sodium might be added to the official list, but for now that is not that case. Figure 2 holds the trending results while Appendix C contains the trend analysis results.

Magnesium (Mg)

Magnesium is naturally occurring in water and the human body, making it unnecessary to regulate. Contributing to water hardness, an excess of it can be produced by using water softeners. Magnesium in other compounds like asbestos can be harmful however (Lenntech B.V, 2012). This element was included in this study due to concern that compounds containing it might be working down into the aquifer and raised levels of magnesium might help in pinpointing this. Figure 3 contains the trending results while Appendix D has the trend analysis results.

Nitrogen-Nitrate (NO_3)

Nitrate is a distinct concern due to its effects on infants below the age of six months that can end in death by blue baby syndrome. Found mostly in run off from fertilizers and leaking sewage, the

MCL for it is 10 mg/L and can be removed from drinking water with ion exchange, reverse osmosis, and electrodialysis (EPA, 2012c). Nitrate is a water contaminant that is closely monitored and has been included in this report due to the concern that with the Rathdrum Prairie's inclination towards agriculture, we might be seeing a rise in it over time in our drinking water. It is also a good indicator on the travel of fertilizers and potentially pesticides to our ground water. Figure 4 is the trend results and Appendix E is the statistical analysis results.

Electrical Conductivity

While not a water quality impact itself, it stands as a measure of how many inorganic dissolved solids are in the water. For example, magnesium, sodium, and nitrate will all enhance water's ability to conduct an electrical current and, by proxy, potentially show the increase of such ions or similar ones in the groundwater (EPA, 2012d). Figure 5 is the trend results while Appendix F is the trend analysis results.

Table 1. Chloride Trend Analysis Results

Well ID	Sen's Test			Mann-Kendall Test		
	Increasing	Decreasing	No Trend	Increasing	Decreasing	No Trend
99	0.2480			x		
100	0.1060			x		
101	0.0747			x		
102	0.1150			x		
103	0.0327			x		
104	0.0899			x		
105	0.1440			x		
106	0.0775			x		
107			0.0291	x		
108	0.1450			x		
109	0.0333			x		
110			x			x
111	0.2080			x		
112	0.0985			x		
113	0.1110			x		
114	0.0973			x		
115			x			x
116	0.0183			x		
117	0.3080			x		
118	0.0156			x		
119	0.0617			x		
120			0.00929	x		
121	0.1080			x		
122	0.0533			x		
123	0.1180			x		
124	0.1000			x		
125	0.0682			x		
126	0.0833			x		
127	0.1030			x		
128			0.0185	x		
129	0.1540			x		
130	0.0784			x		
131			x			x
132	0.2290			x		

Table 2. Sodium Trend Analysis Results

Well ID	Sen's Test			Mann-Kendall Test		
	Increasing	Decreasing	No Trend	Increasing	Decreasing	No Trend
99			-0.0364		x	
100	0.0238			x		
101			x			x
102			x			x
103			x			x
104	0.0287			x		
105	0.0500			x		
106	0.0274			x		
107			0.0235	x		
108	0.2510			x		
109			x			x
110			x			x
111			x			x
112			0.0103	x		
113			0.0151	x		
114			x			x
115			x			x
116			x			x
117	0.0545			x		
118			0.0000	x		
119			0.0166	x		
120			x			x
121	0.0432			x		
122	0.0496			x		
123			0.0191	x		
124			x			x
125	0.0365			x		
126		-0.0803			x	
127	0.0573			x		
128	0.1330			x		
129			0.162	x		
130			x			x
131			x			x

Table 3. Magnesium Trend Analysis Results

Well ID	Sen's Test			Mann-Kendall Test		
	Increasing	Decreasing	No Trend	Increasing	Decreasing	No Trend
99			x			x
100			x			x
101			x			x
102			x			x
103			x			x
104	0.1290			x		
105	0.1690			x		
106	0.2530			x		
107			x			x
108			x			x
109			x			x
110			x			x
111			x			x
112	0.0570			x		
113			x			x
114	0.0360			x		
115			x			x
116			x			x
117	0.0907			x		
118			x			x
119			x			x
120			x			x
121	0.2290			x		
122	0.0453			x		
123			x			x
124		-0.1890			x	
125	0.1460			x		
126			x			x
127			x			x
128			x			x
129	0.1160			x		
130	0.1720			x		
131	0.1090			x		
132			x			x

Table 4. Nitrogen-Nitrate Trend Analysis Results

Well ID	Sen's Test			Mann-Kendall Test		
	Increasing	Decreasing	No Trend	Increasing	Decreasing	No Trend
99			x			x
100			x			x
101			x			x
102		-0.0145			x	
103		-0.0146			x	
104	0.00912			x		
105	0.0190			x		
106	0.0413			x		
107			-0.0127		x	
108		-0.0683			x	
109			x			x
110			x			x
111			x			x
112	0.0161			x		
113			x			x
114	0.00599			x		
115			-0.0219		x	
116	0.00211			x		
117	0.01780			x		
118			x			x
119	0.00997			x		
120			x			x
121			x			x
122		-0.0544			x	
123			x			x
124		-0.0836			x	
125			x			x
126		-0.0376			x	
127		-0.0480			x	
128			x			x
129			x			x
130		-0.0510			x	
131	0.0106			x		
132			x			x

Table 5. Electrical Conductivity Trend Analysis Results

Well ID	Sen's Test			Mann-Kendall Test		
	Increasing	Decreasing	No Trend	Increasing	Decreasing	No Trend
99	5.4830			x		
100	3.4640			x		
101			1.9920	x		
102	3.8370			x		
103	1.6280			x		
104	5.6840			x		
105	6.0600			x		
106	6.4550			x		
107			1.1730	x		
108	2.8240			x		
109	2.1690			x		
110			x			x
111	9.7630			x		
112	7.2460			x		
113	4.5150			x		
114	5.8540			x		
115			x			x
116	1.6610			x		
117	7.1310			x		
118	5.2480			x		
119	6.8310			x		
120			x			x
121	6.2320			x		
122	5.1380			x		
123	2.5030			x		
124			-2.4880		x	
125	4.3350			x		
126	9.7100			x		
127	4.2890			x		
128			x			x
129			x			x
130			x			x
131			x			x
132	3.0150			x		

Conclusion

Relevant trends of each constituent can be found in the above tables with their more detailed statistical values in the appendices. This paper exists to present the trends of past data to the present for future consideration on what it might mean. Causal links to location, geology, and land use practices will have to wait for further studies. This paper will assist in narrowing areas of consideration when it comes to the chosen constituents and hopefully pinpoint any issues that might exist before they could become serious.

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Table 6. Well Construction Details

PHD Well ID	PWS ID	Well Name	Active Well	Well Depth	Top Of Screen	Length of Screen	Top of Casing
99	1280053	CDA – 4th Street	Yes	309	206	103	175
100	1280053	CDA – Locust Street	Yes	295	190	85	175
101	1280053	CDA – Linden Street	No	-	-	-	-
102	1280053	CDA – Atlas Well	Yes	350	280	60	42
103	1280147	Post Falls #4 Greensferry	Yes	-	-	-	-
104	1280147	Post Falls #3 Idaho Rd	Yes	-	-	-	-
105	1280147	Post Falls #5 Poleline	Yes	328	291	37	2
106	1280147	Post Falls #1 N. Tennis	No	276	231	45	4
107	12801	Post Falls #2 S. Tennis	No	275	237	38	0
108	1280155	South River Association	Yes	420	-	-	1.5
109	1280095	N. Kootenai Water #1 Hayden	Yes	-	-	-	-
110	0	Avondale Well	No	281	240	10	2
111	1280059	Dalton Gardens #1 E.	Yes	309	279	30	2
112	1280064	East Greenacres	Yes	230	200	30	2
113	1280123	Mtn. View Terrace	Yes	-	-	-	-
114	0	CHS	Yes	-	-	-	-
115	1280163	Ross Point – Syringa	Yes	273	263	26	2
116	0	Turrel Well	No	-	-	-	-
117	1280212	USFS Nursery	Yes	365	-	-	2
118	1280069	Farragut	Yes	356	210	140	1
119	128006	Athol #1 Grove Ave.	Yes	410	390	20	2
120	1280177	Spirit Lake Well #3	No	362	298	54	1
121	1280152	Rathdrum – Pine Street	Yes	222	207	15	1.5
122	1280152	Rathdrum – Grange	Yes	-	-	-	-
123	1280163	Ross Point - HWY 41	Yes	231	-	-	-
124	0	CDA – Airport	No	348	328	20	0
125	0	L.A. Aluminum	Yes	343	323	10	2
126	1280173	Silver Water Association	Yes	-	-	-	-
127	1280053	CDA – Hanley	Yes	360	290	50	2
128	12801	Post Falls #7 Majestic	No	340	300	40	2
129	1280147	Post Falls #6 – Mullan	Yes	305	255	50	2
130	1280053	CDA – Honeysuckle	Yes	291	218	53	208
131	1280177	Spirit Lake #4	Yes	626	606	20	1.5
132	1280084	Hauser	Yes	208	188	20	2

Figure 1. Rathdrum Prairie Valley Well Locations

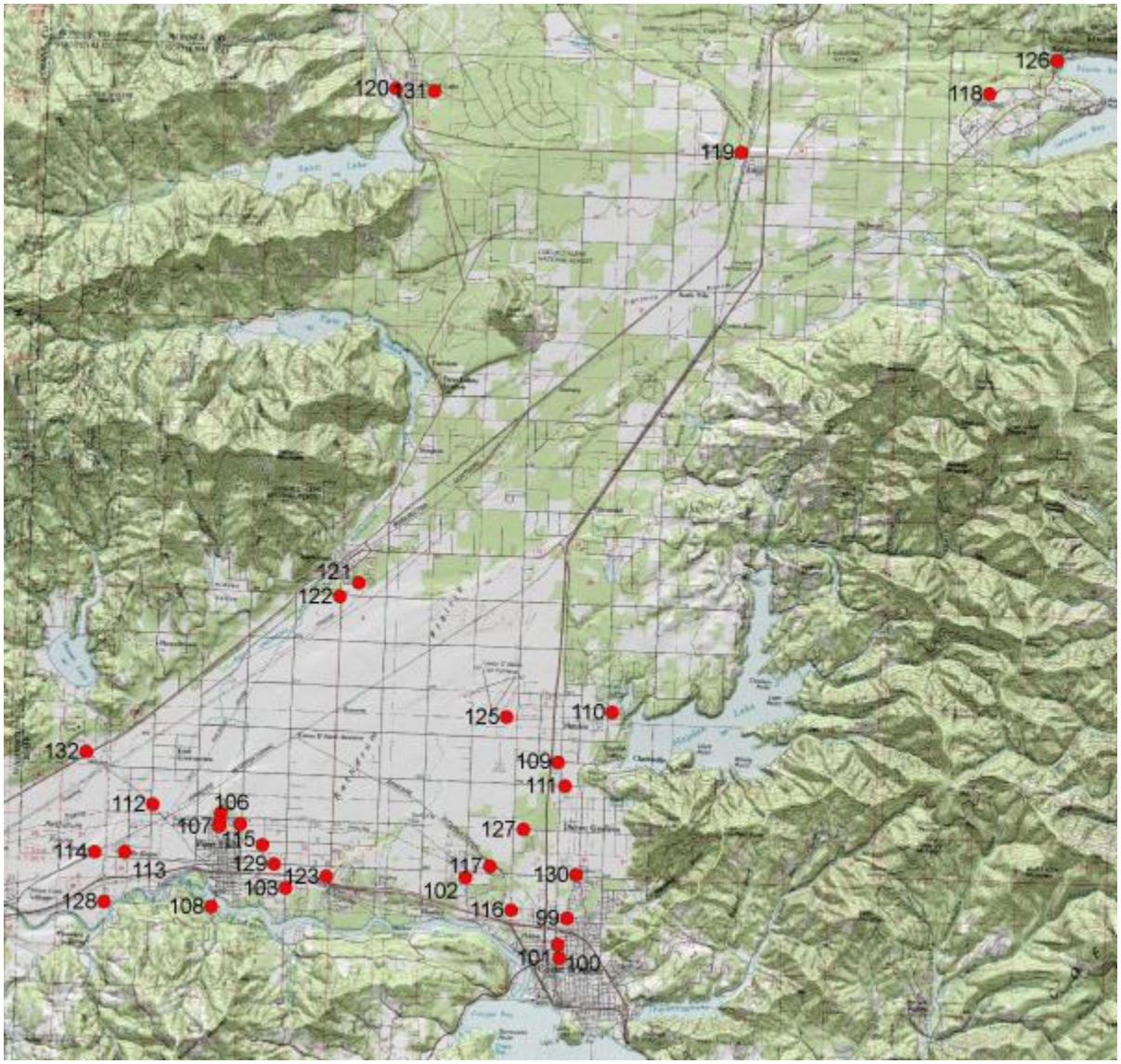
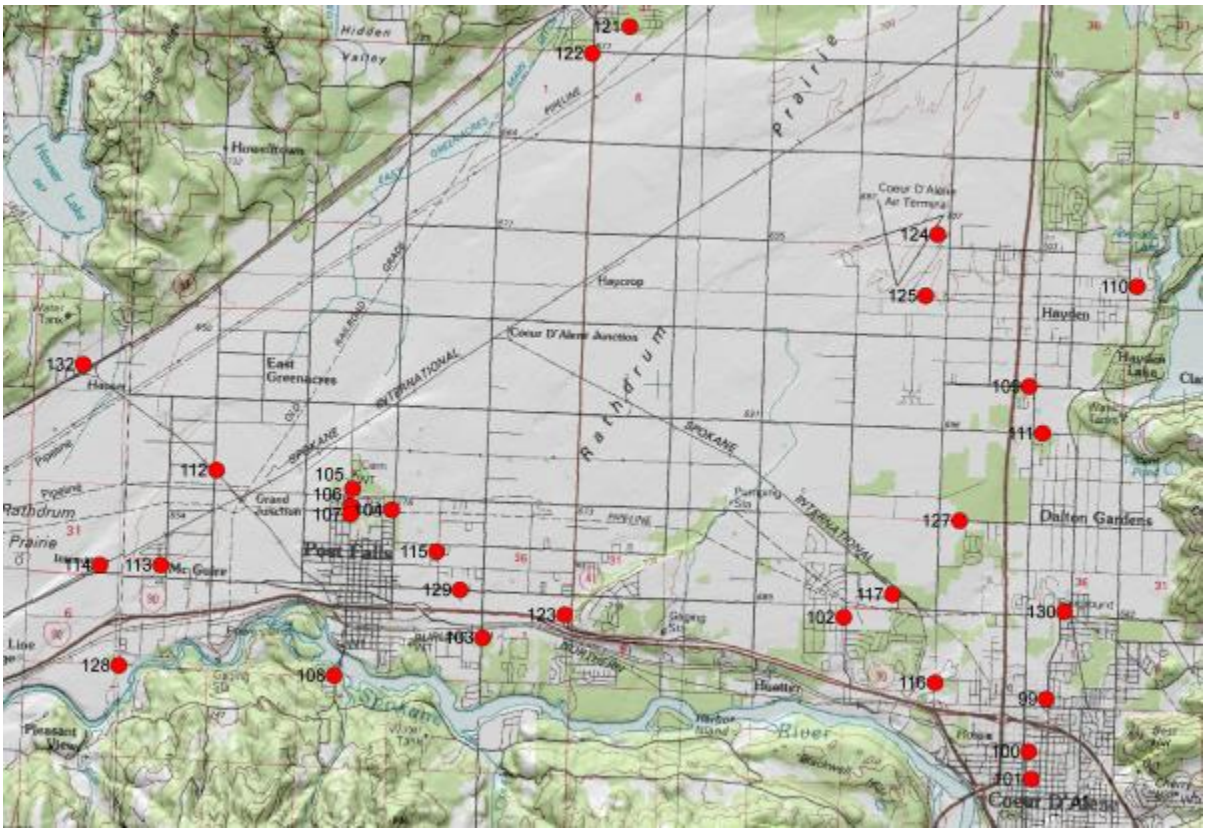


Figure 2. Athol and Surrounding Area Well Locations

Figure 3. Post Falls and Coeur d'Alene Well Locations



Appendix A: Change Log of Data

> Well 122 2/1/2011 removed due to error and its exact number in faction of years to the value before it making it incapable of trending.
> Conductivity ND used from Well 99 of 0.01 for Well 123.
> Nitrate ND used from Well 117 of 0.010 for Wells 109, 118, 119.
> Nitrate values converted using 0.2259 to Nitrate as Nitrogen on Well 109. All other values kept as is due to similar values, exact same, or overlap.

Appendix B: Chloride Trend Analysis

Well 99

Number of Samples: 41
Minimum: 1
Maximum: 14
Mean: 5.066
Median: 3.9
Standard Deviation: 3.536
SEM: 0.552

Mann-Kendall Test: Increasing
Test Value (S): 3.78
Critical Value (0.05): 1.645
Standard Deviation of S: 88.96
Standardized Value of S: 4.238
Approximate p-value: 1.1285E-5

Theil-Sen Test: Increasing
Number of Slopes: 820
Theil-Sen Slope: 0.248
Theil-Sen Intercept: 0.238
M1: 322.8
M2: 497.2
95% LCL of Slope (0.025): 0.149
95% UCL of Slope (0.975): 0.356

Well 100

Number of Samples: 62
Minimum: 0.9
Maximum: 5.5
Mean: 2.445
Median: 2
Standard Deviation: 1.086
SEM: 0.138

Mann-Kendall Test: Increasing
Test Value (S): 1166
Critical Value (0.05): 1.645
Standard Deviation of S: 163.7
Standardized Value of S: 7.117
Approximate p-value: 5.504E-13

Theil-Sen Test: Increasing
Number of Slopes: 1891
Theil-Sen Slope: 0.106
Theil-Sen Intercept: -0.00561
M1: 785.1
M2: 1106
95% LCL of Slope (0.025): 0.0844
95% UCL of Slope (0.975): 0.127

Well 101

Number of Samples: 25
Minimum: 0.2
Maximum: 3
Mean: 1.216
Median: 1.1
Standard Deviation: 0.652
SEM: 0.13

Mann-Kendall Test: Increasing
Test Value (S): 115
Critical Value (0.05): 1.645
Standard Deviation of S: 42.3
Standardized Value of S: 2.695
Approximate p-value: 0.00352

Theil-Sen Test: Increasing
Number of Slopes: 300
Theil-Sen Slope: 0.0747
Theil-Sen Intercept: 0.288
M1: 108.5
M2: 191.5
95% LCL of Slope (0.025): 0.0124
95% UCL of Slope (0.975): 0.107

Well 102

Number of Samples: 46
Minimum: 0.4
Maximum: 11
Mean: 3.51
Median: 3
Standard Deviation: 1.882
SEM: 0.277

Mann-Kendall Test: Increasing
Test Value (S): 480
Critical Value (0.05): 1.645
Standard Deviation of S: 105.3
Standardized Value of S: 4.55
Approximate p-value: 2.6855E-6

Theil-Sen Test: Increasing
Number of Slopes: 1035
Theil-Sen Slope: 0.115
Theil-Sen Intercept: 0.0536
M1: 414.3
M2: 620.7
95% LCL of Slope (0.025): 0.0712
95% UCL of Slope (0.975): 0.157

Well 103
Number of Samples: 80
Minimum: 0.3
Maximum: 4.9
Mean: 1.609
Median: 1.5
Standard Deviation: 0.8
SEM: 0.0895

Mann-Kendall Test: Increasing
Test Value (S): 919
Critical Value (0.05): 1.645
Standard Deviation of S: 239.7
Standardized Value of S: 3.83
Approximate p-value: 6.3973E-5

Theil-Sen Test: Increasing
Number of Slopes: 3160
Theil-Sen Slope: 0.0327
Theil-Sen Intercept: 0.934
M1: 1345
M2: 1815
95% LCL of Slope (0.025): 0.0154
95% UCL of Slope (0.975): 0.0554

Well 104
Number of Samples: 82
Minimum: 0.09
Maximum: 4.55
Mean: 2.136
Median: 2
Standard Deviation: 0.941
SEM: 0.104

Mann-Kendall Test: Increasing
Test Value (S): 1633
Critical Value (0.05): 0.645
Standard Deviation of S: 248.7
Standardized Value of S: 6.562
Approximate p-value: 2.655E-11

Theil-Sen Test: Increasing
Number of Slopes: 3321
Theil-Sen Slope: 0.0899
Theil-Sen Intercept: 0.428
M1: 1417
M2: 1904
95% LCL of Slope (0.025): 0.0714
95% UCL of Slope (0.975): 0.107

Well 105
Number of Samples: 72
Minimum: 0.7
Maximum: 5
Mean: 2.507
Median: 2.5
Standard Deviation: 1.167
SEM: 0.138

Mann-Kendall Test: Increasing
Test Value (S): 1901
Critical Value (0.05): 1.645
Standard Deviation of S: 205.1
Standardized Value of S: 9.265
Approximate p-value: 0

Theil-Sen Test: Increasing
Number of Slopes: 2556
Theil-Sen Slope: 0.144
Theil-Sen Intercept: 0.32
M1: 1077
M2: 1479
95% LCL of Slope (0.025): 0.13
95% UCL of Slope (0.975): 0.16

Well 106
Number of Samples: 50
Minimum: 0.8
Maximum: 3.5
Mean: 1.738
Median: 1.7
Standard Deviation: 0.644
SEM: 0.0911

Mann-Kendall Test: Increasing
Test Value (S): 416
Critical Value (0.05): 1.645
Standard Deviation of S: 118.6
Standardized Value of S: 3.499
Approximate p-value: 2.3315E-4

Theil-Sen Test: Increasing
Number of Slopes: 1225
Theil-Sen Slope: 0.0775
Theil-Sen Intercept: 0.655
M1: 496.3
M2: 728.7
95% LCL of Slope (0.025): 0.0279
95% UCL of Slope (0.975): 0.126

Well 107
Number of Samples: 48
Minimum: 0.6
Maximum: 2.4
Mean: 1.227
Median: 1.1
Standard Deviation: 0.448
SEM: 0.0647

Mann-Kendall Test: Increasing
Test Value (S): 252
Critical Value (0.05): 1.645
Standard Deviation of S: 111.2
Standardized Value of S: 2.258
Approximate p-value: 0.012

Theil-Sen Test: No Trend
Number of Slopes: 1128
Theil-Sen Slope: 0.0291
Theil-Sen Intercept: 0.711
M1: 455.1
M2: 672.9
95% LCL of Slope (0.025): 0
95% UCL of Slope (0.975): 0.0637

Well 108
Number of Samples: 57
Minimum: 1.2
Maximum: 19.6
Mean: 4.572
Median: 3.5
Standard Deviation: 3.162
SEM: 0.419

Mann-Kendall Test: Increasing
Test Value (S): 432
Critical Value (0.05): 1.645
Standard Deviation of S: 145.1
Standardized Value of S: 2.97
Approximate p-value: 0.00149

Theil-Sen Test: Increasing
Number of Slopes: 1596
Theil-Sen Slope: 0.145
Theil-Sen Intercept: 2.41
M1: 655.8
M2: 940.2
95% LCL of Slope (0.025): 0.0507
95% UCL of Slope (0.975): 0.238

Well 109
Number of Samples: 77
Minimum: 0.3
Maximum: 4.25
Mean: 1.171
Median: 1
Standard Deviation: 0.645
SEM: 0.0735

Mann-Kendall Test: Increasing
Test Value (S): 1191
Critical Value (0.05): 1.645
Standard Deviation of S: 225.7
Standardized Value of S: 5.273
Approximate p-value: 6.6988E-8

Theil-Sen Test: Increasing
Number of Slopes: 2926
Theil-Sen Slope: 0.0333
Theil-Sen Intercept: 0.372
M1: 1242
M2: 1684
95% LCL of Slope (0.025): 0.0223
95% UCL of Slope (0.975): 0.0441

Well 110
Number of Samples: 5
Minimum: 0.4
Maximum: 1.49
Mean: 0.898
Median: 0.8
Standard Deviation: 0.415
SEM: 0.185

Mann-Kendall Test: No Trend
Test Value (S): 2
Tabulated p-value: 0.408
Standard Deviation of S: 4.082
Standardized Value of S: 0.245
Approximate p-value: 0.403

Theil-Sen Test: No Trend
Number of Slopes: 10
Theil-Sen Slope: 0.0363
Theil-Sen Intercept: 0.682
M1: 0.999
M2: 9.001
95% LCL of Slope (0.025): -0.126
95% UCL of Slope (0.975): 0.6

Well 111
Number of Samples: 79
Minimum: 0.8
Maximum: 9.15
Mean: 4.27
Median: 3.97
Standard Deviation: 1.99
SEM: 0.224

Mann-Kendall Test: Increasing
Test Value (S): 1365
Critical Value (0.05): 1.645
Standard Deviation of S: 236
Standardized Value of S: 5.78
Approximate p-value: 3.7376E-9

Theil-Sen Test: Increasing
Number of Slopes: 3081
Theil-Sen Slope: 0.208
Theil-Sen Intercept: 0.045
M1: 1309
M2: 1772
95% LCL of Slope (0.025): 0.146
95% UCL of Slope (0.975): 0.255

Well 112
Number of Samples: 86
Minimum: 0.5
Maximum: 4
Mean: 2
Median: 2
Standard Deviation: 0.862
SEM: 0.093

Mann-Kendall Test: Increasing
Test Value (S): 2360
Critical Value (0.05): 1.645
Standard Deviation of S: 267.2
Standardized Value of S: 8.829
Approximate p-value: 0

Theil-Sen Test: Increasing
Number of Slopes: 3655
Theil-Sen Slope: 0.0985
Theil-Sen Intercept: -0.124
M1: 1566
M2: 2089
95% LCL of Slope (0.025): 0.0865
95% UCL of Slope (0.975): 0.109

Well 113
Number of Samples: 83
Minimum: 0.9
Maximum: 5
Mean: 2.727
Median: 3
Standard Deviation: 0.993
SEM: 0.109

Mann-Kendall Test: Increasing
Test Value (S): 2120
Critical Value (0.05): 1.645
Standard Deviation of S: 253.8
Standardized Value of S: 8.35
Approximate p-value: 0

Theil-Sen Test: Increasing
Number of Slopes: 3403
Theil-Sen Slope: 0.111
Theil-Sen Intercept: 1.011
M1: 1453
M2: 1950
95% LCL of Slope (0.025): 0.0956
95% UCL of Slope (0.975): 0.128

Well 114
Number of Samples: 83
Minimum: 0.7
Maximum: 3.7
Mean: 1.918
Median: 2
Standard Deviation: 0.845
SEM: 0.0928

Mann-Kendall Test: Increasing
Test Value (S): 2103
Critical Value (0.05): 1.645
Standard Deviation of S: 253.2
Standardized Value of S: 8.303
Approximate p-value: 0

Theil-Sen Test: Increasing
Number of Slopes: 3403
Theil-Sen Slope: 0.0973
Theil-Sen Intercept: 0.286
M1: 1453
M2: 1950
95% LCL of Slope (0.025): 0.0841
95% UCL of Slope (0.975): 0.108

Well 115
Number of Samples: 66
Minimum: 0.5
Maximum: 7.2
Mean: 2.272
Median: 2
Standard Deviation: 1.159
SEM: 0.143

Mann-Kendall Test: No Trend
Test Value (S): -17
Critical Value (0.05): -1.645
Standard Deviation of S: 180.1
Standardized Value of S: -0.0888
Approximate p-value: 0.465

Theil-Sen Test: No Trend
Number of Slopes: 2145
Theil-Sen Slope: 0
Theil-Sen Intercept: 2
M1: 896
M2: 1249
95% LCL of Slope (0.025): -0.0354
95% UCL of Slope (0.975): 0.0283

Well 116
Number of Samples: 70
Minimum: 0.3
Maximum: 4.35
Mean: 0.913
Median: 0.9
Standard Deviation: 0.553
SEM: 0.0661

Mann-Kendall Test: Increasing
Test Value (S): 651
Critical Value (0.05): 1.645
Standard Deviation of S: 194.5
Standardized Value of S: 3.342
Approximate p-value: 4.1617E-4

Theil-Sen Test: Increasing
Number of Slopes: 2415
Theil-Sen Slope: 0.0183
Theil-Sen Intercept: 0.683
M1: 1017
M2: 1398
95% LCL of Slope (0.025): 0.00157
95% UCL of Slope (0.975): 0.0326

Well 117
Number of Samples: 85
Minimum: 0.2
Maximum: 12.1
Mean: 3.684
Median: 3.5
Standard Deviation: 2.876
SEM: 0.312

Mann-Kendall Test: Increasing
Test Value (S): 2566
Critical Value (0.05): 1.645
Standard Deviation of S: 263.2
Standardized Value of S: 9.745
Approximate p-value: 0

Theil-Sen Test: Increasing
Number of Slopes: 3570
Theil-Sen Slope: 0.308
Theil-Sen Intercept: -0.734
M1: 1527
M2: 2043
95% LCL of Slope (0.025): 0.273
95% UCL of Slope (0.975): 0.357

Well 118
Number of Samples: 79
Minimum: 0.09
Maximum: 3.9
Mean: 1.264
Median: 1.11
Standard Deviation: 0.638
SEM: 0.0718

Mann-Kendall Test: Increasing
Test Value (S): 695
Critical Value (0.05): 1.645
Standard Deviation of S: 235.5
Standardized Value of S: 2.946
Approximate p-value: 0.00161

Theil-Sen Test: Increasing
Number of Slopes: 3081
Theil-Sen Slope: 0.0156
Theil-Sen Intercept: 0.825
M1: 1310
M2: 1771
95% LCL of Slope (0.025): 0.0058
95% UCL of Slope (0.975): 0.0258

Well 119
Number of Samples: 82
Minimum: 0.4
Maximum: 5.41
Mean: 1.686
Median: 1.5
Standard Deviation: 0.868
SEM: 0.0958

Mann-Kendall Test: Increasing
Test Value (S): 1482
Critical Value (0.05): 1.645
Standard Deviation of S: 248.9
Standardized Value of S: 5.949
Approximate p-value: 1.3477E-9

Theil-Sen Test: Increasing
Number of Slopes: 3321
Theil-Sen Slope: 0.0617
Theil-Sen Intercept: 0.645
M1: 1417
M2: 1904
95% LCL of Slope (0.025): 0.0382
95% UCL of Slope (0.975): 0.0832

Well 120
Number of Samples: 43
Minimum: 0.2
Maximum: 4.5
Mean: 0.737
Median: 0.5
Standard Deviation: 0.653
SEM: 0.0966

Mann-Kendall Test: Increasing
Test Value (S): 184
Critical Value (0.05): 1.645
Standard Deviation of S: 92.12
Standardized Value of S: 1.986
Approximate p-value: 0.0235

Theil-Sen Test: No Trend
Number of Slopes: 903
Theil-Sen Slope: 0.00929
Theil-Sen Intercept: 0.421
M1: 361.2
M2: 541.8
95% LCL of Slope (0.025): 0
95% UCL of Slope (0.975): 0.0385

Well 121
Number of Samples: 82
Minimum: 1
Maximum: 11.4
Mean: 3.068
Median: 2.82
Standard Deviation: 1.606
SEM: 0.177

Mann-Kendall Test: Increasing
Test Value (S): 1490
Critical Value (0.05): 1.645
Standard Deviation of S: 249.5
Standardized Value of S: 5.968
Approximate p-value: 1.2013E-9

Theil-Sen Test: Increasing
Number of Slopes: 3321
Theil-Sen Slope: 0.108
Theil-Sen Intercept: 0.562
M1: 1416
M2: 1905
95% LCL of Slope (0.025): 0.0751
95% UCL of Slope (0.975): 0.144

Well 122
Number of Samples: 92
Minimum: 1
Maximum: 12
Mean: 3.737
Median: 3.6
Standard Deviation: 1.681
SEM: 0.175

Mann-Kendall Test: Increasing
Test Value (S): 868
Critical Value (0.05): 1.645
Standard Deviation of S: 296.2
Standardized Value of S: 2.927
Approximate p-value: 0.00171

Theil-Sen Test: Increasing
Number of Slopes: 4186
Theil-Sen Slope: 0.0533
Theil-Sen Intercept: 2.745
M1: 1803
M2: 2383
95% LCL of Slope (0.025): 0.0171
95% UCL of Slope (0.975): 0.0906

Well 123
Number of Samples: 72
Minimum: 0.6
Maximum: 9.36
Mean: 2.53
Median: 2
Standard Deviation: 1.616
SEM: 0.19

Mann-Kendall Test: Increasing
Test Value (S): 1147
Critical Value (0.05): 1.645
Standard Deviation of S: 204.9
Standardized Value of S: 5.592
Approximate p-value: 1.1211E-8

Theil-Sen Test: Increasing
Number of Slopes: 2556
Theil-Sen Slope: 0.118
Theil-Sen Intercept: -0.137
M1: 1077
M2: 1479
95% LCL of Slope (0.025): 0.0807
95% UCL of Slope (0.975): 0.152

Well 124
Number of Samples: 23
Minimum: 0.7
Maximum: 2.5
Mean: 1.578
Median: 1.6
Standard Deviation: 0.427
SEM: 0.0891

Mann-Kendall Test: Increasing
Test Value (S): 104
Critical Value (0.05): 1.645
Standard Deviation of S: 37.52
Standardized Value of S: 2.745
Approximate p-value: 0.00303

Theil-Sen Test: Increasing
Number of Slopes: 253
Theil-Sen Slope: 0.1
Theil-Sen Intercept: 0.947
M1: 89.73
M2: 163.3
95% LCL of Slope (0.025): 0.0417
95% UCL of Slope (0.975): 0.166

Well 125
Number of Samples: 84
Minimum: 0.4
Maximum: 3.05
Mean: 1.643
Median: 1.5
Standard Deviation: 0.659
SEM: 0.0719

Mann-Kendall Test: Increasing
Test Value (S): 2061
Critical Value (0.05): 1.645
Standard Deviation of S: 257.9
Standardized Value of S: 7.987
Approximate p-value: 6.661E-16

Theil-Sen Test: Increasing
Number of Slopes: 3486
Theil-Sen Slope: 0.0682
Theil-Sen Intercept: 0.273
M1: 1490
M2: 1996
95% LCL of Slope (0.025): 0.0563
95% UCL of Slope (0.975): 0.0802

Well 126
Number of Samples: 97
Minimum: 1
Maximum: 11
Mean: 3.942
Median: 3.5
Standard Deviation: 1.874
SEM: 0.19

Mann-Kendall Test: Increasing
Test Value (S): 1432
Critical Value (0.05): 1.645
Standard Deviation of S: 320.6
Standardized Value of S: 4.463
Approximate p-value: 4.0330E-6

Theil-Sen Test: Increasing
Number of Slopes: 4656
Theil-Sen Slope: 0.0833
Theil-Sen Intercept: 2.137
M1: 2014
M2: 2642
95% LCL of Slope (0.025): 0.0481
95% UCL of Slope (0.975): 0.125

Well 127
Number of Samples: 55
Minimum: 2.7
Maximum: 11
Mean: 4.571
Median: 4
Standard Deviation: 1.689
SEM: 0.228

Mann-Kendall Test: Increasing
Test Value (S): 462
Critical Value (0.05): 1.645
Standard Deviation of S: 137
Standardized Value of S: 3.365
Approximate p-value: 3.8264E-4

Theil-Sen Test: Increasing
Number of Slopes: 1485
Theil-Sen Slope: 0.103
Theil-Sen Intercept: 3.202
M1: 608.2
M2: 876.8
95% LCL of Slope (0.025): 0.0392
95% UCL of Slope (0.975): 0.167

Well 128
Number of Samples: 49
Minimum: 0.492
Maximum: 3.93
Mean: 1.044
Median: 1
Standard Deviation: 0.582
SEM: 0.0831

Mann-Kendall Test: Increasing
Test Value (S): 276
Critical Value (0.05): 1.645
Standard Deviation of S: 112.8
Standardized Value of S: 2.439
Approximate p-value: 0.00737

Theil-Sen Test: No Trend
Number of Slopes: 1176
Theil-Sen Slope: 0.0185
Theil-Sen Intercept: 0.885
M1: 477.5
M2: 698.5
95% LCL of Slope (0.025): 0
95% UCL of Slope (0.975): 0.0483

Well 129
Number of Samples: 48
Minimum: 0.683
Maximum: 37
Mean: 3.266
Median: 2.47
Standard Deviation: 5.078
SEM: 0.733

Mann-Kendall Test: Increasing
Test Value (S): 565
Critical Value (0.05): 1.645
Standard Deviation of S: 111.9
Standardized Value of S: 5.04
Approximate p-value: 2.3317E-7

Theil-Sen Test: Increasing
Number of Slopes: 1128
Theil-Sen Slope: 0.154
Theil-Sen Intercept: 1.378
M1: 454.3
M2: 673.7
95% LCL of Slope (0.025): 0.112
95% UCL of Slope (0.975): 0.195

Well 130
Number of Samples: 38
Minimum: 1.91
Maximum: 4.806
Mean: 3.368
Median: 3.39
Standard Deviation: 0.702
SEM: 0.114

Mann-Kendall Test: Increasing
Test Value (S): 211
Critical Value (0.05): 1.645
Standard Deviation of S: 79.2
Standardized Value of S: 2.651
Approximate p-value: 0.00401

Theil-Sen Test: Increasing
Number of Slopes: 703
Theil-Sen Slope: 0.0784
Theil-Sen Intercept: 2.827
M1: 273.9
M2: 429.1
95% LCL of Slope (0.025): 0.018
95% UCL of Slope (0.975): 0.122

Well 131
Number of Samples: 37
Minimum: 0.647
Maximum: 2.82
Mean: 0.977
Median: 0.988
Standard Deviation: 0.346
SEM: 0.0569

Mann-Kendall Test: No Trend
Test Value (S): 108
Critical Value (0.05): 1.645
Standard Deviation of S: 75.86
Standardized Value of S: 1.411
Approximate p-value: 0.0792

Theil-Sen Test: No Trend
Number of Slopes: 666
Theil-Sen Slope: 0.00849
Theil-Sen Intercept: 0.931
M1: 258.7
M2: 407.3
95% LCL of Slope (0.025): -0.00159
95% UCL of Slope (0.975): 0.0231

Well 132
Number of Samples: 23
Minimum: 2.1
Maximum: 5.24
Mean: 3.824
Median: 3.53
Standard Deviation: 0.758
SEM: 0.158

Mann-Kendall Test: Increasing
Test Value (S): 195
Critical Value (0.05): 1.645
Standard Deviation of S: 37.86
Standardized Value of S: 5.124
Approximate p-value: 1.4986E-7

Theil-Sen Test: Increasing
Number of Slopes: 253
Theil-Sen Slope: 0.229
Theil-Sen Intercept: 2.383
M1: 89.39
M2: 163.6
95% LCL of Slope (0.025): 0.167
95% UCL of Slope (0.975): 0.289

Appendix C: Sodium Trend Analysis

Well 99

Number of Samples: 18
Minimum: 1.61
Maximum: 3.4
Mean: 2.651
Median: 2.7
Standard Deviation: 0.408
SEM: 0.0961

Mann-Kendall Test: Decreasing
Test Value (S): -44
Tabulated p-value: 0.048
Standard Deviation of S: 25.82
Standardized Value of S: -1.665
Approximate p-value: 0.0479

Theil-Sen Test: No Trend
Number of Slopes: 153
Theil-Sen Slope: -0.0364
Theil-Sen Intercept: 2.946
M1: 51.2
M2: 101.8
95% LCL of Slope (0.025): -0.0996
95% UCL of Slope (0.975): 0

Well 100

Number of Samples: 36
Minimum: 2.1
Maximum: 2.9
Mean: 2.475
Median: 2.45
Standard Deviation: 0.21
SEM: 0.035

Mann-Kendall Test: Increasing
Test Value (S): 207
Critical Value (0.05): 1.645
Standard Deviation of S: 72.36
Standardized Value of S: 2.847
Approximate p-value: 0.00221

Theil-Sen Test: Increasing
Number of Slopes: 630
Theil-Sen Slope: 0.0238
Theil-Sen Intercept: 2.188
M1: 244.1
M2: 385.9
95% LCL of Slope (0.025): 0
95% UCL of Slope (0.975): 0.0396

Well 101

Number of Samples: 25
Minimum: 1.8
Maximum: 2.7
Mean: 2.152
Median: 2.1
Standard Deviation: 0.212
SEM: 0.0425

Mann-Kendall Test: No Trend
Test Value (S): 34
Critical Value (0.05): 1.645
Standard Deviation of S: 42.2
Standardized Value of S: 0.782
Approximate p-value: 0.217

Theil-Sen Test: No Trend
Number of Slopes: 300
Theil-Sen Slope: 0.0028
Theil-Sen Intercept: 2.07
M1: 108.6
M2: 191.4
95% LCL of Slope (0.025): -0.0112
95% UCL of Slope (0.975): 0.0286

Well 102

Number of Samples: 23
Minimum: 2.3
Maximum: 3.5
Mean: 2.896
Median: 2.9
Standard Deviation: 0.307
SEM: 0.064

Mann-Kendall Test: No Trend
Test Value (S): 50
Critical Value (0.05): 1.645
Standard Deviation of S: 37.46
Standardized Value of S: 1.308
Approximate p-value: 0.0954

Theil-Sen Test: No Trend
Number of Slopes: 253
Theil-Sen Slope: 0.0218
Theil-Sen Intercept: 2.509
M1: 89.79
M2: 163.2
95% LCL of Slope (0.025): -0.00507
95% UCL of Slope (0.975): 0.0499

Well 103
Number of Samples: 49
Minimum: 1.8
Maximum: 4.1
Mean: 2.3
Median: 2.3
Standard Deviation: 0.348
SEM: 0.0497

Mann-Kendall Test: No Trend
Test Value (S):151
Critical Value (0.05): 1.645
Standard Deviation of S: 114.9
Standardized Value of S: 1.306
Approximate p-value: 0.0958

Theil-Sen Test: No Trend
Number of Slopes: 1176
Theil-Sen Slope: 0.0107
Theil-Sen Intercept: 2.201
M1: 475.4
M2: 700.6
95% LCL of Slope (0.025): 0
95% UCL of Slope (0.975): 0.0285

Well 104
Number of Samples: 51
Minimum: 1.9
Maximum: 3
Mean: 2.278
Median: 2.3
Standard Deviation: 0.215
SEM: 0.0301

Mann-Kendall Test: Increasing
Test Value (S): 489
Critical Value (0.05): 1.645
Standard Deviation of S: 121.5
Standardized Value of S: 4.018
Approximate p-value: 2.9359E-5

Theil-Sen Test: Increasing
Number of Slopes: 1275
Theil-Sen Slope: 0.0287
Theil-Sen Intercept: 2.035
M1: 518.5
M2: 756.5
95% LCL of Slope (0.025): 0.016
95% UCL of Slope (0.975): 0.0401

Well 105
Number of Samples: 46
Minimum: 2
Maximum: 8
Mean: 2.702
Median: 2.5
Standard Deviation: 0.851
SEM: 0.125

Mann-Kendall Test: Increasing
Test Value (S): 457
Critical Value (0.05): 1.645
Standard Deviation of S: 104.7
Standardized Value of S: 4.353
Approximate p-value: 6.7021E-6

Theil-Sen Test: Increasing
Number of Slopes: 1035
Theil-Sen Slope: 0.05
Theil-Sen Intercept: 2.019
M1: 414.9
M2: 620.1
95% LCL of Slope (0.025): 0.03
95% UCL of Slope (0.975): 0.0701

Well 106
Number of Samples: 49
Minimum: 1.8
Maximum: 5.8
Mean: 2.467
Median: 2.4
Standard Deviation: 0.548
SEM: 0.0783

Mann-Kendall Test: Increasing
Test Value (S): 347
Critical Value (0.05): 1.645
Standard Deviation of S: 114.8
Standardized Value of S: 3.014
Approximate p-value: 0.00129

Theil-Sen Test: Increasing
Number of Slopes: 1176
Theil-Sen Slope: 0.0274
Theil-Sen Intercept: 2.147
M1: 475.5
M2: 700.5
95% LCL of Slope (0.025): 0.00436
95% UCL of Slope (0.975): 0.0444

Well 107
Number of Samples: 46
Minimum: 1.8
Maximum: 3
Mean: 2.215
Median: 2.2
Standard Deviation: 0.239
SEM: 0.0353

Mann-Kendall Test: Increasing
Test Value (S): 280
Critical Value (0.05): 1.645
Standard Deviation of S: 103.9
Standardized Value of S: 2.684
Approximate p-value: 0.00363

Theil-Sen Test: No Trend
Number of Slopes: 1035
Theil-Sen Slope: 0.0235
Theil-Sen Intercept: 1.98
M1: 415.6
M2: 619.4
95% LCL of Slope (0.025): 0
95% UCL of Slope (0.975): 0.04

Well 108
Number of Samples: 30
Minimum: 2.6
Maximum: 7.8
Mean: 4.227
Median: 4
Standard Deviation: 1.206
SEM: 0.22

Mann-Kendall Test: Increasing
Test Value (S): 176
Critical Value (0.05): 1.645
Standard Deviation of S: 55.95
Standardized Value of S: 3.128
Approximate p-value: 8.8002E-4

Theil-Sen Test: Increasing
Number of Slopes: 435
Theil-Sen Slope: 0.251
Theil-Sen Intercept: 3.024
M1: 162.7
M2: 272.3
95% LCL of Slope (0.025): 0.105
95% UCL of Slope (0.975): 0.4

Well 109
Number of Samples: 44
Minimum: 1.7
Maximum: 3
Mean: 2.152
Median: 2.1
Standard Deviation: 0.282
SEM: 0.0426

Mann-Kendall Test: No Trend
Test Value (S): -79
Critical Value (0.05): -1.645
Standard Deviation of S: 97.56
Standardized Value of S: -0.8
Approximate p-value: 0.212

Theil-Sen Test: No Trend
Number of Slopes: 946
Theil-Sen Slope: 0
Theil-Sen Intercept: 2.1
M1: 377.4
M2: 568.6
95% LCL of Slope (0.025): -0.0285
95% UCL of Slope (0.975): 0

Well 110
Number of Samples: 3
Minimum: 1.9
Maximum: 3.7
Mean: 2.533
Median: 2
Standard Deviation: 1.012
SEM: 0.584

Mann-Kendall Test: No Trend
Test Value (S): 1
Tabulated p-value: N/A
Standard Deviation of S: 1.915
Standardized Value of S: 0
Approximate p-value: 0.5

Theil-Sen Test: No Trend
Number of Slopes: 3
Theil-Sen Slope: 0.455
Theil-Sen Intercept: 0.527
M1: -0.377
M2: 3.377
95% LCL of Slope (0.025): -0.214
95% UCL of Slope (0.975): 3.6

Well 111
Number of Samples: 44
Minimum: 2.6
Maximum: 5.1
Mean: 3.882
Median: 4.1
Standard Deviation: 0.734
SEM: 0.111

Mann-Kendall Test: No Trend
Test Value (S): -90
Critical Value (0.05): -1.645
Standard Deviation of S: 98.57
Standardized Value of S: -0.903
Approximate p-value: 0.183

Theil-Sen Test: No Trend
Number of Slopes: 946
Theil-Sen Slope: -0.213
Theil-Sen Intercept: 4.321
M1: 376.4
M2: 569.6
95% LCL of Slope (0.025): -0.0818
95% UCL of Slope (0.975): 0.0316

Well 112
Number of Samples: 53
Minimum: 1.9
Maximum: 3.6
Mean: 2.843
Median: 2.9
Standard Deviation: 0.252
SEM: 0.0346

Mann-Kendall Test: Increasing
Test Value (S): 244
Critical Value (0.05): 1.645
Standard Deviation of S: 128.2
Standardized Value of S: 1.896
Approximate p-value: 0.029

Theil-Sen Test: No Trend
Number of Slopes: 1378
Theil-Sen Slope: 0.0103
Theil-Sen Intercept: 2.723
M1: 563.4
M2: 814.6
95% LCL of Slope (0.025): 0
95% UCL of Slope (0.975): 0.025

Well 113
Number of Samples: 49
Minimum: 2.3
Maximum: 3.5
Mean: 2.816
Median: 2.8
Standard Deviation: 0.197
SEM: 0.0282

Mann-Kendall Test: Increasing
Test Value (S): 284
Critical Value (0.05): 1.645
Standard Deviation of S: 113.2
Standardized Value of S: 2.501
Approximate p-value: 0.0062

Theil-Sen Test: No Trend
Number of Slopes: 1176
Theil-Sen Slope: 0.0151
Theil-Sen Intercept: 2.657
M1: 477.1
M2: 698.9
95% LCL of Slope (0.025): 0
95% UCL of Slope (0.975): 0.0287

Well 114
Number of Samples: 50
Minimum: 2.4
Maximum: 3.3
Mean: 2.804
Median: 2.8
Standard Deviation: 0.187
SEM: 0.0265

Mann-Kendall Test: No Trend
Test Value (S): 71
Critical Value (0.05): 1.645
Standard Deviation of S: 117.4
Standardized Value of S: 0.596
Approximate p-value: 0.275

Theil-Sen Test: No Trend
Number of Slopes: 1225
Theil-Sen Slope: 0
Theil-Sen Intercept: 2.8
M1: 497.5
M2: 727.5
95% LCL of Slope (0.025): 0
95% UCL of Slope (0.975): 0.0157

Well 115
Number of Samples: 46
Minimum: 1.9
Maximum: 3.6
Mean: 2.598
Median: 2.6
Standard Deviation: 0.35
SEM: 0.0516

Mann-Kendall Test: No Trend
Test Value (S): 25
Critical Value (0.05): 1.645
Standard Deviation of S: 105
Standardized Value of S: 0.229
Approximate p-value: 0.41

Theil-Sen Test: No Trend
Number of Slopes: 1035
Theil-Sen Slope: 0
Theil-Sen Intercept: 2.6
M1: 414.6
M2: 620.4
95% LCL of Slope (0.025): -0.0207
95% UCL of Slope (0.975): 0.0243

Well 116
Number of Samples: 50
Minimum: 1.7
Maximum: 2.4
Mean: 2.062
Median: 2.1
Standard Deviation: 0.131
SEM: 0.0185

Mann-Kendall Test: No Trend
Test Value (S): 32
Critical Value (0.05): 1.645
Standard Deviation of S: 114.4
Standardized Value of S: 0.271
Approximate p-value: 0.393

Theil-Sen Test: No Trend
Number of Slopes: 1225
Theil-Sen Slope: 0
Theil-Sen Intercept: 2.1
M1: 500.4
M2: 724.6
95% LCL of Slope (0.025): 0
95% UCL of Slope (0.975): 0

Well 117
Number of Samples: 51
Minimum: 2.3
Maximum: 4
Mean: 2.812
Median: 2.7
Standard Deviation: 0.412
SEM: 0.0576

Mann-Kendall Test: Increasing
Test Value (S): 552
Critical Value (0.05): 1.645
Standard Deviation of S: 122.2
Standardized Value of S: 4.508
Approximate p-value: 3.2733E-6

Theil-Sen Test: Increasing
Number of Slopes: 1275
Theil-Sen Slope: 0.0545
Theil-Sen Intercept: 2.182
M1: 517.7
M2: 757.3
95% LCL of Slope (0.025): 0.0334
95% UCL of Slope (0.975): 0.08

Well 118
Number of Samples: 46
Minimum: 2.4
Maximum: 3.2
Mean: 2.991
Median: 3
Standard Deviation: 0.166
SEM: 0.0244

Mann-Kendall Test: Increasing
Test Value (S): 184
Critical Value (0.05): 1.645
Standard Deviation of S: 102.9
Standardized Value of S: 1.778
Approximate p-value: 0.0377

Theil-Sen Test: No Trend
Number of Slopes: 1035
Theil-Sen Slope: 0
Theil-Sen Intercept: 3
M1: 416.6
M2: 618.4
95% LCL of Slope (0.025): 0
95% UCL of Slope (0.975): 0.021

Well 119
Number of Samples: 49
Minimum: 2.5
Maximum: 3.4
Mean: 3
Median: 3
Standard Deviation: 0.181
SEM: 0.0259

Mann-Kendall Test: Increasing
Test Value (S): 294
Critical Value (0.05): 1.645
Standard Deviation of S: 113.9
Standardized Value of S: 2.572
Approximate p-value: 0.00506

Theil-Sen Test: No Trend
Number of Slopes: 1176
Theil-Sen Slope: 0.0166
Theil-Sen Intercept: 2.842
M1: 476.4
M2: 699.6
95% LCL of Slope (0.025): 0
95% UCL of Slope (0.975): 0.0296

Well 120
Number of Samples: 44
Minimum: 1.5
Maximum: 2.5
Mean: 2.143
Median: 2.2
Standard Deviation: 0.258
SEM: 0.0389

Mann-Kendall Test: No Trend
Test Value (S): -55
Critical Value (0.05): -1.645
Standard Deviation of S: 97.82
Standardized Value of S: -0.552
Approximate p-value: 0.29

Theil-Sen Test: No Trend
Number of Slopes: 946
Theil-Sen Slope: 0
Theil-Sen Intercept: 2.2
M1: 377.1
M2: 568.9
95% LCL of Slope (0.025): -0.0294
95% UCL of Slope (0.975): 0.0149

Well 121
Number of Samples: 49
Minimum: 2.2
Maximum: 5.7
Mean: 3.214
Median: 2.9
Standard Deviation: 0.884
SEM: 0.126

Mann-Kendall Test: Increasing
Test Value (S): 277
Critical Value (0.05): 1.645
Standard Deviation of S: 115.5
Standardized Value of S: 2.39
Approximate p-value: 0.00842

Theil-Sen Test: Increasing
Number of Slopes: 1176
Theil-Sen Slope: 0.0432
Theil-Sen Intercept: 2.49
M1: 474.8
M2: 701.2
95% LCL of Slope (0.025): 0
95% UCL of Slope (0.975): 0.0762

Well 122
Number of Samples: 55
Minimum: 2.2
Maximum: 5.9
Mean: 4.705
Median: 5
Standard Deviation: 0.865
SEM: 0.117

Mann-Kendall Test: Increasing
Test Value (S): 358
Critical Value (0.05): 1.645
Standard Deviation of S: 137.3
Standardized Value of S: 2.599
Approximate p-value: 0.00467

Theil-Sen Test: Increasing
Number of Slopes: 1485
Theil-Sen Slope: 0.0496
Theil-Sen Intercept: 4.567
M1: 607.9
M2: 877.1
95% LCL of Slope (0.025): 0.0142
95% UCL of Slope (0.975): 0.0681

Well 123
Number of Samples: 42
Minimum: 2.1
Maximum: 3.3
Mean: 2.557
Median: 2.5
Standard Deviation: 0.298
SEM: 0.046

Mann-Kendall Test: Increasing
Test Value (S): 164
Critical Value (0.05): 1.645
Standard Deviation of S: 91.58
Standardized Value of S: 1.78
Approximate p-value: 0.0376

Theil-Sen Test: No Trend
Number of Slopes: 861
Theil-Sen Slope: 0.0191
Theil-Sen Intercept: 2.326
M1: 340.8
M2: 520.2
95% LCL of Slope (0.025): 0
95% UCL of Slope (0.975): 0.0415

Well 124
Number of Samples: 23
Minimum: 2.5
Maximum: 3.1
Mean: 2.704
Median: 2.6
Standard Deviation: 0.166
SEM: 0.0347

Mann-Kendall Test: No Trend
Test Value (S): 29
Critical Value (0.05): 1.645
Standard Deviation of S: 36.43
Standardized Value of S: 0.769
Approximate p-value: 0.221

Theil-Sen Test: No Trend
Number of Slopes: 253
Theil-Sen Slope: 0
Theil-Sen Intercept: 2.6
M1: 90.8
M2: 162.2
95% LCL of Slope (0.025): 0
95% UCL of Slope (0.975): 0.0501

Well 125
Number of Samples: 51
Minimum: 2
Maximum: 3.2
Mean: 2.485
Median: 2.5
Standard Deviation: 0.283
SEM: 0.0397

Mann-Kendall Test: Increasing
Test Value (S): 429
Critical Value (0.05): 1.645
Standard Deviation of S: 121.9
Standardized Value of S: 3.51
Approximate p-value: 2.2415E-4

Theil-Sen Test: Increasing
Number of Slopes: 1275
Theil-Sen Slope: 0.0365
Theil-Sen Intercept: 2.154
M1: 518
M2: 757
95% LCL of Slope (0.025): 0.0148
95% UCL of Slope (0.975): 0.0556

Well 126
Number of Samples: 53
Minimum: 2.7
Maximum: 6.1
Mean: 4.951
Median: 5.2
Standard Deviation: 0.899
SEM: 0.123

Mann-Kendall Test: Decreasing
Test Value (S): -464
Critical Value (0.05): -1.645
Standard Deviation of S: 129.9
Standardized Value of S: -3.543
Approximate p-value: 1.8336E-4

Theil-Sen Test: Decreasing
Number of Slopes: 1378
Theil-Sen Slope: -0.0803
Theil-Sen Intercept: 5.882
M1: 561.7
M2: 816.3
95% LCL of Slope (0.025): -0.134
95% UCL of Slope (0.975): -0.039

Well 127
Number of Samples: 30
Minimum: 3.3
Maximum: 4.1
Mean: 3.76
Median: 3.8
Standard Deviation: 0.234
SEM: 0.0428

Mann-Kendall Test: Increasing
Test Value (S): 167
Critical Value (0.05): 1.645
Standard Deviation of S: 55.4
Standardized Value of S: 2.996
Approximate p-value: 0.00137

Theil-Sen Test: Increasing
Number of Slopes: 435
Theil-Sen Slope: 0.0573
Theil-Sen Intercept: 3.549
M1: 163.2
M2: 271.8
95% LCL of Slope (0.025): 0.0211
95% UCL of Slope (0.975): 0.089

Well 128
Number of Samples: 26
Minimum: 1.6
Maximum: 6.4
Mean: 2.488
Median: 1.9
Standard Deviation: 1.456
SEM: 0.286

Mann-Kendall Test: Increasing
Test Value (S): 117
Critical Value (0.05): 1.645
Standard Deviation of S: 44.95
Standardized Value of S: 2.58
Approximate p-value: 0.00494

Theil-Sen Test: Increasing
Number of Slopes: 325
Theil-Sen Slope: 0.133
Theil-Sen Intercept: 1.448
M1: 118.4
M2: 206.6
95% LCL of Slope (0.025): 0.0241
95% UCL of Slope (0.975): 0.356

Well 129
Number of Samples: 15
Minimum: 2.1
Maximum: 19.8
Mean: 3.733
Median: 2.7
Standard Deviation: 4.452
SEM: 1.15

Mann-Kendall Test: Increasing
Test Value (S): 42
Tabulated p-value: 0.018
Standard Deviation of S: 19.65
Standardized Value of S: 2.087
Approximate p-value: 0.0185

Theil-Sen Test: No Trend
Number of Slopes: 105
Theil-Sen Slope: 0.162
Theil-Sen Intercept: 2.378
M1: 33.25
M2: 71.75
95% LCL of Slope (0.025): 0
95% UCL of Slope (0.975): 0.295

Well 130
Number of Samples: 8
Minimum: 2.6
Maximum: 3.2
Mean: 2.938
Median: 2.95
Standard Deviation: 0.25
SEM: 0.0885

Mann-Kendall Test: No Trend
Test Value (S): -4
Tabulated p-value: 0.36
Standard Deviation of S: 7.789
Standardized Value of S: -0.385
Approximate p-value: 0.35

Theil-Sen Test: No Trend
Number of Slopes: 28
Theil-Sen Slope: -0.0201
Theil-Sen Intercept: 2.988
M1: 6.367
M2: 21.63
95% LCL of Slope (0.025): -0.53
95% UCL of Slope (0.975): 0.232

Well 131
Number of Samples: 4
Minimum: 1.8
Maximum: 2.2
Mean: 2.05
Median: 2.1
Standard Deviation: 0.191
SEM: 0.0957

Mann-Kendall Test: No Trend
Test Value (S): 1
Tabulated p-value: 0.625
Standard Deviation of S: 2.769
Standardized Value of S: 0
Approximate p-value: 0.5

Theil-Sen Test: No Trend
Number of Slopes: 6
Theil-Sen Slope: 0.0662
Theil-Sen Intercept: 2.026
M1: 0.287
M2: 5.713
95% LCL of Slope (0.025): -0.639
95% UCL of Slope (0.975):0.381

Appendix D: Magnesium Trend Analysis

Well 99

Number of Samples: 26
Minimum: 2
Maximum: 20
Mean: 12.45
Median: 12.5
Standard Deviation: 3.582
SEM: 0.703

Mann-Kendall Test: No Trend
Test Value (S): 31
Critical Value (0.05): 1.645
Standard Deviation of S: 45.3
Standardized Value of S: 0.662
Approximate p-value: 0.254

Theil-Sen Test: No Trend
Number of Slopes: 325
Theil-Sen Slope: 0.057
Theil-Sen Intercept: 11.94
M1: 118.1
M2: 206.9
95% LCL of Slope (0.025): -0.218
95% UCL of Slope (0.975): 0.156

Well 100

Number of Samples: 44
Minimum: 6
Maximum: 9.6
Mean: 7.328
Median: 7.2
Standard Deviation: 0.795
SEM: 0.12

Mann-Kendall Test: No Trend
Test Value (S): -8
Critical Value (0.05): -1.645
Standard Deviation of S: 98.68
Standardized Value of S: -0.0709
Approximate p-value: 0.472

Theil-Sen Test: No Trend
Number of Slopes: 946
Theil-Sen Slope: 0
Theil-Sen Intercept: 7.2
M1: 376.3
M2: 569.7
95% LCL of Slope (0.025): -0.0359
95% UCL of Slope (0.975): 0.0286

Well 101

Number of Samples: 24
Minimum: 4.2
Maximum: 6.6
Mean: 4.892
Median: 4.7
Standard Deviation: 0.561
SEM: 0.115

Mann-Kendall Test: No Trend
Test Value (S): 38
Critical Value (0.05): 1.645
Standard Deviation of S: 39.97
Standardized Value of S: 0.926
Approximate p-value: 0.177

Theil-Sen Test: No Trend
Number of Slopes: 276
Theil-Sen Slope: 0.024
Theil-Sen Intercept: 4.547
M1: 98.83
M2: 177.2
95% LCL of Slope (0.025): -0.0344
95% UCL of Slope (0.975): 0.0711

Well 102

Number of Samples: 30
Minimum: 5.8
Maximum: 12.9
Mean: 8.257
Median: 7.85
Standard Deviation: 1.751
SEM: 0.32

Mann-Kendall Test: No Trend
Test Value (S): 75
Critical Value (0.05): 1.645
Standard Deviation of S: 56.03
Standardized Value of S: 1.321
Approximate p-value: 0.0933

Theil-Sen Test: No Trend
Number of Slopes: 435
Theil-Sen Slope: 0.0544
Theil-Sen Intercept: 7.244
M1: 162.6
M2: 272.4
95% LCL of Slope (0.025): -0.032
95% UCL of Slope (0.975): 0.147

Well 103
Number of Samples: 57
Minimum: 2.6
Maximum: 14.7
Mean: 6.762
Median: 6.7
Standard Deviation: 3.221
SEM: 0.427

Mann-Kendall Test: No Trend
Test Value (S): -84
Critical Value (0.05): -1.645
Standard Deviation of S: 145.2
Standardized Value of S: -0.572
Approximate p-value: 0.284

Theil-Sen Test: No Trend
Number of Slopes: 1596
Theil-Sen Slope: -0.0368
Theil-Sen Intercept: 7.077
M1: 655.7
M2: 940.3
95% LCL of Slope (0.025): -0.229
95% UCL of Slope (0.975): 0.0665

Well 104
Number of Samples: 59
Minimum: 6.5
Maximum: 13.7
Mean: 9.956
Median: 9.7
Standard Deviation: 1.657
SEM: 0.216

Mann-Kendall Test: Increasing
Test Value (S): 577
Critical Value (0.05): 1.645
Standard Deviation of S: 152.8
Standardized Value of S: 3.769
Approximate p-value: 8.1933E-5

Theil-Sen Test: Increasing
Number of Slopes: 1711
Theil-Sen Slope: 0.129
Theil-Sen Intercept: 8.373
M1: 705.7
M2: 1005
95% LCL of Slope (0.025): 0.08
95% UCL of Slope (0.975): 0.184

Well 105
Number of Samples: 54
Minimum: 6.9
Maximum: 13.2
Mean: 9.567
Median: 9.2
Standard Deviation: 1.434
SEM: 0.195

Mann-Kendall Test: Increasing
Test Value (S): 848
Critical Value (0.05): 1.645
Standard Deviation of S: 133.9
Standardized Value of S: 6.326
Approximate p-value: 1.257E-10

Theil-Sen Test: Increasing
Number of Slopes: 1431
Theil-Sen Slope: 0.169
Theil-Sen Intercept: 7.403
M1: 584.3
M2: 846.7
95% LCL of Slope (0.025): 0.133
95% UCL of Slope (0.975): 0.218

Well 106
Number of Samples: 49
Minimum: 7.1
Maximum: 13.5
Mean: 10.34
Median: 10.4
Standard Deviation: 1.558
SEM: 0.223

Mann-Kendall Test: Increasing
Test Value (S): 509
Critical Value (0.05): 1.645
Standard Deviation of S: 115.9
Standardized Value of S: 4.383
Approximate p-value: 5.8629E-6

Theil-Sen Test: Increasing
Number of Slopes: 1176
Theil-Sen Slope: 0.253
Theil-Sen Intercept: 8.058
M1: 474.4
M2: 701.6
95% LCL of Slope (0.025): 0.156
95% UCL of Slope (0.975): 0.351

Well 107
Number of Samples: 46
Minimum: 5.6
Maximum: 12
Mean: 7.9
Median: 7.7
Standard Deviation: 1.188
SEM: 0.175

Mann-Kendall Test: No Trend
Test Value (S): -33
Critical Value (0.05): -1.645
Standard Deviation of S: 105.5
Standardized Value of S: -0.303
Approximate p-value: 0.381

Theil-Sen Test: No Trend
Number of Slopes: 1035
Theil-Sen Slope: -0.0143
Theil-Sen Intercept: 7.834
M1: 414.1
M2: 620.9
95% LCL of Slope (0.025): -0.0996
95% UCL of Slope (0.975): 0.0615

Well 108
Number of Samples: 36
Minimum: 1.5
Maximum: 7.6
Mean: 3.653
Median: 3.525
Standard Deviation: 1.19
SEM: 0.198

Mann-Kendall Test: No Trend
Test Value (S): 112
Critical Value (0.05): 1.645
Standard Deviation of S: 73.33
Standardized Value of S: 1.514
Approximate p-value: 0.065

Theil-Sen Test: No Trend
Number of Slopes: 630
Theil-Sen Slope: 0.0601
Theil-Sen Intercept: 3.232
M1: 243.1
M2: 386.9
95% LCL of Slope (0.025): -0.0137
95% UCL of Slope (0.975): 0.153

Well 109
Number of Samples: 53
Minimum: 2.1
Maximum: 17.2
Mean: 3.612
Median: 3
Standard Deviation: 2.716
SEM: 0.373

Mann-Kendall Test: No Trend
Test Value (S): 46
Critical Value (0.05): 1.645
Standard Deviation of S: 129.7
Standardized Value of S: 0.347
Approximate p-value: 0.364

Theil-Sen Test: No Trend
Number of Slopes: 1378
Theil-Sen Slope: 0
Theil-Sen Intercept: 3
M1: 561.9
M2: 816.1
95% LCL of Slope (0.025): -0.014
95% UCL of Slope (0.975): 0.0182

Well 110
Number of Samples: 3
Minimum: 2.2
Maximum: 15.4
Mean: 6.6
Median: 2.2
Standard Deviation: 7.621
SEM: 4.4

Mann-Kendall Test: No Trend
Test Value (S): 2
Tabulated p-value: N/A
Standard Deviation of S: 1.633
Standardized Value of S: 0.612
Approximate p-value: 0.27

Theil-Sen Test: No Trend
Number of Slopes: 3
Theil-Sen Slope: 3.529
Theil-Sen Intercept: -9.235
M1: -0.1
M2: 3.1
95% LCL of Slope (0.025): -0.354
95% UCL of Slope (0.975): 26.4

Well 111
Number of Samples: 53
Minimum: 6
Maximum: 19.3
Mean: 11.8
Median: 12.8
Standard Deviation: 3.466
SEM: 0.476

Mann-Kendall Test: No Trend
Test Value (S): -69
Tabulated p-value: -1.645
Standard Deviation of S: 130.3
Standardized Value of S: -0.522
Approximate p-value: 0.301

Theil-Sen Test: No Trend
Number of Slopes: 1378
Theil-Sen Slope: -0.0318
Theil-Sen Intercept: 13.17
M1: 561.3
M2: 816.7
95% LCL of Slope (0.025): -0.223
95% UCL of Slope (0.975): 0.114

Well 112
Number of Samples: 62
Minimum: 11.9
Maximum: 18.5
Mean: 15.71
Median: 15.8
Standard Deviation: 1.328
SEM: 0.169

Mann-Kendall Test: Increasing
Test Value (S): 364
Critical Value (0.05): 1.645
Standard Deviation of S: 164.5
Standardized Value of S: 2.207
Approximate p-value: 0.0137

Theil-Sen Test: Increasing
Number of Slopes: 1891
Theil-Sen Slope: 0.057
Theil-Sen Intercept: 15.19
M1: 784.3
M2: 1107
95% LCL of Slope (0.025): 0.00431
95% UCL of Slope (0.975): 0.1

Well 113
Number of Samples: 57
Minimum: 10.8
Maximum: 18.8
Mean: 14.39
Median: 14.4
Standard Deviation: 1.458
SEM: 0.193

Mann-Kendall Test: No Trend
Test Value (S): 97
Critical Value (0.05): 1.645
Standard Deviation of S: 145.1
Standardized Value of S: 0.661
Approximate p-value: 0.254

Theil-Sen Test: No Trend
Number of Slopes: 1596
Theil-Sen Slope: 0.0145
Theil-Sen Intercept: 14.25
M1: 655.8
M2: 940.2
95% LCL of Slope (0.025): -0.0327
95% UCL of Slope (0.975): 0.0689

Well 114
Number of Samples: 60
Minimum: 4.3
Maximum: 17.8
Mean: 13.66
Median: 13.75
Standard Deviation: 1.627
SEM: 0.21

Mann-Kendall Test: Increasing
Test Value (S): 520
Critical Value (0.05): 1.645
Standard Deviation of S: 156.5
Standardized Value of S: 3.317
Approximate p-value: 4.5438E-4

Theil-Sen Test: Increasing
Number of Slopes: 1770
Theil-Sen Slope: 0.036
Theil-Sen Intercept: 13.38
M1: 731.7
M2: 1038
95% LCL of Slope (0.025): 0.0166
95% UCL of Slope (0.975): 0.0655

Well 115
Number of Samples: 52
Minimum: 4.2
Maximum: 16
Mean: 9.099
Median: 8.28
Standard Deviation: 3.542
SEM: 0.491

Mann-Kendall Test: No Trend
Test Value (S): -156
Critical Value (0.05): -1.645
Standard Deviation of S: 126.7
Standardized Value of S: -1.224
Approximate p-value: 0.111

Theil-Sen Test: No Trend
Number of Slopes: 1326
Theil-Sen Slope: -0.17
Theil-Sen Intercept: 10.13
M1: 538.9
M2: 787.1
95% LCL of Slope (0.025): -0.361
95% UCL of Slope (0.975): 0.0756

Well 116
Number of Samples: 50
Minimum: 1.8
Maximum: 2.9
Mean: 2.456
Median: 2.5
Standard Deviation: 0.206
SEM: 0.0292

Mann-Kendall Test: No Trend
Test Value (S): -16
Critical Value (0.05): -1.645
Standard Deviation of S: 117
Standardized Value of S: -0.128
Approximate p-value: 0.449

Theil-Sen Test: No Trend
Number of Slopes: 1225
Theil-Sen Slope: 0
Theil-Sen Intercept: 2.5
M1: 497.9
M2: 727.1
95% LCL of Slope (0.025): -0.0121
95% UCL of Slope (0.975): 0.00891

Well 117
Number of Samples: 60
Minimum: 4.3
Maximum: 14.7
Mean: 7.088
Median: 6.3
Standard Deviation: 2.036
SEM: 0.263

Mann-Kendall Test: Increasing
Test Value (S): 636
Critical Value (0.05): 1.645
Standard Deviation of S: 156.6
Standardized Value of S: 4.054
Approximate p-value: 2.5121E5

Theil-Sen Test: Increasing
Number of Slopes: 1770
Theil-Sen Slope: 0.0907
Theil-Sen Intercept: 5.336
M1: 731.5
M2: 1038
95% LCL of Slope (0.025): 0.0494
95% UCL of Slope (0.975): 0.16

Well 118
Number of Samples: 56
Minimum: 8.9
Maximum: 14.9
Mean: 13.26
Median: 13.3
Standard Deviation: 0.895
SEM: 0.12

Mann-Kendall Test: No Trend
Test Value (S): -43
Critical Value (0.05): -1.645
Standard Deviation of S: 141.2
Standardized Value of S: -0.297
Approximate p-value: 0.383

Theil-Sen Test: No Trend
Number of Slopes: 1540
Theil-Sen Slope: 0
Theil-Sen Intercept: 13.3
M1: 631.6
M2: 908.4
95% LCL of Slope (0.025): -0.0356
95% UCL of Slope (0.975): 0.028

Well 119
Number of Samples: 59
Minimum: 0.0214
Maximum: 14.9
Mean: 12.73
Median: 13
Standard Deviation: 2.04
SEM: 0.266

Mann-Kendall Test: No Trend
Test Value (S): 242
Critical Value (0.05): 1.645
Standard Deviation of S: 152.6
Standardized Value of S: 1.579
Approximate p-value: 0.0572

Theil-Sen Test: No Trend
Number of Slopes: 1711
Theil-Sen Slope: 0.0397
Theil-Sen Intercept: 12.56
M1: 705.9
M2: 1005
95% LCL of Slope (0.025): -0.0088
95% UCL of Slope (0.975): 0.0794

Well 120
Number of Samples: 44
Minimum: 0.3
Maximum: 2
Mean: 0.639
Median: 0.6
Standard Deviation: 0.241
SEM: 0.0364

Mann-Kendall Test: No Trend
Test Value (S): 42
Critical Value (0.05): 1.645
Standard Deviation of S: 95.45
Standardized Value of S: 0.43
Approximate p-value: 0.334

Theil-Sen Test: No Trend
Number of Slopes: 946
Theil-Sen Slope: 0
Theil-Sen Intercept: 0.6
M1: 379.5
M2: 566.5
95% LCL of Slope (0.025): 0
95% UCL of Slope (0.975): 0.0104

Well 121
Number of Samples: 58
Minimum: 5.1
Maximum: 12.6
Mean: 7.722
Median: 7.3
Standard Deviation: 1.764
SEM: 0.232

Mann-Kendall Test: Increasing
Test Value (S): 1009
Critical Value (0.05): 1.645
Standard Deviation of S: 149
Standardized Value of S: 6.767
Approximate p-value: 6.586E-12

Theil-Sen Test: Increasing
Number of Slopes: 1653
Theil-Sen Slope: 0.229
Theil-Sen Intercept: 4.864
M1: 680.5
M2: 972.5
95% LCL of Slope (0.025): 0.185
95% UCL of Slope (0.975): 0.27

Well 122
Number of Samples: 64
Minimum: 3.6
Maximum: 10.1
Mean: 7.66
Median: 7.785
Standard Deviation: 0.988
SEM: 0.124

Mann-Kendall Test: Increasing
Test Value (S): 460
Critical Value (0.05): 1.645
Standard Deviation of S: 172.4
Standardized Value of S: 2.662
Approximate p-value: 0.00388

Theil-Sen Test: Increasing
Number of Slopes: 2016
Theil-Sen Slope: 0.0453
Theil-Sen Intercept: 7.326
M1: 839
M2: 1177
95% LCL of Slope (0.025): 0.01
95% UCL of Slope (0.975): 0.0781

Well 123
Number of Samples: 48
Minimum: 3.7
Maximum: 16.4
Mean: 7.569
Median: 6.75
Standard Deviation: 3.076
SEM: 0.444

Mann-Kendall Test: No Trend
Test Value (S): 60
Critical Value (0.05): 1.645
Standard Deviation of S: 112.5
Standardized Value of S: 0.524
Approximate p-value: 0.3

Theil-Sen Test: No Trend
Number of Slopes: 1128
Theil-Sen Slope: 0.0519
Theil-Sen Intercept: 6.185
M1: 453.8
M2: 674.2
95% LCL of Slope (0.025): -0.158
95% UCL of Slope (0.975): 0.142

Well 124
Number of Samples: 23
Minimum: 8.8
Maximum: 12
Mean: 11.04
Median: 11
Standard Deviation: 0.819
SEM: 0.171

Mann-Kendall Test: Decreasing
Test Value (S): -106
Critical Value (0.05): -1.645
Standard Deviation of S: 37.65
Standardized Value of S: -2.789
Approximate p-value: 0.00264

Theil-Sen Test: Decreasing
Number of Slopes: 253
Theil-Sen Slope: -0.189
Theil-Sen Intercept: 12.23
M1: 89.61
M2: 163.4
95% LCL of Slope (0.025): -0.309
95% UCL of Slope (0.975): -0.0561

Well 125
Number of Samples: 60
Minimum: 4.8
Maximum: 10.2
Mean: 6.745
Median: 6.5
Standard Deviation: 1.345
SEM: 0.174

Mann-Kendall Test: Increasing
Test Value (S): 995
Critical Value (0.05): 1.645
Standard Deviation of S: 156.6
Standardized Value of S: 6.347
Approximate p-value: 1.098E-10

Theil-Sen Test: Increasing
Number of Slopes: 1770
Theil-Sen Slope: 0.146
Theil-Sen Intercept: 4.946
M1: 731.5
M2: 1038
95% LCL of Slope (0.025): 0.112
95% UCL of Slope (0.975): 0.185

Well 126
Number of Samples: 62
Minimum: 7.4
Maximum: 22.4
Mean: 17.09
Median: 17.4
Standard Deviation: 3.062
SEM: 0.389

Mann-Kendall Test: No Trend
Test Value (S): 129
Critical Value (0.05): 1.645
Standard Deviation of S: 164.5
Standardized Value of S: 0.778
Approximate p-value: 0.218

Theil-Sen Test: No Trend
Number of Slopes: 1891
Theil-Sen Slope: 0.0471
Theil-Sen Intercept: 16.93
M1: 784.3
M2: 1107
95% LCL of Slope (0.025): -0.0598
95% UCL of Slope (0.975): 0.124

Well 127
Number of Samples: 37
Minimum: 8.95
Maximum: 19.2
Mean: 14.58
Median: 14.5
Standard Deviation: 2.759
SEM: 0.454

Mann-Kendall Test: No Trend
Test Value (S): -54
Critical Value (0.05): -1.645
Standard Deviation of S: 76.43
Standardized Value of S: -0.693
Approximate p-value: 0.244

Theil-Sen Test: No Trend
Number of Slopes: 666
Theil-Sen Slope: -0.0814
Theil-Sen Intercept: 14.93
M1: 258.1
M2: 407.9
95% LCL of Slope (0.025): -0.271
95% UCL of Slope (0.975): 0.202

Well 128
Number of Samples: 27
Minimum: 1.2
Maximum: 10.5
Mean: 1.911
Median: 1.6
Standard Deviation: 1.727
SEM: 0.332

Mann-Kendall Test: No Trend
Test Value (S): -69
Critical Value (0.05): -1.645
Standard Deviation of S: 46.5
Standardized Value of S: -1.462
Approximate p-value: 0.0718

Theil-Sen Test: No Trend
Number of Slopes: 351
Theil-Sen Slope: -0.0235
Theil-Sen Intercept: 1.682
M1: 129.9
M2: 221.1
95% LCL of Slope (0.025): -0.0803
95% UCL of Slope (0.975): 0

Well 129
Number of Samples: 25
Minimum: 3.4
Maximum: 11.9
Mean: 6.289
Median: 5.8
Standard Deviation: 1.807
SEM: 0.361

Mann-Kendall Test: Increasing
Test Value (S): 146
Critical Value (0.05): 1.645
Standard Deviation of S: 42.79
Standardized Value of S: 3.388
Approximate p-value: 3.5161E-4

Theil-Sen Test: Increasing
Number of Slopes: 300
Theil-Sen Slope: 0.116
Theil-Sen Intercept: 5.393
M1: 108.1
M2: 191.9
95% LCL of Slope (0.025): 0.0619
95% UCL of Slope (0.975): 0.25

Well 130
Number of Samples: 17
Minimum: 11
Maximum: 16
Mean: 13.84
Median: 14.2
Standard Deviation: 1.506
SEM: 0.365

Mann-Kendall Test: Increasing
Test Value (S): 56
Critical Value (0.05): 0.011
Standard Deviation of S: 24.23
Standardized Value of S: 2.269
Approximate p-value: 0.0116

Theil-Sen Test: Increasing
Number of Slopes: 136
Theil-Sen Slope: 0.172
Theil-Sen Intercept: 12.2
M1: 44.25
M2: 91.75
95% LCL of Slope (0.025): 0.0427
95% UCL of Slope (0.975): 0.291

Well 131
Number of Samples: 13
Minimum: 0.3
Maximum: 4.51
Mean: 3.296
Median: 3.5
Standard Deviation: 1.07
SEM: 0.297

Mann-Kendall Test: Increasing
Test Value (S): 36
Tabulated p-value: 0.015
Standard Deviation of S: 16.39
Standardized Value of S: 2.135
Approximate p-value: 0.0164

Theil-Sen Test: Increasing
Number of Slopes: 78
Theil-Sen Slope: 0.109
Theil-Sen Intercept: 2.288
M1: 22.94
M2: 55.06
95% LCL of Slope (0.025): 0.00577
95% UCL of Slope (0.975): 0.3

Well 132
Number of Samples: 9
Minimum: 8.56
Maximum: 9.86
Mean: 9.156
Median: 9.23
Standard Deviation: 0.448
SEM: 0.149

Mann-Kendall Test: No Trend
Test Value (S): -6
Tabulated p-value: 0.306
Standard Deviation of S: 9.592
Standardized Value of S: -0.521
Approximate p-value: 0.301

Theil-Sen Test: No Trend
Number of Slopes: 36
Theil-Sen Slope: -0.094
Theil-Sen Intercept: 9.391
M1: 8.6
M2: 27.4
95% LCL of Slope (0.025): -0.528
95% UCL of Slope (0.975): 0.293

Appendix E: Nitrogen-Nitrate Trend Analysis

Well 99

Number of Samples: 41
Minimum: 0.43
Maximum: 13.6
Mean: 1.329
Median: 1
Standard Deviation: 1.986
SEM: 0.31

Mann-Kendall Test: No Trend
Test Value (S): 35
Critical Value (0.05): 1.645
Standard Deviation of S: 89.01
Standardized Value of S: 0.382
Approximate p-value: 0.351

Theil-Sen Test: No Trend
Number of Slopes: 820
Theil-Sen Slope: 0.00238
Theil-Sen Intercept: 0.965
M1: 322.8
M2: 497.2
95% LCL of Slope (0.025): -0.0154
95% UCL of Slope (0.975): 0.0158

Well 100

Number of Samples: 63
Minimum: 0.28
Maximum: 1.18
Mean: 0.69
Median: 0.69
Standard Deviation: 0.186
SEM: 0.0235

Mann-Kendall Test: No Trend
Test Value (S): -32
Critical Value (0.05): -1.645
Standard Deviation of S: 168.6
Standardized Value of S: -0.184
Approximate p-value: 0.427

Theil-Sen Test: No Trend
Number of Slopes: 1953
Theil-Sen Slope: -6.173E-4
Theil-Sen Intercept: 0.702
M1: 811.3
M2: 1142
95% LCL of Slope (0.025): -0.00677
95% UCL of Slope (0.975): 0.00543

Well 101

Number of Samples: 26
Minimum: 0.12
Maximum: 0.87
Mean: 0.441
Median: 0.405
Standard Deviation: 0.159
SEM: 0.0313

Mann-Kendall Test: No Trend
Test Value (S): 52
Critical Value (0.05): 1.645
Standard Deviation of S: 45.25
Standardized Value of S: 1.127
Approximate p-value: 0.13

Theil-Sen Test: No Trend
Number of Slopes: 325
Theil-Sen Slope: 0.0057
Theil-Sen Intercept: 0.342
M1: 118.2
M2: 206.8
95% LCL of Slope (0.025): -0.00594
95% UCL of Slope (0.975): 0.0159

Well 102

Number of Samples: 47
Minimum: 0.22
Maximum: 1.48
Mean: 0.799
Median: 0.747
Standard Deviation: 0.298
SEM: 0.0434

Mann-Kendall Test: Decreasing
Test Value (S): -305
Critical Value (0.05): -1.645
Standard Deviation of S: 109
Standardized Value of S: -2.788
Approximate p-value: 0.00265

Theil-Sen Test: Decreasing
Number of Slopes: 1081
Theil-Sen Slope: -0.0145
Theil-Sen Intercept: 1.11
M1: 433.7
M2: 647.3
95% LCL of Slope (0.025): -0.0251
95% UCL of Slope (0.975): -0.00438

Well 103
Number of Samples: 81
Minimum: 0.228
Maximum: 2.17
Mean: 0.738
Median: 0.62
Standard Deviation: 0.419
SEM: 0.0465

Mann-Kendall Test: Decreasing
Test Value (S): -658
Critical Value (0.05): -1.645
Standard Deviation of S: 245.2
Standardized Value of S: -2.68
Approximate p-value: 0.00368

Theil-Sen Test: Decreasing
Number of Slopes: 3240
Theil-Sen Slope: -0.0146
Theil-Sen Intercept: 0.871
M1: 1380
M2: 1860
95% LCL of Slope (0.025): -0.0252
95% UCL of Slope (0.975): -0.00435

Well 104
Number of Samples: 83
Minimum: 0.69
Maximum: 2.19
Mean: 1.274
Median: 1.25
Standard Deviation: 0.276
SEM: 0.0303

Mann-Kendall Test: Increasing
Test Value (S): 557
Critical Value (0.05): 1.645
Standard Deviation of S: 254.1
Standardized Value of S: 2.188
Approximate p-value: 0.0143

Theil-Sen Test: Increasing
Number of Slopes: 3403
Theil-Sen Slope: 0.00912
Theil-Sen Intercept: 1.092
M1: 1452
M2: 1951
95% LCL of Slope (0.025): 5.4903E-4
95% UCL of Slope (0.975): 0.0166

Well 105
Number of Samples: 73
Minimum: 0.6
Maximum: 2.45
Mean: 1.142
Median: 1.09
Standard Deviation: 0.4
SEM: 0.0468

Mann-Kendall Test: Increasing
Test Value (S): 716
Critical Value (0.05): 1.645
Standard Deviation of S: 209.9
Standardized Value of S: 3.406
Approximate p-value: 3.2952E-4

Theil-Sen Test: Increasing
Number of Slopes: 2628
Theil-Sen Slope: 0.019
Theil-Sen Intercept: 0.8
M1: 1108
M2: 1520
95% LCL of Slope (0.025): 0.01
95% UCL of Slope (0.975): 0.0279

Well 106
Number of Samples: 50
Minimum: 0.72
Maximum: 2.42
Mean: 1.346
Median: 1.365
Standard Deviation: 0.39
SEM: 0.0552

Mann-Kendall Test: Increasing
Test Value (S): 304
Critical Value (0.05): 1.645
Standard Deviation of S: 119.5
Standardized Value of S: 2.535
Approximate p-value: 0.00562

Theil-Sen Test: Increasing
Number of Slopes: 1225
Theil-Sen Slope: 0.0413
Theil-Sen Intercept: 0.809
M1: 495.4
M2: 729.6
95% LCL of Slope (0.025): 0.00752
95% UCL of Slope (0.975): 0.0678

Well 107
Number of Samples: 48
Minimum: 0.4
Maximum: 2.21
Mean: 0.893
Median: 0.785
Standard Deviation: 0.39
SEM: 0.0562

Mann-Kendall Test: Decreasing
Test Value (S): -187
Critical Value (0.05): -1.645
Standard Deviation of S: 112.5
Standardized Value of S: -1.654
Approximate p-value: 0.0491

Theil-Sen Test: No Trend
Number of Slopes: 1128
Theil-Sen Slope: -0.0127
Theil-Sen Intercept: 0.955
M1: 453.8
M2: 674.2
95% LCL of Slope (0.025): -0.0275
95% UCL of Slope (0.975): 0.00212

Well 108
Number of Samples: 57
Minimum: 0.268
Maximum: 18.4
Mean: 2.685
Median: 1.76
Standard Deviation: 2.958
SEM: 0.392

Mann-Kendall Test: Decreasing
Test Value (S): -338
Critical Value (0.05): -1.645
Standard Deviation of S: 145.3
Standardized Value of S: -2.32
Approximate p-value: 0.0102

Theil-Sen Test: Decreasing
Number of Slopes: 1596
Theil-Sen Slope: -0.0683
Theil-Sen Intercept: 2.272
M1: 655.7
M2: 940.3
95% LCL of Slope (0.025): -0.145
95% UCL of Slope (0.975): -0.0109

Well 109
Number of Samples: 78
Minimum: 0.05
Maximum: 1.07
Mean: 0.24
Median: 0.204
Standard Deviation: 0.151
SEM: 0.0171

Mann-Kendall Test: No Trend
Test Value (S): -106
Critical Value (0.05): -1.645
Standard Deviation of S: 231.7
Standardized Value of S: -0.453
Approximate p-value: 0.325

Theil-Sen Test: No Trend
Number of Slopes: 3003
Theil-Sen Slope: -6.014E-4
Theil-Sen Intercept: 0.215
M1: 1274
M2: 1729
95% LCL of Slope (0.025): -0.00374
95% UCL of Slope (0.975): 0.0022

Well 110
Number of Samples: 5
Minimum: 0.09
Maximum: 0.33
Mean: 0.166
Median: 0.14
Standard Deviation: 0.0971
SEM: 0.0434

Mann-Kendall Test: No Trend
Test Value (S): 0
Tabulated p-value: 0.592
Standard Deviation of S: 4.082
Standardized Value of S: N/A
Approximate p-value: N/A

Theil-Sen Test: No Trend
Number of Slopes: 10
Theil-Sen Slope: 0.00378
Theil-Sen Intercept: 0.128
M1: 0.999
M2: 9.001
95% LCL of Slope (0.025): -0.0407
95% UCL of Slope (0.975): 0.0418

Well 111
Number of Samples: 79
Minimum: 0.232
Maximum: 2.48
Mean: 1.628
Median: 1.86
Standard Deviation: 0.648
SEM: 0.0729

Mann-Kendall Test: No Trend
Test Value (S): 115
Critical Value (0.05): 1.645
Standard Deviation of S: 236.2
Standardized Value of S: 0.483
Approximate p-value: 0.315

Theil-Sen Test: No Trend
Number of Slopes: 3081
Theil-Sen Slope: 0.00365
Theil-Sen Intercept: 1.791
M1: 1309
M2: 1772
95% LCL of Slope (0.025): -0.0114
95% UCL of Slope (0.975): 0.0196

Well 112
Number of Samples: 87
Minimum: 0.99
Maximum: 1.92
Mean: 1.441
Median: 1.46
Standard Deviation: 0.197
SEM: 0.0212

Mann-Kendall Test: Increasing
Test Value (S): 1759
Critical Value (0.05): 1.645
Standard Deviation of S: 272.6
Standardized Value of S: 6.45
Approximate p-value: 5.588E-11

Theil-Sen Test: Increasing
Number of Slopes: 3741
Theil-Sen Slope: 0.0161
Theil-Sen Intercept: 1.115
M1: 1603
M2: 2138
95% LCL of Slope (0.025): 0.0118
95% UCL of Slope (0.975): 0.0203

Well 113
Number of Samples: 83
Minimum: 0.66
Maximum: 3.49
Mean: 1.794
Median: 1.78
Standard Deviation: 0.452
SEM: 0.0496

Mann-Kendall Test: No Trend
Test Value (S): -29
Critical Value (0.05): -1.645
Standard Deviation of S: 254.2
Standardized Value of S: -0.11
Approximate p-value: 0.456

Theil-Sen Test: No Trend
Number of Slopes: 3403
Theil-Sen Slope: -0.00108
Theil-Sen Intercept: 1.799
M1: 1452
M2: 1951
95% LCL of Slope (0.025): -0.0125
95% UCL of Slope (0.975): 0.0115

Well 114
Number of Samples: 84
Minimum: 0.34
Maximum: 10.6
Mean: 1.396
Median: 1.28
Standard Deviation: 1.037
SEM: 0.113

Mann-Kendall Test: Increasing
Test Value (S): 857
Critical Value (0.05): 1.645
Standard Deviation of S: 258.5
Standardized Value of S: 3.311
Approximate p-value: 4.6485E-4

Theil-Sen Test: Increasing
Number of Slopes: 3486
Theil-Sen Slope: 0.00599
Theil-Sen Intercept: 1.175
M1: 1490
M2: 1996
95% LCL of Slope (0.025): 0.00268
95% UCL of Slope (0.975): 0.00943

Well 115
Number of Samples: 66
Minimum: 0.27
Maximum: 4.4
Mean: 1.25
Median: 0.94
Standard Deviation: 0.935
SEM: 0.115

Mann-Kendall Test: Decreasing
Test Value (S): -306
Critical Value (0.05): -1.645
Standard Deviation of S: 180.7
Standardized Value of S: -1.688
Approximate p-value: 0.0457

Theil-Sen Test: No Trend
Number of Slopes: 2145
Theil-Sen Slope: -0.0219
Theil-Sen Intercept: 1.374
M1: 895.4
M2: 1250
95% LCL of Slope (0.025): -0.0549
95% UCL of Slope (0.975): 0.0035

Well 116
Number of Samples: 70
Minimum: 0.08
Maximum: 0.2
Mean: 0.131
Median: 0.13
Standard Deviation: 0.0232
SEM: 0.00277

Mann-Kendall Test: Increasing
Test Value (S): 1102
Critical Value (0.05): 1.645
Standard Deviation of S: 196.1
Standardized Value of S: 5.615
Approximate p-value: 9.8138E-9

Theil-Sen Test: Increasing
Number of Slopes: 2415
Theil-Sen Slope: 0.00211
Theil-Sen Intercept: 0.104
M1: 1015
M2: 1400
95% LCL of Slope (0.025): 0.00133
95% UCL of Slope (0.975): 0.00284

Well 117
Number of Samples: 84
Minimum: 0.01
Maximum: 2.05
Mean: 0.548
Median: 0.495
Standard Deviation: 0.326
SEM: 0.0355

Mann-Kendall Test: Increasing
Test Value (S): 1328
Critical Value (0.05): 1.645
Standard Deviation of S: 258.8
Standardized Value of S: 5.127
Approximate p-value: 1.4709E-7

Theil-Sen Test: Increasing
Number of Slopes: 3486
Theil-Sen Slope: 0.0178
Theil-Sen Intercept: 0.248
M1: 1489
M2: 1997
95% LCL of Slope (0.025): 0.0123
95% UCL of Slope (0.975): 0.0238

Well 118
Number of Samples: 80
Minimum: 0.007
Maximum: 0.26
Mean: 0.141
Median: 0.131
Standard Deviation: 0.0493
SEM: 0.00551

Mann-Kendall Test: No Trend
Test Value (S): -25
Critical Value (0.05): -1.645
Standard Deviation of S: 240.4
Standardized Value of S: -0.0998
Approximate p-value: 0.46

Theil-Sen Test: No Trend
Number of Slopes: 3160
Theil-Sen Slope: 0
Theil-Sen Intercept: 0.131
M1: 1344
M2: 1816
95% LCL of Slope (0.025): -0.0016
95% UCL of Slope (0.975): 0.00129

Well 119
Number of Samples: 83
Minimum: 0.07
Maximum: 2.43
Mean: 0.533
Median: 0.35
Standard Deviation: 0.412
SEM: 0.0452

Mann-Kendall Test: Increasing
Test Value (S): 719
Critical Value (0.05): 1.645
Standard Deviation of S: 254.2
Standardized Value of S: 2.824
Approximate p-value: 0.00237

Theil-Sen Test: Increasing
Number of Slopes: 3403
Theil-Sen Slope: 0.00997
Theil-Sen Intercept: 0.21
M1: 1452
M2: 1951
95% LCL of Slope (0.025): 0.00263
95% UCL of Slope (0.975): 0.0212

Well 120
Number of Samples: 44
Minimum: 0.09
Maximum: 0.94
Mean: 0.207
Median: 0.185
Standard Deviation: 0.135
SEM: 0.0204

Mann-Kendall Test: No Trend
Test Value (S): -101
Critical Value (0.05): -1.645
Standard Deviation of S: 98.69
Standardized Value of S: -1.013
Approximate p-value: 0.155

Theil-Sen Test: No Trend
Number of Slopes: 946
Theil-Sen Slope: -0.00356
Theil-Sen Intercept: 0.215
M1: 376.3
M2: 0.215
95% LCL of Slope (0.025): -0.0109
95% UCL of Slope (0.975): 0.00332

Well 121
Number of Samples: 82
Minimum: 0.516
Maximum: 2.53
Mean: 1.324
Median: 1.29
Standard Deviation: 0.383
SEM: 0.0423

Mann-Kendall Test: No Trend
Test Value (S): 198
Critical Value (0.05): 1.645
Standard Deviation of S: 249.7
Standardized Value of S: 0.789
Approximate p-value: 0.215

Theil-Sen Test: No Trend
Number of Slopes: 3321
Theil-Sen Slope: 0.00455
Theil-Sen Intercept: 1.195
M1: 1416
M2: 1905
95% LCL of Slope (0.025): -0.00671
95% UCL of Slope (0.975): 0.0144

Well 122
Number of Samples: 92
Minimum: 0.08
Maximum: 3.16
Mean: 1.816
Median: 1.795
Standard Deviation: 0.704
SEM: 0.0734

Mann-Kendall Test: Decreasing
Test Value (S): -1777
Critical Value (0.05): -1.645
Standard Deviation of S: 296.5
Standardized Value of S: -5.991
Approximate p-value: 1.0446E-9

Theil-Sen Test: Decreasing
Number of Slopes: 4186
Theil-Sen Slope: -0.0544
Theil-Sen Intercept: 2.668
M1: 1802
M2: 2384
95% LCL of Slope (0.025): -0.0675
95% UCL of Slope (0.975): -0.0403

Well 123
Number of Samples: 72
Minimum: 0.29
Maximum: 3.08
Mean: 0.891
Median: 0.745
Standard Deviation: 0.547
SEM: 0.0645

Mann-Kendall Test: No Trend
Test Value (S): -187
Critical Value (0.05): -1.645
Standard Deviation of S: 205.7
Standardized Value of S: -0.904
Approximate p-value: 0.183

Theil-Sen Test: No Trend
Number of Slopes: 2556
Theil-Sen Slope: -0.00726
Theil-Sen Intercept: 0.876
M1: 1076
M2: 1480
95% LCL of Slope (0.025): -0.0201
95% UCL of Slope (0.975): 0.0057

Well 124
Number of Samples: 23
Minimum: 0.01
Maximum: 2.05
Mean: 1.455
Median: 1.48
Standard Deviation: 0.386
SEM: 0.0806

Mann-Kendall Test: Decreasing
Test Value (S): -93
Critical Value (0.05): -1.645
Standard Deviation of S: 37.84
Standardized Value of S: -2.431
Approximate p-value: 0.00752

Theil-Sen Test: Decreasing
Number of Slopes: 253
Theil-Sen Slope: -0.0836
Theil-Sen Intercept: 2.024
M1: 89.42
M2: 163.6
95% LCL of Slope (0.025): -0.15
95% UCL of Slope (0.975): -0.0335

Well 125
Number of Samples: 85
Minimum: 0.09
Maximum: 2.47
Mean: 0.703
Median: 0.65
Standard Deviation: 0.296
SEM: 0.0321

Mann-Kendall Test: No Trend
Test Value (S): -246
Critical Value (0.05): -1.645
Standard Deviation of S: 263.4
Standardized Value of S: -0.93
Approximate p-value: 0.176

Theil-Sen Test: No Trend
Number of Slopes: 3570
Theil-Sen Slope: -0.00236
Theil-Sen Intercept: 0.692
M1: 1527
M2: 2043
95% LCL of Slope (0.025): -0.00825
95% UCL of Slope (0.975): 0.00241

Well 126
Number of Samples: 98
Minimum: 0.19
Maximum: 2.85
Mean: 1.384
Median: 1.39
Standard Deviation: 0.597
SEM: 0.0604

Mann-Kendall Test: Decreasing
Test Value (S): -1875
Critical Value (0.05): -1.645
Standard Deviation of S: 325.8
Standardized Value of S: -5.762
Approximate p-value: 4.1627E-9

Theil-Sen Test: Decreasing
Number of Slopes: 4753
Theil-Sen Slope: -0.0376
Theil-Sen Intercept: 2.001
M1: 2057
M2: 2696
95% LCL of Slope (0.025): -0.0488
95% UCL of Slope (0.975): -0.0263

Well 127
Number of Samples: 55
Minimum: 0.3
Maximum: 2.32
Mean: 1.033
Median: 1.1
Standard Deviation: 0.419
SEM: 0.0565

Mann-Kendall Test: Decreasing
Test Value (S): -703
Critical Value (0.05): -1.645
Standard Deviation of S: 137.7
Standardized Value of S: -5.096
Approximate p-value: 1.7303E-7

Theil-Sen Test: Decreasing
Number of Slopes: 1485
Theil-Sen Slope: -0.048
Theil-Sen Intercept: 1.472
M1: 607.5
M2: 877.5
95% LCL of Slope (0.025): -0.0606
95% UCL of Slope (0.975): -0.0362

Well 128
Number of Samples: 49
Minimum: 0.029
Maximum: 1.58
Mean: 0.235
Median: 0.16
Standard Deviation: 0.235
SEM: 0.0336

Mann-Kendall Test: No Trend
Test Value (S): 55
Critical Value (0.05): 1.645
Standard Deviation of S: 115.8
Standardized Value of S: 0.466
Approximate p-value: 0.32

Theil-Sen Test: No Trend
Number of Slopes: 1176
Theil-Sen Slope: 7.0181E-4
Theil-Sen Intercept: 0.156
M1: 474.5
M2: 701.5
95% LCL of Slope (0.025): -0.00304
95% UCL of Slope (0.975): 0.00357

Well 129
Number of Samples: 48
Minimum: 0.316
Maximum: 1.74
Mean: 0.834
Median: 0.799
Standard Deviation: 0.291
SEM: 0.042

Mann-Kendall Test: No Trend
Test Value (S): -153
Critical Value (0.05): -1.645
Standard Deviation of S: 112.5
Standardized Value of S: -1.351
Approximate p-value: 0.0883

Theil-Sen Test: No Trend
Number of Slopes: 1128
Theil-Sen Slope: -0.0133
Theil-Sen Intercept: 0.893
M1: 453.7
M2: 674.3
95% LCL of Slope (0.025): -0.0304
95% UCL of Slope (0.975): 0.00541

Well 130
Number of Samples: 38
Minimum: 0.46
Maximum: 1.68
Mean: 1.035
Median: 0.902
Standard Deviation: 0.325
SEM: 0.0527

Mann-Kendall Test: Decreasing
Test Value (S): -287
Critical Value (0.05): -1.645
Standard Deviation of S: 79.53
Standardized Value of S: -3.596
Approximate p-value: 1.6149E-4

Theil-Sen Test: Decreasing
Number of Slopes: 703
Theil-Sen Slope: -0.051
Theil-Sen Intercept: 1.268
M1: 273.6
M2: 429.4
95% LCL of Slope (0.025): -0.0668
95% UCL of Slope (0.975): -0.0265

Well 131
Number of Samples: 37
Minimum: 0.164
Maximum: 0.63
Mean: 0.326
Median: 0.304
Standard Deviation: 0.122
SEM: 0.02

Mann-Kendall Test: Increasing
Test Value (S): 217
Critical Value (0.05): 1.645
Standard Deviation of S: 76.45
Standardized Value of S: 2.825
Approximate p-value: 0.00236

Theil-Sen Test: Increasing
Number of Slopes: 666
Theil-Sen Slope: 0.0106
Theil-Sen Intercept: 0.232
M1: 258.1
M2: 407.9
95% LCL of Slope (0.025): 0.00452
95% UCL of Slope (0.975): 0.0165

Well 132
Number of Samples: 23
Minimum: 0.86
Maximum: 1.24
Mean: 1.087
Median: 1.1
Standard Deviation: 0.0926
SEM: 0.0193

Mann-Kendall Test: No Trend
Test Value (S): 24
Critical Value (0.05): 1.645
Standard Deviation of S: 37.73
Standardized Value of S: 0.61
Approximate p-value: 0.271

Theil-Sen Test: No Trend
Number of Slopes: 253
Theil-Sen Slope: 0.00275
Theil-Sen Intercept: 1.086
M1: 89.53
M2: 163.5
95% LCL of Slope (0.025): -0.0113
95% UCL of Slope (0.975): 0.0203

Appendix F: Electrical Conductivity Trend Analysis

Well 99

Number of Samples: 41
Minimum: 119.9
Maximum: 425
Mean: 254.1
Median: 240
Standard Deviation: 76.8
SEM: 11.99

Mann-Kendall Test: Increasing
Test Value (S): 345
Critical Value (0.05): 1.645
Standard Deviation of S: 89
Standardized Value of S: 3.865
Approximate p-value: 5.5506E-5

Theil-Sen Test: Increasing
Number of Slopes: 820
Theil-Sen Slope: 5.483
Theil-Sen Intercept: 159.1
M1: 322.8
M2: 497.2
95% LCL of Slope (0.025): 3.355
95% UCL of Slope (0.975): 8.38

Well 100

Number of Samples: 64
Minimum: 130
Maximum: 379
Mean: 194.3
Median: 185
Standard Deviation: 51.29
SEM: 6.411

Mann-Kendall Test: Increasing
Test Value (S): 993
Critical Value (0.05): 1.645
Standard Deviation of S: 172.4
Standardized Value of S: 5.755
Approximate p-value: 4.3229E-9

Theil-Sen Test: Increasing
Number of Slopes: 2016
Theil-Sen Slope: 3.464
Theil-Sen Intercept: 119.2
M1: 839.1
M2: 1177
95% LCL of Slope (0.025): 2.473
95% UCL of Slope (0.975): 4.68

Well 101

Number of Samples: 26
Minimum: 100
Maximum: 230
Mean: 132.1
Median: 125
Standard Deviation: 29.37
SEM: 5.76

Mann-Kendall Test: Increasing
Test Value (S): 81
Critical Value (0.05): 1.645
Standard Deviation of S: 45.07
Standardized Value of S: 1.775
Approximate p-value: 0.038

Theil-Sen Test: No Trend
Number of Slopes: 325
Theil-Sen Slope: 1.992
Theil-Sen Intercept: 103.1
M1: 118.3
M2: 206.7
95% LCL of Slope (0.025): 0
95% UCL of Slope (0.975): 4.879

Well 102

Number of Samples: 46
Minimum: 130
Maximum: 282
Mean: 213.2
Median: 223.5
Standard Deviation: 43.3
SEM: 6.385

Mann-Kendall Test: Increasing
Test Value (S): 551
Critical Value (0.05): 1.645
Standard Deviation of S: 105.5
Standardized Value of S: 5.215
Approximate p-value: 9.2157E-8

Theil-Sen Test: Increasing
Number of Slopes: 1035
Theil-Sen Slope: 3.837
Theil-Sen Intercept: 145.1
M1: 414.1
M2: 620.9
95% LCL of Slope (0.025): 2.838
95% UCL of Slope (0.975): 5.306

Well 103
Number of Samples: 81
Minimum: 75
Maximum: 536
Mean: 142.3
Median: 126
Standard Deviation: 69.45
SEM: 7.717

Mann-Kendall Test: Increasing
Test Value (S): 653
Critical Value (0.05): 1.645
Standard Deviation of S: 245
Standardized Value of S: 2.661
Approximate p-value: 0.0039

Theil-Sen Test: Increasing
Number of Slopes: 3240
Theil-Sen Slope: 1.628
Theil-Sen Intercept: 98.08
M1: 1380
M2: 1860
95% LCL of Slope (0.025): 0.425
95% UCL of Slope (0.975): 3.159

Well 104
Number of Samples: 83
Minimum: 1.45
Maximum: 347
Mean: 184.5
Median: 170
Standard Deviation: 53.88
SEM: 5.915

Mann-Kendall Test: Increasing
Test Value (S): 2252
Critical Value (0.05): 1.645
Standard Deviation of S: 253.9
Standardized Value of S: 8.866
Approximate p-value: 0

Theil-Sen Test: Increasing
Number of Slopes: 3403
Theil-Sen Slope: 5.684
Theil-Sen Intercept: 71.33
M1: 1453
M2: 1950
95% LCL of Slope (0.025): 4.772
95% UCL of Slope (0.975): 6.487

Well 105
Number of Samples: 73
Minimum: 120
Maximum: 305
Mean: 188.3
Median: 180
Standard Deviation: 53.05
SEM: 6.209

Mann-Kendall Test: Increasing
Test Value (S): 1598
Critical Value (0.05): 1.645
Standard Deviation of S: 209.6
Standardized Value of S: 7.621
Approximate p-value: 1.266E-14

Theil-Sen Test: Increasing
Number of Slopes: 2628
Theil-Sen Slope: 6.06
Theil-Sen Intercept: 87.59
M1: 1109
M2: 1519
95% LCL of Slope (0.025): 5.333
95% UCL of Slope (0.975): 6.856

Well 106
Number of Samples: 50
Minimum: 120
Maximum: 271
Mean: 171.2
Median: 160
Standard Deviation: 40.04
SEM: 5.662

Mann-Kendall Test: Increasing
Test Value (S): 558
Critical Value (0.05): 1.645
Standard Deviation of S: 119.2
Standardized Value of S: 4.672
Approximate p-value: 1.4942E-6

Theil-Sen Test: Increasing
Number of Slopes: 1225
Theil-Sen Slope: 6.455
Theil-Sen Intercept: 72.95
M1: 495.7
M2: 729.3
95% LCL of Slope (0.025): 3.868
95% UCL of Slope (0.975): 9.23

Well 107
Number of Samples: 48
Minimum: 120
Maximum: 227
Mean: 152.3
Median: 142
Standard Deviation: 23.97
SEM: 3.46

Mann-Kendall Test: Increasing
Test Value (S): 191
Critical Value (0.05): 1.645
Standard Deviation of S: 111.4
Standardized Value of S: 1.705
Approximate p-value: 0.0441

Theil-Sen Test: No Trend
Number of Slopes: 1128
Theil-Sen Slope: 1.173
Theil-Sen Intercept: 126.3
M1: 454.8
M2: 673.2
95% LCL of Slope (0.025): 0
95% UCL of Slope (0.975): 2.685

Well 108
Number of Samples: 57
Minimum: 75
Maximum: 367
Mean: 180.1
Median: 175
Standard Deviation: 60.38
SEM: 7.998

Mann-Kendall Test: Increasing
Test Value (S): 271
Critical Value (0.05): 1.645
Standard Deviation of S: 145.2
Standardized Value of S: 1.86
Approximate p-value: 0.0315

Theil-Sen Test: Increasing
Number of Slopes: 1596
Theil-Sen Slope: 2.824
Theil-Sen Intercept: 153.8
M1: 655.7
M2: 940.3
95% LCL of Slope (0.025): 0
95% UCL of Slope (0.975): 5.398

Well 109
Number of Samples: 77
Minimum: 70
Maximum: 210
Mean: 123.6
Median: 125
Standard Deviation: 37.41
SEM: 4.263

Mann-Kendall Test: Increasing
Test Value (S): 824
Critical Value (0.05): 1.645
Standard Deviation of S: 227.1
Standardized Value of S: 3.625
Approximate p-value: 1.4472E-4

Theil-Sen Test: Increasing
Number of Slopes: 2926
Theil-Sen Slope: 2.169
Theil-Sen Intercept: 85.18
M1: 1240
M2: 1686
95% LCL of Slope (0.025): 1.173
95% UCL of Slope (0.975): 2.901

Well 110
Number of Samples: 5
Minimum: 43
Maximum: 240
Mean: 84.2
Median: 45
Standard Deviation: 87.11
SEM: 38.96

Mann-Kendall Test: No Trend
Test Value (S): 7
Critical Value (0.05): 0.117
Standard Deviation of S: 3.958
Standardized Value of S: 1.516
Approximate p-value: 0.0648

Theil-Sen Test: No Trend
Number of Slopes: 10
Theil-Sen Slope: 1.779
Theil-Sen Intercept: 39.22
M1: 1.121
M2: 8.879
95% LCL of Slope (0.025): -0.814
95% UCL of Slope (0.975): 49.06

Well 111
Number of Samples: 79
Minimum: 110
Maximum: 451
Mean: 283
Median: 260
Standard Deviation: 97.66
SEM: 10.99

Mann-Kendall Test: Increasing
Test Value (S): 1313
Critical Value (0.05): 1.645
Standard Deviation of S: 236.2
Standardized Value of S: 5.556
Approximate p-value: 1.3829E-8

Theil-Sen Test: Increasing
Number of Slopes: 3081
Theil-Sen Slope: 9.763
Theil-Sen Intercept: 75.76
M1: 1309
M2: 1772
95% LCL of Slope (0.025): 6.89
95% UCL of Slope (0.975): 12.16

Well 112
Number of Samples: 86
Minimum: 3.4
Maximum: 398
Mean: 255.9
Median: 238.5
Standard Deviation: 69.74
SEM: 7.52

Mann-Kendall Test: Increasing
Test Value (S): 2408
Critical Value (0.05): 1.645
Standard Deviation of S: 267.6
Standardized Value of S: 8.994
Approximate p-value: 0

Theil-Sen Test: Increasing
Number of Slopes: 3655
Theil-Sen Slope: 7.246
Theil-Sen Intercept: 139.8
M1: 1565
M2: 2090
95% LCL of Slope (0.025): 5.979
95% UCL of Slope (0.975): 8.207

Well 113
Number of Samples: 82
Minimum: 3.4
Maximum: 482
Mean: 245.9
Median: 258.5
Standard Deviation: 58.87
SEM: 6.501

Mann-Kendall Test: Increasing
Test Value (S): 1617
Critical Value (0.05): 1.645
Standard Deviation of S: 249.6
Standardized Value of S: 6.474
Approximate p-value: 4.761E-11

Theil-Sen Test: Increasing
Number of Slopes: 3321
Theil-Sen Slope: 4.515
Theil-Sen Intercept: 177.3
M1: 1416
M2: 1905
95% LCL of Slope (0.025): 3.62
95% UCL of Slope (0.975): 5.418

Well 114
Number of Samples: 84
Minimum: 30
Maximum: 315
Mean: 233.2
Median: 200
Standard Deviation: 60.75
SEM: 6.629

Mann-Kendall Test: Increasing
Test Value (S): 2175
Critical Value (0.05): 1.645
Standard Deviation of S: 258.5
Standardized Value of S: 8.41
Approximate p-value: 0

Theil-Sen Test: Increasing
Number of Slopes: 3486
Theil-Sen Slope: 5.854
Theil-Sen Intercept: 97.64
M1: 1490
M2: 1996
95% LCL of Slope (0.025): 4.499
95% UCL of Slope (0.975): 6.818

Well 115
Number of Samples: 65
Minimum: 80
Maximum: 273
Mean: 169.9
Median: 181
Standard Deviation: 43.96
SEM: 5.453

Mann-Kendall Test: No Trend
Test Value (S): -54
Critical Value (0.05): -1.645
Standard Deviation of S: 176.5
Standardized Value of S: -0.3
Approximate p-value: 0.382

Theil-Sen Test: No Trend
Number of Slopes: 2080
Theil-Sen Slope: -0.0823
Theil-Sen Intercept: 182.3
M1: 867
M2: 1213
95% LCL of Slope (0.025): -1.242
95% UCL of Slope (0.975): 0.994

Well 116
Number of Samples: 71
Minimum: 40
Maximum: 140
Mean: 72.82
Median: 65
Standard Deviation: 20.62
SEM: 2.447

Mann-Kendall Test: Increasing
Test Value (S): 1222
Critical Value (0.05): 1.645
Standard Deviation of S: 199.8
Standardized Value of S: 6.111
Approximate p-value: 4.950E-10

Theil-Sen Test: Increasing
Number of Slopes: 2485
Theil-Sen Slope: 1.661
Theil-Sen Intercept: 45.07
M1: 1047
M2: 1438
95% LCL of Slope (0.025): 1.15
95% UCL of Slope (0.975): 2.359

Well 117
Number of Samples: 85
Minimum: 2.51
Maximum: 439
Mean: 208.9
Median: 216
Standard Deviation: 79.03
SEM: 8.572

Mann-Kendall Test: Increasing
Test Value (S): 1784
Critical Value (0.05): 1.645
Standard Deviation of S: 263.3
Standardized Value of S: 6.809
Approximate p-value: 4.930E-12

Theil-Sen Test: Increasing
Number of Slopes: 3570
Theil-Sen Slope: 7.131
Theil-Sen Intercept: 117.9
M1: 1527
M2: 2043
95% LCL of Slope (0.025): 5.864
95% UCL of Slope (0.975): 8.112

Well 118
Number of Samples: 79
Minimum: 19
Maximum: 315
Mean: 232.9
Median: 270
Standard Deviation: 57.92
SEM: 6.517

Mann-Kendall Test: Increasing
Test Value (S): 1506
Critical Value (0.05): 1.645
Standard Deviation of S: 236
Standardized Value of S: 6.377
Approximate p-value: 9.045E-11

Theil-Sen Test: Increasing
Number of Slopes: 3081
Theil-Sen Slope: 5.248
Theil-Sen Intercept: 174.2
M1: 1309
M2: 1772
95% LCL of Slope (0.025): 3.774
95% UCL of Slope (0.975): 6.363

Well 119
Number of Samples: 83
Minimum: 118
Maximum: 344
Mean: 230.3
Median: 251
Standard Deviation: 60.88
SEM: 6.682

Mann-Kendall Test: Increasing
Test Value (S): 2056
Critical Value (0.05): 1.645
Standard Deviation of S: 254.1
Standardized Value of S: 8.089
Approximate p-value: 3.331E-16

Theil-Sen Test: Increasing
Number of Slopes: 3403
Theil-Sen Slope: 6.831
Theil-Sen Intercept: 155.4
M1: 1453
M2: 1950
95% LCL of Slope (0.025): 5.893
95% UCL of Slope (0.975): 7.718

Well 120
Number of Samples: 44
Minimum: 10
Maximum: 170
Mean: 35.83
Median: 30
Standard Deviation: 32.74
SEM: 4.936

Mann-Kendall Test: No Trend
Test Value (S): 124
Critical Value (0.05): 1.645
Standard Deviation of S: 94.96
Standardized Value of S: 1.295
Approximate p-value: 0.0976

Theil-Sen Test: No Trend
Number of Slopes: 946
Theil-Sen Slope: 0
Theil-Sen Intercept: 30
M1: 379.9
M2: 566.1
95% LCL of Slope (0.025): 0
95% UCL of Slope (0.975): 1.003

Well 121
Number of Samples: 81
Minimum: 2.5
Maximum: 315
Mean: 203.6
Median: 195
Standard Deviation: 59.88
SEM: 6.653

Mann-Kendall Test: Increasing
Test Value (S): 2066
Critical Value (0.05): 1.645
Standard Deviation of S: 245.1
Standardized Value of S: 8.426
Approximate p-value: 0

Theil-Sen Test: Increasing
Number of Slopes: 3240
Theil-Sen Slope: 6.232
Theil-Sen Intercept: 104.7
M1: 1380
M2: 1860
95% LCL of Slope (0.025): 5.569
95% UCL of Slope (0.975): 6.863

Well 122
Number of Samples: 92
Minimum: 24
Maximum: 340
Mean: 185.4
Median: 170
Standard Deviation: 57.64
SEM: 6.01

Mann-Kendall Test: Increasing
Test Value (S): 2391
Critical Value (0.05): 1.645
Standard Deviation of S: 296.2
Standardized Value of S: 8.069
Approximate p-value: 3.331E-16

Theil-Sen Test: Increasing
Number of Slopes: 4186
Theil-Sen Slope: 5.138
Theil-Sen Intercept: 86.25
M1: 1803
M2: 2383
95% LCL of Slope (0.025): 4.375
95% UCL of Slope (0.975): 5.92

Well 123
Number of Samples: 72
Minimum: 2.3
Maximum: 331
Mean: 161.3
Median: 170.2
Standard Deviation: 48.99
SEM: 5.774

Mann-Kendall Test: Increasing
Test Value (S): 739
Critical Value (0.05): 1.645
Standard Deviation of S: 205.6
Standardized Value of S: 3.589
Approximate p-value: 1.6576E-4

Theil-Sen Test: Increasing
Number of Slopes: 2556
Theil-Sen Slope: 2.503
Theil-Sen Intercept: 124.9
M1: 1077
M2: 1479
95% LCL of Slope (0.025): 1.135
95% UCL of Slope (0.975): 3.931

Well 124
Number of Samples: 23
Minimum: 145
Maximum: 185
Mean: 166.1
Median: 169
Standard Deviation: 12.19
SEM: 2.541

Mann-Kendall Test: Decreasing
Test Value (S): -68
Critical Value (0.05): -1.645
Standard Deviation of S: 37.59
Standardized Value of S: -1.783
Approximate p-value: 0.0373

Theil-Sen Test: No Trend
Number of Slopes: 253
Theil-Sen Slope: -2.488
Theil-Sen Intercept: 185.2
M1: 89.67
M2: 163.3
95% LCL of Slope (0.025): -5.735
95% UCL of Slope (0.975): 0

Well 125
Number of Samples: 85
Minimum: 90
Maximum: 282
Mean: 154.1
Median: 158
Standard Deviation: 42.34
SEM: 4.593

Mann-Kendall Test: Increasing
Test Value (S): 1928
Critical Value (0.05): 1.645
Standard Deviation of S: 263.3
Standardized Value of S: 7.319
Approximate p-value: 1.246E-13

Theil-Sen Test: Increasing
Number of Slopes: 3570
Theil-Sen Slope: 4.335
Theil-Sen Intercept: 80.62
M1: 1527
M2: 2043
95% LCL of Slope (0.025): 3.565
95% UCL of Slope (0.975): 5.146

Well 126
Number of Samples: 94
Minimum: 125
Maximum: 620
Mean: 380.3
Median: 335.5
Standard Deviation: 121.7
SEM: 12.55

Mann-Kendall Test: Increasing
Test Value (S): 2027
Critical Value (0.05): 1.645
Standard Deviation of S: 306
Standardized Value of S: 6.62
Approximate p-value: 1.792-11

Theil-Sen Test: Increasing
Number of Slopes: 4371
Theil-Sen Slope: 9.71
Theil-Sen Intercept: 172.8
M1: 1886
M2: 2485
95% LCL of Slope (0.025): 7.826
95% UCL of Slope (0.975): 11.7

Well 127
Number of Samples: 55
Minimum: 2.5
Maximum: 344
Mean: 249.7
Median: 250
Standard Deviation: 56.33
SEM: 7.595

Mann-Kendall Test: Increasing
Test Value (S): 587
Critical Value (0.05): 1.645
Standard Deviation of S: 137.7
Standardized Value of S: 4.256
Approximate p-value: 1.0383E-5

Theil-Sen Test: Increasing
Number of Slopes: 1485
Theil-Sen Slope: 4.289
Theil-Sen Intercept: 216.8
M1: 607.6
M2: 877.4
95% LCL of Slope (0.025): 2.739
95% UCL of Slope (0.975): 6.733

Well 128
Number of Samples: 48
Minimum: 32.2
Maximum: 459
Mean: 77.52
Median: 61.7
Standard Deviation: 63.08
SEM: 9.105

Mann-Kendall Test: No Trend
Test Value (S): 160
Critical Value (0.05): 1.645
Standard Deviation of S: 112.3
Standardized Value of S: 1.416
Approximate p-value: 0.0784

Theil-Sen Test: No Trend
Number of Slopes: 1128
Theil-Sen Slope: 1
Theil-Sen Intercept: 55.58
M1: 454
M2: 674
95% LCL of Slope (0.025): -0.624
95% UCL of Slope (0.975): 2.846

Well 129
Number of Samples: 48
Minimum: 99.3
Maximum: 471
Mean: 181.5
Median: 178.8
Standard Deviation: 56.37
SEM: 8.136

Mann-Kendall Test: No Trend
Test Value (S): 69
Critical Value (0.05): 1.645
Standard Deviation of S: 112.5
Standardized Value of S: 0.605
Approximate p-value: 0.273

Theil-Sen Test: No Trend
Number of Slopes: 1128
Theil-Sen Slope: 0.849
Theil-Sen Intercept: 172.7
M1: 453.8
M2: 674.2
95% LCL of Slope (0.025): -1.51
95% UCL of Slope (0.975): 3.022

Well 130
Number of Samples: 38
Minimum: 165
Maximum: 390
Mean: 278.2
Median: 285
Standard Deviation: 41.77
SEM: 6.777

Mann-Kendall Test: No Trend
Test Value (S): 8
Critical Value (0.05): 1.645
Standard Deviation of S: 79.39
Standardized Value of S: 0.0882
Approximate p-value: 0.465

Theil-Sen Test: No Trend
Number of Slopes: 703
Theil-Sen Slope: 0
Theil-Sen Intercept: 285
M1: 273.7
M2: 429.3
95% LCL of Slope (0.025): -2.022
95% UCL of Slope (0.975): 2.234

Well 131
Number of Samples: 37
Minimum: 33.6
Maximum: 272
Mean: 124.9
Median: 122
Standard Deviation: 32.98
SEM: 5.422

Mann-Kendall Test: No Trend
Test Value (S): -35
Critical Value (0.05): -1.645
Standard Deviation of S: 76.44
Standardized Value of S: -0.445
Approximate p-value: 0.328

Theil-Sen Test: No Trend
Number of Slopes: 666
Theil-Sen Slope: -0.479
Theil-Sen Intercept: 125.2
M1: 258.1
M2: 407.9
95% LCL of Slope (0.025): -2.359
95% UCL of Slope (0.975): 1.296

Well 132
Number of Samples: 23
Minimum: 110
Maximum: 394
Mean: 357.6
Median: 372
Standard Deviation: 56.33
SEM: 11.75

Mann-Kendall Test: Increasing
Test Value (S): 111
Critical Value (0.05): 1.645
Standard Deviation of S: 37.78
Standardized Value of S: 2.912
Approximate p-value: 0.0018

Theil-Sen Test: Increasing
Number of Slopes: 253
Theil-Sen Slope: 3.015
Theil-Sen Intercept: 356.9
M1: 89.48
M2: 163.5
95% LCL of Slope (0.025): 0.927
95% UCL of Slope (0.975): 5.349