Stillwater Township

Stream Surface Water Sampling – Chemical Data and Biological Analysis through Macroinvertebrates

Prepared For
The Stillwater Township
Environmental Commission

By
Steve Grodsky

Sampling Stations and Dates

Sampling stations were selected in four watersheds within Stillwater Township at the following locations to evaluate trends in water quality:

Station Number	Sampling Station	Trout Identification	Location
1	Blair Creek	Trout Maintenance	Off of Old Schoolhouse Rd – along dirt road below confluence of North and South branch of Blair Creek
2	Trout Brook	Trout Production	Owassa Rd. at the junction with Fairview lake Rd.
3	Trout Brook	Trout Production	Middleville Rd. and Pond Brook Rd.
4	Spring Brook (Quick Pond)	Trout Maintenance	Mount Benevolence Rd. near Crandon Lodge
5	Spring Brook (Crandon)	Trout Maintenance	Hampton Rd. Bridge
6	Spring Brook	Trout Maintenance	Swartswood Rd. Bridge
7	Paulinskill River	Trout Maintenance	Stillwater Rd. – Main St. Bridge
8	Keen's Mill	Trout Maintenance	Off of Rt. 521 - next to Keen's Mill

Dates of sampling range from the beginning of the project in the spring of 1984 to present, the most recent sampling being the fall of 2003. All water samples were collected in accordance with the New Jersey Department of Environmental Protection (NJDEP) "Field Procedures Manual for Water Data Acquisition" (NJDEP Division of Water Resources) and were remanded to a licensed environmental laboratory (QC Laboratories - Southampton, PA) for analysis.

*No sampling took place during the years of 1991, 1992, 1994, and 1995. As a result, the graphical representation of the data will exclude these time periods.

Tested Chemical Parameters – Stillwater Township

Alkalinity (mg/l)
Aluminum (mg/l)
Ammonia [un-ionized] (mg/l)
Conductivity (umhos)
Fecal Coliform (col/100ml)
Kjeldhal Nitrogen (mg/l)
Lead (mg/l)
Nitrate as N (mg/l)
Nitrite as N (mg/l)
Ortho Phosphate as P (mg/l)
pH (lab-units)
Total Phosphorus (mg/l)
Total Suspended Solids (mg/l)

NJ State Criteria

Fecal Coliforms (col/100ml) – **200col/100ml**

Lead (ug/l) – **5ug/l**

Nitrate as N (ug/l) – **10,000ug/l**

pH (lab-units) – **6.5 – 8.5 lab-units**

Total Phosphorus (mg/l) - **.1mg/l**

Total Suspended Solids (mg/l) – **25mg/l**

*All of the state standards have been derived from the New Jersey Department of Environmental Protection (NJDEP) New Jersey Environment Codified Regulations document 7.9B-1.14 "Surface water quality criteria".

**Although the criteria for un-ionized Ammonia is present in the NJ DEP document, temperature is needed in an equation to derive the standard. Being that there has been no stream temperatures recorded; the criteria will not be applied to this study.

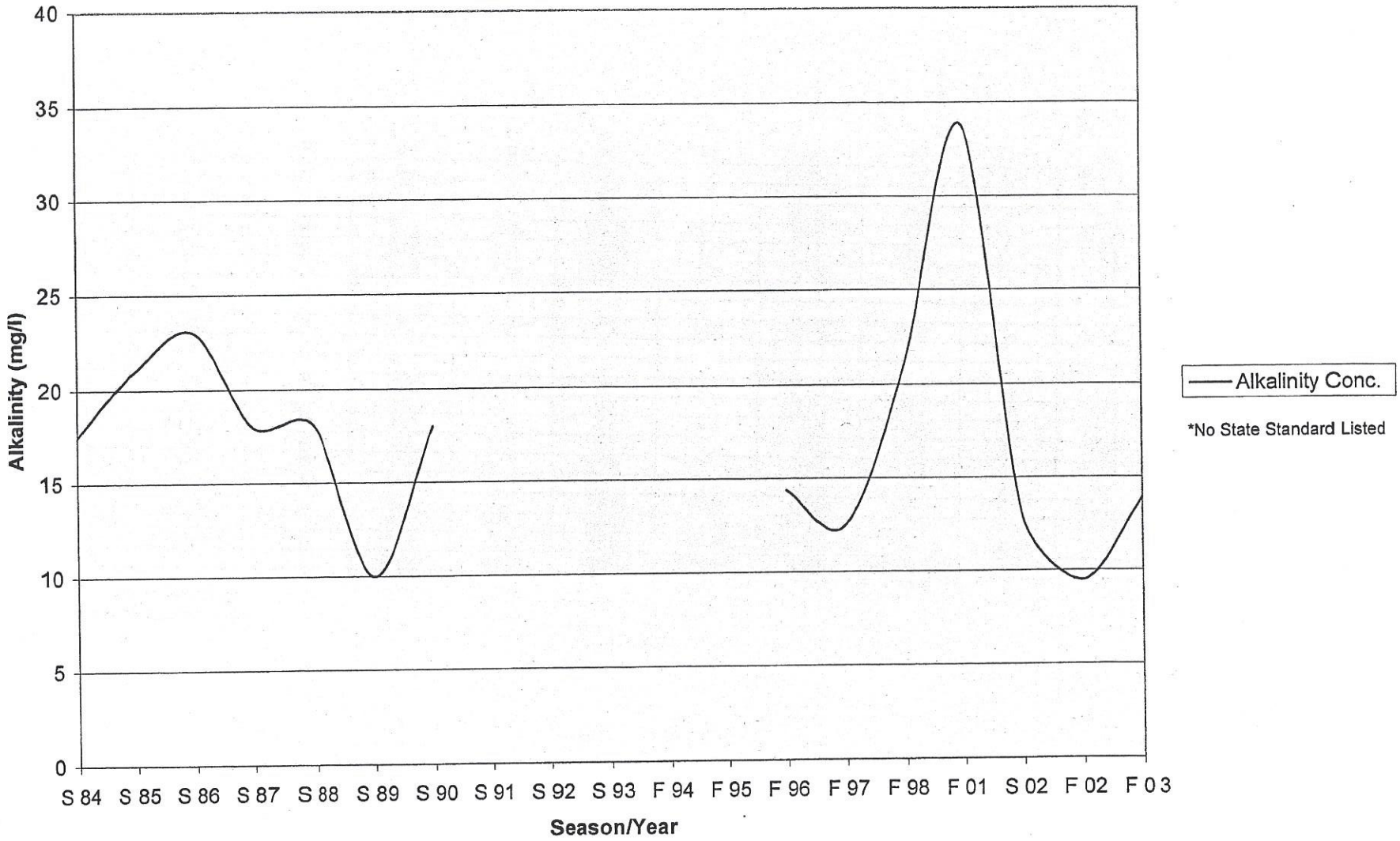
Table of Contents

Damselfly – Blair Creek

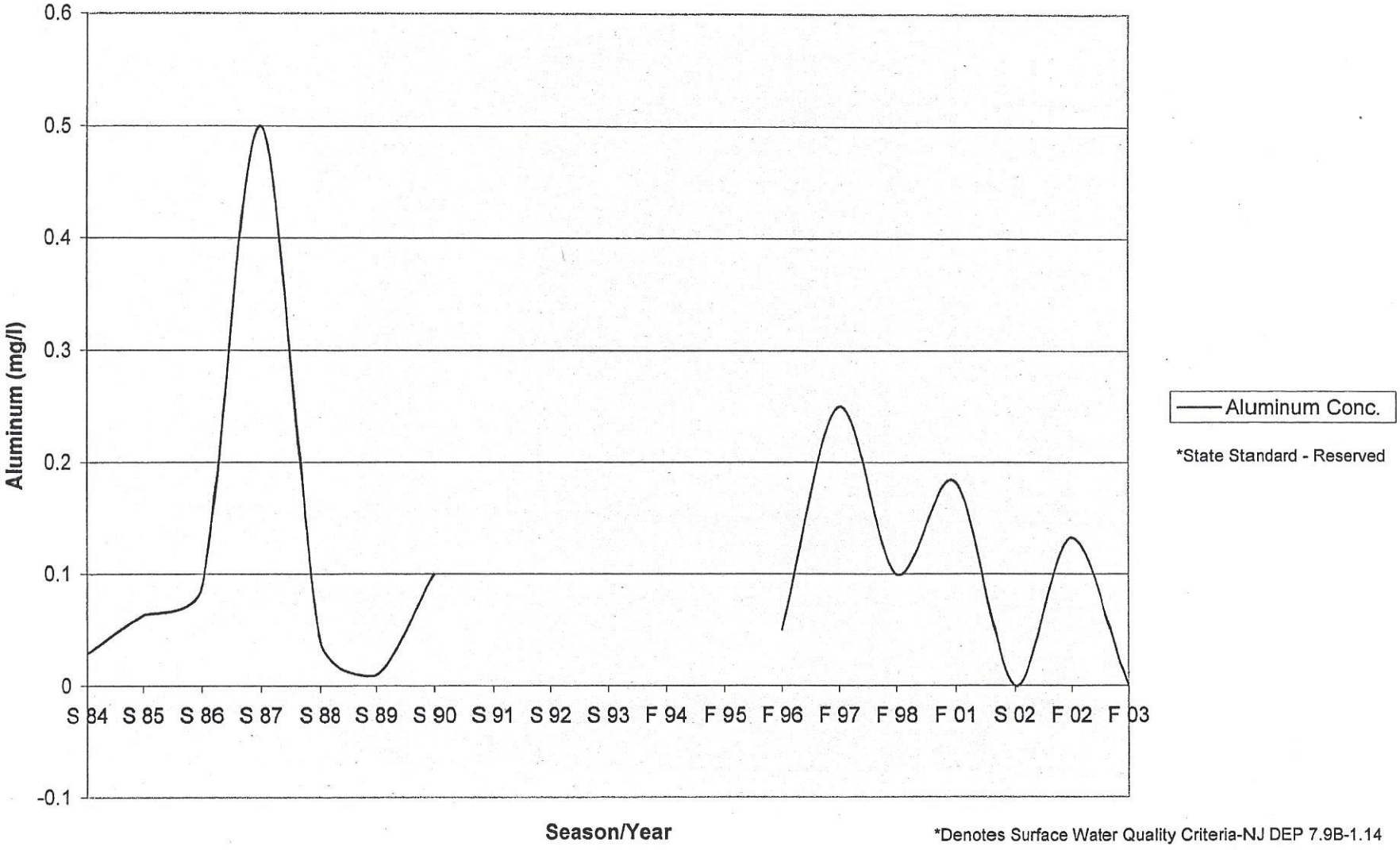
Stillwater Township Environmental Commission
Water Chemistry Data Set - Site 1: Blair Creek

Year	Fecal Coliforms (col/100ml)	Conductivity (umhos)	pH (lab-units)	Ammonia as N (mg/l)	Nitrite as N (mg/l)	Nitrate as N (mg/l)	Kjeldhal Nitrogen (mg/l)	Total Phosphorus (mg/l)	Ortho Phosphate as P (mg/l)	Alkalinity (mg/l)	Lead (mg/l)	Aluminum (mg/l)	Total Suspended Solids (mg/l)
S 84	80	140	6.83	0.24	0.01	0.016	0.264	0.065	0.065	17.5	0.003	0.029	0.3
S 85		110	6.35	0.8	0.02	0.07	0.9	0.03	0.03	21	0.006	0.063	1.7
S 86	30	125	7.05	0.1	0.02	0.14	0.1	0.03	0.03	23	0.009	0.088	1
S 87	36	90	6.89	0.1	0.01	0.1	0.1	0.03	0.03	18	0.004	0.5	0.7
S 88	148	149	6.09	0.2	0.02	0.2	0.5	0.02	0.05	18	0.004	0.04	2
S 89	70	67	6.75	0.2	0.02	0.2		0.05	0.05	10	0.004	0.01	2
S 90	20	95	7.09	0.2	0.05	0.5	0.5	0.023	0.05	18	0.004	0.1	2
S 91													
S 92													
S 93	32	102	7.4	0.2	0.05	0.5	0.88	0.105	0.05	34	0.05		43
F 94													
F 95													
F 96	37	72	5.98	0.05	0.01	0.046	1.07	0.04	0.01	14.4	0.05	0.05	1
F 97	56	158	6.87	0.05	0.01	0.052	1.26	0.014	0.007	12.5	0.008	0.25	15
F 98	98	79.2	6.61	0.03	0.008	0.042	2.83	0.02	0.006	21.1	0.0063	0.1	2
F 01	70	152	7.04	0.1	0.2	0.5	1	0.129	0.05	33.8	0.005	0.183	2
S 02	60	82.4	7.13	0.1	ND	0.5	1	ND	0.05	12.9	0.005	ND	3
F 02	10	102	7.26	0.1	0.02	0.5	1	0.01	0.01	9.5	0.005	0.133	ND
F 03	10	72.3	6.65	ND	ND	ND	ND	ND	ND	13.9	ND	ND	ND

Site 1 (Blair Creek) - Alkalinity

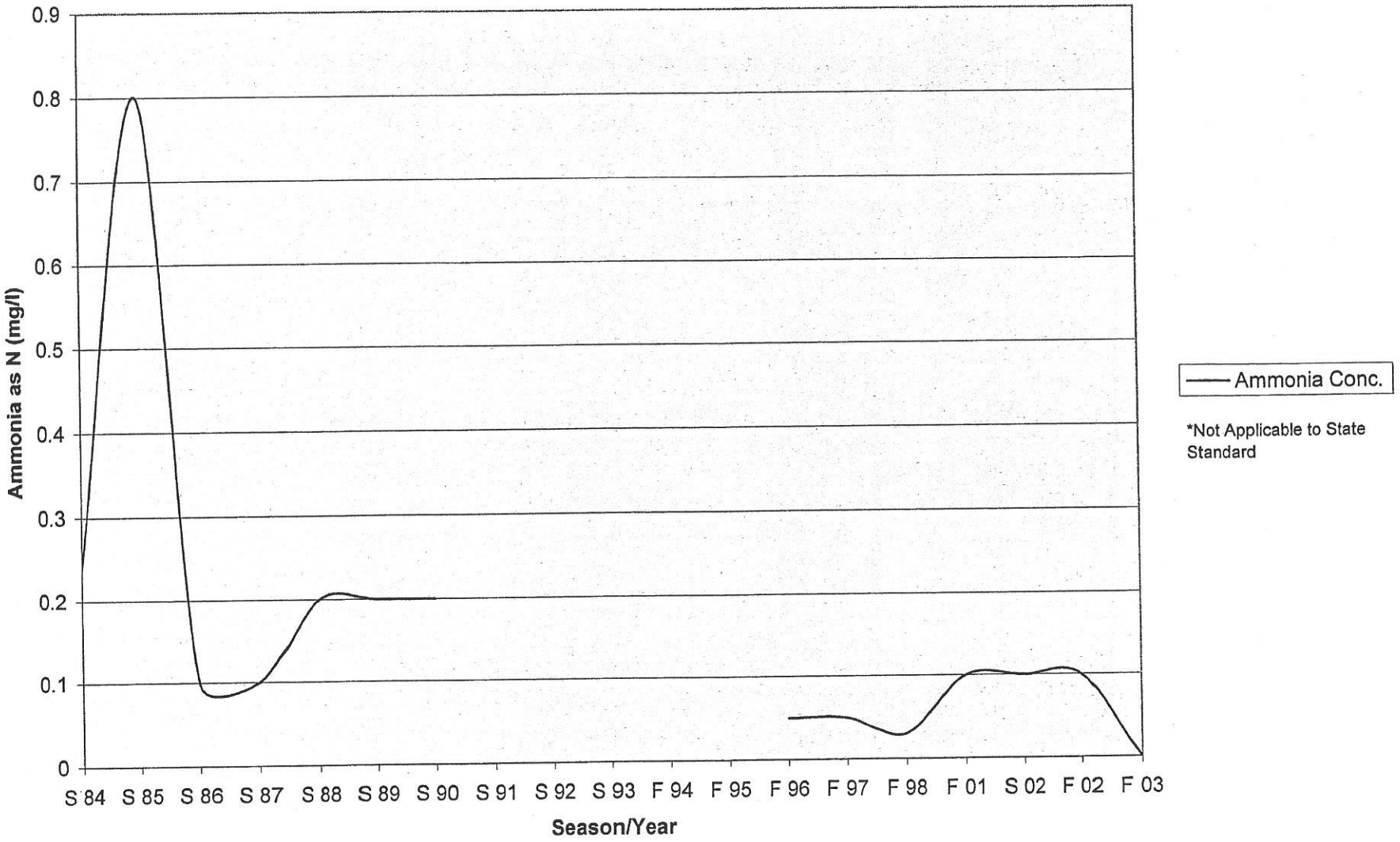


Site 1 (Blair Creek) - Aluminum

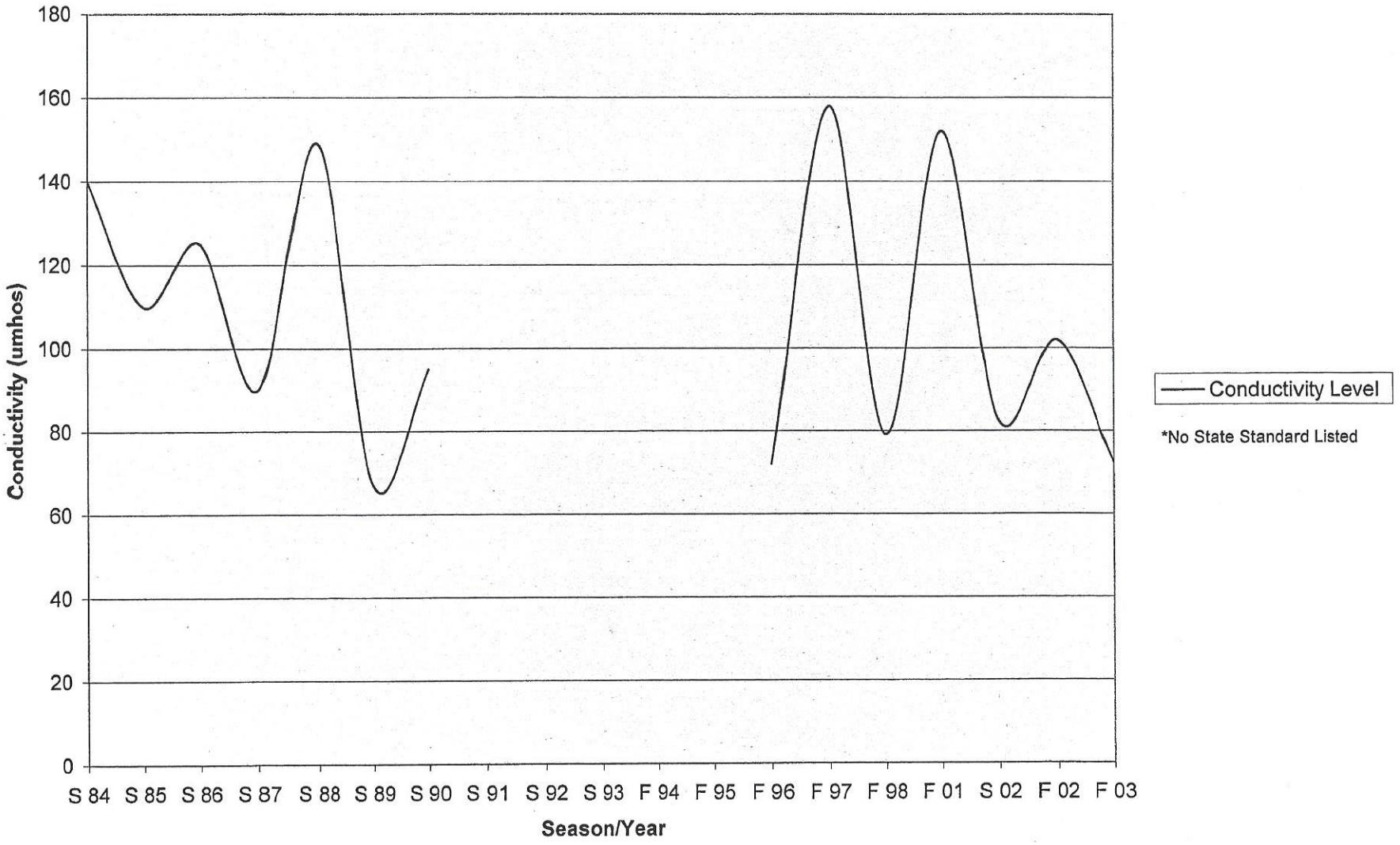


*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

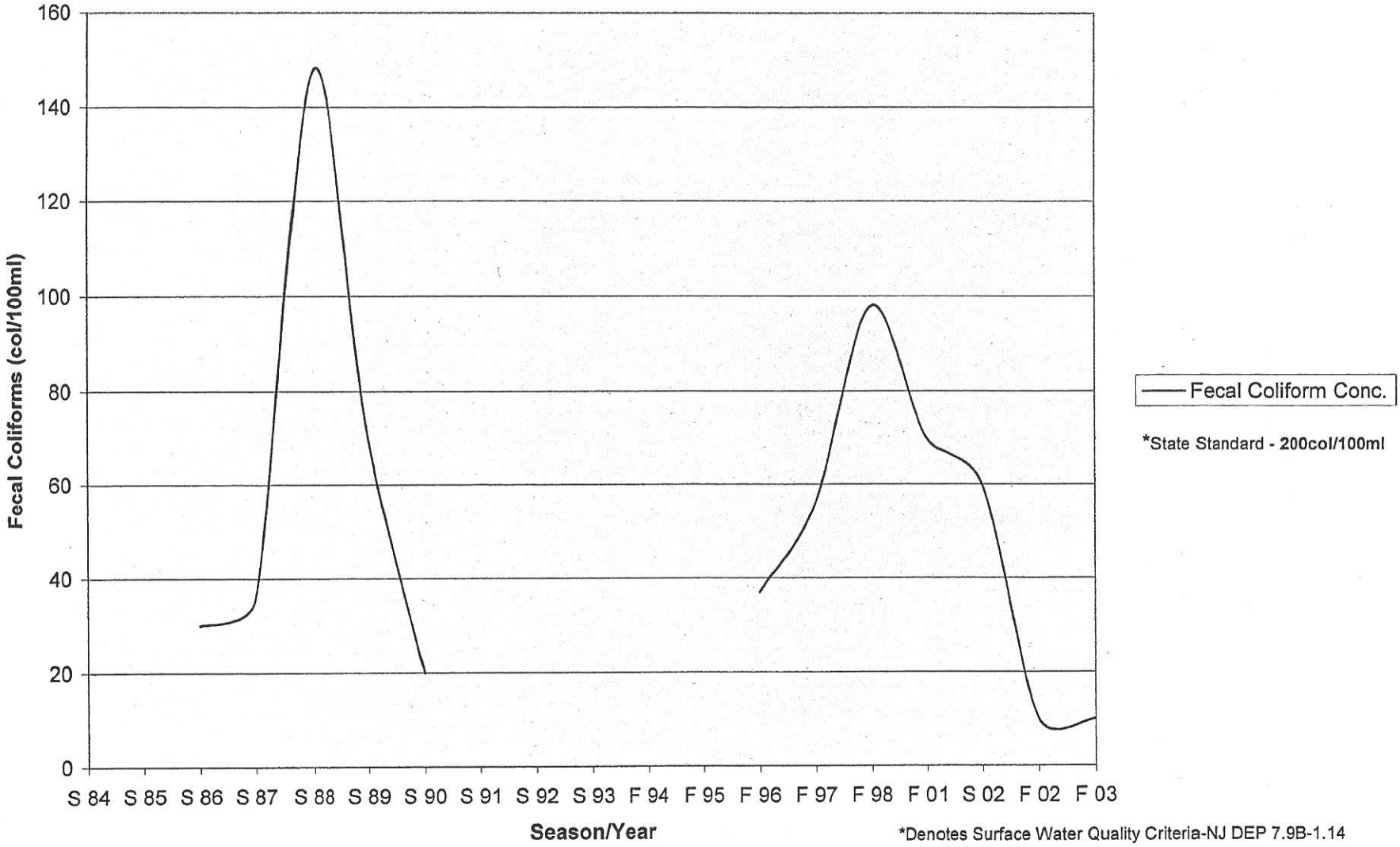
Site 1 (Blair Creek) - Ammonia as N



Site 1 (Blair Creek) - Conductivity



Site 1 (Blair Creek) - Fecal Coliforms



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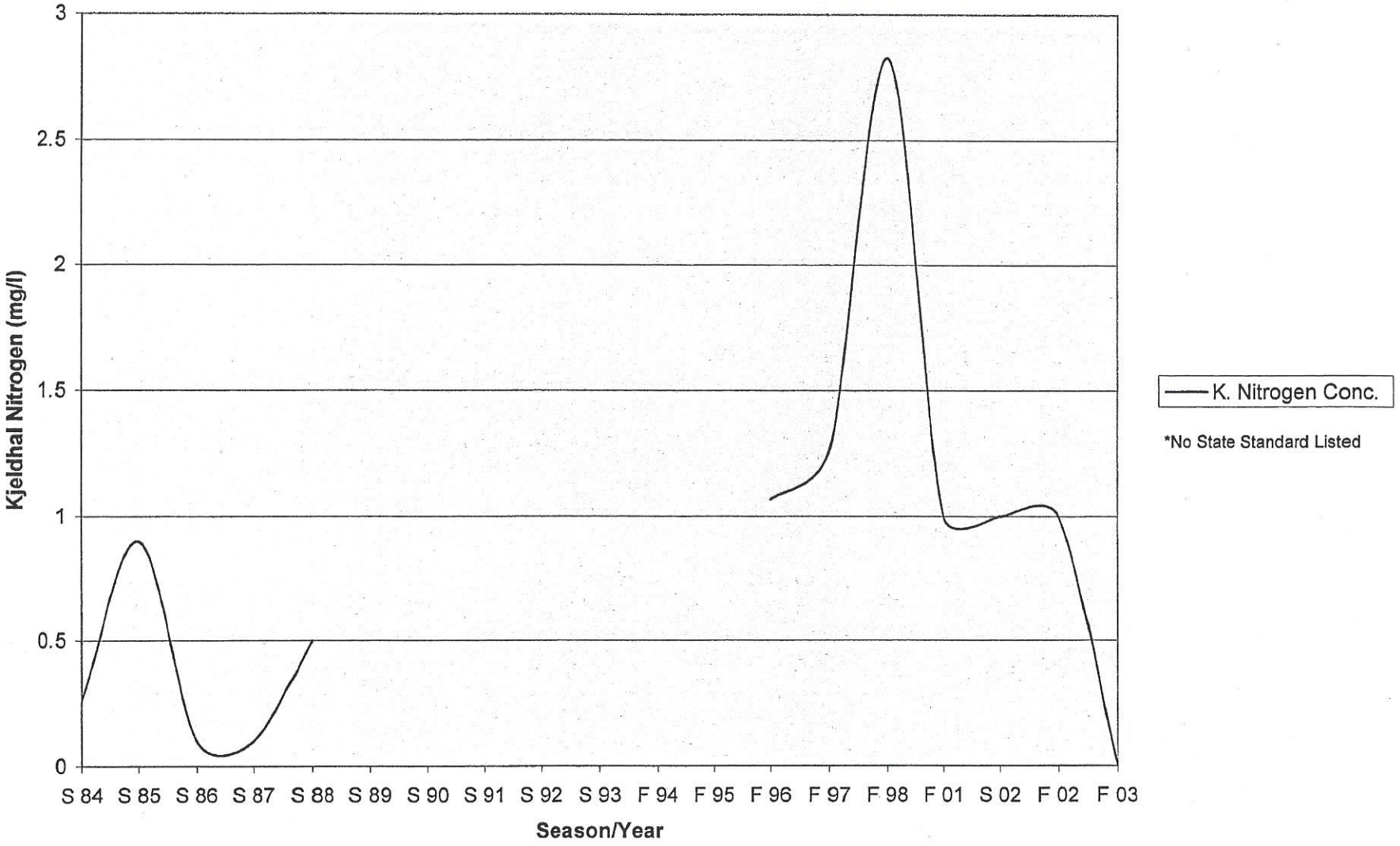
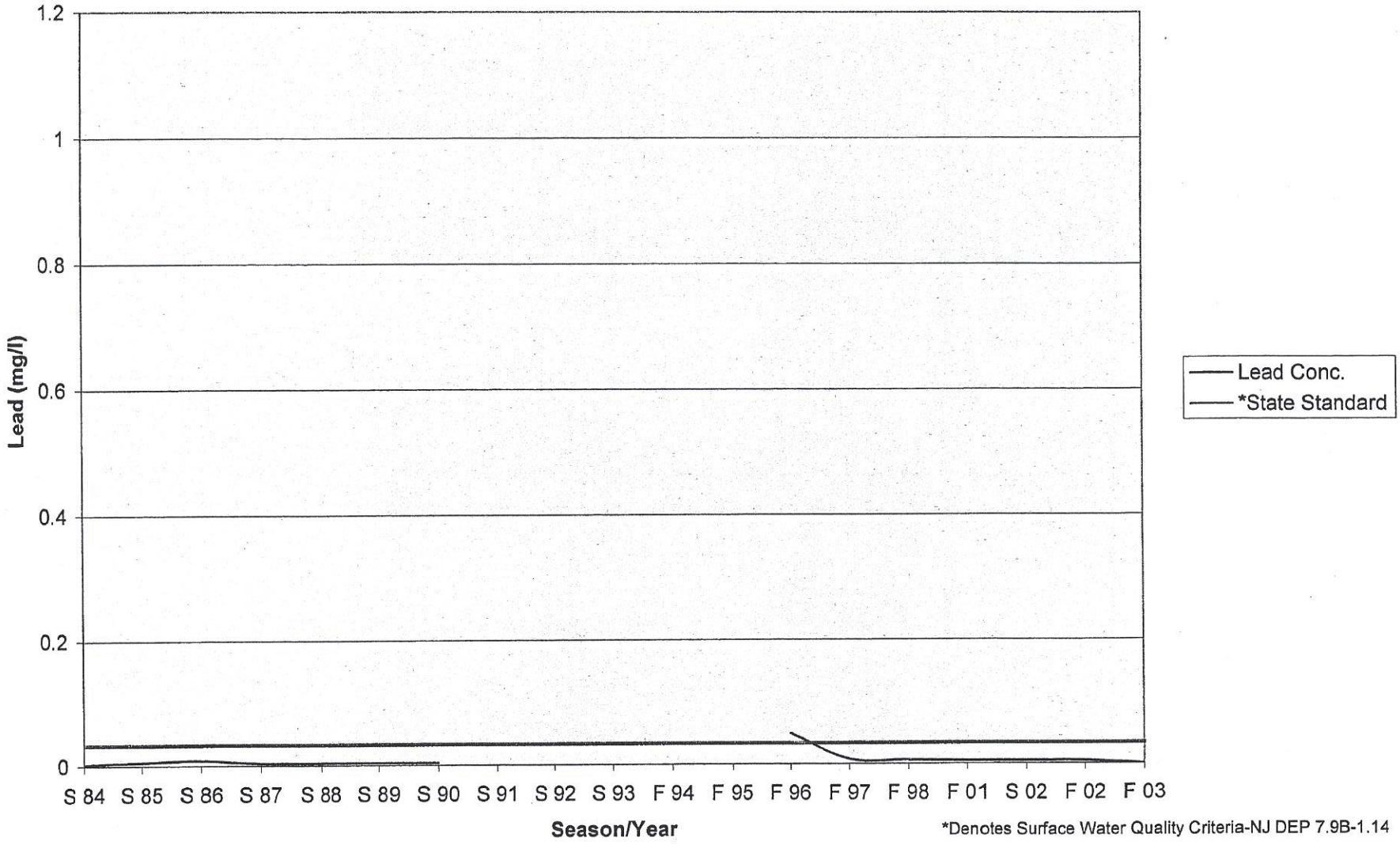
Site 1 (Blair Creek) - Kjeldhal Nitrogen



Site 1 (Blair Creek) - Lead



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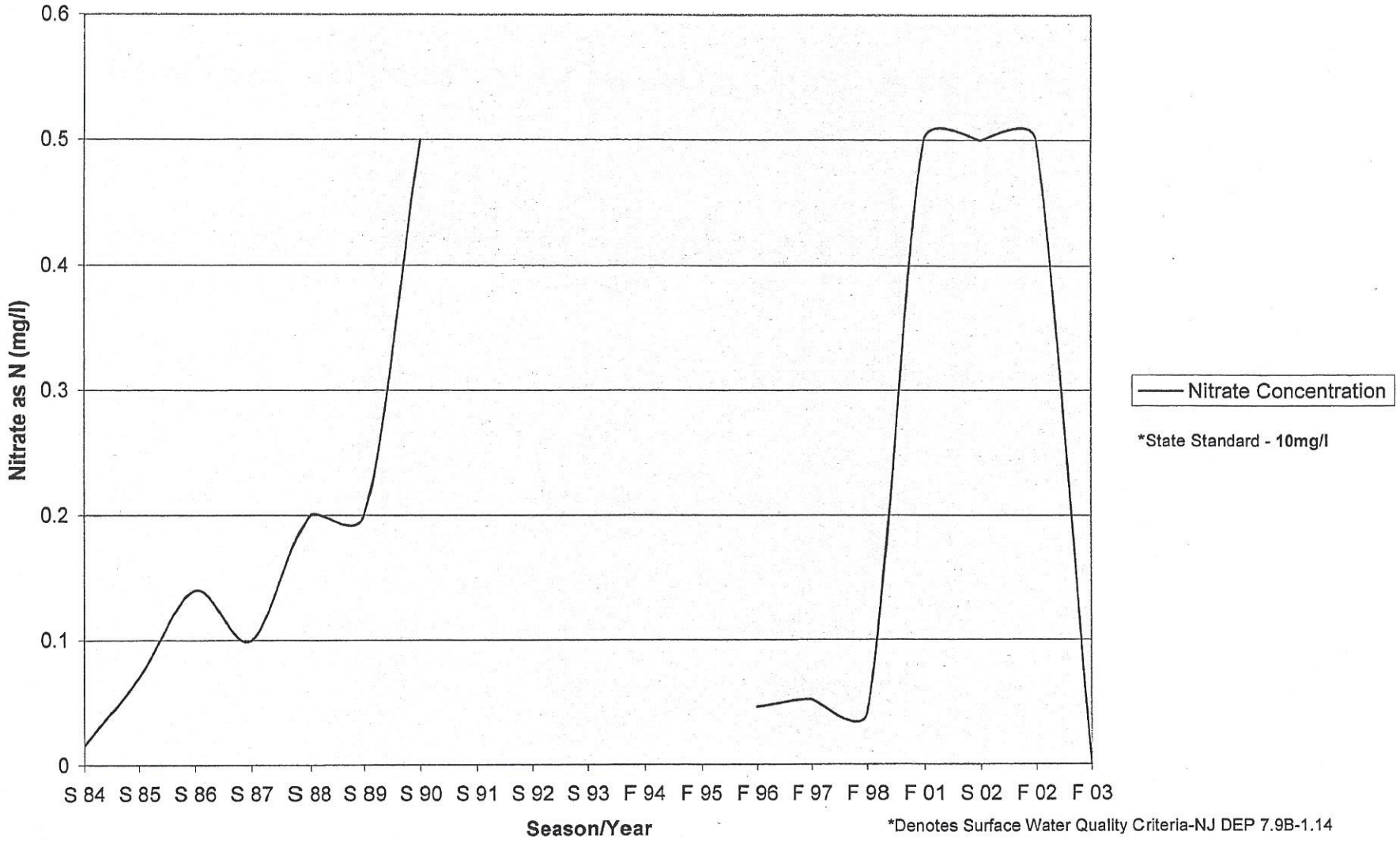
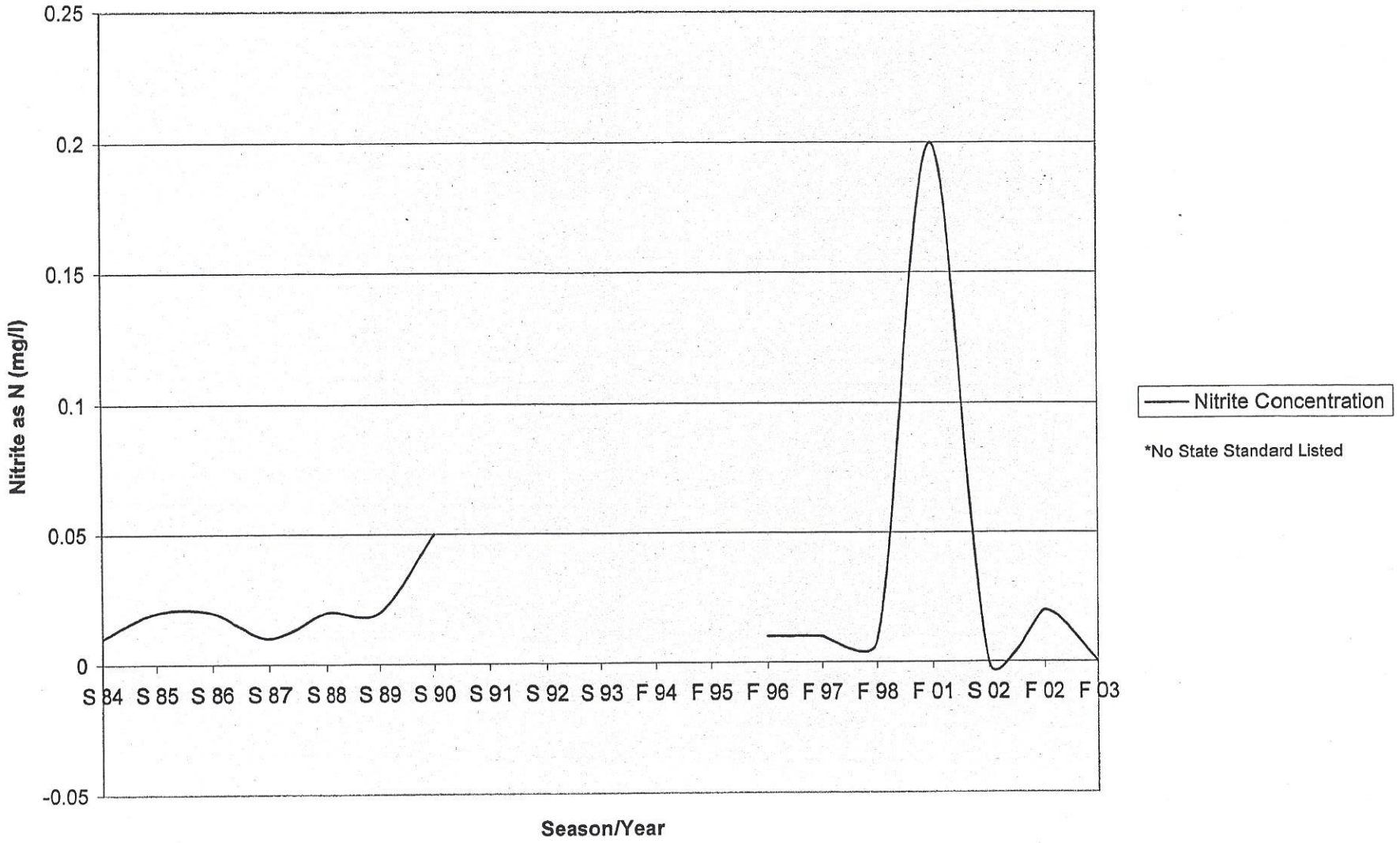
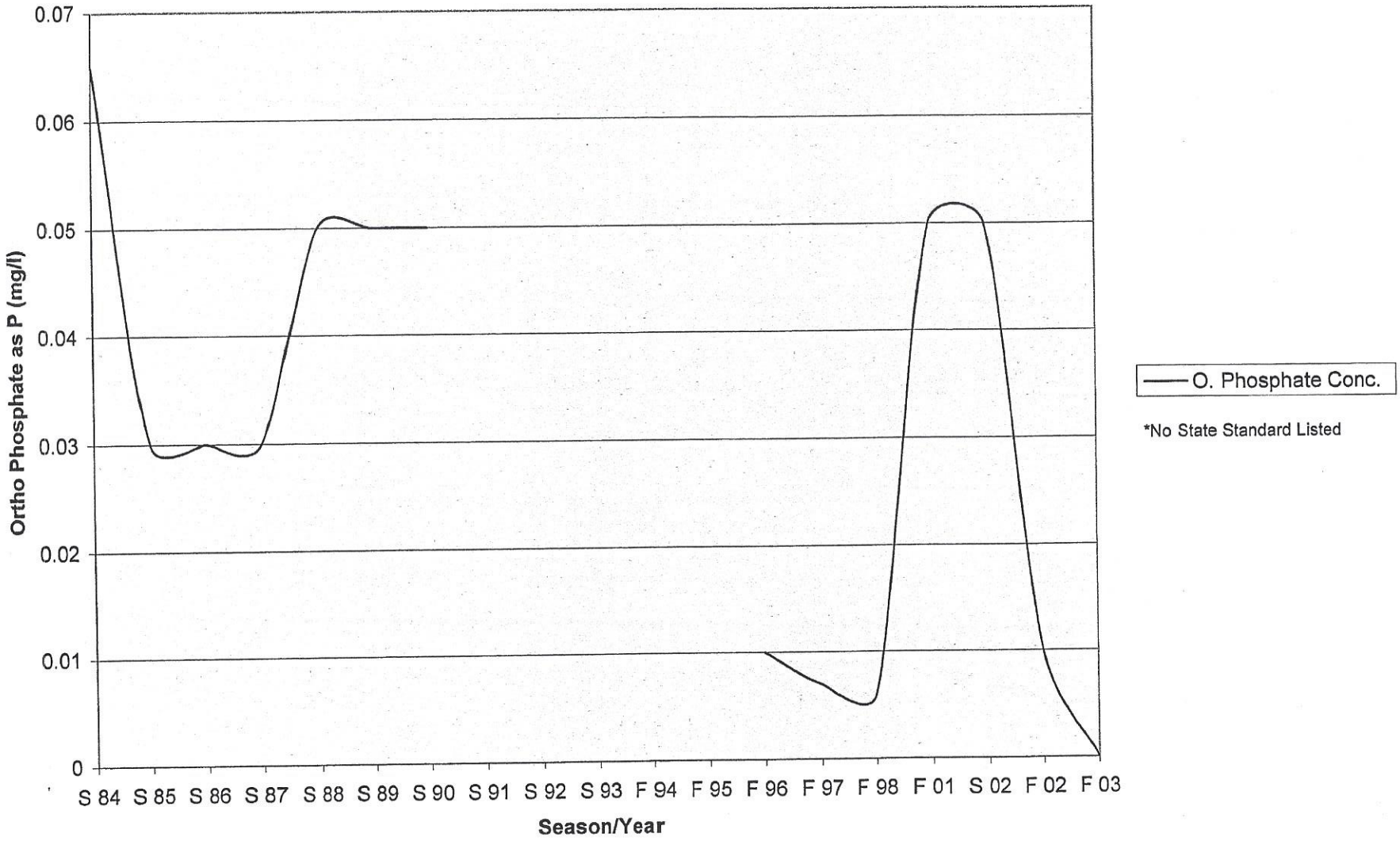
Site 1 (Blair Creek)- Nitrate as N



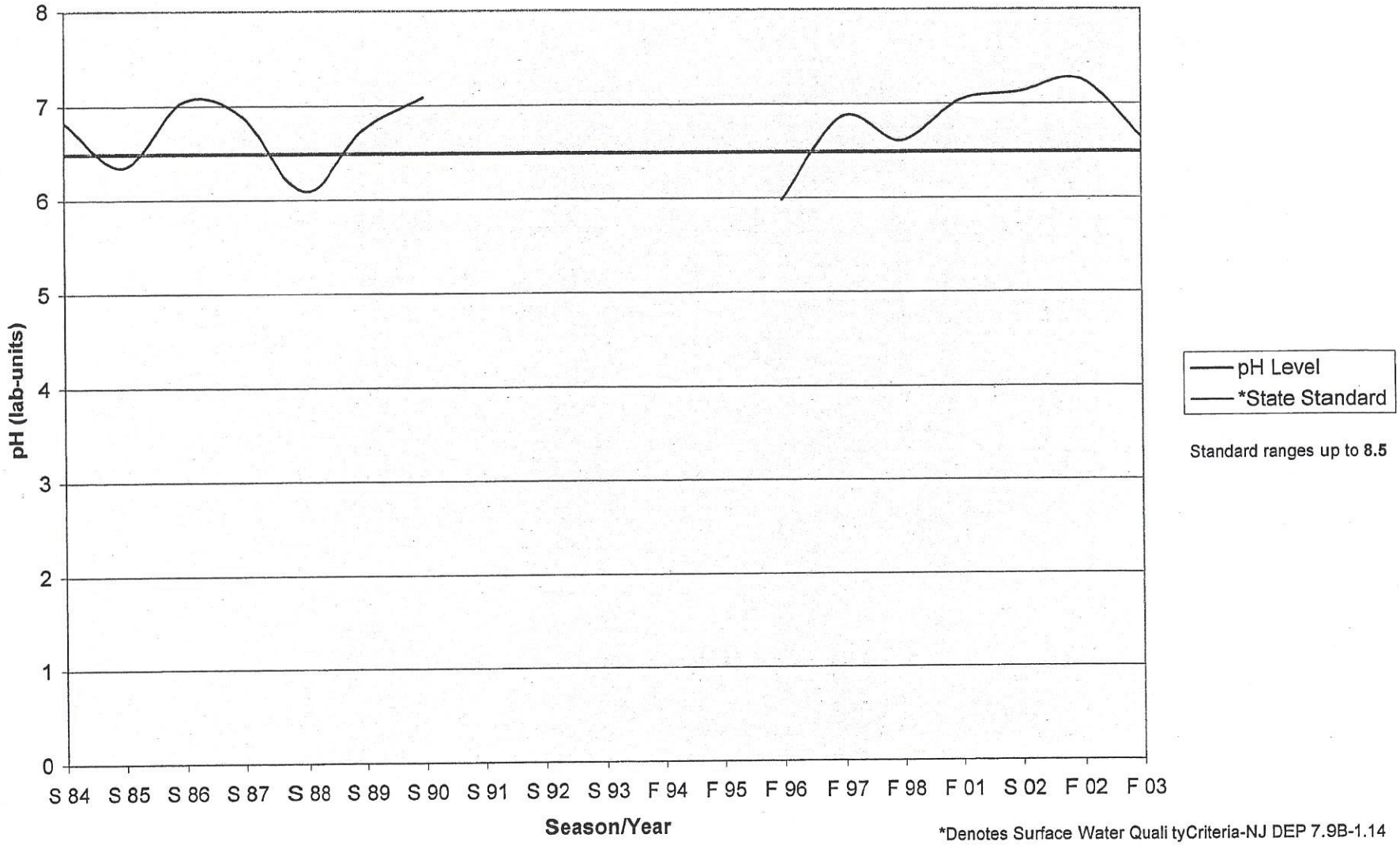
Site 1 (Blair Creek) - Nitrite as N



Site 1 (Blair Creek) - Ortho Phosphate as P



Site 1 (Blair Creek) - pH



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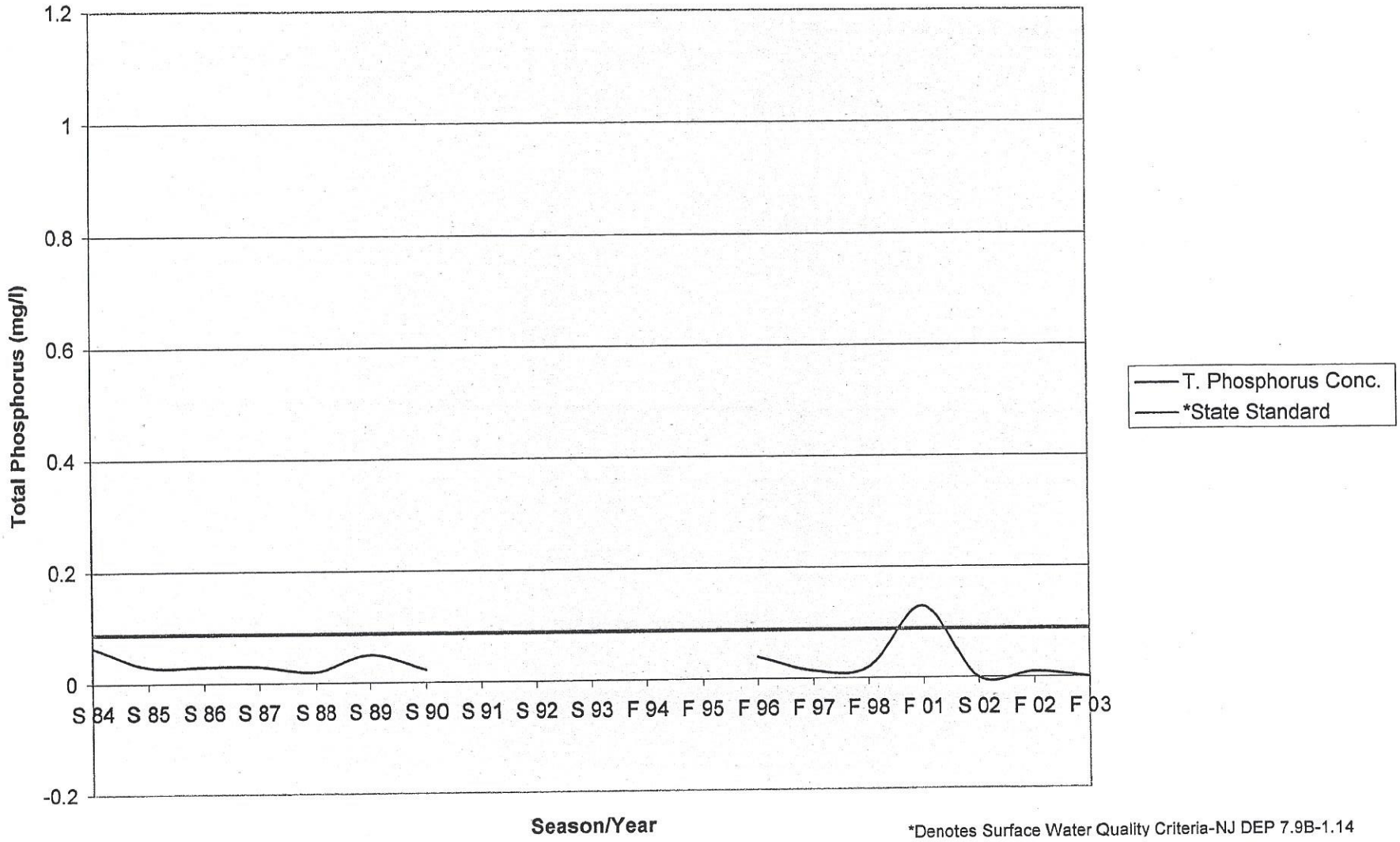
Site 1 (Blair Creek) - Total Phosphorus



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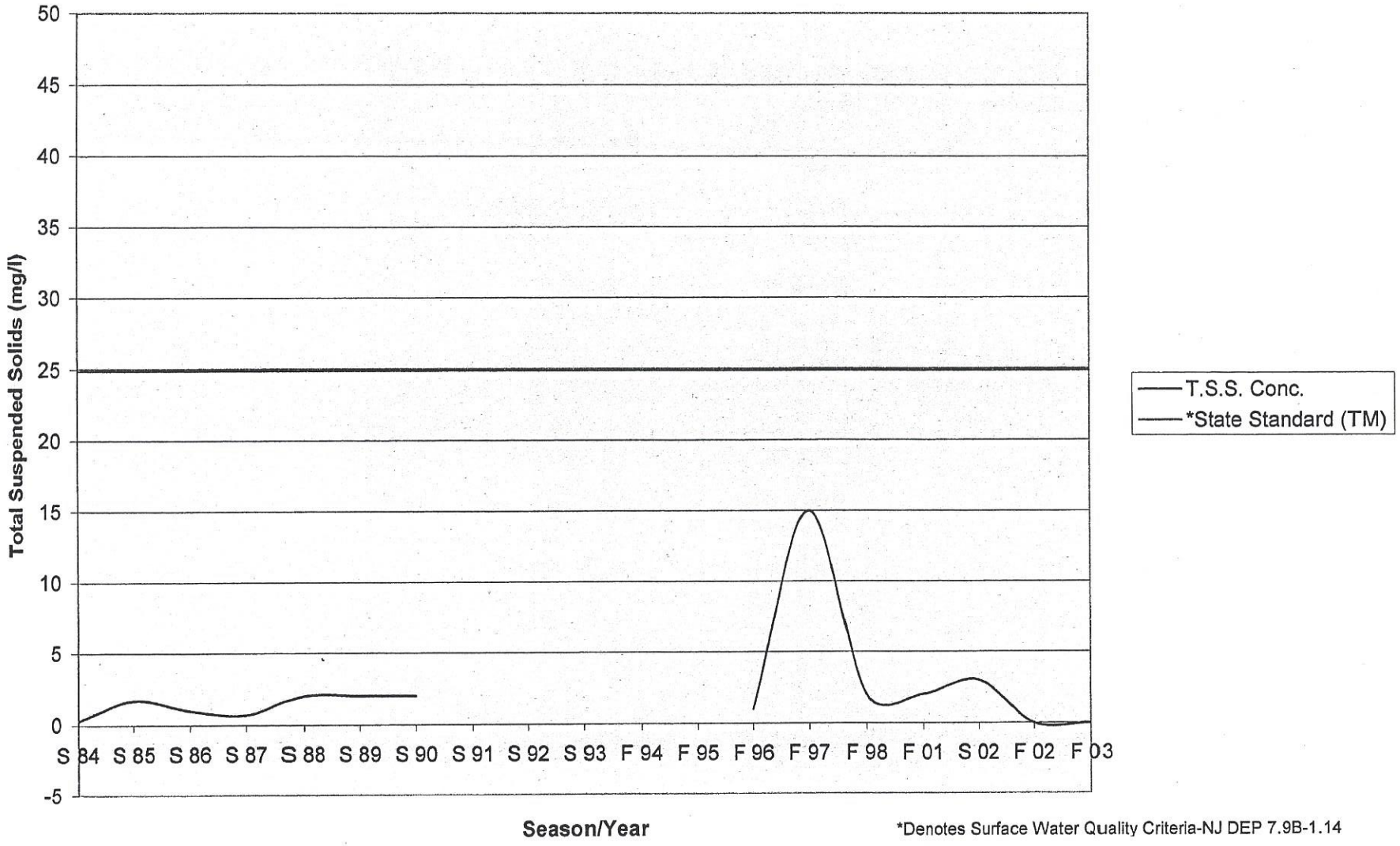
Site 1 (Blair Creek) - Total Suspended Solids



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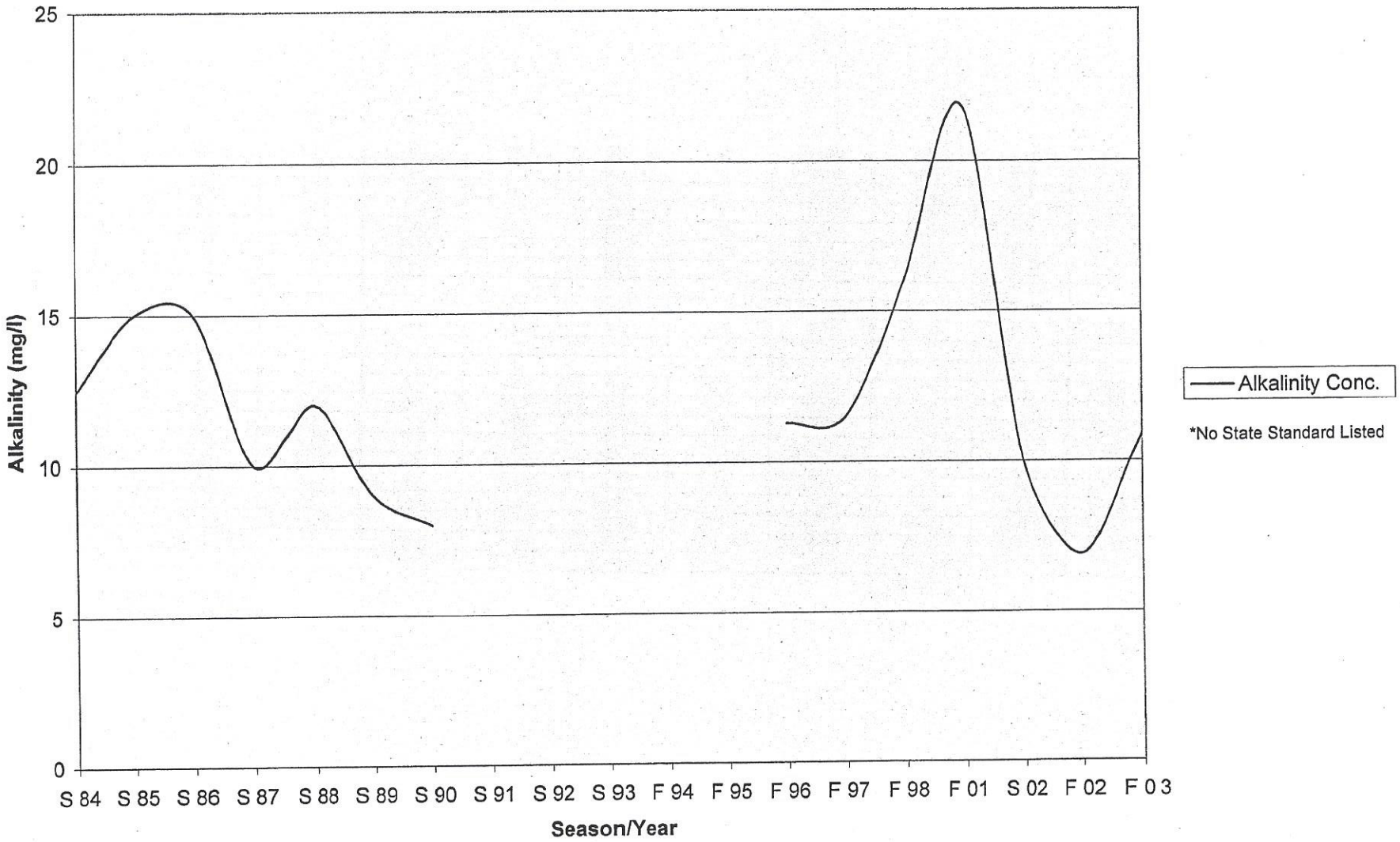
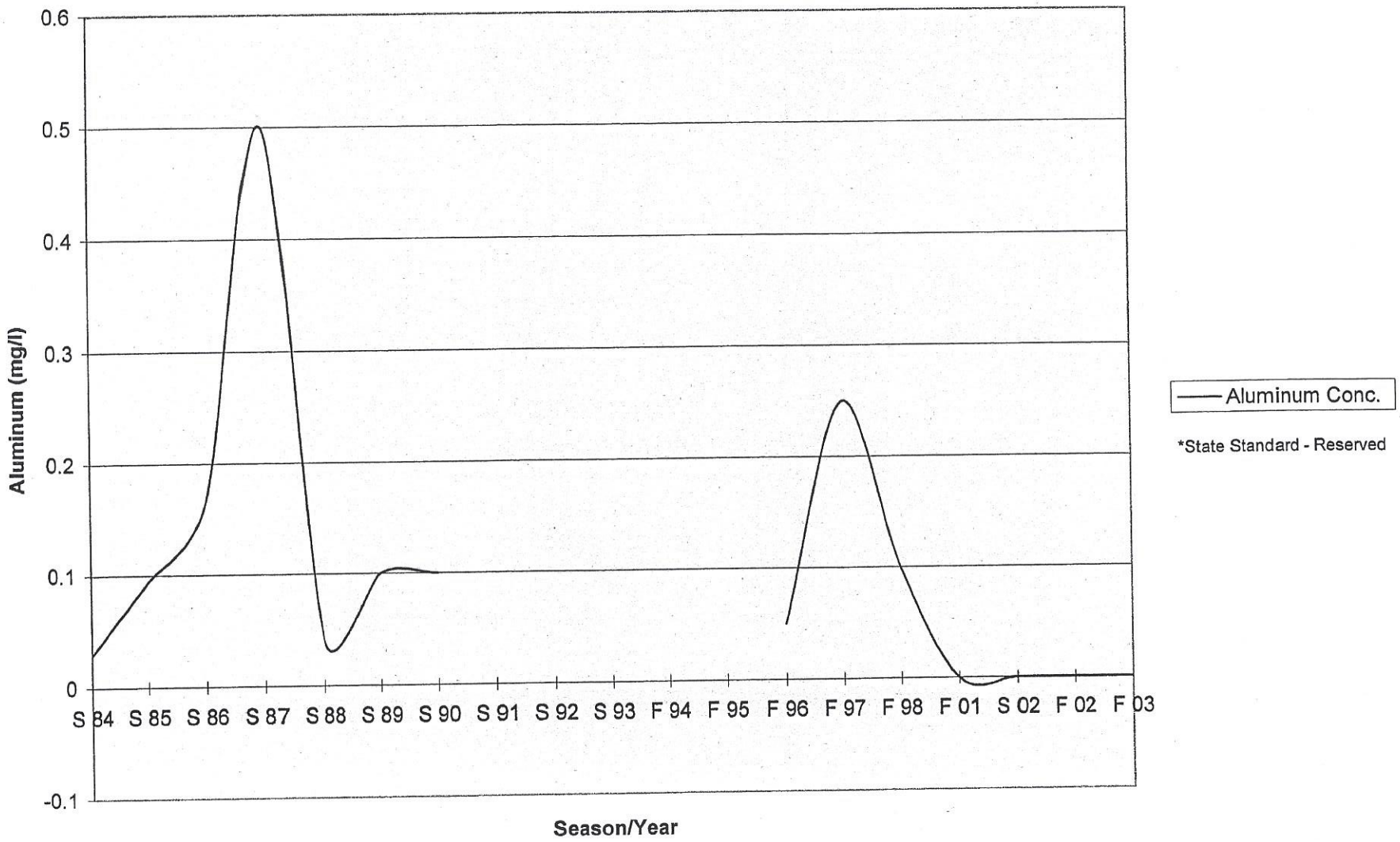
Stillwater Township Environmental Commission
Water Chemistry Data Set - Site 2: Trout Brook

Year	Fecal Coliforms (col/100ml)	Conductivity (umhos)	pH (lab-units)	Ammonia as N (mg/l)	Nitrite as N (mg/l)	Nitrate as N (mg/l)	Kjeldhal Nitrogen (mg/l)	Total Phosphorus (mg/l)	Ortho Phosphate as P (mg/l)	Alkalinity (mg/l)	Lead (mg/l)	Aluminum (mg/l)	Total Suspended Solids (mg/l)
S 84	20	110	6.58	0.62	0.003	0.01	0.26	0.06	0.06	12.5	0.003	0.029	6.7
S 85		110	6.31	0.9	0.002	0.07	0.9	0.03	0.03	15	0.003	0.094	3.8
S 86	10	180	6.74	0.1	0.006	0.7	0.1	0.05	0.03	15	0.01	0.163	6.5
S 87	23	100	6.88	0.1	0.01	0.1	0.1	0.03	0.03	10	0.004	0.5	2.2
S 88	12	154	5.92	0.2	0.02	0.2	0.5	0.02	0.05	12	0.004	0.04	3
S 89	70	77	6.49	0.2	0.02	0.2	0.5	0.05	0.05	9	0.004	0.1	2
S 90	80	69	6.65	0.2	0.05	0.5	0.5	0.02	0.05	8	0.004	0.1	2
S 91													
S 92													
S 93	80	104	7.25	0.2	0.05	0.5	0.5	0.05	0.05	19.5	0.05		2
F 94													
F 95													
F 96	32	138	6	0.5	0.01	0.04	0.54	0.54	0.01	11.3	0.05	0.05	2
F 97	66	199	6.71	0.03	0.01	0.05	1.55	0.01	0.01	11.5	0.014	0.25	11
F 98	236	149	6.65	0.03	0.008	0.042	0.57	0.023	0.006	16	0.004	0.1	1
F 01	40	182	7.08	0.1	0.2	0.5	1	0.05	0.05	21.8	0.005	ND	ND
S 02	50	141	6.83	0.1	ND	0.5	1	ND	0.05	10	0.005	ND	2
F 02	10	134	7.06	0.1	0.02	0.5	1	0.01	0.01	6.9	0.005	ND	12
F 03	10	90.2	6.45	ND	ND	ND	ND	0.066	ND	10.9	ND	ND	ND

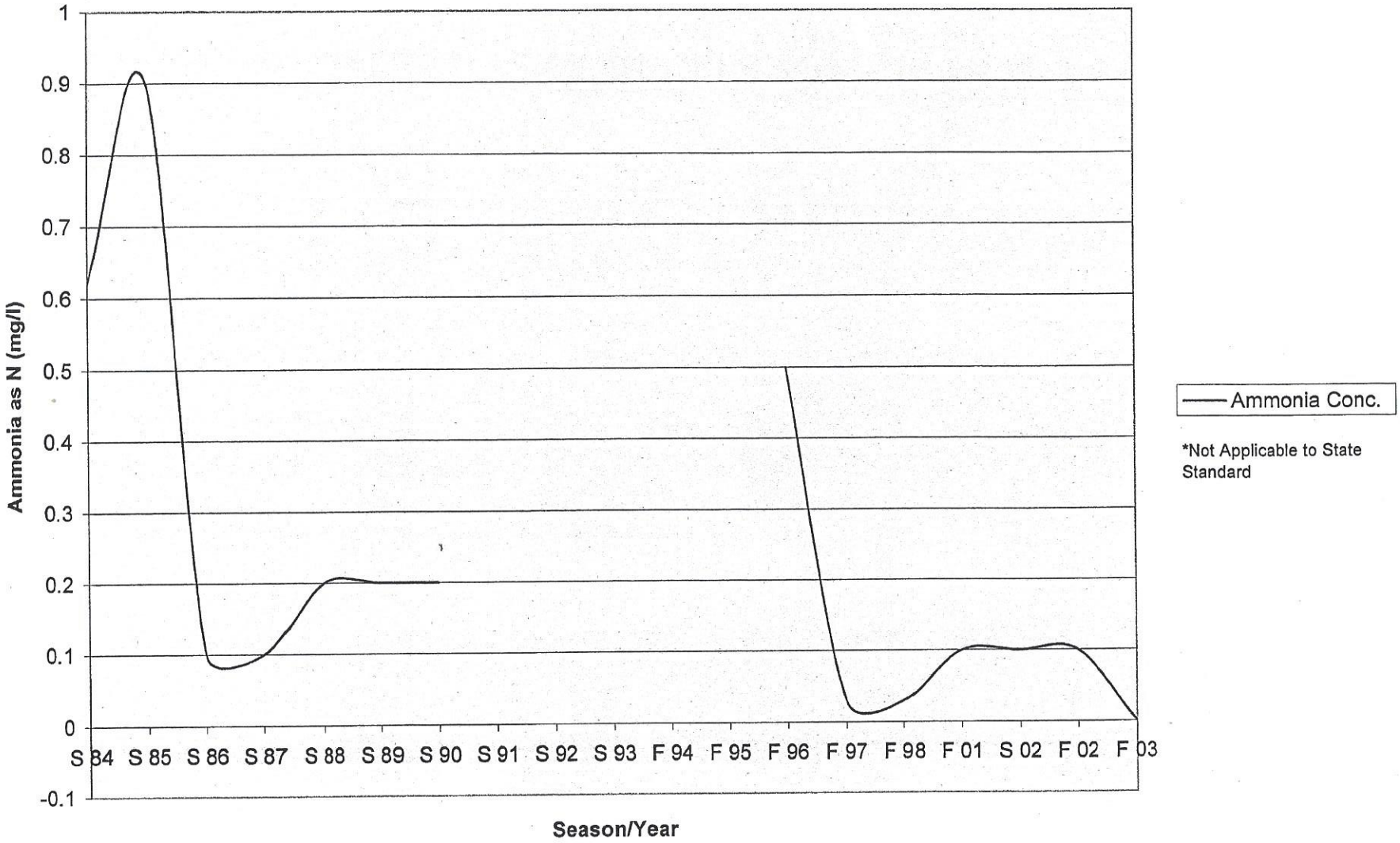
Site 2 (Trout Brook) - Alkalinity



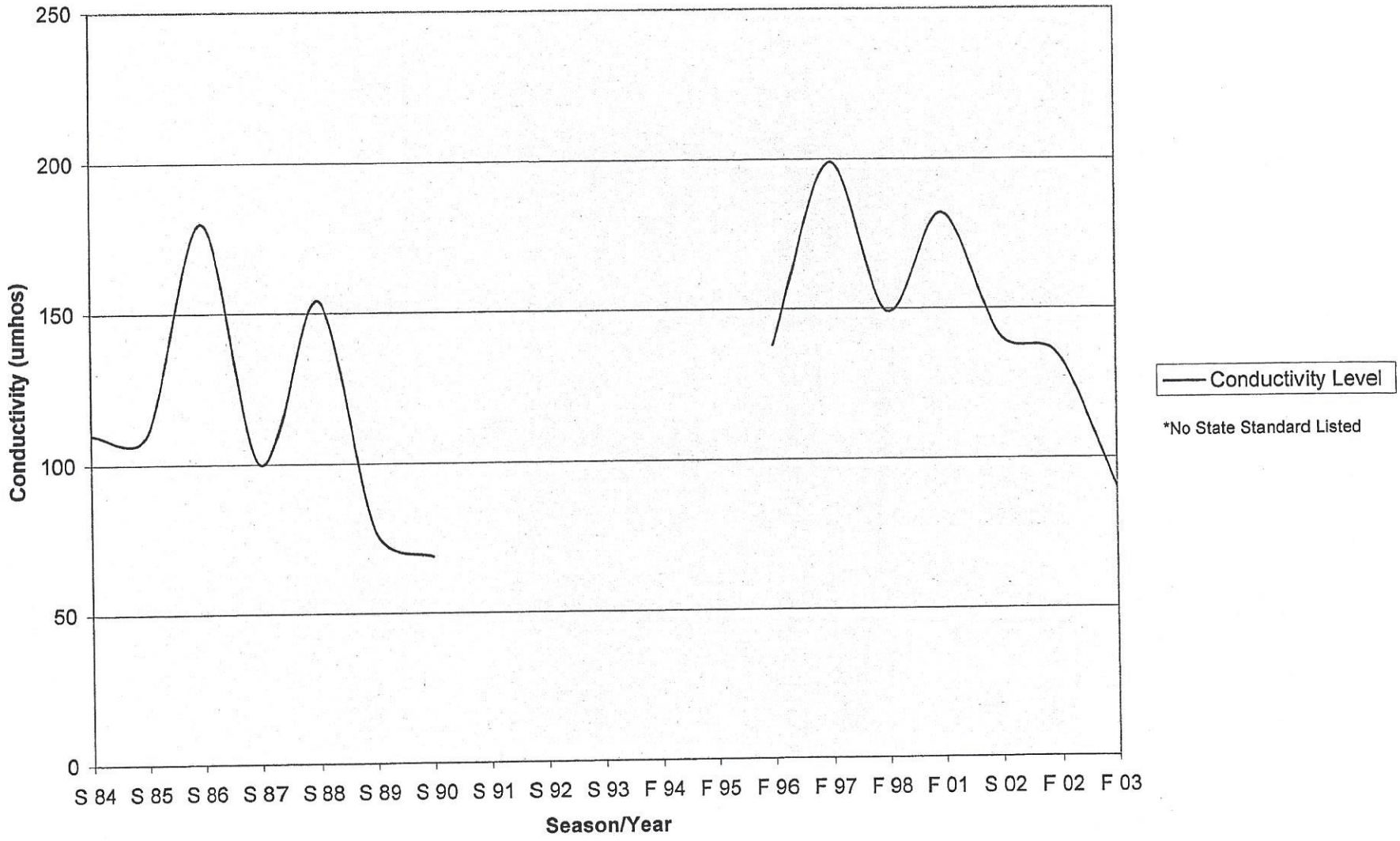
Site 2 (Trout Brook) - Aluminum



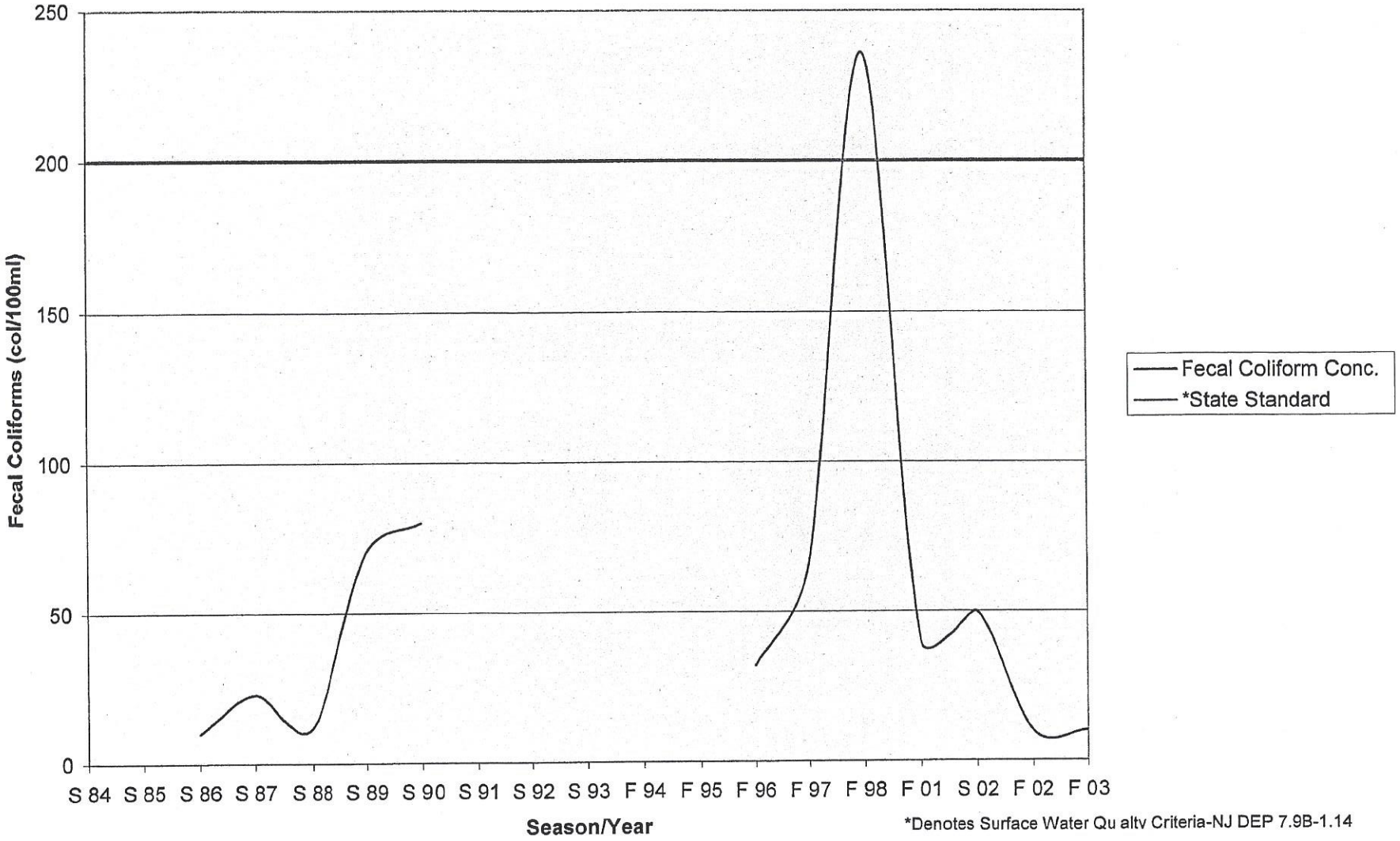
Site 2 (Trout Brook) - Ammonia as N



Site 2 (Trout Brook) - Conductivity

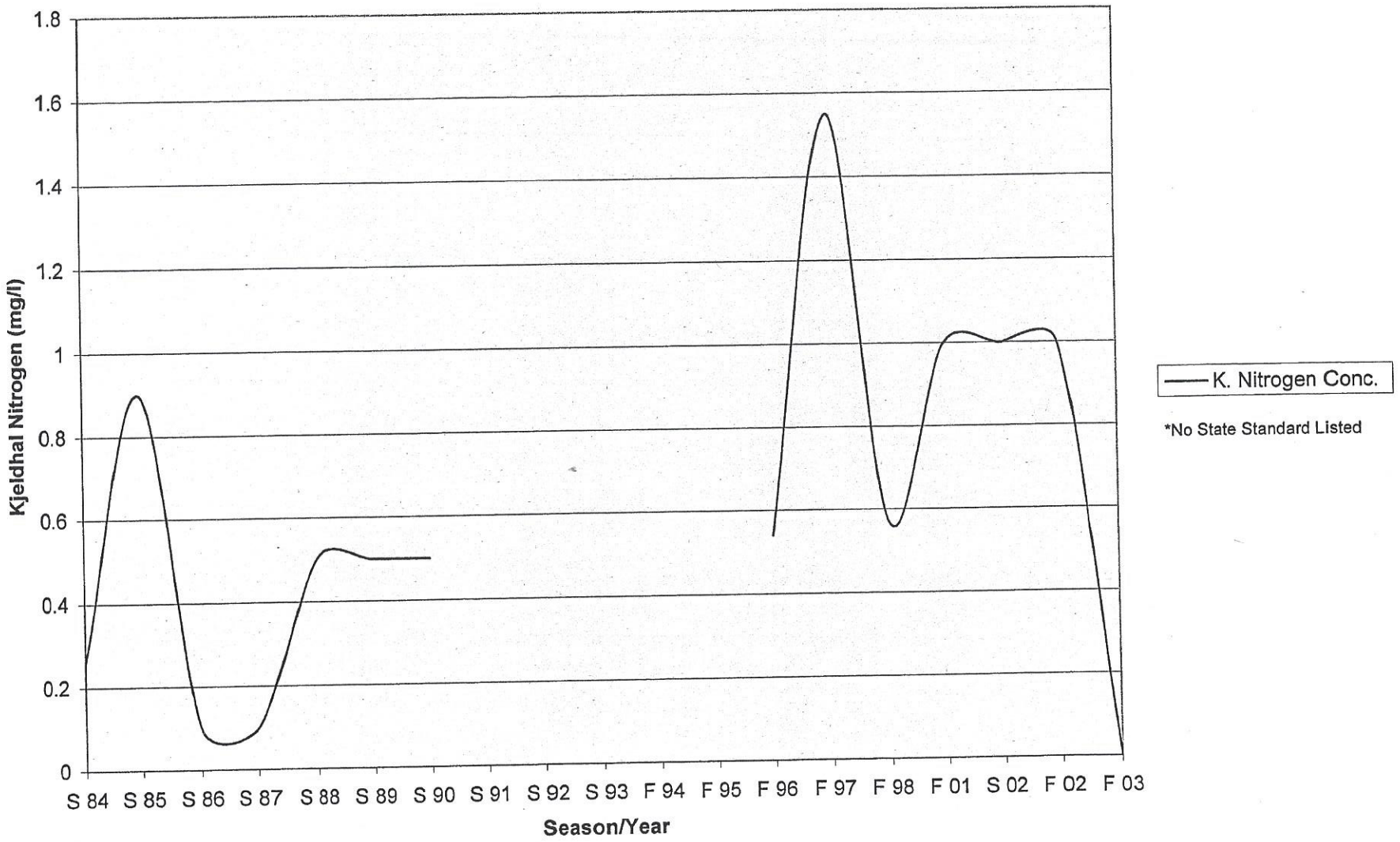


Site 2 (Trout Brook) - Fecal Coliforms

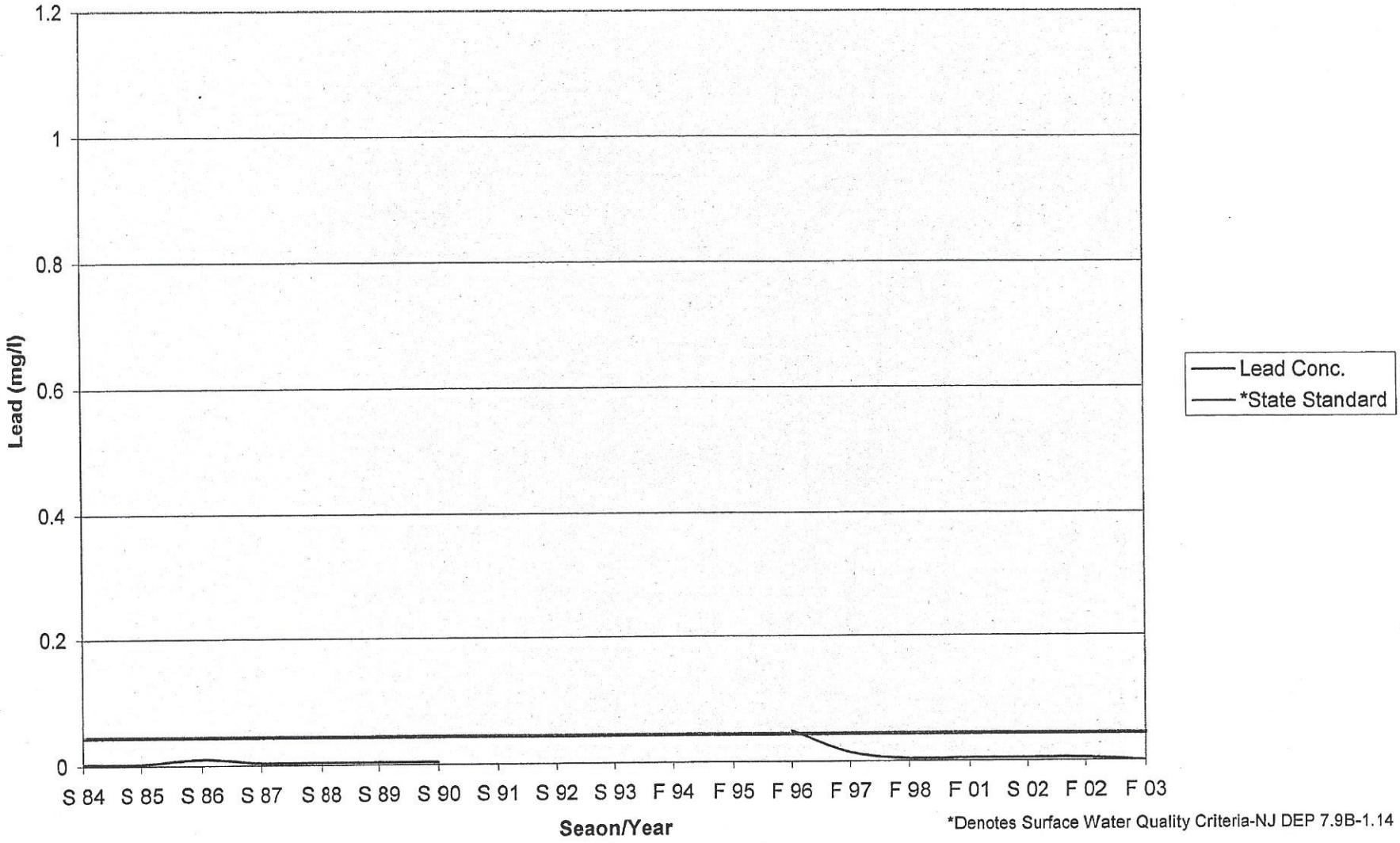


*Denotes Surface Water Qu altv Criteria-NJ DEP 7.9B-1.14

Site 2 (Trout Brook) - Kjeldhal Nitrogen



Site 2 (Trout Brook) - Lead



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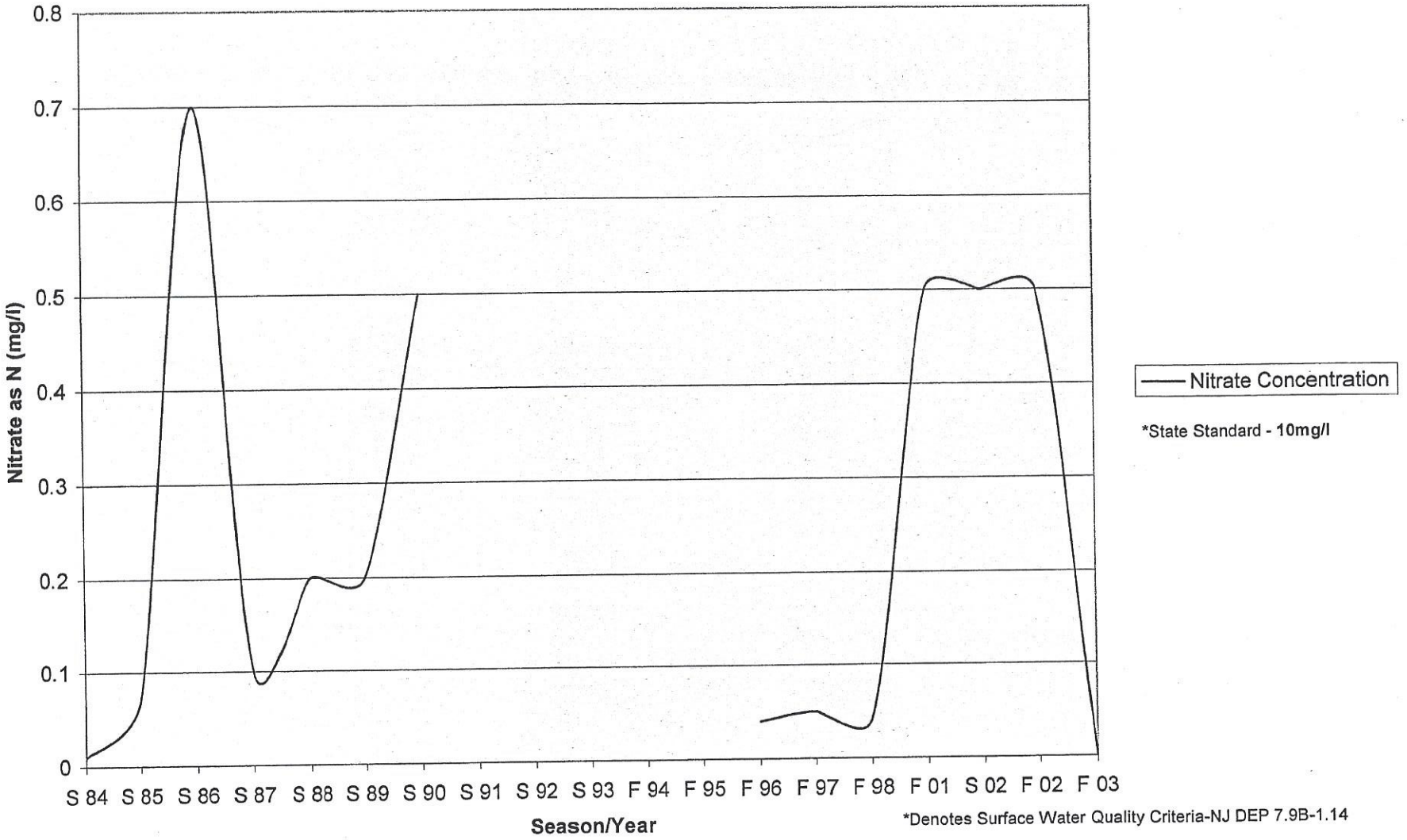
Site 2 (Trout Brook) - Nitrate as N



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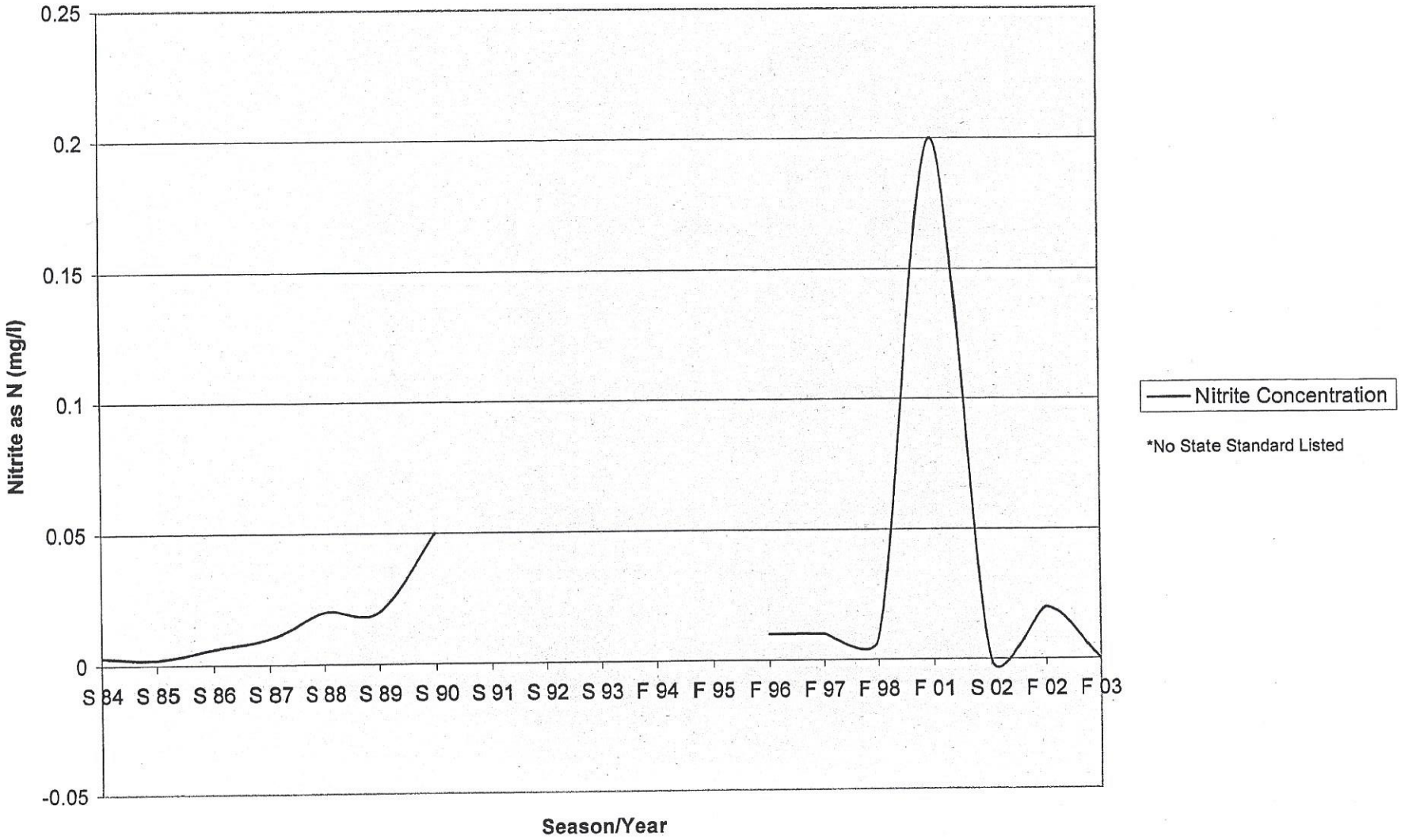
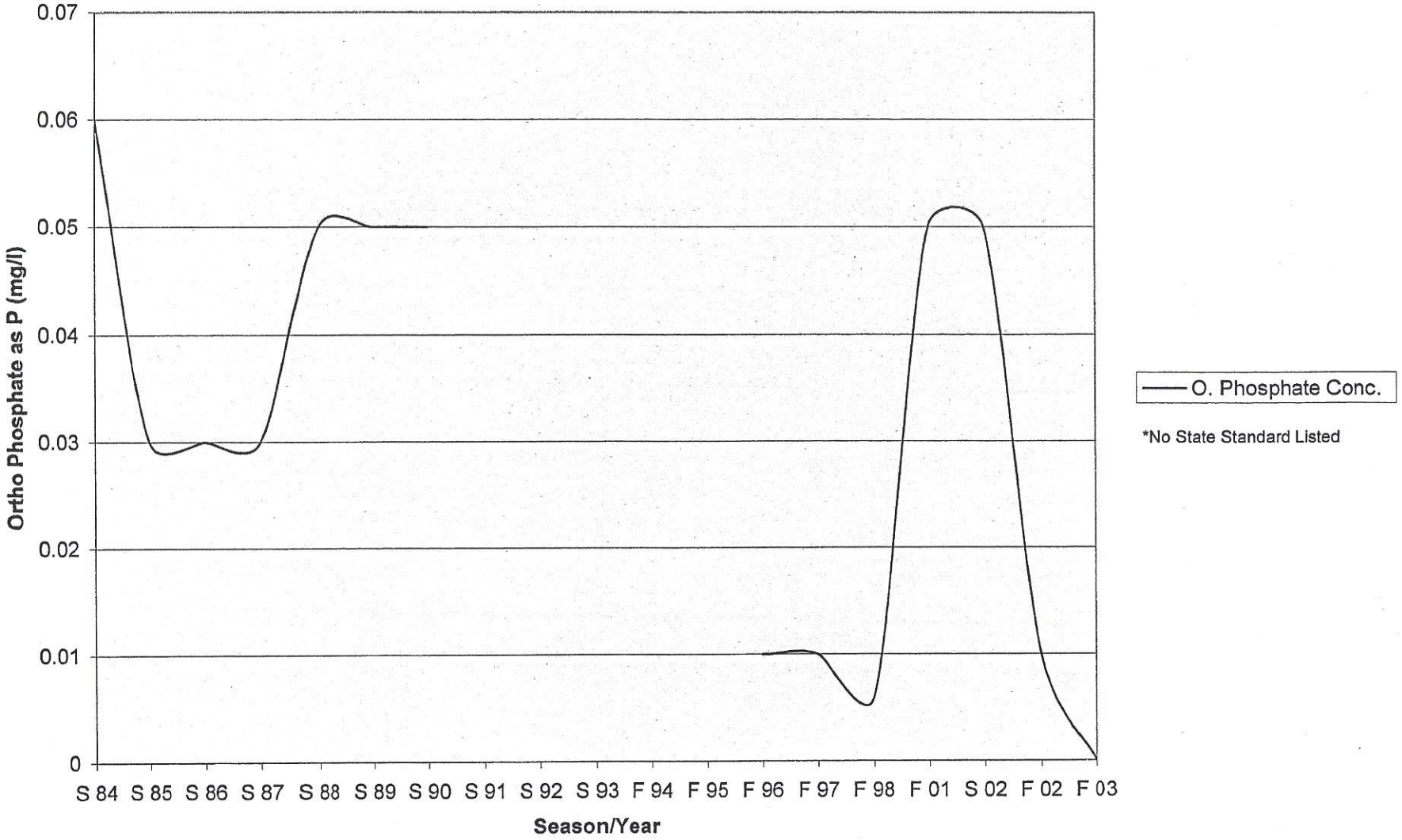
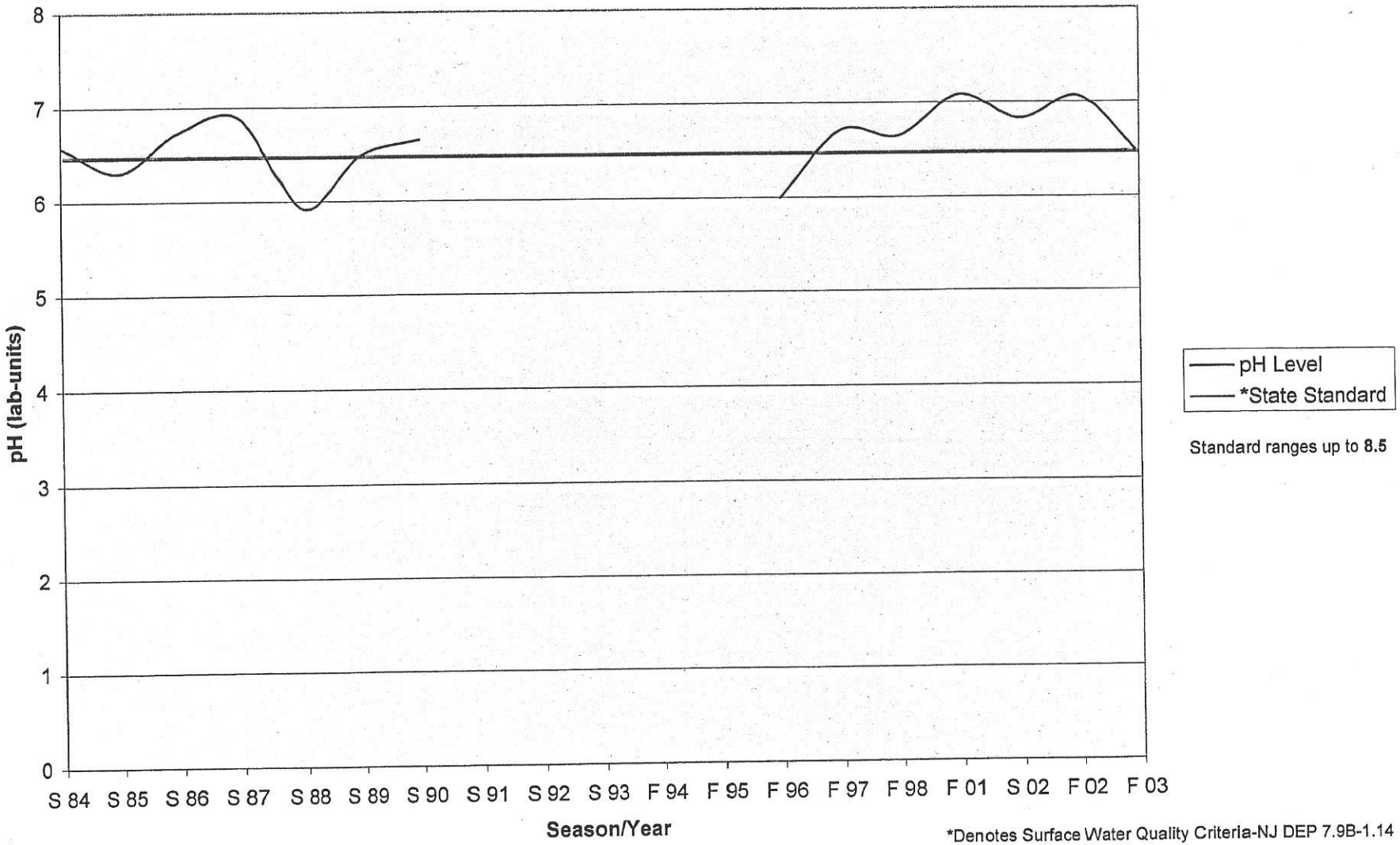
Site 2 (Trout Brook) - Nitrite as N



Site 2 (Trout Brook) - Ortho Phosphate as P



Site 2 (Trout Brook) - pH



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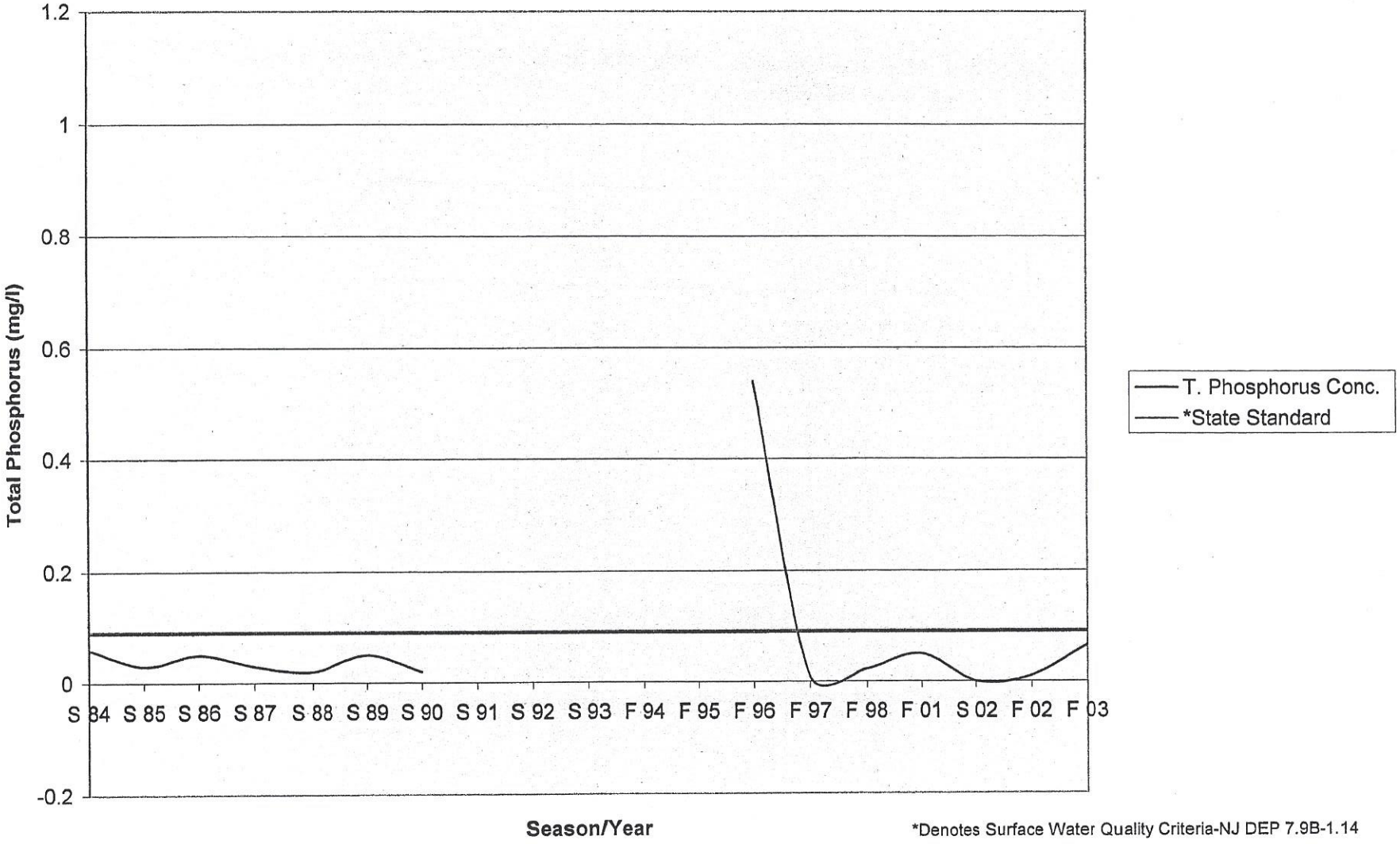
Site 2 (Trout Brook) - Total Phosphorus



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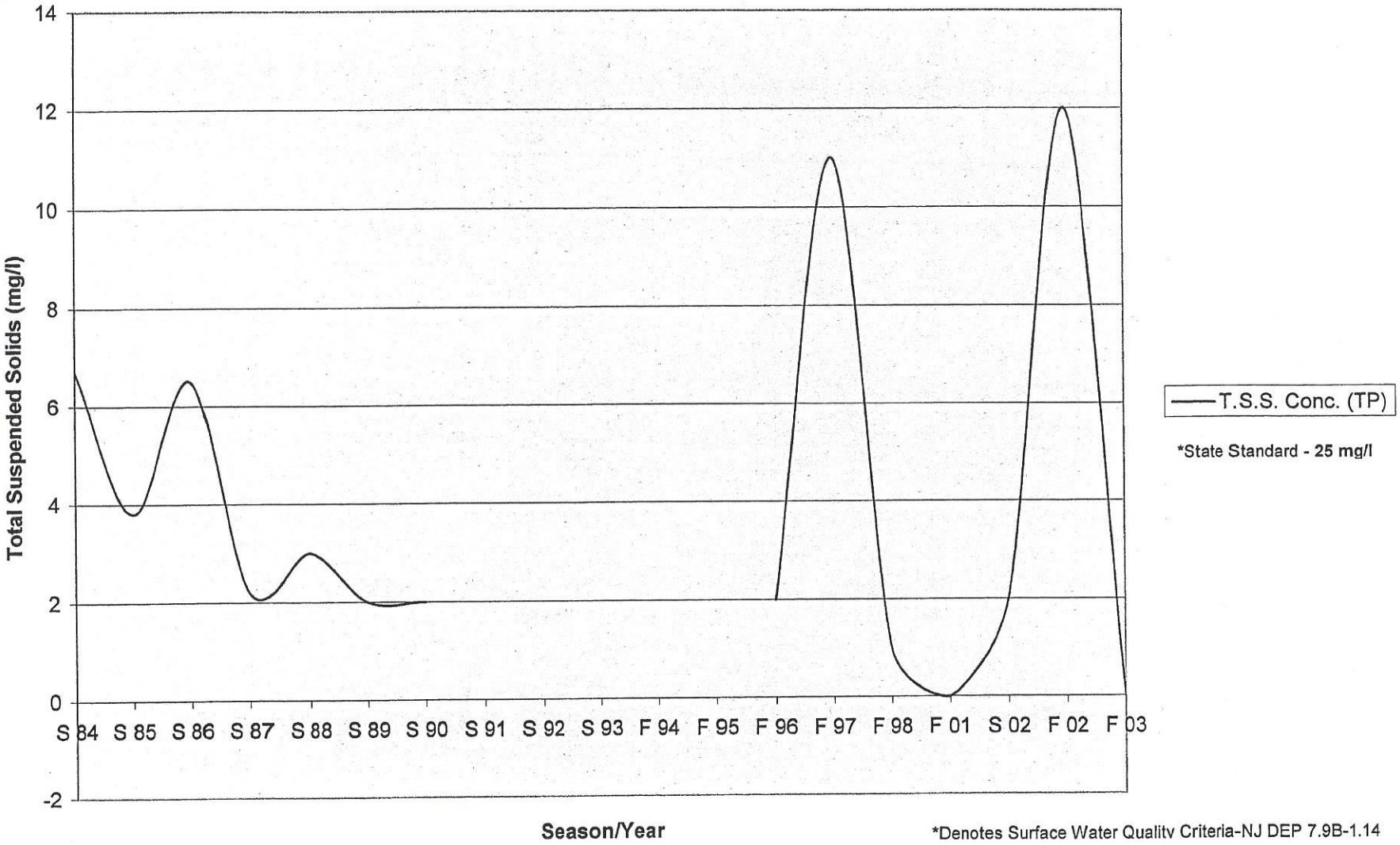
Site 2 (Trout Brook) - Total Suspended Solids



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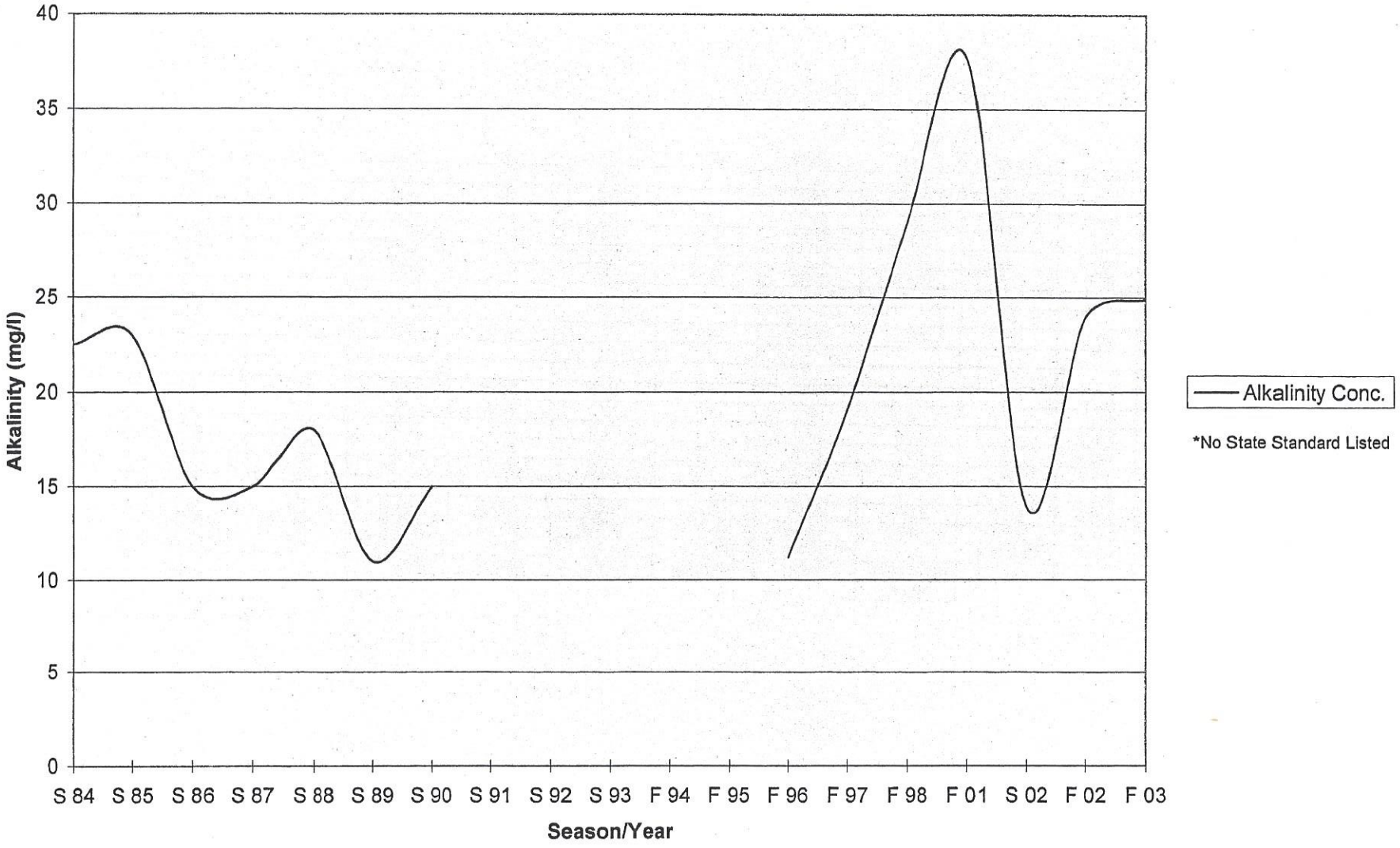
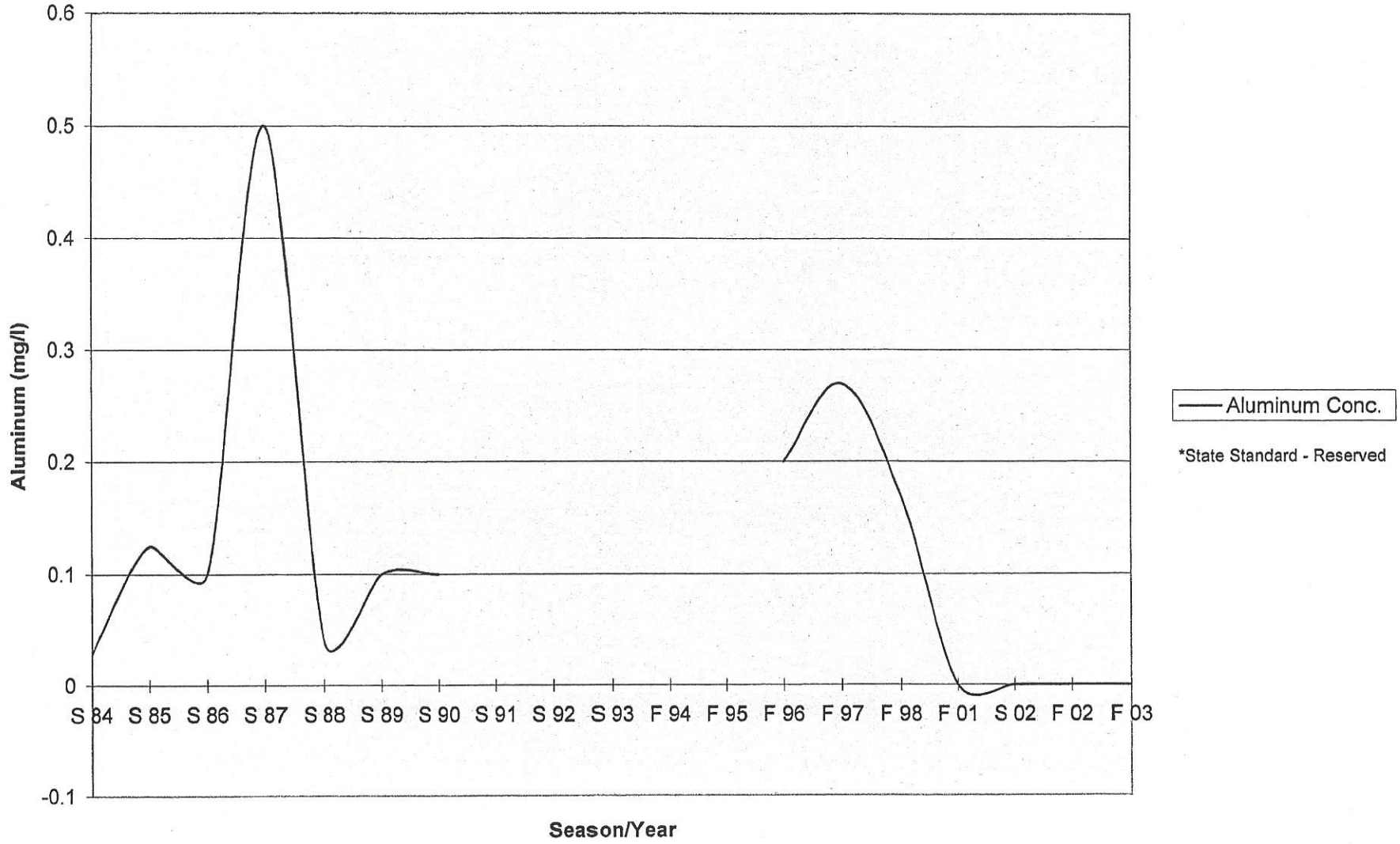
Stillwater Township Environmental Commission
Water Chemistry Data Set - Site 3: Trout Brook

Year	Fecal Coliforms (col/100ml)	Conductivity (umhos)	pH (lab-units)	Ammonia as N (mg/l)	Nitrite as N (mg/l)	Nitrate as N (mg/l)	Kjeldhal Nitrogen (mg/l)	Total Phosphorus (mg/l)	Ortho Phosphate as P (mg/l)	Alkalinity (mg/l)	Lead (mg/l)	Aluminum (mg/l)	Total Suspended Solids (mg/l)
S 84	40	100	6.9	0.05	0.001	0.009	0.06	0.065	0.065	22.5	0.003	0.029	4.1
S 85		115	6.81	0.5	0.002	0.07	0.5	0.03	0.03	23	0.003	0.125	2.1
S 86	80	180	7.42	0.1	0.002	0.07	0.6	0.03	0.03	15	0.01	0.1	6.5
S 87	30	100	7.44	0.1	0.01	0.1	0.3	0.03	0.03	15	0.004	0.5	0.8
S 88	4	141	6.23	0.2	0.02	0.02	0.5	0.02	0.02	18	0.004	0.04	2
S 89	27	84	6.99	0.2	0.02	0.02	0.5	0.05	0.05	11	0.004	0.1	3
S 90	4	92	7.25	0.2	0.05	0.05	0.5	0.023	0.025	15	0.004	0.1	2
S 91													
S 92													
S 93	110	133	7.46	0.2	0.05	0.54	0.5	0.015	0.05	31	0.05		2
F 94													
F 95													
F 96	63	89	6.12	0.05	0.01	0.03	0.27	0.064	0.049	11.2	0.05	0.2	2
F 97	18	132	7.23	0.03	0.01	0.052	0.42	0.014	0.007	19.1	0.004	0.27	10
F 98	8	134	7.41	0.03	0.008	0.063	3.68	0.016	0.007	29	0.004	0.17	3
F 01	10	185	7.5	0.1	0.2	0.5	1	0.05	ND	37.7	0.005	ND	ND
S 02	20	122	7.31	0.1	ND	0.5	1	0.05	ND	13.9	0.005	ND	3
F 02	10	178	7.46	0.1	0.02	0.5	1	0.01	0.01	23.9	0.005	ND	ND
F 03	10	114	6.85	ND	ND	ND	ND	0.206	ND	24.9	ND	ND	ND

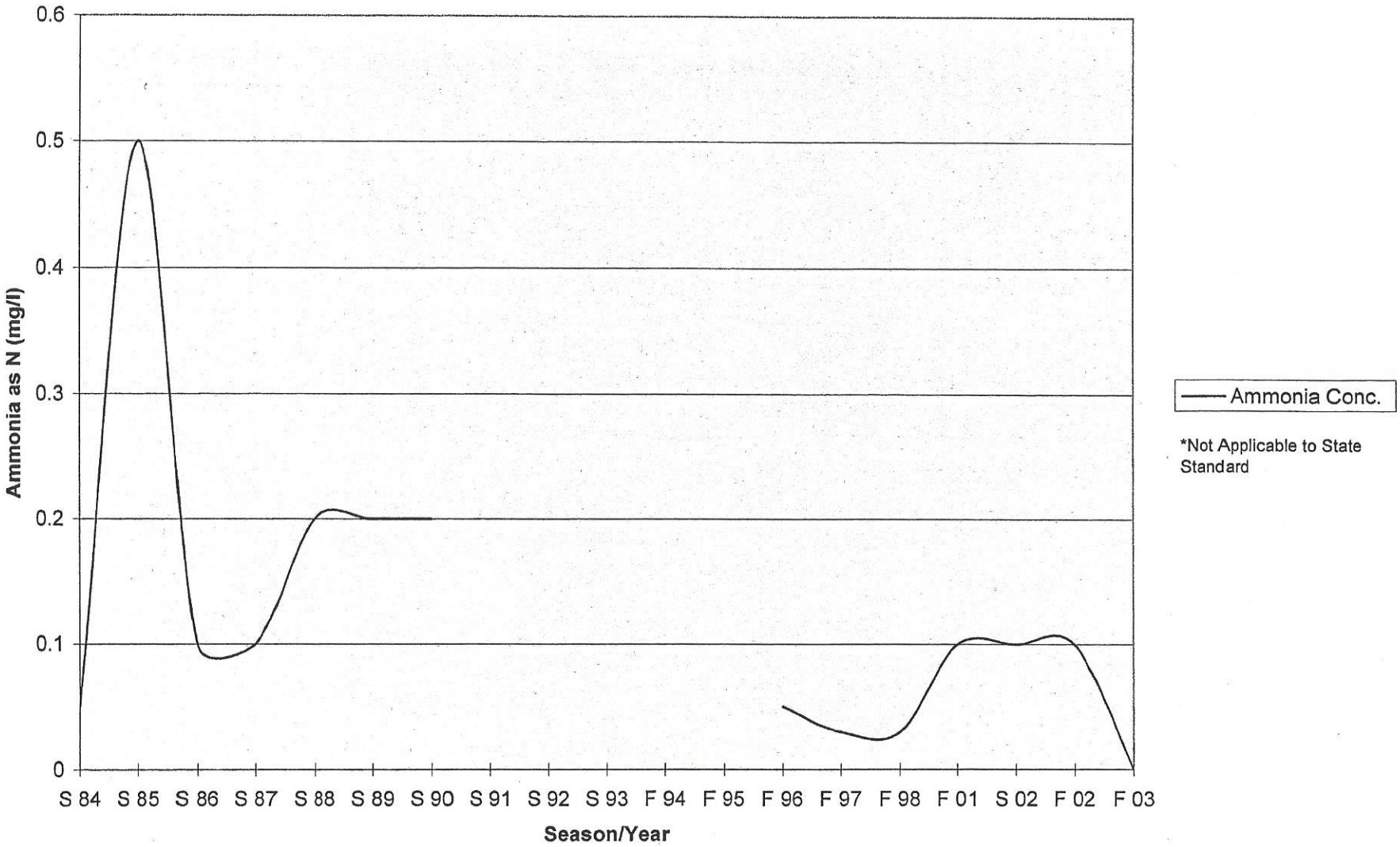
Site 3 (Trout Brook) - Alkalinity



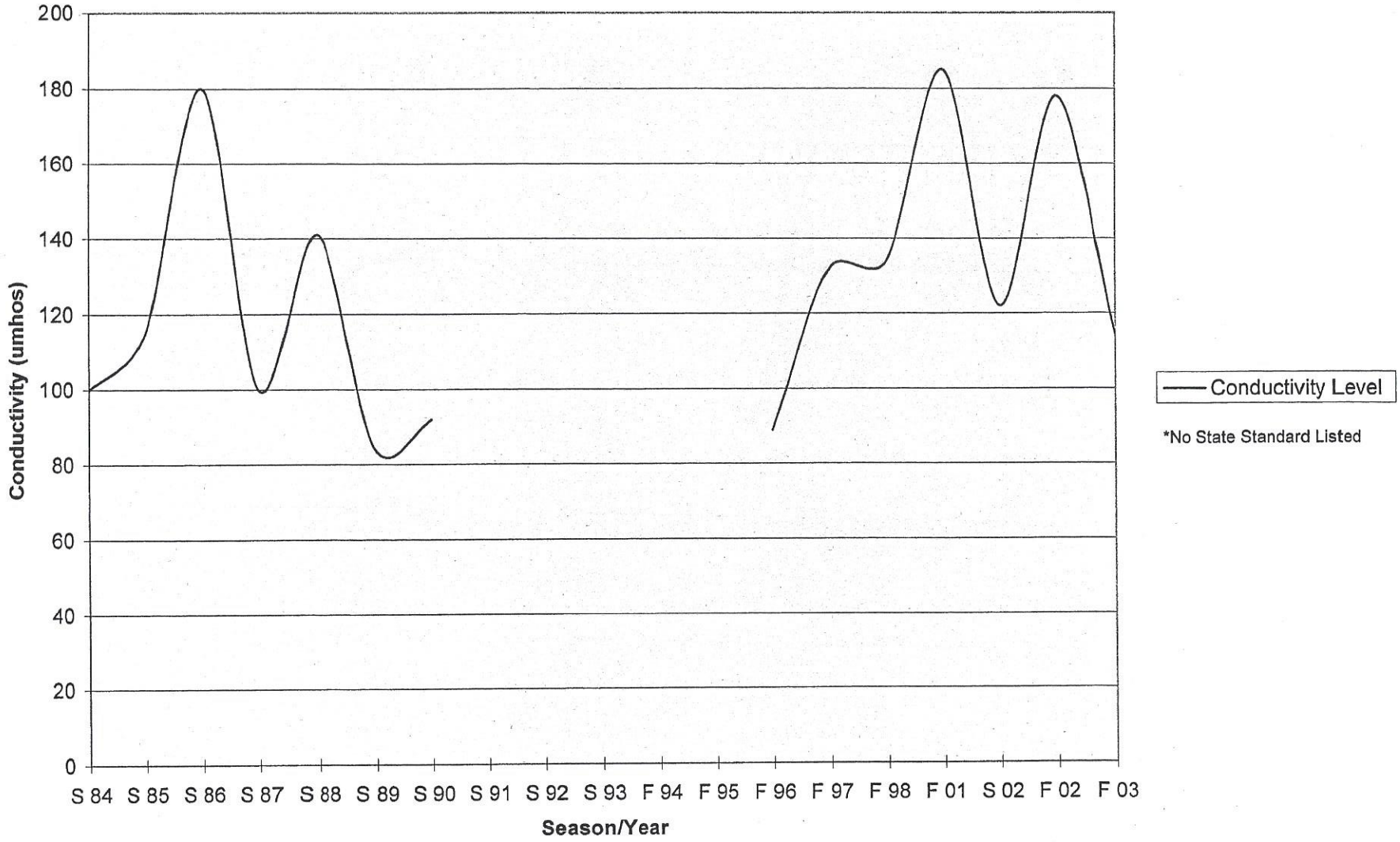
Site 3 (Trout Brook) - Aluminum



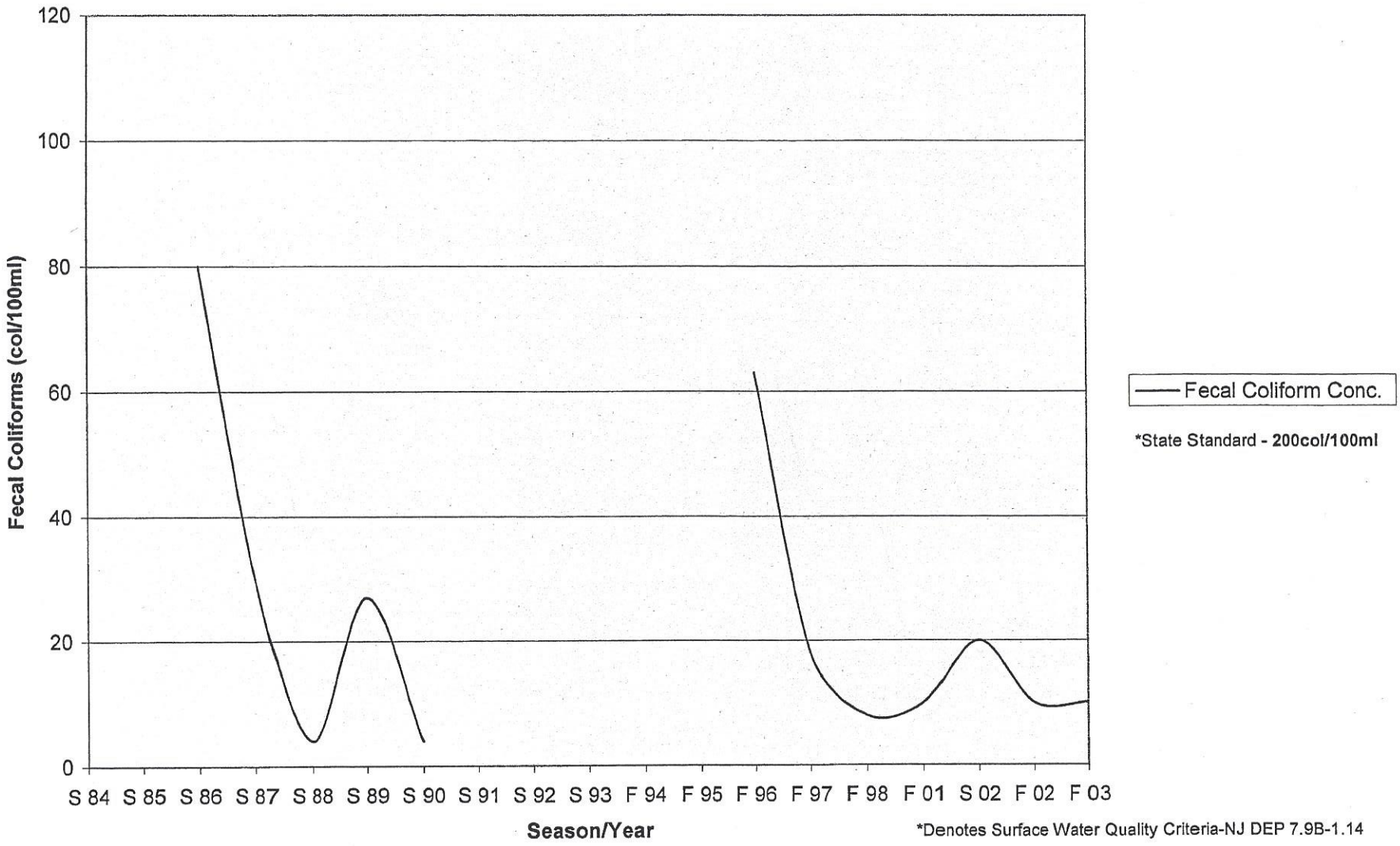
Site 3 (Trout Brook) - Ammonia as N



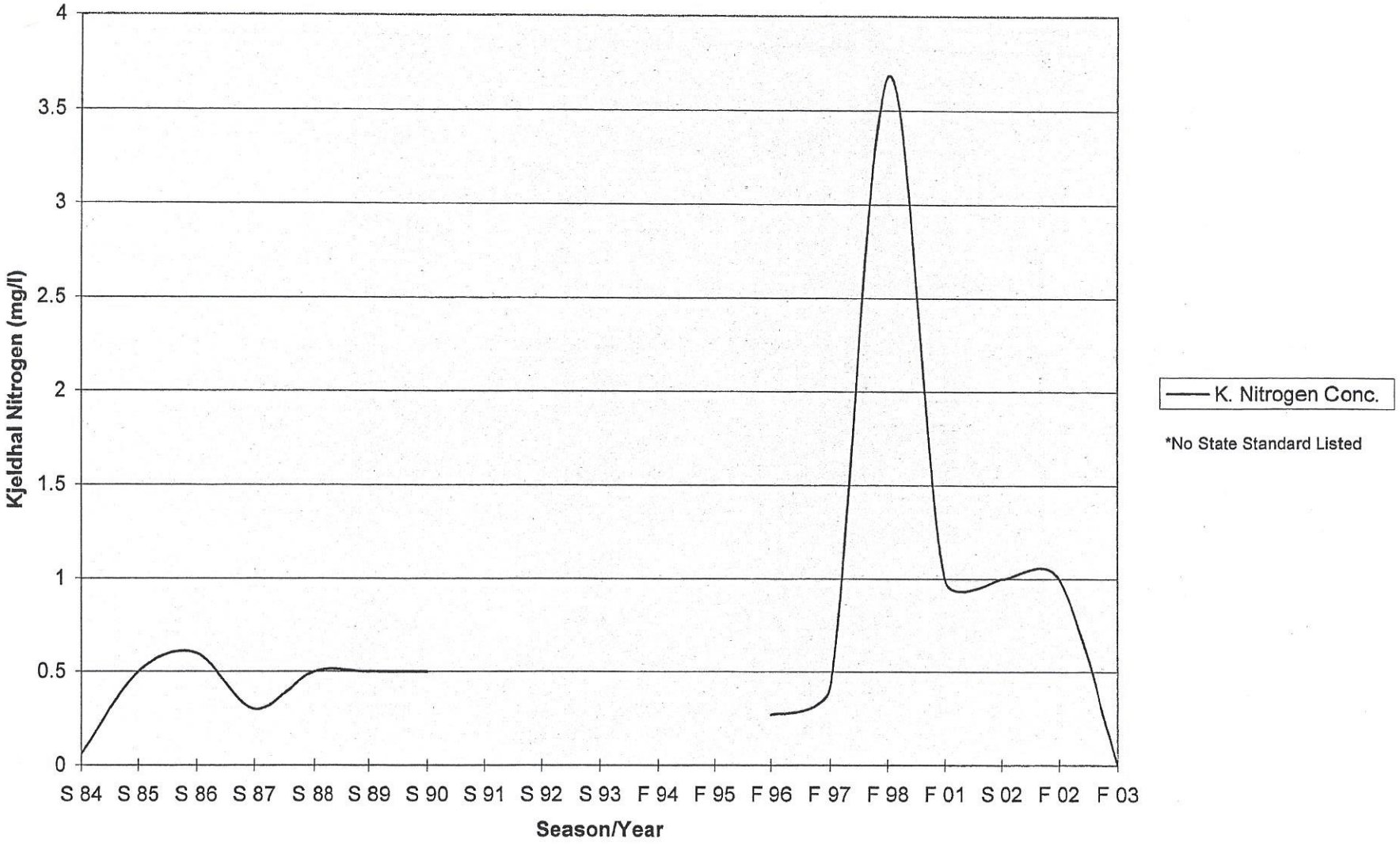
Site 3 (Trout Brook) - Conductivity



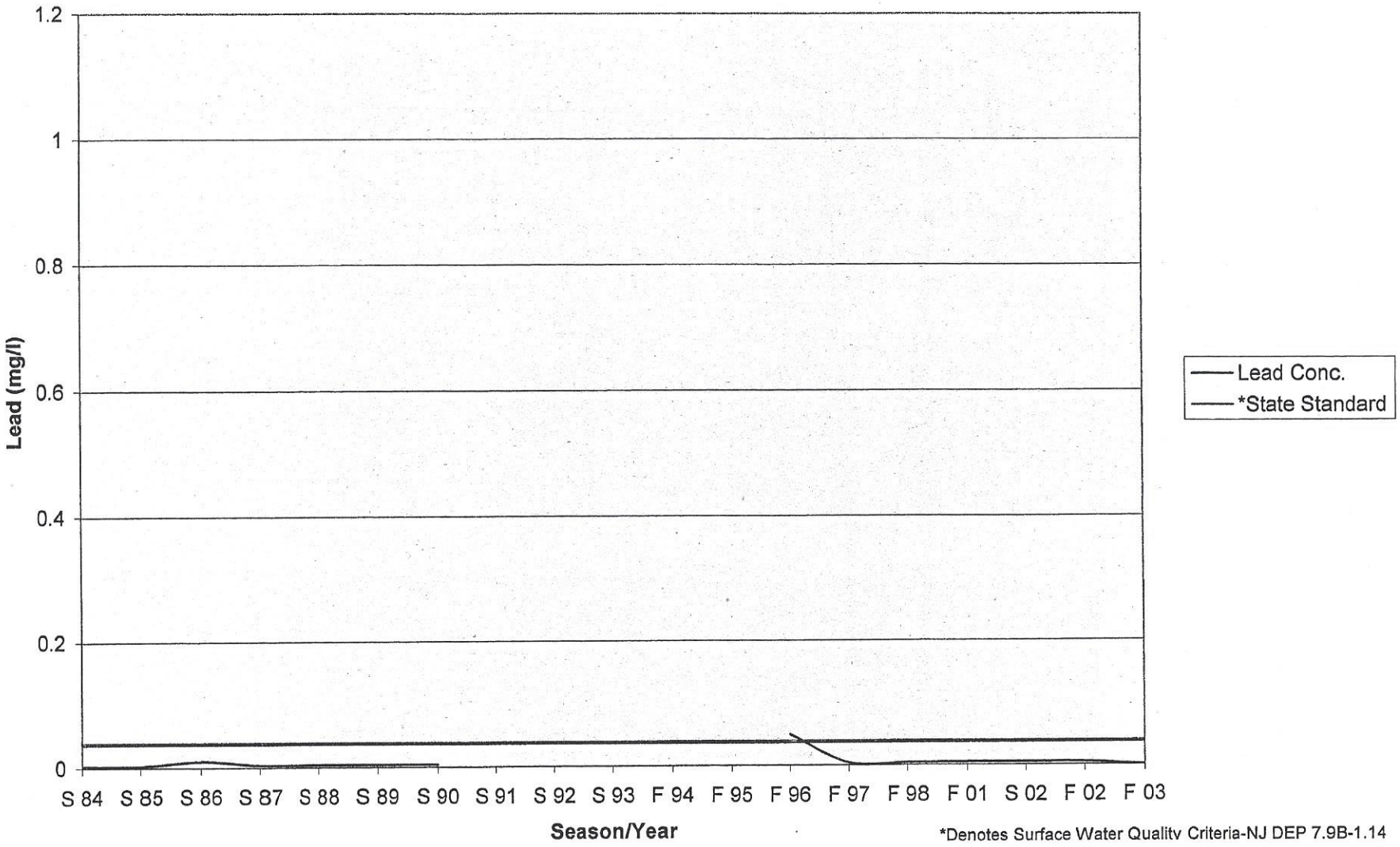
Site 3 (Trout Brook) - Fecal Coliforms



Site 3 (Trout Brook) - Kjeldhal Nitrogen

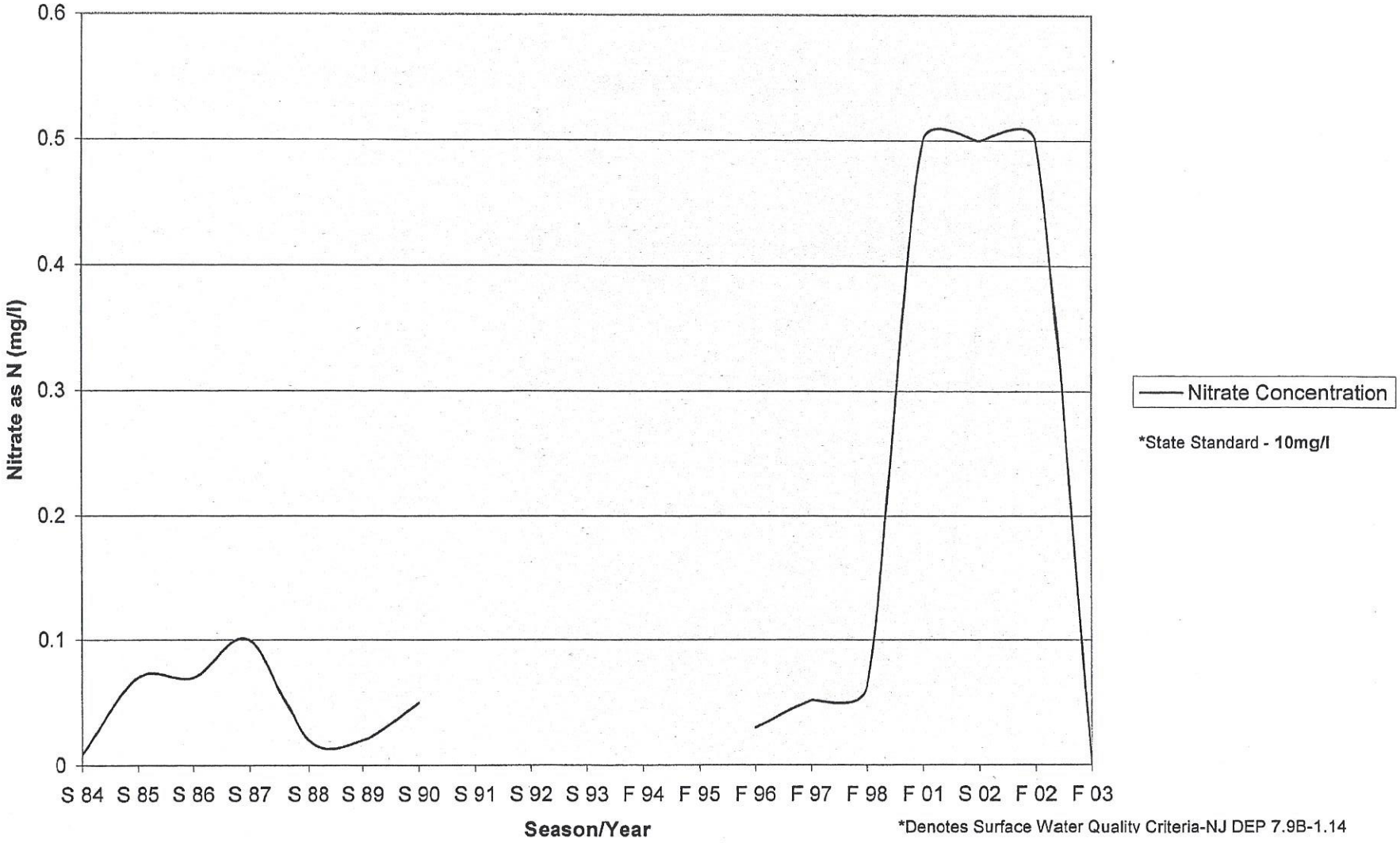


Site 3 (Trout Brook) - Lead



*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

Site 3 (Trout Brook) - Nitrate as N

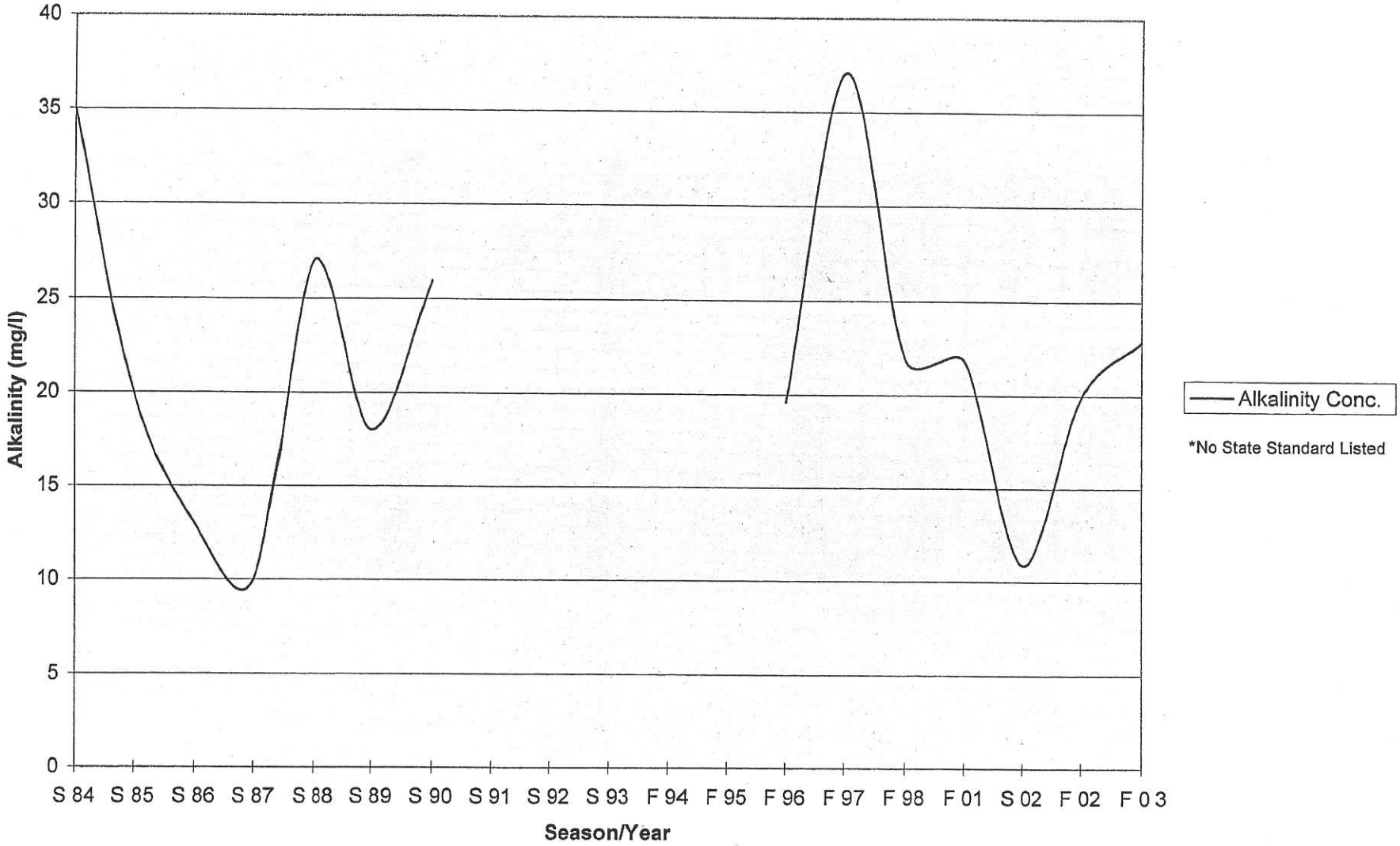


*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

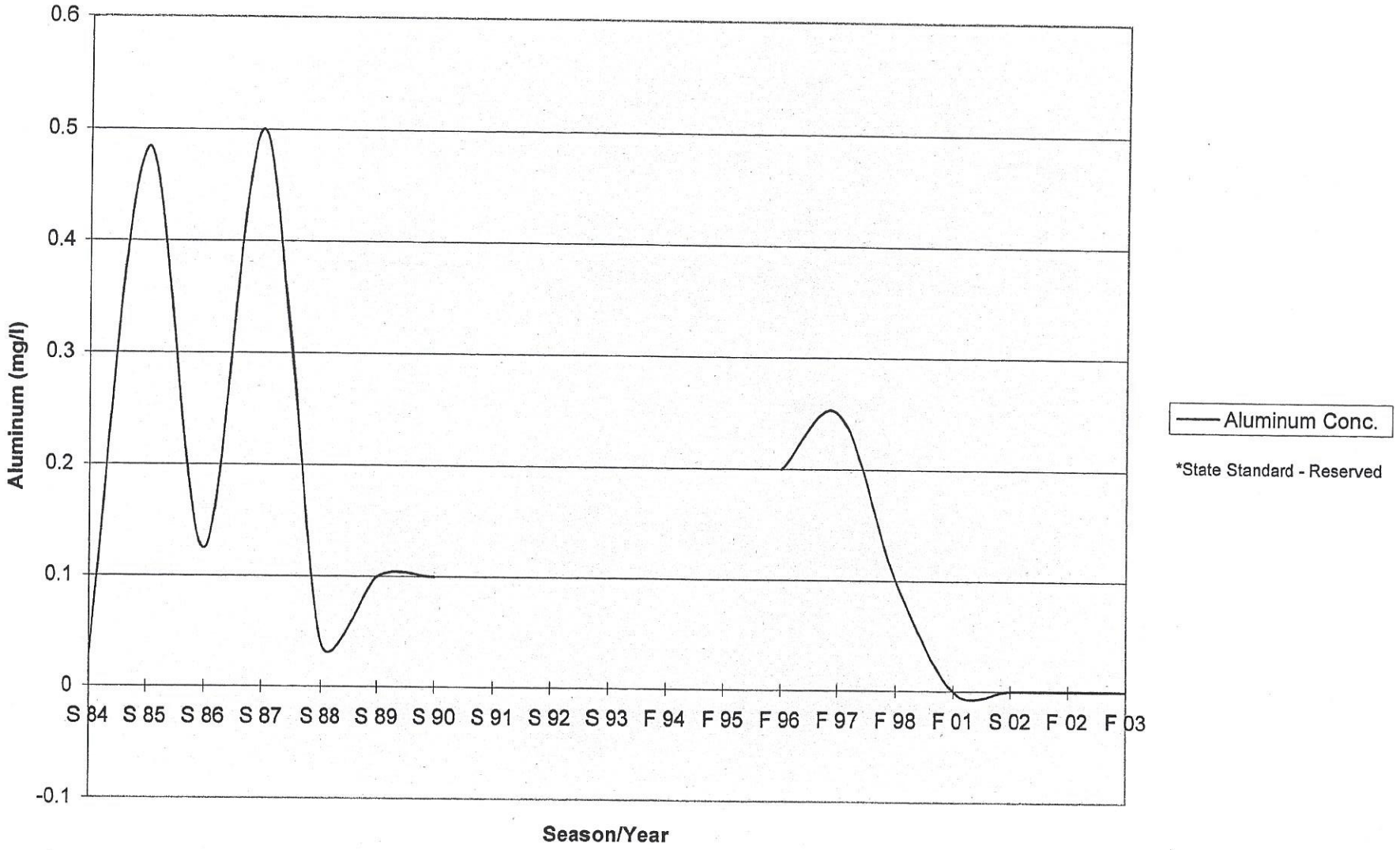
Stillwater Township Environmental Commission
Water Chemistry Data Set - Site 4: Spring Brook

Year	Fecal Coliforms (col/100ml)	Conductivity (umhos)	pH (lab-units)	Ammonia as N (mg/l)	Nitrite as N (mg/l)	Nitrate as N (mg/l)	Kjeldhal Nitrogen (mg/l)	Total Phosphorus (mg/l)	Ortho Phosphate as P (mg/l)	Alkalinity (mg/l)	Lead (mg/l)	Aluminum (mg/l)	Total Suspended Solids (mg/l)
S 84	10	90	6.99	0.5	0.001	0.009	0.06	0.065	0.065	35	0.003	0.029	4.7
S 85		100	6.39	0.4	0.002	0.07	1.1	0.03	0.03	20	0.003	0.484	2.1
S 86	10	110	7.33	0.1	0.002	0.07	0.4	0.06	0.03	13	0.009	0.125	17.4
S 87	13	100	7.24	0.1	0.001	0.01	0.1	0.03	0.03	10	0.004	0.5	2.4
S 88	60	165	6.28	0.2	0.2	0.2	0.5	0.02	0.05	27	0.004	0.04	2
S 89	21	99	7.05	0.2	0.02	0.2	0.5	0.05	0.05	18	0.004	0.1	3
S 90	16	120	7.45	0.2	0.05	0.5	0.5	0.017	0.05	26	0.004	0.1	2
S 91													
S 92													
S 93	30	102	7.22	0.2	0.05	0.5	0.5	0.025	0.05	20.5	0.05		2
F 94													
F 95													
F 96	23	140	6.34	0.05	0.01	0.01	0.14	0.081	0.027	19.6	0.05	0.2	4
F 97	7	191	7.35	0.03	0.01	0.052	0.14	0.014	0.001	37.1	0.008	0.25	11
F 98	42	105	7.12	0.03	0.008	0.116	0.57	0.016	0.006	21.9	0.0045	0.1	1
F 01	10	156	7.29	0.1	0.2	0.5	1	0.05	0.05	21.8	0.005	ND	3
S 02	40	119	7	0.1	ND	0.5	1	ND	0.05	10.9	0.005	ND	2
F 02	10	148	7.41	0.1	0.02	0.5	1	0.01	0.01	19.9	0.005	ND	ND
F 03	10	116	6.81	ND	ND	ND	ND	ND	ND	22.9	ND	ND	ND

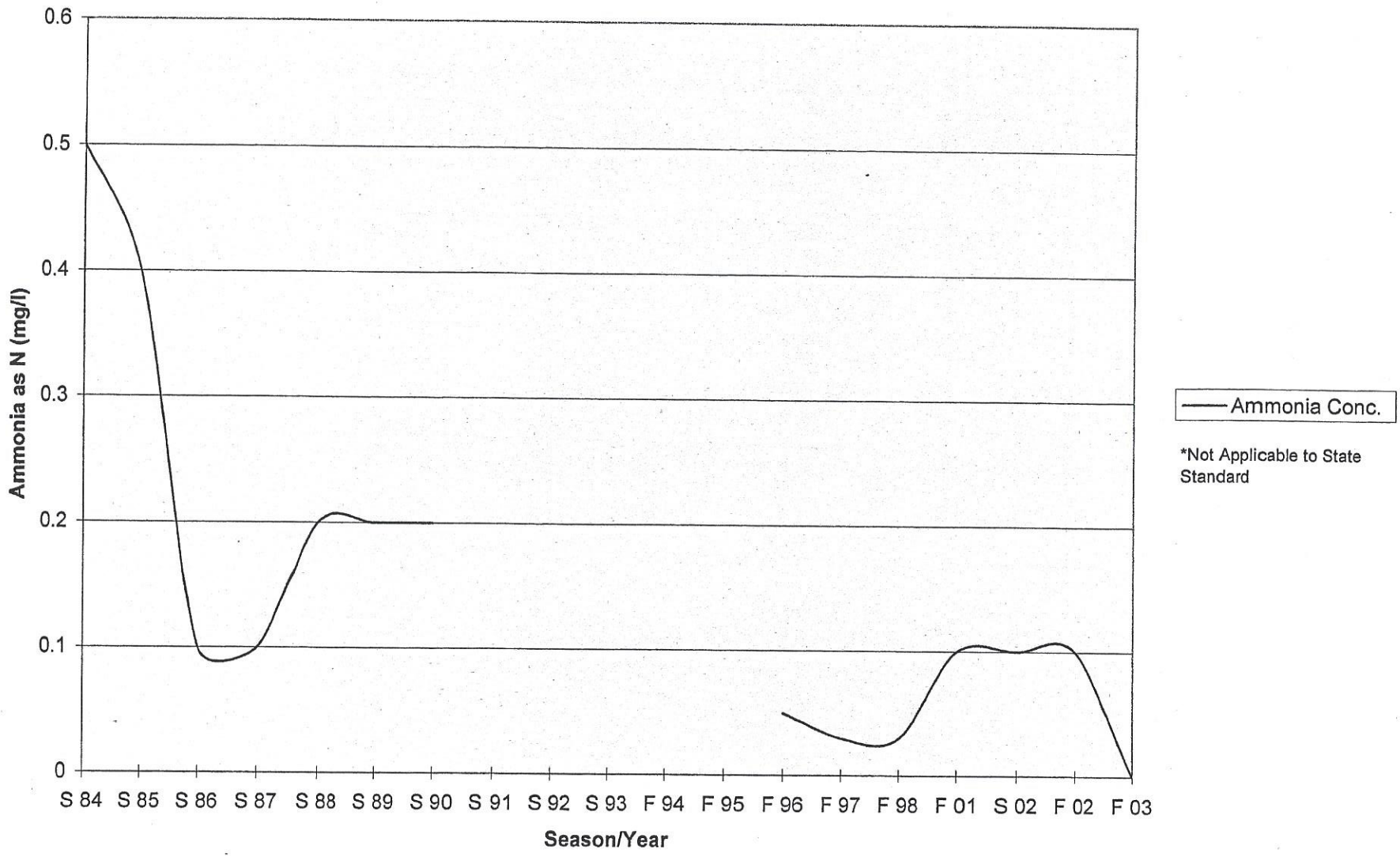
Site 4 (Spring Brook) - Alkalinity



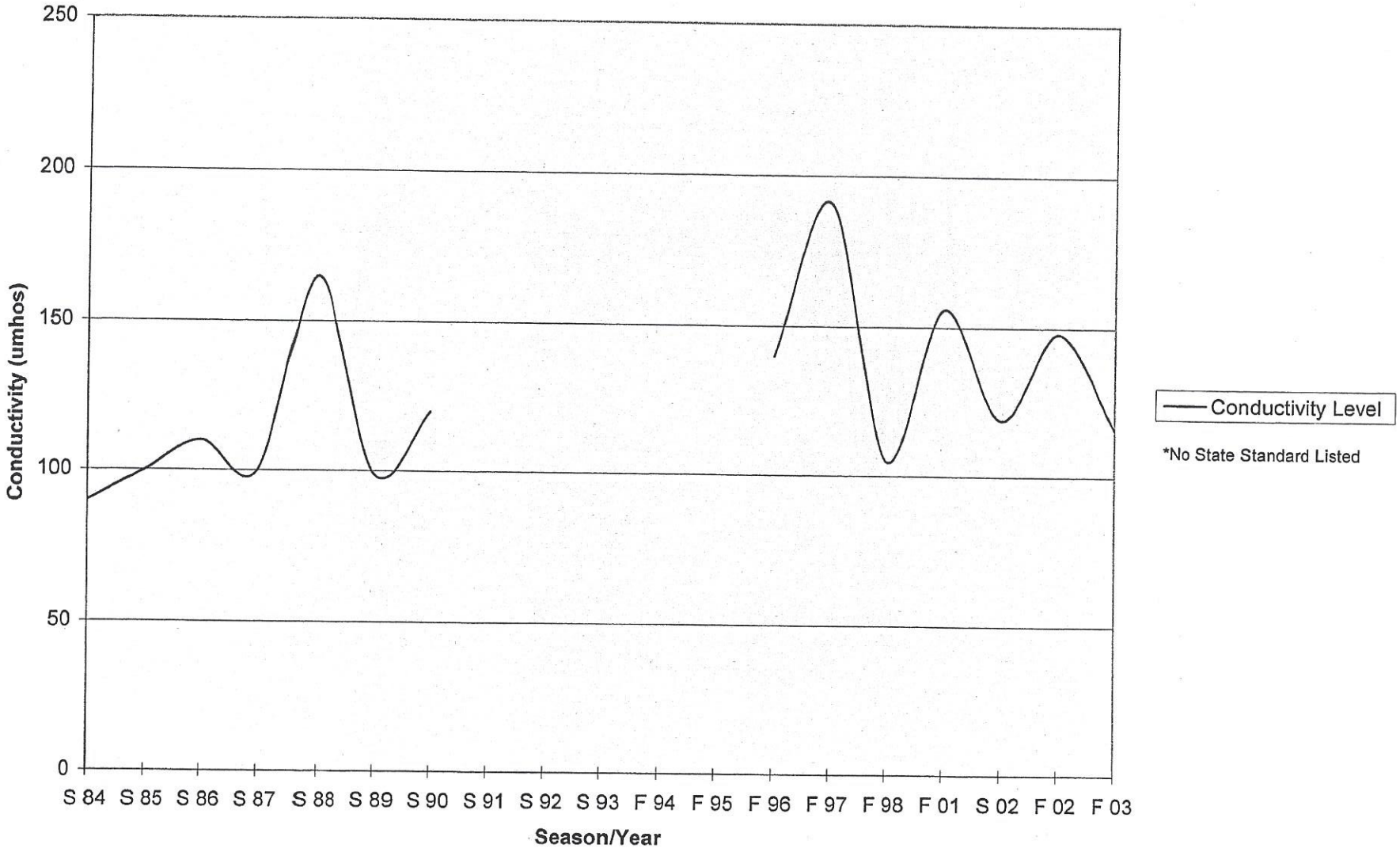
Site 4 (Spring Brook) - Aluminum



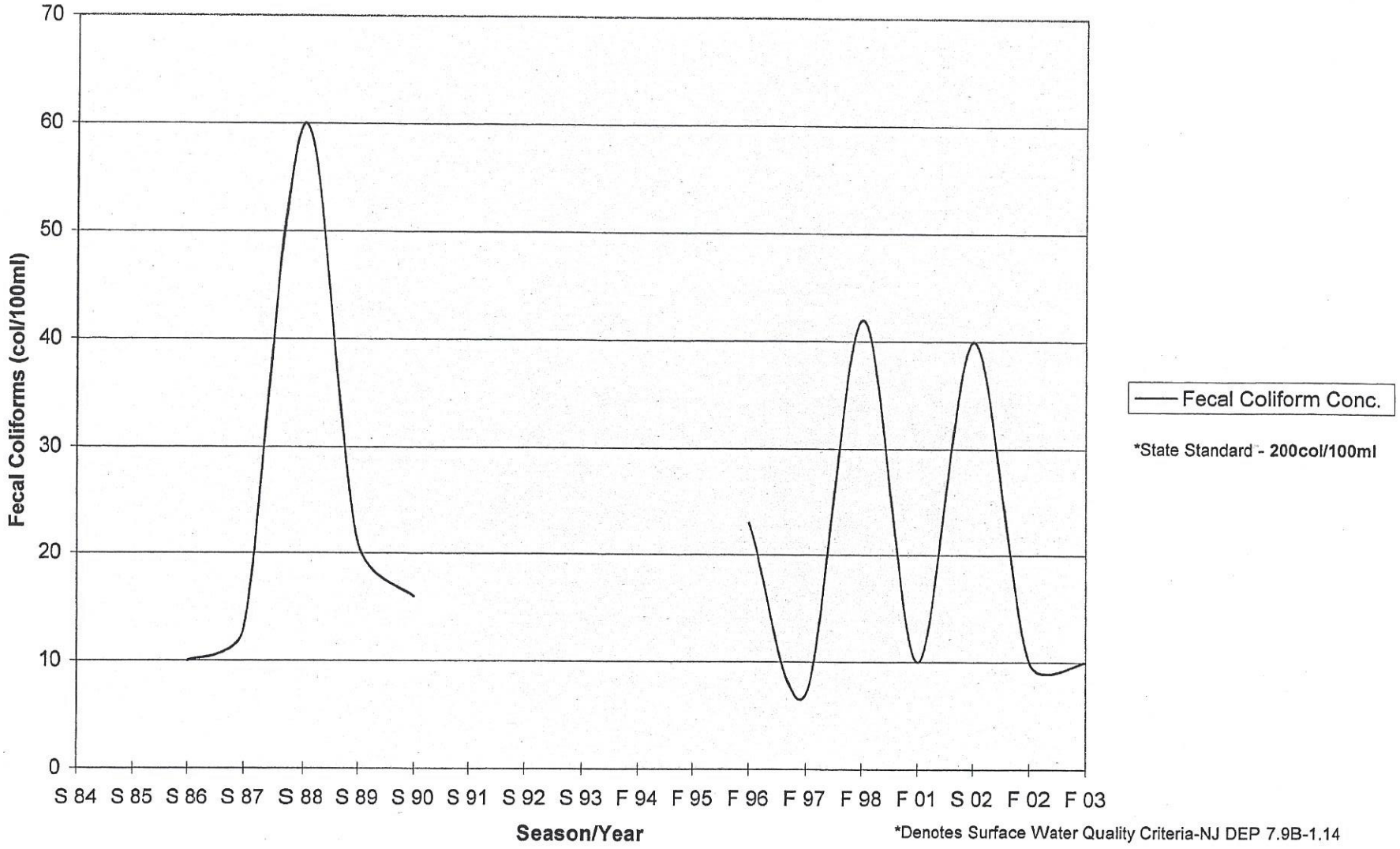
Site 4 (Spring Brook) - Ammonia as N



Site 4 (Spring Brook) - Conductivity

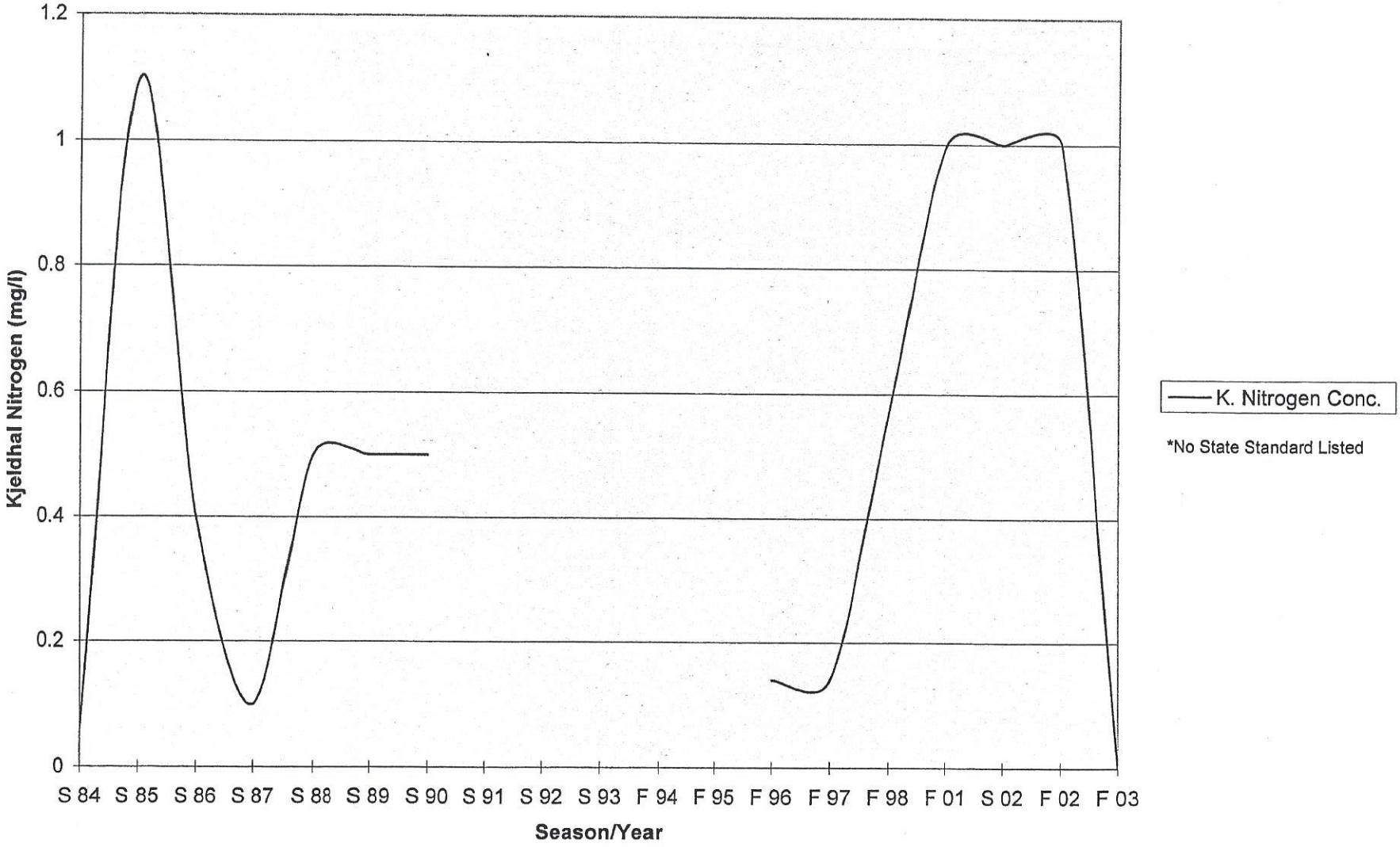


Site 4 (Spring Brook) - Fecal Coliforms

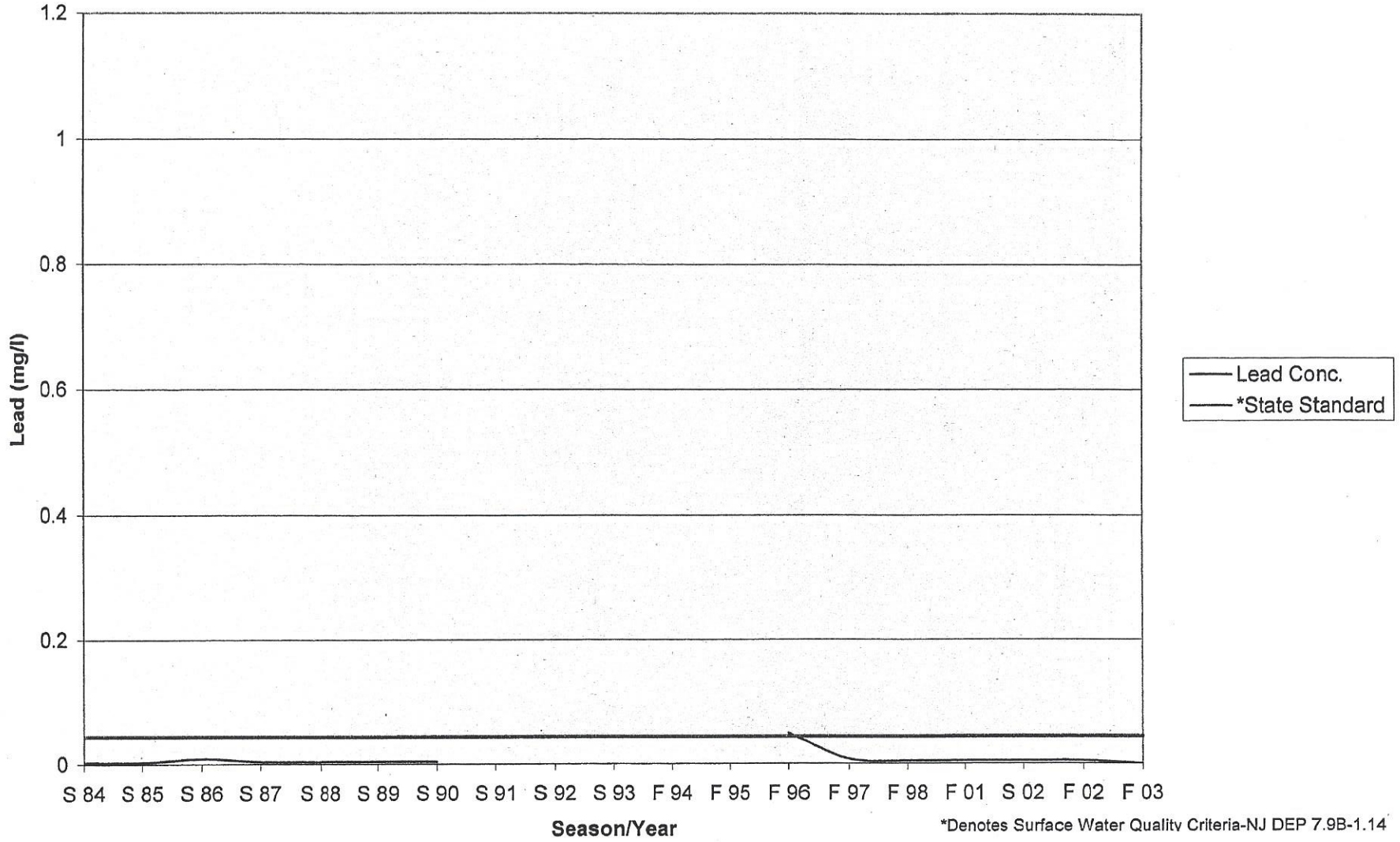


*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

Site 4 (Spring Brook) - Kjeldhal Nitrogen

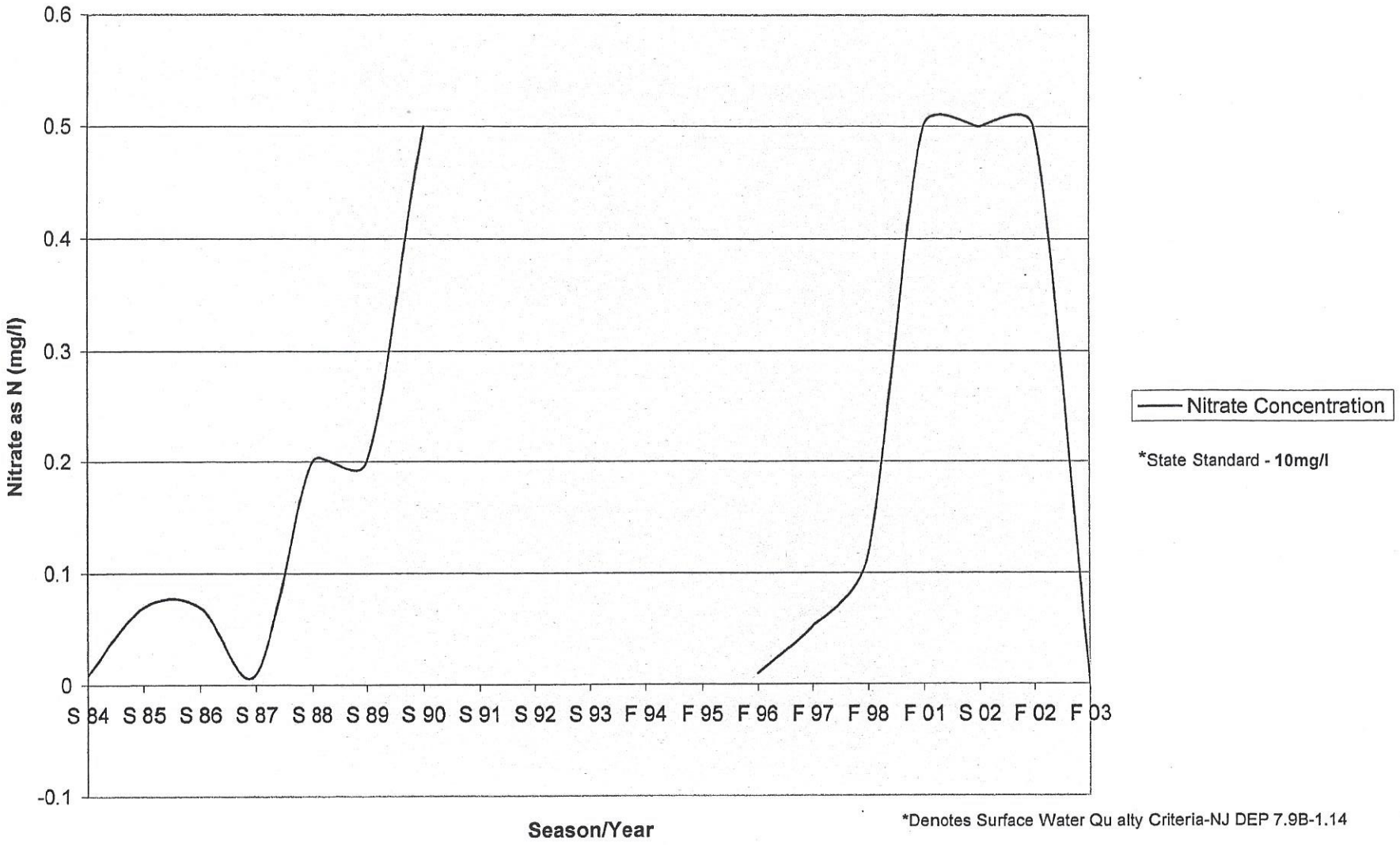


Site 4 (Spring Brook) - Lead



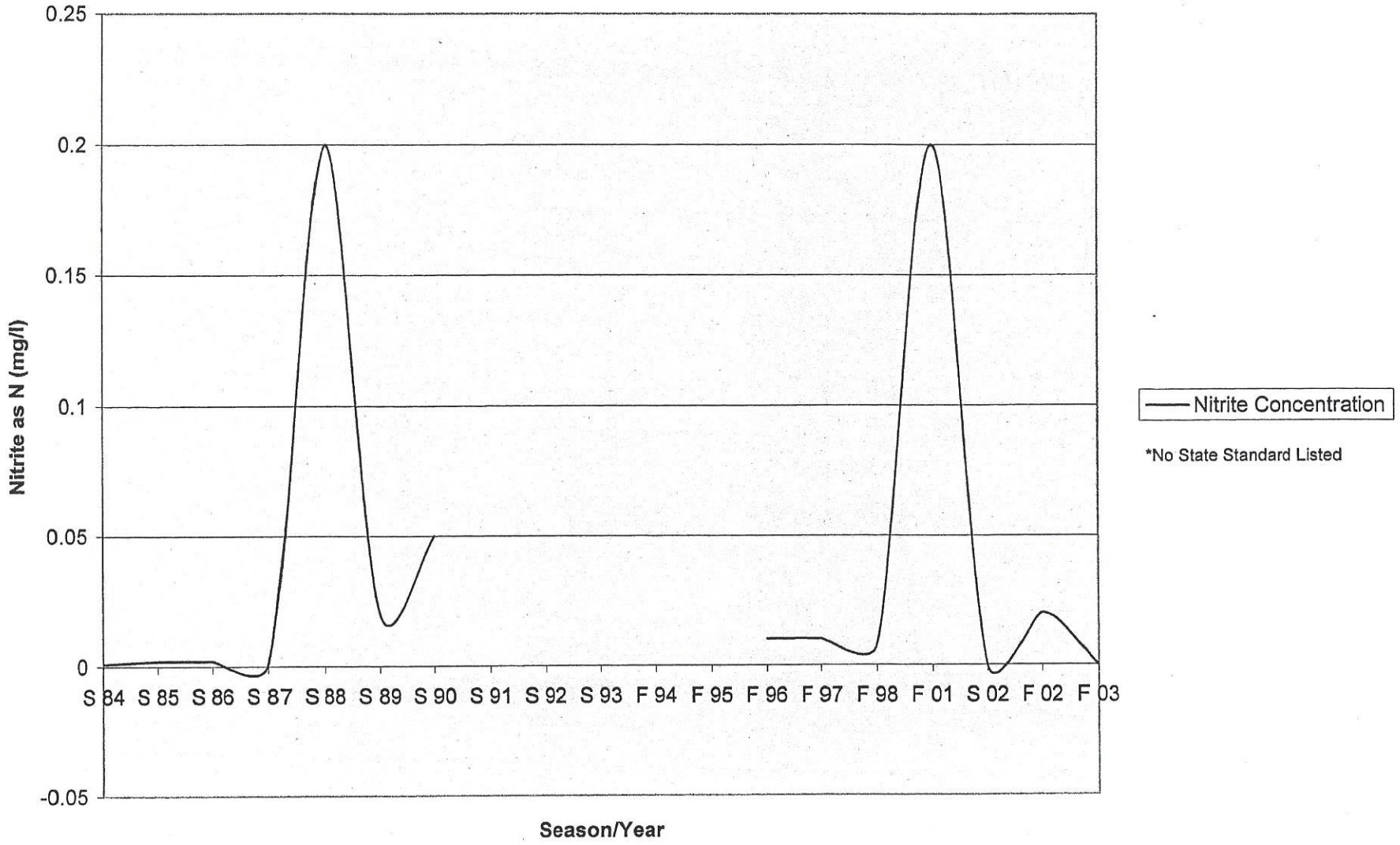
*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

Site 4 (Spring Brook) - Nitrate as N

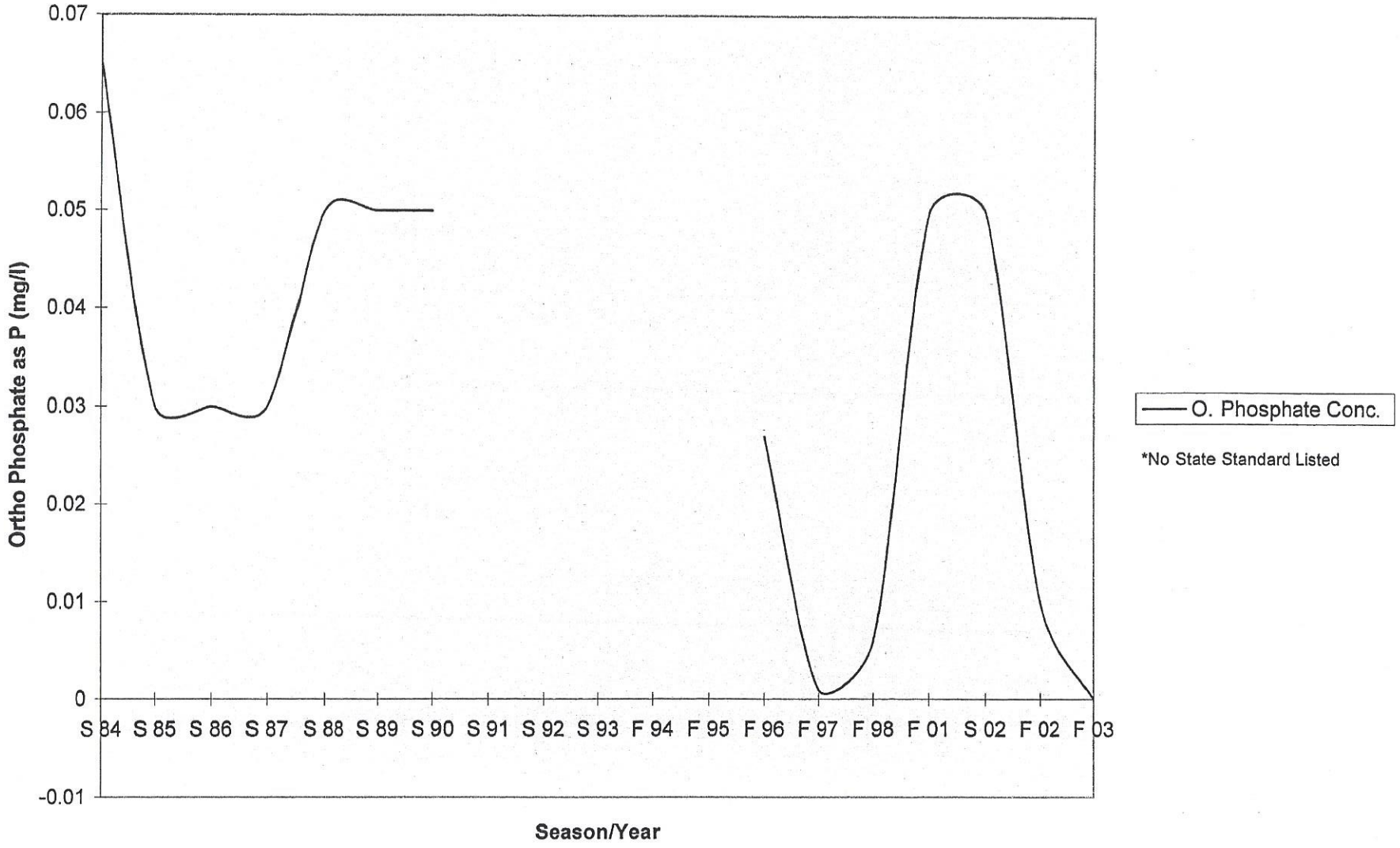


*Denotes Surface Water Qu alty Criteria-NJ DEP 7.9B-1.14

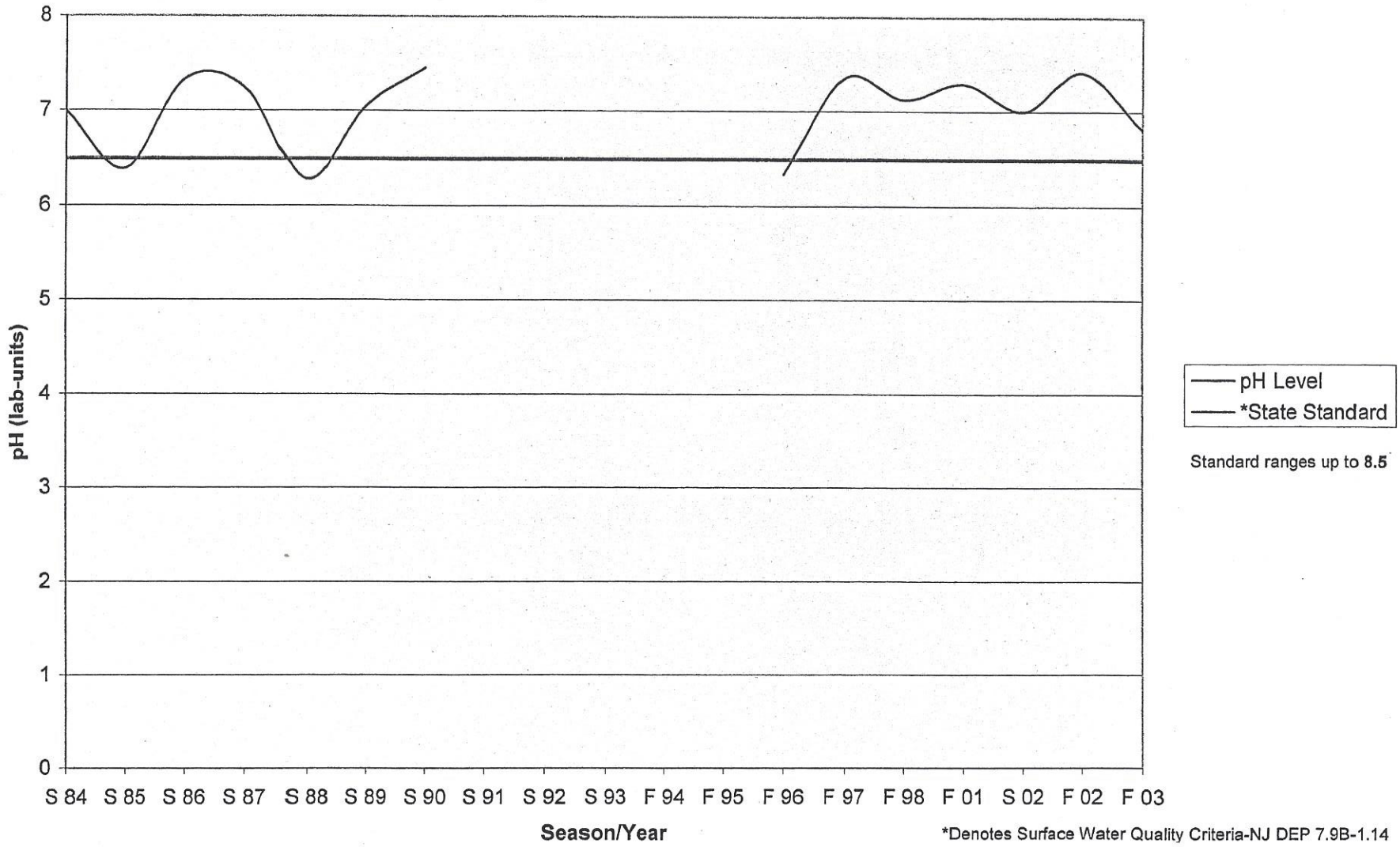
Site 4 (Spring Brook) - Nitrite as N



Site 4 (Spring Brook) - Ortho Phosphate as P

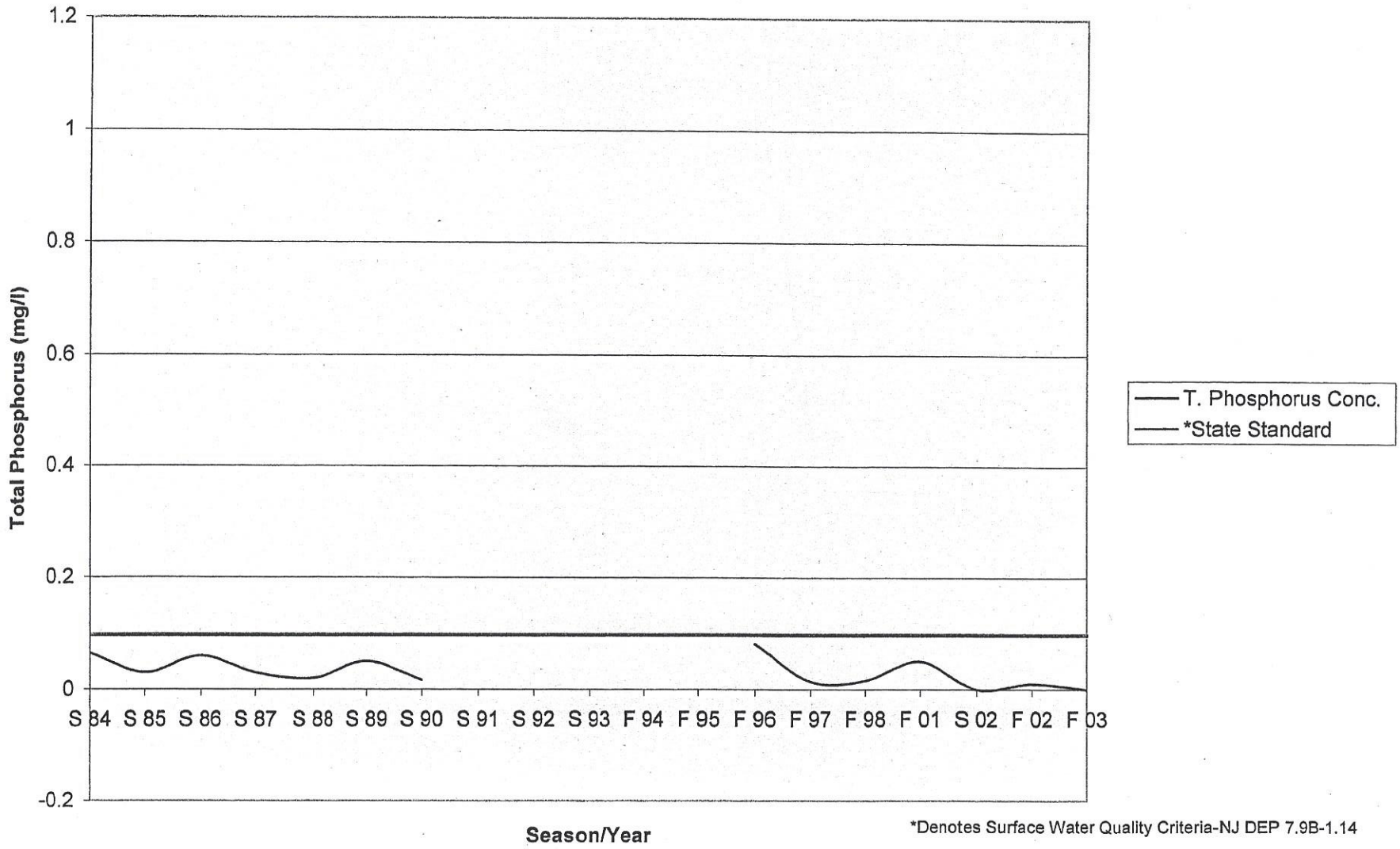


Site 4 (Spring Brook) - pH



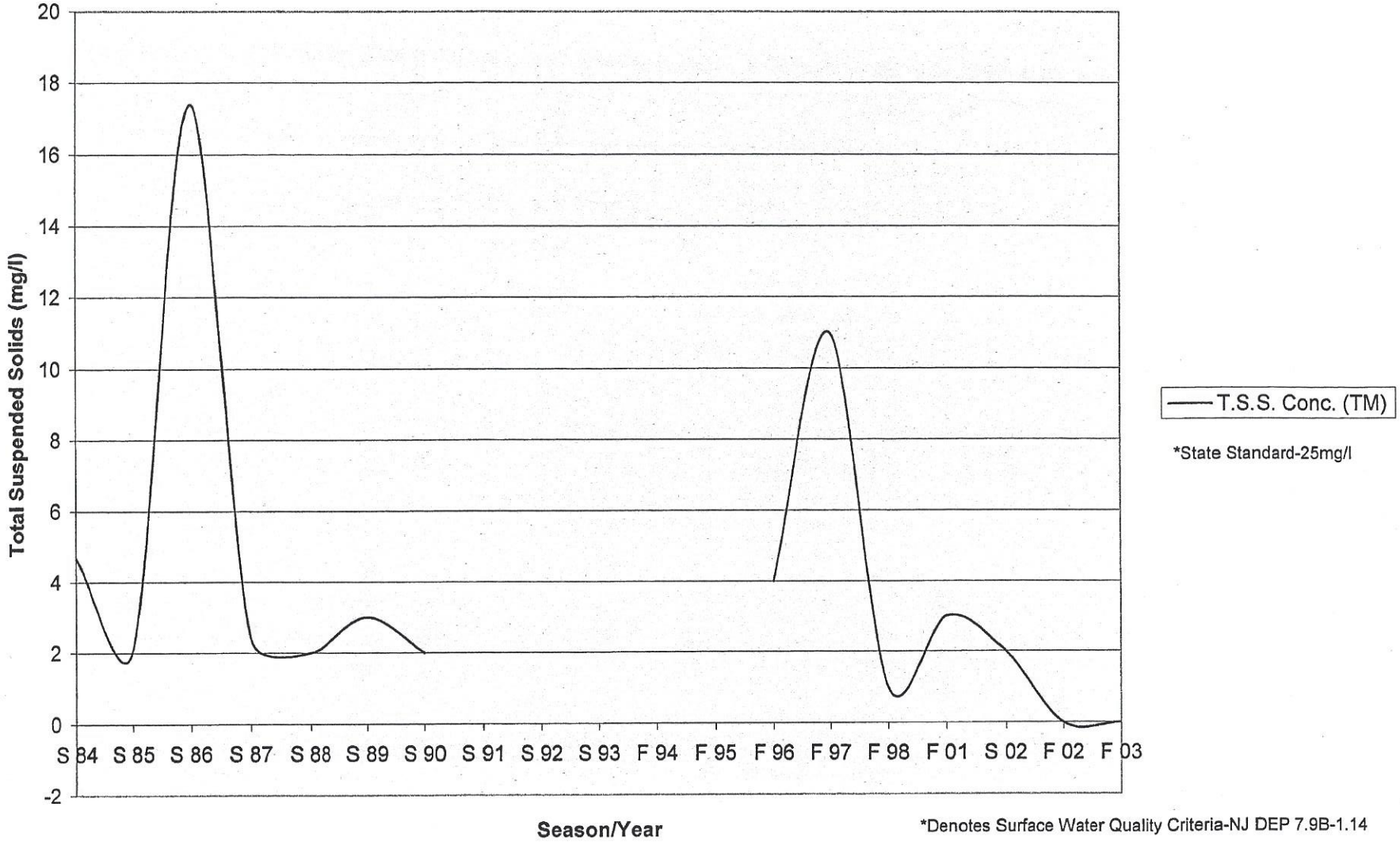
*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

Site 4 (Spring Brook) - Total Phosphorus



*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

Site 4 (Spring Brook) - Total Suspended Solids

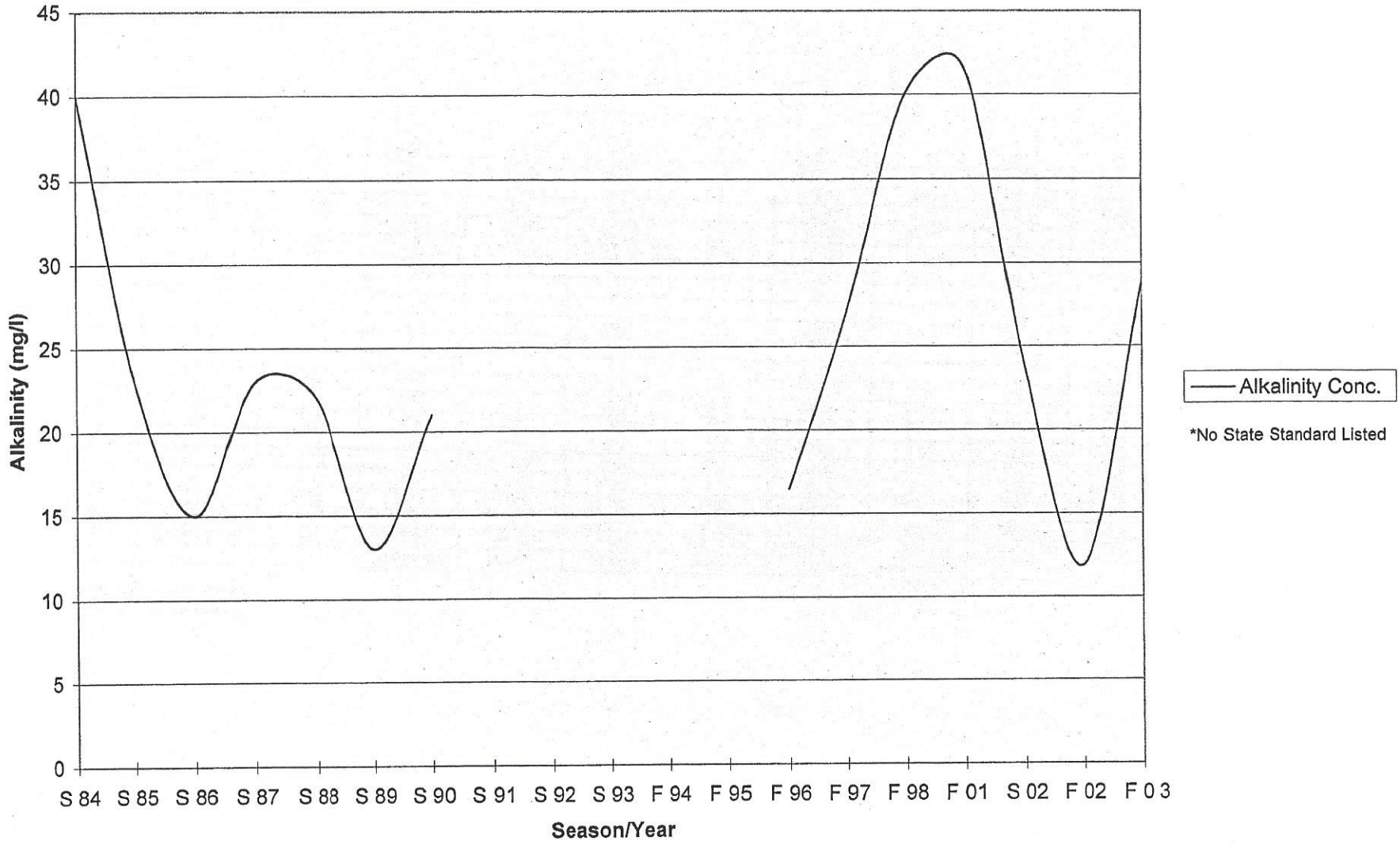


*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

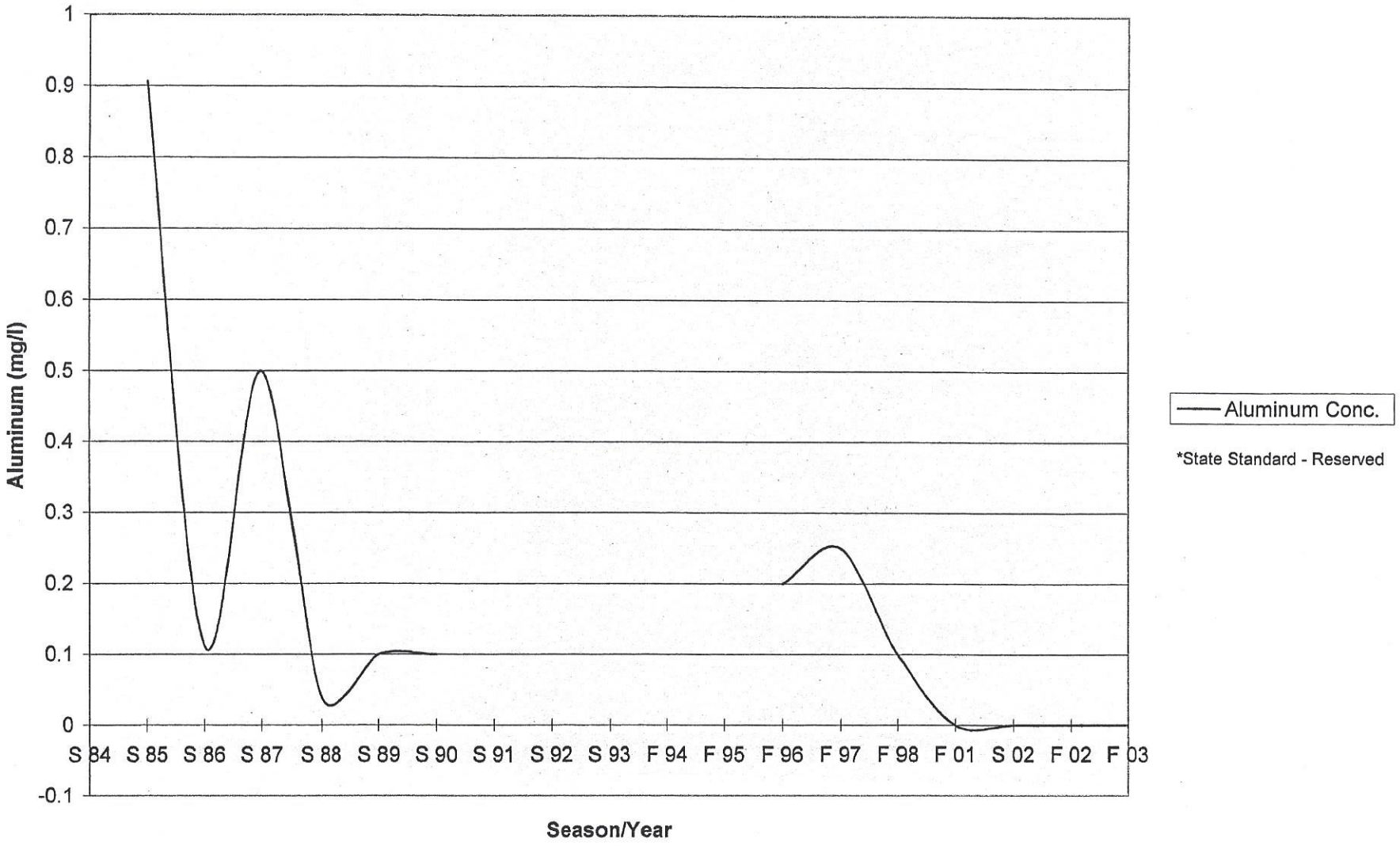
Stillwater Township Environmental Commission
Water Chemistry Data Set - Site 5: Spring Brook

Year	Fecal Coliforms (col/100ml)	Conductivity (umhos)	pH (lab-units)	Ammonia as N (mg/l)	Nitrite as N (mg/l)	Nitrate as N (mg/l)	Kjeldhal Nitrogen (mg/l)	Total Phosphorus (mg/l)	Ortho Phosphate as P (mg/l)	Alkalinity (mg/l)	Lead (mg/l)	Aluminum (mg/l)	Total Suspended Solids (mg/l)
S 84	30	140	6.93	0.05	0.001	0.009	0.06	0.065	0.065	40	0.006		2.7
S 85		110	6.42	0.3	0.002	0.002	1.3	0.03	0.03	23	0.006	0.906	2.8
S 86	100	120	7.26	0.1	0.005	0.07	0.3	0.04	0.03	15	0.009	0.113	3.3
S 87	70	110	7.18	0.1	0.01	0.1	0.1	0.03	0.03	23	0.004	0.5	2.2
S 88	60	152	6.58	0.2	0.02	0.2	0.5	0.01	0.03	22	0.004	0.04	3
S 89	300	93	7.34	0.2	0.02	0.2	0.5	0.05	0.05	13	0.004	0.1	2
S 90	248	103	7.58	0.2	0.05	0.5	0.5	0.016	0.05	21	0.004	0.1	2
S 91													
S 92													
S 93	23	164	7.23	0.2	0.05	0.88	0.5	0.03	0.05	35.05	0.05		65
F 94													
F 95													
F 96	70	112	6.54	0.05	0.01	0.01	0.27	0.034	0.025	16.5	0.05	0.2	1
F 97	2	152	7.43	0.03	0.01	0.052	0.14	0.014	0.007	27.1	0.016	0.25	14
F 98	136	152	6.99	0.03	0.008	0.042	3.68	0.016	0.006	40	0.0043	0.1	2
F 01	10	255	7.3	0.1	0.2	0.5	1	0.05	ND	41.7	0.005	ND	2
S 02	40	174	7.31	0.1	ND	0.5	1	0.05	ND	23.9	0.005	ND	3
F 02	10	133	7.25	0.1	0.02	0.5	1	0.01	0.01	11.9	0.005	ND	ND
F 03	10	141	7.04	ND	ND	ND	ND	ND	ND	28.9	ND	ND	ND

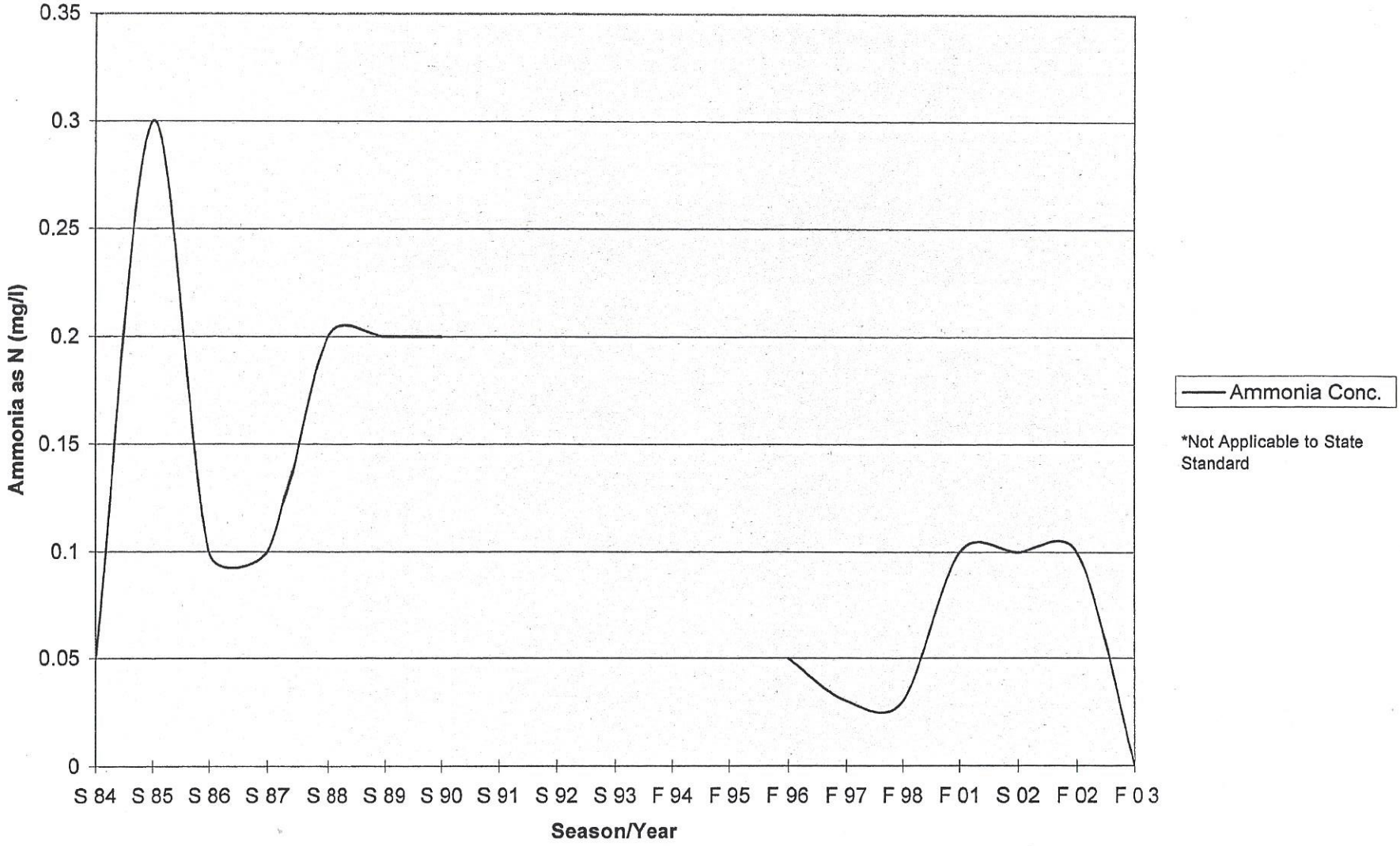
Site 5 (Spring Brook) - Alkalinity



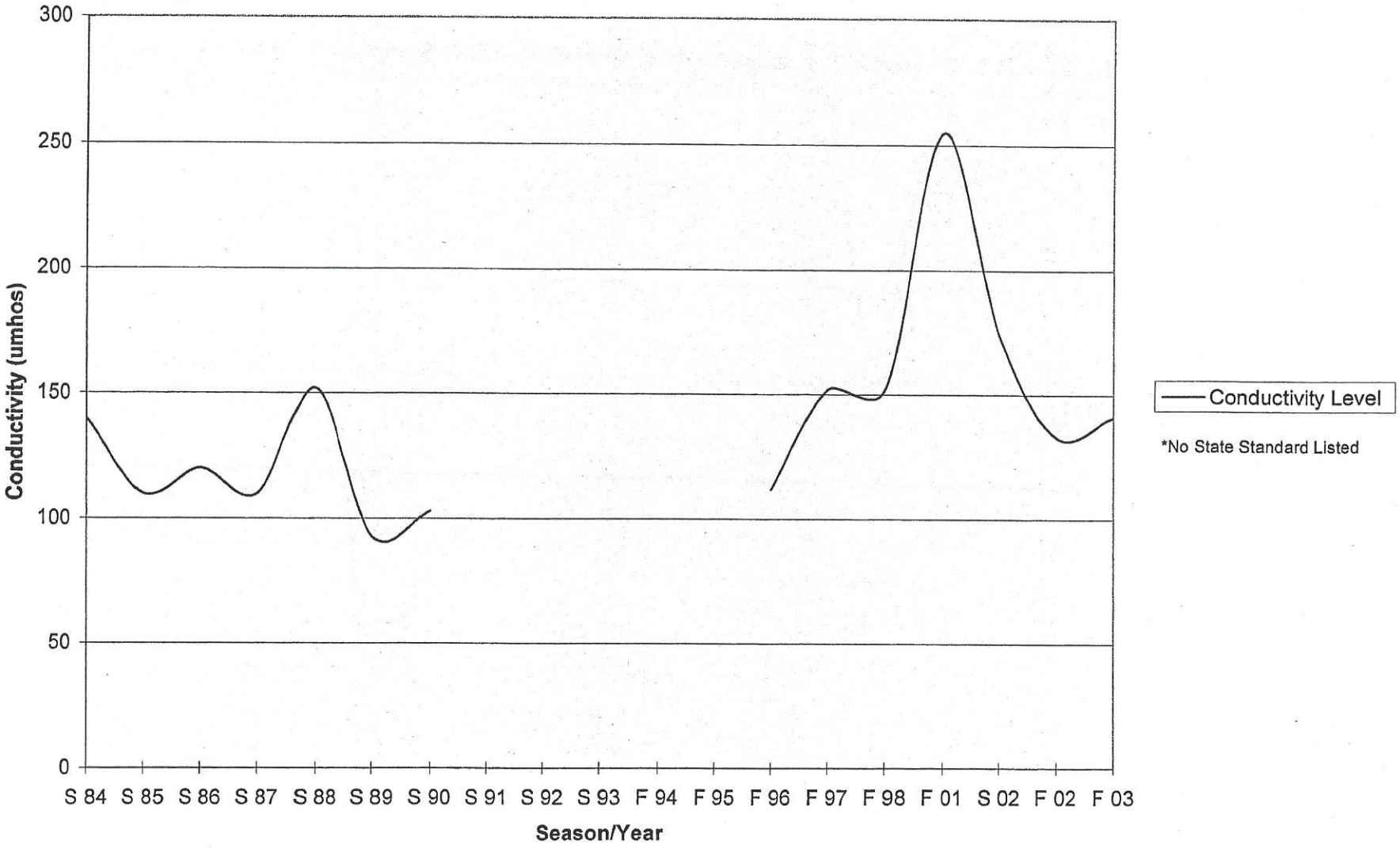
Site 5 (Spring Brook) - Aluminum



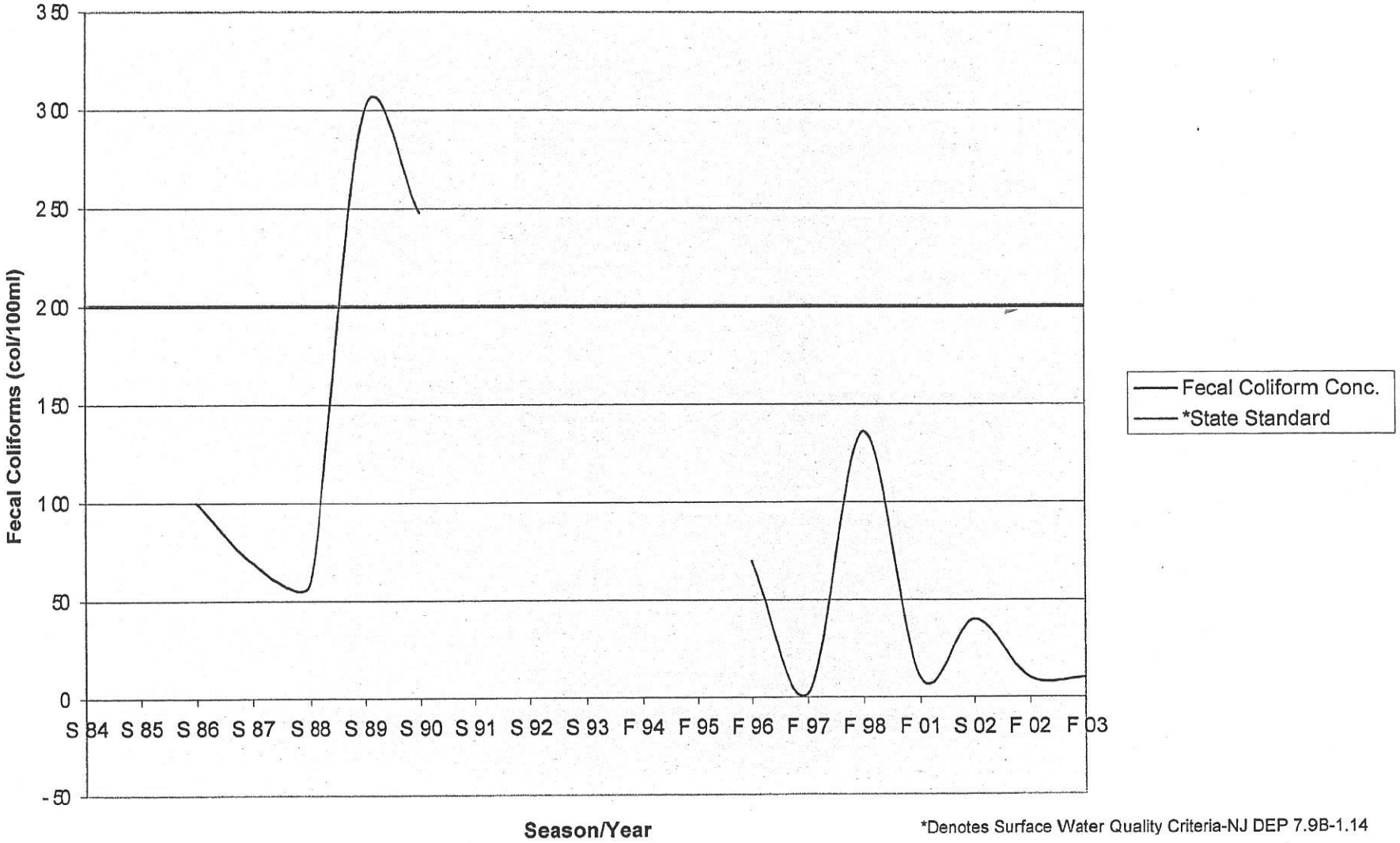
Site 5 (Spring Brook) - Ammonia as N



Site 5 (Spring Brook) - Conductivity

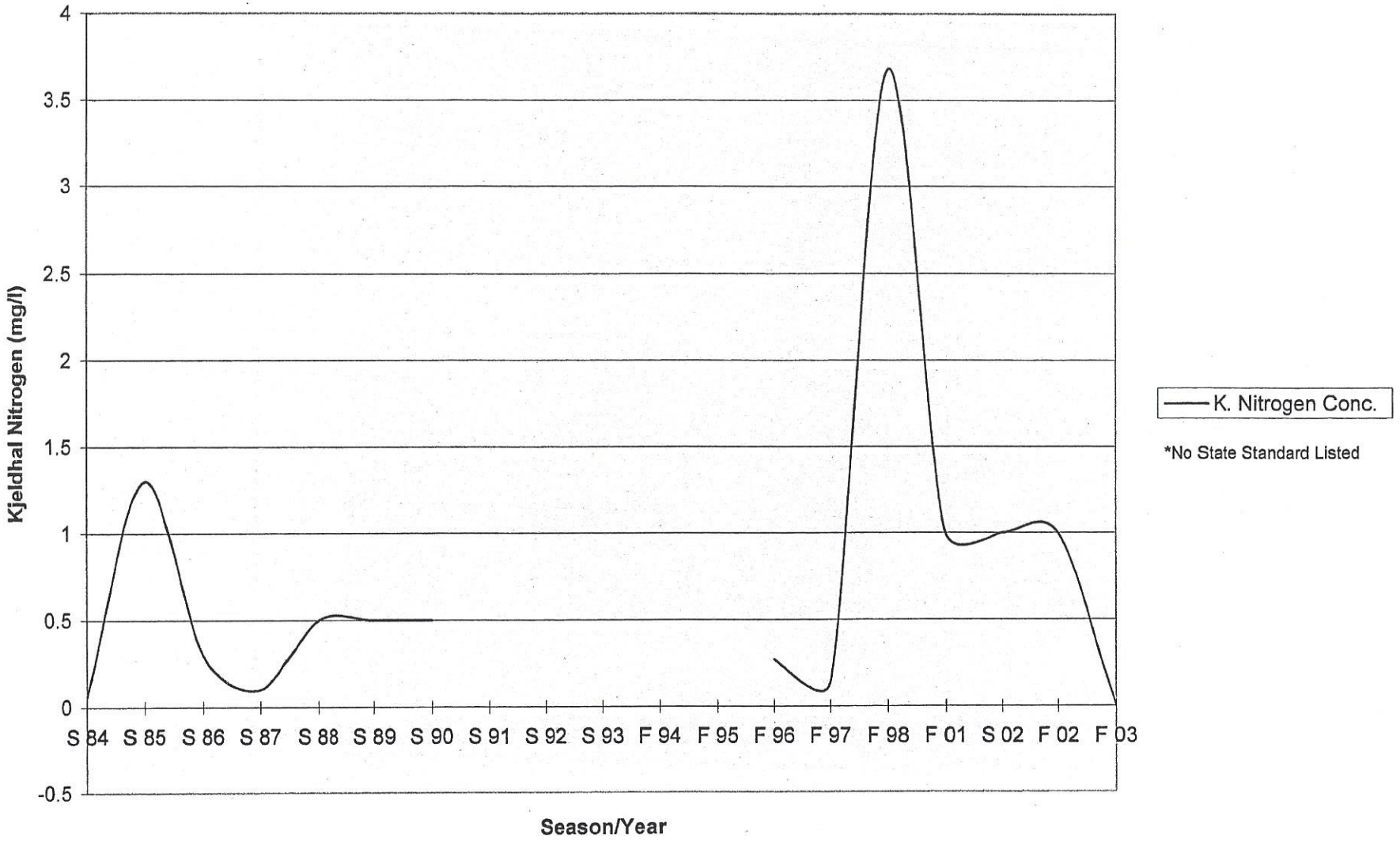


Site 5 (Spring Brook) - Fecal Coliforms

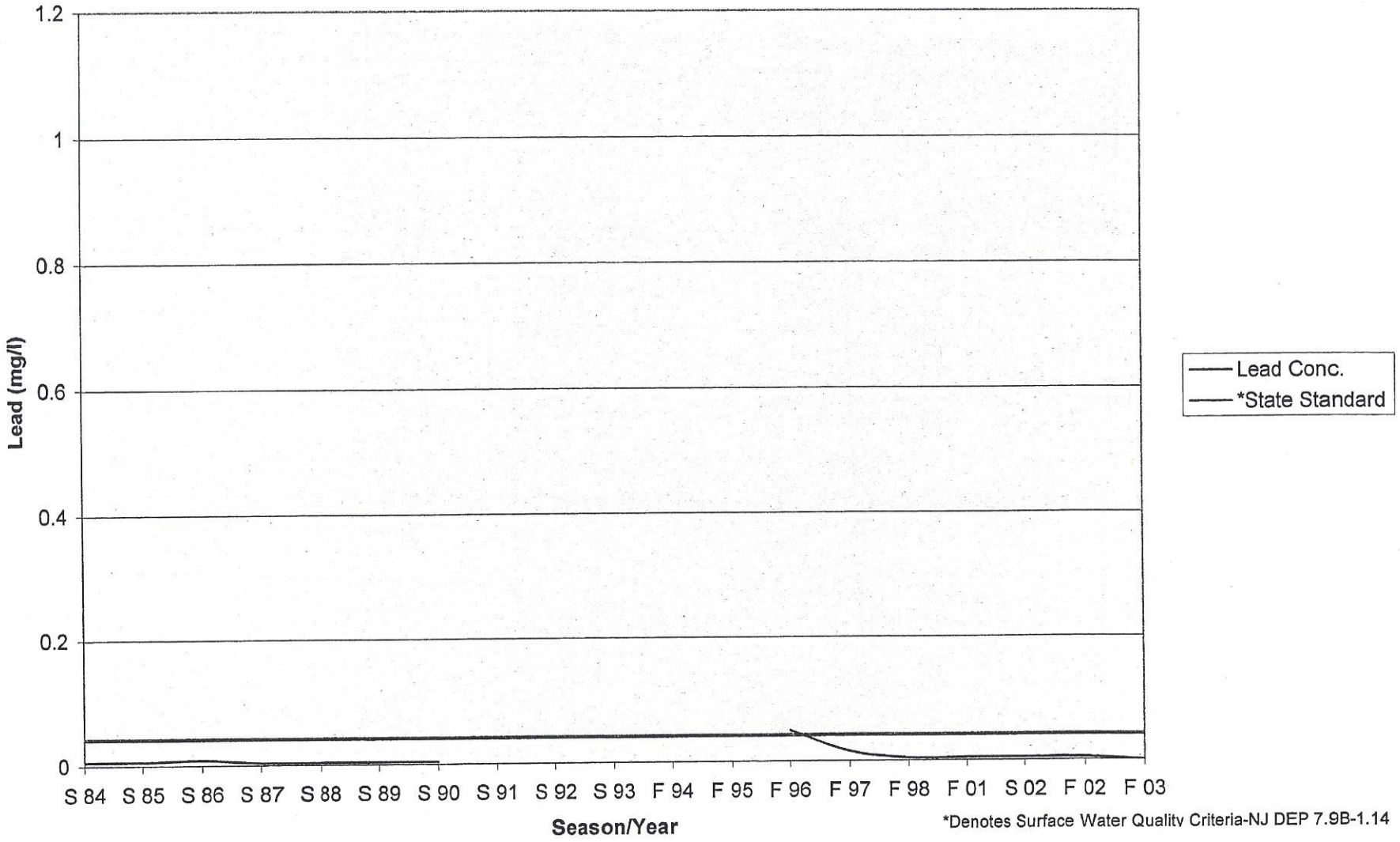


*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

Site 5 (Spring Brook) - Kjeldhal Nitrogen

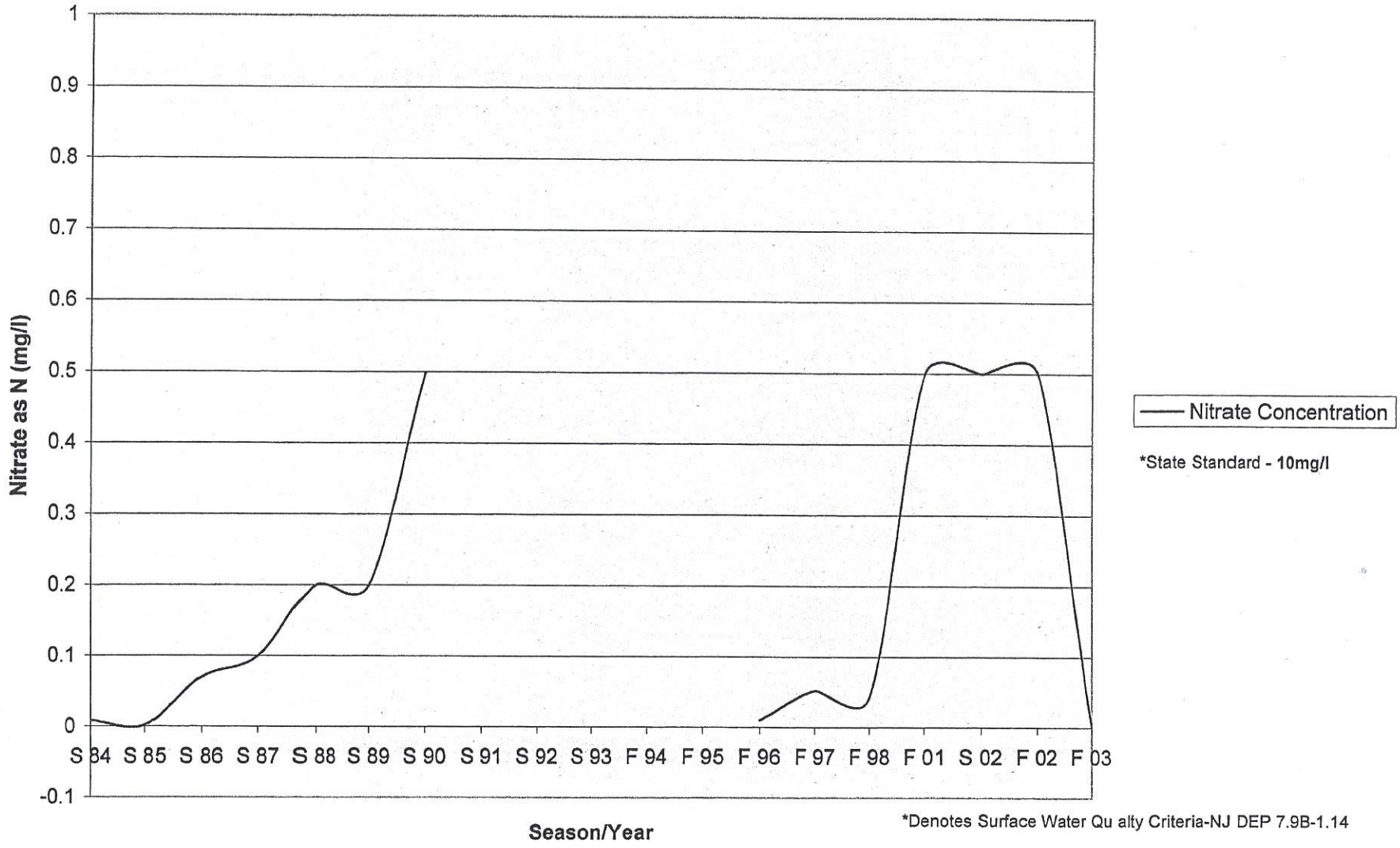


Site 5 (Spring Brook) - Lead



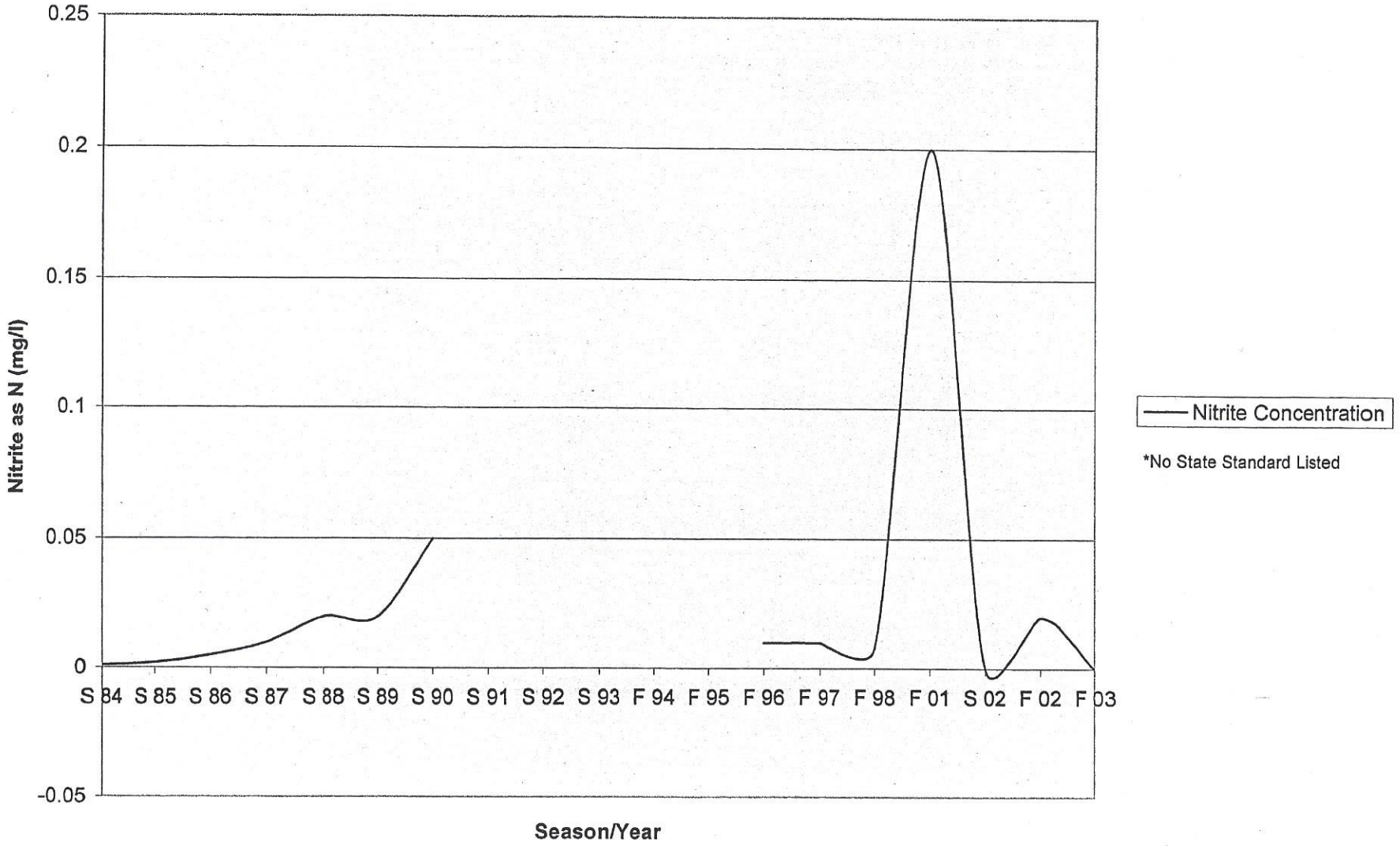
*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

Site 5 (Spring Brook) - Nitrate as N

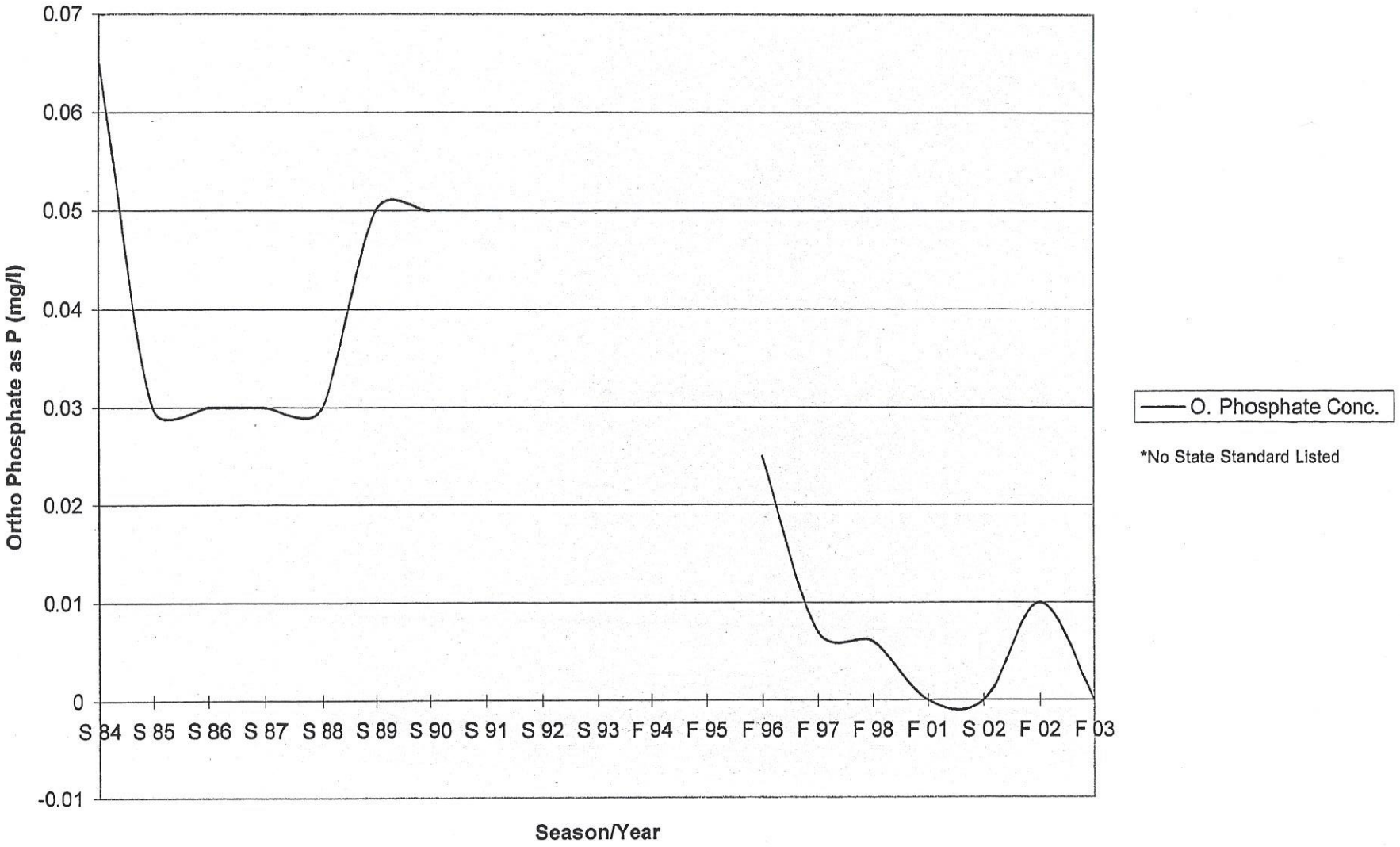


*Denotes Surface Water Qu alty Criteria-NJ DEP 7.9B-1.14

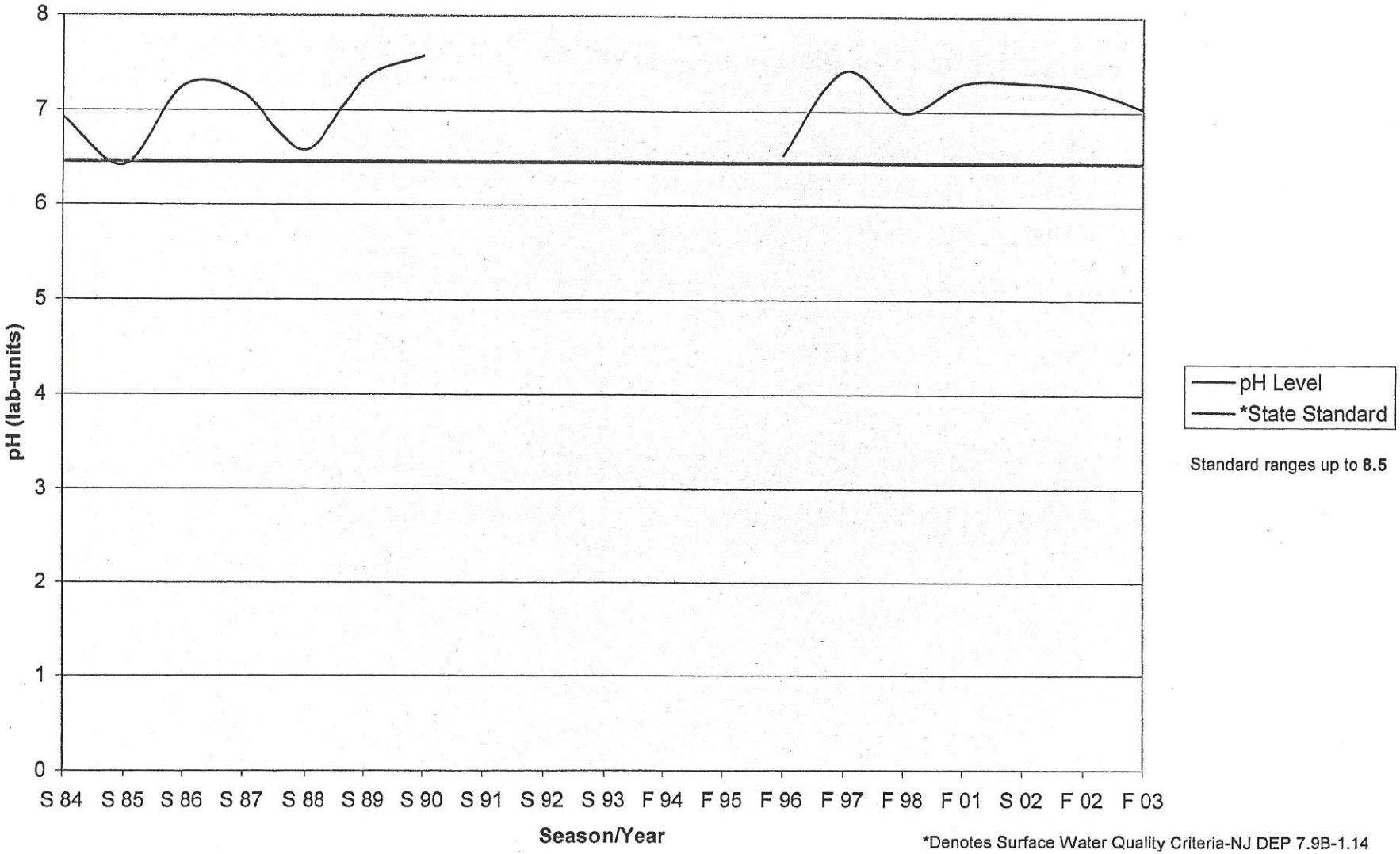
Site 5 (Spring Brook) - Nitrite as N



Site 5 (Spring Brook) - Ortho Phosphate as P

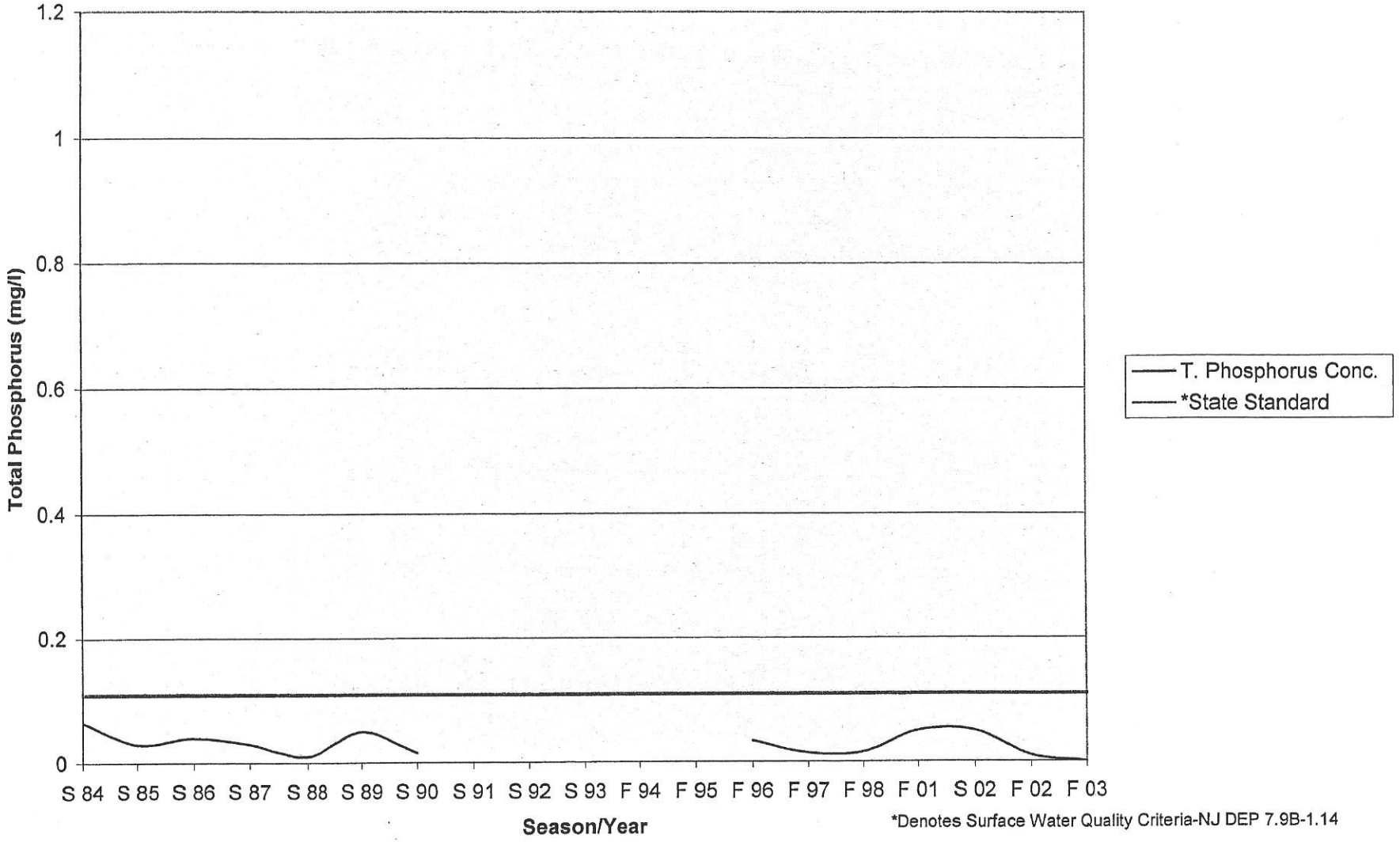


Site 5 (Spring Brook) - pH



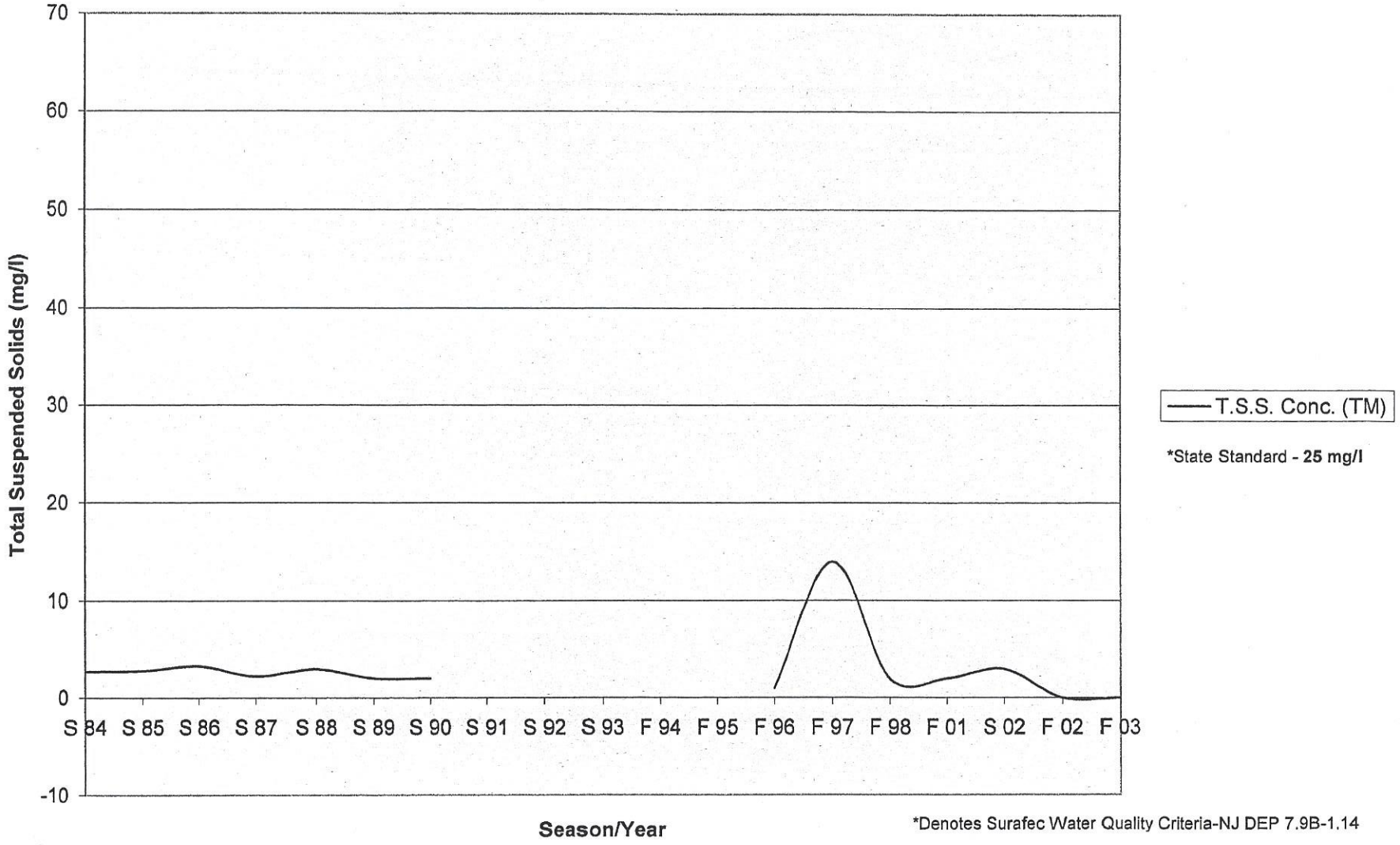
*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

Site 5 (Spring Brook) - Total Phosphorus



*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

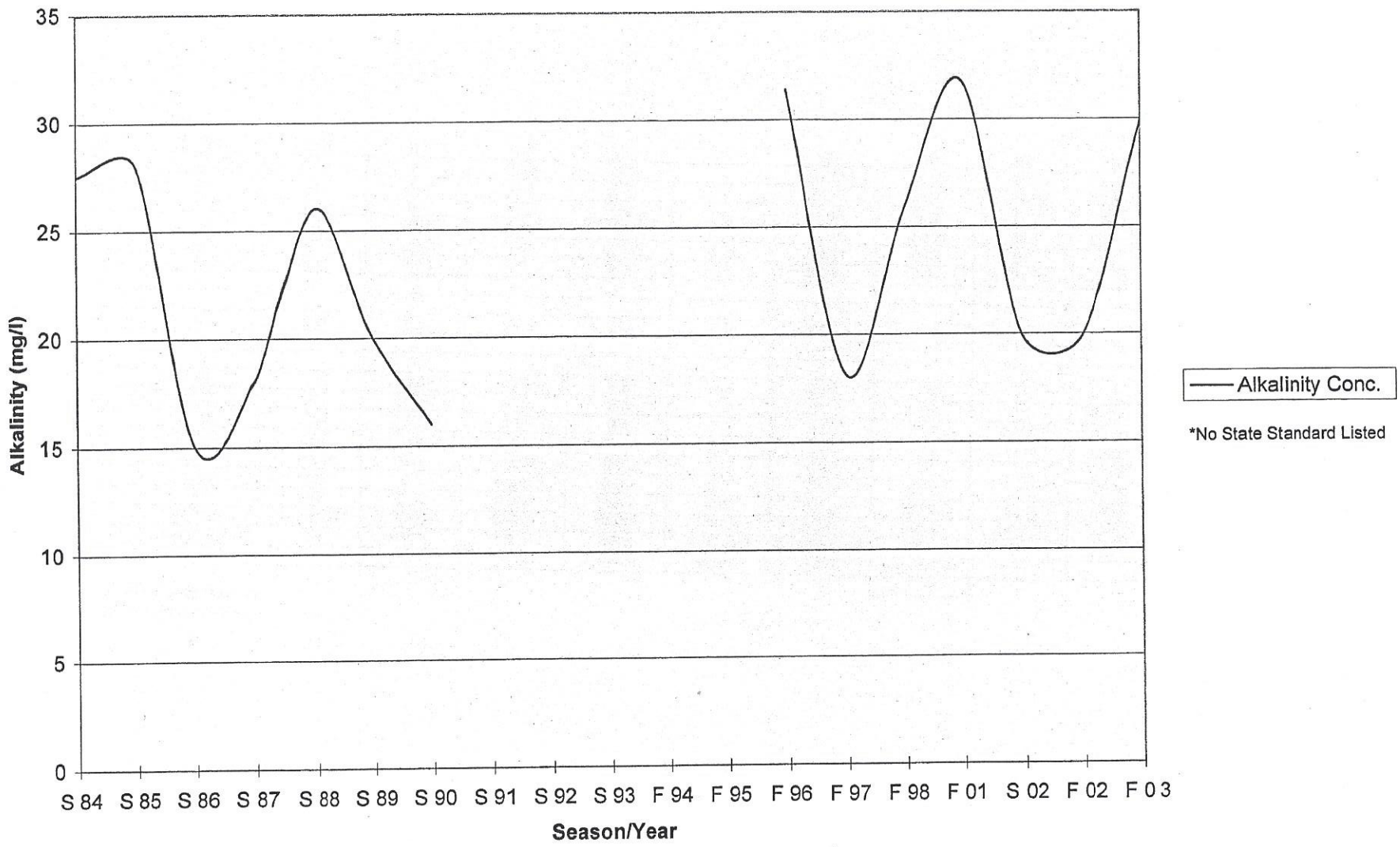
Site 5 (Spring Brook) - Total Suspended Solids



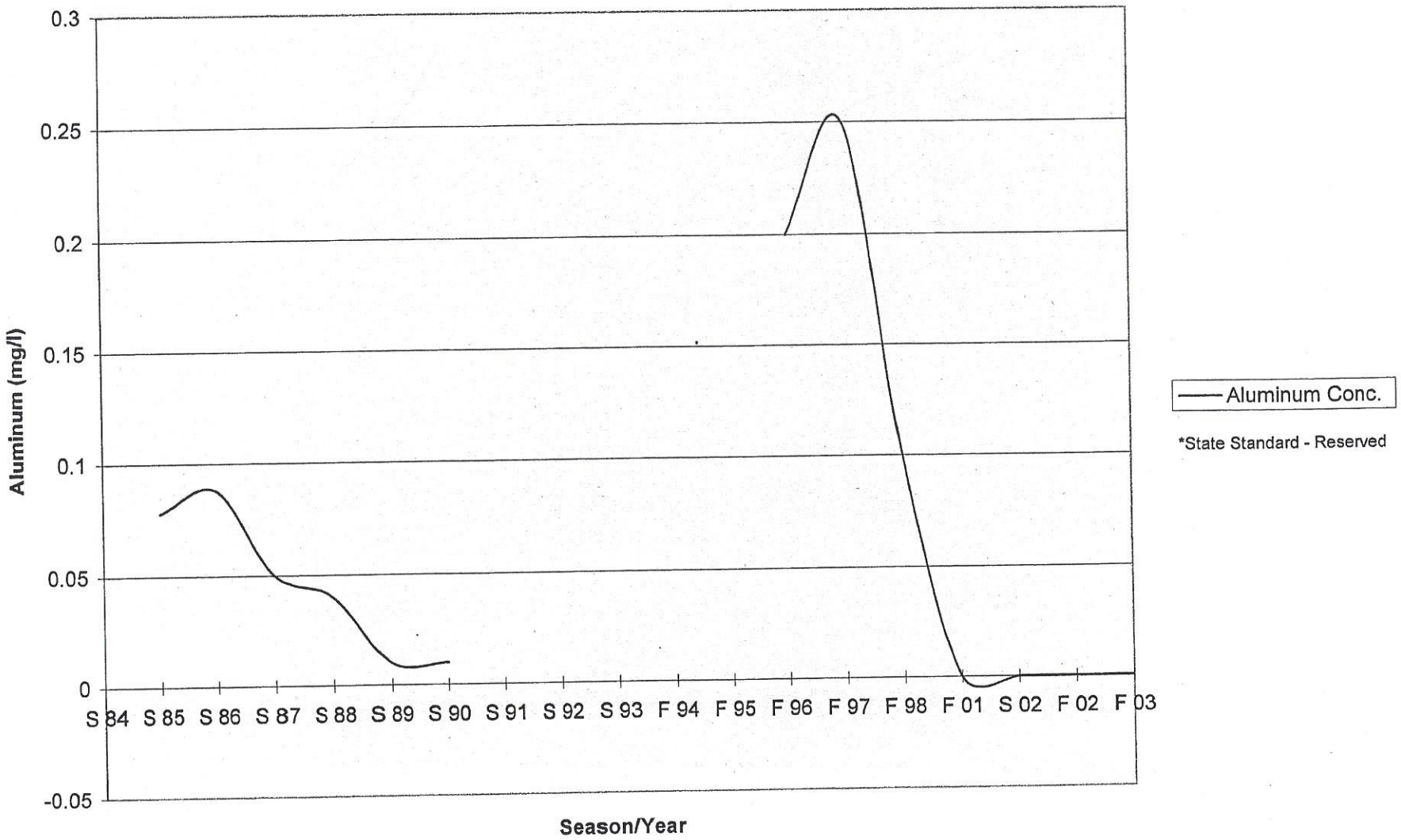
Stillwater Township Environmental Commission
Water Chemistry Data Set - Site 6: Spring Brook

Year	Fecal Coliforms (col/100ml)	Conductivity (umhos)	pH (lab-units)	Ammonia as N (mg/l)	Nitrite as N (mg/l)	Nitrate as N (mg/l)	Kjeldhal Nitrogen (mg/l)	Total Phosphorus (mg/l)	Ortho Phosphate as P (mg/l)	Alkalinity (mg/l)	Lead (mg/l)	Aluminum (mg/l)	Total Suspended Solids (mg/l)
S 84	30	95	6.91	0.05	0.001	0.005	0.06	0.065	0.06	27.5	0.003		3
S 85		100	6.92	0.2	0.002	0.07	0.9	0.03	0.03	28	0.003	0.078	2.1
S 86	60	250	6.93	0.1	0.004	0.07	0.5	0.03	0.03	15	0.009	0.088	6.8
S 87	11	100	7.33	0.1	0.021	0.1	0.2	0.03	0.03	18	0.004	0.05	2.4
S 88	4	173	7.21	0.2	0.02	0.2	0.5	0.01	0.05	26	0.004	0.04	1
S 89	75	100	7.17	0.2	0.02	0.2	0.5	0.05	0.05	20	0.004	0.01	3
S 90	32	85	7.43	0.2	0.05	0.5	0.5	0.016	0.05	16	0.004	0.01	2
S 91													
S 92													
S 93	50	132	7.53	0.2	0.05	0.5	0.5	0.015	0.05	29	0.05		2
F 94													
F 95													
F 96	45	143	6.46	0.05	0.01	0.01	0.4	0.037	0.01	31.4	0.05	0.2	2
F 97	1	160	7.37	0.03	0.01	0.052	0.14	0.014	0.01	18.1	0.014	0.25	15
F 98	18	121	7.01	0.03	0.008	0.042	2.83	0.016	0.006	25.8	0.0073	0.1	1
F 01	10	208	7.38	0.1	0.2	0.5	1	0.05	ND	31.8	0.005	ND	ND
S 02	10	145	7.5	0.1	ND	0.5	1	0.05	ND	19.9	0.005	ND	2
F 02	10	183	7.28	0.1	0.02	0.5	1	0.044	0.01	19.9	0.005	ND	5
F 03	10	135	7.14	ND	ND	ND	ND	ND	ND	29.9	ND	ND	2

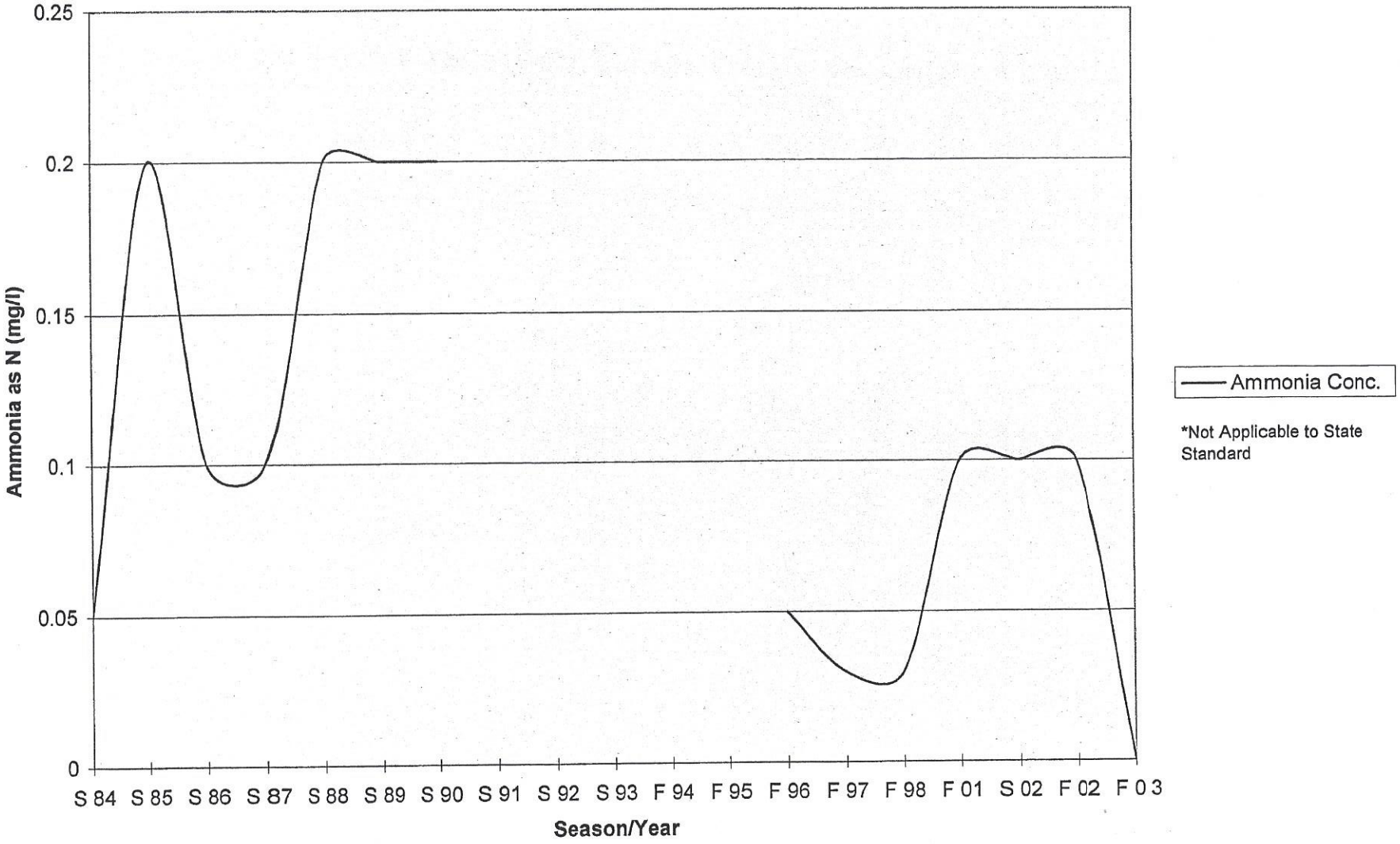
Site 6 (Spring Brook) - Alkalinity



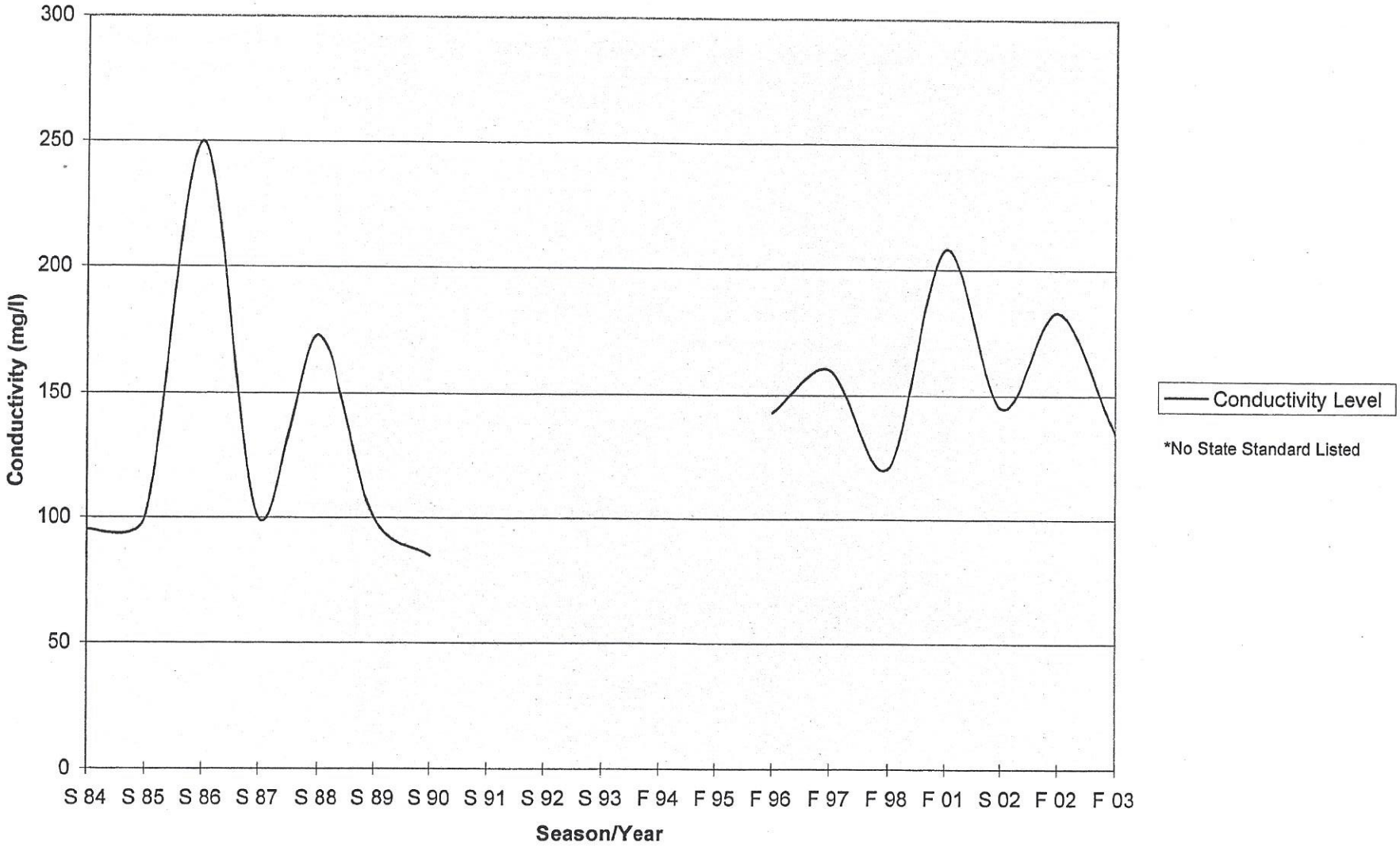
Site 6 (Spring Brook) - Aluminum



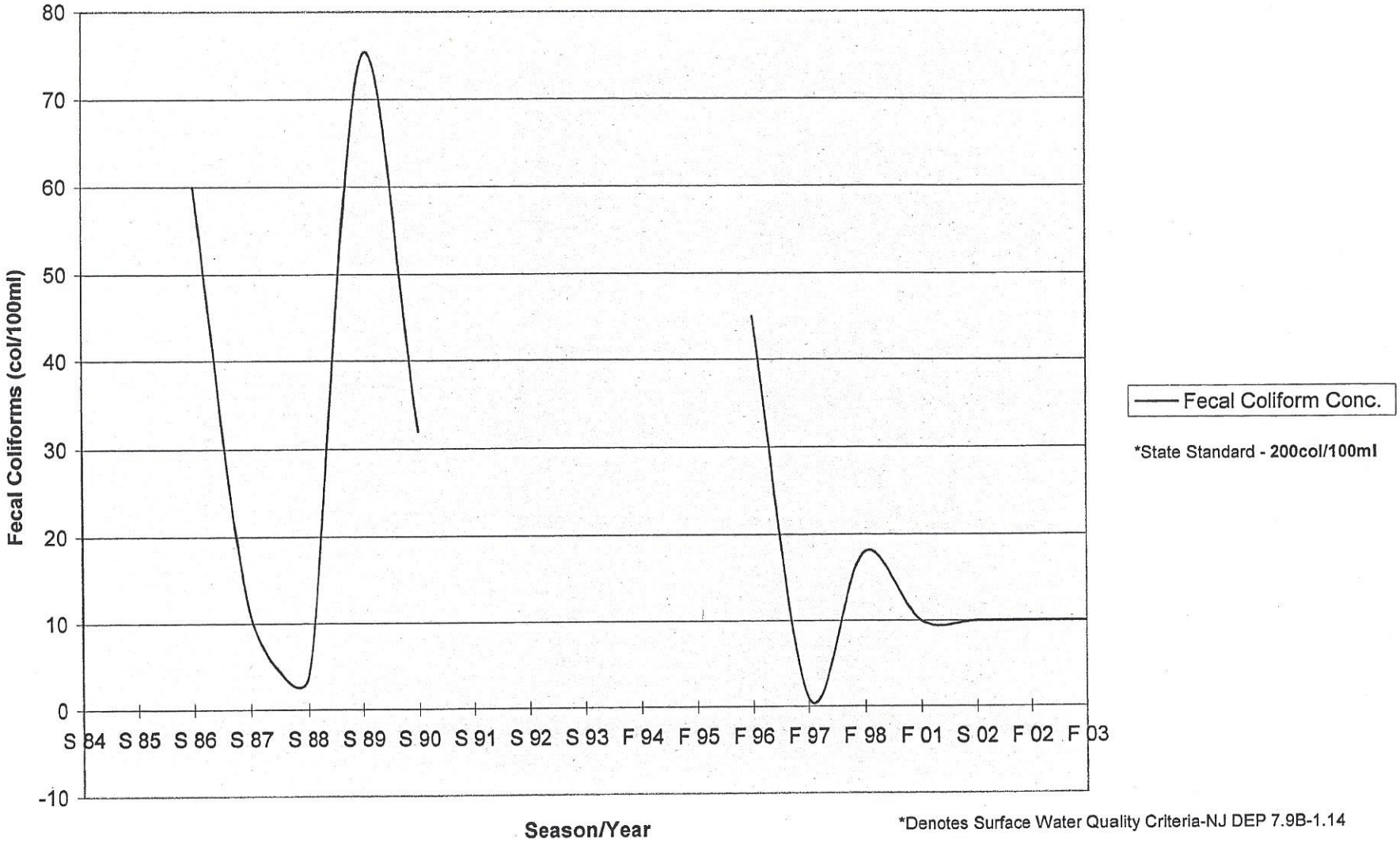
Site 6 (Spring Brook) - Ammonia as N



Site 6 (Spring Brook) - Conductivity

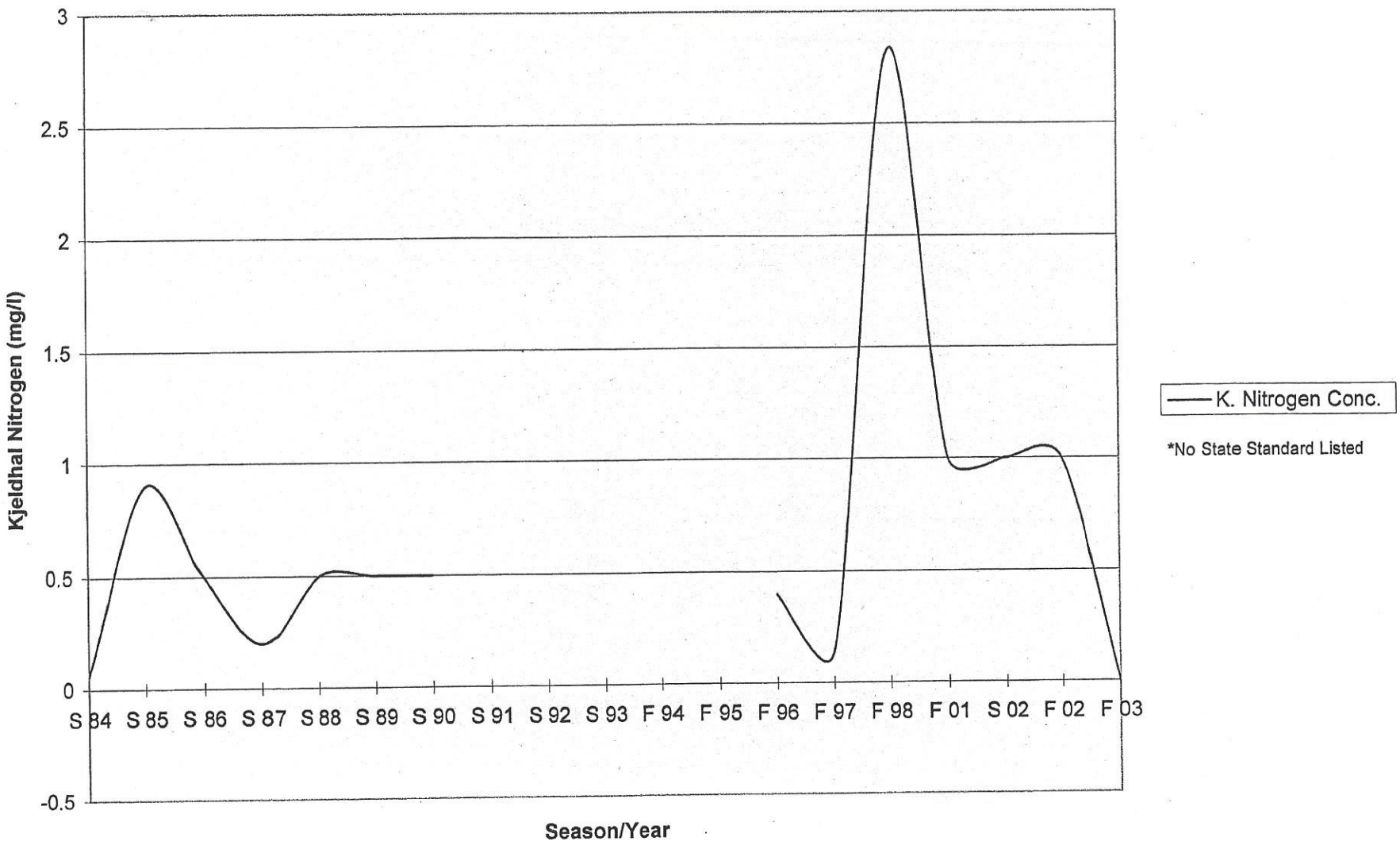


Site 6 (Spring Brook) - Fecal Coliforms

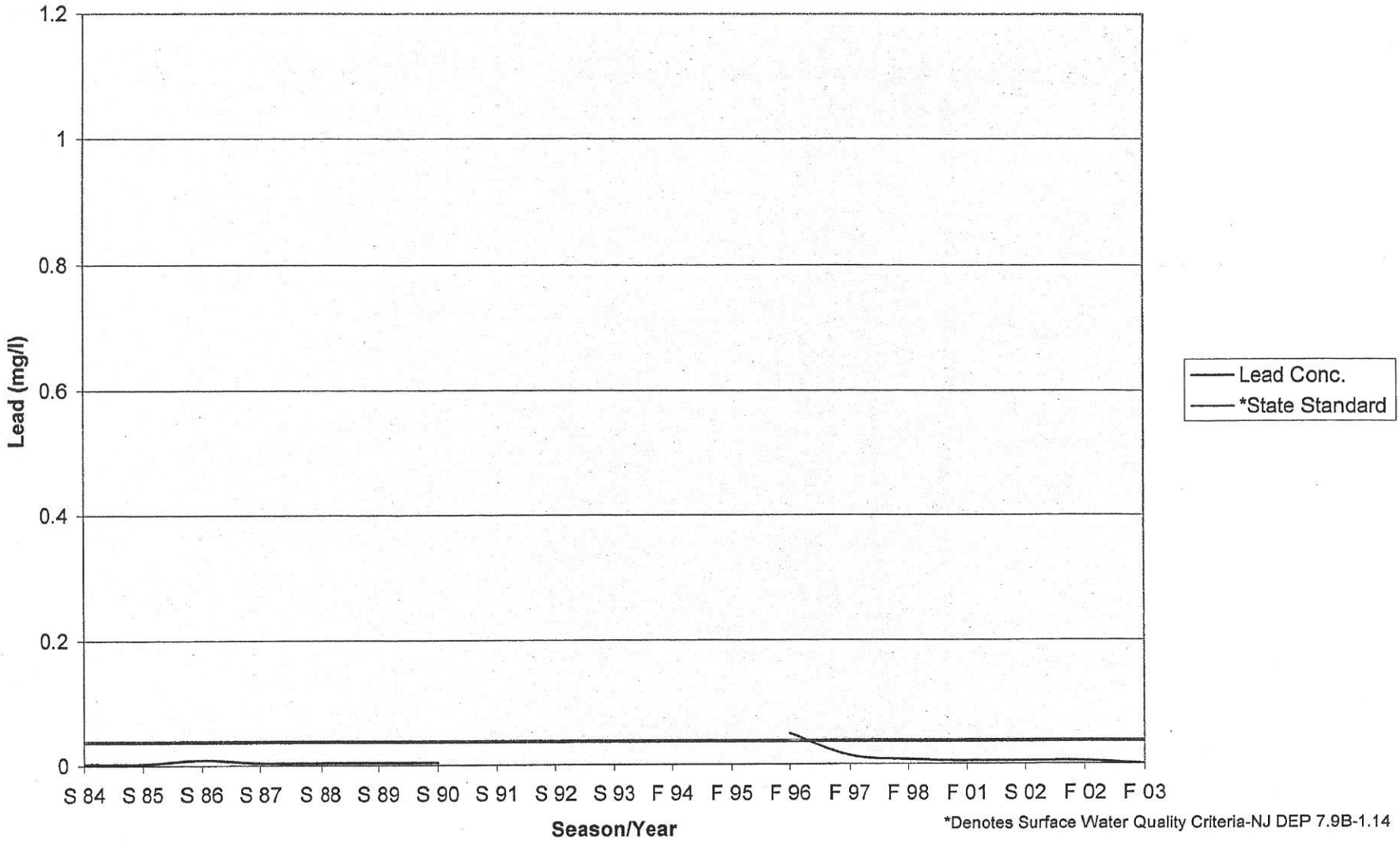


*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

Site 6 (Spring Brook) - Kjeldhal Nitrogen

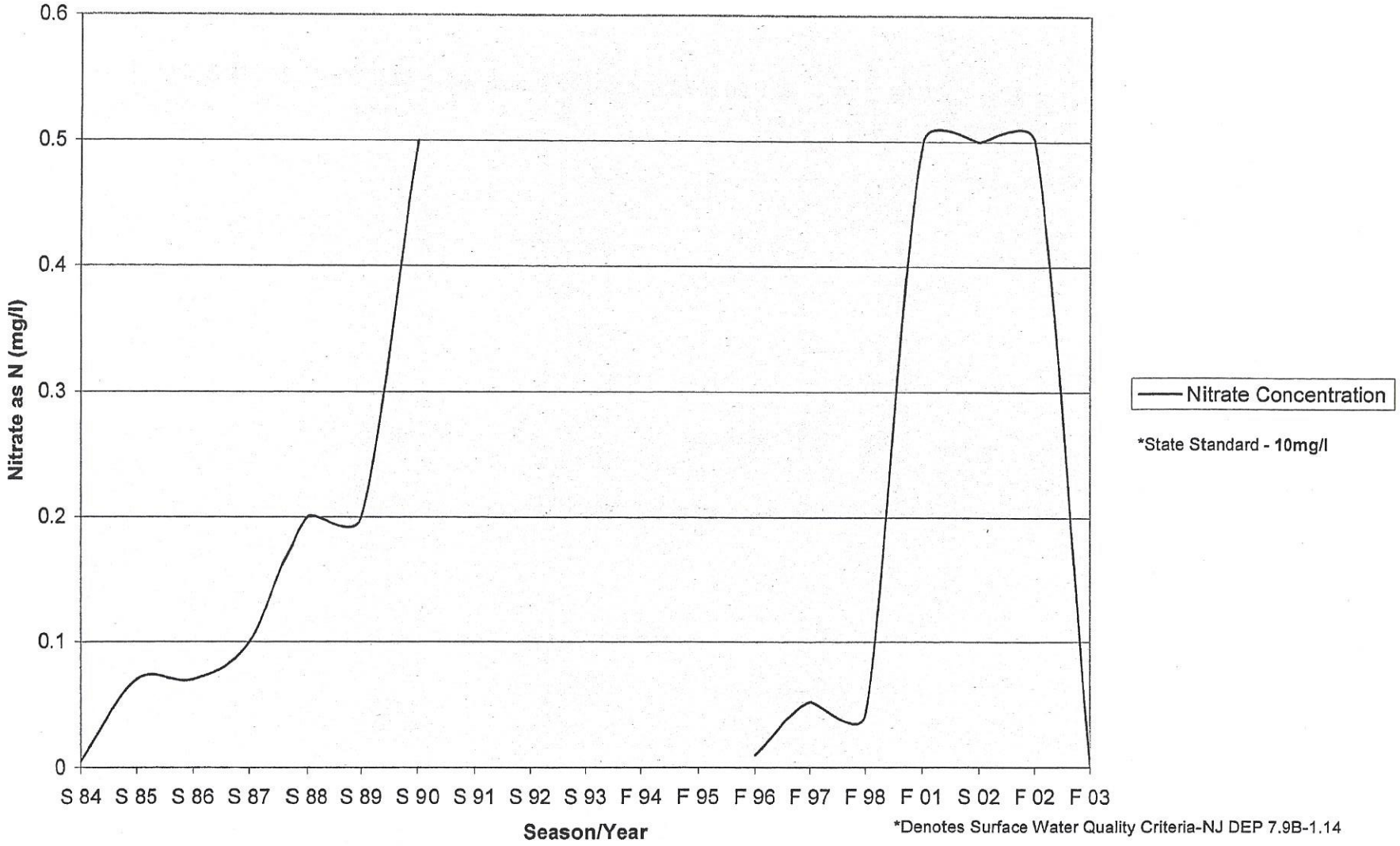


Site 6 (Spring Brook) - Lead



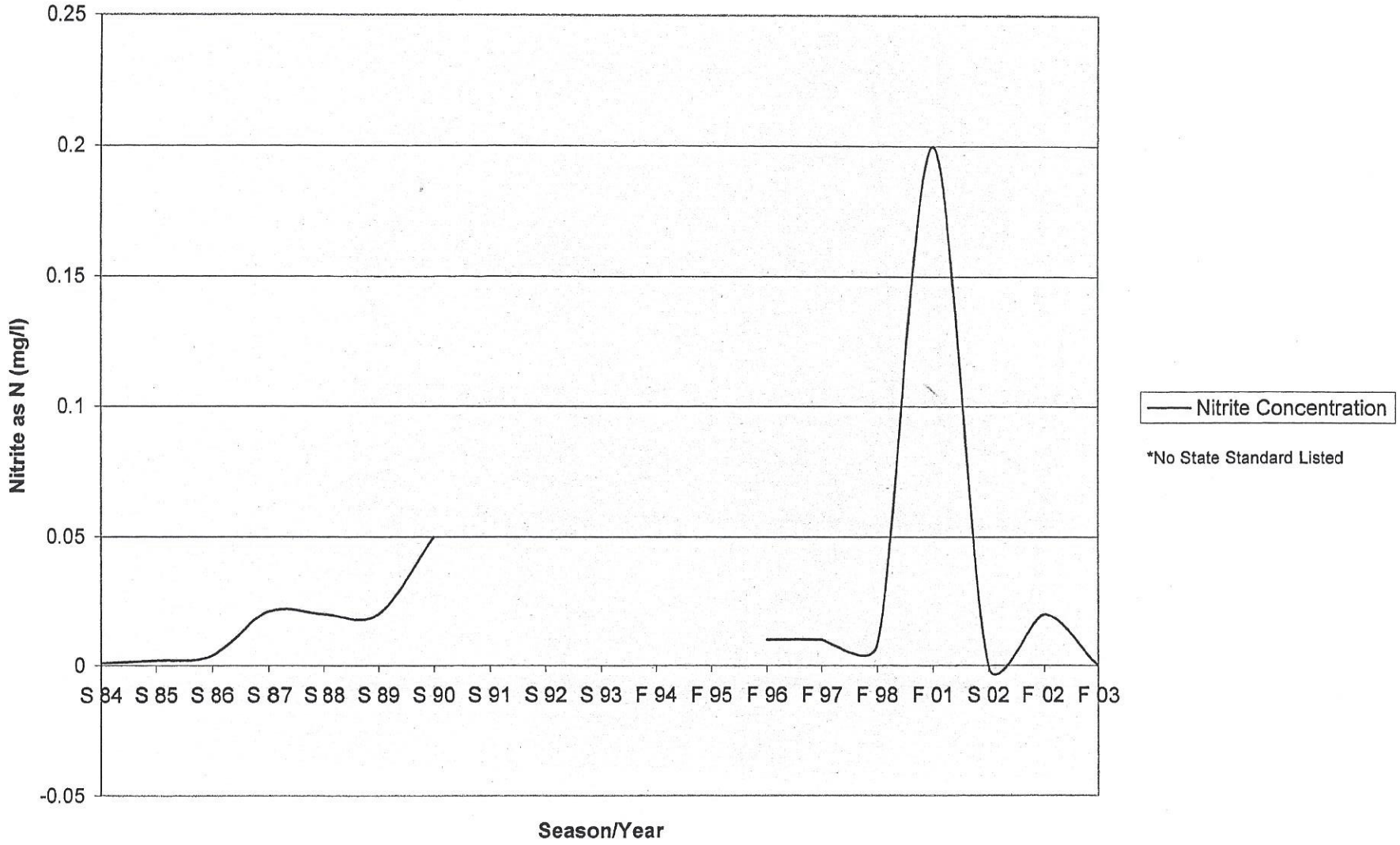
*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

Site 6 (Spring Brook) - Nitrate as N

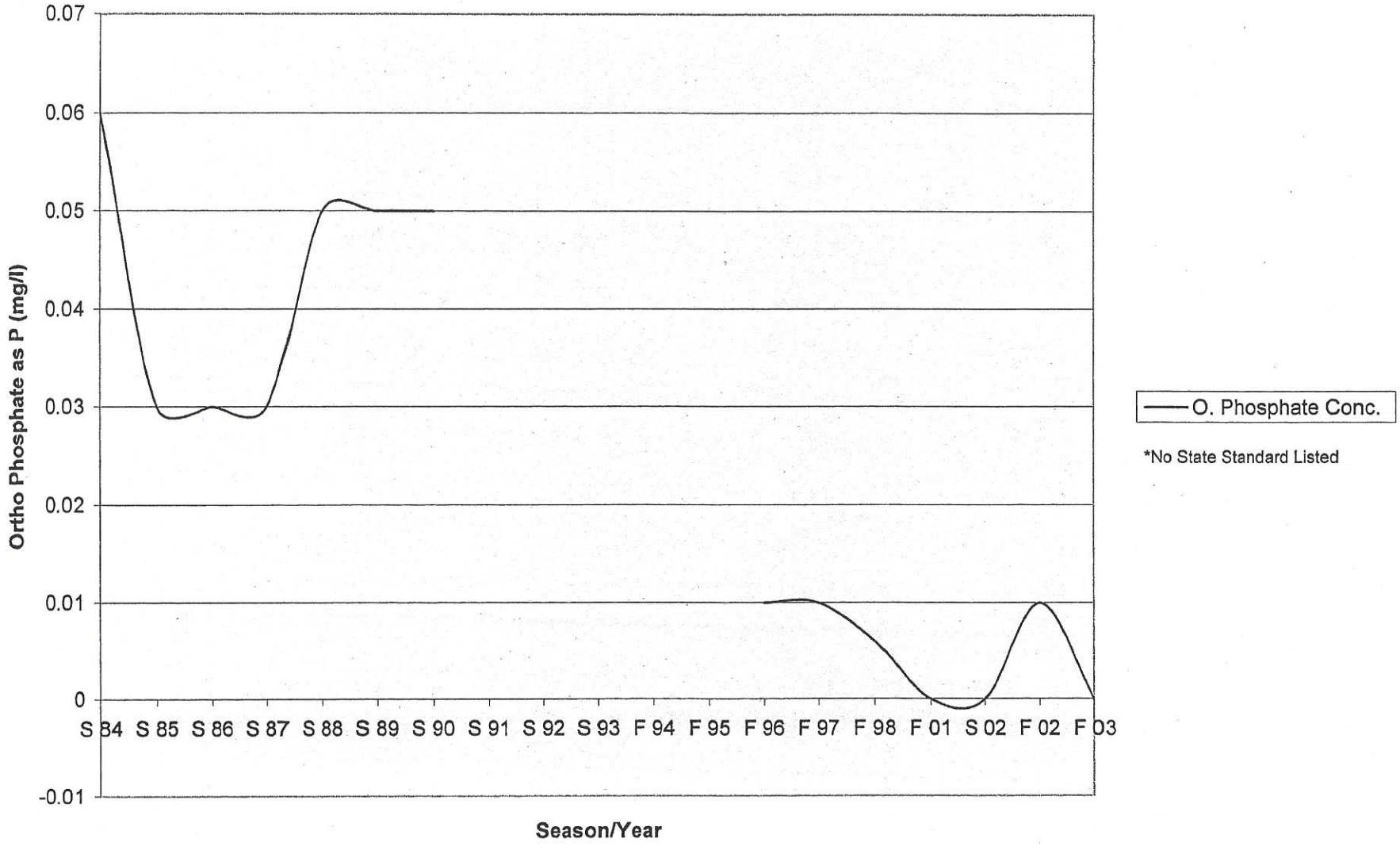


*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

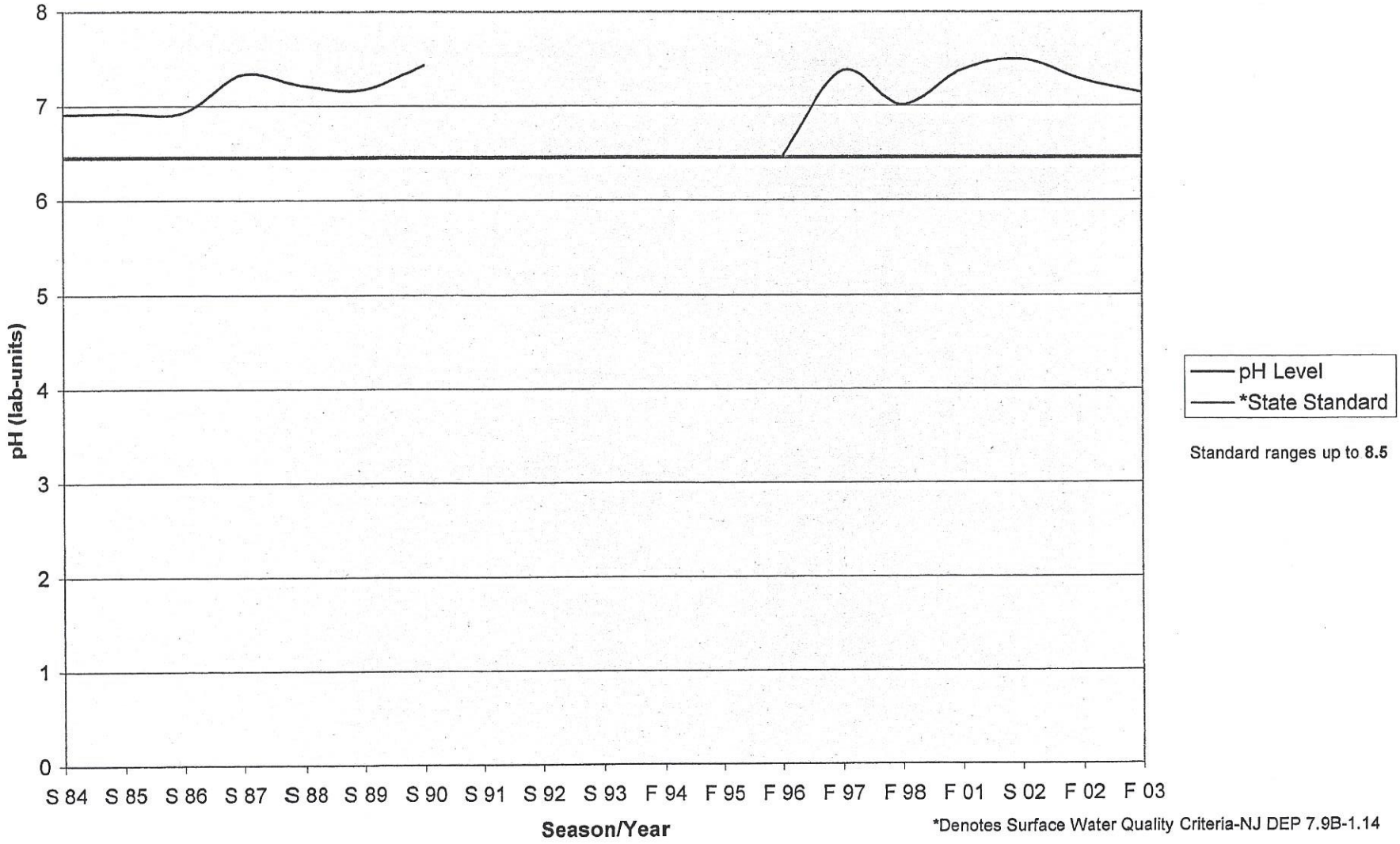
Site 6 (Spring Brook) - Nitrite as N



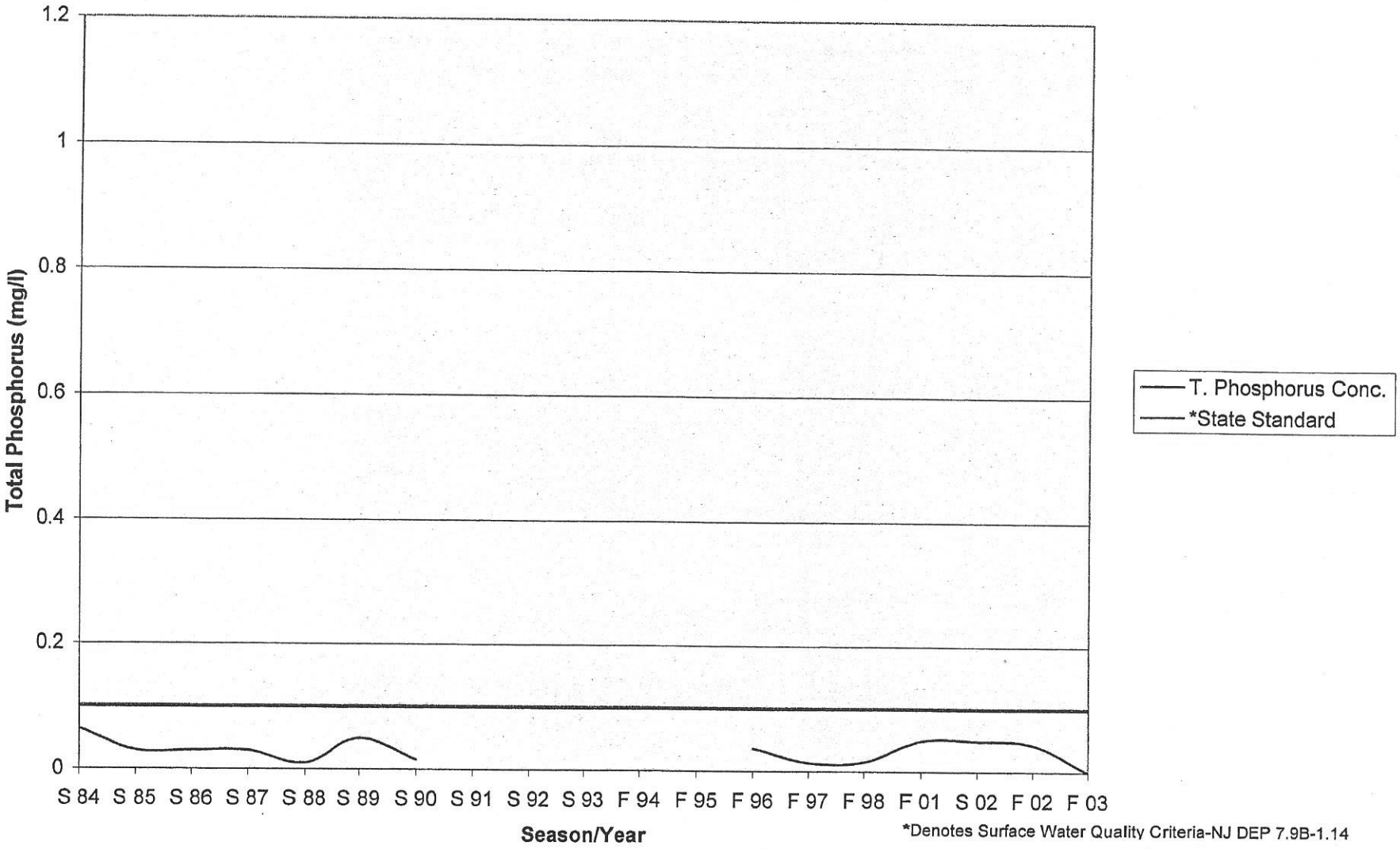
Site 6 (Spring Brook) - Ortho Phosphate as P



Site 6 (Spring Brook) - pH

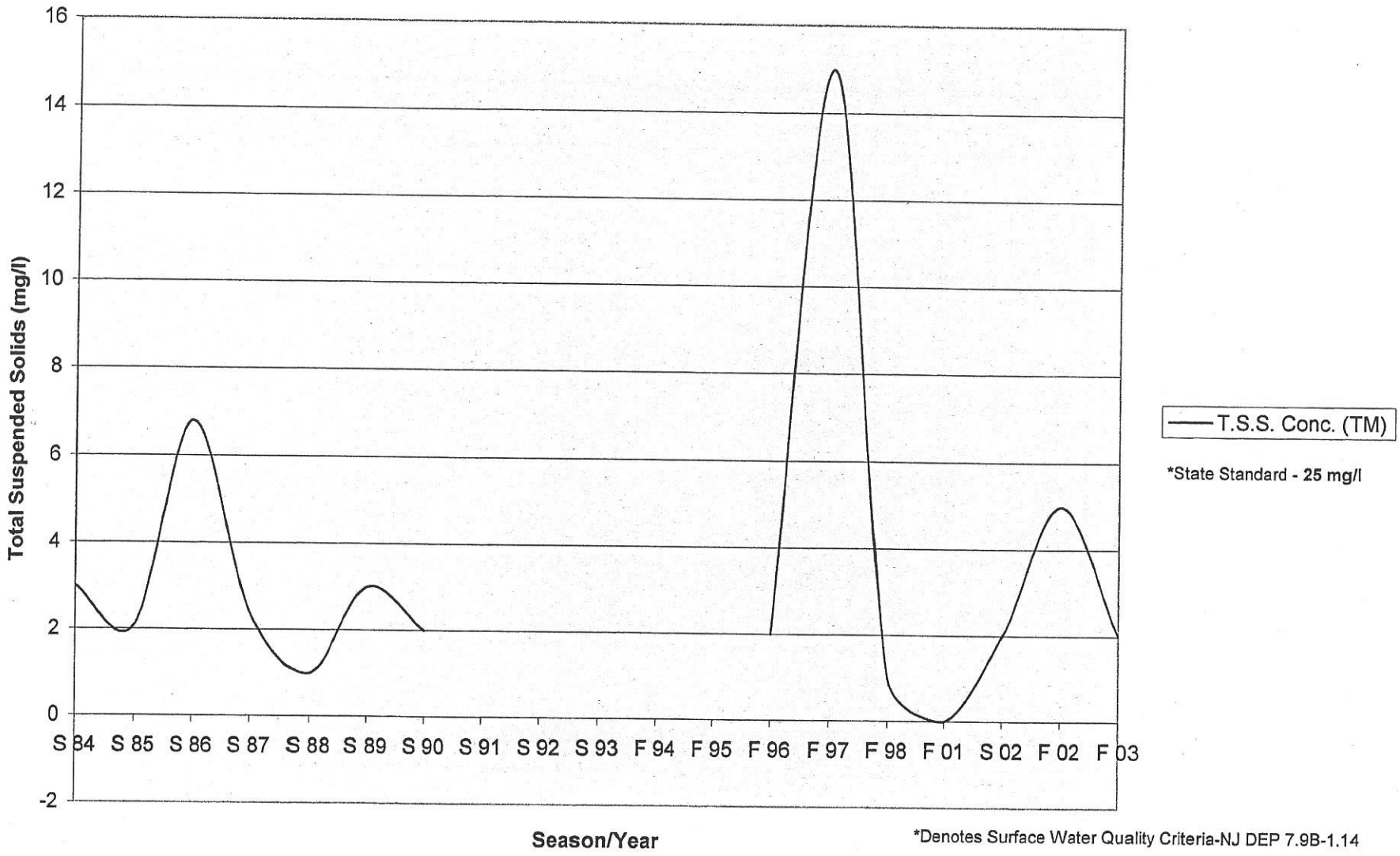


Site 6 (Spring Brook) - Total Phosphorus



*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

Site 6 (Spring Brook) - Total Suspended Solids

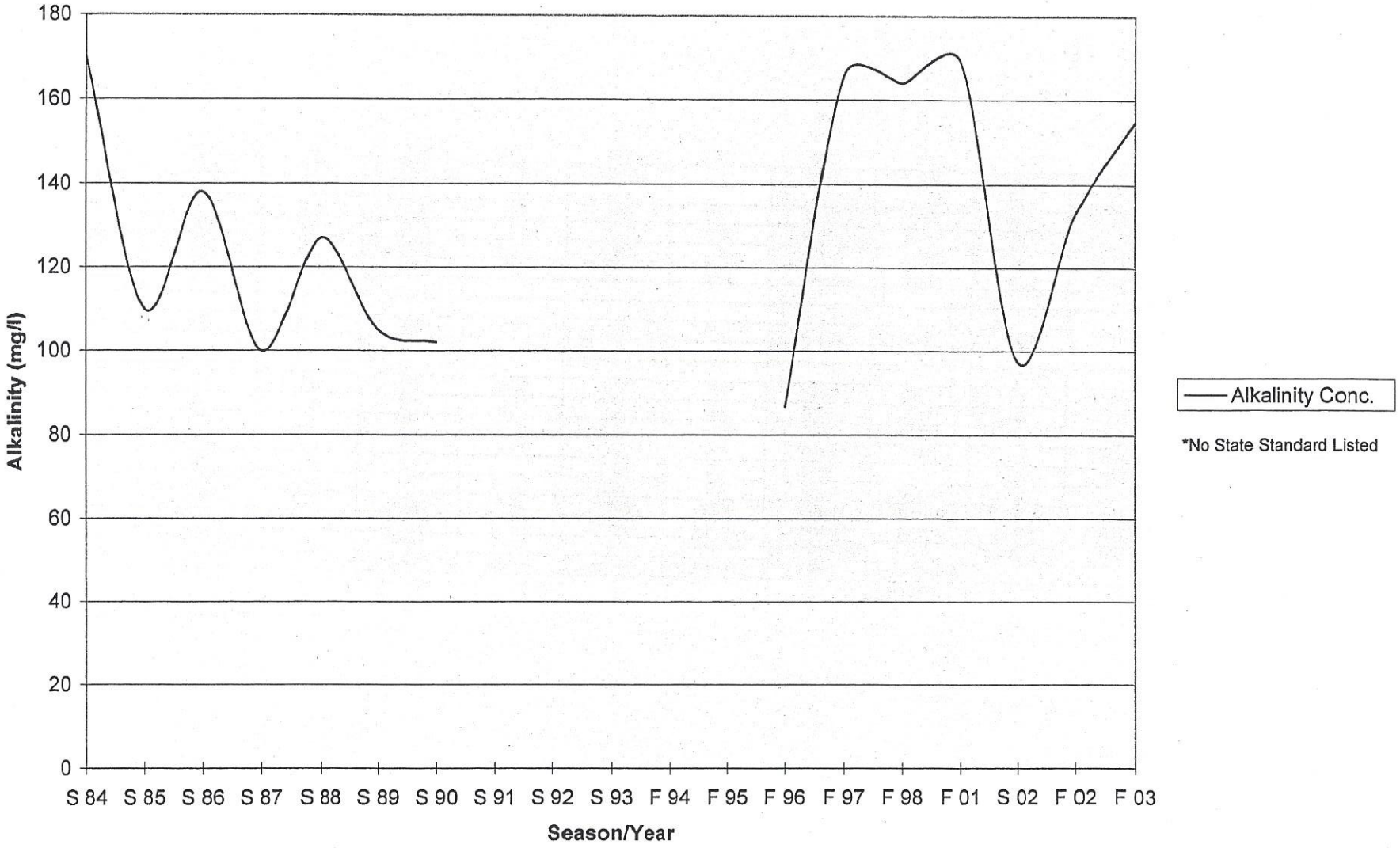


*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

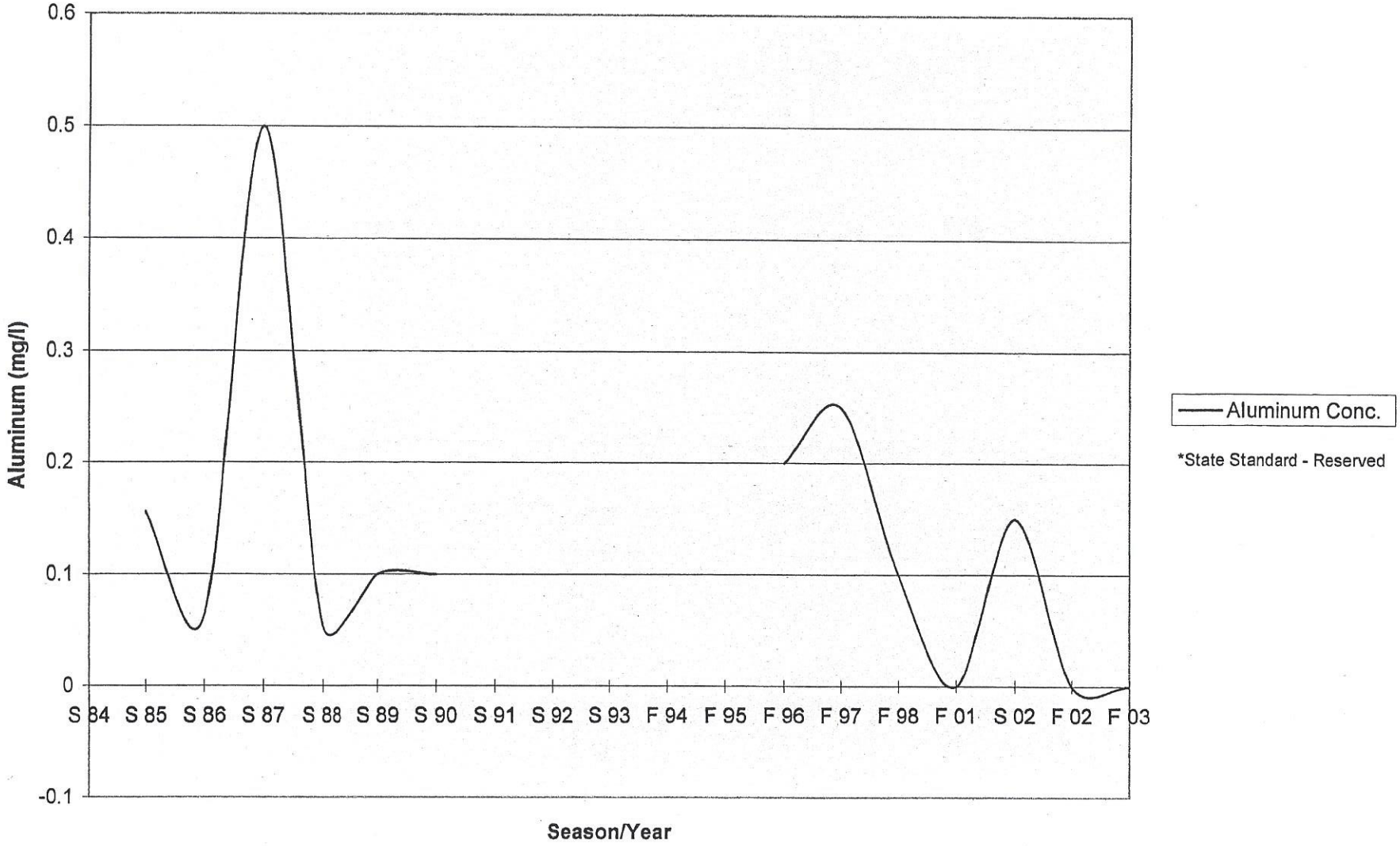
Stillwater Township Environmental Commission
Water Chemistry Data Set - Site 7: Paulinskill River

Year	Fecal Coliforms (col/100ml)	Conductivity (umhos)	pH (lab-units)	Ammonia as N (mg/l)	Nitrite as N (mg/l)	Nitrate as N (mg/l)	Kjeldhal Nitrogen (mg/l)	Total Phosphorus (mg/l)	Ortho Phosphate as P (mg/l)	Alkalinity (mg/l)	Lead (mg/l)	Aluminum (mg/l)	Total Suspended Solids (mg/l)
S 84	100	380	8.05	0.05	0.05	0.028	0.09	0.065	0.065	170	0.009		0.1
S 85		350	7.91	0.3	0.015	0.57	0.9	0.05	0.031	110	0.011	0.156	4.9
S 86	70	450	7.95	0.1		0.08	0.6	0.13		138	0.088	0.063	3.2
S 87	220	300	7.66	0.1	0.01	0.2	0.4	0.05	0.041	100	0.004	0.5	2.1
S 88	20	488	7.71	0.2	0.02	0.11	0.54	0.05	0.051	127	0.004	0.054	2
S 89	900	307	7.78	0.2	0.02	0.8	0.5	0.05	0.051	105	0.004	0.1	5
S 90	56	314	7.97	0.2	0.05	0.5	0.5	0.045	0.051	102	0.004	0.1	2
S 91													
S 92													
S 93	240	447	8.24	0.2	0.05	0.5	0.57	0.045	0.051	155	0.05		14
F 94													
F 95													
F 96	391	321	7.3	0.05	0.01	0.19	0.67	0.0148	0.011	86.8	0.05	0.2	10
F 97	96	508	8.47	0.03	0.013	0.949	0.98	0.039	0.007	166	0.004	0.25	19
F 98	50	409	8.11	0.03	0.008	2.28	3.68	0.008	0.006	164	0.0202	0.1	4
F 01	90	642	8.26	0.1	0.2	0.5	1	0.05	0.05	169	0.005	ND	6
S 02	70	395	7.91	0.1	ND	0.5	1	ND	0.05	97.5	0.0062	0.15	8
F 02	10	479	8.25	0.1	0.02	1.15	1	0.01	0.01	133	0.005	ND	4
F 03	10	478	7.89	ND	ND	0.8	ND	ND	ND	155	ND	ND	ND

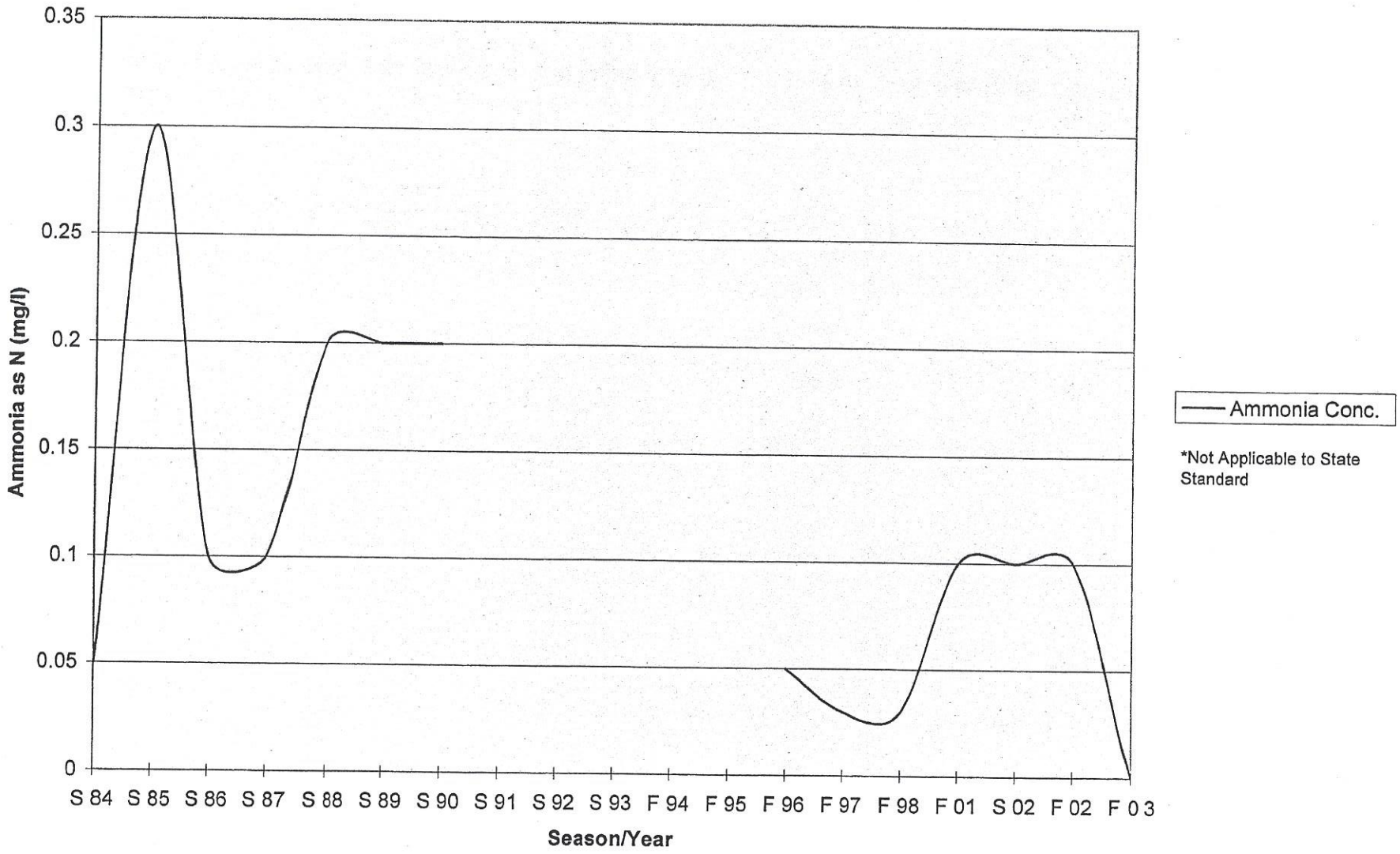
Site 7 (Paulinskill River) - Alkalinity



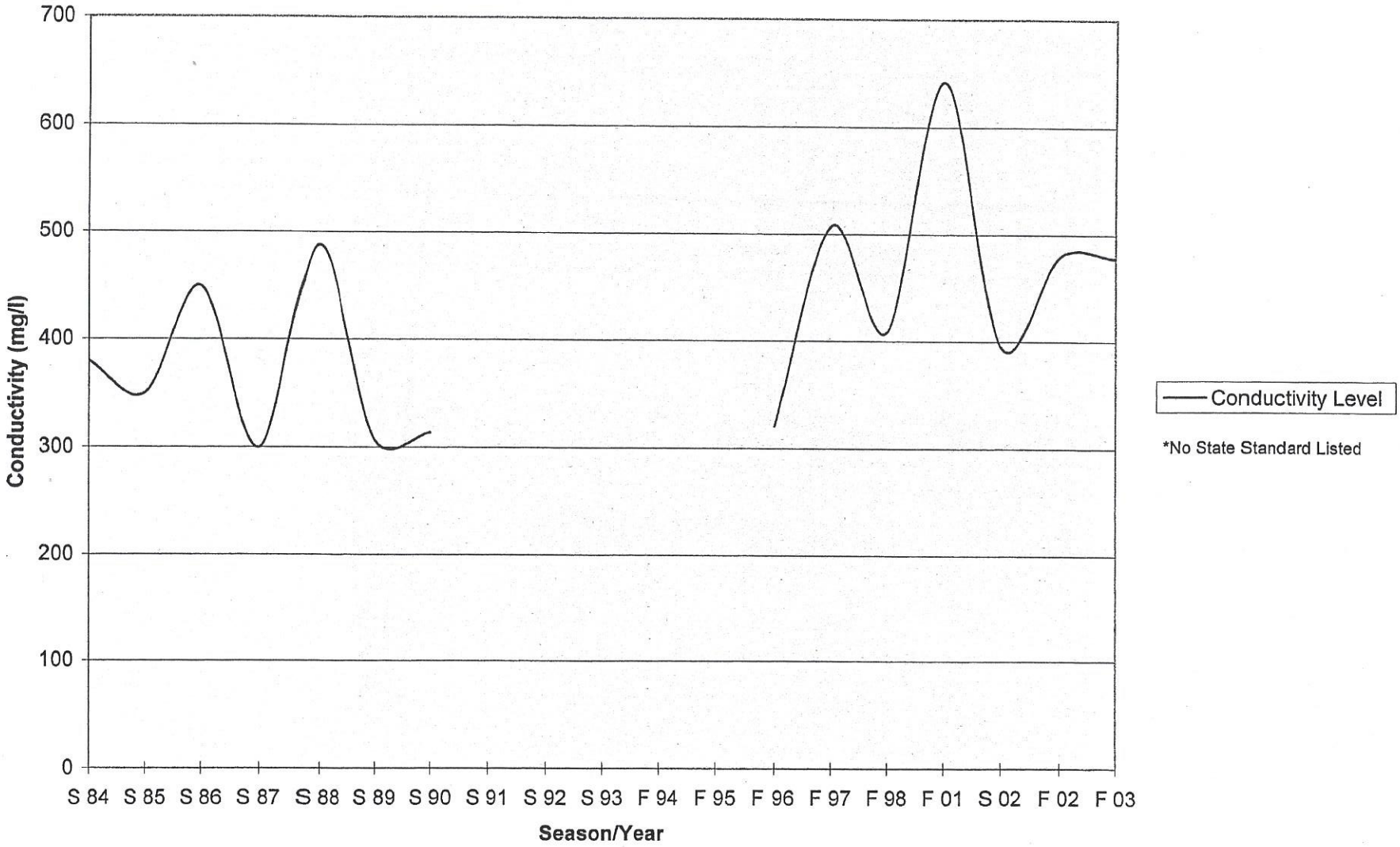
Site 7 (Paulinskill River) - Aluminum



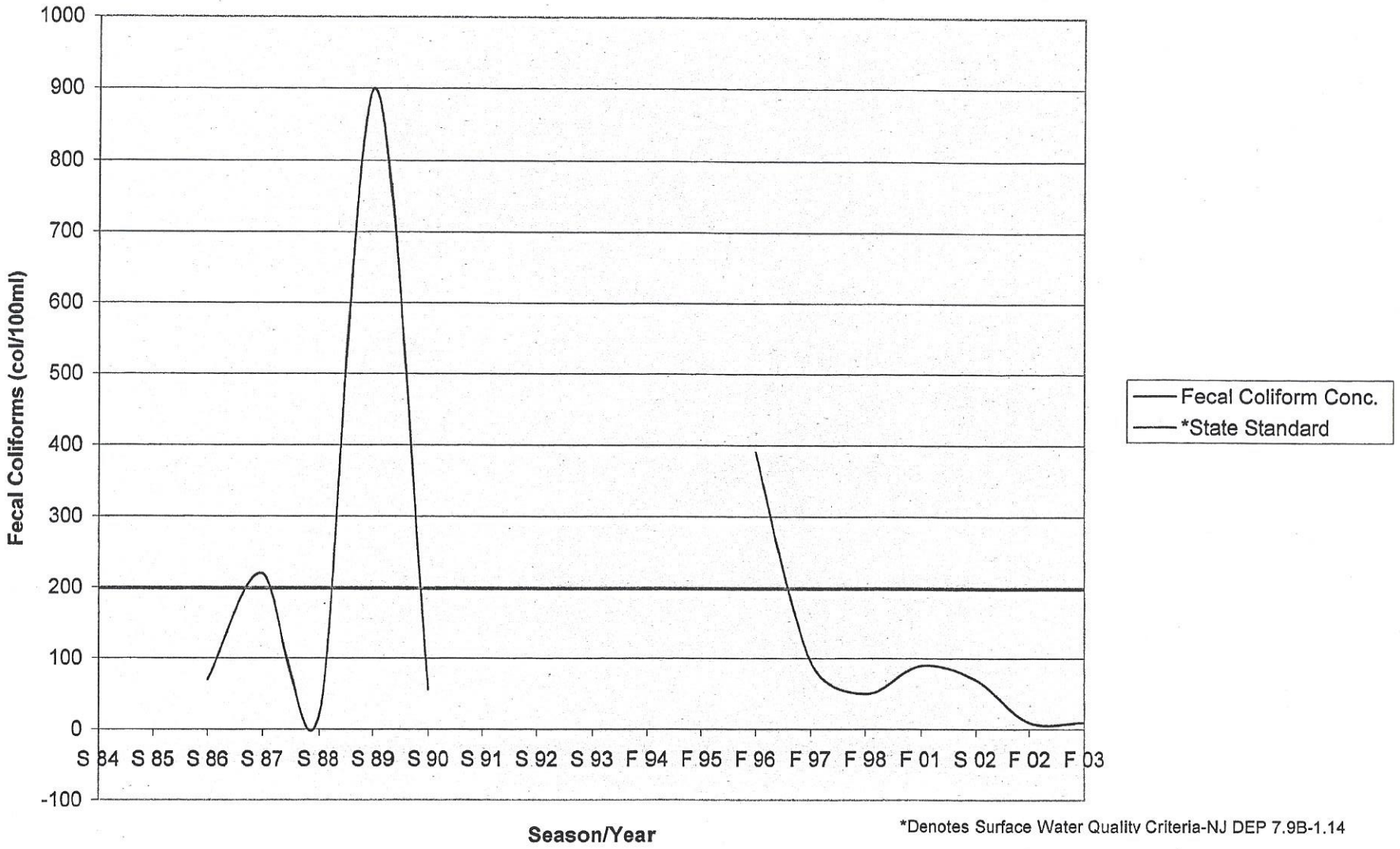
Site 7 (Paulinskill River) - Ammonia as N



Site 7 (Paulinskill River) - Conductivity

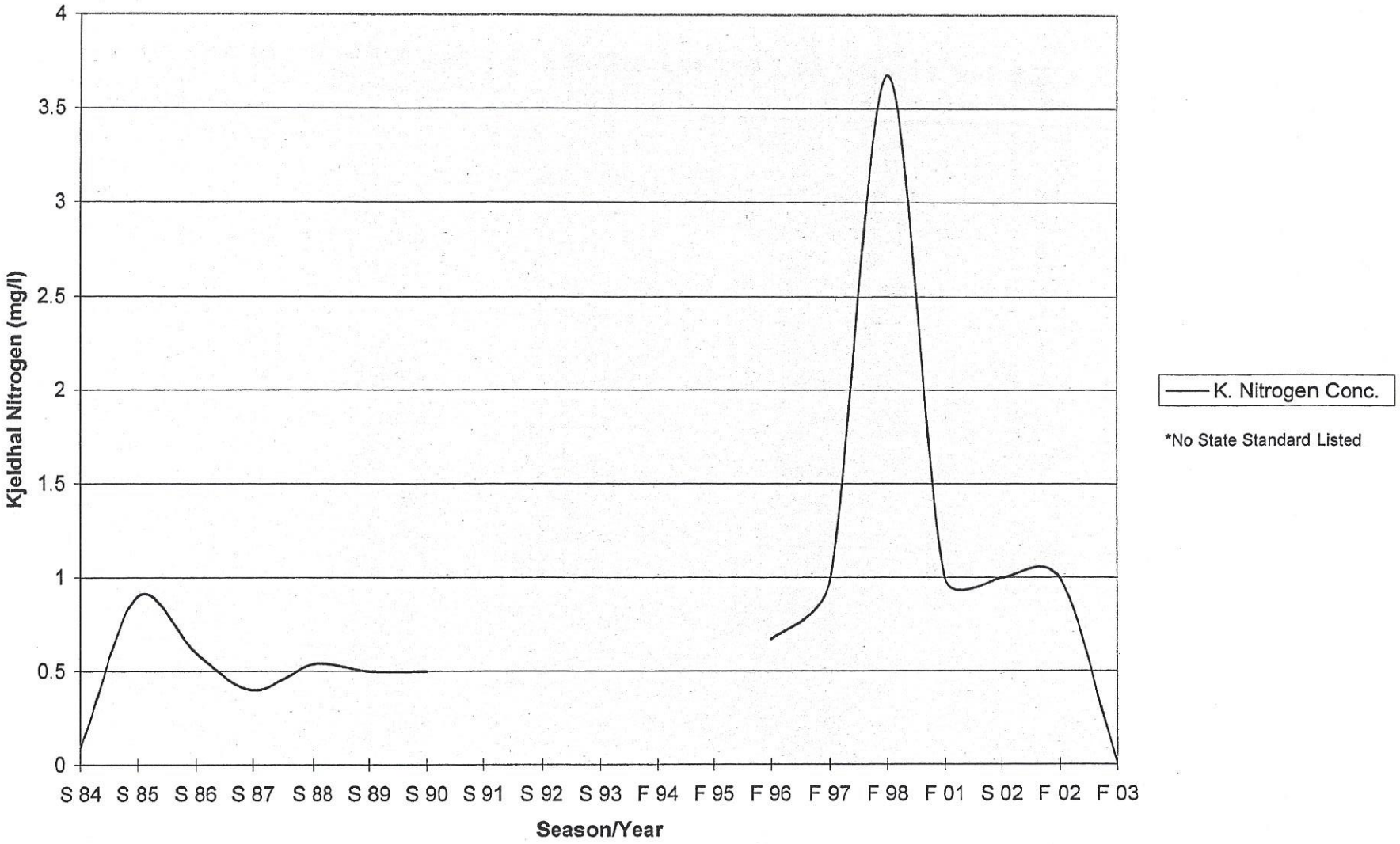


Site 7 (Paulinskill River) - Fecal Coliforms

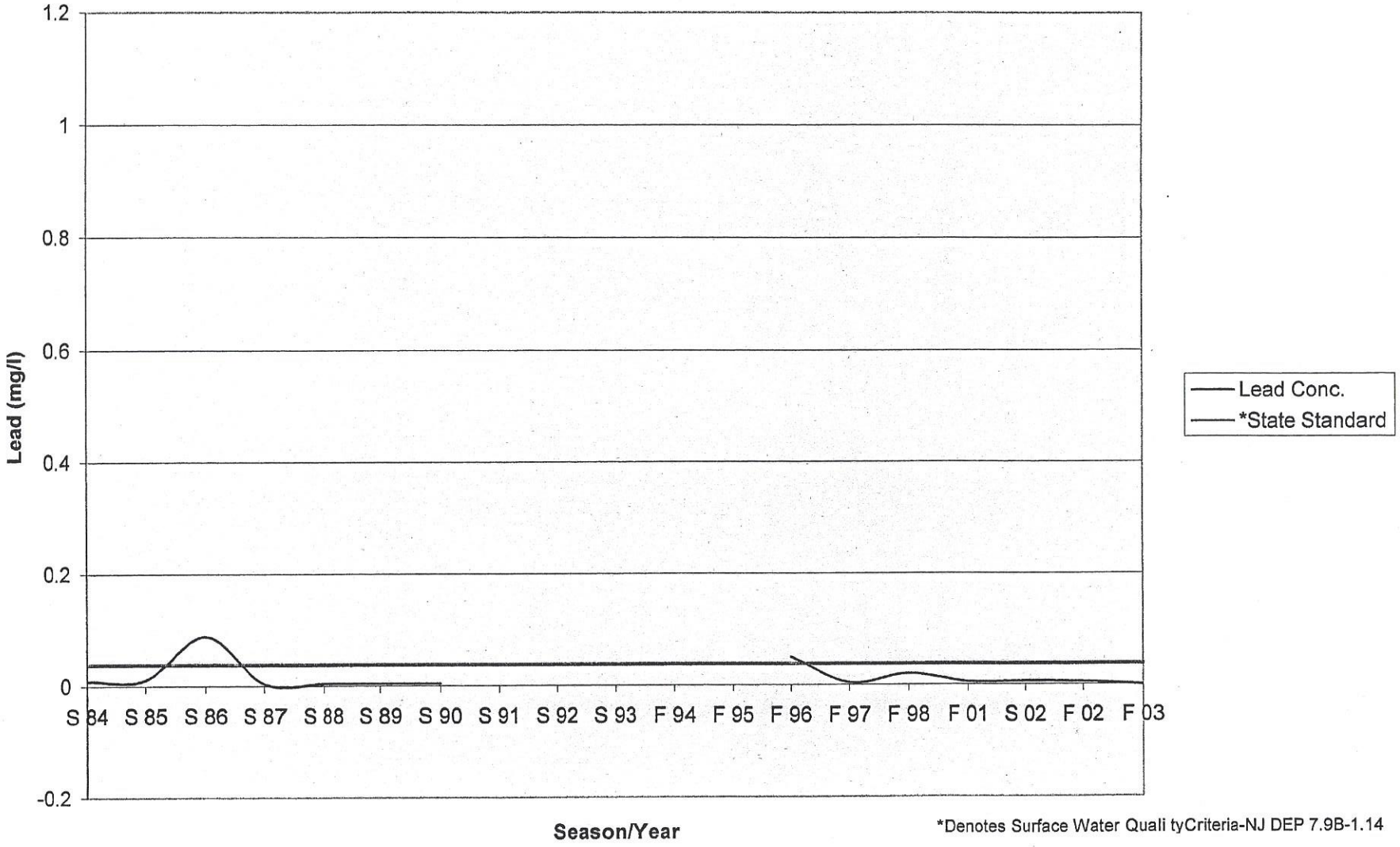


*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

Site 7 (Paulinskill River) - Kjeldhal Nitrogen

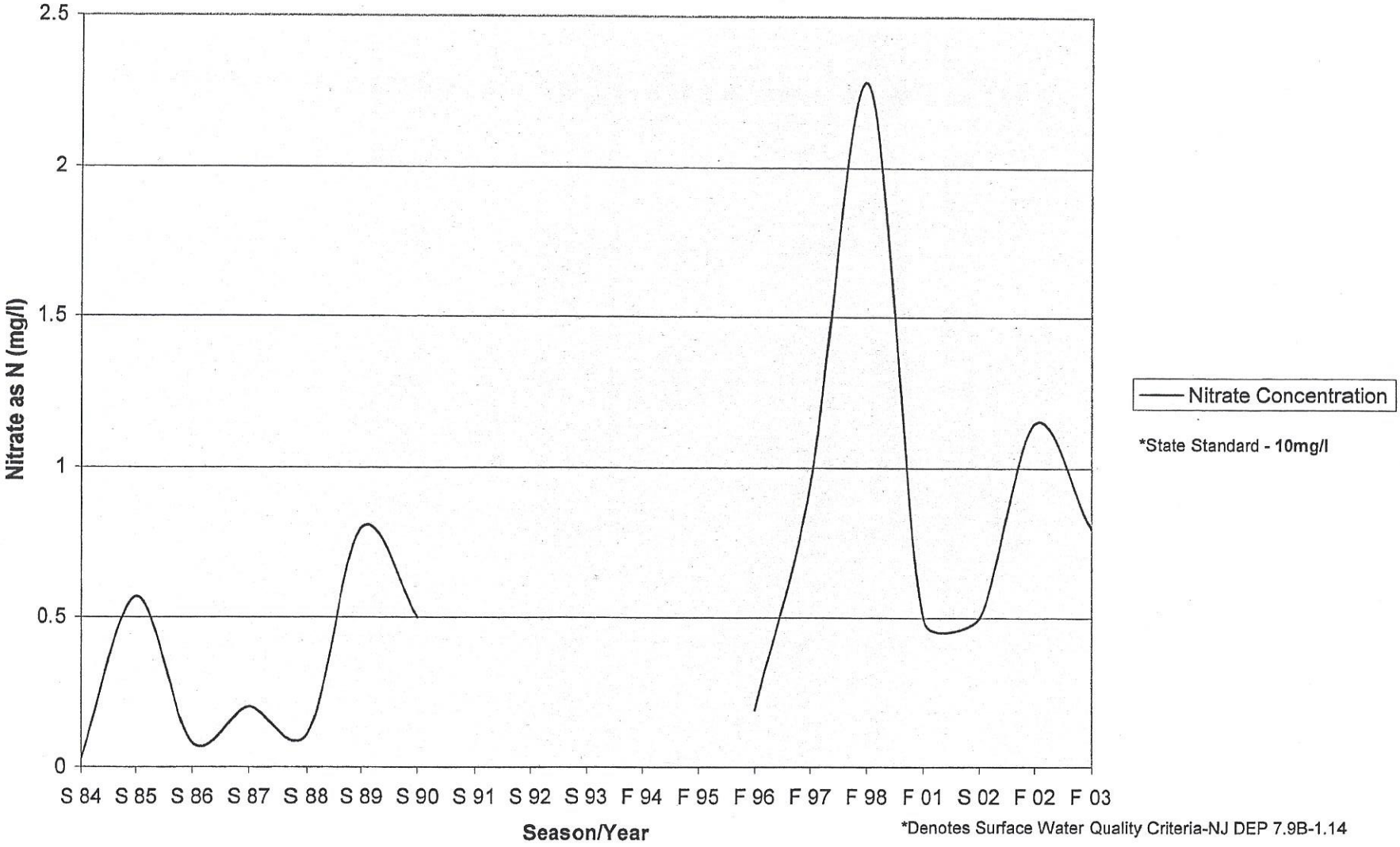


Site 7 (Paulinskill River) - Lead



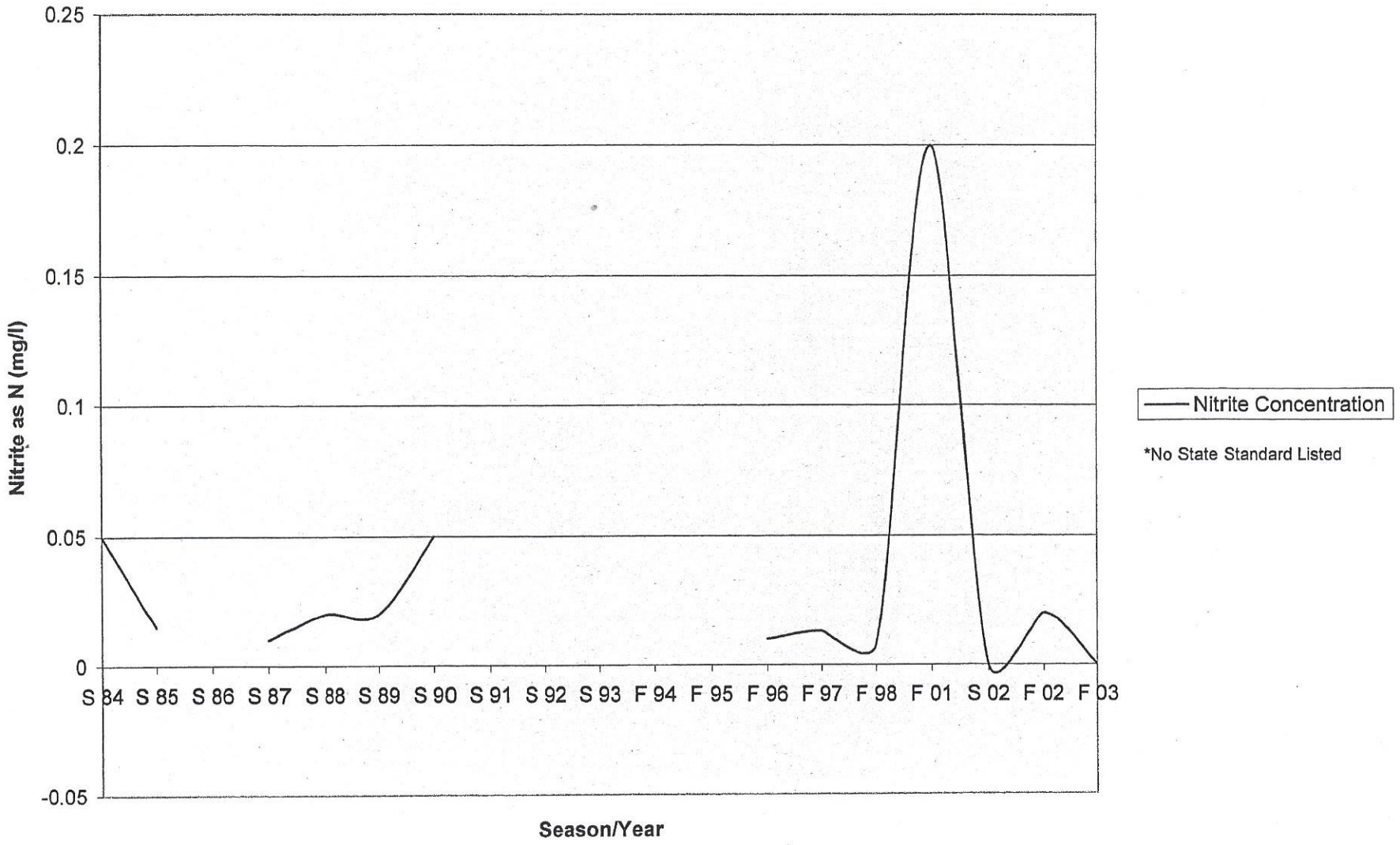
*Denotes Surface Water Quali tyCriteria-NJ DEP 7.9B-1.14

Site 7 (Paulinskill River) - Nitrate as N

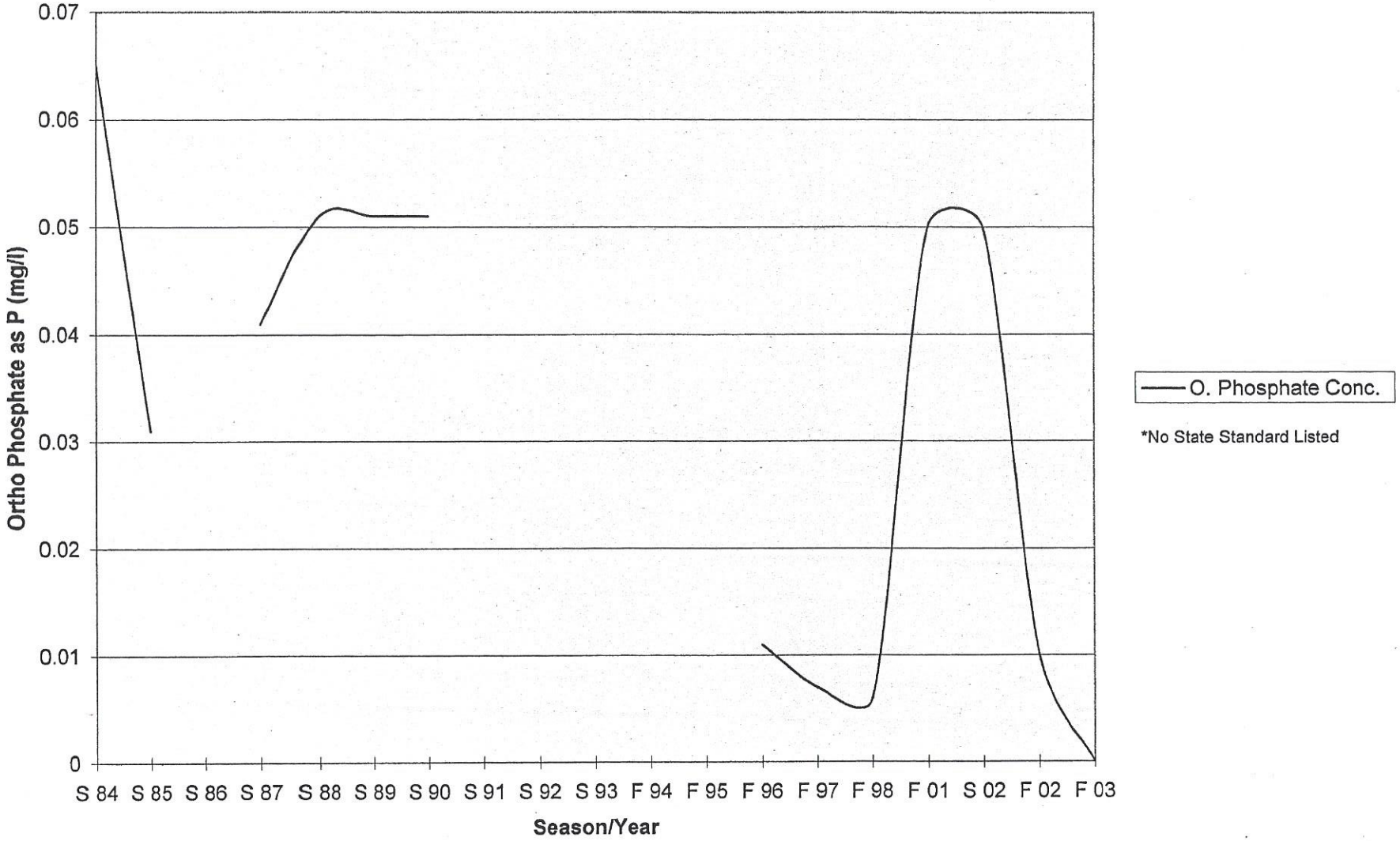


*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

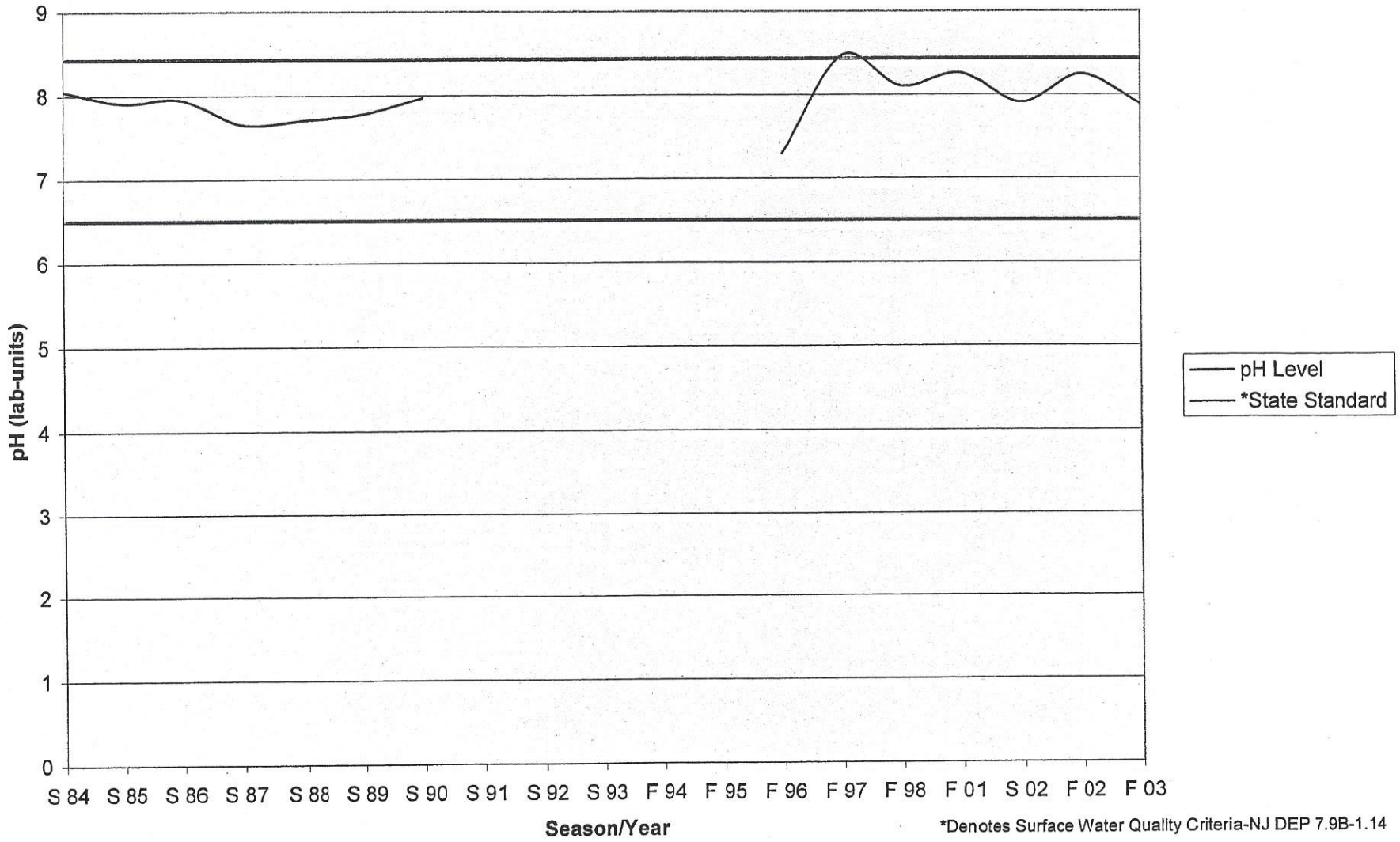
Site 7 (Paulinskill River) - Nitrite as N



Site 7 (Paulinskill River) - Ortho Phosphate as P

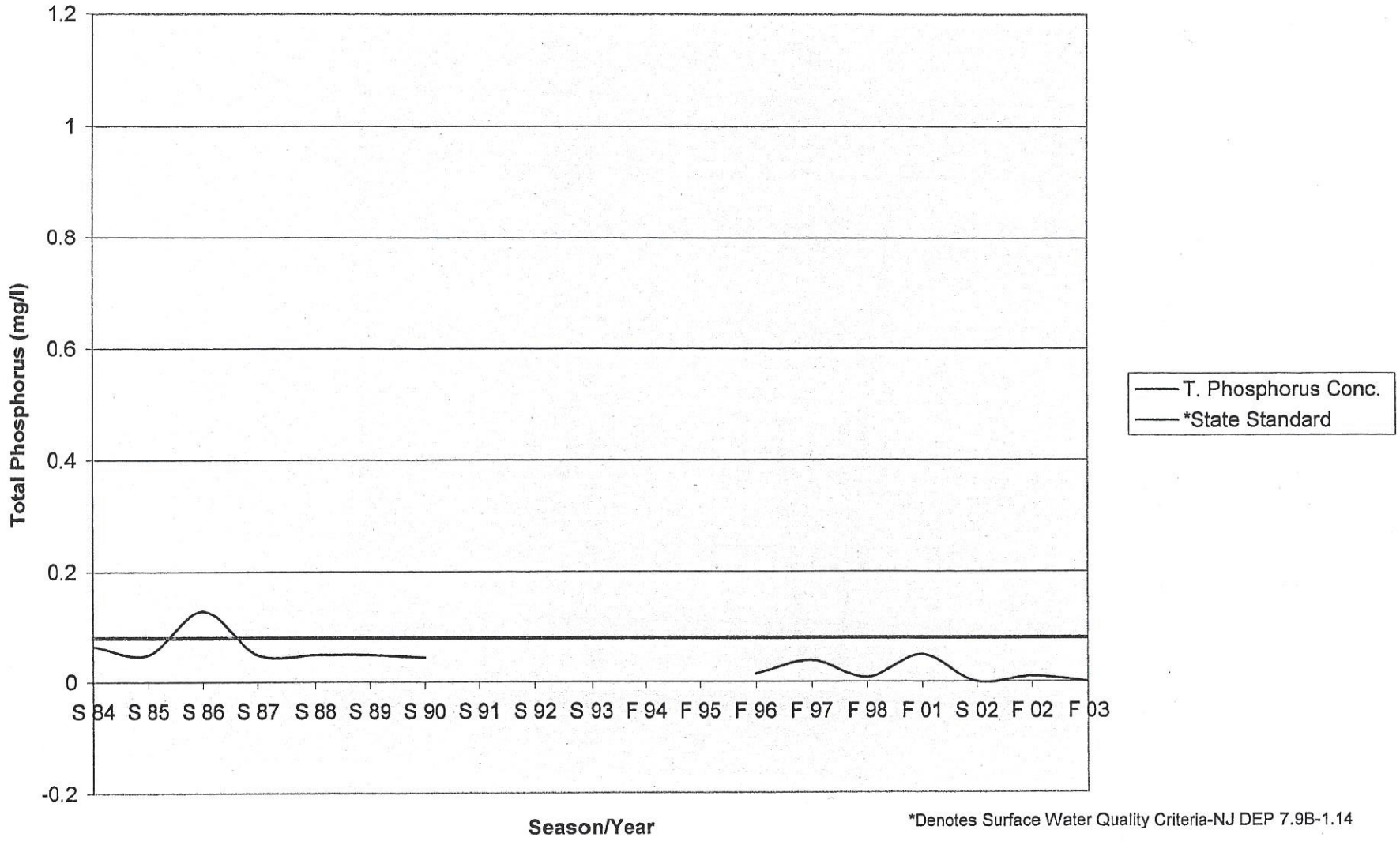


Site 7 (Paulinskill River) - pH



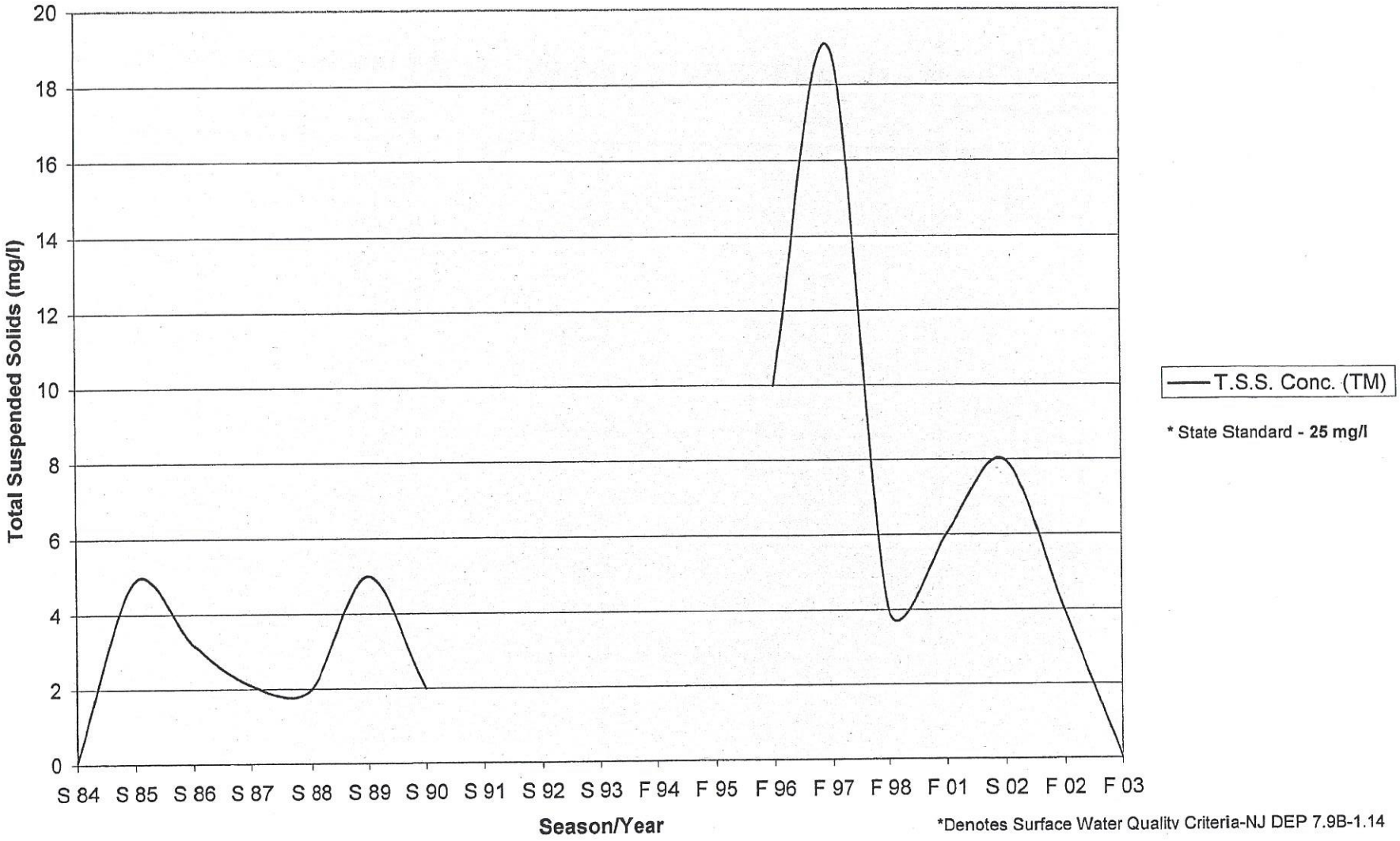
*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

Site 7 (Paulinskill River) - Total Phosphorus



*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

Site 7 (Paulinskill River) - Total Suspended Solids

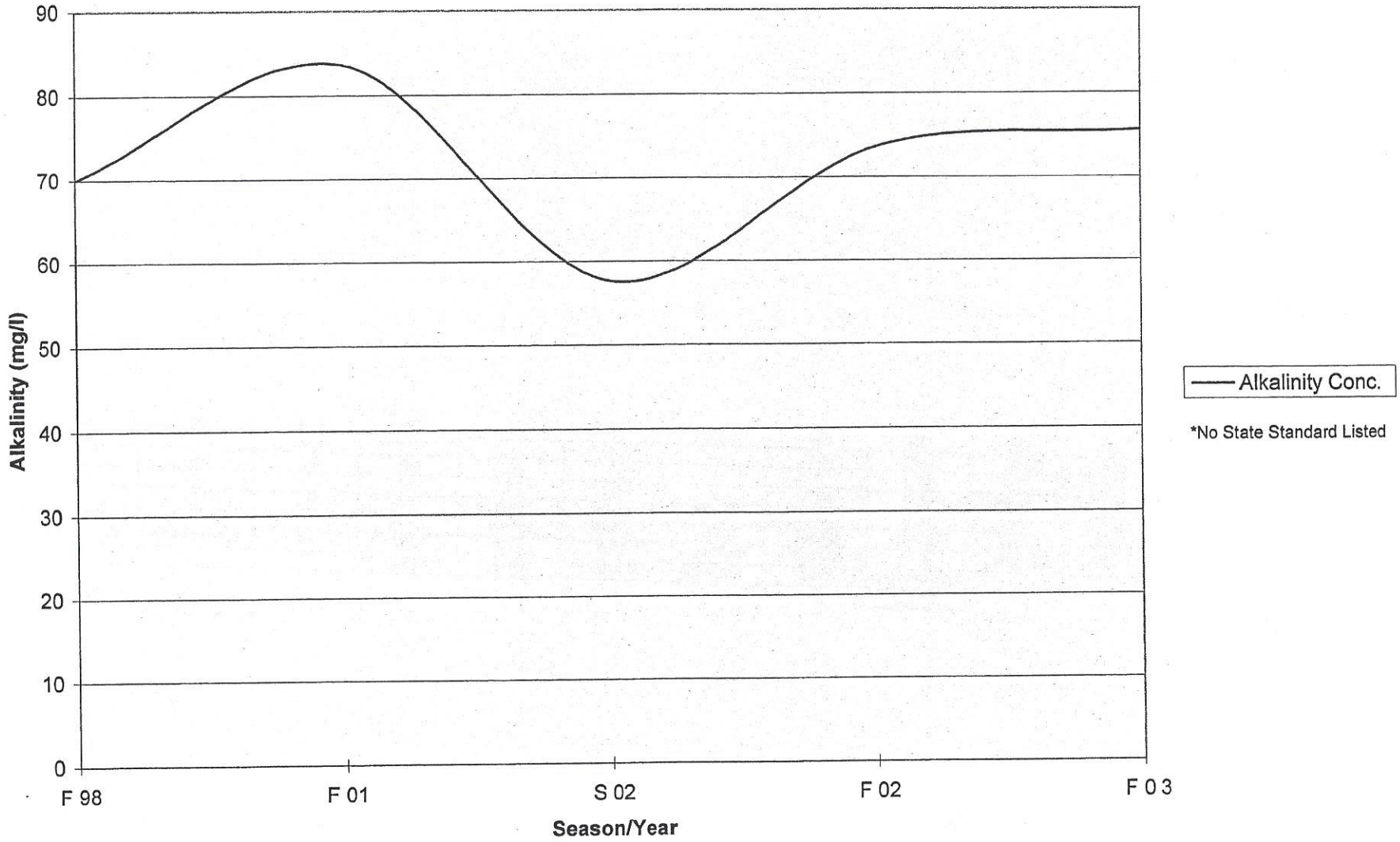


*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

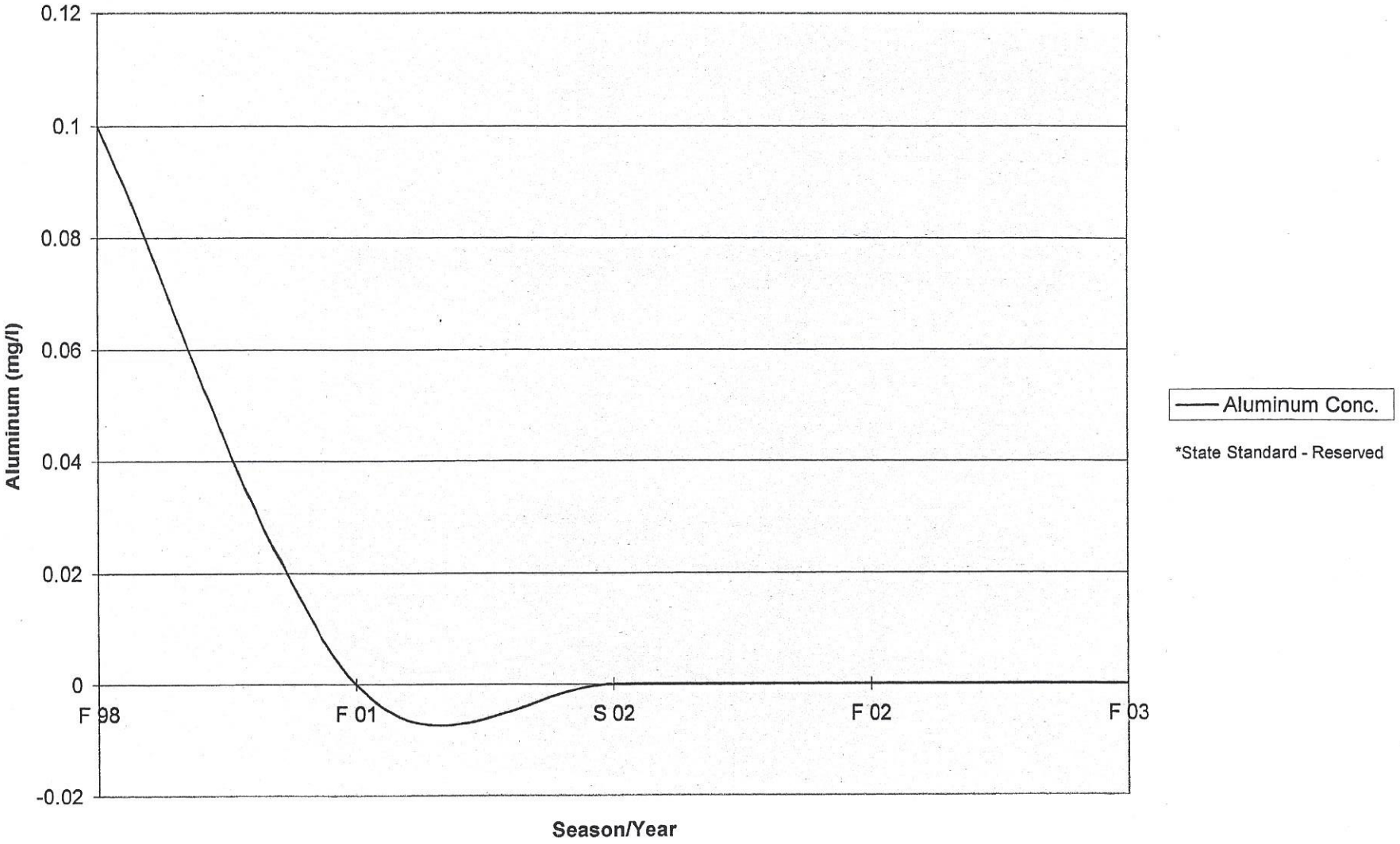
Stillwater Township Environmental Commission
Water Chemistry Data Set - Site 8: Keen's Mill

Year	Fecal Coliforms (col/100ml)	Conductivity (umhos)	pH (lab-units)	Ammonia as N (mg/l)	Nitrite as N (mg/l)	Nitrate as N (mg/l)	Kjeldhal Nitrogen (mg/l)	Total Phosphorus (mg/l)	Ortho Phosphate as P (mg/l)	Alkalinity (mg/l)	Lead (mg/l)	Aluminum (mg/l)	Total Suspended Solids (mg/l)
F 98	2	172	7.65	0.03	0.01	0.08	2.83	0.192	0.01	70	0.004	0.1	59
F 01	20	258	7.7	0.1	0.2	0.5	1	0.05	0.05	83.6	0.005	ND	20
S 02	10	240	7.9	0.1	ND	0.5	1	ND	0.05	57.7	0.005	ND	2
F 02	10	252	8.12	0.1	0.02	0.5	1	0.01	0.01	73.6	0.005	ND	2
F 03	10	242	7.38	ND	ND	ND	ND	ND	ND	75.6	ND	ND	2

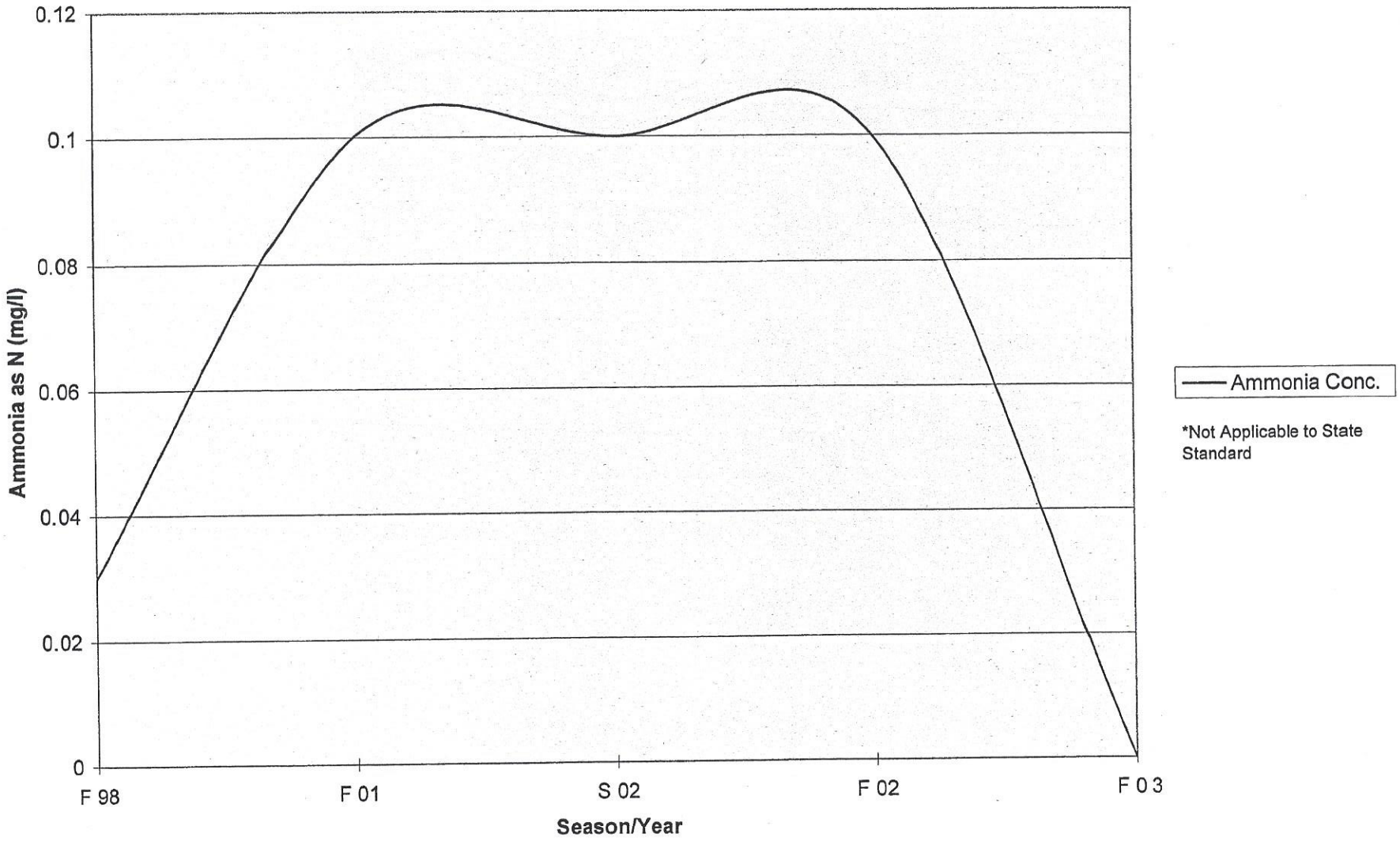
Site 8 (Keen's Mill) - Alkalinity



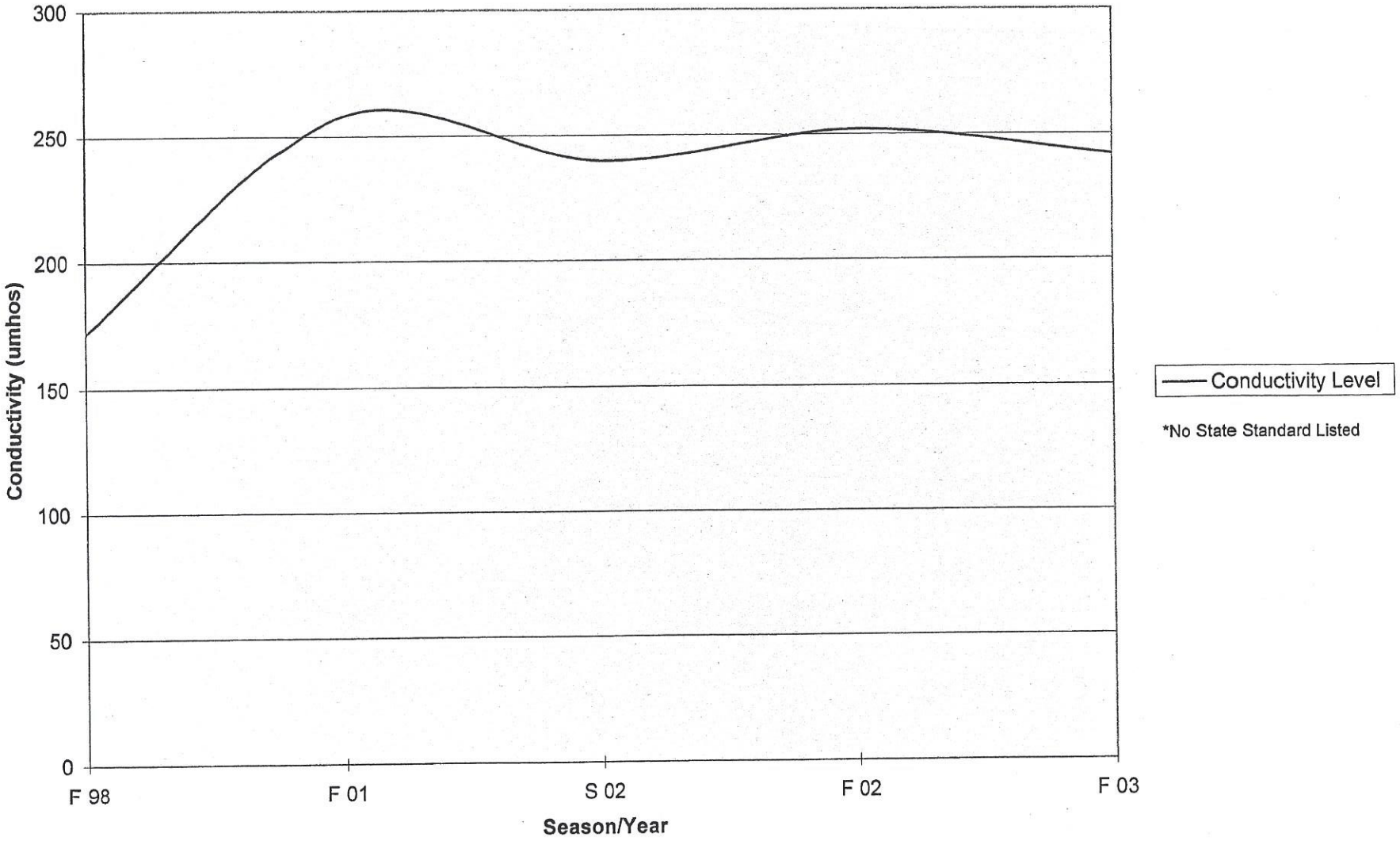
Site 8 (Keen's Mill) - Aluminum



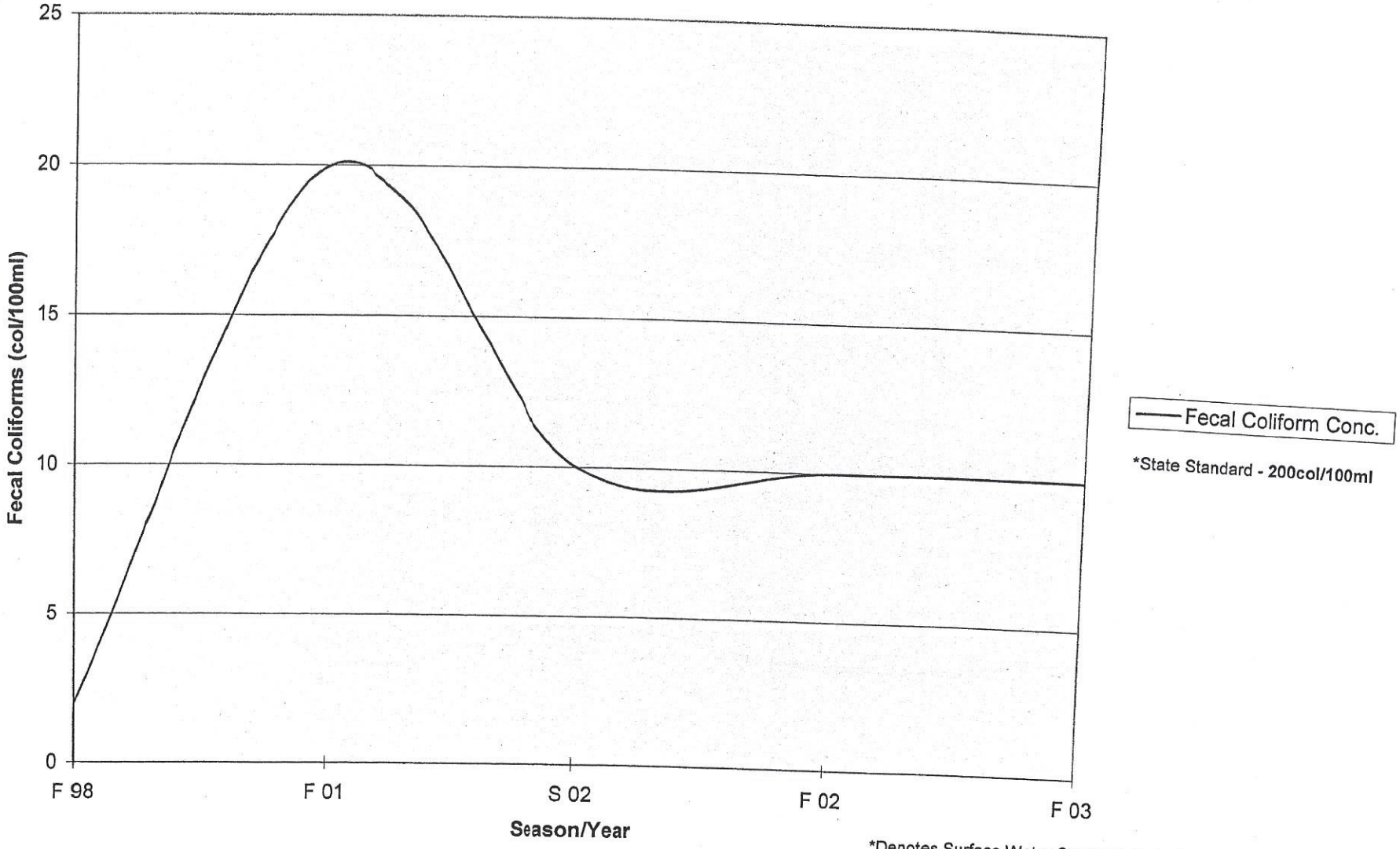
Site 8 (Keen's Mill) - Ammonia as N



Site 8 (Keen's Mill) - Conductivity



Site 8 (Keen's Mill) - Fecal Coliforms



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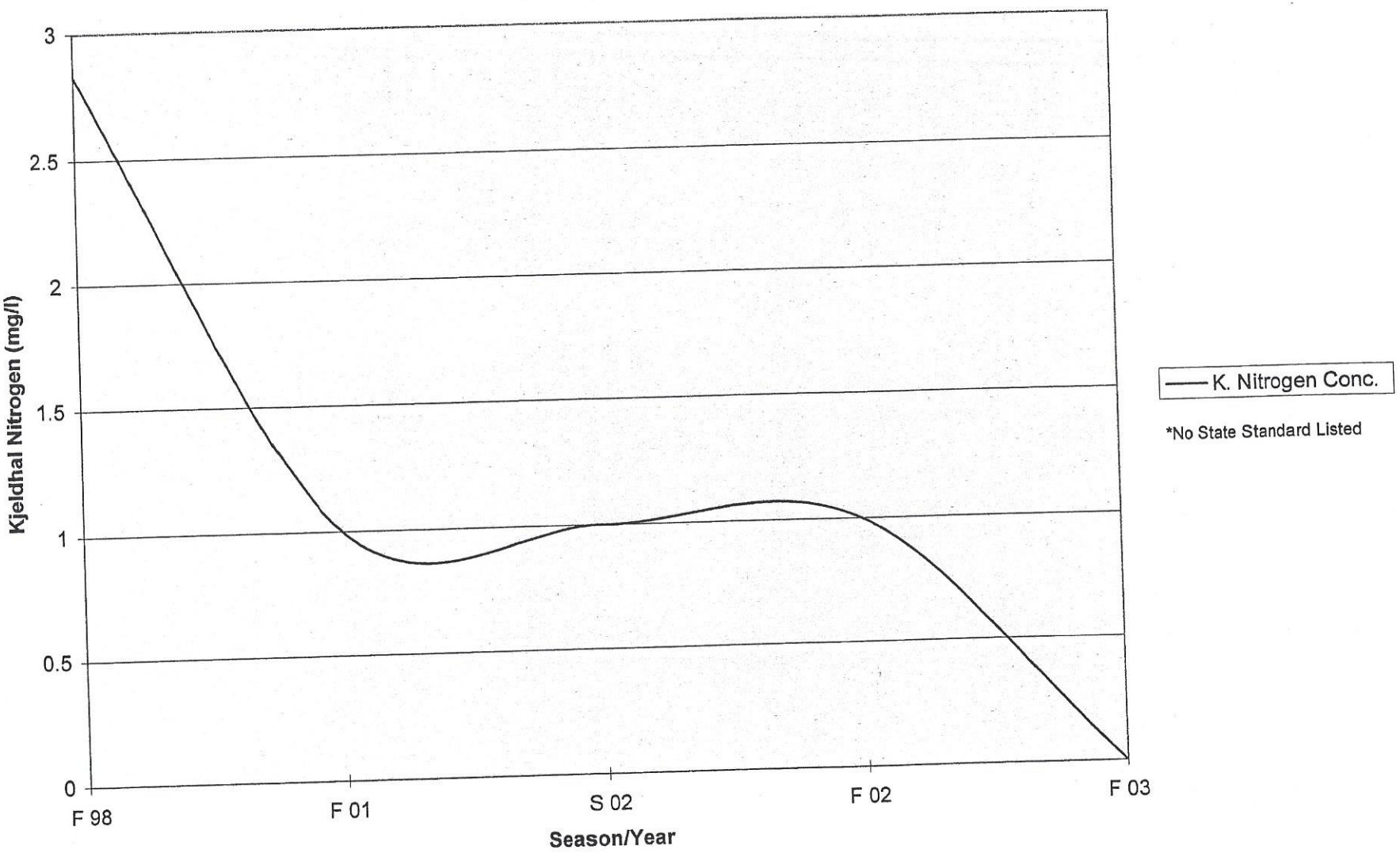
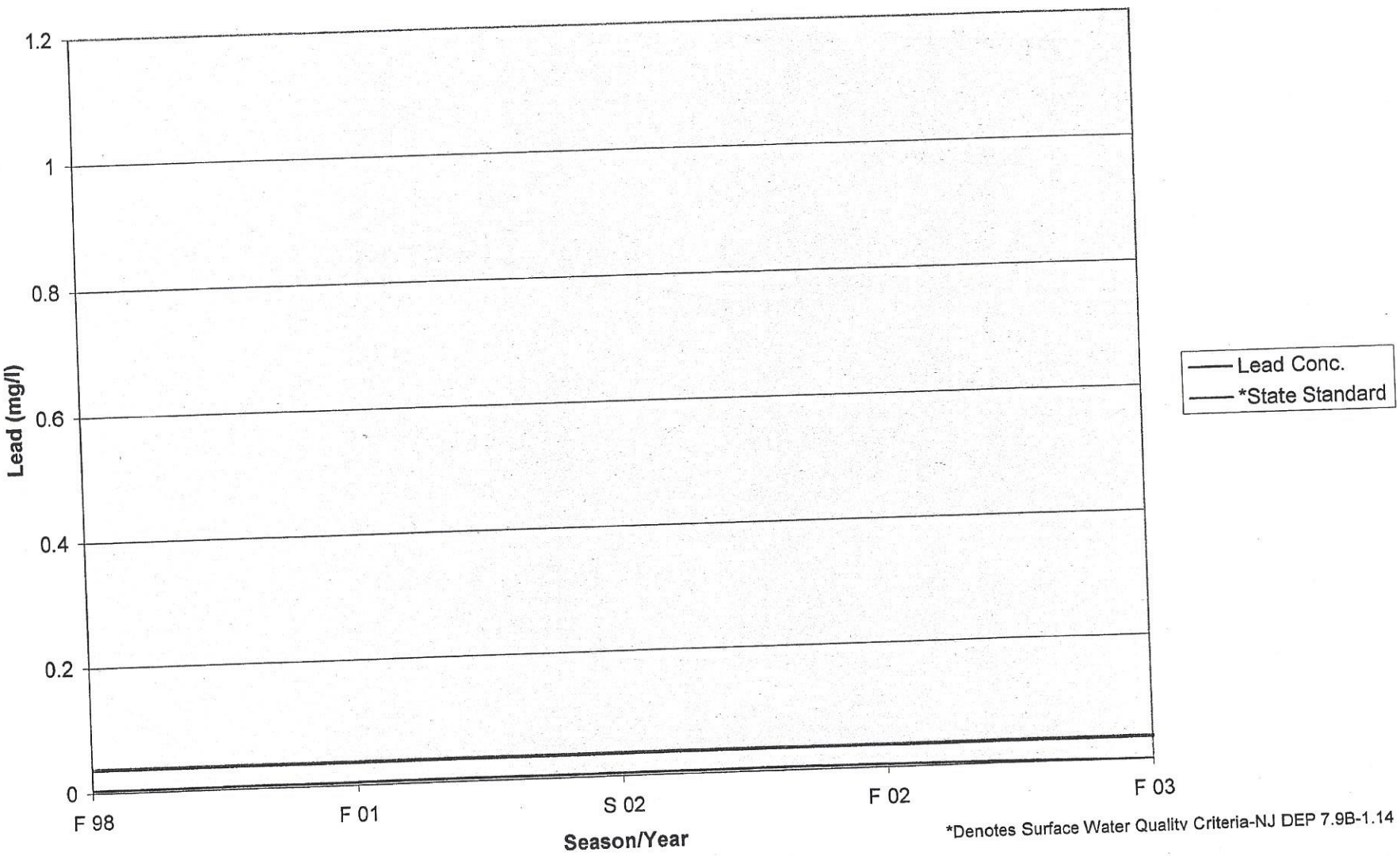
Site 8 (Keen's Mill) - Kjeldhal Nitrogen

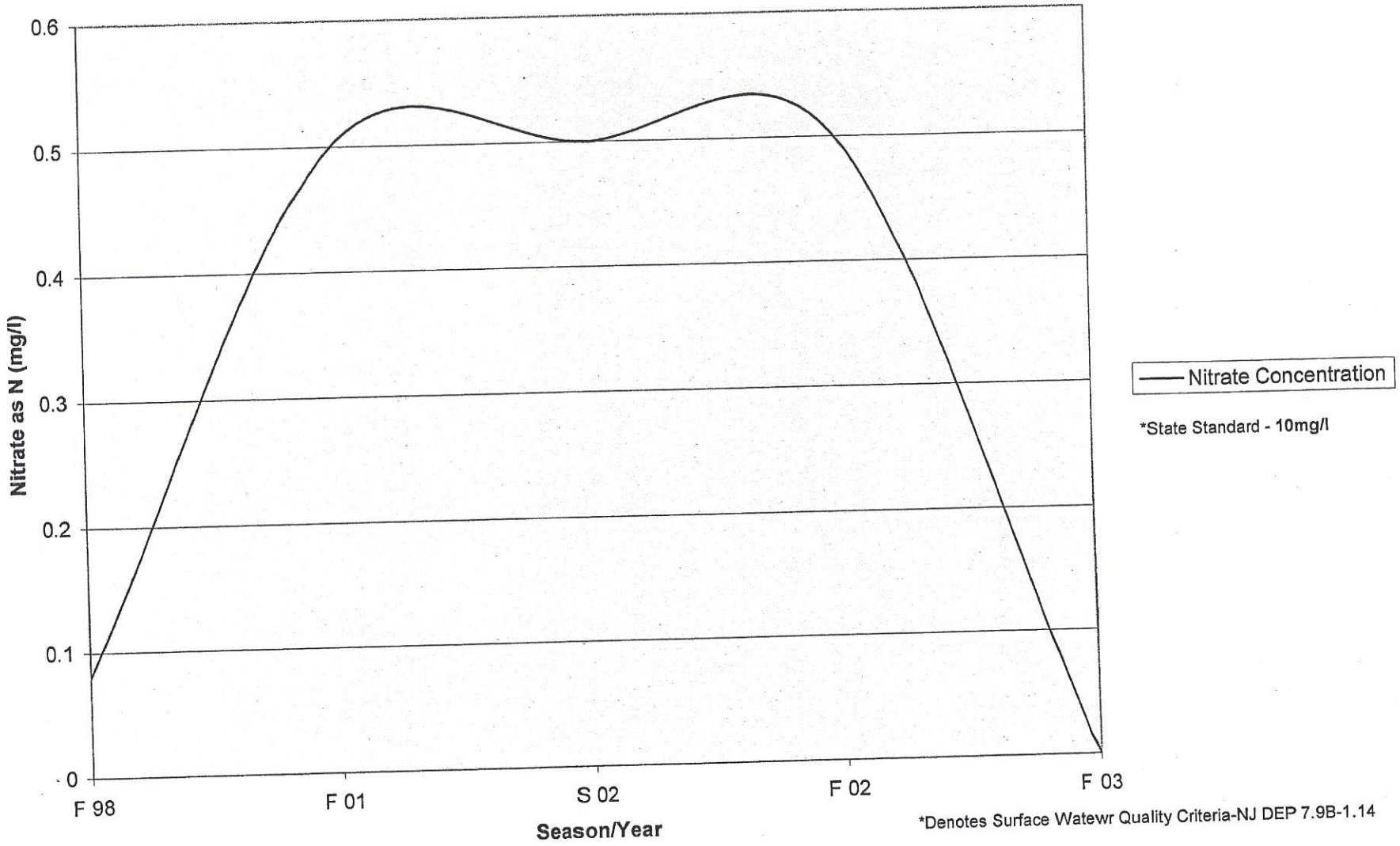


Site 8 (Keen's Mill) - Lead

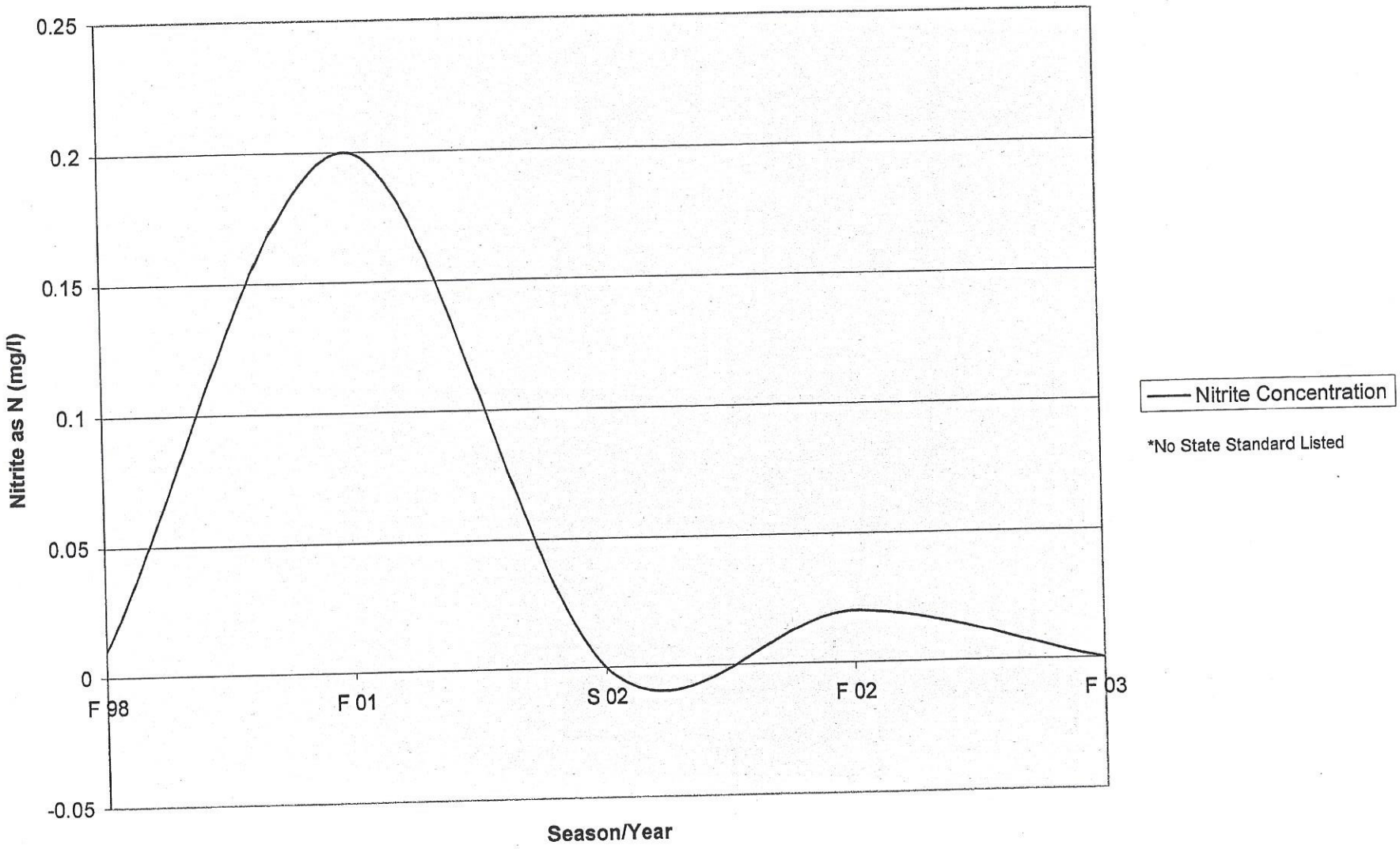


*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

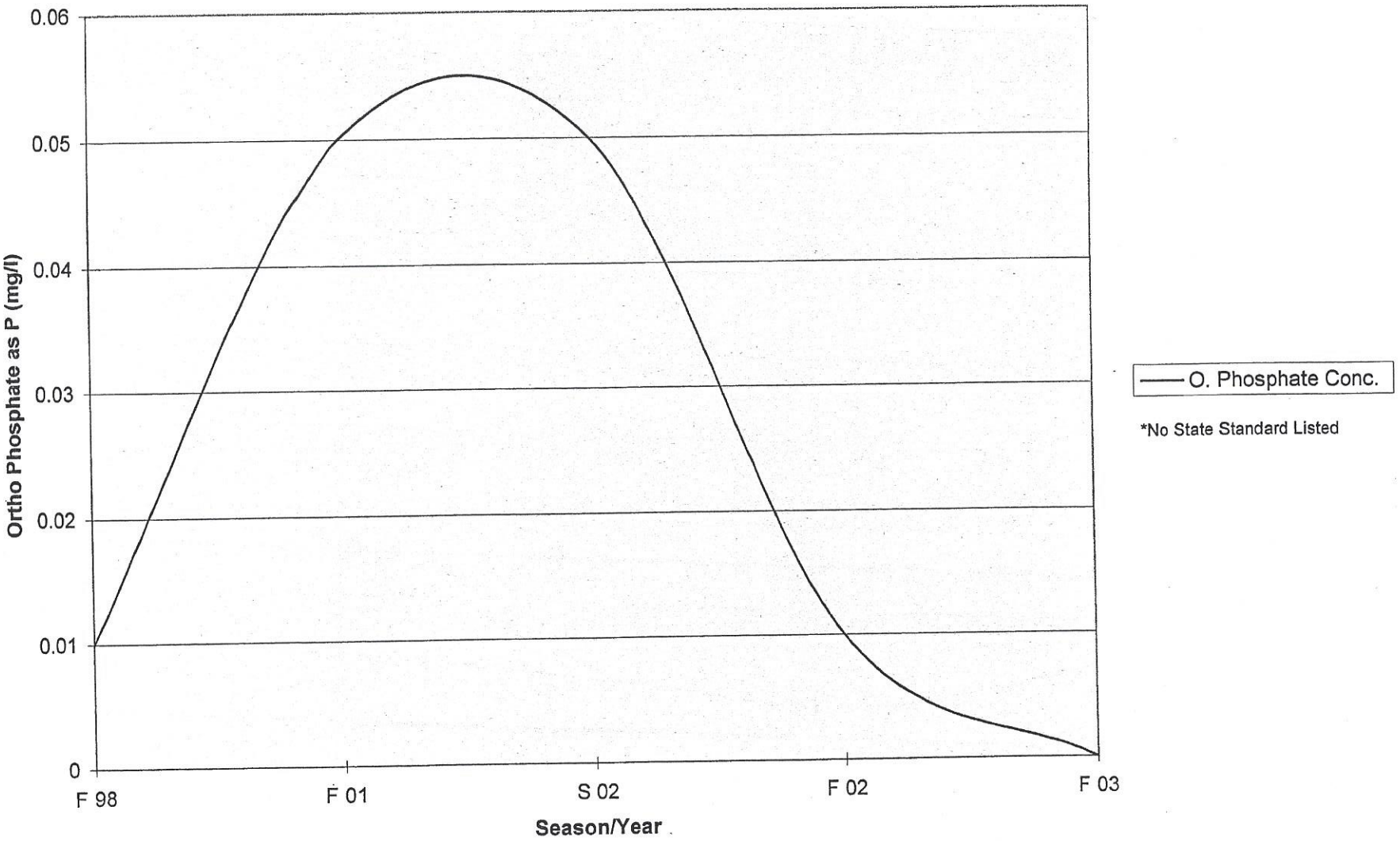
Site 8 (Keen's Mill) - Nitrate as N



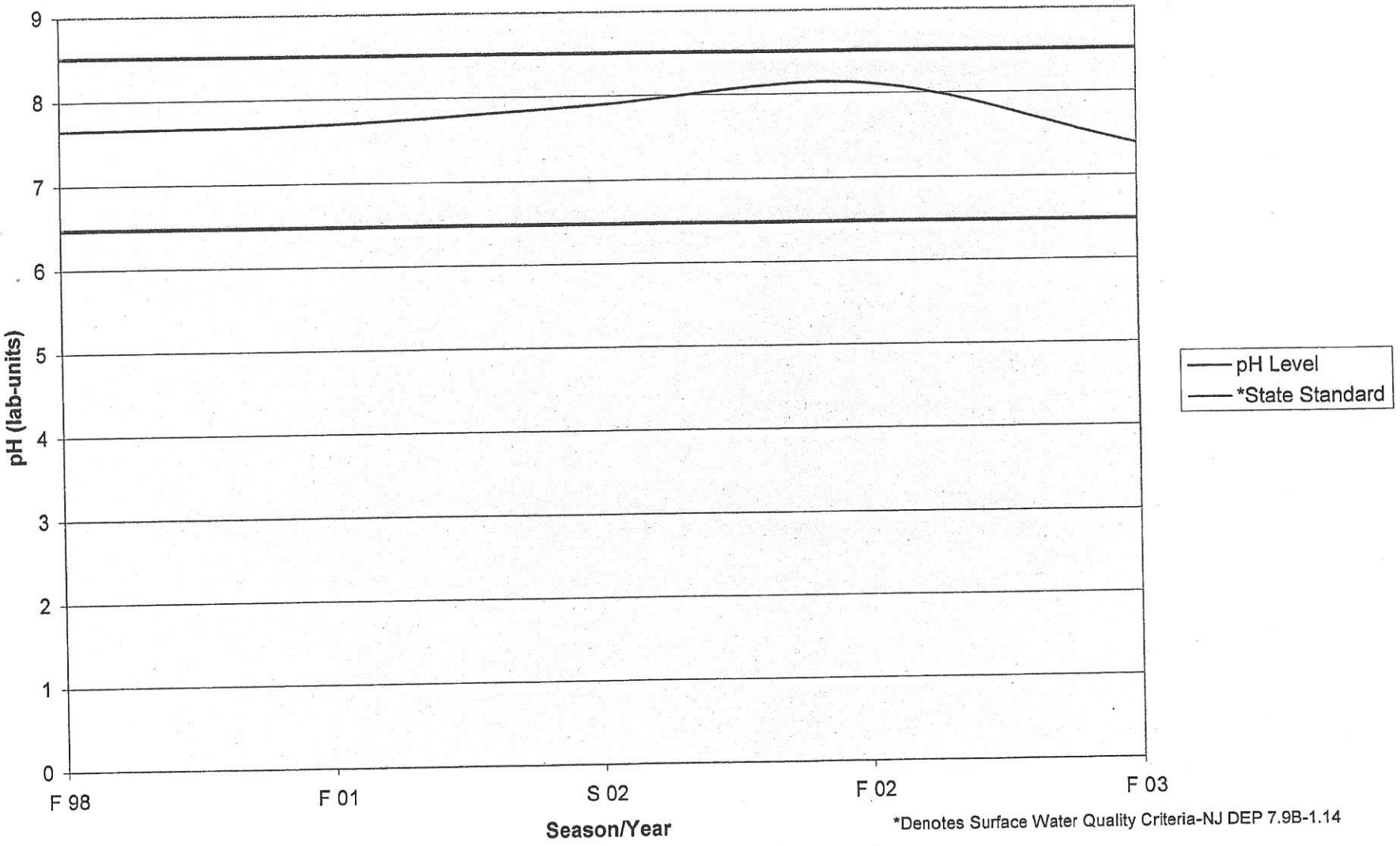
Site 8 (Keen's Mill) - Nitrite as N



Site 8 (Keen's Mill) - Ortho Phosphate as P

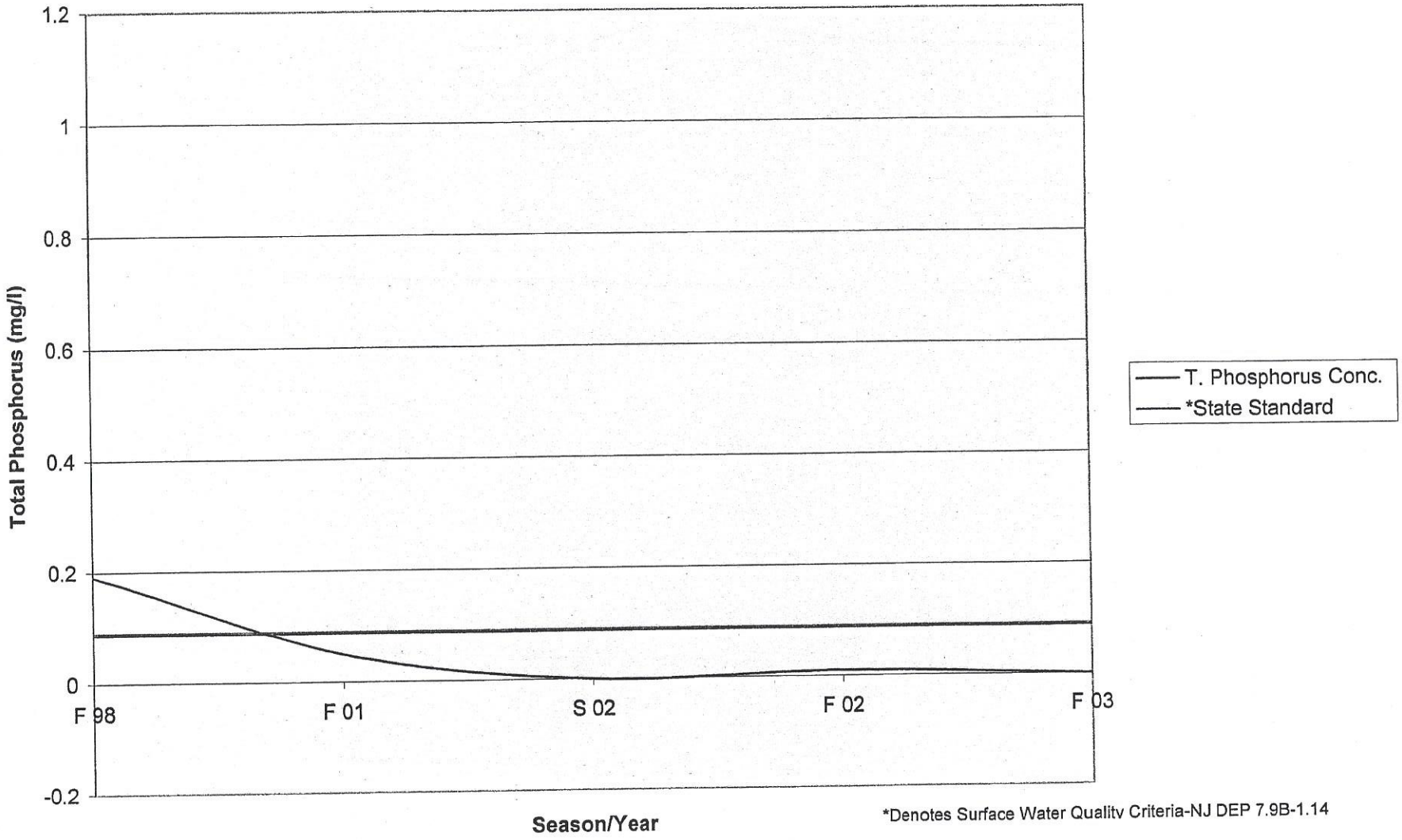


Site 8 (Keen's Mill) - pH



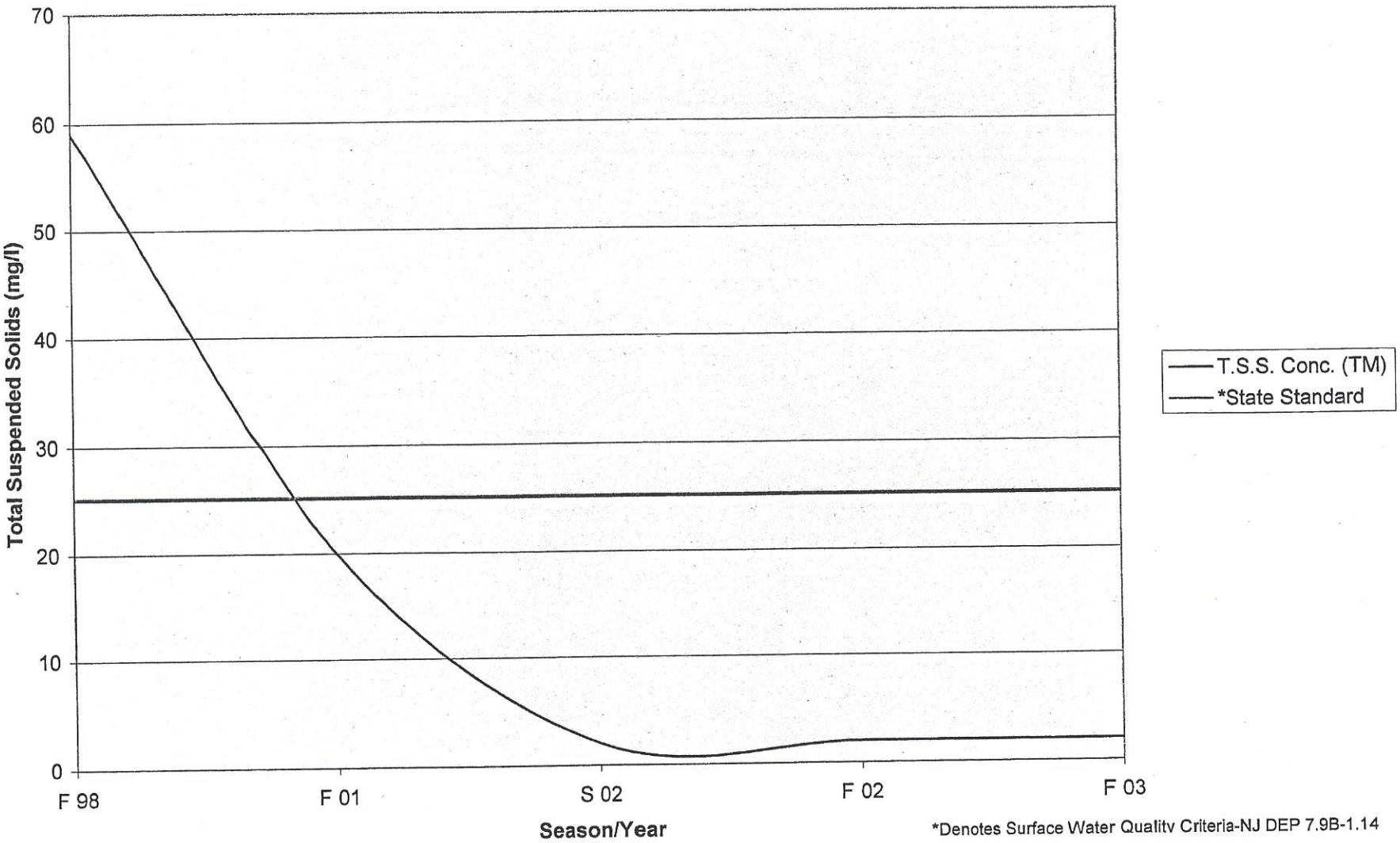
*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

Site 8 (Keen's Mill) - Total Phosphorus



*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

Site 8 (Keen's Mill) - Total Suspended Solids



*Denotes Surface Water Quality Criteria-NJ DEP 7.9B-1.14

Methods and Materials

The biological sampling sites for each of the eight streams were determined by identifying a "riffle-pool sequence" nearest to where the chemical sampling took place. Once this specific stretch of the stream is determined as the sampling site, a slow moving pool, a fast riffle, and a transitional riffle are picked out from the larger schemed "riffle-pool sequence". Within each of these stream habitats, a rock is selected, with each of the three rocks being embedded in the sediment at differing levels. The rock is then upturned and brushed with a hand or paintbrush by one worker while a net is held downstream by the second worker, to collect whatever biota is removed from the rock. If a suitable rock is not available, a square meter of bottom substrate is disturbed and the drifting sediments and biota are collected. The contents of the net are then emptied into a white collection tub for streamside examination. These steps are repeated until the pool, the fast riffle, and the transitional riffle are all sampled. The macroinvertebrates in the white tub are transferred into a cooler for transport to the laboratory. Once at the lab, the macroinvertebrates are counted and identified with the use of stereoscopes. The tally for each species is divided by three to obtain the total number of macroinvertebrate specie (for each of the species) for the stream. This number is then placed into one of three categories. Category "A", which designates 1-9 individuals, "B" designates 10-99, and "C" designates 100 or more. Once the number of individuals within each species is acquired, the letter will be placed on the chart on a *1994 Stream Quality Survey Izaak Walton League of America document*, which is being used to simplify and portray the analysis of the stream study results. Although the species abundance designations (A, B,

and C) are not used in determining each stream's index of biological integrity, these data may be useful for comparisons of future stream studies.

The study format is set up for different species to fall into one of the three categories of pollution sensitivity. The categories are sensitive, somewhat sensitive, and tolerant. By their presence or absence, macroinvertebrates indicate water quality with some species being found in both pristine and degraded sites, while others can only be found in pristine sites. The letter, or species abundance designation, for the specie is then placed into one of these categories and then added up, with the pollution sensitive being of a more weighted score than the somewhat sensitive, and so on. A composite score is reached when all the letters in each category are added up. This is the water quality rating for the stream, with the highest numbers (>22) being *excellent*, followed by *good*, then *fair*, and lastly *poor*.

In addition to the collection of the biological data, other important information is collected and recorded while streamside. These data include water and air temperature, water depth and width, flow rate, barriers to fish movement, surface water appearance, and stream bed composition. In addition, the odor, stability in the stream bed, percentile of bank covered by plants and rock, stream channel shade, stream bank composition and erosion, riffle composition, and land uses in the watershed are also recorded and integrated into the study. These are also recorded within the *1994 Stream Quality Survey IWL document*. All materials were removed at the conclusion of the sampling, leaving the streams in their pre-sample condition.

Save Our Streams

Stream Quality Survey

October 1994

Name of reviewer: ______
Date reviewed: ______
Data sent to: ______

The purpose of this form is to aid you in gathering and recording important data about the health of your stream. By keeping accurate and consistent records of your observations and data from your macroinvertebrate count, you can document changes in water quality. Refer to the SOS insect card and monitoring instructions to learn how to trap and identify stream macroinvertebrates and how to complete this form.

Stream Blair Creek Station # 1 # of participants 8

County Sussex State NJ Group or individual Stillwater Environmental Commission

Location Stillwater - Old Schoolhouse Rd.

Weather conditions (last 72 hours) ______

Date 6/8/14 Average stream width 5 ft. Average stream depth 5 inches ~~ft.~~

Start Time 15:30 End Time 15:51 Flow rate: High ______ Normal ______ Low ✓ Negligible ______

If conducting rocky bottom sampling, select a riffle where the water is not running too fast, the water depth is between 3-12 inches, and the bed consists of cobble-sized stones or larger. Monitored riffle area (3' x 3' square) ______ Water depth ______ in., in riffle. Water temperature 22 F° ? C° (circled) ? Take 3 samples in the same general area. Count each separately and report the highest-scoring sample below. Sample ______ reported of 3.

If conducting muddy bottom sampling, take the required number of scoops from each habitat type: steep banks/vegetated margin (10 scoops), woody debris with organic matter (4 scoops), rock/gravel/sand substrates (3 scoops), and silty bottom with organic matter (3 scoops). Air temp. 27°C

MACROINVERTEBRATE COUNT

Use the stream monitoring instructions to conduct a macroinvertebrate count. Use letter codes (A = 1-9, B = 10-99, C = 100 or more) to record the numbers of organisms found in a 3 foot by 3 foot area. Add up the number of letters in each column and multiply by the indicated index value. The following columns are divided based on the organism's sensitivity to pollution.

SENSITIVE		SOMEWHAT SENSITIVE		TOLERANT	
B	caddisfly larvae	A	beetle larvae	A	aquatic worms
A	hellgrammite		clams		blackfly larvae
A	mayfly nymphs	A	crane fly larvae		leeches
	gilled snails		crayfish	A	midge larvae
	riffle beetle adult		damselfly nymphs	A	pouch (and other) snails
B	stonefly nymphs	A	dragonfly nymphs		
	water-penny larvae		scuds		
			sowbugs		
			fishfly larvae		
			alderfly larvae		
			atherix		
4	# letters times 3 =	3	# letters times 2 =	3	# letters times 1 =
12	index value	6	index value	3	index value

Now add together the three index values from each column for your total index value. Total index value 21

Compare this total index value to the following ranges of numbers to determine the water quality of your stream. Good water quality is indicated by a variety of different kinds of organisms, with no one kind making up the majority of the sample. Although the A, B, and C ratings do not contribute to the water quality rating, keep track of them to see how your macroinvertebrate populations change over time.

3-1

WATER QUALITY RATING

______ Excellent (>22) 21 ✓ Good (17-22) ______ Fair (11-16) ______ Poor (<11)

Sam Goldky

Fish water quality indicators:
- ☐ scattered individuals
- ☐ scattered schools
- ☐ trout (pollution sensitive)
- ☐ bass (somewhat sensitive)
- ☐ catfish (pollution tolerant)
- ☐ carp (pollution tolerant)

Barriers to fish movement:
- ☐ beaver dams
- ☐ man-made dams
- ☐ waterfalls (>1 ft.)
- ☐ other
- ☑ none

Stream: Blair Creek
Station #: 1
Date: 6/8/04

Surface water appearance:
- ☐ clear
- ☑ clear, but tea-colored
- ☐ colored sheen (oily)
- ☐ foamy
- ☐ milky
- ☐ muddy
- ☐ black
- ☐ grey
- ☐ other _____

Stream bed deposit (bottom):
- ☐ grey
- ☐ orange/red
- ☐ yellow
- ☐ black
- ☐ brown
- ☑ silt
- ☑ sand
- ☐ other _____

Odor:
- ☐ rotten eggs
- ☐ musky
- ☐ oil
- ☐ sewage
- ☐ other _____
- ☑ none

Stability of stream bed:
Bed sinks beneath your feet in:
- ☐ no spots
- ☐ a few spots
- ☑ many spots

% bank covered by plants, rocks and logs (no exposed soil) is:	Good >70%	Fair 30%-70%	Poor <30%
Stream banks (sides)	✓		
Top bank (slope and floodplain)	✓		

Algae color:
- ☐ light green
- ☐ dark green
- ☐ brown coated
- ☐ matted on stream bed
- ☑ hairy

Algae located:
- ☐ everywhere
- ☐ in spots
- _____ % of bed covered

Stream channel shade:
- ☑ >80% excellent
- ☐ 50%-80% high
- ☐ 20%-49% moderate
- ☐ <20% almost none

Stream bank composition (=100%):
- 50 % trees
- 25 % shrubs
- 25 % grass
- _____ % bare soil
- _____ % rocks
- _____ % other _____

Stream bank erosion:
- ☐ >80% severe
- ☐ 50%-80% high
- ☐ 20%-49% moderate
- ☑ <20% slight

Riffle composition (=100%):
- _____ % silt (mud)
- 100 % sand (1/16"-1/4"grains)
- _____ % gravel (1/4"-2" stones)
- _____ % cobbles (2"-10" stones)
- _____ % boulders (>10" stones)

MUDDY BOTTOM ONLY: Record the number of scoops taken from each habitat type. Provide any details (mostly sand, little silt, etc.) to best describe the habitat.
- ☐ Steep bank/vegetated margin _____
- ☐ Woody debris with organic matter _____
- ☐ Rock/gravel/sand substrates _____
- ☐ Silty bottom with organic matter _____

Land uses in the watershed: Record all land uses observed in the watershed area upstream and surrounding your sampling site. Indicate whether the following land uses have a high (H), moderate (M), slight (S), or none (N) potential to impact the quality of your stream. Refer to the SOS stream survey instructions to determine how to assess H, M, S, or N. If the land use is not present in your watershed, leave the space blank.
- ☐ Oil & gas drilling
- ☐ Housing developments
- ☑ Forest
- ☐ Logging
- ☐ Urban uses (parking lots, highways, etc.)
- ☐ Sanitary landfill
- ☐ Active construction
- ☐ Mining (types) _____
- ☐ Cropland (types) _____
- ☐ Trash dump
- ☐ Fields
- ☐ Livestock pasture
- ☐ Other _____

Are there any discharging pipes? ☑ no ☐ yes If yes, how many? _____
What types of pipes are they?
- ☐ sewage treatment _____
- ☐ runoff (field or stormwater) describe: _____
- ☐ industrial: type of industry _____

Did you test above and below the pipes to determine any change in water quality? Were changes noticed? NOTE: If you answer *Yes*, you must submit two different survey forms, one for above the pipe and one for below the pipe, to document your claim.

Describe amount of litter in and around the stream as % of ground cover. Also describe the type of litter in and around the stream.

Comments Indicate what you think are the current and potential future threats to your stream's health. Feel free to attach additional pages or photographs to better describe the condition of your stream.

Save Our Streams

Stream Quality Survey

October 1994

Name of reviewer: _____

Date reviewed: _____

Data sent to: _____

The purpose of this form is to aid you in gathering and recording important data about the health of your stream. By keeping accurate and consistent records of your observations and data from your macroinvertebrate count; you can document changes in water quality. Refer to the SOS insect card and monitoring instructions to learn how to trap and identify stream macroinvertebrates and how to complete this form.

Stream Trout Brook (OWASSA) Station # 2 # of participants 8

County Sussex State NJ Group or individual Stillwater Environmental Commission

Location Stillwater (Owassa / Fairview Lake Rd.

Weather conditions (last 72 hours) _____

Date 6/19/94 Average stream width 5 ft. Average stream depth 6.5 inches ft.

Start Time 10:10 End Time 10:45 Flow rate: High _____ Normal ✓ Low _____ Negligible _____

If conducting rocky bottom sampling, select a riffle where the water is not running too fast, the water depth is between 3-12 inches, and the bed consists of cobble-sized stones or larger. Monitored riffle area (3' x 3' square) ✓, Water depth ✓ in., in riffle. Water temperature 71 F° ? (C°)? Take 3 samples in the same general area. Count each separately and report the highest-scoring sample below. Sample ✓ reported of 3.

If conducting muddy bottom sampling, take the required number of scoops from each habitat type: steep banks/vegetated margin (10 scoops), woody debris with organic matter (4 scoops), rock/gravel/sand substrates (3 scoops), and silty bottom with organic matter (3 scoops). Air temp. 19°c

MACROINVERTEBRATE COUNT

Use the stream monitoring instructions to conduct a macroinvertebrate count. Use letter codes (A = 1-9, B = 10-99, C = 100 or more) to record the numbers of organisms found in a 3 foot by 3 foot area. Add up the number of letters in each column and multiply by the indicated index value. The following columns are divided based on the organism's sensitivity to pollution.

SENSITIVE		SOMEWHAT SENSITIVE		TOLERANT	
A	caddisfly larvae		beetle larvae	A	aquatic worms
	hellgrammite		clams	A	blackfly larvae
A	mayfly nymphs		crane fly larvae		leeches
	gilled snails	A	crayfish	A	midge larvae
	riffle beetle adult		damselfly nymphs		pouch (and other) snails
	stonefly nymphs		dragonfly nymphs		
	water-penny larvae		scuds		
			sowbugs		
			fishfly larvae		
			alderfly larvae		
			atherix		
2	# letters times 3 =	1	# letters times 2 =	3	# letters times 1 =
6	index value	2	index value	3	index value

Now add together the three index values from each column for your total index value. Total index value = 11

Compare this total index value to the following ranges of numbers to determine the water quality of your stream. Good water quality is indicated by a variety of different kinds of organisms, with no one kind making up the majority of the sample. Although the A, B, and C ratings do not contribute to the water quality rating, keep track of them to see how your macroinvertebrate populations change over time.

WATER QUALITY RATING

_____ Excellent (>22) _____ Good (17-22) 11 ✓ Fair (11-16) _____ Poor (<11)

3-1

Steve Grodsky

Fish water quality indicators:
- ☐ scattered individuals
- ☐ scattered schools
- ☐ trout (pollution sensitive)
- ☐ bass (somewhat sensitive)
- ☐ catfish (pollution tolerant)
- ☐ carp (pollution tolerant)

Barriers to fish movement:
- ☐ beaver dams
- ☐ man-made dams
- ☐ waterfalls (>1 ft.)
- ☐ other
- ☑ none

Stream: Trout Brook (Owasco)
Station #: 2
Date: 6/14/04

Surface water appearance:
- ☐ clear
- ☐ clear, but tea-colored
- ☑ colored sheen (oily)
- ☐ foamy
- ☐ milky
- ☐ muddy
- ☐ black
- ☐ grey
- ☐ other _____

Stream bed deposit (bottom):
- ☐ grey
- ☑ orange/red
- ☐ yellow
- ☐ black
- ☐ brown
- ☑ silt
- ☑ sand
- ☐ other _____

Odor:
- ☐ rotten eggs
- ☐ musky
- ☐ oil
- ☐ sewage
- ☐ other _____
- ☑ none

Stability of stream bed:
Bed sinks beneath your feet in:
- ☐ no spots
- ☐ a few spots
- ☑ many spots

% bank covered by plants, rocks and logs (no exposed soil) is:

	Good >70%	Fair 30%-70%	Poor <30%
Stream banks (sides)	✓		
Top bank (slope and floodplain)	✓		

Algae color:
- ☐ light green
- ☐ dark green
- ☐ brown coated
- ☐ matted on stream bed
- ☐ hairy

Algae located:
- ☐ everywhere
- ☐ in spots
- _____ % of bed covered

Stream channel shade:
- ☑ >80% excellent
- ☐ 50%-80% high
- ☐ 20%-49% moderate
- ☐ <20% almost none

Stream bank composition (=100%):
- _____ % trees
- 70 % shrubs
- 30 % grass
- _____ % bare soil
- _____ % rocks
- _____ % other _____

Stream bank erosion:
- ☐ >80% severe
- ☐ 50%-80% high
- ☐ 20%-49% moderate
- ☑ <20% slight

Riffle composition (=100%):
- _____ % silt (mud)
- 10 % sand (1/16"-1/4"grains)
- 20 % gravel (1/4"-2" stones)
- 70 % cobbles (2"-10" stones)
- _____ % boulders (>10" stones)

MUDDY BOTTOM ONLY: Record the number of scoops taken from each habitat type. Provide any details (mostly sand, little silt, etc.) to best describe the habitat.
- ☐ Steep bank/vegetated margin _____
- ☐ Woody debris with organic matter _____
- ☐ Rock/gravel/sand substrates _____
- ☐ Silty bottom with organic matter _____

Land uses in the watershed: Record all land uses observed in the watershed area upstream and surrounding your sampling site. Indicate whether the following land uses have a high (H), moderate (M), slight (S), or none (N) potential to impact the quality of your stream. Refer to the SOS stream survey instructions to determine how to assess H, M, S, or N. If the land use is not present in your watershed, leave the space blank.
- ☐ Oil & gas drilling
- ☐ Housing developments
- ☑ Forest
- ☐ Logging
- ☑ Urban uses (parking lots, highways, etc.)
- ☐ Sanitary landfill
- ☐ Active construction
- ☐ Mining (types) _____
- ☐ Cropland (types) _____
- ☐ Trash dump
- ☑ Fields
- ☐ Livestock pasture
- ☐ Other _____

Are there any discharging pipes? ☑ no ☐ yes If yes, how many? _____
What types of pipes are they?
- ☐ sewage treatment _____
- ☐ runoff (field or stormwater) describe: _____
- ☐ industrial: type of industry _____

Did you test above and below the pipes to determine any change in water quality? Were changes noticed? NOTE: If you answer *Yes*, you must submit two different survey forms, one for above the pipe and one for below the pipe, to document your claim.

Describe amount of litter in and around the stream as % of ground cover. Also describe the type of litter in and around the stream.

Comments Indicate what you think are the current and potential future threats to your stream's health. Feel free to attach additional pages or photographs to better describe the condition of your stream. _____

Save Our Streams

Stream Quality Survey

October 1994

Name of reviewer: _____

Date reviewed: _____

Data sent to: _____

The purpose of this form is to aid you in gathering and recording important data about the health of your stream. By keeping accurate and consistent records of your observations and data from your macroinvertebrate count, you can document changes in water quality. Refer to the SOS insect card and monitoring instructions to learn how to trap and identify stream macroinvertebrates and how to complete this form.

Stream Trout Brook (Middleville) Station # 3 # of participants 8

County Sussex State NJ Group or individual Stillwater Environmental Commission

Location Stillwater - Middleville Rd.

Weather conditions (last 72 hours) _____

Date 5/24/94 Average stream width 10 ft. Average stream depth 9.6 inches ft.

Start Time 16:00 End Time 16:10 Flow rate: High _____ Normal ✓ Low _____ Negligible _____

If conducting rocky bottom sampling, select a riffle where the water is not running too fast, the water depth is between 3-12 inches, and the bed consists of cobble-sized stones or larger. Monitored riffle area (3' x 3' square) ✓, Water depth ✓ in., in riffle. Water temperature 70 F° ? (C°)? Take 3 samples in the same general area. Count each separately and report the highest-scoring sample below. Sample ✓ reported of 3.

If conducting muddy bottom sampling, take the required number of scoops from each habitat type: steep banks/vegetated margin (10 scoops), woody debris with organic matter (4 scoops), rock/gravel/sand substrates (3 scoops), and silty bottom with organic matter (3 scoops). Air temp. 80°

MACROINVERTEBRATE COUNT

Use the stream monitoring instructions to conduct a macroinvertebrate count. Use letter codes (A = 1-9, B = 10-99, C = 100 or more) to record the numbers of organisms found in a 3 foot by 3 foot area. Add up the number of letters in each column and multiply by the indicated index value. The following columns are divided based on the organism's sensitivity to pollution.

SENSITIVE		SOMEWHAT SENSITIVE		TOLERANT	
B	caddisfly larvae	A	beetle larvae	_____	aquatic worms
_____	hellgrammite	_____	clams	_____	blackfly larvae
C	mayfly nymphs	A	crane fly larvae	_____	leeches
_____	gilled snails	_____	crayfish	A	midge larvae
_____	riffle beetle adult	_____	damselfly nymphs	_____	pouch (and other) snails
_____	stonefly nymphs	_____	dragonfly nymphs		
A	water-penny larvae	_____	scuds		
		_____	sowbugs		
		_____	fishfly larvae		
		_____	alderfly larvae		
		_____	atherix		
3	# letters times 3 =	2	# letters times 2 =	1	# letters times 1 =
12	index value	4	index value	1	index value

Now add together the three index values from each column for your total index value. Total index value 17

Compare this total index value to the following ranges of numbers to determine the water quality of your stream. Good water quality is indicated by a variety of different kinds of organisms, with no one kind making up the majority of the sample. Although the A, B, and C ratings do not contribute to the water quality rating, keep track of them to see how your macroinvertebrate populations change over time.

WATER QUALITY RATING

_____ Excellent (>22) 17 ✓ Good (17-22) _____ Fair (11-16) _____ Poor (<11)

3-1

Sean Radsky

Fish water quality indicators:
- ☐ scattered individuals
- ☐ scattered schools
- ☐ trout (pollution sensitive)
- ☐ bass (somewhat sensitive)
- ☐ catfish (pollution tolerant)
- ☐ carp (pollution tolerant)

Barriers to fish movement:
- ☐ beaver dams
- ☐ man-made dams
- ☐ waterfalls (>1 ft.)
- ☐ other
- ☑ none

Stream: Tom Brook (Middleville)
Station #: 3
Date: 5/24/09

Surface water appearance:
- ☐ clear
- ☑ clear, but tea-colored
- ☐ colored sheen (oily)
- ☐ foamy
- ☐ milky
- ☐ muddy
- ☐ black
- ☐ grey
- ☐ other _____

Stream bed deposit (bottom):
- ☐ grey
- ☐ orange/red
- ☐ yellow
- ☐ black
- ☐ brown
- ☑ silt
- ☑ sand
- ☐ other _____

Odor:
- ☐ rotten eggs
- ☐ musky
- ☐ oil
- ☐ sewage
- ☐ other _____
- ☑ none

Stability of stream bed:
Bed sinks beneath your feet in:
- ☑ no spots
- ☐ a few spots
- ☐ many spots

% bank covered by plants, rocks and logs (no exposed soil) is:

	Good >70%	Fair 30%-70%	Poor <30%
Stream banks (sides)	✓		
Top bank (slope and floodplain)		✓	

Algae color:
- ☐ light green
- ☐ dark green
- ☐ brown coated
- ☐ matted on stream bed
- ☐ hairy

Algae located:
- ☐ everywhere
- ☐ in spots
- ____ % of bed covered

Stream channel shade:
- ☐ >80% excellent
- ☐ 50%-80% high
- ☑ 20%-49% moderate
- ☐ <20% almost none

Stream bank composition (=100%):
- ____ % trees
- 50 % shrubs
- 30 % grass
- ____ % bare soil
- ____ % rocks
- ____ % other _____

Stream bank erosion:
- ☐ >80% severe
- ☐ 50%-80% high
- ☐ 20%-49% moderate
- ☑ <20% slight

Riffle composition (=100%):
- ____ % silt (mud)
- ____ % sand (1/16"-1/4" grains)
- 40 % gravel (1/4"-2" stones)
- 50 % cobbles (2"-10" stones)
- 10 % boulders (>10" stones)

MUDDY BOTTOM ONLY: Record the number of scoops taken from each habitat type. Provide any details (mostly sand, little silt, etc.) to best describe the habitat.
- ☐ Steep bank/vegetated margin _____
- ☐ Woody debris with organic matter _____
- ☐ Rock/gravel/sand substrates _____
- ☐ Silty bottom with organic matter _____

Land uses in the watershed: Record all land uses observed in the watershed area upstream and surrounding your sampling site. Indicate whether the following land uses have a high (H), moderate (M), slight (S), or none (N) potential to impact the quality of your stream. Refer to the SOS stream survey instructions to determine how to assess H, M, S, or N. If the land use is not present in your watershed, leave the space blank.

- ☐ Oil & gas drilling
- ☐ Housing developments
- ☐ Forest
- ☐ Logging
- ☑ Urban uses (parking lots, highways, etc.)
- ☐ Sanitary landfill
- ☐ Active construction
- ☐ Mining (types) _____
- ☐ Cropland (types) _____
- ☐ Trash dump
- ☐ Fields
- ☑ Livestock pasture
- ☐ Other _____

Are there any discharging pipes? ☑ no ☐ yes If yes, how many? _____
What types of pipes are they?
- ☐ sewage treatment _____
- ☐ runoff (field or stormwater) describe: _____
- ☐ industrial: type of industry _____

Did you test above and below the pipes to determine any change in water quality? Were changes noticed? NOTE: If you answer *Yes*, you must submit two different survey forms, one for above the pipe and one for below the pipe, to document your claim.

Describe amount of litter in and around the stream as % of ground cover. Also describe the type of litter in and around the stream.

Comments Indicate what you think are the current and potential future threats to your stream's health. Feel free to attach additional pages or photographs to better describe the condition of your stream. _____

Save Our Streams Program – April 1994
The Izaak Walton League of America • 707 Conservation Lane • Gaithersburg, MD 20878 • 301-548-0150

Save Our Streams

Stream Quality Survey

October 1994

Name of reviewer: _____

Date reviewed: _____

Data sent to: _____

The purpose of this form is to aid you in gathering and recording important data about the health of your stream. By keeping accurate and consistent records of your observations and data from your macroinvertebrate count, you can document changes in water quality. Refer to the SOS insect card and monitoring instructions to learn how to trap and identify stream macroinvertebrates and how to complete this form.

Stream Spring Brook (Quick Pond) Station # 4 # of participants 8

County Sussex State NJ Group or individual Stillwater Environmental Commission

Location Stillwater - Blue Mountain Inn

Weather conditions (last 72 hours) _____

Date 6/24/94 Average stream width 10 ft. Average stream depth 6 inches ft.

Start Time 14:30 End Time 14:50 Flow rate: High _____ Normal ~ V Low _____ Negligible _____

If conducting rocky bottom sampling, select a riffle where the water is not running too fast, the water depth is between 3-12 inches, and the bed consists of cobble-sized stones or larger. Monitored riffle area (3' x 3' square) _____ Water depth _____ in., in riffle. Water temperature 25 F° ? (C°)? Take 3 samples in the same general area. Count each separately and report the highest-scoring sample below. Sample _____ reported of 3.

If conducting muddy bottom sampling, take the required number of scoops from each habitat type: steep banks/vegetated margin (10 scoops), woody debris with organic matter (4 scoops), rock/gravel/sand substrates (3 scoops), and silty bottom with organic matter (3 scoops). Air temp. 30°C

MACROINVERTEBRATE COUNT

Use the stream monitoring instructions to conduct a macroinvertebrate count. Use letter codes (A = 1-9, B = 10-99, C = 100 or more) to record the numbers of organisms found in a 3 foot by 3 foot area. Add up the number of letters in each column and multiply by the indicated index value. The following columns are divided based on the organism's sensitivity to pollution.

SENSITIVE		SOMEWHAT SENSITIVE		TOLERANT	
B	caddisfly larvae	A	beetle larvae		aquatic worms
	hellgrammite		clams	A	blackfly larvae
A	mayfly nymphs	A	crane fly larvae		leeches
	gilled snails	A	crayfish		midge larvae
A	riffle beetle adult		damselfly nymphs		pouch (and other) snails
A	stonefly nymphs		dragonfly nymphs		
	water-penny larvae		scuds		
			sowbugs		
			fishfly larvae		
			alderfly larvae		
			atherix		
4	# letters times 3 =	3	# letters times 2 =	1	# letters times 1 =
12	index value	6	index value	1	index value

Now add together the three index values from each column for your total index value. Total index value = 19

Compare this total index value to the following ranges of numbers to determine the water quality of your stream. Good water quality is indicated by a variety of different kinds of organisms, with no one kind making up the majority of the sample. Although the A, B, and C ratings do not contribute to the water quality rating, keep track of them to see how your macroinvertebrate populations change over time.

3-1

WATER QUALITY RATING

_____ Excellent (>22) 19 ✓ Good (17-22) _____ Fair (11-16) _____ Poor (<11)

Shari Gadsky

Stream: Spring Brook (Quick Pond)
Station #: 4
Date: 6/04/04

Fish water quality indicators:
- ☐ scattered individuals
- ☐ scattered schools
- ☐ trout (pollution sensitive)
- ☐ bass (somewhat sensitive)
- ☐ catfish (pollution tolerant)
- ☐ carp (pollution tolerant)

Barriers to fish movement:
- ☐ beaver dams
- ☐ man-made dams
- ☐ waterfalls (>1 ft.)
- ☐ other
- ☑ none

Surface water appearance:
- ☑ clear
- ☐ clear, but tea-colored
- ☐ colored sheen (oily)
- ☐ foamy
- ☐ milky
- ☐ muddy
- ☐ black
- ☐ grey
- ☐ other _____

Stream bed deposit (bottom):
- ☐ grey
- ☐ orange/red
- ☐ yellow
- ☐ black
- ☑ brown
- ☑ silt
- ☐ sand
- ☐ other _____

Odor:
- ☐ rotten eggs
- ☐ musky
- ☐ oil
- ☐ sewage
- ☐ other _____
- ☑ none

Stability of stream bed:
Bed sinks beneath your feet in:
- ☑ no spots
- ☐ a few spots
- ☐ many spots

% bank covered by plants, rocks and logs (no exposed soil) is:

	Good >70%	Fair 30%-70%	Poor <30%
Stream banks (sides)	✓		
Top bank (slope and floodplain)	✓		

Algae color:
- ☐ light green
- ☐ dark green
- ☐ brown coated
- ☐ matted on stream bed
- ☐ hairy

Algae located:
- ☐ everywhere
- ☐ in spots
- ____ % of bed covered

Stream channel shade:
- ☑ >80% excellent
- ☐ 50%-80% high
- ☐ 20%-49% moderate
- ☐ <20% almost none

Stream bank composition (=100%):
- 10 % trees
- 80 % shrubs
- 10 % grass
- ____ % bare soil
- ____ % rocks
- ____ % other _____

Stream bank erosion:
- ☐ >80% severe
- ☐ 50%-80% high
- ☐ 20%-49% moderate
- ☑ <20% slight

Riffle composition (=100%):
- ____ % silt (mud)
- ____ % sand (1/16"-1/4" grains)
- 10 % gravel (1/4"-2" stones)
- 90 % cobbles (2"-10" stones)
- ____ % boulders (>10" stones)

MUDDY BOTTOM ONLY: Record the number of scoops taken from each habitat type. Provide any details (mostly sand, little silt, etc.) to best describe the habitat.
- ☐ Steep bank/vegetated margin _____
- ☐ Woody-debris with organic matter _____
- ☐ Rock/gravel/sand substrates _____
- ☐ Silty bottom with organic matter _____

Land uses in the watershed: Record all land uses observed in the watershed area upstream and surrounding your sampling site. Indicate whether the following land uses have a high (H), moderate (M), slight (S), or none (N) potential to impact the quality of your stream. Refer to the SOS stream survey instructions to determine how to assess H, M, S, or N. If the land use is not present in your watershed, leave the space blank.
- ☐ Oil & gas drilling
- ☐ Housing developments
- ☑ Forest
- ☐ Logging
- ☑ Urban uses (parking lots, highways, etc.)
- ☐ Sanitary landfill
- ☐ Active construction
- ☐ Mining (types) _____
- ☐ Cropland (types) _____
- ☐ Trash dump
- ☐ Fields
- ☐ Livestock pasture
- ☐ Other _____

Are there any discharging pipes? ☑ no ☐ yes If yes, how many? _____
What types of pipes are they?
- ☐ sewage treatment _____
- ☐ runoff (field or stormwater) describe: _____
- ☐ industrial: type of industry _____

Did you test above and below the pipes to determine any change in water quality? Were changes noticed? NOTE: If you answer *Yes*, you must submit two different survey forms, one for above the pipe and one for below the pipe, to document your claim.

Describe amount of litter in and around the stream as % of ground cover. Also describe the type of litter in and around the stream.

Comments Indicate what you think are the current and potential future threats to your stream's health. Feel free to attach additional pages or photographs to better describe the condition of your stream.

Save Our Streams Program – April 1994
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Save Our Streams

Stream Quality Survey

October 1994

Name of reviewer: _____

Date reviewed: _____

Data sent to: _____

The purpose of this form is to aid you in gathering and recording important data about the health of your stream. By keeping accurate and consistent records of your observations and data from your macroinvertebrate count, you can document changes in water quality. Refer to the SOS insect card and monitoring instructions to learn how to trap and identify stream macroinvertebrates and how to complete this form.

Stream Spring Brook (Cranbury) Station # 5 # of participants 8

County Sussex State NJ Group or individual Stillwater Environmental Commission

Location Stillwater - Hampton Rd. Bridge

Weather conditions (last 72 hours) _____

Date 6/11/04 Average stream width 5 ft. Average stream depth 5 inches ft.

Start Time 15:00 End Time 15:15 Flow rate: High _____ Normal _____ Low ✓ Negligible _____

If conducting rocky bottom sampling, select a riffle where the water is not running too fast, the water depth is between 3-12 inches, and the bed consists of cobble-sized stones or larger. Monitored riffle area (3' x 3' square) _____ Water depth _____ in., in riffle. Water temperature 21 F° ? (C°)? Take 3 samples in the same general area. Count each separately and report the highest-scoring sample below. Sample _____ reported of 3.

If conducting muddy bottom sampling, take the required number of scoops from each habitat type: steep banks/vegetated margin (10 scoops), woody debris with organic matter (4 scoops), rock/gravel/sand substrates (3 scoops), and silty bottom with organic matter (3 scoops). Air temp. 25°c

MACROINVERTEBRATE COUNT

Use the stream monitoring instructions to conduct a macroinvertebrate count. Use letter codes (A = 1-9, B = 10-99, C = 100 or more) to record the numbers of organisms found in a 3 foot by 3 foot area. Add up the number of letters in each column and multiply by the indicated index value. The following columns are divided based on the organism's sensitivity to pollution.

SENSITIVE		SOMEWHAT SENSITIVE		TOLERANT	
C	caddisfly larvae	A	beetle larvae	_____	aquatic worms
A	hellgrammite	_____	clams	_____	blackfly larvae
B	mayfly nymphs	_____	crane fly larvae	_____	leeches
_____	gilled snails	_____	crayfish	_____	midge larvae
_____	riffle beetle adult	_____	damselfly nymphs	_____	pouch (and other) snails
A	stonefly nymphs	A	dragonfly nymphs		
_____	water-penny larvae	_____	scuds		
		_____	sowbugs		
		_____	fishfly larvae		
		_____	alderfly larvae		
		_____	atherix		
4	# letters times 3 =	2	# letters times 2 =	0	# letters times 1 =
12	index value	4	index value	0	index value

Now add together the three index values from each column for your total index value. Total index value = 16

Compare this total index value to the following ranges of numbers to determine the water quality of your stream. Good water quality is indicated by a variety of different kinds of organisms, with no one kind making up the majority of the sample. Although the A, B, and C ratings do not contribute to the water quality rating, keep track of them to see how your macroinvertebrate populations change over time.

WATER QUALITY RATING

_____ Excellent (>22) _____ Good (17-22) 16 ✓ Fair (11-16) _____ Poor (<11)

3-1

Steve Kadsky

Fish water quality indicators:
- ☐ scattered individuals
- ☐ scattered schools
- ☐ trout (pollution sensitive)
- ☐ bass (somewhat sensitive)
- ☐ catfish (pollution tolerant)
- ☐ carp (pollution tolerant)

Barriers to fish movement:
- ☐ beaver dams
- ☐ man-made dams
- ☐ waterfalls (>1 ft.)
- ☐ other
- ☑ none

Stream: Spring Brook (Control)
Station #: 5
Date: 6/11/94

Surface water appearance:
- ☑ clear
- ☐ clear, but tea-colored
- ☐ colored sheen (oily)
- ☐ foamy
- ☐ milky
- ☐ muddy
- ☐ black
- ☐ grey
- ☐ other _____

Stream bed deposit (bottom):
- ☐ grey
- ☐ orange/red
- ☐ yellow
- ☐ black
- ☐ brown
- ☑ silt
- ☑ sand
- ☐ other _____

Odor:
- ☐ rotten eggs
- ☐ musky
- ☐ oil
- ☐ sewage
- ☐ other _____
- ☑ none

Stability of stream bed:
Bed sinks beneath your feet in:
- ☐ no spots
- ☑ a few spots
- ☐ many spots

% bank covered by plants, rocks and logs (no exposed soil) is:

	Good >70%	Fair 30%-70%	Poor <30%
Stream banks (sides)	✓		
Top bank (slope and floodplain)	✓		

Algae color:
- ☐ light green
- ☐ dark green
- ☐ brown coated
- ☐ matted on stream bed
- ☐ hairy

Algae located:
- ☐ everywhere
- ☐ in spots
- _____ % of bed covered

Stream channel shade:
- ☑ >80% excellent
- ☐ 50%-80% high
- ☐ 20%-49% moderate
- ☐ <20% almost none

Stream bank composition (=100%):
- 30 % trees
- 60 % shrubs
- 10 % grass
- _____ % bare soil
- _____ % rocks
- _____ % other _____

Stream bank erosion:
- ☐ >80% severe
- ☐ 50%-80% high
- ☐ 20%-49% moderate
- ☑ <20% slight

Riffle composition (=100%):
- _____ % silt (mud)
- _____ % sand (1/16"-1/4" grains)
- 30 % gravel (1/4"-2" stones)
- 70 % cobbles (2"-10" stones)
- _____ % boulders (>10" stones)

MUDDY BOTTOM ONLY: Record the number of scoops taken from each habitat type. Provide any details (mostly sand, little silt, etc.) to best describe the habitat.
- ☐ Steep bank/vegetated margin _____
- ☐ Woody debris with organic matter _____
- ☐ Rock/gravel/sand substrates _____
- ☐ Silty bottom with organic matter _____

Land uses in the watershed: Record all land uses observed in the watershed area upstream and surrounding your sampling site. Indicate whether the following land uses have a high (H), moderate (M), slight (S), or none (N) potential to impact the quality of your stream. Refer to the SOS stream survey instructions to determine how to assess H, M, S, or N. If the land use is not present in your watershed, leave the space blank.

- ☐ Oil & gas drilling
- ☐ Housing developments
- ☐ Forest
- ☐ Logging
- ☑ Urban uses (parking lots, highways, etc.)
- ☐ Sanitary landfill
- ☐ Active construction
- ☐ Mining (types) _____
- ☐ Cropland (types) _____
- ☐ Trash dump
- ☐ Fields
- ☐ Livestock pasture
- ☐ Other _____

Are there any discharging pipes? ☑ no ☐ yes If yes, how many? _____
What types of pipes are they?
- ☐ sewage treatment _____
- ☐ runoff (field or stormwater) describe: _____
- ☐ industrial: type of industry _____

Did you test above and below the pipes to determine any change in water quality? Were changes noticed? NOTE: If you answer *Yes*, you must submit two different survey forms, one for above the pipe and one for below the pipe, to document your claim.

Describe amount of litter in and around the stream as % of ground cover. Also describe the type of litter in and around the stream.

Comments Indicate what you think are the current and potential future threats to your stream's health. Feel free to attach additional pages or photographs to better describe the condition of your stream. _____

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Save Our Streams

Stream Quality Survey

October 1994

Name of reviewer: _____

Date reviewed: _____

Data sent to: _____

The purpose of this form is to aid you in gathering and recording important data about the health of your stream. By keeping accurate and consistent records of your observations and data from your macroinvertebrate count, you can document changes in water quality. Refer to the SOS insect card and monitoring instructions to learn how to trap and identify stream macroinvertebrates and how to complete this form.

Stream Spring Brook Station # 6 # of participants 8

County Sussex State NJ Group or individual Stillwater Environmental Commission

Location: Stillwater - Swartswood Rd. Bridge

Weather conditions (last 72 hours) _____

Date 6/3/94 Average stream width 10 ft. Average stream depth 11 inches ft.

Start Time 16:10 End Time 16:30 Flow rate: High ✓ Normal _____ Low _____ Negligible _____

If conducting rocky bottom sampling, select a riffle where the water is not running too fast, the water depth is between 3-12 inches, and the bed consists of cobble-sized stones or larger. Monitored riffle area (3' x 3' square) ✓ Water depth ✓ in., in riffle. Water temperature 74 F° ? C° ? Take 3 samples in the same general area. Count each separately and report the highest-scoring sample below. Sample _____ reported of 3.

If conducting muddy bottom sampling, take the required number of scoops from each habitat type: steep banks/vegetated margin (10 scoops), woody debris with organic matter (4 scoops), rock/gravel/sand substrates (3 scoops), and silty bottom with organic matter (3 scoops). Air temp. 76°C

MACROINVERTEBRATE COUNT

Use the stream monitoring instructions to conduct a macroinvertebrate count. Use letter codes (A = 1-9, B = 10-99, C = 100 or more) to record the numbers of organisms found in a 3 foot by 3 foot area. Add up the number of letters in each column and multiply by the indicated index value. The following columns are divided based on the organism's sensitivity to pollution.

SENSITIVE		SOMEWHAT SENSITIVE		TOLERANT	
B	caddisfly larvae	B	beetle larvae	A	aquatic worms
_____	hellgrammite	_____	clams	_____	blackfly larvae
B	mayfly nymphs	_____	crane fly larvae	_____	leeches
_____	gilled snails	_____	crayfish	A	midge larvae
_____	riffle beetle adult	_____	damselfly nymphs	_____	pouch (and other) snails
A	stonefly nymphs	_____	dragonfly nymphs		
_____	water-penny larvae	_____	scuds		
		_____	sowbugs		
		_____	fishfly larvae		
		_____	alderfly larvae		
		_____	atherix		
3	# letters times 3 =	1	# letters times 2 =	2	# letters times 1 =
9	index value	2	index value	2	index value

Now add together the three index values from each column for your total index value. Total index value = 13

Compare this total index value to the following ranges of numbers to determine the water quality of your stream. Good water quality is indicated by a variety of different kinds of organisms, with no one kind making up the majority of the sample. Although the A, B, and C ratings do not contribute to the water quality rating, keep track of them to see how your macroinvertebrate populations change over time.

3-1

WATER QUALITY RATING

_____ Excellent (>22) _____ Good (17-22) 13 ✓ Fair (11-16) _____ Poor (<11)

Steve Goldstein

Stream: Spring Brook
Station #: 6
Date: 6/3/04

Fish water quality indicators:
- ☐ scattered individuals
- ☐ scattered schools
- ☐ trout (pollution sensitive)
- ☐ bass (somewhat sensitive)
- ☐ catfish (pollution tolerant)
- ☐ carp (pollution tolerant)

Barriers to fish movement:
- ☐ beaver dams
- ☐ man-made dams
- ☐ waterfalls (>1 ft.)
- ☐ other
- ☑ none

Surface water appearance:
- ☐ clear
- ☑ clear, but tea-colored
- ☐ colored sheen (oily)
- ☐ foamy
- ☐ milky
- ☐ muddy
- ☐ black
- ☐ grey
- ☐ other _____

Stream bed deposit (bottom):
- ☐ grey
- ☐ orange/red
- ☐ yellow
- ☐ black
- ☐ brown
- ☐ silt
- ☑ sand
- ☐ other _____

Odor:
- ☐ rotten eggs
- ☐ musky
- ☐ oil
- ☐ sewage
- ☐ other _____
- ☑ none

Stability of stream bed:
Bed sinks beneath your feet in:
- ☑ no spots
- ☐ a few spots
- ☐ many spots

% bank covered by plants, rocks and logs (no exposed soil) is:

	Good >70%	Fair 30%-70%	Poor <30%
Stream banks (sides)	✓		
Top bank (slope and floodplain)	✓		

Algae color:
- ☐ light green
- ☐ dark green
- ☐ brown coated
- ☐ matted on stream bed
- ☐ hairy

Algae located:
- ☐ everywhere
- ☐ in spots
- _____ % of bed covered

Stream channel shade:
- ☑ >80% excellent
- ☐ 50%-80% high
- ☐ 20%-49% moderate
- ☐ <20% almost none

Stream bank composition (=100%):
- 50 % trees
- 30 % shrubs
- _____ % grass
- _____ % bare soil
- 20 % rocks
- _____ % other _____

Stream bank erosion:
- ☐ >80% severe
- ☐ 50%-80% high
- ☐ 20%-49% moderate
- ☑ <20% slight

Riffle composition (=100%):
- _____ % silt (mud)
- _____ % sand (1/16"-1/4" grains)
- _____ % gravel (1/4"-2" stones)
- 50 % cobbles (2"-10" stones)
- 20 % boulders (>10" stones)

MUDDY BOTTOM ONLY: Record the number of scoops taken from each habitat type. Provide any details (mostly sand, little silt, etc.) to best describe the habitat.
- ☐ Steep bank/vegetated margin _____
- ☐ Woody debris with organic matter _____
- ☐ Rock/gravel/sand substrates _____
- ☐ Silty bottom with organic matter _____

Land uses in the watershed: Record all land uses observed in the watershed area upstream and surrounding your sampling site. Indicate whether the following land uses have a high (H), moderate (M), slight (S), or none (N) potential to impact the quality of your stream. Refer to the SOS stream survey instructions to determine how to assess H, M, S, or N. If the land use is not present in your watershed, leave the space blank.
- ☐ Oil & gas drilling
- ☐ Housing developments
- ☑ Forest
- ☐ Logging
- ☑ Urban uses (parking lots, highways, etc.)
- ☐ Sanitary landfill
- ☐ Active construction
- ☐ Mining (types) _____
- ☐ Cropland (types) _____
- ☐ Trash dump
- ☐ Fields
- ☐ Livestock pasture
- ☐ Other _____

Are there any discharging pipes? ☐ no ☑ yes If yes, how many? 2
What types of pipes are they?
- ☑ runoff (field or stormwater) describe: _____
- ☐ sewage treatment _____
- ☐ industrial: type of industry _____

Did you test above and below the pipes to determine any change in water quality? Were changes noticed? NOTE: If you answer *Yes*, you must submit two different survey forms, one for above the pipe and one for below the pipe, to document your claim.
Below Only

Describe amount of litter in and around the stream as % of ground cover. Also describe the type of litter in and around the stream.

Comments Indicate what you think are the current and potential future threats to your stream's health. Feel free to attach additional pages or photographs to better describe the condition of your stream.

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Save Our Streams

Stream Quality Survey

October 1994

Name of reviewer: _____

Date reviewed: _____

Data sent to: _____

The purpose of this form is to aid you in gathering and recording important data about the health of your stream. By keeping accurate and consistent records of your observations and data from your macroinvertebrate count, you can document changes in water quality. Refer to the SOS insect card and monitoring instructions to learn how to trap and identify stream macroinvertebrates and how to complete this form.

Stream Paulinskill River Station # 7 # of participants 8

County Sussex State NJ Group or individual Stillwater Environmental Commission

Location Stillwater - Green Bridge

Weather conditions (last 72 hours) _____

Date 6/19/04 Average stream width 25-35 ft. Average stream depth 1 ft.

Start Time 11:01 End Time 11:45 Flow rate: High ___ Normal ✓ Low ___ Negligible ___

If conducting rocky bottom sampling, select a riffle where the water is not running too fast, the water depth is between 3-12 inches, and the bed consists of cobble-sized stones or larger. Monitored riffle area (3' x 3' square): ✓ Water depth ✓ in., in riffle. Water temperature 74 F° ? (C°)? Take 3 samples in the same general area. Count each separately and report the highest-scoring sample below. Sample ✓ reported of 3.

If conducting muddy bottom sampling, take the required number of scoops from each habitat type: steep banks/vegetated margin (10 scoops), woody debris with organic matter (4 scoops), rock/gravel/sand substrates (3 scoops), and silty bottom with organic matter (3 scoops). Air temp. 72°F

MACROINVERTEBRATE COUNT

Use the stream monitoring instructions to conduct a macroinvertebrate count. Use letter codes (A = 1-9, B = 10-99, C = 100 or more) to record the numbers of organisms found in a 3 foot by 3 foot area. Add up the number of letters in each column and multiply by the indicated index value. The following columns are divided based on the organism's sensitivity to pollution.

SENSITIVE		SOMEWHAT SENSITIVE		TOLERANT	
A	caddisfly larvae		beetle larvae	A	aquatic worms
	hellgrammite	A	clams		blackfly larvae
A	mayfly nymphs		crane fly larvae		leeches
A	gilled snails		crayfish		midge larvae
	riffle beetle adult		damselfly nymphs		pouch (and other) snails
A	stonefly nymphs	A	dragonfly nymphs		
A	water-penny larvae	C	scuds		
			sowbugs		
			fishfly larvae		
			alderfly larvae		
			atherix		
5	# letters times 3 =	3	# letters times 2 =	1	# letters times 1 =
15	index value	6	index value	1	index value

Now add together the three index values from each column for your total index value. Total index value = 22

Compare this total index value to the following ranges of numbers to determine the water quality of your stream. Good water quality is indicated by a variety of different kinds of organisms, with no one kind making up the majority of the sample. Although the A, B, and C ratings do not contribute to the water quality rating, keep track of them to see how your macroinvertebrate populations change over time.

WATER QUALITY RATING

3-1

_____ Excellent (>22) 22 ✓ Good (17-22) _____ Fair (11-16) _____ Poor (<11)

Steve Gerken

Fish water quality indicators:
- ☐ scattered individuals
- ☐ scattered schools
- ☐ trout (pollution sensitive)
- ☐ bass (somewhat sensitive)
- ☐ catfish (pollution tolerant)
- ☐ carp (pollution tolerant)

Barriers to fish movement:
- ☐ beaver dams
- ☐ man-made dams
- ☐ waterfalls (>1 ft.)
- ☐ other
- ☑ none

Stream: Pavlinskill
Station #: 7
Date: 6/19/14

Surface water appearance:
- ☐ clear
- ☑ clear, but tea-colored
- ☐ colored sheen (oily)
- ☐ foamy
- ☐ milky
- ☐ muddy
- ☐ black
- ☐ grey
- ☐ other _____

Stream bed deposit (bottom):
- ☐ grey
- ☐ orange/red
- ☐ yellow
- ☐ black
- ☑ brown
- ☑ silt
- ☑ sand
- ☐ other _____

Odor:
- ☐ rotten eggs
- ☐ musky
- ☐ oil
- ☐ sewage
- ☐ other _____
- ☑ none

Stability of stream bed:
Bed sinks beneath your feet in:
- ☐ no spots
- ☑ a few spots
- ☐ many spots

% bank covered by plants, rocks and logs (no exposed soil) is:

	Good >70%	Fair 30%-70%	Poor <30%
Stream banks (sides)	✓		
Top bank (slope and floodplain)	✓		

Algae color:
- ☐ light green
- ☐ dark green
- ☐ brown coated
- ☐ matted on stream bed
- ☐ hairy

Algae located:
- ☐ everywhere
- ☐ in spots
- _____ % of bed covered

Stream channel shade:
- ☐ >80% excellent
- ☐ 50%-80% high
- ☑ 20%-49% moderate
- ☐ <20% almost none

Stream bank composition (=100%):
- 30 % trees
- 30 % shrubs
- 40 % grass
- _____ % bare soil
- _____ % rocks
- _____ % other _____

Stream bank erosion:
- ☐ >80% severe
- ☐ 50%-80% high
- ☑ 20%-49% moderate
- ☐ <20% slight

Riffle composition (=100%):
- 10 % silt (mud)
- _____ % sand (1/16"-1/4" grains)
- 70 % gravel (1/4"-2" stones)
- 20 % cobbles (2"-10" stones)
- _____ % boulders (>10" stones)

MUDDY BOTTOM ONLY: Record the number of scoops taken from each habitat type. Provide any details (mostly sand, little silt, etc.) to best describe the habitat.
- ☐ Steep bank/vegetated margin _____
- ☐ Woody debris with organic matter _____
- ☐ Rock/gravel/sand substrates _____
- ☐ Silty bottom with organic matter _____

Land uses in the watershed: Record all land uses observed in the watershed area upstream and surrounding your sampling site. Indicate whether the following land uses have a high (H), moderate (M), slight (S), or none (N) potential to impact the quality of your stream. Refer to the SOS stream survey instructions to determine how to assess H, M, S, or N. If the land use is not present in your watershed, leave the space blank.
- ☐ Oil & gas drilling
- ☐ Housing developments
- ☑ Forest
- ☐ Logging
- ☑ Urban uses (parking lots, highways, etc.)
- ☐ Sanitary landfill
- ☐ Active construction
- ☐ Mining (types) _____
- ☐ Cropland (types) _____
- ☐ Trash dump
- ☑ Fields
- ☑ Livestock pasture
- ☐ Other _____

Are there any discharging pipes? ☐ no ☑ yes If yes, how many? 1
What types of pipes are they?
- ☐ sewage treatment _____
- ☑ runoff (field or stormwater) describe: _____
- ☐ industrial: type of industry _____

Did you test above and below the pipes to determine any change in water quality? Were changes noticed? NOTE: If you answer *Yes*, you must submit two different survey forms, one for above the pipe and one for below the pipe, to document your claim.
Below only

Describe amount of litter in and around the stream as % of ground cover. Also describe the type of litter in and around the stream.

Comments Indicate what you think are the current and potential future threats to your stream's health. Feel free to attach additional pages or photographs to better describe the condition of your stream.

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Save Our Streams

Stream Quality Survey

October 1994

Name of reviewer: _____

Date reviewed: _____

Data sent to: _____

The purpose of this form is to aid you in gathering and recording important data about the health of your stream. By keeping accurate and consistent records of your observations and data from your macroinvertebrate count, you can document changes in water quality. Refer to the SOS insect card and monitoring instructions to learn how to trap and identify stream macroinvertebrates and how to complete this form.

Stream Keen's Mill Station # 8 # of participants 8

County Sussex State NJ Group or individual Stillwater Environmental Commission

Location Stillwater - Rt. 521

Weather conditions (last 72 hours) _____

Date 5/25/04 Average stream width 30 ft. Average stream depth 1 ft.

Start Time 15:10 End Time 15:30 Flow rate: High _____ Normal ✓ Low _____ Negligible _____

If conducting rocky bottom sampling, select a riffle where the water is not running too fast, the water depth is between 3-12 inches, and the bed consists of cobble-sized stones or larger. Monitored riffle area (3' x 3' square) ✓ Water depth ✓ in., in riffle. Water temperature 75 F° ? (C°)? Take 3 samples in the same general area. Count each separately and report the highest-scoring sample below. Sample ✓ reported of 3.

If conducting muddy bottom sampling, take the required number of scoops from each habitat type: steep banks/vegetated margin (10 scoops), woody debris with organic matter (4 scoops), rock/gravel/sand substrates (3 scoops), and silty bottom with organic matter (3 scoops). Air temp. 76°F

MACROINVERTEBRATE COUNT

Use the stream monitoring instructions to conduct a macroinvertebrate count. Use letter codes (A = 1-9, B = 10-99, C = 100 or more) to record the numbers of organisms found in a 3 foot by 3 foot area. Add up the number of letters in each column and multiply by the indicated index value. The following columns are divided based on the organism's sensitivity to pollution.

SENSITIVE		SOMEWHAT SENSITIVE		TOLERANT	
B	caddisfly larvae	A	beetle larvae	A	aquatic worms
A	hellgrammite	A	clams	B	blackfly larvae
A	mayfly nymphs		crane fly larvae		leeches
A	gilled snails		crayfish	A	midge larvae
	riffle beetle adult		damselfly nymphs		pouch (and other) snails
A	stonefly nymphs		dragonfly nymphs		
A	water-penny larvae	B	scuds		
		A	sowbugs		
			fishfly larvae		
			alderfly larvae		
			atherix		
6	# letters times 3 =	4	# letters times 2 =	3	# letters times 1 =
18	index value	8	index value	3	index value

Now add together the three index values from each column for your total index value. Total index value = 29

Compare this total index value to the following ranges of numbers to determine the water quality of your stream. Good water quality is indicated by a variety of different kinds of organisms, with no one kind making up the majority of the sample. Although the A, B, and C ratings do not contribute to the water quality rating, keep track of them to see how your macroinvertebrate populations change over time.

WATER QUALITY RATING

3-1

29 ✓ Excellent (>22) _____ Good (17-22) _____ Fair (11-16) _____ Poor (<11)

Steve Goldberg

Fish water quality indicators:
- ☐ scattered individuals
- ☐ scattered schools
- ☐ trout (pollution sensitive)
- ☐ bass (somewhat sensitive)
- ☐ catfish (pollution tolerant)
- ☐ carp (pollution tolerant)

Barriers to fish movement:
- ☐ beaver dams
- ☑ man-made dams
- ☐ waterfalls (>1 ft.)
- ☐ other
- ☐ none

Stream: Keen's Mill
Station #: 8
Date: 5/15/04

Surface water appearance:
- ☐ clear
- ☑ clear, but tea-colored
- ☐ colored sheen (oily)
- ☐ foamy
- ☐ milky
- ☐ muddy
- ☐ black
- ☐ grey
- ☐ other _____

Stream bed deposit (bottom):
- ☐ grey
- ☐ orange/red
- ☐ yellow
- ☐ black
- ☐ brown
- ☑ silt
- ☑ sand
- ☐ other _____

Odor:
- ☐ rotten eggs
- ☐ musky
- ☐ oil
- ☐ sewage
- ☑ other fish
- ☐ none

Stability of stream bed:
Bed sinks beneath your feet in:
- ☑ no spots
- ☐ a few spots
- ☐ many spots

% bank covered by plants, rocks and logs (no exposed soil) is:	Good >70%	Fair 30%-70%	Poor <30%
Stream banks (sides)	✓		
Top bank (slope and floodplain)	NA		

Algae color:
- ☐ light green
- ☐ dark green
- ☐ brown coated
- ☐ matted on stream bed
- ☐ hairy

Algae located:
- ☐ everywhere
- ☐ in spots
- _____ % of bed covered

Stream channel shade:
- ☑ >80% excellent
- ☐ 50%-80% high
- ☐ 20%-49% moderate
- ☐ <20% almost none

Stream bank composition (=100%):
- 70 % trees
- 30 % shrubs
- _____ % grass
- _____ % bare soil
- _____ % rocks
- _____ % other _____

Stream bank erosion:
- ☐ >80% severe
- ☐ 50%-80% high
- ☐ 20%-49% moderate
- ☑ <20% slight

Riffle composition (=100%):
- _____ % silt (mud)
- _____ % sand (1/16"-1/4" grains)
- 20 % gravel (1/4"-2" stones)
- 50 % cobbles (2"-10" stones)
- _____ % boulders (>10" stones)

MUDDY BOTTOM ONLY: Record the number of scoops taken from each habitat type. Provide any details (mostly sand, little silt, etc.) to best describe the habitat.
- ☐ Steep bank/vegetated margin _____
- ☐ Woody debris with organic matter _____
- ☐ Rock/gravel/sand substrates _____
- ☐ Silty bottom with organic matter _____

Land uses in the watershed: Record all land uses observed in the watershed area upstream and surrounding your sampling site. Indicate whether the following land uses have a high (H), moderate (M), slight (S), or none (N) potential to impact the quality of your stream. Refer to the SOS stream survey instructions to determine how to assess H, M, S, or N. If the land use is not present in your watershed, leave the space blank.
- ☐ Oil & gas drilling
- ☐ Housing developments
- ☑ Forest
- ☐ Logging
- ☐ Urban uses (parking lots, highways, etc.)
- ☐ Sanitary landfill
- ☐ Active construction
- ☐ Mining (types) _____
- ☐ Cropland (types) _____
- ☐ Trash dump
- ☐ Fields
- ☐ Livestock pasture
- ☐ Other _____

Are there any discharging pipes? ☑ no ☐ yes If yes, how many? _____
What types of pipes are they?
- ☐ sewage treatment _____
- ☐ runoff (field or stormwater) describe: _____
- ☐ industrial: type of industry _____

Did you test above and below the pipes to determine any change in water quality? Were changes noticed? NOTE: If you answer *Yes*, you must submit two different survey forms, one for above the pipe and one for below the pipe, to document your claim.

Describe amount of litter in and around the stream as % of ground cover. Also describe the type of litter in and around the stream.

Comments Indicate what you think are the current and potential future threats to your stream's health. Feel free to attach additional pages or photographs to better describe the condition of your stream.

Save Our Streams Program – April 1994
The Izaak Walton League of America • 707 Conservation Lane • Gaithersburg, MD 20878 • 301-548-0150

Blair Creek
Site 1

Site Description and Results

The sampling of Blair Creek took place on June 8, 2004 under partly cloudy skies, with a temperature around 27 degrees Celsius. Sampling began at approximately 1530h and finished at 1551h EDT. The sample site was accessed off of Old Schoolhouse Road, along a dirt road below the confluence of the North and South branch of Blair Creek. The site was in the county of Sussex and in the town of Stillwater. The average stream width recorded was approximately 5 feet and the average depth, approximately 5 inches. The water temperature at the time of the sample was 22 degrees Celsius and the stream maintained a fairly low flow rate. There was no man-made structure in the area besides the bridge near which the sample took place. The surface water and stream bed deposit were both of healthy color, with the bottom being mostly silt and sand, causing the stream bed to sink beneath ones feet in most spots. The stream was heavily shaded and the banks were composed of nearly all trees and shrub, with some grass types present.

There was not any erosion sighted and the riffle composition consisted solely of sand. There were no discharging pipes present in the sample area and the only land uses apparent were that of the forest category on the *1994 Stream Quality Survey*. Blair Creek placed very high in the "Good" category of the survey sheet. It exhibited its health by maintaining the key sensitive species of macros, including caddisfly larvae, mayfly nymphs, and stonefly nymphs. Also present in the stream were hellgrammites, beetle larvae (most liking that of the predacious diving beetle), crane fly larvae, and a dragonfly nymph. Other tolerant species included aquatic worms, midge larvae, and pouch (and other) snails. Blair Creek's biological assessment along with its nearly perfect chemical record proves that it is a stream of high biological integrity and water quality.

Trout Brook (Owassa)
Site 2

Site Description and Results

The sampling of Trout Brook (Owassa) was done on June 19, 2004. Weather conditions were stable, with sunny skies and a recorded air temperature of 19 degrees Celsius. Sampling began at approximately 1010h and was completed at 1045h EDT. This stream can be accessed from Owassa road at its junction with Fairview Lake road. The stream is in the county of Sussex and the township of Stillwater. The average stream width recorded was approximately 5 feet and the average depth was around six and a half inches. The water temperature at the time of the sample was 21 degrees Celsius and the flow rate was recorded as normal. The stream contained no visible man-made structures or barriers to fish movement. An area of concern for the stream's visual check was an oily surface water appearance in several spots in addition to the orange/red stream bed deposit color. The stream bed also sunk under the feet in almost every spot. These three

conditions may imply that the general health of the stream is not up to par. There was ample shade, with 80 percentile or higher stream channel shade. The banks were nearly all shrub, with some grass and stream bank erosion was minimal, with most of the bank covered by plant, rock, etc…Riffles consisted of mostly cobbles, with some sand and silt cover. There were no discharging pipes at this site. Land uses include forest, some field, and urban uses in the form of fairly heavily used roads. Trout Brook (Owassa) put up one of the lowest scores, barely placing in the "Fair" category of the scoring system. In terms of biological data, the macroinvertebrates found were few and mostly of high tolerance to poor stream water. Though there were sparse counts of caddisfly larvae and mayfly nymphs, the rest of the sample contained animals of very high tolerance. These include crayfish, aquatic worms, blackfly larvae, and midge larvae. The site has, in the past, suffered chemically as well, in comparison to others streams in the study as well as the state mandated standards. The stream has already peaked over the state standard fecal coliform levels near 1998 and total phosphorous followed the same trend peaking in 96, rising nearly .5 mg/l above the state standard. Currently, the chemical levels have plateaued to at or below state mandates. Despite the cleaner chemical record, the biological sample as well as the general stream appearance imply that the stream is not as healthy as it should be.

Trout Brook (Middleville)
Site 3

Site Description and Results

The sampling of Trout Brook (Middleville) took place on May 24, 2004 with partly cloudy conditions and thunderstorms the previous nights. The recorded air temperature was around 28 degrees Celsius. Sampling began at approximately 1600h and ended at approximately 1610h EDT. The site can be found at the intersection of Middleville road and Pond Brook road in the county of Sussex and the town of Stillwater. The average recorded stream width was approximately 10 feet and the average depth, approximately 9.6 inches. At the time of the sample, the flow rate was normal and the water temperature was around 20 degrees Celsius. There were no visible man-made structures in or near the site as well as no barriers to fish movement. The surface water appearance was clear, but tea colored (the picture above was taken at a later date, and do to heavy rains the water appeared murky from short term runoff-it is not representative of

the appearance of the stream at the time of the sample.) The stream bed deposit was a healthy silt and sand combination and there were no apparent odors emitted from the stream. Also, the stream bed did not sink in any spots beneath ones feet. The stream sides were sufficiently covered with little exposed soil but the slope and floodplain had much less cover, with most of the area consisting of road. There was very little stream channel shade, with the majority of stream bank consisting of small shrub and brush. There was little to no bank erosion in sight of the sample. The riffle composition was a split between gravel and cobbles. The surrounding lands were used as livestock pasture and urban uses in the form of road. There were no discharging pipes at the site. Trout Brook (Middleville) was an average stream in the study coming in the low end of the "Good" category. Chemically, total phosphorus seems to be on the rise, jumping .1mg/l above the state standard .1mg/l in the fall of 2003. All other chemical parameters are right up to par, with fecal coliforms well below state limitations despite the streams proximity to the livestock pasture. The biological assessment through the macroinvertebrates produced a standard but solid outcome. Animals sensitive to water quality, such as water-penny larvae, caddisfly larvae, and mayfly nymphs were numerous, with the mayflies reaches numbers upwards of one hundred. The somewhat sensitive category was filled by beetle larvae (predacious diving beetle) and cranefly larvae. A midge larva was also found. Trout brook (Middleville) meets some of the biocriteria of a stream of high water quality and its chemical record is nearly perfect. With a little more macroinvertebrate biodiversity, the stream would be upgraded from the "average" category in which it falls in currently.

Spring Brook (Blue Mountain Inn)
Site 4

Site Description and Results

The Spring Brook (Quick Pond) sample took place on June 26, 2004, with clear, sunny weather conditions and a recorded air temperature of 30 degrees Celsius. Sampling began at approximately 1420h and was completed at 1450h EDT. The sample can be accessed off of Mt. Benevolence road near the Blue Mountain Inn (previously the Crandon Lodge) in the county of Sussex and the town of Stillwater. The average stream width recorded was about 10 feet, with the approximate stream depth being 6 inches. The water temperature at the time of the sample was 25 degrees Celsius and the stream maintained a normal flow rate. The site contained no visible man-made structure or barriers to fish movement. The surface water appearance was clear and the bed deposit was a mixed brown and silt. Spring Brook was odor free and had healthy stream bed

stability. There was no exposed soil in the sampling site due to both the bank sides and most of the slope and floodplain being heavily wooded. Despite the fact that the bank composition was mostly that of shrub, the density of the plants made for excellent stream channel shade. There was no visible erosion at the site and the riffle composition was nearly all cobbles. Land uses include forest and urban use in the form of roadway and a fairly far off parking lot. There were no discharging pipes at the site. Spring Brook (Quick Pond) has maintained an excellent chemical record as well as putting out fairly good results in the macroinvertebrate bioassesment. It placed highly in the "Good" category of the scoring table. The stream produced the only Riffle beetle count recorded in addition to three other sensitive macroinvertebrates. These include high counts of caddisfly larvae, and slightly smaller counts of mayfly and stonefly nymphs. Animals found that belong to the somewhat sensitive column of the score sheet include Predacious diving beetle larvae, cranefly larvae, and a crayfish. The only low water quality tolerant animal found was blackfly larvae. From examining the biological and chemical information one can concur that Spring Brook (Quick Pond) maintains a high water quality.

Spring Brook (Crandon)
Site 5

Site Description and Results

The sampling of Spring Brook (Crandon) took place on June 11, 2004, beginning at 1500h and ending at approximately 1515h EDT. The recorded air temperature was 25 degrees Celsius and the weather was standard, with no storming or precipitation. The site can be accessed from the Hampton road bridge, in the county of Sussex and the town of Stillwater. The average stream width recorded was about 5 feet, with the average stream depth being approximately 5 inches. The flow rate at the time of the sample was very low and the water temperature at the time of the sample was around 21 degrees Celsius. The stream site contained no man-made structure as well as no barriers to fish movement (in exception to the significantly low water level.) The surface water appearance was clear and the stream bed deposit maintained a silt and sand composition. There were no apparent odors at the site. Stream bed stability was mid-range, with the bed sinking

under the foot in a few spots. There was little to no exposed soil, with both the banks and the floodplain covered with plant matter. A mix of trees and shrubs provided ample stream channel shade. Stream bank erosion was minimal within the range of the site. Most riffles were composed of cobbles, with some gravel. In terms of land use, urban use in the form of roadway is the most significant. The site contained no discharging pipes. Chemically, Spring Brook (Crandon) has experienced difficulty in fecal coliform levels, from a rise in the spring of 1988 to its decline in 1991, with the pinnacle reaching more than 100col/100ml over the state standard. The stream seems to be another placed in the "average" category. The macroinvertebrate count produced a mid-range score, just missing the bottom of the "Good" category. The site contained a fairly diverse group of sensitive animals including caddisfly, hellgrammite, mayfly nymphs, and stonefly nymphs. Yet, the only other two macroinvertebrate species found were in the somewhat sensitive category. They were beetle larvae and dragonfly nymphs. The stream lacked the macroinvertebrate biodiversity needed for a more solid score. The stream is probably of a moderate water quality but there is room for improvement.

Spring Brook (Swartswood)
Site 6

Site Description and Results

The sampling of Spring Brook took place on June 3, 2004, with no outstanding weather conditions and the air temperature at 26 degrees Celsius. Sampling began at approximately 1610h and ended around 1630h EDT. The site can be accessed off of the Swartswood road bridge in the county of Sussex and the town of Stillwater. The recorded average stream width was approximately 10 feet, with the average depth approximately 11 inches. At the time of the sample, the flow rate was recorded as high; probably do to heavy precipitation the nights before. The water temperature was recorded at 24 degrees Celsius. There were no apparent man-made structures in the stream site as well as no barriers to fish movement. The surface water appearance was clear, but tea-colored and there were no evident odors in the sample area. The stream bed

deposit appeared to be sandy and the bed was mostly stable, with the bed sinking beneath ones feet in very few spots. The bank and floodplain was well covered with plant matter as well as several tracts of rock which was most likely once a stream bed. With the stream bank consisting of nearly all tree and shrub, the stream channel shade was very good. There was little to no bank erosion in the vicinity of the site. The riffle composition of the stream was nearly all cobbles with some boulders as well. The land uses for the area surrounding the test site were forest, parking lots, and roadway. There were 2 discharging pipes in the area used for storm-water runoff for the roadway. The sampling was done below these pipes. Spring Brook was one of the lowering scoring streams in the study. The stream lacked both diversity and quality in the macroinvertebrate count. There were good counts of caddisfly larvae, mayfly nymphs, and predacious diving beetle larvae but that is the extent of the quality of the count. Some stonefly nymphs were found as well as some lower quality and tolerant species such as aquatic worms and midge larvae. The final macroinvertebrate score was a 13, placing the stream in the mid-range "Fair" category. Spring Brook has a nearly perfect chemical record which leads one to believe that either not all the macroinvertebrate inhabitants were found or that there is a misbalance in the biological workings of the watercourse.

Paulinskill River
Site 7

Site Description and Results

The sampling of Paulinskill River was done on June 19, 2004, with the weather conditions being stable and the air temperature at a recorded 22 degrees Celsius. Sampling began at approximately 1101h and finished at 1145h EDT. The sample site can be accessed off of the Main St. green bridge in the town of Stillwater and the county of Sussex. The average recorded stream width was approximately 25 to 35 feet and the average depth, about one foot. The water temperature at the time of the sample was around 24 degrees Celsius. The water temperature was most likely warmer than the air because of the river's large size and shallow depth. The river maintained a normal flow rate at the time of the sample. The cement base of the bridge acted as a man-made structure but it had little impact on water movement or river ecology. There were no barriers to fish movement in the test site. The surface water appearance was clear but,

tea-colored and the stream bed deposit was of a healthy color and composition, consisting mostly of silt and sand. It should be noted that on parts of the river edge there were thick concentrations of highly organic "muck". There was no odor in the actual sampling site, but the "muck" gave off a musky, earthly smell. The river bed was mostly stable, but with the edges, the foot sunk in a few spots. There was little to no open soil on the river banks or floodplain, with most of the surrounding area consisting of pasture grass, along with some trees and shrub. The river channel shade was moderate, with 20 to 50 percent of the water being covered at the time of the sample. River bank erosion was moderate as well. The riffle composition for the river was mostly gravel, with some cobbles and even less silt. Being the largest waterway of the water quality study, there were many land uses in the vicinity of the sample site. These included forest, roadways, livestock pastures, and fields. There is a discharging pipe in the sample site and all sampling was done below this pipe. In the past, Paulinskill River has had a well known problem with chemical parameters, in specific fecal coliforms. In the spring of 1989, fecal coliform levels were found to be 700col/100ml over the state limit. That was an obvious problem, but currently the coliform levels are well below the state mandate standard. Also, in 1985 and 1986, the river experienced a slight jump over state regulations in total phosphorus as well as just peaking over the pH standard of 8.5 lab-units in 1997. Despite its past chemical record, the river has shown great improvement and the biological data confirms this fact. Paulinskill produced the second highest score in the study, just barely missing the excellent water quality category. The river maintained 5 pollution sensitive species including caddisfly larvae, mayfly nymphs, gilled snails, stonefly nymphs, and water-penny larvae. The high number of pollution sensitive species in the

macroinvertebrate survey is great evidence of improving water quality. The river was also inhabited by freshwater clams, which is always a good sign for larger rivers, as well as dragonfly nymphs, and a huge population of scuds. All of the above species fall under the somewhat pollution sensitive category. Pollution tolerant aquatic worms were also found. The rivers index of biological integrity is very high and the chemical data has improved. With both these factors, it is safe to assume that Paulinskill River is of a fairly high water quality.

Keen's Mill
Site 8

Site Description and Results

The sampling of Keen's Mill took place on May 25, 2004, under stable weather conditions. The recorded air temperature was approximately 26 degrees Celsius. The sampling began at about 1510h and finished around 1530h EDT. The sample site can be accessed near Keen's mill off of Route 521, in the town of Stillwater and the county of Sussex. The average stream width recorded was approximately 20 feet and the average depth, approximately 1 foot. The water temperature at the time of the sample was 25 degrees Celsius and the stream maintained a normal flow rate (the picture above was taken at a later date and as it exhibits evidence of a low water level, it is not representative of the stream's condition at the time of the sample.) The only man-made structure and barrier to fish movement is a small dam at the head of the stream. The surface water appeared clear, but tea-colored and the stream bed deposit was of a healthy

silt/sand color and composition. There was an obvious fish odor emitted from the waterway. The stream bed was extremely stable, with no apparent sinking of the bed in any spots. There was no exposed soil in the vicinity of the site, due to the surrounding area consisting of established forest, with trees and shrub dominating the terrain. There was no erosion noted within the test site and the riffle composition was nearly all cobbles with some gravel. Keen's Mill has only been chemically tested for 4 years, with the sampling starting in the fall of the year 1998. Within its first year of testing, the stream had two noticeable chemical problems. One of them was a .1mg/l deficit from the state standard for total phosphorus and the other was a very high number of total suspended solids in the stream, with the count being 35mg/l more than the state allotted 25mg/l. Both of these tribulations dissipated by the time the stream was tested again in the fall of 2001. Keen's Mill had extremely impressive results for its biological sampling. The stream had the best macroinvertebrate count, while maintaining quality, pollution sensitive animals as well as a very impressive biodiversity. It had 6 macroinvertebrates out of the 7 pollution sensitive species in the category, only missing the riffle beetle. These included caddisfly larvae, hellgrammite, mayfly nymphs, gilled snails, stonefly nymphs, and water-penny larvae. The stream was also inhabited by somewhat pollution tolerant species like predacious diving beetle larvae, clams, scuds, and sowbugs. In addition, the stream had tolerant species including aquatic worms, blackfly larvae, and midge larvae. This stream's macroinvertebrate quality and diversity, along with its good chemical record, make it one of the best, if not the best stream in the study in terms of water quality and biological integrity.