
Cathcart Landfill Environmental Monitoring Report

Annual
Report
2018



Table of Contents

Tables..... i
Figures..... ii
Appendices..... ii
1.0 INTRODUCTION 1
 1.1 BACKGROUND 1
 1.2 PERMIT INFORMATION..... 1
 1.3 SITE DESCRIPTION AND PHYSICAL CONDITIONS..... 1
 1.4 LOCAL HYDROGEOLOGY 2
 1.5 EXISTING MONITORING NETWORK 3
2.0 GROUNDWATER MONITORING..... 4
 2.1 GROUNDWATER LEVEL MEASUREMENTS 4
 2.2 2018 GROUNDWATER SAMPLING 5
 2.3 EVALUATION OF GROUNDWATER ANALYTICAL RESULTS 5
 2.4 STATISTICAL EVALUATION 6
3.0 SURFACE WATER MONITORING 9
 3.1 SURFACE WATER SAMPLING 9
 3.2 SURFACE WATER ANALYTICAL RESULTS 9
4.0 LANDFILL GAS MONITORING..... 10
5.0 LEACHATE CHARACTERIZATION MONITORING 10
6.0 SETTLEMENT MONITORING 12
 6.1 SETTLEMENT MONITORING REQUIREMENTS..... 12
 6.2 SETTLEMENT MONITORING PROCEDURES..... 12
7.0 SUMMARY AND RECOMMENDATIONS..... 12
 7.1 SIGNATURES AND LICENSES 13

Tables

Table 1 – Groundwater Elevation Measurements 4
Table 2 – Summary of Shallow Well Standard Exceedances 5
Table 3 - Summary of Deep Well Standard Exceedances 6
Table 4 - Statistical Exceedance Summary - Shallow Wells 7
Table 5 - Statistical Summary - Deep Wells 8
Table 6 - 2018 Quarterly Surface Water Analytical Results..... 9
Table 7 - 2018 Landfill Gas Analytical Results..... 10
Table 8a – Leachate Vault Results – Inorganics 11
Table 8b – Leachate Vault Results – Metals/Heavy Organics..... 11
Table 8c – Leachate Vault Results – VOCs 11
Table 8d – Leachate Vault Results – SVOCs 11

Figures

Figure 1	Vicinity Map
Figure 2	Site Map
Figure 3	Site Topography Map
Figure 4	Geologic Map
Figure 5	Monitoring Network Map
Figure 5a	Monitoring Network Map Detail
Figure 6a	Shallow Aquifer Water Elevation Contours, First Quarter 2018
Figure 6b	Deep Aquifer Water Elevation Contours, First Quarter 2018
Figure 6c	Shallow Aquifer Water Elevation Contours, Second Quarter 2018
Figure 6d	Deep Aquifer Water Elevation Contours, Second Quarter 2018
Figure 6e	Shallow Aquifer Water Elevation Contours, Third Quarter 2018
Figure 6f	Deep Aquifer Water Elevation Contours, Third Quarter 2018
Figure 6g	Shallow Aquifer Water Elevation Contours, Fourth Quarter 2018
Figure 6h	Deep Aquifer Water Elevation Contours, Fourth Quarter 2018
Figure 7	Vertical Movement Study of Monitoring Points

Appendices

Appendix A	2018 Hydrographs
Appendix B	2018 Groundwater Analytical Summary Tables
Appendix C	2018 Groundwater Statistical Analyses

1.0 INTRODUCTION

The following report discusses the results of groundwater, surface water, and landfill gas monitoring for the 2018 monitoring year at the Cathcart Sanitary Landfill (*Landfill, Site*). The Site is located at 8915 Cathcart Way, just southwest of the intersection of Cathcart Way and State Route 9 in south-central Snohomish County, Washington. The location of the site relative to existing municipal improvements is shown on the **Vicinity Map** (*Figure 1*).

1.1 BACKGROUND

The Cathcart Landfill was permitted in the late 1970s and designed to minimize environmental impact to ground and surface water. When opened in June 1980, it was one of the first lined landfills in the United States. Cathcart Landfill operated as a solid waste landfill for 12 years, ceasing operation in June 1992. Upon closure, a cover system was installed, complying with **U.S. Environmental Protection Agency's (EPA) Resource Conservation and Recovery Act (RCRA) Subtitle D** and **Washington States Department of Ecology's (Ecology) Minimum Functional Standards for Solid Waste Handling (Chapter 173-304, Washington Administrative Code [WAC])**.

1.2 PERMIT INFORMATION

During 2018, the Site was permitted for post-closure monitoring by the **Snohomish Health District (SHD)** with a Solid Waste Facility Permit, SW-011 (*landfill permit, Snohomish Health District 2018*). Monitoring activities at the landfill are governed by the Solid Waste Facility Permit, and monitoring results are reviewed by both the **SHD** and the **Department of Ecology**. The permit requires quarterly post-closure groundwater, surface water, and landfill gas monitoring until the facility has been shown to be stable and/or not harmful to human health or the environment. The **SHD** permits and evaluates post-closure conditions at Cathcart using the Minimum Functional Standards (MFS) for Solid Waste Handling, Chapter 173-304 WAC.

1.3 SITE DESCRIPTION AND PHYSICAL CONDITIONS

The closed landfill is approximately 60 acres in area and is part of a larger County parcel. The Cathcart Landfill is bounded by private residential property to the northwest, north and east, and by **Snohomish County Road Maintenance** and **Solid Waste** facilities to the south and west. Stormwater detention ponds are located immediately north and south of the landfill. Existing site improvements and the site layout are shown on the **Site Map** (*Figure 2*).

Cathcart Landfill was constructed in six-(6) stages, filling from north to south. The bottom of the landfill has a 30-mil polyvinyl chloride (PVC) liner and the sides were constructed using a 36-mil chlorosulfonated polyethylene synthetic rubber (*Hypalon™*) liner. In stages 1 and 2, the top liner was constructed with a 60-mil, high-density polyethylene (HDPE) material. In stages 3 through 6, the top liner was constructed using 40-mil, very low density polyethylene (VLDPE) material. All penetrations of the liner for leachate and gas extraction systems installation were sealed to maintain full encapsulation of the landfill.

The leachate collection system is constructed of HDPE pipe. Leachate is collected and gravity flows to a pretreatment facility. The water is then pumped via a **Silver Lake Water District** sewer pipeline to the **City of Everett's** Wastewater Treatment Plant for final treatment and discharge.

Gas generated by the landfill is collected and extracted through a negatively pressurized system. Variable frequency blowers allow gas removal rates to increase or decrease as conditions within the landfill dictate. Collected gas is piped from the landfill and discharged through an on-site gas flaring facility.

Perimeter access roads and/or property boundaries currently define the location of the landfill. The landfill itself is grass covered. A network of surficial piping for the gas extraction system extends across the landfill surface. The site and surrounding area occupy a moderately-sloped bench, bordered to the south by steeper slopes extending upward to a broad upland, and to the north by steeper slopes extending downward to the Snohomish River valley floor. Garden Creek flows northward in an excavated ditch along the west side of the landfill. The landfill has been placed along the original Garden Creek channel. North of the landfill, Garden Creek re-enters its natural channel where both its gradient and channel side slopes steepen abruptly and it flows downward towards and eventually into the Snohomish River floodplain. Overall topography in the immediate vicinity of the site slopes down toward the north. Existing site elevations range from 340 feet above mean sea level (*MSL, National Geodetic Vertical Datum [NGVD] 1929*) at the south end of the landfill to approximately 120 feet above MSL at the northern end of the site. For reference purposes, existing site topography is shown on the **Site Topographic Map** (*Figure 3*).

1.4 LOCAL HYDROGEOLOGY

Surficial geology of the site area is shown on the **Geologic Map** (*Figure 4*). The Cathcart Landfill is located on the Intercity Plateau. Below the Intercity Plateau, sands and gravels of the Advance Outwash (*Qva*) are the thickest and most productive aquifer - extending from the northern edge of the plateau in the immediate vicinity of the project site southward to Lake Washington. The Cross Valley Sole Source Aquifer is also located on the Intercity Plateau. Its designated boundaries are to the south and upgradient of the project site. Locally, groundwater has been found within the less productive confining beds including Glacial Till (*Qvt*), Transitional Beds (*Qtb*) and Siltstone/Sandstone Bedrock (*Tb*). Water wells completed within the confining bed units will generally provide much lower yields than wells completed within the Advance Outwash (*Qva*), but the lower production rates may still be sufficient for limited domestic use. Typically these wells will dry up or have limited use during extended periods of dry weather or during the summer and early fall months.

During previous site investigations, groundwater was encountered within the Recessional and Advance Outwash soils (*Qvr, Qva*). Moist to wet conditions were documented in sandy lenses of the Glacial Till (*Qvt*) and within discontinuous fractures located within the upper portion of the basal Siltstone and/or Sandstone bedrock (*Tb*). Groundwater movement through the low permeability Glacial Till (*Qvt*) and bedrock (*Tb*) units is complex. In some locations the encountered groundwater was limited, but appeared to be under confined conditions. Initial site

investigations characterized site groundwater as occurring within two-(2) distinct aquifers, labeled shallow (*upper*) and deep (*lower*) aquifers. The shallow aquifer included any groundwater encountered above bedrock and/or close to the ground surface and the deep aquifer was considered groundwater found within bedrock or in deeper test borings. Due to the lack of any apparent separation between these two-(2) groundwater zones, it would appear that they may not be separate aquifers. Instead, the monitored zones may represent a complex, single, contiguous groundwater table below the site.

1.5 EXISTING MONITORING NETWORK

The site is currently monitored following the procedures outlined in the approved Sampling and Analysis Plan (SAP; Landau Associates, Inc. dated 2006). Site closure permits require quarterly monitoring of groundwater, surface water, and landfill gas. An analysis of the existing Site conditions is currently underway. A new SAP that incorporates this new information will be developed once the analysis has been completed. The existing monitoring networks are summarized below.

1.5.1 Groundwater Monitoring Network

Currently, a total of 17 groundwater monitoring wells (*nine-(9) deep wells and eight-(8) shallow wells*), are monitored on a quarterly basis. Of these wells, four-(4) are considered upgradient, and 13 are considered to be within the landfill footprint or downgradient site wells. Sampling of wells G-09S, G-09D, and G-10S resumed during 2018. Sampling at those wells was discontinued in 2013 due to a dye injection test that was performed to better delineate groundwater flow conditions in the immediate vicinity of the G-09 and G-10. The dye injection test was inconclusive in clarifying the flow conditions in those locations, and the inconclusive result was interpreted as further evidence that wells G-09 and G-10 had been drilled through the leachate underdrain system and likely were more representative of leachate than downgradient groundwater conditions. Therefore, groundwater sampling was not immediately resumed at those wells following the test. At the request of Ecology, monitoring at those wells resumed during the second quarter of 2018 and will continue for at least eight-(8) consecutive quarters. Well locations are shown on the **Monitoring Network Map (Figure 5)**.

1.5.2 Surface Water Monitoring Network

Surface water monitoring stations have been established along Garden Creek and in the Site stormwater detention ponds per the **SAP**. The seven-(7) surface water sampling locations consist of five-(5) downgradient locations (*CC-D, CC-D1, CC-F, CC-J, CC-NSDP*) and two-(2) upgradient locations (*CC-A and CC-B*). Sampling locations are shown on **Monitoring Network Map (Figures 5 and 5A)**. Quarterly surface water monitoring results are discussed in **Section 3.0** of this report.

1.5.3 Landfill Gas Monitoring Network

The **SAP** requires that landfill gas monitoring be conducted quarterly and that the monitoring will include measurements of methane (*measured in percentage of the lower explosive limit [% LEL]*),

oxygen (% volume), and carbon dioxide (% volume). The existing gas monitoring system consists of eight-(8) gas probes, six-(6) permanently-installed barhole probes, seven-(7) vaults, 19 manholes, and two-(2) lift stations, which surround the landfill. The gas monitoring locations are shown on the **Monitoring Network Map** (Figure 5). Quarterly landfill gas monitoring results are summarized and discussed in **Section 4.0** of this report.

2.0 GROUNDWATER MONITORING

Quarterly monitoring of the groundwater wells is performed by Snohomish County personnel. Depth to water was measured and groundwater samples were collected in accordance with the approved **SAP**. The following sections describe field procedures used and analytical results of the 2018 groundwater monitoring events.

2.1 GROUNDWATER LEVEL MEASUREMENTS

The depth to the groundwater within each well was measured prior to sampling activities using an electronic water level indicator. The measurements were recorded to the nearest 0.01 foot as taken from a marked survey point on the top of each well casing. Based on the ten-(10) years of data that has been collected, all wells appear to track precipitation very closely. The Site received 54.58 inches of rain in 2018, which was higher than the average yearly rainfall total of 53.13 inches. The quarterly rainfall totals during the year were:

- First quarter 2018: 19.68 inches
- Second quarter 2018: 12.19 inches
- Third quarter 2018: 4.93 inches
- Fourth quarter 2018: 17.78 inches

Hydrographs showing the groundwater elevation and precipitation fluctuations for the Site are included herein as Appendix A. Groundwater elevation contour maps that show the approximate calculated groundwater velocity and flow direction in each groundwater zone during each quarter of 2018 are included as Figures 6a through 6h.

Table 1 – Groundwater Elevation Measurements

Well ID	Casing Elevation	First Quarter 2018	Second Quarter 2018	Third Quarter 2018	Fourth Quarter 2018	Fourth Quarter Delta*
Shallow Wells						
G-01A	229.00	219.96	219.67	DRY	218.81	0.34
G-04A	286.52	273.62	273.65	DRY	271.40	0.21
G-08D1	222.02	200.22	199.47	192.28	195.33	5.19
G-09S	273.08	NM	243.65	241.44	241.06	0.09
G-10S	266.94	NM	244.52	241.89	242.51	1.69
G-11S	250.74	233.50	233.75	228.33	232.11	4.86
G-14S	328.76	319.24	320.96	315.39	313.36	-0.44
G-24S	321.10	308.47	309.22	306.48	306.68	0.96
Deep Wells						
G-01D	229.96	206.63	206.70	203.60	206.34	2.90
G-02D	242.10	213.16	217.49	210.07	210.08	0.33
G-06B	246.24	212.51	212.51	208.44	211.86	4.56

Well ID	Casing Elevation	First Quarter 2018	Second Quarter 2018	Third Quarter 2018	Fourth Quarter 2018	Yearly Delta*
G-08D2	221.62	219.38	220.81	211.98	212.27	0.38
G-09D	274.60	NM	223.78	219.69	220.14	1.40
G-10D	268.32	238.72	238.60	237.02	237.81	1.31
G-13D	232.17	222.25	222.35	218.28	221.26	3.29
G-14D	329.58	298.14	298.87	297.57	297.12	-0.51
G-24D	320.51	301.62	301.61	299.81	300.68	1.53

* Delta based on comparison of fourth quarter 2017 and fourth quarter 2018 well readings.

2.2 2018 GROUNDWATER SAMPLING

Purging and sampling of each of the 17 wells was conducted in accordance with the **SAP**. Purge volumes ranged from approximately 1.1 gallon (G-04A) to 54.0 gallons (G-08D2) per well.

Water samples were collected by slowly filling laboratory-supplied containers to reduce aeration and eliminate headspace. Where wells were purged dry, they were allowed to recover prior to sampling. Samples were placed in coolers and packed on ice to keep them at approximately 4°C for delivery to the lab. Samples were picked up by Am Test, Inc. and taken to their Kirkland, Washington laboratory for analysis of dissolved metals, volatile organic compounds (VOCs), and conventional chemistry parameters. The monitoring results for 2018 are discussed below.

2.3 EVALUATION OF GROUNDWATER ANALYTICAL RESULTS

The constituents that exceeded their respective groundwater standards in the shallow and deep monitoring wells are summarized in *Tables 2 and 3* below. These results are generally similar to the 2017 sampling events. Sodium, pH, and arsenic were consistently above groundwater standards in the wells sampled during 2018. Well G-10D continues to exhibit elevated concentrations of several constituents.

2.3.2 Shallow Wells

The shallow wells exhibited consistency throughout the current monitoring year. pH, sodium, and arsenic were the constituents that most often exceeded the groundwater standards in the shallow zone wells during 2018. The second quarter sample from well G-09S contained the only shallow zone VOC standard exceedance during 2018 (*vinyl chloride, 0.11 µg/L*).

Table 2 – Summary of Shallow Well Standard Exceedances

Well No.	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
G-01A	pH, arsenic	pH, arsenic	Not sampled – insufficient water	pH, arsenic
G-04A	pH, arsenic, iron, manganese	pH, arsenic, iron, manganese	Not sampled – insufficient water	Not sampled – insufficient water
G-08D1	pH, sodium, arsenic	pH, sodium, arsenic	pH, sodium, arsenic, iron	pH, sodium, arsenic, iron
G-09S	No sample	Conductivity, pH, sodium, TDS, arsenic, manganese, vinyl chloride	Conductivity, pH, sodium, TDS, arsenic, manganese	Conductivity, pH, sodium, TDS, arsenic, manganese

Table 2 – Summary of Shallow Well Standard Exceedances

Well No.	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
G-10S	No sample	No sample	Conductivity, sodium, sulfate, TDS, arsenic, iron, manganese	Conductivity, pH, sodium, sulfate, TDS, arsenic, iron, manganese
G-11S	Sodium, arsenic	Sodium, arsenic	Sodium, arsenic	Sodium, arsenic
G-14S	pH, sodium, arsenic	pH, sodium, arsenic	pH, sodium, arsenic	pH, sodium, arsenic
G-24S	Sodium, arsenic	Sodium, arsenic	Sodium, arsenic	Sodium, arsenic

2.3.1 Deep Wells

Similar to the shallow well exceedances shown above, pH, sodium, and arsenic were the constituents that most often exceeded the groundwater standards in the deep zone wells. This further suggests that a single, complex water-bearing zone exists beneath the Site instead of two (2) separate aquifers.

Table 3 - Summary of Deep Well Standard Exceedances

Well Number	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
G-01D	pH, sodium, arsenic	pH, sodium, arsenic	pH, sodium	pH, sodium, arsenic
G-02D	Sodium, arsenic	Sodium, arsenic	Sodium, arsenic	Sodium, arsenic, lead
G-06B	Sodium, arsenic	Sodium, arsenic	Sodium, arsenic	Sodium, arsenic
G-08D2	pH, sodium, arsenic, iron, manganese	pH, sodium, arsenic, iron, manganese	pH, sodium, arsenic	pH, sodium, arsenic
G-09D	No sample	pH, sodium, arsenic, vinyl chloride	pH, sodium, arsenic, vinyl chloride	Conductivity, pH, sodium, TDS, arsenic, vinyl chloride
G-10D	Conductivity, sodium, sulfate, TDS, arsenic, manganese	Conductivity, sodium, sulfate, TDS, arsenic, iron, manganese, vinyl chloride	Conductivity, sodium, sulfate, TDS, arsenic, iron, manganese	Conductivity, sodium, sulfate, TDS, arsenic, iron, manganese
G-13D	pH, sodium, arsenic	pH, sodium, arsenic	pH, sodium, arsenic	pH, sodium, arsenic
G-14D	pH, sodium, arsenic, iron	pH, sodium, arsenic, iron	pH, sodium, arsenic	pH, sodium, arsenic
G-24D	pH, sodium, arsenic	Sodium, arsenic	pH, sodium	Sodium

2.4 STATISTICAL EVALUATION

State health regulations under which the Cathcart Landfill is permitted require that the landfill “...shall not cause exceedances of **Chapter 173-200 WAC, Water Quality Standards for Groundwater**, and **Chapter 246-290 WAC, Drinking Water Regulations**.” The intent of these state regulations is to limit the impact that a landfill will have on the surrounding groundwater resources. Collected groundwater samples are analyzed for inorganic constituents, dissolved and total metals, and volatile organic compounds, and the results are compared to the applicable standards listed in the above referenced WACs. Where an exceedance to the standards occurs, a statistical analysis will be accomplished to determine the significance of the change.

The contaminants listed in Tables 2 and 3 above (*shallow and deep wells*) exceed the most stringent of the criteria in each **WAC**. Per our **SAP** (*Landau, 2006*), the statistical approach utilized for the analysis of the exceedances is the up versus down prediction limit (*PL*) which has been determined using **DUMPstat Software** (*Version 3.0 by Robert D. Gibbons Ltd., 2018*).

Historical groundwater data from all wells is evaluated using **DUMPStat**, and mean, standard deviation, prediction limit, and confidence values were calculated. The Sens Trend analysis test was performed for the entire data set stretching back to 1988, and trend analyses are run between 2008 and current time. This allows the placement of multiple constituents on a single graph to better see any potential correlation between the geochemistry and dissolved metals. Per Ecology and Snohomish Health District request, the prediction limit is updated in the first quarter of the year and subsequent data sets are compared against that prediction limit.

Results of the statistical analyses are summarized below and on the table in *Appendix B*. The statistical analysis diagrams (*including summary tables, power charts, Stiff diagrams, trilinear diagrams, and time series plots*) are included in *Appendix C*.

2.4.1 Shallow Groundwater Well Statistical Results

Contaminants found within the shallow wells that exceeded the current prediction limits for that zone are presented in *Table 4, Statistical Exceedance Summary - Shallow Wells* below. Exceedances of the following constituents were noted in one-(1) or more shallow zone wells during 2018: Alkalinity, ammonia nitrogen, bicarbonate, calcium, COD, chloride, magnesium, pH, potassium, sodium, sulfate, TDS, TOC, arsenic, cobalt, iron, manganese, and selenium. Power curves for upgradient vs. downgradient and intra-well prediction limits were all within acceptable tolerances.

Table 4 - Statistical Exceedance Summary - Shallow Wells

Well No.	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
G-01A	pH	pH	Not sampled – insufficient water	pH
G-04A	Ammonia nitrogen, calcium, magnesium, potassium, TOC, arsenic, cobalt, iron, manganese	Ammonia nitrogen, calcium, COD, magnesium, potassium, arsenic, iron, manganese	Not sampled – insufficient water	Not sampled – insufficient water
G-08D1	None	None	None	None
G-09S	No Sample	Alkalinity, bicarbonate, calcium, magnesium, potassium, sulfate, TDS, manganese, selenium	Alkalinity, bicarbonate, calcium, magnesium, potassium, sulfate, TDS, manganese, selenium	Alkalinity, bicarbonate, calcium, magnesium, potassium, sulfate, TDS, manganese, selenium
G-10S	No sample	No sample	Alkalinity, ammonia nitrogen, bicarbonate, calcium, magnesium, potassium, sodium,	Alkalinity, ammonia nitrogen, bicarbonate, calcium, magnesium, potassium, sodium,

Table 4 - Statistical Exceedance Summary - Shallow Wells

Well No.	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
G-10S (cont.)			sulfate, TDS, arsenic, iron, manganese	sulfate, TDS, arsenic, iron, manganese
G-11S	None	None	None	None
G-14S	None	None	None	None
G-24S	None	None	None	Chloride

2.4.2 Deep Groundwater Well Statistical Results

Contaminants found within the deep wells that exceeded the current prediction limits for that zone are presented in *Table 5, Statistical Summary – 2018 Deep Wells* below. Exceedances of the following constituents were noted in one-(1) or more deep zone wells during 2018: Alkalinity, bicarbonate, calcium, chloride, conductivity, magnesium, nitrate nitrogen, pH, potassium, sodium, sulfate, TDS, arsenic, barium, cadmium, copper, iron, lead, manganese, vanadium. And zinc. Power curves for upgradient vs. downgradient and intra-well prediction limits were all within acceptable tolerances.

Table 5 - Statistical Summary - Deep Wells

Well No.	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
G-01D	Sodium, copper	Bicarbonate, sodium	Bicarbonate, sodium, iron	Bicarbonate, sodium
G-02D	Nitrate nitrogen, sulfate	Nitrate nitrogen, sulfate, arsenic	Nitrate nitrogen, sulfate, arsenic, iron	Nitrate nitrogen, sulfate, arsenic, copper, iron, lead
G-06B	Bicarbonate, nitrate nitrogen, sodium, sulfate	Alkalinity, bicarbonate, nitrate nitrogen, sodium, sulfate, arsenic	Bicarbonate, nitrate nitrogen, sodium, arsenic, vanadium	Bicarbonate, nitrate nitrogen, sodium, sulfate, arsenic, iron
G-08D2	Magnesium, barium, copper, iron, manganese	Magnesium, nitrate nitrogen, arsenic, barium, iron, manganese	None	Iron
G-09D	No Sample	pH, sodium, arsenic	pH, sodium, sulfate, arsenic, cadmium, iron, manganese, zinc	Chloride, nitrate nitrogen, sodium, sulfate, TDS, arsenic
G-10D	Alkalinity, bicarbonate, calcium, chloride, conductivity, magnesium, potassium, sodium, sulfate, TDS, manganese, vanadium	Alkalinity, bicarbonate, calcium, chloride, conductivity, magnesium, potassium, sodium, sulfate, TDS, iron, manganese	Alkalinity, bicarbonate, calcium, chloride, conductivity, magnesium, potassium, sodium, sulfate, TDS, iron, manganese	Alkalinity, bicarbonate, calcium, chloride, conductivity, magnesium, potassium, sodium, sulfate, TDS, iron, manganese
G-13D	None	None	None	None
G-14D	Iron	Magnesium, iron	Iron	Iron
G-24D	None	None	None	None

3.0 SURFACE WATER MONITORING

Snohomish County performed surface water sampling during each quarter of 2018 as required by the landfill’s permit and SAP.

3.1 SURFACE WATER SAMPLING

County field personnel collected surface water samples in accordance with procedures outlined in the SAP from two-(2) upgradient monitoring locations (CC-A and CC-B) and four-(4) downgradient monitoring locations (CC-D1, CC-F, CC-J, and CC-NSDP). The collected samples were delivered to Am Test for analysis of fecal coliform, conductivity, nitrate nitrogen, and pH. Surface water monitoring results were compared to applicable criteria in Chapter 173-201A WAC as required by the landfill permit and the results are tabulated below.

3.2 SURFACE WATER ANALYTICAL RESULTS

The 2018 surface water analytical results are summarized as follows in Table 6. Due to dry conditions, sufficient surface water flow was present at only one-(1) of the surface water sampling locations during the third quarter sampling event. Additionally, surface water sampling points CC-D1 and CC-J were removed from the surface water sampling program (with Ecology approval) due to safety concerns with accessing those locations.

Table 6 - 2018 Quarterly Surface Water Analytical Results

Parameter	Criteria	CC-A1	CC-B1	CC-D1	CC-F	CC-J	CC-NSDP
First Quarter 1/30/18							
Coliform	200	38	17	30	80	66	8
Conductivity	--	91	100	160	98	110	170
Nitrate N	--	1.5	1.4	0.6	1.4	1.3	1.3
pH	5.5 – 6.5	7.02	6.61	6.47	6.54	6.61	6.08
Second Quarter 4/24/18							
Coliform	200	640	940	NS	140	NS	780
Conductivity	--	100	120	NS	130	NS	150
Nitrate N	--	0.70	0.67	NS	0.62	NS	0.016
pH	5.5 – 6.5	7.07	7.09	NS	6.55	NS	6.15
Third Quarter 7/10/18							
Coliform	200	NS	NS	NS	NS	NS	210
Conductivity	--	NS	NS	NS	NS	NS	230
Nitrate N	--	NS	NS	NS	NS	NS	<0.01
pH	5.5 – 6.5	NS	NS	NS	NS	NS	6.89
Fourth Quarter 10/18/17							
Coliform	200	100	88	NS	48	NS	58
Conductivity	--	150	120	NS	160	NS	310
Nitrate N	--	0.045	0.17	NS	0.33	NS	0.69
pH	5.5 – 6.5	6.63	6.49	NS	6.80	NS	6.76

NS = Not sampled

4.0 LANDFILL GAS MONITORING

Landfill gas readings were collected from eight-(8) landfill gas probes in accordance with the **SAP** (Landau, 2006); the **2018 Landfill Gas Analytical Results** are summarized in *Table 7*. This year, as with the last couple of years, probe GP2-1 had lower than expected oxygen readings and slightly elevated CO2 readings when compared to the other probes. This is attributed to a tight seal at the GP-2 location that allows the probe tube to be completely purged.

Table 7 - 2018 Landfill Gas Analytical Results

Probe	% Methane				% Oxygen				% Carbon Dioxide			
	1 st	2 nd	3 rd	4 th	1 st	2 nd	3 rd	4 th	1 st	2 nd	3 rd	4 th
GP1-1	0	0	0	0	21	21	21	21	0	0	0	0
GP1-2	0	0	0	0	21	21	21	21	0	0	0	0
GP2-1	0	0	0	0	21	21	5	0	0	0	5	6
GP2-2	0	0	0	0	21	21	11	9	0	0	6	8
GP-3	0	0	0	0	21	8	21	21	0	3	0	1
GP-4	0	0	0	0	21	21	21	21	0	0	0	0
GP5-S	0	0	0	0	21	21	19	18	0	0	2	3
GP5-D	0	0	0	0	21	21	20	12	0	0	0	0
Flare	30	40	39	65	10	6	5	0	17	21	23	34

5.0 LEACHATE CHARACTERIZATION MONITORING

On April 24, 2018, Snohomish County Solid Waste personnel collected annual samples from the leachate pump station vaults designated SP-1 and SP-4 to characterize leachate from above (SP-1) and below (SP-4) the landfill liner. The leachate samples were analyzed for the following constituents:

- pH by USEPA Method 150.2
- Biological oxygen demand (BOD) by Method SM 5210B
- Conductivity by Method SM 2510B
- Total cyanide by USEPA Method 335.4
- Oil and Grease (HEM) by USEPA Method 1664 HEM
- Total Petroleum Hydrocarbons (Polar/Non-Polar) by USEPA Method 1664 SGT-HEM
- Total Suspended Solids (TSS) by Method SM 2540D
- Flashpoint by USEPA Method 1020
- Metals by USEPA Method 200.7/245.1, including:
 - Arsenic
 - Cadmium
 - Chromium
 - Copper
 - Mercury
 - Lead
 - Nickel
 - Silver
 - Zinc

In addition, the sample from vault SP-1 was analyzed for the standard groundwater constituent suite and priority pollutants, which included:

- Total Phenol by EPA Method 420.4
- Metals by USEPA Methods 200.8/245.1, including the above-listed metals and:
 - Antimony
 - Beryllium
 - Selenium
 - Thallium
- VOCs by USEPA Method 8260/8260 SIM/624
- Semivolatile Organic Compounds (SVOCs) by USEPA Method 625/625-SIM
- Polynuclear Aromatic Hydrocarbons (PAHs) by USEPA Method 625-SIM
- Organochlorine Pesticides (OPPs) by USEPA Method 608
- Polychlorinated Biphenyls (PCBs) by USEPA Method 608

Tabulated summaries of the leachate vault sample analytical results are included below as Tables 8a, 8b, 8c, and 8d. Only constituents that were detected are shown in the tables; none of the leachate vault samples collected during the current monitoring year contained detectable concentrations of PAHs, OPPs, or PCBs. SP-1 was inadvertently not analyzed for BOD, TSS, TPH, and Oil & Grease during the 2018 leachate sampling.

Table 8a – Leachate Vault Results – Inorganics

Location ID	Date	pH	BOD	Total Cyanide	Conductivity	TSS
Units		std. units	mg/L	mg/L	µmhos/cm	mg/L
SP-1	1/30/18	5.89	--	0.010	460	--
SP-4	1/30/18	6.40	4.1	0.007	410	4.0

Table 8b – Leachate Vault Results – Metals

Location ID	Date	Arsenic	Beryllium	Cadmium	Chromium	Copper	Mercury	Nickel	Lead	Selenium	Zinc
Units		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
SP-1	1/30/18	12.4	0.33	0.268	21.6	7.25	0.07	7.11	0.769	1.40	143
SP-4	1/30/18	<5	--	<0.5	6.4	10	<0.05	<5	<10	--	<5

-- = not analyzed

Table 8c – Leachate Vault Results – Heavy Organics

Location ID	Date	Oil & Grease	TPH (Non-Polar)	Total Phenol
Units		mg/L	mg/L	mg/L
SP-1	1/30/18	--	--	0.028
SP-4	1/30/18	2.8	2.3	--

Table 8d – Leachate Vault Results – VOCs/SVOCs

Location ID	Date	1,4-dichlorobenzene	Chlorobenzene	m,p Xylene	Vinyl chloride	Bis(2-ethylhexyl) phthalate	Acenaphthene	Naphthalene
Units		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
SP-1	1/30/18	1.7	1.56	1.1	0.50	0.25	0.12	0.34

6.0 SETTLEMENT MONITORING

Annual settlement monitoring was initiated by Snohomish County Solid Waste personnel in 2011 in order to establish landfill biomass stability for custodial care planning. In 2013, a County survey crew installed a permanent 100 foot grid over the top of the biomass, which will allow for compliance with the new Department of Ecology Guidance document.

6.1 SETTLEMENT MONITORING REQUIREMENTS

In order to comply with post closure requirements, cover surface slopes must remain between 2 and 5 percent grade, side slopes must remain below 33 percent slope and localized settlements must not impair cover drainage or cover integrity. Existing biomass stability will be determined based on these annual surveys.

6.2 SETTLEMENT MONITORING PROCEDURES

Settlement monitoring is performed on an annual basis by taking direct measurements through topographic surveys and comparing them to existing and previous topographic surveys. Survey crews perform a field survey of the side slopes, grade breaks and additional points necessary to prepare a topographic contour map with maximum two-(2) foot contours. Topographic survey data is compared to previous and/or existing data for any changes, which includes historic topographic surveys. Existing surface slope grades are also analyzed.

The most recent Cathcart Landfill survey was completed by the *Snohomish County Public Works Survey Group* in October 2018. Current survey results are shown on the **Vertical Movement Study of Monitoring Points**, *Figure 7* of this report. Survey results for 2018 indicate small amounts of settlement across the landfill mass, with slightly more settlement noted in the south-central portion of the landfill. The settlement amounts measured during 2018 are within tolerance levels established in the Department of Ecology's Uniform Guidance document.

7.0 SUMMARY AND RECOMMENDATIONS

Based on the downgradient well test results, there were no indications of groundwater impacts that are attributable to the Cathcart Landfill extending beyond the site boundaries. There were also no indications of significant surface water impacts or of landfill gas impacts at the Site boundaries. The underdrain sample results did not indicate the presence of significant impacts within the leachate collection system.

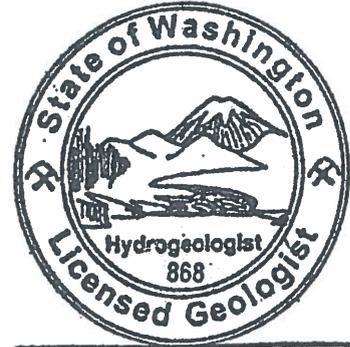
In accordance with the recently-approved Application of Variance between the County and SHD and using the methods described in the existing **SAP**, Snohomish County Solid Waste Environmental Personnel will begin monitoring groundwater and surface water on a semiannual basis throughout 2019. Wells G-09S/D and G-10S/D will continue to be monitored on a quarterly basis for eight-(8) quarters, after which the monitoring frequency at those wells will be reduced if warranted. Landfill gas will continue to be monitored on a quarterly basis through 2019.



Kirk R. Bailey, LEG, LHG
SCPW – Engineering Services

3/4/19

Date



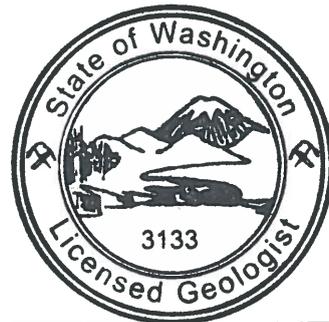
KIRK R. BAILEY



Brian K. Eytcheson, LG
SCPW–Solid Waste

3/4/19

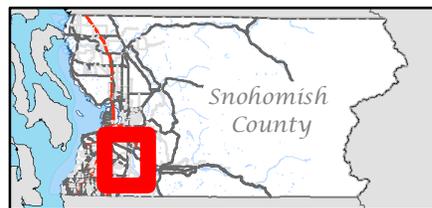
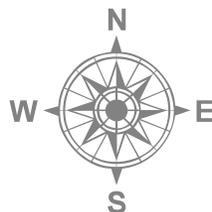
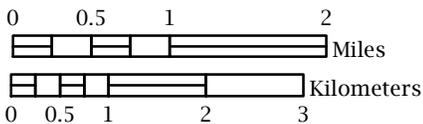
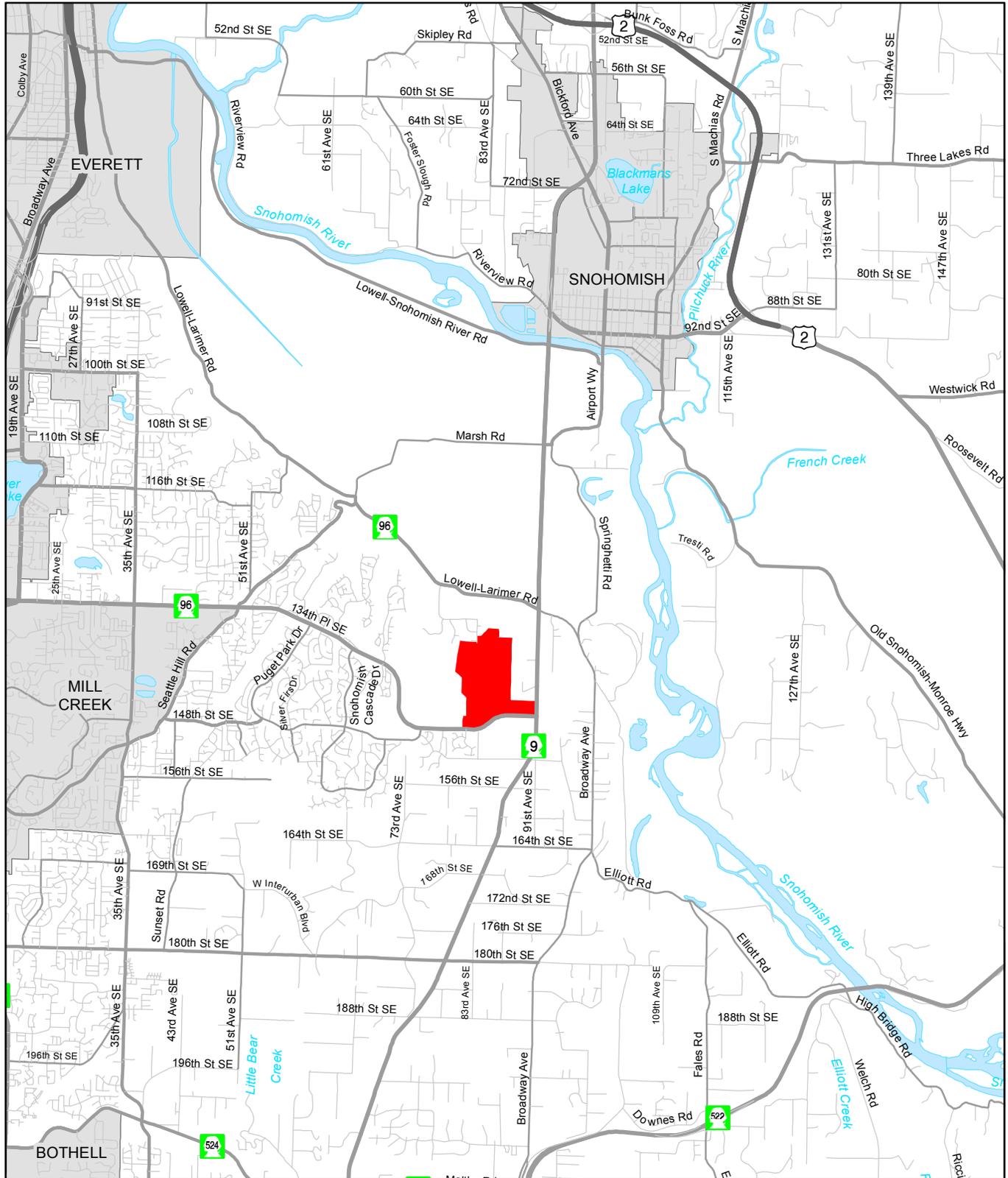
Date



BRIAN K. EYCHESON

Figures

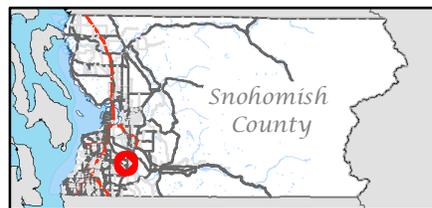
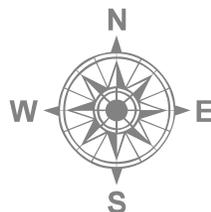
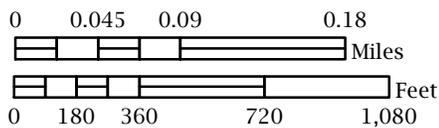
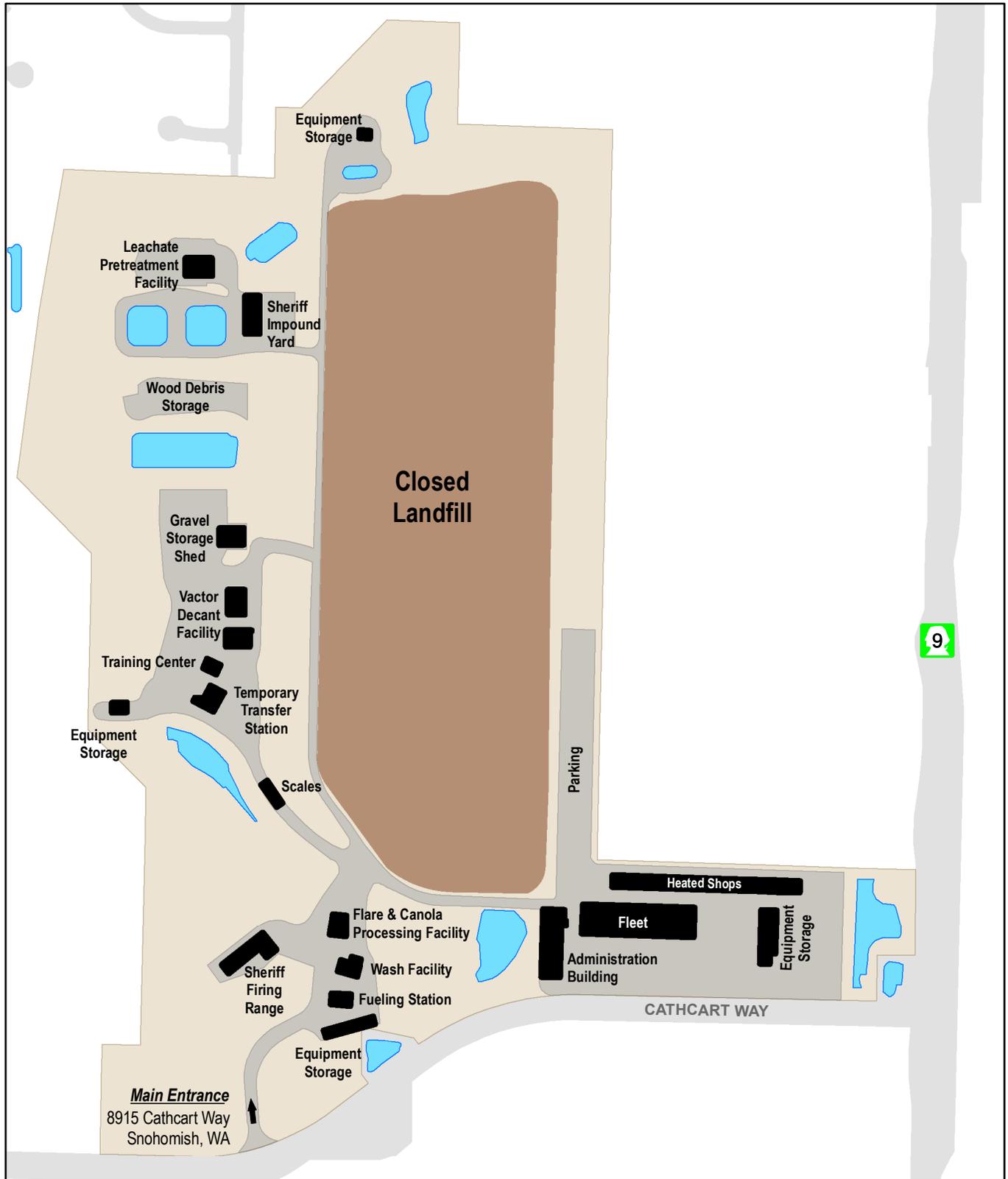
Cathcart Landfill Vicinity Map




Snohomish County
Public Works
Solid Waste Division
 March 16, 2010

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Cathcart Landfill Site Map




Snohomish County
Public Works
Solid Waste Division
March 16, 2010

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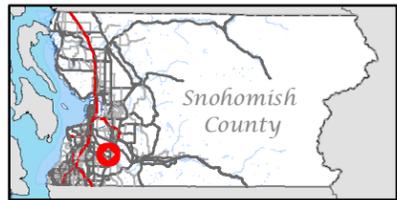
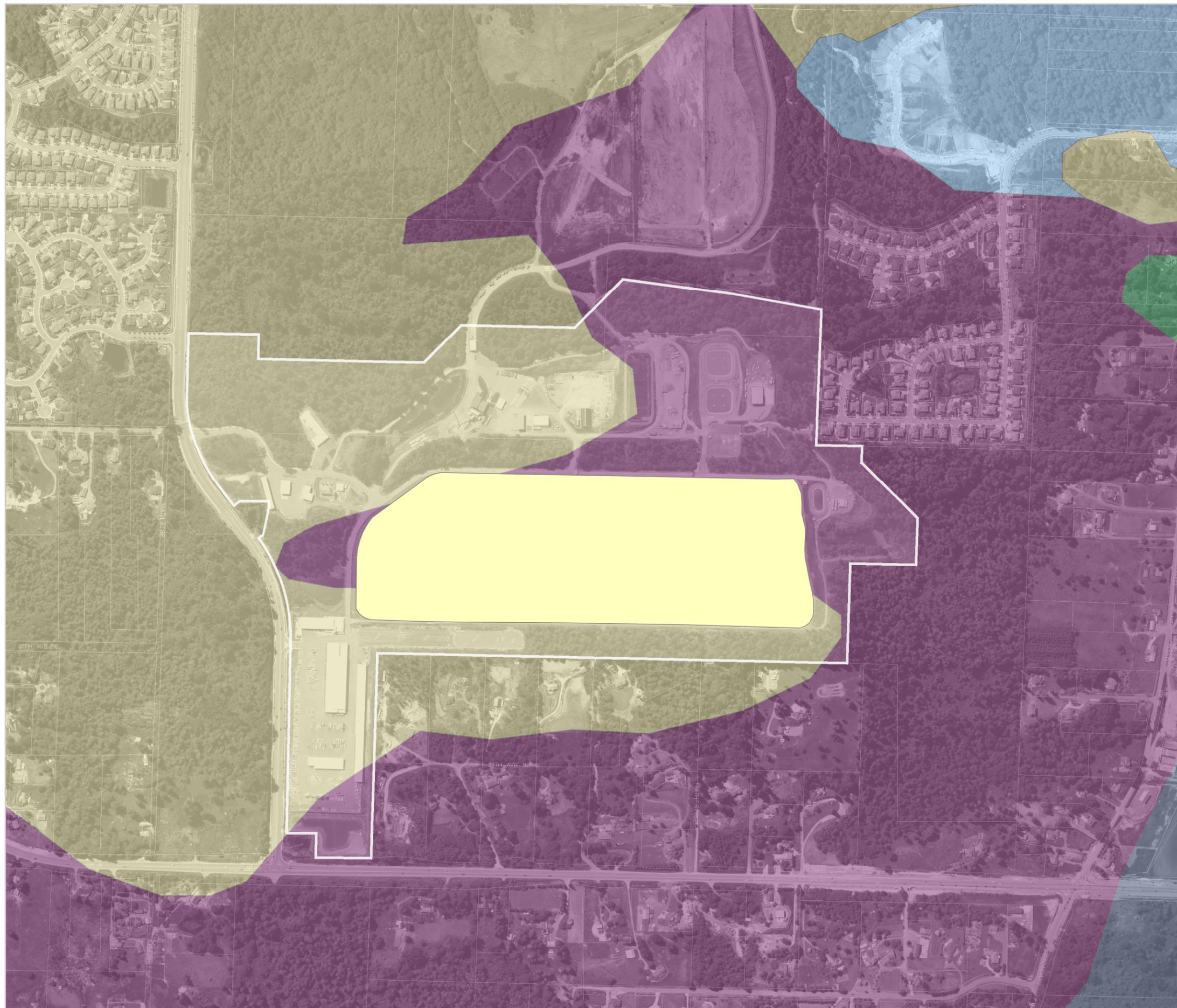
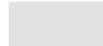


Figure 4

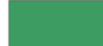
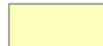
Cathcart Landfill Geologic Map

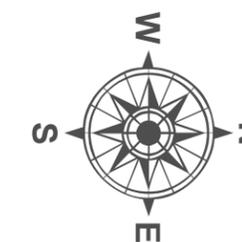


Map Features

-  Parcel Boundary
-  Subject Property Boundary

Geologic Description

-  Recent Alluvium (Qyal)
-  Vashon Recessional Outwash (Qvr)
-  Vashon Glacial Till (Qvt)
-  Vashon Advance Outwash (Qva)
-  Transitional Beds (Qtb)
-  Modified Land



1 inch = 600 feet

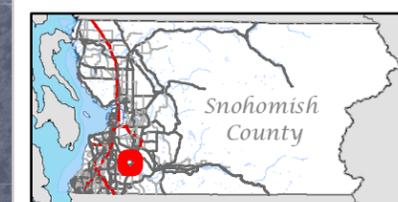
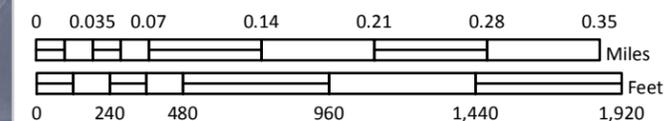


Figure 5

Cathcart Landfill Monitoring Network



Map Features

- Parcel Boundary
- Subject Property Boundary

Aquifer Unit (Active Wells)

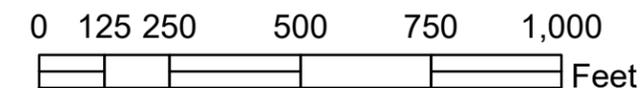
- Deep Aquifer
- Shallow Aquifer

Well Status

- Abandoned
- Decommissioned
- Destroyed
- Inactive

Additional Sampling Points

- Gas Probe
- Surface Water Sample Locations

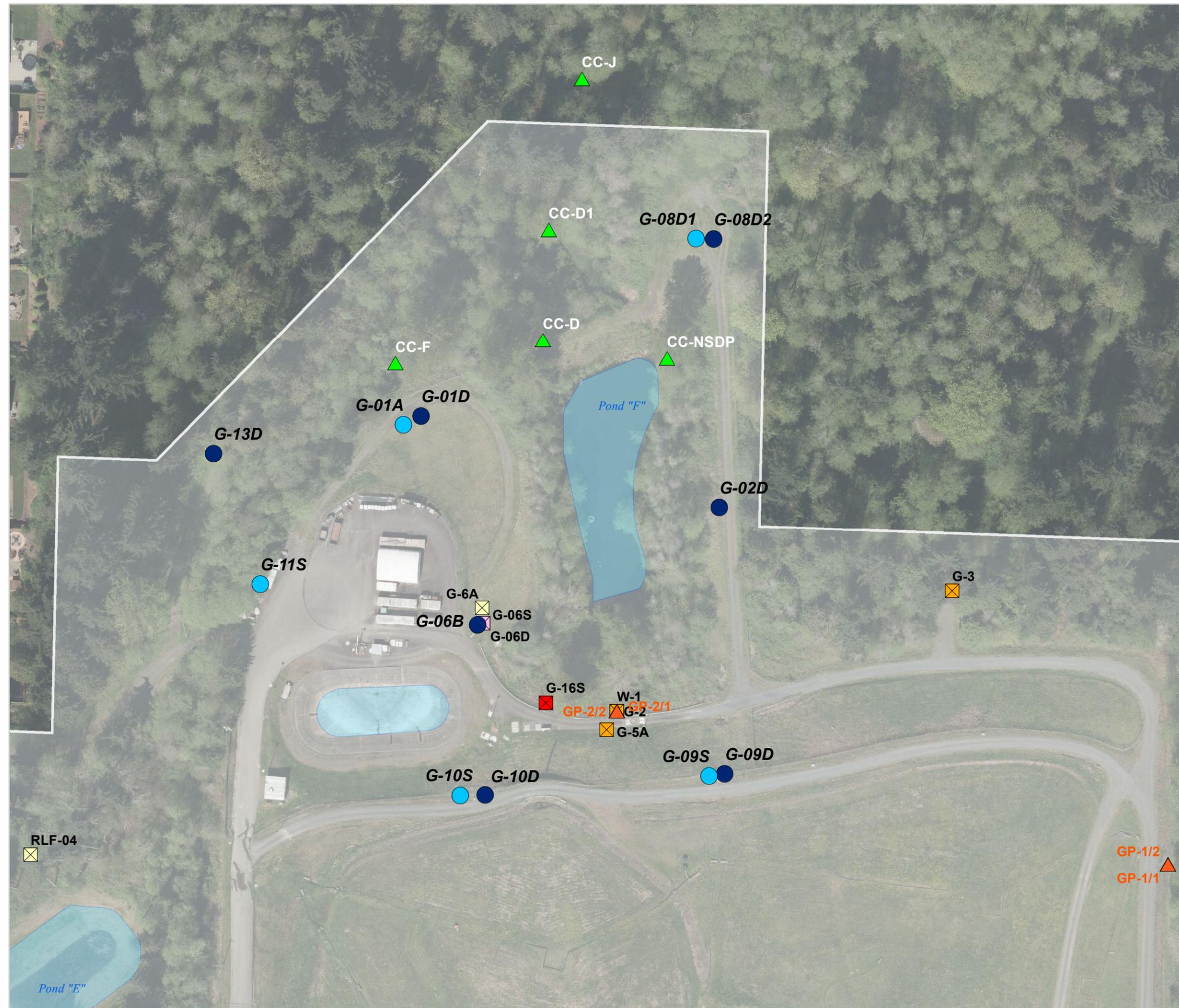


Snohomish County
Public Works
Solid Waste Division
April 25, 2018

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Figure 5a

Cathcart Landfill Monitoring Network



Map Features

- Parcel Boundary
- Subject Property Boundary

Aquifer Unit (Active Wells)

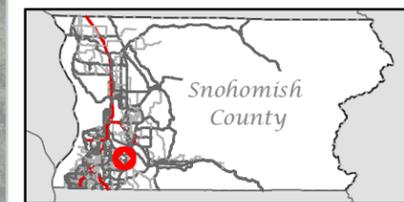
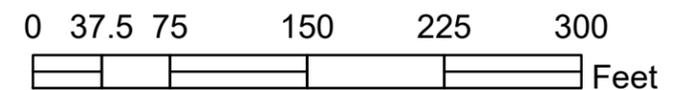
- Deep Aquifer
- Shallow Aquifer

Well Status

- Abandoned
- Decommissioned
- Destroyed
- Inactive

Additional Sampling Points

- Gas Probe
- Water Sample Locations



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Figure 6a

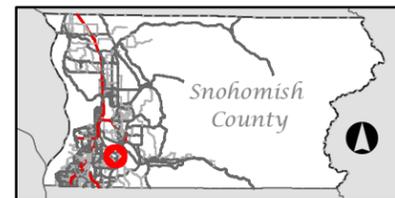
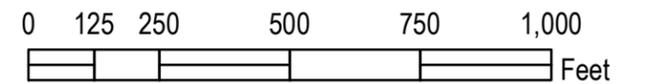
Cathcart Landfill

Shallow Aquifer
Groundwater Elevation Contours
First Quarter 2018

 DIRECTION OF GROUNDWATER FLOW
.00037 ft / day
.14 ft / year
123.93 degrees to the positive x - axis

-  PARCEL BOUNDARY
-  SUBJECT PROPERTY BOUNDARY
-  5 FT CONTOUR
-  WELL LOCATION

WELL_ID	SAMP_DATE	MEAS_HEAD
G-01A	1/23/2018	219.96
G-04A	1/23/2018	273.62
G-08D1	1/23/2018	200.22
G-11S	1/23/2018	233.50
G-14S	1/23/2018	319.24
G-24S	1/23/2018	308.47




Snohomish County
Public Works
Solid Waste Division
March 27, 2018

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Figure 6b

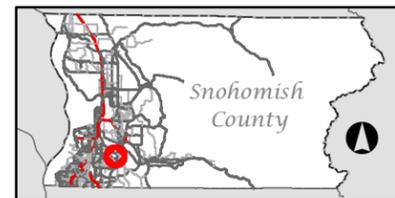
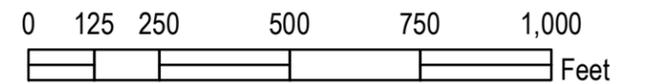
Cathcart Landfill

Deep Aquifer Groundwater Elevation Contours First Quarter 2018

 DIRECTION OF GROUNDWATER FLOW
 .012 ft / day
 4.35 ft / year
 142.07 degrees to the positive x - axis

-  PARCEL BOUNDARY
-  SUBJECT PROPERTY BOUNDARY
-  5 FT CONTOUR
-  WELL LOCATION

WELL_ID	SAMP_DATE	MEAS_HEAD
G-01D	1/23/2018	206.63
G-02D	1/23/2018	213.16
G-06B	1/23/2018	212.51
G-08D2	1/23/2018	219.38
G-10D	1/23/2018	238.72
G-13D	1/23/2018	222.25
G-14D	1/23/2018	298.14
G-24D	1/23/2018	301.62



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Figure 6c

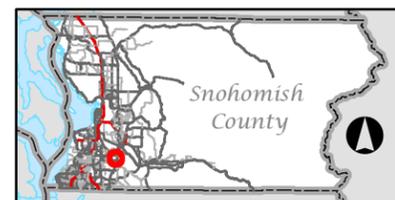
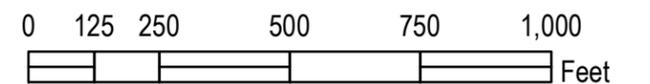
Cathcart Landfill

Shallow Aquifer Groundwater Elevation Contours Second Quarter 2018

 DIRECTION OF GROUNDWATER FLOW
 .00037 ft / day
 .14 ft / year
 124.07 degrees to the positive x - axis

-  PARCEL BOUNDARY
-  SUBJECT PROPERTY BOUNDARY
-  5 FT CONTOUR
-  WELL LOCATION

WELL_ID	SAMP_DATE	MEAS_HEAD
G-01A	4/17/2018	219.67
G-04A	4/17/2018	273.65
G-08D1	4/17/2018	199.47
G-09S	4/17/2018	243.65
G-10S	4/17/2018	244.52
G-11S	4/17/2018	233.75
G-14S	4/17/2018	320.96
G-24S	4/17/2018	309.22



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Figure 6d

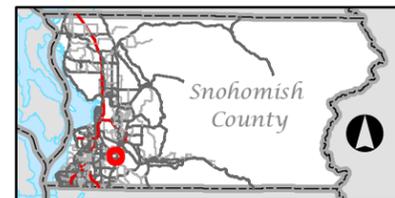
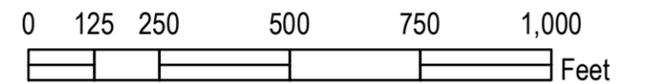
Cathcart Landfill

Deep Aquifer Groundwater Elevation Contours Second Quarter 2018

DIRECTION OF GROUNDWATER FLOW
 .012 ft / day
 4.35 ft / year
 142.17 degrees to the positive x - axis

-  PARCEL BOUNDARY
-  SUBJECT PROPERTY BOUNDARY
-  5 FT CONTOUR
-  WELL LOCATION

WELL ID	DATE	GW ELEV.
G-01D	4/17/2018	206.70
G-02D	4/17/2018	217.49
G-06B	4/17/2018	212.51
G-08D2	4/17/2018	221.54
G-09D	4/17/2018	223.78
G-10D	4/17/2018	238.60
G-13D	4/17/2018	222.35
G-14D	4/17/2018	298.87
G-24D	4/17/2018	301.61



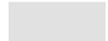
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Figure 6e

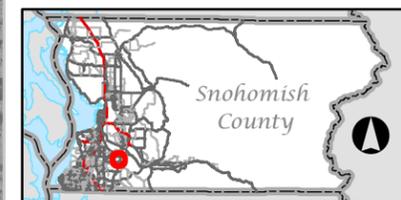
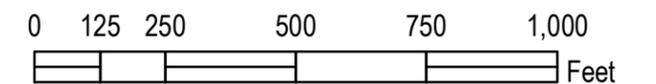
Cathcart Landfill

Shallow Aquifer
Groundwater Elevation Contours
Third Quarter 2018

 DIRECTION OF GROUNDWATER FLOW
.00042 ft / day
.15 ft / year
136.66 degrees to the positive x - axis

-  PARCEL BOUNDARY
-  SUBJECT PROPERTY BOUNDARY
-  5 FT CONTOUR
-  WELL LOCATION

WELL_ID	SAMP_DATE	MEAS_HEAD
G-08D1	8/29/2018	192.28
G-09S	8/29/2018	241.44
G-10S	8/29/6/2018	241.89
G-11S	8/29/2018	228.33
G-14S	8/29/2018	315.39
G-24S	8/29/2018	306.48



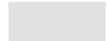
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Figure 6f

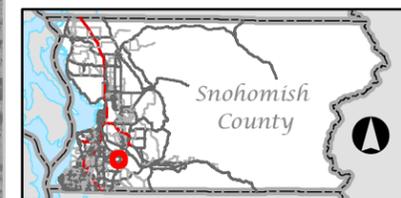
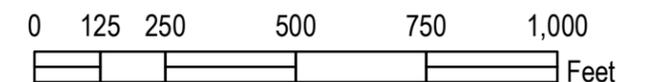
Cathcart Landfill

Deep Aquifer Groundwater Elevation Contours Third Quarter 2018

 DIRECTION OF GROUNDWATER FLOW
 .012 ft / day
 4.21 ft / year
 136.98 degrees to the positive x - axis

-  PARCEL BOUNDARY
-  SUBJECT PROPERTY BOUNDARY
-  5 FT CONTOUR
-  WELL LOCATION

WELL_ID	SAMP_DATE	MEAS_HEAD
G-01D	8/29/2018	203.60
G-02D	8/29/2018	210.07
G-06B	8/29/2018	208.44
G-08D2	8/29/2018	211.98
G-09D	8/29/2018	219.69
G-10D	8/29/2018	237.02
G-13D	8/29/2018	218.28
G-14D	8/29/2018	297.57
G-24D	8/29/2018	299.81



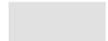
All maps, data, and information set forth herein ("Data"), are for illustrative purposes only and are not to be considered an official citation to, or representation of, the Snohomish County Code. Amendments and updates to the Data, together with other applicable County Code provisions, may apply which are not depicted herein. Snohomish County makes no representation or warranty concerning the content, accuracy, currency, completeness or quality of the Data contained herein and expressly disclaims any warranty of merchantability or fitness for any particular purpose. All persons accessing or otherwise using this Data assume all responsibility for use thereof and agree to hold Snohomish County harmless from and against any damages, loss, claim or liability arising out of any error, defect or omission contained within said Data. Washington State Law, Ch. 42.56 RCW, prohibits state and local agencies from providing access to lists of individuals intended for use for commercial purposes and, thus, no commercial use may be made of any Data comprising lists of individuals contained herein.

Figure 6g

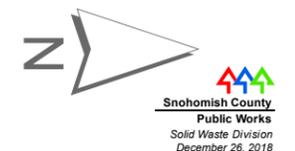
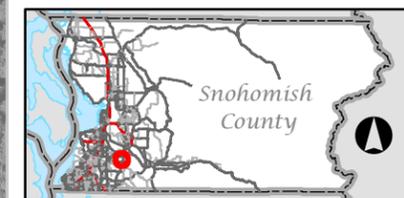
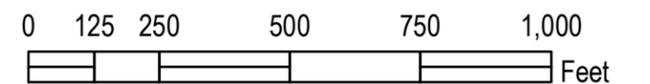
Cathcart Landfill

Shallow Aquifer Groundwater Elevation Contours Fourth Quarter 2018

 DIRECTION OF GROUNDWATER FLOW
 .00035 ft / day
 .13 ft / year
 117.29 degrees to the positive x - axis

-  PARCEL BOUNDARY
-  SUBJECT PROPERTY BOUNDARY
-  5 FT CONTOUR
-  WELL LOCATION

WELL_ID	SAMP_DATE	MEAS_HEAD
G-01A	10/16/2018	218.81
G-04A	10/16/2018	271.40
G-08D1	10/16/2018	195.33
G-09S	10/16/2018	241.06
G-10S	10/16/2018	242.51
G-11S	10/16/2018	232.11
G-14S	10/16/2018	313.36
G-24S	10/16/2018	306.68



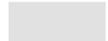
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Figure 6h

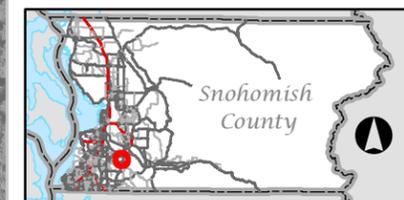
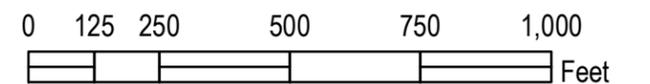
Cathcart Landfill

Deep Aquifer Groundwater Elevation Contours Fourth Quarter 2018

 DIRECTION OF GROUNDWATER FLOW
 .011 ft / day
 3.92 ft / year
 132.57 degrees to the positive x - axis

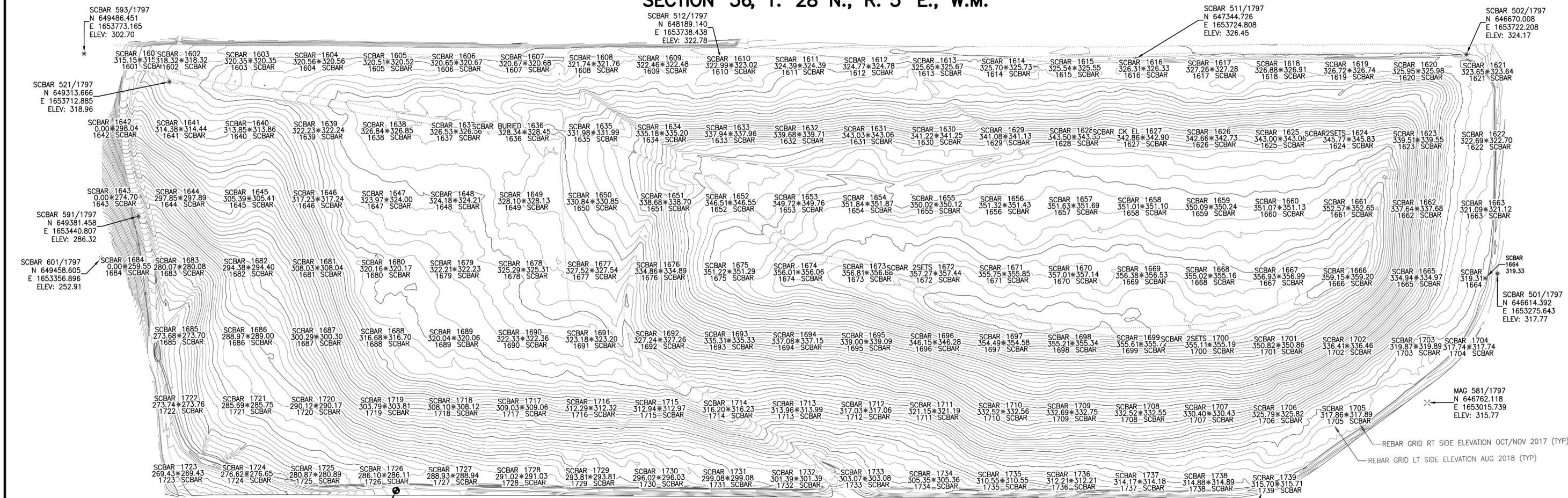
-  PARCEL BOUNDARY
-  SUBJECT PROPERTY BOUNDARY
-  5 FT CONTOUR
-  WELL LOCATION

WELL_ID	SAMP_DATE	MEAS_HEAD
G-01D	10/16/2018	206.34
G-02D	10/16/2018	210.08
G-06B	10/16/2018	211.86
G-08D2	10/16/2018	212.27
G-09D	10/16/2018	220.14
G-10D	10/16/2018	237.81
G-13D	10/16/2018	221.26
G-14D	10/16/2018	297.12
G-24D	10/16/2018	300.68



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SECTION 36, T. 28 N., R. 5 E., W.M.



POINT	DESC.	2017 ELEV.	2018 ELEV.	ELEVATION CHANGE
1601	SCBAR	315.146	315.147	0.00
1602	SCBAR	318.321	318.317	0.00
1603	SCBAR	320.353	320.351	0.00
1604	SCBAR	320.565	320.56	0.00
1605	SCBAR	320.517	320.507	-0.01
1606	SCBAR	320.668	320.654	-0.01
1607	SCBAR	320.682	320.672	-0.01
1608	SCBAR	321.756	321.742	-0.01
1609	SCBAR	322.478	322.461	-0.02
1610	SCBAR	323.02	322.988	-0.03
1611	SCBAR	324.392	324.386	-0.01
1612	SCBAR	324.783	324.766	-0.02
1613	SCBAR	325.674	325.652	-0.02
1614	SCBAR	325.73	325.705	-0.03
1615	SCBAR	325.55	325.537	-0.01
1616	SCBAR	326.326	326.309	-0.02
1617	SCBAR	327.285	327.262	-0.02
1618	SCBAR	326.911	326.885	-0.03
1619	SCBAR	326.745	326.72	-0.02
1620	SCBAR	325.975	325.948	-0.03
1621	SCBAR	323.642	323.653	0.01
1622	SCBAR	322.702	322.687	-0.01
1623	SCBAR	339.547	339.507	-0.04
1624	SCBAR	345.831	345.767	-0.06
1625	SCBAR	343.063	343.002	-0.06
1626	SCBAR	342.726	342.664	-0.06
1627	SCBAR	342.898	342.855	-0.04
1628	SCBAR	343.548	343.503	-0.05
1629	SCBAR	341.131	341.079	-0.05
1630	SCBAR	341.252	341.216	-0.04
1631	SCBAR	343.056	343.026	-0.03
1632	SCBAR	339.708	339.681	-0.03
1633	SCBAR	337.962	337.941	-0.02
1634	SCBAR	335.199	335.184	-0.01
1635	SCBAR	331.994	331.978	-0.02

POINT	DESC.	2017 ELEV.	2018 ELEV.	ELEVATION CHANGE
1636	SCBAR	328.446	328.342	-0.10
1637	SCBAR	326.565	326.531	-0.03
1638	SCBAR	326.854	326.842	-0.01
1639	SCBAR	322.241	322.226	-0.01
1640	SCBAR	313.863	313.847	-0.02
1641	SCBAR	314.443	314.385	-0.06
1642	SCBAR	298.039	notms'd	#VALUE!
1643	SCBAR	274.702	notms'd	#VALUE!
1644	SCBAR	297.888	297.849	-0.04
1645	SCBAR	305.41	305.387	-0.02
1646	SCBAR	317.245	317.233	-0.01
1647	SCBAR	323.998	323.971	-0.03
1648	SCBAR	324.214	324.178	-0.04
1649	SCBAR	328.128	328.1	-0.03
1650	SCBAR	330.851	330.84	-0.01
1651	SCBAR	338.704	338.683	-0.02
1652	SCBAR	346.552	346.512	-0.04
1653	SCBAR	349.755	349.725	-0.03
1654	SCBAR	351.874	351.838	-0.04
1655	SCBAR	350.116	350.023	-0.09
1656	SCBAR	351.429	351.325	-0.10
1657	SCBAR	351.694	351.633	-0.06
1658	SCBAR	351.095	351.007	-0.09
1659	SCBAR	350.241	350.088	-0.15
1660	SCBAR	351.129	351.07	-0.06
1661	SCBAR	352.647	352.566	-0.08
1662	SCBAR	337.68	337.643	-0.04
1663	SCBAR	321.12	321.094	-0.03
1664	SCBAR	319.326	319.312	-0.01
1665	SCBAR	334.974	334.939	-0.03
1666	SCBAR	359.199	359.147	-0.05
1667	SCBAR	356.986	356.929	-0.06
1668	SCBAR	355.165	355.02	-0.15
1669	SCBAR	356.529	356.382	-0.15
1670	SCBAR	357.142	357.011	-0.13

POINT	DESC.	2017 ELEV.	2018 ELEV.	ELEVATION CHANGE
1671	SCBAR	355.848	355.75	-0.10
1672	SCBAR	357.439	357.272	-0.17
1673	SCBAR	356.882	356.806	-0.08
1674	SCBAR	356.065	356.014	-0.05
1675	SCBAR	351.291	351.219	-0.07
1676	SCBAR	334.887	334.859	-0.03
1677	SCBAR	327.54	327.52	-0.02
1678	SCBAR	325.313	325.293	-0.02
1679	SCBAR	322.232	322.208	-0.02
1680	SCBAR	320.172	320.158	-0.01
1681	SCBAR	308.041	308.029	-0.01
1682	SCBAR	294.399	294.383	-0.02
1683	SCBAR	280.083	280.074	-0.01
1684	SCBAR	259.546	notms'd	#VALUE!
1685	SCBAR	273.695	273.678	-0.02
1686	SCBAR	288.996	288.968	-0.03
1687	SCBAR	300.303	300.29	-0.01
1688	SCBAR	316.696	316.68	-0.02
1689	SCBAR	320.062	320.035	-0.03
1690	SCBAR	322.355	322.326	-0.03
1691	SCBAR	323.202	323.183	-0.02
1692	SCBAR	327.264	327.241	-0.02
1693	SCBAR	335.333	335.314	-0.02
1694	SCBAR	337.152	337.082	-0.07
1695	SCBAR	339.094	338.996	-0.10
1696	SCBAR	346.285	346.148	-0.14
1697	SCBAR	354.578	354.493	-0.08
1698	SCBAR	355.338	355.213	-0.13
1699	SCBAR	355.718	355.611	-0.11
1700	SCBAR	355.192	355.114	-0.08
1701	SCBAR	350.859	350.815	-0.04
1702	SCBAR	336.462	336.408	-0.05
1703	SCBAR	319.89	319.87	-0.02
1704	SCBAR	317.742	317.741	0.00
1705	SCBAR	317.889	317.862	-0.03

POINT	DESC.	2017 ELEV.	2018 ELEV.	ELEVATION CHANGE
1706	SCBAR	325.819	325.789	-0.03
1707	SCBAR	330.427	330.398	-0.03
1708	SCBAR	332.554	332.515	-0.04
1709	SCBAR	332.746	332.687	-0.06
1710	SCBAR	332.56	332.515	-0.05
1711	SCBAR	321.187	321.149	-0.04
1712	SCBAR	317.058	317.031	-0.03
1713	SCBAR	313.99	313.963	-0.03
1714	SCBAR	316.227	316.196	-0.03
1715	SCBAR	312.969	312.94	-0.03
1716	SCBAR	312.321	312.294	-0.03
1717	SCBAR	309.057	309.032	-0.03
1718	SCBAR	308.12	308.098	-0.02
1719	SCBAR	303.812	303.794	-0.02
1720	SCBAR	290.167	290.125	-0.04
1721	SCBAR	285.75	285.69	-0.06
1722	SCBAR	273.755	273.737	-0.02
1723	SCBAR	269.432	269.43	0.00
1724	SCBAR	276.646	276.625	-0.02
1725	SCBAR	280.891	280.87	-0.02
1726	SCBAR	286.112	286.103	-0.01
1727	SCBAR	288.936	288.926	-0.01
1728	SCBAR	291.029	291.024	0.00
1729	SCBAR	293.809	293.809	0.00
1730	SCBAR	296.029	296.024	0.00
1731	SCBAR	299.085	299.082	0.00
1732	SCBAR	301.393	301.391	0.00
1733	SCBAR	303.075	303.066	-0.01
1734	SCBAR	305.356	305.348	-0.01
1735	SCBAR	310.552	310.552	0.00
1736	SCBAR	312.206	312.207	0.00
1737	SCBAR	314.176	314.174	0.00
1738	SCBAR	314.894	314.877	-0.02
1739	SCBAR	315.707	315.705	0.00



HORIZONTAL DATUM: PROJECT DATUM, BASED ON CONVERTING STATE PLANE COORDINATES, (WASHINGTON NORTH ZONE, NAD 83/2007 ADJUSTMENT) BY SCALING UP DRAWING AT BASE POINT 0,0 AND USING A MULTIPLICATION FACTOR OF 1.000054548 AND MOVING 100,000 METERS NORTH & 100,000 METERS EAST.

TO OBTAIN STATE PLANE GRID DISTANCES FROM PROJECT DATUM DISTANCES, SHOWN, MULTIPLY BY THE PROJECT COMBINED GRID FACTOR OF 0.999945455



VERTICAL DATUM: NAVD 88 BASED ON MULTI-SESSION GPS

CONTOUR MAPPING DATA: BASED ON COUNTY MAPPING FROM 12-12-13 THRU 3-07-14. (10' GRID TOPOGRAPHIC SHOTS)
CONTOUR INTERVAL = 1 FOOT

SNOHOMISH COUNTY DEPARTMENT OF PUBLIC WORKS PROJECT NO. RR 8019	SURVEY NO. 3659
	FIELD BOOK(S): 1812,1815,1816,1818,1820, 1907,1908,1944
	DWN BY: ALJ UPI# 09-0064-1D
CATHCART LANDFILL CATHCART WAY & SR 9 VERTICAL MOVEMENT STUDY OF MONITORING POINTS	REFERENCE SHEET NO. 7

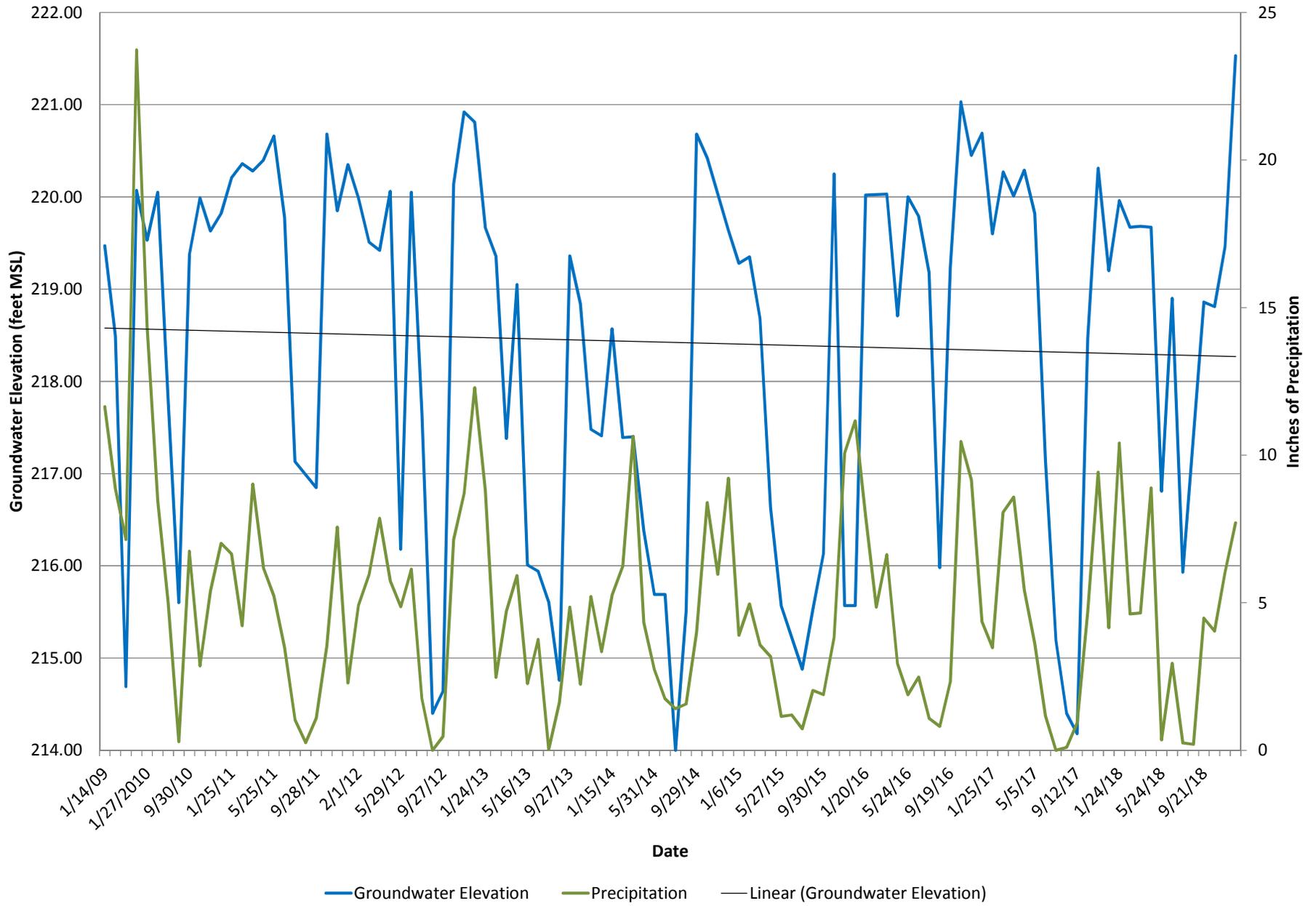


Appendix A

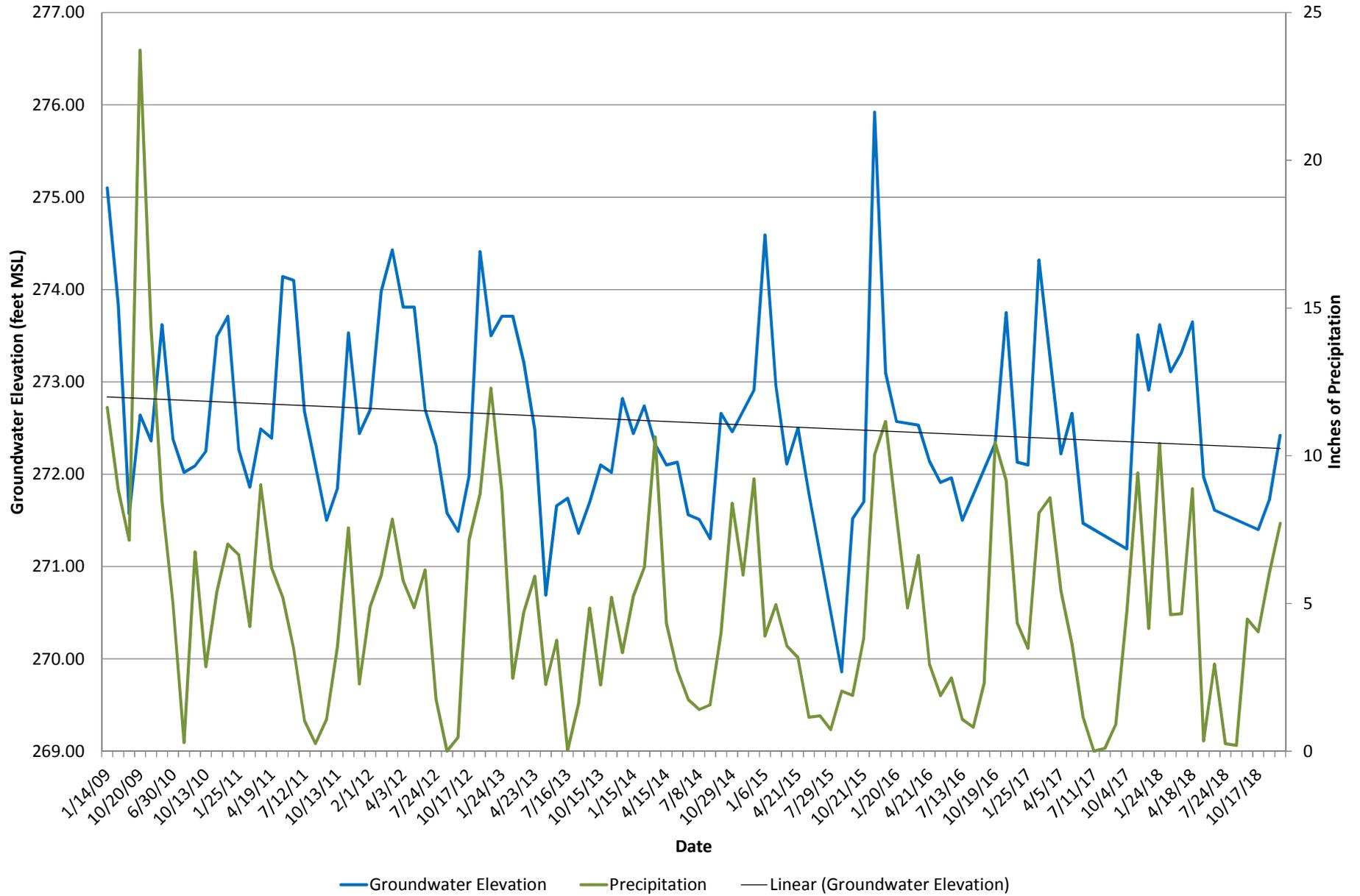
2018 Hydrographs

Shallow Wells

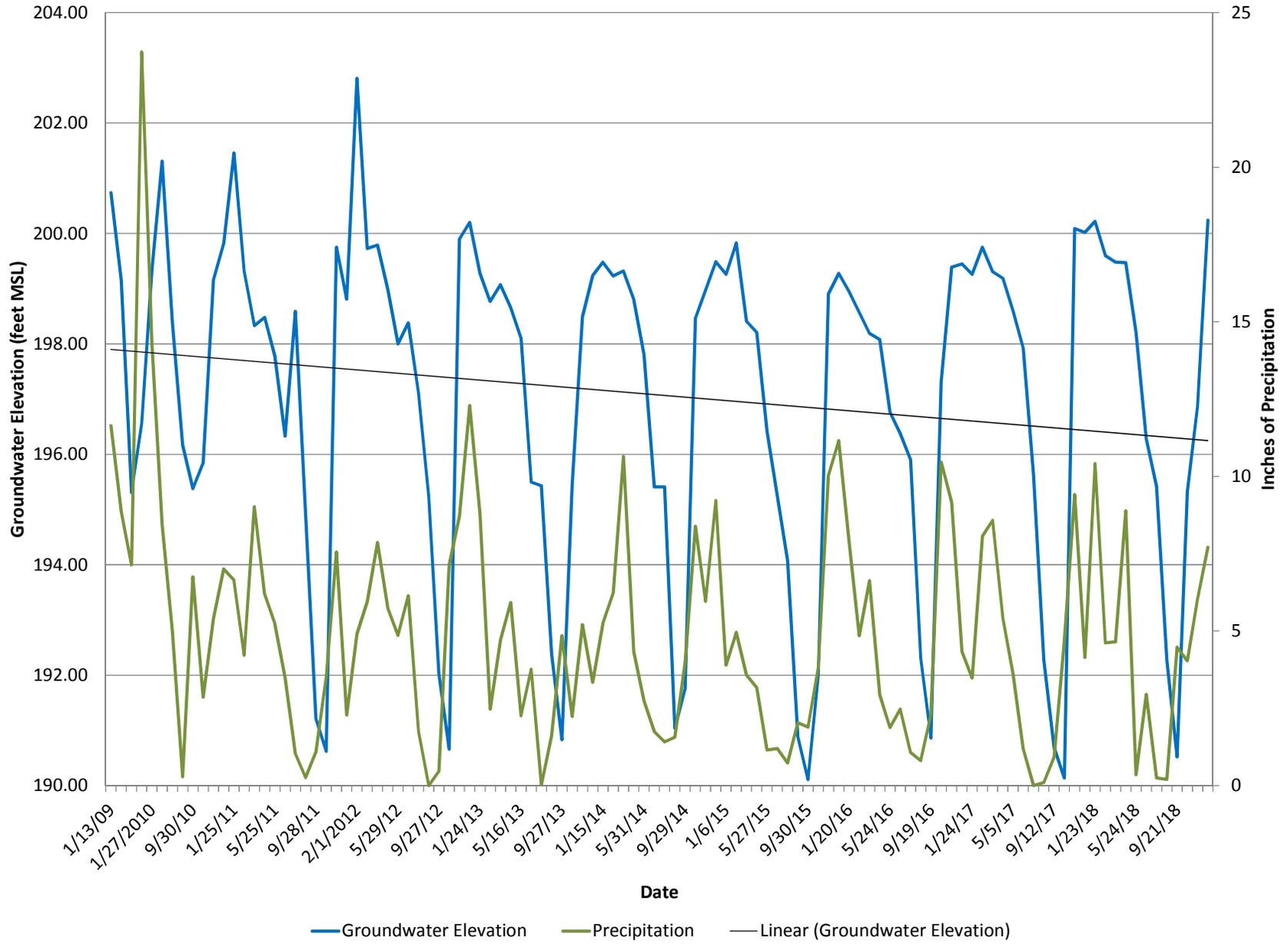
Hydrograph
Cathcart Landfill Shallow Aquifer
Well G-01A



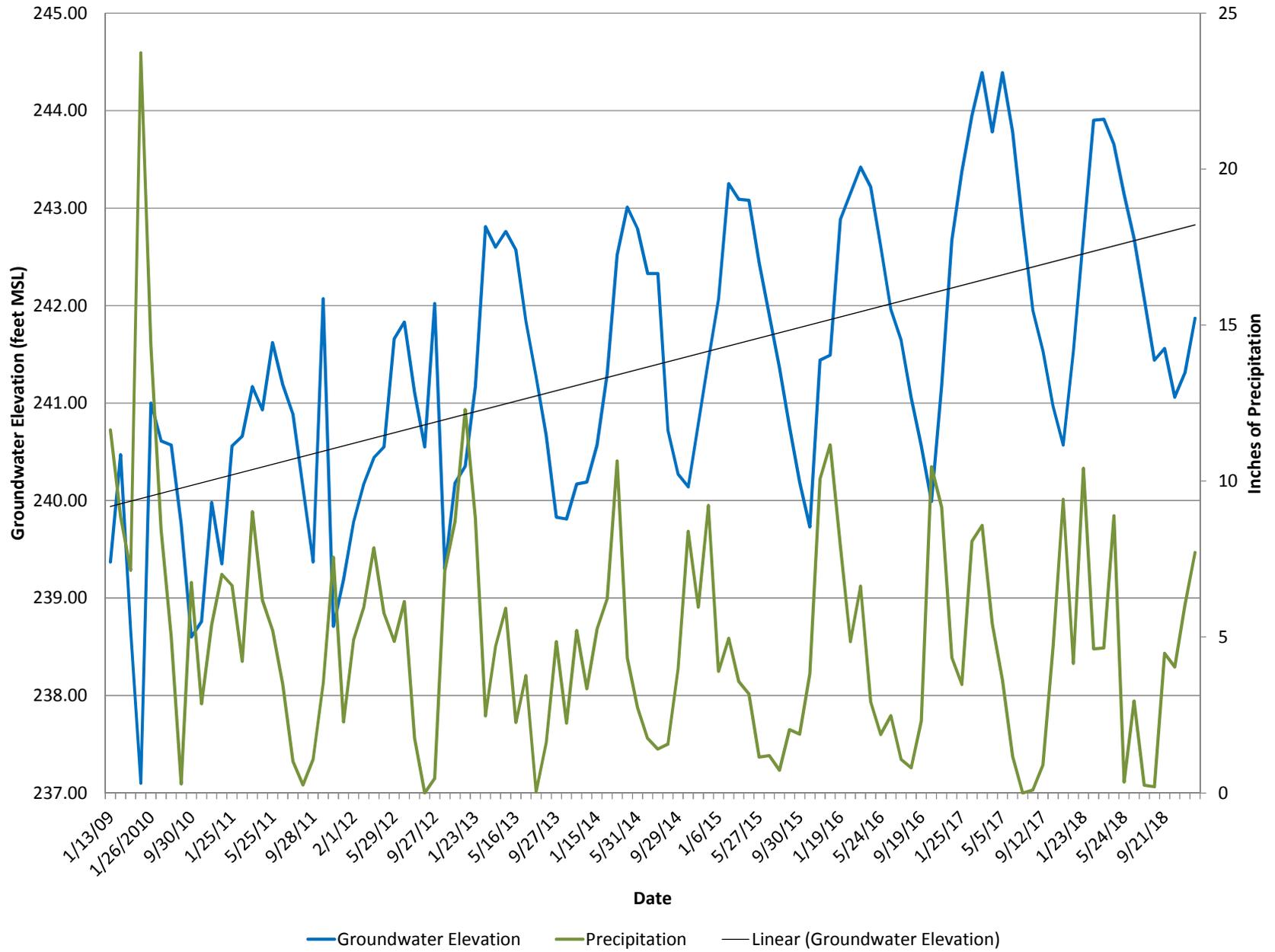
Hydrograph
Cathcart Landfill Shallow Aquifer
Well G-04A



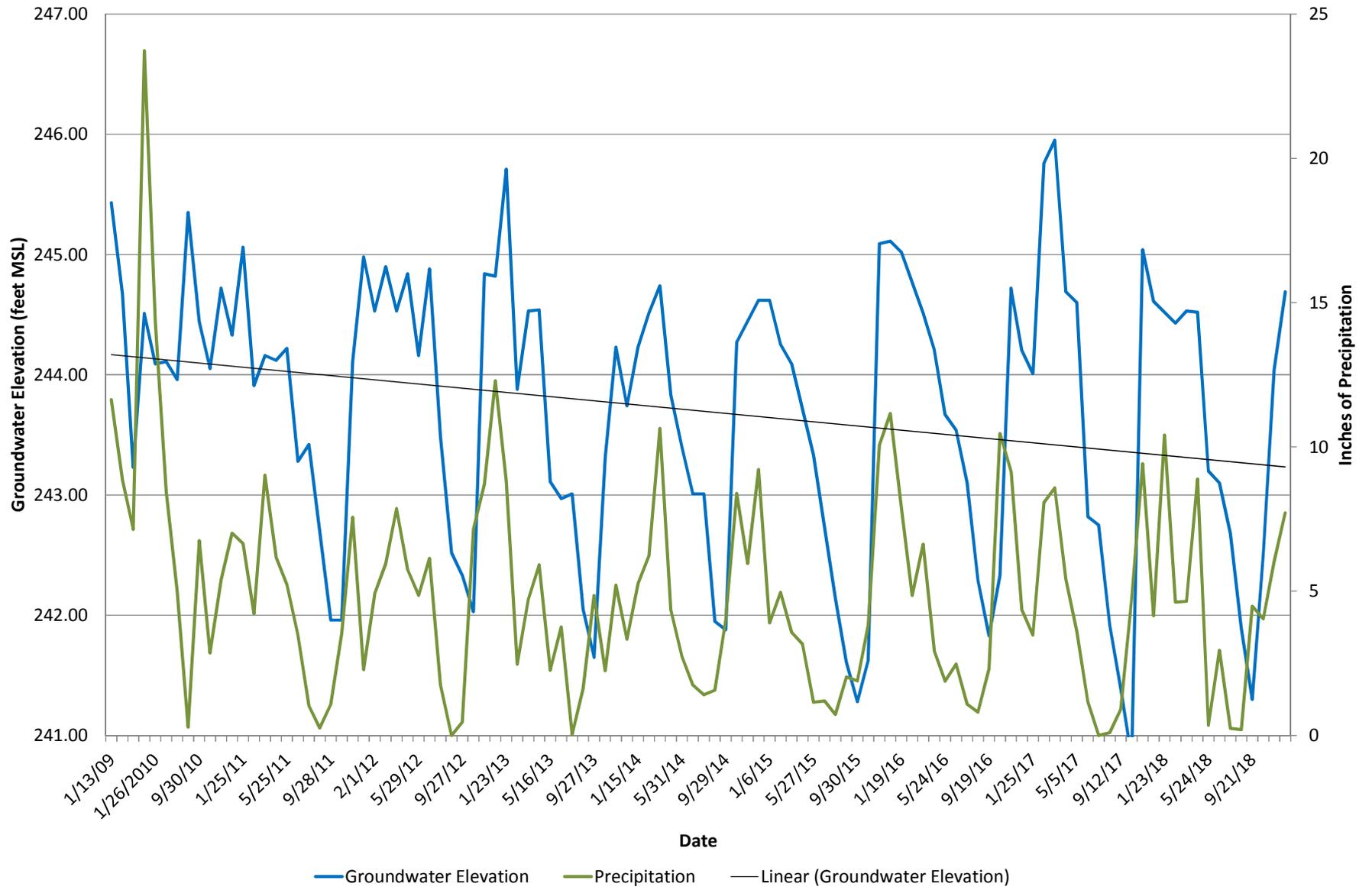
Hydrograph
Cathcart Landfill Shallow Aquifer
Well G-08D1



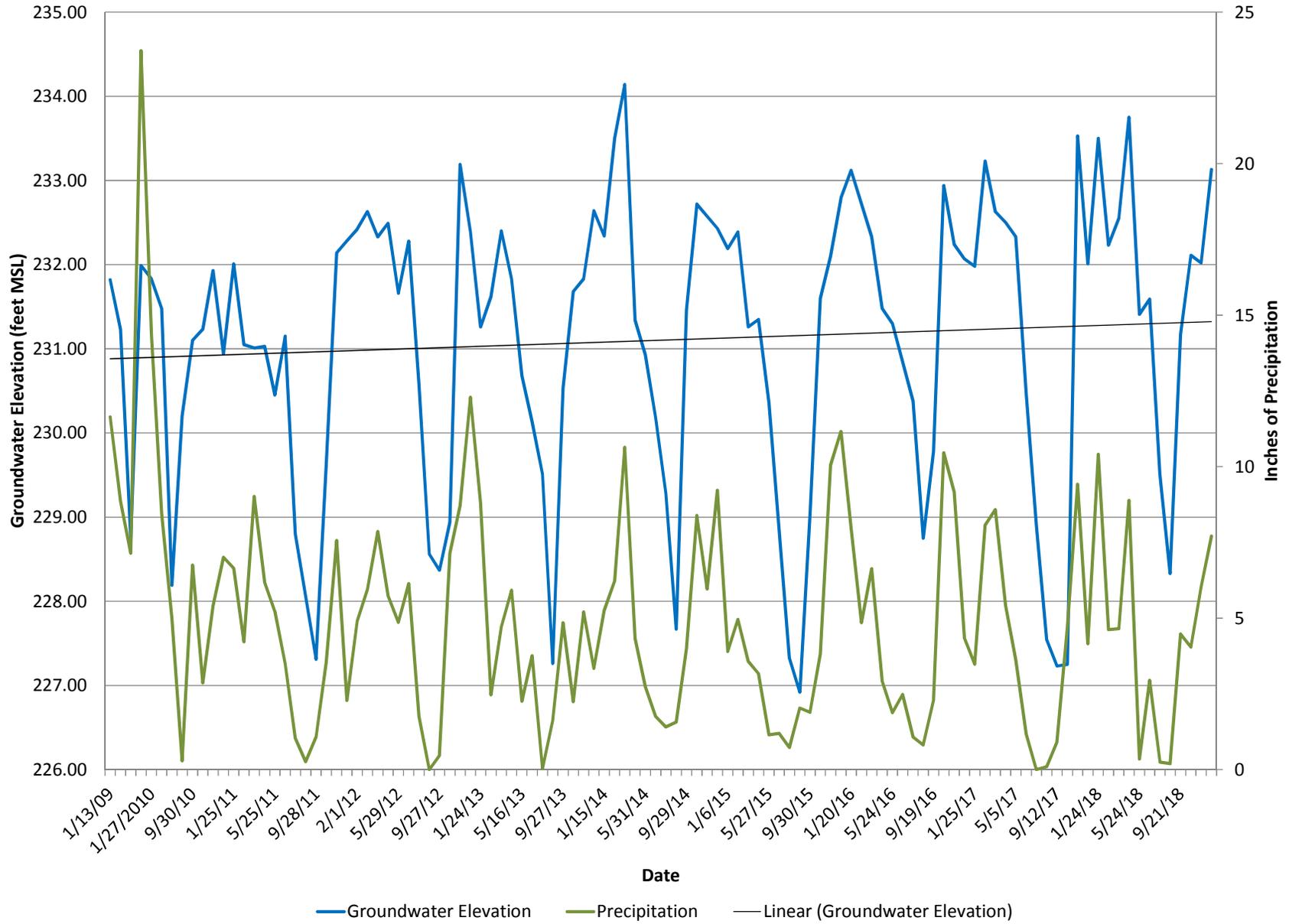
Hydrograph
Cathcart Landfill Shallow Aquifer
Well G-09S



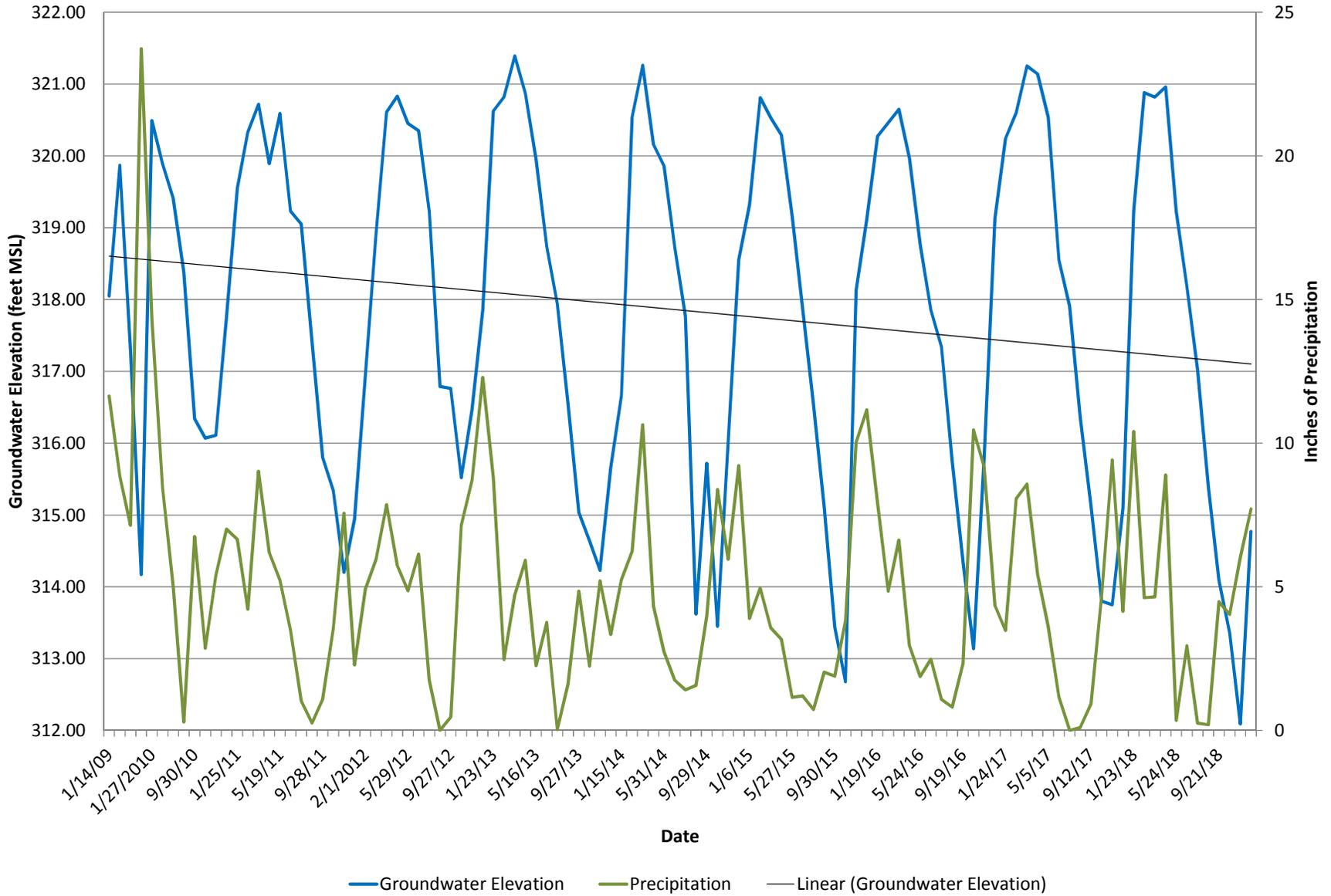
Hydrograph
Cathcart Landfill Shallow Aquifer
Well G-10S



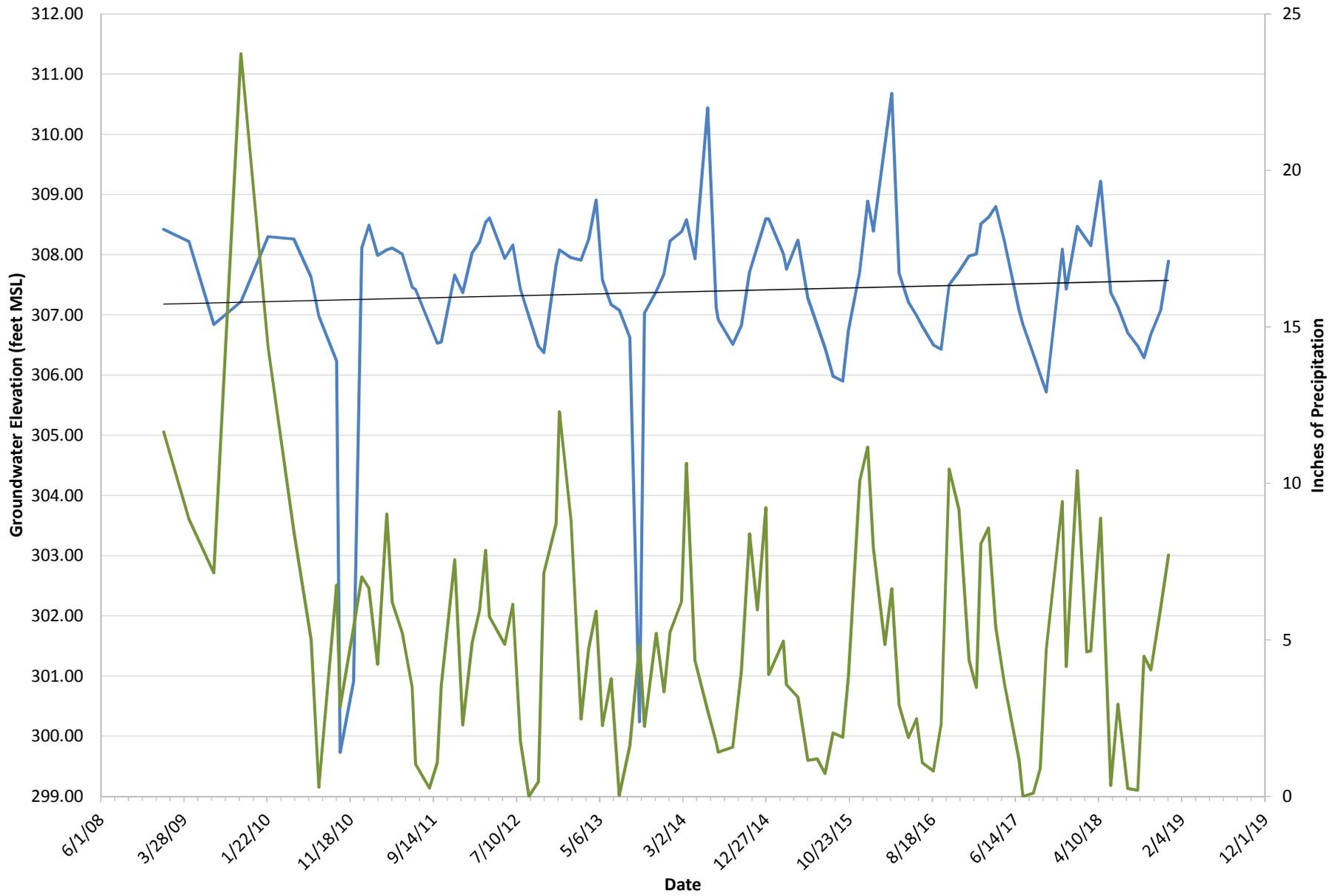
Hydrograph
Cathcart Landfill Shallow Aquifer
Well G-11S



Hydrograph
Cathcart Landfill Shallow Aquifer
Well G-14S



Hydrograph
Cathcart Landfill Shallow Aquifer
Well G-24S



— Groundwater Elevation — Precipitation — Linear (Groundwater Elevation)



Snohomish County Solid Waste

Environmental Services Section

8915 Cathcart Way

Snohomish, WA 98296

Tel: (360) 668-7652

GROUND WATER ELEVATIONS

Cathcart

Location	Aquifer	Date	MSL Water Elev (Ft)
G-01A	S	1/24/2018	219.96
G-04A	S	1/24/2018	273.62
G-08D1	S	1/23/2018	200.22
G-11S	S	1/24/2018	233.50
G-14S	S	1/23/2018	319.24
G-24S	S	1/23/2018	308.47

Site: **Cathcart Landfill - Shallow Aquifer**

Measurement Date: **1/23/2018**

Well ID	[X] matrix		GW Elev.	[D] matrix	Pt										
	X-axis	Y-axis		D											
G-01A	413.12	3968.37	219.96	1											
G-04A	213.73	2603.52	273.62	1		413.12	213.73	710.11	267.7	1256.3	778.2	0	0		
G-08D1	710.11	4157.06	200.22	1		3968.37	2603.52	4157.06	3807	2341.04	538.9	0	0		
G-11S	267.66	3807.05	233.50	1		219.96	273.62	200.22	233.5	319.24	308.5	0	0		
G-14S	1256.30	2341.04	319.24	1											
G-24S	778.15	538.89	308.47	1	{[P]t{[P]}										
7	0	0	0	1		2976053.848	9527214.029	995124.7							
8	0	0	0	1		9527214.029	60071925.11	4220116							
9	0	0	0	1		995124.6545	4220115.544	414928.5							
10	0	0	0	1											
11	0	0	0	1	{[P]t{[P]}'										
12	0	0	0	1		1.75785E-06	6.08731E-08	-4.8E-06							
13	0	0	0	1		6.08731E-08	6.04158E-08	-7.6E-07							
14	0	0	0	1		-4.83499E-06	-7.6046E-07	2.17E-05							
15	0	0	0	1											
16	0	0	0	1	{[P]t{[P]}'[P]t										
17	0	0	0	1		-9.57325E-05	-0.00078876	0.000533	-4E-04	0.000807375	-9E-05	0	0		
18	0	0	0	1		9.76285E-05	-3.7774E-05	0.000142	7E-05	-2.48596E-05	-2E-04	0	0		
19	0	0	0	1		-0.00023324	0.002935309	-0.00224	9E-04	-0.000914105	0.003	0	0		
20	0	0	0	1											

{[P]t{[P]}'[P]t [D] = [A] matrix

- A -6.1343E-05
- B 9.11905E-05
- C 0.002967304

Groundwater Gradient:	0.0370
Conductivity (ft/day):	0.001
Effective porosity:	10%
GW velocity:	0.00037 ft/day
	0.14 ft/year
Flow direction:	123.93 degrees from the positive x-axis

This spreadsheet is from the paper, "A Spreadsheet Method For Estimating Hydraulic Gradient With Heads From Multiple Wells" submitted to Ground Water, March, 2002. To use the program, enter the coordinates for the well locations in the columns labeled x and y (part of the [X] matrix), and the water levels in the z column. The matrices are automatically updated and the gradient magnitude and direction are calculated in cell H30 and H35.



Snohomish County Solid Waste

Environmental Services Section

8915 Cathcart Way

Snohomish, WA 98296

Tel: (360) 668-7652

GROUND WATER ELEVATIONS

Cathcart

Location	Aquifer	Date	MSL Water Elev (Ft)
G-01A	S	4/18/2018	219.67
G-04A	S	4/18/2018	273.65
G-08D1	S	4/17/2018	199.47
G-09S	S	4/17/2018	243.65
G-10S	S	4/17/2018	244.52
G-11S	S	4/18/2018	233.75
G-14S	S	4/17/2018	320.96
G-24S	S	4/17/2018	309.22

Site: **Cathcart Landfill - Shallow Aquifer**

Measurement Date: **4/17/2018**

Well ID	X-axis	Y-axis	GW Elev.	D										
G-01A	413.12	3968.37	219.67	1	Pt									
G-04A	213.73	2603.52	273.65	1			413.12	213.73	710.11	723.5	470.79	267.7	1256	778.2
G-08D1	710.11	4157.06	199.47	1			3968.37	2603.52	4157.06	3613	3595.13	3807	2341	538.9
G-09S	723.45	3612.73	243.65	1			219.67	273.65	199.47	243.7	244.52	233.8	321	309.2
G-10S	470.79	3595.13	244.52	1										
G-11S	267.66	3807.05	233.75	1	{{[P]t{[P]}}									
G-14S	1256.30	2341.04	320.96	1			3721076.974	13833394.8	1288676					
G-24S	778.15	538.89	309.22	1			13833394.8	86048702.88	5980630					
9	0	0	0	1		1288676.206	5980630.398	535354.3						
10	0	0	0	1										
11	0	0	0	1	{{[P]t{[P]}'									
12	0	0	0	1			1.65954E-06	4.8557E-08	-4.5E-06					
13	0	0	0	1			4.8557E-08	5.3404E-08	-7.1E-07					
14	0	0	0	1			-4.53721E-06	-7.1348E-07	2.08E-05					
15	0	0	0	1										
16	0	0	0	1	{{[P]t{[P]}'[P]t									
17	0	0	0	1			-0.000118407	-0.00076049	0.000475	3E-04	-0.000153574	-4E-04	7E-04	-9E-05
18	0	0	0	1			7.52568E-05	-4.5827E-05	0.000114	5E-05	4.03946E-05	5E-05	-4E-05	-2E-04
19	0	0	0	1			-0.000145371	0.002853727	-0.00205	-8E-04	0.000375156	9E-04	-7E-04	0.003
20	0	0	0	1										

{{[P]t{[P]}'[P]t [D] = [A] matrix

- A -6.1354E-05
- B 9.07145E-05
- C 0.002953979

Groundwater Gradient:	0.0371
Conductivity (ft/day):	0.001
Effective porosity:	10%
GW velocity:	0.00037 ft/day
	0.14 ft/year
Flow direction:	124.07 degrees from the positive x-axis

This spreadsheet is from the paper, "A Spreadsheet Method For Estimating Hydraulic Gradient With Heads From Multiple Wells" submitted to Ground Water, March, 2002. To use the program, enter the coordinates for the well locations in the columns labeled x and y (part of the [X] matrix), and the water levels in the z column. The matrices are automatically updated and the gradient magnitude and direction are calculated in cell H30 and H35.



Snohomish County Solid Waste

Environmental Services Section

8915 Cathcart Way

Snohomish, WA 98296

Tel: (360) 668-7652

GROUND WATER ELEVATIONS

Cathcart

Location	Aquifer	Date	MSL Water Elev (Ft)
G-08D1	S	8/29/2018	192.28
G-09S	S	8/30/2018	241.44
G-10S	S	8/30/2018	241.89
G-11S	S	8/29/2018	228.33
G-14S	S	8/29/2018	315.39
G-24S	S	8/29/2018	306.48

Site: **Cathcart Landfill - Shallow Aquifer**

Measurement Date: **8/29/2018**

Well ID	X-axis	Y-axis	GW Elev.	D	Pt									
G-08D1	710.11	4157.06	192.28	1										
G-09S	723.45	3612.73	241.44	1		710.11	723.45	470.79	267.7	1256.3	778.2	0	0	
G-10S	470.79	3595.13	241.89	1		4157.06	3612.73	3595.13	3807	2341.04	538.9	0	0	
G-11S	267.66	3807.05	228.33	1		192.28	241.44	241.89	228.3	315.39	306.5	0	0	
G-14S	1256.30	2341.04	315.39	1										
G-24S	778.15	538.89	306.48	1										
7	0	0	0	1	{[P]t{P}}	3504728.327	11637531.46	1120916						
8	0	0	0	1		11637531.46	63522426.03	4313966						
9	0	0	0	1		1120915.789	4313966.363	399311.1						
10	0	0	0	1										
11	0	0	0	1	{[P]t{P}'									
12	0	0	0	1		2.89862E-06	8.09299E-08	-9E-06						
13	0	0	0	1		8.09299E-08	6.13738E-08	-8.9E-07						
14	0	0	0	1		-9.01112E-06	-8.9023E-07	3.74E-05						
15	0	0	0	1										
16	0	0	0	1	{[P]t{P}'}[P]t									
17	0	0	0	1		0.000662113	0.000213741	-0.00052	-1E-03	0.000988982	-5E-04	0	0	
18	0	0	0	1		0.00014143	6.53378E-05	4.34E-05	5E-05	-3.542E-05	-2E-04	0	0	
19	0	0	0	1		-0.002905042	-0.00070123	0.001608	0.003	-0.001603698	0.004	0	0	
20	0	0	0	1										

{[P]t{P}'}[P]t [D] = [A] matrix

- A -9.5381E-05
- B 9.00149E-05
- C 0.003116374

Groundwater Gradient:	0.0421
Conductivity (ft/day):	0.001
Effective porosity:	10%
GW velocity:	0.00042 ft/day
	0.15 ft/year
Flow direction:	136.66 degrees from the positive x-axis

This spreadsheet is from the paper, "A Spreadsheet Method For Estimating Hydraulic Gradient With Heads From Multiple Wells" submitted to Ground Water, March, 2002. To use the program, enter the coordinates for the well locations in the columns labeled x and y (part of the [X] matrix), and the water levels in the z column. The matrices are automatically updated and the gradient magnitude and direction are calculated in cell H30 and H35.



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GROUND WATER ELEVATIONS

Cathcart

Location	Aquifer	Date	MSL Water Elev (Ft)
G-01A	S	10/17/2018	218.81
G-04A	S	10/17/2018	271.40
G-08D1	S	10/16/2018	195.33
G-09S	S	10/17/2018	241.06
G-10S	S	10/17/2018	242.51
G-11S	S	10/17/2018	232.11
G-14S	S	10/16/2018	313.36
G-24S	S	10/16/2018	306.68

Site: **Cathcart Landfill - Shallow Aquifer**

Measurement Date: **10/16/2018**

Well ID	[X] matrix		GW Elev.	[D] matrix	Pt										
	X-axis	Y-axis		D											
G-01A	413.12	3968.37	218.81	1											
G-04A	213.73	2603.52	271.40	1		413.12	213.73	710.11	723.5	470.79	267.7	1256	778.2		
G-08D1	710.11	4157.06	195.33	1		3968.37	2603.52	4157.06	3613	3595.13	3807	2341	538.9		
G-09S	723.45	3612.73	241.06	1		218.81	271.4	195.33	241.1	242.51	232.1	313.4	306.7		
G-10S	470.79	3595.13	242.51	1											
G-11S	267.66	3807.05	232.11	1	{[P]{t[P]}}										
G-14S	1256.3	2341.04	313.36	1		3721076.974	13833394.8	1270117							
G-24S	778.15	538.89	306.68	1		13833394.8	86048702.88	5912162							
9	0	0	0	1		1270116.808	5912162.023	522732.8							
10	0	0	0	1											
11	0	0	0	1	{[P]{t[P]}'										
12	0	0	0	1		1.61225E-06	4.46954E-08	-4.4E-06							
13	0	0	0	1		4.46954E-08	5.33725E-08	-7.1E-07							
14	0	0	0	1		-4.42289E-06	-7.1225E-07	2.07E-05							
15	0	0	0	1											
16	0	0	0	1	{[P]{t[P]}'[P]t										
17	0	0	0	1		-0.000124353	-0.00073942	0.000467	3E-04	-0.000152879	-4E-04	7E-04	-8E-05		
18	0	0	0	1		7.44195E-05	-4.4795E-05	0.000114	5E-05	4.01961E-05	5E-05	-4E-05	-2E-04		
19	0	0	0	1		-0.000120956	0.002822447	-0.00206	-8E-04	0.000380766	9E-04	-7E-04	0.003		
20	0	0	0	1											

{[P]{t[P]}'[P]t [D] = [A] matrix

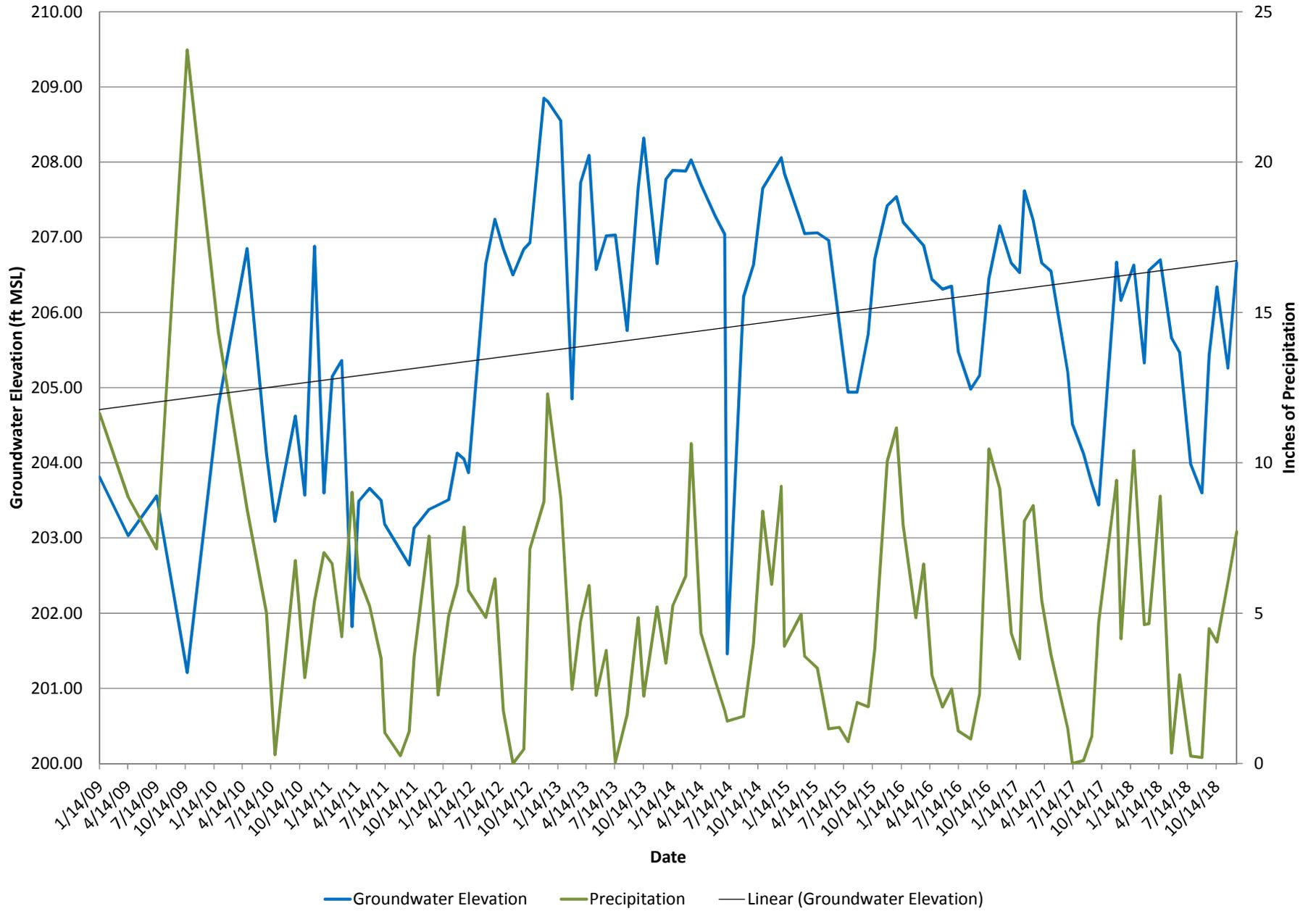
- A -4.6747E-05
- B 9.06221E-05
- C 0.002955356

Groundwater Gradient:	0.0345	
Conductivity (ft/day):	0.001	
Effective porosity:	10%	
GW velocity:	0.00035	ft/day
	0.13	ft/year
Flow direction:	117.29	degrees from the positive x-axis

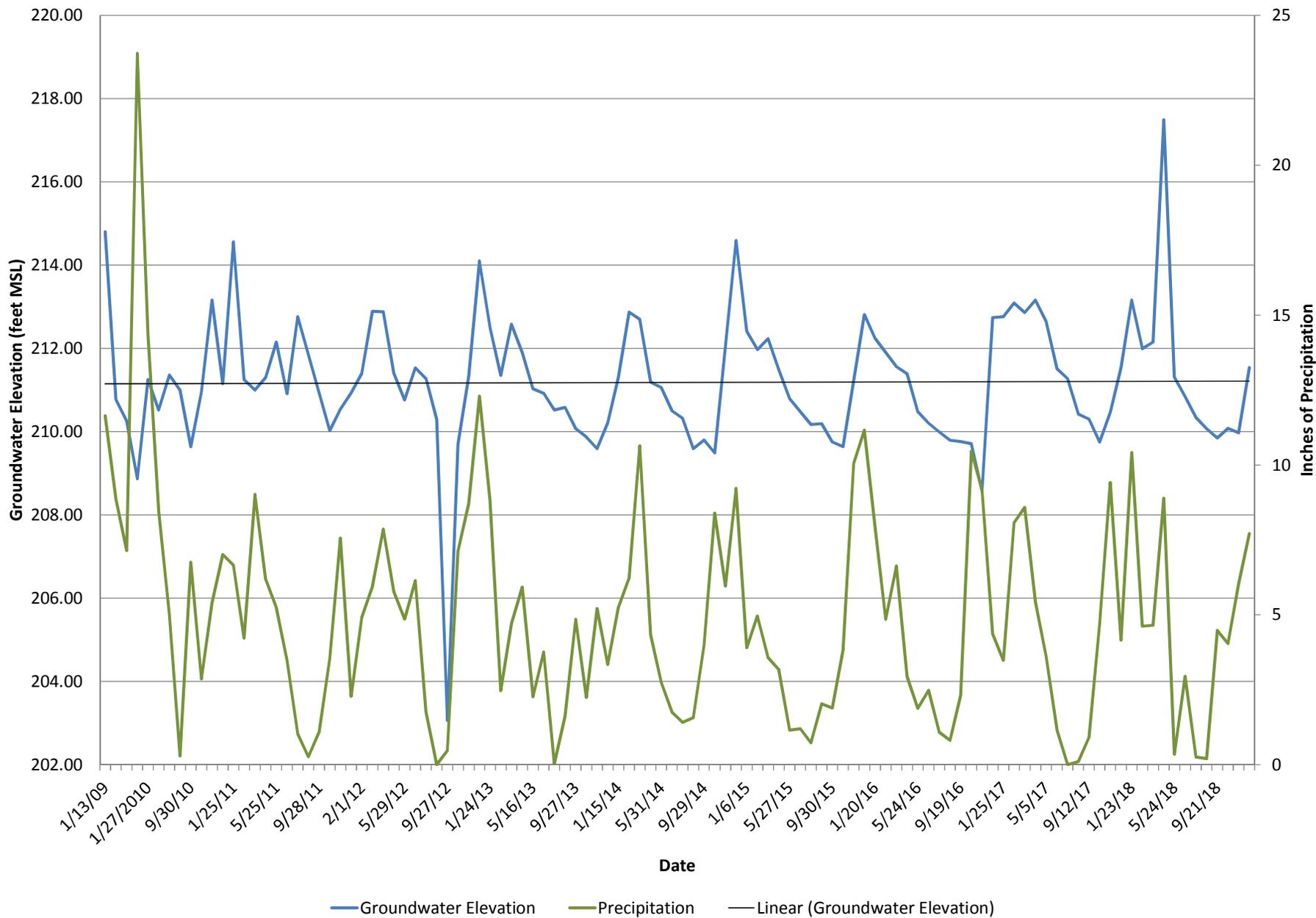
This spreadsheet is from the paper, "A Spreadsheet Method For Estimating Hydraulic Gradient With Heads From Multiple Wells" submitted to Ground Water, March, 2002. To use the program, enter the coordinates for the well locations in the columns labeled x and y (part of the [X] matrix), and the water levels in the z column. The matrices are automatically updated and the gradient magnitude and direction are calculated in cell H30 and H35.

Deep Wells

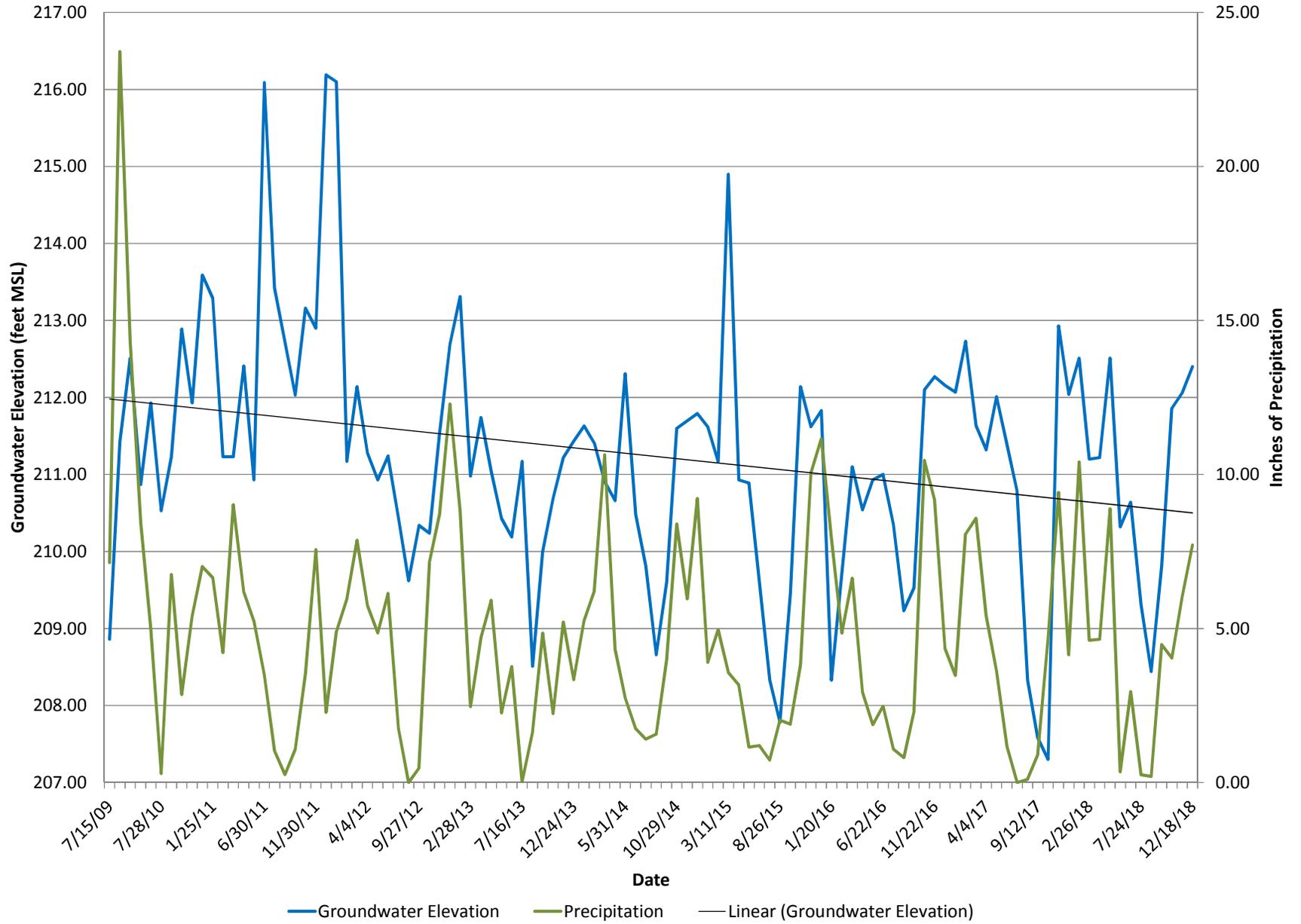
Hydrograph
Cathcart Landfill Deep Aquifer
Well G-01D



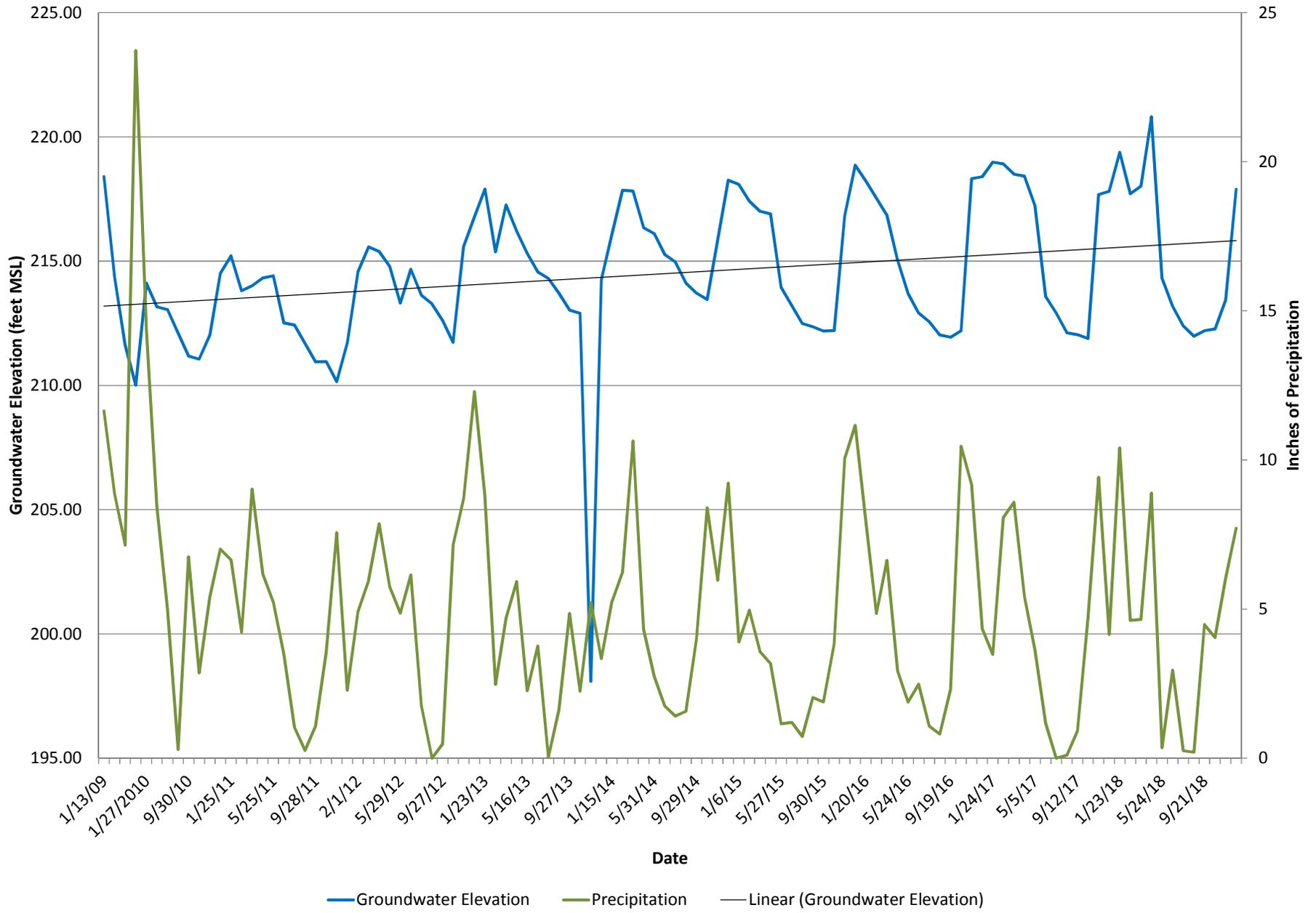
Hydrograph
Cathcart Landfill Deep Aquifer
Well G-02D



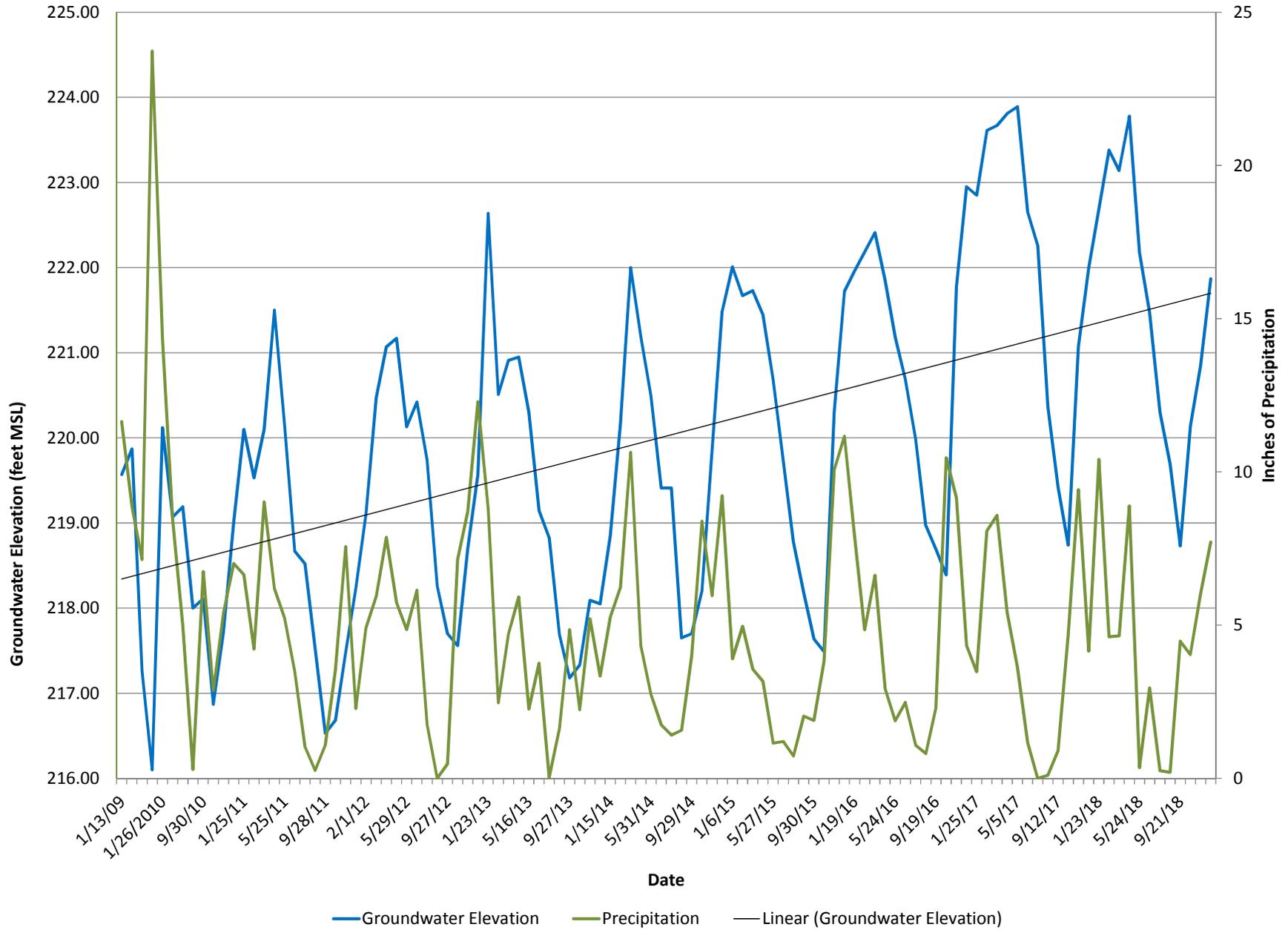
Hydrograph
Cathcart Landfill Deep Aquifer
Well G-06B



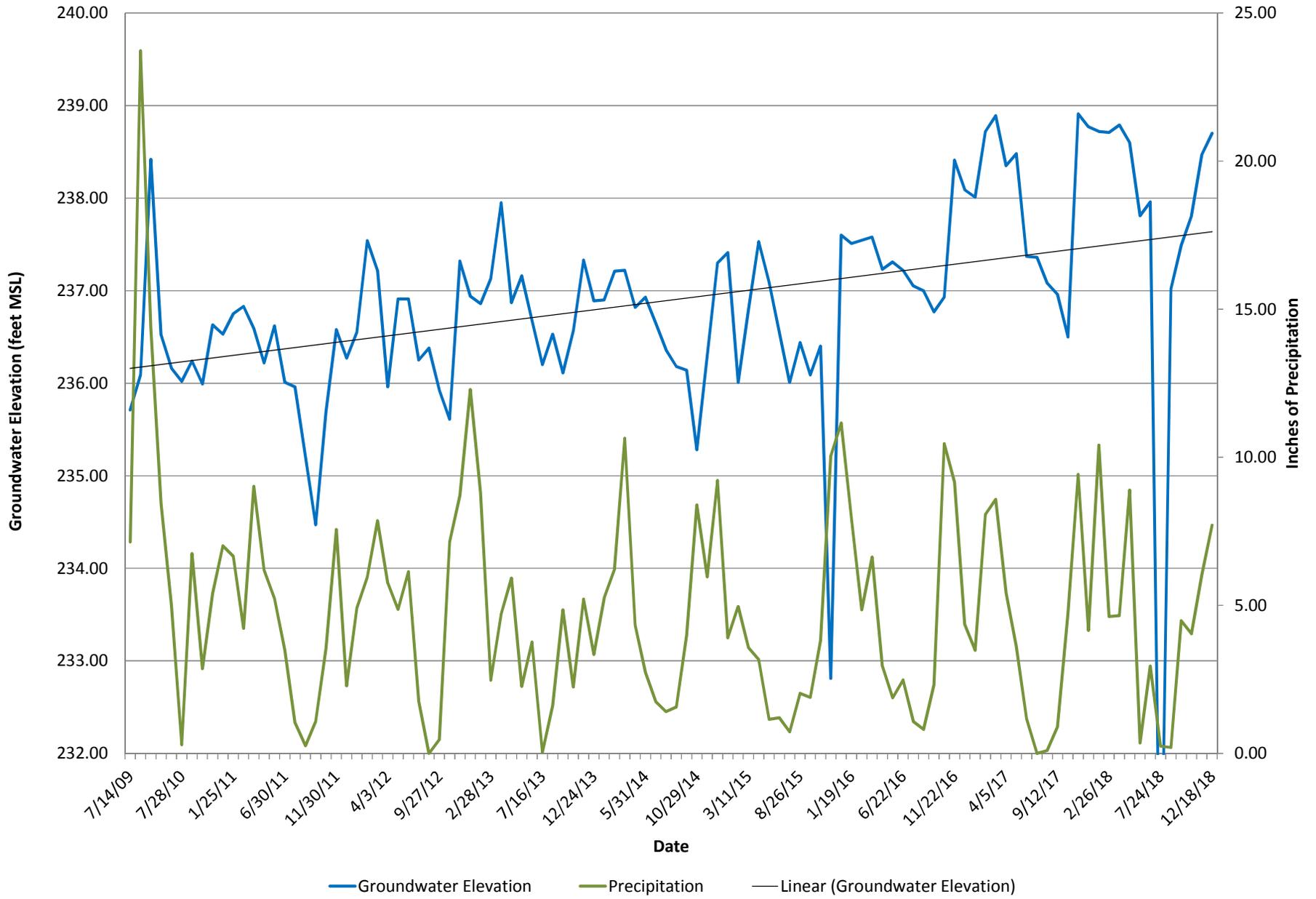
Hydrograph
Cathcart Landfill Deep Aquifer
Well G-08D2



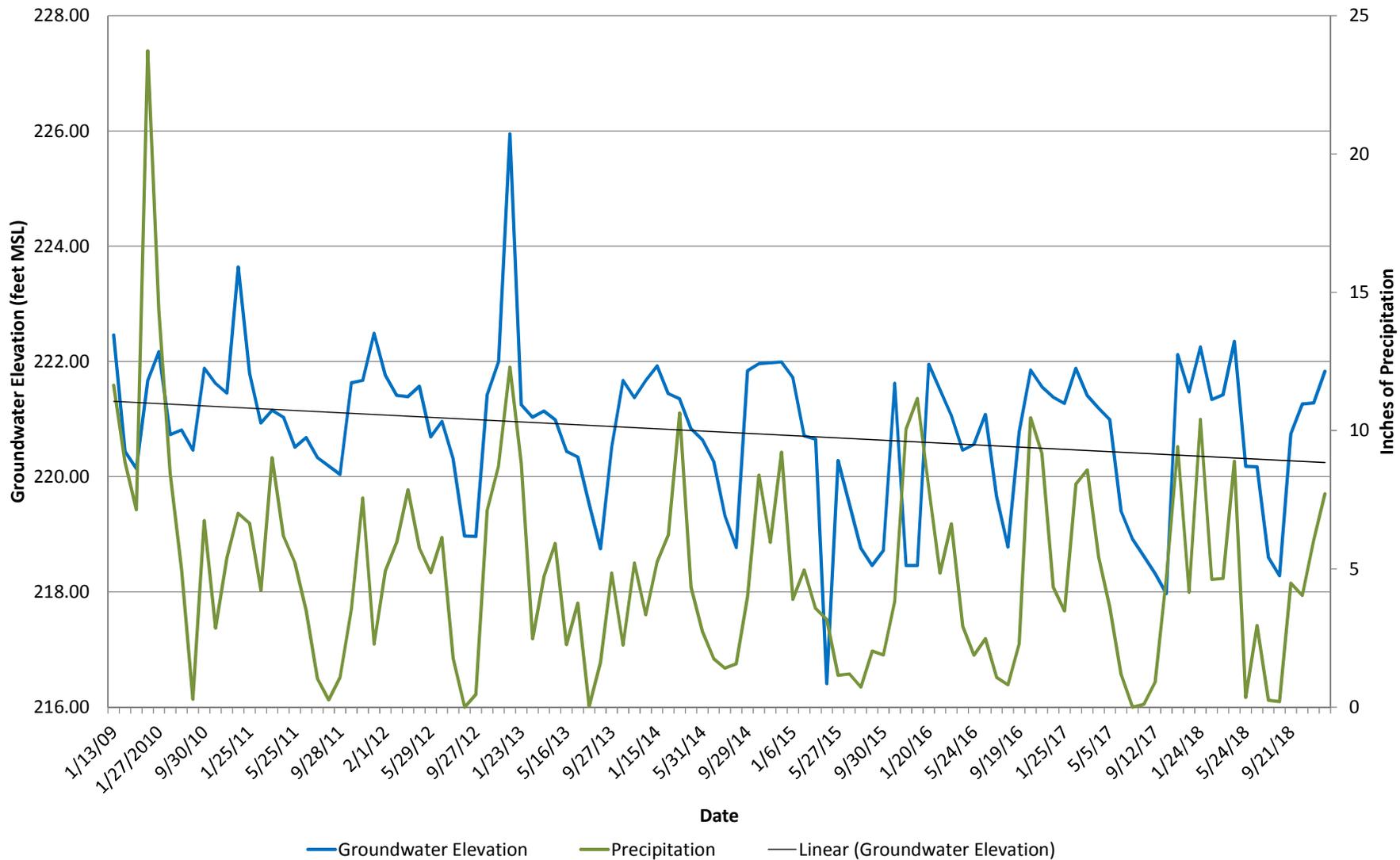
Hydrograph
Cathcart Landfill Deep Aquifer
Well G-09D



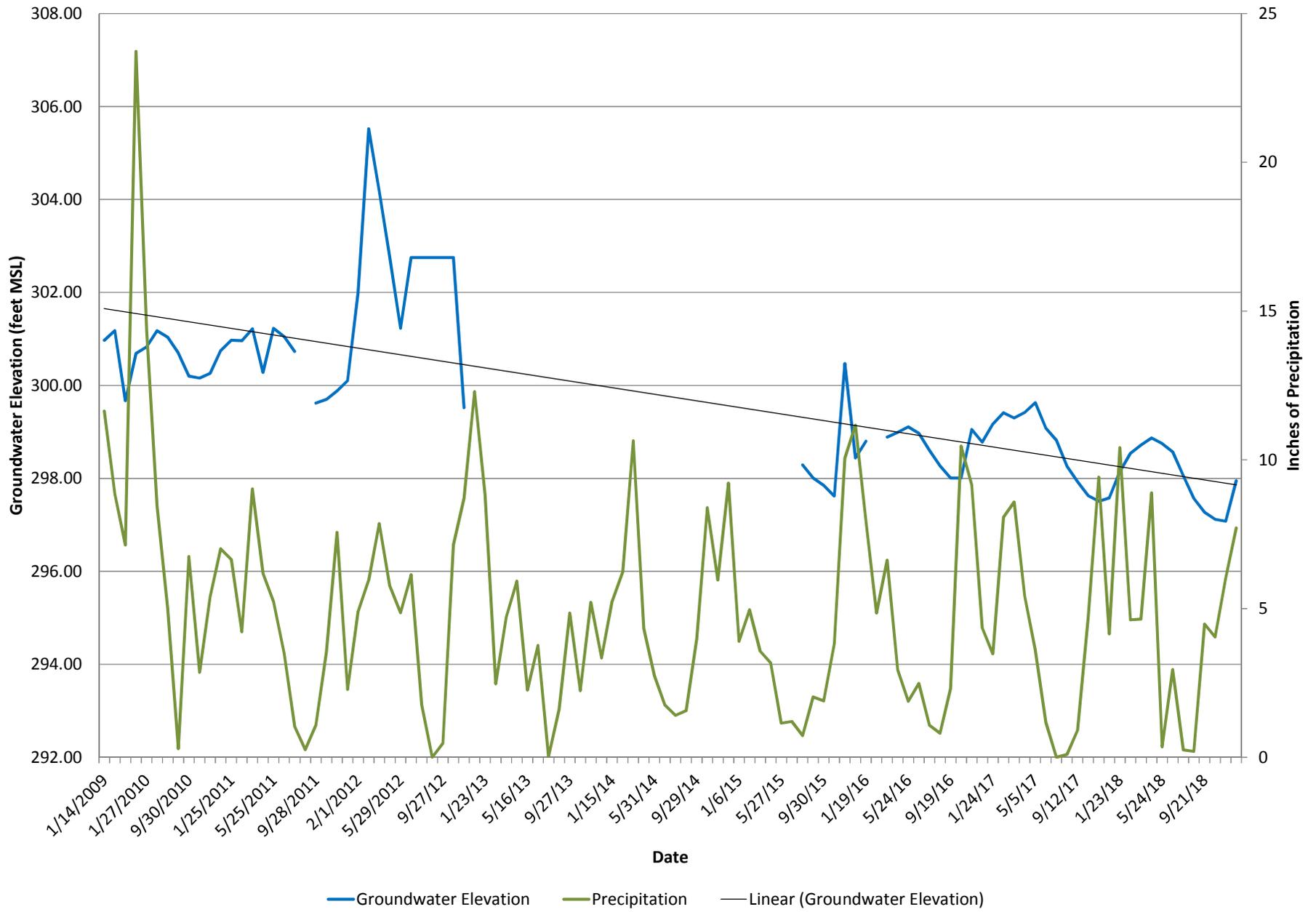
Hydrograph
Cathcart Landfill Deep Aquifer
Well G-10D



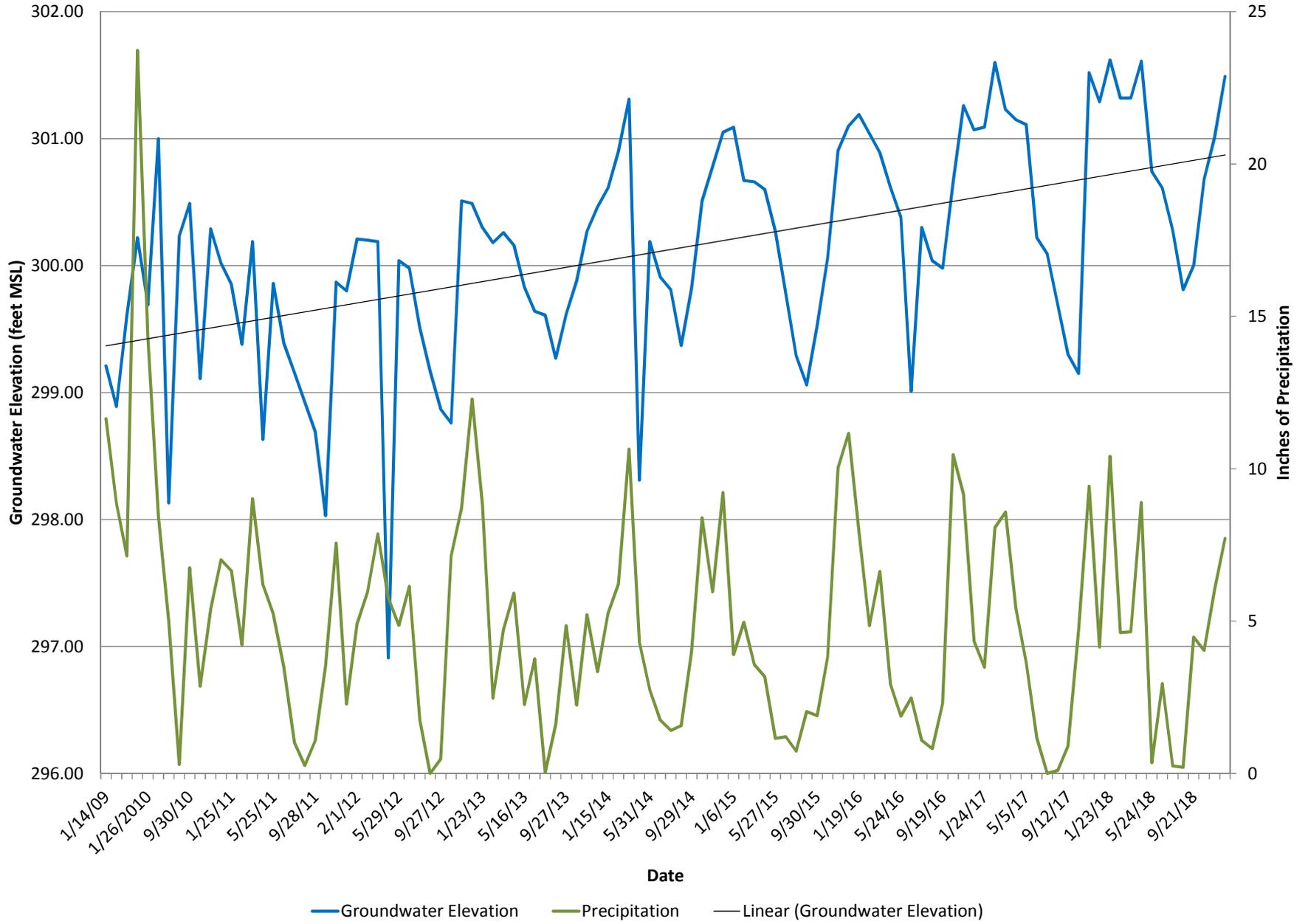
Hydrograph
Cathcart Landfill Deep Aquifer
Well G-13D



Hydrograph
Cathcart Landfill Deep Aquifer
Well G-14D



Hydrograph
Cathcart Landfill Deep Aquifer
Well G-24D





Snohomish County Solid Waste

Environmental Services Section

8915 Cathcart Way

Snohomish, WA 98296

Tel: (360) 668-7652

GROUND WATER ELEVATIONS

Cathcart

Location	Aquifer	Date	MSL Water Elev (Ft)
G-01D	D	1/24/2018	206.63
G-02D	D	1/23/2018	213.16
G-06B	D	1/23/2018	212.51
G-08D2	D	1/23/2018	219.38
G-10D	D	1/30/2018	238.72
G-13D	D	1/24/2018	222.25
G-14D	D	1/23/2018	298.14
G-24D	D	1/23/2018	301.62

Site: **Cathcart Landfill - Deep Aquifer**

Measurement Date: **1/23/2018**

Well ID	[X] matrix			[D] matrix	Pt															
	X-axis	Y-axis	GW Elev.	D																
G-01D	431.12	3977.30	206.63	1																
G-02D	733.79	3884.79	213.16	1		431.12	733.79	488.43	728.1	495.97	220.3	1266	781	0						
G-06B	488.43	3765.90	212.51	1		3977.3	3884.79	3765.9	4156	3593.41	3939	2338	528.9	0						
G-08D2	728.12	4156.36	219.38	1		206.63	213.16	212.51	219.4	238.72	222.3	298.1	301.6	0						
G-10D	495.97	3593.41	238.72	1																
G-13D	220.31	3939.18	222.25	1	{[P]{[P]}															
G-14D	1266.00	2337.53	298.14	1		4000258.935	15453424.86	1289398												
G-24D	780.99	528.85	301.62	1		15453424.86	96541303.22	5951750												
9	0	0	0	1		1289397.527	5951749.523	467665.6												
10	0	0	0	1																
11	0	0	0	1	{[P]{[P]}'															
12	0	0	0	1		2.49182E-06	1.1456E-07	-8.33E-06												
13	0	0	0	1		1.1456E-07	5.33523E-08	-9.95E-07												
14	0	0	0	1		-8.32811E-06	-9.94841E-07	3.78E-05												
15	0	0	0	1																
16	0	0	0	1	{[P]{[P]}'[P]t															
17	0	0	0	1		-0.000190927	0.00049829	-0.000121	5E-04	-0.000340561	-9E-04	9E-04	-5E-04	0						
18	0	0	0	1		5.60232E-05	7.92651E-05	4.55E-05	9E-05	1.10466E-05	1E-05	-3E-05	-2E-04	0						
19	0	0	0	1		0.000255258	-0.001926804	0.00021	-0.002	0.001308824	0.003	-0.002	0.004	0						
20	0	0	0	1																

{[P]{[P]}'[P]t [D] = [A] matrix

- A -0.000107492
- B 8.37767E-05
- C 0.003319448

Groundwater Gradient:	0.0411
Conductivity (ft/day):	0.029
Effective porosity:	10%
GW velocity:	0.012 ft/day
	4.35 ft/year
Flow direction:	142.07 degrees from the positive x-axis

This spreadsheet is from the paper, "A Spreadsheet Method For Estimating Hydraulic Gradient With Heads From Multiple Wells" submitted to Ground Water, March, 2002. To use the program, enter the coordinates for the well locations in the columns labeled x and y (part of the [X] matrix), and the water levels in the z column. The matrices are automatically updated and the gradient magnitude and direction are calculated in cell H30 and H35.



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GROUND WATER ELEVATIONS

Cathcart

Location	Aquifer	Date	MSL Water Elev (Ft)
G-01D	D	4/18/2018	206.70
G-02D	D	4/18/2018	217.49
G-06B	D	4/18/2018	212.51
G-08D2	D	4/17/2018	221.54
G-09D	D	4/17/2018	223.78
G-10D	D	4/17/2018	238.60
G-13D	D	4/18/2018	222.35
G-14D	D	4/17/2018	298.87
G-24D	D	4/17/2018	301.61

Site: **Cathcart Landfill - Deep Aquifer**

Measurement Date: **4/17/2018**

Well ID	[X] matrix			[D] matrix	Pt															
	X-axis	Y-axis	GW Elev.	D																
G-01D	431.12	3977.30	206.70	1																
G-02D	733.79	3884.79	217.49	1		431.12	733.79	488.43	728.1		739.2	496	220.3	1266	781					
G-06B	488.43	3765.90	212.51	1		3977.3	3884.79	3765.9	4156		3614.85	3593	3939	2338	528.9					
G-08D2	728.12	4156.36	221.54	1		206.7	217.49	212.51	221.5		223.78	238.6	222.4	298.9	301.6					
G-09D	739.2	3614.85	223.78	1																
G-10D	495.97	3593.41	238.60	1	{[P]{[P]}															
G-13D	220.31	3939.18	222.35	1		4546675.575	18125521.98	1460475												
G-14D	1266.00	2337.53	298.87	1		18125521.98	109608443.7	6788422												
G-24D	780.99	528.85	301.61	1		1460474.816	6788421.762	521006.1												
10	0	0	0	1																
11	0	0	0	1	{[P]{[P]}'															
12	0	0	0	1		2.41484E-06	1.03133E-07	-8.11E-06												
13	0	0	0	1		1.03133E-07	5.16657E-08	-9.62E-07												
14	0	0	0	1		-8.113E-06	-9.62275E-07	3.72E-05												
15	0	0	0	1																
16	0	0	0	1	{[P]{[P]}'[P]t															
17	0	0	0	1		-0.000225681	0.000408139	-0.000156	4E-04	0.000342333	-4E-04	-9E-04	9E-04	-5E-04						
18	0	0	0	1		5.10502E-05	6.71029E-05	4.04E-05	8E-05	4.76615E-05	7E-06	1E-05	-4E-05	-2E-04						
19	0	0	0	1		0.000364202	-0.001600958	0.000319	-0.002	-0.001151108	0.001	0.003	-0.001	0.004						
20	0	0	0	1																

{[P]{[P]}'[P]t [D] = [A] matrix

- A -0.00010789
- B 8.378E-05
- C 0.003324887

Groundwater Gradient:	0.0411
Conductivity (ft/day):	0.029
Effective porosity:	10%
GW velocity:	0.012 ft/day
	4.35 ft/year
Flow direction:	142.17 degrees from the positive x-axis

This spreadsheet is from the paper, "A Spreadsheet Method For Estimating Hydraulic Gradient With Heads From Multiple Wells" submitted to Ground Water, March, 2002. To use the program, enter the coordinates for the well locations in the columns labeled x and y (part of the [X] matrix), and the water levels in the z column. The matrices are automatically updated and the gradient magnitude and direction are calculated in cell H30 and H35.



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GROUND WATER ELEVATIONS

Cathcart

Location	Aquifer	Date	MSL Water Elev (Ft)
G-01D	D	8/29/2018	203.60
G-02D	D	8/29/2018	210.07
G-06B	D	8/29/2018	208.44
G-08D2	D	8/29/2018	211.98
G-09D	D	8/30/2018	219.69
G-10D	D	8/30/2018	237.02
G-13D	D	8/30/2018	218.28
G-14D	D	8/29/2018	297.57
G-24D	D	8/29/2018	299.81

Site: **Cathcart Landfill - Deep Aquifer**

Measurement Date: **8/29/2018**

Well ID	[X] matrix			[D] matrix	Pt															
	X-axis	Y-axis	GW Elev.	D																
G-01D	431.12	3977.30	203.60	1																
G-02D	733.79	3884.79	210.07	1		431.12	733.79	488.43	728.1		739.2	496	220.3	1266	781					
G-06B	488.43	3765.90	208.44	1		3977.3	3884.79	3765.9	4156		3614.85	3593	3939	2338	528.9					
G-08D2	728.12	4156.36	211.98	1		203.6	210.07	208.44	212		219.69	237	218.3	297.6	299.8					
G-09D	739.2	3614.85	219.69	1																
G-10D	495.97	3593.41	237.02	1	{{[P]t{[P]}}															
G-13D	220.31	3939.18	218.28	1		4546675.575	18125521.98	1436990												
G-14D	1266.00	2337.53	297.57	1		18125521.98	109608443.7	6651719												
G-24D	780.99	528.85	299.81	1		1436989.68	6651719.47	504487.4												
10	0	0	0	1																
11	0	0	0	1	{{[P]t{[P]}'															
12	0	0	0	1		2.36555E-06	8.8698E-08	-7.91E-06												
13	0	0	0	1		8.8698E-08	4.89779E-08	-8.98E-07												
14	0	0	0	1		-7.90755E-06	-8.98427E-07	3.64E-05												
15	0	0	0	1																
16	0	0	0	1	{{[P]t{[P]}'[P]t															
17	0	0	0	1		-0.000237365	0.000419248	-0.000159	4E-04	0.000332032	-4E-04	-9E-04	8E-04	-5E-04						
18	0	0	0	1		5.01194E-05	6.66218E-05	4.05E-05	8E-05	4.52377E-05	7E-06	2E-05	-4E-05	-2E-04						
19	0	0	0	1		0.000418862	-0.001656206	0.000332	-0.002	-0.001106758	0.001	0.003	-0.001	0.004						
20	0	0	0	1																

{{[P]t{[P]}'[P]t [D] = [A] matrix

- A -9.51931E-05
- B 8.88429E-05
- C 0.003275193

Groundwater Gradient:	0.0398
Conductivity (ft/day):	0.029
Effective porosity:	10%
GW velocity:	0.012 ft/day
	4.21 ft/year
Flow direction:	136.98 degrees from the positive x-axis

This spreadsheet is from the paper, "A Spreadsheet Method For Estimating Hydraulic Gradient With Heads From Multiple Wells" submitted to Ground Water, March, 2002. To use the program, enter the coordinates for the well locations in the columns labeled x and y (part of the [X] matrix), and the water levels in the z column. The matrices are automatically updated and the gradient magnitude and direction are calculated in cell H30 and H35.



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GROUND WATER ELEVATIONS

Cathcart

Location	Aquifer	Date	MSL Water Elev (Ft)
G-01D	D	10/16/2018	206.34
G-02D	D	10/16/2018	210.08
G-06B	D	10/16/2018	211.86
G-08D2	D	10/16/2018	212.27
G-09D	D	10/17/2018	220.14
G-10D	D	10/17/2018	237.81
G-13D	D	10/17/2018	221.26
G-14D	D	10/16/2018	297.12
G-24D	D	10/16/2018	300.68

Site: **Cathcart Landfill - Deep Aquifer**

Measurement Date: **10/16/2018**

Well ID	[X] matrix		GW Elev.	[D] matrix	Pt															
	X-axis	Y-axis		D																
G-01D	431.12	3977.30	206.34	1																
G-02D	733.79	3884.79	210.08	1		431.12	733.79	488.43	728.1	739.2	496	220.3	1266	781						
G-06B	488.43	3765.90	211.86	1		3977.3	3884.79	3765.9	4156	3614.85	3593	3939	2338	528.9						
G-08D2	728.12	4156.36	212.27	1		206.34	210.08	211.86	212.3	220.14	237.8	221.3	297.1	300.7						
G-09D	739.2	3614.85	220.14	1																
G-10D	495.97	3593.41	237.81	1	{[P]t{[P]}															
G-13D	220.31	3939.18	221.26	1		4546675.575	18125521.98	1441551												
G-14D	1266.00	2337.53	297.12	1		18125521.98	109608443.7	6692353												
G-24D	780.99	528.85	300.68	1		1441550.614	6692353.286	509313												
10	0	0	0	1																
11	0	0	0	1	{[P]t{[P]}															
12	0	0	0	1		2.29473E-06	8.64475E-08	-7.63E-06												
13	0	0	0	1		8.64475E-08	4.94009E-08	-8.94E-07												
14	0	0	0	1		-7.63089E-06	-8.93805E-07	3.53E-05												
15	0	0	0	1																
16	0	0	0	1	{[P]t{[P]}{[P]t															
17	0	0	0	1		-0.000241425	0.000416585	-0.00017	4E-04	0.000328898	-4E-04	-8E-04	8E-04	-5E-04						
18	0	0	0	1		4.93236E-05	6.75758E-05	3.89E-05	8E-05	4.57165E-05	8E-06	2E-05	-4E-05	-2E-04						
19	0	0	0	1		0.000440349	-0.001654562	0.000387	-0.002	-0.00109939	0.001	0.003	-0.001	0.004						
20	0	0	0	1																

{[P]t{[P]}{[P]t [D] = [A] matrix

- A -8.08407E-05
- B 8.80208E-05
- C 0.0032299

Groundwater Gradient:	0.0370	
Conductivity (ft/day):	0.029	
Effective porosity:	10%	
GW velocity:	0.011	ft/day
	3.92	ft/year
Flow direction:	132.57	degrees from the positive x-axis

This spreadsheet is from the paper, "A Spreadsheet Method For Estimating Hydraulic Gradient With Heads From Multiple Wells" submitted to Ground Water, March, 2002. To use the program, enter the coordinates for the well locations in the columns labeled x and y (part of the [X] matrix), and the water levels in the z column. The matrices are automatically updated and the gradient magnitude and direction are calculated in cell H30 and H35.

Appendix B

2018 Groundwater Analytical Summary Tables

Shallow Wells

Groundwater Analytical Summary - Shallow Wells: First Quarter 2018
Cathcart Landfill, Snohomish County, WA

	Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	Downgradient Wells																Upgradient Wells																		
						G-01A				G-04A				G-08D1				G-09S				G-10S				G-11S				G-14S				G-24S						
						1/24/18	D	V	Tr	Ch	1/24/18	D	V	Tr	Ch	1/23/18	D	V	Tr	Ch	D	V	Tr	Ch	D	V	Tr	Ch	1/24/18	D	V	Tr	Ch	1/23/18	D	V	Tr	Ch	1/23/18	D
VOLATILE ORGANIC COMPOUNDS (VOCs) EPA Method 8260 (µg/L) (cont.)																																								
1,1-Dichloroethylene					--	1	U				1	U				1	U														1	U				1	U			
1,2,3-Trichloropropane					--	1	U				1	U				1	U														1	U				1	U			
1,2-Dibromo-3-chloropropane					0.2	5	U				5	U				5	U														5	U				5	U			
1,2-Dibromoethane					0.001	0.01	U				0.01	U				0.01	U														0.01	U				0.01	U			
1,2-Dichlorobenzene					--	1	U				1	U				1	U														1	U				1	U			
1,2-Dichloroethane					0.5	0.5	U				0.5	U				0.5	U														0.5	U				0.5	U			
1,2-Dichloropropane					0.6	0.6	U				0.6	U				0.6	U														0.6	U				0.6	U			
1,4-Dichlorobenzene					4	1	U				1	U				1	U														1	U				1	U			
2-Butanone					--	5	U				5	U				5	U														5	U				5	U			
2-Hexanone					--	5	U				5	U				5	U														5	U				5	U			
4-Methyl-2-Pentanone (MIBK)					--	5	U				5	U				5	U														5	U				5	U			
Acetone					--	5	U				5	U				5	U														5	U				5	U			
Acrylonitrile					0.07	0.01	U				0.01	U				0.01	U														0.01	U				0.01	U			
Benzene					1	1	U				1	U				1	U														1	U				1	U			
Bromodichloromethane					0.3	0.3	U				0.3	U				0.3	U														0.3	U				0.3	U			
Bromoform					5	1	U				1	U				1	U														1	U				1	U			
Bromomethane					--	1	U				1	U				1	U														1	U				1	U			
Carbon Disulfide					--	1	U				1	U				1	U														1	U				1	U			
Carbon Tetrachloride					0.3	0.3	U				0.3	U				0.3	U														0.3	U				0.3	U			
Chlorobenzene					--	0.2	U				0.2	U				0.2	U														0.2	U				0.2	U			
Chlorodibromomethane					0.5	0.5	U				0.5	U				0.5	U														0.5	U				0.5	U			
Chloroethane					--	1	U				1	U				1	U														1	U				1	U			
Chloroform					7	1	U				1	U				1	U														1	U				1	U			
Chloromethane					--	1	U				1	U				1	U														1	U				1	U			
cis-1,2-Dichloroethene					--	0.2	U				0.2	U				0.2	U														0.2	U				0.2	U			
cis-1,3-Dichloropropene					0.2	0.2	U				0.2	U				0.2	U														0.2	U				0.2	U			
Dibromomethane					--	0.01	U				0.01	U				0.01	U														0.01	U				0.01	U			
Ethyl Benzene					--	1	U				1	U				1	U														1	U				1	U			
m,p-Xylene					--	1	U				1	U				1	U														1	U				1	U			
Methyl Iodide					--	1	U				1	U				1	U														1	U				1	U			
Methylene Chloride					5	2	U				2	U				2	U														2	U				2	U			
o-Xylene					--	1	U				1	U				1	U														1	U				1	U			
Styrene					--	1	U				1	U				1	U														1	U				1	U			
Tetrachloroethylene					0.8	0.8	U				0.8	U				0.8	U														0.8	U				0.8	U			
Toluene					--	1	U				1	U				1	U														1	U				1	U			
trans-1,2-Dichloroethene					--	1	U				1	U				1	U														1	U				1	U			
trans-1,3-Dichloropropene					0.2	0.2	U				0.2	U				0.2	U														0.2	U				0.2	U			
trans-1,4-Dichloro-2-butene					--	5	U				5	U				5	U														5	U				5	U			
Trichloroethene (1,1,2-Trichloroethylene)					3	1	U				1	U				1	U														1	U				1	U			
Trichlorofluoromethane					--	1	U				1	U				1	U														1	U				1	U			
Vinyl Acetate					--	5	U				5	U				5	U														5	U				5	U			
Vinyl Chloride					0.02	0.01	U				0.01	U				0.01	U														0.01	U				0.01	U			

D: U = Indicates compound was not detected at the given reporting limit.
V: E= Exceedance, waiting verification based on subsequent lab data; V= Exceedance verified based on previous lab data; P=Passed, previous exceedance not verified based on current lab data.
Tr: I=increasing Trend, D=Decreasing Trend;
Ch: Y indicates a change in trend from previous quarter; N means no change in trend.
The groundwater standards listed are based on the Washington Administrative Code (WAC) 173-200 groundwater limits as modified by the TMS 91-11 standards - the most restrictive of the two is used.
* = Non-detect; exceedance due to elevated laboratory reporting limit

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Alkalinity (as cacO3)	mg/L	G-01A	01/24/2018		16.0000	**	200.0000
Ammonia nitrogen	mg-N/L	G-01A	01/24/2018		0.0430	**	0.1500
Bicarbonate	mg/L	G-01A	01/24/2018		16.0000	**	200.0000
Chemical oxygen demand	mg/L	G-01A	01/24/2018	ND	10.0000		74.0000
Chloride	mg/L	G-01A	01/24/2018		0.8900		14.0000
Conductivity	umhos/cm	G-01A	01/24/2018		110.0000		2000.0000
Dissolved antimony	mg/L	G-01A	01/24/2018	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-01A	01/24/2018		0.0002		0.0040
Dissolved barium	mg/L	G-01A	01/24/2018	ND	0.0005		0.0160
Dissolved beryllium	mg/L	G-01A	01/24/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-01A	01/24/2018	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-01A	01/24/2018		10.2000		22.0000
Dissolved chromium	mg/L	G-01A	01/24/2018		0.0058		0.0150
Dissolved cobalt	mg/L	G-01A	01/24/2018	ND	0.0050		0.0070
Dissolved copper	mg/L	G-01A	01/24/2018		0.0130		0.0350
Dissolved iron	mg/L	G-01A	01/24/2018		0.0130		1.0600
Dissolved lead	mg/L	G-01A	01/24/2018	ND	0.0001		0.0010
Dissolved magnesium	mg/L	G-01A	01/24/2018		2.8600		13.8895
Dissolved manganese	mg/L	G-01A	01/24/2018	ND	0.0050		0.0450
Dissolved nickel	mg/L	G-01A	01/24/2018	ND	0.0050		0.0380
Dissolved potassium	mg/L	G-01A	01/24/2018		0.8800		1.6000
Dissolved selenium	mg/L	G-01A	01/24/2018	ND	0.0003		0.0020
Dissolved silver	mg/L	G-01A	01/24/2018	ND	0.0001		0.0012
Dissolved sodium	mg/L	G-01A	01/24/2018		4.3500	**	123.0000
Dissolved thallium	mg/L	G-01A	01/24/2018	ND	0.0001		0.0010
Dissolved vanadium	mg/L	G-01A	01/24/2018	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-01A	01/24/2018	ND	0.0050		0.0250
Nitrate nitrogen	mg-N/L	G-01A	01/24/2018		0.4500		1.3000
Nitrite nitrogen	mg-N/L	G-01A	01/24/2018		0.0010		0.0480
pH	std units	G-01A	01/24/2018		5.7700	*	5.87 - 10.09
Sulfate	mg/L	G-01A	01/24/2018		21.6000		132.4465
Total dissolved solids	mg/L	G-01A	01/24/2018		87.0000	**	405.4645
Total organic carbon	mg/L	G-01A	01/24/2018		4.0000		22.0000
Alkalinity (as cacO3)	mg/L	G-04A	01/24/2018		190.0000		200.0000
Ammonia nitrogen	mg-N/L	G-04A	01/24/2018		0.3110	*	0.1500
Bicarbonate	mg/L	G-04A	01/24/2018		190.0000		200.0000
Chemical oxygen demand	mg/L	G-04A	01/24/2018		55.0000		74.0000
Chloride	mg/L	G-04A	01/24/2018		5.5000		14.0000
Conductivity	umhos/cm	G-04A	01/24/2018		420.0000		2000.0000
Dissolved antimony	mg/L	G-04A	01/24/2018	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-04A	01/24/2018		0.0213	***	0.0040
Dissolved barium	mg/L	G-04A	01/24/2018	ND	0.0005		0.0160
Dissolved beryllium	mg/L	G-04A	01/24/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-04A	01/24/2018	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-04A	01/24/2018		38.9000	***	22.0000
Dissolved chromium	mg/L	G-04A	01/24/2018		0.0077		0.0150
Dissolved cobalt	mg/L	G-04A	01/24/2018		0.0110	*	0.0070
Dissolved copper	mg/L	G-04A	01/24/2018		0.0090		0.0350
Dissolved iron	mg/L	G-04A	01/24/2018		34.1000	***	1.0600
Dissolved lead	mg/L	G-04A	01/24/2018	ND	0.0001		0.0010
Dissolved magnesium	mg/L	G-04A	01/24/2018		22.7000	***	13.8895
Dissolved manganese	mg/L	G-04A	01/24/2018		5.7650	***	0.0450
Dissolved nickel	mg/L	G-04A	01/24/2018	ND	0.0050		0.0380
Dissolved potassium	mg/L	G-04A	01/24/2018		2.1600	*	1.6000
Dissolved selenium	mg/L	G-04A	01/24/2018		0.0007		0.0020
Dissolved silver	mg/L	G-04A	01/24/2018	ND	0.0001		0.0012
Dissolved sodium	mg/L	G-04A	01/24/2018		13.2000		123.0000
Dissolved thallium	mg/L	G-04A	01/24/2018	ND	0.0001		0.0010
Dissolved vanadium	mg/L	G-04A	01/24/2018	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-04A	01/24/2018	ND	0.0050		0.0250
Nitrate nitrogen	mg-N/L	G-04A	01/24/2018		0.0310		1.3000
Nitrite nitrogen	mg-N/L	G-04A	01/24/2018	ND	0.0010		0.0480
pH	std units	G-04A	01/24/2018		6.1800		5.87 - 10.09
Sulfate	mg/L	G-04A	01/24/2018		19.5000		132.4465
Total dissolved solids	mg/L	G-04A	01/24/2018		320.0000		405.4645
Total organic carbon	mg/L	G-04A	01/24/2018		28.0000	*	22.0000
Alkalinity (as cacO3)	mg/L	G-08D1	01/23/2018		150.0000		200.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Ammonia nitrogen	mg-N/L	G-08D1	01/23/2018		0.1090		0.1500
Bicarbonate	mg/L	G-08D1	01/23/2018		130.0000		200.0000
Chemical oxygen demand	mg/L	G-08D1	01/23/2018	ND	10.0000		74.0000
Chloride	mg/L	G-08D1	01/23/2018		2.9000		14.0000
Conductivity	umhos/cm	G-08D1	01/23/2018		440.0000		2000.0000
Dissolved antimony	mg/L	G-08D1	01/23/2018	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-08D1	01/23/2018		0.0002		0.0040
Dissolved barium	mg/L	G-08D1	01/23/2018	ND	0.0005		0.0160
Dissolved beryllium	mg/L	G-08D1	01/23/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-08D1	01/23/2018		0.0001		0.0010
Dissolved calcium	mg/L	G-08D1	01/23/2018		0.9200		22.0000
Dissolved chromium	mg/L	G-08D1	01/23/2018	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-08D1	01/23/2018	ND	0.0050		0.0070
Dissolved copper	mg/L	G-08D1	01/23/2018		0.0120		0.0350
Dissolved iron	mg/L	G-08D1	01/23/2018		0.1320		1.0600
Dissolved lead	mg/L	G-08D1	01/23/2018		0.0002		0.0010
Dissolved magnesium	mg/L	G-08D1	01/23/2018	ND	0.2000		13.8895
Dissolved manganese	mg/L	G-08D1	01/23/2018	ND	0.0050		0.0450
Dissolved nickel	mg/L	G-08D1	01/23/2018	ND	0.0050		0.0380
Dissolved potassium	mg/L	G-08D1	01/23/2018		0.3700		1.6000
Dissolved selenium	mg/L	G-08D1	01/23/2018	ND	0.0003		0.0020
Dissolved silver	mg/L	G-08D1	01/23/2018	ND	0.0001		0.0012
Dissolved sodium	mg/L	G-08D1	01/23/2018		76.6000		123.0000
Dissolved thallium	mg/L	G-08D1	01/23/2018	ND	0.0001		0.0010
Dissolved vanadium	mg/L	G-08D1	01/23/2018	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-08D1	01/23/2018		0.0060		0.0250
Nitrate nitrogen	mg-N/L	G-08D1	01/23/2018		0.3100		1.3000
Nitrite nitrogen	mg-N/L	G-08D1	01/23/2018		0.0040		0.0480
pH	std units	G-08D1	01/23/2018		9.5500		5.87 - 10.09
Sulfate	mg/L	G-08D1	01/23/2018		52.5000		132.4465
Total dissolved solids	mg/L	G-08D1	01/23/2018		310.0000		405.4645
Total organic carbon	mg/L	G-08D1	01/23/2018		1.5000		22.0000
Alkalinity (as cacO3)	mg/L	G-09S	07/16/2013		260.0000	***	200.0000
Ammonia nitrogen	mg-N/L	G-09S	07/16/2013	ND	0.0100		0.1500
Bicarbonate	mg/L	G-09S	07/16/2013		260.0000	***	200.0000
Chemical oxygen demand	mg/L	G-09S	07/16/2013	ND	10.0000		74.0000
Chloride	mg/L	G-09S	07/16/2013		6.3000		14.0000
Conductivity	umhos/cm	G-09S	07/16/2013		1100.0000		2000.0000
Dissolved antimony	mg/L	G-09S	07/16/2013	ND	0.0000		0.0019
Dissolved arsenic	mg/L	G-09S	07/16/2013		0.0006		0.0040
Dissolved barium	mg/L	G-09S	07/16/2013		0.0203	*	0.0160
Dissolved beryllium	mg/L	G-09S	07/16/2013	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-09S	07/16/2013		0.0000		0.0010
Dissolved calcium	mg/L	G-09S	07/16/2013		127.0000	***	22.0000
Dissolved chromium	mg/L	G-09S	07/16/2013	ND	0.0010		0.0150
Dissolved cobalt	mg/L	G-09S	07/16/2013	ND	0.0010		0.0070
Dissolved copper	mg/L	G-09S	07/16/2013		0.0060		0.0350
Dissolved iron	mg/L	G-09S	07/16/2013		0.0260		1.0600
Dissolved lead	mg/L	G-09S	07/16/2013		0.0001		0.0010
Dissolved magnesium	mg/L	G-09S	07/16/2013		42.5000	***	13.8895
Dissolved manganese	mg/L	G-09S	07/16/2013		0.0490	*	0.0450
Dissolved nickel	mg/L	G-09S	07/16/2013		0.0220		0.0380
Dissolved potassium	mg/L	G-09S	07/16/2013		5.1600	***	1.6000
Dissolved selenium	mg/L	G-09S	07/16/2013		0.0016		0.0020
Dissolved silver	mg/L	G-09S	07/16/2013	ND	0.0001		0.0012
Dissolved sodium	mg/L	G-09S	07/16/2013		78.6000		123.0000
Dissolved thallium	mg/L	G-09S	07/16/2013		0.0000		0.0010
Dissolved vanadium	mg/L	G-09S	07/16/2013	ND	0.0050		0.0100
Dissolved zinc	mg/L	G-09S	07/16/2013		0.0160		0.0250
Nitrate nitrogen	mg-N/L	G-09S	07/16/2013	ND	0.0100		1.3000
Nitrite nitrogen	mg-N/L	G-09S	07/16/2013	ND	0.0020		0.0480
pH	std units	G-09S	07/16/2013		5.0800	*	5.87 - 10.09
Sulfate	mg/L	G-09S	07/16/2013		446.0000	***	132.4465
Total dissolved solids	mg/L	G-09S	07/16/2013		940.0000	***	405.4645
Total organic carbon	mg/L	G-09S	07/16/2013		2.8000		22.0000
Alkalinity (as cacO3)	mg/L	G-10S	07/16/2013		390.0000	***	200.0000
Ammonia nitrogen	mg-N/L	G-10S	07/16/2013		0.2340	*	0.1500

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Bicarbonate	mg/L	G-10S	07/16/2013		390.0000	***	200.0000
Chemical oxygen demand	mg/L	G-10S	07/16/2013	ND	10.0000		74.0000
Chloride	mg/L	G-10S	07/16/2013		11.0000		14.0000
Conductivity	umhos/cm	G-10S	07/16/2013		1300.0000		2000.0000
Dissolved antimony	mg/L	G-10S	07/16/2013	ND	0.0000		0.0019
Dissolved arsenic	mg/L	G-10S	07/16/2013		0.0037	**	0.0040
Dissolved barium	mg/L	G-10S	07/16/2013		0.0080		0.0160
Dissolved beryllium	mg/L	G-10S	07/16/2013	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-10S	07/16/2013	ND	0.0000		0.0010
Dissolved calcium	mg/L	G-10S	07/16/2013		108.0000	***	22.0000
Dissolved chromium	mg/L	G-10S	07/16/2013	ND	0.0010		0.0150
Dissolved cobalt	mg/L	G-10S	07/16/2013	ND	0.0010		0.0070
Dissolved copper	mg/L	G-10S	07/16/2013		0.0060		0.0350
Dissolved iron	mg/L	G-10S	07/16/2013		4.5400	*	1.0600
Dissolved lead	mg/L	G-10S	07/16/2013	ND	0.0001		0.0010
Dissolved magnesium	mg/L	G-10S	07/16/2013		25.1000	***	13.8895
Dissolved manganese	mg/L	G-10S	07/16/2013		3.3000	***	0.0450
Dissolved nickel	mg/L	G-10S	07/16/2013		0.0050		0.0380
Dissolved potassium	mg/L	G-10S	07/16/2013		3.3500	***	1.6000
Dissolved selenium	mg/L	G-10S	07/16/2013		0.0005		0.0020
Dissolved silver	mg/L	G-10S	07/16/2013		0.0001		0.0012
Dissolved sodium	mg/L	G-10S	07/16/2013		162.0000	***	123.0000
Dissolved thallium	mg/L	G-10S	07/16/2013	ND	0.0000		0.0010
Dissolved vanadium	mg/L	G-10S	07/16/2013	ND	0.0050		0.0100
Dissolved zinc	mg/L	G-10S	07/16/2013		0.0080		0.0250
Nitrate nitrogen	mg-N/L	G-10S	07/16/2013	ND	0.0100		1.3000
Nitrite nitrogen	mg-N/L	G-10S	07/16/2013	ND	0.0020		0.0480
pH	std units	G-10S	07/16/2013		5.7200	*	5.87 - 10.09
Sulfate	mg/L	G-10S	07/16/2013		408.0000	***	132.4465
Total dissolved solids	mg/L	G-10S	07/16/2013		1100.0000	***	405.4645
Total organic carbon	mg/L	G-10S	07/16/2013		3.8000		22.0000
Alkalinity (as cacO3)	mg/L	G-11S	01/24/2018		82.0000		200.0000
Ammonia nitrogen	mg-N/L	G-11S	01/24/2018		0.0170		0.1500
Bicarbonate	mg/L	G-11S	01/24/2018		82.0000		200.0000
Chemical oxygen demand	mg/L	G-11S	01/24/2018	ND	10.0000		74.0000
Chloride	mg/L	G-11S	01/24/2018		4.4000		14.0000
Conductivity	umhos/cm	G-11S	01/24/2018		240.0000		2000.0000
Dissolved antimony	mg/L	G-11S	01/24/2018	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-11S	01/24/2018		0.0008		0.0040
Dissolved barium	mg/L	G-11S	01/24/2018	ND	0.0005		0.0160
Dissolved beryllium	mg/L	G-11S	01/24/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-11S	01/24/2018	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-11S	01/24/2018		7.6800		22.0000
Dissolved chromium	mg/L	G-11S	01/24/2018		0.0064		0.0150
Dissolved cobalt	mg/L	G-11S	01/24/2018	ND	0.0050		0.0070
Dissolved copper	mg/L	G-11S	01/24/2018		0.0060		0.0350
Dissolved iron	mg/L	G-11S	01/24/2018		0.0140		1.0600
Dissolved lead	mg/L	G-11S	01/24/2018	ND	0.0001		0.0010
Dissolved magnesium	mg/L	G-11S	01/24/2018		1.6000		13.8895
Dissolved manganese	mg/L	G-11S	01/24/2018		0.0088		0.0450
Dissolved nickel	mg/L	G-11S	01/24/2018	ND	0.0050		0.0380
Dissolved potassium	mg/L	G-11S	01/24/2018		0.9300		1.6000
Dissolved selenium	mg/L	G-11S	01/24/2018	ND	0.0003		0.0020
Dissolved silver	mg/L	G-11S	01/24/2018	ND	0.0001		0.0012
Dissolved sodium	mg/L	G-11S	01/24/2018		44.6000		123.0000
Dissolved thallium	mg/L	G-11S	01/24/2018	ND	0.0001		0.0010
Dissolved vanadium	mg/L	G-11S	01/24/2018	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-11S	01/24/2018	ND	0.0050		0.0250
Nitrate nitrogen	mg-N/L	G-11S	01/24/2018		0.0700		1.3000
Nitrite nitrogen	mg-N/L	G-11S	01/24/2018	ND	0.0010		0.0480
pH	std units	G-11S	01/24/2018		6.9700		5.87 - 10.09
Sulfate	mg/L	G-11S	01/24/2018		29.9000		132.4465
Total dissolved solids	mg/L	G-11S	01/24/2018		160.0000		405.4645

Table 2**Most Current Downgradient Monitoring Data**

Constituent	Units	Well	Date	Result	Pred. Limit
Total organic carbon	mg/L	G-11S	01/24/2018	2.6000	22.0000

- * - Current value failed - awaiting verification.
 - ** - Current value passed - previous exceedance not verified.
 - *** - Current value failed - exceedance verified.
 - **** - Current value passed - awaiting one more verification.
 - ***** - Insufficient background data to compute prediction limit.
- ND = Not Detected, result = detection limit.

Table 5

Summary Statistics and Prediction Limits

Constituent	Units	Model Type	N	Detect	Mean	SD	Pred Limit	Conf*
Alkalinity (as caco3)	mg/L	nonpar	79	79			200.0000	0.99
Ammonia nitrogen	mg-N/L	nonpar	73	40			0.1500	0.99
Bicarbonate	mg/L	nonpar	79	79			200.0000	0.99
Chemical oxygen demand	mg/L	nonpar	79	13			74.0000	0.99
Chloride	mg/L	nonpar	79	78			14.0000	0.99
Conductivity	umhos/cm	nonpar	79	79			2000.0000	0.99
Dissolved antimony	mg/L	nonpar	79	34			0.0019	0.99
Dissolved arsenic	mg/L	nonpar	74	69			0.0040	0.99
Dissolved barium	mg/L	nonpar	72	57			0.0160	0.99
Dissolved beryllium	mg/L	nonpar	79	0			0.0005	0.99
Dissolved cadmium	mg/L	nonpar	74	40			0.0010	0.99
Dissolved calcium	mg/L	nonpar	78	78			22.0000	0.99
Dissolved chromium	mg/L	nonpar	77	35			0.0150	0.99
Dissolved cobalt	mg/L	nonpar	78	11			0.0070	0.99
Dissolved copper	mg/L	nonpar	73	41			0.0350	0.99
Dissolved iron	mg/L	nonpar	76	48			1.0600	0.99
Dissolved lead	mg/L	nonpar	78	30			0.0010	0.99
Dissolved magnesium	mg/L	lognor	74	68	0.8682	0.7653	13.8895	
Dissolved manganese	mg/L	nonpar	72	61			0.0450	0.99
Dissolved nickel	mg/L	nonpar	77	18			0.0380	0.99
Dissolved potassium	mg/L	nonpar	79	77			1.6000	0.99
Dissolved selenium	mg/L	nonpar	76	9			0.0020	0.99
Dissolved silver	mg/L	nonpar	73	5			0.0012	0.99
Dissolved sodium	mg/L	nonpar	77	77			123.0000	0.99
Dissolved thallium	mg/L	nonpar	77	6			0.0010	0.99
Dissolved vanadium	mg/L	nonpar	79	4			0.0100	0.99
Dissolved zinc	mg/L	nonpar	76	34			0.0250	0.99
Nitrate nitrogen	mg-N/L	nonpar	76	71			1.3000	0.99
Nitrite nitrogen	mg-N/L	nonpar	71	49			0.0480	0.99
pH	std units	normal	79	79	7.9785	0.7939	5.87 - 10.09	
Sulfate	mg/L	normal	78	78	59.4272	30.5402	132.4465	
Total dissolved solids	mg/L	normal	79	79	284.8101	50.4813	405.4645	
Total organic carbon	mg/L	nonpar	79	64			22.0000	0.99

* - Confidence level for passing initial test or one verification resample at all downgradient wells for a single constituent (nonparametric test only).

Model Type refers to type of prediction limit.

For lognormal limit, mean and sd in natural log units and prediction limit in original units.

All sample sizes and statistics are based on outlier free data.

For nonparametric limits, median reporting limits are substituted for extreme reporting limit values.

Groundwater Analytical Summary - Shallow Wells: Second Quarter 2018
Cathcart Landfill, Snohomish County, WA

	Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	Downgradient Wells																				Upgradient Wells																			
						G-01A					G-04A					G-08D1					G-09S					G-10S					G-11S					G-14S					G-24S				
						4/18/18	D	V	Tr	Ch	4/18/18	D	V	Tr	Ch	4/17/18	D	V	Tr	Ch	4/17/18	D	V	Tr	Ch		D	V	Tr	Ch	4/18/18	D	V	Tr	Ch	4/17/18	D	V	Tr	Ch	4/17/18	D	V	Tr	Ch
CONVENTIONAL CHEMISTRY PARAMETERS (mg/L)																																													
Alkalinity (as CaCO3)	nonpar	81	81	200	--	26					120					140					310		V	I		60			D	N	170					64									
Ammonia Nitrogen	nonpar	75	42	0.15	--	0.015					0.412		V		0.081					0.005					0.01				0.009					0.01											
Bicarbonate	nonpar	81	81	200	--	26					120					120					310		V	I		60			D	N	170					64									
Calcium, Dissolved	nonpar	80	80	22.0	--	13.0					38.9		V		1.17			I	Y	80.5		V			8.63				Y	1.11			I	N	13.8										
Chemical Oxygen Demand	nonpar	81	13	74.0	--	10	U				98		E		10	U				10	U				10	U			10	U					10	U									
Chloride	nonpar	81	80	14.0	250	0.40					7.2			I	N	3.1			D	Y	3.6					2.8				2.1			D	N	5.7										
Conductivity (umhos/cm)	nonpar	81	81	2000	700	130					470					430					940					200			D	N	380			D	N	270									
Magnesium, Dissolved	lognor	76	69	13.8895	--	3.52					22.4		V		0.2	U				29.8		V			1.88				0.2	U				4.34											
Nitrate Nitrogen (mg-N/L)	nonpar	78	73	1.3	10	0.31			I	Y	0.01	U				0.56					0.01	U		D		0.01	U			0.018			D	N	0.42										
Nitrite Nitrogen (mg-N/L)	nonpar	73	50	0.048	1	0.001					0.001	U				0.001	U		D	N	0.005					0.001	U			0.001	U				0.006										
pH (std units)	normal	81	81	5.87-10.09	6.5-8.5	5.78			V	D	N	6.13				9.33			D	N	6.13		P			6.77				9.08			I	N	6.94										
Potassium, Dissolved	nonpar	81	79	1.6	--	0.99					2.29		E		0.45			I	N	5.35		V			0.91				0.29			I	N	0.80			I	N							
Sodium, Dissolved	nonpar	79	79	123	20	5.28			D	N	13.3					96.8					82.6			D		33.8			D	N	93.2			D	N	56.6									
Sulfate	normal	80	80	132.4465	250	34.1					12.1					49.7					210		V			25.2			D	N	17.1			D	N	49.1			I	N					
Total Dissolved Solids	normal	81	81	405.4645	500	87					360					310					670		V			140			D	N	260					210									
Total Organic Carbon	nonpar	81	66	22.0	--	2.8					2.3		P		2.3			D	N	4.7					3.3				2.3					2.9											
DISSOLVED METALS EPA Methods 200.7/200.8 (mg/L)																																													
Antimony	nonpar	81	34	0.0019	0.006	0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U			0.0003	U				0.0003	U									
Arsenic	nonpar	76	71	0.004	0.00005	0.000169					0.0161		V		0.00238					0.00083					0.000678				0.0027				0.000451			D	N								
Barium	nonpar	74	58	0.016	1	0.0005	U				0.008					0.0005	U				0.0037		P			0.0005	U			0.0005	U			0.0036			D	N							
Beryllium	nonpar	81	0	0.0005	0.004	0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U			0.0005	U			0.0005	U										
Cadmium	nonpar	76	40	0.001	0.005	0.00005	U				0.000169					0.00005	U				0.00005	U				0.00005	U			0.00005	U			0.00005	U										
Chromium	nonpar	79	35	0.015	0.05	0.005	U				0.006					0.005	U				0.005	U				0.005	U			0.005	U			0.005	U										
Cobalt	nonpar	80	11	0.007	--	0.005	U				0.005	U	P			0.005	U				0.005	U				0.005	U			0.005	U			0.005	U										
Copper	nonpar	75	41	0.035	1	0.005	U				0.005	U				0.005	U				0.005	U				0.005	U			0.005	U			0.005	U										
Iron	nonpar	78	48	1.06	0.3	0.012					29.7		V	I	N	0.02					0.113					0.01	U			0.01	U		I	N	0.01	U									
Lead	nonpar	80	30	0.001	0.05	0.0001	U				0.000161					0.0001	U				0.000243					0.0001	U			0.0001	U			0.0001	U										
Manganese	nonpar	74	61	0.045	0.05	0.005	U				5.512		V			0.005	U				0.245		E			0.0087				0.005	U			0.005	U										
Nickel	nonpar	79	18	0.038	0.1	0.005	U				0.005	U				0.005	U				0.005	U				0.005	U			0.005	U			0.005	U										
Selenium	nonpar	78	9	0.002	0.01	0.0003	U				0.00069					0.0003	U				0.00208		E			0.0003	U			0.0003	U			0.0003	U										
Silver	nonpar	75	5	0.0012	0.05	0.0001	U				0.0001	U				0.0001	U				0.0001	U				0.0001	U			0.0001	U			0.0001	U										
Thallium	nonpar	79	6	0.001	0.002	0.00005	U				0.000127					0.00005	U				0.00005	U				0.00005	U			0.00005	U			0.00005	U										
Vanadium	nonpar	81	4	0.01	--	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U			0.01	U			0.01	U										
Zinc	nonpar	78	34	0.025	5	0.005	U				0.005	U				0.005	U				0.005	U				0.005	U			0.005	U			0.005	U										
TOTAL METALS EPA Methods 200.7/200.8 (mg/L)																																													
Antimony					0.006	0.0003	U				0.00032					0.0003	U				0.0003	U				0.0003	U			0.0003	U			0.0003	U										
Arsenic					0.00005	0.000115					0.0232					0.00126					0.00083					0.000407				0.00162				0.00039											
Barium					1	0.0012					0.0097					0.0123					0.006					0.0005	U			0.0112				0.0035											
Beryllium					0.004	0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U			0.0005	U			0.0005	U										
Cadmium					0.005	0.00005	U				0.000142					0.00005	U				0.00005	U				0.00005	U			0.000143				0.00005	U										
Chromium					0.05	0.005	U				0.0191					0.005	U				0.0059					0.005	U			0.0072				0.005	U										
Cobalt					--	0.005	U				0.033					0.005	U				0.005	U				0.005	U			0.005	U			0.005	U										
Copper					1	0.005	U				0.005					0.005	U				0.005	U				0.005	U			0.005	U			0.005	U										
Iron					0.3	0.1					29.0					2.86					0.664					0.034				2.76				0.171											
Lead					0.05	0.000117					0.00111					0.00119					0.00146					0.0001	U			0.000765				0.000208											
Manganese					0.05	0.005	U				5.69					0.0628					0.232					0.0529				0.145				0.0112											
Nickel					0.1	0.005	U				0.005	U				0.005	U				0.005	U				0.005	U			0.005	U			0.005	U										
Selenium					0.01	0.																																							

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result	Pred. Limit
Alkalinity (as cacO3)	mg/L	G-01A	04/18/2018		26.0000	200.0000
Ammonia nitrogen	mg-N/L	G-01A	04/18/2018		0.0150	0.1500
Bicarbonate	mg/L	G-01A	04/18/2018		26.0000	200.0000
Chemical oxygen demand	mg/L	G-01A	04/18/2018	ND	10.0000	74.0000
Chloride	mg/L	G-01A	04/18/2018		0.4000	14.0000
Conductivity	umhos/cm	G-01A	04/18/2018		130.0000	2000.0000
Dissolved antimony	mg/L	G-01A	04/18/2018	ND	0.0003	0.0019
Dissolved arsenic	mg/L	G-01A	04/18/2018		0.0002	0.0040
Dissolved barium	mg/L	G-01A	04/18/2018	ND	0.0005	0.0160
Dissolved beryllium	mg/L	G-01A	04/18/2018	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-01A	04/18/2018	ND	0.0001	0.0010
Dissolved calcium	mg/L	G-01A	04/18/2018		13.0000	22.0000
Dissolved chromium	mg/L	G-01A	04/18/2018	ND	0.0050	0.0150
Dissolved cobalt	mg/L	G-01A	04/18/2018	ND	0.0050	0.0070
Dissolved copper	mg/L	G-01A	04/18/2018	ND	0.0050	0.0350
Dissolved iron	mg/L	G-01A	04/18/2018		0.0120	1.0600
Dissolved lead	mg/L	G-01A	04/18/2018	ND	0.0001	0.0010
Dissolved magnesium	mg/L	G-01A	04/18/2018		3.5200	13.9309
Dissolved manganese	mg/L	G-01A	04/18/2018	ND	0.0050	0.0450
Dissolved nickel	mg/L	G-01A	04/18/2018	ND	0.0050	0.0380
Dissolved potassium	mg/L	G-01A	04/18/2018		0.9900	1.6000
Dissolved selenium	mg/L	G-01A	04/18/2018	ND	0.0003	0.0020
Dissolved silver	mg/L	G-01A	04/18/2018	ND	0.0001	0.0012
Dissolved sodium	mg/L	G-01A	04/18/2018		5.2800	123.0000
Dissolved thallium	mg/L	G-01A	04/18/2018	ND	0.0001	0.0010
Dissolved vanadium	mg/L	G-01A	04/18/2018	ND	0.0100	0.0100
Dissolved zinc	mg/L	G-01A	04/18/2018	ND	0.0050	0.0250
Nitrate nitrogen	mg-N/L	G-01A	04/18/2018		0.3100	1.3000
Nitrite nitrogen	mg-N/L	G-01A	04/18/2018		0.0010	0.0480
pH	std units	G-01A	04/18/2018		5.7800	5.85 - 10.11
Sulfate	mg/L	G-01A	04/18/2018		34.1000	131.7367
Total dissolved solids	mg/L	G-01A	04/18/2018		87.0000	404.4462
Total organic carbon	mg/L	G-01A	04/18/2018		2.8000	22.0000
Alkalinity (as cacO3)	mg/L	G-04A	04/18/2018		120.0000	200.0000
Ammonia nitrogen	mg-N/L	G-04A	04/18/2018		0.4120	0.1500
Bicarbonate	mg/L	G-04A	04/18/2018		120.0000	200.0000
Chemical oxygen demand	mg/L	G-04A	04/18/2018		98.0000	74.0000
Chloride	mg/L	G-04A	04/18/2018		7.2000	14.0000
Conductivity	umhos/cm	G-04A	04/18/2018		470.0000	2000.0000
Dissolved antimony	mg/L	G-04A	04/18/2018	ND	0.0003	0.0019
Dissolved arsenic	mg/L	G-04A	04/18/2018		0.0161	0.0040
Dissolved barium	mg/L	G-04A	04/18/2018		0.0080	0.0160
Dissolved beryllium	mg/L	G-04A	04/18/2018	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-04A	04/18/2018		0.0002	0.0010
Dissolved calcium	mg/L	G-04A	04/18/2018		38.9000	22.0000
Dissolved chromium	mg/L	G-04A	04/18/2018		0.0060	0.0150
Dissolved cobalt	mg/L	G-04A	04/18/2018	ND	0.0050	0.0070
Dissolved copper	mg/L	G-04A	04/18/2018	ND	0.0050	0.0350
Dissolved iron	mg/L	G-04A	04/18/2018		29.7000	1.0600
Dissolved lead	mg/L	G-04A	04/18/2018		0.0002	0.0010
Dissolved magnesium	mg/L	G-04A	04/18/2018		22.4000	13.9309
Dissolved manganese	mg/L	G-04A	04/18/2018		5.5120	0.0450
Dissolved nickel	mg/L	G-04A	04/18/2018	ND	0.0050	0.0380
Dissolved potassium	mg/L	G-04A	04/18/2018		2.2900	1.6000
Dissolved selenium	mg/L	G-04A	04/18/2018		0.0007	0.0020
Dissolved silver	mg/L	G-04A	04/18/2018	ND	0.0001	0.0012
Dissolved sodium	mg/L	G-04A	04/18/2018		13.3000	123.0000
Dissolved thallium	mg/L	G-04A	04/18/2018		0.0001	0.0010
Dissolved vanadium	mg/L	G-04A	04/18/2018	ND	0.0100	0.0100
Dissolved zinc	mg/L	G-04A	04/18/2018	ND	0.0050	0.0250
Nitrate nitrogen	mg-N/L	G-04A	04/18/2018	ND	0.0100	1.3000
Nitrite nitrogen	mg-N/L	G-04A	04/18/2018	ND	0.0010	0.0480
pH	std units	G-04A	04/18/2018		6.1300	5.85 - 10.11
Sulfate	mg/L	G-04A	04/18/2018		12.1000	131.7367
Total dissolved solids	mg/L	G-04A	04/18/2018		360.0000	404.4462
Total organic carbon	mg/L	G-04A	04/18/2018		2.3000	22.0000
Alkalinity (as cacO3)	mg/L	G-08D1	04/17/2018		140.0000	200.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Ammonia nitrogen	mg-N/L	G-08D1	04/17/2018		0.0810		0.1500
Bicarbonate	mg/L	G-08D1	04/17/2018		120.0000		200.0000
Chemical oxygen demand	mg/L	G-08D1	04/17/2018	ND	10.0000		74.0000
Chloride	mg/L	G-08D1	04/17/2018		3.1000		14.0000
Conductivity	umhos/cm	G-08D1	04/17/2018		430.0000		2000.0000
Dissolved antimony	mg/L	G-08D1	04/17/2018	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-08D1	04/17/2018		0.0024		0.0040
Dissolved barium	mg/L	G-08D1	04/17/2018	ND	0.0005		0.0160
Dissolved beryllium	mg/L	G-08D1	04/17/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-08D1	04/17/2018	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-08D1	04/17/2018		1.1700		22.0000
Dissolved chromium	mg/L	G-08D1	04/17/2018	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-08D1	04/17/2018	ND	0.0050		0.0070
Dissolved copper	mg/L	G-08D1	04/17/2018	ND	0.0050		0.0350
Dissolved iron	mg/L	G-08D1	04/17/2018		0.0200		1.0600
Dissolved lead	mg/L	G-08D1	04/17/2018	ND	0.0001		0.0010
Dissolved magnesium	mg/L	G-08D1	04/17/2018	ND	0.2000		13.9309
Dissolved manganese	mg/L	G-08D1	04/17/2018	ND	0.0050		0.0450
Dissolved nickel	mg/L	G-08D1	04/17/2018	ND	0.0050		0.0380
Dissolved potassium	mg/L	G-08D1	04/17/2018		0.4500		1.6000
Dissolved selenium	mg/L	G-08D1	04/17/2018	ND	0.0003		0.0020
Dissolved silver	mg/L	G-08D1	04/17/2018	ND	0.0001		0.0012
Dissolved sodium	mg/L	G-08D1	04/17/2018		96.8000		123.0000
Dissolved thallium	mg/L	G-08D1	04/17/2018	ND	0.0001		0.0010
Dissolved vanadium	mg/L	G-08D1	04/17/2018	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-08D1	04/17/2018	ND	0.0050		0.0250
Nitrate nitrogen	mg-N/L	G-08D1	04/17/2018		0.5600		1.3000
Nitrite nitrogen	mg-N/L	G-08D1	04/17/2018	ND	0.0010		0.0480
pH	std units	G-08D1	04/17/2018		9.3300		5.85 - 10.11
Sulfate	mg/L	G-08D1	04/17/2018		49.7000		131.7367
Total dissolved solids	mg/L	G-08D1	04/17/2018		310.0000		404.4462
Total organic carbon	mg/L	G-08D1	04/17/2018		2.3000		22.0000
Alkalinity (as cacO3)	mg/L	G-09S	04/17/2018		310.0000	***	200.0000
Ammonia nitrogen	mg-N/L	G-09S	04/17/2018		0.0050		0.1500
Bicarbonate	mg/L	G-09S	04/17/2018		310.0000	***	200.0000
Chemical oxygen demand	mg/L	G-09S	04/17/2018	ND	10.0000		74.0000
Chloride	mg/L	G-09S	04/17/2018		3.6000		14.0000
Conductivity	umhos/cm	G-09S	04/17/2018		940.0000		2000.0000
Dissolved antimony	mg/L	G-09S	04/17/2018	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-09S	04/17/2018		0.0008		0.0040
Dissolved barium	mg/L	G-09S	04/17/2018		0.0037	**	0.0160
Dissolved beryllium	mg/L	G-09S	04/17/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-09S	04/17/2018	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-09S	04/17/2018		80.5000	***	22.0000
Dissolved chromium	mg/L	G-09S	04/17/2018	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-09S	04/17/2018	ND	0.0050		0.0070
Dissolved copper	mg/L	G-09S	04/17/2018	ND	0.0050		0.0350
Dissolved iron	mg/L	G-09S	04/17/2018		0.1130		1.0600
Dissolved lead	mg/L	G-09S	04/17/2018		0.0002		0.0010
Dissolved magnesium	mg/L	G-09S	04/17/2018		29.8000	***	13.9309
Dissolved manganese	mg/L	G-09S	04/17/2018		0.2450	*	0.0450
Dissolved nickel	mg/L	G-09S	04/17/2018	ND	0.0050		0.0380
Dissolved potassium	mg/L	G-09S	04/17/2018		5.3500	***	1.6000
Dissolved selenium	mg/L	G-09S	04/17/2018		0.0021	*	0.0020
Dissolved silver	mg/L	G-09S	04/17/2018	ND	0.0001		0.0012
Dissolved sodium	mg/L	G-09S	04/17/2018		82.6000		123.0000
Dissolved thallium	mg/L	G-09S	04/17/2018	ND	0.0001		0.0010
Dissolved vanadium	mg/L	G-09S	04/17/2018	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-09S	04/17/2018	ND	0.0050		0.0250
Nitrate nitrogen	mg-N/L	G-09S	04/17/2018	ND	0.0100		1.3000
Nitrite nitrogen	mg-N/L	G-09S	04/17/2018		0.0050		0.0480
pH	std units	G-09S	04/17/2018		6.1300	**	5.85 - 10.11
Sulfate	mg/L	G-09S	04/17/2018		210.0000	***	131.7367
Total dissolved solids	mg/L	G-09S	04/17/2018		670.0000	***	404.4462
Total organic carbon	mg/L	G-09S	04/17/2018		4.7000		22.0000
Alkalinity (as cacO3)	mg/L	G-10S	07/16/2013		390.0000	***	200.0000
Ammonia nitrogen	mg-N/L	G-10S	07/16/2013		0.2340	*	0.1500

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Bicarbonate	mg/L	G-10S	07/16/2013		390.0000	***	200.0000
Chemical oxygen demand	mg/L	G-10S	07/16/2013	ND	10.0000		74.0000
Chloride	mg/L	G-10S	07/16/2013		11.0000		14.0000
Conductivity	umhos/cm	G-10S	07/16/2013		1300.0000		2000.0000
Dissolved antimony	mg/L	G-10S	07/16/2013	ND	0.0000		0.0019
Dissolved arsenic	mg/L	G-10S	07/16/2013		0.0037	**	0.0040
Dissolved barium	mg/L	G-10S	07/16/2013		0.0080		0.0160
Dissolved beryllium	mg/L	G-10S	07/16/2013	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-10S	07/16/2013	ND	0.0000		0.0010
Dissolved calcium	mg/L	G-10S	07/16/2013		108.0000	***	22.0000
Dissolved chromium	mg/L	G-10S	07/16/2013	ND	0.0010		0.0150
Dissolved cobalt	mg/L	G-10S	07/16/2013	ND	0.0010		0.0070
Dissolved copper	mg/L	G-10S	07/16/2013		0.0060		0.0350
Dissolved iron	mg/L	G-10S	07/16/2013		4.5400	*	1.0600
Dissolved lead	mg/L	G-10S	07/16/2013	ND	0.0001		0.0010
Dissolved magnesium	mg/L	G-10S	07/16/2013		25.1000	***	13.9309
Dissolved manganese	mg/L	G-10S	07/16/2013		3.3000	***	0.0450
Dissolved nickel	mg/L	G-10S	07/16/2013		0.0050		0.0380
Dissolved potassium	mg/L	G-10S	07/16/2013		3.3500	***	1.6000
Dissolved selenium	mg/L	G-10S	07/16/2013		0.0005		0.0020
Dissolved silver	mg/L	G-10S	07/16/2013		0.0001		0.0012
Dissolved sodium	mg/L	G-10S	07/16/2013		162.0000	***	123.0000
Dissolved thallium	mg/L	G-10S	07/16/2013	ND	0.0000		0.0010
Dissolved vanadium	mg/L	G-10S	07/16/2013	ND	0.0050		0.0100
Dissolved zinc	mg/L	G-10S	07/16/2013		0.0080		0.0250
Nitrate nitrogen	mg-N/L	G-10S	07/16/2013	ND	0.0100		1.3000
Nitrite nitrogen	mg-N/L	G-10S	07/16/2013	ND	0.0020		0.0480
pH	std units	G-10S	07/16/2013		5.7200	*	5.85 - 10.11
Sulfate	mg/L	G-10S	07/16/2013		408.0000	***	131.7367
Total dissolved solids	mg/L	G-10S	07/16/2013		1100.0000	***	404.4462
Total organic carbon	mg/L	G-10S	07/16/2013		3.8000		22.0000
Alkalinity (as cacO3)	mg/L	G-11S	04/18/2018		60.0000		200.0000
Ammonia nitrogen	mg-N/L	G-11S	04/18/2018		0.0100		0.1500
Bicarbonate	mg/L	G-11S	04/18/2018		60.0000		200.0000
Chemical oxygen demand	mg/L	G-11S	04/18/2018	ND	10.0000		74.0000
Chloride	mg/L	G-11S	04/18/2018		2.8000		14.0000
Conductivity	umhos/cm	G-11S	04/18/2018		200.0000		2000.0000
Dissolved antimony	mg/L	G-11S	04/18/2018	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-11S	04/18/2018		0.0007		0.0040
Dissolved barium	mg/L	G-11S	04/18/2018	ND	0.0005		0.0160
Dissolved beryllium	mg/L	G-11S	04/18/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-11S	04/18/2018	ND	0.0001		0.0010
Dissolved calcium	mg/L	G-11S	04/18/2018		8.6300		22.0000
Dissolved chromium	mg/L	G-11S	04/18/2018	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-11S	04/18/2018	ND	0.0050		0.0070
Dissolved copper	mg/L	G-11S	04/18/2018	ND	0.0050		0.0350
Dissolved iron	mg/L	G-11S	04/18/2018	ND	0.0100		1.0600
Dissolved lead	mg/L	G-11S	04/18/2018	ND	0.0001		0.0010
Dissolved magnesium	mg/L	G-11S	04/18/2018		1.8800		13.9309
Dissolved manganese	mg/L	G-11S	04/18/2018		0.0087		0.0450
Dissolved nickel	mg/L	G-11S	04/18/2018	ND	0.0050		0.0380
Dissolved potassium	mg/L	G-11S	04/18/2018		0.9100		1.6000
Dissolved selenium	mg/L	G-11S	04/18/2018	ND	0.0003		0.0020
Dissolved silver	mg/L	G-11S	04/18/2018	ND	0.0001		0.0012
Dissolved sodium	mg/L	G-11S	04/18/2018		33.8000		123.0000
Dissolved thallium	mg/L	G-11S	04/18/2018	ND	0.0001		0.0010
Dissolved vanadium	mg/L	G-11S	04/18/2018	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-11S	04/18/2018	ND	0.0050		0.0250
Nitrate nitrogen	mg-N/L	G-11S	04/18/2018	ND	0.0100		1.3000
Nitrite nitrogen	mg-N/L	G-11S	04/18/2018	ND	0.0010		0.0480
pH	std units	G-11S	04/18/2018		6.7700		5.85 - 10.11
Sulfate	mg/L	G-11S	04/18/2018		25.2000		131.7367
Total dissolved solids	mg/L	G-11S	04/18/2018		140.0000		404.4462

Table 2**Most Current Downgradient Monitoring Data**

Constituent	Units	Well	Date	Result	Pred. Limit
Total organic carbon	mg/L	G-11S	04/18/2018	3.3000	22.0000

- * - Current value failed - awaiting verification.
 - ** - Current value passed - previous exceedance not verified.
 - *** - Current value failed - exceedance verified.
 - **** - Current value passed - awaiting one more verification.
 - ***** - Insufficient background data to compute prediction limit.
- ND = Not Detected, result = detection limit.

Table 5

Summary Statistics and Prediction Limits

Constituent	Units	Model Type	N	Detect	Mean	SD	Pred Limit	Conf*
Alkalinity (as caco3)	mg/L	nonpar	81	81			200.0000	0.99
Ammonia nitrogen	mg-N/L	nonpar	75	42			0.1500	0.99
Bicarbonate	mg/L	nonpar	81	81			200.0000	0.99
Chemical oxygen demand	mg/L	nonpar	81	13			74.0000	0.99
Chloride	mg/L	nonpar	81	80			14.0000	0.99
Conductivity	umhos/cm	nonpar	81	81			2000.0000	0.99
Dissolved antimony	mg/L	nonpar	81	34			0.0019	0.99
Dissolved arsenic	mg/L	nonpar	76	71			0.0040	0.99
Dissolved barium	mg/L	nonpar	74	58			0.0160	0.99
Dissolved beryllium	mg/L	nonpar	81	0			0.0005	0.99
Dissolved cadmium	mg/L	nonpar	76	40			0.0010	0.99
Dissolved calcium	mg/L	nonpar	80	80			22.0000	0.99
Dissolved chromium	mg/L	nonpar	79	35			0.0150	0.99
Dissolved cobalt	mg/L	nonpar	80	11			0.0070	0.99
Dissolved copper	mg/L	nonpar	75	41			0.0350	0.99
Dissolved iron	mg/L	nonpar	78	48			1.0600	0.99
Dissolved lead	mg/L	nonpar	80	30			0.0010	0.99
Dissolved magnesium	mg/L	lognor	76	69	0.8674	0.7673	13.9309	
Dissolved manganese	mg/L	nonpar	74	61			0.0450	0.99
Dissolved nickel	mg/L	nonpar	79	18			0.0380	0.99
Dissolved potassium	mg/L	nonpar	81	79			1.6000	0.99
Dissolved selenium	mg/L	nonpar	78	9			0.0020	0.99
Dissolved silver	mg/L	nonpar	75	5			0.0012	0.99
Dissolved sodium	mg/L	nonpar	79	79			123.0000	0.99
Dissolved thallium	mg/L	nonpar	79	6			0.0010	0.99
Dissolved vanadium	mg/L	nonpar	81	4			0.0100	0.99
Dissolved zinc	mg/L	nonpar	78	34			0.0250	0.99
Nitrate nitrogen	mg-N/L	nonpar	78	73			1.3000	0.99
Nitrite nitrogen	mg-N/L	nonpar	73	50			0.0480	0.99
pH	std units	normal	81	81	7.9793	0.8019	5.85 - 10.11	
Sulfate	mg/L	normal	80	80	58.7690	30.5398	131.7367	
Total dissolved solids	mg/L	normal	81	81	283.5802	50.6041	404.4462	
Total organic carbon	mg/L	nonpar	81	66			22.0000	0.99

* - Confidence level for passing initial test or one verification resample at all downgradient wells for a single constituent (nonparametric test only).

Model Type refers to type of prediction limit.

For lognormal limit, mean and sd in natural log units and prediction limit in original units.

All sample sizes and statistics are based on outlier free data.

For nonparametric limits, median reporting limits are substituted for extreme reporting limit values.

Groundwater Analytical Summary - Shallow Wells: Third Quarter 2018
Cathcart Landfill, Snohomish County, WA

	Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	Downgradient Wells																				Upgradient Wells																	
						G-01A				G-04A				G-08D1				G-09S				G-10S				G-11S				G-14S				G-24S									
						D	V	Tr	Ch	D	V	Tr	Ch	8/29/18	D	V	Tr	Ch	8/30/18	D	V	Tr	Ch	8/30/18	D	V	Tr	Ch	8/29/18	D	V	Tr	Ch	8/29/18	D	V	Tr	Ch	8/29/18	D	V	Tr	Ch
VOLATILE ORGANIC COMPOUNDS (VOCs) EPA Method 8260 (µg/L) (cont.)																																											
1,1-Dichloroethylene				--		Not sampled - insufficient water				Not sampled - insufficient water				1	U				1	U				1	U				1	U				1	U				1	U			
1,2,3-Trichloropropane				--		Not sampled - insufficient water				Not sampled - insufficient water				1	U				1	U				1	U				1	U				1	U				1	U			
1,2-Dibromo-3-chloropropane				0.2		Not sampled - insufficient water				Not sampled - insufficient water				5	U				5	U				5	U				5	U				5	U				5	U			
1,2-Dibromoethane				0.001		Not sampled - insufficient water				Not sampled - insufficient water				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U			
1,2-Dichlorobenzene				--		Not sampled - insufficient water				Not sampled - insufficient water				1	U				1	U				1	U				1	U				1	U				1	U			
1,2-Dichloroethane				0.5		Not sampled - insufficient water				Not sampled - insufficient water				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U			
1,2-Dichloropropane				0.6		Not sampled - insufficient water				Not sampled - insufficient water				0.6	U				0.6	U				0.6	U				0.6	U				0.6	U				0.6	U			
1,4-Dichlorobenzene				4		Not sampled - insufficient water				Not sampled - insufficient water				1	U				1	U				1	U				1	U				1	U				1	U			
2-Butanone				--		Not sampled - insufficient water				Not sampled - insufficient water				5	U				5	U				5	U				5	U				5	U				5	U			
2-Hexanone				--		Not sampled - insufficient water				Not sampled - insufficient water				5	U				5	U				5	U				5	U				5	U				5	U			
4-Methyl-2-Pentanone (MIBK)				--		Not sampled - insufficient water				Not sampled - insufficient water				5	U				5	U				5	U				5	U				5	U				5	U			
Acetone				--		Not sampled - insufficient water				Not sampled - insufficient water				5	U				5	U				5	U				5	U				5	U				5	U			
Acrylonitrile				0.07		Not sampled - insufficient water				Not sampled - insufficient water				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U			
Benzene				1		Not sampled - insufficient water				Not sampled - insufficient water				1	U				1	U				1	U				1	U				1	U				1	U			
Bromodichloromethane				0.3		Not sampled - insufficient water				Not sampled - insufficient water				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U			
Bromoform				5		Not sampled - insufficient water				Not sampled - insufficient water				1	U				1	U				1	U				1	U				1	U				1	U			
Bromomethane				--		Not sampled - insufficient water				Not sampled - insufficient water				1	U				1	U				1	U				1	U				1	U				1	U			
Carbon Disulfide				--		Not sampled - insufficient water				Not sampled - insufficient water				1	U				1	U				1	U				1	U				1	U				1	U			
Carbon Tetrachloride				0.3		Not sampled - insufficient water				Not sampled - insufficient water				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U			
Chlorobenzene				--		Not sampled - insufficient water				Not sampled - insufficient water				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U			
Chlorodibromomethane				0.5		Not sampled - insufficient water				Not sampled - insufficient water				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U			
Chloroethane				--		Not sampled - insufficient water				Not sampled - insufficient water				1	U				1	U				1	U				1	U				1	U				1	U			
Chloroform				7		Not sampled - insufficient water				Not sampled - insufficient water				1	U				1	U				1	U				1	U				1	U				1	U			
Chloromethane				--		Not sampled - insufficient water				Not sampled - insufficient water				1	U				1	U				1	U				1	U				1	U				1	U			
cis-1,2-Dichloroethene				--		Not sampled - insufficient water				Not sampled - insufficient water				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U			
cis-1,3-Dichloropropene				0.2		Not sampled - insufficient water				Not sampled - insufficient water				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U			
Dibromomethane				--		Not sampled - insufficient water				Not sampled - insufficient water				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U			
Ethyl Benzene				--		Not sampled - insufficient water				Not sampled - insufficient water				1	U				1	U				1	U				1	U				1	U				1	U			
m,p-Xylene				--		Not sampled - insufficient water				Not sampled - insufficient water				1	U				1	U				1	U				1	U				1	U				1	U			
Methyl Iodide				--		Not sampled - insufficient water				Not sampled - insufficient water				1	U				1	U				1	U				1	U				1	U				1	U			
Methylene Chloride				5		Not sampled - insufficient water				Not sampled - insufficient water				2	U				2	U				2	U				2	U				2	U				2	U			
o-Xylene				--		Not sampled - insufficient water				Not sampled - insufficient water				1	U				1	U				1	U				1	U				1	U				1	U			
Styrene				--		Not sampled - insufficient water				Not sampled - insufficient water				1	U				1	U				1	U				1	U				1	U				1	U			
Tetrachloroethylene				0.8		Not sampled - insufficient water				Not sampled - insufficient water				0.8	U				0.8	U				0.8	U				0.8	U				0.8	U				0.8	U			
Toluene				--		Not sampled - insufficient water				Not sampled - insufficient water				1	U				1	U				1	U				1	U				1	U				1	U			
trans-1,2-Dichloroethene				--		Not sampled - insufficient water				Not sampled - insufficient water				1	U				1	U				1	U				1	U				1	U				1	U			
trans-1,3-Dichloropropene				0.2		Not sampled - insufficient water				Not sampled - insufficient water				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U			
trans-1,4-Dichloro-2-butene				--		Not sampled - insufficient water				Not sampled - insufficient water				5	U				5	U				5	U				5	U				5	U				5	U			
Trichlorethene (1,1,2-Trichloroethylene)				3		Not sampled - insufficient water				Not sampled - insufficient water				1	U				1	U				1	U				1	U				1	U				1	U			
Trichlorofluoromethane				--		Not sampled - insufficient water				Not sampled - insufficient water				1	U				1	U				1	U				1	U				1	U				1	U			
Vinyl Acetate				--		Not sampled - insufficient water				Not sampled - insufficient water				5	U				5	U				5	U				5	U				5	U				5	U			
Vinyl Chloride				0.02		Not sampled - insufficient water				Not sampled - insufficient water				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U			

D: U = Indicates compound was not detected at the given reporting limit.

V: E= Exceedance, waiting verification based on subsequent lab data; V= Exceedance verified based on previous lab data; P=Passed, previous exceedance not verified based on current lab data.

Tr: I=increasing Trend, D=Decreasing Trend;

Ch: Y indicates a change in trend from previous quarter; N means no change in trend.

The groundwater standards listed are based on the Washington Administrative Code (WAC) 173-200 groundwater limits as modified by the TMS 91-11 standards - the most restrictive of the two is used.

* = Non-detect; exceedance due to elevated laboratory reporting limit

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result	Pred. Limit
Alkalinity (as cacO ₃)	mg/L	G-01A	04/18/2018		26.0000	200.0000
Ammonia nitrogen	mg-N/L	G-01A	04/18/2018		0.0150	13.5870
Bicarbonate	mg/L	G-01A	04/18/2018		26.0000	200.0000
Chemical oxygen demand	mg/L	G-01A	04/18/2018	ND	10.0000	28.0000
Chloride	mg/L	G-01A	04/18/2018		0.4000	14.0000
Conductivity	umhos/cm	G-01A	04/18/2018		130.0000	578.8230
Dissolved antimony	mg/L	G-01A	04/18/2018	ND	0.0003	0.0019
Dissolved arsenic	mg/L	G-01A	04/18/2018		0.0002	0.0040
Dissolved barium	mg/L	G-01A	04/18/2018	ND	0.0005	3.3468
Dissolved beryllium	mg/L	G-01A	04/18/2018	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-01A	04/18/2018	ND	0.0001	660.2421
Dissolved calcium	mg/L	G-01A	04/18/2018		13.0000	23.5560
Dissolved chromium	mg/L	G-01A	04/18/2018	ND	0.0050	0.0150
Dissolved cobalt	mg/L	G-01A	04/18/2018	ND	0.0050	0.0070
Dissolved copper	mg/L	G-01A	04/18/2018	ND	0.0050	0.1150
Dissolved iron	mg/L	G-01A	04/18/2018		0.0120	1.0600
Dissolved lead	mg/L	G-01A	04/18/2018	ND	0.0001	0.0027
Dissolved magnesium	mg/L	G-01A	04/18/2018		3.5200	56.1598
Dissolved manganese	mg/L	G-01A	04/18/2018	ND	0.0050	2.7844
Dissolved nickel	mg/L	G-01A	04/18/2018	ND	0.0050	0.0220
Dissolved potassium	mg/L	G-01A	04/18/2018		0.9900	2.6733
Dissolved selenium	mg/L	G-01A	04/18/2018	ND	0.0003	0.0050
Dissolved silver	mg/L	G-01A	04/18/2018	ND	0.0001	0.0015
Dissolved sodium	mg/L	G-01A	04/18/2018		5.2800	123.0000
Dissolved thallium	mg/L	G-01A	04/18/2018	ND	0.0001	0.0030
Dissolved thallium	mg/L	G-01A	04/18/2018	ND	0.0100	0.0100
Dissolved zinc	mg/L	G-01A	04/18/2018	ND	0.0050	0.0300
Nitrate nitrogen	mg-N/L	G-01A	04/18/2018		0.3100	2.6365
Nitrite nitrogen	mg-N/L	G-01A	04/18/2018		0.0010	13.2001
pH	std units	G-01A	04/18/2018		5.7800	5.84 - 10.12
Sulfate	mg/L	G-01A	04/18/2018		34.1000	131.3104
Total dissolved solids	mg/L	G-01A	04/18/2018		87.0000	402.7653
Total organic carbon	mg/L	G-01A	04/18/2018		2.8000	22.0000
Alkalinity (as cacO ₃)	mg/L	G-04A	04/18/2018		120.0000	200.0000
Ammonia nitrogen	mg-N/L	G-04A	04/18/2018		0.4120	13.5870
Bicarbonate	mg/L	G-04A	04/18/2018		120.0000	200.0000
Chemical oxygen demand	mg/L	G-04A	04/18/2018		98.0000	28.0000
Chloride	mg/L	G-04A	04/18/2018		7.2000	14.0000
Conductivity	umhos/cm	G-04A	04/18/2018		470.0000	578.8230
Dissolved antimony	mg/L	G-04A	04/18/2018	ND	0.0003	0.0019
Dissolved arsenic	mg/L	G-04A	04/18/2018		0.0161	0.0040
Dissolved barium	mg/L	G-04A	04/18/2018		0.0080	3.3468
Dissolved beryllium	mg/L	G-04A	04/18/2018	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-04A	04/18/2018		0.0002	660.2421
Dissolved calcium	mg/L	G-04A	04/18/2018		38.9000	23.5560
Dissolved chromium	mg/L	G-04A	04/18/2018		0.0060	0.0150
Dissolved cobalt	mg/L	G-04A	04/18/2018	ND	0.0050	0.0070
Dissolved copper	mg/L	G-04A	04/18/2018	ND	0.0050	0.1150
Dissolved iron	mg/L	G-04A	04/18/2018		29.7000	1.0600
Dissolved lead	mg/L	G-04A	04/18/2018		0.0002	0.0027
Dissolved magnesium	mg/L	G-04A	04/18/2018		22.4000	56.1598
Dissolved manganese	mg/L	G-04A	04/18/2018		5.5120	2.7844
Dissolved nickel	mg/L	G-04A	04/18/2018	ND	0.0050	0.0220
Dissolved potassium	mg/L	G-04A	04/18/2018		2.2900	2.6733
Dissolved selenium	mg/L	G-04A	04/18/2018		0.0007	0.0050
Dissolved silver	mg/L	G-04A	04/18/2018	ND	0.0001	0.0015
Dissolved sodium	mg/L	G-04A	04/18/2018		13.3000	123.0000
Dissolved thallium	mg/L	G-04A	04/18/2018		0.0001	0.0030
Dissolved vanadium	mg/L	G-04A	04/18/2018	ND	0.0100	0.0100
Dissolved zinc	mg/L	G-04A	04/18/2018	ND	0.0050	0.0300
Nitrate nitrogen	mg-N/L	G-04A	04/18/2018	ND	0.0100	2.6365
Nitrite nitrogen	mg-N/L	G-04A	04/18/2018	ND	0.0010	13.2001
pH	std units	G-04A	04/18/2018		6.1300	5.84 - 10.12
Sulfate	mg/L	G-04A	04/18/2018		12.1000	131.3104
Total dissolved solids	mg/L	G-04A	04/18/2018		360.0000	402.7653
Total organic carbon	mg/L	G-04A	04/18/2018		2.3000	22.0000
Alkalinity (as cacO ₃)	mg/L	G-08D1	08/29/2018		150.0000	200.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Ammonia nitrogen	mg-N/L	G-08D1	08/29/2018		0.0710		13.5870
Bicarbonate	mg/L	G-08D1	08/29/2018		120.0000		200.0000
Chemical oxygen demand	mg/L	G-08D1	08/29/2018	ND	10.0000		28.0000
Chloride	mg/L	G-08D1	08/29/2018		3.3000		14.0000
Conductivity	umhos/cm	G-08D1	08/29/2018		420.0000		578.8230
Dissolved antimony	mg/L	G-08D1	08/29/2018	ND	0.0015		0.0019
Dissolved arsenic	mg/L	G-08D1	08/29/2018		0.0031		0.0040
Dissolved barium	mg/L	G-08D1	08/29/2018		0.0047		3.3468
Dissolved beryllium	mg/L	G-08D1	08/29/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-08D1	08/29/2018	ND	0.0003		660.2421
Dissolved calcium	mg/L	G-08D1	08/29/2018		1.0100		23.5560
Dissolved chromium	mg/L	G-08D1	08/29/2018	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-08D1	08/29/2018	ND	0.0050		0.0070
Dissolved copper	mg/L	G-08D1	08/29/2018	ND	0.0050		0.1150
Dissolved iron	mg/L	G-08D1	08/29/2018		0.6740		1.0600
Dissolved lead	mg/L	G-08D1	08/29/2018		0.0007		0.0027
Dissolved magnesium	mg/L	G-08D1	08/29/2018		0.2200		56.1598
Dissolved manganese	mg/L	G-08D1	08/29/2018		0.0138		2.7844
Dissolved nickel	mg/L	G-08D1	08/29/2018	ND	0.0050		0.0220
Dissolved potassium	mg/L	G-08D1	08/29/2018		0.5200		2.6733
Dissolved selenium	mg/L	G-08D1	08/29/2018	ND	0.0015		0.0050
Dissolved silver	mg/L	G-08D1	08/29/2018	ND	0.0003		0.0015
Dissolved sodium	mg/L	G-08D1	08/29/2018		99.7000		123.0000
Dissolved thallium	mg/L	G-08D1	08/29/2018	ND	0.0003		0.0030
Dissolved vanadium	mg/L	G-08D1	08/29/2018	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-08D1	08/29/2018	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-08D1	08/29/2018		0.6800		2.6365
Nitrite nitrogen	mg-N/L	G-08D1	08/29/2018		0.0070		13.2001
pH	std units	G-08D1	08/29/2018		9.3900		5.84 - 10.12
Sulfate	mg/L	G-08D1	08/29/2018		47.9000		131.3104
Total dissolved solids	mg/L	G-08D1	08/29/2018		280.0000		402.7653
Total organic carbon	mg/L	G-08D1	08/29/2018		0.9700		22.0000
Alkalinity (as cacO3)	mg/L	G-09S	08/30/2018		320.0000	***	200.0000
Ammonia nitrogen	mg-N/L	G-09S	08/30/2018	ND	0.0050		13.5870
Bicarbonate	mg/L	G-09S	08/30/2018		320.0000	***	200.0000
Chemical oxygen demand	mg/L	G-09S	08/30/2018	ND	10.0000		28.0000
Chloride	mg/L	G-09S	08/30/2018		4.2000		14.0000
Conductivity	umhos/cm	G-09S	08/30/2018		930.0000	***	578.8230
Dissolved antimony	mg/L	G-09S	08/30/2018	ND	0.0015		0.0019
Dissolved arsenic	mg/L	G-09S	08/30/2018		0.0008		0.0040
Dissolved barium	mg/L	G-09S	08/30/2018		0.0041		3.3468
Dissolved beryllium	mg/L	G-09S	08/30/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-09S	08/30/2018		0.0003		660.2421
Dissolved calcium	mg/L	G-09S	08/30/2018		89.1000	***	23.5560
Dissolved chromium	mg/L	G-09S	08/30/2018	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-09S	08/30/2018	ND	0.0050		0.0070
Dissolved copper	mg/L	G-09S	08/30/2018	ND	0.0050		0.1150
Dissolved iron	mg/L	G-09S	08/30/2018		0.0200		1.0600
Dissolved lead	mg/L	G-09S	08/30/2018	ND	0.0005		0.0027
Dissolved magnesium	mg/L	G-09S	08/30/2018		32.6000		56.1598
Dissolved manganese	mg/L	G-09S	08/30/2018		0.1689		2.7844
Dissolved nickel	mg/L	G-09S	08/30/2018	ND	0.0050		0.0220
Dissolved potassium	mg/L	G-09S	08/30/2018		7.4100	***	2.6733
Dissolved selenium	mg/L	G-09S	08/30/2018		0.0022		0.0050
Dissolved silver	mg/L	G-09S	08/30/2018	ND	0.0003		0.0015
Dissolved sodium	mg/L	G-09S	08/30/2018		91.4000		123.0000
Dissolved thallium	mg/L	G-09S	08/30/2018	ND	0.0003		0.0030
Dissolved vanadium	mg/L	G-09S	08/30/2018	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-09S	08/30/2018		0.0070		0.0300
Nitrate nitrogen	mg-N/L	G-09S	08/30/2018	ND	0.0100		2.6365
Nitrite nitrogen	mg-N/L	G-09S	08/30/2018	ND	0.0010		13.2001
pH	std units	G-09S	08/30/2018		6.4700		5.84 - 10.12
Sulfate	mg/L	G-09S	08/30/2018		213.0000	***	131.3104
Total dissolved solids	mg/L	G-09S	08/30/2018		680.0000	***	402.7653
Total organic carbon	mg/L	G-09S	08/30/2018		3.5000		22.0000
Alkalinity (as cacO3)	mg/L	G-10S	08/30/2018		440.0000	***	200.0000
Ammonia nitrogen	mg-N/L	G-10S	08/30/2018		0.2110		13.5870

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Bicarbonate	mg/L	G-10S	08/30/2018		440.0000	***	200.0000
Chemical oxygen demand	mg/L	G-10S	08/30/2018		11.0000		28.0000
Chloride	mg/L	G-10S	08/30/2018		12.1000		14.0000
Conductivity	umhos/cm	G-10S	08/30/2018		1300.0000	***	578.8230
Dissolved antimony	mg/L	G-10S	08/30/2018	ND	0.0015		0.0019
Dissolved arsenic	mg/L	G-10S	08/30/2018		0.0069	*	0.0040
Dissolved barium	mg/L	G-10S	08/30/2018		0.0064		3.3468
Dissolved beryllium	mg/L	G-10S	08/30/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-10S	08/30/2018	ND	0.0003		660.2421
Dissolved calcium	mg/L	G-10S	08/30/2018		106.0000	***	23.5560
Dissolved chromium	mg/L	G-10S	08/30/2018		0.0063		0.0150
Dissolved cobalt	mg/L	G-10S	08/30/2018	ND	0.0050		0.0070
Dissolved copper	mg/L	G-10S	08/30/2018	ND	0.0050		0.1150
Dissolved iron	mg/L	G-10S	08/30/2018		12.1000	*	1.0600
Dissolved lead	mg/L	G-10S	08/30/2018	ND	0.0005		0.0027
Dissolved magnesium	mg/L	G-10S	08/30/2018		25.1000		56.1598
Dissolved manganese	mg/L	G-10S	08/30/2018		3.4280	***	2.7844
Dissolved nickel	mg/L	G-10S	08/30/2018	ND	0.0050		0.0220
Dissolved potassium	mg/L	G-10S	08/30/2018		5.4300	***	2.6733
Dissolved selenium	mg/L	G-10S	08/30/2018	ND	0.0005		0.0050
Dissolved silver	mg/L	G-10S	08/30/2018	ND	0.0003		0.0015
Dissolved sodium	mg/L	G-10S	08/30/2018		178.0000	***	123.0000
Dissolved thallium	mg/L	G-10S	08/30/2018	ND	0.0003		0.0030
Dissolved vanadium	mg/L	G-10S	08/30/2018	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-10S	08/30/2018	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-10S	08/30/2018	ND	0.0100		2.6365
Nitrite nitrogen	mg-N/L	G-10S	08/30/2018	ND	0.0010		13.2001
pH	std units	G-10S	08/30/2018		6.6300	**	5.84 - 10.12
Sulfate	mg/L	G-10S	08/30/2018		307.0000	***	131.3104
Total dissolved solids	mg/L	G-10S	08/30/2018		980.0000	***	402.7653
Total organic carbon	mg/L	G-10S	08/30/2018		3.1000		22.0000
Alkalinity (as cacO3)	mg/L	G-11S	08/29/2018		72.0000		200.0000
Ammonia nitrogen	mg-N/L	G-11S	08/29/2018		0.0140		13.5870
Bicarbonate	mg/L	G-11S	08/29/2018		72.0000		200.0000
Chemical oxygen demand	mg/L	G-11S	08/29/2018	ND	10.0000		28.0000
Chloride	mg/L	G-11S	08/29/2018		3.2000		14.0000
Conductivity	umhos/cm	G-11S	08/29/2018		190.0000		578.8230
Dissolved antimony	mg/L	G-11S	08/29/2018	ND	0.0015		0.0019
Dissolved arsenic	mg/L	G-11S	08/29/2018		0.0008		0.0040
Dissolved barium	mg/L	G-11S	08/29/2018	ND	0.0005		3.3468
Dissolved beryllium	mg/L	G-11S	08/29/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-11S	08/29/2018	ND	0.0003		660.2421
Dissolved calcium	mg/L	G-11S	08/29/2018		7.1800		23.5560
Dissolved chromium	mg/L	G-11S	08/29/2018	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-11S	08/29/2018	ND	0.0050		0.0070
Dissolved copper	mg/L	G-11S	08/29/2018	ND	0.0050		0.1150
Dissolved iron	mg/L	G-11S	08/29/2018		0.0130		1.0600
Dissolved lead	mg/L	G-11S	08/29/2018		0.0007		0.0027
Dissolved magnesium	mg/L	G-11S	08/29/2018		1.5000		56.1598
Dissolved manganese	mg/L	G-11S	08/29/2018		0.0082		2.7844
Dissolved nickel	mg/L	G-11S	08/29/2018	ND	0.0050		0.0220
Dissolved potassium	mg/L	G-11S	08/29/2018		1.0500		2.6733
Dissolved selenium	mg/L	G-11S	08/29/2018	ND	0.0015		0.0050
Dissolved silver	mg/L	G-11S	08/29/2018	ND	0.0003		0.0015
Dissolved sodium	mg/L	G-11S	08/29/2018		41.9000		123.0000
Dissolved thallium	mg/L	G-11S	08/29/2018	ND	0.0003		0.0030
Dissolved vanadium	mg/L	G-11S	08/29/2018	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-11S	08/29/2018		0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-11S	08/29/2018		0.0440		2.6365
Nitrite nitrogen	mg-N/L	G-11S	08/29/2018	ND	0.0010		13.2001
pH	std units	G-11S	08/29/2018		6.7400		5.84 - 10.12
Sulfate	mg/L	G-11S	08/29/2018		24.9000		131.3104
Total dissolved solids	mg/L	G-11S	08/29/2018		140.0000		402.7653

Table 2**Most Current Downgradient Monitoring Data**

Constituent	Units	Well	Date	Result	Pred. Limit
Total organic carbon	mg/L	G-11S	08/29/2018	1.5000	22.0000

- * - Current value failed - awaiting verification.
 - ** - Current value passed - previous exceedance not verified.
 - *** - Current value failed - exceedance verified.
 - **** - Current value passed - awaiting one more verification.
 - ***** - Insufficient background data to compute prediction limit.
- ND = Not Detected, Result = detection limit.

Table 5

Summary Statistics and Prediction Limits

Constituent	Units	Detect	N	Mean	SD	alpha	Factor	Pred Limit	Type		Conf
Alkalinity (as cacO ₃)	mg/L	83	83					200.0000	nonpar		0.99
Ammonia nitrogen	mg-N/L	46	79	-2.2153	2.0185	0.0100	2.3901	13.5870	lognor		
Bicarbonate	mg/L	83	83					200.0000	nonpar		0.99
Chemical oxygen demand	mg/L	12	82					28.0000	nonpar		0.99
Chloride	mg/L	82	83					14.0000	nonpar		0.99
Conductivity	umhos/cm	82	82	427.1951	63.5041	0.0100	2.3877	578.8230	normal		
Dissolved antimony	mg/L	34	83					0.0019	nonpar		0.99
Dissolved arsenic	mg/L	73	78					0.0040	nonpar		0.99
Dissolved barium	mg/L	61	76	-4.5758	2.4173	0.0100	2.3927	3.3468	lognor		
Dissolved beryllium	mg/L	0	83					0.0005	nonpar	***	0.99
Dissolved cadmium	mg/L	40	78	-4.7457	4.7004	0.0100	2.3909	660.2421	lognor		
Dissolved calcium	mg/L	81	81	7.1438	6.8715	0.0100	2.3885	23.5560	normal		
Dissolved chromium	mg/L	35	81					0.0150	nonpar		0.99
Dissolved cobalt	mg/L	11	82					0.0070	nonpar		0.99
Dissolved copper	mg/L	43	79					0.1150	nonpar		0.99
Dissolved iron	mg/L	50	80					1.0600	nonpar		0.99
Dissolved lead	mg/L	32	83					0.0027	nonpar		0.99
Dissolved magnesium	mg/L	71	79	-0.1768	1.7594	0.0100	2.3901	56.1598	lognor		
Dissolved manganese	mg/L	62	76	-4.3554	2.2483	0.0100	2.3927	2.7844	lognor		
Dissolved nickel	mg/L	17	80					0.0220	nonpar		0.99
Dissolved potassium	mg/L	80	81	-0.7454	0.7238	0.0100	2.3885	2.6733	lognor		
Dissolved selenium	mg/L	11	82					0.0050	nonpar		0.99
Dissolved silver	mg/L	6	78					0.0015	nonpar		0.99
Dissolved sodium	mg/L	81	81					123.0000	nonpar		0.99
Dissolved thallium	mg/L	7	82					0.0030	nonpar		0.99
Dissolved vanadium	mg/L	4	83					0.0100	nonpar		0.99
Dissolved zinc	mg/L	36	82					0.0300	nonpar		0.99
Nitrate nitrogen	mg-N/L	75	80	-1.9502	1.2220	0.0100	2.3893	2.6365	lognor		
Nitrite nitrogen	mg-N/L	53	77	-3.6160	2.5906	0.0100	2.3918	13.2001	lognor		
pH	std units	83	83	7.9822	0.8067	0.0100	2.6529	5.84 - 10.12	normal		
Sulfate	mg/L	82	82	58.3978	30.5370	0.0100	2.3877	131.3104	normal		
Total dissolved solids	mg/L	83	83	283.1325	50.1200	0.0100	2.3869	402.7653	normal		
Total organic carbon	mg/L	67	83					22.0000	nonpar		0.99

Conf = confidence level for passing initial test or one of two verification resamples at all downgradient wells for a single constituent (nonparametric test only).

* - Insufficient Data.

** - Calculated limit raised to Manual Reporting Limit.

*** - Nonparametric limit based on ND value.

For transformed data, mean and SD in transformed units and prediction limit in original units.

All sample sizes and statistics are based on outlier free data.

For nonparametric limits, median reporting limits are substituted for extreme reporting limit values.

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result	Pred. Limit
Alkalinity (as cacO3)	mg/L	G-01A	10/17/2018		16.0000	200.0000
Ammonia nitrogen	mg-N/L	G-01A	10/17/2018		0.0060	12.6869
Bicarbonate	mg/L	G-01A	10/17/2018		16.0000	200.0000
Chemical oxygen demand	mg/L	G-01A	10/17/2018		16.0000	28.0000
Chloride	mg/L	G-01A	10/17/2018		2.5000	18.3000
Conductivity	umhos/cm	G-01A	10/17/2018		150.0000	577.1695
Dissolved antimony	mg/L	G-01A	10/17/2018	ND	0.0003	0.0019
Dissolved arsenic	mg/L	G-01A	10/17/2018		0.0002	0.0040
Dissolved barium	mg/L	G-01A	10/17/2018		0.0028	3.1159
Dissolved beryllium	mg/L	G-01A	10/17/2018	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-01A	10/17/2018	ND	0.0001	737.0161
Dissolved calcium	mg/L	G-01A	10/17/2018		15.1000	23.3766
Dissolved chromium	mg/L	G-01A	10/17/2018	ND	0.0050	0.0150
Dissolved cobalt	mg/L	G-01A	10/17/2018	ND	0.0050	0.0070
Dissolved copper	mg/L	G-01A	10/17/2018		0.0060	0.1150
Dissolved iron	mg/L	G-01A	10/17/2018		0.0260	1.0600
Dissolved lead	mg/L	G-01A	10/17/2018	ND	0.0001	0.0027
Dissolved magnesium	mg/L	G-01A	10/17/2018		4.1500	54.4845
Dissolved manganese	mg/L	G-01A	10/17/2018	ND	0.0050	3.0957
Dissolved nickel	mg/L	G-01A	10/17/2018		0.0060	0.0380
Dissolved potassium	mg/L	G-01A	10/17/2018		1.3900	2.6310
Dissolved selenium	mg/L	G-01A	10/17/2018	ND	0.0003	0.0050
Dissolved silver	mg/L	G-01A	10/17/2018	ND	0.0001	0.0015
Dissolved sodium	mg/L	G-01A	10/17/2018		6.5200	123.0000
Dissolved thallium	mg/L	G-01A	10/17/2018	ND	0.0001	0.0030
Dissolved thallium	mg/L	G-01A	10/17/2018	ND	0.0100	0.0100
Dissolved zinc	mg/L	G-01A	10/17/2018	ND	0.0050	0.0300
Nitrate nitrogen	mg-N/L	G-01A	10/17/2018		0.3400	2.5710
Nitrite nitrogen	mg-N/L	G-01A	10/17/2018	ND	0.0010	15.4624
pH	std units	G-01A	10/17/2018		5.5900	5.83 - 10.12
Sulfate	mg/L	G-01A	10/17/2018		50.9000	130.8893
Total dissolved solids	mg/L	G-01A	10/17/2018		180.0000	401.0317
Total organic carbon	mg/L	G-01A	10/17/2018		4.6000	22.0000
Alkalinity (as cacO3)	mg/L	G-04A	04/18/2018		120.0000	200.0000
Ammonia nitrogen	mg-N/L	G-04A	04/18/2018		0.4120	12.6869
Bicarbonate	mg/L	G-04A	04/18/2018		120.0000	200.0000
Chemical oxygen demand	mg/L	G-04A	04/18/2018		98.0000	28.0000
Chloride	mg/L	G-04A	04/18/2018		7.2000	18.3000
Conductivity	umhos/cm	G-04A	04/18/2018		470.0000	577.1695
Dissolved antimony	mg/L	G-04A	04/18/2018	ND	0.0003	0.0019
Dissolved arsenic	mg/L	G-04A	04/18/2018		0.0161	0.0040
Dissolved barium	mg/L	G-04A	04/18/2018		0.0080	3.1159
Dissolved beryllium	mg/L	G-04A	04/18/2018	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-04A	04/18/2018		0.0002	737.0161
Dissolved calcium	mg/L	G-04A	04/18/2018		38.9000	23.3766
Dissolved chromium	mg/L	G-04A	04/18/2018		0.0060	0.0150
Dissolved cobalt	mg/L	G-04A	04/18/2018	ND	0.0050	0.0070
Dissolved copper	mg/L	G-04A	04/18/2018	ND	0.0050	0.1150
Dissolved iron	mg/L	G-04A	04/18/2018		29.7000	1.0600
Dissolved lead	mg/L	G-04A	04/18/2018		0.0002	0.0027
Dissolved magnesium	mg/L	G-04A	04/18/2018		22.4000	54.4845
Dissolved manganese	mg/L	G-04A	04/18/2018		5.5120	3.0957
Dissolved nickel	mg/L	G-04A	04/18/2018	ND	0.0050	0.0380
Dissolved potassium	mg/L	G-04A	04/18/2018		2.2900	2.6310
Dissolved selenium	mg/L	G-04A	04/18/2018		0.0007	0.0050
Dissolved silver	mg/L	G-04A	04/18/2018	ND	0.0001	0.0015
Dissolved sodium	mg/L	G-04A	04/18/2018		13.3000	123.0000
Dissolved thallium	mg/L	G-04A	04/18/2018		0.0001	0.0030
Dissolved vanadium	mg/L	G-04A	04/18/2018	ND	0.0100	0.0100
Dissolved zinc	mg/L	G-04A	04/18/2018	ND	0.0050	0.0300
Nitrate nitrogen	mg-N/L	G-04A	04/18/2018	ND	0.0100	2.5710
Nitrite nitrogen	mg-N/L	G-04A	04/18/2018	ND	0.0010	15.4624
pH	std units	G-04A	04/18/2018		6.1300	5.83 - 10.12
Sulfate	mg/L	G-04A	04/18/2018		12.1000	130.8893
Total dissolved solids	mg/L	G-04A	04/18/2018		360.0000	401.0317
Total organic carbon	mg/L	G-04A	04/18/2018		2.3000	22.0000
Alkalinity (as cacO3)	mg/L	G-08D1	10/16/2018		150.0000	200.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Ammonia nitrogen	mg-N/L	G-08D1	10/16/2018		0.0940		12.6869
Bicarbonate	mg/L	G-08D1	10/16/2018		110.0000		200.0000
Chemical oxygen demand	mg/L	G-08D1	10/16/2018	ND	10.0000		28.0000
Chloride	mg/L	G-08D1	10/16/2018		3.3000		18.3000
Conductivity	umhos/cm	G-08D1	10/16/2018		420.0000		577.1695
Dissolved antimony	mg/L	G-08D1	10/16/2018	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-08D1	10/16/2018		0.0022		0.0040
Dissolved barium	mg/L	G-08D1	10/16/2018		0.0031		3.1159
Dissolved beryllium	mg/L	G-08D1	10/16/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-08D1	10/16/2018	ND	0.0001		737.0161
Dissolved calcium	mg/L	G-08D1	10/16/2018		0.8500		23.3766
Dissolved chromium	mg/L	G-08D1	10/16/2018	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-08D1	10/16/2018	ND	0.0050		0.0070
Dissolved copper	mg/L	G-08D1	10/16/2018	ND	0.0050		0.1150
Dissolved iron	mg/L	G-08D1	10/16/2018		0.5460		1.0600
Dissolved lead	mg/L	G-08D1	10/16/2018		0.0003		0.0027
Dissolved magnesium	mg/L	G-08D1	10/16/2018		0.2300		54.4845
Dissolved manganese	mg/L	G-08D1	10/16/2018		0.0094		3.0957
Dissolved nickel	mg/L	G-08D1	10/16/2018	ND	0.0050		0.0380
Dissolved potassium	mg/L	G-08D1	10/16/2018		0.4500		2.6310
Dissolved selenium	mg/L	G-08D1	10/16/2018	ND	0.0003		0.0050
Dissolved silver	mg/L	G-08D1	10/16/2018	ND	0.0001		0.0015
Dissolved sodium	mg/L	G-08D1	10/16/2018		95.9000		123.0000
Dissolved thallium	mg/L	G-08D1	10/16/2018	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-08D1	10/16/2018	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-08D1	10/16/2018	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-08D1	10/16/2018		0.5400		2.5710
Nitrite nitrogen	mg-N/L	G-08D1	10/16/2018		0.0380		15.4624
pH	std units	G-08D1	10/16/2018		9.2700		5.83 - 10.12
Sulfate	mg/L	G-08D1	10/16/2018		102.0000		130.8893
Total dissolved solids	mg/L	G-08D1	10/16/2018		300.0000		401.0317
Total organic carbon	mg/L	G-08D1	10/16/2018		1.1000		22.0000
Alkalinity (as cacO3)	mg/L	G-09S	10/17/2018		300.0000	***	200.0000
Ammonia nitrogen	mg-N/L	G-09S	10/17/2018		0.0070		12.6869
Bicarbonate	mg/L	G-09S	10/17/2018		300.0000	***	200.0000
Chemical oxygen demand	mg/L	G-09S	10/17/2018		11.0000		28.0000
Chloride	mg/L	G-09S	10/17/2018		5.3000		18.3000
Conductivity	umhos/cm	G-09S	10/17/2018		980.0000	***	577.1695
Dissolved antimony	mg/L	G-09S	10/17/2018	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-09S	10/17/2018		0.0007		0.0040
Dissolved barium	mg/L	G-09S	10/17/2018		0.0052		3.1159
Dissolved beryllium	mg/L	G-09S	10/17/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-09S	10/17/2018	ND	0.0001		737.0161
Dissolved calcium	mg/L	G-09S	10/17/2018		86.9000	***	23.3766
Dissolved chromium	mg/L	G-09S	10/17/2018	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-09S	10/17/2018	ND	0.0050		0.0070
Dissolved copper	mg/L	G-09S	10/17/2018		0.0240		0.1150
Dissolved iron	mg/L	G-09S	10/17/2018		0.1050		1.0600
Dissolved lead	mg/L	G-09S	10/17/2018		0.0002		0.0027
Dissolved magnesium	mg/L	G-09S	10/17/2018		32.2000		54.4845
Dissolved manganese	mg/L	G-09S	10/17/2018		0.0512		3.0957
Dissolved nickel	mg/L	G-09S	10/17/2018		0.0200		0.0380
Dissolved potassium	mg/L	G-09S	10/17/2018		5.5300	***	2.6310
Dissolved selenium	mg/L	G-09S	10/17/2018		0.0028		0.0050
Dissolved silver	mg/L	G-09S	10/17/2018	ND	0.0001		0.0015
Dissolved sodium	mg/L	G-09S	10/17/2018		86.9000		123.0000
Dissolved thallium	mg/L	G-09S	10/17/2018	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-09S	10/17/2018	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-09S	10/17/2018		0.0170		0.0300
Nitrate nitrogen	mg-N/L	G-09S	10/17/2018		0.0300		2.5710
Nitrite nitrogen	mg-N/L	G-09S	10/17/2018	ND	0.0010		15.4624
pH	std units	G-09S	10/17/2018		6.1800		5.83 - 10.12
Sulfate	mg/L	G-09S	10/17/2018		227.0000	***	130.8893
Total dissolved solids	mg/L	G-09S	10/17/2018		760.0000	***	401.0317
Total organic carbon	mg/L	G-09S	10/17/2018		3.8000		22.0000
Alkalinity (as cacO3)	mg/L	G-10S	10/17/2018		460.0000	***	200.0000
Ammonia nitrogen	mg-N/L	G-10S	10/17/2018		0.3240		12.6869

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Bicarbonate	mg/L	G-10S	10/17/2018		460.0000	***	200.0000
Chemical oxygen demand	mg/L	G-10S	10/17/2018		11.0000		28.0000
Chloride	mg/L	G-10S	10/17/2018		13.1000		18.3000
Conductivity	umhos/cm	G-10S	10/17/2018		1400.0000	***	577.1695
Dissolved antimony	mg/L	G-10S	10/17/2018	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-10S	10/17/2018		0.0078	*	0.0040
Dissolved barium	mg/L	G-10S	10/17/2018		0.0073		3.1159
Dissolved beryllium	mg/L	G-10S	10/17/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-10S	10/17/2018	ND	0.0001		737.0161
Dissolved calcium	mg/L	G-10S	10/17/2018		110.0000	***	23.3766
Dissolved chromium	mg/L	G-10S	10/17/2018	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-10S	10/17/2018	ND	0.0050		0.0070
Dissolved copper	mg/L	G-10S	10/17/2018	ND	0.0050		0.1150
Dissolved iron	mg/L	G-10S	10/17/2018		12.5000	***	1.0600
Dissolved lead	mg/L	G-10S	10/17/2018	ND	0.0001		0.0027
Dissolved magnesium	mg/L	G-10S	10/17/2018		25.8000		54.4845
Dissolved manganese	mg/L	G-10S	10/17/2018		3.6290	***	3.0957
Dissolved nickel	mg/L	G-10S	10/17/2018		0.0060		0.0380
Dissolved potassium	mg/L	G-10S	10/17/2018		4.2500	***	2.6310
Dissolved selenium	mg/L	G-10S	10/17/2018		0.0008		0.0050
Dissolved silver	mg/L	G-10S	10/17/2018	ND	0.0001		0.0015
Dissolved sodium	mg/L	G-10S	10/17/2018		178.0000	***	123.0000
Dissolved thallium	mg/L	G-10S	10/17/2018	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-10S	10/17/2018	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-10S	10/17/2018	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-10S	10/17/2018		0.0280		2.5710
Nitrite nitrogen	mg-N/L	G-10S	10/17/2018	ND	0.0010		15.4624
pH	std units	G-10S	10/17/2018		6.4500		5.83 - 10.12
Sulfate	mg/L	G-10S	10/17/2018		335.0000	***	130.8893
Total dissolved solids	mg/L	G-10S	10/17/2018		1100.0000	***	401.0317
Total organic carbon	mg/L	G-10S	10/17/2018		3.8000		22.0000
Alkalinity (as cacO3)	mg/L	G-11S	10/17/2018		66.0000		200.0000
Ammonia nitrogen	mg-N/L	G-11S	10/17/2018		0.0065		12.6869
Bicarbonate	mg/L	G-11S	10/17/2018		66.0000		200.0000
Chemical oxygen demand	mg/L	G-11S	10/17/2018	ND	10.0000		28.0000
Chloride	mg/L	G-11S	10/17/2018		4.6000		18.3000
Conductivity	umhos/cm	G-11S	10/17/2018		215.0000		577.1695
Dissolved antimony	mg/L	G-11S	10/17/2018	ND	0.0003		0.0019
Dissolved arsenic	mg/L	G-11S	10/17/2018		0.0006		0.0040
Dissolved barium	mg/L	G-11S	10/17/2018		0.0011		3.1159
Dissolved beryllium	mg/L	G-11S	10/17/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-11S	10/17/2018	ND	0.0001		737.0161
Dissolved calcium	mg/L	G-11S	10/17/2018		9.8650		23.3766
Dissolved chromium	mg/L	G-11S	10/17/2018	ND	0.0050		0.0150
Dissolved cobalt	mg/L	G-11S	10/17/2018	ND	0.0050		0.0070
Dissolved copper	mg/L	G-11S	10/17/2018	ND	0.0050		0.1150
Dissolved iron	mg/L	G-11S	10/17/2018		0.0140		1.0600
Dissolved lead	mg/L	G-11S	10/17/2018		0.0001		0.0027
Dissolved magnesium	mg/L	G-11S	10/17/2018		2.1300		54.4845
Dissolved manganese	mg/L	G-11S	10/17/2018	ND	0.0050		3.0957
Dissolved nickel	mg/L	G-11S	10/17/2018	ND	0.0050		0.0380
Dissolved potassium	mg/L	G-11S	10/17/2018		1.0800		2.6310
Dissolved selenium	mg/L	G-11S	10/17/2018	ND	0.0003		0.0050
Dissolved silver	mg/L	G-11S	10/17/2018	ND	0.0001		0.0015
Dissolved sodium	mg/L	G-11S	10/17/2018		41.2500		123.0000
Dissolved thallium	mg/L	G-11S	10/17/2018	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-11S	10/17/2018	ND	0.0100		0.0100
Dissolved zinc	mg/L	G-11S	10/17/2018	ND	0.0050		0.0300
Nitrate nitrogen	mg-N/L	G-11S	10/17/2018		0.0705		2.5710
Nitrite nitrogen	mg-N/L	G-11S	10/17/2018	ND	0.0010		15.4624
pH	std units	G-11S	10/17/2018		6.7000		5.83 - 10.12
Sulfate	mg/L	G-11S	10/17/2018		34.6500		130.8893
Total dissolved solids	mg/L	G-11S	10/17/2018		215.0000		401.0317

Table 2**Most Current Downgradient Monitoring Data**

Constituent	Units	Well	Date	Result	Pred. Limit
Total organic carbon	mg/L	G-11S	10/17/2018	2.2000	22.0000

- * - Current value failed - awaiting verification.
 - ** - Current value passed - previous exceedance not verified.
 - *** - Current value failed - exceedance verified.
 - **** - Current value passed - awaiting one more verification.
 - ***** - Insufficient background data to compute prediction limit.
- ND = Not Detected, Result = detection limit.

Table 5

Summary Statistics and Prediction Limits

Constituent	Units	Detect	N	Mean	SD	alpha	Factor	Pred Limit	Type	Conf
Alkalinity (as cacO ₃)	mg/L	85	85					200.0000	nonpar	0.99
Ammonia nitrogen	mg-N/L	48	81	-2.2479	2.0048	0.0100	2.3885	12.6869	lognor	
Bicarbonate	mg/L	85	85					200.0000	nonpar	0.99
Chemical oxygen demand	mg/L	12	84					28.0000	nonpar	0.99
Chloride	mg/L	84	85					18.3000	nonpar	0.99
Conductivity	umhos/cm	84	84	426.0714	63.3220	0.0100	2.3862	577.1695	normal	
Dissolved antimony	mg/L	34	85					0.0019	nonpar	0.99
Dissolved arsenic	mg/L	75	80					0.0040	nonpar	0.99
Dissolved barium	mg/L	63	78	-4.6261	2.4102	0.0100	2.3909	3.1159	lognor	
Dissolved beryllium	mg/L	0	85					0.0005	nonpar	*** 0.99
Dissolved cadmium	mg/L	40	80	-4.6271	4.7001	0.0100	2.3893	737.0161	lognor	
Dissolved calcium	mg/L	83	83	7.0845	6.8256	0.0100	2.3869	23.3766	normal	
Dissolved chromium	mg/L	35	83					0.0150	nonpar	0.99
Dissolved cobalt	mg/L	11	84					0.0070	nonpar	0.99
Dissolved copper	mg/L	44	81					0.1150	nonpar	0.99
Dissolved iron	mg/L	52	82					1.0600	nonpar	0.99
Dissolved lead	mg/L	34	85					0.0027	nonpar	0.99
Dissolved magnesium	mg/L	72	81	-0.1615	1.7415	0.0100	2.3885	54.4845	lognor	
Dissolved manganese	mg/L	63	78	-4.3085	2.2747	0.0100	2.3909	3.0957	lognor	
Dissolved nickel	mg/L	19	83					0.0380	nonpar	0.99
Dissolved potassium	mg/L	82	83	-0.7494	0.7192	0.0100	2.3869	2.6310	lognor	
Dissolved selenium	mg/L	11	84					0.0050	nonpar	0.99
Dissolved silver	mg/L	6	80					0.0015	nonpar	0.99
Dissolved sodium	mg/L	83	83					123.0000	nonpar	0.99
Dissolved thallium	mg/L	7	84					0.0030	nonpar	0.99
Dissolved vanadium	mg/L	4	85					0.0100	nonpar	0.99
Dissolved zinc	mg/L	36	84					0.0300	nonpar	0.99
Nitrate nitrogen	mg-N/L	77	82	-1.9454	1.2102	0.0100	2.3877	2.5710	lognor	
Nitrite nitrogen	mg-N/L	53	79	-3.5244	2.6204	0.0100	2.3901	15.4624	lognor	
pH	std units	85	85	7.9781	0.8094	0.0100	2.6511	5.83 - 10.12	normal	
Sulfate	mg/L	84	84	58.2086	30.4590	0.0100	2.3862	130.8893	normal	
Total dissolved solids	mg/L	85	85	282.7059	49.6029	0.0100	2.3855	401.0317	normal	
Total organic carbon	mg/L	69	85					22.0000	nonpar	0.99

Conf = confidence level for passing initial test or one of two verification resamples at all downgradient wells for a single constituent (nonparametric test only).

* - Insufficient Data.

** - Calculated limit raised to Manual Reporting Limit.

*** - Nonparametric limit based on ND value.

For transformed data, mean and SD in transformed units and prediction limit in original units.

All sample sizes and statistics are based on outlier free data.

For nonparametric limits, median reporting limits are substituted for extreme reporting limit values.

Deep Wells

Groundwater Analytical Summary - Deep Wells: First Quarter 2018
Cathcart Landfill, Snohomish County, WA

	Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	Downgradient Wells																Upgradient Wells																						
						G-01D				G-02D				G-06B				G-08D2				G-09D				G-10D				G-13D				G-14D				G-24D						
						1/24/18	D	V	Tr	Ch	1/23/18	D	V	Tr	Ch	1/23/18	D	V	Tr	Ch	1/23/18	D	V	Tr	Ch	D	V	Tr	Ch	1/30/18	D	V	Tr	Ch	1/24/18	D	V	Tr	Ch	1/23/18	D	V	Tr	Ch
CONVENTIONAL CHEMISTRY PARAMETERS (mg/L)																																												
Alkalinity (as CaCO3)	nonpar	68	68	280	--	280		P			88					260					170						480	V			170				230				210					
Ammonia Nitrogen	nonpar	65	64	0.78	--	0.147					0.01					0.069					0.195						0.333				0.089				0.146			D	Y	0.098				
Bicarbonate	nonpar	68	68	220	--	220					88					260					150						480	V			160				200				210					
Calcium, Dissolved	nonpar	65	65	6.32	--	1.39					0.61			D	N	1.21					2.62						26.4	V	D	N	0.61				0.84				0.67			D	N	
Chemical Oxygen Demand	nonpar	68	20	160	--	10	U				10	U				10	U				10	U					10	U			10	U			10	U			10	U				
Chloride	lognor	68	67	10.021	250	6.6			D	Y	5.8					7.9					3.1						27.2	V			9.1			Y	2.1				3.7			D	N	
Conductivity (umhos/cm)	nonpar	68	68	900	700	690					400			D	N	700					460						1600	V			440				490				490					
Magnesium, Dissolved	nonpar	64	45	0.25	--	0.2	U				0.2	U		D	Y	0.2	U				0.75						2.33	V	D	N	0.2	U			0.23				0.2	U		Y		
Nitrate Nitrogen (mg-N/L)	nonpar	65	10	0.069	10	0.01	U				1.7		V	D	N	0.47		V	D	N	0.026						0.01	U			0.01	U	P		0.013				0.01	U				
Nitrite Nitrogen (mg-N/L)	nonpar	61	34	0.27	1	0.032					0.003					0.001	U				0.001						0.003				0.003	U	P		0.005				0.001	U				
pH (std units)	nonpar	67	67	6.02-10.02	6.5-8.5	9.19				Y	7.90			D	N	8.19					9.95						7.16			Y	9.34				9.74			Y	8.57					
Potassium, Dissolved	nonpar	68	66	1.6	--	0.49					0.38			I	Y	0.61					0.59						2.16	V			0.32			I	N	0.3				0.24				
Sodium, Dissolved	normal	65	65	125.8108	20	144		V			65.3			D	N	126		V	D	N	81.6						269	V	D	Y	99.1				93.5				96.6					
Sulfate	nonpar	68	68	74.7	250	50.1			D	N	83.7		V			77.4		V	D	N	36.7						390	V	Y		39		D	Y	3.5				35.2					
Total Dissolved Solids	nonpar	68	68	480	500	440					260			D	N	460					310						1100	V			300				350				330					
Total Organic Carbon	nonpar	68	59	94	--	2.4					0.76					2.3					3.7						3.5				1.3				2.4				2.2					
DISSOLVED METALS EPA Methods 200.7/200.8 (mg/L)																																												
Antimony	nonpar	68	11	0.01	0.006	0.0003	U				0.0003	U				0.0003	U				0.0003	U					0.0003	U			0.0003	U			0.0003	U			0.0003	U				
Arsenic	nonpar	65	46	0.0021	0.00005	0.000214					0.000404		P			0.000382		P	Y		0.000488						0.00192				0.000255				0.000835				0.0001					
Barium	nonpar	66	19	0.0049	1	0.0005	U				0.0005	U				0.0005	U				0.007			E			0.0016				0.0005	U			0.0028				0.0005	U				
Beryllium	nonpar	68	0	0.0005	0.004	0.0005	U				0.0005	U				0.0005	U				0.0005	U					0.0005	U			0.0005	U			0.0005	U			0.0005	U				
Cadmium	nonpar	63	14	0.0001	0.005	0.00005	U				0.000085					0.000085					0.000089						0.00005	U			0.00005	U			0.00005	U			0.00005	U				
Chromium	nonpar	67	11	0.0106	0.05	0.005	U				0.0069					0.0068					0.0064						0.005	U			0.005	U			0.0058				0.005	U				
Cobalt	nonpar	68	10	0.008	--	0.005	U				0.005	U				0.005	U				0.005	U					0.005	U			0.005	U			0.005	U			0.005	U				
Copper	nonpar	65	14	0.008	1	0.009		E			0.005		P			0.005	U				0.016			E			0.005				0.008				0.005	U			0.005	U				
Iron	normal	61	32	0.1076	0.3	0.01	U				0.027			I	Y	0.032					0.016			E			0.01	U	P	Y	0.01				0.466				0.01	U				
Lead	nonpar	68	19	0.0023	0.05	0.00005	U				0.000241					0.000247					0.000246						0.0001	U			0.00005	U			0.00005	U			0.00005	U				
Manganese	nonpar	59	48	0.0183	0.05	0.005	U				0.005	U				0.005	U				0.0992			E			0.4551		V	D	N	0.005	U			0.0091				0.005	U		D	N
Nickel	nonpar	68	3	0.026	0.1	0.005	U				0.005	U				0.005	U				0.005	U					0.005	U			0.005	U			0.005	U			0.005	U				
Selenium	nonpar	67	15	0.004	0.01	0.00069					0.0003	U				0.0003	U				0.0003	U					0.00106				0.00031				0.0003	U			0.0003	U				
Silver	nonpar	64	7	0.0007	0.05	0.00005	U				0.0001	U				0.0001	U				0.0001	U					0.0001	U			0.00005	U			0.00005	U			0.00005	U				
Thallium	nonpar	66	6	0.001	0.002	0.00005	U				0.00005	U				0.00005	U				0.00005	U					0.00005	U			0.00005	U			0.00005	U			0.00005	U				
Vanadium	nonpar	68	4	0.008	--	0.01	U				0.01	U				0.01	U				0.01	U					0.014		E		0.01	U			0.01	U			0.01	U				
Zinc	nonpar	66	19	0.008	5	0.005	U				0.005	U				0.008					0.007						0.005	U			0.005	U			0.006				0.0050	U				
TOTAL METALS EPA Methods 200.7/200.8 (mg/L)																																												
Antimony					0.006	0.0003	U				0.0003	U				0.0003	U				0.0003	U					0.0003	U			0.0003	U			0.0003	U			0.0003	U				
Arsenic					0.00005	0.000074					0.00312					0.00121					0.00273						0.0018				0.000361				0.000722				0.000173					
Barium					1	0.0266					0.0031					0.0055					0.0178						0.0023				0.0025				0.0081				0.0005	U				
Beryllium					0.004	0.0005	U				0.0005	U				0.0005	U				0.0005	U					0.0005	U			0.0005	U			0.0005	U			0.0005	U				
Cadmium					0.005	0.00005	U				0.00005	U				0.00005	U				0.00005	U					0.00005	U			0.00005	U			0.00005	U			0.00005	U				
Chromium					0.05	0.0086					0.0115					0.0124					0.0112</																							

Groundwater Analytical Summary - Deep Wells: First Quarter 2018
Cathcart Landfill, Snohomish County, WA

Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	Downgradient Wells																Upgradient Wells																						
					G-01D				G-02D				G-06B				G-08D2				G-09D				G-10D				G-13D				G-14D				G-24D						
					1/24/18	D	V	Tr	Ch	1/23/18	D	V	Tr	Ch	1/23/18	D	V	Tr	Ch	1/23/18	D	V	Tr	Ch	D	V	Tr	Ch	1/30/18	D	V	Tr	Ch	1/24/18	D	V	Tr	Ch	1/23/18	D	V	Tr	Ch
VOLATILE ORGANIC COMPOUNDS (VOCs) EPA Method 8260 (µg/L) (cont.)																																											
1,1-Dichloroethylene				--	1	U				1	U				1	U				1	U				1	U					1	U					1	U					
1,2,3-Trichloropropane				--	1	U				1	U				1	U				1	U				1	U					1	U					1	U					
1,2-Dibromo-3-chloropropane				0.2	5	U				5	U				5	U				5	U				5	U					5	U					5	U					
1,2-Dibromoethane				0.001	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U					0.01	U					0.01	U					
1,2-Dichlorobenzene				--	1	U				1	U				1	U				1	U				1	U					1	U					1	U					
1,2-Dichloroethane				0.5	0.5	U				0.5	U				0.5	U				0.5	U				0.5	U					0.5	U					0.5	U					
1,2-Dichloropropane				0.6	0.6	U				0.6	U				0.6	U				0.6	U				0.6	U					0.6	U					0.6	U					
1,4-Dichlorobenzene				4	1	U				1	U				1	U				1	U				1	U					1	U					1	U					
2-Butanone				--	5	U				5	U				5	U				5	U				5	U					5	U					5	U					
2-Hexanone				--	5	U				5	U				5	U				5	U				5	U					5	U					5	U					
4-Methyl-2-Pentanone (MIBK)				--	5	U				5	U				5	U				5	U				5	U					5	U					5	U					
Acetone				--	5	U				5	U				5	U				5	U				5	U					5	U					5	U					
Acrylonitrile				0.07	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U					0.01	U					0.01	U					
Benzene				1	1	U				1	U				1	U				1	U				1	U					1	U					1	U					
Bromodichloromethane				0.3	0.3	U				0.3	U				0.3	U				0.3	U				0.3	U					0.3	U					0.3	U					
Bromoform				5	1	U				1	U				1	U				1	U				1	U					1	U					1	U					
Bromomethane				--	1	U				1	U				1	U				1	U				1	U					1	U					1	U					
Carbon Disulfide				--	1	U				1	U				1	U				1	U				1	U					1	U					1	U					
Carbon Tetrachloride				0.3	0.3	U				0.3	U				0.3	U				0.3	U				0.3	U					0.3	U					0.3	U					
Chlorobenzene				--	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U					0.2	U					0.2	U					
Chlorodibromomethane				0.5	0.5	U				0.5	U				0.5	U				0.5	U				0.5	U					0.5	U					0.5	U					
Chloroethane				--	1	U				1	U				1	U				1	U				1	U					1	U					1	U					
Chloroform				7	1	U				1	U				1	U				1	U				1	U					1	U					1	U					
Chloromethane				--	1	U				1	U				1	U				1	U				1	U					1	U					1	U					
cis-1,2-Dichloroethene				--	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U					0.2	U					0.2	U					
cis-1,3-Dichloropropene				0.2	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U					0.2	U					0.2	U					
Dibromomethane				--	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U					0.01	U					0.01	U					
Ethyl Benzene				--	1	U				1	U				1	U				1	U				1	U					1	U					1	U					
m,p-Xylene				--	1	U				1	U				1	U				1	U				1	U					1	U					1	U					
Methyl Iodide				--	1	U				1	U				1	U				1	U				1	U					1	U					1	U					
Methylene Chloride				5	2	U				2	U				2	U				2	U				2	U					2	U					2	U					
o-Xylene				--	1	U				1	U				1	U				1	U				1	U					1	U					1	U					
Styrene				--	1	U				1	U				1	U				1	U				1	U					1	U					1	U					
Tetrachloroethylene				0.8	0.8	U				0.8	U				0.8	U				0.8	U				0.8	U					0.8	U					0.8	U					
Toluene				--	1	U				1	U				1	U				1	U				1	U					1	U					1	U					
trans-1,2-Dichloroethene				--	1	U				1	U				1	U				1	U				1	U					1	U					1	U					
trans-1,3-Dichloropropene				0.2	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U					0.2	U					0.2	U					
trans-1,4-Dichloro-2-butene				--	5	U				5	U				5	U				5	U				5	U					5	U					5	U					
Trichlorethene (1,1,2-Trichloroethylene)				3	1	U				1	U				1	U				1	U				1	U					1	U					1	U					
Trichlorofluoromethane				--	1	U				1	U				1	U				1	U				1	U					1	U					1	U					
Vinyl Acetate				--	5	U				5	U				5	U				5	U				5	U					5	U					5	U					
Vinyl Chloride				0.02	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U					0.01	U					0.01	U					

D: U = Indicates compound was not detected at the given reporting limit.
V: E= Exceedance, waiting verification based on subsequent lab data; V= Exceedance verified based on previous lab data; P=Passed, previous exceedance not verified based on current lab data.
Tr: I=Increasing Trend, D=Decreasing Trend;
Ch: Y indicates a change in trend from previous quarter; N means no change in trend.
The groundwater standards listed are based on the Washington Administrative Code (WAC) 173-200 groundwater limits as modified by the TMS 91-11 standards.
* = Non-detect; exceedance due to elevated laboratory reporting limit

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Alkalinity (as cacO3)	mg/L	G-01D	01/24/2018		280.0000	**	280.0000
Ammonia nitrogen	mg-N/L	G-01D	01/24/2018		0.1470		0.7800
Bicarbonate	mg/L	G-01D	01/24/2018		220.0000		280.0000
Chemical oxygen demand	mg/L	G-01D	01/24/2018	ND	10.0000		160.0000
Chloride	mg/L	G-01D	01/24/2018		6.6000		10.0210
Conductivity	umhos/cm	G-01D	01/24/2018		690.0000		900.0000
Dissolved antimony	mg/L	G-01D	01/24/2018	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-01D	01/24/2018		0.0002		0.0021
Dissolved barium	mg/L	G-01D	01/24/2018	ND	0.0005		0.0049
Dissolved beryllium	mg/L	G-01D	01/24/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-01D	01/24/2018	ND	0.0001		0.0001
Dissolved calcium	mg/L	G-01D	01/24/2018		1.3900		6.3200
Dissolved chromium	mg/L	G-01D	01/24/2018	ND	0.0050		0.0106
Dissolved cobalt	mg/L	G-01D	01/24/2018	ND	0.0050		0.0080
Dissolved copper	mg/L	G-01D	01/24/2018		0.0090	*	0.0080
Dissolved iron	mg/L	G-01D	01/24/2018	ND	0.0100		0.1076
Dissolved lead	mg/L	G-01D	01/24/2018	ND	0.0001		0.0023
Dissolved magnesium	mg/L	G-01D	01/24/2018	ND	0.2000		0.2500
Dissolved manganese	mg/L	G-01D	01/24/2018	ND	0.0050		0.0183
Dissolved nickel	mg/L	G-01D	01/24/2018	ND	0.0050		0.0260
Dissolved potassium	mg/L	G-01D	01/24/2018		0.4900		1.6000
Dissolved selenium	mg/L	G-01D	01/24/2018		0.0007		0.0040
Dissolved silver	mg/L	G-01D	01/24/2018	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-01D	01/24/2018		144.0000	***	125.8018
Dissolved thallium	mg/L	G-01D	01/24/2018	ND	0.0001		0.0010
Dissolved vanadium	mg/L	G-01D	01/24/2018	ND	0.0100		0.0080
Dissolved zinc	mg/L	G-01D	01/24/2018	ND	0.0050		0.0080
Nitrate nitrogen	mg-N/L	G-01D	01/24/2018	ND	0.0100		0.0690
Nitrite nitrogen	mg-N/L	G-01D	01/24/2018		0.0320		0.2700
pH	std units	G-01D	01/24/2018		9.1900		6.02 - 10.02
Sulfate	mg/L	G-01D	01/24/2018		50.1000		74.7000
Total dissolved solids	mg/L	G-01D	01/24/2018		440.0000		480.0000
Total organic carbon	mg/L	G-01D	01/24/2018		2.4000		94.0000
Alkalinity (as cacO3)	mg/L	G-02D	01/23/2018		88.0000		280.0000
Ammonia nitrogen	mg-N/L	G-02D	01/23/2018		0.0100		0.7800
Bicarbonate	mg/L	G-02D	01/23/2018		88.0000		280.0000
Chemical oxygen demand	mg/L	G-02D	01/23/2018	ND	10.0000		160.0000
Chloride	mg/L	G-02D	01/23/2018		5.8000		10.0210
Conductivity	umhos/cm	G-02D	01/23/2018		400.0000		900.0000
Dissolved antimony	mg/L	G-02D	01/23/2018	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-02D	01/23/2018		0.0004	**	0.0021
Dissolved barium	mg/L	G-02D	01/23/2018	ND	0.0005		0.0049
Dissolved beryllium	mg/L	G-02D	01/23/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-02D	01/23/2018		0.0001		0.0001
Dissolved calcium	mg/L	G-02D	01/23/2018		0.6100		6.3200
Dissolved chromium	mg/L	G-02D	01/23/2018		0.0069		0.0106
Dissolved cobalt	mg/L	G-02D	01/23/2018	ND	0.0050		0.0080
Dissolved copper	mg/L	G-02D	01/23/2018		0.0050	**	0.0080
Dissolved iron	mg/L	G-02D	01/23/2018		0.0270		0.1076
Dissolved lead	mg/L	G-02D	01/23/2018		0.0002		0.0023
Dissolved magnesium	mg/L	G-02D	01/23/2018	ND	0.2000		0.2500
Dissolved manganese	mg/L	G-02D	01/23/2018	ND	0.0050		0.0183
Dissolved nickel	mg/L	G-02D	01/23/2018	ND	0.0050		0.0260
Dissolved potassium	mg/L	G-02D	01/23/2018		0.3800		1.6000
Dissolved selenium	mg/L	G-02D	01/23/2018	ND	0.0003		0.0040
Dissolved silver	mg/L	G-02D	01/23/2018	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-02D	01/23/2018		65.3000		125.8018
Dissolved thallium	mg/L	G-02D	01/23/2018	ND	0.0001		0.0010
Dissolved vanadium	mg/L	G-02D	01/23/2018	ND	0.0100		0.0080
Dissolved zinc	mg/L	G-02D	01/23/2018	ND	0.0050		0.0080
Nitrate nitrogen	mg-N/L	G-02D	01/23/2018		1.7000	***	0.0690
Nitrite nitrogen	mg-N/L	G-02D	01/23/2018		0.0030		0.2700
pH	std units	G-02D	01/23/2018		7.9000		6.02 - 10.02
Sulfate	mg/L	G-02D	01/23/2018		83.7000	***	74.7000
Total dissolved solids	mg/L	G-02D	01/23/2018		260.0000		480.0000
Total organic carbon	mg/L	G-02D	01/23/2018		0.7600		94.0000
Alkalinity (as cacO3)	mg/L	G-06B	01/23/2018		260.0000		280.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result	Pred. Limit
Ammonia nitrogen	mg-N/L	G-06B	01/23/2018		0.0690	0.7800
Bicarbonate	mg/L	G-06B	01/23/2018		260.0000	280.0000
Chemical oxygen demand	mg/L	G-06B	01/23/2018	ND	10.0000	160.0000
Chloride	mg/L	G-06B	01/23/2018		7.9000	10.0210
Conductivity	umhos/cm	G-06B	01/23/2018		700.0000	900.0000
Dissolved antimony	mg/L	G-06B	01/23/2018	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-06B	01/23/2018		0.0004	0.0021
Dissolved barium	mg/L	G-06B	01/23/2018	ND	0.0005	0.0049
Dissolved beryllium	mg/L	G-06B	01/23/2018	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-06B	01/23/2018		0.0001	0.0001
Dissolved calcium	mg/L	G-06B	01/23/2018		1.2100	6.3200
Dissolved chromium	mg/L	G-06B	01/23/2018		0.0068	0.0106
Dissolved cobalt	mg/L	G-06B	01/23/2018	ND	0.0050	0.0080
Dissolved copper	mg/L	G-06B	01/23/2018	ND	0.0050	0.0080
Dissolved iron	mg/L	G-06B	01/23/2018		0.0320	0.1076
Dissolved lead	mg/L	G-06B	01/23/2018		0.0002	0.0023
Dissolved magnesium	mg/L	G-06B	01/23/2018	ND	0.2000	0.2500
Dissolved manganese	mg/L	G-06B	01/23/2018	ND	0.0050	0.0183
Dissolved nickel	mg/L	G-06B	01/23/2018	ND	0.0050	0.0260
Dissolved potassium	mg/L	G-06B	01/23/2018		0.6100	1.6000
Dissolved selenium	mg/L	G-06B	01/23/2018	ND	0.0003	0.0040
Dissolved silver	mg/L	G-06B	01/23/2018	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-06B	01/23/2018		126.0000	125.8018
Dissolved thallium	mg/L	G-06B	01/23/2018	ND	0.0001	0.0010
Dissolved vanadium	mg/L	G-06B	01/23/2018	ND	0.0100	0.0080
Dissolved zinc	mg/L	G-06B	01/23/2018		0.0080	0.0080
Nitrate nitrogen	mg-N/L	G-06B	01/23/2018		0.4700	0.0690
Nitrite nitrogen	mg-N/L	G-06B	01/23/2018	ND	0.0010	0.2700
pH	std units	G-06B	01/23/2018		8.1900	6.02 - 10.02
Sulfate	mg/L	G-06B	01/23/2018		77.4000	74.7000
Total dissolved solids	mg/L	G-06B	01/23/2018		460.0000	480.0000
Total organic carbon	mg/L	G-06B	01/23/2018		2.3000	94.0000
Alkalinity (as cacO3)	mg/L	G-08D2	01/23/2018		170.0000	280.0000
Ammonia nitrogen	mg-N/L	G-08D2	01/23/2018		0.1950	0.7800
Bicarbonate	mg/L	G-08D2	01/23/2018		150.0000	280.0000
Chemical oxygen demand	mg/L	G-08D2	01/23/2018	ND	10.0000	160.0000
Chloride	mg/L	G-08D2	01/23/2018		3.1000	10.0210
Conductivity	umhos/cm	G-08D2	01/23/2018		460.0000	900.0000
Dissolved antimony	mg/L	G-08D2	01/23/2018	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-08D2	01/23/2018		0.0005	0.0021
Dissolved barium	mg/L	G-08D2	01/23/2018		0.0070	0.0049
Dissolved beryllium	mg/L	G-08D2	01/23/2018	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-08D2	01/23/2018		0.0001	0.0001
Dissolved calcium	mg/L	G-08D2	01/23/2018		2.6200	6.3200
Dissolved chromium	mg/L	G-08D2	01/23/2018		0.0064	0.0106
Dissolved cobalt	mg/L	G-08D2	01/23/2018	ND	0.0050	0.0080
Dissolved copper	mg/L	G-08D2	01/23/2018		0.0160	0.0080
Dissolved iron	mg/L	G-08D2	01/23/2018		7.7600	0.1076
Dissolved lead	mg/L	G-08D2	01/23/2018		0.0002	0.0023
Dissolved magnesium	mg/L	G-08D2	01/23/2018		0.7500	0.2500
Dissolved manganese	mg/L	G-08D2	01/23/2018		0.0992	0.0183
Dissolved nickel	mg/L	G-08D2	01/23/2018	ND	0.0050	0.0260
Dissolved potassium	mg/L	G-08D2	01/23/2018		0.5900	1.6000
Dissolved selenium	mg/L	G-08D2	01/23/2018	ND	0.0003	0.0040
Dissolved silver	mg/L	G-08D2	01/23/2018	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-08D2	01/23/2018		81.6000	125.8018
Dissolved thallium	mg/L	G-08D2	01/23/2018	ND	0.0001	0.0010
Dissolved vanadium	mg/L	G-08D2	01/23/2018	ND	0.0100	0.0080
Dissolved zinc	mg/L	G-08D2	01/23/2018		0.0070	0.0080
Nitrate nitrogen	mg-N/L	G-08D2	01/23/2018		0.0260	0.0690
Nitrite nitrogen	mg-N/L	G-08D2	01/23/2018		0.0010	0.2700
pH	std units	G-08D2	01/23/2018		9.9500	6.02 - 10.02
Sulfate	mg/L	G-08D2	01/23/2018		36.7000	74.7000
Total dissolved solids	mg/L	G-08D2	01/23/2018		310.0000	480.0000
Total organic carbon	mg/L	G-08D2	01/23/2018		3.7000	94.0000
Alkalinity (as cacO3)	mg/L	G-09D	07/16/2013		190.0000	280.0000
Ammonia nitrogen	mg-N/L	G-09D	07/16/2013		0.0880	0.7800

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Bicarbonate	mg/L	G-09D	07/16/2013		180.0000		280.0000
Chemical oxygen demand	mg/L	G-09D	07/16/2013	ND	10.0000		160.0000
Chloride	mg/L	G-09D	07/16/2013		7.2000		10.0210
Conductivity	umhos/cm	G-09D	07/16/2013		640.0000		900.0000
Dissolved antimony	mg/L	G-09D	07/16/2013		0.0002		0.0100
Dissolved arsenic	mg/L	G-09D	07/16/2013		0.0056	***	0.0021
Dissolved barium	mg/L	G-09D	07/16/2013		0.0028		0.0049
Dissolved beryllium	mg/L	G-09D	07/16/2013	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-09D	07/16/2013		0.0001		0.0001
Dissolved calcium	mg/L	G-09D	07/16/2013		1.5600		6.3200
Dissolved chromium	mg/L	G-09D	07/16/2013	ND	0.0010		0.0106
Dissolved cobalt	mg/L	G-09D	07/16/2013	ND	0.0010		0.0080
Dissolved copper	mg/L	G-09D	07/16/2013		0.0040		0.0080
Dissolved iron	mg/L	G-09D	07/16/2013		0.0320		0.1076
Dissolved lead	mg/L	G-09D	07/16/2013		0.0026	*	0.0023
Dissolved magnesium	mg/L	G-09D	07/16/2013		0.1000		0.2500
Dissolved manganese	mg/L	G-09D	07/16/2013		0.0073		0.0183
Dissolved nickel	mg/L	G-09D	07/16/2013		0.0060		0.0260
Dissolved potassium	mg/L	G-09D	07/16/2013		0.4800		1.6000
Dissolved selenium	mg/L	G-09D	07/16/2013		0.0005		0.0040
Dissolved silver	mg/L	G-09D	07/16/2013	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-09D	07/16/2013		149.0000	***	125.8018
Dissolved thallium	mg/L	G-09D	07/16/2013	ND	0.0000		0.0010
Dissolved vanadium	mg/L	G-09D	07/16/2013	ND	0.0050		0.0080
Dissolved zinc	mg/L	G-09D	07/16/2013		0.0050		0.0080
Nitrate nitrogen	mg-N/L	G-09D	07/16/2013		0.3300	***	0.0690
Nitrite nitrogen	mg-N/L	G-09D	07/16/2013		0.0120		0.2700
pH	std units	G-09D	07/16/2013		8.2700		6.02 - 10.02
Sulfate	mg/L	G-09D	07/16/2013		142.0000	***	74.7000
Total dissolved solids	mg/L	G-09D	07/16/2013		450.0000		480.0000
Total organic carbon	mg/L	G-09D	07/16/2013		3.0000		94.0000
Alkalinity (as cac03)	mg/L	G-10D	01/30/2018		480.0000	***	280.0000
Ammonia nitrogen	mg-N/L	G-10D	01/30/2018		0.3330		0.7800
Bicarbonate	mg/L	G-10D	01/30/2018		480.0000	***	280.0000
Chemical oxygen demand	mg/L	G-10D	01/30/2018	ND	10.0000		160.0000
Chloride	mg/L	G-10D	01/30/2018		27.2000	***	10.0210
Conductivity	umhos/cm	G-10D	01/30/2018		1600.0000	***	900.0000
Dissolved antimony	mg/L	G-10D	01/30/2018	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-10D	01/30/2018		0.0019		0.0021
Dissolved barium	mg/L	G-10D	01/30/2018		0.0016		0.0049
Dissolved beryllium	mg/L	G-10D	01/30/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-10D	01/30/2018	ND	0.0001		0.0001
Dissolved calcium	mg/L	G-10D	01/30/2018		26.4000	***	6.3200
Dissolved chromium	mg/L	G-10D	01/30/2018	ND	0.0050		0.0106
Dissolved cobalt	mg/L	G-10D	01/30/2018	ND	0.0050		0.0080
Dissolved copper	mg/L	G-10D	01/30/2018		0.0050		0.0080
Dissolved iron	mg/L	G-10D	01/30/2018	ND	0.0100	**	0.1076
Dissolved lead	mg/L	G-10D	01/30/2018	ND	0.0001		0.0023
Dissolved magnesium	mg/L	G-10D	01/30/2018		2.3300	***	0.2500
Dissolved manganese	mg/L	G-10D	01/30/2018		0.4551	***	0.0183
Dissolved nickel	mg/L	G-10D	01/30/2018	ND	0.0050		0.0260
Dissolved potassium	mg/L	G-10D	01/30/2018		2.1600	***	1.6000
Dissolved selenium	mg/L	G-10D	01/30/2018		0.0011		0.0040
Dissolved silver	mg/L	G-10D	01/30/2018	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-10D	01/30/2018		269.0000	***	125.8018
Dissolved thallium	mg/L	G-10D	01/30/2018	ND	0.0001		0.0010
Dissolved vanadium	mg/L	G-10D	01/30/2018		0.0140	*	0.0080
Dissolved zinc	mg/L	G-10D	01/30/2018	ND	0.0050		0.0080
Nitrate nitrogen	mg-N/L	G-10D	01/30/2018	ND	0.0100		0.0690
Nitrite nitrogen	mg-N/L	G-10D	01/30/2018		0.0030		0.2700
pH	std units	G-10D	01/30/2018		7.1600		6.02 - 10.02
Sulfate	mg/L	G-10D	01/30/2018		390.0000	***	74.7000
Total dissolved solids	mg/L	G-10D	01/30/2018		1100.0000	***	480.0000
Total organic carbon	mg/L	G-10D	01/30/2018		3.5000		94.0000
Alkalinity (as cac03)	mg/L	G-13D	01/24/2018		170.0000		280.0000
Ammonia nitrogen	mg-N/L	G-13D	01/24/2018		0.0875		0.7800
Bicarbonate	mg/L	G-13D	01/24/2018		165.0000		280.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result	Pred. Limit
Chemical oxygen demand	mg/L	G-13D	01/24/2018	ND	10.0000	160.0000
Chloride	mg/L	G-13D	01/24/2018		9.0500	10.0210
Conductivity	umhos/cm	G-13D	01/24/2018		455.0000	900.0000
Dissolved antimony	mg/L	G-13D	01/24/2018	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-13D	01/24/2018		0.0002	0.0021
Dissolved barium	mg/L	G-13D	01/24/2018	ND	0.0005	0.0049
Dissolved beryllium	mg/L	G-13D	01/24/2018	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-13D	01/24/2018	ND	0.0001	0.0001
Dissolved calcium	mg/L	G-13D	01/24/2018		0.6100	6.3200
Dissolved chromium	mg/L	G-13D	01/24/2018	ND	0.0050	0.0106
Dissolved cobalt	mg/L	G-13D	01/24/2018	ND	0.0050	0.0080
Dissolved copper	mg/L	G-13D	01/24/2018		0.0080	0.0080
Dissolved iron	mg/L	G-13D	01/24/2018		0.0115	0.1076
Dissolved lead	mg/L	G-13D	01/24/2018	ND	0.0001	0.0023
Dissolved magnesium	mg/L	G-13D	01/24/2018	ND	0.2000	0.2500
Dissolved manganese	mg/L	G-13D	01/24/2018	ND	0.0050	0.0183
Dissolved nickel	mg/L	G-13D	01/24/2018	ND	0.0050	0.0260
Dissolved potassium	mg/L	G-13D	01/24/2018		0.3300	1.6000
Dissolved selenium	mg/L	G-13D	01/24/2018		0.0003	0.0040
Dissolved silver	mg/L	G-13D	01/24/2018	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-13D	01/24/2018		98.6500	125.8018
Dissolved thallium	mg/L	G-13D	01/24/2018	ND	0.0001	0.0010
Dissolved vanadium	mg/L	G-13D	01/24/2018	ND	0.0100	0.0080
Dissolved zinc	mg/L	G-13D	01/24/2018	ND	0.0050	0.0080
Nitrate nitrogen	mg-N/L	G-13D	01/24/2018	ND	0.0100	0.0690
Nitrite nitrogen	mg-N/L	G-13D	01/24/2018		0.0035	0.2700
pH	std units	G-13D	01/24/2018		9.3400	6.02 - 10.02
Sulfate	mg/L	G-13D	01/24/2018		39.1000	74.7000
Total dissolved solids	mg/L	G-13D	01/24/2018		295.0000	480.0000
Total organic carbon	mg/L	G-13D	01/24/2018		1.3000	94.0000

- * - Current value failed - awaiting verification.
** - Current value passed - previous exceedance not verified.
*** - Current value failed - exceedance verified.
**** - Current value passed - awaiting one more verification.
***** - Insufficient background data to compute prediction limit.
ND = Not Detected, result = detection limit.

Table 5

Summary Statistics and Prediction Limits

Constituent	Units	Model Type	N	Detect	Mean	SD	Pred Limit	Conf*
Alkalinity (as caco3)	mg/L	nonpar	68	68			280.0000	0.99
Ammonia nitrogen	mg-N/L	nonpar	65	64			0.7800	0.99
Bicarbonate	mg/L	nonpar	68	68			280.0000	0.99
Chemical oxygen demand	mg/L	nonpar	68	20			160.0000	0.99
Chloride	mg/L	lognor	68	67	1.5887	0.3379	10.0210	
Conductivity	umhos/cm	nonpar	68	68			900.0000	0.99
Dissolved antimony	mg/L	nonpar	68	11			0.0100	0.99
Dissolved arsenic	mg/L	nonpar	65	46			0.0021	0.99
Dissolved barium	mg/L	nonpar	66	19			0.0049	0.99
Dissolved beryllium	mg/L	nonpar	68	0			0.0005	0.99
Dissolved cadmium	mg/L	nonpar	63	14			0.0001	0.99
Dissolved calcium	mg/L	nonpar	65	65			6.3200	0.99
Dissolved chromium	mg/L	nonpar	67	11			0.0106	0.99
Dissolved cobalt	mg/L	nonpar	68	10			0.0080	0.99
Dissolved copper	mg/L	nonpar	65	14			0.0080	0.99
Dissolved iron	mg/L	normal	61	32	0.0198	0.0365	0.1076	
Dissolved lead	mg/L	nonpar	68	19			0.0023	0.99
Dissolved magnesium	mg/L	nonpar	64	45			0.2500	0.99
Dissolved manganese	mg/L	nonpar	59	48			0.0183	0.99
Dissolved nickel	mg/L	nonpar	68	3			0.0260	0.99
Dissolved potassium	mg/L	nonpar	68	66			1.6000	0.99
Dissolved selenium	mg/L	nonpar	67	15			0.0040	0.99
Dissolved silver	mg/L	nonpar	64	7			0.0007	0.99
Dissolved sodium	mg/L	normal	65	65	106.8908	7.8655	125.8018	
Dissolved thallium	mg/L	nonpar	66	6			0.0010	0.99
Dissolved vanadium	mg/L	nonpar	68	4			0.0080	0.99
Dissolved zinc	mg/L	nonpar	66	19			0.0080	0.99
Nitrate nitrogen	mg-N/L	nonpar	65	10			0.0690	0.99
Nitrite nitrogen	mg-N/L	nonpar	61	34			0.2700	0.99
pH	std units	nonpar	67	67			6.02- 10.02	0.99
Sulfate	mg/L	nonpar	68	68			74.7000	0.99
Total dissolved solids	mg/L	nonpar	68	68			480.0000	0.99
Total organic carbon	mg/L	nonpar	68	59			94.0000	0.99

* - Confidence level for passing initial test or one verification resample at all downgradient wells for a single constituent (nonparametric test only).

Model Type refers to type of prediction limit.

For lognormal limit, mean and sd in natural log units and prediction limit in original units.

All sample sizes and statistics are based on outlier free data.

For nonparametric limits, median reporting limits are substituted for extreme reporting limit values.

Groundwater Analytical Summary - Deep Wells: Second Quarter 2018
Cathcart Landfill, Snohomish County, WA

	Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	Downgradient Wells												Upgradient Wells																																
						G-01D				G-02D				G-06B				G-08D2				G-09D				G-10D				G-13D				G-14D				G-24D												
						4/18/18	D	V	Tr	Ch	4/18/18	D	V	Tr	Ch	4/18/18	D	V	Tr	Ch	4/17/18	D	V	Tr	Ch	4/17/18	D	V	Tr	Ch	4/17/18	D	V	Tr	Ch	4/18/18	D	V	Tr	Ch	4/17/18	D	V	Tr	Ch					
CONVENTIONAL CHEMISTRY PARAMETERS (mg/L)																																																		
Alkalinity (as CaCO3)	nonpar	70	70	280	--	270					90					300	E				180					170					480	V				170					230					200				
Ammonia Nitrogen	nonpar	67	66	0.78	--	0.141					0.019					0.028					0.175					0.145					0.332					0.062					0.117			D		0.096				
Bicarbonate	nonpar	70	70	220	--	250					90					300	E				120					120			D		480	V				150					170					200				
Calcium, Dissolved	nonpar	67	67	6.32	--	1.27					0.76			D	N						2.54					1.59					26.1	V	D	N		0.69					1.12					0.73			D	N
Chemical Oxygen Demand	nonpar	70	20	160	--	10	U				10	U				10	U				10	U				10	U				10	U				10	U				10	U				10	U			
Chloride	nonpar	70	69	10.021	250	7.1			D	Y	6.8					8.1			D	N	2.8					5.8			D		14.7	V				9.6					2.5					3.5			D	N
Conductivity (umhos/cm)	nonpar	70	70	900	700	680					390			D	N	690			D	N	460					610			D		1700	V				450					480					470				
Magnesium, Dissolved	lognor	66	46	0.25	--	0.2	U				0.2	U				0.2	U				0.58	E				0.2	U				2.37	V	D	N		0.2	U				0.31					0.2	U			
Nitrate Nitrogen (mg-N/L)	nonpar	67	10	0.069	10	0.01	U				1.2	V	D	N		0.5	V	D	N		0.37	E				0.01	U	P			0.01	U				0.01	U				0.01	U				0.01	U			
Nitrite Nitrogen (mg-N/L)	nonpar	63	34	0.27	1	0.03					0.008					0.005					0.012					0.001	U				0.002					0.01					0.001	U				0.001	U			
pH (std units)	normal	69	69	6.02-10.02	6.5-8.5	9.11					7.72			D	N	7.99					9.88					9.47					6.74					9.11					9.66					8.48				
Potassium, Dissolved	nonpar	70	68	1.6	--	0.65					0.51			I	N	0.75			I	N	0.62					0.73					2.93	V				0.72			I	N	0.33					0.23				
Sodium, Dissolved	nonpar	67	67	125.8108	20	151	V				81.7			D	N	157	V	D	N		102				136	V				339	V	D	N		103					105					117					
Sulfate	normal	70	70	74.7	250	49.7			D	N	80.6	V				82.9	V	D	N		37.9				49.1	P				367	V				39.3			D	N	3.5					42.9					
Total Dissolved Solids	normal	70	70	480	500	460					260			D	N	450			D	N	340					410			D		1100	V				310					320					310				
Total Organic Carbon	nonpar	70	61	94	--	2.8					1.1					2.5					2.5					4.0					4.1					1.6					2.9					1.8				
DISSOLVED METALS EPA Methods 200.7/200.8 (mg/L)																																																		
Antimony	nonpar	70	11	0.01	0.006	0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0009					0.0003	U				0.0003	U				0.0003	U				0.0003	U			
Arsenic	nonpar	67	48	0.0021	0.00005	0.000139				0.00389	E				0.00273					0.00267	E				0.00652	V				0.000636					0.000202					0.0011					0.000058					
Barium	nonpar	68	19	0.0049	1	0.0005	U				0.0005	U				0.0005	U				0.0051	E				0.0005	U				0.0013					0.0005	U				0.0005	U				0.0005	U			
Beryllium	nonpar	70	0	0.0005	0.004	0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U			
Cadmium	nonpar	65	14	0.0001	0.0005	0.00005	U				0.00005	U				0.000071					0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U			
Chromium	nonpar	69	11	0.0106	0.05	0.005	U				0.005	U				0.005	U				0.005	U				0.0088					0.005	U				0.005	U				0.005	U				0.005	U			
Cobalt	nonpar	70	10	0.008	--	0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U			
Copper	nonpar	67	14	0.008	1	0.005	U	P			0.005	U				0.005	U				0.005	U	P			0.005	U				0.005	U				0.005	U				0.005	U				0.005	U			
Iron	nonpar	62	33	0.1076	0.3	0.046				0.088			I	N		1.75					0.028	E				0.028					0.71	E				0.093					0.52					0.017				
Lead	nonpar	70	20	0.0023	0.05	0.0001	U				0.0001	U				0.0001	U				0.000361					0.00035	P				0.0001	U				0.0001	U				0.000111					0.0001	U			
Manganese	nonpar	61	49	0.0183	0.05	0.005	U				0.005	U				0.005	U				0.0705	E				0.0084					0.456	V	D	N		0.005	U				0.0097					0.005	U		D	N
Nickel	nonpar	70	3	0.026	0.1	0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U			
Selenium	nonpar	69	16	0.004	0.01	0.00058				0.0003	U				0.00046					0.0003	U				0.00077					0.00085					0.00035					0.0003	U				0.00052					
Silver	nonpar	66	7	0.0007	0.05	0.0001	U				0.0001	U				0.0001	U				0.0001	U				0.0001	U				0.0001	U				0.0001	U				0.0001	U				0.0001	U			
Thallium	nonpar	68	6	0.001	0.002	0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U			
Vanadium	nonpar	70	4	0.008	--	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U	P			0.01	U				0.01	U				0.01	U			
Zinc	nonpar	68	19	0.008	5	0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U			
TOTAL METALS EPA Methods 200.7/200.8 (mg/L)																																																		
Antimony					0.006	0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.00069					0.0003	U				0.0003	U				0.0003	U				0.0003	U			
Arsenic					0.00005	0.000243				0.00307					0.00234					0.00204					0.00523					0.00125					0.00005	U				0.000641					0.000139					
Barium					1	0.0046				0.013					0.0066					0.0136					0.009					0.001					0.0005															

Groundwater Analytical Summary - Deep Wells: Second Quarter 2018
Cathcart Landfill, Snohomish County, WA

Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	Downgradient Wells																				Upgradient Wells															
					G-01D				G-02D				G-06B				G-08D2				G-09D				G-10D				G-13D				G-14D				G-24D			
					4/18/18	D	V	Tr	Ch	4/18/18	D	V	Tr	Ch	4/18/18	D	V	Tr	Ch	4/17/18	D	V	Tr	Ch	4/17/18	D	V	Tr	Ch	4/17/18	D	V	Tr	Ch	4/18/18	D	V	Tr	Ch	4/17/18
VOLATILE ORGANIC COMPOUNDS (VOCs) EPA Method 8260 (µg/L) (cont.)																																								
1,1-Dichloroethylene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
1,2,3-Trichloropropane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
1,2-Dibromo-3-chloropropane				0.2	5	U				5	U				5	U				5	U				5	U				5	U				5	U				
1,2-Dibromoethane				0.001	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				
1,2-Dichlorobenzene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
1,2-Dichloroethane				0.5	0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				
1,2-Dichloropropane				0.6	0.6	U				0.6	U				0.6	U				0.6	U				0.6	U				0.6	U				0.6	U				
1,4-Dichlorobenzene				4	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
2-Butanone				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				
2-Hexanone				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				
4-Methyl-2-Pentanone (MIBK)				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				
Acetone				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				
Acrylonitrile				0.07	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				
Benzene				1	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Bromodichloromethane				0.3	0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				
Bromoform				5	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Bromomethane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Carbon Disulfide				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Carbon Tetrachloride				0.3	0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				
Chlorobenzene				--	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				
Chlorodibromomethane				0.5	0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				
Chloroethane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Chloroform				7	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Chloromethane				--	1	U				1	U				2.6					1	U				1	U				1	U				1	U				
cis-1,2-Dichloroethene				--	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				
cis-1,3-Dichloropropene				0.2	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				
Dibromomethane				--	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				
Ethyl Benzene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
m,p-Xylene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Methyl Iodide				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Methylene Chloride				5	2	U				2	U				2	U				2	U				2	U				2	U				2	U				
o-Xylene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Styrene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Tetrachloroethylene				0.8	0.8	U				0.8	U				0.8	U				0.8	U				0.8	U				0.8	U				0.8	U				
Toluene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
trans-1,2-Dichloroethene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
trans-1,3-Dichloropropene				0.2	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				
trans-1,4-Dichloro-2-butene				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				
Trichlorethene (1,1,2-Trichloroethylene)				3	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Trichlorofluoromethane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				
Vinyl Acetate				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				
Vinyl Chloride				0.02	0.01	U				0.01	U				0.01	U				0.09					0.03				0.01	U				0.01	U					

D: U = Indicates compound was not detected at the given reporting limit.
V: E= Exceedance, waiting verification based on subsequent lab data; V= Exceedance verified based on previous lab data; P=Passed, previous exceedance not verified based on current lab data.
Tr: I=Increasing Trend, D=Decreasing Trend;
Ch: Y indicates a change in trend from previous quarter; N means no change in trend.
The groundwater standards listed are based on the Washington Administrative Code (WAC) 173-200 groundwater limits as modified by the TMS 91-11 standards.
* = Non-detect, exceedance due to elevated laboratory reporting limit

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Alkalinity (as cacO3)	mg/L	G-01D	04/18/2018		275.0000		280.0000
Ammonia nitrogen	mg-N/L	G-01D	04/18/2018		0.1470		0.7800
Bicarbonate	mg/L	G-01D	04/18/2018		255.0000		280.0000
Chemical oxygen demand	mg/L	G-01D	04/18/2018	ND	10.0000		160.0000
Chloride	mg/L	G-01D	04/18/2018		7.1000		9.8843
Conductivity	umhos/cm	G-01D	04/18/2018		680.0000		900.0000
Dissolved antimony	mg/L	G-01D	04/18/2018	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-01D	04/18/2018		0.0001		0.0021
Dissolved barium	mg/L	G-01D	04/18/2018	ND	0.0005		0.0049
Dissolved beryllium	mg/L	G-01D	04/18/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-01D	04/18/2018	ND	0.0001		0.0001
Dissolved calcium	mg/L	G-01D	04/18/2018		1.2600		6.3200
Dissolved chromium	mg/L	G-01D	04/18/2018	ND	0.0050		0.0106
Dissolved cobalt	mg/L	G-01D	04/18/2018	ND	0.0050		0.0080
Dissolved copper	mg/L	G-01D	04/18/2018	ND	0.0050	**	0.0080
Dissolved iron	mg/L	G-01D	04/18/2018		0.0415		0.1068
Dissolved lead	mg/L	G-01D	04/18/2018	ND	0.0001		0.0023
Dissolved magnesium	mg/L	G-01D	04/18/2018	ND	0.2000		0.3100
Dissolved manganese	mg/L	G-01D	04/18/2018	ND	0.0050		0.0183
Dissolved nickel	mg/L	G-01D	04/18/2018	ND	0.0050		0.0260
Dissolved potassium	mg/L	G-01D	04/18/2018		0.7050		1.6000
Dissolved selenium	mg/L	G-01D	04/18/2018		0.0007		0.0040
Dissolved silver	mg/L	G-01D	04/18/2018	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-01D	04/18/2018		150.0000	***	125.8616
Dissolved thallium	mg/L	G-01D	04/18/2018	ND	0.0001		0.0010
Dissolved vanadium	mg/L	G-01D	04/18/2018	ND	0.0100		0.0080
Dissolved zinc	mg/L	G-01D	04/18/2018	ND	0.0050		0.0080
Nitrate nitrogen	mg-N/L	G-01D	04/18/2018	ND	0.0100		0.0690
Nitrite nitrogen	mg-N/L	G-01D	04/18/2018		0.0355		0.2700
pH	std units	G-01D	04/18/2018		9.1900		6.02 - 10.02
Sulfate	mg/L	G-01D	04/18/2018		50.3000		74.7000
Total dissolved solids	mg/L	G-01D	04/18/2018		455.0000		480.0000
Total organic carbon	mg/L	G-01D	04/18/2018		2.9500		94.0000
Alkalinity (as cacO3)	mg/L	G-02D	04/18/2018		90.0000		280.0000
Ammonia nitrogen	mg-N/L	G-02D	04/18/2018		0.0190		0.7800
Bicarbonate	mg/L	G-02D	04/18/2018		90.0000		280.0000
Chemical oxygen demand	mg/L	G-02D	04/18/2018	ND	10.0000		160.0000
Chloride	mg/L	G-02D	04/18/2018		6.8000		9.8843
Conductivity	umhos/cm	G-02D	04/18/2018		390.0000		900.0000
Dissolved antimony	mg/L	G-02D	04/18/2018	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-02D	04/18/2018		0.0039	*	0.0021
Dissolved barium	mg/L	G-02D	04/18/2018	ND	0.0005		0.0049
Dissolved beryllium	mg/L	G-02D	04/18/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-02D	04/18/2018	ND	0.0001		0.0001
Dissolved calcium	mg/L	G-02D	04/18/2018		0.7600		6.3200
Dissolved chromium	mg/L	G-02D	04/18/2018	ND	0.0050		0.0106
Dissolved cobalt	mg/L	G-02D	04/18/2018	ND	0.0050		0.0080
Dissolved copper	mg/L	G-02D	04/18/2018	ND	0.0050		0.0080
Dissolved iron	mg/L	G-02D	04/18/2018		0.0880		0.1068
Dissolved lead	mg/L	G-02D	04/18/2018	ND	0.0001		0.0023
Dissolved magnesium	mg/L	G-02D	04/18/2018	ND	0.2000		0.3100
Dissolved manganese	mg/L	G-02D	04/18/2018	ND	0.0050		0.0183
Dissolved nickel	mg/L	G-02D	04/18/2018	ND	0.0050		0.0260
Dissolved potassium	mg/L	G-02D	04/18/2018		0.5100		1.6000
Dissolved selenium	mg/L	G-02D	04/18/2018	ND	0.0003		0.0040
Dissolved silver	mg/L	G-02D	04/18/2018	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-02D	04/18/2018		81.7000		125.8616
Dissolved thallium	mg/L	G-02D	04/18/2018	ND	0.0001		0.0010
Dissolved vanadium	mg/L	G-02D	04/18/2018	ND	0.0100		0.0080
Dissolved zinc	mg/L	G-02D	04/18/2018	ND	0.0050		0.0080
Nitrate nitrogen	mg-N/L	G-02D	04/18/2018		1.2000	***	0.0690
Nitrite nitrogen	mg-N/L	G-02D	04/18/2018		0.0080		0.2700
pH	std units	G-02D	04/18/2018		7.7200		6.02 - 10.02
Sulfate	mg/L	G-02D	04/18/2018		80.6000	***	74.7000
Total dissolved solids	mg/L	G-02D	04/18/2018		260.0000		480.0000
Total organic carbon	mg/L	G-02D	04/18/2018		1.1000		94.0000
Alkalinity (as cacO3)	mg/L	G-06B	04/18/2018		300.0000	*	280.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Ammonia nitrogen	mg-N/L	G-06B	04/18/2018		0.0280		0.7800
Bicarbonate	mg/L	G-06B	04/18/2018		300.0000	*	280.0000
Chemical oxygen demand	mg/L	G-06B	04/18/2018	ND	10.0000		160.0000
Chloride	mg/L	G-06B	04/18/2018		8.1000		9.8843
Conductivity	umhos/cm	G-06B	04/18/2018		690.0000		900.0000
Dissolved antimony	mg/L	G-06B	04/18/2018	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-06B	04/18/2018		0.0027	*	0.0021
Dissolved barium	mg/L	G-06B	04/18/2018	ND	0.0005		0.0049
Dissolved beryllium	mg/L	G-06B	04/18/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-06B	04/18/2018		0.0001		0.0001
Dissolved calcium	mg/L	G-06B	04/18/2018		1.0900		6.3200
Dissolved chromium	mg/L	G-06B	04/18/2018	ND	0.0050		0.0106
Dissolved cobalt	mg/L	G-06B	04/18/2018	ND	0.0050		0.0080
Dissolved copper	mg/L	G-06B	04/18/2018	ND	0.0050		0.0080
Dissolved iron	mg/L	G-06B	04/18/2018	ND	0.0100		0.1068
Dissolved lead	mg/L	G-06B	04/18/2018	ND	0.0001		0.0023
Dissolved magnesium	mg/L	G-06B	04/18/2018	ND	0.2000		0.3100
Dissolved manganese	mg/L	G-06B	04/18/2018	ND	0.0050		0.0183
Dissolved nickel	mg/L	G-06B	04/18/2018	ND	0.0050		0.0260
Dissolved potassium	mg/L	G-06B	04/18/2018		0.7500		1.6000
Dissolved selenium	mg/L	G-06B	04/18/2018		0.0005		0.0040
Dissolved silver	mg/L	G-06B	04/18/2018	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-06B	04/18/2018		157.0000	***	125.8616
Dissolved thallium	mg/L	G-06B	04/18/2018	ND	0.0001		0.0010
Dissolved vanadium	mg/L	G-06B	04/18/2018	ND	0.0100		0.0080
Dissolved zinc	mg/L	G-06B	04/18/2018	ND	0.0050		0.0080
Nitrate nitrogen	mg-N/L	G-06B	04/18/2018		0.5000	***	0.0690
Nitrite nitrogen	mg-N/L	G-06B	04/18/2018		0.0050		0.2700
pH	std units	G-06B	04/18/2018		7.9900		6.02 - 10.02
Sulfate	mg/L	G-06B	04/18/2018		82.9000	***	74.7000
Total dissolved solids	mg/L	G-06B	04/18/2018		450.0000		480.0000
Total organic carbon	mg/L	G-06B	04/18/2018		2.5000		94.0000
Alkalinity (as cacO3)	mg/L	G-08D2	04/17/2018		180.0000		280.0000
Ammonia nitrogen	mg-N/L	G-08D2	04/17/2018		0.1750		0.7800
Bicarbonate	mg/L	G-08D2	04/17/2018		120.0000		280.0000
Chemical oxygen demand	mg/L	G-08D2	04/17/2018	ND	10.0000		160.0000
Chloride	mg/L	G-08D2	04/17/2018		2.8000		9.8843
Conductivity	umhos/cm	G-08D2	04/17/2018		460.0000		900.0000
Dissolved antimony	mg/L	G-08D2	04/17/2018	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-08D2	04/17/2018		0.0027	*	0.0021
Dissolved barium	mg/L	G-08D2	04/17/2018		0.0051	*	0.0049
Dissolved beryllium	mg/L	G-08D2	04/17/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-08D2	04/17/2018	ND	0.0001		0.0001
Dissolved calcium	mg/L	G-08D2	04/17/2018		2.5400		6.3200
Dissolved chromium	mg/L	G-08D2	04/17/2018	ND	0.0050		0.0106
Dissolved cobalt	mg/L	G-08D2	04/17/2018	ND	0.0050		0.0080
Dissolved copper	mg/L	G-08D2	04/17/2018	ND	0.0050	**	0.0080
Dissolved iron	mg/L	G-08D2	04/17/2018		1.7500	*	0.1068
Dissolved lead	mg/L	G-08D2	04/17/2018		0.0004		0.0023
Dissolved magnesium	mg/L	G-08D2	04/17/2018		0.5800	*	0.3100
Dissolved manganese	mg/L	G-08D2	04/17/2018		0.0705	*	0.0183
Dissolved nickel	mg/L	G-08D2	04/17/2018	ND	0.0050		0.0260
Dissolved potassium	mg/L	G-08D2	04/17/2018		0.6200		1.6000
Dissolved selenium	mg/L	G-08D2	04/17/2018	ND	0.0003		0.0040
Dissolved silver	mg/L	G-08D2	04/17/2018	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-08D2	04/17/2018		102.0000		125.8616
Dissolved thallium	mg/L	G-08D2	04/17/2018	ND	0.0001		0.0010
Dissolved vanadium	mg/L	G-08D2	04/17/2018	ND	0.0100		0.0080
Dissolved zinc	mg/L	G-08D2	04/17/2018	ND	0.0050		0.0080
Nitrate nitrogen	mg-N/L	G-08D2	04/17/2018		0.3700	*	0.0690
Nitrite nitrogen	mg-N/L	G-08D2	04/17/2018		0.0120		0.2700
pH	std units	G-08D2	04/17/2018		9.8800		6.02 - 10.02
Sulfate	mg/L	G-08D2	04/17/2018		37.9000		74.7000
Total dissolved solids	mg/L	G-08D2	04/17/2018		340.0000		480.0000
Total organic carbon	mg/L	G-08D2	04/17/2018		2.5000		94.0000
Alkalinity (as cacO3)	mg/L	G-09D	04/17/2018		170.0000		280.0000
Ammonia nitrogen	mg-N/L	G-09D	04/17/2018		0.1450		0.7800

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Bicarbonate	mg/L	G-09D	04/17/2018		120.0000		280.0000
Chemical oxygen demand	mg/L	G-09D	04/17/2018	ND	10.0000		160.0000
Chloride	mg/L	G-09D	04/17/2018		5.8000		9.8843
Conductivity	umhos/cm	G-09D	04/17/2018		610.0000		900.0000
Dissolved antimony	mg/L	G-09D	04/17/2018		0.0009		0.0100
Dissolved arsenic	mg/L	G-09D	04/17/2018		0.0065	***	0.0021
Dissolved barium	mg/L	G-09D	04/17/2018	ND	0.0005		0.0049
Dissolved beryllium	mg/L	G-09D	04/17/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-09D	04/17/2018	ND	0.0001		0.0001
Dissolved calcium	mg/L	G-09D	04/17/2018		1.5900		6.3200
Dissolved chromium	mg/L	G-09D	04/17/2018		0.0088		0.0106
Dissolved cobalt	mg/L	G-09D	04/17/2018	ND	0.0050		0.0080
Dissolved copper	mg/L	G-09D	04/17/2018	ND	0.0050		0.0080
Dissolved iron	mg/L	G-09D	04/17/2018		0.0280		0.1068
Dissolved lead	mg/L	G-09D	04/17/2018		0.0004	**	0.0023
Dissolved magnesium	mg/L	G-09D	04/17/2018	ND	0.2000		0.3100
Dissolved manganese	mg/L	G-09D	04/17/2018		0.0084		0.0183
Dissolved nickel	mg/L	G-09D	04/17/2018	ND	0.0050		0.0260
Dissolved potassium	mg/L	G-09D	04/17/2018		0.7300		1.6000
Dissolved selenium	mg/L	G-09D	04/17/2018		0.0008		0.0040
Dissolved silver	mg/L	G-09D	04/17/2018	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-09D	04/17/2018		136.0000	***	125.8616
Dissolved thallium	mg/L	G-09D	04/17/2018	ND	0.0001		0.0010
Dissolved vanadium	mg/L	G-09D	04/17/2018	ND	0.0100		0.0080
Dissolved zinc	mg/L	G-09D	04/17/2018	ND	0.0050		0.0080
Nitrate nitrogen	mg-N/L	G-09D	04/17/2018	ND	0.0100	**	0.0690
Nitrite nitrogen	mg-N/L	G-09D	04/17/2018	ND	0.0010		0.2700
pH	std units	G-09D	04/17/2018		9.4700		6.02 - 10.02
Sulfate	mg/L	G-09D	04/17/2018		49.1000	**	74.7000
Total dissolved solids	mg/L	G-09D	04/17/2018		410.0000		480.0000
Total organic carbon	mg/L	G-09D	04/17/2018		4.0000		94.0000
Alkalinity (as cacO3)	mg/L	G-10D	04/17/2018		480.0000	***	280.0000
Ammonia nitrogen	mg-N/L	G-10D	04/17/2018		0.3320		0.7800
Bicarbonate	mg/L	G-10D	04/17/2018		480.0000	***	280.0000
Chemical oxygen demand	mg/L	G-10D	04/17/2018	ND	10.0000		160.0000
Chloride	mg/L	G-10D	04/17/2018		14.7000	***	9.8843
Conductivity	umhos/cm	G-10D	04/17/2018		1700.0000	***	900.0000
Dissolved antimony	mg/L	G-10D	04/17/2018	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-10D	04/17/2018		0.0006		0.0021
Dissolved barium	mg/L	G-10D	04/17/2018		0.0013		0.0049
Dissolved beryllium	mg/L	G-10D	04/17/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-10D	04/17/2018	ND	0.0001		0.0001
Dissolved calcium	mg/L	G-10D	04/17/2018		26.1000	***	6.3200
Dissolved chromium	mg/L	G-10D	04/17/2018	ND	0.0050		0.0106
Dissolved cobalt	mg/L	G-10D	04/17/2018	ND	0.0050		0.0080
Dissolved copper	mg/L	G-10D	04/17/2018	ND	0.0050		0.0080
Dissolved iron	mg/L	G-10D	04/17/2018		0.7100	*	0.1068
Dissolved lead	mg/L	G-10D	04/17/2018	ND	0.0001		0.0023
Dissolved magnesium	mg/L	G-10D	04/17/2018		2.3700	***	0.3100
Dissolved manganese	mg/L	G-10D	04/17/2018		0.4560	***	0.0183
Dissolved nickel	mg/L	G-10D	04/17/2018	ND	0.0050		0.0260
Dissolved potassium	mg/L	G-10D	04/17/2018		2.9300	***	1.6000
Dissolved selenium	mg/L	G-10D	04/17/2018		0.0009		0.0040
Dissolved silver	mg/L	G-10D	04/17/2018	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-10D	04/17/2018		339.0000	***	125.8616
Dissolved thallium	mg/L	G-10D	04/17/2018	ND	0.0001		0.0010
Dissolved vanadium	mg/L	G-10D	04/17/2018	ND	0.0100	**	0.0080
Dissolved zinc	mg/L	G-10D	04/17/2018	ND	0.0050		0.0080
Nitrate nitrogen	mg-N/L	G-10D	04/17/2018	ND	0.0100		0.0690
Nitrite nitrogen	mg-N/L	G-10D	04/17/2018		0.0020		0.2700
pH	std units	G-10D	04/17/2018		6.7400		6.02 - 10.02
Sulfate	mg/L	G-10D	04/17/2018		367.0000	***	74.7000
Total dissolved solids	mg/L	G-10D	04/17/2018		1100.0000	***	480.0000
Total organic carbon	mg/L	G-10D	04/17/2018		4.1000		94.0000
Alkalinity (as cacO3)	mg/L	G-13D	04/18/2018		170.0000		280.0000
Ammonia nitrogen	mg-N/L	G-13D	04/18/2018		0.0620		0.7800
Bicarbonate	mg/L	G-13D	04/18/2018		150.0000		280.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result	Pred. Limit
Chemical oxygen demand	mg/L	G-13D	04/18/2018	ND	10.0000	160.0000
Chloride	mg/L	G-13D	04/18/2018		9.6000	9.8843
Conductivity	umhos/cm	G-13D	04/18/2018		450.0000	900.0000
Dissolved antimony	mg/L	G-13D	04/18/2018	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-13D	04/18/2018		0.0002	0.0021
Dissolved barium	mg/L	G-13D	04/18/2018	ND	0.0005	0.0049
Dissolved beryllium	mg/L	G-13D	04/18/2018	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-13D	04/18/2018	ND	0.0001	0.0001
Dissolved calcium	mg/L	G-13D	04/18/2018		0.6900	6.3200
Dissolved chromium	mg/L	G-13D	04/18/2018	ND	0.0050	0.0106
Dissolved cobalt	mg/L	G-13D	04/18/2018	ND	0.0050	0.0080
Dissolved copper	mg/L	G-13D	04/18/2018	ND	0.0050	0.0080
Dissolved iron	mg/L	G-13D	04/18/2018		0.0930	0.1068
Dissolved lead	mg/L	G-13D	04/18/2018	ND	0.0001	0.0023
Dissolved magnesium	mg/L	G-13D	04/18/2018	ND	0.2000	0.3100
Dissolved manganese	mg/L	G-13D	04/18/2018	ND	0.0050	0.0183
Dissolved nickel	mg/L	G-13D	04/18/2018	ND	0.0050	0.0260
Dissolved potassium	mg/L	G-13D	04/18/2018		0.7200	1.6000
Dissolved selenium	mg/L	G-13D	04/18/2018		0.0004	0.0040
Dissolved silver	mg/L	G-13D	04/18/2018	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-13D	04/18/2018		103.0000	125.8616
Dissolved thallium	mg/L	G-13D	04/18/2018	ND	0.0001	0.0010
Dissolved vanadium	mg/L	G-13D	04/18/2018	ND	0.0100	0.0080
Dissolved zinc	mg/L	G-13D	04/18/2018	ND	0.0050	0.0080
Nitrate nitrogen	mg-N/L	G-13D	04/18/2018	ND	0.0100	0.0690
Nitrite nitrogen	mg-N/L	G-13D	04/18/2018		0.0100	0.2700
pH	std units	G-13D	04/18/2018		9.1100	6.02 - 10.02
Sulfate	mg/L	G-13D	04/18/2018		39.3000	74.7000
Total dissolved solids	mg/L	G-13D	04/18/2018		310.0000	480.0000
Total organic carbon	mg/L	G-13D	04/18/2018		1.6000	94.0000

* - Current value failed - awaiting verification.
** - Current value passed - previous exceedance not verified.
*** - Current value failed - exceedance verified.
**** - Current value passed - awaiting one more verification.
***** - Insufficient background data to compute prediction limit.
ND = Not Detected, result = detection limit.

Table 5

Summary Statistics and Prediction Limits

Constituent	Units	Model Type	N	Detect	Mean	SD	Pred Limit	Conf*
Alkalinity (as cacO ₃)	mg/L	nonpar	70	70			280.0000	0.99
Ammonia nitrogen	mg-N/L	nonpar	67	66			0.7800	0.99
Bicarbonate	mg/L	nonpar	70	70			280.0000	0.99
Chemical oxygen demand	mg/L	nonpar	70	20			160.0000	0.99
Chloride	mg/L	lognor	70	69	1.5826	0.3355	9.8843	
Conductivity	umhos/cm	nonpar	70	70			900.0000	0.99
Dissolved antimony	mg/L	nonpar	70	11			0.0100	0.99
Dissolved arsenic	mg/L	nonpar	67	48			0.0021	0.99
Dissolved barium	mg/L	nonpar	68	19			0.0049	0.99
Dissolved beryllium	mg/L	nonpar	70	0			0.0005	0.99
Dissolved cadmium	mg/L	nonpar	65	14			0.0001	0.99
Dissolved calcium	mg/L	nonpar	67	67			6.3200	0.99
Dissolved chromium	mg/L	nonpar	69	11			0.0106	0.99
Dissolved cobalt	mg/L	nonpar	70	10			0.0080	0.99
Dissolved copper	mg/L	nonpar	67	14			0.0080	0.99
Dissolved iron	mg/L	normal	62	33	0.0197	0.0362	0.1068	
Dissolved lead	mg/L	nonpar	70	20			0.0023	0.99
Dissolved magnesium	mg/L	nonpar	66	46			0.3100	0.99
Dissolved manganese	mg/L	nonpar	61	49			0.0183	0.99
Dissolved nickel	mg/L	nonpar	70	3			0.0260	0.99
Dissolved potassium	mg/L	nonpar	70	68			1.6000	0.99
Dissolved selenium	mg/L	nonpar	69	16			0.0040	0.99
Dissolved silver	mg/L	nonpar	66	7			0.0007	0.99
Dissolved sodium	mg/L	normal	67	67	107.0134	7.8472	125.8616	
Dissolved thallium	mg/L	nonpar	68	6			0.0010	0.99
Dissolved vanadium	mg/L	nonpar	70	4			0.0080	0.99
Dissolved zinc	mg/L	nonpar	68	19			0.0080	0.99
Nitrate nitrogen	mg-N/L	nonpar	67	10			0.0690	0.99
Nitrite nitrogen	mg-N/L	nonpar	63	34			0.2700	0.99
pH	std units	nonpar	69	69			6.02- 10.02	0.99
Sulfate	mg/L	nonpar	70	70			74.7000	0.99
Total dissolved solids	mg/L	nonpar	70	70			480.0000	0.99
Total organic carbon	mg/L	nonpar	70	61			94.0000	0.99

* - Confidence level for passing initial test or one verification resample at all downgradient wells for a single constituent (nonparametric test only).

Model Type refers to type of prediction limit.

For lognormal limit, mean and sd in natural log units and prediction limit in original units.

All sample sizes and statistics are based on outlier free data.

For nonparametric limits, median reporting limits are substituted for extreme reporting limit values.

Groundwater Analytical Summary - Deep Wells: Third Quarter 2018
Cathcart Landfill, Snohomish County, WA

Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	Downgradient Wells																				Upgradient Wells																			
					G-01D				G-02D				G-06B				G-08D2				G-09D				G-10D				G-13D				G-14D				G-24D							
					8/29/18	D	V	Tr	Ch	8/29/18	D	V	Tr	Ch	8/29/18	D	V	Tr	Ch	8/29/18	D	V	Tr	Ch	8/30/18	D	V	Tr	Ch	8/30/18	D	V	Tr	Ch	8/30/18	D	V	Tr	Ch	8/29/18	D	V	Tr	Ch
VOLATILE ORGANIC COMPOUNDS (VOCs) EPA Method 8260 (µg/L) (cont.)																																												
1,1-Dichloroethylene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U			
1,2,3-Trichloropropane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U			
1,2-Dibromo-3-chloropropane				0.2	5	U				5	U				5	U				5	U				5	U				5	U				5	U				5	U			
1,2-Dibromoethane				0.001	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U			
1,2-Dichlorobenzene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U			
1,2-Dichloroethane				0.5	0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U			
1,2-Dichloropropane				0.6	0.6	U				0.6	U				0.6	U				0.6	U				0.6	U				0.6	U				0.6	U				0.6	U			
1,4-Dichlorobenzene				4	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U			
2-Butanone				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				5	U			
2-Hexanone				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				5	U			
4-Methyl-2-Pentanone (MIBK)				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				5	U			
Acetone				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				5	U			
Acrylonitrile				0.07	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U			
Benzene				1	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Bromodichloromethane				0.3	0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U			
Bromoform				5	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Bromomethane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Carbon Disulfide				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Carbon Tetrachloride				0.3	0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U			
Chlorobenzene				--	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U			
Chlorodibromomethane				0.5	0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U			
Chloroethane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Chloroform				7	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Chloromethane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U			
cis-1,2-Dichloroethene				--	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U			
cis-1,3-Dichloropropene				0.2	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U			
Dibromomethane				--	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U			
Ethyl Benzene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U			
m,p-Xylene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Methyl Iodide				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Methylene Chloride				5	2	U				2	U				2	U				2	U				2	U				2	U				2	U				2	U			
o-Xylene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Styrene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Tetrachloroethylene				0.8	0.8	U				0.8	U				0.8	U				0.8	U				0.8	U				0.8	U				0.8	U				0.8	U			
Toluene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U			
trans-1,2-Dichloroethene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U			
trans-1,3-Dichloropropene				0.2	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U			
trans-1,4-Dichloro-2-butene				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				5	U			
Trichlorethene (1,1,2-Trichloroethylene)				3	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Trichlorofluoromethane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U			
Vinyl Acetate				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				5	U			
Vinyl Chloride				0.02	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U			

D: U = Indicates compound was not detected at the given reporting limit.
V: E= Exceedance, waiting verification based on subsequent lab data; V= Exceedance verified based on previous lab data; P=Passed, previous exceedance not verified based on current lab data.
Tr: I=Increasing Trend, D=Decreasing Trend;
Ch: Y indicates a change in trend from previous quarter; N means no change in trend.
The groundwater standards listed are based on the Washington Administrative Code (WAC) 173-200 groundwater limits as modified by the TMS 91-11 standards.
* = Non-detect, exceedance due to elevated laboratory reporting limit

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Alkalinity (as cacO3)	mg/L	G-01D	08/29/2018		270.0000		280.0000
Alkalinity (as cacO3)	mg/L	G-02D	08/29/2018		94.0000		280.0000
Alkalinity (as cacO3)	mg/L	G-06B	08/29/2018		250.0000	**	280.0000
Alkalinity (as cacO3)	mg/L	G-08D2	08/29/2018		170.0000		280.0000
Alkalinity (as cacO3)	mg/L	G-09D	08/30/2018		180.0000		280.0000
Alkalinity (as cacO3)	mg/L	G-10D	08/30/2018		500.0000	***	280.0000
Alkalinity (as cacO3)	mg/L	G-13D	08/30/2018		190.0000		280.0000
Ammonia nitrogen	mg-N/L	G-01D	08/29/2018		0.1640		0.5700
Ammonia nitrogen	mg-N/L	G-02D	08/29/2018		0.0180		0.5700
Ammonia nitrogen	mg-N/L	G-06B	08/29/2018		0.0250		0.5700
Ammonia nitrogen	mg-N/L	G-08D2	08/29/2018		0.1580		0.5700
Ammonia nitrogen	mg-N/L	G-09D	08/30/2018		0.0860		0.5700
Ammonia nitrogen	mg-N/L	G-10D	08/30/2018		0.3180		0.5700
Ammonia nitrogen	mg-N/L	G-13D	08/30/2018		0.0440		0.5700
Bicarbonate	mg/L	G-01D	08/29/2018		250.0000		280.0000
Bicarbonate	mg/L	G-02D	08/29/2018		94.0000		280.0000
Bicarbonate	mg/L	G-06B	08/29/2018		250.0000	**	280.0000
Bicarbonate	mg/L	G-08D2	08/29/2018		90.0000		280.0000
Bicarbonate	mg/L	G-09D	08/30/2018		140.0000		280.0000
Bicarbonate	mg/L	G-10D	08/30/2018		500.0000	***	280.0000
Bicarbonate	mg/L	G-13D	08/30/2018		130.0000		280.0000
Chemical oxygen demand	mg/L	G-01D	08/29/2018	ND	10.0000		160.0000
Chemical oxygen demand	mg/L	G-02D	08/29/2018	ND	10.0000		160.0000
Chemical oxygen demand	mg/L	G-06B	08/29/2018	ND	10.0000		160.0000
Chemical oxygen demand	mg/L	G-08D2	08/29/2018	ND	10.0000		160.0000
Chemical oxygen demand	mg/L	G-09D	08/30/2018	ND	10.0000		160.0000
Chemical oxygen demand	mg/L	G-10D	08/30/2018	ND	10.0000		160.0000
Chemical oxygen demand	mg/L	G-13D	08/30/2018	ND	10.0000		160.0000
Chloride	mg/L	G-01D	08/29/2018		6.5000		9.6861
Chloride	mg/L	G-02D	08/29/2018		5.3000		9.6861
Chloride	mg/L	G-06B	08/29/2018		8.2000		9.6861
Chloride	mg/L	G-08D2	08/29/2018		3.1000		9.6861
Chloride	mg/L	G-09D	08/30/2018		7.7000		9.6861
Chloride	mg/L	G-10D	08/30/2018		17.5000	***	9.6861
Chloride	mg/L	G-13D	08/30/2018		8.3000		9.6861
Conductivity	umhos/cm	G-01D	08/29/2018		610.0000		900.0000
Conductivity	umhos/cm	G-02D	08/29/2018		350.0000		900.0000
Conductivity	umhos/cm	G-06B	08/29/2018		690.0000		900.0000
Conductivity	umhos/cm	G-08D2	08/29/2018		460.0000		900.0000
Conductivity	umhos/cm	G-09D	08/30/2018		660.0000		900.0000
Conductivity	umhos/cm	G-10D	08/30/2018		1500.0000	***	900.0000
Conductivity	umhos/cm	G-13D	08/30/2018		400.0000		900.0000
Dissolved antimony	mg/L	G-01D	08/29/2018	ND	0.0015		0.0100
Dissolved antimony	mg/L	G-02D	08/29/2018	ND	0.0015		0.0100
Dissolved antimony	mg/L	G-06B	08/29/2018	ND	0.0015		0.0100
Dissolved antimony	mg/L	G-08D2	08/29/2018	ND	0.0015		0.0100
Dissolved antimony	mg/L	G-09D	08/30/2018	ND	0.0015		0.0100
Dissolved antimony	mg/L	G-10D	08/30/2018	ND	0.0015		0.0100
Dissolved antimony	mg/L	G-13D	08/30/2018	ND	0.0015		0.0100
Dissolved arsenic	mg/L	G-01D	08/29/2018	ND	0.0003		39.0687
Dissolved arsenic	mg/L	G-02D	08/29/2018		0.0039		39.0687
Dissolved arsenic	mg/L	G-06B	08/29/2018		0.0033		39.0687
Dissolved arsenic	mg/L	G-08D2	08/29/2018		0.0012		39.0687
Dissolved arsenic	mg/L	G-09D	08/30/2018		0.0041		39.0687
Dissolved arsenic	mg/L	G-10D	08/30/2018		0.0013		39.0687
Dissolved arsenic	mg/L	G-13D	08/30/2018		0.0006		39.0687
Dissolved barium	mg/L	G-01D	08/29/2018		0.0012		0.0049
Dissolved barium	mg/L	G-02D	08/29/2018	ND	0.0005		0.0049
Dissolved barium	mg/L	G-06B	08/29/2018	ND	0.0005		0.0049
Dissolved barium	mg/L	G-08D2	08/29/2018	ND	0.0005	**	0.0049
Dissolved barium	mg/L	G-09D	08/30/2018		0.0018		0.0049
Dissolved barium	mg/L	G-10D	08/30/2018		0.0020		0.0049
Dissolved barium	mg/L	G-13D	08/30/2018	ND	0.0005		0.0049
Dissolved beryllium	mg/L	G-01D	08/29/2018	ND	0.0005		0.0005
Dissolved beryllium	mg/L	G-02D	08/29/2018	ND	0.0005		0.0005
Dissolved beryllium	mg/L	G-06B	08/29/2018	ND	0.0005		0.0005
Dissolved beryllium	mg/L	G-08D2	08/29/2018	ND	0.0005		0.0005

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Dissolved beryllium	mg/L	G-09D	08/30/2018	ND	0.0005		0.0005
Dissolved beryllium	mg/L	G-10D	08/30/2018	ND	0.0005		0.0005
Dissolved beryllium	mg/L	G-13D	08/30/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-01D	08/29/2018	ND	0.0003		0.0001
Dissolved cadmium	mg/L	G-02D	08/29/2018	ND	0.0003		0.0001
Dissolved cadmium	mg/L	G-06B	08/29/2018	ND	0.0003		0.0001
Dissolved cadmium	mg/L	G-08D2	08/29/2018	ND	0.0003		0.0001
Dissolved cadmium	mg/L	G-09D	08/30/2018		0.0003	*	0.0001
Dissolved cadmium	mg/L	G-10D	08/30/2018	ND	0.0003		0.0001
Dissolved cadmium	mg/L	G-13D	08/30/2018	ND	0.0003		0.0001
Dissolved calcium	mg/L	G-01D	08/29/2018		1.2400		6.3200
Dissolved calcium	mg/L	G-02D	08/29/2018		0.4700		6.3200
Dissolved calcium	mg/L	G-06B	08/29/2018		1.1000		6.3200
Dissolved calcium	mg/L	G-08D2	08/29/2018		0.5700		6.3200
Dissolved calcium	mg/L	G-09D	08/30/2018		1.6950		6.3200
Dissolved calcium	mg/L	G-10D	08/30/2018		24.5000	***	6.3200
Dissolved calcium	mg/L	G-13D	08/30/2018		0.5900		6.3200
Dissolved chromium	mg/L	G-01D	08/29/2018	ND	0.0050		0.0136
Dissolved chromium	mg/L	G-02D	08/29/2018	ND	0.0050		0.0136
Dissolved chromium	mg/L	G-06B	08/29/2018	ND	0.0050		0.0136
Dissolved chromium	mg/L	G-08D2	08/29/2018	ND	0.0050		0.0136
Dissolved chromium	mg/L	G-09D	08/30/2018		0.0062		0.0136
Dissolved chromium	mg/L	G-10D	08/30/2018	ND	0.0050		0.0136
Dissolved chromium	mg/L	G-13D	08/30/2018	ND	0.0050		0.0136
Dissolved cobalt	mg/L	G-01D	08/29/2018	ND	0.0050		0.0080
Dissolved cobalt	mg/L	G-02D	08/29/2018	ND	0.0050		0.0080
Dissolved cobalt	mg/L	G-06B	08/29/2018	ND	0.0050		0.0080
Dissolved cobalt	mg/L	G-08D2	08/29/2018	ND	0.0050		0.0080
Dissolved cobalt	mg/L	G-09D	08/30/2018	ND	0.0050		0.0080
Dissolved cobalt	mg/L	G-10D	08/30/2018	ND	0.0050		0.0080
Dissolved cobalt	mg/L	G-13D	08/30/2018	ND	0.0050		0.0080
Dissolved copper	mg/L	G-01D	08/29/2018	ND	0.0050		0.0080
Dissolved copper	mg/L	G-02D	08/29/2018	ND	0.0050		0.0080
Dissolved copper	mg/L	G-06B	08/29/2018	ND	0.0050		0.0080
Dissolved copper	mg/L	G-08D2	08/29/2018	ND	0.0050		0.0080
Dissolved copper	mg/L	G-09D	08/30/2018	ND	0.0050		0.0080
Dissolved copper	mg/L	G-10D	08/30/2018	ND	0.0050		0.0080
Dissolved copper	mg/L	G-13D	08/30/2018	ND	0.0050		0.0080
Dissolved iron	mg/L	G-01D	08/29/2018		0.1250		17.2851
Dissolved iron	mg/L	G-02D	08/29/2018		0.1200		17.2851
Dissolved iron	mg/L	G-06B	08/29/2018		0.0170		17.2851
Dissolved iron	mg/L	G-08D2	08/29/2018		0.0850		17.2851
Dissolved iron	mg/L	G-09D	08/30/2018		0.3890		17.2851
Dissolved iron	mg/L	G-10D	08/30/2018		0.6720		17.2851
Dissolved iron	mg/L	G-13D	08/30/2018		0.0590		17.2851
Dissolved lead	mg/L	G-01D	08/29/2018	ND	0.0005		0.0023
Dissolved lead	mg/L	G-02D	08/29/2018	ND	0.0005		0.0023
Dissolved lead	mg/L	G-06B	08/29/2018	ND	0.0005		0.0023
Dissolved lead	mg/L	G-08D2	08/29/2018	ND	0.0005		0.0023
Dissolved lead	mg/L	G-09D	08/30/2018		0.0014		0.0023
Dissolved lead	mg/L	G-10D	08/30/2018	ND	0.0005		0.0023
Dissolved lead	mg/L	G-13D	08/30/2018	ND	0.0005		0.0023
Dissolved magnesium	mg/L	G-01D	08/29/2018	ND	0.2000		0.3100
Dissolved magnesium	mg/L	G-02D	08/29/2018	ND	0.2000		0.3100
Dissolved magnesium	mg/L	G-06B	08/29/2018	ND	0.2000		0.3100
Dissolved magnesium	mg/L	G-08D2	08/29/2018	ND	0.2000	**	0.3100
Dissolved magnesium	mg/L	G-09D	08/30/2018	ND	0.2000		0.3100
Dissolved magnesium	mg/L	G-10D	08/30/2018		2.1000	***	0.3100
Dissolved magnesium	mg/L	G-13D	08/30/2018	ND	0.2000		0.3100
Dissolved manganese	mg/L	G-01D	08/29/2018	ND	0.0050		2.7546
Dissolved manganese	mg/L	G-02D	08/29/2018	ND	0.0050		2.7546
Dissolved manganese	mg/L	G-06B	08/29/2018	ND	0.0050		2.7546
Dissolved manganese	mg/L	G-08D2	08/29/2018	ND	0.0050		2.7546
Dissolved manganese	mg/L	G-09D	08/30/2018		0.0217		2.7546
Dissolved manganese	mg/L	G-10D	08/30/2018		0.4085		2.7546
Dissolved manganese	mg/L	G-13D	08/30/2018	ND	0.0050		2.7546
Dissolved nickel	mg/L	G-01D	08/29/2018	ND	0.0050		0.0060

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Dissolved nickel	mg/L	G-02D	08/29/2018	ND	0.0050		0.0060
Dissolved nickel	mg/L	G-06B	08/29/2018	ND	0.0050		0.0060
Dissolved nickel	mg/L	G-08D2	08/29/2018	ND	0.0050		0.0060
Dissolved nickel	mg/L	G-09D	08/30/2018	ND	0.0050		0.0060
Dissolved nickel	mg/L	G-10D	08/30/2018	ND	0.0050		0.0060
Dissolved nickel	mg/L	G-13D	08/30/2018	ND	0.0050		0.0060
Dissolved potassium	mg/L	G-01D	08/29/2018		0.6400		1.6000
Dissolved potassium	mg/L	G-02D	08/29/2018		0.3300		1.6000
Dissolved potassium	mg/L	G-06B	08/29/2018		0.6500		1.6000
Dissolved potassium	mg/L	G-08D2	08/29/2018		0.3300		1.6000
Dissolved potassium	mg/L	G-09D	08/30/2018		0.7850		1.6000
Dissolved potassium	mg/L	G-10D	08/30/2018		2.9300	***	1.6000
Dissolved potassium	mg/L	G-13D	08/30/2018		0.4200		1.6000
Dissolved selenium	mg/L	G-01D	08/29/2018	ND	0.0015		0.0040
Dissolved selenium	mg/L	G-02D	08/29/2018	ND	0.0015		0.0040
Dissolved selenium	mg/L	G-06B	08/29/2018	ND	0.0015		0.0040
Dissolved selenium	mg/L	G-08D2	08/29/2018	ND	0.0015		0.0040
Dissolved selenium	mg/L	G-09D	08/30/2018	ND	0.0015		0.0040
Dissolved selenium	mg/L	G-10D	08/30/2018	ND	0.0015		0.0040
Dissolved selenium	mg/L	G-13D	08/30/2018	ND	0.0015		0.0040
Dissolved silver	mg/L	G-01D	08/29/2018	ND	0.0003		0.0007
Dissolved silver	mg/L	G-02D	08/29/2018	ND	0.0003		0.0007
Dissolved silver	mg/L	G-06B	08/29/2018	ND	0.0003		0.0007
Dissolved silver	mg/L	G-08D2	08/29/2018	ND	0.0003		0.0007
Dissolved silver	mg/L	G-09D	08/30/2018	ND	0.0003		0.0007
Dissolved silver	mg/L	G-10D	08/30/2018	ND	0.0003		0.0007
Dissolved silver	mg/L	G-13D	08/30/2018	ND	0.0003		0.0007
Dissolved sodium	mg/L	G-01D	08/29/2018		151.0000	***	125.5400
Dissolved sodium	mg/L	G-02D	08/29/2018		83.8000		125.5400
Dissolved sodium	mg/L	G-06B	08/29/2018		158.0000	***	125.5400
Dissolved sodium	mg/L	G-08D2	08/29/2018		91.5000		125.5400
Dissolved sodium	mg/L	G-09D	08/30/2018		159.5000	***	125.5400
Dissolved sodium	mg/L	G-10D	08/30/2018		353.0000	***	125.5400
Dissolved sodium	mg/L	G-13D	08/30/2018		107.0000		125.5400
Dissolved thallium	mg/L	G-01D	08/29/2018	ND	0.0003		0.0030
Dissolved thallium	mg/L	G-02D	08/29/2018	ND	0.0003		0.0030
Dissolved thallium	mg/L	G-06B	08/29/2018	ND	0.0003		0.0030
Dissolved thallium	mg/L	G-08D2	08/29/2018	ND	0.0003		0.0030
Dissolved thallium	mg/L	G-09D	08/30/2018	ND	0.0003		0.0030
Dissolved thallium	mg/L	G-10D	08/30/2018	ND	0.0003		0.0030
Dissolved thallium	mg/L	G-13D	08/30/2018	ND	0.0003		0.0030
Dissolved vanadium	mg/L	G-01D	08/29/2018	ND	0.0100		0.0080
Dissolved vanadium	mg/L	G-02D	08/29/2018	ND	0.0100		0.0080
Dissolved vanadium	mg/L	G-06B	08/29/2018		0.0120	*	0.0080
Dissolved vanadium	mg/L	G-08D2	08/29/2018	ND	0.0100		0.0080
Dissolved vanadium	mg/L	G-09D	08/30/2018	ND	0.0100		0.0080
Dissolved vanadium	mg/L	G-10D	08/30/2018	ND	0.0100		0.0080
Dissolved vanadium	mg/L	G-13D	08/30/2018	ND	0.0100		0.0080
Dissolved zinc	mg/L	G-01D	08/29/2018	ND	0.0050		0.0120
Dissolved zinc	mg/L	G-02D	08/29/2018	ND	0.0050		0.0120
Dissolved zinc	mg/L	G-06B	08/29/2018	ND	0.0050		0.0120
Dissolved zinc	mg/L	G-08D2	08/29/2018	ND	0.0050		0.0120
Dissolved zinc	mg/L	G-09D	08/30/2018		0.0130	*	0.0120
Dissolved zinc	mg/L	G-10D	08/30/2018	ND	0.0050		0.0120
Dissolved zinc	mg/L	G-13D	08/30/2018	ND	0.0050		0.0120
Nitrate nitrogen	mg-N/L	G-01D	08/29/2018		0.0260		0.2100
Nitrate nitrogen	mg-N/L	G-02D	08/29/2018		0.9900	***	0.2100
Nitrate nitrogen	mg-N/L	G-06B	08/29/2018		0.3500	***	0.2100
Nitrate nitrogen	mg-N/L	G-08D2	08/29/2018		0.0180	**	0.2100
Nitrate nitrogen	mg-N/L	G-09D	08/30/2018		0.0175		0.2100
Nitrate nitrogen	mg-N/L	G-10D	08/30/2018	ND	0.0100		0.2100
Nitrate nitrogen	mg-N/L	G-13D	08/30/2018	ND	0.0100		0.2100
Nitrite nitrogen	mg-N/L	G-01D	08/29/2018		0.0090		46.6650
Nitrite nitrogen	mg-N/L	G-02D	08/29/2018		0.0100		46.6650
Nitrite nitrogen	mg-N/L	G-06B	08/29/2018		0.0020		46.6650
Nitrite nitrogen	mg-N/L	G-08D2	08/29/2018		0.0020		46.6650
Nitrite nitrogen	mg-N/L	G-09D	08/30/2018		0.0035		46.6650

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Nitrite nitrogen	mg-N/L	G-10D	08/30/2018	ND	0.0010		46.6650
Nitrite nitrogen	mg-N/L	G-13D	08/30/2018	ND	0.0010		46.6650
pH	std units	G-01D	08/29/2018		9.1500		6.02 - 10.02
pH	std units	G-02D	08/29/2018		8.2700		6.02 - 10.02
pH	std units	G-06B	08/29/2018		8.0500		6.02 - 10.02
pH	std units	G-08D2	08/29/2018		9.8400		6.02 - 10.02
pH	std units	G-09D	08/30/2018		8.8700		6.02 - 10.02
pH	std units	G-10D	08/30/2018		7.0300		6.02 - 10.02
pH	std units	G-13D	08/30/2018		9.3800		6.02 - 10.02
Sulfate	mg/L	G-01D	08/29/2018		46.5000		74.7000
Sulfate	mg/L	G-02D	08/29/2018		76.9000	***	74.7000
Sulfate	mg/L	G-06B	08/29/2018		73.9000	**	74.7000
Sulfate	mg/L	G-08D2	08/29/2018		39.3000		74.7000
Sulfate	mg/L	G-09D	08/30/2018		128.5000	*	74.7000
Sulfate	mg/L	G-10D	08/30/2018		302.0000	***	74.7000
Sulfate	mg/L	G-13D	08/30/2018		34.3000		74.7000
Total dissolved solids	mg/L	G-01D	08/29/2018		390.0000		480.0000
Total dissolved solids	mg/L	G-02D	08/29/2018		250.0000		480.0000
Total dissolved solids	mg/L	G-06B	08/29/2018		430.0000		480.0000
Total dissolved solids	mg/L	G-08D2	08/29/2018		280.0000		480.0000
Total dissolved solids	mg/L	G-09D	08/30/2018		440.0000		480.0000
Total dissolved solids	mg/L	G-10D	08/30/2018		1100.0000	***	480.0000
Total dissolved solids	mg/L	G-13D	08/30/2018		280.0000		480.0000
Total organic carbon	mg/L	G-01D	08/29/2018		2.8000		94.0000
Total organic carbon	mg/L	G-02D	08/29/2018		1.1000		94.0000
Total organic carbon	mg/L	G-06B	08/29/2018		2.2000		94.0000
Total organic carbon	mg/L	G-08D2	08/29/2018		1.5000		94.0000
Total organic carbon	mg/L	G-09D	08/30/2018		2.3000		94.0000
Total organic carbon	mg/L	G-10D	08/30/2018		3.1000		94.0000
Total organic carbon	mg/L	G-13D	08/30/2018		0.7100		94.0000

* - Current value failed - awaiting verification.
 ** - Current value passed - previous exceedance not verified.
 *** - Current value failed - exceedance verified.
 **** - Current value passed - awaiting one more verification.
 ***** - Insufficient background data to compute prediction limit.
 ND = Not Detected, Result = detection limit.

Table 5

Summary Statistics and Prediction Limits

Constituent	Units	Detect	N	Mean	SD	alpha	Factor	Pred Limit	Type	Conf
Alkalinity (as caco3)	mg/L	72	72					280.0000	nonpar	0.99
Ammonia nitrogen	mg-N/L	65	65					0.5700	nonpar	0.99
Bicarbonate	mg/L	72	72					280.0000	nonpar	0.99
Chemical oxygen demand	mg/L	19	71					160.0000	nonpar	0.99
Chloride	mg/L	71	72	1.3410	0.3880	0.0100	2.3965	9.6861	lognor	
Conductivity	umhos/cm	72	72					900.0000	nonpar	0.99
Dissolved antimony	mg/L	11	72					0.0100	nonpar	0.99
Dissolved arsenic	mg/L	48	68	-5.7716	3.9309	0.0100	2.4007	39.0687	lognor	
Dissolved barium	mg/L	19	70					0.0049	nonpar	0.99
Dissolved beryllium	mg/L	0	72					0.0005	nonpar	***
Dissolved cadmium	mg/L	13	65					0.0001	nonpar	0.99
Dissolved calcium	mg/L	69	69					6.3200	nonpar	0.99
Dissolved chromium	mg/L	12	72					0.0136	nonpar	0.99
Dissolved cobalt	mg/L	10	72					0.0080	nonpar	0.99
Dissolved copper	mg/L	14	69					0.0080	nonpar	0.99
Dissolved iron	mg/L	36	66	-1.9748	2.0077	0.0100	2.4031	17.2851	lognor	
Dissolved lead	mg/L	20	72					0.0023	nonpar	0.99
Dissolved magnesium	mg/L	46	68					0.3100	nonpar	0.99
Dissolved manganese	mg/L	51	63	-4.5062	2.2932	0.0100	2.4069	2.7546	lognor	
Dissolved nickel	mg/L	2	71					0.0060	nonpar	0.99
Dissolved potassium	mg/L	69	72					1.6000	nonpar	0.99
Dissolved selenium	mg/L	16	71					0.0040	nonpar	0.99
Dissolved silver	mg/L	8	69					0.0007	nonpar	0.99
Dissolved sodium	mg/L	69	69	106.9841	7.7329	0.0100	2.3996	125.5400	normal	
Dissolved thallium	mg/L	7	71					0.0030	nonpar	0.99
Dissolved vanadium	mg/L	4	72					0.0080	nonpar	0.99
Dissolved zinc	mg/L	20	71					0.0120	nonpar	0.99
Nitrate nitrogen	mg-N/L	13	71					0.2100	nonpar	0.99
Nitrite nitrogen	mg-N/L	37	67	-2.5843	2.6759	0.0100	2.4019	46.6650	lognor	
pH	std units	71	71					6.02- 10.02	nonpar	0.99
Sulfate	mg/L	72	72					74.7000	nonpar	0.99
Total dissolved solids	mg/L	72	72					480.0000	nonpar	0.99
Total organic carbon	mg/L	63	72					94.0000	nonpar	0.99

Conf = confidence level for passing initial test or one of two verification resamples at all downgradient wells for a single constituent (nonparametric test only).

* - Insufficient Data.

** - Calculated limit raised to Manual Reporting Limit.

*** - Nonparametric limit based on ND value.

For transformed data, mean and SD in transformed units and prediction limit in original units.

All sample sizes and statistics are based on outlier free data.

For nonparametric limits, median reporting limits are substituted for extreme reporting limit values.

Groundwater Analytical Summary - Deep Wells: Fourth Quarter 2018
Cathcart Landfill, Snohomish County, WA

	Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	Downgradient Wells																								Upgradient Wells																						
						G-01D				G-02D				G-06B				G-08D2				G-09D				G-10D				G-13D				G-14D				G-24D														
						10/16/18	D	V	Tr	Ch	10/16/18	D	V	Tr	Ch	10/16/18	D	V	Tr	Ch	10/16/18	D	V	Tr	Ch	10/17/18	D	V	Tr	Ch	10/17/18	D	V	Tr	Ch	10/17/18	D	V	Tr	Ch	10/16/18	D	V	Tr	Ch	10/16/18	D	V	Tr	Ch		
CONVENTIONAL CHEMISTRY PARAMETERS (mg/L)																																																				
Alkalinity (as CaCO3)	nonpar	74	74	280	--	270					110					270					170					200					420		V			170					220					210						
Ammonia Nitrogen	nonpar	67	67	0.78	--	0.154					0.013					0.039					0.173					0.131					0.352					0.045			D	Y	0.101			D	N	0.101						
Bicarbonate	nonpar	74	74	220	--	260					110					270					110					180					420		V			160					160					210						
Calcium, Dissolved	nonpar	71	71	6.32	--	1.27					0.58			D	N	1.18					0.56					1.67			D	Y	23.9		V	D	N	0.63					0.68					0.63			D	N		
Chemical Oxygen Demand	nonpar	73	20	160	--	10	U				10	U				10	U				10	U				14					11					10	U				11					10	U					
Chloride	lognor	74	73	10.021	250	7.7			D	N	6.1					8.5			D	N	3.5			D	N	10.7		E	D	N	36.5		V		Y	9.4					2.2					4.2			D	N		
Conductivity (umhos/cm)	nonpar	74	74	900	700	650					420			D	N	700			D	N	450					730			D	N	1600		V			450					470					460						
Magnesium, Dissolved	nonpar	70	46	0.25	--	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				2.04		V	D	N	0.2	U				0.2	U				0.2	U					
Nitrate Nitrogen (mg-N/L)	nonpar	73	15	0.069	10	0.01	U				1.8		V	D	N	0.74		V	D	N	0.01	U				0.33		E		Y	0.04					0.011					0.015					0.051						
Nitrite Nitrogen (mg-N/L)	lognor	69	38	0.27	1	0.045					0.002					0.001	U				0.04					0.018					0.001	U				0.001	U				0.035					0.001	U					
pH (std units)	nonpar	73	73	6.02-10.02	6.5-8.5	9.03					7.93			D	N	7.70					9.81					8.53					6.90					9.29					9.58					8.41						
Potassium, Dissolved	nonpar	74	70	1.6	--	0.56			I	N	0.31			I	N	0.59			I	N	0.34			I	N	0.63					2.22		V			0.41			I	N	0.21					0.2	U					
Sodium, Dissolved	normal	71	71	125.8108	20	156		V			88.6			D	N	167		V	D	N	100					161		V			335		V	D	N	101					107					111						
Sulfate	nonpar	74	74	74.7	250	53.0			D	N	87.0			V		88.0		E	D	N	45.3					153		E			316		V	D	Y	41.0			D	N	4.6					34.3						
Total Dissolved Solids	nonpar	74	74	480	500	450					280			D	N	460			D	N	330					530		E			1100		V			370					320					320						
Total Organic Carbon	nonpar	74	65	94	--	2.5					0.86					2.4					1.5					3.3					3.6					1.2					2.5					2.2						
DISSOLVED METALS EPA Methods 200.7/200.8 (mg/L)																																																				
Antimony	nonpar	74	11	0.01	0.006	0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U					
Arsenic	lognor	70	49	0.0021	0.00005	0.000276					0.00372				I	N	0.000978				0.00342					0.00464					0.00133					0.000228					0.00115					0.00005	U					
Barium	nonpar	72	20	0.0049	1	0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0014					0.0022					0.0014					0.0014					0.0005	U					
Beryllium	nonpar	74	0	0.0005	0.004	0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U				0.0005	U					
Cadmium	nonpar	67	13	0.0001	0.0005	0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U	P			0.00005	U				0.00005	U				0.00005	U				0.00005	U					
Chromium	nonpar	74	12	0.0106	0.05	0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U					
Cobalt	nonpar	74	10	0.008	--	0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U				0.005	U					
Copper	nonpar	71	14	0.008	1	0.005	U				0.015		E			0.005	U				0.005	U				0.007					0.005	U				0.005	U				0.005	U				0.005	U					
Iron	lognor	68	37	0.1076	0.3	0.01	U				0.257			I	Y	0.173			I	Y	0.116					0.092					0.614					0.056			I	N	0.266					0.01	U					
Lead	nonpar	74	21	0.0023	0.05	0.000145					0.126					0.000143					0.0001	U				0.000492					0.0001	U				0.0001	U				0.00011					0.0001	U					
Manganese	lognor	65	51	0.0183	0.05	0.005	U				0.0052					0.012					0.005	U				0.0096					0.4083				D	N	0.005	U				0.005	U				0.005	U			D	N
Nickel	nonpar	73	2	0.026	0.1	0.005	U				0.015					0.007					0.005	U				0.006					0.006					0.005	U				0.005	U				0.005	U					
Selenium	nonpar	73	17	0.004	0.01	0.00081					0.0003	U				0.00064					0.0003	U				0.00114					0.00129					0.00041					0.0003	U				0.00096						
Silver	nonpar	71	8	0.0007	0.05	0.0001	U				0.0001	U				0.0001	U				0.0001	U				0.0001	U				0.0001	U				0.0001	U				0.0001	U				0.0001	U					
Thallium	nonpar	73	7	0.001	0.002	0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U				0.00005	U					
Vanadium	nonpar	74	4	0.008	--	0.01	U				0.01	U				0.01	U	P			0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U					
Zinc	nonpar	73	20	0.008	5	0.005	U				0.005	U				0.005	U				0.005	U				0.005	P			0.005	U				0.005	U				0.005	U				0.005	U						
TOTAL METALS EPA Methods 200.7/200.8 (mg/L)																																																				
Antimony					0.006	0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U				0.0003	U					
Arsenic					0.00005	0.000486					0.00316					0.00194					0.000901					0.00424					0.00144					0.000296					0.001					0.000131						
Barium					1	0.0005					0.0021					0.0035					0.0012					0.0089					0.0017																					

Groundwater Analytical Summary - Deep Wells: Fourth Quarter 2018
Cathcart Landfill, Snohomish County, WA

Statistical Method	Number of Samples	Number of Detects	Prediction Limit	Primary GW Stds 173-200	Downgradient Wells																				Upgradient Wells																								
					G-01D				G-02D				G-06B				G-08D2				G-09D				G-10D				G-13D				G-14D				G-24D												
					10/16/18	D	V	Tr	Ch	10/16/18	D	V	Tr	Ch	10/16/18	D	V	Tr	Ch	10/16/18	D	V	Tr	Ch	10/17/18	D	V	Tr	Ch	10/17/18	D	V	Tr	Ch	10/17/18	D	V	Tr	Ch	10/16/18	D	V	Tr	Ch	10/16/18	D	V	Tr	Ch
VOLATILE ORGANIC COMPOUNDS (VOCs) EPA Method 8260 (µg/L) (cont.)																																																	
1,1-Dichloroethylene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U								
1,2,3-Trichloropropane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U								
1,2-Dibromo-3-chloropropane				0.2	5	U				5	U				5	U				5	U				5	U				5	U				5	U				5	U								
1,2-Dibromoethane				0.001	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U								
1,2-Dichlorobenzene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U								
1,2-Dichloroethane				0.5	0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U								
1,2-Dichloropropane				0.6	0.6	U				0.6	U				0.6	U				0.6	U				0.6	U				0.6	U				0.6	U				0.6	U								
1,4-Dichlorobenzene				4	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U								
2-Butanone				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				5	U								
2-Hexanone				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				5	U								
4-Methyl-2-Pentanone (MIBK)				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				5	U								
Acetone				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				5	U								
Acrylonitrile				0.07	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U								
Benzene				1	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U								
Bromodichloromethane				0.3	0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U								
Bromoform				5	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U								
Bromomethane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U								
Carbon Disulfide				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U								
Carbon Tetrachloride				0.3	0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U				0.3	U								
Chlorobenzene				--	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U								
Chlorodibromomethane				0.5	0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U				0.5	U								
Chloroethane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U								
Chloroform				7	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U								
Chloromethane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U								
cis-1,2-Dichloroethene				--	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U								
cis-1,3-Dichloropropene				0.2	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U								
Dibromomethane				--	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U								
Ethyl Benzene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U								
m,p-Xylene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U								
Methyl Iodide				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U								
Methylene Chloride				5	7.4	X				11.4	X				16.2	X				15.2	X				2	U				2	U				2	U				8.3	X				15.2	X			
o-Xylene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U								
Styrene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U								
Tetrachloroethylene				0.8	0.8	U				0.8	U				0.8	U				0.8	U				0.8	U				0.8	U				0.8	U				0.8	U								
Toluene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U								
trans-1,2-Dichloroethene				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U								
trans-1,3-Dichloropropene				0.2	0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U				0.2	U								
trans-1,4-Dichloro-2-butene				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				5	U								
Trichlorethene (1,1,2-Trichloroethylene)				3	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U								
Trichlorofluoromethane				--	1	U				1	U				1	U				1	U				1	U				1	U				1	U				1	U								
Vinyl Acetate				--	5	U				5	U				5	U				5	U				5	U				5	U				5	U				5	U								
Vinyl Chloride				0.02	0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U				0.01	U								

D: U = Indicates compound was not detected at the given reporting limit; X indicates that the compound was detected in the trip blank and contamination is suspected.
V: E= Exceedance, waiting verification based on subsequent lab data; V= Exceedance verified based on previous lab data; P=Passed, previous exceedance not verified based on current lab data.
Tr: I=Increasing Trend, D=Decreasing Trend;
Ch: Y indicates a change in trend from previous quarter; N means no change in trend.
The groundwater standards listed are based on the Washington Administrative Code (WAC) 173-200 groundwater limits as modified by the TMS 91-11 standards.
X = Methylene chloride was measured in the trip blank, but not in the lab blank - contaminations during transport is suspected.

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result	Pred. Limit
Alkalinity (as cacO ₃)	mg/L	G-01D	10/16/2018		270.0000	280.0000
Ammonia nitrogen	mg-N/L	G-01D	10/16/2018		0.1540	0.5700
Bicarbonate	mg/L	G-01D	10/16/2018		260.0000	280.0000
Chemical oxygen demand	mg/L	G-01D	10/16/2018	ND	10.0000	160.0000
Chloride	mg/L	G-01D	10/16/2018		7.7000	9.6231
Conductivity	umhos/cm	G-01D	10/16/2018		650.0000	900.0000
Dissolved antimony	mg/L	G-01D	10/16/2018	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-01D	10/16/2018		0.0003	42.0370
Dissolved barium	mg/L	G-01D	10/16/2018	ND	0.0005	0.0049
Dissolved beryllium	mg/L	G-01D	10/16/2018	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-01D	10/16/2018	ND	0.0001	0.0001
Dissolved calcium	mg/L	G-01D	10/16/2018		1.2700	6.3200
Dissolved chromium	mg/L	G-01D	10/16/2018	ND	0.0050	0.0136
Dissolved cobalt	mg/L	G-01D	10/16/2018	ND	0.0050	0.0080
Dissolved copper	mg/L	G-01D	10/16/2018	ND	0.0050	0.0080
Dissolved iron	mg/L	G-01D	10/16/2018	ND	0.0100	17.2848
Dissolved lead	mg/L	G-01D	10/16/2018		0.0001	0.0023
Dissolved magnesium	mg/L	G-01D	10/16/2018	ND	0.2000	0.3100
Dissolved manganese	mg/L	G-01D	10/16/2018	ND	0.0050	3.9651
Dissolved nickel	mg/L	G-01D	10/16/2018	ND	0.0050	0.0060
Dissolved potassium	mg/L	G-01D	10/16/2018		0.5600	1.6000
Dissolved selenium	mg/L	G-01D	10/16/2018		0.0008	0.0040
Dissolved silver	mg/L	G-01D	10/16/2018	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-01D	10/16/2018		156.0000	125.3493
Dissolved thallium	mg/L	G-01D	10/16/2018	ND	0.0001	0.0030
Dissolved vanadium	mg/L	G-01D	10/16/2018	ND	0.0100	0.0080
Dissolved zinc	mg/L	G-01D	10/16/2018	ND	0.0050	0.0120
Nitrate nitrogen	mg-N/L	G-01D	10/16/2018	ND	0.0100	0.2100
Nitrite nitrogen	mg-N/L	G-01D	10/16/2018		0.0450	45.4312
pH	std units	G-01D	10/16/2018		9.0300	6.02 - 10.02
Sulfate	mg/L	G-01D	10/16/2018		53.0000	74.7000
Total dissolved solids	mg/L	G-01D	10/16/2018		450.0000	480.0000
Total organic carbon	mg/L	G-01D	10/16/2018		2.5000	94.0000
Alkalinity (as cacO ₃)	mg/L	G-02D	10/16/2018		110.0000	280.0000
Ammonia nitrogen	mg-N/L	G-02D	10/16/2018		0.0130	0.5700
Bicarbonate	mg/L	G-02D	10/16/2018		110.0000	280.0000
Chemical oxygen demand	mg/L	G-02D	10/16/2018	ND	10.0000	160.0000
Chloride	mg/L	G-02D	10/16/2018		6.1000	9.6231
Conductivity	umhos/cm	G-02D	10/16/2018		420.0000	900.0000
Dissolved antimony	mg/L	G-02D	10/16/2018	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-02D	10/16/2018		0.0037	42.0370
Dissolved barium	mg/L	G-02D	10/16/2018	ND	0.0005	0.0049
Dissolved beryllium	mg/L	G-02D	10/16/2018	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-02D	10/16/2018	ND	0.0001	0.0001
Dissolved calcium	mg/L	G-02D	10/16/2018		0.5800	6.3200
Dissolved chromium	mg/L	G-02D	10/16/2018	ND	0.0050	0.0136
Dissolved cobalt	mg/L	G-02D	10/16/2018	ND	0.0050	0.0080
Dissolved copper	mg/L	G-02D	10/16/2018		0.0150	0.0080
Dissolved iron	mg/L	G-02D	10/16/2018		0.2570	17.2848
Dissolved lead	mg/L	G-02D	10/16/2018		0.0001	0.0023
Dissolved magnesium	mg/L	G-02D	10/16/2018	ND	0.2000	0.3100
Dissolved manganese	mg/L	G-02D	10/16/2018		0.0052	3.9651
Dissolved nickel	mg/L	G-02D	10/16/2018		0.0150	0.0060
Dissolved potassium	mg/L	G-02D	10/16/2018		0.3100	1.6000
Dissolved selenium	mg/L	G-02D	10/16/2018	ND	0.0003	0.0040
Dissolved silver	mg/L	G-02D	10/16/2018	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-02D	10/16/2018		88.6000	125.3493
Dissolved thallium	mg/L	G-02D	10/16/2018	ND	0.0001	0.0030
Dissolved vanadium	mg/L	G-02D	10/16/2018	ND	0.0100	0.0080
Dissolved zinc	mg/L	G-02D	10/16/2018	ND	0.0050	0.0120
Nitrate nitrogen	mg-N/L	G-02D	10/16/2018		1.8000	0.2100
Nitrite nitrogen	mg-N/L	G-02D	10/16/2018		0.0020	45.4312
pH	std units	G-02D	10/16/2018		7.9300	6.02 - 10.02
Sulfate	mg/L	G-02D	10/16/2018		87.0000	74.7000
Total dissolved solids	mg/L	G-02D	10/16/2018		280.0000	480.0000
Total organic carbon	mg/L	G-02D	10/16/2018		0.8600	94.0000
Alkalinity (as cacO ₃)	mg/L	G-06B	10/16/2018		270.0000	280.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result	Pred. Limit
Ammonia nitrogen	mg-N/L	G-06B	10/16/2018		0.0390	0.5700
Bicarbonate	mg/L	G-06B	10/16/2018		270.0000	280.0000
Chemical oxygen demand	mg/L	G-06B	10/16/2018	ND	10.0000	160.0000
Chloride	mg/L	G-06B	10/16/2018		8.5000	9.6231
Conductivity	umhos/cm	G-06B	10/16/2018		700.0000	900.0000
Dissolved antimony	mg/L	G-06B	10/16/2018	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-06B	10/16/2018		0.0034	42.0370
Dissolved barium	mg/L	G-06B	10/16/2018	ND	0.0005	0.0049
Dissolved beryllium	mg/L	G-06B	10/16/2018	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-06B	10/16/2018	ND	0.0001	0.0001
Dissolved calcium	mg/L	G-06B	10/16/2018		1.1800	6.3200
Dissolved chromium	mg/L	G-06B	10/16/2018	ND	0.0050	0.0136
Dissolved cobalt	mg/L	G-06B	10/16/2018	ND	0.0050	0.0080
Dissolved copper	mg/L	G-06B	10/16/2018	ND	0.0050	0.0080
Dissolved iron	mg/L	G-06B	10/16/2018		0.1730	17.2848
Dissolved lead	mg/L	G-06B	10/16/2018		0.0001	0.0023
Dissolved magnesium	mg/L	G-06B	10/16/2018	ND	0.2000	0.3100
Dissolved manganese	mg/L	G-06B	10/16/2018		0.0120	3.9651
Dissolved nickel	mg/L	G-06B	10/16/2018		0.0070	0.0060
Dissolved potassium	mg/L	G-06B	10/16/2018		0.5900	1.6000
Dissolved selenium	mg/L	G-06B	10/16/2018		0.0006	0.0040
Dissolved silver	mg/L	G-06B	10/16/2018	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-06B	10/16/2018		167.0000	125.3493
Dissolved thallium	mg/L	G-06B	10/16/2018	ND	0.0001	0.0030
Dissolved vanadium	mg/L	G-06B	10/16/2018	ND	0.0100	0.0080
Dissolved zinc	mg/L	G-06B	10/16/2018	ND	0.0050	0.0120
Nitrate nitrogen	mg-N/L	G-06B	10/16/2018		0.7400	0.2100
Nitrite nitrogen	mg-N/L	G-06B	10/16/2018	ND	0.0010	45.4312
pH	std units	G-06B	10/16/2018		7.7000	6.02 - 10.02
Sulfate	mg/L	G-06B	10/16/2018		88.0000	74.7000
Total dissolved solids	mg/L	G-06B	10/16/2018		460.0000	480.0000
Total organic carbon	mg/L	G-06B	10/16/2018		2.4000	94.0000
Alkalinity (as cacO3)	mg/L	G-08D2	10/16/2018		170.0000	280.0000
Ammonia nitrogen	mg-N/L	G-08D2	10/16/2018		0.1730	0.5700
Bicarbonate	mg/L	G-08D2	10/16/2018		110.0000	280.0000
Chemical oxygen demand	mg/L	G-08D2	10/16/2018	ND	10.0000	160.0000
Chloride	mg/L	G-08D2	10/16/2018		3.5000	9.6231
Conductivity	umhos/cm	G-08D2	10/16/2018		450.0000	900.0000
Dissolved antimony	mg/L	G-08D2	10/16/2018	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-08D2	10/16/2018		0.0010	42.0370
Dissolved barium	mg/L	G-08D2	10/16/2018	ND	0.0005	0.0049
Dissolved beryllium	mg/L	G-08D2	10/16/2018	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-08D2	10/16/2018	ND	0.0001	0.0001
Dissolved calcium	mg/L	G-08D2	10/16/2018		0.5600	6.3200
Dissolved chromium	mg/L	G-08D2	10/16/2018	ND	0.0050	0.0136
Dissolved cobalt	mg/L	G-08D2	10/16/2018	ND	0.0050	0.0080
Dissolved copper	mg/L	G-08D2	10/16/2018	ND	0.0050	0.0080
Dissolved iron	mg/L	G-08D2	10/16/2018		0.1160	17.2848
Dissolved lead	mg/L	G-08D2	10/16/2018	ND	0.0001	0.0023
Dissolved magnesium	mg/L	G-08D2	10/16/2018	ND	0.2000	0.3100
Dissolved manganese	mg/L	G-08D2	10/16/2018	ND	0.0050	3.9651
Dissolved nickel	mg/L	G-08D2	10/16/2018	ND	0.0050	0.0060
Dissolved potassium	mg/L	G-08D2	10/16/2018		0.3400	1.6000
Dissolved selenium	mg/L	G-08D2	10/16/2018	ND	0.0003	0.0040
Dissolved silver	mg/L	G-08D2	10/16/2018	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-08D2	10/16/2018		100.0000	125.3493
Dissolved thallium	mg/L	G-08D2	10/16/2018	ND	0.0001	0.0030
Dissolved vanadium	mg/L	G-08D2	10/16/2018	ND	0.0100	0.0080
Dissolved zinc	mg/L	G-08D2	10/16/2018	ND	0.0050	0.0120
Nitrate nitrogen	mg-N/L	G-08D2	10/16/2018	ND	0.0100	0.2100
Nitrite nitrogen	mg-N/L	G-08D2	10/16/2018		0.0400	45.4312
pH	std units	G-08D2	10/16/2018		9.8100	6.02 - 10.02
Sulfate	mg/L	G-08D2	10/16/2018		45.3000	74.7000
Total dissolved solids	mg/L	G-08D2	10/16/2018		330.0000	480.0000
Total organic carbon	mg/L	G-08D2	10/16/2018		1.5000	94.0000
Alkalinity (as cacO3)	mg/L	G-09D	10/17/2018		200.0000	280.0000
Ammonia nitrogen	mg-N/L	G-09D	10/17/2018		0.1310	0.5700

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result		Pred. Limit
Bicarbonate	mg/L	G-09D	10/17/2018		180.0000		280.0000
Chemical oxygen demand	mg/L	G-09D	10/17/2018		14.0000		160.0000
Chloride	mg/L	G-09D	10/17/2018		10.7000	*	9.6231
Conductivity	umhos/cm	G-09D	10/17/2018		730.0000		900.0000
Dissolved antimony	mg/L	G-09D	10/17/2018	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-09D	10/17/2018		0.0046		42.0370
Dissolved barium	mg/L	G-09D	10/17/2018		0.0014		0.0049
Dissolved beryllium	mg/L	G-09D	10/17/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-09D	10/17/2018	ND	0.0001	**	0.0001
Dissolved calcium	mg/L	G-09D	10/17/2018		1.6700		6.3200
Dissolved chromium	mg/L	G-09D	10/17/2018	ND	0.0050		0.0136
Dissolved cobalt	mg/L	G-09D	10/17/2018	ND	0.0050		0.0080
Dissolved copper	mg/L	G-09D	10/17/2018		0.0070		0.0080
Dissolved iron	mg/L	G-09D	10/17/2018		0.0920		17.2848
Dissolved lead	mg/L	G-09D	10/17/2018		0.0005		0.0023
Dissolved magnesium	mg/L	G-09D	10/17/2018	ND	0.2000		0.3100
Dissolved manganese	mg/L	G-09D	10/17/2018		0.0096		3.9651
Dissolved nickel	mg/L	G-09D	10/17/2018		0.0060		0.0060
Dissolved potassium	mg/L	G-09D	10/17/2018		0.6300		1.6000
Dissolved selenium	mg/L	G-09D	10/17/2018		0.0011		0.0040
Dissolved silver	mg/L	G-09D	10/17/2018	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-09D	10/17/2018		161.0000	***	125.3493
Dissolved thallium	mg/L	G-09D	10/17/2018	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-09D	10/17/2018	ND	0.0100		0.0080
Dissolved zinc	mg/L	G-09D	10/17/2018		0.0050	**	0.0120
Nitrate nitrogen	mg-N/L	G-09D	10/17/2018		0.3300	*	0.2100
Nitrite nitrogen	mg-N/L	G-09D	10/17/2018		0.0180		45.4312
pH	std units	G-09D	10/17/2018		8.5300		6.02 - 10.02
Sulfate	mg/L	G-09D	10/17/2018		153.0000	*	74.7000
Total dissolved solids	mg/L	G-09D	10/17/2018		530.0000	*	480.0000
Total organic carbon	mg/L	G-09D	10/17/2018		3.3000		94.0000
Alkalinity (as cacO3)	mg/L	G-10D	10/17/2018		420.0000	***	280.0000
Ammonia nitrogen	mg-N/L	G-10D	10/17/2018		0.3520		0.5700
Bicarbonate	mg/L	G-10D	10/17/2018		420.0000	***	280.0000
Chemical oxygen demand	mg/L	G-10D	10/17/2018		11.0000		160.0000
Chloride	mg/L	G-10D	10/17/2018		36.5000	***	9.6231
Conductivity	umhos/cm	G-10D	10/17/2018		1600.0000	***	900.0000
Dissolved antimony	mg/L	G-10D	10/17/2018	ND	0.0003		0.0100
Dissolved arsenic	mg/L	G-10D	10/17/2018		0.0013		42.0370
Dissolved barium	mg/L	G-10D	10/17/2018		0.0022		0.0049
Dissolved beryllium	mg/L	G-10D	10/17/2018	ND	0.0005		0.0005
Dissolved cadmium	mg/L	G-10D	10/17/2018	ND	0.0001		0.0001
Dissolved calcium	mg/L	G-10D	10/17/2018		23.9000	***	6.3200
Dissolved chromium	mg/L	G-10D	10/17/2018	ND	0.0050		0.0136
Dissolved cobalt	mg/L	G-10D	10/17/2018	ND	0.0050		0.0080
Dissolved copper	mg/L	G-10D	10/17/2018	ND	0.0050		0.0080
Dissolved iron	mg/L	G-10D	10/17/2018		0.6140		17.2848
Dissolved lead	mg/L	G-10D	10/17/2018	ND	0.0001		0.0023
Dissolved magnesium	mg/L	G-10D	10/17/2018		2.0400	***	0.3100
Dissolved manganese	mg/L	G-10D	10/17/2018		0.4083		3.9651
Dissolved nickel	mg/L	G-10D	10/17/2018		0.0060		0.0060
Dissolved potassium	mg/L	G-10D	10/17/2018		2.2200	***	1.6000
Dissolved selenium	mg/L	G-10D	10/17/2018		0.0013		0.0040
Dissolved silver	mg/L	G-10D	10/17/2018	ND	0.0001		0.0007
Dissolved sodium	mg/L	G-10D	10/17/2018		335.0000	***	125.3493
Dissolved thallium	mg/L	G-10D	10/17/2018	ND	0.0001		0.0030
Dissolved vanadium	mg/L	G-10D	10/17/2018	ND	0.0100		0.0080
Dissolved zinc	mg/L	G-10D	10/17/2018	ND	0.0050		0.0120
Nitrate nitrogen	mg-N/L	G-10D	10/17/2018		0.0400		0.2100
Nitrite nitrogen	mg-N/L	G-10D	10/17/2018	ND	0.0010		45.4312
pH	std units	G-10D	10/17/2018		6.9000		6.02 - 10.02
Sulfate	mg/L	G-10D	10/17/2018		316.0000	***	74.7000
Total dissolved solids	mg/L	G-10D	10/17/2018		1100.0000	***	480.0000
Total organic carbon	mg/L	G-10D	10/17/2018		3.6000		94.0000
Alkalinity (as cacO3)	mg/L	G-13D	10/17/2018		170.0000		280.0000
Ammonia nitrogen	mg-N/L	G-13D	10/17/2018		0.0450		0.5700
Bicarbonate	mg/L	G-13D	10/17/2018		160.0000		280.0000

Table 2

Most Current Downgradient Monitoring Data

Constituent	Units	Well	Date		Result	Pred. Limit
Chemical oxygen demand	mg/L	G-13D	10/17/2018	ND	10.0000	160.0000
Chloride	mg/L	G-13D	10/17/2018		9.4000	9.6231
Conductivity	umhos/cm	G-13D	10/17/2018		450.0000	900.0000
Dissolved antimony	mg/L	G-13D	10/17/2018	ND	0.0003	0.0100
Dissolved arsenic	mg/L	G-13D	10/17/2018		0.0002	42.0370
Dissolved barium	mg/L	G-13D	10/17/2018		0.0014	0.0049
Dissolved beryllium	mg/L	G-13D	10/17/2018	ND	0.0005	0.0005
Dissolved cadmium	mg/L	G-13D	10/17/2018	ND	0.0001	0.0001
Dissolved calcium	mg/L	G-13D	10/17/2018		0.6300	6.3200
Dissolved chromium	mg/L	G-13D	10/17/2018	ND	0.0050	0.0136
Dissolved cobalt	mg/L	G-13D	10/17/2018	ND	0.0050	0.0080
Dissolved copper	mg/L	G-13D	10/17/2018	ND	0.0050	0.0080
Dissolved iron	mg/L	G-13D	10/17/2018		0.0560	17.2848
Dissolved lead	mg/L	G-13D	10/17/2018	ND	0.0001	0.0023
Dissolved magnesium	mg/L	G-13D	10/17/2018	ND	0.2000	0.3100
Dissolved manganese	mg/L	G-13D	10/17/2018	ND	0.0050	3.9651
Dissolved nickel	mg/L	G-13D	10/17/2018	ND	0.0050	0.0060
Dissolved potassium	mg/L	G-13D	10/17/2018		0.4100	1.6000
Dissolved selenium	mg/L	G-13D	10/17/2018		0.0004	0.0040
Dissolved silver	mg/L	G-13D	10/17/2018	ND	0.0001	0.0007
Dissolved sodium	mg/L	G-13D	10/17/2018		101.0000	125.3493
Dissolved thallium	mg/L	G-13D	10/17/2018	ND	0.0001	0.0030
Dissolved vanadium	mg/L	G-13D	10/17/2018	ND	0.0100	0.0080
Dissolved zinc	mg/L	G-13D	10/17/2018	ND	0.0050	0.0120
Nitrate nitrogen	mg-N/L	G-13D	10/17/2018		0.0110	0.2100
Nitrite nitrogen	mg-N/L	G-13D	10/17/2018	ND	0.0010	45.4312
pH	std units	G-13D	10/17/2018		9.2900	6.02 - 10.02
Sulfate	mg/L	G-13D	10/17/2018		41.0000	74.7000
Total dissolved solids	mg/L	G-13D	10/17/2018		370.0000	480.0000
Total organic carbon	mg/L	G-13D	10/17/2018		1.2000	94.0000

* - Current value failed - awaiting verification.
** - Current value passed - previous exceedance not verified.
*** - Current value failed - exceedance verified.
**** - Current value passed - awaiting one more verification.
***** - Insufficient background data to compute prediction limit.
ND = Not Detected, Result = detection limit.

Table 5

Summary Statistics and Prediction Limits

Constituent	Units	Detect	N	Mean	SD	alpha	Factor	Pred Limit	Type	Conf
Alkalinity (as caco3)	mg/L	74	74					280.0000	nonpar	0.99
Ammonia nitrogen	mg-N/L	67	67					0.5700	nonpar	0.99
Bicarbonate	mg/L	74	74					280.0000	nonpar	0.99
Chemical oxygen demand	mg/L	20	73					160.0000	nonpar	0.99
Chloride	mg/L	73	74	1.3348	0.3881	0.0100	2.3945	9.6231	lognor	
Conductivity	umhos/cm	74	74					900.0000	nonpar	0.99
Dissolved antimony	mg/L	11	74					0.0100	nonpar	0.99
Dissolved arsenic	mg/L	49	70	-5.7034	3.9365	0.0100	2.3985	42.0370	lognor	
Dissolved barium	mg/L	20	72					0.0049	nonpar	0.99
Dissolved beryllium	mg/L	0	74					0.0005	nonpar	***
Dissolved cadmium	mg/L	13	67					0.0001	nonpar	0.99
Dissolved calcium	mg/L	71	71					6.3200	nonpar	0.99
Dissolved chromium	mg/L	12	74					0.0136	nonpar	0.99
Dissolved cobalt	mg/L	10	74					0.0080	nonpar	0.99
Dissolved copper	mg/L	14	71					0.0080	nonpar	0.99
Dissolved iron	mg/L	37	68	-1.9362	1.9936	0.0100	2.4007	17.2848	lognor	
Dissolved lead	mg/L	21	74					0.0023	nonpar	0.99
Dissolved magnesium	mg/L	46	70					0.3100	nonpar	0.99
Dissolved manganese	mg/L	51	65	-4.3675	2.3895	0.0100	2.4043	3.9651	lognor	
Dissolved nickel	mg/L	2	73					0.0060	nonpar	0.99
Dissolved potassium	mg/L	70	74					1.6000	nonpar	0.99
Dissolved selenium	mg/L	17	73					0.0040	nonpar	0.99
Dissolved silver	mg/L	8	71					0.0007	nonpar	0.99
Dissolved sodium	mg/L	71	71	107.0408	7.6365	0.0100	2.3975	125.3493	normal	
Dissolved thallium	mg/L	7	73					0.0030	nonpar	0.99
Dissolved vanadium	mg/L	4	74					0.0080	nonpar	0.99
Dissolved zinc	mg/L	20	73					0.0120	nonpar	0.99
Nitrate nitrogen	mg-N/L	15	73					0.2100	nonpar	0.99
Nitrite nitrogen	mg-N/L	38	69	-2.5580	2.6563	0.0100	2.3996	45.4312	lognor	
pH	std units	73	73					6.02- 10.02	nonpar	0.99
Sulfate	mg/L	74	74					74.7000	nonpar	0.99
Total dissolved solids	mg/L	74	74					480.0000	nonpar	0.99
Total organic carbon	mg/L	65	74					94.0000	nonpar	0.99

Conf = confidence level for passing initial test or one of two verification resamples at all downgradient wells for a single constituent (nonparametric test only).

* - Insufficient Data.

** - Calculated limit raised to Manual Reporting Limit.

*** - Nonparametric limit based on ND value.

For transformed data, mean and SD in transformed units and prediction limit in original units.

All sample sizes and statistics are based on outlier free data.

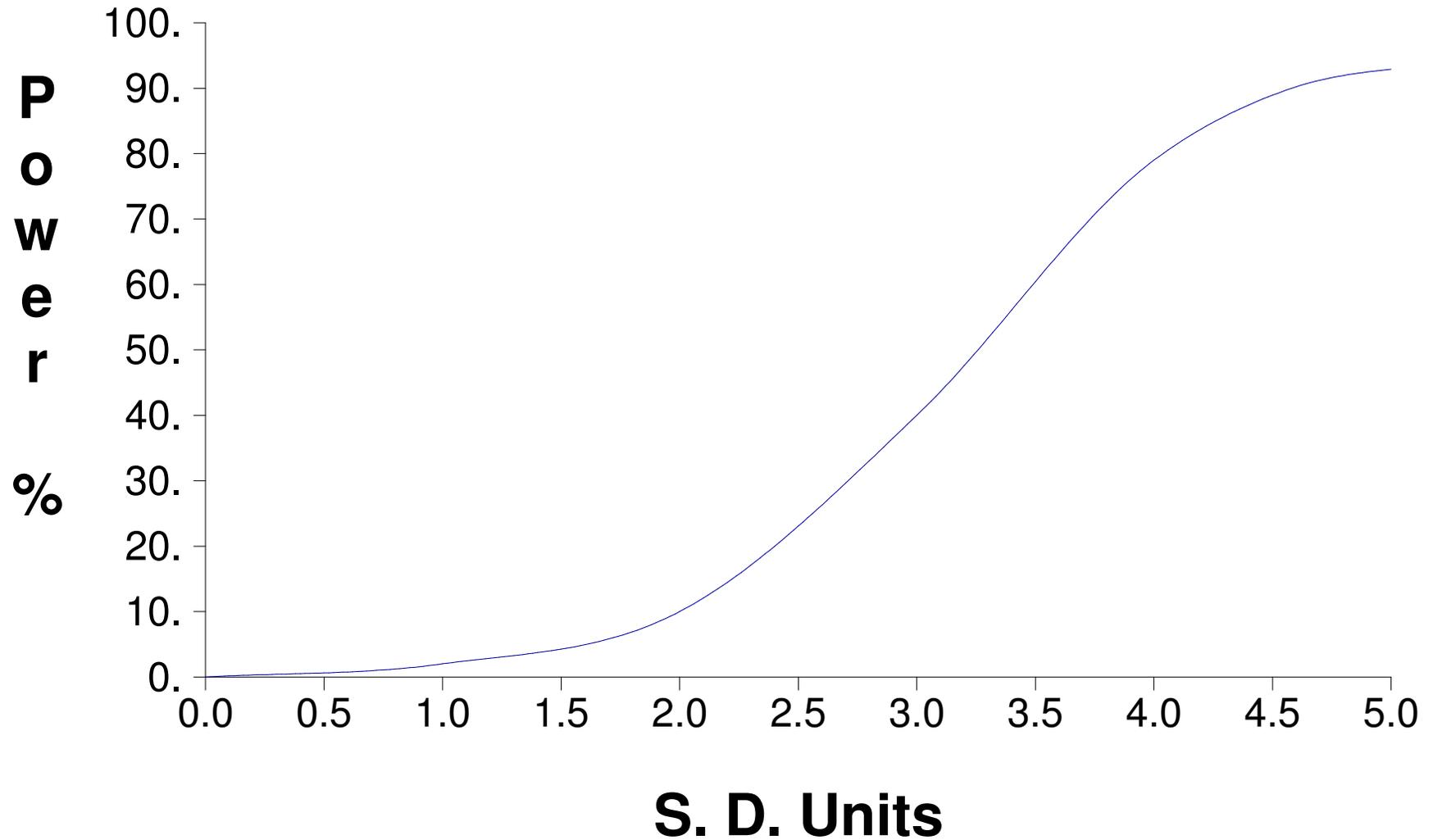
For nonparametric limits, median reporting limits are substituted for extreme reporting limit values.

Appendix C

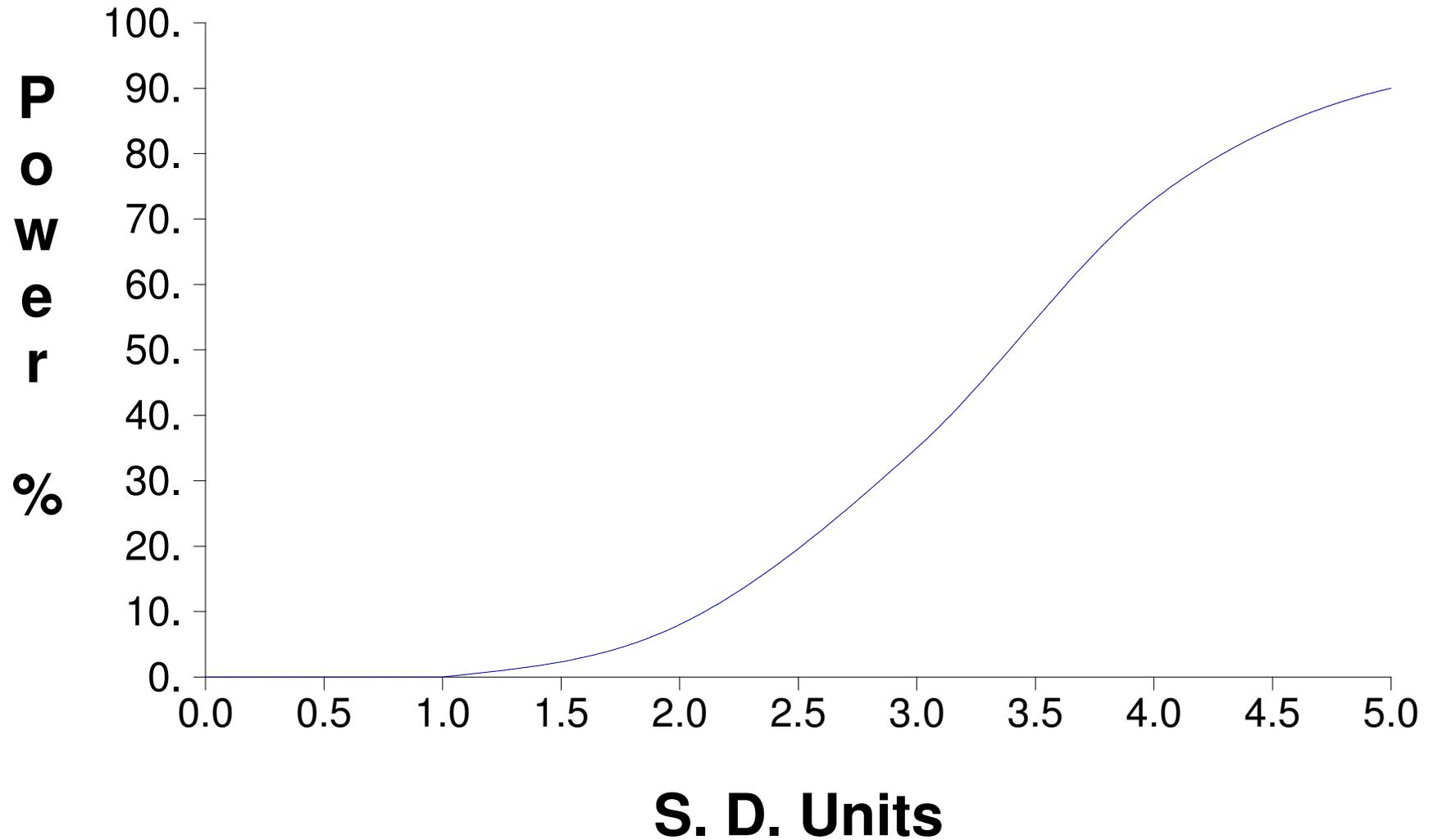
2018 Groundwater Statistical Analyses

Shallow Wells

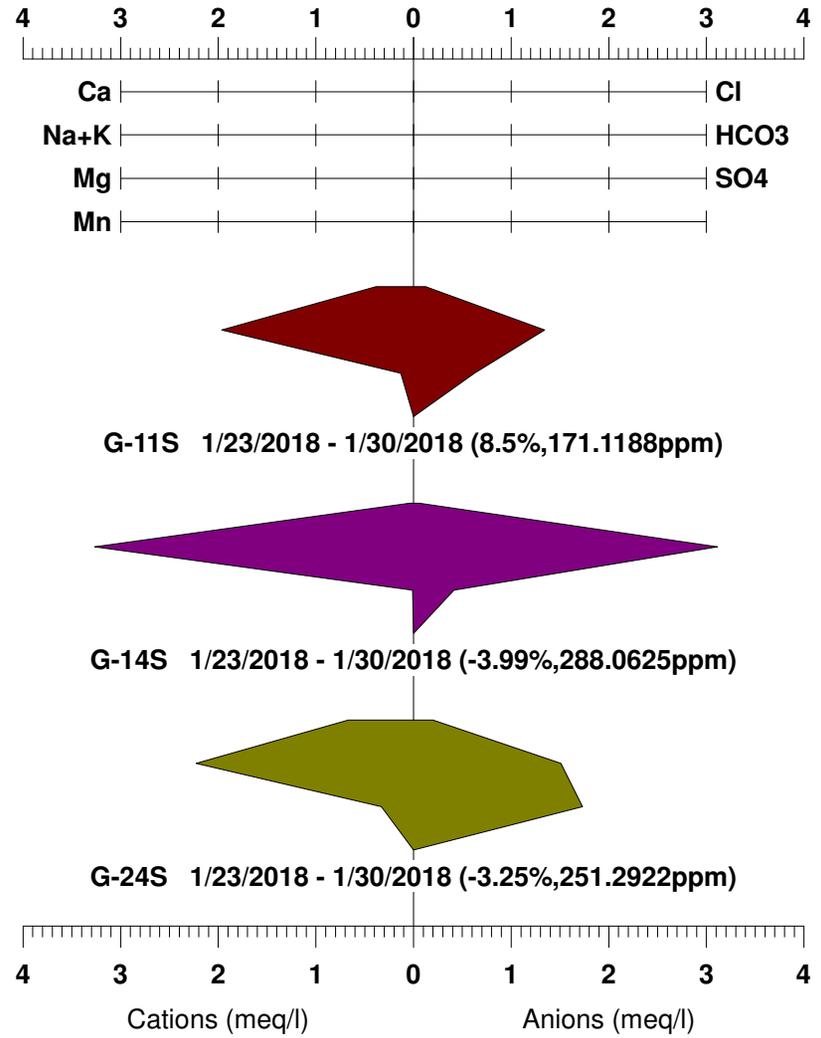
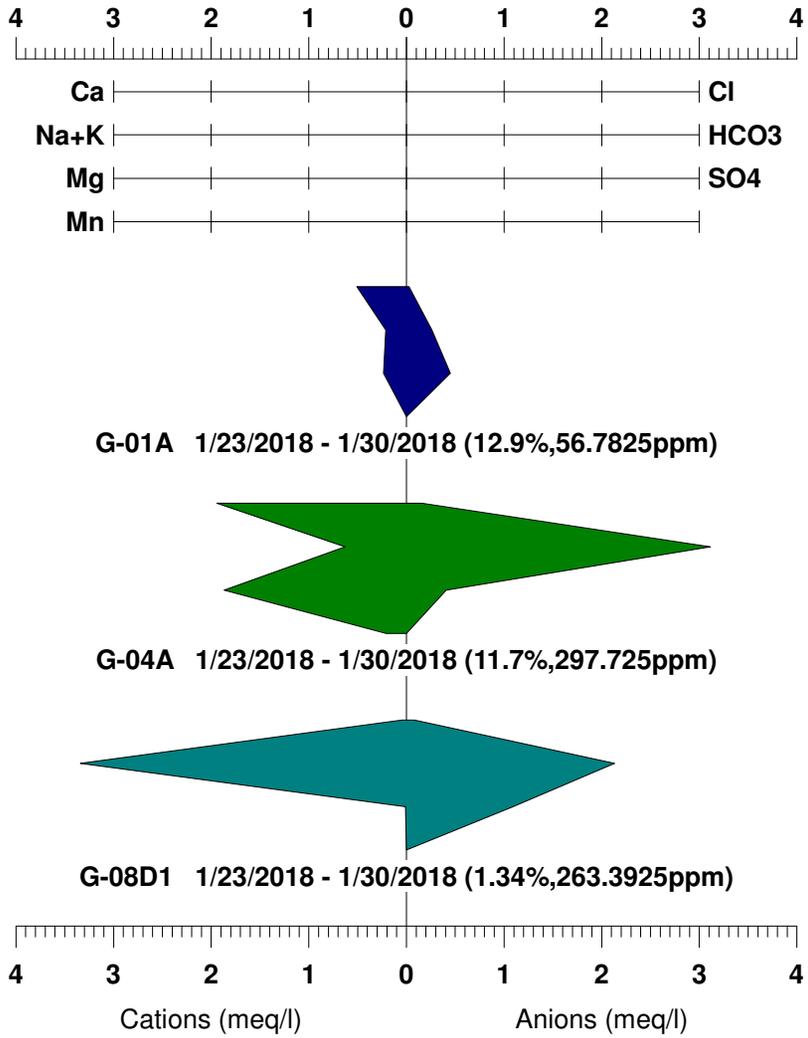
False Positive and False Negative Rates for Current Intra-Well Prediction Limits Monitoring Program



False Positive and False Negative Rates for Current Upgradient vs. Downgradient Monitoring Program

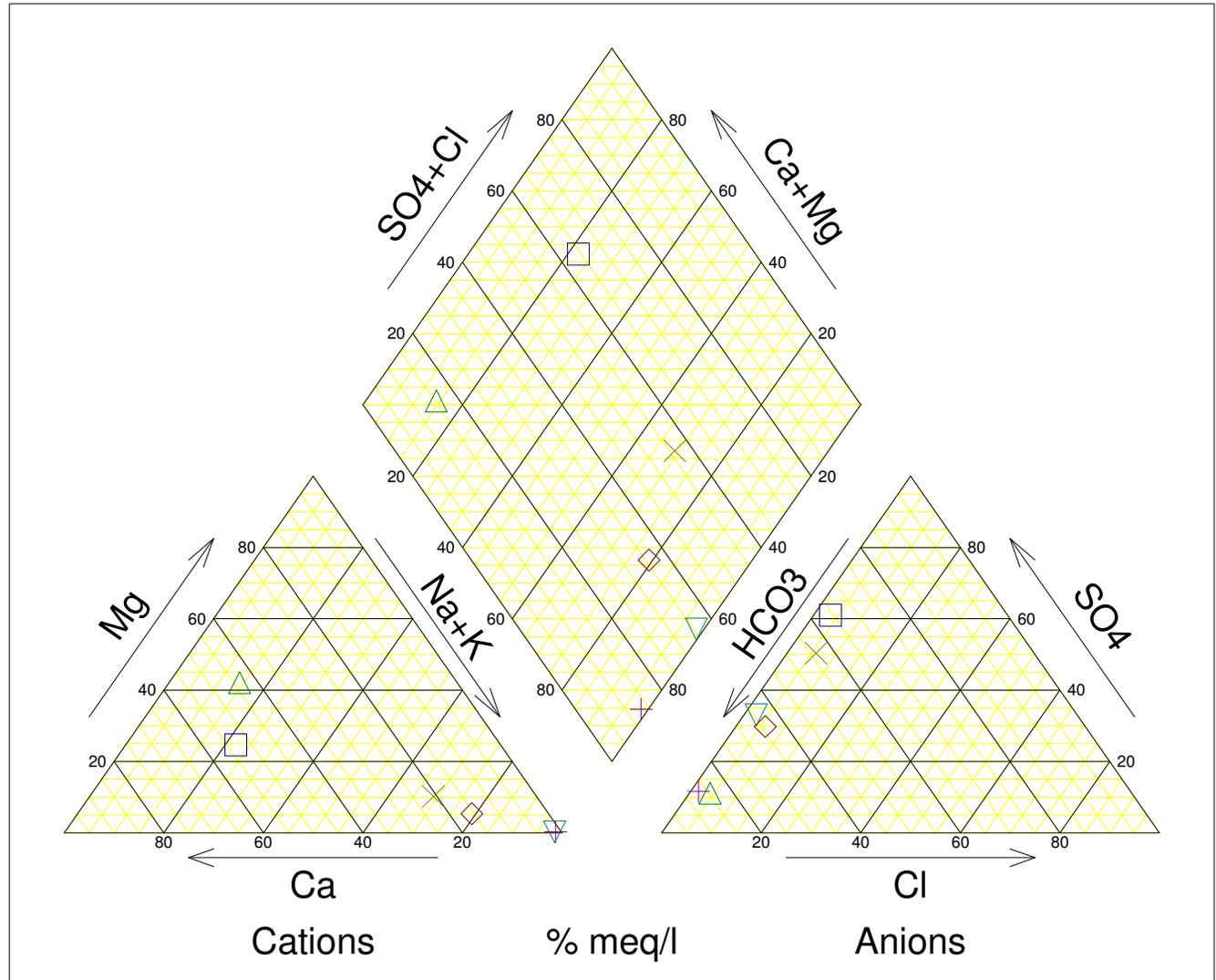


Cathcart Landfill [ccshal]

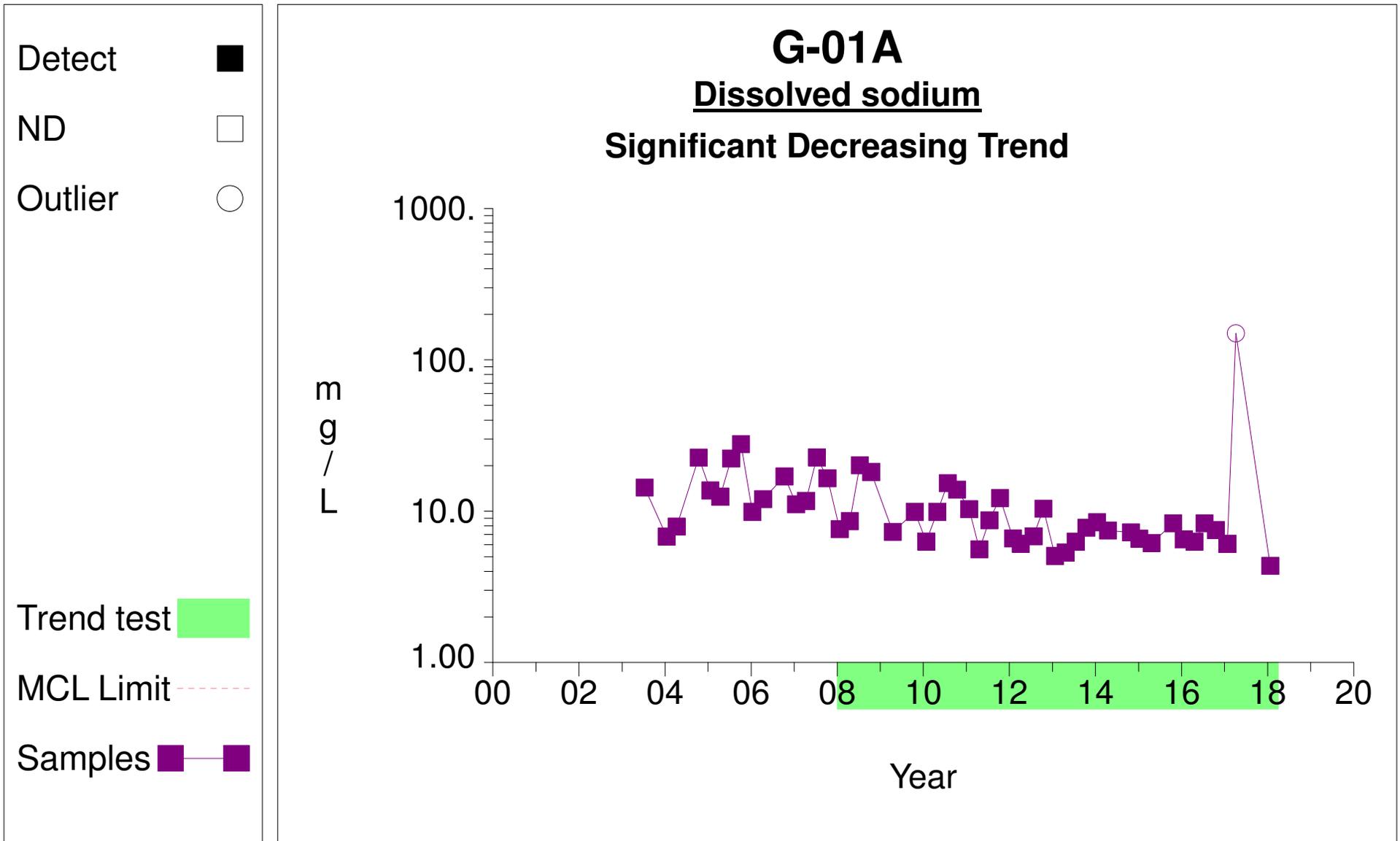


Cathcart Landfill [ccshal]

□ G-01A	1/23/2018 - 1/30/2018 (12.9%, 56.78ppm)
△ G-04A	1/23/2018 - 1/30/2018 (9.41%, 291.96ppm)
▽ G-08D1	1/23/2018 - 1/30/2018 (1.34%, 263.39ppm)
◇ G-11S	1/23/2018 - 1/30/2018 (8.49%, 171.11ppm)
✦ G-14S	1/23/2018 - 1/30/2018 (-3.99%, 288.06ppm)
✕ G-24S	1/23/2018 - 1/30/2018 (-3.26%, 251.28ppm)

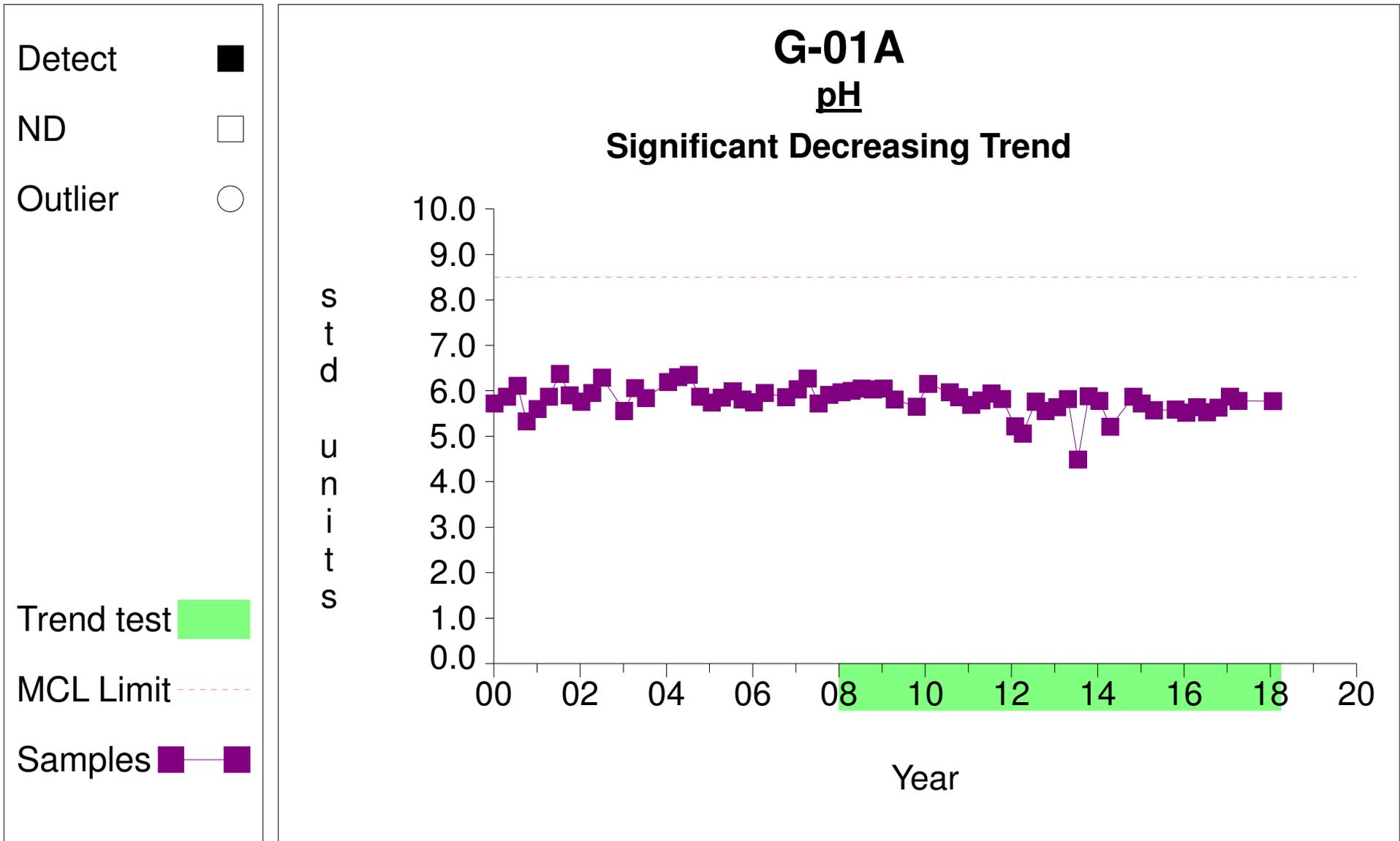


Time Series



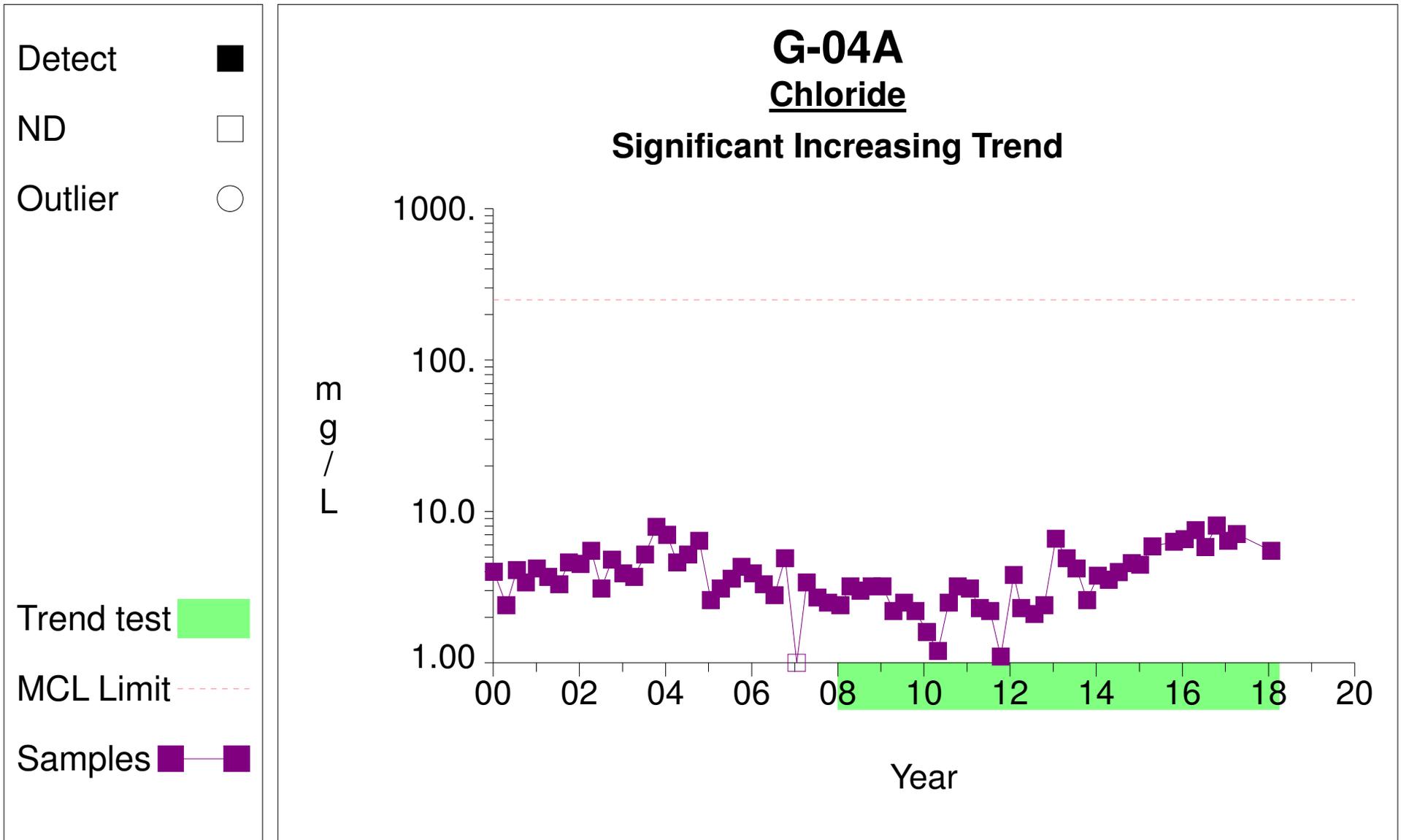
Graph 24

Time Series



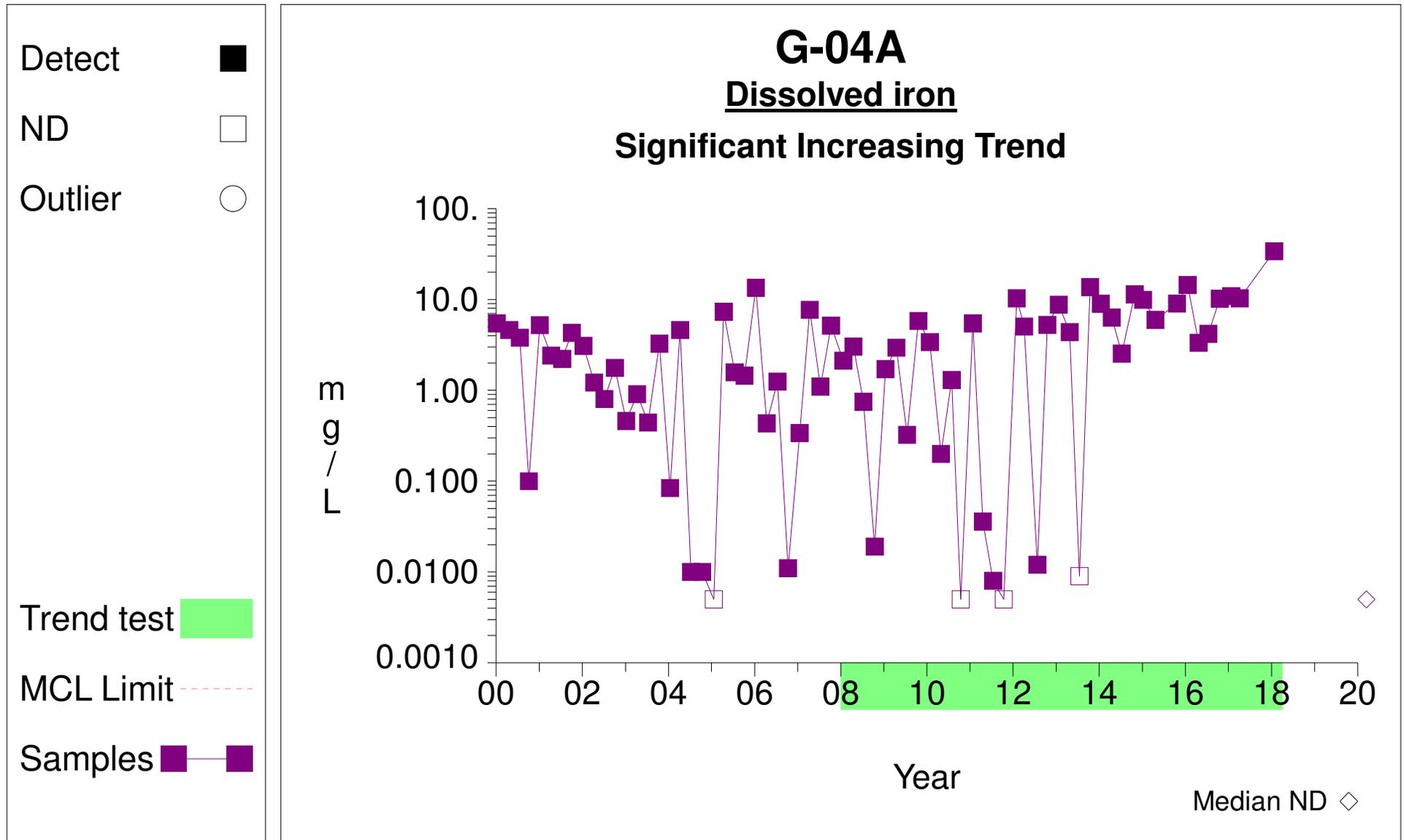
Graph 30

Time Series



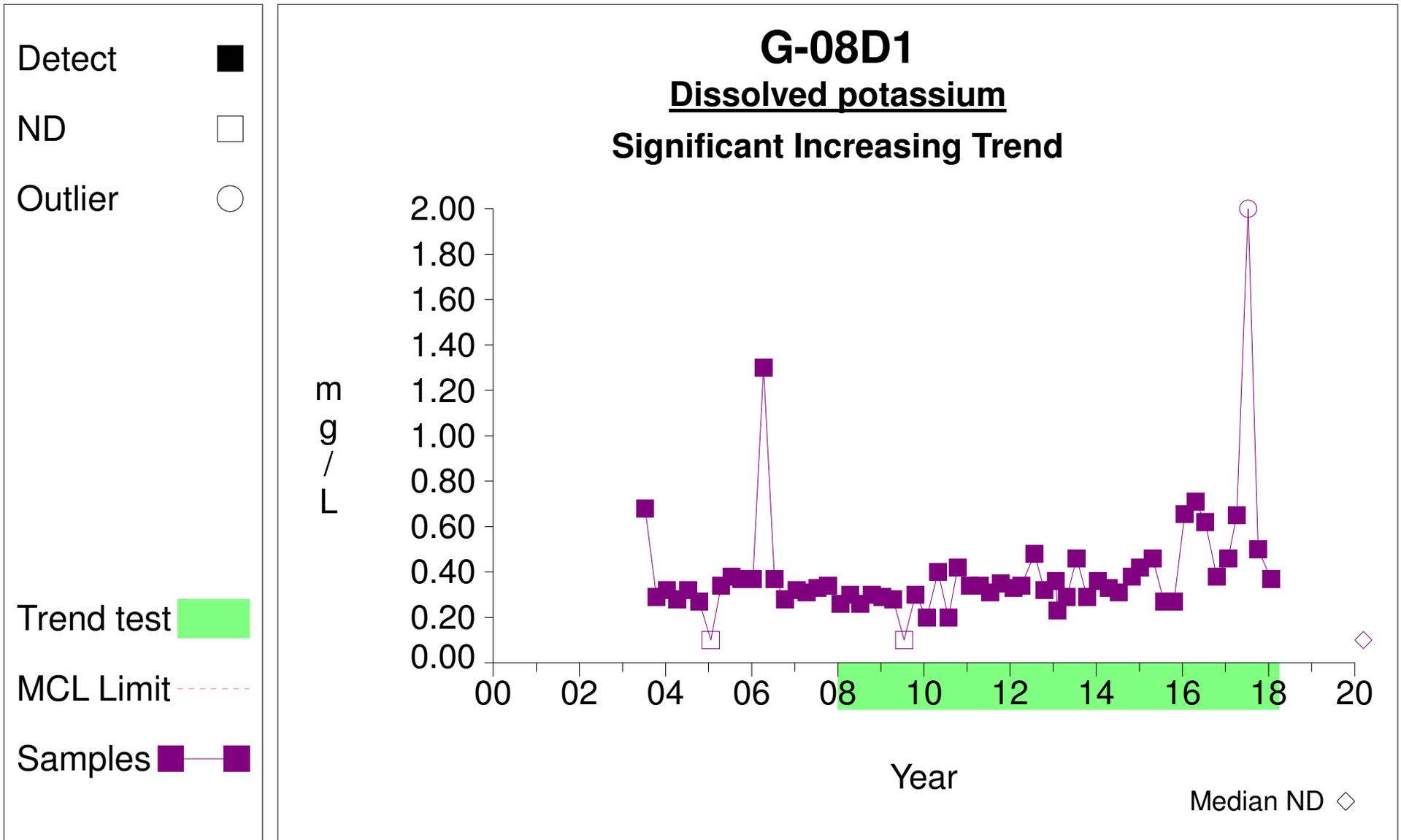
Graph 38

Time Series



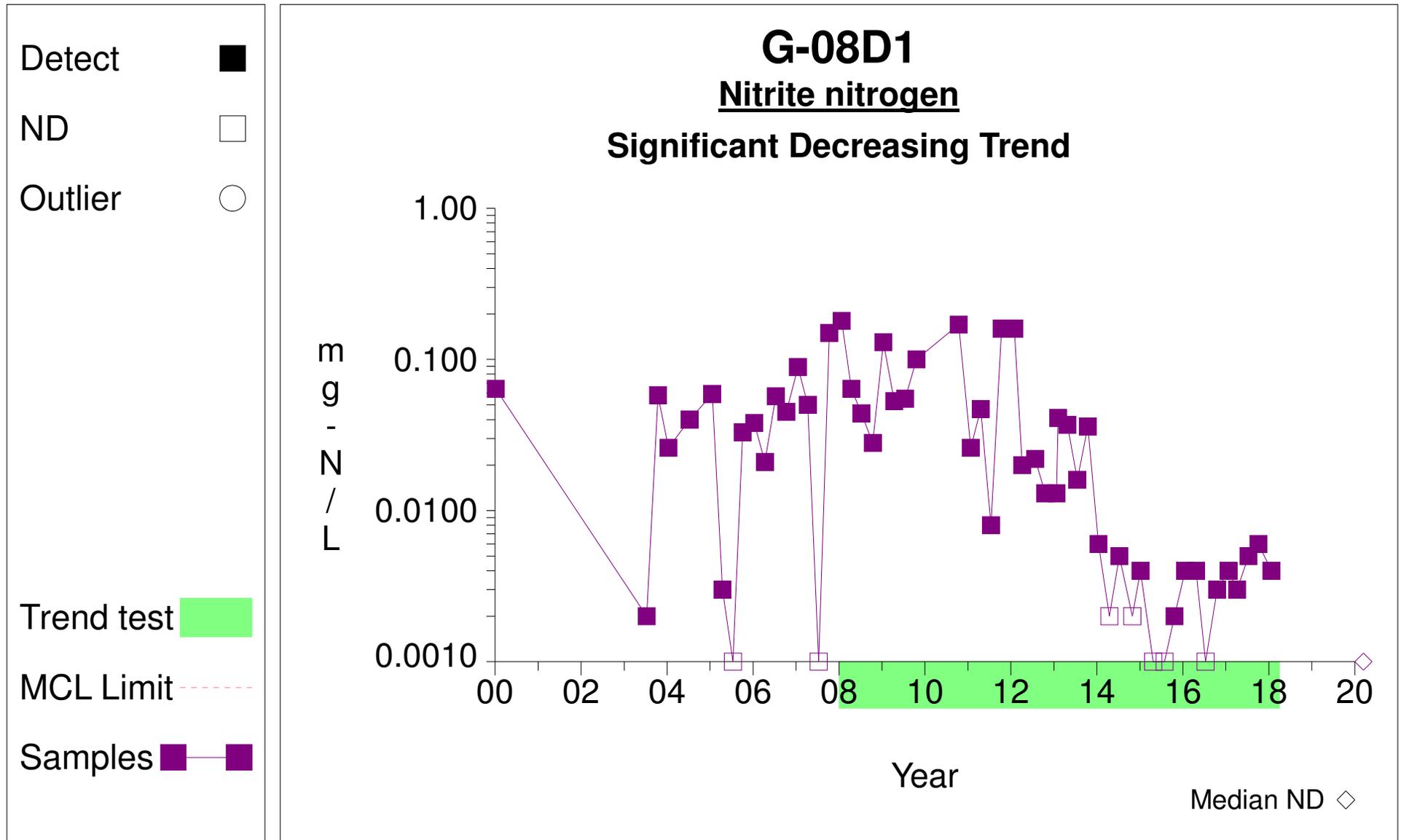
Graph 49

Time Series



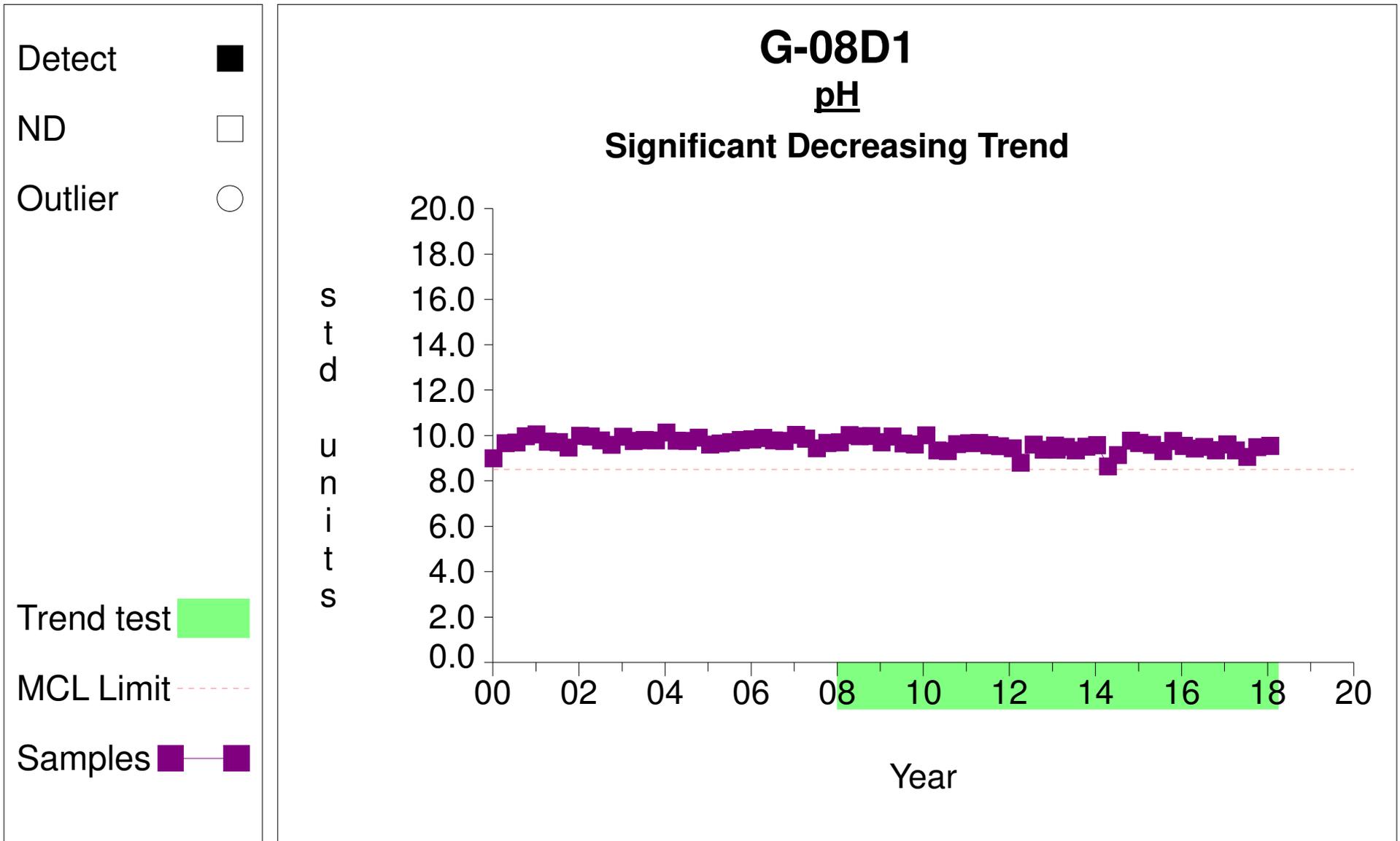
Graph 87

Time Series



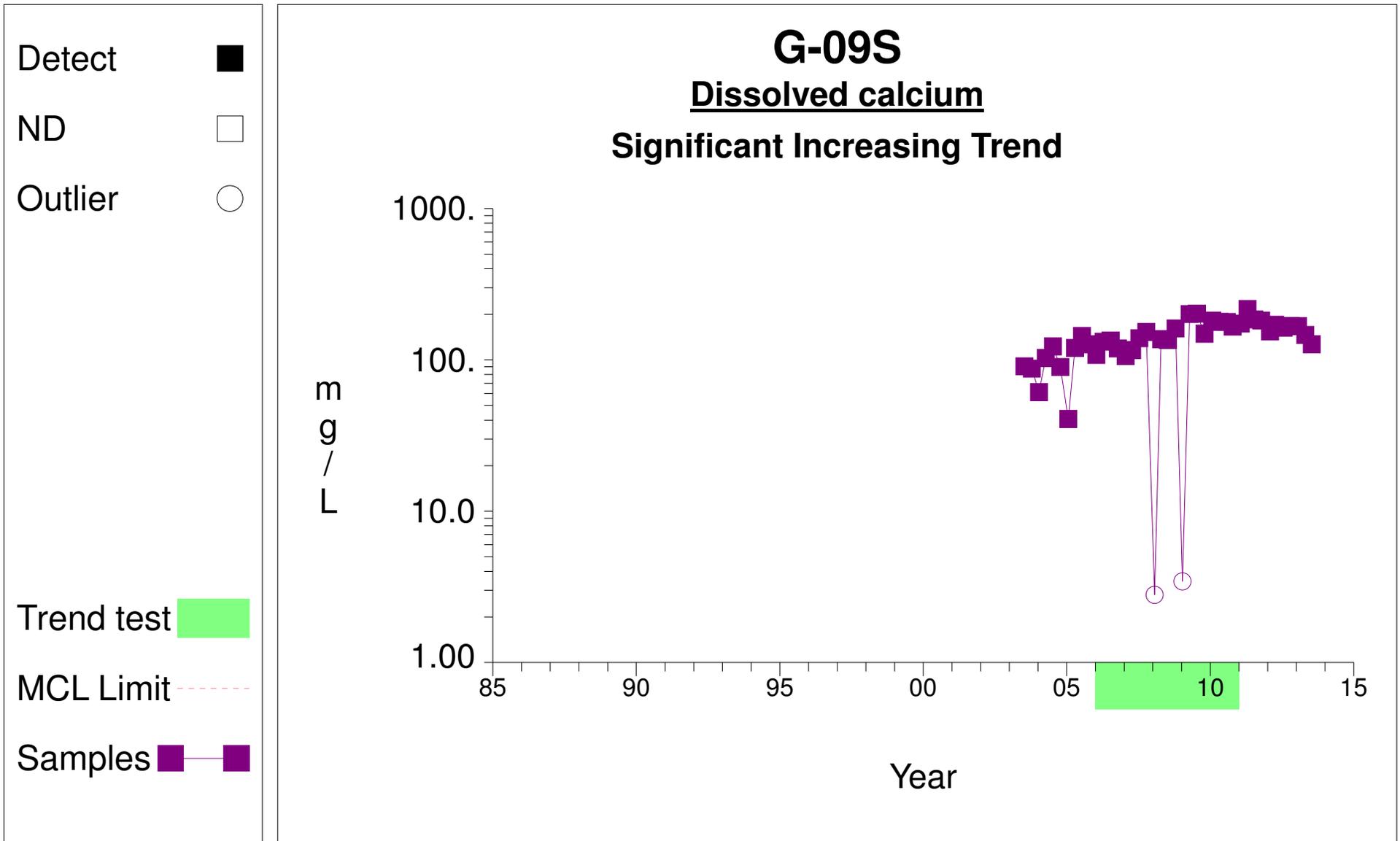
Graph 95

Time Series



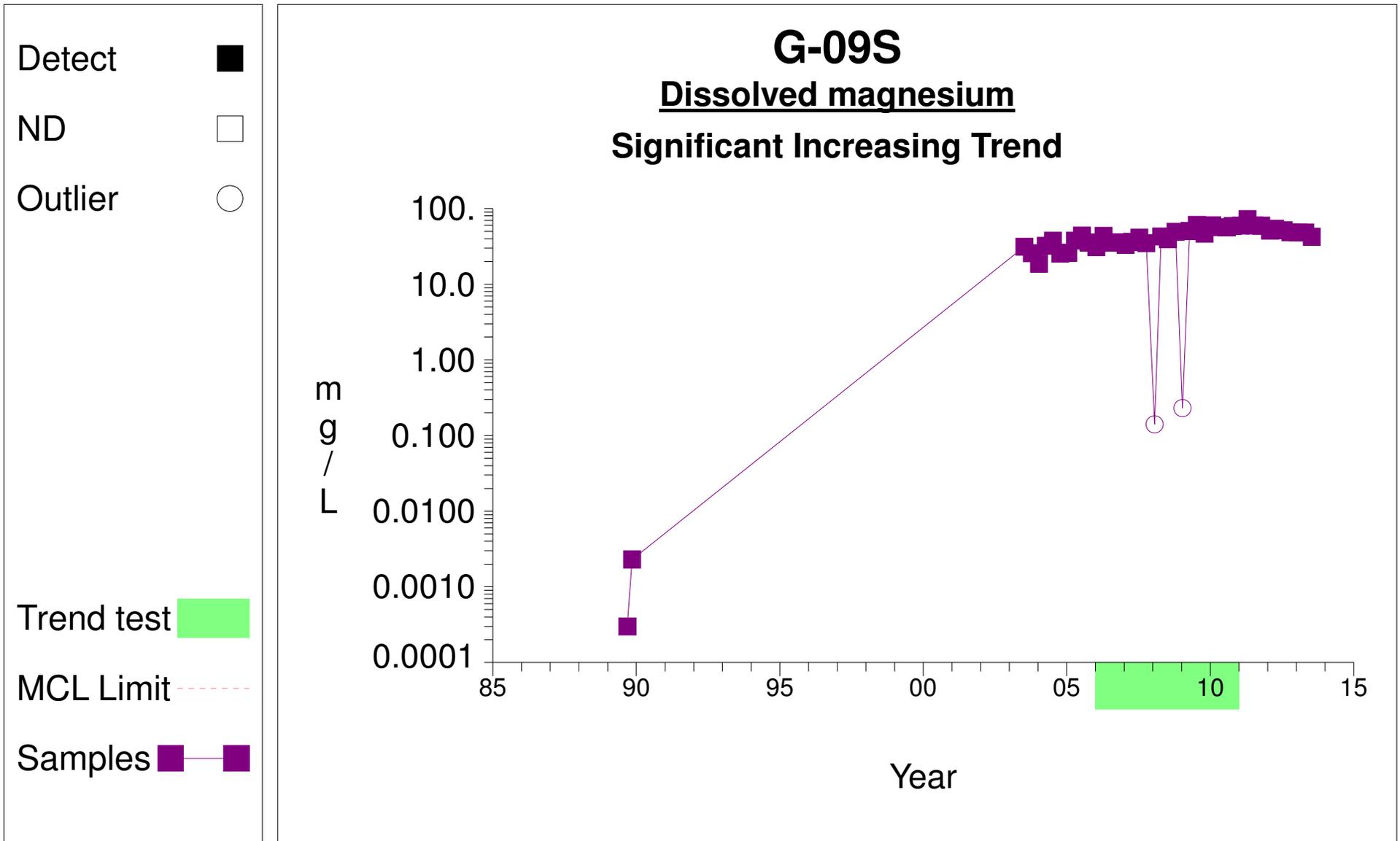
Graph 96

Time Series



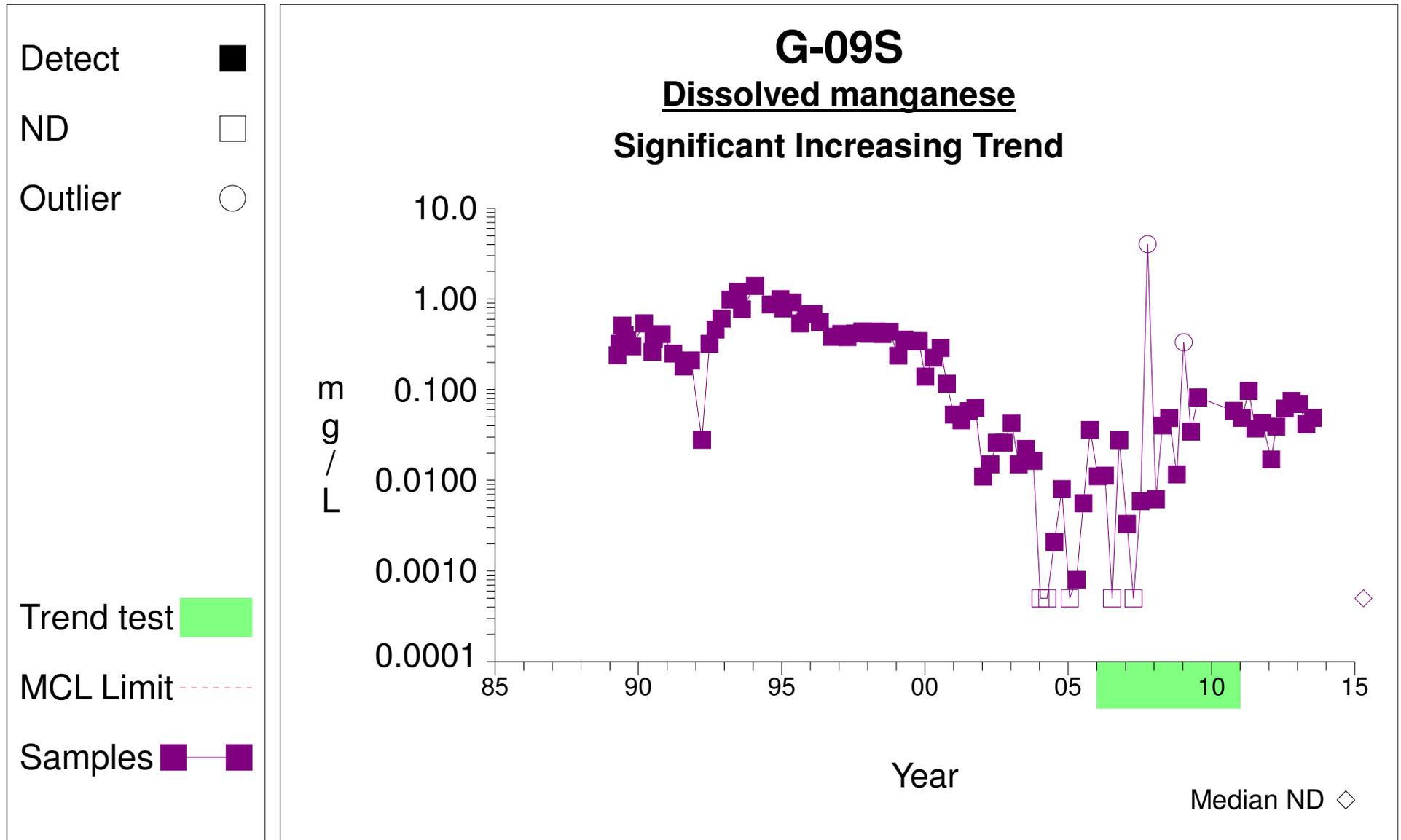
Graph 111

Time Series



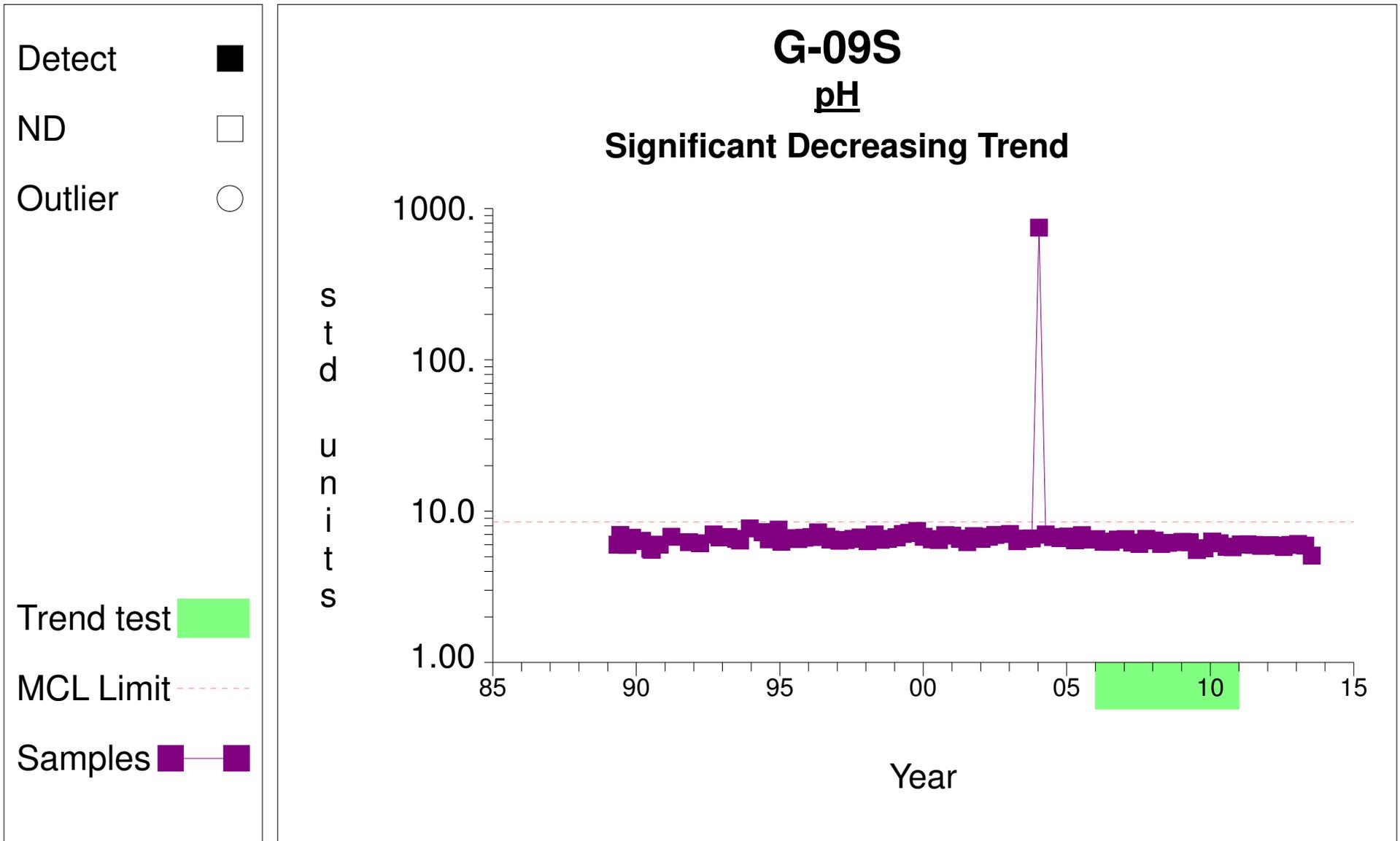
Graph 117

Time Series



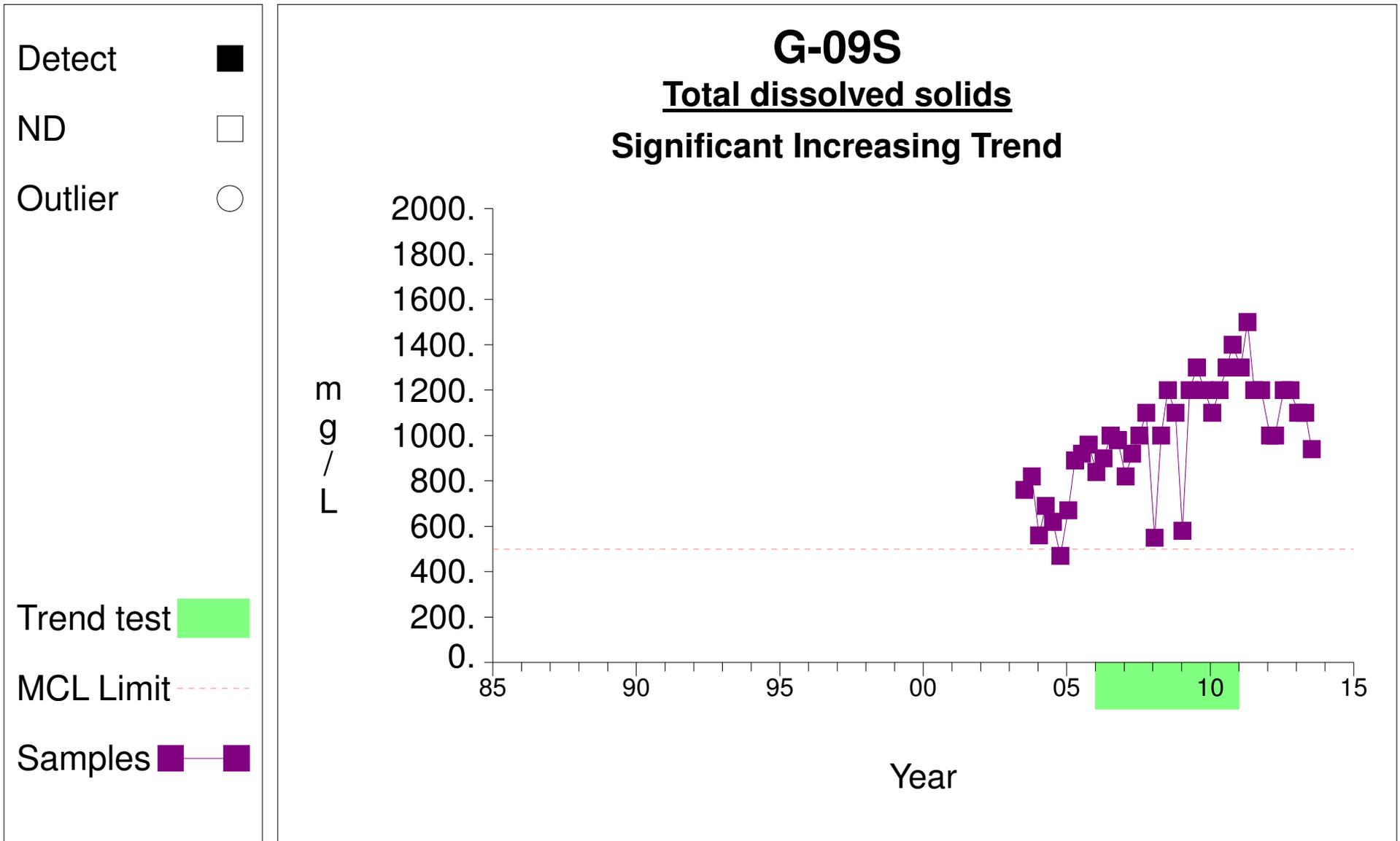
Graph 118

Time Series



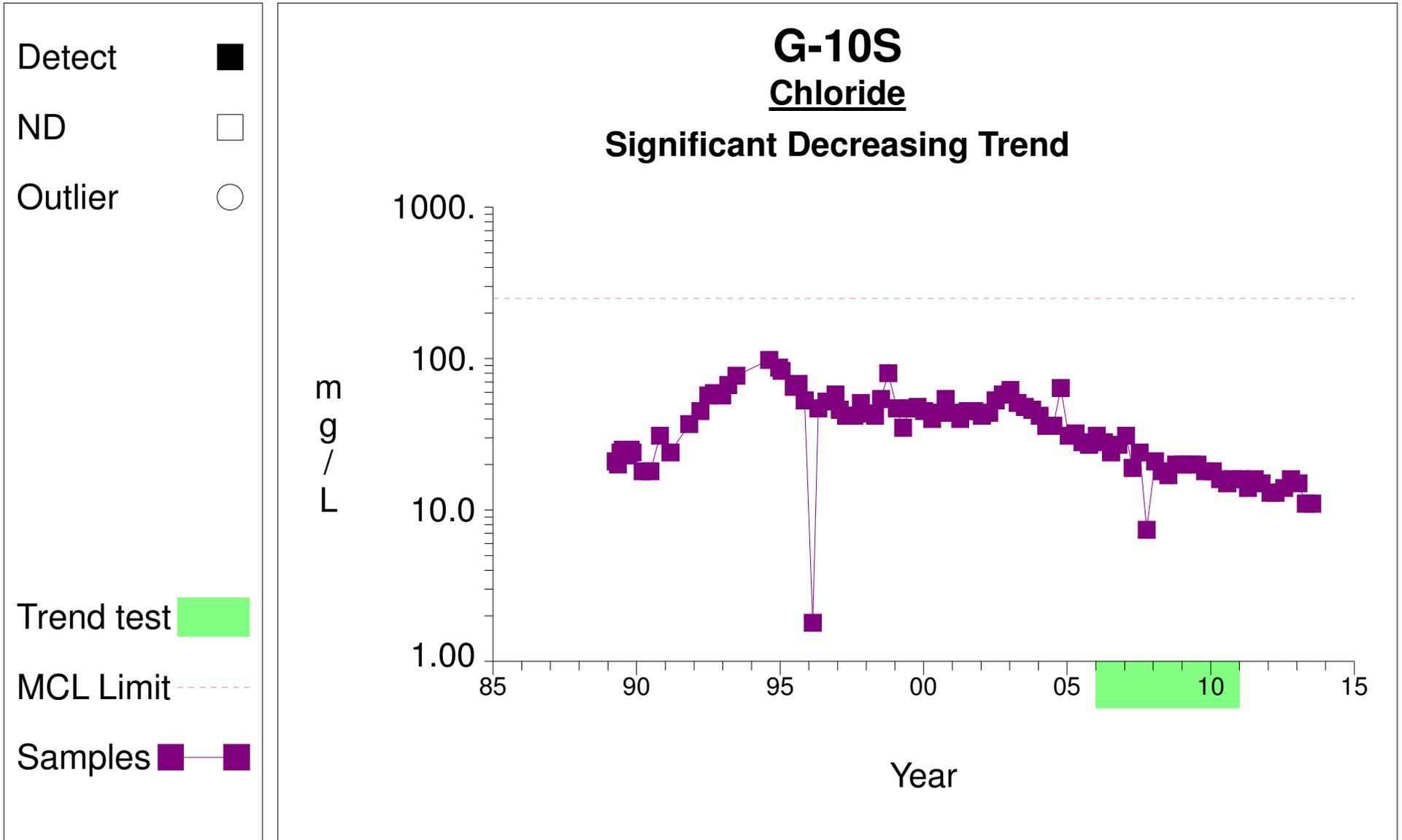
Graph 129

Time Series



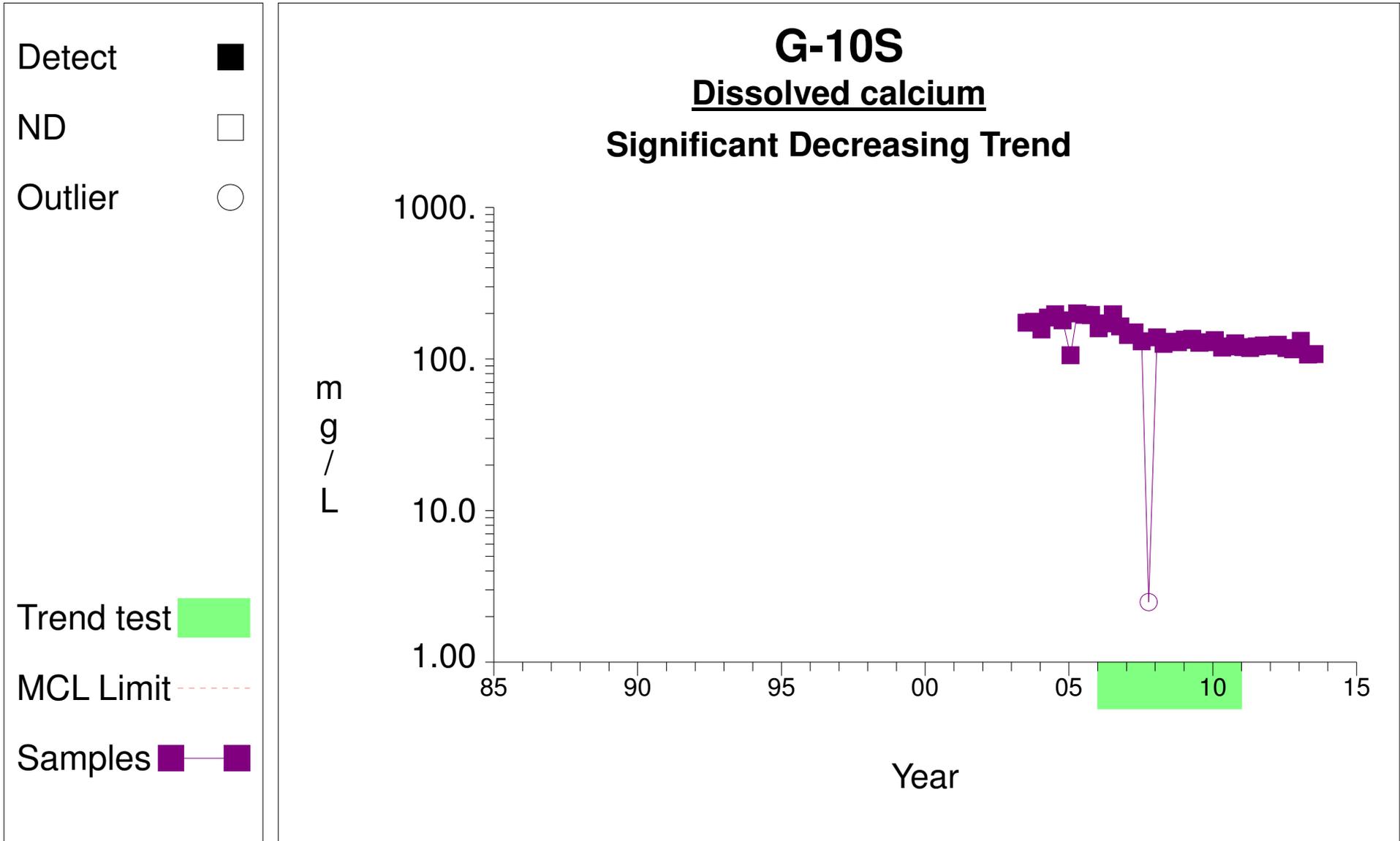
Graph 131

Time Series



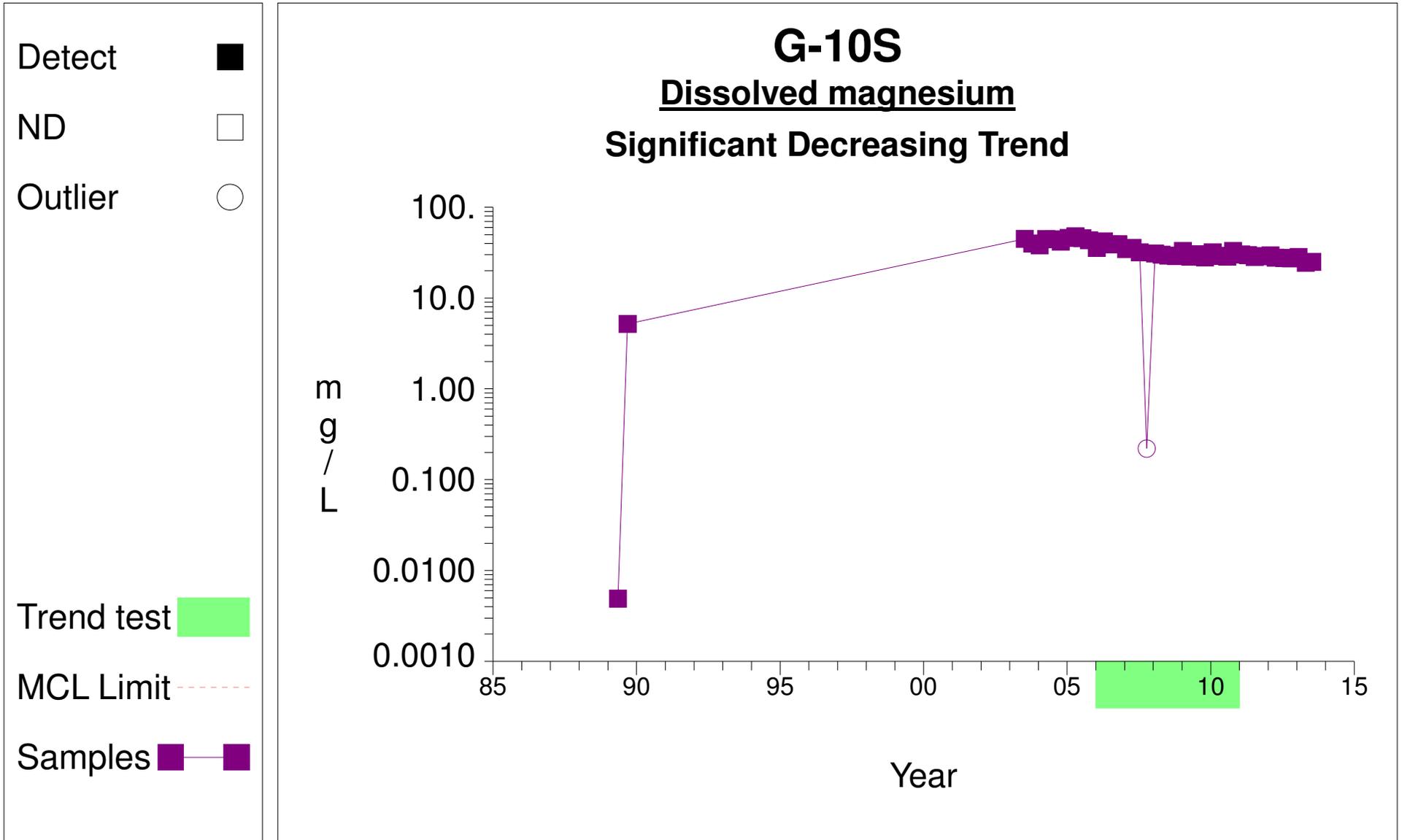
Graph 137

Time Series



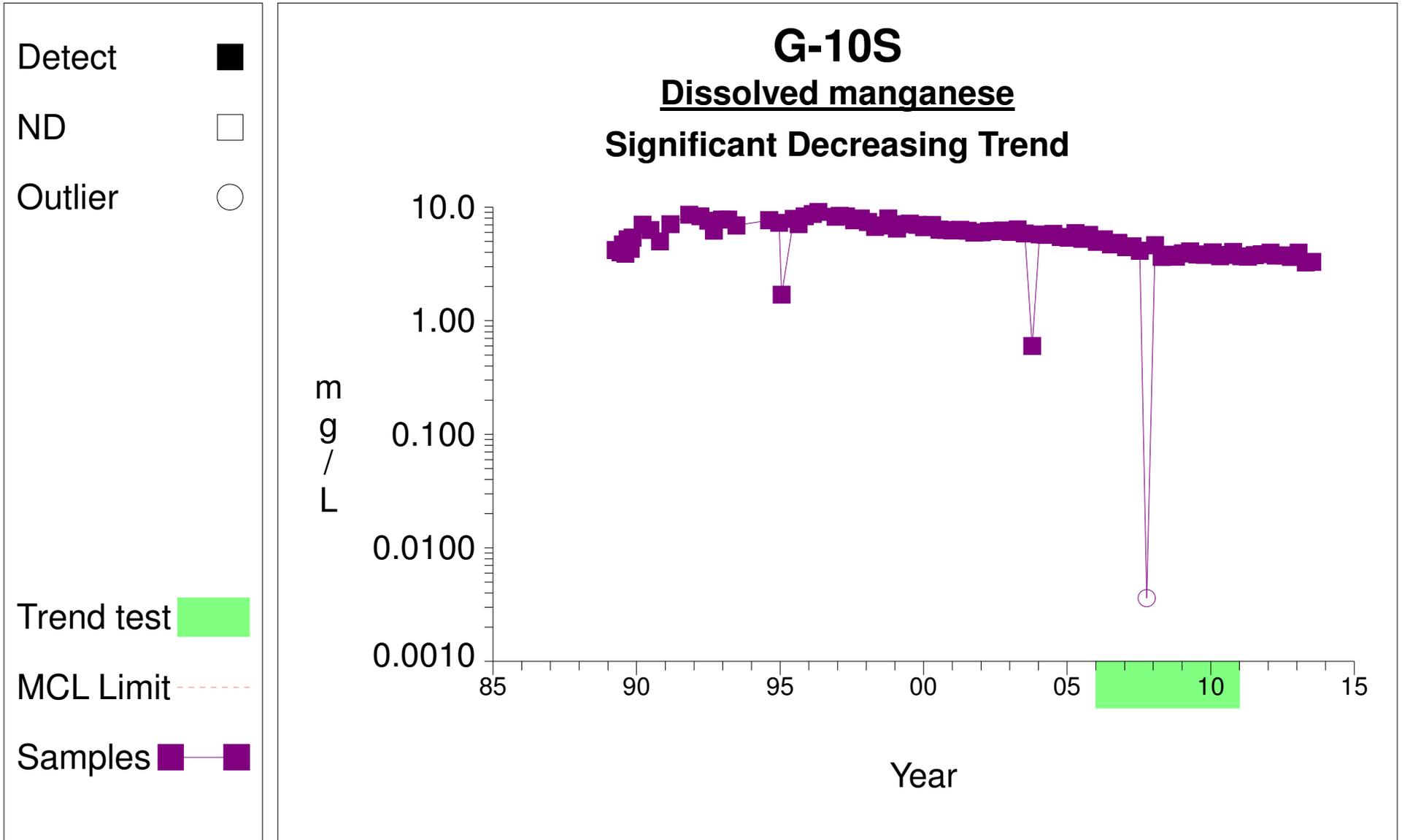
Graph 144

Time Series



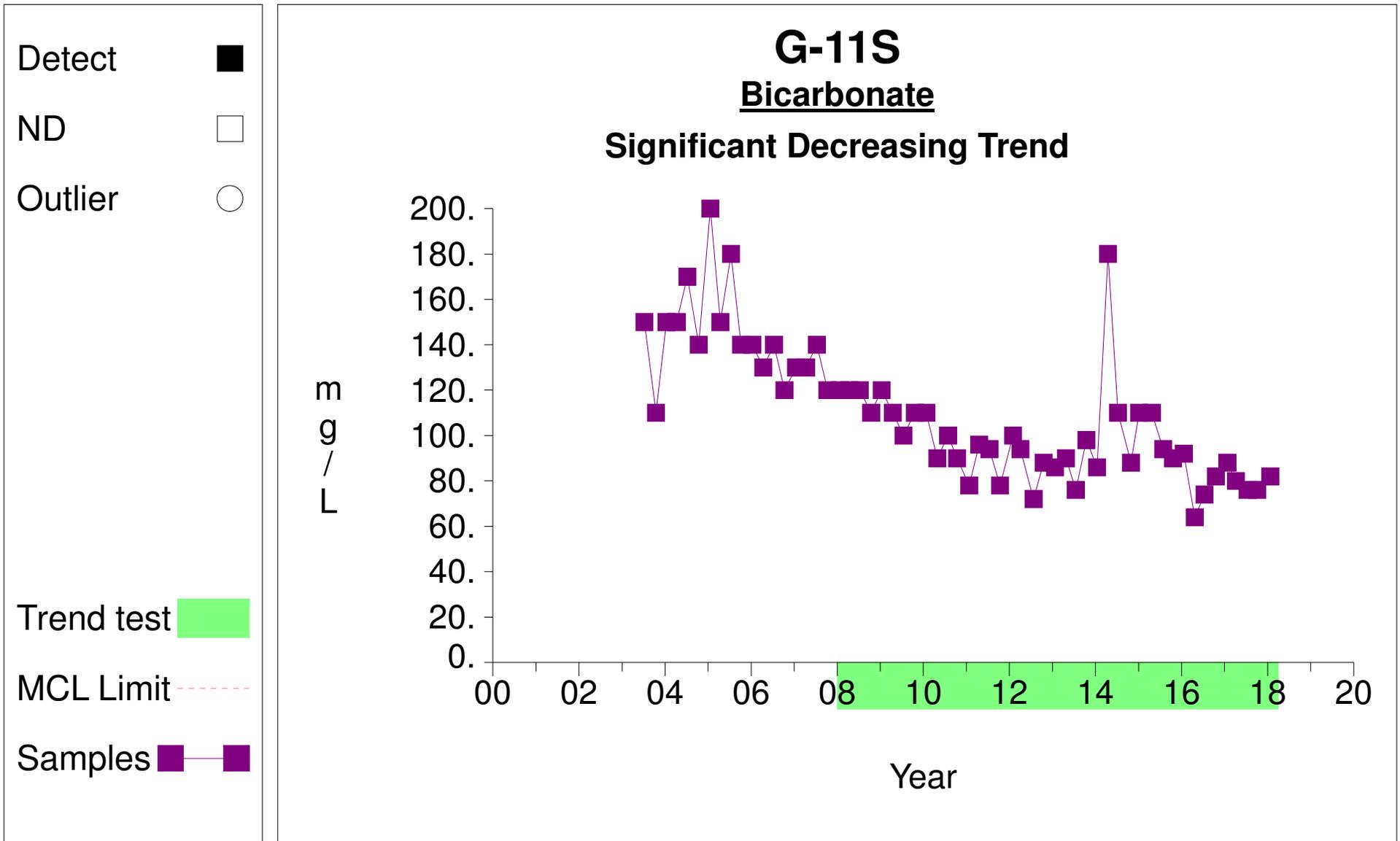
Graph 150

Time Series



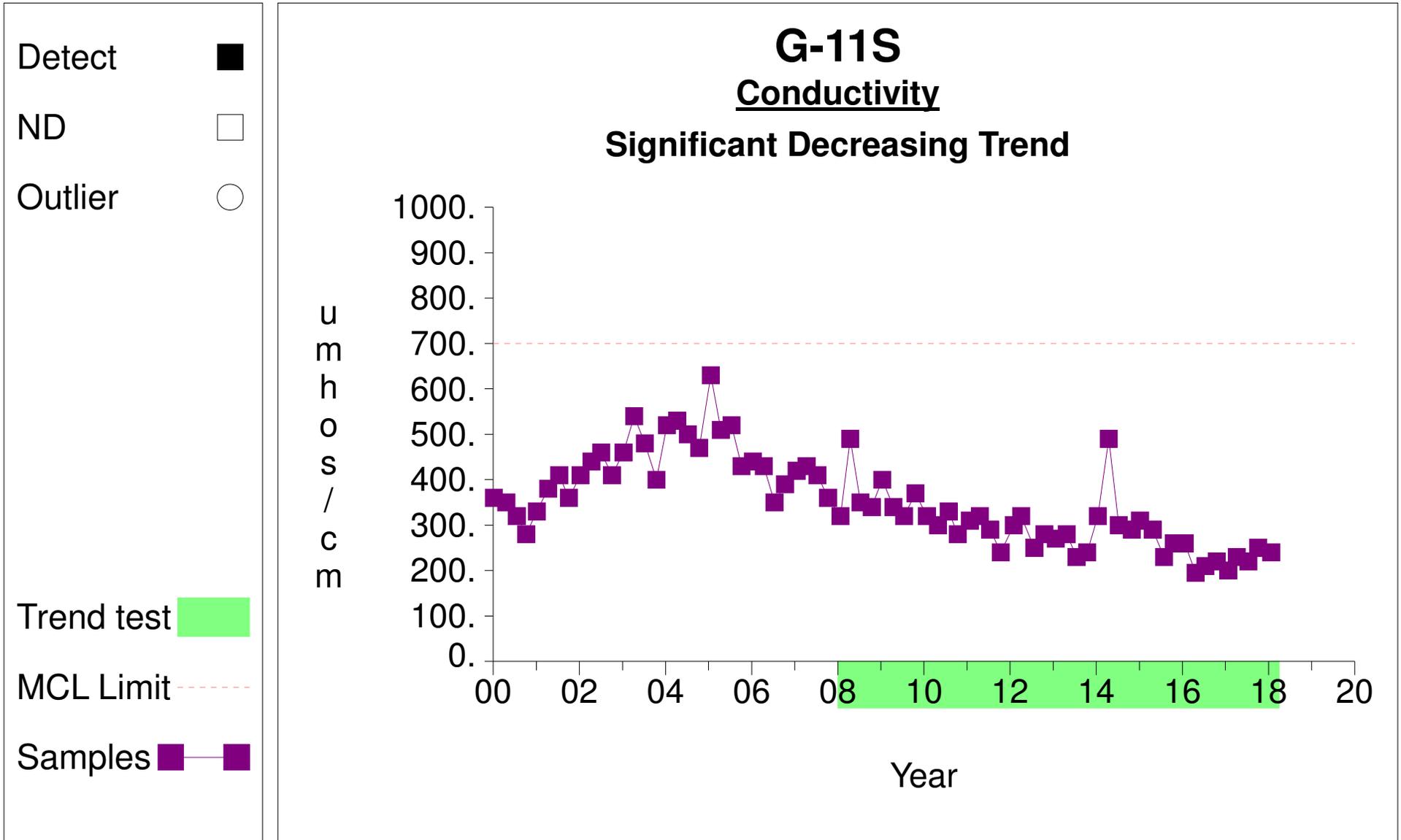
Graph 151

Time Series



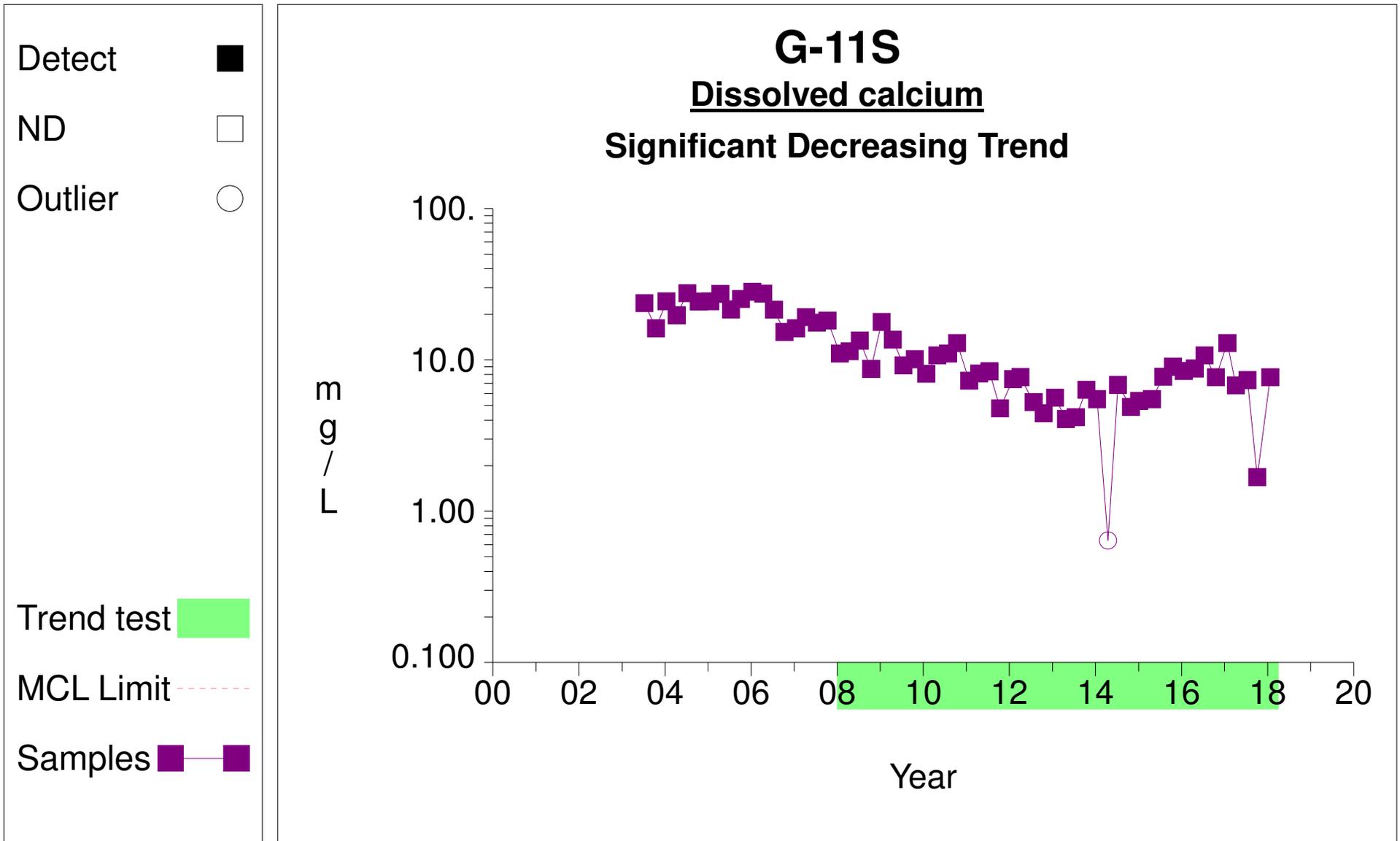
Graph 168

Time Series



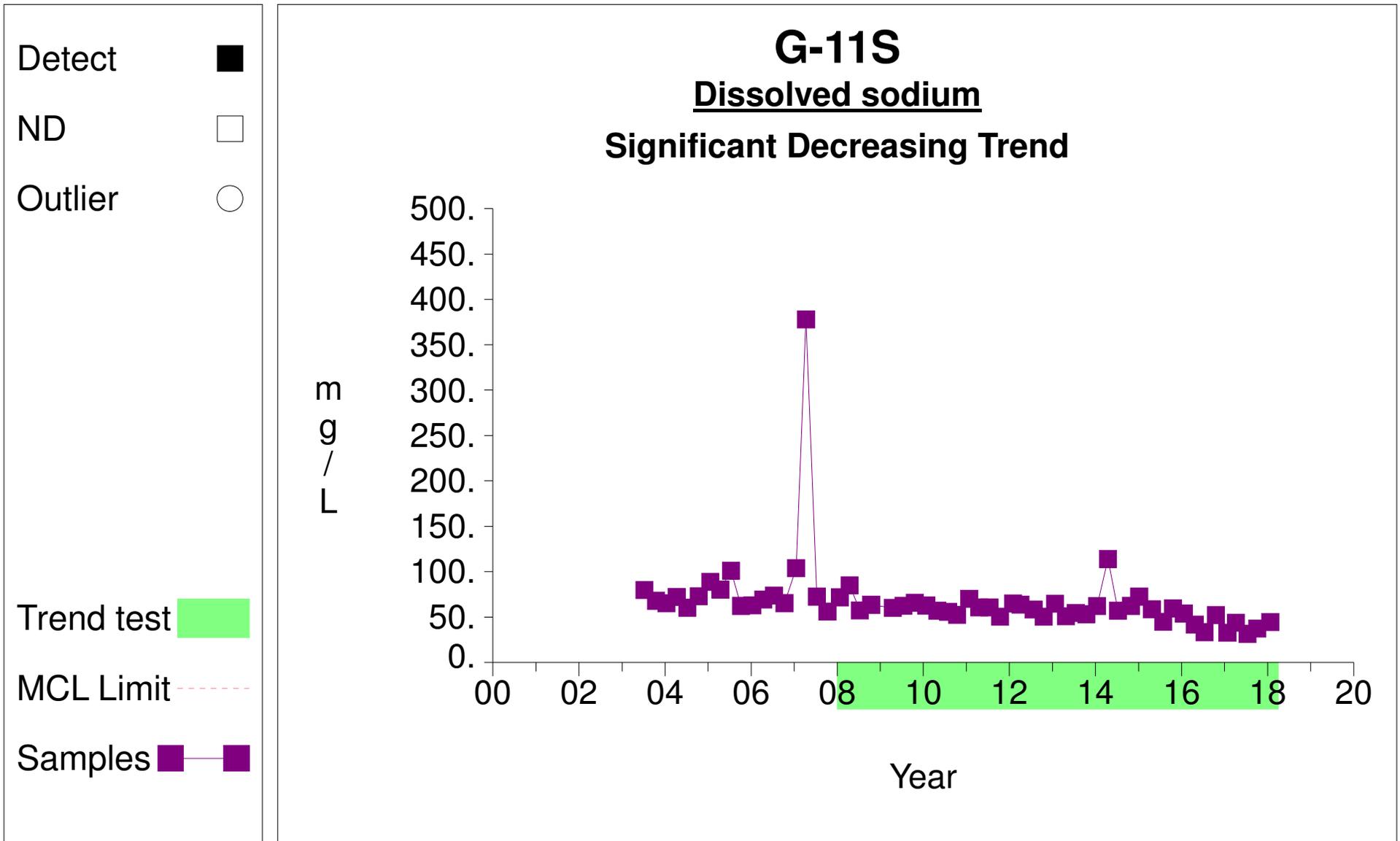
Graph 171

Time Series



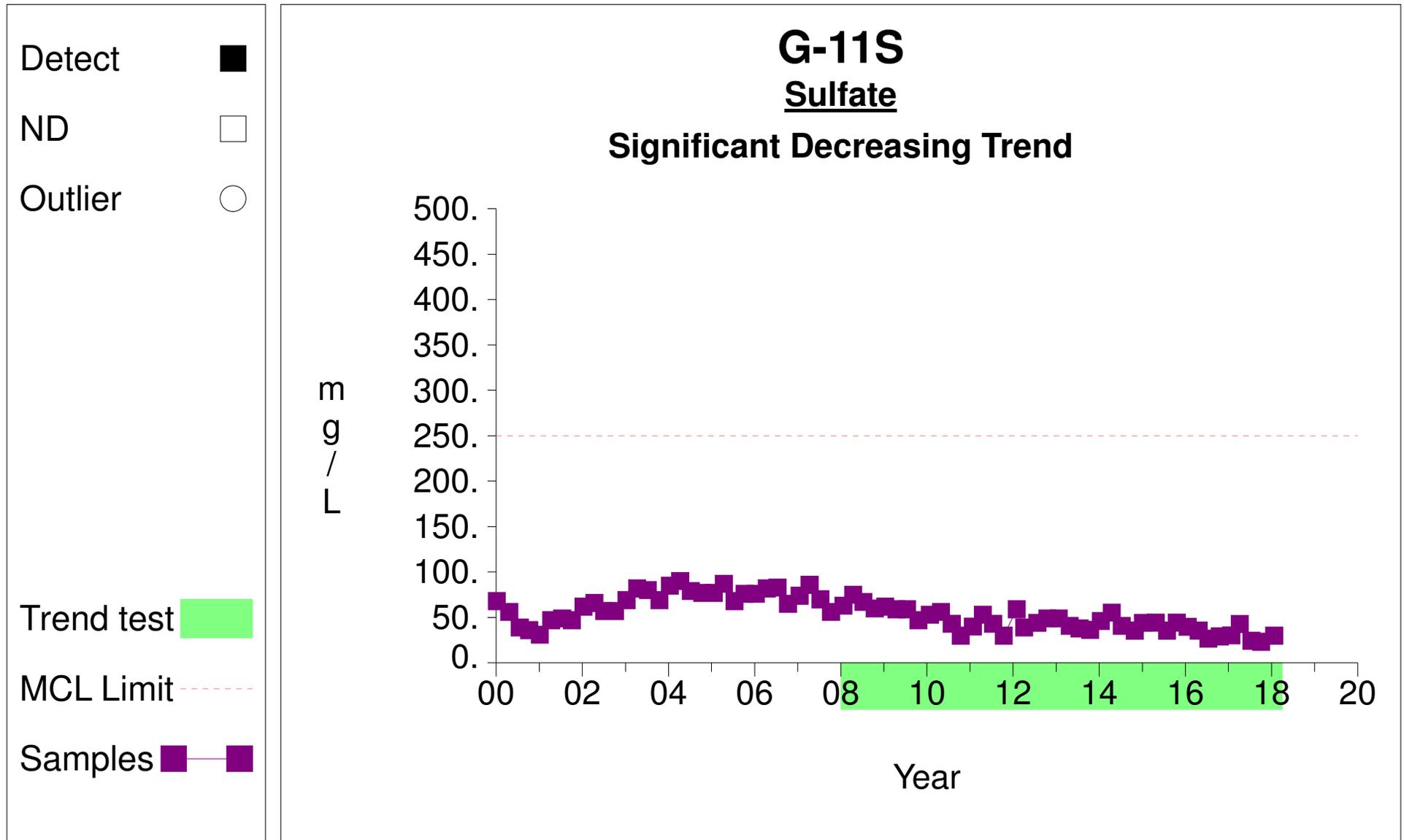
Graph 177

Time Series



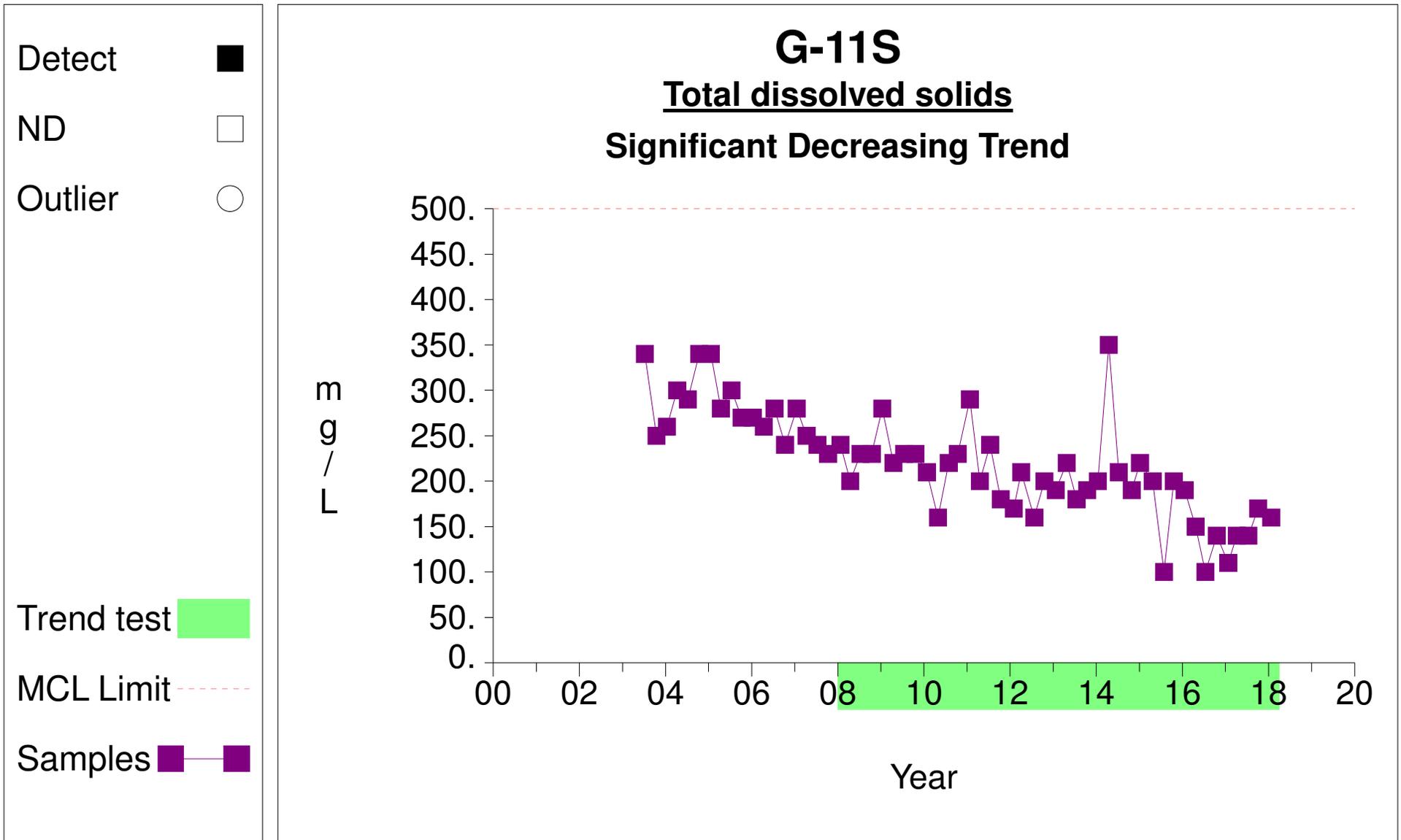
Graph 189

Time Series



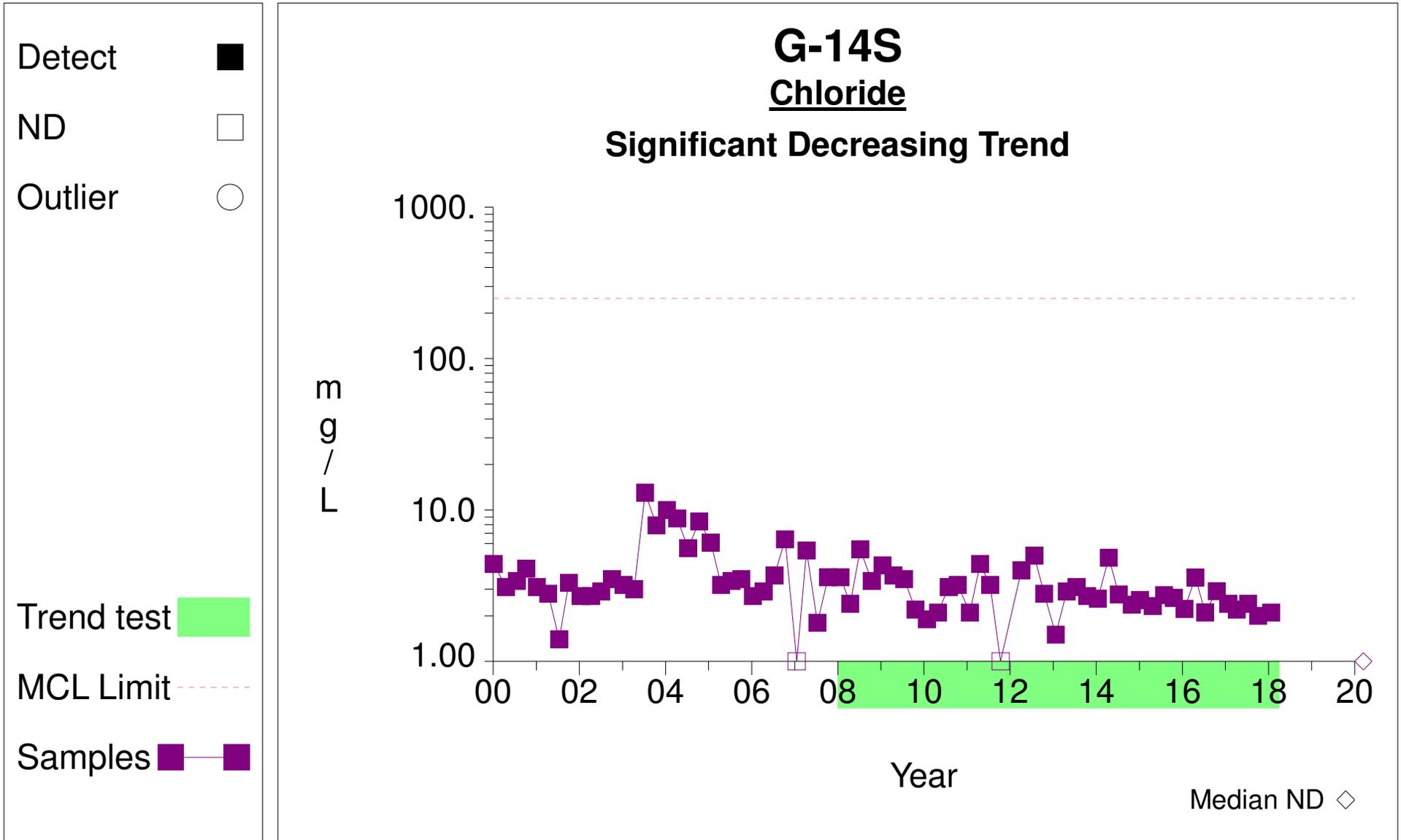
Graph 196

Time Series



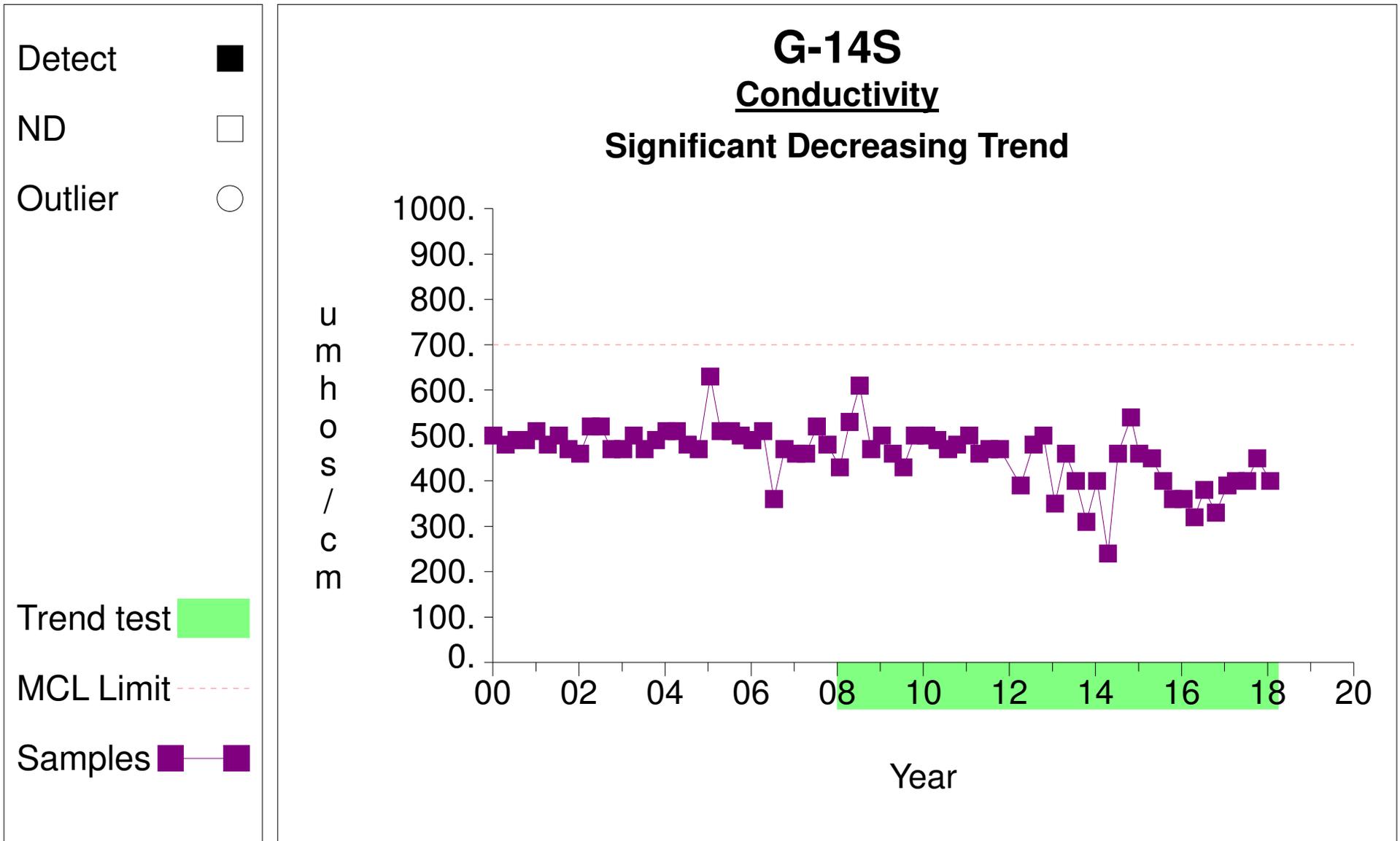
Graph 197

Time Series



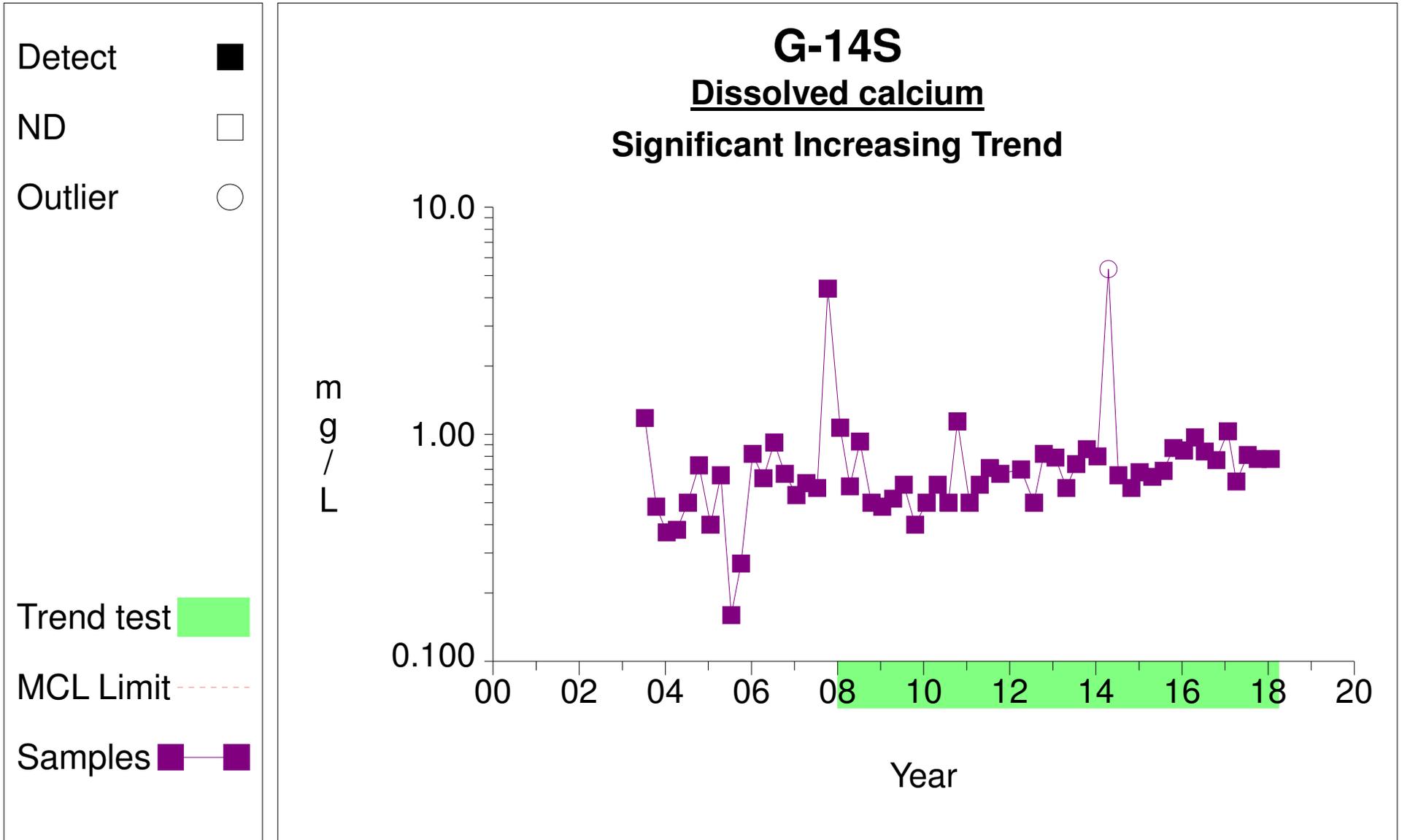
Graph 203

Time Series



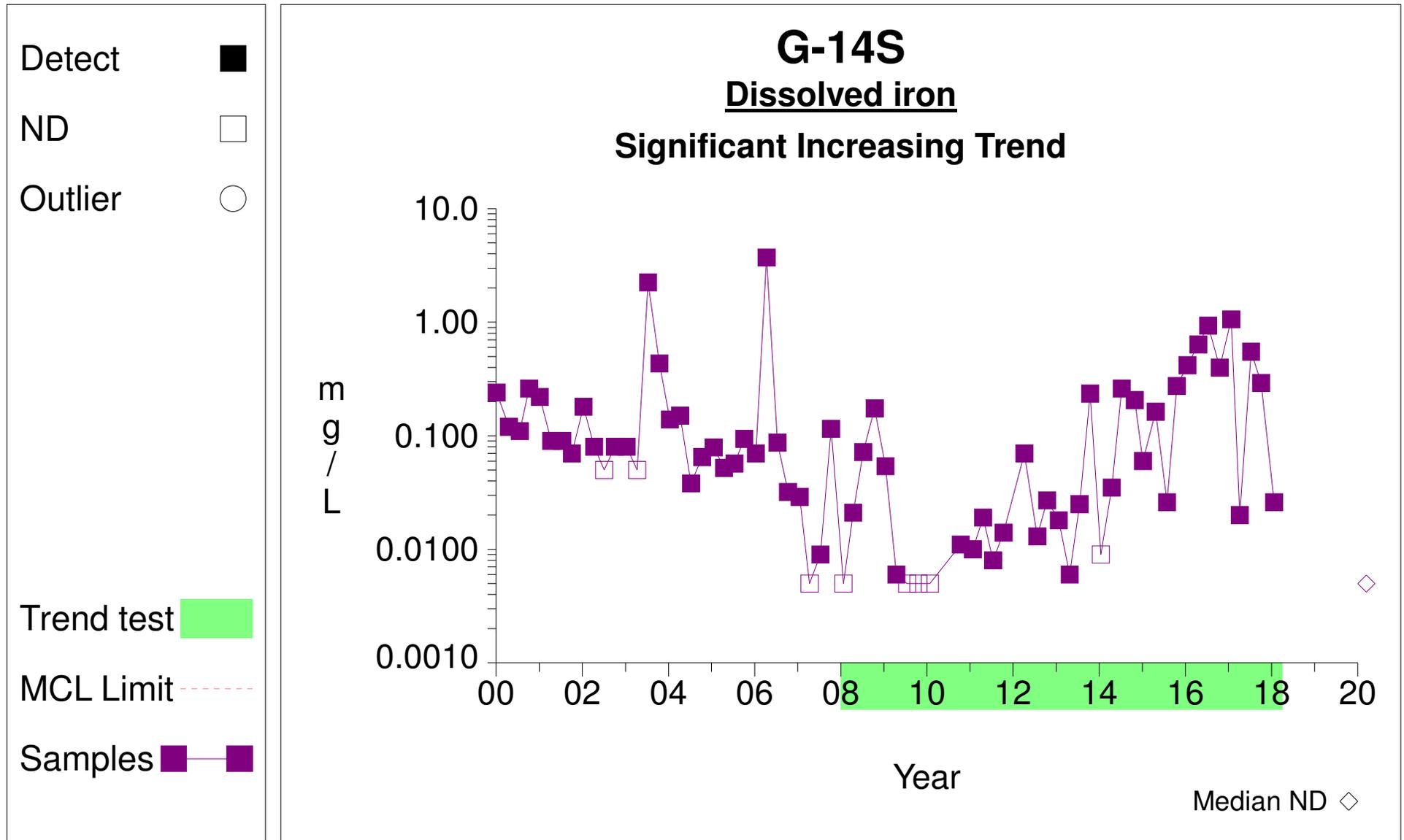
Graph 204

Time Series



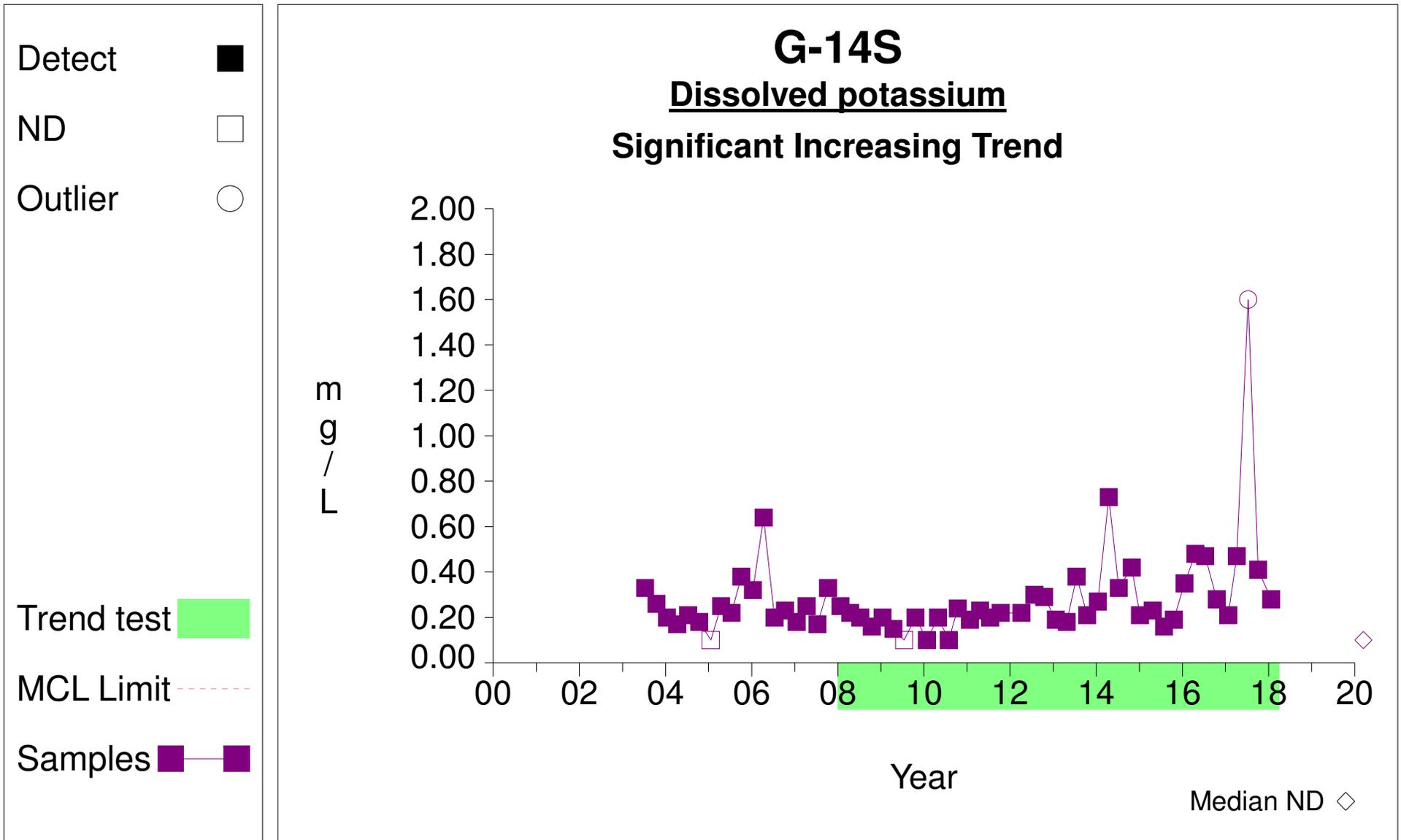
Graph 210

Time Series



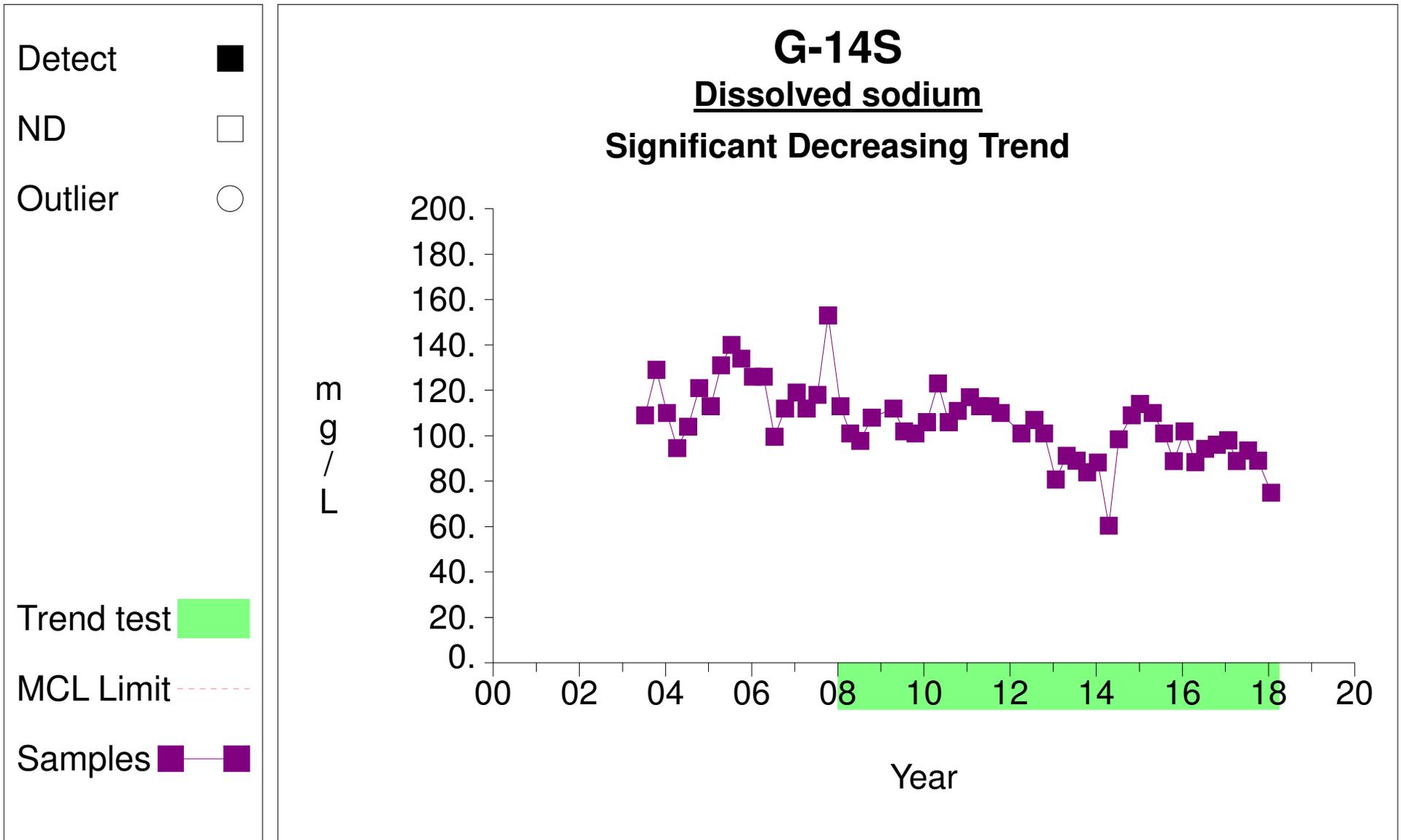
Graph 214

Time Series



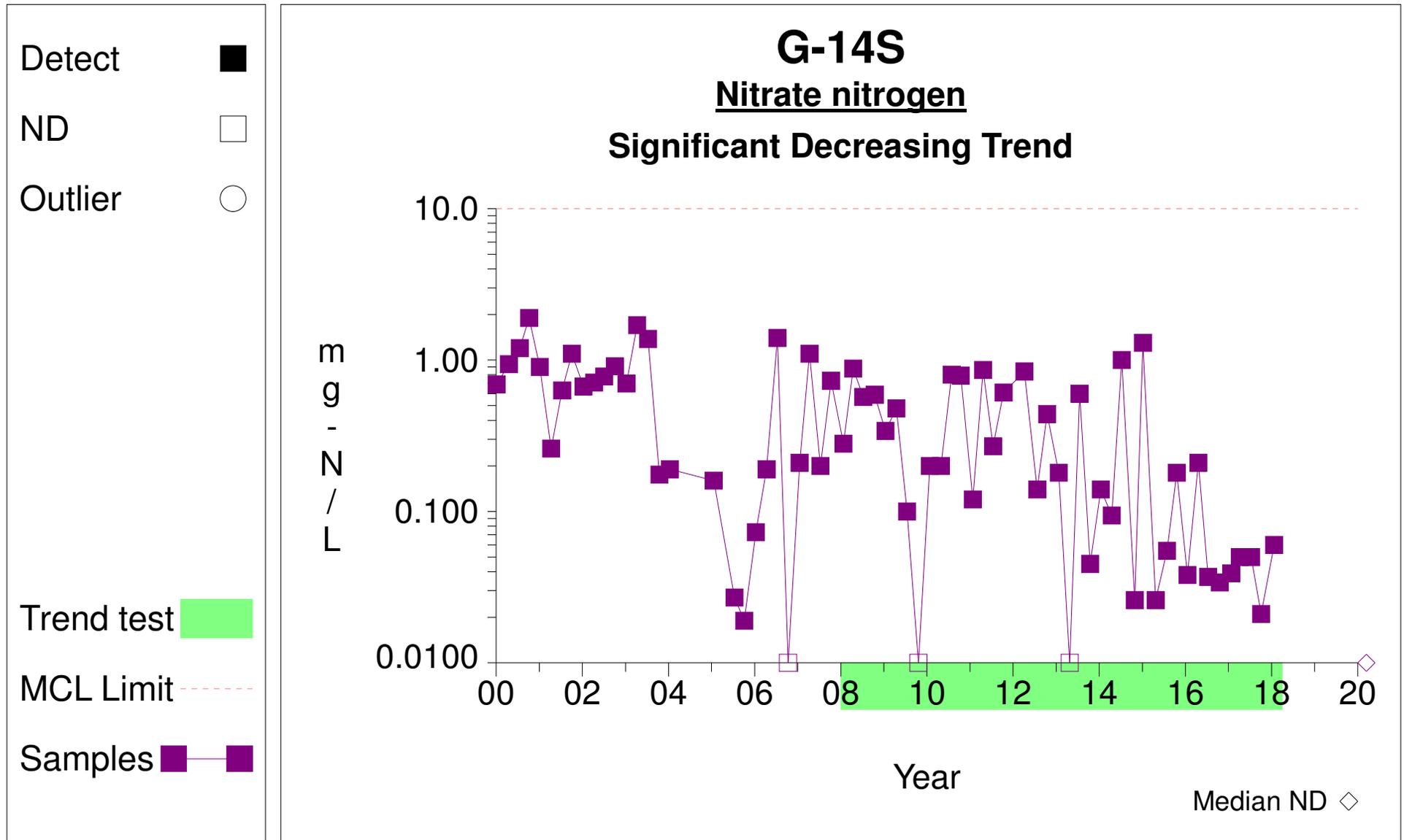
Graph 219

Time Series



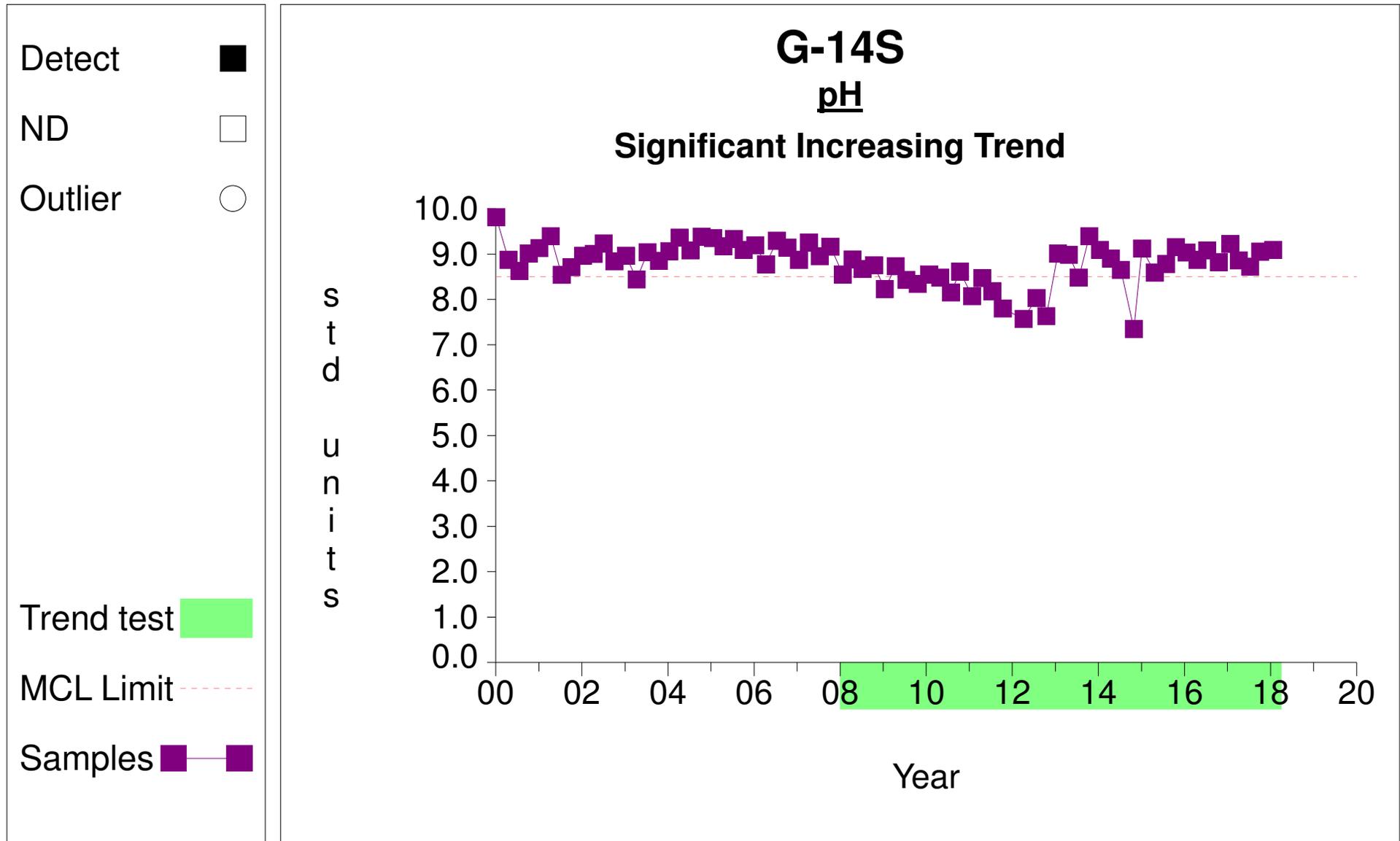
Graph 222

Time Series



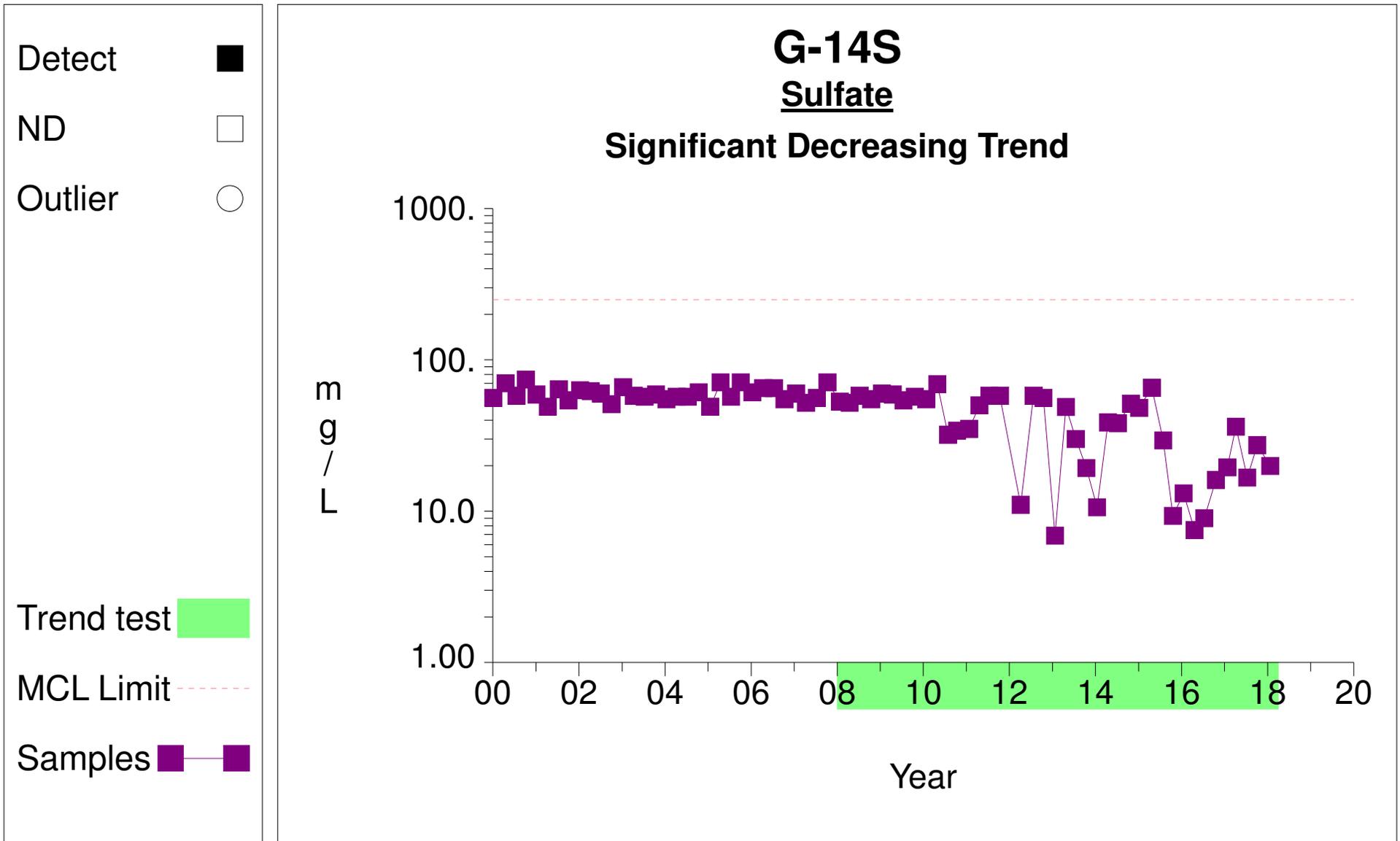
Graph 226

Time Series



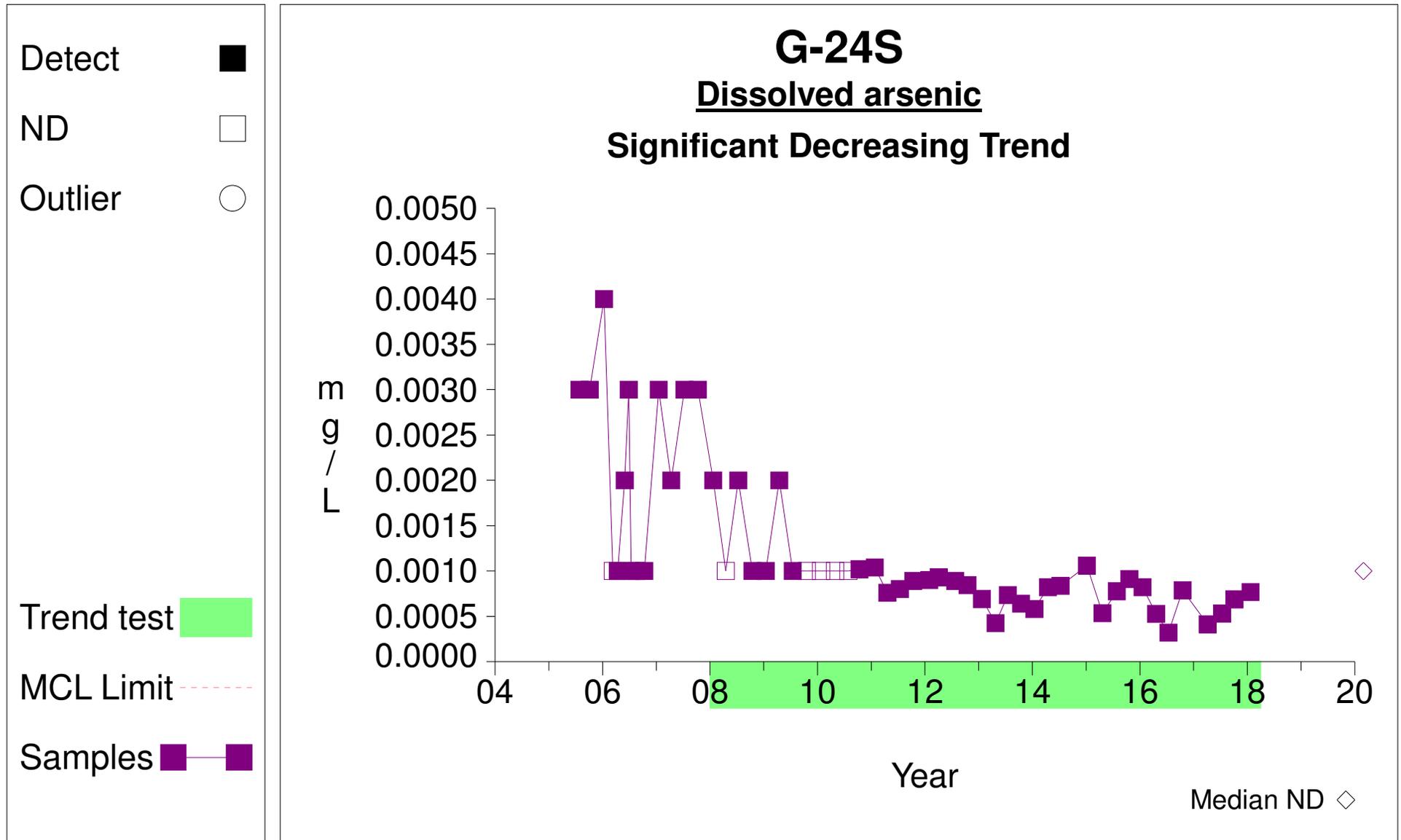
Graph 228

Time Series



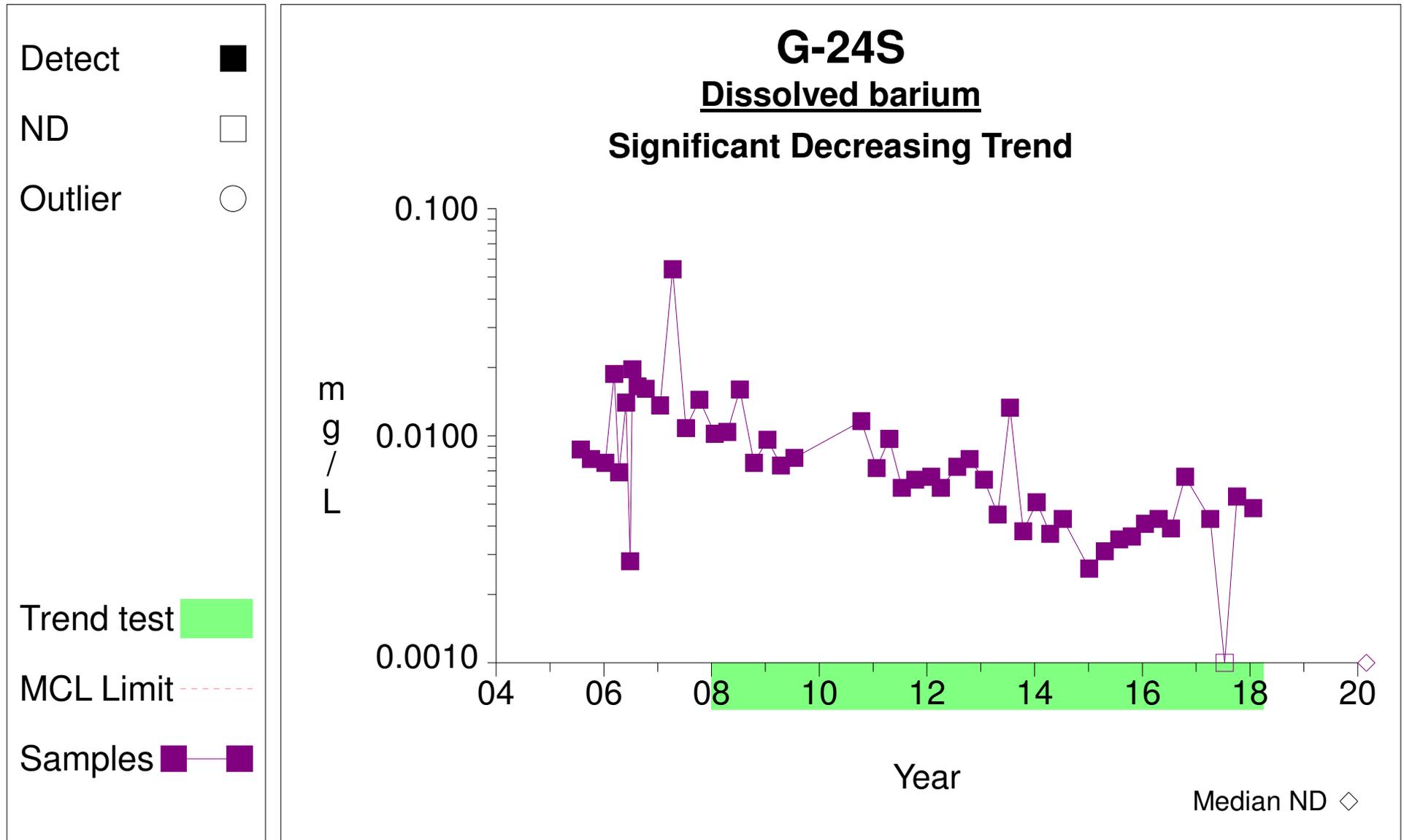
Graph 229

Time Series



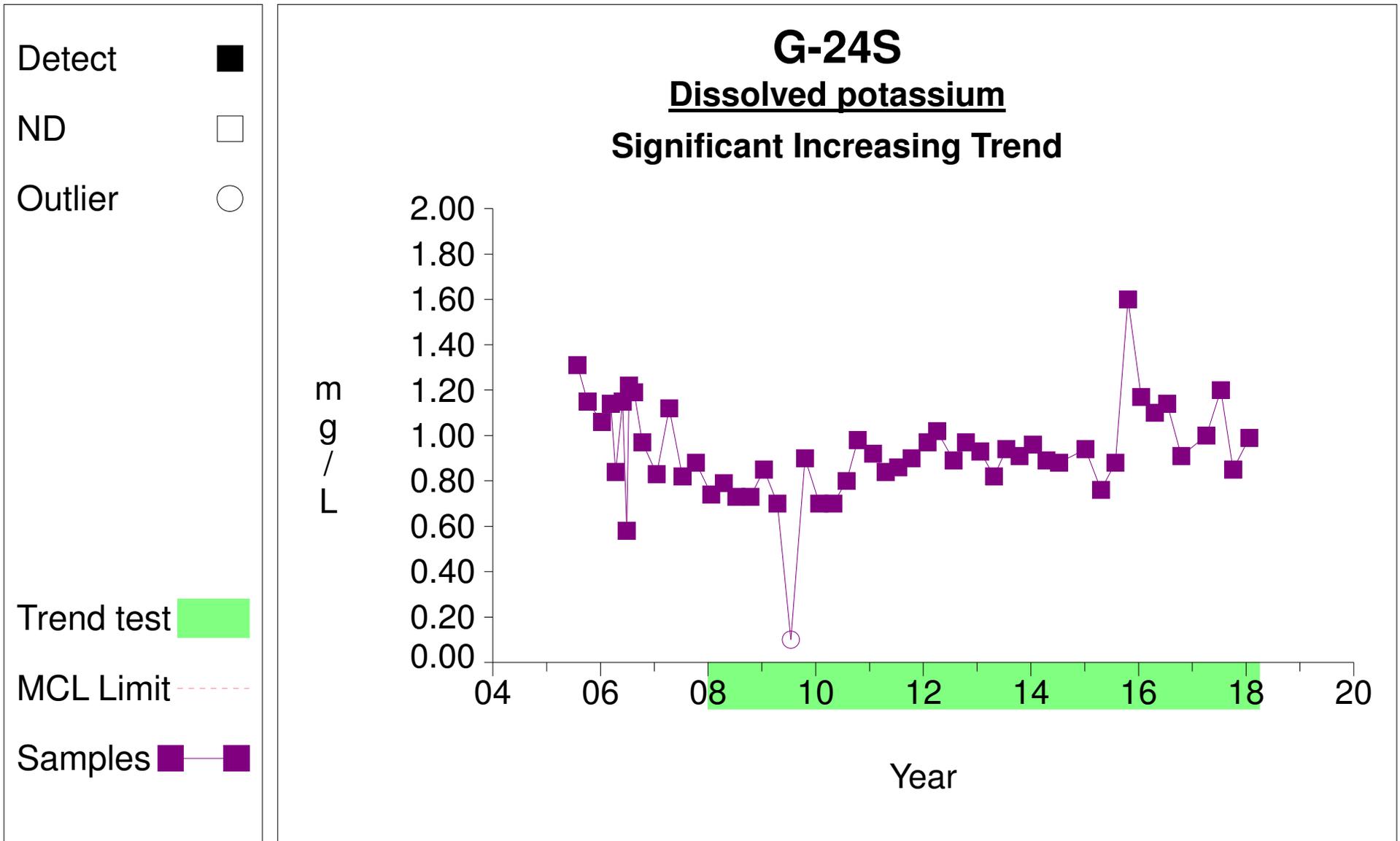
Graph 239

Time Series



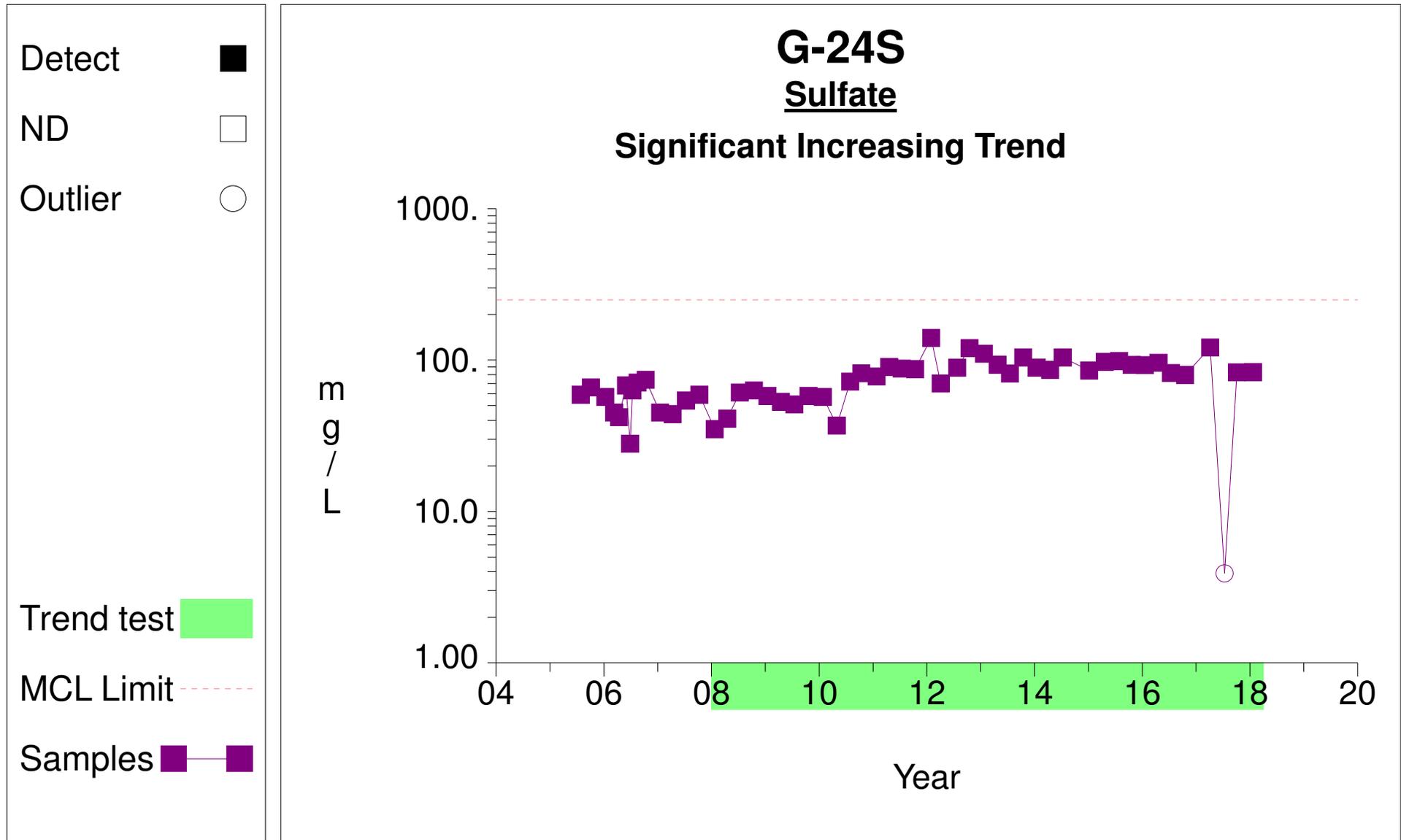
Graph 240

Time Series



Graph 252

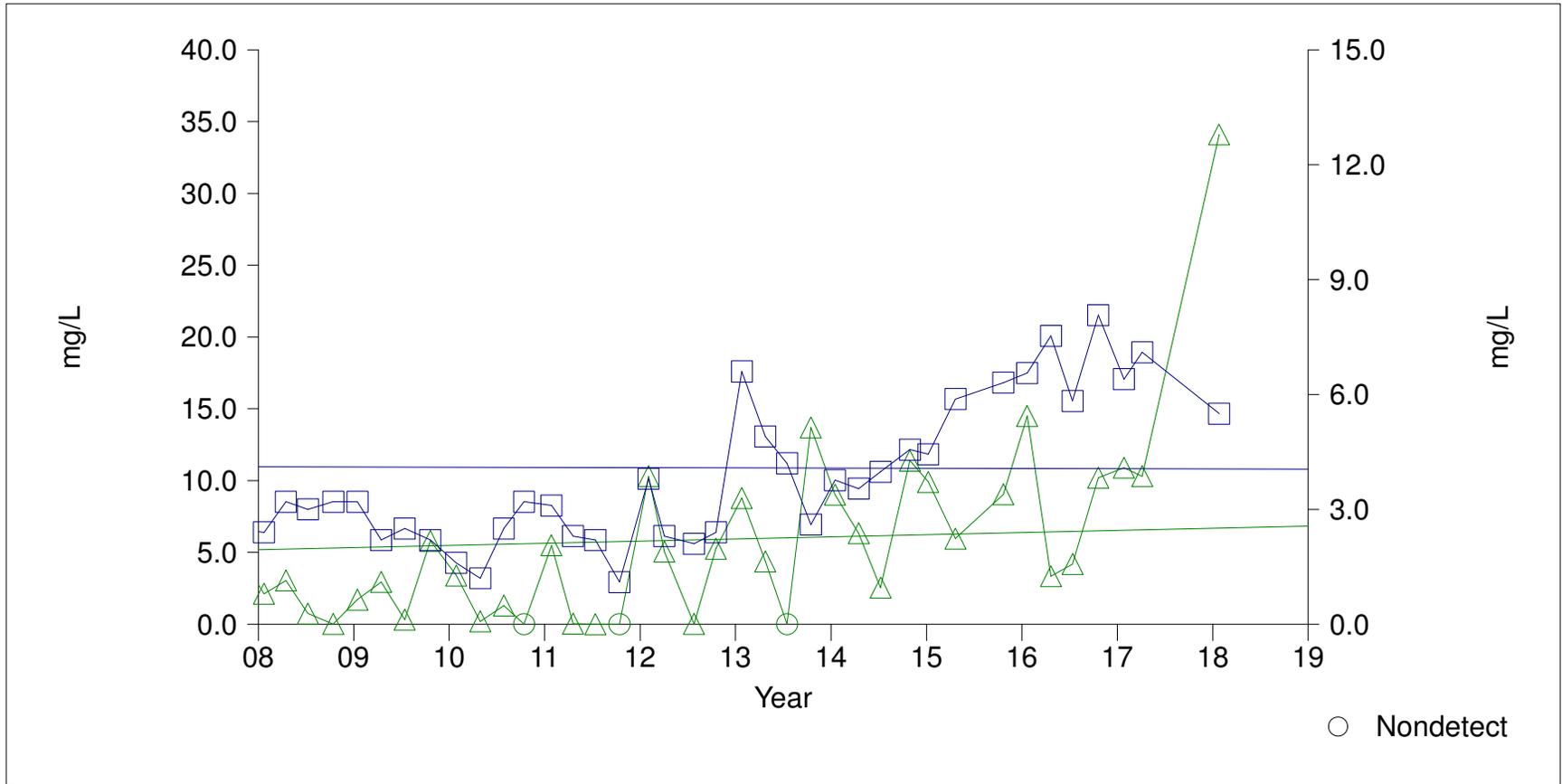
Time Series



Graph 262

Cathcart Landfill [ccshal]

Time Series Plot for G-04A



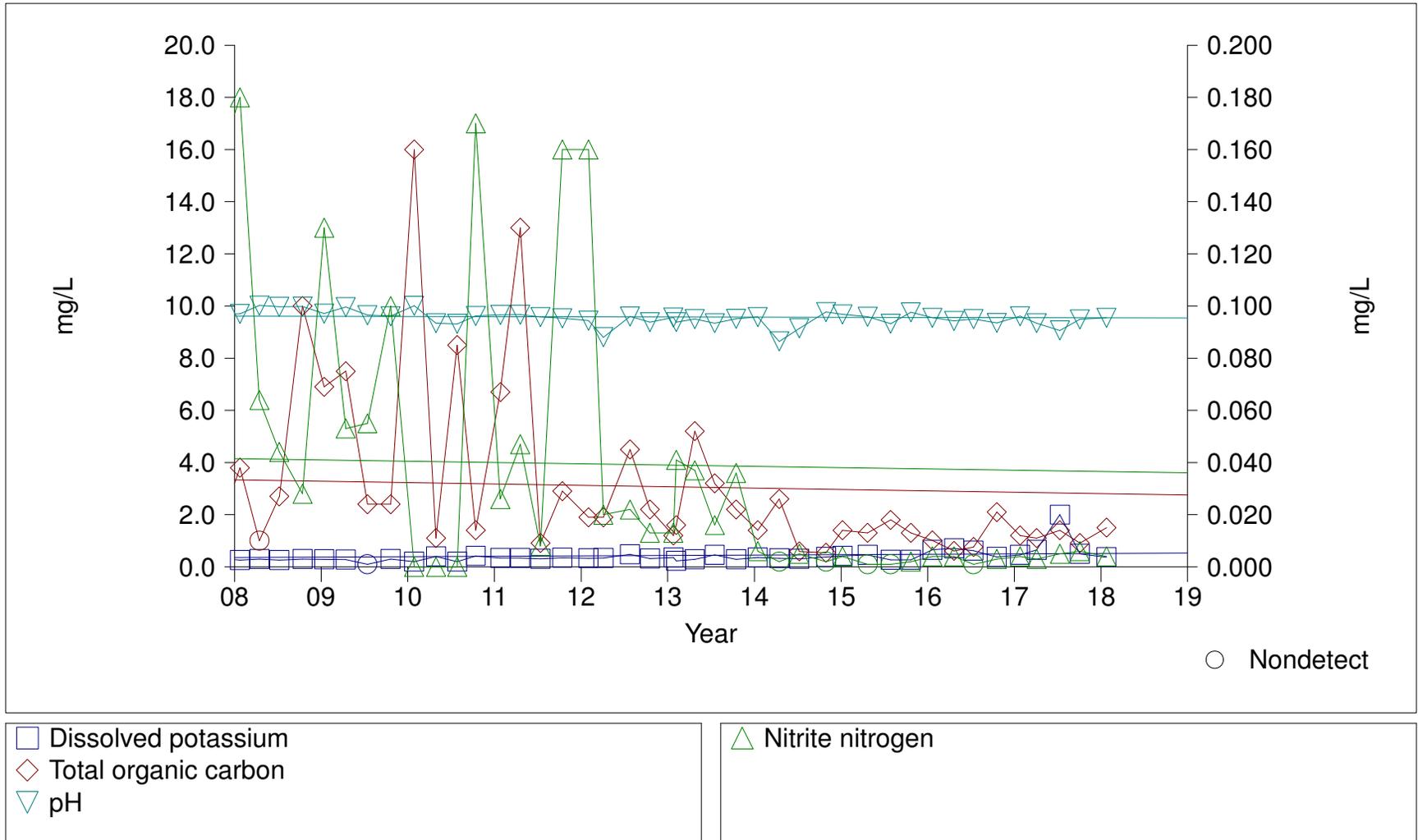
△ Dissolved iron

□ Chloride

○ Nondetect

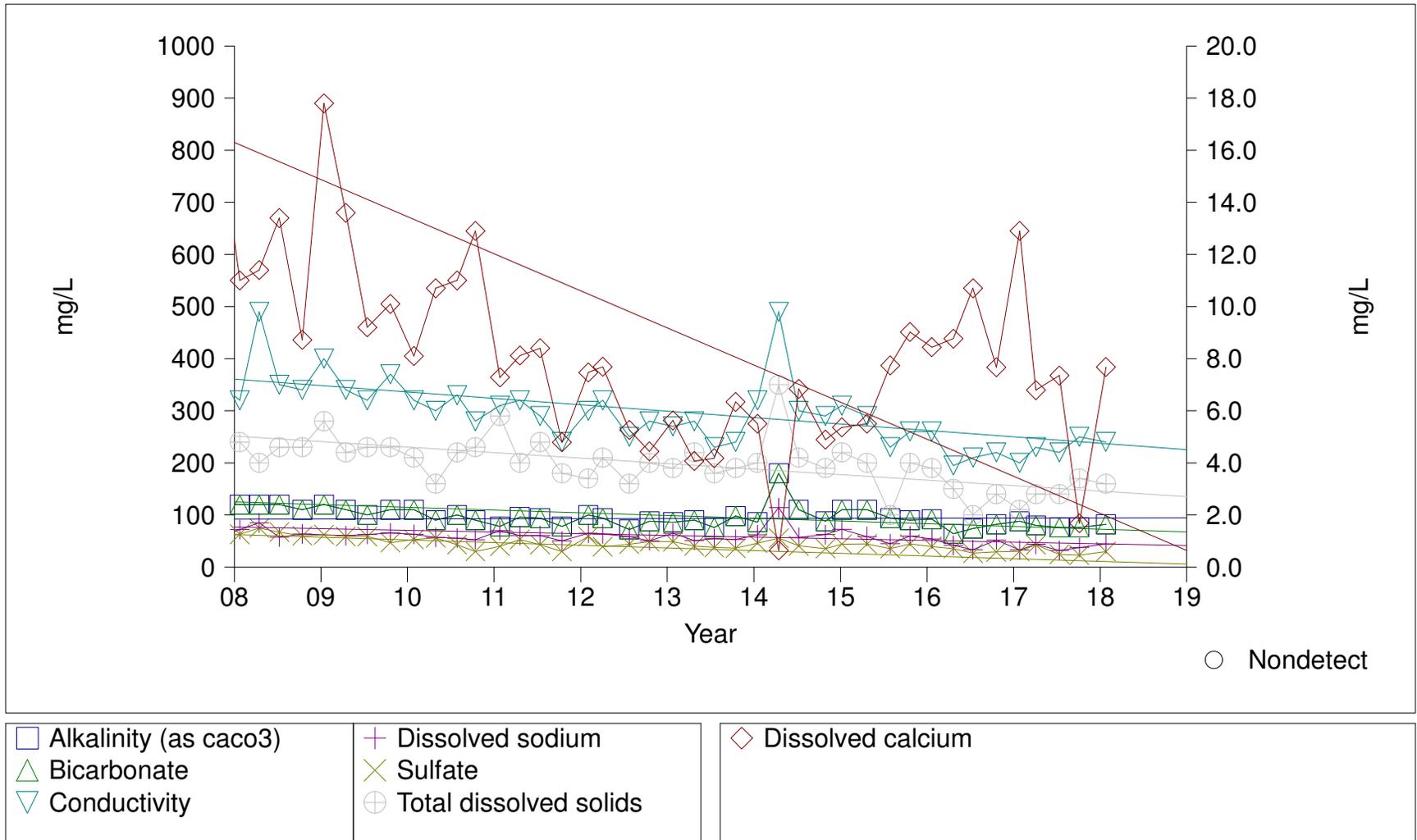
Cathcart Landfill [ccshal]

Time Series Plot for G-08D1



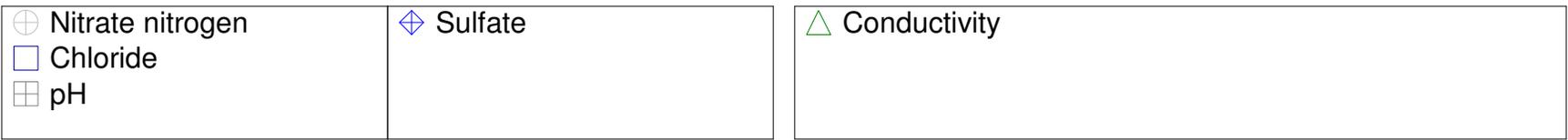
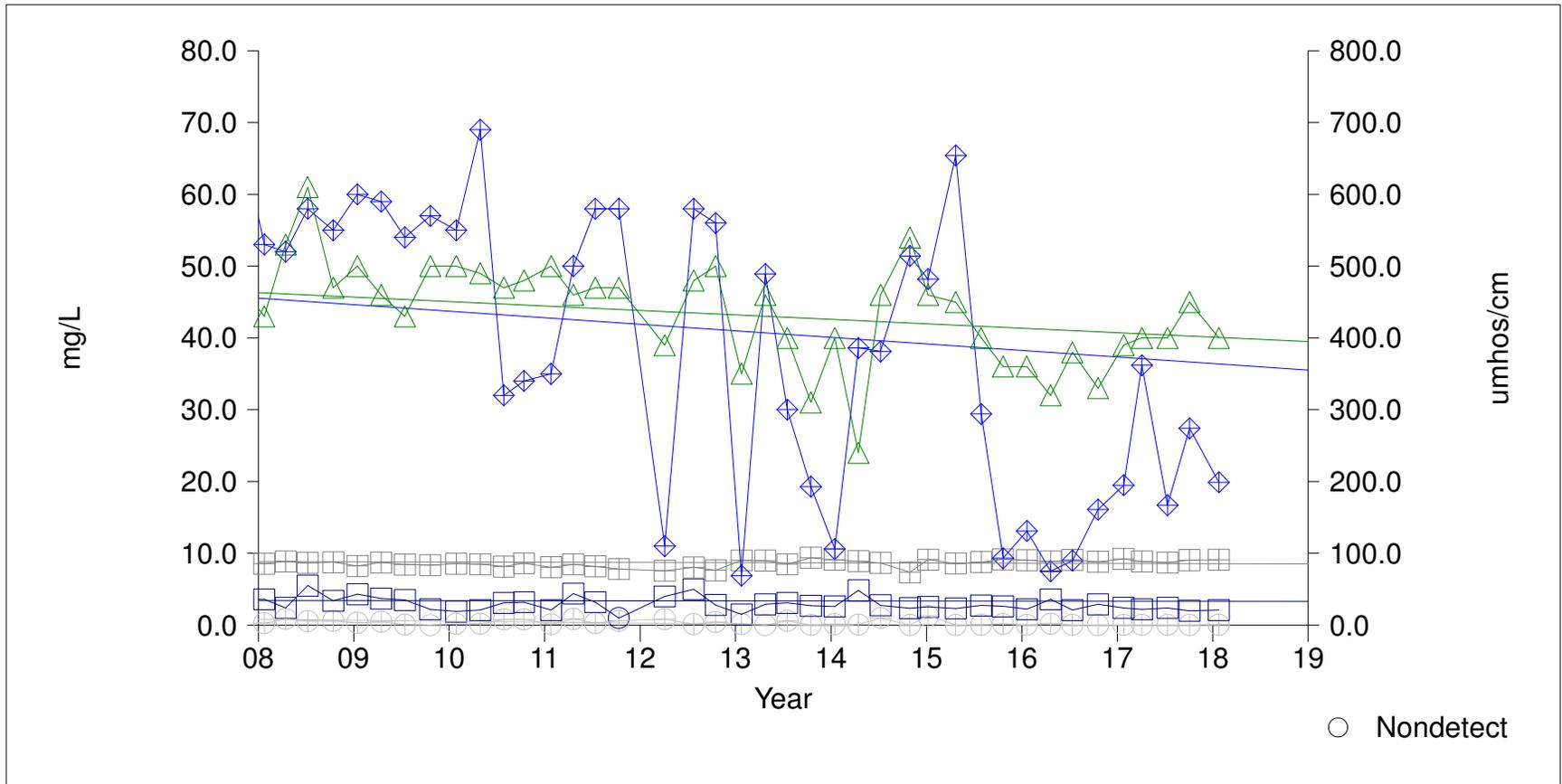
Cathcart Landfill [ccshal]

Time Series Plot for G-11S



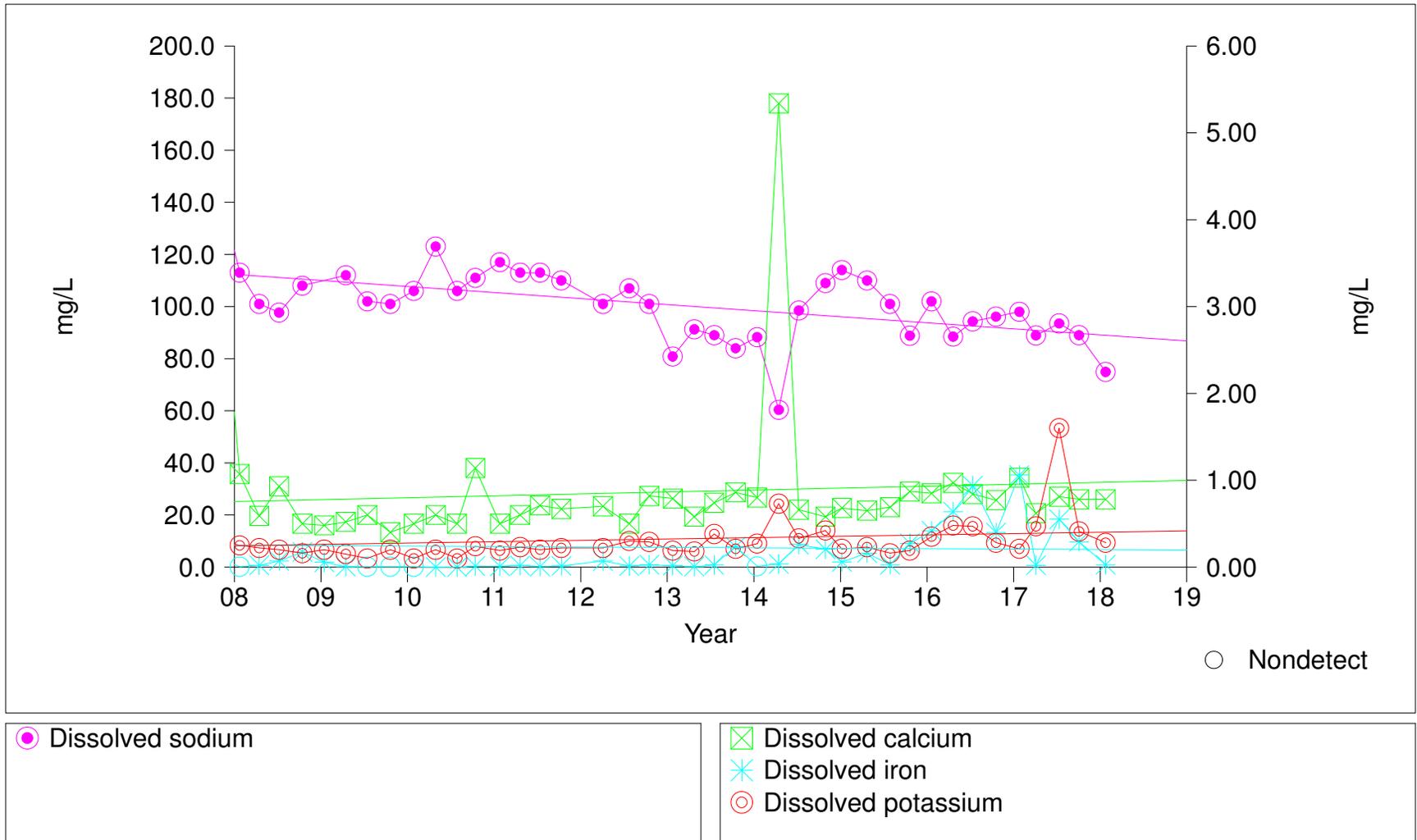
Cathcart Landfill [ccshal]

Time Series Plot for G-14S



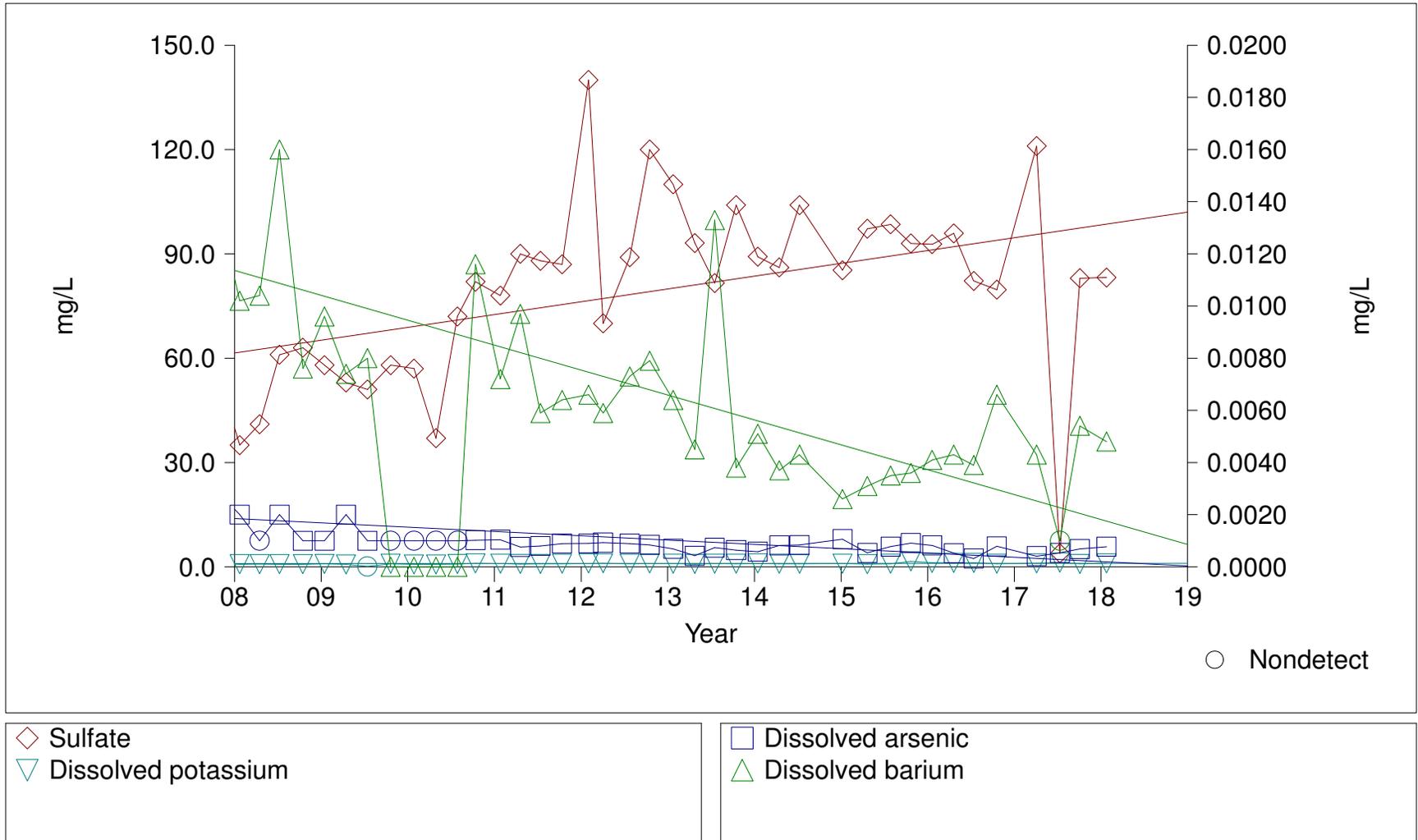
Cathcart Landfill [ccshal]

Time Series Plot for G-14S

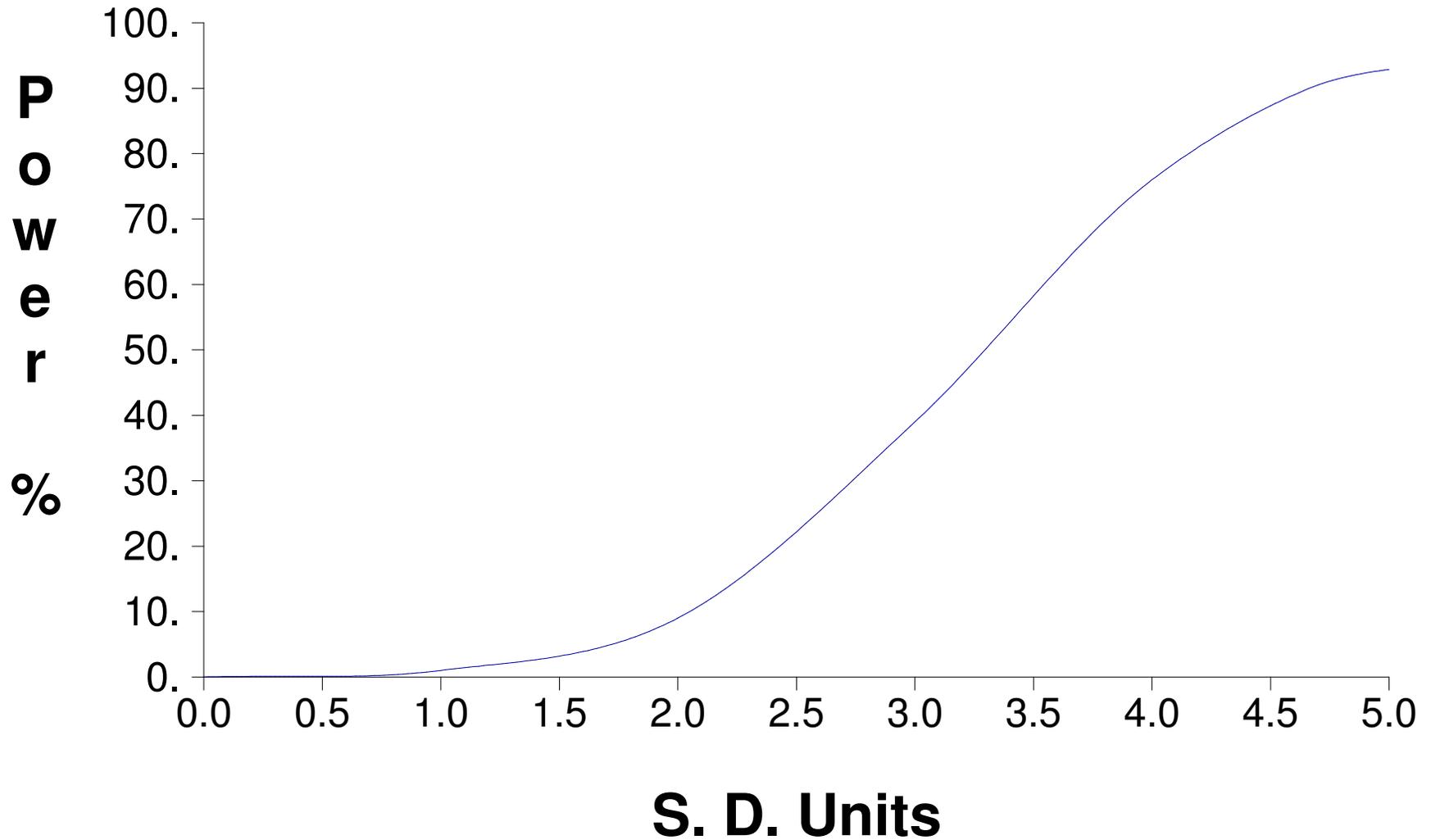


Cathcart Landfill [ccshal]

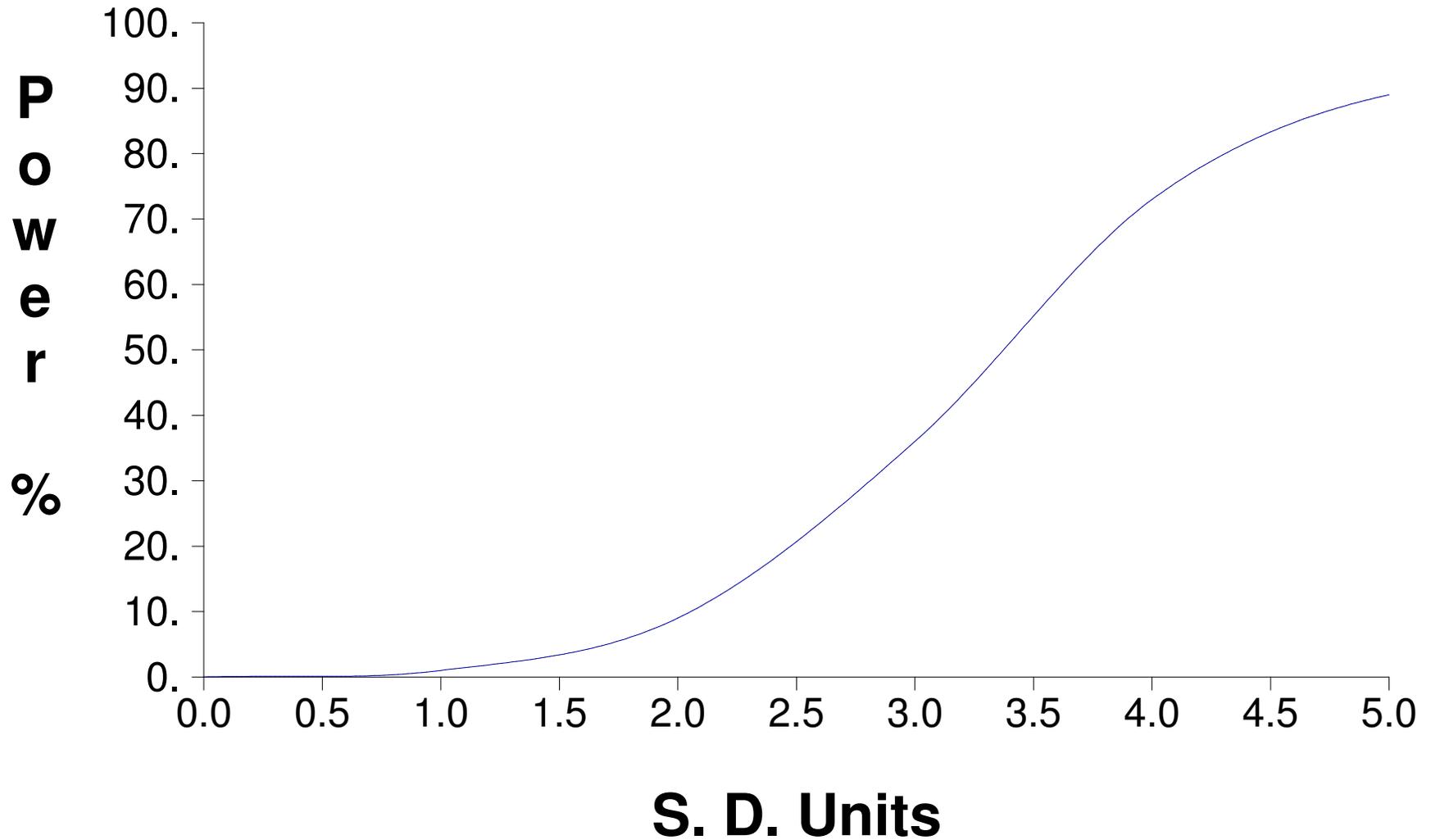
Time Series Plot for G-24S



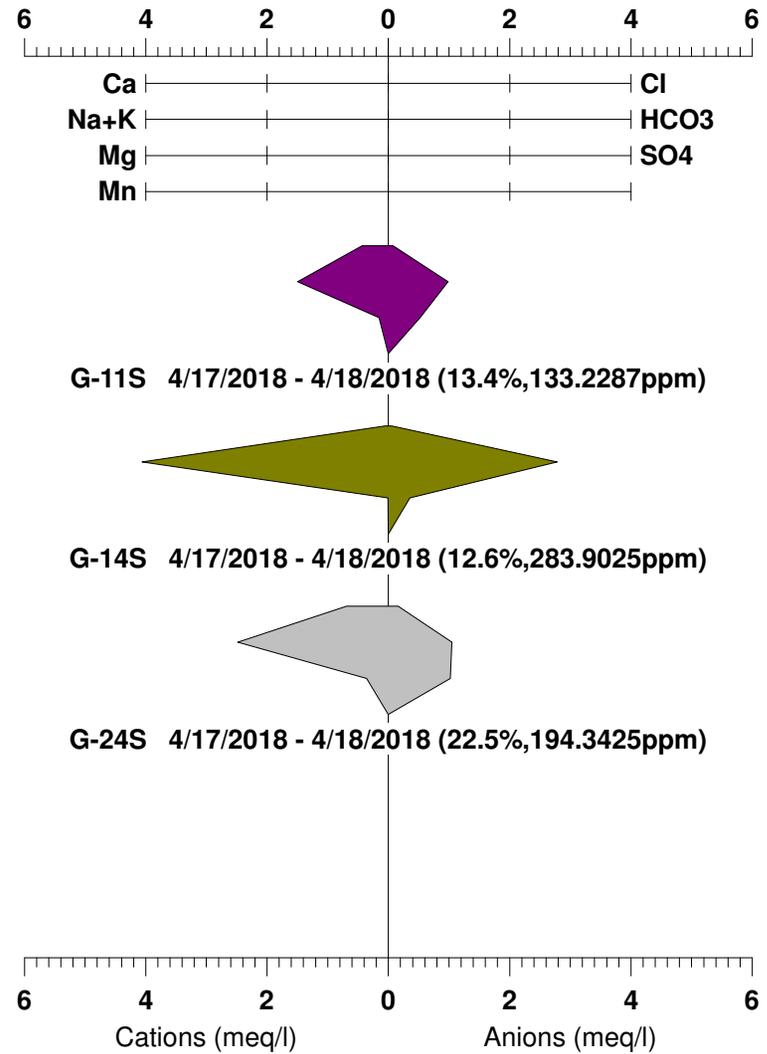
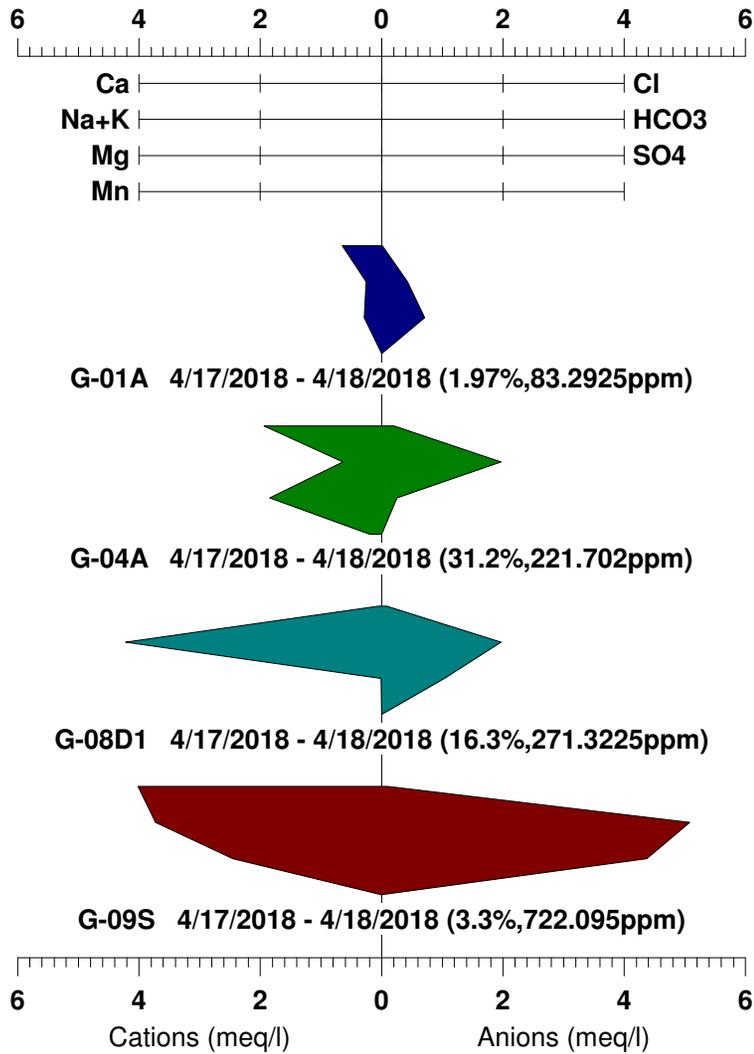
False Positive and False Negative Rates for Current Intra-Well Prediction Limits Monitoring Program



False Positive and False Negative Rates for Current Upgradient vs. Downgradient Monitoring Program

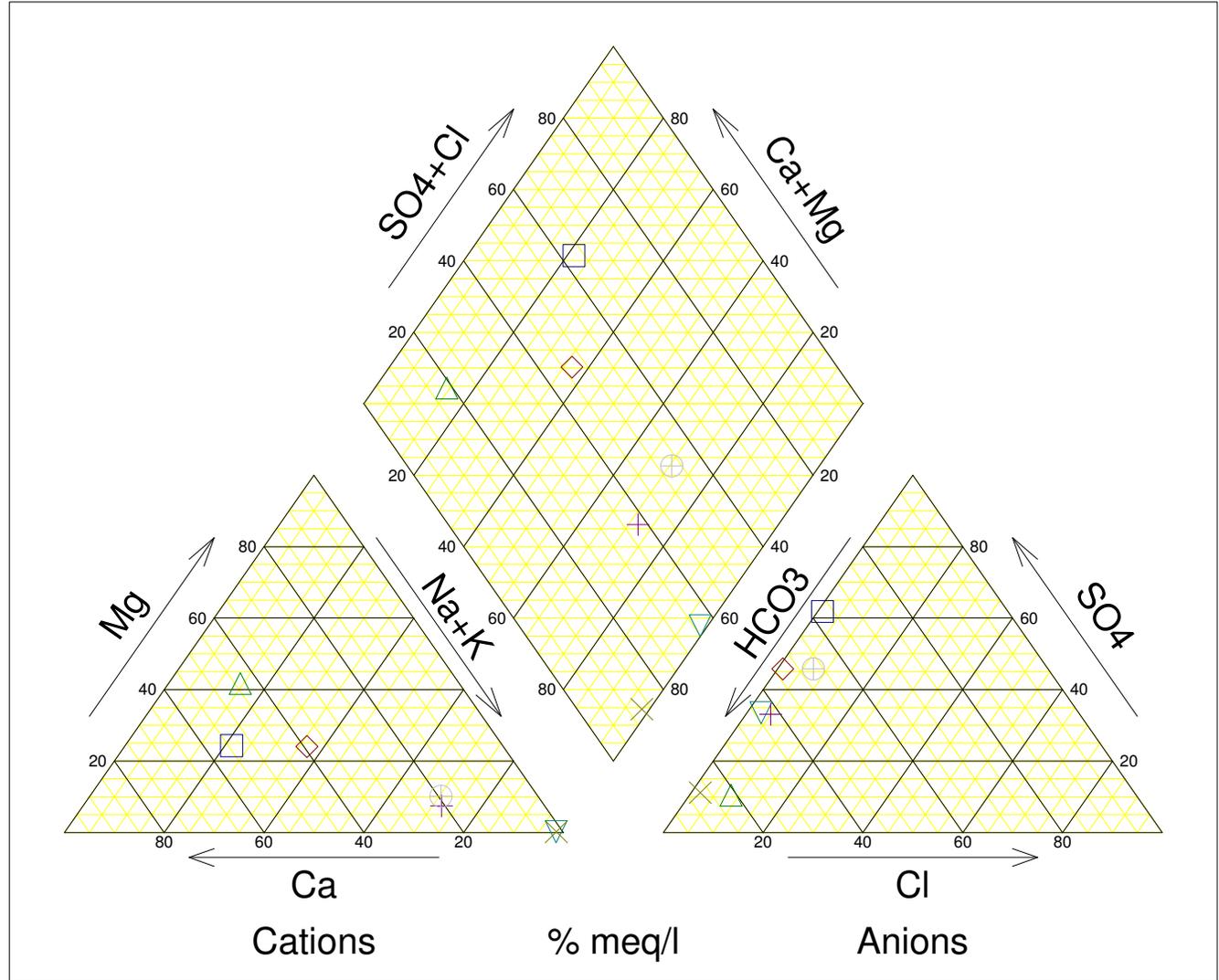


Cathcart Landfill [ccshal]

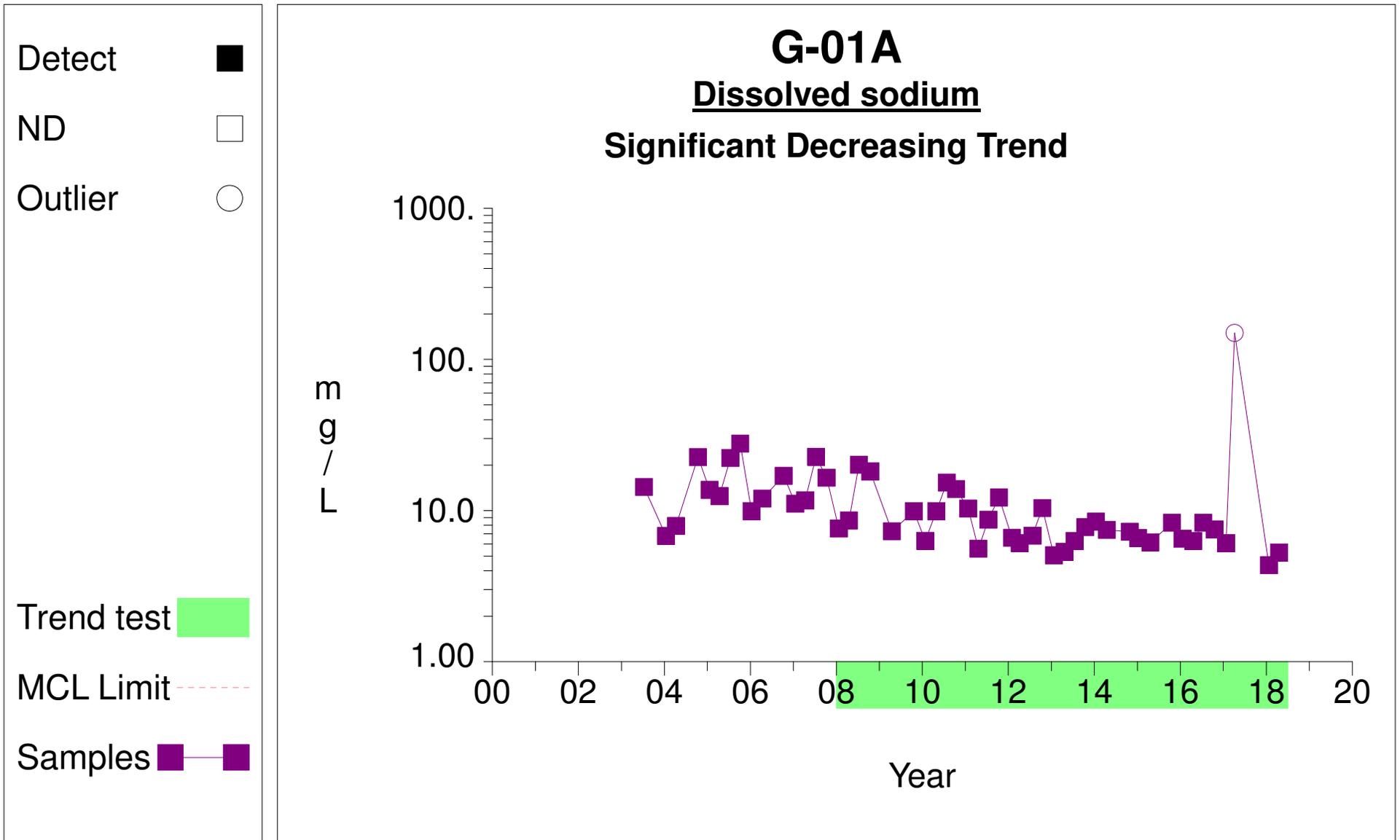


Cathcart Landfill [ccshal]

□	G-01A	4/17/2018 - 4/18/2018	(1.96%, 83.29ppm)
△	G-04A	4/17/2018 - 4/18/2018	(29.2%, 216.19ppm)
▽	G-08D1	4/17/2018 - 4/18/2018	(16.3%, 271.32ppm)
◇	G-09S	4/17/2018 - 4/18/2018	(3.26%, 721.85ppm)
+	G-11S	4/17/2018 - 4/18/2018	(13.4%, 133.22ppm)
×	G-14S	4/17/2018 - 4/18/2018	(12.6%, 283.9ppm)
⊕	G-24S	4/17/2018 - 4/18/2018	(22.5%, 194.34ppm)

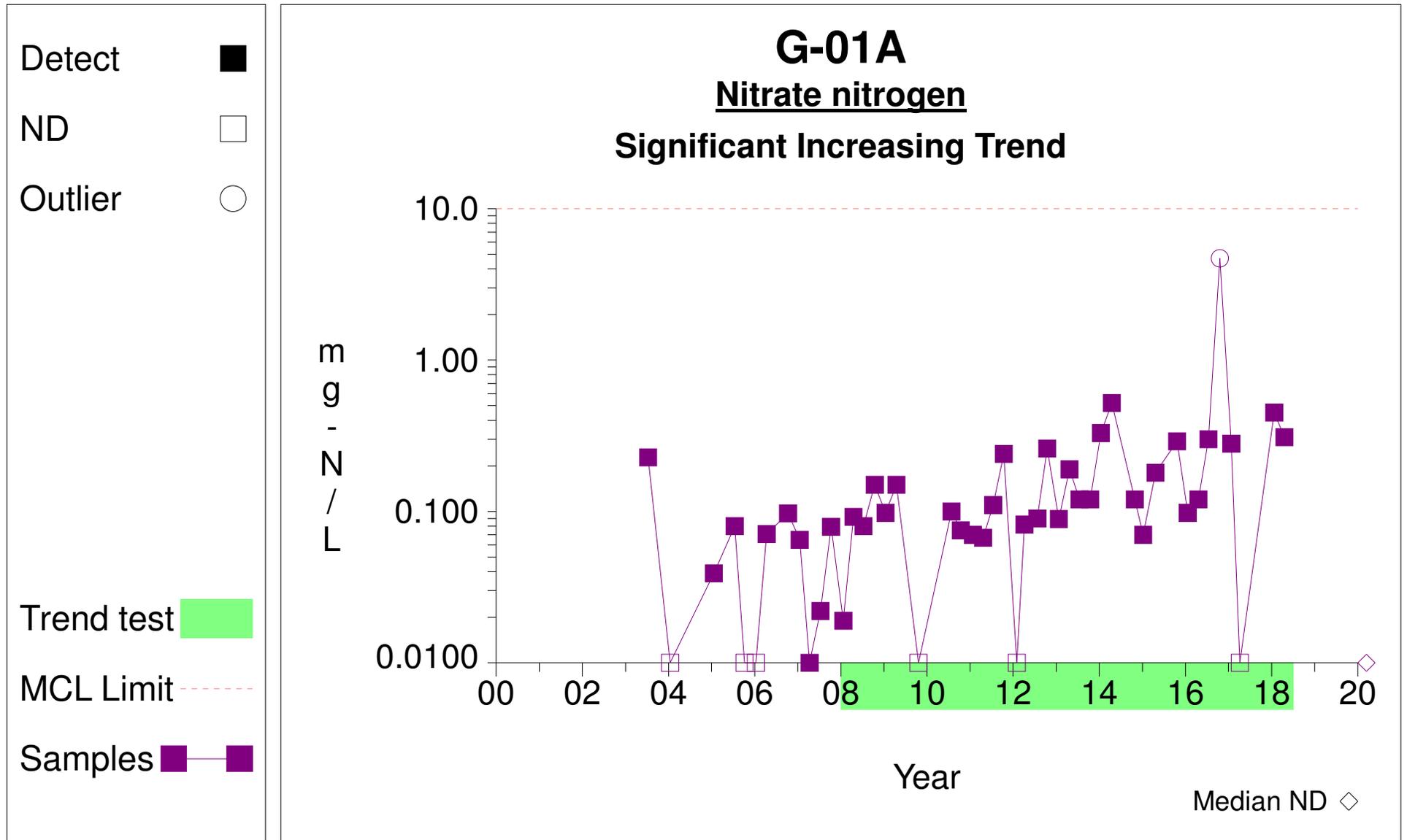


Time Series



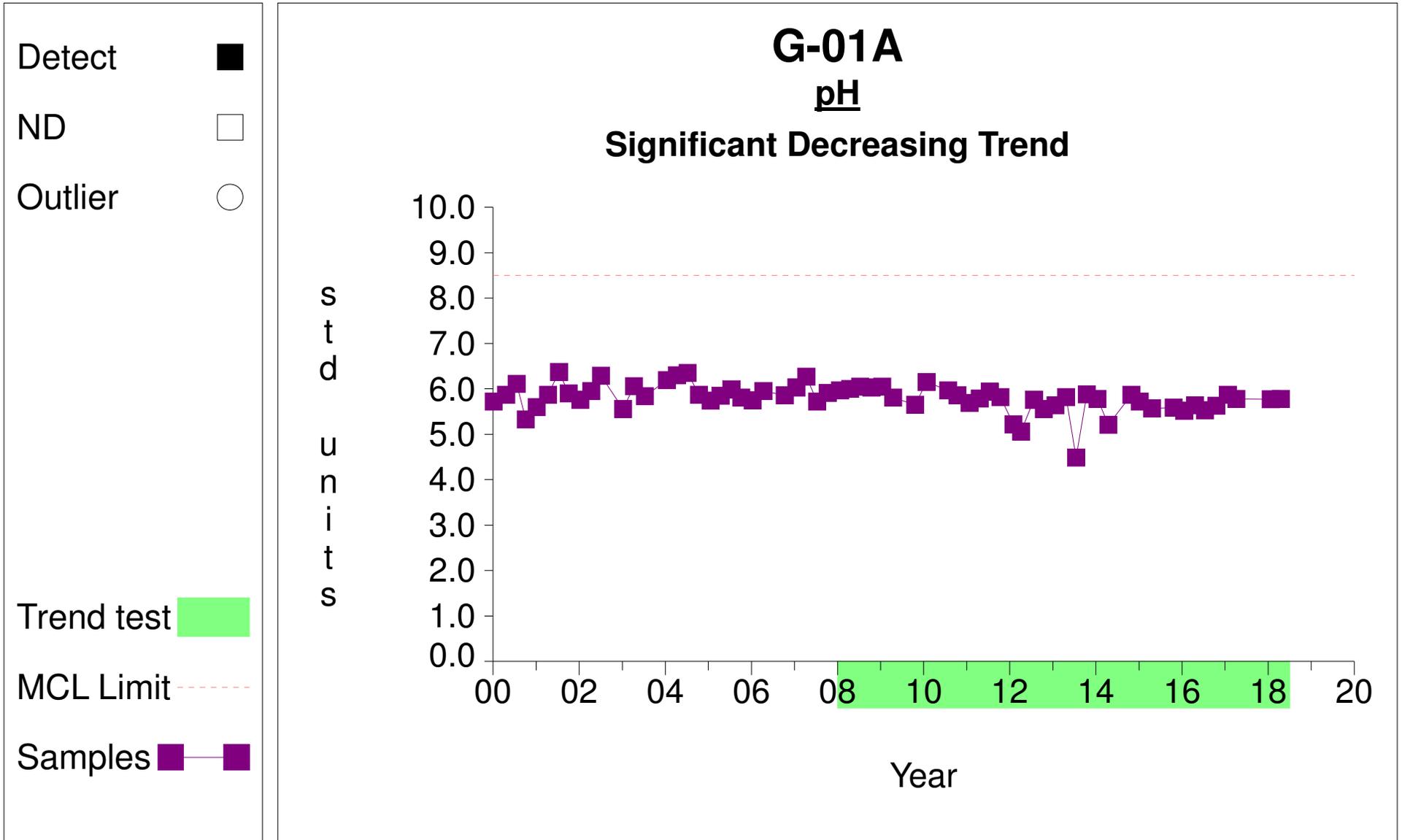
Graph 24

Time Series



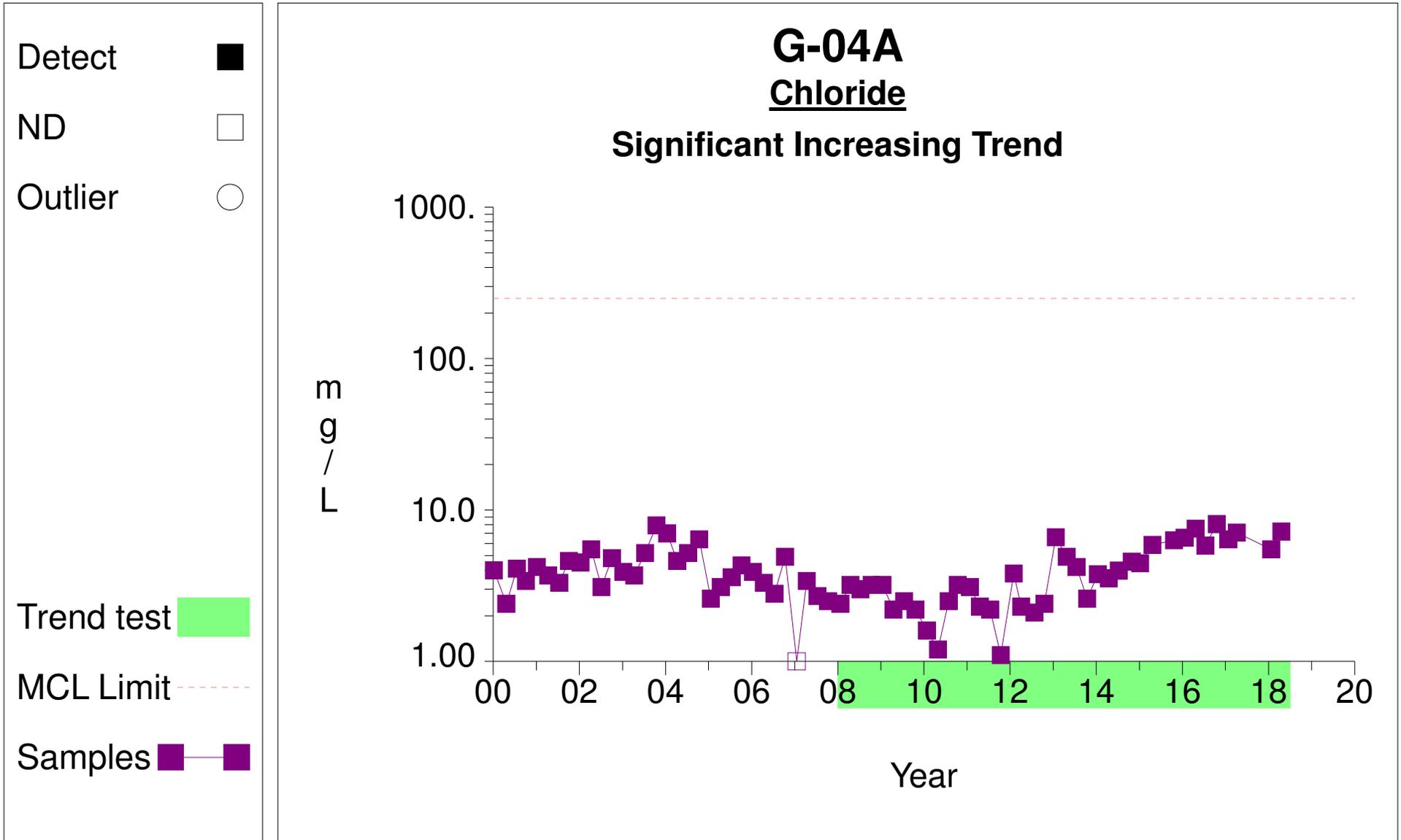
Graph 28

Time Series



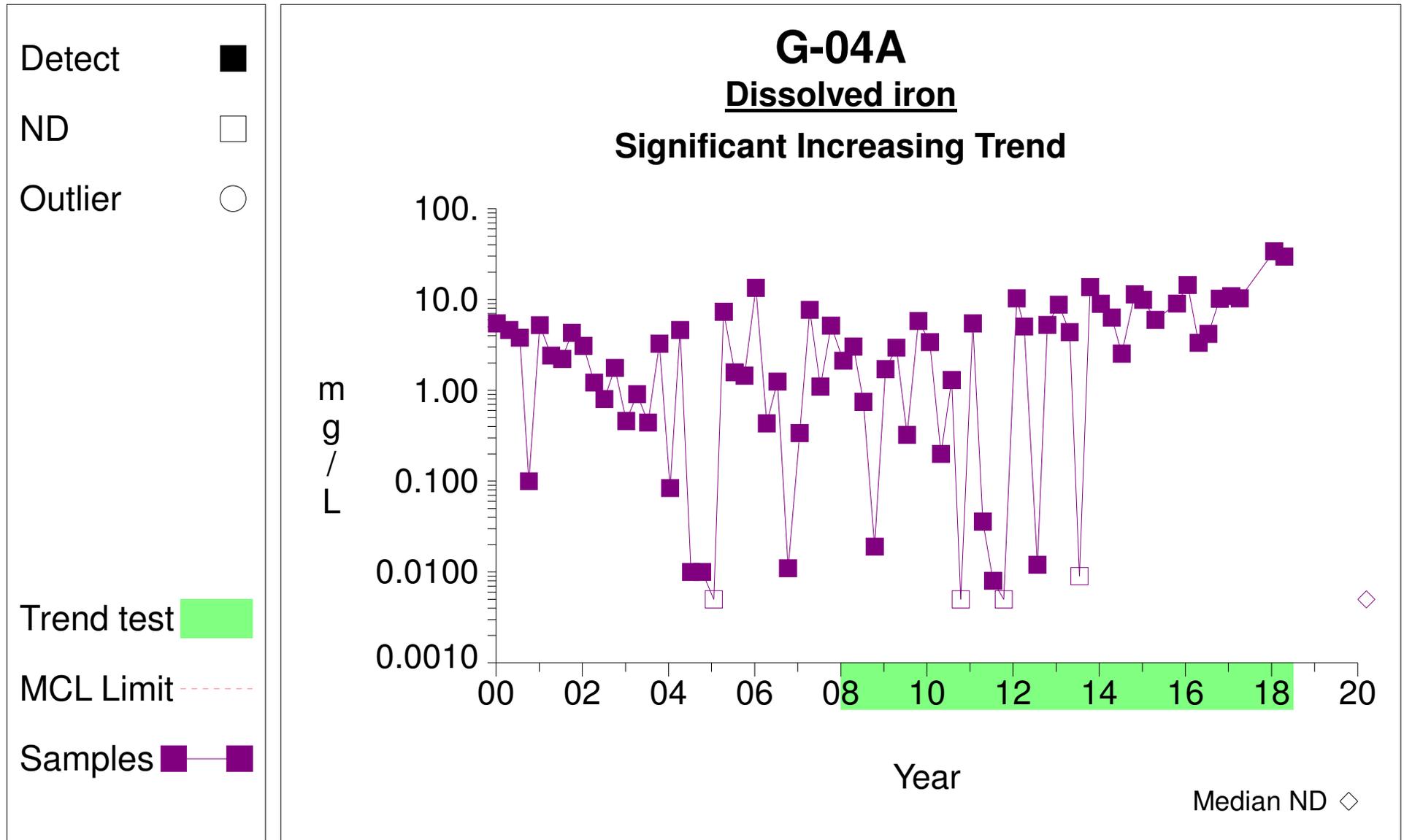
Graph 30

Time Series



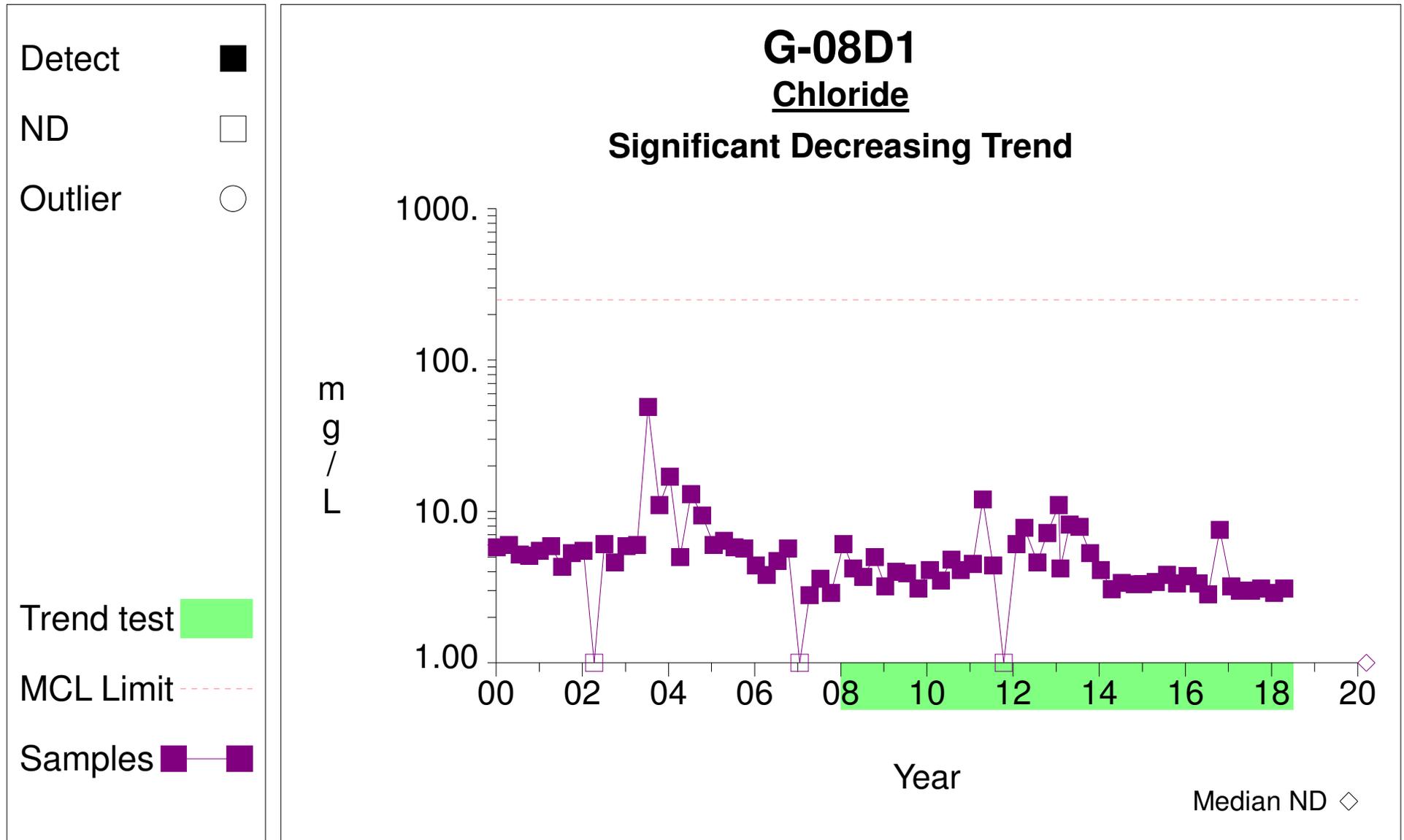
Graph 38

Time Series



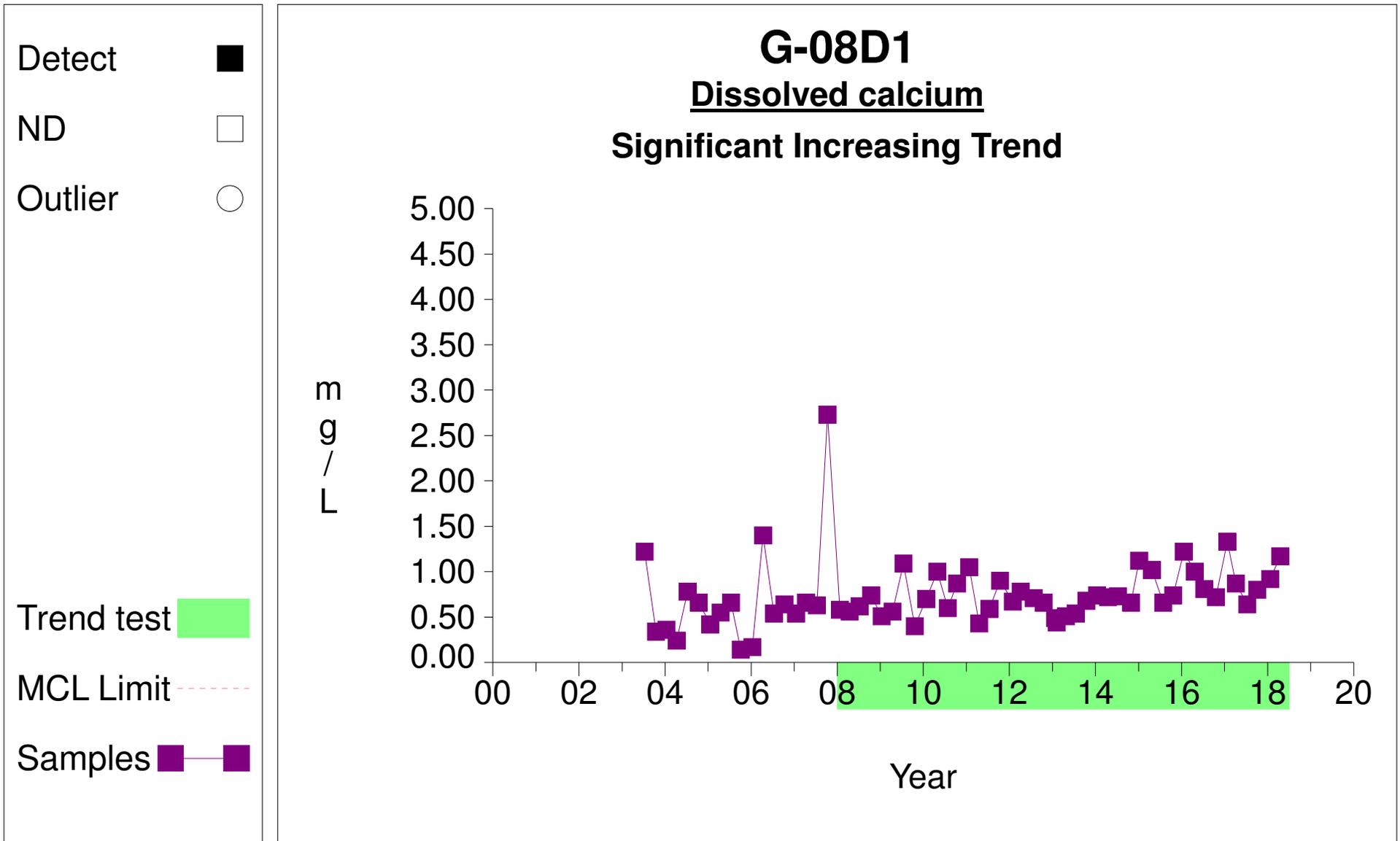
Graph 49

Time Series



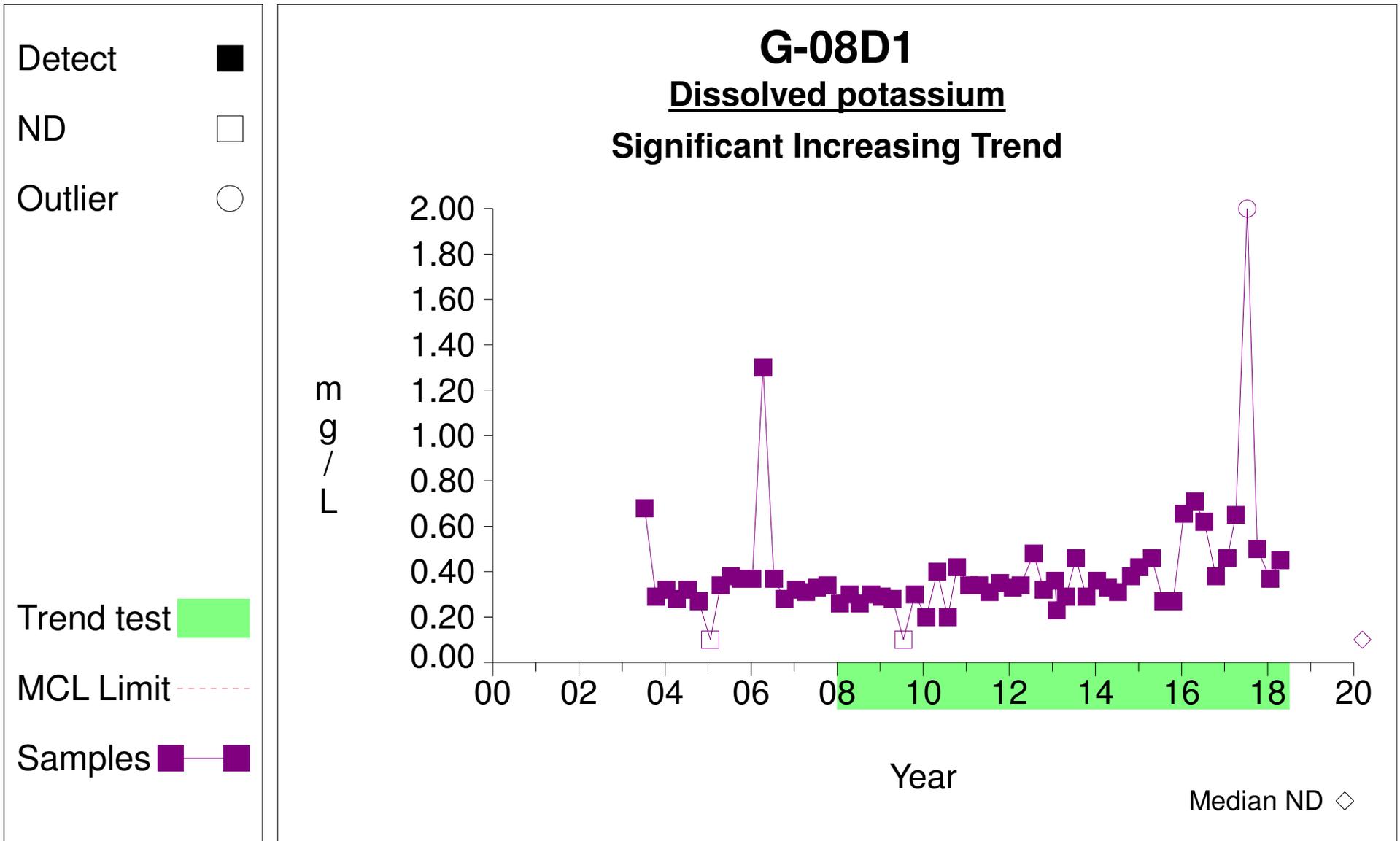
Graph 71

Time Series



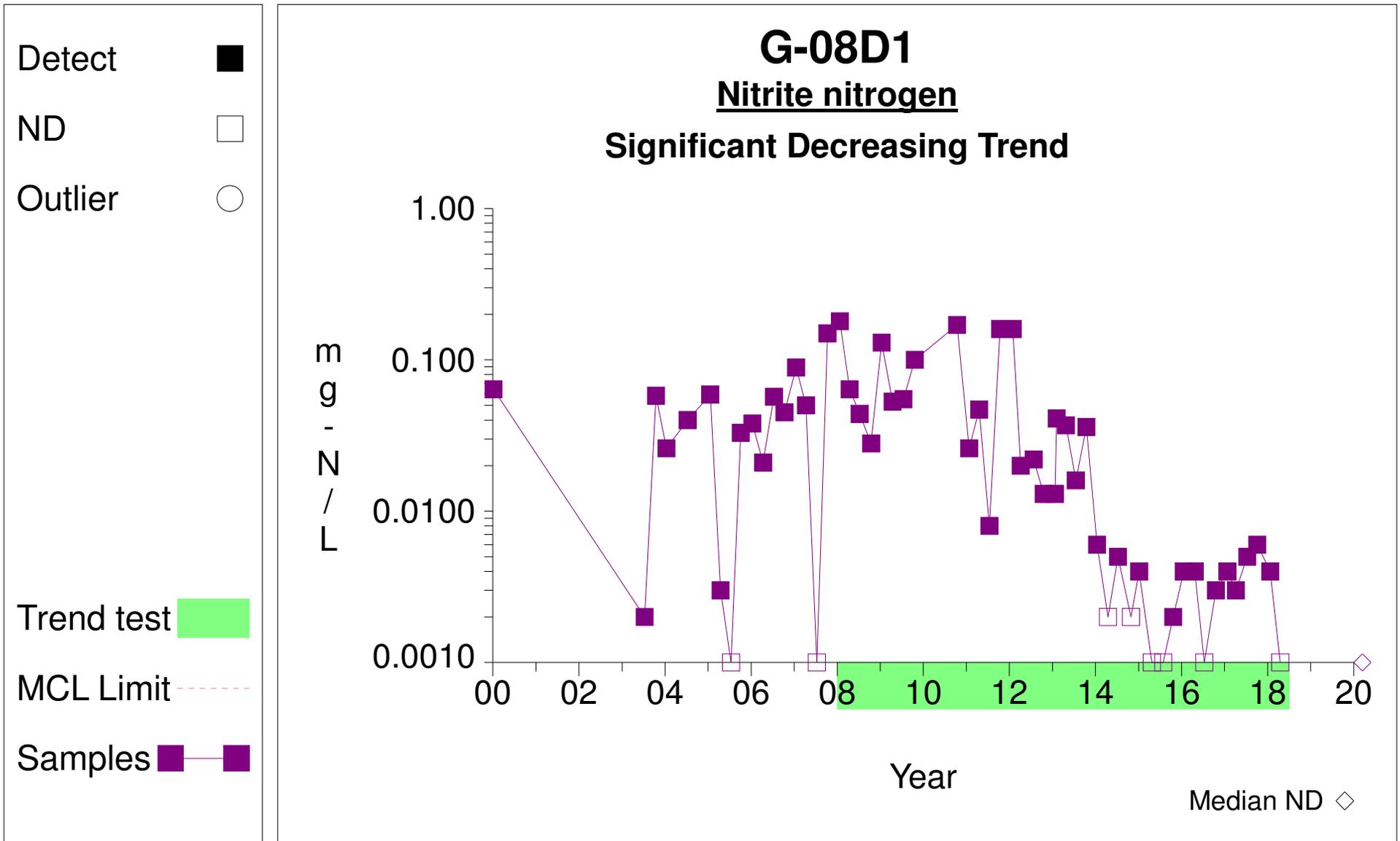
Graph 78

Time Series



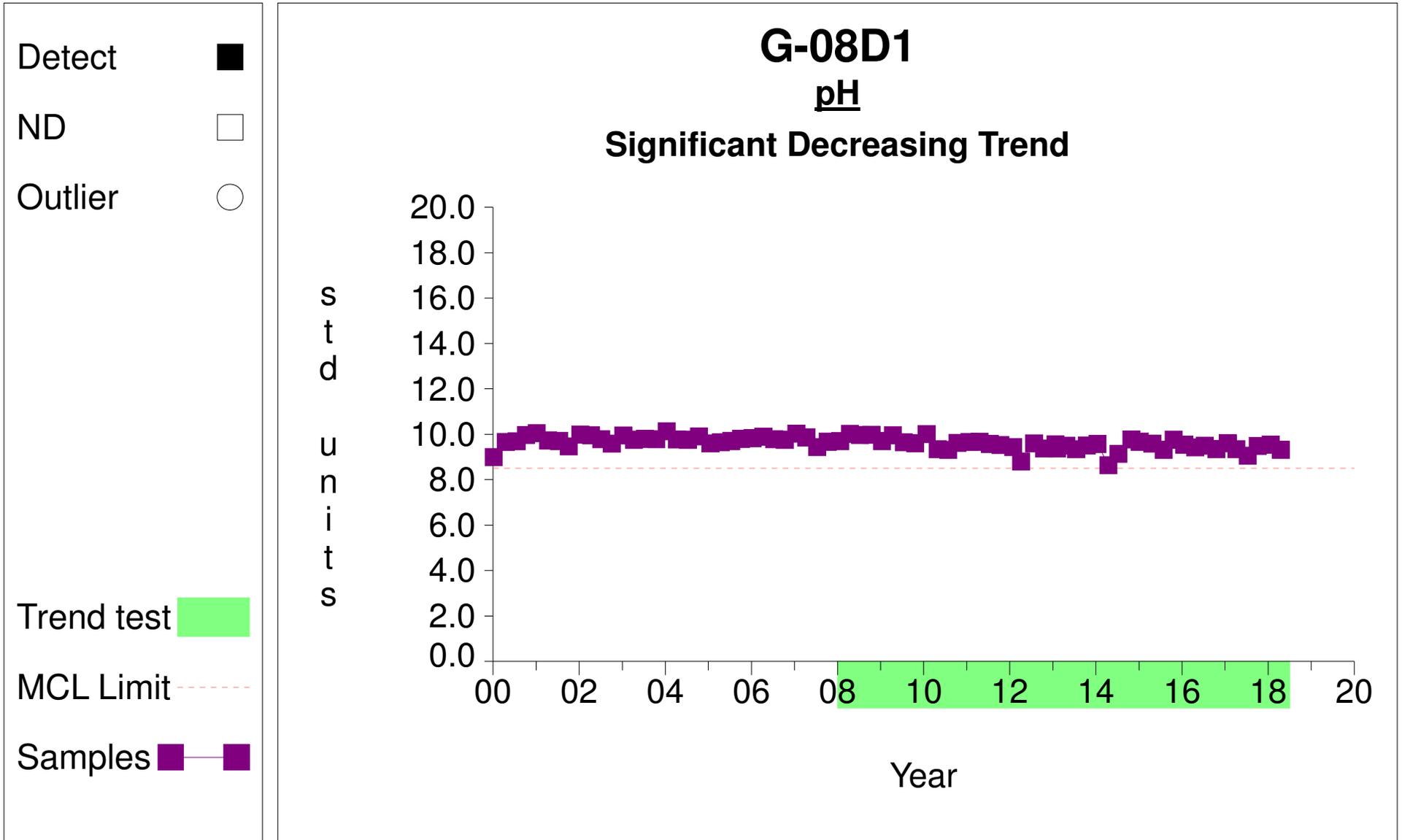
Graph 87

Time Series



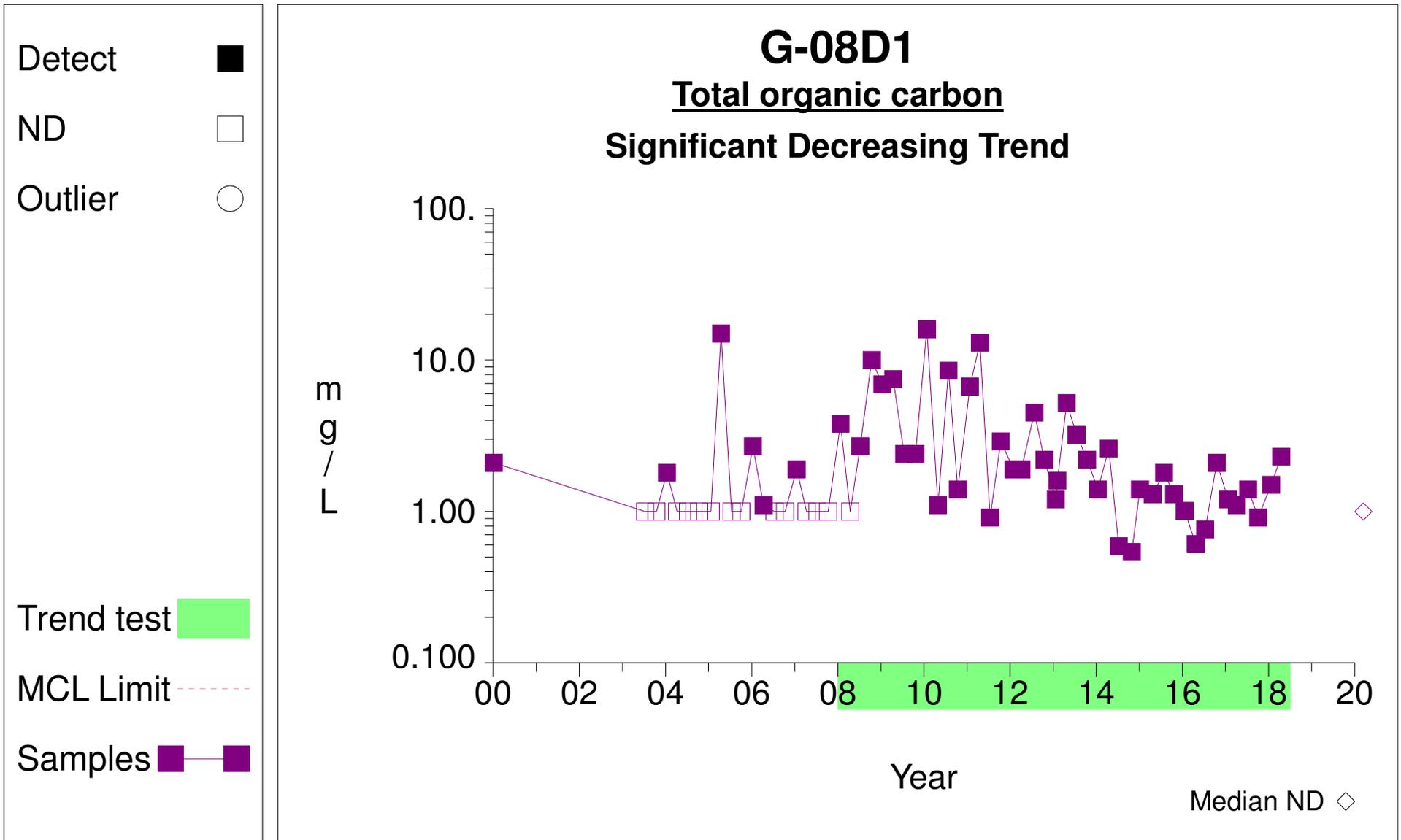
Graph 95

Time Series



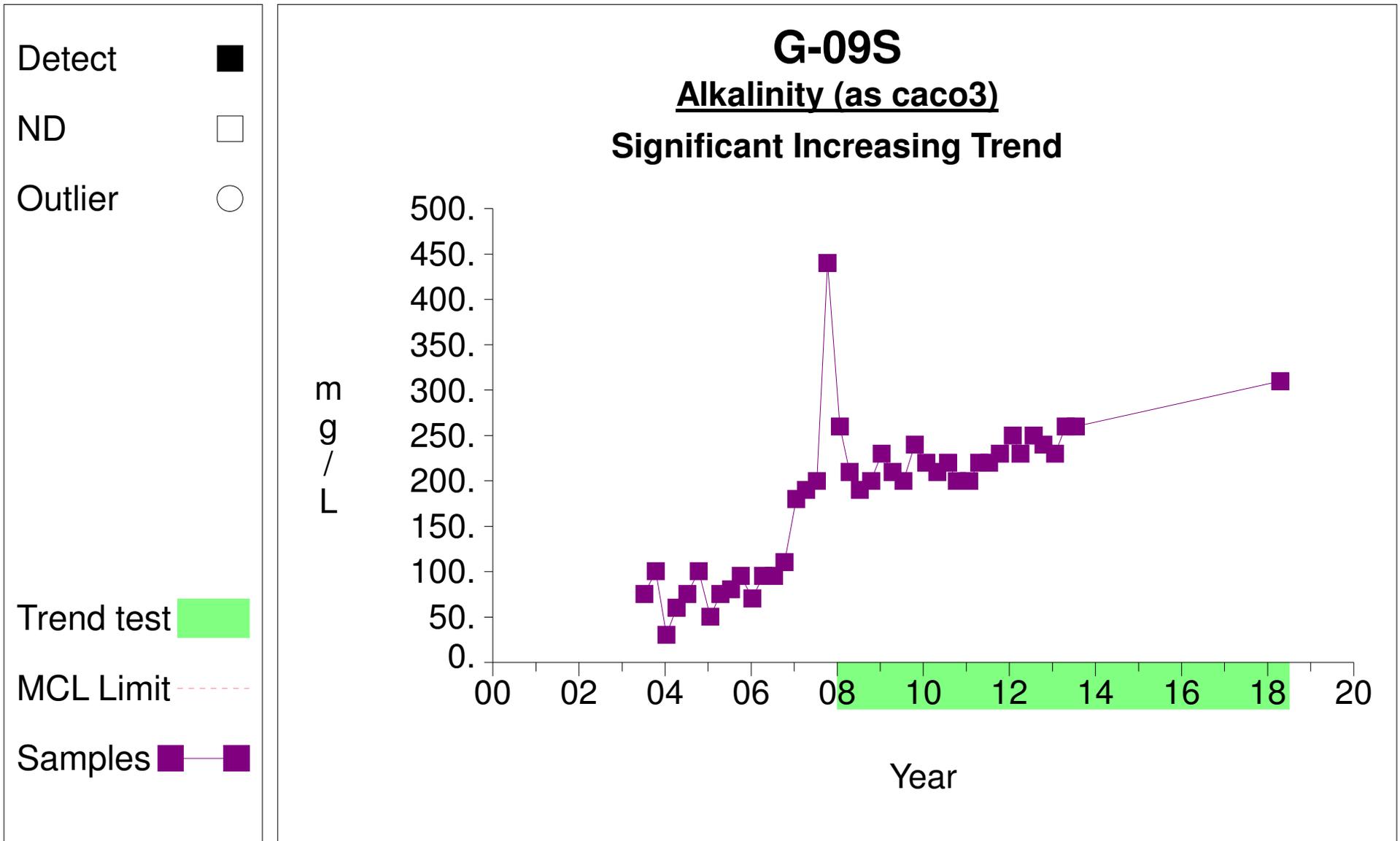
Graph 96

Time Series



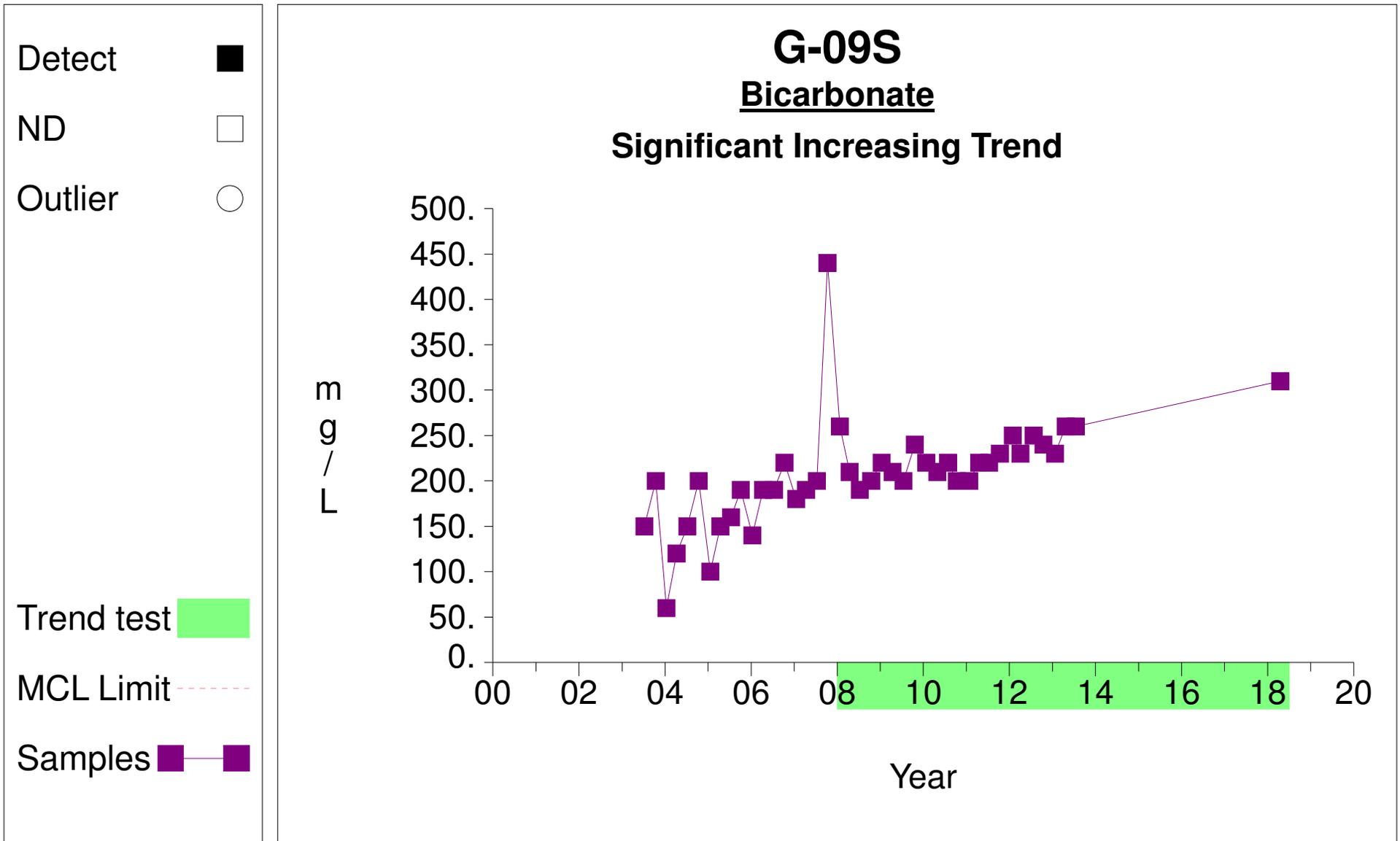
Graph 99

Time Series



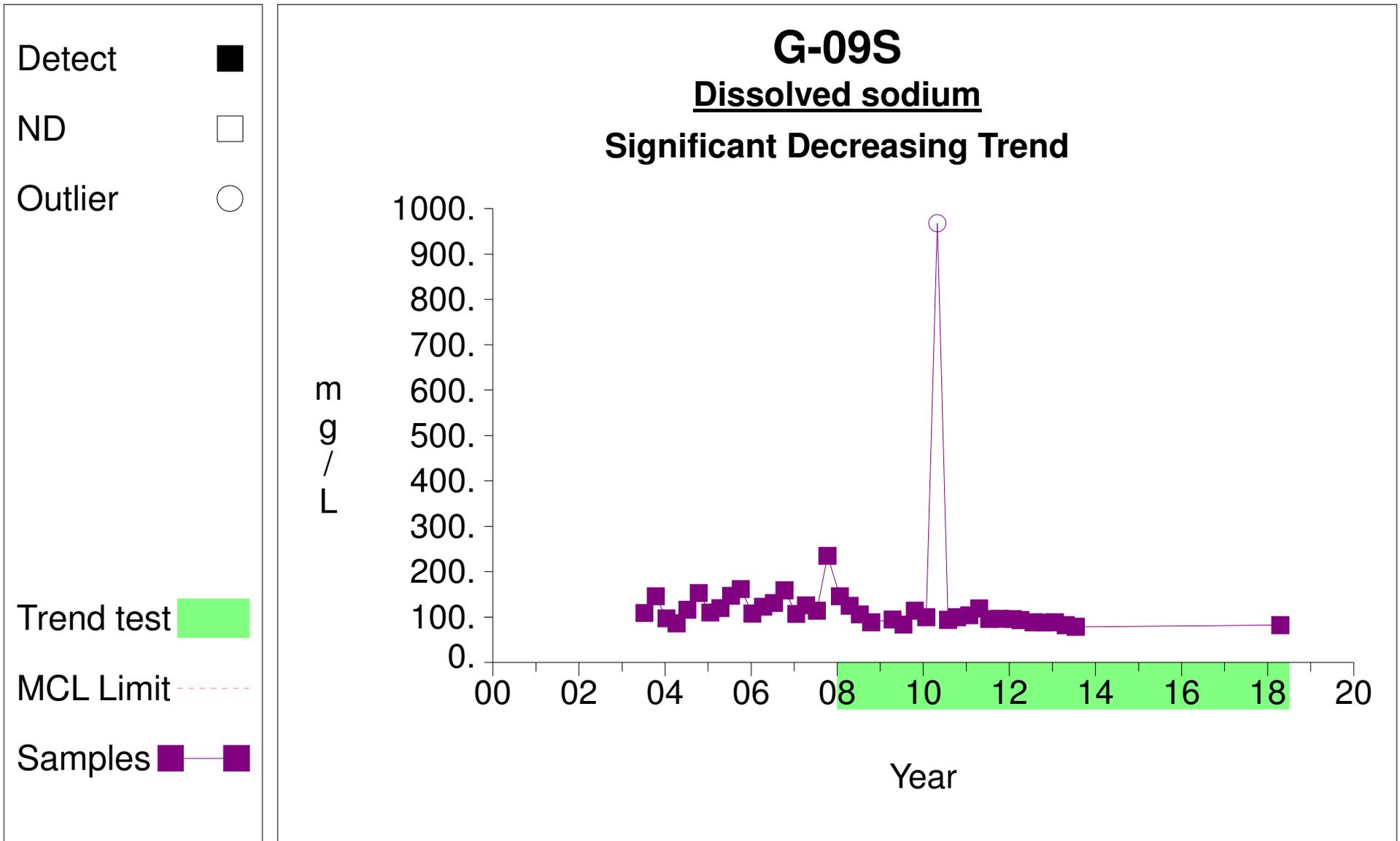
Graph 100

Time Series



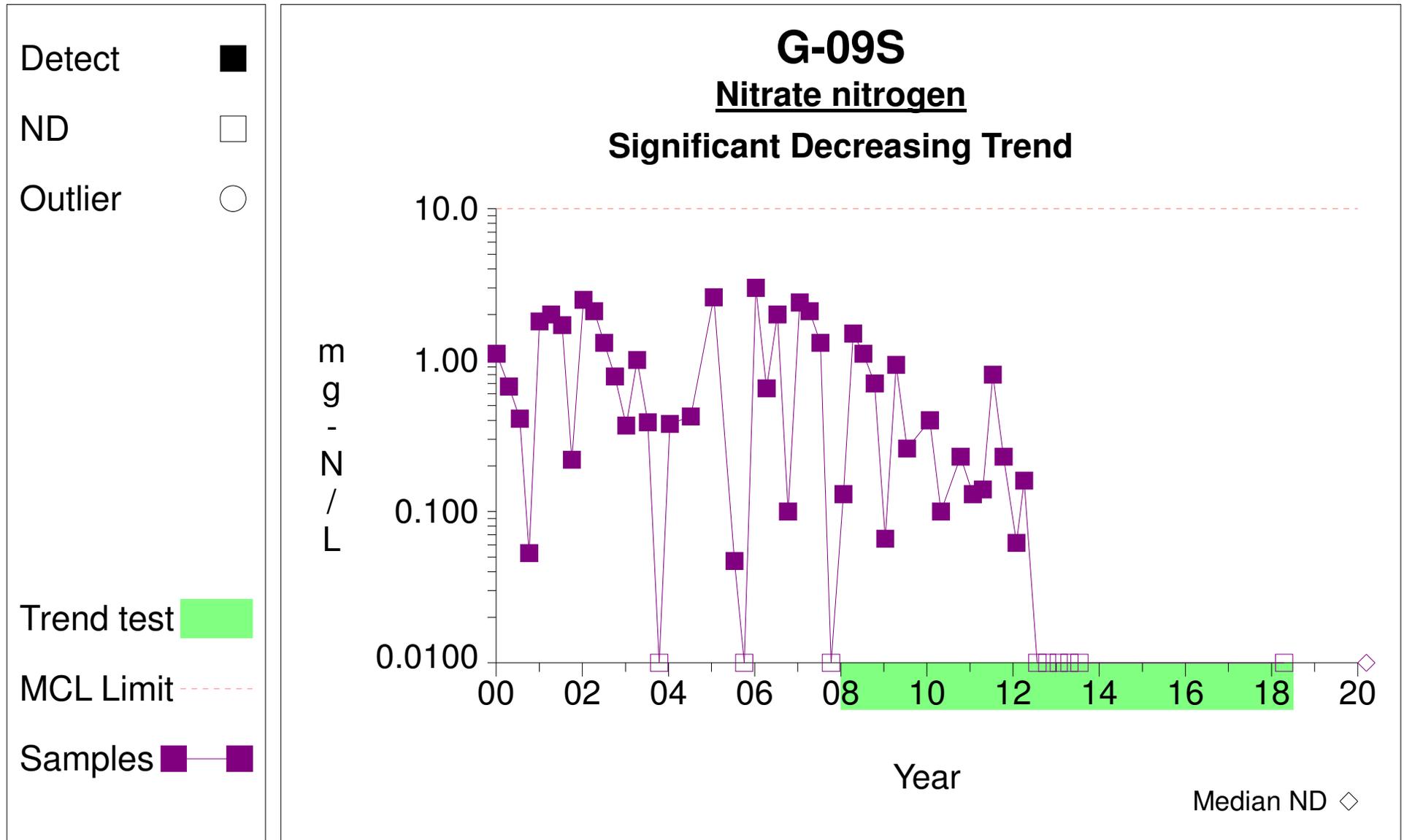
Graph 102

Time Series



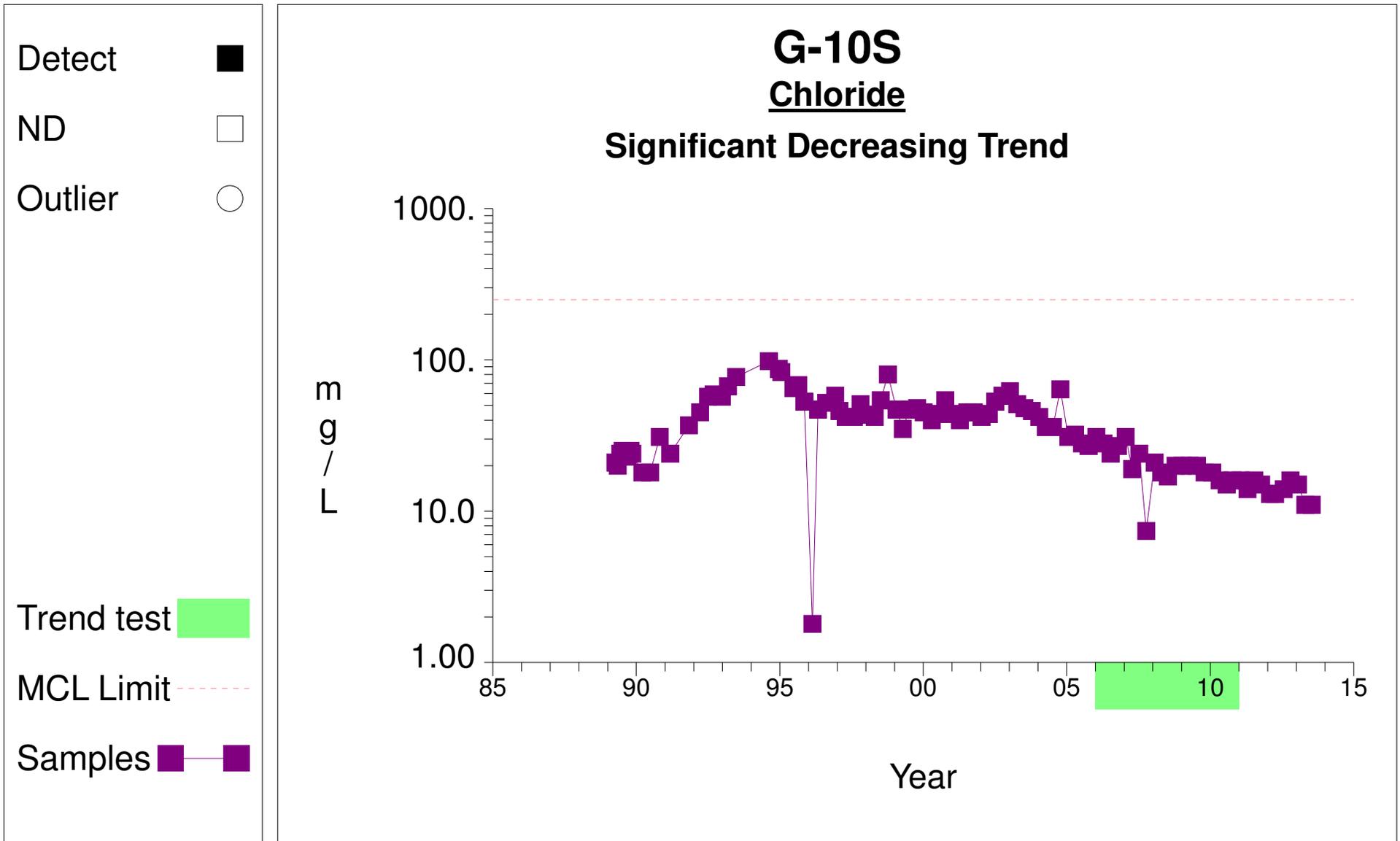
Graph 123

Time Series



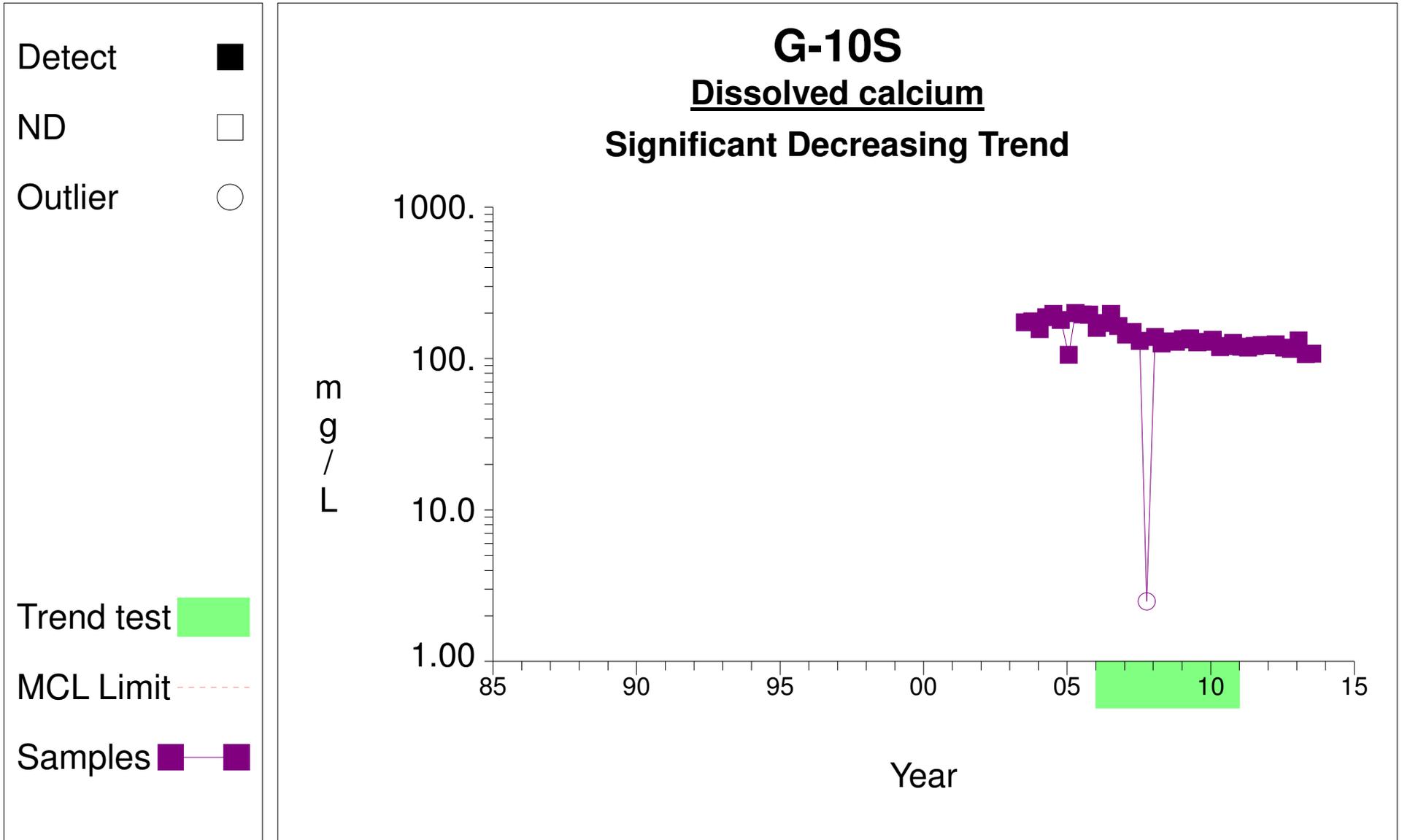
Graph 127

Time Series



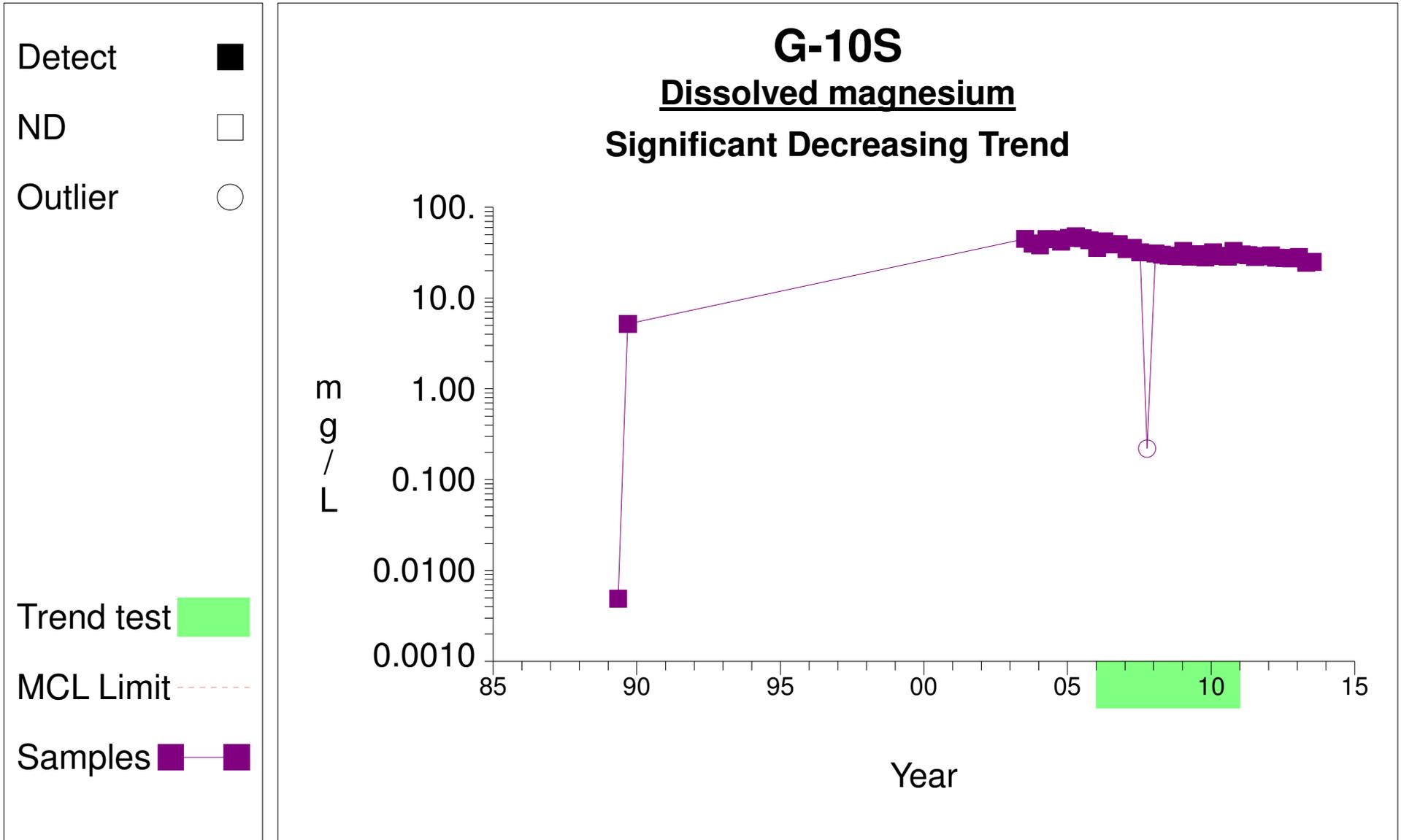
Graph 137

Time Series



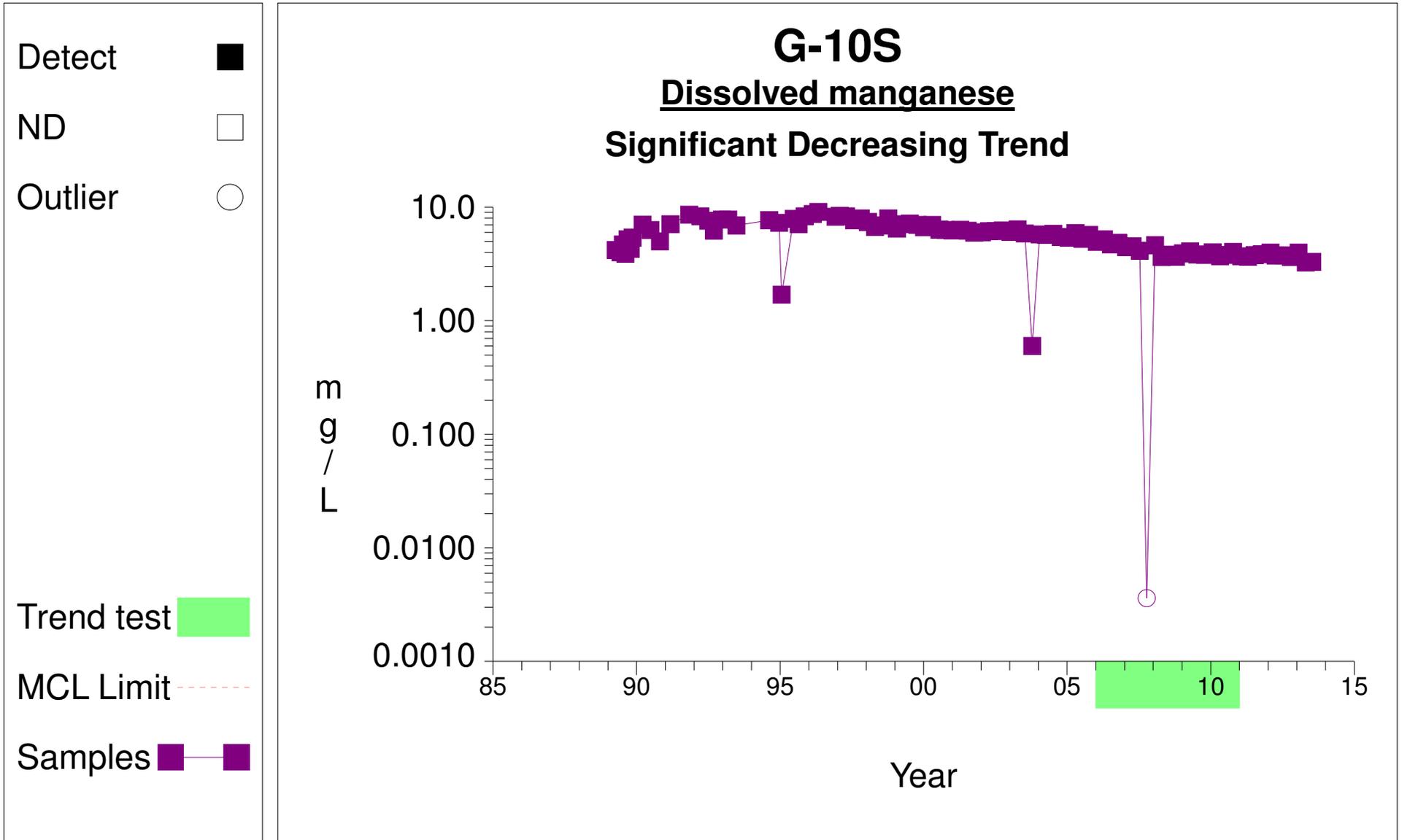
Graph 144

Time Series



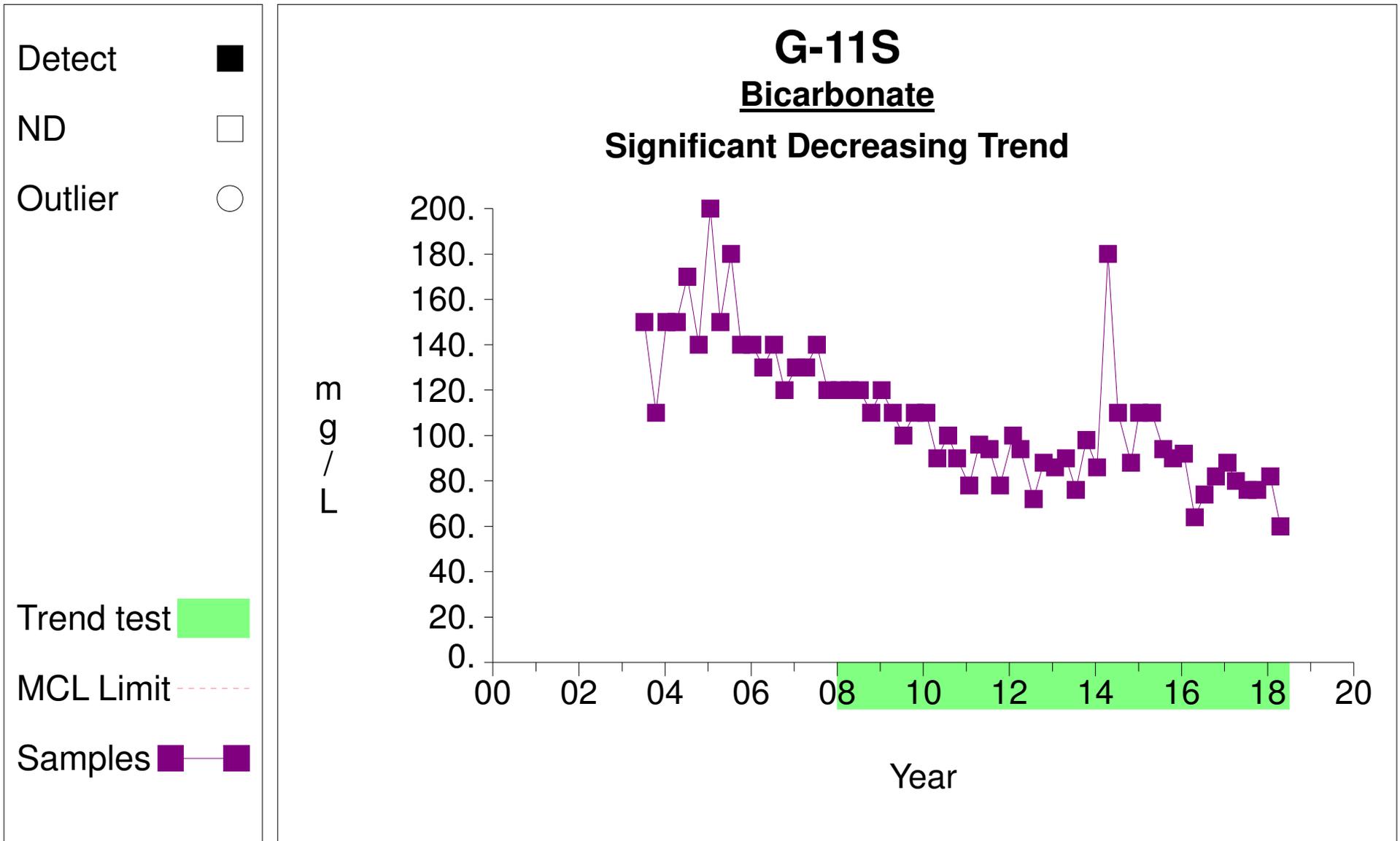
Graph 150

Time Series



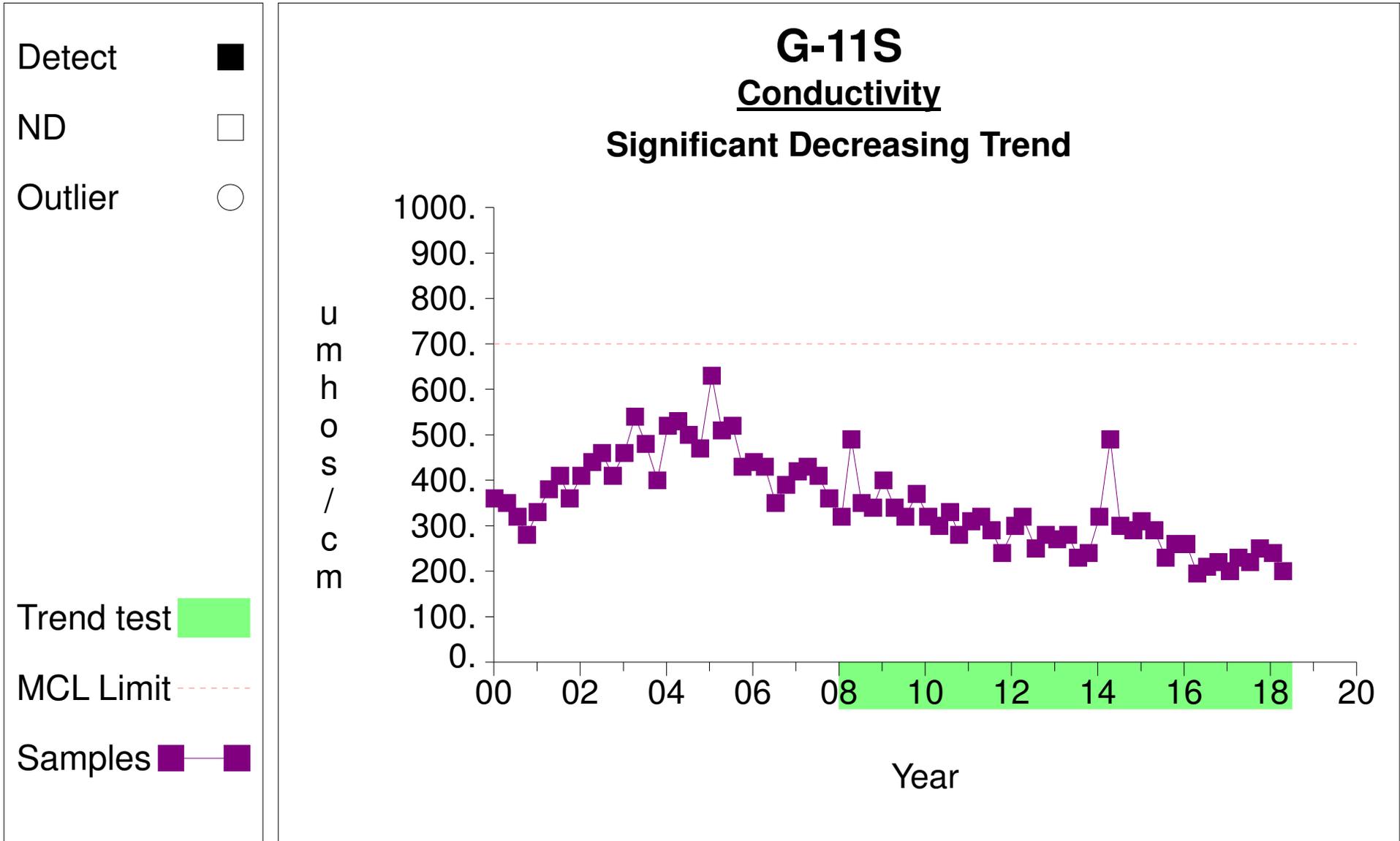
Graph 151

Time Series



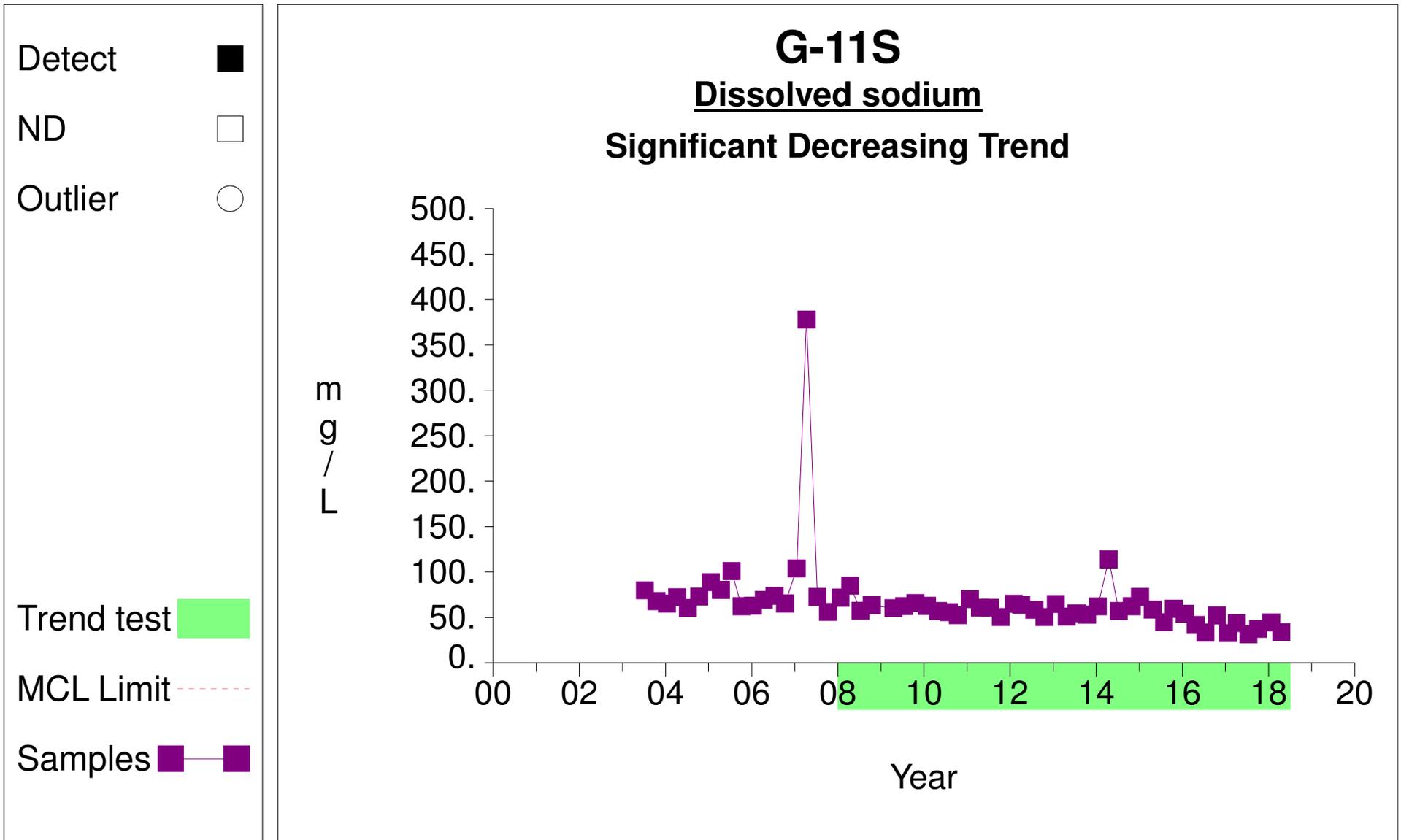
Graph 168

Time Series



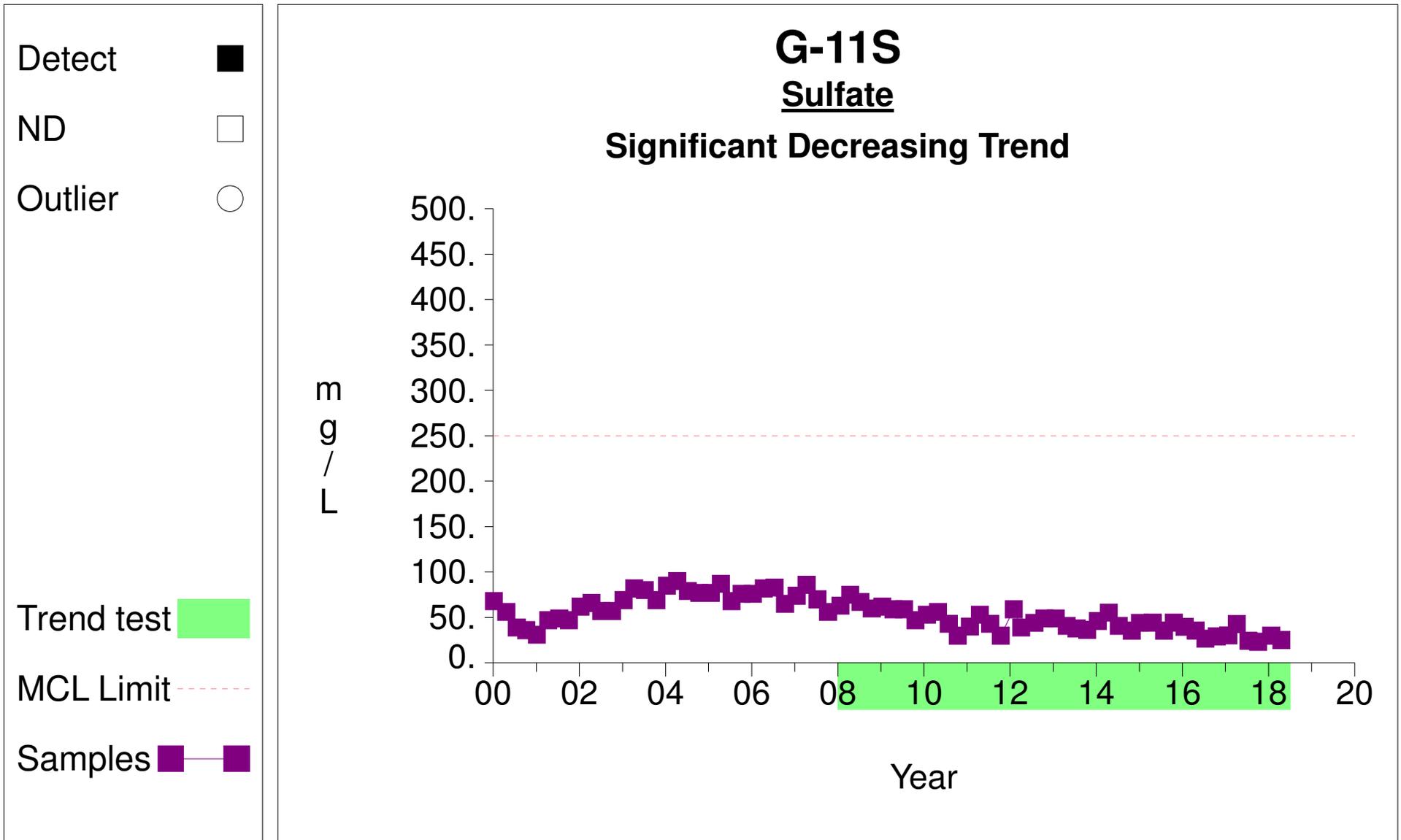
Graph 171

Time Series



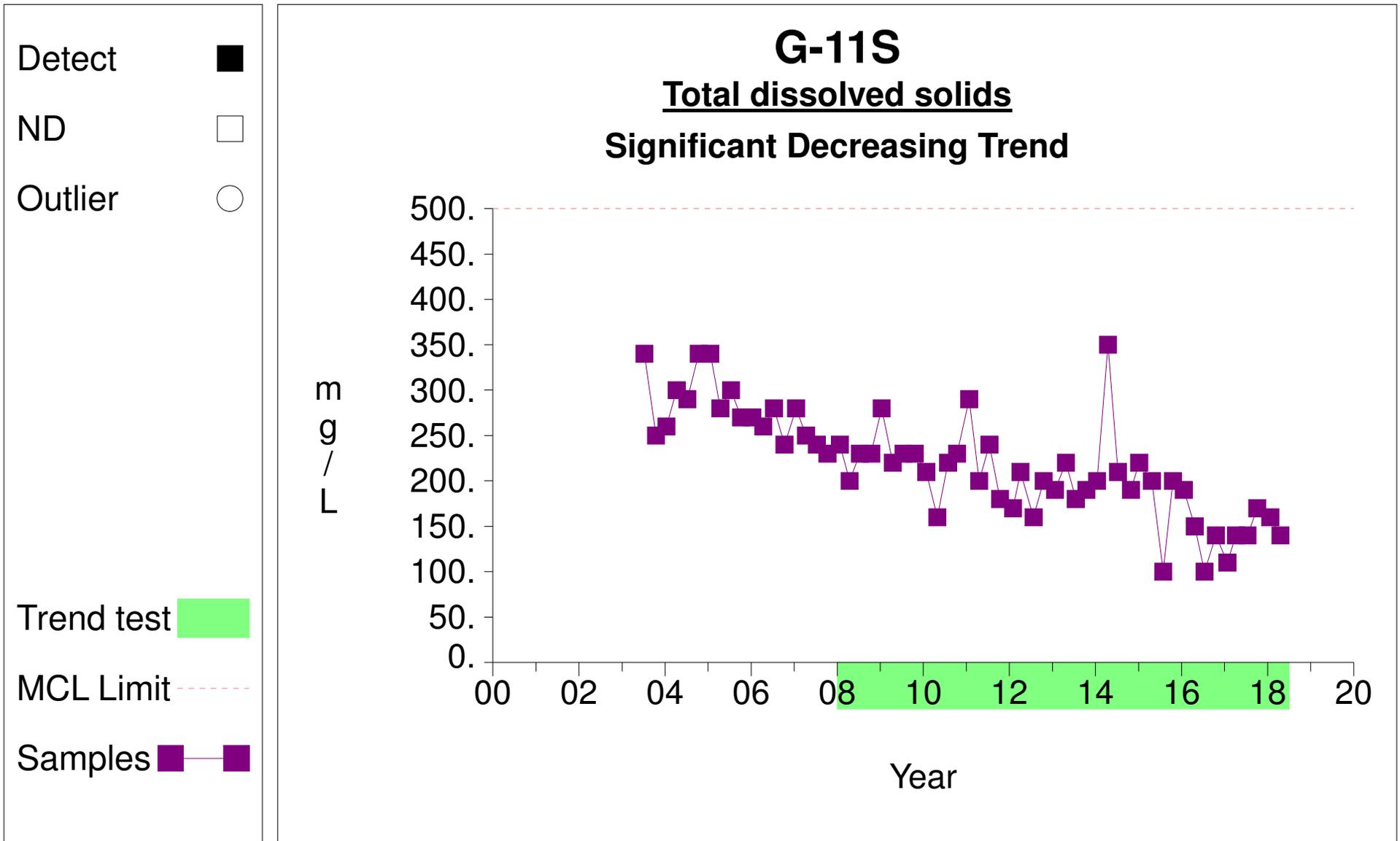
Graph 189

Time Series



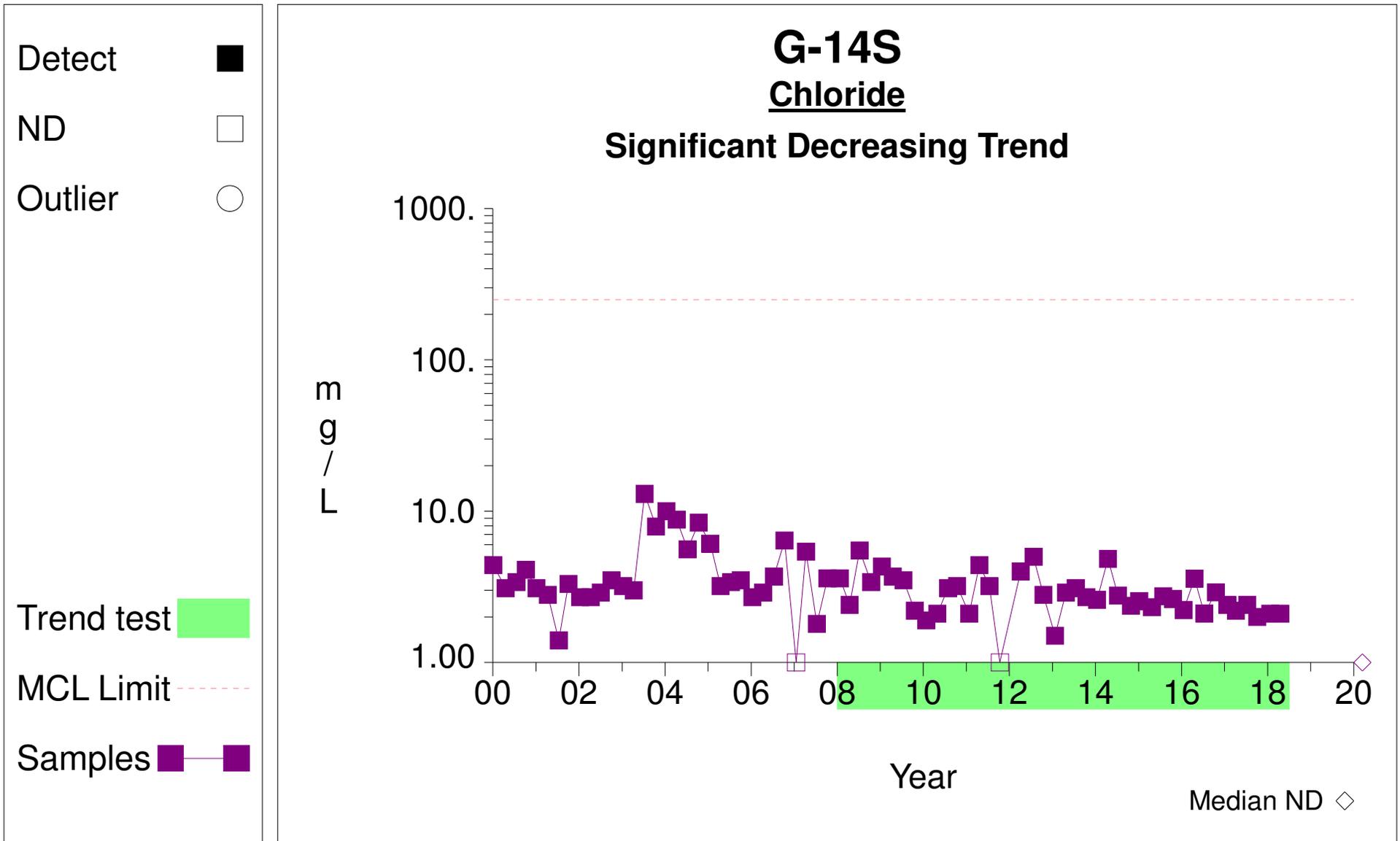
Graph 196

Time Series



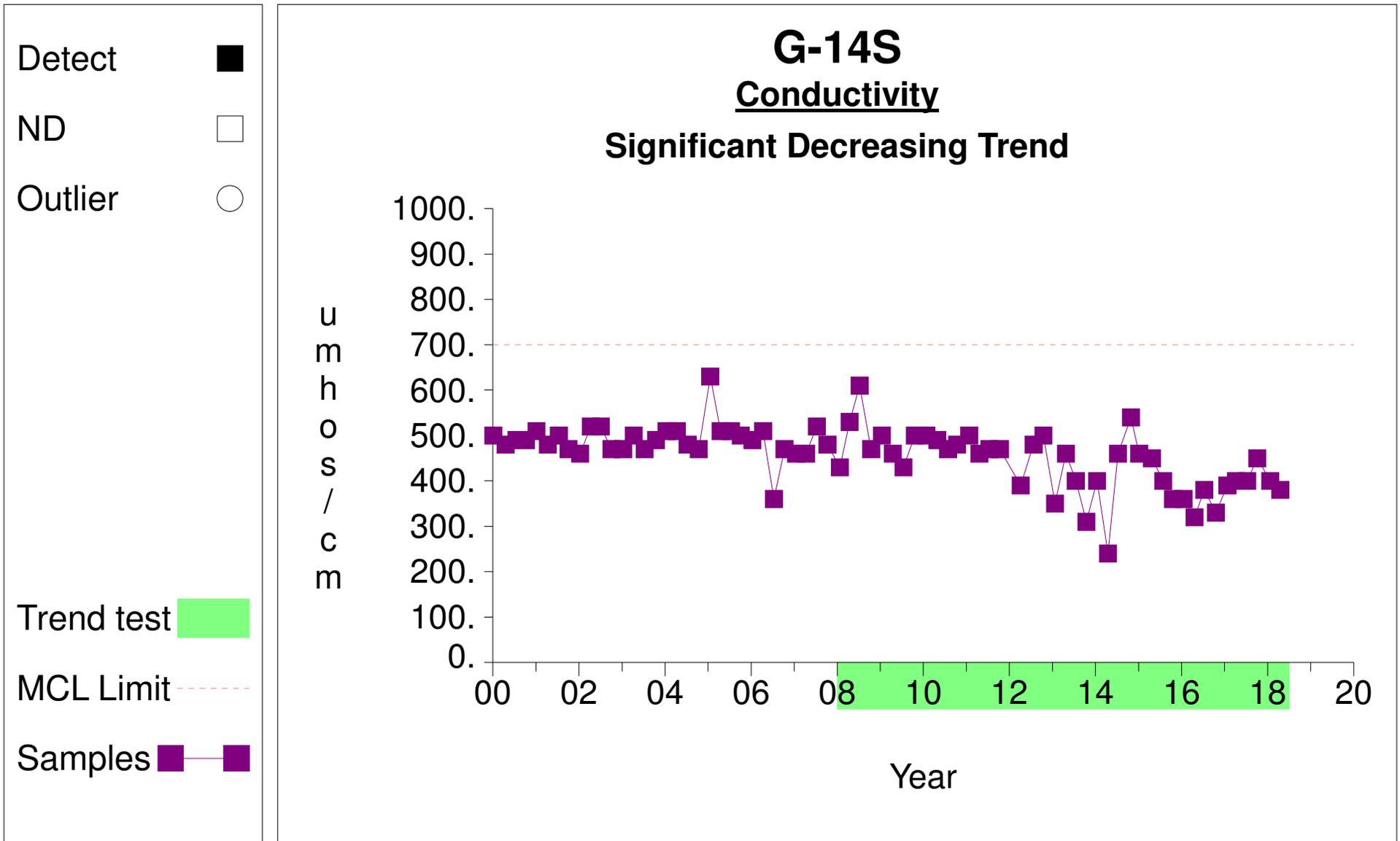
Graph 197

Time Series



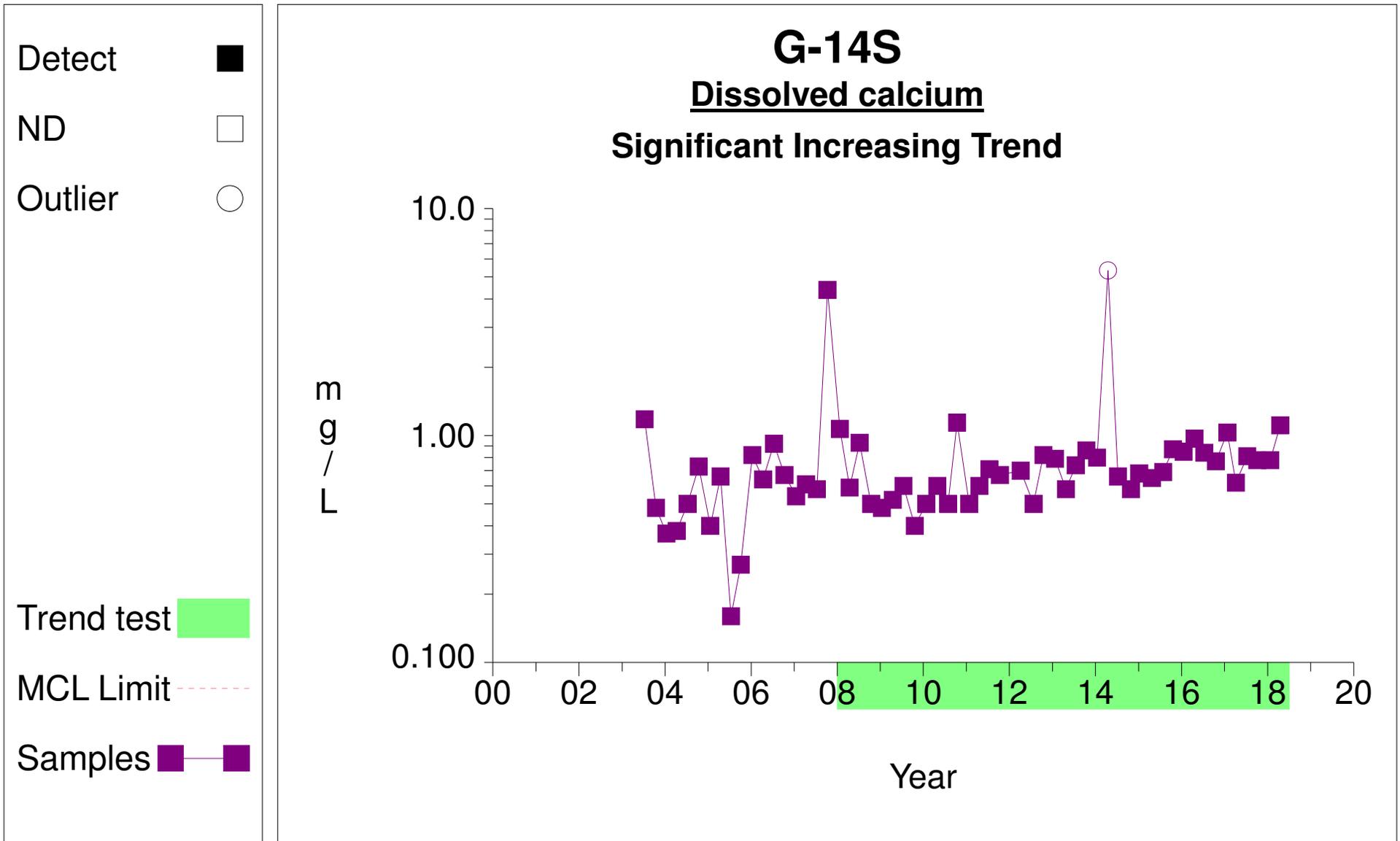
Graph 203

Time Series



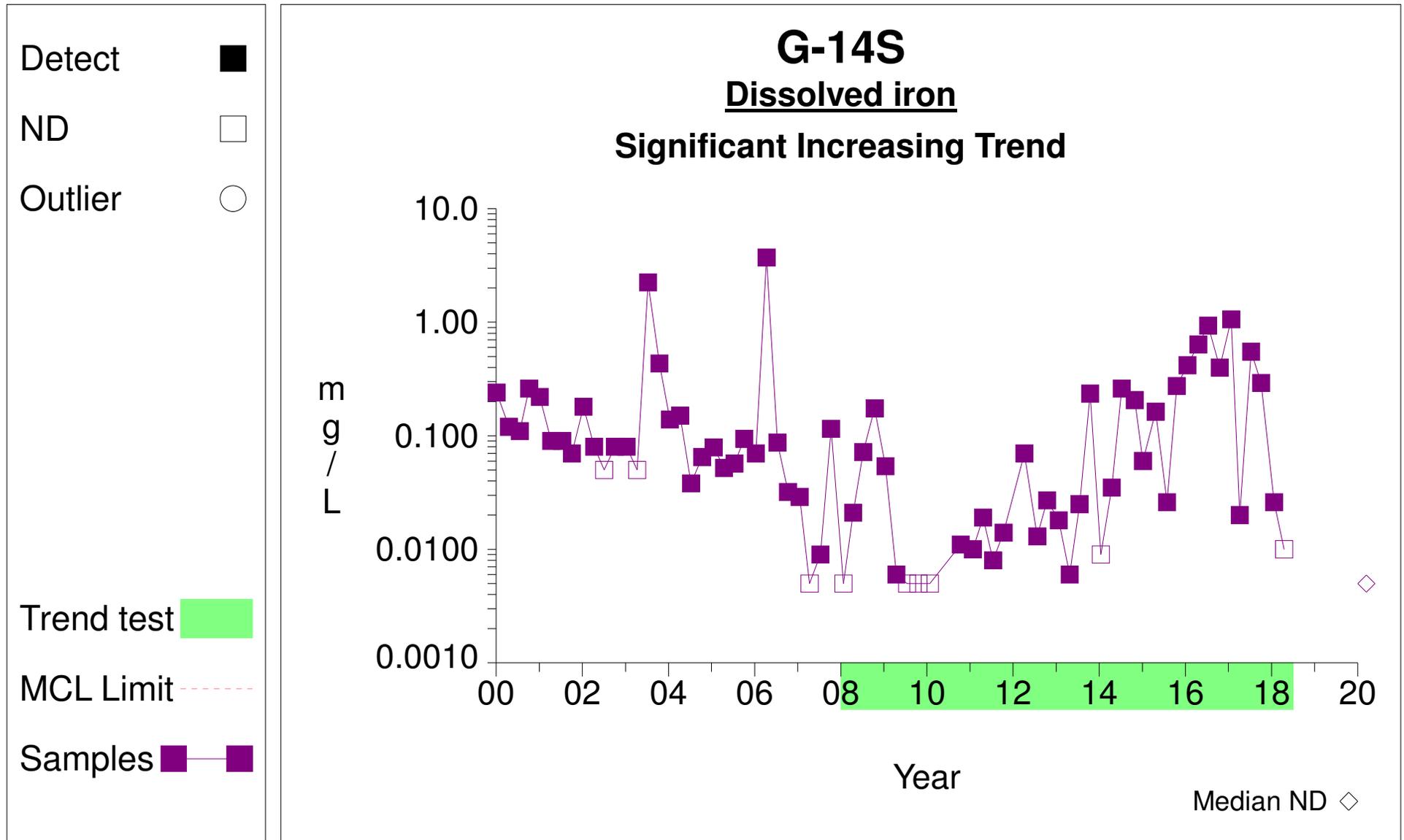
Graph 204

Time Series



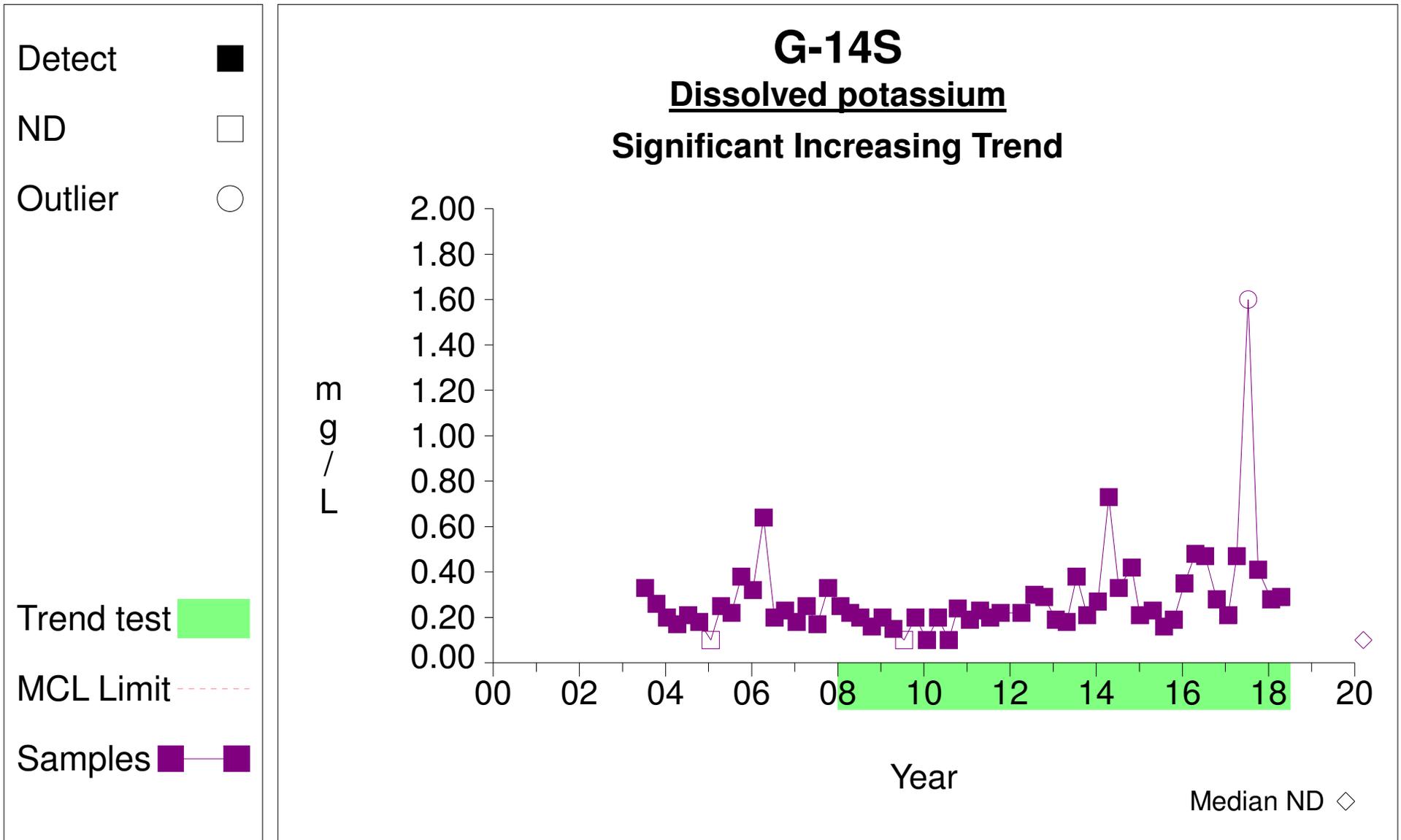
Graph 210

Time Series



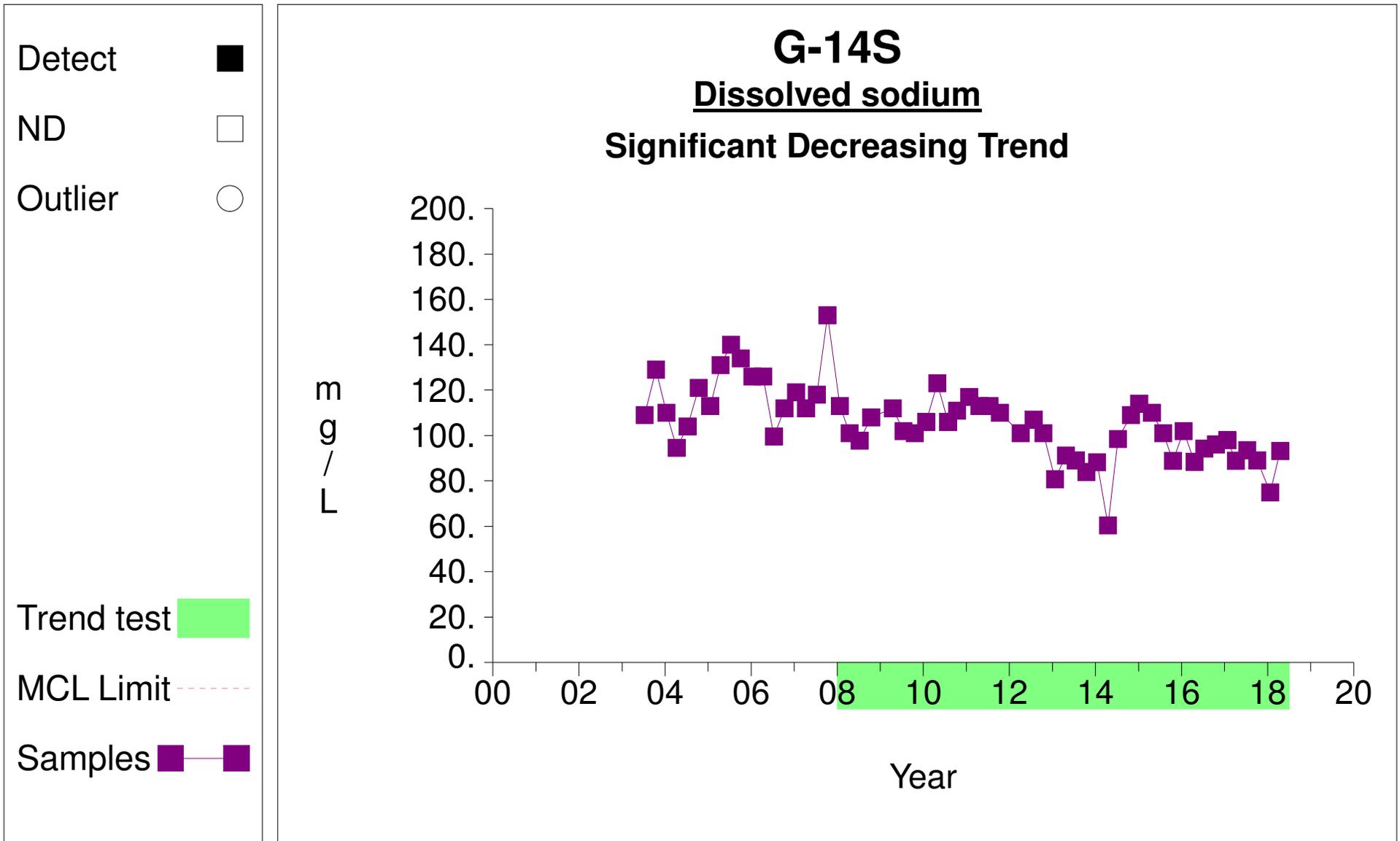
Graph 214

Time Series



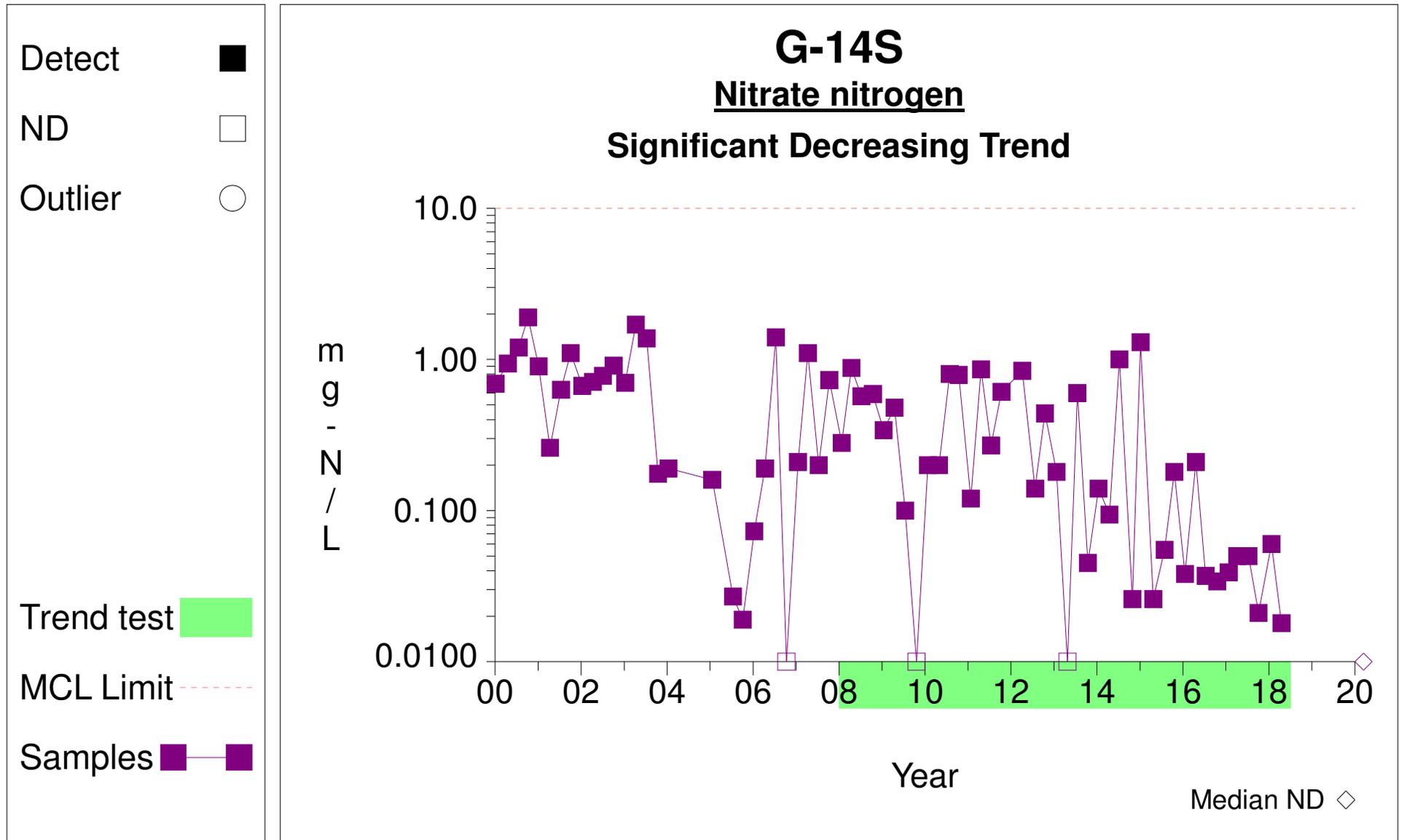
Graph 219

Time Series



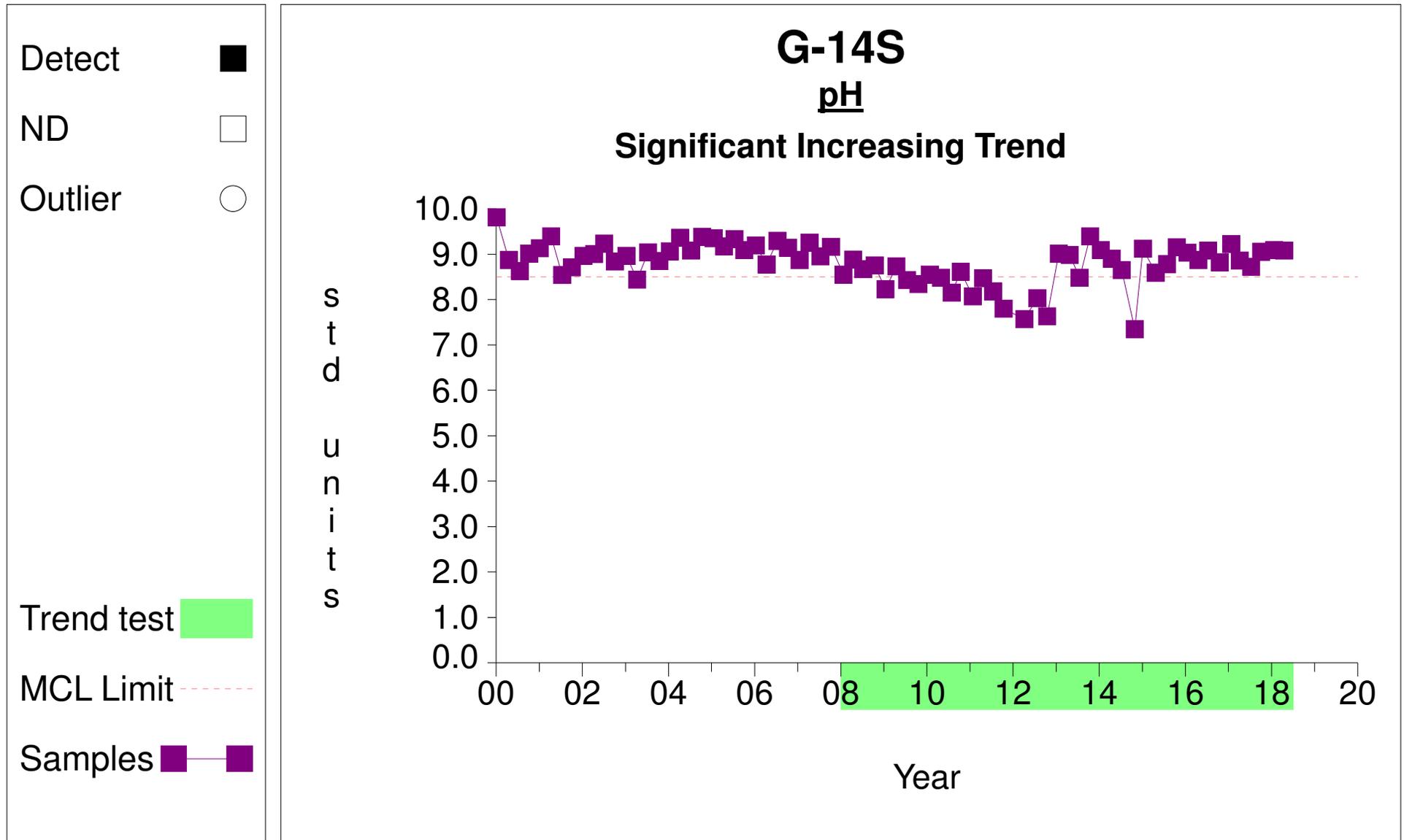
Graph 222

Time Series



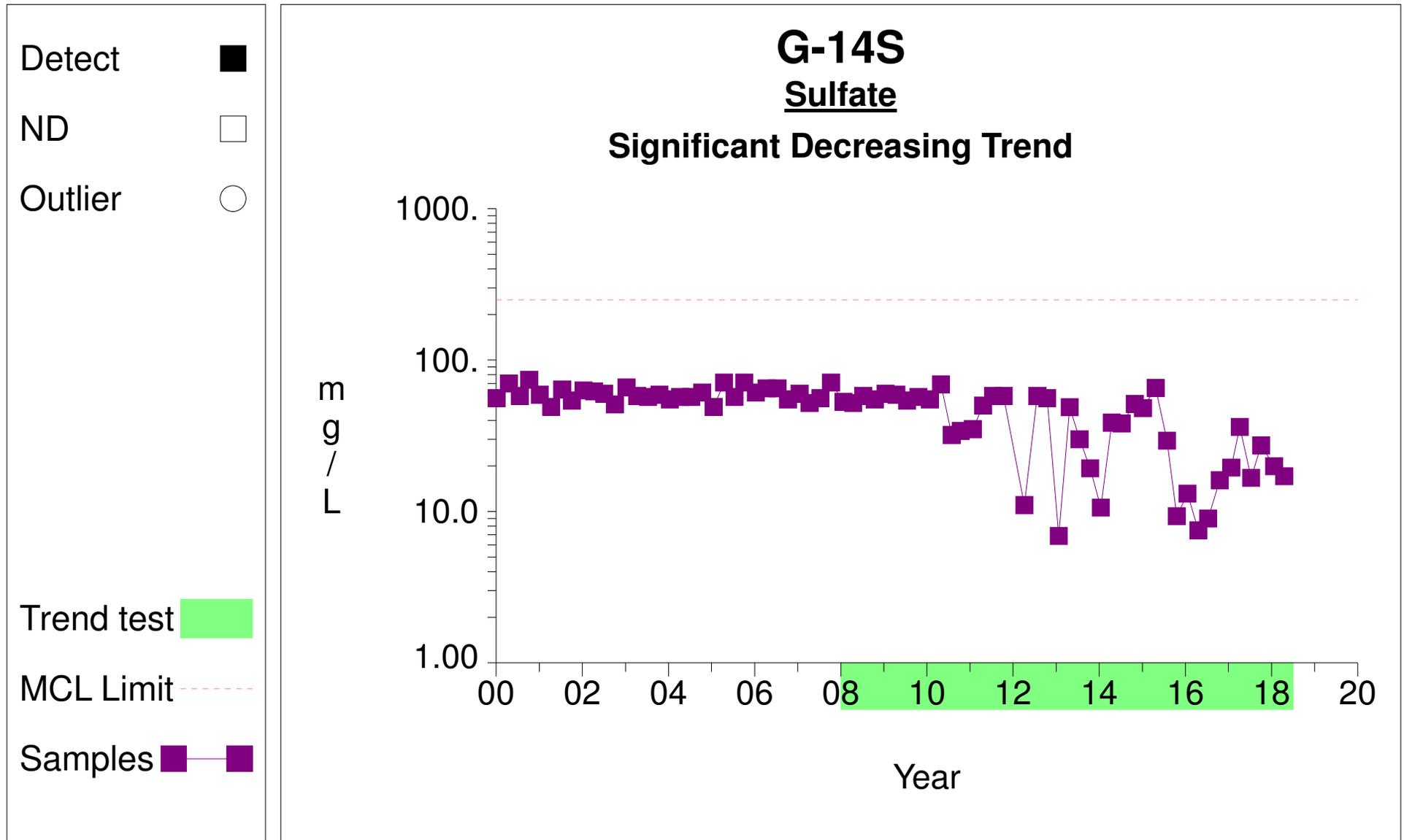
Graph 226

Time Series



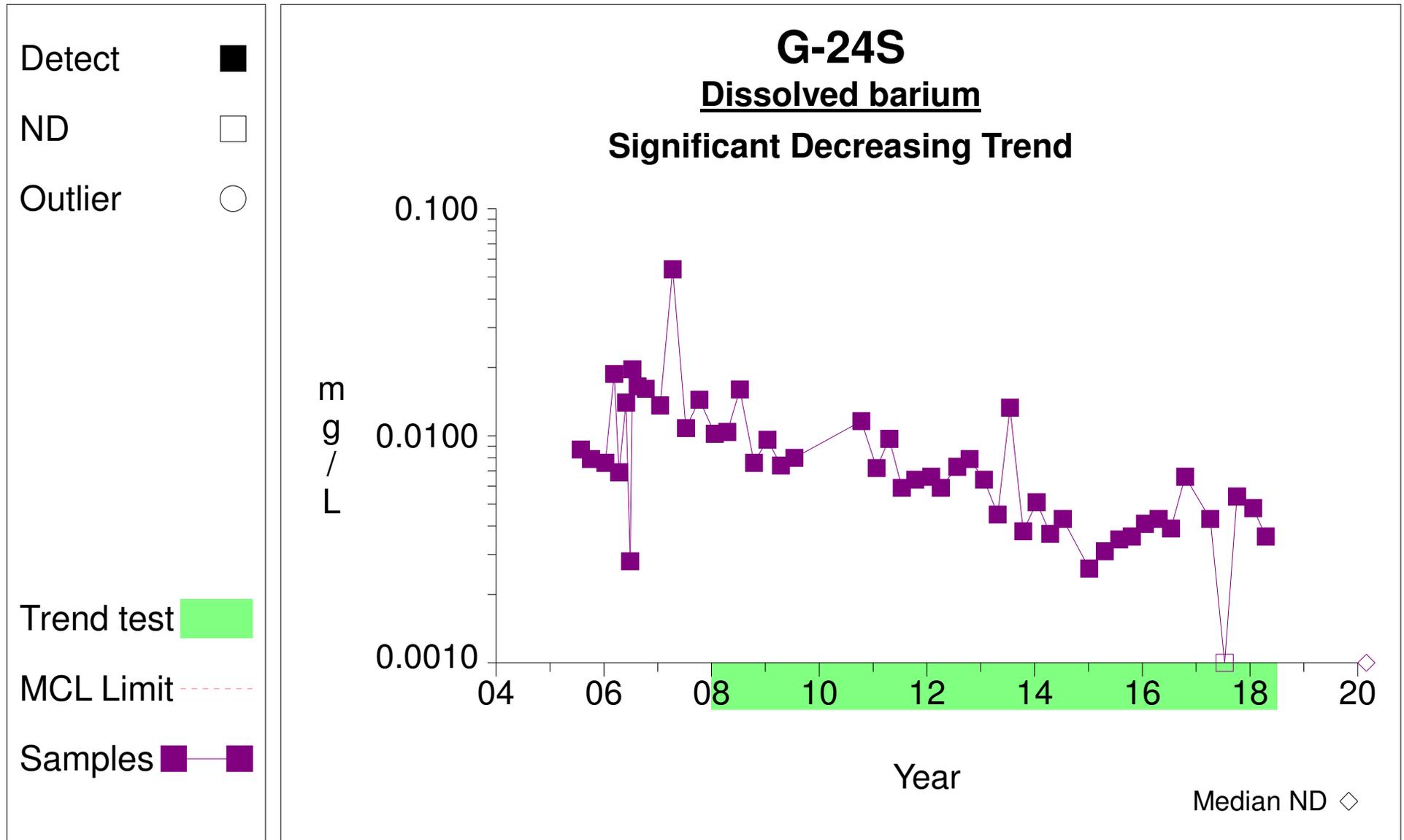
Graph 228

Time Series



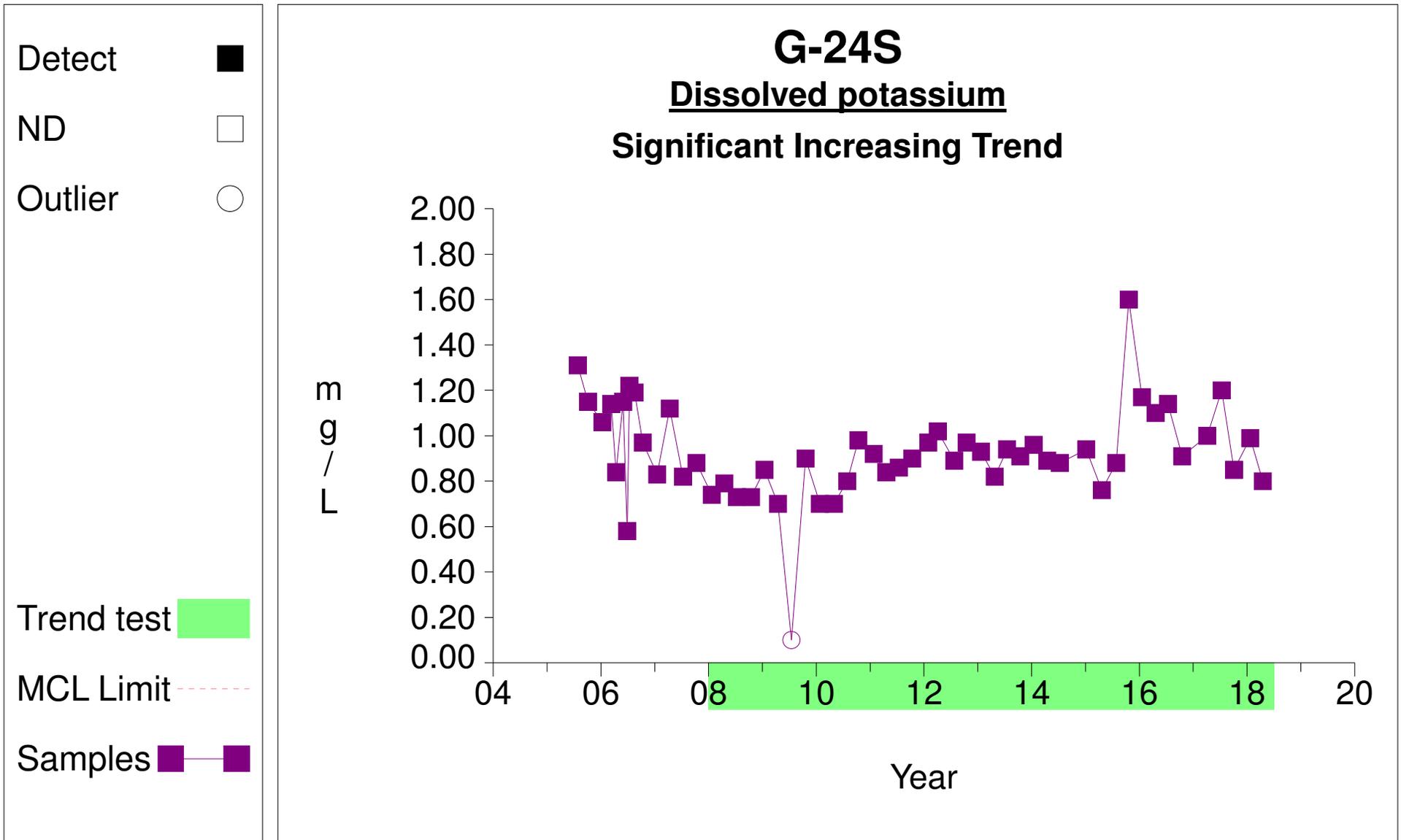
Graph 229

Time Series



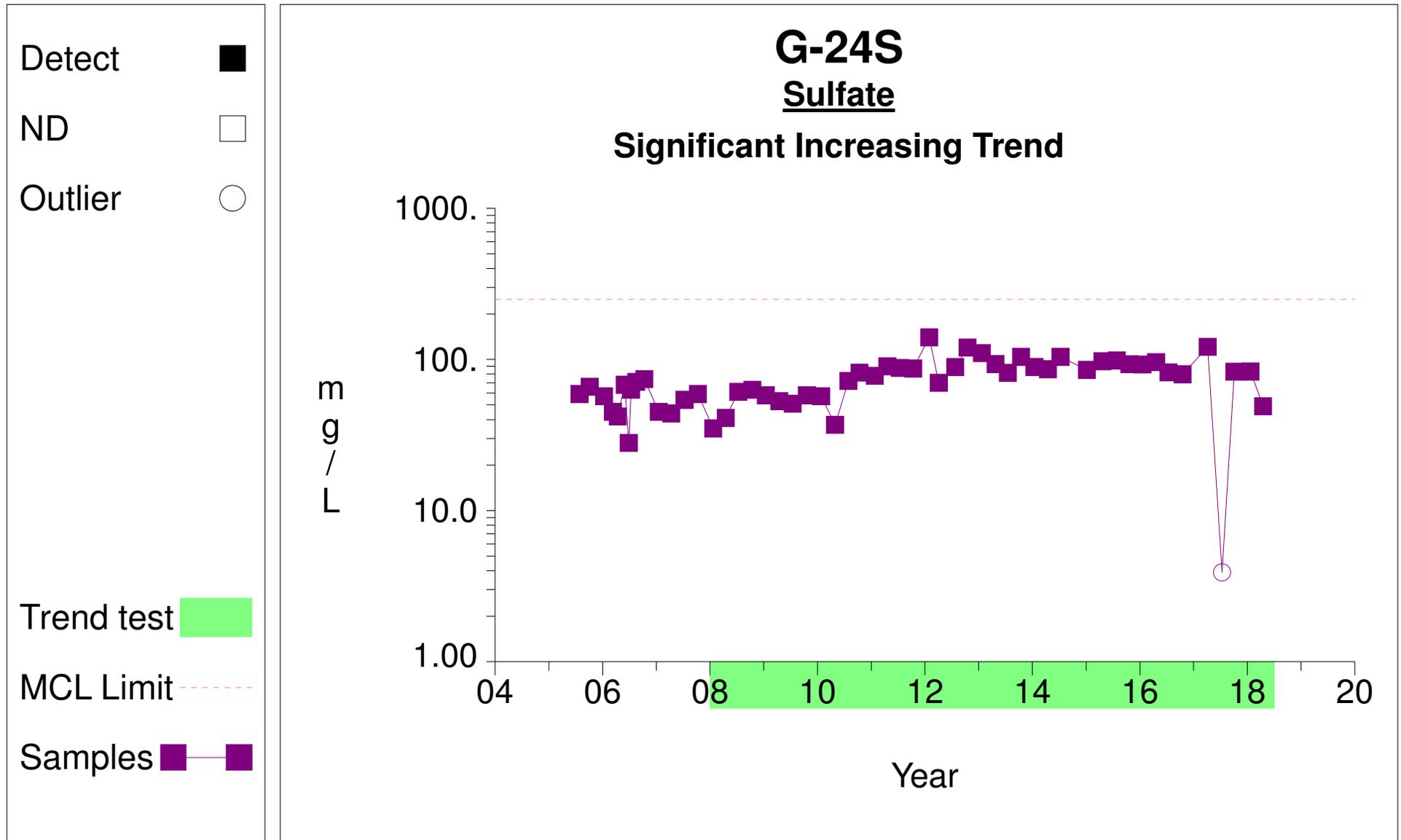
Graph 240

Time Series



Graph 252

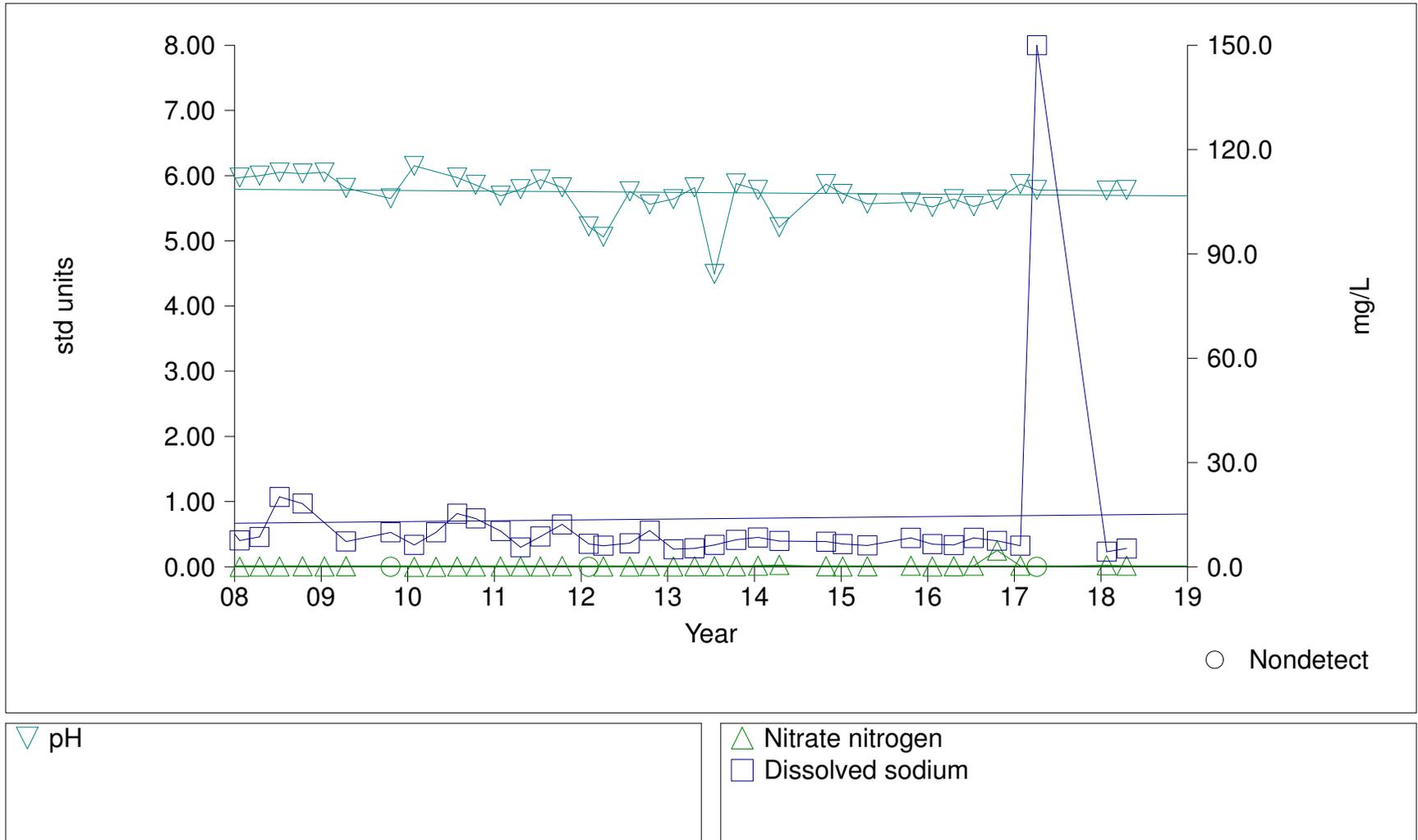
Time Series



Graph 262

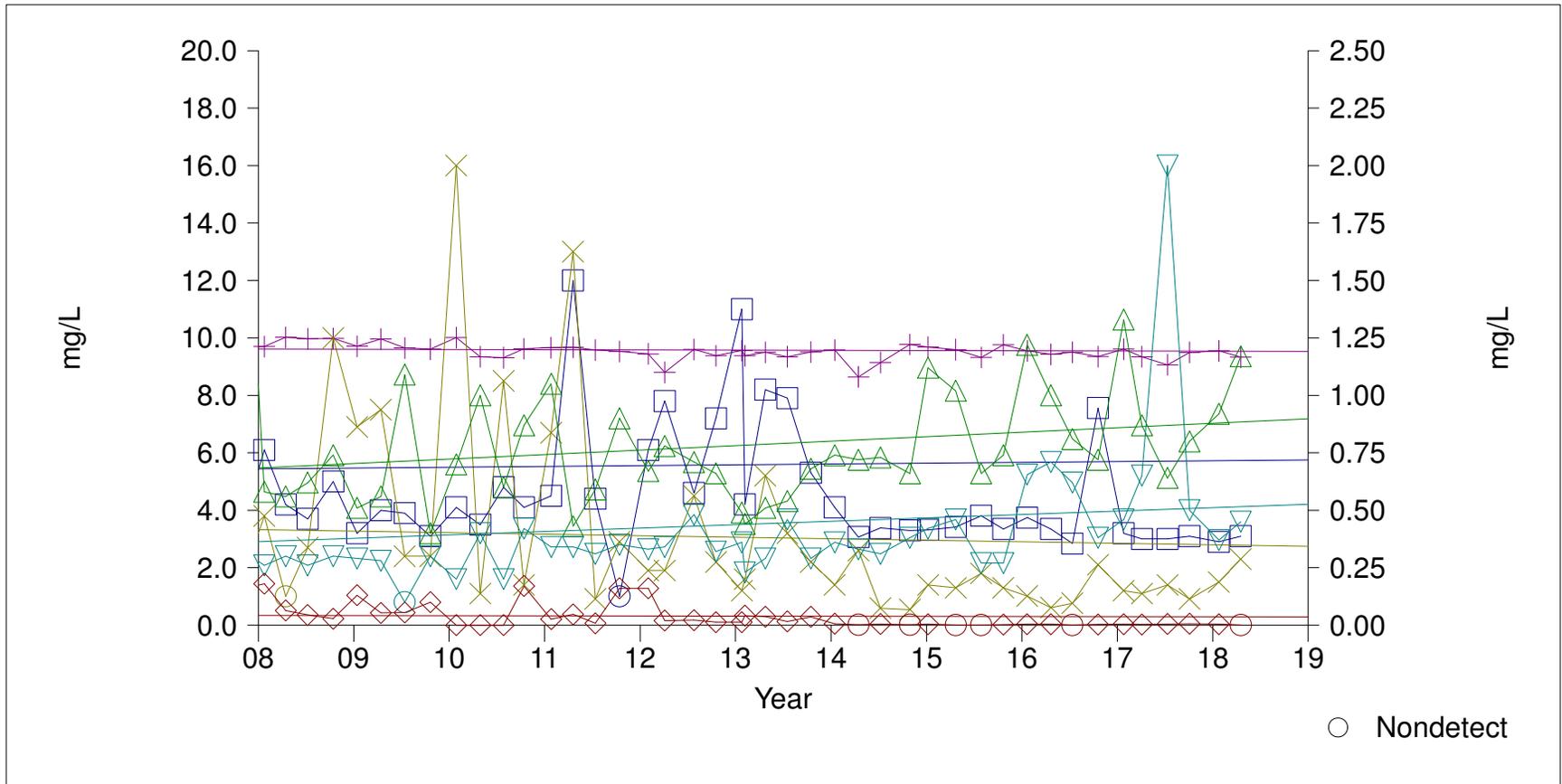
Cathcart Landfill [ccshal]

Time Series Plot for G-01A



Cathcart Landfill [ccshal]

Time Series Plot for G-08D1

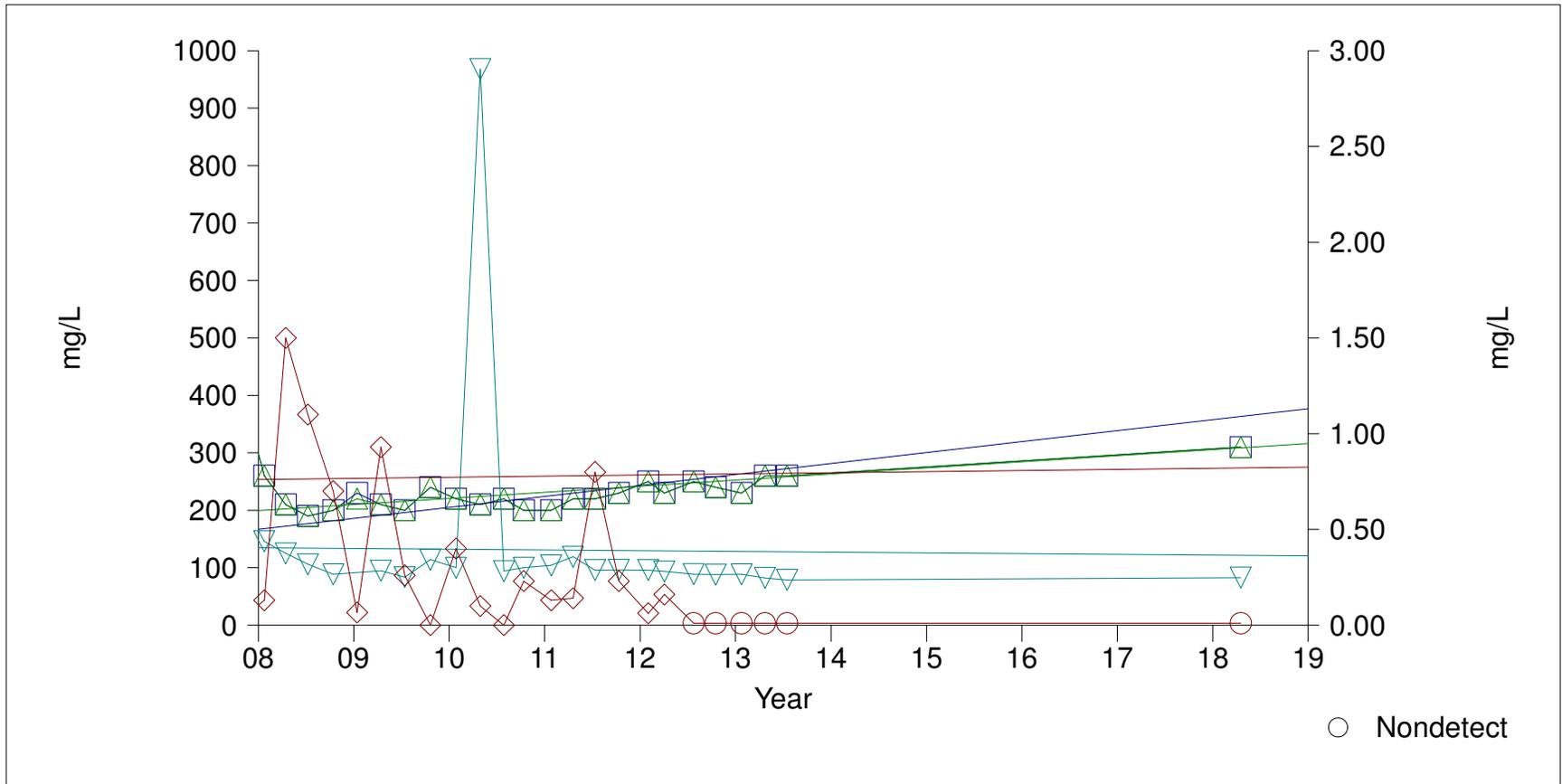


□ Chloride
+ pH
× Total organic carbon

△ Dissolved calcium
▽ Dissolved potassium
◇ Nitrite nitrogen
○ Nondetect

Cathcart Landfill [ccshal]

Time Series Plot for G-09S



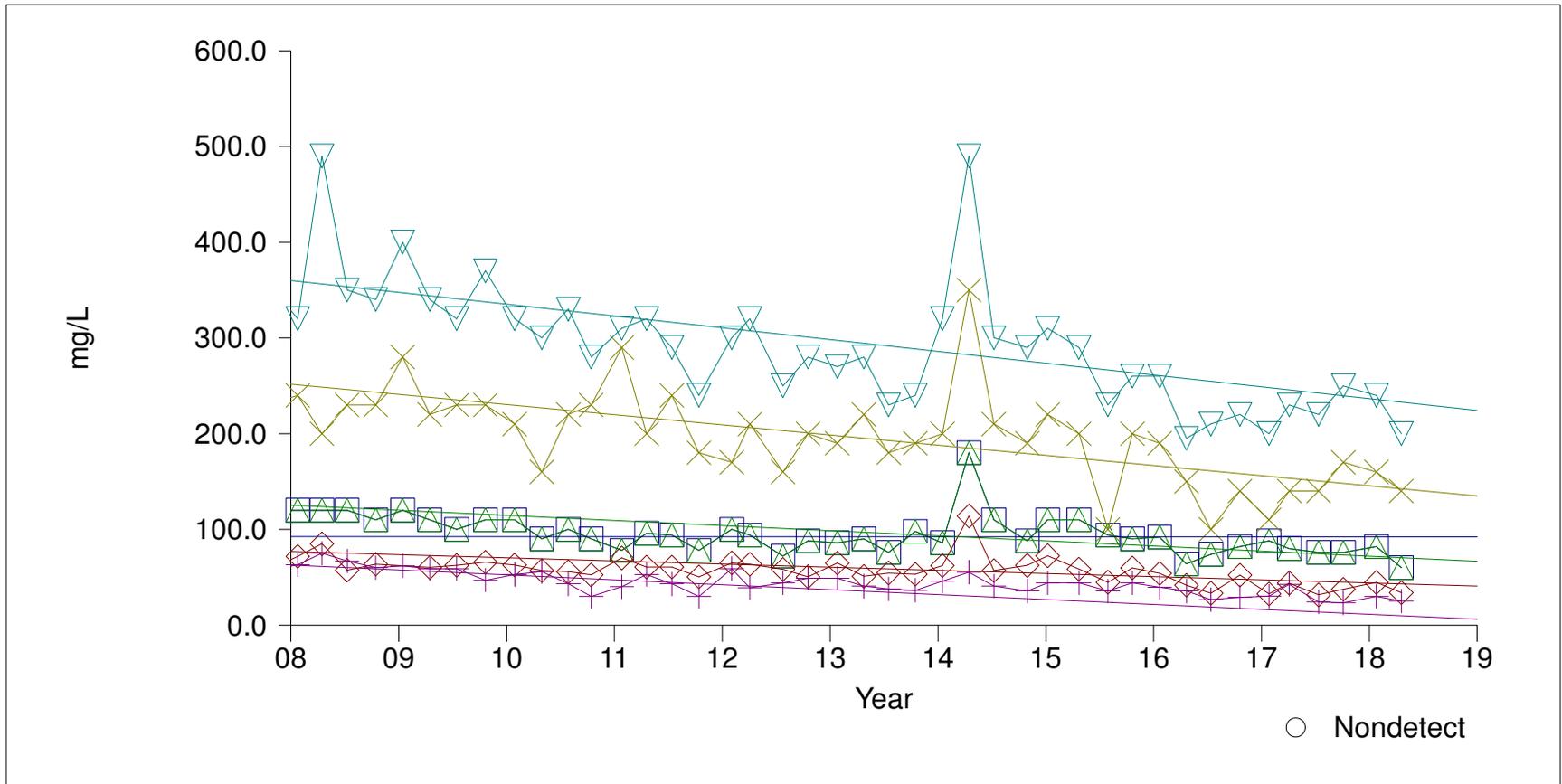
□ Alkalinity (as cacO3)
△ Bicarbonate
▽ Dissolved sodium

◇ Nitrate nitrogen

○ Nondetect

Cathcart Landfill [ccshal]

Time Series Plot for G-11S



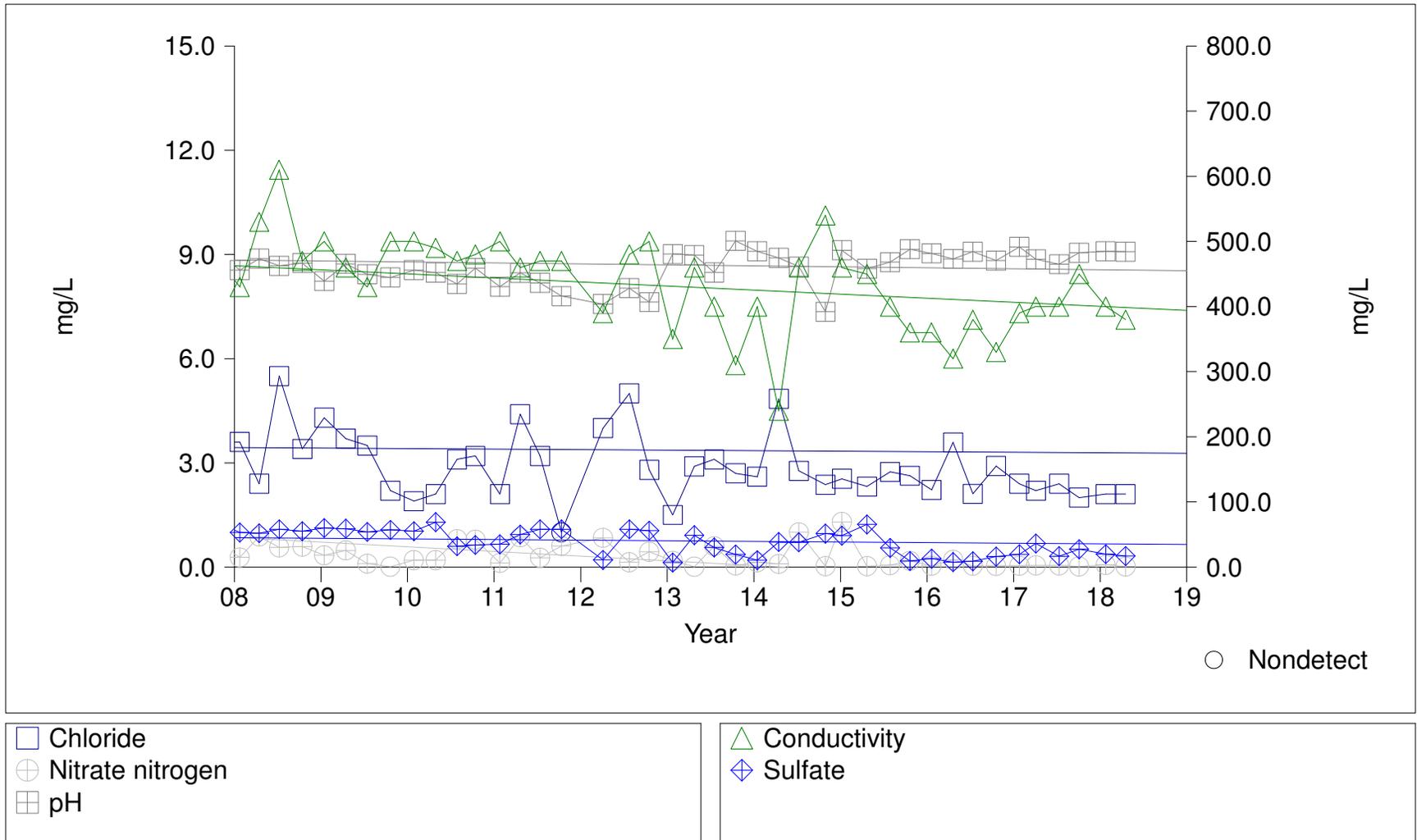
○ Nondetect

□ Alkalinity (as cacO3)
△ Bicarbonate
▽ Conductivity

◇ Dissolved sodium
+ Sulfate
× Total dissolved solids

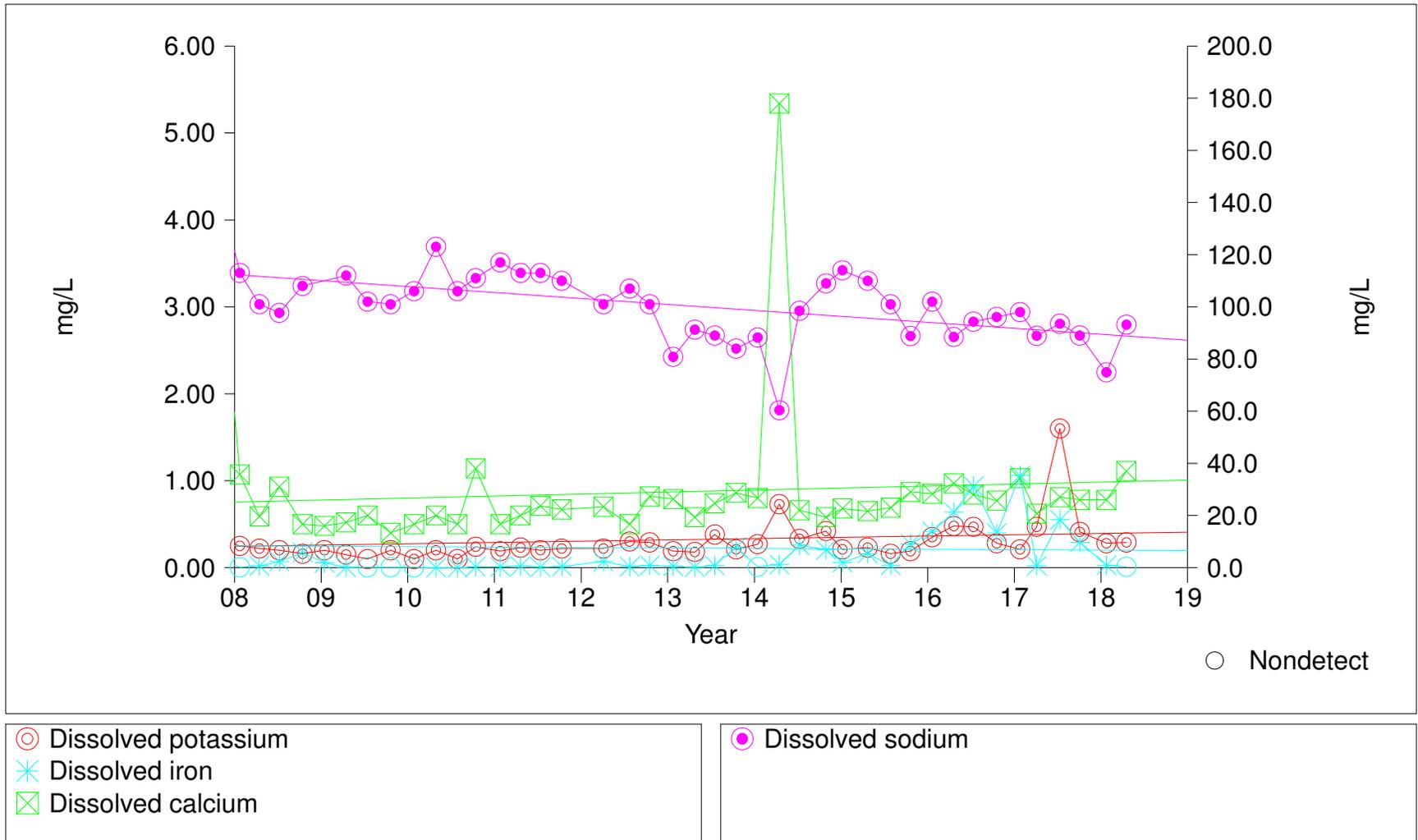
Cathcart Landfill [ccshal]

Time Series Plot for G-14S



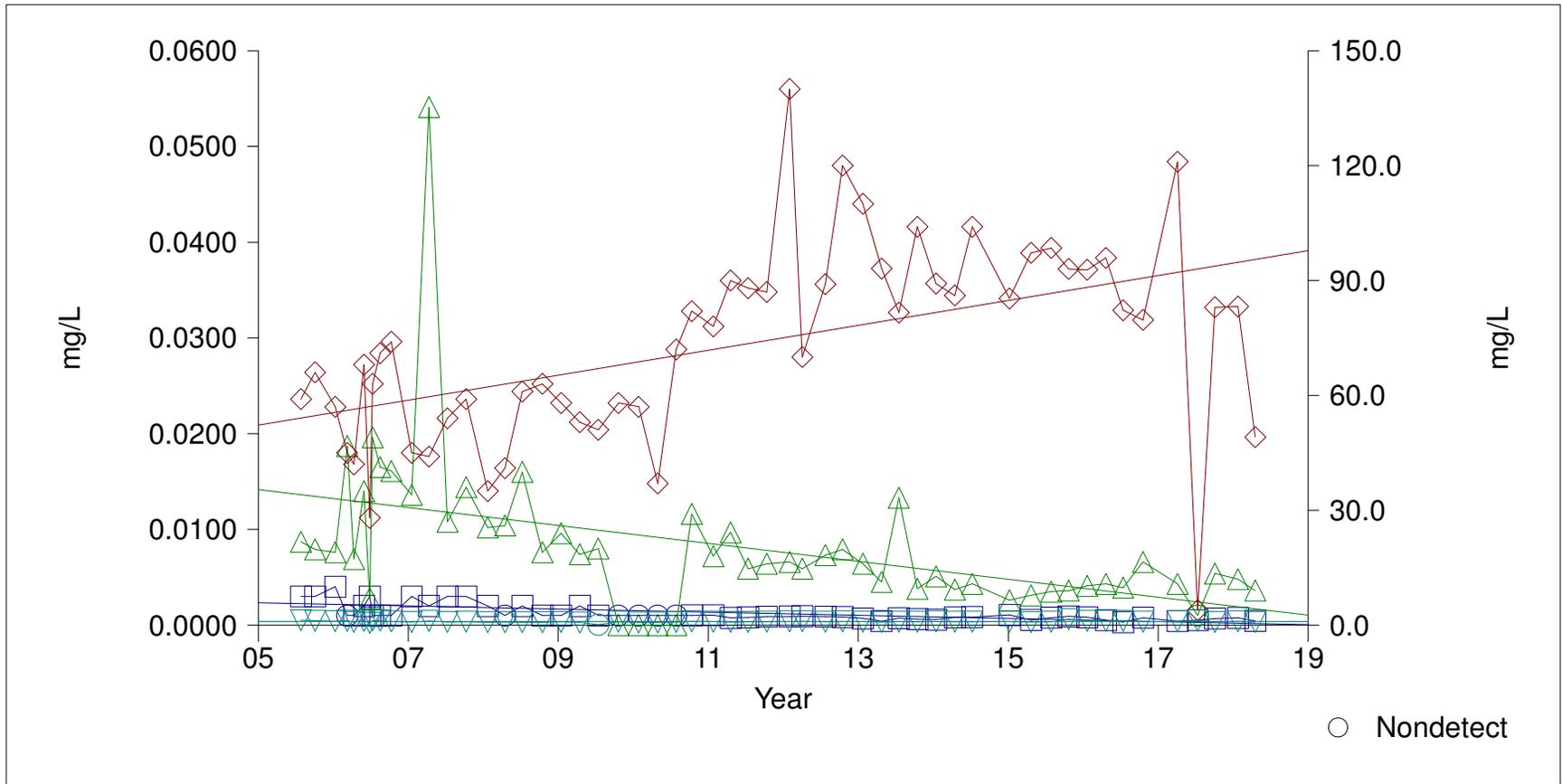
Cathcart Landfill [ccshal]

Time Series Plot for G-14S



Cathcart Landfill [ccshal]

Time Series Plot for G-24S

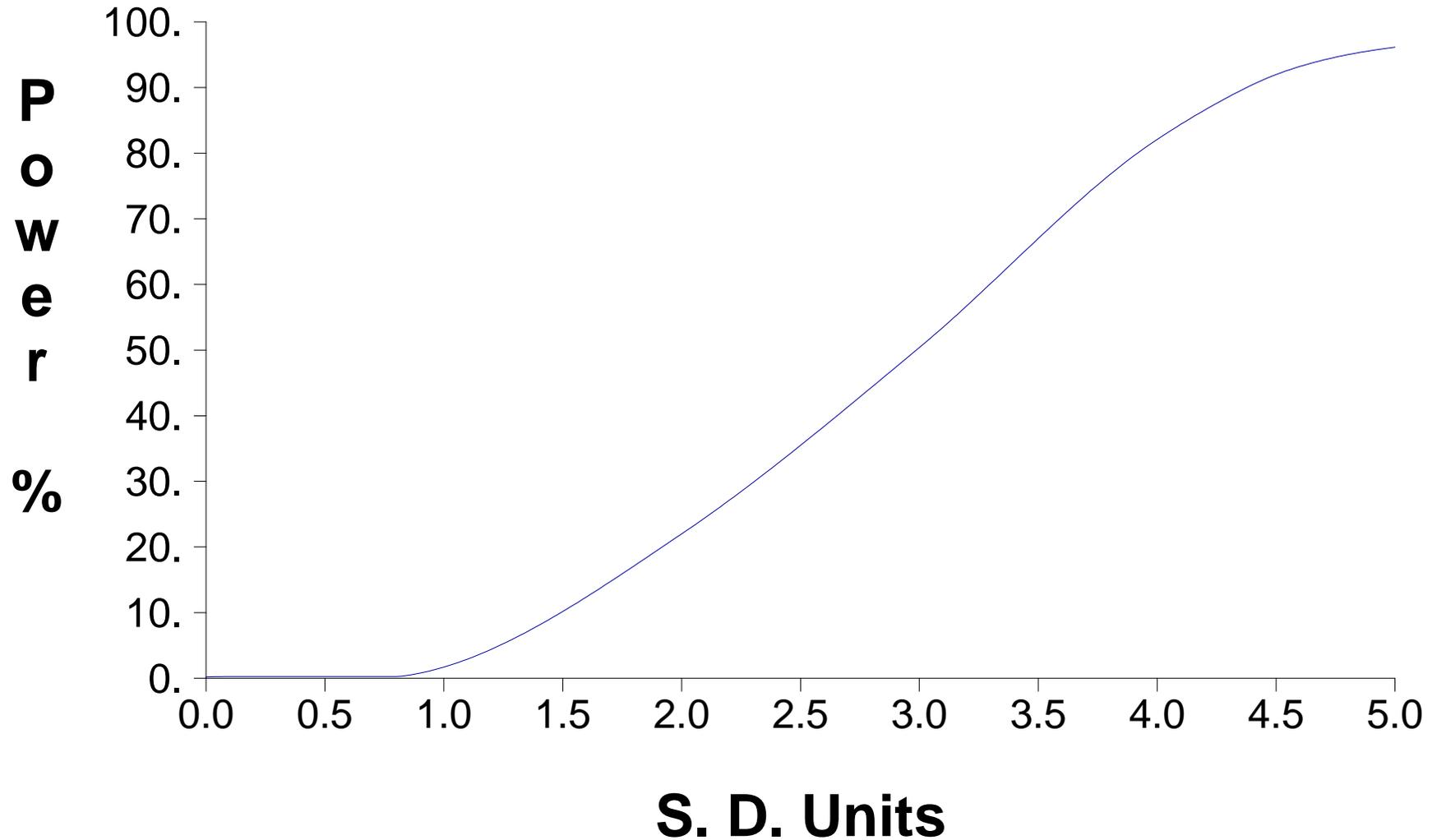


□ Dissolved arsenic
△ Dissolved barium

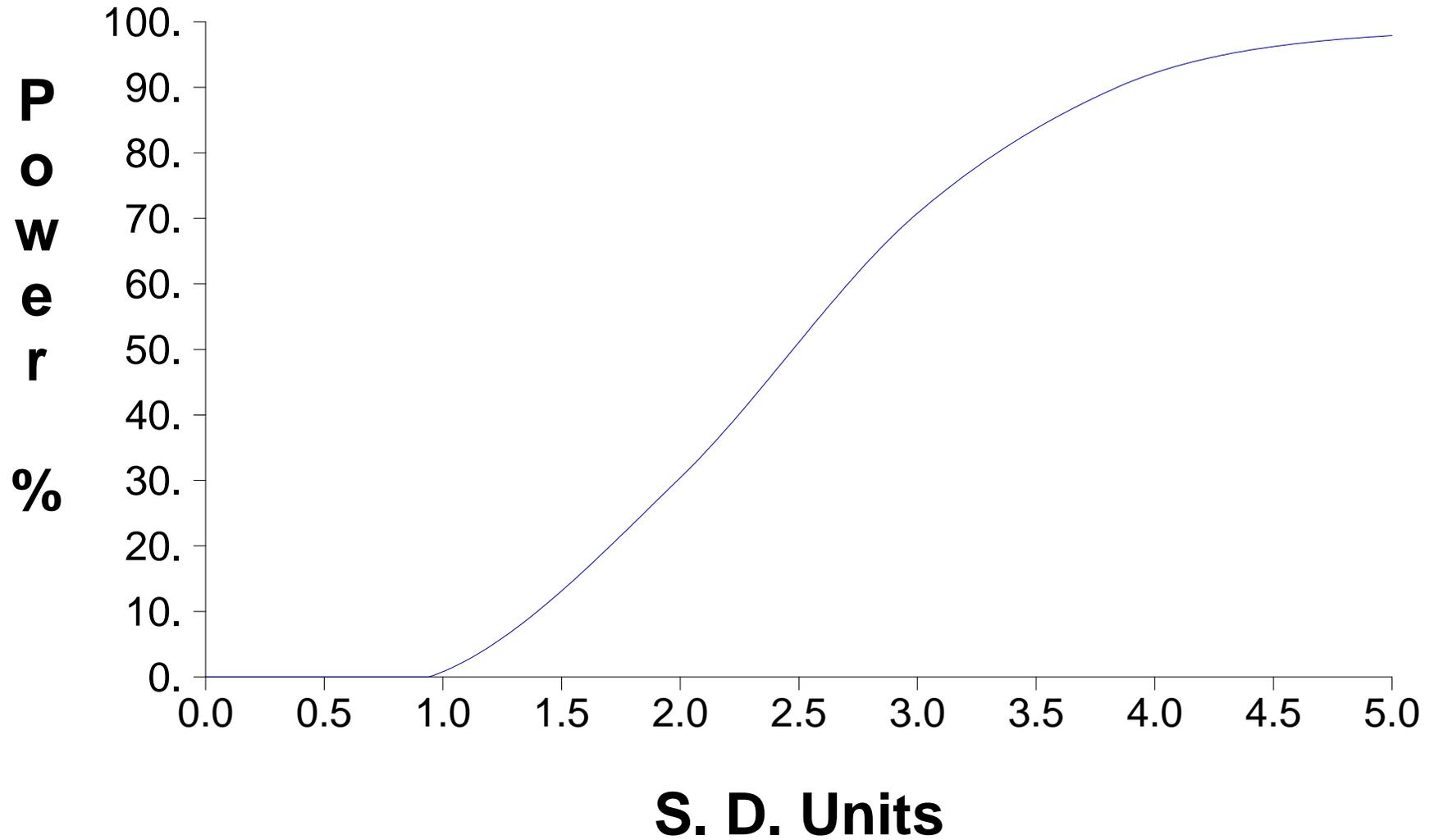
◇ Sulfate
▽ Dissolved potassium

○ Nondetect

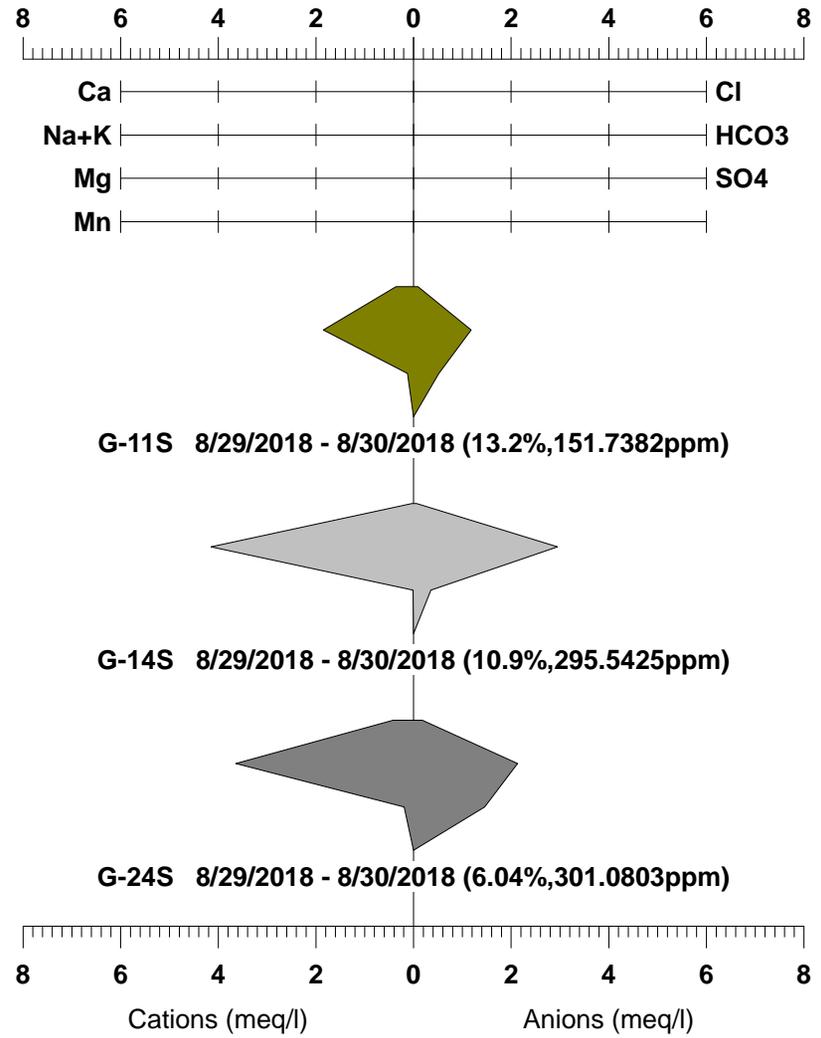
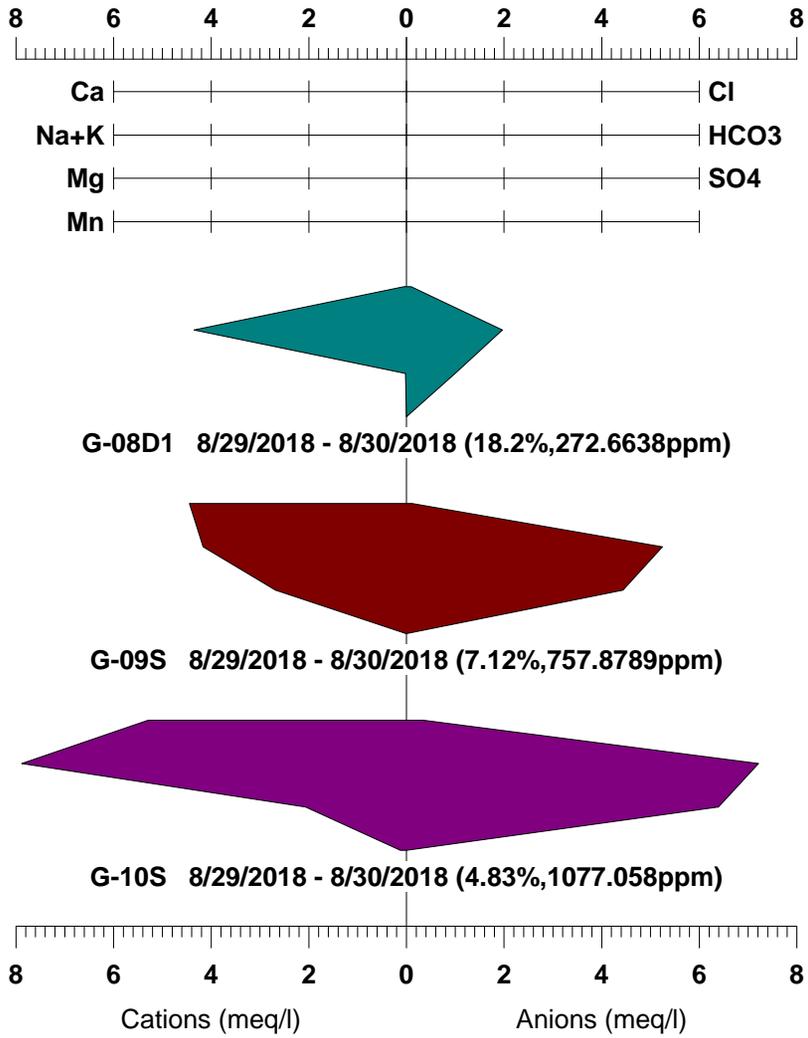
False Positive and False Negative Rates for Current Intra-Well Prediction Limits Monitoring Program



False Positive and False Negative Rates for Current Upgradient vs. Downgradient Monitoring Program

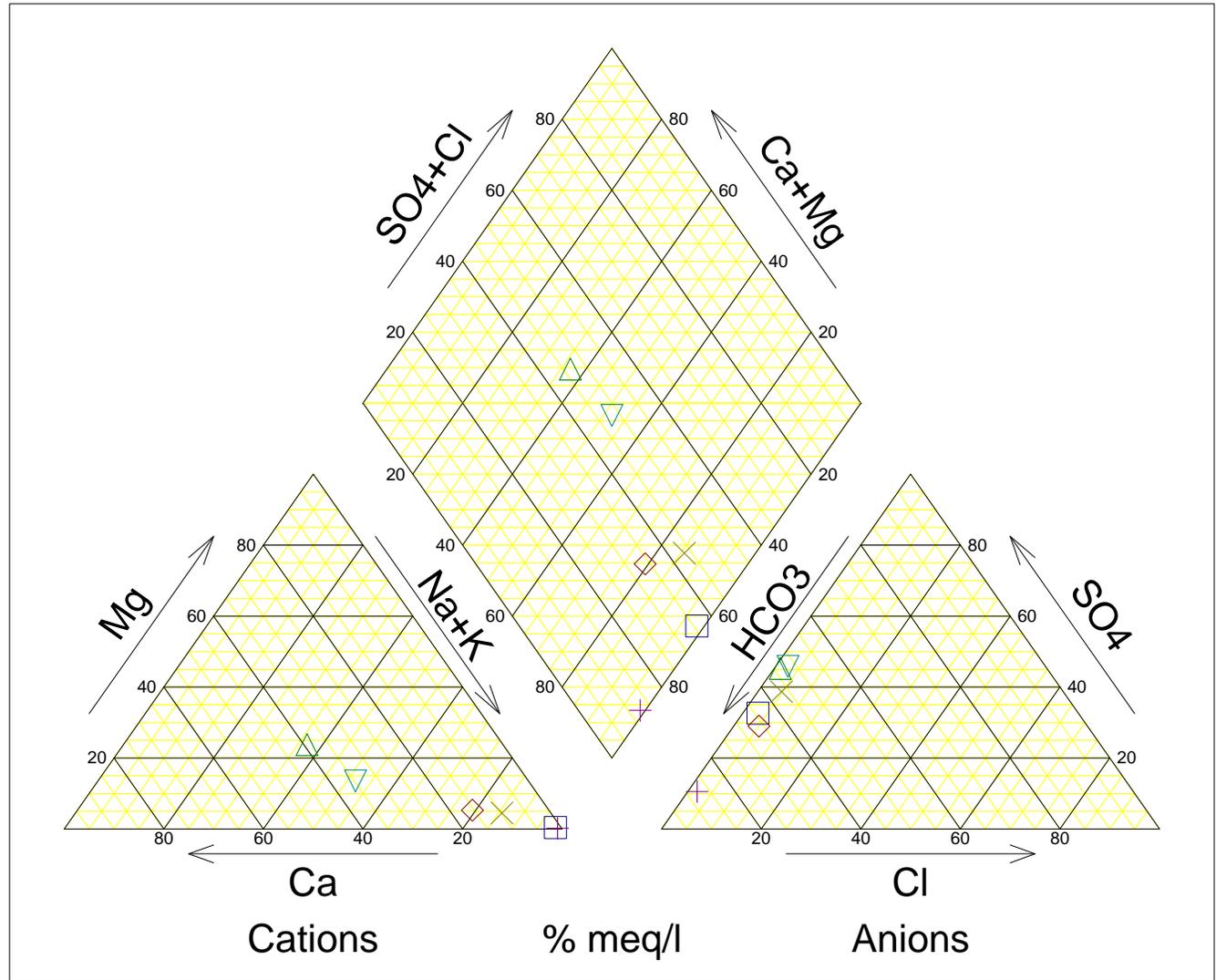


Cathcart Landfill

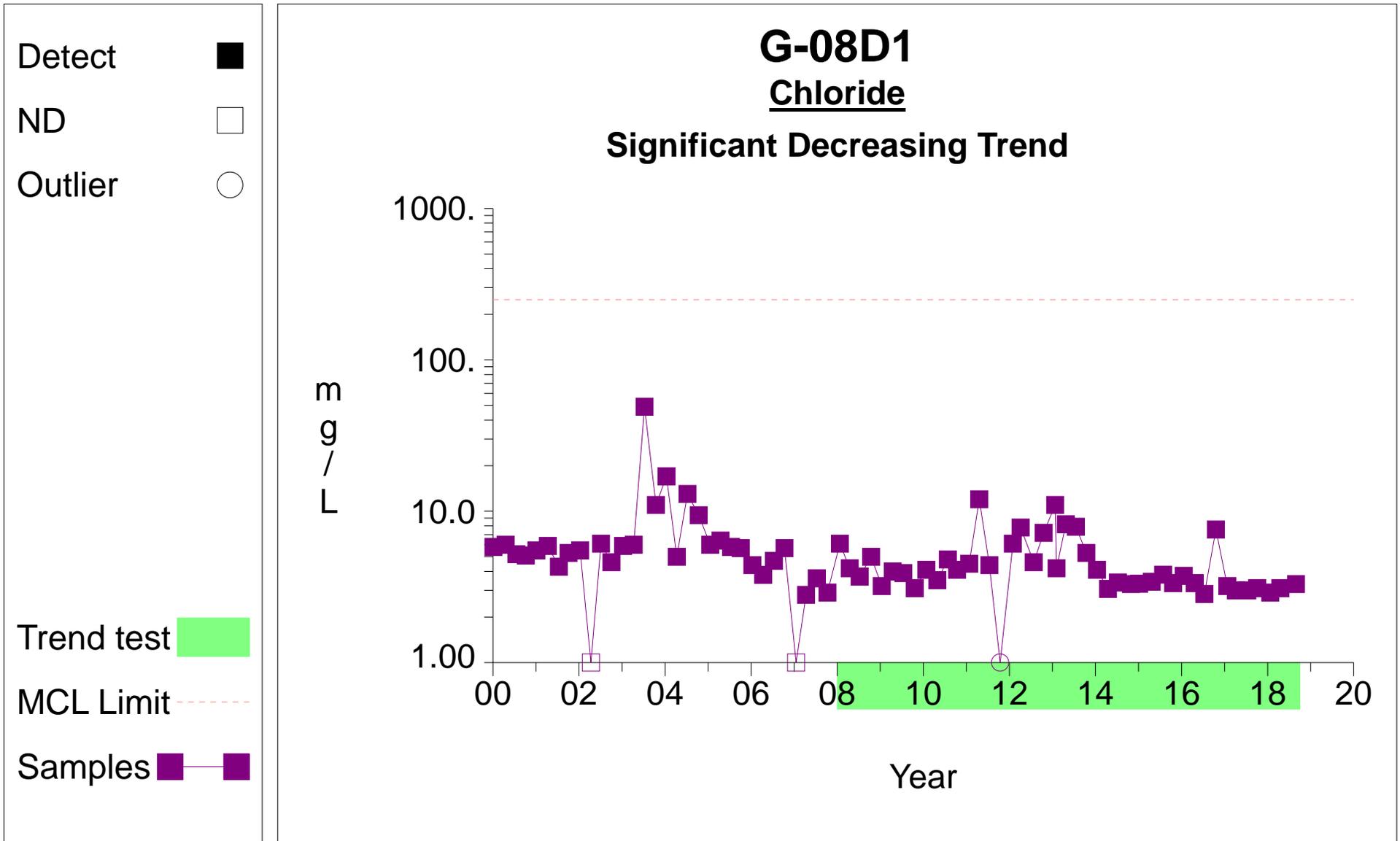


Cathcart Landfill

□ G-08D1	8/29/2018 - 8/30/2018 (18.2%, 272.65ppm)
△ G-09S	8/29/2018 - 8/30/2018 (7.09%, 757.71ppm)
▽ G-10S	8/29/2018 - 8/30/2018 (4.43%, 1073.63ppm)
◇ G-11S	8/29/2018 - 8/30/2018 (13.2%, 151.73ppm)
⊕ G-14S	8/29/2018 - 8/30/2018 (10.9%, 295.54ppm)
× G-24S	8/29/2018 - 8/30/2018 (6.04%, 301.07ppm)

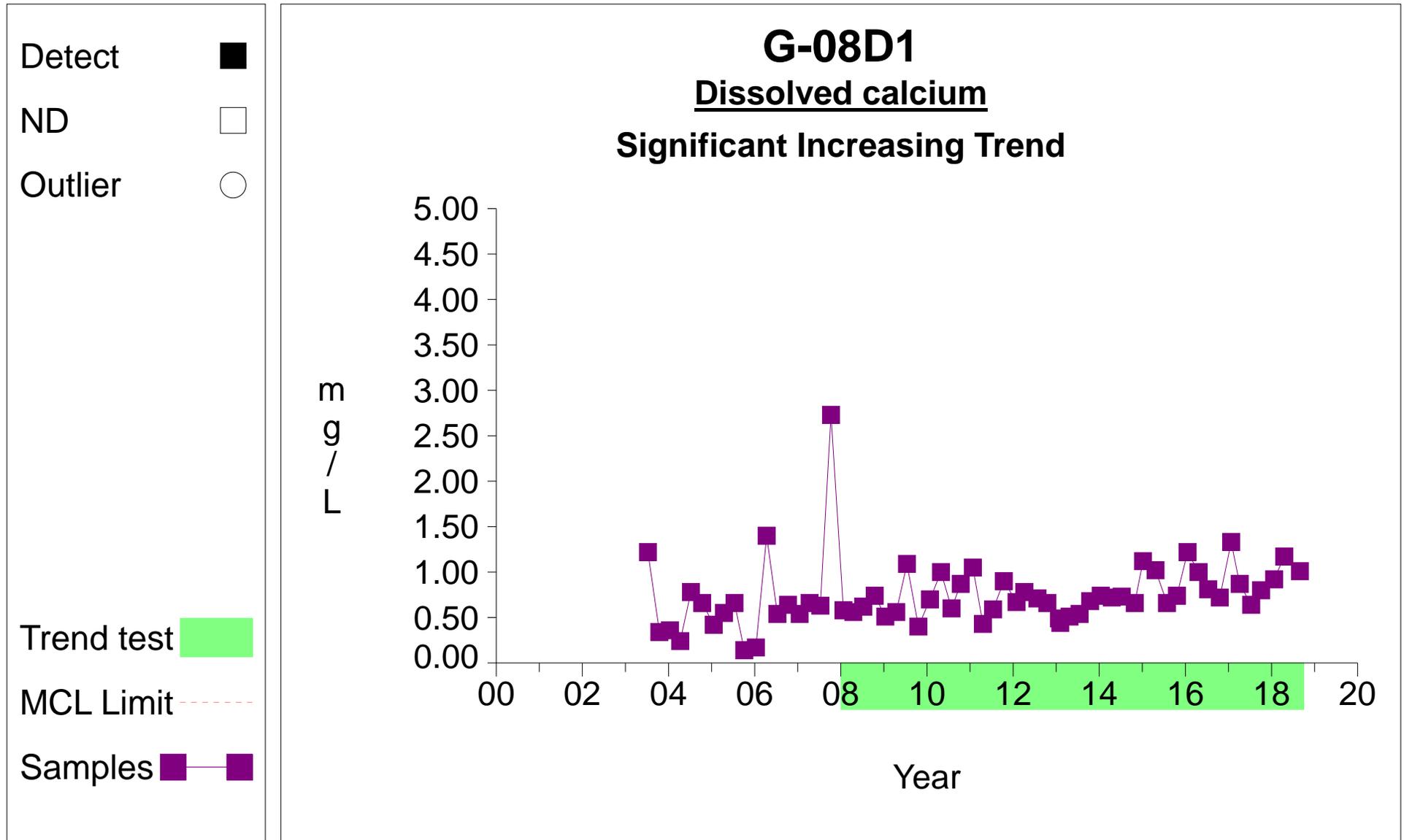


Time Series



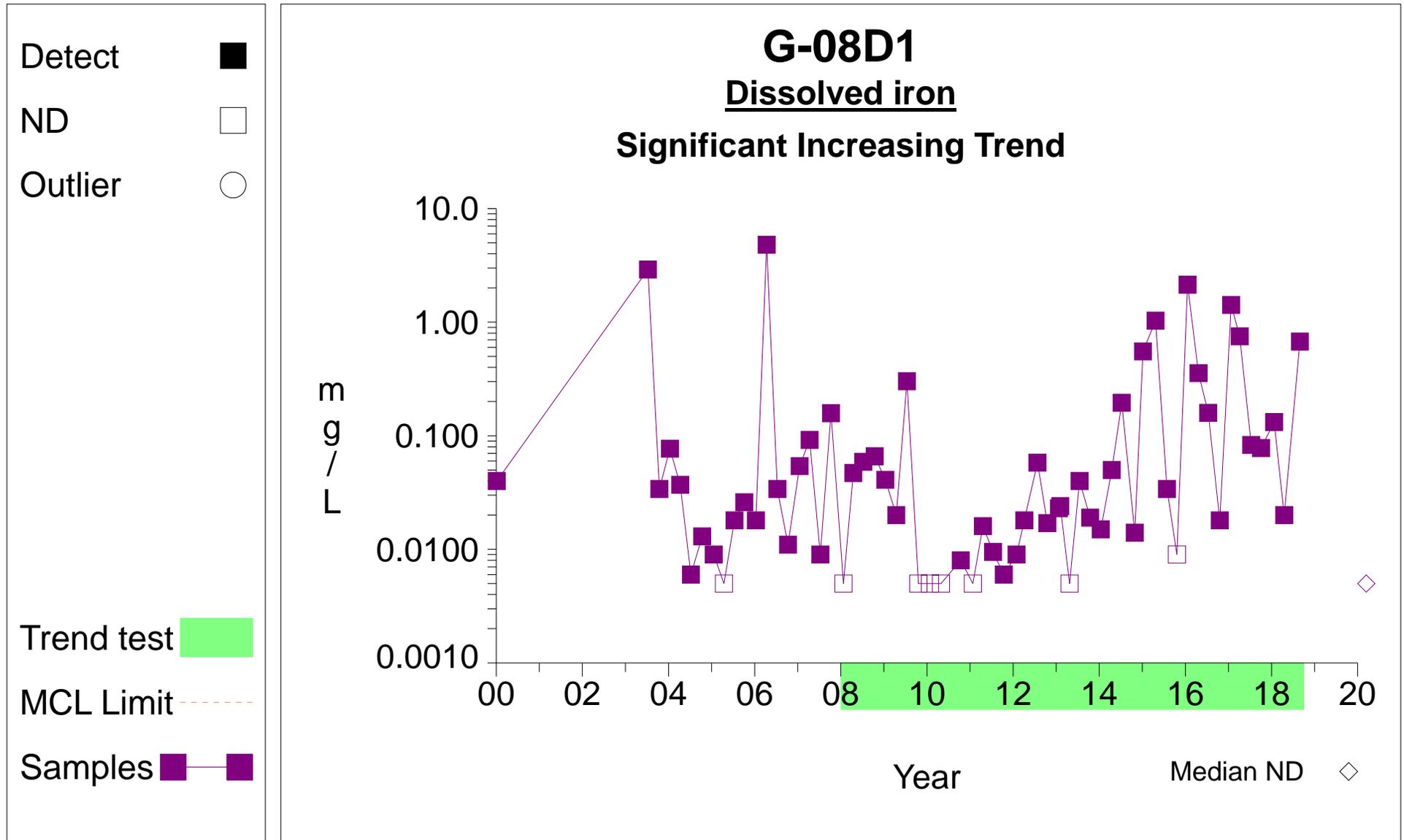
Graph 71

Time Series



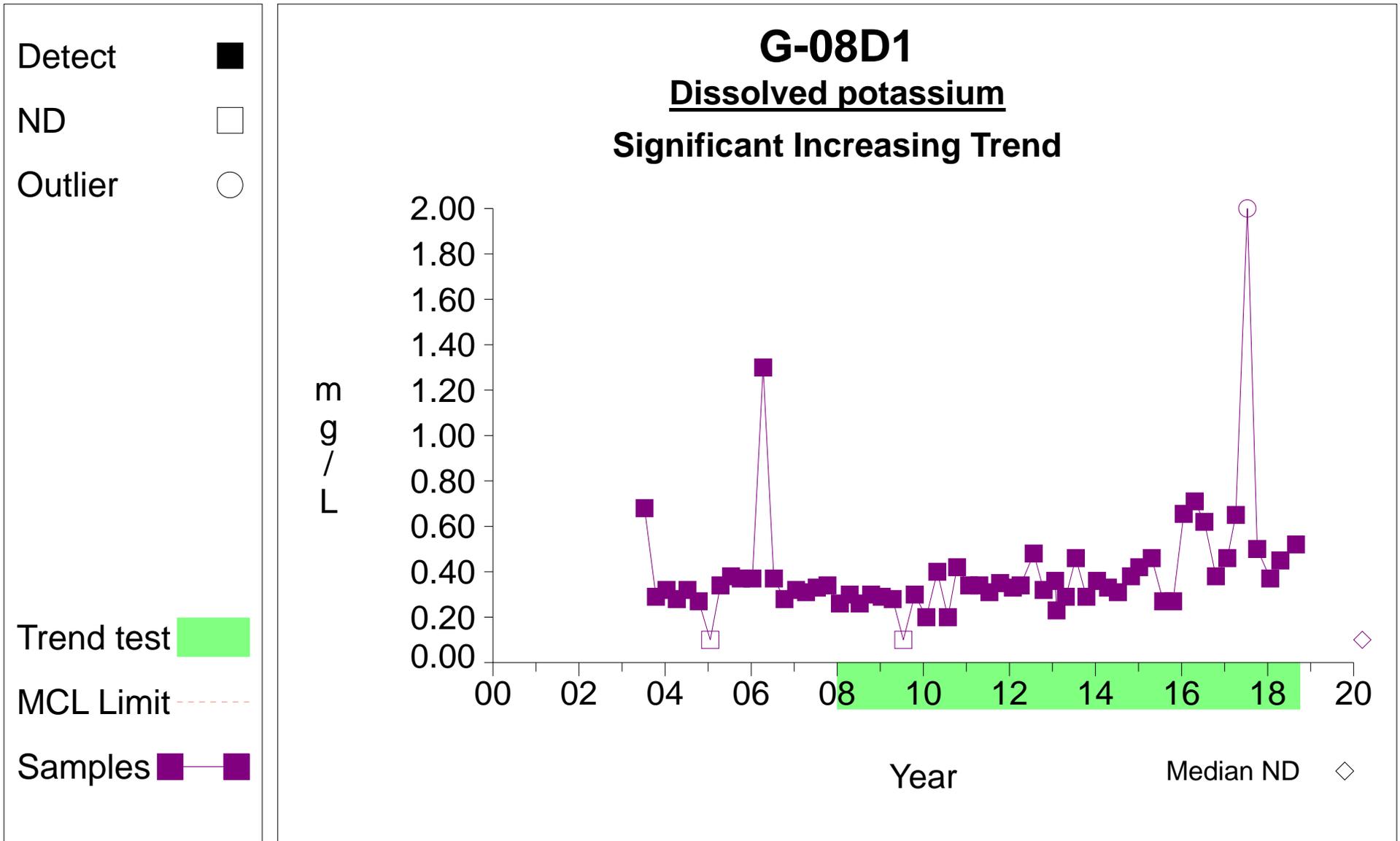
Graph 78

Time Series



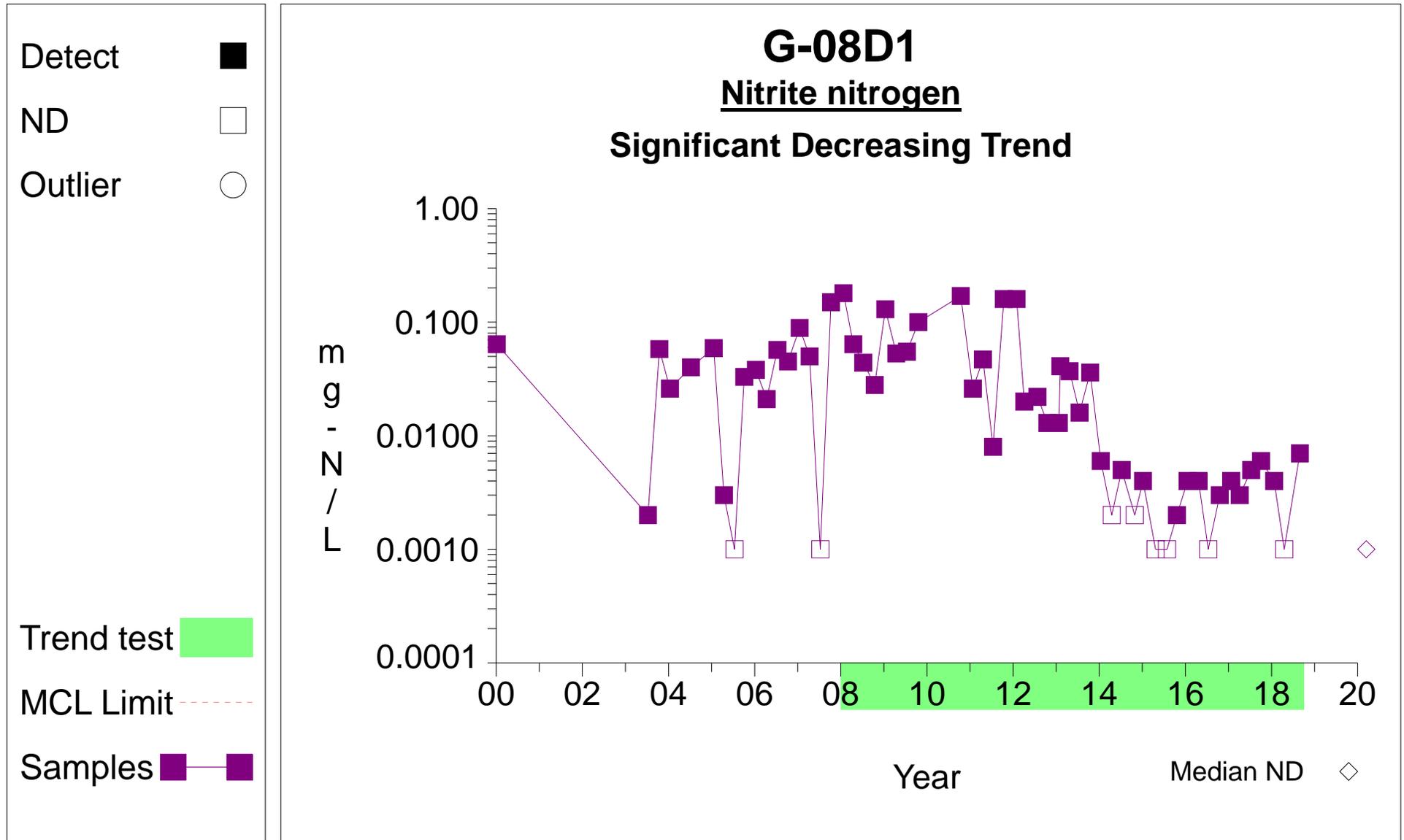
Graph 82

Time Series



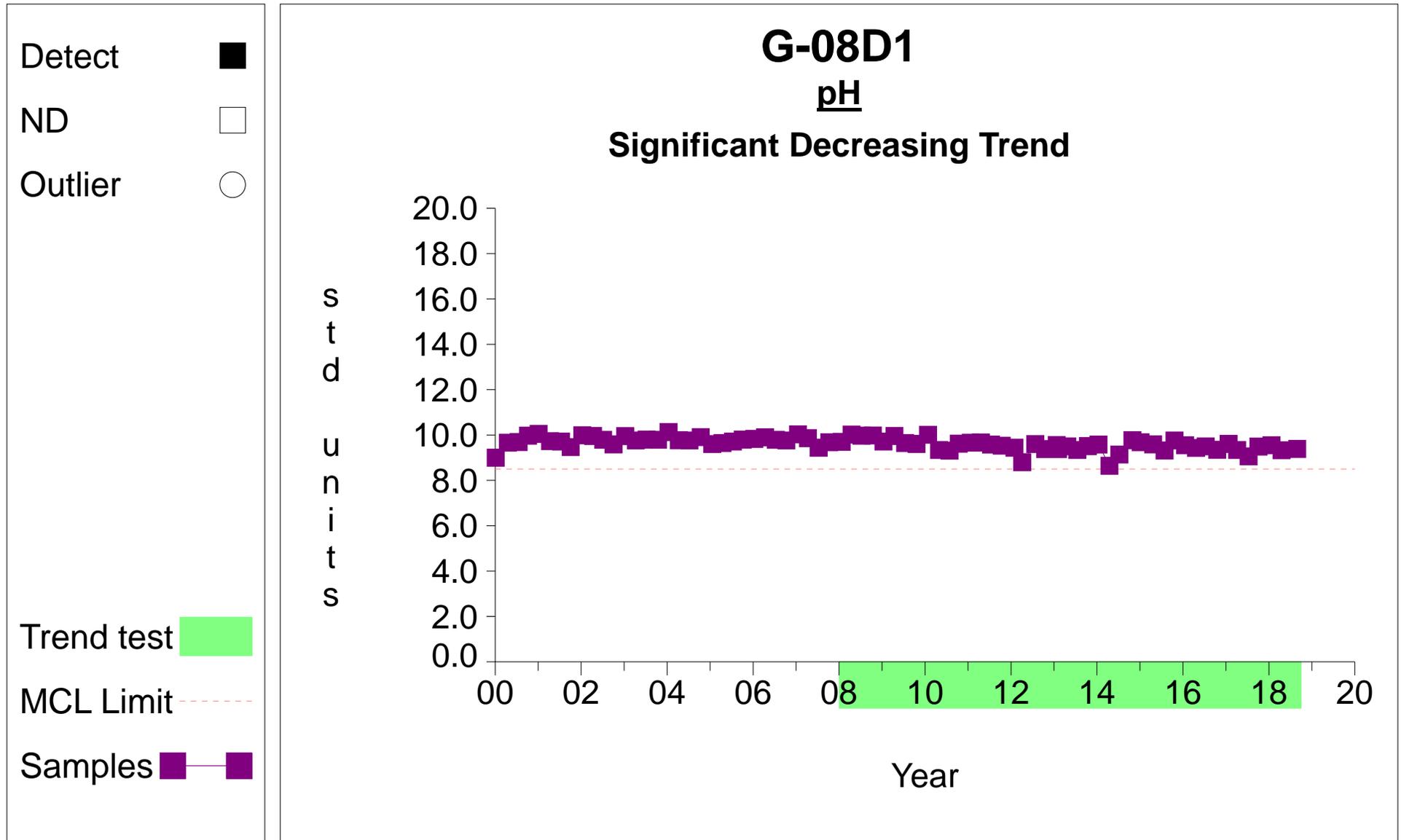
Graph 87

Time Series



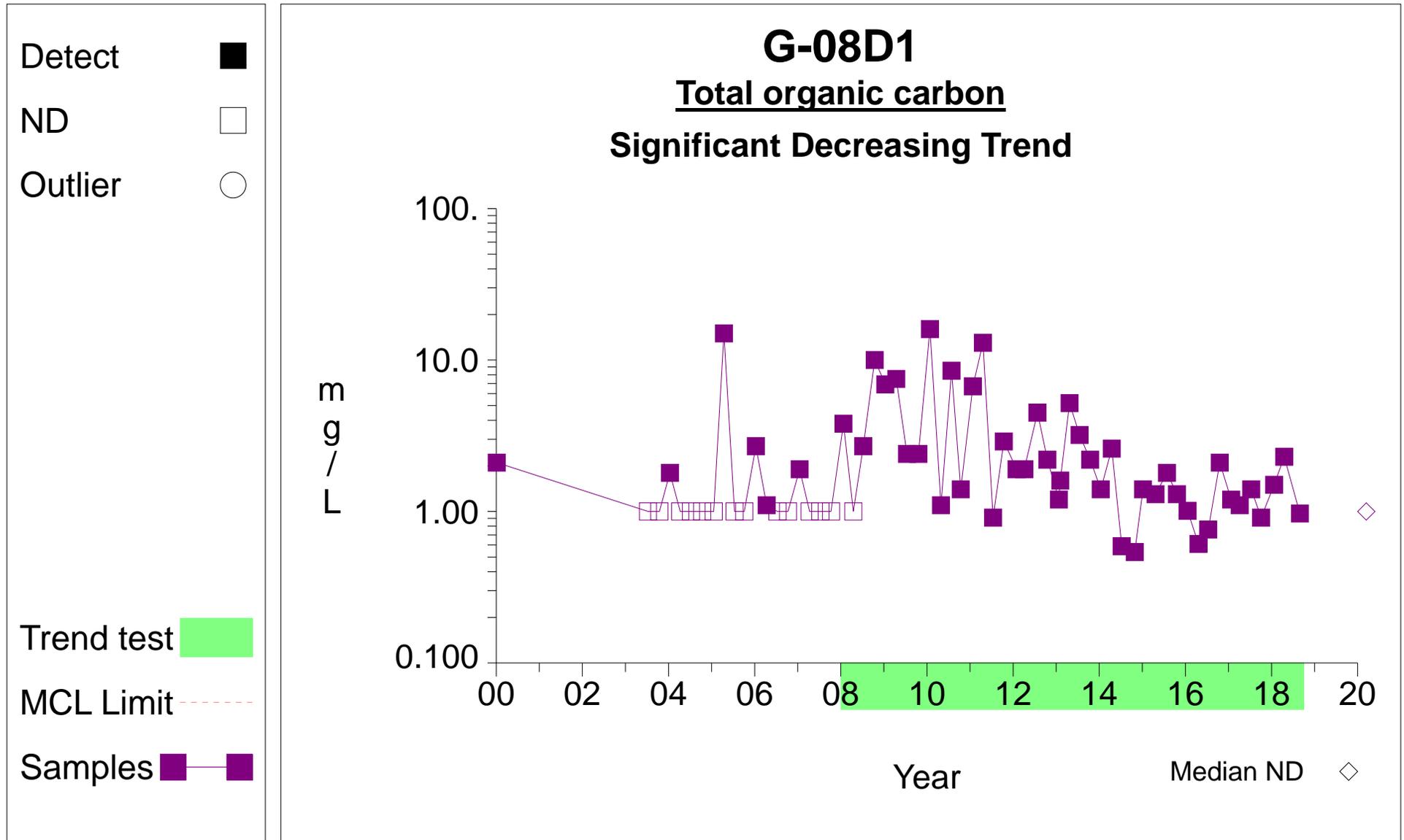
Graph 95

Time Series



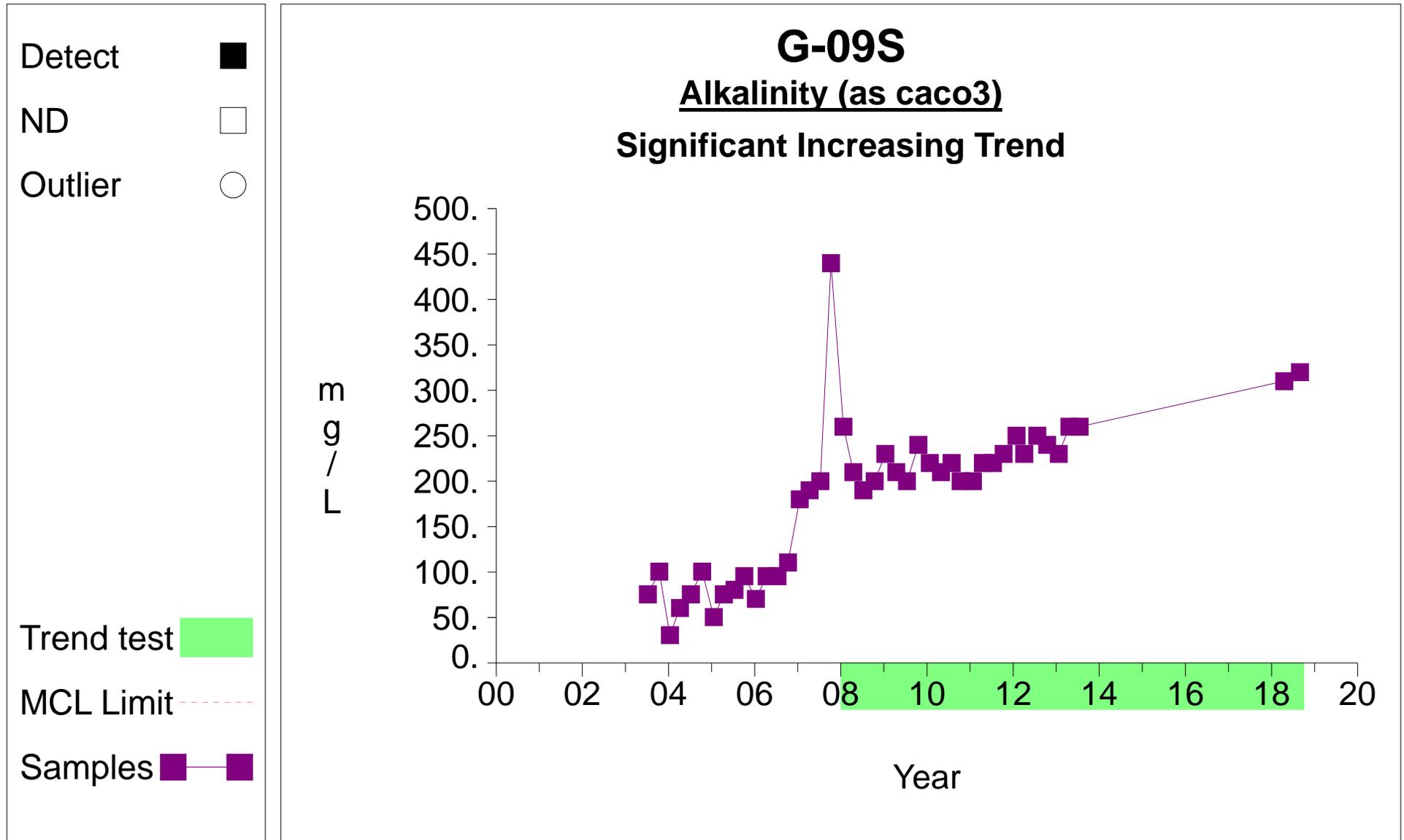
Graph 96

Time Series



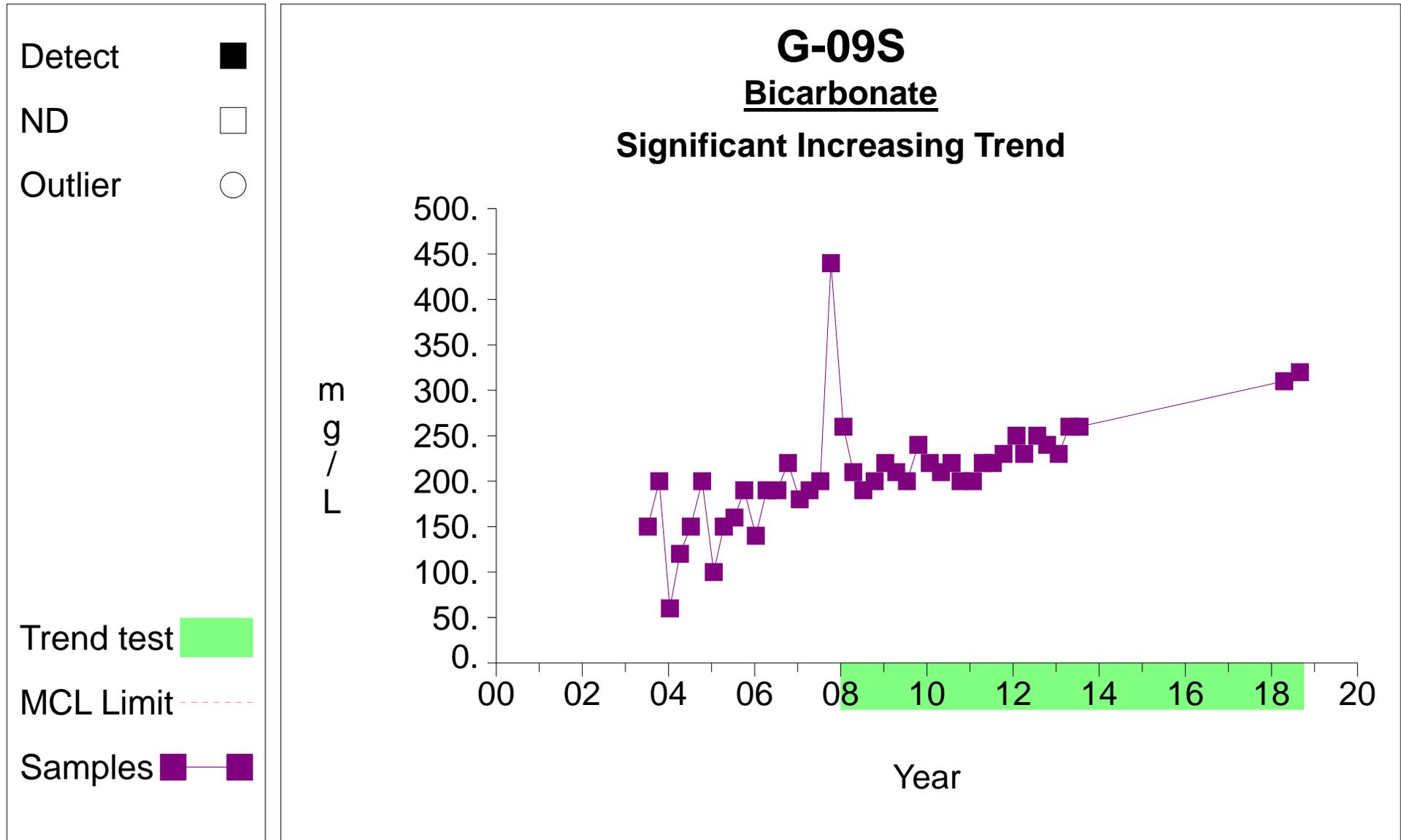
Graph 99

Time Series



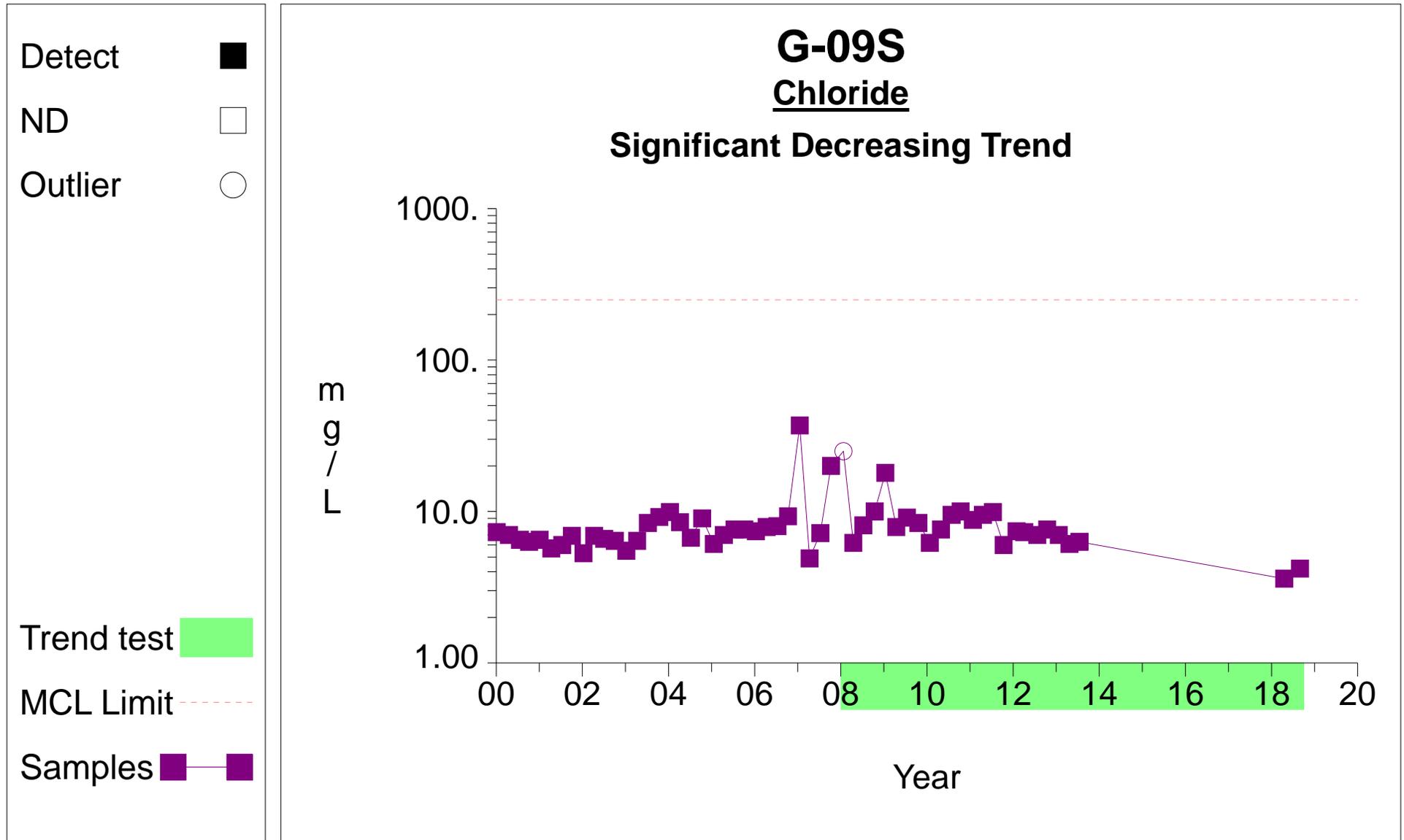
Graph 100

Time Series



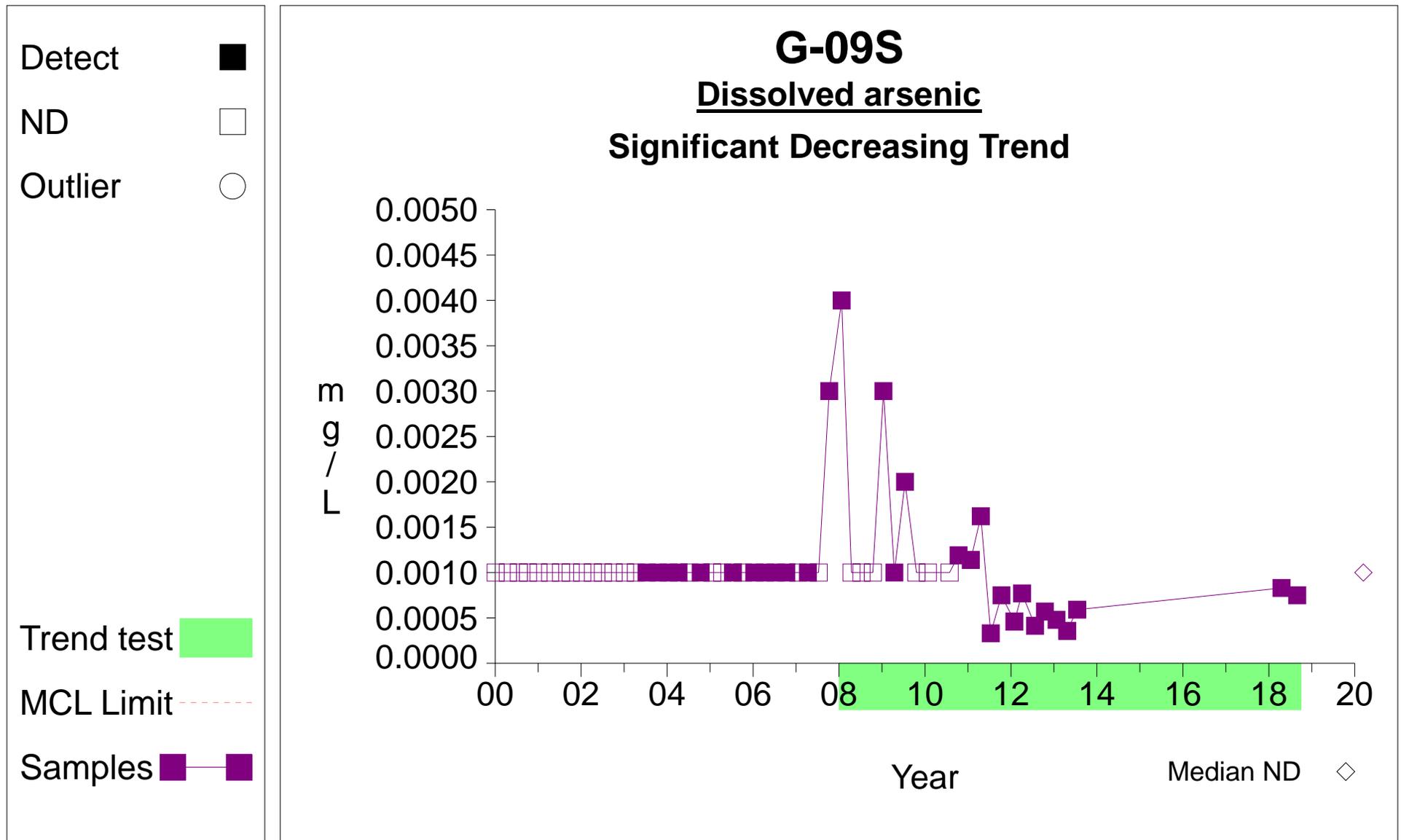
Graph 102

Time Series



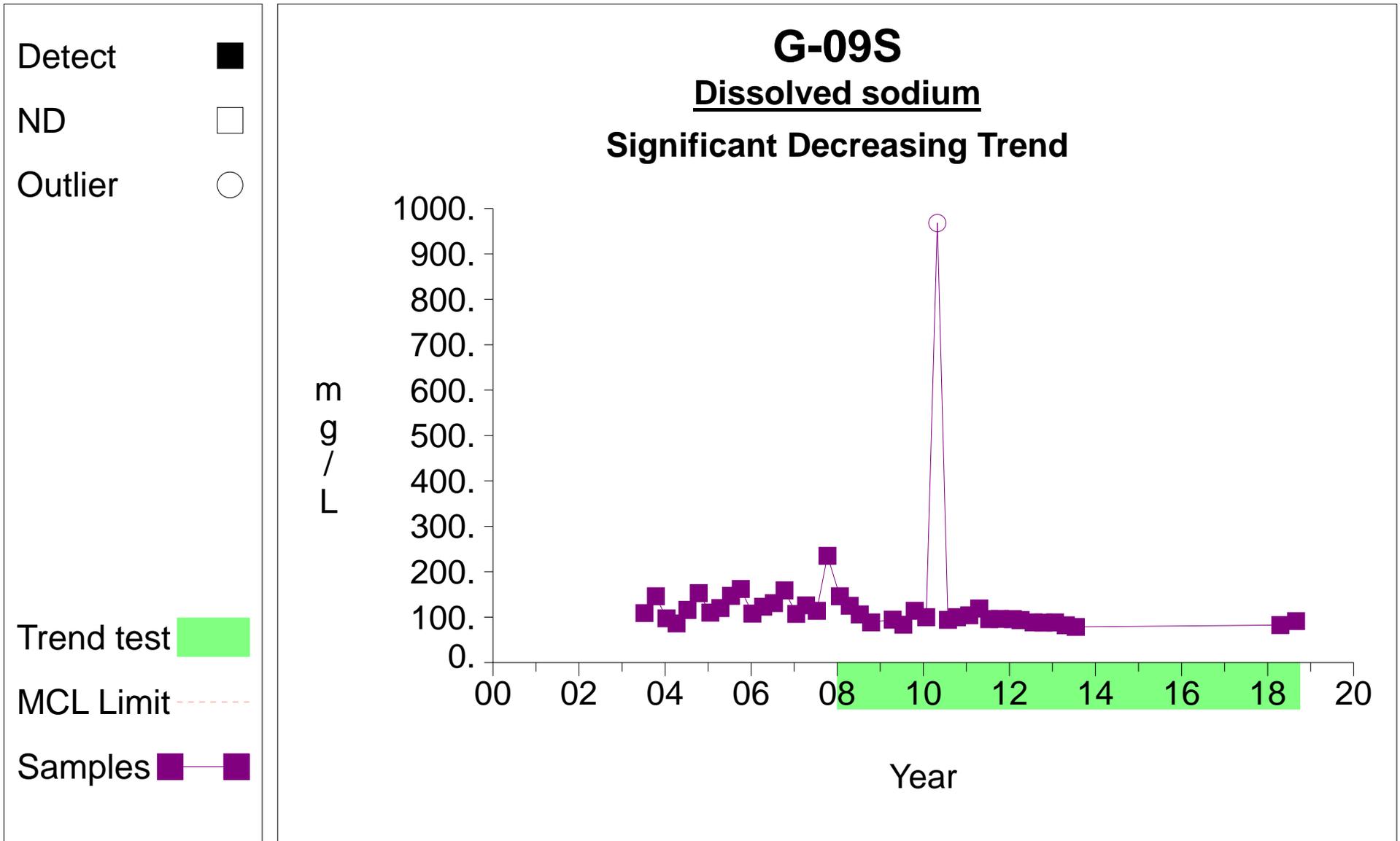
Graph 104

Time Series



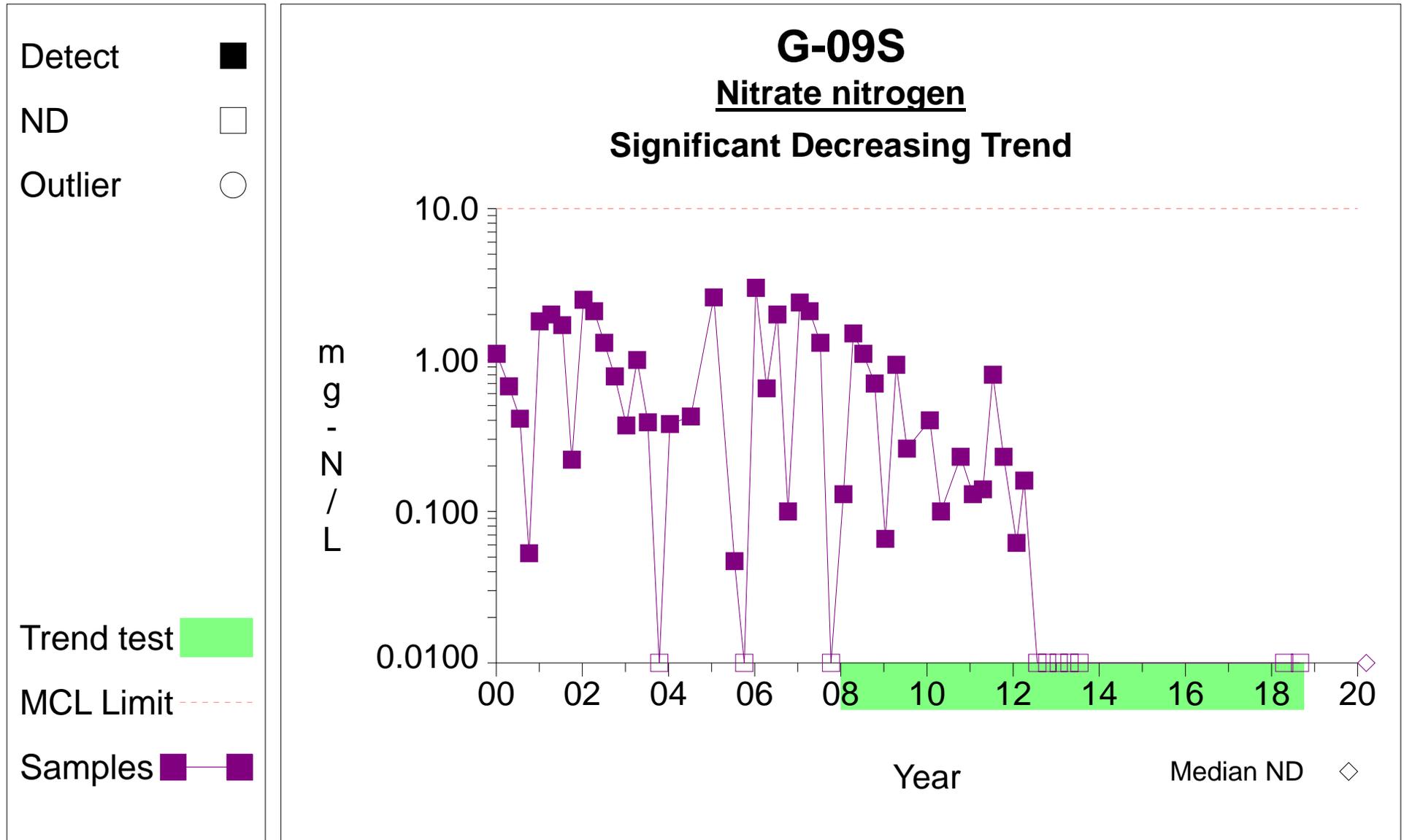
Graph 107

Time Series



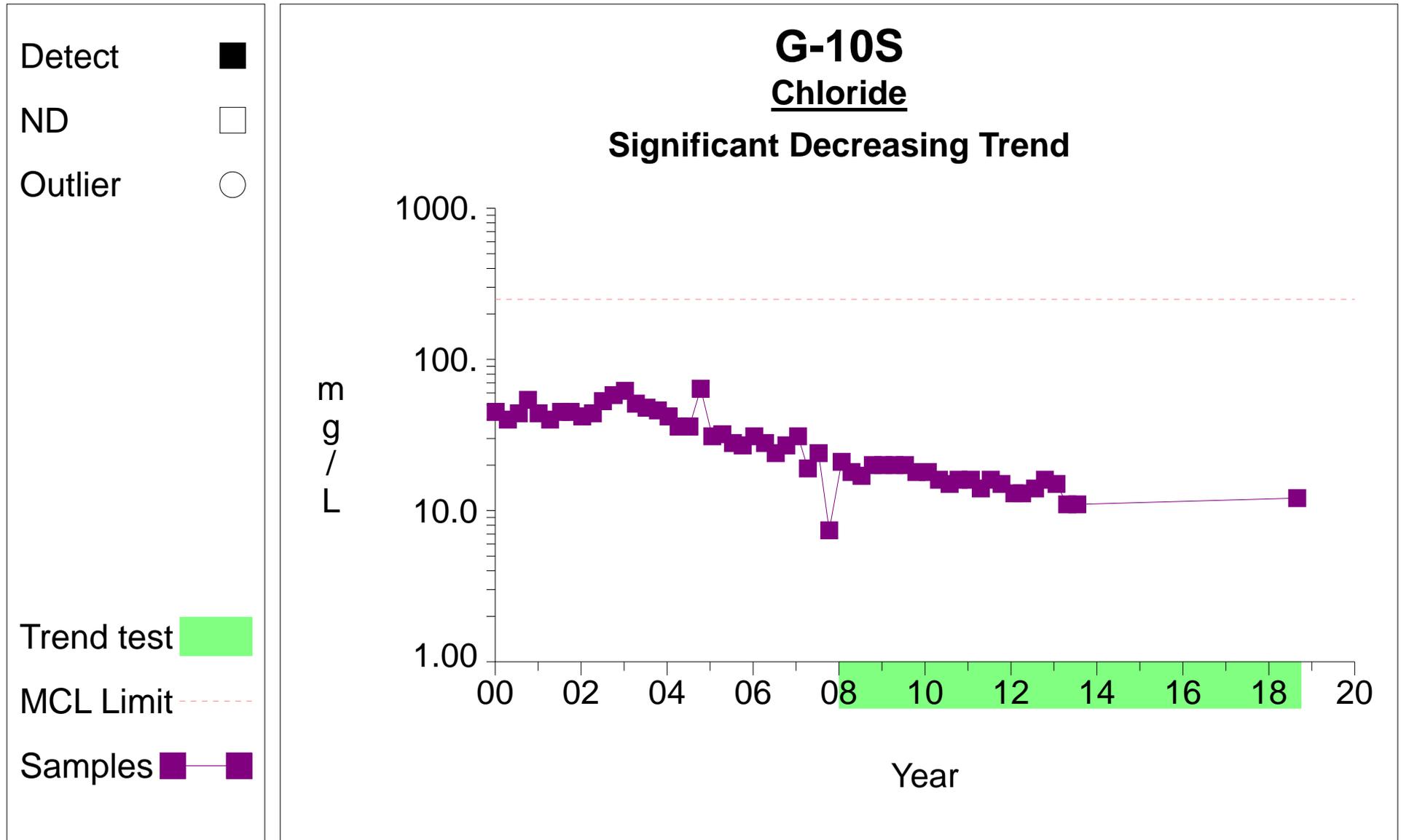
Graph 123

Time Series



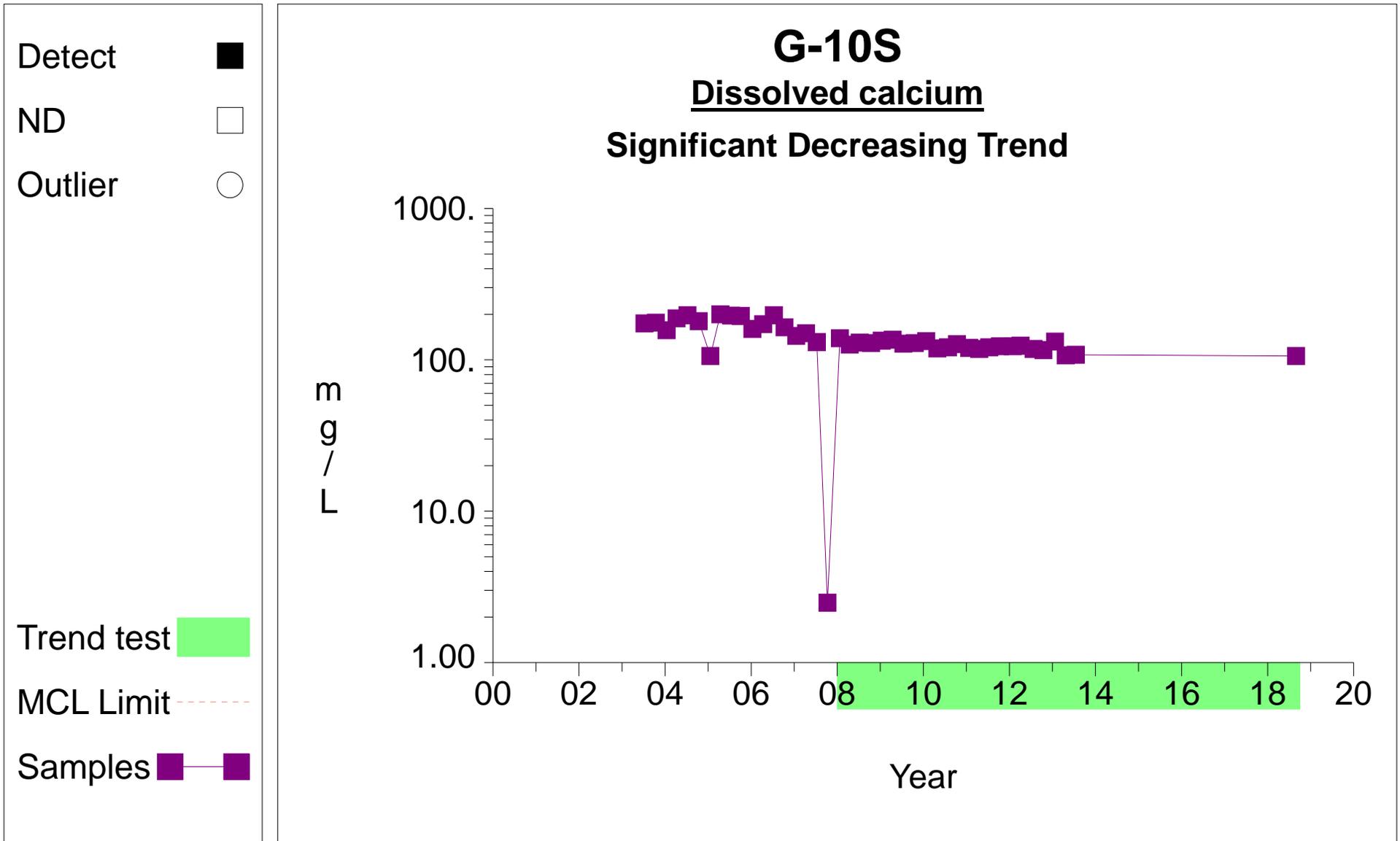
Graph 127

Time Series



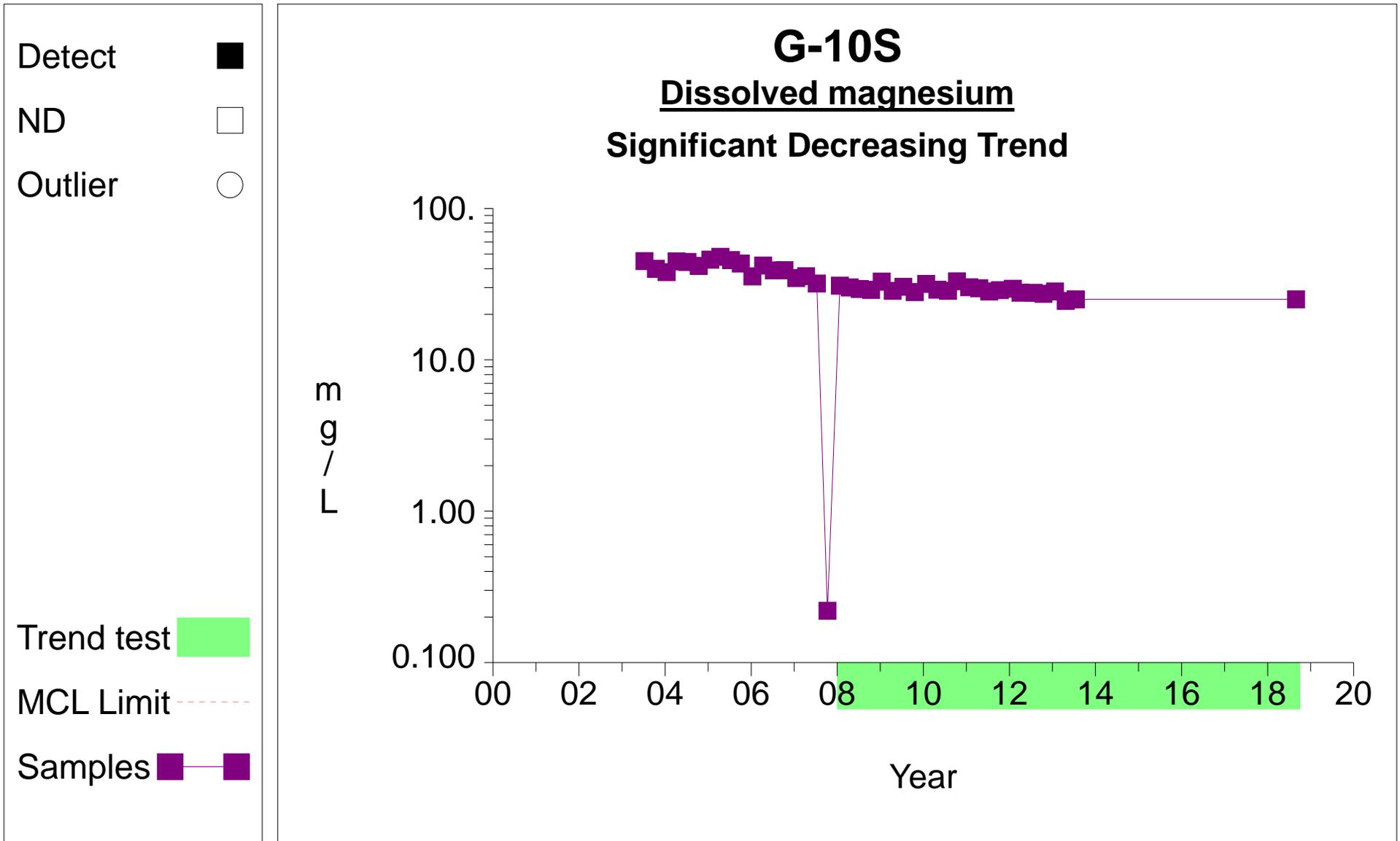
Graph 137

Time Series



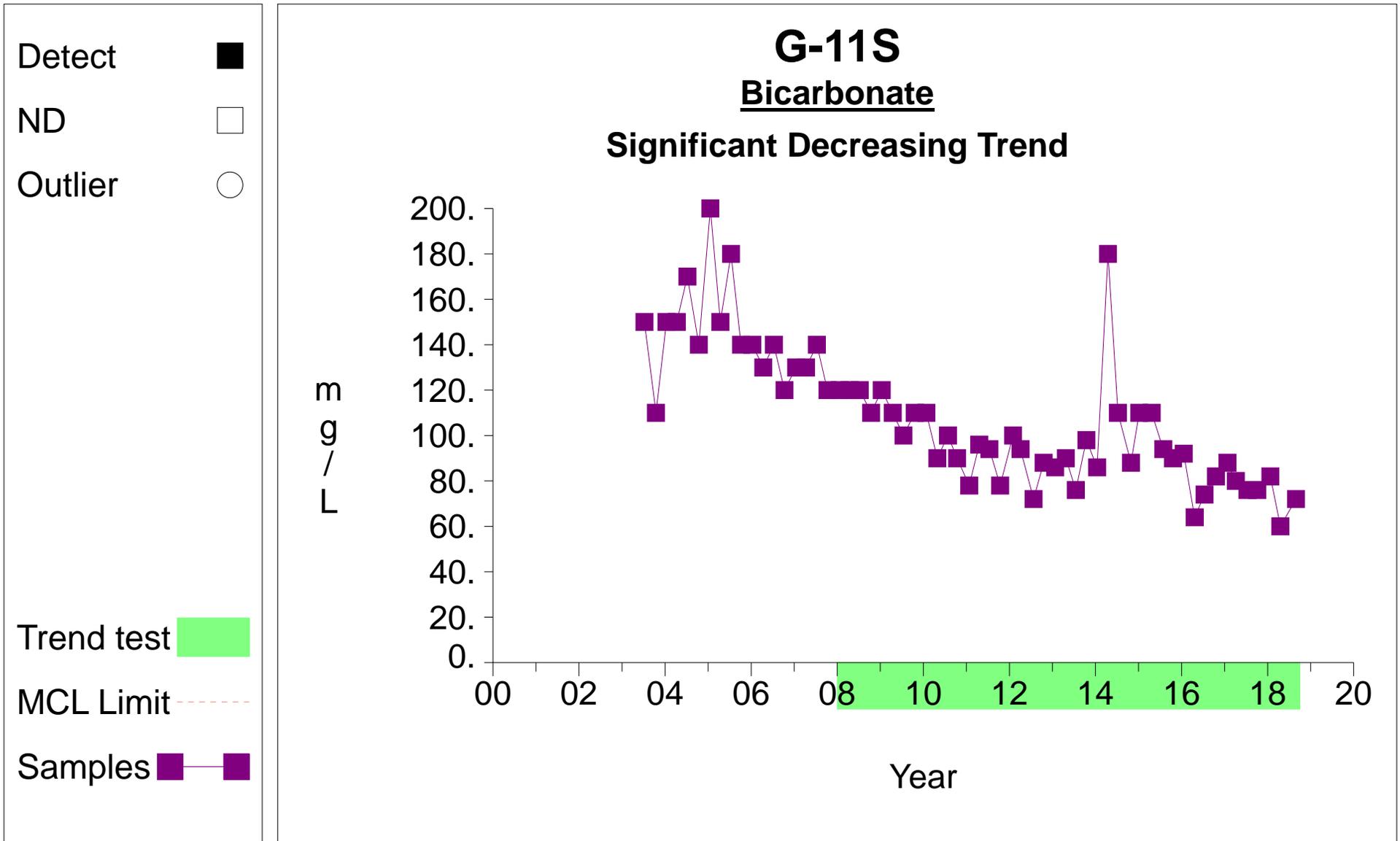
Graph 144

Time Series



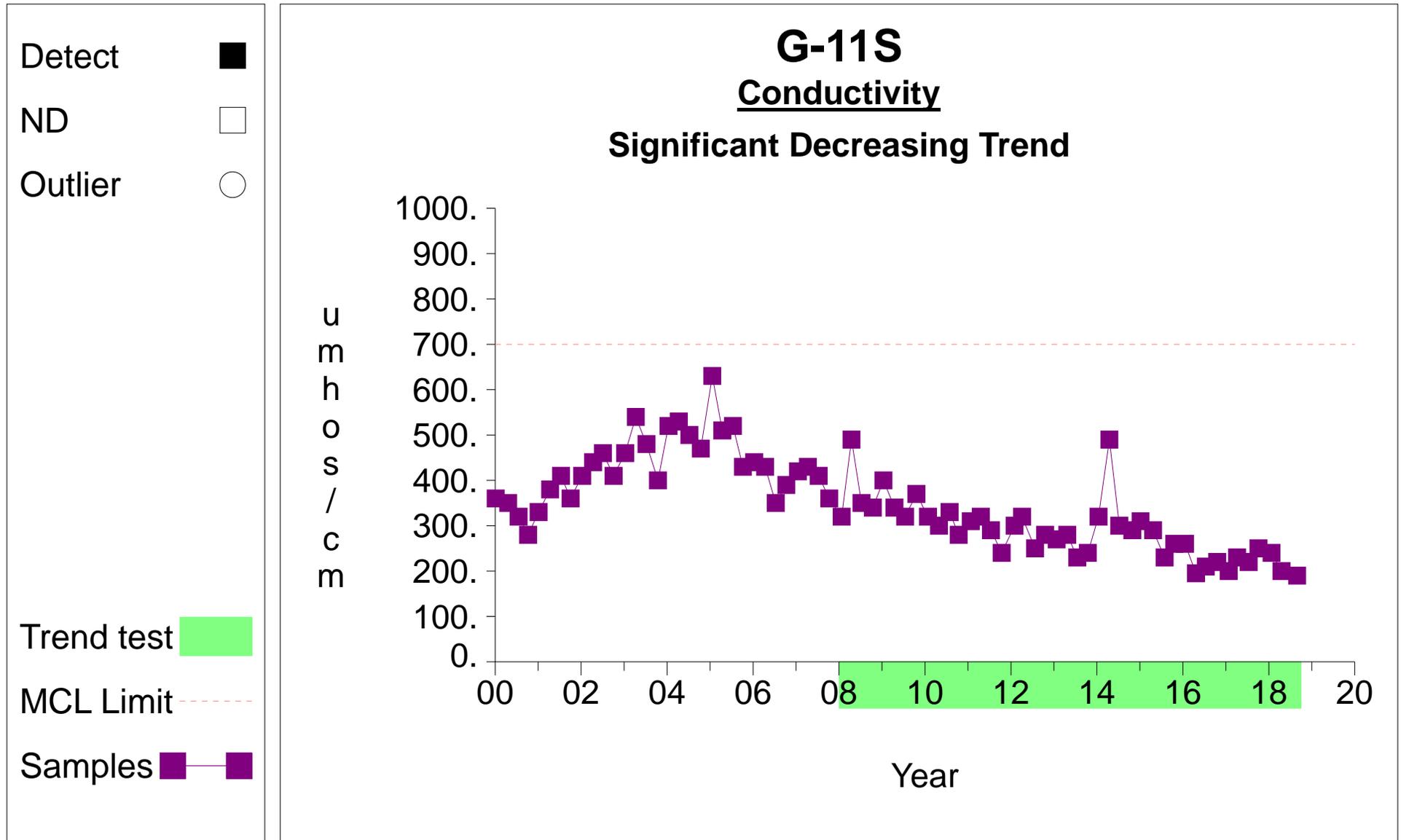
Graph 150

Time Series



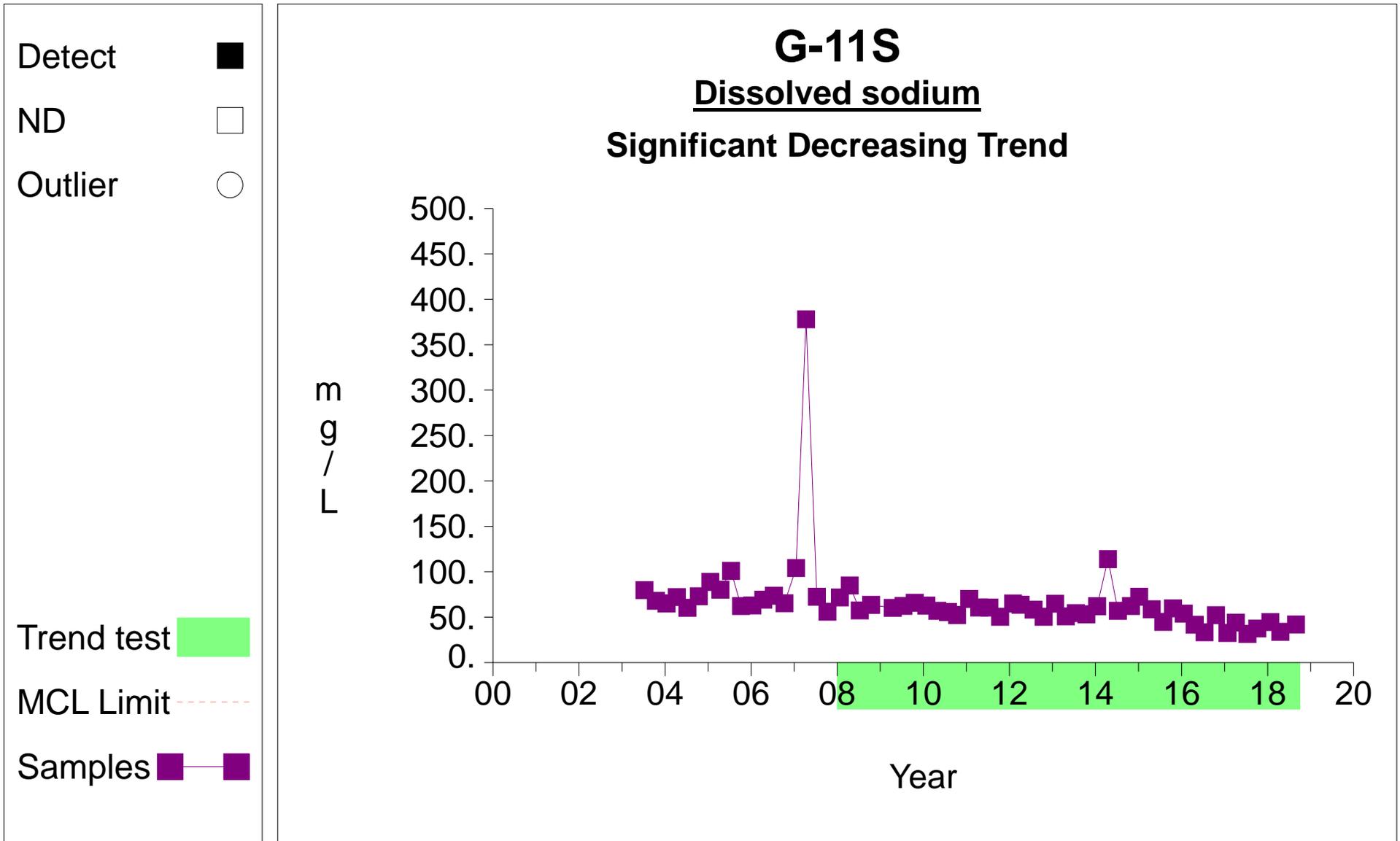
Graph 168

Time Series



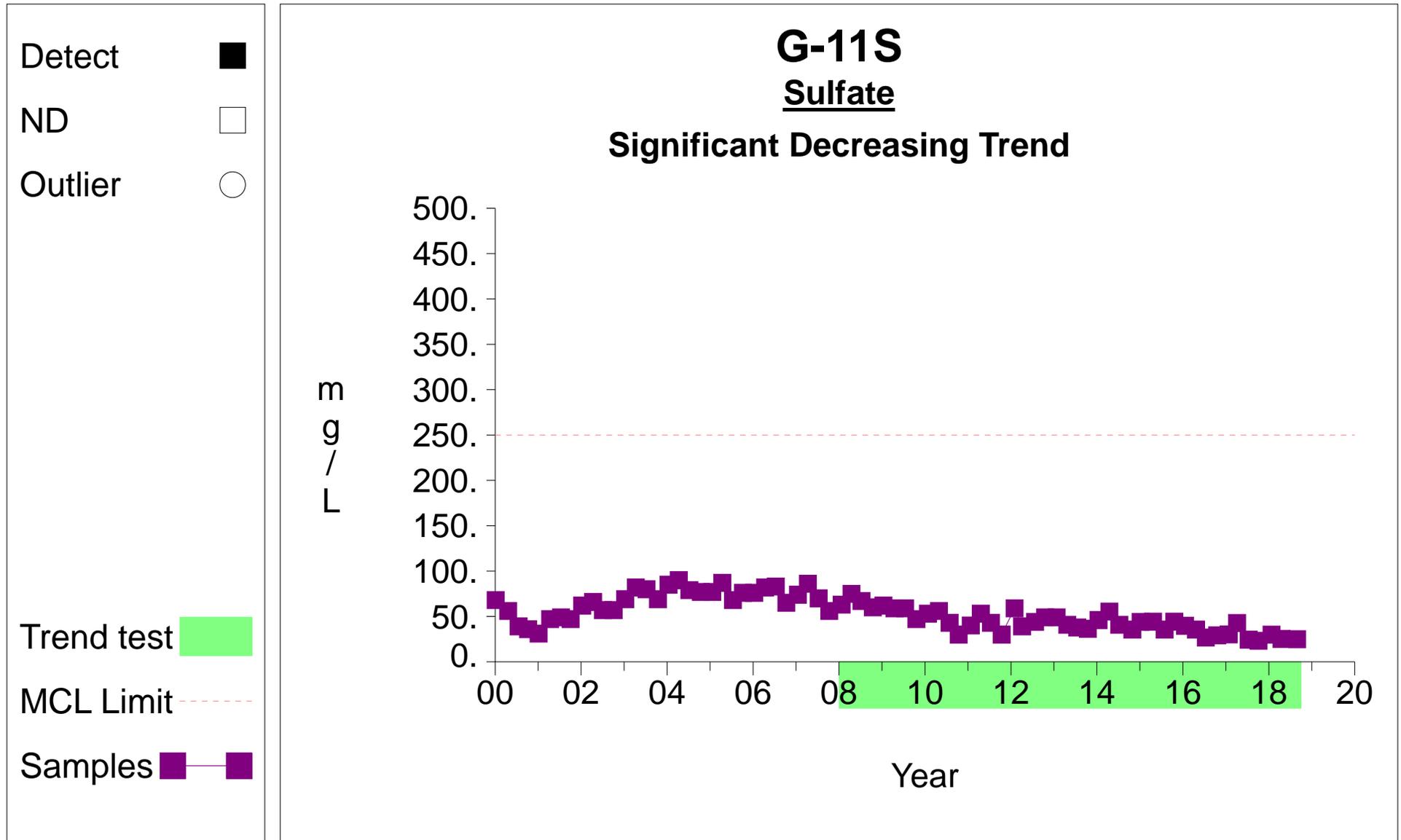
Graph 171

Time Series



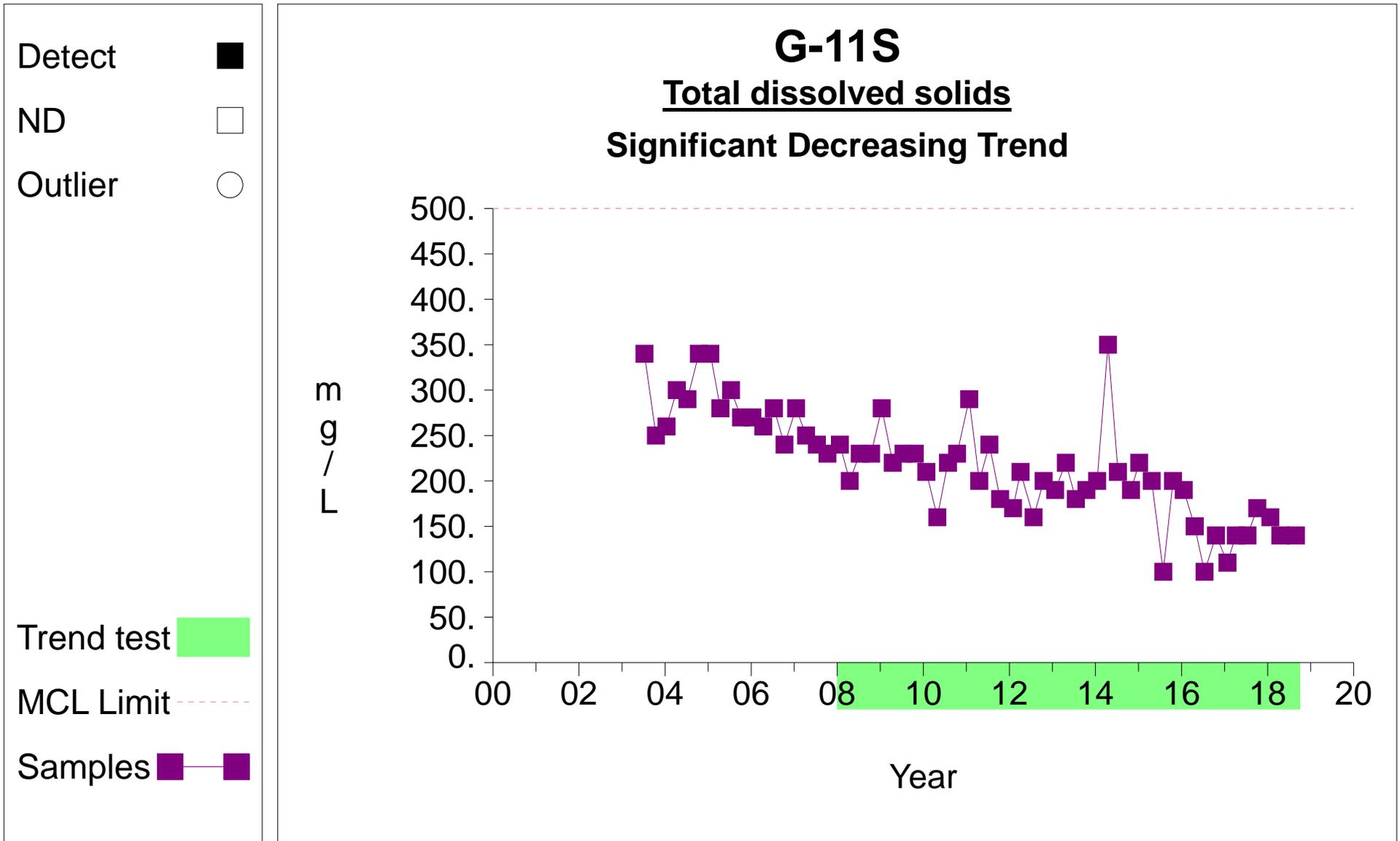
Graph 189

Time Series



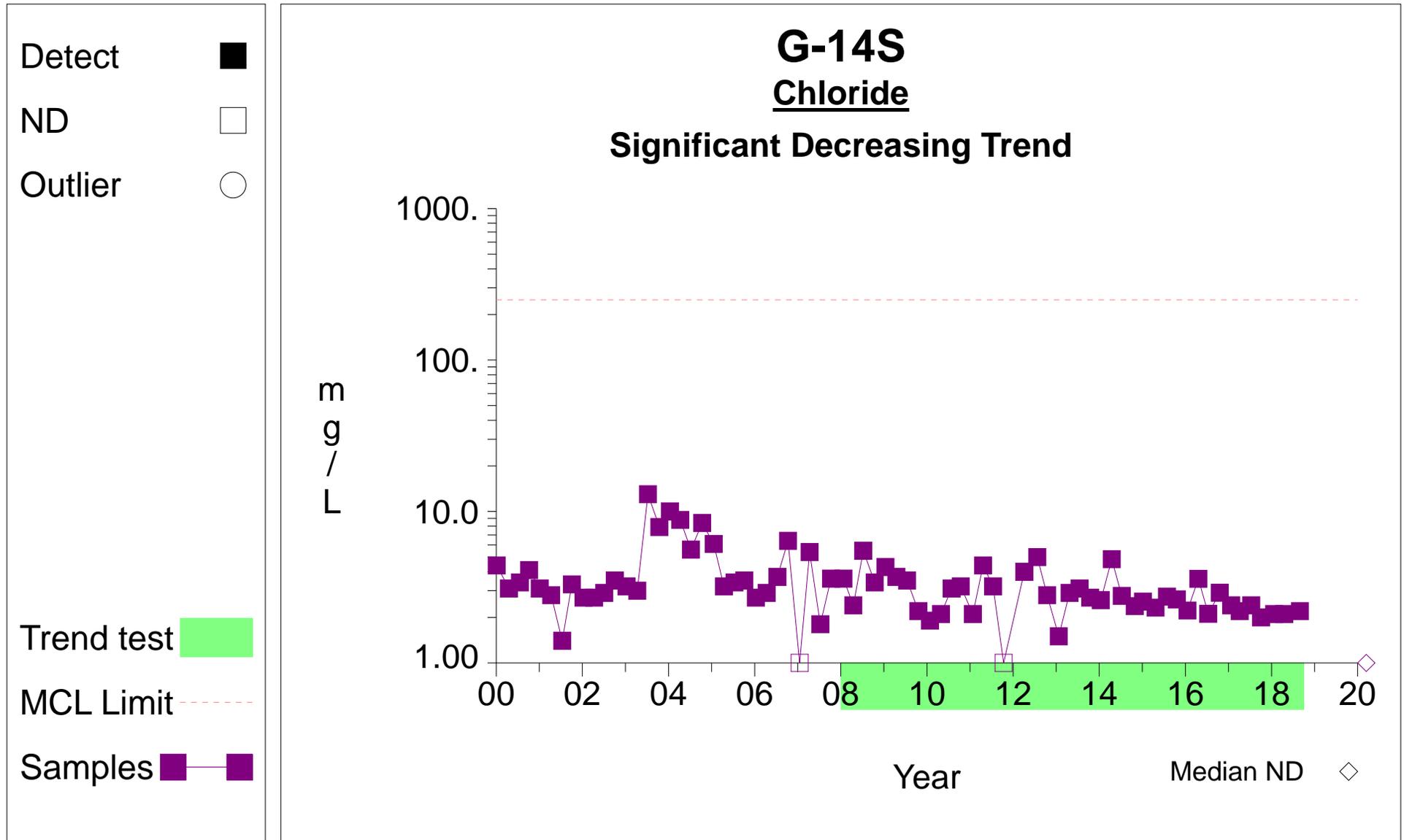
Graph 196

Time Series



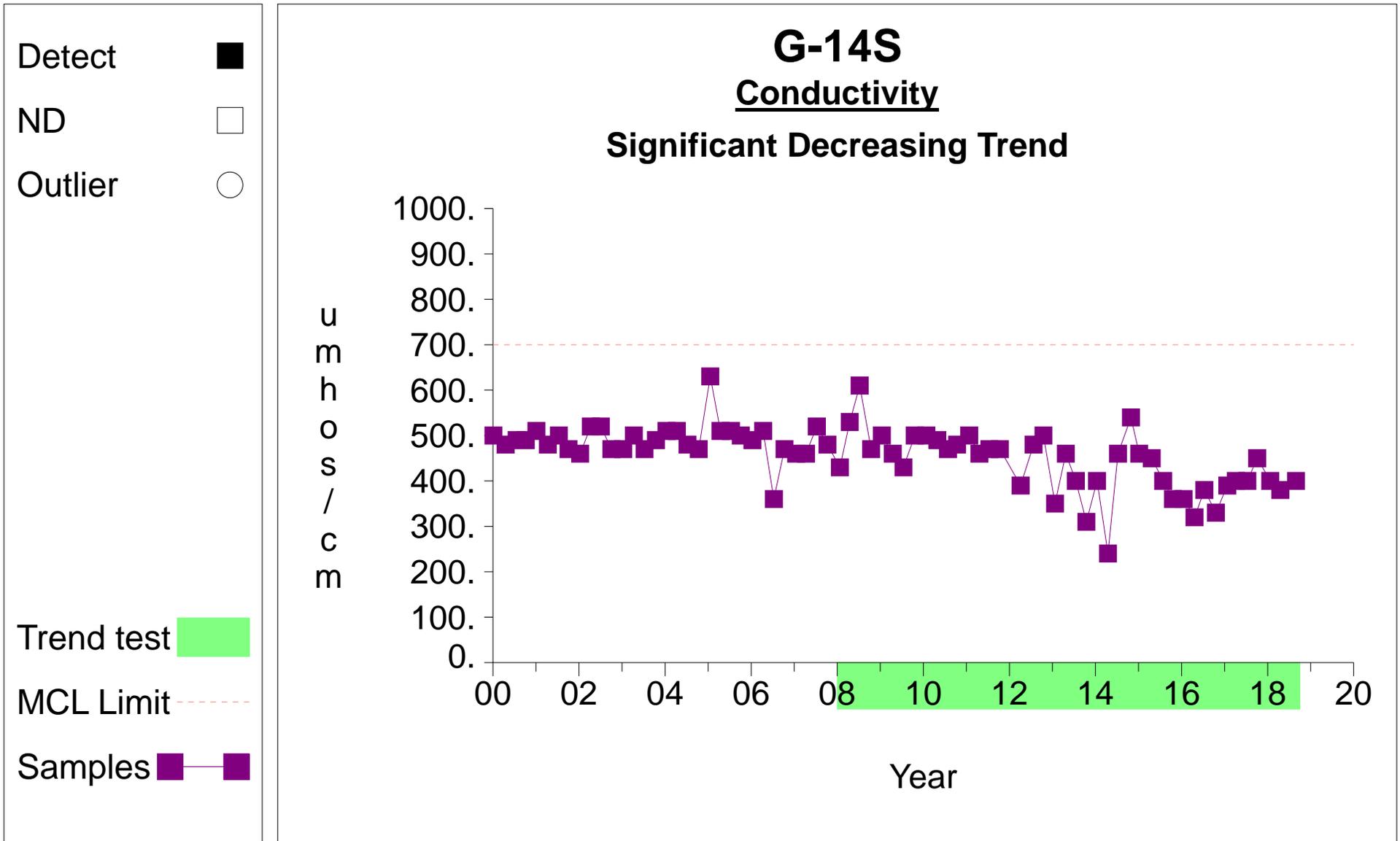
Graph 197

Time Series



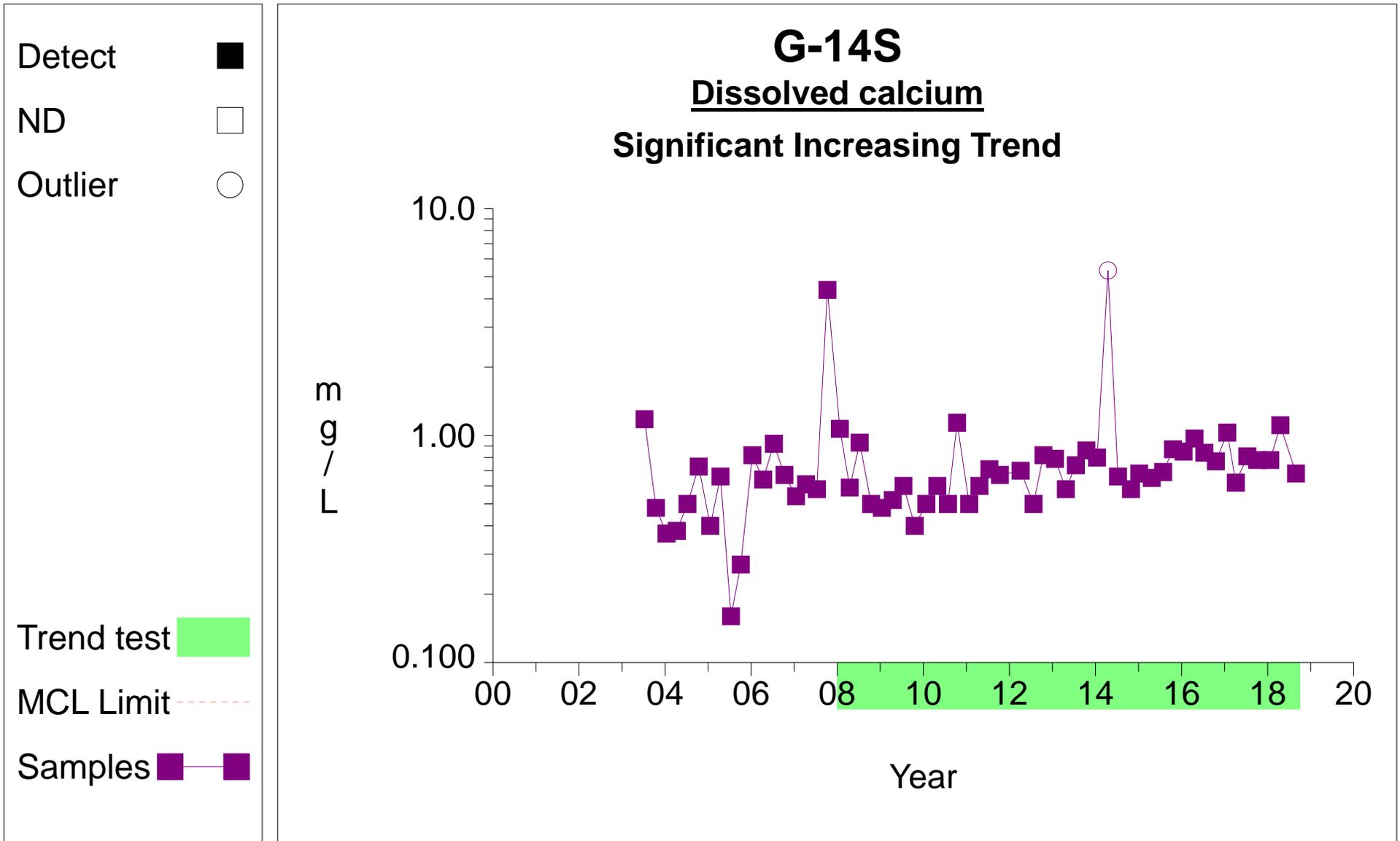
Graph 203

Time Series



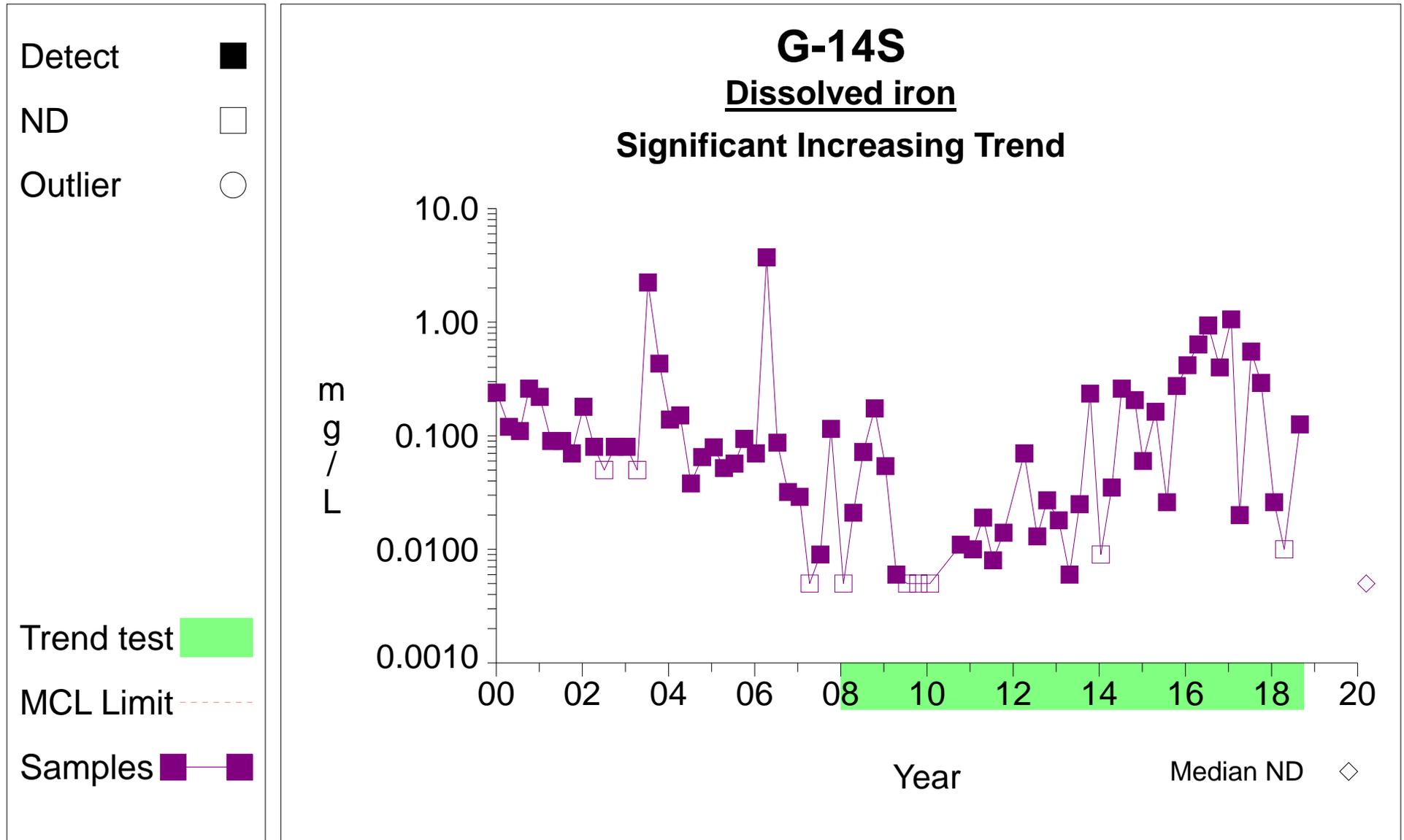
Graph 204

Time Series



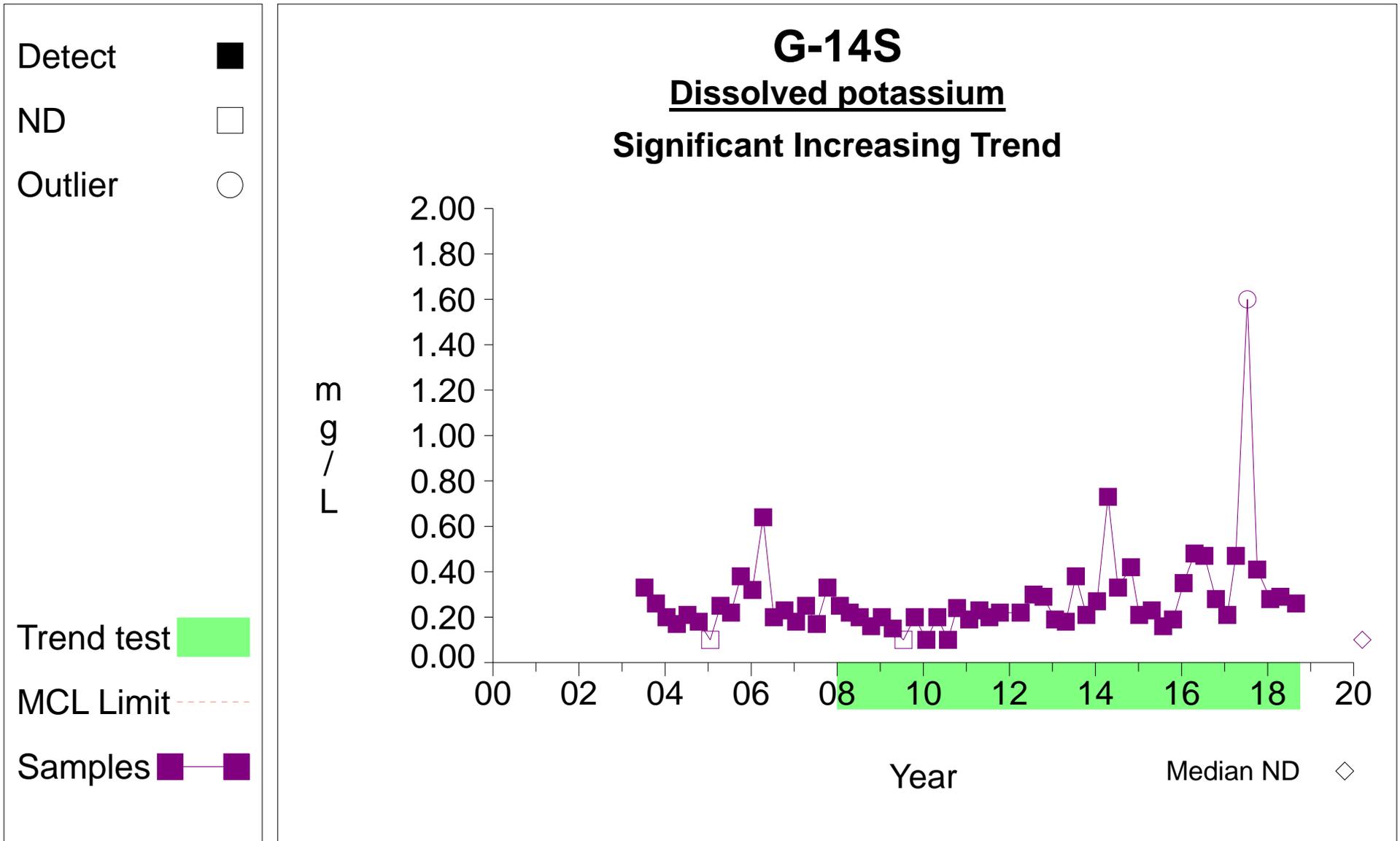
Graph 210

Time Series



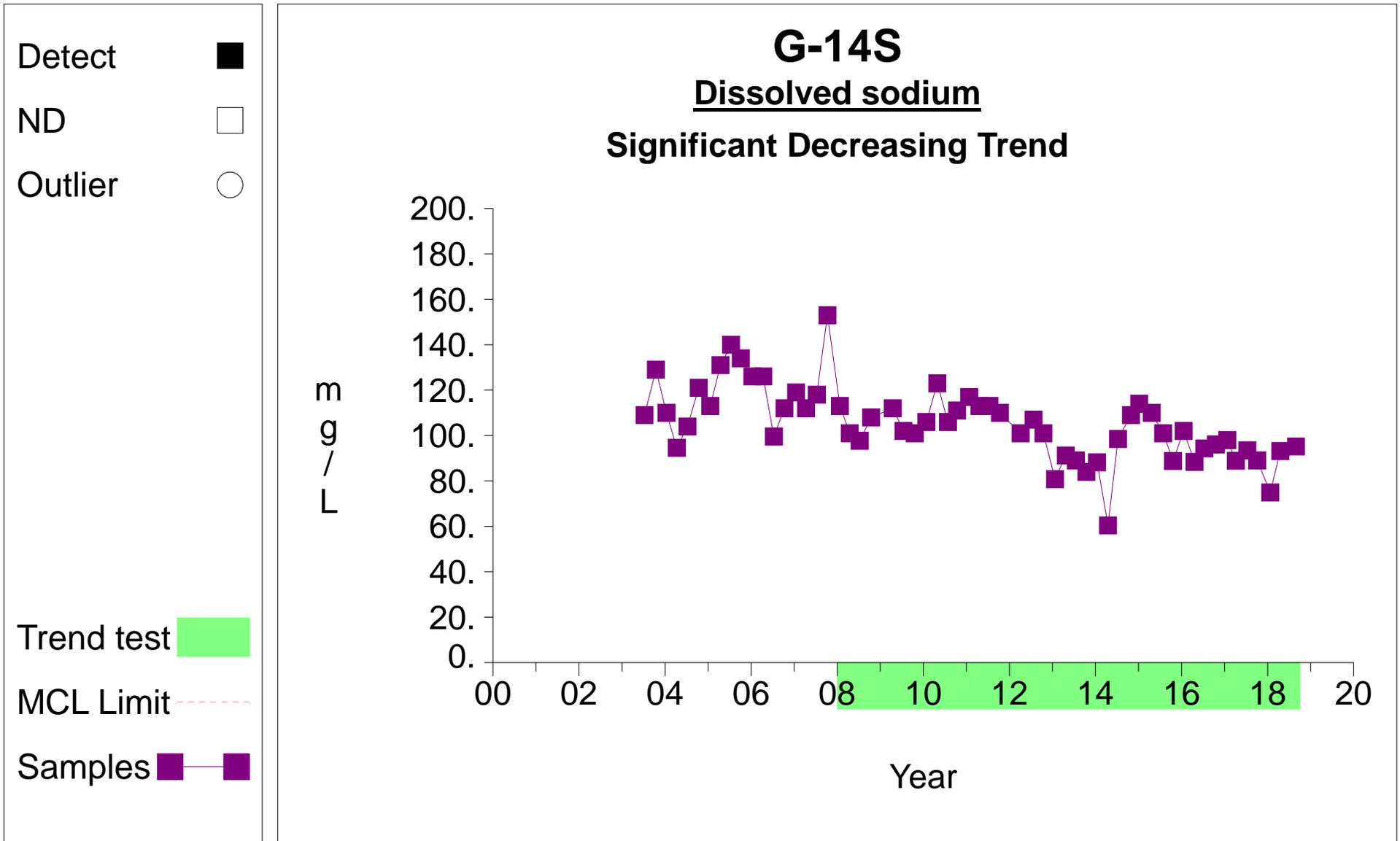
Graph 214

Time Series



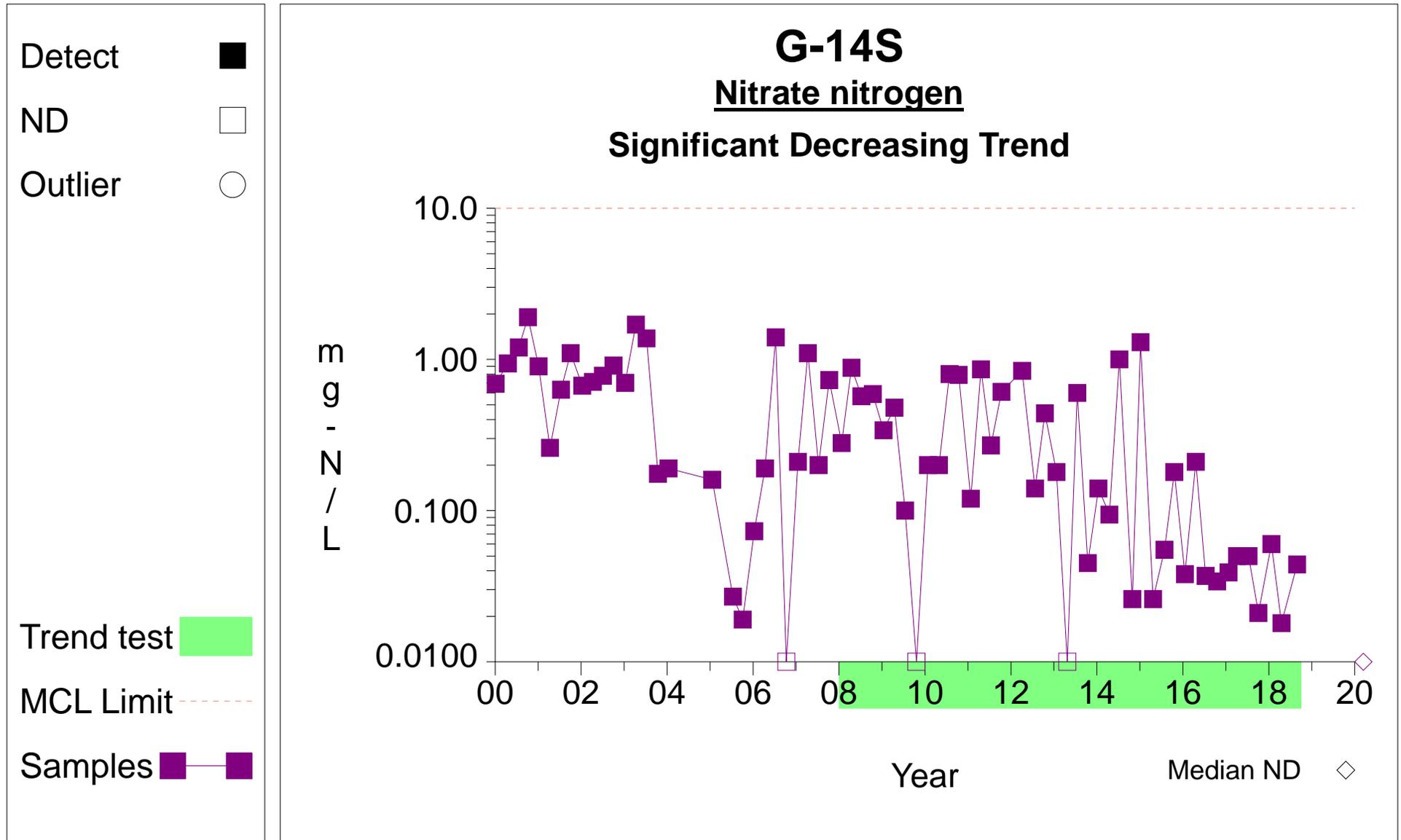
Graph 219

Time Series



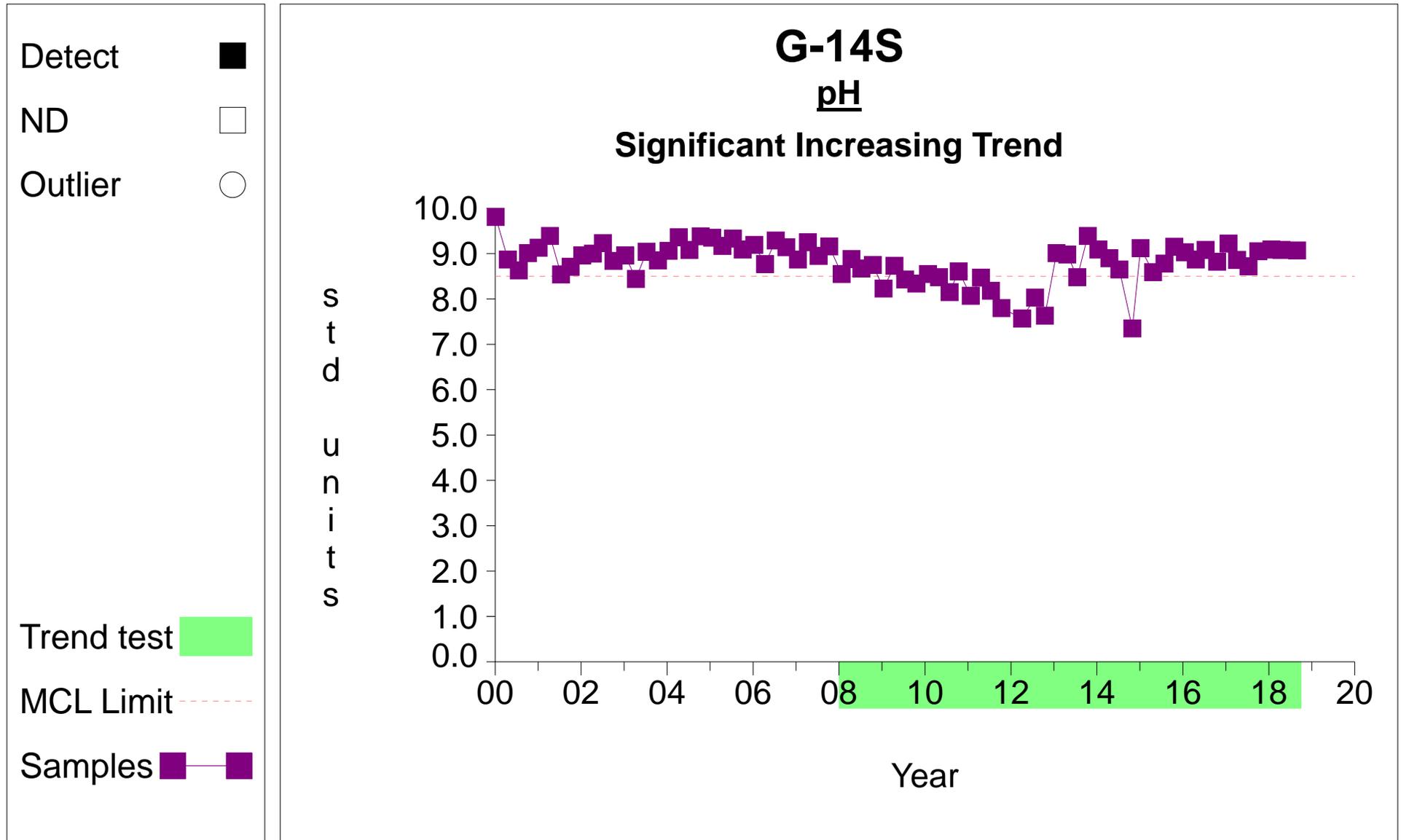
Graph 222

Time Series



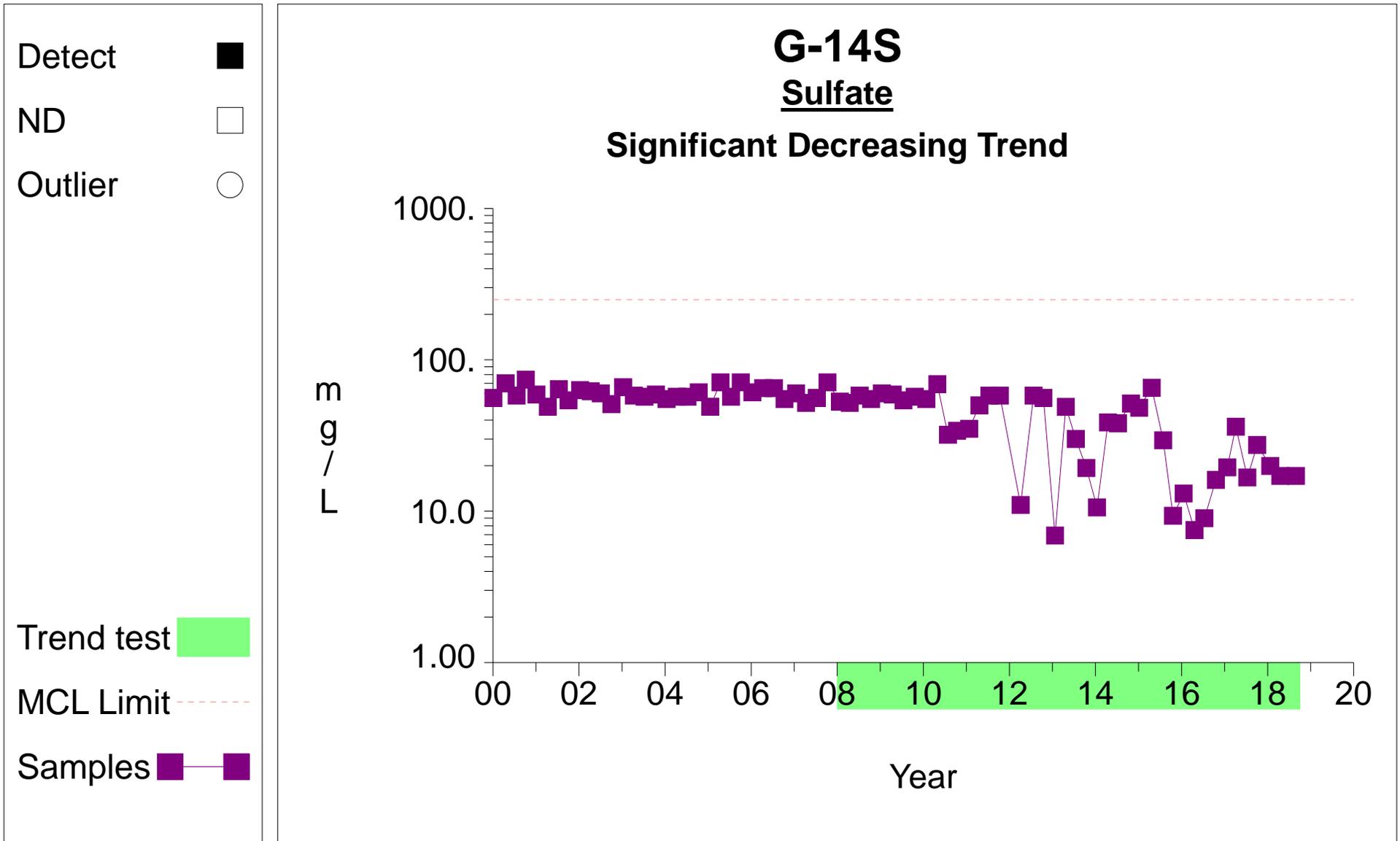
Graph 226

Time Series



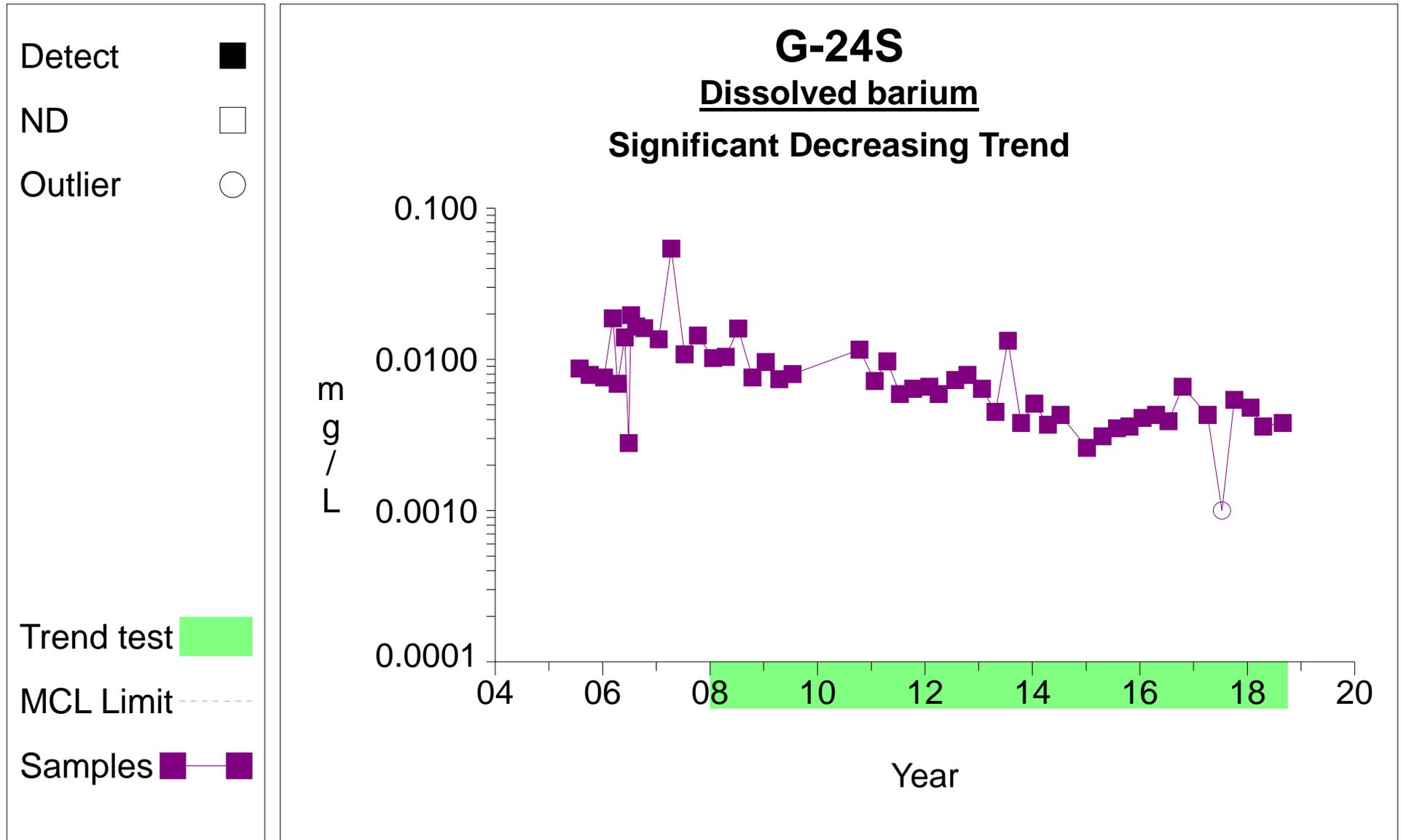
Graph 228

Time Series



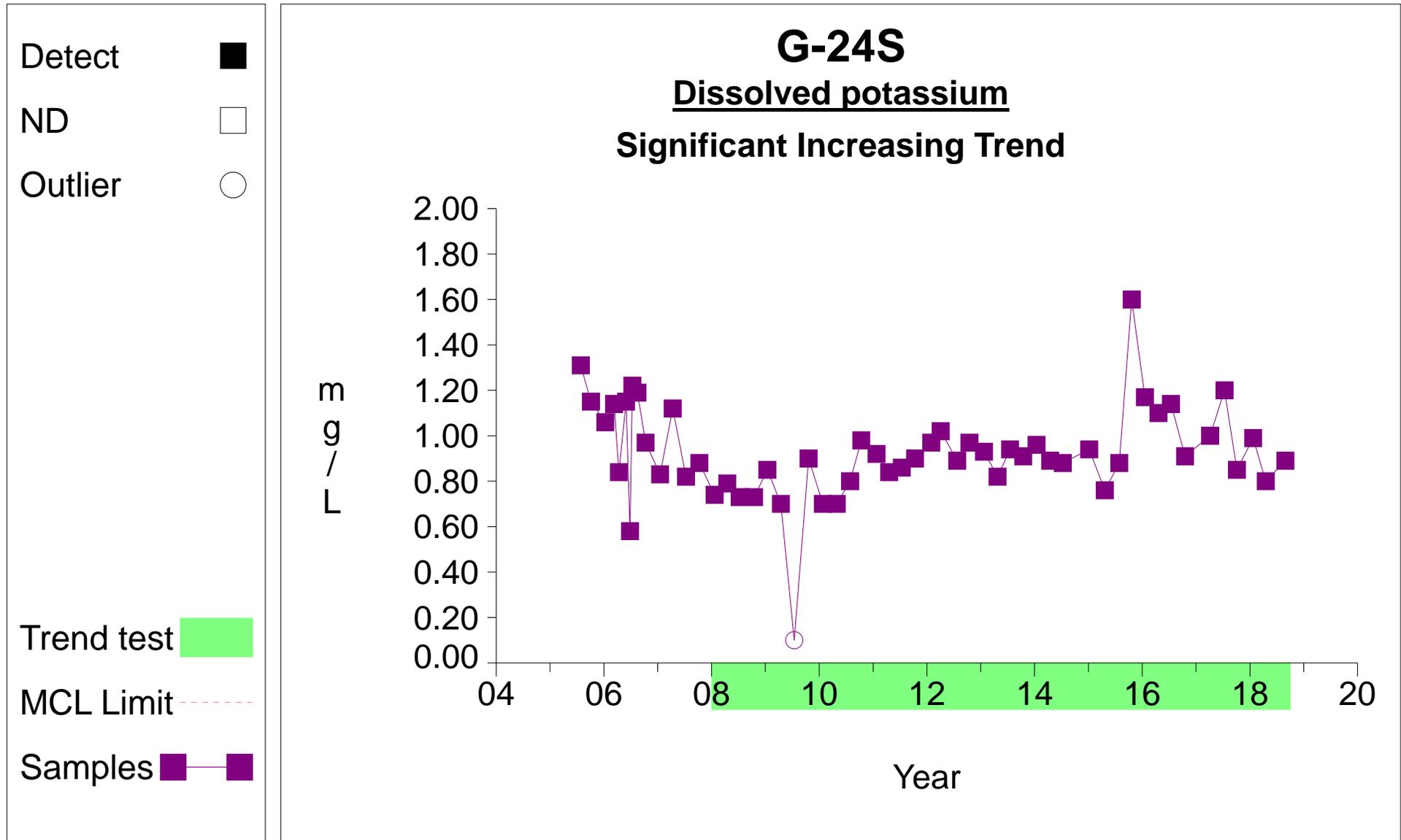
Graph 229

Time Series



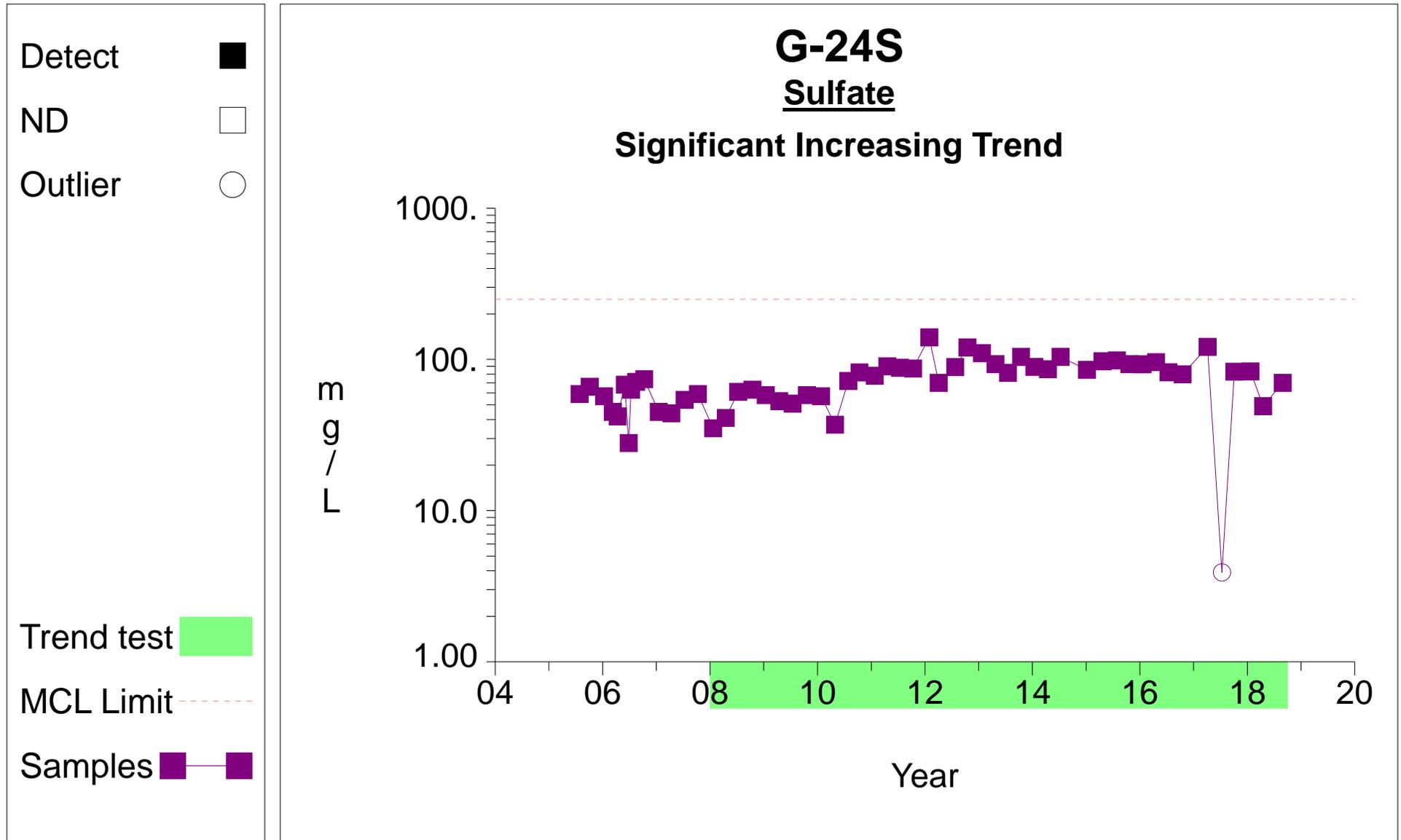
Graph 240

Time Series



Graph 252

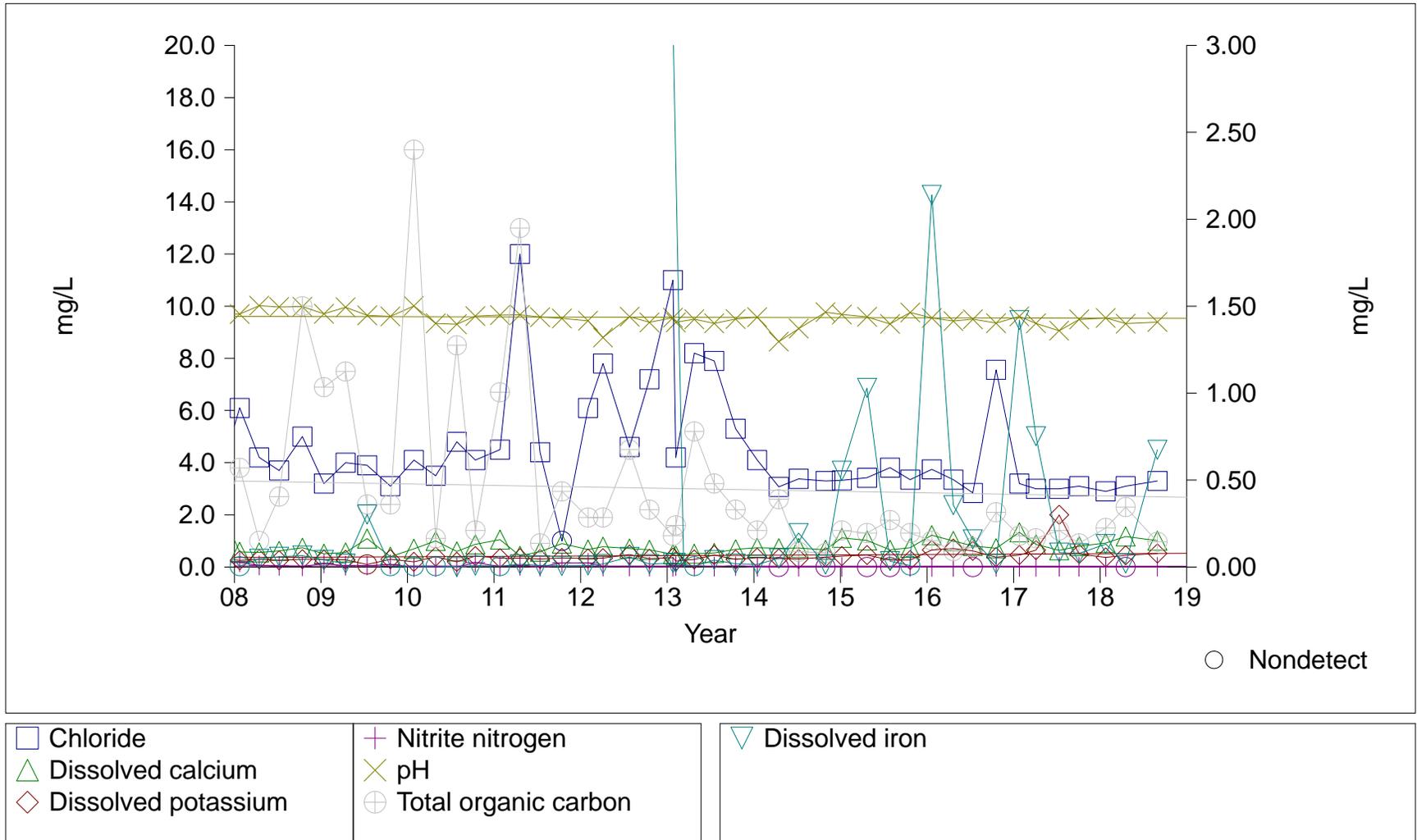
Time Series



Graph 262

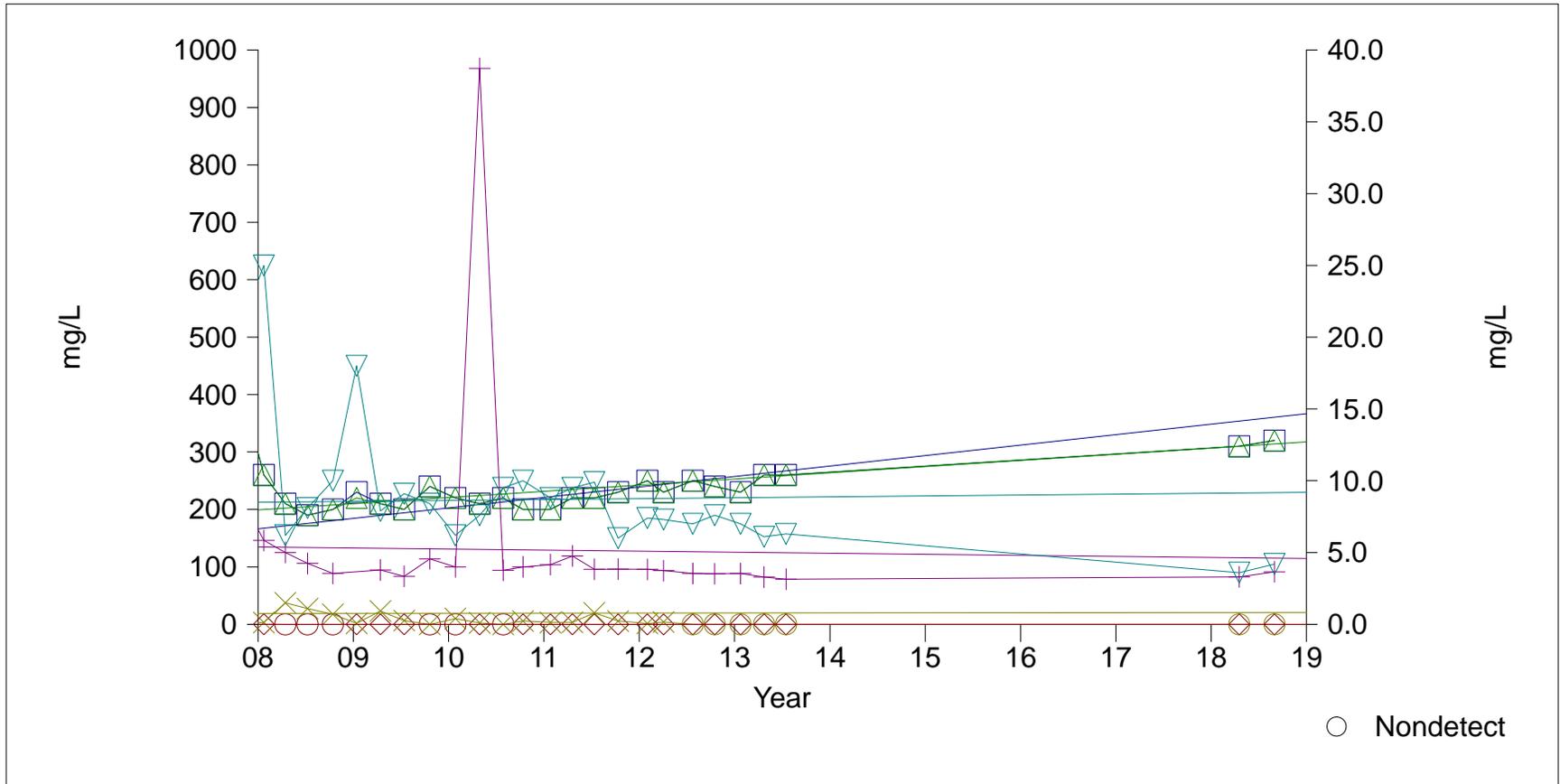
Cathcart Landfill

Time Series Plot for G-08D1



Cathcart Landfill

Time Series Plot for G-09S



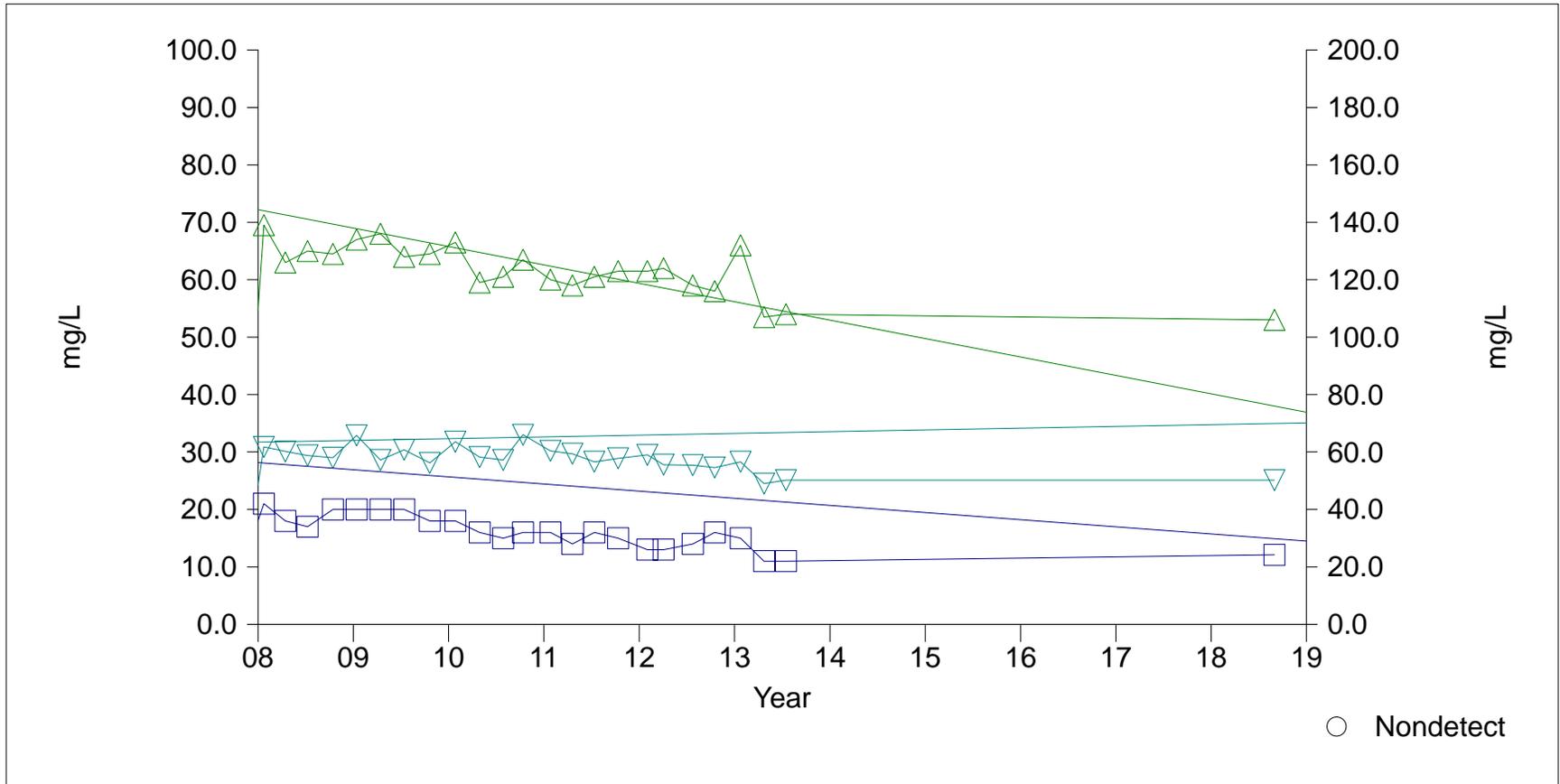
□ Alkalinity (as cacO3)
△ Bicarbonate
+ Dissolved sodium

◇ Dissolved arsenic
× Nitrate nitrogen
▽ Chloride

○ Nondetect

Cathcart Landfill

Time Series Plot for G-10S

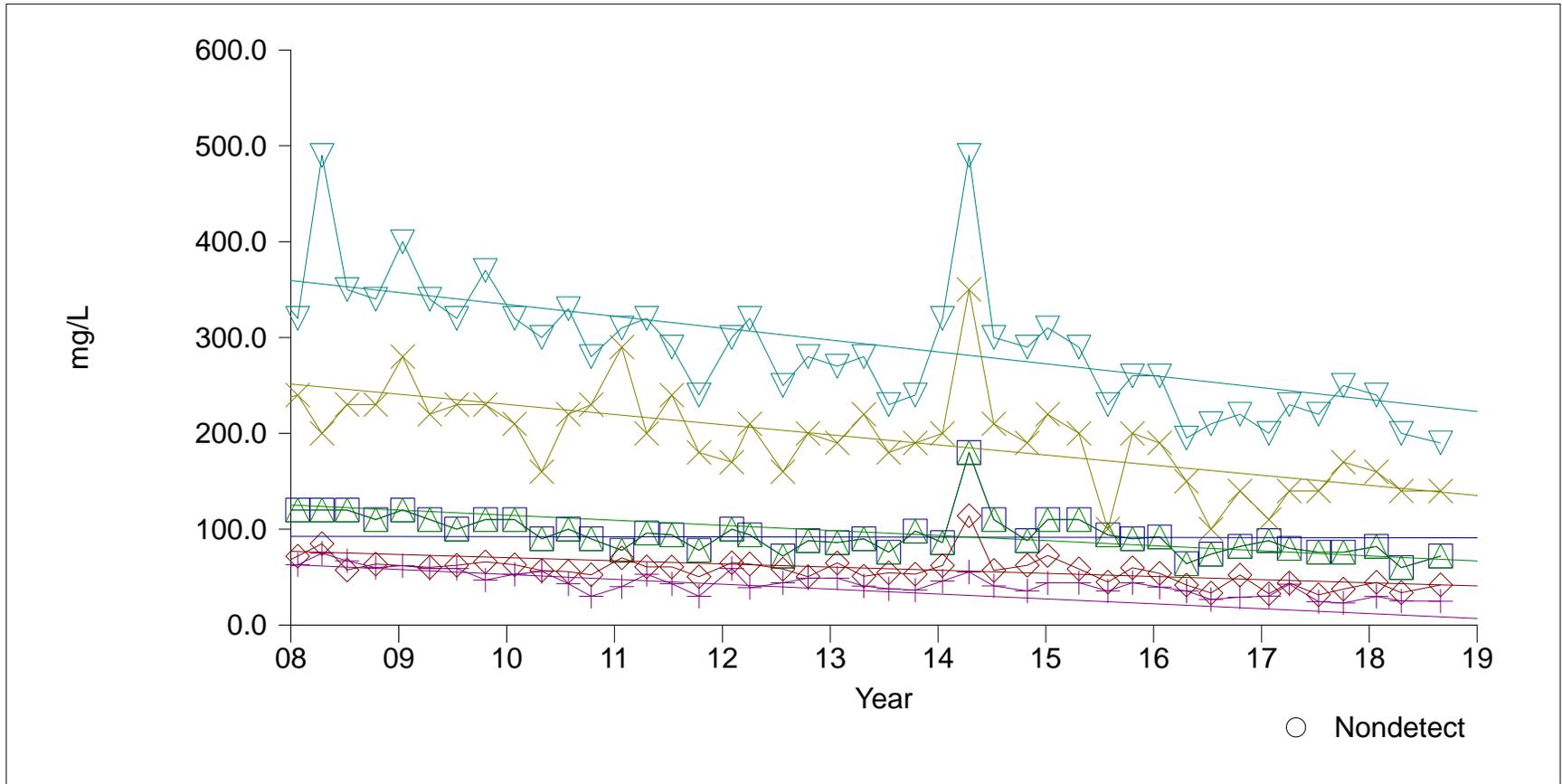


□ Chloride
▽ Dissolved magnesium

△ Dissolved calcium
○ Nondetect

Cathcart Landfill

Time Series Plot for G-11S



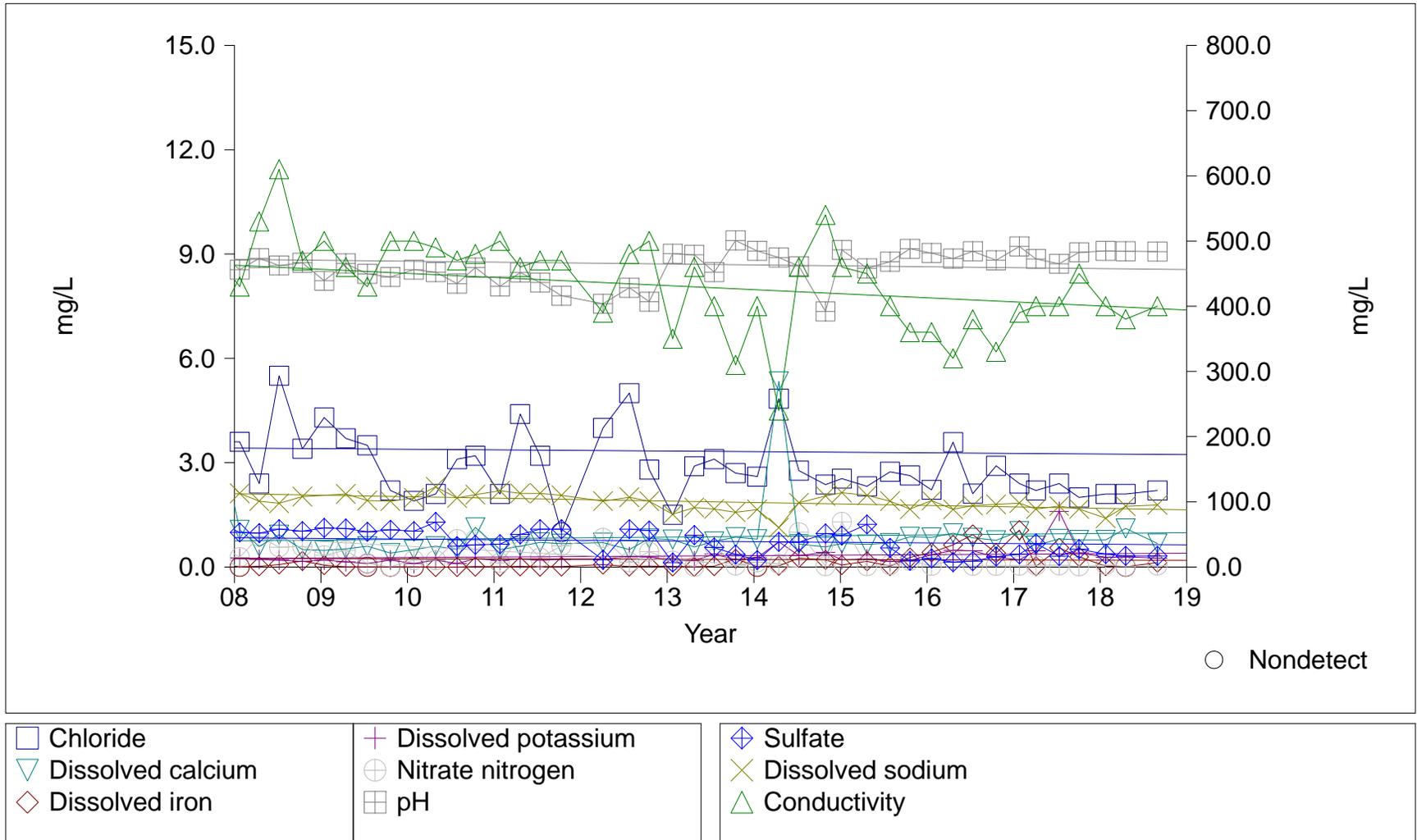
□ Alkalinity (as cacO3)
△ Bicarbonate
▽ Conductivity

◇ Dissolved sodium
+ Sulfate
× Total dissolved solids

○ Nondetect

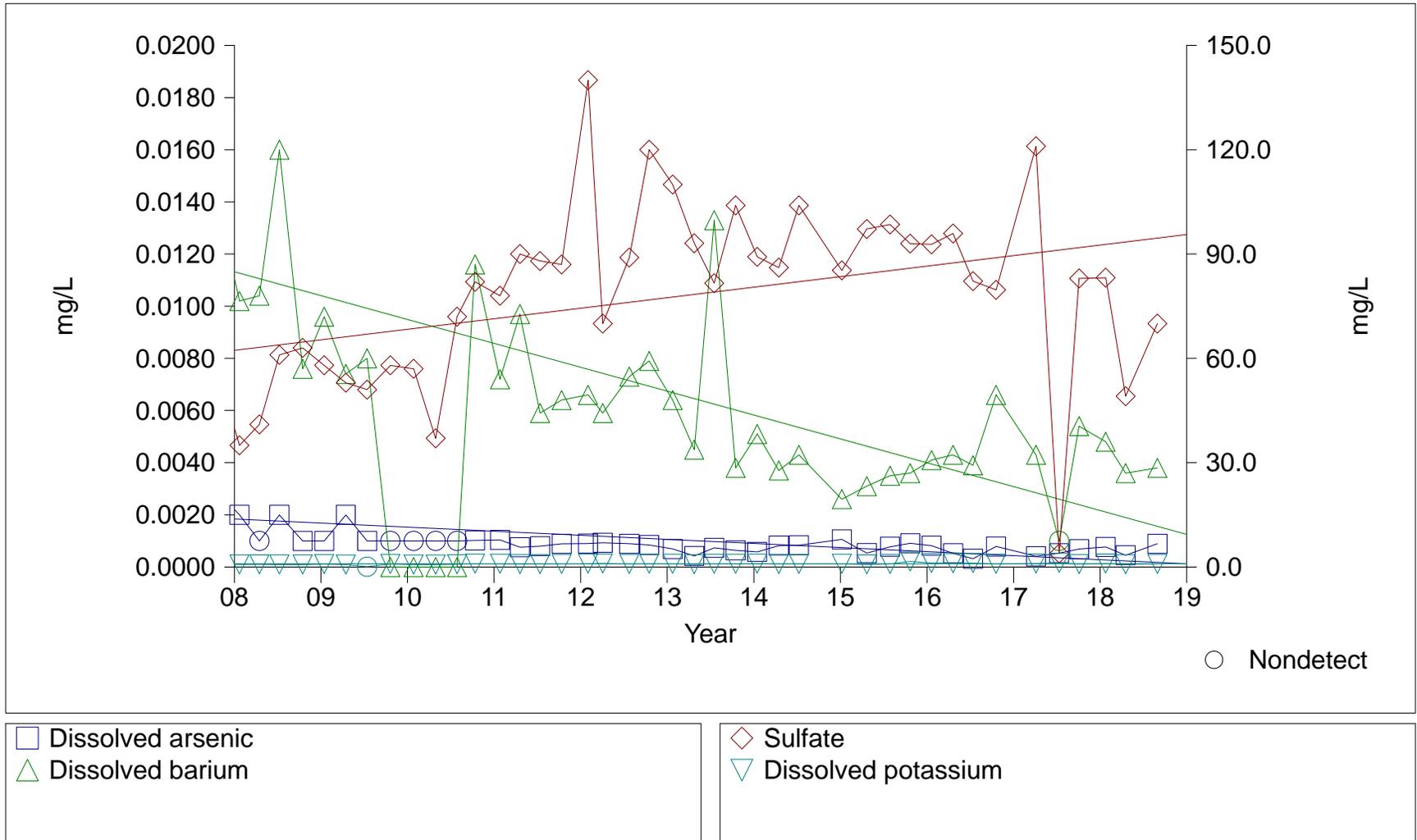
Cathcart Landfill

Time Series Plot for G-14S

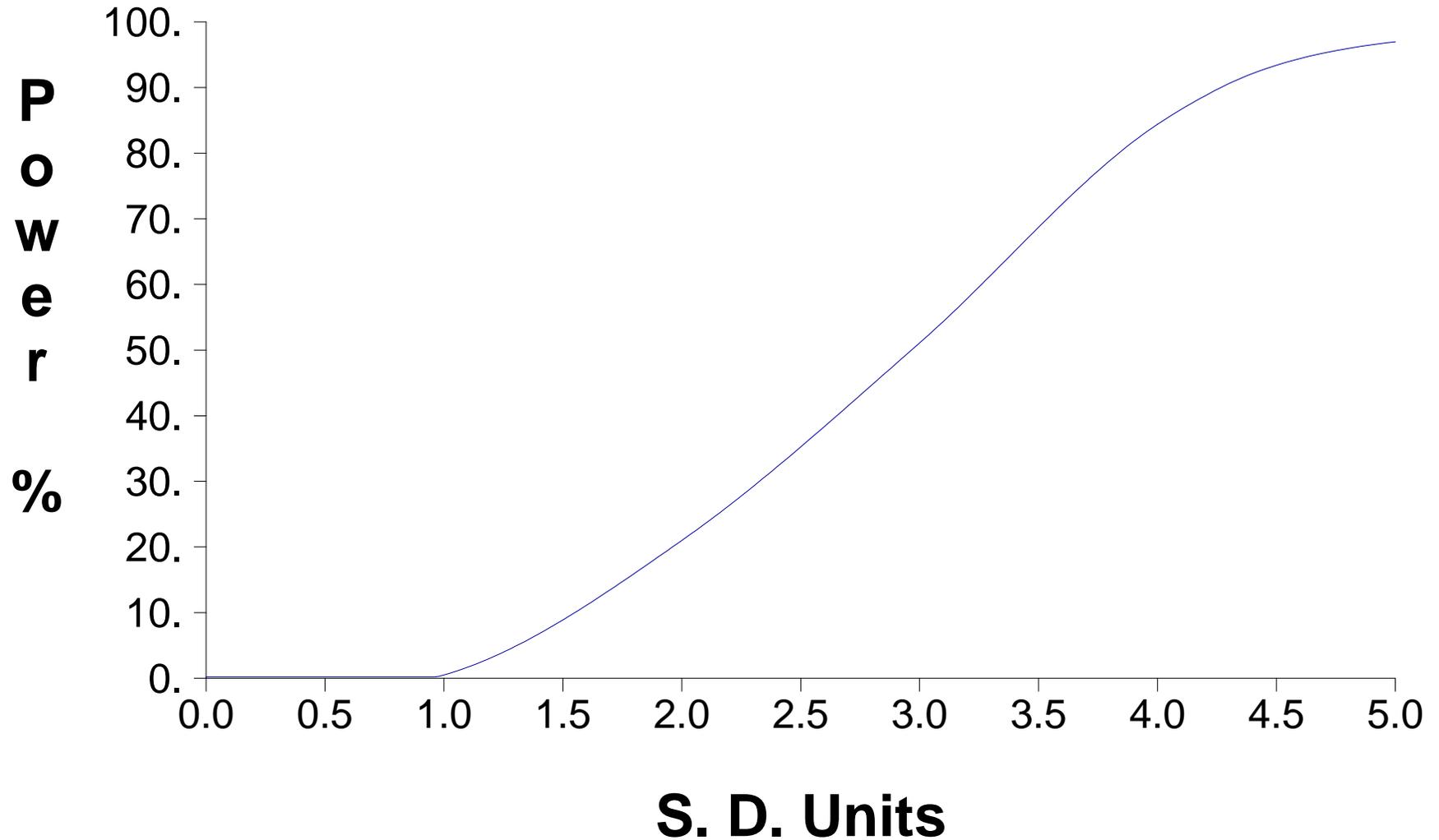


Cathcart Landfill

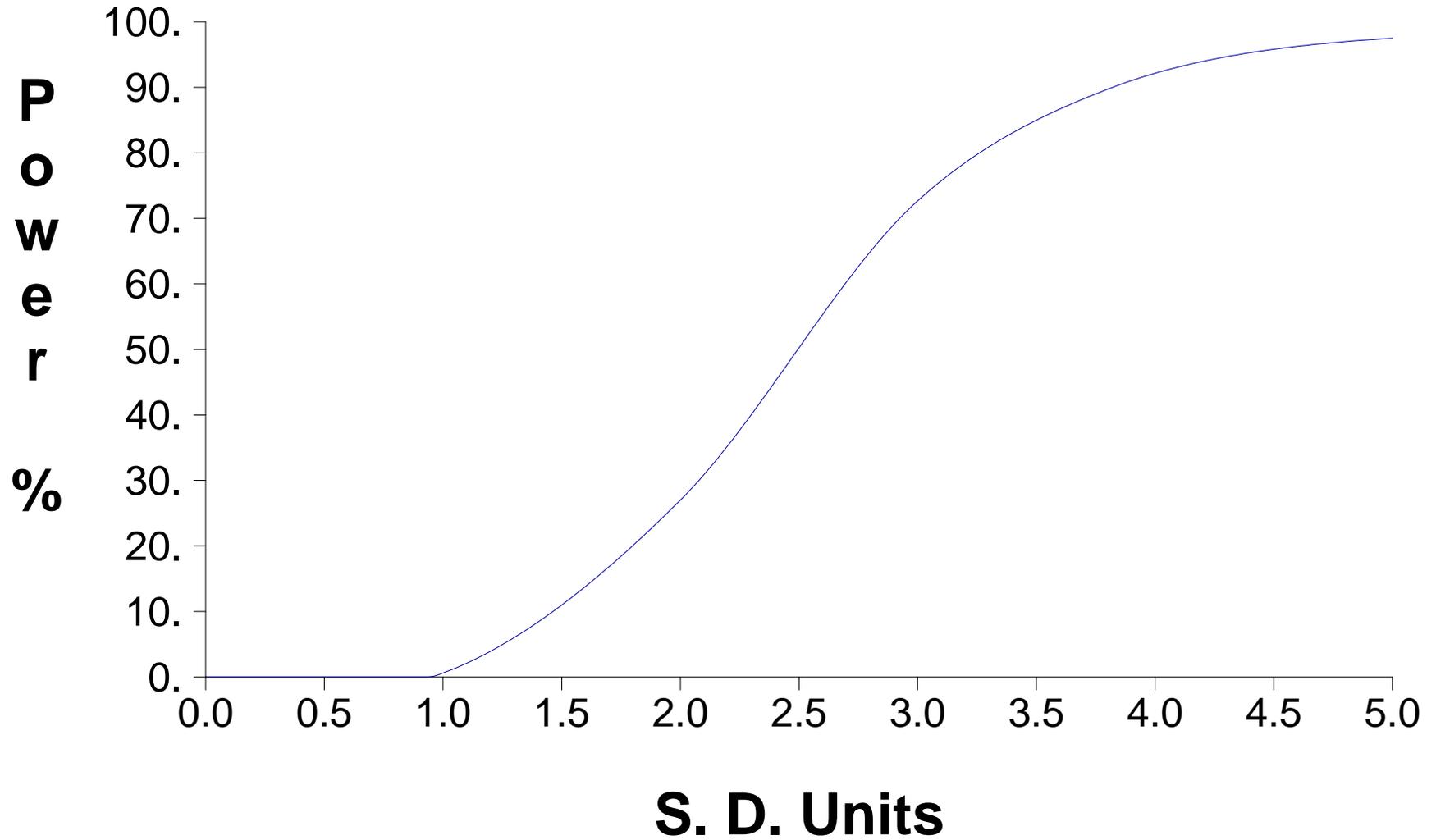
Time Series Plot for G-24S



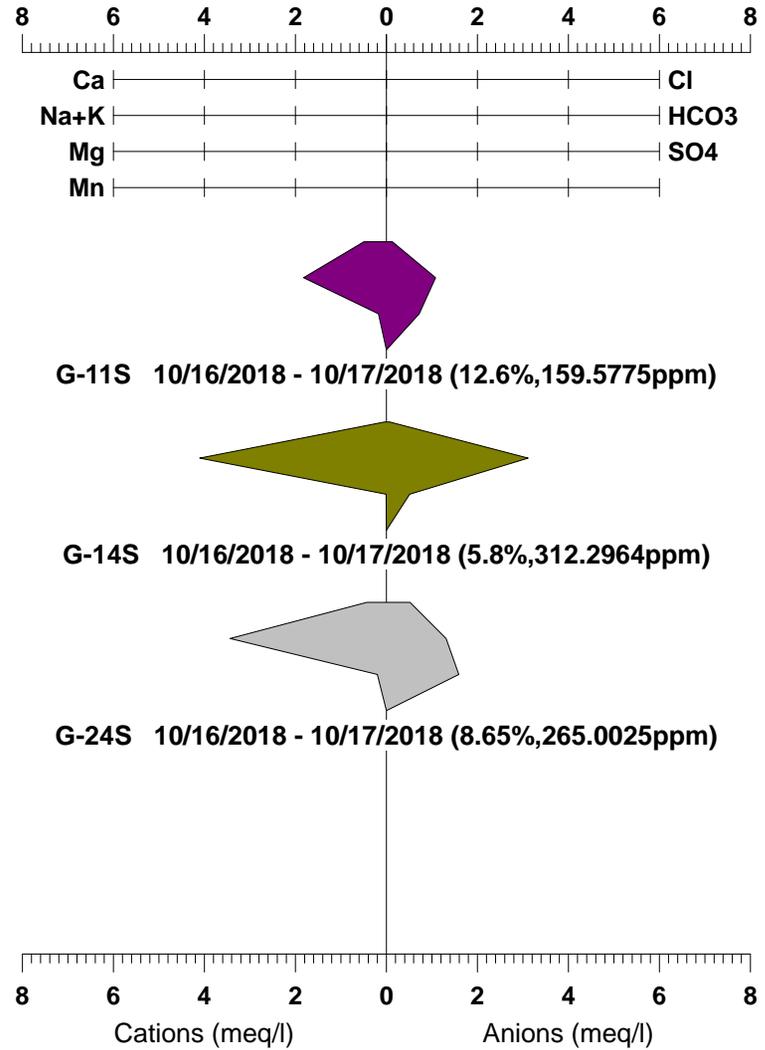
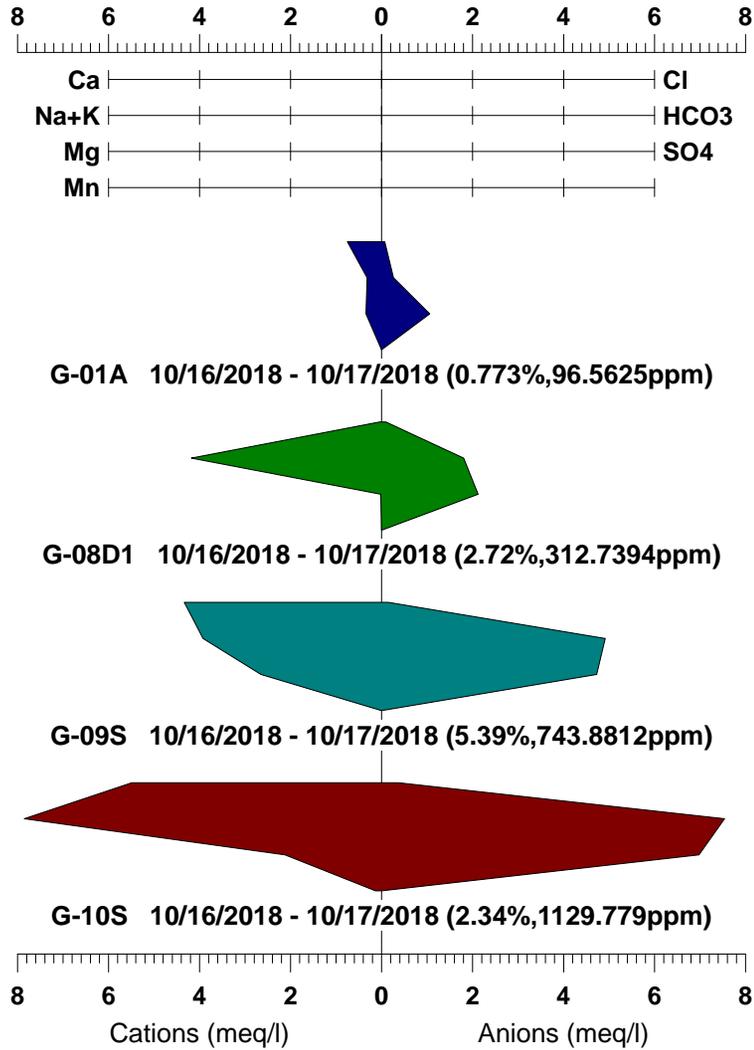
False Positive and False Negative Rates for Current Intra-Well Prediction Limits Monitoring Program



False Positive and False Negative Rates for Current Upgradient vs. Downgradient Monitoring Program

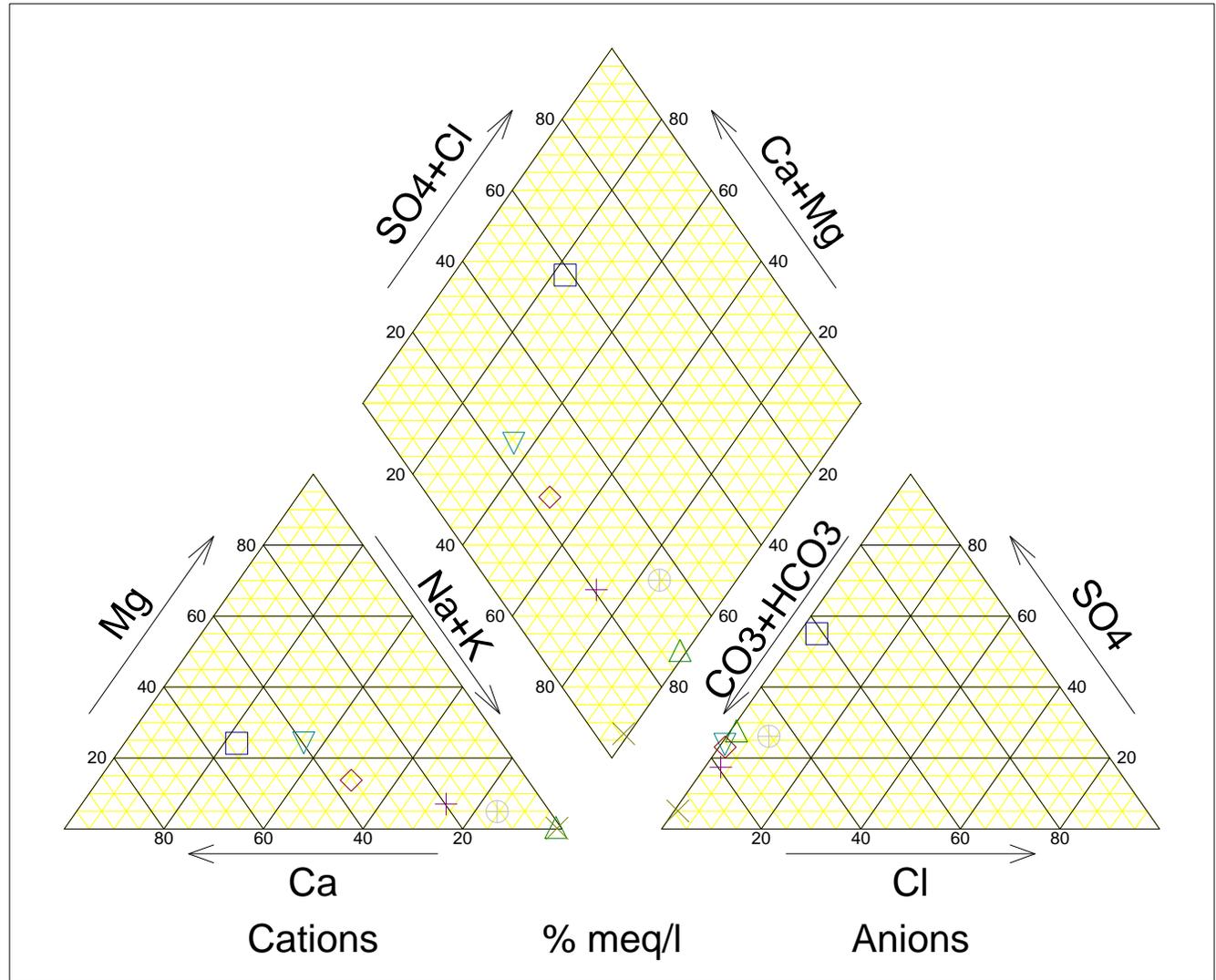


Cathcart Landfill

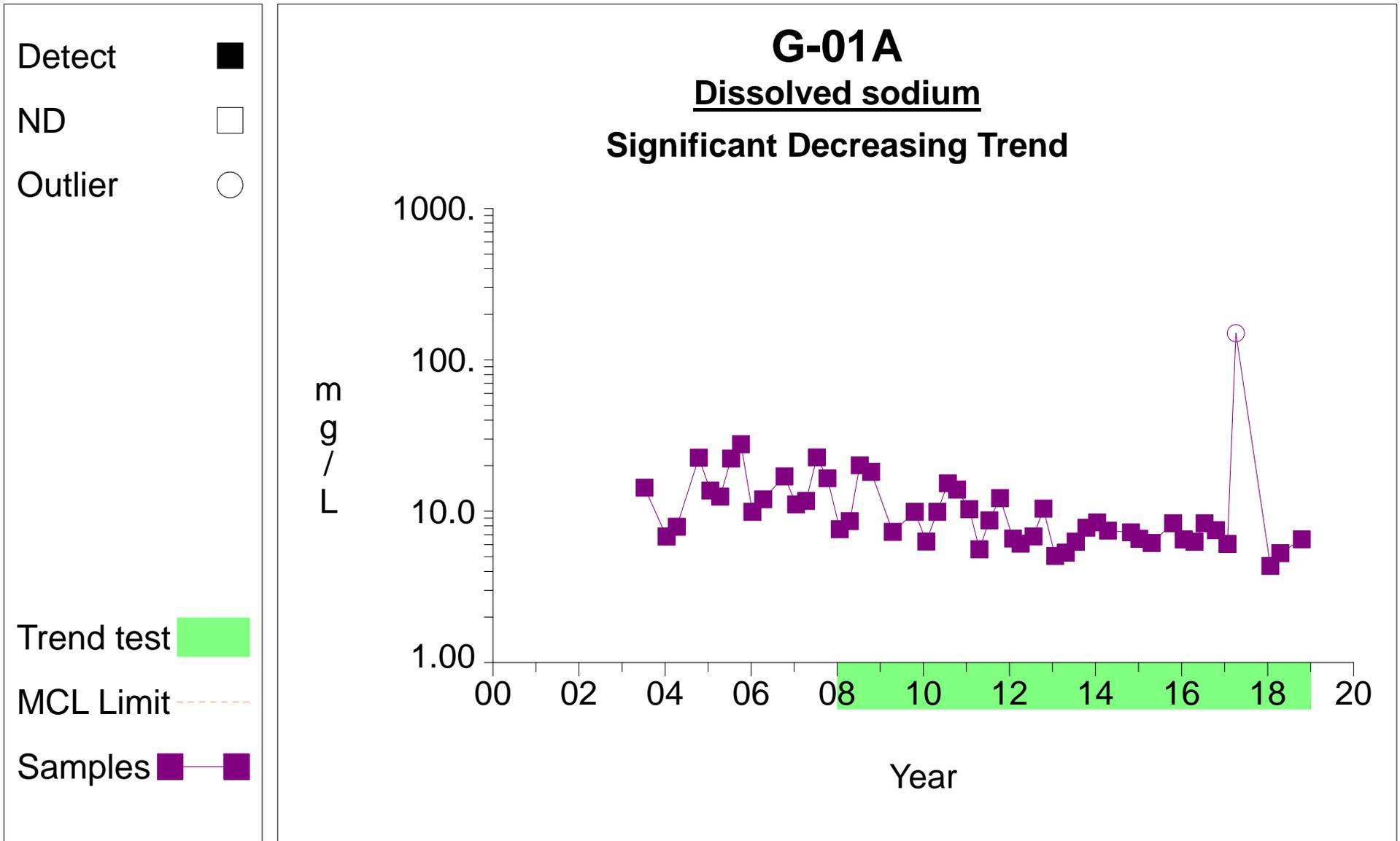


Cathcart Landfill

□	G-01A	10/16/2018 - 10/17/2018 (-15.3%, 112.56ppm)
△	G-08D1	10/16/2018 - 10/17/2018 (-28.8%, 422.73ppm)
▽	G-09S	10/16/2018 - 10/17/2018 (-28.9%, 1043.83ppm)
◇	G-10S	10/16/2018 - 10/17/2018 (-32.3%, 1586.15ppm)
+	G-11S	10/16/2018 - 10/17/2018 (-24.8%, 225.575ppm)
×	G-14S	10/16/2018 - 10/17/2018 (-41.5%, 502.29ppm)
⊗	G-24S	10/16/2018 - 10/17/2018 (-19.9%, 345ppm)

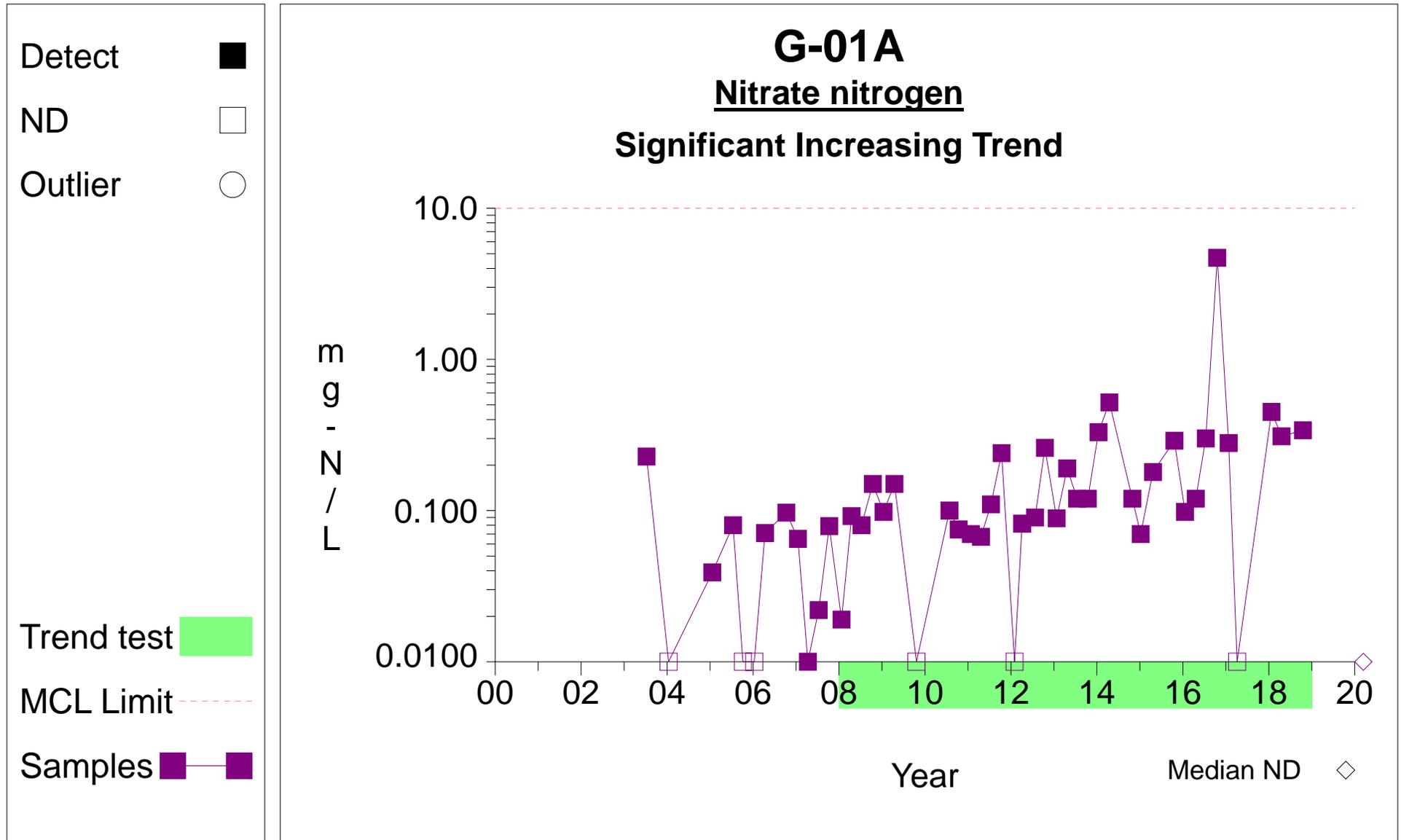


Time Series



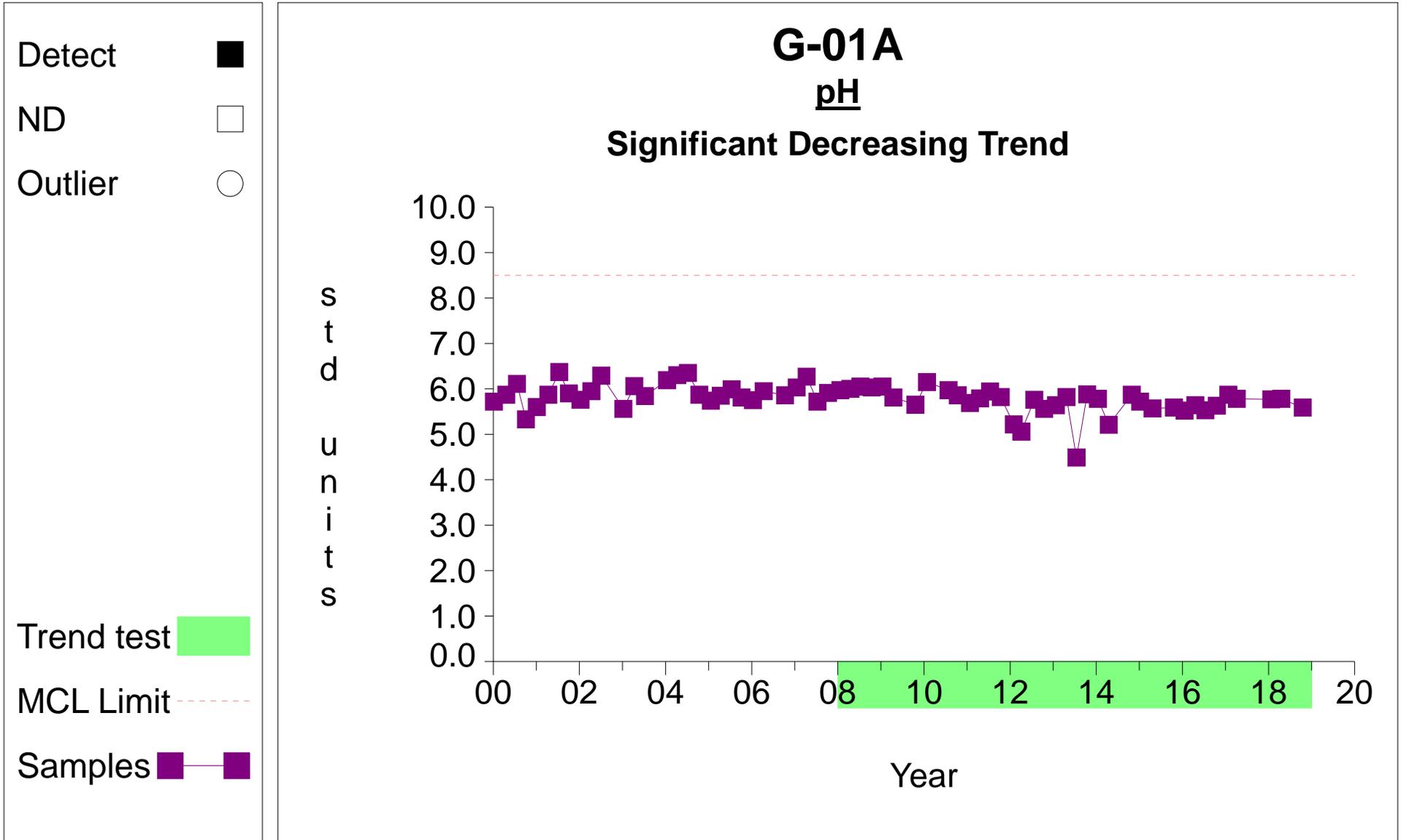
Graph 24

Time Series



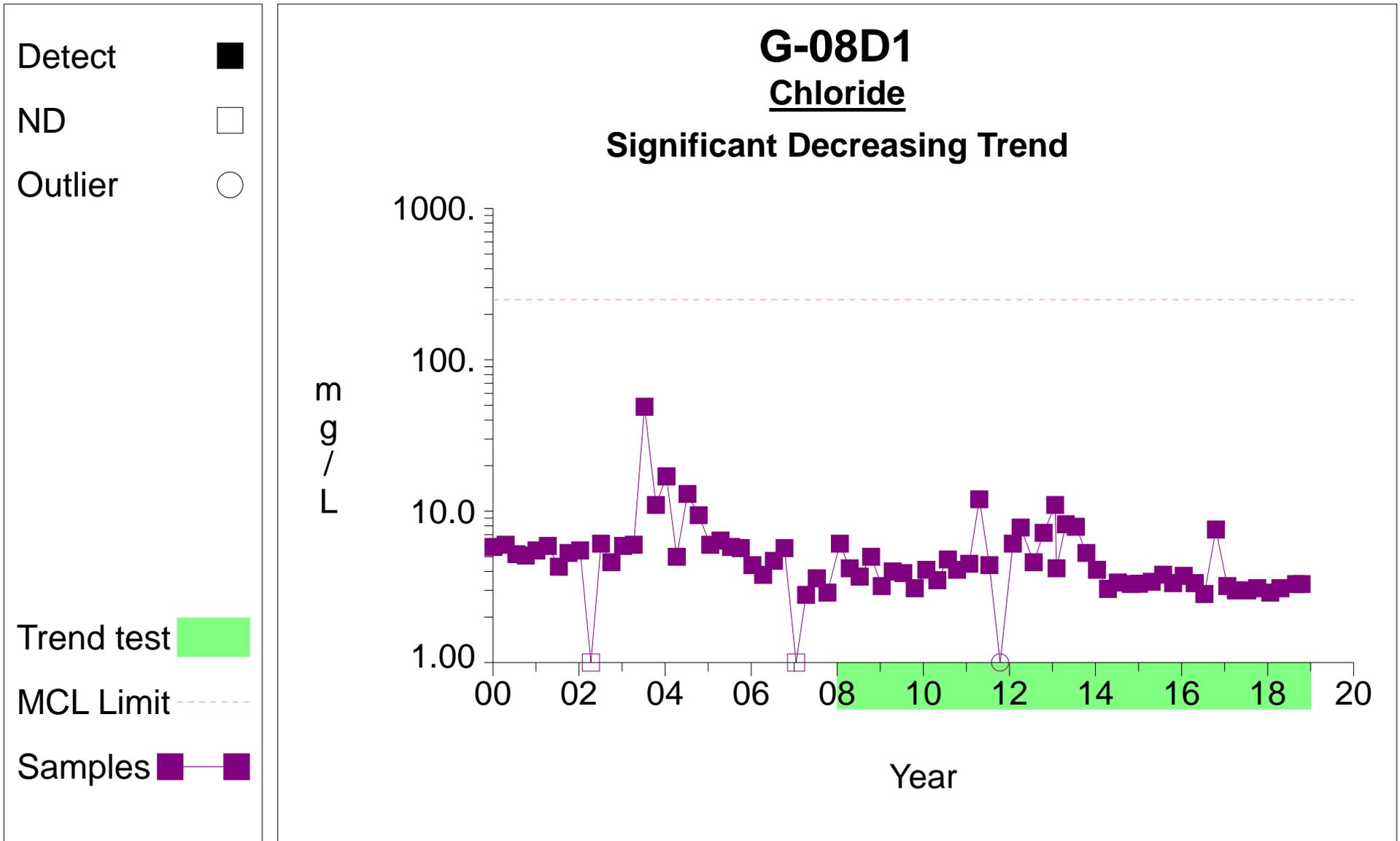
Graph 28

Time Series



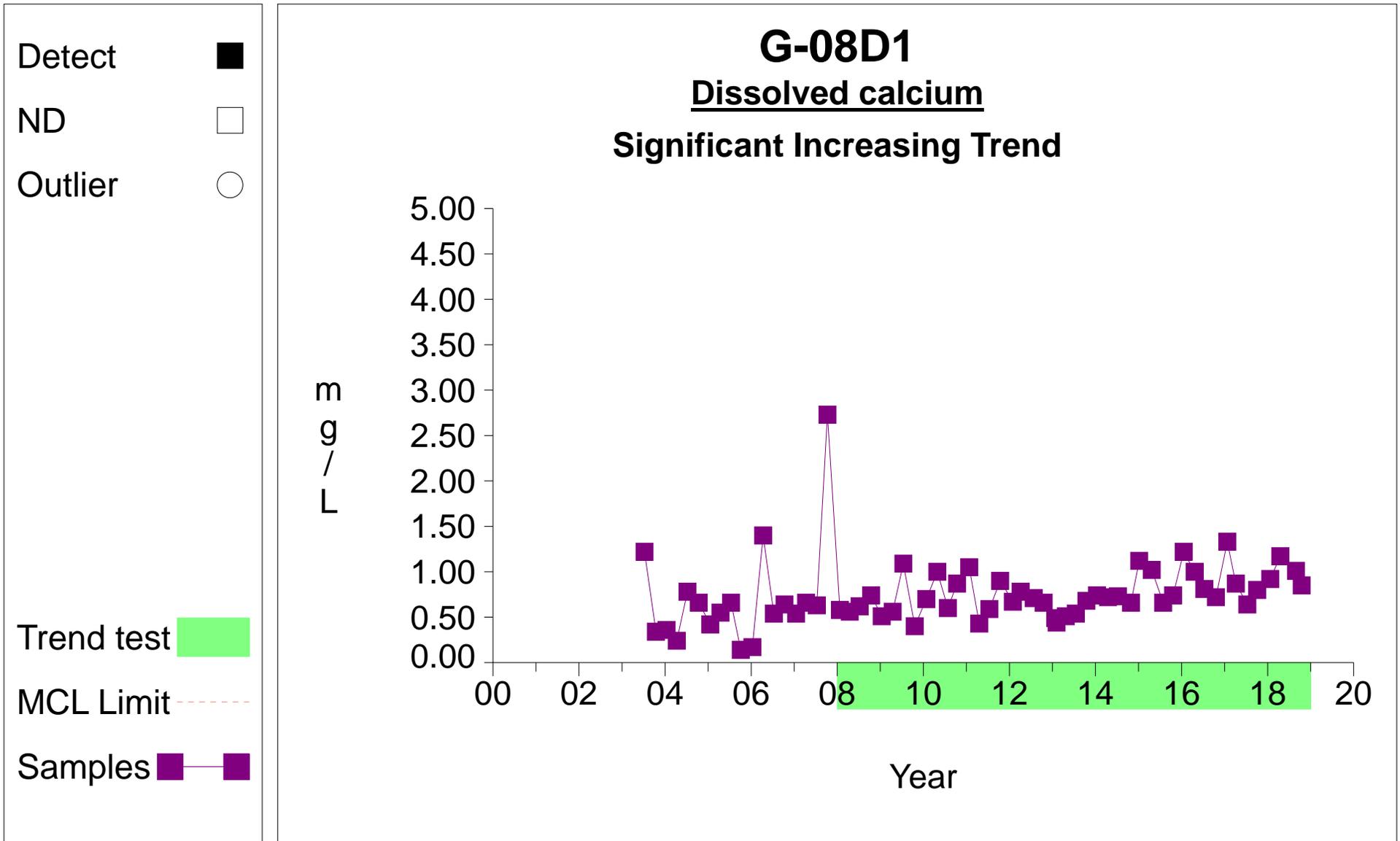
Graph 30

Time Series



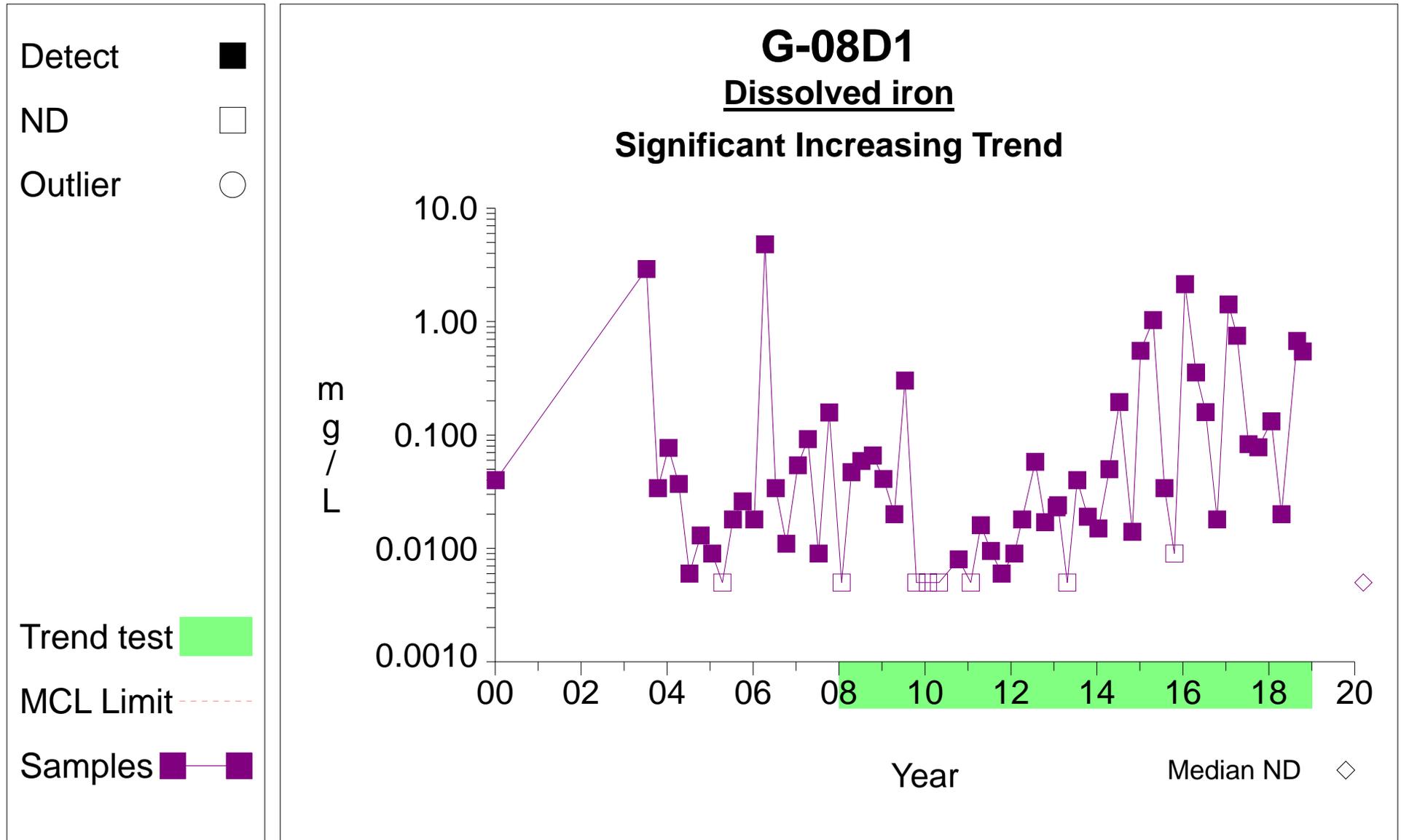
Graph 71

Time Series



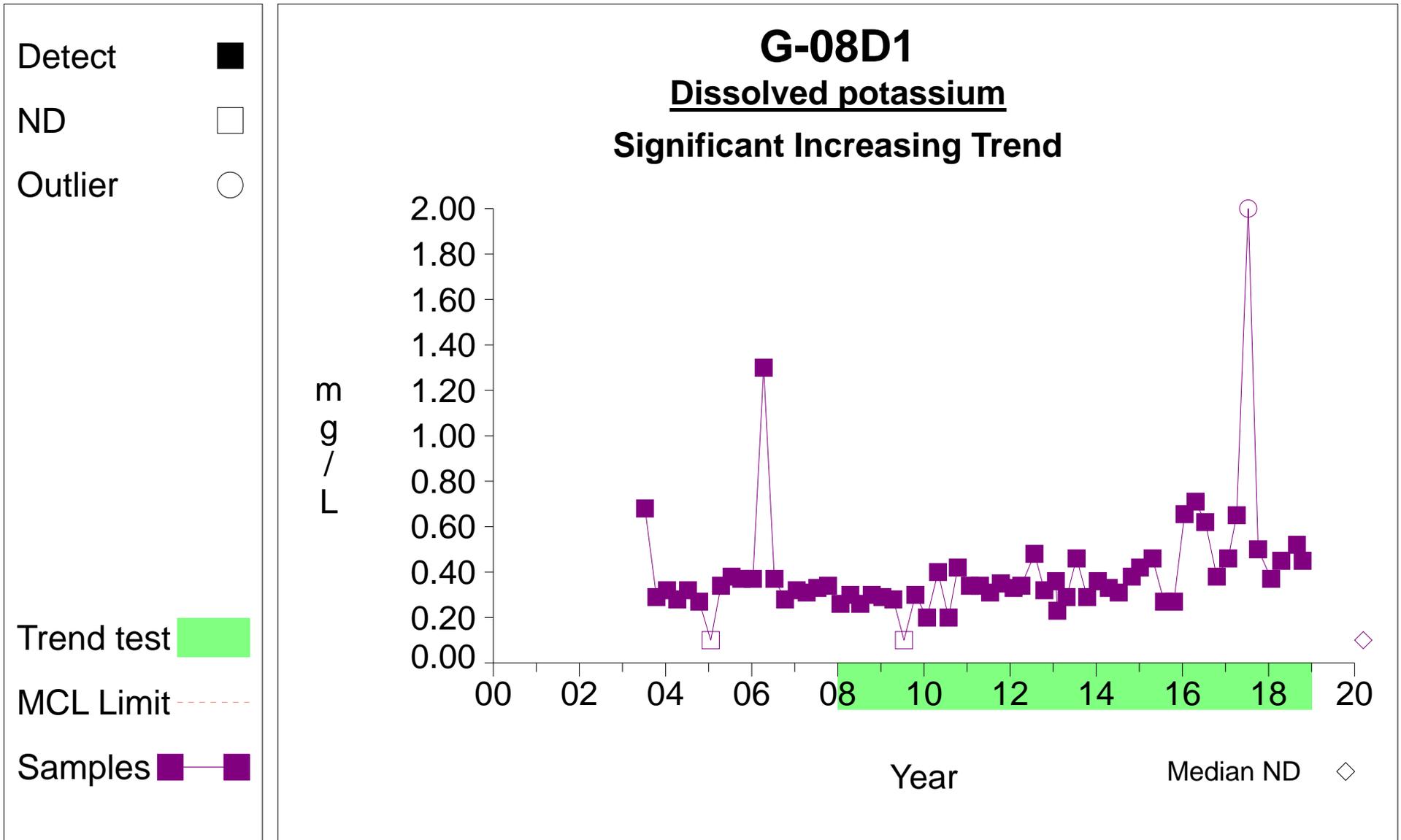
Graph 78

Time Series



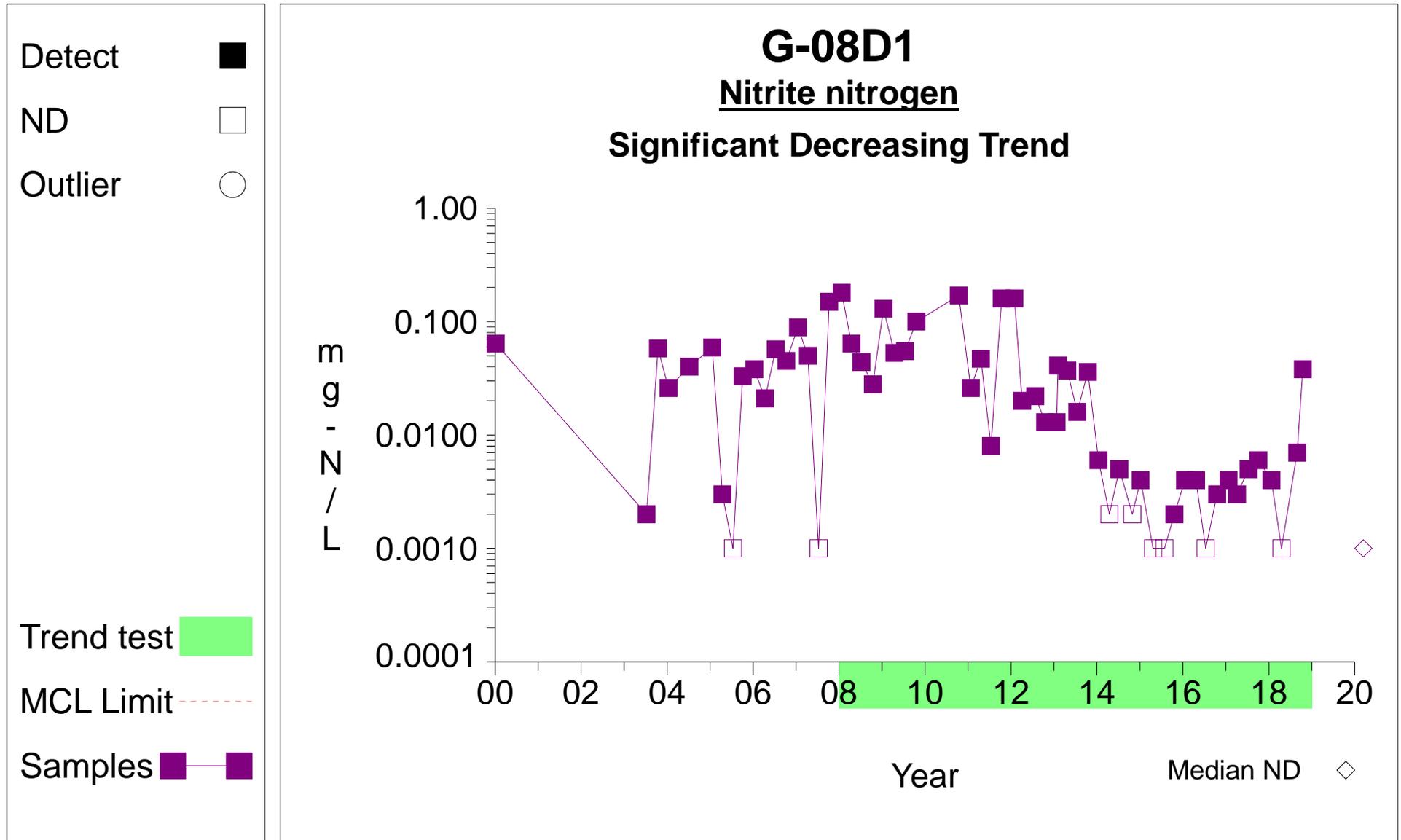
Graph 82

Time Series



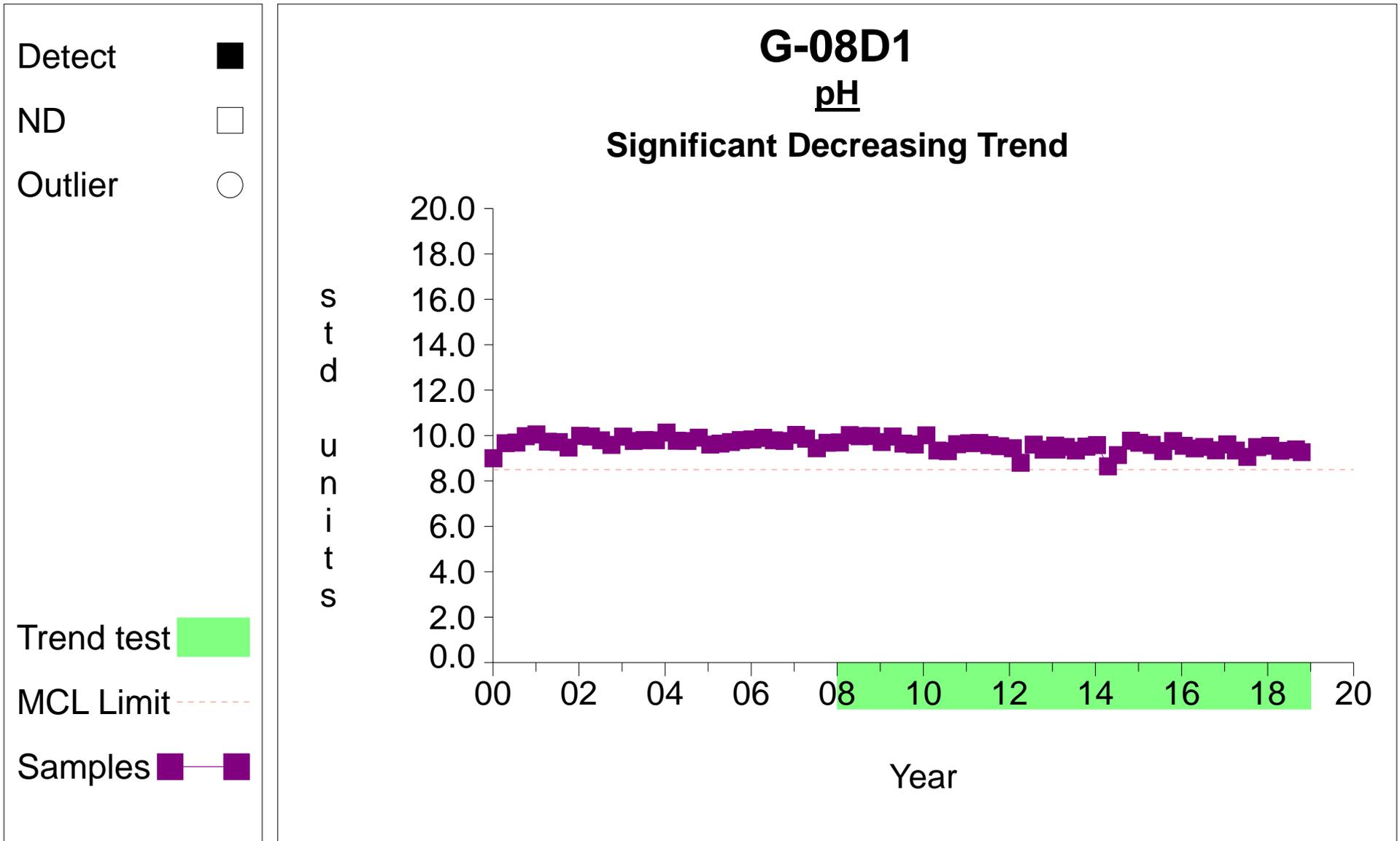
Graph 87

Time Series



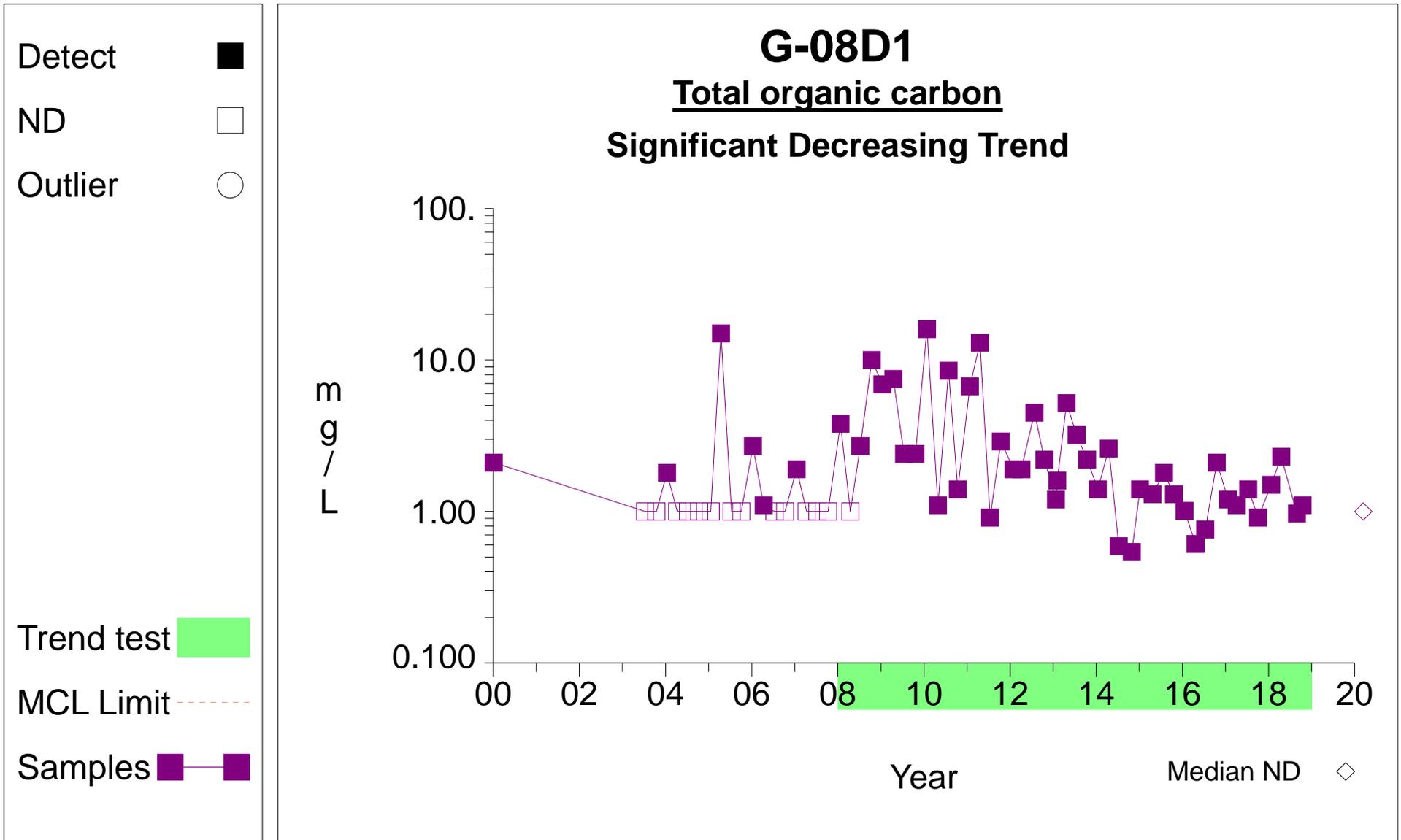
Graph 95

Time Series



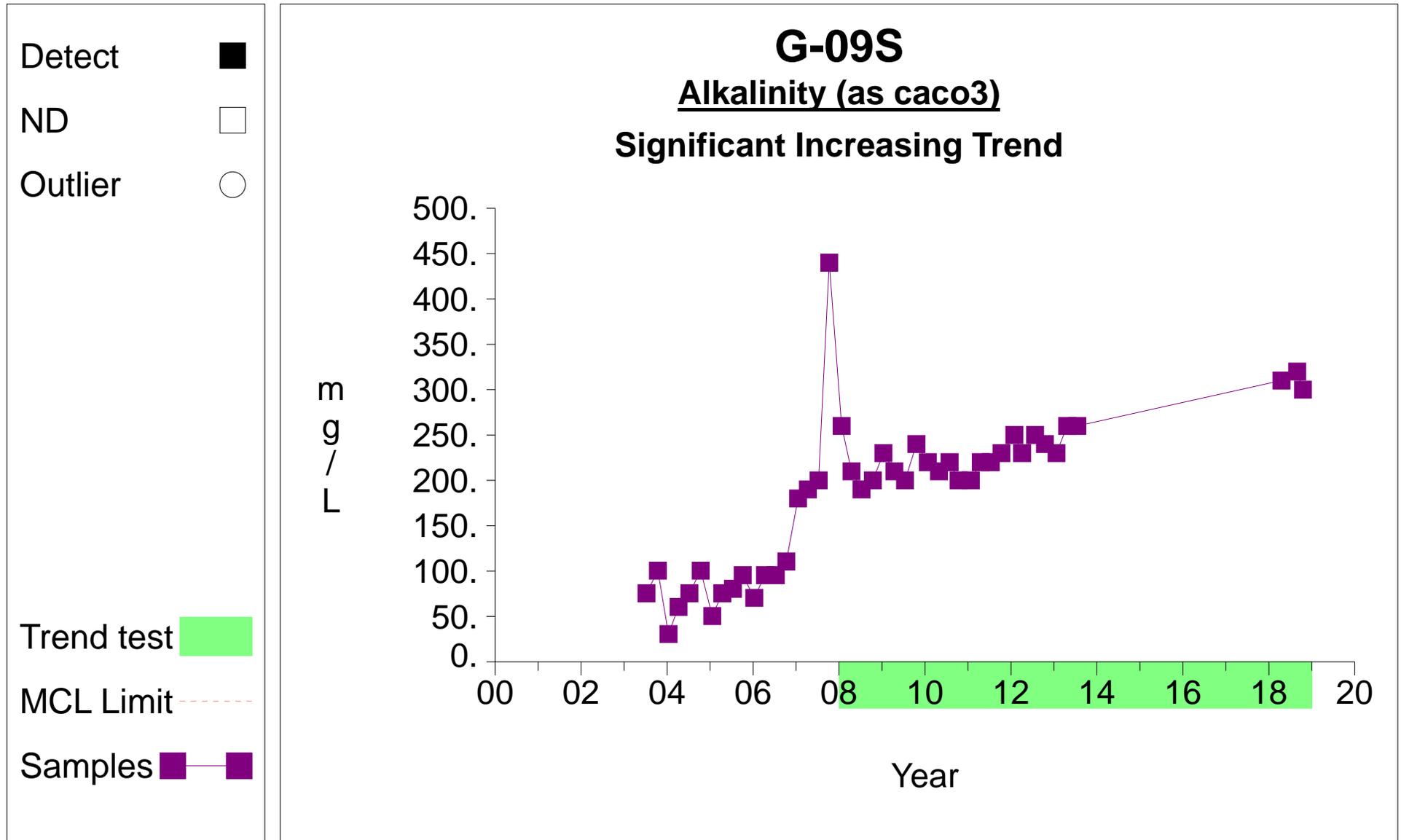
Graph 96

Time Series



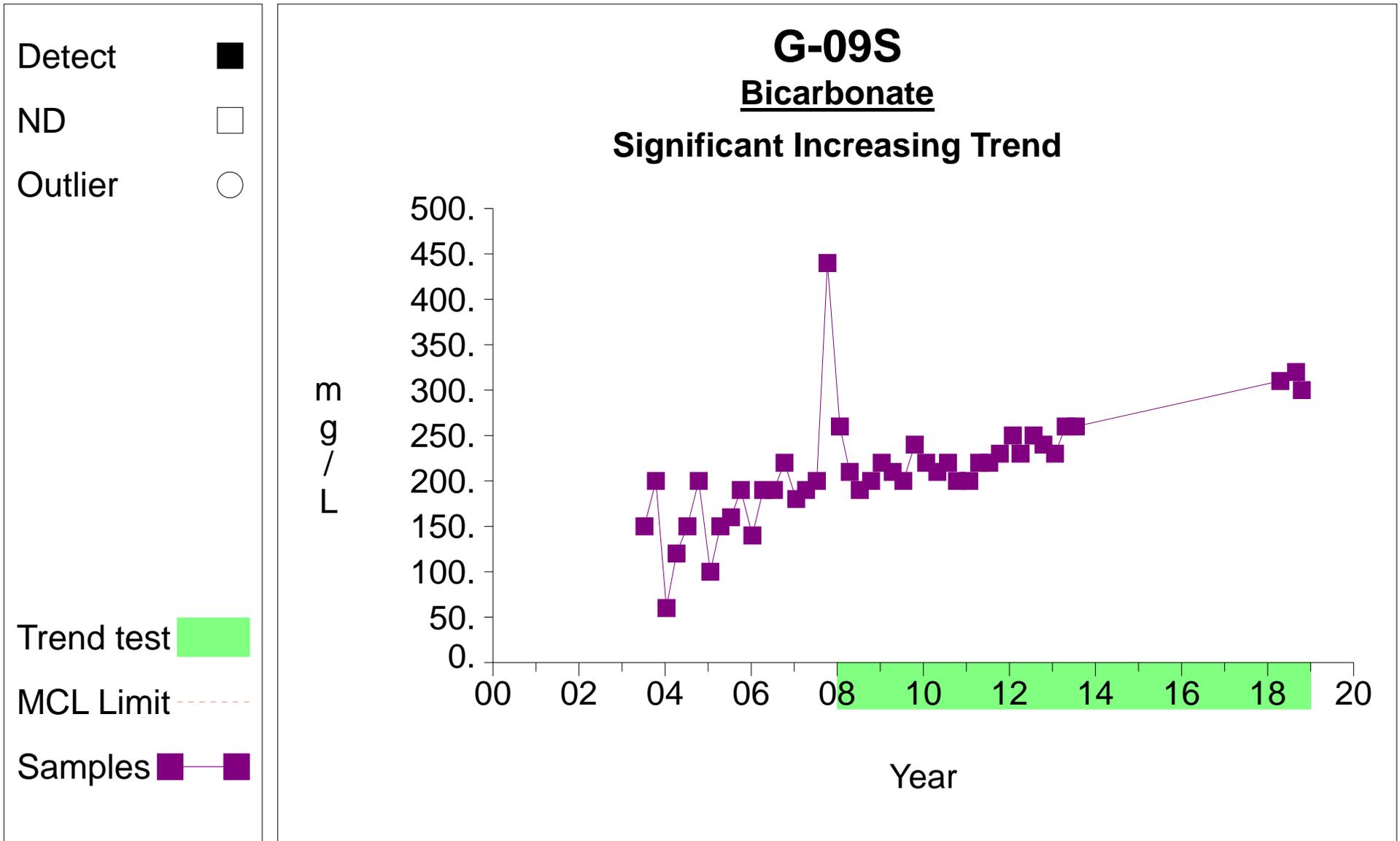
Graph 99

Time Series



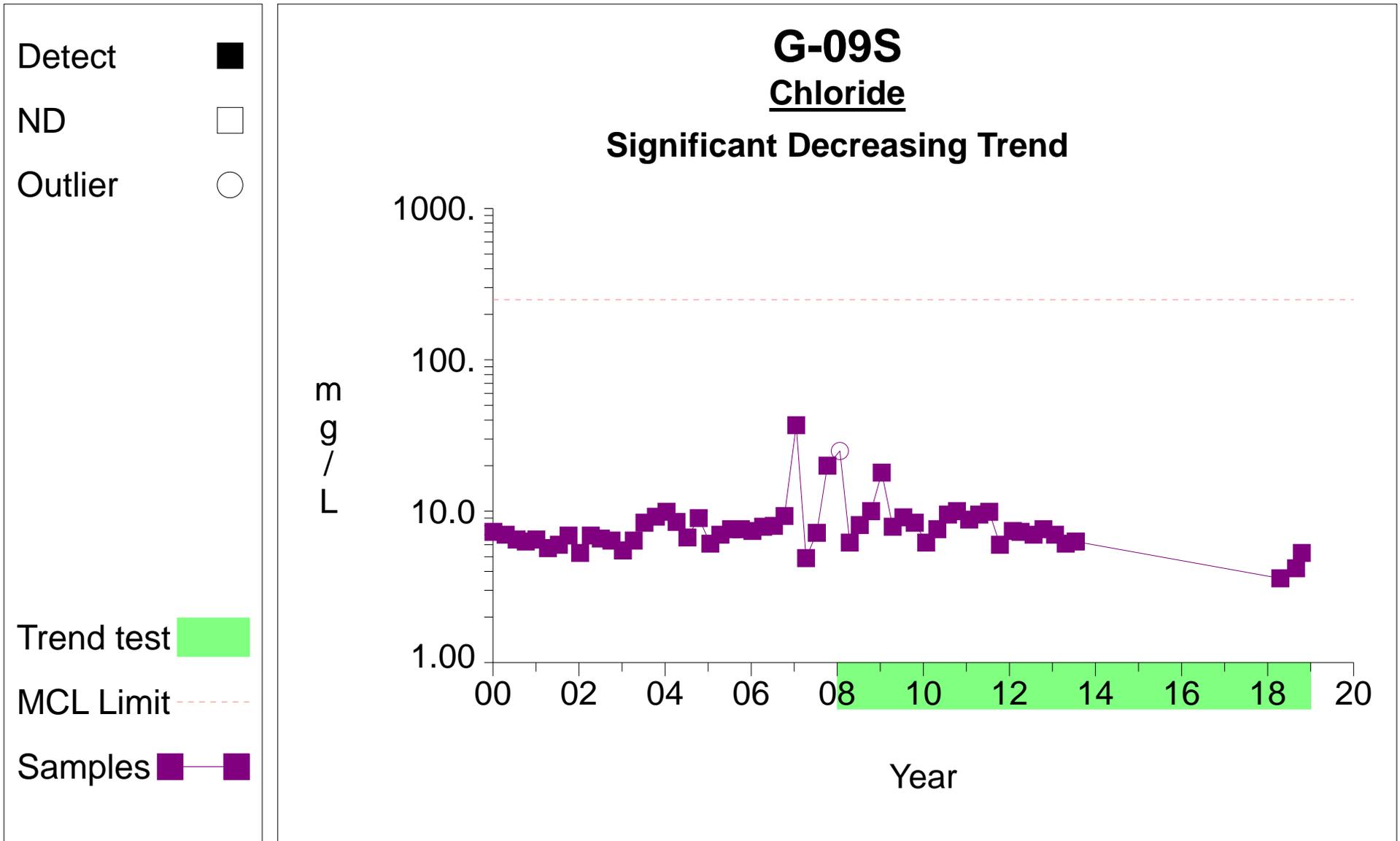
Graph 100

Time Series



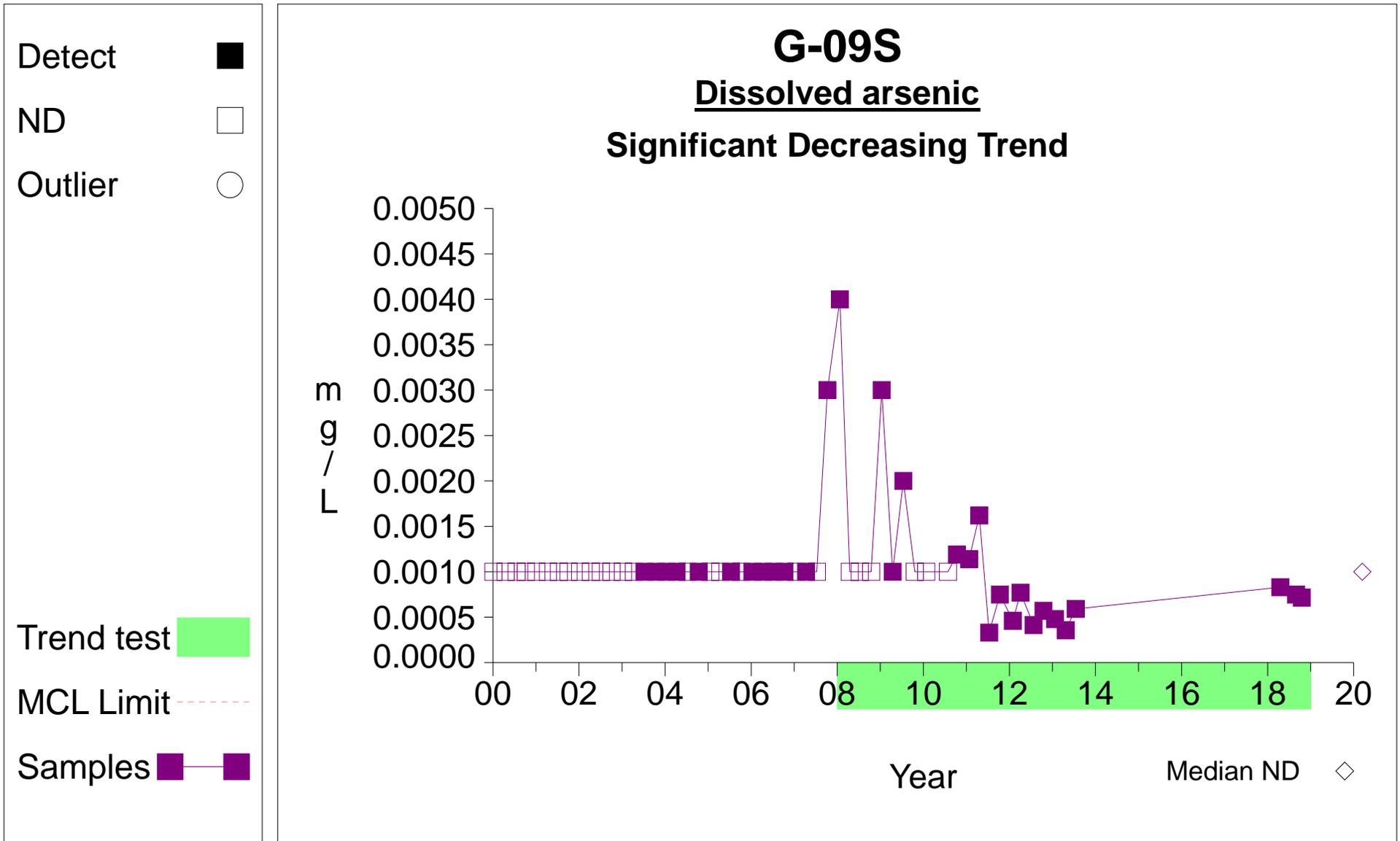
Graph 102

Time Series



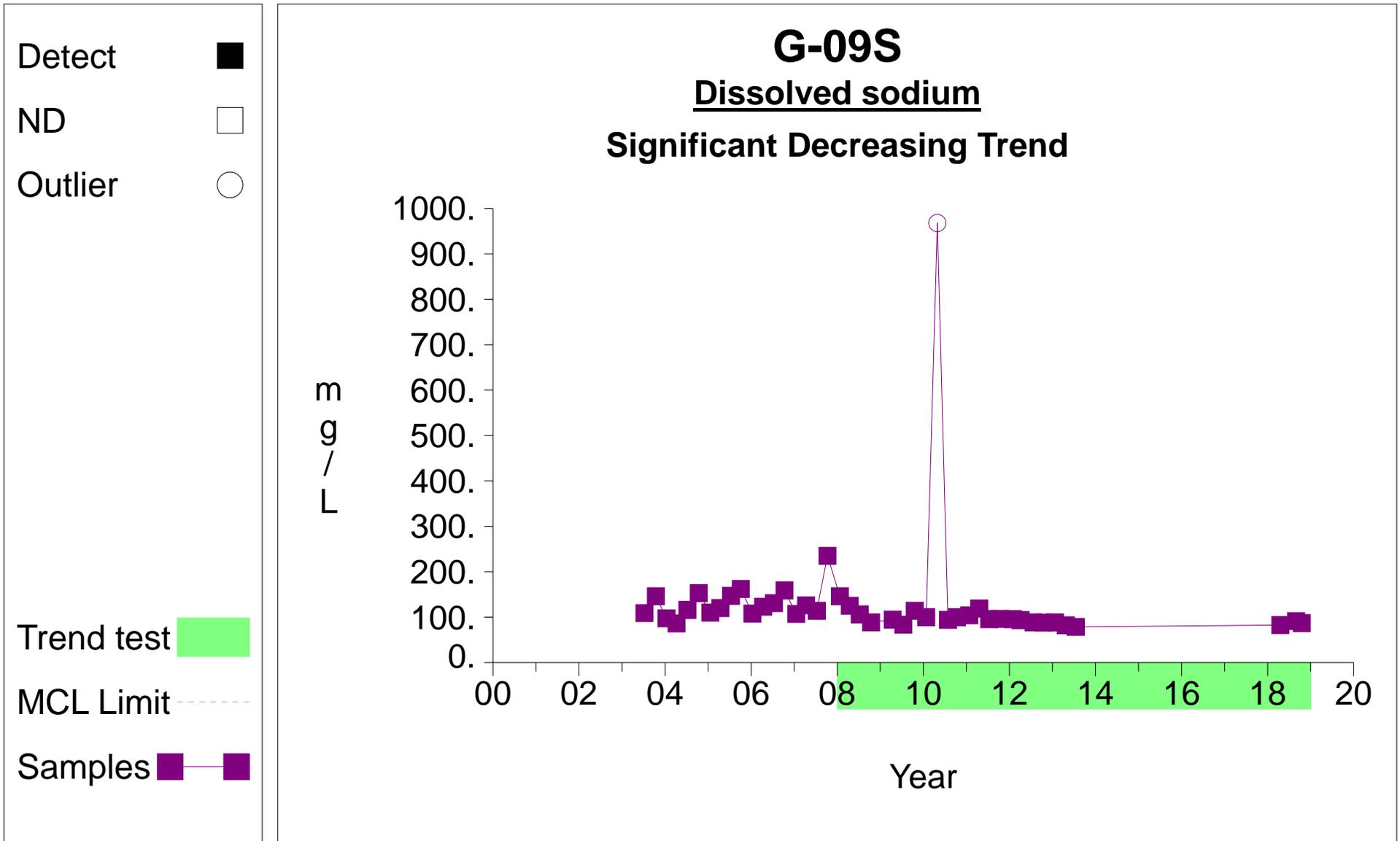
Graph 104

Time Series



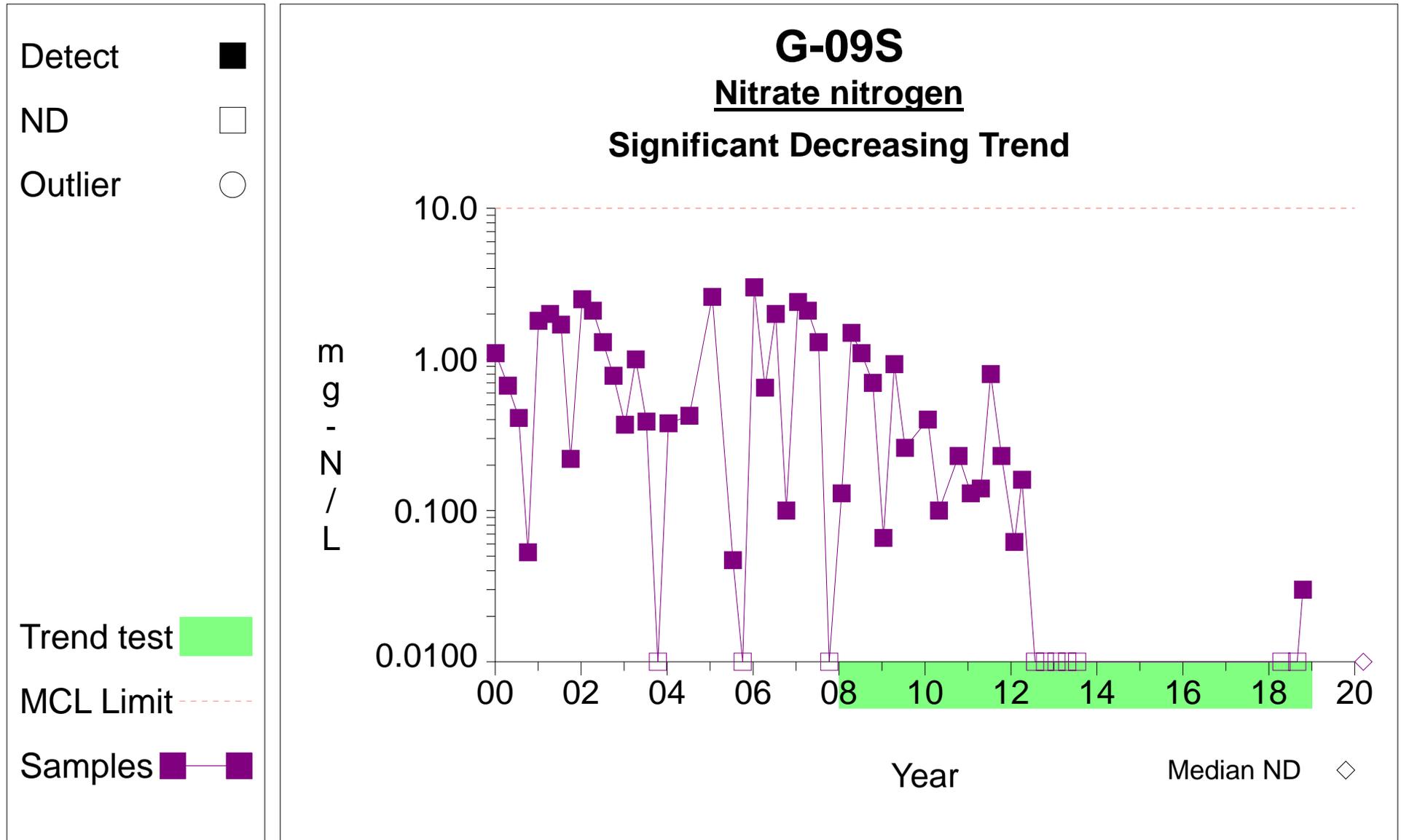
Graph 107

Time Series



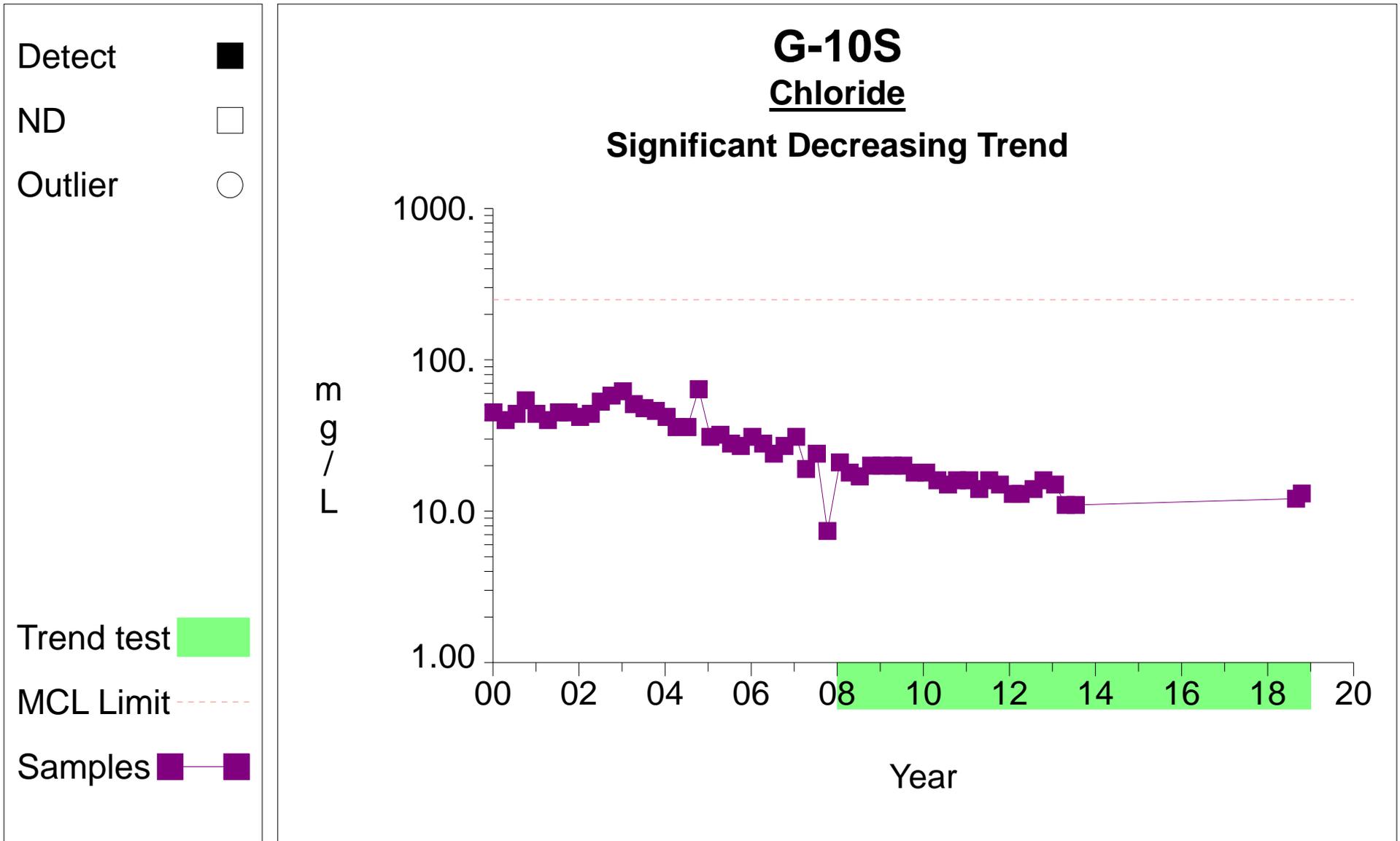
Graph 123

Time Series



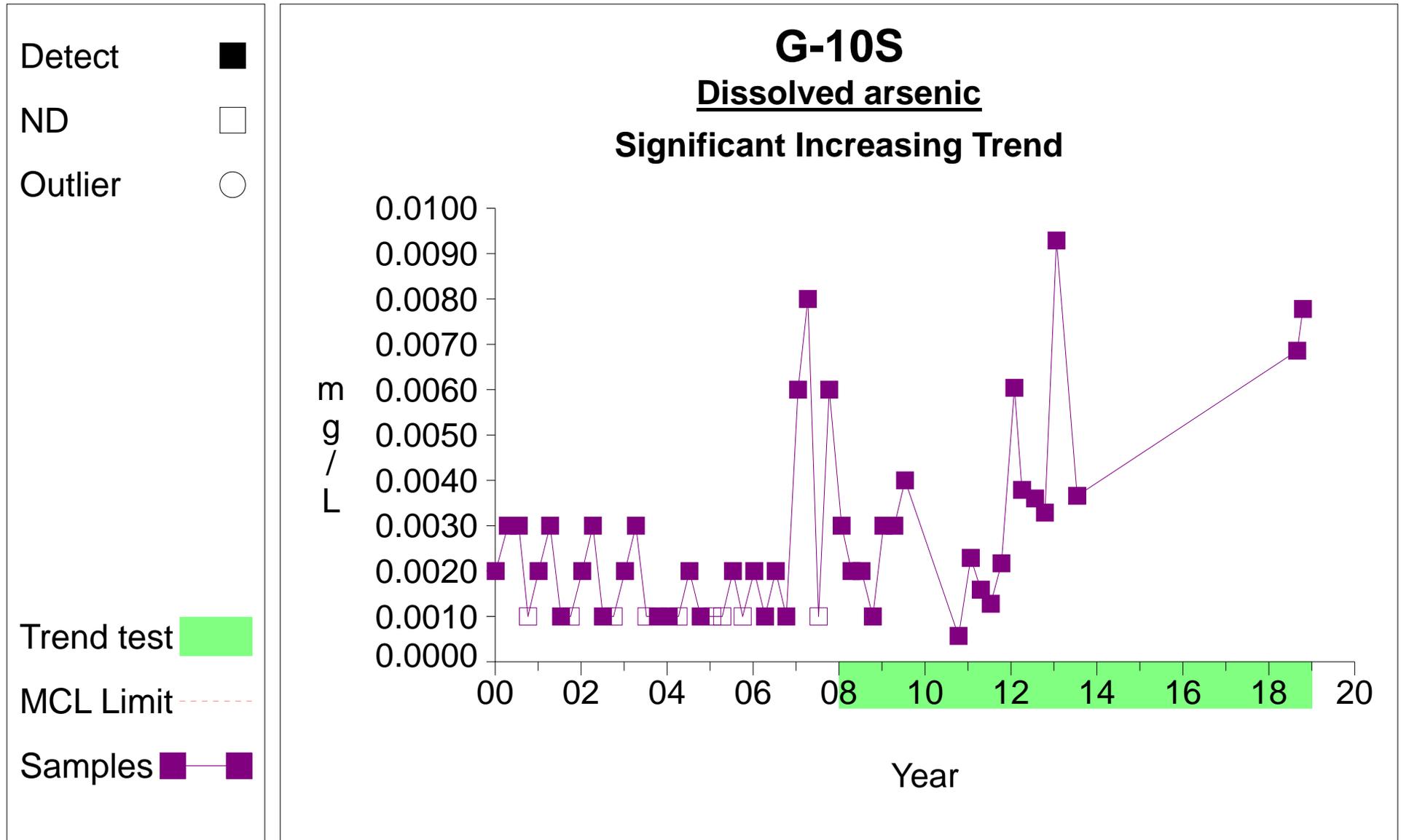
Graph 127

Time Series



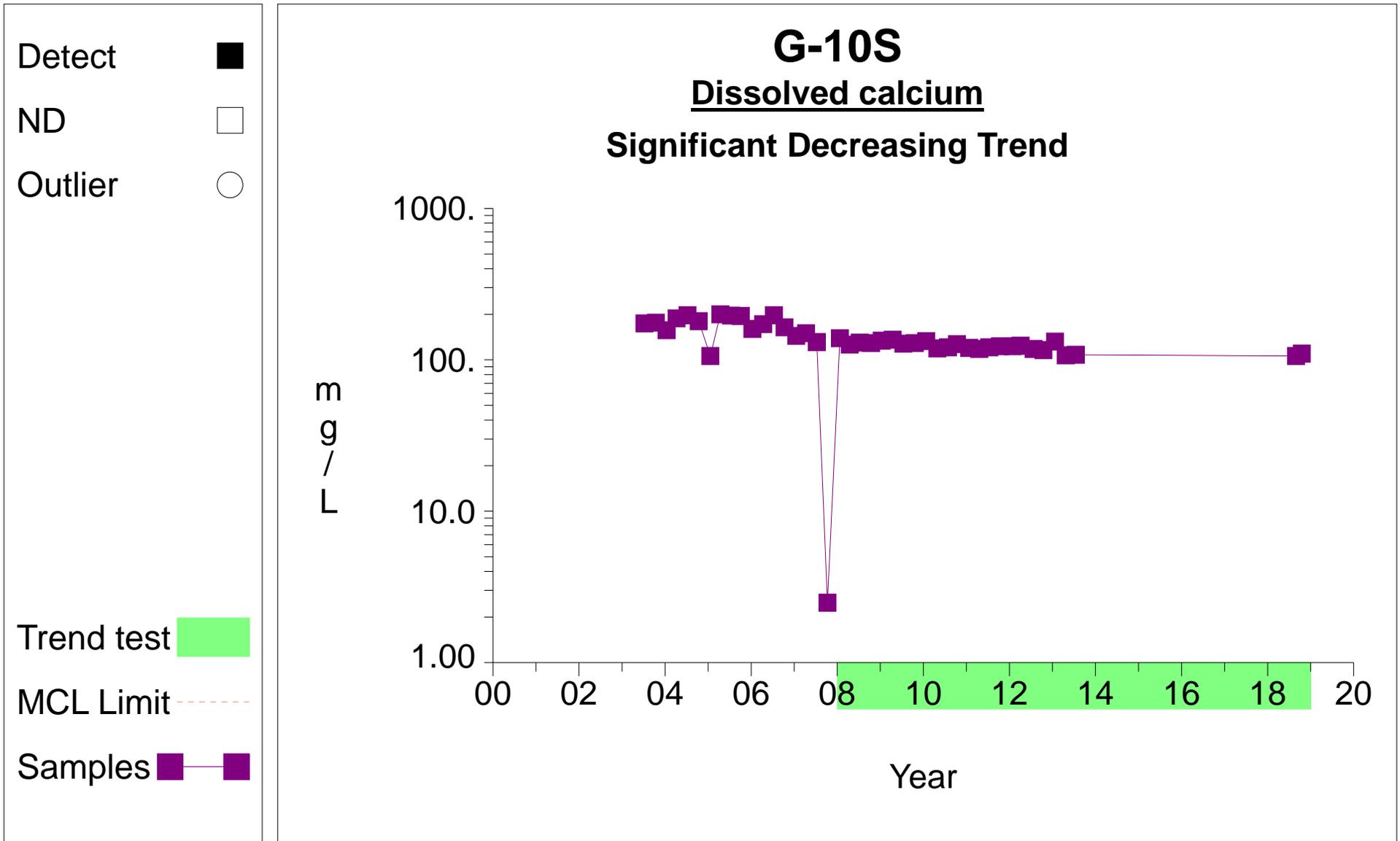
Graph 137

Time Series



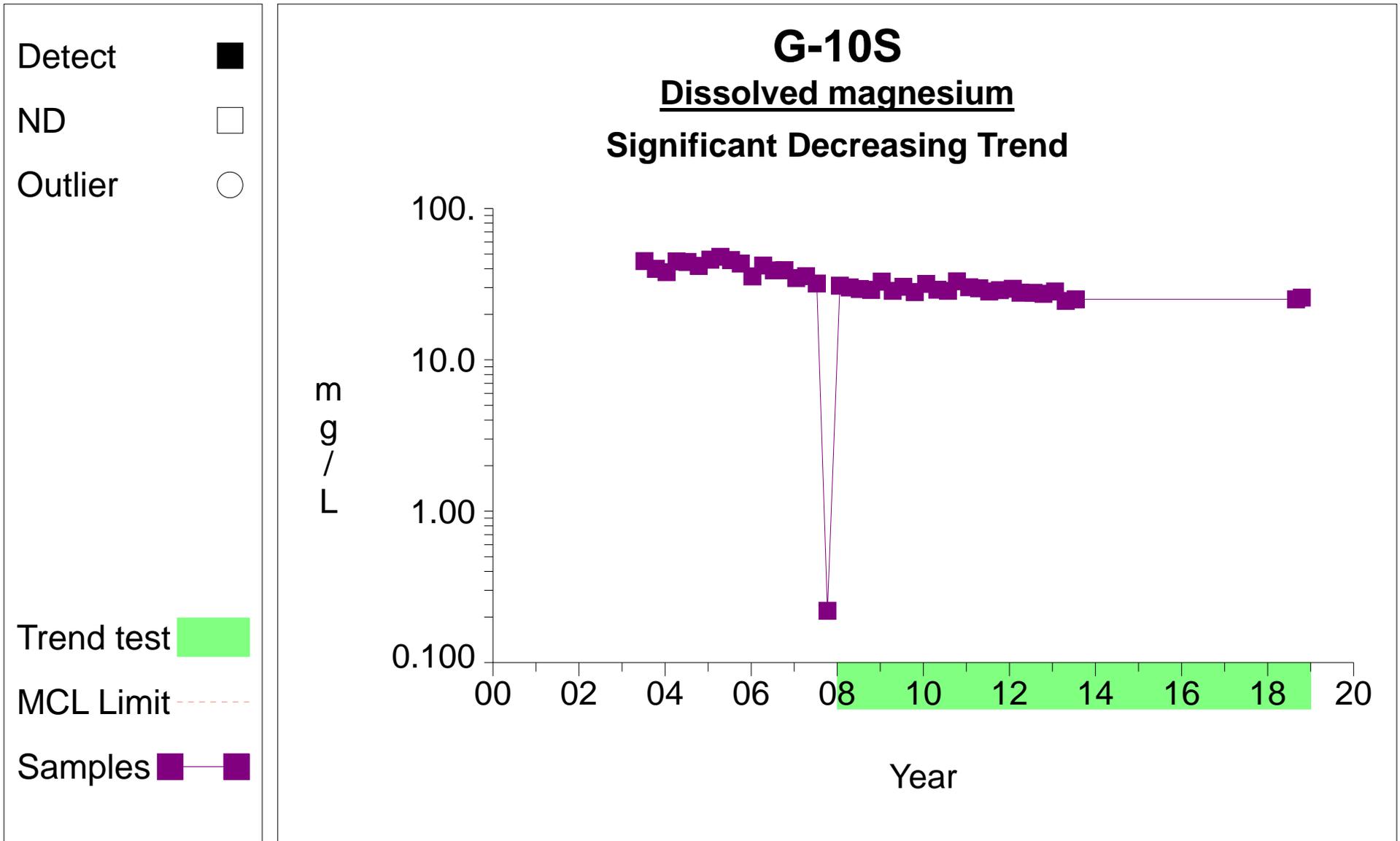
Graph 140

Time Series



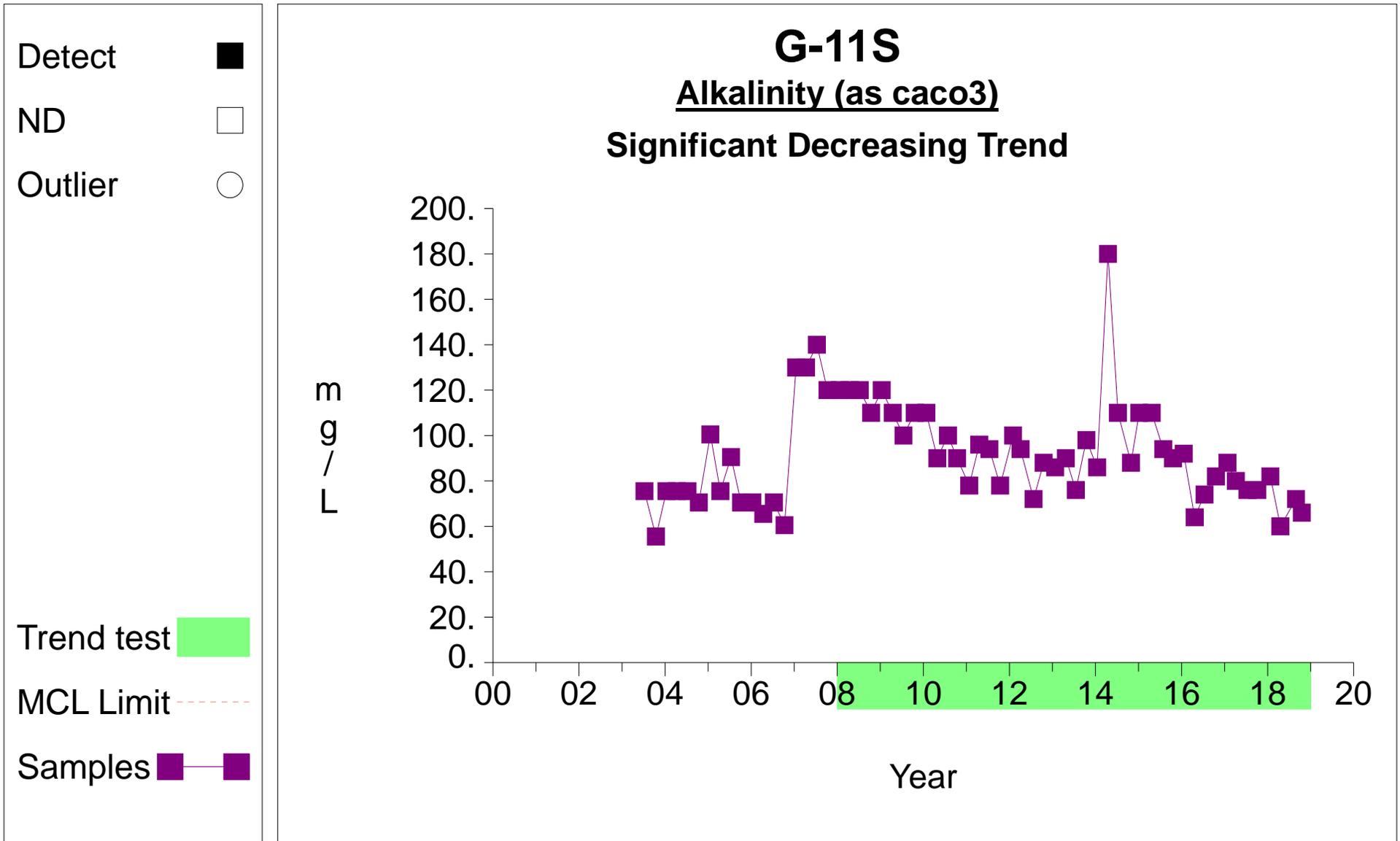
Graph 144

Time Series



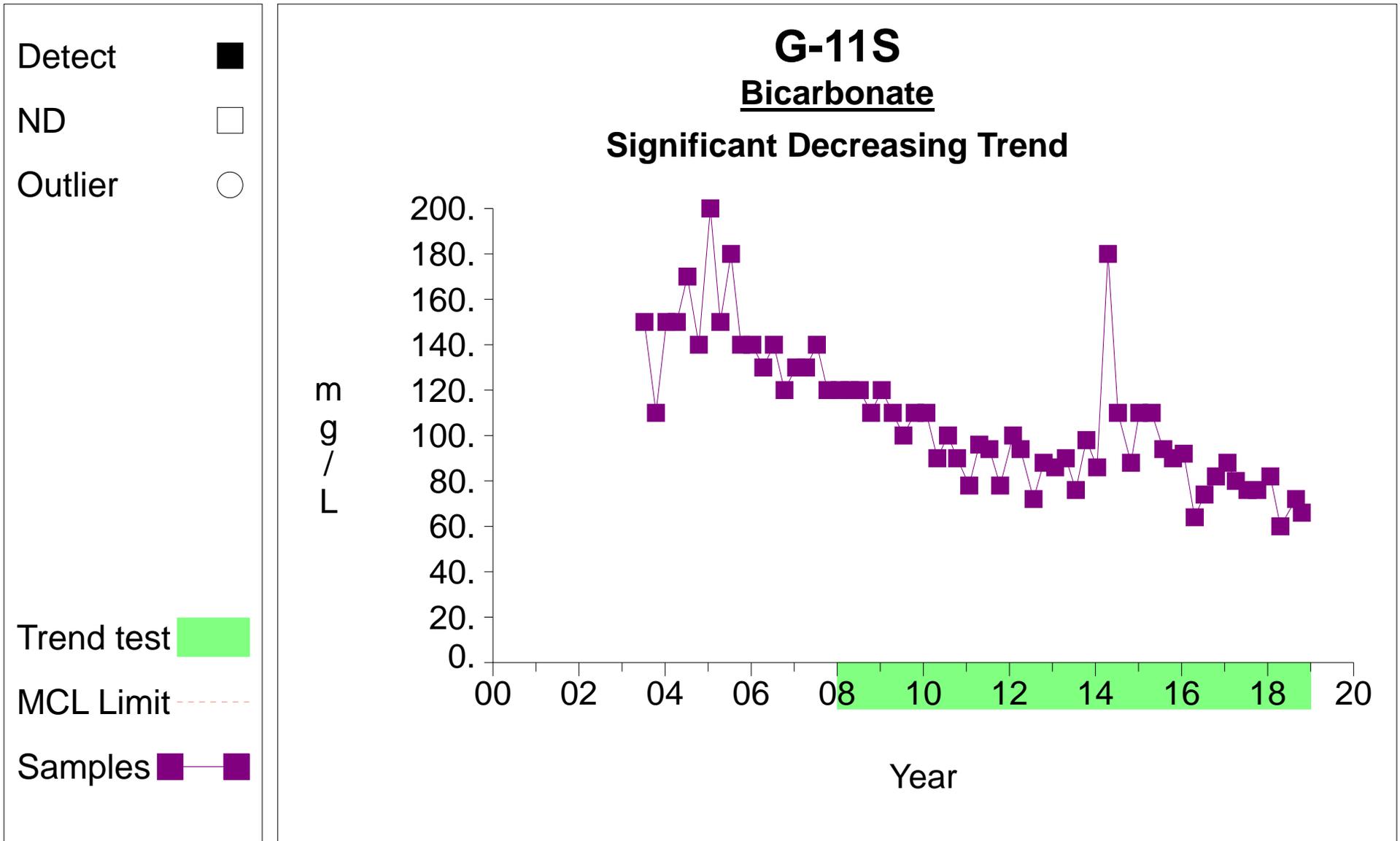
Graph 150

Time Series



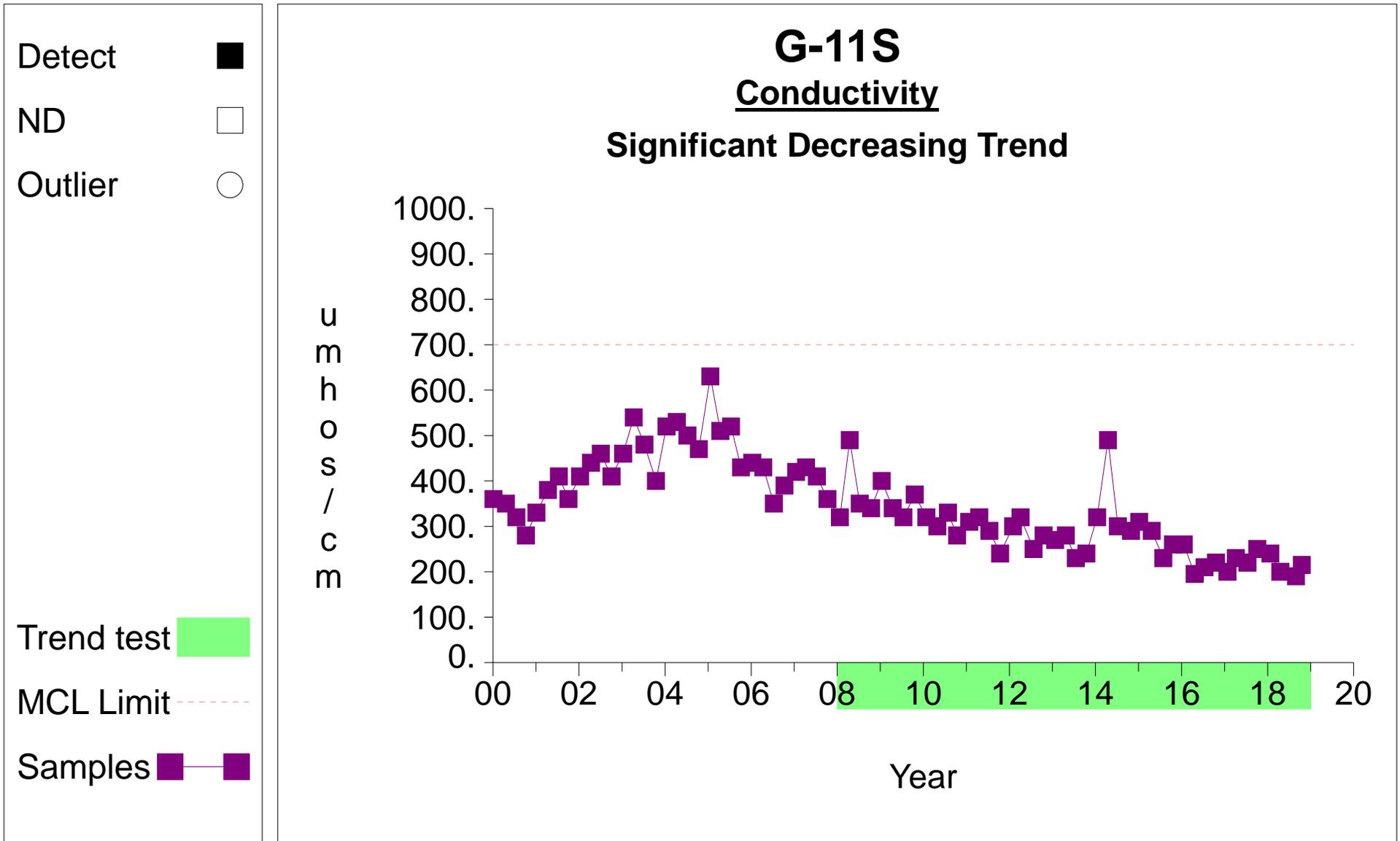
Graph 166

Time Series



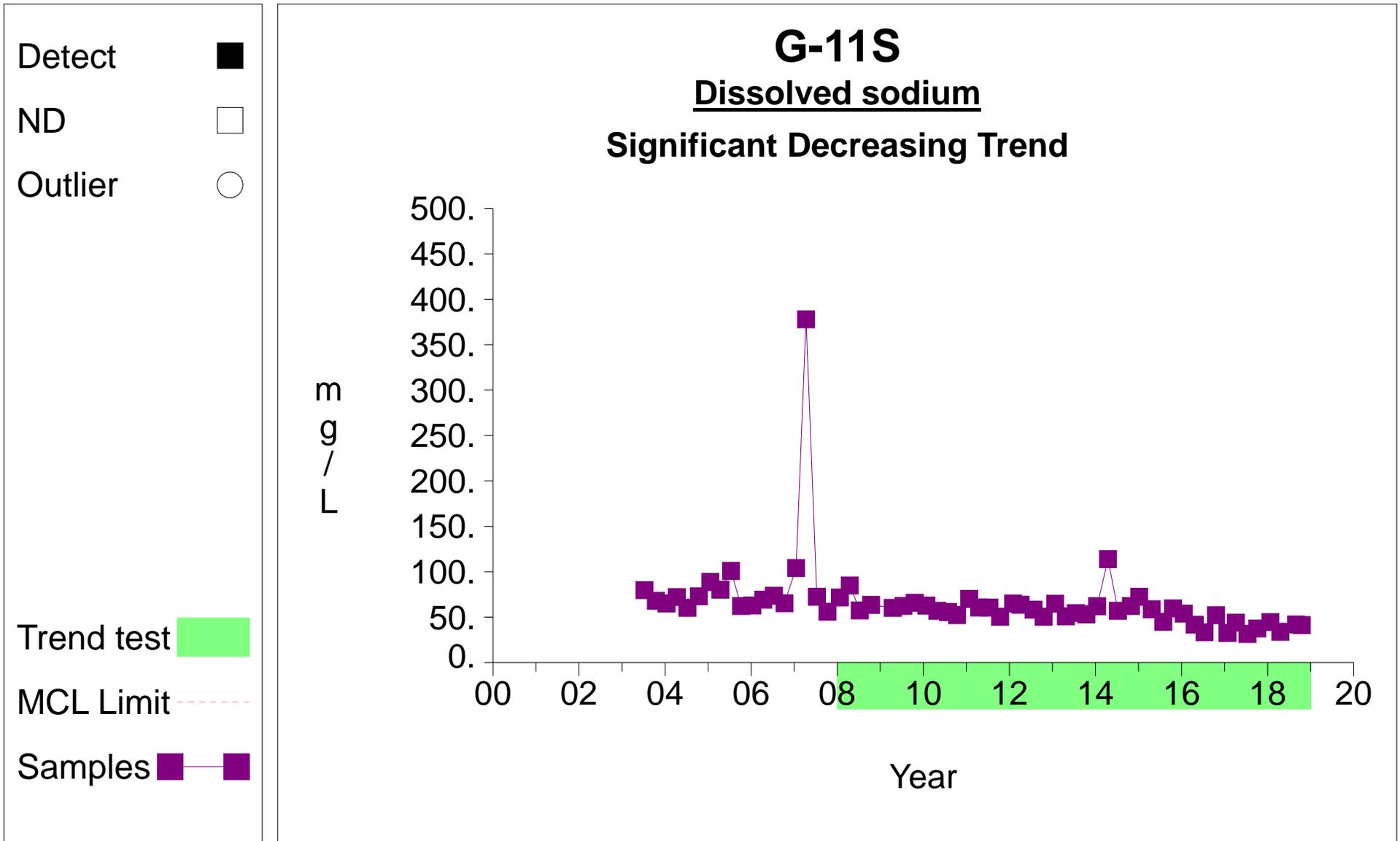
Graph 168

Time Series



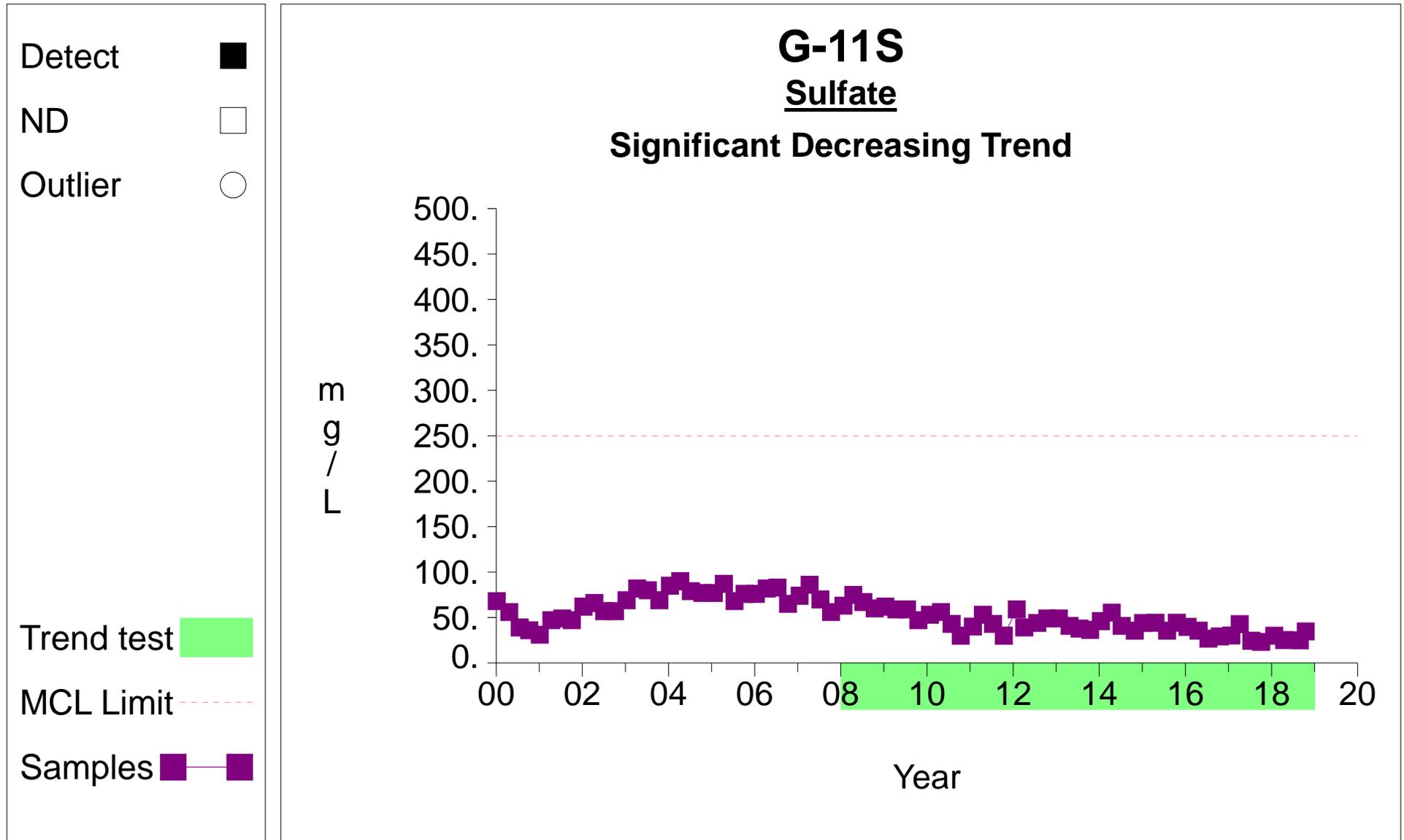
Graph 171

Time Series



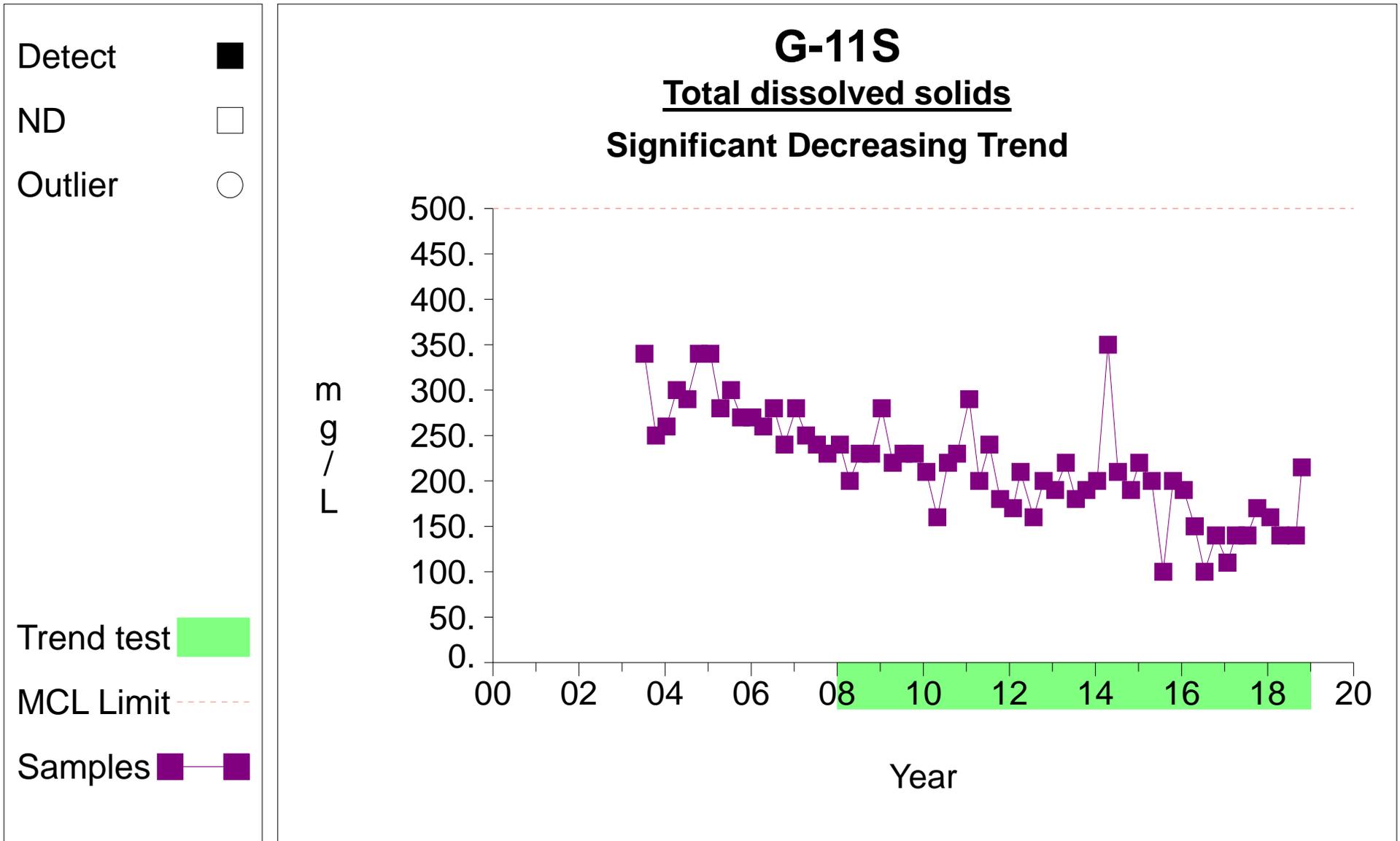
Graph 189

Time Series



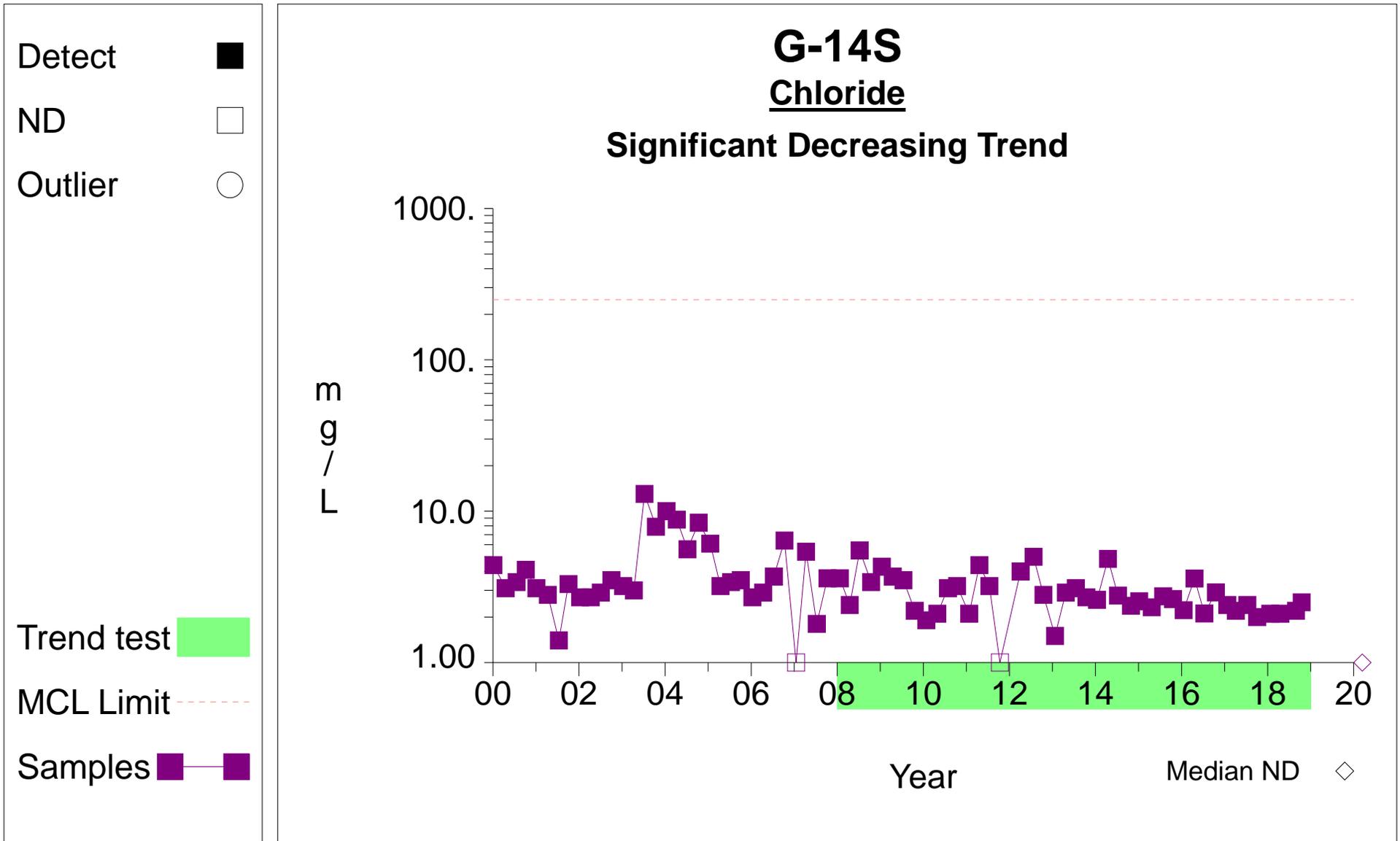
Graph 196

Time Series



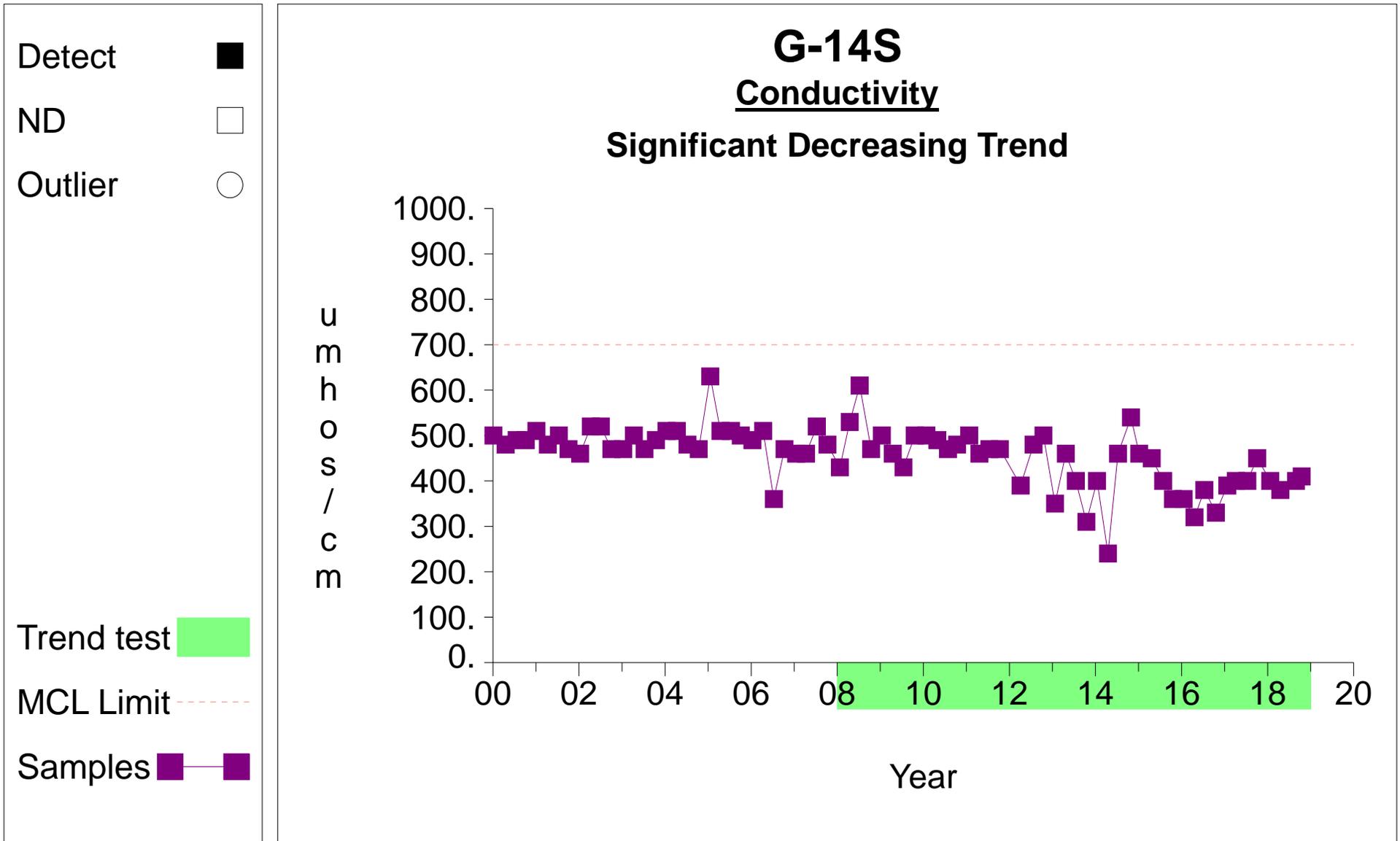
Graph 197

Time Series



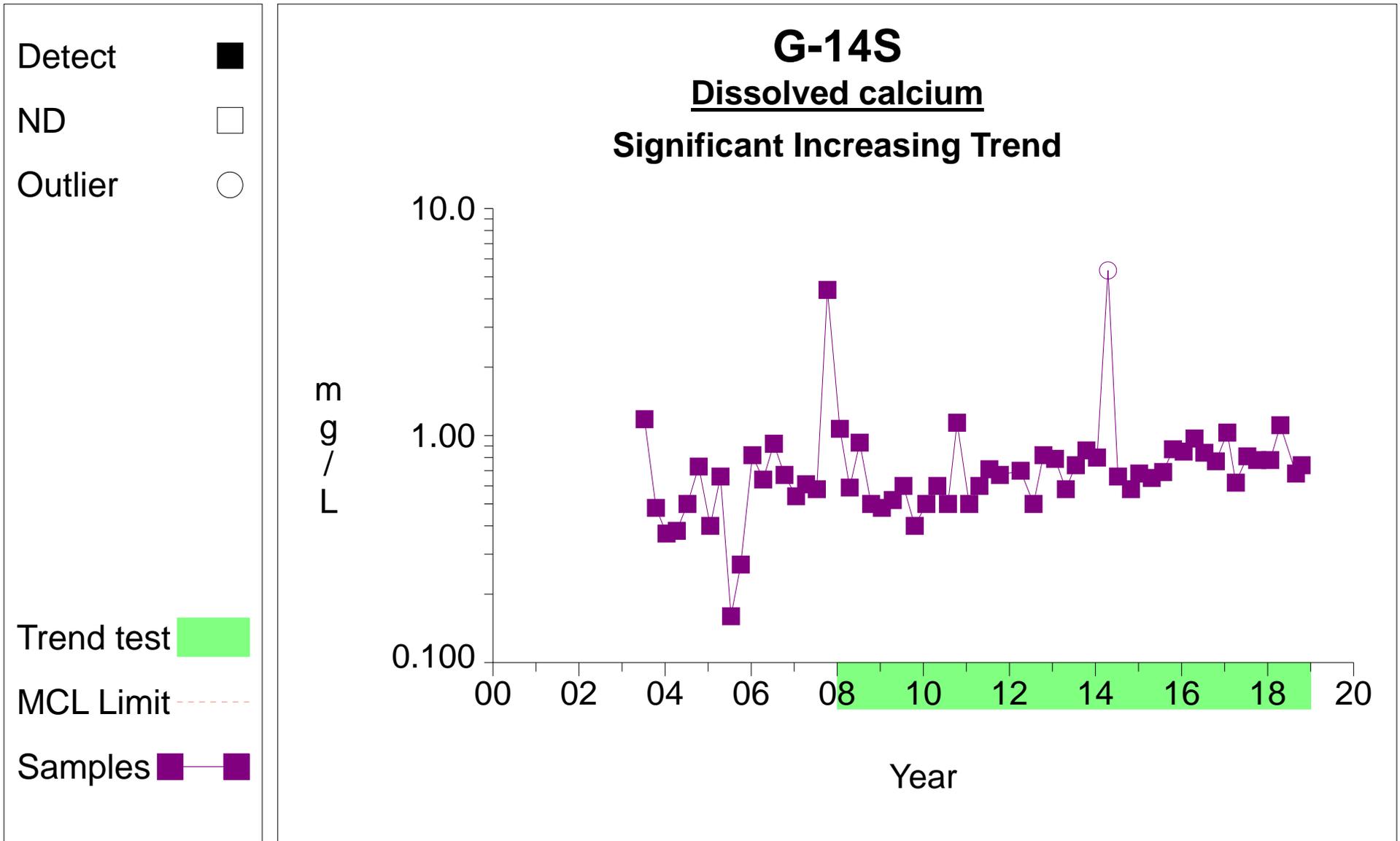
Graph 203

Time Series



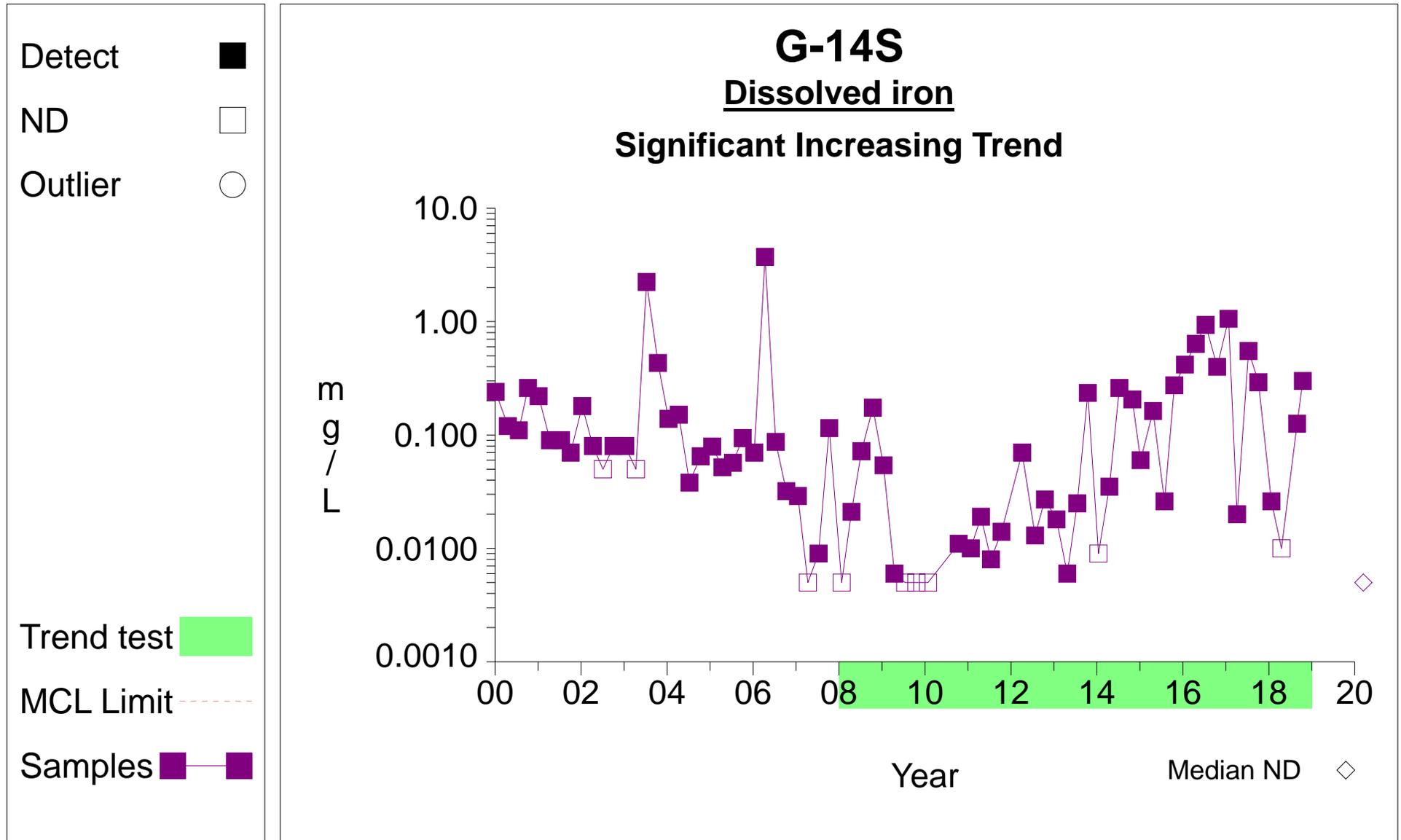
Graph 204

Time Series



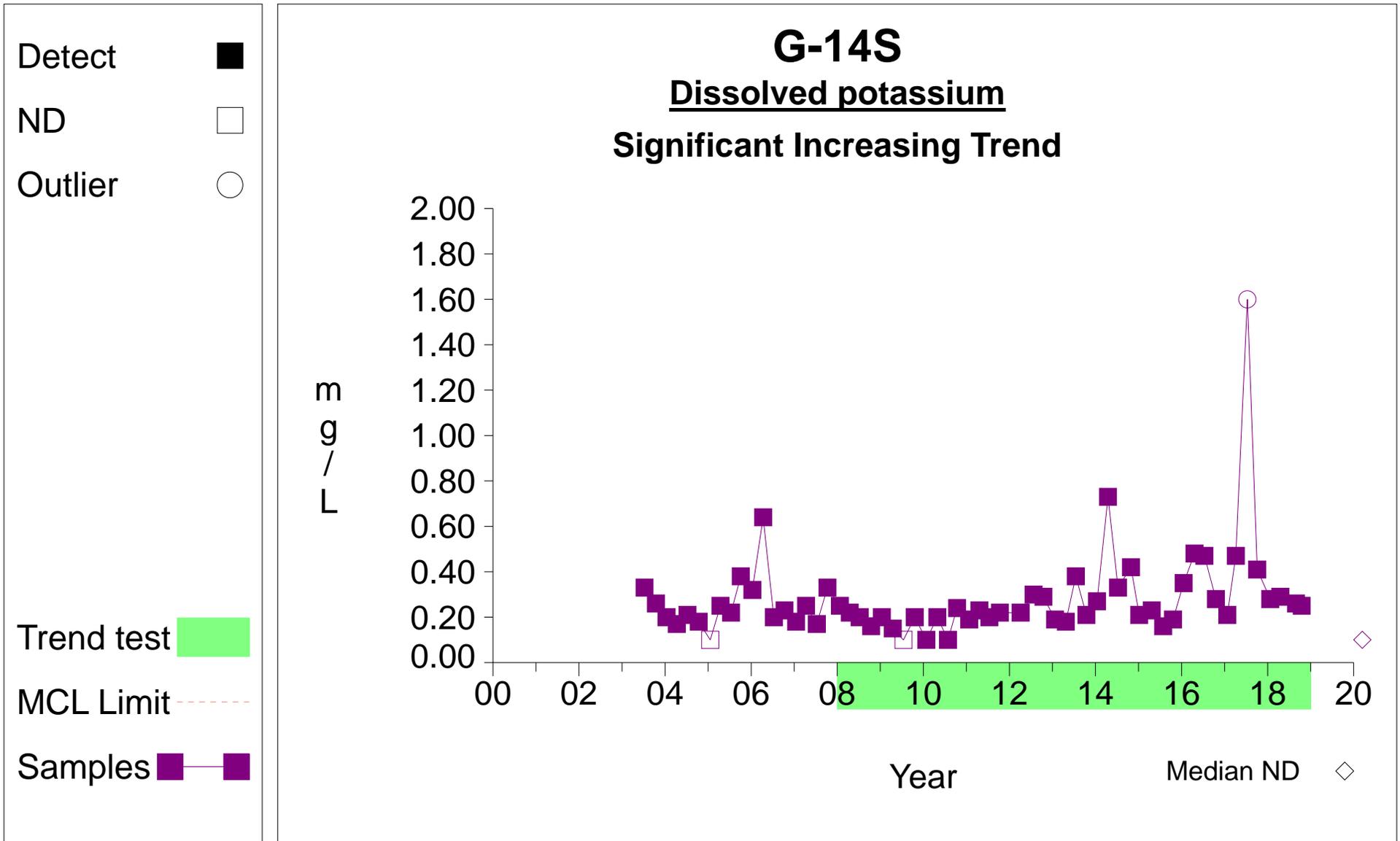
Graph 210

Time Series



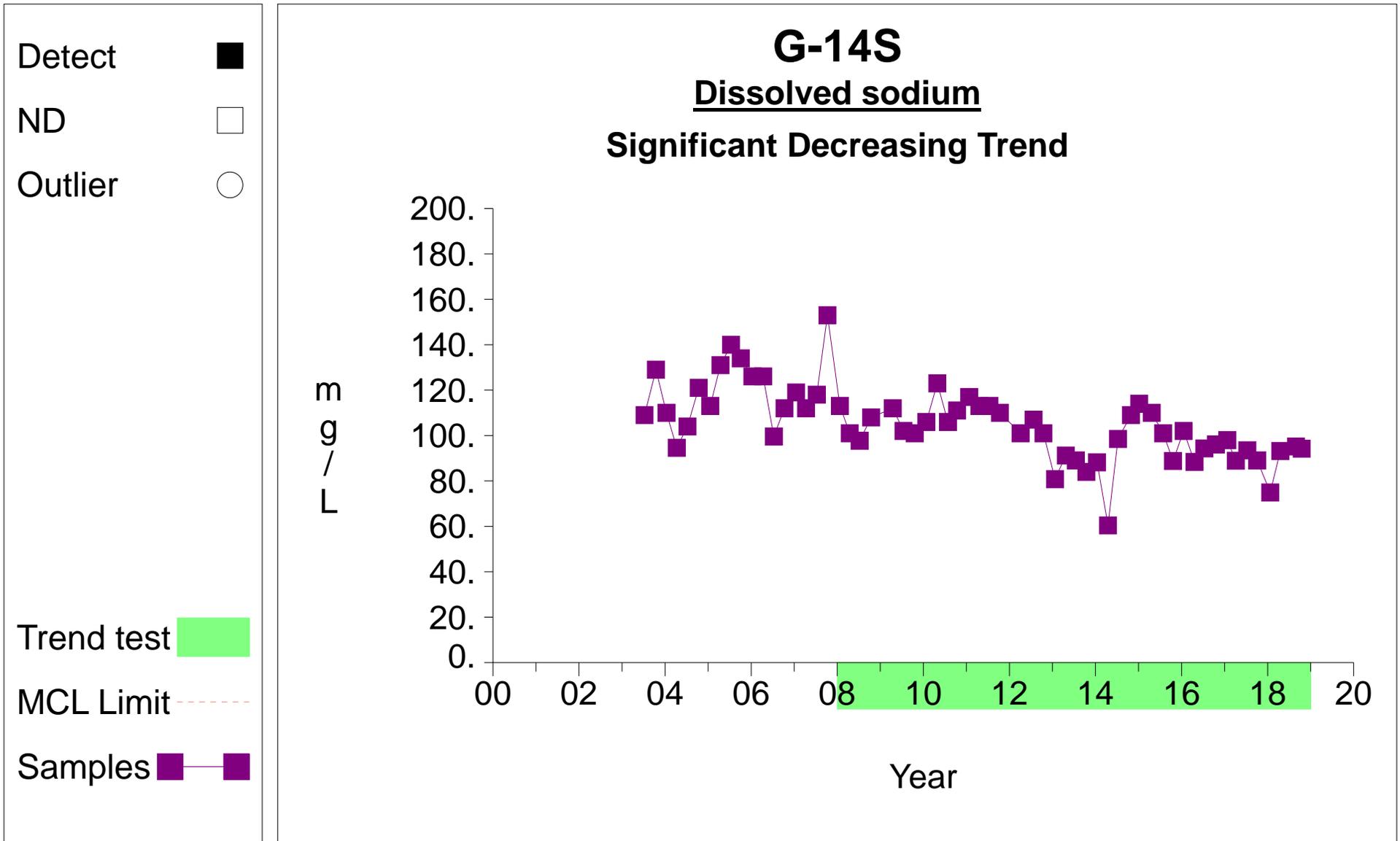
Graph 214

Time Series



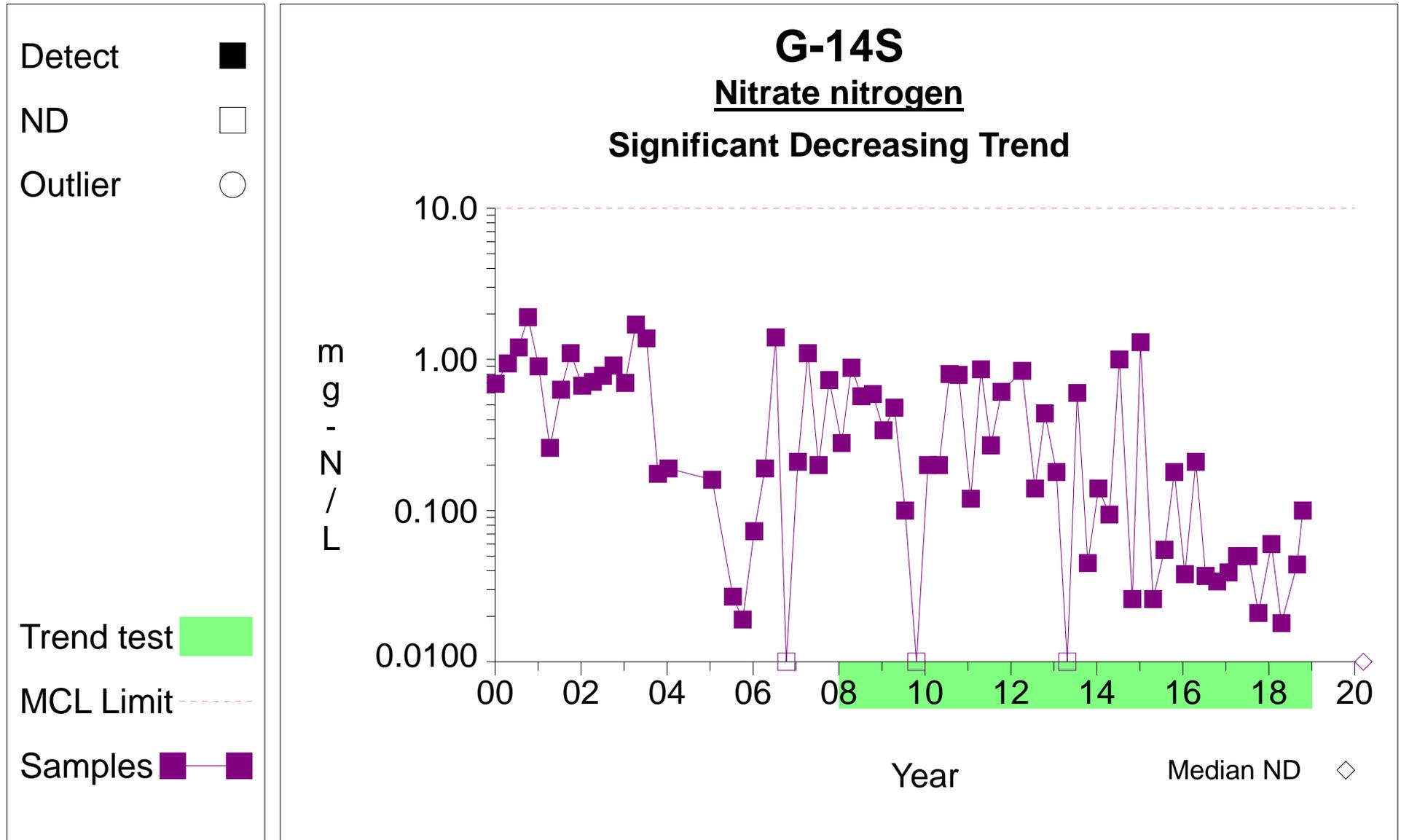
Graph 219

Time Series



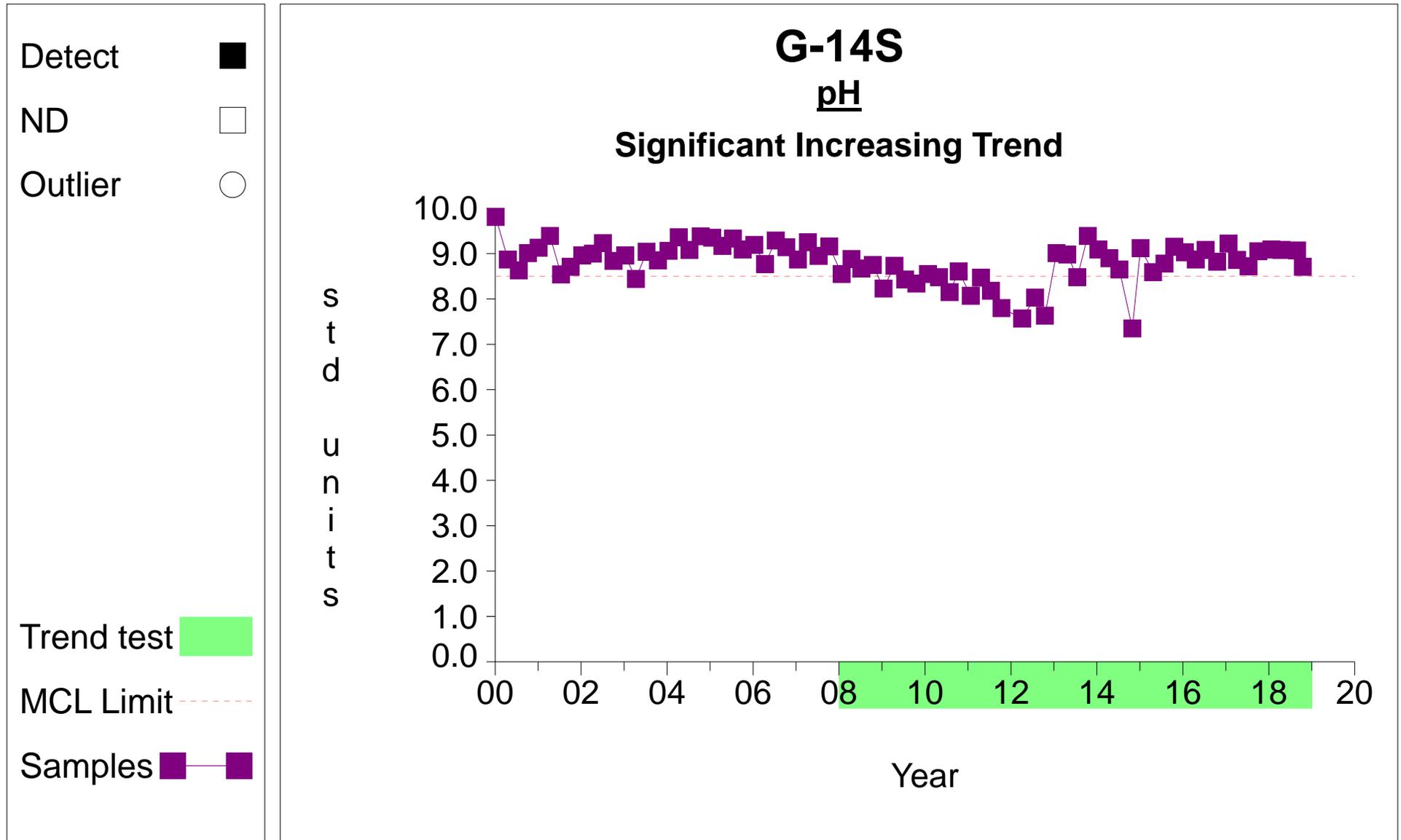
Graph 222

Time Series



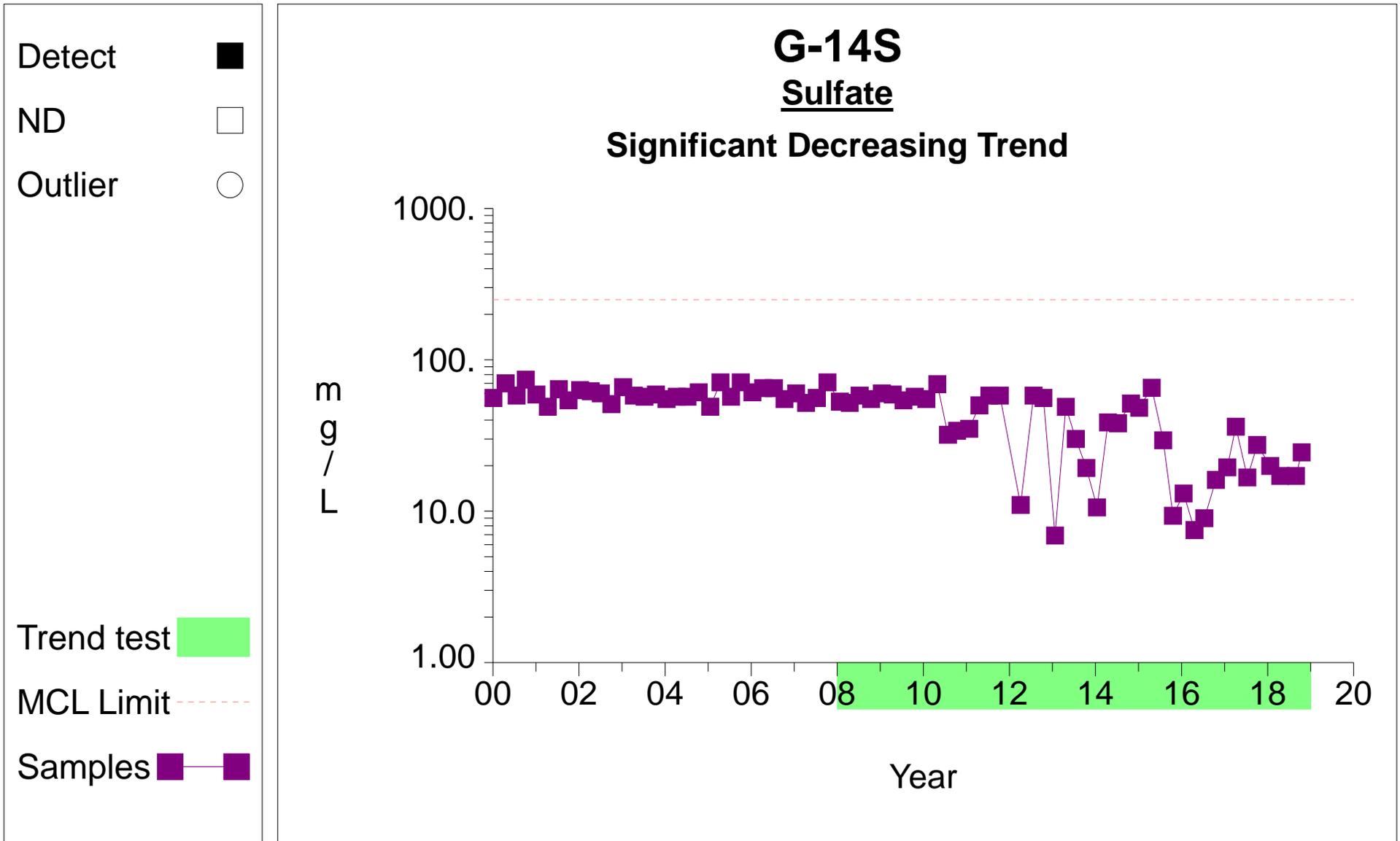
Graph 226

Time Series



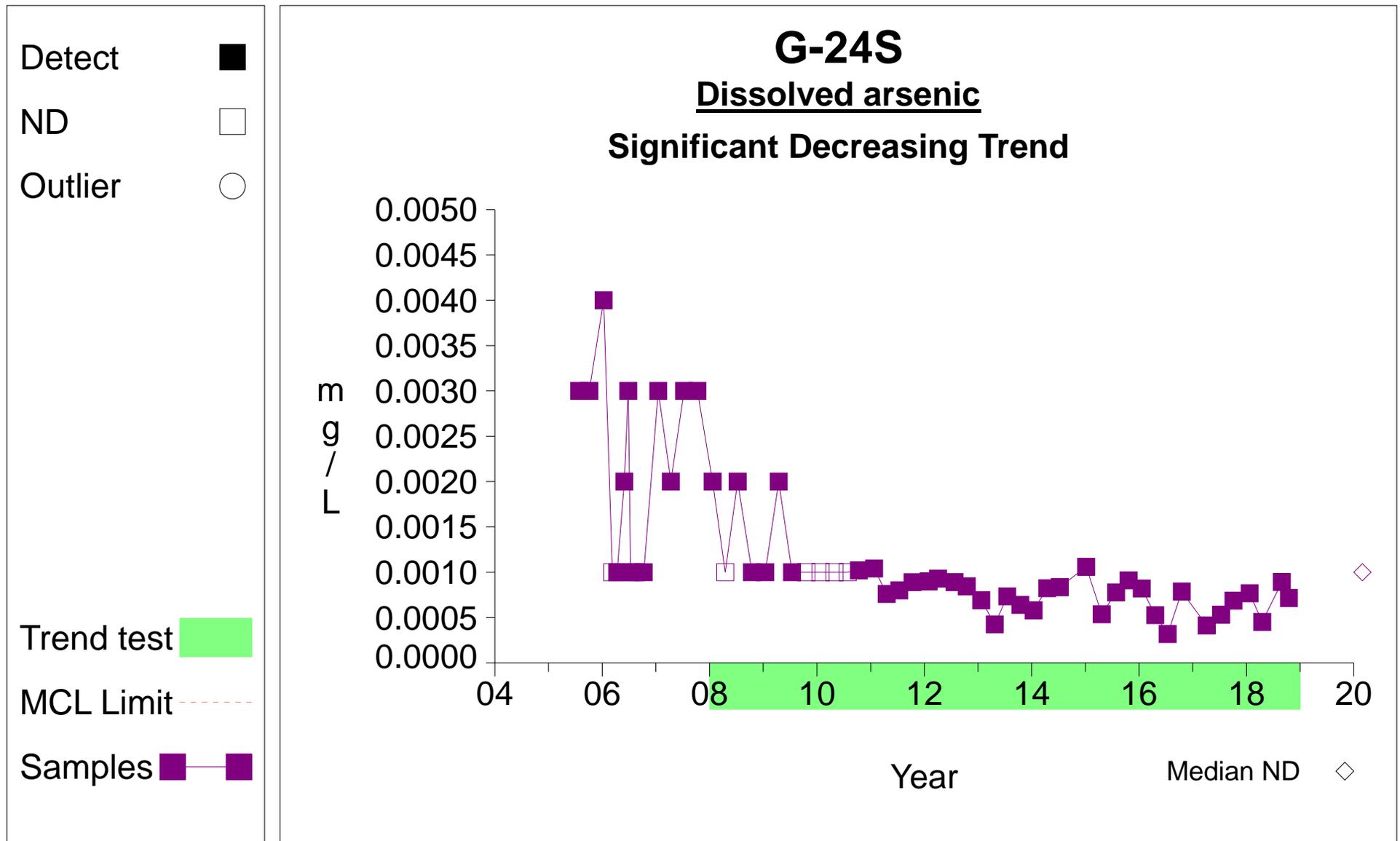
Graph 228

Time Series



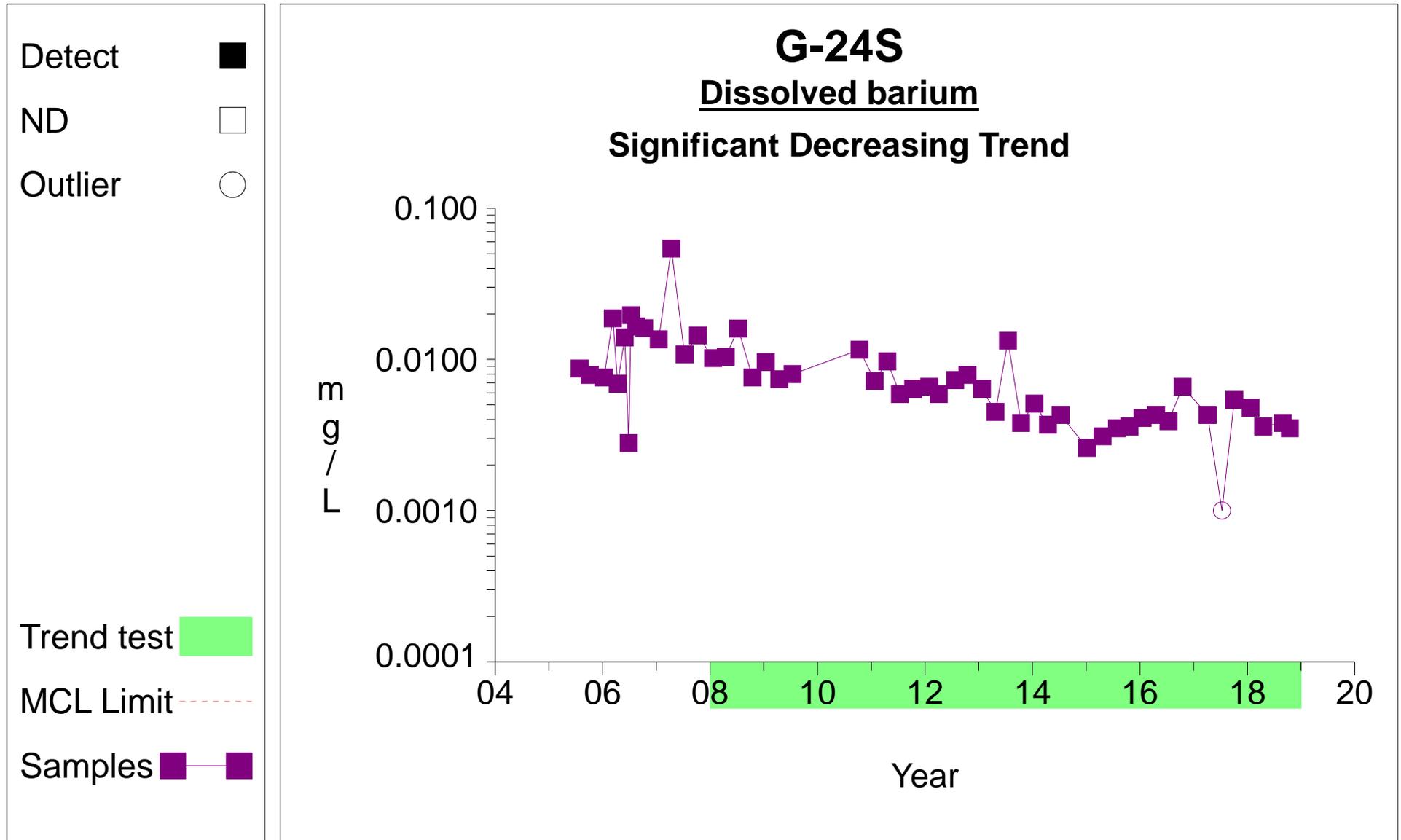
Graph 229

Time Series



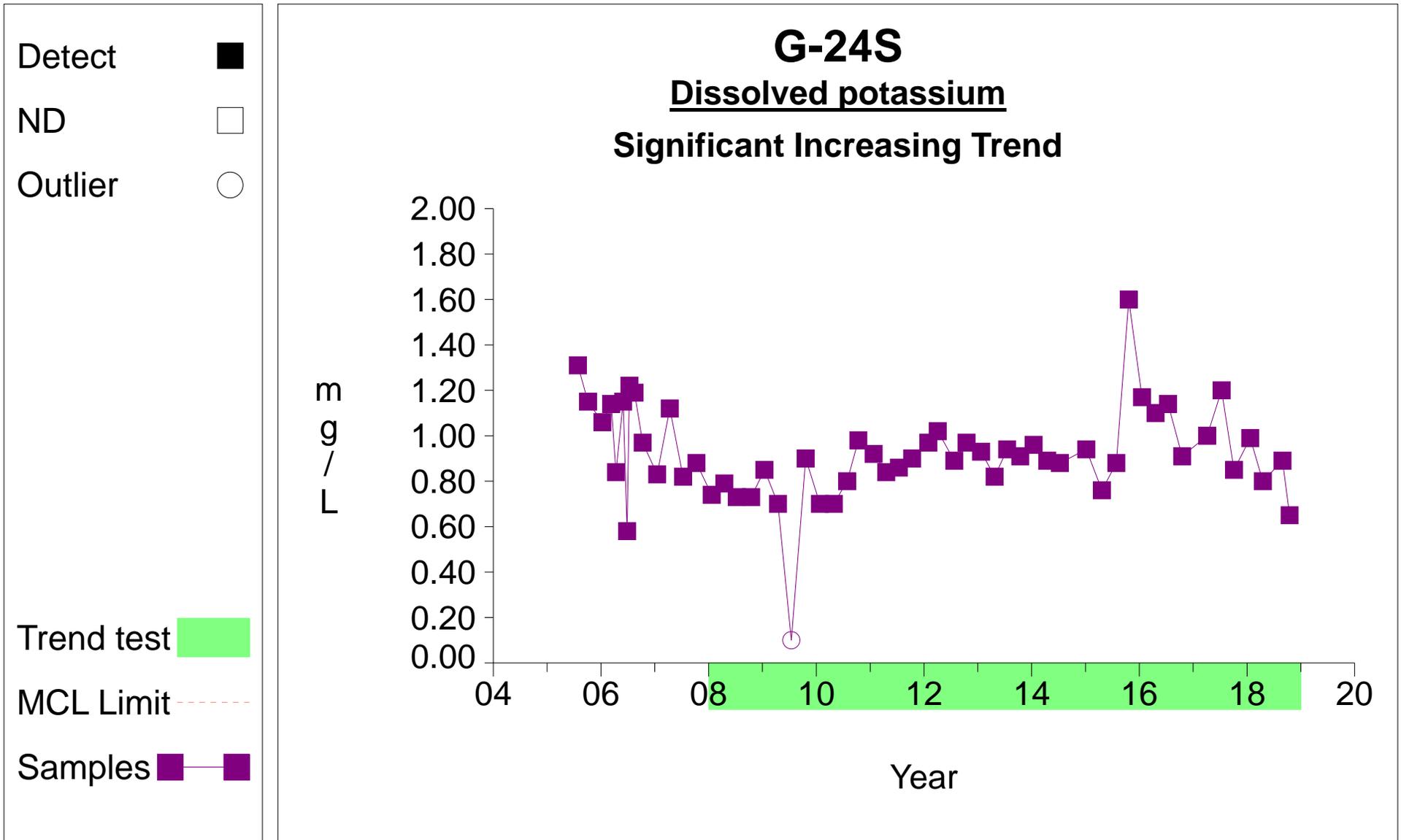
Graph 239

Time Series



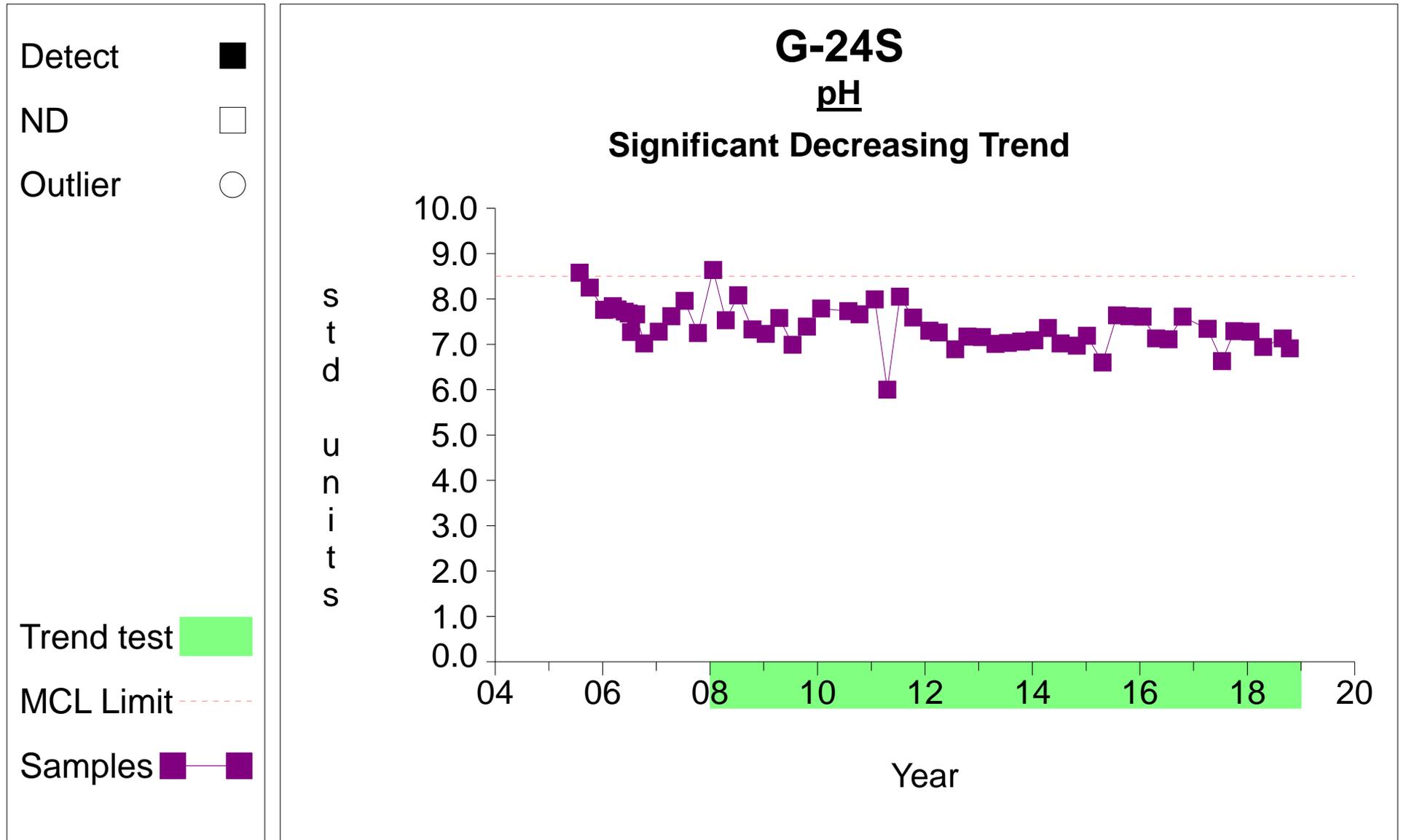
Graph 240

Time Series



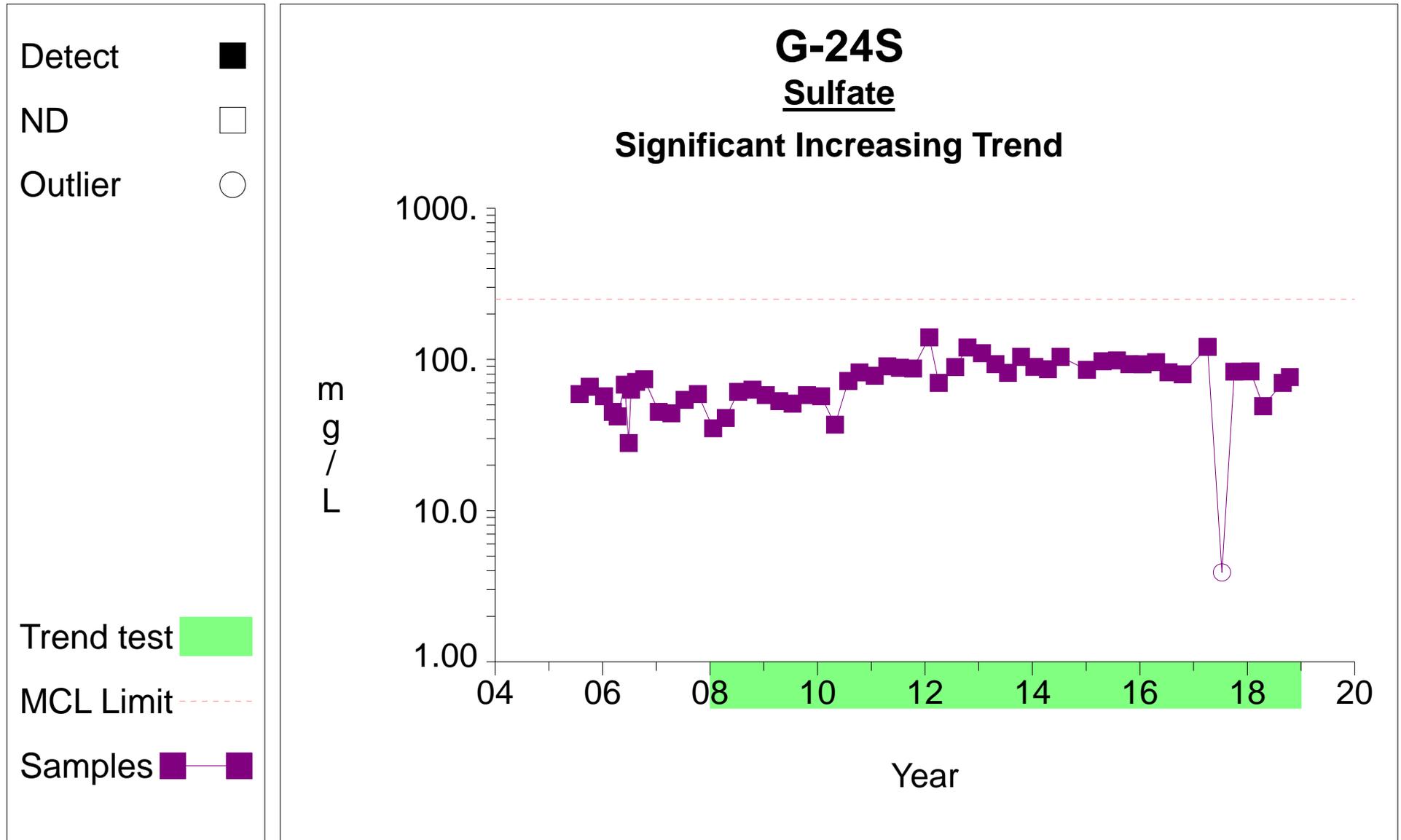
Graph 252

Time Series



Graph 261

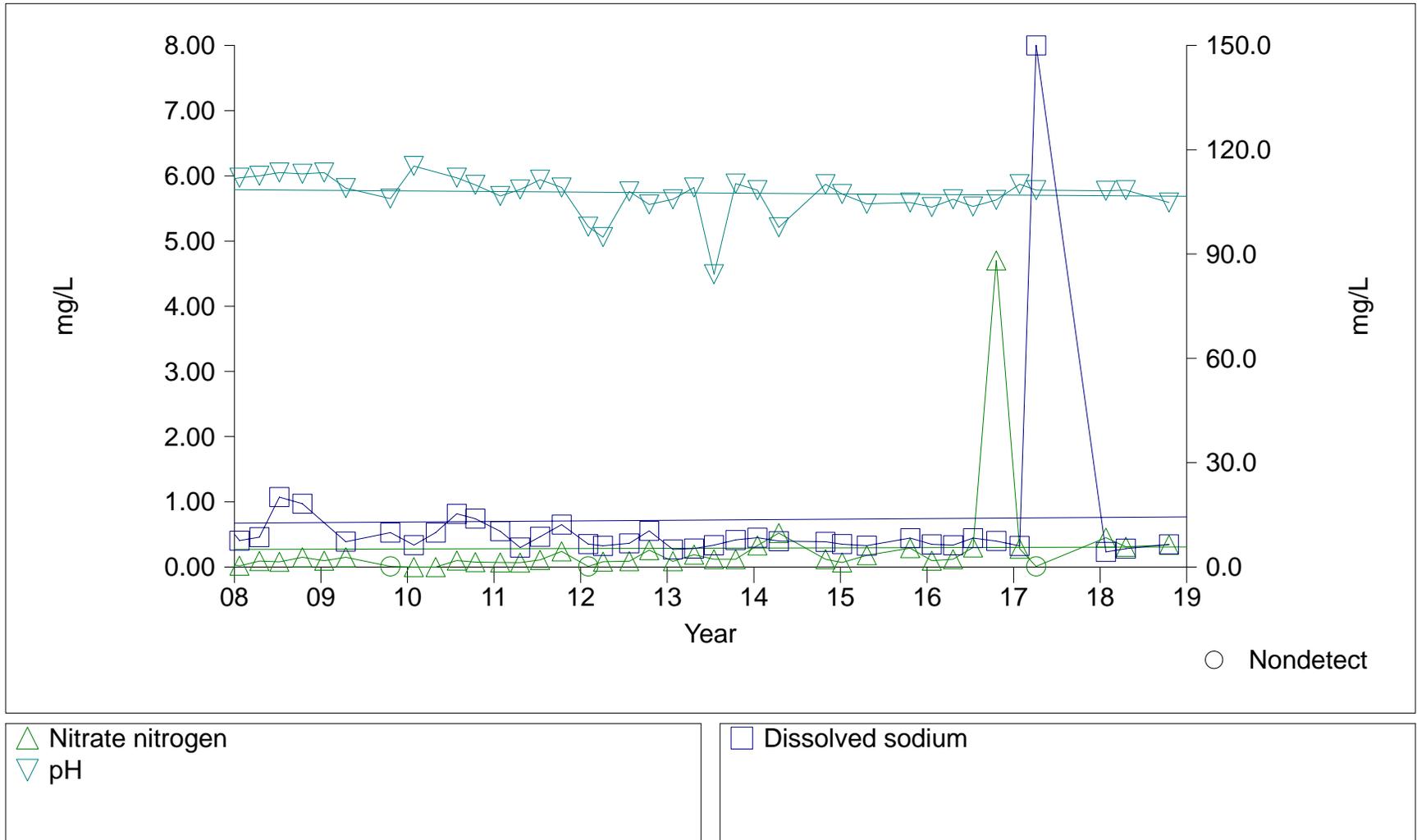
Time Series



Graph 262

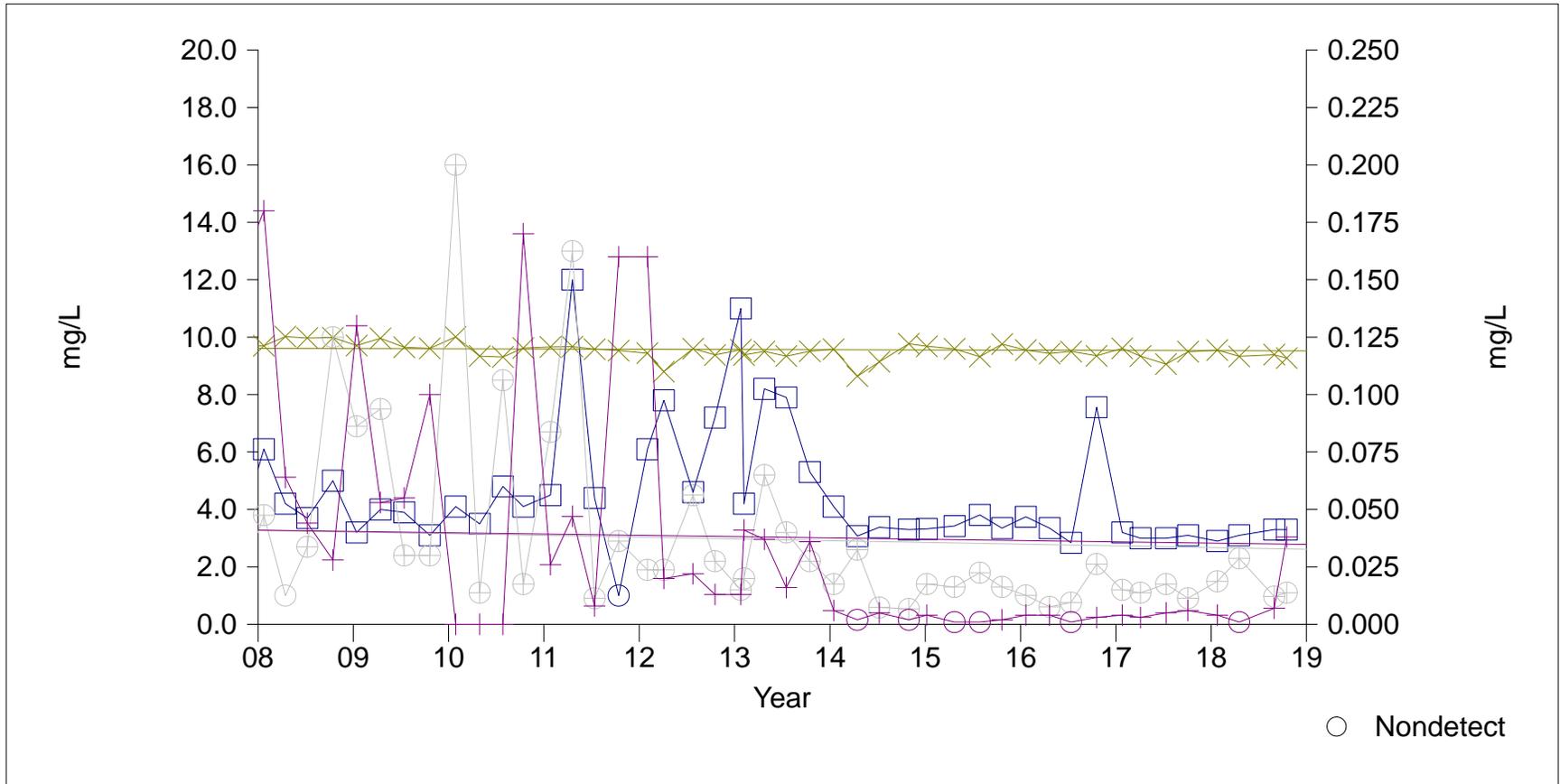
Cathcart Landfill

Time Series Plot for G-01A



Cathcart Landfill

Time Series Plot for G-08D1

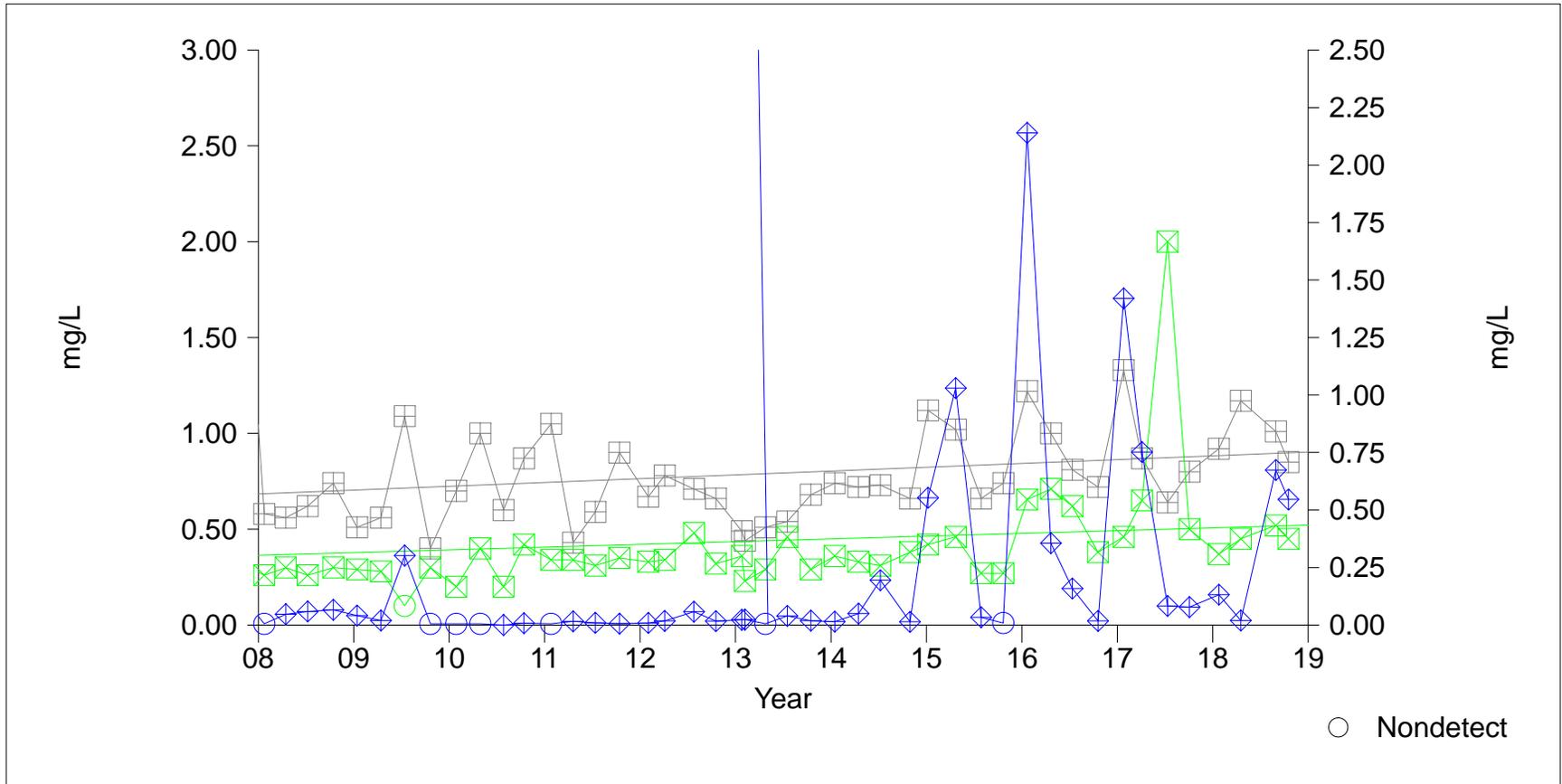


□ Chloride
× pH
⊕ Total organic carbon

+ Nitrite nitrogen

Cathcart Landfill

Time Series Plot for G-08D1

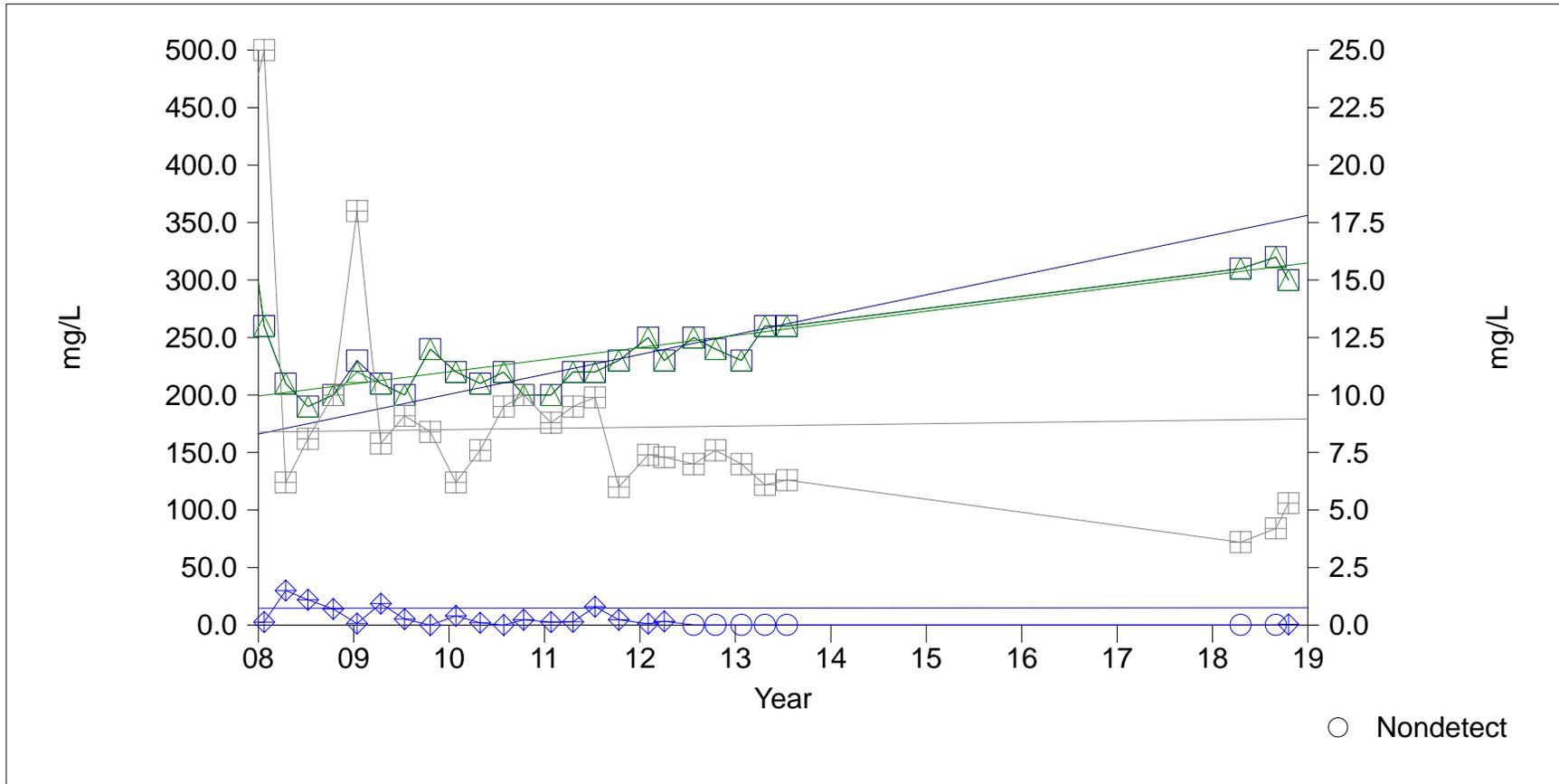


□ Dissolved calcium
× Dissolved potassium

◇ Dissolved iron
○ Nondetect

Cathcart Landfill

Time Series Plot for G-09S



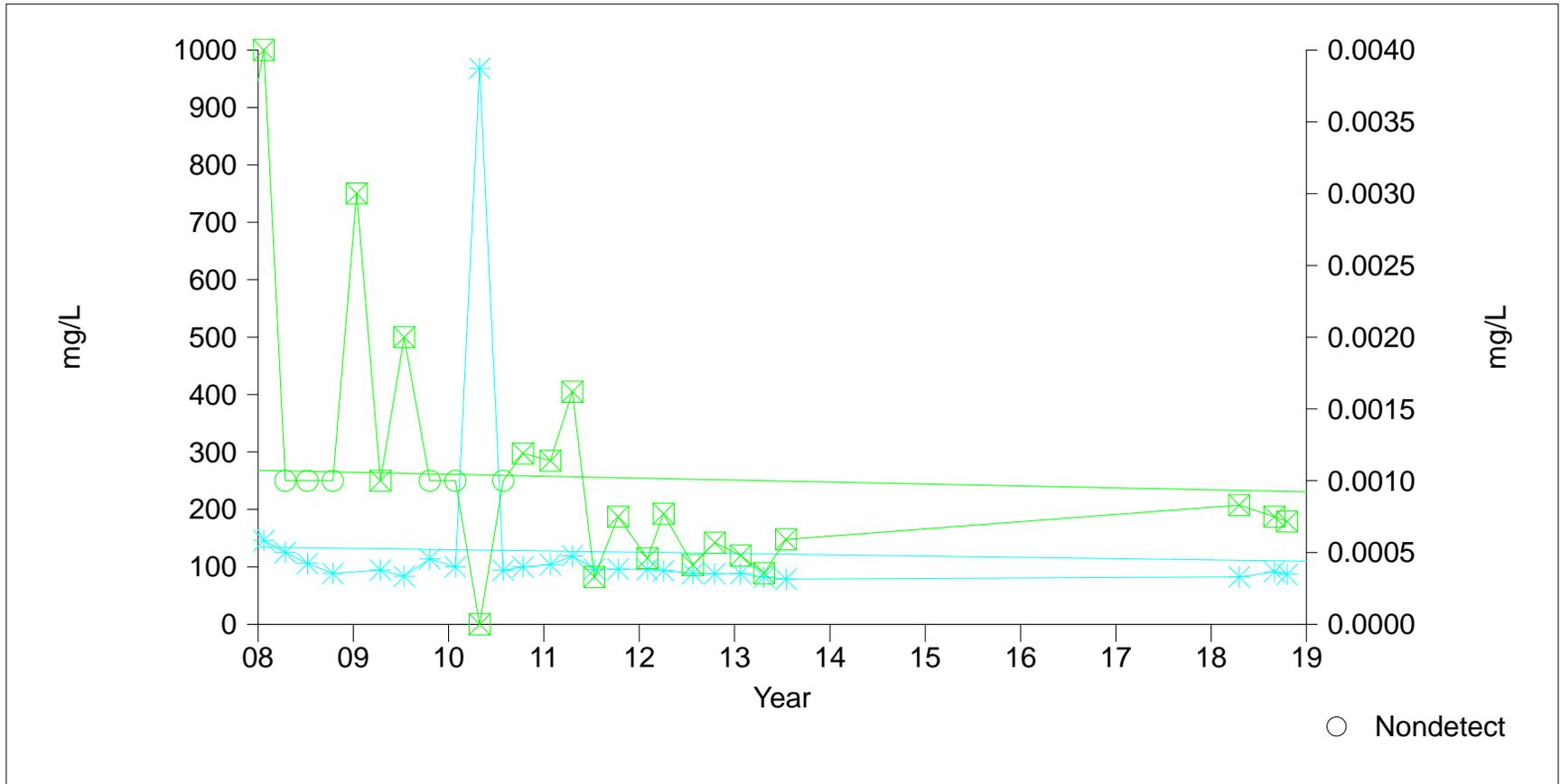
□ Alkalinity (as cacO3)
△ Bicarbonate

◇ Nitrate nitrogen
□ Chloride

○ Nondetect

Cathcart Landfill

Time Series Plot for G-09S

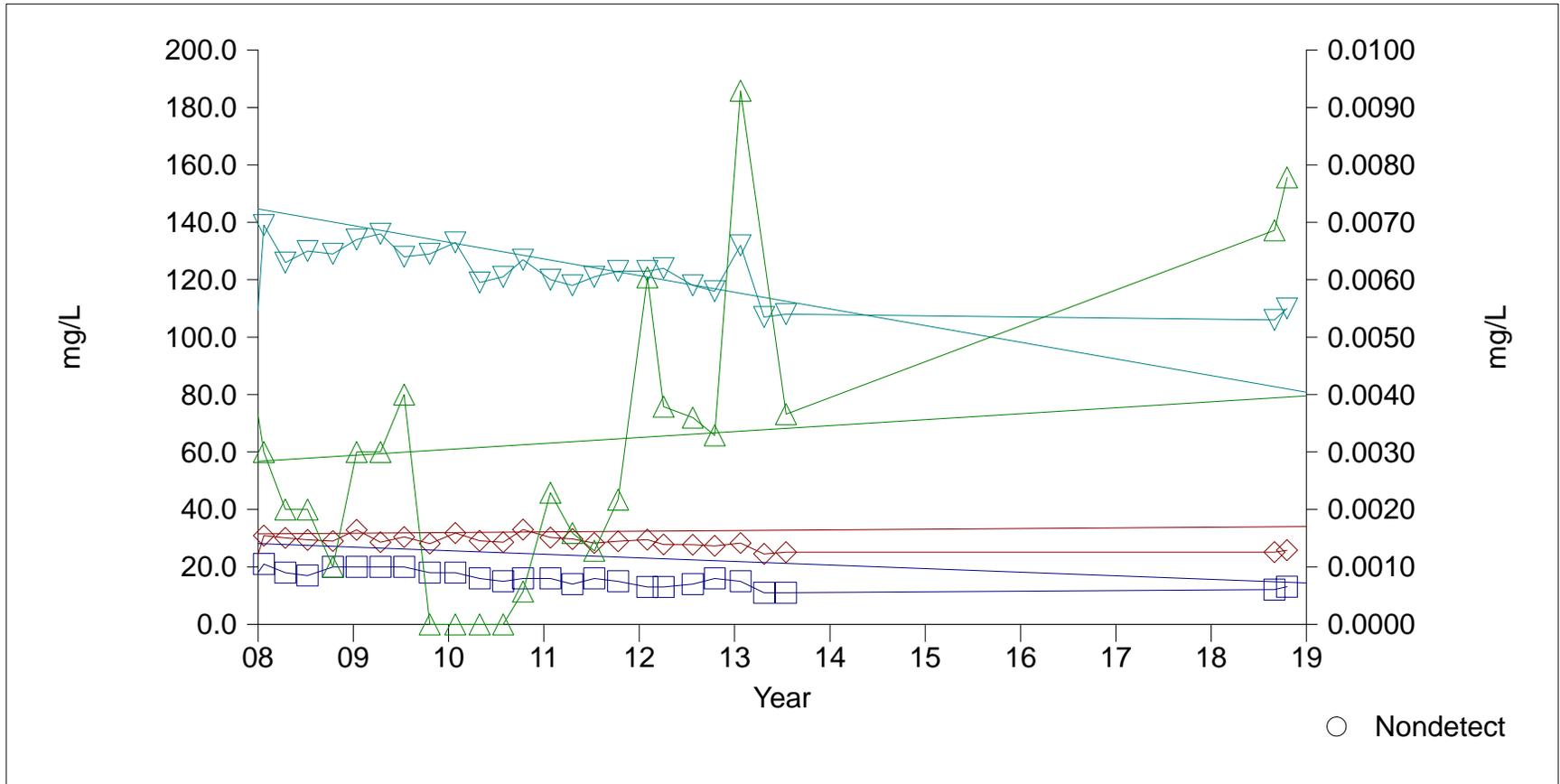


* Dissolved sodium

□ Dissolved arsenic

Cathcart Landfill

Time Series Plot for G-10S

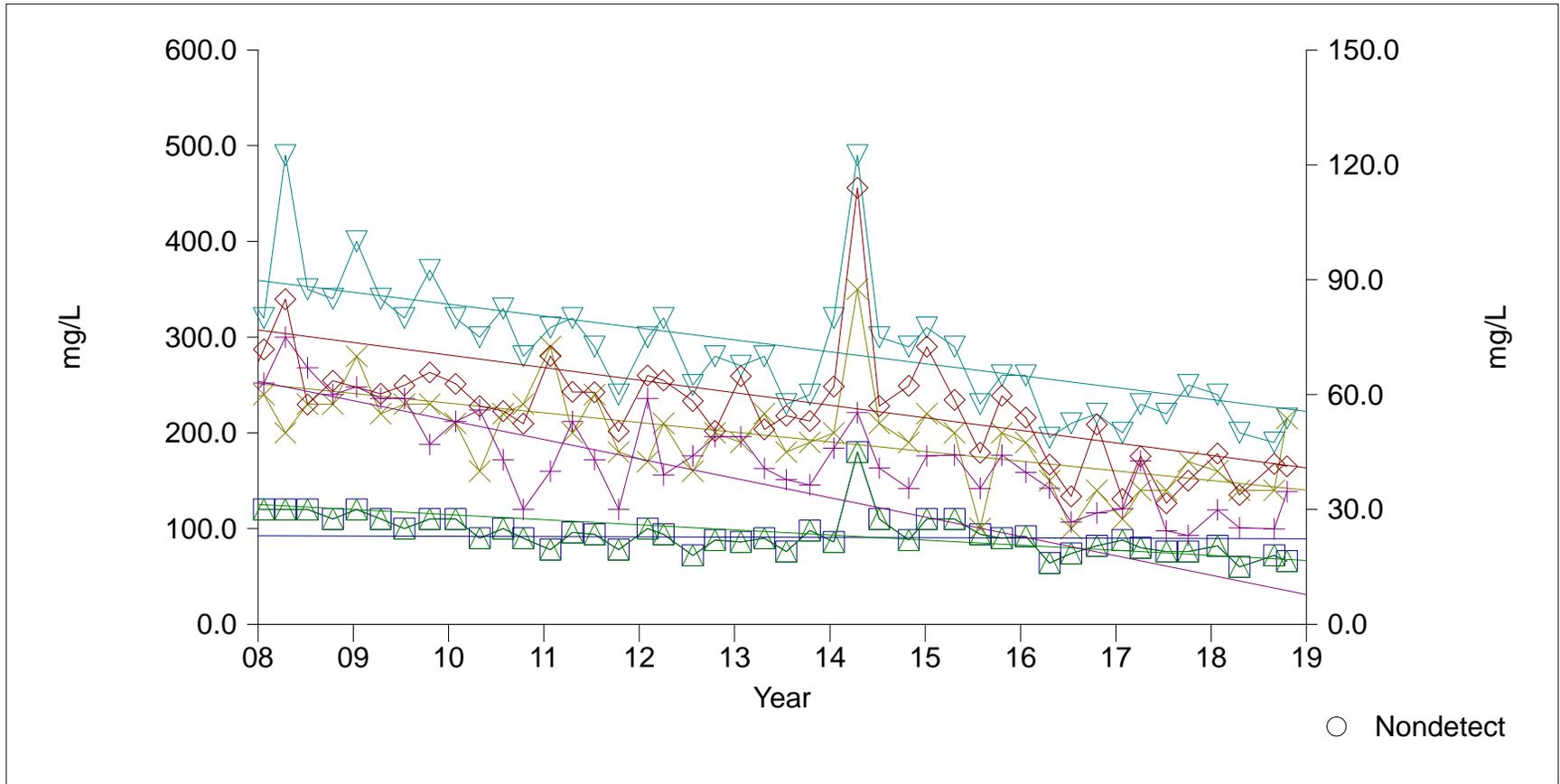


□ Chloride
▽ Dissolved calcium
◇ Dissolved magnesium

△ Dissolved arsenic
○ Nondetect

Cathcart Landfill

Time Series Plot for G-11S



□ Alkalinity (as cac03)
△ Bicarbonate
▽ Conductivity

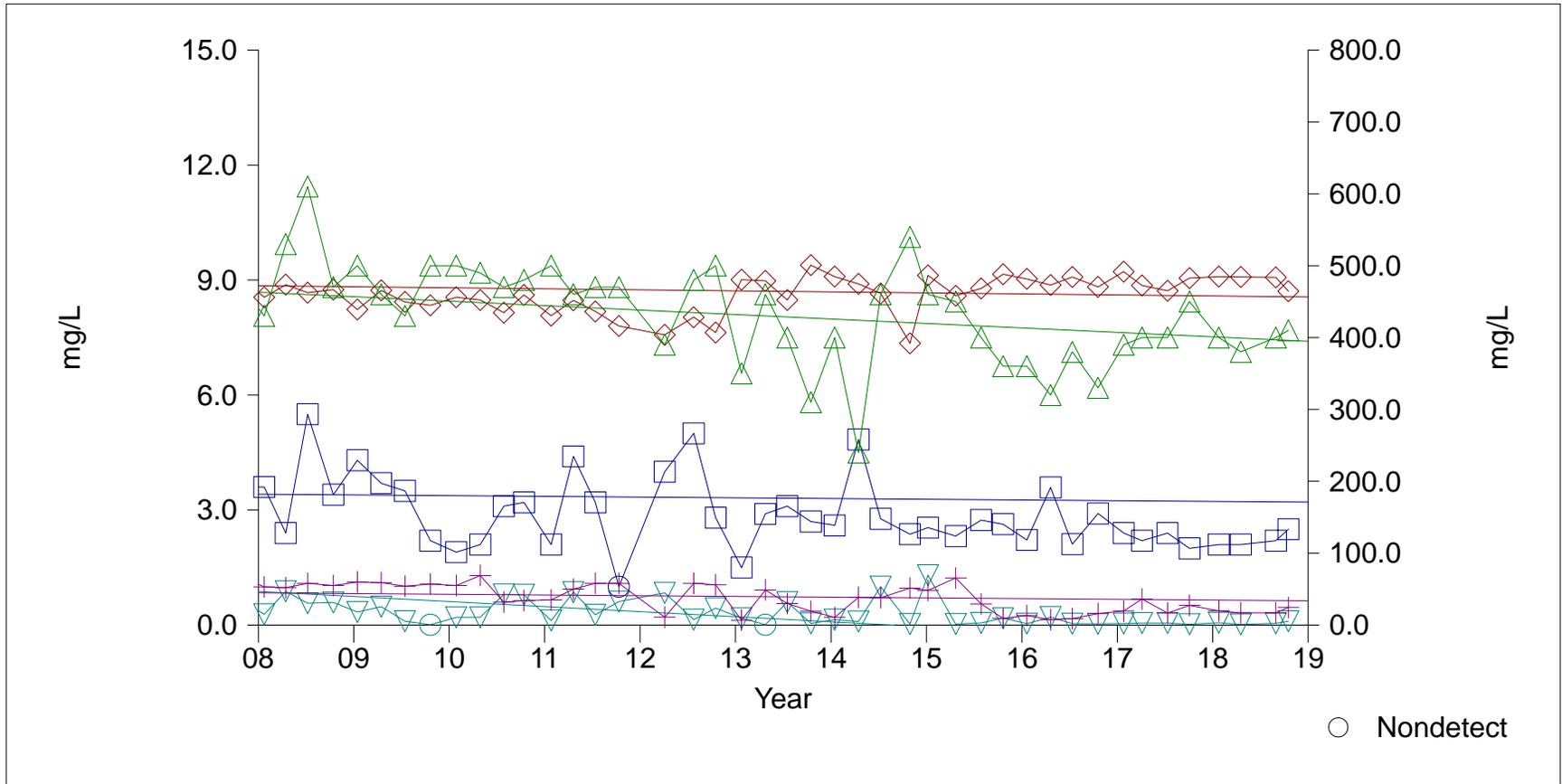
× Total dissolved solids

+ Sulfate
◇ Dissolved sodium

○ Nondetect

Cathcart Landfill

Time Series Plot for G-14S

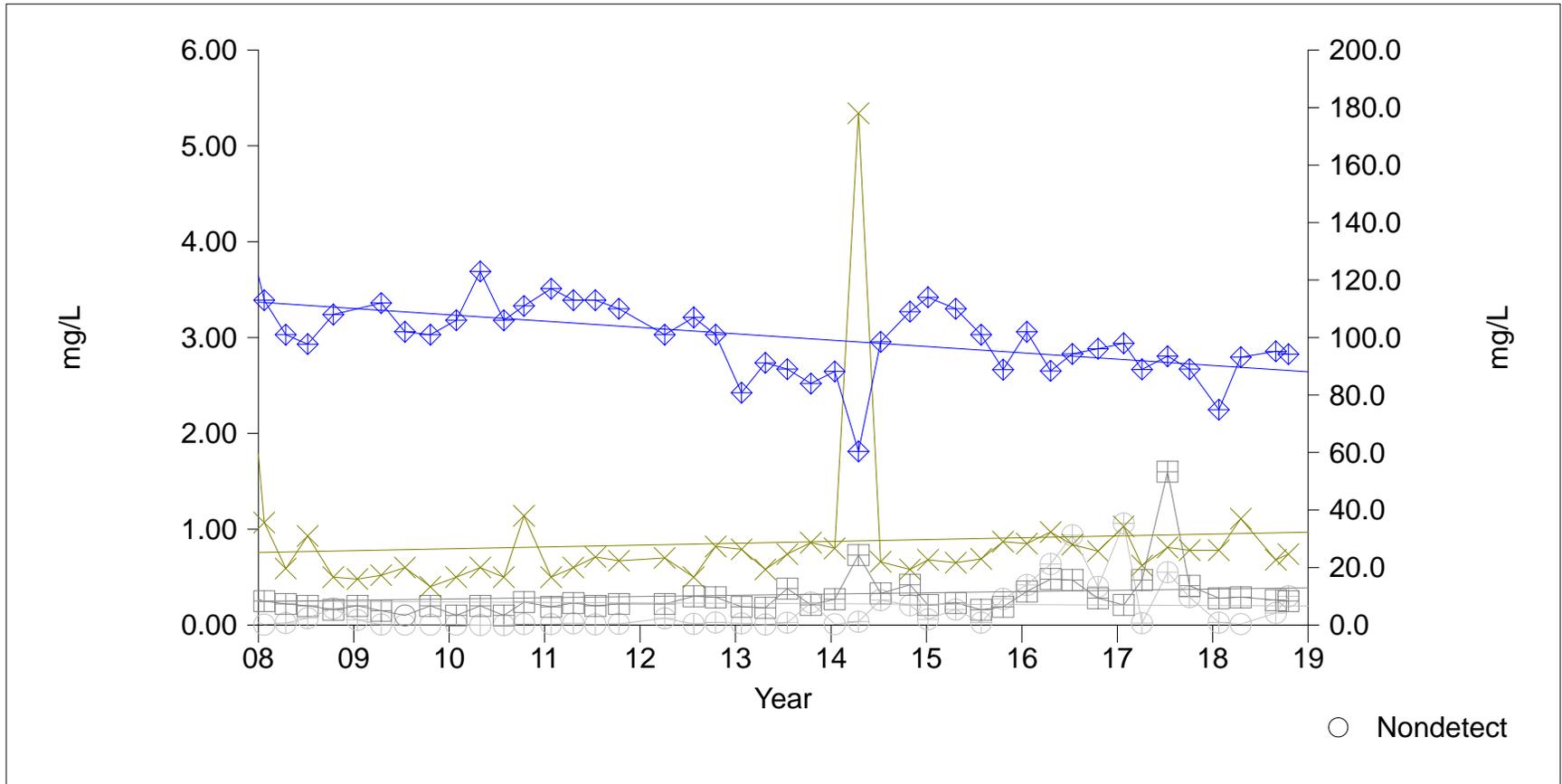


□ Chloride
▽ Nitrate nitrogen
◇ pH

△ Conductivity
+ Sulfate
○ Nondetect

Cathcart Landfill

Time Series Plot for G-14S



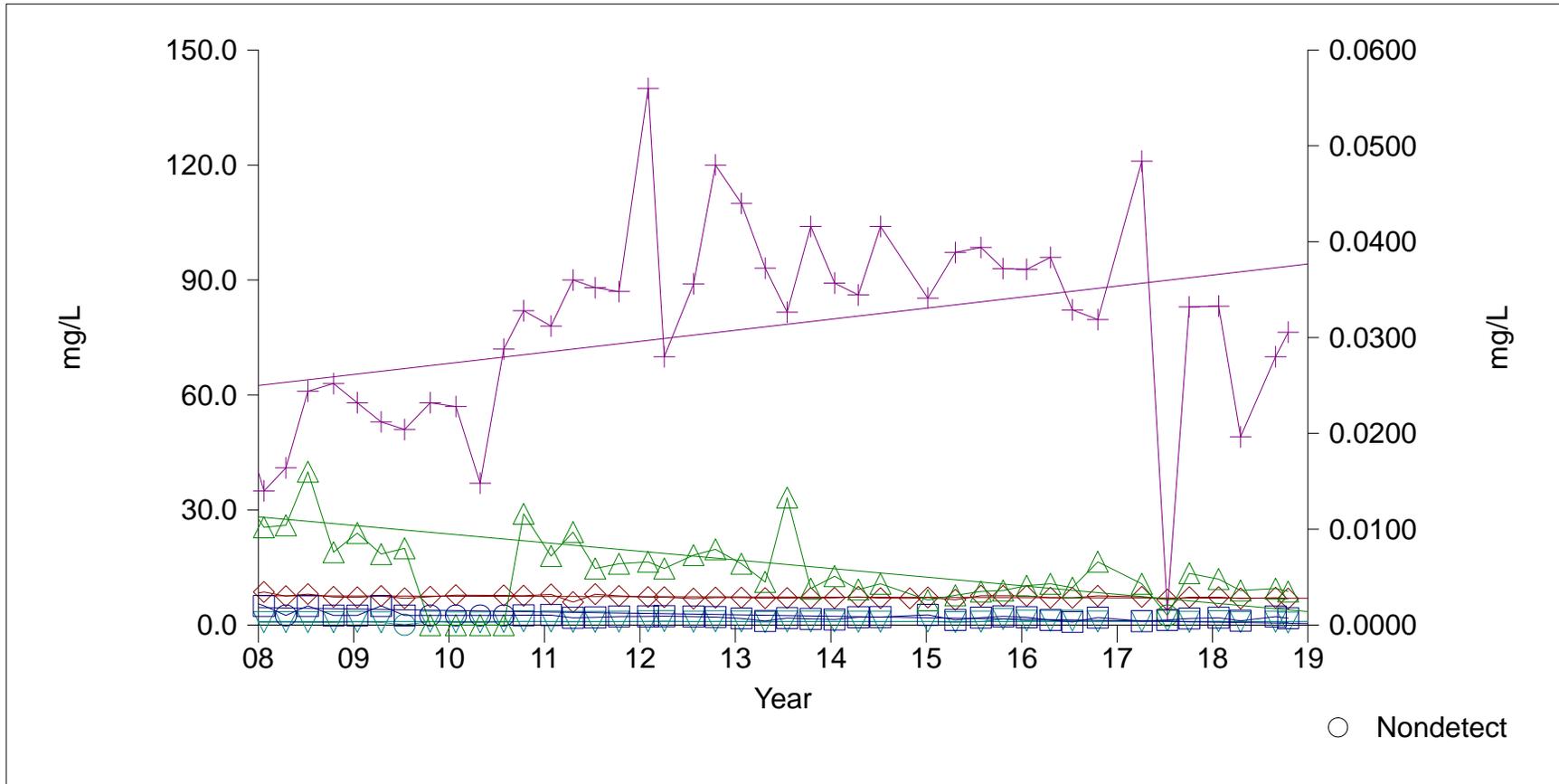
⊕ Dissolved iron
⊠ Dissolved potassium
× Dissolved calcium

◇ Dissolved sodium

○ Nondetect

Cathcart Landfill

Time Series Plot for G-24S

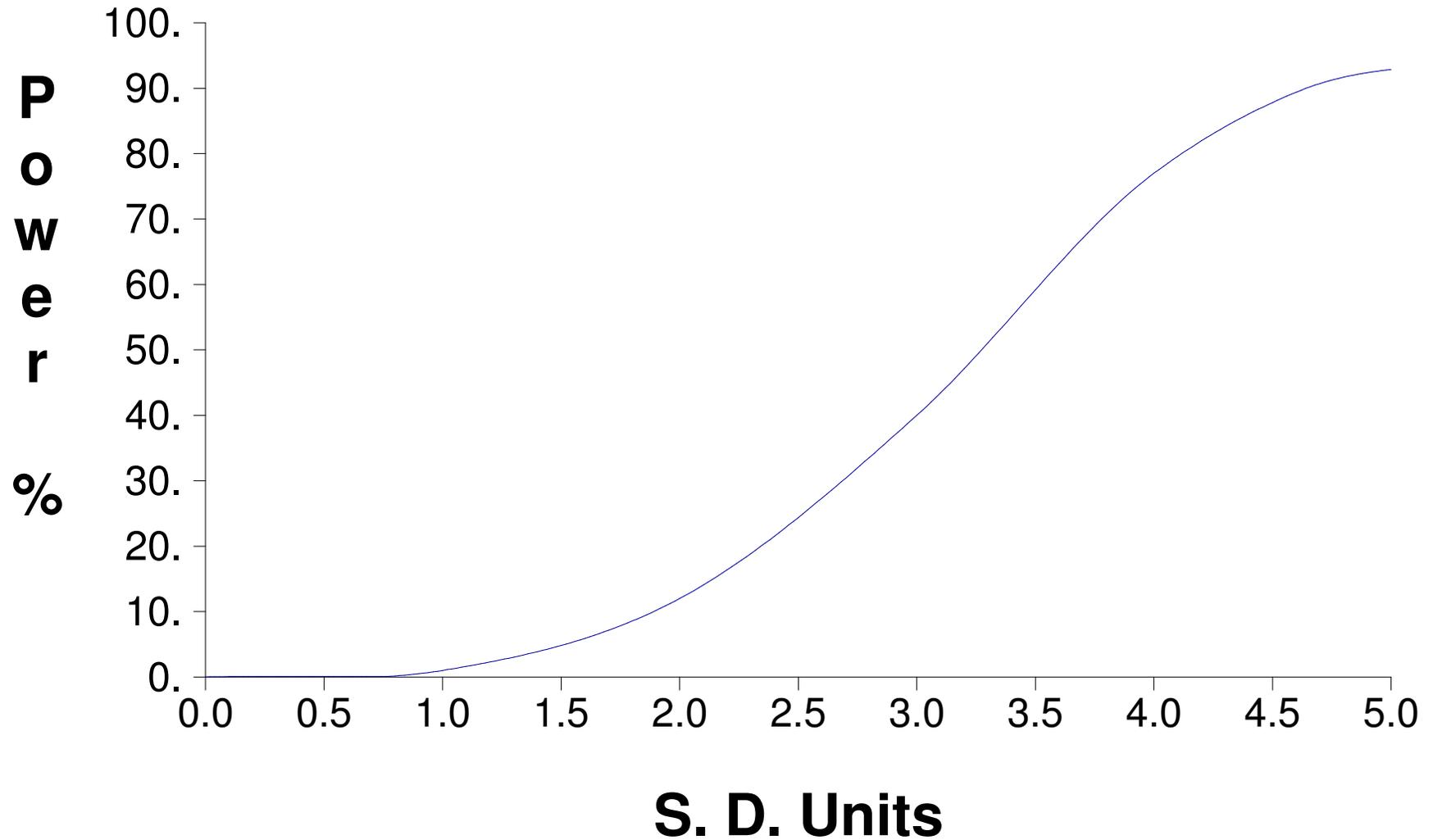


+ Sulfate
◇ pH
▽ Dissolved potassium

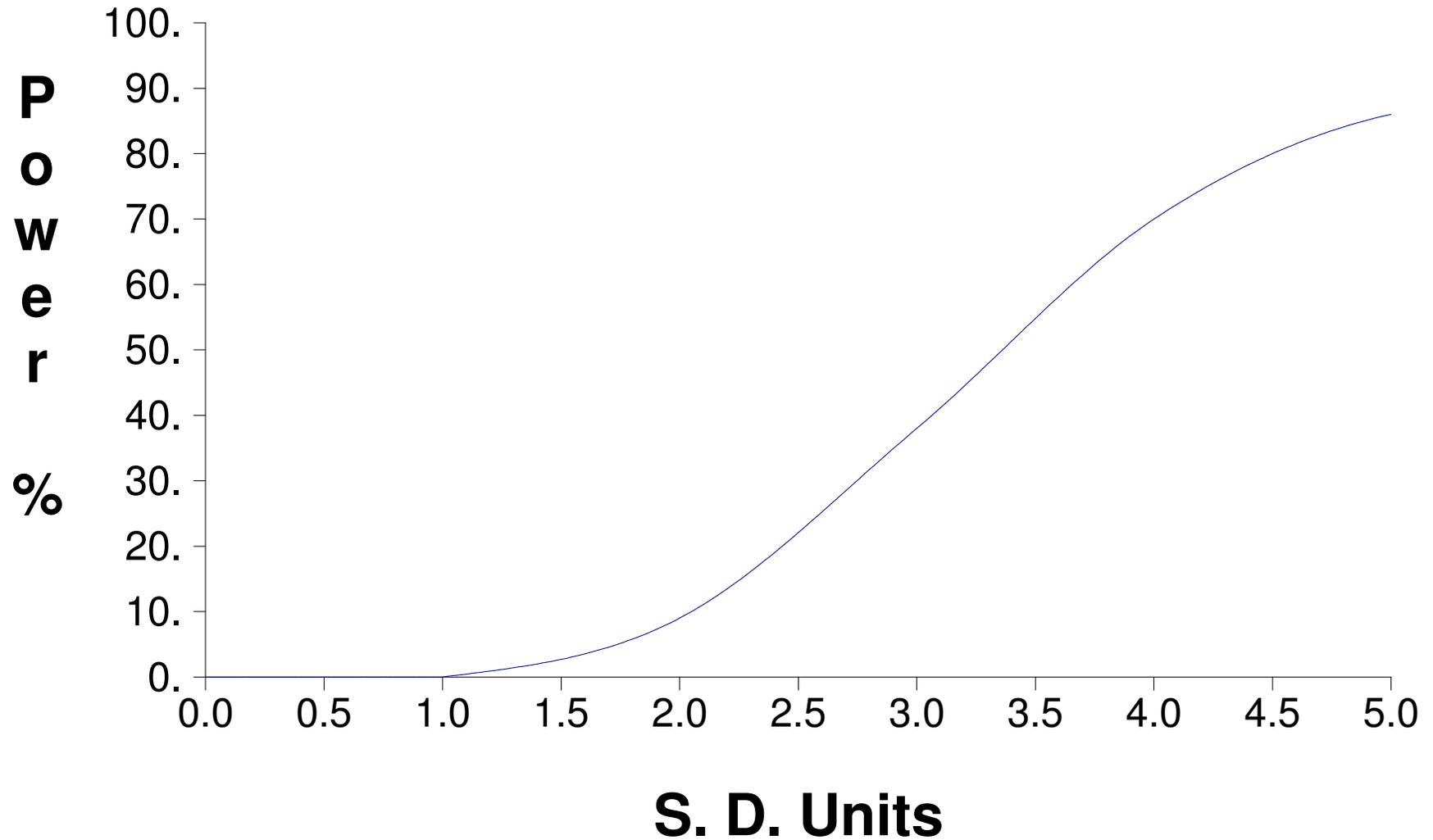
□ Dissolved arsenic
△ Dissolved barium
○ Nondetect

Deep Wells

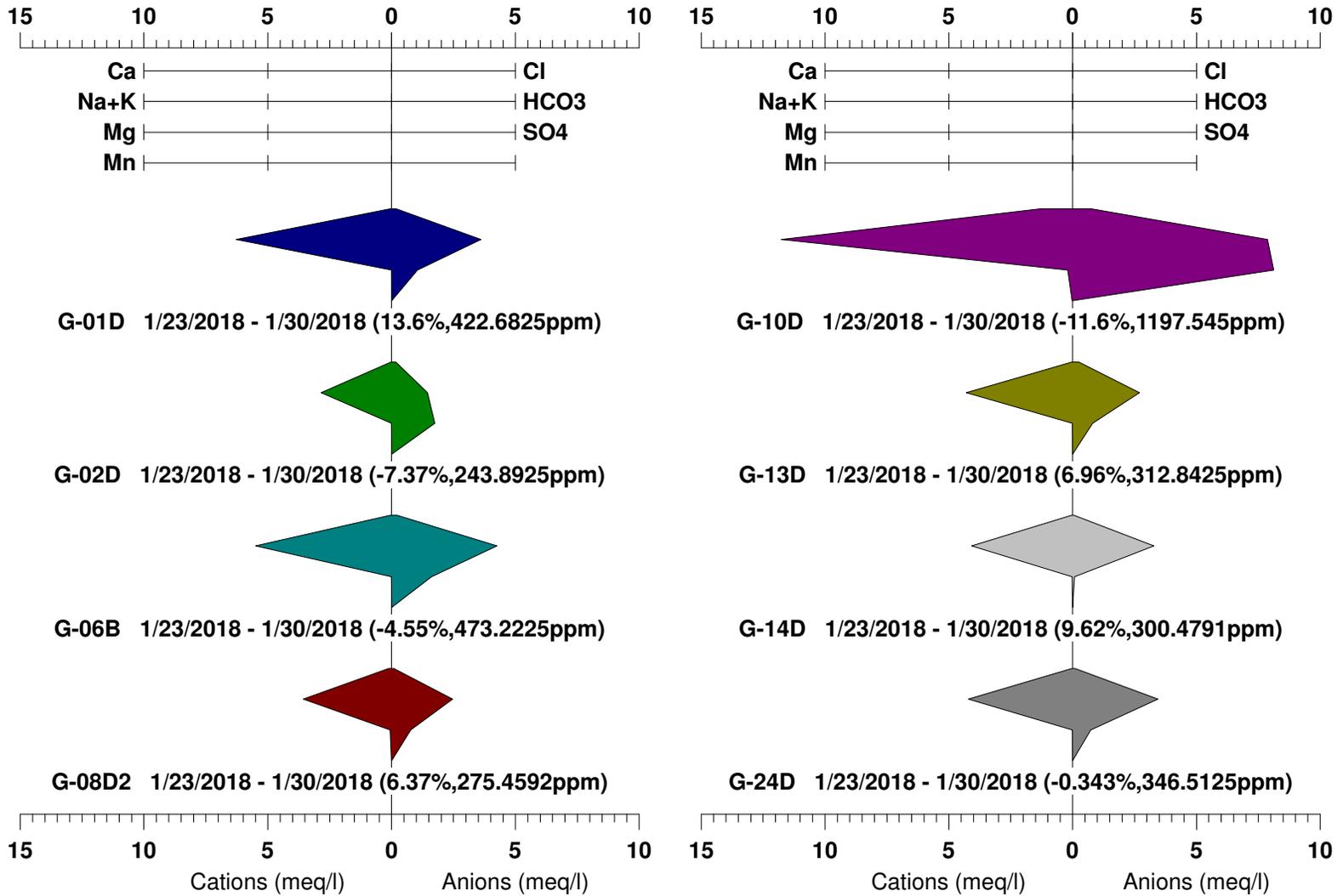
False Positive and False Negative Rates for Current Intra-Well Prediction Limits Monitoring Program



False Positive and False Negative Rates for Current Upgradient vs. Downgradient Monitoring Program

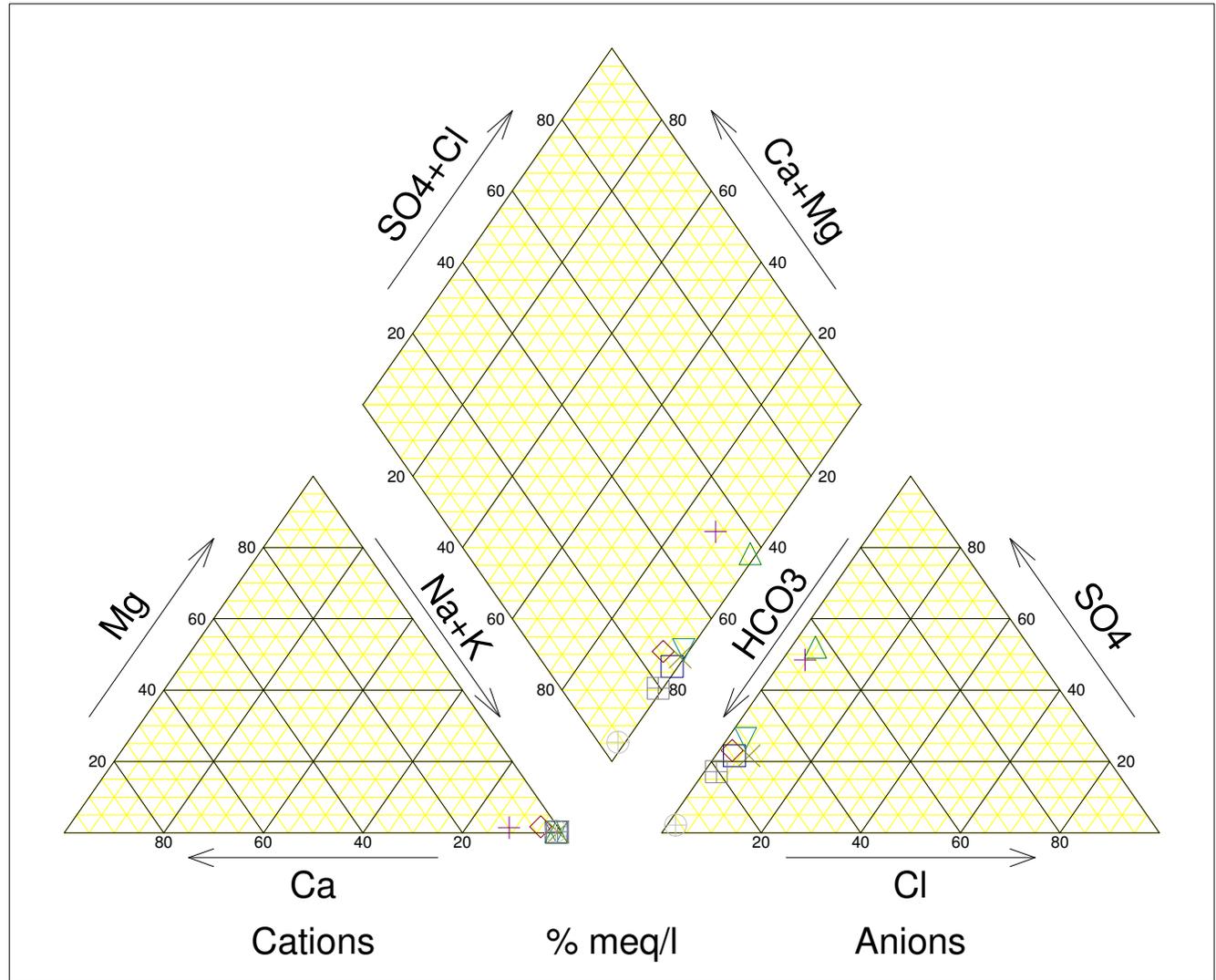


Cathcart Landfill [ccdeep]

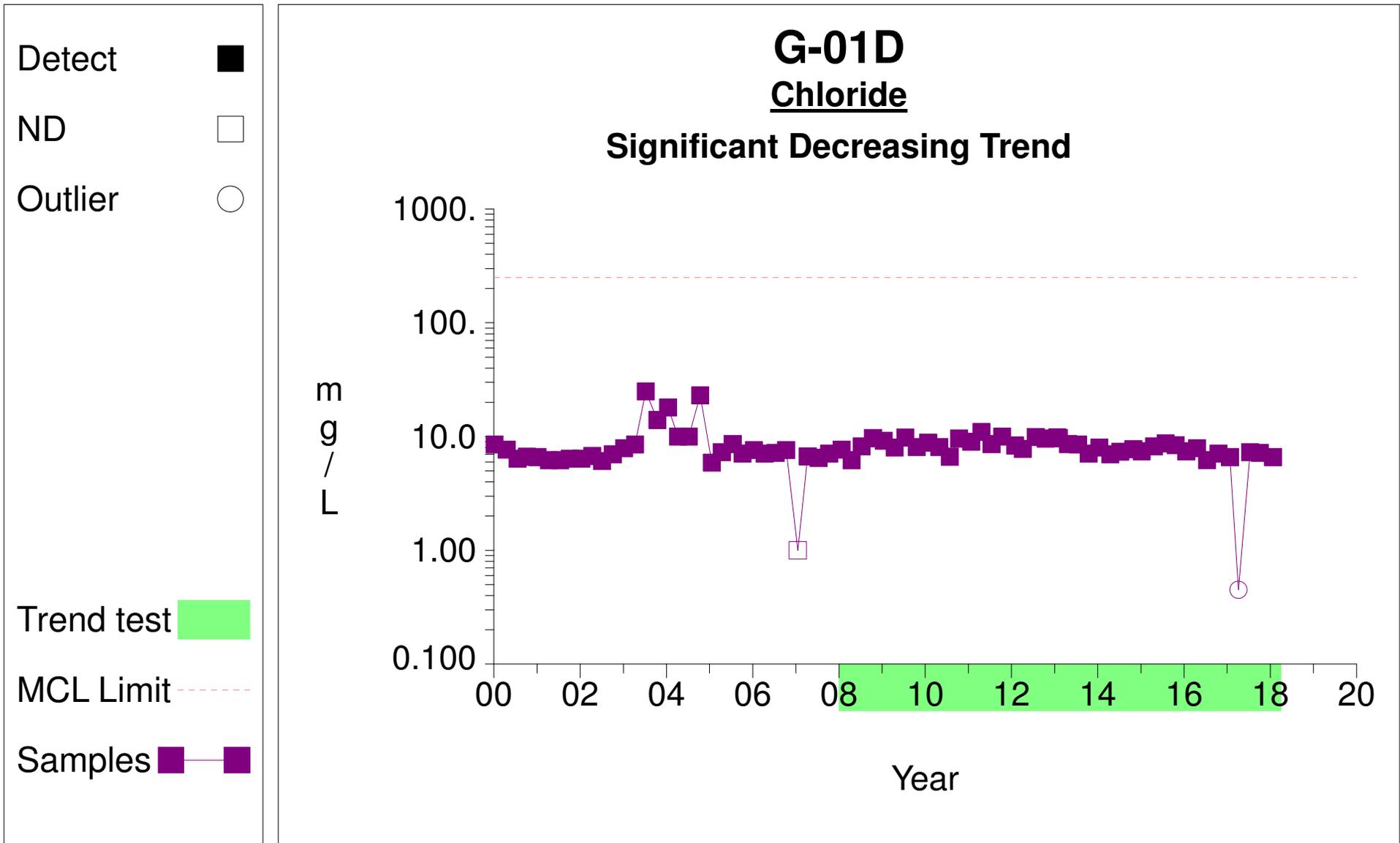


Cathcart Landfill [ccdeep]

□	G-01D	1/23/2018 - 1/30/2018 (13.6%, 422.68ppm)
△	G-02D	1/23/2018 - 1/30/2018 (-7.37%, 243.89ppm)
▽	G-06B	1/23/2018 - 1/30/2018 (-4.55%, 473.22ppm)
◇	G-08D2	1/23/2018 - 1/30/2018 (6.33%, 275.36ppm)
+	G-10D	1/23/2018 - 1/30/2018 (-11.6%, 1197.09ppm)
×	G-13D	1/23/2018 - 1/30/2018 (6.96%, 312.84ppm)
⊕	G-14D	1/23/2018 - 1/30/2018 (9.62%, 300.47ppm)
⊗	G-24D	1/23/2018 - 1/30/2018 (-0.344%, 346.51ppm)

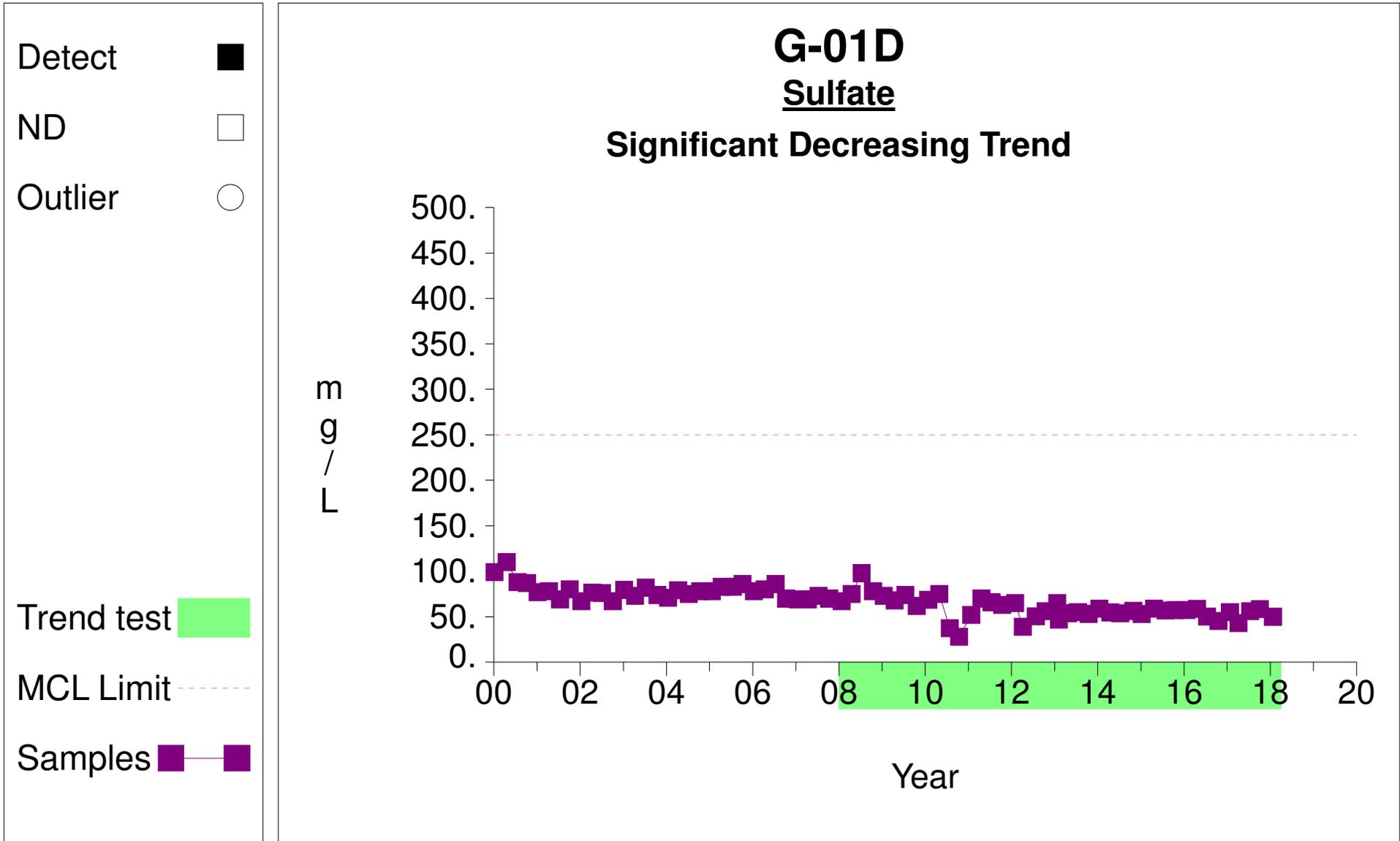


Time Series



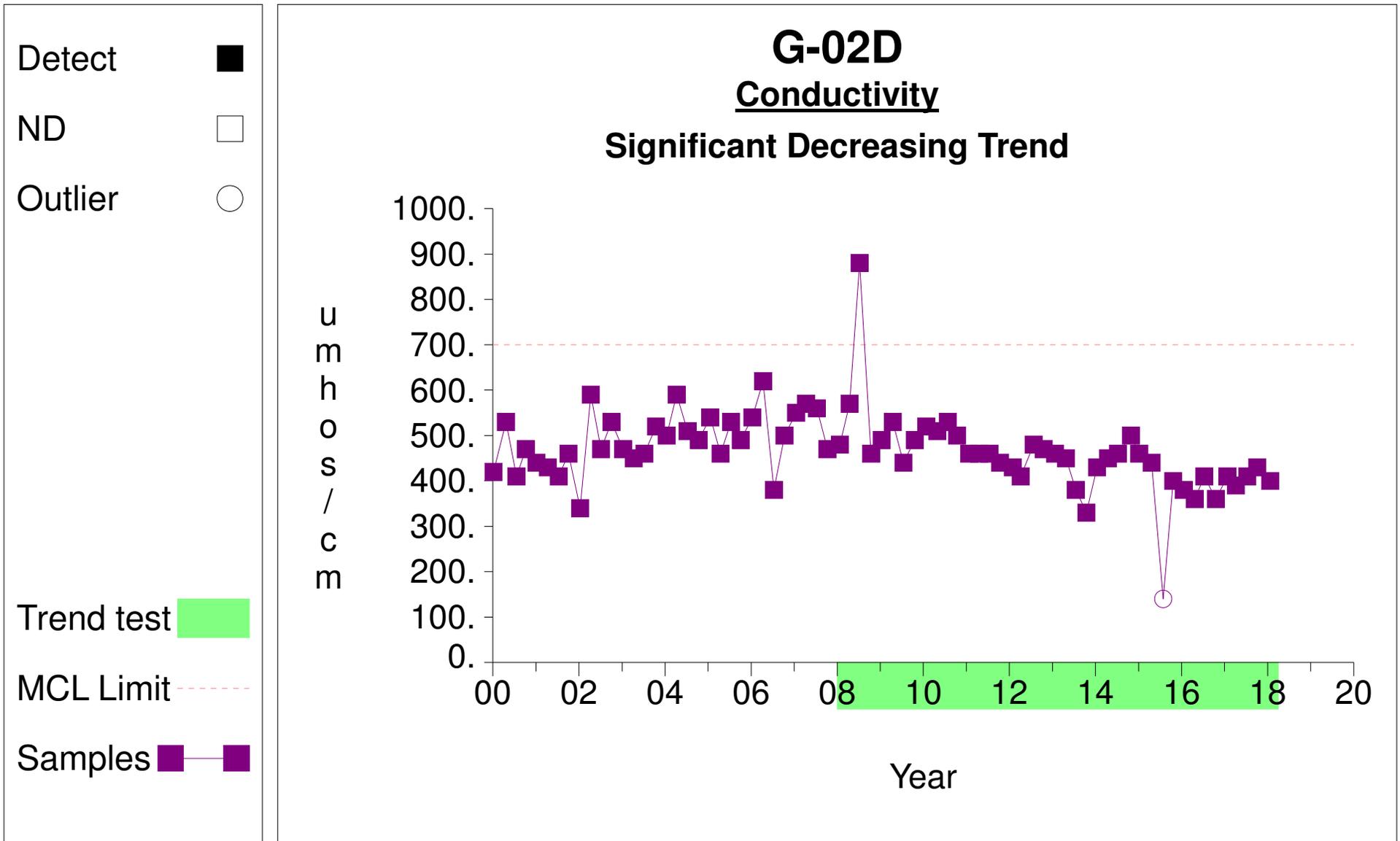
Graph 5

Time Series



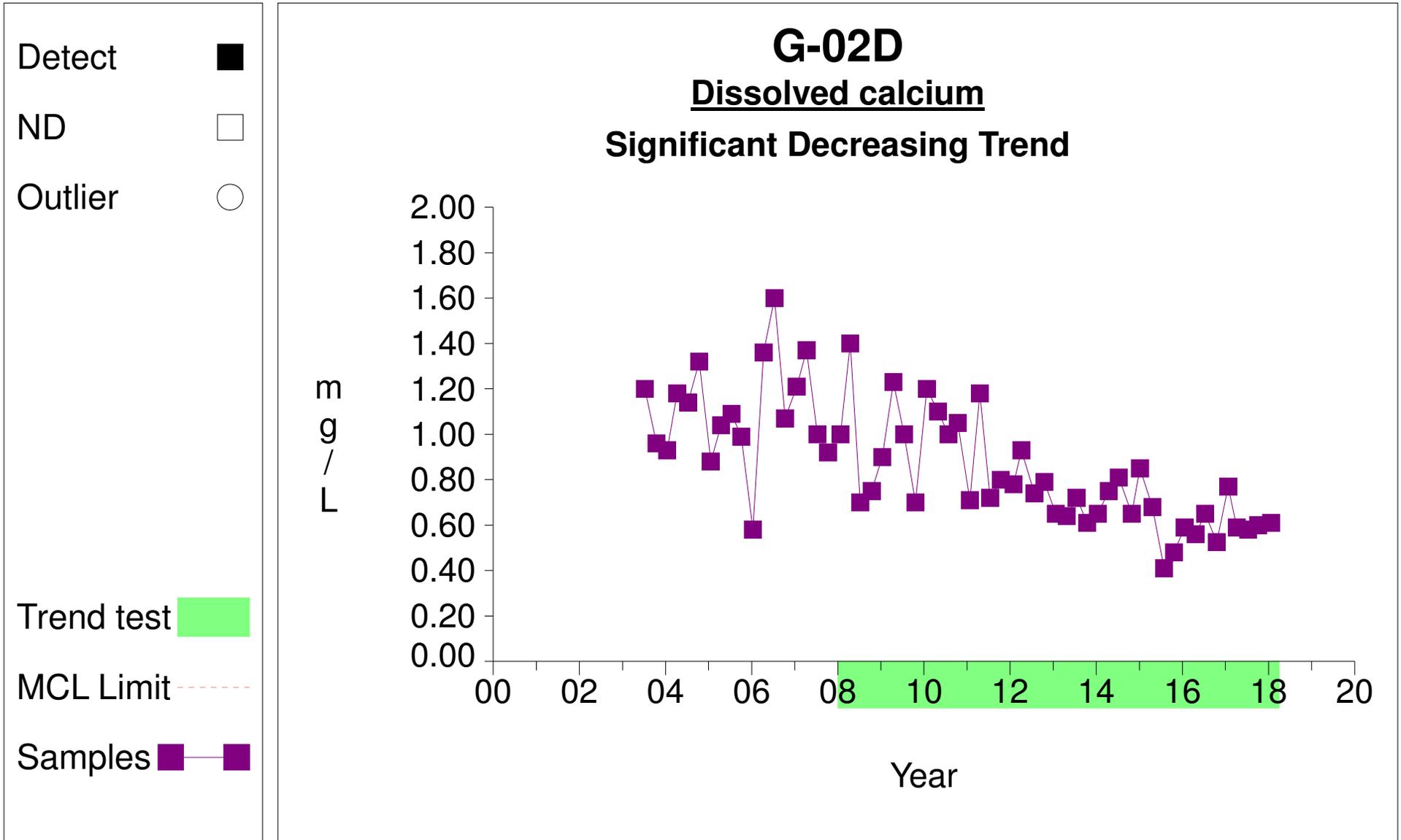
Graph 31

Time Series



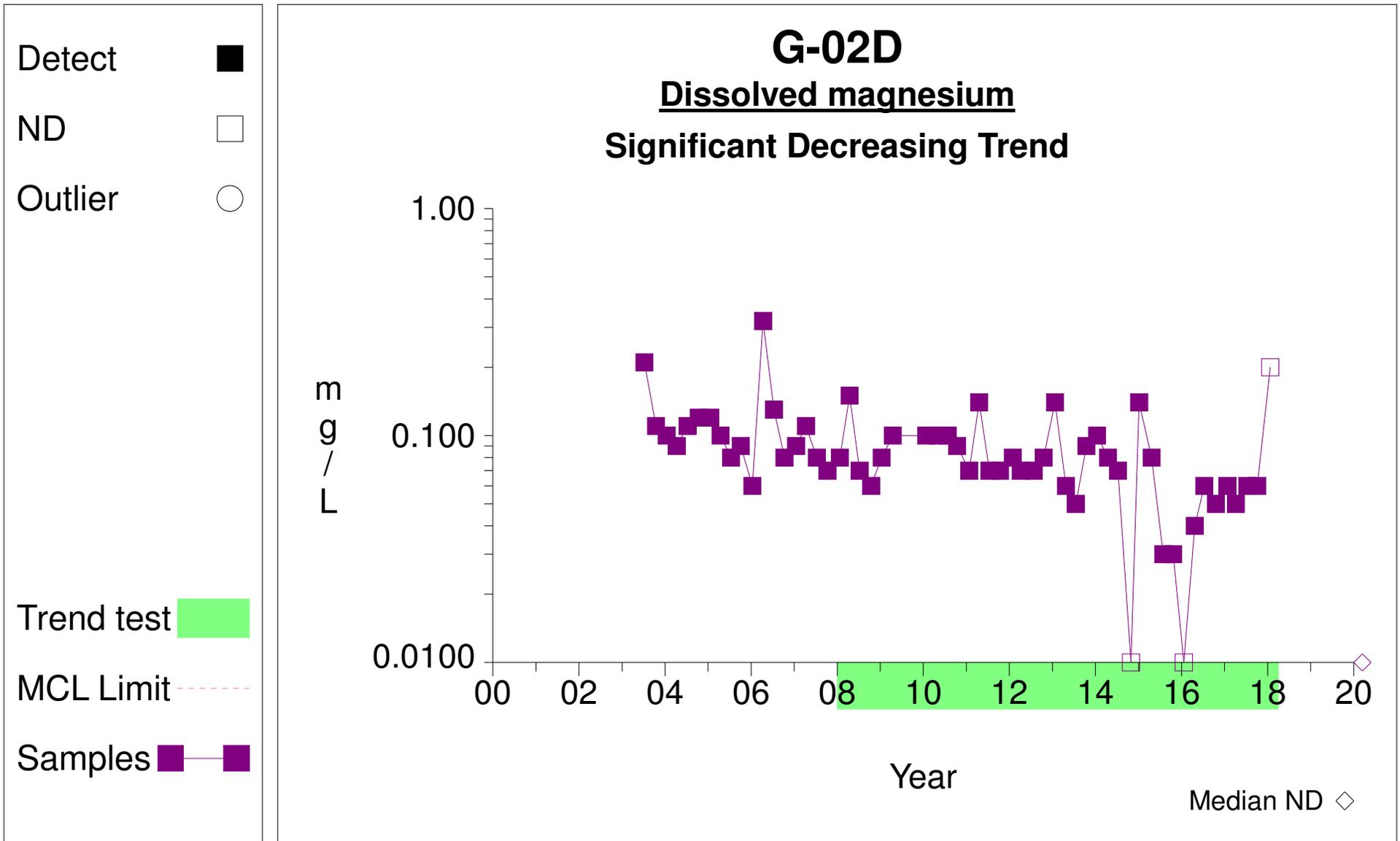
Graph 39

Time Series



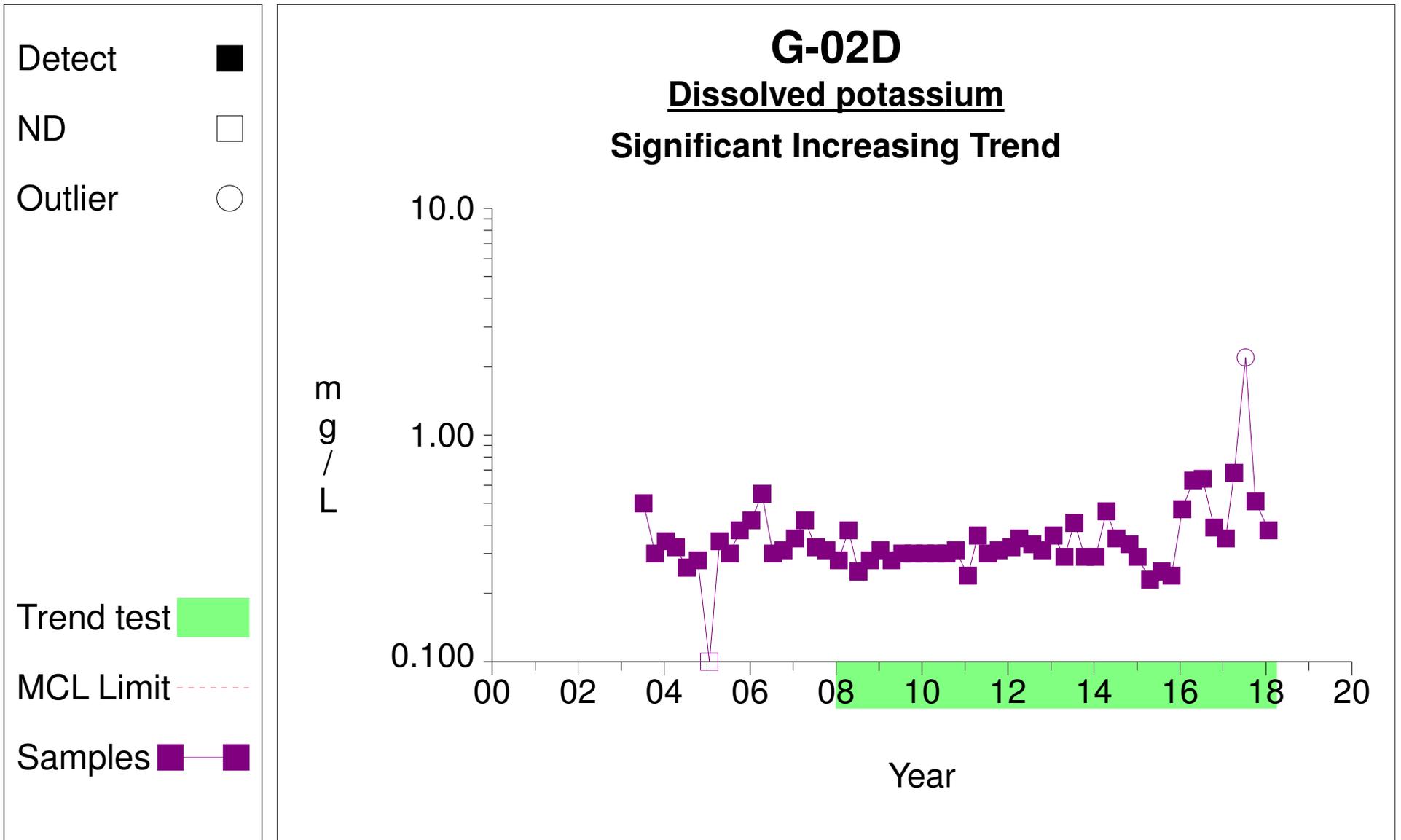
Graph 45

Time Series



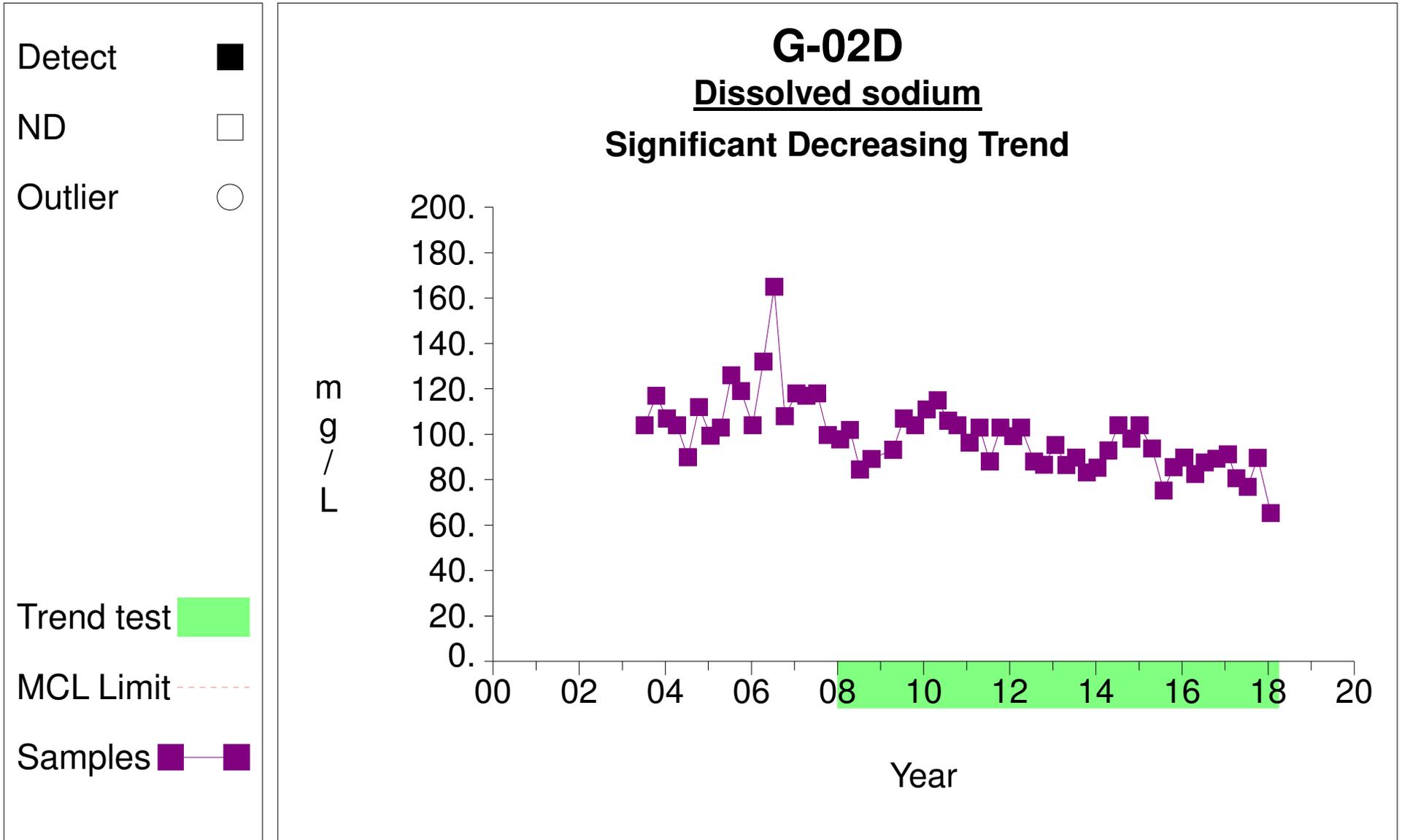
Graph 51

Time Series



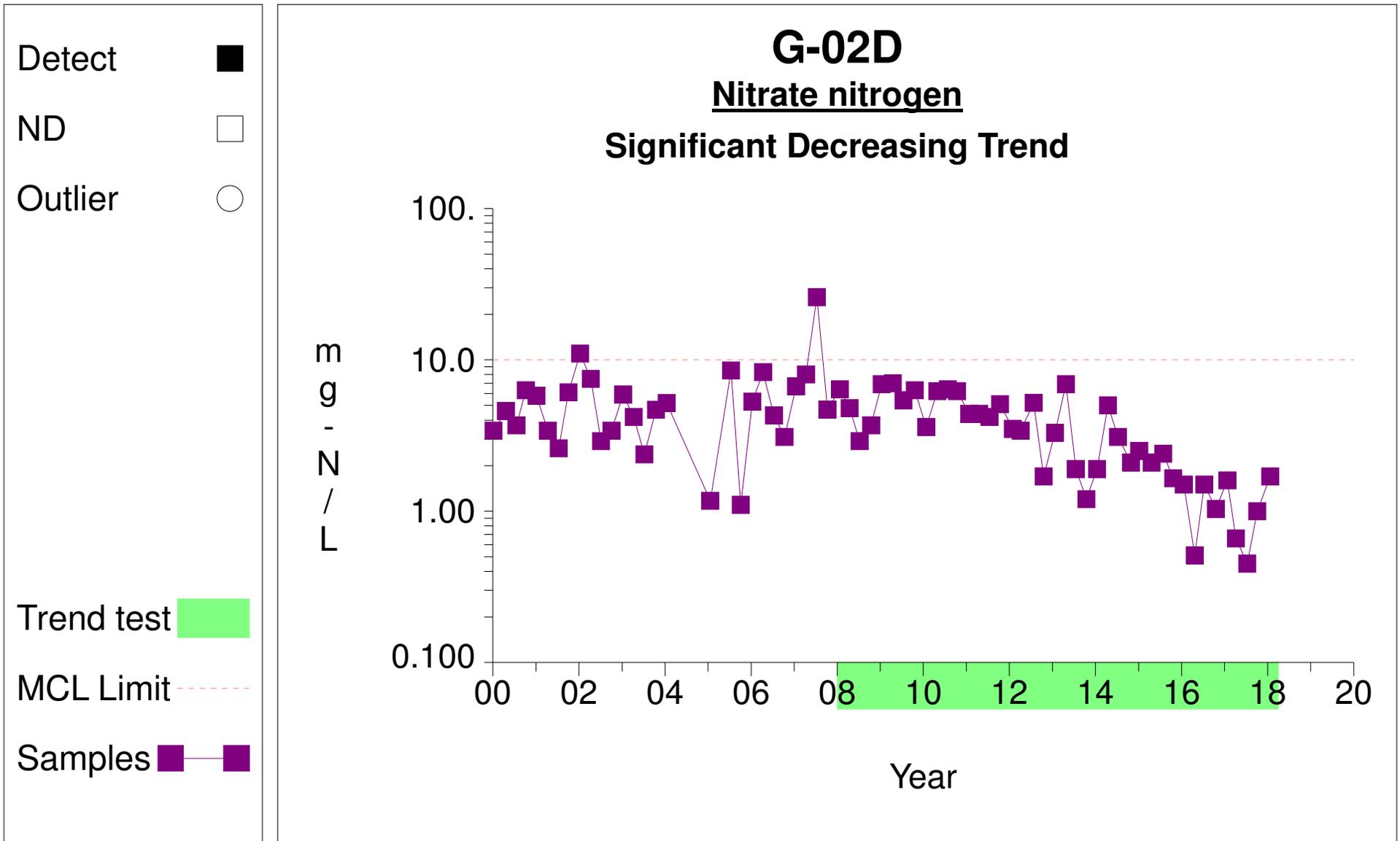
Graph 54

Time Series



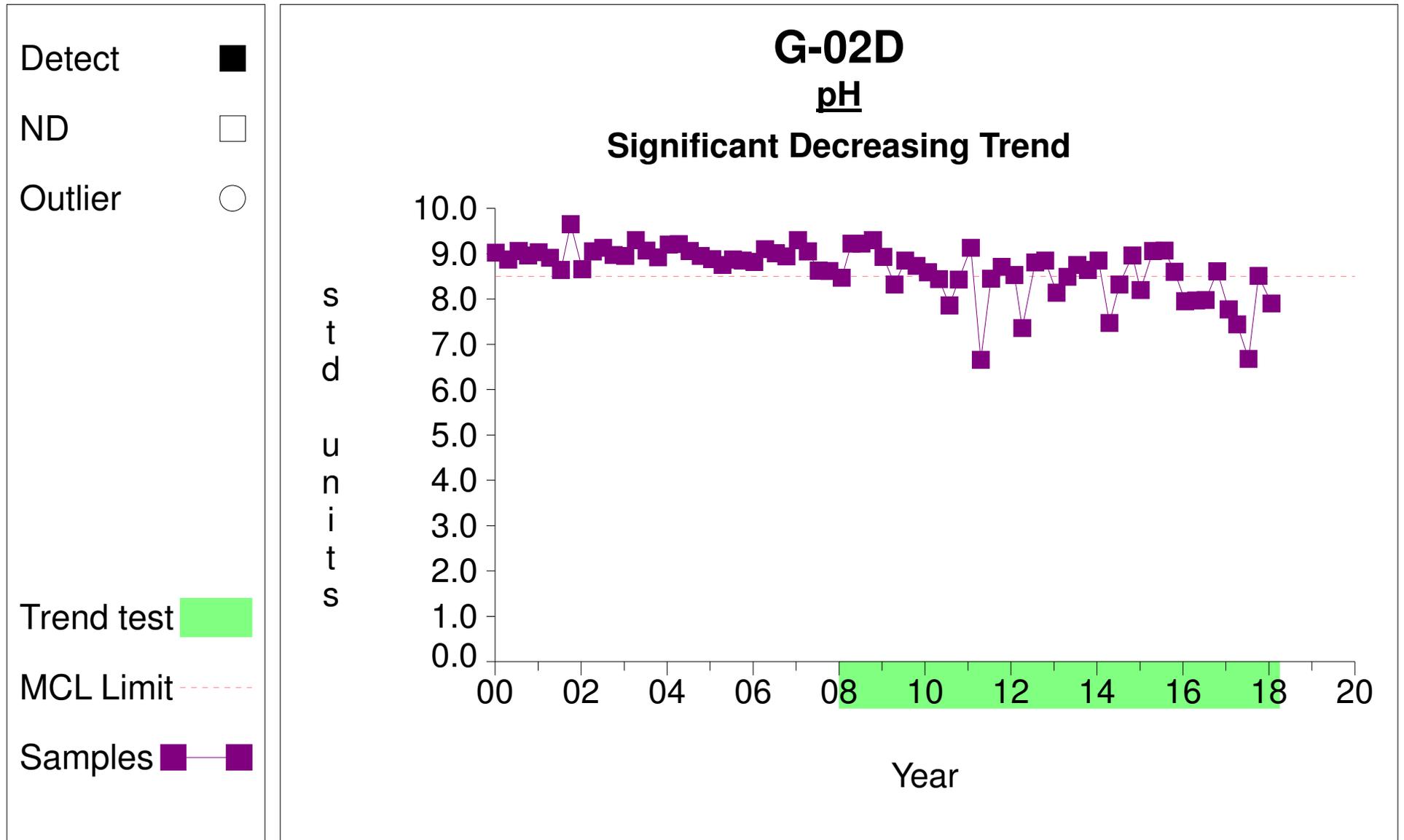
Graph 57

Time Series



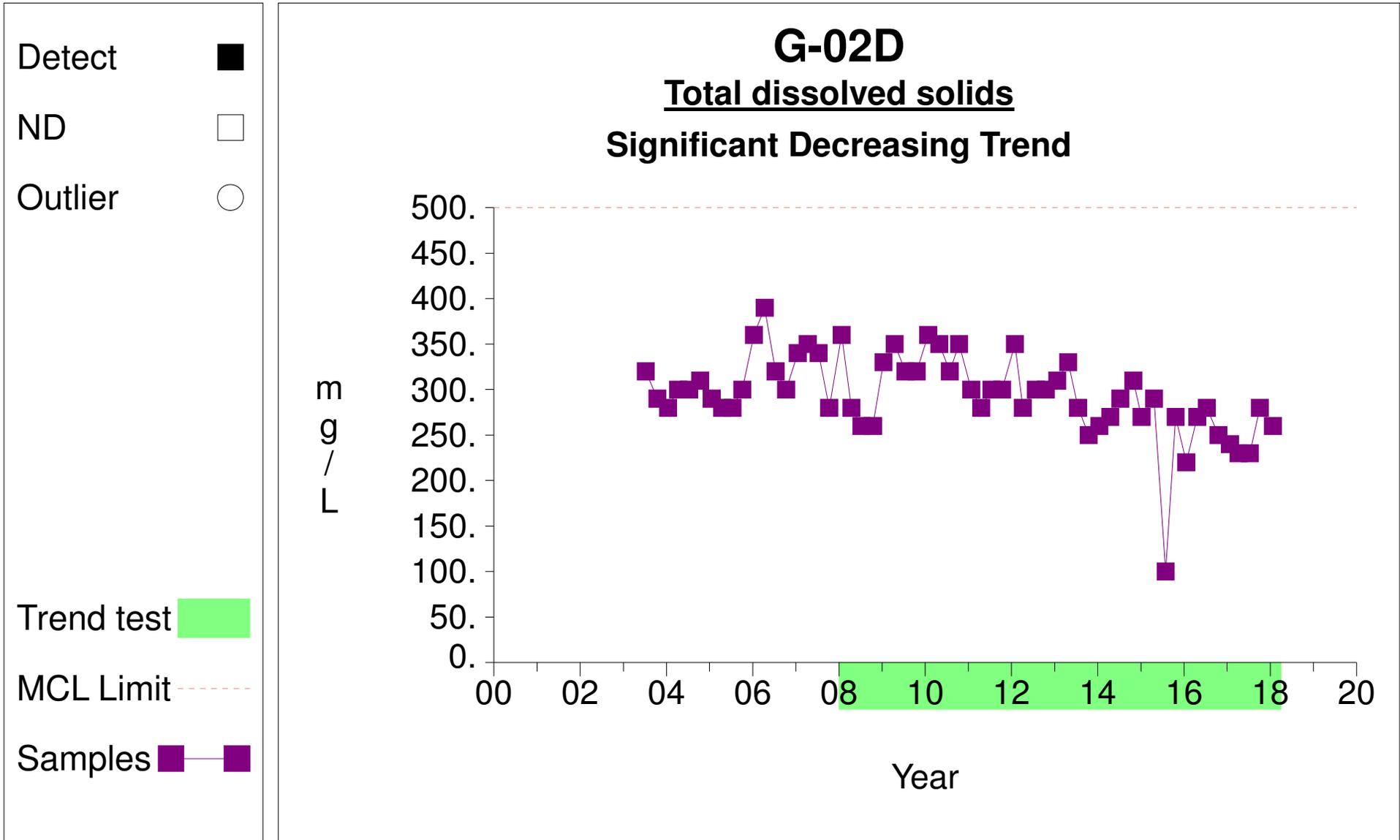
Graph 61

Time Series



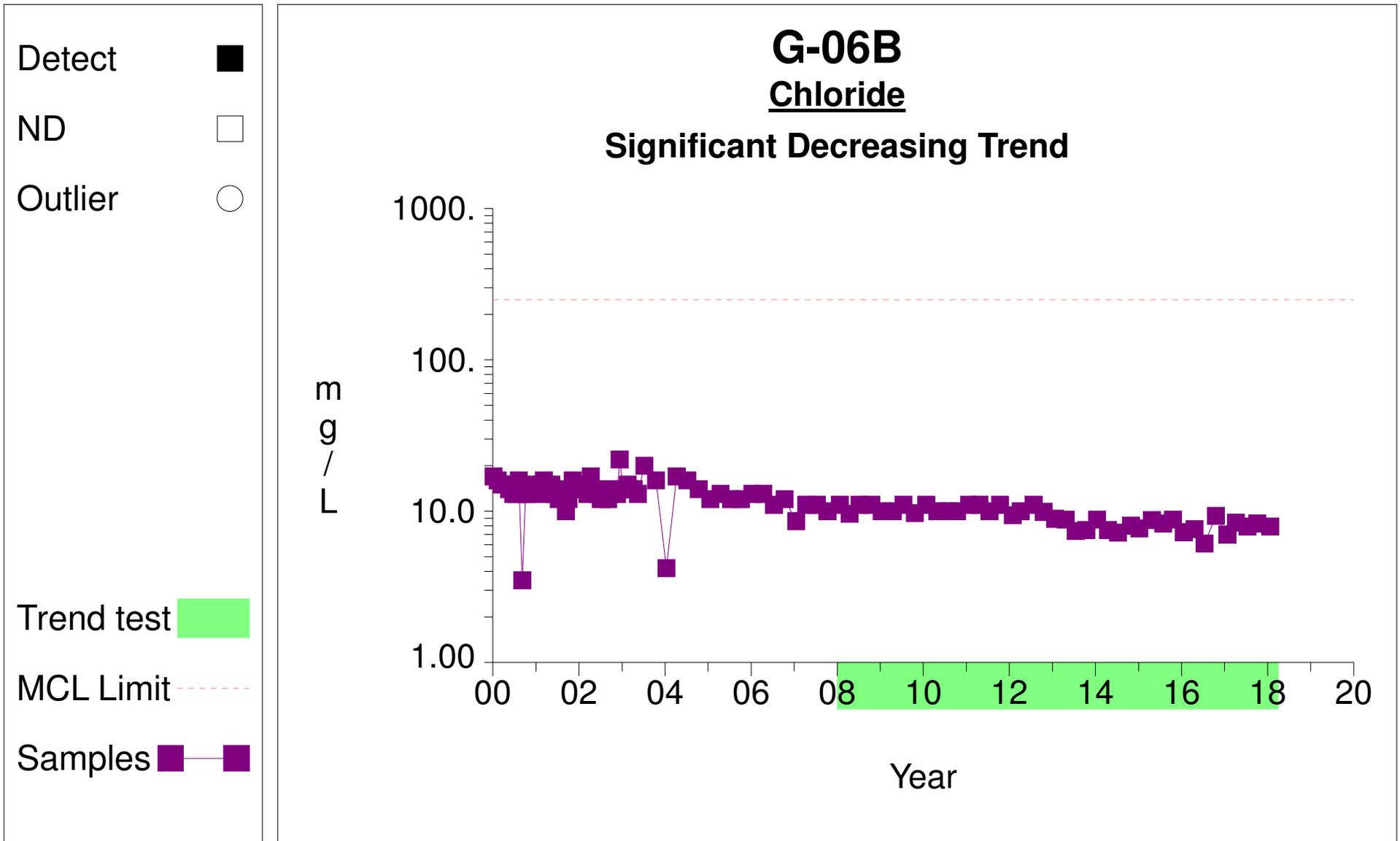
Graph 63

Time Series



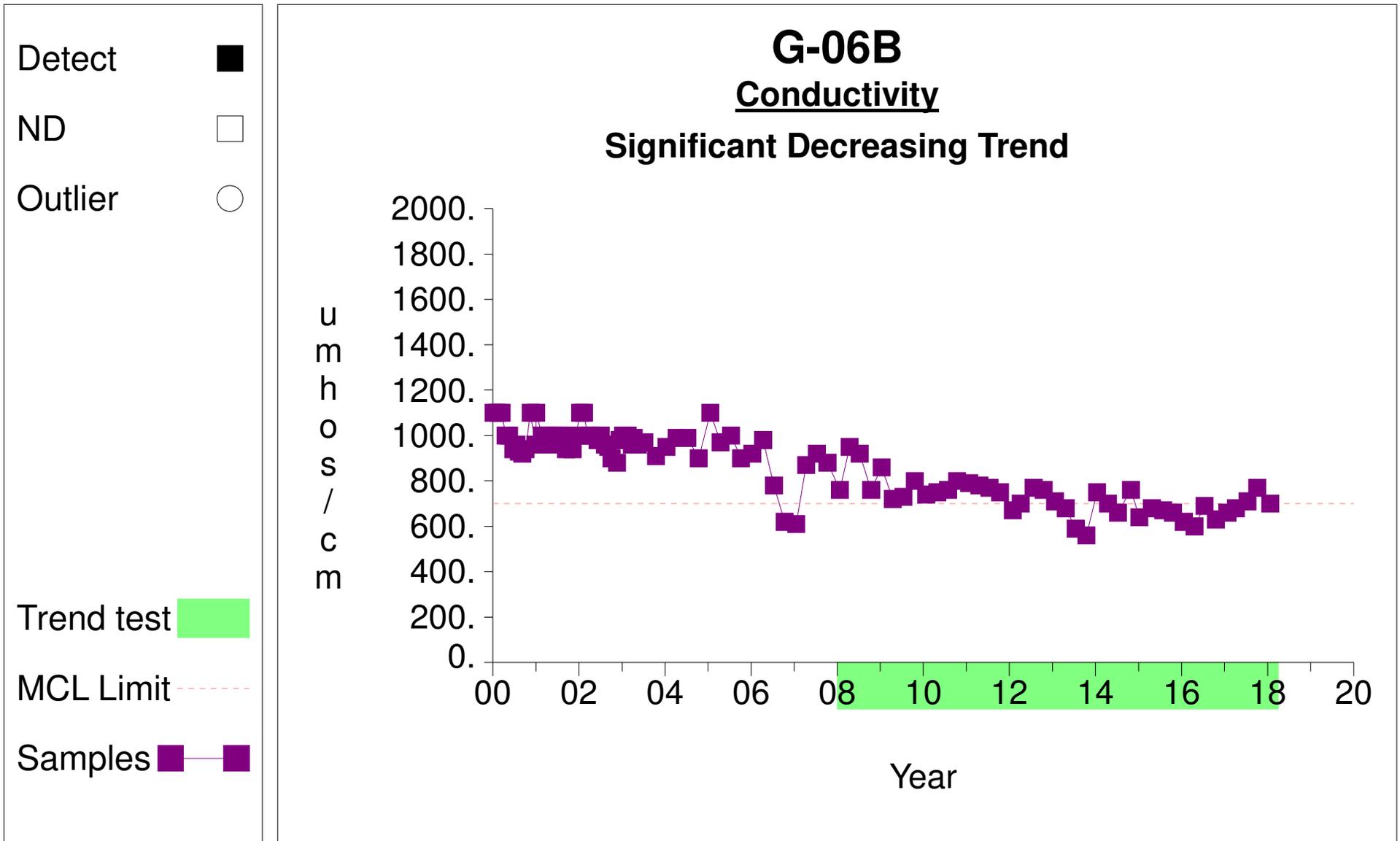
Graph 65

Time Series



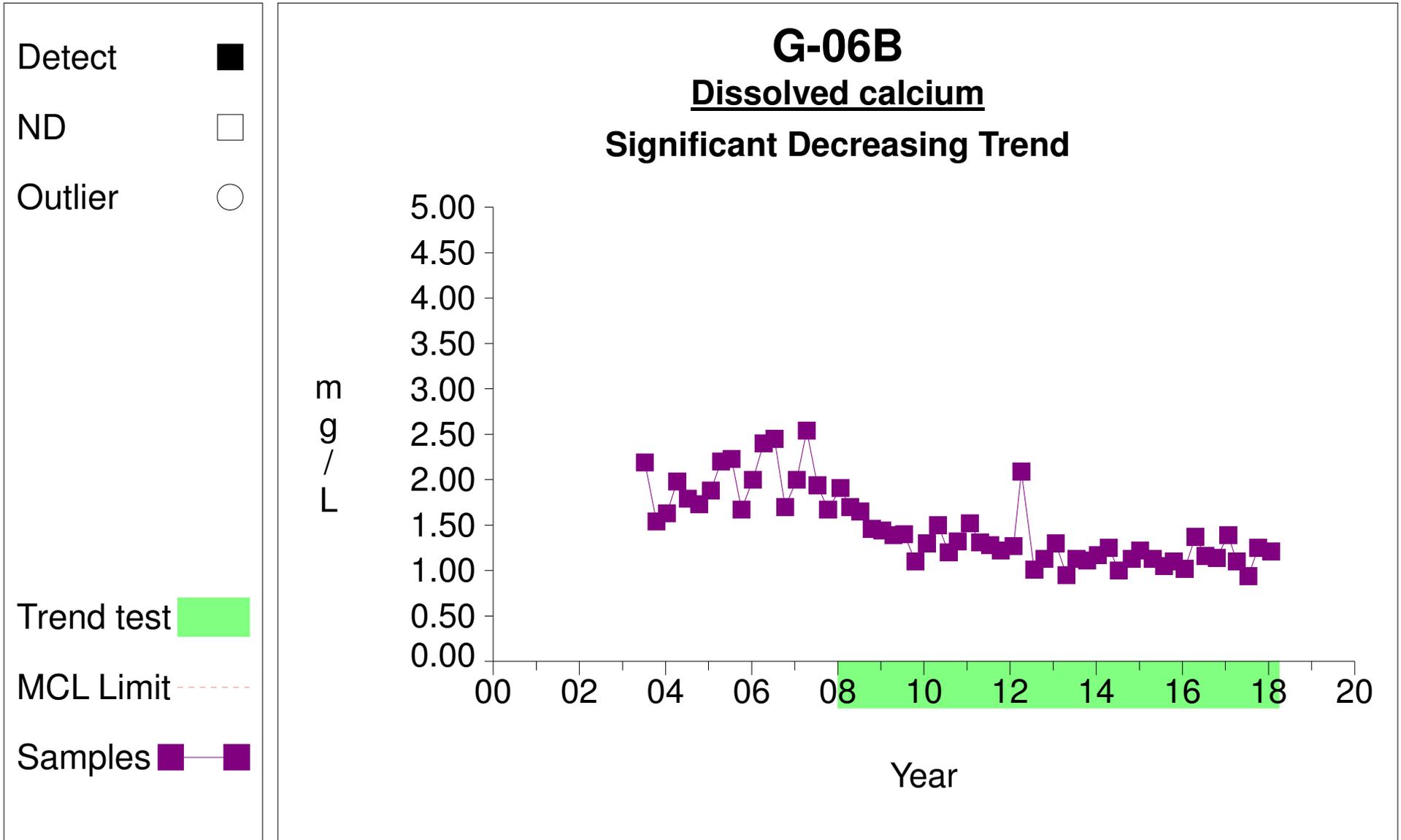
Graph 71

Time Series



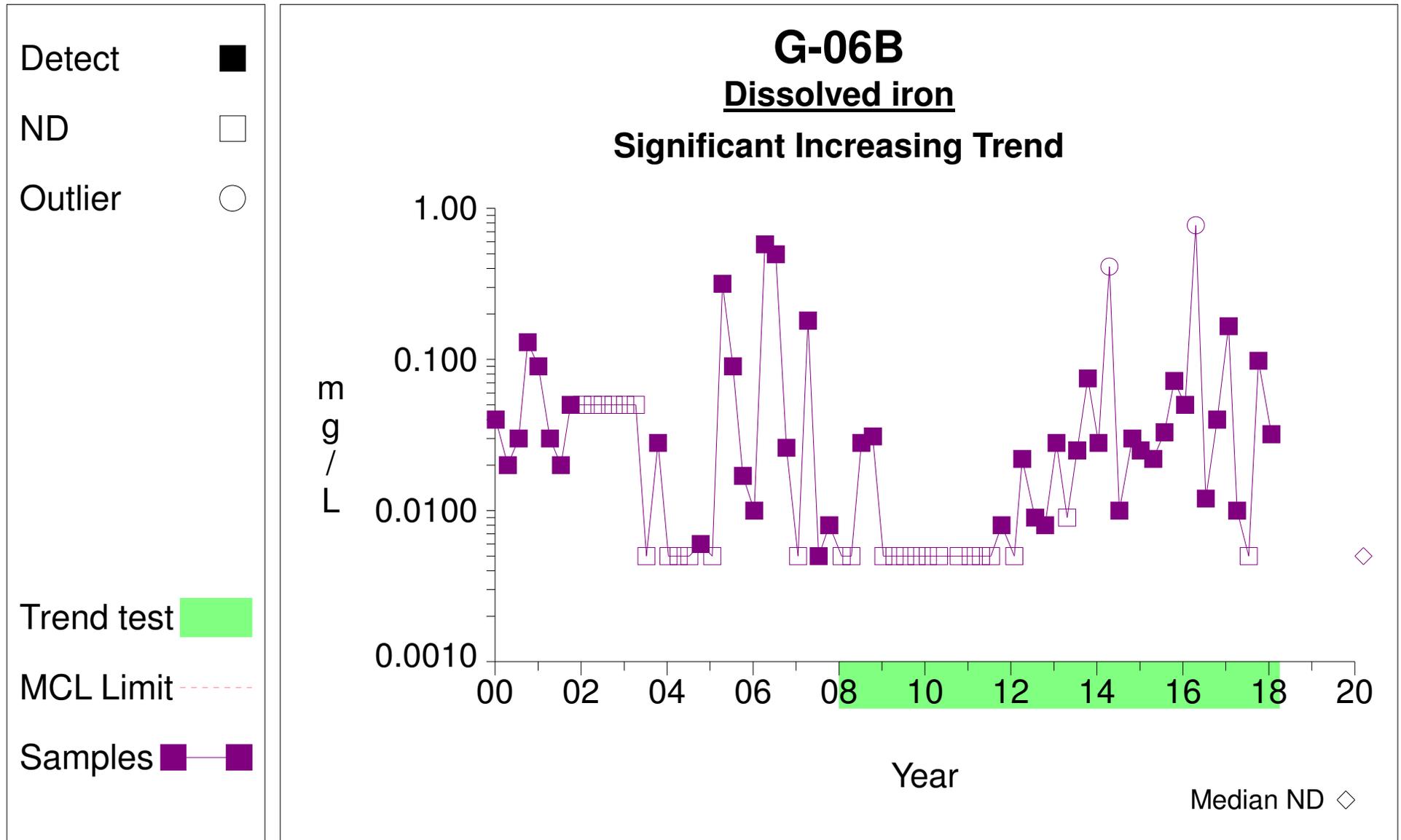
Graph 72

Time Series



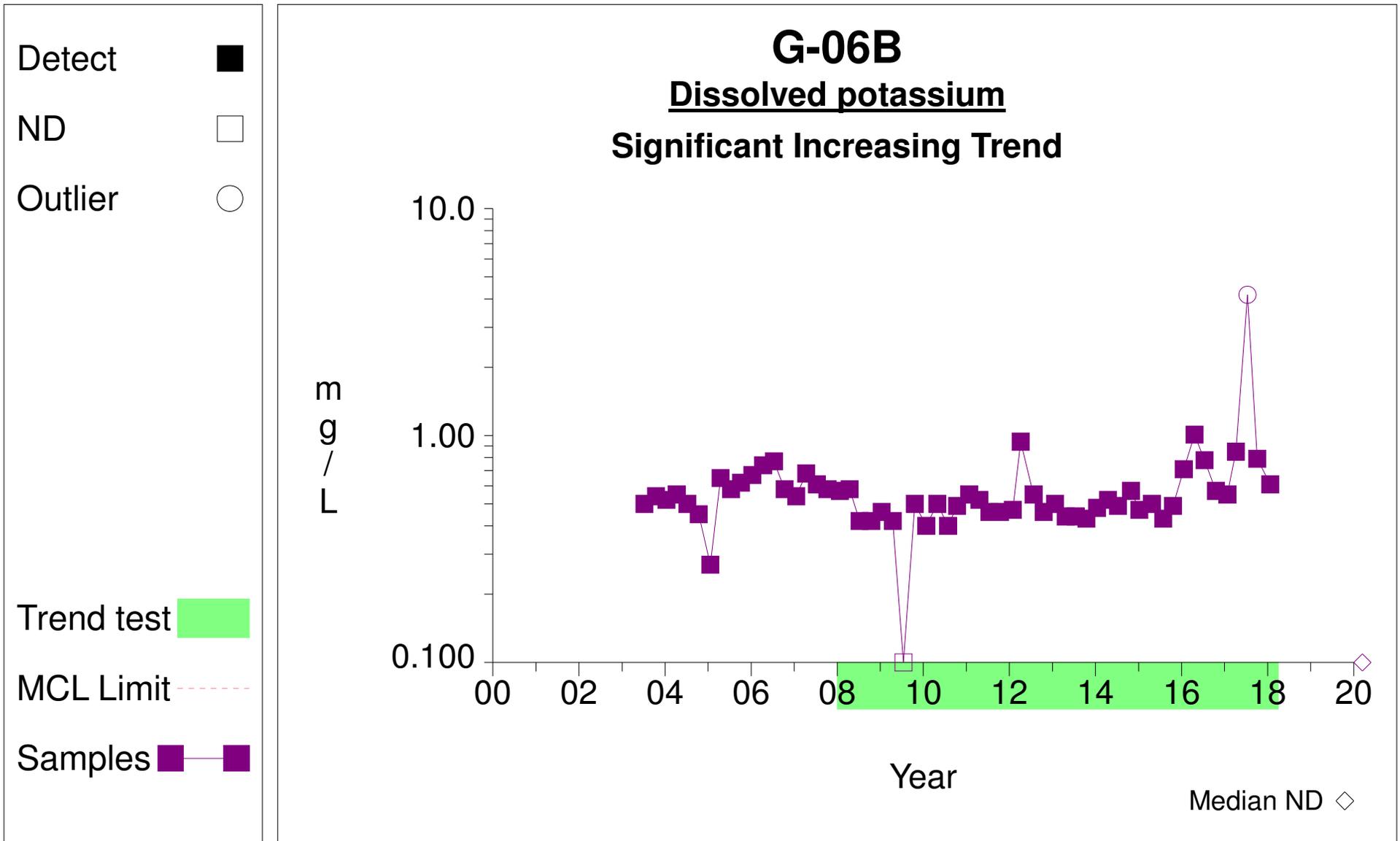
Graph 78

Time Series



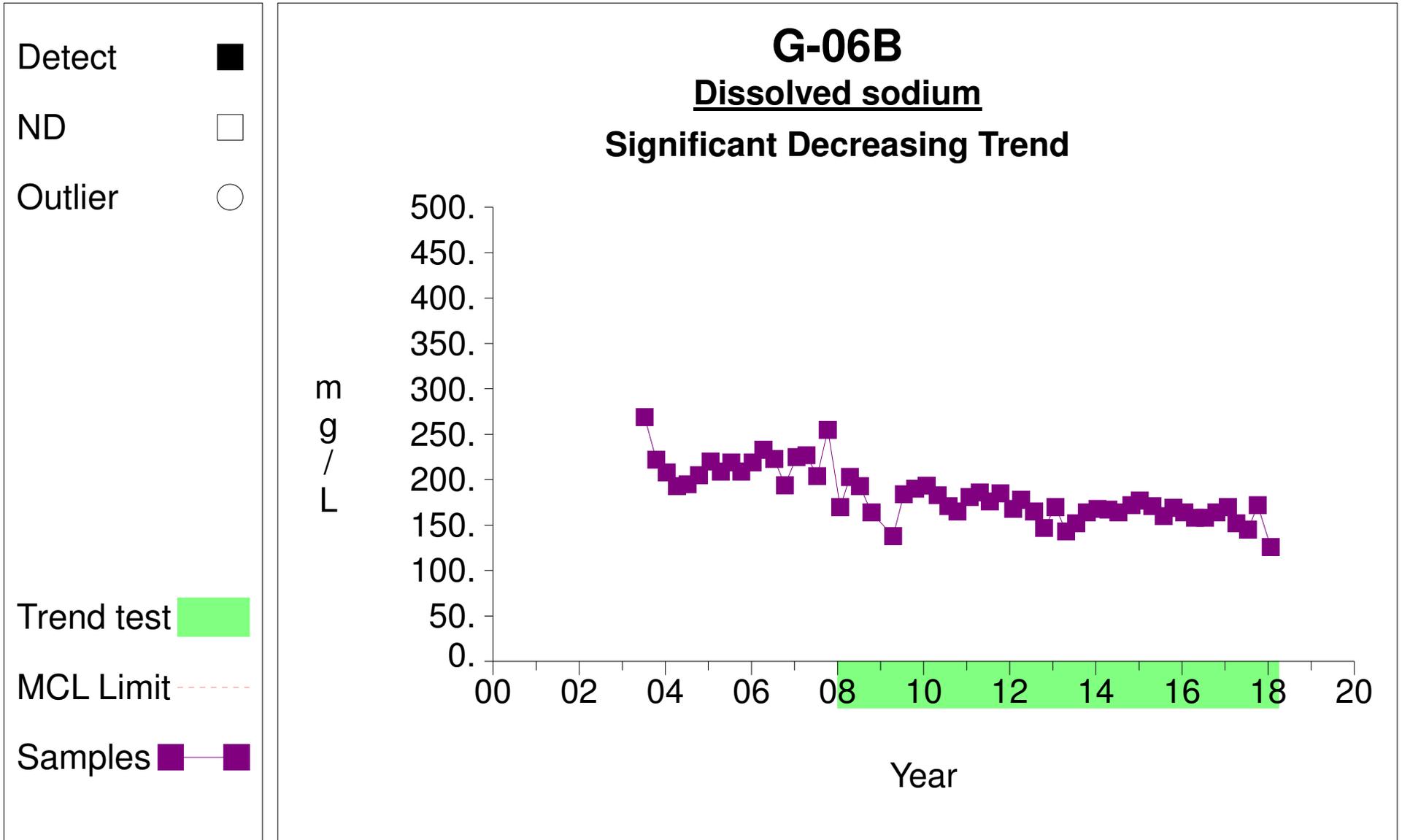
Graph 82

Time Series



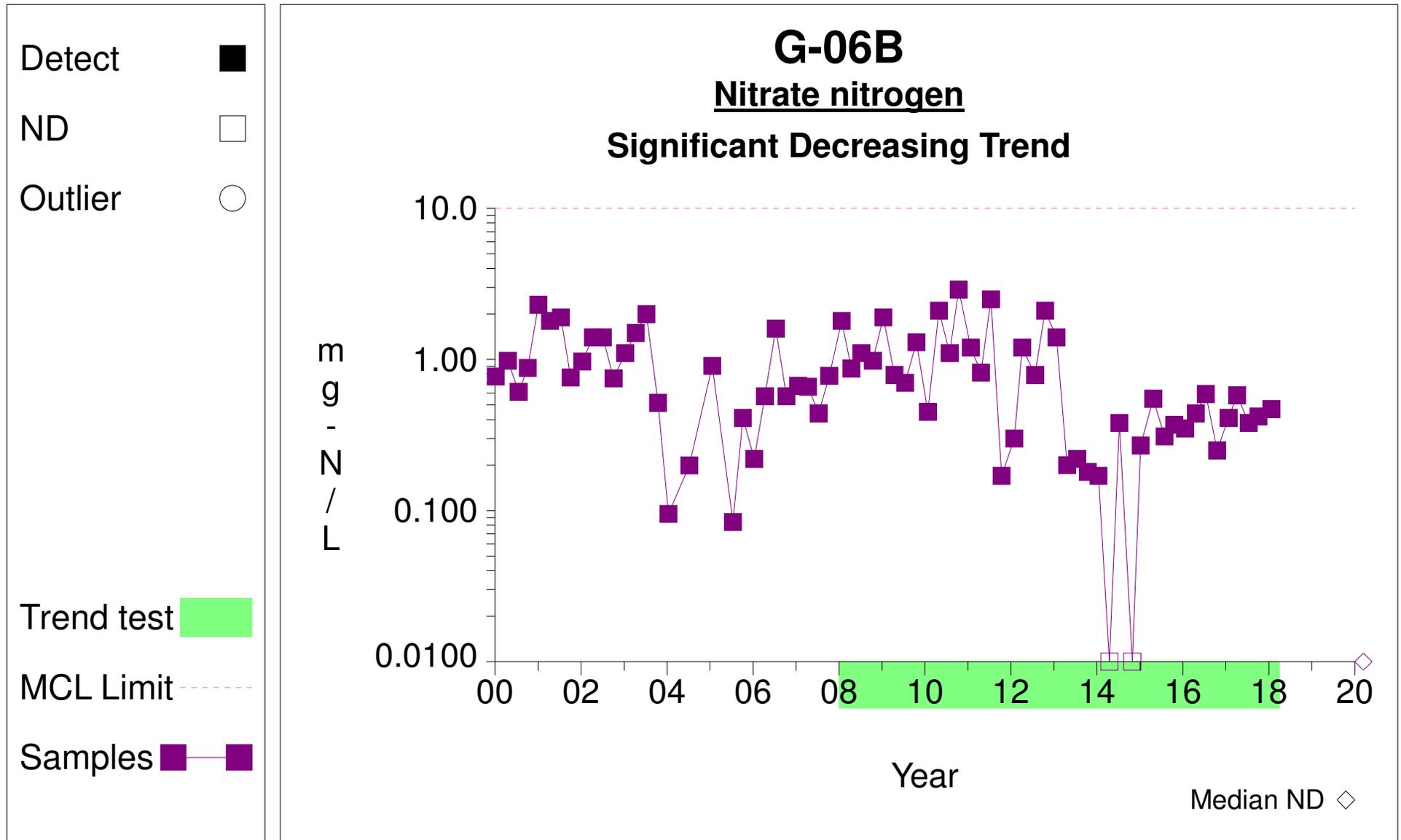
Graph 87

Time Series



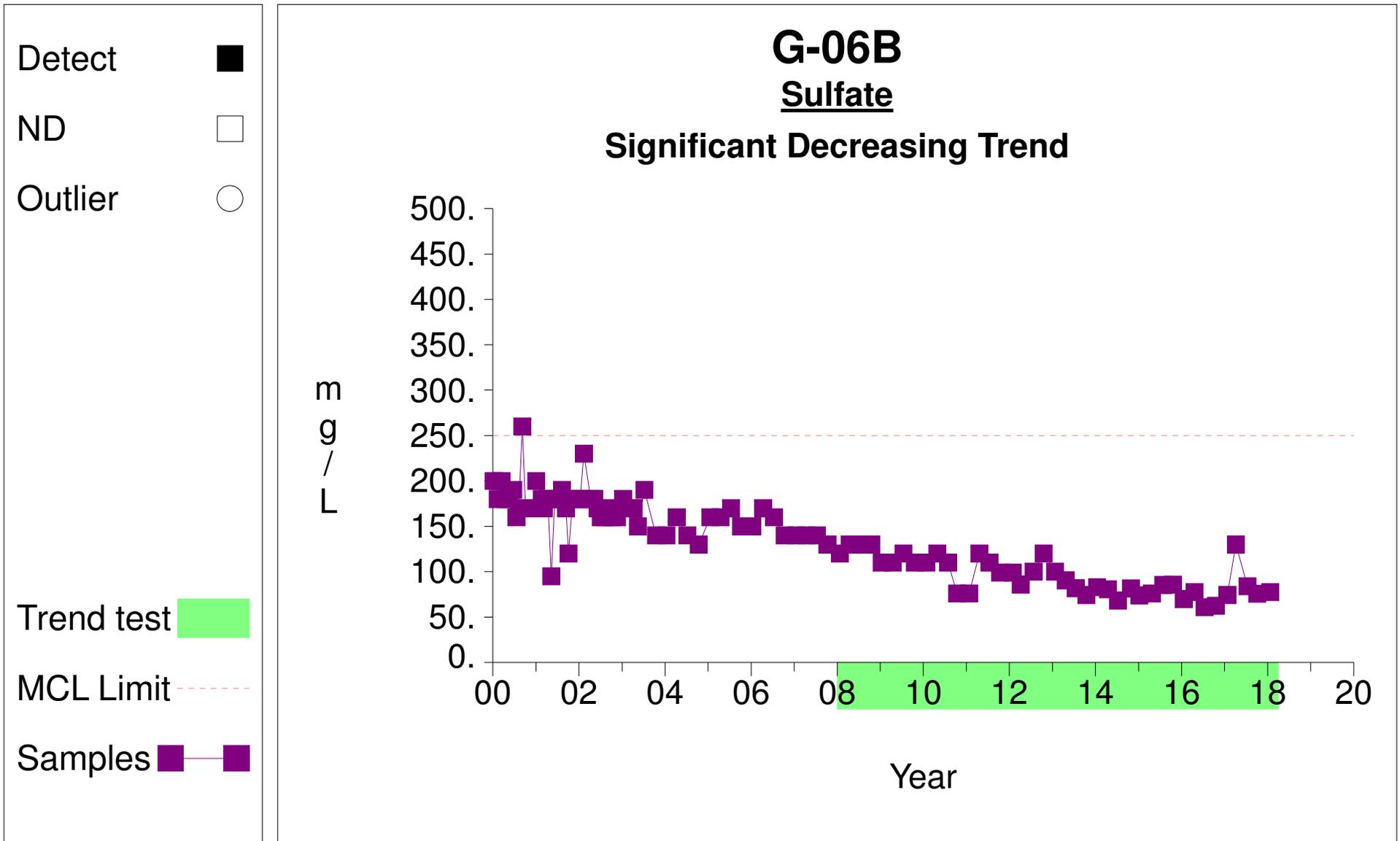
Graph 90

Time Series



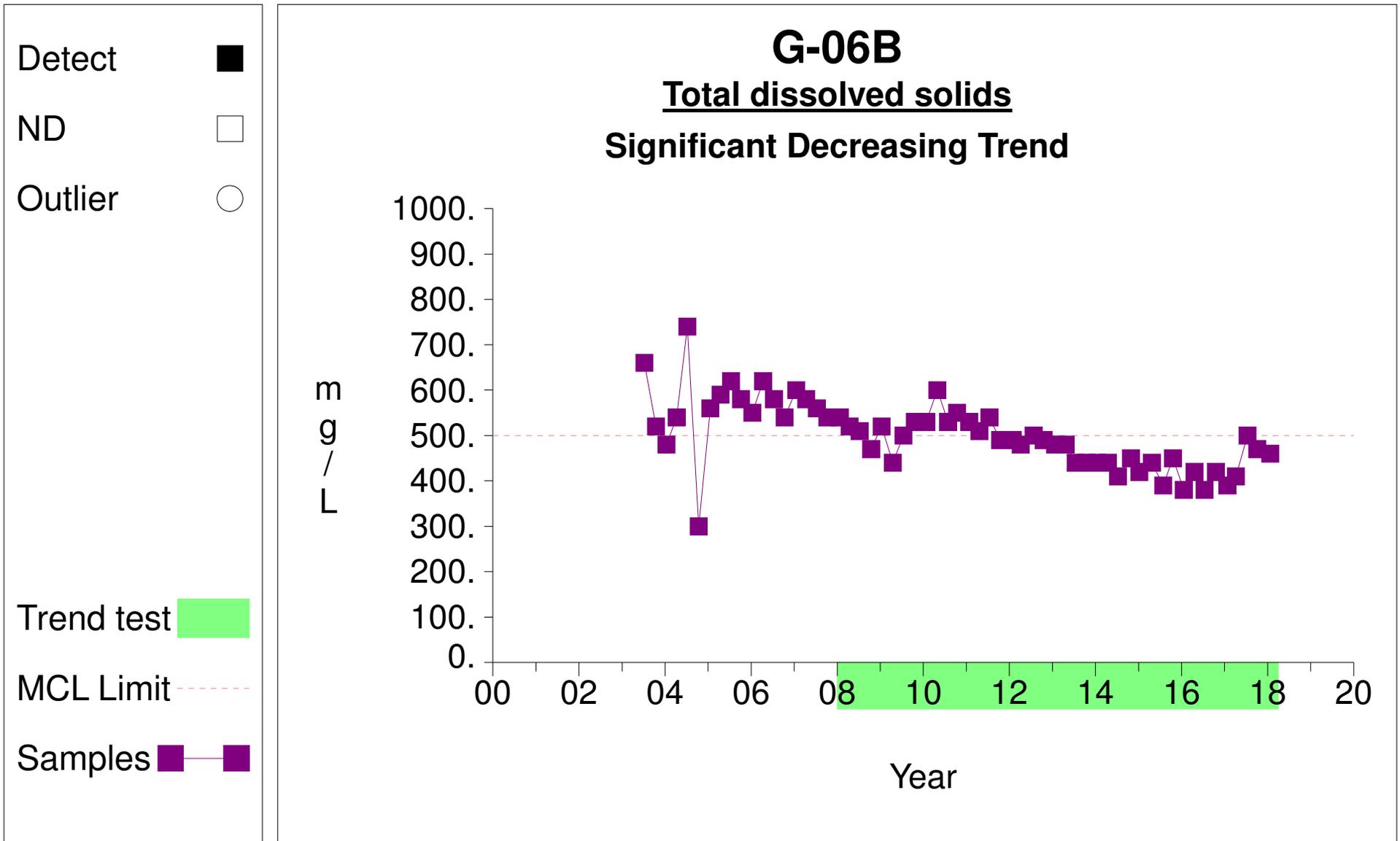
Graph 94

Time Series



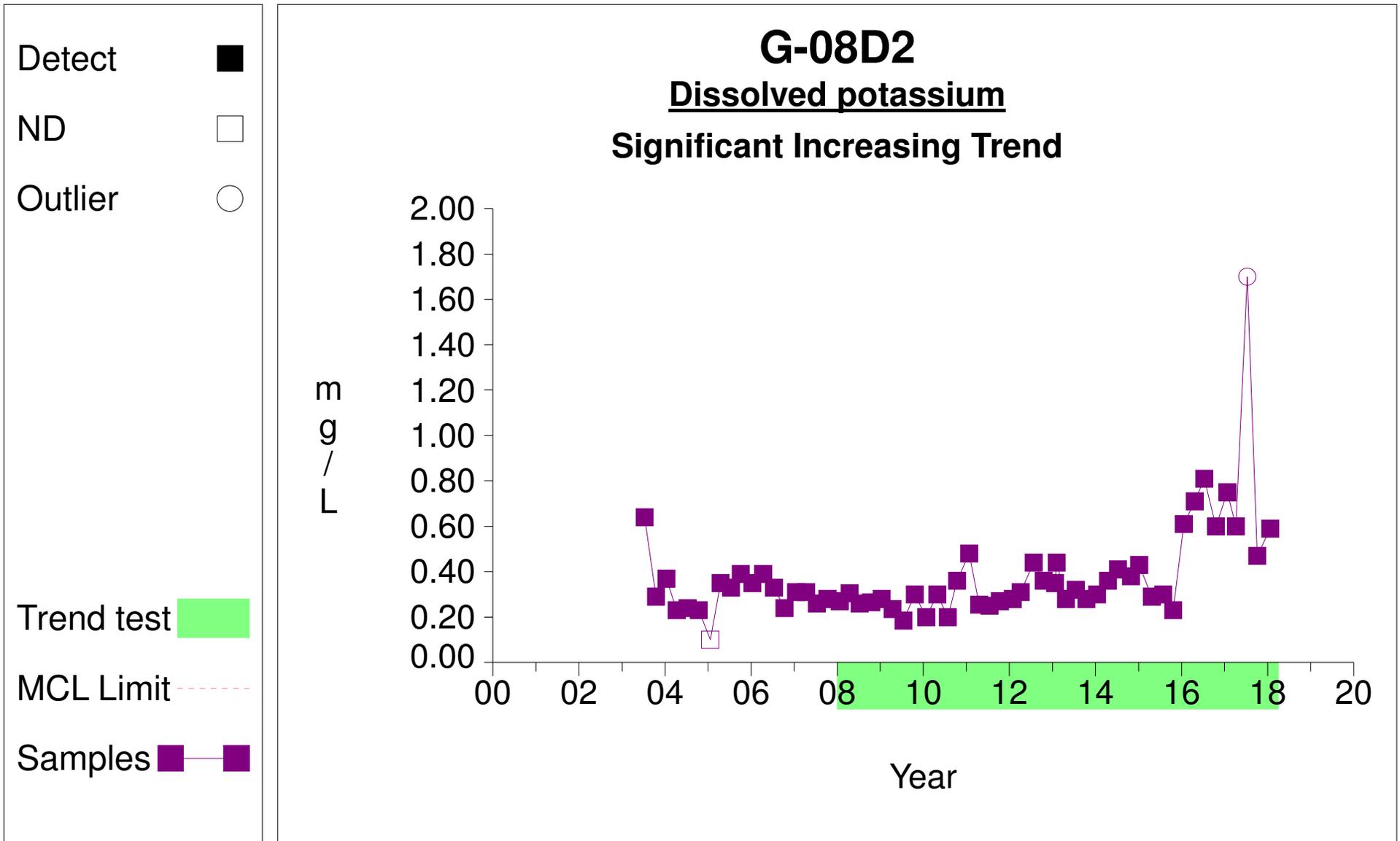
Graph 97

Time Series



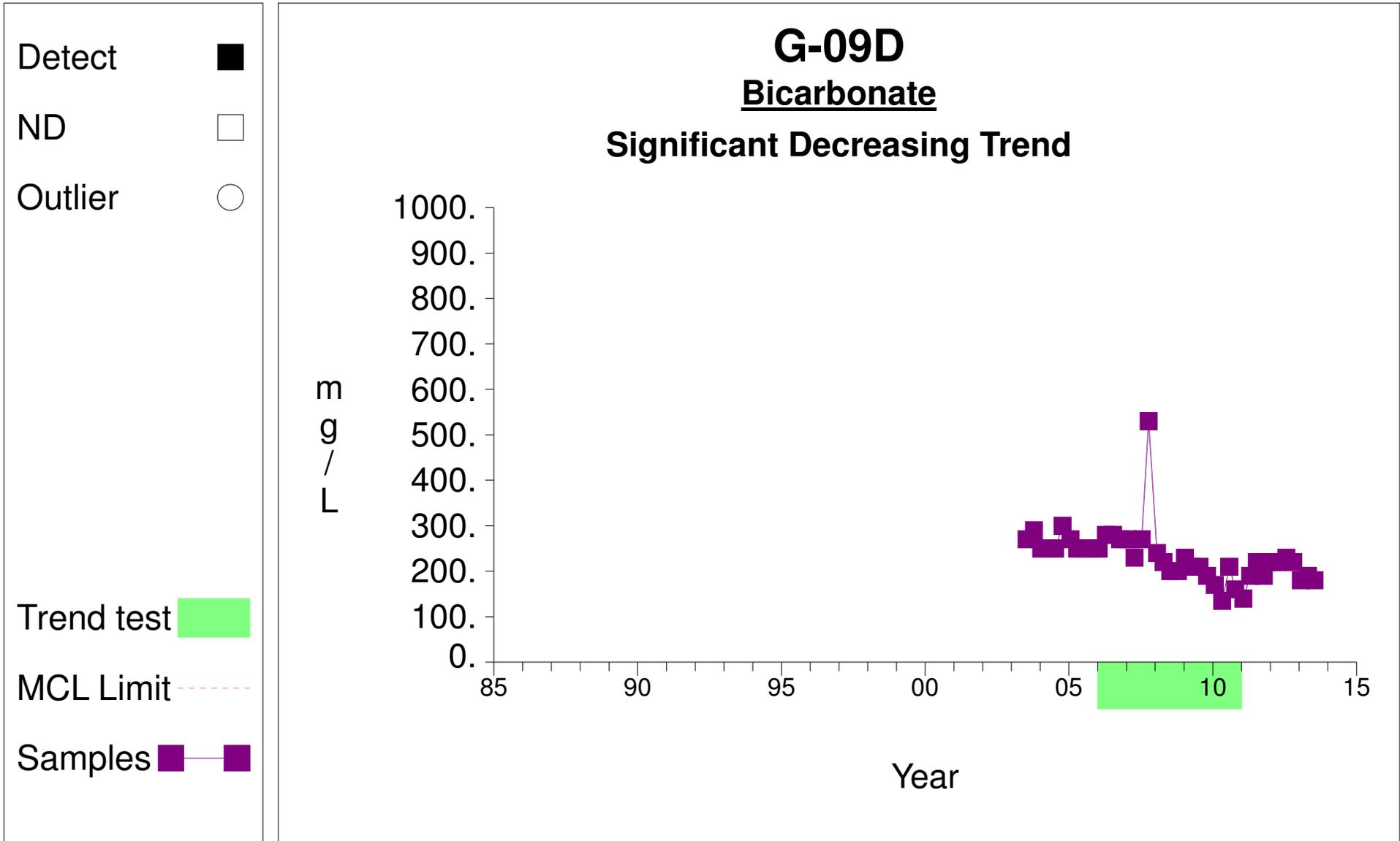
Graph 98

Time Series



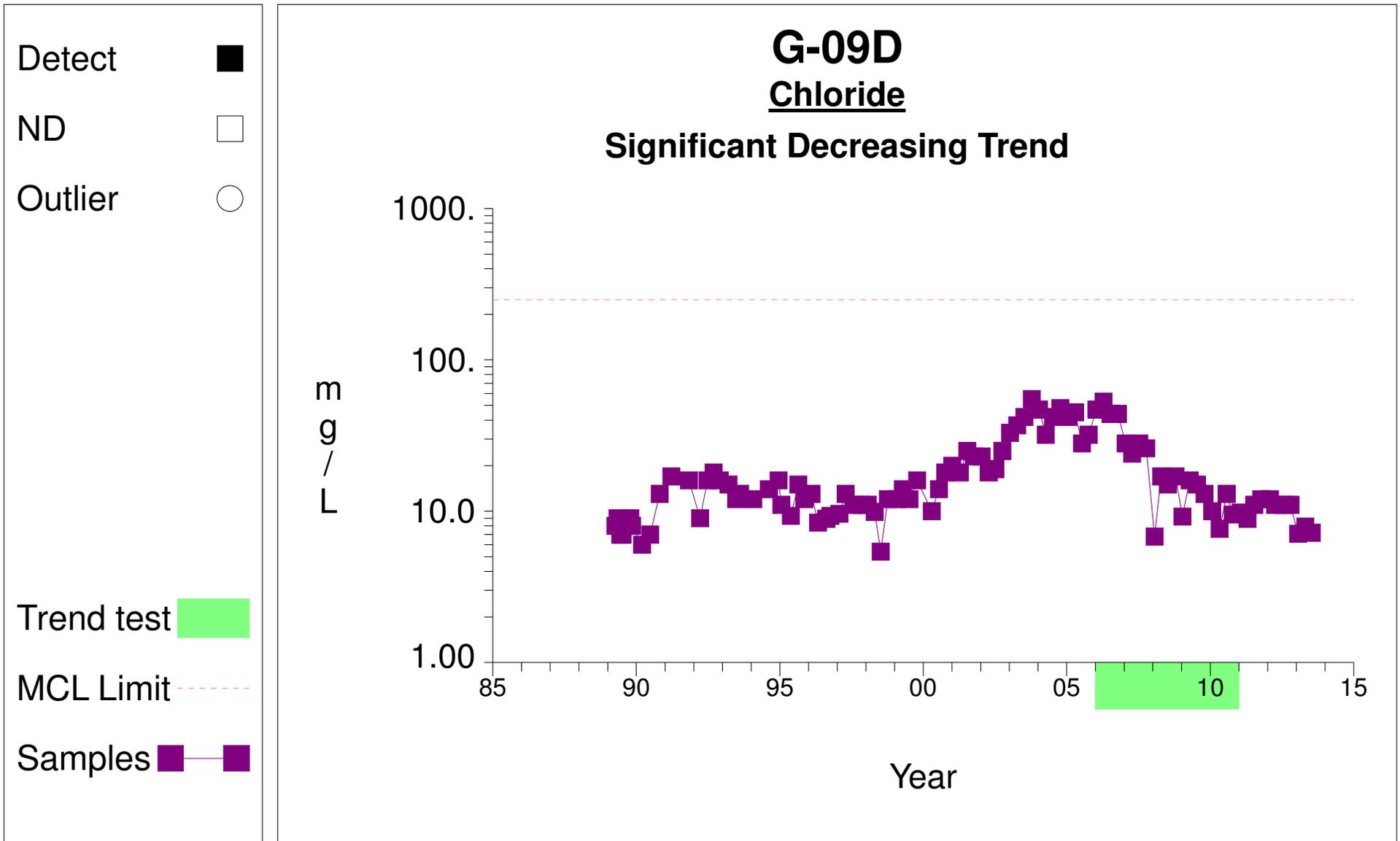
Graph 120

Time Series



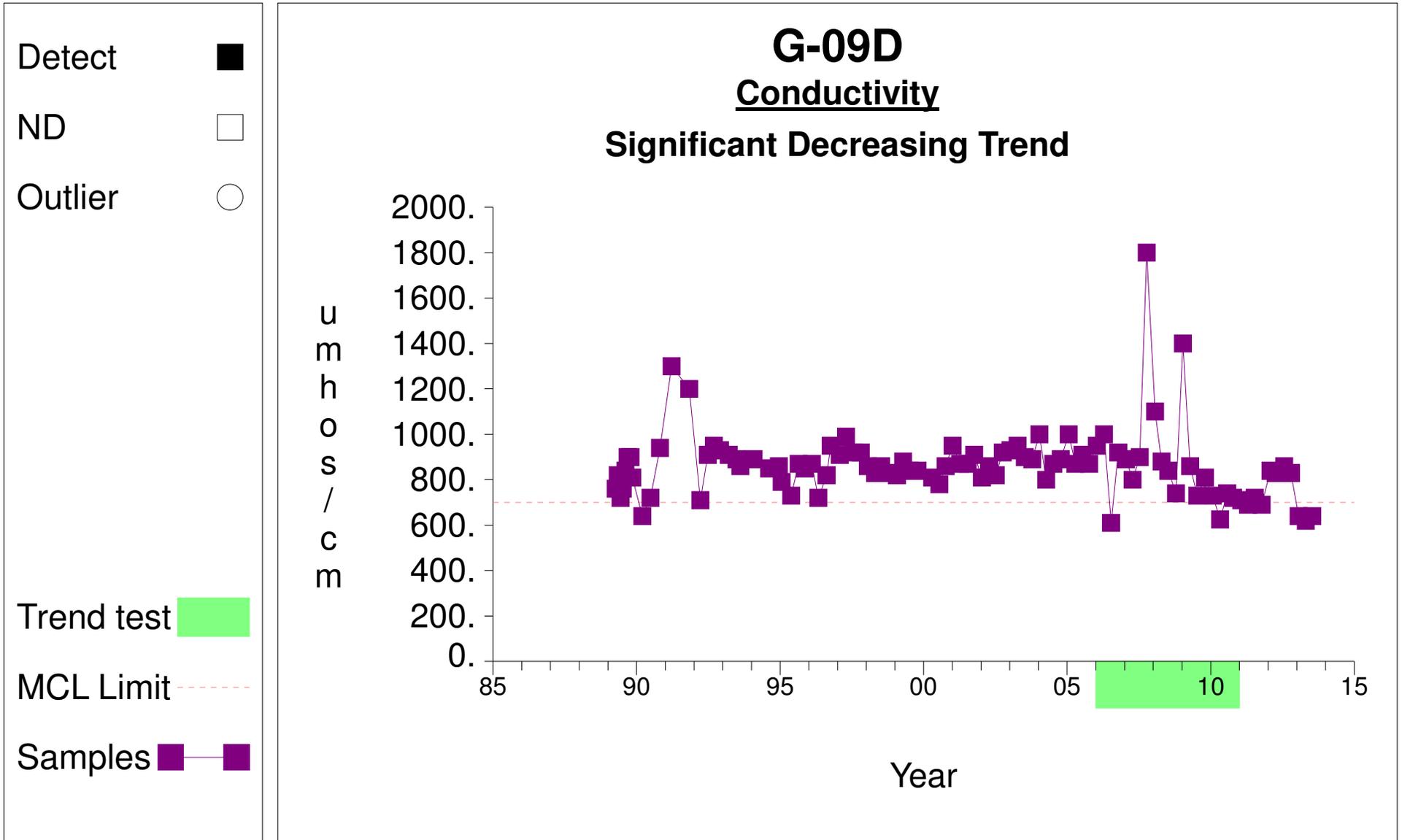
Graph 135

Time Series



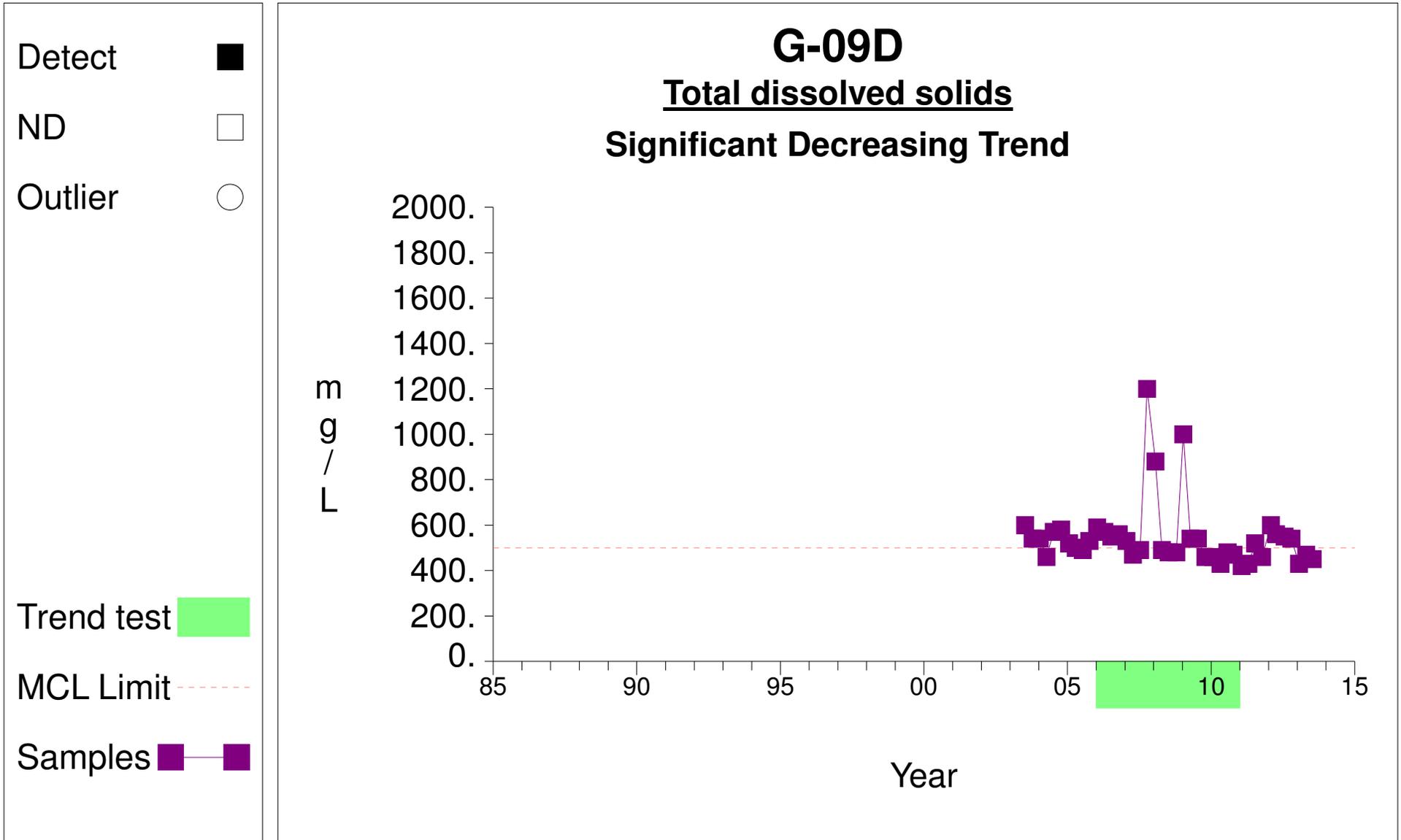
Graph 137

Time Series



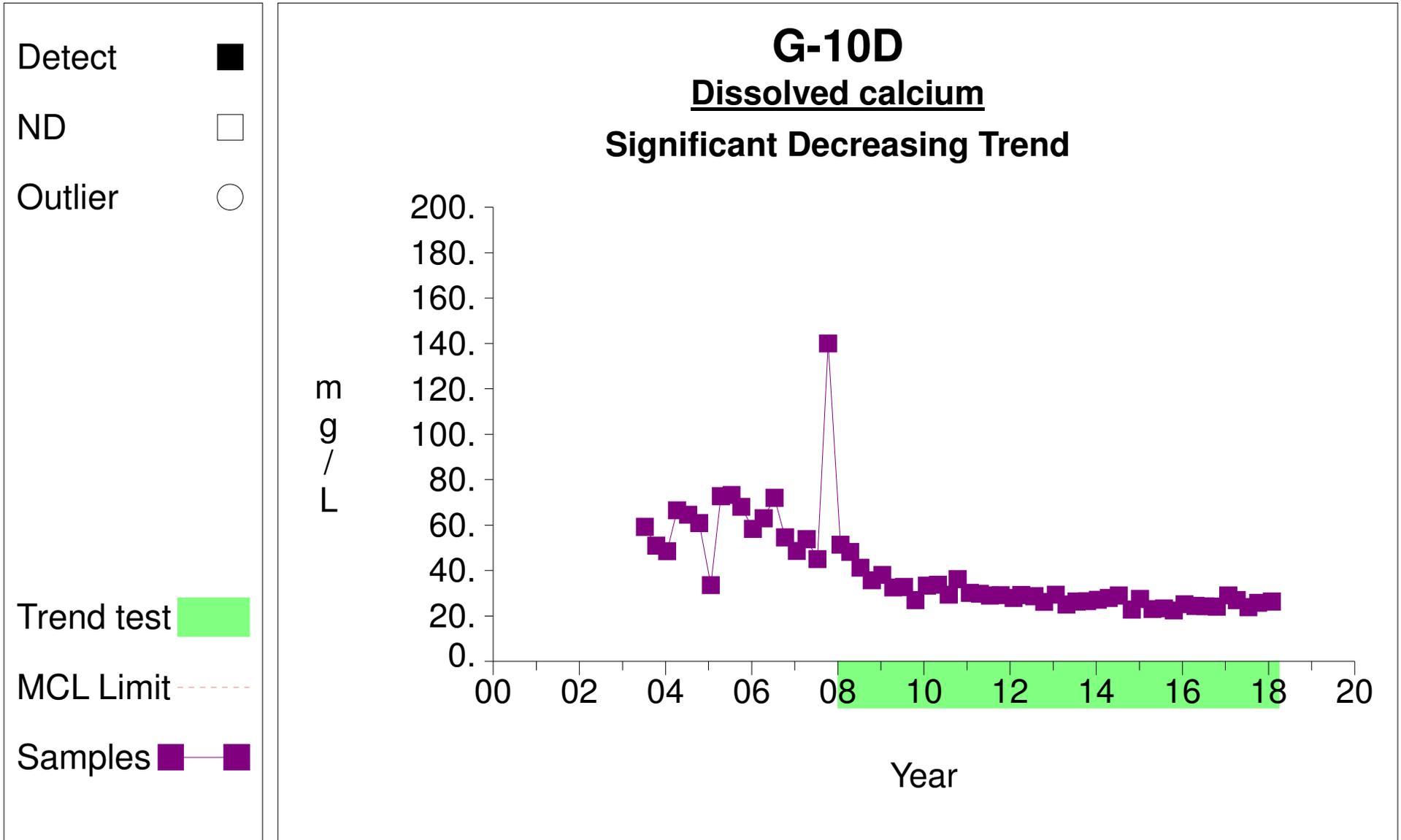
Graph 138

Time Series



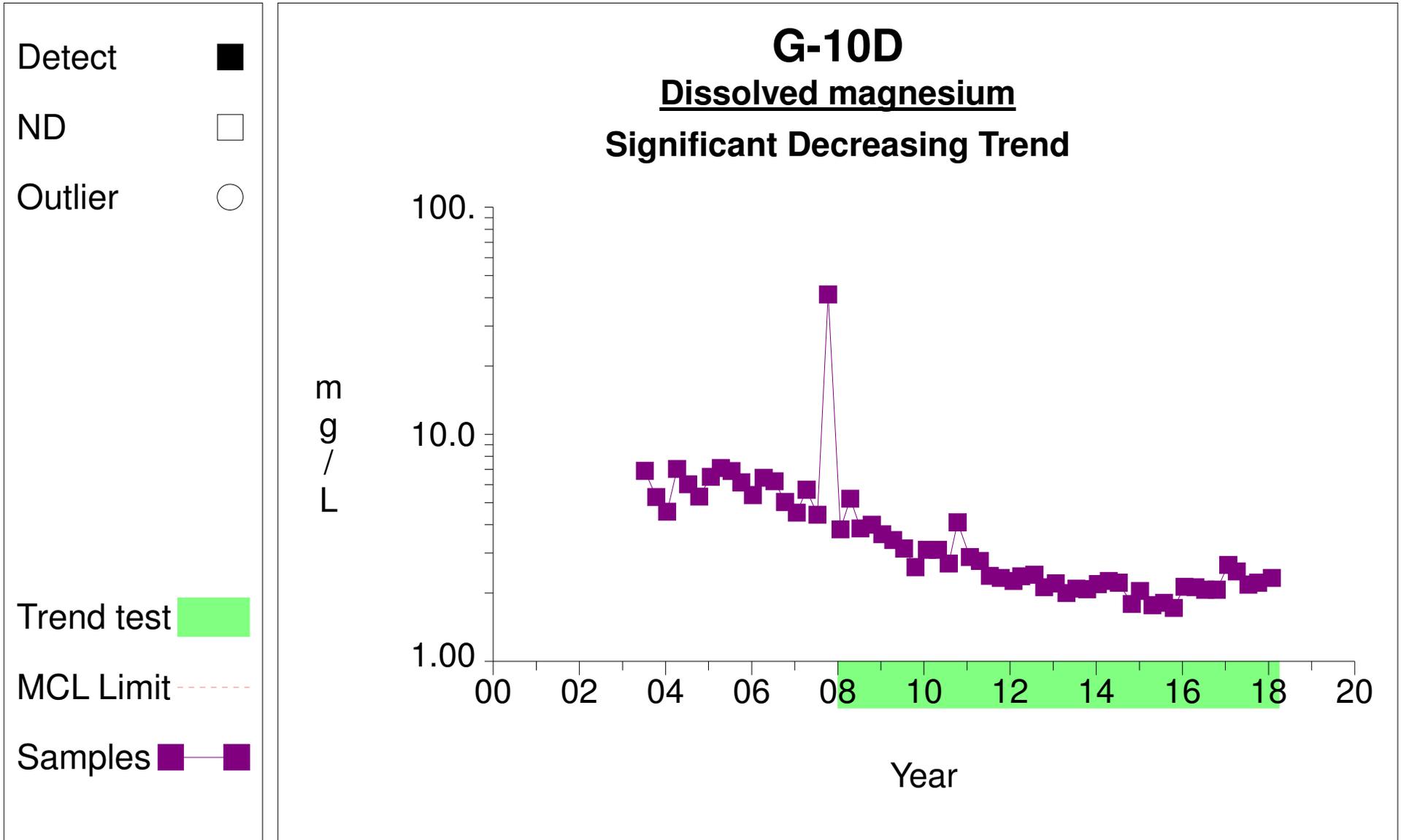
Graph 164

Time Series



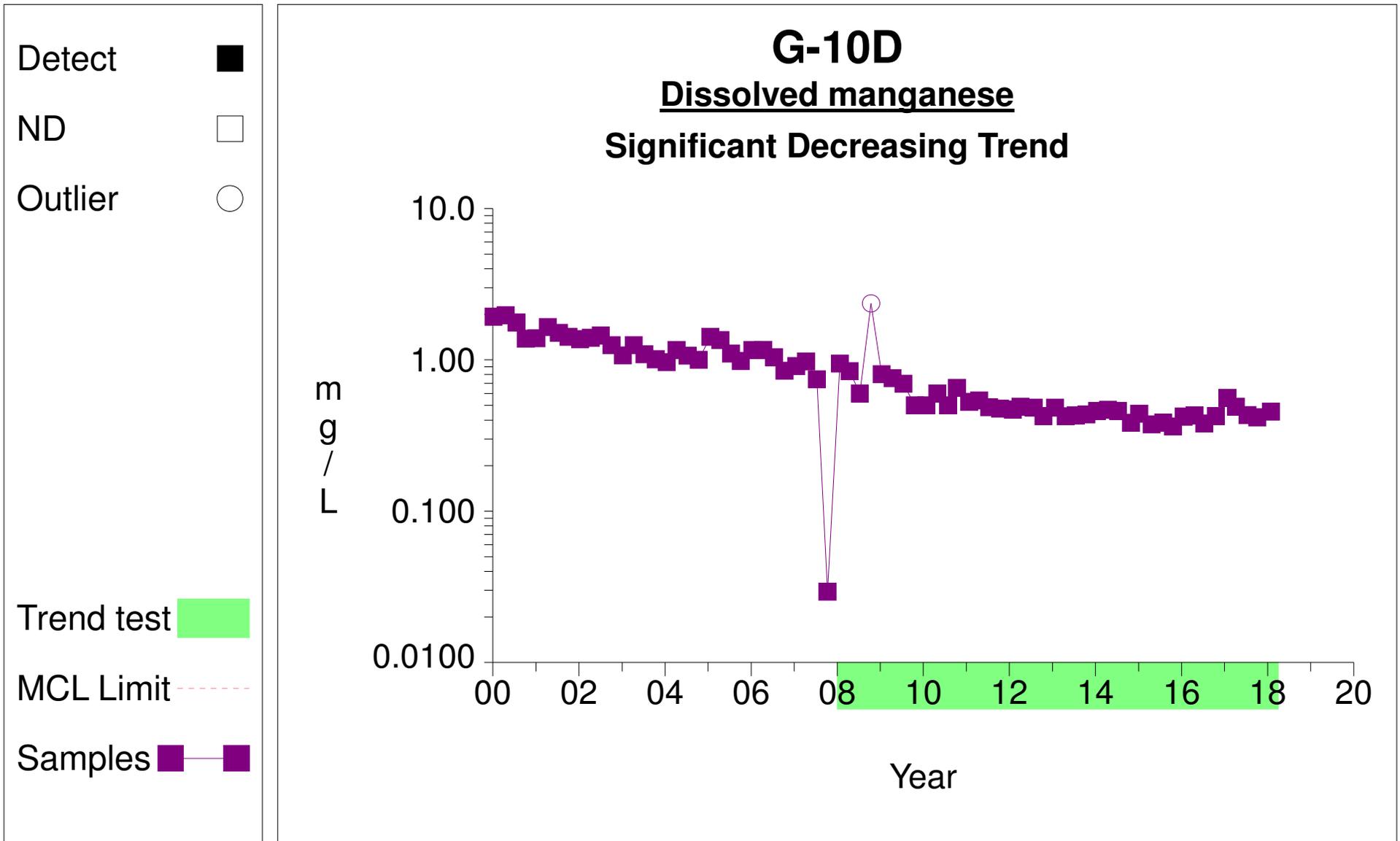
Graph 177

Time Series



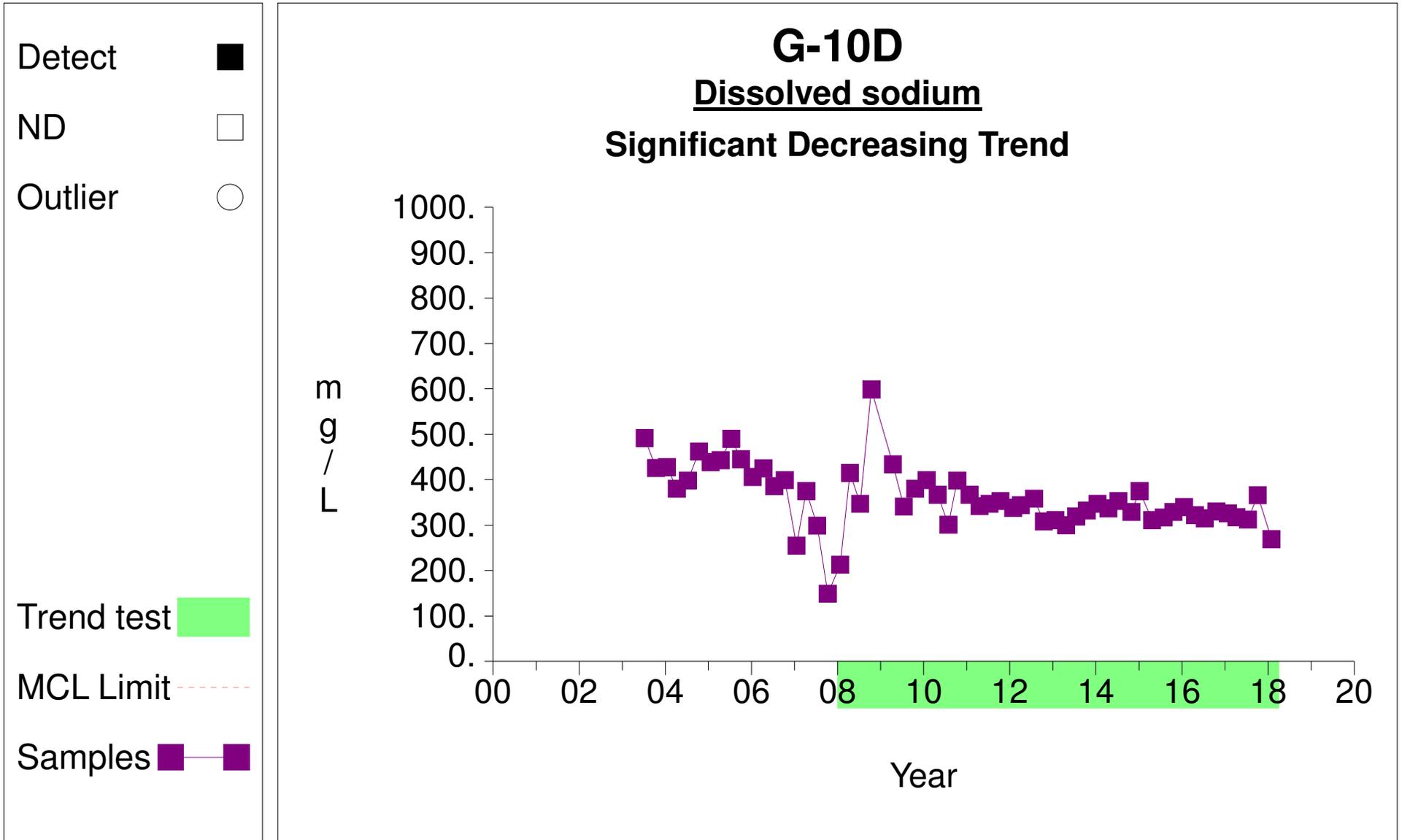
Graph 183

Time Series



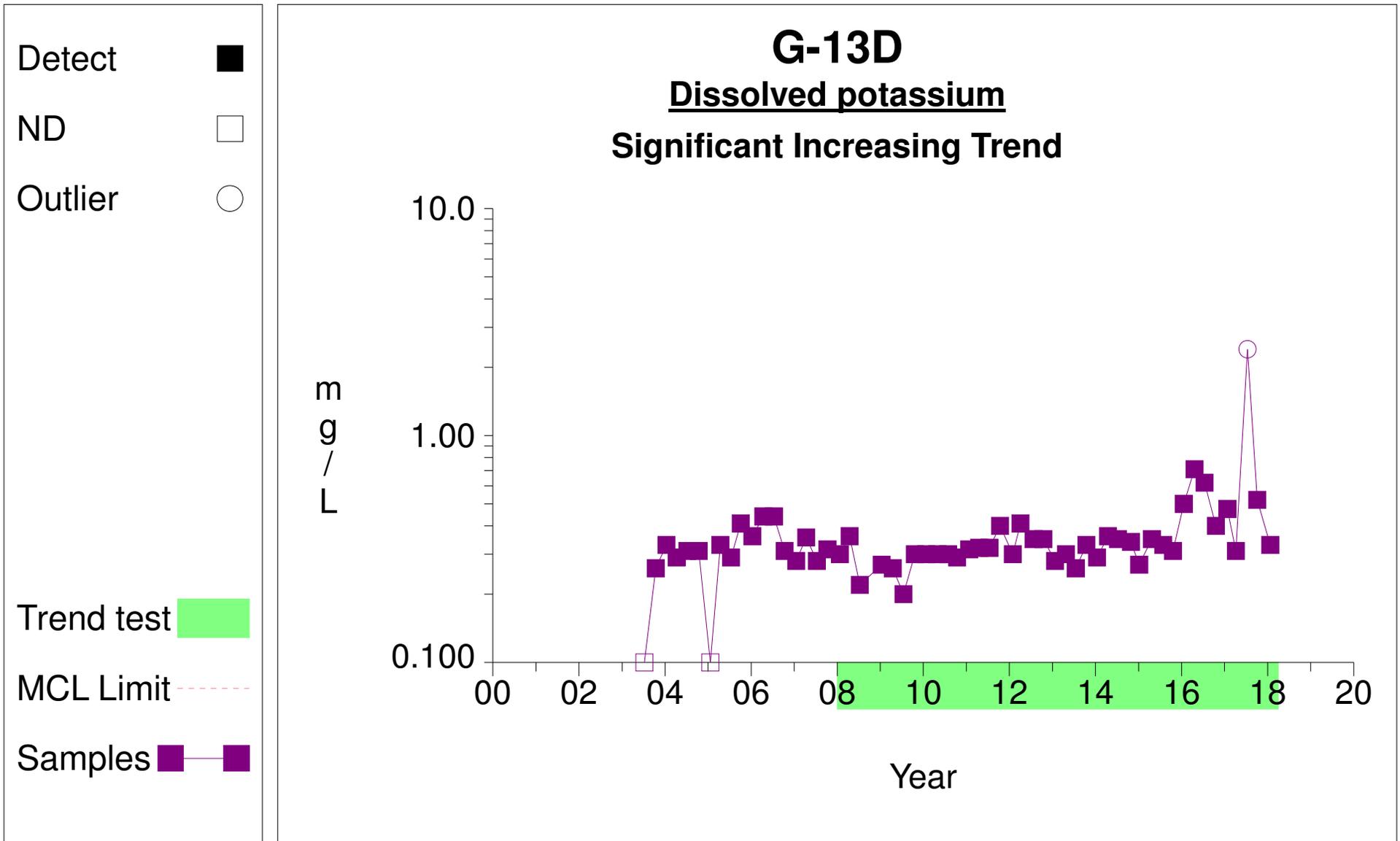
Graph 184

Time Series



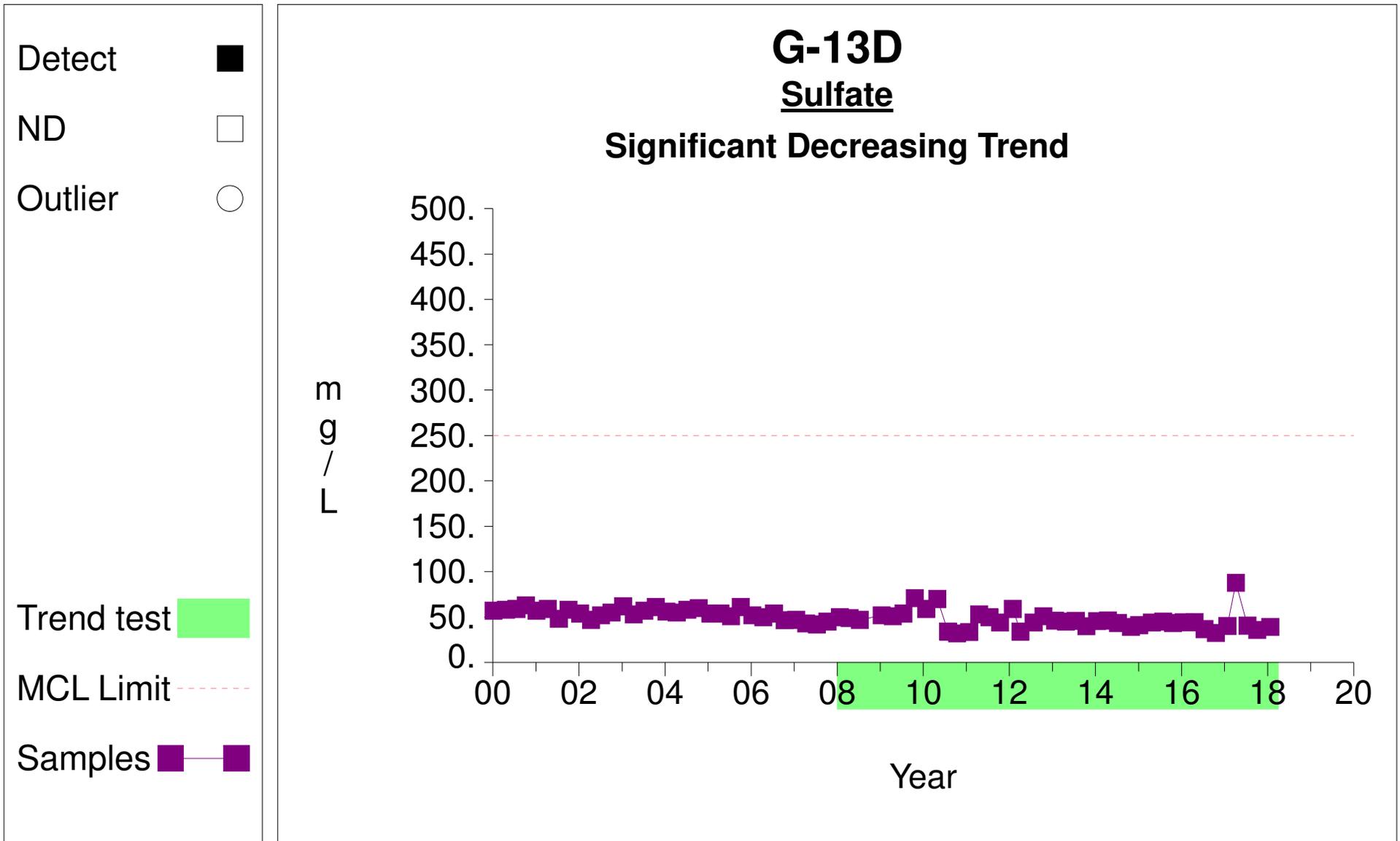
Graph 189

Time Series



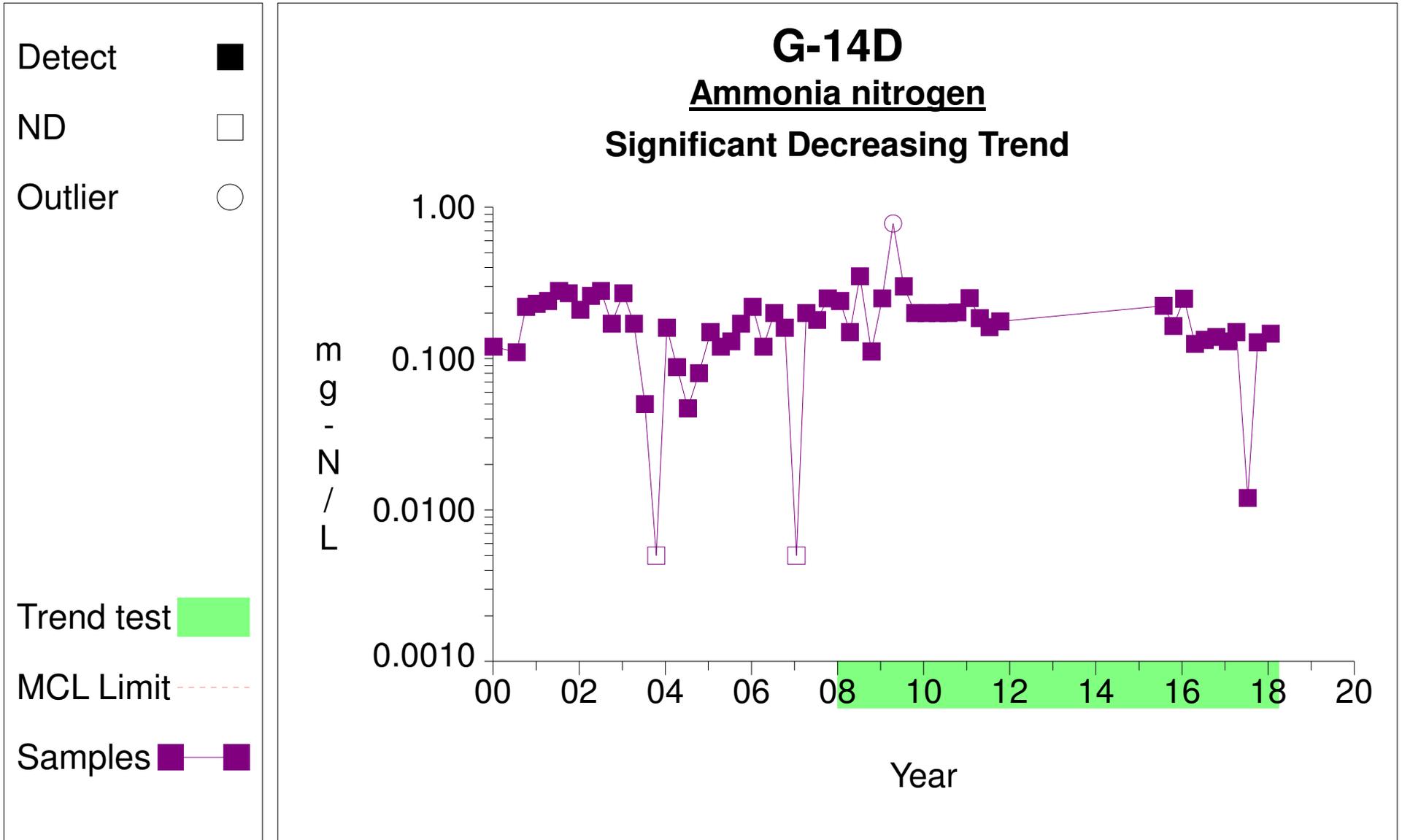
Graph 219

Time Series



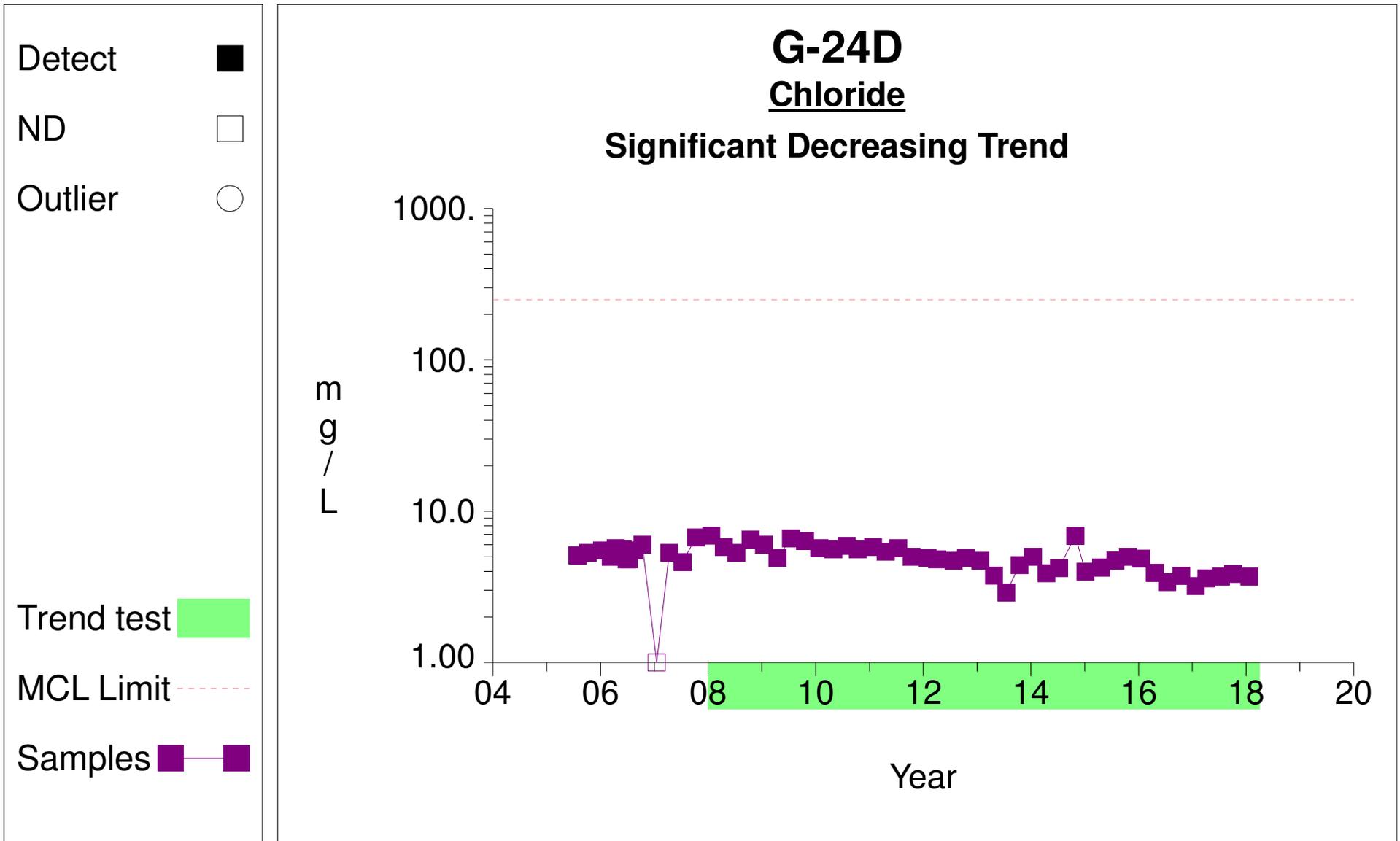
Graph 229

Time Series



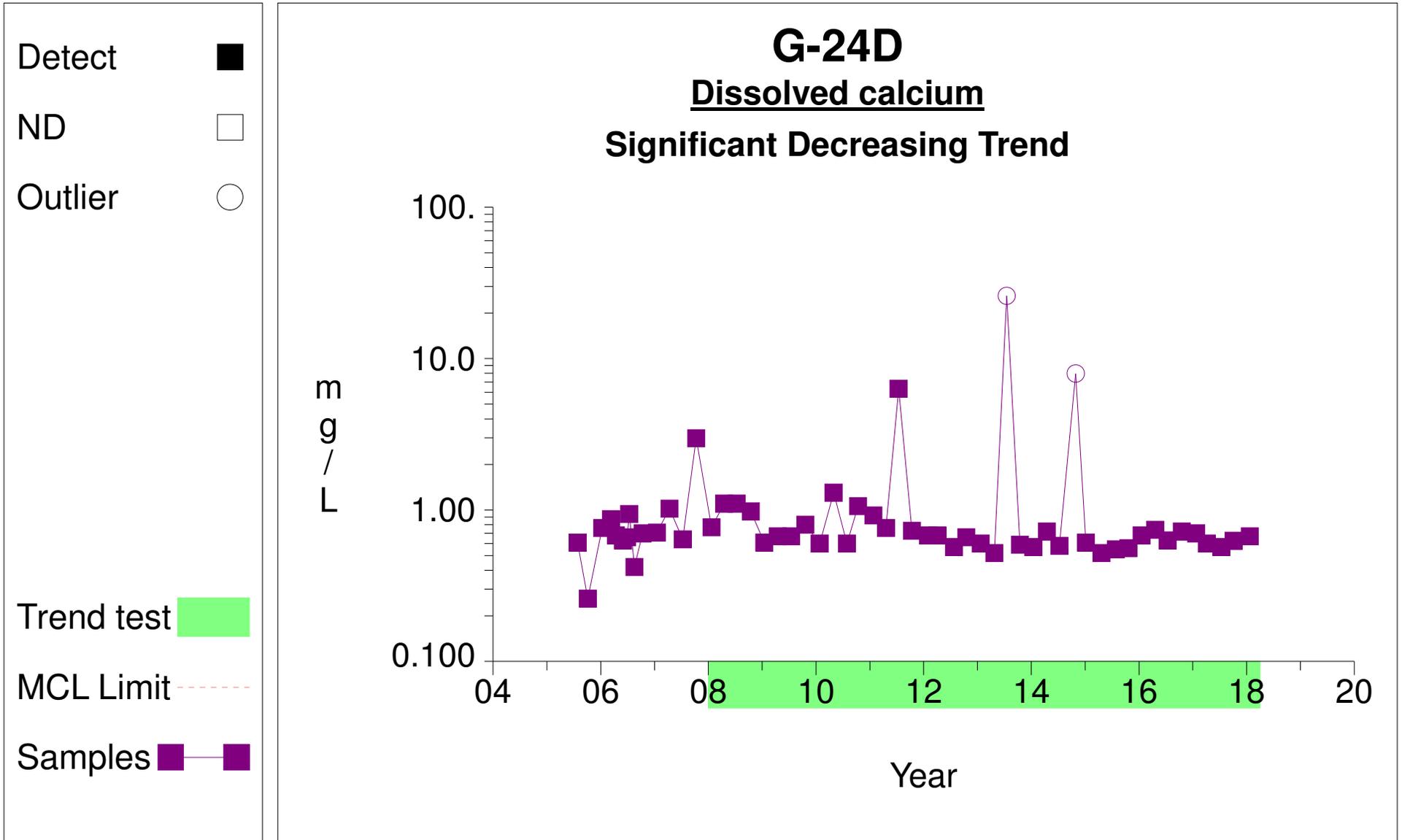
Graph 233

Time Series



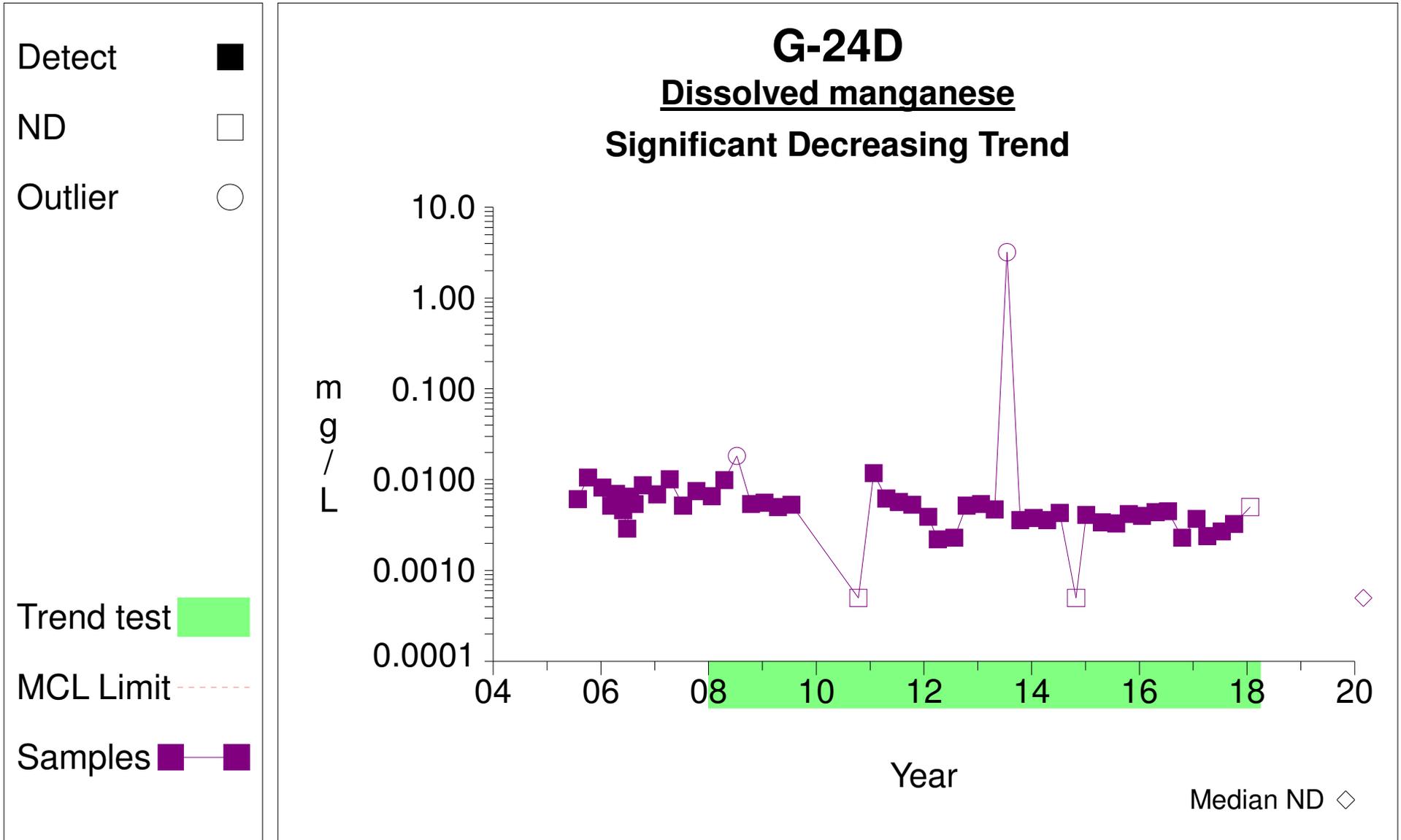
Graph 269

Time Series



Graph 276

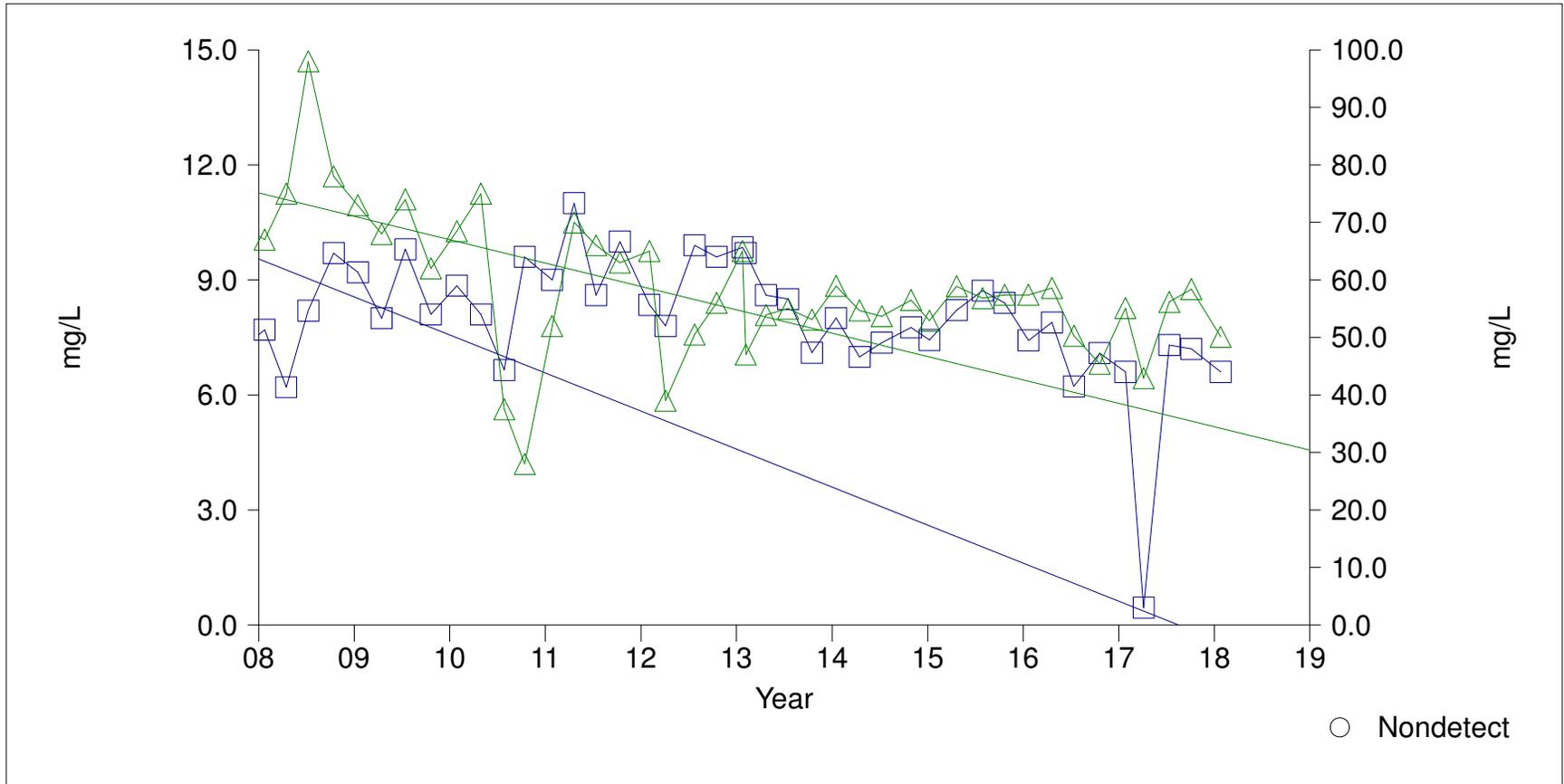
Time Series



Graph 283

Cathcart Landfill [ccdeep]

Time Series Plot for G-01D



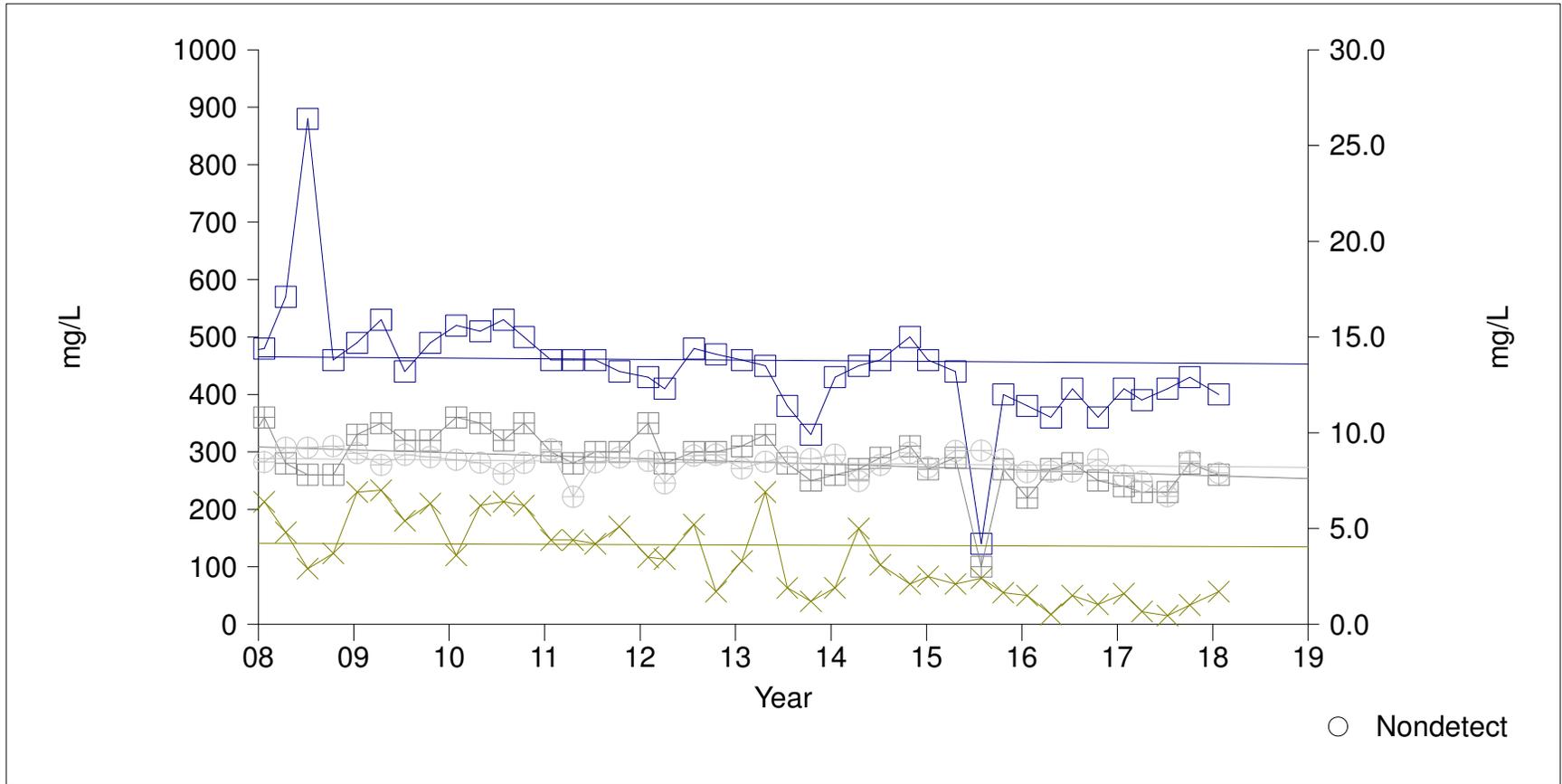
□ Chloride

△ Sulfate

○ Nondetect

Cathcart Landfill [ccdeep]

Time Series Plot for G-02D



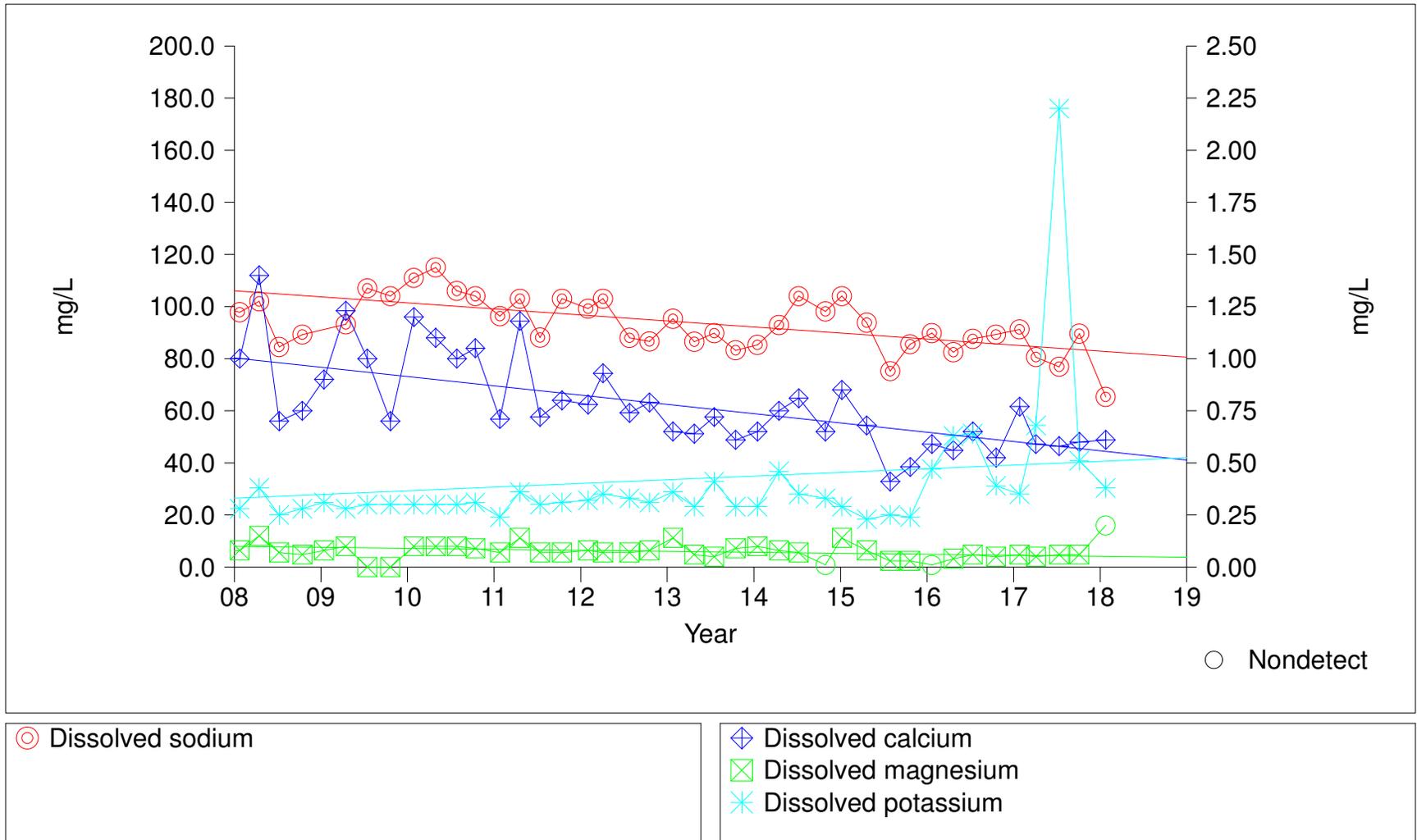
□ Total dissolved solids
□ Conductivity

× Nitrate nitrogen
⊕ pH

○ Nondetect

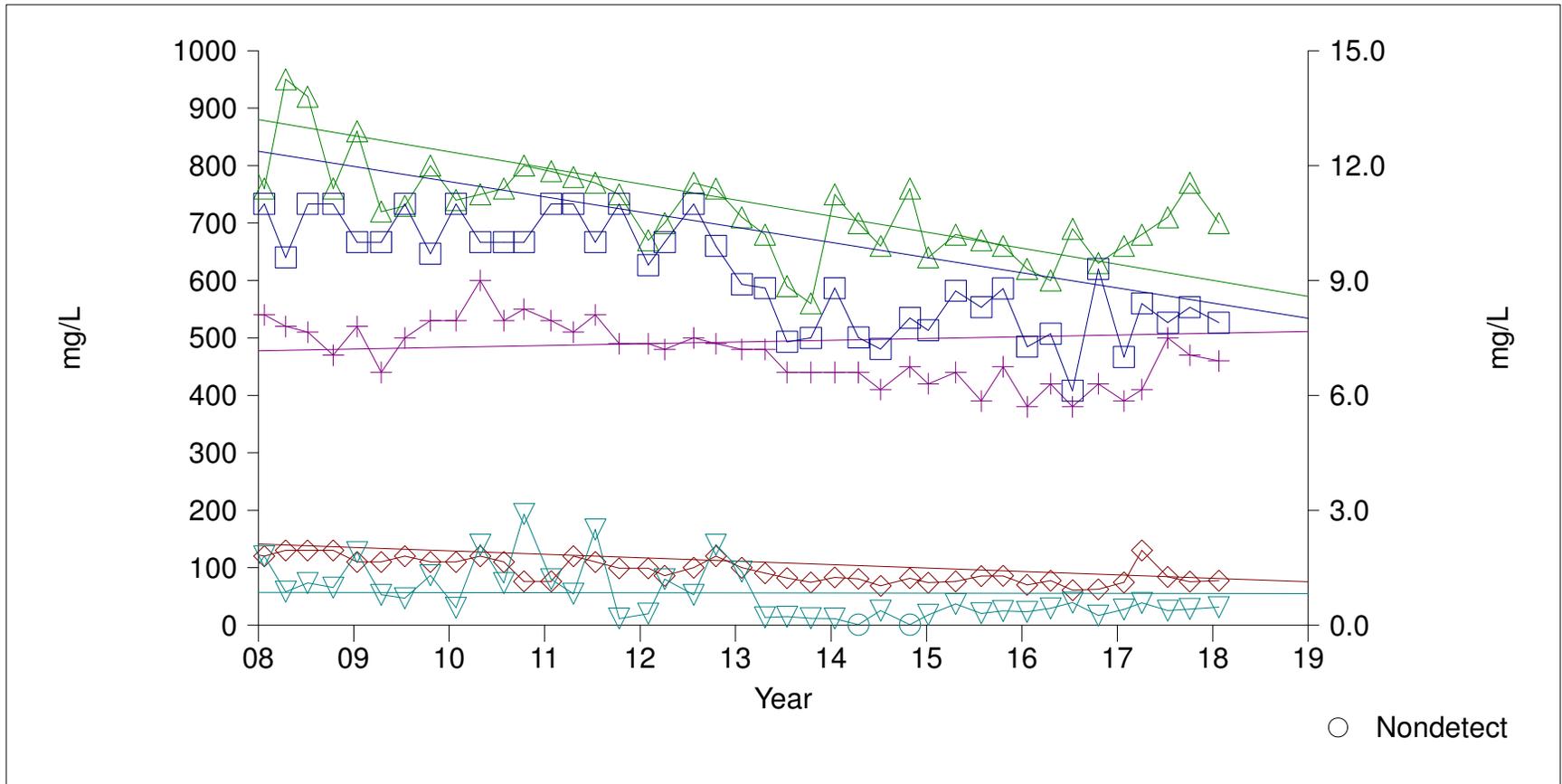
Cathcart Landfill [ccdeep]

Time Series Plot for G-02D



Cathcart Landfill [ccdeep]

Time Series Plot for G-06B

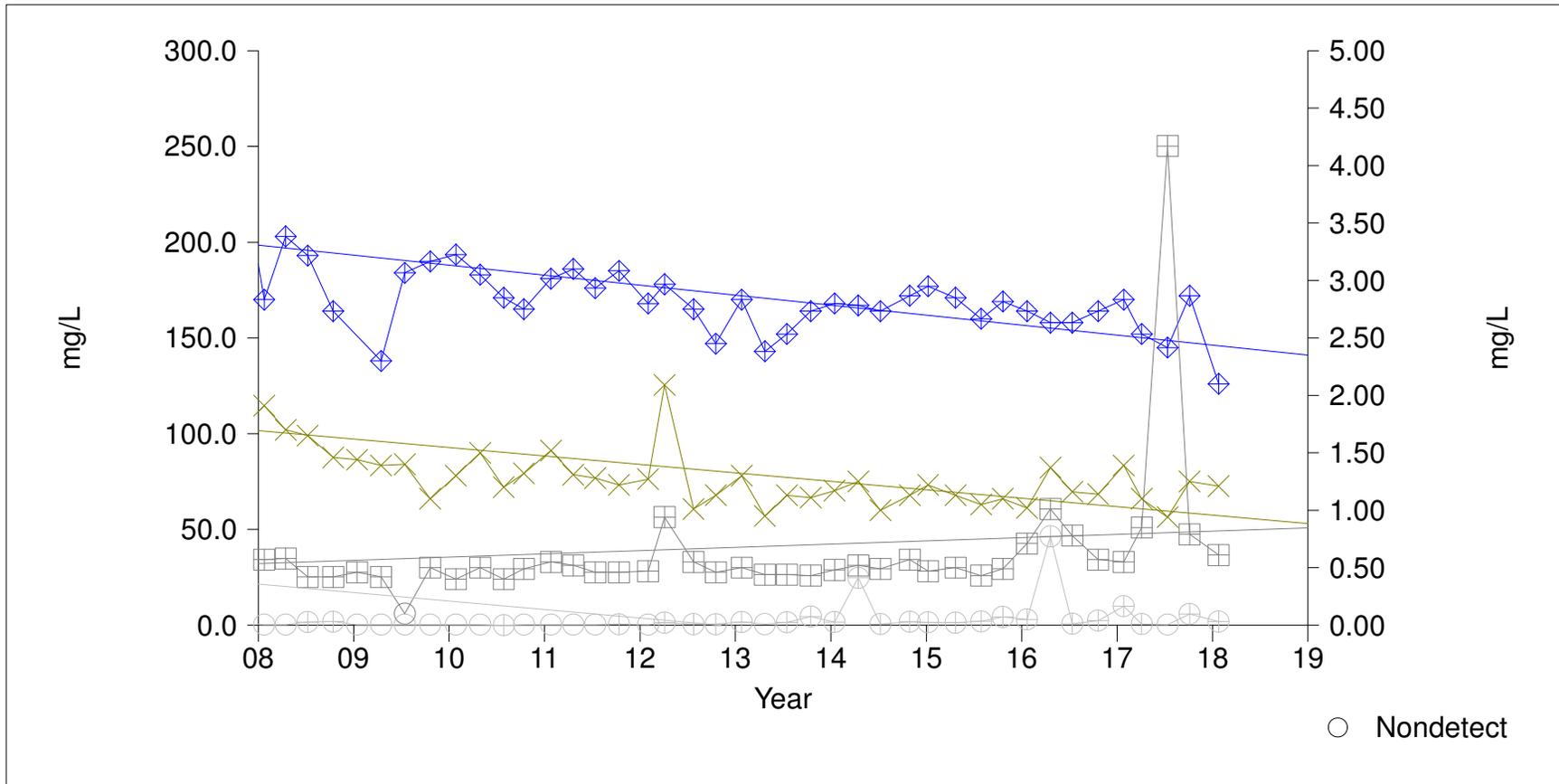


◇ Sulfate
+ Total dissolved solids
△ Conductivity

▽ Nitrate nitrogen
□ Chloride
○ Nondetect

Cathcart Landfill [ccdeep]

Time Series Plot for G-06B

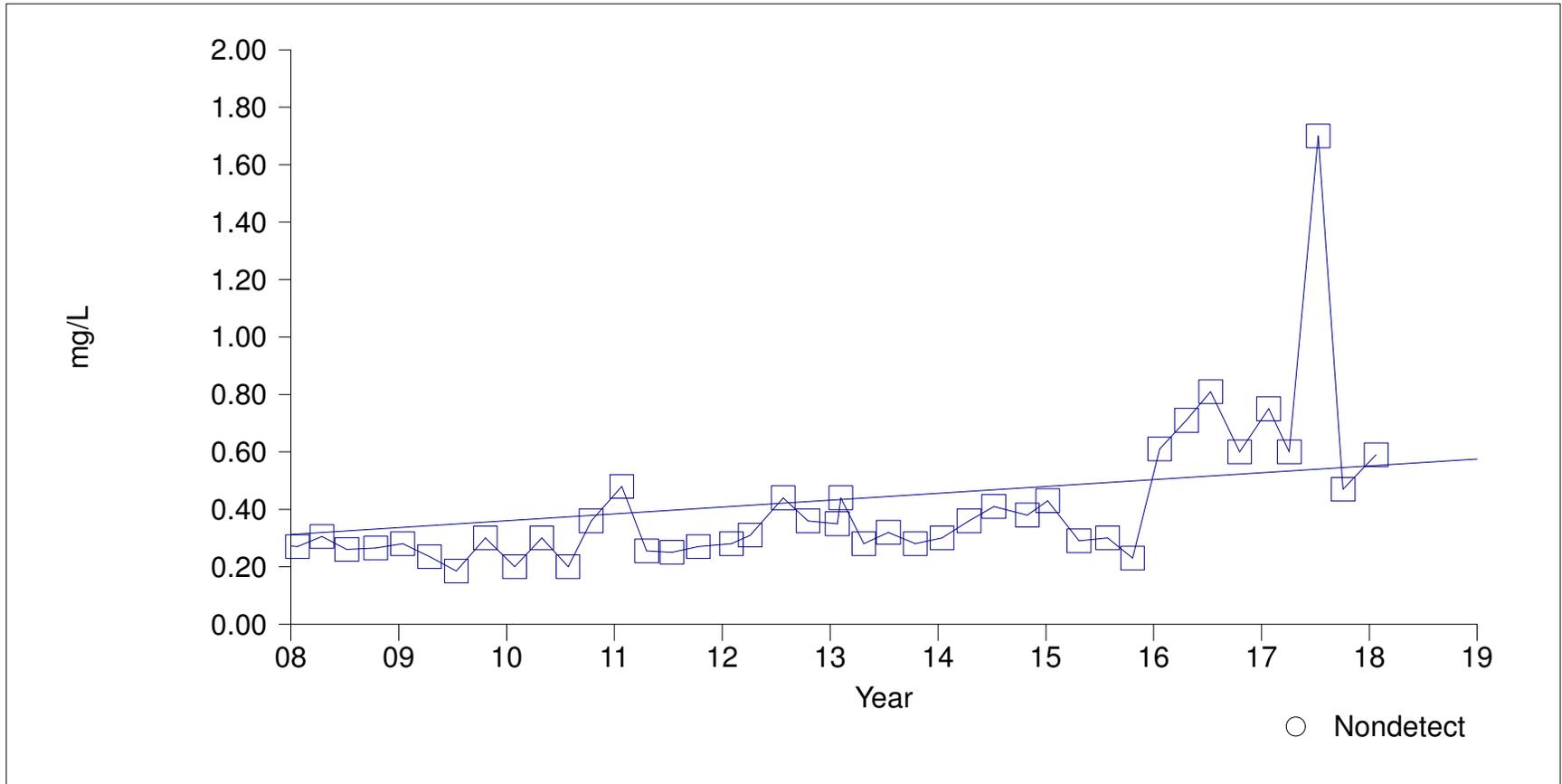


◆ Dissolved sodium

⊕ Dissolved iron
⊠ Dissolved potassium
× Dissolved calcium

Cathcart Landfill [ccdeep]

Time Series Plot for G-08D2

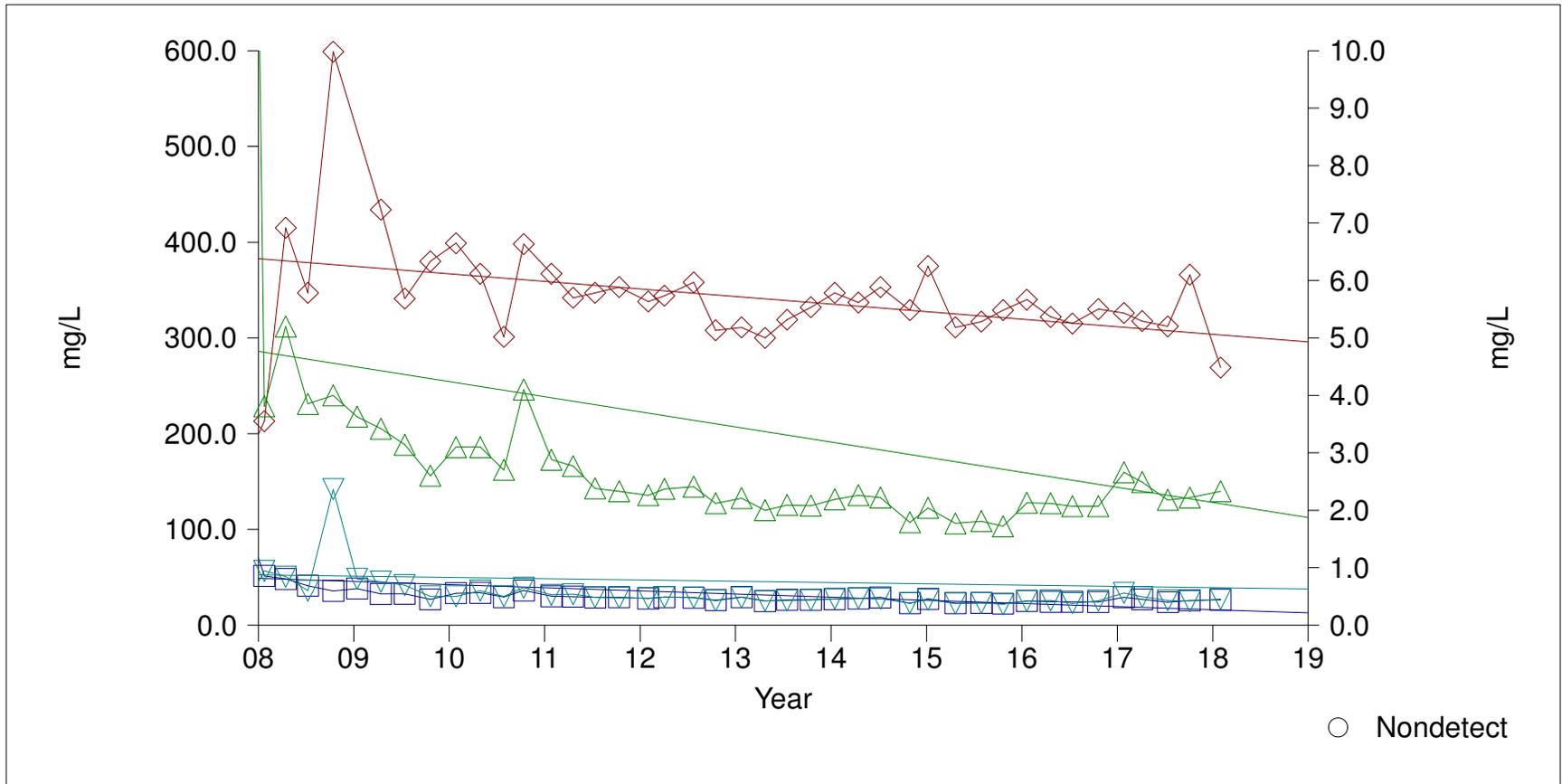


□ Dissolved potassium

○ Nondetect

Cathcart Landfill [ccdeep]

Time Series Plot for G-10D

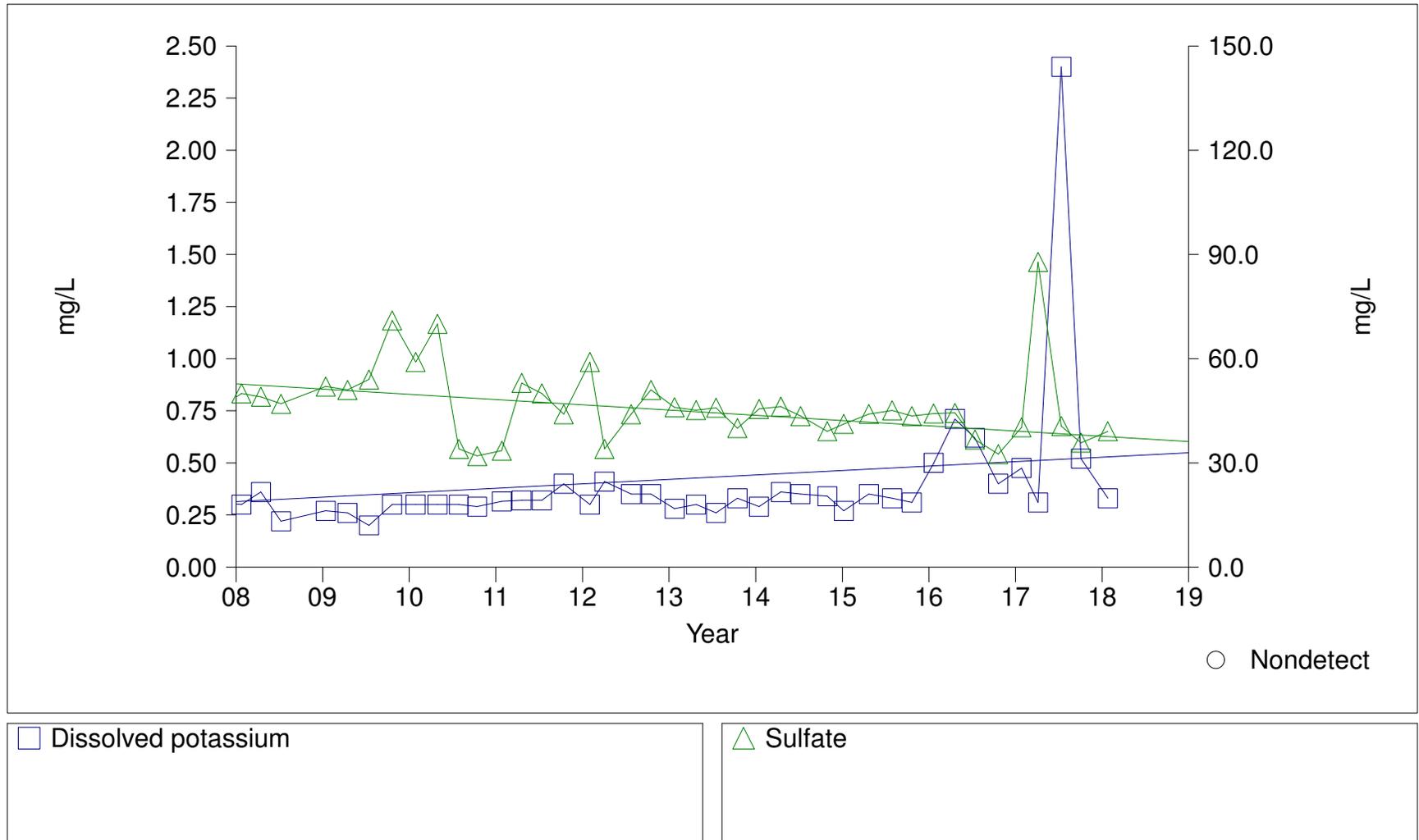


□ Dissolved calcium
◇ Dissolved sodium

△ Dissolved magnesium
▽ Dissolved manganese
○ Nondetect

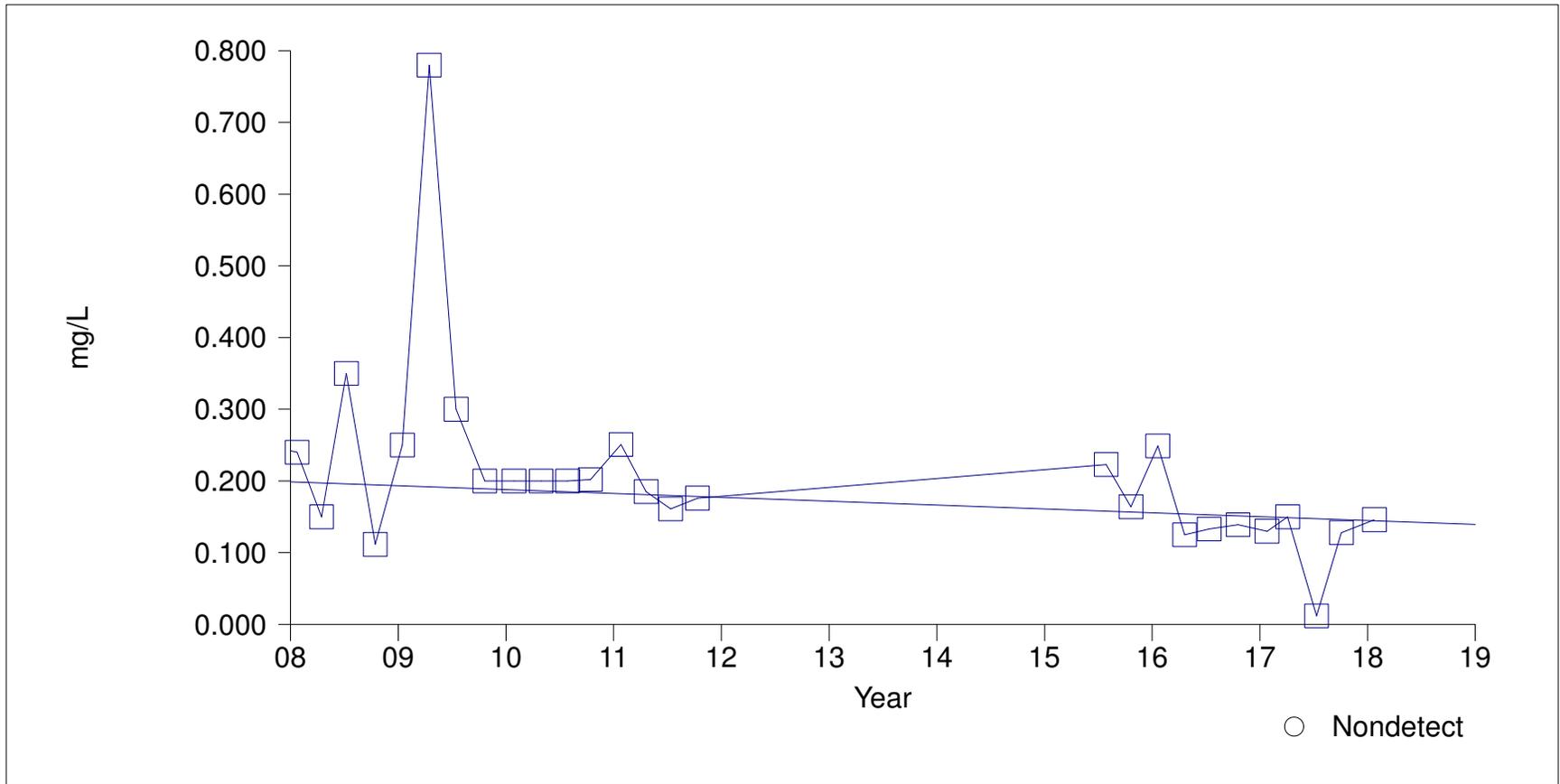
Cathcart Landfill [ccdeep]

Time Series Plot for G-13D



Cathcart Landfill [ccdeep]

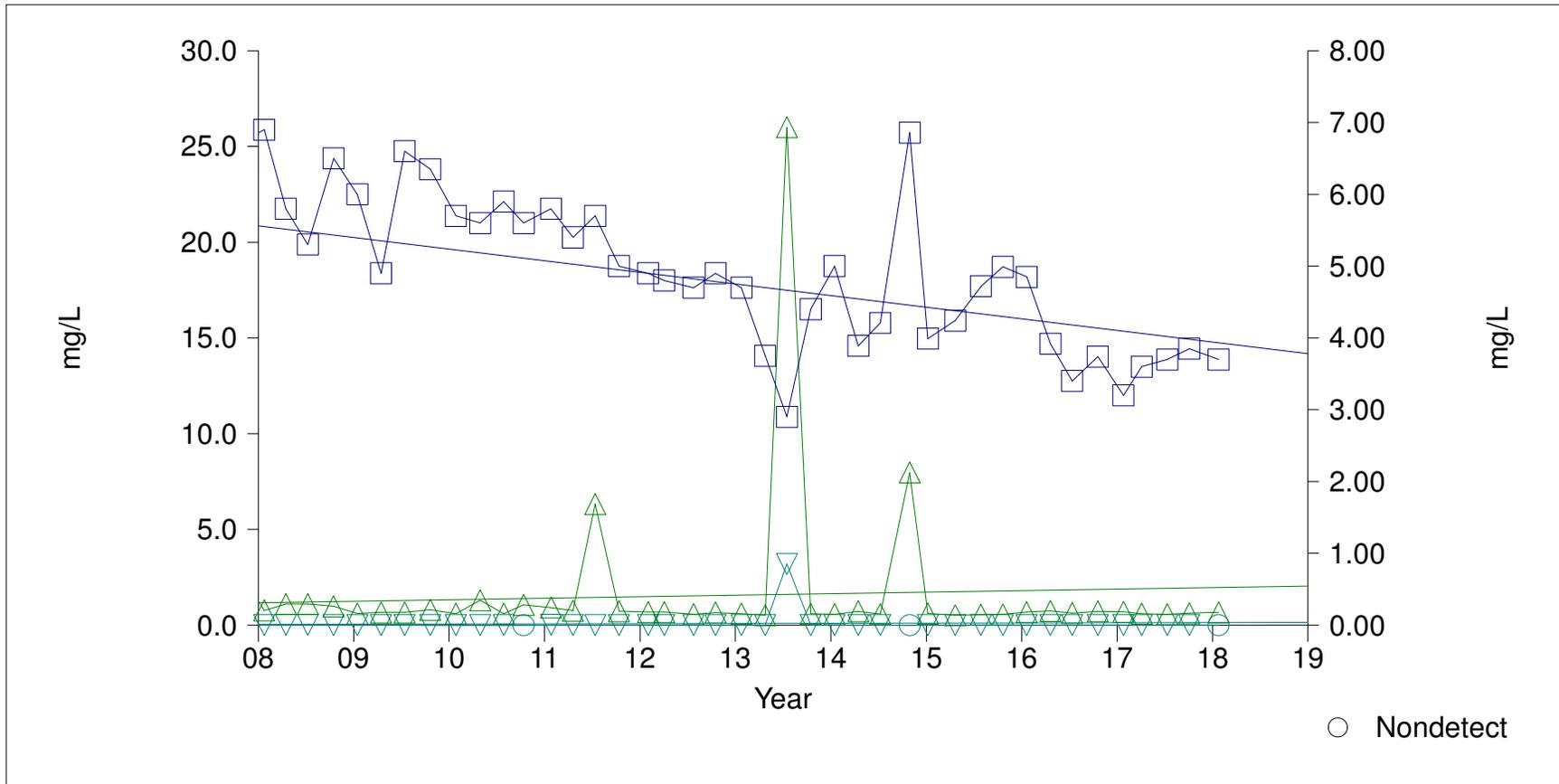
Time Series Plot for G-14D



Ammonia nitrogen

Cathcart Landfill [ccdeep]

Time Series Plot for G-24D

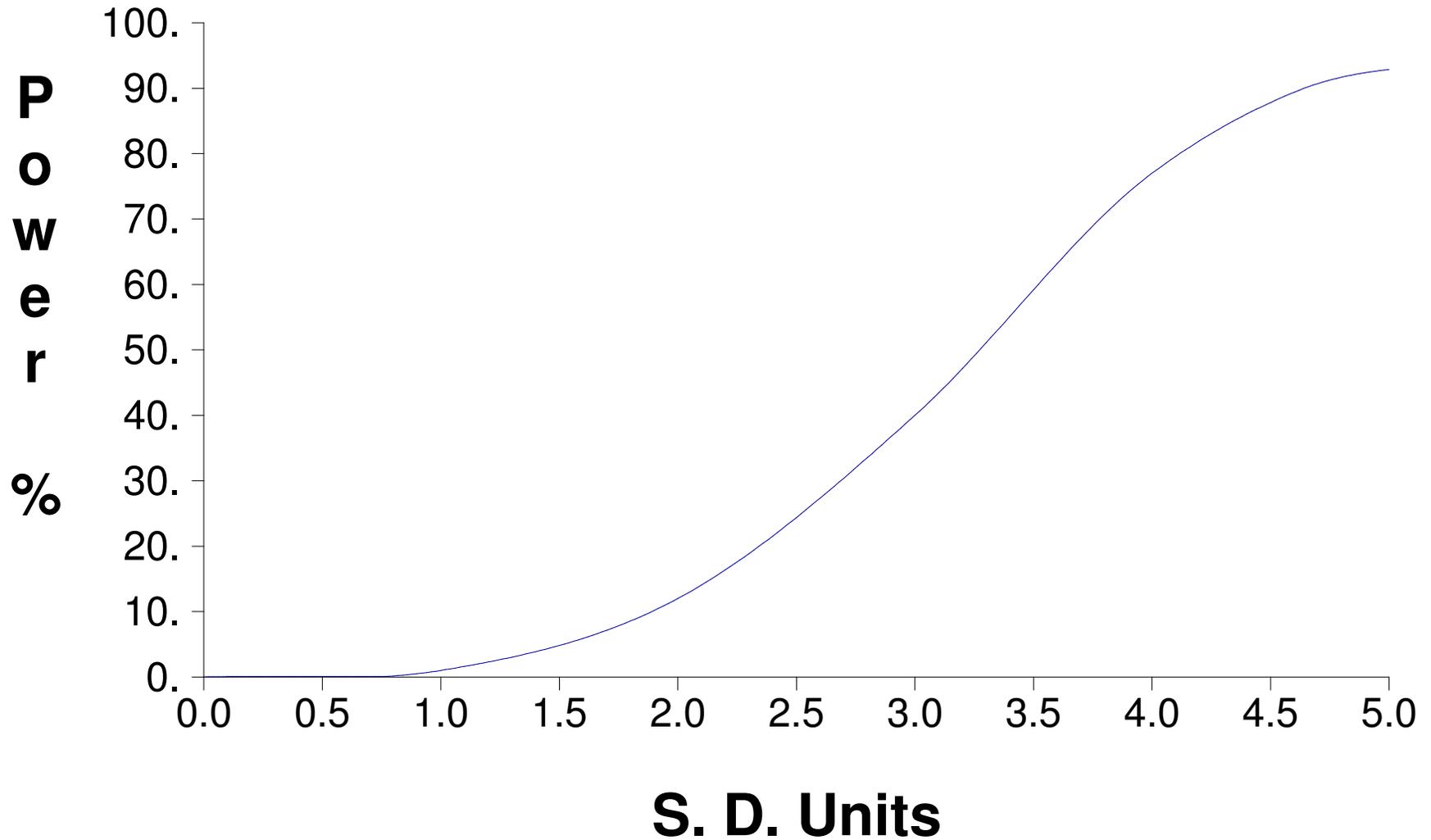


▽ Dissolved manganese
△ Dissolved calcium

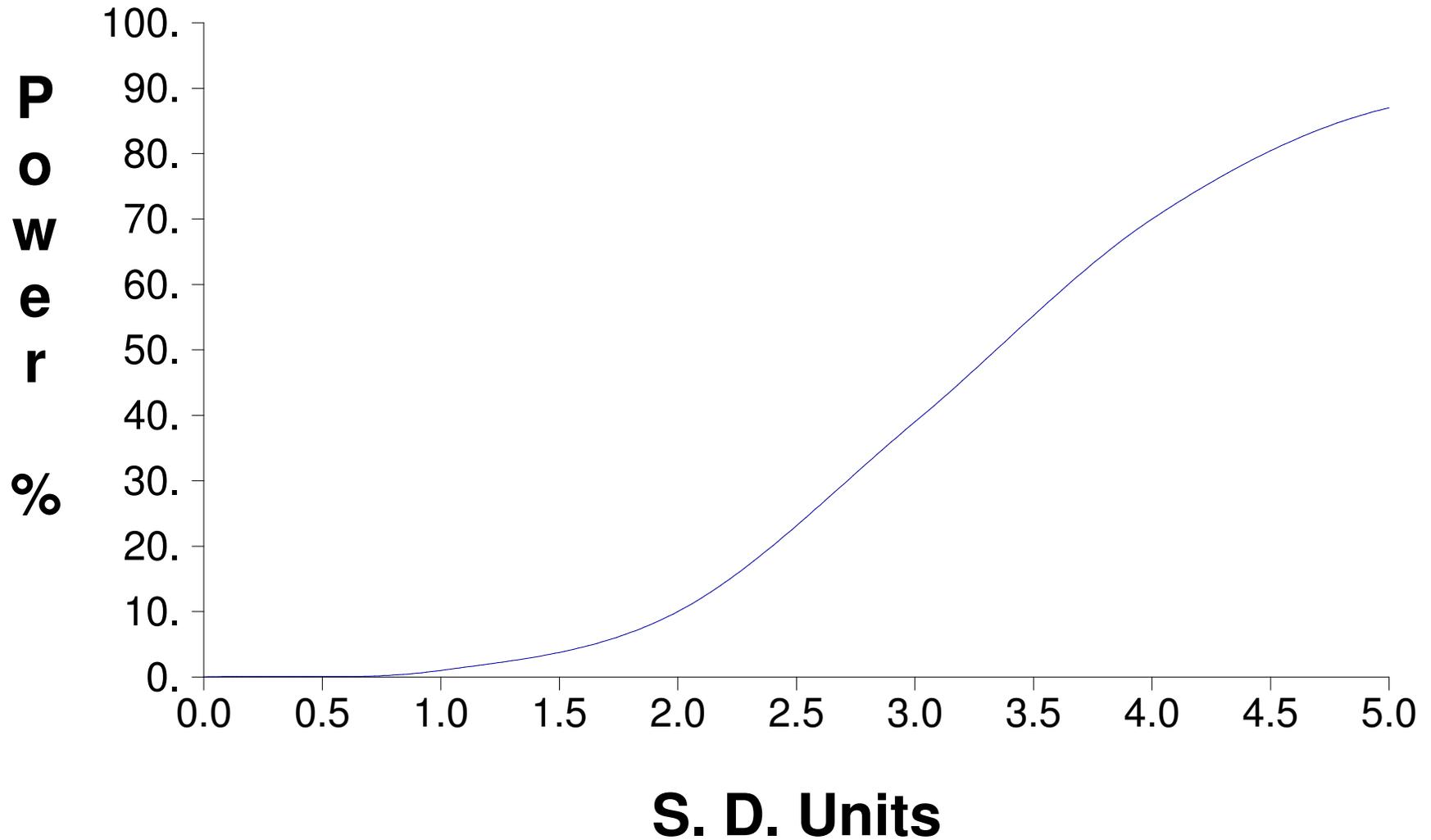
□ Chloride

○ Nondetect

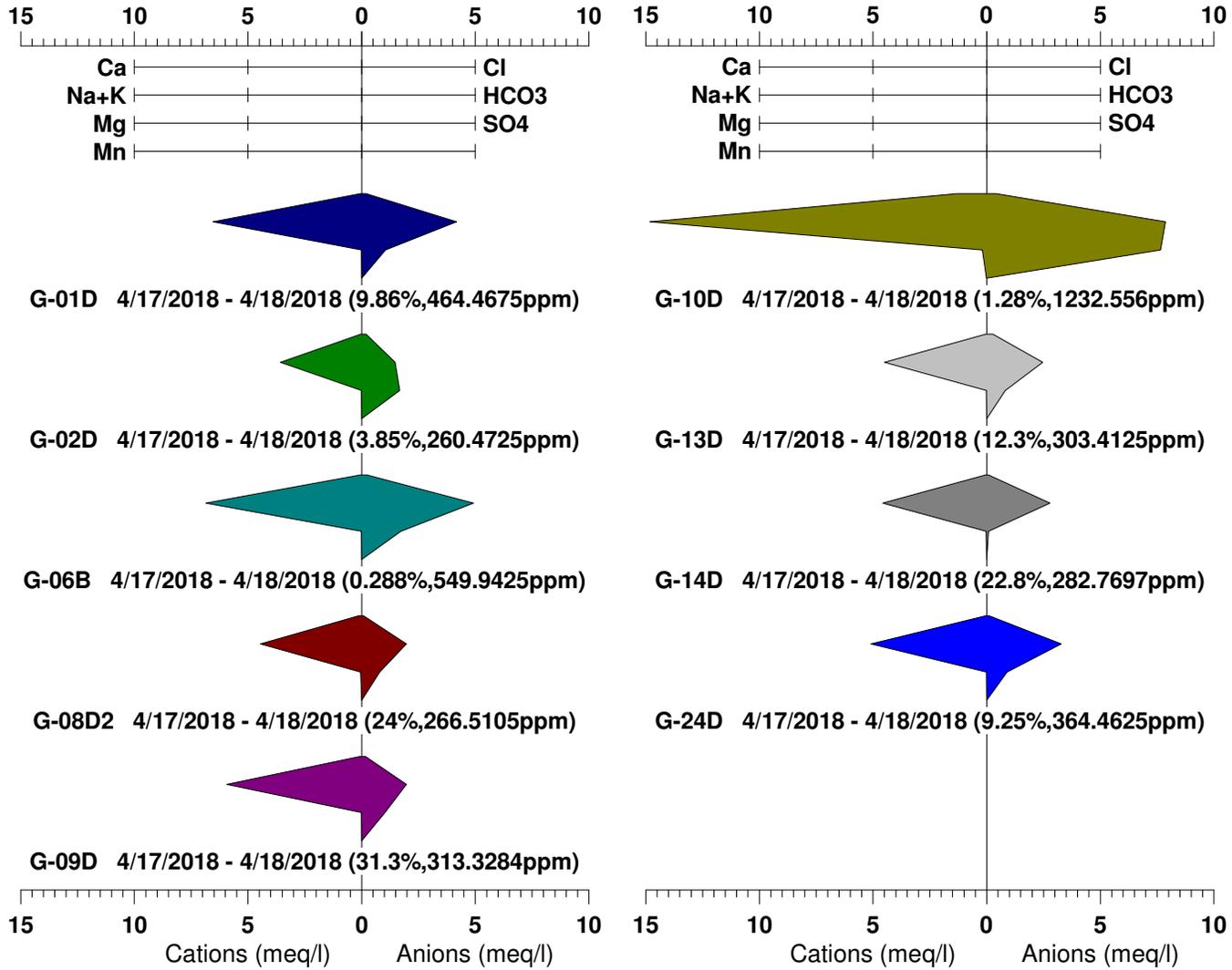
False Positive and False Negative Rates for Current Intra-Well Prediction Limits Monitoring Program



False Positive and False Negative Rates for Current Upgradient vs. Downgradient Monitoring Program



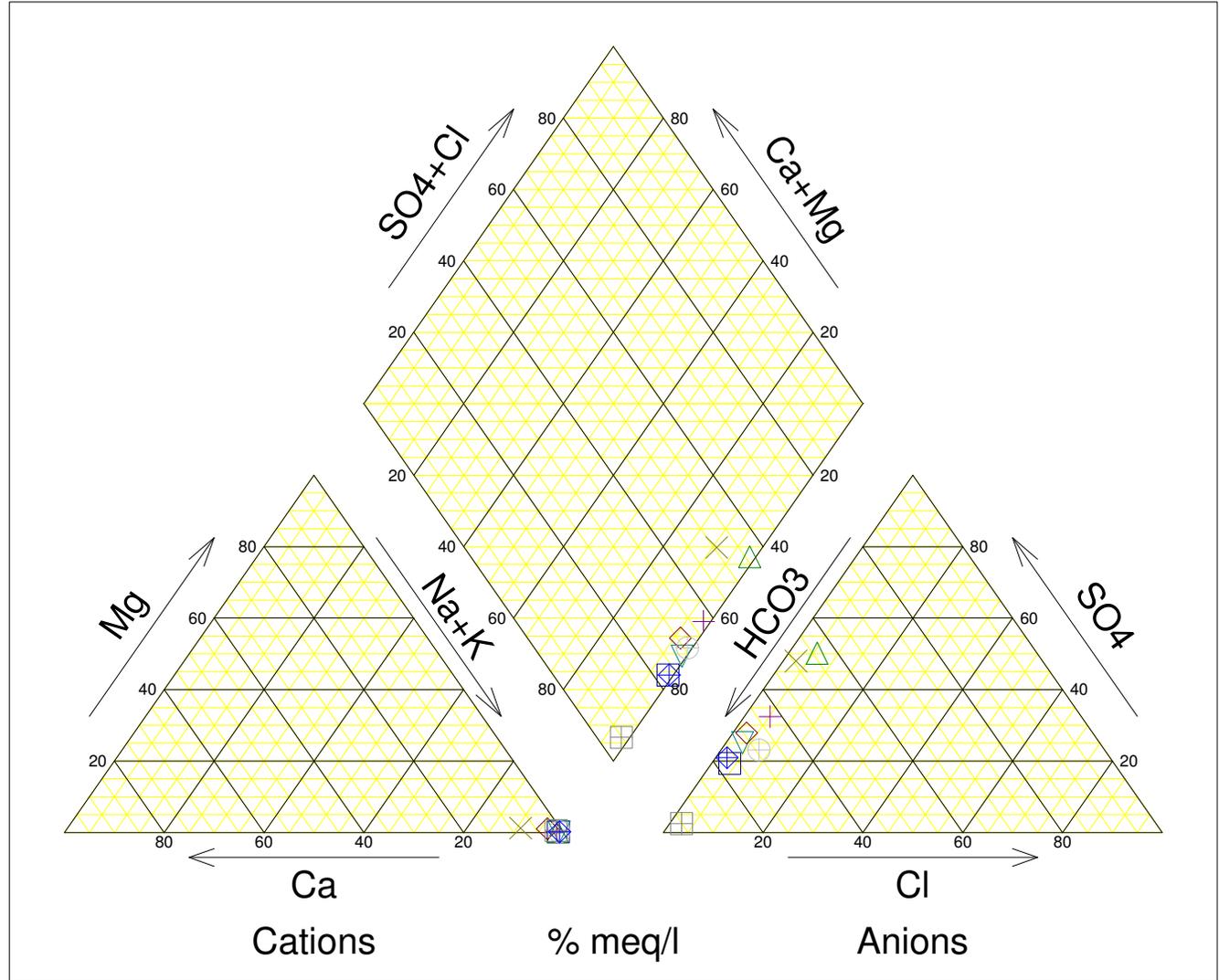
Cathcart Landfill [ccshal]



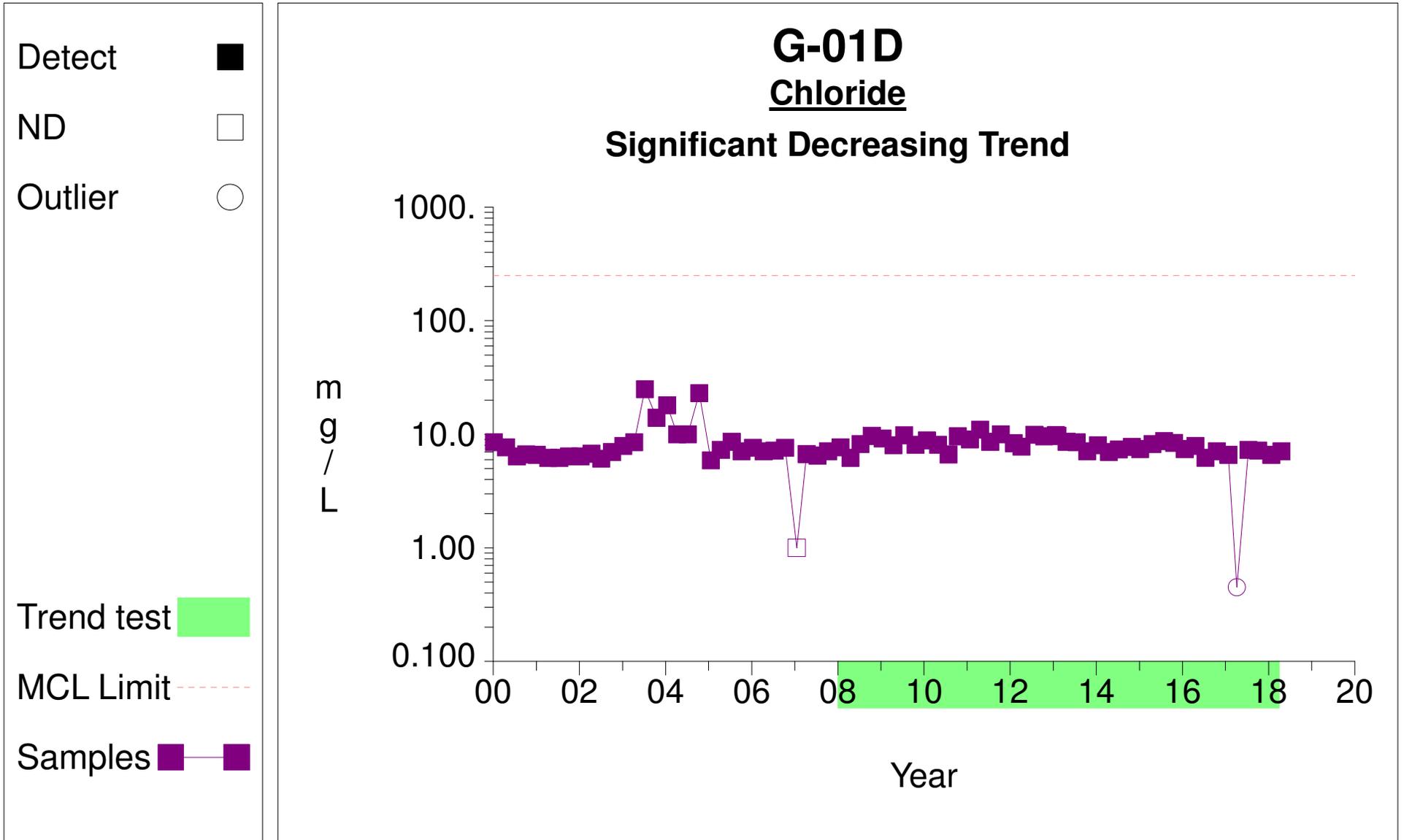
Prepared by: Snohomish County Solid Waste

Cathcart Landfill [ccshal]

□	G-01D	4/17/2018 - 4/18/2018	(9.86%, 464.465ppm)
△	G-02D	4/17/2018 - 4/18/2018	(3.85%, 260.47ppm)
▽	G-06B	4/17/2018 - 4/18/2018	(0.287%, 549.94ppm)
◇	G-08D2	4/17/2018 - 4/18/2018	(24%, 266.44ppm)
+	G-09D	4/17/2018 - 4/18/2018	(31.3%, 313.32ppm)
×	G-10D	4/17/2018 - 4/18/2018	(1.23%, 1232.1ppm)
⊕	G-13D	4/17/2018 - 4/18/2018	(12.3%, 303.41ppm)
⊗	G-14D	4/17/2018 - 4/18/2018	(22.8%, 282.76ppm)
◆	G-24D	4/17/2018 - 4/18/2018	(9.25%, 364.46ppm)

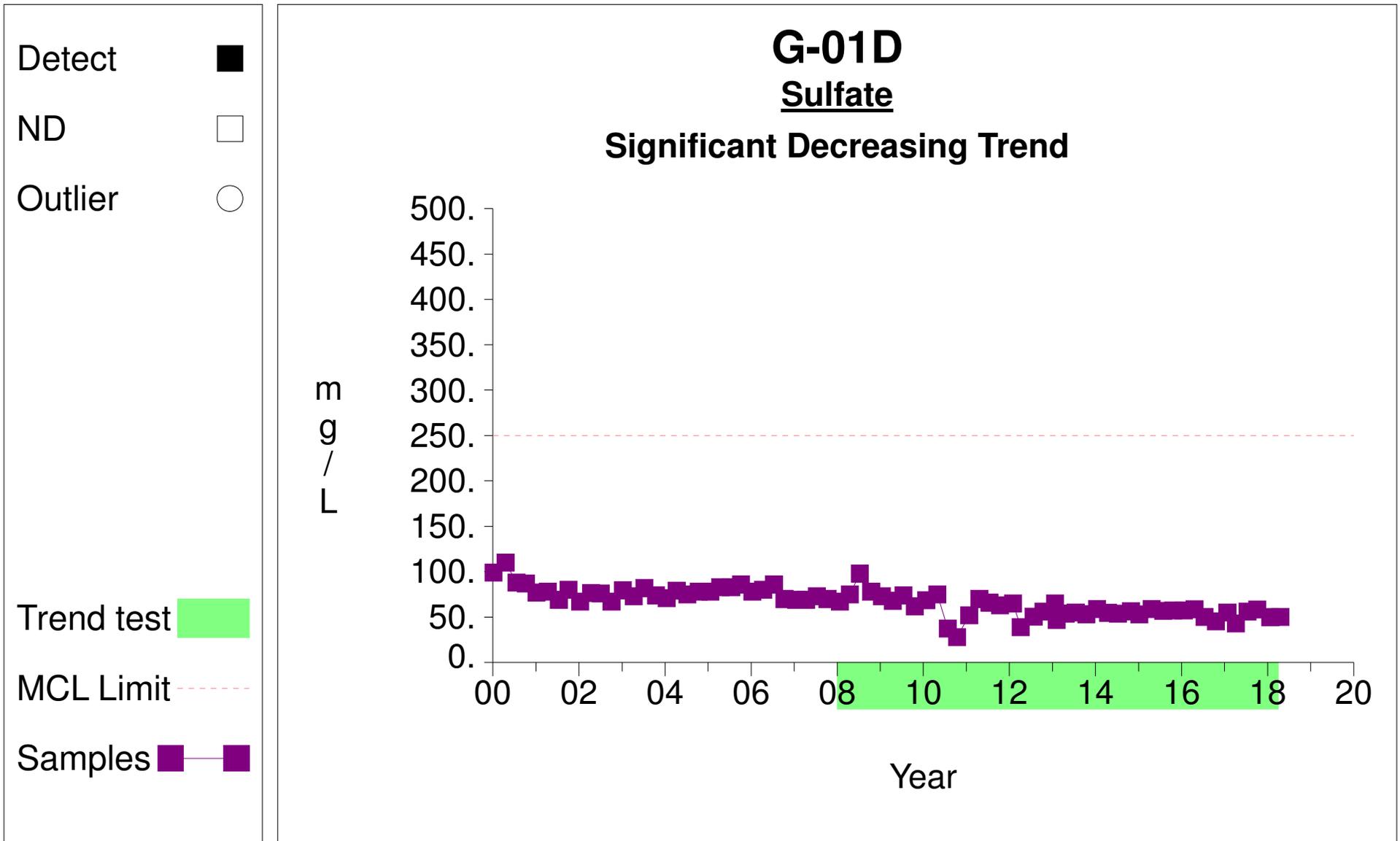


Time Series



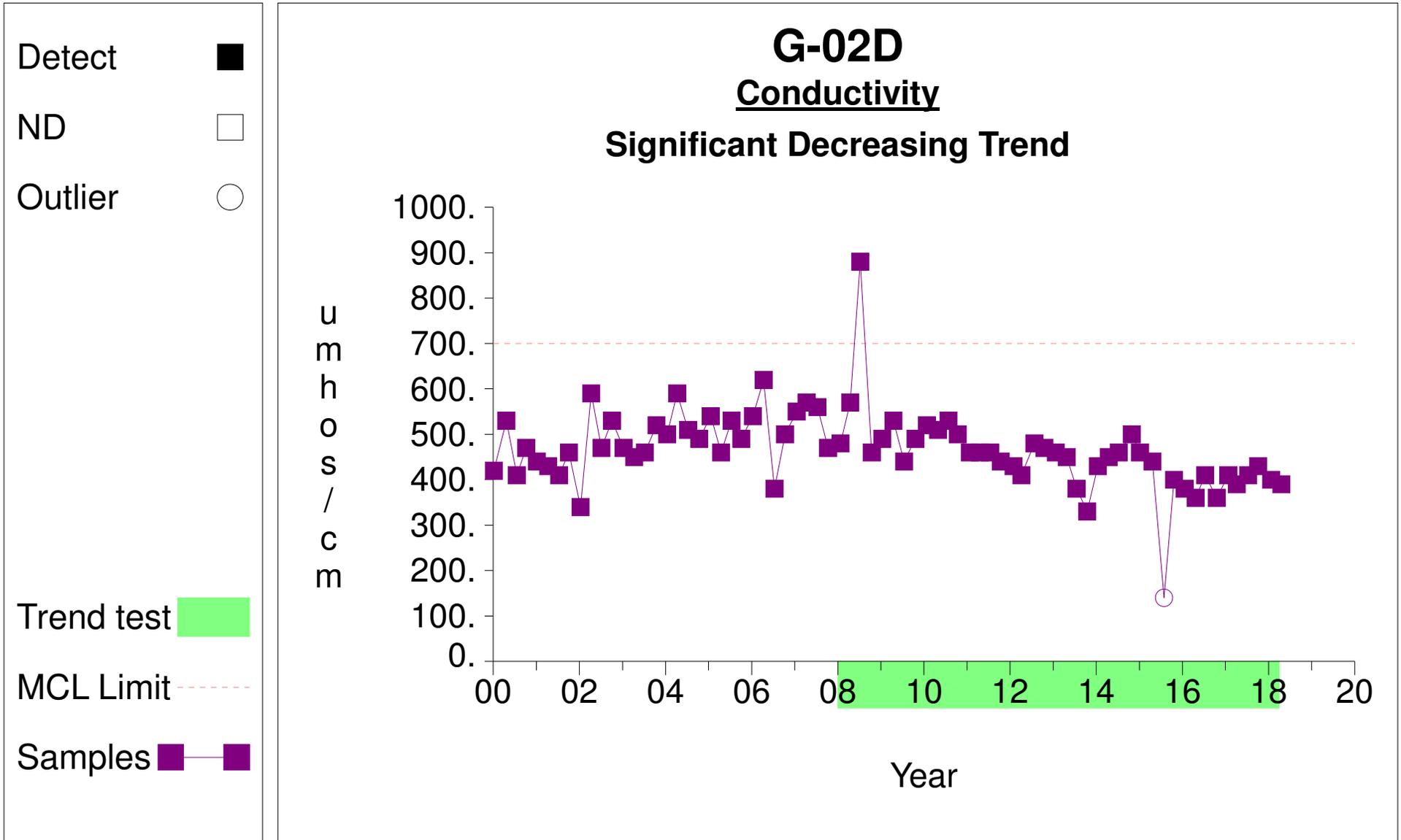
Graph 5

Time Series



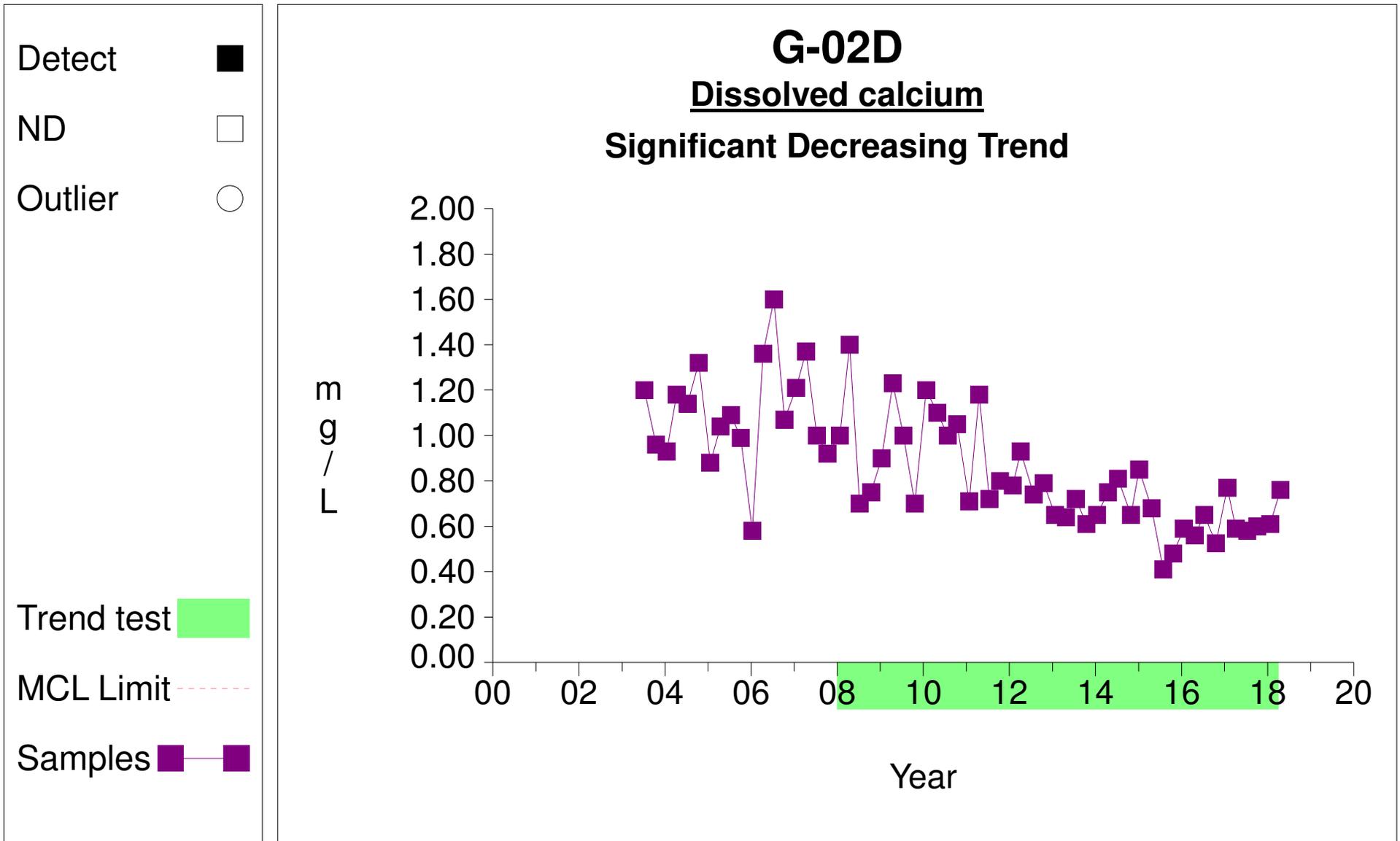
Graph 31

Time Series



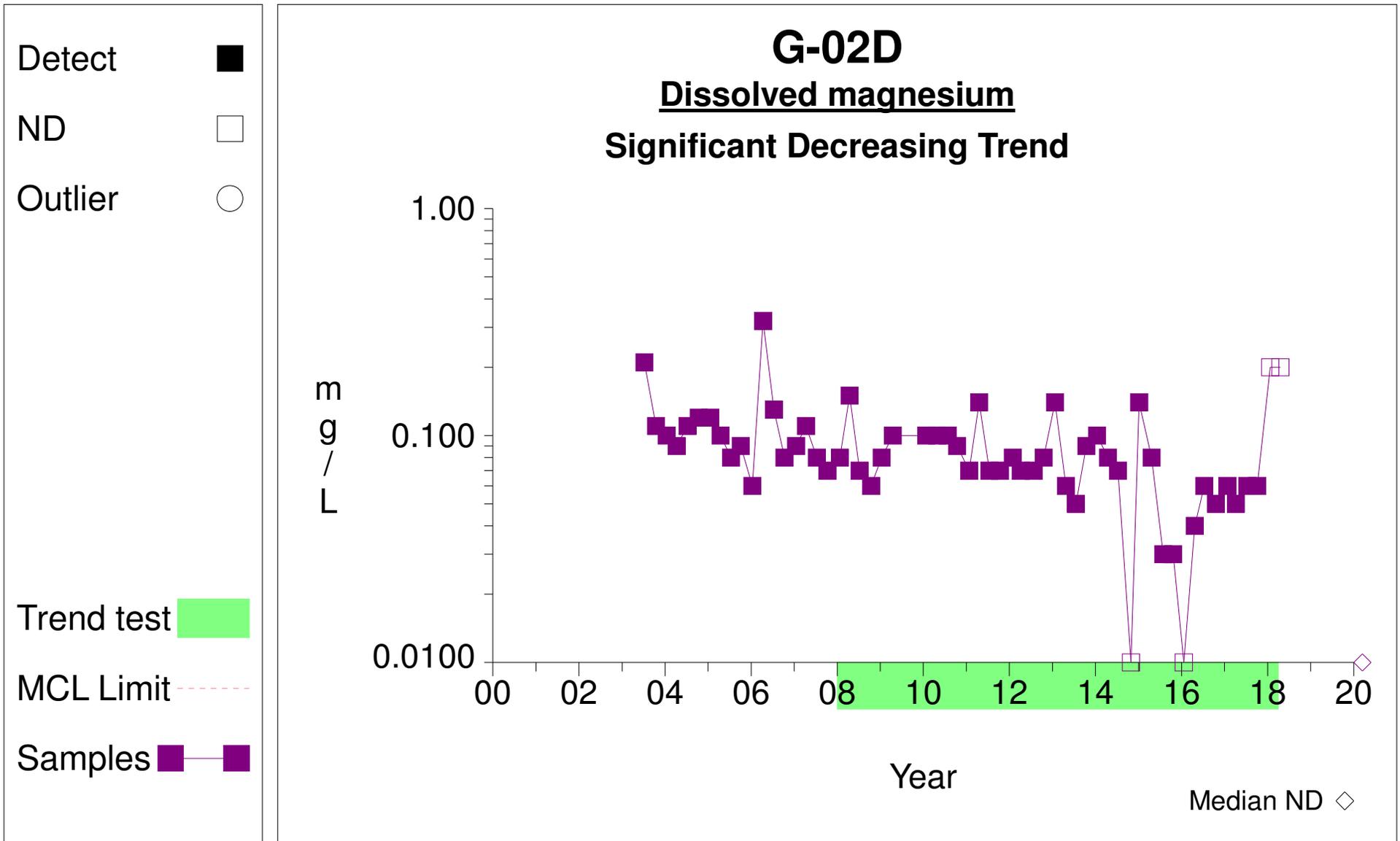
Graph 39

Time Series



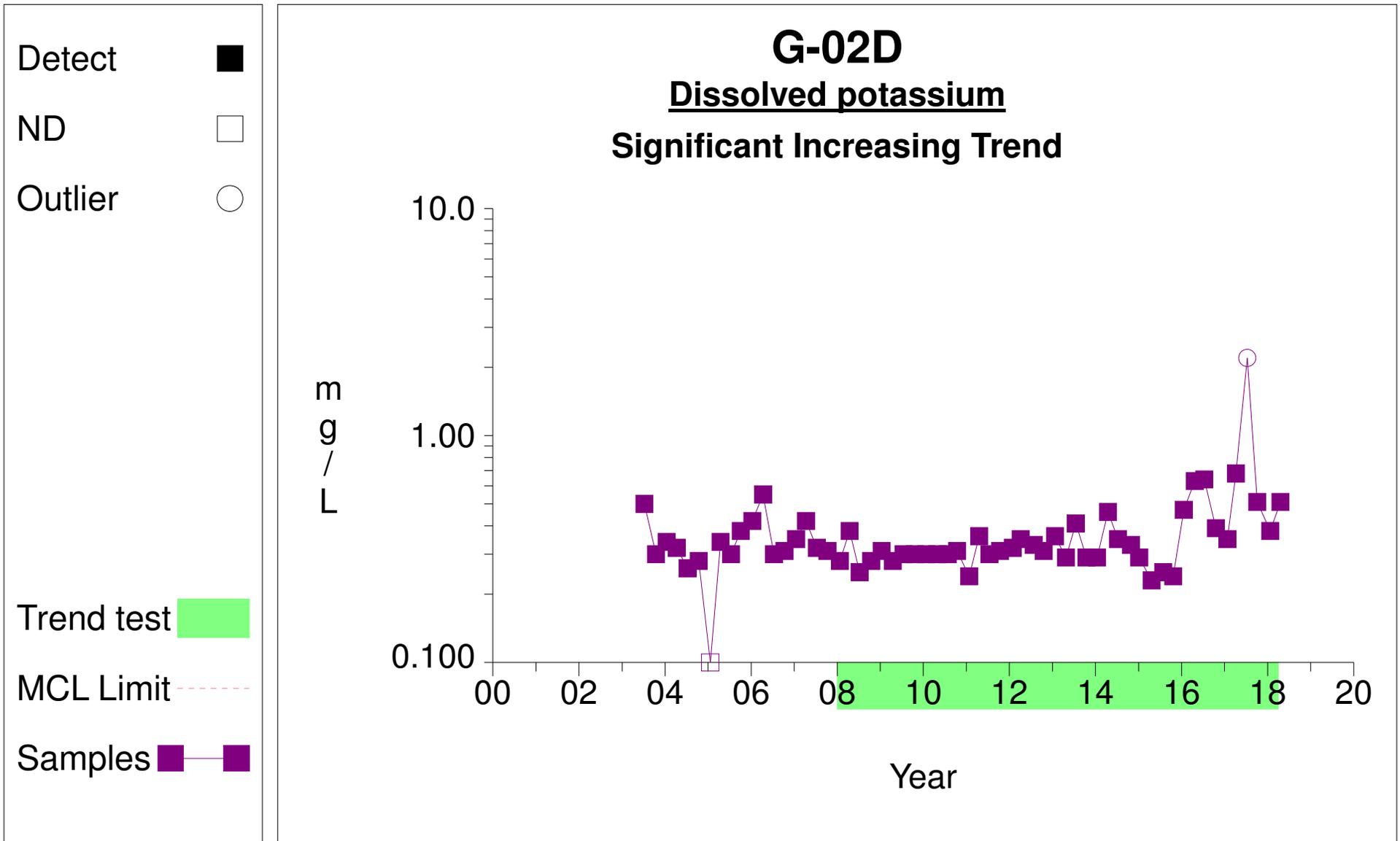
Graph 45

Time Series



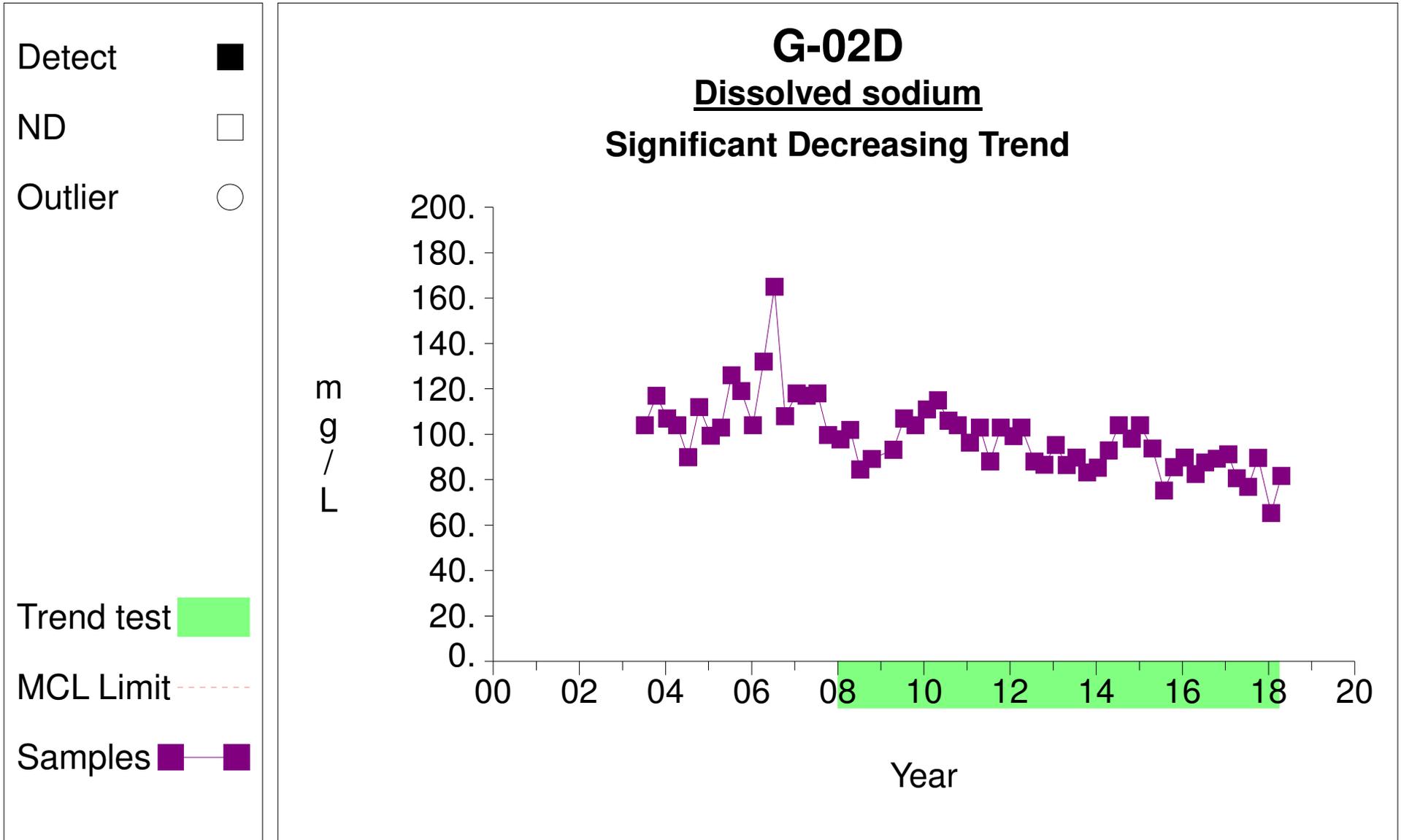
Graph 51

Time Series



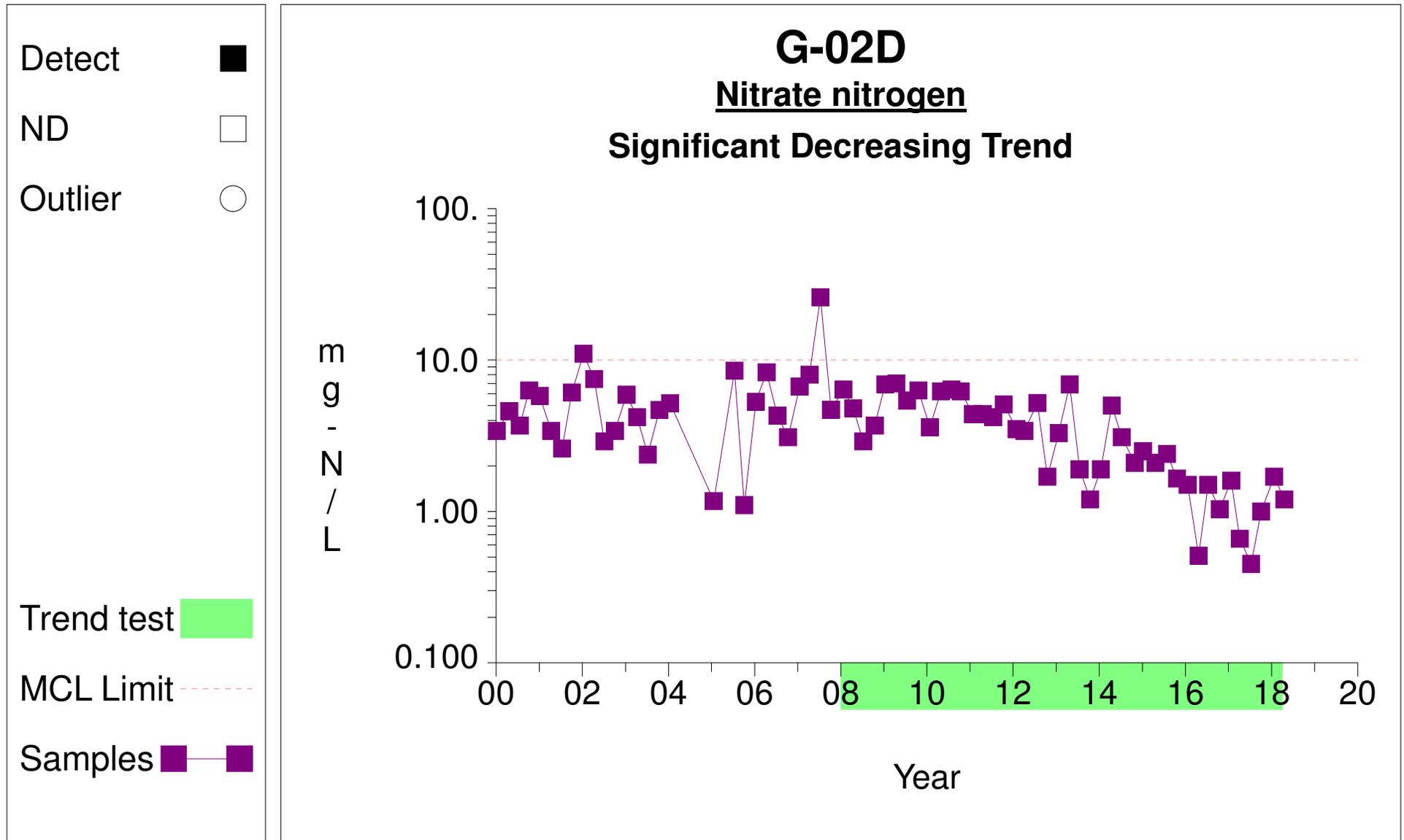
Graph 54

Time Series



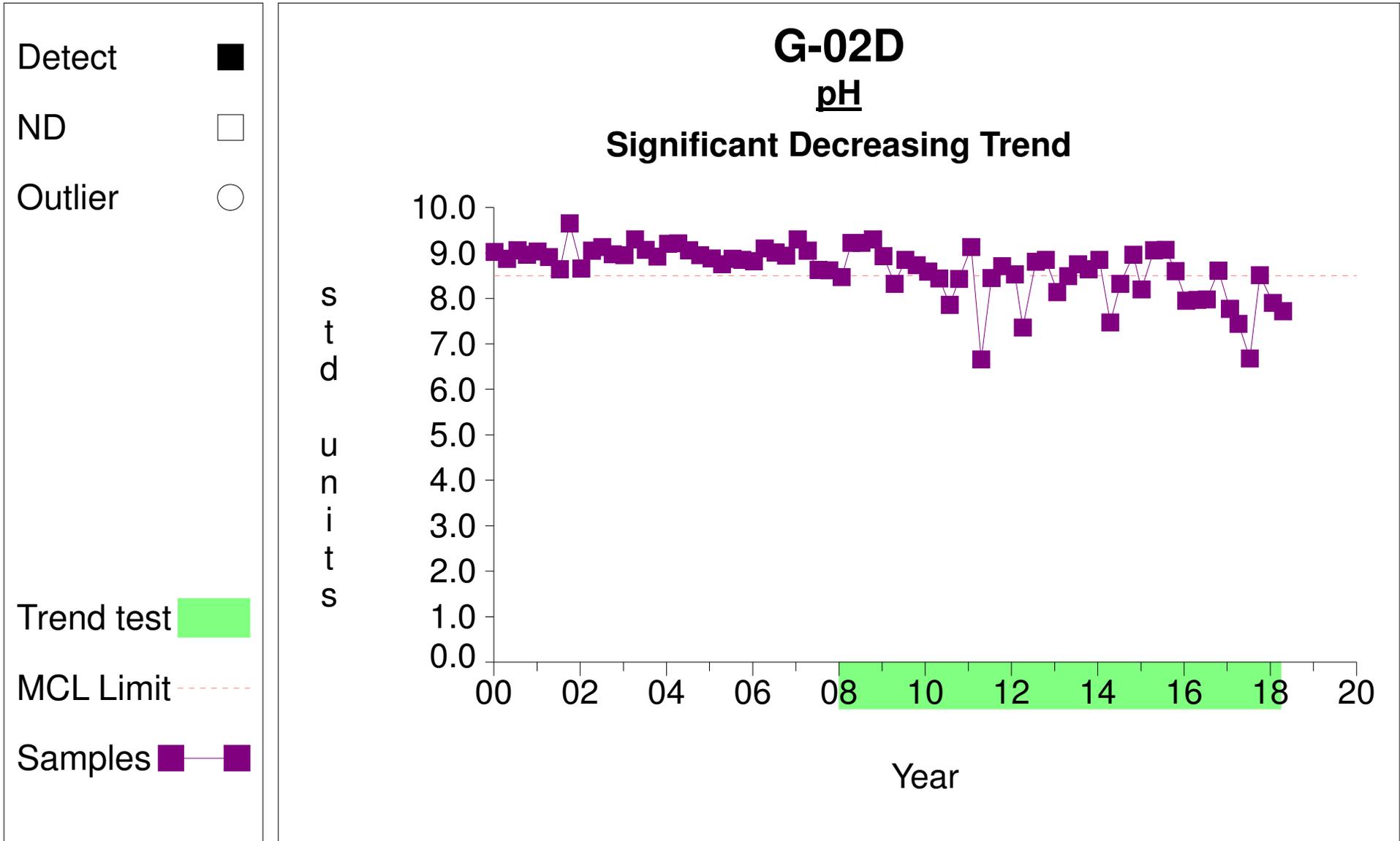
Graph 57

Time Series



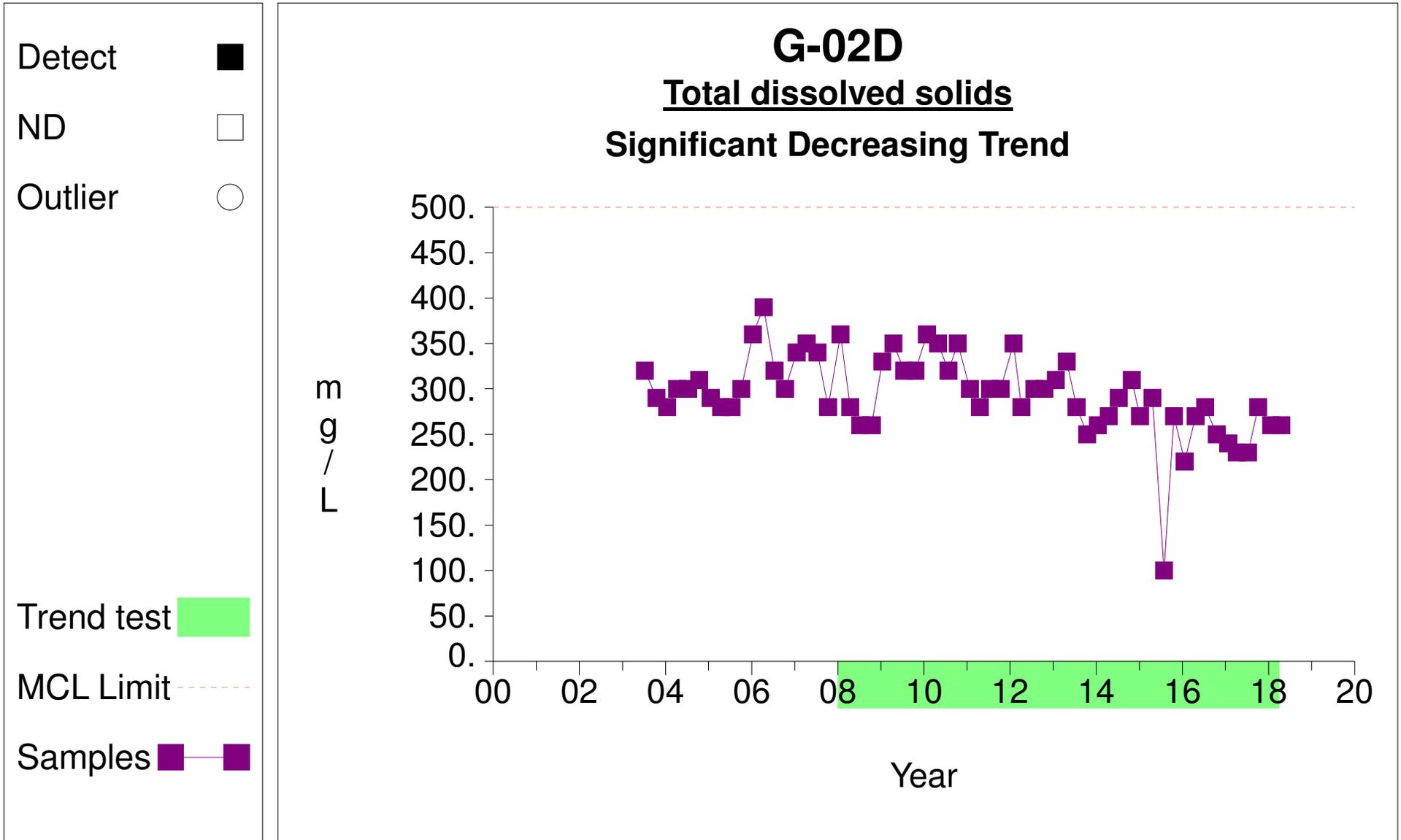
Graph 61

Time Series



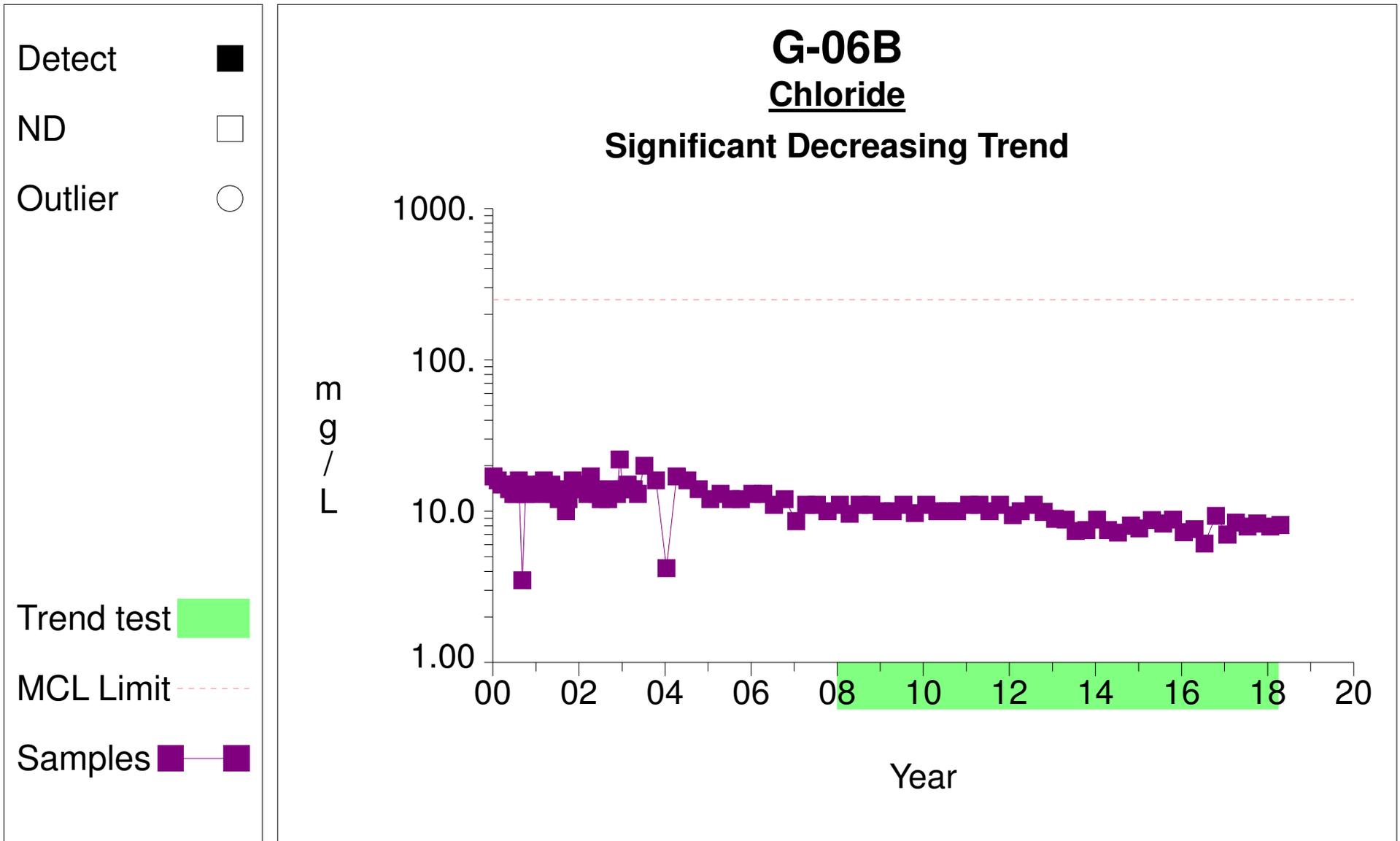
Graph 63

Time Series



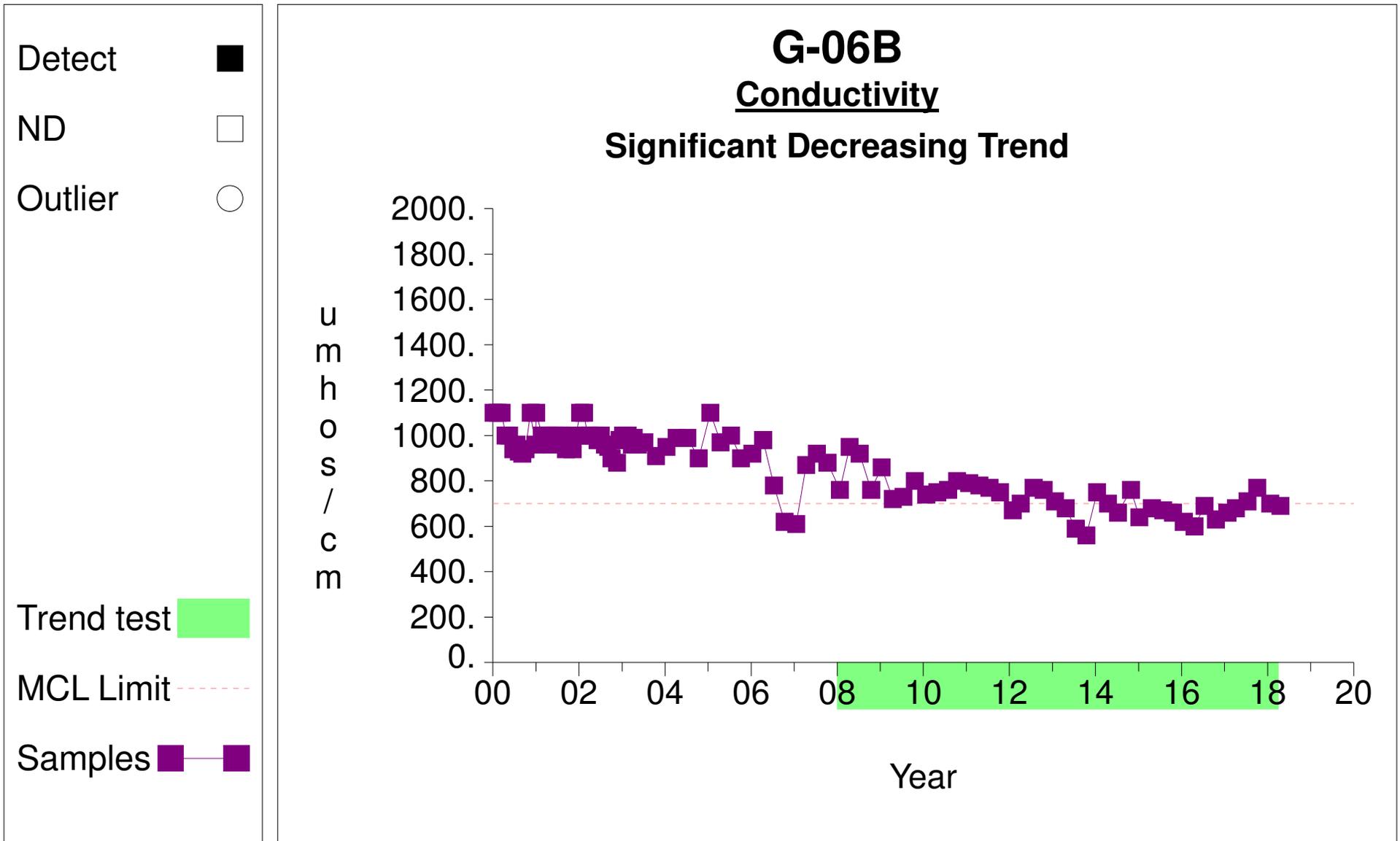
Graph 65

Time Series



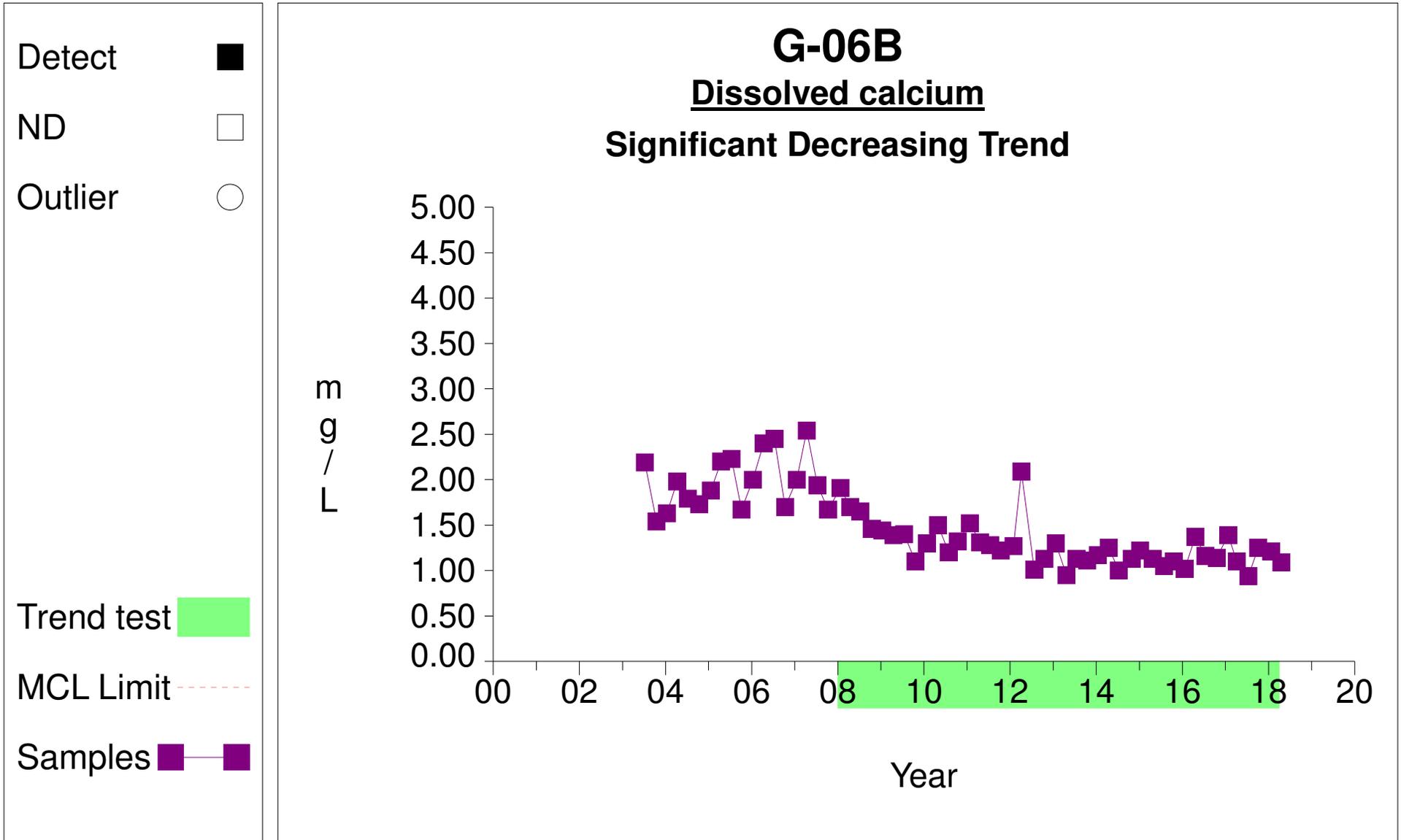
Graph 71

Time Series



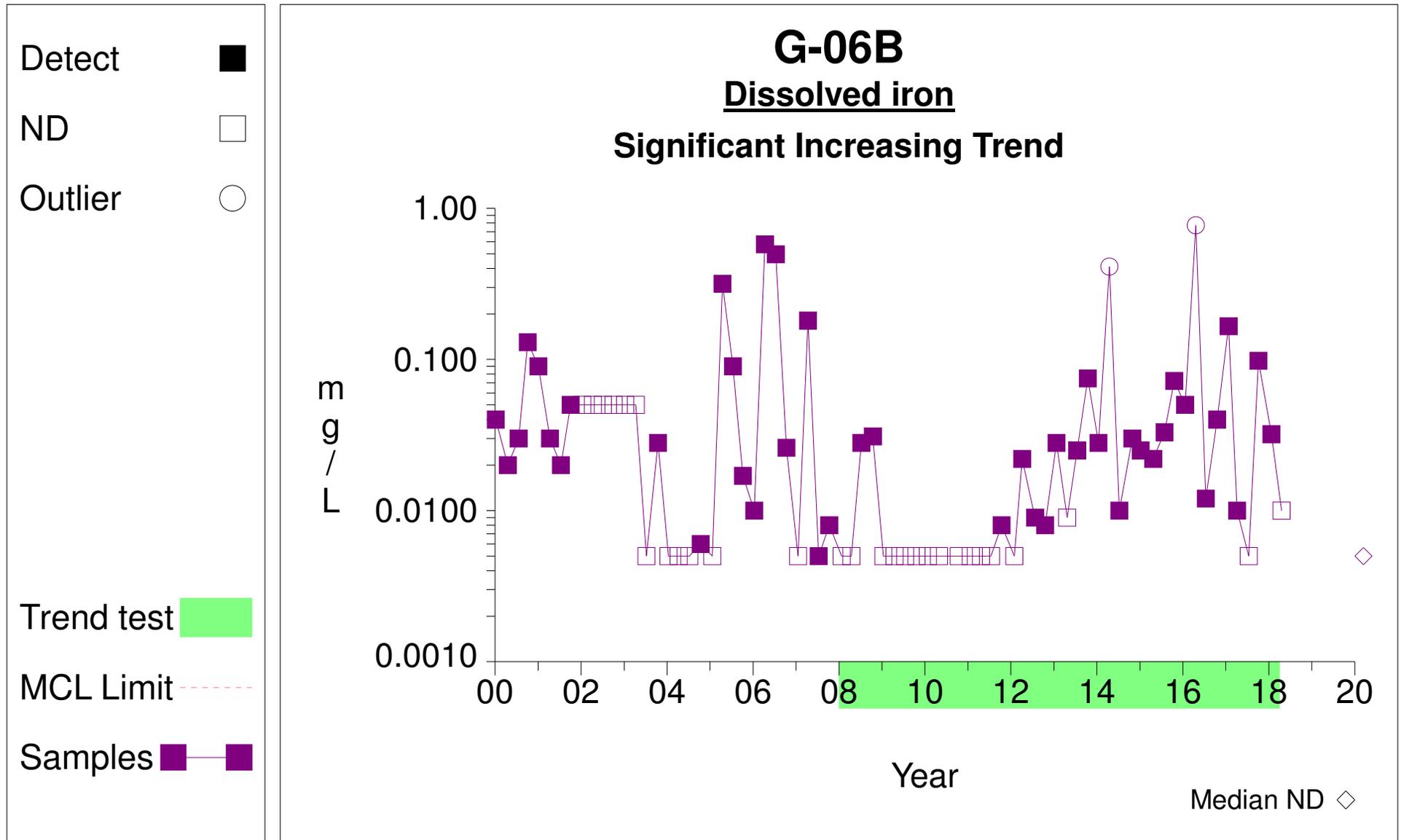
Graph 72

Time Series



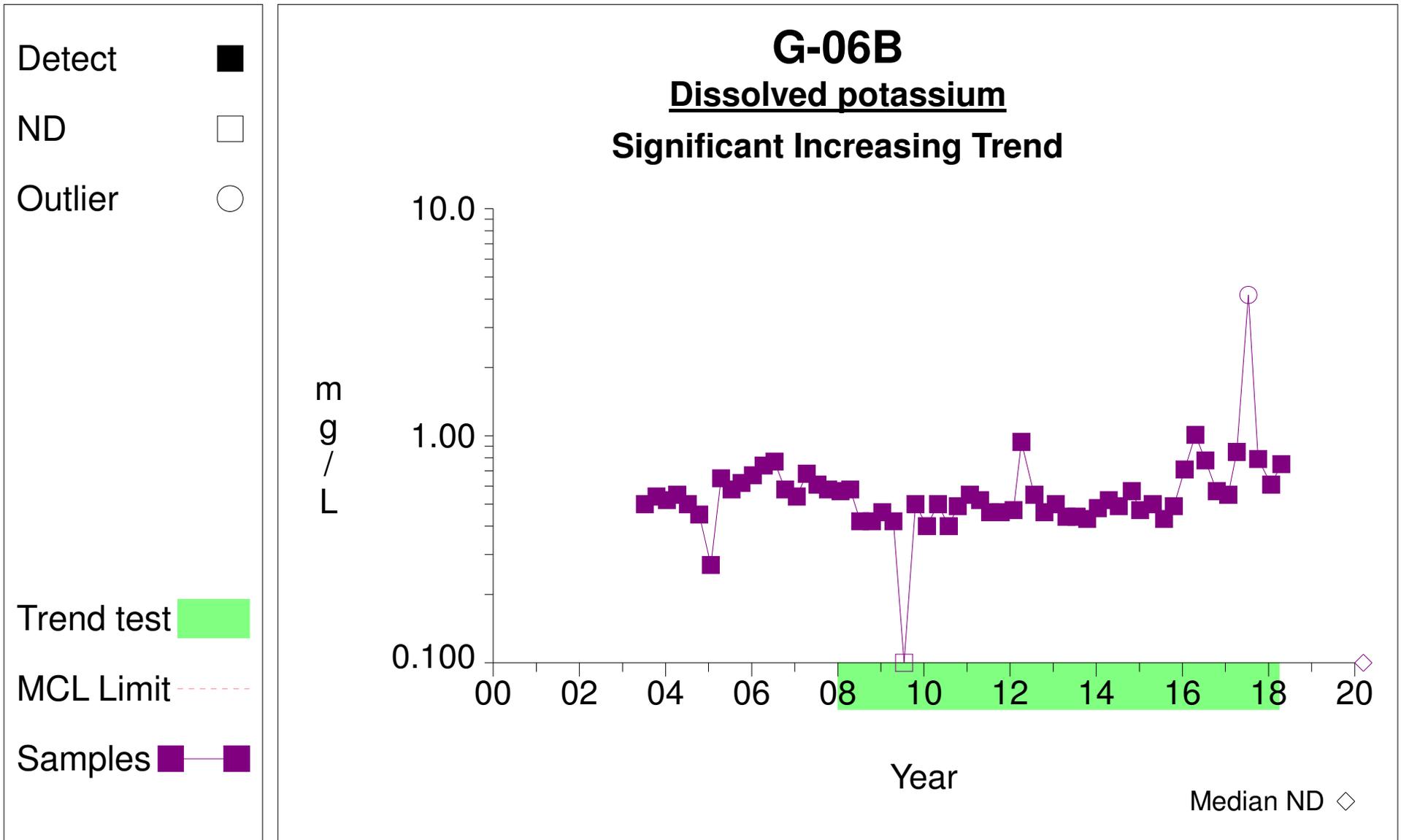
Graph 78

Time Series



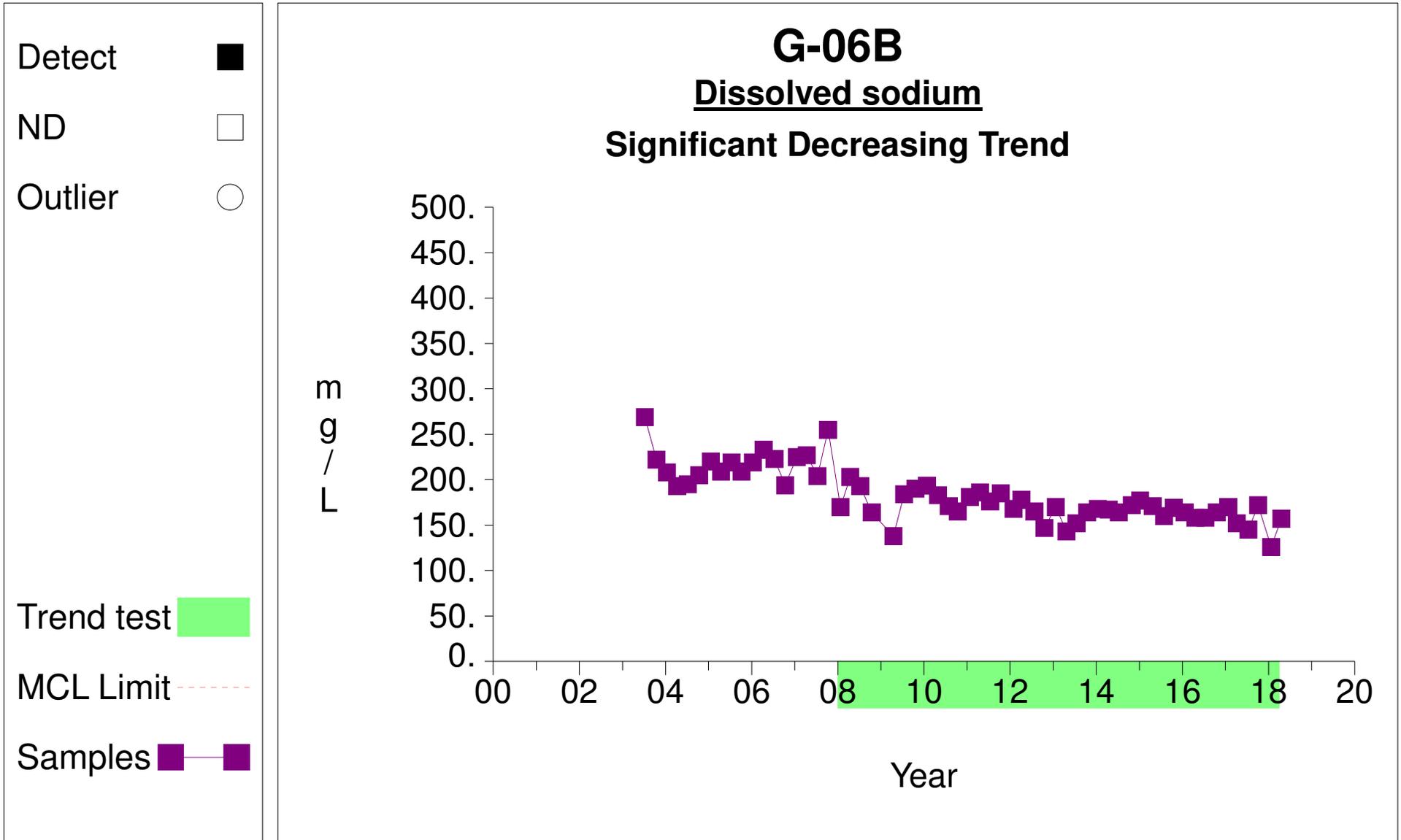
Graph 82

Time Series



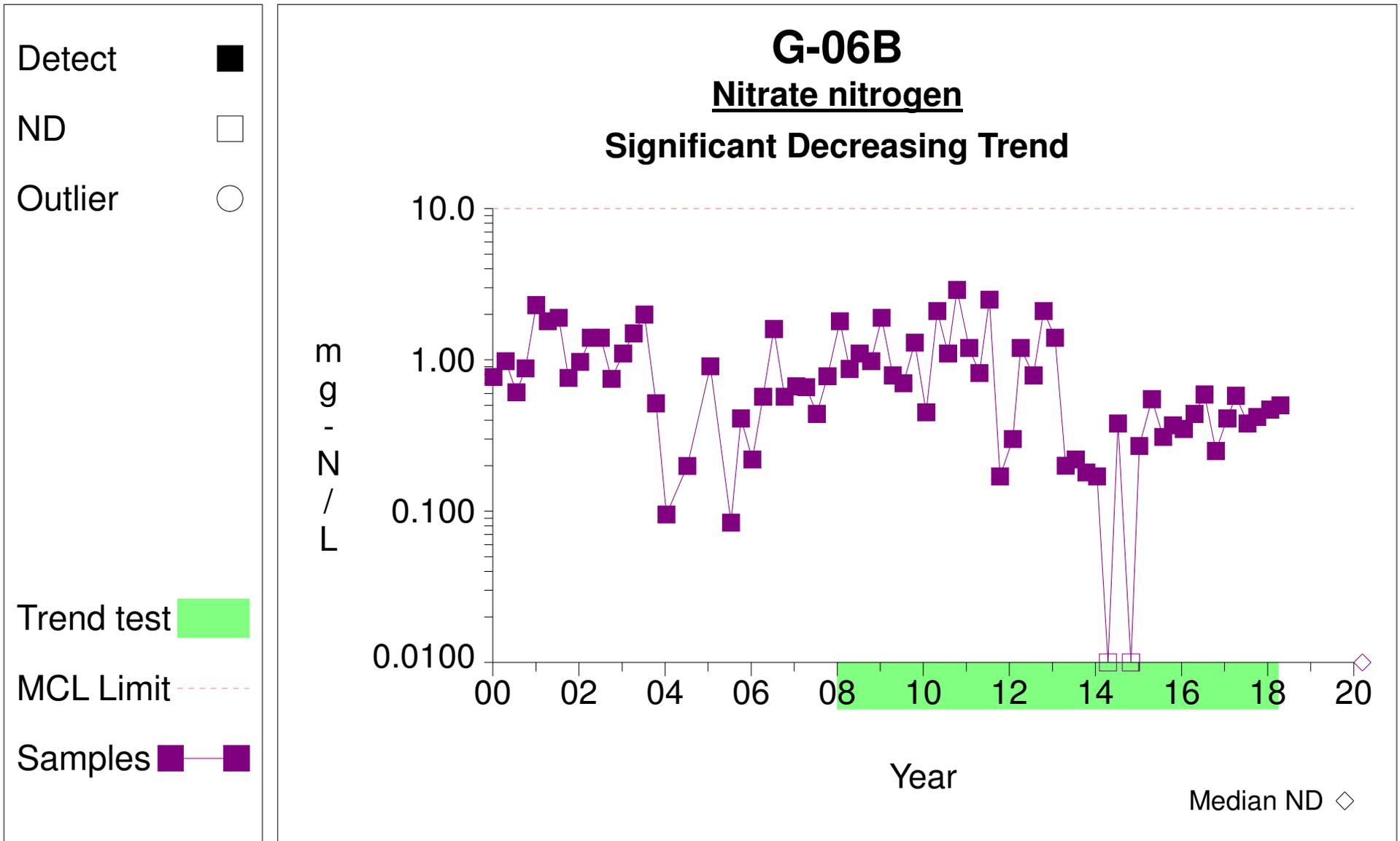
Graph 87

Time Series



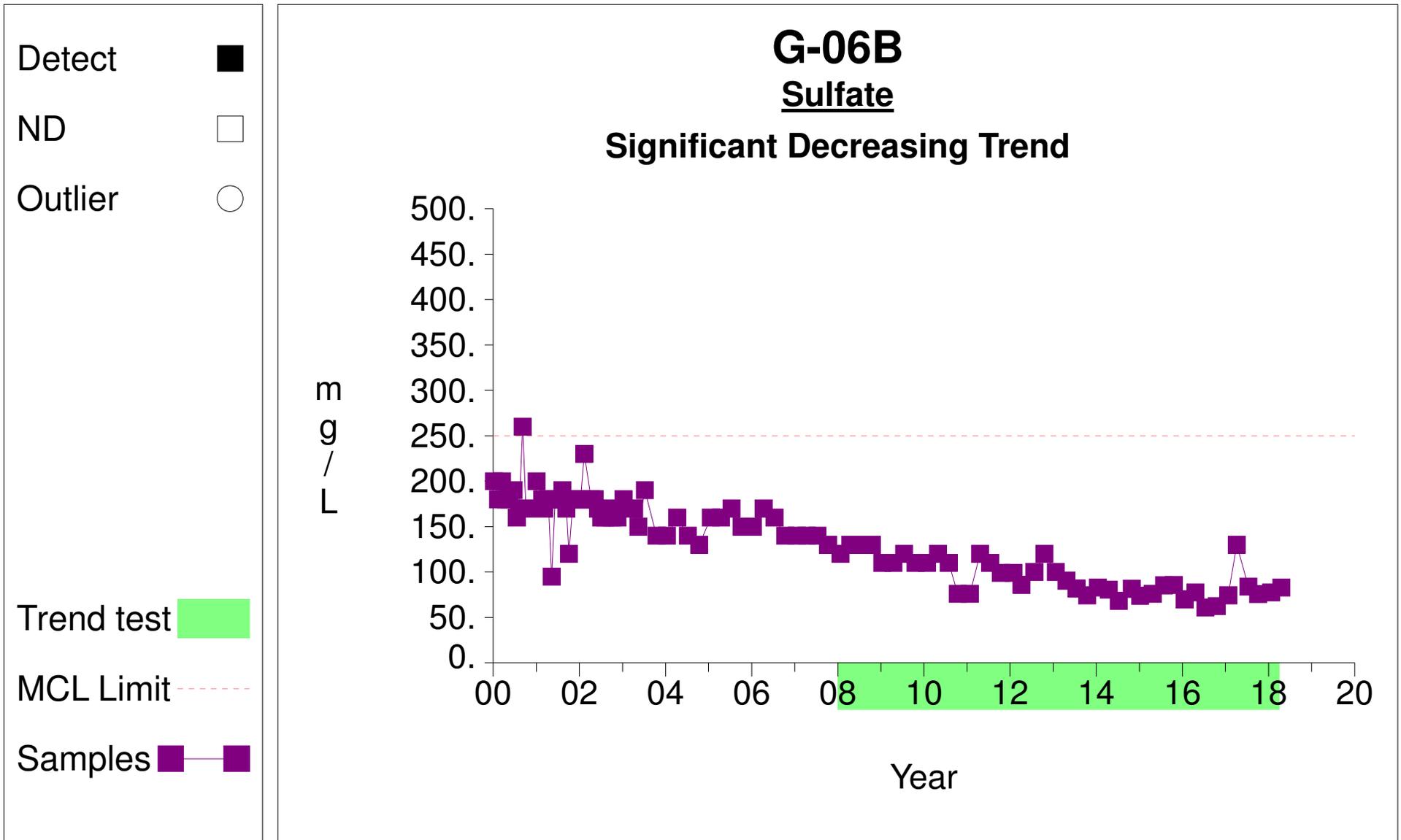
Graph 90

Time Series



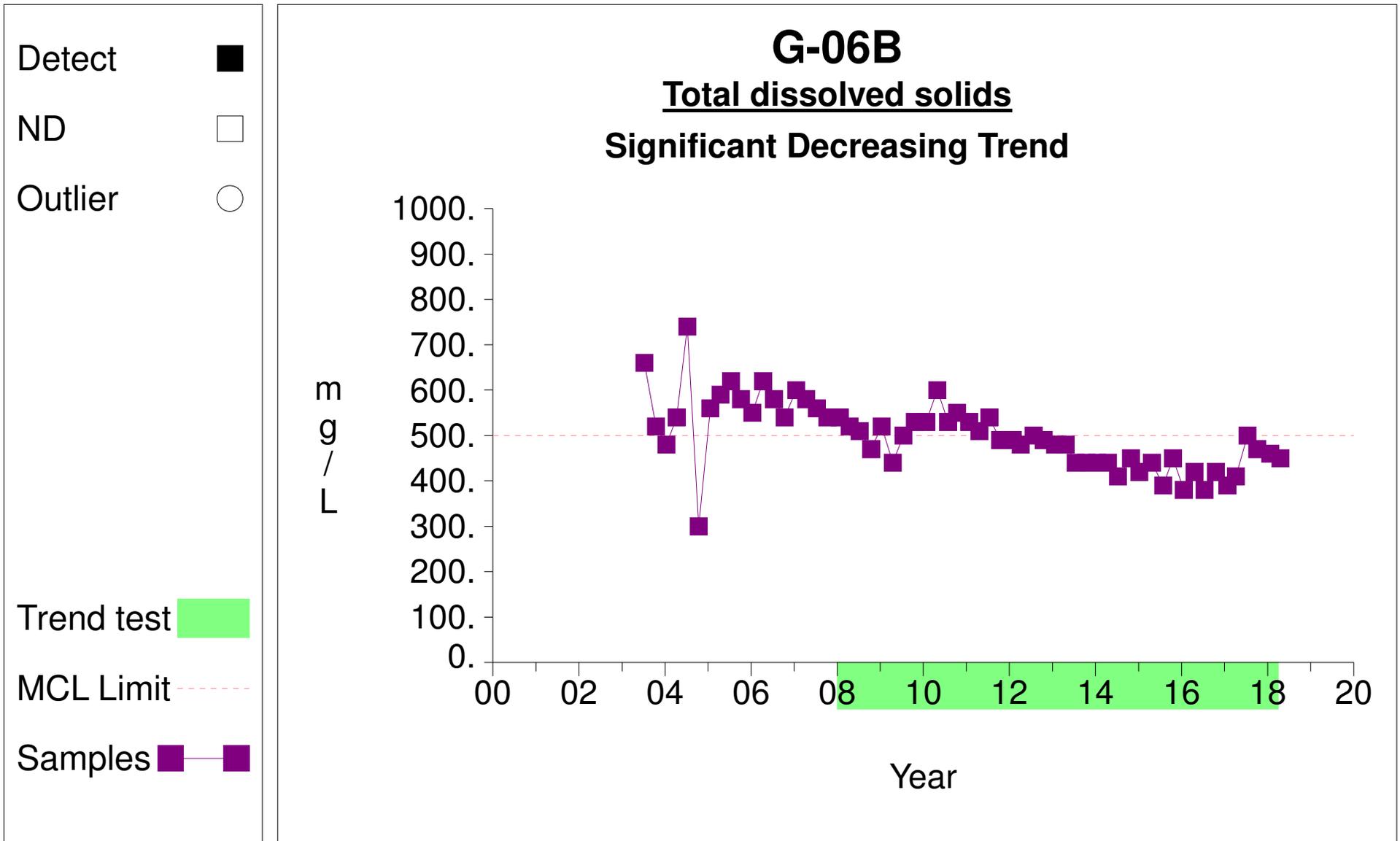
Graph 94

Time Series



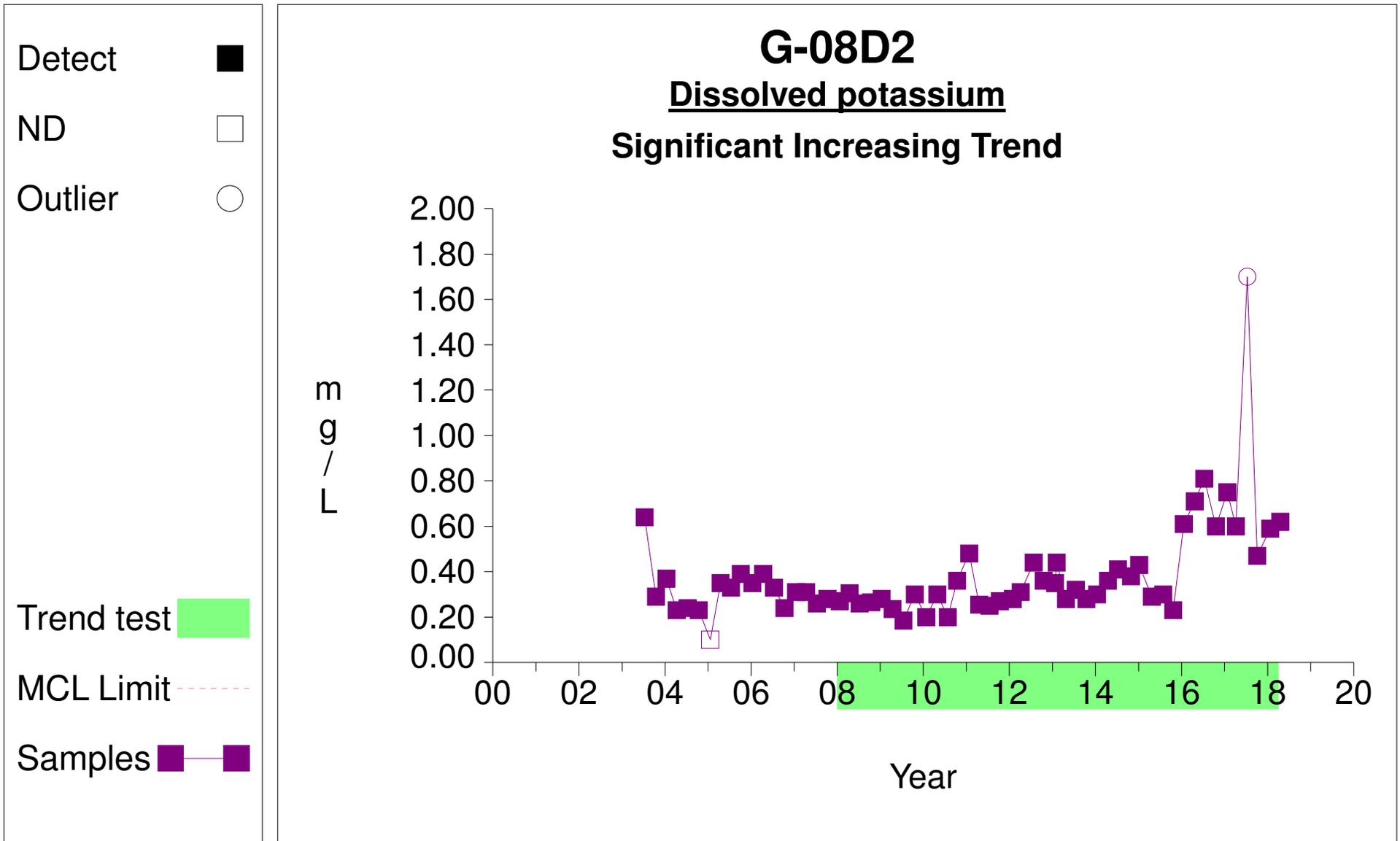
Graph 97

Time Series



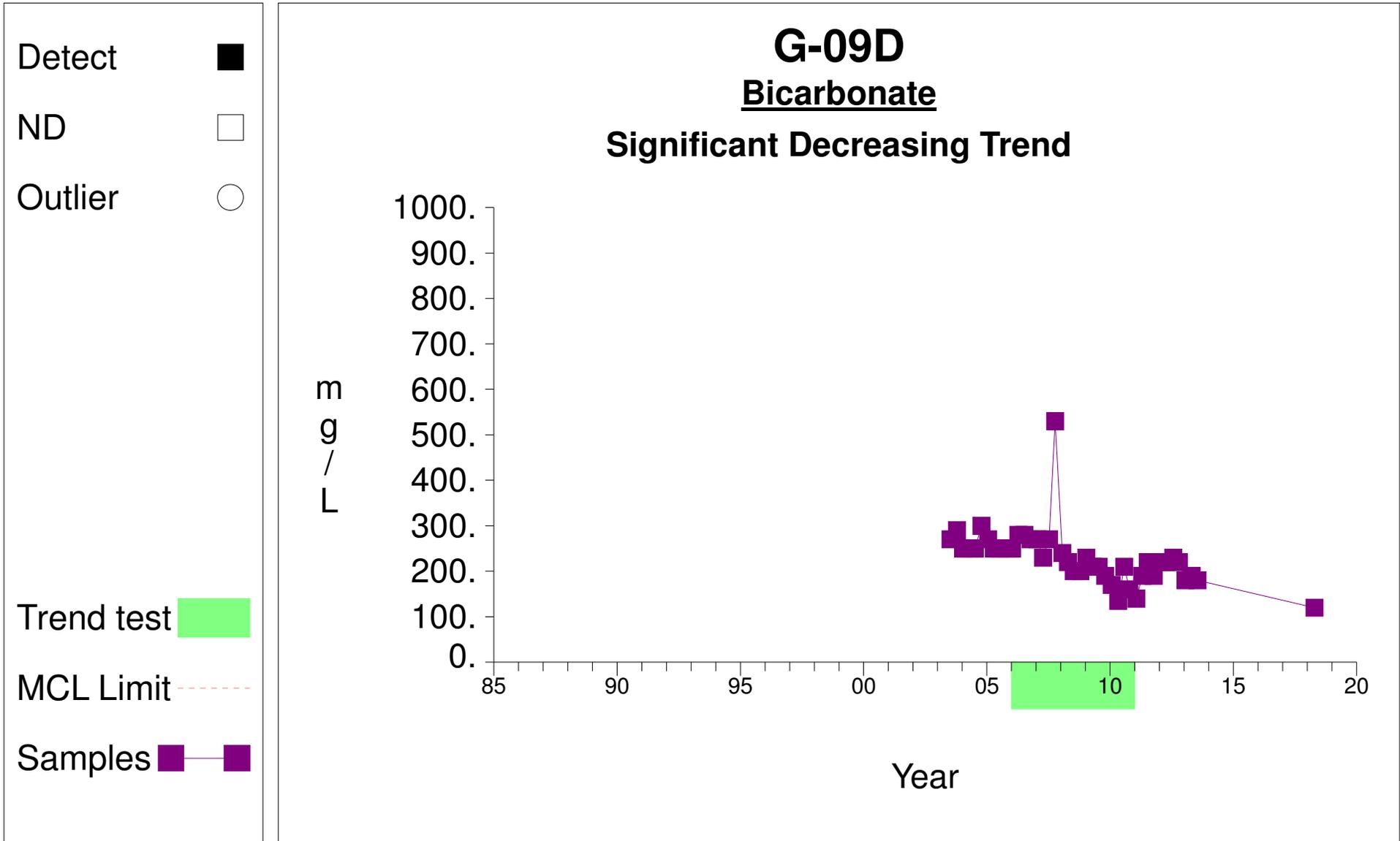
Graph 98

Time Series



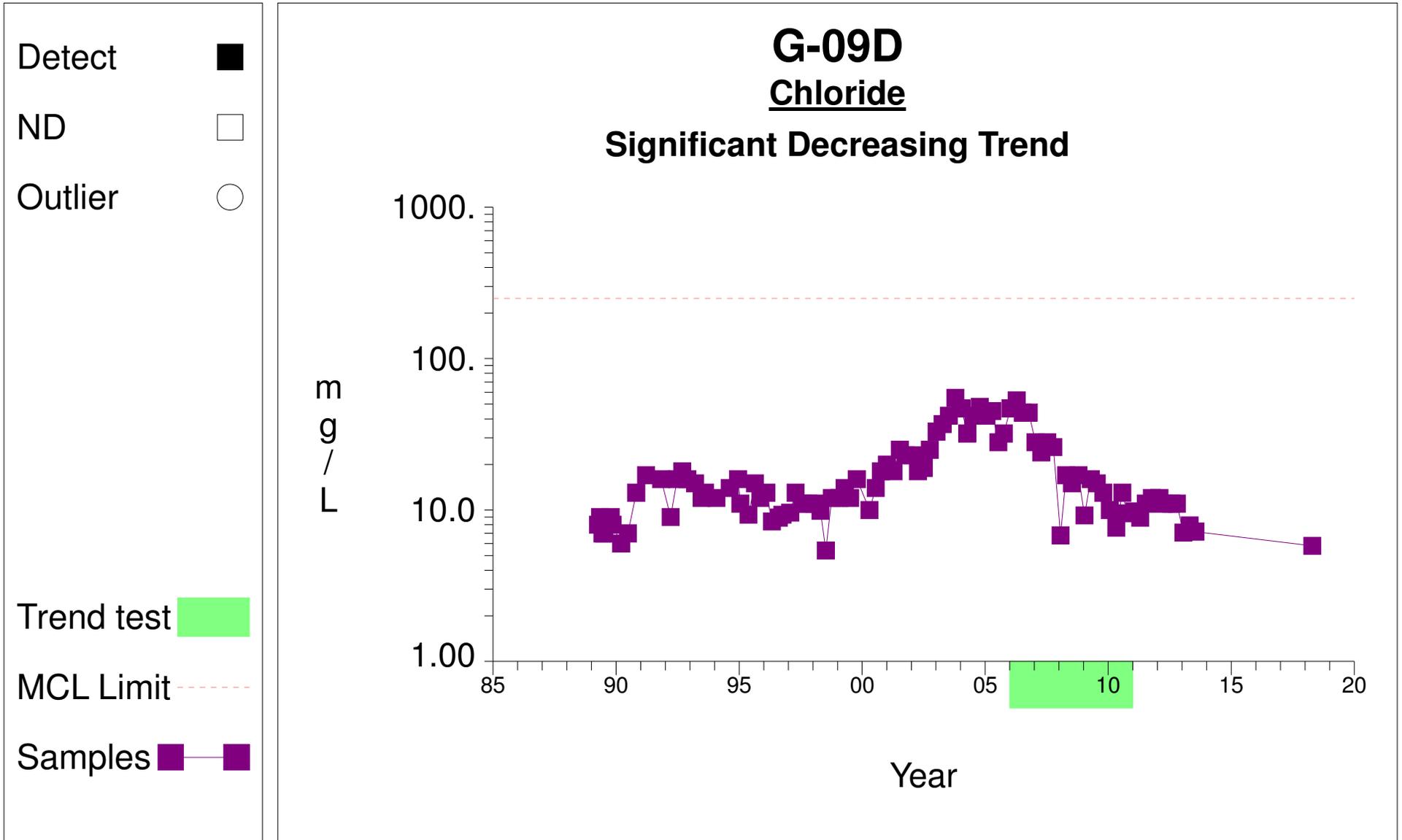
Graph 120

Time Series



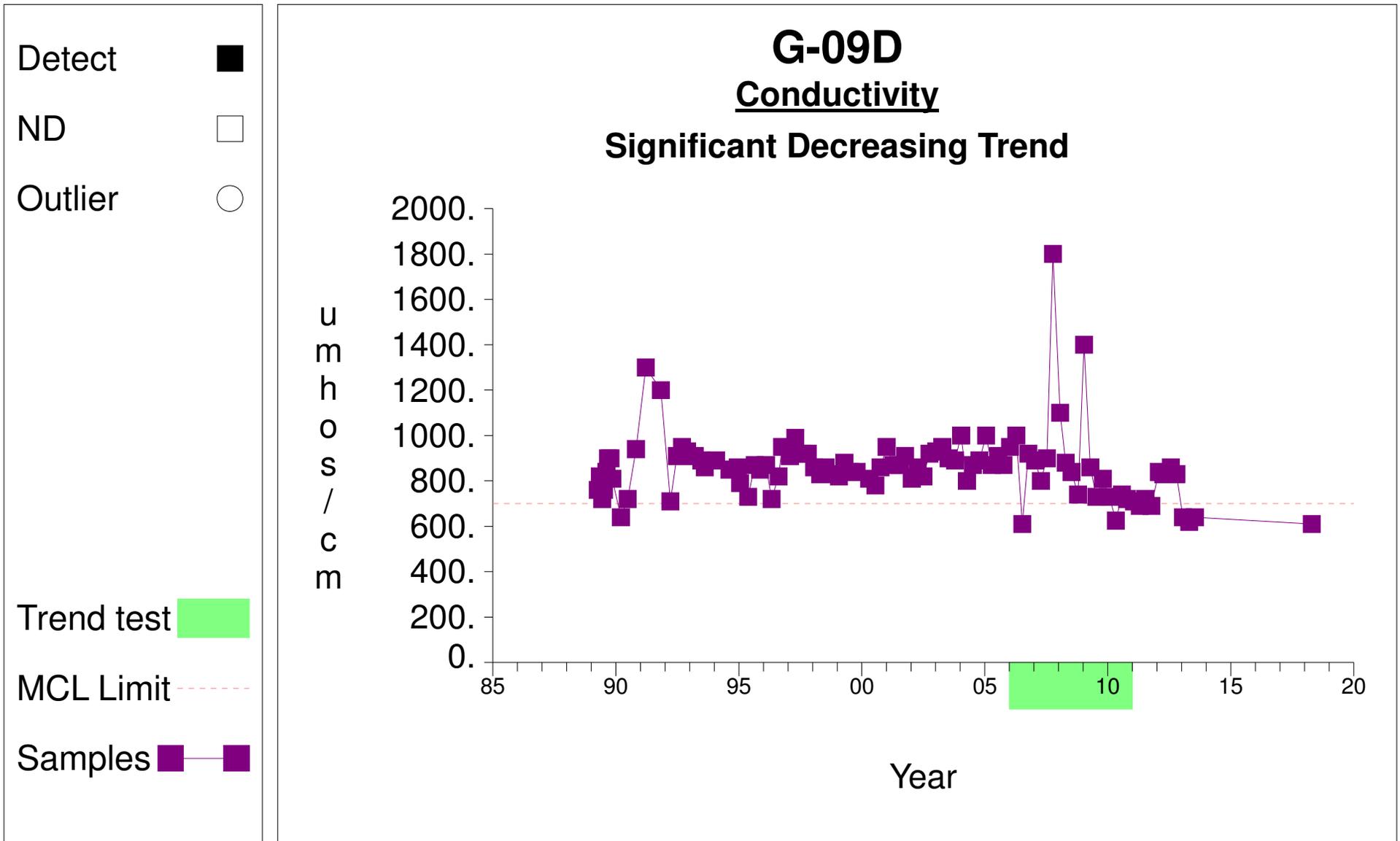
Graph 135

Time Series



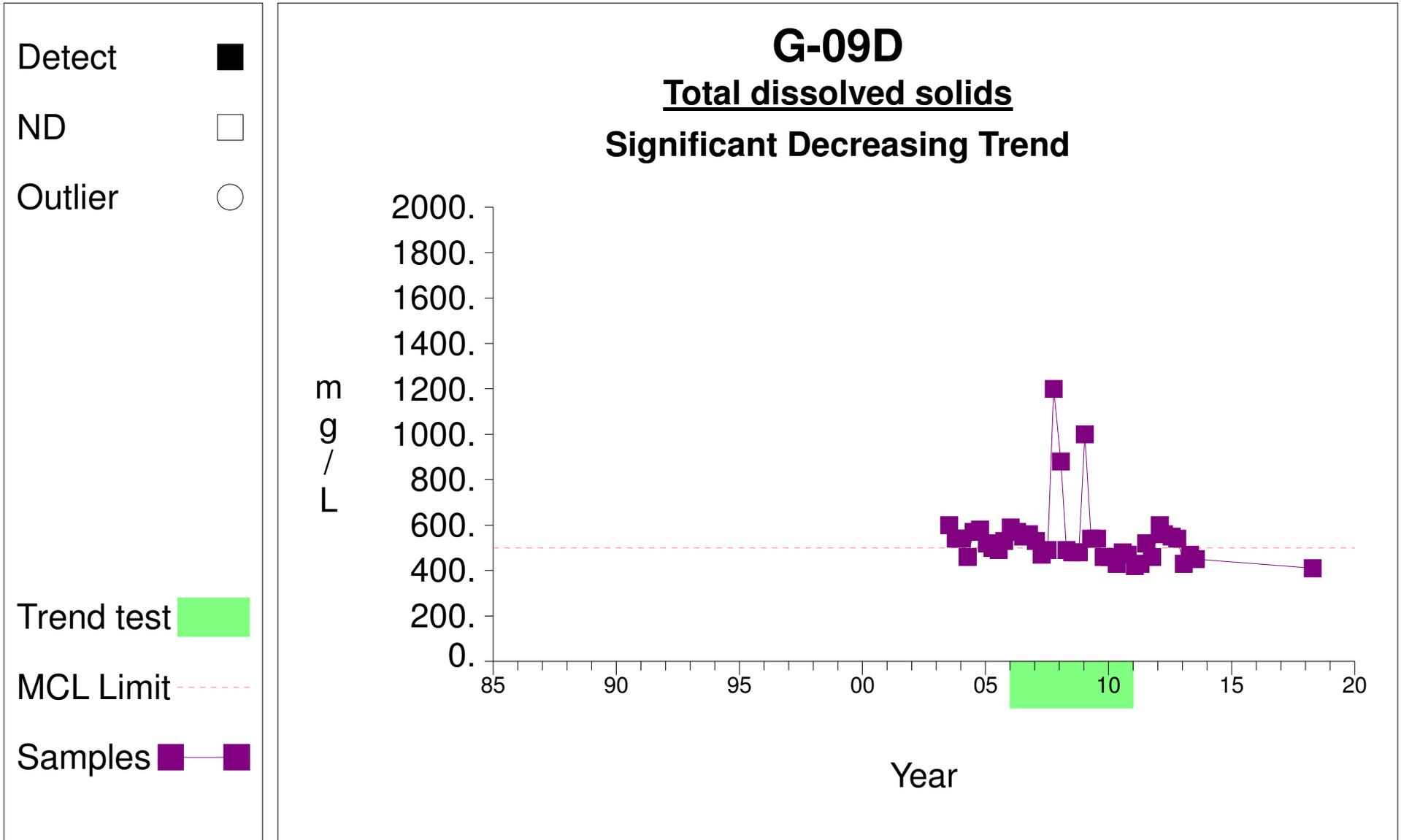
Graph 137

Time Series



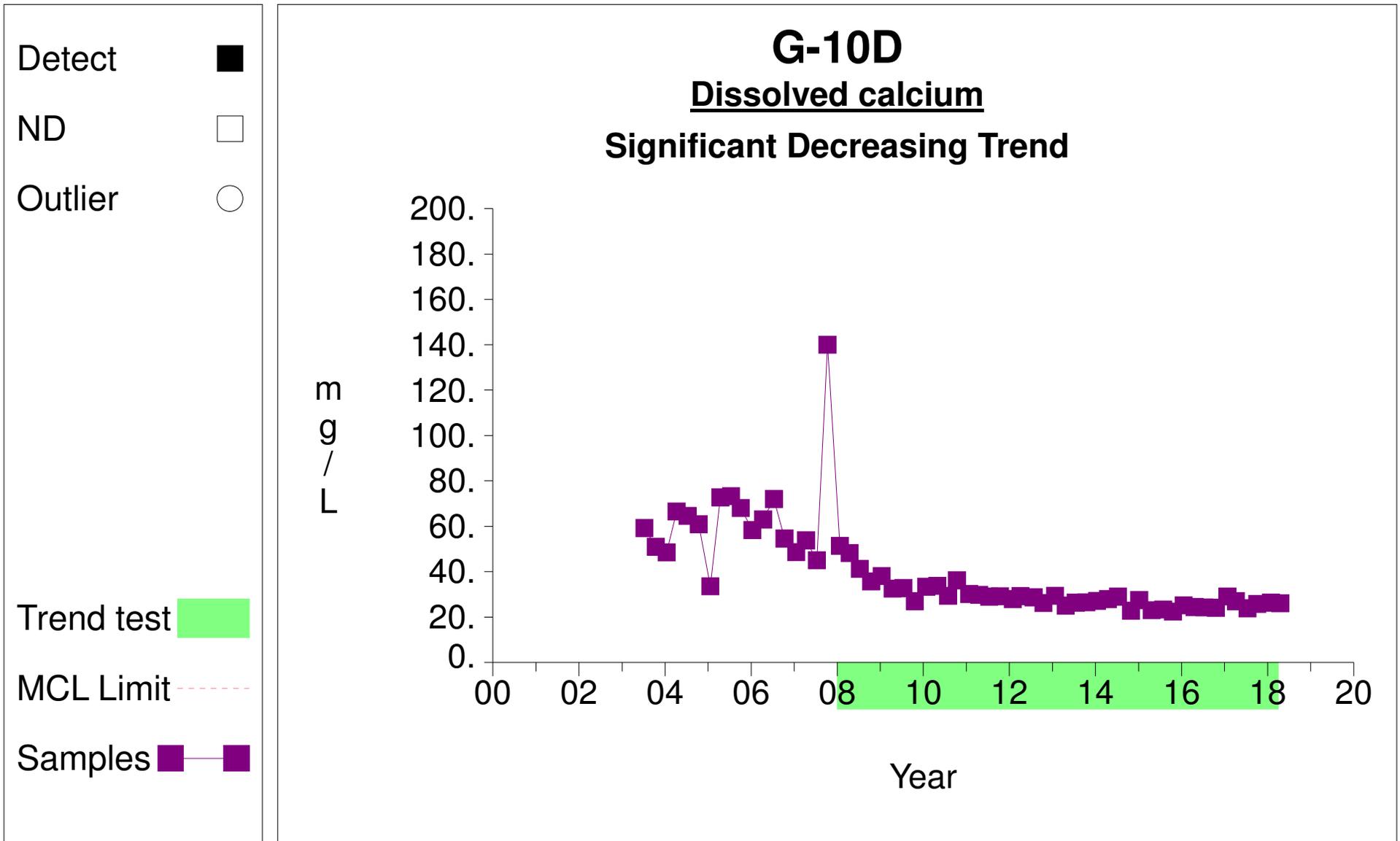
Graph 138

Time Series



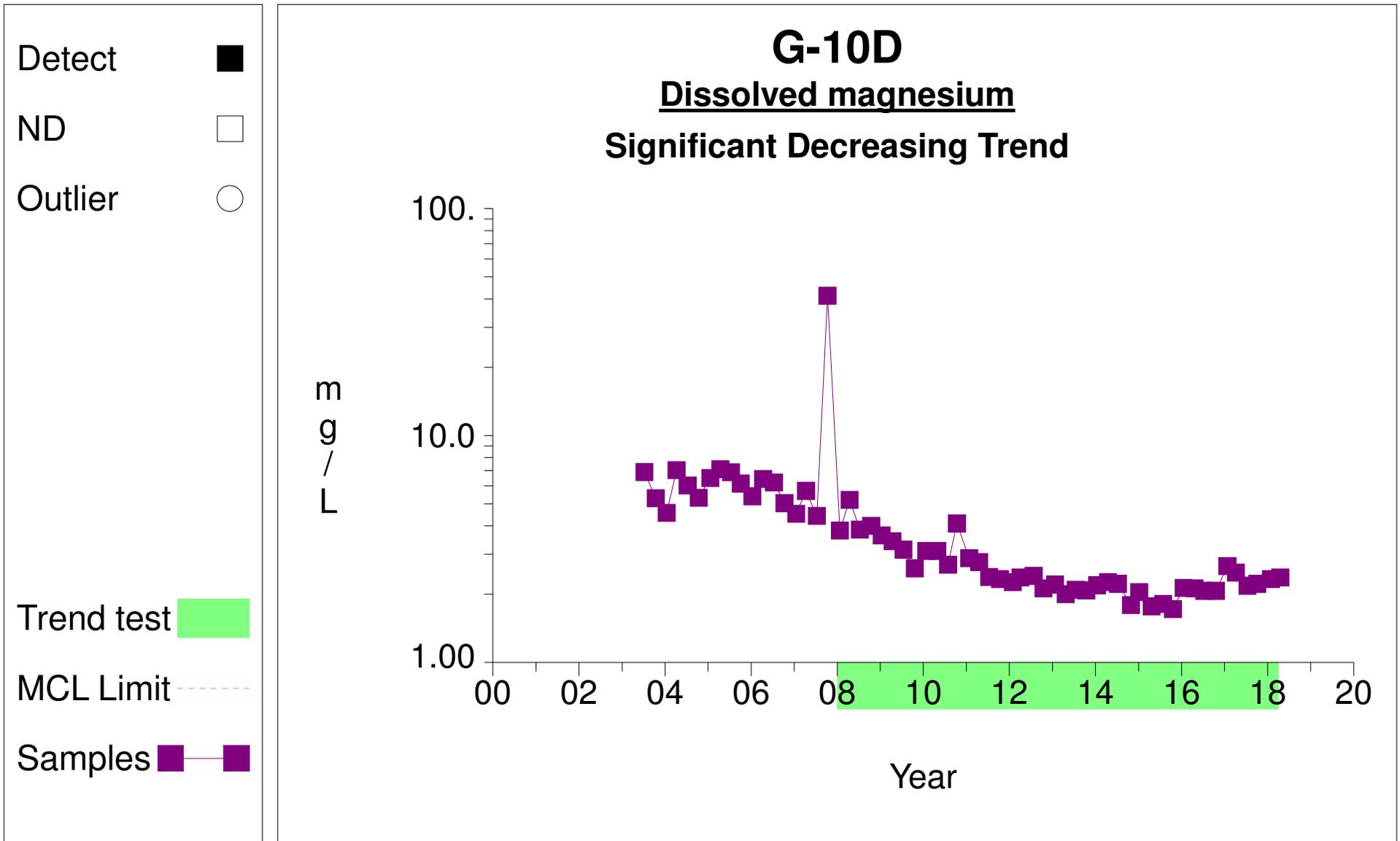
Graph 164

Time Series



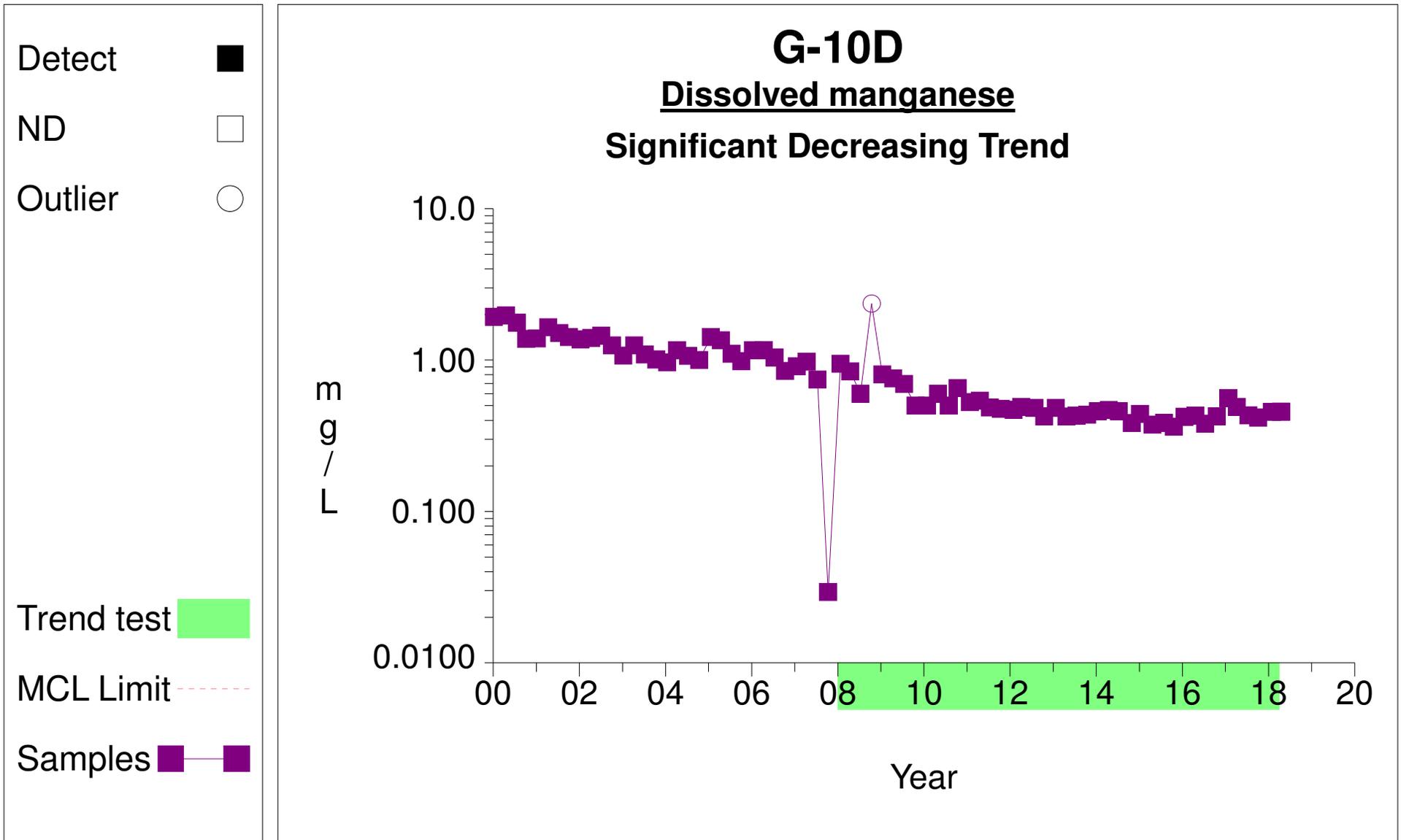
Graph 177

Time Series



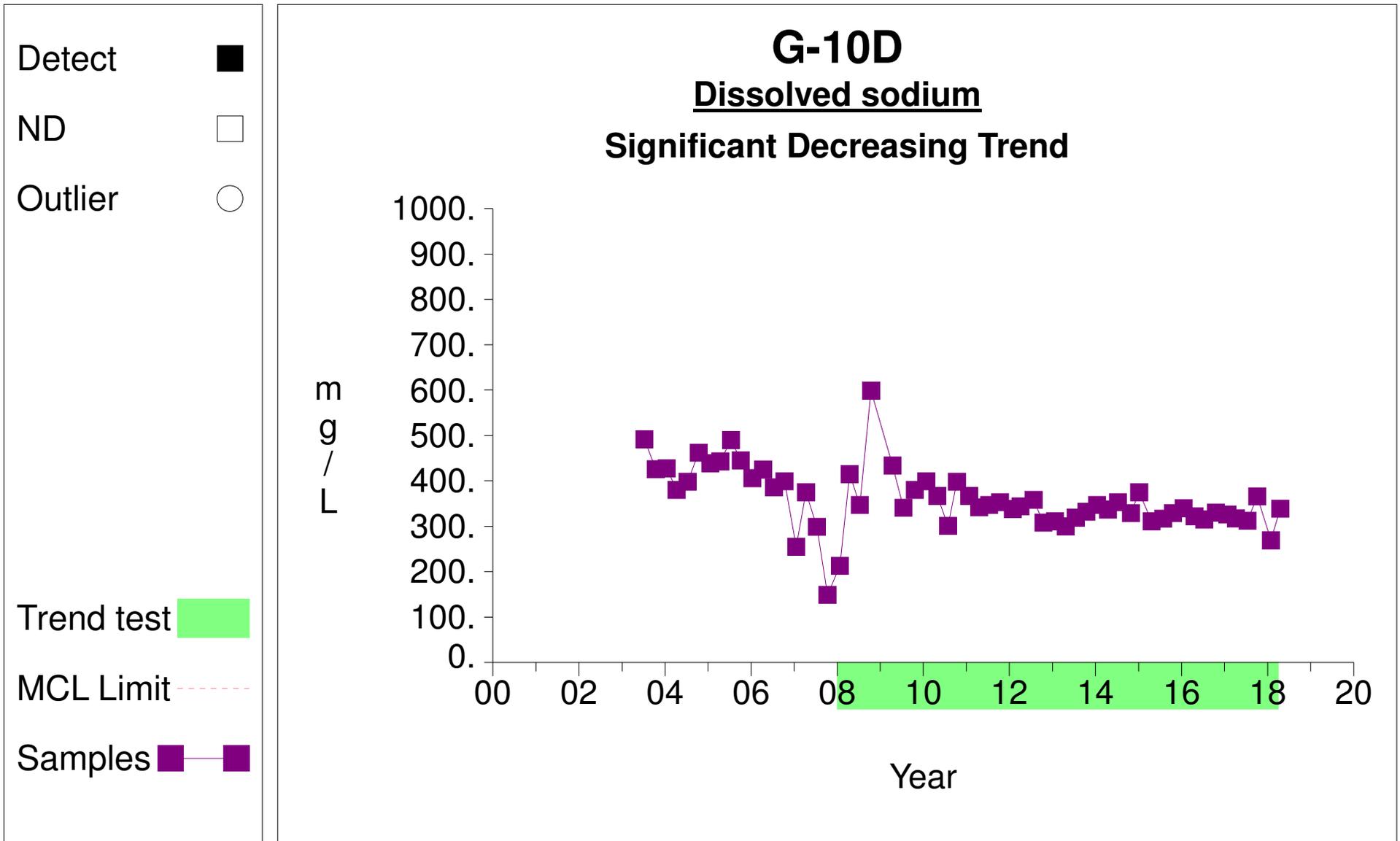
Graph 183

Time Series



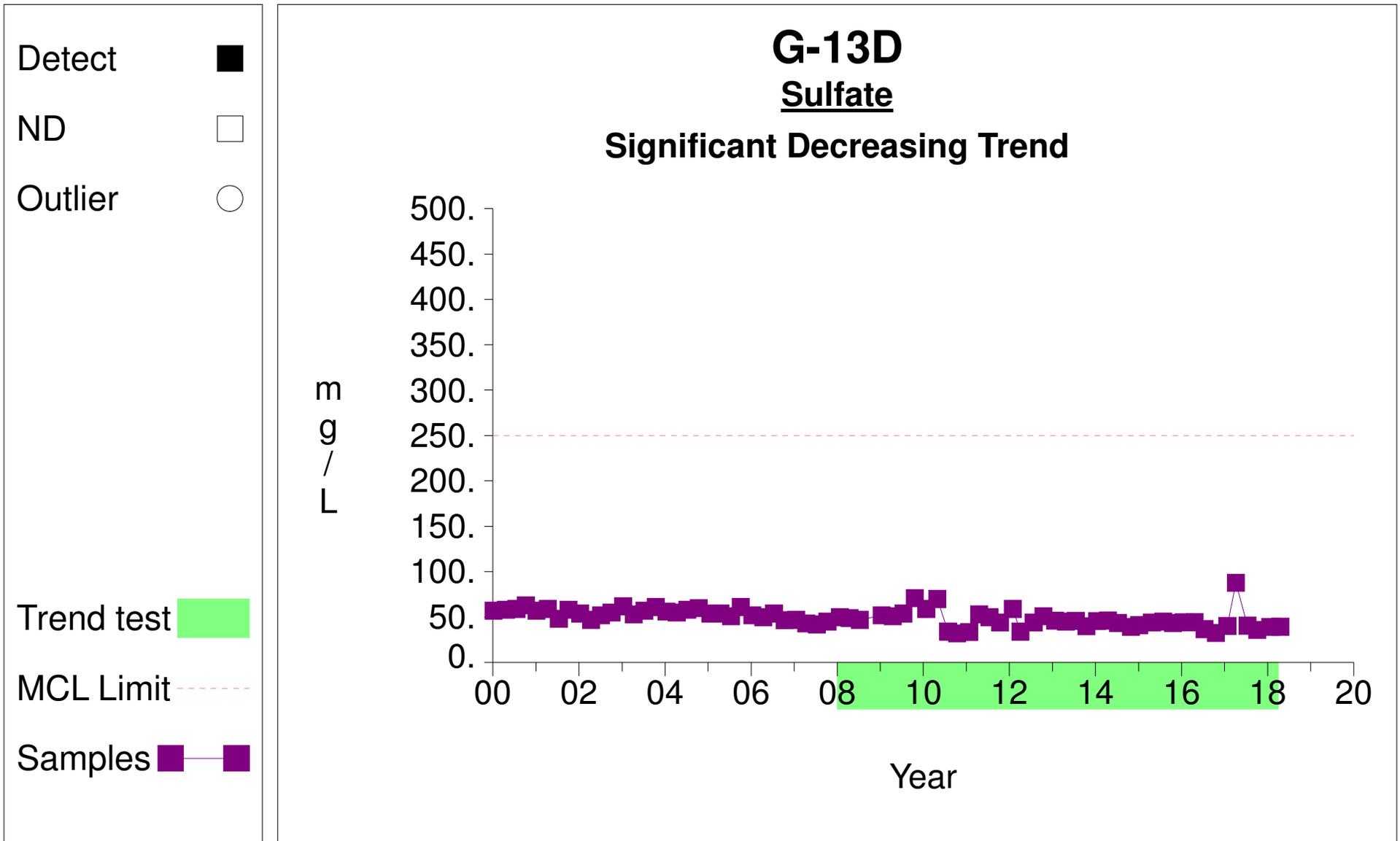
Graph 184

Time Series



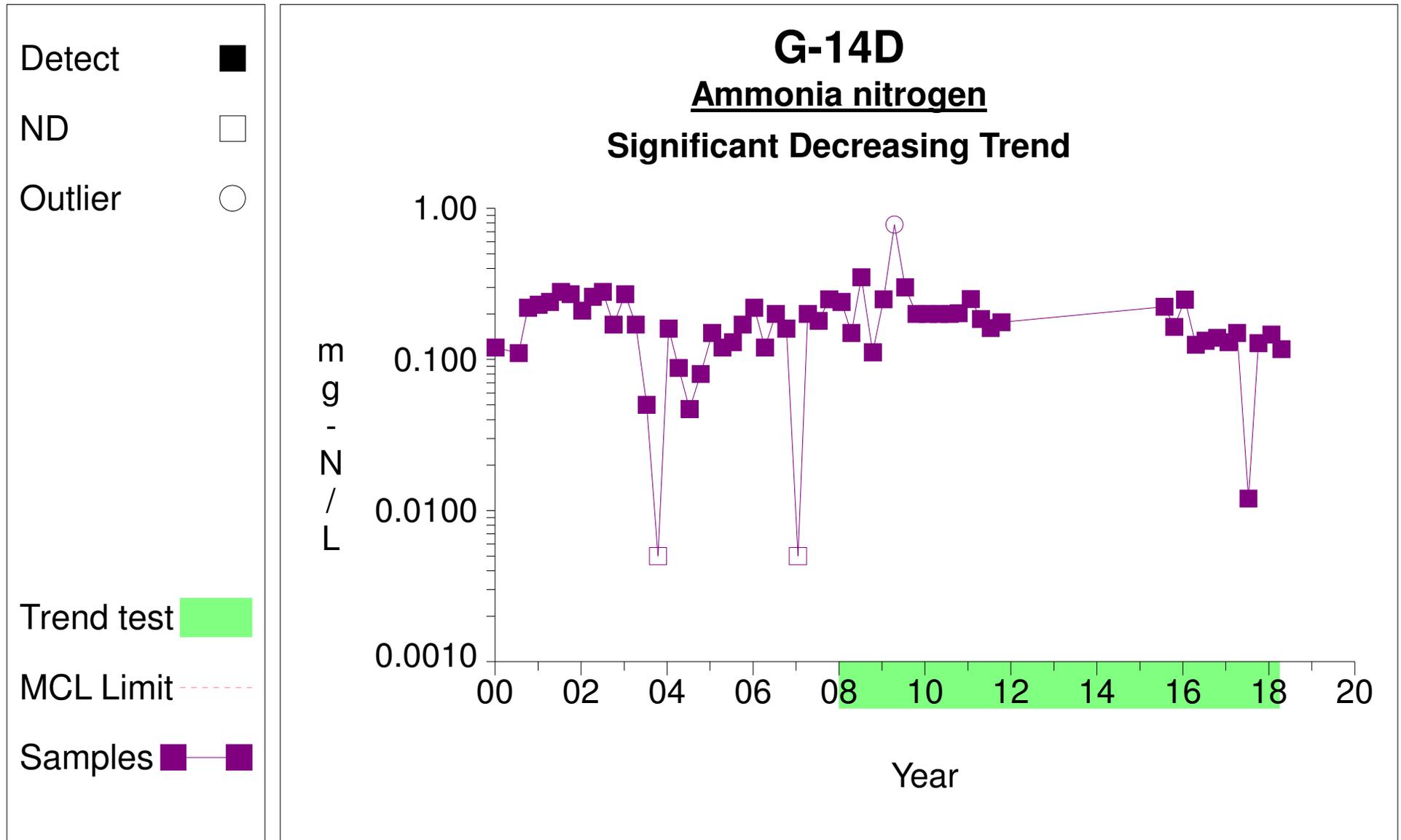
Graph 189

Time Series



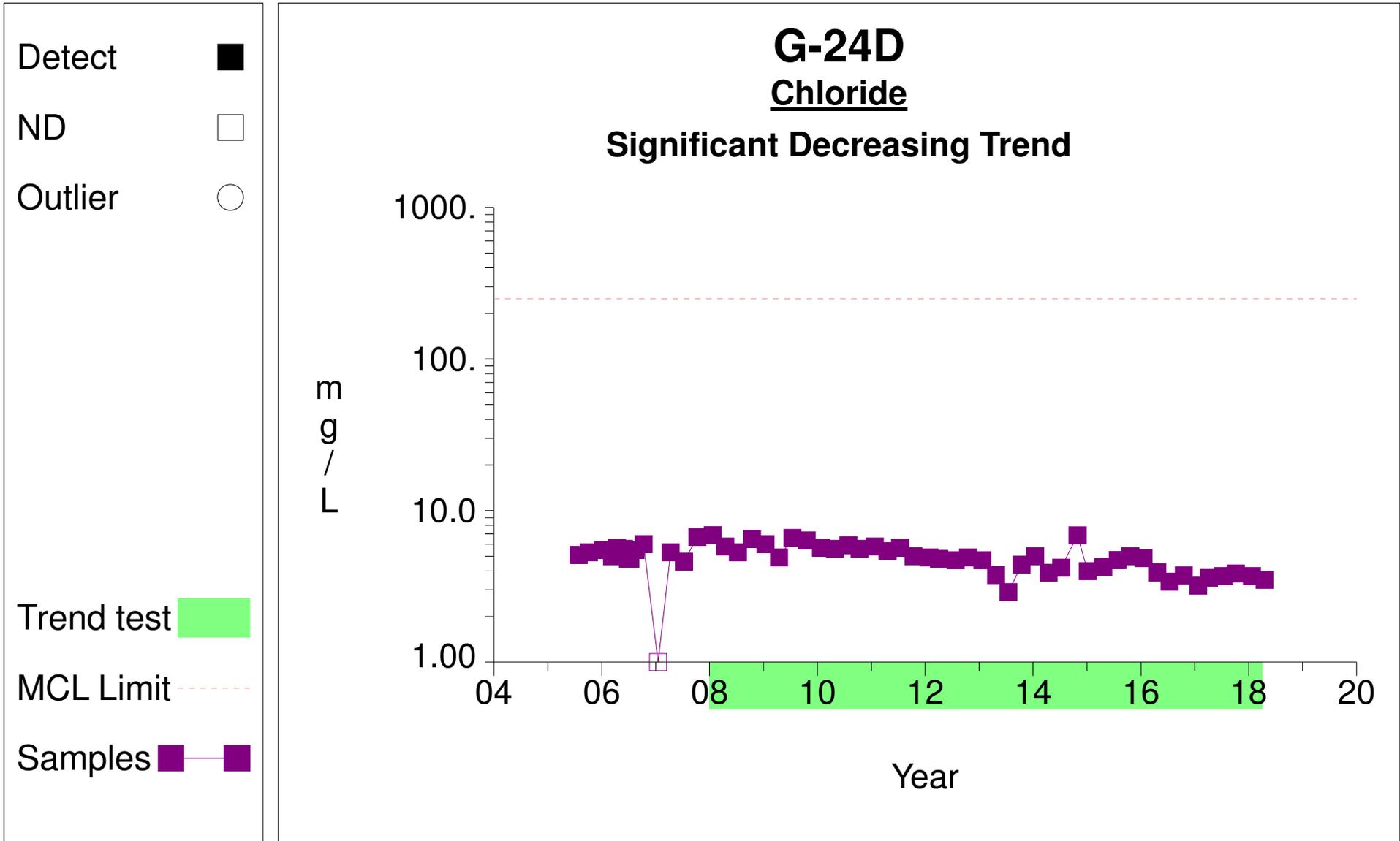
Graph 229

Time Series



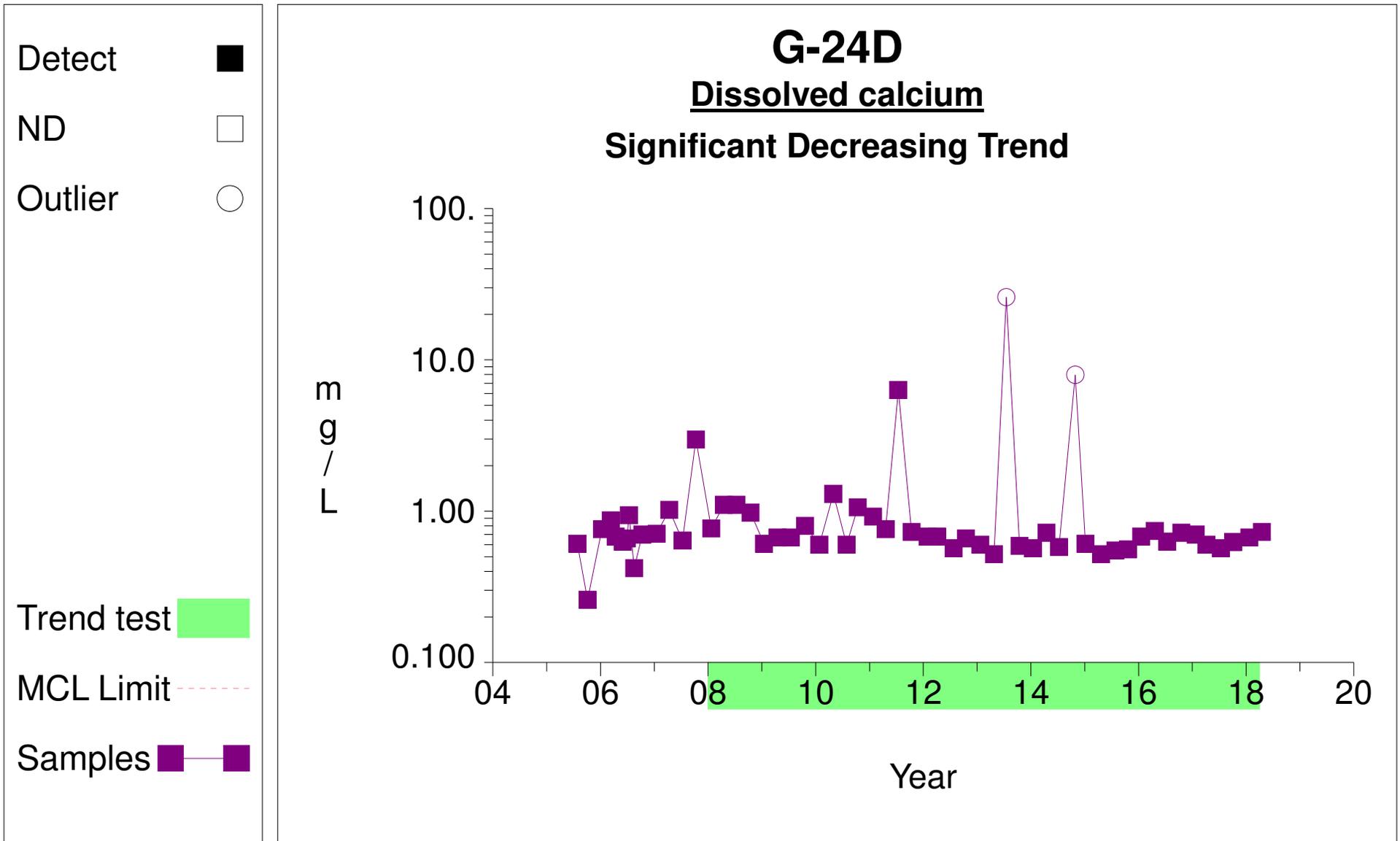
Graph 233

Time Series



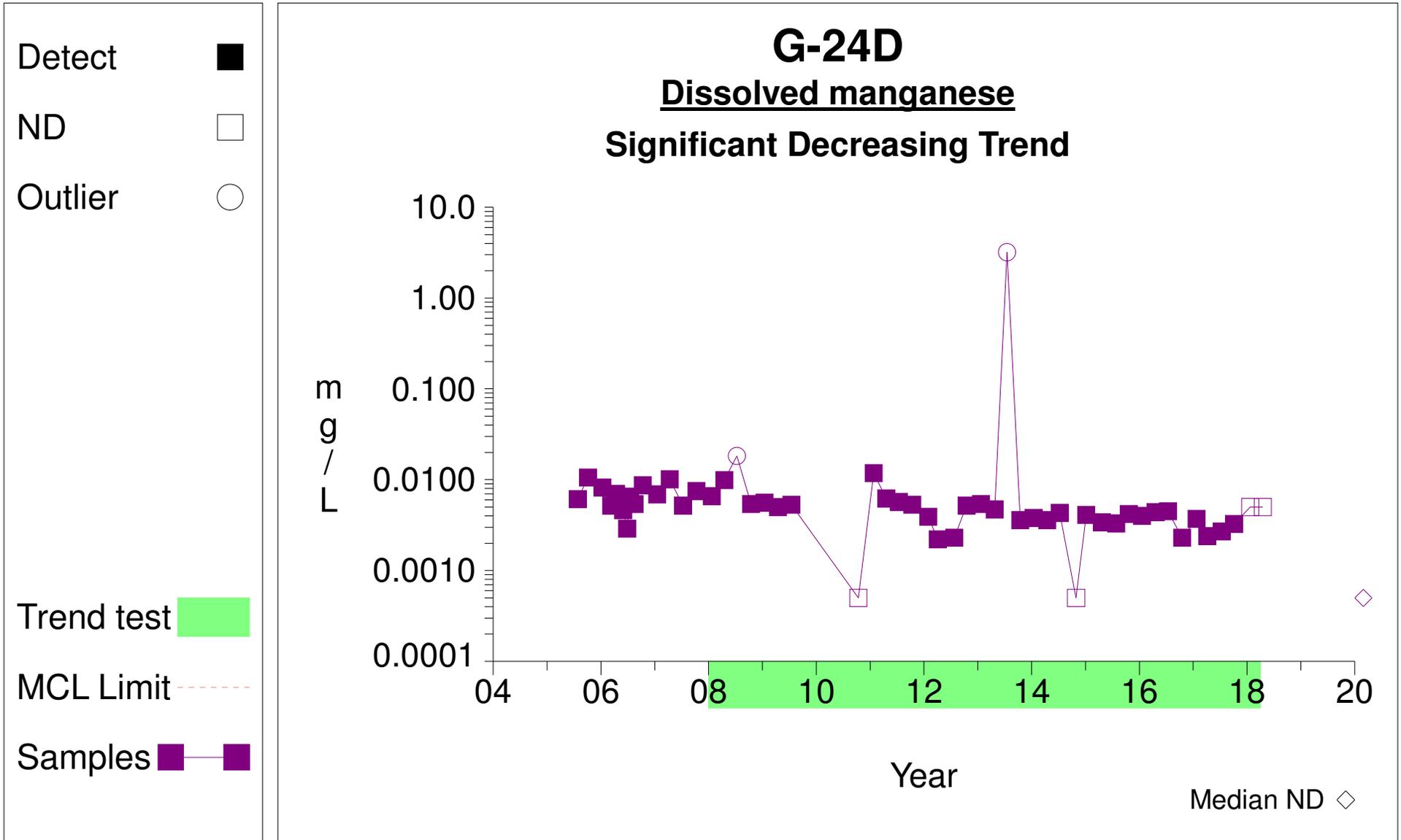
Graph 269

Time Series



Graph 276

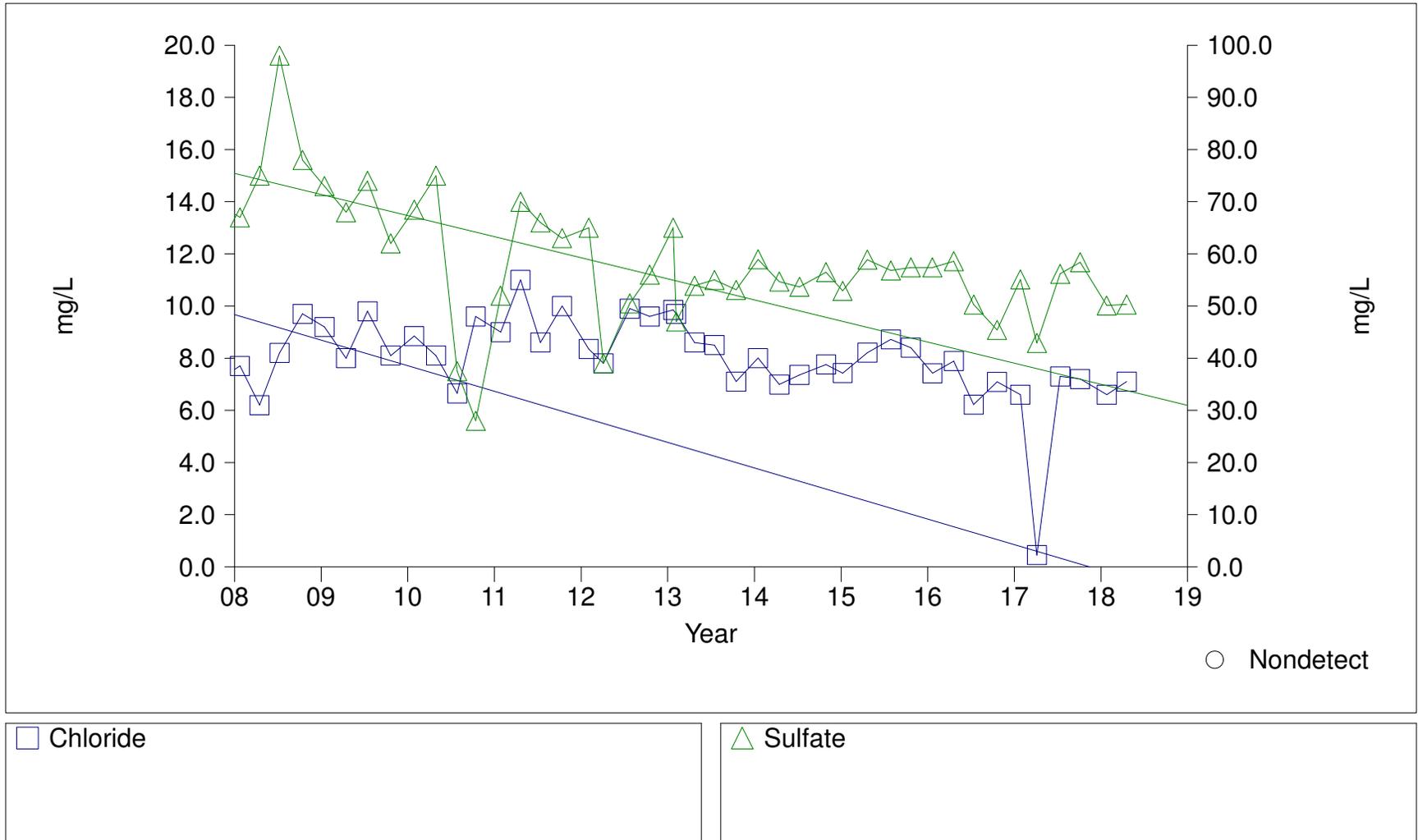
Time Series



Graph 283

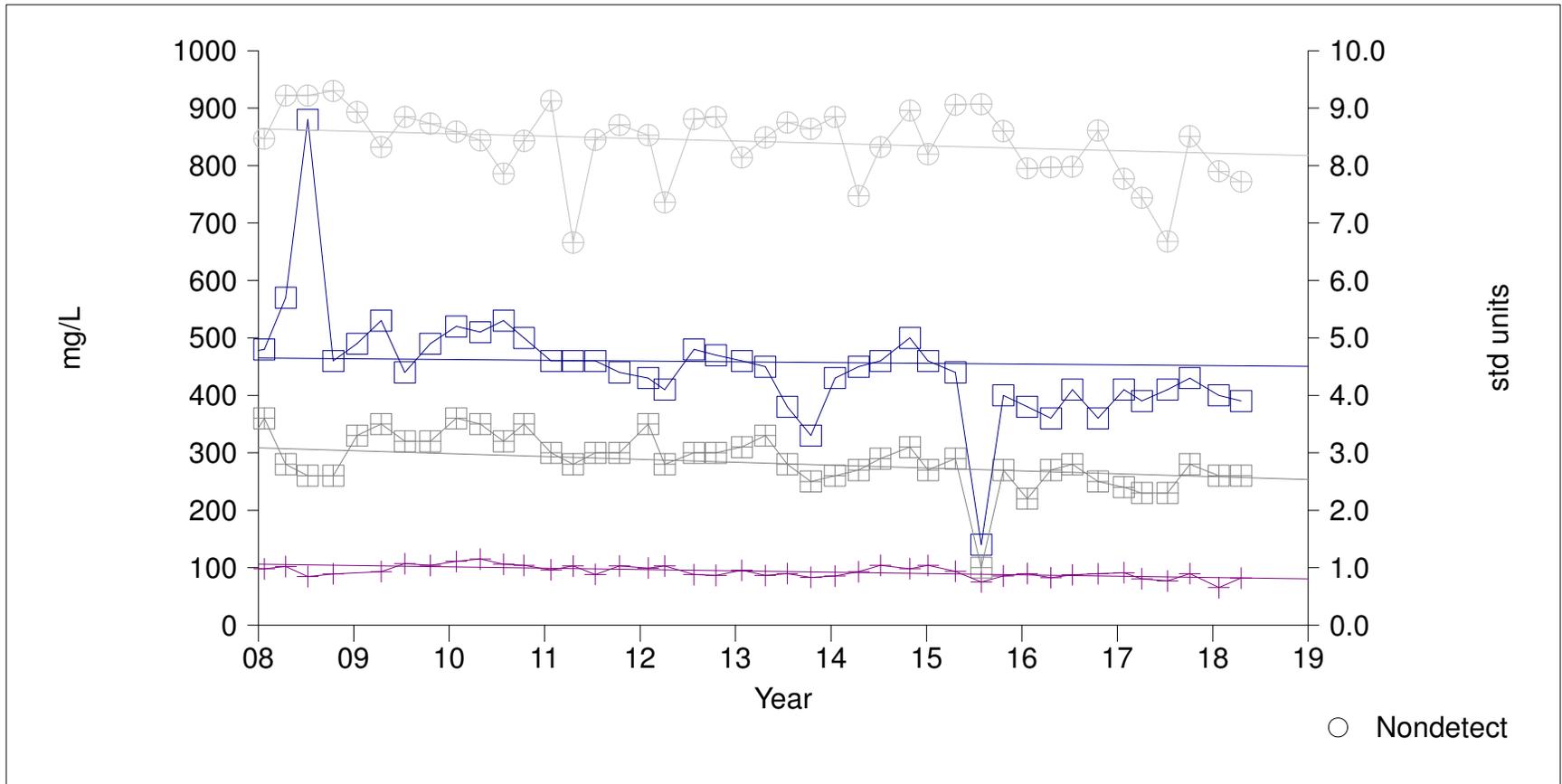
Cathcart Landfill [ccshal]

Time Series Plot for G-01D



Cathcart Landfill [ccshal]

Time Series Plot for G-02D

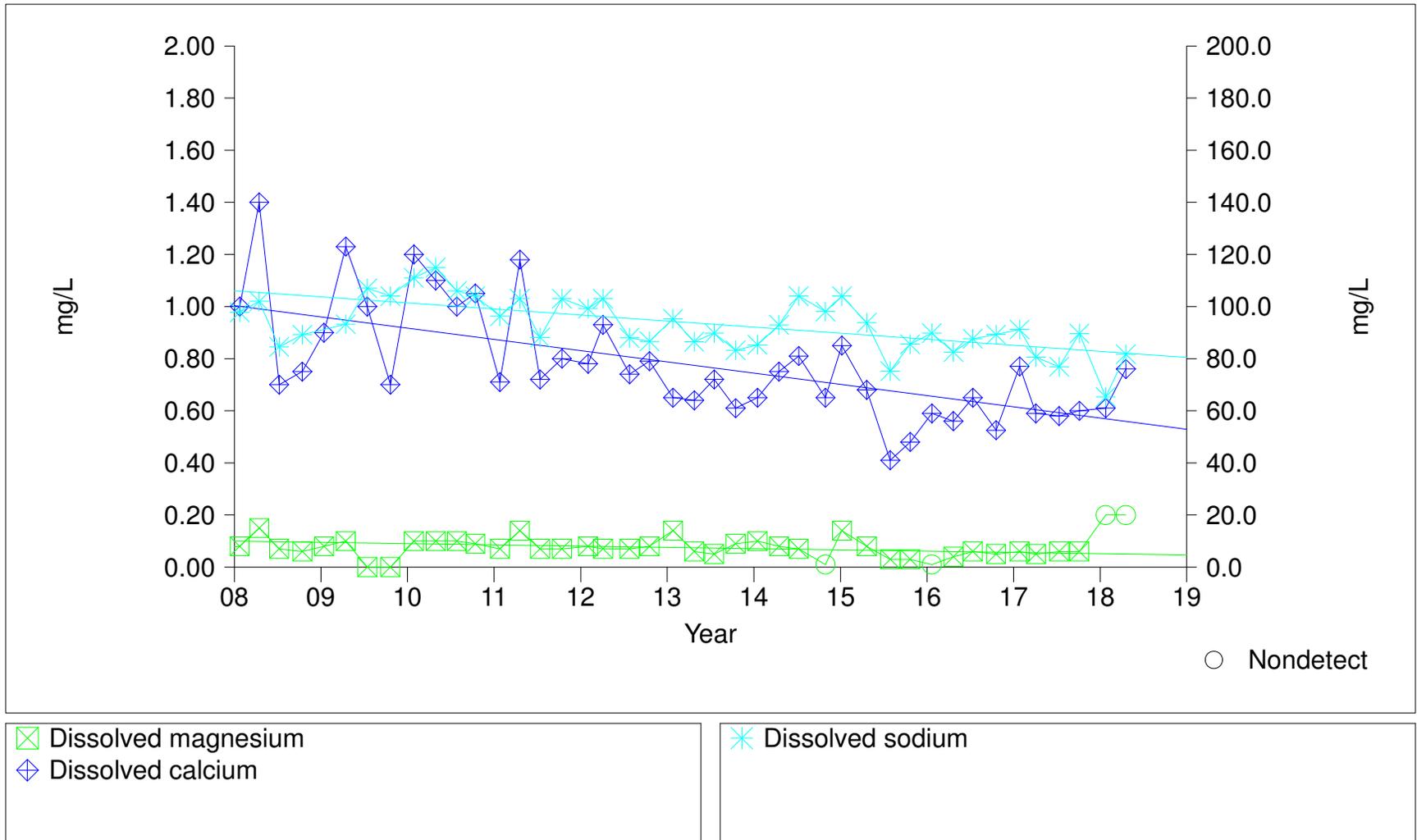


+ Dissolved sodium
Total dissolved solids
Conductivity

⊕ pH

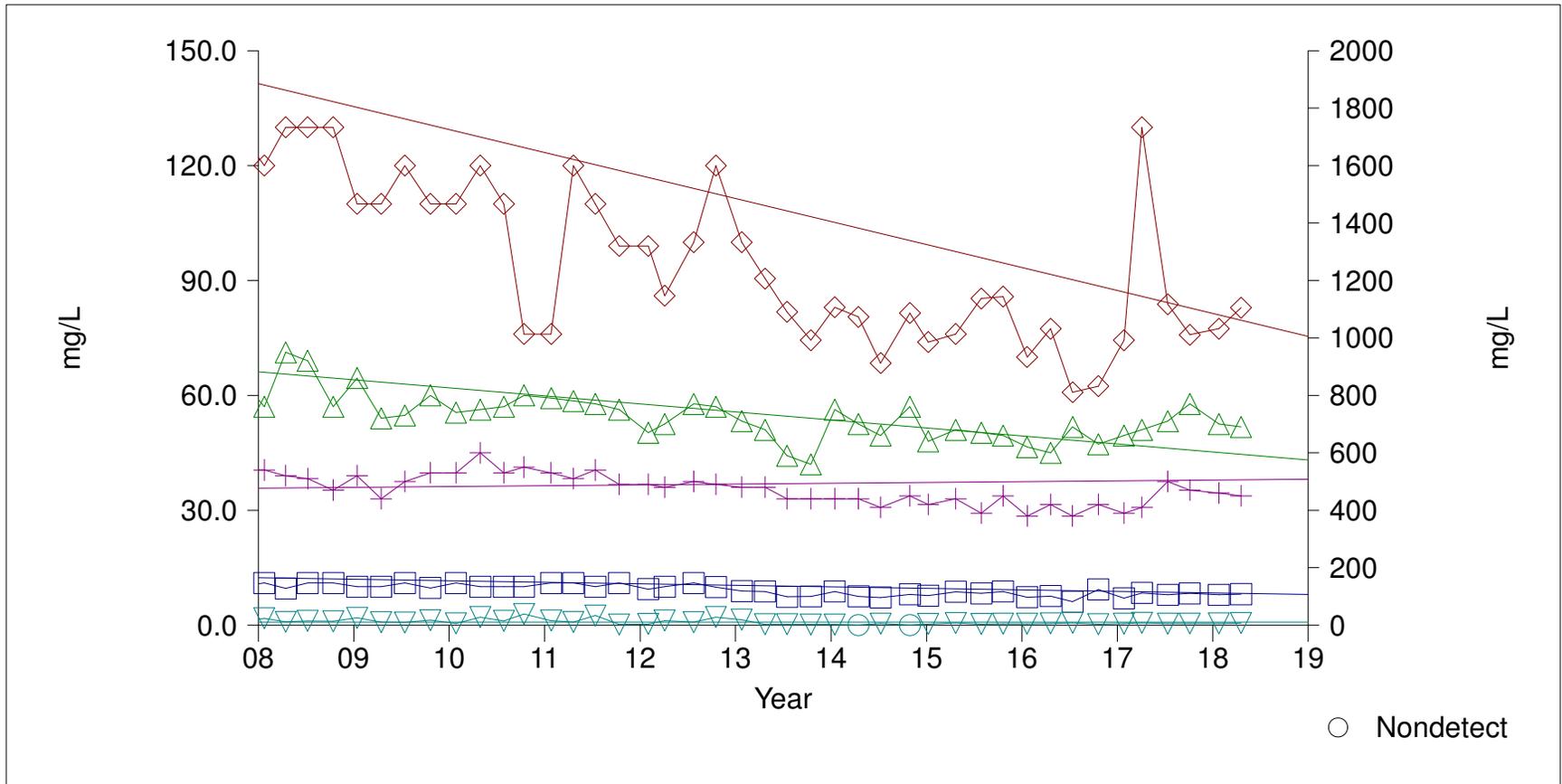
Cathcart Landfill [ccshal]

Time Series Plot for G-02D



Cathcart Landfill [ccshal]

Time Series Plot for G-06B

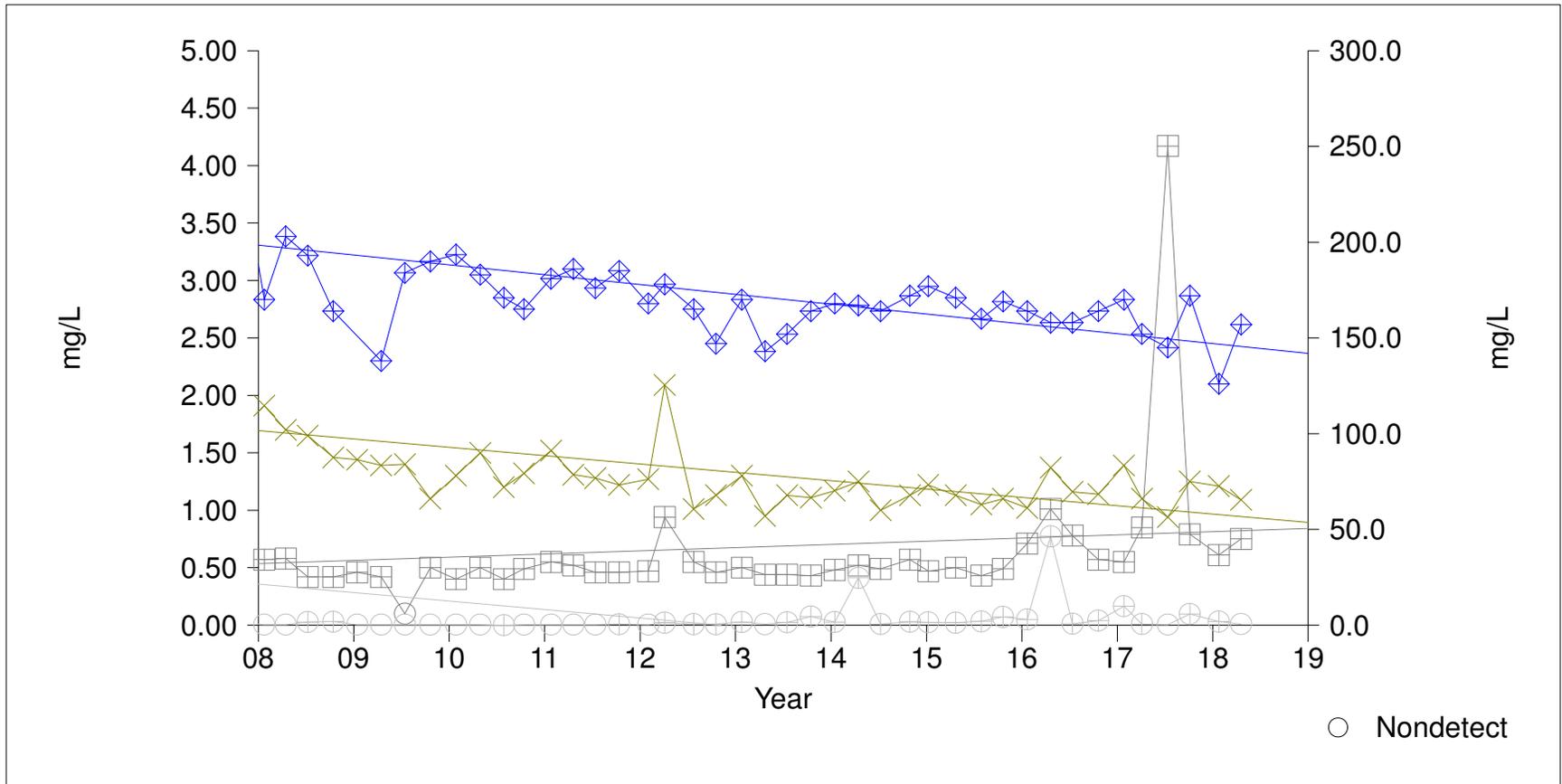


□ Chloride
▽ Nitrate nitrogen
◇ Sulfate

+ Total dissolved solids
△ Conductivity
○ Nondetect

Cathcart Landfill [ccshal]

Time Series Plot for G-06B



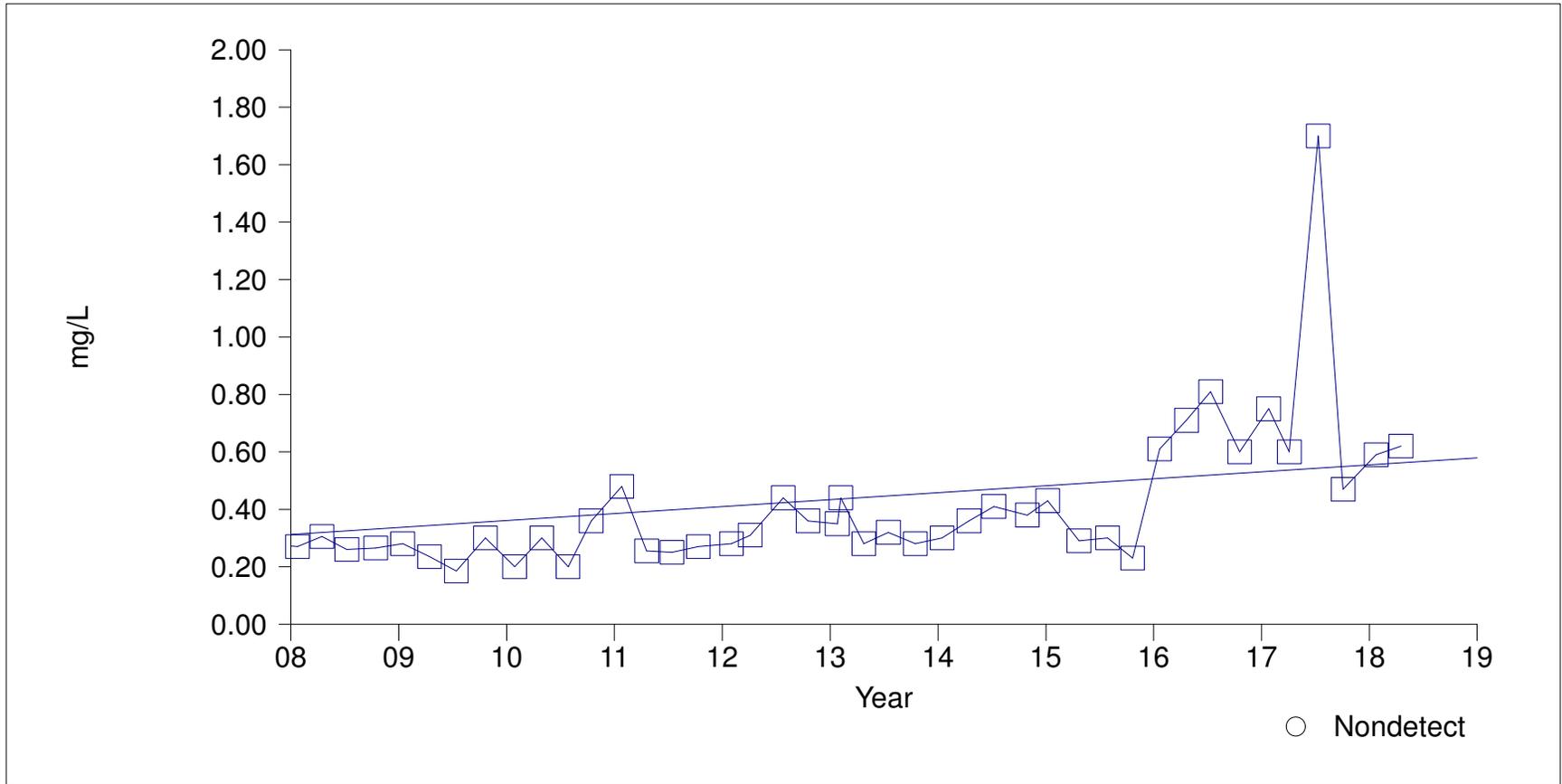
□ Dissolved potassium
⊕ Dissolved iron
× Dissolved calcium

◇ Dissolved sodium

○ Nondetect

Cathcart Landfill [ccshal]

Time Series Plot for G-08D2

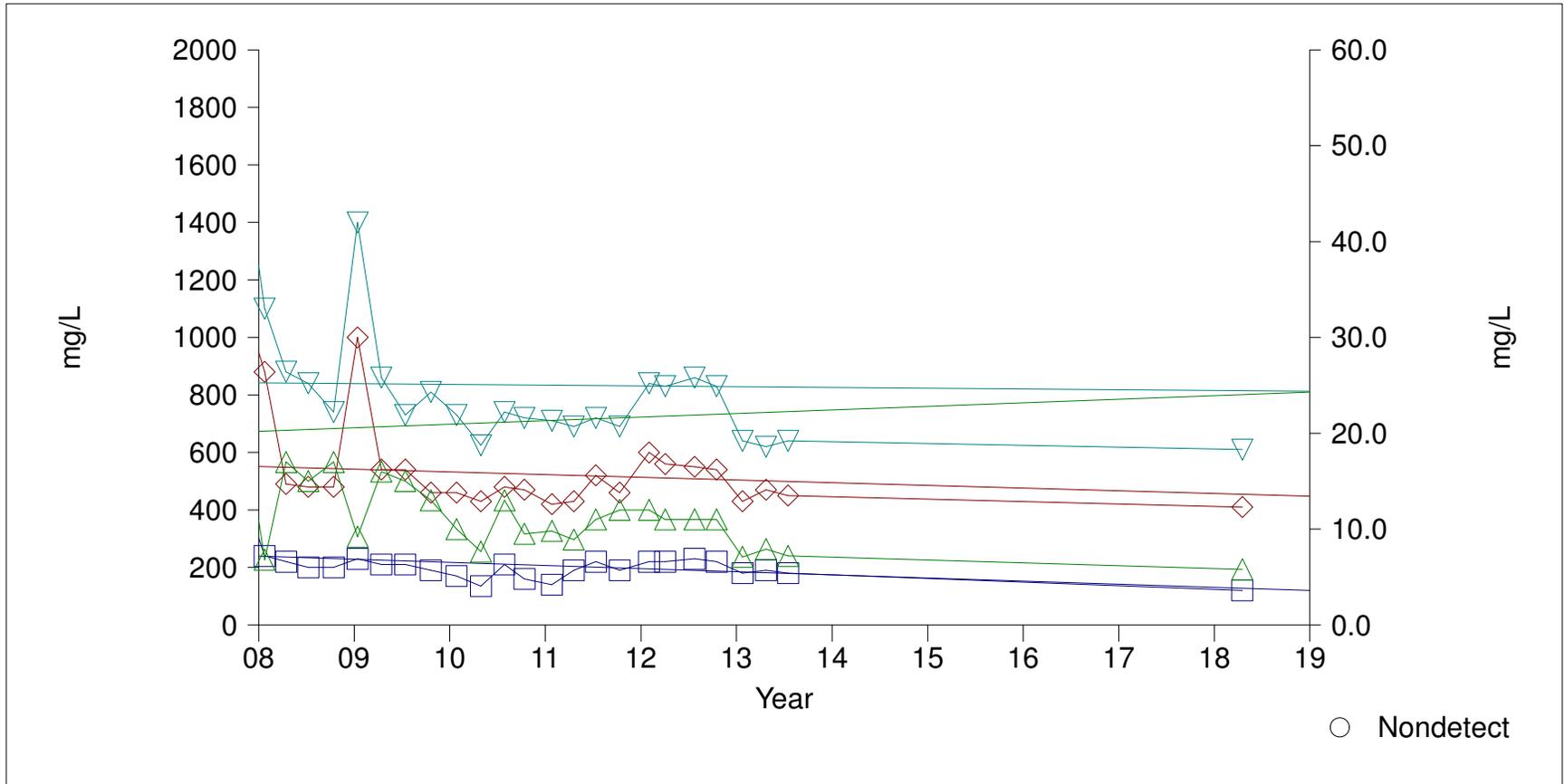


□ Dissolved potassium

○ Nondetect

Cathcart Landfill [ccshal]

Time Series Plot for G-09D

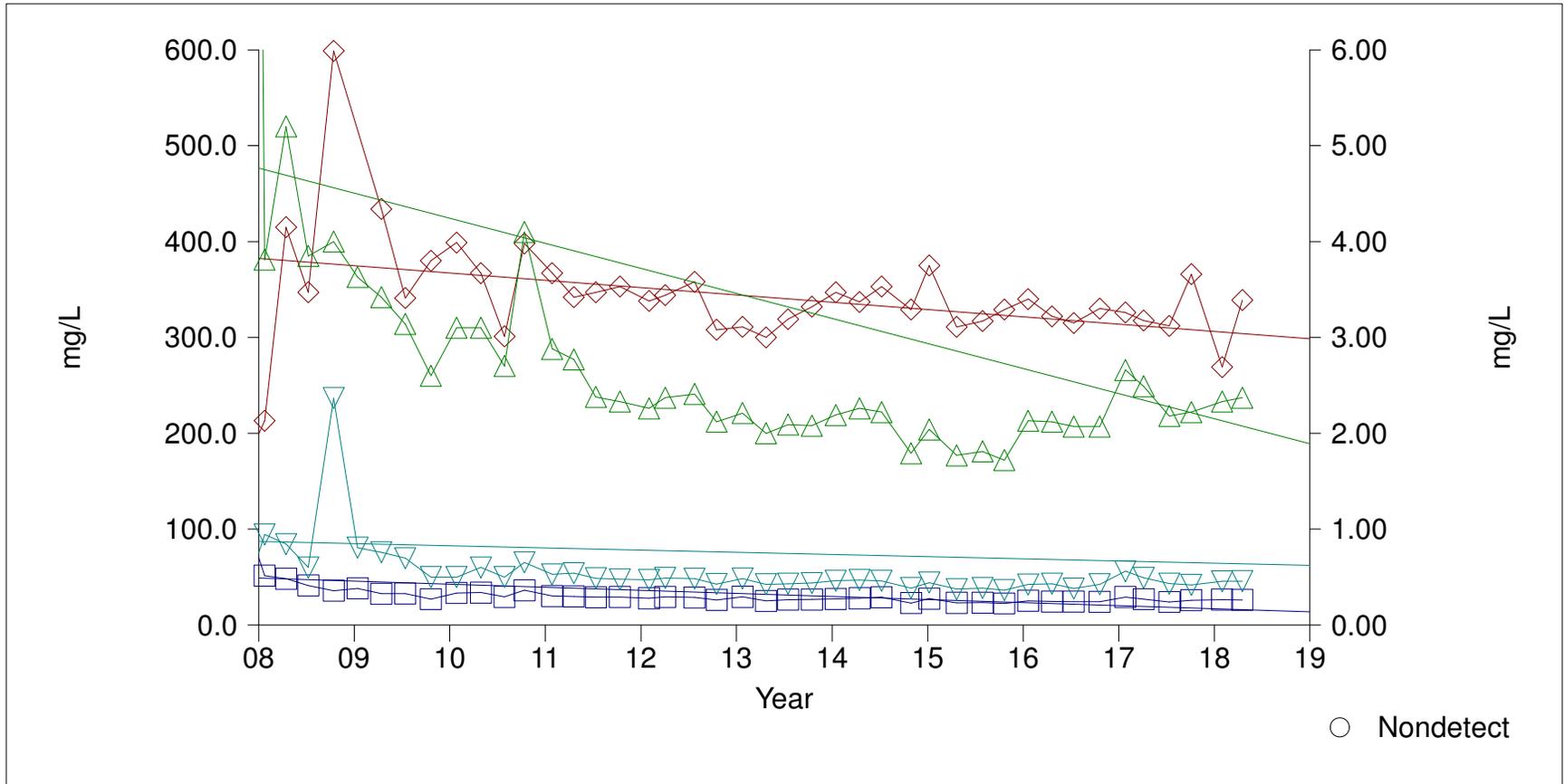


□ Bicarbonate
▽ Conductivity
◇ Total dissolved solids

△ Chloride
○ Nondetect

Cathcart Landfill [ccshal]

Time Series Plot for G-10D



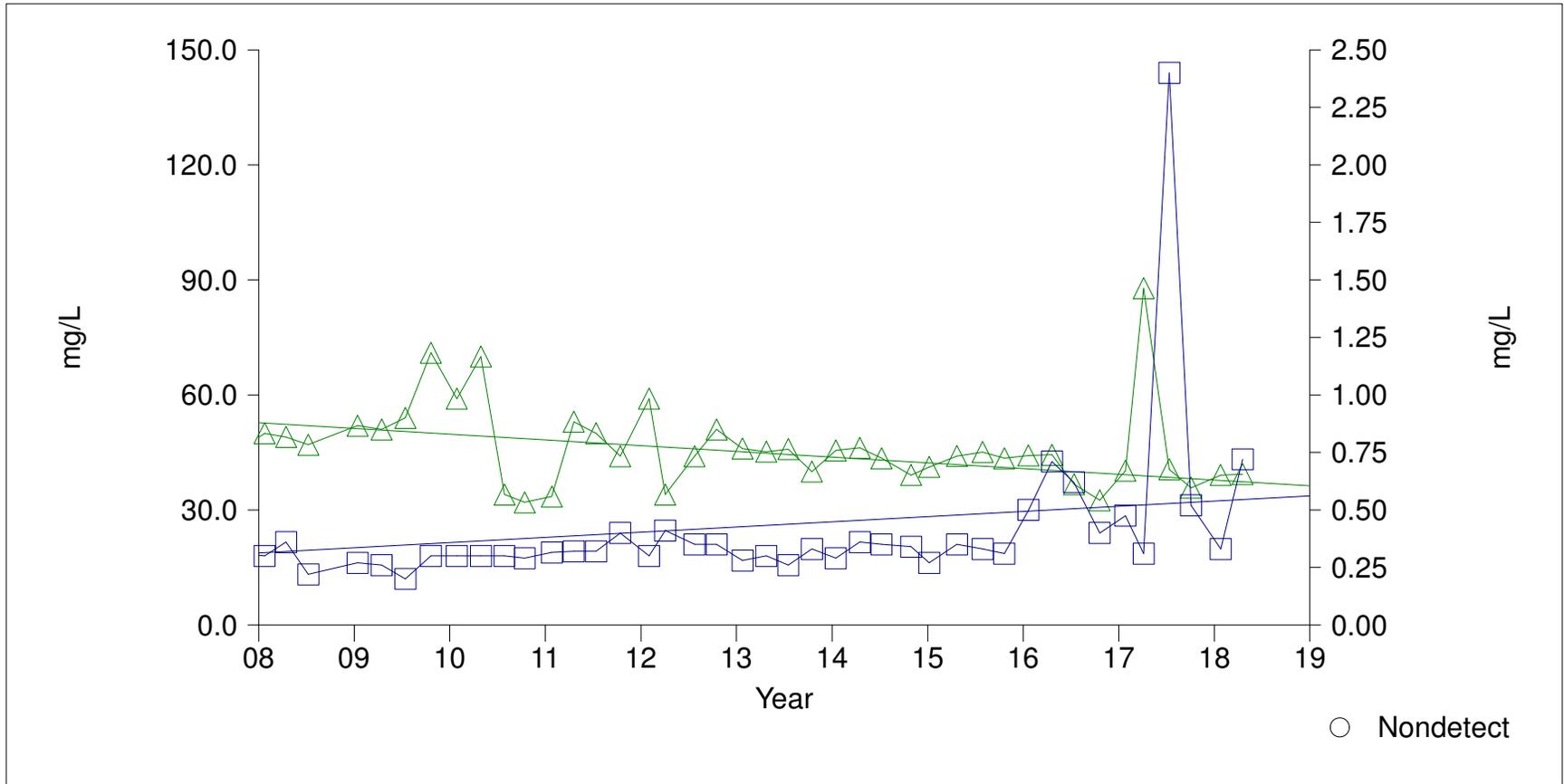
◇ Dissolved sodium
□ Dissolved calcium

△ Dissolved magnesium
▽ Dissolved manganese

○ Nondetect

Cathcart Landfill [ccshal]

Time Series Plot for G-13D



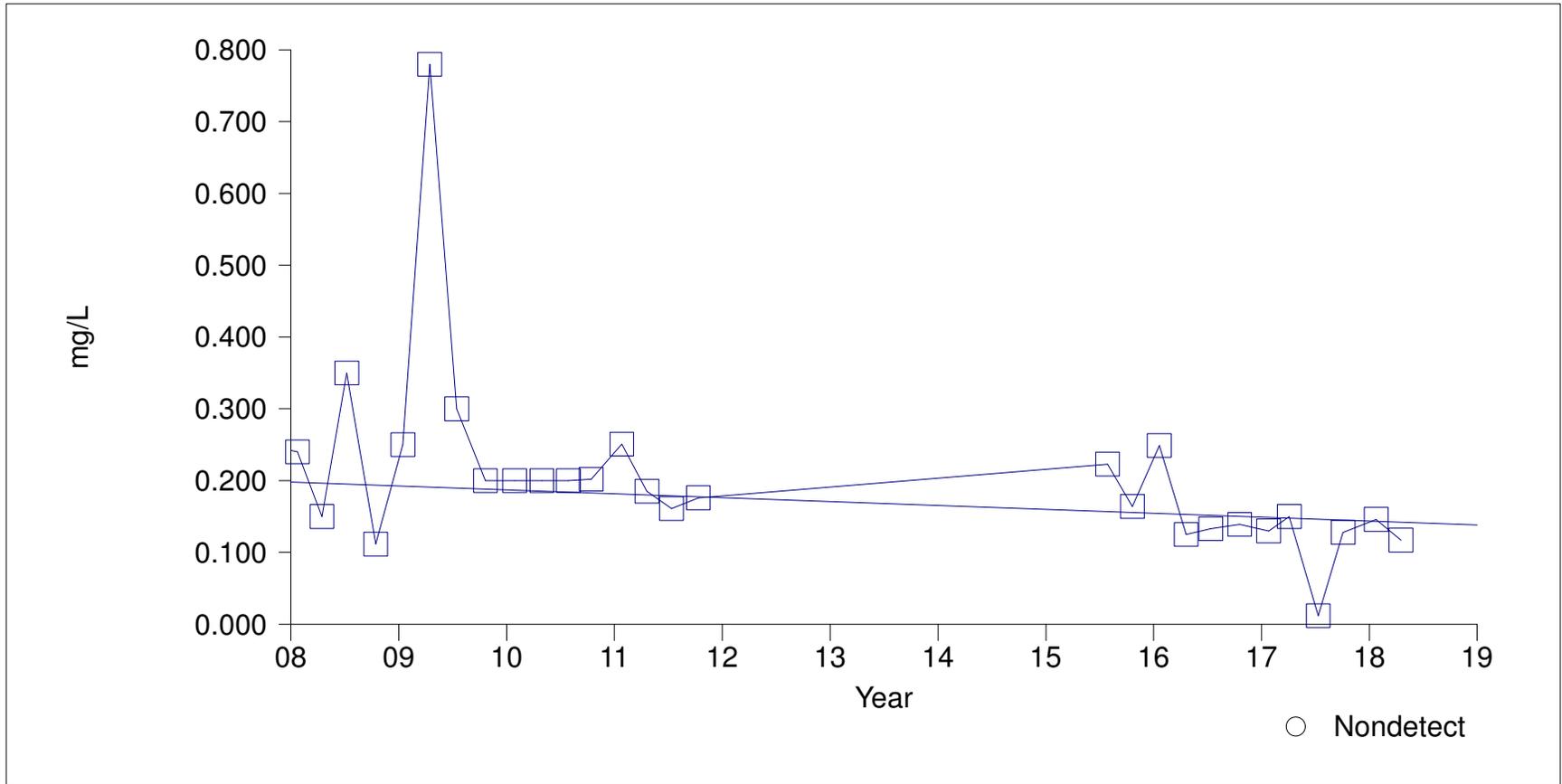
△ Sulfate

□ Dissolved potassium

○ Nondetect

Cathcart Landfill [ccshal]

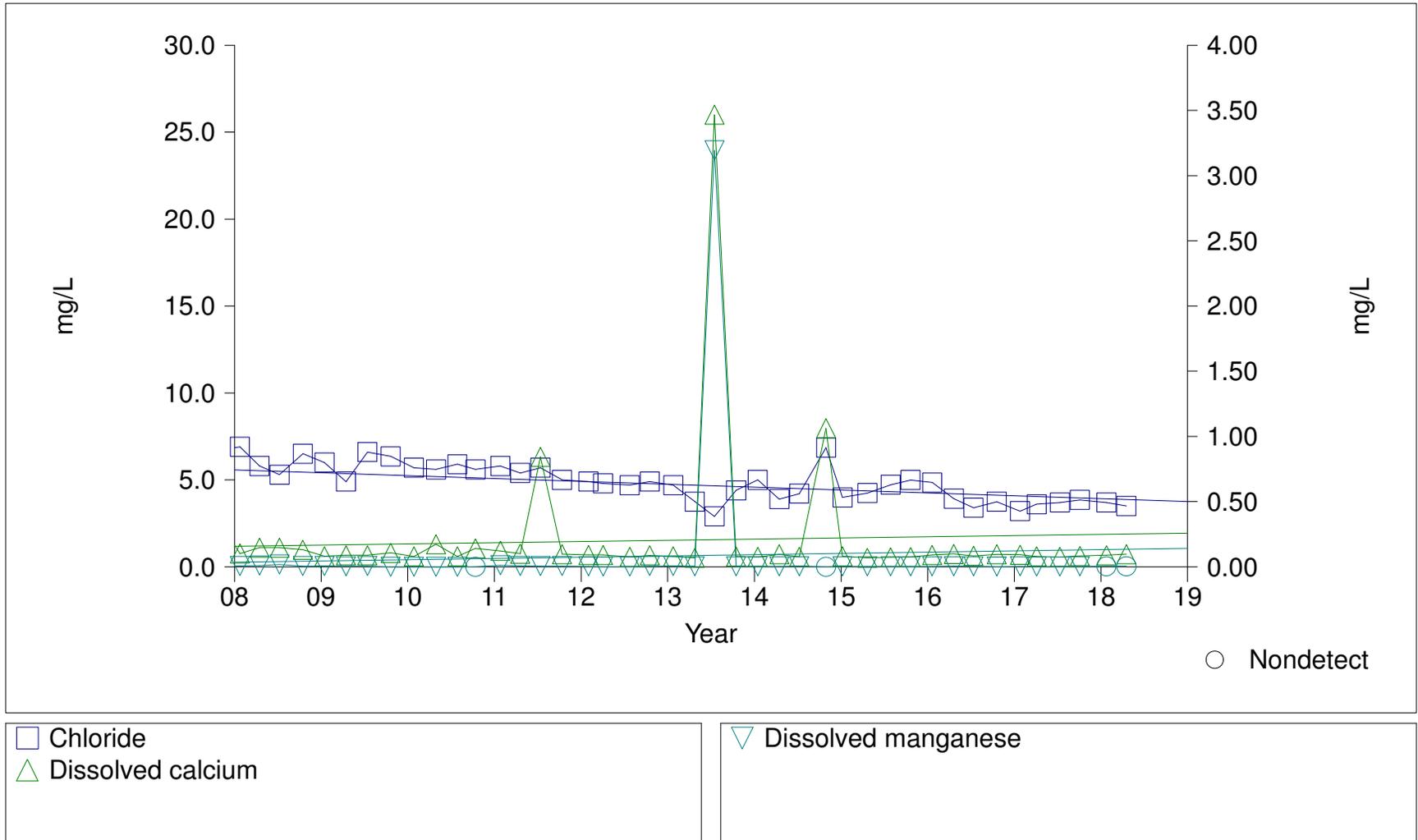
Time Series Plot for G-14D



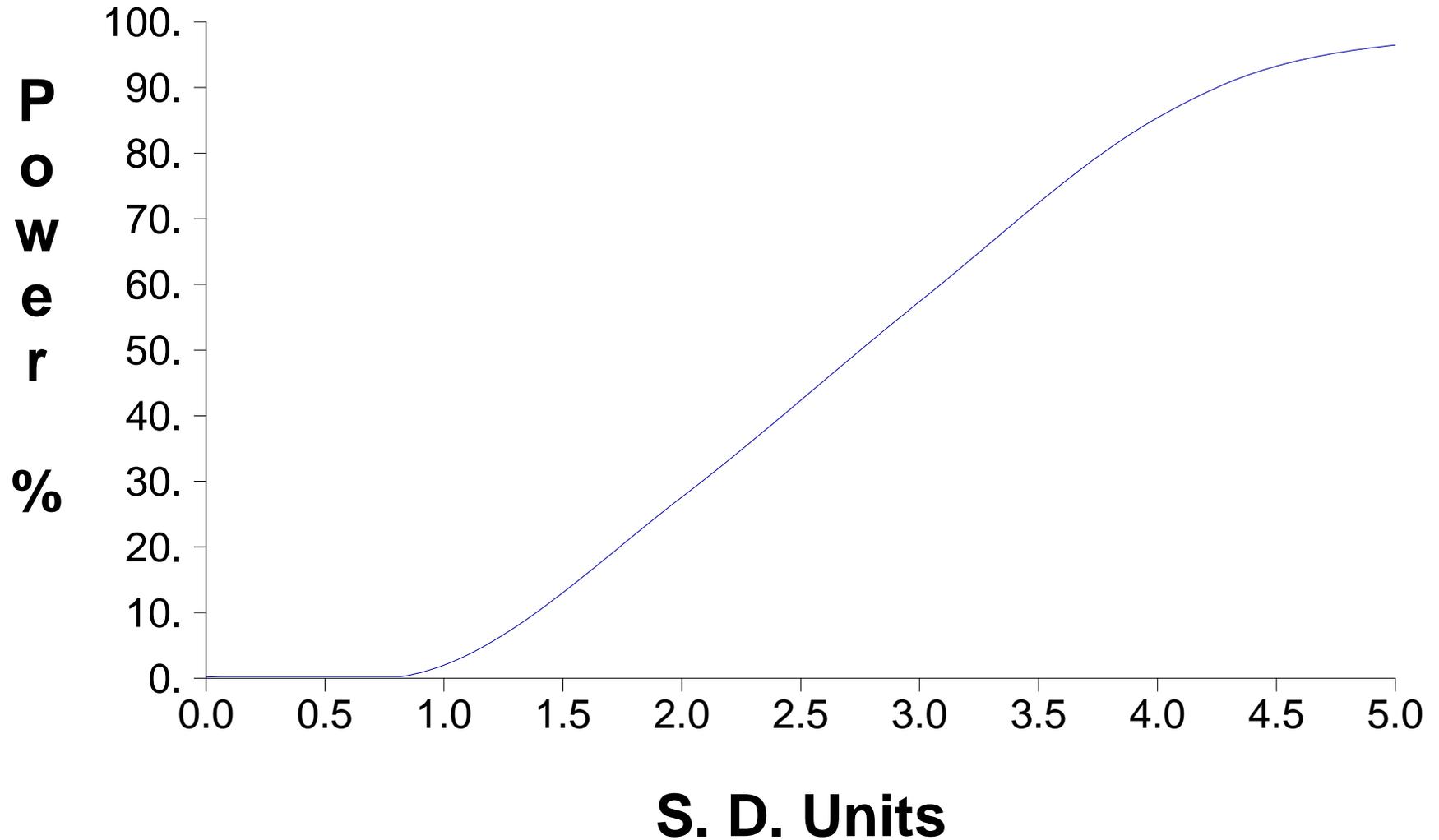
Ammonia nitrogen

Cathcart Landfill [ccshal]

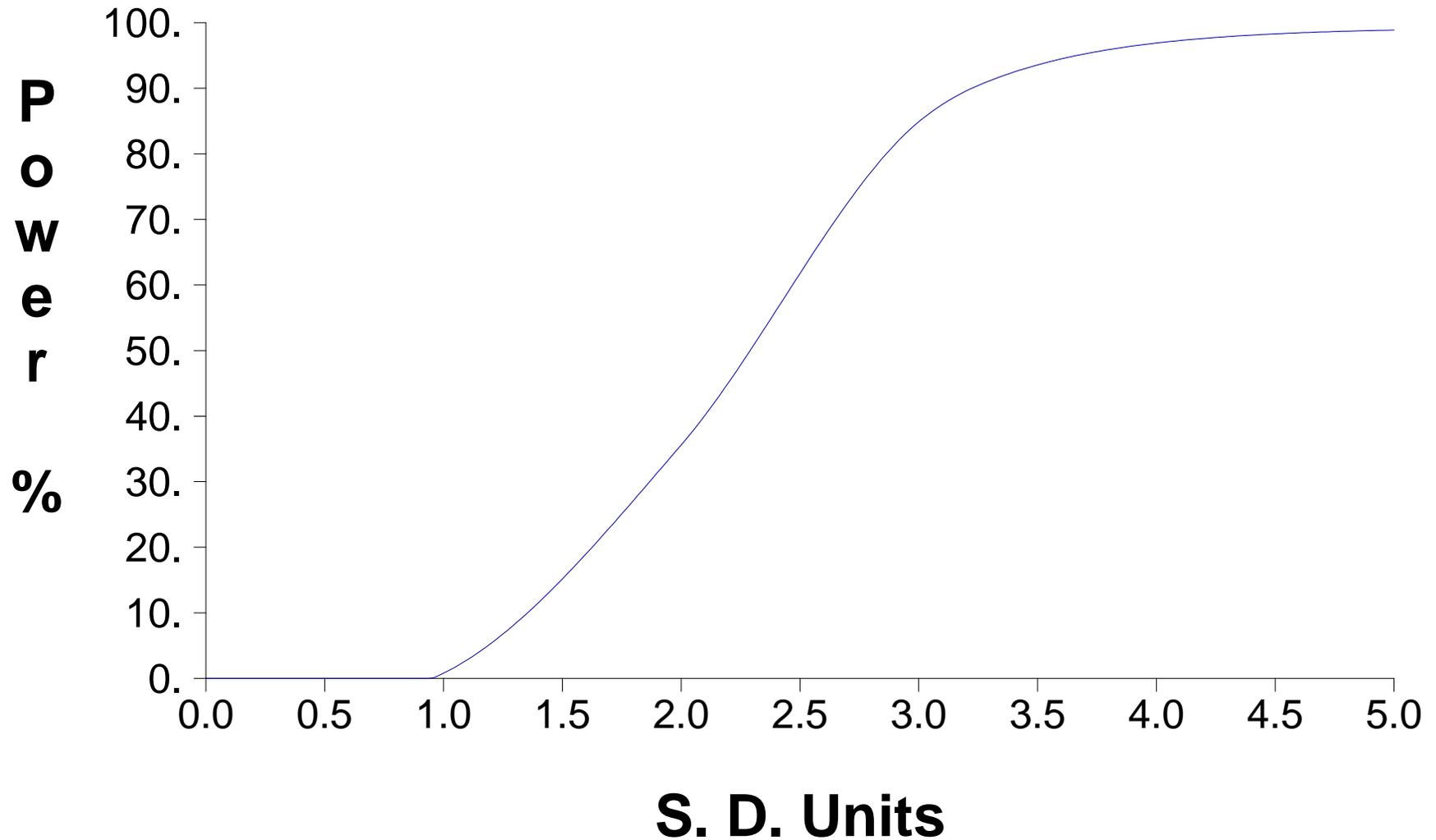
Time Series Plot for G-24D



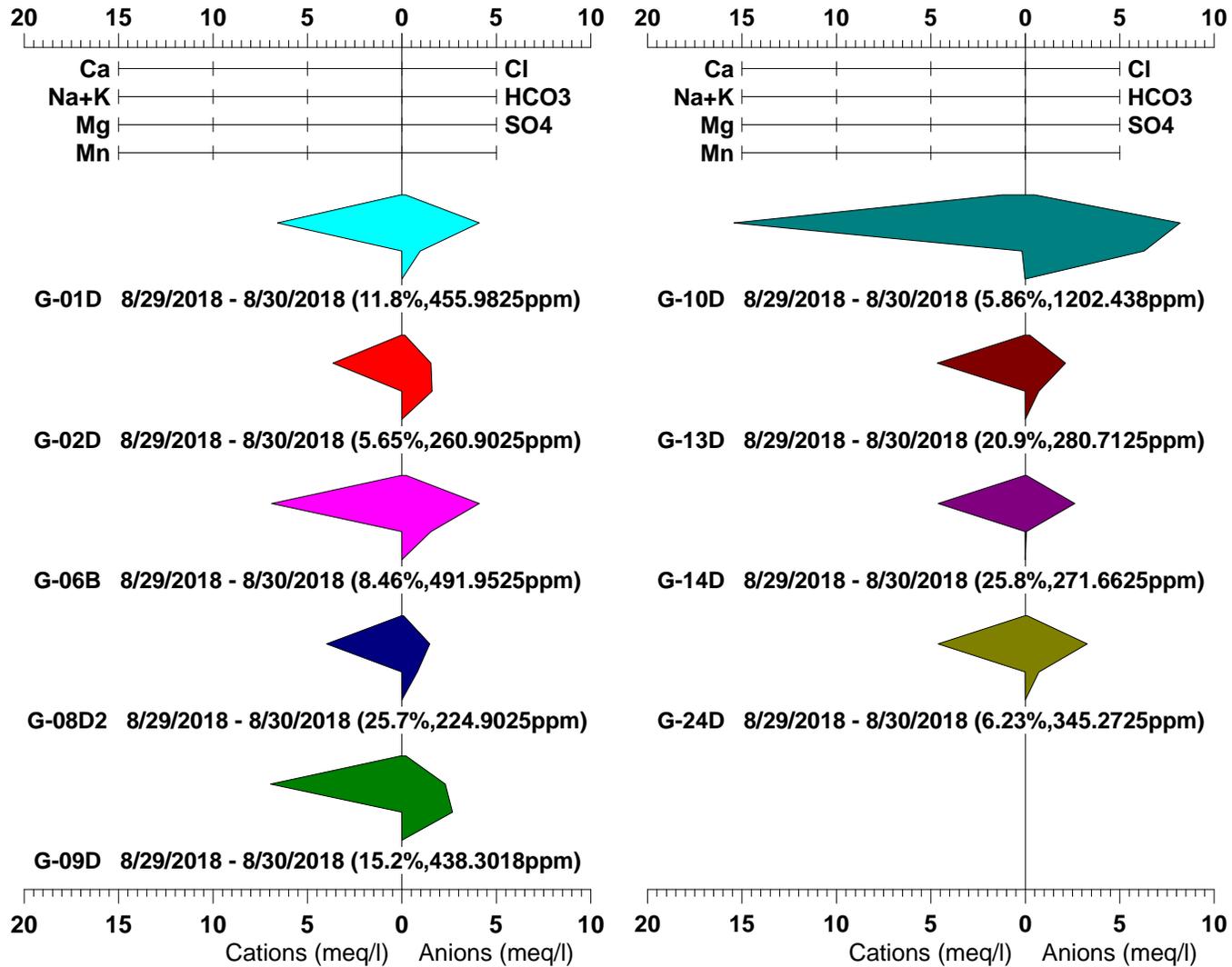
False Positive and False Negative Rates for Current Intra-Well Prediction Limits Monitoring Program



False Positive and False Negative Rates for Current Upgradient vs. Downgradient Monitoring Program



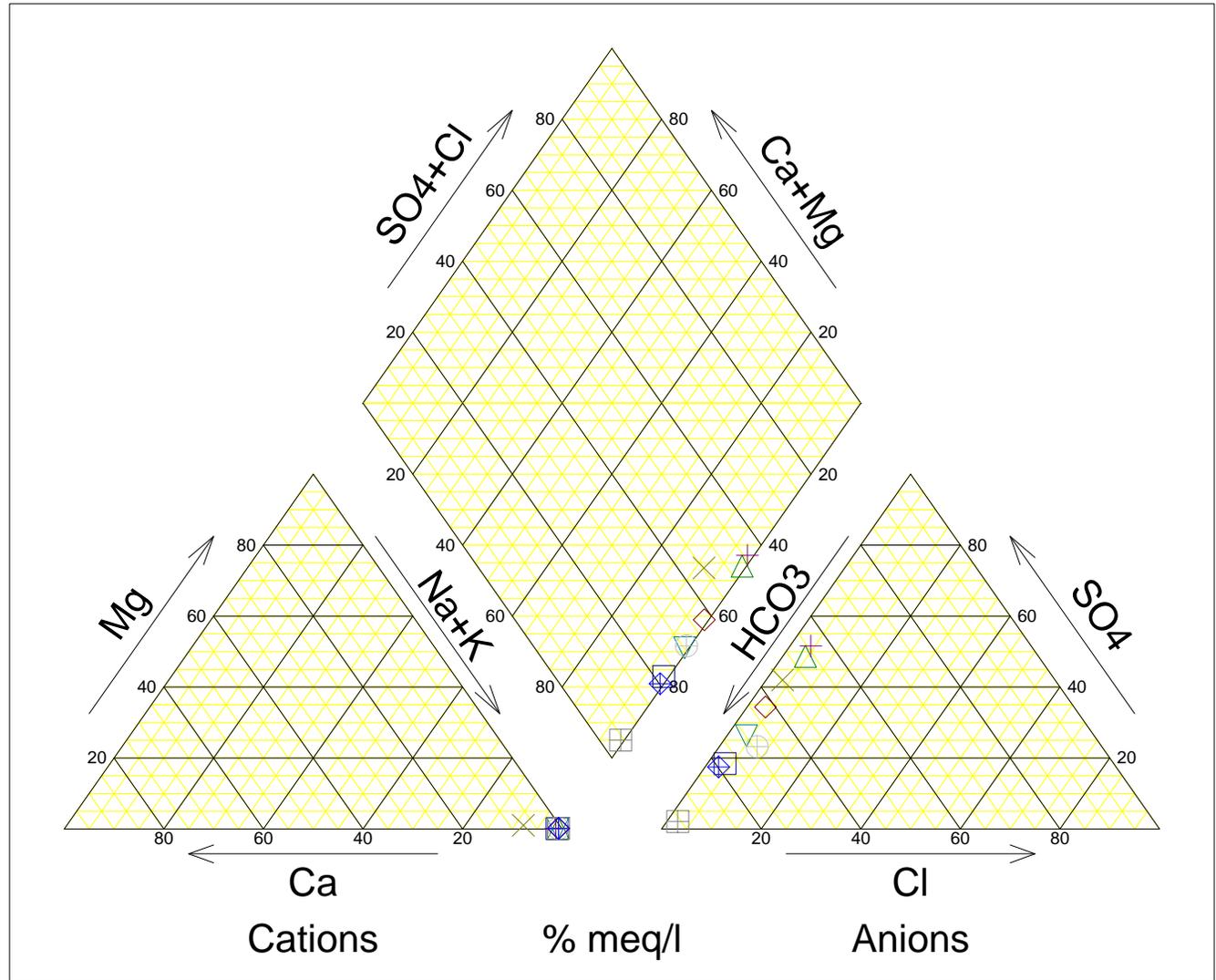
Cathcart Landfill



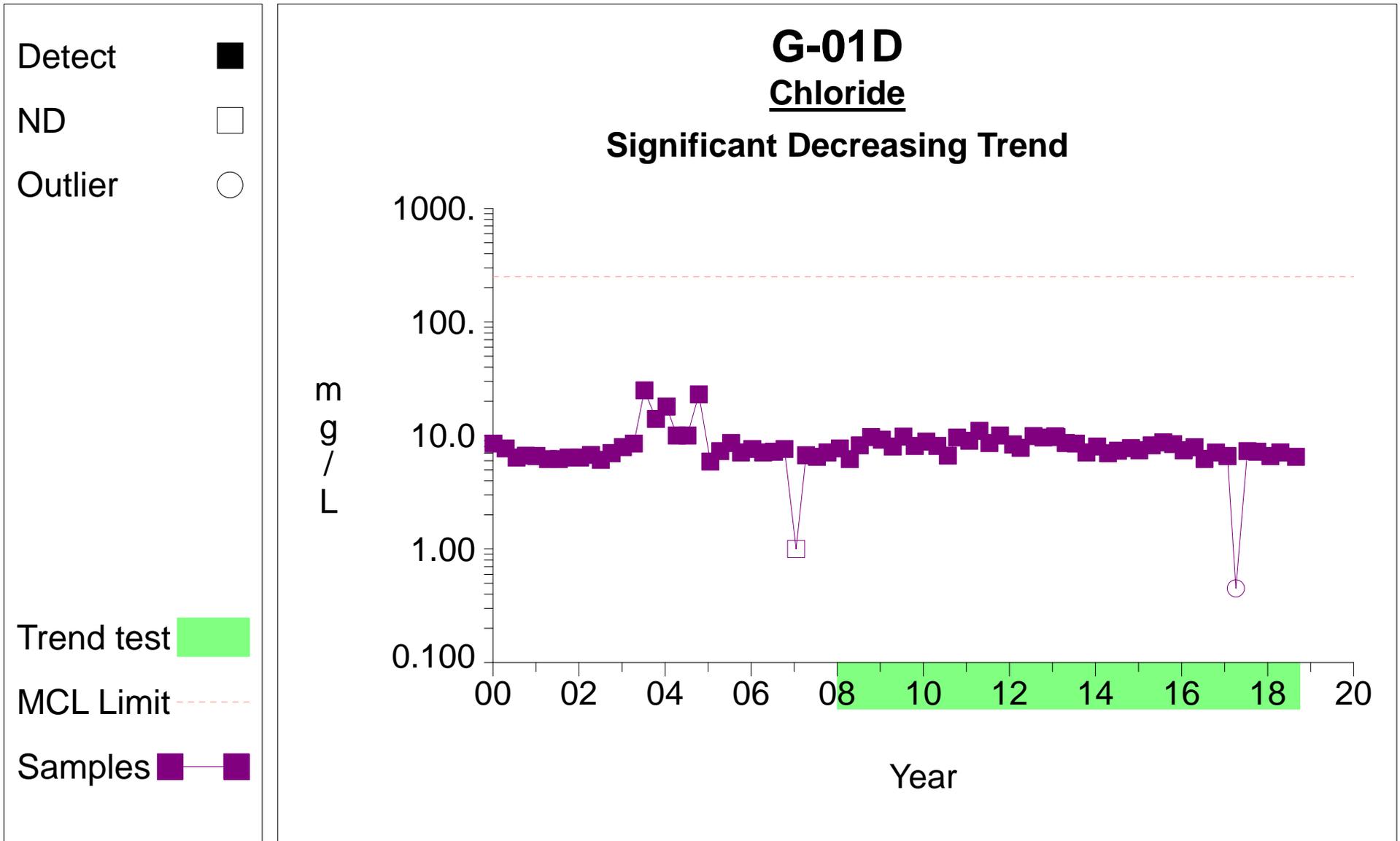
Prepared by: Snohomish County Solid Waste

Cathcart Landfill

□	G-01D	8/29/2018 - 8/30/2018 (11.8%, 455.98ppm)
△	G-02D	8/29/2018 - 8/30/2018 (5.65%, 260.9ppm)
▽	G-06B	8/29/2018 - 8/30/2018 (8.46%, 491.95ppm)
◇	G-08DZ	8/29/2018 - 8/30/2018 (25.7%, 224.9ppm)
+	G-09D	8/29/2018 - 8/30/2018 (15.2%, 438.28ppm)
×	G-10D	8/29/2018 - 8/30/2018 (5.81%, 1202.03ppm)
⊕	G-13D	8/29/2018 - 8/30/2018 (20.9%, 280.71ppm)
⊞	G-14D	8/29/2018 - 8/30/2018 (25.8%, 271.66ppm)
⊕	G-24D	8/29/2018 - 8/30/2018 (6.23%, 345.27ppm)

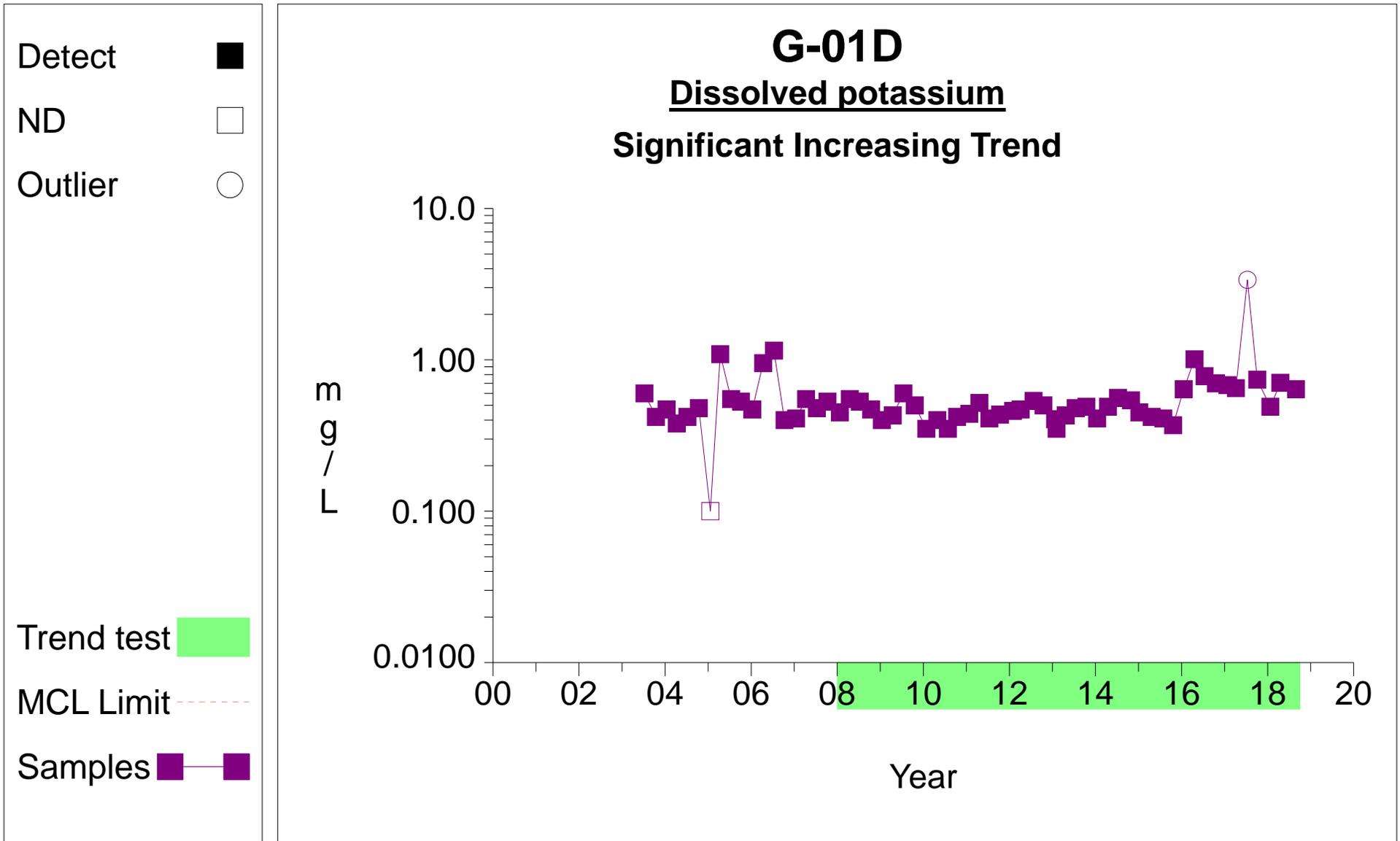


Time Series



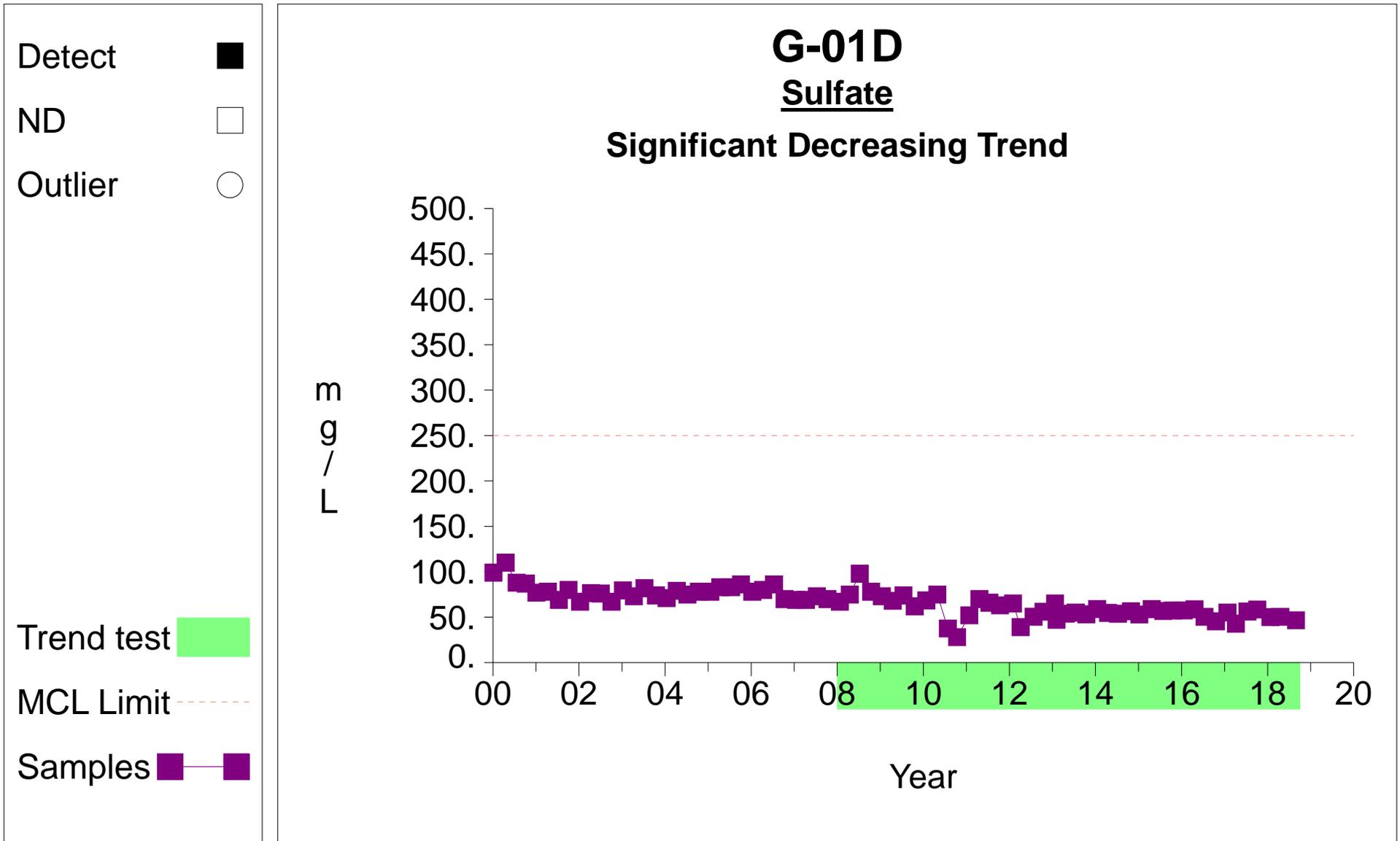
Graph 5

Time Series



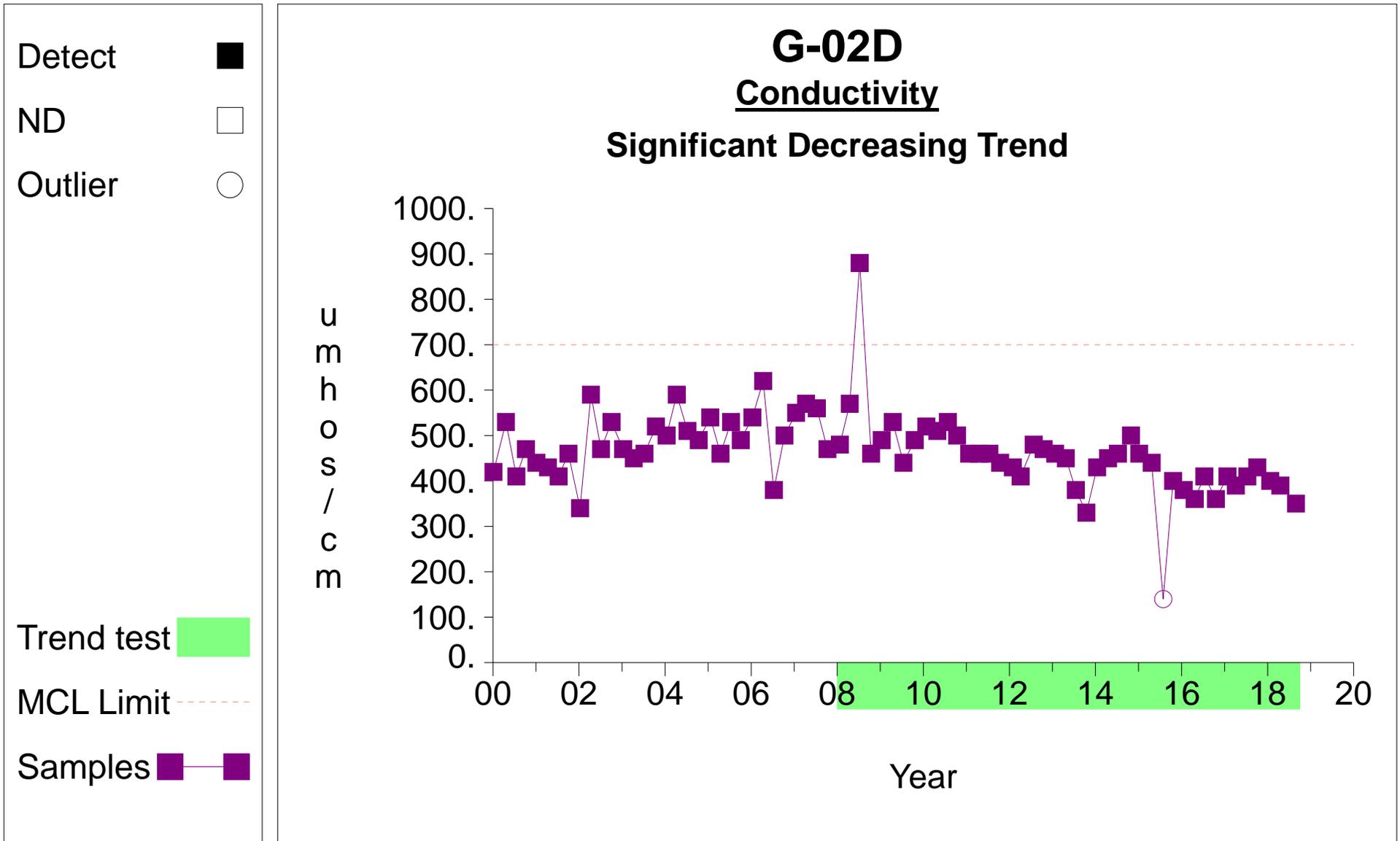
Graph 21

Time Series



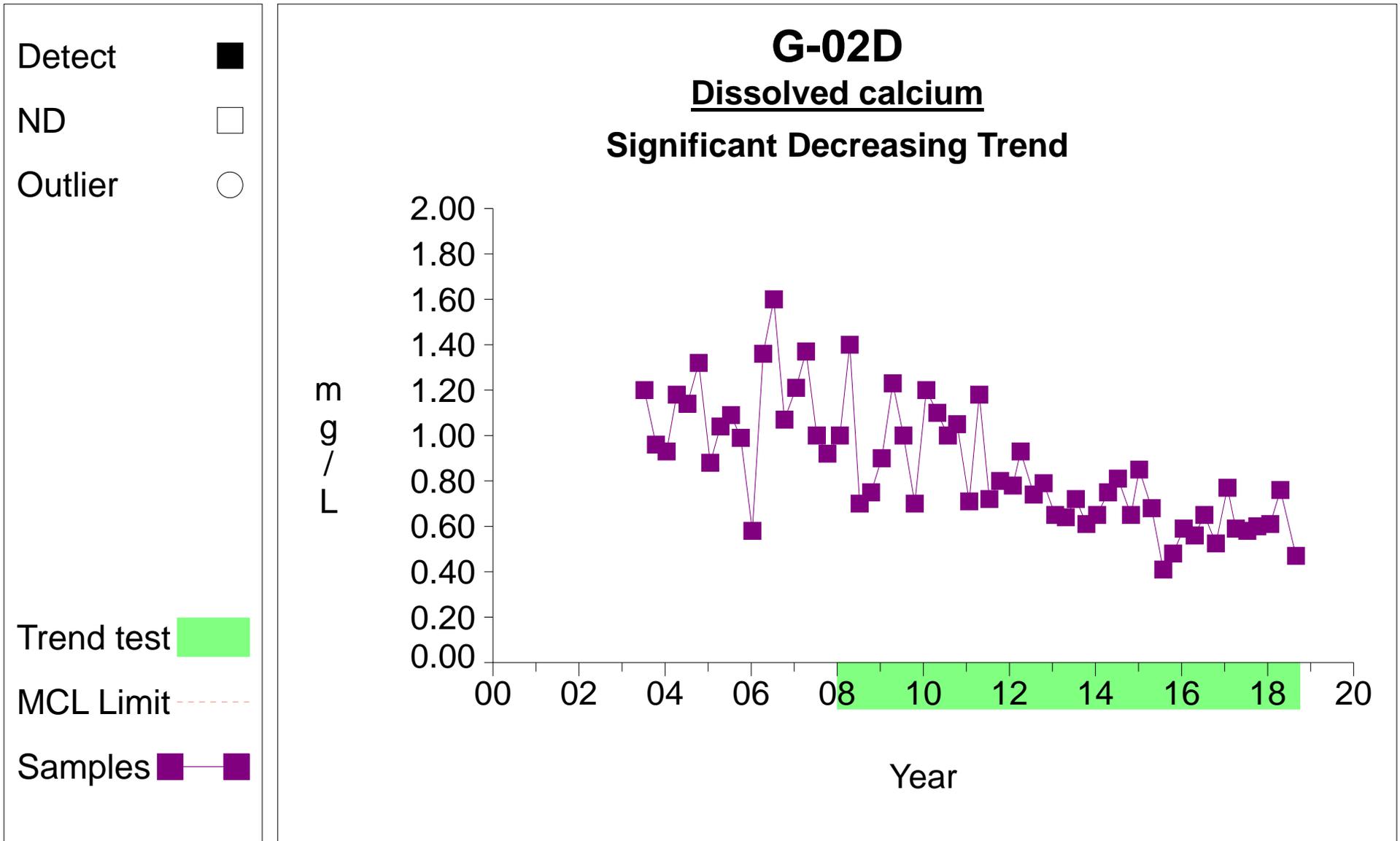
Graph 31

Time Series



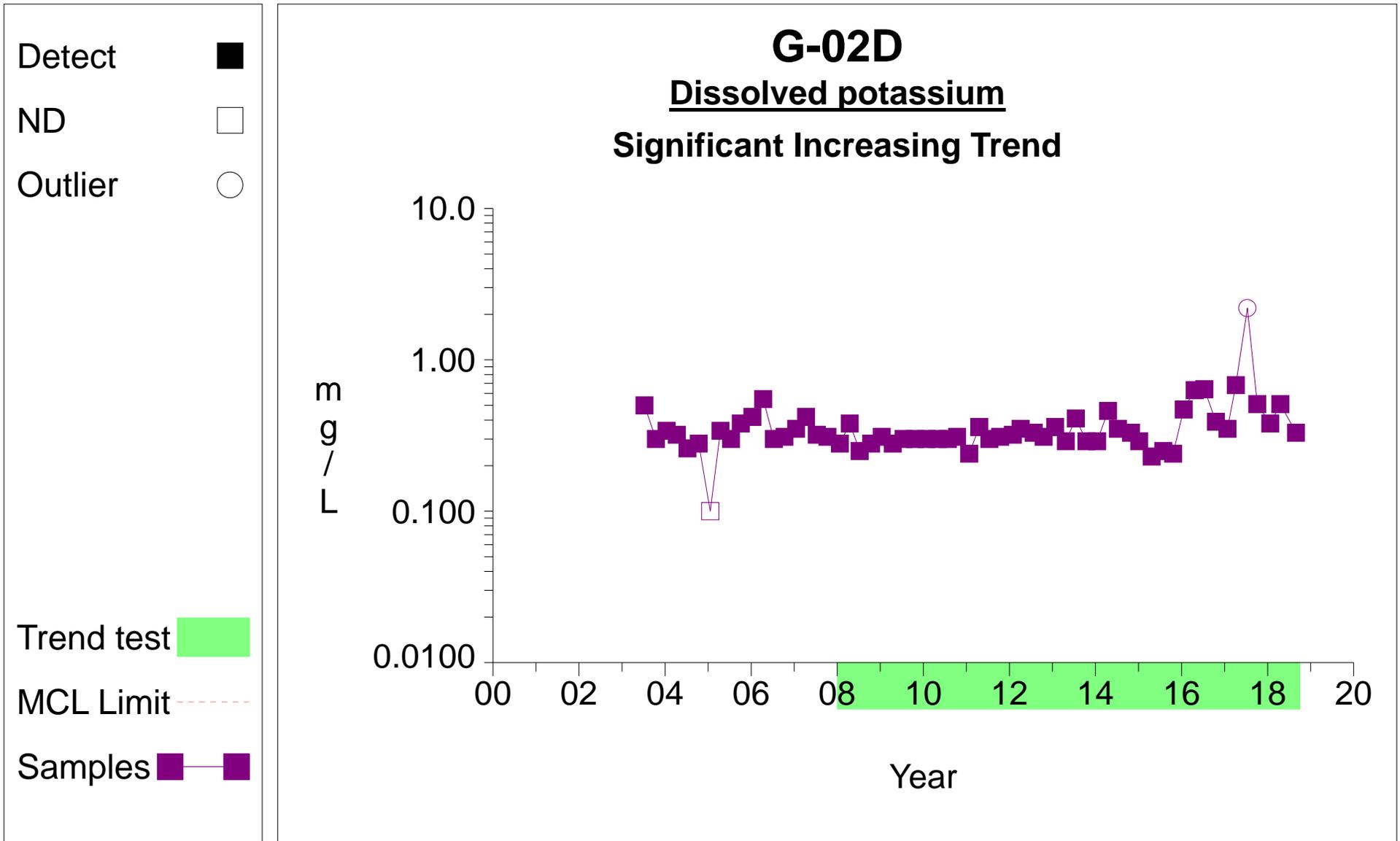
Graph 39

Time Series



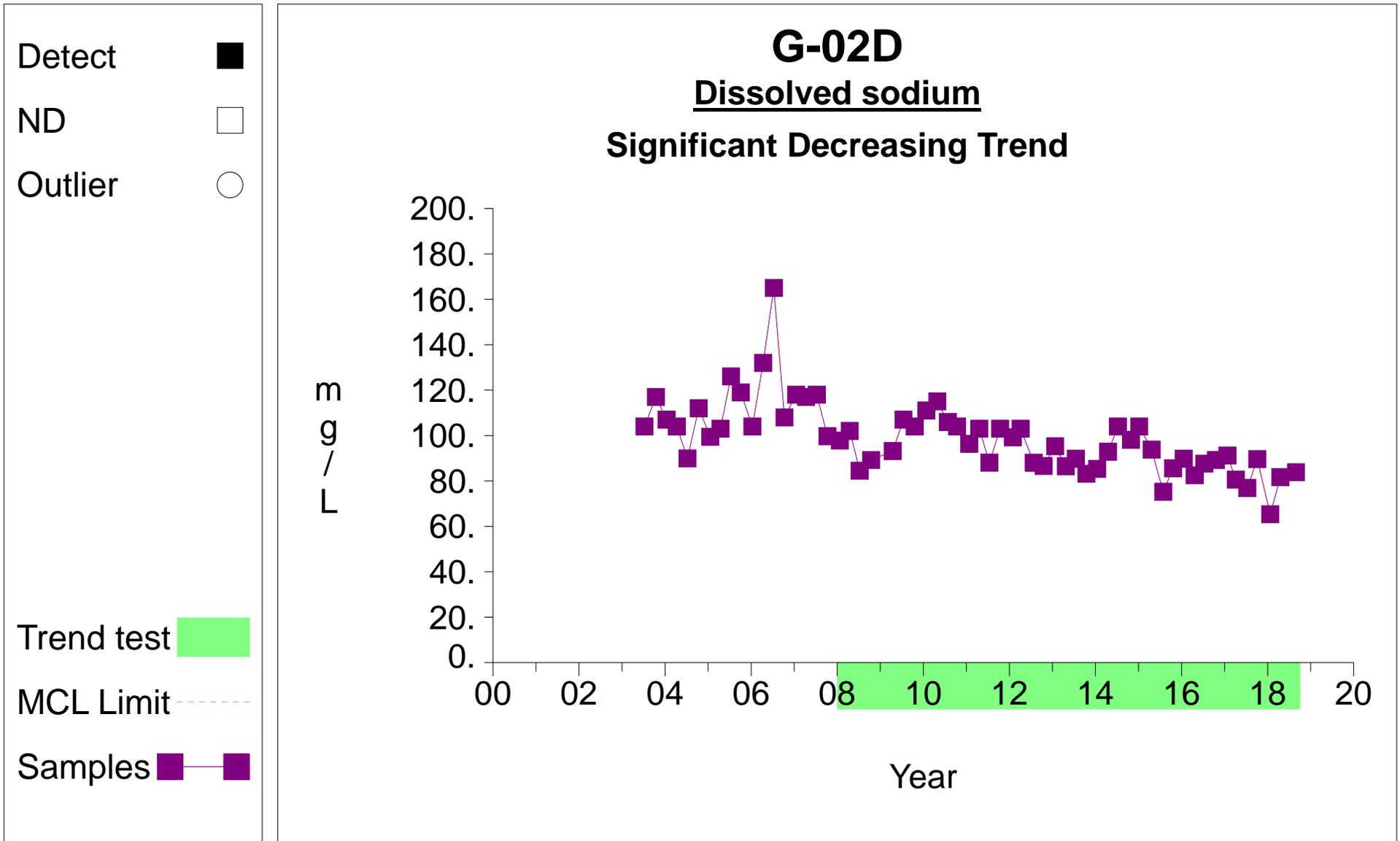
Graph 45

Time Series



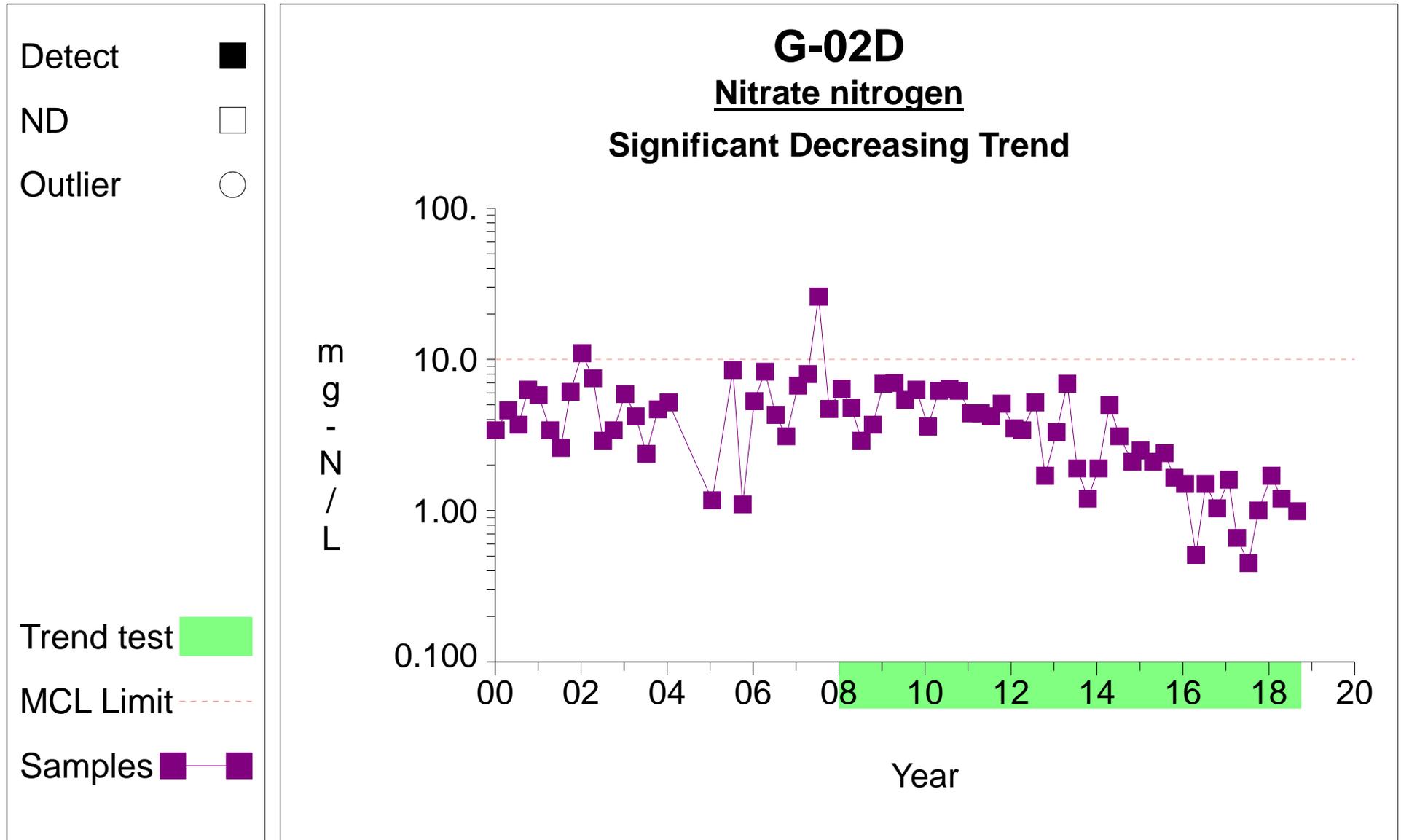
Graph 54

Time Series



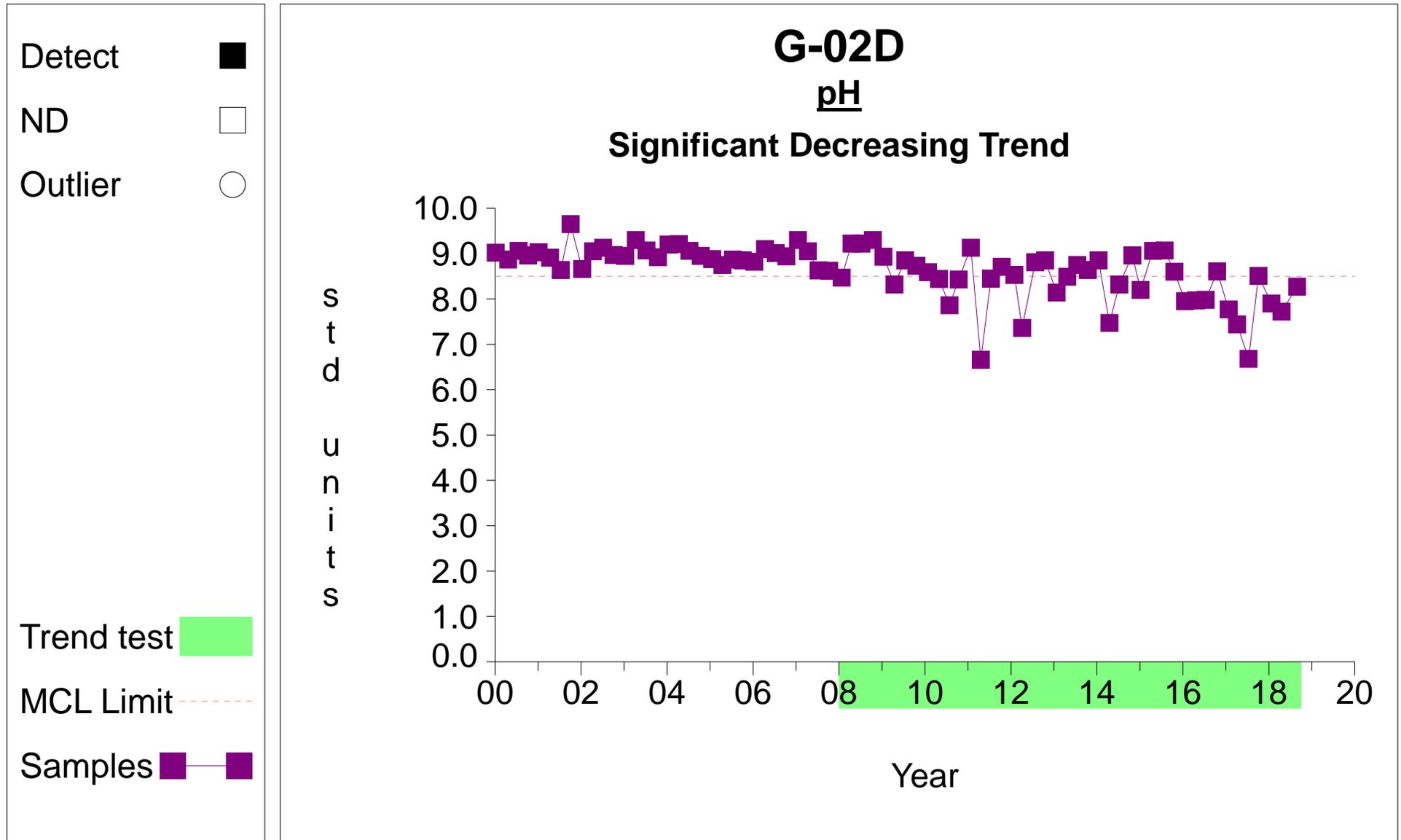
Graph 57

Time Series



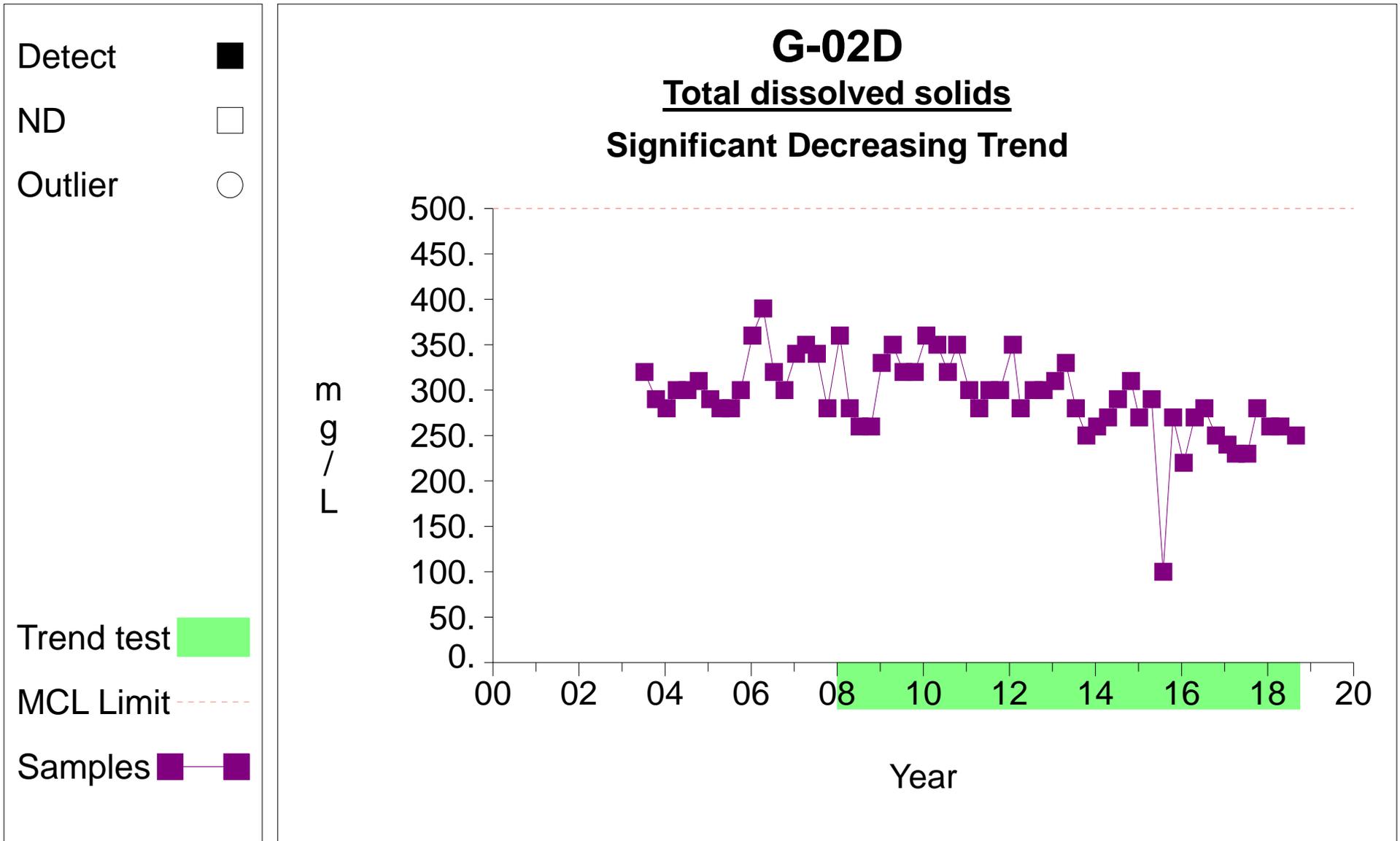
Graph 61

Time Series



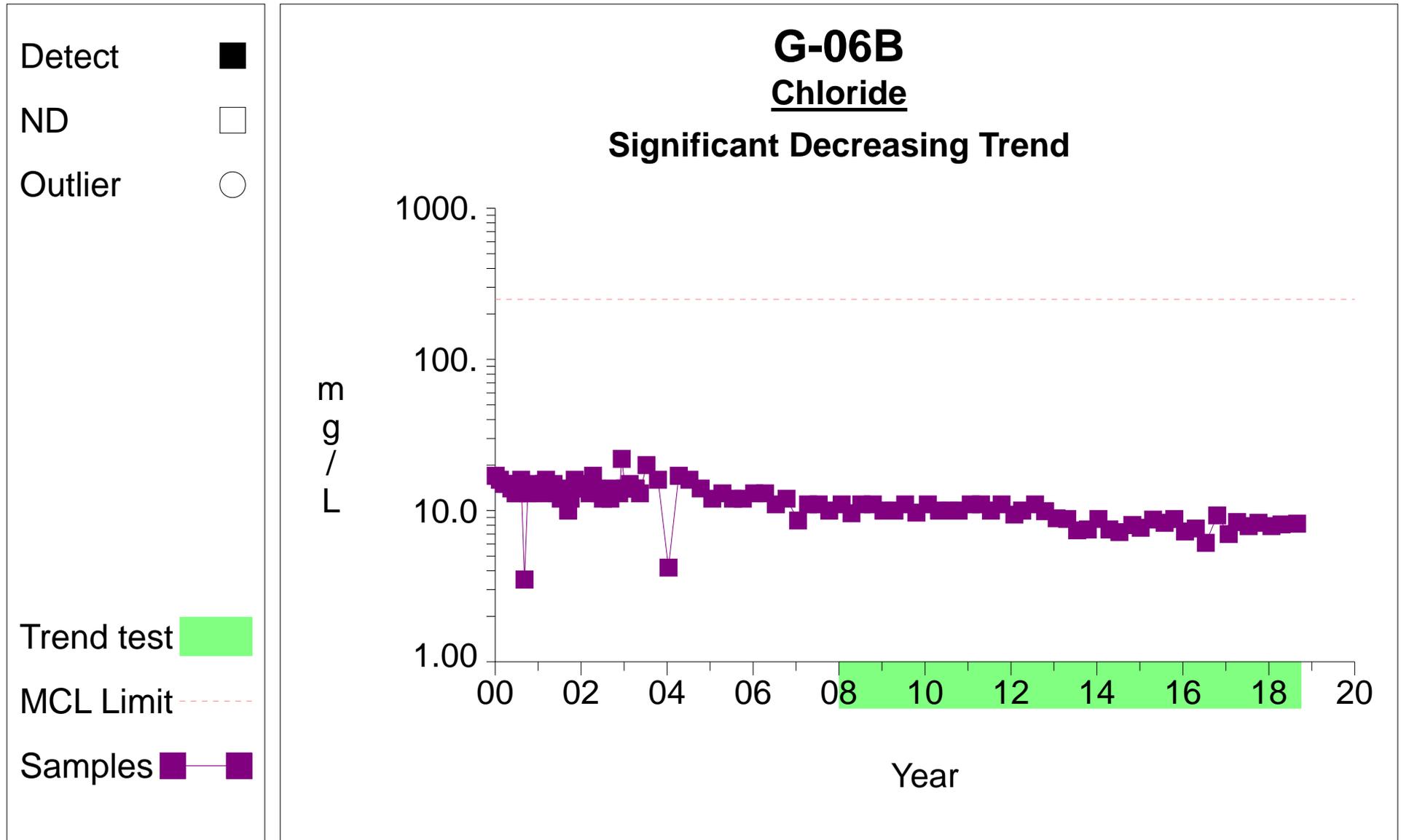
Graph 63

Time Series



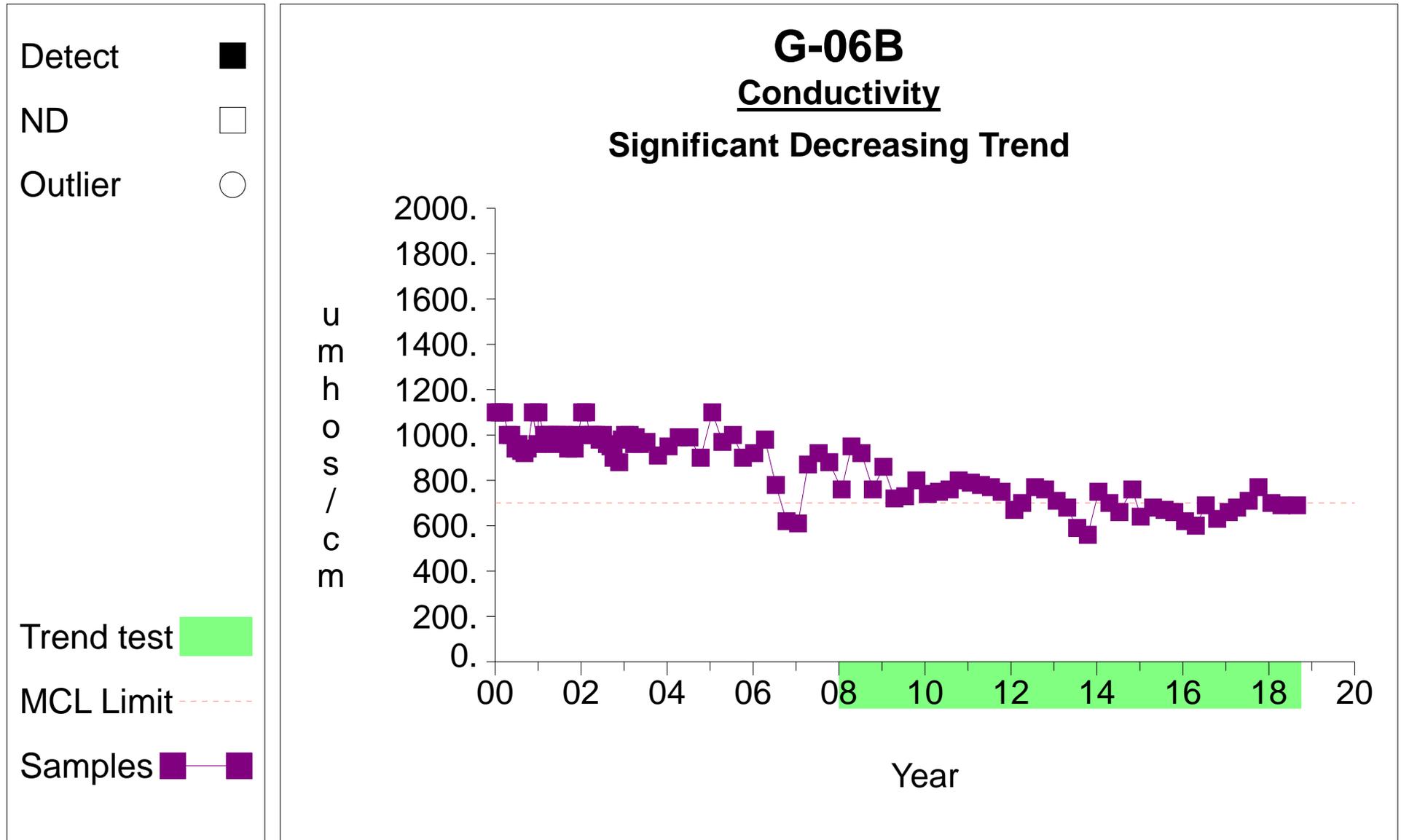
Graph 65

Time Series



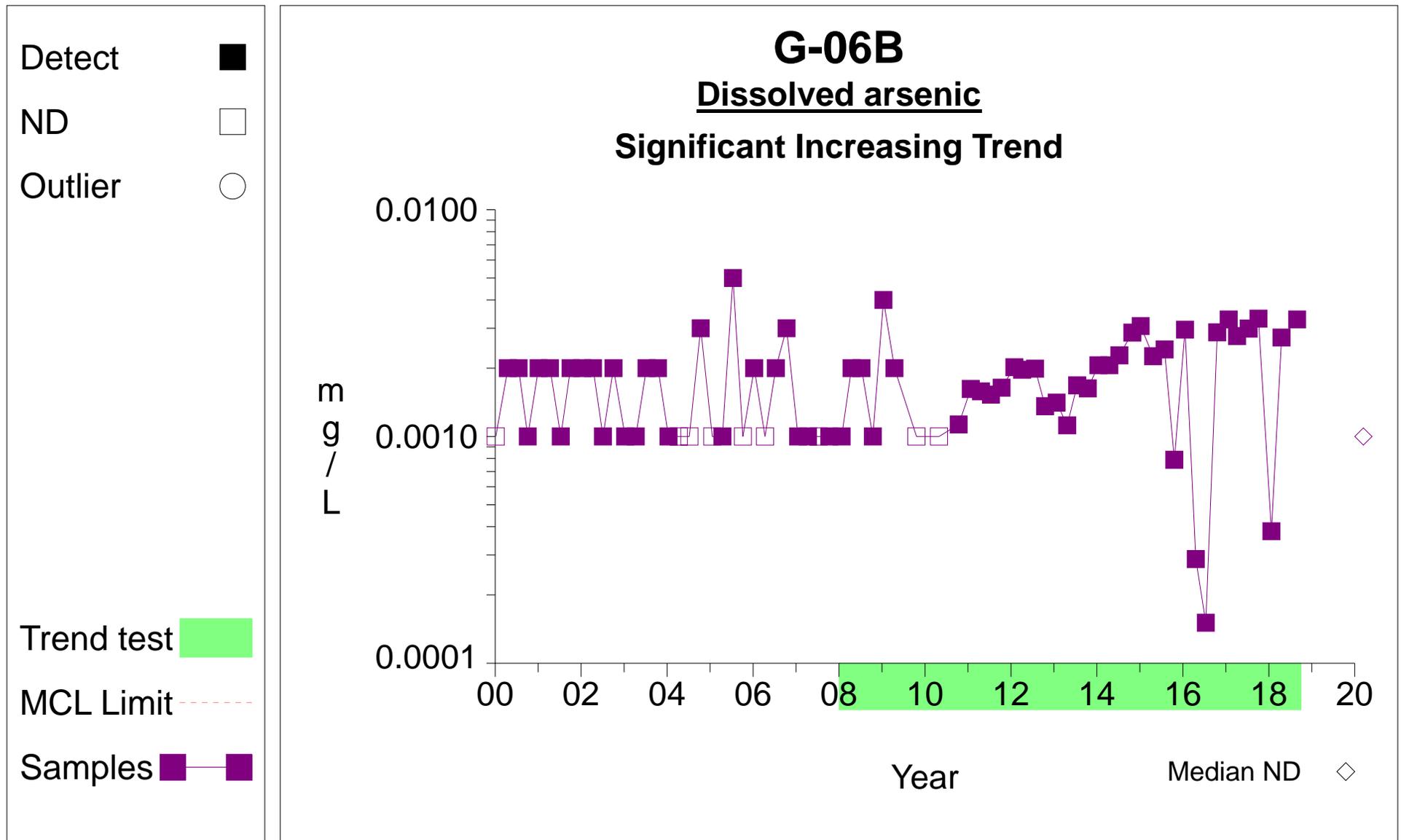
Graph 71

Time Series



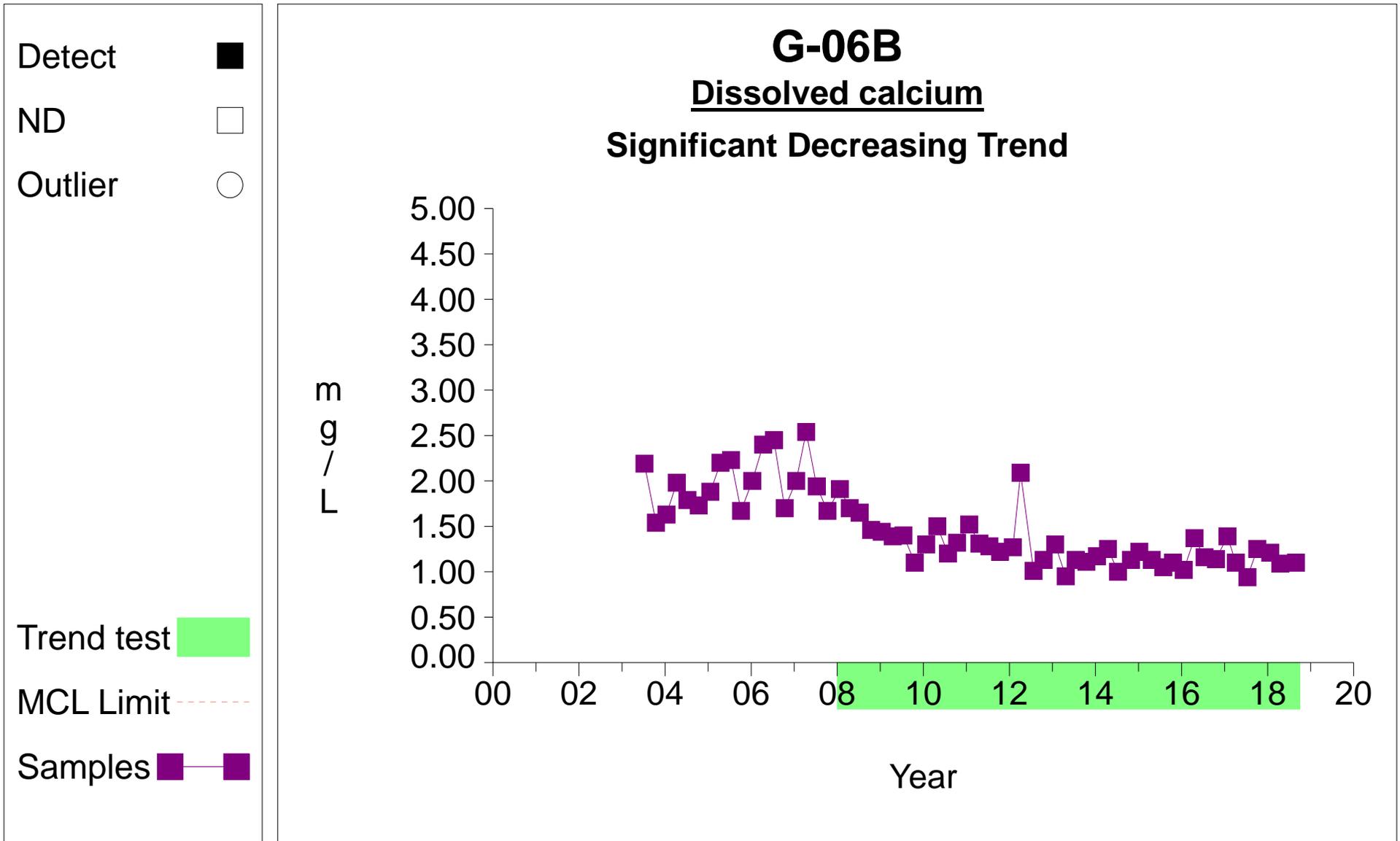
Graph 72

Time Series



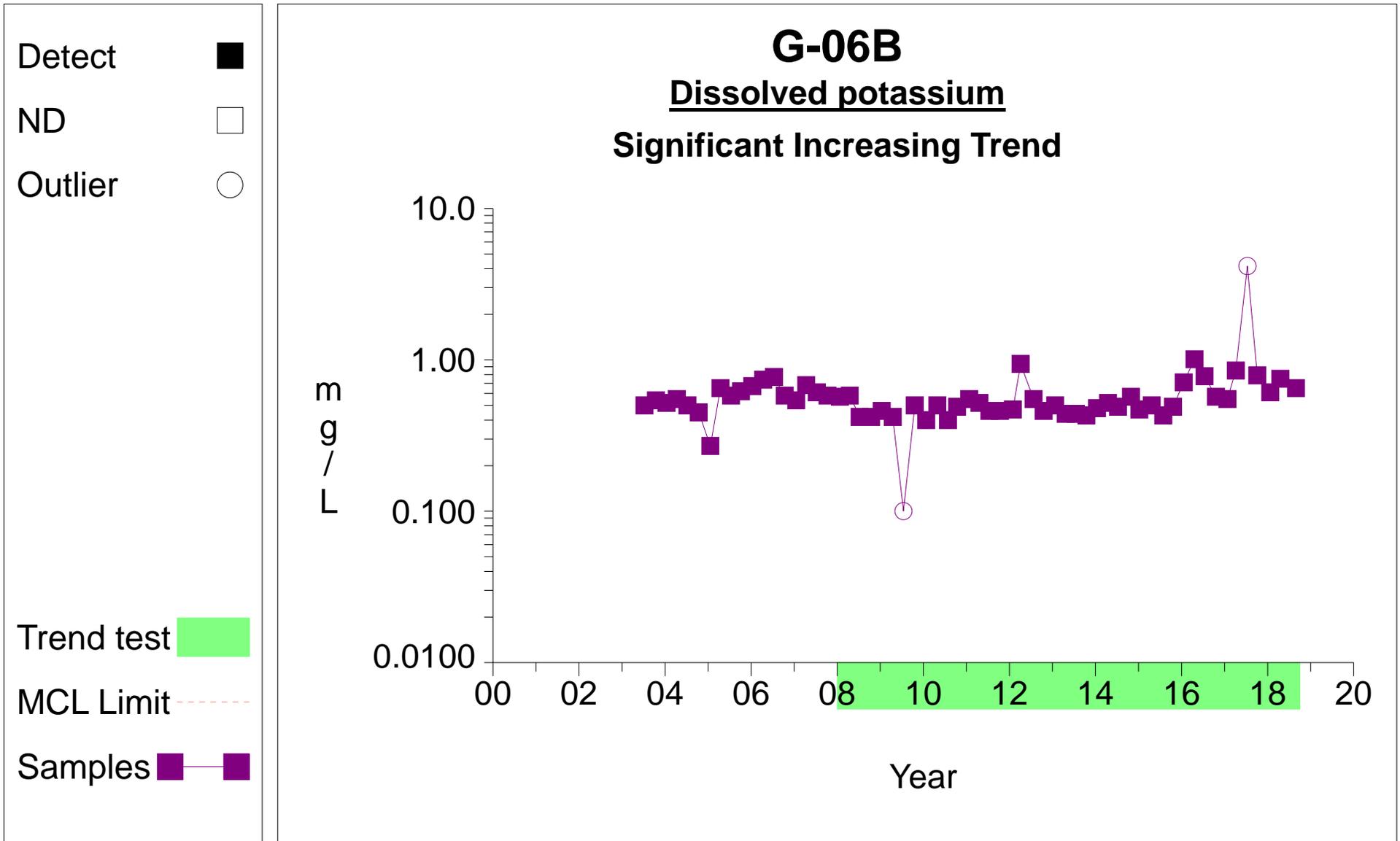
Graph 74

Time Series



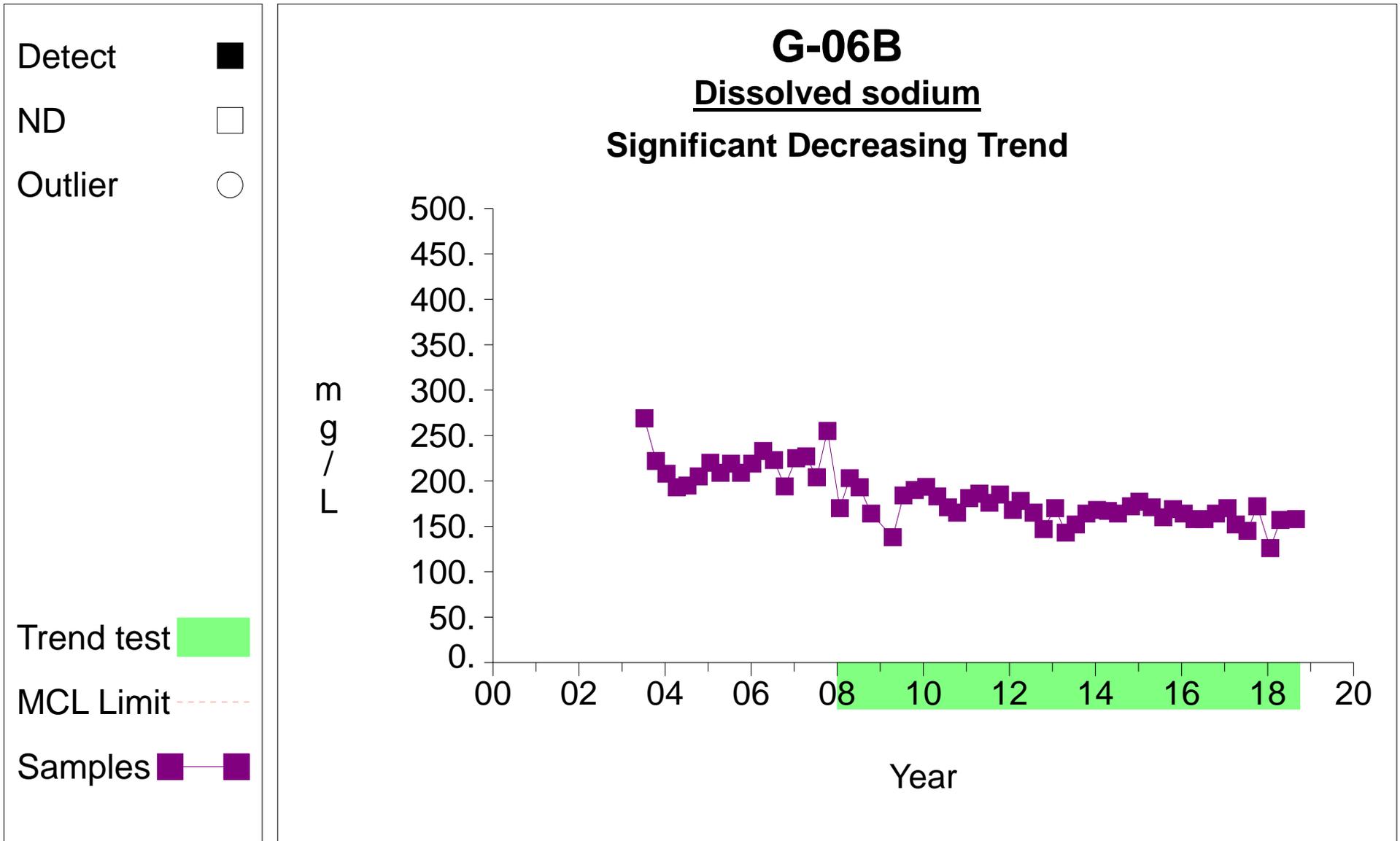
Graph 78

Time Series



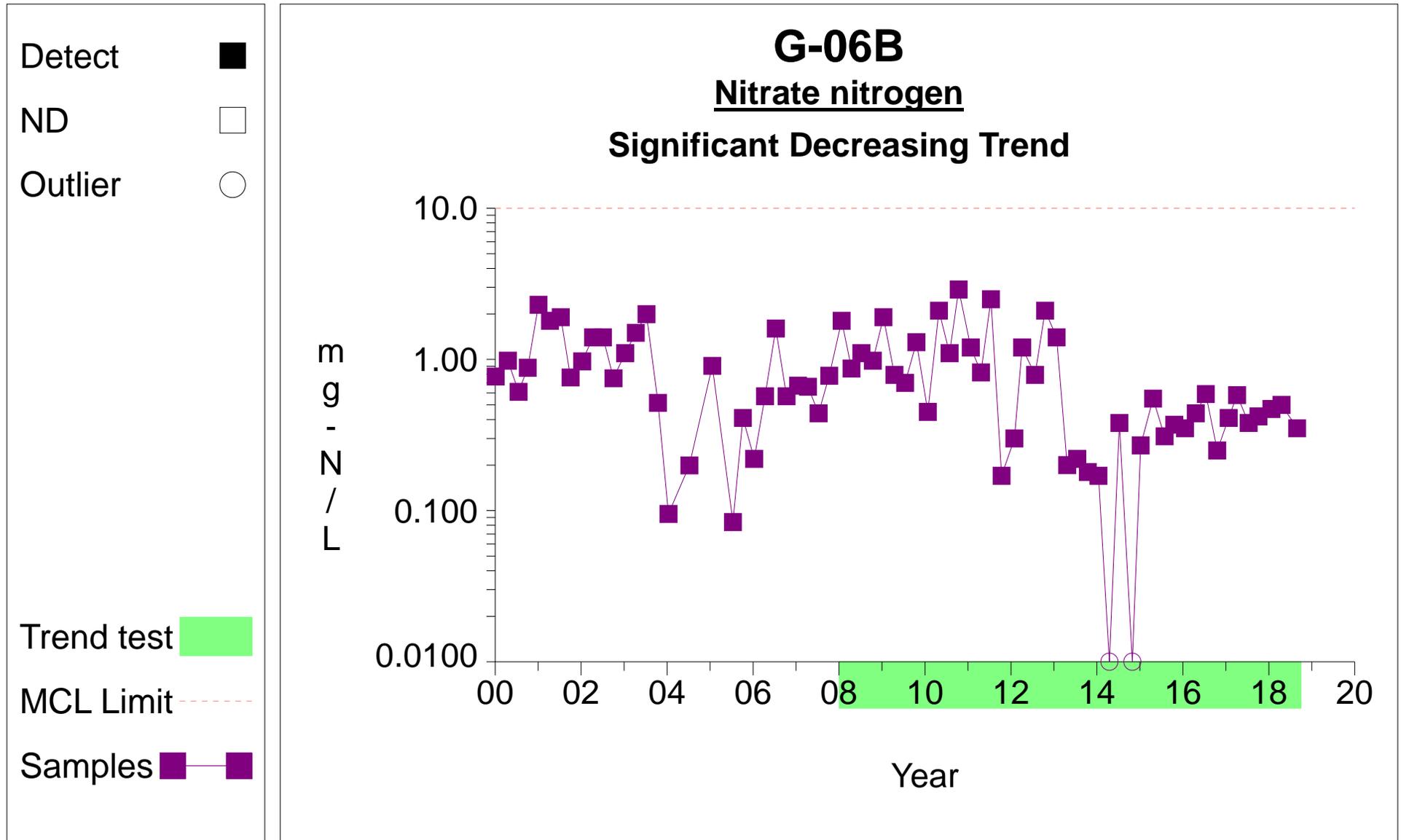
Graph 87

Time Series



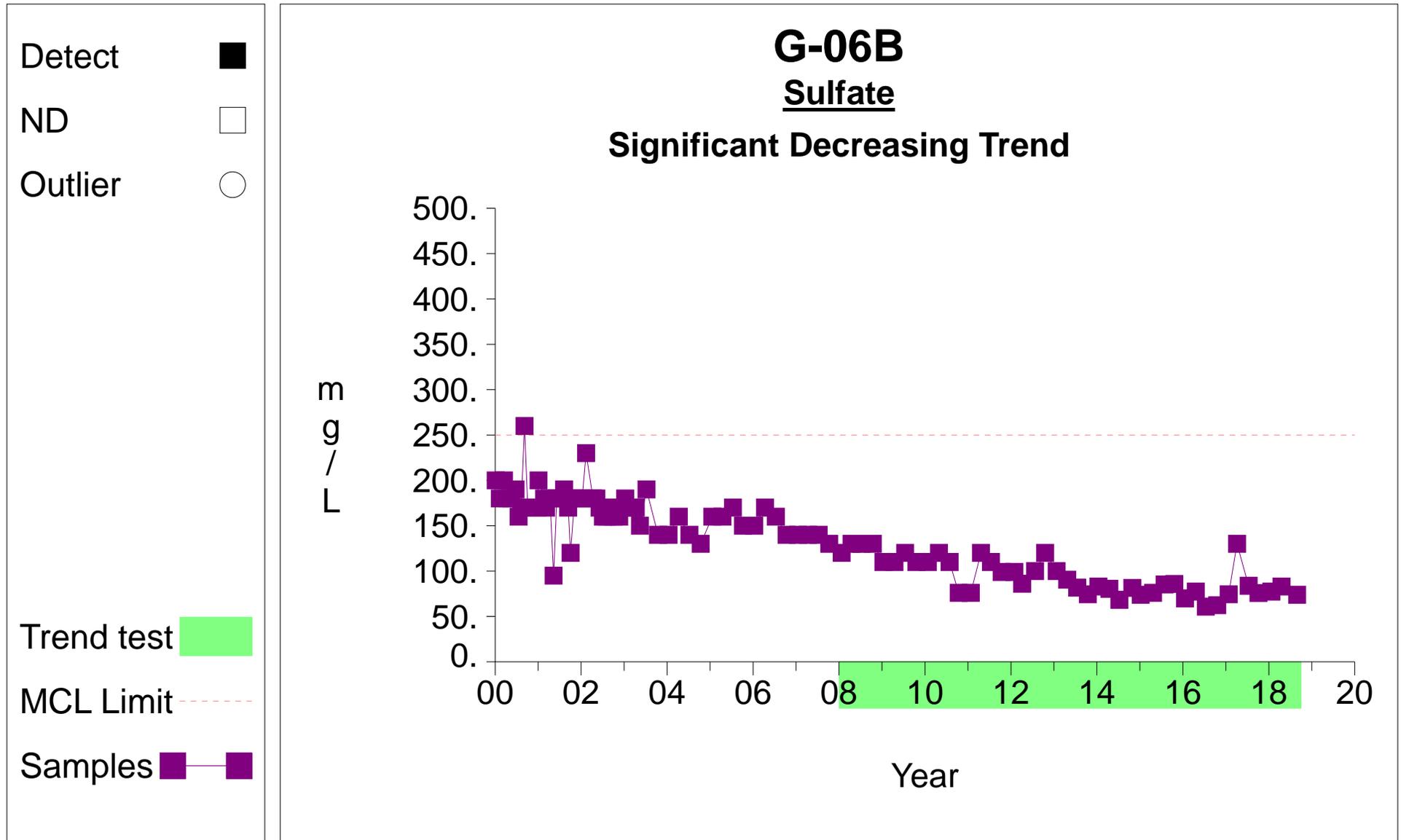
Graph 90

Time Series



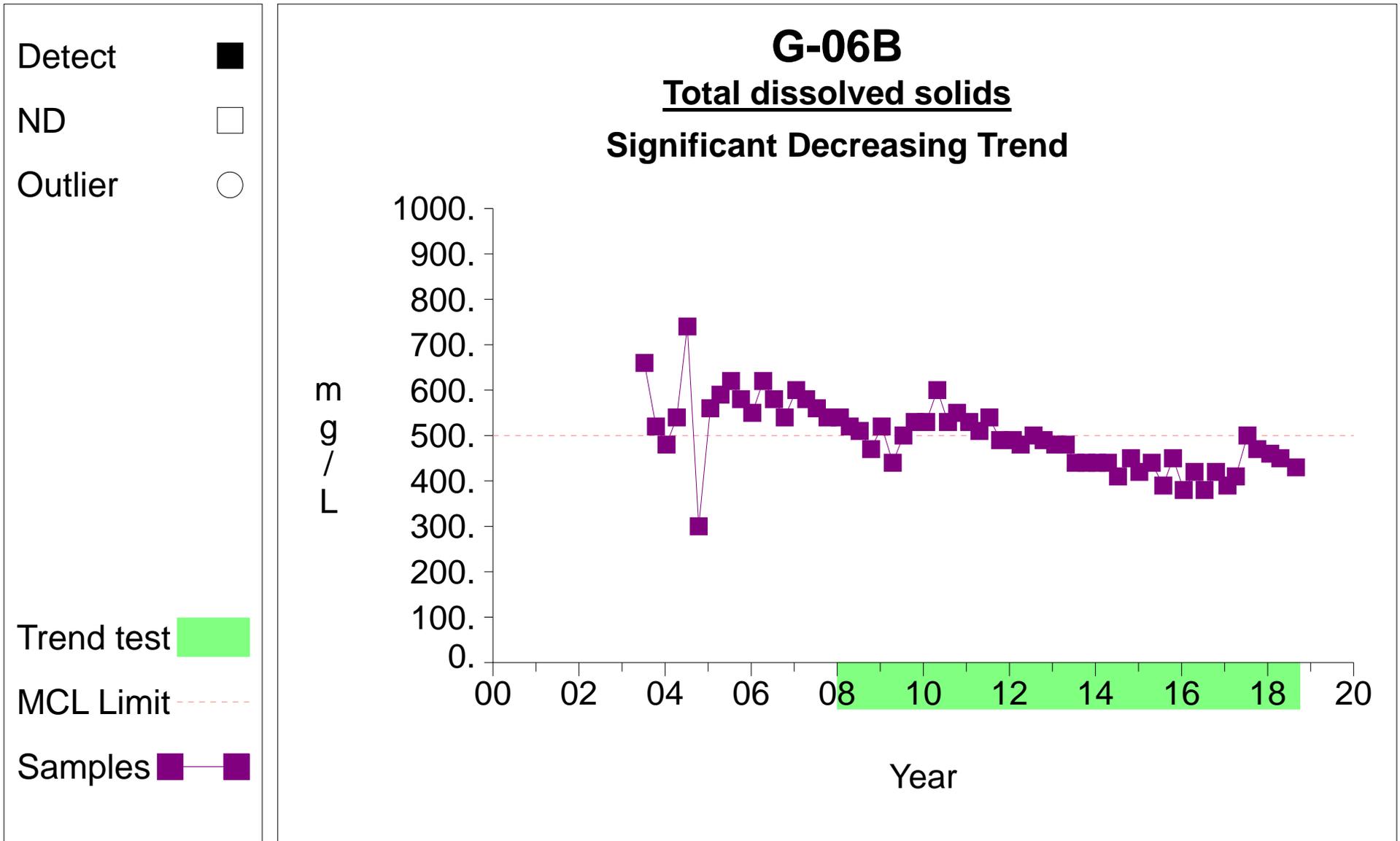
Graph 94

Time Series



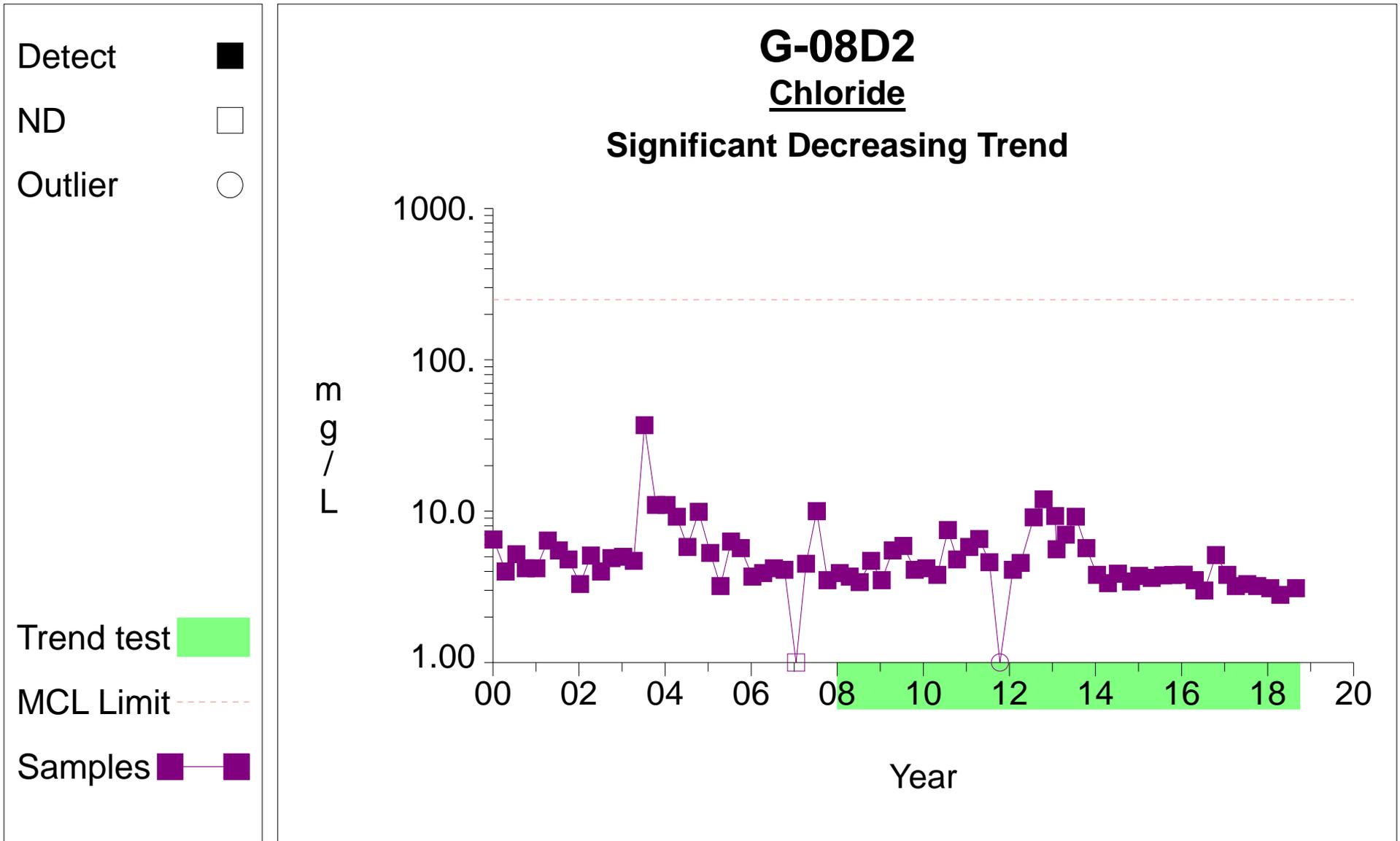
Graph 97

Time Series



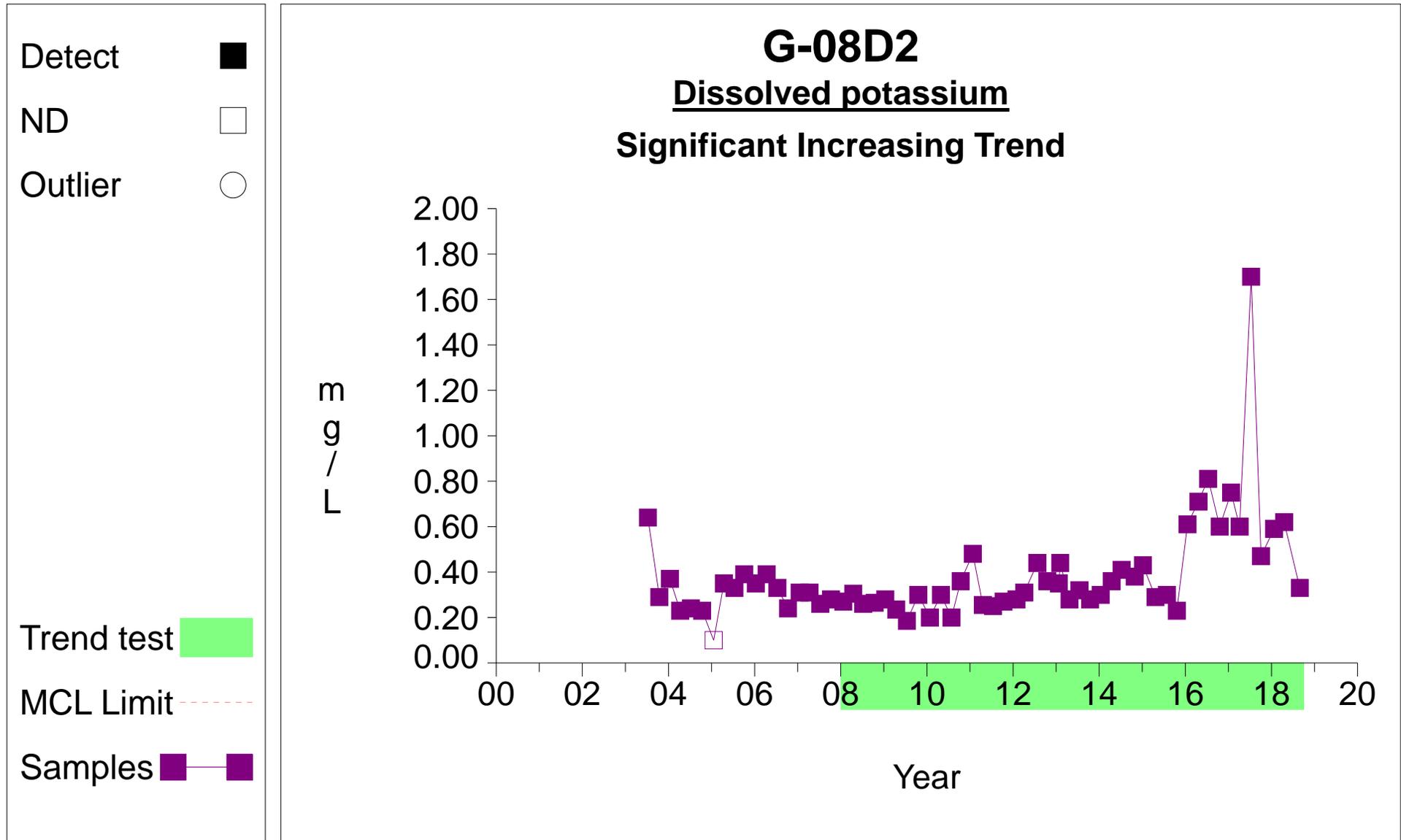
Graph 98

Time Series



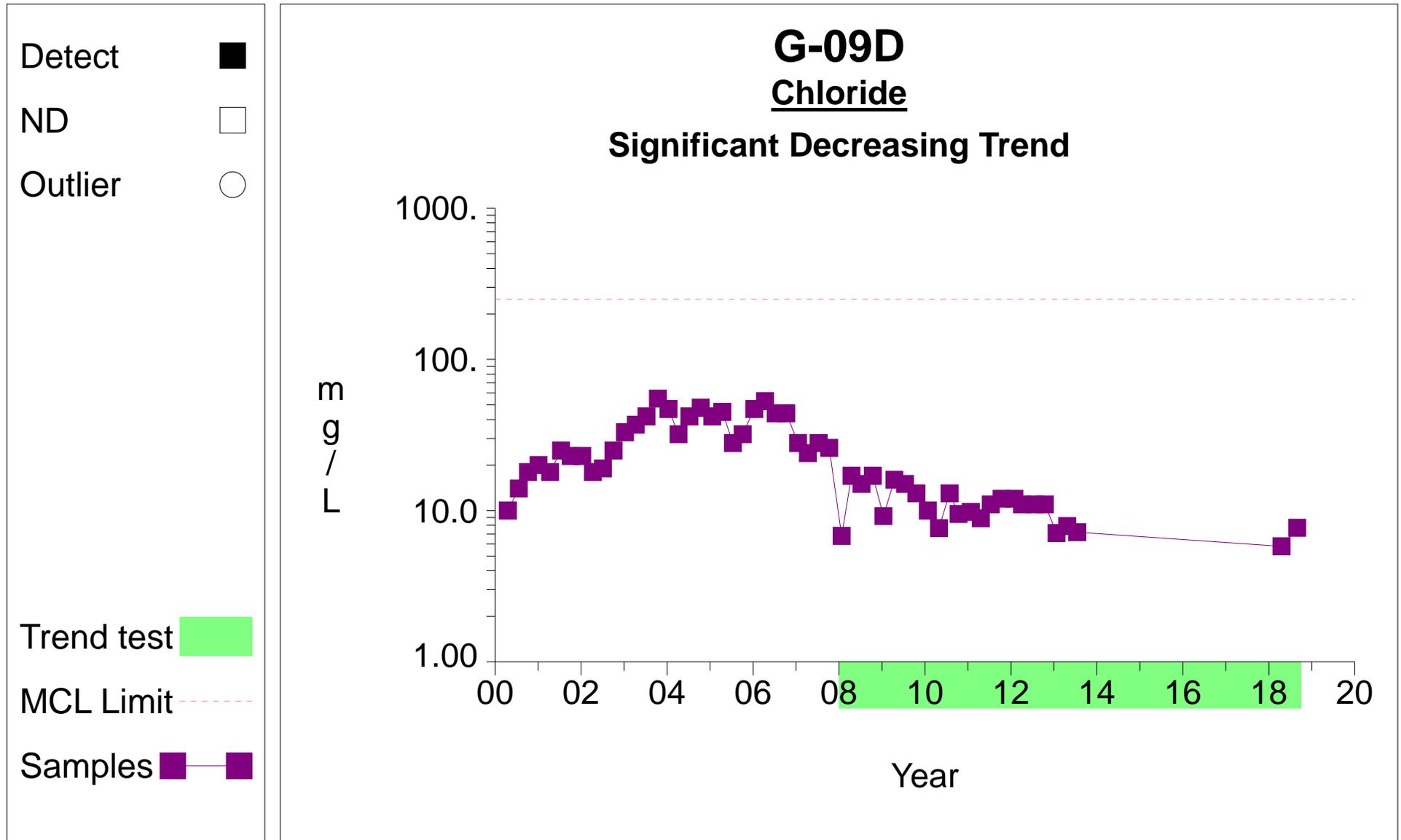
Graph 104

Time Series



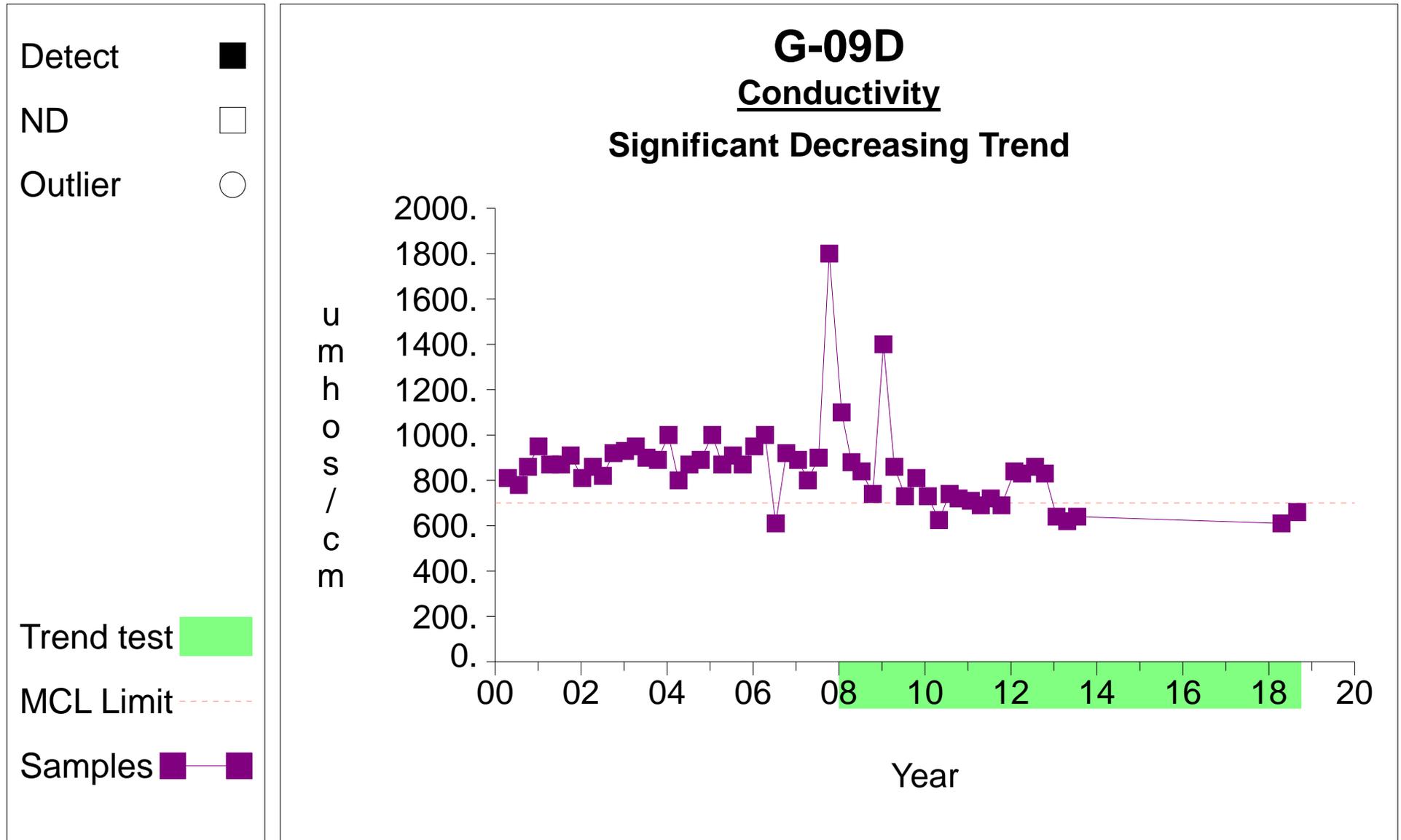
Graph 120

Time Series



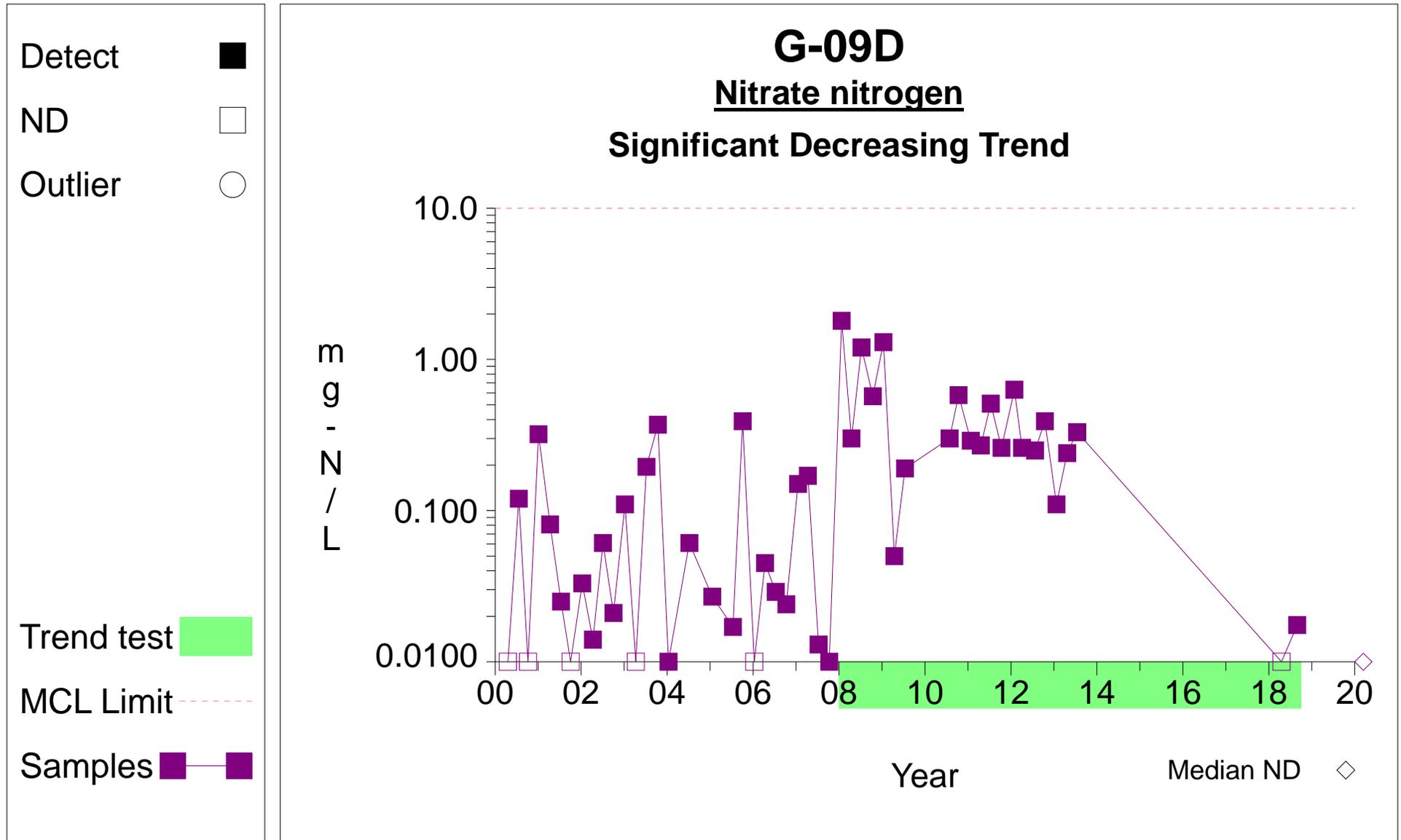
Graph 137

Time Series



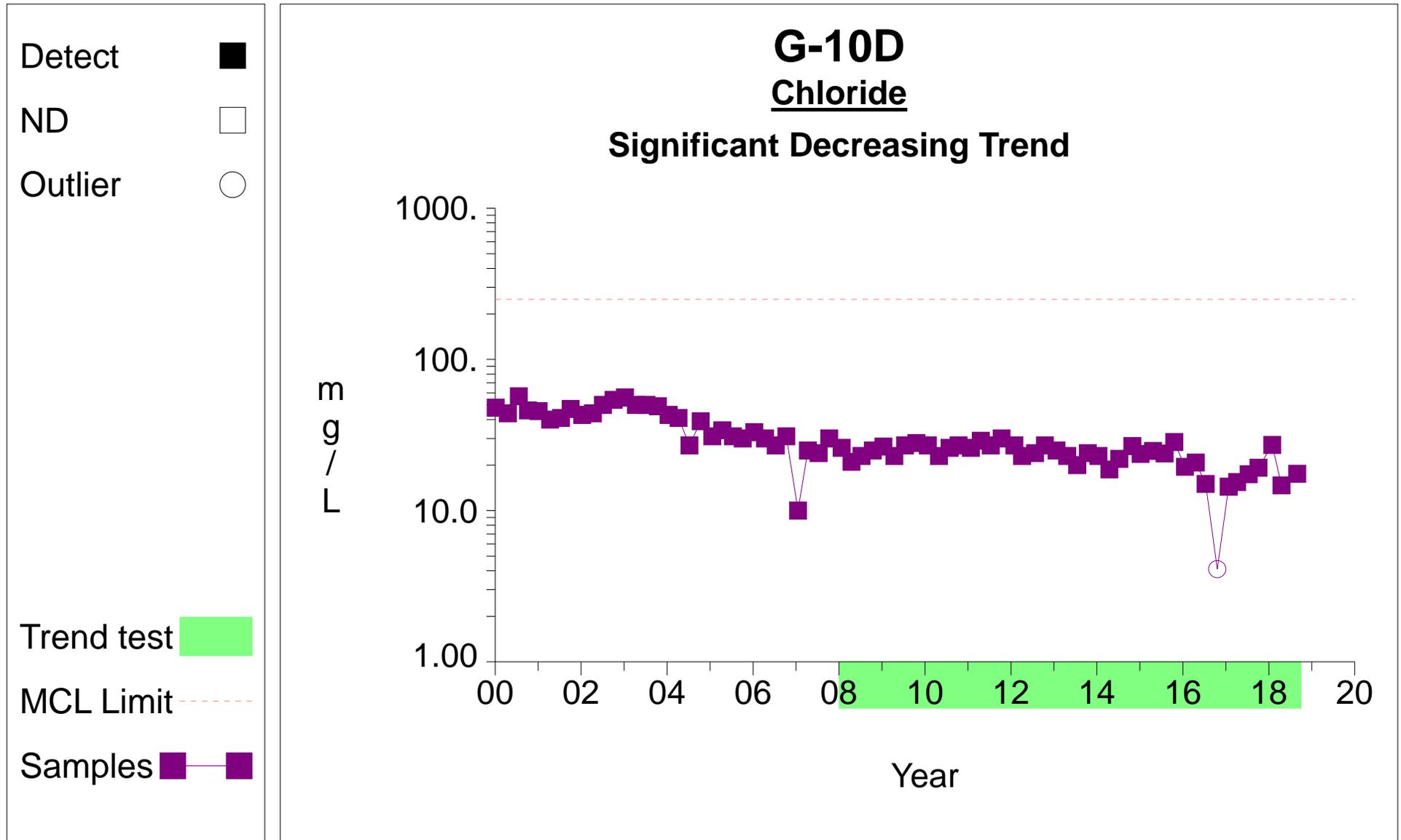
Graph 138

Time Series



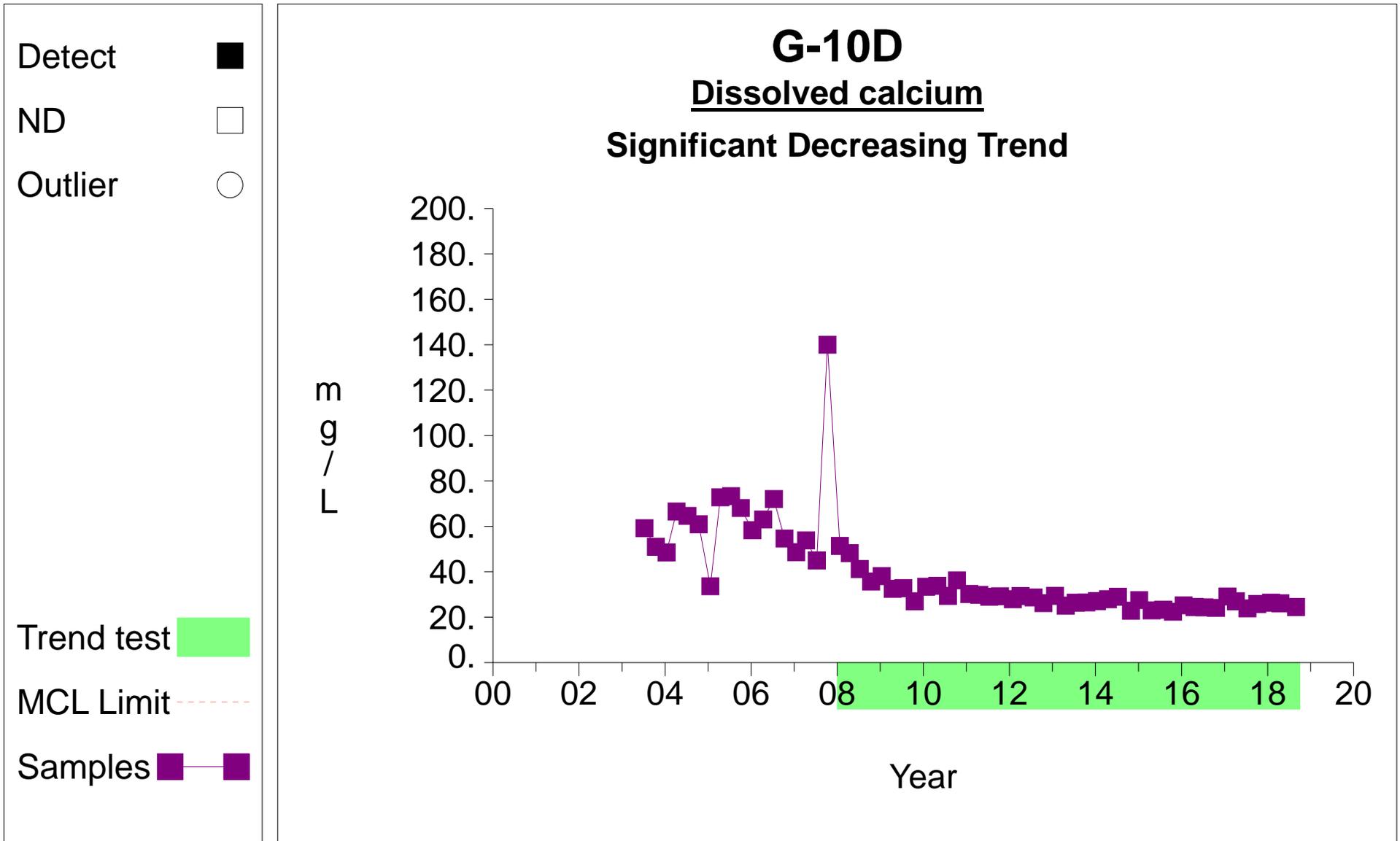
Graph 160

Time Series



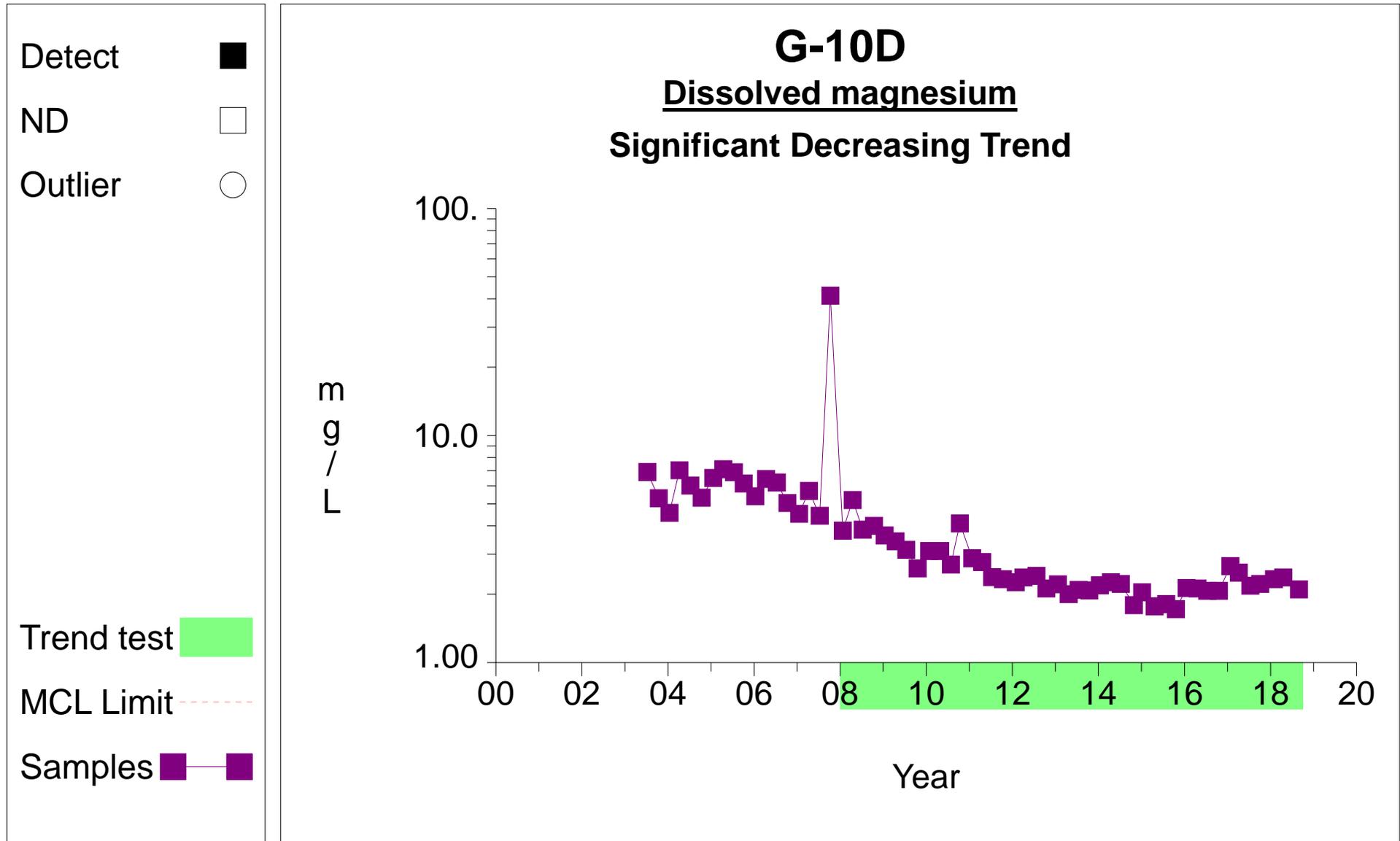
Graph 170

Time Series



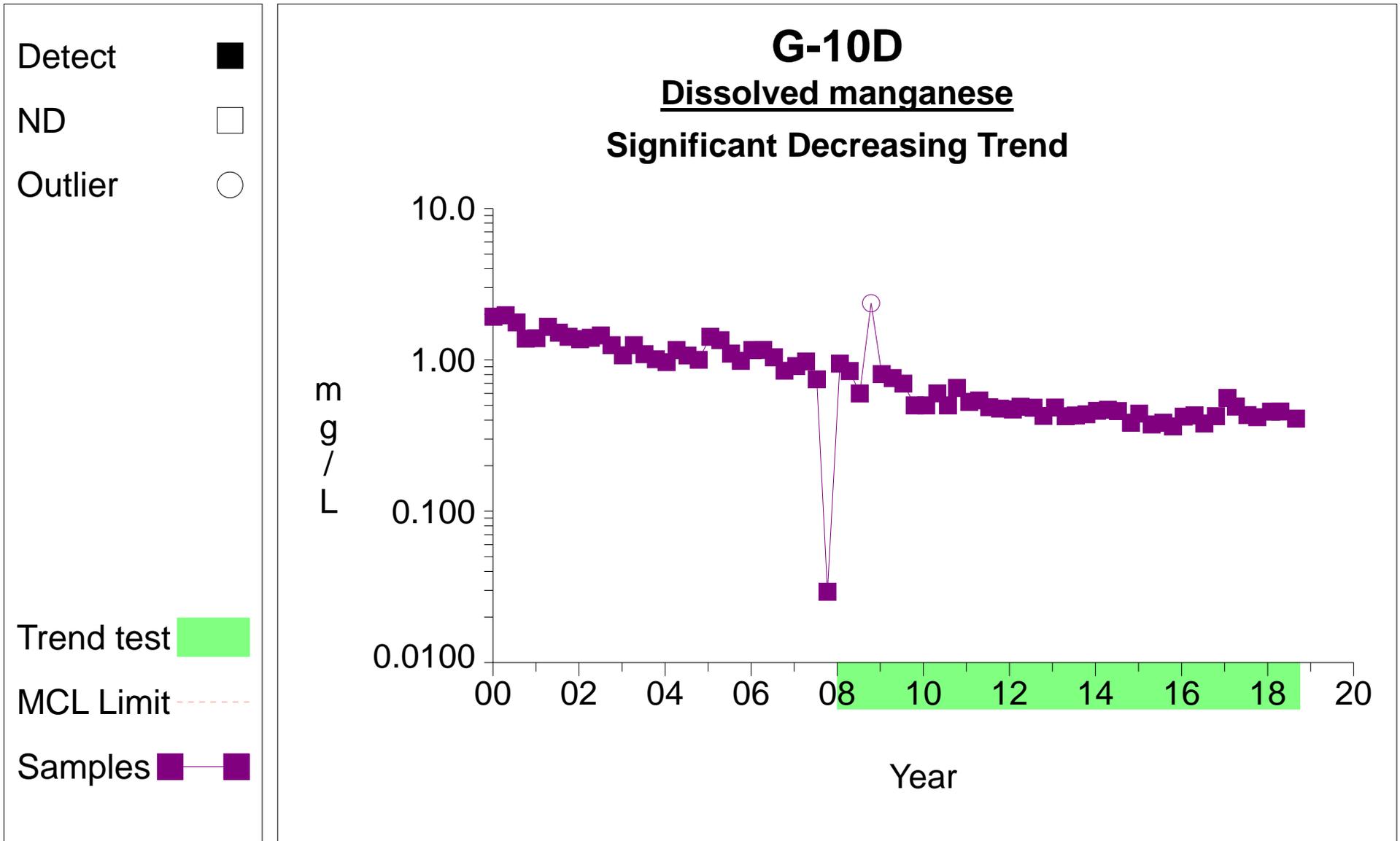
Graph 177

Time Series



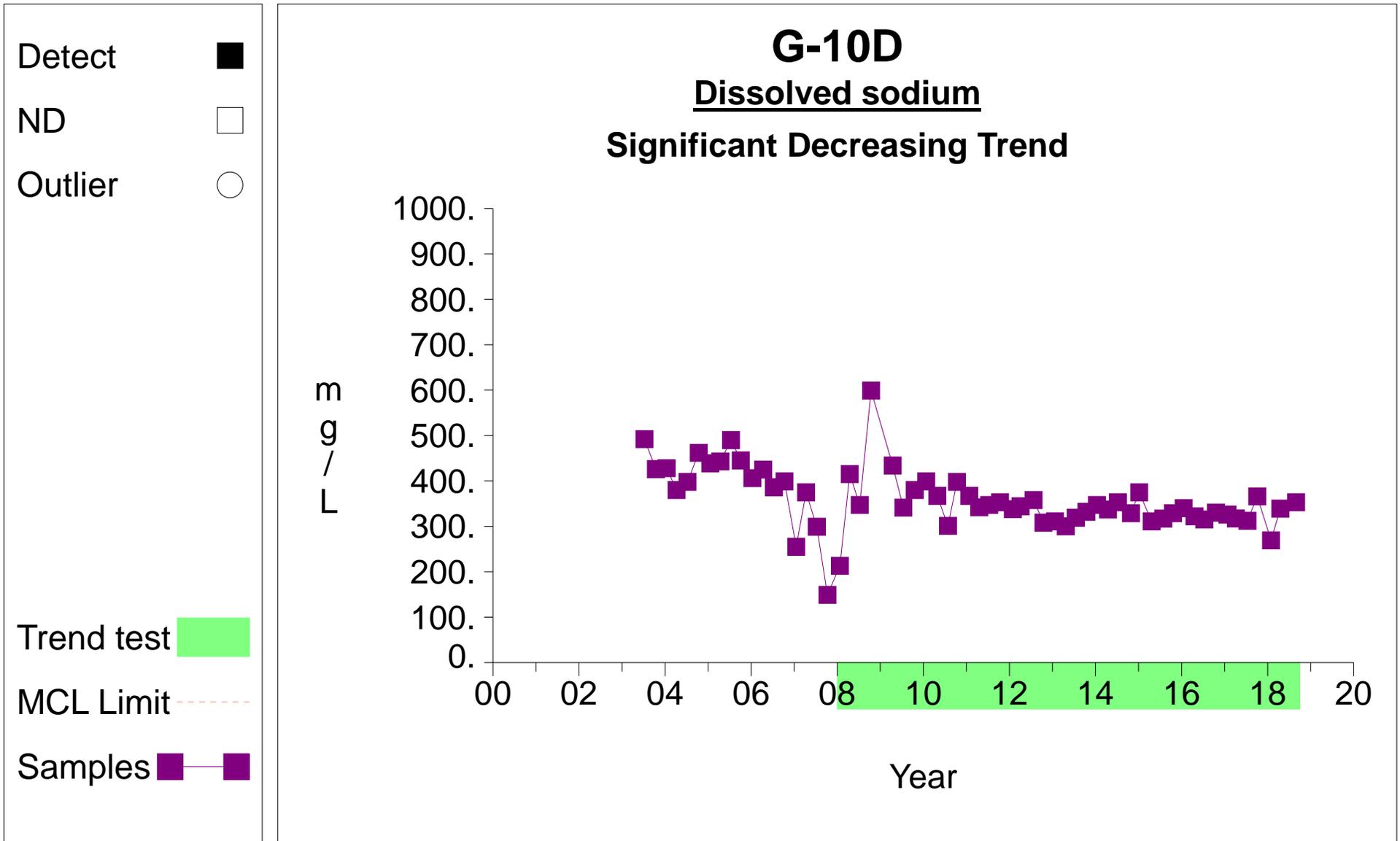
Graph 183

Time Series



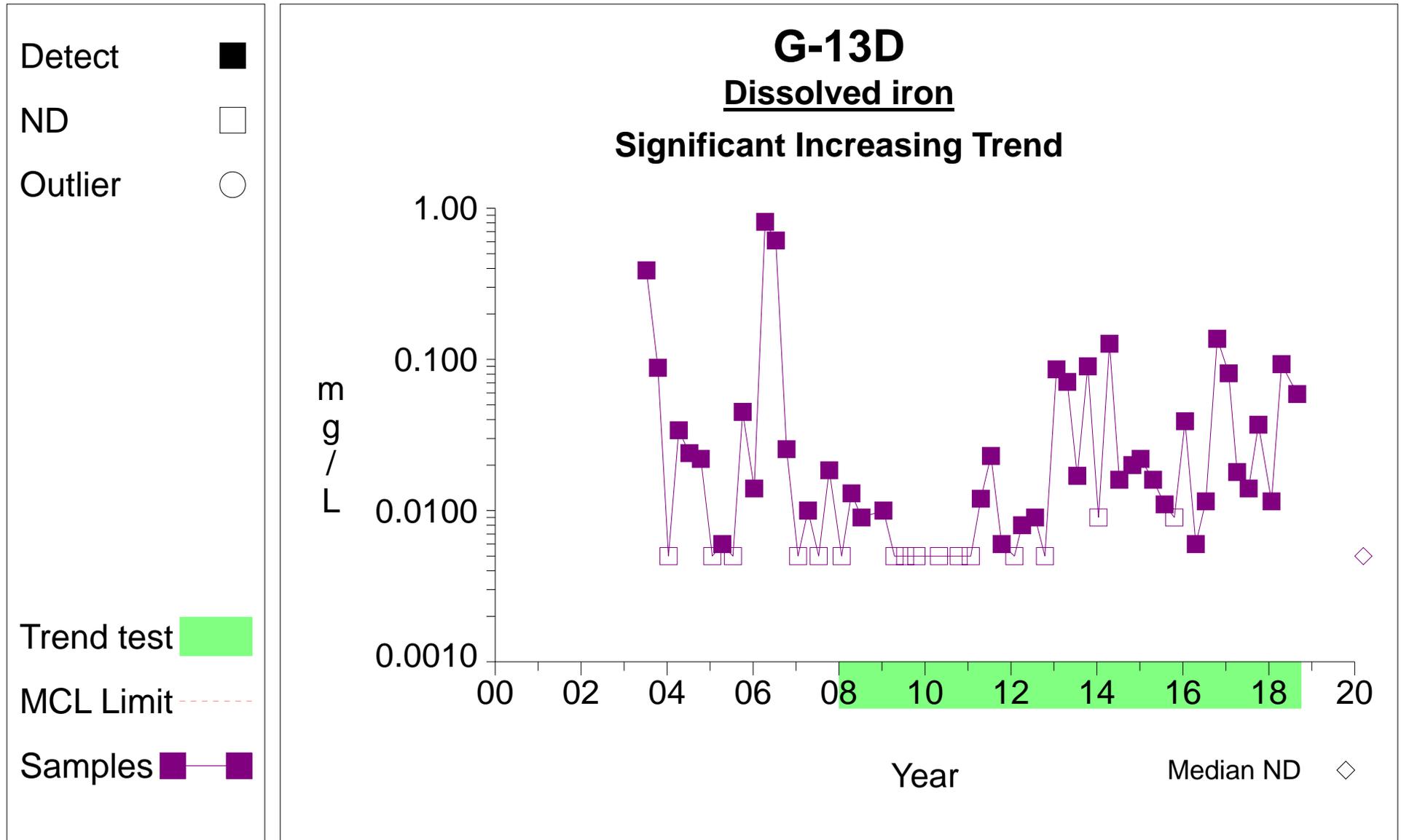
Graph 184

Time Series



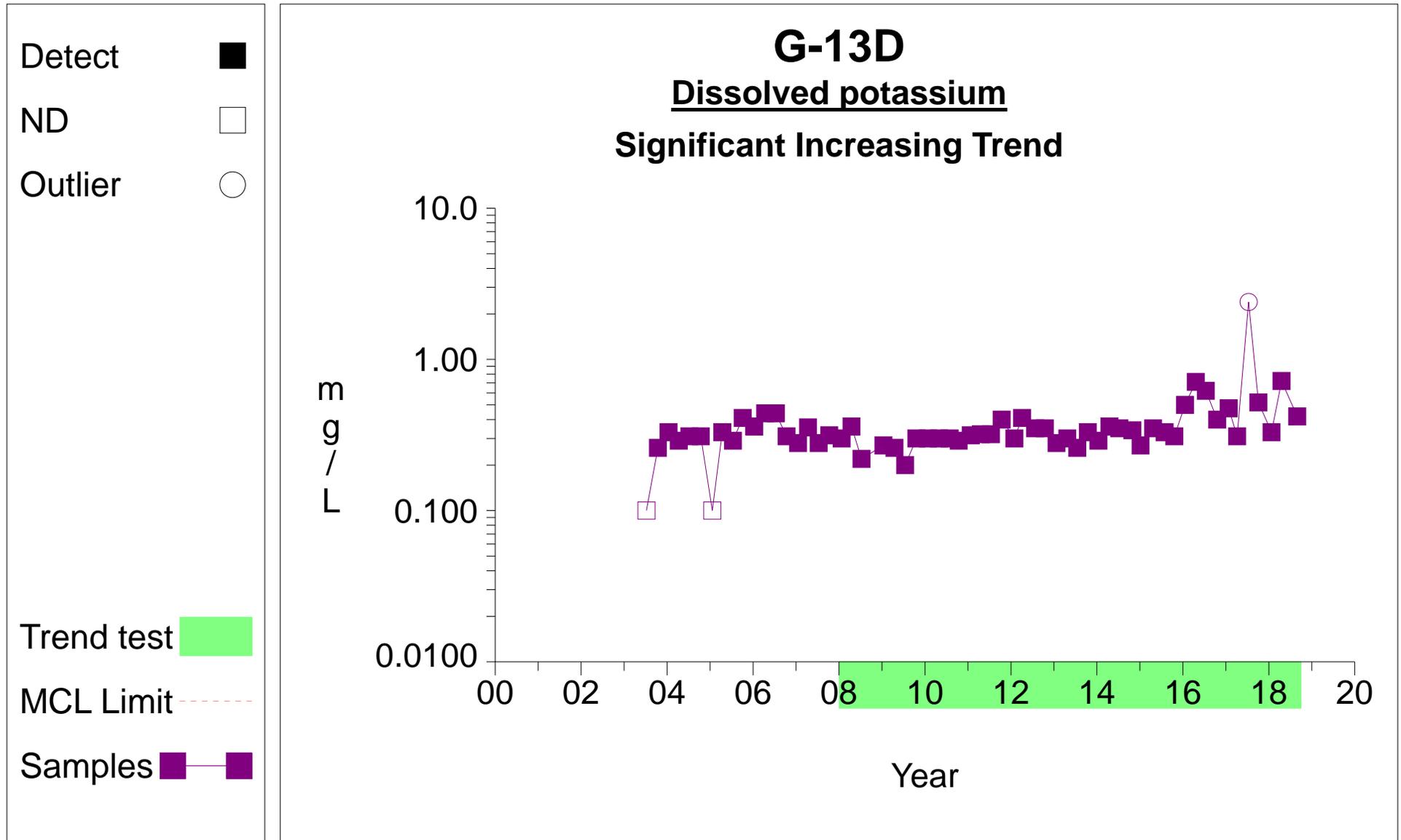
Graph 189

Time Series



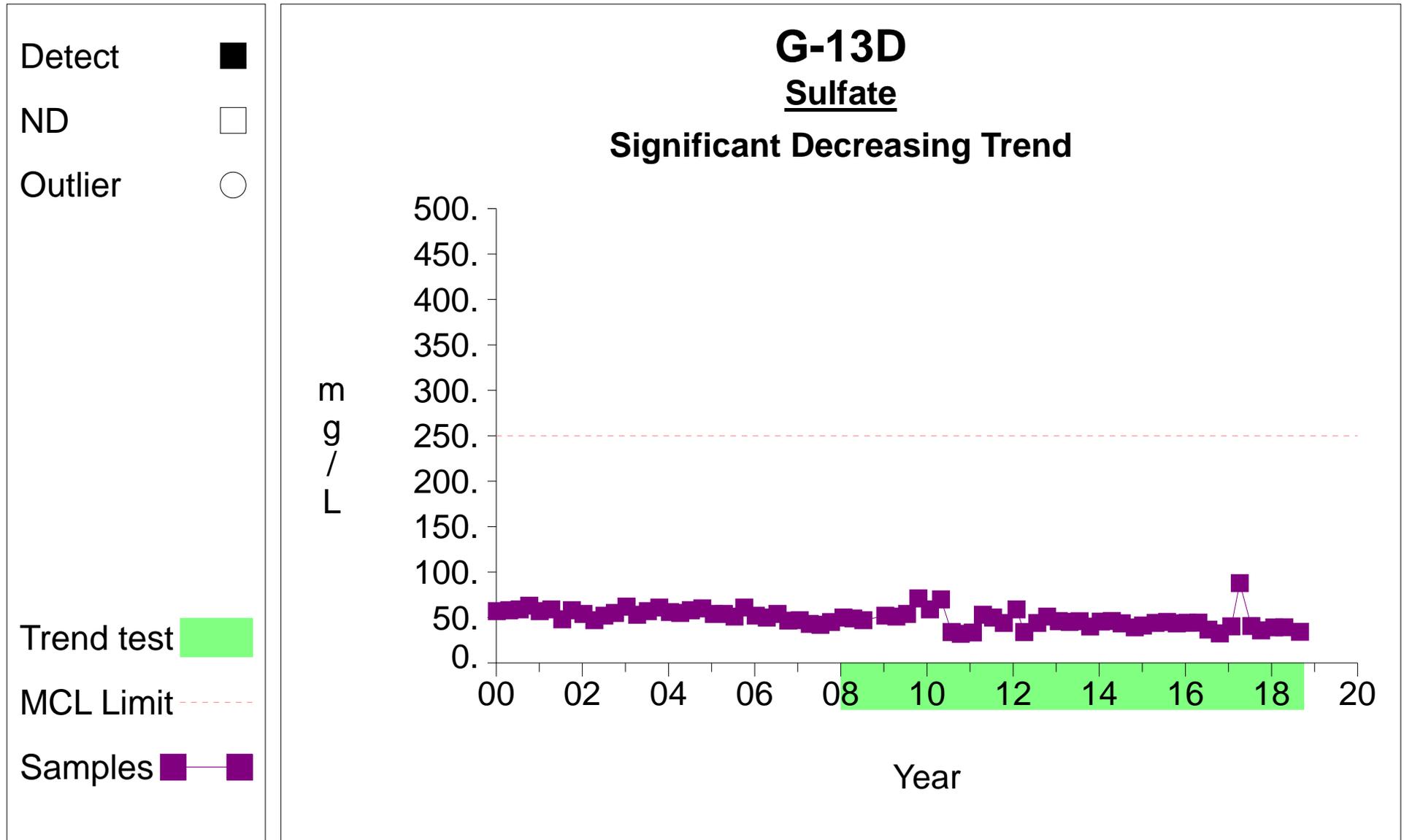
Graph 214

Time Series



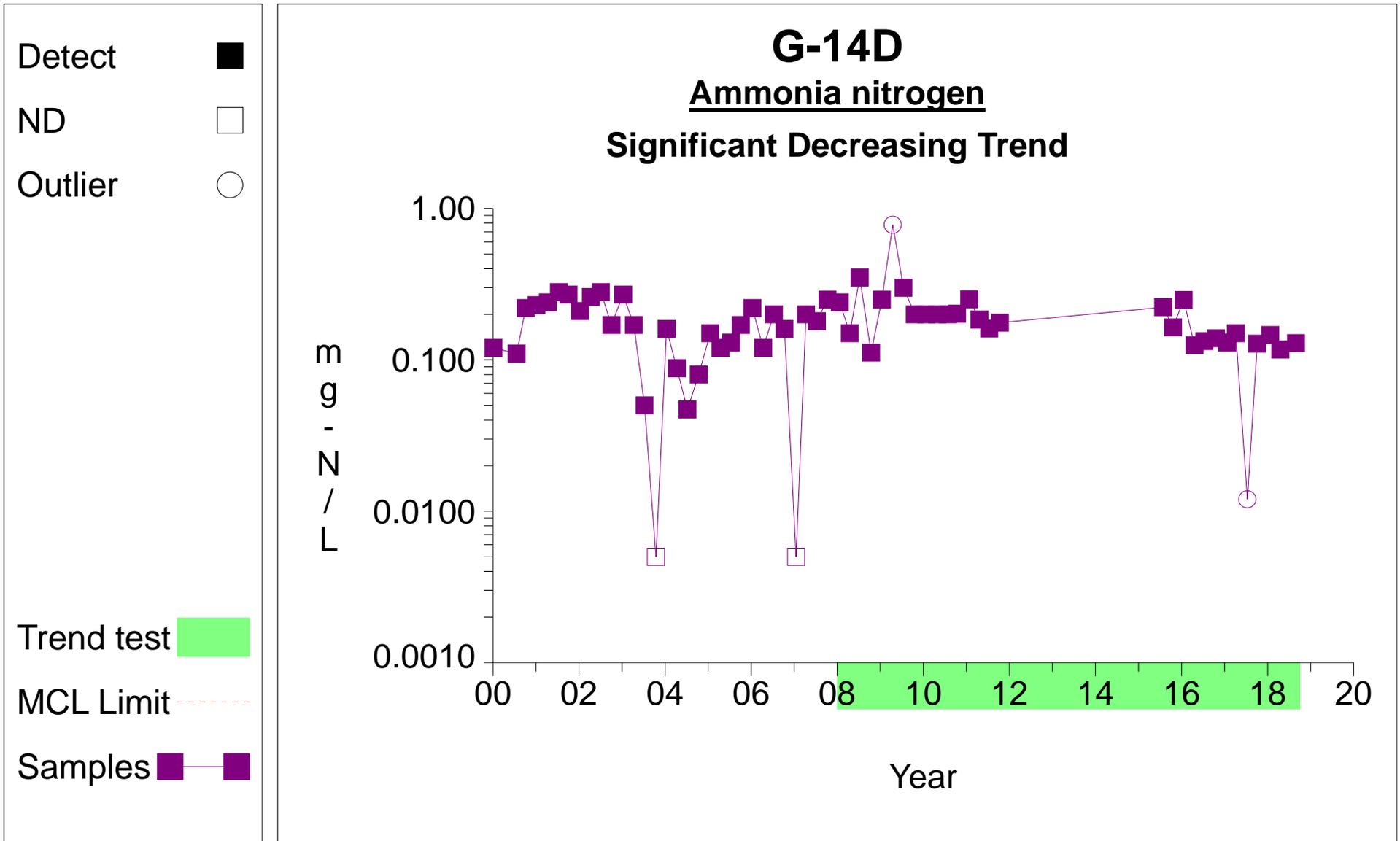
Graph 219

Time Series



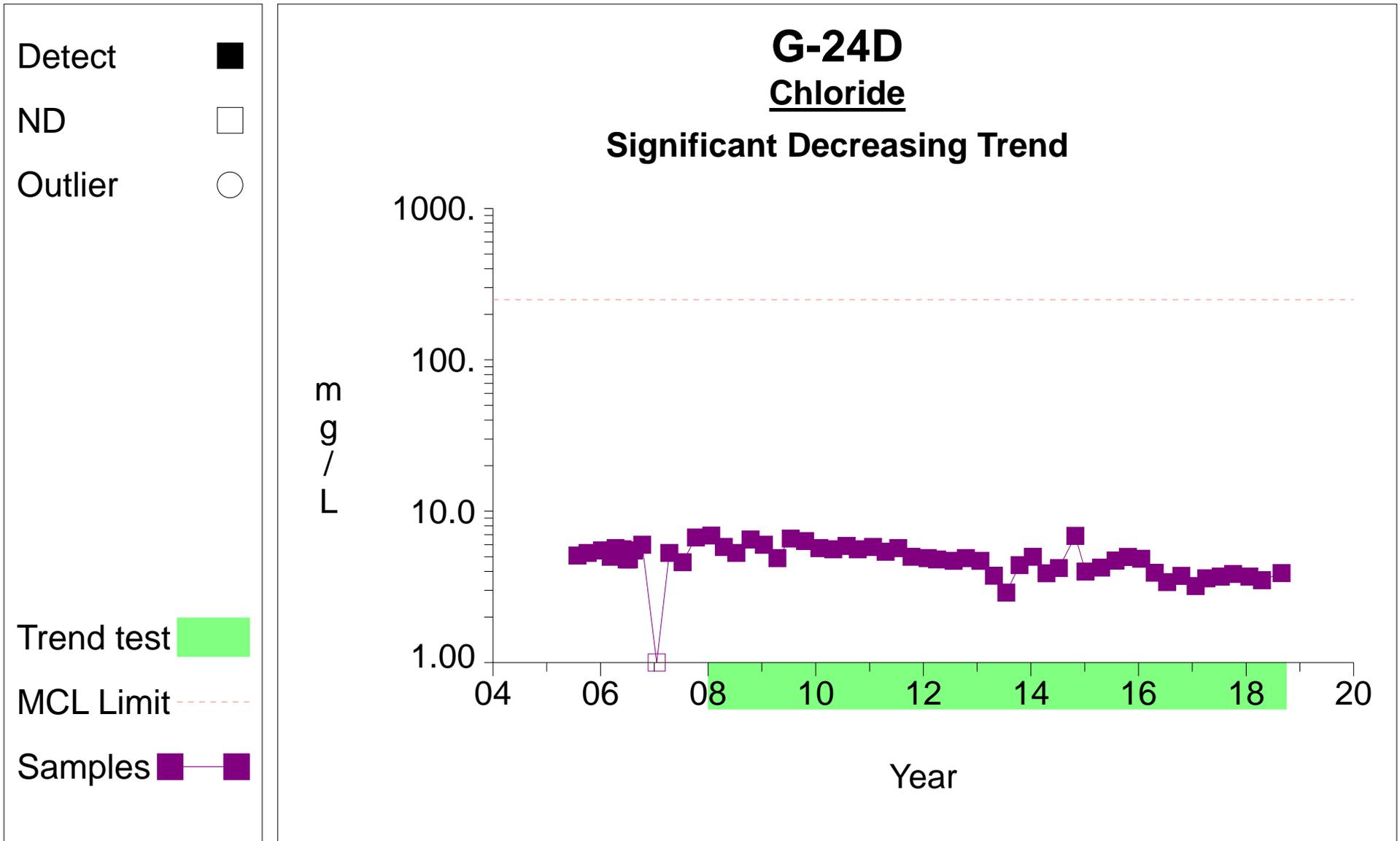
Graph 229

Time Series



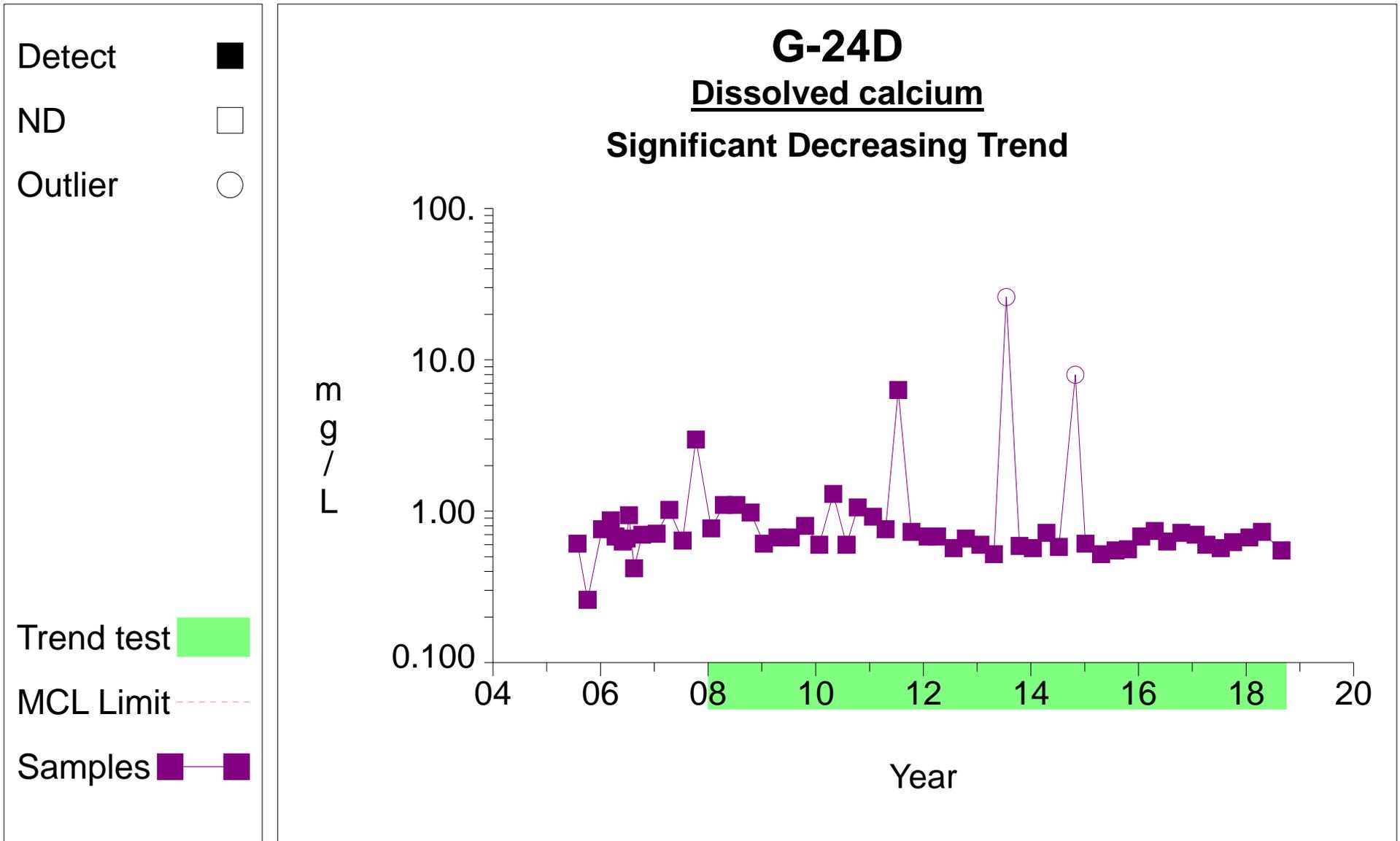
Graph 233

Time Series



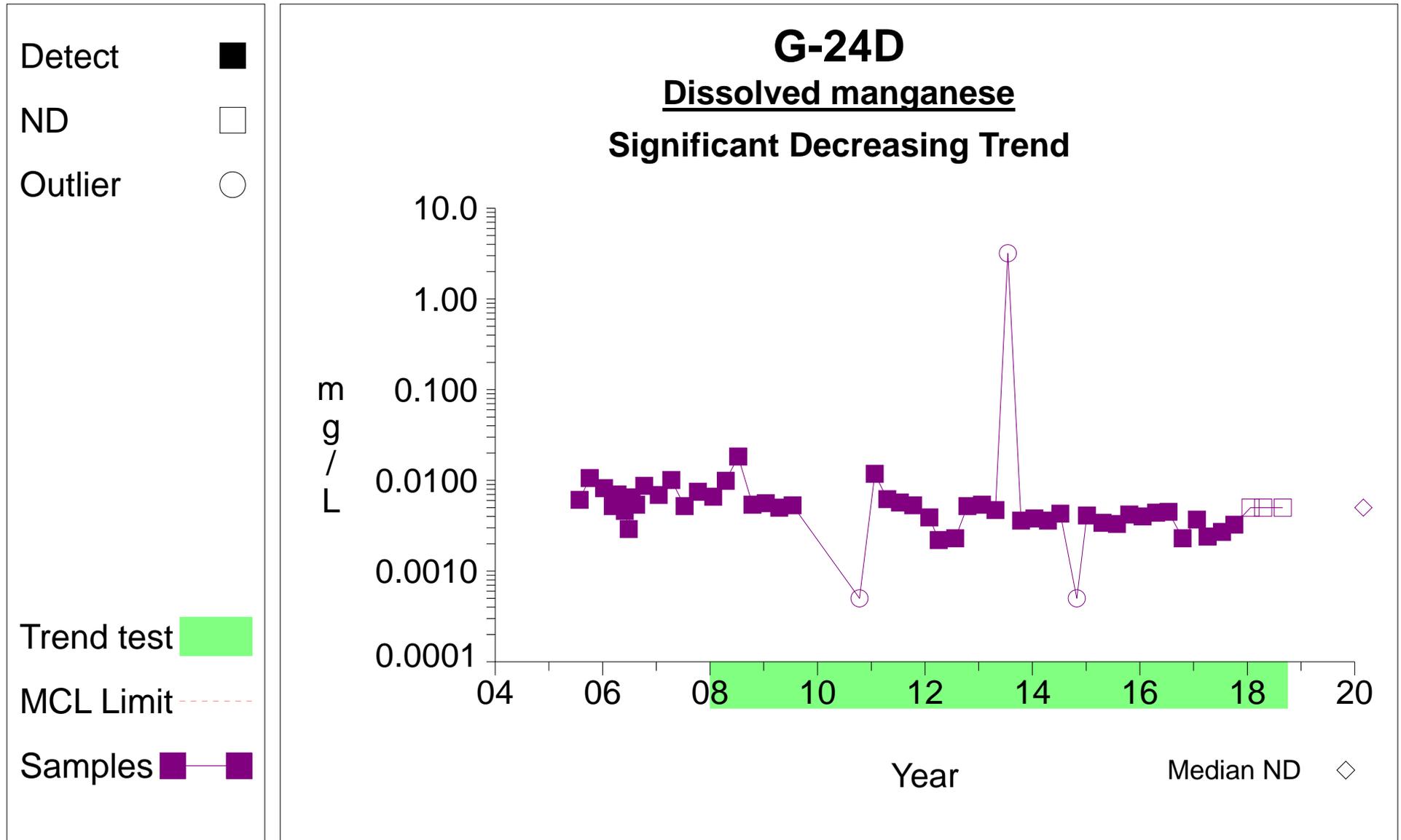
Graph 269

Time Series



Graph 276

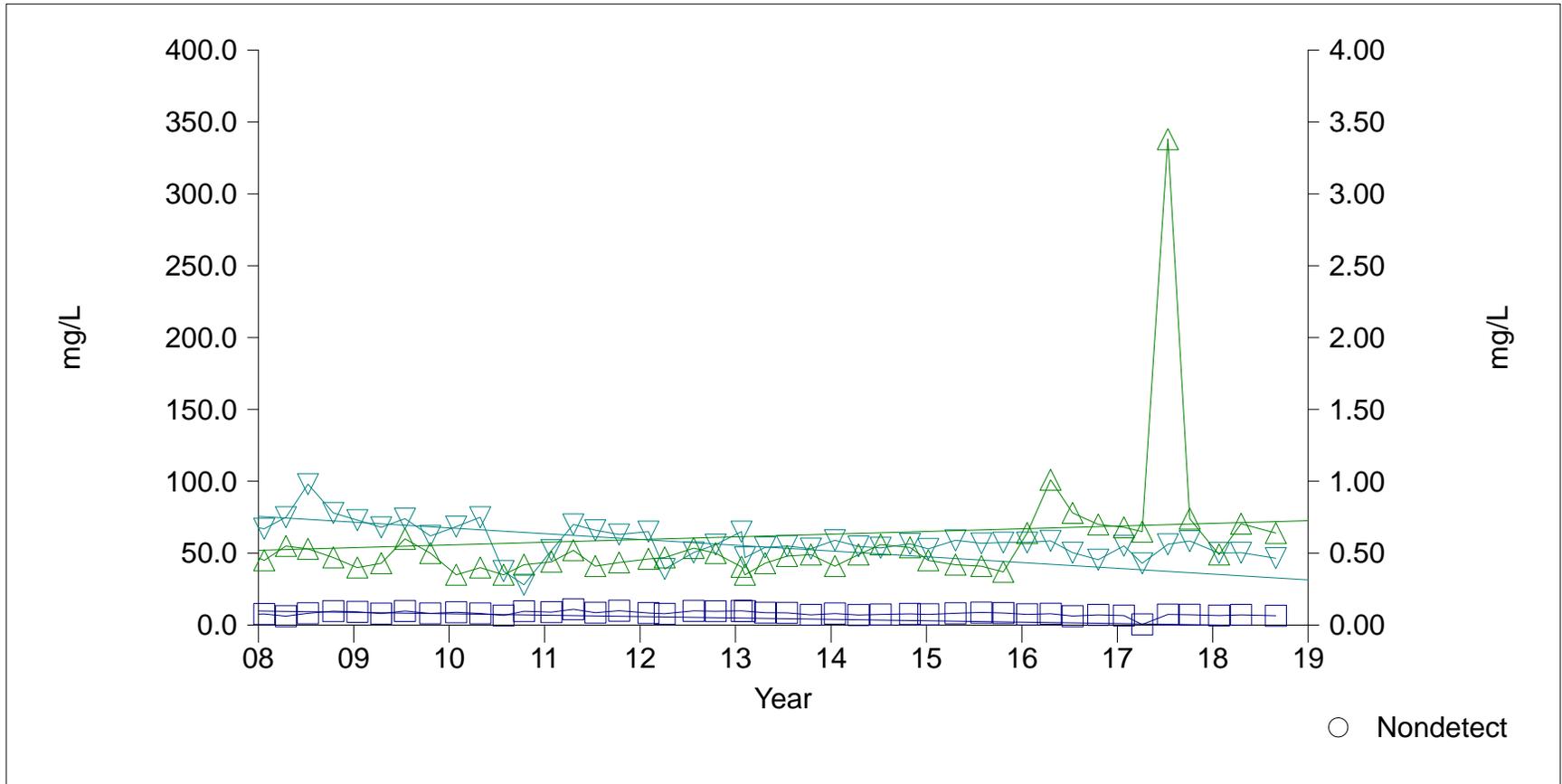
Time Series



Graph 283

Cathcart Landfill

Time Series Plot for G-01D



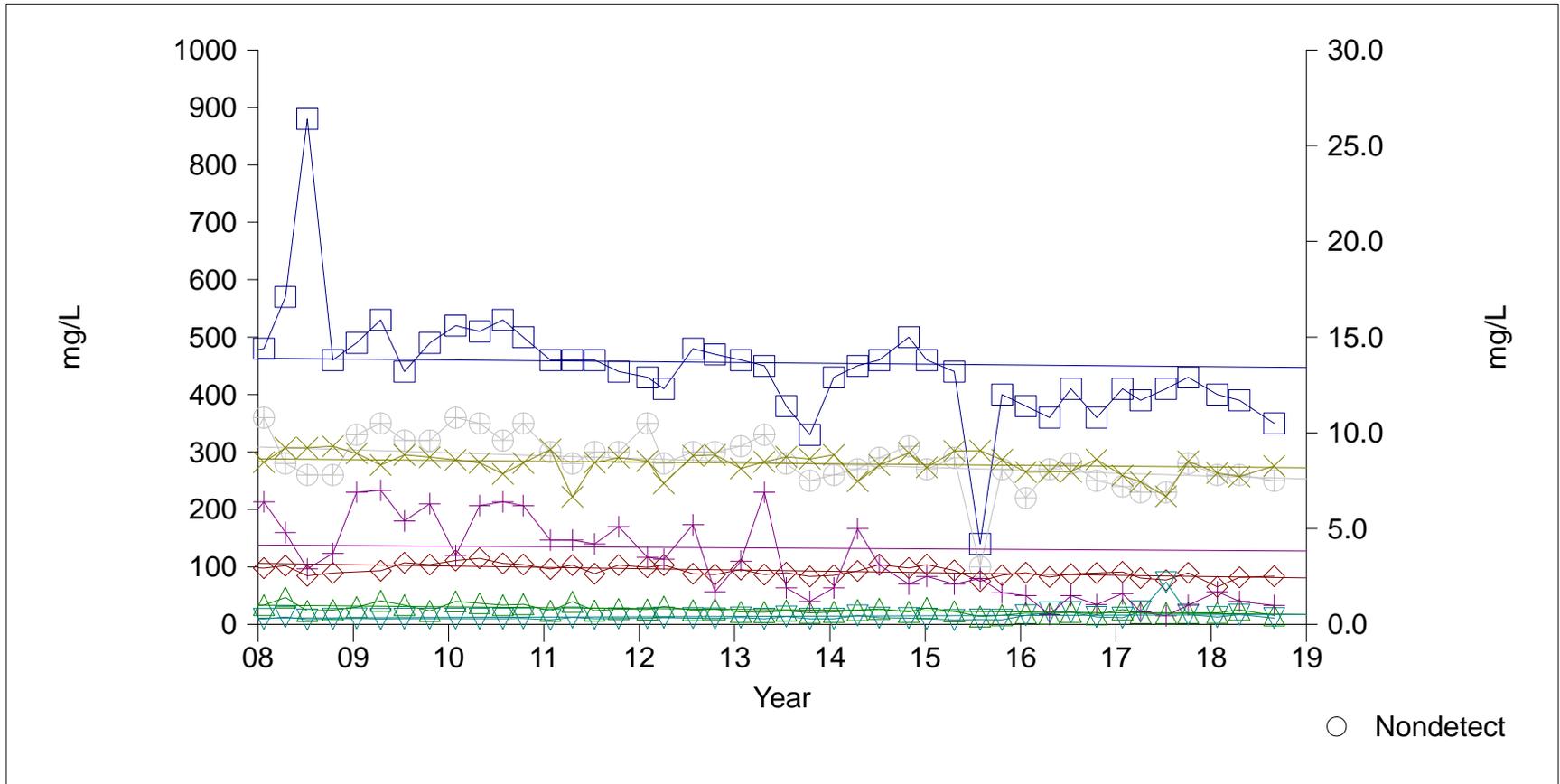
▽ Sulfate
□ Chloride

△ Dissolved potassium

○ Nondetect

Cathcart Landfill

Time Series Plot for G-02D



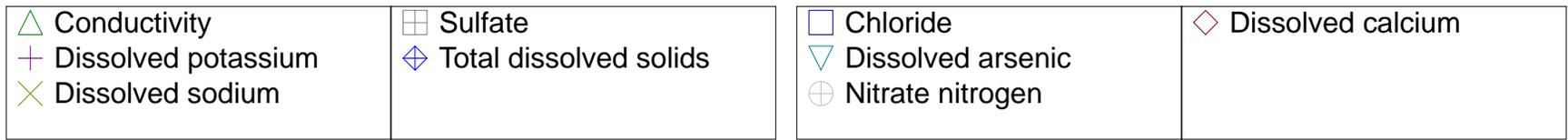
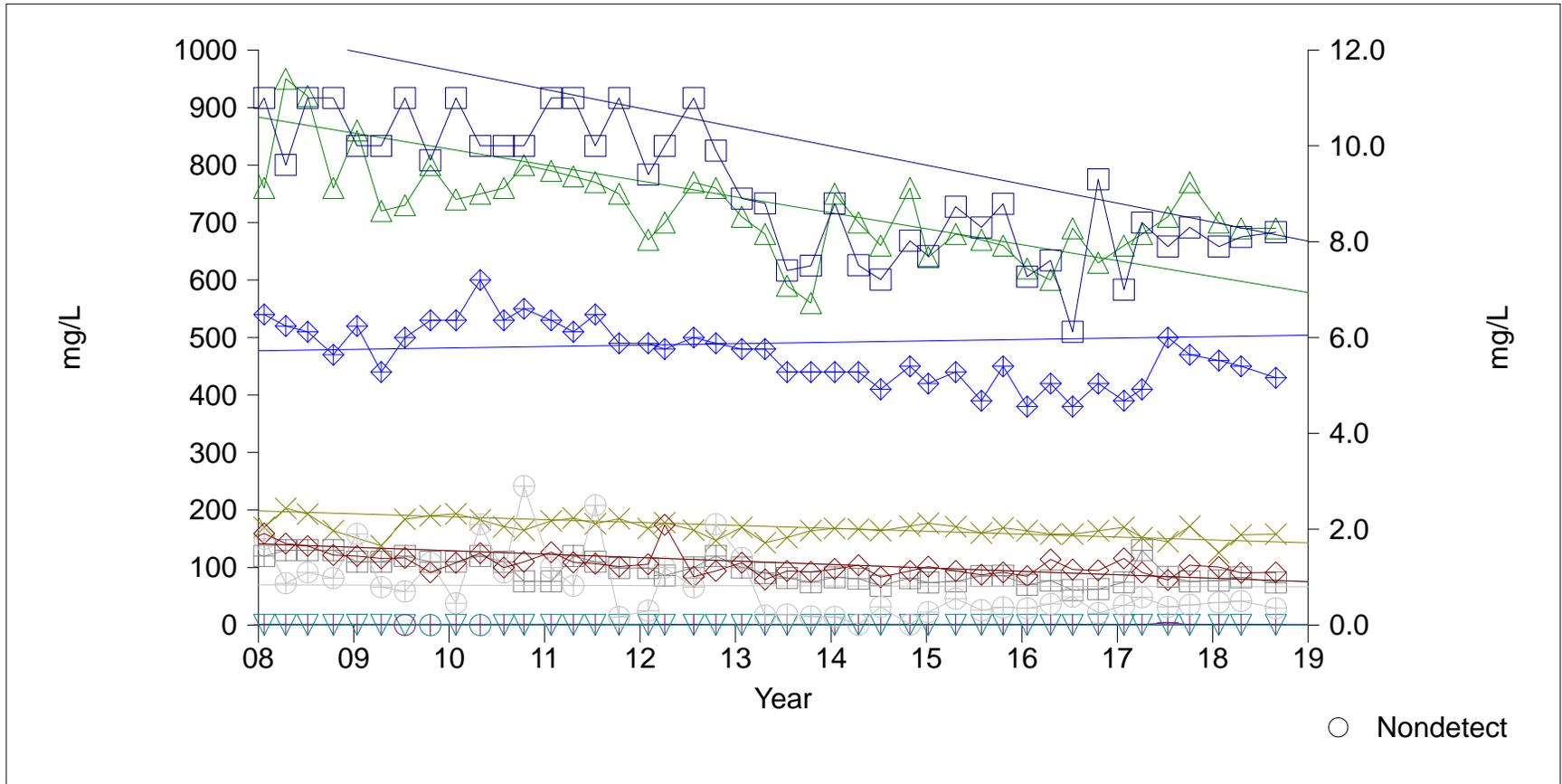
◇ Dissolved sodium
□ Conductivity
⊕ Total dissolved solids

△ Dissolved calcium
▽ Dissolved potassium
+ Nitrate nitrogen

× pH

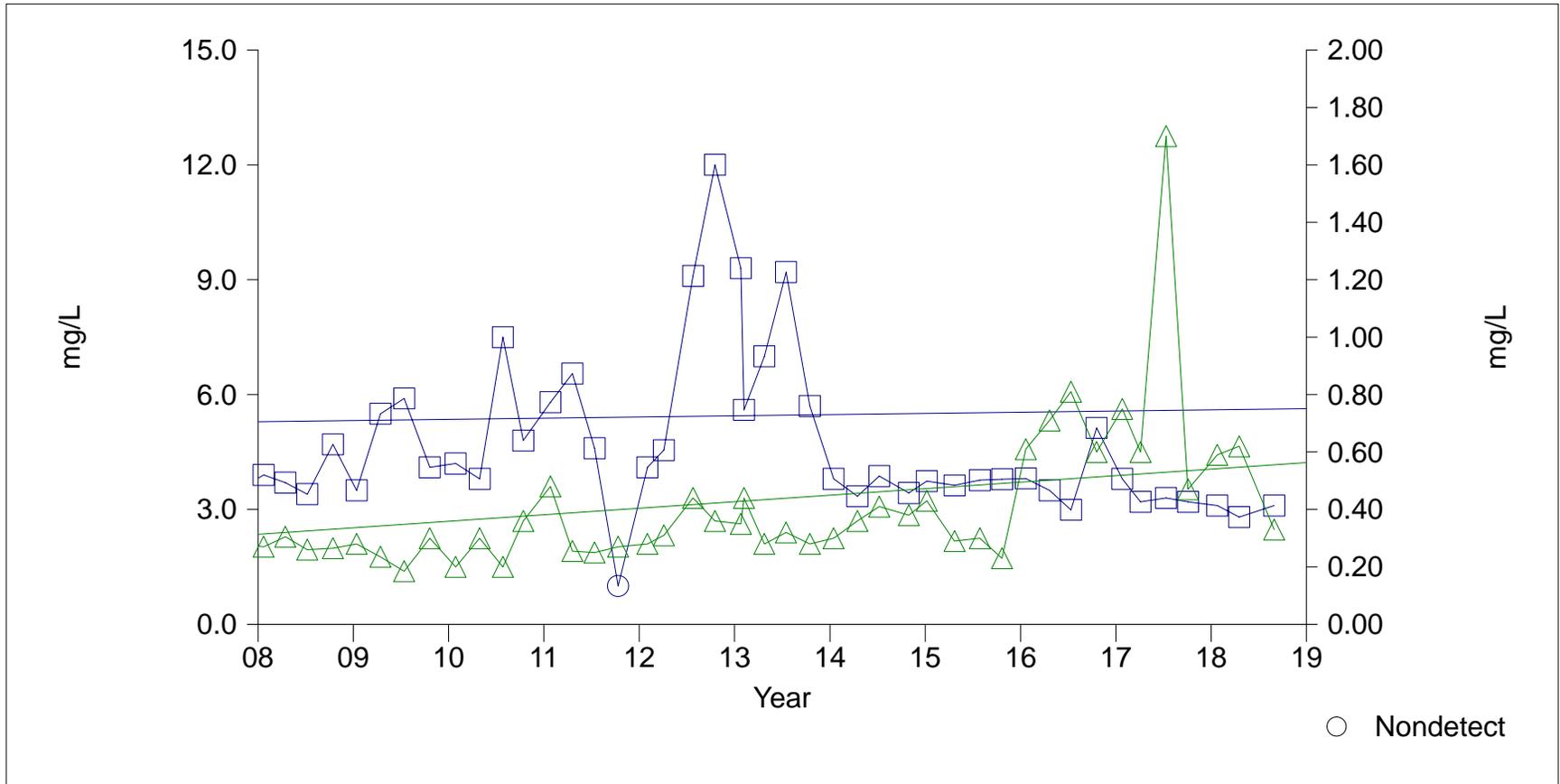
Cathcart Landfill

Time Series Plot for G-06B



Cathcart Landfill

Time Series Plot for G-08D2



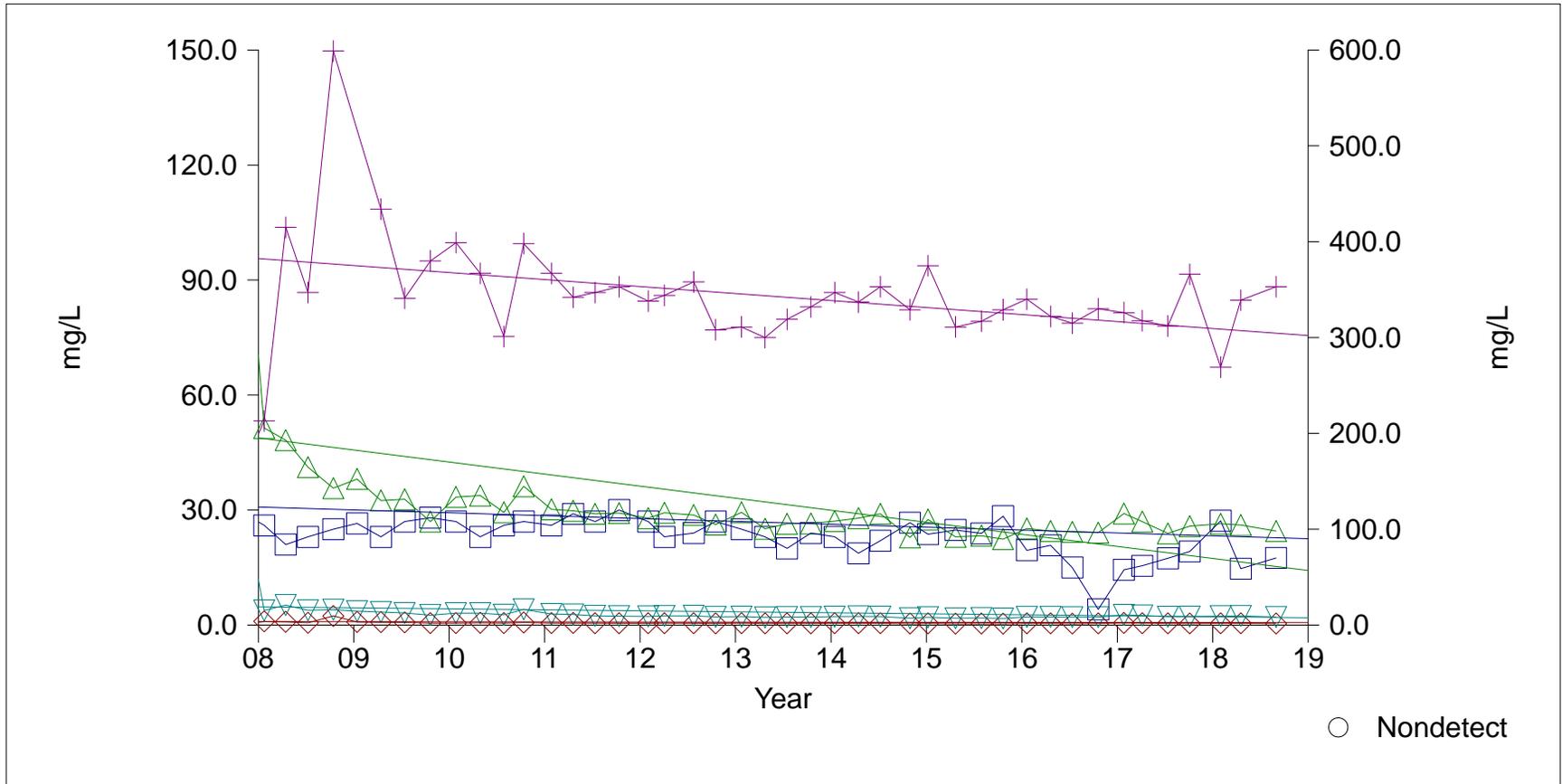
□ Chloride

△ Dissolved potassium

○ Nondetect

Cathcart Landfill

Time Series Plot for G-10D



□ Chloride
△ Dissolved calcium
▽ Dissolved magnesium

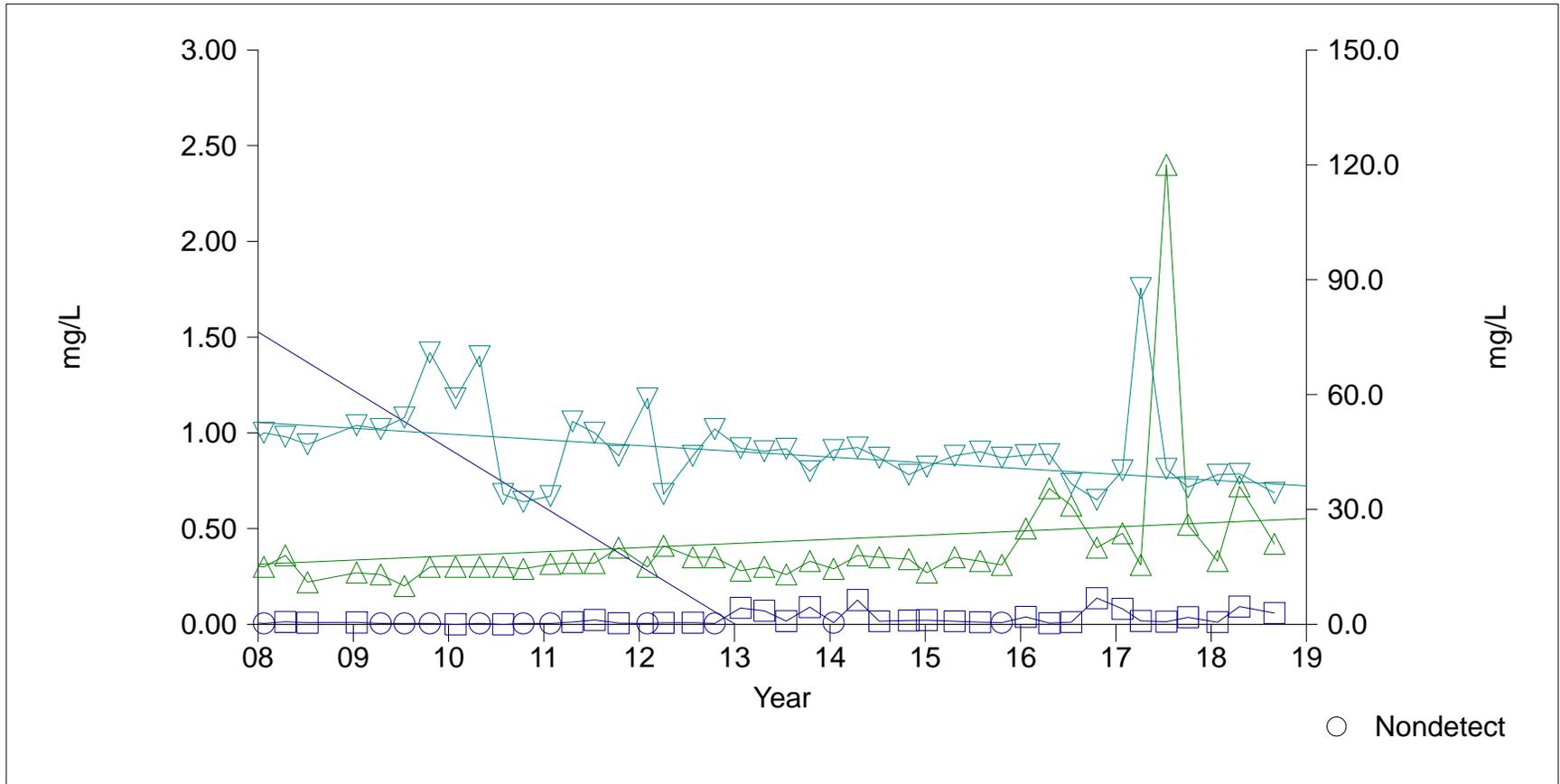
◇ Dissolved manganese

+ Dissolved sodium

○ Nondetect

Cathcart Landfill

Time Series Plot for G-13D



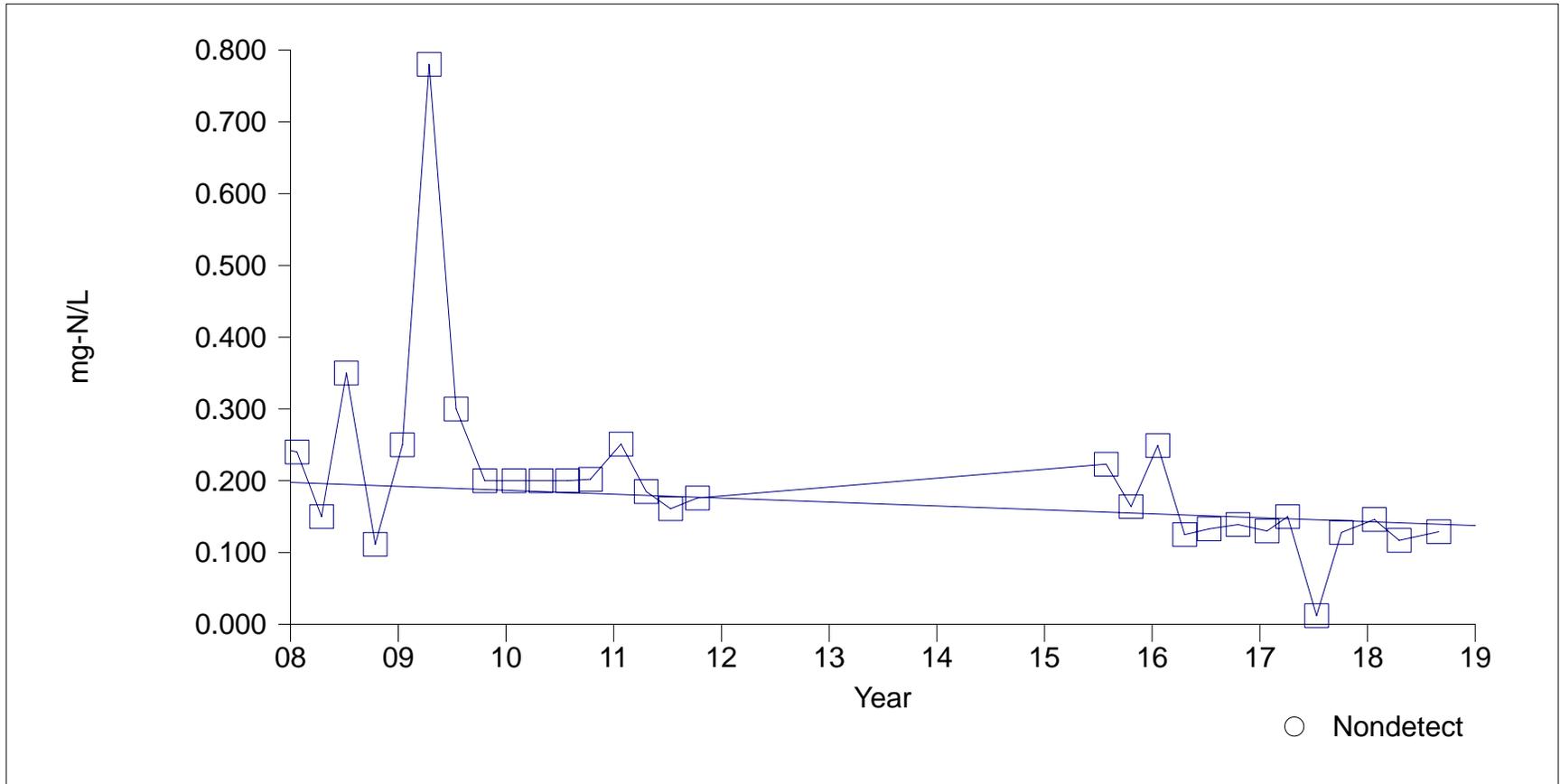
□ Dissolved iron
△ Dissolved potassium

▽ Sulfate

○ Nondetect

Cathcart Landfill

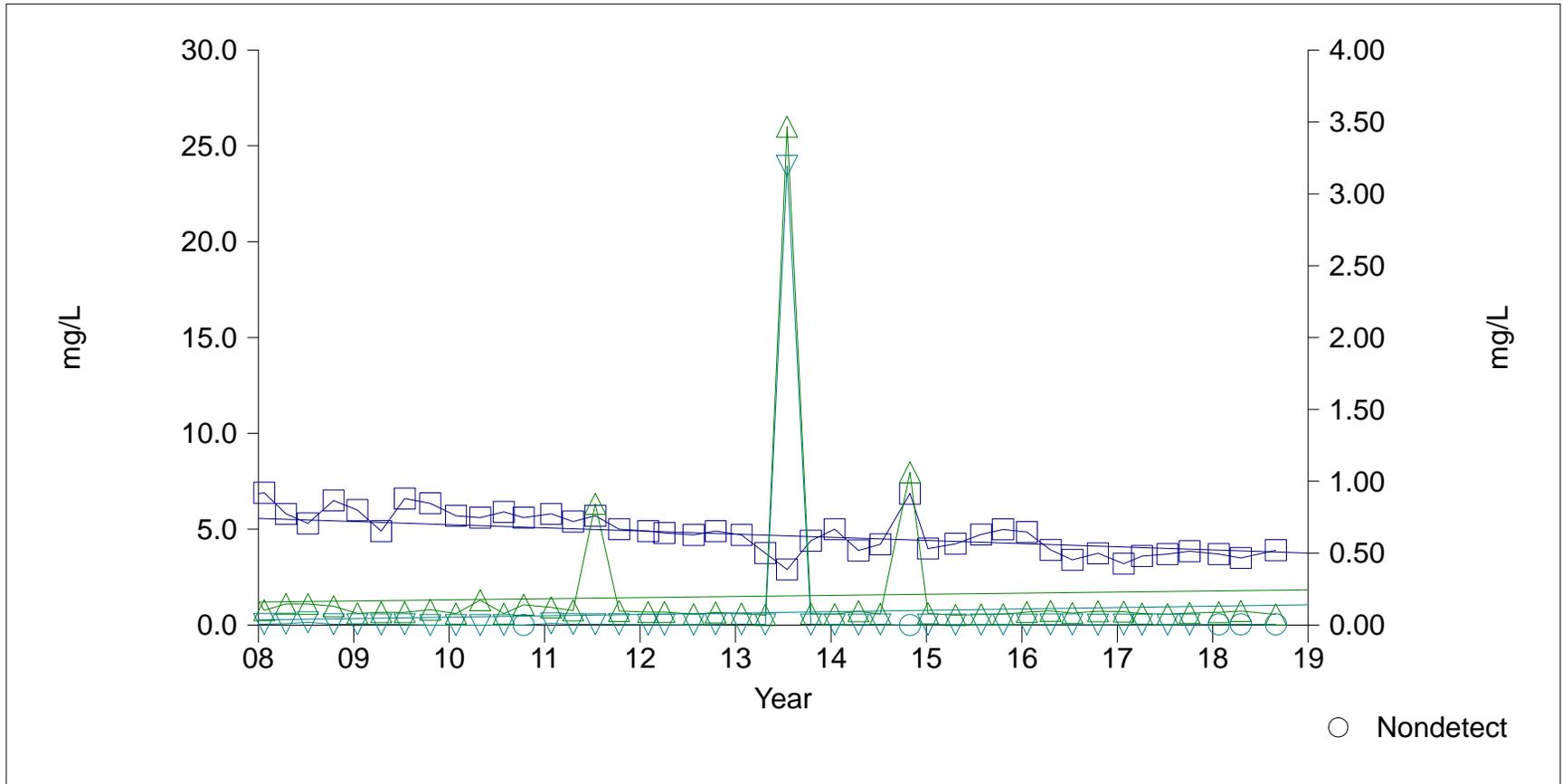
Time Series Plot for G-14D



Ammonia nitrogen

Cathcart Landfill

Time Series Plot for G-24D

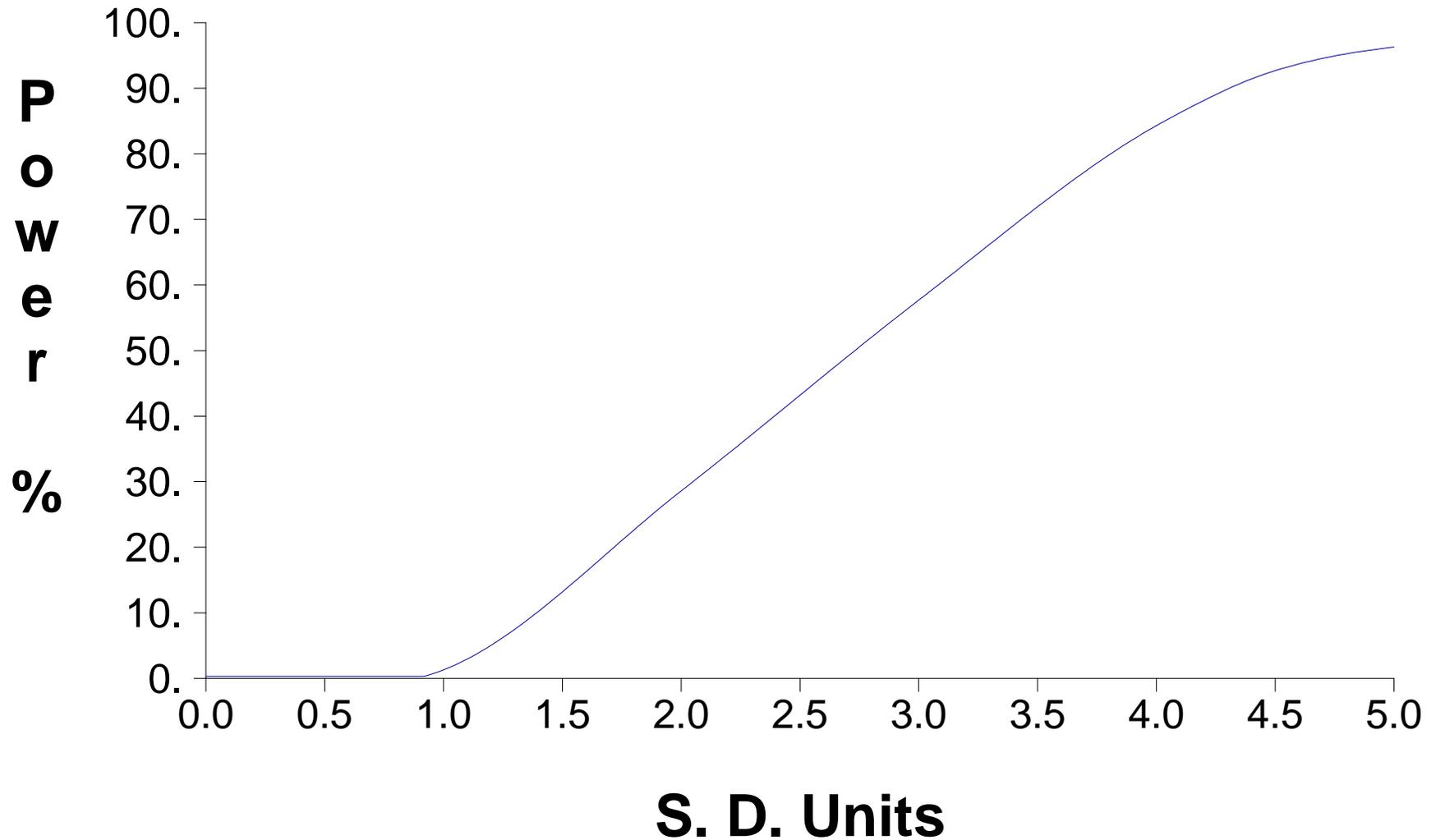


□ Chloride
△ Dissolved calcium

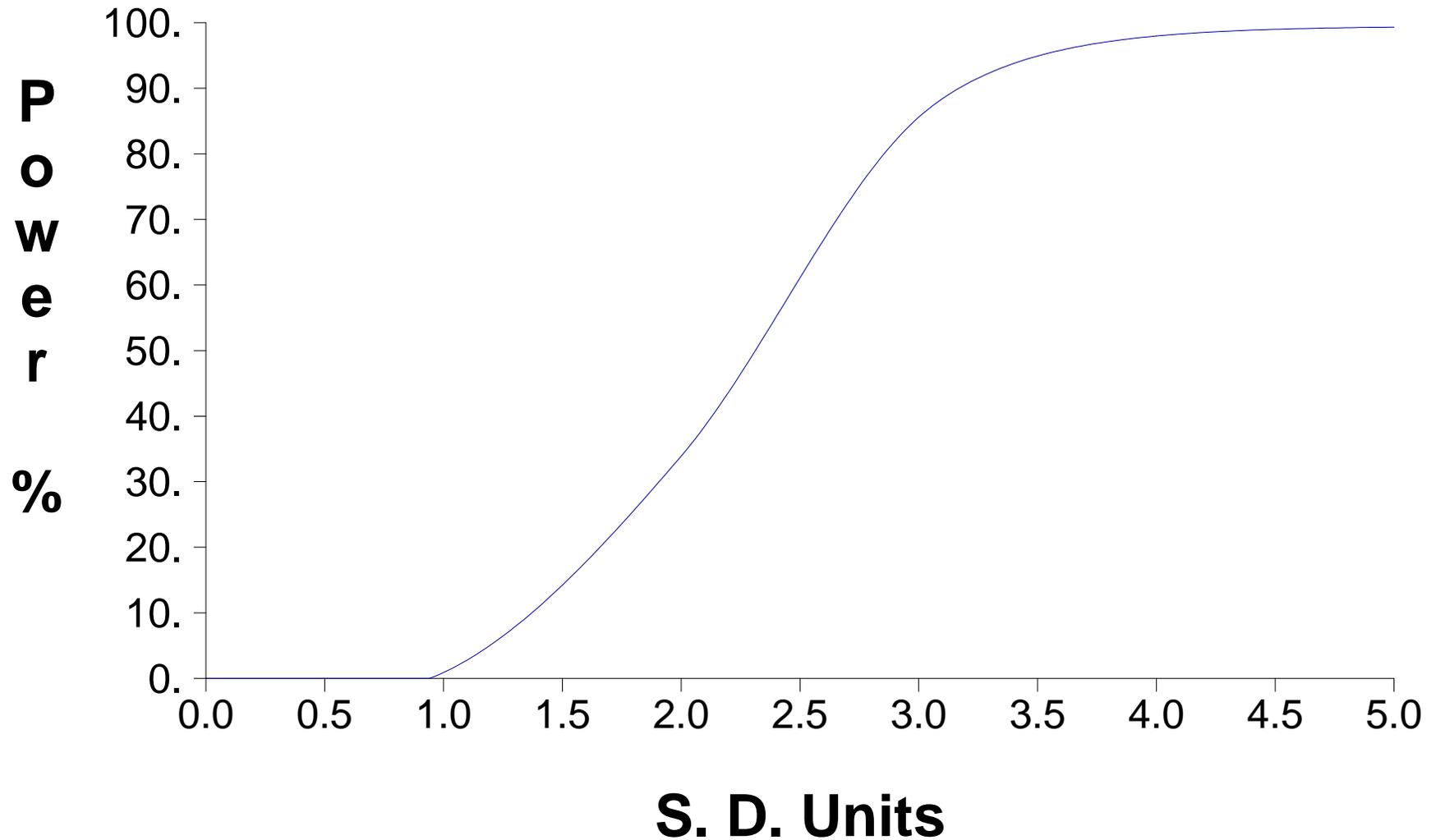
▽ Dissolved manganese

○ Nondetect

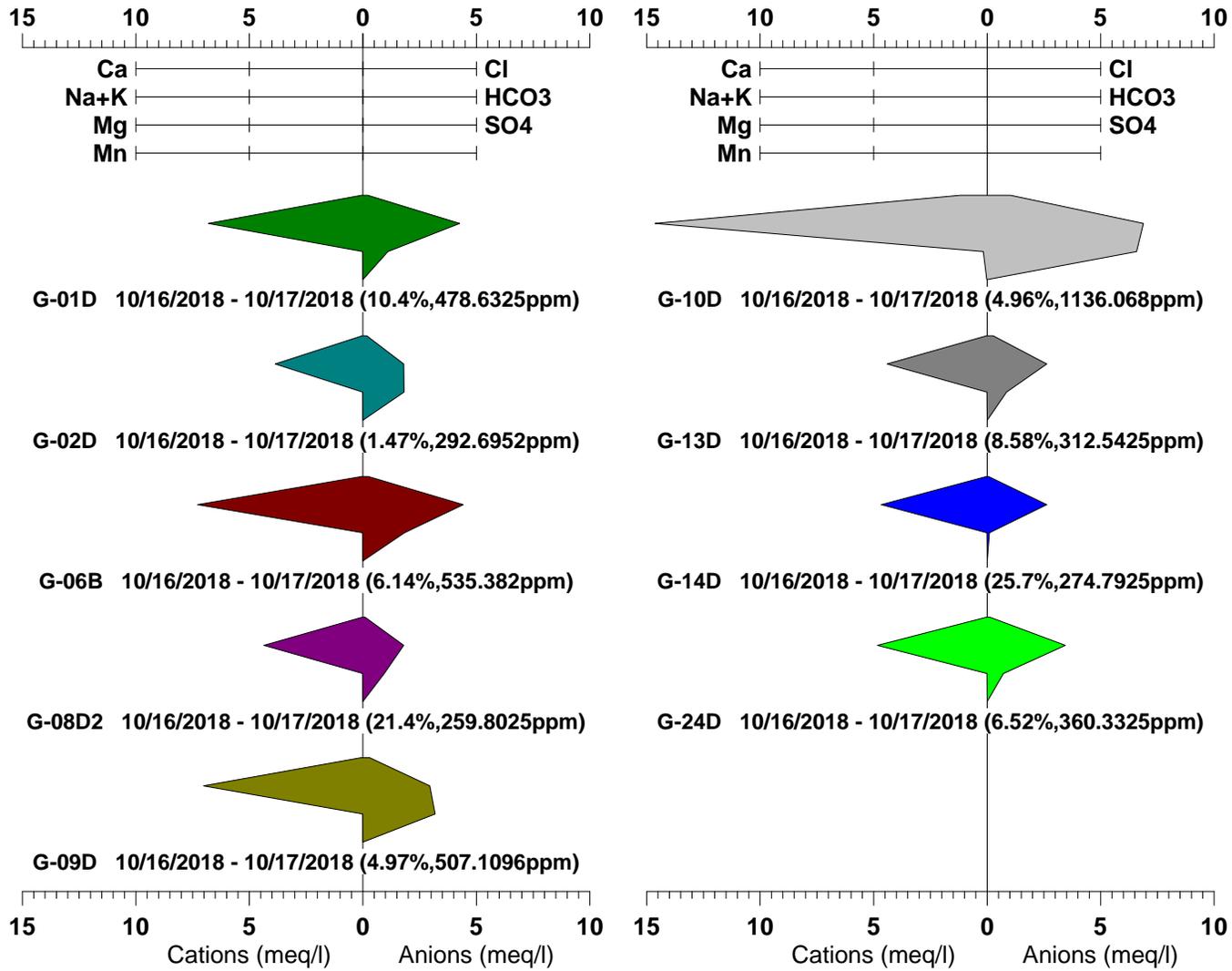
False Positive and False Negative Rates for Current Intra-Well Prediction Limits Monitoring Program



False Positive and False Negative Rates for Current Upgradient vs. Downgradient Monitoring Program



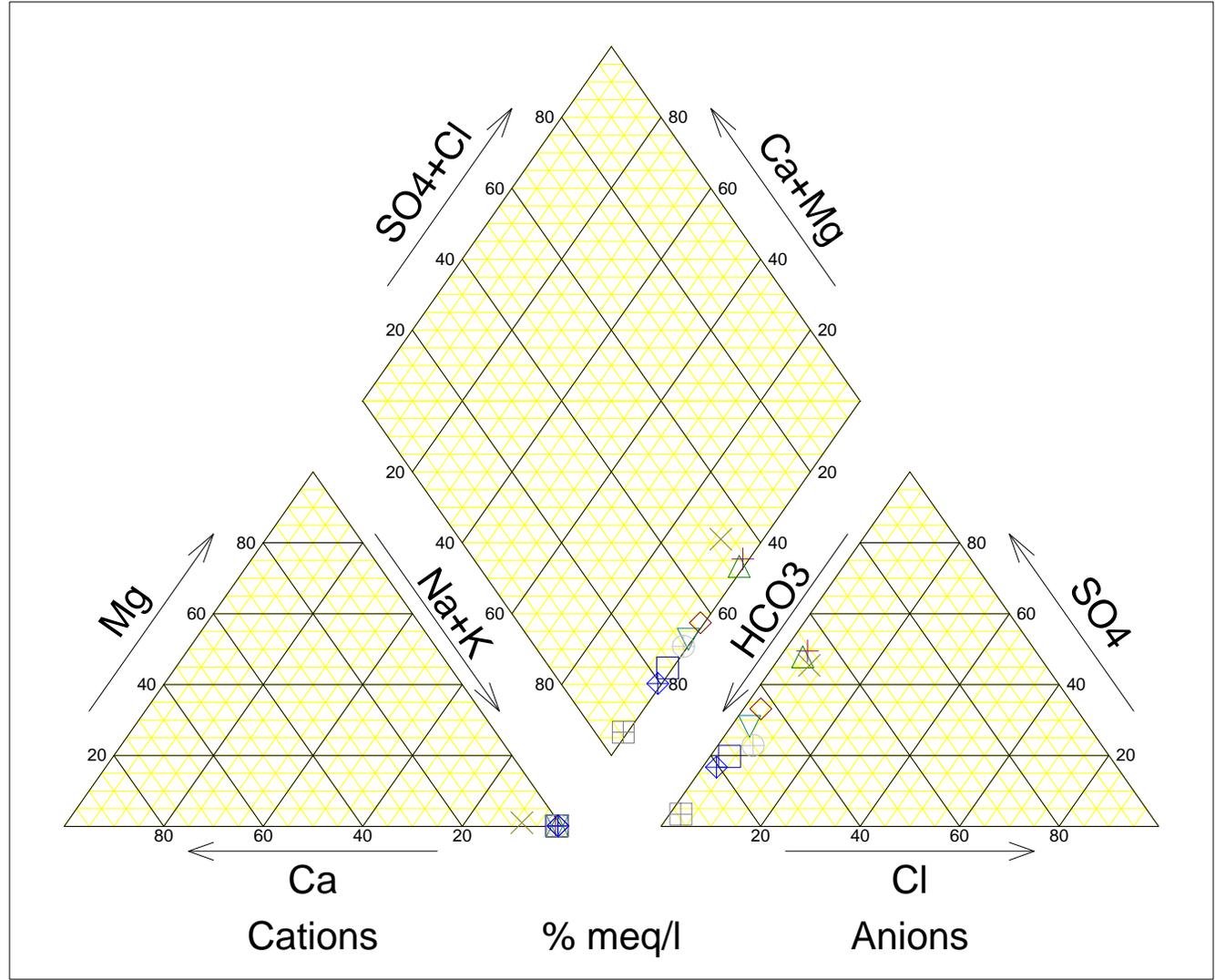
Cathcart Landfill



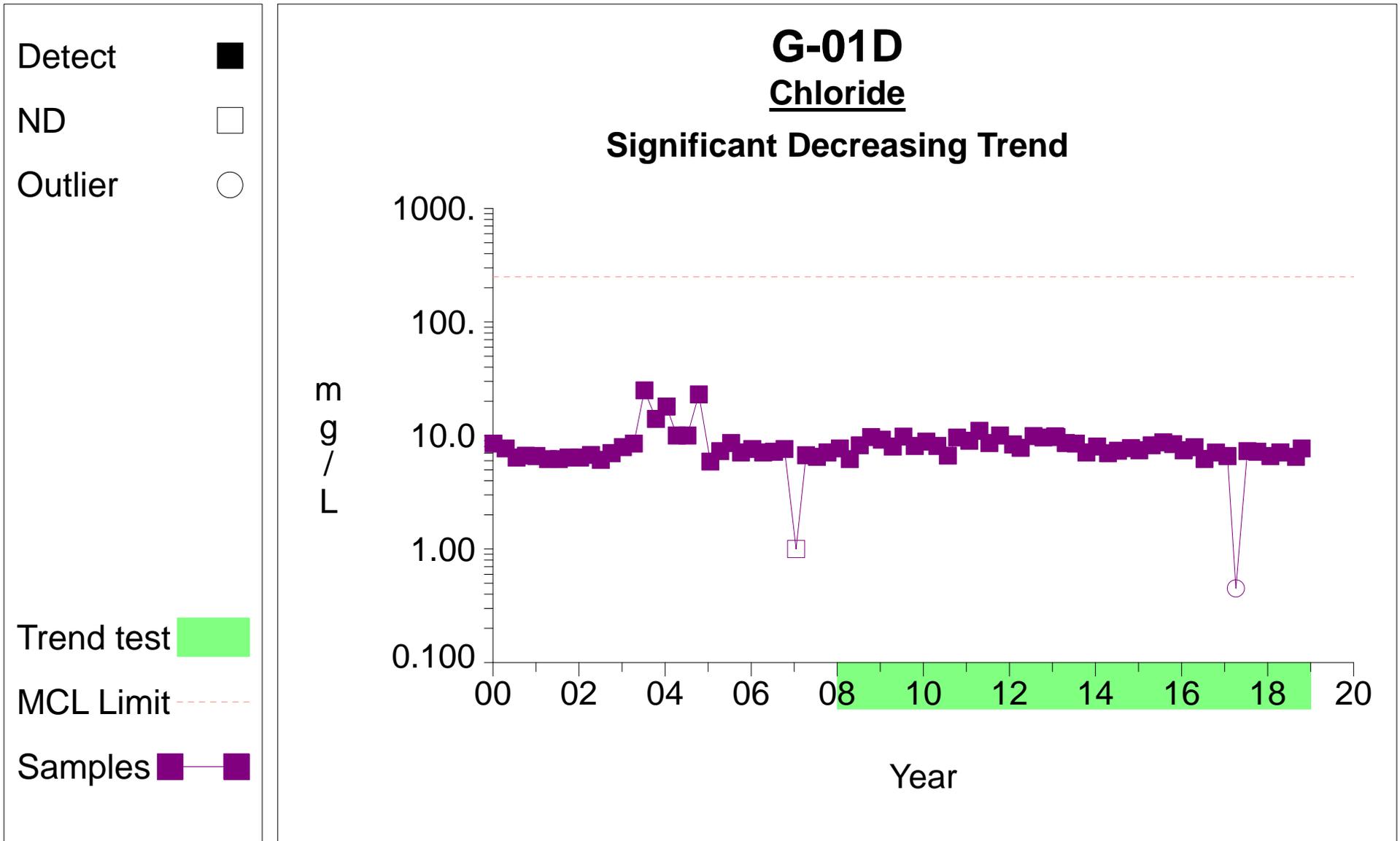
Prepared by: Snohomish County Solid Waste

Cathcart Landfill

□	G-01D	10/16/2018 - 10/17/2018 (10.4%, 478.63ppm)
△	G-02D	10/16/2018 - 10/17/2018 (1.47%, 292.69ppm)
▽	G-06B	10/16/2018 - 10/17/2018 (6.13%, 535.37ppm)
◇	G-08DZ	10/16/2018 - 10/17/2018 (21.4%, 259.8ppm)
+	G-09D	10/16/2018 - 10/17/2018 (4.97%, 507.1ppm)
×	G-10D	10/16/2018 - 10/17/2018 (4.91%, 1135.66ppm)
⊕	G-13D	10/16/2018 - 10/17/2018 (8.58%, 312.54ppm)
⊞	G-14D	10/16/2018 - 10/17/2018 (25.7%, 274.79ppm)
⊕	G-24D	10/16/2018 - 10/17/2018 (6.52%, 360.33ppm)

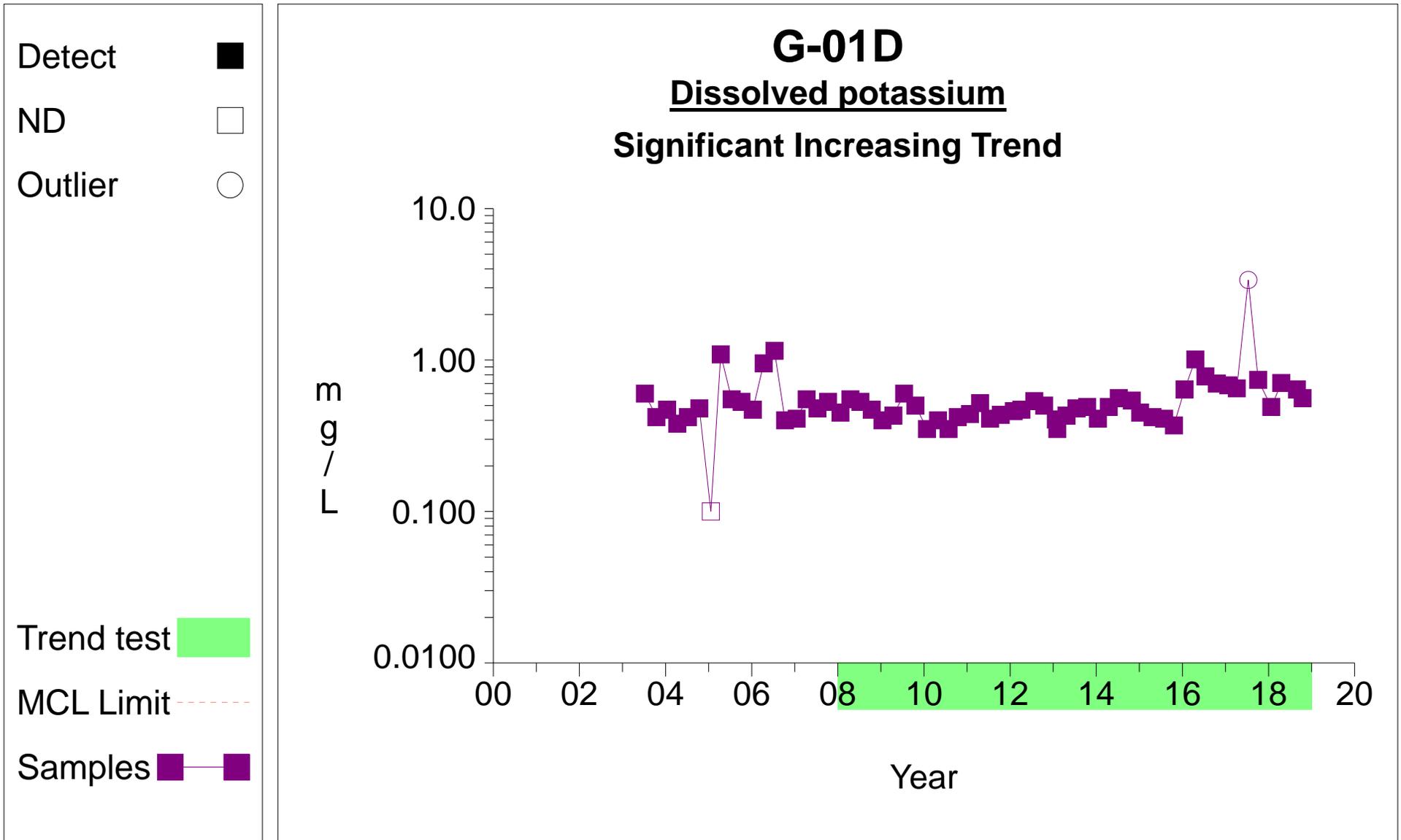


Time Series



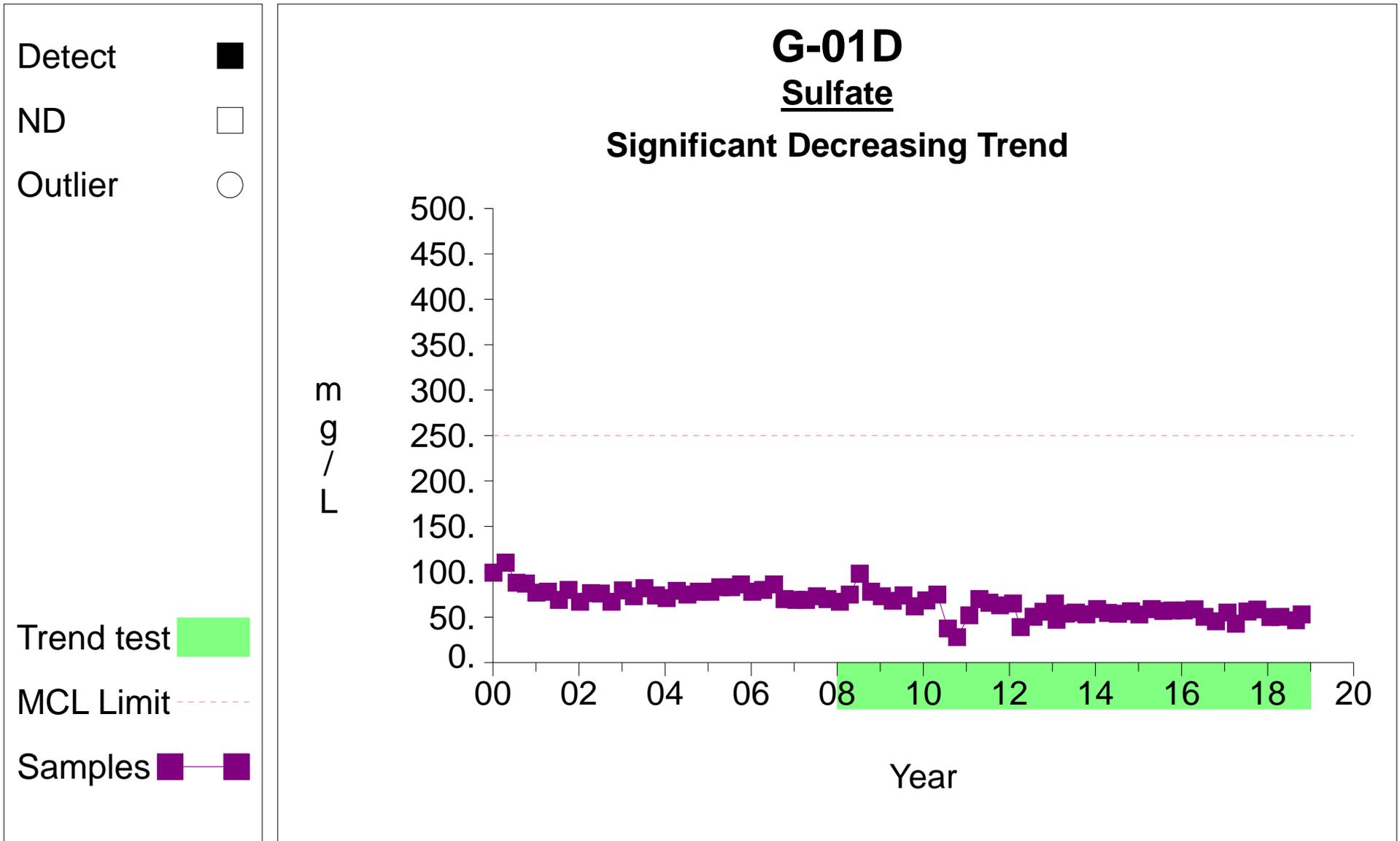
Graph 5

Time Series



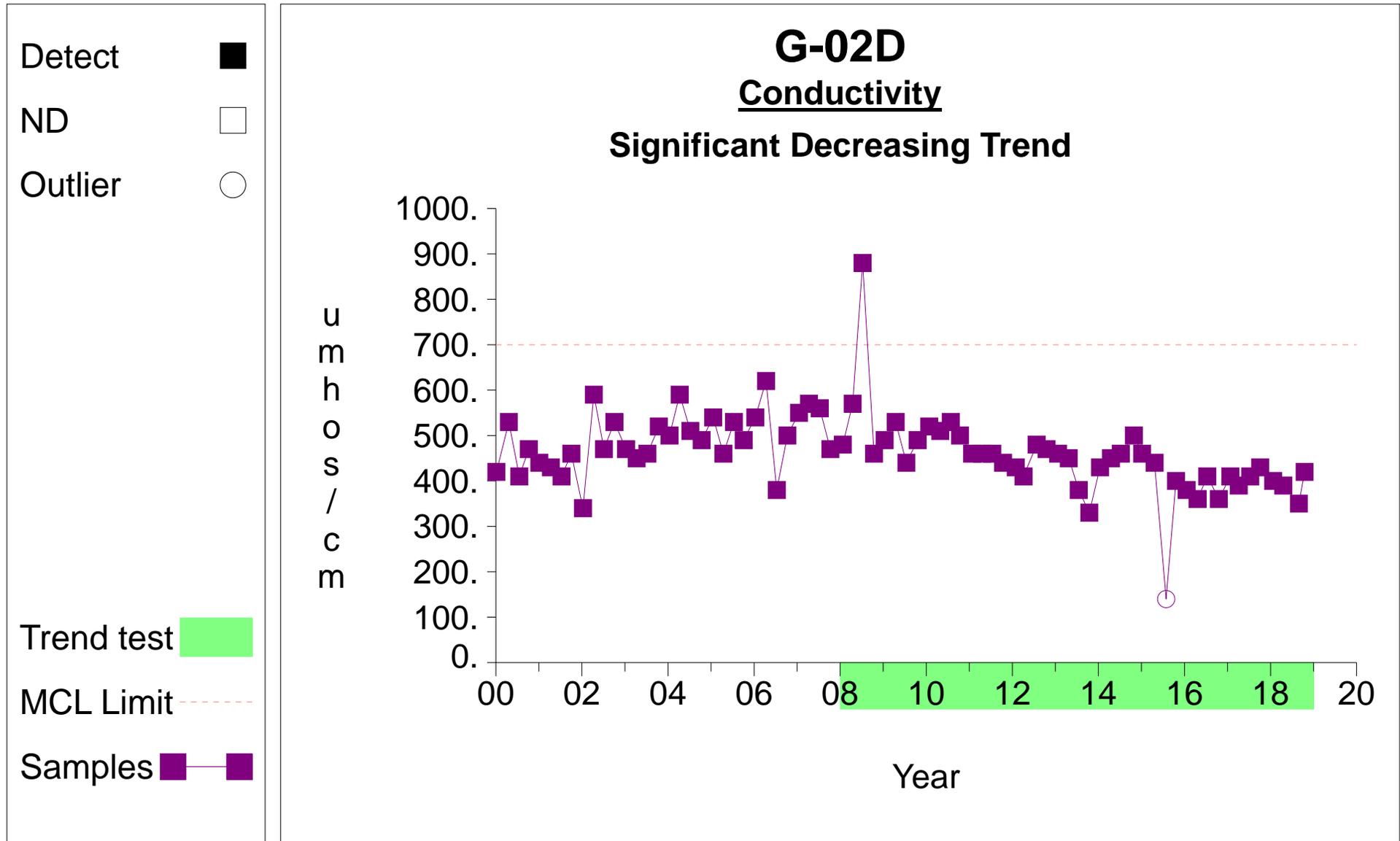
Graph 21

Time Series



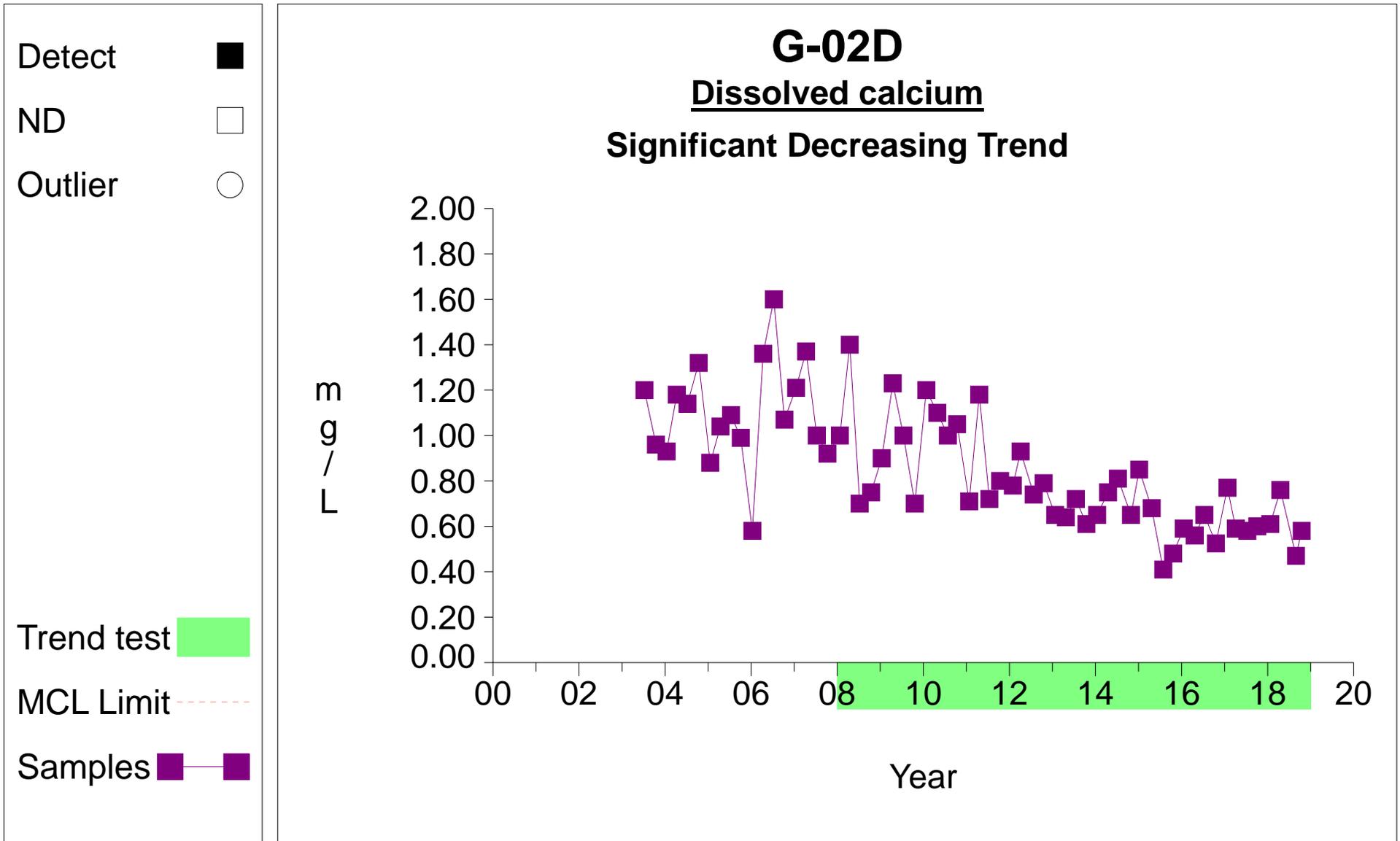
Graph 31

Time Series



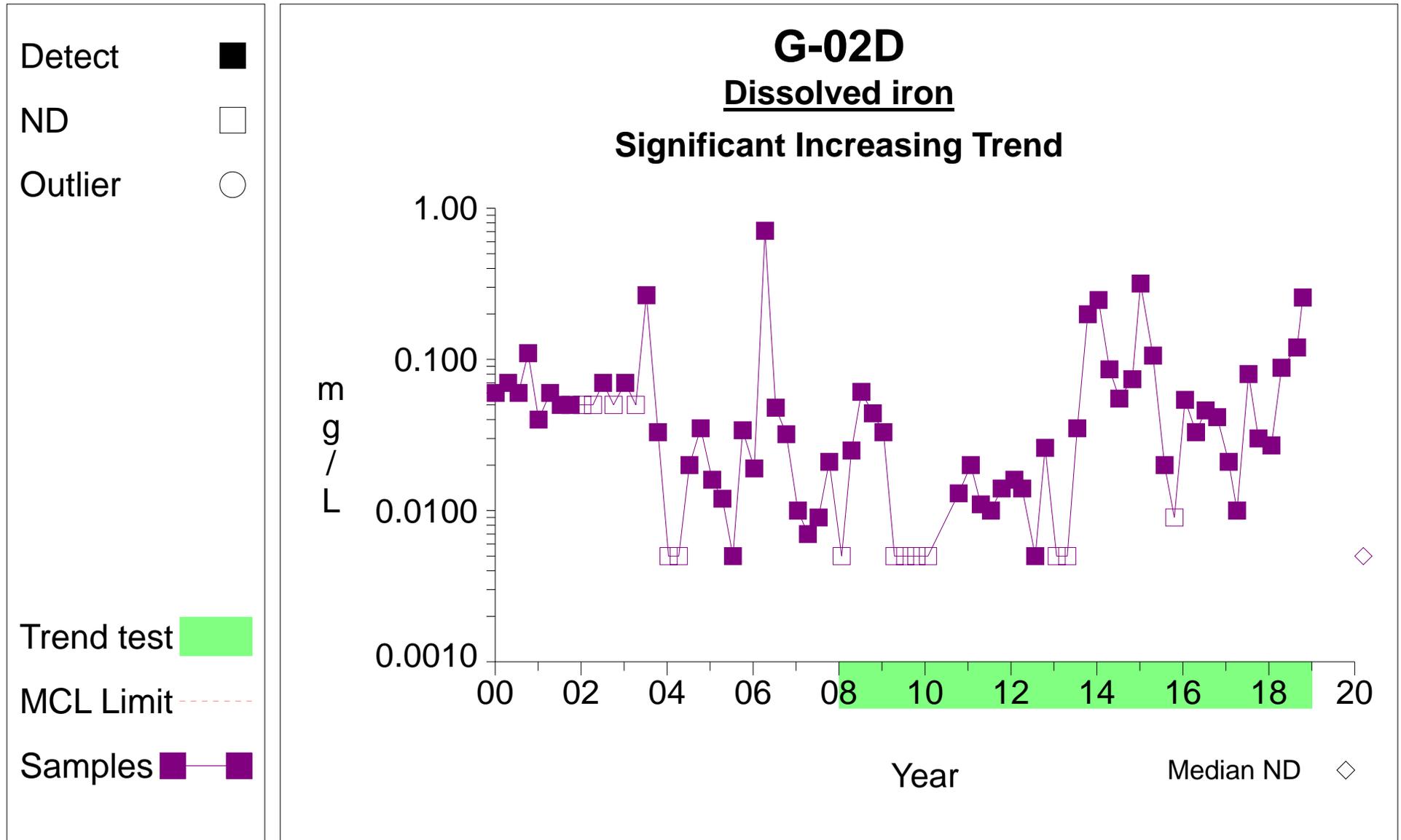
Graph 39

Time Series



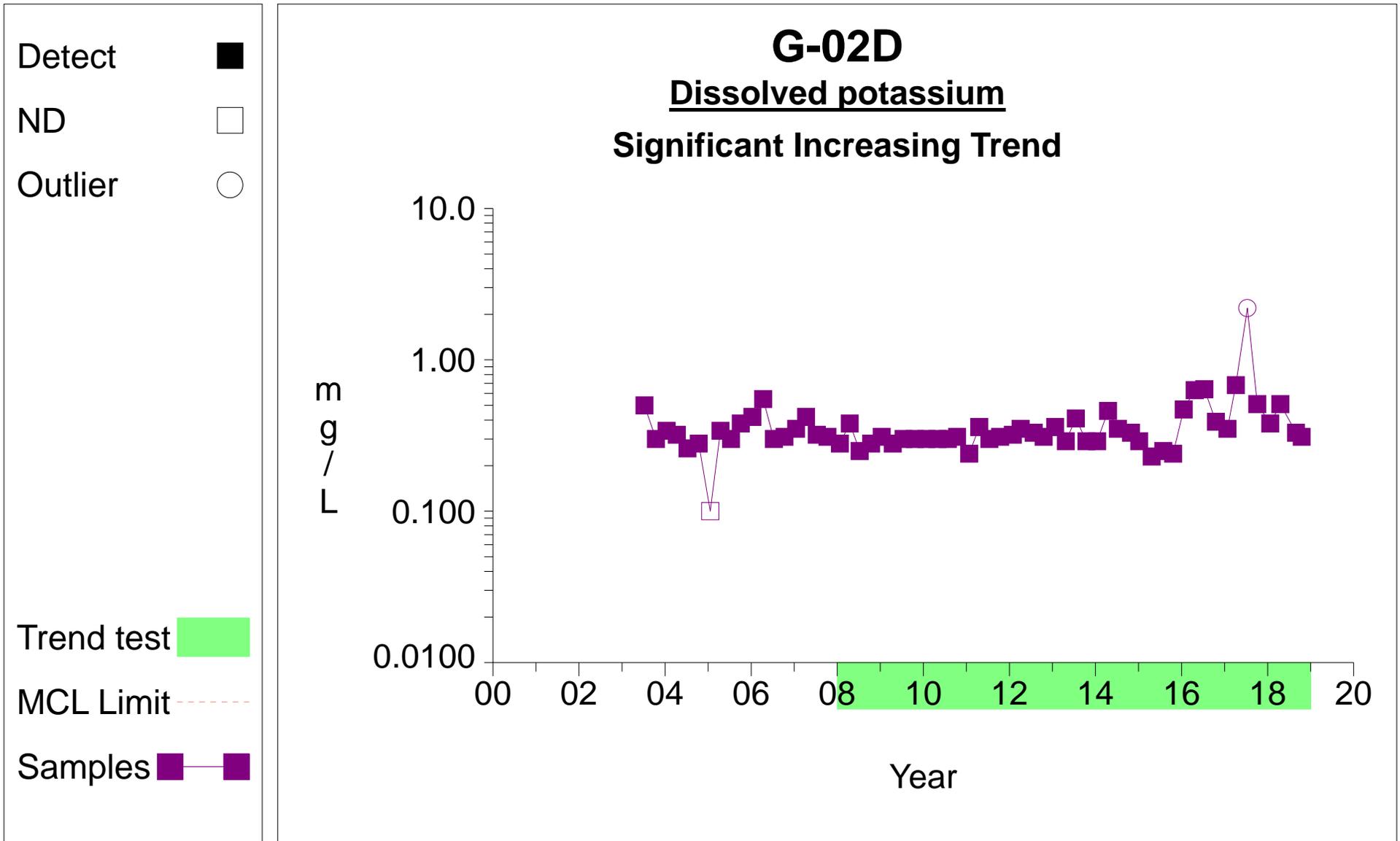
Graph 45

Time Series



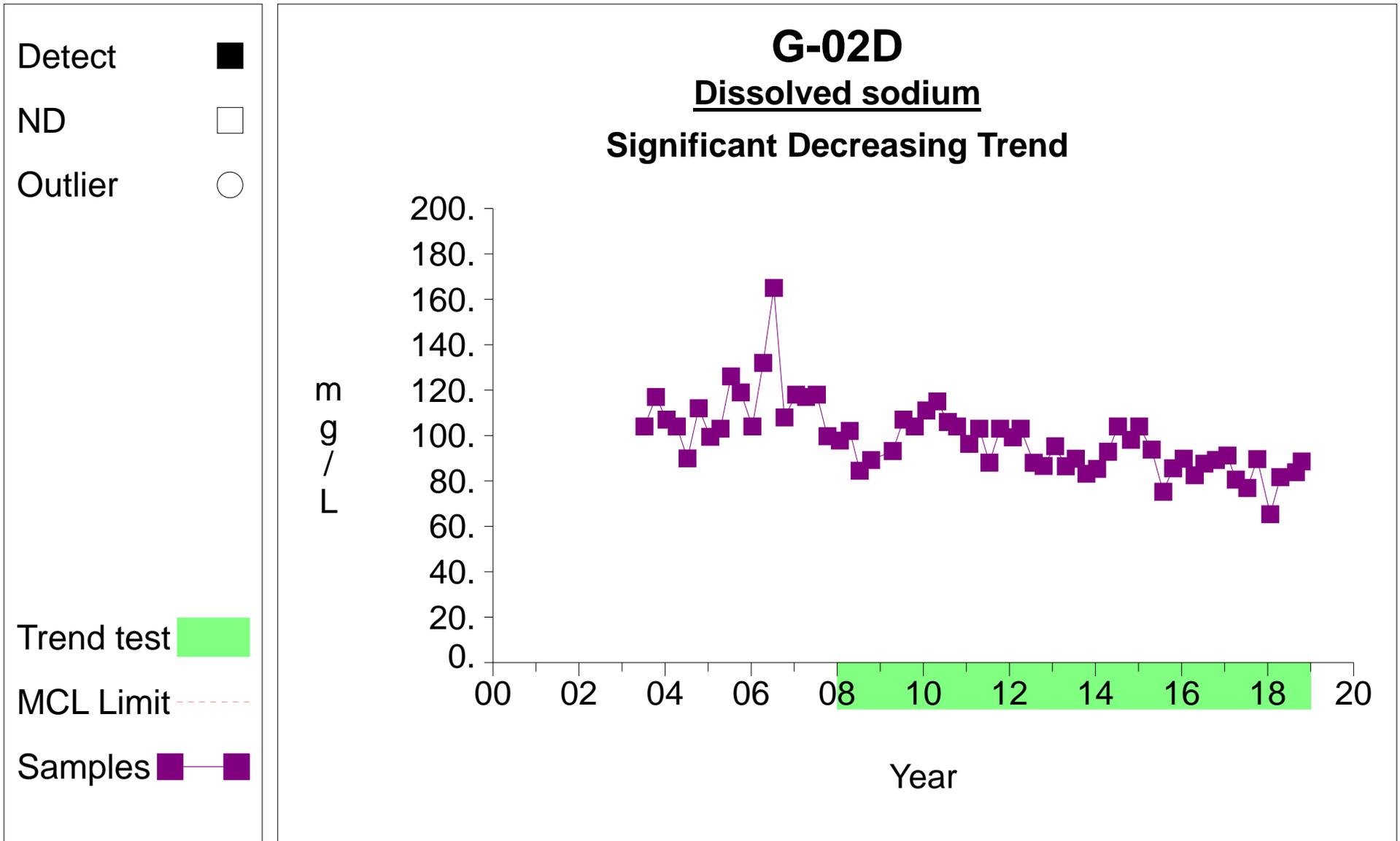
Graph 49

Time Series



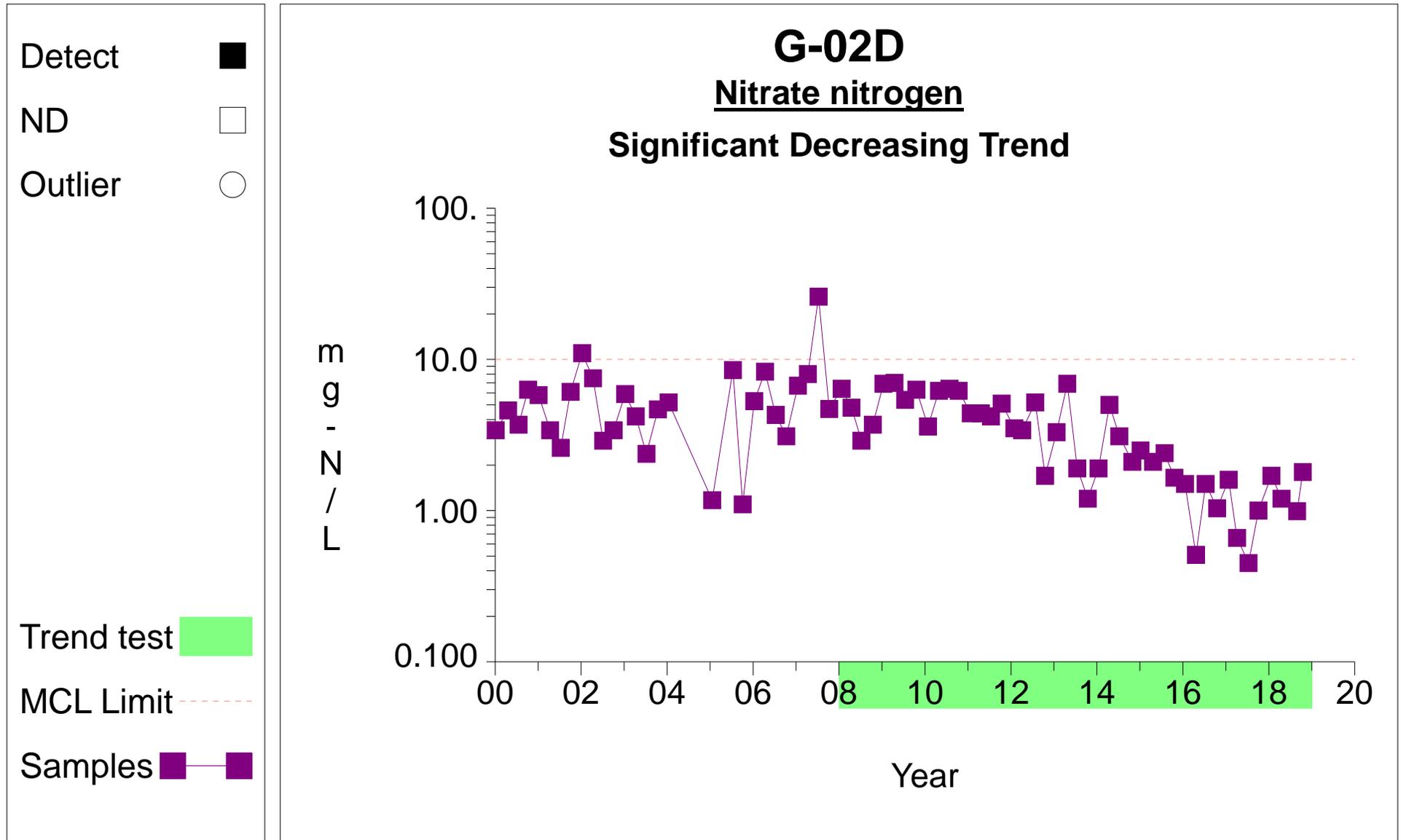
Graph 54

Time Series



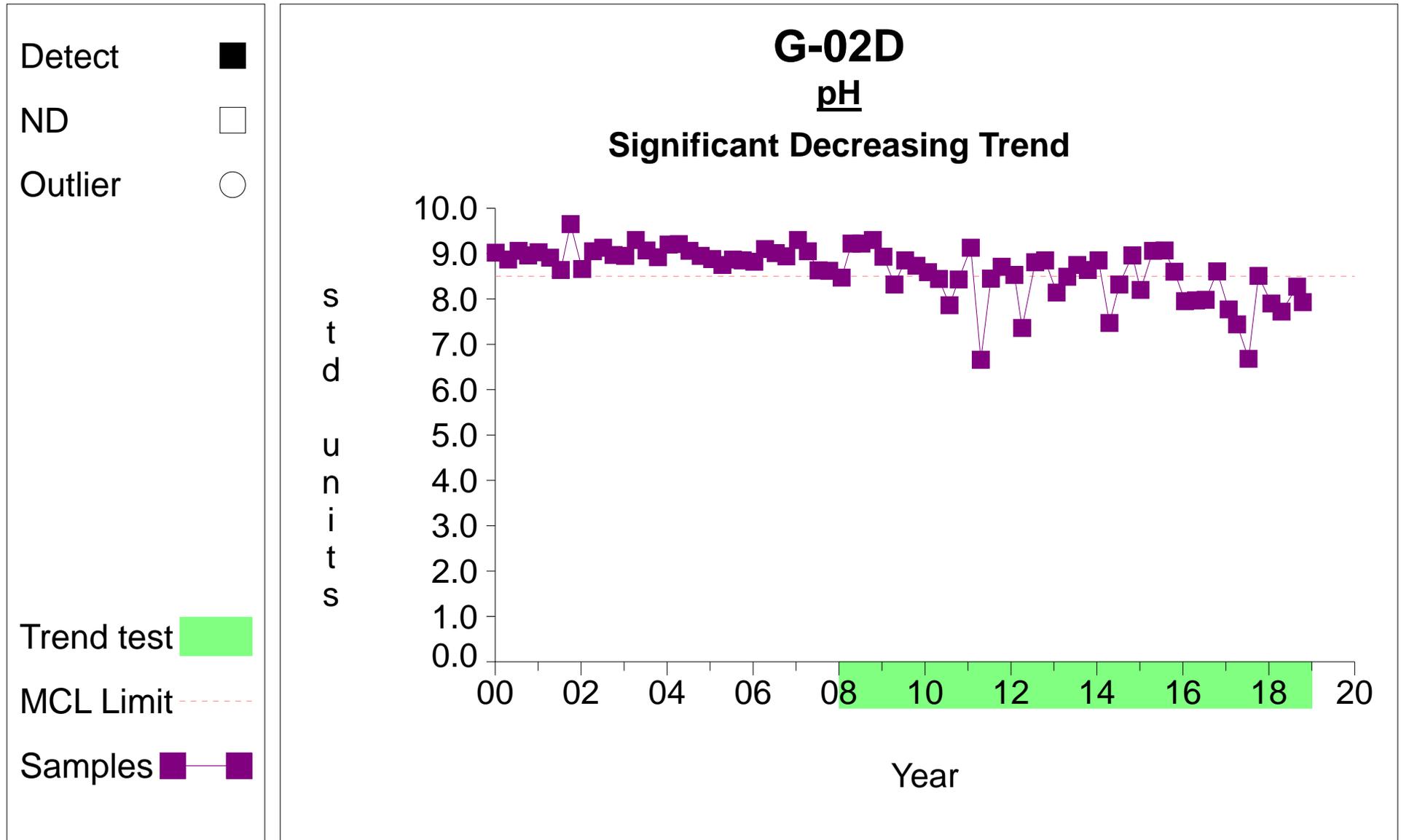
Graph 57

Time Series



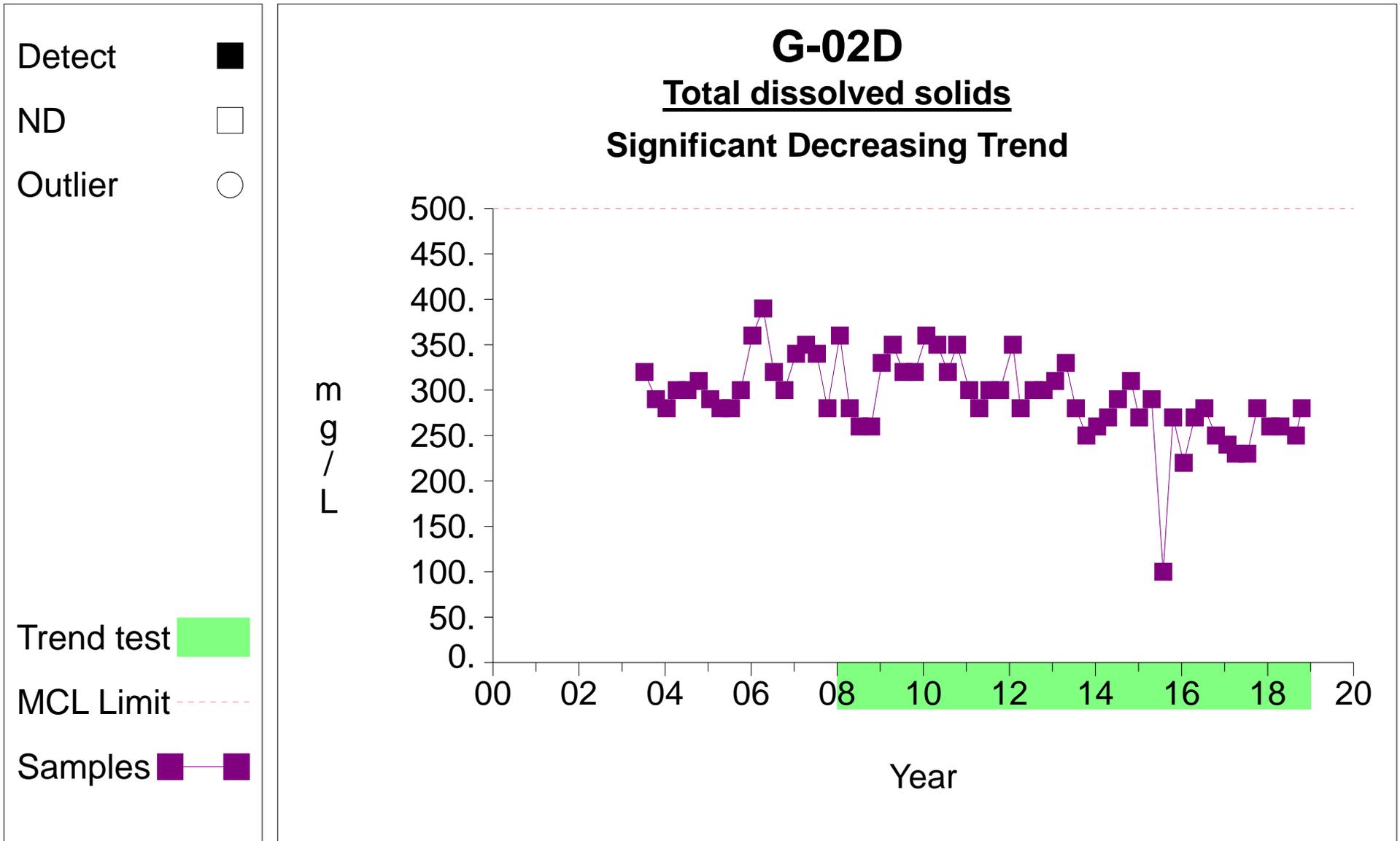
Graph 61

Time Series



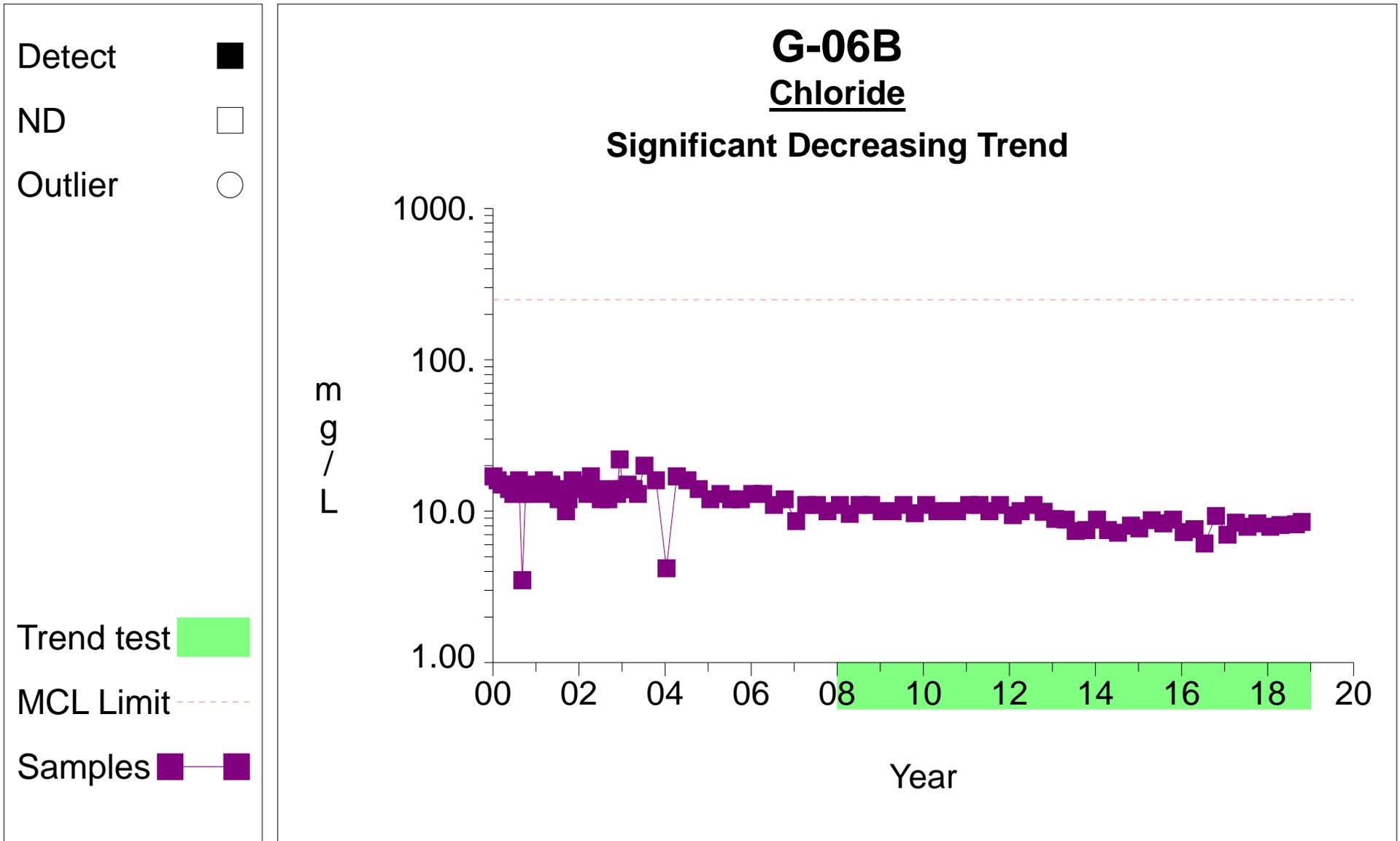
Graph 63

Time Series



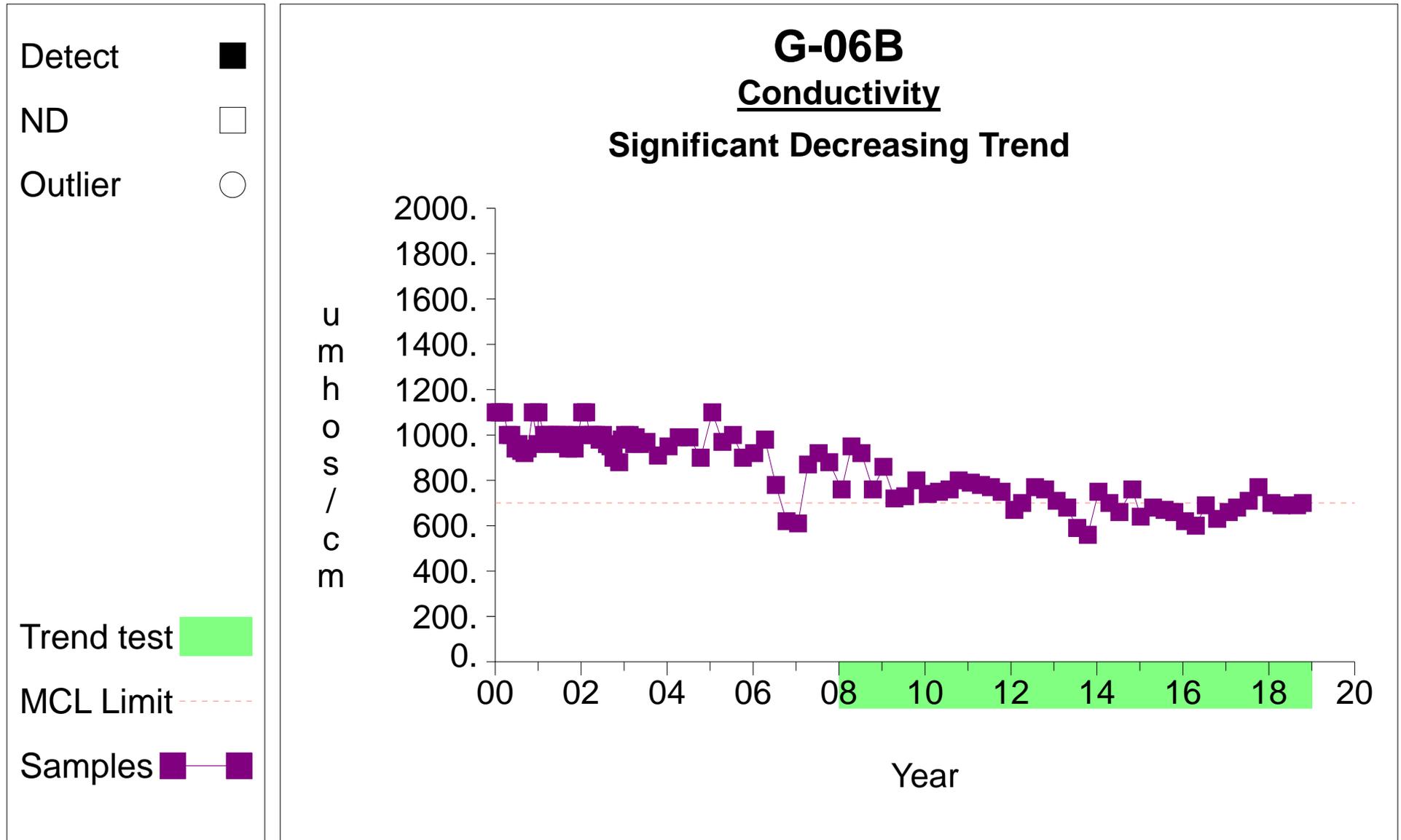
Graph 65

Time Series



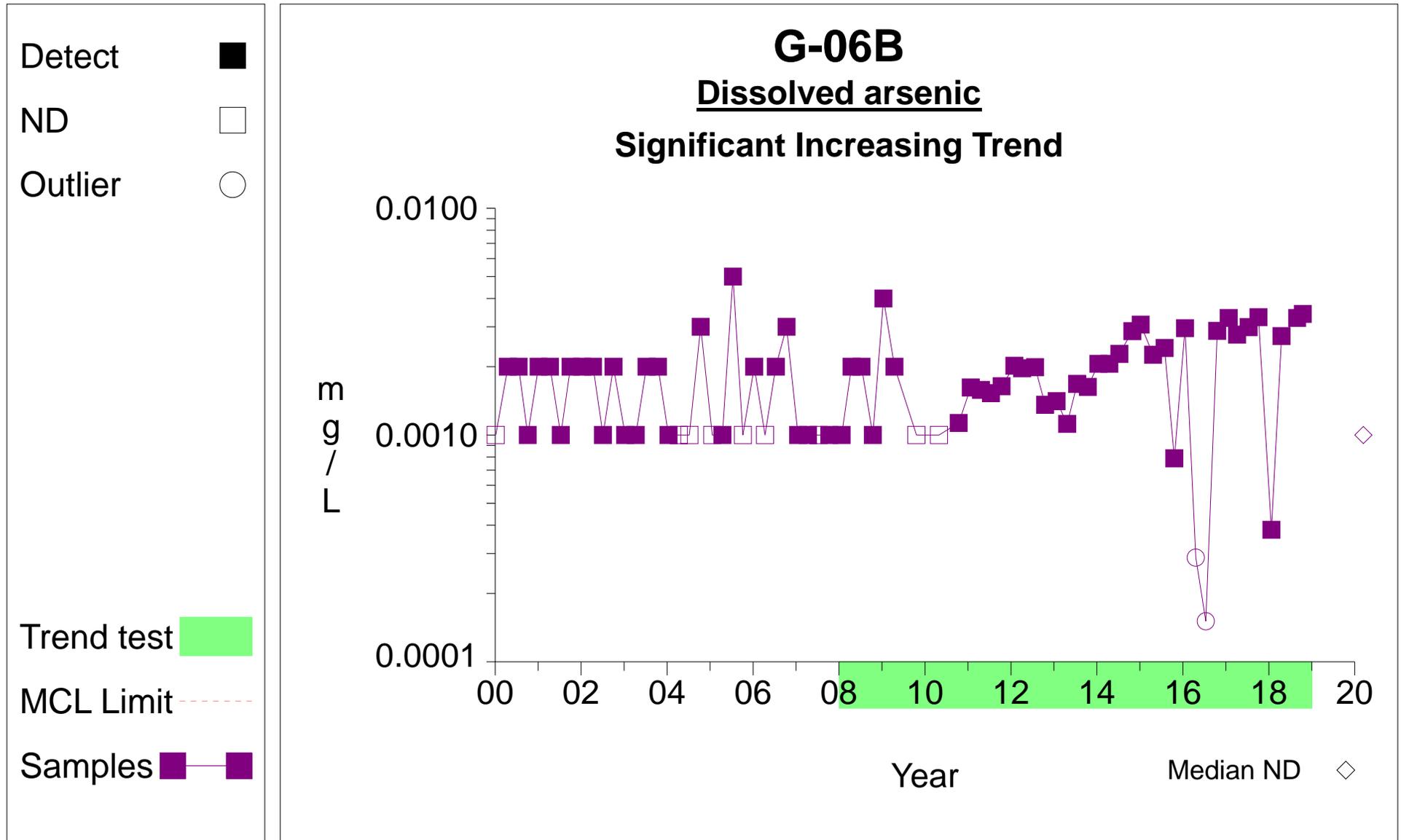
Graph 71

Time Series



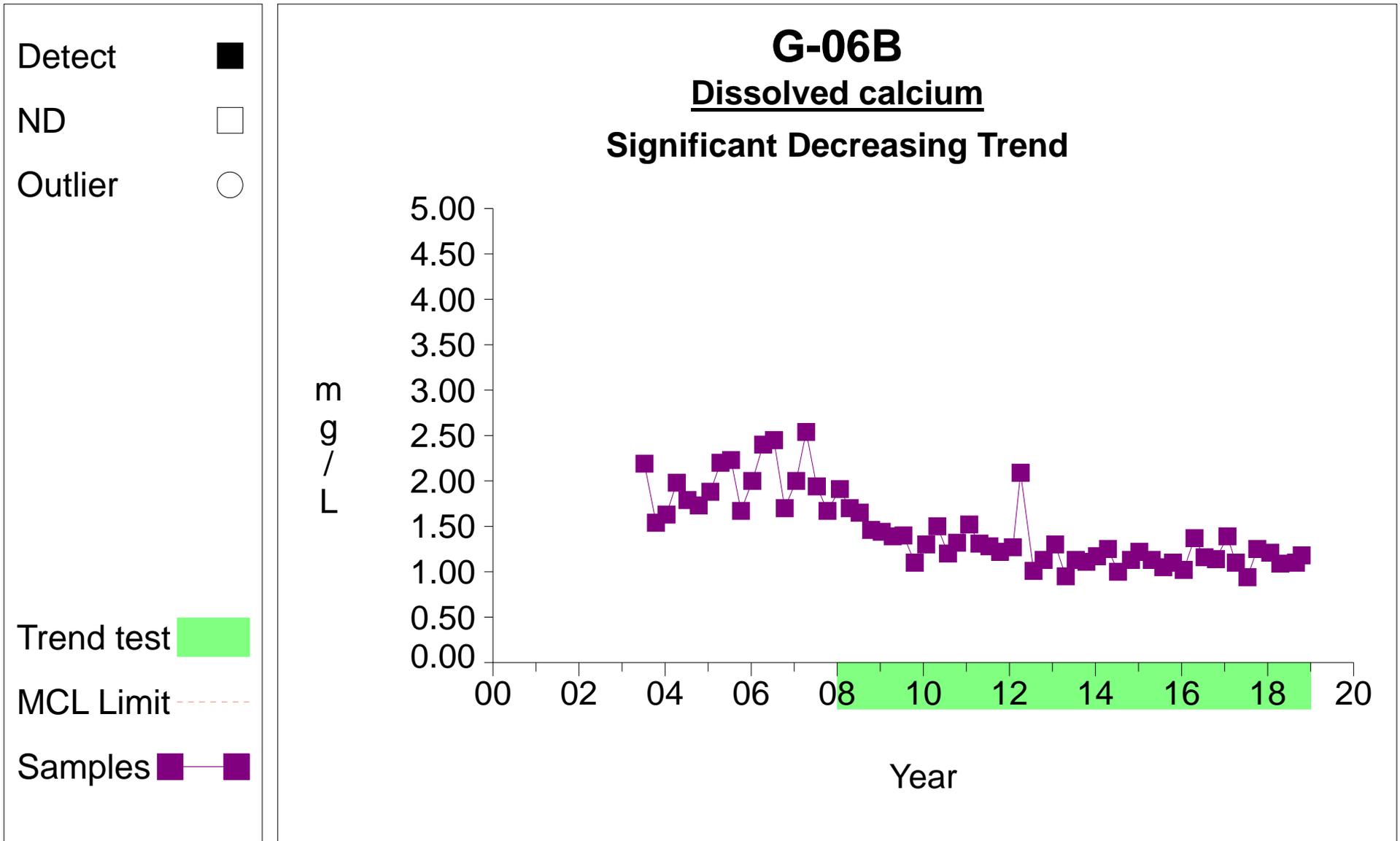
Graph 72

Time Series



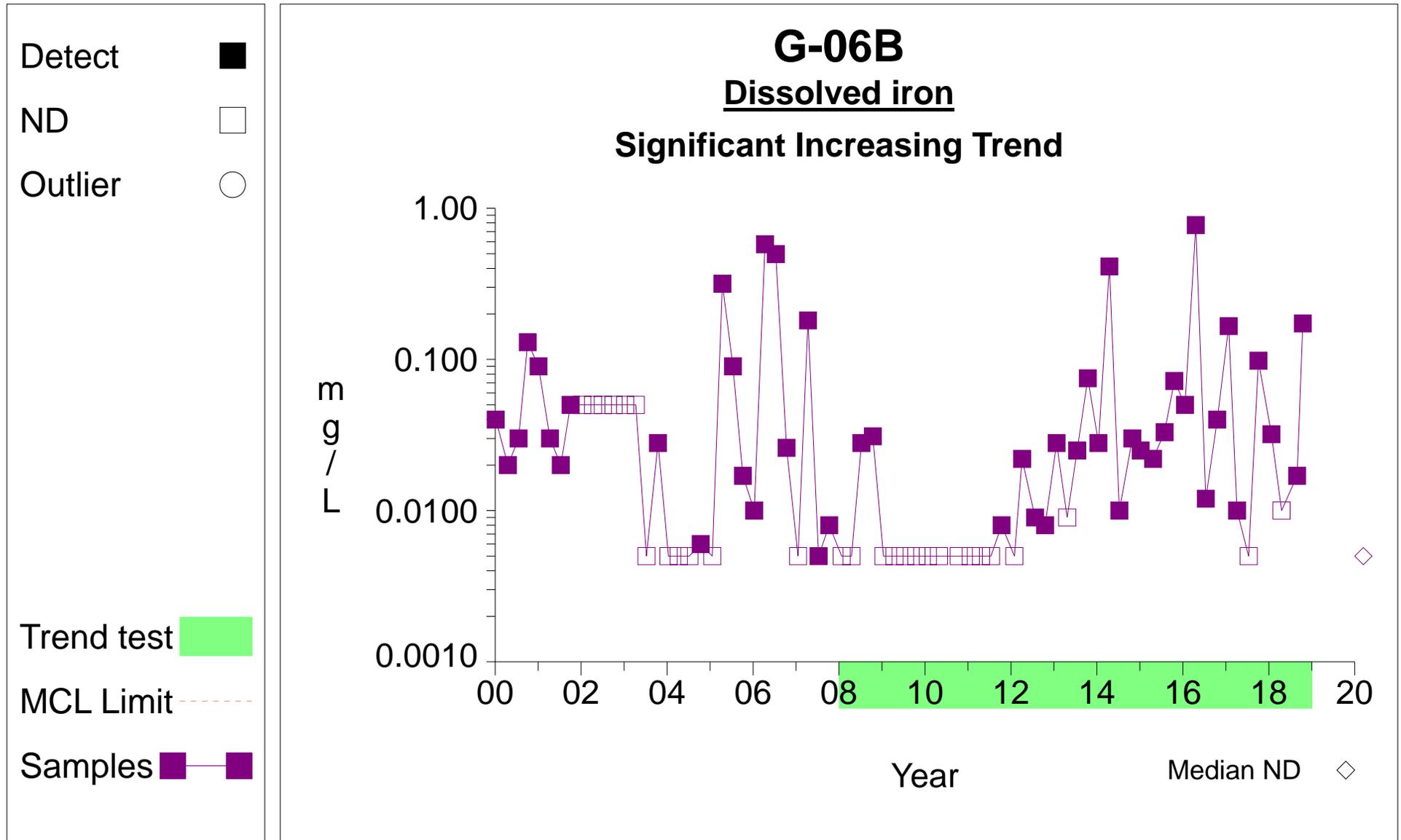
Graph 74

Time Series



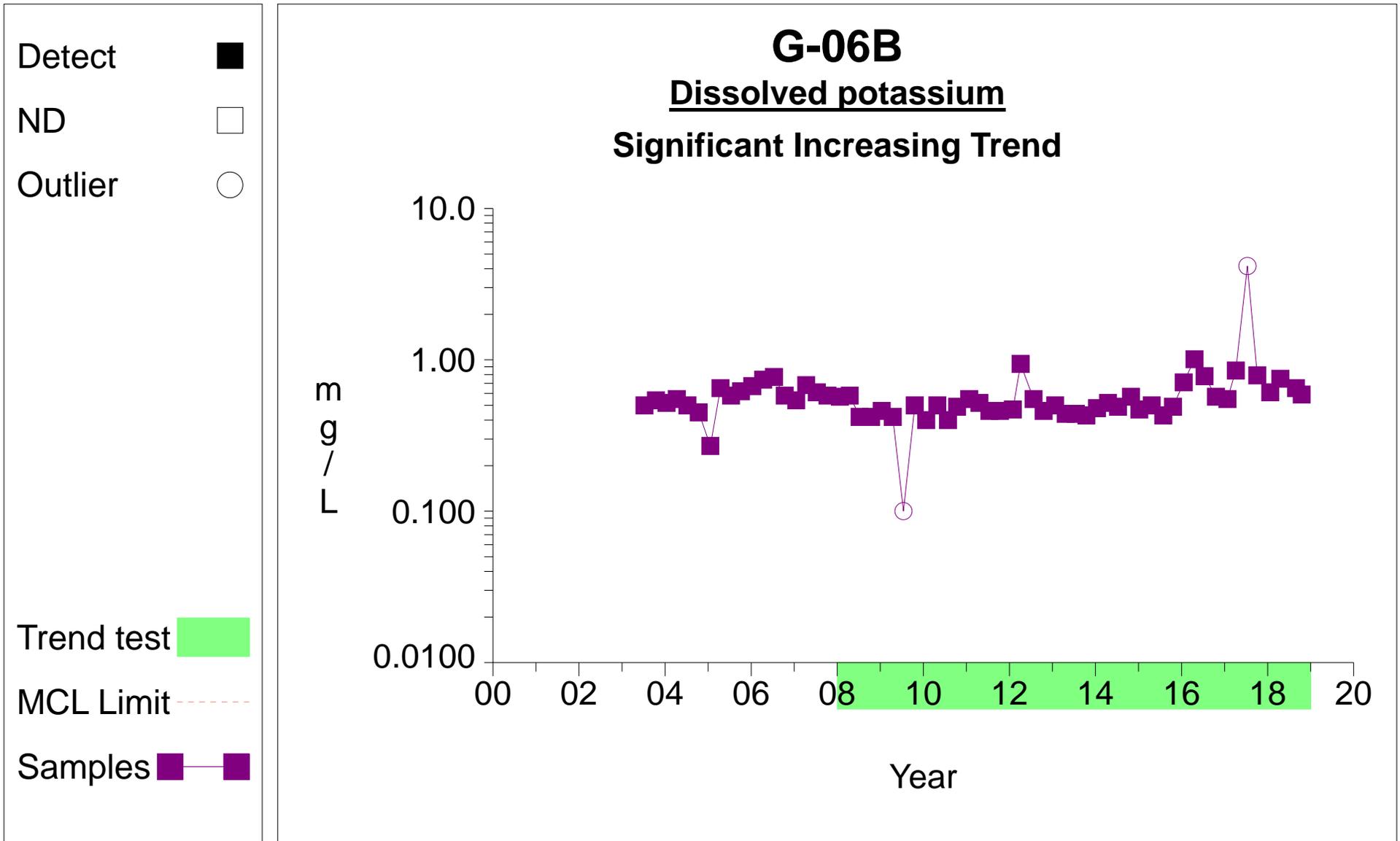
Graph 78

Time Series



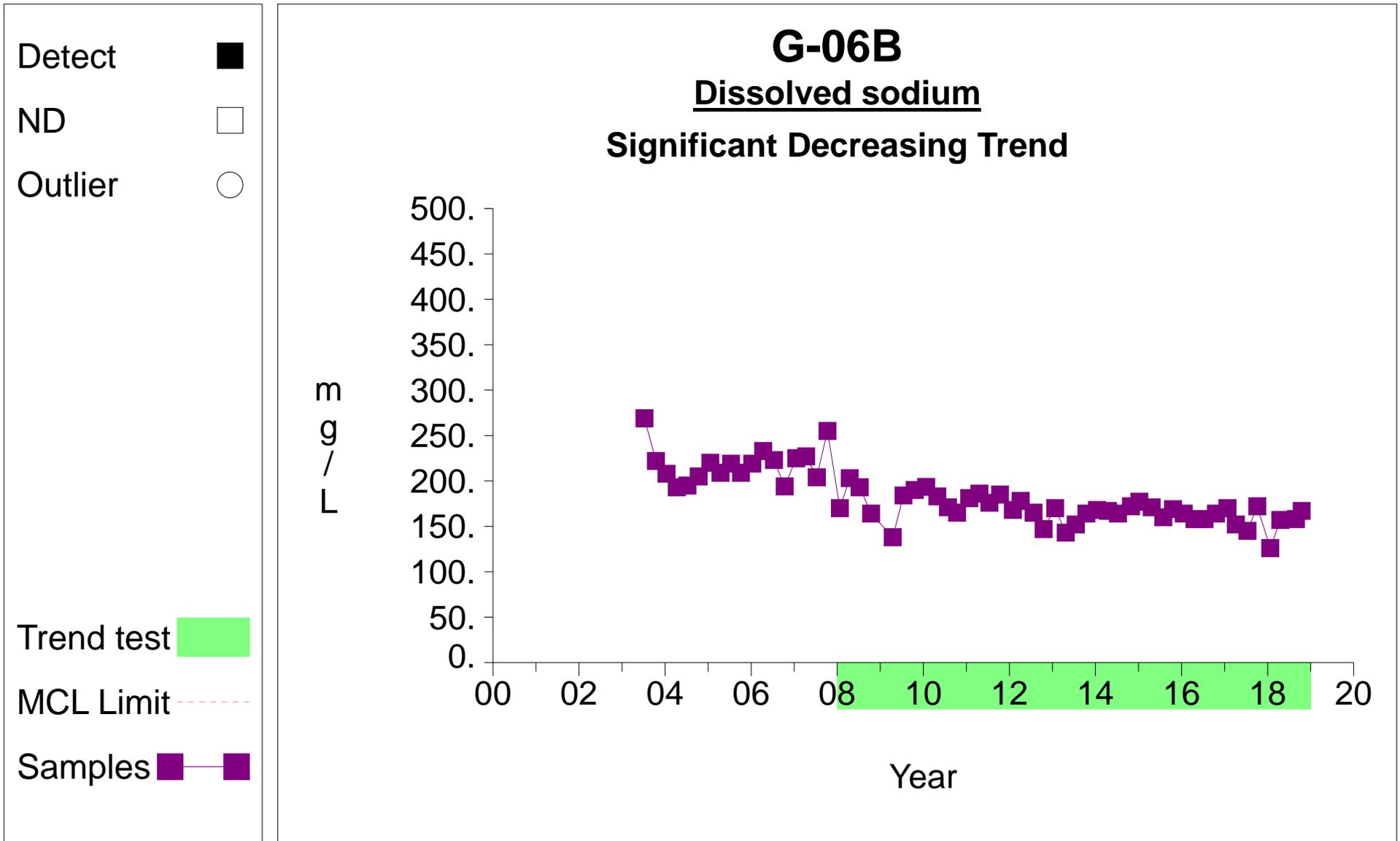
Graph 82

Time Series



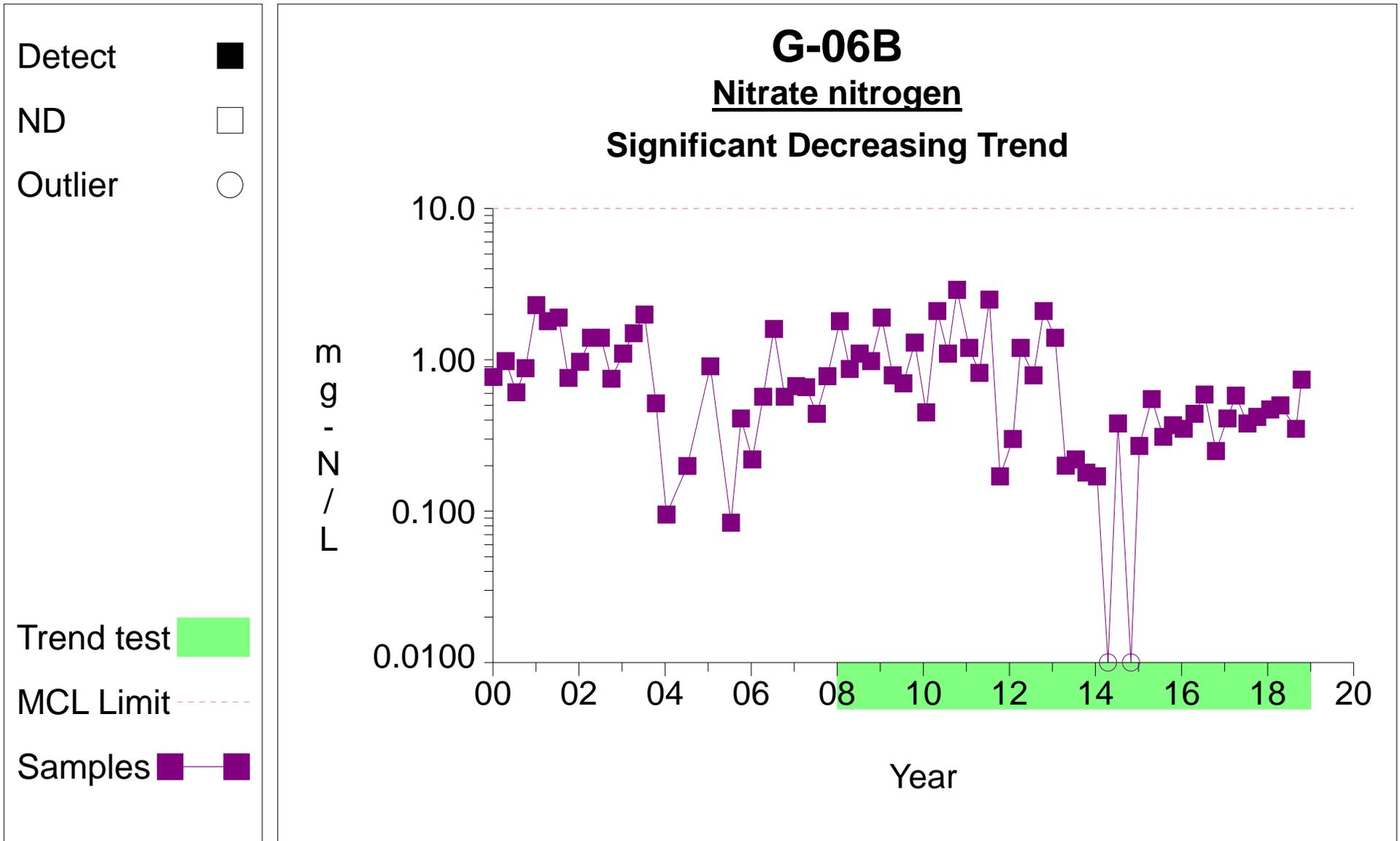
Graph 87

Time Series



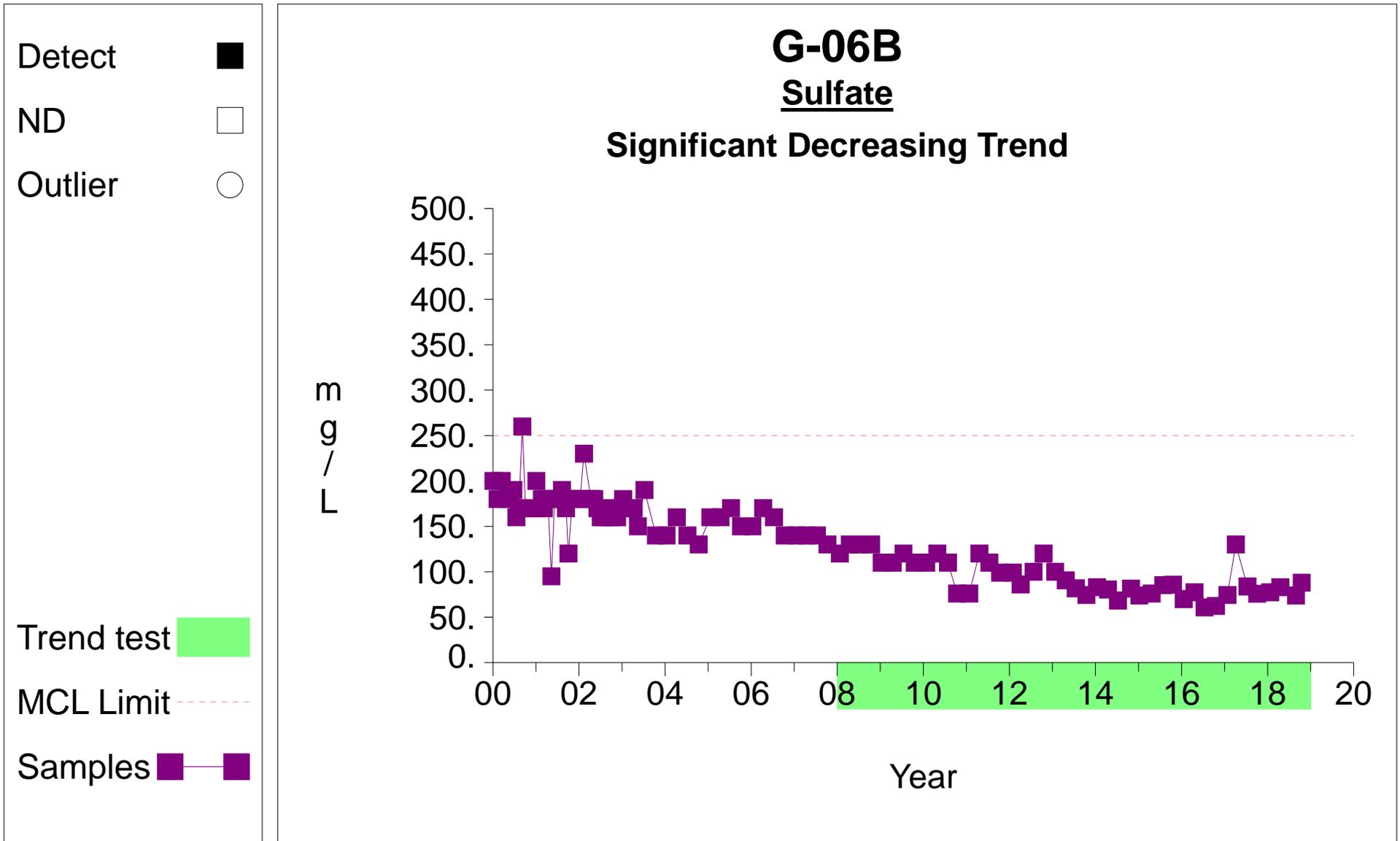
Graph 90

Time Series



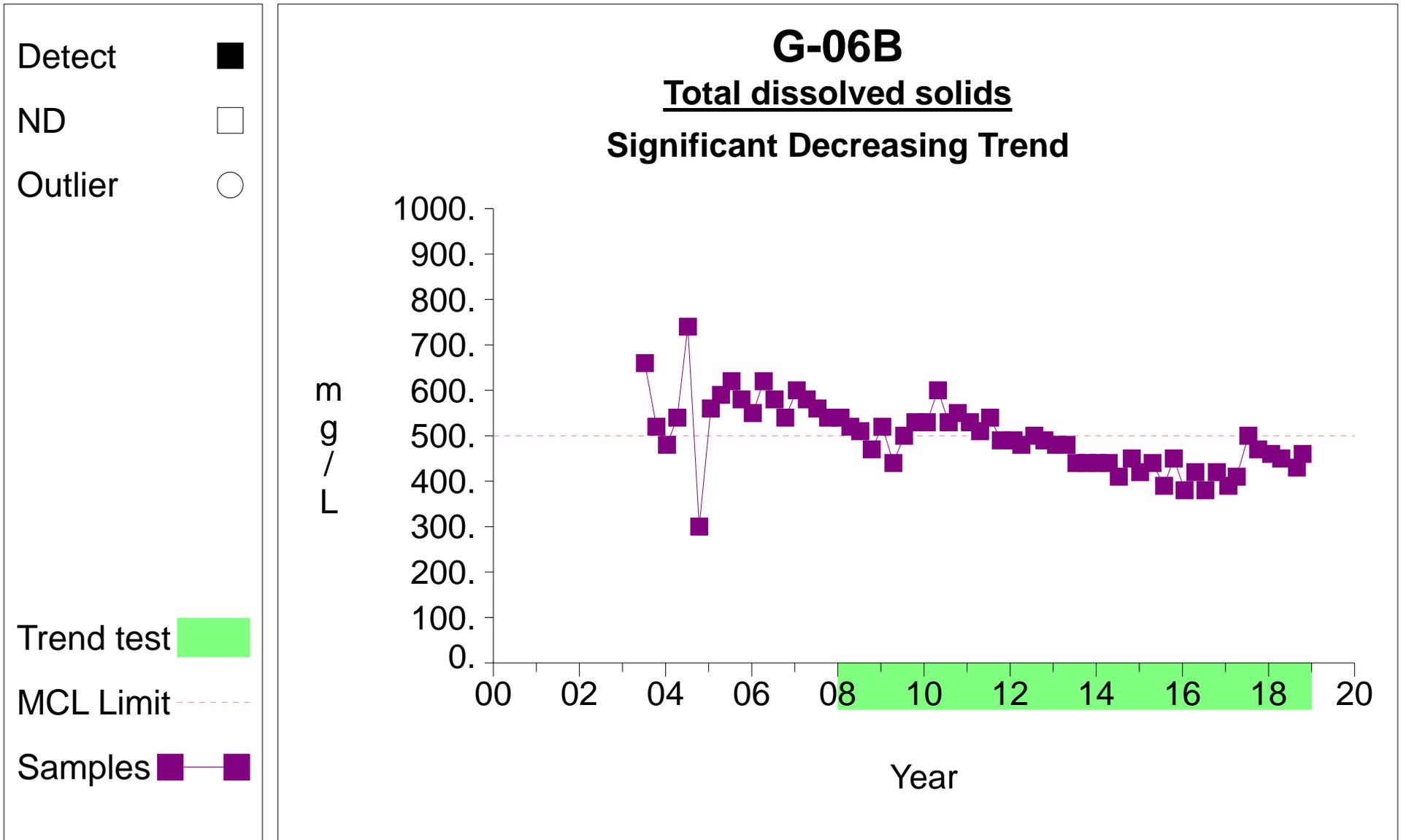
Graph 94

Time Series



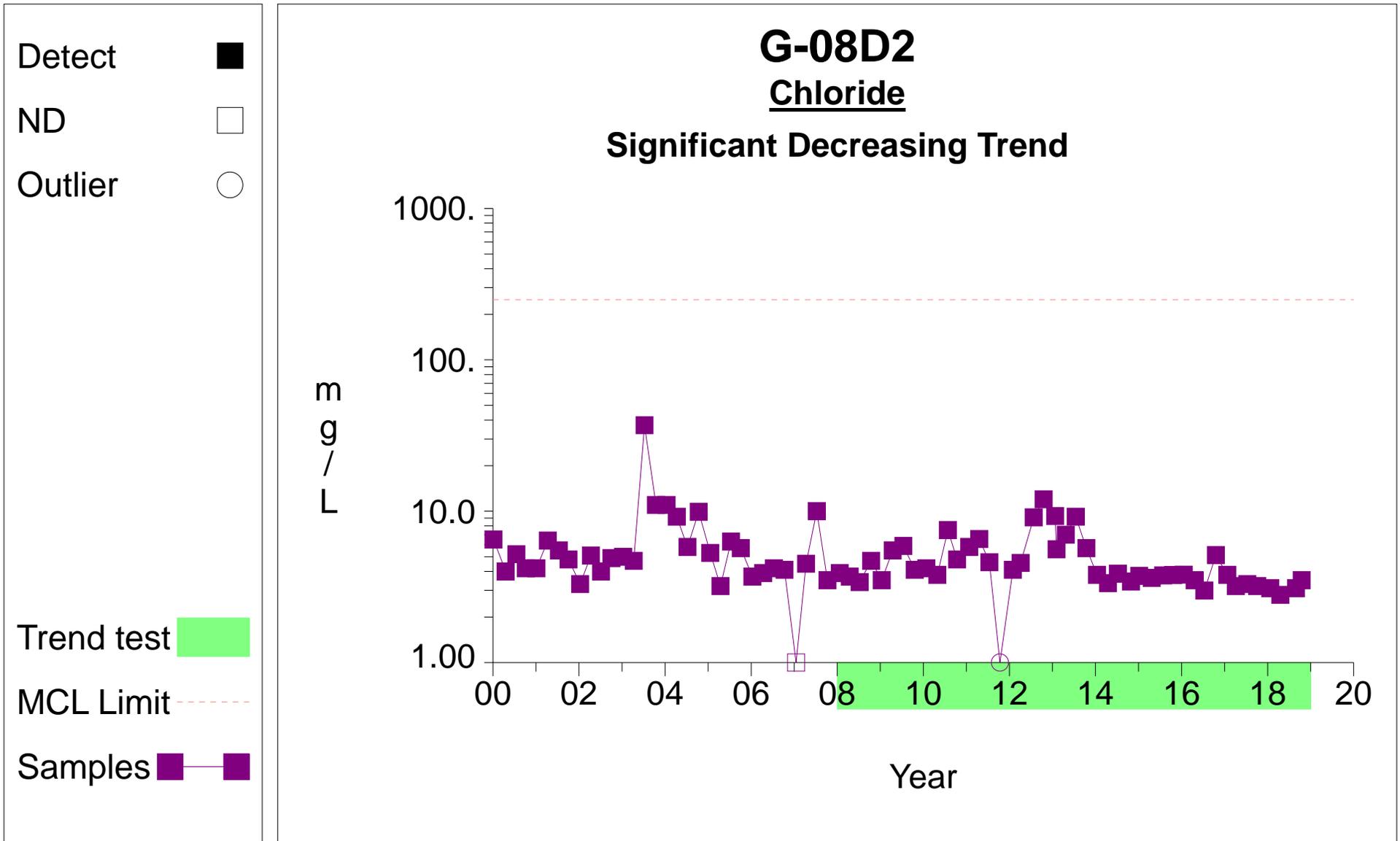
Graph 97

Time Series



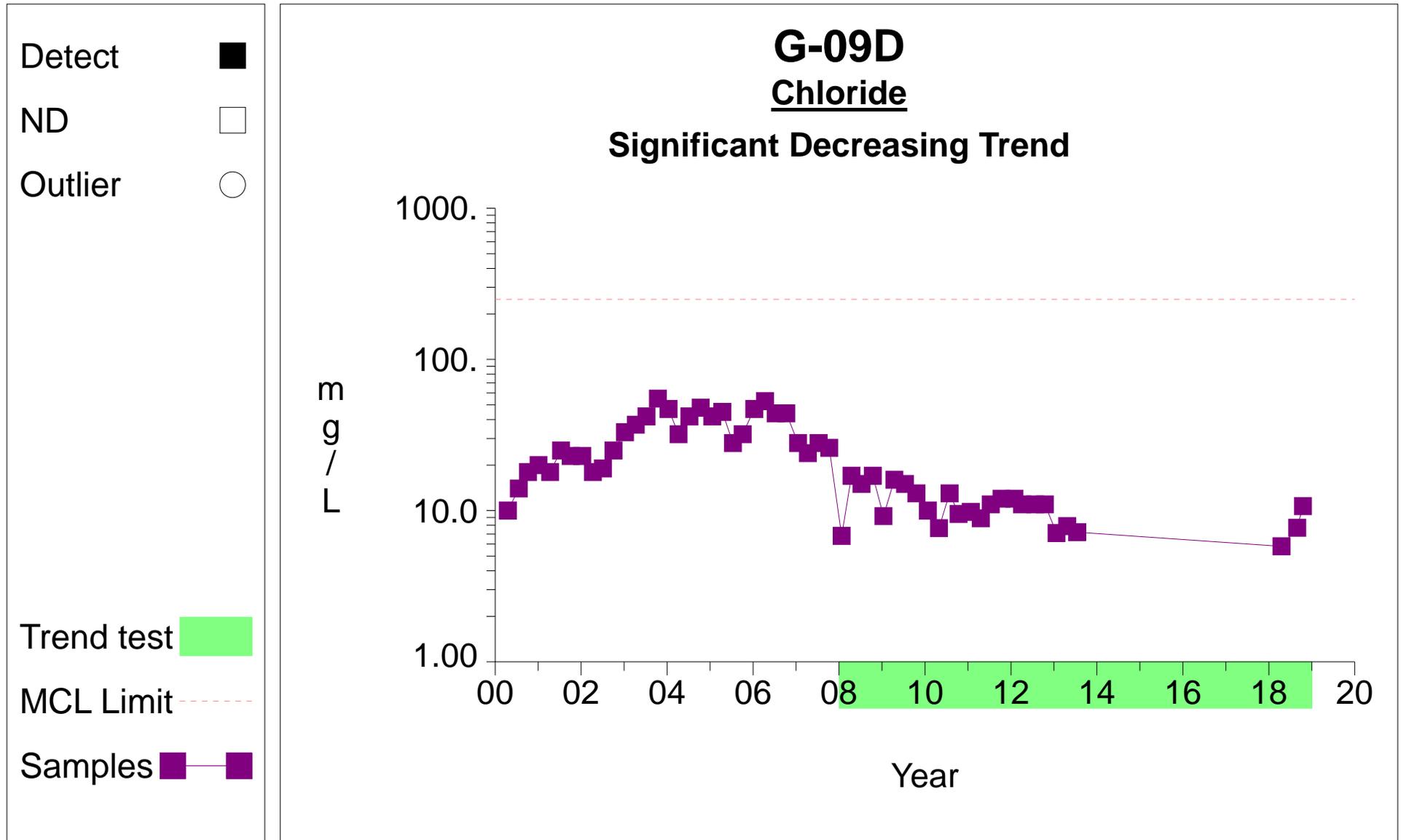
Graph 98

Time Series



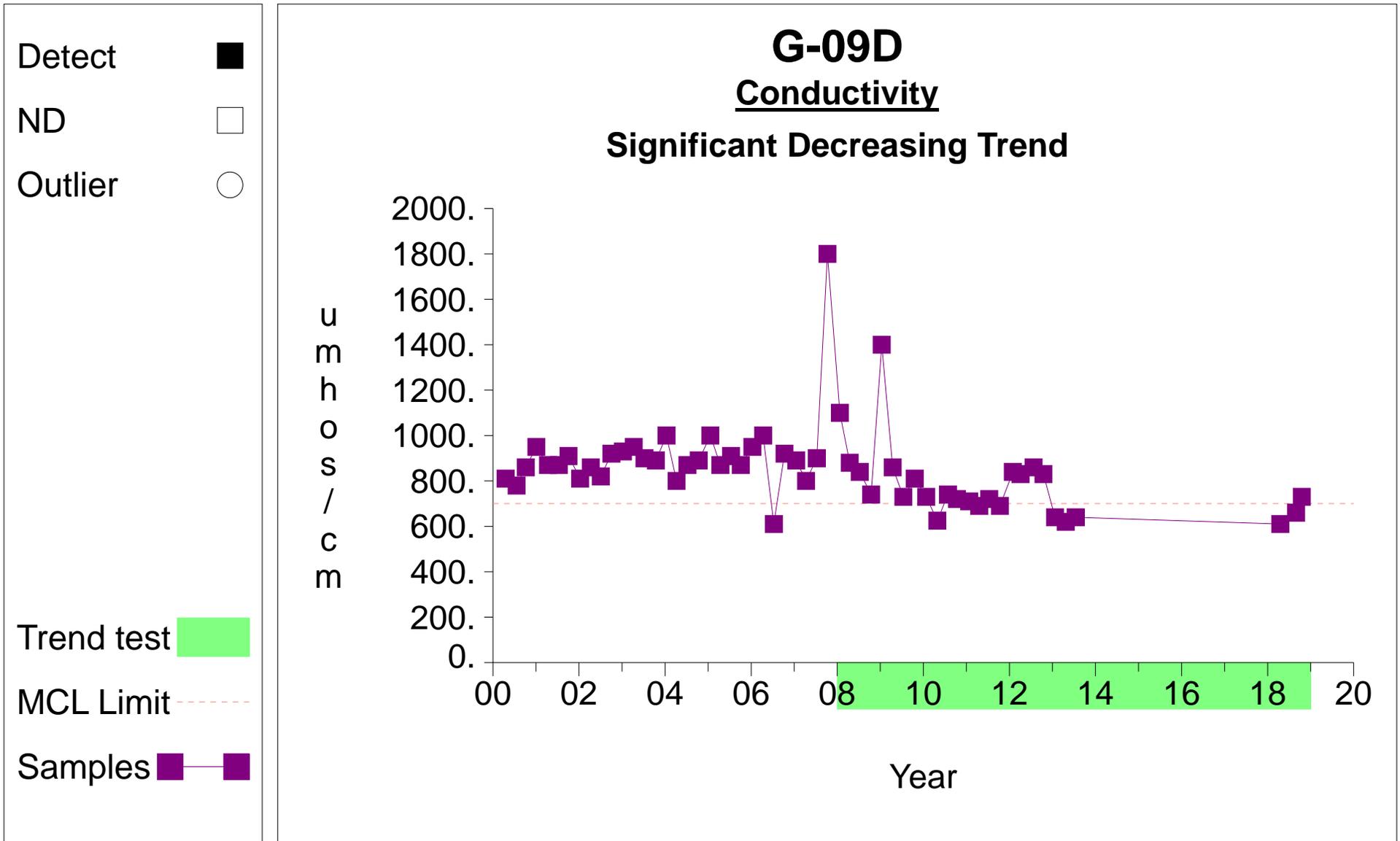
Graph 104

Time Series



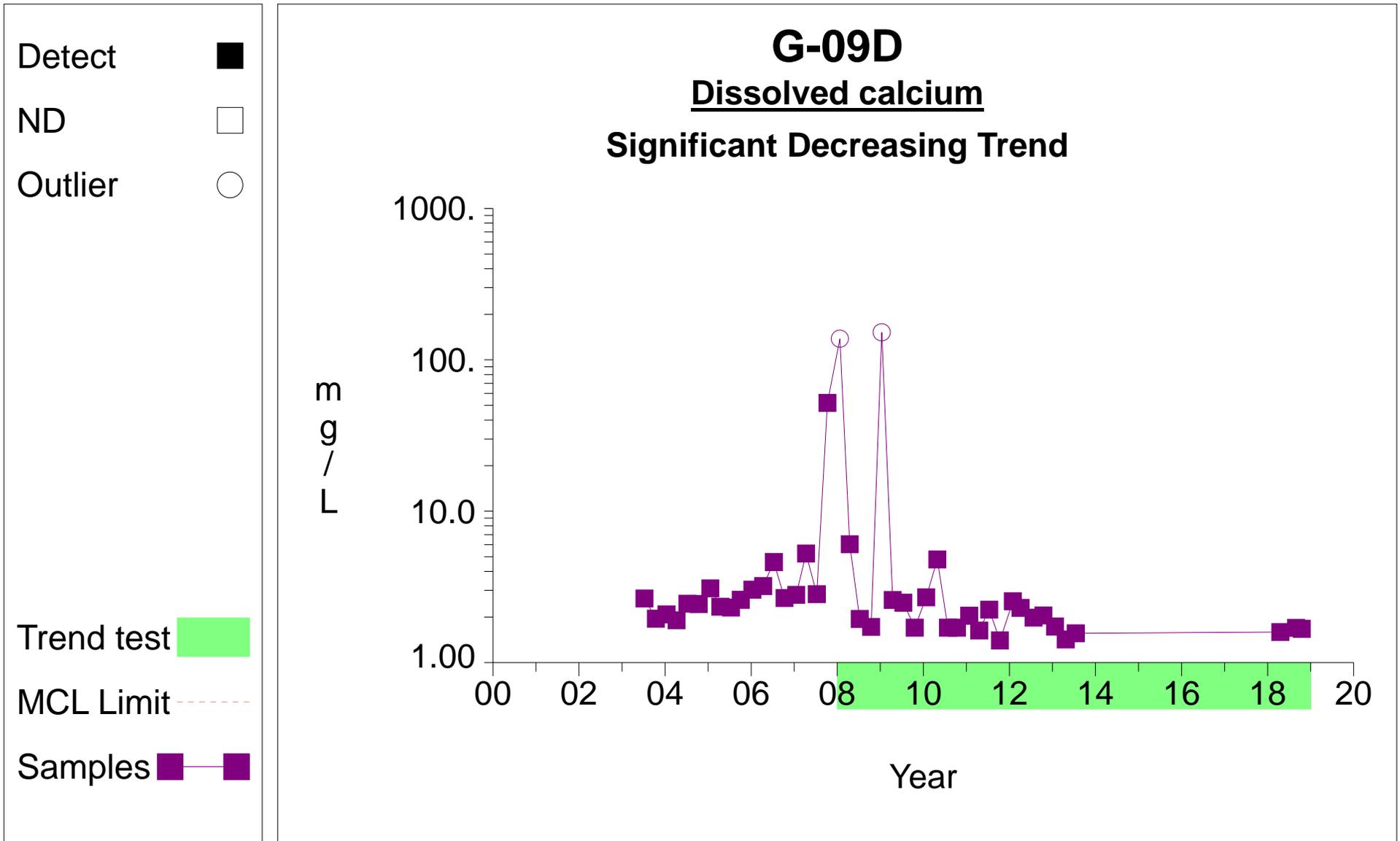
Graph 137

Time Series



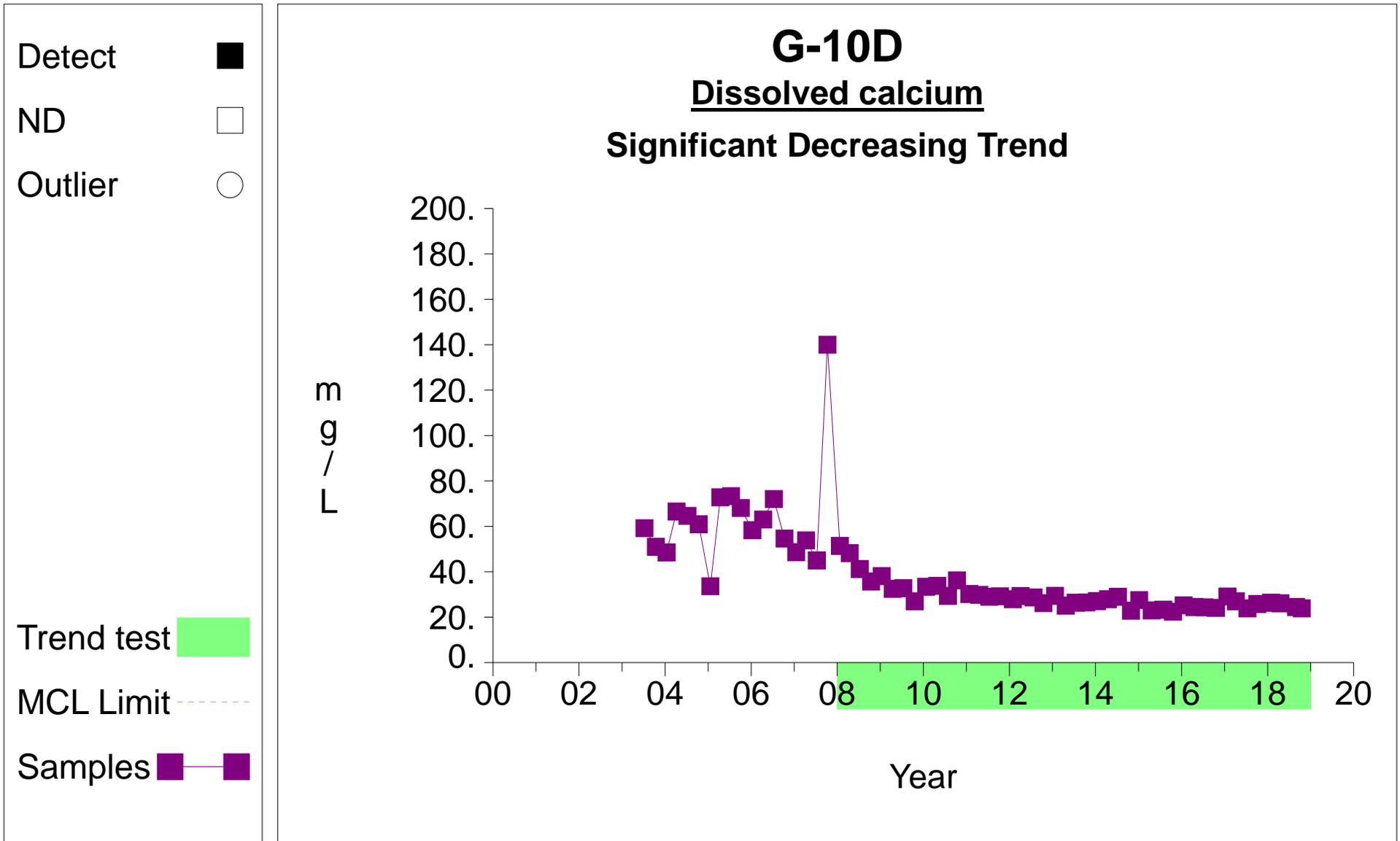
Graph 138

Time Series



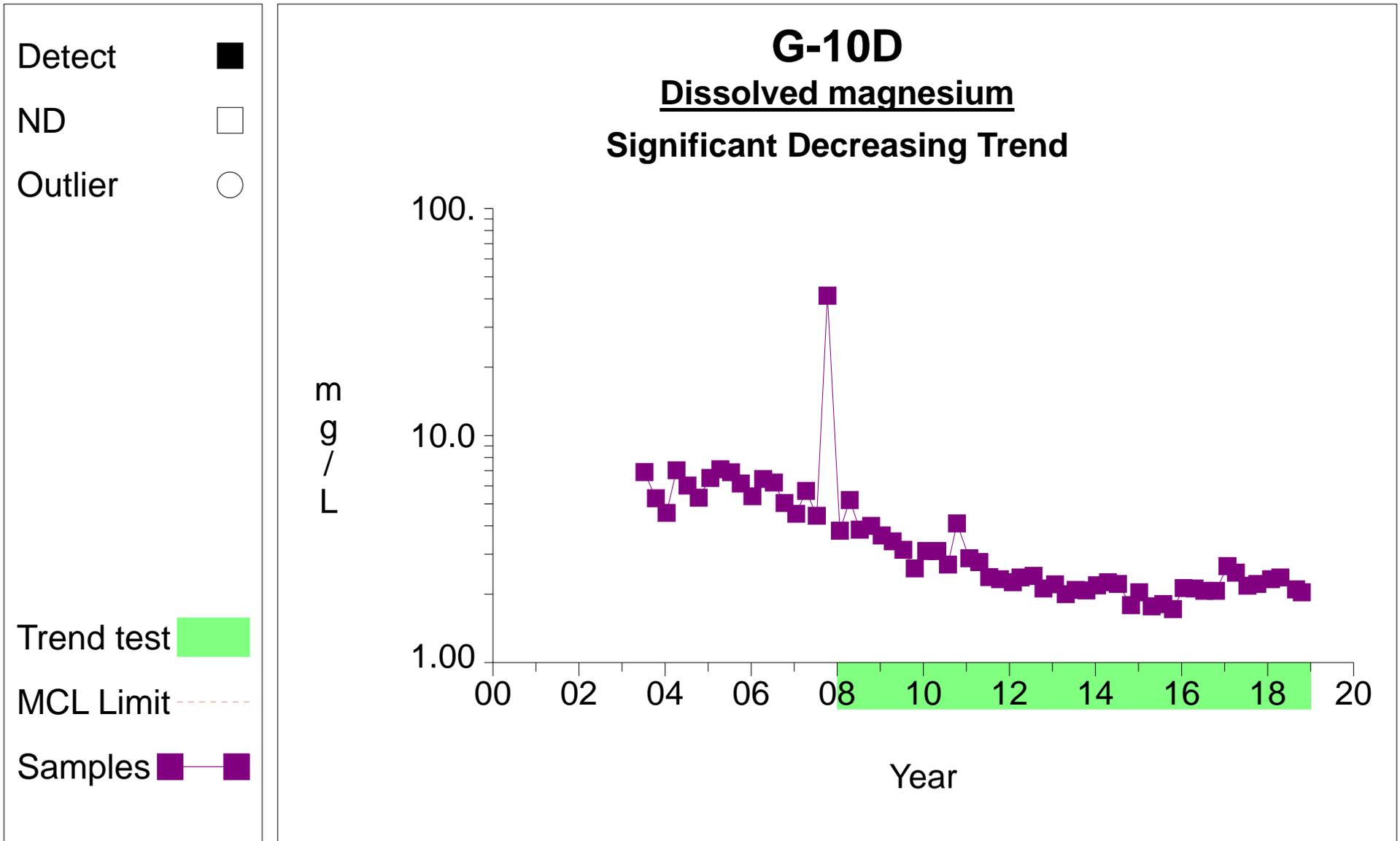
Graph 144

Time Series



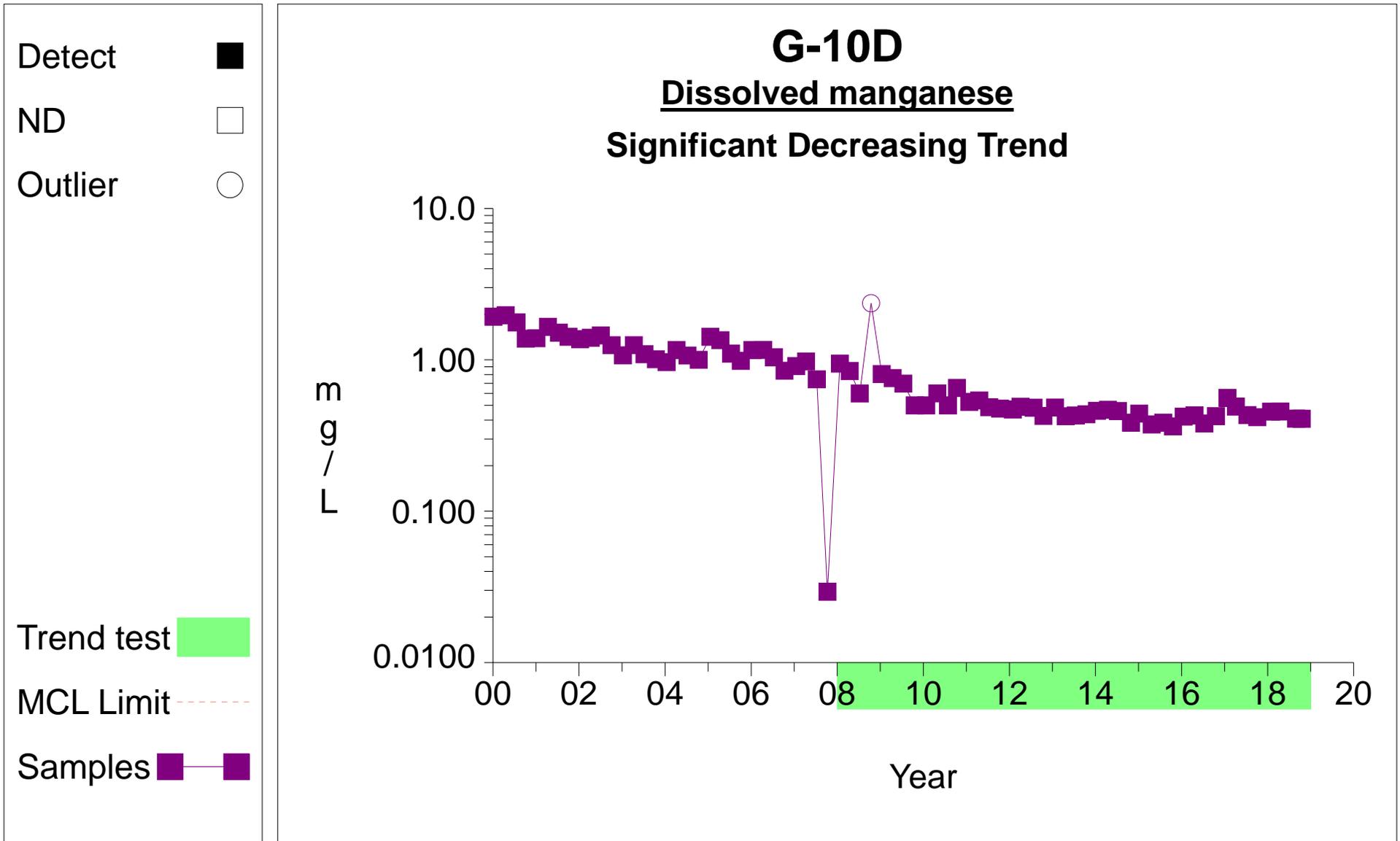
Graph 177

Time Series



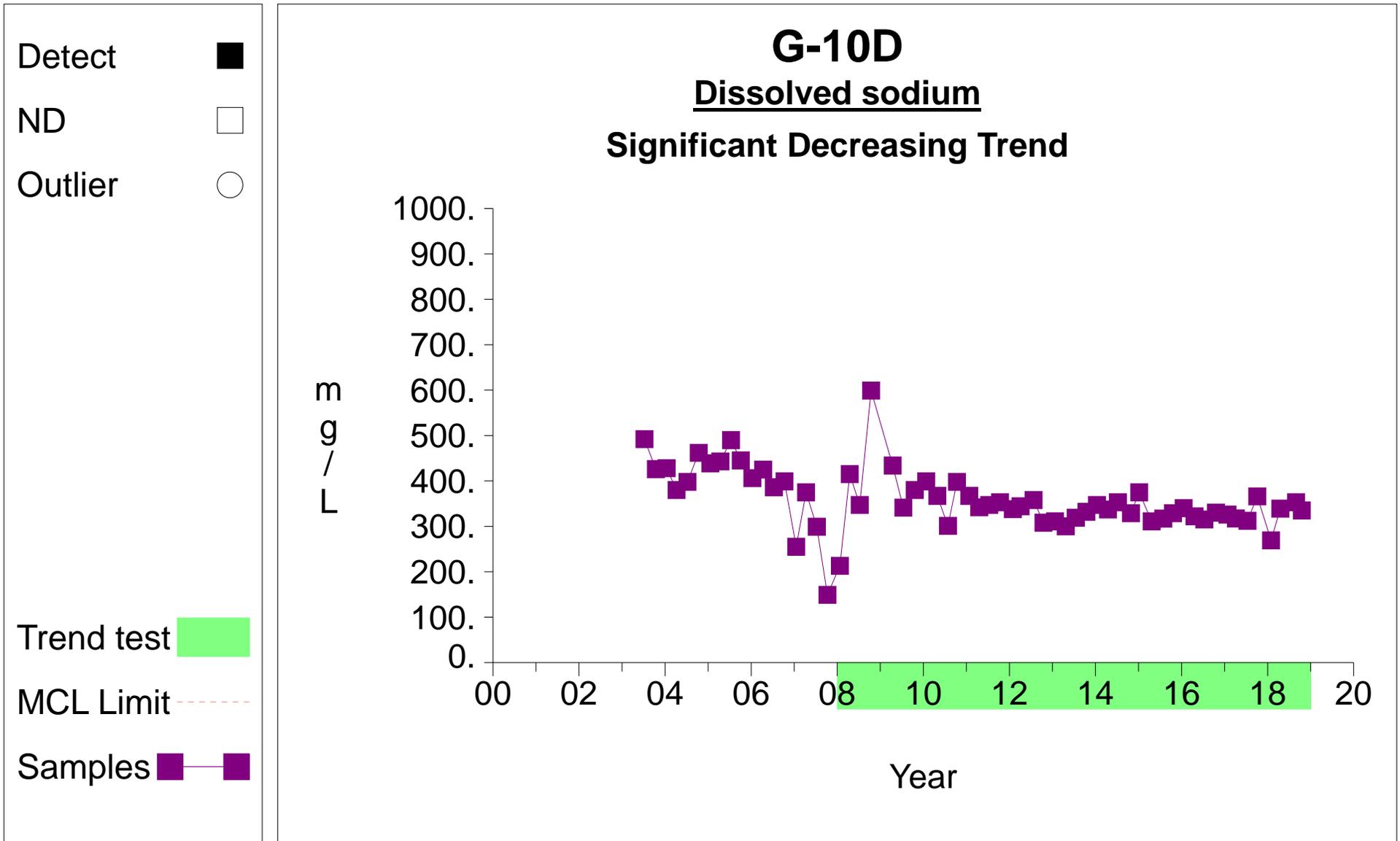
Graph 183

Time Series



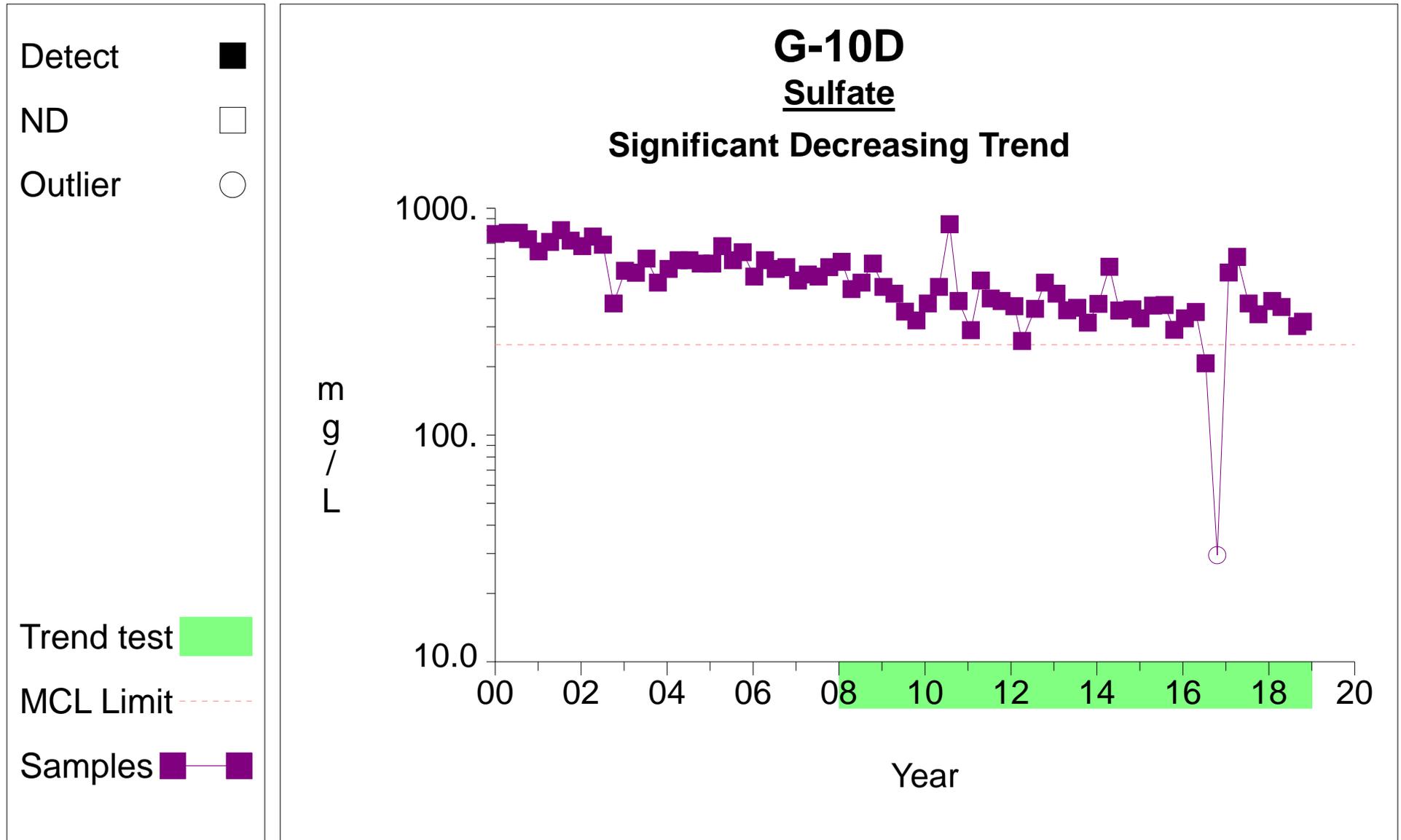
Graph 184

Time Series



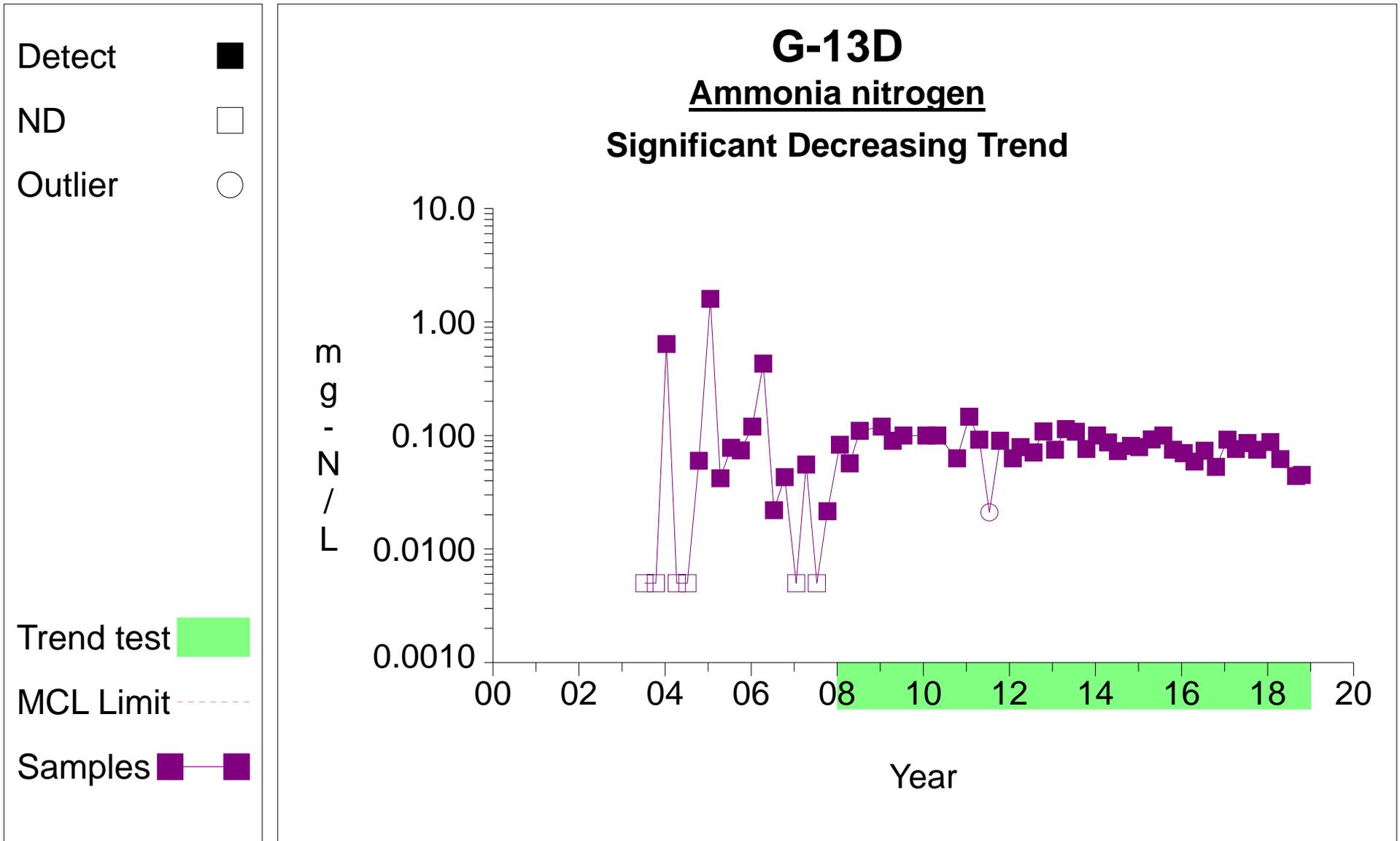
Graph 189

Time Series



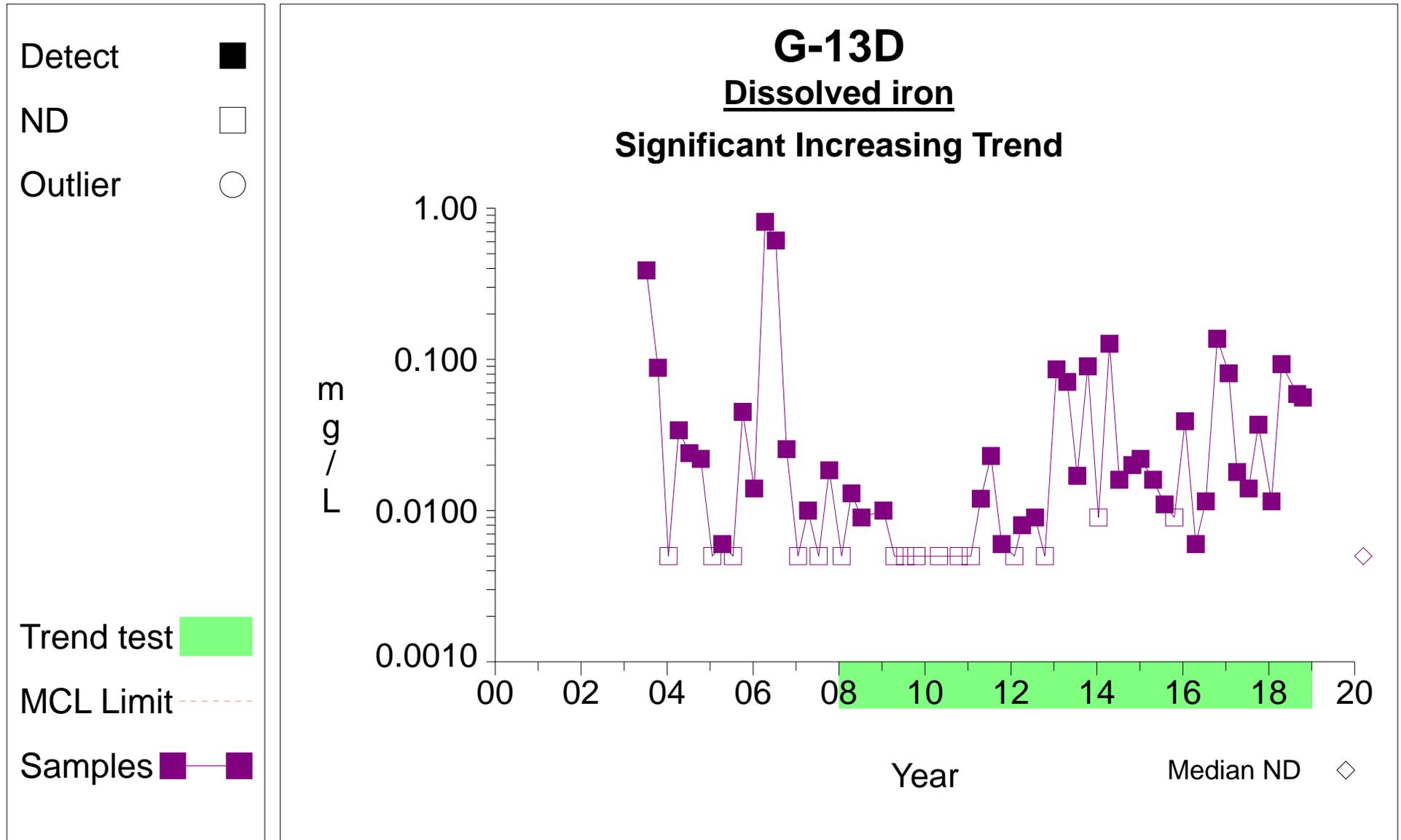
Graph 196

Time Series



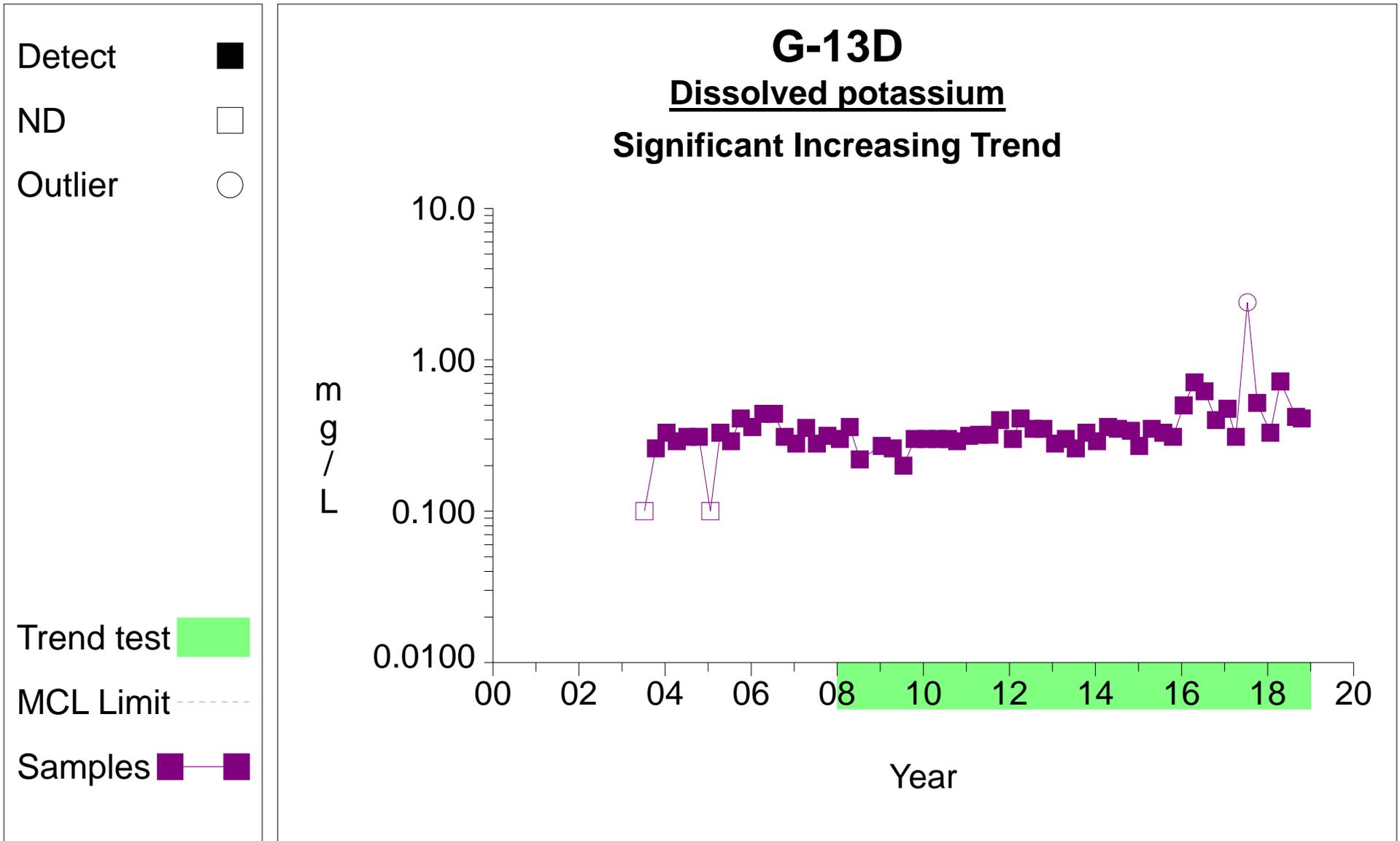
Graph 200

Time Series



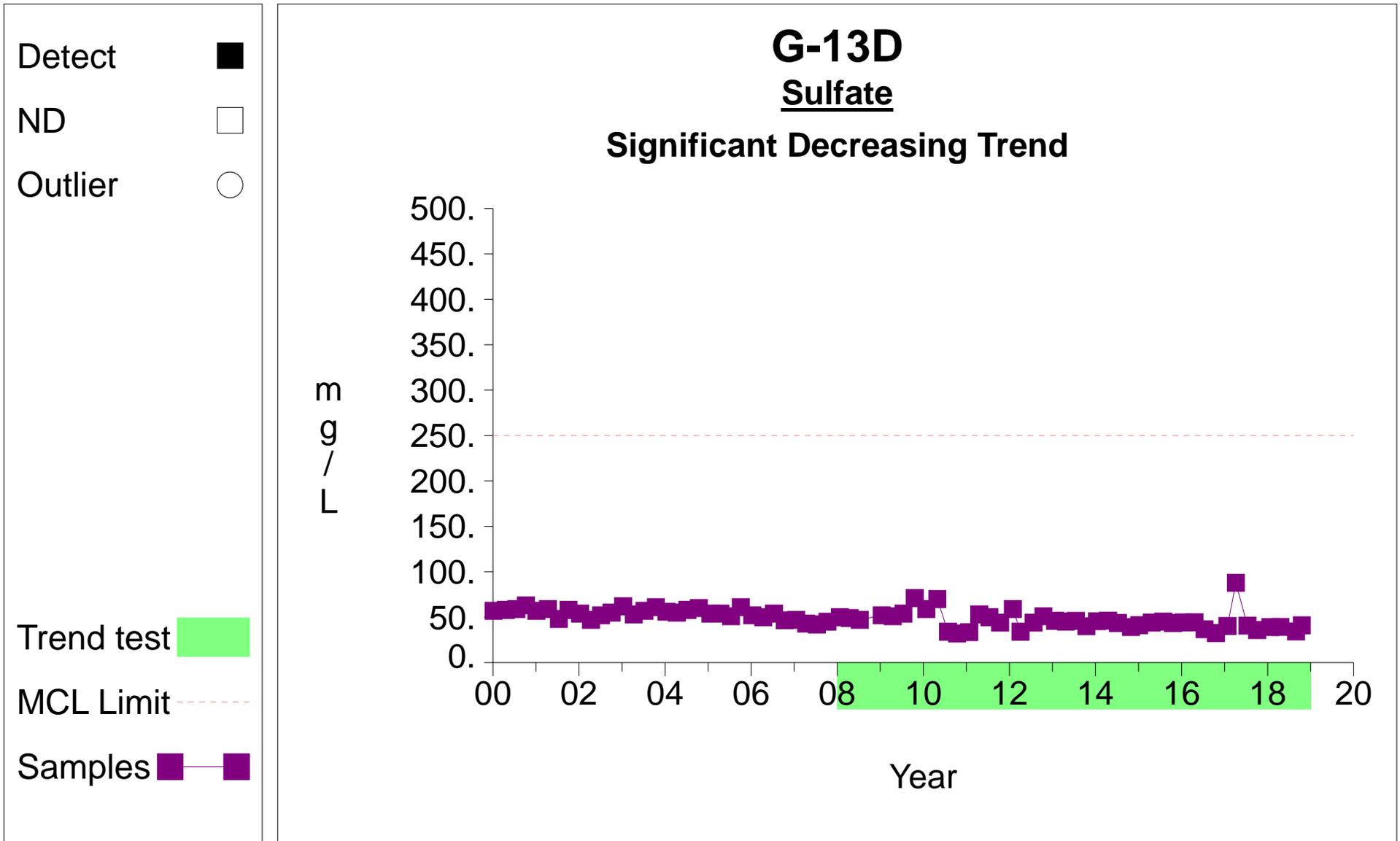
Graph 214

Time Series



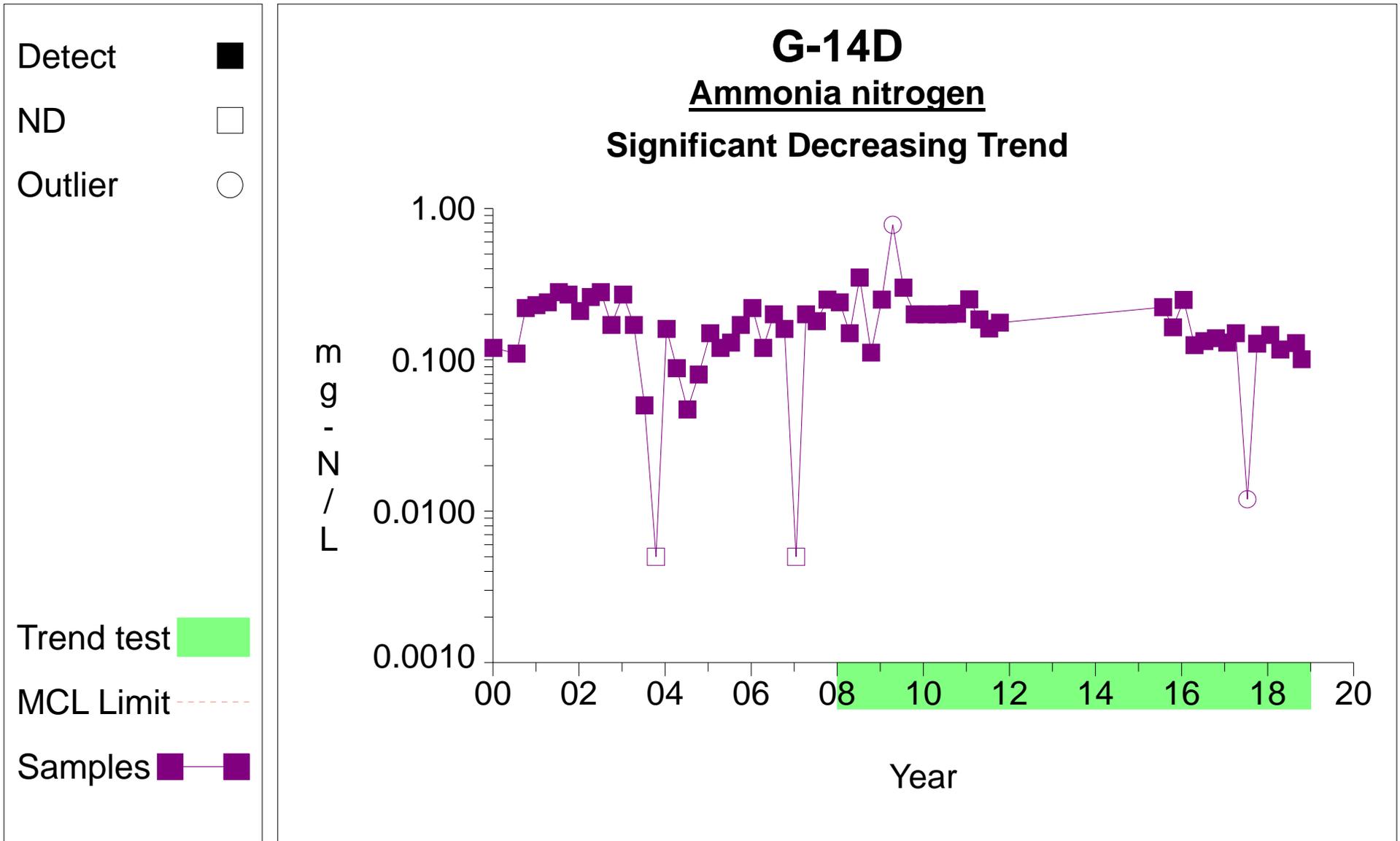
Graph 219

Time Series



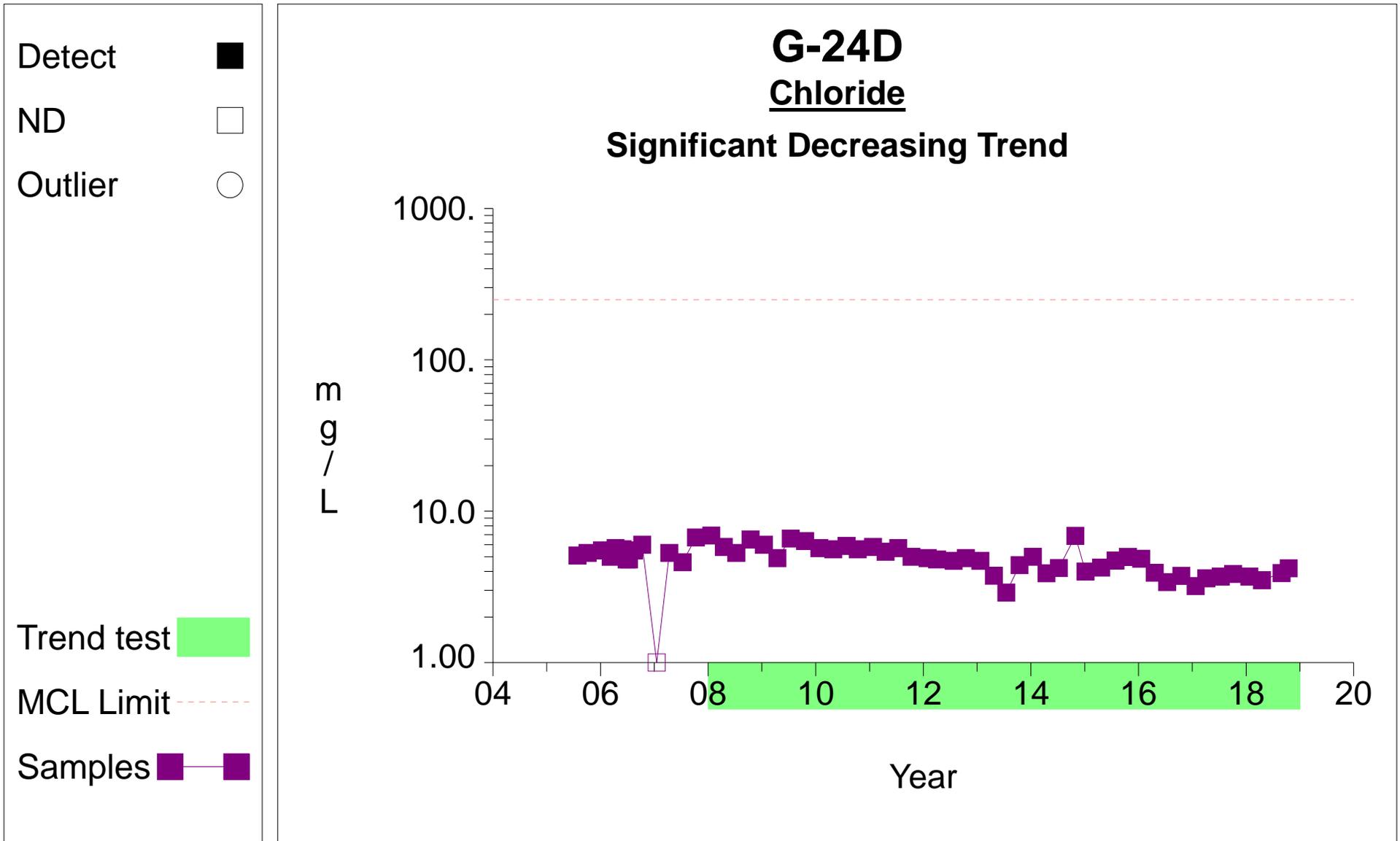
Graph 229

Time Series



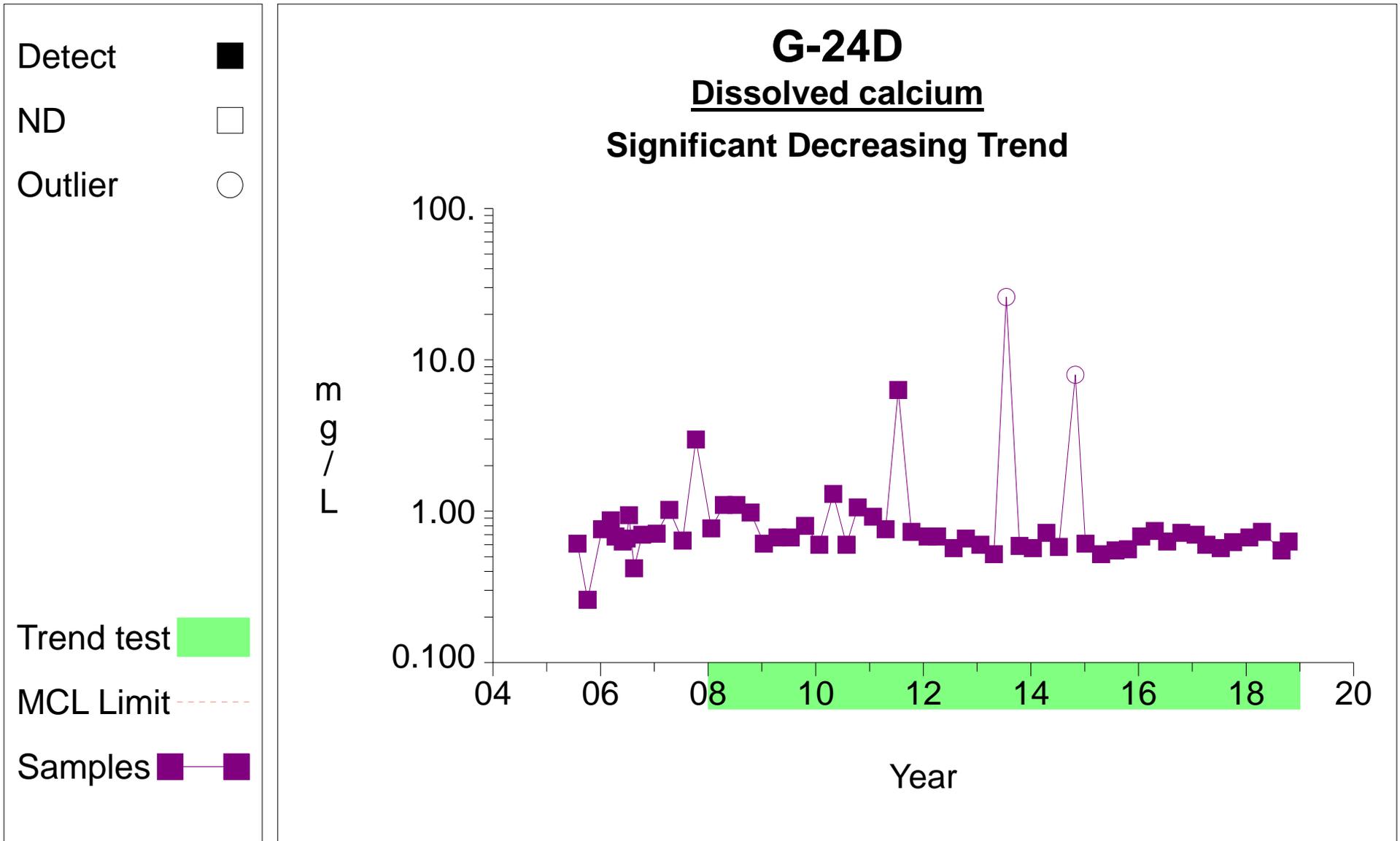
Graph 233

Time Series



Graph 269

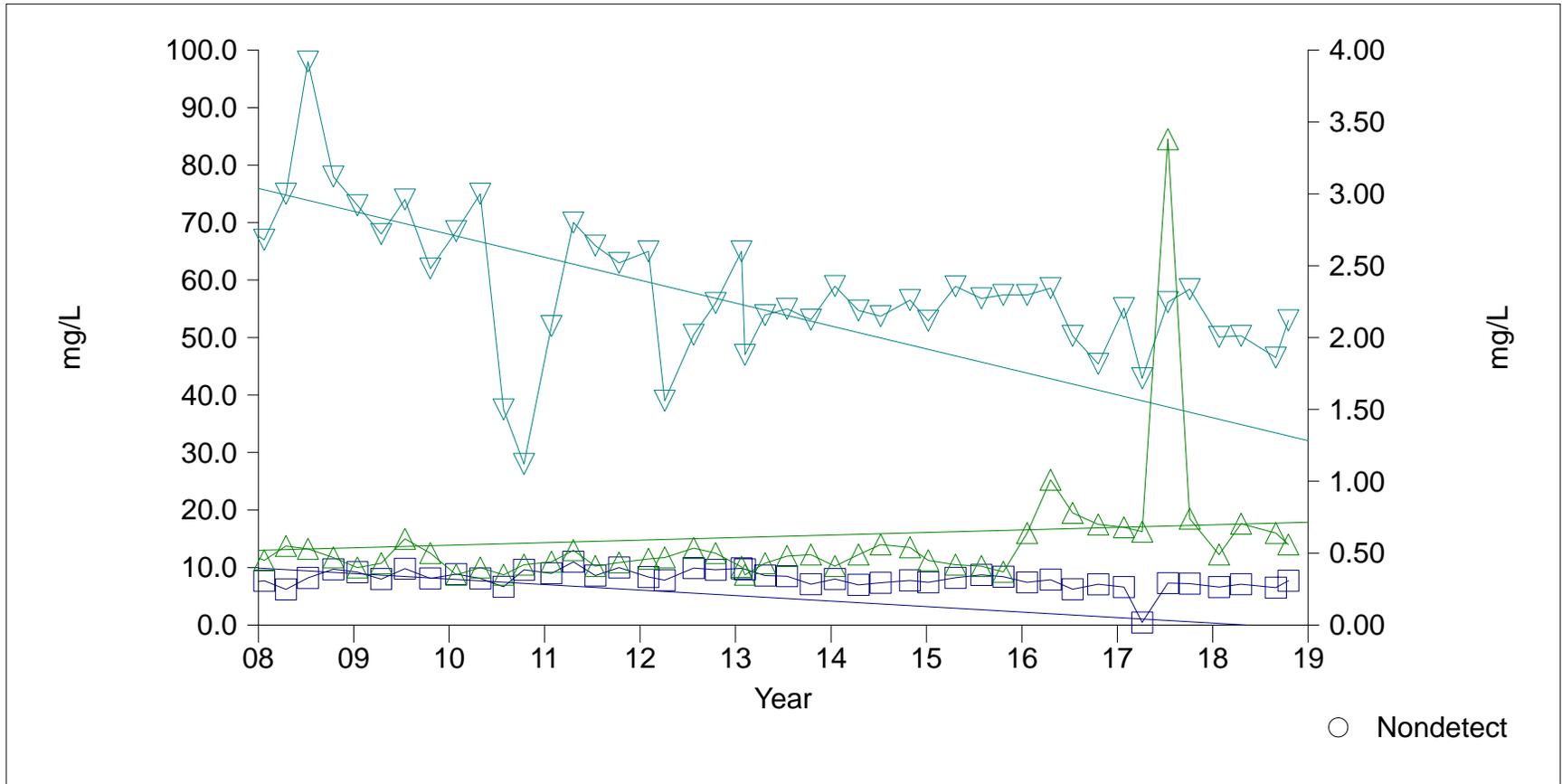
Time Series



Graph 276

Cathcart Landfill

Time Series Plot for G-01D

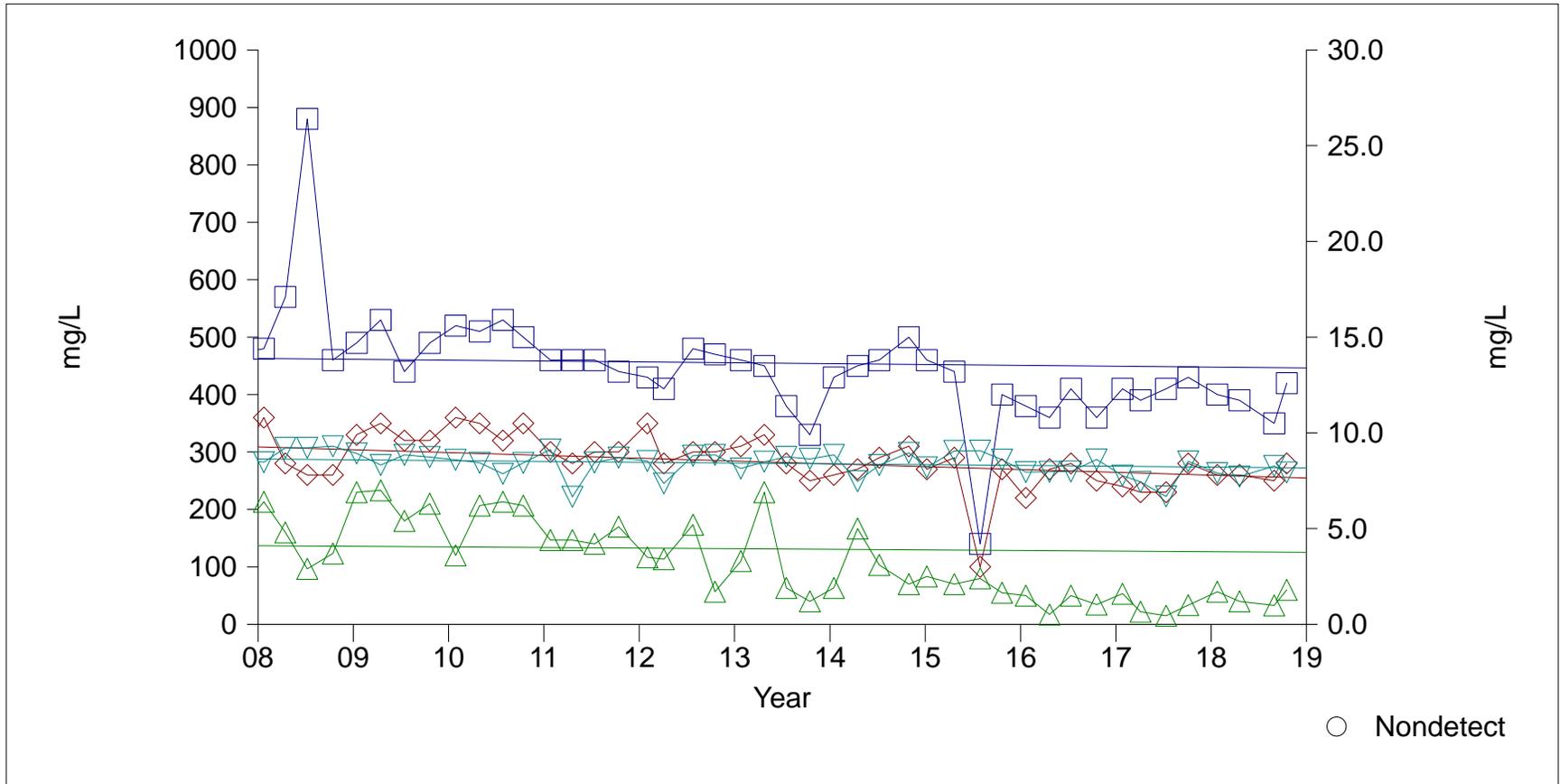


□ Chloride
▽ Sulfate

△ Dissolved potassium
○ Nondetect

Cathcart Landfill

Time Series Plot for G-02D



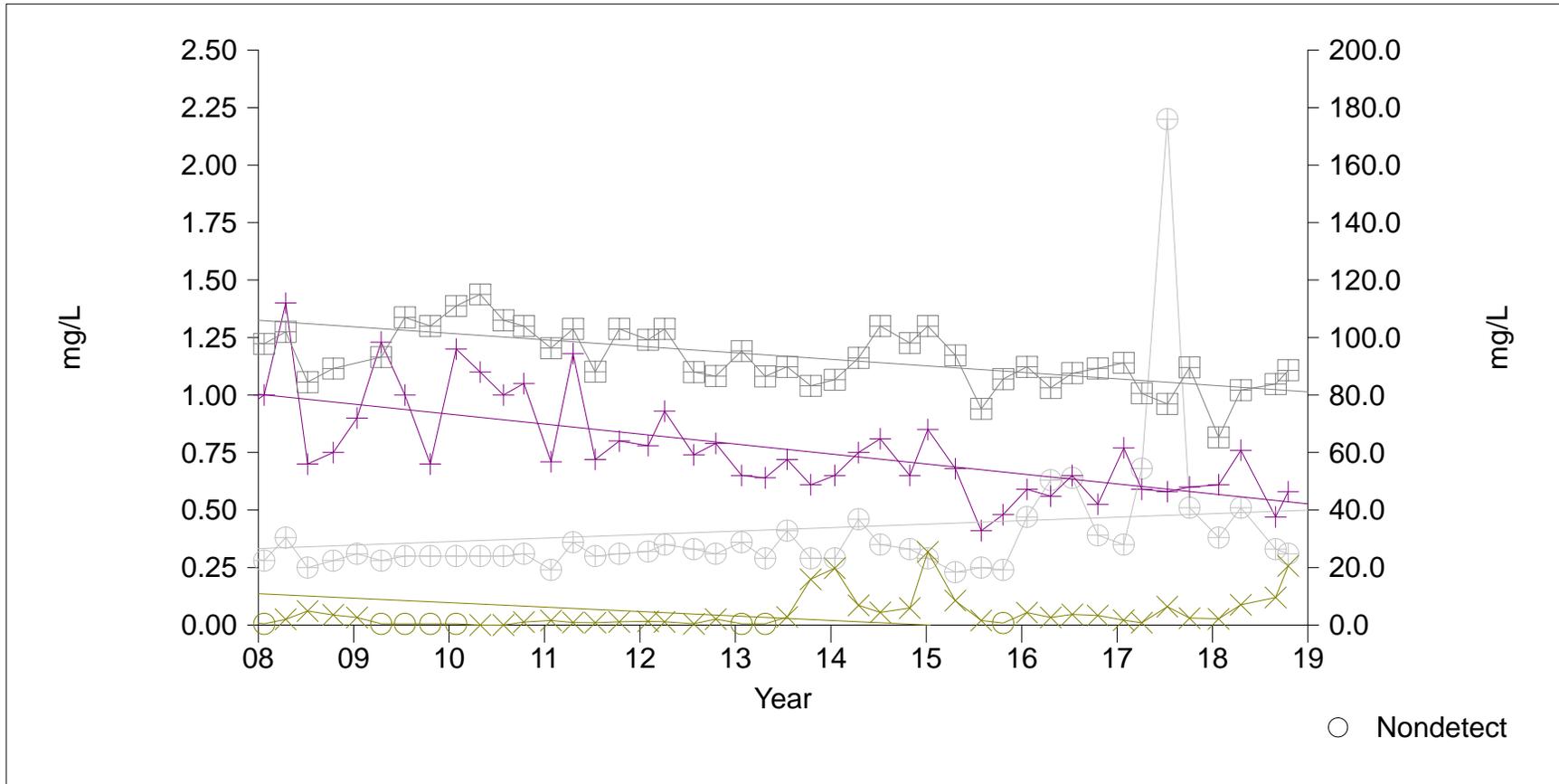
◇ Total dissolved solids
□ Conductivity

△ Nitrate nitrogen
▽ pH

○ Nondetect

Cathcart Landfill

Time Series Plot for G-02D

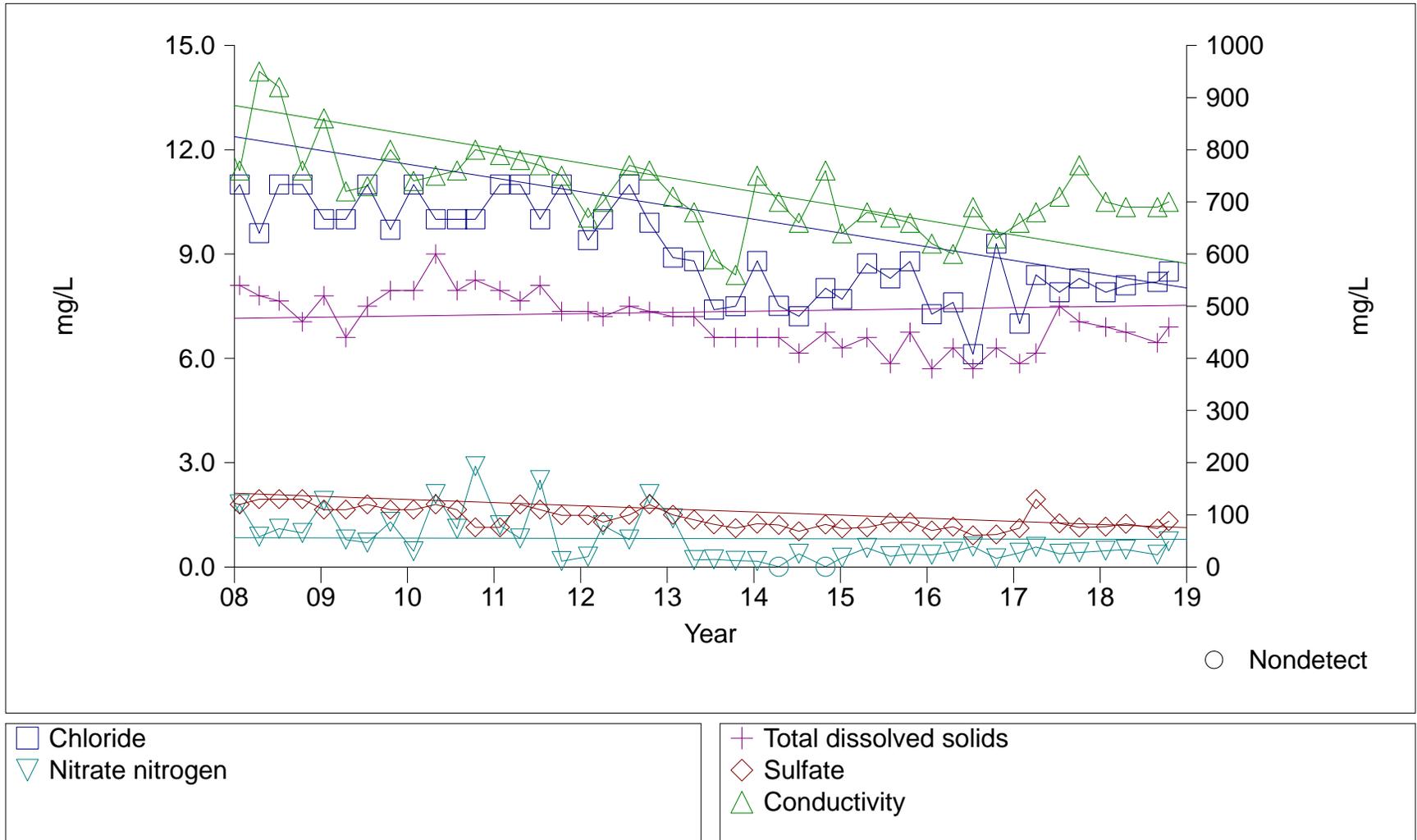


⊕ Dissolved potassium
× Dissolved iron
+ Dissolved calcium

⊠ Dissolved sodium

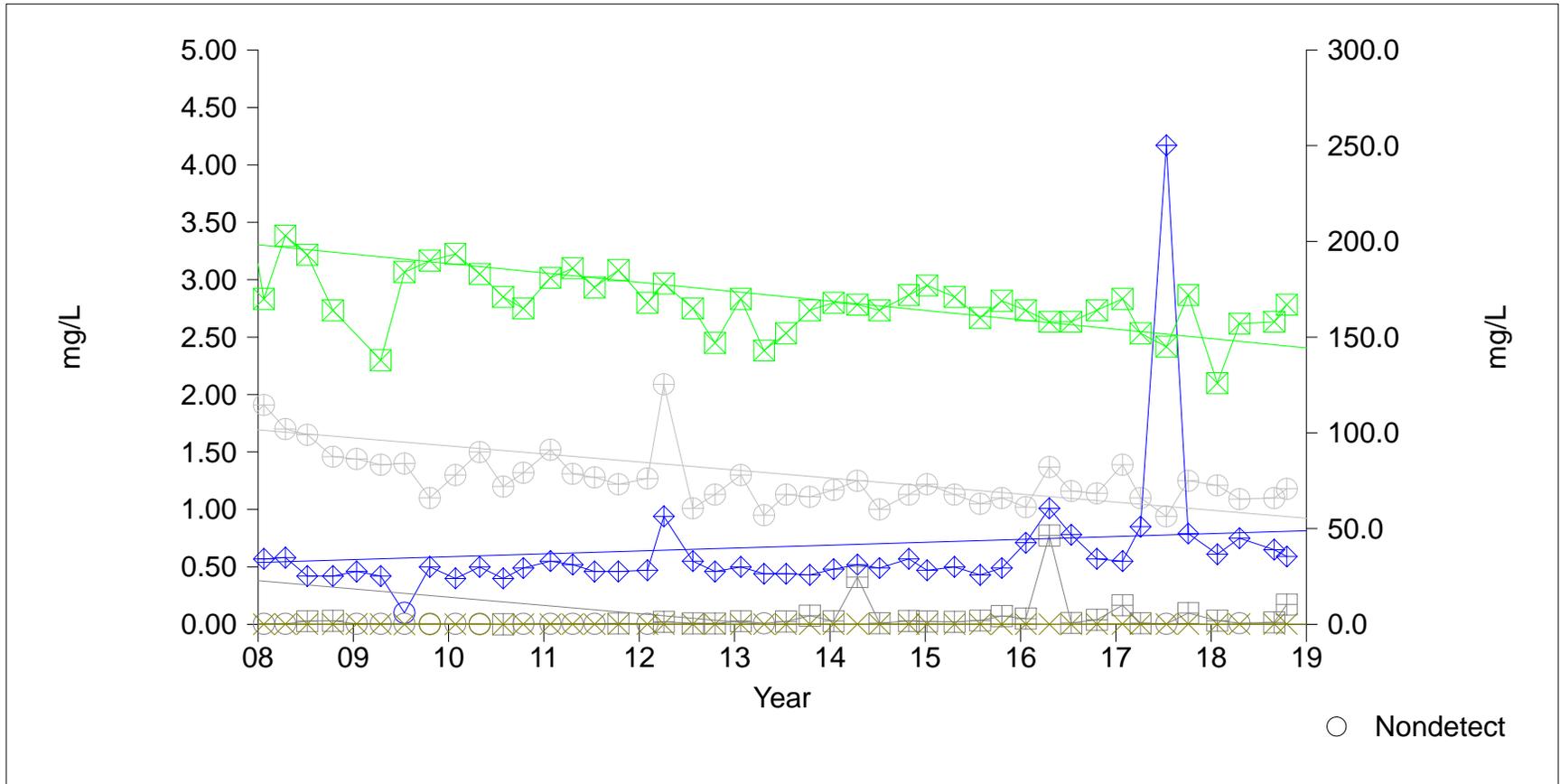
Cathcart Landfill

Time Series Plot for G-06B



Cathcart Landfill

Time Series Plot for G-06B



⊕ Dissolved calcium
⬠ Dissolved potassium
⊞ Dissolved iron

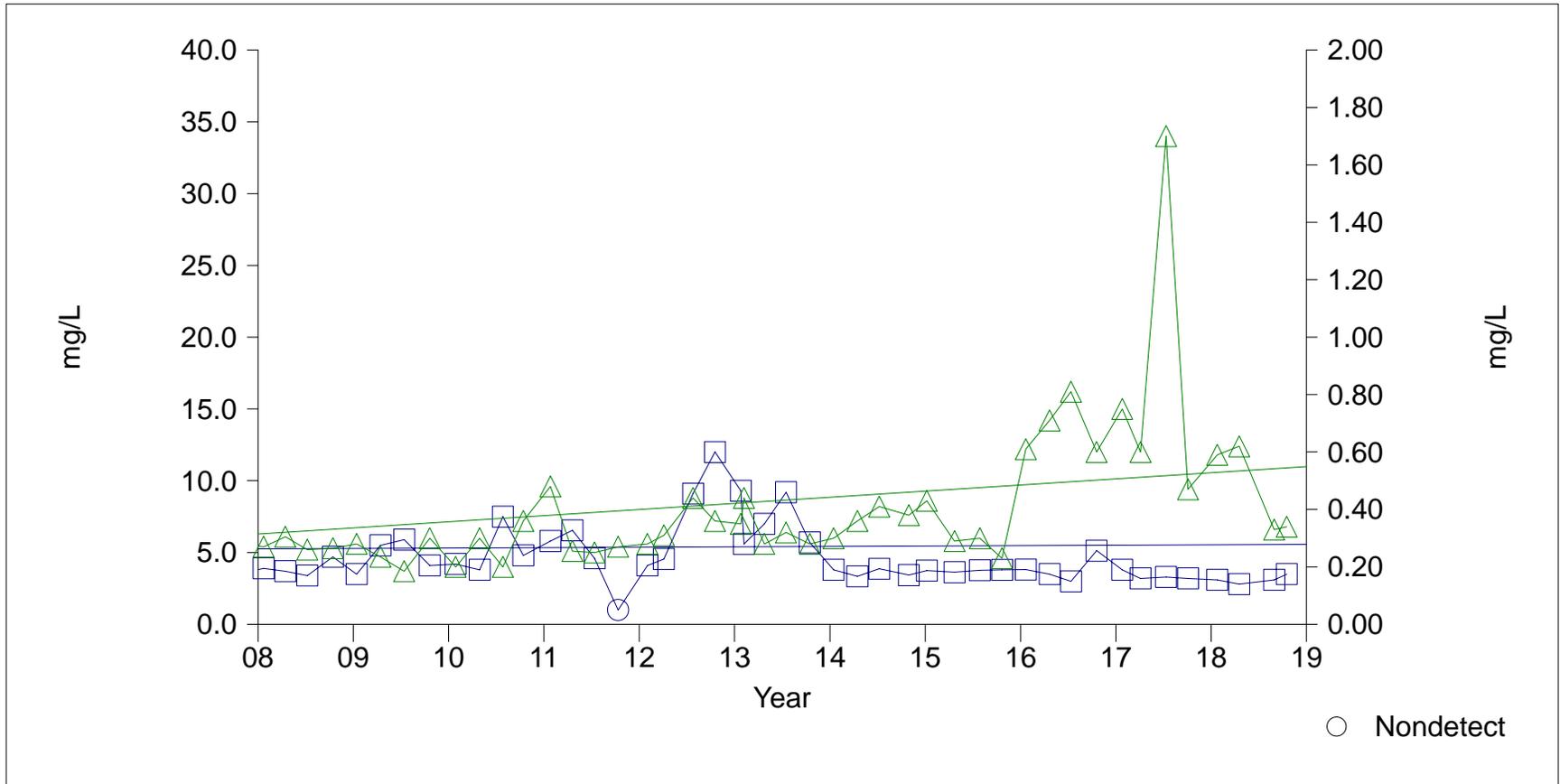
× Dissolved arsenic

⊞ Dissolved sodium

○ Nondetect

Cathcart Landfill

Time Series Plot for G-08D2



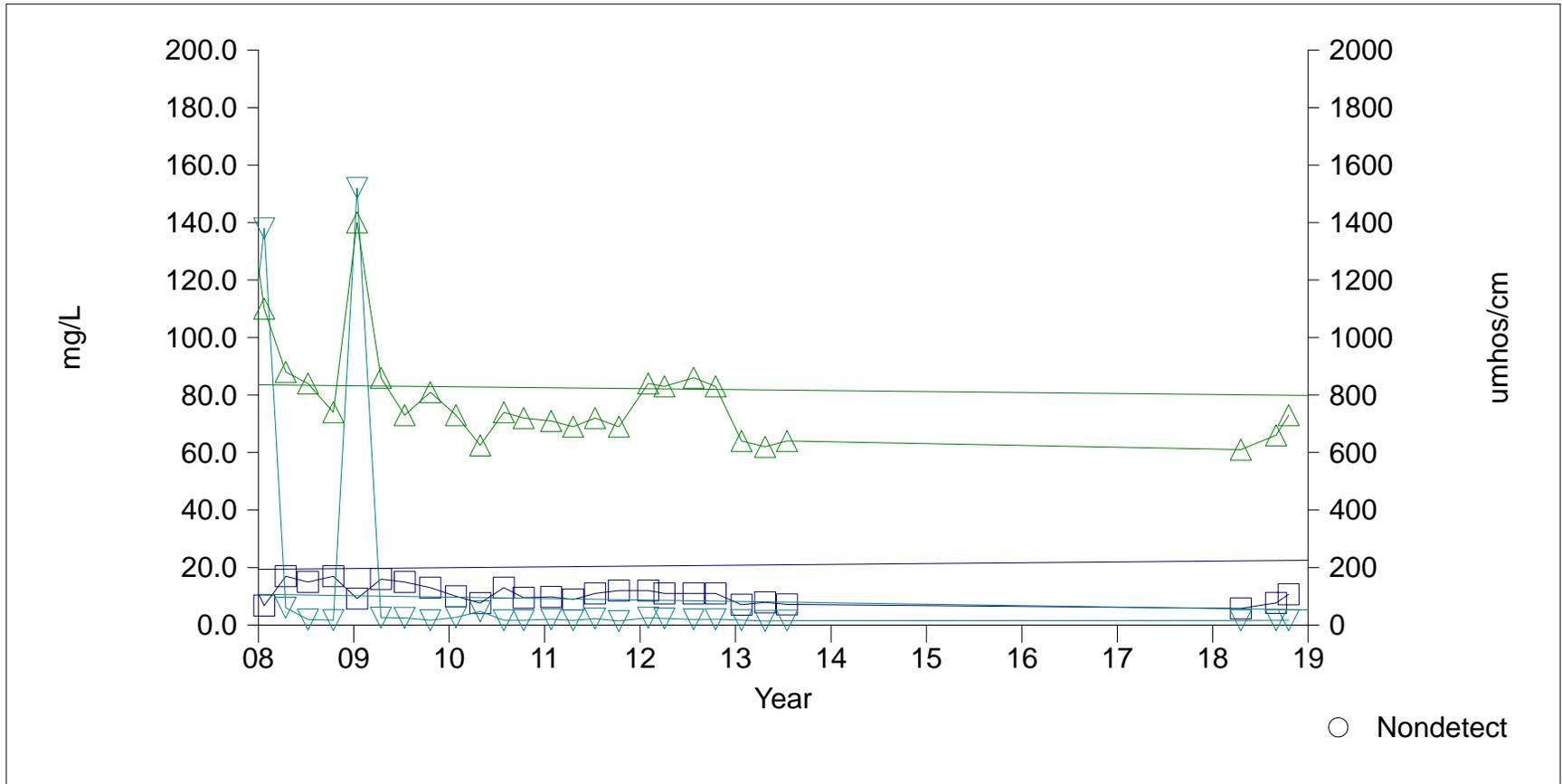
□ Chloride

△ Dissolved potassium

○ Nondetect

Cathcart Landfill

Time Series Plot for G-09D



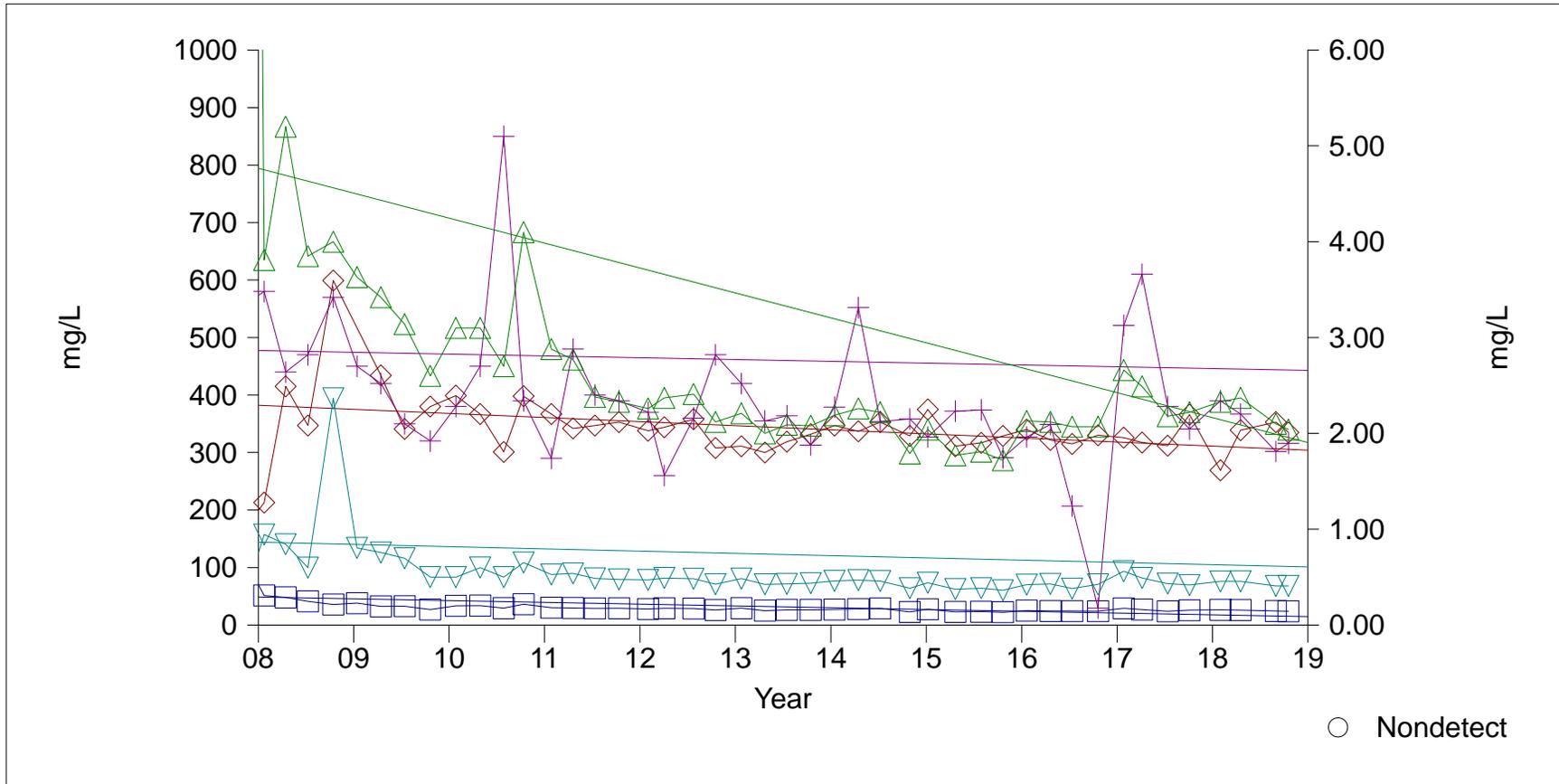
□ Chloride
▽ Dissolved calcium

△ Conductivity

○ Nondetect

Cathcart Landfill

Time Series Plot for G-10D

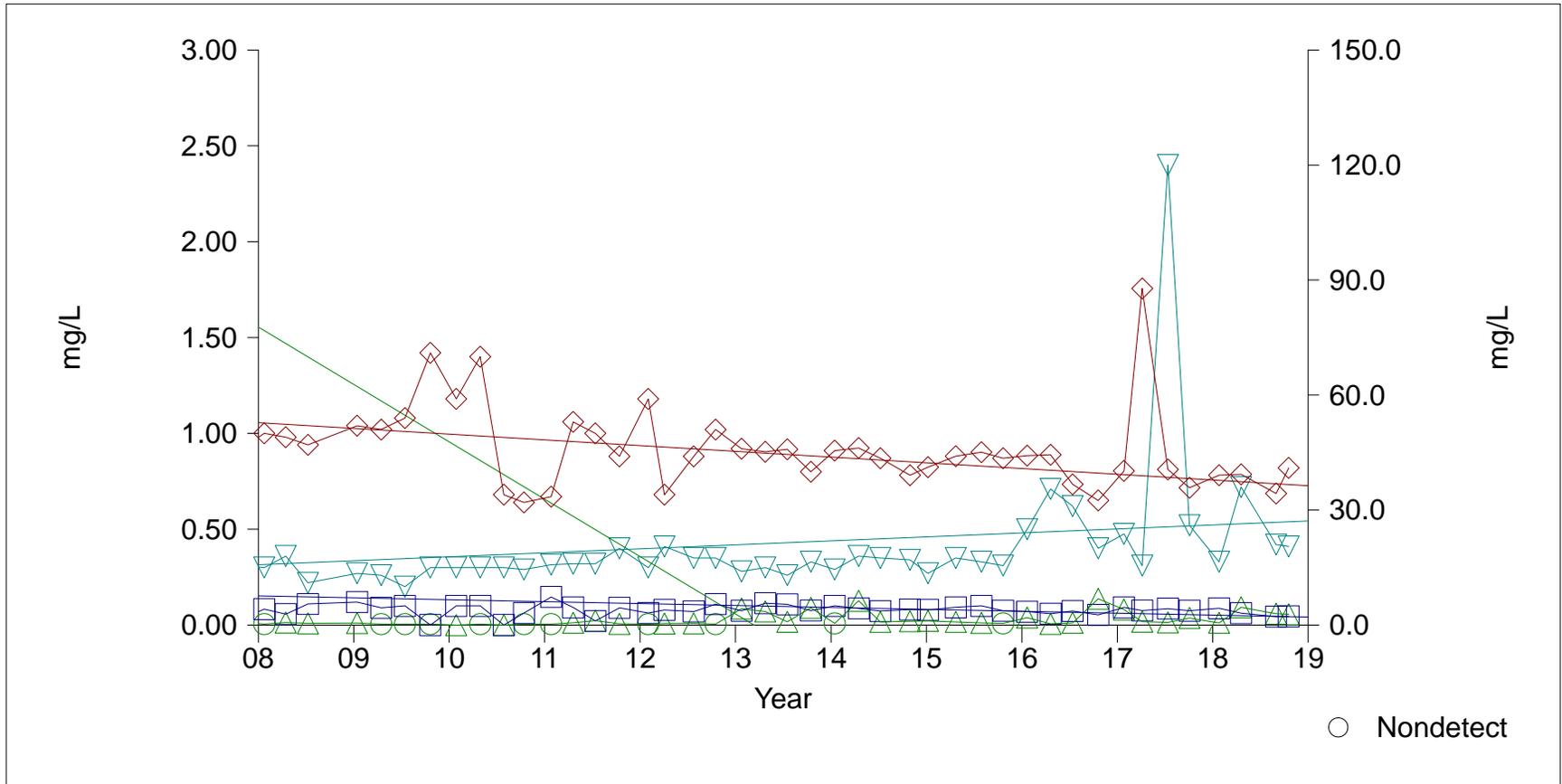


□ Dissolved calcium
◇ Dissolved sodium
+ Sulfate

△ Dissolved magnesium
▽ Dissolved manganese
○ Nondetect

Cathcart Landfill

Time Series Plot for G-13D

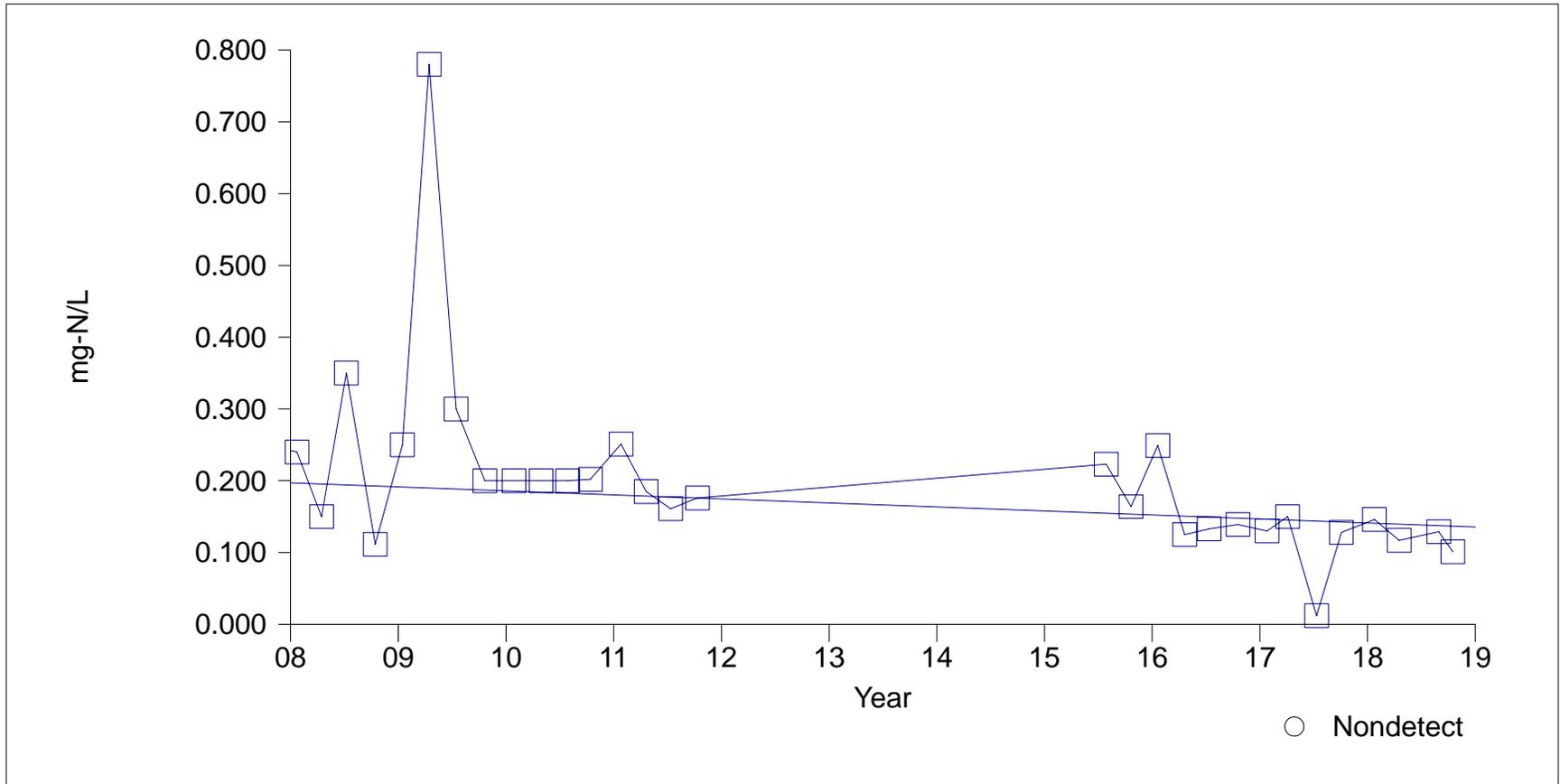


△ Dissolved iron
▽ Dissolved potassium
□ Ammonia nitrogen

◇ Sulfate
○ Nondetect

Cathcart Landfill

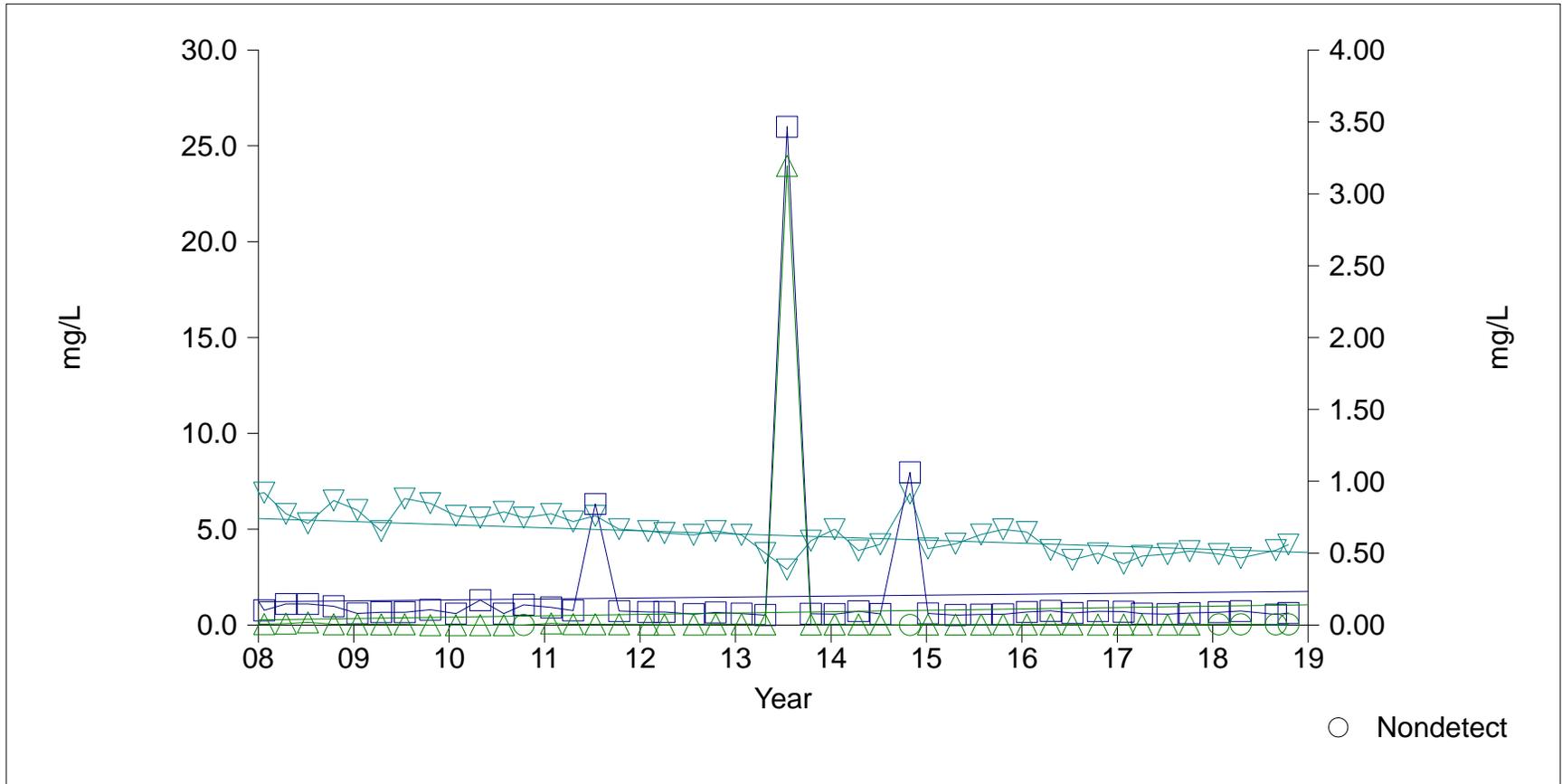
Time Series Plot for G-14D



Ammonia nitrogen

Cathcart Landfill

Time Series Plot for G-24D



▽ Chloride
□ Dissolved calcium

△ Dissolved manganese

○ Nondetect