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REPORT ON

UPDATED CORRECTIVE MEASURES ASSESSMENT
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

by
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Cleveland, Ohio

for
AES Indiana
Indianapolis, Indiana

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List of Abbreviations

Abbreviation	Definition
AESI	AES Indiana
AOI	Area of Interest
Ash Pond System	Ponds A, B, and C and Former Ponds D and E
bgs	below ground surface
BMP	best management practice
CBR	closure by removal
CCGT	combined cycle gas turbine
CCR	Coal Combustion Residual
CCR Rule	USEPA's final rule for "Disposal of Coal Combustion Residuals from Electric Utilities"
CFR	Code of Federal Regulations
CIP	closure in place
CMA	Corrective Measures Assessment
EVGS	Eagle Valley Generating Station also referred to as Site, facility and station
Former Ponds D and E	former Ash Ponds D and E
GWPS	Groundwater Protection Standard
Haley & Aldrich	Haley & Aldrich, Inc.
IDEM	Indiana Department of Environmental Management
MNA	monitored natural attenuation
MSW	municipal solid waste
N&E	nature and extent
NPDES	National Pollutant Discharge Elimination System
O&M	operations and maintenance
PPE	personal protective equipment
Ponds A, B, and C	Ash Ponds A, B, and C
RO	reverse osmosis
Site	Eagle Valley Generating Station
SSI	statistically significant increase
SSL	statistically significant level
USEPA	United States Environmental Protection Agency

1. Introduction and Background Information

Haley & Aldrich, Inc. (Haley & Aldrich) was retained by AES Indiana (AESI) to prepare this updated Corrective Measures Assessment (CMA) for the regulated Coal Combustion Residual (CCR) units, Ash Ponds A, B, and C (herein referred to as Ponds A, B, and C) at the Eagle Valley Generating Station (EVGS or Site). AESI has completed comprehensive geologic and hydrogeologic investigations in accordance with the United States Environmental Protection Agency's (USEPA) rule entitled *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities*. 80 Fed. Reg. 21302 (effective 19 October 2015) and subsequent regulatory revisions (CCR Rule). These investigations have included ongoing semiannual compliance groundwater monitoring and supplemental Nature and Extent (N&E) investigations under the CCR Rule.

This updated CMA report evaluates potential corrective measures for Ponds A, B, and C to remediate impacts to groundwater at statistically significant levels (SSLs) above Groundwater Protection Standards (GWPSs). The initial CMA was prepared by Haley & Aldrich in September 2019 and subsequently amended in October 2019. The initial CMA, along with the annual groundwater monitoring and corrective action reports (that contain historical groundwater monitoring results for the CCR Rule Appendix III and Appendix IV constituents and relevant statistics for that annual period), are posted on the EVGS public CCR website: https://www.aesindiana.com/eagle-valley-generating-station.

This update to the CMA report has been prepared to account for the supplemental information collected since 2019 which is sourced from additional monitoring data, groundwater N&E investigations, conceptual site model development, geochemical and site-specific investigations, groundwater modeling updates, and potential corrective measures evaluations. Based on an evaluation of this additional information, this updated CMA report evaluates four remedial alternatives that expand on the alternatives considered in the initial 2019 CMA report. The evaluation of remedial alternatives provided in this updated CMA report, along with the information and feedback from a public meeting, will form the basis for the final remedy selection for Ponds A, B, and C in accordance with the CCR Rule.

1.1 FACILITY DESCRIPTION

AESI owns and operates the EVGS, which is located approximately 4 miles north of Martinsville, Indiana, in Morgan County. The Site is bounded to the north, west, and southwest by the White River and wetland areas, to the south by farmland and fields, and to the east by various residences and wooded areas (**Figure 1-1**).

AESI ceased coal-fired power-generating operations at the Site in April 2016, and the coal-fired power plant has been demolished. The EVGS had been in operation since 1949 and had four operating bituminous, coal-fired electric generating units (Units 3, 4, 5, and 6) with a combined generating capacity of approximately 300 megawatts immediately prior to ceasing coal-fired operations. In April 2018, AESI began operating a natural gas-fired combined-cycle generating station which is located southwest of the former coal-fired facility and has a generating capacity of 644 megawatts.

CCR produced by the EVGS were historically managed in Ponds A, B, and C (regulated CCR units under the CCR Rule) and in former Ash Ponds D and E (Former Ponds D and E; not regulated under the CCR Rule), located to the east (**Figure 1-2**). The Indiana Southern Railroad traverses the Site in the north-south direction and separates the westerly Ponds A, B, and C from the easterly Former Ponds D and E.

Collectively, Ponds A, B, and C and Former Ponds D and E are considered the Ash Pond System. This updated CMA report focuses on evaluating potential corrective measures under the CCR Rule related to the regulated Ponds A, B, and C.

Ponds A, B, and C, illustrated on **Figure 1-2,** encompass approximately 51 acres. Historically, Ponds A, B, and C treated fly ash and bottom ash waste streams generated by the station's power generating units through sedimentation, flocculation, and neutralization. In addition, Ponds A, B, and C also treated low-volume waste streams and stormwater. CCR-related waste stream inflows ceased to Ponds A, B, and C in 2016.

1.2 CCR RULE COMPLIANCE SUMMARY

CCR Rule groundwater monitoring has been performed in accordance with the Code of Federal Regulations Title 40 (40 CFR) §257.90 through §257.95. The monitoring has been completed through a phased approach to allow for a graduated response (i.e., detection monitoring followed by assessment monitoring and then N&E investigation, as applicable):

- Detection monitoring per 40 CFR §257.94 consisted of nine sampling events completed between April 2016 and September 2017. Statistical evaluation determined that statistically significant increases (SSIs) of Appendix III constituent concentrations had occurred in downgradient monitoring wells. No alternative source was identified for the SSI constituents. Accordingly, the groundwater monitoring program transitioned to an assessment monitoring program.
- Assessment monitoring events per 40 CFR §257.95 began in May 2018 with a resampling assessment monitoring event completed in September 2018. Samples were analyzed for the Appendix III and Appendix IV constituents as required by 40 CFR §257.95(b) and §257.95(d)(1). Concurrent with the second assessment sampling round, and as required by 40 CFR §257.95(h), GWPSs were established for the detected Appendix IV constituents. Based on the established GWPSs, it was determined that arsenic, lithium, and molybdenum were present in groundwater at SSLs above the respective GWPSs.
- Groundwater sampling to investigate the N&E in accordance with 40 CFR §257.95(g) began in 2019 and has included sampling of newly installed N&E monitoring wells and select existing wells.

Based on monitoring data available at the time, the initial CMA report was prepared in 2019, as described in Section 1.2.1 below. A comprehensive N&E investigation began in 2019 after completion of the initial CMA. Results of the N&E investigation have been documented in a comprehensive N&E report (**Appendix A**). The N&E investigation is summarized in Section 1.2.2, and the results of the N&E investigation are summarized in Section 1.3.

40 CFR §257.97(a) requires that a semiannual report be prepared to document progress toward remedy selection and design. Since completion of the initial CMA report in 2019, semiannual reports have been prepared to document progress toward remedy selection and design. Once a remedy is selected, a final remedy selection report must be prepared to document details of the selected remedy and how the selected remedy meets 40 CFR §257.97(b) requirements. The final Selection of Remedy report will be certified by a qualified professional engineer and posted to the facility's publicly-available CCR website[1].

[1] https://www.aesindiana.com/eagle-valley-generating-station

1.2.1 2019 CMA Report Summary

40 CFR §257.96(a) requires that within 90 days of detecting Appendix IV SSLs, "*the owner or operator must initiate an assessment of corrective measures to prevent further releases, to remediate any releases and to restore affected area to original conditions.*" The initial CMA report was completed on 13 September 2019, and an amended version was posted to the facility's publicly-available CCR website on 11 October 2019.

The initial CMA report included three corrective measures alternatives (i.e., remedial alternatives) based on information and understanding of Site conditions at that time:

- Initial Alternative 1: Hybrid closure in place (CIP) with capping and hydraulic control through groundwater pumping with ex-situ treatment;
- Initial Alternative 2: Hybrid CIP with capping and hydraulic control through groundwater pumping with no treatment; and
- Initial Alternative 3: Closure by removal (CBR) with monitored natural attenuation.

The initial CMA report evaluated the three initial potential remedial alternatives with regard to each of the three balancing criteria: long- and short-term effectiveness, protectiveness, and certainty of success; effectiveness in controlling the source to reduce further releases; and ease or difficulty of implementation.

The initial CMA report was prepared based on data available at the time (up to September 2019). Since preparation of the initial CMA report, additional sampling events, data evaluation, N&E investigation, groundwater risk evaluation, and groundwater modeling have been conducted and have been summarized in the N&E report (**Appendix A**). This supplemental information supports updating the CMA and alternatives to account for the more comprehensive understanding of Site conditions. This updated CMA is intended to more effectively address constituent concentrations detected at SSLs above GWPSs in groundwater near Ponds A, B, and C based on the supplemental information available. For instance, results from the N&E investigation provided further delineation of affected groundwater west and south of the Ash Pond System[2], and updated groundwater modeling further refined understanding of the extent of pumping effects from the existing production wells. Based on the additional information, each of the alternatives outlined in this updated CMA report includes additional groundwater extraction wells west of the Ash Pond System to supplement the effects of the existing production wells over the affected groundwater.

The updated CMA alternatives are presented and evaluated in Section 2.6.

1.2.2 N&E Investigation Activities Summary

A notification identifying SSLs of the Appendix IV constituents arsenic, lithium, and molybdenum above the applicable GWPSs during assessment monitoring of Ponds A, B, and C was posted to the facility's publicly-available CCR website on 14 January 2019, in accordance with 40 CFR §257.95(g). Subsequently, pursuant to requirements under 40 CFR §257.95(g)(1), activities associated with the N&E investigation included:

[2] The term "Ash Pond System" is used to describe Ponds A, B, C, and Former Ponds D, and E, collectively.

- Installing additional N&E monitoring wells necessary to define the extent of affected groundwater;
- Collecting data regarding the nature and estimated quantity of material released;
- Installing and sampling at least one additional monitoring well at the facility boundary in the direction of constituent migration; and
- Sampling all background wells, CCR Rule groundwater monitoring system wells, and N&E monitoring wells for Appendix III and Appendix IV constituents to characterize the nature and extent of the release.

The N&E investigation, in accordance with 40 CFR §257.95(g)(1), was initiated in 2019 by installing supplemental N&E monitoring wells at strategic locations and depths primarily south and east of Ponds A, B, and C, as shown on **Figure 1-3**. Based on analytical results collected from those N&E monitoring wells, additional N&E wells were installed offsite to the south in 2021 and 2022, and onsite to the west of Ponds A, B, and C in 2023.

A total of 71 CCR Rule groundwater monitoring system wells, background monitoring wells, and N&E monitoring wells are currently monitored at the Site, including:

- 25 shallow zone wells (generally screened between 20 to 40 feet below ground surface [Bgs]);
- 23 intermediate zone wells (generally screened between 40 to 70 feet bgs); and
- 23 deep zone wells (screened between 70 to 107 feet bgs).

Groundwater samples from multiple rounds of CCR Rule groundwater sampling events have been collected from the Site's 38 N&E monitoring wells to sufficiently characterize the nature and extent of groundwater affected by the Site's Ash Pond System. Results of the N&E investigation have been documented in an N&E report (**Appendix A**), and a summary of N&E results is provided in Section 1.3.

1.3 N&E RESULTS SUMMARY

The N&E investigation activities performed at the Site (summarized in Section 1.2.2) have resulted in an enhanced understanding of the N&E of affected groundwater. The results of the N&E investigation are summarized below and described further in the N&E report (**Appendix A**):

- The Ash Pond System has been identified as the source of arsenic, lithium, and molybdenum SSLs above GWPSs detected in groundwater near the Ash Pond System.
- The uppermost aquifer at the Site is comprised of alluvial sand and gravel deposits on top of relatively impermeable shale bedrock. Hydraulic conductivity tends to decrease with depth, with greater groundwater flow rates generally recorded in the shallow zone than in the intermediate or deep zones. The underlying bedrock constitutes an aquitard (or confining unit), which restricts downward constituent migration in groundwater.

Groundwater near the Ash Pond System naturally flows west toward the White River. However, three production wells located east of the Ash Pond System influence groundwater flow across the Site, creating an inward hydraulic gradient. The inward hydraulic gradient shows some variability and can change based on seasonal effects and operating requirements of the production wells, influencing the flow of groundwater beneath the Ash Pond System.

- Production well pumping influences the relatively lower conductivity deep zone less than the relatively higher conductivity shallow zone. This factor, combined with the Ash Pond System storing CCR with the potential to leach to groundwater since 1949, results in generally greater constituent concentrations at depth and at farther distances from the Ash Pond System boundary.
- Evaluation of the N&E investigation results identified predominately stable and decreasing constituent concentrations in impacted groundwater.
- The horizontal extent of affected groundwater covers approximately 360 acres, which encompass the Ash Pond System and extend to the west and southwest. The vertical extent of affected groundwater is limited by relatively impermeable shale bedrock, approximately 90 feet bgs.
- Groundwater pumping by production wells that support plant operations provides ongoing management for about 65 percent of the area of affected groundwater.
- Affected groundwater was identified offsite and beyond the influence of pumping by the production wells. That area encompasses approximately 100 acres.

1.4 RISK EVALUATION SUMMARY

The Groundwater Risk Evaluation report (**Appendix B**) describes the risk evaluations completed for groundwater and discharge water at the Site and the results of those evaluations. These risk evaluations demonstrate that there are no adverse impacts on human health or ecological receptors from constituents present in groundwater resulting from CCR management practices at the Site's Ash Pond System.

Based on these conclusions, all the remedies considered in this updated CMA report are protective of human health and the environment.

1.5 AREAS OF INTEREST FOR CORRECTIVE MEASURES

Based on results from the N&E investigation, the area of CCR-affected groundwater has been divided into four Areas of Interest (AOIs) to support assessment of tailored potential remedial alternatives that consider localized constituent concentrations, geochemical reactivity, and physical site characteristics. Constituent reactivity, proximity to the Ponds A, B, and C, hydrogeologic framework, and geochemical environment were considered to develop these AOIs. AOIs are summarized in **Table 1-1** below and presented on **Figure 1-4**. These AOIs are referenced throughout Section 2 in terms of implementing potential corrective measures to address Appendix IV SSLs in groundwater.

Table 1-1. Area of Interest Summary

Area of Interest	Constituent (> GWPS)	Characteristics
AOI 1	Lithium, molybdenum	Largest AOI, encompasses most of the Ash Pond System, within influence of existing production wells.
AOI 2	Lithium, molybdenum	West of Ponds A, B, and C, outside of existing production well influence.

Table 1-1. Area of Interest Summary		
Area of Interest	**Constituent (> GWPS)**	**Characteristics**
AOI 3	Lithium	Southwest of Ponds A, B, and C, outside of existing production well influence.
AOI 4	Arsenic	Generally, within the southwestern portion of Pond A, within influence of existing production wells.

2. Updated Corrective Measures Assessment

As described in Section 1, this updated CMA report has been prepared to account for the supplemental information collected from comprehensive monitoring and investigations since preparation of the initial CMA report in 2019. This section outlines the CMA goals, summarizes conclusions from the initial 2019 CMA report, introduces the updated potential corrective measures and remedial alternatives, and evaluates those corrective measures and remedial alternatives based on criteria outlined in the CCR Rule.

2.1 CORRECTIVE MEASURES ASSESSMENT GOALS

40 CFR §257.96(c) Assessment of Corrective Measures [CMA Criteria, as termed in this report]

In accordance with 40 CFR §257.96(c), a CMA is to be performed and must include an analysis of the effectiveness of potential corrective measures in meeting all the requirements and objectives of the remedy as described under 40 CFR §257.97 addressing at least the following:

(1) The performance, reliability, ease of implementation, and potential impacts of appropriate potential remedies, including safety impacts, cross-media impacts, and control of exposure to any residual contamination;

(2) The time required to begin and complete the remedy;

(3) The institutional requirements, such as state or local permit requirements or other environmental or public health requirements that may substantially affect implementation of the remedy(s).

40 CFR §257.97(b) Selection of Remedy [Threshold Criteria, as termed in this report]

The evaluation of potential corrective measures is presented in Section 2.5. Based on the outcome of the potential corrective measures evaluation in Section 2.5, potential remedial alternatives (unique combinations of potential closure and groundwater measures) are identified and evaluated in Section 2.6 based on the requirements and objectives of 40 CFR §257.97(b):

(b) Remedies must:

(1) Be protective of human health and the environment;

(2) Attain the groundwater protection standard as specified pursuant to §257.95(h);

(3) Control the source(s) of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of constituents in appendix IV to this part into the environment;

(4) Remove from the environment as much of the contaminated material that was released from the CCR unit as is feasible, taking into account factors such as avoiding inappropriate disturbance of sensitive ecosystems;

(5) Comply with standards for management of wastes as specified in §257.98(d).

40 CFR §257.97(c) Selection of Remedy [Balancing Criteria, as termed in this report]

Once these technologies are demonstrated to meet these Threshold Criteria, they are then further evaluated in Section 2.6 with respect to the following Balancing Criteria outlined in 40 CFR §257.97(c):

(c) In selecting a remedy that meets the standards of paragraph (b) of this section, the owner or operator of the CCR unit shall consider the following evaluation factors:

(1) The long- and short-term effectiveness and protectiveness of the potential remedy(s), along with the degree of certainty that the remedy will prove successful based on consideration of the following:

(i) Magnitude of reduction of existing risks;

(ii) Magnitude of residual risks in terms of likelihood of further releases due to CCR remaining following implementation of a remedy;

(iii) The type and degree of long-term management required, including monitoring, operation, and maintenance;

(iv) Short-term risks that might be posed to the community or the environment during implementation of such a remedy, including potential threats to human health and the environment associated with excavation, transportation, and re-disposal of contaminant;

(v) Time until full protection is achieved;

(vi) Potential for exposure of humans and environmental receptors to remaining wastes, considering the potential threat to human health and the environment associated with excavation, transportation, re-disposal, or containment;

(vii) Long-term reliability of the engineering and institutional controls; and

(viii) Potential need for replacement of the remedy.

(2) The effectiveness of the remedy in controlling the source to reduce further releases based on consideration of the following factors:

(i) The extent to which containment practices will reduce further releases; and

(ii) The extent to which treatment technologies may be used.

(3) The ease or difficulty of implementing a potential remedy(s) based on consideration of the following types of factors:

(i) Degree of difficulty associated with constructing the technology;

(ii) Expected operational reliability of the technologies;

(iii) Need to coordinate with and obtain necessary approvals and permits from other agencies;

(iv) Availability of necessary equipment and specialists; and

(v) Available capacity and location of needed treatment, storage, and disposal services.

(4) The degree to which community concerns are addressed by a potential remedy(s).

The CMA Criteria outlined in 40 CFR §257.96(c), Threshold Criteria outlined in 40 CFR §257.97(b), and Balancing Criteria outlined in 40 CFR §257.97(c) are evaluated in this report in terms of two primary categories of corrective measures (source control measures and groundwater measures):

- Source control (closure) measures pertain to methods of closing a CCR unit to provide a safe long-term solution for the storage of CCR material and to reduce the potential for future release of CCR material into the environment or CCR constituents into groundwater. Potential source control measures considered in this report for Ponds A, B, and C are identified in Section 2.2.
- Groundwater measures pertain to methods of remediating constituent concentrations in groundwater with the objective of attaining GWPSs for Appendix IV constituents beyond the waste boundary of a CCR unit. Potential groundwater measures considered in this report for Ponds A, B, and C are identified in Section 2.3.

Source control measures and groundwater measures identified in Section 2.2 and Section 2.3 are evaluated in Section 2.5 against the CMA Criteria. Unique combinations of potential source control measures and groundwater measures are then used to develop potential remedial alternatives that are evaluated against the Balancing Criteria in Section 2.6.

2.2 SOURCE CONTROL (CLOSURE) MEASURES

CCR material storage in Ponds A, B, and C has resulted in leaching of CCR constituents into groundwater downgradient of Ponds A, B, and C. Concentrations of arsenic, lithium, and molybdenum at SSLs above GWPSs have been recorded in groundwater at and beyond the waste boundary of the Ash Pond System. CCR material historically stored in Ponds A, B, and C has been identified as the source of those SSLs in groundwater based on evaluation of groundwater flow patterns, chemical composition of groundwater, and Site operational features, as summarized in the N&E report (**Appendix A**).

This report defines source control as a method or combination of methods to directly address the source of affected groundwater: the historical storage of ponded CCR material in CCR surface impoundments (Ponds A, B, and C). Closure of Ponds A, B, and C is planned and will be the primary mechanism of source control to support the groundwater measures. The source control measures evaluated in this report consider both hybrid CIP and CBR of Ponds A, B, and C, as discussed below, and both are considered acceptable solutions for completing CCR surface impoundment closure required under the CCR Rule.

Former Ponds D and E will be closed in accordance with Indiana solid waste regulations in a manner subject to approval by the Indiana Department of Environmental Management (IDEM). This evaluation assumes that Former Ponds D and E closure will utilize capping and CIP and will be identical for each of the potential remedial alternatives considered such that it does not affect the resulting evaluation of remedial alternatives for Ponds A, B and C.

The hybrid CIP and CBR source control (closure) measures under consideration in this evaluation are described in further detail in Section 2.2.1 and Section 2.2.2 below.

2.2.1 Hybrid Closure in Place (CIP)

The hybrid CIP source control measure for Ponds A, B, and C would involve the removal of CCR that is determined to be likely in contact with groundwater during seasonal high groundwater conditions, placement of the removed CCR with other CCR that is above the seasonal high groundwater table, and installation of an engineered cover (or cap) system over the CCR closure footprint. CCR that may potentially come into contact with groundwater has been identified in an approximately 18-acre portion of Ponds A, B, and C. CCR determined to be likely below the seasonal high groundwater table would be excavated from below the water table and placed above the water table across the Pond A, B, and C closure footprint to establish a new base grade for the CCR and engineered cover system. Following removal and temporary stockpiling of the CCR within the Pond A, B, and C footprint, clean cohesive soil from an onsite or offsite source would be used to backfill the excavated area and raise the grades throughout the excavated area to be at least 1 foot above the seasonal high groundwater table. The CCR would then be regraded over the soil backfilled area to achieve final grades prior to installing the cover system, in accordance with an Ash Pond Closure Plan approved by IDEM. Ponds A, B, and C would then be closed in place with a geomembrane and soil protective cap system to restrict infiltration of precipitation into the underlying capped CCR. The combination of maintaining CCR material above the water table and capping the material with an engineered cap system would restrict the potential for leaching of CCR constituents into groundwater after closure is complete. This cap would be designed to meet the 1×10^{-5} centimeters per second permeability performance criteria required by the CCR Rule for surface impoundment final cover systems (i.e., the cap would be designed to be as permeable or less permeable than what is required under the CCR Rule, thereby further limiting the potential for post-closure leaching to occur from the closed Ponds A, B, and C).

2.2.2 Closure by Removal (CBR)

This source control measure includes the removal, offsite transportation, and disposal of CCR from Ponds A, B, and C. An engineered CBR final grading plan would be prepared and field adjusted as needed to address the regrading of remaining onsite soil berm material and pond interior surfaces. The final grading would accommodate the backfill of as much of the excavated area as feasible, with a focus on eliminating steep and/or unsafe slopes and promoting drainage of stormwater runoff away from the excavated area post-closure.

2.3 GROUNDWATER MEASURES

As summarized in previous sections, Appendix IV constituents arsenic, lithium, and molybdenum were detected at SSLs above GWPSs in one or more monitoring wells downgradient of Ponds A, B, and C. Based on the unique combination of constituent distribution, constituent reactivity, and pumping influences across the Site, the extent of affected groundwater has been grouped into four different AOIs (as discussed in Section 1.5 and as shown in **Figure 1-4**) for remedy evaluation. This section discusses a number of groundwater measures, that may be used in combination, to directly address the constituents in affected groundwater in the four AOIs. In addition to groundwater measure(s), AESI would implement post-closure care activities after completion of closure.

The following terms are frequently used throughout the discussion of groundwater measures and remedial alternatives:

In-situ – refers to a process in which a substance remains in its original location.

Ex-situ – refers to a process in which a substance is temporarily or permanently transferred or relocated.

2.3.1 Hydraulic Containment through Groundwater Pumping (AOI 1 and AOI 2)

This groundwater measure would be used to address lithium and molybdenum SSLs above GWPSs in AOI 1 and AOI 2.

Lithium and molybdenum SSLs at AOI 1 would be addressed via hydraulic containment through the existing groundwater pumping from the facility's production wells associated with the Eagle Valley CCGT Natural Gas Plant. With this measure, no treatment of extracted groundwater would be used prior to discharge. Extracted groundwater effluent from existing production wells would be monitored and be discharged in accordance with the EVGS's NPDES permit.

Lithium and molybdenum at AOI 2 would be addressed via hydraulic containment through groundwater pumping of supplemental extraction wells to be installed along the southern boundary of the property near the southwest corner of Pond A and Pond B to hydraulically control the migration of the constituents downgradient. Additional extracted groundwater effluent from pumping of the supplemental extraction wells would be characterized and appropriately managed.

2.3.2 Hydraulic Containment through Groundwater Pumping with Ex-Situ Treatment (AOI 1 and AOI 2)

This groundwater measure would be used to address lithium and molybdenum SSLs above GWPSs in AOI 1 and AOI 2. This measure would be the same as described above in Section 2.3.1, except that the extracted groundwater would be treated ex-situ with the following treatment considerations:

- AOI 1 – Production well effluent would be treated, ex-situ, via ion exchange, or reverse osmosis (RO) prior to discharge in accordance with NPDES permit requirements.
- AOI 2 – Supplemental extraction well effluent would be treated ex-situ (e.g., ion exchange, RO) prior to discharge in accordance with NPDES permit requirements or offsite disposal.

2.3.3 Monitored Natural Attenuation (AOI 3)

This groundwater measure would be used to address lithium SSLs above the GWPS in AOI 3.

Monitored natural attenuation (MNA)[3] is a groundwater measure that relies on data collection from historical and ongoing groundwater monitoring to demonstrate that physical, chemical, and biological processes naturally occurring in the subsurface are sufficient to adequately remediate (or reduce the concentration of) an SSL to below the GWPS.

Lithium SSLs at AOI 3 would be addressed via ongoing natural attenuation processes for this portion of the plume. The concentrations of lithium in groundwater within AOI 3 are anticipated to naturally decrease primarily via physical processes of attenuation to less than the GWPS based on data from monitoring well MW-17D. Data from MW-17D indicate lithium concentrations are only marginally above the GWPS and not increasing, and future completion of closure (source control) is anticipated to contribute to decreased constituent concentrations.

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[3] MNA is defined by the USEPA as "…the reliance on natural attenuation processes (within the context of a carefully controlled and monitored site cleanup approach) to achieve site-specific remediation objectives within a time frame that is reasonable compared to that offered by other more active methods. The 'natural attenuation processes' that are at work in such a remediation approach include a variety of physical, chemical or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in soil or groundwater. These in-situ processes include biodegradation; dispersion; dilution; sorption; volatilization; radioactive decay; and chemical or biological stabilization, transformation, or destruction of contaminants." (EPA 1999c, page 3)

2.3.4 In-Situ Treatment (AOI 4)

This groundwater measure would be used to address arsenic SSLs above the GWPS within the limited area of AOI 4.

Arsenic SSLs at AOI 4 would be addressed via a combination of influence from the existing production well pumping and the introduction of in-situ treatment via generation of ferric oxides and potential air sparging. Ferric oxides have been demonstrated to adsorb and immobilize arsenic. In-situ generation of ferric oxides in the arsenic-impacted zone can be achieved through injection of acidic ferric iron solution that will react with naturally occurring buffering minerals in soil to promote the formation of ferric oxides in-situ. Alternatively, ferric oxides can also be generated in-situ by distributing ferrous iron in the arsenic-impacted zone and then sparging the impacted zone with oxygen or air.

The in-situ treatment would be implemented near monitoring well cluster MW-11 (outside the post-closure boundary of Ponds A, B, and C to ensure that any final cover system would not be affected by the treatment).

2.4 OTHER CMA CONSIDERATIONS

The potential source control measures described in Section 2.2 and the groundwater measures described in Section 2.3 were developed based on consideration of the array of potential source control (closure) measures and groundwater measures available to address impacted groundwater at the Site. Additional potential corrective measures beyond those listed in Section 2.2 and Section 2.3 that were considered for preliminary evaluation in this CMA included:

- Other potential source control (closure) measures considered:
  - CIP with capping, with all CCR material remaining in-place; and
  - CBR with onsite landfill disposal.
- Other potential groundwater measures considered:
  - In-situ chemical groundwater treatment with reactive barriers;
  - Low-permeability groundwater migration barriers;
  - Phytoremediation; and
  - Clean water infiltration/groundwater flushing.

Further consideration of these other potential corrective measures was not performed due to Site-specific conditions and limitations including, but not limited to: the Site hydrogeologic and geochemical framework; the Site land/infrastructure configuration and geospatial disposition of the impacted groundwater; and finally, the relative impracticability of installing and/or limited remedial benefit of implementing the subject remedy elements.

2.5 EVALUATION OF POTENTIAL CORRECTIVE MEASURES

This section presents an evaluation of the potential source control (closure) measures presented in Section 2.2 and the potential groundwater measures presented in Section 2.3 based on the CMA Criteria specified in 40 CFR §257.96(c) and outlined in Section 2.1. A summary of this evaluation is presented in **Table 2-1**.

2.5.1 Performance

This criterion evaluates the ability of each of the source control (closure) measures to effectively reduce the potential for future release of CCR material into the environment and the ability of each of the groundwater measures to remediate Appendix IV constituent concentrations in groundwater to below GWPSs beyond the waste boundary of the CCR unit(s).

- Source Control Measures
  - Hybrid CIP – This source control measure would provide high performance for closing Ponds A, B, and C. Hybrid CIP would provide a long-term solution for storage of CCR onsite. Closure activities would involve removing CCR currently below the seasonal high groundwater table, backfilling with clean fill to above the seasonal high groundwater table, consolidating and grading all the CCR within the existing footprint of Ponds A, B, and C above the seasonal high groundwater table, and installing an engineered final cover system over the CCR that encloses the CCR and restricts infiltration. Periodic post-closure operations and maintenance (O&M) of the final cover system would be performed to maintain cover system integrity and restrict infiltration long term.
  - CBR – This source control measure would provide high performance for closing Ponds A, B, and C. CBR would entail complete removal of CCR from the Site and long-term storage in an offsite lined, permitted landfill. Complete removal of the source from the Site would eliminate potential for future releases of CCR material to the environment or CCR constituents to groundwater.
- Groundwater Measures:
  - Hydraulic Containment through Groundwater Pumping (AOI 1 and AOI 2) – This groundwater measure would provide high performance for addressing lithium and molybdenum SSLs in AOI 1 and AOI 2. Groundwater pumping is highly effective at controlling the migration of constituents in groundwater, removing constituent mass from groundwater, and reducing constituent concentrations in groundwater. Based on the high groundwater pumping rates achieved by the existing production wells in AOI 1 (average annual withdrawal of approximately 2,500 gpm) and anticipated high groundwater yields across the Site, it is expected that the supplemental extraction wells would also provide a high capacity for groundwater pumping to address SSLs in AOI 2. Groundwater extraction effluent would be discharged in accordance with an approved NPDES permit or disposed of offsite.
  - Hydraulic Containment through Groundwater Pumping with Ex-Situ Treatment (AOI 1 and AOI 2) – This groundwater measure would provide high performance for addressing lithium and molybdenum SSLs in AOI 1 and AOI 2. Groundwater pumping is highly effective at controlling the migration of constituents in groundwater, removing constituent mass from groundwater, and reducing constituent concentrations in groundwater. Based on the high groundwater pumping rates achieved by the existing production wells in AOI 1 (average annual withdrawal of approximately 2,500 gpm) and anticipated high groundwater yields across the Site, it is expected that the supplemental extraction wells would also provide a high capacity for groundwater pumping to address SSLs in AOI 2. Ex-situ treatment of extracted groundwater would treat constituents in effluent prior to being discharged in accordance with an approved NPDES permit or disposed offsite.

- MNA (AOI 3) – This groundwater measure would provide moderate to high performance for addressing lithium SSLs in AOI 3. Lithium concentrations in AOI 3 are expected to naturally attenuate to below the GWPS within a reasonable time frame, based primarily on physical process of natural attenuation anticipated to be effective in combination with source control. The main factor that affects the performance of MNA in addressing lithium SSLs in AOI 3 is the degree to which geochemical and/or biological processes may also supplement the physical processes of attenuation.
- In-Situ Treatment (AOI 4) – This groundwater measure would provide moderate to high performance for addressing arsenic SSLs in AOI 4 by limiting the migration and concentrations of arsenic in groundwater. In-situ treatment of arsenic through formation of additional iron oxides in-situ is anticipated to result in arsenic adsorption to iron oxides, thereby reducing arsenic concentrations below the GWPS. Iron oxide formation could be achieved by injecting acidic ferric iron solution or by distributing ferrous iron and operating a supplemental air sparging system. The main factor that affects the performance is aquifer heterogeneity, which influences the effectiveness of reagent distribution in the impacted zone. The uppermost aquifer at the Site is relatively homogeneous, with continuous sand with horizontal stratification and varying amounts of gravel within a saturated zone of approximately 85 feet on average (**Appendix A**). The relative homogeneity of the saturated zone above bedrock at the Site is anticipated to render in-situ treatment an effective method of remediating arsenic SSLs within the relatively small AOI 4.

2.5.2 Reliability

This criterion evaluates the degree to which source control (closure) and groundwater measures will consistently and reliably perform their intended functions over time. For source control measures, the timeframe for evaluating reliability extends through the post-closure period and in the long-term. For groundwater measures, the timeframe for evaluating reliability extends from when the measures have been installed until Appendix IV GWPSs are achieved and applicable measures are removed from service.

- Source Control Measures:
  - Hybrid CIP – This source control measure would be highly reliable for closing Ponds A, B, and C. Hybrid CIP is a proven engineering method that provides an effective long-term solution for CCR unit closure. The combination of a low-permeability engineered final cover system and the removal of CCR potentially below the seasonal high groundwater significantly reduces the potential for future release of CCR material into the environment. A post-closure maintenance plan would be implemented during the post-closure period to further ensure the long-term performance of this source control measure.
  - CBR – This source control measure would be highly reliable for closing Ponds A, B, and C. CBR is a proven engineering method that provides an effective long-term solution for CCR unit closure. After excavation is complete, no CCR would remain within Ponds A, B, and C, and the excavation area within the former waste boundary would be graded to optimize slopes and promote post-closure stormwater drainage. The removal of the CCR material from Ponds A, B and C would prevent future release of CCR material into the environment. Disposal of the excavated CCR would take place at a permitted offsite

landfill that would be designed to meet all applicable regulatory criteria and provide long-term storage for the excavated CCR.

- Groundwater Measures:
  - Hydraulic Containment through Groundwater Pumping (AOI 1 and AOI 2) – This groundwater measure would provide moderate to high reliability for addressing lithium and molybdenum SSLs in AOI 1 and AOI 2 until GWPSs are achieved in those AOIs. Groundwater pumping is expected to be an effective and reliable remedy, although O&M may require temporary system shutoff and maintenance to ensure system operational efficiency and effectiveness. Biofouling[4] associated with the pumping of the existing production wells in AOI 1 has not been a significant maintenance concern to date. Biofouling is also not expected to be a significant concern for the supplemental wells to be installed to address AOI 2 due to the lack of low pH conditions in groundwater near AOI 2 and the relatively low concentrations of aluminum, iron, and manganese in groundwater near AOI 2.
  - Hydraulic Containment through Groundwater Pumping with Ex-Situ Treatment (AOI 1 and AOI 2) – This groundwater measure would provide moderate to high reliability for addressing lithium and molybdenum SSLs in AOI 1 and AOI 2 until GWPSs are achieved in those AOIs. Groundwater pumping and ex-situ treatment is expected to be an effective and reliable remedy, although both systems would require O&M activities that involve temporary system shutoff and maintenance to ensure system operational efficiency and effectiveness. Biofouling associated with the pumping of the existing production wells in AOI 1 has not been a significant maintenance concern to date. Biofouling is also not expected to be a significant concern for the supplemental wells to be installed to address AOI 2 due to the lack of low pH conditions in groundwater near AOI 2 and the relatively low concentrations of aluminum, iron, and manganese in groundwater near AOI 2.
  - MNA (AOI 3) – This groundwater measure would provide high reliability for addressing lithium SSLs in AOI 3 until the GWPS are achieved in AOI 3. MNA relies on natural processes of attenuation already active in the subsurface to effectively address the target constituent(s). Because MNA relies on processes that are naturally ongoing, source control would be completed, and geochemical conditions within AOI 3 are not expected to change significantly post-closure, MNA is considered highly reliable for reducing lithium concentrations to below the GWPS in AOI 3.
  - In-Situ Treatment (AOI 4) – This groundwater measure would provide moderate to high reliability for addressing arsenic SSLs in AOI 4 until the GWPSs are achieved in AOI 4. In-situ generation of iron oxides is expected to be an effective and reliable remedy, although occasional O&M needs may arise that require temporary system shutoff and maintenance to ensure system operational efficiency and effectiveness. Use of an acidic ferrous iron solution or a combination of ferric oxide solids with air sparging is a reliable remediation technique that incorporates materials that are readily available.

[4] Biofouling is the accumulation of microorganisms on wet surfaces. Biofouling on infrastructure components that have a mechanical function (e.g., extraction wells or associated conveyances) can cause functional deficiencies.

2.5.3 Ease of Implementation

This criterion evaluates the degree of difficulty in implementing the source control (closure) and groundwater measures.

- Source Control Measures:
  - Hybrid CIP – This source control measure is expected to require a moderate to high level of difficulty to complete and therefore would be implemented with low to moderate ease. Hybrid CIP is anticipated to require a significant amount of CCR handling in order to remove CCR that may be in potential contact with groundwater and place the CCR above the seasonal high groundwater table. Additional significant closure activities and processes, and the use of heavy equipment and large-scale construction activities would also be required for dewatering, import of clean soil for fill, and CCR regrading and consolidation. The CCR would remain within the footprint of Ponds A, B, and C throughout the closure process. Long-term O&M of the post-closure final cover system would also be required.
  - CBR – This source control measure is expected to require a high level of difficulty to implement. CBR requires a significant amount of heavy equipment and large-scale construction activities, including large-scale dewatering and complete removal of CCR material, and Site regrading. In addition, substantial offsite transportation and disposal efforts would be required that would necessitate a large number of haul trucks, truck trips, and significant truck-miles driven across public roads to dispose the excavated CCR in a permitted, offsite landfill. A substantial amount of available landfill space would also be necessary to dispose of the excavated CCR, which may result in increased difficulty in identifying possible options for implementing CBR.
- Groundwater Measures:
  - Hydraulic Containment through Groundwater Pumping (AOI 1 and AOI 2) – This groundwater measure is expected to require a moderate level of difficulty to implement in order to address lithium and molybdenum SSLs in AOI 1 and AOI 2. The production wells are existing, and no significant modifications to operation of those wells would be anticipated for this groundwater measure in AOI 1. Installation of supplemental groundwater extraction wells and associated infrastructure in AOI 2 would occur in an undeveloped portion of the Site at an appreciable distance (>2,000 feet) from existing infrastructure. The supplemental extraction system would be designed and implemented to be readily adaptable if well additions or pumping modifications are deemed necessary for the system in the future.
  - Hydraulic Containment through Groundwater Pumping with Ex-Situ Treatment (AOI 1 and AOI 2) – This groundwater measure is expected to require a moderate to high level of difficulty to implement in order to address lithium and molybdenum SSLs in AOI 1 and AOI 2. The production wells exist, and no significant modifications to the operation of those wells would be anticipated for this groundwater measure in AOI 1. Installation of supplemental groundwater extraction wells and associated infrastructure in AOI 2 would occur in an undeveloped portion of the Site at an appreciable distance (>2,000 feet) from existing infrastructure. The supplemental extraction system would be designed and implemented to be readily adaptable if well additions or pumping modifications are deemed necessary for the system in the future. The ex-situ treatment

system would be sizeable to manage potential treatment flow rates and would involve additional construction and O&M activities within the developed portion of the Site.

  - Monitored Natural Attenuation (AOI 3) – This groundwater measure, used to address lithium SSLs in AOI 3, is expected to require a low level of difficulty to implement. Natural attenuation processes are already active in the subsurface, and a groundwater monitoring system already exists to continue evaluating MNA effectiveness. Therefore, continued groundwater monitoring is anticipated to be the primary implementation procedure for MNA. Data obtained from ongoing groundwater monitoring will continue to be evaluated to confirm if the existing CCR Rule groundwater monitoring system is sufficient to demonstrate the effectiveness of MNA and whether additional monitoring well installation may be needed to demonstrate the effectiveness of MNA.
  - In-Situ Treatment (AOI 4) – This groundwater measure is expected to require a moderate level of difficulty to implement in order to address arsenic SSLs in AOI 4. In-situ generation of ferric oxides (with potential air sparging) would be limited in coverage to spot treating arsenic in the AOI 4 area and would be located in a currently developed portion of the Site. Bench-scale and pilot testing, engineering design, and permits and approvals could be necessary for implementation of the treatment system. The materials needed for in-situ treatment of arsenic are anticipated to be readily available.

2.5.4 Potential Safety Impacts

This criterion evaluates potential safety impacts that could result from the implementation of the source control (closure) and groundwater measures. The following evaluation assumes adherence to applicable health and safety regulations and requirements, including health and safety and closure/post closure plans, as well as implementation of proper best management practices (BMPs) and personal protective equipment (PPE) to help mitigate the potential for safety impacts.

- Source Control Measures:
  - Hybrid CIP – This source control measure has moderate potential for safety impacts. Potential safety impacts associated with hybrid CIP could result from heavy equipment and large-scale construction activities over an extended period for dewatering, excavating CCR that may be in potential contact with groundwater, importing clean soil for fill, consolidating CCR onsite, regrading, and capping.
  - CBR – This source control measure has high potential for safety impacts. Potential safety impacts associated with CBR could result from heavy equipment and large-scale construction activities over an extended period for dewatering, excavating all CCR from the ponds, transporting the excavated CCR over public roads, and disposing the excavated CCR in a permitted, offsite landfill.
- Groundwater Measures:
  - Hydraulic Containment through Groundwater Pumping (AOI 1 and AOI 2) – This groundwater measure has low potential for safety impacts. Potential safety impacts associated with groundwater pumping could result from clearing/grading, construction, and O&M of the supplemental groundwater extraction system.
  - Hydraulic Containment through Groundwater Pumping with Ex-Situ Treatment (AOI 1 and AOI 2) – This groundwater measure has moderate potential for safety impacts. Potential safety impacts associated with groundwater pumping and ex-situ treatment

could result from clearing/grading, construction, and O&M of the supplemental groundwater extraction system and the ex-situ groundwater treatment system.

- Monitored Natural Attenuation (AOI 3) – This groundwater measure has no anticipated potential for safety impacts since natural attenuation is occurring and will continue without external action/activity.
- In-Situ Treatment (AOI 4) – This groundwater measure has low potential for safety impacts. Potential safety impacts associated with in-situ treatment could result from construction and O&M to implement the technologies associated with in-situ generation of ferric oxides.

2.5.5 Potential Cross-Media Impacts

This criterion evaluates potential impacts to other environmental media that could result from the implementation of the source control (closure) and groundwater measures. The following evaluation assumes adherence to applicable environmental regulations and requirements, including closure/post closure and O&M plans, as well as implementation of proper BMPs to help mitigate the potential for cross-media impacts.

- Source Control Measures:
  - Hybrid CIP – This source control measure has low potential for cross-media impacts. The potential for cross-media impacts to additional areas onsite or offsite during closure activities is low because CCR material would remain within the existing boundaries of Ponds A, B, and C. The potential for cross-media impacts would also remain low post-closure because an engineered final cover system would be in place, which would keep the CCR isolated from the environment.
  - CBR – This source control measure has moderate to high potential for cross-media impacts. CBR presents moderate to high potential for cross-media impacts to additional areas onsite or offsite during closure activities associated with the transportation and disposal of CCR material offsite (e.g., potential impacts to soil, water, and air). The potential for cross-media impacts would be low post-closure because the CCR would be disposed of and remain stored within a permitted, lined landfill, which would remove the CCR from the Site and keep the CCR isolated from the environment.
- Groundwater Measures:
  - Hydraulic Containment through Groundwater Pumping (AOI 1 and AOI 2) – This groundwater measure has low to moderate potential for cross-media impacts as a result of extracting affected groundwater from the subsurface and discharging or disposing the extracted groundwater.
  - Hydraulic Containment through Groundwater Pumping with Ex-Situ Treatment (AOI 1 and AOI 2) – This groundwater measure has moderate potential for cross-media impacts as a result of extracting affected groundwater from the subsurface, discharging or disposing the extracted groundwater, and generating a secondary waste stream (e.g., ion exchange media, RO reject water).
  - Monitored Natural Attenuation (AOI 3) – This groundwater measure has very low potential for cross-media impacts because affected groundwater remains in-situ.

- In-Situ Treatment (AOI 4) – This groundwater measure has low potential for cross-media impacts because, although subsurface injection is required, affected groundwater remains in-situ.

2.5.6 Potential Exposure to Residual Contamination

This criterion evaluates the potential for exposure to any remaining contamination after the source control (closure) and groundwater measures have been implemented. The following evaluation assumes adherence to applicable environmental, health, and safety regulations and requirements, including health and safety and closure/post closure plans, as well as implementation of proper BMPs and PPE to help mitigate the potential for exposure to residual contamination.

- Source Control Measures:
  - Hybrid CIP – This source control measure has low potential for exposure to residual contamination because an engineered final cover system would act as an engineering control to mitigate the potential for exposure of humans or environmental receptors to CCR after closure is complete. The final cover system would include design measures to minimize cover slopes and provide geotechnical slope stability and O&M measures to provide erosion protection and surface water runoff control. These design and O&M measures would help limit the potential for erosion and overall degradation of the cover system.
  - CBR – This source control measure has very low potential for exposure to residual contamination after closure is complete because CCR would be removed from the Site and stored in a permitted offsite landfill. Removal of CCR from the Site would eliminate the potential for exposure of humans or environmental receptors to CCR after closure is complete.
- Groundwater Measures:
  - Hydraulic Containment through Groundwater Pumping (AOI 1 and AOI 2) – This groundwater measure has low potential for exposure to residual contamination as a result of extracting affected groundwater from existing production wells and supplemental extraction wells and discharging or disposing the extracted groundwater. Pumping affected groundwater from the supplemental extraction wells would introduce a limited potential for additional exposure to residual contamination because the affected groundwater in that area of the Site would be pumped from the subsurface and conveyed above the ground where accidental release to the environment with potential for Site worker exposure could occur; however, direct exposure to affected groundwater would not be likely. Potential exposure pathways do not currently pose an adverse risk to human health or the environment (**Appendix B**), and potential future exposures would also not be anticipated to present an adverse risk to human health or the environment.
  - Hydraulic Containment through Groundwater Pumping with Ex-Situ Treatment (AOI 1 and AOI 2) – This groundwater measure has moderate potential for exposure to residual contamination due to the generation of a secondary waste stream (e.g., ion exchange media, RO reject water) during the ex-situ treatment process, in addition to the limited potential for exposure resulting from the extracted groundwater. Also, pumping affected groundwater from the supplemental extraction wells would introduce a limited potential for additional exposure to residual contamination because the affected

groundwater in that area of the Site would be pumped from the subsurface and conveyed above the ground where accidental release to the environment with potential for Site worker exposure could occur; however, direct exposure to affected groundwater would not be likely. Potential exposure pathways do not currently pose an adverse risk to human health or the environment (**Appendix B**), and potential future exposures would also not be anticipated to present unacceptable risk.

  - Monitored Natural Attenuation (AOI 3) – This groundwater measure has very low potential for exposure to residual contamination because affected groundwater remains in-situ except minimal pumping required for groundwater monitoring.
  - In-Situ Treatment (AOI 4) – This groundwater measure has low to very low potential for exposure to residual contamination because the in-situ spot treatment is limited to the relatively small areal extent of AOI 4 and affected groundwater remains in the subsurface. Although subsurface injection of acidic ferric iron solution or ferrous iron with air sparging is required, no secondary waste streams would be generated during the treatment process.

2.5.7 Time Required to Begin the Remedy

This criterion evaluates the time required after the remedy is selected to initiate construction activities for the source control (closure) measures or to begin operation of groundwater measures. For source control measures, this is the time to plan, design, permit, and engage a contractor prior to beginning initial construction activities. For groundwater measures, this is the time to plan, design, permit, mobilize, install the system (if necessary), and perform testing (if necessary) prior to beginning initial operation of the system. This evaluation assumes that groundwater measures can be installed and begin operating independently of closure activities, except the in-situ treatment in AOI 4 which would be installed after closure of Pond A is substantially complete.

- Source Control Measures:
  - Hybrid CIP – A closure and post-closure plan has already been prepared for this source control measure and has been submitted to IDEM for review and approval. Upon approval of the plan, AES would work on obtaining applicable permits, retain and mobilize a qualified contractor (including necessary personnel and equipment), and begin to implement closure activities. Based on the estimated timing for these activities, it is estimated that hybrid CIP physical work could begin approximately 6 to 9 months following IDEM approval of the closure and post-closure plan.
  - CBR – CBR would require development of a new closure and post-closure plan, which would be subject to approval by IDEM. An estimated minimum of 1 to 1.5 years would be expected to develop the plan, obtain IDEM approval of the plan, obtain applicable permits, arrange large-volume offsite disposal agreements, retain and mobilize a qualified contractor (including necessary personnel and equipment), and begin implementing CBR closure activities.
- Groundwater Measures:
  - Hydraulic Containment through Groundwater Pumping (AOI 1 and AOI 2) – Groundwater pumping would require an estimated 1.5 to 2.5 years to perform testing, prepare the design, receive approvals, install, and begin operating the supplemental

extraction wells system within AOI 2. The three production wells are already operating within AOI 1.

  - Hydraulic Containment through Groundwater Pumping with Ex-Situ Treatment (AOI 1 and AOI 2) – Groundwater pumping and ex-situ treatment would require an estimated 1.5 to 3 years to perform testing, prepare the design, receive approvals, install, and begin operating the supplemental extraction wells system (within AOI 2) and ex-situ treatment system (for AOI 1 & AOI 2) and associated infrastructure. The three production wells are already operating within AOI 1.
  - MNA (AOI 3) – Natural attenuation is already ongoing at the Site, and a groundwater monitoring system exists to continue monitoring conditions and evaluate MNA effectiveness.
  - In-Situ Treatment (AOI 4) – In-situ treatment would require an estimated 1 to 2 years to perform bench scale and pilot testing, prepare the design, receive permits/approvals, install, and begin initial distribution of reagents (and potential air sparging) to promote in-situ generation of ferric oxides. The construction of in-situ treatment in AOI 4 would start once closure of Pond A is substantially complete since the physical location of in-situ treatment elements may be within the limits of construction for the closure operation.

2.5.8 Time Required to Complete the Remedy

This criterion evaluates the timing required to complete the implementation of the source control (closure) and groundwater measures. For source control measures, this is the time to perform the closure construction activities. For groundwater measures, this is the time from when initial operation of the measure begins to when all Appendix IV constituent concentrations have achieved the GWPSs.

- Source Control Measures:
  - Hybrid CIP – Once initiated, hybrid CIP would require an estimated 2 to 3 years to complete CCR material dewatering, CCR excavation and material consolidation, grading, and constructing the engineered cover system.
  - CBR – Once initiated, CBR would require an estimated 2 to 3 years to complete CCR excavation and disposal in an offsite permitted landfill.
- Groundwater Measures:
  - Hydraulic Containment through Groundwater Pumping (AOI 1 and AOI 2) – Based on preliminary groundwater modeling, groundwater pumping of existing and supplemental extraction wells is anticipated to achieve lithium and molybdenum GWPSs in AOI 1 and AOI 2 within the post-closure period for Ponds A, B, and C.
  - Hydraulic Containment through Groundwater Pumping with Ex-Situ Treatment (AOI 1 and AOI 2) – Based on groundwater modeling, groundwater pumping of existing and supplemental extraction wells is anticipated to achieve lithium and molybdenum GWPSs in AOI 1 and AOI 2 within the post-closure period for Ponds A, B, and C.
  - Monitored Natural Attenuation (AOI 3) – Based on groundwater modeling, natural processes of attenuation already active in the subsurface are anticipated to achieve the lithium GWPS in AOI 3 within the post-closure period for Ponds A, B, and C.

- In-Situ Treatment (AOI 4) – Based on the limited size/location of the treatment area and broad demonstration of using ferric oxides to promote arsenic adsorption and immobilization, in-situ generation of ferric oxides is anticipated to achieve the arsenic GWPS at AOI 4 within the post-closure period for Ponds A, B, and C.

2.5.9 Institutional Requirements (State or Local Permit Requirements) or other Environmental or Public Health Requirements that may Substantially Affect Implementation

This criterion evaluates the level of potential requirements associated with the source control (closure) and groundwater measures, including the need to obtain permits and approvals that may affect implementation. This section provides a high-level review of potential requirements. AESI would conduct a complete evaluation of the source control and groundwater measures based on project details and information prior to implementation to determine actual requirements.

- Source Control Measures:
  - Hybrid CIP – Hybrid CIP could require an IDEM ash pond closure plan approval, stormwater construction permit, construction in floodway permit, and county drainage permit. It could also require a modification to the NPDES permit depending on dewatering practices.
  - CBR – CBR could require an IDEM ash pond closure plan approval, stormwater construction permit, construction in floodway permit, and county drainage permit. It could also require a modification to the NPDES permit depending on dewatering practices. Studies and evaluations may be required to determine whether additional approvals would be required related to transportation or disposal. Depending on the results of such studies/evaluations, roadway improvements [e.g., additional turn lane(s) or stop signs], approvals [e.g., for new driveway(s), easement(s)], or permits (e.g., for operation of a new landfill cell) could be required.
- Groundwater Measures:
  - Hydraulic Containment through Groundwater Pumping (AOI 1 and AOI 2) – Groundwater pumping could require an extraction well permit, stormwater construction permit, and a construction in floodway permit. It could also require a modification to the NPDES permit depending on various factors.
  - Hydraulic Containment through Groundwater Pumping with Ex-Situ Treatment (AOI 1 and AOI 2) – Groundwater pumping and ex-situ treatment could require an extraction well permit, a construction permit, a stormwater construction permit, and a construction in floodway permit. It could also require a modification to the NPDES permit depending on various factors.
  - Monitored Natural Attenuation (AOI 3) – With MNA, no permitting or approvals are anticipated with the exception of a potential concurrence review/approval by IDEM of the groundwater performance monitoring program in support of MNA.
  - In-Situ Treatment (AOI 4) – In-situ treatment could require an injection permit, a stormwater construction permit, and a construction in floodway permit.

2.6 POTENTIAL REMEDIAL ALTERNATIVES

Potential remedial alternatives have been identified by developing unique combinations of the potential source control (closure) measures presented in Section 2.2 and the potential groundwater measures presented in Section 2.3. Outcomes from the evaluation of potential source control and groundwater measures summarized in Section 2.5 and **Table 2-1** have been used to conduct a preliminary evaluation of potential remedial alternatives based on the criteria from 257.97. Four potential remedial alternatives have been identified:

- Alternative 1 – Hybrid CIP with Capping and Hydraulic Containment through Groundwater Pumping
- Alternative 2 – Hybrid CIP with Capping and Hydraulic Containment through Groundwater Pumping with Ex-situ Treatment
- Alternative 3 – Closure by Removal with Hydraulic Containment through Groundwater Pumping
- Alternative 4 – Closure by Removal with Hydraulic Containment through Groundwater Pumping with Ex-situ Treatment

Each of these alternatives would also include MNA for AOI 3 and in-situ treatment for AOI 4. The corrective measures that comprise each alternative are as described in Section 2.2 (source control measures) and Section 2.3 (groundwater measures). A summary of each alternative is also presented in **Table 2-2**.

Each of the four remedial alternatives meet the requirements for Threshold Criteria (as outlined in Section 2.1) and are preliminarily evaluated in Section 2.6.1.1 through Section 2.6.1.4 against the Balancing Criteria prescribed in 40 CFR §257.97(c).

2.6.1 Preliminary Evaluation of Potential Remedial Alternatives

This section provides a preliminary evaluation of the four potential remedial alternatives introduced in Section 2.6 based on the evaluation of the Balancing Criteria outlined in 40 CFR §257.97(c) and summarized in Section 2.1. The four primary Balancing Criteria and their respective subcriteria are separated into individual evaluations in Section 2.6.1.1 through Section 2.6.1.4 below. A summary of this evaluation is presented in **Table 2-3**.

2.6.1.1 Balancing Criterion 1- The long- and short-term effectiveness and protectiveness of the potential remedy(s), along with the degree of certainty that the remedy will prove successful.

This criterion considers eight subcriteria related to the long- and short-term effectiveness and protectiveness of the remedy, along with the anticipated success of the remedy. Following a summary of Balancing Criterion 1, individual evaluations for each of the eight subcriteria are provided below in Section 2.6.1.1.1 through Section 2.6.1.1.8.

Balancing Criterion 1 – Summary
Each of the four alternatives includes continued use of the existing production wells to provide hydraulic containment, which has been demonstrated to be effective and is expected to be effective in the long term. Alternative 2 and Alternative 4 would produce a secondary waste stream (e.g., spent ion exchange media or reject water from an ex-situ treatment system) that would need to be handled and disposed, creating a potential for exposure and additional long-term operations and maintenance. Alternative 3 and Alternative 4 could entail potential exposure during the construction period and potential community impacts during transportation of material offsite.

Each of the four alternatives also involves MNA to address lithium SSLs in AOI 3 and in-situ treatment to address arsenic SSLs in AOI 4. MNA is anticipated to be highly effective at addressing lithium SSLs in AOI 3, concentrations of which are only slightly greater than the GWPS and expected to decrease as a result of source control measures. In-situ treatment is anticipated to effectively address arsenic SSLs in AOI 4 by generating ferric oxides to adsorb arsenic ions in groundwater to iron oxide compounds in soil.

2.6.1.1.1 Magnitude of reduction of existing risks

As concluded by the groundwater and Outfall 003 discharge water risk evaluations included as **Appendix B**, the Ash Pond System at EVGS does not pose an adverse risk to human health or the environment. Therefore, the remedial alternatives considered are not necessary to reduce potential risk posed by the Appendix IV constituents detected at SSLs in groundwater (arsenic, lithium, and molybdenum) because no such adverse risk exists. Each remedial alternative is also protective of groundwater quality. Each alternative results in the removal of CCR in Ponds A, B, and C that may be in potential contact with groundwater (during seasonal high groundwater conditions), storage of CCR within an engineered solution, and constituent mass removal through existing and supplemental groundwater pumping.

2.6.1.1.2 Magnitude of residual risks in terms of likelihood of further releases due to CCR remaining following implementation of a remedy

Following implementation of the remedy, all alternatives are projected to achieve a near equal magnitude of residual risks in terms of likelihood of further releases due to CCR remaining. This is because full remedy implementation would result in achieving the GWPSs as a threshold criterion. CCR material would also be permanently removed from locations where it may be in potential contact with groundwater (during seasonal high groundwater conditions) under each alternative. CCR would remain onsite and capped in Alternatives 1 and 2. Magnitude of residual risk of potential further release from CCR material remaining in place is considered to be low because CCR would be stored onsite above the seasonal high groundwater table within the footprint of Ponds A, B, and C and would be capped and graded to ensure proper drainage to prevent rainfall infiltration. For Alternatives 3 and 4, CCR would be disposed offsite in a lined, permitted landfill; no onsite residual risk of further releases due to CCR remaining would exist because no CCR material would remain onsite.

2.6.1.1.3 The type and degree of long-term management required, including monitoring, operation, and maintenance

A robust CCR Rule groundwater monitoring system, groundwater pumping system (existing and supplemental), in-situ treatment system, and associated O&M would be included for each of the remedial alternatives. Alternatives 2 and 4, which include treatment of extracted groundwater, would also involve long-term management related to the ongoing O&M of the ex-situ groundwater treatment system that would be constructed. Additionally, Alternatives 1 and 2 would involve ongoing maintenance at the Site for the post-closure engineered cap associated with hybrid CIP.

2.6.1.1.4 Short-term risks that might be posed to the community or the environment during implementation of such a remedy

Short-term community risks posed by CBR with offsite disposal (Alternatives 3 and 4) include potential risks to the community due to increased truck traffic on public roads during construction activities, along with truck emissions and noise. The increased offsite truck traffic also entails an increased possibility of vehicular accidents, roadway damage, or incidental release of CCR material into the environment. Alternatives 1 and 2 would involve onsite CCR handling within the area of Ponds A, B, and C due to removal of CCR in potential contact with groundwater. Truck traffic on public roads for Alternatives 1 and 2 would be limited to local delivery/import of soil backfill (to backfill the excavated area) and for final cover materials. Keeping offsite transportation activities limited would limit the potential for risk to the community or environment.

Groundwater-related risks are not expected for any of the alternatives because there are already no adverse risks. Additionally, each of the alternatives includes groundwater pumping using existing and supplemental extraction wells and an in-situ treatment system.

2.6.1.1.5 Time until full protection is achieved

As detailed in the risk evaluation report (**Appendix B**), based on current data, there is no adverse risk of exposure for potential human or environmental receptors to groundwater with SSLs of arsenic, lithium, and molybdenum associated with the Ash Pond System. As such, full protection of human health and the environment is already achieved. Moreover, a groundwater flow and solute transport model was constructed as a tool to evaluate the anticipated effects that implementing each potential corrective measure would have on constituent concentrations in groundwater (refer to **Appendix C**). Based on predictive modeling results, the timeframes to achieve GWPSs at or beyond the waste boundary are within the post-closure period for Ponds A, B, and C for the four alternatives.

2.6.1.1.6 Potential for exposure of humans and environmental receptors to remaining wastes, considering the potential threat to human health and the environment associated with excavation, transportation, re-disposal, or containment

The potential for human or environmental exposure to remaining wastes is greater for activities related to closure than for activities related to groundwater pumping or treatment.

Alternatives 3 and 4 involve transport and disposal of excavated CCR material to a permitted, offsite landfill, which would entail the potential for exposure of humans and environmental receptors to remaining wastes during CCR excavation, transportation (including offsite), re-disposal (offsite), and potential for incidental CCR release into the environment. Alternatives 3 and 4 would involve CCR handling both onsite and offsite. Alternatives 1 and 2, include potential exposure of humans and environmental receptors to remaining wastes during onsite CCR excavation and consolidation within the footprint of Ponds A, B, and C; CCR handling would remain onsite.

Alternatives 1 and 3 do not include treatment of extracted groundwater; therefore, they do not generate a secondary waste stream. Alternatives 2 and 4 would result in a secondary waste stream generated from the groundwater treatment process (e.g., spent ion exchange media or reject water from an ex-situ treatment system). Thus, there is potential for exposure to waste or wastewater associated with the groundwater treatment system. Any effluent discharges associated with any of the four alternatives would be appropriately permitted under the NPDES permitting program and subject to applicable requirements.

2.6.1.1.7 Long-term reliability of the engineering and institutional controls

The source control (closure) measure-related and groundwater-related engineering and institutional controls included with each alternative are proven and provide a high degree of certainty that the remedy would be effective in the long term.

Both hybrid CIP and CBR methodologies are accepted and proven closure engineering solutions that allow for safe and effective final disposition of the CCR material. Therefore, closure-related considerations for the alternatives are considered reliable in the long term.

Each alternative includes existing and supplemental groundwater pumping and in-situ treatment, while Alternatives 2 and 4 also include treatment of the extracted groundwater. Treatment systems are generally highly adaptable, allowing operational modifications or system retrofits over time as necessary. Therefore, all alternatives are considered reliable in the long term.

2.6.1.1.8 Potential need for replacement of the remedy

The potential need for replacing each alternative's closure methodology in the future is unlikely because each alternative involves CCR material ultimately disposed in an offsite lined landfill (Alternatives 3 and 4) or onsite under an engineered cover system (Alternatives 1 and 2).

Alternatives 1 and 3 involve groundwater pumping without treatment. The alternatives could be supplemented with an ex-situ treatment system as represented in Alternatives 2 and 4. Although this potential future modification would not entail a replacement of the remedy, additional resources would be necessary to supplement the alternatives. For Alternatives 2 and 4, pilot testing for the ex-situ groundwater treatment system may be performed to support system design. Once operational, the ex-situ groundwater treatment system would be highly adaptable, allowing operational modifications or system retrofits over time if needed.

2.6.1.2 Balancing Criterion 2 – The Effectiveness of the Remedy in Controlling the Source to Reduce Further Releases

This balancing criterion considers two subcriteria related to the ability and effectiveness of the remedy to control the source and reduce further releases, including the extent to which treatment technologies will be used. Following a summary of Balancing Criterion 2, individual evaluations for each of the two subcriteria for Criterion 2 are provided below in Section 2.6.1.2.1 and Section 2.6.1.2.2.

Balancing Criterion 2 – Summary
Each alternative provides a high degree of effectiveness in reducing the potential for further releases through reliable closure methodologies that either isolate the CCR onsite above the seasonal high groundwater table (Alternatives 1 and 2) or store the CCR within an offsite lined landfill (Alternatives 3 and 4). Each of the alternatives employs the use of in-situ treatment within AOI 4, and Alternatives 2 and 4 also employ the use of treatment technologies for extracted groundwater.

2.6.1.2.1 The extent to which containment practices will reduce further releases

Each alternative involves the same degree of existing and supplemental groundwater extraction and in-situ treatment, which are effective in controlling the affected groundwater.

The lowering of hydraulic head after ceasing placement of CCR in Ponds A, B, and C in 2016 has already contributed significantly to source control and reducing the potential for further releases. Each alternative additionally involves a closure methodology that is proven to be successful at reducing further releases through containment. Alternatives 3 and 4, involving a long-term storage solution for CCR in an offsite, permitted, lined landfill, would provide effective containment of the CCR. Alternatives 1 and 2, involving capping the CCR material above the seasonal high groundwater table, would be effective at isolating the CCR by storing the CCR above the seasonal high groundwater table within the footprint of Ponds A, B, and C and installing an engineered cover system over the footprint of Ponds A, B, and C. Therefore, each alternative is considered to have a limited likelihood of additional releases.

2.6.1.2.2 The extent to which treatment technologies may be used

Each of the four alternatives include the same degree of in-situ treatment to address arsenic SSLs in AOI 4. Alternatives 2 and 4 include ex-situ treatment of extracted groundwater pumped from the existing production wells and/or supplemental extraction wells. Alternatives 1 and 3 do not include a treatment technology for extracted groundwater.

2.6.1.3 Balancing Criterion 3 – The Ease or Difficulty of Implementing a Potential Remedy

This balancing criterion considers five subcriteria related to the technical and logistical aspects associated with implementation of a potential remedy, including practical considerations such as resource availability and disposal facility capacity. Following a summary of Balancing Criterion 1, individual evaluations for each of the five subcriteria for Balancing Criterion 3 are provided below in Section 2.6.1.3.1 through Section 2.6.1.3.5.

Balancing Criterion 3 – Summary
For implementation of Alternative 1, although the final cover system and pumping systems will require ongoing O&M, the equipment for closure completion is readily available, additional construction and operation of a groundwater treatment system is not necessary, and the final disposition of the CCR material is onsite and without additional treatment or disposal requirements. Alternative 2 requires additional treatment system construction, long-term treatment system O&M, and generation and disposal of secondary waste streams post-treatment (e.g., spent ion exchange media or reject water from an ex-situ treatment system). Alternative 3 and Alternative 4 involve large-scale construction activities and expected permits and approvals required for complete CCR material excavation and offsite transport and disposal.

2.6.1.3.1 Degree of difficulty associated with constructing the technology

All alternatives involve substantial construction operations primarily related to closure of Ponds A, B, and C, which entails a significant degree of difficulty. Hybrid CIP under Alternatives 1 and 2 involves large-scale construction activities to consolidate CCR onsite above the seasonal high groundwater table within the footprint of Ponds A, B, and C and with the subsequent installation of the engineered cover system. CBR under Alternatives 3 and 4 requires very large-scale construction activities to remove CCR from the Site, transport the CCR material offsite, and dispose of the CCR material in an offsite permitted landfill. Additionally, Alternatives 2 and 4 include construction of a reverse osmosis/ion exchange groundwater treatment system that would require treatment tanks, pumps, valves, piping, and other infrastructure necessary for conveying and treating the extracted groundwater, which entails a moderate degree of difficulty.

2.6.1.3.2 Expected operational reliability of the technologies

Each alternative involves source control (closure) measures and groundwater measures that are operationally reliable. Because of the scale of the closure operations, construction and transportation equipment may occasionally be placed out of service temporarily for routine or non-routine maintenance, repair, or replacement. Construction operations may also temporarily cease during periods of inclement weather or other adverse conditions. However, project planning and scheduling typically account for such variables, and the activities would ultimately achieve the closure objectives.

Each alternative includes groundwater pumping and in-situ treatment, both of which may experience equipment placed out of service for routine or non-routine maintenance, repair, or replacement of system components or treatment media.

Alternatives 2 and 4 include treatment of extracted groundwater. The use of ex-situ treatment technologies involves additional O&M requirements that could present increased operational and maintenance challenges (e.g., system downtown to performance routine or non-routine maintenance, repair, or replacement of system components or treatment media) that could affect system performance and effectiveness.

2.6.1.3.3 Need to coordinate with and obtain necessary approvals and permits from other agencies

Each alternative is expected to require permitting and approvals from applicable regulatory agencies based on closure activities, construction and operation of an in-situ treatment system, installation of additional groundwater extraction wells, and discharge of extracted groundwater (unless extracted groundwater is sent offsite for disposal).

IDEM approval of a closure and post-closure plan would be required. Additionally, construction in floodway permit, stormwater construction permit, county drainage permit, CWA § 404, IDEM § 401 Water Quality Certification, and potential NPDES permit modifications (depending on dewatering/discharge practices) may be required. While Alternatives 1 and 2 would likely involve permitting and approvals related only to onsite activities, Alternatives 3 and 4 involve offsite transportation and disposal which could require additional approvals. Studies and evaluations could be required to determine whether additional permits or approvals would be required related to transportation or disposal. Depending on the results of such studies/evaluations, roadway improvements (e.g., turn lane additions, stop signs), approvals (e.g., for new driveway(s), easement(s)), or permits (e.g., for operation of a new landfill cell) could be required.

From a groundwater treatment perspective, an injection permit may be required for in-situ treatment, which is included as part of each alternative evaluated. For Alternatives 2 and 4, the addition of ex-situ groundwater treatment and related infrastructure may require building and electrical permits and/or permitting related to discharge or disposal of treatment reject water. The collection and disposal of treatment reject water may require construction or improvement of Site access roads that would also require permitting. The system would also require O&M plans and monitoring programs which may be subject to initial and routine regulatory review and approval. Regulatory approvals or oversight of the ex-situ treatment system may also be required during system testing and operations.

2.6.1.3.4 Availability of necessary equipment and specialists

Each alternative requires equipment and specialists to complete ash pond closure, construct and operate the in-situ treatment system, and construct and operate the existing and supplemental groundwater extraction system (for which the magnitude of groundwater extraction is the same for each alternative). The inclusion of groundwater treatment under Alternatives 2 and 4 would require additional equipment and specialists to construct and operate the system.

Alternatives 1 and 2 would require significant equipment and resources for material handling associated with the removal of CCR in an approximately 18-acre area where CCR may be in potential contact with groundwater. Alternatives 3 and 4 would require significant resources for CBR completion. The amount of equipment and resources for all alternatives is expected to be similar, with the exception that haul trucks would also be required to transport excavated CCR to the offsite landfill for completing the CBR Alternatives 3 and 4.

2.6.1.3.5 Available capacity and location of needed treatment, storage, and disposal services

Alternatives 1 and 2 involve final CCR material placement onsite within the current footprint of Ponds A, B, and C. Alternatives 3 and 4 involve final CCR material disposal in an offsite landfill that would likely be 25 to 100 miles from the Site. A substantial amount of available landfill space would also be necessary to dispose of the excavated CCR, which may result in increased difficulty in identifying possible options for implementing CBR. Alternatives 2 and 4 involve additional treatment of extracted groundwater, which would require construction, operation, and maintenance of an onsite treatment system and disposal of secondary waste streams (e.g., spent ion exchange media or reject water from an ex-situ treatment system) generated as a result of the treatment process. The in-situ treatment system included with each alternative is not anticipated to require treatment, storage, or disposal services because the treatment will occur in-situ.

2.6.1.4 Criterion 4 – The Degree to which Community Concerns are Addressed by a Potential Remedy

The fourth Balancing Criterion involves input from the community regarding the proposed corrective measures. This criterion will be addressed by discussing the results of the corrective measures assessment and presenting the corrective measures at a public meeting and soliciting comments. In accordance with 40 CFR §257.96(e), that meeting will be held at least 30 days prior to remedy selection.

References

1. Sargent & Lundy. 2020. CCR Surface Impoundment Closure Plan. Indianapolis Power & Light Company Eagle Valley Generating Station.

2. Sargent & Lundy, 2023. Closure & Post Closure Plan for Eagle Valley Ponds A, B, & C. Revision 4. AES Indiana Eagle Valley Generating Station.

3. United States Environmental Protection Agency. 2015. Final Rule: Disposal of Coal Combustion Residuals (CCRs) for Electric Utilities. 80 CFR 21301-21501. Unites States Environmental Protection Agency, Washington, D.C. Available at: https://www.govinfo.gov/content/pkg/FR-2015-04-17/pdf/2015-00257.pdf

4. USEPA. 1999. Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites. OSWER Directive 9200.1-17P.

TABLES

TABLE 2-1
CORRECTIVE MEASURES SCREENING MATRIX - 40 CFR §257.96(c) REQUIREMENTS
CORRECTIVE MEASURES ASSESSMENT - PONDS A, B, AND C
EAGLE VALLEY GENERATING STATION - MARTINSVILLE, INDIANA

	SOURCE CONTROL MEASURES		GROUNDWATER MEASURES			
	Hybrid Closure in Place (CIP)	*Closure by Removal (CBR)*	*Hydraulic Containment through Groundwater Pumping*	*Hydraulic Containment through Groundwater Pumping with Ex-situ Treatment*	*Monitored Natural Attenuation (MNA)*	*In-Situ Treatment via In-Situ Generation of Ferric Oxides/Air Sparging*
General Description	*This source control measure would involve removal of CCR that is determined to be likely in contact with groundwater, placement of the removed CCR above the groundwater table, and installation of an engineered final cover (cap) system over the CCR closure footprint.*	*This source control measure would involve removal and offsite transportation and disposal of CCR to an approved offsite permitted, lined landfill, followed by regrading with a focus on eliminating steep and/or unsafe slopes and promoting drainage of stormwater runoff away from the excavated area post-closure.*	*This groundwater measure would involve hydraulic containment through continued operation (pumping) of the existing CCGT production wells to address lithium and molybdenum SSLs in AOI 1 and the addition of pumping from supplemental extraction wells to be installed along the southern property boundary to address lithium and molybdenum SSLs in AOI 2. Extracted groundwater would be characterized and appropriately managed.*	*This groundwater remedial measure is the same as the Hydraulic Containment through Groundwater Pumping measure, with the exception that this measure additionally includes ex-situ treatment of extracted groundwater. Possible treatment technologies include ion exchange and RO treatment.*	*MNA is a groundwater measure that relies on data collection from historical and ongoing groundwater monitoring to demonstrate that physical, chemical, and biological processes naturally occurring in the subsurface are sufficient to adequately remediate (or attenuate) SSLs to the GWPS. MNA would address lithium SSLs in AOI 3.*	*In-situ treatment via generation of ferric oxides would address arsenic SSLs in AOI 4. Ferric oxides have been demonstrated to adsorb and immobilize arsenic. In-situ generation of ferric oxides in the arsenic-impacted zone can be achieved through injection of acidic ferric iron solution that will react with naturally occurring buffering minerals in soil to promote the formation of ferric oxides in-situ or another method using ferrous iron and air sparging.*
257.96(c)(1)						
Performance	**High Performance** Provides a long-term solution for storage of CCR onsite by placing CCR above the seasonal high groundwater table and by installing an engineered final cover system that encloses the CCR and restricts infiltration.	**High Performance** Provides complete removal of CCR from the Site and eliminates potential for future releases of CCR material to the environment or CCR constituents to groundwater.	**High Performance** Hydraulic containment through groundwater pumping is highly effective at controlling the migration of constituents in groundwater, removing constituent mass from groundwater, and reducing constituent concentrations in groundwater. Groundwater extraction effluent would be discharged in accordance with an approved NPDES permit or disposed of offsite.	**High Performance** Hydraulic containment through groundwater pumping is highly effective at controlling the migration of constituents in groundwater, removing constituent mass from groundwater, and reducing constituent concentrations in groundwater. Ex-situ treatment of extracted groundwater would treat constituents in effluent prior to being discharged in accordance with an approved NPDES permit or disposed of offsite.	**Moderate to High Performance** MNA (primarily via physical processes of natural attenuation) is expected to attenuate lithium concentrations in AOI 3 to below the GWPS within a reasonable time frame.	**Moderate to High Performance** In-situ generation of iron oxides would limit the migration and concentrations of arsenic in groundwater in AOI 4. The formation of additional iron oxides in-situ is anticipated to result in arsenic adsorption to iron oxides, thereby reducing arsenic concentrations below the GWPS.
Reliability	**High Reliability** A proven engineering method that provides an effective long-term solution for CCR unit closure.	**High Reliability** A proven engineering method that provides an effective long-term solution for CCR unit closure.	**Moderate to High Reliability** Groundwater pumping is expected to be an effective and reliable remedy, although occasional O&M needs may require temporary system shutoff and maintenance to ensure system operational efficiency and effectiveness.	**Moderate to High Reliability** Groundwater pumping and ex-situ treatment is expected to be an effective and reliable remedy, although occasional O&M needs may require temporary system shutoff and maintenance to ensure system operational efficiency and effectiveness.	**High Reliability** MNA is expected to be effective in treating the lithium SSLs in AOI 3 as it relies on natural processes of attenuation already active in the subsurface to effectively address the target constituent(s).	**Moderate to High Reliability** In-situ generation of iron oxides is expected to be an effective and reliable remedy, although occasional O&M needs may arise that require temporary system shutoff and maintenance to ensure system operational efficiency and effectiveness.
Ease of implementation	**Moderate to High Difficulty** A significant amount of CCR handling via use of heavy equipment and large-scale construction activities, etc. but the CCR will remain within the footprint of Ponds A, B, and C throughout the closure process. Long-term O&M of the post-closure final cover system would be required.	**High Difficulty** A significant amount of heavy equipment and large-scale construction activities, including large-scale dewatering and complete removal of CCR material, Site regrading, and substantial offsite transportation and disposal efforts would be required.	**Moderate Difficulty** CCGT production wells exist. Installation of supplemental groundwater extraction wells and associated infrastructure would occur in an undeveloped portion of the Site an appreciable distance (>2,000 feet) from existing infrastructure.	**Moderate to High Difficulty** CCGT production exist. Installation of supplemental groundwater extraction wells, ex-situ treatment system, and associated infrastructure would occur in undeveloped portions of Site an appreciable distance (>2,000 feet) from existing infrastructure. The ex-situ treatment system would be sizeable to manage potential treatment flow rates and involve additional construction and O&M activities within the developed portion of the Site.	**Easy** Natural attenuation processes are already active in the subsurface, and a groundwater monitoring system already exists to continue evaluating MNA effectiveness. Data obtained from ongoing groundwater monitoring will continue to be evaluated to confirm if the existing CCR Rule groundwater monitoring system is sufficient to demonstrate the effectiveness of MNA and whether additional monitoring well installation may be needed to demonstrate the effectiveness of MNA.	**Moderate Difficulty** In-situ generation of ferric oxides (with potential air sparging) would be limited in coverage to spot treating arsenic in the AOI 4 area and would be located in a currently developed portion of the Site. Bench-scale and pilot testing, engineering design, and permits/approvals could be necessary for implementation.
Potential impacts - safety impacts	**Moderate Potential Impact** Presents moderate potential for safety impacts that could result from heavy equipment and large-scale construction activities over an extended period for dewatering, excavating CCR that may be in potential contact with groundwater, importing clean soil for fill, consolidating CCR onsite, regrading, and capping.	**High Potential Impact** Presents high potential for safety impacts that could result from heavy equipment and large-scale construction activities over an extended period for dewatering, excavating all CCR from the ponds, transporting the excavated CCR over public roads, and disposing the excavated CCR in a permitted, offsite landfill.	**Low Potential Impact** Presents low potential for safety impacts that could result from clearing/grading, construction, and O&M of the supplemental groundwater extraction system.	**Moderate Potential Impact** Presents moderate potential for safety impacts that could result from clearing/grading, construction, and O&M of the supplemental groundwater extraction system and the ex-situ groundwater treatment system.	**No Potential Impact** Presents no anticipated potential for safety impacts since natural attenuation is occurring and will continue without external action/activity.	**Low Potential Impact** Presents low potential for safety impacts that could result from construction and O&M to implement the technologies associated with in-situ generation of ferric oxides.
Potential impacts - cross-media impacts	**Low Potential Impact** Presents low potential for cross-media impacts to additional areas onsite or offsite during closure activities by keeping CCR material within the existing boundaries of Ponds A, B, and C. Presents low potential for post-closure cross-media impacts through use of an engineered final cover system.	**Moderate to High Potential Impact** Presents moderate to high potential for cross-media impacts to additional areas onsite or offsite during closure activities associated with transportation and disposal of CCR material offsite (e.g., potential impacts to soil, water, and air). Presents low potential for post-closure cross-media impacts through offsite disposal at a permitted, lined landfill.	**Low to Moderate Potential Impact** Presents low to moderate potential for cross-media impacts as a result of extracting affected groundwater from the subsurface and discharging or disposing the extracted groundwater.	**Moderate Potential Impact** Presents moderate potential for cross-media impacts as a result of extracting affected groundwater from the subsurface, discharging or disposing the extracted groundwater, and generating a secondary waste stream (e.g., ion exchange media, RO reject water).	**Very Low Potential Impact** Presents very low potential for cross-media impacts because affected groundwater remains in-situ.	**Low Potential Impact** Presents low potential for cross-media impacts because, although subsurface injection is required, affected groundwater remains in-situ.
Potential impacts - exposure to residual contamination	**Low Potential Impact** Presents low potential for post-closure residual contamination impacts through use of an engineered final cover system, which would act as an engineering control to mitigate potential for exposure of humans or environmental receptors to CCR after closure is complete.	**Very Low Potential Impact** Presents very low potential for post-closure residual contamination impacts because CCR would be removed from the Site and stored in a permitted offsite landfill.	**Low Potential Impact** Presents low potential for exposure to residual contamination because direct exposure to pumped groundwater is unlikely. Potential exposure pathways do not currently pose an adverse risk to human health or the environment, and future exposure pathways would not be anticipated to either.	**Moderate Potential Impact** Presents moderate potential for exposure to residual contamination as a result of generating a secondary waste stream (e.g., ion exchange media, RO reject water) in addition to limited potential for exposure resulting from the extracted groundwater.	**Very Low Potential Impact** Presents very low potential for exposure to residual contamination because affected groundwater remains in-situ except minimal pumping required for groundwater monitoring.	**Low to Very Low Potential Impact** Presents low to very low potential for exposure to residual contamination because the in-situ spot treatment is limited to the relatively small areal extent of AOI 4 and the affected groundwater remains in-situ and no secondary waste streams would be generated during the treatment process.

TABLE 2-1
CORRECTIVE MEASURES SCREENING MATRIX - 40 CFR § 257.96(c) REQUIREMENTS
CORRECTIVE MEASURES ASSESSMENT - PONDS A, B, AND C
EAGLE VALLEY GENERATING STATION - MARTINSVILLE, INDIANA

	SOURCE CONTROL MEASURES		GROUNDWATER MEASURES			
	Hybrid Closure in Place (CIP)	***Closure by Removal (CBR)***	***Hydraulic Containment through Groundwater Pumping***	***Hydraulic Containment through Groundwater Pumping with Ex-situ Treatment***	***Monitored Natural Attenuation (MNA)***	***In-situ Treatment via In-situ Generation of Ferric Oxides/Air Sparging***
General Description	*This source control measure would involve removal of CCR that is determined to be likely in contact with groundwater, placement of the removed CCR above the groundwater table, and installation of an engineered final cover (cap) system over the CCR closure footprint.*	*This source control measure would involve removal and offsite transportation and disposal of CCR to an approved offsite permitted, lined landfill, followed by regrading with a focus on eliminating steep and/or unsafe slopes and promoting drainage of stormwater runoff away from the excavated area post-closure.*	*This groundwater measure would involve hydraulic containment through continued operation (pumping) of the existing CCGT production wells to address lithium and molybdenum SSLs in AOI 1 and the addition of pumping from supplemental extraction wells to be installed along the southern property boundary to address lithium and molybdenum SSLs in AOI 2. Extracted groundwater would be discharged in accordance with a NPDES permit or sent offsite for disposal.*	*This groundwater remedial measure is the same as the Hydraulic Containment through Groundwater Pumping measure, with the exception that this measure additionally includes ex-situ treatment of extracted groundwater. Possible treatment technologies include ion exchange and RO treatment.*	*MNA is a groundwater measure that relies on data collection from historical and ongoing groundwater monitoring to demonstrate that physical, chemical, and biological processes naturally occurring in the subsurface are sufficient to adequately remediate (or attenuate) SSLs to the GWPS. MNA would address lithium SSLs in AOI 3.*	*In-situ treatment via generation of ferric oxides would address arsenic SSLs in AOI 4. Ferric oxides have been demonstrated to adsorb and immobilize arsenic. In-situ generation of ferric oxides in the arsenic-impacted zone can be achieved through injection of acidic ferric iron solution that will react with naturally occurring buffering minerals in soil to promote the formation of ferric oxides in-situ or another method using ferrous iron and air sparging.*
257.96(c)(2)						
Time required to begin the remedy	A closure and post-closure plan that includes hybrid CIP has already been submitted to IDEM for review and approval. Physical Site work for hybrid CIP would be estimated to begin approximately 6 to 9 months after IDEM approval of the closure and post-closure plan.	A new closure and post-closure plan would have to be developed and would be subject to IDEM approval. An estimated minimum of 1 to 1.5 years would be expected to develop the plan, obtain IDEM approval of plan, obtain applicable permits, arrange large-volume offsite disposal agreements, retain and mobilize a qualified contractor (including necessary personnel and equipment), and begin implementing CBR closure activities.	An estimated 1.5 to 2.5 years to perform testing, prepare the design, receive approvals, install, and begin operating the supplemental extraction wells system within AOI 2. The three CCGT production wells are already operating within AOI 1.	An estimated 1.5 to 3 years to perform testing, prepare the design, receive approvals, install, and begin operating the supplemental extraction wells system (within AOI 2) and ex-situ treatment system (for AOI 1 & AOI 2) and associated infrastructure. The three CCGT production wells are already operating within AOI 1.	Natural attenuation is already ongoing at the Site, and a groundwater monitoring system exists to continue monitoring conditions and evaluate MNA effectiveness.	An estimated 1 to 2 years to perform bench-scale and pilot testing, prepare the design, receive permits and approvals, install, and begin initial distribution of reagents (and potential air sparging) to promote in-situ generation of ferric oxides. The construction of the in-situ treatment system in AOI 4 would start once closure of Pond A is substantially complete.
Time required to complete the remedy	Once initiated, an estimated 2 to 3 years to complete CCR material dewatering, CCR excavation and material consolidation, grading, and constructing the engineered cover system.	Once initiated, an estimated 2 to 3 years to complete CCR excavation and disposal in an offsite permitted landfill.	Based on groundwater modeling, active groundwater pumping of existing and supplemental extraction wells is anticipated to achieve lithium and molybdenum GWPSs in AOI 1 and AOI 2 within the post-closure period for Ash Ponds A, B, and C.	Based on groundwater modeling, active groundwater pumping of existing and supplemental extraction wells is anticipated to achieve lithium and molybdenum GWPSs in AOI 1 and AOI 2 within the post-closure period for Ash Ponds A, B, and C.	Based on groundwater modeling, natural processes of attenuation already active in the subsurface are anticipated to achieve the lithium GWPS in AOI 3 within the post-closure period for Ash Ponds A, B, and C.	Based on the limited size/location of the treatment area and broad demonstration of using ferric oxides to promote arsenic adsorption and immobilization, in-situ generation of ferric oxides is anticipated to achieve the arsenic GWPS at AOI 4 within the post-closure period for Ash Ponds A, B, and C.
257.96(c)(3)						
State or local permitting requirements or other environmental or public health requirements	Could require an IDEM ash pond closure plan approval, stormwater construction permit, construction in floodway permit, and county drainage permit. May also require NPDES discharge permit modification depending on dewatering practices.	In addition to permits and approvals for hybrid CIP, off-site disposal of the CCR may require studies and evaluations to determine whether additional approvals would be required related to transportation or disposal. Roadway improvements, approvals, or permits could be required.	Could require an extraction well permit, a stormwater construction permit, and a construction in floodway permit. Could also require NPDES discharge permit modification depending on various factors.	Could require an extraction well permit, a construction permit, a stormwater construction permit, and a construction in floodway permit. Could also require NPDES discharge permit modification depending on various factors.	No permitting or approvals are anticipated with the exception of a potential concurrence review/approval by IDEM of the groundwater performance monitoring program in support of MNA.	Could require an injection permit, a stormwater construction permit, and a construction in floodway permit.

Notes:

AOI - Area of Interest (refer to ***Figure 1-4*** *for locations of AOIs)*
BMPs - best management practices
CBR - closure by removal
CCGT - combined cycle gas turbine power plant
CCR - coal combustion residuals
CFR - Code of Federal Regulations
CIP - closure in place
GWPS - Groundwater Protection Standard
IDEM - Indiana Department of Environmental Management
MNA - monitored natural attenuation
NPDES - National Pollutant Discharge Elimination System
O&M - operations and maintenance
PPE - personal protective equipment
RO - reverse osmosis
SSL - statistically significant level

TABLE 2-2
SUMMARY OF REMEDIAL ALTERNATIVES
CORRECTIVE MEASURES ASSESSMENT - PONDS A, B, AND C
EAGLE VALLEY GENERATING STATION - MARTINSVILLE, INDIANA

<table>
<tr><th rowspan="2">Alternative Number</th><th rowspan="2">Remedial Alternative Description</th><th rowspan="2">Pond Closure Description</th><th colspan="4">Groundwater Measures per Area of Interest (AOI)</th></tr>
<tr><th>AOI 1</th><th>AOI 2</th><th>AOI 3</th><th>AOI 4</th></tr>
<tr><td>1</td><td>Hybrid Closure in Place (CIP) with Capping and Hydraulic Containment through Groundwater Pumping</td><td rowspan="2">Hybrid CIP with Cap</td><td>Groundwater Pumping
No active treatment technologies</td><td>Groundwater Pumping
No active treatment technologies</td><td rowspan="4">Monitored Natural Attenuation</td><td rowspan="4">In-Situ Treatment</td></tr>
<tr><td>2</td><td>Hybrid CIP with Capping and Hydraulic Containment through Groundwater Pumping with Ex-Situ Treatment</td><td>Groundwater Pumping with Ex-Situ Treatment
Treatment system (e.g., ion exchange or reverse osmosis)</td><td>Groundwater Pumping with Ex-Situ Treatment
Treatment system (e.g., ion exchange or reverse osmosis)</td></tr>
<tr><td>3</td><td>Closure by Removal (CBR) with Hydraulic Containment through Groundwater Pumping</td><td rowspan="2">Closure By Removal</td><td>Groundwater Pumping
No active treatment technologies for groundwater</td><td>Groundwater Pumping
No active treatment technologies for groundwater</td></tr>
<tr><td>4</td><td>CBR with Hydraulic Containment through Groundwater Pumping with Ex-Situ Treatment</td><td>Groundwater Pumping with Ex-Situ Treatment
Treatment system (e.g., ion exchange or reverse osmosis)</td><td>Groundwater Pumping with Ex-Situ Treatment
Treatment system (e.g., ion exchange or reverse osmosis)</td></tr>
</table>

TABLE 2-3
SUMMARY OF PRELIMINARY EVALUATION OF REMEDIAL ALTERNATIVES - 40 CFR §257.97(c) REQUIREMENTS
CORRECTIVE MEASURES ASSESSMENT - PONDS A, B, AND C
EAGLE VALLEY GENERATING STATION - MARTINSVILLE, INDIANA

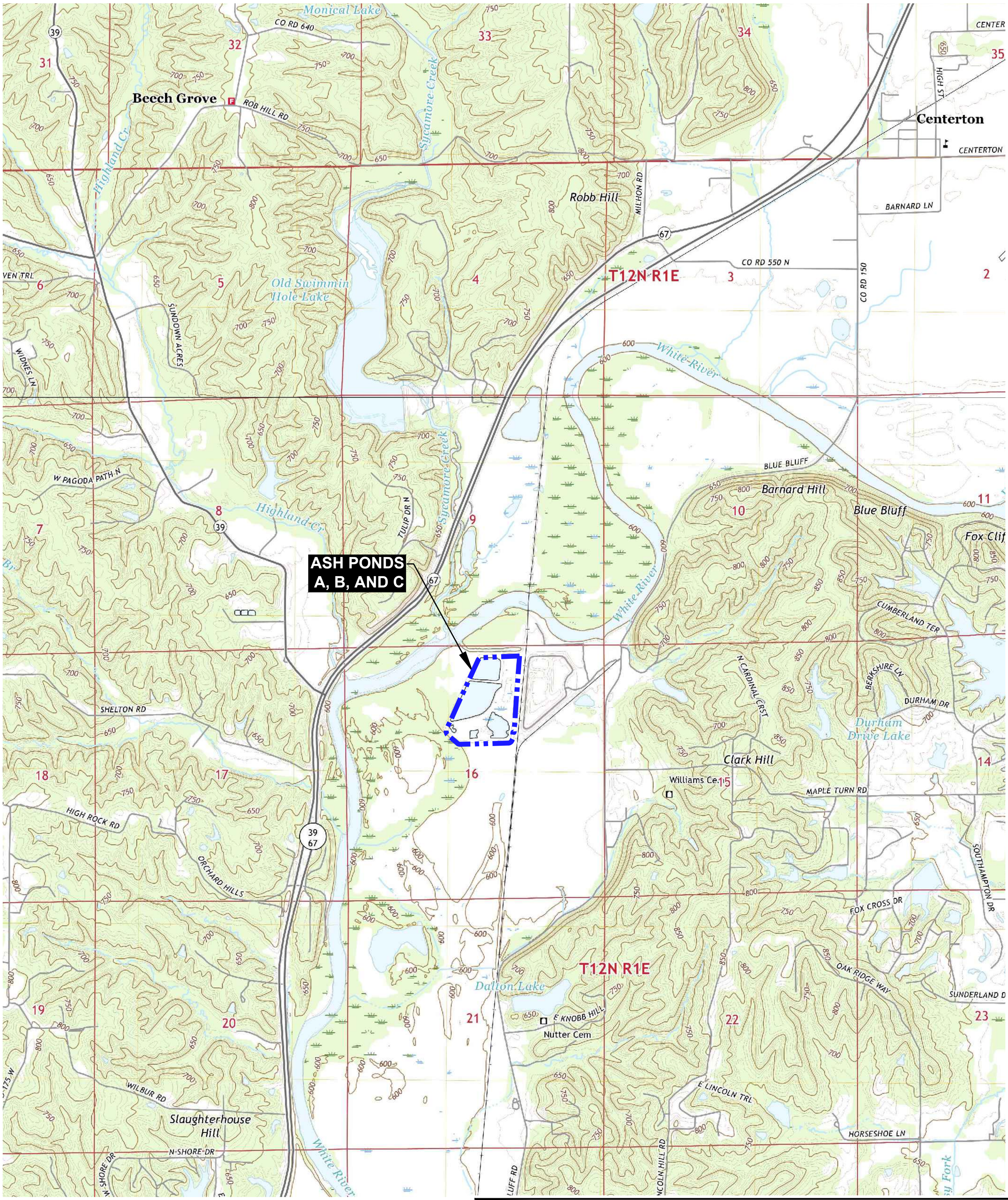
General Description	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Hybrid Closure in Place (CIP) with Capping, Hydraulic Containment through Groundwater Pumping (no treatment), Monitored Natural Attenuation (MNA), and In-Situ Treatment (IST)	Hybrid CIP with Capping, Hydraulic Containment through Groundwater Pumping with Ex-situ Treatment, MNA, and IST	Closure by Removal (CBR), Hydraulic Containment through Groundwater Pumping (no treatment), MNA, and IST	CBR, Hydraulic Containment through Groundwater Pumping with Ex-situ Treatment, MNA, and IST
257.97(c)(1) The long and short term effectiveness and protectiveness of the remedy(s), along with the degree of certainty that the remedy will prove successful				
(i) Magnitude of reduction of existing risk	The risk evaluation concluded no adverse risk currently exists for human health or the environment. The alternative results in the removal of CCR in Ponds A, B, and C that may be in potential contact with groundwater (during seasonal high groundwater conditions), storage of CCR within an engineered solution, and constituent mass removal through existing and supplemental groundwater pumping.	The risk evaluation concluded no adverse risk currently exists for human health or the environment. The alternative results in the removal of CCR in Ponds A, B, and C that may be in potential contact with groundwater (during seasonal high groundwater conditions), storage of CCR within an engineered solution, and constituent mass removal through existing and supplemental groundwater pumping.	The risk evaluation concluded no adverse risk currently exists for human health or the environment. The alternative results in the removal of CCR in Ponds A, B, and C that may be in potential contact with groundwater (during seasonal high groundwater conditions), storage of CCR within an engineered solution, and constituent mass removal through existing and supplemental groundwater pumping.	The risk evaluation concluded no adverse risk currently exists for human health or the environment. The alternative results in the removal of CCR in Ponds A, B, and C that may be in potential contact with groundwater (during seasonal high groundwater conditions), storage of CCR within an engineered solution, and constituent mass removal through existing and supplemental groundwater pumping.
(ii) Magnitude of residual risks in terms of likelihood of further releases due to CCR remaining following implementation of a remedy	Hybrid CIP would result in CCR stored onsite above the seasonal high groundwater table within the footprint of Ponds A, B, and C and would be capped and graded to ensure proper drainage to prevent rainfall infiltration. The magnitude of residual risk of potential further releases associated with CCR materials remaining onsite is considered low.	Hybrid CIP would result in CCR stored onsite above the seasonal high groundwater table within the footprint of Ponds A, B, and C and would be capped and graded to ensure proper drainage to prevent rainfall infiltration. The magnitude of residual risk of potential further releases associated with CCR materials remaining onsite is considered low.	CBR would result in CCR disposed offsite in a lined, permitted landfill. No CCR material would remain onsite, meaning no onsite residual risk of further releases due to CCR remaining would exist.	CBR would result in CCR disposed offsite in a lined, permitted landfill. No CCR material would remain onsite, meaning no onsite residual risk of further releases due to CCR remaining would exist.
(iii) The type and degree of long-term management required, including monitoring, operation, and maintenance	A groundwater monitoring system, groundwater pumping system, IST system, and associated O&M would be included. Additionally, ongoing maintenance for the post-closure engineered cap system would be required with a hybrid CIP closure method.	A groundwater monitoring system, groundwater pumping system, IST system, and associated O&M would be included. Additionally, ongoing maintenance for the post-closure engineered cap system would be included with a hybrid CIP closure method, and ongoing O&M of the ex-situ groundwater treatment system would be included.	A groundwater monitoring system, groundwater pumping system, IST system, and associated O&M would be included.	A groundwater monitoring system, groundwater pumping system, IST system, and associated O&M would be included. Additionally, ongoing O&M of the ex-situ groundwater treatment system would be included.
(iv) Short-term risks that might be posed to the community or the environment during implementation of such a remedy	Hybrid CIP would involve onsite CCR handling within the area of Ponds A, B, and C due to removal of CCR in potential contact with groundwater. Truck traffic on public roads would be limited to local delivery/import of soil backfill (to backfill the excavated area) and for final cover materials Keeping offsite transportation activities limited would limit the potential for risk to the community or environment.	Hybrid CIP would involve onsite CCR handling within the area of Ponds A, B, and C due to removal of CCR in potential contact with groundwater. Truck traffic on public roads would be limited to local delivery/import of soil backfill (to backfill the excavated area) and for final cover materials. Keeping offsite transportation activities limited would limit the potential for risk to the community or environment.	CBR would include potential risks due to increased truck traffic on public roads (along with increased possibility of vehicular accidents, roadway damage, or incidental release of CCR into the environment), truck emissions, and noise.	CBR would include potential risks due to increased truck traffic on public roads (along with increased possibility of vehicular accidents, roadway damage, or incidental release of CCR into the environment), truck emissions, and noise.
(v) Time until full protection is achieved	The risk evaluation concluded no adverse risk of exposure for potential human or environmental receptors to groundwater with SSLs of arsenic, lithium, and molybdenum associated with the Ash Pond System. As such, full protection of human health and the environment is already achieved. The model-predicted timeframes to achieve GWPSs at or beyond the waste boundary are within the post-closure period for Ponds A, B, and C.	The risk evaluation concluded no adverse risk of exposure for potential human or environmental receptors to groundwater with SSLs of arsenic, lithium, and molybdenum associated with the Ash Pond System. As such, full protection of human health and the environment is already achieved. The model-predicted timeframes to achieve GWPSs at or beyond the waste boundary are within the post-closure period for Ponds A, B, and C.	The risk evaluation concluded no adverse risk of exposure for potential human or environmental receptors to groundwater with SSLs of arsenic, lithium, and molybdenum associated with the Ash Pond System. As such, full protection of human health and the environment is already achieved. The model-predicted timeframes to achieve GWPSs at or beyond the waste boundary are within the post-closure period for Ponds A, B, and C.	The risk evaluation concluded no adverse risk of exposure for potential human or environmental receptors to groundwater with SSLs of arsenic, lithium, and molybdenum associated with the Ash Pond System. As such, full protection of human health and the environment is already achieved. The model-predicted timeframes to achieve GWPSs at or beyond the waste boundary are within the post-closure period for Ponds A, B, and C.
(vi) Potential for exposure of humans and environmental receptors to remaining wastes, considering the potential threat to human health and the environment associated with excavation, transportation, re-disposal, or containment	With hybrid CIP, the potential for exposure to remaining wastes exists during onsite CCR excavation and consolidation within the footprint of Ponds A, B, and C; this potential for exposure is limited because CCR handling would remain onsite.	With hybrid CIP, the potential for exposure to remaining wastes exists during onsite CCR excavation and consolidation within the footprint of Ponds A, B, and C; this potential for exposure is limited because CCR handling would remain onsite. With groundwater treatment, a secondary waste stream (e.g., spent resins or reject water) would be generated that could introduce additional potential for exposure.	With CBR, the potential for exposure to remaining wastes exists during CCR excavation, transportation, re-disposal, and potential for incidental CCR release into the environment. CCR handling would occur both onsite and offsite.	With CBR, the potential for exposure to remaining wastes exists during CCR excavation, transportation, re-disposal, and potential for incidental CCR release into the environment. CCR handling would occur both onsite and offsite. With groundwater treatment, a secondary waste stream (e.g., spent resins or reject water) would be generated that could introduce additional potential for exposure.
(vii) Long-term reliability of the engineering and institutional controls	The closure-related and groundwater -related components of the alternative are proven reliable and provide a high degree of certainty that the remedy would be effective in the long-term.	The closure-related and groundwater -related components of the alternative are proven reliable and provide a high degree of certainty that the remedy would be effective in the long-term.	The closure-related and groundwater -related components of the alternative are proven reliable and provide a high degree of certainty that the remedy would be effective in the long-term.	The closure-related and groundwater -related components of the alternative are proven reliable and provide a high degree of certainty that the remedy would be effective in the long-term.
(viii) Potential need for replacement of the remedy	Replacement of the closure-related and groundwater-related components of the alternative is unlikely.	Replacement of the closure-related and groundwater-related components of the alternative is unlikely.	Replacement of the closure-related and groundwater-related components of the alternative is unlikely.	Replacement of the closure-related and groundwater-related components of the alternative is unlikely.
257.97(c)(2) The Effectiveness of the Remedy in Controlling the Source to Reduce Further Releases				
(i) The extent to which containment practices will reduce further releases	Hybrid CIP would effectively isolate the CCR by storing the CCR above the seasonal high groundwater table within the footprint of Ponds A, B, and C and installing an engineered cover system over the footprint. Therefore, the likelihood for further releases is limited.	Hybrid CIP would effectively isolate the CCR by storing the CCR above the seasonal high groundwater table within the footprint of Ponds A, B, and C and installing an engineered cover system over the footprint. Therefore, the likelihood for further releases is limited.	CBR would provide an effective long-term storage solution for the CCR offsite in a lined landfill. Therefore, the likelihood for further releases is limited.	CBR would provide an effective long-term storage solution for the CCR offsite in a lined landfill. Therefore, the likelihood for further releases is limited.

TABLE 2-3
SUMMARY OF PRELIMINARY EVALUATION OF REMEDIAL ALTERNATIVES - 40 CFR §257.97(c) REQUIREMENTS
CORRECTIVE MEASURES ASSESSMENT - PONDS A, B, AND C
EAGLE VALLEY GENERATING STATION - MARTINSVILLE, INDIANA

General Description	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Hybrid Closure in Place (CIP) with Capping, Hydraulic Containment through Groundwater Pumping (no treatment), Monitored Natural Attenuation (MNA), and In-Situ Treatment (IST)	Hybrid CIP with Capping, Hydraulic Containment through Groundwater Pumping with Ex-situ Treatment, MNA, and IST	Closure by Removal (CBR), Hydraulic Containment through Groundwater Pumping (no treatment), MNA, and IST	CBR, Hydraulic Containment through Groundwater Pumping with Ex-situ Treatment, MNA, and IST
(ii) The extent to which treatment technologies may be used	IST would be implemented for AOI 4.	IST would be implemented for AOI 4. Additionally, ex-situ treatment of extracted groundwater would be used to treat groundwater pumped from the existing production wells and/or supplemental extraction wells.	IST would be implemented for AOI 4.	IST would be implemented for AOI 4. Additionally, ex-situ treatment of extracted groundwater would be used to treat groundwater pumped from the existing production wells and/or supplemental extraction wells.
257.97(c)(3) The Ease or Difficulty of Implementing a Potential Remedy				
(i) Degree of difficulty associated with constructing the technology	Hybrid CIP involves large-scale construction activities to consolidate CCR onsite above the seasonal high groundwater table within the footprint of Ponds A, B, and C and with the subsequent installation of the engineered cover system.	Hybrid CIP involves large-scale construction activities to consolidate CCR onsite above the seasonal high groundwater table within the footprint of Ponds A, B, and C and with the subsequent installation of the engineered cover system and construction of an ex-situ groundwater treatment system.	CBR involves very large-scale construction activities to remove CCR from the Site, transport the CCR material offsite, and disposal of the CCR material in an offsite permitted landfill.	CBR involves very large-scale construction activities to remove CCR from the Site, transport the CCR material offsite, and disposal of the CCR material in an offsite permitted landfill and requires construction of an ex-situ groundwater treatment system.
(ii) Expected operational reliability of the technologies	Closure and groundwater pumping related operations are generally reliable, with temporary shutdowns for routine or non-routine maintenance, repair, or replacement or for inclement weather or other adverse conditions.	Closure and groundwater pumping related operations are generally reliable, with temporary shutdowns for routine or non-routine maintenance, repair, or replacement or for inclement weather or other adverse conditions. Also, the ex-situ groundwater treatment system involves additional O&M requirements that could present increased O&M challenges, that could affect system performance and effectiveness.	Closure and groundwater pumping related operations are generally reliable, with temporary shutdowns for routine or non-routine maintenance, repair, or replacement or for inclement weather or other adverse conditions.	Closure and groundwater pumping related operations are generally reliable, with temporary shutdowns for routine or non-routine maintenance, repair, or replacement or for inclement weather or other adverse conditions. Also, the ex-situ groundwater treatment system involves additional O&M requirements that could present increased O&M challenges, that could affect system performance and effectiveness.
(iii) Need to coordinate with and obtain necessary approvals and permits from other agencies	Various permits and approvals would be anticipated to accommodate onsite hybrid CIP closure construction (e.g., state ash pond closure/post-closure plan approval, construction in floodway permit, stormwater construction permit, county drainage permit, CWA § 404, IDEM § 401 Water Quality Certification, and potential NPDES permit modifications. Groundwater-related permitting and approvals would be required for installation of the supplemental extraction wells and an injection permit would also be required for the IST system.	Various permits and approvals would be anticipated to accommodate onsite hybrid CIP closure construction (e.g., state ash pond closure/post-closure plan approval, construction in floodway permit, stormwater construction permit, county drainage permit, CWA § 404, IDEM § 401 Water Quality Certification, and potential NPDES permit modifications. Groundwater-related permitting and approvals would be required for installation of the supplemental extraction wells and an injection permit would also be required for the IST system. Additionally, permitting and approvals would be required for implementation of the ex-situ groundwater treatment system.	Permits and approvals for CBR would generally include those required for hybrid CIP. Studies and evaluations could be required to determine whether additional approvals would be required related to offsite transportation or disposal. Groundwater-related permitting and approvals would be required for installation of the supplemental extraction wells and an injection permit would also be required for the IST system.	Permits and approvals for CBR would generally include those required for hybrid CIP. Studies and evaluations could be required to determine whether additional approvals would be required related to offsite transportation or disposal. Groundwater-related permitting and approvals would be required for installation of the supplemental extraction wells and an injection permit would also be required for the IST system. Additionally, permitting and approvals would be required for implementation of the ex-situ groundwater treatment system.
(iv) Availability of necessary equipment and specialists	A significant amount of equipment and specialists would be needed to complete ash pond closure, construct and operate the IST system, and supplemental groundwater extraction system.	A significant amount of equipment and specialists would be needed to complete ash pond closure, construct and operate the IST system, and supplemental groundwater extraction system. Additional equipment and specialists would be required to construct and operate the ex-situ groundwater treatment system.	A significant amount of equipment and specialists would be needed to complete ash pond closure, construct and operate the IST system, and supplemental groundwater extraction system. CBR would also require haul trucks to transport excavated CCR to the offsite landfill.	A significant amount of equipment and specialists would be needed to complete ash pond closure, construct and operate the IST system, and supplemental groundwater extraction system. CBR would also require haul trucks to transport excavated CCR to the offsite landfill. Additional equipment and specialists would also be required to construct and operate the ex-situ groundwater treatment system.
(v) Available capacity and location of needed treatment, storage, and disposal services	The hybrid CIP alternative involves final CCR material placement onsite within the current footprint of Ponds A, B, and C. Treatment, storage or disposal would not be required for the groundwater pumping and IST systems.	The hybrid CIP alternative involves final CCR material placement onsite within the current footprint of Ponds A, B, and C. Extracted groundwater would be treated for this alternative, requiring construction, operation, and maintenance of an onsite treatment system and disposal of secondary waste streams generated as a result of the treatment process. Treatment, storage or disposal would not be required for the IST system.	The CBR alternative involves final CCR material disposal in an offsite landfill that would likely be 25 to 100 miles from the Site. A substantial amount of available landfill space would also be necessary to dispose of the excavated CCR, which may result in increased difficulty in identifying possible options for implementing CBR. Treatment, storage or disposal would not be required for the groundwater pumping and IST systems.	The CBR alternative involves final CCR material disposal in an offsite landfill that would likely be 25 to 100 miles from the Site. A substantial amount of available landfill space would also be necessary to dispose of the excavated CCR, which may result in increased difficulty in identifying possible options for implementing CBR. Extracted groundwater would be treated for this alternative, requiring construction, operation, and maintenance of an onsite treatment system and disposal of secondary waste streams generated as a result of the treatment process. Treatment, storage or disposal would not be required for the IST system.

Notes:
*AOI - Area of Interest (refer to **Figure 1-4**)*
BMP - best management practices
CBR - closure by removal
CCR - coal combustion residuals
CIP - closure in place
GWPS - Groundwater Protection Standard
IST - in-situ treatment
MNA - monitored natural attenuation
NPDES - National Pollutant Discharge Elimination System
O&M - operations and maintenance
PPE - personal protective equipment

FIGURES



MAP SOURCE: USGS
QUADRANGLES: MARTINSVILLE, IN 2019
MOORESVILLE WEST, IN 2019

HALEY ALDRICH

CORRECTIVE MEASURES ASSESSMENT
PONDS A, B, AND C - EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

SITE LOCATION MAP

APPROXIMATE SCALE: 1IN = 3000 FT
APRIL 2024

FIGURE 1-1

YEOMAN, ROB Printed: 1/17/2024 3:36 PM Layout: FIGURE 1-1
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\133274\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\2023 CMA\133274-013_FIG 1-1_SLM.DWG

LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF REGULATED CCR UNITS
- APPROXIMATE LIMITS OF FORMER AND NON REGULATED CCR UNITS
- ● 5 CCGT PRODUCTION WELL

NOTES

1. AERIAL IMAGE FROM BING MAPS, 2022.
2. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE.
3. CCGT = COMBINED CYCLE GAS TURBINE
4. CCR = COAL COMBUSTION RESIDUALS

0 360 720
SCALE IN FEET

HALEY ALDRICH

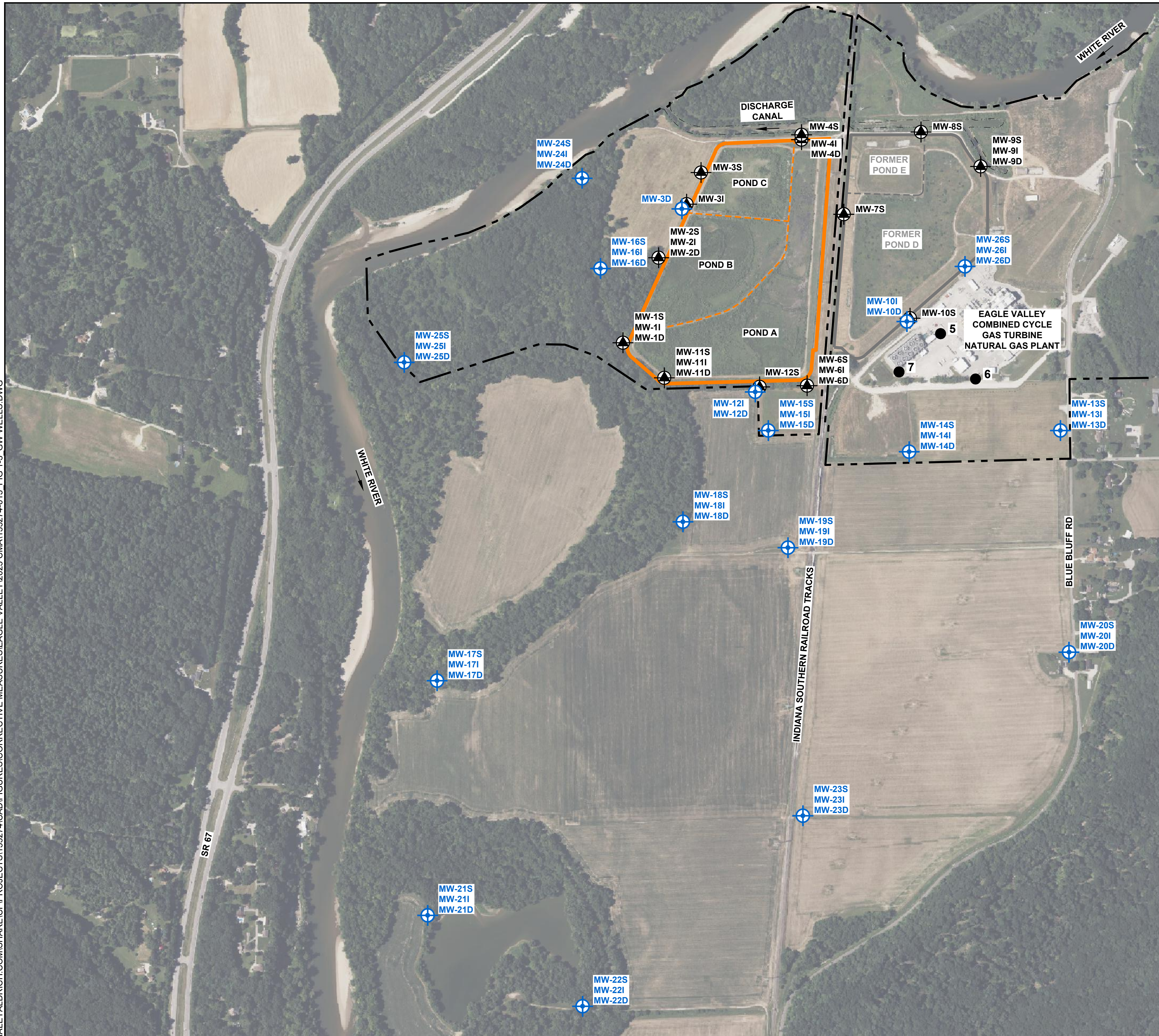
CORRECTIVE MEASURES ASSESSMENT
PONDS A, B, AND C - EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

SITE FEATURES MAP

SCALE: AS SHOWN
APRIL 2024

FIGURE 1-2

YEOMAN, ROB Saved: 1/17/2024 3:19 PM Layout: FIGURE 1-2
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\133274\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\2023 CMA\133274-013_FIG 1-2_SITE.DWG



LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF REGULATED CCR UNITS
- APPROXIMATE LIMITS OF FORMER AND NON REGULATED CCR UNITS
- 5 — CCGT PRODUCTION WELL
- MW-3 — CCR MONITORING WELL
- MW-15 — NATURE AND EXTENT MONITORING WELL

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE.
3. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
4. CCGT = COMBINED CYCLE GAS TURBINE
5. CCR = COAL COMBUSTION RESIDUALS

N

0 800 1600

SCALE IN FEET

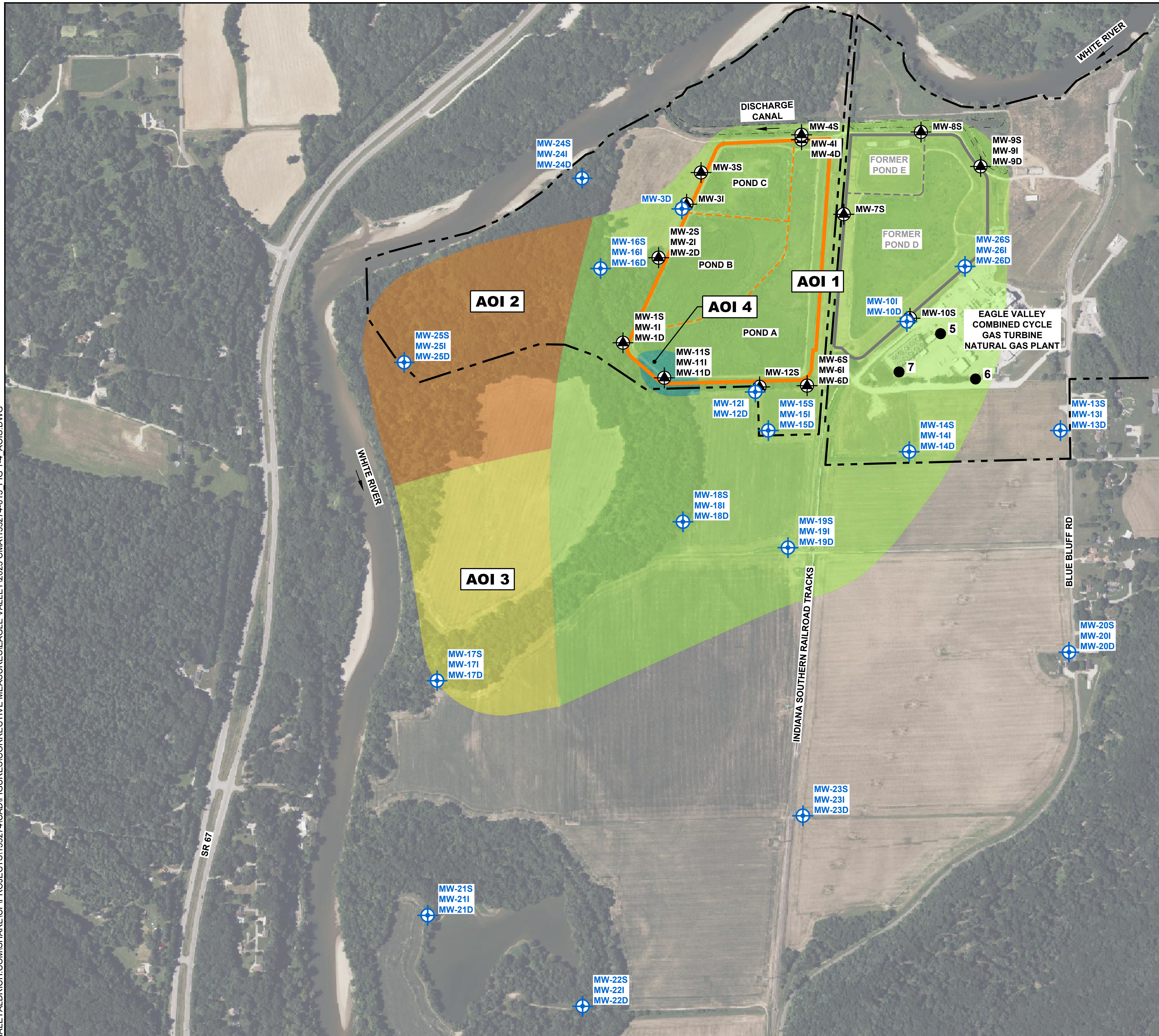
HALEY ALDRICH

CORRECTIVE MEASURES ASSESSMENT
PONDS A, B, AND C - EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

GROUNDWATER MONITORING WELL LOCATION MAP

SCALE: AS SHOWN
APRIL 2024

FIGURE 1-3



LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF REGULATED CCR UNITS
- APPROXIMATE LIMITS OF FORMER AND NON REGULATED CCR UNITS
- 5 CCGT PRODUCTION WELL
- MW-3 CCR MONITORING WELL
- MW-15 NATURE AND EXTENT MONITORING WELL
- AOI 1 - WITHIN INFLUENCE OF PRODUCTION WELLS
  - LITHIUM, MOLYBDENUM
- AOI 2 - OUTSIDE OF PRODUCTION WELL INFLUENCE
  - LITHIUM, MOLYBDENUM
- AOI 3 - OUTSIDE OF PRODUCTION WELL INFLUENCE
  - LITHIUM
- AOI 4 - WITHIN INFLUENCE OF PRODUCTION WELLS
  - ARSENIC

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE.
3. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
4. CCGT = COMBINED CYCLE GAS TURBINE
5. CCR = COAL COMBUSTION RESIDUALS
6. AOI = AREA OF INTEREST

N

0 800 1600
SCALE IN FEET

HALEY ALDRICH

CORRECTIVE MEASURES ASSESSMENT
PONDS A, B, AND C - EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

AFFECTED GROUNDWATER AREAS OF INTEREST

SCALE: AS SHOWN
APRIL 2024

FIGURE 1-4

YEOMAN, ROB Saved: 1/17/2024 3:40 PM Layout: FIGURE 1-4
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\133274\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\2023 CMA\133274-013_FIG 1-4_AOIS.DWG

APPENDIX A
Nature and Extent Report

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NATURE AND EXTENT REPORT
EAGLE VALLEY GENERATING STATION
4040 BLUE BLUFF ROAD
MARTINSVILLE, INDIANA

by
Haley & Aldrich, Inc.
Cleveland, Ohio

for
AES Indiana
Indianapolis, Indiana

File No. 0133274-013
April 2024

HALEY & ALDRICH, INC.
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SIGNATURE PAGE FOR

NATURE AND EXTENT REPORT
EAGLE VALLEY GENERATING STATION
4040 BLUE BLUFF ROAD
MARTINSVILLE, INDIANA

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Project Principal
Haley & Aldrich, Inc.

Executive Summary

In accordance with requirements of the Coal Combustion Residuals (CCR) Rule, AES Indiana (AESI) has completed comprehensive site investigation activities to sufficiently characterize the nature and extent of groundwater affected by the Ash Pond System located at the Eagle Valley Generating Station (EVGS or Site). Findings from the Site investigation activities are as follows:

- Statistical analysis has identified three Appendix IV constituents present in groundwater samples collected from the CCR Rule groundwater monitoring system at statistically significant levels (SSLs): arsenic, lithium, and molybdenum.
- The Ash Pond System has been identified as the source of SSLs in groundwater based on evaluation of groundwater flow patterns, chemical composition of groundwater, and Site operational features.
- The horizontal extent of affected groundwater covers approximately 360 acres, which encompasses the Ash Pond System and extends to the west and southwest. The vertical extent of affected groundwater is limited by relatively impermeable shale bedrock, approximately 90 feet below ground surface.
- Groundwater pumping east of the Ash Pond System to support plant operations significantly influences groundwater flow and constituent migration at the Site and provides ongoing management for about 65 percent of the area of affected groundwater (**Figure ES-1**).
- Affected groundwater was identified offsite and beyond the influence of groundwater pumping. That area encompasses approximately 100 acres.

In conclusion, the nature and extent of CCR affected groundwater has been sufficiently characterized to proceed with a review of the previous corrective measures assessment (CMA) and perform updates to the CMA, as appropriate.

Table of Contents

HALEY ALDRICH

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List of Abbreviations

Abbreviation	Definition
AESI	AES Indiana
Ash Pond System	Ponds A, B, and C Former Ponds D and E
ATC	ATC Group Services, LLC
bgs	below ground surface
CCGT	combined cycle gas turbine
CCR	coal combustion residual
CCR Rule	USEPA's final rule for "Disposal of Coal Combustion Residuals from Electric Utilities"
CFR	Code of Federal Regulations
CMA	corrective measures assessment
EVGS	Eagle Valley Generating Station
Former Ponds D and E	former Ash Ponds D and E
ft/day	feet per day
ft/ft	feet per foot
ft/yr	feet per year
gpm	gallons per minute
GWPS	groundwater protection standard
Haley & Aldrich	Haley & Aldrich, Inc.
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources
MCL	Maximum Contaminant Level
µg/L	micrograms per liter
NA	not analyzed
N&E	Nature and Extent
pCi/L	picocuries per liter
Ponds A, B, and C	Ash Ponds A, B, and C
Site	Eagle Valley Generating Station
SSI	statistically significant increase
SSL	statistically significant level
USEPA	United States Environmental Protection Agency

1. Introduction

Haley & Aldrich, Inc. (Haley & Aldrich) was retained by AES Indiana (AESI) to prepare this Nature and Extent Report for the regulated coal combustion residual (CCR) units, Ash Ponds A, B, and C, (herein referred to as Ponds A, B, and C) at the Eagle Valley Generating Station (EVGS or Site). AESI has completed comprehensive geologic and hydrogeologic investigations in accordance with the United States Environmental Protection Agency's (USEPA) rule entitled *Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities*. 80 Fed. Reg. 21302 (effective 19 October 2015) and subsequent regulatory revisions (CCR Rule). Analytical results from an extensive network of onsite and offsite groundwater monitoring wells (currently comprised of 71 wells) have been evaluated to sufficiently characterize the nature and extent of constituents associated with former ash pond operations in accordance with the Code of Federal Regulations Title 40 (40 CFR) §257.95(g)(1). This report characterizes the nature and extent of groundwater affected by CCR and relevant Site conditions to support the corrective measures assessment (CMA) completed in accordance with 40 CFR §257.96 and associated CMA updates. Two units which are not regulated by the CCR Rule, former Ash Ponds D and E (Former Ponds D and E) are located directly adjacent to Ponds A, B, and C and potential effects from those units are incorporated into this evaluation. Collectively, Ponds A, B, and C and Former Ponds D and E are considered the Ash Pond System (**Figure 1**).

This Nature and Extent (N&E) Report provides a comprehensive summary of data evaluation. This evaluation includes characteristics of the source of impacts, groundwater quality conditions and geochemical factors that define the "nature" of the release, as well as the groundwater flow conditions, contaminant distribution, and migration pathways that define the "extent" of the release. Results from the semiannual compliance monitoring and N&E investigations have identified arsenic, lithium, and molybdenum in groundwater at statistically significant levels (SSLs) greater than the respective groundwater protection standards (GWPSs). Affected groundwater is observed over an approximate 360-acre area, which encompasses the Ash Pond System and extends to the west and southwest.

1.1 FACILITY DESCRIPTION

AESI ceased coal-fired power-generating operations at the Site in April 2016, and the coal-fired power plant has been demolished. The EVGS had been in operation since 1949 and had four operating bituminous, coal-fired electric generating units (Units 3, 4, 5, and 6) with a combined generating capacity of approximately 300 megawatts immediately prior to ceasing coal-fired operations. In April 2018, AESI began operating a natural gas-fired combined cycle generating station which is located southwest of the former coal-fired facility and has a generating capacity of 644 megawatts.

CCR produced by the EVGS were historically managed in the Ash Pond System. The Indiana Southern Railroad traverses the Site in the north-south direction (**Figure 2**) and separates the westerly Ponds A, B, and C from the easterly Former Ponds D and E. Historically, the Ash Pond System treated fly ash and bottom ash waste streams generated by EVGS's power-generating units through sedimentation, flocculation, and neutralization. In addition, the Ash Pond System also treated low-volume waste streams and stormwater.

According to information presented in the History of Construction of CCR Surface Impoundments by Sargent & Lundy, dated 14 October 2016 (Sargent & Lundy, 2016), during normal operation prior to 2016, Pond A served as the station's initial settling pond. Processed water from Pond A flowed through two 24-inch diameter corrugated metal pipes into Pond B, which operated as a secondary settling pond. The wastewater then flowed through two more 24-inch diameter corrugated metal pipes into Pond C, the final settling pond, where finer CCR particles would settle. As of 2012, water could be directed to Former Pond D as an alternate initial settling pond which then flowed into Pond C. The treated water from Pond C was discharged through a concrete outlet structure (National Pollutant Discharge Elimination System-permitted Outfall 103) into the discharge canal.

Former Ponds D and E no longer received waste and did not hold water as of 2015; therefore, Former Ponds D and E are not CCR units regulated under the CCR Rule (Sargent & Lundy, 2016).

CCR wastewater was no longer sluiced to Ponds A, B, and C by 2016. Thereafter, Ponds A, B, and C were used intermittently for non-CCR wastes during coal-fired power plant decommissioning and demolition. Placement of non-CCR related waste and indirect stormwater flows into Ponds A, B and C ceased in 2019. Closure of Ponds A, B, and C was initiated through the planning and permitting process in April 2019. As of November 2020, low-volume waste streams were no longer sent to Ponds A, B, and C (Sargent & Lundy, 2020). No impounded water was present in Ponds A, B, and C, as of the completion of the 2020 annual inspection performed in accordance with 40 CFR §257.83(b).

The Ash Pond System covers an area of approximately 70 acres. Information regarding the size and volume of each of the ash ponds is presented in the in-text **Table 1.1-1** below.

Table 1.1-1: Ash Pond Information

Ash Pond ID	Surface Area[1] (acres)	Approximate Volume of Impounded CCR[2] (acre-feet)
Pond A	27	386
Pond B	15	136
Pond C	9	53
Former Pond D	16	N/A[3]
Former Pond E	3	N/A[3]

Notes:

1. *Pond surface areas for Former Ponds D and E are approximate and based on aerial photographs. Pond surface areas for Ponds A, B, and C are estimated values from Sargent & Lundy, 2023.*
2. *Annual Inspection of CCR Surface Impoundments by Sargent & Lundy, dated 11 January 2024.*
3. *Volume information is not available for Former Ponds D and E, which are not regulated under the CCR Rule.*

Plant process water, including cooling water for the combined cycle gas turbine (CCGT) plant, is sourced from three high yield groundwater production wells that were installed in 2018 at the locations shown on **Figure 2** and further discussed in Section 3.1.1.

1.2 ENVIRONMENTAL SETTING

1.2.1 Geology

Morgan County is located at the southern limit of the last major Wisconsin glacial advance, with the limit of the glacial advance defining two separate physiographic regions: the Central Till Plain physiographic region in the northern part of the county within the limit of the glacial advance and the

Southern Hills and Lowlands physiographic region in remainder of the county to the south, including in the area of EVGS. The physiographic regions are further divided with the area of the EVGS in the Martinsville Hills physiographic section of the Southern Hills and Lowlands region (Gray, 2001). Although this area was not glaciated during the Wisconsin glacial advance, it was affected by older glaciation. Deposits from pre-Wisconsin ice sheets have been eroded and bedrock is at or near the surface in much of the region (Indiana Department of Natural Resources [IDNR], 2002). The natural soil in this area consists mainly of outwash including fine-grained clays and silts overlying sands and gravels associated with the White River. Bedrock in the region consists of sedimentary rocks including carbonates, sandstone, shale, and coal deposited during the Cambrian through Pennsylvanian periods of Paleozoic Era overlying crystalline rocks of Precambrian age (Gray et al., 1987). The coal-bearing Pennsylvanian units are not present in the vicinity of the EVGS and are primarily found in western and southwestern Indiana.

Bedrock beneath the EVGS is siltstone and shale of the Mississippian-age Borden Group. Typical rocks comprising the Borden Group are argillaceous shales and siltstone that become sandier upward in the sequence. Carbonates are rare, occurring mainly in the upper portion of the sequence. Regional mapping by the Indiana Geological Survey indicates bedrock under the Site more specifically is part of the Spickert Knob Formation of the Borden Group (Rupp et al., 2017).

This formation is identified as siltstone with abundant silty shale, some sandstone, and minor amounts of limestone (Rexroad, 1986). In-text **Figure 1.2.1-1** below depicts a generalized stratigraphic column of bedrock geology near the EVGS.

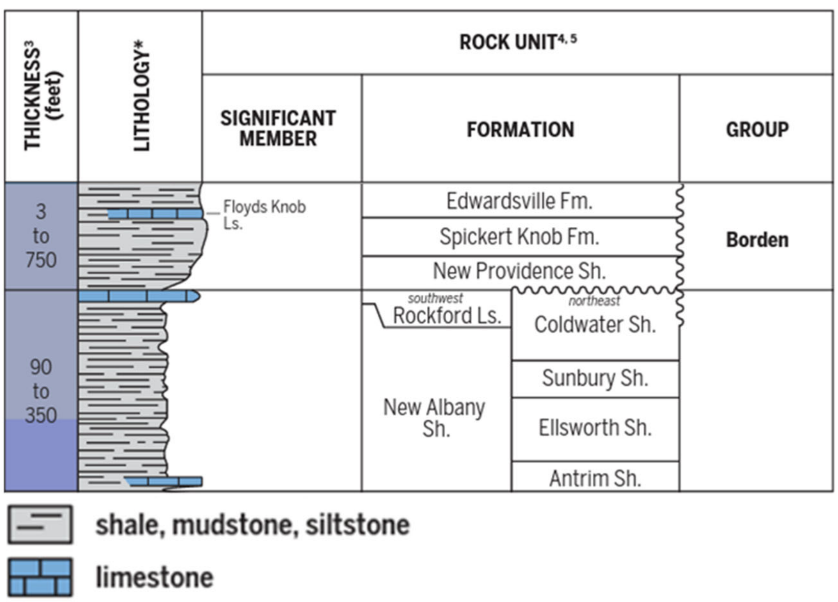

Figure 1.2.1-1: *Generalized Stratigraphic Column (igws.indiana.edu/research/energy)*

Alluvial deposits of the White River valley overlie the shale bedrock at the EVGS.

1.2.2 Hydrogeology

The EVGS is located in the floodplain of the White River. The White River flows to the south and forms the northern and western boundaries of the Site. The White River valley was formed from meltwater from the continental ice sheets and filled with alluvial sediments deposited from meltwater heavily loaded with entrained sediments. Historic and modern floodplain deposits are primarily comprised of silt/clay loam alluvium less than 10 feet thick overlying sand and gravel outwash of the Atherton formation. The Atherton formation consists of sand and gravel up to 100 feet thick (Loope, 2015). The Atherton formation and floodplain deposits make up the uppermost aquifer and would be expected to have moderate groundwater yield (Robinson and Risch, 2006). The underlying Borden Group is often regarded as an aquitard and where productive wells are installed within the group, most of the domestic wells yield only 1 to 5 gallons per minute (gpm; IDNR, 2002).

The White River system has played a significant role in the development of alluvial setting surrounding the EVGS. The image below (in-text **Figure 1.2.2-1**) shows the location of the former generating station within the flood plain, the White River channel, and historical meander scars and water drainages present within the floodplain.

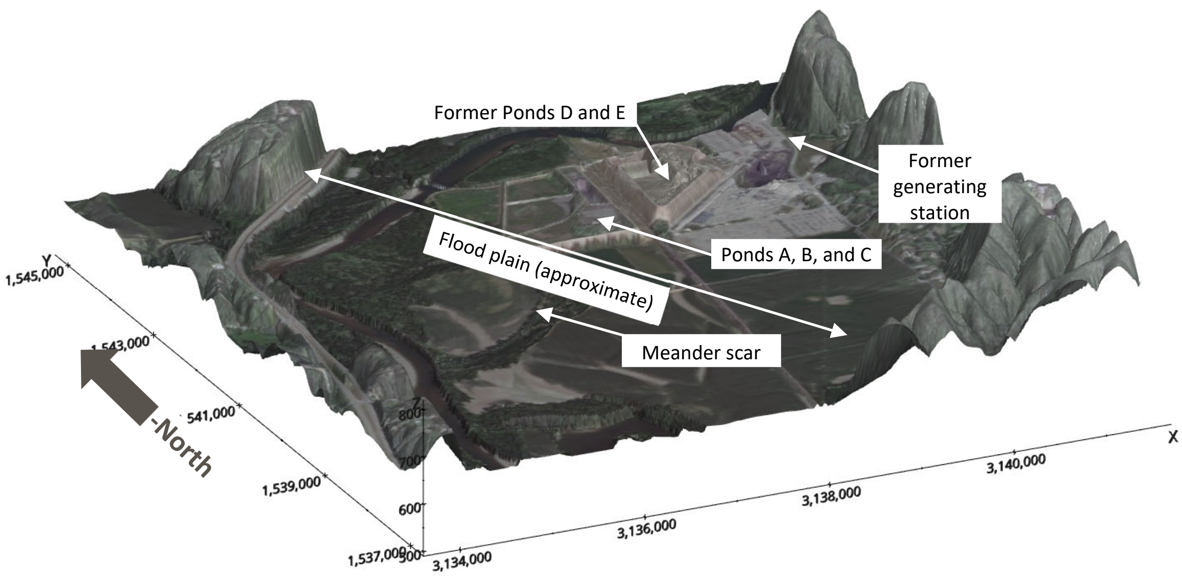

Figure 1.2.2-1: *Digital Elevation Model of Topography near EVGS (with 5x vertical exaggeration)*

Within the Ash Pond System, CCR was impounded by the perimeter dam embankments, which were constructed with fine-grained soils such as silt and lean clay. Borings advanced for monitoring well installation encountered these fine-grained soils at thicknesses of up to 20 feet.

The saturated zone includes alluvial deposits primarily comprised of sand and gravel overlying bedrock comprised primarily of silty clay shale. These two discrete types of naturally occurring subsurface materials occurring within the saturated zone beneath the Site (i.e., hydrostratigraphic units) are presented in the in-text **Table 1.2.2-1** below with details regarding the approximate extent, thickness, and hydraulic conductivity of each hydrostratigraphic unit.

Table 1.2.2-1: Hydrostratigraphic Unit Summary			
Hydrostratigraphic Unit	**Flow Zone**	**Approximate Extent and Thickness**	**Calculated Hydraulic Conductivity[2] (feet/day)**
Sand or Sand and Gravel (Alluvial Deposits)	Shallow, Intermediate, and Deep	Continuous sand with horizontal stratification and varying amounts of gravel. Average thickness of approximately 85 feet. Thickest gravel-containing layer was identified at the MW-6 well cluster and gravel 2 to 15 feet thick was identified above shale in the deep zone beneath the Ash Pond System. Information regarding gravel presence and thickness is most refined near the area of the Ash Pond System where there is a greater density of subsurface borings.	(S) 0.9 – 2,806 (I) 21 – 225 (D) 1.2 – 317
Silty Clay Shale (Bedrock)	Confining unit	The Borden Group is up to 750 feet thick in Indiana.[1]	0.0001 – 0.0005

Notes:

[1]GeneralizedStratigraphicColumn.pdf (igws.indiana.edu/research/energy)
[2]Hydraulic conductivity values are calculated based on Site-specific measurements described in Section 3.1.1
NA = not available
(S)(I)(D): indicates shallow, intermediate, and deep zones

Cross sections were generated to depict subsurface geology at the Site. Cross section transect lines are shown on **Figure 3**. Cross sections showing Site subsurface are included on **Figures 4A** through **Figure 4C**.

2. Groundwater Monitoring

Groundwater monitoring is performed in accordance with the Groundwater Monitoring and Corrective Action requirements of the CCR Rule per 40 CFR §257.90 through 40 CFR 257.95. Monitoring is completed through a phased approach to allow for a graduated response (i.e., detection monitoring followed by assessment monitoring and then N&E investigation, as applicable). After identification of SSLs greater than the GWPS are identified, 40 CFR §257.95(g)(1) of the CCR Rule requires the operator to:

> *"Characterize the nature and extent of the release and any relevant site conditions that may affect the remedy ultimately selected. The characterization must be sufficient to support a complete and accurate assessment of the corrective measures necessary to effectively clean up all releases from the CCR unit pursuant to §257.96. Characterization of the release includes the following minimum measures:*
>
> *I. Install additional monitoring wells necessary to define the contaminant plume(s);*
>
> *II. Collect data on the nature and estimated quantity of material released including specific information on the constituents listed in appendix IV of this part and the levels at which they are present in the material released;*
>
> *III. Install at least one additional monitoring well at the facility boundary in the direction of contaminant migration and sample this well in accordance with paragraph (d)(1) of this section; and*
>
> *IV. Sample all wells in accordance with paragraph (d)(1) of this section to characterize the nature and extent of the release."*

The following sections provide an overview of monitoring well installation and sampling events for the different phases of groundwater monitoring at the EVGS. Key terminology used in this report that pertain to the CCR Rule groundwater monitoring phases include:

- CCR Rule groundwater monitoring system – the combination of CCR monitoring wells and background monitoring wells certified as part of the CCR Rule for detection monitoring and assessment monitoring (not including N&E monitoring wells);
- Background monitoring wells – monitoring wells included in the CCR Rule groundwater monitoring system and located in an area of the Site not influenced by constituent migration in groundwater from the Ash Pond System;
- CCR monitoring wells – monitoring wells included in the CCR Rule groundwater monitoring system and located along the perimeter of the Ash Pond System;
- N&E monitoring wells – monitoring wells installed to further delineate the horizontal and vertical extent of constituents in groundwater downgradient of the Ash Pond System;
- Well cluster – a group of two or more monitoring wells installed in close proximity to each other but screened in groundwater at differing depths; for instance, MW-1S, MW-1I, and MW-1D comprise the MW-1 well cluster.
- Site monitoring well network – the comprehensive collection of all monitoring wells at the Site
- Appendix III constituents – indicator constituents that are generally prevalent in CCR, transport readily (i.e., are relatively mobile) in groundwater, and provide an early indication that leaching

of constituents from a CCR unit to groundwater has occurred if downgradient concentrations are statistically greater than background concentrations. The USEPA includes seven Appendix III constituents in the CCR Rule: boron, calcium, chloride, fluoride, pH, sulfate, and total dissolved solids;

- Appendix IV constituents – constituents that are generally prevalent in CCR and that the USEPA determined may pose a risk if recorded in groundwater above groundwater protection standards. The USEPA includes 15 Appendix IV constituents in the CCR Rule: antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, fluoride, lead, lithium, mercury, molybdenum, selenium, thallium, and total radium (radium 226 and 228 combined);
- Groundwater protection standard (GWPS) – established under the CCR Rule as either:
  - The maximum contaminant level (MCL) established by USEPA or alternative GWPS established by the CCR Rule Amendments to the National Minimum Criteria Finalized in 2018 (Phase One, Part One) in the Federal Register on 30 July 2018 for constituents without an MCL (i.e., cobalt, lead, lithium, and molybdenum), or
  - The site-specific background concentration if greater than the MCL or alternative GWPS;
- Statistically significant increase (SSI) – a concentration of an Appendix III constituent that is recorded at a statistically significant increase above the established background concentration for that constituent in a CCR monitoring well;
- Statistically significant level (SSL) – a concentration of an Appendix IV constituent that is recorded at a statistically significant level above the established GWPS for that constituent in a CCR monitoring well.

2.1 INVESTIGATION APPROACH AND TIMELINE – FEDERAL CCR RULE

CCR Rule groundwater monitoring has been performed in accordance with 40 CFR §257.90 through 40 CFR §257.95. The groundwater monitoring has been completed through a phased approach as follows:

- Background monitoring:
  - Background monitoring has been performed in accordance with CCR Rule requirements. Nine independent (baseline) sampling events were completed for the initial network of background monitoring wells between April 2016 and September 2017 for Appendix III and Appendix IV constituents, concurrent with detection monitoring per 40 CFR §257.94(b).
  - After the nine baseline sampling events were complete, background monitoring continued semiannually for the initial network of background monitoring wells. In 2019, the MW-13 well cluster was installed. It replaced the initial network of background monitoring wells in 2021, as further described in Section 2.2. The updated MW-13 background well cluster continues to be sampled semiannually for Appendix III and Appendix IV constituents.
- Detection monitoring:
  - Detection monitoring (per 40 CFR §257.94), which included CCR monitoring wells and background monitoring wells, consisted of nine independent (baseline) sampling events completed between April 2016 and September 2017 for Appendix III and Appendix IV constituents.

  - A statistical evaluation of detection monitoring results indicated that SSIs of Appendix III constituent concentrations above background concentrations had occurred in CCR monitoring wells located downgradient of the Ash Pond System. No alternative source was identified for the SSI of Appendix III constituents. Based on the Appendix III SSIs above background levels and in accordance with CCR Rule requirements, the groundwater monitoring program transitioned from detection monitoring to assessment monitoring in 2018.
- Assessment monitoring:
  - Assessment monitoring (per 40 CFR §257.95), which includes CCR monitoring wells and background monitoring wells, began in May 2018 and has continued with semiannual assessment monitoring events. Samples are analyzed for the Appendix III and Appendix IV constituents as required by 40 CFR §257.95(b) and 40 CFR §257.95(d)(1). Concurrent with the second assessment sampling event in September 2018, and as required by 40 CFR §257.95(h), GWPSs were established for the detected Appendix IV constituents.
  - A statistical evaluation of assessment monitoring results indicated that arsenic (MW-11S), lithium (MW-1I/D, MW-2I/D, MW-6I/D, MW-7S, MW-11S/I/D), and molybdenum (MW-1D, MW-2D, MW-6I/D, MW-7S, MW-10S, and MW-11S/I/D) were present in groundwater at SSLs above the GWPS. Based on the Appendix IV SSLs above GWPSs, and in accordance with CCR Rule requirements, an N&E investigation was initiated.
- N&E investigation:
  - Groundwater sampling to investigate the N&E in accordance with 40 CFR §257.95(g) began in 2019. As described in Section 2.5, the N&E investigation includes the sampling of the complete Site monitoring well network of CCR monitoring wells, background monitoring wells, and N&E monitoring wells installed to further delineate the horizontal and vertical extent of Appendix IV constituents identified at SSLs above GWPSs downgradient of the Ash Pond System. This N&E report focuses on the outcome of the N&E investigation.

Monitoring wells were installed to monitor groundwater at various depths within the alluvial deposits (sand and gravel aquifer zone) below the base of the Ash Pond System. Monitoring wells designated MW-#S are screened in the upper part of the saturated zone (i.e. shallow zone); wells designated MW-#I are screened in the middle part of the saturated zone (i.e., intermediate zone); and wells designated MW-#D are screened in the lower part of the saturated zone (i.e. deep zone).

The Site monitoring well network currently consists of 71 wells, including three background wells, 24 CCR monitoring wells around the perimeter of the Ash Pond System, and 44 wells installed for the N&E investigation to the south and west of the Ash Pond System (**Figure 5A**). Those 71 wells include 25 shallow zone wells (generally screened between 20 and 40 feet below ground surface [bgs]), 23 intermediate zone wells (generally screened between 40 and 70 feet bgs), and 23 deep zone wells (screened between 70 and 107 feet bgs).

In-text **Table 2.1-1** (below) summarizes the monitoring well installation activities, and **Figure 5B** correlates the timing and location of monitoring well installations.

Table 2.1-1: Monitoring Well Installation Timeline		
Year	**Description**	**Number Installed**
2015-2016	First monitoring wells installed for groundwater monitoring per CCR Rule (well clusters MW-1, MW-2, MW-4, MW-6, MW-9, and MW-11 and monitoring wells MW-3S/I, MW-5S, MW-7S, MW-8S, MW-10S, and MW-12S). Monitoring well MW-5S was subsequently abandoned prior to the initial CCR Rule groundwater monitoring system certification because the well did not yield sufficient water volume for sampling; therefore, that monitoring wells is not accounted for in the total number of wells installed.	24
2019	Monitoring wells installed for the N&E investigation (MW-10I and MW-10D and well clusters MW-14 through MW-16) and updated background monitoring well cluster MW-13.	14
2021-2022	Offsite monitoring wells installed for the N&E investigation to the south of the Ash Pond System (well cluster MW-17 through MW-23).	21
2023	Additional monitoring wells installed for the N&E investigation (MW-3D, MW-12I, MW-12D, and well clusters MW-24 to MW-26).	12
	Total Monitoring Wells Installed	**71**

The following Sections 2.2 through 2.5 provide additional details regarding background monitoring, detection monitoring, assessment monitoring, and the N&E investigation.

2.2 BACKGROUND MONITORING

Background monitoring has been performed in accordance with CCR Rule requirements to accurately represent the quality of background groundwater that has not been affected by the Ash Pond System. Background monitoring wells were initially installed in September/October 2015 and March 2016 to support compliance with the requirements of the CCR Rule. The initial CCR Rule groundwater monitoring system included seven background monitoring wells located along the northern boundary of the Ash Pond System (**Figure 5A**): MW-4S, MW-4I, MW-4D, MW-8S, MW-9S, MW-9I, and MW-9D. Those monitoring wells were initially selected to represent background groundwater quality because they are located upgradient of the Ash Pond System during normal Site operations. Normal Site operation is considered as the time when the three production wells are pumping to satisfy the operational needs of the CCGT, and groundwater flow direction is toward the production wells. Data from those initial background monitoring wells were initially used to establish statistically derived background concentrations for each Appendix III and Appendix IV constituent.

Use of those initial background monitoring wells to determine background concentrations was reviewed in 2019 due to data variability attributed to proximity to the Ash Pond System and discharge canal. Monitoring wells MW-13S, MW-13I, and MW-13D (MW-13 well cluster) were installed in 2019 and identified as potential replacement for the previously installed initial background monitoring wells due to the location of the MW-13 well cluster approximately 1,400 feet southeast of the Ash Pond System, in an area of the Site considered unaffected by Ash Pond System operations (**Figure 5A**). After collecting eight rounds of baseline monitoring samples from the MW-13 well cluster, the CCR Rule groundwater monitoring system was recertified on 17 December 2021 to designate the MW-13 well cluster as the new background wells. Statistical evaluations based on sampling results from the MW-13 well cluster began in November 2021. The seven initial background monitoring wells are currently identified in the CCR Rule groundwater monitoring system as CCR monitoring wells and are no longer used as background wells.

2.3 DETECTION MONITORING

In addition to the seven initial background monitoring wells described in Section 2.2, 17 monitoring wells were installed in September/October 2015 and March 2016 and incorporated into the CCR Rule groundwater monitoring system to support detection monitoring requirements of the CCR Rule: MW-1S, MW-1I, MW-1D, MW-2S, MW-2I, MW-2D, MW-3S, MW-3I, MW-6S, MW-6I, MW-6D, MW-7S, MW-10S, MW-11S, MW-11I, MW-11D, and MW-12S.

Detection monitoring of the CCR Rule groundwater monitoring system per 40 CFR §257.94 consisted of nine sampling events completed between April 2016 and September 2017 for Appendix III and Appendix IV constituents. The results of these sampling events were then compared to statistically derived background concentrations from the initial network of background monitoring wells described in Section 2.2. ATC Group Services, LLC (ATC) certified the statistical analysis procedures to evaluate groundwater monitoring analytical results in accordance with 40 CFR §257.93(f)(6). The certified statistical testing approach is described in the Certification of Selected Statistical Method for Groundwater Monitoring Data Evaluation (ATC, 2017). Statistical evaluations completed to evaluate the groundwater sample results meet the performance standard of 40 CFR §257.93 and are used to develop site-specific background concentrations for Appendix III and Appendix IV constituents. Reports prepared by ATC, including statical evaluations, are available at the publicly available CCR website for EVGS.

Based on statistical evaluation of detection monitoring results, SSIs above background concentrations for Appendix III constituent concentrations were determined to have occurred in CCR monitoring wells downgradient of the Ash Pond System, indicating the possibility of leaching of CCR constituents from the Ash Pond System to groundwater. The detection monitoring program transitioned to an assessment monitoring program in 2018 after no alternative source was identified for the SSI constituents.

2.4 ASSESSMENT MONITORING

Assessment monitoring events per 40 CFR §257.95 began in May 2018. Samples were analyzed for the Appendix III and Appendix IV constituents as required by 40 CFR §257.95(b) and 40 CFR §257.95(d)(1). Concurrent with the second assessment monitoring event in September 2018, and as required by 40 CFR §257.95(h), GWPSs were established for detected Appendix IV constituents, and it was determined that arsenic, lithium, and molybdenum were present in groundwater at SSLs above the GWPS in certain wells described previously in Section 2.1. Notice of the GWPS exceedances for Ponds A, B, and C was placed on the EVGS publicly available CCR website on 14 January 2019.

The CCR Rule groundwater monitoring system was updated in November 2021 to incorporate monitoring wells MW-13S, MW-13I, and MW-13D as background monitoring wells, and to reclassify the seven initial background monitoring wells as CCR monitoring wells. GWPSs for Appendix IV constituents have been established as the MCL or alternative GWPS (for cobalt, lead, lithium, and molybdenum) for each constituent because those values are greater than current background concentrations.

Assessment monitoring has occurred semiannually in May and November since May 2018. A prediction interval statistical analysis performed on results from each of the semiannual assessment monitoring events per 40 CFR §257.90(b) has determined that arsenic, lithium, and molybdenum continue to be present in groundwater at CCR monitoring wells at SSLs above the GWPS.

2.5 NATURE AND EXTENT INVESTIGATION

After the January 2019 notice of GWPS exceedances was posted, an N&E investigation began to further determine the N&E of Appendix IV constituent concentrations greater than GWPSs.

The N&E investigation was initiated in 2019 by installing N&E monitoring wells to further delineate the area of affected groundwater, primarily south and/or west of the Ash Pond System as shown on **Figure 5A**. Based on analytical results collected from these wells, additional monitoring wells were installed offsite to the south of the Ash Pond System in 2021 and 2022 and onsite to the west of the Ash Pond System in 2023. 44 N&E monitoring wells have been installed for the purpose of further delineating the horizontal and vertical extent of Appendix IV constituent concentrations greater than GWPSs downgradient from the Ash Pond System (**Figure 5A**) and include:

- MW-10I and MW-10D – installed in 2019 to delineate the vertical extent of constituent concentrations at the MW-10 cluster along the southeastern Ash Pond System boundary;
- MW-14S/I/D, MW-15S/I/D, and MW-16S/I/D – installed on-Site in 2019 to delineate the horizontal extent of constituent concentrations south and west of the Ash Pond System;
- MW-17S/I/D, MW-18S/I/D, MW-19S/I/D, MW-20S/I/D, MW-21S/I/D, MW-22S/I/D, and MW-23S/I/D – installed off-Site in 2021 and 2022 to further delineate the horizontal extent of constituent concentrations south of the Site based on concentrations greater than GWPSs in N&E well clusters MW-14 and MW-15;
- MW-3D – installed in 2023 to delineate the vertical extent of constituent concentrations at the MW-3 cluster along the northwestern Ash Pond System boundary;
- MW-12I and MW-12D – installed in 2023 to delineate the vertical extent of constituent concentrations at the MW-12 cluster along the southern Ash Pond System boundary;
- MW-24S/I/D and MW-25S/I/D – installed on-Site in 2023 to further delineate the horizontal extent of constituent concentrations west of the Ash Pond System based on concentrations greater than GWPSs in N&E well cluster MW-16; and
- MW-26S/I/D – installed in 2023 to further delineate the horizontal extent of constituent concentrations along the southeastern Ash Pond System boundary.

A summary of N&E monitoring is provided in the in-text **Table 2.5-1** below. In 2023, the N&E of Appendix IV constituents at SSLs above GWPS was deemed sufficiently characterized to proceed with an accurate assessment of corrective measures in support of final remedy selection required by the CCR Rule. The extent of affected groundwater determined from the N&E investigation is further described in Section 4.

Table 2.5-1: Nature and Extent Monitoring Summary

Sampling Event Date	Wells Sampled
August 2019	Newly installed wells MW-10I and 10D, and clusters MW-13 to MW-16
September 2019	MW-13 to MW-16 clusters
May 2020	MW-13 to MW-16 clusters (during comprehensive semiannual CCR Rule assessment monitoring event)
November 2020	MW-13 to MW-16 clusters (during comprehensive semiannual CCR Rule assessment monitoring event)
February and March 2021	Background well cluster MW-13
April 2021	Newly installed wells clusters MW-17 to MW-19

Table 2.5-1: Nature and Extent Monitoring Summary	
Sampling Event Date	**Wells Sampled**
May 2021	MW-13 to MW-19 clusters (during comprehensive semiannual CCR Rule assessment monitoring event)
June 2021	Background well cluster MW-13
July 2021	Background well cluster MW-13 and wells clusters MW-17 to MW-19
August 2021	Wells clusters MW-17 to MW-19
November 2021	MW-13 to MW-19 clusters (during comprehensive semiannual CCR Rule assessment monitoring event)
May 2022	MW-13 to MW-19 clusters and newly installed well clusters MW-20 and MW-22 (during comprehensive semiannual CCR Rule assessment monitoring event)
August and September 2022	MW-20 and MW-22 well clusters and newly installed well clusters MW-21 and MW-23
November 2022	MW-13 to MW-19 clusters (during comprehensive semiannual CCR Rule assessment monitoring event)
December 2022	Well clusters MW-20 to MW-23
March 2023	Newly installed wells MW-12I and MW-12D and newly installed well clusters MW-24 to MW-26
April and May 2023	MW-13 to MW-26 clusters, MW-12I, MW-12D, and newly installed MW-3D (during comprehensive semiannual CCR Rule assessment monitoring event)
July 2023	MW-12I, MW-12D and well clusters MW-24 to MW-26

3. Results

Site investigation activities were completed to sufficiently characterize the N&E of groundwater affected by the Ash Pond System and identify any relevant Site conditions that may affect the remedy ultimately selected, per 40 CFR §257.95(g)(1). Additionally, information from these activities will be used as described in 40 CFR §257.97(d)(5) when considering selection of remedy, in particular the N&E of affected groundwater, potential risks to human health and the environment, current and future aquifer use, proximity and withdrawal rates of adjacent groundwater users, groundwater quantity and quality, and the hydrogeologic characteristics near the Site. Site investigation results are summarized in the following sections.

3.1 GROUNDWATER

3.1.1 Groundwater Flow

Site-wide groundwater level gauging events occur as part of each of the semiannual groundwater monitoring events. Groundwater level measurements are recorded from all monitoring wells during a contemporaneous 24-hour gauging period, as described in the Revised Groundwater Sampling and Analysis Plan (ATC, 2022), and prior to the start of monitoring well sampling. Monitoring well construction details are summarized in **Table 1**. Recorded water level measurements are provided in annual groundwater monitoring and corrective action reports required by the CCR Rule.[1] Groundwater flow characteristics present at the Site are summarized below.

3.1.1.1 Groundwater Elevation and Flow Direction

Groundwater elevation and flow direction at the EVGS is influenced by production well operation (pumping), seasonal variation in rainfall, and White River stage fluctuations.

The production wells influence groundwater flow across the Site. Operation of the production wells, screened in the alluvial aquifer, began in April 2018. The production wells operate (pump) continuously except for annually scheduled temporary CCGT plant shut-down periods. These plant shut-down periods are generally brief, except for an extended shut-down period from April 2021 to March 2022. During periods of CCGT plant shut-down, the production wells typically operate at a significantly reduced capacity (generally at 5 percent of capacity or less). When operating at capacity, the groundwater average annual withdrawal is approximately 2,500 gpm. The production wells are shown on **Figure 2**.

The influence of operation (pumping) of the production wells on surrounding groundwater was evaluated by comparing groundwater level data during typical operation of the production wells to groundwater level data during temporary periods of significantly reduced production well operation:

- To evaluate groundwater flow conditions during temporary periods of significantly reduced groundwater pumping, data from a water level gauging event completed in January 2022 were evaluated (**Figure 6A**). The January 2022 gauging event occurred during the extended period of significantly reduced production well pumping from April 2021 to March 2022. **Figure 6A** depicts

[1] Water level information is provided in annual groundwater monitoring and corrective action reports required by the CCR Rule, which are posted on the publicly available website for EVGS: https://www.aesindiana.com/eagle-valley-generating-station.

shallow groundwater elevations and groundwater flow direction based on the data collected during the January 2022 gauging event when the CCGT was offline. Data from this gauging event indicate that during this period of significantly reduced production well pumping[2], groundwater flows toward the west and away from the production wells. Based on this finding, it is anticipated groundwater would also flow toward the west and away from the production wells if the production wells do not operate.

- To evaluate typical Site groundwater flow conditions (influenced by production well pumping), data from water level gauging events completed in November 2022 and April 2023 were evaluated (**Figure 6B** through **Figure 6G**). These gauging events occurred when the production wells were pumping during normal Site operations. Groundwater levels from these two events are lower than those recorded during the January 2022 (reduced operation) event (**Figure 6A**). The lower groundwater levels recorded during periods of normal production well operation indicate that the production wells lower local groundwater levels. Data from the November 2022 and April 2023 events also show a groundwater flow direction reversal as compared to data from the January 2022 (non-operation) event, with groundwater near the Ash Pond System being captured by the production wells. Further evaluation of the data also indicates that a groundwater flow direction divide exists near the western boundary of the Ash Pond System in the shallow, intermediate, and deep zones. The groundwater flow direction divide (as shown on **Figure 6B** through **Figure 6G**) is an inferred groundwater elevation high at the limit of influence of the production wells, where the water to the east of the divide flows toward the production wells and the groundwater west of the divide flows toward the White River.

Also, based on the data collected during the November 2022 and April 2023 events (depicted in **Figures 6B** through **6G)**, the highest groundwater elevation levels tend to occur in the spring (with generally higher precipitation and associated groundwater recharge) and lowest groundwater elevation levels are generally observed in the fall (with generally lower precipitation and associated groundwater recharge). As a result, influence from production well pumping also varies seasonally, with the inferred groundwater flow direction divide and pumping influence extending farther west during the lower precipitation period in the fall than during the higher precipitation period in the spring. Hydrographs for each flow zone show the seasonal variation and overall lower groundwater elevation after production well operation resumed to normal conditions in 2022 (**Appendix A**).

3.1.1.2 Hydraulic Gradients

Hydraulic gradients are calculated based on differences in groundwater elevations among monitoring wells screened in the same flow zone but laterally separated along the groundwater flow zone (horizontal hydraulic gradient) or among wells located within the same well cluster but screened at different depths (to determine vertical hydraulic gradients). Horizontal hydraulic gradients provide a general understanding of the magnitude of lateral (downgradient) groundwater flow. Vertical hydraulic gradients provide a general understanding of the magnitude and direction (upward or downward) of vertical groundwater flow. Together, these calculations support understanding of the magnitude and direction of groundwater flow at a site.

Horizontal hydraulic gradients for EVGS were calculated using data collected during the November 2022 and April 2023 groundwater gauging events at select locations for the shallow, intermediate, and deep

[2] From April 2021 to March 2022, while the CCGT was offline, the production wells continued to pump at a low rate estimated at approximately 5% of that during normal Site operations.

zones (see **Table 2A** and **Table 2B)**. The calculated gradients are relatively flat for each zone and consistent among the three zones. The geometric means of the horizontal hydraulic gradients for each zone are summarized in the in-text **Table 3.1.1-1** below.

Table 3.1.1-1: Geometric Mean of Horizontal Hydraulic Gradients		
Zone	**November 2022**	**April 2023**
Shallow	0.0016 ft/ft	0.0011 ft/ft
Intermediate	0.0013 ft/ft	0.0009 ft/ft
Deep	0.0018 ft/ft	0.0006 ft/ft
Notes: *ft/ft = feet per feet*		

Vertical gradients were calculated between shallow and intermediate zone wells and between intermediate and deep zone wells. The shallow, intermediate, and deep zones are hydraulically connected, as no continuous confining zone was identified, and water level information indicates a vertically connected groundwater flow system. Vertical gradients across the Site are relatively flat, indicating horizontal flow is the predominant flow vector at the Site. Vertical gradients are presented on **Table 3A** and **Table 3B**. They are summarized in the in-text **Table 3.1.1-2** below.

Table 3.1.1-2: Summary of Vertical Hydraulic Gradients		
Calculated Vertical Gradients	**November 2022**	**April 2023**
Average	0.0009↓	0.00005↑
Maximum Upward	0.0097↑	0.0104↑
Maximum Downward	0.0150↓	0.0210↓

3.1.1.3 Hydraulic Conductivity

Hydraulic conductivity is calculated based on in-field slug testing of subsurface material to determine the relative ease with which water can flow through the material. Slug tests are performed by rapidly changing the water level within a monitoring well and measuring the rate of response to the water level change in order to calculate hydraulic conductivity. Whereas hydraulic gradients provide a general understanding of existing horizontal and vertical groundwater flow conditions at a site, hydraulic conductivity provides a general understanding of the ability of water to flow through a soil or rock matrix and can be particularly helpful in understanding the potential for an aquifer solid to allow or restrict groundwater flow under differing conditions.

Horizontal hydraulic conductivity data for the Site's shallow, intermediate, and deep zones was derived from slug tests completed by Weaver Consulting Group in 2016, ATC in 2018 through 2022, and Haley & Aldrich in 2023. This data is presented in **Table 4**. Overall, the horizontal hydraulic conductivity exhibits a decreasing trend with depth based on the geometric means of the results, indicating reduced groundwater flow velocity with depth. Slug test results are included in **Appendix B**.

The mean, minimum, and maximum hydraulic conductivity values for the Site's shallow, intermediate, and deep zones are presented in the in-text **Table 3.1.1-3** below.

Table 3.1.1-3: Hydraulic Conductivity Based on Slug Testing			
Zone	**Geometric Mean (ft/day)**	**Minimum (ft/day)**	**Maximum (ft/day)**
Shallow	107	0.9 (MW-4S)	2,806 (MW-10S)
Intermediate	72	21 (MW-16I)	225 (MW-25I)
Deep	56	1.2 (MW-4D)	317 (MW-1D)
Notes: *ft/day = feet per day*			

The Horizontal hydraulic conductivity of a discrete zone of the localized bedrock was estimated from a series of packer tests completed by Atlas in 2023 in bedrock borings completed adjacent to monitoring wells MW-3D, MW-12D and MW-26D. Packer tests were performed by pumping water from an isolated shale bedrock zone within the borehole and measuring the rate of response of the water level over time (**Appendix C**). Hydraulic conductivity results for the shale bedrock packer testing ranged from 0.0001 to 0.0005 feet per day, which is substantially lower than for the shallow, intermediate, and deep zones. The relative difference between hydraulic conductivity values for the shallow, intermediate, and deep zones (as presented in in-text **Table 3.1.1-3**) compared to the shale bedrock (i.e., hydraulic conductivity is over 100,000 times greater in the shallow, intermediate, and deep zones than in shale bedrock) indicates that the potential for downward vertical groundwater flow and constituent migration into the bedrock is limited (i.e., the shale bedrock is a confining layer). These results also support the conclusions that groundwater flow is predominately horizontal and that the potential for affected groundwater is limited to the shallow, intermediate, and deep zones above bedrock.

Rock cores from borings MW-3D (116.5 to 117.2 feet bgs), MW-12D (109.2 to 109.8 feet bgs), and MW-26D (113 to 113.8 feet bgs) were also submitted for laboratory vertical hydraulic conductivity testing by ASTM International D5084 Method C. The resulting vertical hydraulic conductivity, representative of the underlying shale bedrock at the Site, ranged from 5.7×10^{-4} to 5.7×10^{-6} feet per day. These results are generally similar to or up to 100 times less permeable than the localized bedrock hydraulic conductivities determined by packer tests in the same monitoring wells. The vertical hydraulic conductivity laboratory analytical reports are provided in **Appendix D**.

Pumping tests are performed to determine the radius of influence and pumping capacity of a pumping well by pumping the well at a constant rate and measuring the change in water levels in surrounding monitoring wells. In order to evaluate the production well pumping radius of influence and evaluate aquifer parameter estimates (transmissivity and hydraulic conductivity), a 48-hour pumping test was completed in September 2021 utilizing Production Well 5. Results from the pumping test indicated an approximate 1,250-foot radius of influence for the production wells. Estimated aquifer parameters from the pumping test are summarized in in-text **Table 3.1.1-4** below. Pumping test data are included in **Appendix E**.

Table 3.1.1-4: Hydraulic Conductivity Based on Pumping Test from Production Well 5	
Method	**Geometric Mean (ft/day)**
Theis	680
Cooper-Jacob	709
Distance drawdown	726
Notes: *ft/day = feet per day*	

3.1.1.4 Seepage Velocity

Seepage velocities are determined based on a calculation that considers various aquifer property measurements (i.e., hydraulic conductivity, effective porosity, the change in groundwater elevations between two points along a flow path, and the horizontal distance between those points). Seepage velocities are helpful in determining the rate of groundwater flow within the pore spaces of an aquifer from one point to another.

Seepage velocity calculations for EVGS using data from November 2022 and April 2023 are presented in **Table 3A** and **Table 3B**, respectively. Seepage velocities are also shown on the flow maps included in **Figure 6B** through **Figure 6G**. The relatively consistent hydraulic gradients and hydraulic conductivity values that generally decrease with depth result in lower calculated seepage velocities in the intermediate and deep zones than in the shallow zone (in-text **Table 3.1.1-5**).

Table 3.1.1-5: Geometric Mean of Seepage Velocities		
Zone	**November 2022**	**April 2023**
Shallow	599 ft/yr	381 ft/yr
Intermediate	81 ft/yr	82 ft/yr
Deep	80 ft/yr	74 ft/yr
Notes: *ft/yr = feet per year*		

The greatest seepage velocities occur in the shallow zone where groundwater is captured by production well pumping. Seepage velocities calculated from monitoring wells MW-7S to MW-10S/I/D (located along the boundary of Former Ponds D and E) provide an indication of groundwater flow velocity from the Ash Pond System toward the production wells and range from 6,361 feet per year (November 2022) to 3,434 feet per year (April 2023). Flow velocities measured from piezometers DP-2 and GP-1 to GP-6 (located northwest of the Ash Pond System near the White River) provide an indication of groundwater flow velocity from near the White River toward the Ash Pond System and range from 2,714 feet per year (November 2022) to a no flow condition (April 2023). These results indicate that the influence of the production wells encompasses the Ash Pond System and that groundwater velocities are greatest near Former Ponds D and E and the production wells.

3.1.2 Analytical Results

As described in Section 2.3, the analytical results from the detection monitoring events completed in 2016 and 2017 were compared to background (unaffected by the Ash Pond System) concentrations. This comparison used statistical evaluations to determine whether SSIs of Appendix III constituents above background concentrations in groundwater had occurred. This evaluation was completed in January

2018 and identified SSIs of certain Appendix III constituents in certain CCR monitoring wells located along the perimeter of the Ash Pond System relative to concentrations observed in background monitoring wells. After detection monitoring identified Appendix III SSIs and assessment monitoring identified Appendix IV SSLs in certain CCR monitoring wells located along the perimeter of the Ash Pond System, an N&E investigation began in 2019.

Historical groundwater monitoring results for the CCR Rule Appendix III and Appendix IV constituents, including Appendix III SSIs and Appendix IV SSLs can be found in the Site's annual groundwater monitoring and corrective action reports located at the EVGS publicly available CCR website.

Appendix IV to 40 CFR §257 lists 15 constituents for assessment monitoring. Eight of those constituents have been detected at concentrations greater than the GWPS. Statistical analysis determined that three constituents are present at SSLs including:

- Arsenic;
- Lithium; and
- Molybdenum.

To further evaluate if constituent concentrations in groundwater are related to CCR leaching from the Ash Pond System, an additional statistical evaluation called bivariate analysis of cooccurring constituents was completed. This analysis assists with the identification of a potential empirical relationship between two constituents. In this case, the analysis was completed to determine if a relationship exists between Appendix III constituent boron (a primary indicator of CCR leaching to groundwater from the Ash Pond System) and Appendix IV constituents with SSLs above GWPSs. Results from this analysis indicate:

- A generally positive relationship exists between boron and Appendix IV constituents arsenic, lithium, and molybdenum (**Figure 7A**). These results indicate a likely contribution of those constituents to groundwater from the Ash Pond System.
- No clear relationship is generally evident between boron and the other five Appendix IV constituents for which an exceedance of its GWPS but without an SSL have been historically identified (antimony, cobalt, lead, selenium, and radium) (**Figure 7B**). These results indicate that the presence of those constituents in groundwater is likely not related to the Ash Pond System.

In-text **Table 3.1.2-1** below summarizes constituents exceeding the applicable GWPSs, SSLs, and maximum concentrations.

Table 3.1.2-1: Summary of Constituent Concentrations Greater than the GWPS						
Constituent	**GWPS**	**# Detections >GWPS 2016-May 2023**	**SSL?**	**Historical Maximum Concentration (µg/L[1]) & Well ID**	**Nov/Dec 2022 Maximum Concentration (µg/L[1]) & Well ID**	**April/May 2023 Maximum Concentration (µg/L[1]) & Well ID**
Antimony	6 µg/L	2	No	6.3 (MW-11S & 1S)	2.7 (MW-1S)	2.9 (MW-7S)
Arsenic	**10 µg/L**	**41**	**Yes**	**146 (MW-11S)**	**49.2 (MW-11S)**	**59.8 (MW-11S)**
Boron	-	-	No	13,300 (MW-12S)	13,300 (MW-12S)	7,300 (MW-15I)
Cobalt	6 µg/L	3	No	20.1 (MW-19S)	NA	4.1 (MW-20D)
Lead	15 µg/L	3	No	35.1 (MW-11D)	NA	4.3 (MW-20D)
Lithium	**40 µg/L**	**415**	**Yes**	**170 (MW-7S)**	**142 (MW-11S)**	**109 (MW-12I)**
Molybdenum	**100 µg/L**	**237**	**Yes**	**432 (MW-15I)**	**361 (MW-15I)**	**360 (MW-15I)**
Selenium	50 µg/L	1	No	97.6 (MW-2S)	32.4 (MW-12S)	36.4 (MW-6S)
Radium (total)	5 pCi/L	1	No	7.11 (MW-11D)	1.89 (MW-1I)	2.35 (MW-15I)

Notes:
[1] – Concentrations are in µg/L for each constituent except for total radium, which is in pCi/L
Bold indicates an SSL has been identified for that constituent.
Historical dataset includes data from 2016 to May 2023.
Duplicate concentrations are excluded.
µg/L: Micrograms per liter
NA: Not Analyzed
pCi/L: picocuries per liter

3.1.3 Water Type Analysis

Geochemical signatures can be used to evaluate groundwater recharge sources, discharge zones, and other inputs to constituent concentrations in groundwater, which assist in confirming the N&E of affected groundwater. Distinct geochemical signatures identified via water type analysis at the EVGS include unaffected groundwater upgradient of the Ash Pond System, affected groundwater at the Ash Pond System, and White River surface water. Each water type may have a distinct geochemical signature that can be useful in understanding groundwater flow paths and mixing zones. Geochemical characteristics of each water type are as follows:

- Background groundwater (groundwater that has not been affected by the Ash Pond System) is monitored at the MW-13 well cluster. Analysis of major ions measured in groundwater at this location indicates shallow, intermediate, and deep groundwater is considered a calcium bicarbonate water type.
- White River surface water samples collected as part of the White River Mainstem Project from approximately 6.5 miles downriver of the Site provide an approximation of the river's geochemical signature, and plot as a calcium magnesium bicarbonate water type.
- Groundwater affected by the Ash Pond System is generally represented as a calcium sulfate water type and likely represents a mixture with calcium bicarbonate background water or river water.

Piper plots, which are graphical representations of the geochemistry of a water sample, were also used to better understand water chemistry and the origin of dissolved constituents in water. Piper plots were created for the shallow, intermediate, and deep zones and are included as **Figures 8A** through **8C**. The plots further divide shallow, intermediate, and deep monitoring wells based on proximity to the Ash Pond System boundary, with inner wells located less than 500 feet from the pond boundary and outer wells located at distances greater than 500 feet from the Ash Pond System boundary. Evaluation of these Piper plots indicate that groundwater affected by the Ash Pond System mixes with deeper groundwater with increasing distance from the Ash Pond System. Observations from these plots include:

- In the shallow zone, groundwater with a signature similar to water affected by the Ash Pond System (calcium-sulfate water type) is limited to areas near the Ash Pond System boundary.
- In the intermediate zone, mixing is observed where analytical results from monitoring wells farther downgradient (MW-14I and MW-19I) exhibit a signature similar to water affected by the Ash Pond System.
- In the deep zone, results from monitoring well MW-21D indicate the furthest downgradient potential influence from groundwater affected by the Ash Pond System. Monitoring wells MW-20D, MW-22D, and MW-23D indicate groundwater with signature similar to that of background monitoring wells or not affected by the Ash Pond System.

Piper plots were also used to evaluate shifts in water type over time at single locations to demonstrate how changing Site conditions can influence groundwater flow and constituent migration. The Piper plots in **Figures 8D and 8E** depict analytical results collected from 2017 through 2023 from shallow zone monitoring wells MW-9S and MW-4S, respectively, located north of the Ash Pond System. Both Piper plots show a water type similar to the White River before production well pumping began in 2018 and during non-pumping conditions. Data analysis indicated that sustained pumping changed the groundwater flow gradient, resulting in a water type shift that is similar to water affected by the Ash Pond System.

3.1.4 Trend Analysis

A temporal trend analysis is a type of statistical evaluation conducted to visualize the behavior of a variable over time. For this Site, the trends were evaluated using Mann-Kendall and Sen's Slope statistics for constituents exhibiting SSLs over GWPSs (arsenic, lithium, and molybdenum). Results of the temporal trend analysis conducted indicate that concentrations of these constituents in the area of affected groundwater are generally stable with decreasing trends observed at numerous locations. Time-series plots and statistical output results are included in **Appendix A** and are summarized in the in-text **Table 3.1.4-1** below.

Table 3.1.4-1: Temporal Trend Summary by Constituent

Temporal Trend	Arsenic	Lithium	Molybdenum
Decreasing	6	10	10
Probably decreasing	1	2	0
Stable	24	19	34
Probably increasing	1	0	0
Increasing	1	0	2
No trend	17	13	18

Note:
Excludes monitoring wells that have an insufficient number of sampling events to evaluate a trend (wells MW-3D, MW-12I, MW-12D, and well clusters MW-24 through MW-26).

As previously indicated, most trends indicate a stable to decreasing plume. Limited increasing trends were identified at:

- MW-17D – arsenic (**Figure A-43**)
- MW-22D – arsenic (**Figure A-58**)
- MW-15I – molybdenum (**Figure A-178**)
- MW-15D – molybdenum (**Figure A-179**)

Increasing trends identified for arsenic in off-Site N&E monitoring wells MW-17D and MW-22D do not appear to be representative of increasing plume mass or an expanded plume geometry. This conclusion is made because nearly all arsenic concentrations from these wells are less than the GWPS, analytical results indicate arsenic migration from the Ash Pond System is limited, and arsenic migration does not extend off-Site to the areas of the MW-17 and MW-22 well clusters (**Figure 9**). Only one of out of the eight groundwater samples collected from monitoring well MW-17D recorded a slight exceedance of the 10 µg/L GWPS (10.8 µg/L in November 2022), with the most recent result being below the GWPS. All arsenic concentrations from monitoring well MW-22D are less than the GWPS, and Appendix III indicator constituent boron has remained consistently below the background concentrations at the MW-22 well cluster, indicating MW-22D is likely unaffected by the Ash Pond System. Furthermore, arsenic in upgradient MW-18 and MW-19 well clusters are consistently below the GWPS, and lithium and molybdenum SSLs (not arsenic SSLs) were the driver for installing MW-17 and MW-22 well clusters farther southwest. Groundwater analytical results are provided in annual groundwater monitoring and corrective action reports required by the CCR Rule.[3]

Molybdenum concentrations within the intermediate and deep zones of the MW-15 well cluster, located south of Pond A, appear to be influenced by operation of the production wells. Increasing molybdenum trends in MW-15I and MW-15D appear to indicate the mobilization of molybdenum mass from the area of greatest molybdenum concentrations within the affected groundwater plume toward MW-15. Groundwater monitoring data prior to operation of the production wells is not available; however, concentrations of molybdenum within the intermediate zone in this area decreased when production wells pumping was reduced between April 2021 and March 2022, and increased once production wells operation resumed.

Similarly, lithium and molybdenum concentration trends in monitoring wells along the northern boundary of the Ash Pond System [MW-4S (**Figures A-80 and A-151**), MW-8S (**Figures A-87 and A-158**), and MW-9S (**Figures A-88 and A-159**), respectively] indicate those monitoring wells appear to be influenced by operation of the production wells (**Appendix A**)**.** Trend graphs show concentrations for lithium and molybdenum in the monitoring wells were greater during the period of 2019 to 2021, after production well operation began, than before 2019. Trend graphs also show concentrations for lithium and molybdenum in the monitoring wells were lower during the period of April 2021 to March 2022, corresponding to the period of reduced production well pumping. These temporal analytical trends are consistent with variations in the water signature during a change in pumping conditions from the analysis in the Piper plots (**Figures 8D and 8E**).

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[3] Groundwater analytical results are provided in annual groundwater monitoring and corrective action reports required by the CCR Rule, which are posted on the publicly available website for EVGS: https://www.aesindiana.com/eagle-valley-generating-station.

Spatial trends indicate reducing constituent concentrations along groundwater flow paths downgradient of the Ash Pond System (**Figure 10**). Spatial trend observations include:

- Arsenic concentrations decrease rapidly over a short distance (less than 200 feet) from the Ash Pond System. This is consistent with the relatively high affinity for arsenic to adsorb to aquifer solids, thereby reducing its mobility (USEPA, 2007).
- Molybdenum concentrations decrease over a moderate distance from the Ash Pond System, with concentrations below the GWPS approximately 1,800 feet from the Ash Pond System boundary.
- Lithium concentrations decrease to less than the GWPS over the longest distance compared to arsenic or molybdenum. Concentrations are reduced to less than the GWPS approximately 3,000 feet from the Ash Pond System boundary.

These three constituents demonstrate a spectrum of reactivity (mobility) with arsenic representing the most reactive (least mobile) constituent, followed by molybdenum and lithium (most mobile). Geochemical processes can reduce arsenic concentrations over a short distance. Physical processes, such as dilution and dispersion, are likely the primary mechanisms of lithium attenuation. Molybdenum is likely attenuated by a combination of physical and geochemical processes.

3.2 SOIL

In February and March of 2023, soil samples were collected from the borings for monitoring wells MW-3D, MW-12I, MW-12D, and well clusters MW-25 to MW-26. One sample of saturated soil was collected from each boring within the screen interval depth. Soil sample results were compared to groundwater analytical results to evaluate potential relationships between aqueous and solid phase concentrations. No relationships are apparent for arsenic, lithium, or molybdenum (**Figure 11**). Soil analytical results are presented on **Table 5**.

Soil data will be further evaluated as part of a Site-specific geochemical evaluation completed subsequent to this N&E Report. The geochemical evaluation will further document geochemical conditions influencing transport of arsenic, lithium, and molybdenum in groundwater and support evaluation of potential in-situ treatment approaches as part of the remedy selection process.

4. Extent of Affected Groundwater

The spatial distribution of groundwater analytical results was reviewed to evaluate the extent of affected groundwater and whether horizontal and vertical delineation is complete. Findings regarding the horizontal and vertical extents are discussed below.

4.1 HORIZONTAL EXTENT

Maps showing concentration distribution for arsenic, molybdenum, and lithium for the April and May 2023 sampling events are included on **Figure 9** and **Figures 12A** through **Figure 13C**. Figures were not prepared for flow zones where the constituent was not detected greater than the GWPS.

Elevated concentrations of arsenic occur at isolated locations and do not exhibit a typical plume geometry that is consistent with groundwater flow. Arsenic is detected at the greatest concentration in monitoring well MW-11S, with relatively consistent detections greater than the GWPS in monitoring well MW-2S. As noted in Section 3.1.4 above, only one arsenic result from eight groundwater samples collected from monitoring well MW-17D exceeded the GWPS of 10 µg /L, with the most recent result less than the GWPS. Arsenic concentration in monitoring well MW-11S appears to be stable based on Mann-Kendall statistical evaluation.

Maximum concentrations of lithium and molybdenum have been detected near the southern boundary of the Ash Pond System (in monitoring wells MW-11S, MW-12S, and MW-15I) and extend offsite to the south. Delineation of the lithium and molybdenum plumes is complete based on the presence of monitoring wells with concentrations below the GWPS and/or based on groundwater flow direction, although the western extent near monitoring well MW-25 will continue to be evaluated. Based on concentration versus distance plots presented on **Figure 10**, concentrations greater than a GWPS would not be expected beyond 3,000 feet from the Ash Pond System boundary.

4.1.1 North

Delineation of lithium and molybdenum has been achieved to the north by monitoring well clusters MW-4 and MW-8, along the northern boundary of the Ash Pond System (**Figure 12A** through **Figure 13C**). During active production well pumping, the groundwater in the vicinity of the monitoring wells flows primarily toward the Ash Pond System and production wells.

4.1.2 South

As shown on the concentration maps (**Figure 12A** through **Figure 13C**) lithium and molybdenum groundwater plumes are delineated to the south by monitoring well clusters MW-20 to MW-23, which have not exhibited concentrations greater than a GWPS.

4.1.3 East

Groundwater to the east is upgradient of the Ash Pond System regardless of production well operation status, and the eastern extents of lithium and molybdenum concentrations above GWPSs are delineated by monitoring well clusters MW-9, MW-13, and MW-20 (**Figure 12A** through **Figure 13C**).

4.1.4 West

Monitoring well clusters MW-3 and MW-24 delineate the northwestern extent of affected groundwater (**Figure 12A** through **Figure 13C**). To the southwest, the MW-17 well cluster serves as a delineation well for molybdenum and lithium in the shallow and intermediate zone. For lithium in the deep zone, monitoring well MW-17D defines the western extent with concentrations very close to the GWPS (within 1.7 µg/L in April 2023 and within 12 µg/L historically). Molybdenum and lithium concentrations in groundwater near the MW-25 well cluster west of the Ash Pond System are greater than the GWPS but are less than two times the GWPS. Trend analysis for the MW-25 well cluster can be completed once a statistically significant data set has been established. Access to install additional monitoring wells west of MW-25 was not granted. The MW-25 well cluster is located near the property boundary and near the White River, which acts as a hydraulic boundary. Concentrations in the MW-25 well cluster will continue to be monitored and evaluated following subsequent sampling events.

4.2 VERTICAL EXTENT

Arsenic, lithium, and molybdenum have been detected above their GWPS in the shallow, intermediate, and deep zones. In November/December 2022, the highest lithium and arsenic concentrations were detected in the shallow zone, while the highest molybdenum concentrations were detected in the intermediate zone.

The extent of affected groundwater is bound vertically by the underlying shale bedrock, which is laterally continuous and competent across the complete Site monitoring well network area, as illustrated on **Figures 4A** through **4C**. The United States Geological Survey defines a no-flow boundary as one in which groundwater flow does not cross the boundary (Heath, 1983). Such boundaries exist where aquifers terminate against less permeable materials, such as a sand aquifer adjacent to clay beds or shale bedrock. The same publication (Heath, 1983) provides hydraulic conductivity values for these materials that have an approximate difference of three orders of magnitude or more. Accordingly, since more than three orders of magnitude difference in hydraulic conductivity is observed in the Site overlying alluvium (geometric mean of 56 feet per day in the deep zone) compared to the vertical hydraulic conductivity of the bedrock (5.7×10^{-4} to 5.7×10^{-6} feet per day), the shale bedrock represents a no-flow boundary defining the bottom of the plume (**Table 4**). The shale bedrock is the confining layer that restricts downward vertical groundwater flow and constituent migration into the bedrock formation.

5. Summary of N&E Results

At EVGS, an evaluation of the N&E of impacted groundwater has been completed using a combination of knowledge of historical Site operations (Section 1), published information relevant to Site geologic and hydrogeologic conditions (Section 1), and data and conclusions from Site investigations (Section 2 through Section 4). The results of this N&E evaluation indicate:

- The Ash Pond System has been identified as the source of arsenic, lithium, and molybdenum SSLs above GWPSs detected in groundwater near the Ash Pond System.
- The uppermost aquifer at the Site is comprised of alluvial sand and gravel deposits on top of relatively impermeable shale bedrock. Hydraulic conductivity tends to decrease with depth, with greater groundwater flow rates generally recorded in the shallow zone than in the intermediate or deep zones. The underlying bedrock constitutes an aquitard (or confining unit), which restricts downward constituent migration in groundwater.
- Groundwater near the Ash Pond System naturally flows west toward the adjacent White River. However, three production wells located east of the Ash Pond System influence groundwater flow across the Site, creating an inward hydraulic gradient as shown on **Figure 6B** through **Figure 6G**. The inward hydraulic gradient shows some variability and can change based on seasonal effects and operating requirements of the production wells, influencing the flow of groundwater beneath the Ash Pond System.
- Production well pumping influences the relatively lower conductivity deep zone less than the relatively higher conductivity shallow zone. This factor, combined with the Ash Pond System storing CCR with the potential to leach to groundwater since 1949, results in generally greater constituent concentrations at depth and at farther distances from the Ash Pond System boundary.
- Evaluation of the N&E investigation results identified predominately stable and decreasing constituent concentrations in impacted groundwater.
- The horizontal extent of affected groundwater covers approximately 360 acres, which encompasses the Ash Pond System and extends to the west and southwest. The vertical extent of affected groundwater is limited by relatively impermeable shale bedrock, approximately 90 feet bgs.
- Groundwater pumping by production wells that support plant operations provides ongoing management for about 65 percent of the area of affected groundwater (**Figure 14**).
- Affected groundwater was identified offsite and beyond the influence of pumping by the production wells. That area encompasses approximately 100 acres (**Figure 14**).

In conclusion, the N&E of CCR affected groundwater has been sufficiently characterized to proceed with a review of the previous CMA and perform updates to the CMA, as appropriate.

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TABLES

TABLE 1
MONITORING WELL CONSTRUCTION DETAILS
EAGLE VALLEY GENERATING STATION
4040 BLUE BLUFF ROAD
MARTINSVILLE, INDIANA

Type of Well	Well ID	Date Installed	Casing Diameter (inches)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Well Depth (ft bgs)	Top of Casing Elevation (ft MSL)	Northing	Easting
Monitoring Wells									
CCR Monitoring	MW-1S	09/30/15	2	19.2	29.2	31.2	612.93	1542237.40	3136989.80
	MW-1I	03/01/16	2	45.4	55.4	57.4	612.31	1542248.00	3136987.20
	MW-1D	09/30/15	2	72.7	82.7	84.7	612.91	1542245.30	3136997.20
	MW-2S	09/28/15	2	15.3	25.3	27.3	608.45	1542898.00	3137256.00
	MW-2I	03/07/16	2	41.8	51.8	53.8	608.93	1542893.40	3137272.90
	MW-2D	03/04/16	2	73.3	83.3	85.3	608.72	1542892.30	3137265.70
	MW-3S	09/28/15	2	18.5	28.5	30.5	610.80	1543550.90	3137589.80
	MW-3I	03/08/16	2	42.3	52.3	54.3	610.76	1543307.40	3137478.70
N&E (onsite)	MW-3D	01/17/23	2	85.1	95.1	95.1	610.28	1543300.45	3137468.23
	MW-4S	10/01/15	2	14.1	24.1	26.1	609.94	1543840.50	3138359.40
	MW-4I	03/11/16	2	48.5	58.5	60.5	614.66	1543802.00	3138360.00
	MW-4D	03/02/16	2	82.2	92.2	94.2	614.72	1543802.90	3138369.90
Abandoned	MW-5S	09/29/15	2	22.7	32.7	34.7	631.5	1542632.00	3138431.60
CCR Monitoring	MW-6S	10/02/15	2	11.7	21.7	23.7	605.99	1541915.90	3138402.50
	MW-6I	03/17/16	2	41.9	51.9	53.9	606.00	1541916.50	3138412.90
	MW-6D	03/08/16	2	71.9	81.9	83.9	604.85	1541911.60	3138395.90
	MW-7S	10/02/15	2	19.8	29.8	31.8	616.68	1543230.70	3138684.60
	MW-8S	09/29/15	2	17.4	27.4	29.4	616.67	1543861.70	3139276.50
	MW-9S	10/21/15	2	20.7	30.7	32.7	617.52	1543605.10	3139730.60
	MW-9I	03/10/16	2	56.0	66.0	68.0	617.06	1543590.50	3139741.20
	MW-9D	03/10/16	2	87.9	97.9	99.9	617.41	1543595.40	3139736.10
	MW-10S	10/03/15	2	18.0	28.0	30.0	613.70	1542433.60	3139192.40
Nature & Extent (onsite)	MW-10I	07/11/19	2	48.3	58.3	58.5	613.68	1542421.90	3139176.51
	MW-10D	07/10/19	2	78.5	88.5	99.0	613.54	1542425.41	3139181.85
CCR Monitoring	MW-11S	03/16/16	2	35.5	45.5	47.5	627.29	1541977.30	3137302.80
	MW-11I	03/16/16	2	66.9	76.9	78.9	627.52	1541975.70	3137308.60
	MW-11D	03/16/16	2	96.7	106.7	108.7	627.56	1541973.80	3137314.40
	MW-12S	03/17/16	2	12.4	22.4	24.4	607.26	1541906.30	3138038.90
Nature & Extent (onsite)	MW-12I	02/08/23	2	48.6	58.6	58.6	607.36	1541907.03	3138046.21
	MW-12D	02/07/23	2	77.7	87.7	87.7	607.75	1541904.87	3138031.94
Background	MW-13S	07/02/19	2	15.4	25.4	26.0	606.03	1541571.23	3140338.05
	MW-13I	07/01/19	2	45.3	55.3	56.0	606.21	1541572.13	3140345.02
	MW-13D	07/01/19	2	75.3	85.3	87.3	605.86	1541572.08	3140351.14
Nature & Extent (onsite)	MW-14S	07/12/19	2	20.5	30.5	30.5	607.39	1541410.11	3139179.67
	MW-14I	07/09/19	2	50.3	60.3	60.5	607.34	1541409.56	3139185.37
	MW-14D	07/03/19	2	80.2	90.2	93.8	607.33	1541409.06	3139190.90
	MW-15S	07/17/19	2	15.5	25.5	26.0	607.50	1541572.93	3138099.56
	MW-15I	07/17/19	2	45.3	55.3	56.0	607.61	1541572.82	3138105.74
	MW-15D	07/16/19	2	74.7	84.7	89.0	607.51	1541572.31	3138111.38
	MW-16S	07/23/19	2	25.4	35.4	36.0	609.54	1542809.16	3136817.91
	MW-16I	07/22/19	2	55.3	65.3	66.0	609.53	1542815.18	3136818.65
	MW-16D	07/22/19	2	85.1	95.1	98.8	609.60	1542820.95	3136818.47
Nature & Extent (offsite)	MW-17S	03/16/21	2	25.1	35.1	36.0	602.20	1539652.71	3135570.37
	MW-17I	03/10/21	2	54.8	64.8	66.0	602.69	1539653.77	3135566.07
	MW-17D	03/09/21	2	84.8	94.8	84.8	602.47	1539655.60	3135561.52
	MW-18S	03/17/21	2	19.2	29.2	30.0	606.13	1540867.16	3137449.99
	MW-18I	03/17/21	2	47.1	57.1	58.0	605.82	1540872.27	3137451.35
	MW-18D	03/16/21	2	76.2	86.2	87.4	606.19	1540876.31	3137452.71
	MW-19S	03/15/21	2	15.3	25.3	26.0	602.85	1540672.64	3138261.57
	MW-19I	03/15/21	2	45.3	55.3	56.0	602.69	1540673.36	3138256.11
	MW-19D	03/12/21	2	75.9	85.9	90.0	602.67	1540673.57	3138251.25
	MW-20S	03/21/22	2	21.0	31.0	31.0	615.00	1539871.84	3140415.01
	MW-20I	03/21/22	2	51.0	61.0	61.0	614.63	1539871.79	3140411.09
	MW-20D	03/18/22	2	81.0	91.0	102.7	615.10	1539871.99	3140406.96
	MW-21S	08/02/22	2	22.0	32.0	32.0	601.34	1537848.14	3135492.72
	MW-21I	08/02/22	2	52.0	62.0	62.0	601.38	1537853.90	3135493.98
	MW-21D	08/02/22	2	79.2	89.2	96.0	601.33	1537860.49	3135494.60
	MW-22S	04/21/22	2	20.0	30.0	30.2	608.49	1537156.73	3136687.12
	MW-22I	04/20/22	2	50.0	60.0	60.0	608.37	1537156.30	3136681.37
	MW-22D	04/20/22	2	80.0	90.0	95.0	608.44	1537156.05	3136675.04
	MW-23S	07/14/22	2	18.0	28.0	28.2	600.74	1538616.49	3138374.15
	MW-23I	07/14/22	2	48.0	58.0	58.2	600.64	1538617.44	3138370.04
	MW-23D	07/13/22	2	78.0	88.0	88.2	600.72	1538617.67	3138364.91

TABLE 1
MONITORING WELL CONSTRUCTION DETAILS
EAGLE VALLEY GENERATING STATION
4040 BLUE BLUFF ROAD
MARTINSVILLE, INDIANA

Type of Well	Well ID	Date Installed	Casing Diameter (inches)	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Well Depth (ft bgs)	Top of Casing Elevation (ft MSL)	Northing	Easting
Nature & Extent (onsite)	MW-24S	01/23/23	2	34.6	44.6	44.6	607.72	1543510.06	3136681.28
	MW-24I	01/23/23	2	64.3	74.3	74.3	607.54	1543505.55	3136678.15
	MW-24D	01/19/23	2	95.1	105.1	105.1	607.74	1543501.04	3136675.02
	MW-25S	03/01/23	2	20.3	30.3	30.3	602.88	1542098.27	3135312.39
	MW-25I	03/01/23	2	43.6	53.6	53.6	603.50	1542093.86	3135313.60
	MW-25D	02/28/23	2	70.8	80.8	80.8	603.37	1542089.10	3135314.42
	MW-26S	01/27/23	2	30.6	40.6	40.6	616.14	1542834.63	3139616.64
	MW-26I	01/26/23	2	60.5	70.5	70.5	616.33	1542831.00	3139613.14
	MW-26D	01/26/23	2	90.3	100.3	100.3	616.15	1542828.41	3139610.27
Piezometers									
Piezometers (onsite)	GP-1	03/25/21	1	22	27	27	608.97	1543093.80	3136812.23
	GP-2	03/25/21	1	25	30	30	608.87	1543484.45	3136916.84
	GP-3	03/25/21	1	25	30	30	605.59	1543707.82	3136912.93
	GP-4	03/25/21	1	25	30	30	610.93	1543798.90	3137562.56
	GP-5	03/24/21	1	25	30	30	608.70	1543935.49	3137569.15
	GP-6	03/24/21	1	25	30	30	607.13	1544161.02	3138615.64
	GP-7	03/24/21	1	25	30	30	609.86	1544024.21	3139069.63
	GP-8	03/24/21	1	25	30	30	616.93	1544036.56	3139930.90
	GP-9	03/24/21	1	25	30	30	615.48	1544406.94	3138976.34
	GP-10	03/24/21	1	15	20	20	604.22	1544696.51	3138718.40
	DP-1	03/25/21	0.75	13	14.3	14.3	599.19	1544458.59	3137903.14
	DP-2	03/25/21	0.75	13	14	14	602.61	1544669.47	3138178.58

Notes:

Coordinates are Indiana State Plane West (NAD 83)
Well MW-5S was abandoned in March 2016
CCR = coal combustion residuals
ft bgs = feet below ground surface
ft MSL = feet above mean sea level

TABLE 2A

HORIZONTAL GRADIENT AND SEEPAGE VELOCITY CALCULATIONS - NOVEMBER 2022

EAGLE VALLEY GENERATING STATION
4040 BLUE BLUFF ROAD
MARTINSVILLE, INDIANA

Points/Area for Calculation	Flow Zone	Gauging Event	Horizontal Distance - Δ L (ft)	Upgradient Water Elevation (ft MSL)	Downgradient Water Elevation (ft MSL)	Head Difference - Δ H (Ft)	K Upgradient Well (ft/day)	K Downgradient Well (ft/day)	K Average (ft/day)	n_e	Horizontal Gradient - Δ H / Δ L (ft/ft)	Seepage Velocity - V (ft/yr)
DP-2 to GP-6	Shallow	Nov 2022	670	589.62	588.25	1.37	-	1091	1091	0.3	0.0020	2714
MW-7S to MW-10S	Shallow	Nov 2022	945	586.78	583.52	3.26	225	2806	1516	0.3	0.0034	6361
MW-11S to MW-15S	Shallow	Nov 2022	890	586.22	584.99	1.23	39	68	54	0.3	0.0014	90
MW-18S to MW-19S	Shallow	Nov 2022	830	585.51	584.96	0.55	83	122	103	0.3	0.0007	83
										Geometric Mean (Shallow)	**0.0016**	**599**
MW-3I to MW-10I	Intermediate	Nov 2022	1935	584.94	583.79	1.15	54	22	38	0.3	0.0006	27
MW-4I to MW-10I	Intermediate	Nov 2022	1630	588.36	583.79	4.57	211	22	117	0.3	0.0028	397
MW-9I to 584 contour* (Estimate)	Intermediate	Nov 2022	715	587.40	584.00	3.4	27	-	27	0.3	0.0048	156
MW-11I to MW-15I	Intermediate	Nov 2022	890	586.26	585.18	1.08	46	29	38	0.3	0.0012	55
MW-18I to MW-19I	Intermediate	Nov 2022	830	585.22	584.92	0.3	80	87	84	0.3	0.0004	37
										Geometric Mean (Intermediate)	**0.0013**	**81**
MW-2D to MW-6D	Deep	Nov 2022	1500	587.49	585.06	2.43	243	35	139	0.3	0.0016	274
MW-4D to MW-10D	Deep	Nov 2022	1630	588.35	583.51	4.84	1.2	13	7	0.3	0.0030	26
MW-9D to 584 contour* (Estimate)	Deep	Nov 2022	735	587.47	584.00	3.47	25	-	25	0.3	0.0047	144
MW-11D to MW-15D	Deep	Nov 2022	890	586.22	585.12	1.1	29	16	23	0.3	0.0012	34
MW-18D to MW-19D	Deep	Nov 2022	830	585.50	584.94	0.56	125	109	117	0.3	0.0007	96
										Geometric Mean (Deep)	**0.0018**	**80**
								Geometric Mean (All Data)			**0.0015**	**143**
								Average (All Data)			**0.0012**	**1082**

Notes:

Seepage velocity calculation:

$$V = \frac{K(\Delta H / \Delta L)}{n_e} \times 365 \text{ days}$$

Where:

'V = Groundwater flow velocity (ft/year)

'K= Horizontal hydraulic conductivity (ft/day)

'n_e = Assumed effective porosity

Δ H = Head difference

Δ L = Horizontal distance

**See groundwater elevation contours on Groundwater Flow Maps*

Hydraulic conductivity derived from on-Site measurements (see "Summary of Hydraulic Conductivity Results" table)

Effective porosity derived from literature values (Woessner and Poeter, 2020)

ft/yr = feet per year

ft MSL = feet above mean sea level

ft/day = feet per day

TABLE 2B
HORIZONTAL GRADIENT AND SEEPAGE VELOCITY CALCULATIONS - APRIL 2023
EAGLE VALLEY GENERATING STATION
4040 BLUE BLUFF ROAD
MARTINSVILLE, INDIANA

Points/Area for Calculation	Flow Zone	Gauging Event	Horizontal Distance - Δ L (ft)	Upgradient Water Elevation (ft MSL)	Downgradient Water Elevation (ft MSL)	Head Difference - Δ H (Ft)	K Upgradient Well (ft/day)	K Downgradient Well (ft/day)	K Average (ft/day)	n_e	Horizontal Gradient - Δ H / Δ L (ft/ft)	Seepage Velocity - V (ft/yr)
MW-2S to MW-16S	Shallow	April 2023	450	591.15	590.87	0.28	859	1.4	430	0.3	0.0006	326
MW-7S to MW-10S	Shallow	April 2023	945	591.11	589.35	1.76	225	2806	1516	0.3	0.0019	3434
MW-9S to MW-26S	Shallow	April 2023	775	591.35	589.36	1.99	-	119	119	0.3	0.0026	372
MW-23S to MW-14S	Shallow	April 2023	2910	591.23	590.00	1.23	135	63	99	0.3	0.0004	51
										Geometric Mean (Shallow)	**0.0011**	**381**
MW-2I to MW-16I	Intermediate	April 2023	450	591.08	590.89	0.19	63	21	42	0.3	0.0004	22
MW-12I to MW-6I	Intermediate	April 2024	370	591.16	590.53	0.63	165	51	108	0.3	0.0017	224
MW-9I to MW-26I	Intermediate	April 2023	775	591.34	589.52	1.82	26	154	90	0.3	0.0023	257
MW-23I to MW-14I	Intermediate	April 2023	2910	591.11	589.95	1.16	124	28	76	0.3	0.0004	37
										Geometric Mean (Intermediate)	**0.0009**	**82**
MW-2D to MW-16D	Deep	April 2023	450	591.11	591.08	0.03	243	14	129	0.3	0.0001	10
MW-12D to MW-6D	Deep	April 2023	370	591.37	590.57	0.80	153	35	94	0.3	0.0022	247
MW-9D to MW-26D	Deep	April 2023	775	591.36	589.49	1.87	25	186	106	0.3	0.0024	310
MW-23D to MW-14D	Deep	April 2023	2910	591.18	589.91	1.27	124	21	73	0.3	0.0004	38
										Geometric Mean (Deep)	**0.0006**	**74**
								Geometric Mean (All Data)			**0.0008**	**133**
								Average (All Data)			**0.0009**	**498**

Notes:

Seepage velocity calculation:

$$V = \frac{K(\Delta H / \Delta L)}{n_e} \times 365 \text{ days}$$

Where:

'V = Groundwater flow velocity (ft/year)

'K= Horizontal hydraulic conductivity (ft/day; K Average used for calculation)

'n_e = Assumed effective porosity

Δ H = Head difference

Δ L = Horizontal distance

**See groundwater elevation contours on Groundwater Flow Maps*

Hydraulic conductivity derived from on-Site measurements (see "Summary of Hydraulic Conductivity Results" table)

Effective porosity derived from literature values (Woessner and Poeter, 2020)

ft/yr = feet per year

ft MSL = feet above mean sea level

ft/day = feet per day

"-" indicates not measured

TABLE 3A

VERTICAL HYDRAULIC GRADIENT CALCULATIONS - NOVEMBER 2022

EAGLE VALLEY GENERATING STATION

4040 BLUE BLUFF ROAD

MARTINSVILLE, INDIANA

Well ID	Water Level Gauging Date	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Ground Surface Elevation (ft MSL)	Top of Screen Elevation (ft MSL)	Bottom of Screen Elevation (ft MSL)	Screen Mid Point Elevation (ft MSL)	Depth to Water (ft BTOC)	TOC Elevation (ft MSL)	Water Elevation	Head Difference (Δ H)	Length btw Screen Mid-Points (Δ L)	Vertical Gradient (Δ H / Δ L)	Upward/ Downward Vertical Gradient
MW-1S	11/15/22	19.2	29.3	610.60	591.4	581.3	586.4	26.19	612.93	586.74	-	-	-	-
MW-1I		45.4	55.4	609.70	564.3	554.3	559.3	25.62	612.31	586.69	0.05	27.05	0.0018	down
MW-1D		72.7	82.7	610.30	537.6	527.6	532.6	26.28	612.91	586.63	0.06	26.70	0.0022	down
MW-2S	11/15/22	15.3	25.3	606.00	590.7	580.7	585.7	20.96	608.45	587.49	-	-	-	-
MW-2I		41.8	51.8	606.30	564.5	554.5	559.5	21.40	608.93	587.53	-0.04	26.20	-0.0015	up
MW-2D		73.3	83.3	606.20	532.9	522.9	527.9	21.23	608.72	587.49	0.04	31.60	0.0013	down
MW-3S	11/15/22	18.5	28.5	607.60	589.1	579.1	584.1	22.51	610.80	588.29	-	-	-	-
MW-3I		42.3	52.3	608.00	565.7	555.7	560.7	22.82	610.76	587.94	0.35	23.40	0.0150	down
MW-4S	11/15/22	14.1	24.1	607.00	592.9	582.9	587.9	21.52	609.94	588.42	-	-	-	-
MW-4I		48.5	58.5	612.30	563.8	553.8	558.8	26.30	614.66	588.36	0.06	29.10	0.0021	down
MW-4D		82.2	92.2	612.30	530.1	520.1	525.1	26.37	614.72	588.35	0.01	33.70	0.0003	down
MW-6S	11/15/22	11.7	21.7	602.80	591.1	581.1	586.1	20.93	605.99	585.06	-	-	-	-
MW-6I		41.9	51.9	603.10	561.2	551.2	556.2	20.99	606.00	585.01	0.05	29.90	0.0017	down
MW-6D		71.9	81.9	602.30	530.4	520.4	525.4	19.79	604.85	585.06	-0.05	30.80	-0.0016	up
MW-7S	11/15/22	19.8	29.8	613.50	593.7	583.7	588.7	29.90	616.68	586.78	-	-	-	-
MW-8S	11/15/22	17.4	27.4	614.05	596.7	586.7	591.7	28.34	616.67	588.33	-	-	-	-
MW-9S	11/15/22	20.7	30.7	614.43	593.7	583.7	588.7	29.98	617.52	587.54	-	-	-	-
MW-9I		56.0	66.0	614.70	558.7	548.7	553.7	29.66	617.06	587.40	0.14	35.03	0.0040	down
MW-9D		87.9	97.9	614.71	526.8	516.8	521.8	29.94	617.41	587.47	-0.07	31.89	-0.0022	up
MW-10S	11/15/22	18.0	28.0	611.40	593.4	583.4	588.4	30.18	613.70	583.52	-	-	-	-
MW-10I		48.3	58.3	611.40	563.1	553.1	558.1	29.89	613.68	583.79	-0.27	30.30	-0.0089	up
MW-10D		78.5	88.5	611.29	532.8	522.8	527.8	30.03	613.54	583.51	0.28	30.31	0.0092	down
MW-11S	11/15/22	35.5	45.5	627.40	591.9	581.9	586.9	41.07	627.29	586.22	-	-	-	-
MW-11I		66.9	76.9	627.70	560.8	550.8	555.8	41.26	627.52	586.26	-0.04	31.10	-0.0013	up
MW-11D		96.7	106.7	627.60	530.9	520.9	525.9	41.34	627.56	586.22	0.04	29.90	0.0013	down
MW-12S	11/15/22	12.4	22.4	604.60	592.2	582.2	587.2	-	607.26	-	-	-	-	-
MW-13S	11/15/22	15.4	25.4	603.39	588.0	578.0	583.0	22.33	606.03	583.70	-	-	-	-
MW-13I		45.3	55.3	603.49	558.2	548.2	553.2	22.50	606.21	583.71	-0.01	29.81	-0.0003	up
MW-13D		75.3	85.3	603.50	528.2	518.2	523.2	22.22	605.86	583.64	0.07	29.98	0.0023	down
MW-14S	11/15/22	20.5	30.5	604.66	584.2	574.2	579.2	23.58	607.39	583.81	-	-	-	-
MW-14I		50.3	60.3	604.55	554.2	544.2	549.2	23.58	607.34	583.76	0.05	29.91	0.0017	down
MW-14D		80.2	90.2	604.66	524.5	514.5	519.5	23.63	607.33	583.70	0.06	29.79	0.0020	down
MW-15S	11/15/22	15.5	25.5	604.70	589.2	579.2	584.2	22.51	607.50	584.99	-	-	-	-
MW-15I		45.3	55.3	604.75	559.5	549.5	554.5	22.43	607.61	585.18	-0.19	29.75	-0.0064	up
MW-15D		74.7	84.7	604.69	530.0	520.0	525.0	22.39	607.51	585.12	0.06	29.46	0.0020	down

TABLE 3A
VERTICAL HYDRAULIC GRADIENT CALCULATIONS - NOVEMBER 2022
EAGLE VALLEY GENERATING STATION
4040 BLUE BLUFF ROAD
MARTINSVILLE, INDIANA

Well ID	Water Level Gauging Date	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Ground Surface Elevation (ft MSL)	Top of Screen Elevation (ft MSL)	Bottom of Screen Elevation (ft MSL)	Screen Mid Point Elevation (ft MSL)	Depth to Water (ft BTOC)	TOC Elevation (ft MSL)	Water Elevation	Head Difference (Δ H)	Length btw Screen Mid-Points (Δ L)	Vertical Gradient (Δ H / Δ L)	Upward/ Downward Vertical Gradient
MW-16S	11/15/22	25.4	35.4	606.53	581.1	571.1	576.1	21.97	609.54	587.57	-	-	-	-
MW-16I		55.3	65.3	606.76	551.5	541.5	546.5	21.93	609.53	587.60	-0.03	29.67	-0.0010	up
MW-16D		85.1	95.1	606.73	521.6	511.6	516.6	21.96	609.60	587.64	-0.04	29.83	-0.0013	up
MW-17S	11/15/22	25.1	35.1	599.40	574.3	564.3	569.3	16.72	602.20	585.48	-	-	-	-
MW-17I		54.8	64.8	599.55	544.8	534.8	539.8	17.19	602.69	585.50	-0.02	29.55	-0.0007	up
MW-17D		84.8	94.8	599.59	514.8	504.8	509.8	16.85	602.47	585.62	-0.12	29.96	-0.0040	up
MW-18S	11/15/22	19.2	29.2	603.10	583.9	573.9	578.9	20.62	606.13	585.51	-	-	-	-
MW-18I		47.1	57.1	602.81	555.7	545.7	550.7	20.60	605.82	585.22	0.29	28.19	0.0103	down
MW-18D		76.2	86.2	602.95	526.8	516.8	521.8	20.69	606.19	585.50	-0.28	28.96	-0.0097	up
MW-19S	11/15/22	15.3	25.3	603.17	587.9	577.9	582.9	17.89	602.85	584.96	-	-	-	-
MW-19I		45.3	55.3	603.11	557.8	547.8	552.8	17.77	602.69	584.92	0.04	30.06	0.0013	down
MW-19D		75.9	85.9	602.92	527.0	517.0	522.0	17.73	602.67	584.94	-0.02	30.79	-0.0006	up
MW-20S	11/15/22	21.0	31.0	615.82	594.8	584.8	589.8	29.88	615.00	585.12	-	-	-	-
MW-20I		51.0	61.0	615.84	564.8	554.8	559.8	29.95	614.62	584.67	0.45	29.98	0.0150	down
MW-20D		81.0	91.0	615.83	534.8	524.8	529.8	30.47	615.10	584.63	0.04	30.01	0.0013	down
MW-21S	11/15/22	22.0	32.0	598.40	576.4	566.4	571.4	16.65	601.34	584.69	-	-	-	-
MW-21I		52.0	62.0	598.44	546.4	536.4	541.4	16.61	601.38	584.77	-0.08	29.96	-0.0027	up
MW-21D		79.2	89.2	598.46	519.3	509.3	514.3	16.60	601.33	584.73	0.04	27.18	0.0015	down
MW-22S	11/15/22	20.0	30.0	605.57	585.6	575.6	580.6	18.72	608.49	589.77	-	-	-	-
MW-22I		50.0	60.0	605.57	555.6	545.6	550.6	18.60	608.37	589.77	0.00	30.00	0.0000	none
MW-22D		80.0	90.0	605.45	525.5	515.5	520.5	18.68	608.44	589.76	0.01	30.12	0.0003	down
MW-23S	11/15/22	18.0	28.0	601.18	583.2	573.2	578.2	15.87	600.74	584.87	-	-	-	-
MW-23I		48.0	58.0	601.11	553.1	543.1	548.1	15.82	600.64	584.82	0.05	30.07	0.0017	down
MW-23D		78.0	88.0	601.17	523.2	513.2	518.2	15.85	600.72	584.87	-0.05	29.94	-0.0017	up

Notes:
"-" indicates not applicable or not measured
ft bgs = feet below ground surface
ft BTOC= feet below top of casing
ft MSL = feet below mean sea level
TOC = top of casing
Gradient calculated for "S" and "I" wells and "I" and "D" wells

TABLE 3B

VERTICAL HYDRAULIC GRADIENT CALCULATIONS - APRIL 2023

EAGLE VALLEY GENERATING STATION

4040 BLUE BLUFF ROAD

MARTINSVILLE, INDIANA

Well ID	Water Level Gauging Date	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Ground Surface Elevation (ft MSL)	Top of Screen Elevation (ft MSL)	Bottom of Screen Elevation (ft MSL)	Screen Mid Point Elevation (ft MSL)	Depth to Water (ft bTOC)	TOC Elevation (ft MSL)	Water Elevation	Head Difference (Δ H)	Length btw Screen Mid-Points (Δ L)	Vertical Gradient (Δ H / Δ L)	Upward/ Downward Vertical Gradient
MW-1S	04/14/23	19.2	29.3	610.60	591.4	581.3	586.4	22.12	612.93	590.81	-	-	-	-
MW-1I		45.4	55.4	609.70	564.3	554.3	559.3	21.52	612.31	590.79	0.02	27.05	0.0007	down
MW-1D		72.7	82.7	610.30	537.6	527.6	532.6	22.12	612.91	590.79	0.00	26.70	0.0000	none
MW-2S	04/14/23	15.3	25.3	606.00	590.7	580.7	585.7	17.30	608.45	591.15	-	-	-	-
MW-2I		41.8	51.8	606.30	564.5	554.5	559.5	17.85	608.93	591.08	0.07	26.20	0.0027	down
MW-2D		73.3	83.3	606.20	532.9	522.9	527.9	17.61	608.72	591.11	-0.03	31.60	-0.0009	up
MW-3S	04/14/23	18.5	28.5	607.60	589.1	579.1	584.1	19.50	610.80	591.30	-	-	-	-
MW-3I		42.3	52.3	608.00	565.7	555.7	560.7	19.57	610.76	591.19	0.11	23.40	0.0047	down
MW-3D		84.0	94.0	606.91	522.9	512.9	517.9	19.99	610.28	590.29	0.90	42.79	0.0210	down
MW-4S	04/14/23	14.1	24.1	607.00	592.9	582.9	587.9	18.17	609.94	591.77	-	-	-	-
MW-4I		48.5	58.5	612.30	563.8	553.8	558.8	22.89	614.66	591.77	0.00	29.10	0.0000	none
MW-4D		82.2	92.2	612.30	530.1	520.1	525.1	23.00	614.72	591.72	0.05	33.70	0.0015	down
MW-6S	04/14/23	11.7	21.7	602.80	591.1	581.1	586.1	15.45	605.99	590.54	-	-	-	-
MW-6I		41.9	51.9	603.10	561.2	551.2	556.2	15.47	606.00	590.53	0.01	29.90	0.0003	down
MW-6D		71.9	81.9	602.30	530.4	520.4	525.4	14.28	604.85	590.57	-0.04	30.80	-0.0013	up
MW-7S	04/14/23	19.8	29.8	613.50	593.7	583.7	588.7	25.57	616.68	591.11	-	-	-	-
MW-8S	04/14/23	17.4	27.4	614.05	596.7	586.7	591.7	24.93	616.67	591.74	-	-	-	-
MW-9S	04/14/23	20.7	30.7	614.43	593.7	583.7	588.7	26.17	617.52	591.35	-	-	-	-
MW-9I		56.0	66.0	614.70	558.7	548.7	553.7	25.72	617.06	591.34	0.01	35.03	0.0003	down
MW-9D		87.9	97.9	614.71	526.8	516.8	521.8	26.05	617.41	591.36	-0.02	31.89	-0.0006	up
MW-10S	04/14/23	18.0	28.0	611.40	593.4	583.4	588.4	24.35	613.70	589.35	-	-	-	-
MW-10I		48.3	58.3	611.40	563.1	553.1	558.1	24.20	613.68	589.48	-0.13	30.30	-0.0043	up
MW-10D		78.5	88.5	611.29	532.8	522.8	527.8	24.09	613.54	589.45	0.03	30.31	0.0010	down
MW-11S	04/14/23	35.5	45.5	627.40	591.9	581.9	586.9	36.40	627.29	590.89	-	-	-	-
MW-11I		66.9	76.9	627.70	560.8	550.8	555.8	36.58	627.52	590.94	-0.05	31.10	-0.0016	up
MW-11D		96.7	106.7	627.60	530.9	520.9	525.9	36.60	627.56	590.96	-0.02	29.90	-0.0007	up
MW-12S	04/14/23	12.4	22.4	604.60	592.2	582.2	587.2	16.41	607.26	590.85	-	-	-	-
MW-12I		48.0	58.0	605.12	557.1	547.1	552.1	16.20	607.36	591.16	-0.31	35.08	-0.0088	up
MW-12D		78.0	88.0	604.77	526.8	516.8	521.8	16.38	607.75	591.37	-0.21	30.35	-0.0069	up

TABLE 3B
VERTICAL HYDRAULIC GRADIENT CALCULATIONS - APRIL 2023
EAGLE VALLEY GENERATING STATION
4040 BLUE BLUFF ROAD
MARTINSVILLE, INDIANA

Well ID	Water Level Gauging Date	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Ground Surface Elevation (ft MSL)	Top of Screen Elevation (ft MSL)	Bottom of Screen Elevation (ft MSL)	Screen Mid Point Elevation (ft MSL)	Depth to Water (ft bTOC)	TOC Elevation (ft MSL)	Water Elevation	Head Difference (Δ H)	Length btw Screen Mid-Points (Δ L)	Vertical Gradient (Δ H / Δ L)	Upward/ Downward Vertical Gradient
MW-13S	04/14/23	15.4	25.4	603.39	588.0	578.0	583.0	16.00	606.03	590.03	-	-	-	-
MW-13I		45.3	55.3	603.49	558.2	548.2	553.2	16.20	606.21	590.01	0.02	29.81	0.0007	down
MW-13D		75.3	85.3	603.50	528.2	518.2	523.2	15.92	605.86	589.94	0.07	29.98	0.0023	down
MW-14S	04/14/23	20.5	30.5	604.66	584.2	574.2	579.2	17.39	607.39	590.00	-	-	-	-
MW-14I		50.3	60.3	604.55	554.2	544.2	549.2	17.39	607.34	589.95	0.05	29.91	0.0017	down
MW-14D		80.2	90.2	604.66	524.5	514.5	519.5	17.42	607.33	589.91	0.04	29.79	0.0013	down
MW-15S	04/14/23	15.5	25.5	604.70	589.2	579.2	584.2	16.90	607.50	590.60	-	-	-	-
MW-15I		45.3	55.3	604.75	559.5	549.5	554.5	16.85	607.61	590.76	-0.16	29.75	-0.0054	up
MW-15D		74.7	84.7	604.69	530.0	520.0	525.0	16.77	607.51	590.74	0.02	29.46	0.0007	down
MW-16S	04/14/23	25.4	35.4	606.53	581.1	571.1	576.1	18.67	609.54	590.87	-	-	-	-
MW-16I		55.3	65.3	606.76	551.5	541.5	546.5	18.64	609.53	590.89	-0.02	29.67	-0.0007	up
MW-16D		85.1	95.1	606.73	521.6	511.6	516.6	18.52	609.60	591.08	-0.19	29.83	-0.0064	up
MW-17S	04/14/23	25.1	35.1	599.40	574.3	564.3	569.3	13.57	602.20	588.63	-	-	-	-
MW-17I		54.8	64.8	599.55	544.8	534.8	539.8	14.03	602.69	588.66	-0.03	29.55	-0.0010	up
MW-17D		84.8	94.8	599.59	514.8	504.8	509.8	13.73	602.47	588.74	-0.08	29.96	-0.0027	up
MW-18S	04/14/23	19.2	29.2	603.10	583.9	573.9	578.9	15.04	606.13	591.09	-	-	-	-
MW-18I		47.1	57.1	602.81	555.7	545.7	550.7	15.02	605.82	590.80	0.29	28.19	0.0103	down
MW-18D		76.2	86.2	602.95	526.8	516.8	521.8	15.09	606.19	591.10	-0.30	28.96	-0.0104	up
MW-19S	04/14/23	15.3	25.3	603.17	587.9	577.9	582.9	11.89	602.85	590.96	-	-	-	-
MW-19I		45.3	55.3	603.11	557.8	547.8	552.8	11.77	602.69	590.92	0.04	30.06	0.0013	down
MW-19D		75.9	85.9	602.92	527.0	517.0	522.0	11.69	602.67	590.98	-0.06	30.79	-0.0019	up
MW-20S	04/14/23	21.0	31.0	615.82	594.8	584.8	589.8	23.49	615.00	591.51	-	-	-	-
MW-20I		51.0	61.0	615.84	564.8	554.8	559.8	23.07	614.63	591.56	-0.05	29.98	-0.0017	up
MW-20D		81.0	91.0	615.83	534.8	524.8	529.8	23.59	615.10	591.51	0.05	30.01	0.0017	down
MW-21S	04/14/23	22.0	32.0	598.40	576.4	566.4	571.4	13.41	601.34	587.93	-	-	-	-
MW-21I		52.0	62.0	598.44	546.4	536.4	541.4	13.41	601.38	587.97	-0.04	29.96	-0.0013	up
MW-21D		79.2	89.2	598.46	519.3	509.3	514.3	13.44	601.33	587.89	0.08	27.18	0.0029	down
MW-22S	04/14/23	20.0	30.0	605.57	585.6	575.6	580.6	14.17	608.49	594.32	-	-	-	-
MW-22I		50.0	60.0	605.57	555.6	545.6	550.6	14.04	608.37	594.33	-0.01	30.00	-0.0003	up
MW-22D		80.0	90.0	605.45	525.5	515.5	520.5	14.12	608.44	594.32	0.01	30.12	0.0003	down

TABLE 3B
VERTICAL HYDRAULIC GRADIENT CALCULATIONS - APRIL 2023
EAGLE VALLEY GENERATING STATION
4040 BLUE BLUFF ROAD
MARTINSVILLE, INDIANA

Well ID	Water Level Gauging Date	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Ground Surface Elevation (ft MSL)	Top of Screen Elevation (ft MSL)	Bottom of Screen Elevation (ft MSL)	Screen Mid Point Elevation (ft MSL)	Depth to Water (ft bTOC)	TOC Elevation (ft MSL)	Water Elevation	Head Difference (Δ H)	Length btw Screen Mid-Points (Δ L)	Vertical Gradient (Δ H / Δ L)	Upward/ Downward Vertical Gradient
MW-23S	04/14/23	18.0	28.0	601.18	583.2	573.2	578.2	9.51	600.74	591.23	-	-	-	-
MW-23I		48.0	58.0	601.11	553.1	543.1	548.1	9.53	600.64	591.11	0.12	30.07	0.0040	down
MW-23D		78.0	88.0	601.17	523.2	513.2	518.2	9.54	600.72	591.18	-0.07	29.94	-0.0023	up
MW-24S	04/14/23	34.0	44.0	604.00	570.0	560.0	565.0	16.62	607.72	591.10	-	-	-	-
MW-24I		64.0	74.0	603.94	539.9	529.9	534.9	16.71	607.54	590.83	0.27	30.06	0.0090	down
MW-24D		94.0	104.0	603.97	510.0	500.0	505.0	16.67	607.74	591.07	-0.24	29.97	-0.0080	up
MW-25S	04/14/23	20.0	30.0	600.39	580.4	570.4	575.4	13.02	602.88	589.86	-	-	-	-
MW-25I		43.0	53.0	600.31	557.3	547.3	552.3	13.54	603.50	589.96	-0.10	23.08	-0.0043	up
MW-25D		70.5	80.5	600.05	529.6	519.6	524.6	13.56	603.37	589.81	0.15	27.76	0.0054	down
MW-26S	04/14/23	30.0	40.0	613.69	583.7	573.7	578.7	26.78	616.14	589.36	-	-	-	-
MW-26I		60.0	70.0	613.71	553.7	543.7	548.7	26.81	616.33	589.52	-0.16	29.98	-0.0053	up
MW-26D		90.0	100.0	613.62	523.6	513.6	518.6	26.66	616.15	589.49	0.03	30.09	0.0010	down

Notes:
"-" indicates not applicable or not measured
ft bgs = feet below ground surface
ft BTOC= feet below top of casing
ft MSL = feet below mean sea level
TOC = top of casing
Gradient calculated for "S" and "I" wells and "I" and "D" wells

TABLE 4
HYDRAULIC CONDUCTIVITY DATA
EAGLE VALLEY GENERATING STATION
4040 BLUE BLUFF ROAD
MARTINSVILLE, INDIANA

Slug Test Results					
Well ID	**Date of Slug Test**	**Aquifer Model**	**Solution Method**	**Horizontal Hydraulic Conductivity (cm/s)**	**Horizontal Hydraulic Conductivity (ft/day)**
SHALLOW WELLS					
MW-1S	10/5/2015	Unconfined	Bower-Rice	2.29E-01	648
MW-2S	10/5/2015	Unconfined	Dagan	3.03E-01	859
MW-3S	10/5/2015	Unconfined	Bouwer-Rice	5.25E-01	1488
MW-4S	10/5/2015	Unconfined	Bouwer-Rice	3.85E-01	1091
MW-5S	10/5/2015	Unconfined	Bouwer-Rice	9.07E-04	2.6
MW-6S	10/5/2015	Unconfined	Bouwer-Rice	2.52E-01	714
MW-7S	10/5/2015	Unconfined	Bouwer-Rice	7.92E-02	225
MW-8S	10/5/2015	Unconfined	KGS Model	3.19E-04	0.9
MW-10S	10/5/2015	Unconfined	Bouwer-Rice	9.90E-01	2806
MW-11S	4/20/2016	Unconfined	Springer-Gelhar	1.38E-02	39
MW-12S	4/20/2016	Unconfined	Springer-Gelhar	2.17E-02	62
MW-13S	8/8/2019	Unconfined	Bouwer-Rice	2.13E-02	61
MW-14S	8/8/2019	Unconfined	Bouwer-Rice	2.22E-02	63
MW-15S	8/8/2019	Unconfined	Bouwer-Rice	2.41E-02	68
MW-16S	8/8/2019	Confined	Bouwer-Rice	4.86E-04	1.4
MW-17S	4/19/2021	Unconfined	Bouwer-Rice	5.32E-02	151
MW-18S	4/20/2021	Unconfined	Bouwer-Rice	2.93E-02	83
MW-19S	4/21/2021	Unconfined	Bouwer-Rice	4.32E-02	122
MW-21S	9/16/2022	Unconfined	Bouwer-Rice	2.06E-02	58
MW-22S	9/16/2022	Unconfined	Bouwer-Rice	2.76E-02	78
MW-23S	9/19/2022	Confined	Bouwer-Rice	4.78E-02	135
MW-24S	3/30/2023	Confined	Butler	7.49E-02	212
MW-25S	3/30/2023	Unconfined	Springer-Gelhar	9.15E-02	259
MW-26S	3/30/2023	Unconfined	Springer-Gelhar	4.19E-02	119
SHALLOW GEOMETRIC MEAN (MW-8S & MW-16S excluded):				**5.71E-02**	**162**
SHALLOW GEOMETRIC MEAN:				**3.77E-02**	**107**
INTERMEDIATE WELLS					
MW-1I	4/20/2016	Unconfined	Springer-Gelhar	1.87E-02	53
MW-2I	4/20/2016	Unconfined	Springer-Gelhar	2.22E-02	63
MW-3I	4/20/2016	Unconfined	Springer-Gelhar	1.90E-02	54
MW-4I	4/20/2016	Unconfined	Springer-Gelhar	7.45E-02	211
MW-6I	4/20/2016	Unconfined	Springer-Gelhar	1.80E-02	51
MW-9I	4/20/2016	Unconfined	Springer-Gelhar	9.68E-03	27
MW-10I	8/8/2019	Unconfined	Bouwer-Rice	7.65E-03	22
MW-11I	4/20/2016	Unconfined	Springer-Gelhar	1.62E-02	46
MW-12I	3/30/2023	Unconfined	Springer-Gelhar	5.83E-02	165
MW-13I	8/8/2019	Unconfined	Bouwer-Rice	1.12E-02	32
MW-14I	8/8/2019	Unconfined	Bouwer-Rice	9.96E-03	28
MW-15I	8/8/2019	Unconfined	Bouwer-Rice	1.02E-02	29
MW-16I	8/8/2019	Confined	Bouwer-Rice	7.44E-03	21
MW-17I	4/19/2021	Unconfined	Bouwer-Rice	4.21E-02	119
MW-18I	4/20/2021	Unconfined	Bouwer-Rice	2.81E-02	80
MW-19I	4/21/2021	Unconfined	Bouwer-Rice	3.06E-02	87
MW-20I	9/19/2022	Unconfined	Bouwer-Rice	7.95E-02	225
MW-21I	9/16/2022	Unconfined	Bouwer-Rice	4.20E-02	119
MW-22I	9/16/2022	Unconfined	Bouwer-Rice	3.77E-02	107
MW-23I	9/16/2022	Unconfined	Bouwer-Rice	4.38E-02	124
MW-24I	3/30/2023	Confined	Butler	5.49E-02	156
MW-25I	3/30/2023	Unconfined	Springer-Gelhar	5.69E-02	161
MW-26I	3/30/2023	Unconfined	Springer-Gelhar	5.42E-02	154
INTERMEDIATE GEOMETRIC MEAN:				**2.54E-02**	**72**

TABLE 4
HYDRAULIC CONDUCTIVITY DATA
EAGLE VALLEY GENERATING STATION
4040 BLUE BLUFF ROAD
MARTINSVILLE, INDIANA

Slug Test Results					
Well ID	**Date of Slug Test**	**Aquifer Model**	**Solution Method**	**Horizontal Hydraulic Conductivity (cm/s)**	**Horizontal Hydraulic Conductivity (ft/day)**
DEEP WELLS					
MW-1D	10/5/2015	Unconfined	Springer-Gelhar	1.12E-01	317
MW-2D	4/20/2016	Unconfined	Springer-Gelhar	8.59E-02	243
MW-3D	3/30/2023	Unconfined	Bouwer-Rice	8.20E-03	23
MW-4D	4/20/2016	Unconfined	Springer-Gelhar	4.20E-04	1.2
MW-6D	4/20/2016	Unconfined	Springer-Gelhar	1.25E-02	35
MW-9D	4/20/2016	Unconfined	Springer-Gelhar	8.69E-03	25
MW-10D	8/8/2019	Unconfined	Bouwer-Rice	4.75E-03	13
MW-11D	4/20/2016	Unconfined	Springer-Gelhar	1.04E-02	29
MW-12D	3/30/2023	Unconfined	Springer-Gelhar	5.41E-02	153
MW-13D	8/8/2019	Unconfined	Bouwer-Rice	7.74E-03	22
MW-14D	8/8/2019	Unconfined	Bouwer-Rice	7.38E-03	21
MW-15D	8/8/2019	Unconfined	Bouwer-Rice	5.68E-03	16
MW-16D	8/8/2019	Confined	Bouwer-Rice	4.94E-03	14
MW-17D	4/19/2021	Unconfined	Bouwer-Rice	3.18E-02	90
MW-18D	4/20/2021	Unconfined	Bouwer-Rice	4.40E-02	125
MW-19D	4/21/2021	Unconfined	Bouwer-Rice	3.85E-02	109
MW-20D	9/19/2022	Unconfined	Bouwer-Rice	3.38E-02	96
MW-21D	9/16/2022	Unconfined	Bouwer-Rice	3.05E-02	87
MW-22D	9/16/2022	Unconfined	Bouwer-Rice	4.46E-02	126
MW-23D	9/19/2022	Unconfined	Bouwer-Rice	4.37E-02	124
MW-24D	3/30/2023	Confined	Butler	9.88E-02	280
MW-25D	3/30/2023	Unconfined	Springer-Gelhar	6.76E-02	192
MW-26D	3/30/2023	Unconfined	Springer-Gelhar	6.55E-02	186
DEEP GEOMETRIC MEAN (MW-4D excluded):				**2.37E-02**	**67**
DEEP GEOMETRIC MEAN:				**1.99E-02**	**56**
Packer Test Results					
Well ID	**Depth Packer Placed (ft BGS)**	**Test Interval (ft BGS)**	**Boring Depth (ft BGS)**	**Horizontal Hydraulic Conductivity (cm/s)**	**Horizontal Hydraulic Conductivity (ft/day)**
MW-3D	113 - 115	115 - 120	120	5.23E-08	0.0001
MW-12D	103 - 105	105 - 110	110	1.63E-07	0.0005
MW-26D	110 - 112	112 - 117	119	1.01E-07	0.0003
Geotechnical Test Results (ASTM D 5084: Method C)					
Well ID	**Date of Testing**	**Core Depth Interval**	**Material**	**Vertical Hydraulic Conductivity (cm/s)**	**Vertical Hydraulic Conductivity (ft/day)**
MW-3D	5/11/2023	116.5 - 117.2	Dark Gray Rock	2.0E-09	5.7E-06
MW-12D	5/11/2023	109.2 - 109.8	Dark Gray Rock	2.0E-07	5.7E-04
MW-26D	5/11/2023	113 - 113.8	Dark Gray Rock	2.0E-09	5.7E-06

Notes:
cm/s = centimeter per second
ft BGS = feet below ground surface
ft/day = feet per day
Geometric mean is shown where both rising head and falling head slug test data was reported

TABLE 5

SUMMARY OF MONITORING WELL SOIL ANALYTICAL RESULTS

EAGLE VALLEY GENERATING STATION

4040 BLUE BLUFF ROAD

MARTINSVILLE, INDIANA

Sample ID Number	Sample Depth (ft)	Date	Arsenic	Iron	Manganese	Molybdenum	Lithium	pH at 25 Degrees C	Mean TOC	Percent Moisture	
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	SU	mg/kg	%	
MW-12D (82-88)	82 - 88	02/10/23	3.6	7560	464	1.4	6.6	8.5	21500	6.1	
MW-12I (54-56)	54 - 56	02/10/23	4.0	7380	245	2.6	5.7	8.6	33900	10.4	
MW-24D (98-100)	98 - 100	02/02/23	4.3	7300	192	3.8	5.3 U	8.1	13100	7.0	
MW-24I (68-70)	68 - 70	02/02/23	2.6	5990	191	1.3	5.7	8.2	24300	7.4	
MW-24S (38-40)	38 - 40	02/02/23	5.6	5390	187	1.3	5.4	8.4	26700	8.9	
MW-25D (74-76)		74 - 76	03/15/23	2.2	5020	267	1.0	10.2	8.4	41500	5.0
MW-25I (48-50)	48 - 50	03/15/23	2.5	6090	204	0.95 U	8.0	8.5	28800	8.2	
DUP-2	-	03/15/23	3.3	6510	571	1.0	10.1	8.5	38900	5.4	
MW-25S (24-26)	24 - 26	03/15/23	2.2	4900	507	1 U	10.9	8.4	45600	6.2	
MW-26D (94-96)	94 - 96	02/10/23	7.1	14500	193	1.6	5.4	9.1	20200	7.0	
MW-26I (64-66)	64 - 66	02/10/23	5.1	7460	165	2.0	5.4 U	8.3	18600	13.0	
DUP-1	-	02/10/23	5.4	7990	199	1.9	5.2	8.2	17300	12.7	
MW-26S (34-36)	34 - 36	02/10/23	3.7	5120	247	1.6	5.3 U	8.0	21900	7.4	
MW-3D (88-90)	88 - 90	02/02/23	3.8	6660	293	1.2	6.6	8.3	23900	8.0	

Notes:

(82-88) Indicates sample depth in feet below ground surface

% = percent

C = Celsius

ft = feet

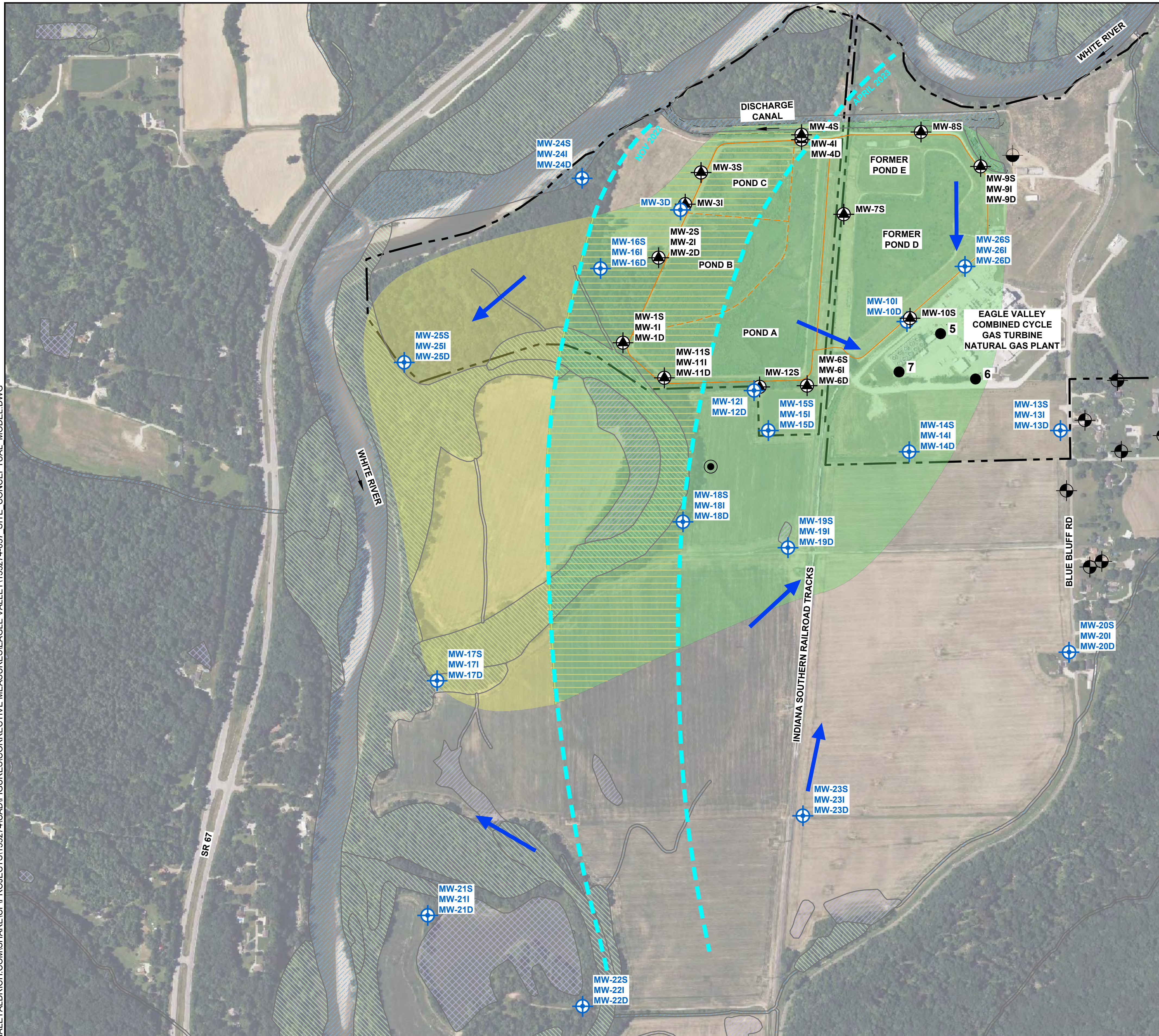
mg/kg = milligrams per kilogram

SU = standard units

TOC = total organic carbon

U = not detected, value is the reporting limit.

FIGURES



LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF ASH POND SYSTEM
- APPROXIMATE BOUNDARY OF ASH POND
- MW-3 CCR MONITORING WELL
- MW-15 NATURE AND EXTENT MONITORING WELL
- 5 PRODUCTION WELL
- OPERATIONAL IPL WELL
- OFF-SITE PRIVATE WELLS
- REPORTED IPL WELL
- = APPROXIMATE AREA OF AFFECTED GROUNDWATER BEYOND PRODUCTION WELL INFLUENCE
- = APPROXIMATE AREA OF AFFECTED GROUNDWATER MANAGED BY PRODUCTION WELL PUMPING
- = AREA WITH SEASONAL GROUNDWATER FLOW DIRECTION CHANGE
- GROUNDWATER FLOW BREAKLINE (SHALLOW ZONE)
- APPROXIMATE GROUNDWATER FLOW DIRECTION

NATIONAL WETLANDS INVENTORY (NWI)

- FRESHWATER EMERGENT WETLAND
- FRESHWATER FORESTED/SHRUB WETLAND
- FRESHWATER POND
- RIVERINE

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
3. CCR = COAL COMBUSTION RESIDUALS
4. EXTENT OF PRODUCTION WELL INFLUENCE IS APPROXIMATE AND BASED ON NOVEMBER 2023 GROUNDWATER ELEVATION DATA
5. WELL LOCATION SOURCE: INDIANA DEPARTMENT OF NATURAL RESOURCES (IDNR) AND INFORMATION FROM AES INDIANA
6. NWI BOUNDARIES ARE FROM THE U.S. FISH AND WILDLIFE SERVICE NATIONAL WETLANDS INVENTORY MAY 2023 (https://www.fws.gov/program/national-wetlands-inventory)
7. GROUNDWATER FLOW BREAKLINE SHIFTS SEASONALLY AND CHANGES WITH PUMPING CONDITIONS
8. REPORTED IPL WELL COULD NOT BE LOCATED. IDNR PLOTTED LOCATION BELIEVED TO BE CORRECT

N

0 800 1600
SCALE IN FEET

HALEY ALDRICH

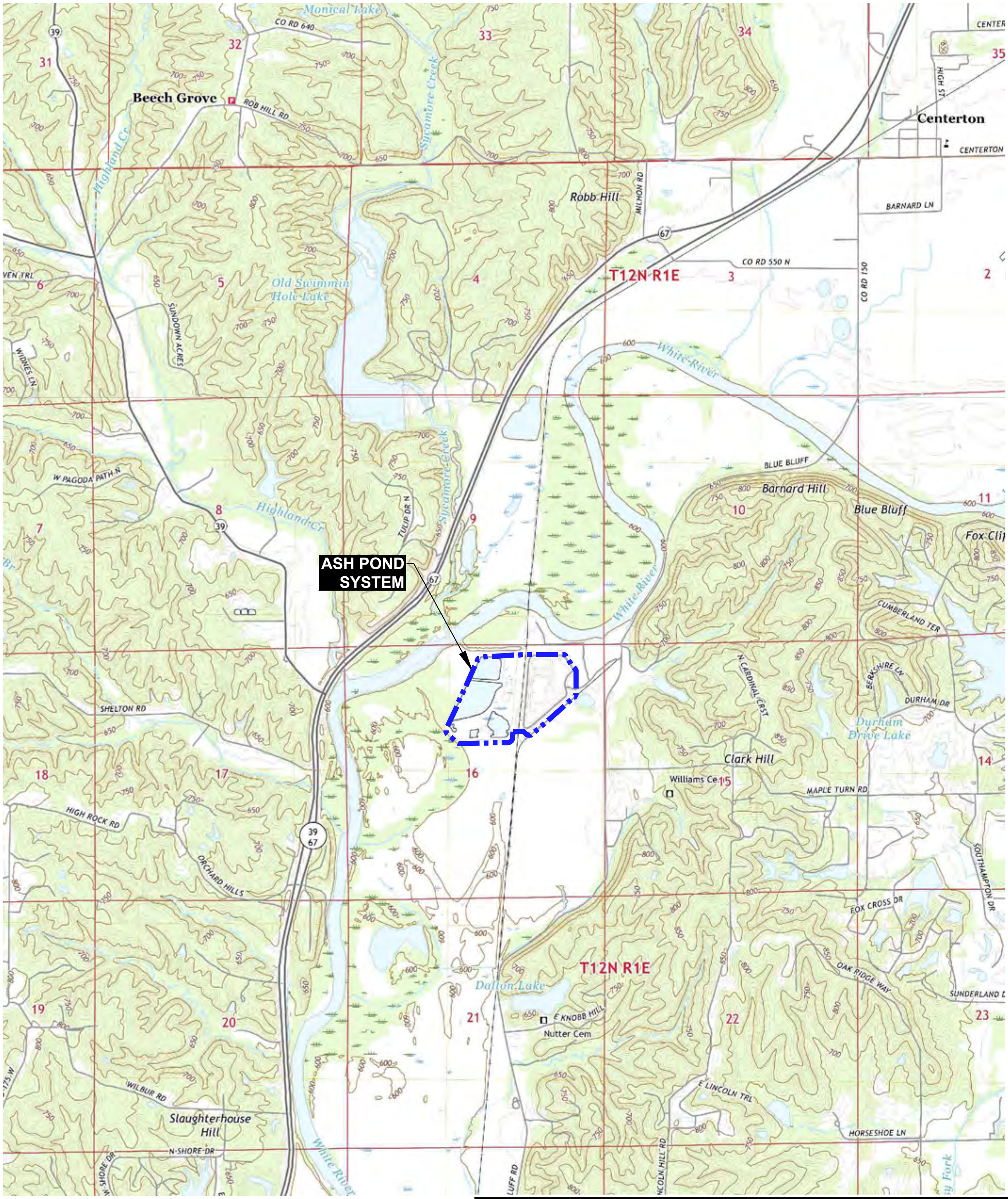
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

SITE CONCEPTUAL MODEL SUMMARY MAP

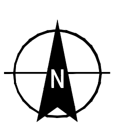
SCALE: AS SHOWN
APRIL 2024

FIGURE ES-1

YEOMAN, ROB Saved: 2/12/2024 4:30 AM Layout: L
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\133274\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\133274-037_SITE_CONCEPTUAL_MODEL.DWG



MAP SOURCE: USGS
QUADRANGELS: MARTINSVILLE, IN 2019
MOORESVILLE WEST, IN 2019



HALEY ALDRICH

EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

SITE LOCATION MAP

APPROXIMATE SCALE: 1IN = 3000 FT
APRIL 2024

FIGURE 1

VARI, KATALIN Printed: 5/11/2023 11:53 AM Layout: FIGURE 1-1
\\HALEYALDRICH.COM\SHARE\AUTODESK\133274\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\NATURE & EXTENT\133274-013_FIG 1_SLM.DWG

LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF REGULATED CCR UNITS
- APPROXIMATE LIMITS OF FORMER AND NON REGULATED CCR UNITS
- 5 CCGT PRODUCTION WELL

NOTES

1. AERIAL IMAGE FROM BING MAPS, 2022.
2. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE.
3. CCGT = COMBINED CYCLE GAS TURBINE
4. CCR = COAL COMBUSTION RESIDUALS

N

0 360 720
SCALE IN FEET

HALEY ALDRICH

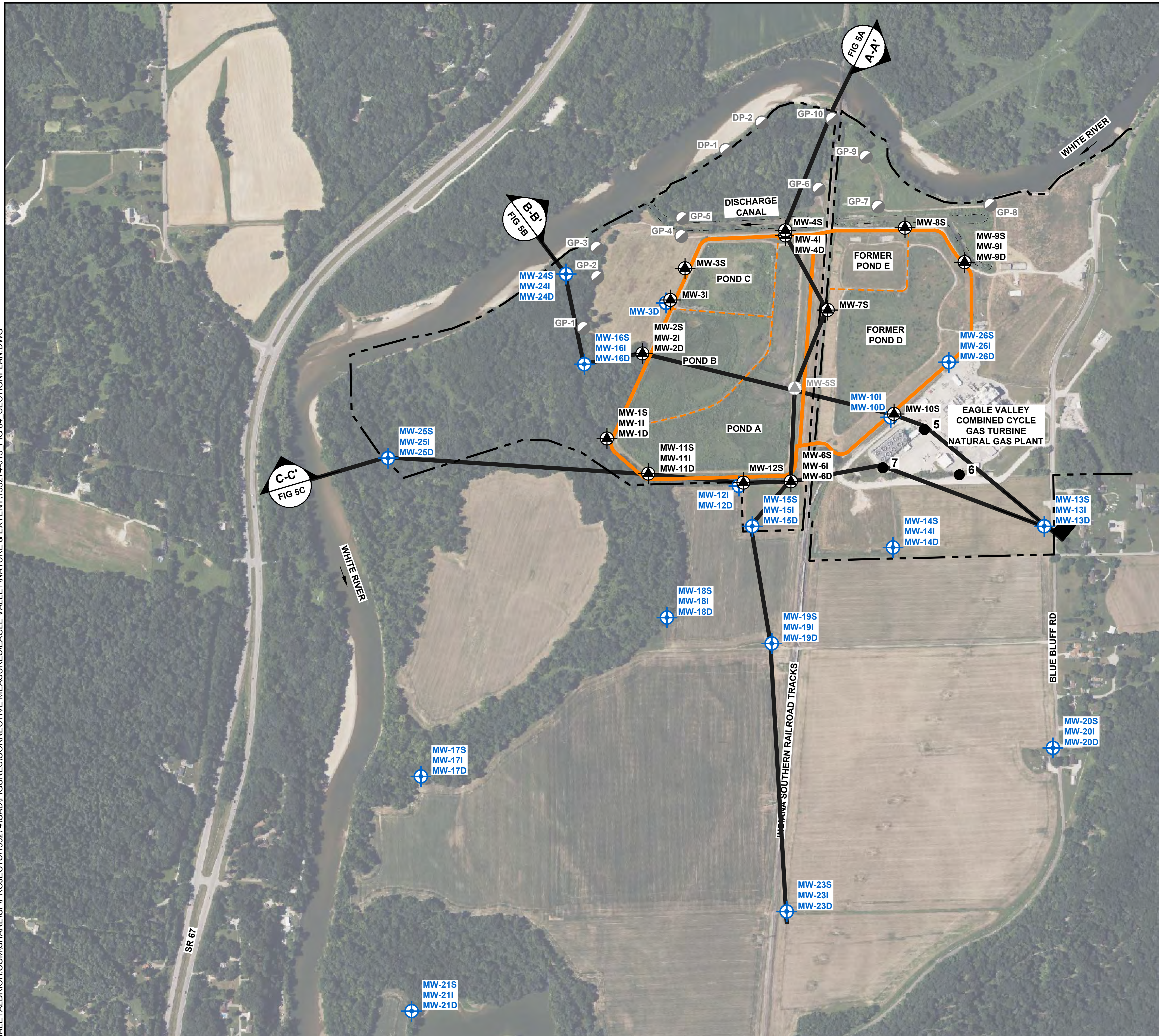
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

SITE FEATURES MAP

SCALE: AS SHOWN
APRIL 2024

FIGURE 2

VARI, KATALIN Saved: 12/5/2023 10:22 AM Layout: FIGURE 1-2
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\133274\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\2023 CMA\133274-013_FIG 1-2_SITE.DWG



LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF ASH POND SYSTEM
- APPROXIMATE BOUNDARY OF ASH POND
- MW-3 CCR MONITORING WELL
- MW-5 ABANDONED CCR MONITORING WELL
- MW-15 NATURE AND EXTENT MONITORING WELL
- 5 PRODUCTION WELL
- GP-2 PIEZOMETER LOCATION

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
3. CCR = COAL COMBUSTION RESIDUALS
4. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE

N

0 800 1600

SCALE IN FEET

HALEY ALDRICH

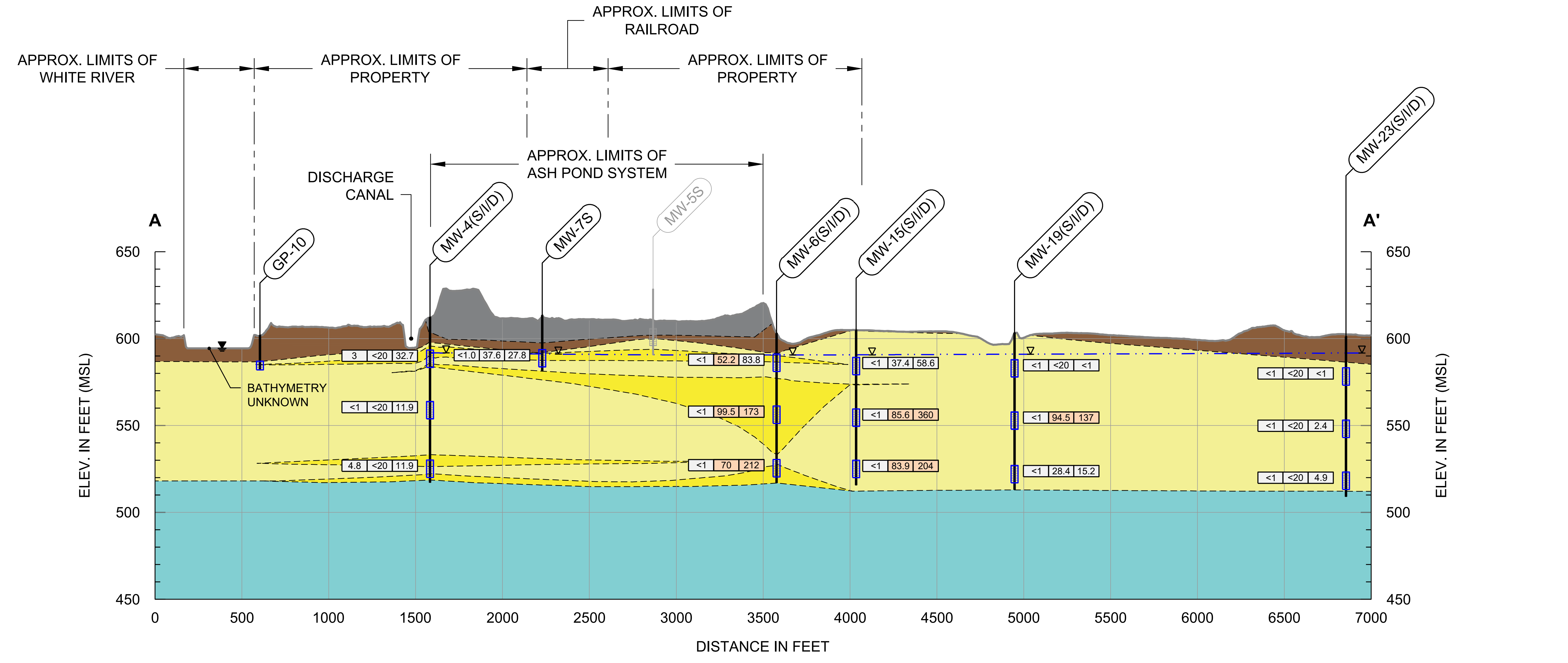
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

CROSS-SECTION TRANSECT LOCATION PLAN

SCALE: AS SHOWN
APRIL 2024

FIGURE 3

YEOMAN, ROB Saved: 3/7/2024 10:36 AM Layout: FIGURE 4
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\133274\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\NATURE & EXTENT\133274-013_FIG 04_SECTIONPLAN.DWG



CROSS SECTION A-A'

EXPLORATION STICK LEGEND

- ##-## — EXPLORATION ID (GREY REPRESENTS ABANDONED WELL)
- WATER LEVEL ELEVATION (SEE NOTE 4)
- WELL SCREEN INTERVAL
- 10.0 | 40.0 | 100.0
  - MOLYBDENUM CONCENTRATION (µg/L)
  - LITHIUM CONCENTRATION (µg/L)
  - ARSENIC CONCENTRATION (µg/L)

ORANGE SHADING INDICATES CONCENTRATIONS ABOVE GROUNDWATER PROTECTION STANDARD (GWPS)

"<" INDICATES CONSTITUENT WAS NOT DETECTED AND VALUE IS AT REPORTING LIMIT

PROFILE LEGEND

- EXISTING GROUND SURFACE
- INTERPRETED GROUNDWATER ELEVATION (SEE NOTE 4)
- INTERPRETED STRATA BREAK
- FILL WITH ASH
- CLAY (INCLUDING SANDY AND SILTY CLAYS)
- SAND & GRAVEL (INCLUDING SAND OR SAND-GRAVEL MIXTURES)
- GRAVEL (INCLUDING GRAVEL-SAND MIXTURES)
- BEDROCK (SHALE)
- APPROX. RIVER LEVEL AT TIME OF TOPOGRAPHIC LIDAR SURVEY

NOTES

1. REFER TO FIGURE 4 FOR PLAN LOCATION OF EXPLORATIONS, SUBSURFACE CROSS SECTION LOCATIONS, AND GENERAL EXISTING CONDITIONS.
2. SUBSURFACE PROFILES DEPICT GENERAL GEOLOGIC CONDITIONS AT THE SITE AND ARE BASED ON INTERPRETATION OF DATA ENCOUNTERED IN THE EXPLORATIONS. LINES REPRESENTING INTERFACES BETWEEN STRATA ON THE CROSS SECTION ARE BASED UPON INTERPOLATION BETWEEN ADJACENT BORINGS.
3. ELEVATIONS ARE IN FEET AND REFERENCE THE MEAN SEA LEVEL VERTICAL DATUM.
4. GROUNDWATER LEVELS RECORDED ON 14 APRIL 2023. INTERPRETED GROUNDWATER ELEVATION DEVELOPED FROM APRIL 2023 READINGS OF THE SHALLOW WELLS (SEE FIGURE 4).
5. CONCENTRATIONS SHOWN ARE FROM APRIL/MAY 2023 SAMPLE RESULTS.

HORIZ. 0 600 1200
VERT. 0 60 120
SCALE IN FEET

HALEY ALDRICH

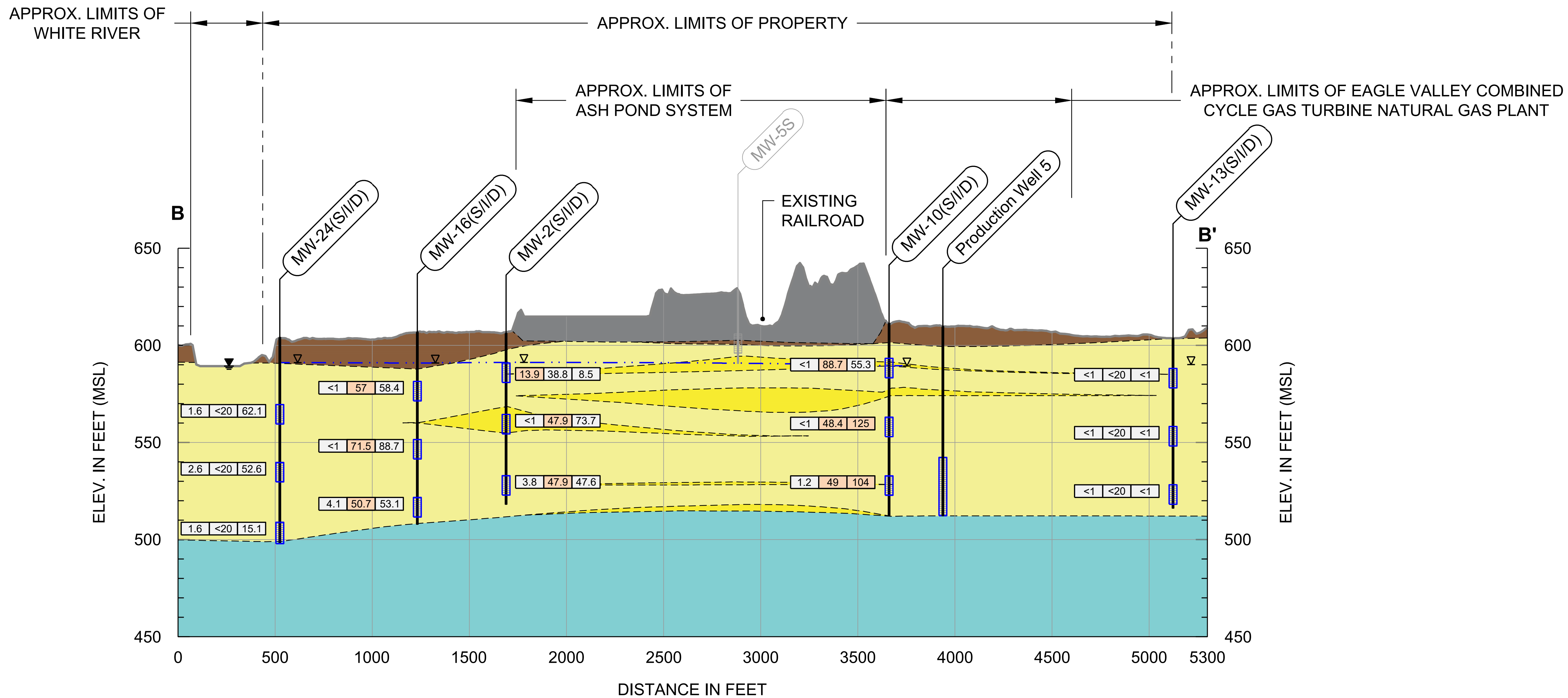
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

SUBSURFACE CROSS SECTION A-A'

SCALE: AS SHOWN
APRIL 2024

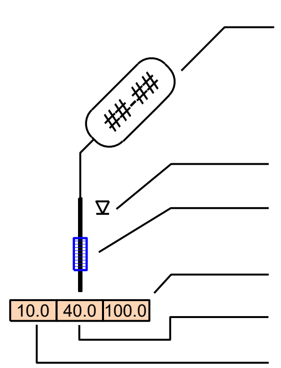
FIGURE 4A

Saved by: ZGARDNER Printed: 9/28/2023 8:34 AM Sheet: A-A'
C:\USERS\ZGARDNER\ONEDRIVE - HALEYALDRICH.COM\0133274_012-EAGLE\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\NATURE & EXTENT\133274-013_FIG X_SECTIONS.DWG



CROSS SECTION B-B'

EXPLORATION STICK LEGEND



EXPLORATION ID
(GREY REPRESENTS ABANDONED WELL)

WATER LEVEL ELEVATION (SEE NOTE 4)

WELL SCREEN INTERVAL

MOLYBDENUM CONCENTRATION (µg/L)

LITHIUM CONCENTRATION (µg/L)

ARSENIC CONCENTRATION (µg/L)

ORANGE SHADING INDICATES CONCENTRATIONS ABOVE GROUNDWATER PROTECTION STANDARD (GWPS)

"<" INDICATES CONSTITUENT WAS NOT DETECTED AND VALUE IS AT REPORTING LIMIT

PROFILE LEGEND

- EXISTING GROUND SURFACE
- INTERPRETED GROUNDWATER ELEVATION (SEE NOTE 4)
- INTERPRETED STRATA BREAK
- FILL WITH ASH
- CLAY (INCLUDING SANDY AND SILTY CLAYS)
- SAND & GRAVEL (INCLUDING SAND OR SAND-GRAVEL MIXTURES)
- GRAVEL (INCLUDING GRAVEL-SAND MIXTURES)
- BEDROCK (SHALE)
- APPROX. RIVER LEVEL AT TIME OF TOPOGRAPHIC LIDAR SURVEY

NOTES

1. REFER TO FIGURE 4 FOR PLAN LOCATION OF EXPLORATIONS, SUBSURFACE CROSS SECTION LOCATIONS, AND GENERAL EXISTING CONDITIONS.
2. SUBSURFACE PROFILES DEPICT GENERAL GEOLOGIC CONDITIONS AT THE SITE AND ARE BASED ON INTERPRETATION OF DATA ENCOUNTERED IN THE EXPLORATIONS. LINES REPRESENTING INTERFACES BETWEEN STRATA ON THE CROSS SECTION ARE BASED UPON INTERPOLATION BETWEEN ADJACENT BORINGS.
3. ELEVATIONS ARE IN FEET AND REFERENCE THE MEAN SEA LEVEL VERTICAL DATUM.
4. GROUNDWATER LEVELS RECORDED ON 14 APRIL 2023. INTERPRETED GROUNDWATER ELEVATION DEVELOPED FROM APRIL 2023 READINGS OF THE SHALLOW WELLS (SEE FIGURE 4).
5. CONCENTRATIONS SHOWN ARE FROM APRIL/MAY 2023 SAMPLE RESULTS.

HORIZ. 0 600 1200
VERT. 0 60 120
SCALE IN FEET

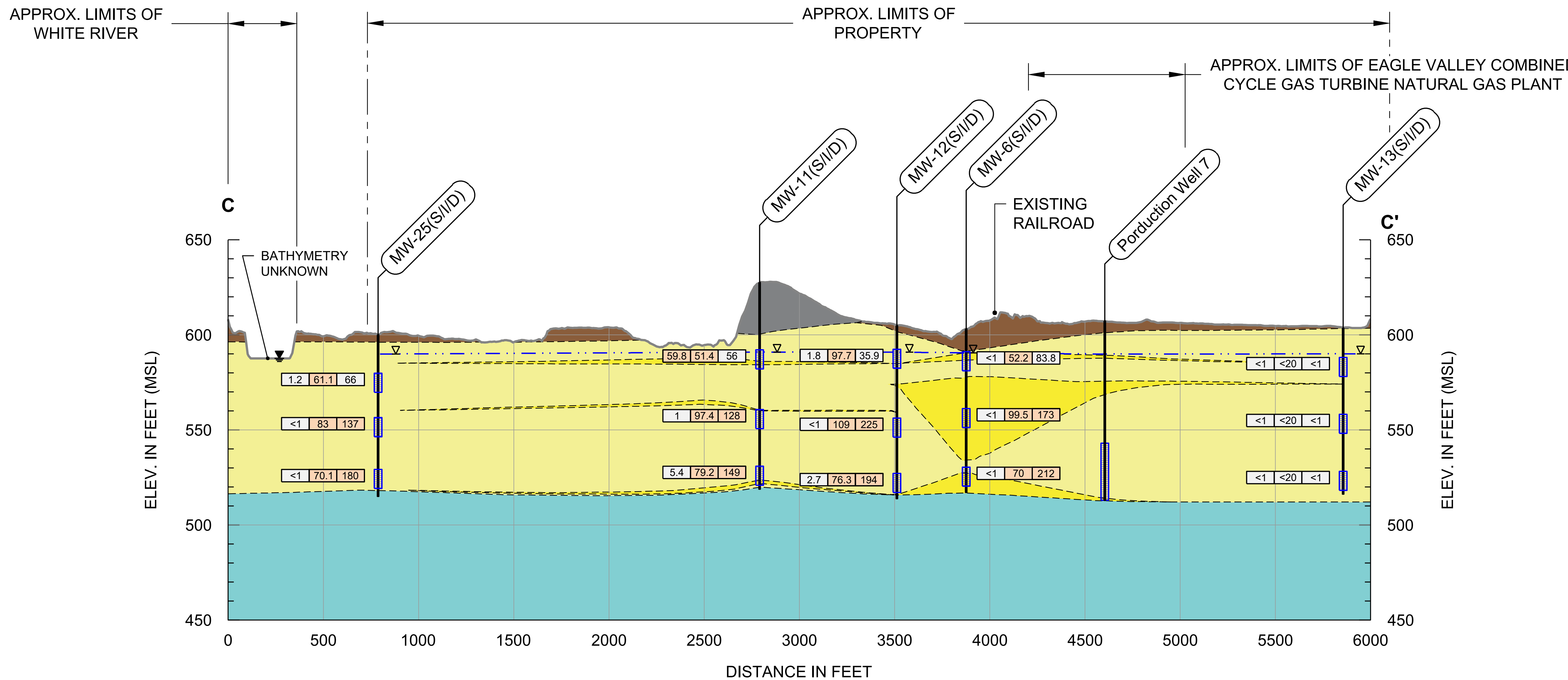
HALEY ALDRICH

EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

SUBSURFACE CROSS SECTION B-B'

SCALE: AS SHOWN
APRIL 2024

FIGURE 4B



CROSS SECTION C-C'

EXPLORATION STICK LEGEND

##-##

- EXPLORATION ID (GREY REPRESENTS ABANDONED WELL)
- WATER LEVEL ELEVATION (SEE NOTE 4)
- WELL SCREEN INTERVAL
- MOLYBDENUM CONCENTRATION (µg/L)
- LITHIUM CONCENTRATION (µg/L)
- ARSENIC CONCENTRATION (µg/L)

10.0 | 40.0 | 100.0

ORANGE SHADING INDICATES CONCENTRATIONS ABOVE GROUNDWATER PROTECTION STANDARD (GWPS)

"<" INDICATES CONSTITUENT WAS NOT DETECTED AND VALUE IS AT REPORTING LIMIT

PROFILE LEGEND

- EXISTING GROUND SURFACE
- INTERPRETED GROUNDWATER ELEVATION (SEE NOTE 4)
- INTERPRETED STRATA BREAK
- FILL WITH ASH
- CLAY (INCLUDING SANDY AND SILTY CLAYS)
- SAND & GRAVEL (INCLUDING SAND OR SAND-GRAVEL MIXTURES)
- GRAVEL (INCLUDING GRAVEL-SAND MIXTURES)
- BEDROCK (SHALE)
- APPROX. RIVER LEVEL AT TIME OF TOPOGRAPHIC LIDAR SURVEY

NOTES

1. REFER TO FIGURE 4 FOR PLAN LOCATION OF EXPLORATIONS, SUBSURFACE CROSS SECTION LOCATIONS, AND GENERAL EXISTING CONDITIONS.
2. SUBSURFACE PROFILES DEPICT GENERAL GEOLOGIC CONDITIONS AT THE SITE AND ARE BASED ON INTERPRETATION OF DATA ENCOUNTERED IN THE EXPLORATIONS. LINES REPRESENTING INTERFACES BETWEEN STRATA ON THE CROSS SECTION ARE BASED UPON INTERPOLATION BETWEEN ADJACENT BORINGS.
3. ELEVATIONS ARE IN FEET AND REFERENCE THE MEAN SEA LEVEL VERTICAL DATUM.
4. GROUNDWATER LEVELS RECORDED ON 14 APRIL 2023. INTERPRETED GROUNDWATER ELEVATION DEVELOPED FROM APRIL 2023 READINGS OF THE SHALLOW WELLS (SEE FIGURE 4).
5. CONCENTRATIONS SHOWN ARE FROM APRIL/MAY 2023 SAMPLE RESULTS.

HORIZ. 0 600 1200
VERT. 0 60 120
SCALE IN FEET

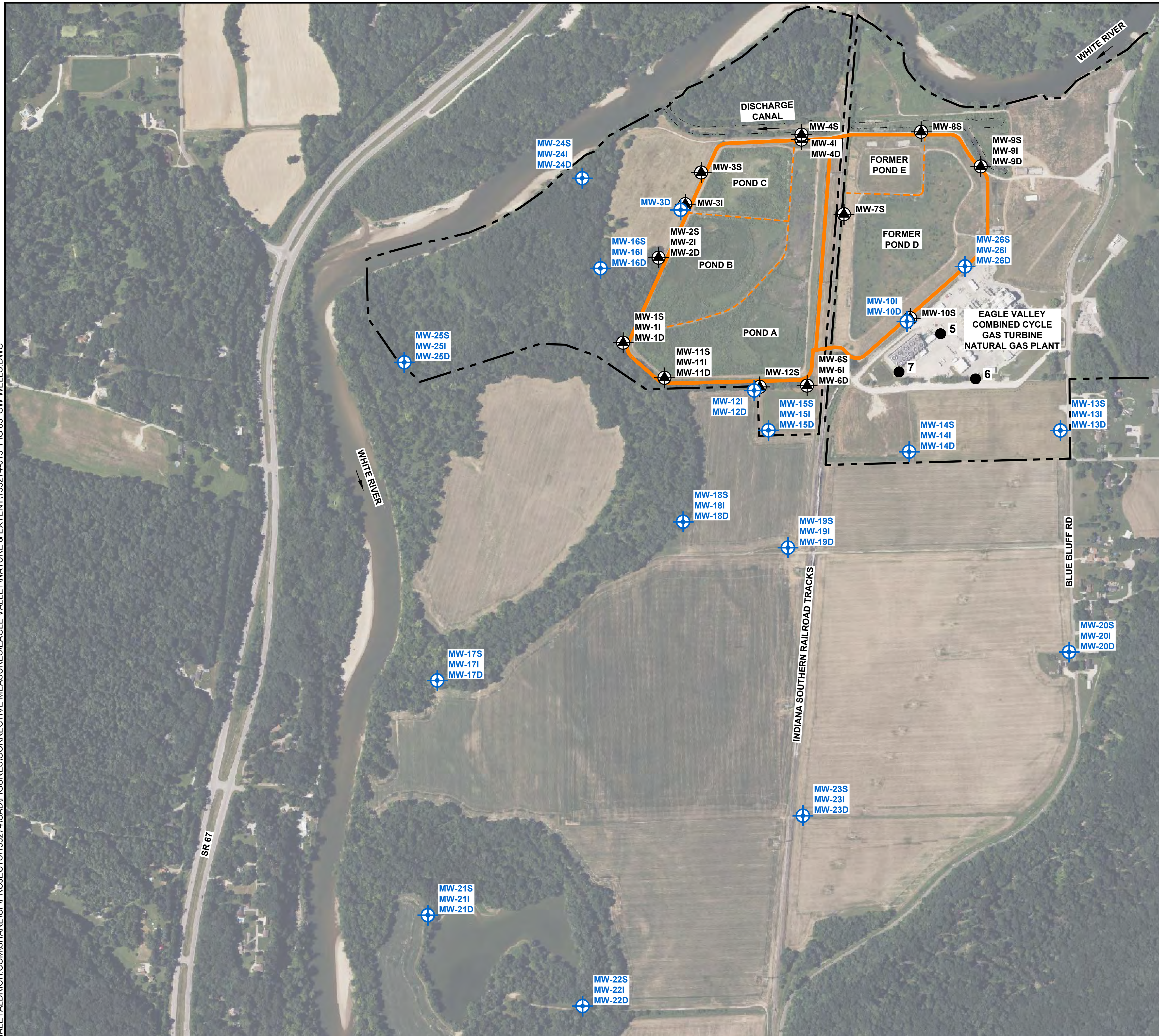
HALEY ALDRICH

EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

SUBSURFACE CROSS SECTION C-C'

SCALE: AS SHOWN
APRIL 2024

FIGURE 4C



LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF ASH POND SYSTEM
- APPROXIMATE BOUNDARY OF ASH POND
- MW-3 CCR MONITORING WELL
- MW-15 NATURE AND EXTENT MONITORING WELL
- 5 PRODUCTION WELL

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
3. CCR = COAL COMBUSTION RESIDUALS
4. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE

N

0 800 1600
SCALE IN FEET

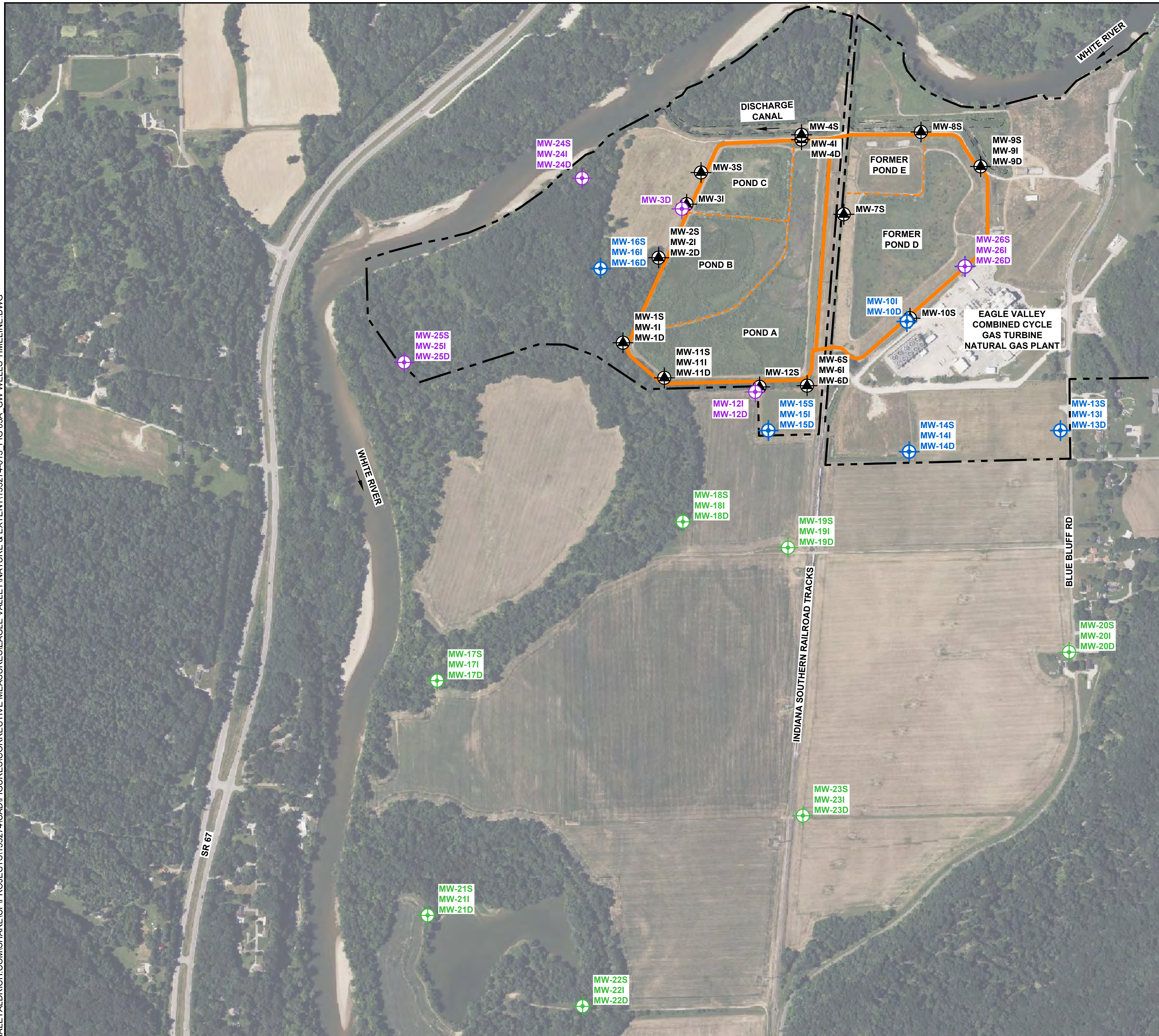
HALEY ALDRICH

EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

GROUNDWATER MONITORING WELL LOCATION MAP

SCALE: AS SHOWN
APRIL 2024

FIGURE 5A



LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF ASH POND SYSTEM
- APPROXIMATE BOUNDARY OF ASH POND
- MW-3 — CCR MONITORING WELL INSTALLED IN 2015 - 2016
- MW-15 — NATURE AND EXTENT MONITORING WELL INSTALLED IN 2019
  NOTE: MW-13 CLUSTER BECAME THE UPDATED BACKGROUND WELL IN NOVEMBER 2021
- MW-18 — NATURE AND EXTENT MONITORING WELL INSTALLED IN 2021 - 2022
- MW-26 — NATURE AND EXTENT MONITORING WELL INSTALLED IN 2023

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
3. CCR = COAL COMBUSTION RESIDUALS
4. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE

0 800 1600
SCALE IN FEET

HALEY ALDRICH

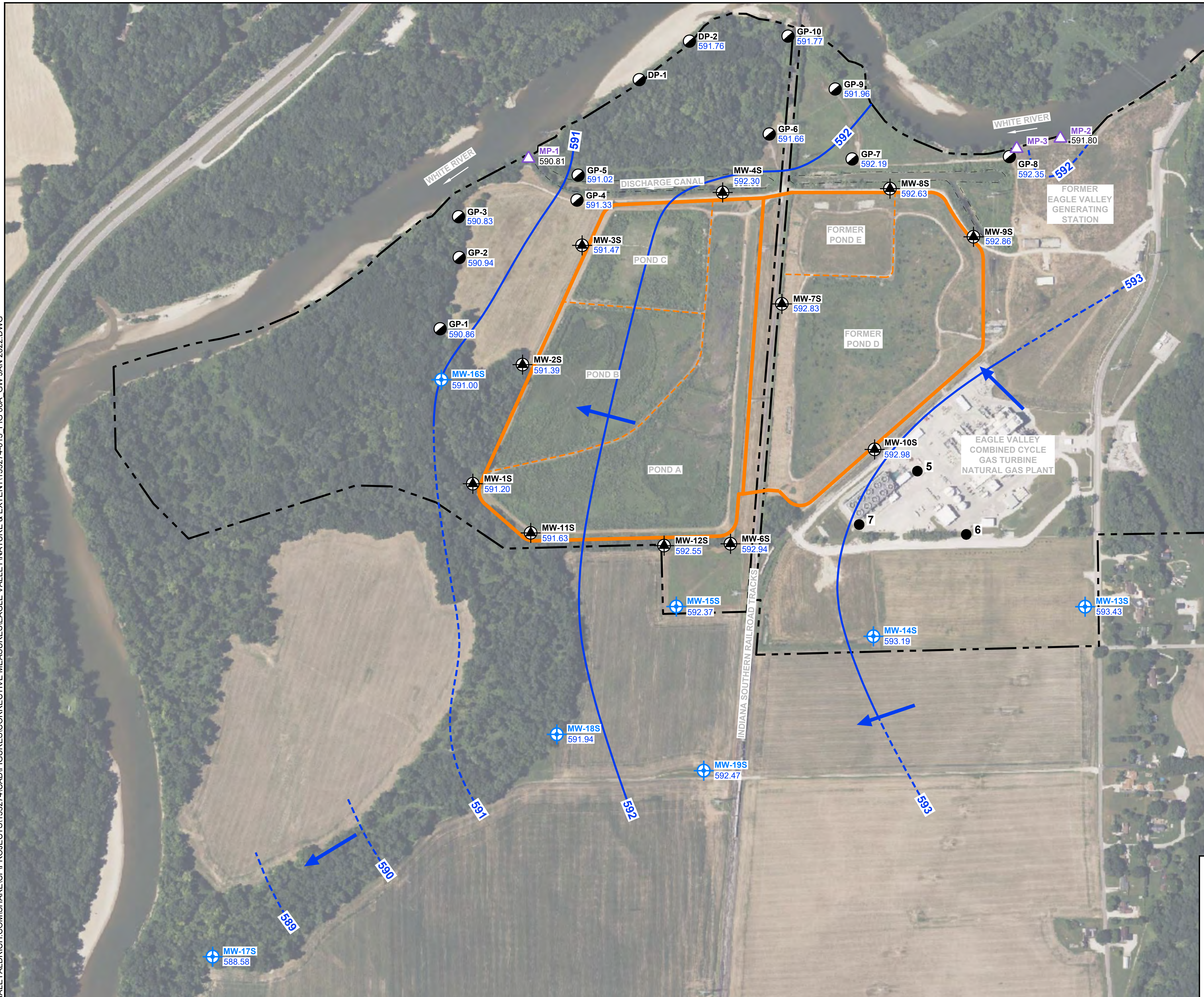
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

GROUNDWATER MONITORING WELL INSTALLATION TIMELINE

SCALE: AS SHOWN
APRIL 2024

FIGURE 5B

YEOMAN, ROB Saved: 1/12/2024 2:10 PM Layout: FIGURE 3A
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\133274\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\NATURE & EXTENT\133274-013_FIG 03A_GW WELLS TIMELINE.DWG



LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF ASH POND SYSTEM
- APPROXIMATE BOUNDARY OF ASH POND
- MW-3 — CCR MONITORING WELL
- MW-15 — NATURE AND EXTENT MONITORING WELL
- 5 — PRODUCTION WELL
- GP-2 — PIEZOMETER LOCATION
- MP-2 — RIVER MEASUREMENT LOCATION
- 591.80 — SURFACE WATER ELEVATION
- 593.02 — GROUNDWATER ELEVATION IN FEET
- 591 — 1 FOOT GROUNDWATER ELEVATION CONTOUR IN FEET (DASHED WHERE INFERRED)
- GROUNDWATER FLOW DIRECTION

NOTES

1. SHALLOW GROUNDWATER FLOW DURING REDUCED PRODUCTION WELL PUMPING
2. AERIAL IMAGE FROM MICROSOFT BING MAPS, DATED JULY 2019.
3. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE.
4. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
4. CCR = COAL COMBUSTION RESIDUALS
5. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE

N

0 550 1100
SCALE IN FEET

HALEY ALDRICH

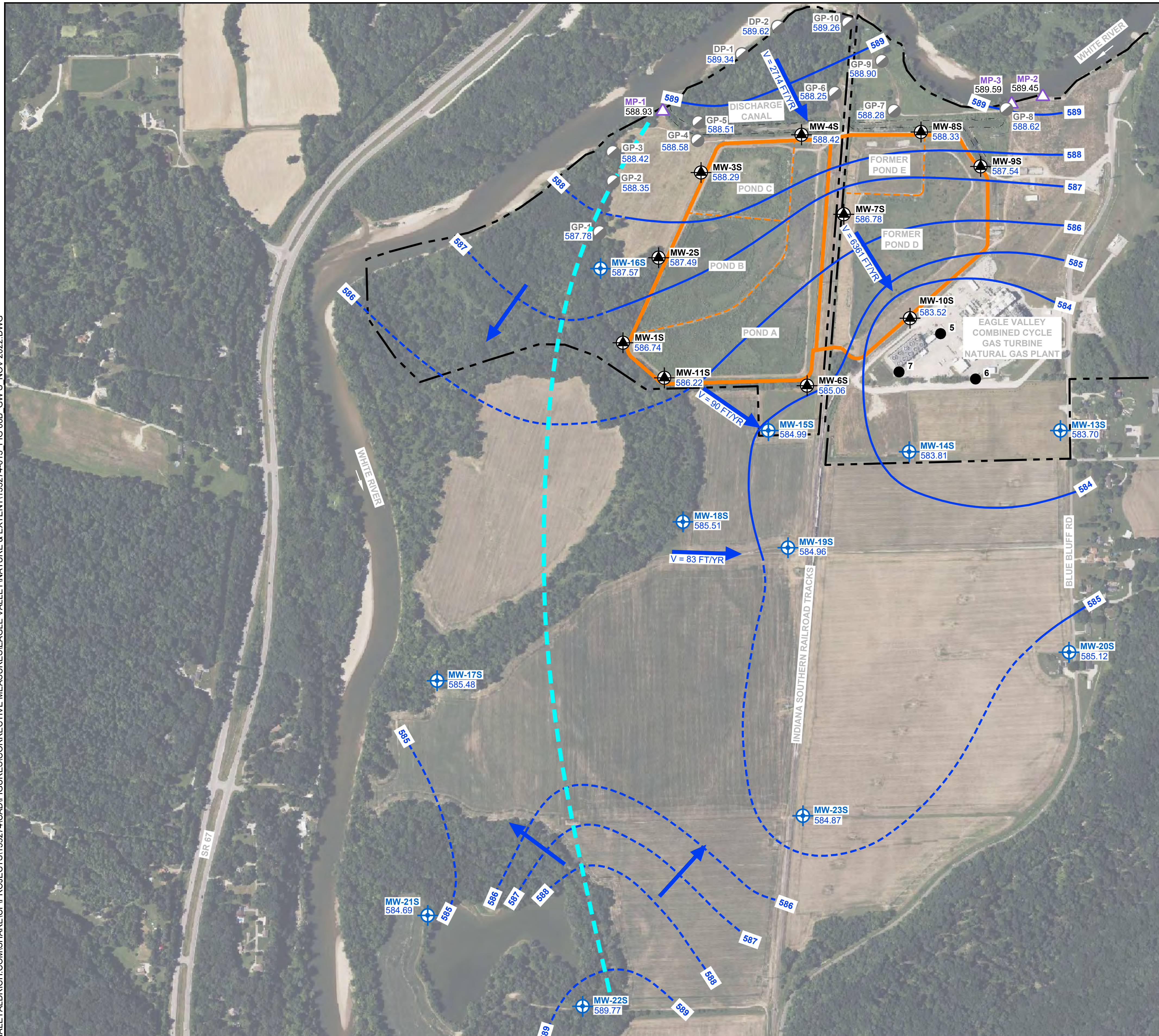
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

SHALLOW GROUNDWATER FLOW MAP
(18 JANUARY 2022)

SCALE: AS SHOWN
APRIL 2024

FIGURE 6A

YEOMAN, ROB Saved: 2/12/2024 5:04 AM Layout: FIGURE 6A
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\133274\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\NATURE & EXTENT\133274-013_FIG 06A_GW JAN 2022.DWG



LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF ASH POND SYSTEM
- APPROXIMATE BOUNDARY OF ASH POND
- MW-3 CCR MONITORING WELL
- MW-15 NATURE AND EXTENT MONITORING WELL
- 5 PRODUCTION WELL
- GP-2 PIEZOMETER LOCATION
- MP-2 RIVER MEASUREMENT LOCATION
- 593.52 SURFACE WATER ELEVATION IN FEET
- 593.52 GROUNDWATER ELEVATION IN FEET
- 591 1-FOOT GROUNDWATER ELEVATION CONTOUR IN FEET (DASHED WHERE INFERRED)
- GROUNDWATER FLOW BREAKLINE
- GROUNDWATER FLOW DIRECTION

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
3. CCR = COAL COMBUSTION RESIDUALS
4. $V = k(i)/n_e$
   WHERE:
   V = GROUNDWATER FLOW VELOCITY (FT/YEAR)
   k = HORIZONTAL HYDRAULIC CONDUCTIVITY (FT/DAY)
   i = HORIZONTAL GROUNDWATER GRADIENT (FT/FT)
   n_e = ASSUMED EFFECTIVE POROSITY
5. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE

0 800 1600
SCALE IN FEET

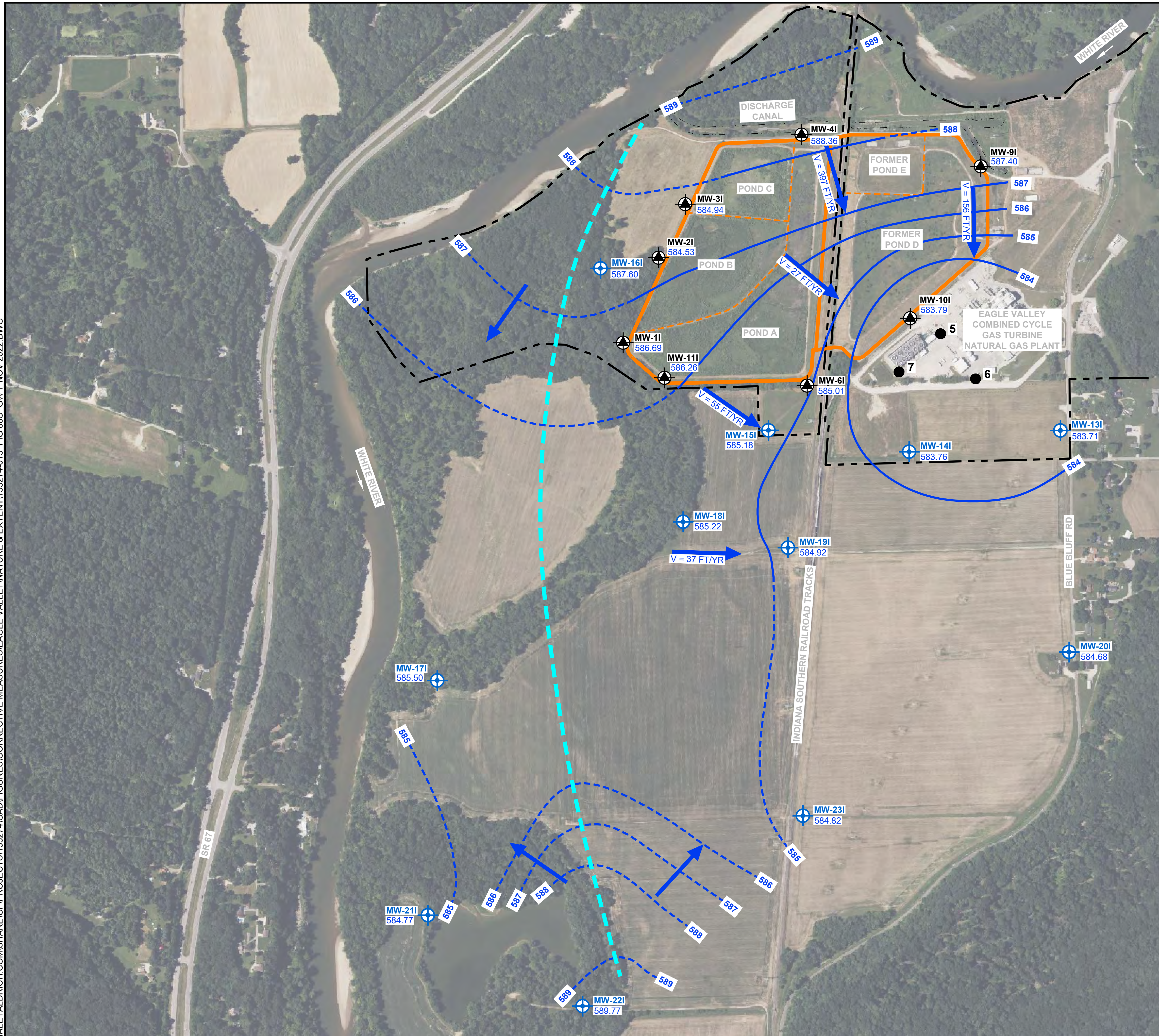
HALEY ALDRICH

EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

GROUNDWATER FLOW MAP SHALLOW ZONE (15 NOVEMBER 2022)

SCALE: AS SHOWN
APRIL 2024

FIGURE 6B



LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF ASH POND SYSTEM
- APPROXIMATE BOUNDARY OF ASH POND
- MW-3 CCR MONITORING WELL
- MW-15 NATURE AND EXTENT MONITORING WELL
- 5 PRODUCTION WELL
- 583.79 GROUNDWATER ELEVATION IN FEET
- 584 1-FOOT GROUNDWATER ELEVATION CONTOUR IN FEET (DASHED WHERE INFERRED)
- GROUNDWATER FLOW BREAKLINE
- GROUNDWATER FLOW DIRECTION

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
3. CCR = COAL COMBUSTION RESIDUALS
4. $V = k(i)/n_e$
   WHERE:
   V = GROUNDWATER FLOW VELOCITY (FT/YEAR)
   k = HORIZONTAL HYDRAULIC CONDUCTIVITY (FT/DAY)
   i = HORIZONTAL GROUNDWATER GRADIENT (FT/FT)
   n_e = ASSUMED EFFECTIVE POROSITY
5. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE

N

0 800 1600
SCALE IN FEET

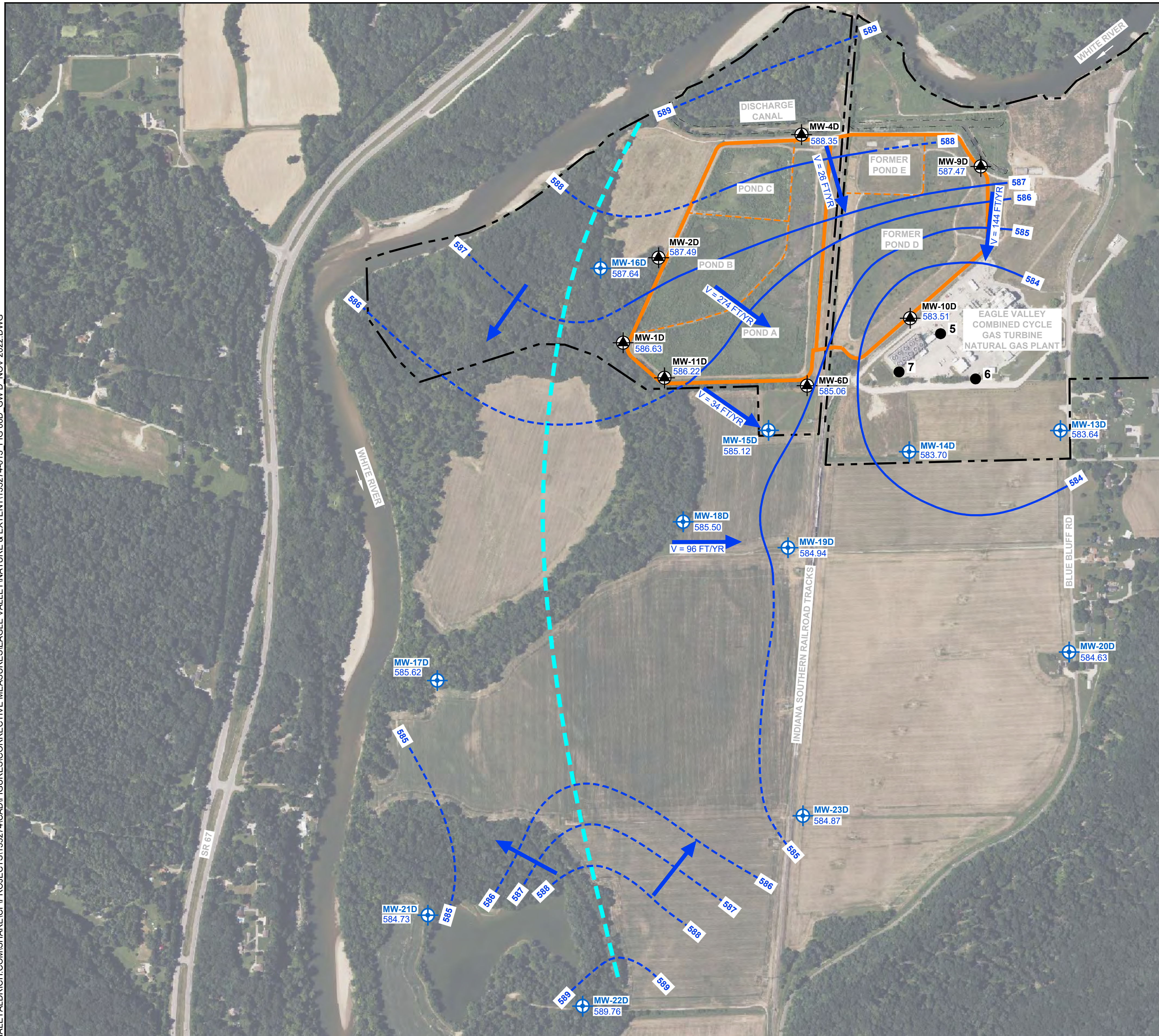
HALEY ALDRICH

EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

GROUNDWATER FLOW MAP
INTERMEDIATE ZONE
(15 NOVEMBER 2022)

SCALE: AS SHOWN
APRIL 2024

FIGURE 6C



LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF ASH POND SYSTEM
- APPROXIMATE BOUNDARY OF ASH POND
- MW-3 — CCR MONITORING WELL
- MW-15 — NATURE AND EXTENT MONITORING WELL
- 5 — PRODUCTION WELL
- 593.51 — GROUNDWATER ELEVATION IN FEET
- 584 — 1-FOOT GROUNDWATER ELEVATION CONTOUR IN FEET (DASHED WHERE INFERRED)
- GROUNDWATER FLOW BREAKLINE
- GROUNDWATER FLOW DIRECTION

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
3. CCR = COAL COMBUSTION RESIDUALS
4. $V = k(i)/n_e$
   WHERE:
   V = GROUNDWATER FLOW VELOCITY (FT/YEAR)
   k = HORIZONTAL HYDRAULIC CONDUCTIVITY (FT/DAY)
   i = HORIZONTAL GROUNDWATER GRADIENT (FT/FT)
   n_e = ASSUMED EFFECTIVE POROSITY
5. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE

N

0 800 1600
SCALE IN FEET

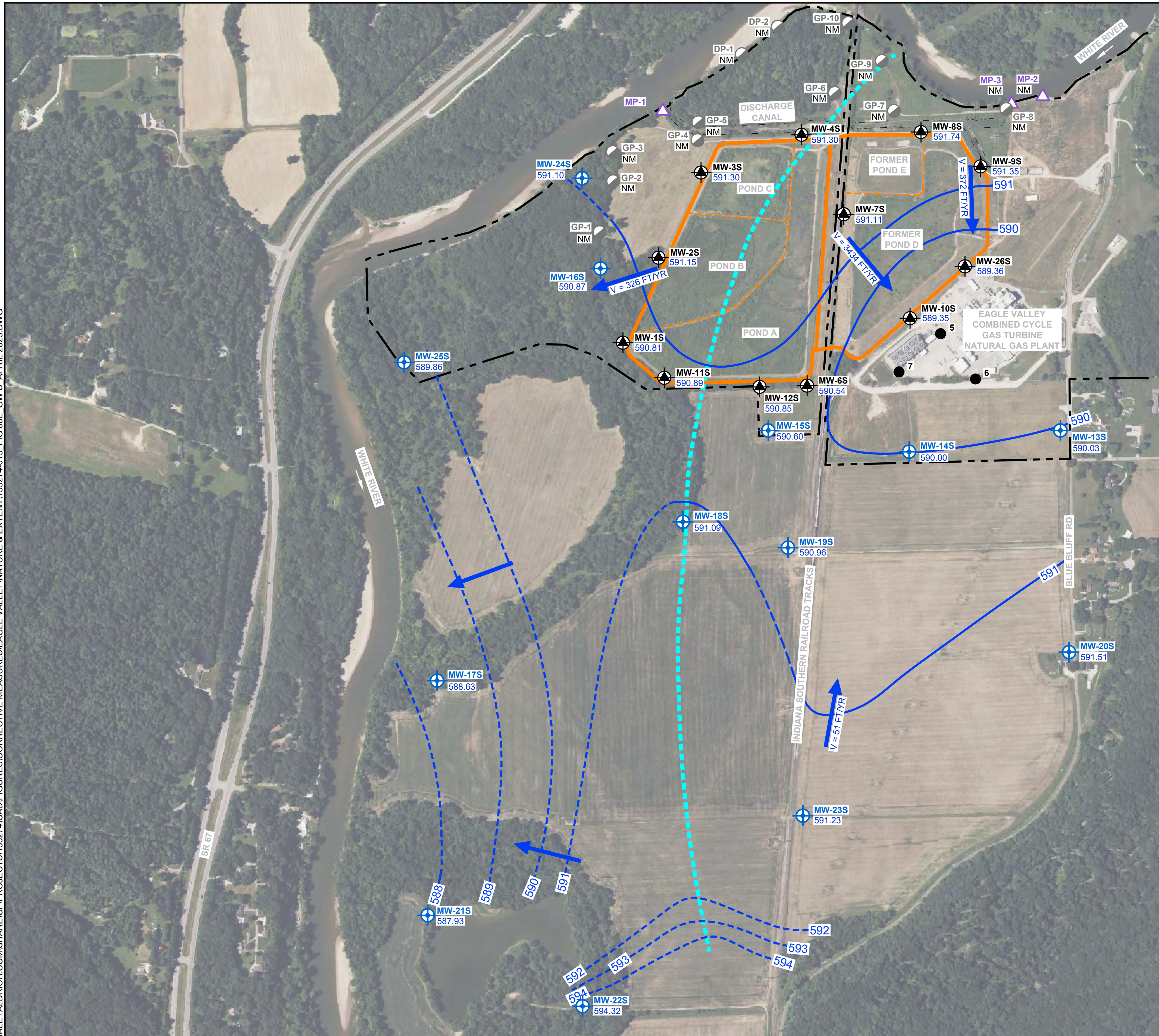
HALEY ALDRICH

EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

GROUNDWATER FLOW MAP
DEEP ZONE
(15 NOVEMBER 2022)

SCALE: AS SHOWN
APRIL 2024

FIGURE 6D



LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF ASH POND SYSTEM
- APPROXIMATE BOUNDARY OF ASH POND
- MW-3 CCR MONITORING WELL
- MW-15 NATURE AND EXTENT MONITORING WELL
- GP-7 PIEZOMETER LOCATION
- MP-3 RIVER MEASUREMENT LOCATION
- 5 PRODUCTION WELL
- 593.52 GROUNDWATER ELEVATION IN FEET
- 591 1-FOOT GROUNDWATER ELEVATION CONTOUR IN FEET (INFERRED WHERE DASHED)
- GROUNDWATER FLOW BREAKLINE
- GROUNDWATER FLOW DIRECTION

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
3. CCR = COAL COMBUSTION RESIDUALS
4. NM = NOT MEASURED
5. $V = k(i)/n_e$
   WHERE:
   V = GROUNDWATER FLOW VELOCITY (FT/YEAR)
   k = HORIZONTAL HYDRAULIC CONDUCTIVITY (FT/DAY)
   i = HORIZONTAL GROUNDWATER GRADIENT (FT/FT)
   n_e = ASSUMED EFFECTIVE POROSITY
6. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE

N

0 800 1600

SCALE IN FEET

HALEY ALDRICH

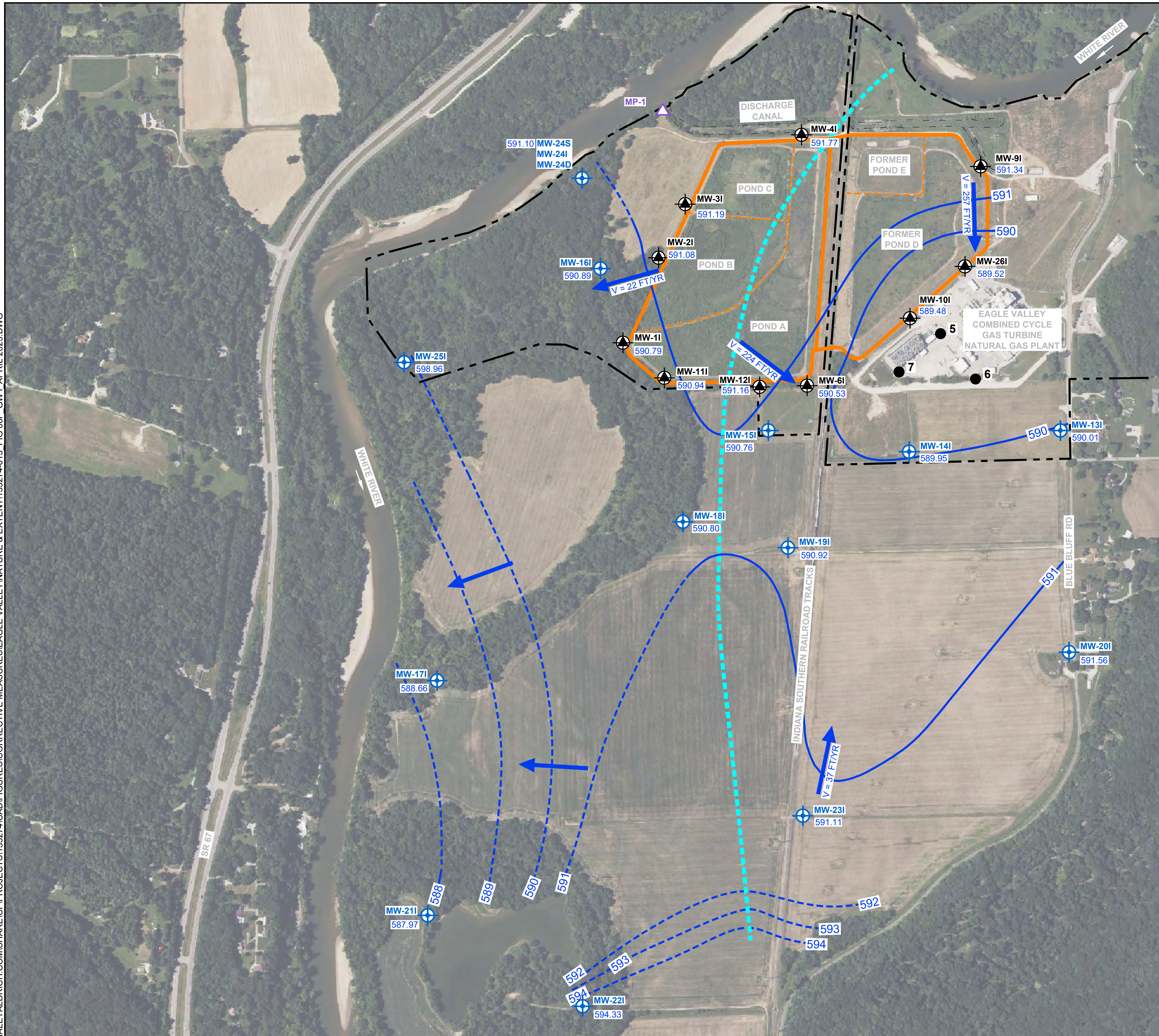
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

GROUNDWATER FLOW MAP
SHALLOW ZONE
(14 APRIL 2023)

SCALE: AS SHOWN
APRIL 2024

FIGURE 6E

YEOMAN, ROB Saved: 9/29/2023 3:28 PM Layout: FIGURE 6E
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\133274\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\NATURE & EXTENT\133274-013_FIG 06E_GW S_APRIL 2023.DWG



LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF ASH POND SYSTEM
- APPROXIMATE BOUNDARY OF ASH POND
- MW-3 CCR MONITORING WELL
- MW-15 NATURE AND EXTENT MONITORING WELL
- 5 PRODUCTION WELL
- 583.79 GROUNDWATER ELEVATION IN FEET
- 584 1-FOOT GROUNDWATER ELEVATION CONTOUR IN FEET (DASHED WHERE INFERRED)
- GROUNDWATER FLOW BREAKLINE
- GROUNDWATER FLOW DIRECTION

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
3. CCR = COAL COMBUSTION RESIDUALS
4. NM = NOT MEASURED
5. $V = k(i)/n_e$
   WHERE:
   V = GROUNDWATER FLOW VELOCITY (FT/YEAR)
   k = HORIZONTAL HYDRAULIC CONDUCTIVITY (FT/DAY)
   i = HORIZONTAL GROUNDWATER GRADIENT (FT/FT)
   n_e = ASSUMED EFFECTIVE POROSITY
6. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE

N

0 800 1600
SCALE IN FEET

HALEY ALDRICH

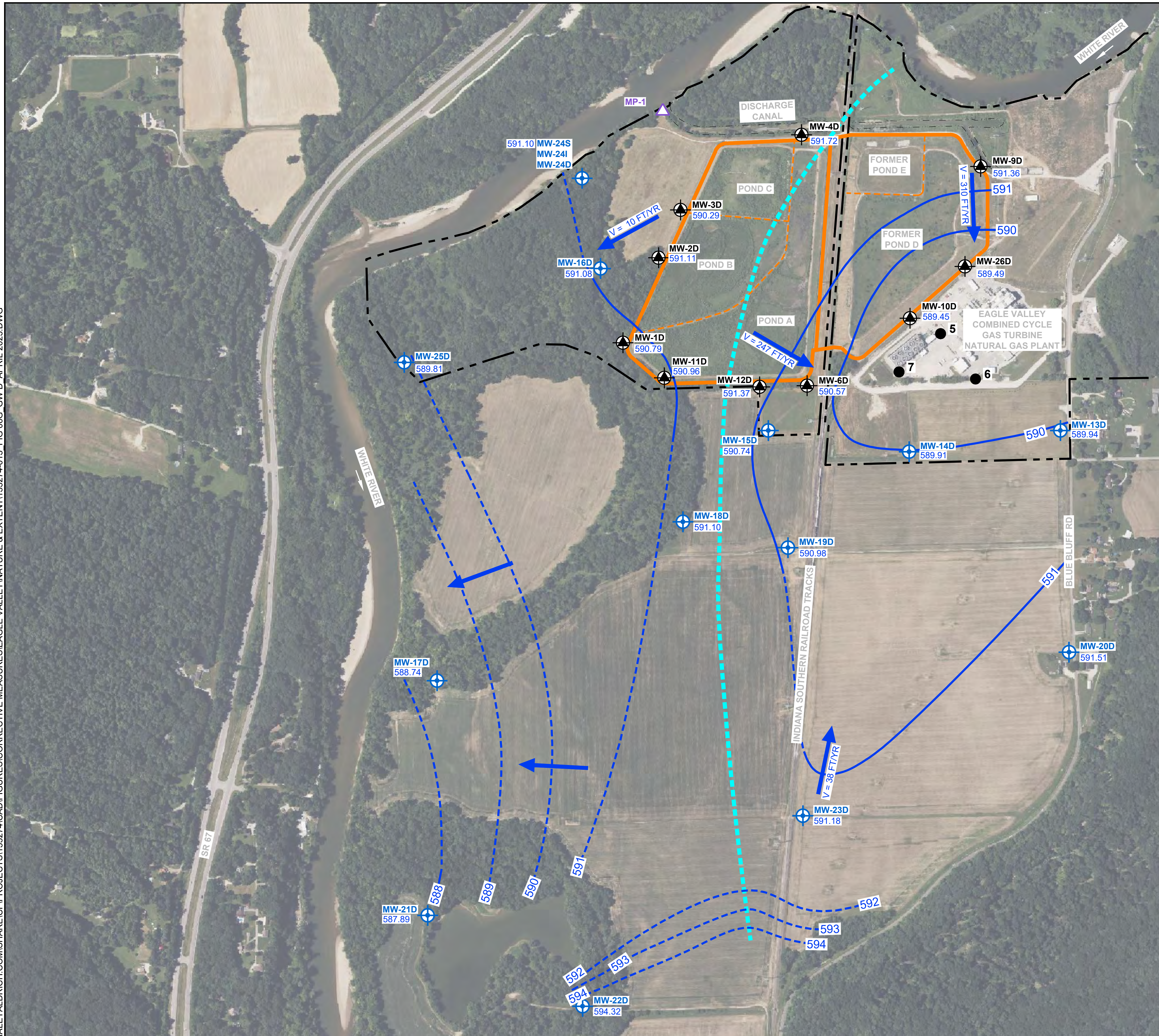
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

GROUNDWATER FLOW MAP
INTERMEDIATE ZONE
(14 APRIL 2023)

SCALE: AS SHOWN
APRIL 2024

FIGURE 6F

YEOMAN, ROB
Saved: 9/29/2023 2:30 PM
Layout: FIGURE 6F
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\133274\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\NATURE & EXTENT\133274-013_FIG 06F_GW I_APRIL 2023.DWG



LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF ASH POND SYSTEM
- APPROXIMATE BOUNDARY OF ASH POND
- MW-3 — CCR MONITORING WELL
- MW-15 — NATURE AND EXTENT MONITORING WELL
- 5 — PRODUCTION WELL
- 593.51 — GROUNDWATER ELEVATION IN FEET
- 584 — 1-FOOT GROUNDWATER ELEVATION CONTOUR IN FEET (DASHED WHERE INFERRED)
- GROUNDWATER FLOW BREAKLINE
- GROUNDWATER FLOW DIRECTION

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
3. CCR = COAL COMBUSTION RESIDUALS
4. NM = NOT MEASURED
5. V = k(i)/n_e
   WHERE:
   V = GROUNDWATER FLOW VELOCITY (FT/YEAR)
   k = HORIZONTAL HYDRAULIC CONDUCTIVITY (FT/DAY)
   i = HORIZONTAL GROUNDWATER GRADIENT (FT/FT)
   n_e = ASSUMED EFFECTIVE POROSITY
6. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE

N

0 800 1600
SCALE IN FEET

HALEY ALDRICH

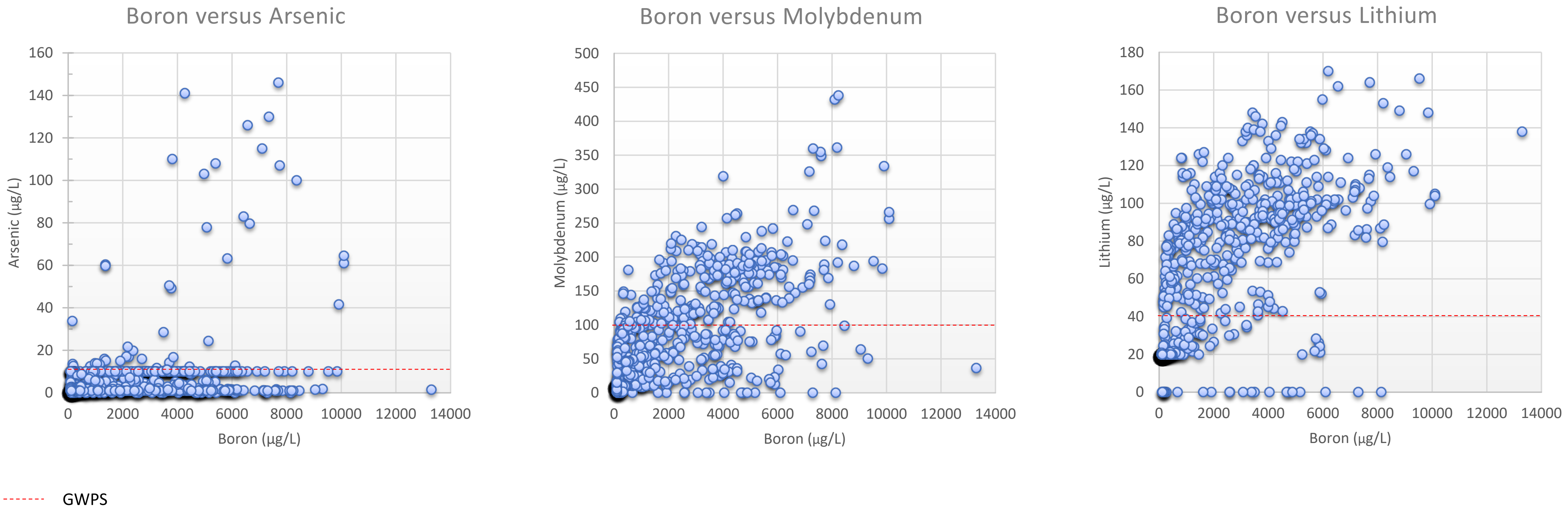
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

GROUNDWATER FLOW MAP
DEEP ZONE
(14 APRIL 2023)

SCALE: AS SHOWN
APRIL 2024

FIGURE 6G

YEOMAN, ROB Saved: 9/29/2023 2:30 PM Layout: FIGURE 6G
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\133274\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\NATURE & EXTENT\133274-013_FIG 06G_GW D_APRIL 2023.DWG



Note: Analytical results include the comprehensive dataset from 2016 through May 2023

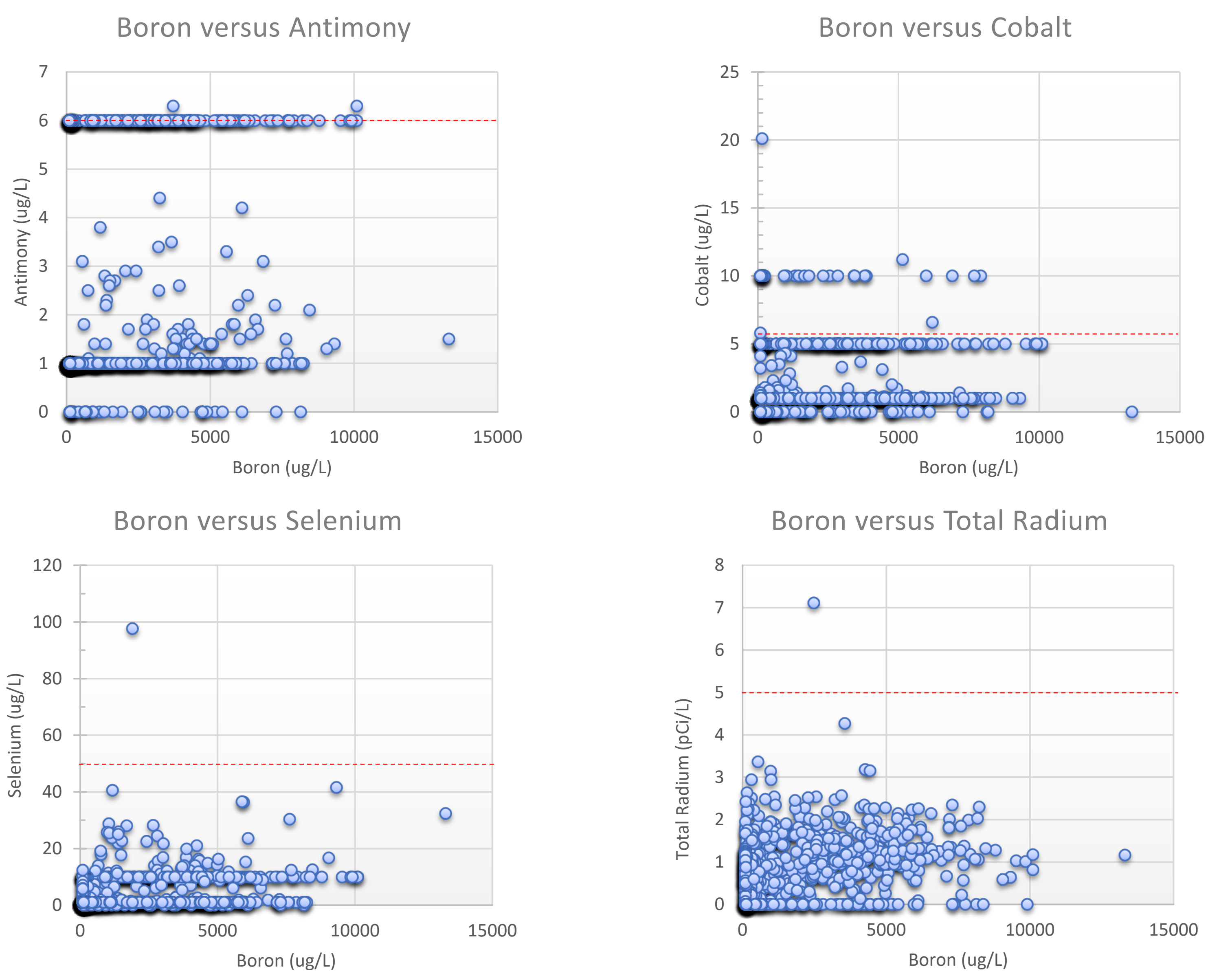
HALEY ALDRICH

EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

BIVARIATE PLOT
CONSTITUENTS WITH
STATISTICALLY SIGNIFICANT
LEVELS

APRIL 2024

FIGURE 7A



GWPS

Note: Analytical results include the comprehensive dataset from 2016 through May 2023

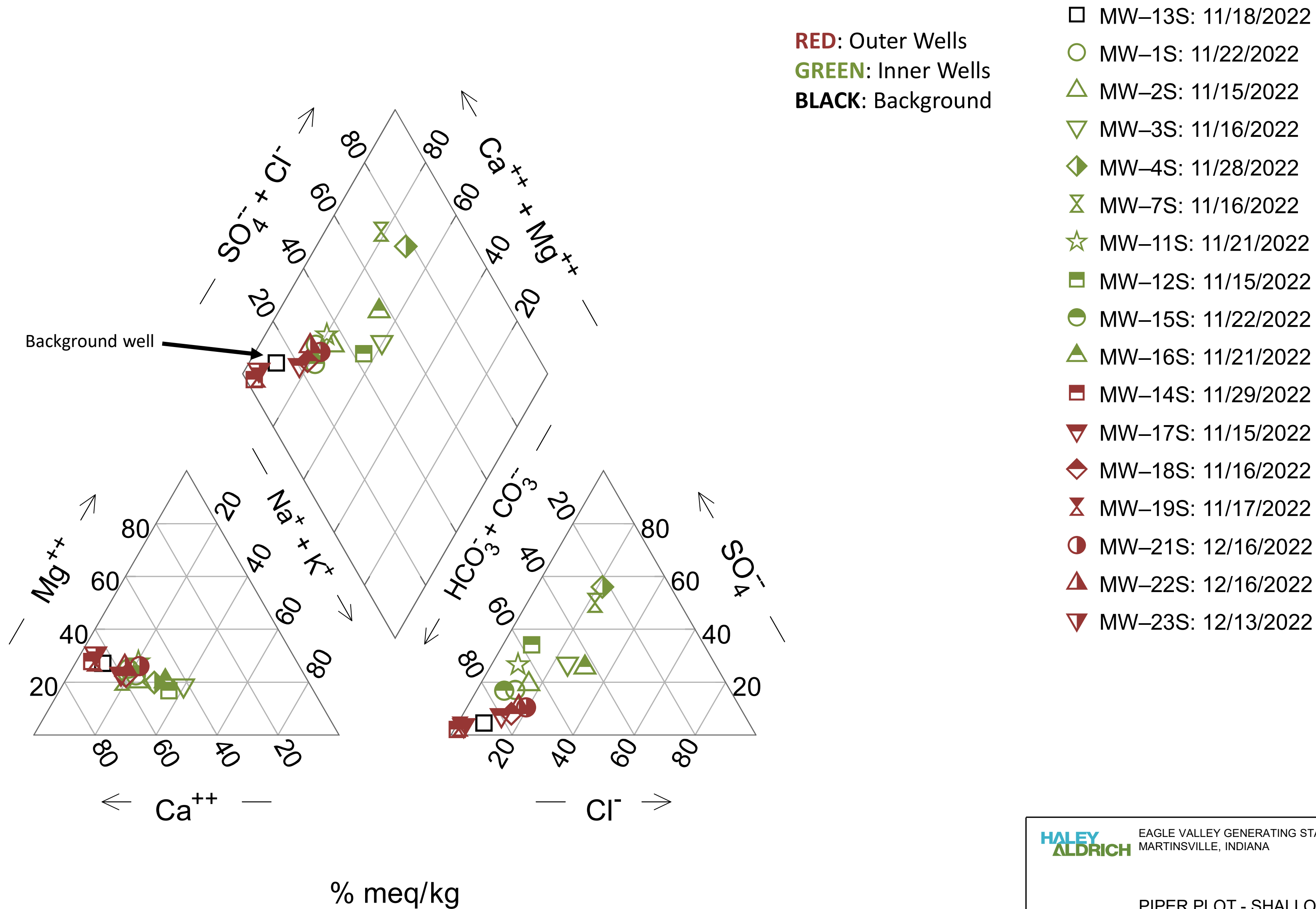
HALEY ALDRICH

EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

BIVARIATE PLOT
OTHER CONSTITUENTS WITH CONCENTRATIONS GREATER THAN THE GWPS

APRIL 2024

FIGURE 7B



Note: Samples without major cations and anions not plotted

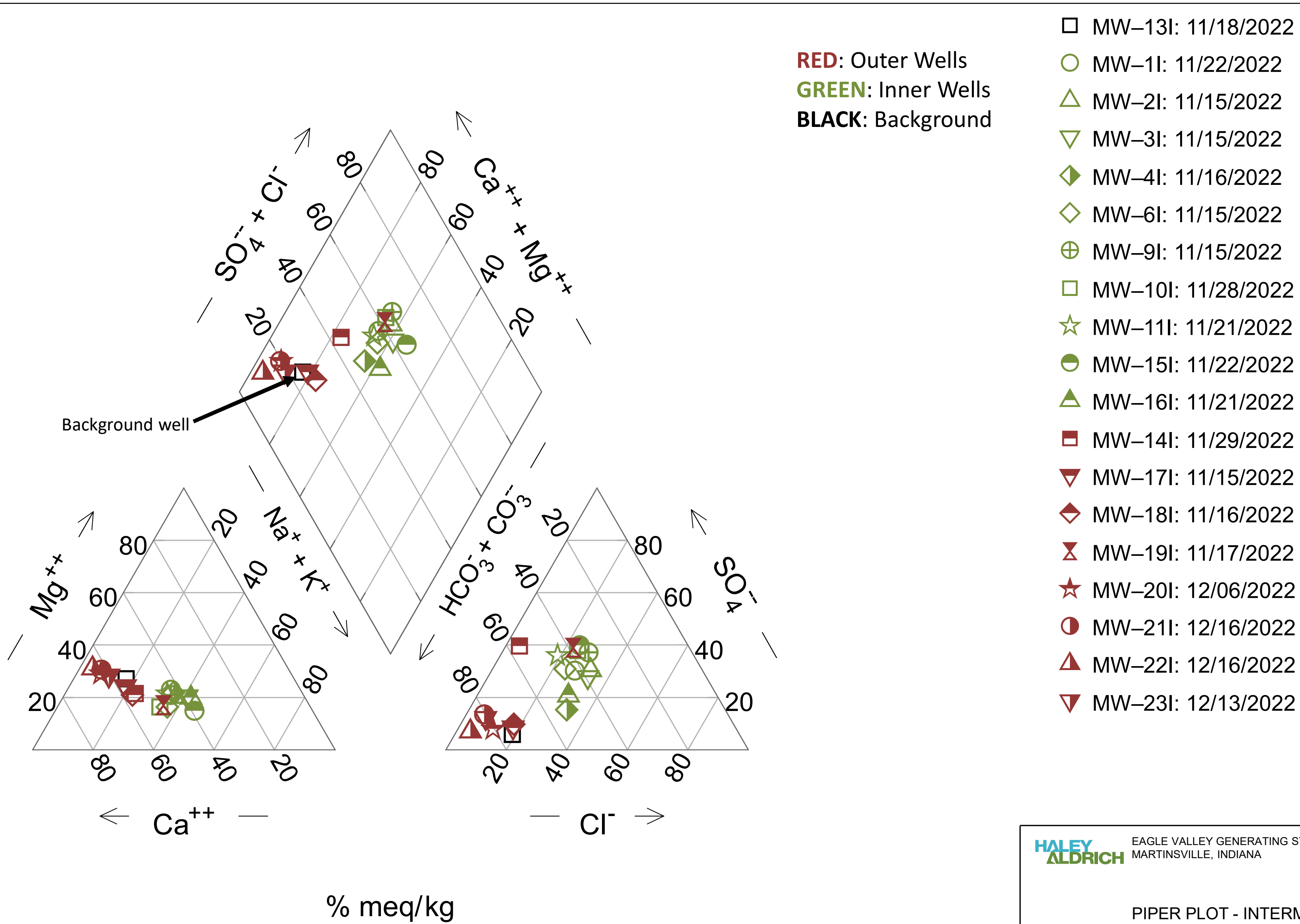
HALEY ALDRICH

EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

PIPER PLOT - SHALLOW

APRIL 2024

FIGURE 8A



Note: Samples without major cations and anions not plotted

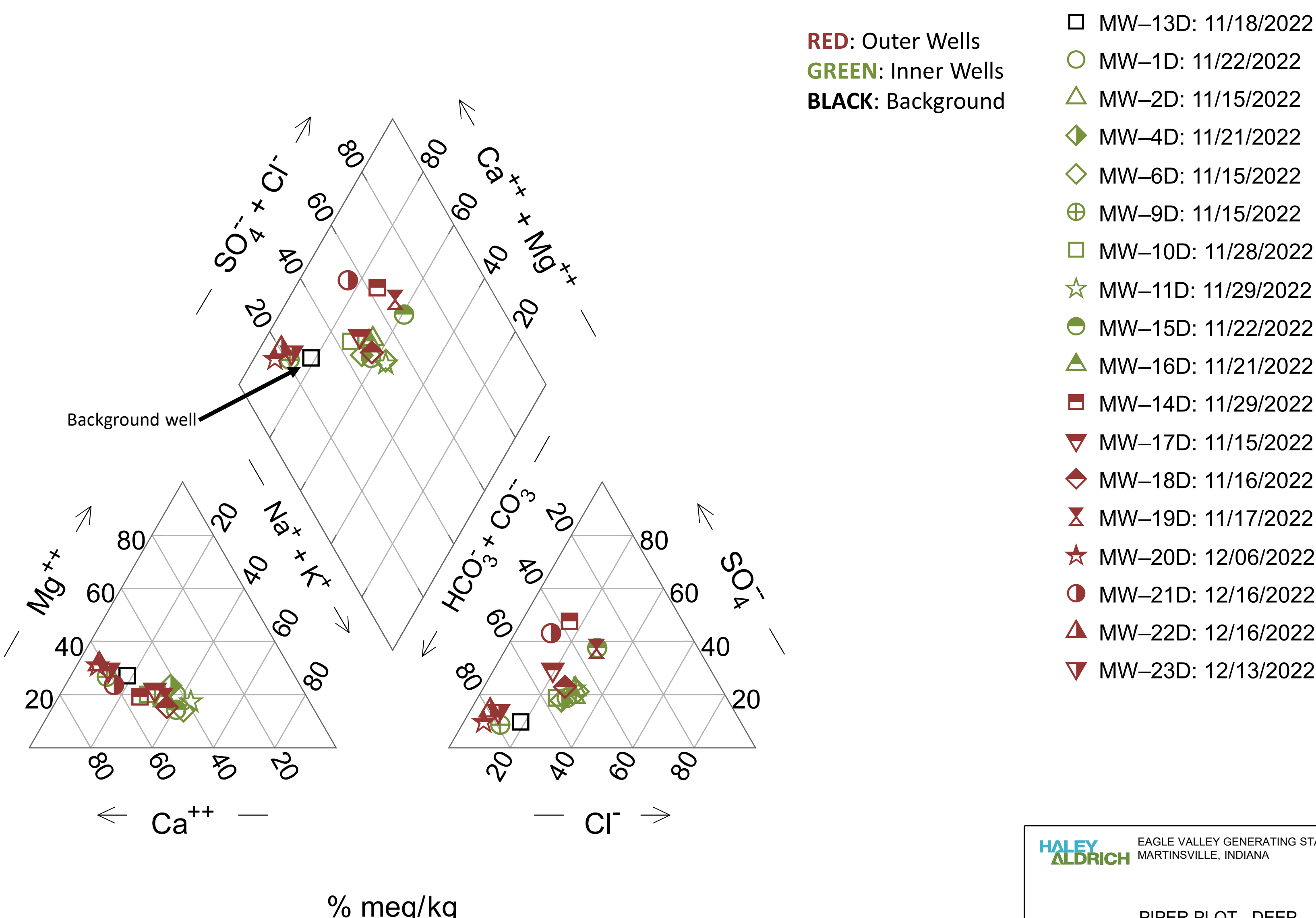
HALEY ALDRICH

EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

PIPER PLOT - INTERMEDIATE

APRIL 2024

FIGURE 8B



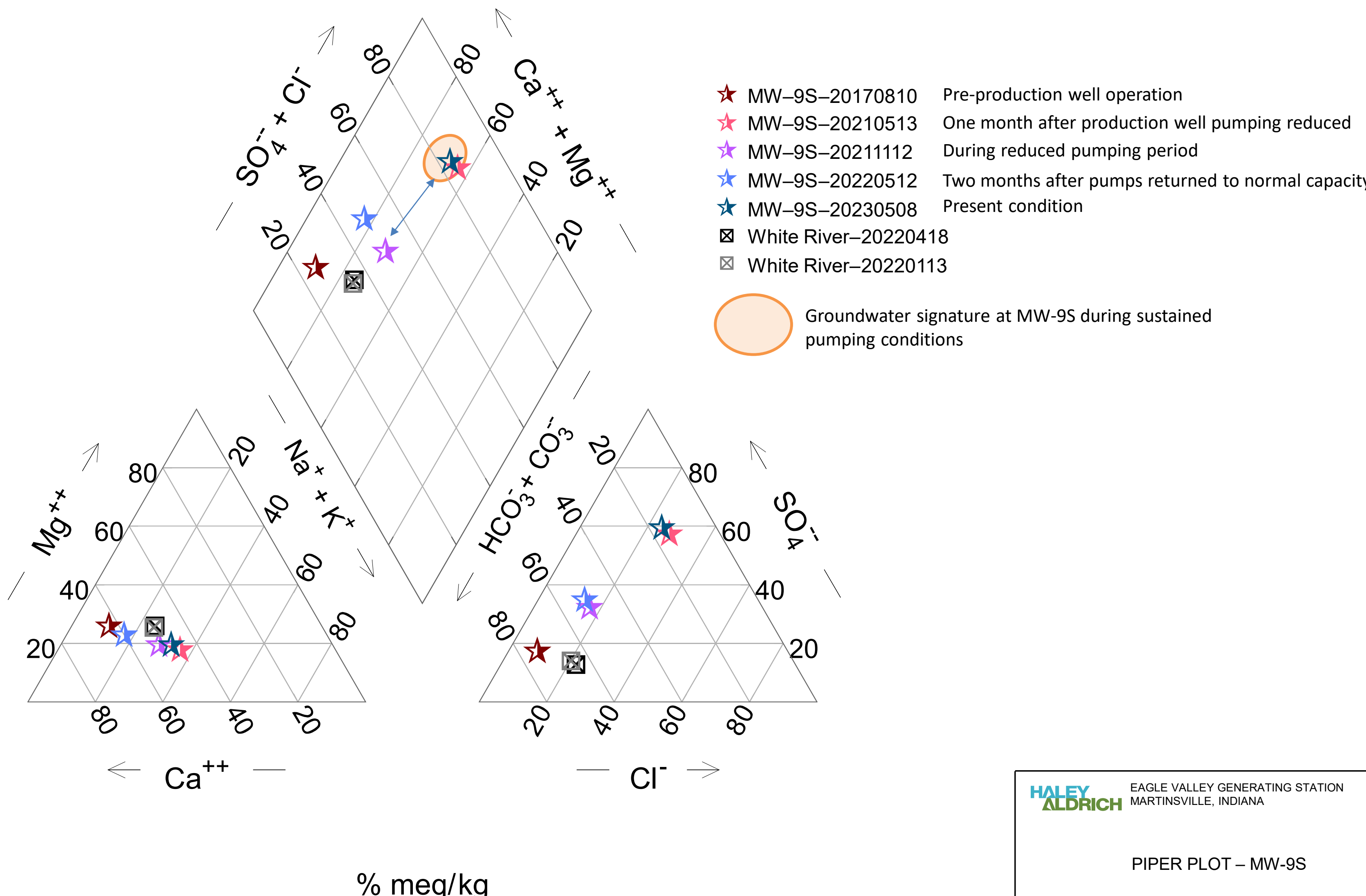
Note: Samples without major cations and anions not plotted

EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

PIPER PLOT - DEEP

APRIL 2024

FIGURE 8C



Note: Samples without major cations and anions not plotted

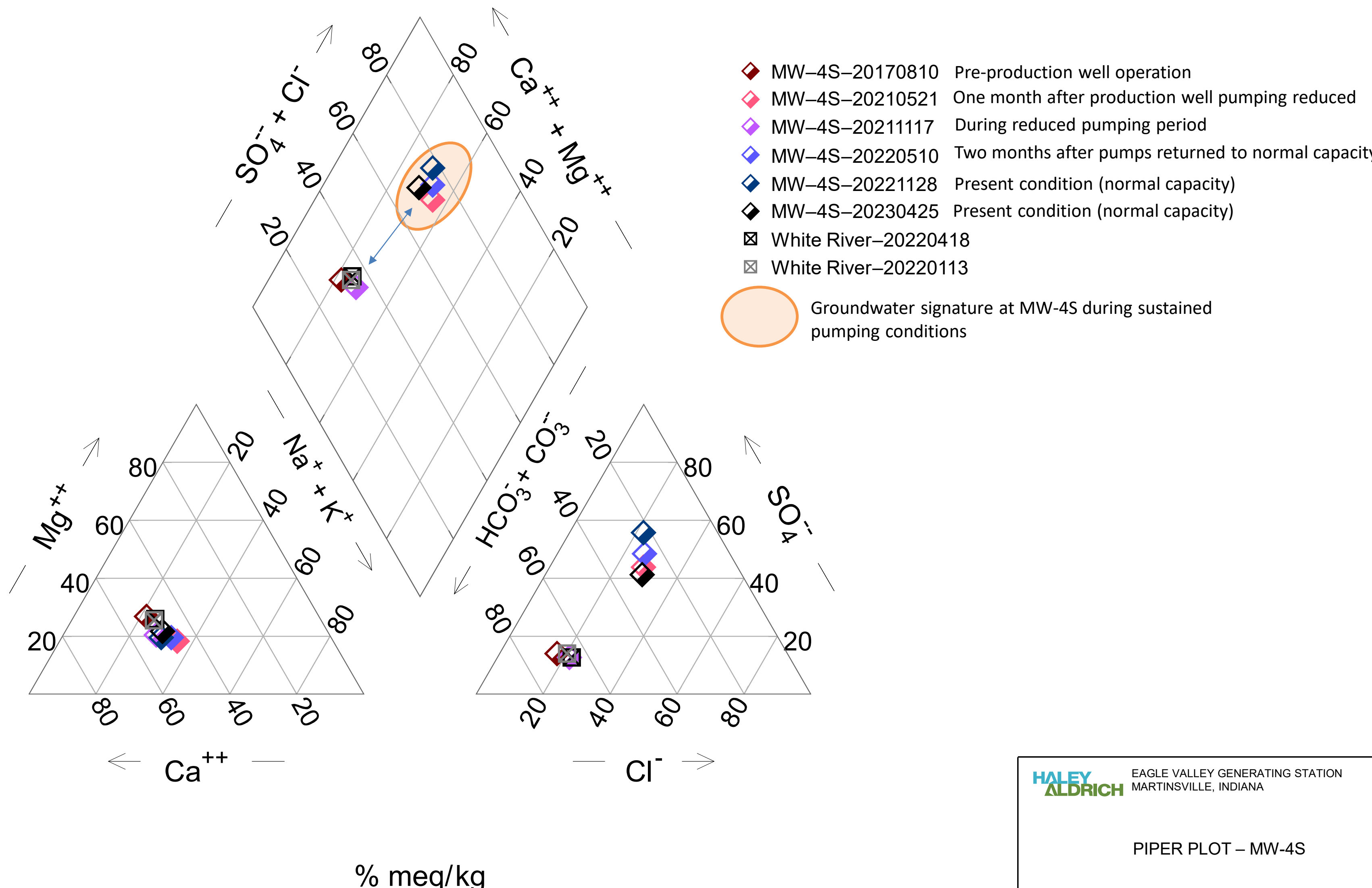
HALEY ALDRICH

EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

PIPER PLOT – MW-9S

APRIL 2024

FIGURE 8D



Note: Samples without major cations and anions not plotted

HALEY ALDRICH

EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

PIPER PLOT – MW-4S

APRIL 2024

FIGURE 8E

LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF ASH POND SYSTEM
- APPROXIMATE BOUNDARY OF ASH POND
- MW-3 — CCR MONITORING WELL
- MW-15 — NATURE AND EXTENT MONITORING WELL
- 5 — PRODUCTION WELL
- 1.6 — ARSENIC CONCENTRATION IN µg/L

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
3. CCR = COAL COMBUSTION RESIDUALS
4. BOLD FONT INDICATED VALUE EXCEEDS GWPS FOR ARSENIC (10 µg/L)
5. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE

0 800 1600
SCALE IN FEET

HALEY ALDRICH

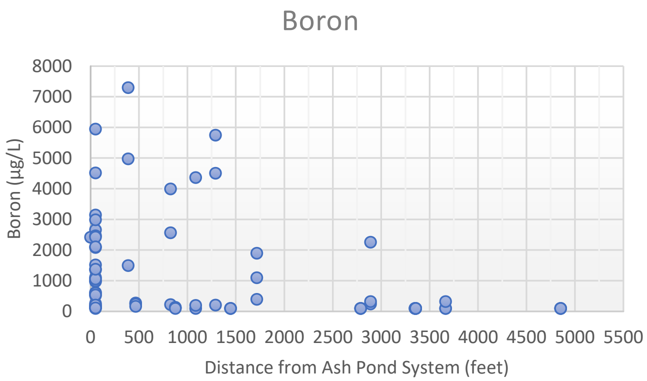
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

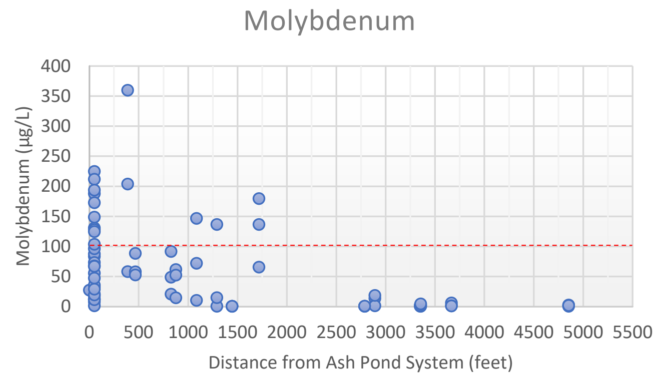
ARSENIC CONCENTRATION MAP SHALLOW (APRIL/MAY 2023)

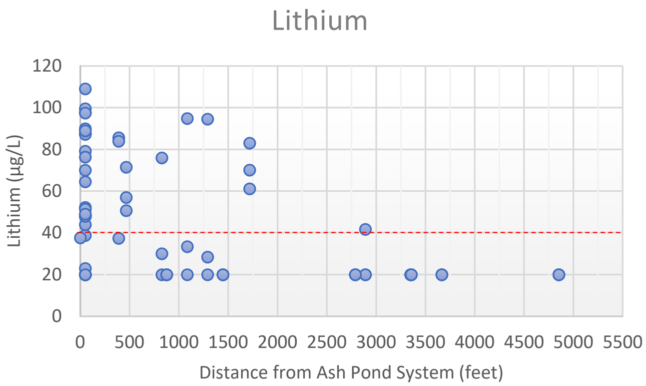
SCALE: AS SHOWN
APRIL 2024

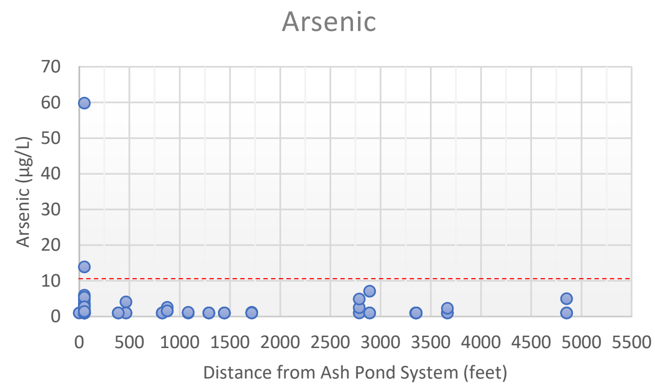
FIGURE 9

YEOMAN, ROB Saved: 2/12/2024 5:04 AM Layout: FIGURE 12A
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\133274\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\NATURE & EXTENT\133274-013_FIG 12A_AS S_APR-MAY 2023.DWG









------- GWPS

Note: Analytical results include the May 2023 monitoring event

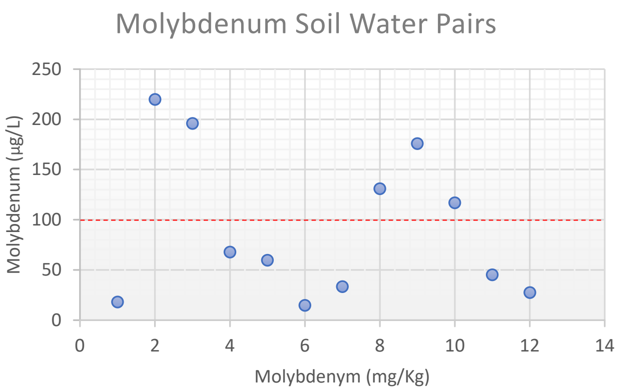
HALEY ALDRICH

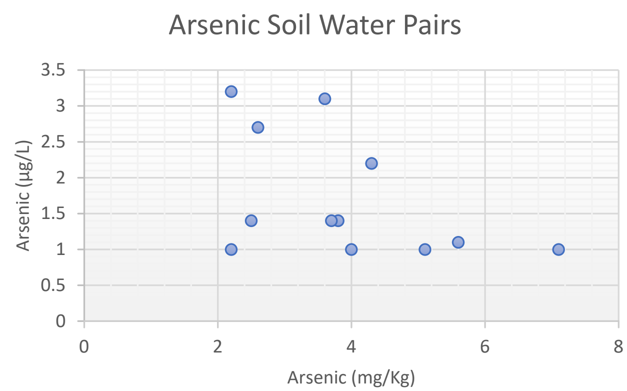
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

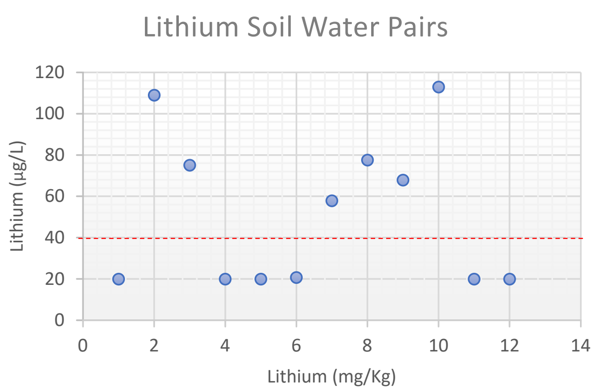
CONCENTRATION VERSUS DISTANCE PLOT

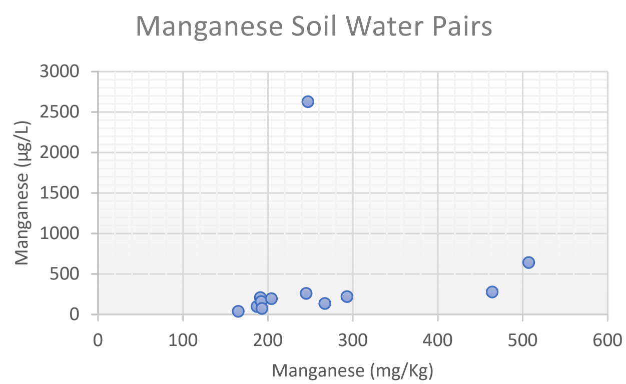
APRIL 2024

FIGURE 10









------- GWPS

Note: Analytical results include March and April 2023 results for monitoring wells: MW-3D, MW-12I/S/D, MW-24S/I/D, MW-25S/I/D, and MW-26S/I/D

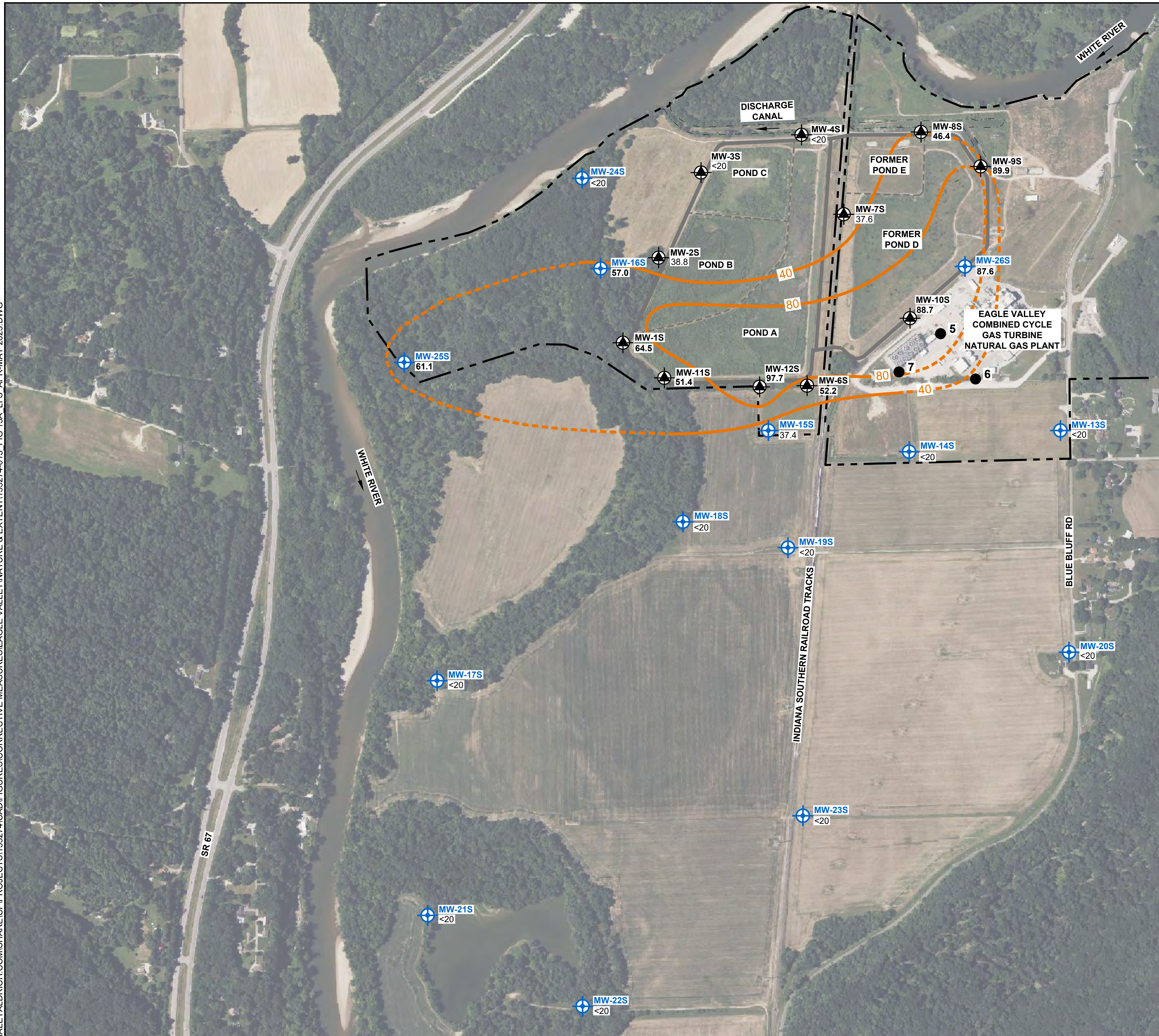
HALEY ALDRICH

EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

SOIL WATER PAIRS

APRIL 2024

FIGURE 11



LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF ASH POND SYSTEM
- APPROXIMATE BOUNDARY OF ASH POND
- MW-3 — CCR MONITORING WELL
- MW-15 — NATURE AND EXTENT MONITORING WELL
- 5 — PRODUCTION WELL
- 30.9 — LITHIUM CONCENTRATION IN μg/L
- 40 — ISOCONCENTRATION LINE (DASHED WHERE INFERRED)

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
3. CCR = COAL COMBUSTION RESIDUALS
4. CONCENTRATION:
   - MEASURED IN μg/L (MICROGRAMS PER LITER)
   - BOLD FONT INDICATES VALUE EXCEEEDS GWPS FOR LITHIUM (40 μg/L)
   - NS = NOT SAMPLED (INSUFFICIENT WATER)
5. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE

0 800 1600
SCALE IN FEET

HALEY ALDRICH

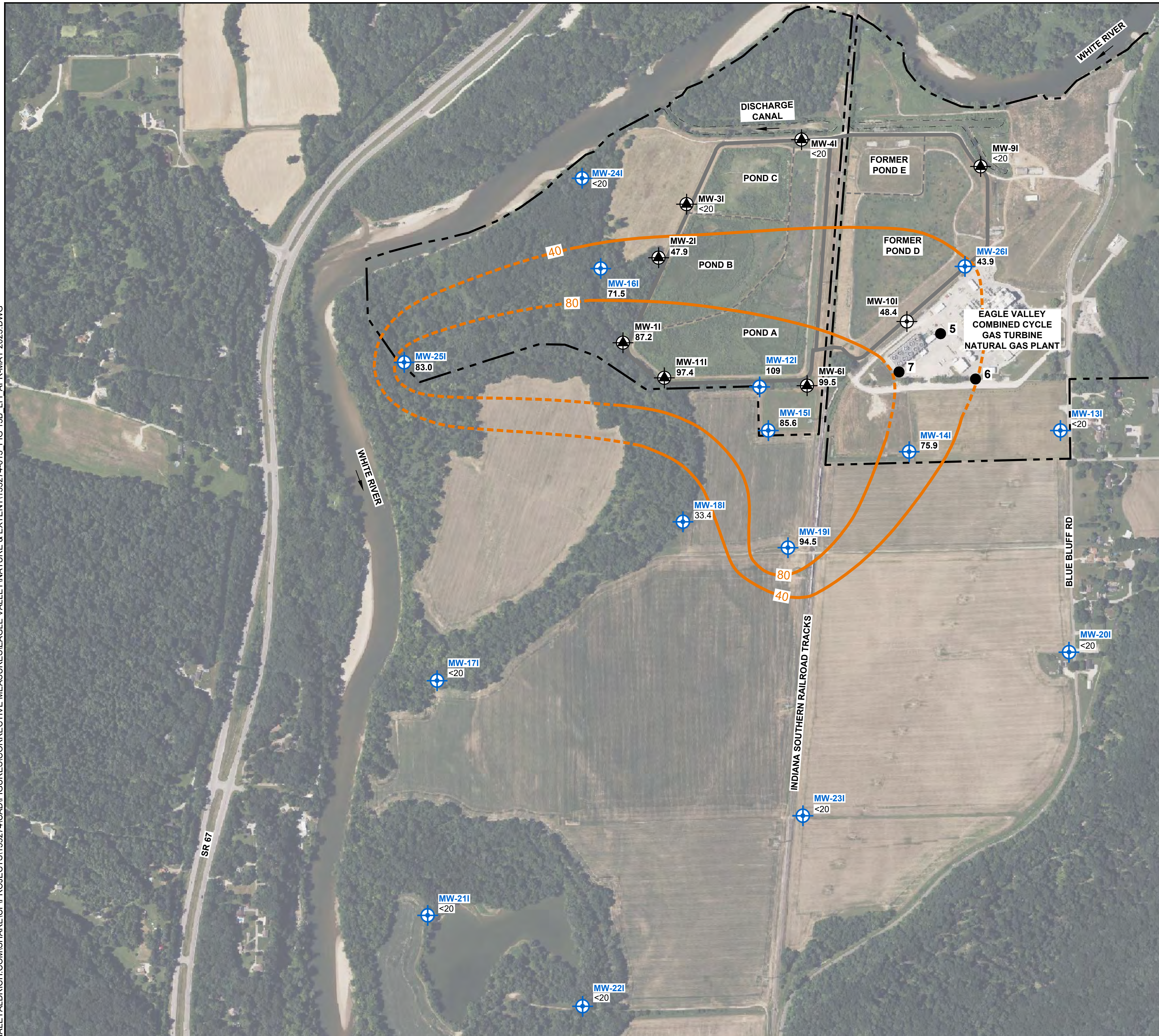
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

LITHIUM CONCENTRATION MAP
SHALLOW
(APRIL/MAY 2023)

SCALE: AS SHOWN
APRIL 2024

FIGURE 12A

YEOMAN, ROB Saved: 3/7/2024 10:12 AM Layout: FIGURE 13A
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\133274\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\NATURE & EXTENT\133274-013_FIG 13A_LI S_APR-MAY 2023.DWG



LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF ASH POND SYSTEM
- APPROXIMATE BOUNDARY OF ASH POND
- MW-3 — CCR MONITORING WELL
- MW-15 — NATURE AND EXTENT MONITORING WELL
- 5 — PRODUCTION WELL
- 30.9 — LITHIUM CONCENTRATION IN µg/L
- 40 — ISOCONCENTRATION LINE (DASHED WHERE INFERRED)

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
3. CCR = COAL COMBUSTION RESIDUALS
4. CONCENTRATION:
   - MEASURED IN µg/L (MICROGRAMS PER LITER)
   - BOLD FONT INDICATES VALUE EXCEEEDS GWPS FOR LITHIUM (40 µg/L)
   - NS = NOT SAMPLED (INSUFFICIENT WATER)
5. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE

0 800 1600
SCALE IN FEET

HALEY ALDRICH

EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

LITHIUM CONCENTRATION MAP
INTERMEDIATE
(APRIL/MAY 2023)

SCALE: AS SHOWN
APRIL 2024

FIGURE 12B

YEOMAN, ROB Saved: 2/12/2024 5:04 AM Layout: FIGURE 13D
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\133274\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\NATURE & EXTENT\133274-013_FIG 13B_LI I_APR-MAY 2023.DWG

LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF ASH POND SYSTEM
- APPROXIMATE BOUNDARY OF ASH POND
- MW-3 — CCR MONITORING WELL
- MW-15 — NATURE AND EXTENT MONITORING WELL
- 5 — PRODUCTION WELL
- 30.9 — LITHIUM CONCENTRATION IN µg/L
- 40 — ISOCONCENTRATION LINE (DASHED WHERE INFERRED)

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
3. CCR = COAL COMBUSTION RESIDUALS
4. CONCENTRATION:
   - MEASURED IN µg/L (MICROGRAMS PER LITER)
   - BOLD FONT INDICATES VALUE EXCEEEDS GWPS FOR LITHIUM (40 µg/L)
   - NS = NOT SAMPLED (INSUFFICIENT WATER)
5. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE

N

0 800 1600
SCALE IN FEET

HALEY ALDRICH

EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

LITHIUM CONCENTRATION MAP
DEEP
(APRIL/MAY 2023)

SCALE: AS SHOWN
APRIL 2024

FIGURE 12C

YEOMAN, ROB Saved: 2/12/2024 5:04 AM Layout: FIGURE 13F
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\133274\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\NATURE & EXTENT\133274-013_FIG 13C_LI D_APR-MAY 2023.DWG

LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF ASH POND SYSTEM
- APPROXIMATE BOUNDARY OF ASH POND
- MW-3 — CCR MONITORING WELL
- MW-15 — NATURE AND EXTENT MONITORING WELL
- 5 — PRODUCTION WELL
- 22.2 — MOLYBDENUM CONCENTRATION IN µg/L
- 100 — ISOCONCENTRATION LINE (DASHED WHERE INFERRED)

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
3. CCR = COAL COMBUSTION RESIDUALS
4. CONCENTRATION:
   - MEASURED IN µg/L (MICROGRAMS PER LITER)
   - BOLD FONT INDICATES VALUE EXCEEEDS GWPS FOR MOLYBDENUM (100 µg/L)
   - NS = NOT SAMPLED (INSUFFICIENT WATER)
5. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE

0 800 1600
SCALE IN FEET

HALEY ALDRICH

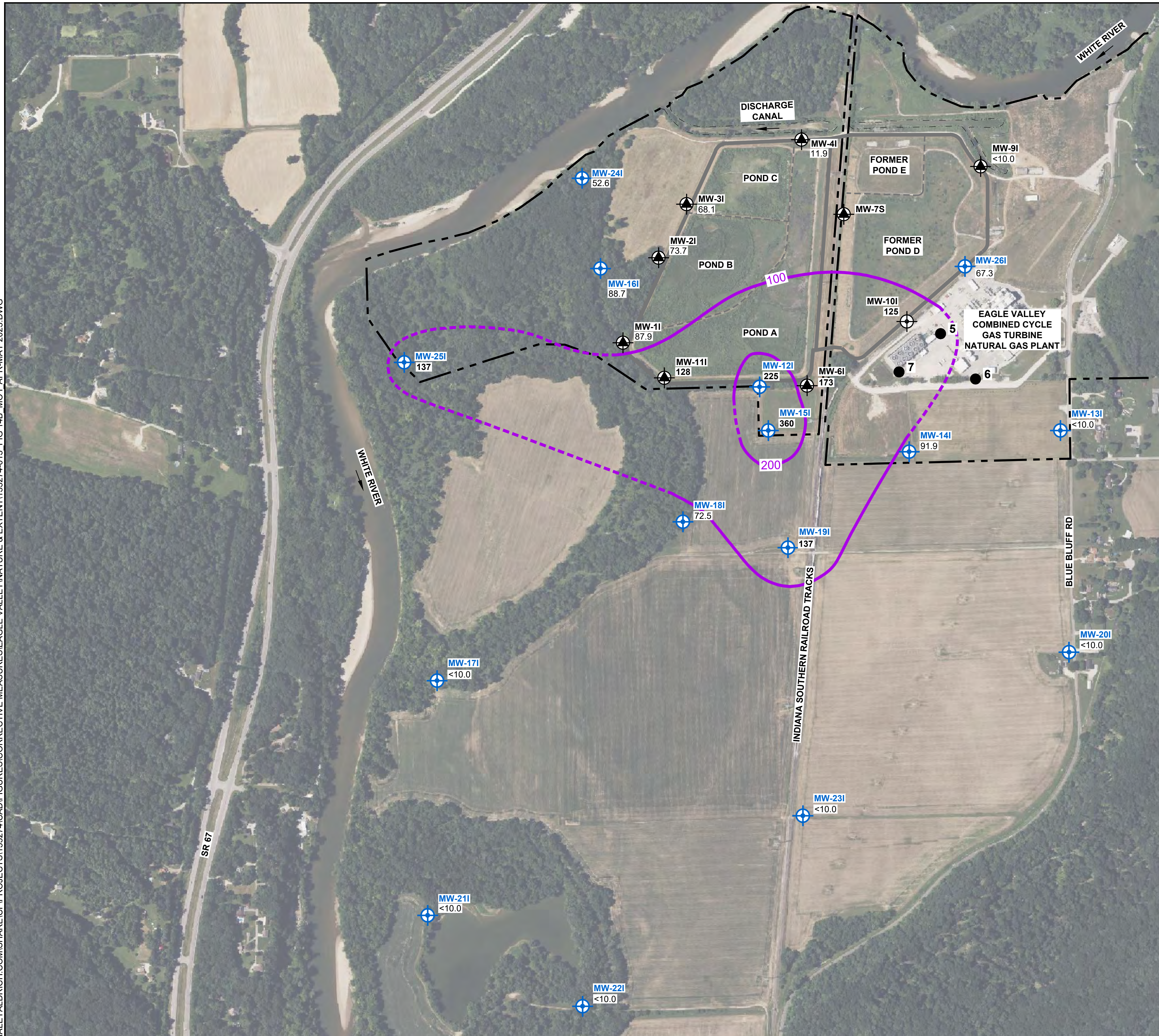
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

MOLYBDENUM CONCENTRATION MAP
SHALLOW
(APRIL/MAY 2023)

SCALE: AS SHOWN
APRIL 2024

FIGURE 13A

YEOMAN, ROB Saved: 2/12/2024 5:03 AM Layout: FIGURE 14A
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\133274\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\NATURE & EXTENT\133274-013_FIG 14A_MO S_APR-MAY 2023.DWG



LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF ASH POND SYSTEM
- APPROXIMATE BOUNDARY OF ASH POND
- MW-3 — CCR MONITORING WELL
- MW-15 — NATURE AND EXTENT MONITORING WELL
- 5 — PRODUCTION WELL
- 22.2 — MOLYBDENUM CONCENTRATION IN µg/L
- 100 — ISOCONCENTRATION LINE (DASHED WHERE INFERRED)

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
3. CCR = COAL COMBUSTION RESIDUALS
4. CONCENTRATION:
   - MEASURED IN µg/L (MICROGRAMS PER LITER)
   - BOLD FONT INDICATES VALUE EXCEEEDS GWPS FOR MOLYBDENUM (100 µg/L)
   - NS = NOT SAMPLED (INSUFFICIENT WATER)
5. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE

0 800 1600
SCALE IN FEET

HALEY ALDRICH

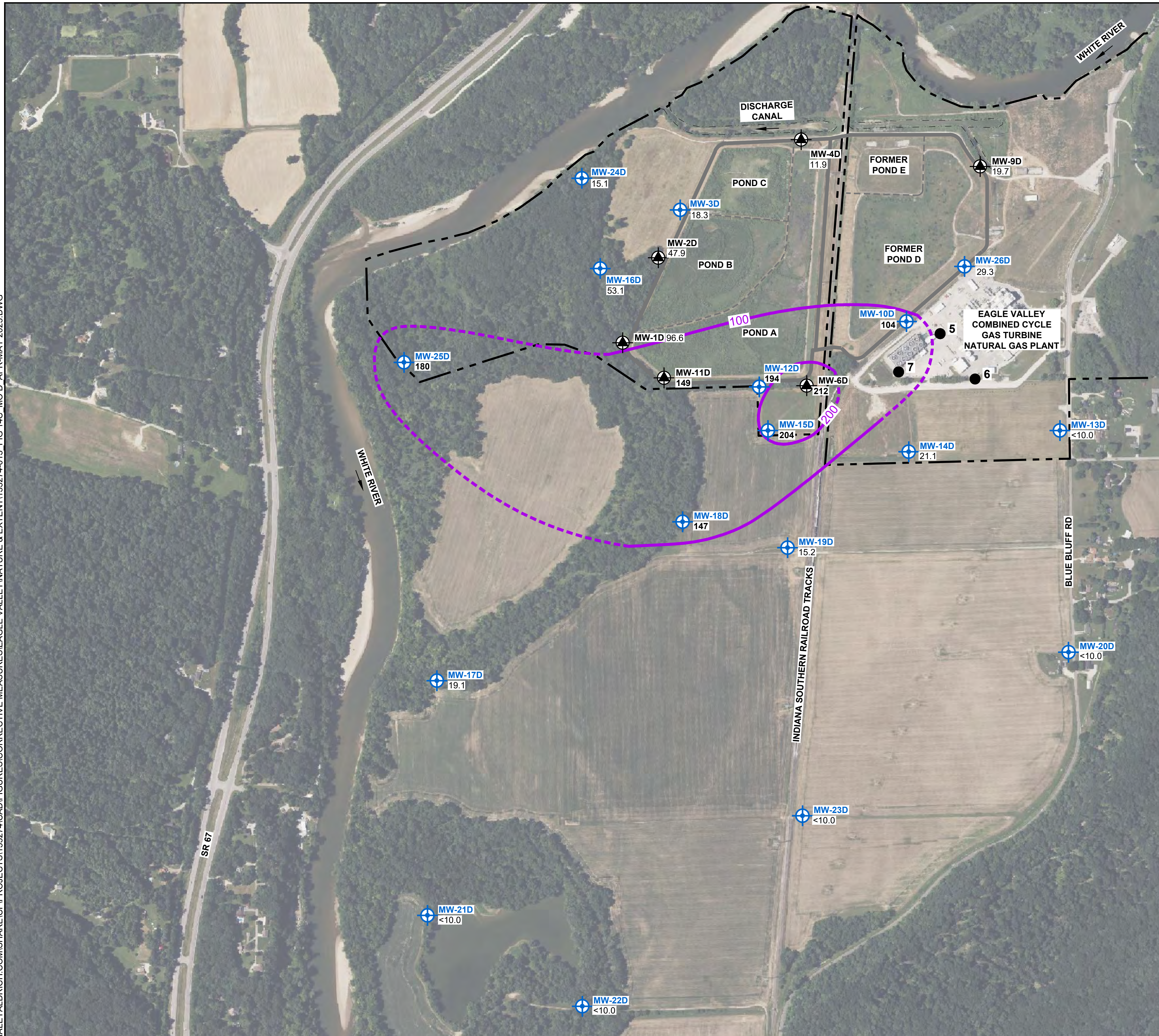
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

MOLYBDENUM CONCENTRATION MAP INTERMEDIATE (APRIL/MAY 2023)

SCALE: AS SHOWN
APRIL 2024

FIGURE 13B

YEOMAN, ROB Saved: 2/12/2024 5:03 AM Layout: FIGURE 14C
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\133274\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\NATURE & EXTENT\133274-013_FIG 14B_MO I_APR-MAY 2023.DWG



LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF ASH POND SYSTEM
- APPROXIMATE BOUNDARY OF ASH POND
- MW-3 — CCR MONITORING WELL
- MW-15 — NATURE AND EXTENT MONITORING WELL
- 5 — PRODUCTION WELL
- 22.2 — MOLYBDENUM CONCENTRATION IN µg/L
- 100 — ISOCONCENTRATION LINE (DASHED WHERE INFERRED)

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
3. CCR = COAL COMBUSTION RESIDUALS
4. CONCENTRATION:
   - MEASURED IN µg/L (MICROGRAMS PER LITER)
   - BOLD FONT INDICATES VALUE EXCEEEDS GWPS FOR MOLYBDENUM (100 µg/L)
   - NS = NOT SAMPLED (INSUFFICIENT WATER)
5. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE

HALEY ALDRICH

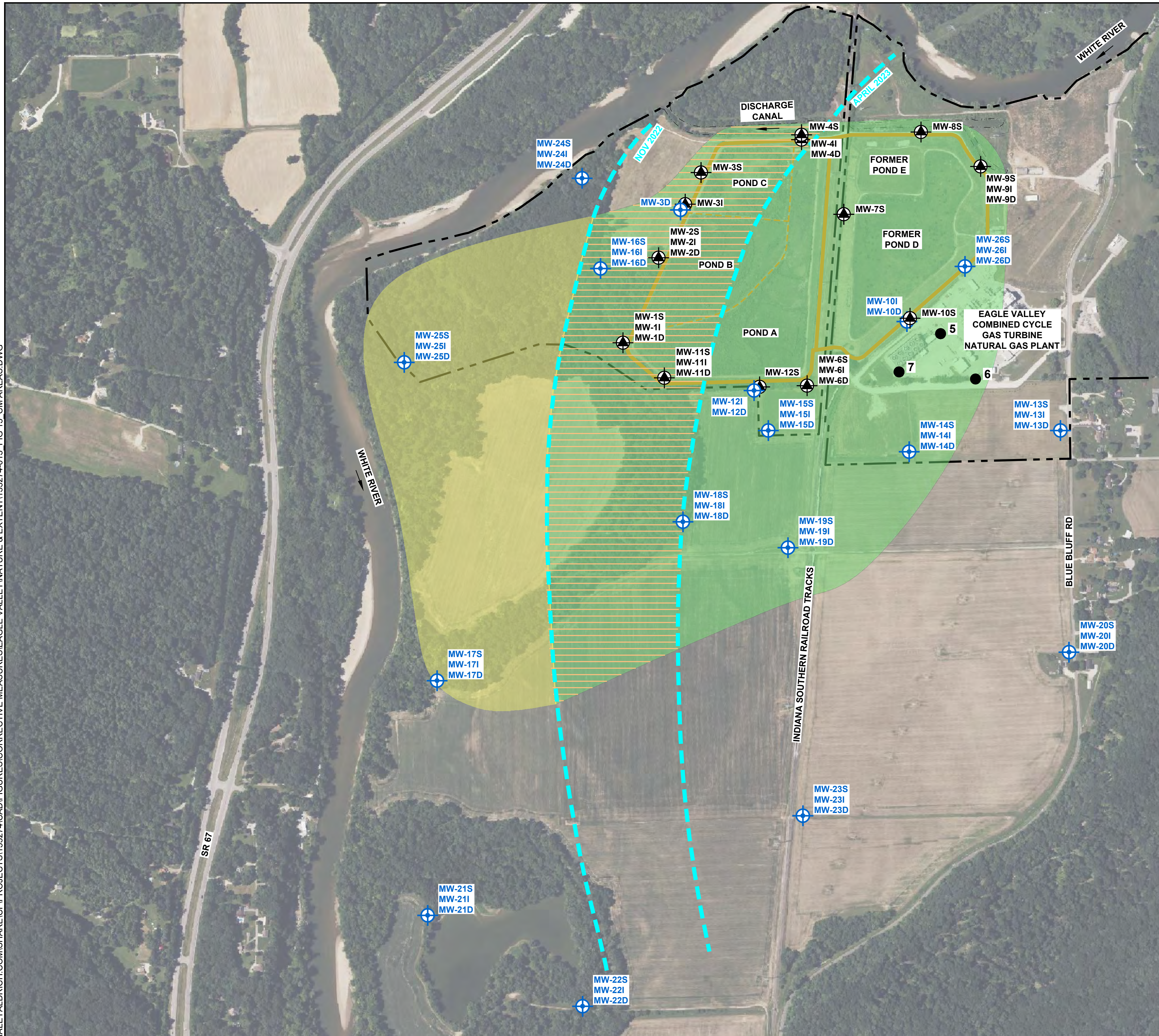
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

MOLYBDENUM CONCENTRATION MAP DEEP (APRIL/MAY 2023)

SCALE: AS SHOWN
APRIL 2024

FIGURE 13C

YEOMAN, ROB Saved: 2/12/2024 5:03 AM Layout: FIGURE 14E
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\133274\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\NATURE & EXTENT\133274-013_FIG 14C_MO D_APR-MAY 2023.DWG



LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF ASH POND SYSTEM
- APPROXIMATE BOUNDARY OF ASH POND
- MW-3 CCR MONITORING WELL
- GROUNDWATER FLOW BREAKLINE (SHALLOW ZONE)
- MW-15 NATURE AND EXTENT MONITORING WELL
- 5 PRODUCTION WELL
- = APPROXIMATE AREA OF AFFECTED GROUNDWATER BEYOND PRODUCTION WELL INFLUENCE
- = APPROXIMATE AREA OF AFFECTED GROUNDWATER MANAGED BY PRODUCTION WELL PUMPING
- = AREA WITH SEASONAL GROUNDWATER FLOW DIRECTIONAL CHANGE

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
3. CCR = COAL COMBUSTION RESIDUALS
4. EXTENT OF PRODUCTION WELL INFLUENCE IS APPROXIMATE AND BASED ON NOVEMBER 2023 GROUNDWATER ELEVATION DATA
5. GROUNDWATER FLOW BREAKLINE SHIFTS SEASONALLY AND CHANGES WITH PUMPING CONDITIONS
6. ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE

N

0 800 1600
SCALE IN FEET

HALEY ALDRICH

EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

POTENTIAL AREAS FOR CORRECTIVE MEASURES

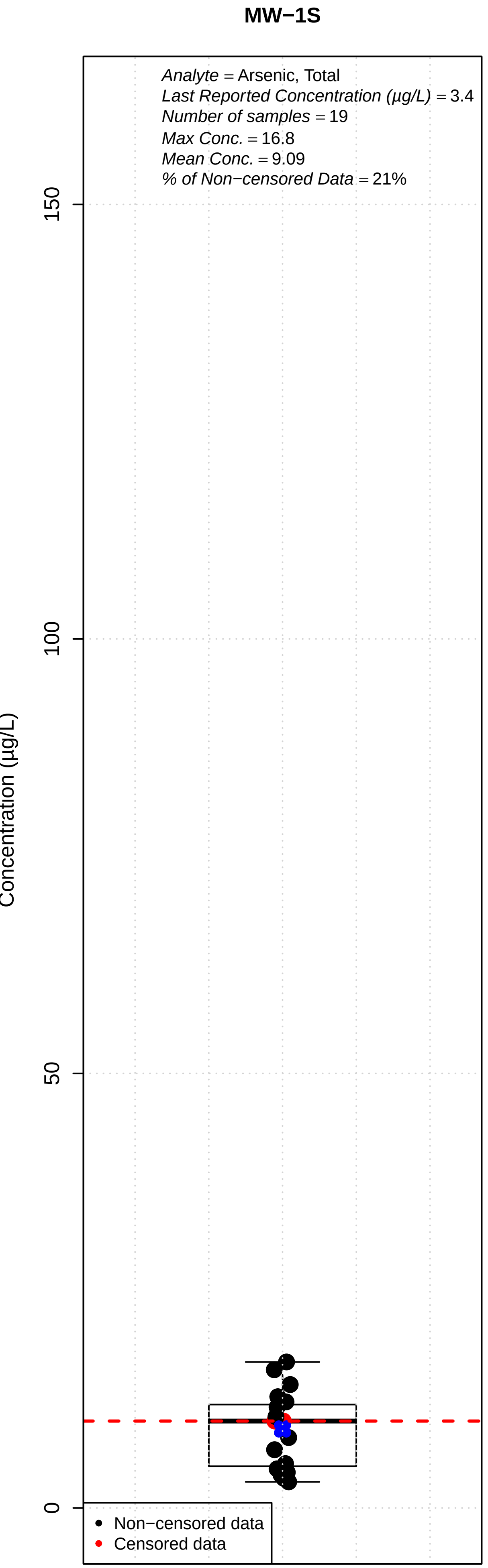
SCALE: AS SHOWN
APRIL 2024

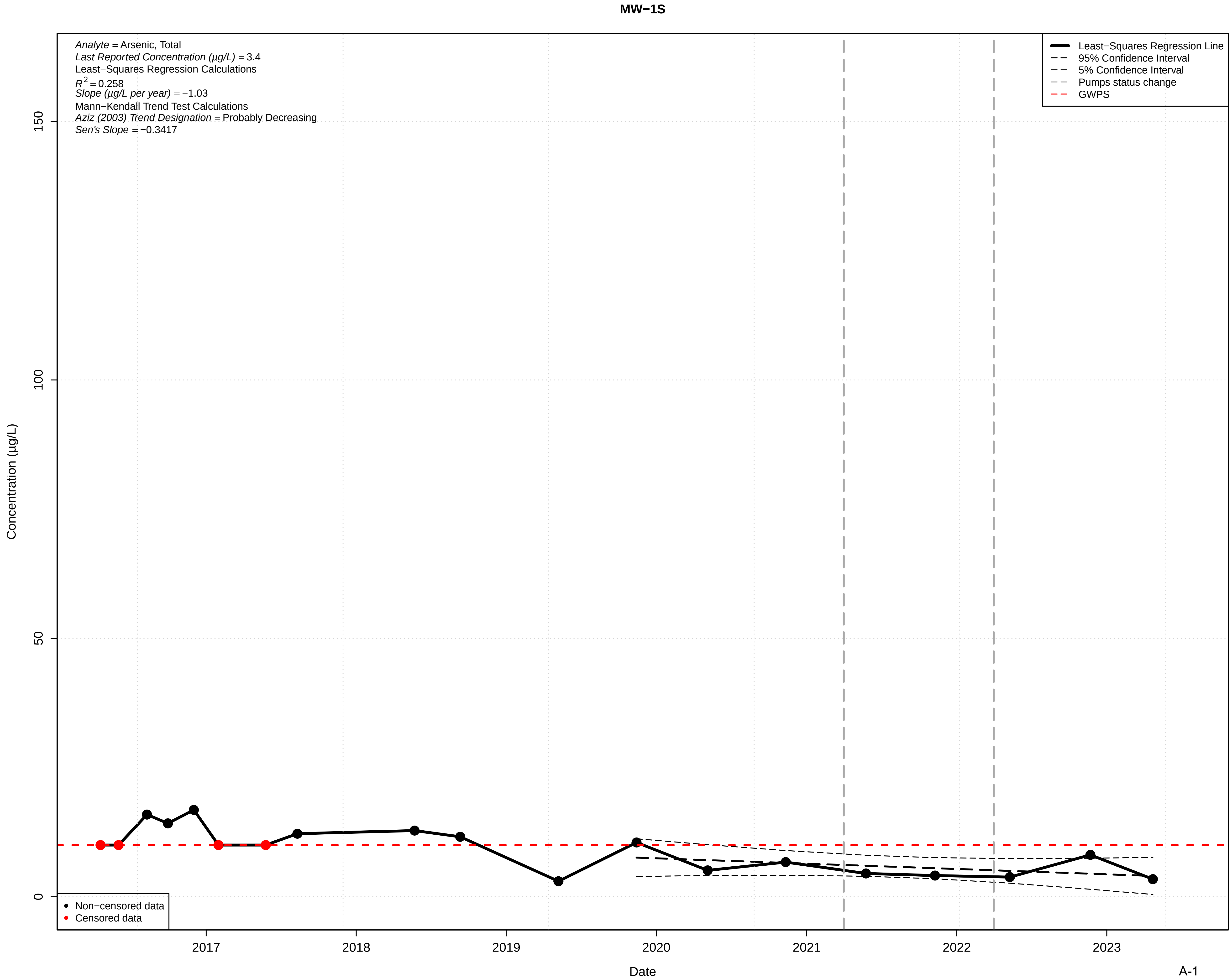
FIGURE 14

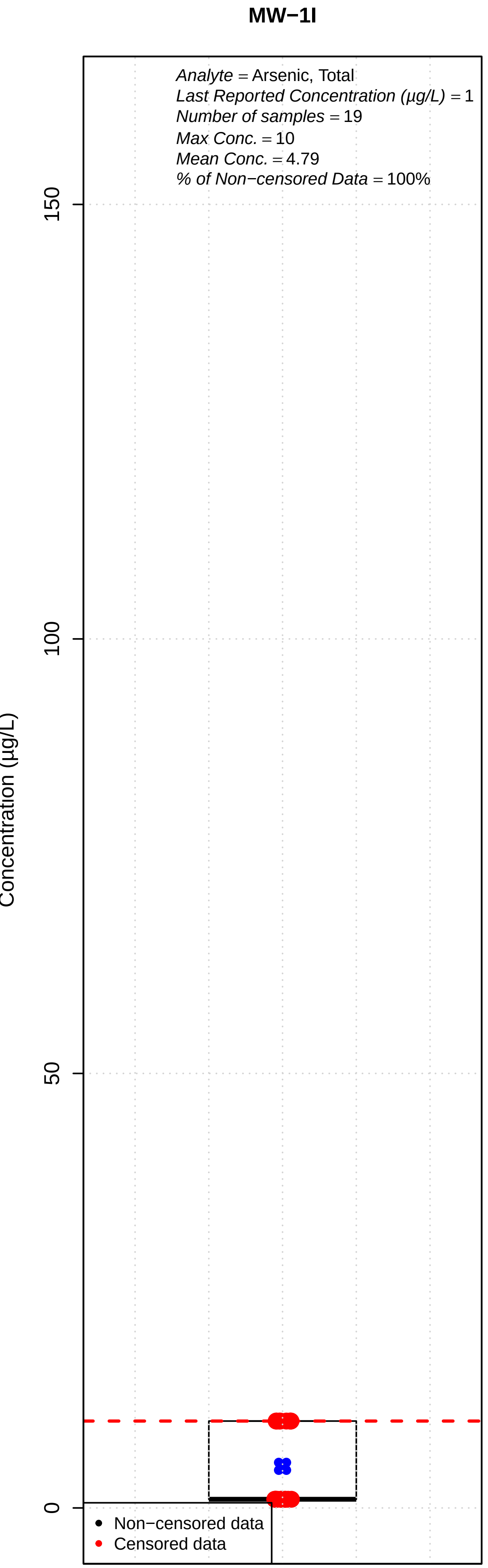
YEOMAN, ROB Saved: 3/7/2024 10:52 AM Layout: FIGURE 15
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\133274\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\NATURE & EXTENT\133274-013_FIG 15_CM AREAS.DWG

APPENDIX A
Time Trend Graphs

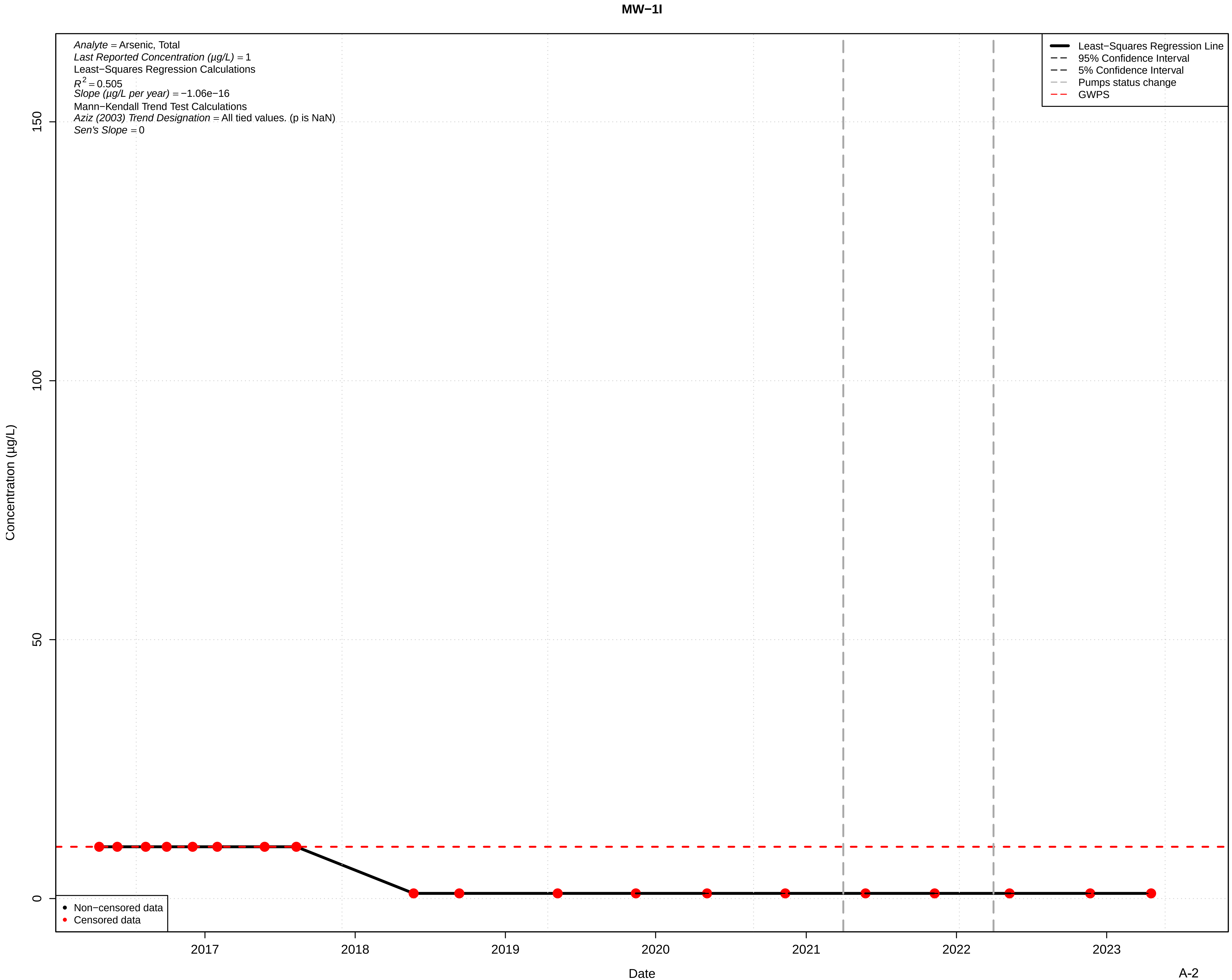
ARSENIC


MW−1S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 3.4
Number of samples = 19
Max Conc. = 16.8
Mean Conc. = 9.09
% of Non−censored Data = 21%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

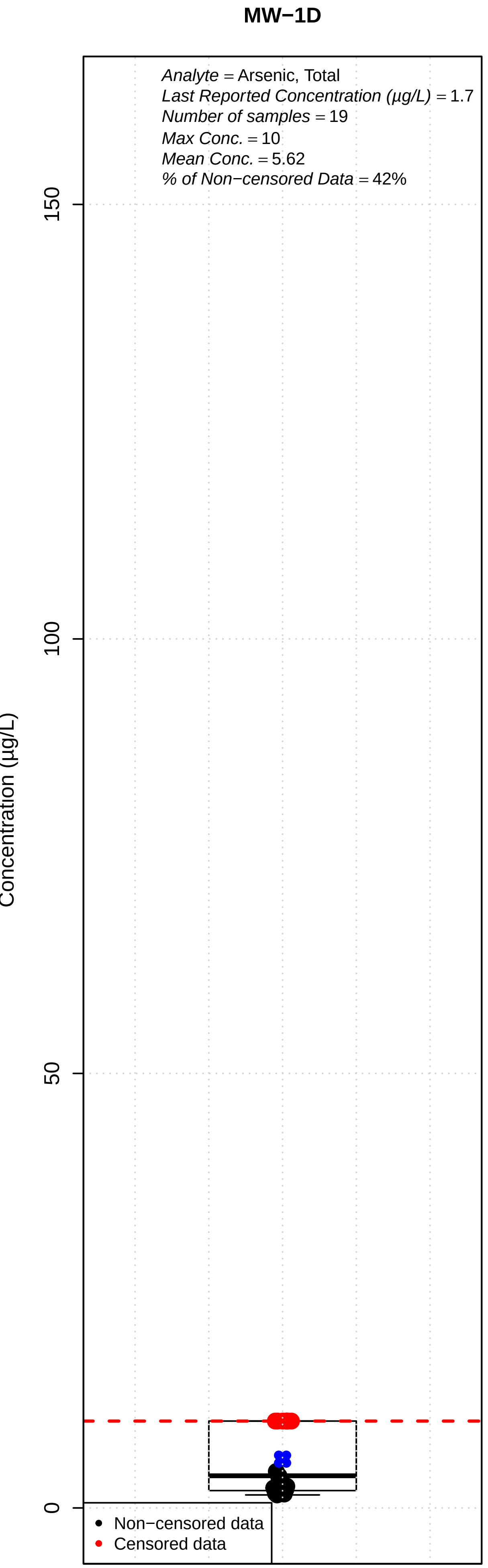

MW−1S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 3.4
Least−Squares Regression Calculations
R^2 = 0.258
Slope (µg/L per year) = −1.03
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Probably Decreasing
Sen's Slope = −0.3417
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

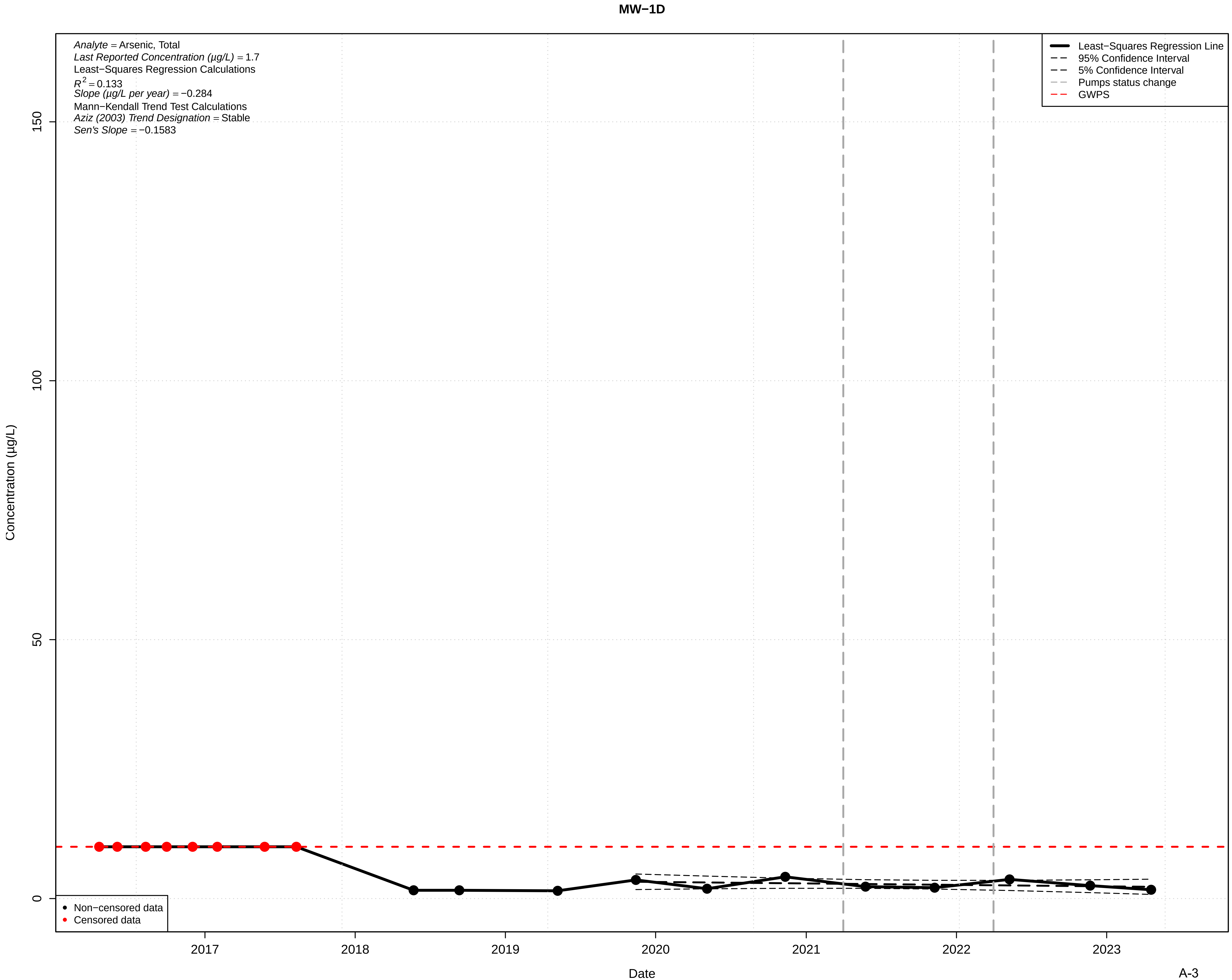


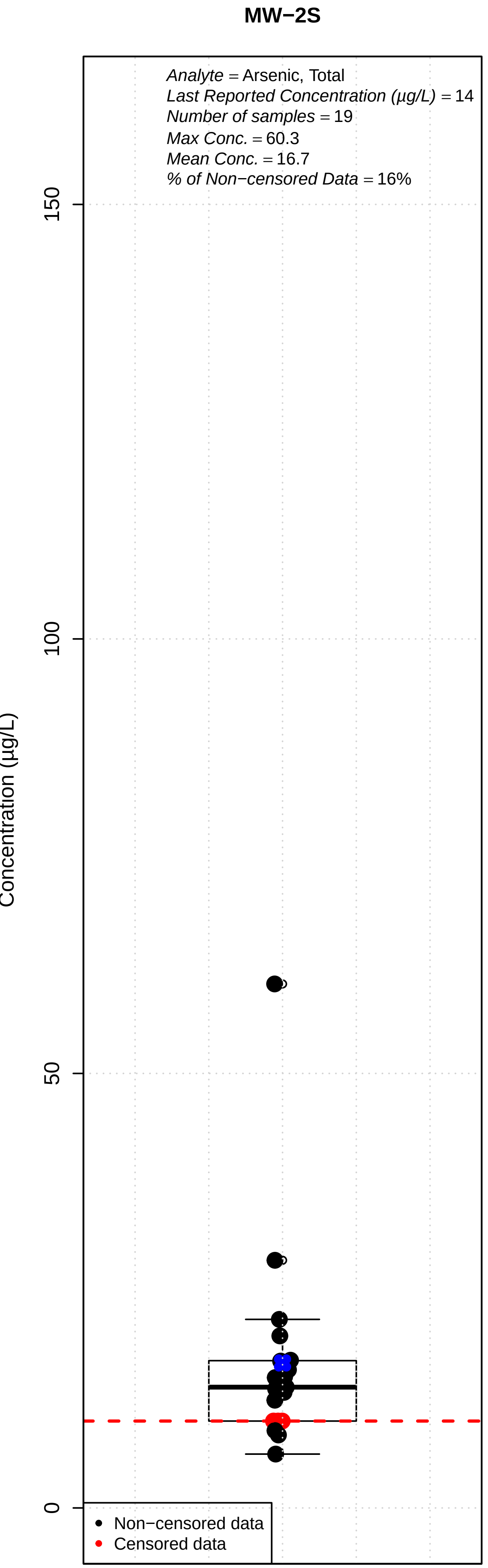
MW−1I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 19
Max Conc. = 10
Mean Conc. = 4.79
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data



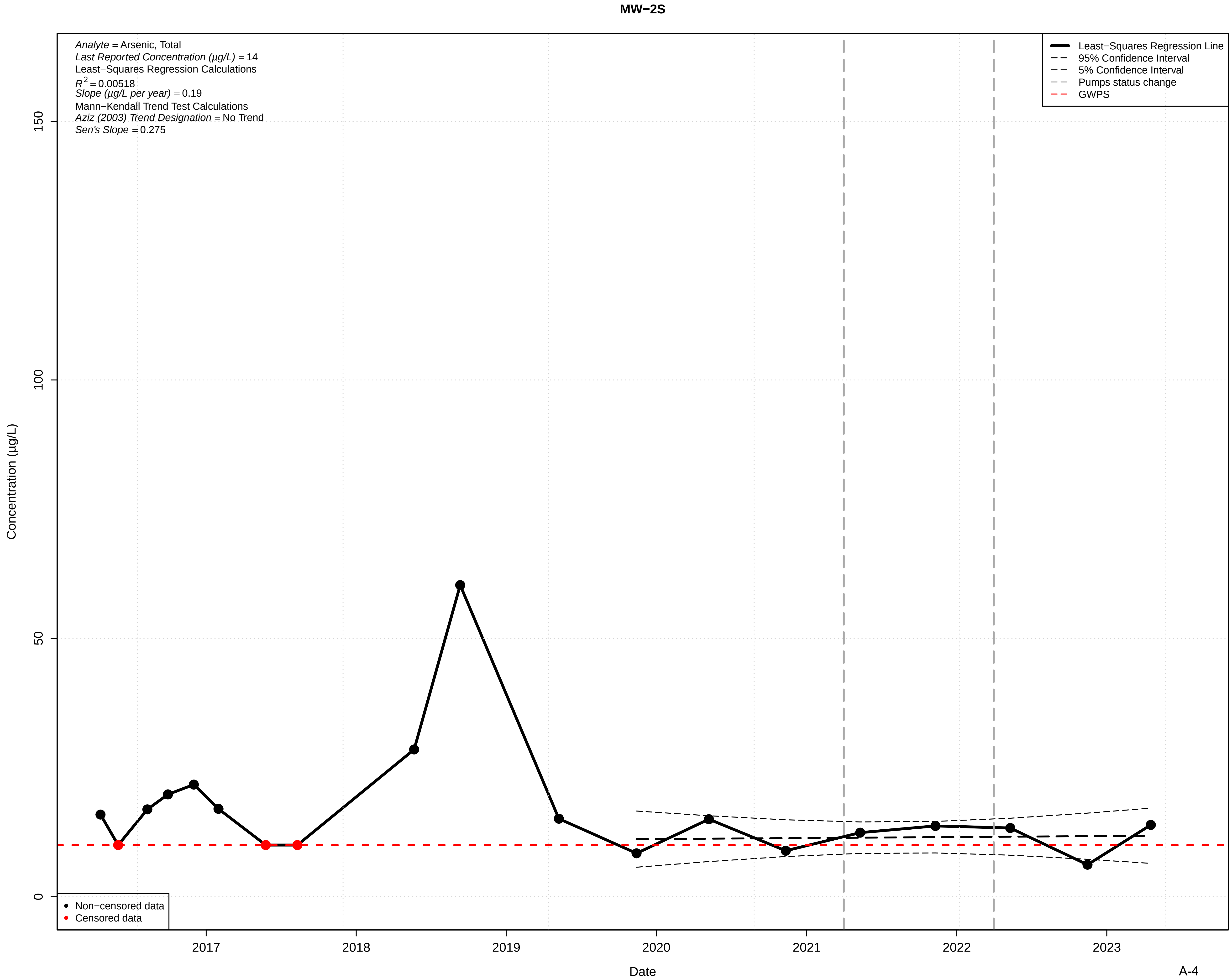
MW−1I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.505
Slope (µg/L per year) = −1.06e−16
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−1D
Analyte = Arsenic, Total
Last Reported Concentration (μg/L) = 1.7
Number of samples = 19
Max Conc. = 10
Mean Conc. = 5.62
% of Non−censored Data = 42%
Concentration (μg/L)
150
100
50
0
Non−censored data
Censored data

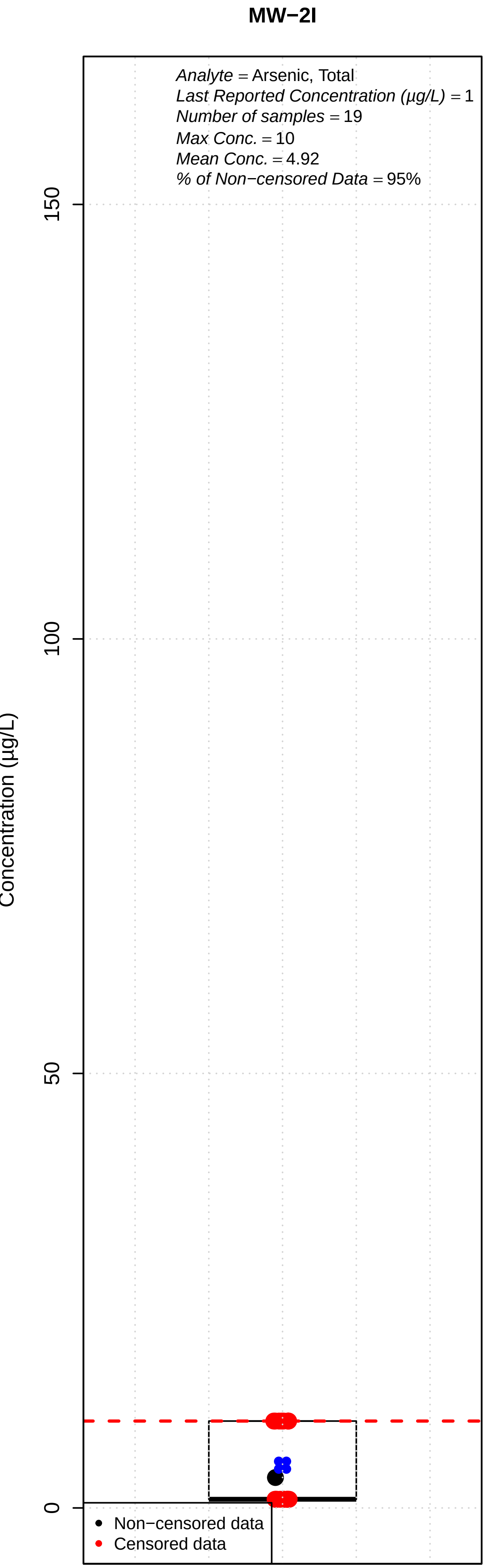

MW−1D
Analyte = Arsenic, Total
Last Reported Concentration (μg/L) = 1.7
Least−Squares Regression Calculations
R^2 = 0.133
Slope (μg/L per year) = −0.284
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.1583
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (μg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

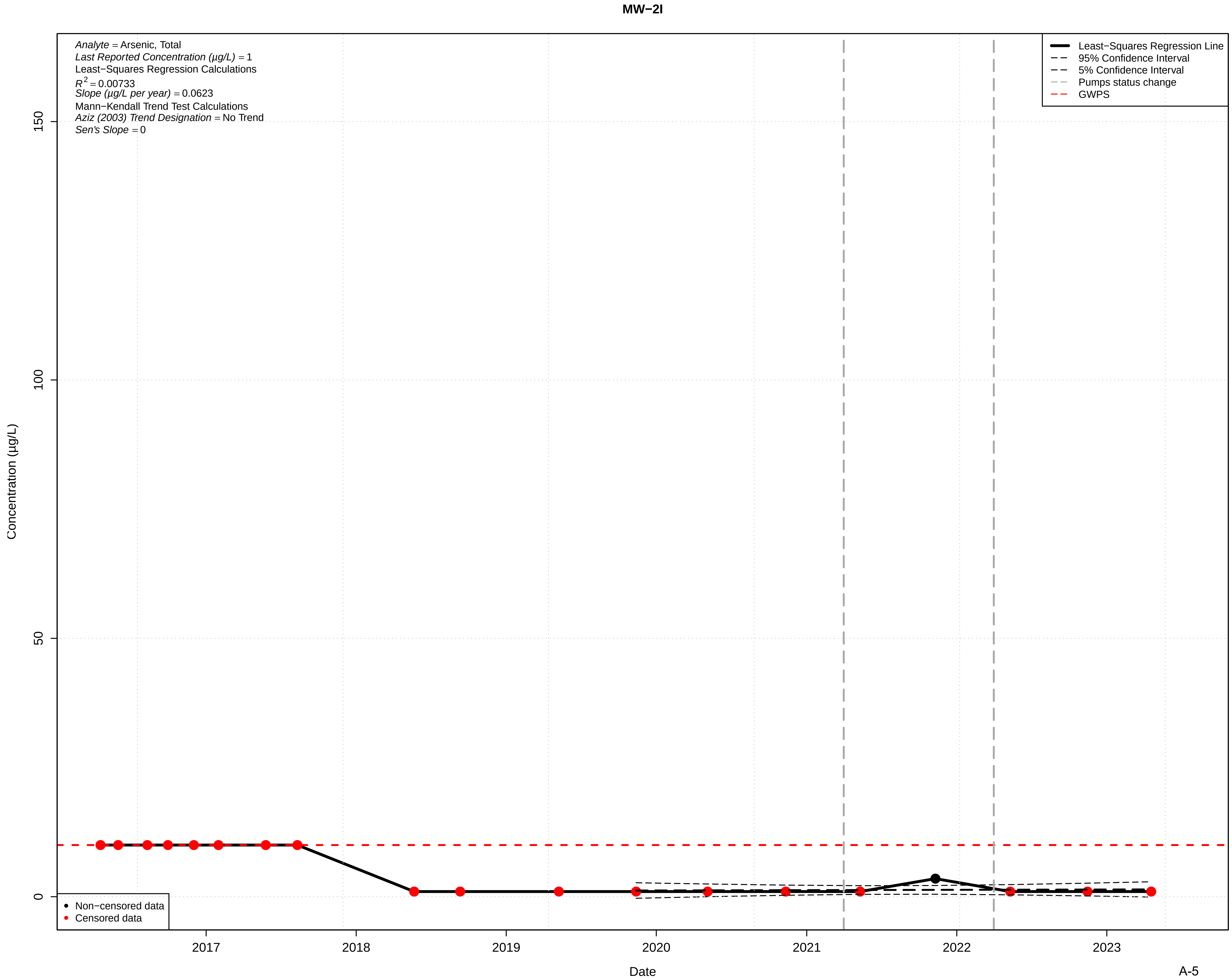


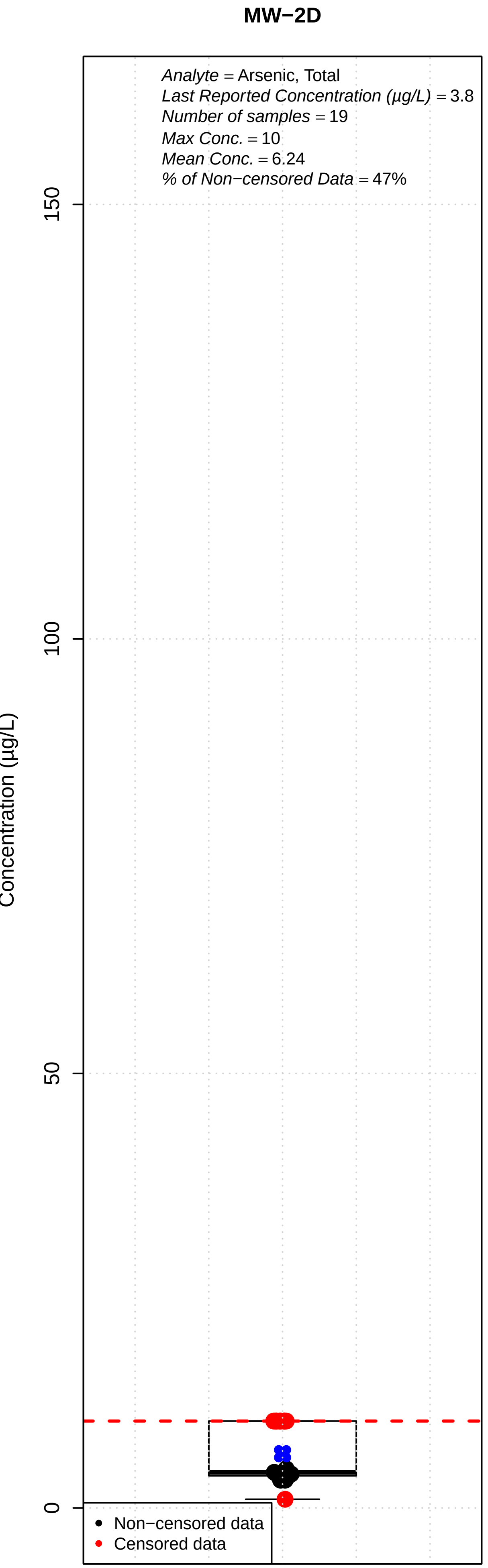
MW−2S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 14
Number of samples = 19
Max Conc. = 60.3
Mean Conc. = 16.7
% of Non−censored Data = 16%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

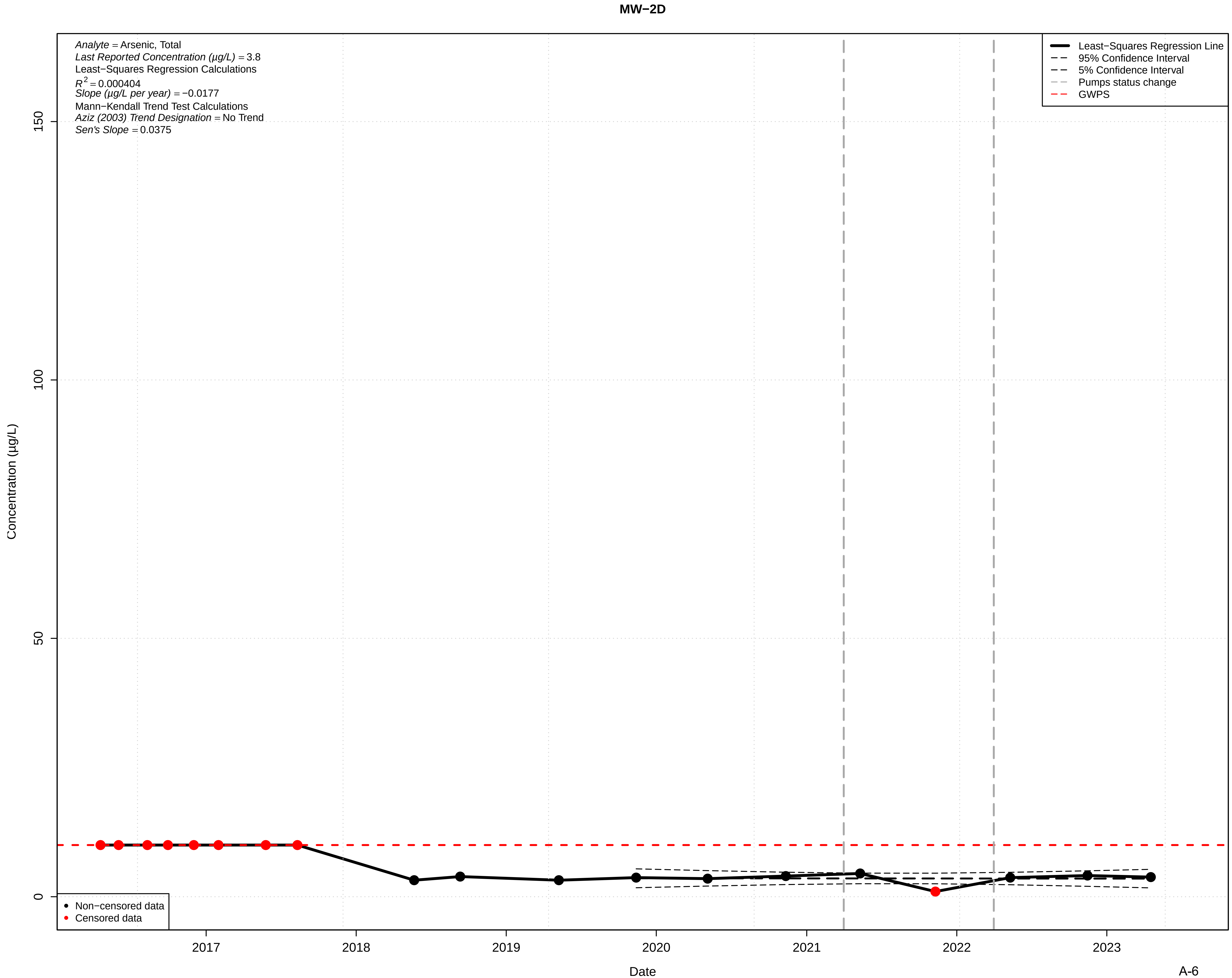


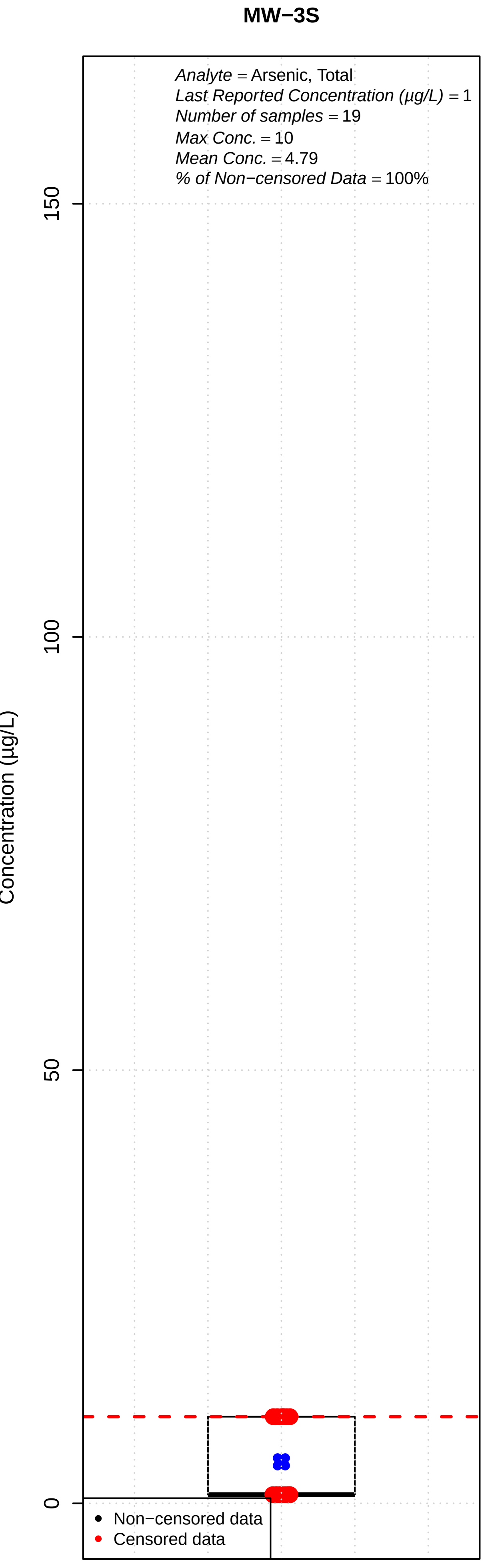
MW−2S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 14
Least−Squares Regression Calculations
R² = 0.00518
Slope (µg/L per year) = 0.19
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.275
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

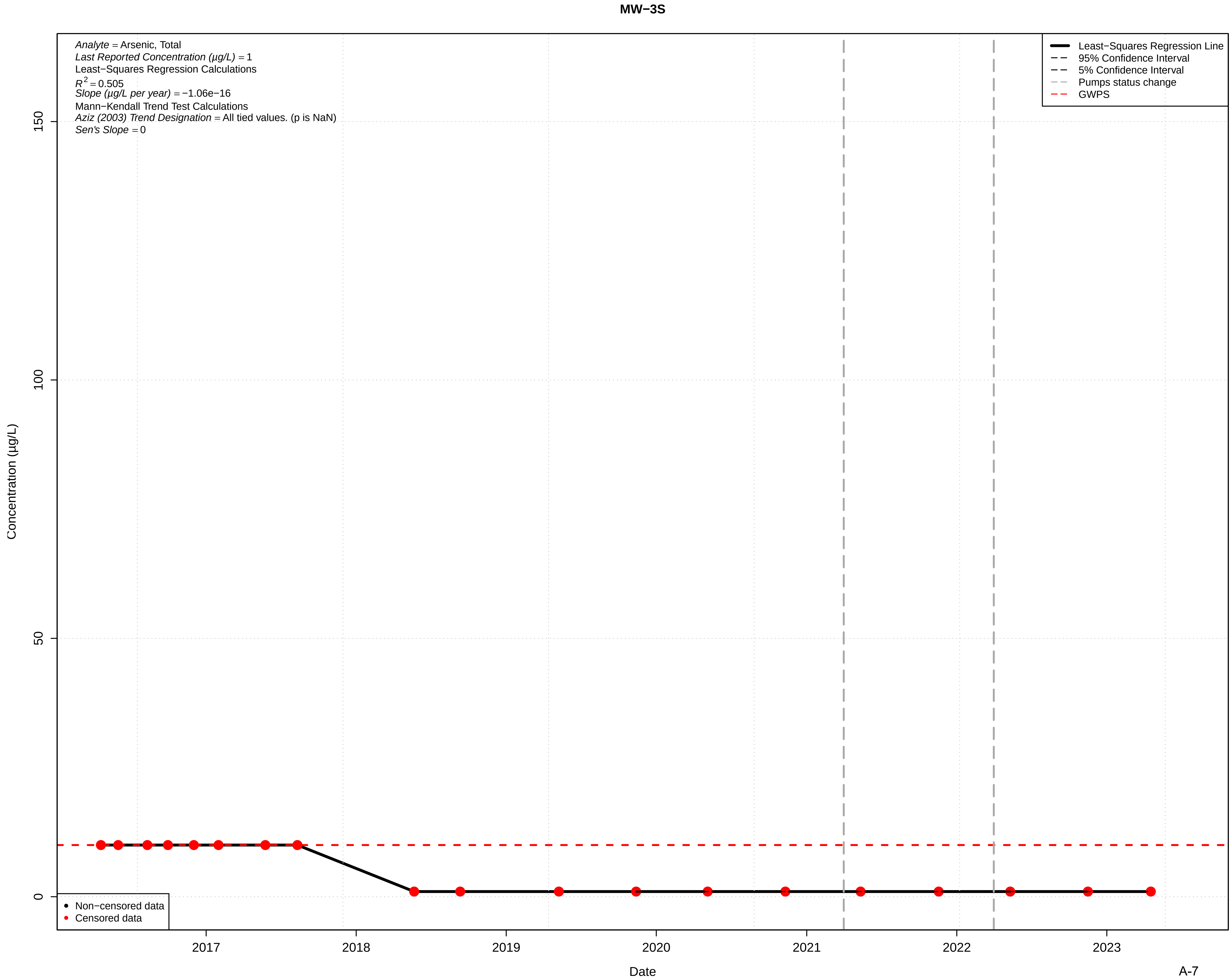

MW−2I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 19
Max Conc. = 10
Mean Conc. = 4.92
% of Non−censored Data = 95%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

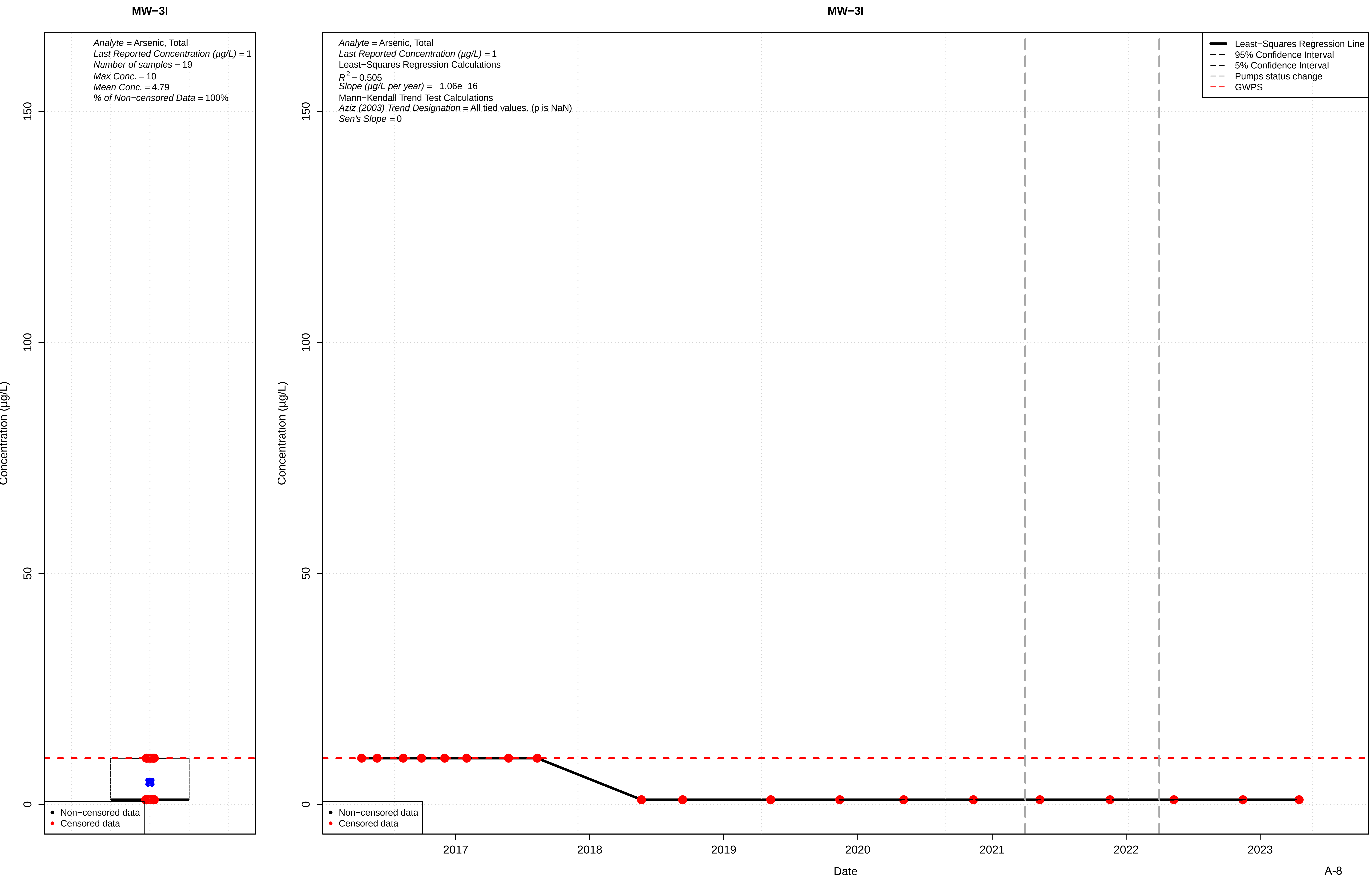

MW−2I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = 0.00733
Slope (µg/L per year) = 0.0623
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−2D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 3.8
Number of samples = 19
Max Conc. = 10
Mean Conc. = 6.24
% of Non−censored Data = 47%
Concentration (µg/L)
Non−censored data
Censored data

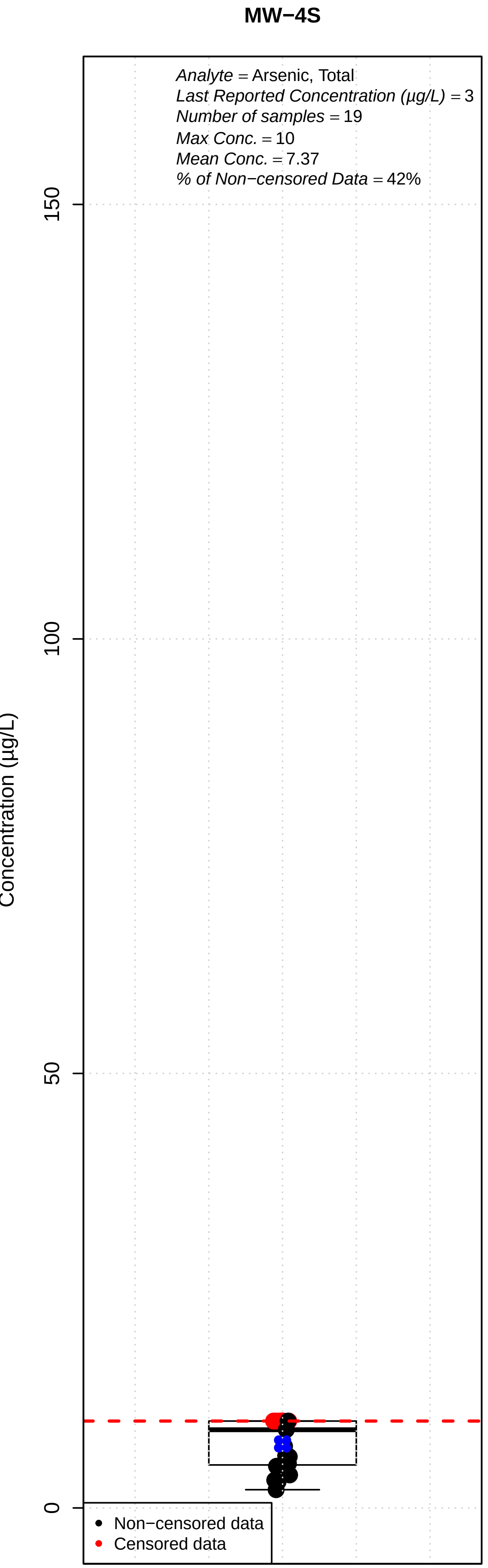

MW−2D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 3.8
Least−Squares Regression Calculations
R^2 = 0.000404
Slope (µg/L per year) = −0.0177
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.0375
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Non−censored data
Censored data
Date


MW−3S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 19
Max Conc. = 10
Mean Conc. = 4.79
% of Non−censored Data = 100%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

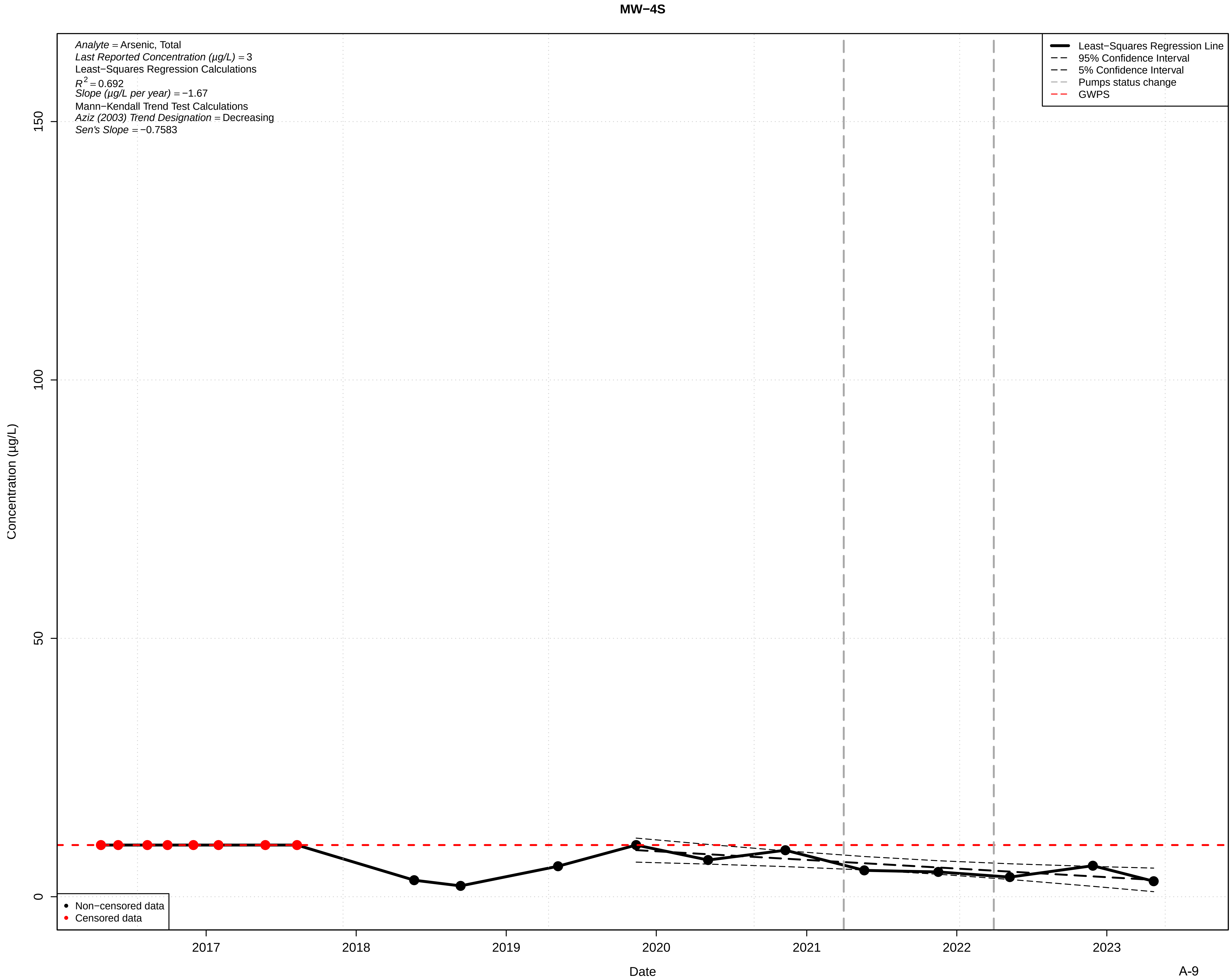

MW−3S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.505
Slope (µg/L per year) = −1.06e−16
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date



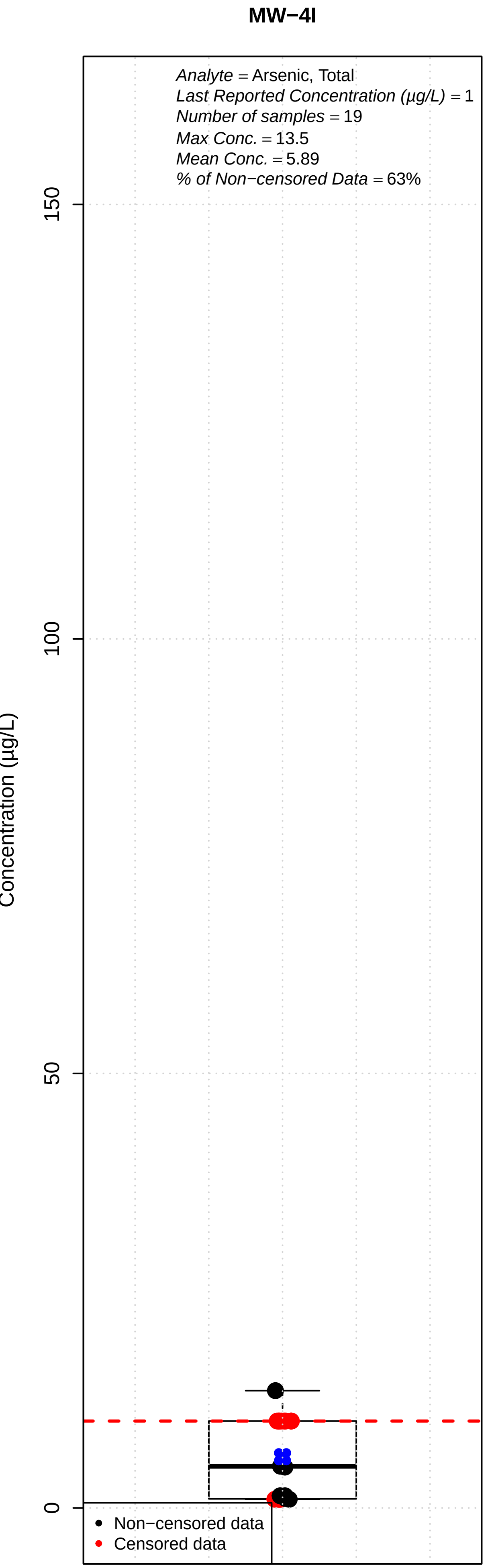
MW−3I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 19
Max Conc. = 10
Mean Conc. = 4.79
% of Non−censored Data = 100%
Concentration (µg/L)
Non−censored data
Censored data
MW−3I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.505
Slope (µg/L per year) = −1.06e−16
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Date

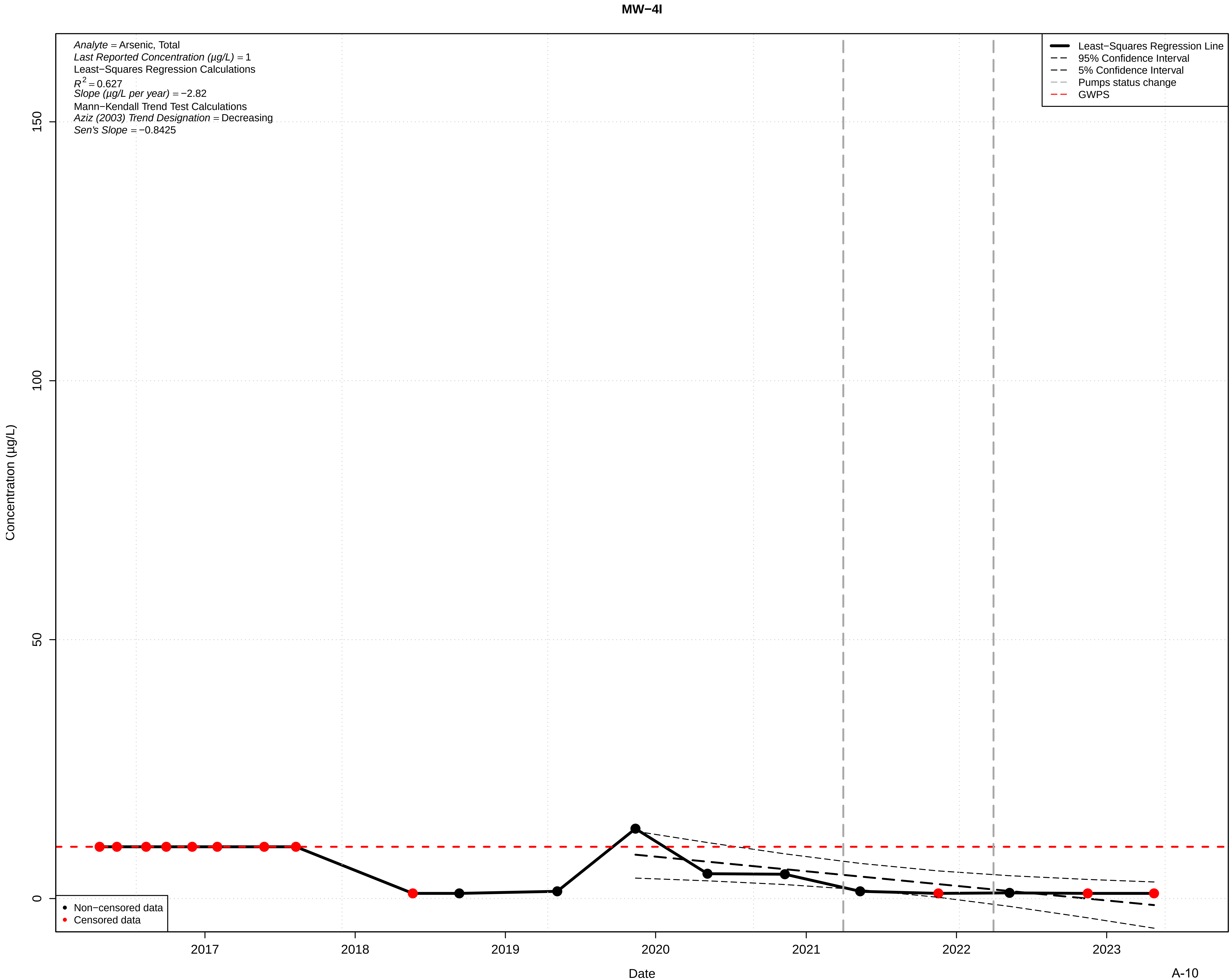


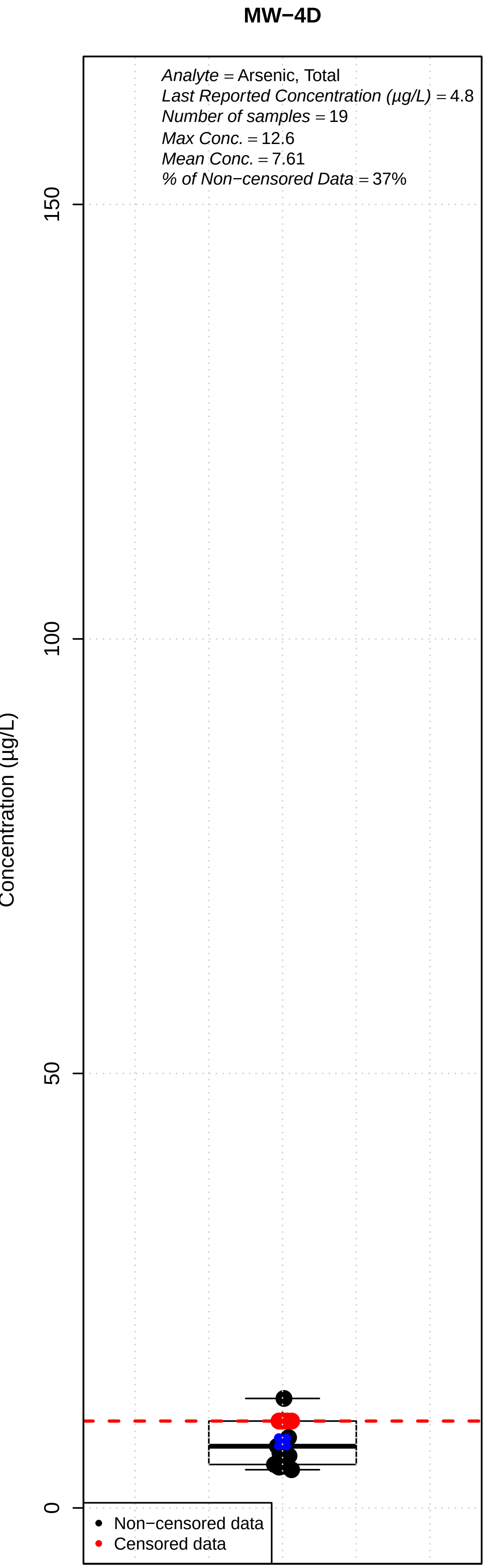
MW−4S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 3
Number of samples = 19
Max Conc. = 10
Mean Conc. = 7.37
% of Non−censored Data = 42%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

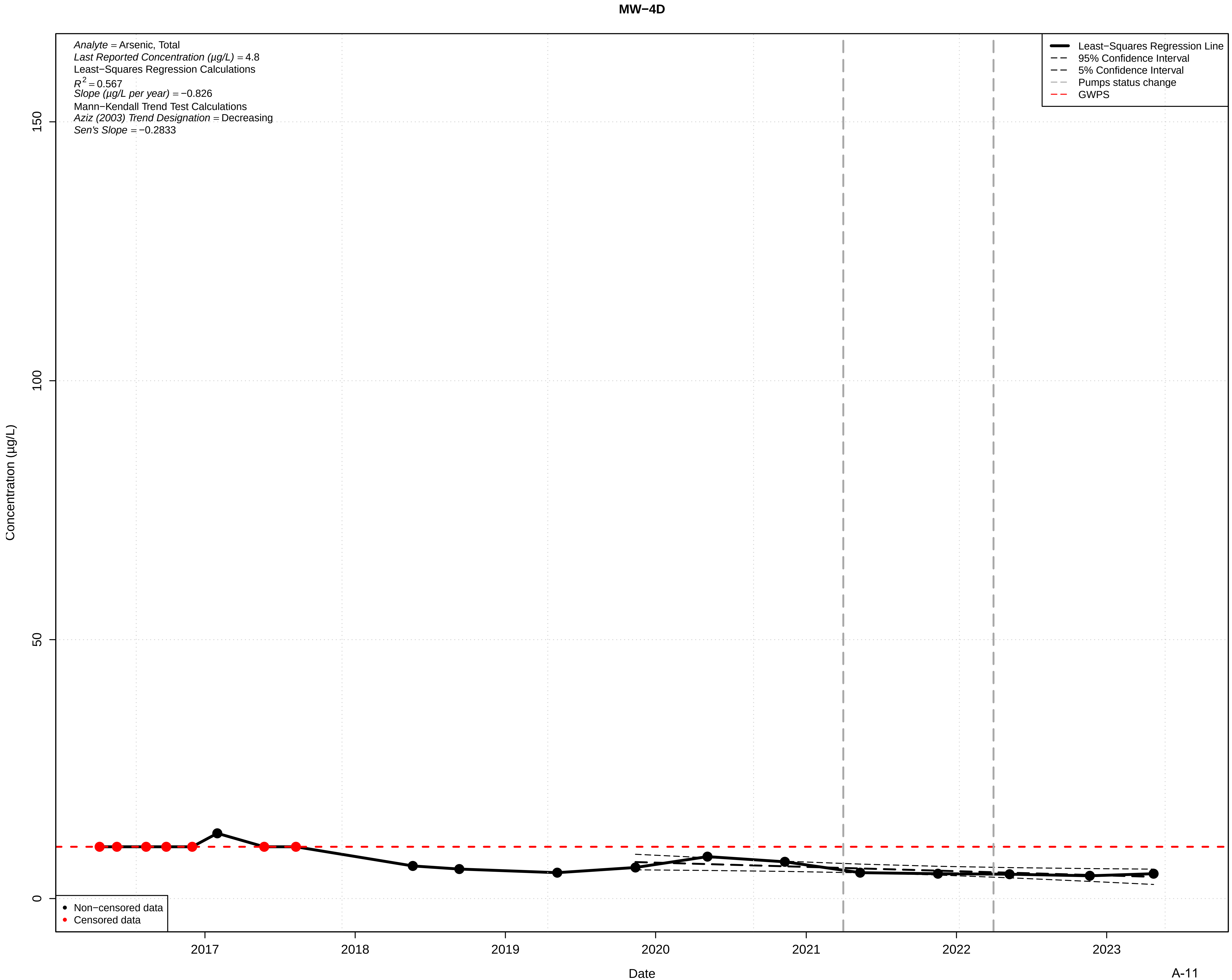


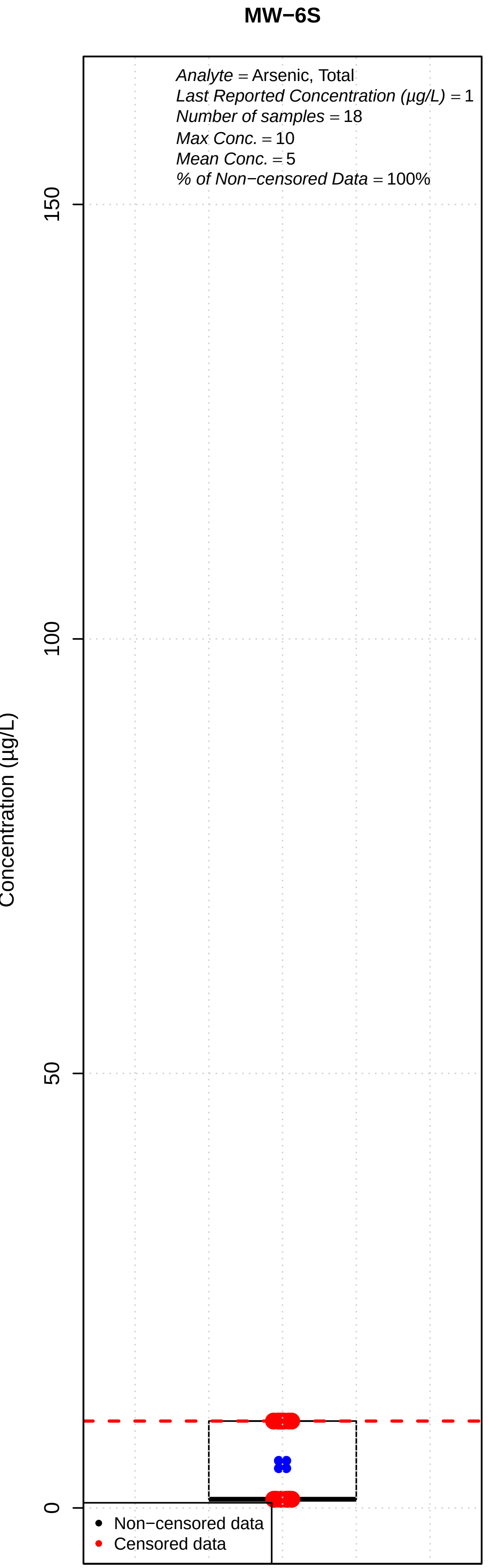
MW−4S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 3
Least−Squares Regression Calculations
R^2 = 0.692
Slope (µg/L per year) = −1.67
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −0.7583
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−4I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 19
Max Conc. = 13.5
Mean Conc. = 5.89
% of Non−censored Data = 63%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

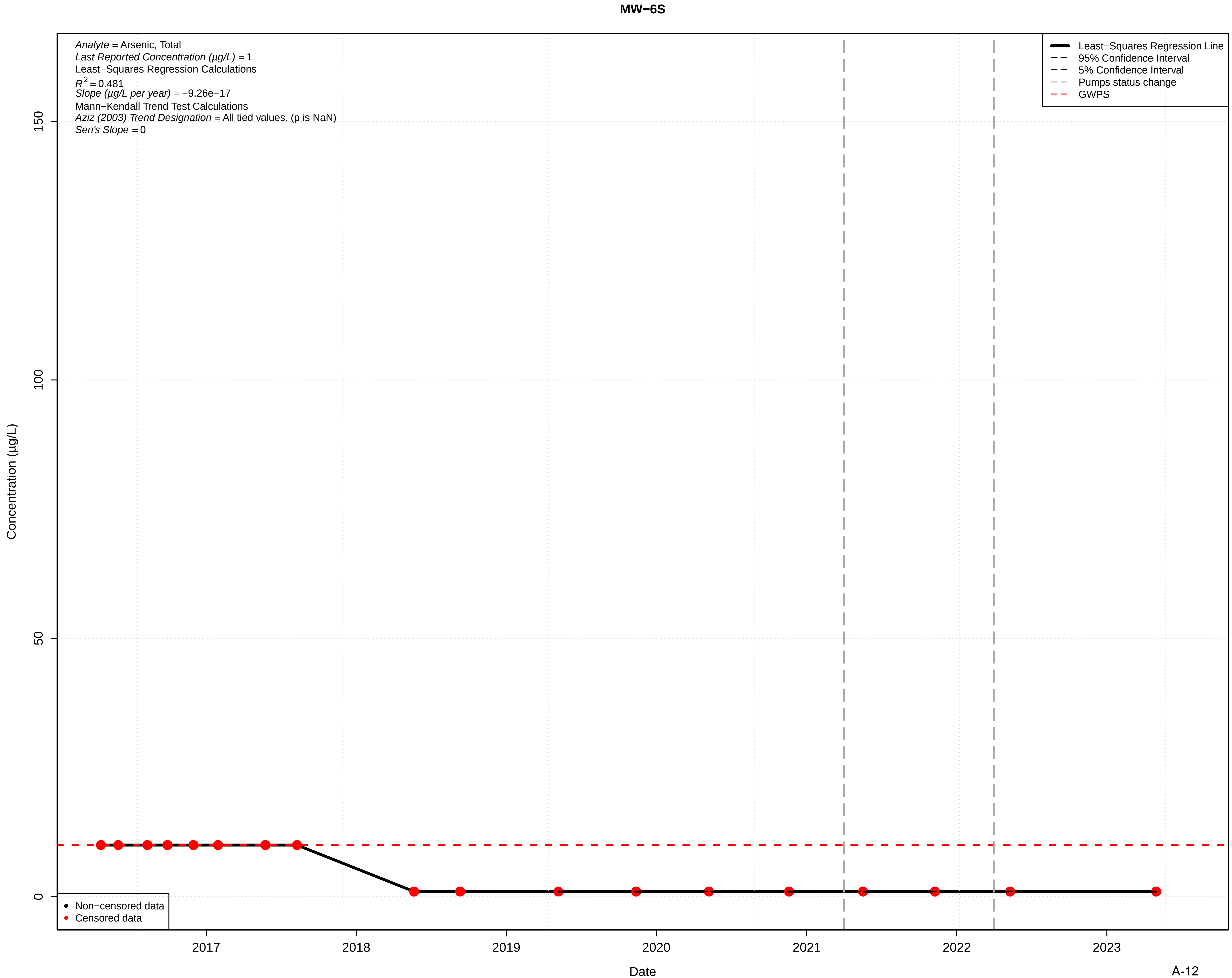

MW−4I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = 0.627
Slope (µg/L per year) = −2.82
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −0.8425
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−4D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 4.8
Number of samples = 19
Max Conc. = 12.6
Mean Conc. = 7.61
% of Non−censored Data = 37%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

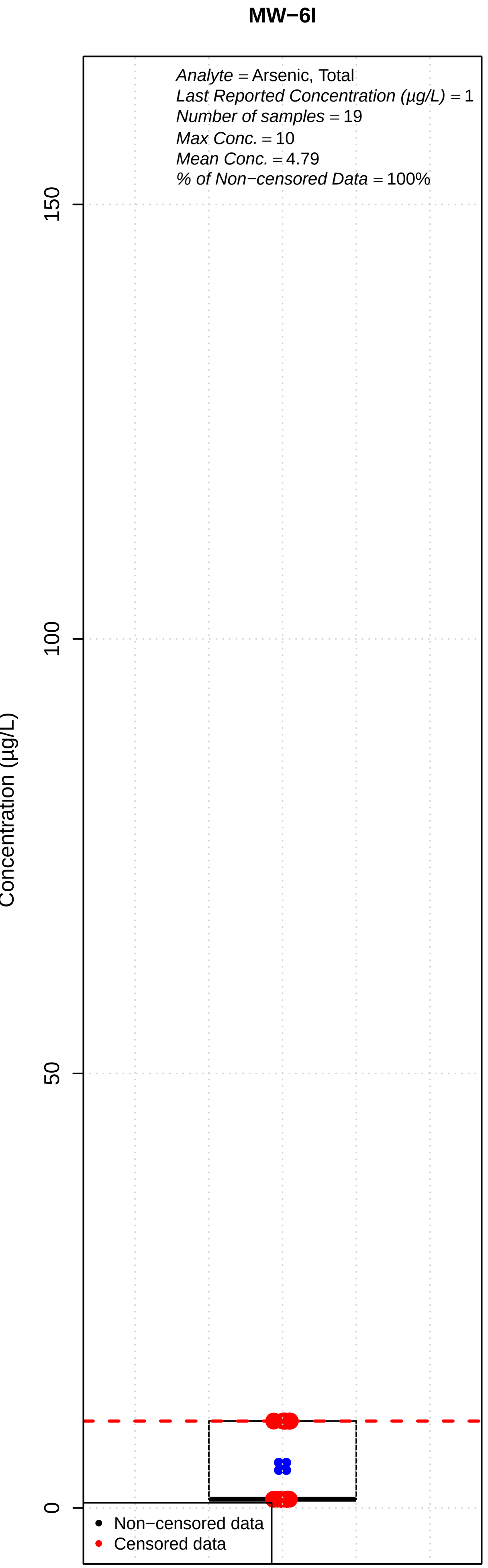

MW−4D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 4.8
Least−Squares Regression Calculations
R² = 0.567
Slope (µg/L per year) = −0.826
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −0.2833
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

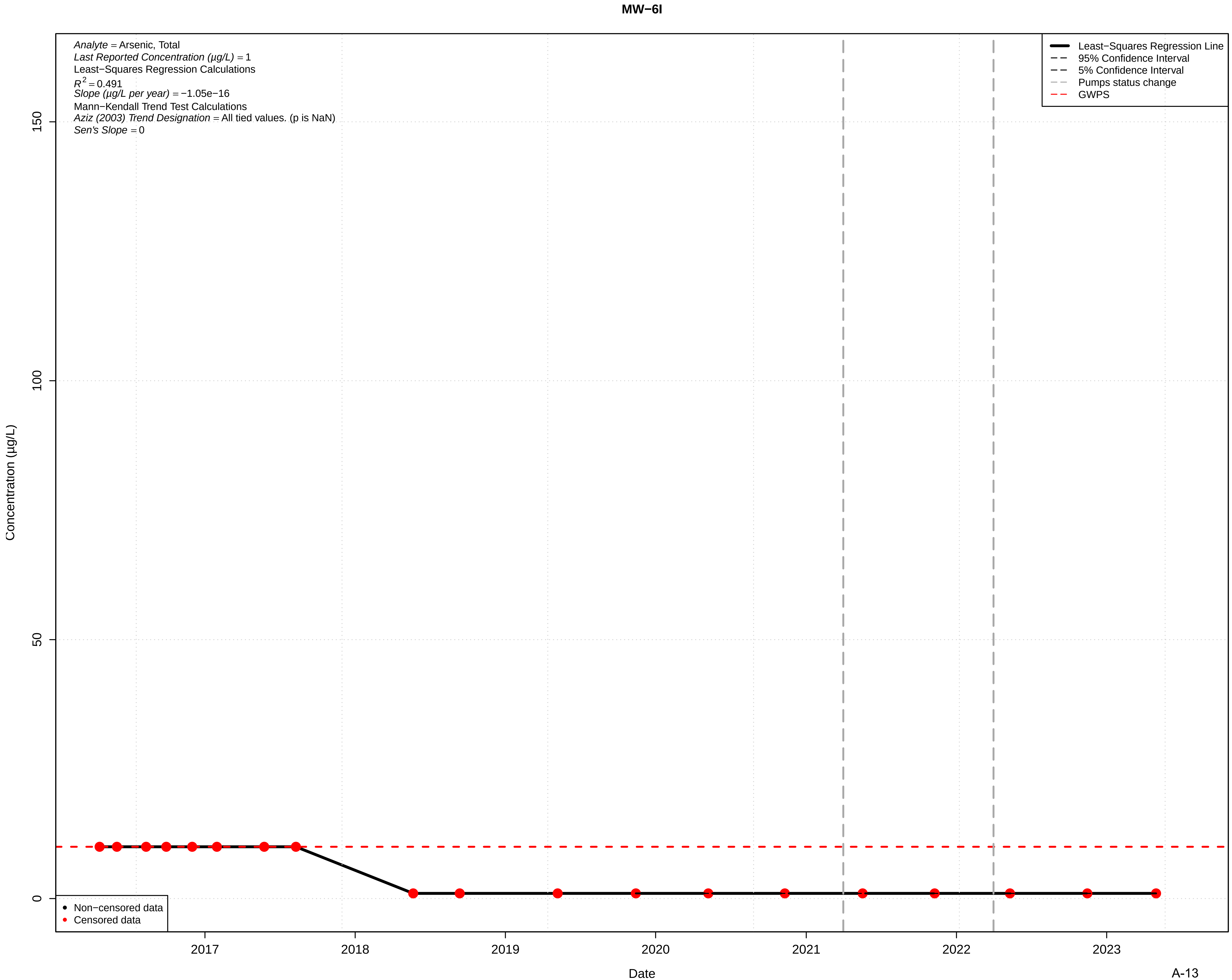


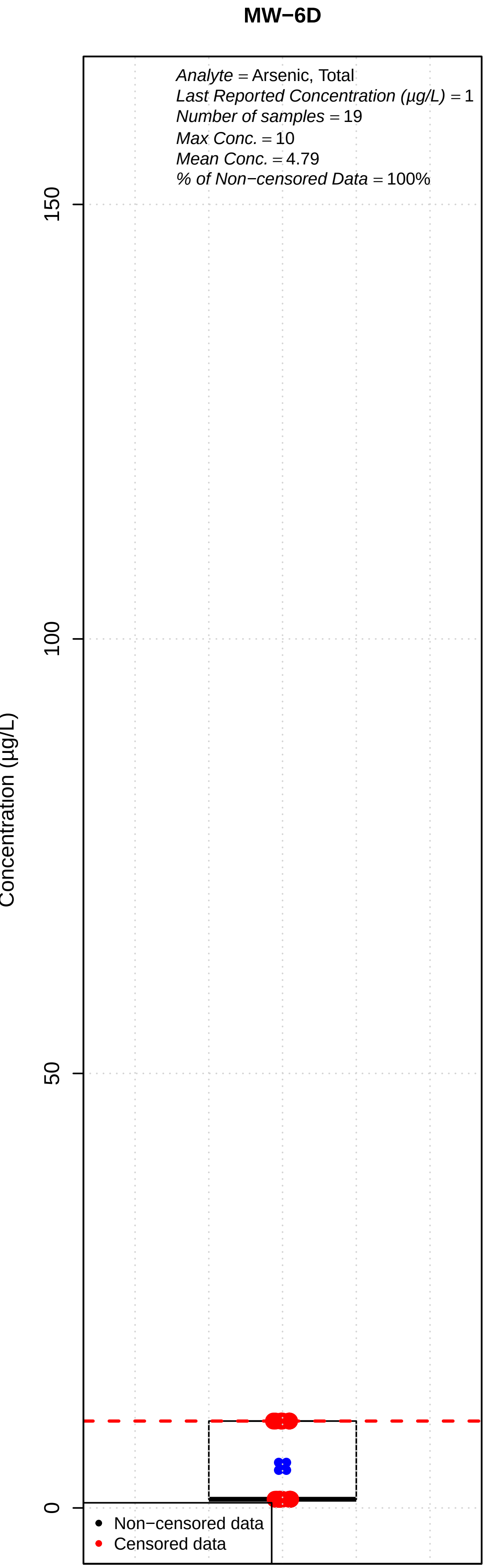
MW−6S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 18
Max Conc. = 10
Mean Conc. = 5
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

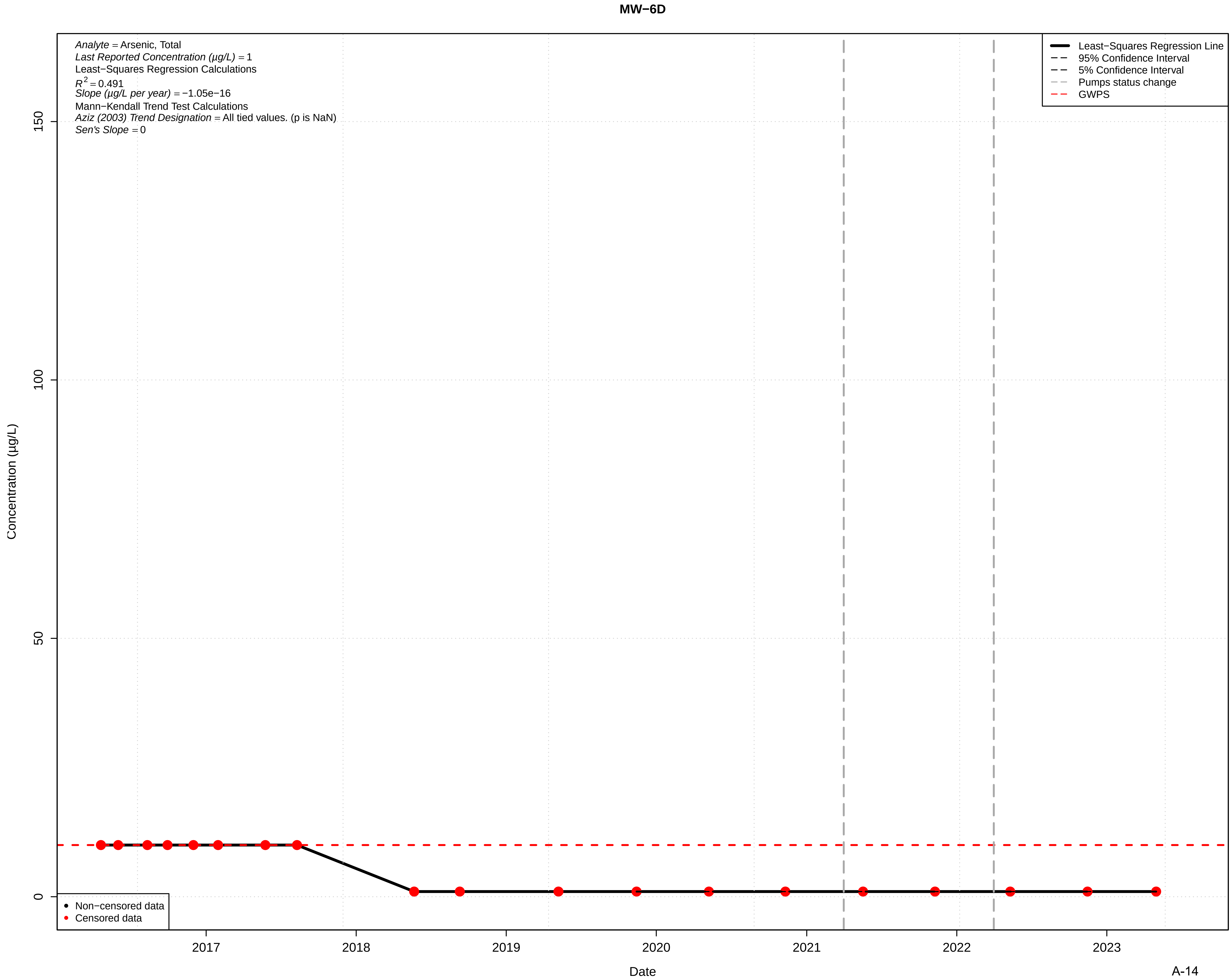


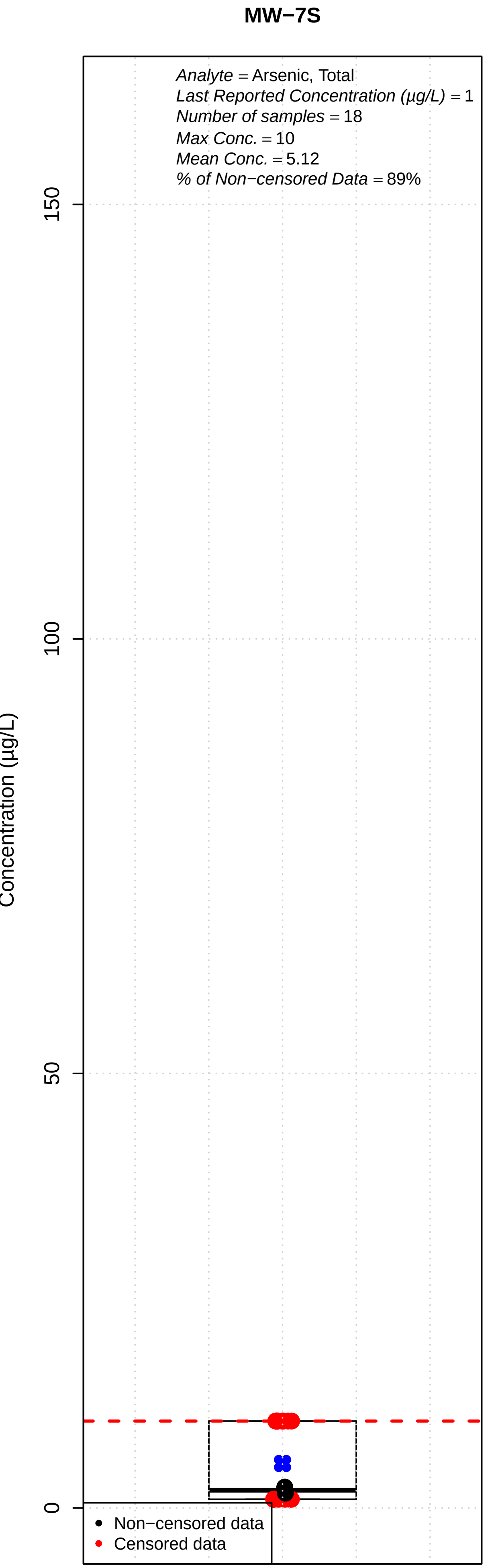
MW−6S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.481
Slope (µg/L per year) = −9.26e−17
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

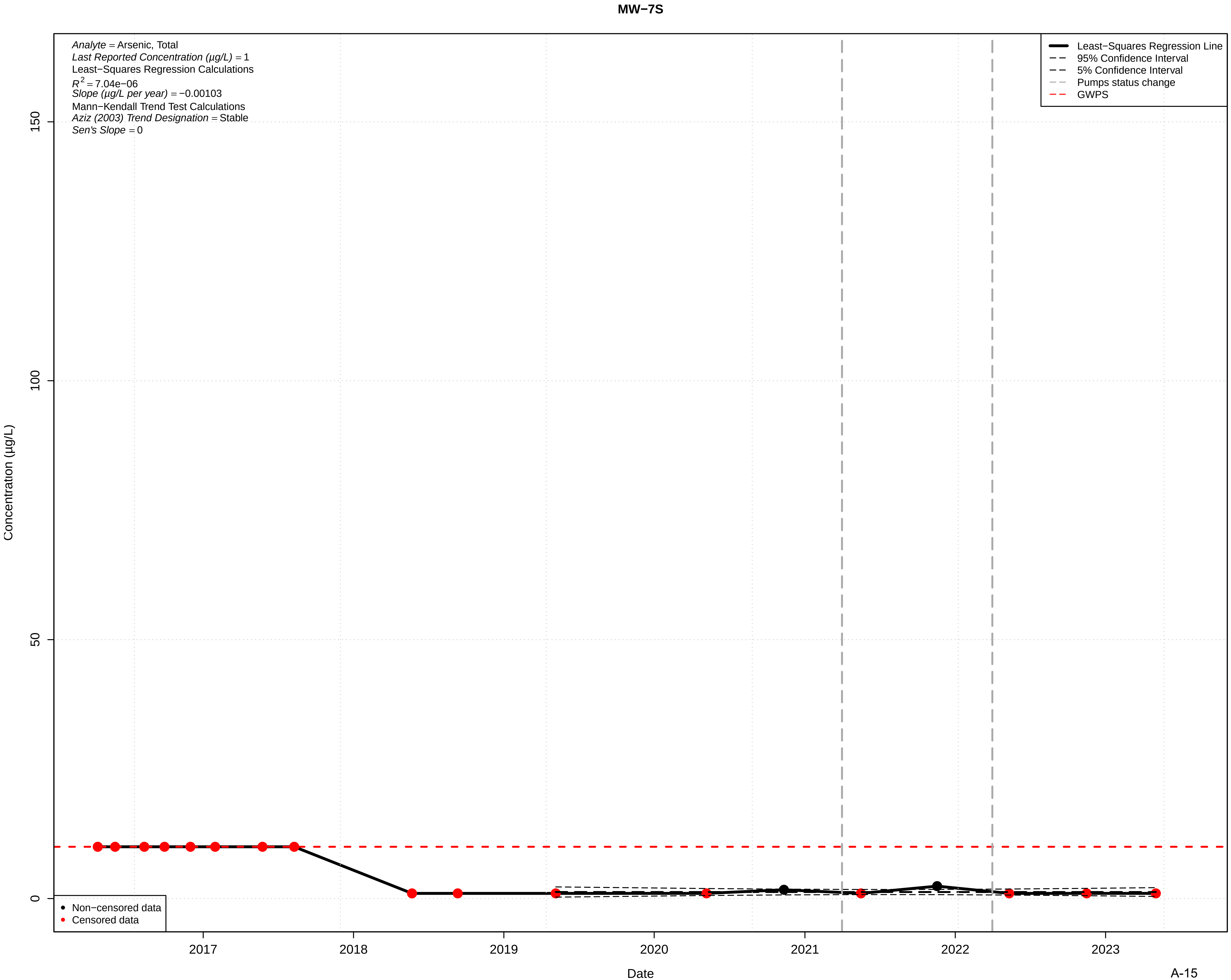

MW−6I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 19
Max Conc. = 10
Mean Conc. = 4.79
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

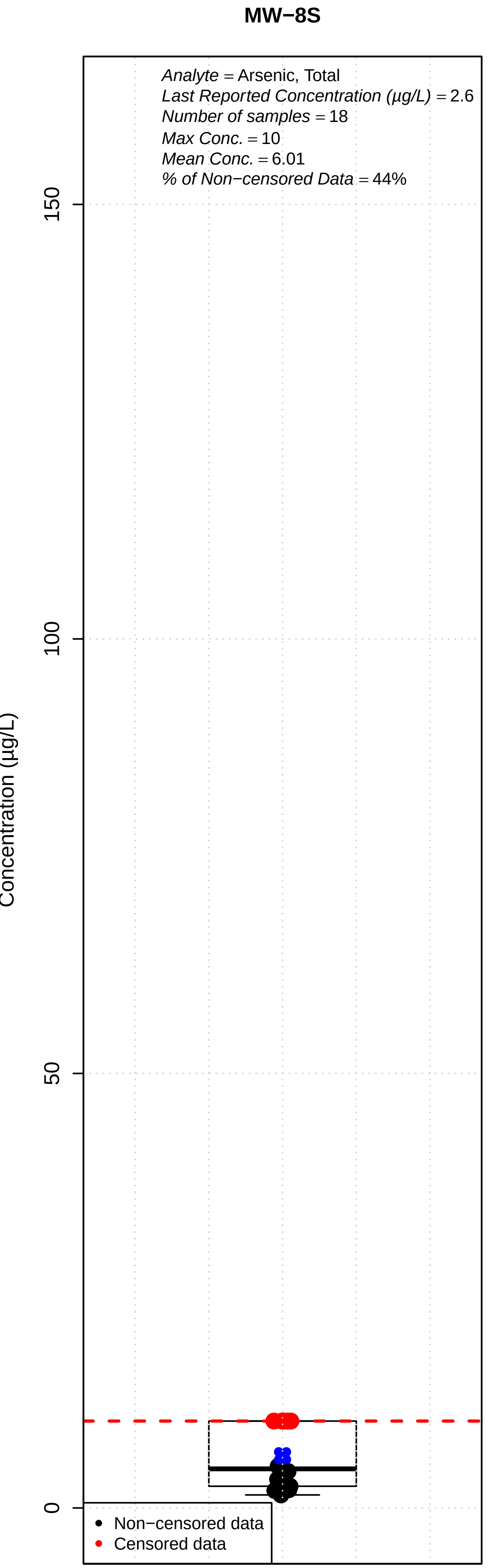

MW−6I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = 0.491
Slope (µg/L per year) = −1.05e−16
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

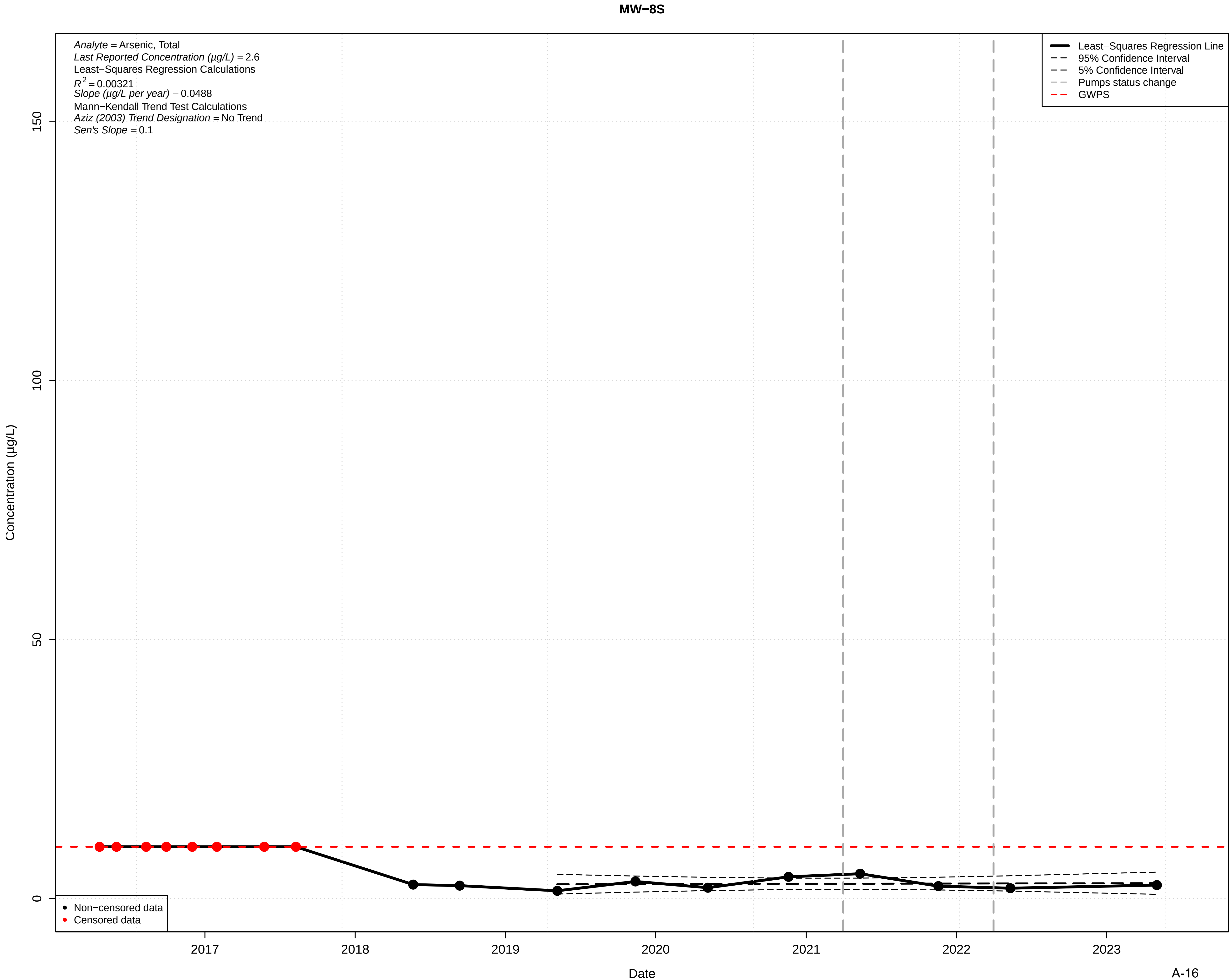

MW−6D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 19
Max Conc. = 10
Mean Conc. = 4.79
% of Non−censored Data = 100%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

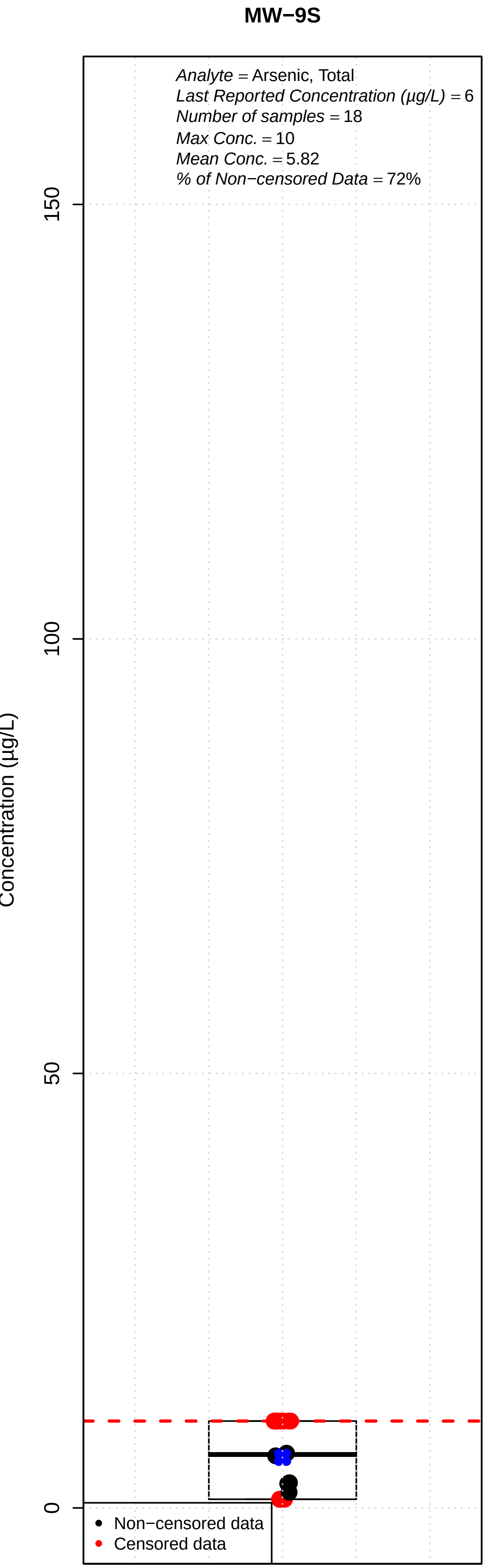

MW−6D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = 0.491
Slope (µg/L per year) = −1.05e−16
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−7S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 18
Max Conc. = 10
Mean Conc. = 5.12
% of Non−censored Data = 89%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

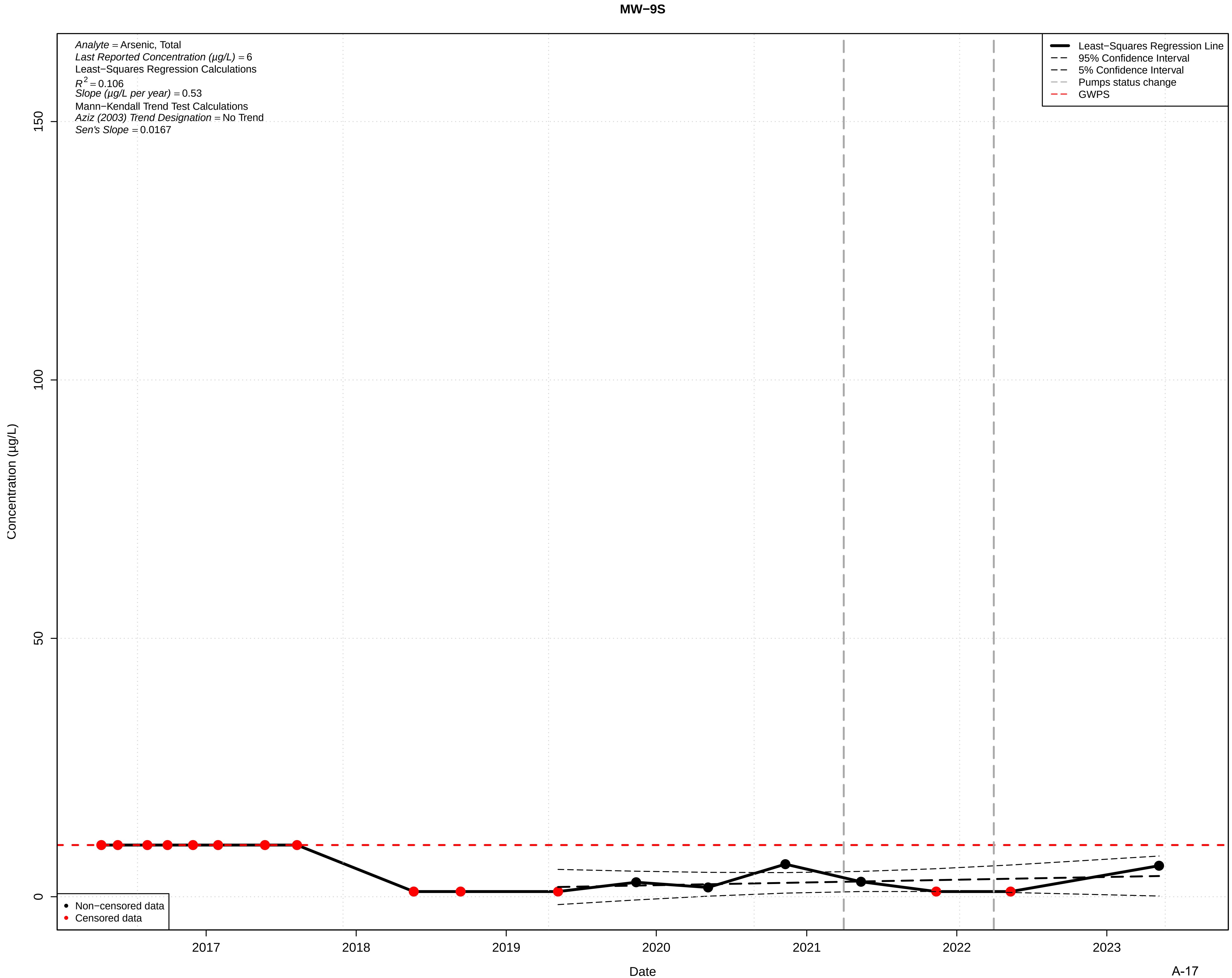

MW−7S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = 7.04e−06
Slope (µg/L per year) = −0.00103
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−8S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 2.6
Number of samples = 18
Max Conc. = 10
Mean Conc. = 6.01
% of Non−censored Data = 44%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

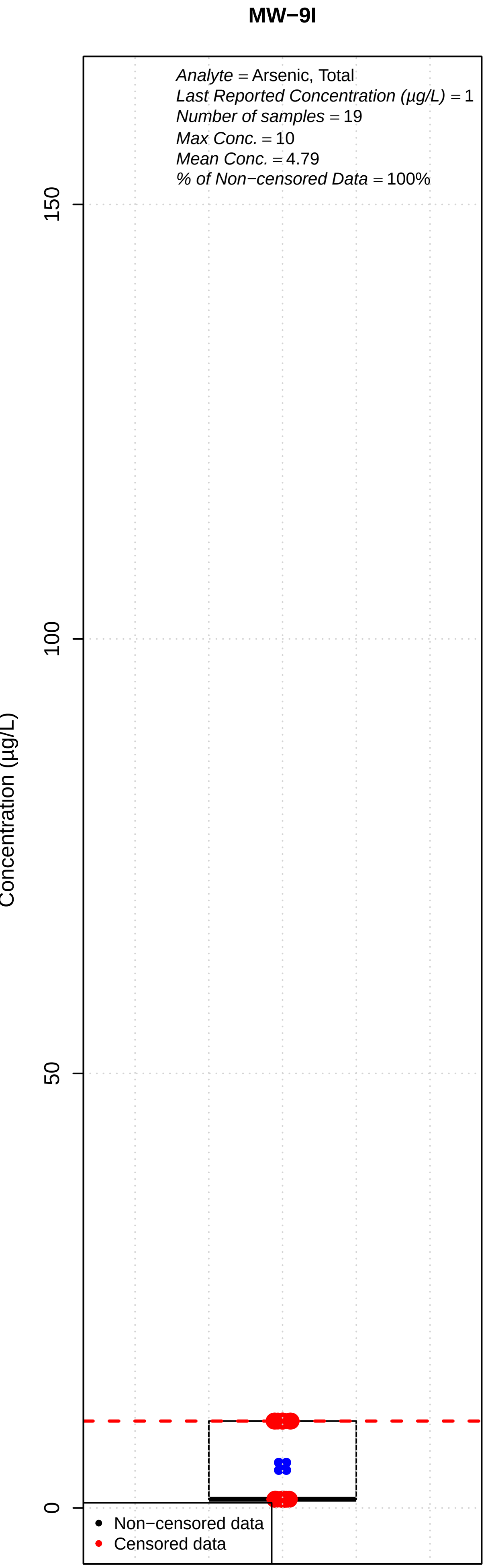

MW−8S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 2.6
Least−Squares Regression Calculations
R^2 = 0.00321
Slope (µg/L per year) = 0.0488
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.1
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

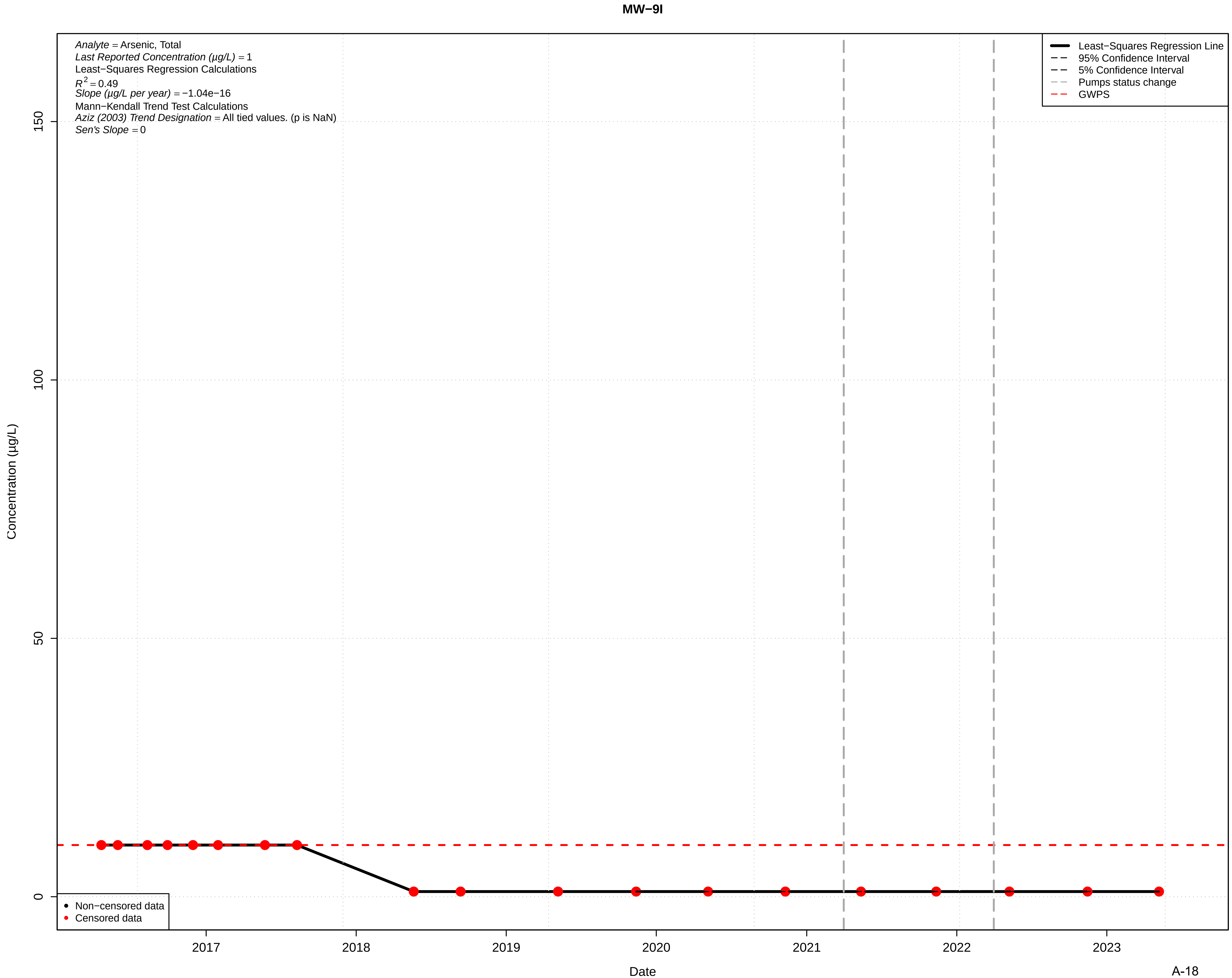


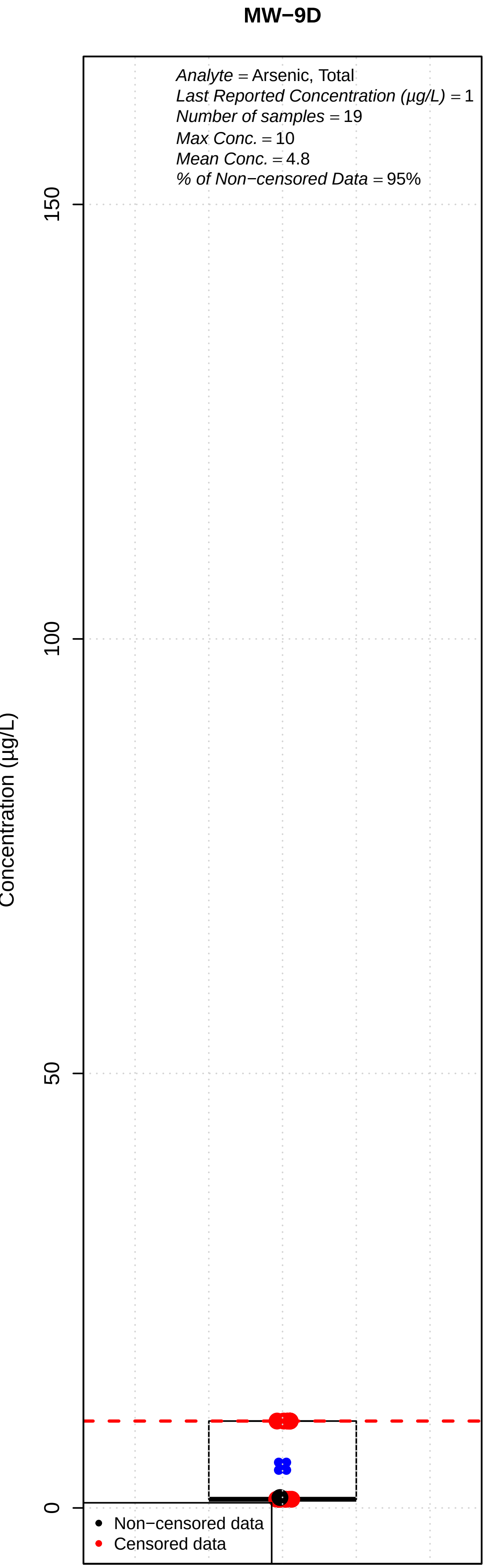
MW−9S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 6
Number of samples = 18
Max Conc. = 10
Mean Conc. = 5.82
% of Non−censored Data = 72%
Concentration (µg/L)
Non−censored data
Censored data

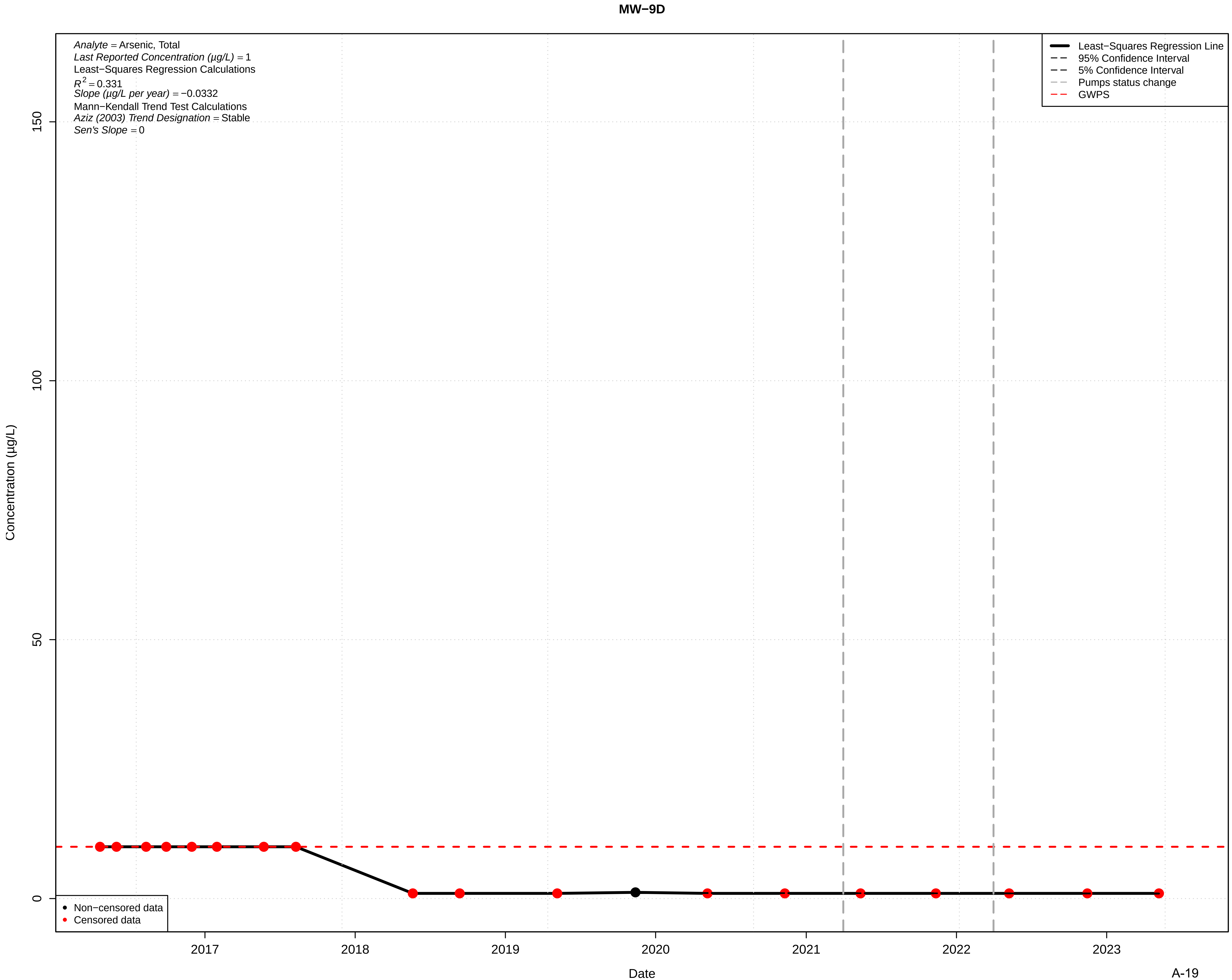


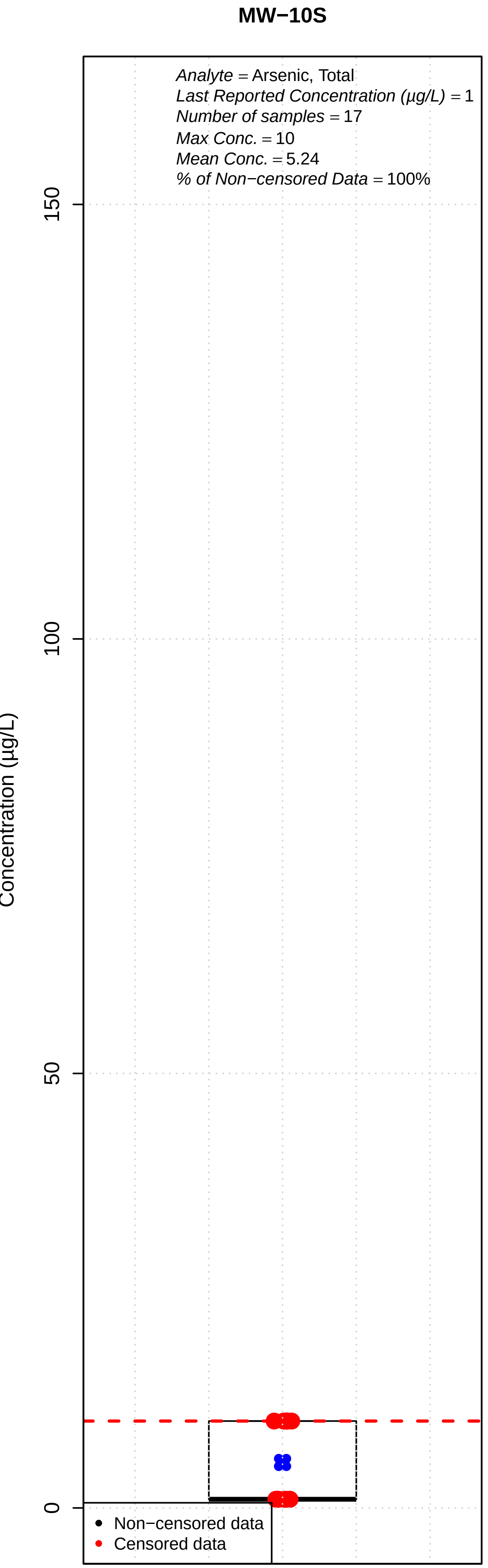
MW−9S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 6
Least−Squares Regression Calculations
R^2 = 0.106
Slope (µg/L per year) = 0.53
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.0167
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Non−censored data
Censored data
Date

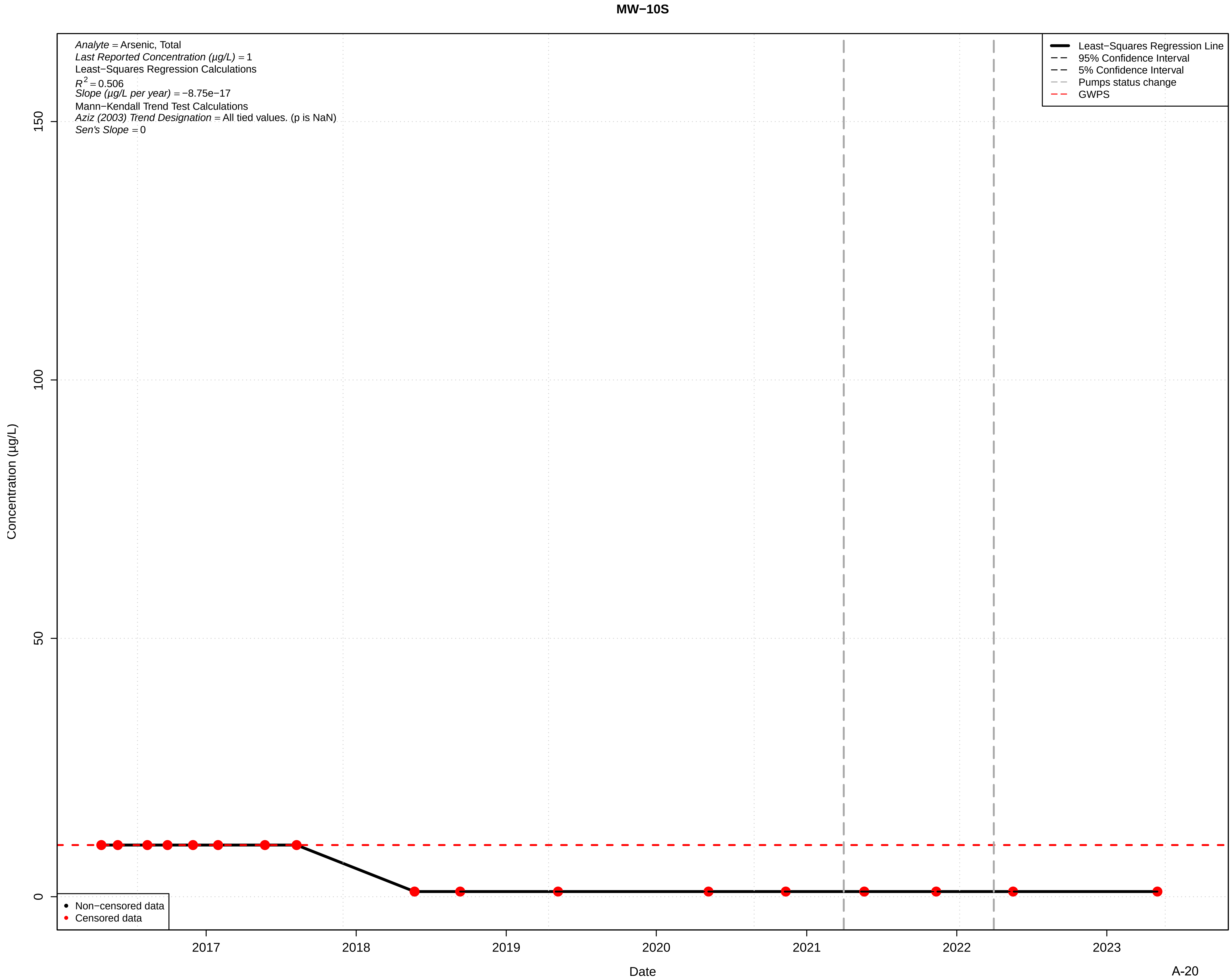

MW−9I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 19
Max Conc. = 10
Mean Conc. = 4.79
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

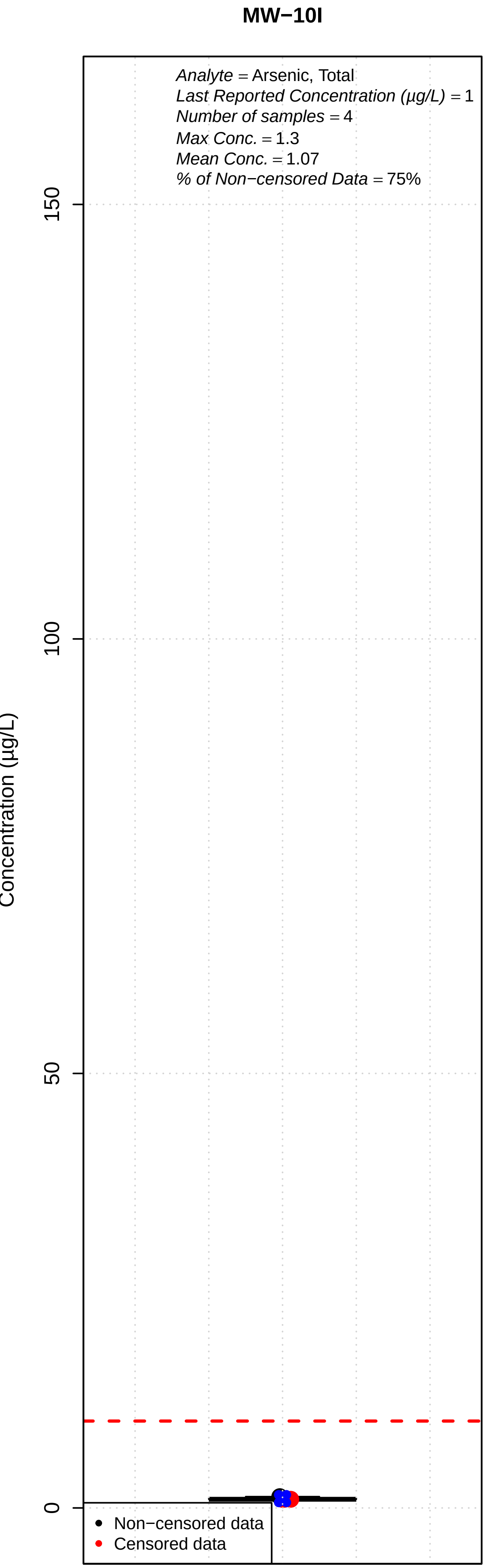

MW−9I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = 0.49
Slope (µg/L per year) = −1.04e−16
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data

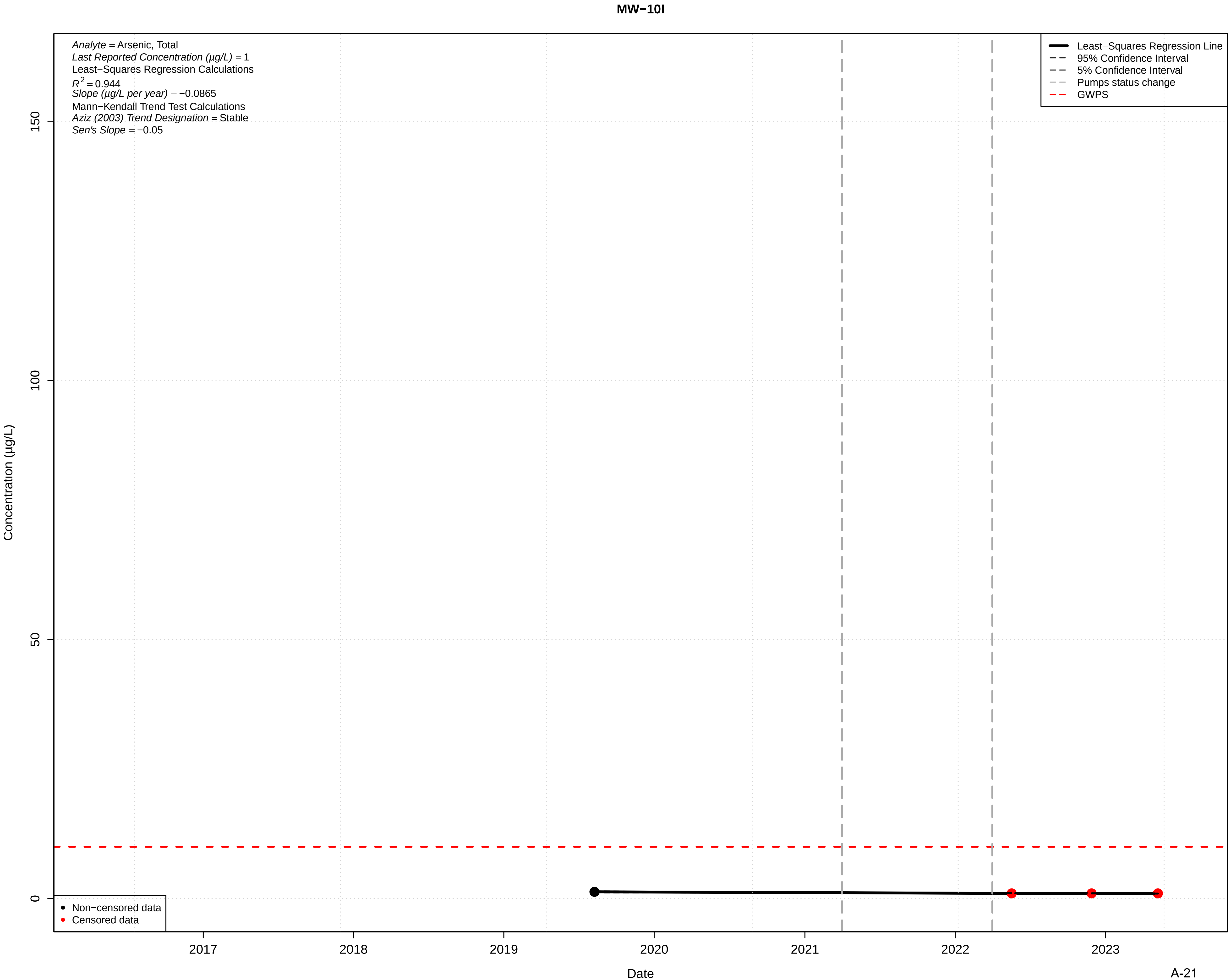

MW−9D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 19
Max Conc. = 10
Mean Conc. = 4.8
% of Non−censored Data = 95%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

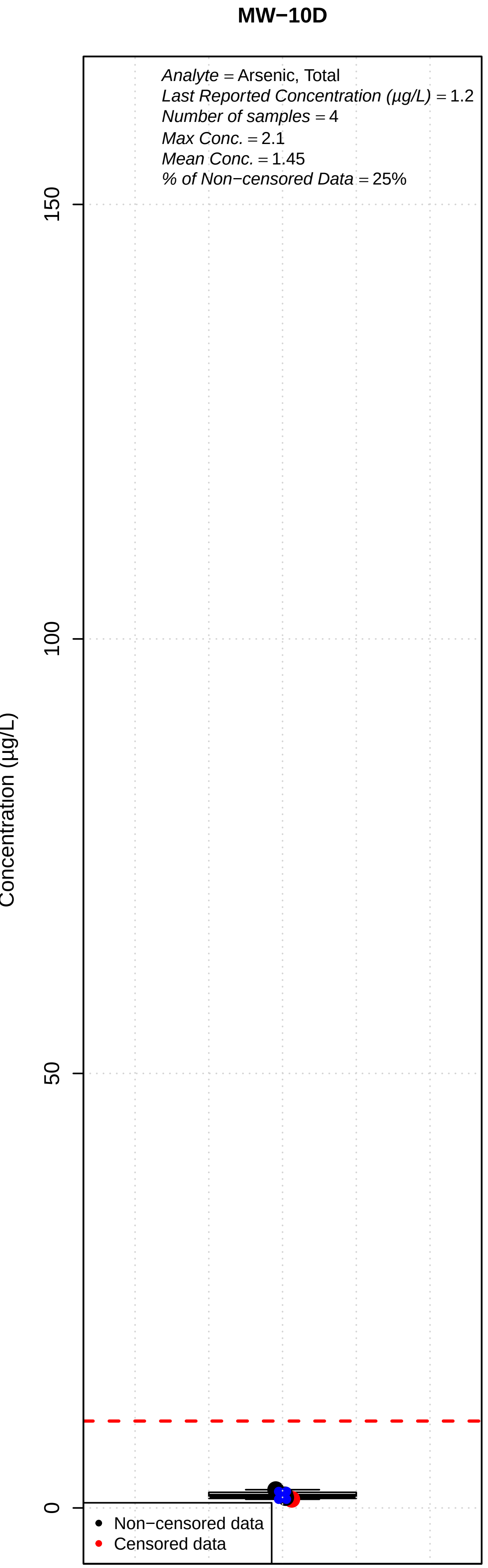

MW−9D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R² = 0.331
Slope (µg/L per year) = −0.0332
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

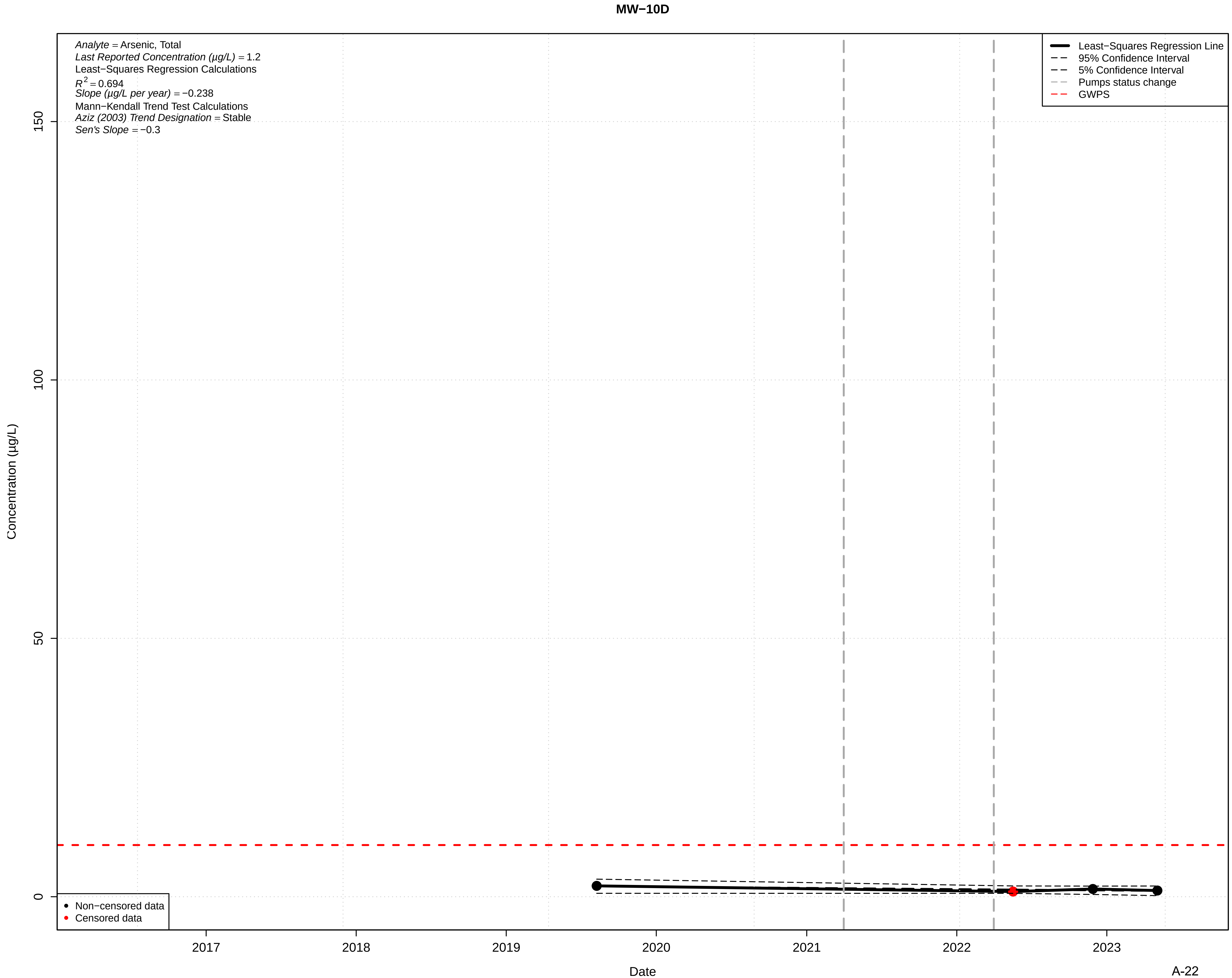

MW−10S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 17
Max Conc. = 10
Mean Conc. = 5.24
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

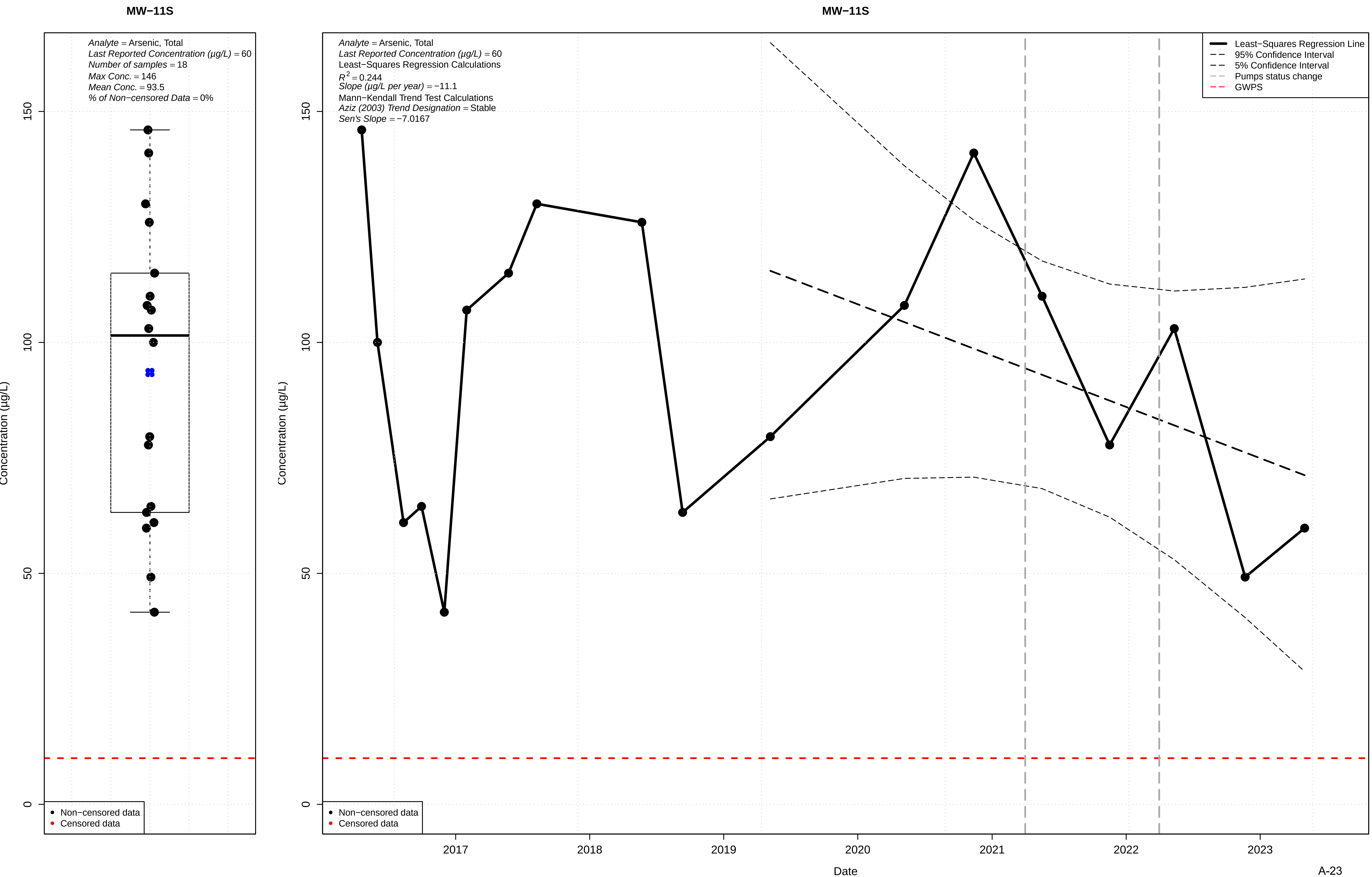

MW−10S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.506
Slope (µg/L per year) = −8.75e−17
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−10I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 4
Max Conc. = 1.3
Mean Conc. = 1.07
% of Non−censored Data = 75%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

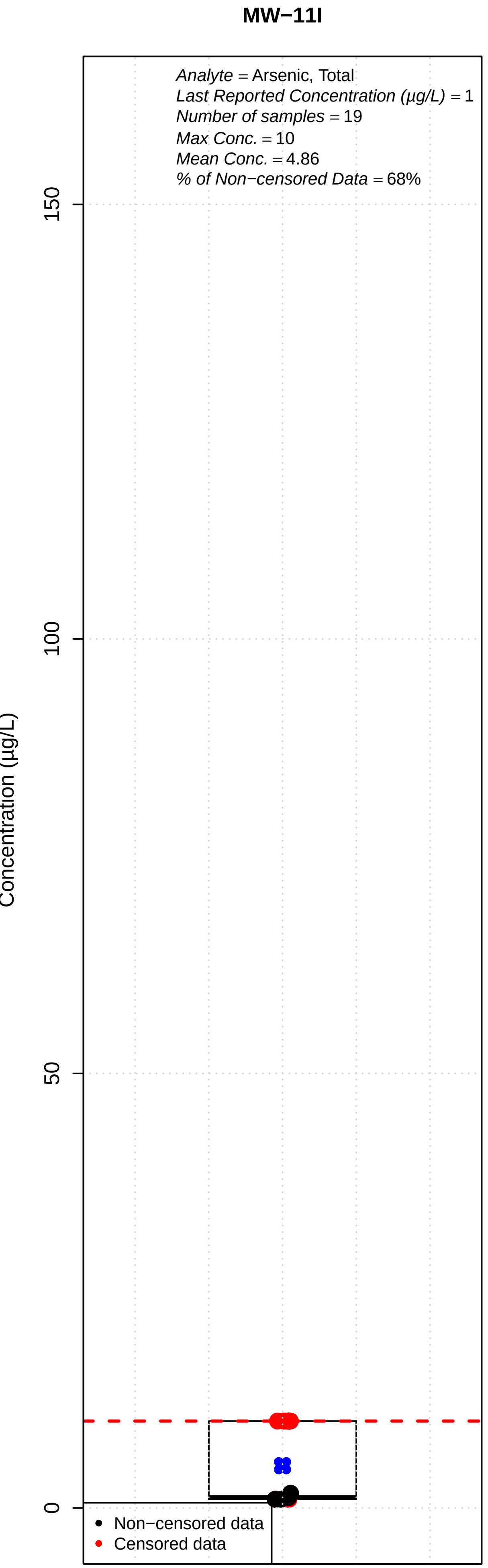

MW−10I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.944
Slope (µg/L per year) = −0.0865
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.05
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data

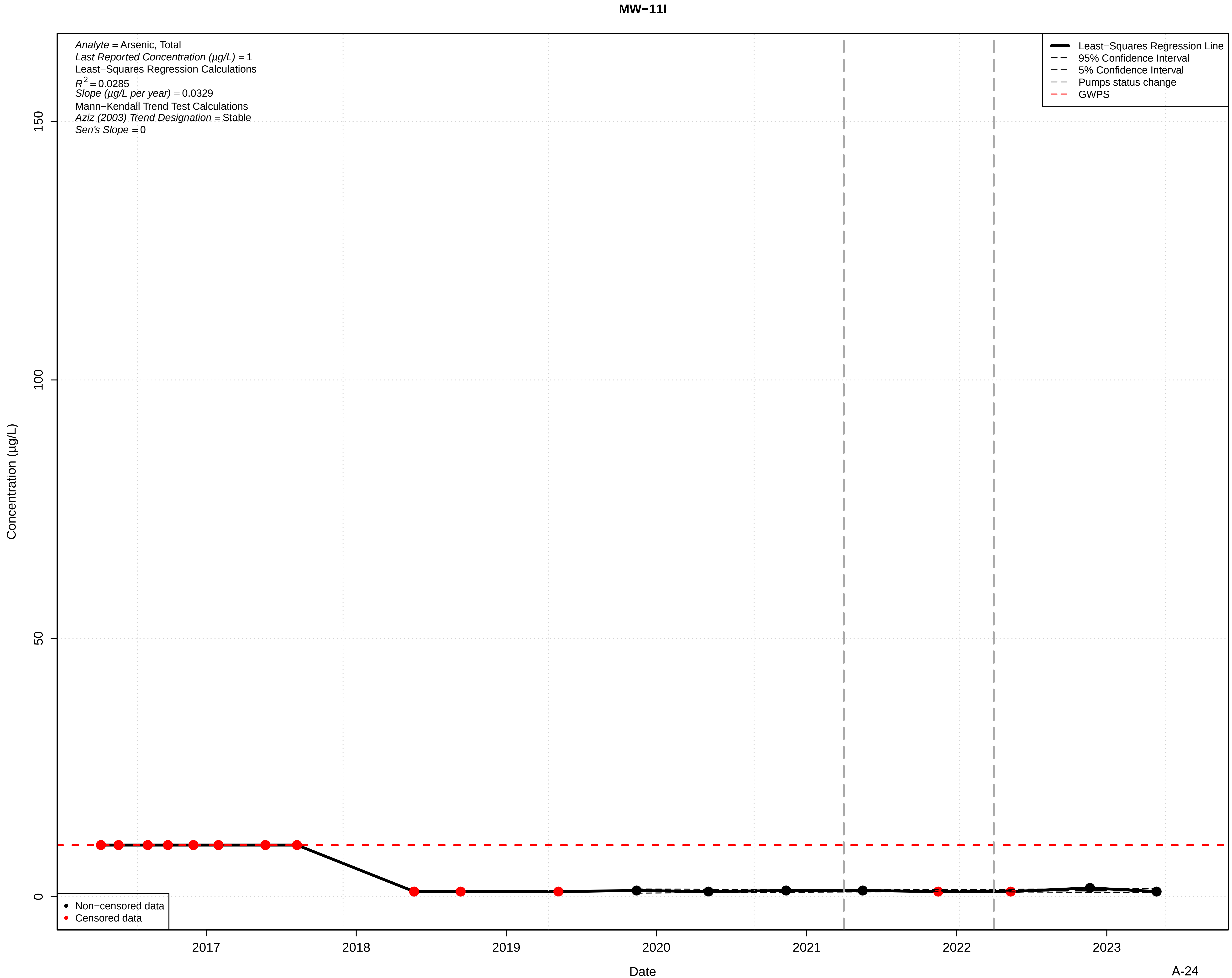

MW−10D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1.2
Number of samples = 4
Max Conc. = 2.1
Mean Conc. = 1.45
% of Non−censored Data = 25%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

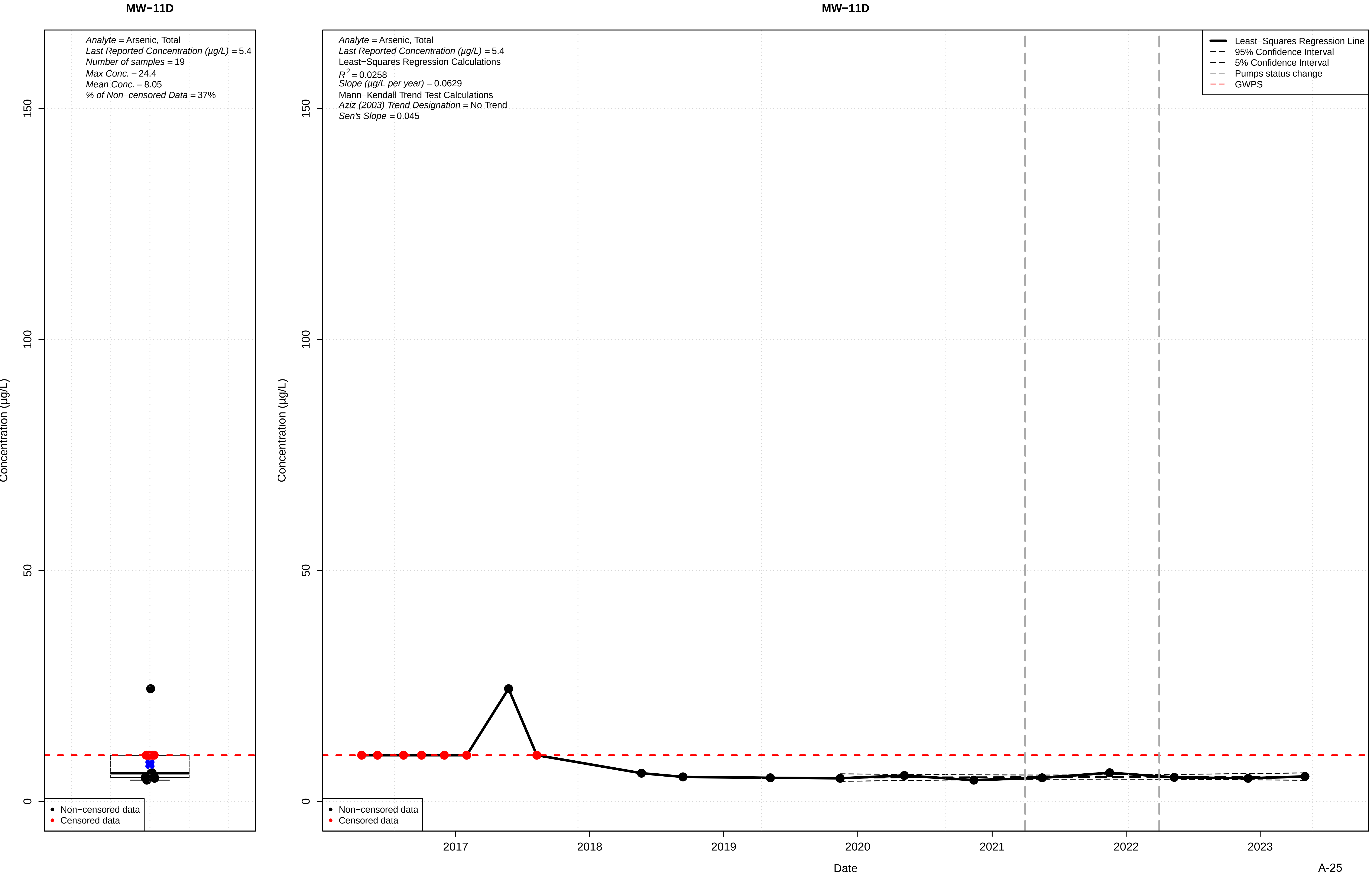

MW−10D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1.2
Least−Squares Regression Calculations
R2 = 0.694
Slope (µg/L per year) = −0.238
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.3
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

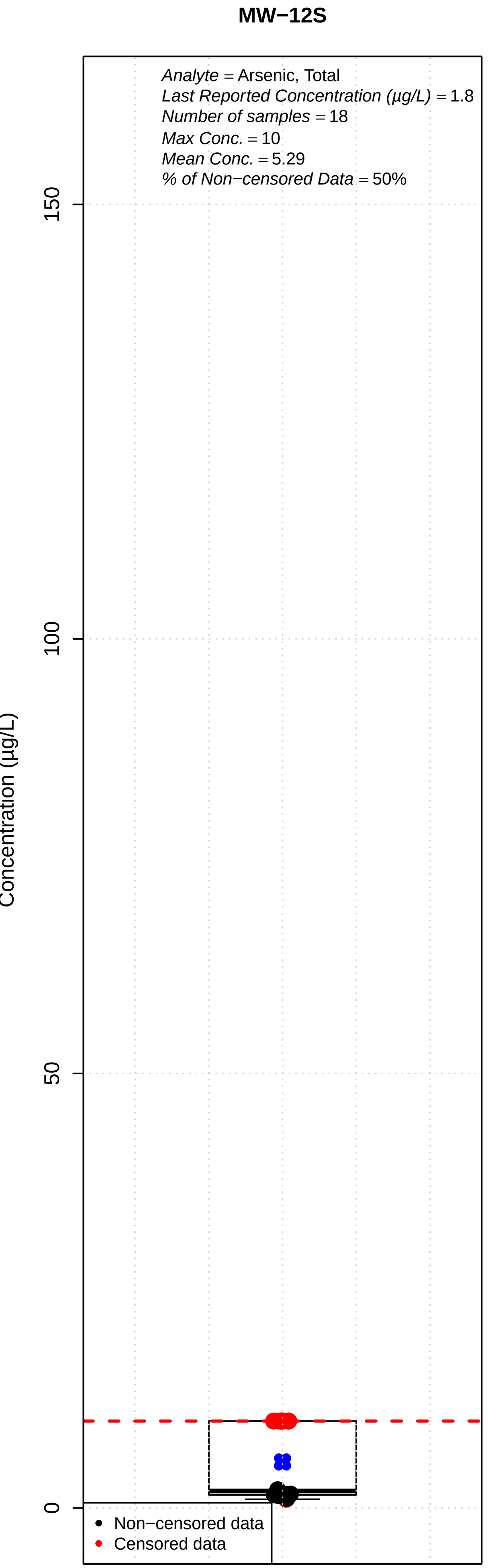


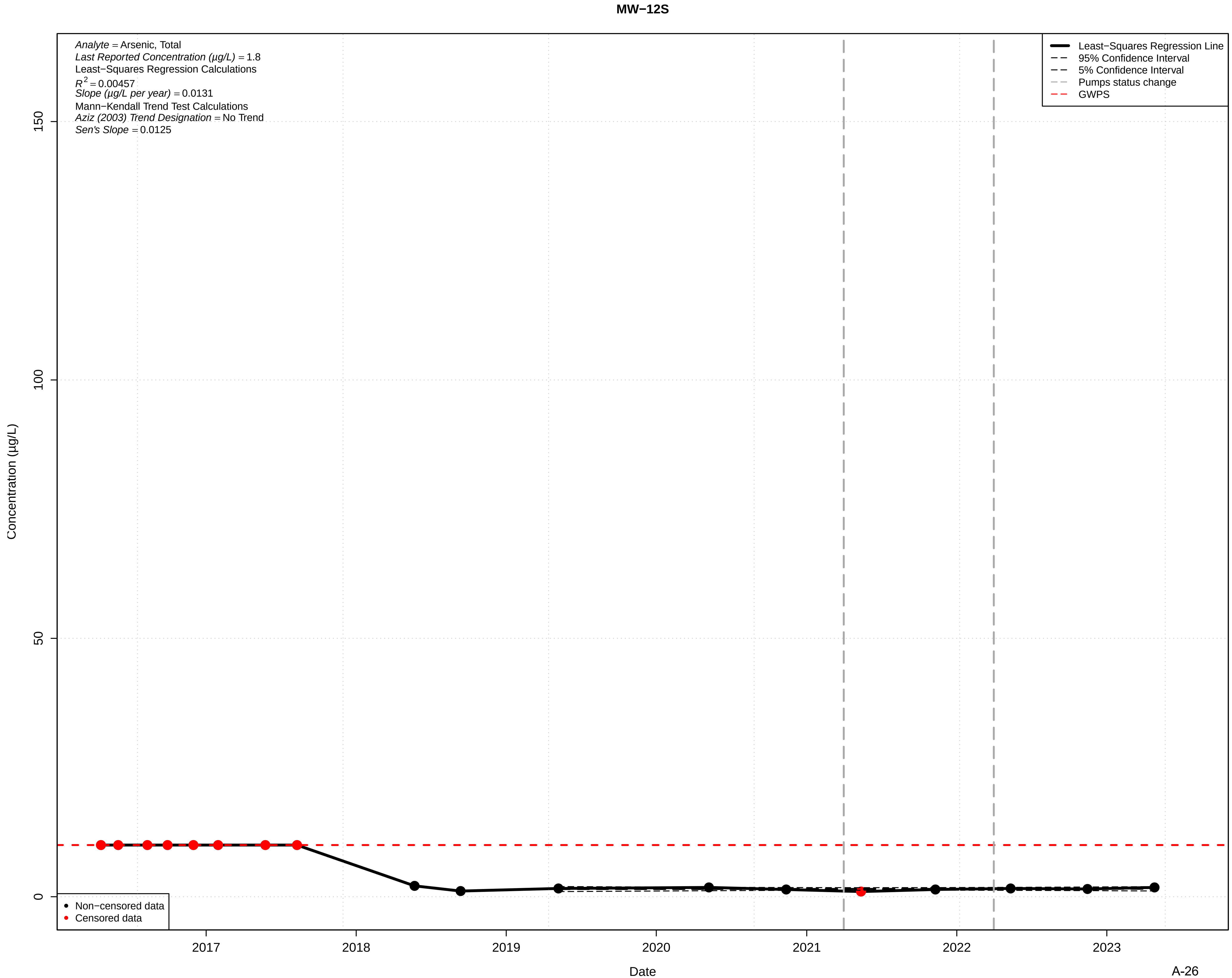
MW−11S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 60
Number of samples = 18
Max Conc. = 146
Mean Conc. = 93.5
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
MW−11S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 60
Least−Squares Regression Calculations
R^2 = 0.244
Slope (µg/L per year) = −11.1
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −7.0167
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

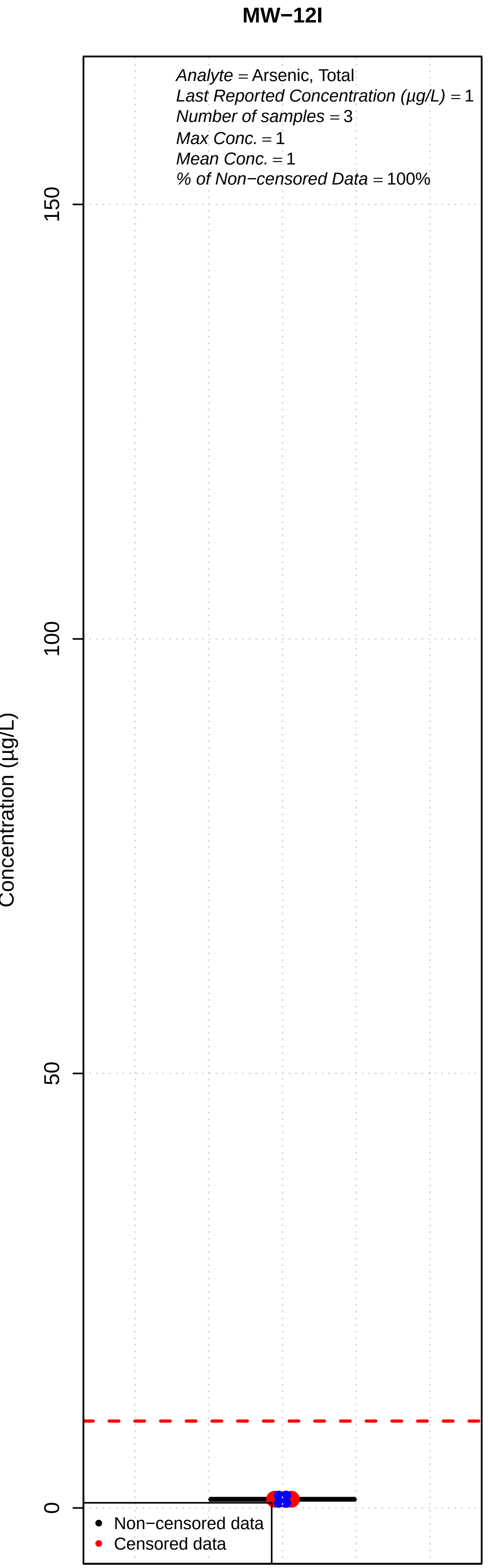

MW−11I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 19
Max Conc. = 10
Mean Conc. = 4.86
% of Non−censored Data = 68%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

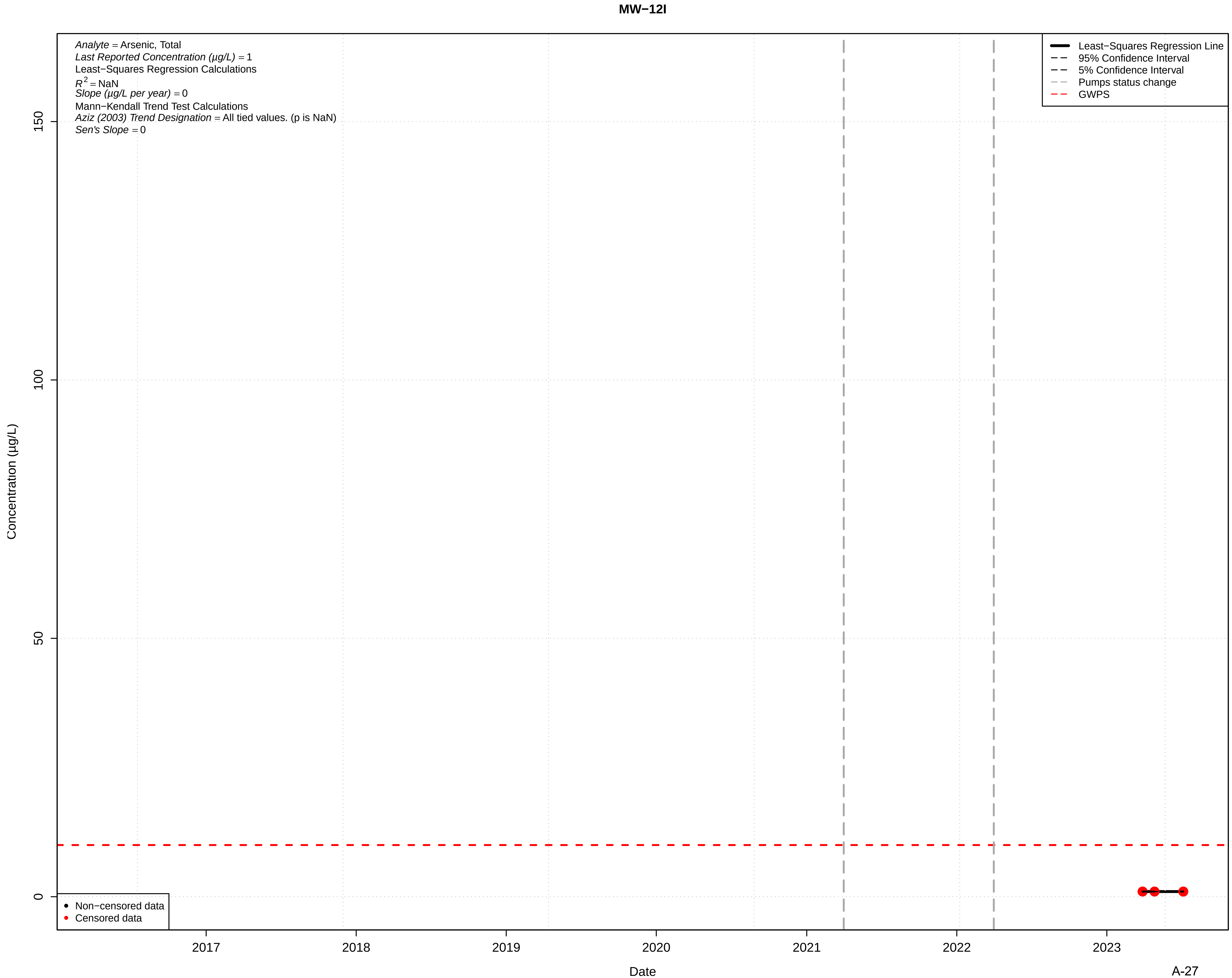

MW−11I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.0285
Slope (µg/L per year) = 0.0329
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

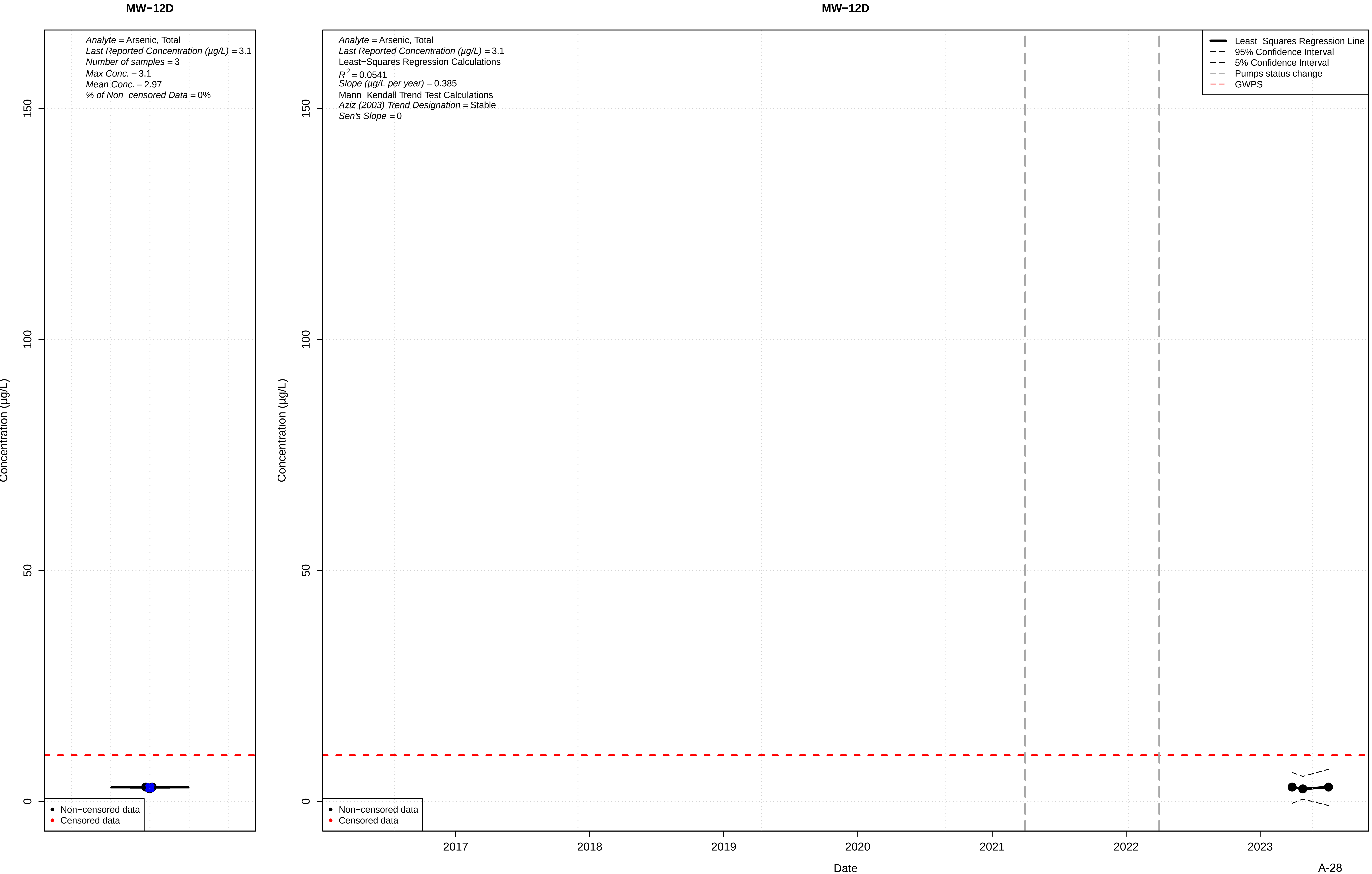

MW−11D
Analyte = Arsenic, Total
Last Reported Concentration (μg/L) = 5.4
Number of samples = 19
Max Conc. = 24.4
Mean Conc. = 8.05
% of Non−censored Data = 37%
Concentration (μg/L)
Non−censored data
Censored data
MW−11D
Analyte = Arsenic, Total
Last Reported Concentration (μg/L) = 5.4
Least−Squares Regression Calculations
R2 = 0.0258
Slope (μg/L per year) = 0.0629
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.045
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Date

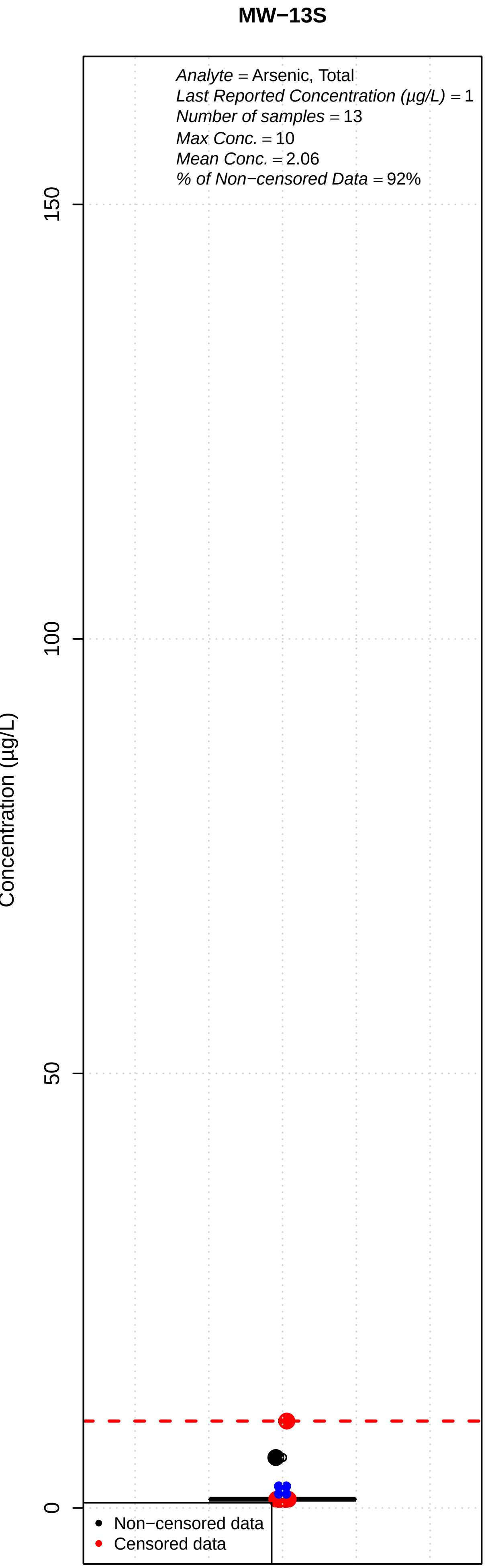

MW−12S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1.8
Number of samples = 18
Max Conc. = 10
Mean Conc. = 5.29
% of Non−censored Data = 50%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

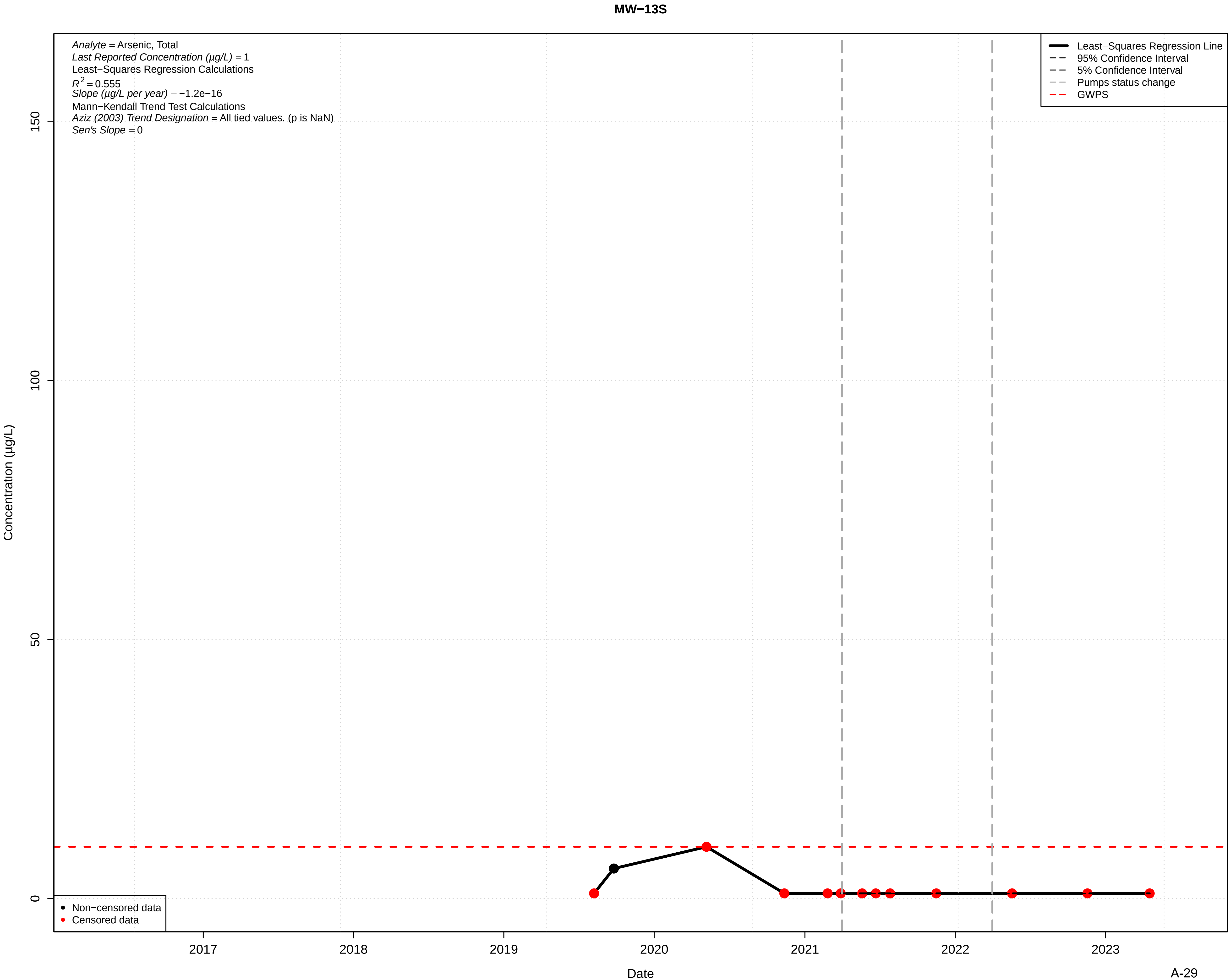

MW−12S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1.8
Least−Squares Regression Calculations
R^2 = 0.00457
Slope (µg/L per year) = 0.0131
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.0125
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

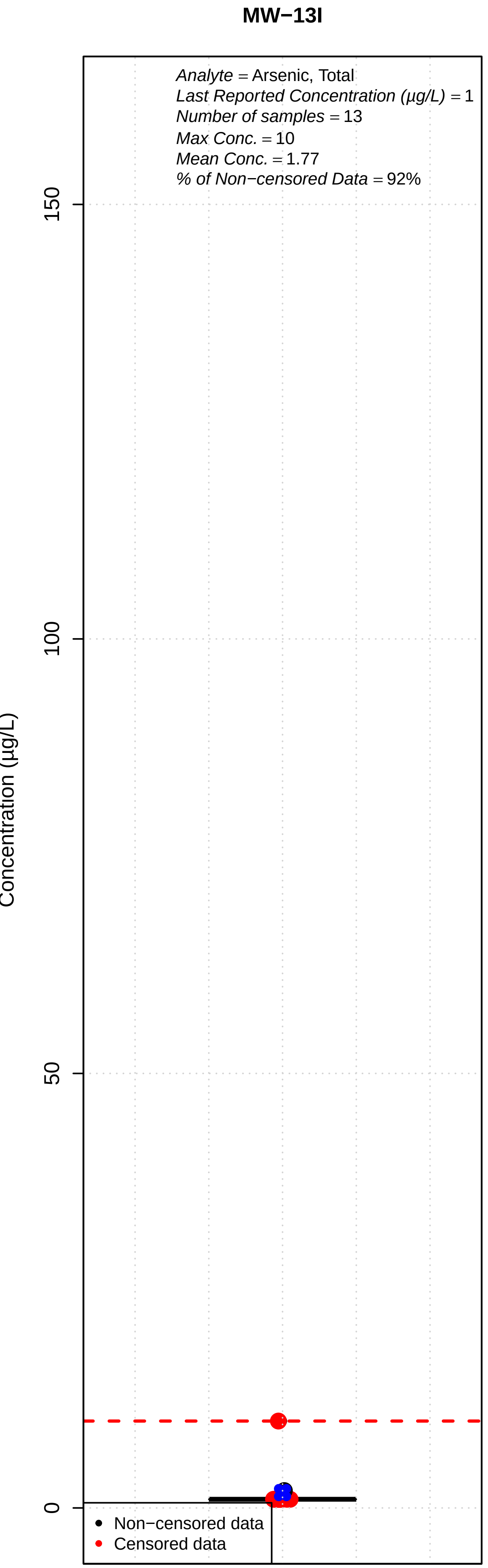

MW−12I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 3
Max Conc. = 1
Mean Conc. = 1
% of Non−censored Data = 100%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

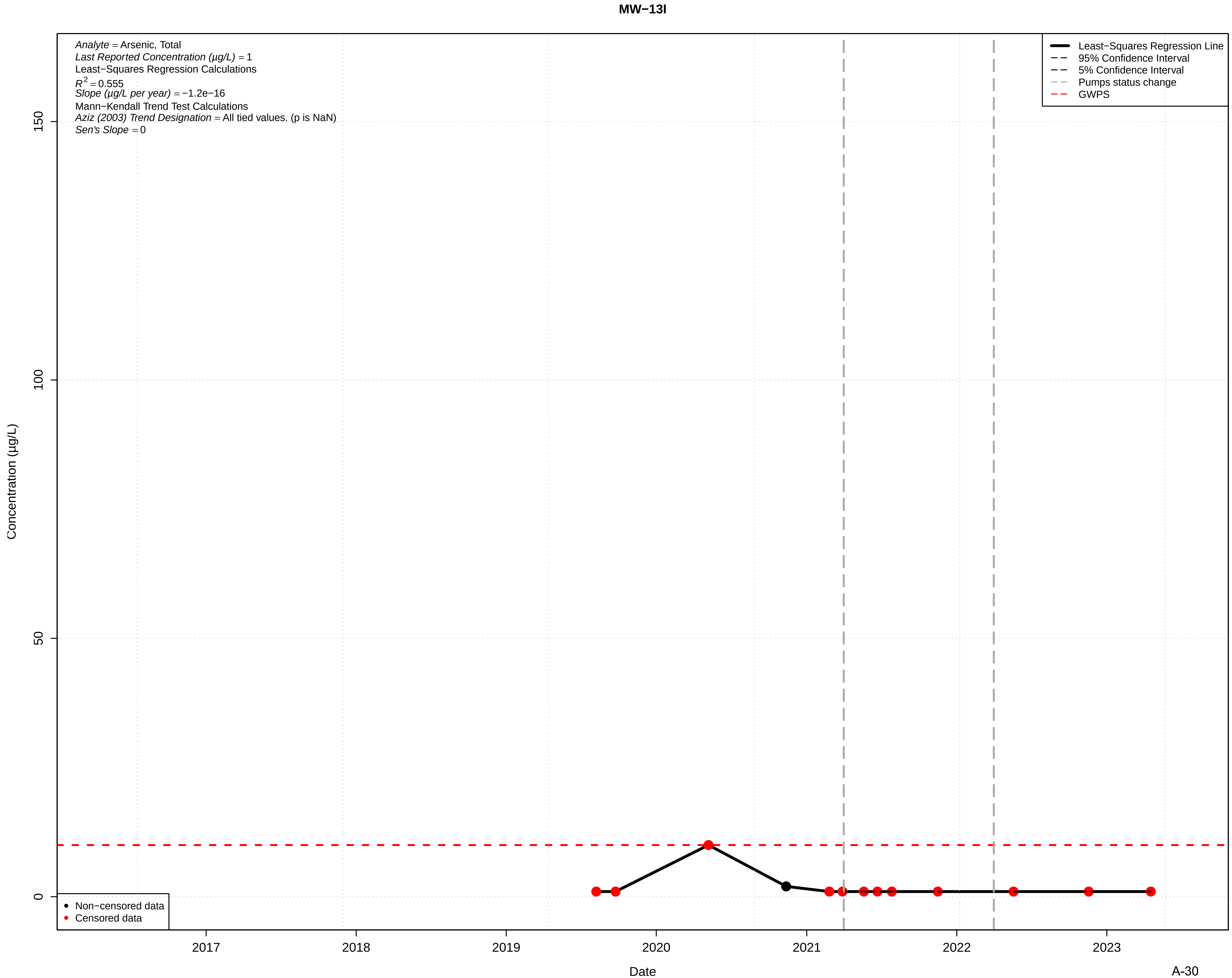

MW−12I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = NaN
Slope (µg/L per year) = 0
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

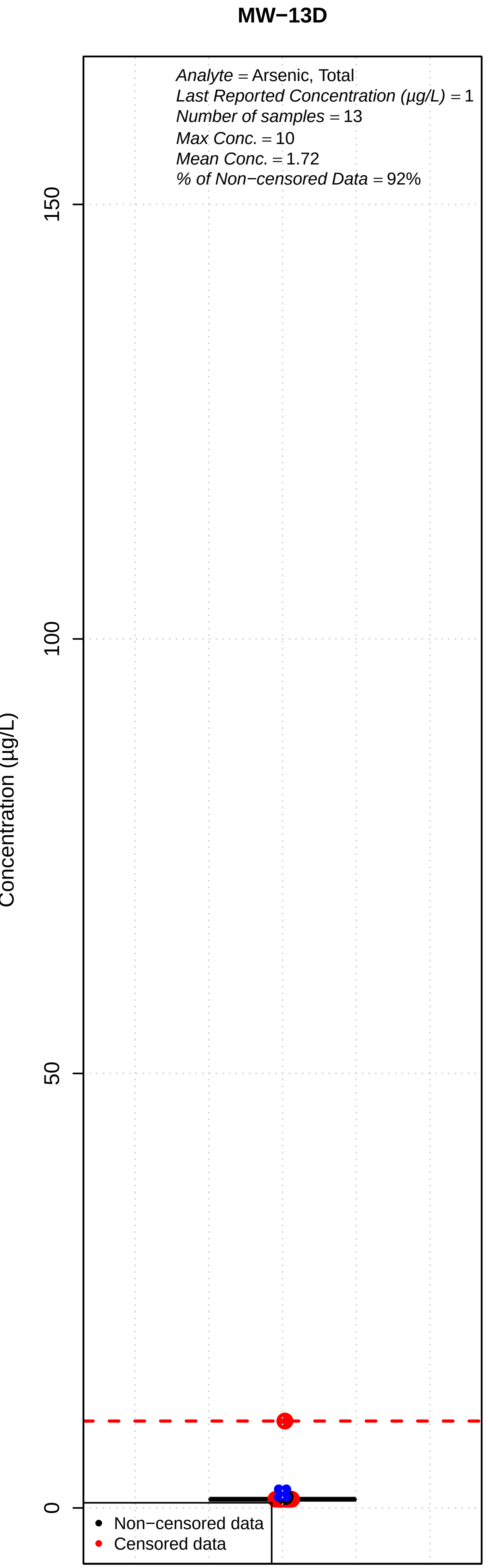

MW−12D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 3.1
Number of samples = 3
Max Conc. = 3.1
Mean Conc. = 2.97
% of Non−censored Data = 0%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
MW−12D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 3.1
Least−Squares Regression Calculations
R2 = 0.0541
Slope (µg/L per year) = 0.385
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

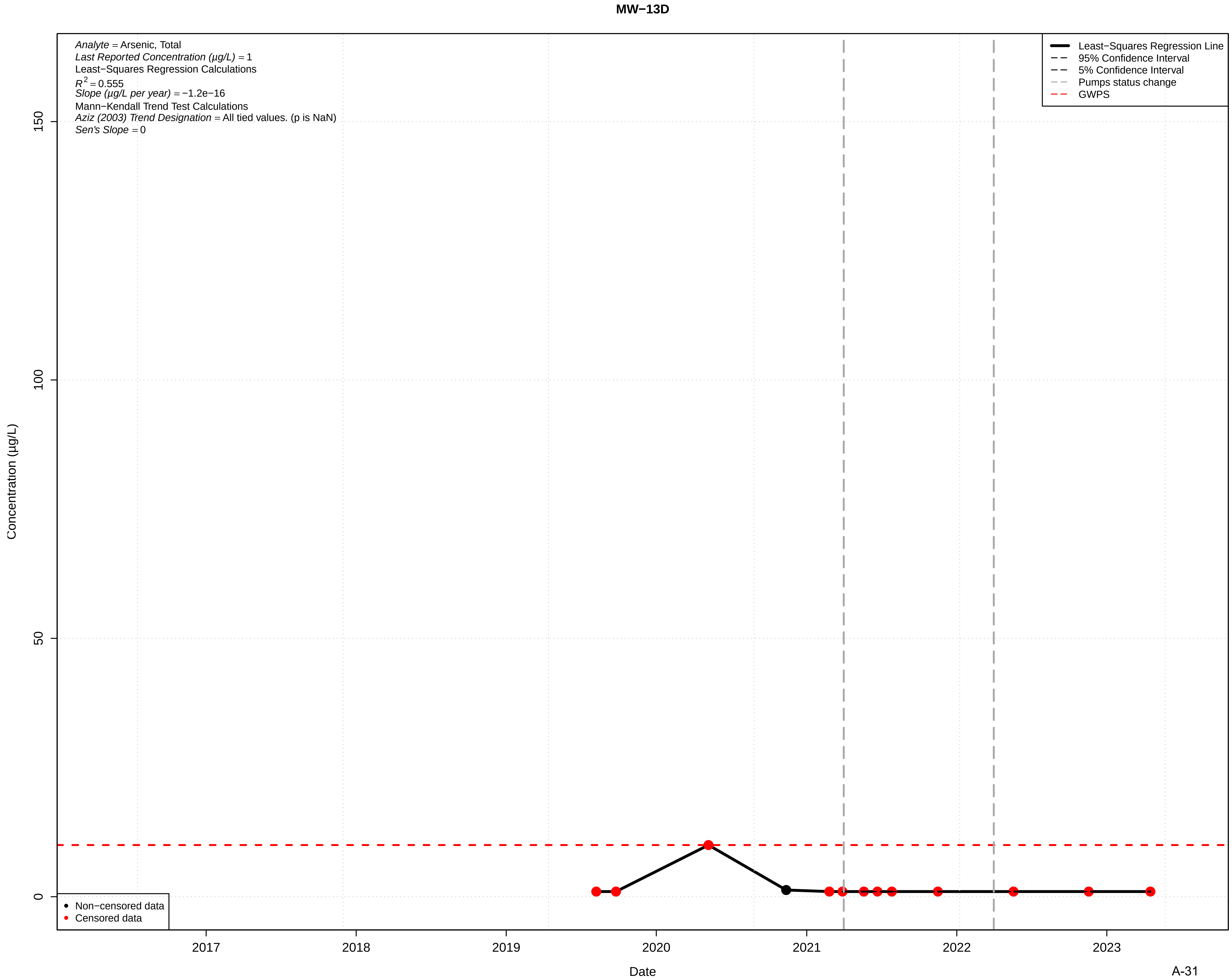

MW−13S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 13
Max Conc. = 10
Mean Conc. = 2.06
% of Non−censored Data = 92%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

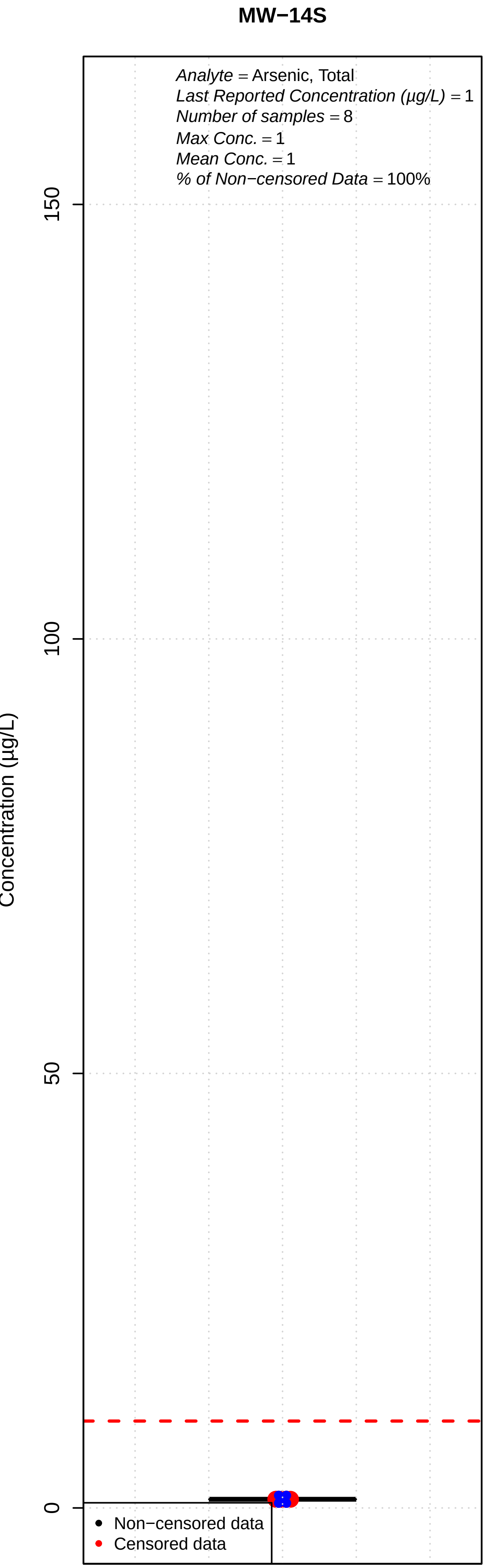

MW−13S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R² = 0.555
Slope (µg/L per year) = −1.2e−16
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

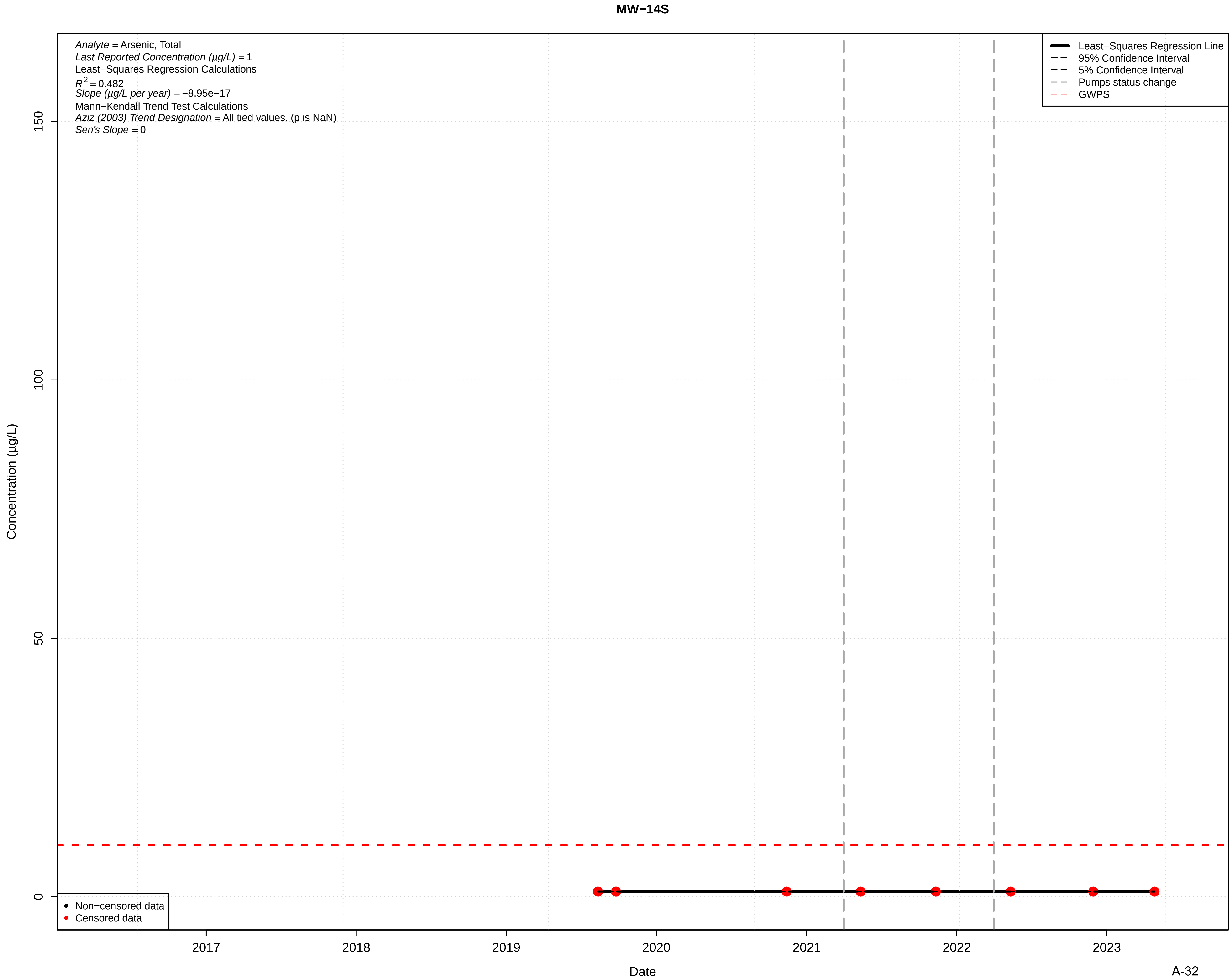

MW−13I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 13
Max Conc. = 10
Mean Conc. = 1.77
% of Non−censored Data = 92%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

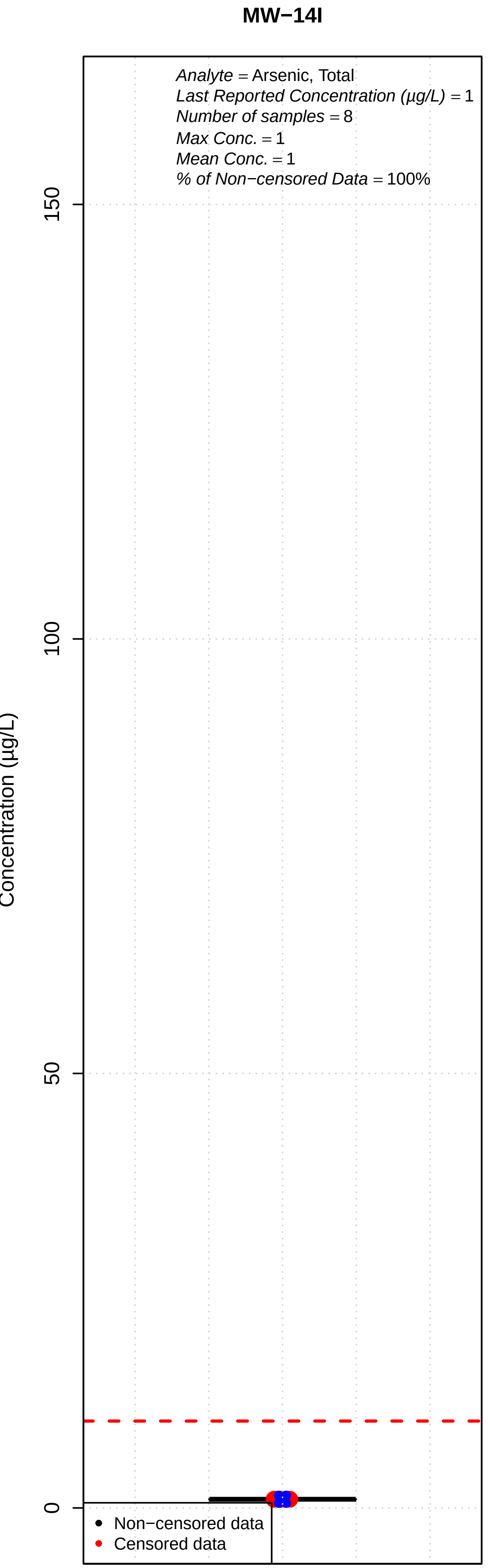

MW−13I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.555
Slope (µg/L per year) = −1.2e−16
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

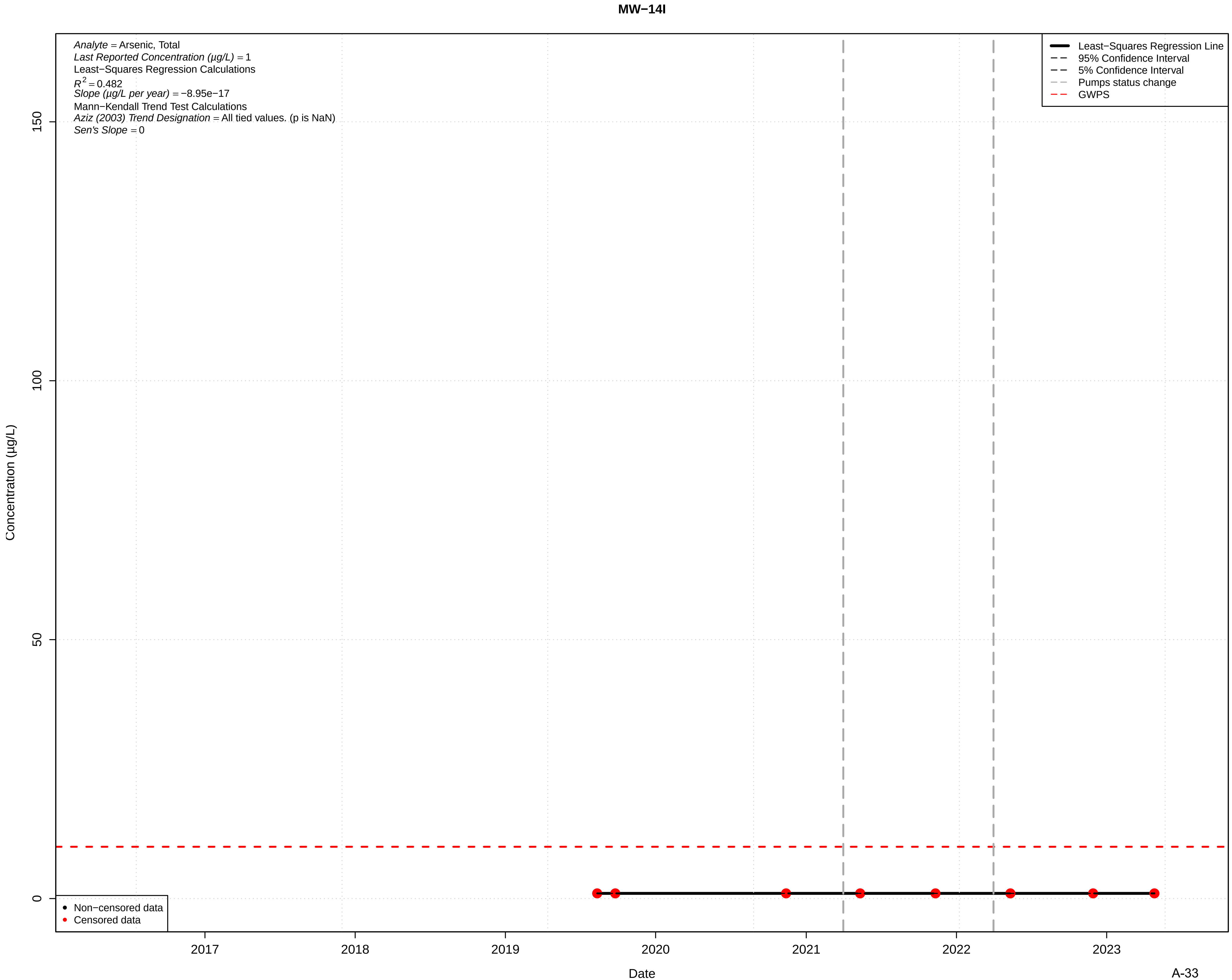

MW−13D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 13
Max Conc. = 10
Mean Conc. = 1.72
% of Non−censored Data = 92%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

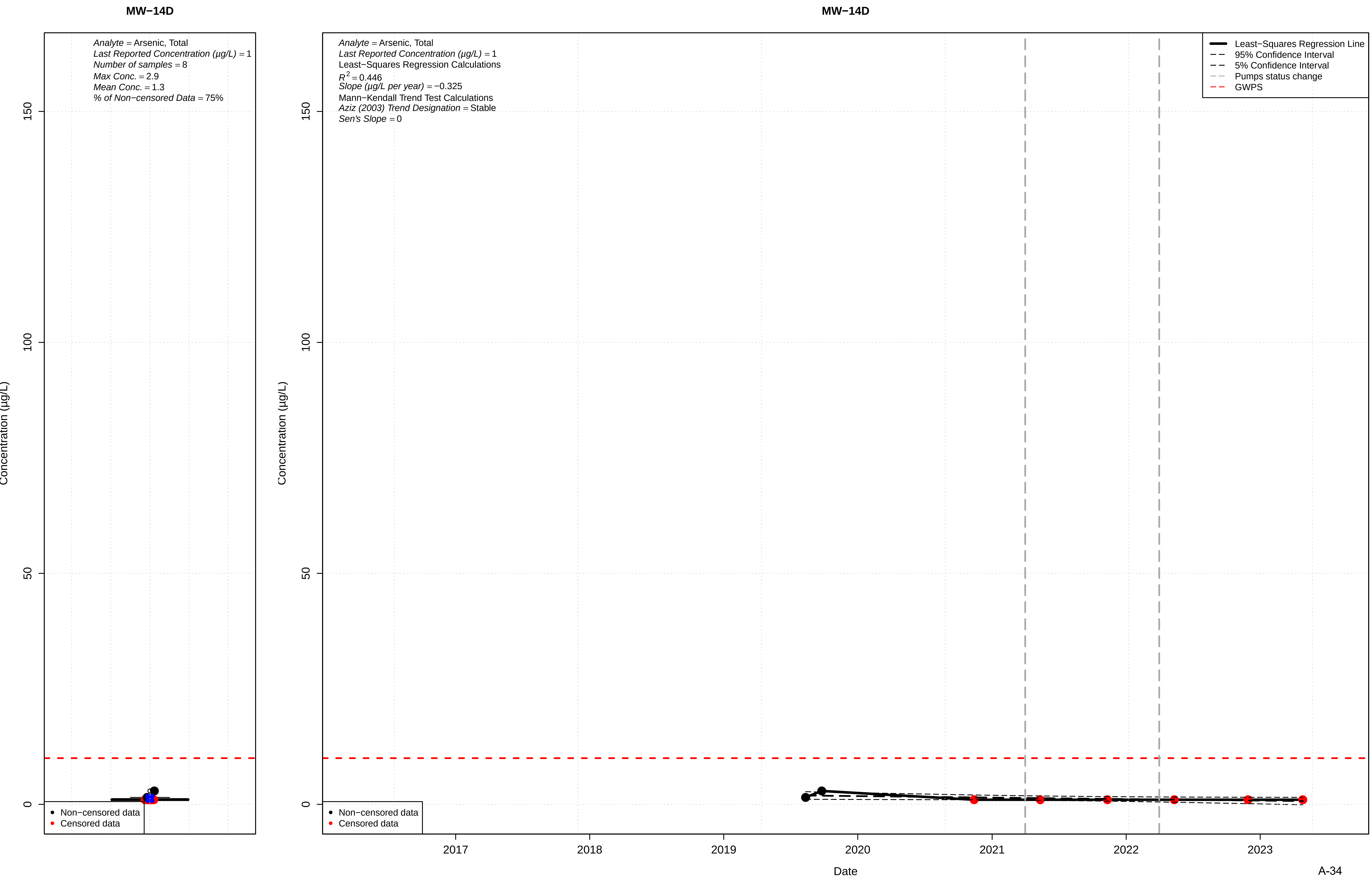

MW−13D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = 0.555
Slope (µg/L per year) = −1.2e−16
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

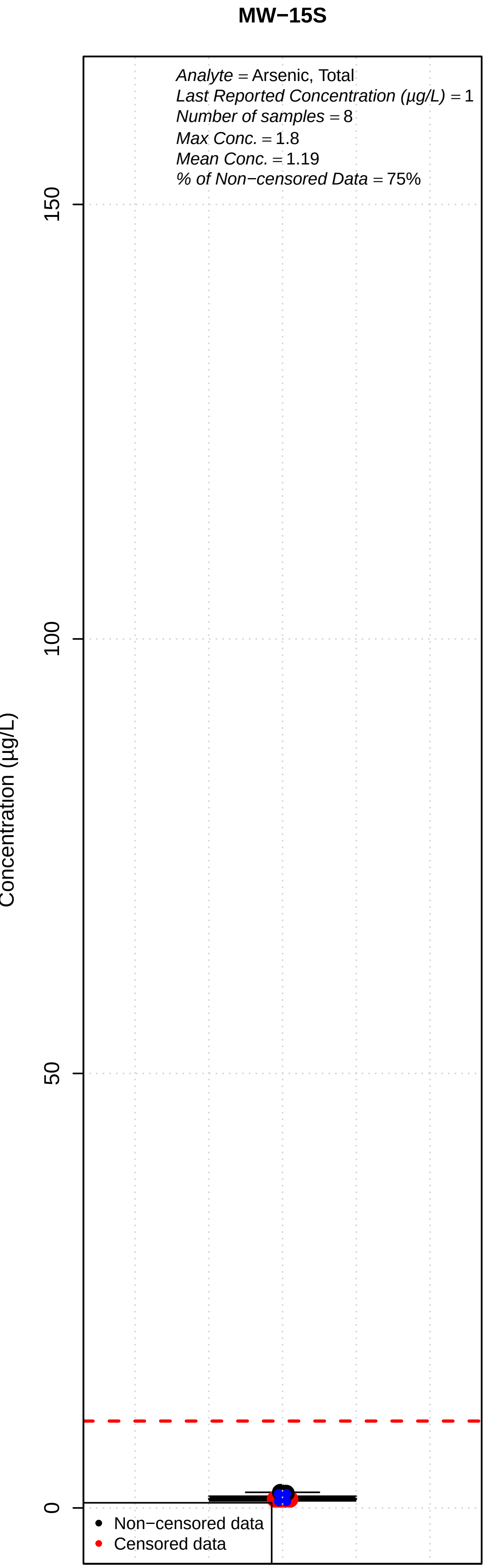

MW−14S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 8
Max Conc. = 1
Mean Conc. = 1
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data


MW−14S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.482
Slope (µg/L per year) = −8.95e−17
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data

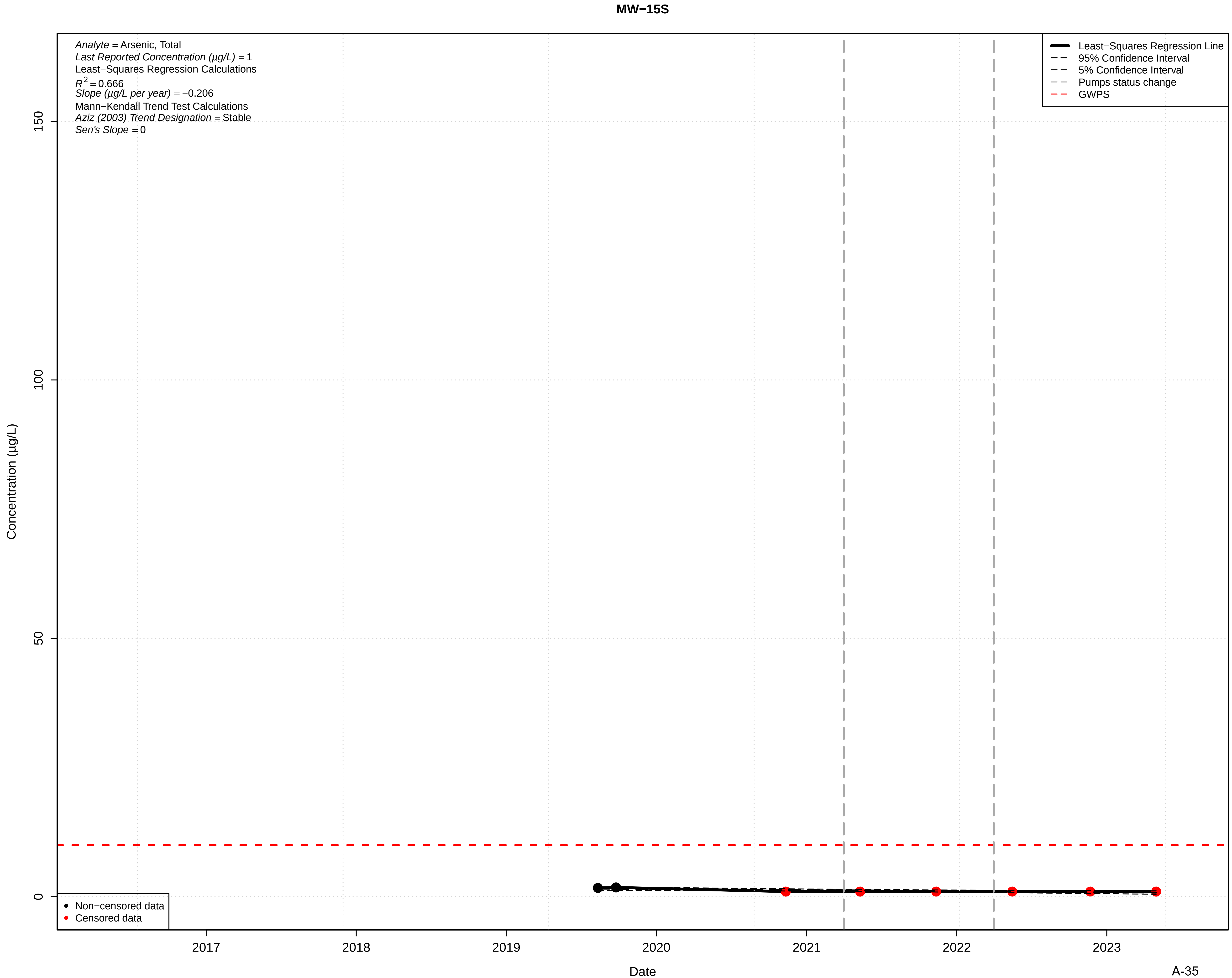

MW−14I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 8
Max Conc. = 1
Mean Conc. = 1
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data


MW−14I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = 0.482
Slope (µg/L per year) = −8.95e−17
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

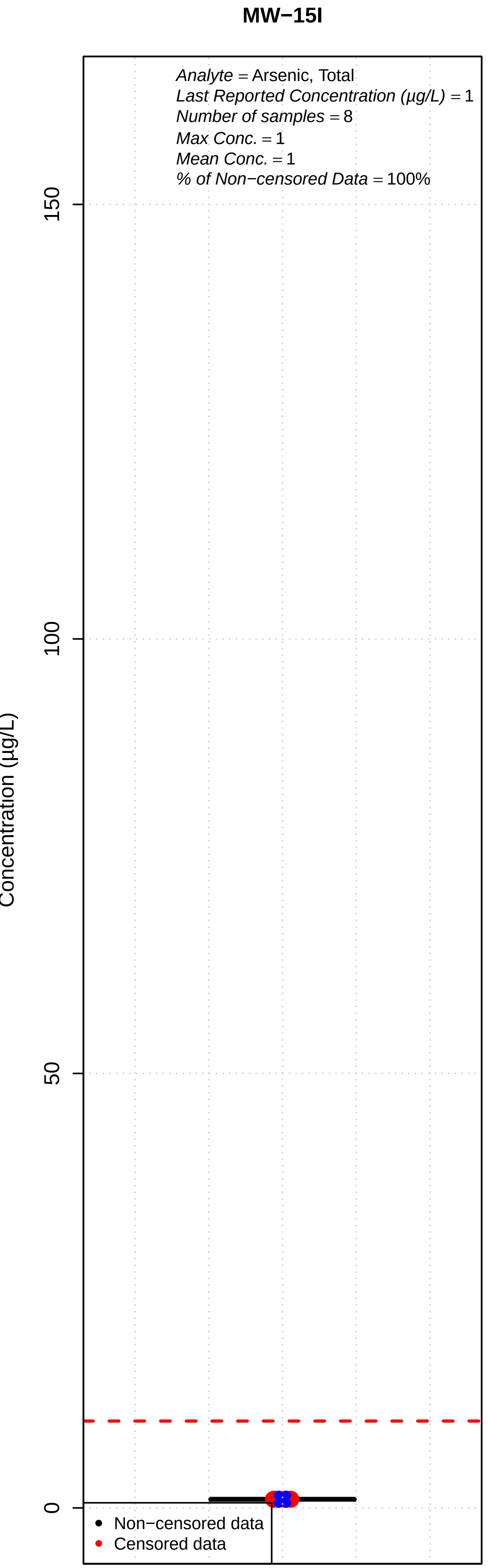

MW−14D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 8
Max Conc. = 2.9
Mean Conc. = 1.3
% of Non−censored Data = 75%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
MW−14D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = 0.446
Slope (µg/L per year) = −0.325
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

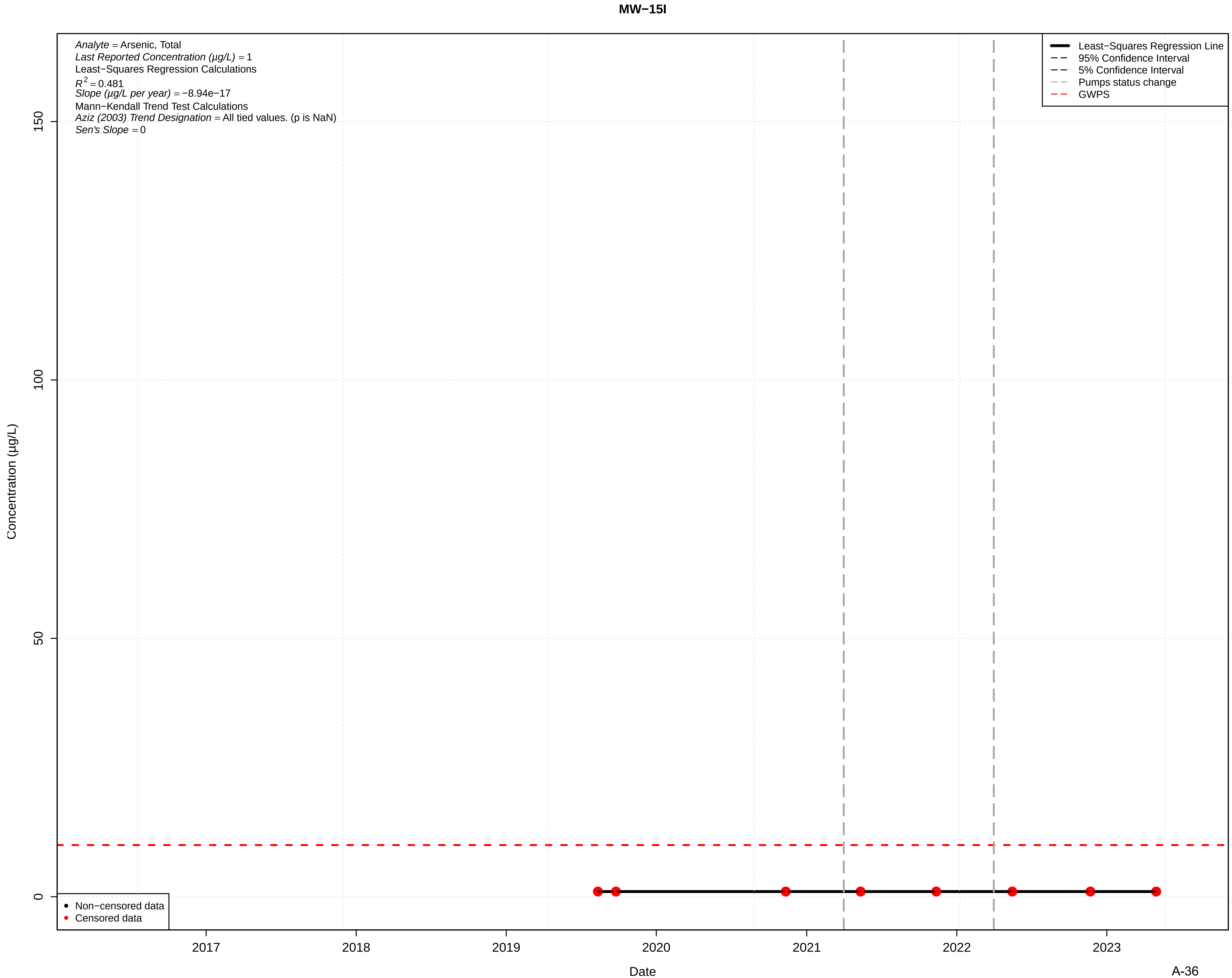


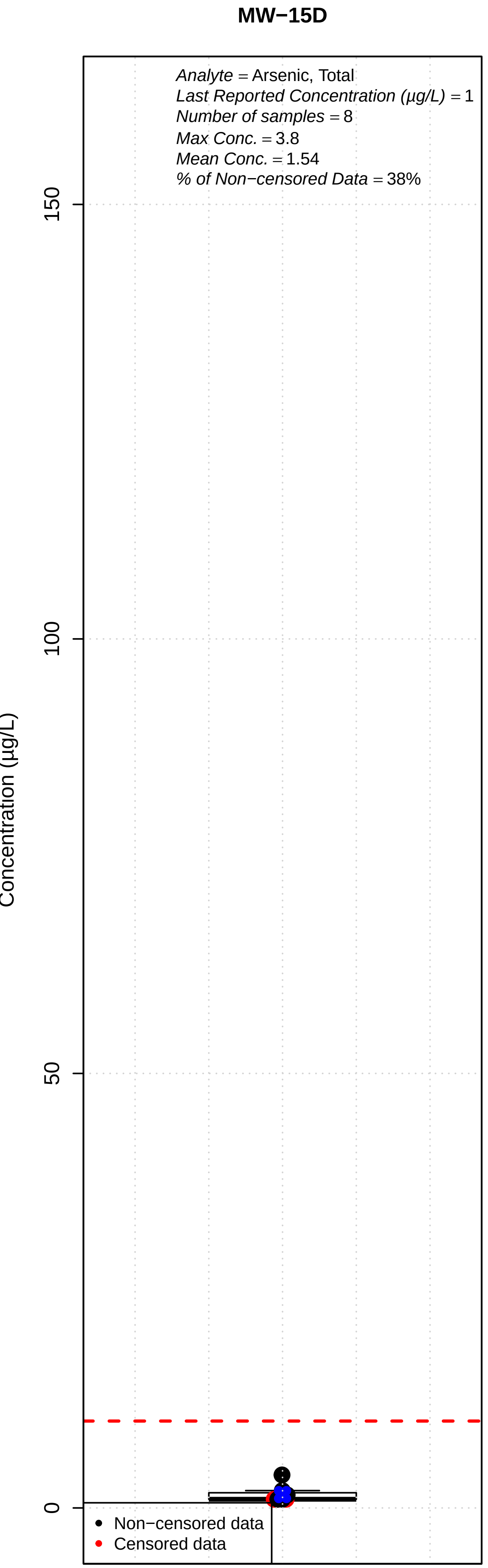
MW−15S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 8
Max Conc. = 1.8
Mean Conc. = 1.19
% of Non−censored Data = 75%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data



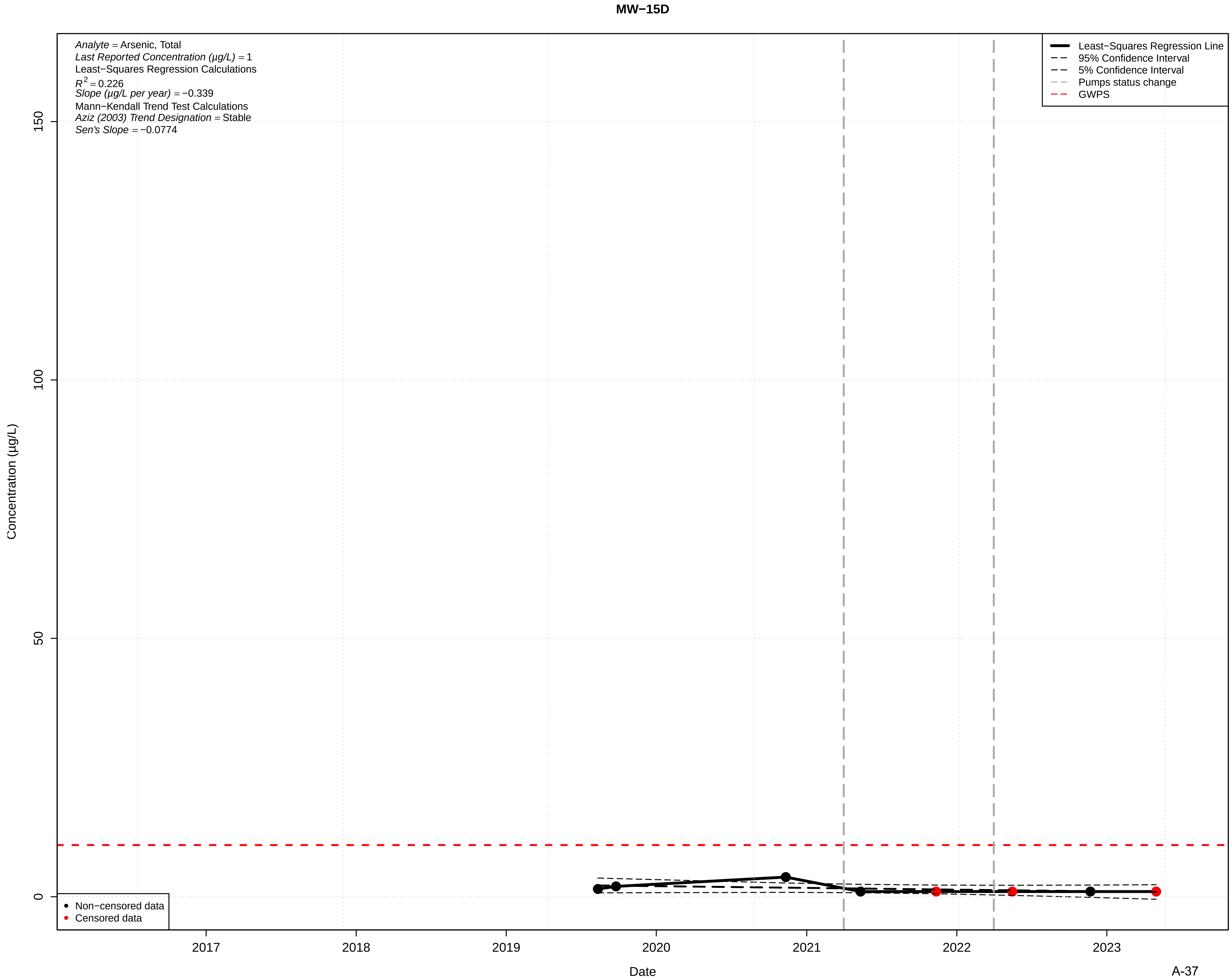
MW−15S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.666
Slope (µg/L per year) = −0.206
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−15I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 8
Max Conc. = 1
Mean Conc. = 1
% of Non−censored Data = 100%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

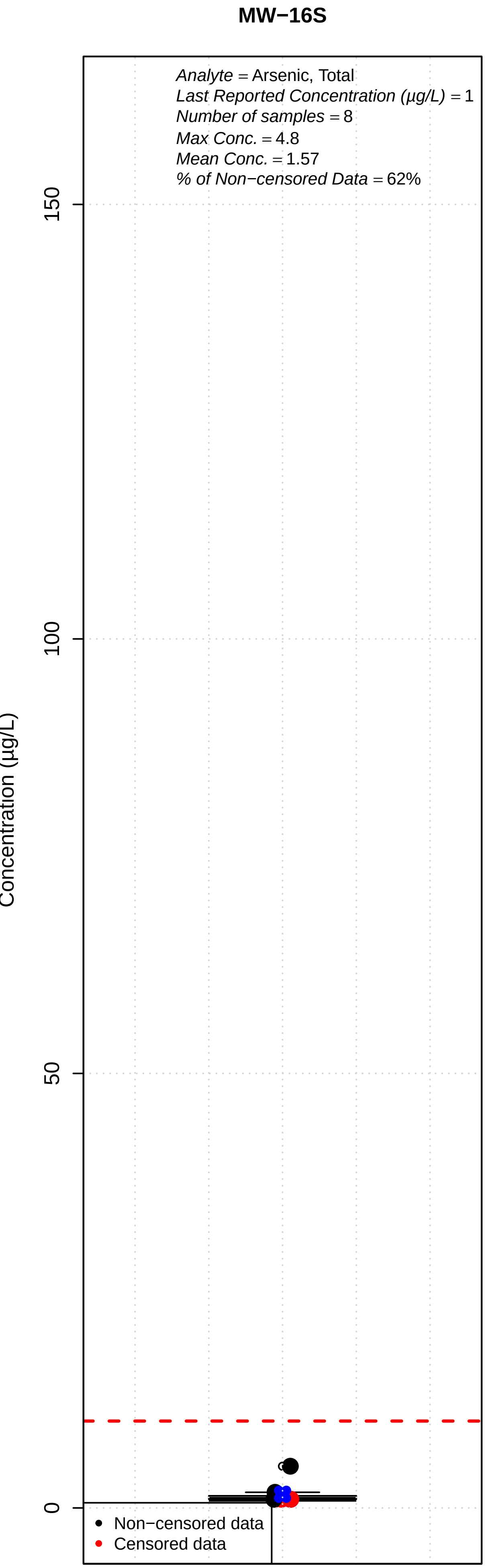

MW−15I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = 0.481
Slope (µg/L per year) = −8.94e−17
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

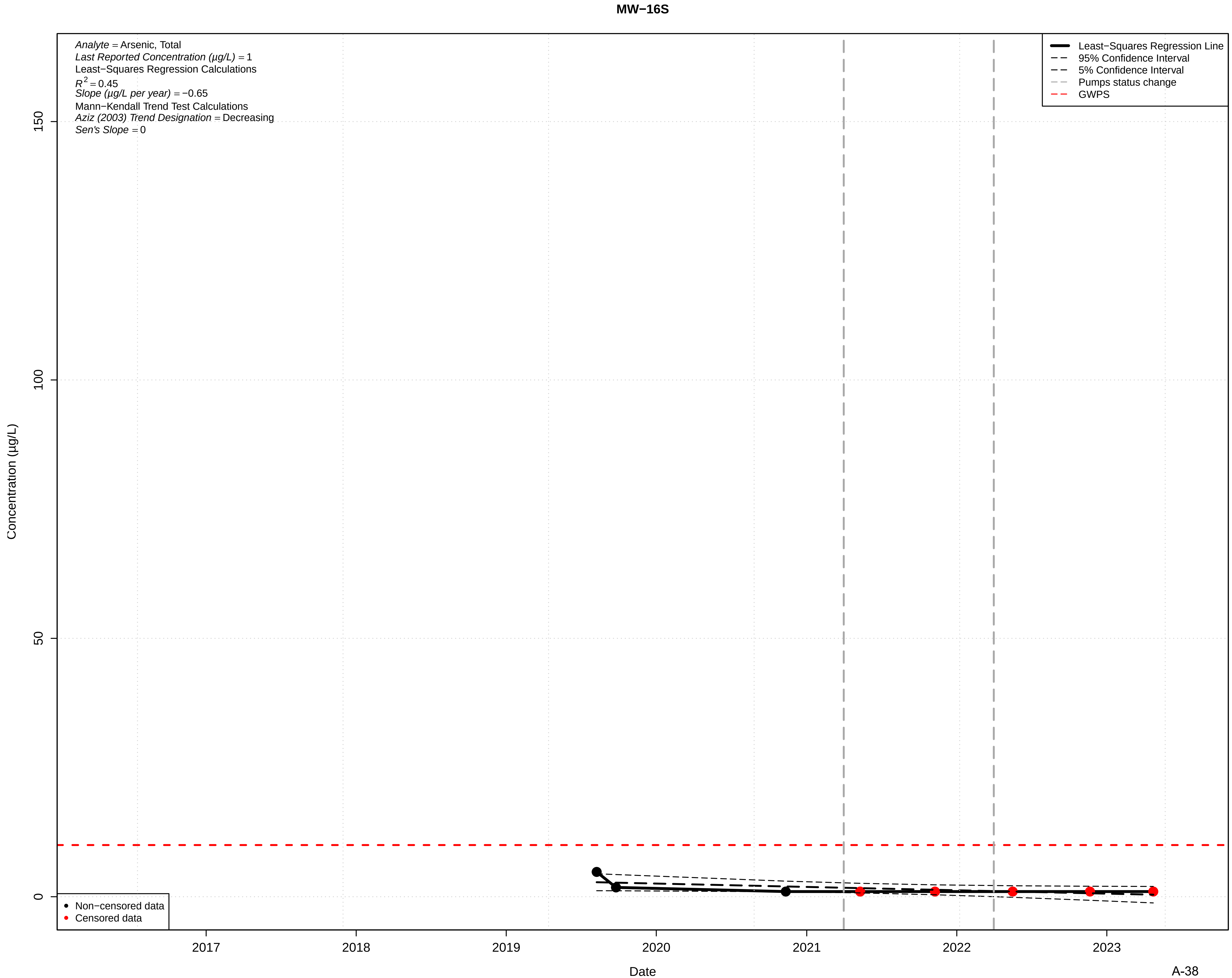


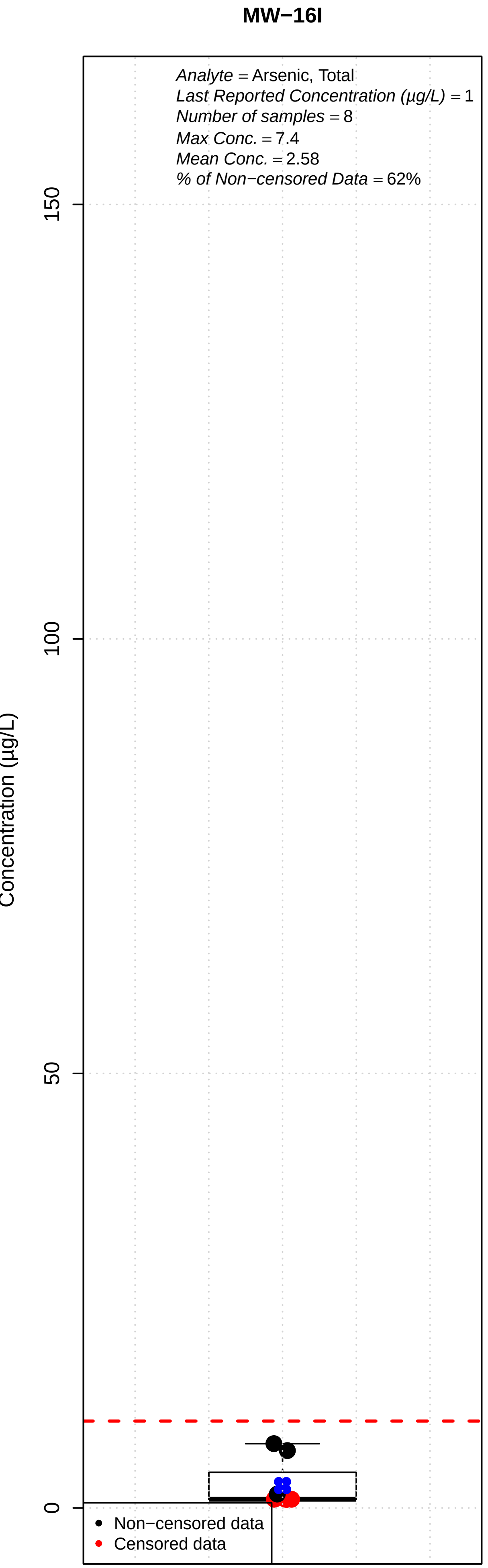
MW−15D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 8
Max Conc. = 3.8
Mean Conc. = 1.54
% of Non−censored Data = 38%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data



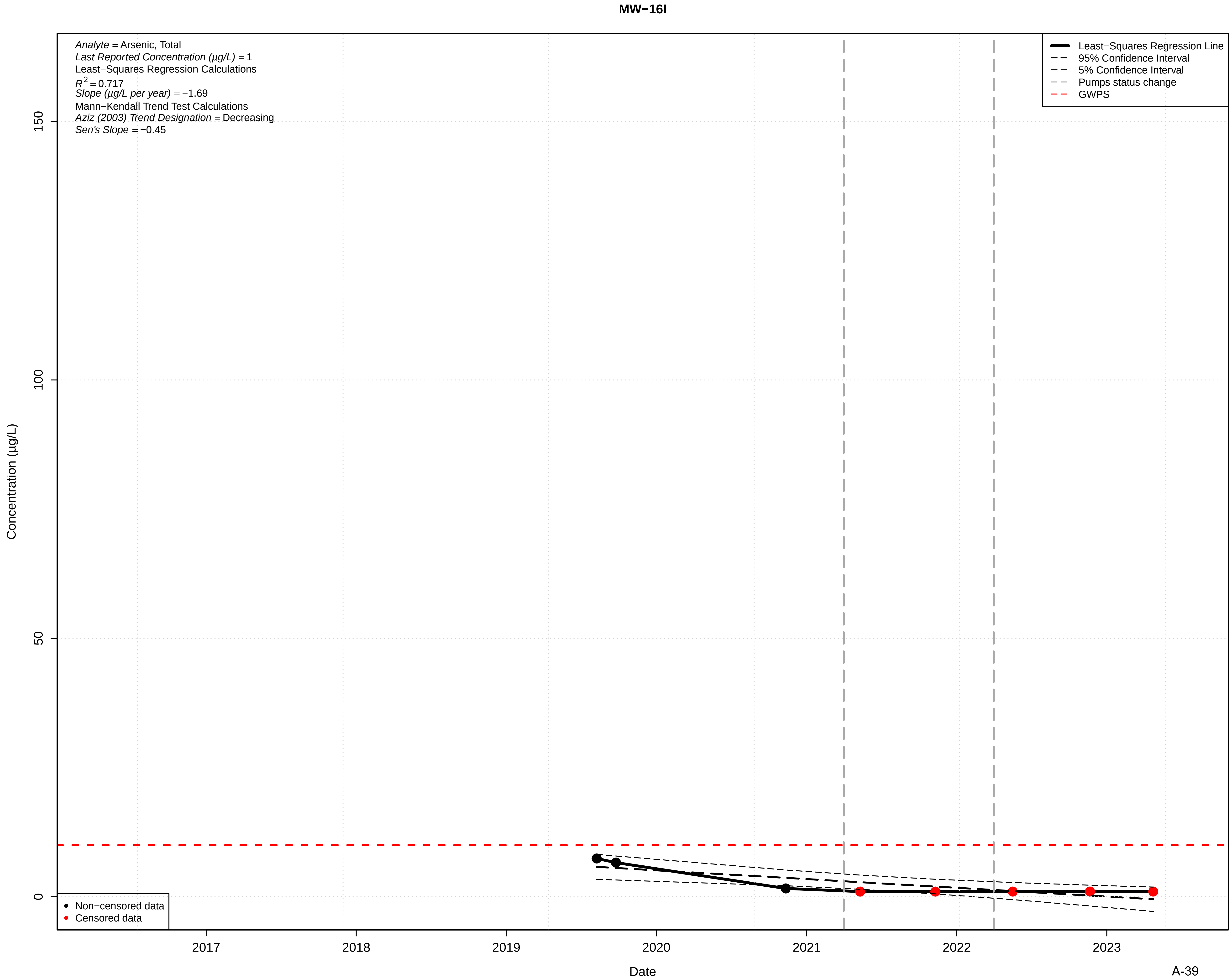
MW−15D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.226
Slope (µg/L per year) = −0.339
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.0774
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−16S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 8
Max Conc. = 4.8
Mean Conc. = 1.57
% of Non−censored Data = 62%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

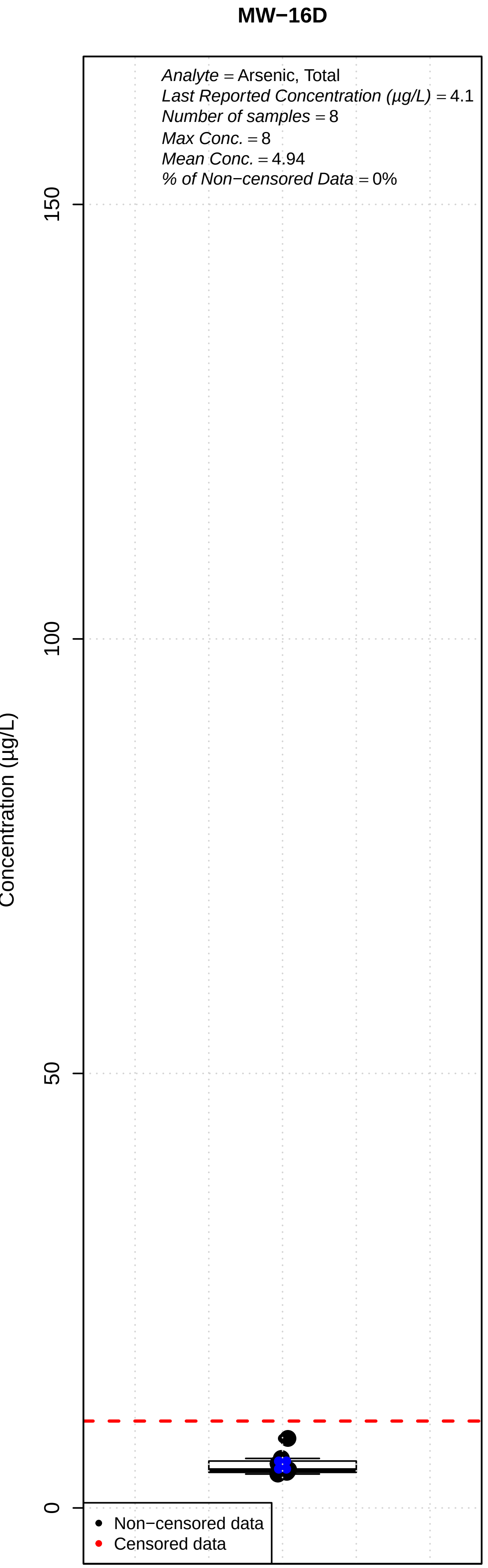

MW−16S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = 0.45
Slope (µg/L per year) = −0.65
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

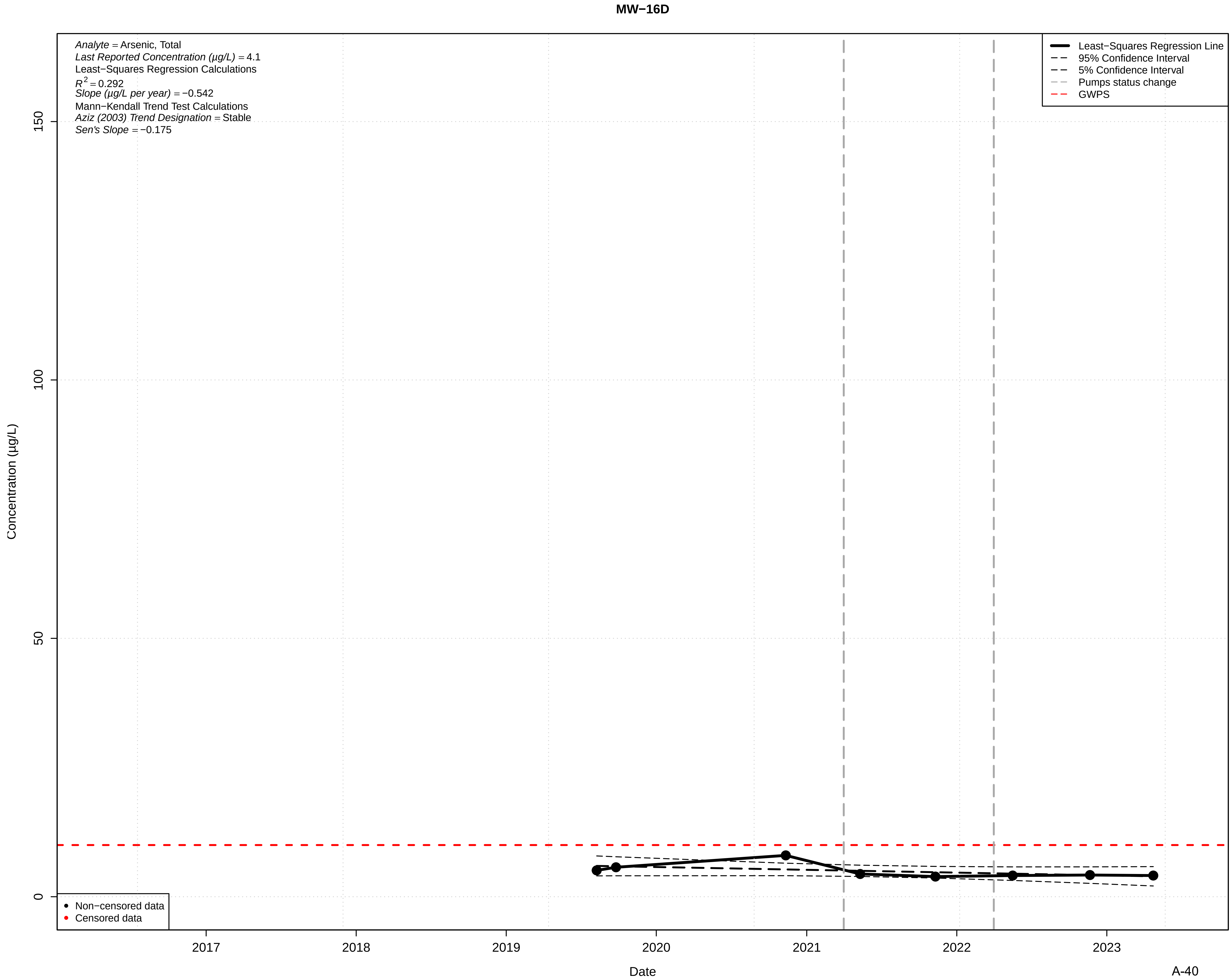


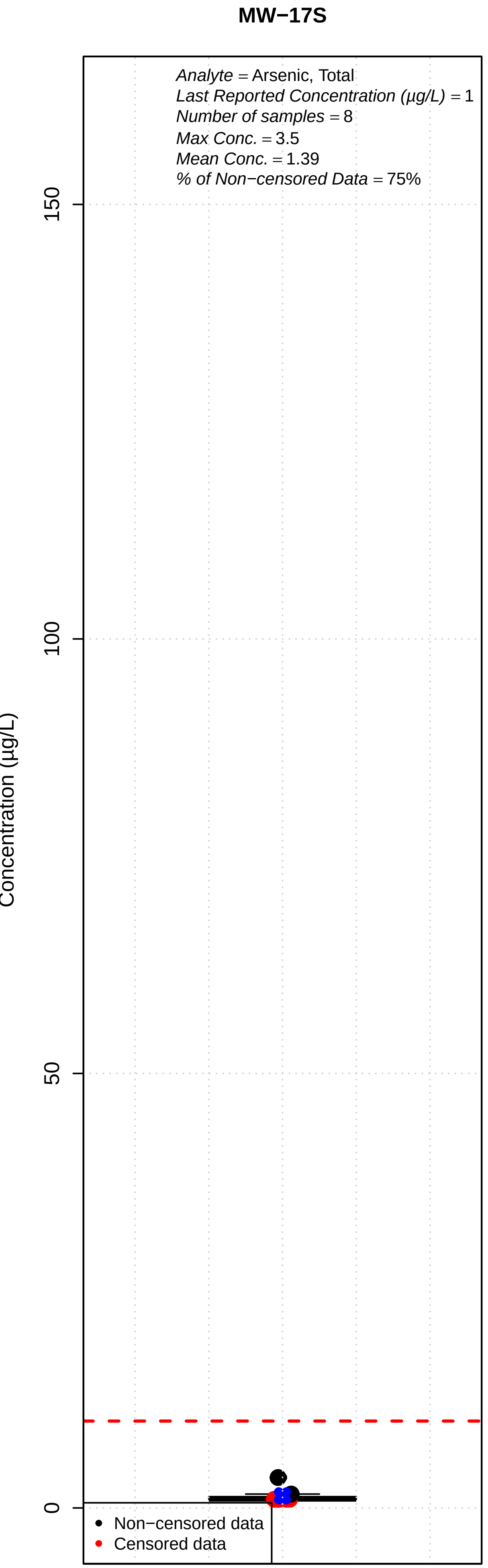
MW−16I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 8
Max Conc. = 7.4
Mean Conc. = 2.58
% of Non−censored Data = 62%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data



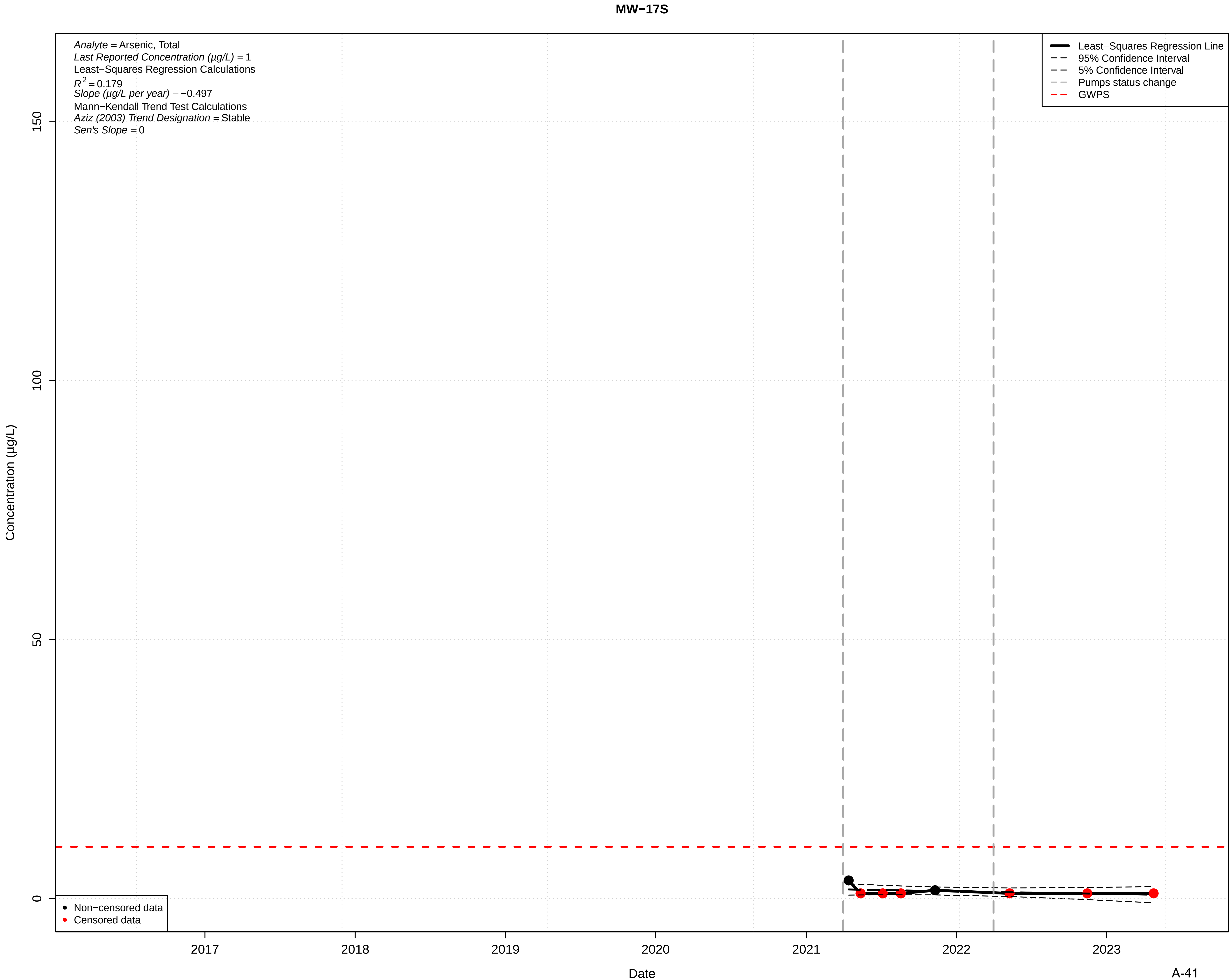
MW−16I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.717
Slope (µg/L per year) = −1.69
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −0.45
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−16D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 4.1
Number of samples = 8
Max Conc. = 8
Mean Conc. = 4.94
% of Non−censored Data = 0%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

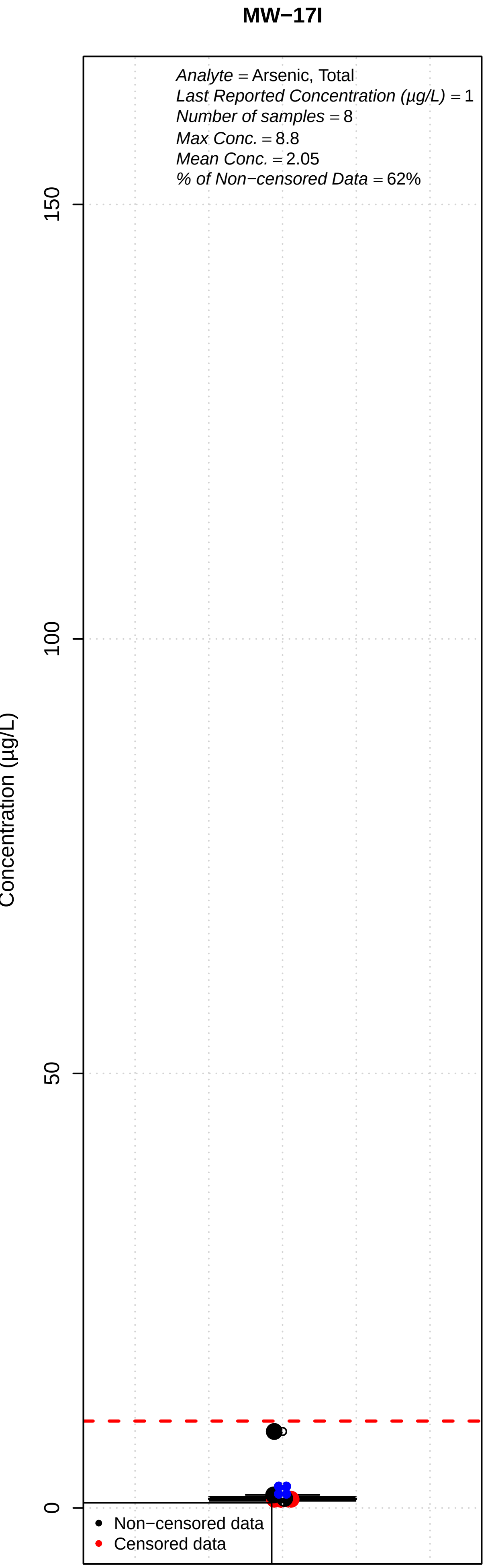

MW−16D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 4.1
Least−Squares Regression Calculations
R² = 0.292
Slope (µg/L per year) = −0.542
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.175
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

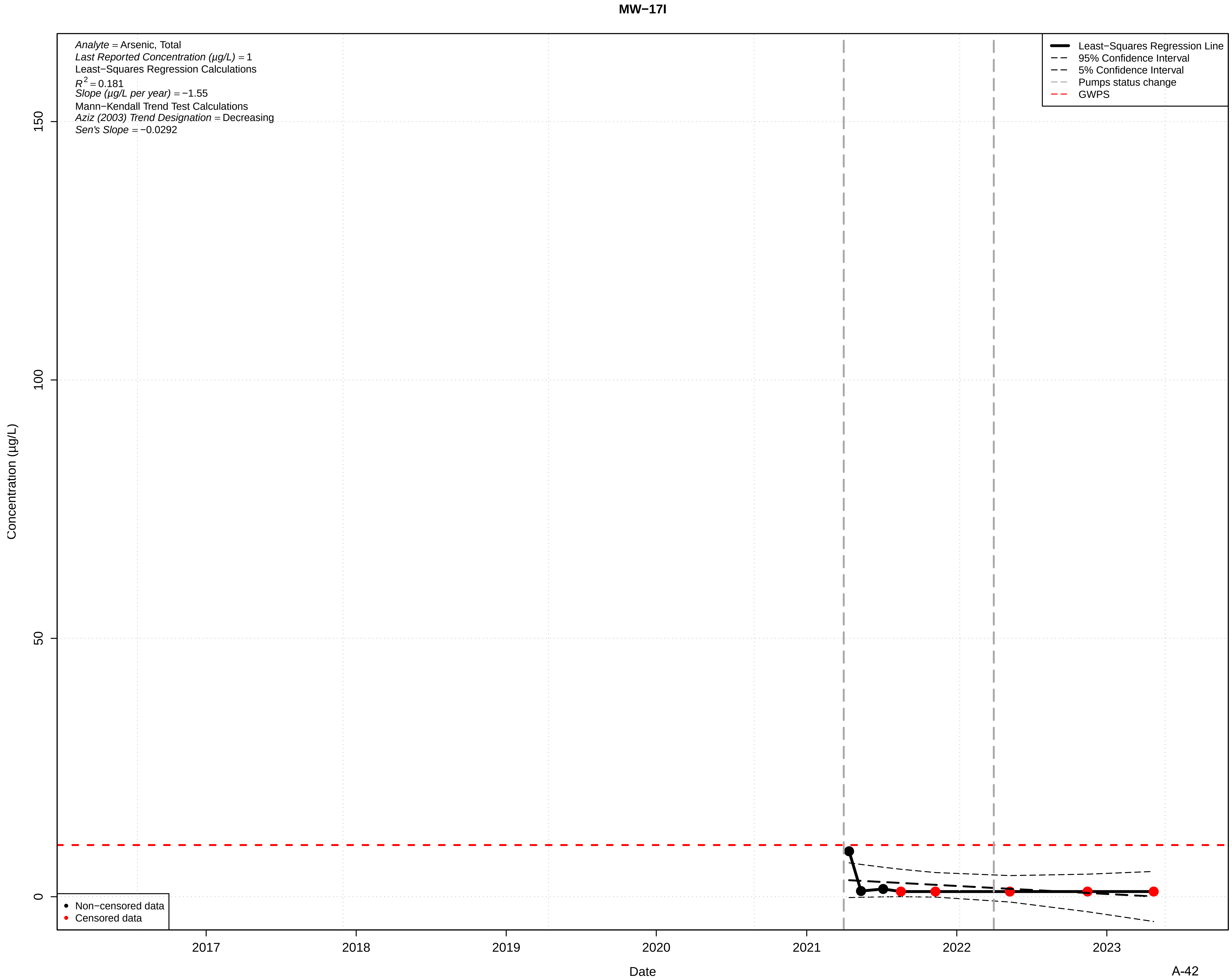


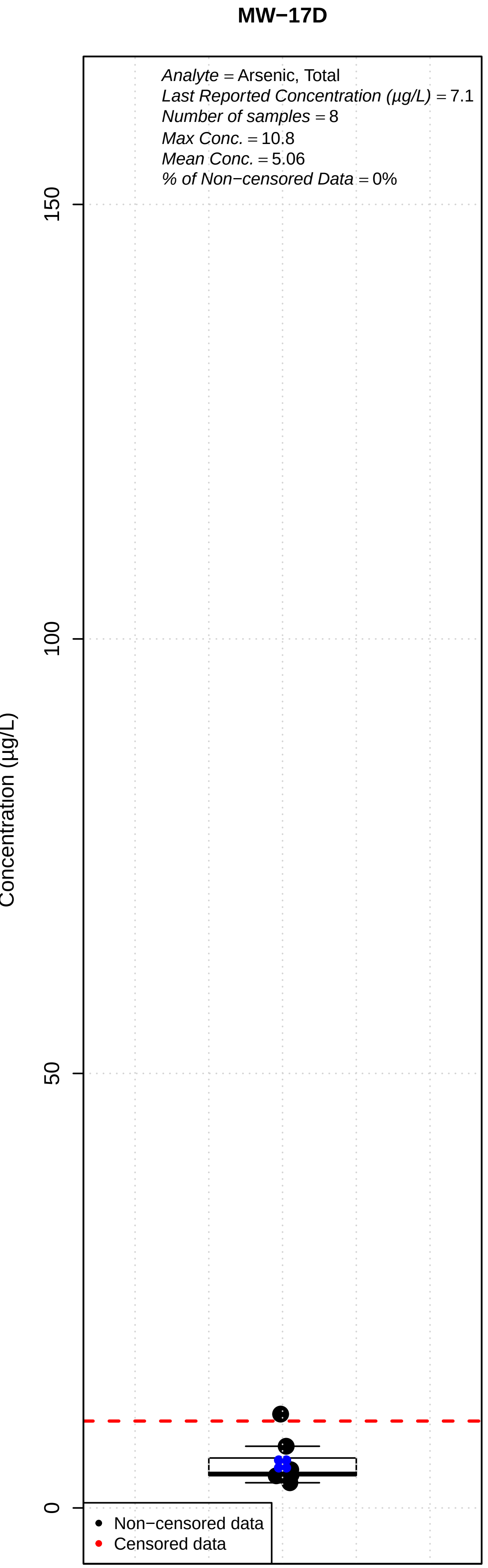
MW−17S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 8
Max Conc. = 3.5
Mean Conc. = 1.39
% of Non−censored Data = 75%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

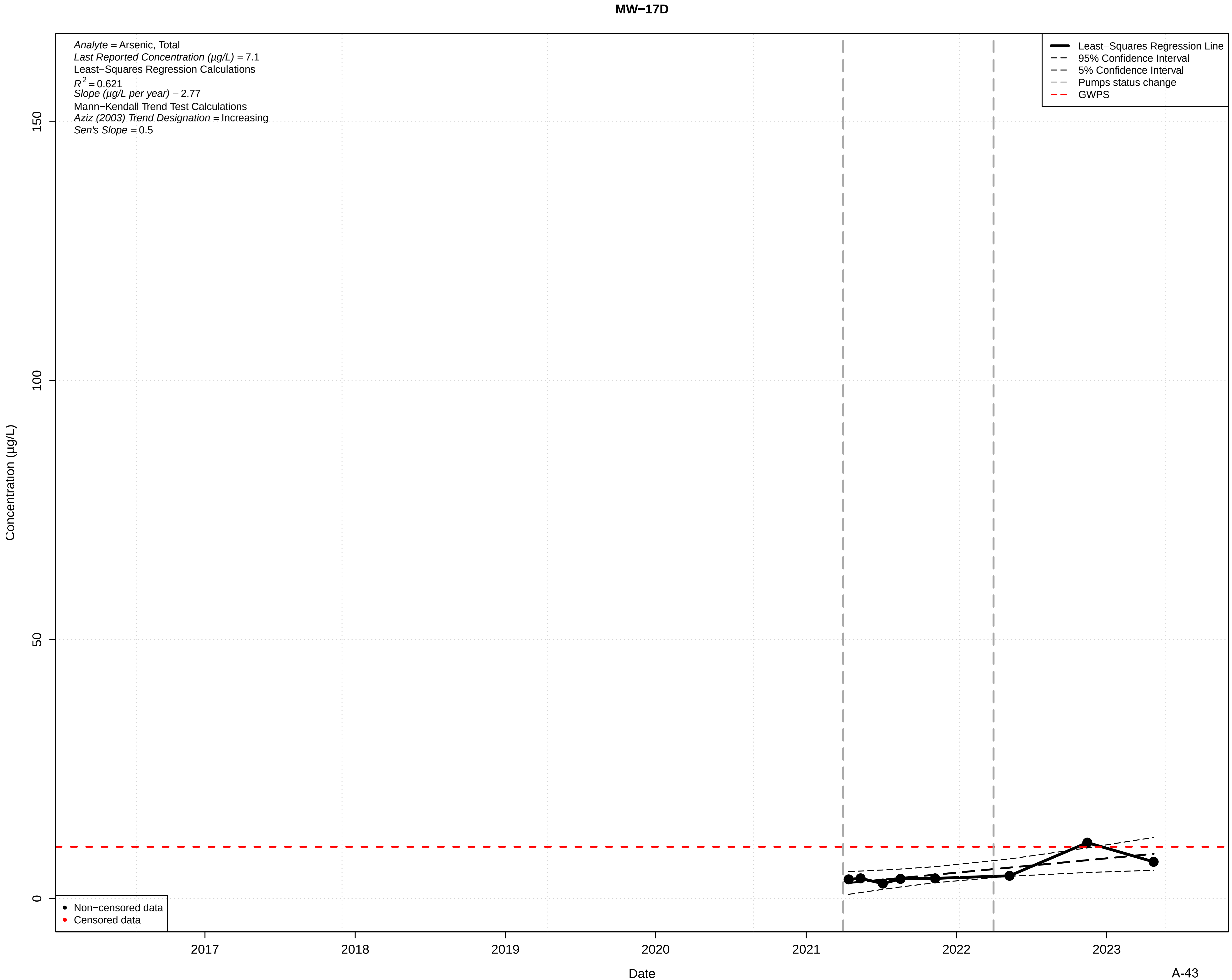


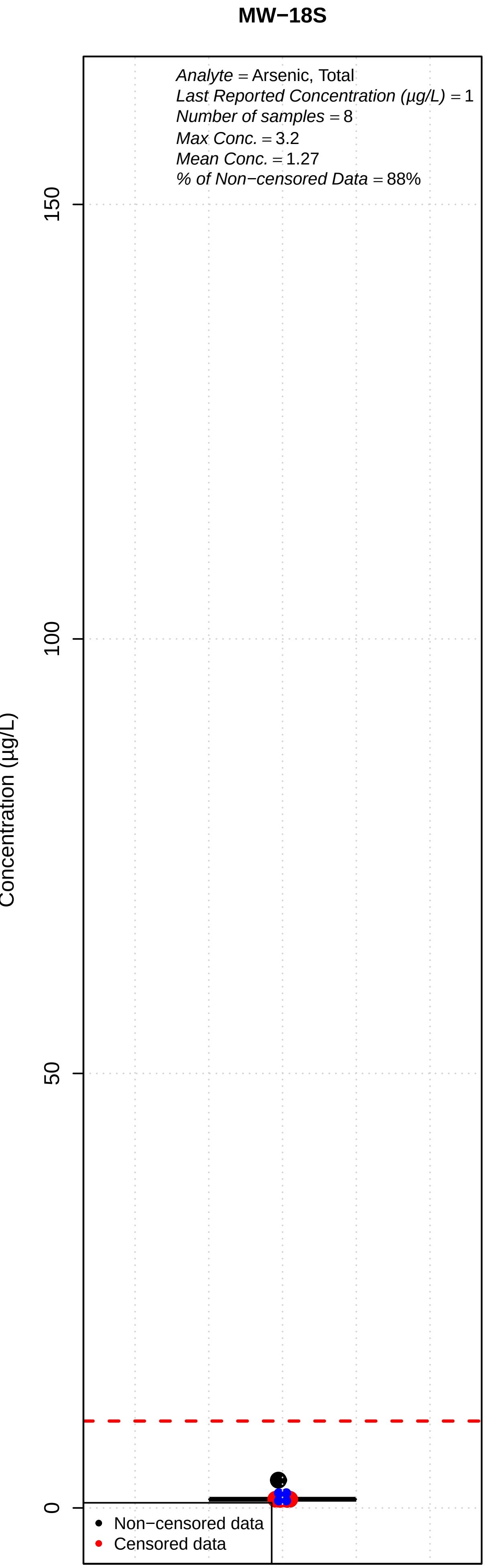
MW−17S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = 0.179
Slope (µg/L per year) = −0.497
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

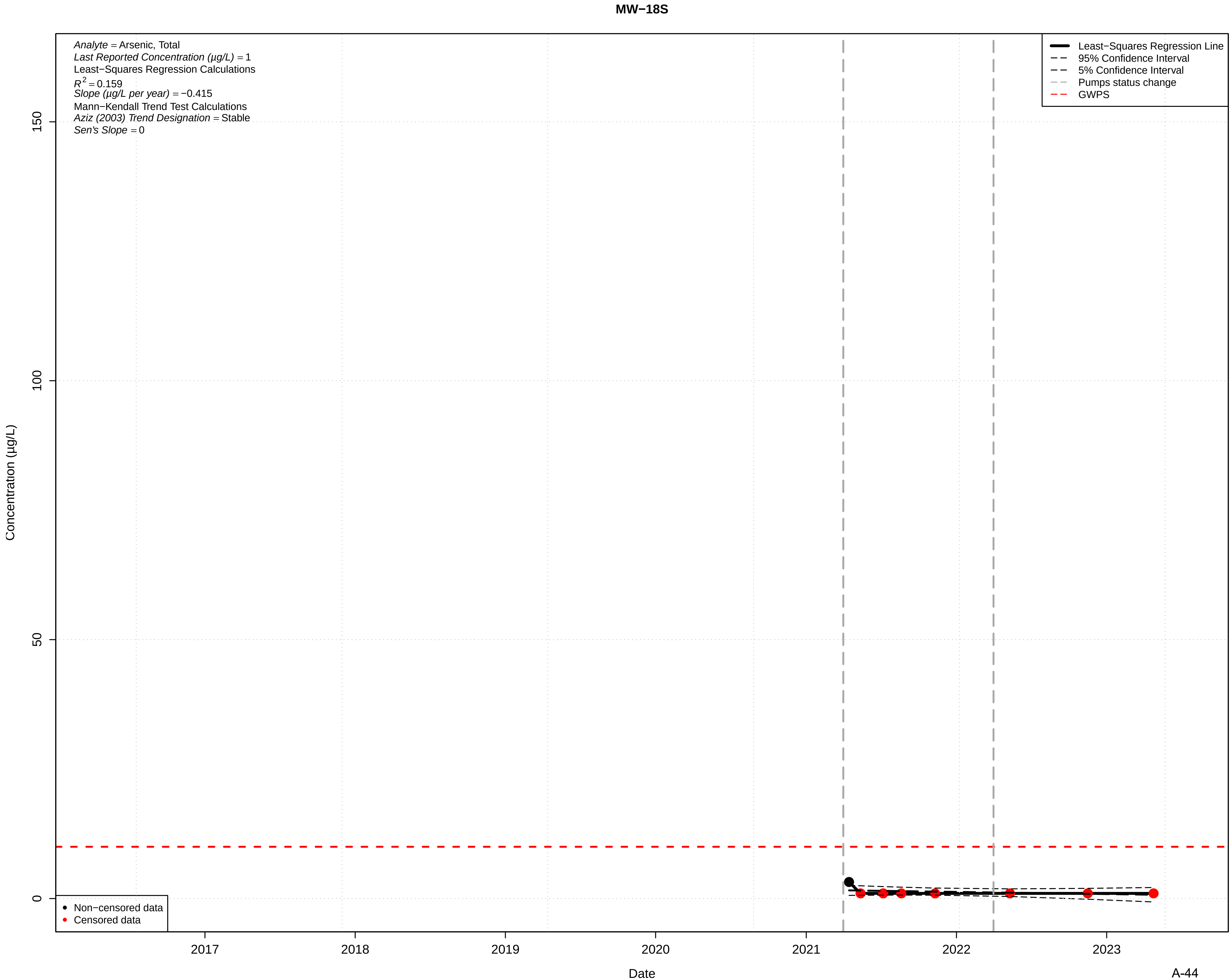

MW−17I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 8
Max Conc. = 8.8
Mean Conc. = 2.05
% of Non−censored Data = 62%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

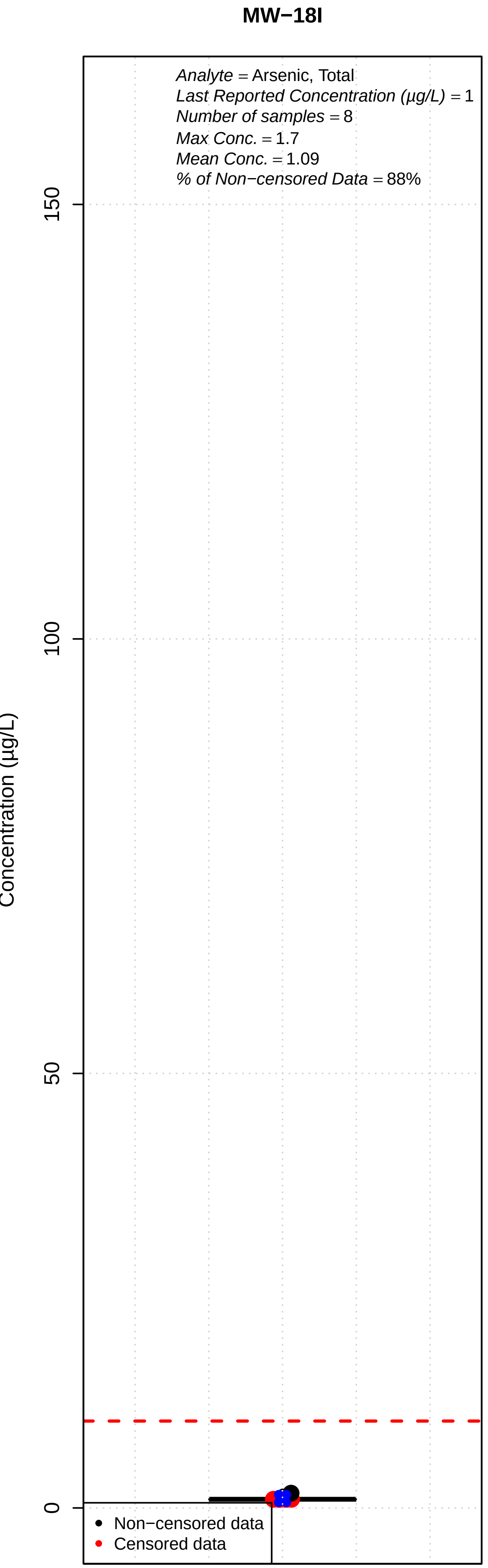

MW−17I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.181
Slope (µg/L per year) = −1.55
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −0.0292
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−17D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 7.1
Number of samples = 8
Max Conc. = 10.8
Mean Conc. = 5.06
% of Non−censored Data = 0%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

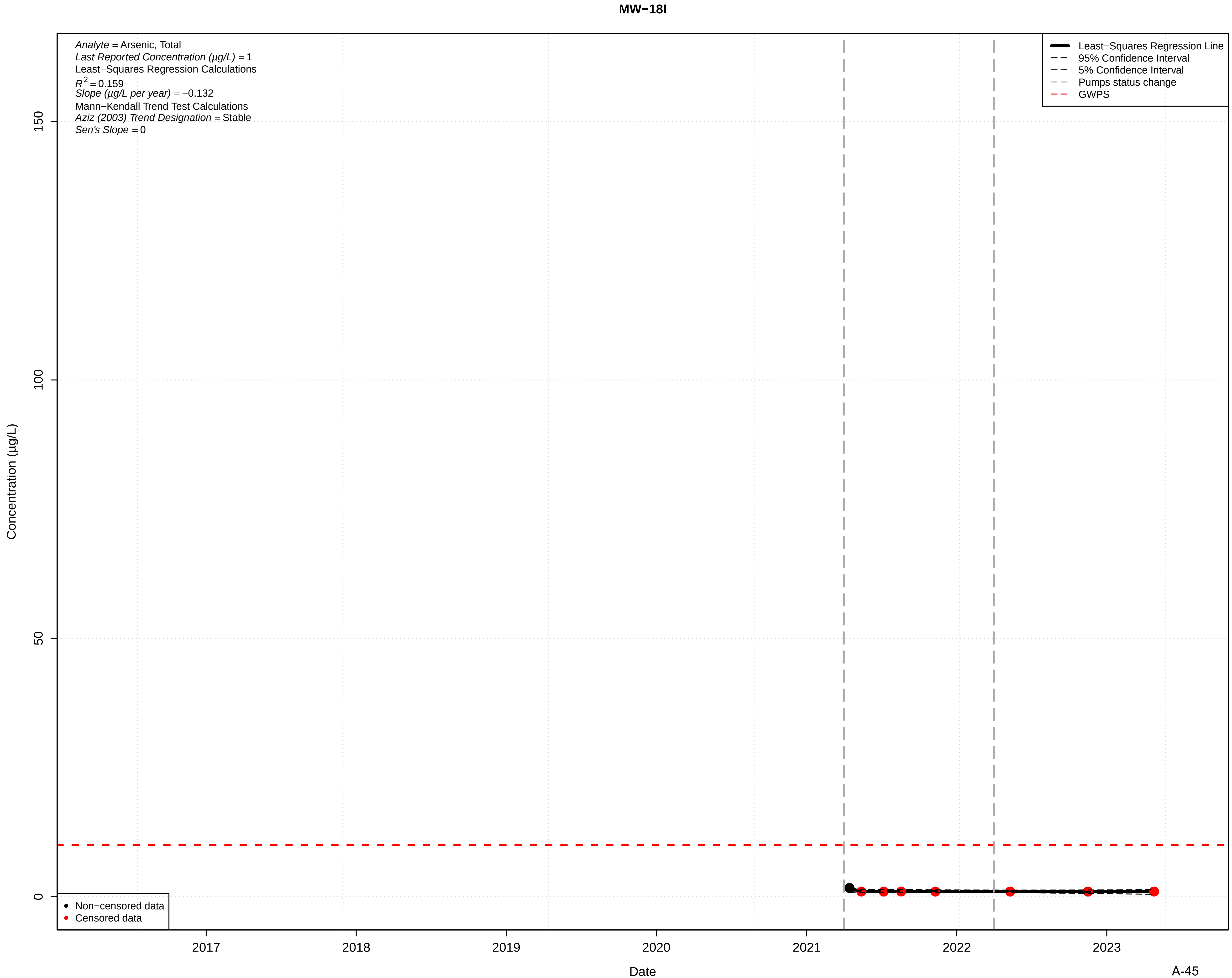

MW−17D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 7.1
Least−Squares Regression Calculations
R2 = 0.621
Slope (µg/L per year) = 2.77
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Increasing
Sen's Slope = 0.5
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−18S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 8
Max Conc. = 3.2
Mean Conc. = 1.27
% of Non−censored Data = 88%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

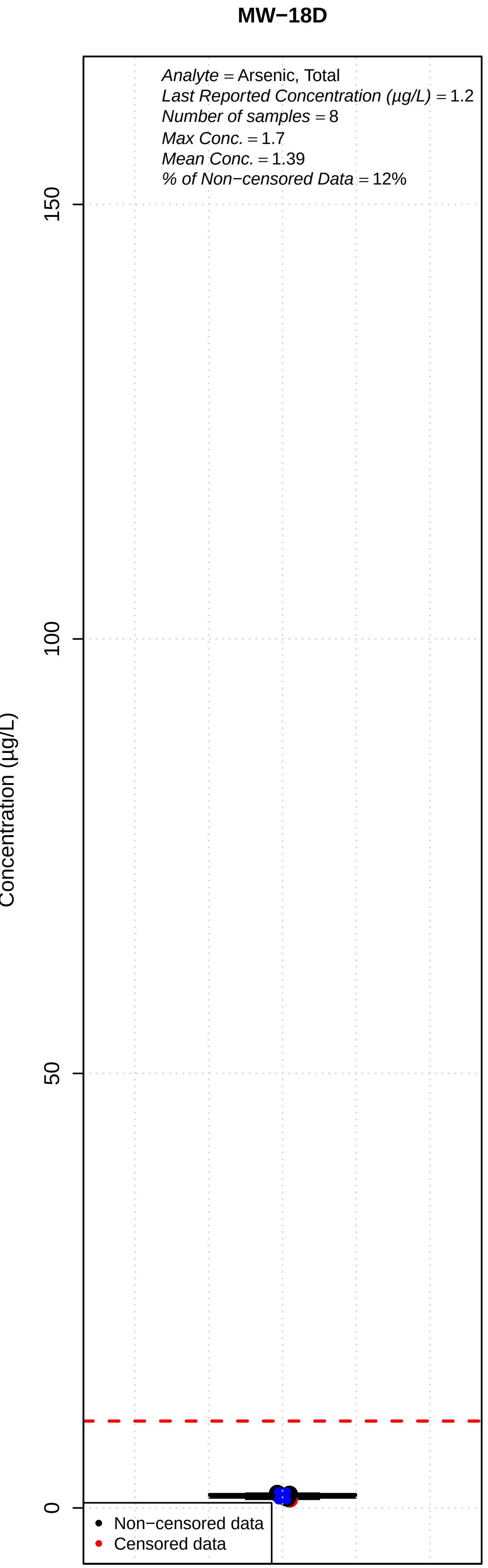

MW−18S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.159
Slope (µg/L per year) = −0.415
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

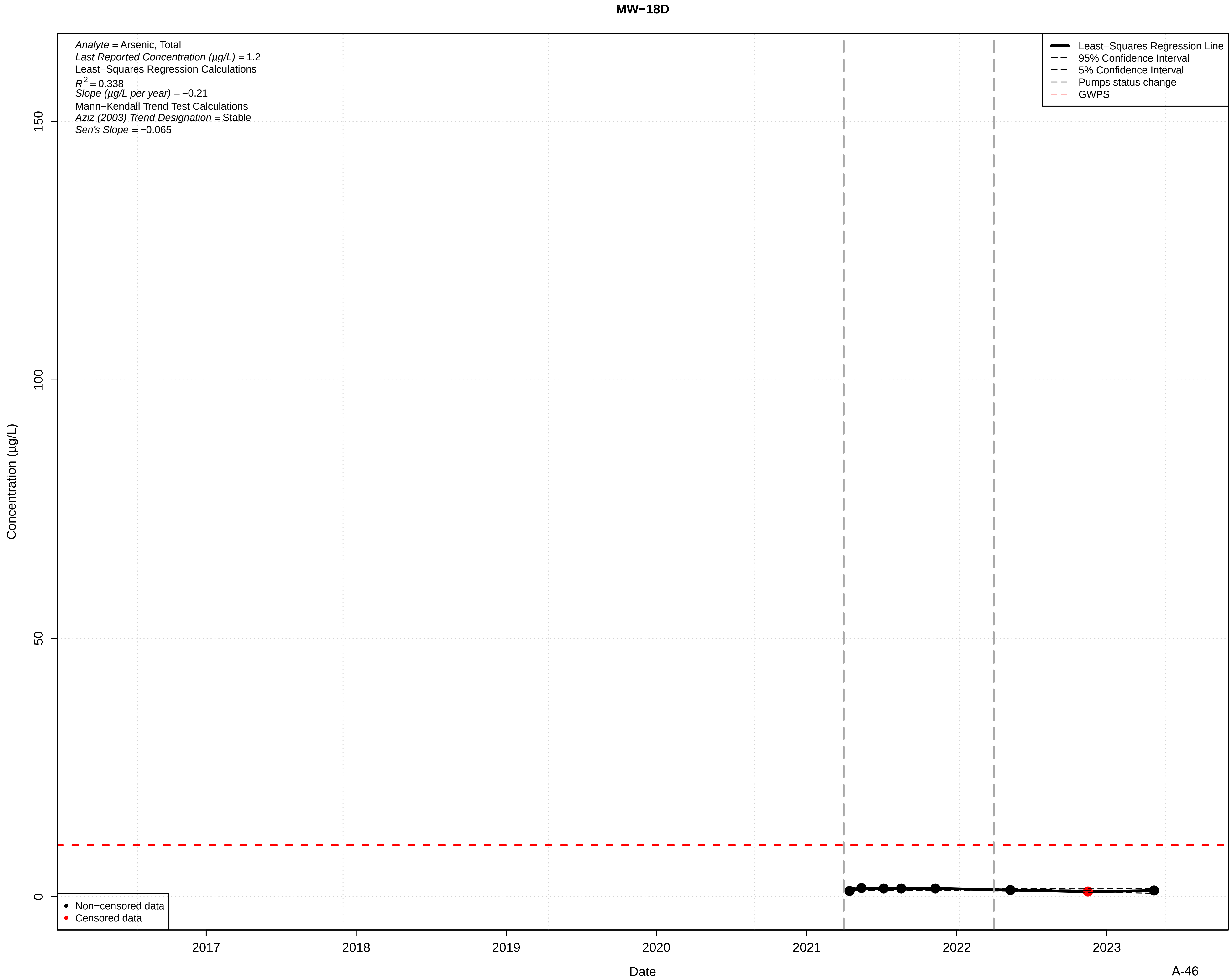


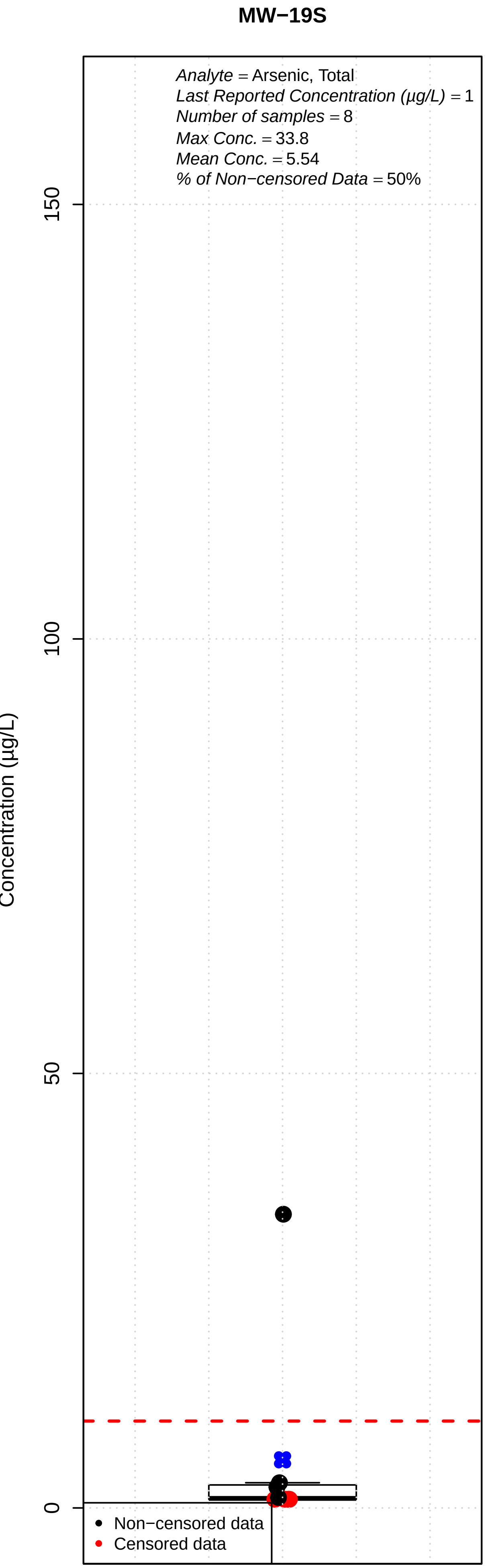
MW−18I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 8
Max Conc. = 1.7
Mean Conc. = 1.09
% of Non−censored Data = 88%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

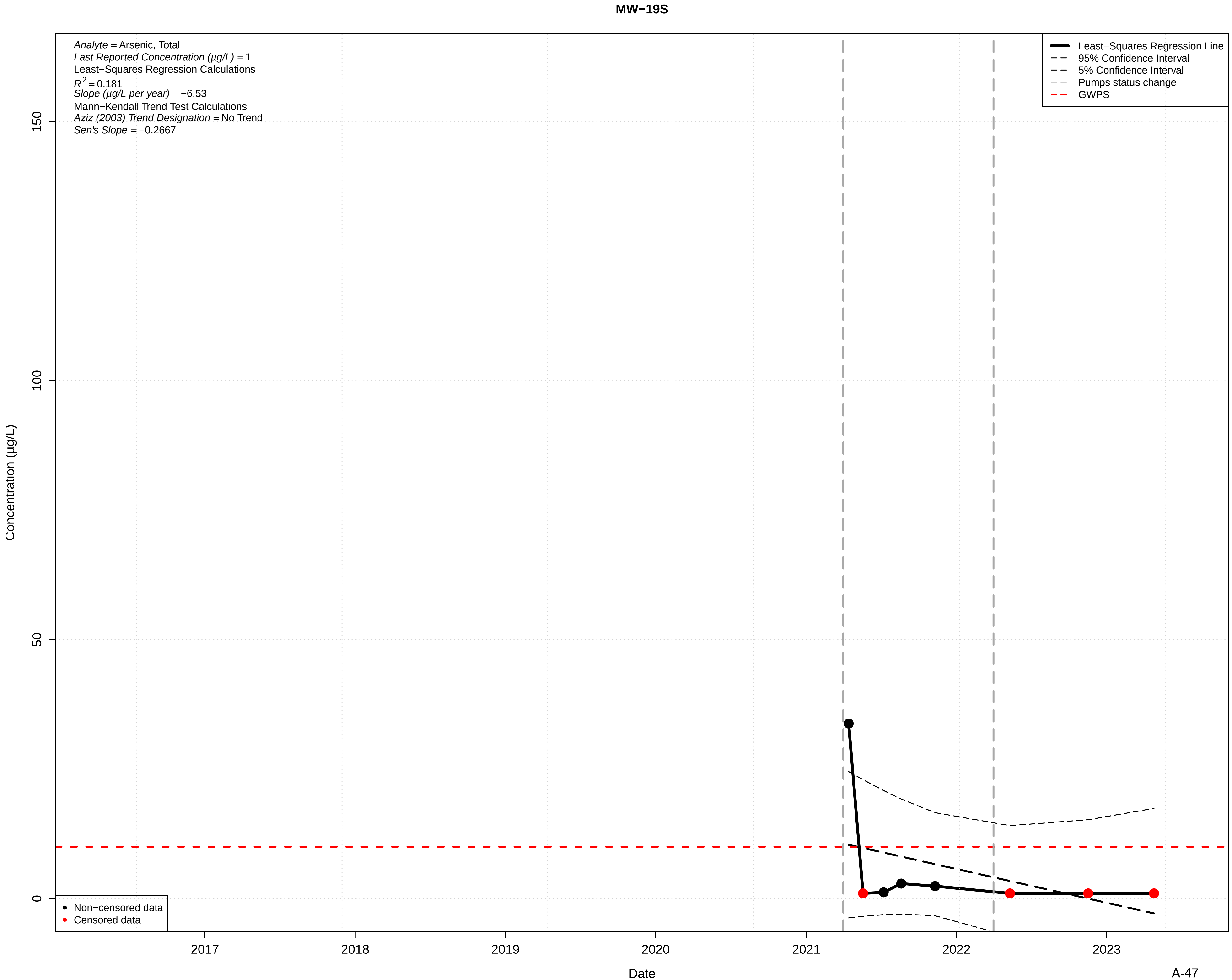


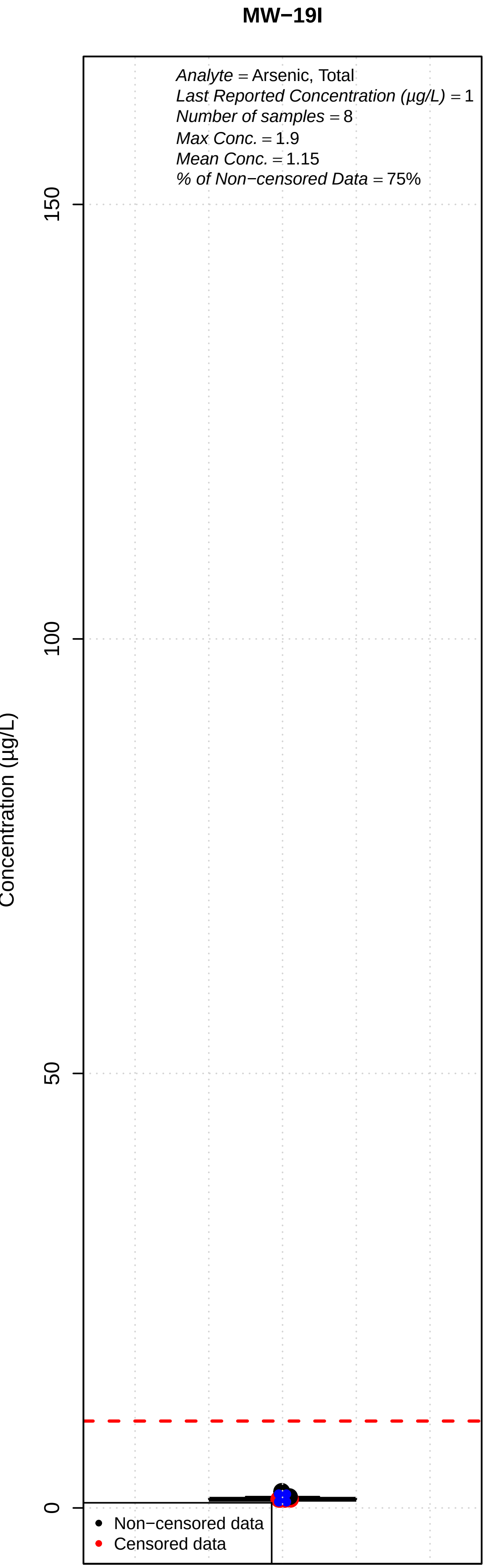
MW−18I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.159
Slope (µg/L per year) = −0.132
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

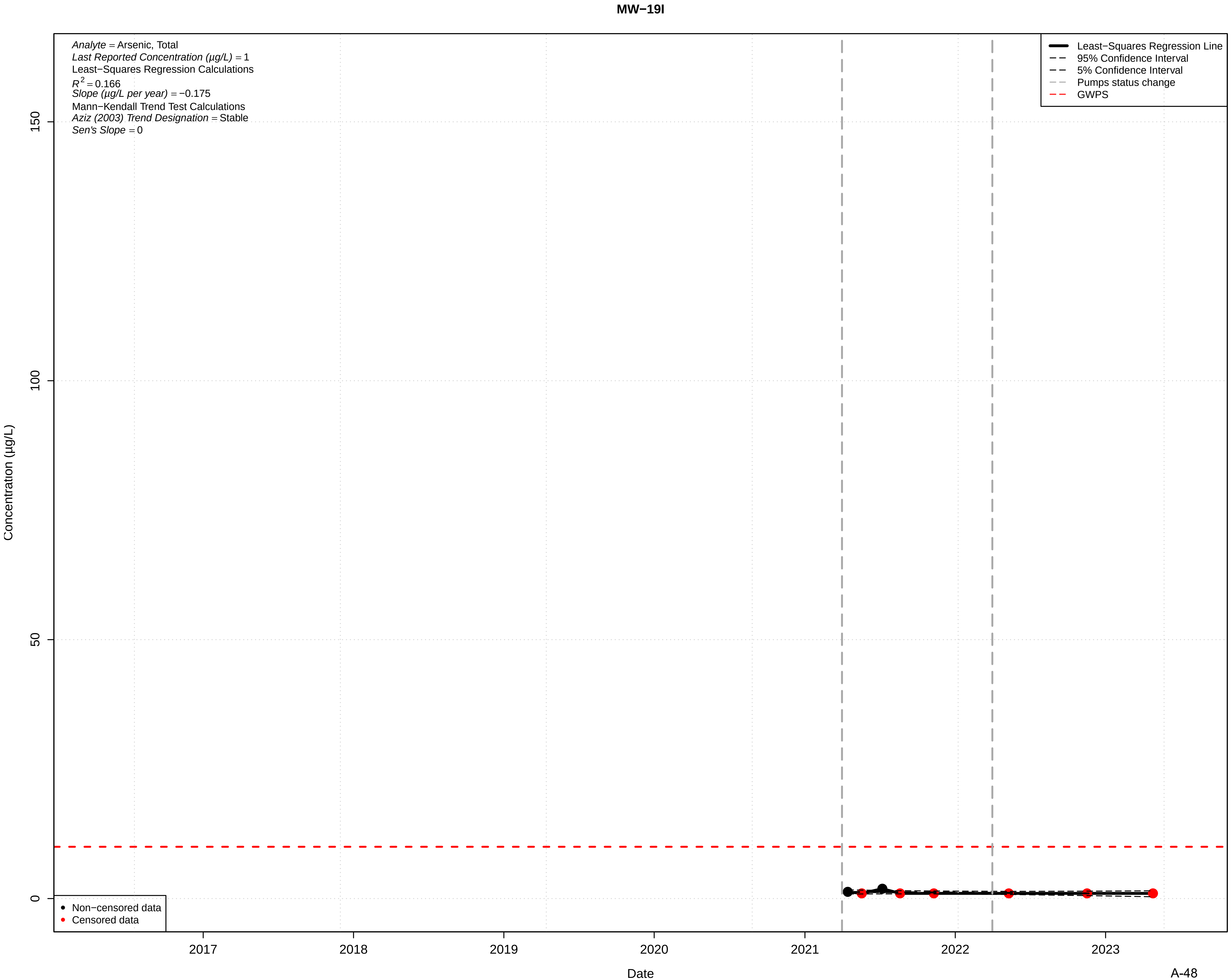

MW−18D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1.2
Number of samples = 8
Max Conc. = 1.7
Mean Conc. = 1.39
% of Non−censored Data = 12%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

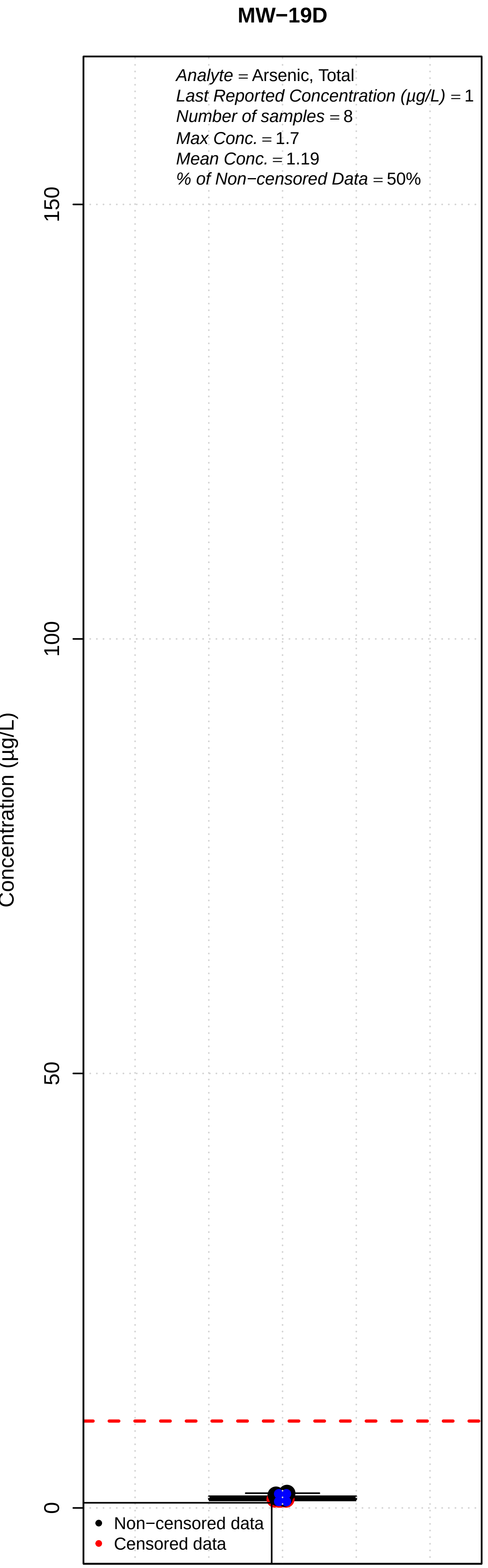

MW−18D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1.2
Least−Squares Regression Calculations
R2 = 0.338
Slope (µg/L per year) = −0.21
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.065
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

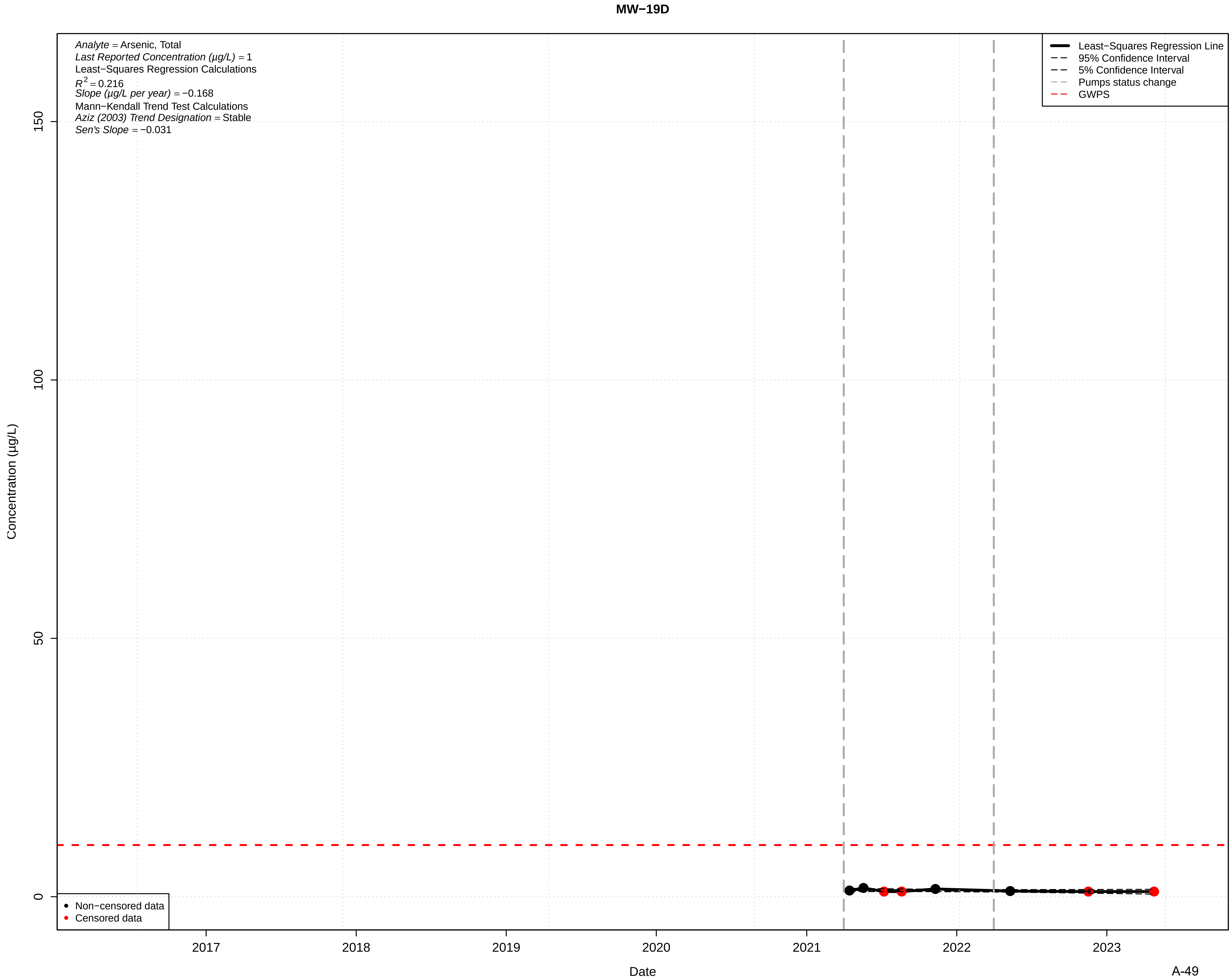

MW−19S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 8
Max Conc. = 33.8
Mean Conc. = 5.54
% of Non−censored Data = 50%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

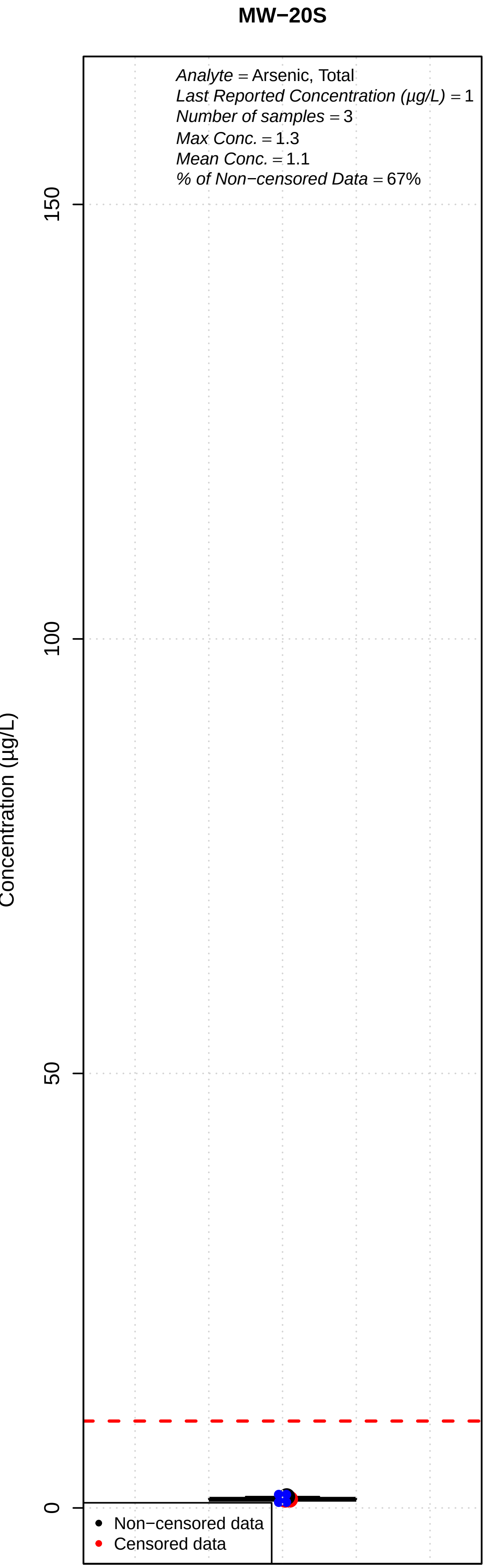

MW−19S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = 0.181
Slope (µg/L per year) = −6.53
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = −0.2667
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−19I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 8
Max Conc. = 1.9
Mean Conc. = 1.15
% of Non−censored Data = 75%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

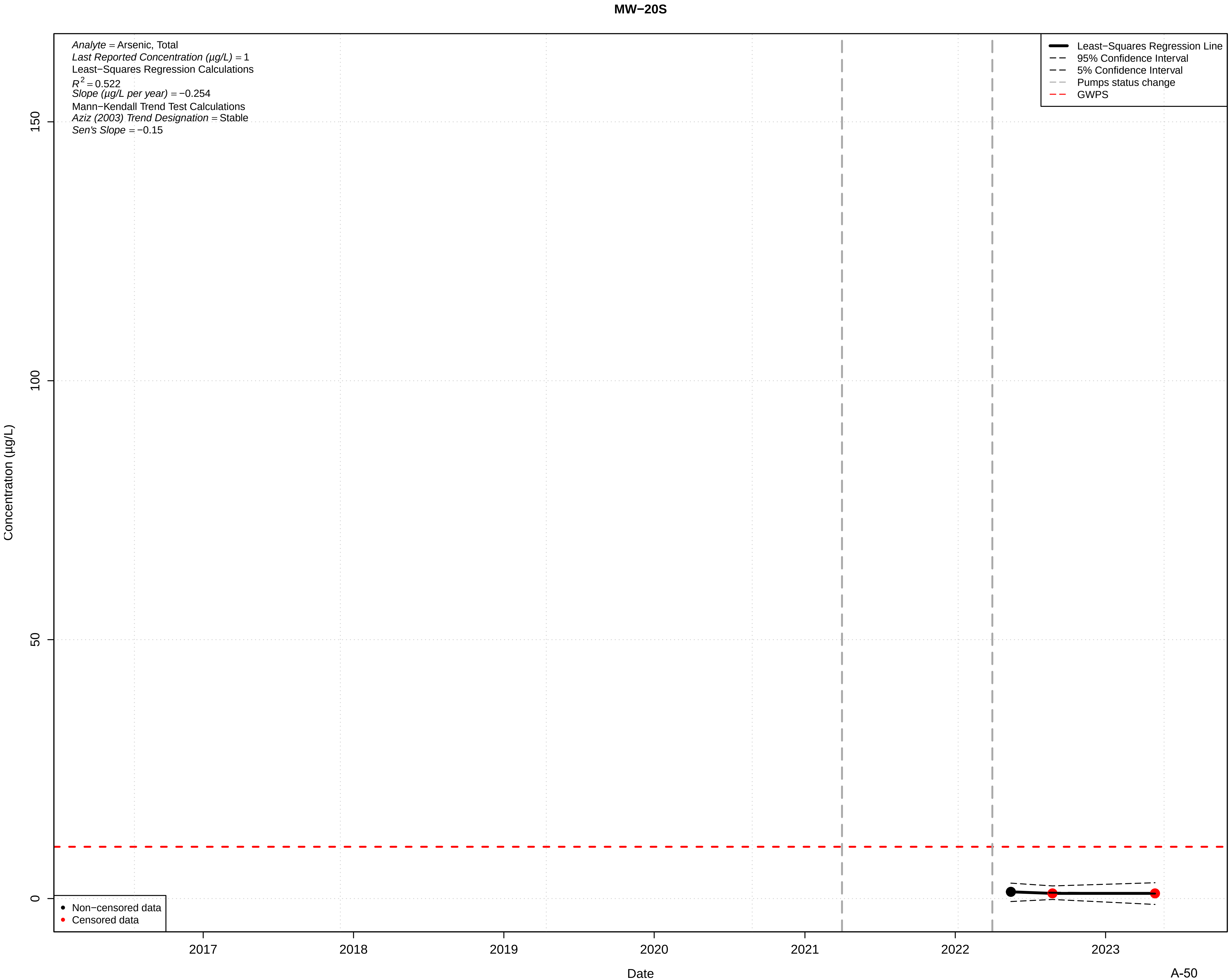

MW−19I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.166
Slope (µg/L per year) = −0.175
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−19D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 8
Max Conc. = 1.7
Mean Conc. = 1.19
% of Non−censored Data = 50%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

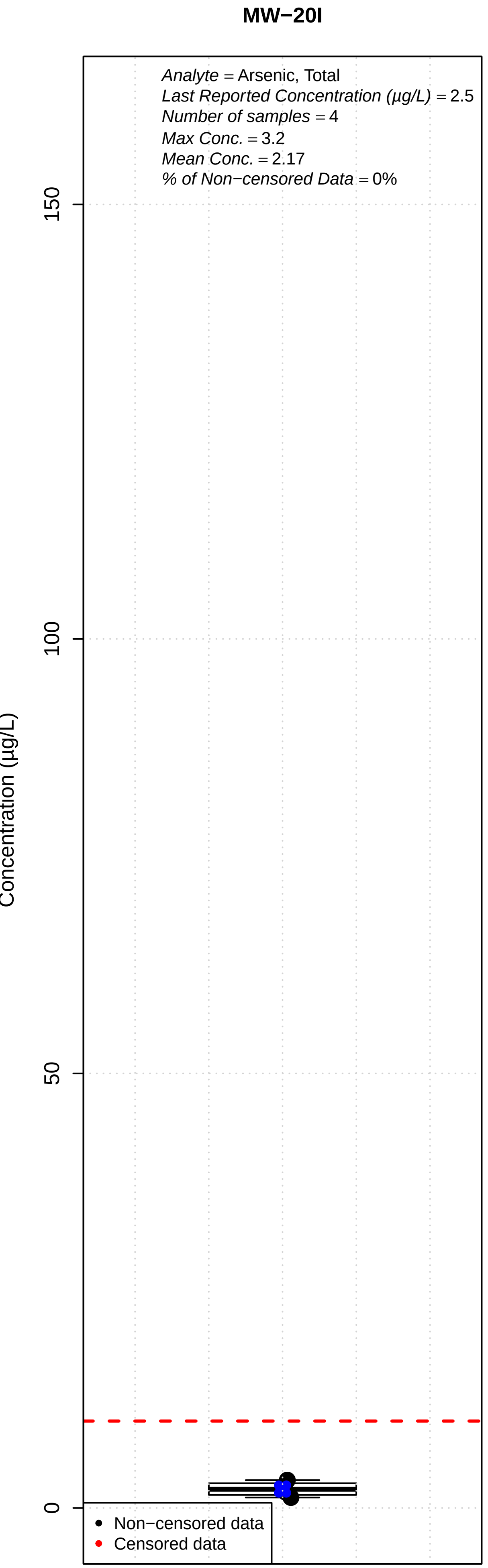

MW−19D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.216
Slope (µg/L per year) = −0.168
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.031
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date



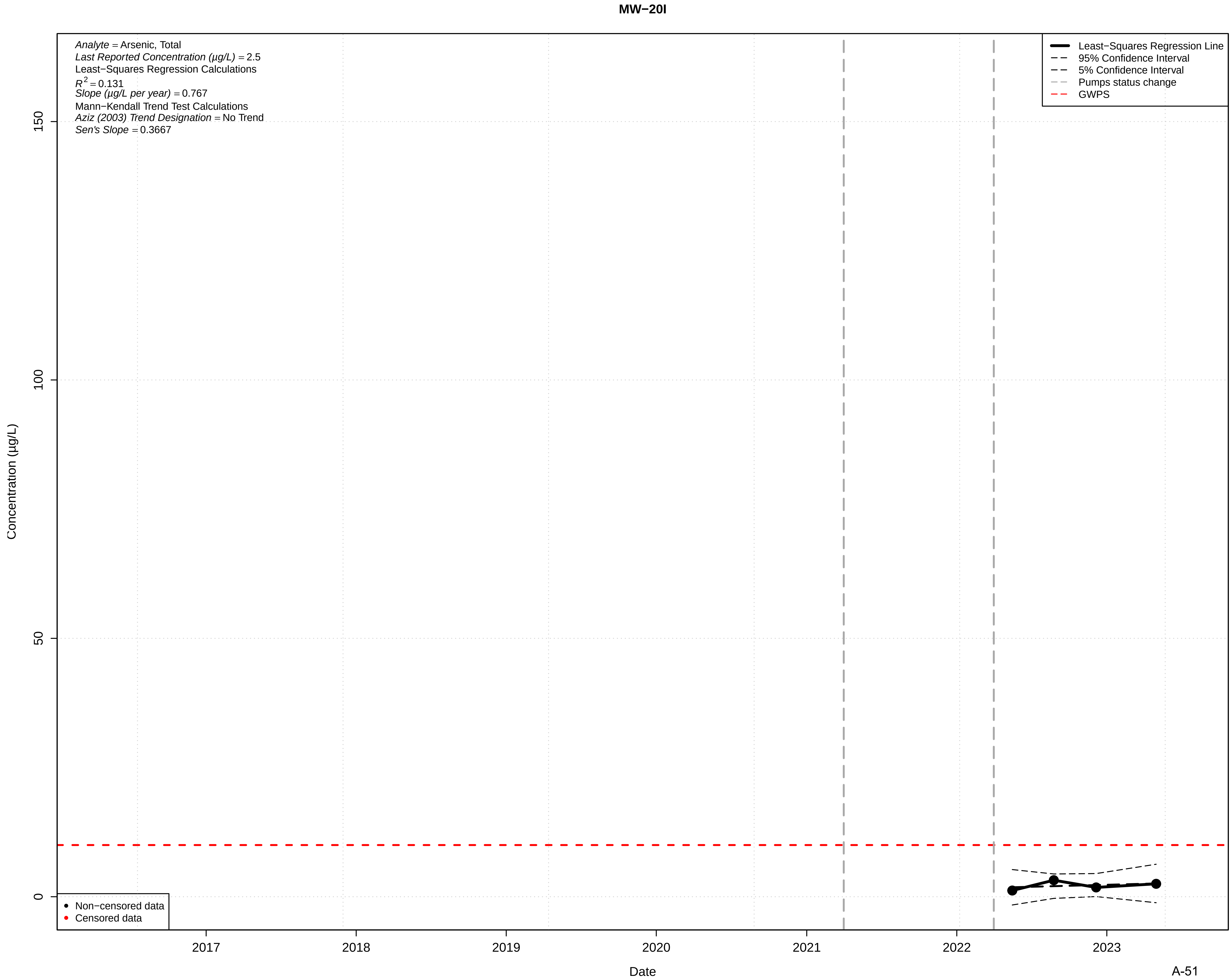
MW−20S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 3
Max Conc. = 1.3
Mean Conc. = 1.1
% of Non−censored Data = 67%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data



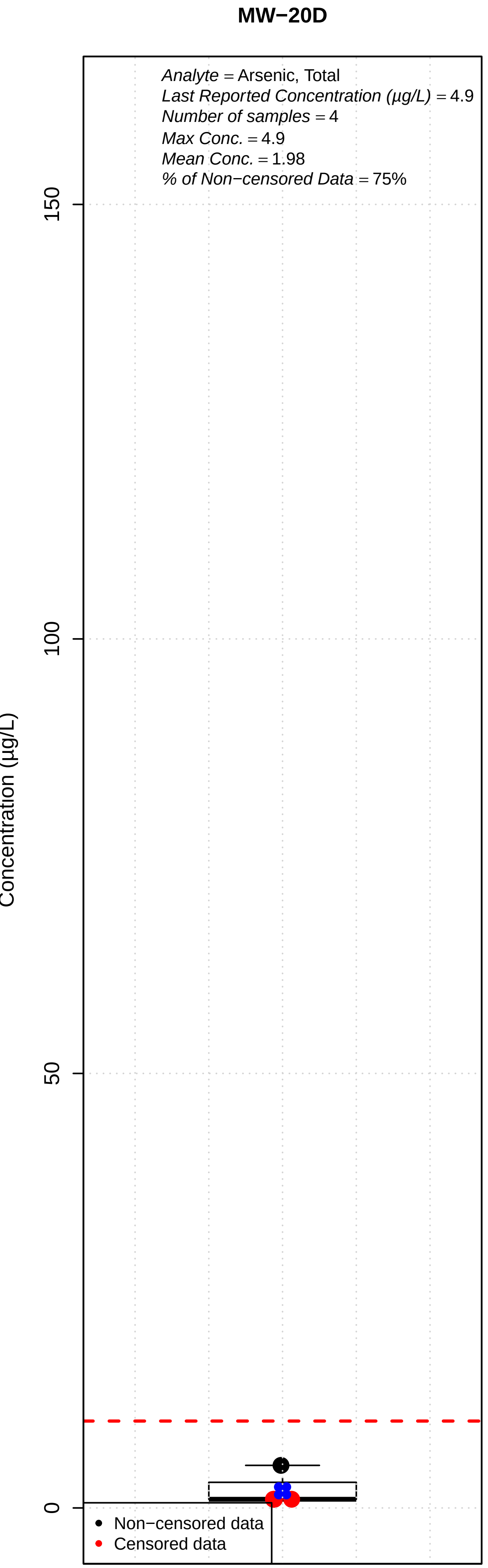
MW−20S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.522
Slope (µg/L per year) = −0.254
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.15
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

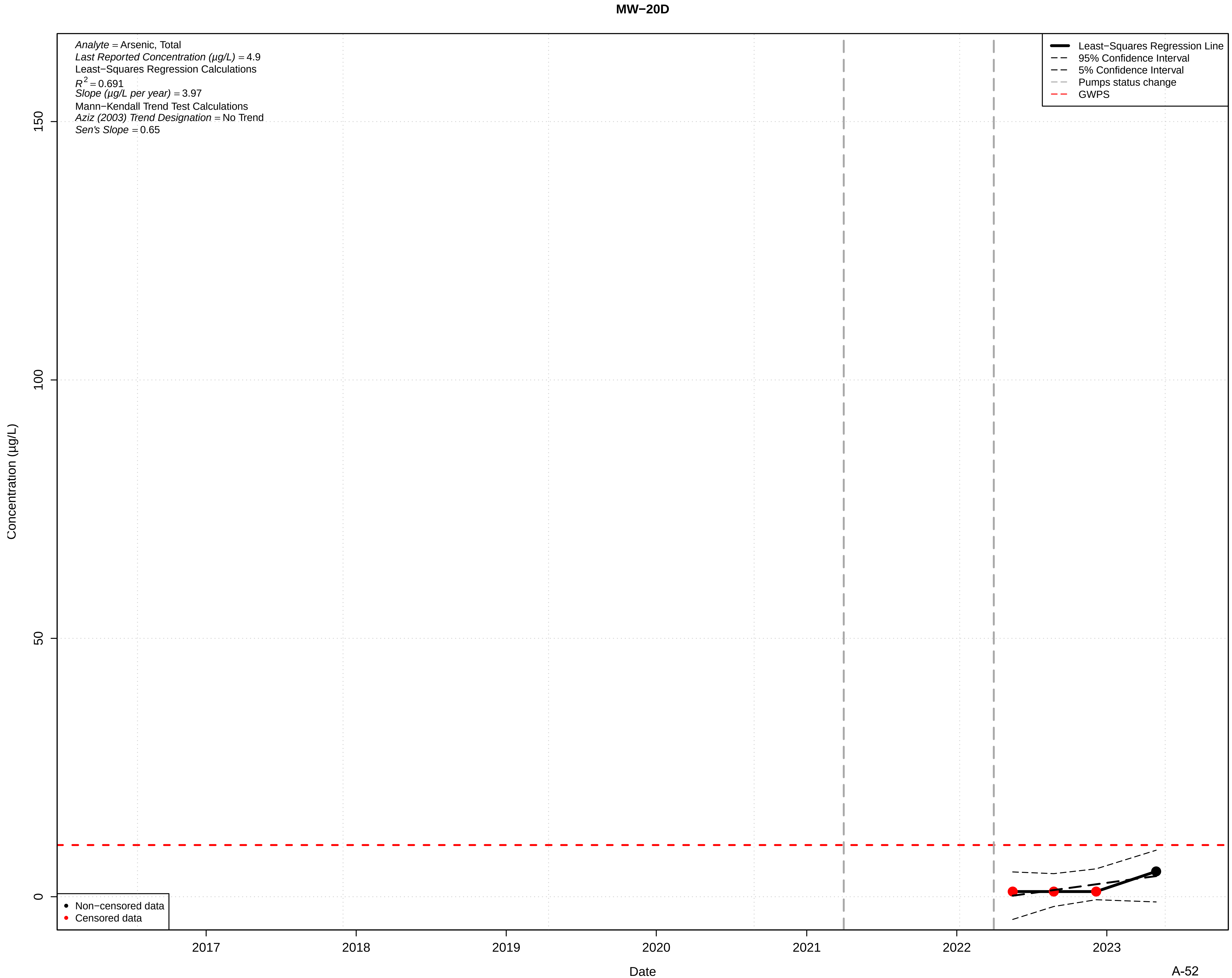


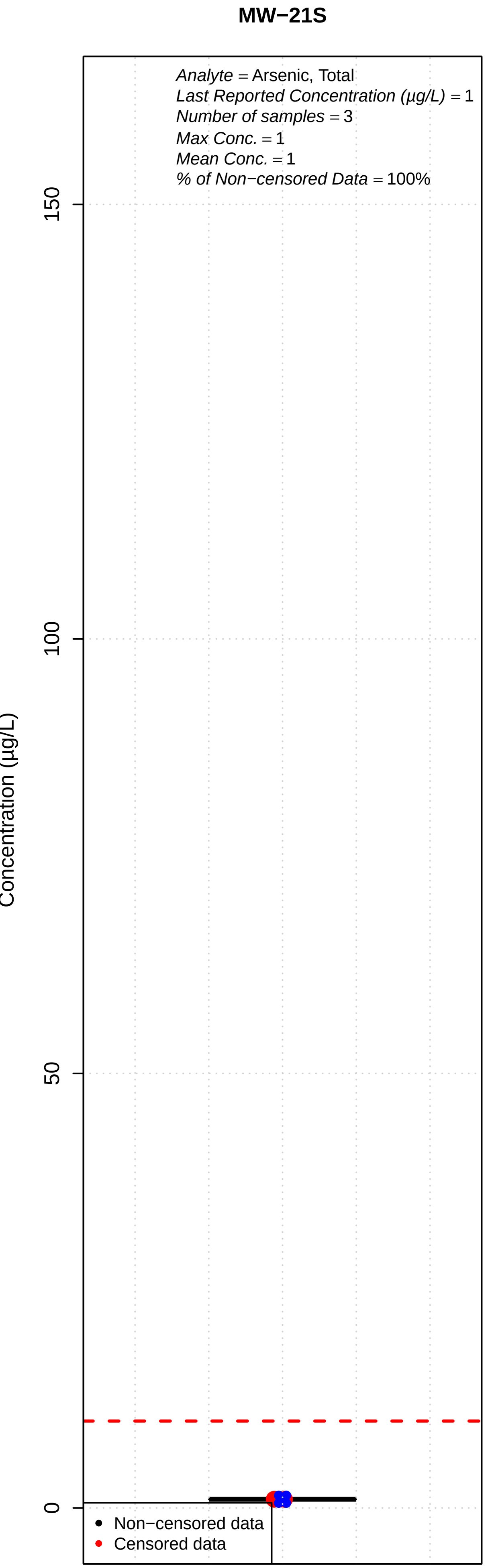
MW−20I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 2.5
Number of samples = 4
Max Conc. = 3.2
Mean Conc. = 2.17
% of Non−censored Data = 0%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data



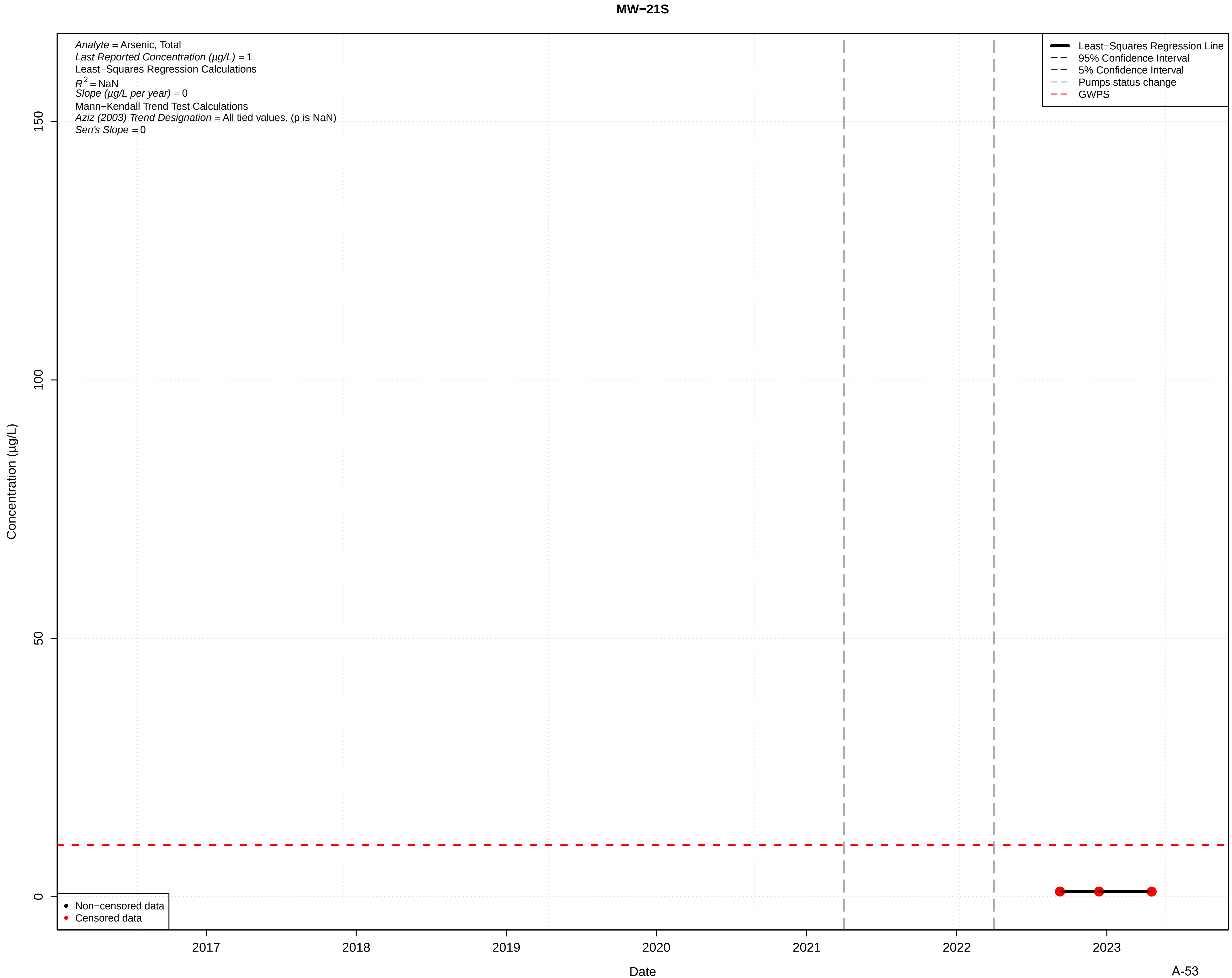
MW−20I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 2.5
Least−Squares Regression Calculations
R^2 = 0.131
Slope (µg/L per year) = 0.767
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.3667
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−20D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 4.9
Number of samples = 4
Max Conc. = 4.9
Mean Conc. = 1.98
% of Non−censored Data = 75%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

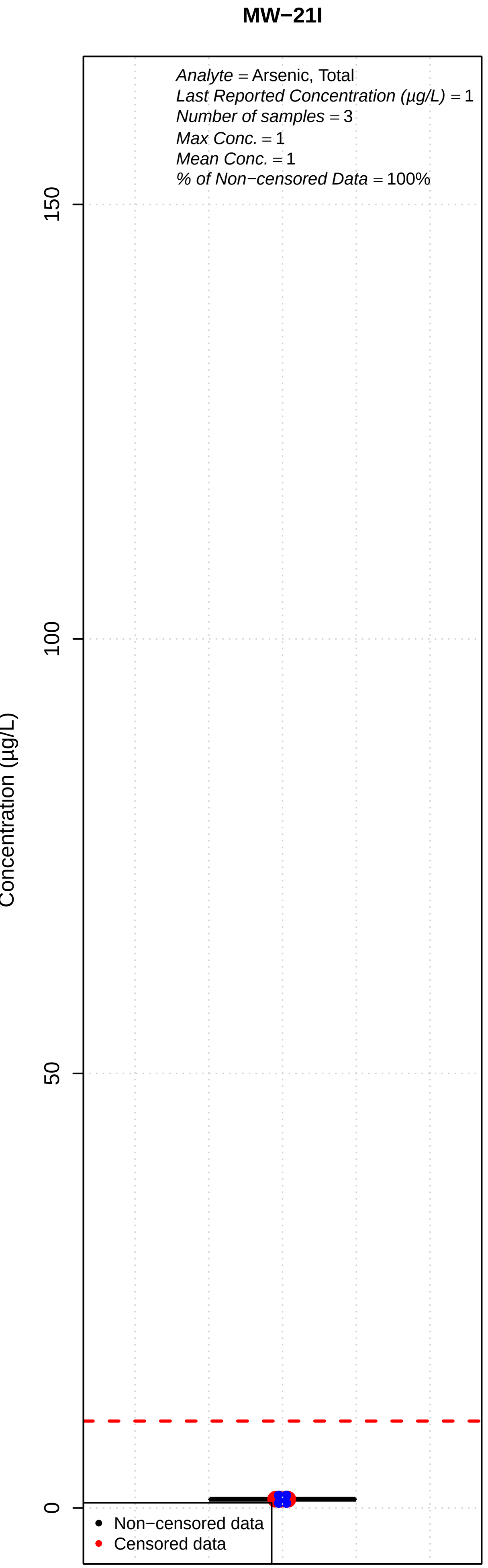

MW−20D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 4.9
Least−Squares Regression Calculations
R^2 = 0.691
Slope (µg/L per year) = 3.97
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.65
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

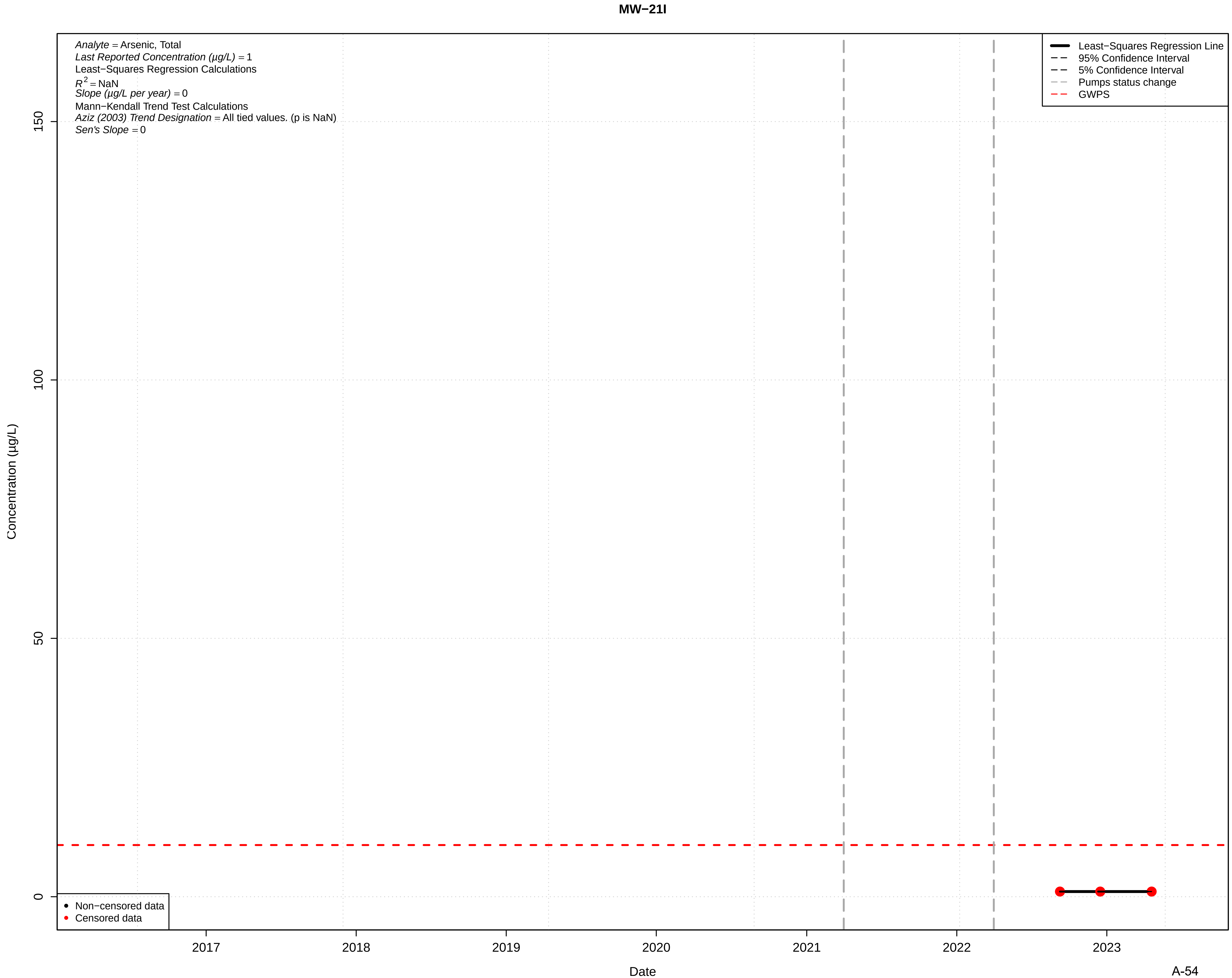


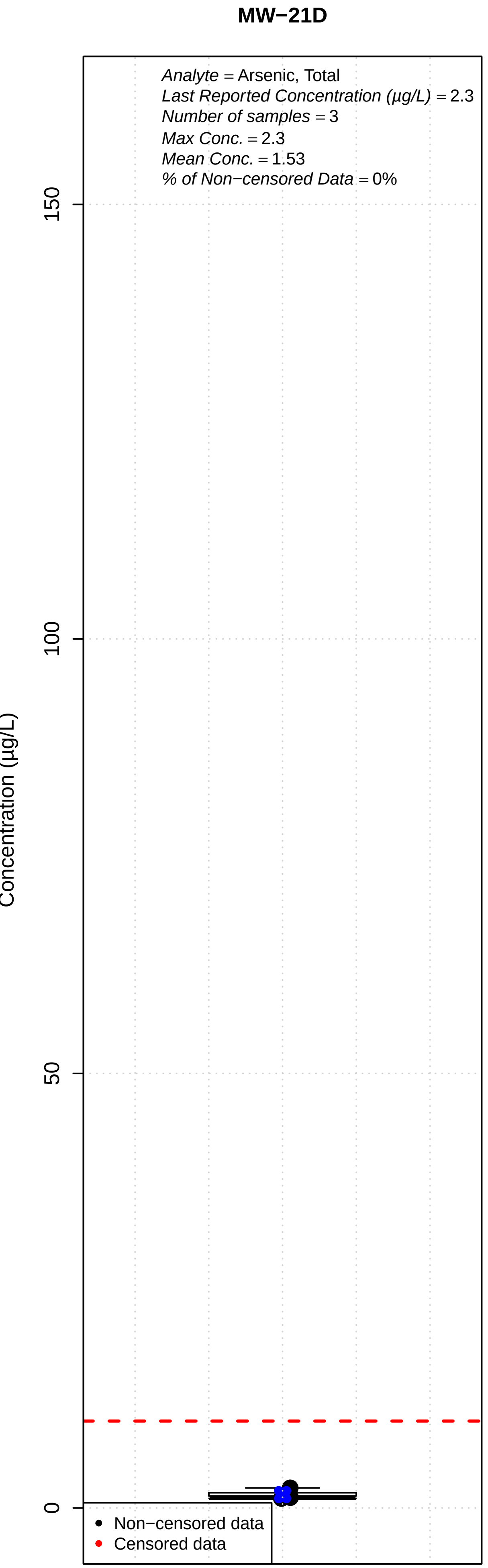
MW−21S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 3
Max Conc. = 1
Mean Conc. = 1
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

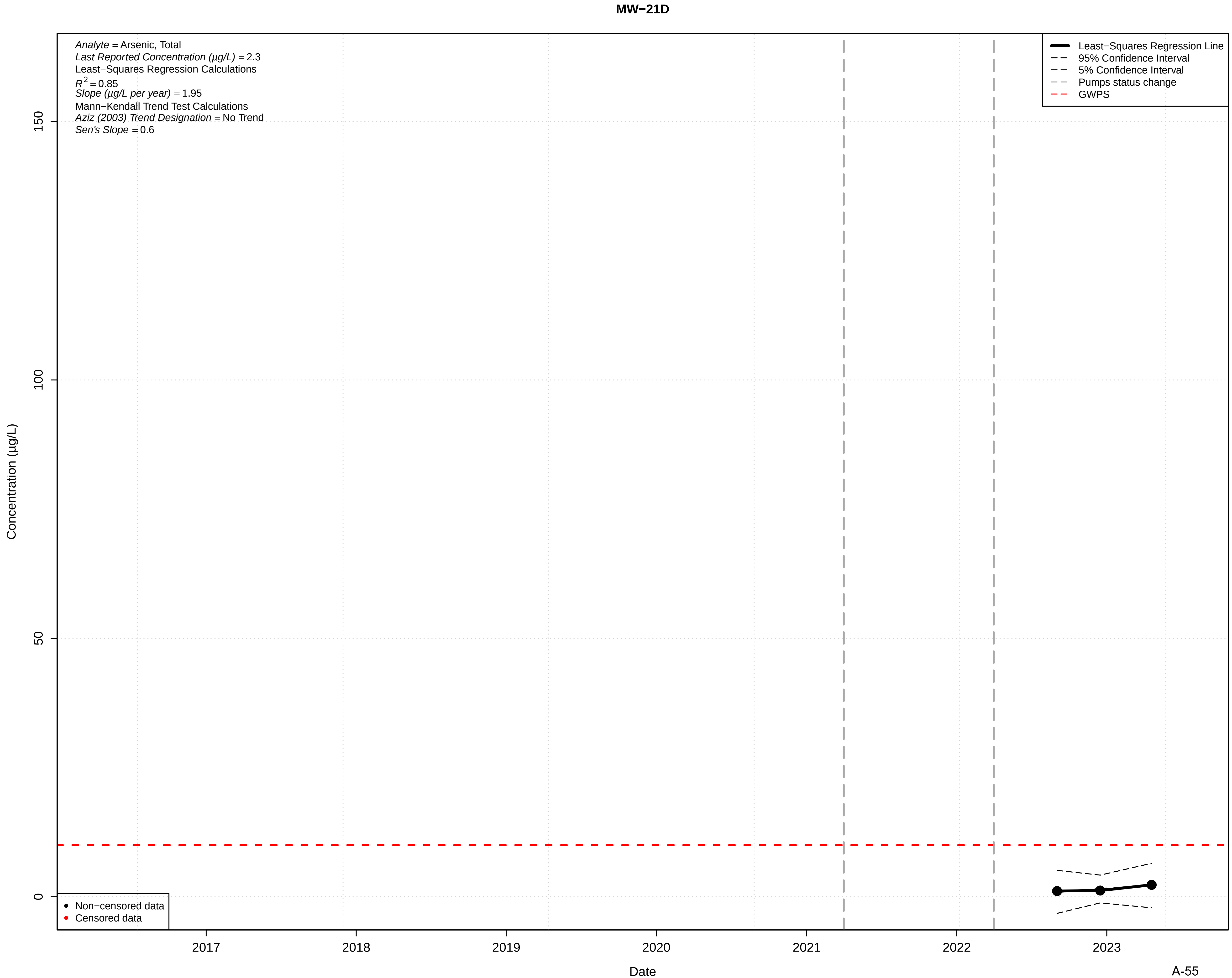


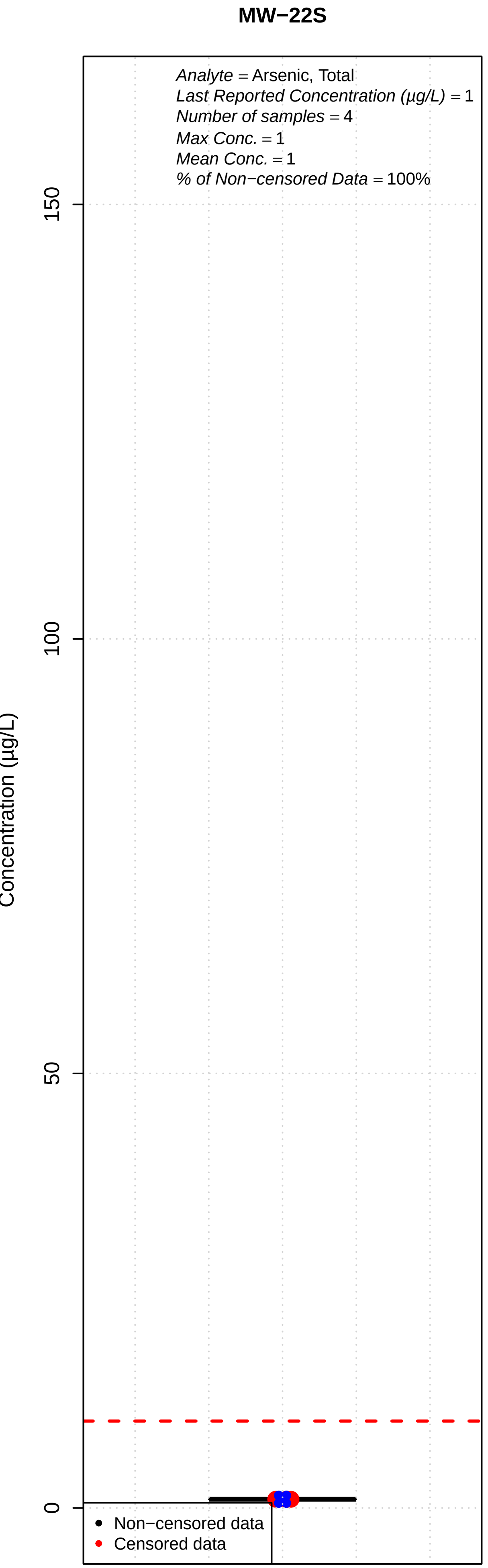
MW−21S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = NaN
Slope (µg/L per year) = 0
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−21I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 3
Max Conc. = 1
Mean Conc. = 1
% of Non−censored Data = 100%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

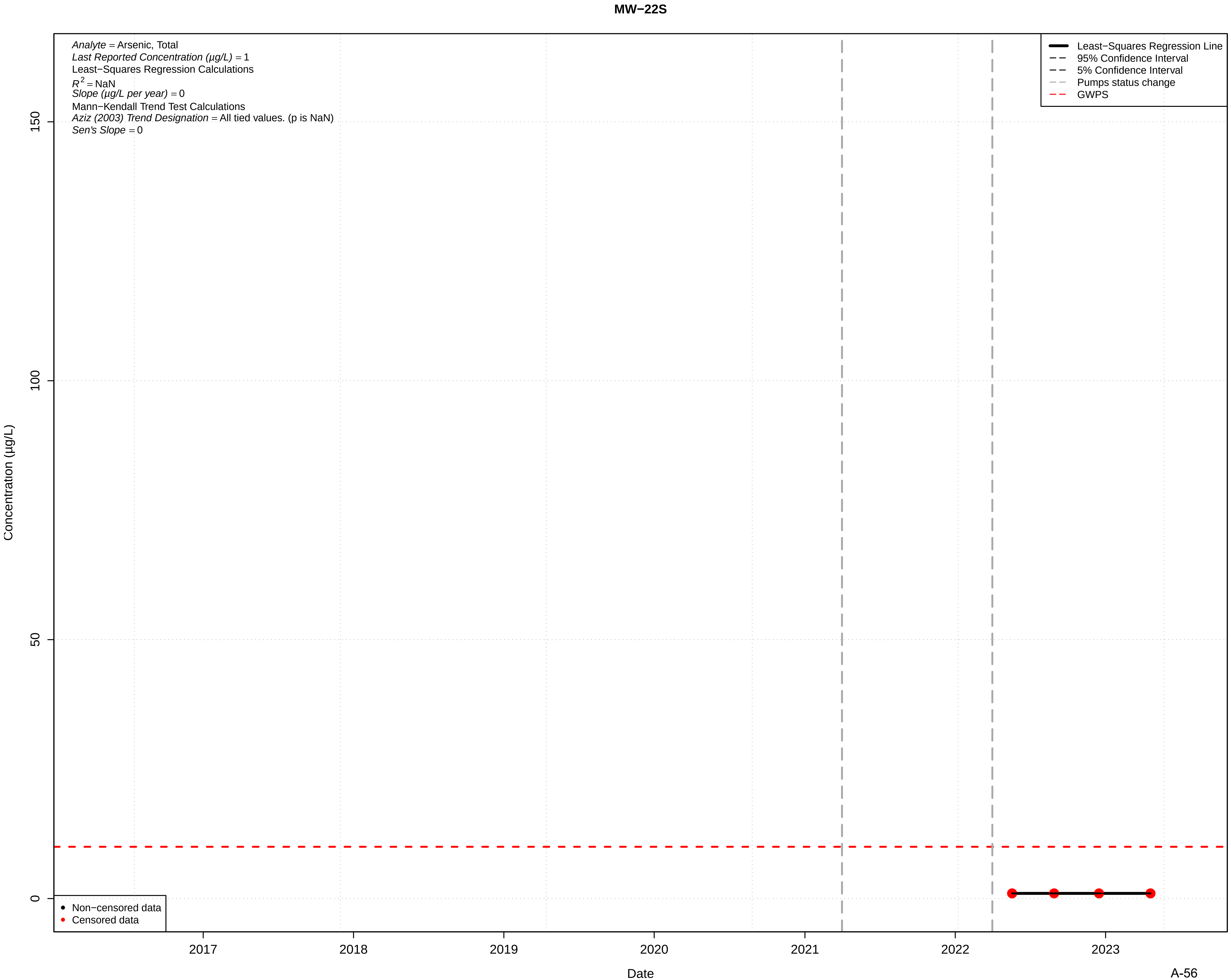

MW−21I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = NaN
Slope (µg/L per year) = 0
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−21D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 2.3
Number of samples = 3
Max Conc. = 2.3
Mean Conc. = 1.53
% of Non−censored Data = 0%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

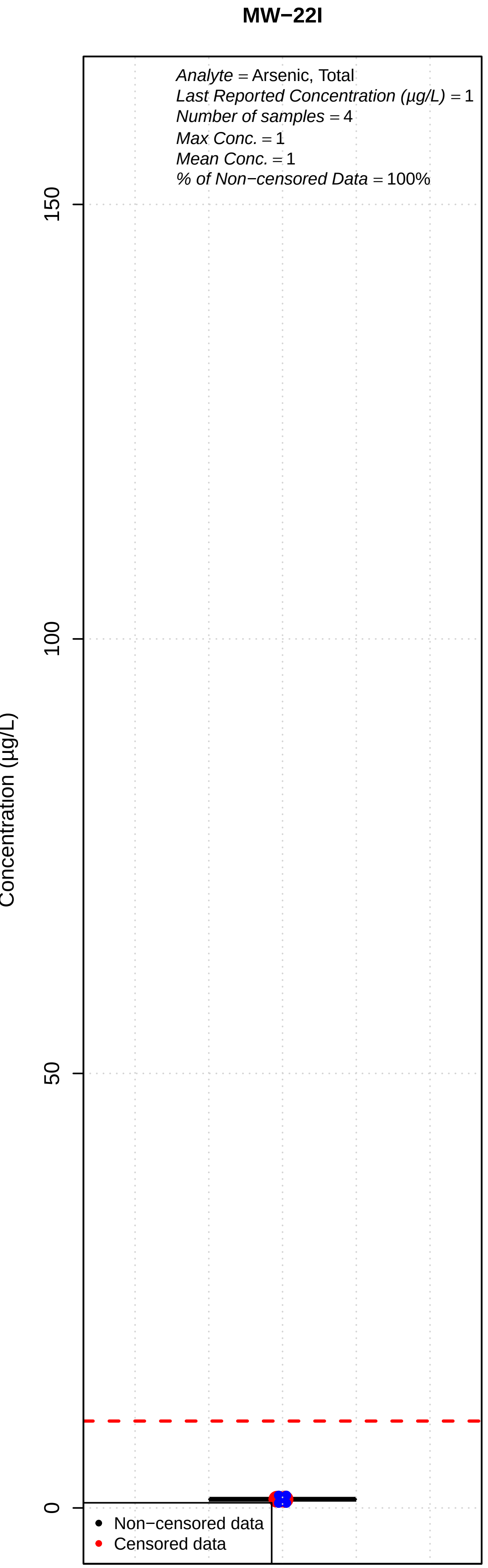

MW−21D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 2.3
Least−Squares Regression Calculations
R² = 0.85
Slope (µg/L per year) = 1.95
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.6
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

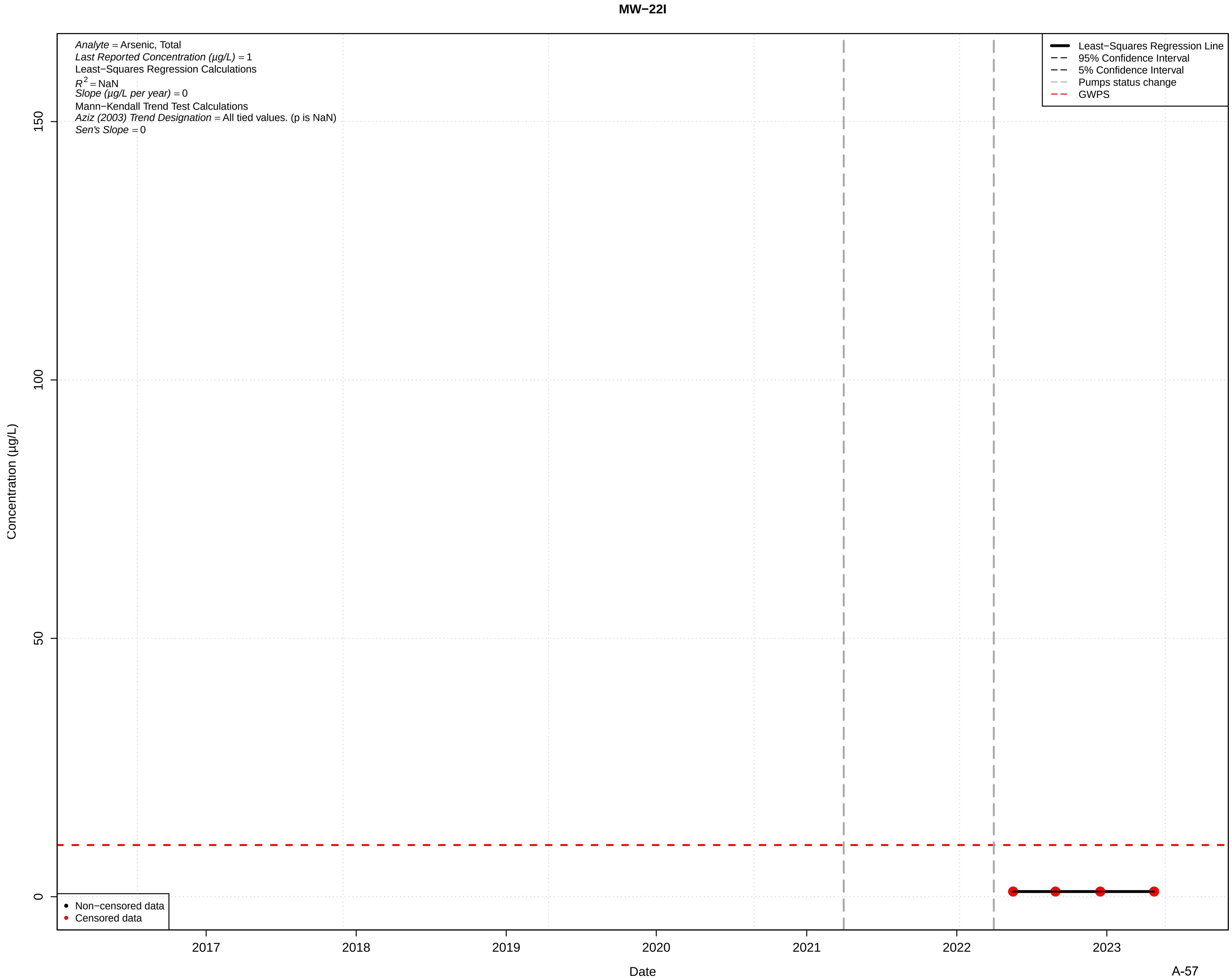


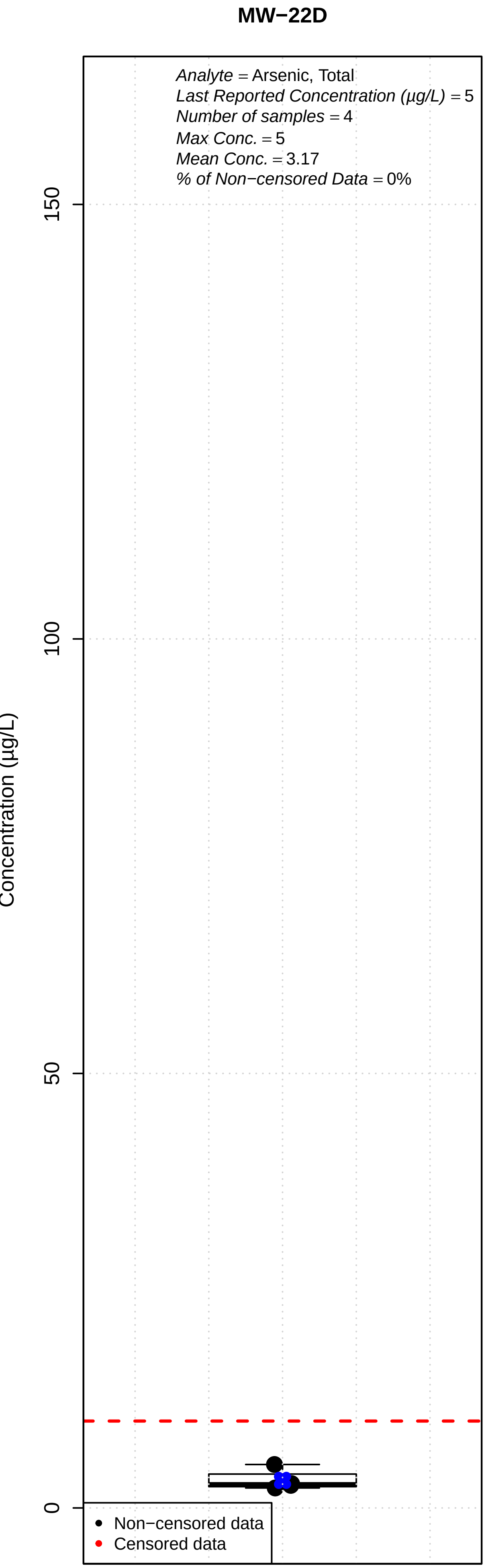
MW−22S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 4
Max Conc. = 1
Mean Conc. = 1
% of Non−censored Data = 100%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

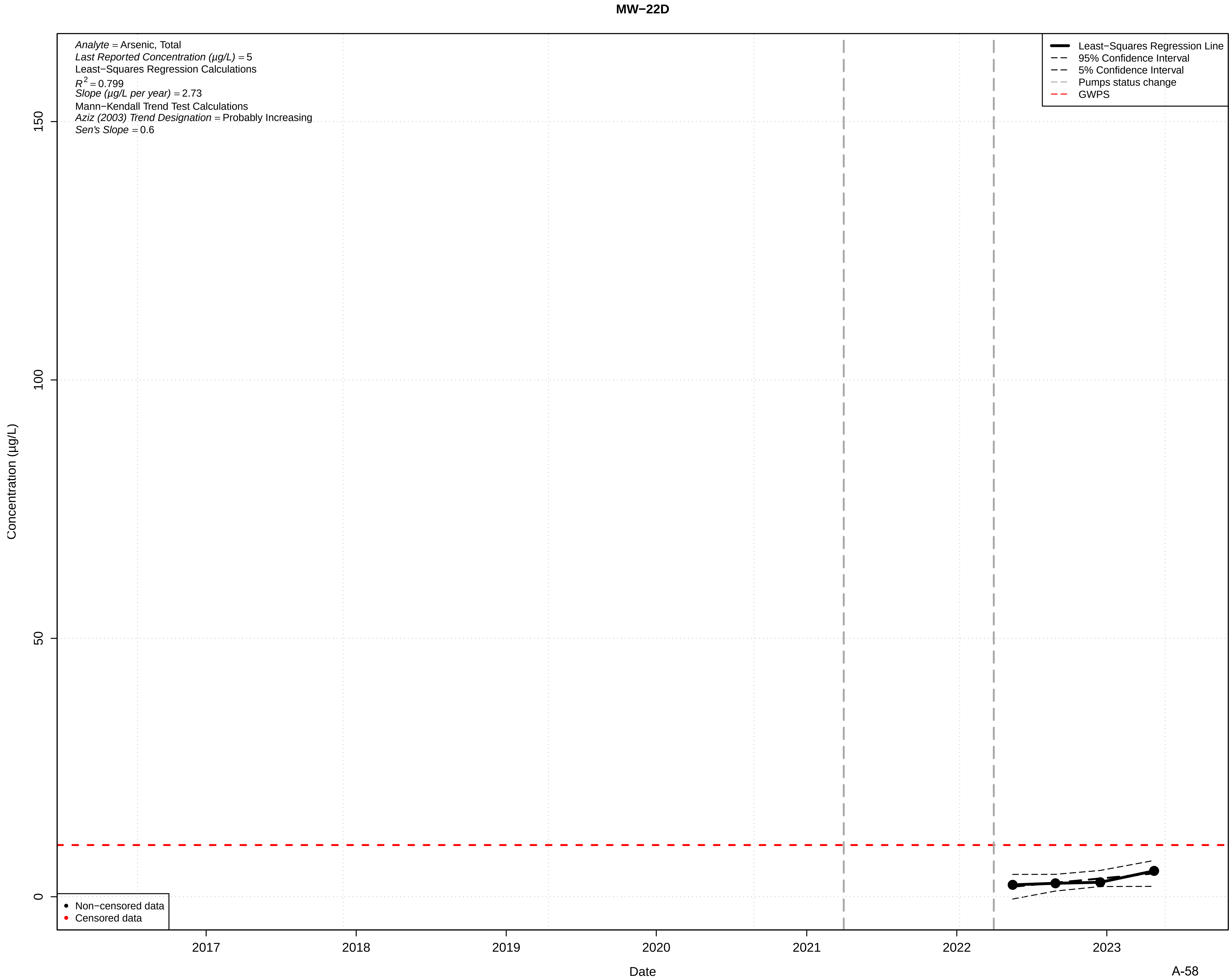


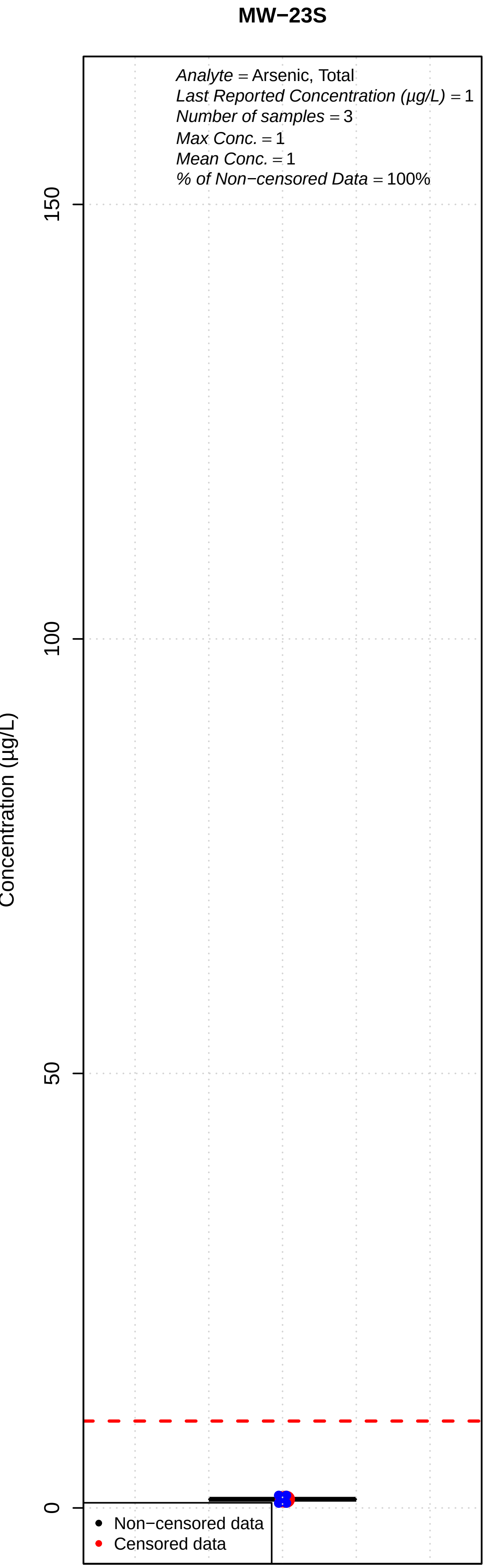
MW−22S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = NaN
Slope (µg/L per year) = 0
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

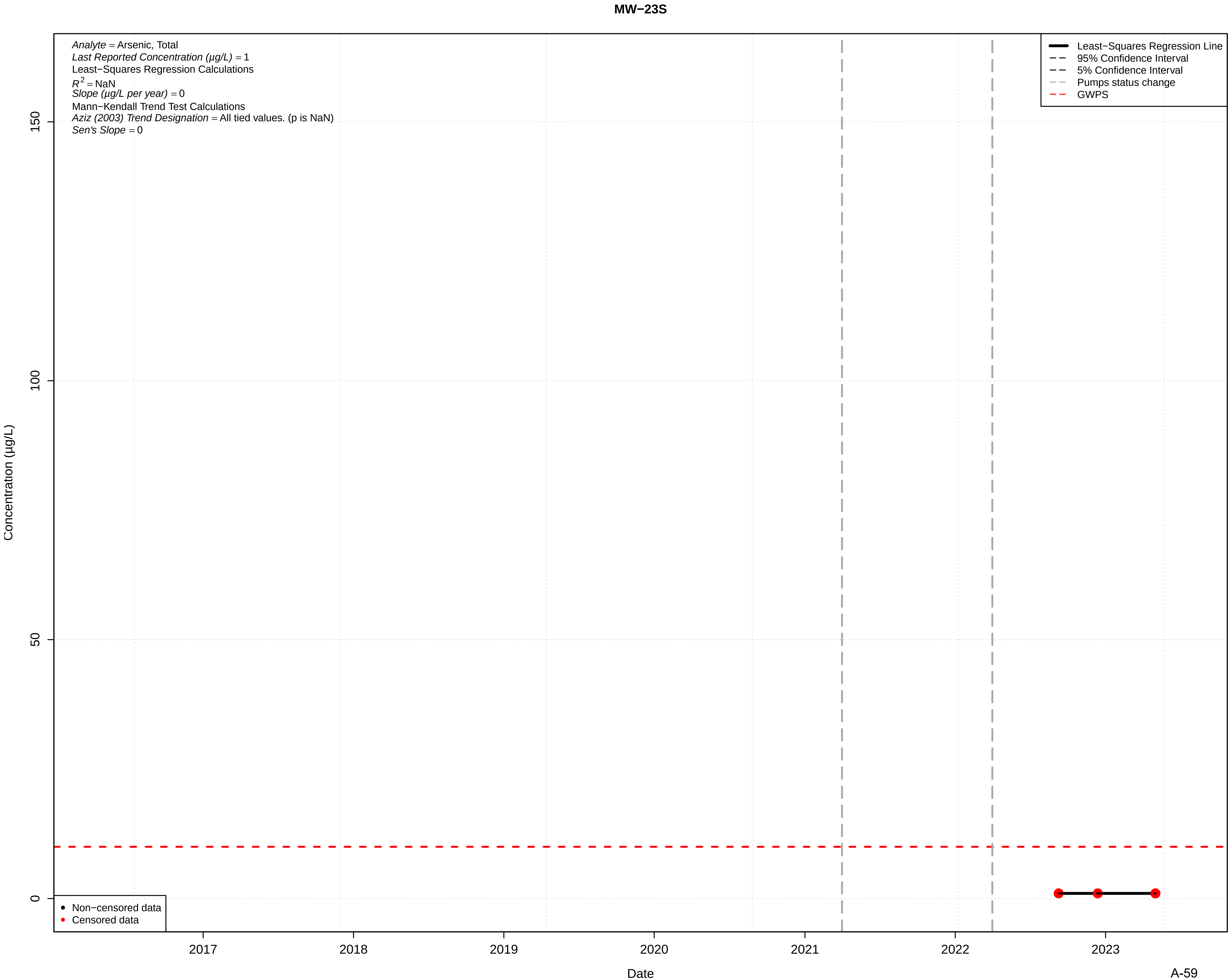

MW−22I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 4
Max Conc. = 1
Mean Conc. = 1
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

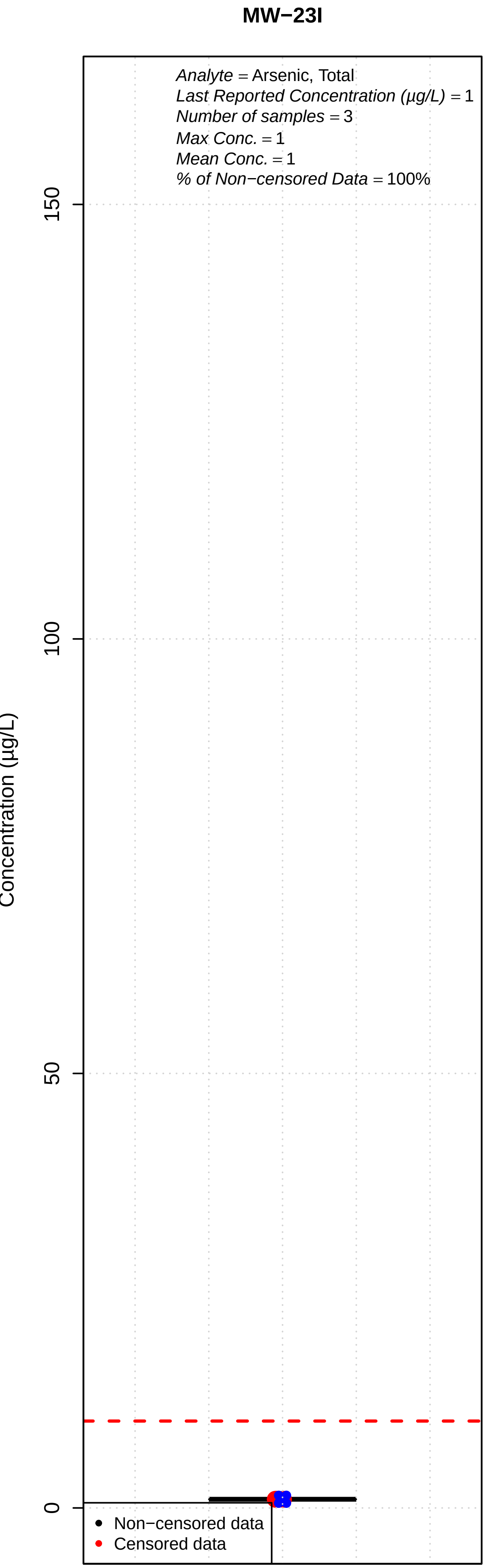

MW−22I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = NaN
Slope (µg/L per year) = 0
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

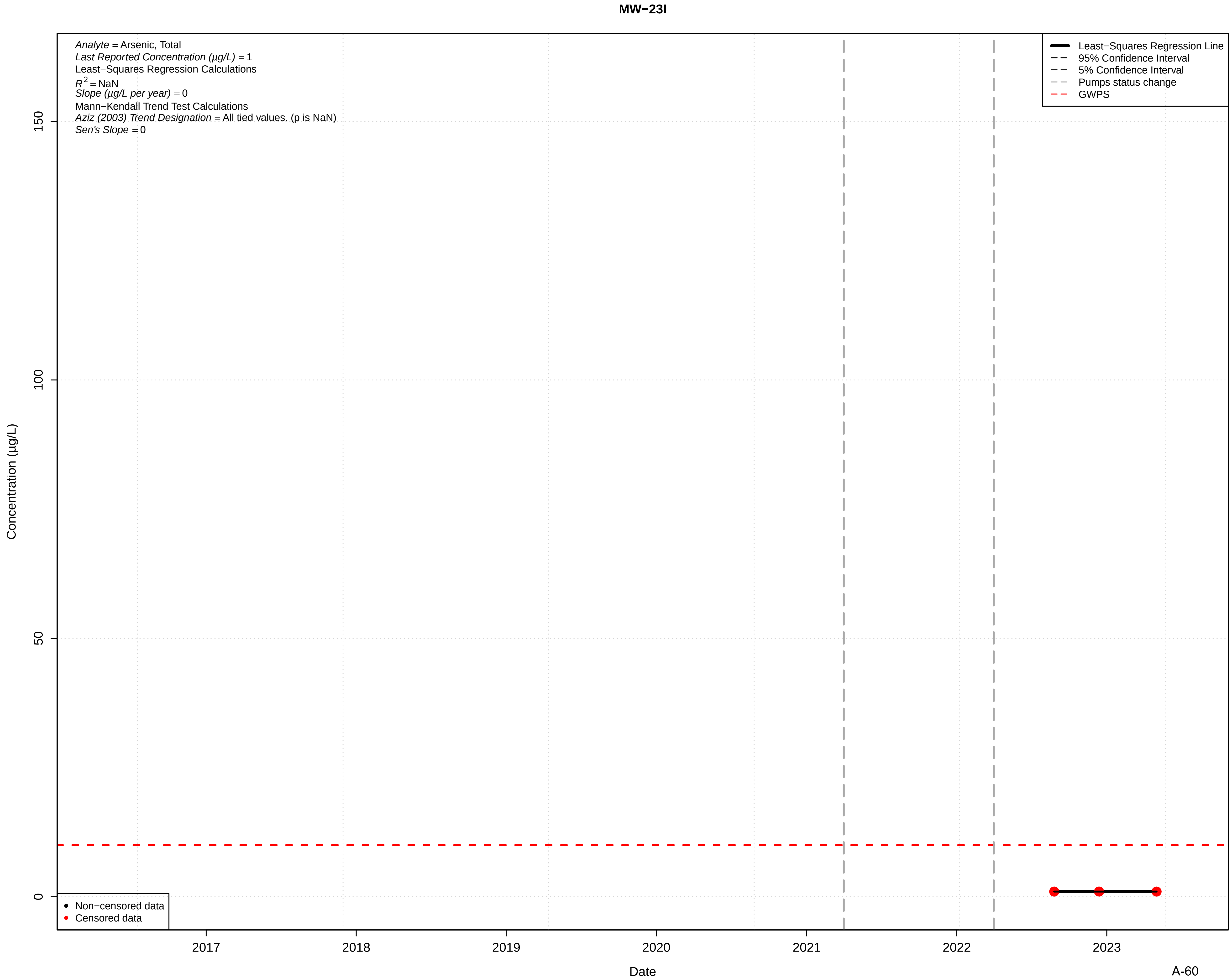

MW−22D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 5
Number of samples = 4
Max Conc. = 5
Mean Conc. = 3.17
% of Non−censored Data = 0%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

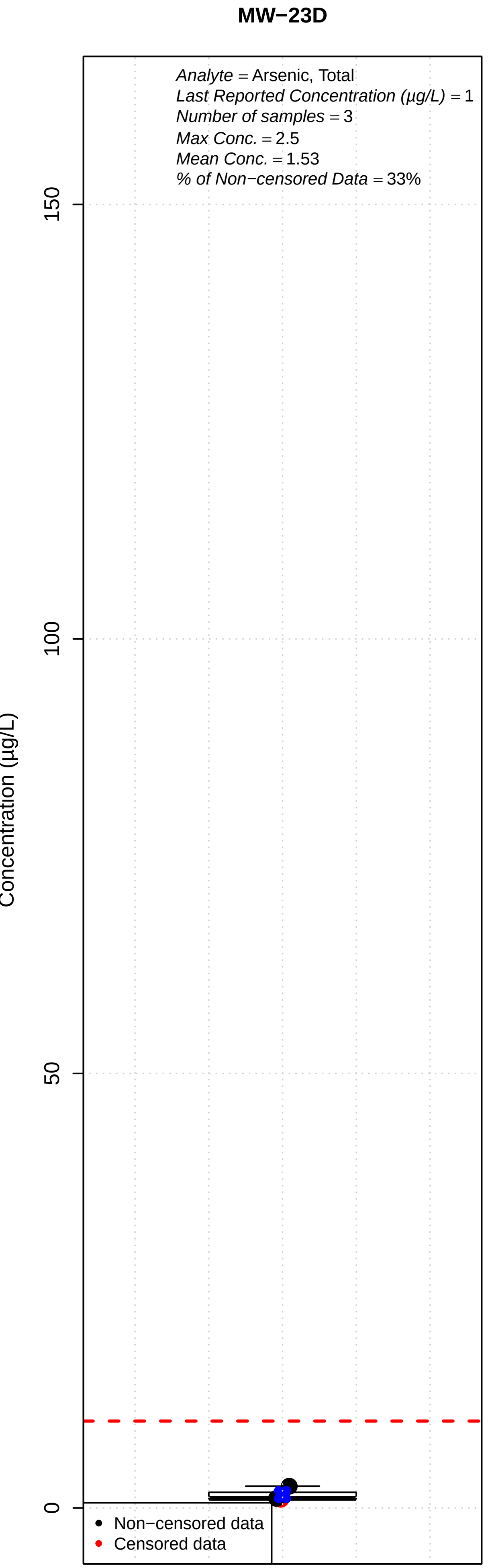

MW−22D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 5
Least−Squares Regression Calculations
R^2 = 0.799
Slope (µg/L per year) = 2.73
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Probably Increasing
Sen's Slope = 0.6
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

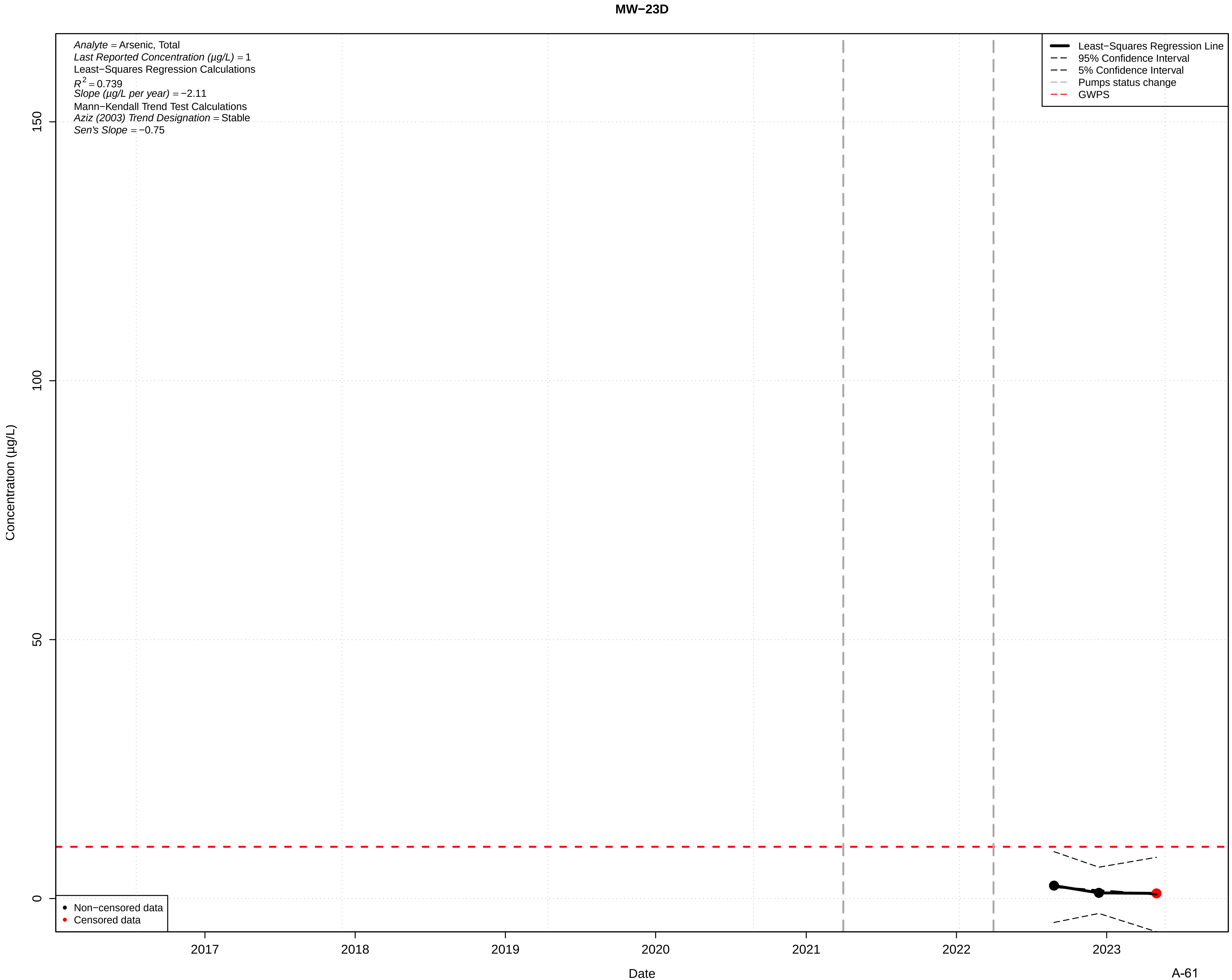

MW−23S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 3
Max Conc. = 1
Mean Conc. = 1
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

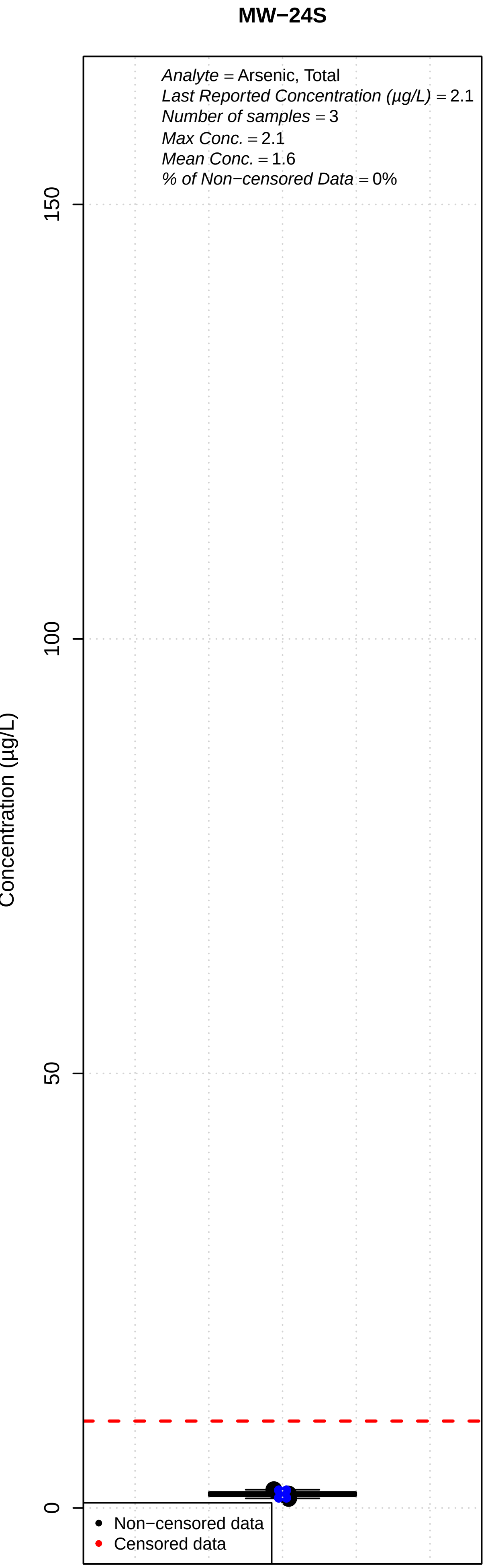

MW−23S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = NaN
Slope (µg/L per year) = 0
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−23I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 3
Max Conc. = 1
Mean Conc. = 1
% of Non−censored Data = 100%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

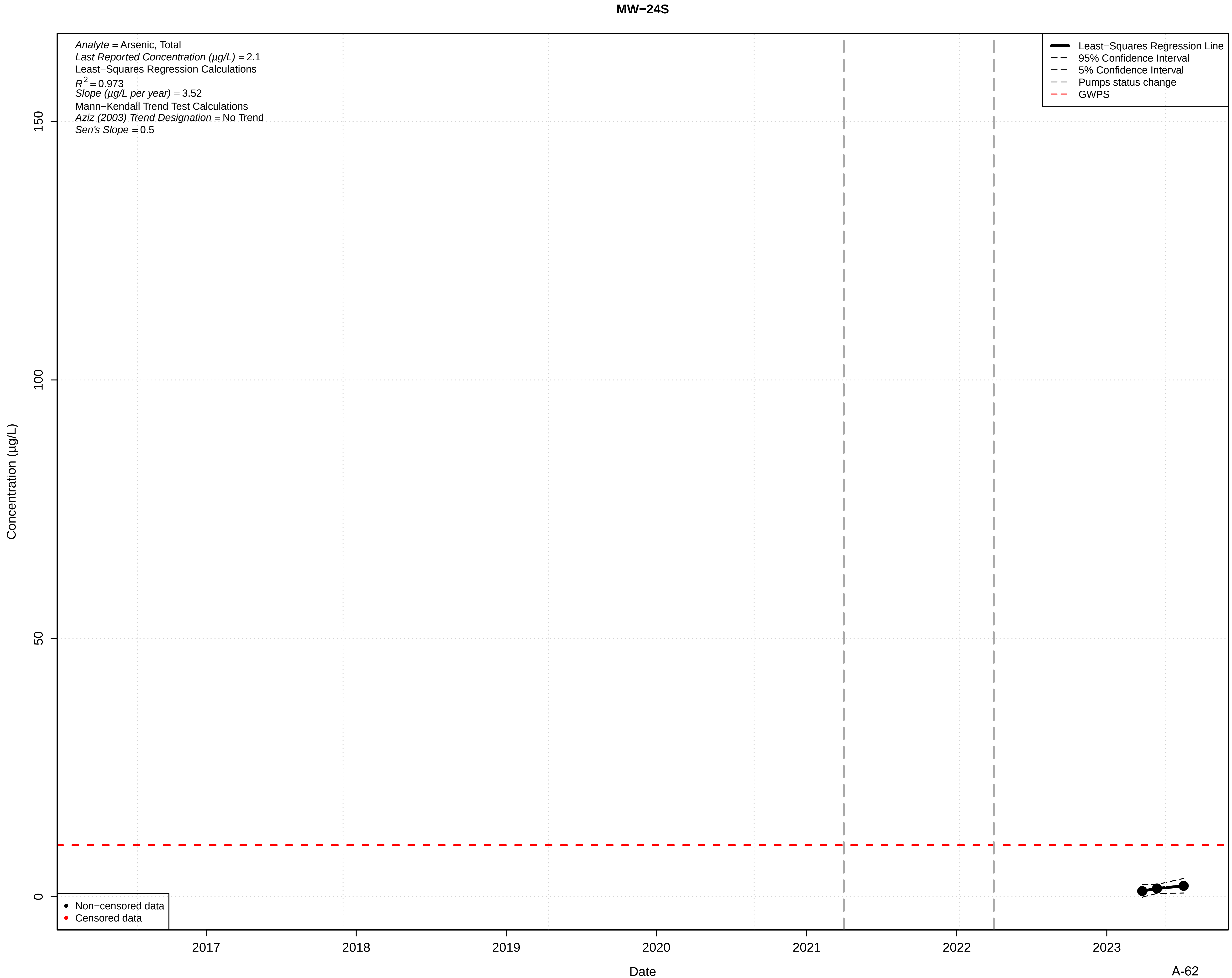

MW−23I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = NaN
Slope (µg/L per year) = 0
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−23D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 3
Max Conc. = 2.5
Mean Conc. = 1.53
% of Non−censored Data = 33%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

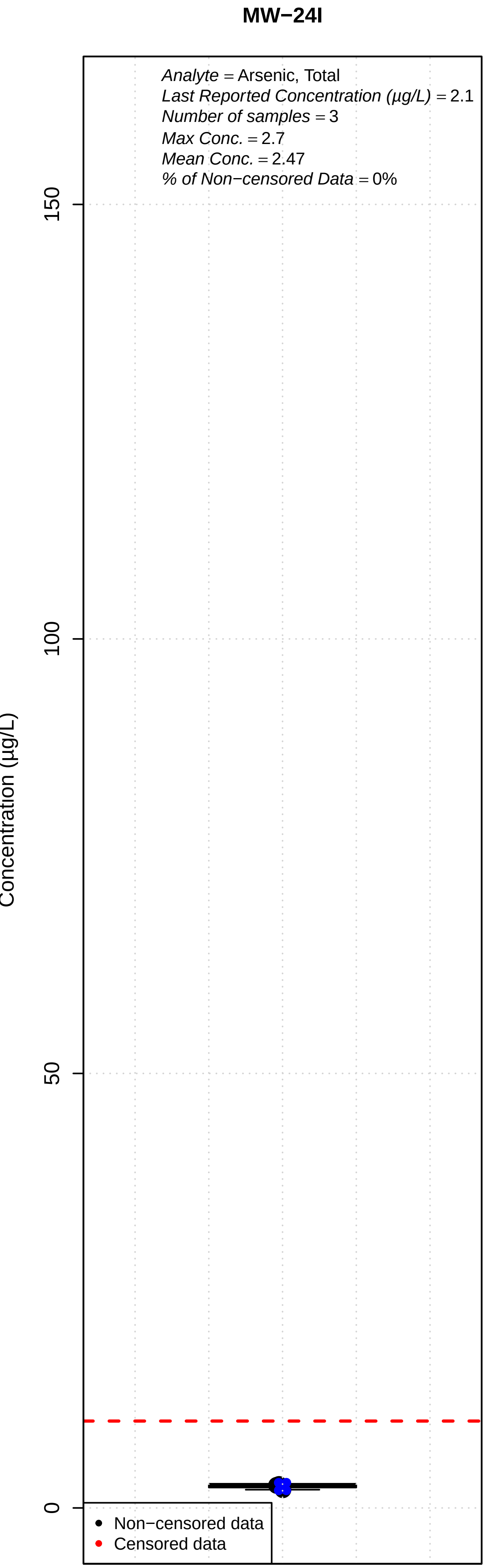

MW−23D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = 0.739
Slope (µg/L per year) = −2.11
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.75
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

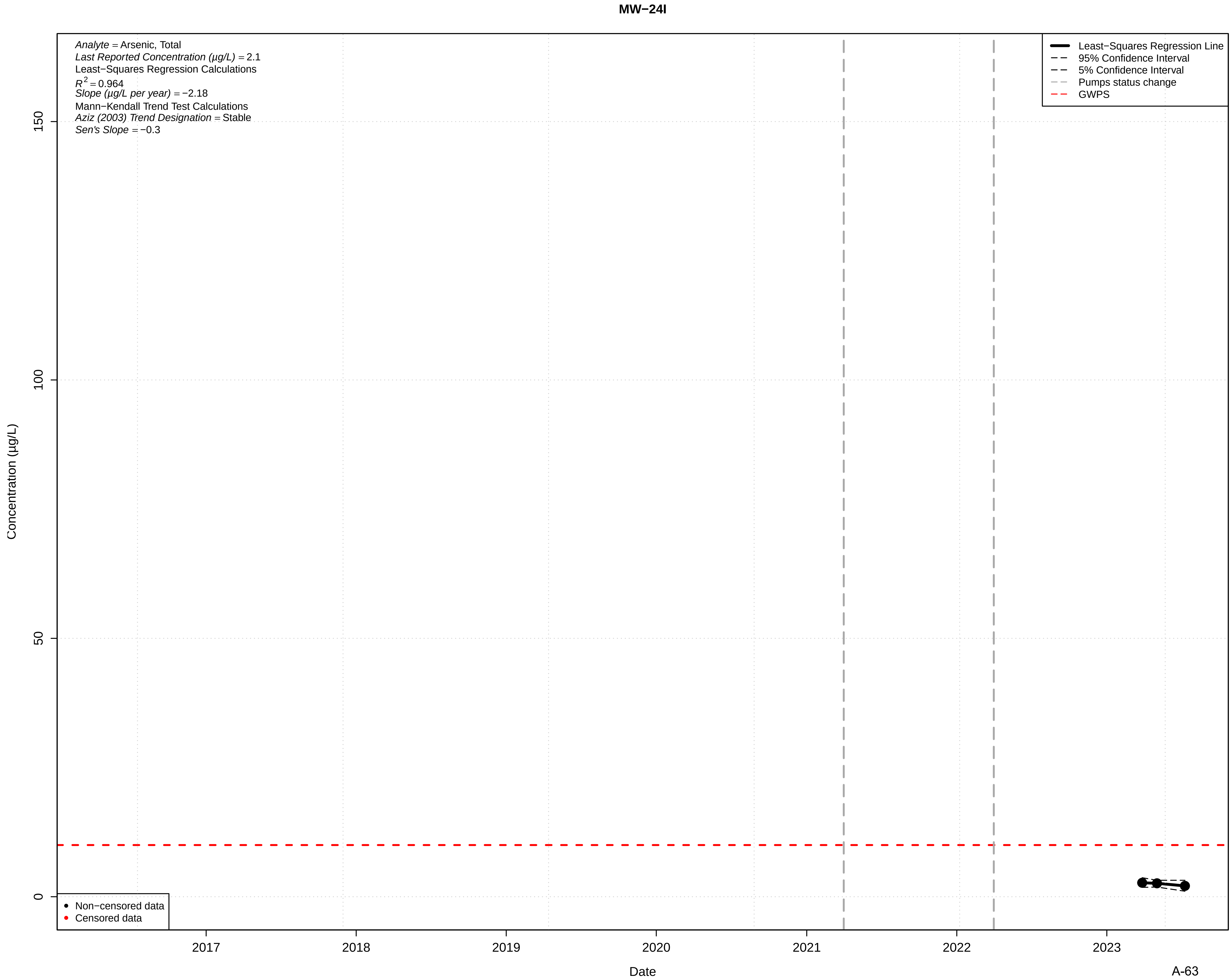


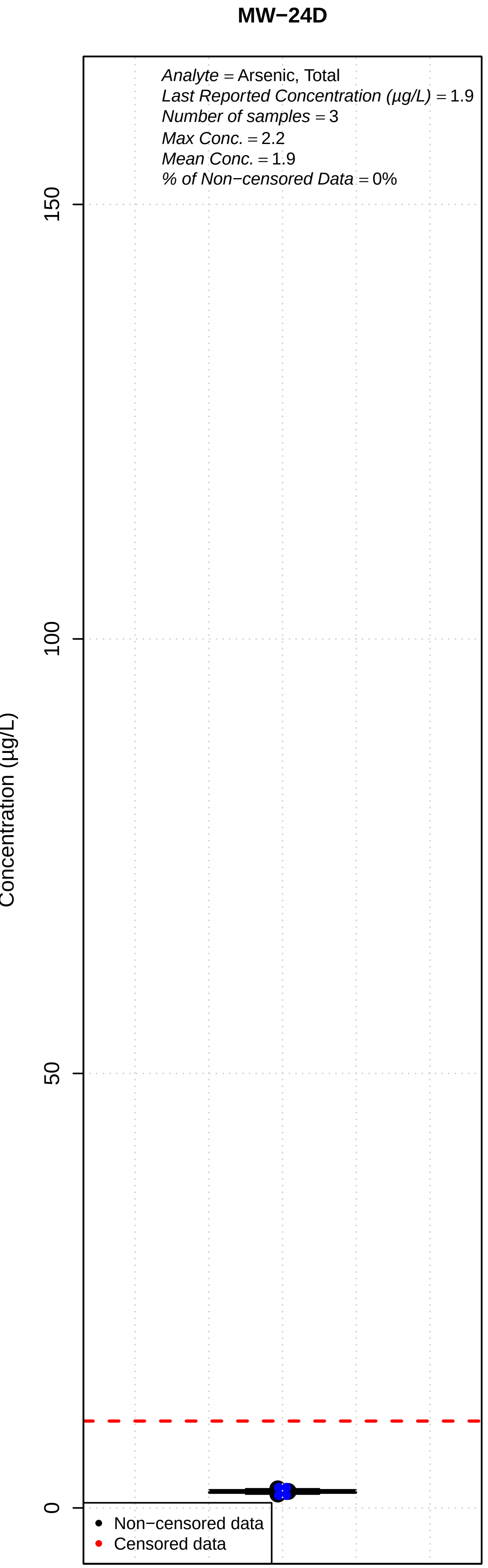
MW−24S
Analyte = Arsenic, Total
Last Reported Concentration (μg/L) = 2.1
Number of samples = 3
Max Conc. = 2.1
Mean Conc. = 1.6
% of Non−censored Data = 0%
Concentration (μg/L)
150
100
50
0
Non−censored data
Censored data

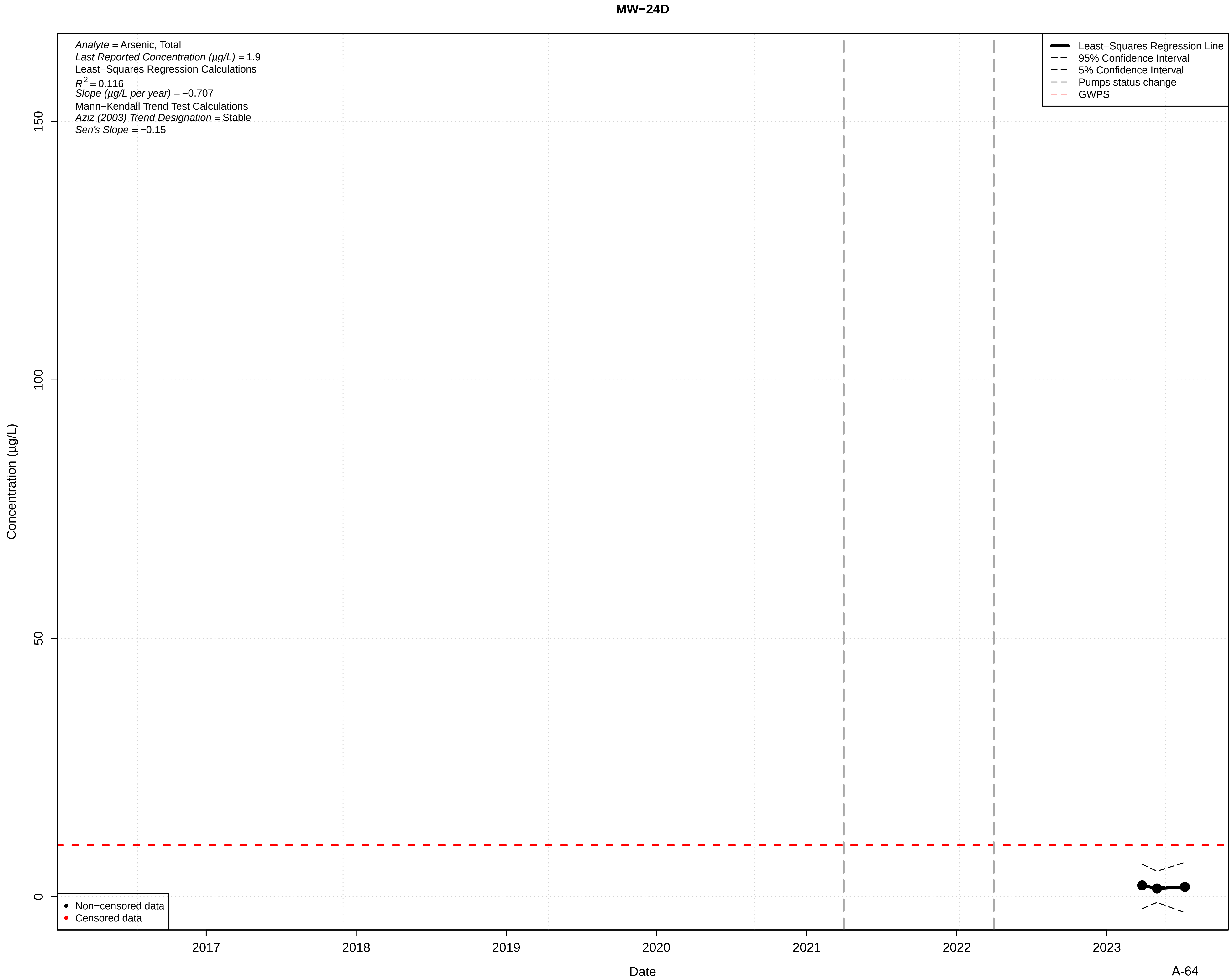


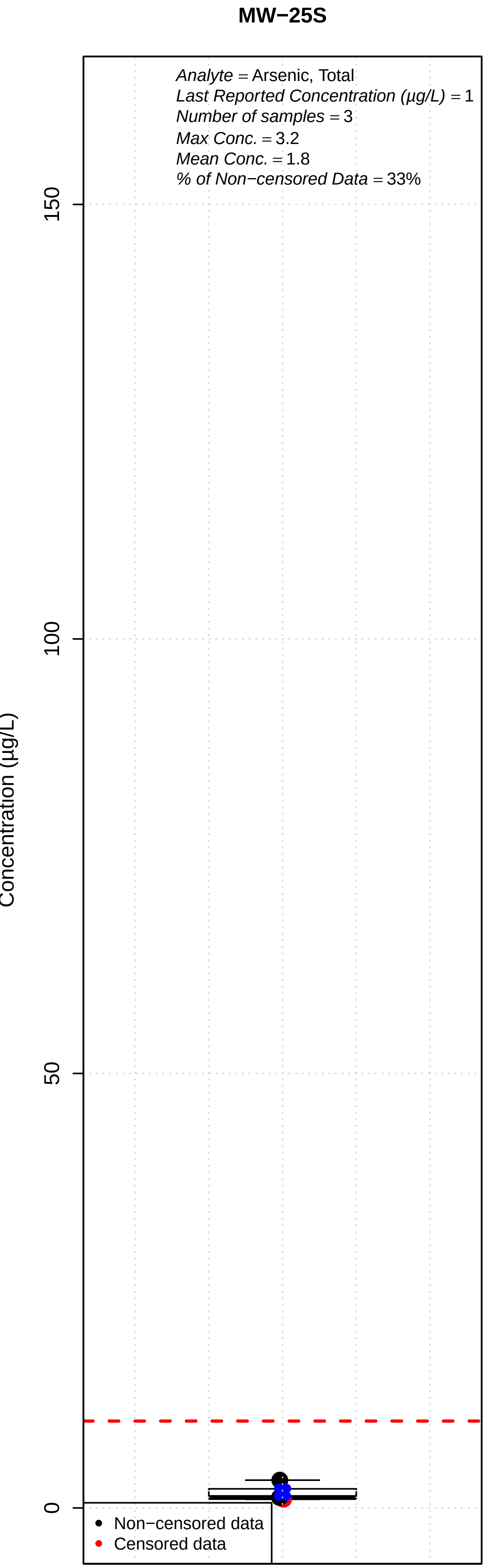
MW−24S
Analyte = Arsenic, Total
Last Reported Concentration (μg/L) = 2.1
Least−Squares Regression Calculations
R^2 = 0.973
Slope (μg/L per year) = 3.52
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.5
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (μg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

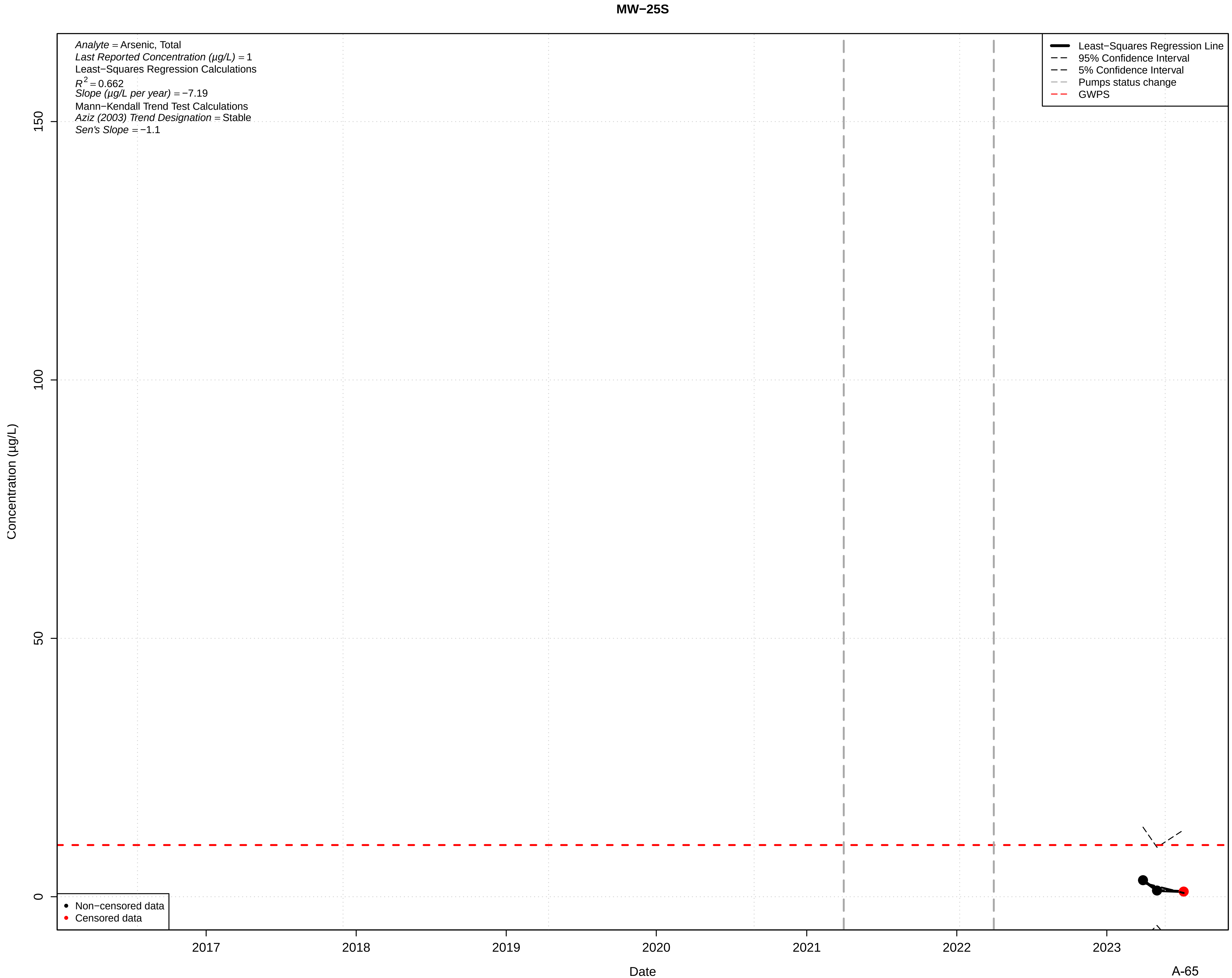

MW−24I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 2.1
Number of samples = 3
Max Conc. = 2.7
Mean Conc. = 2.47
% of Non−censored Data = 0%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

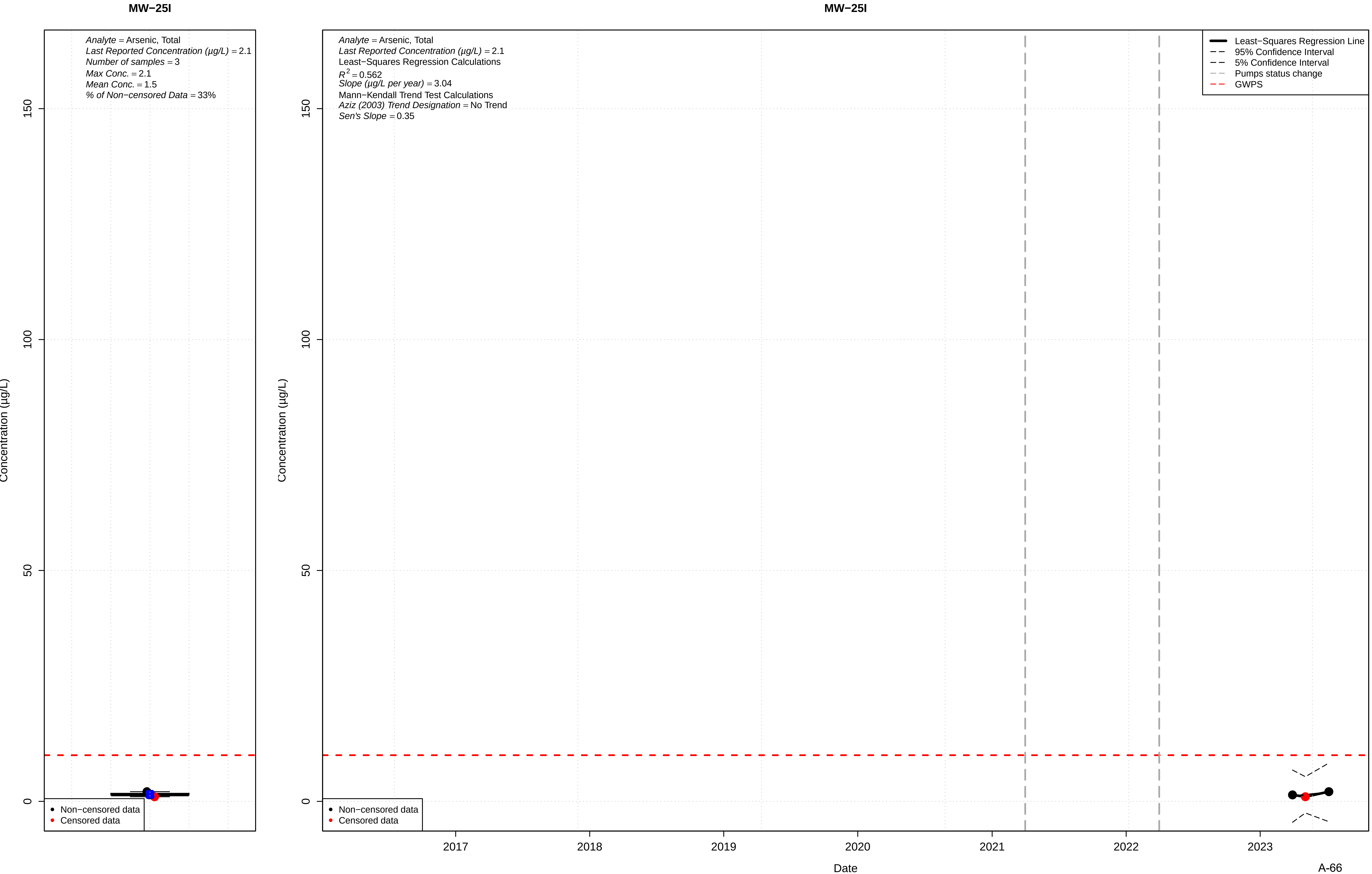

MW−24I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 2.1
Least−Squares Regression Calculations
R2 = 0.964
Slope (µg/L per year) = −2.18
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.3
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

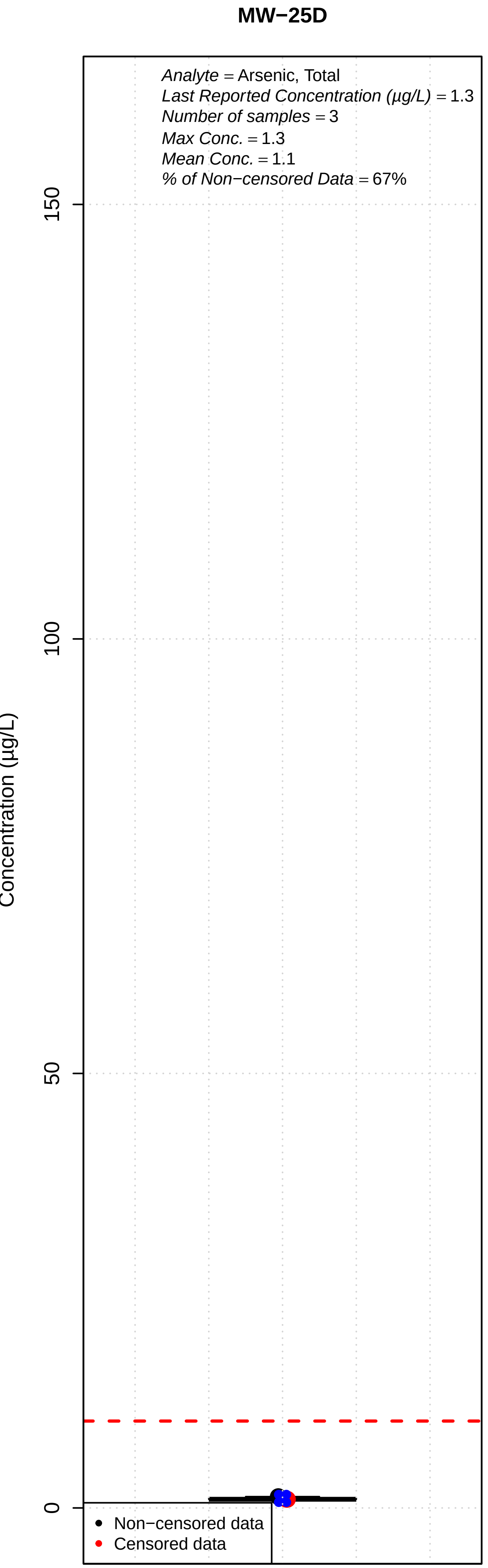

MW−24D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1.9
Number of samples = 3
Max Conc. = 2.2
Mean Conc. = 1.9
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

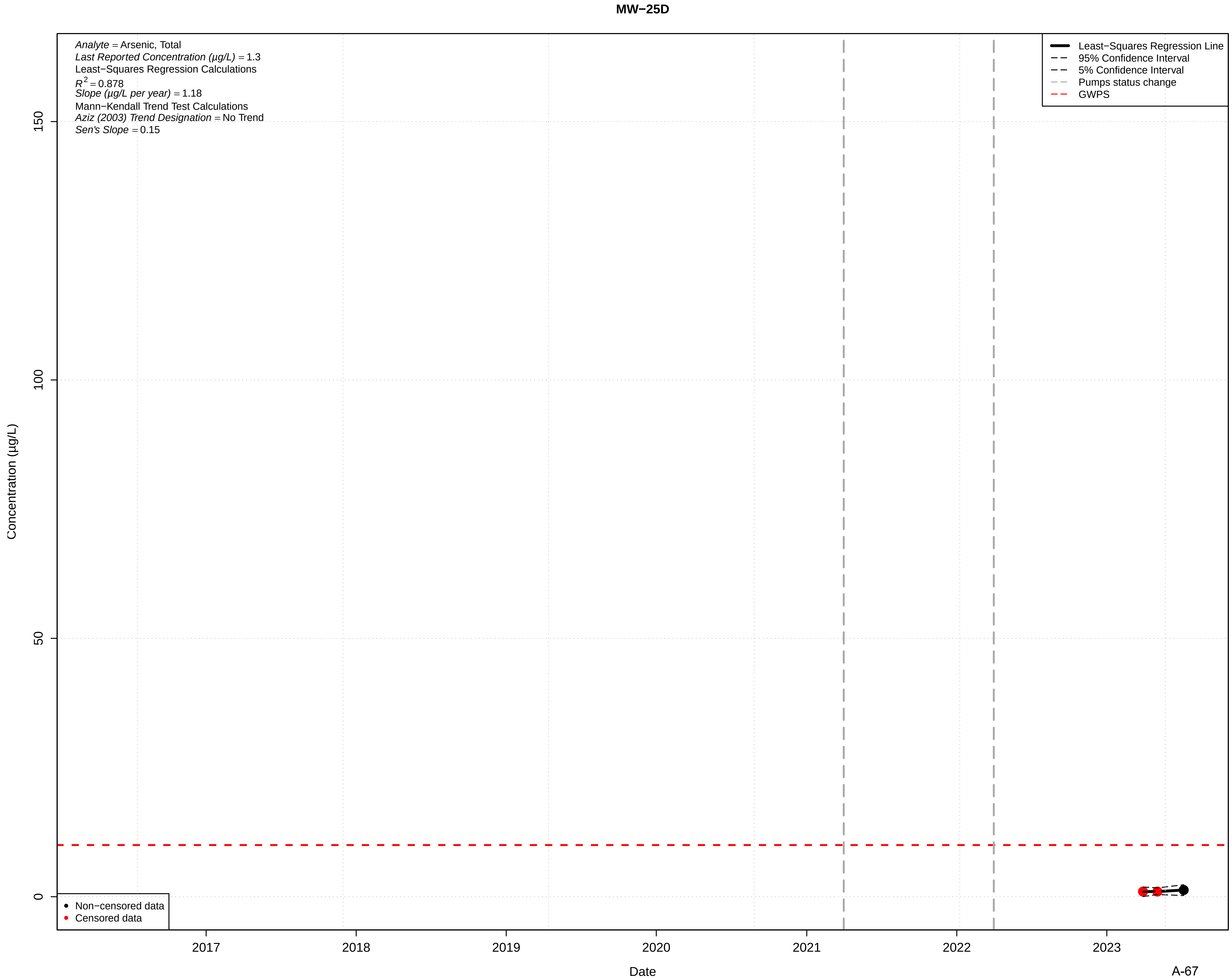

MW−24D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1.9
Least−Squares Regression Calculations
R² = 0.116
Slope (µg/L per year) = −0.707
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.15
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

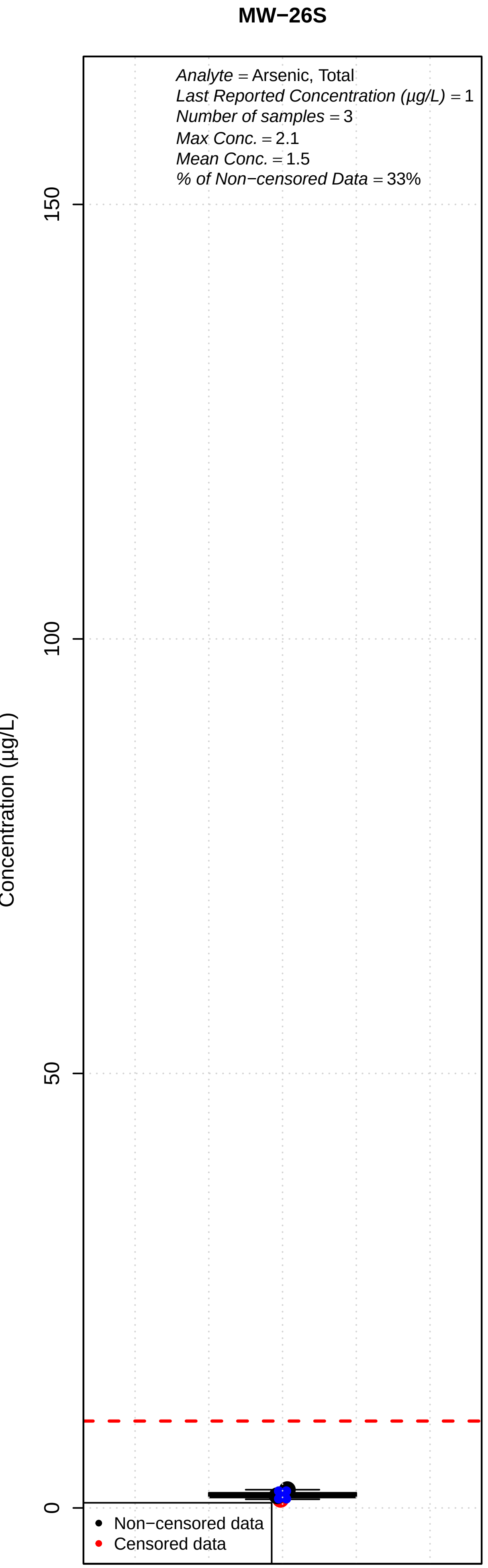

MW−25S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 3
Max Conc. = 3.2
Mean Conc. = 1.8
% of Non−censored Data = 33%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

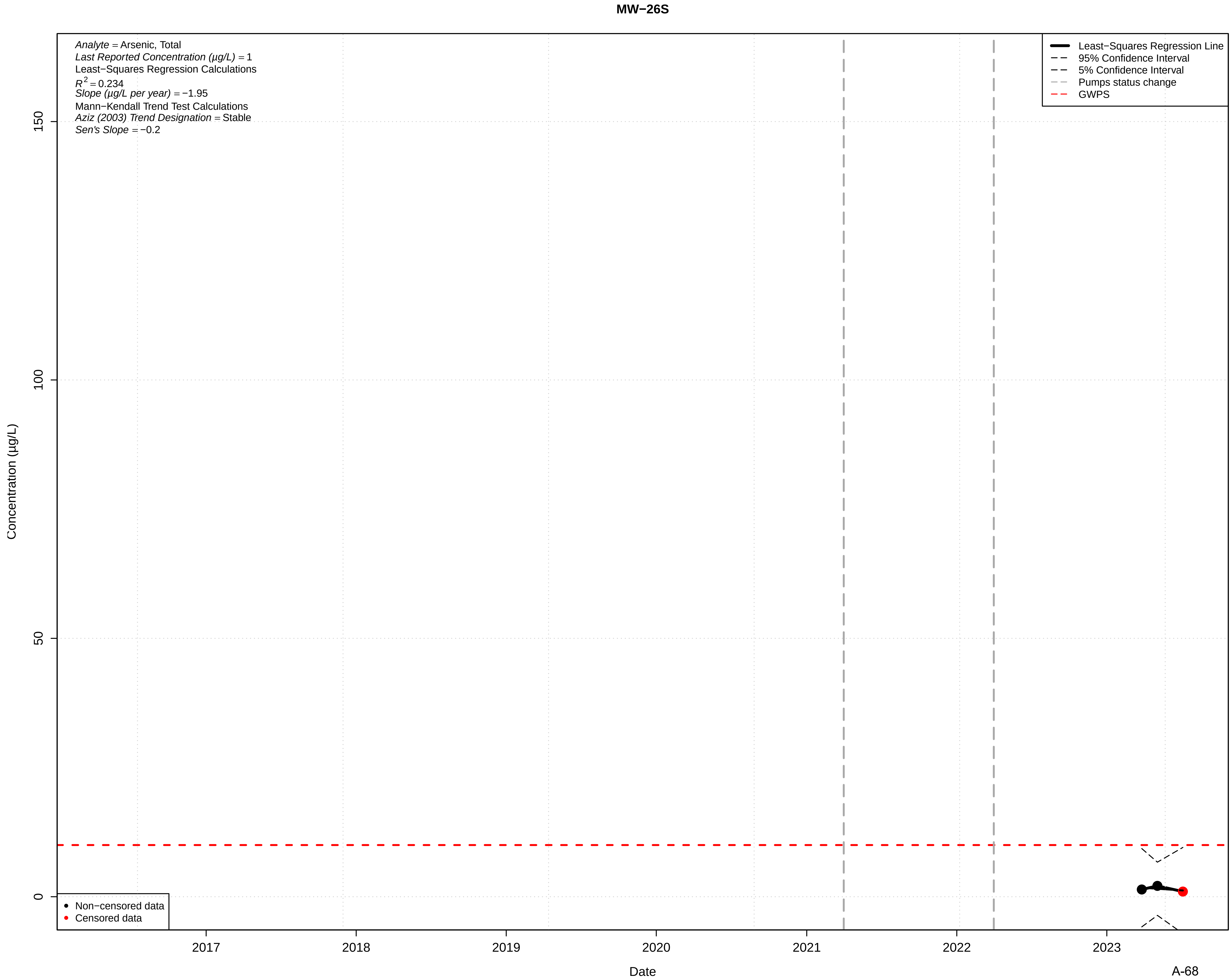

MW−25S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.662
Slope (µg/L per year) = −7.19
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −1.1
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

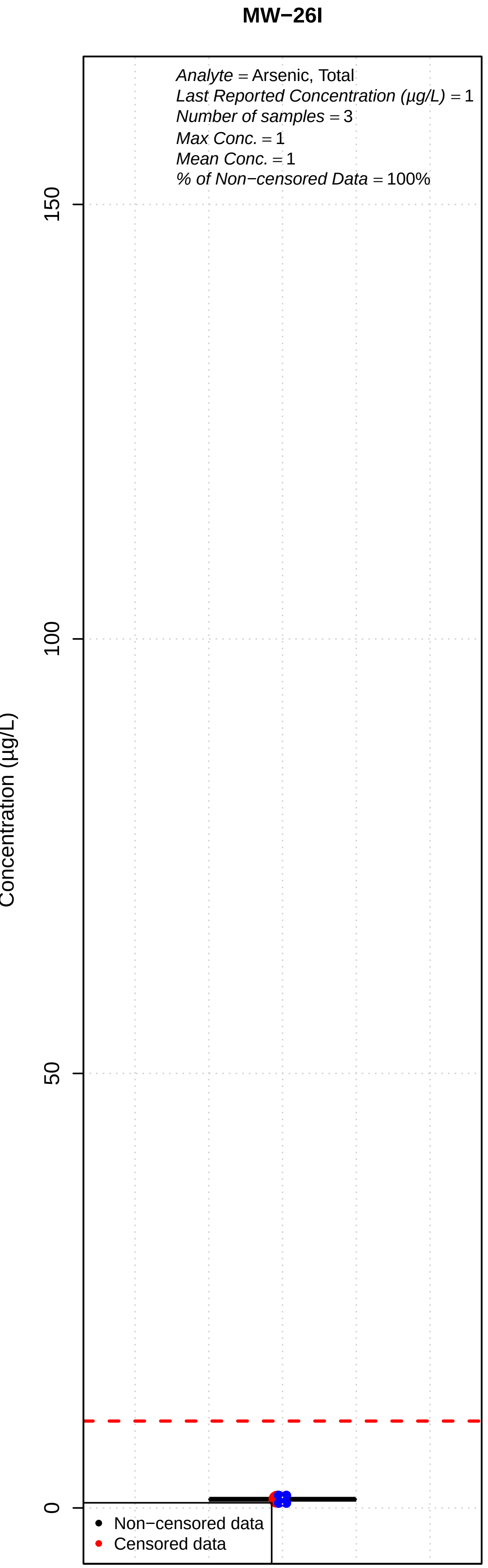

MW−25I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 2.1
Number of samples = 3
Max Conc. = 2.1
Mean Conc. = 1.5
% of Non−censored Data = 33%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
MW−25I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 2.1
Least−Squares Regression Calculations
R2 = 0.562
Slope (µg/L per year) = 3.04
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.35
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−25D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1.3
Number of samples = 3
Max Conc. = 1.3
Mean Conc. = 1.1
% of Non−censored Data = 67%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

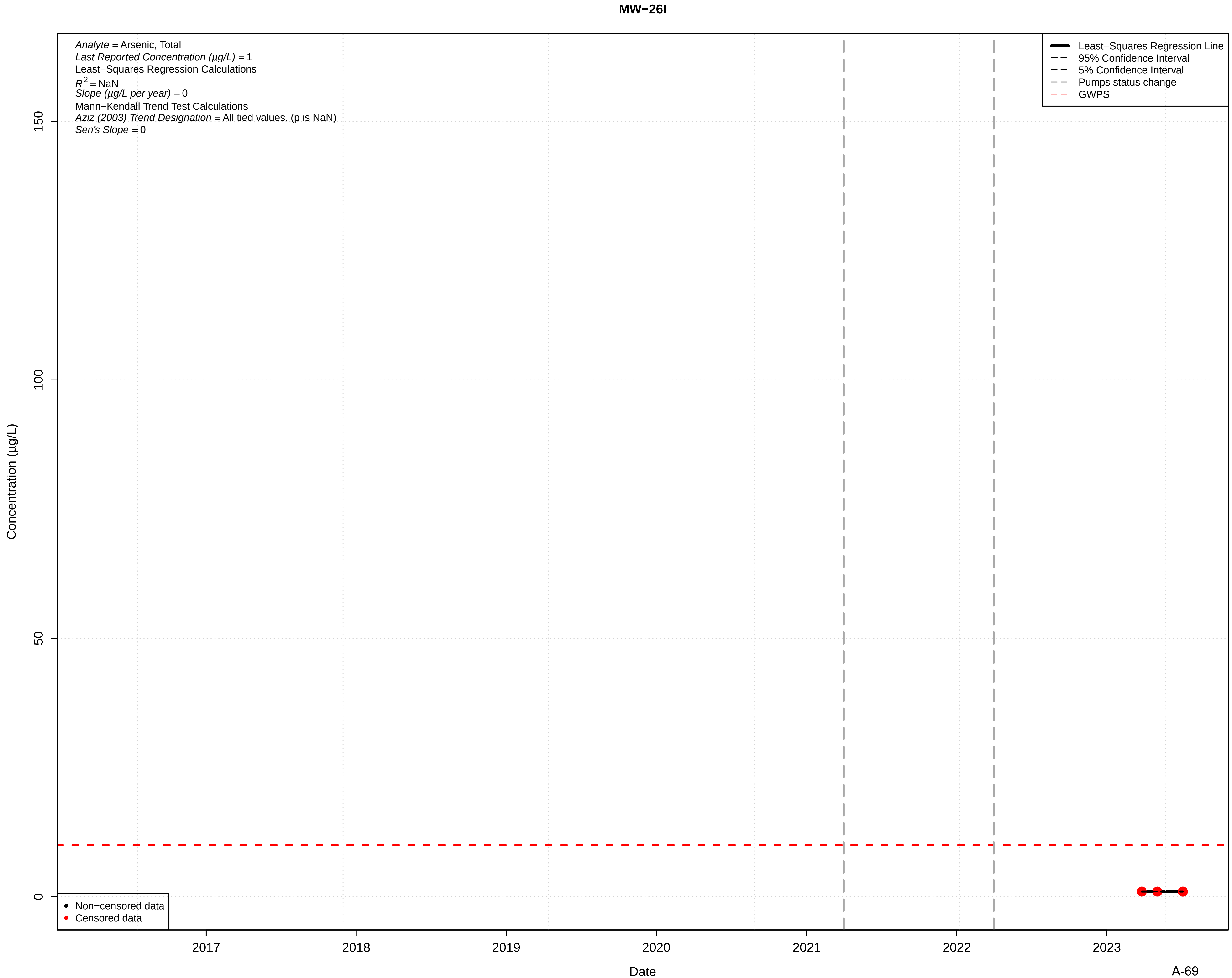

MW−25D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1.3
Least−Squares Regression Calculations
R2 = 0.878
Slope (µg/L per year) = 1.18
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.15
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−26S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 3
Max Conc. = 2.1
Mean Conc. = 1.5
% of Non−censored Data = 33%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

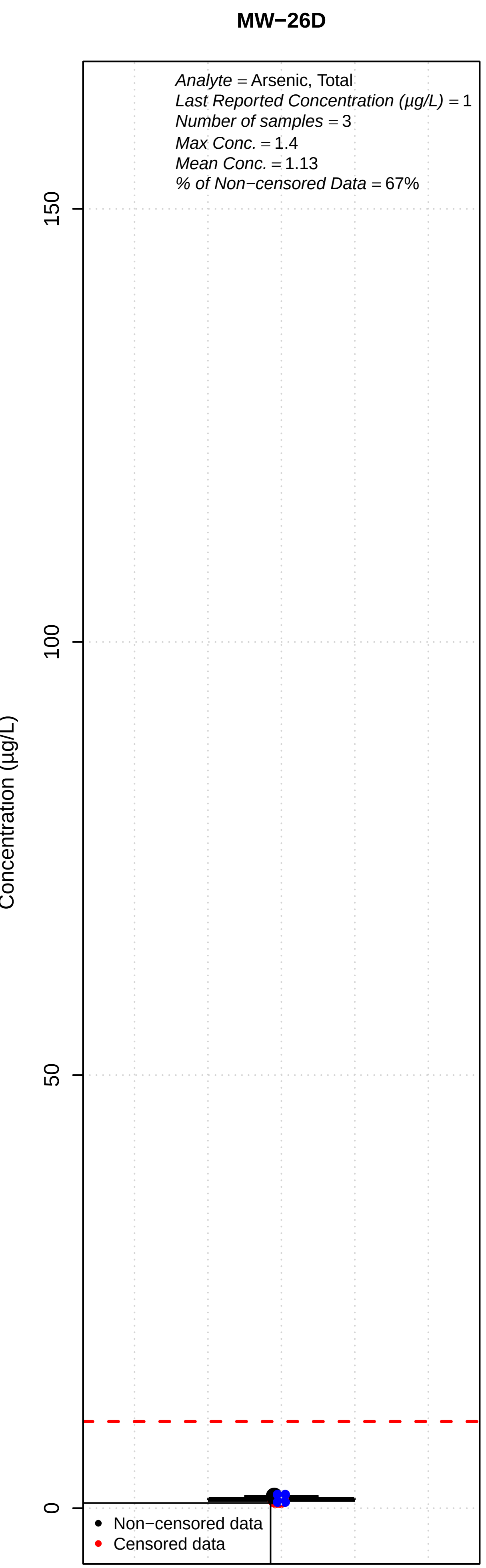

MW−26S
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.234
Slope (µg/L per year) = −1.95
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.2
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date



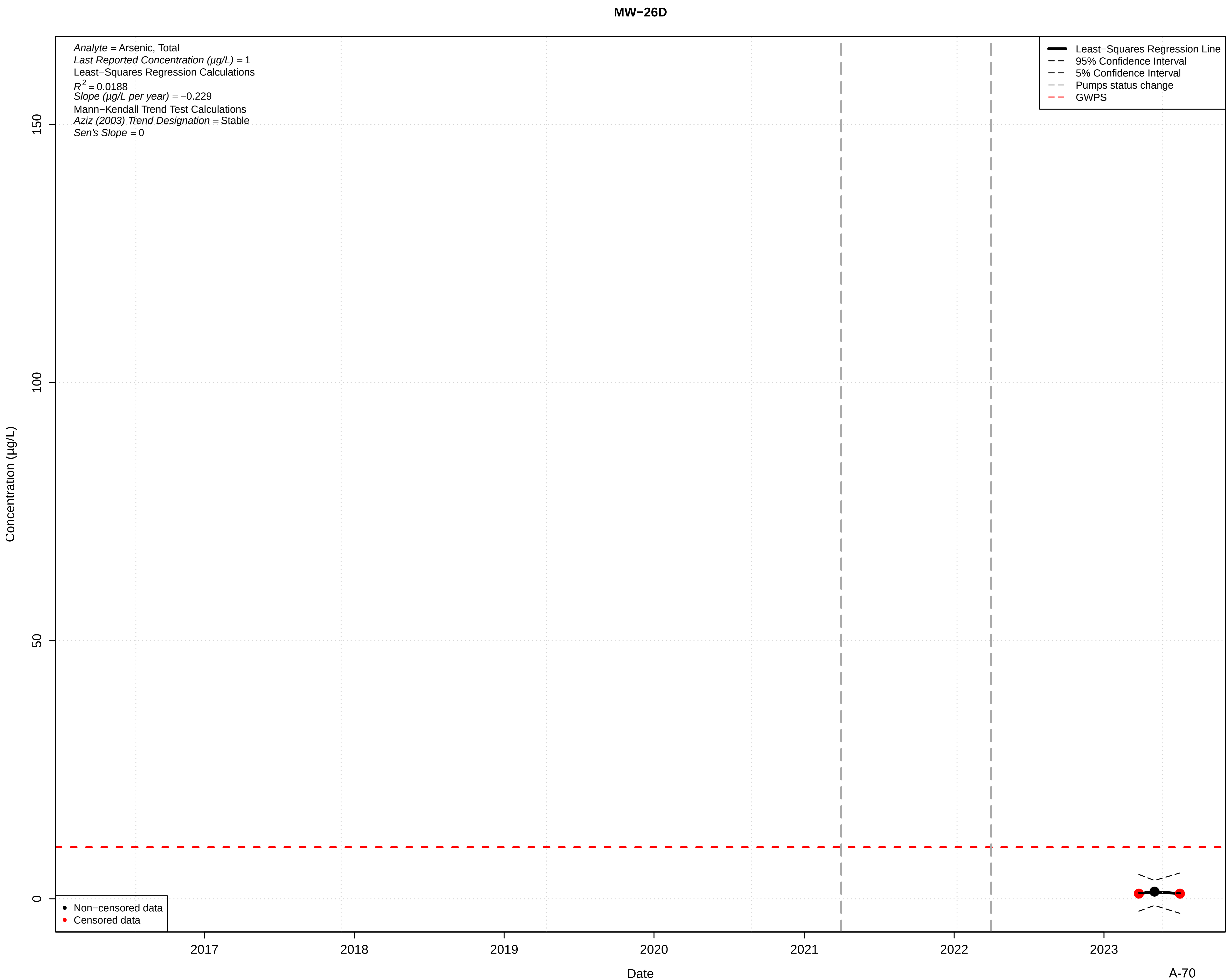
MW−26I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 3
Max Conc. = 1
Mean Conc. = 1
% of Non−censored Data = 100%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data



MW−26I
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = NaN
Slope (µg/L per year) = 0
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

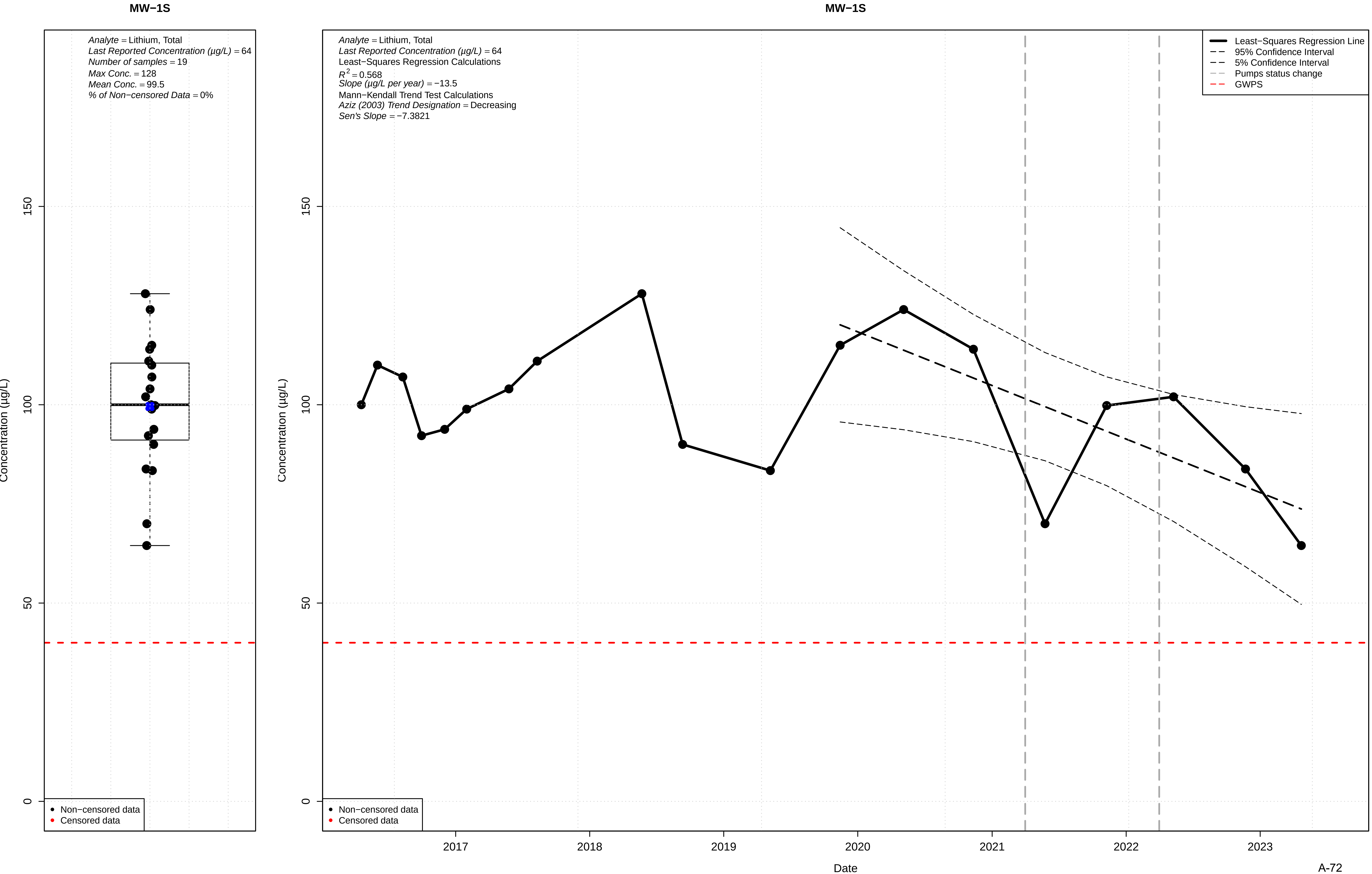


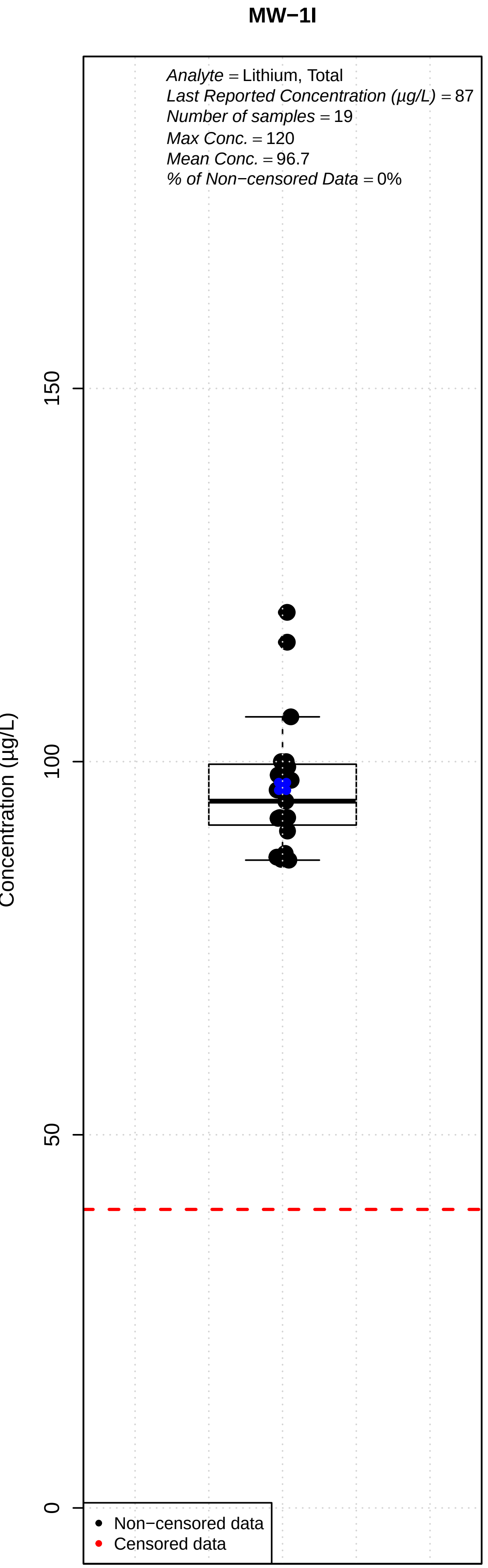
MW−26D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 3
Max Conc. = 1.4
Mean Conc. = 1.13
% of Non−censored Data = 67%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data



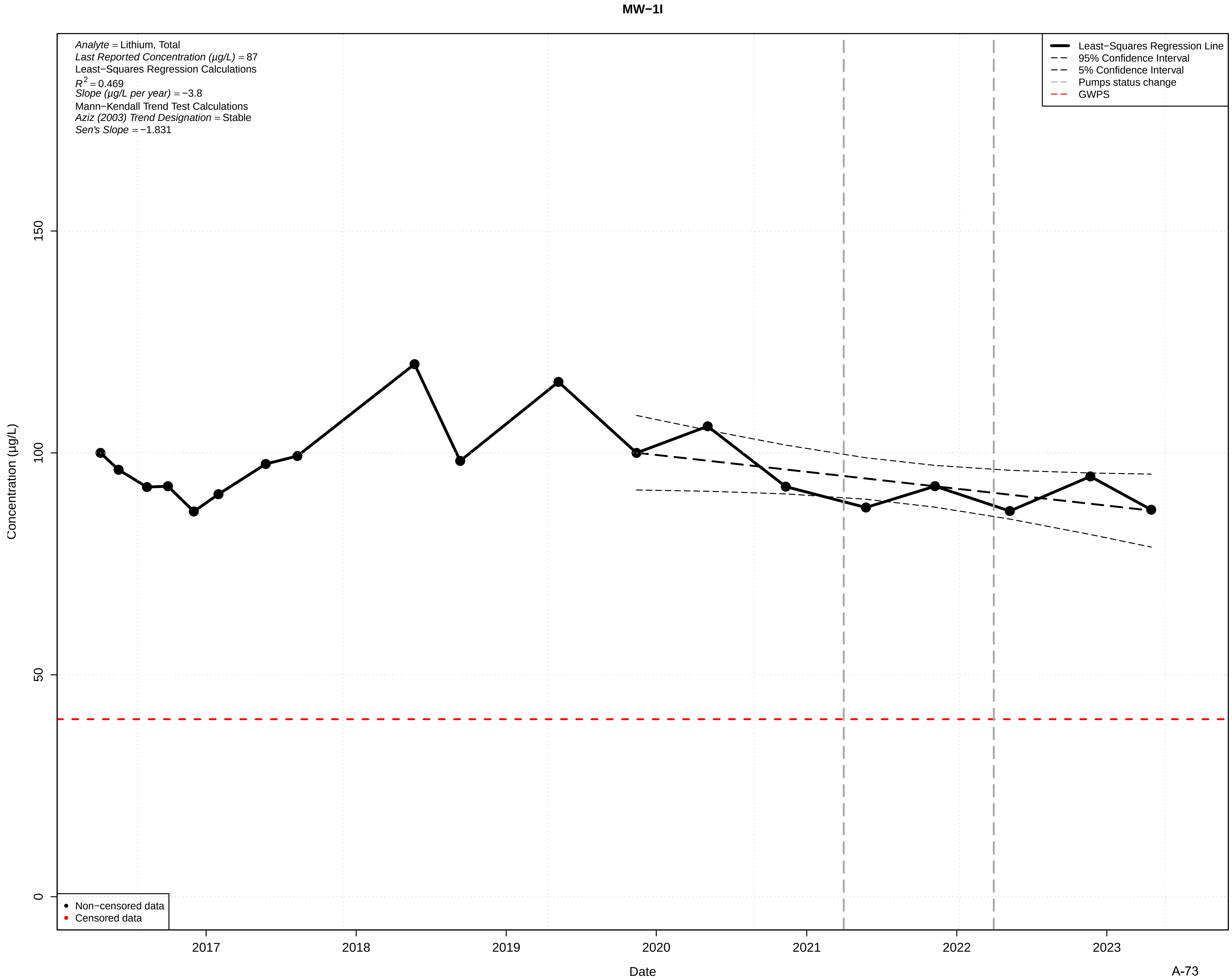
MW−26D
Analyte = Arsenic, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.0188
Slope (µg/L per year) = −0.229
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

LITHIUM

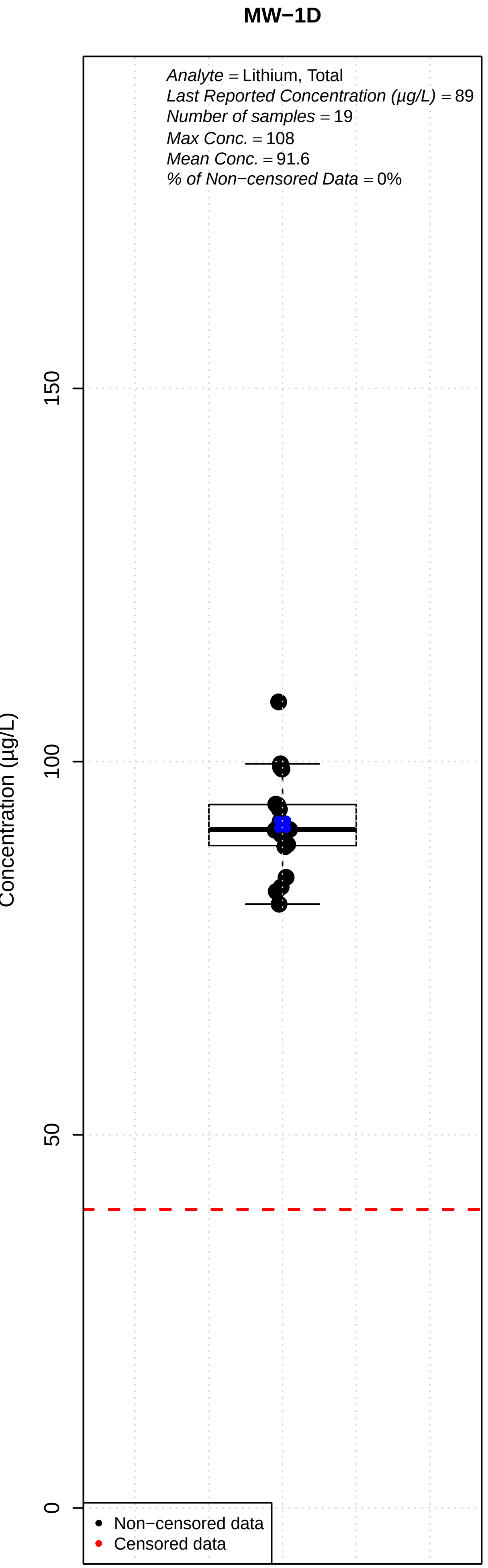

MW−1S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 64
Number of samples = 19
Max Conc. = 128
Mean Conc. = 99.5
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
MW−1S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 64
Least−Squares Regression Calculations
R2 = 0.568
Slope (µg/L per year) = −13.5
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −7.3821
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date



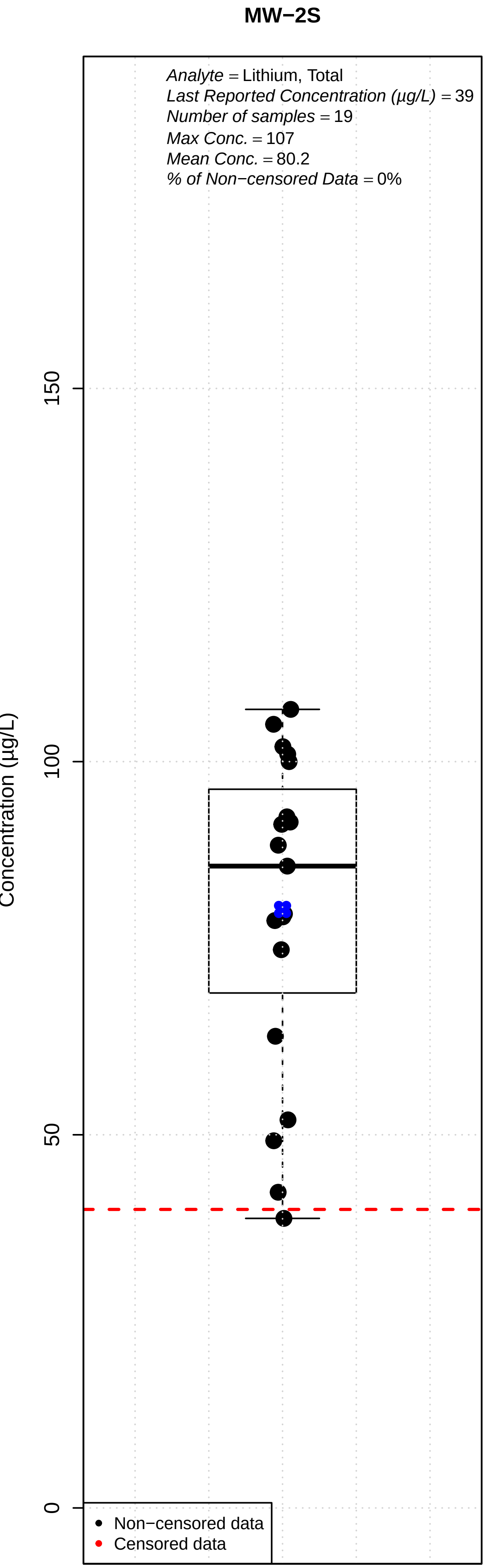
MW−1I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 87
Number of samples = 19
Max Conc. = 120
Mean Conc. = 96.7
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data



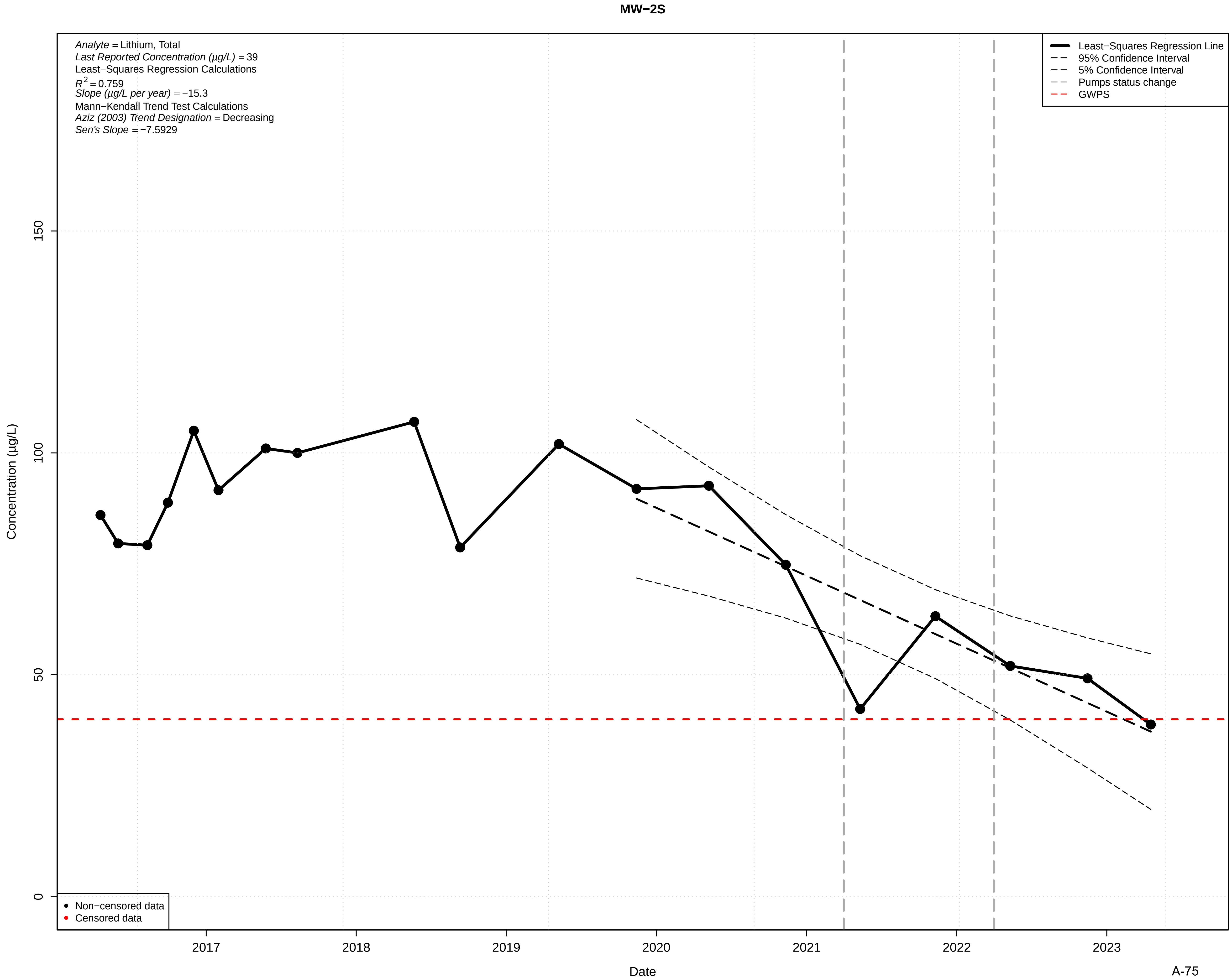
MW−1I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 87
Least−Squares Regression Calculations
R^2 = 0.469
Slope (µg/L per year) = −3.8
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −1.831
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−1D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 89
Number of samples = 19
Max Conc. = 108
Mean Conc. = 91.6
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

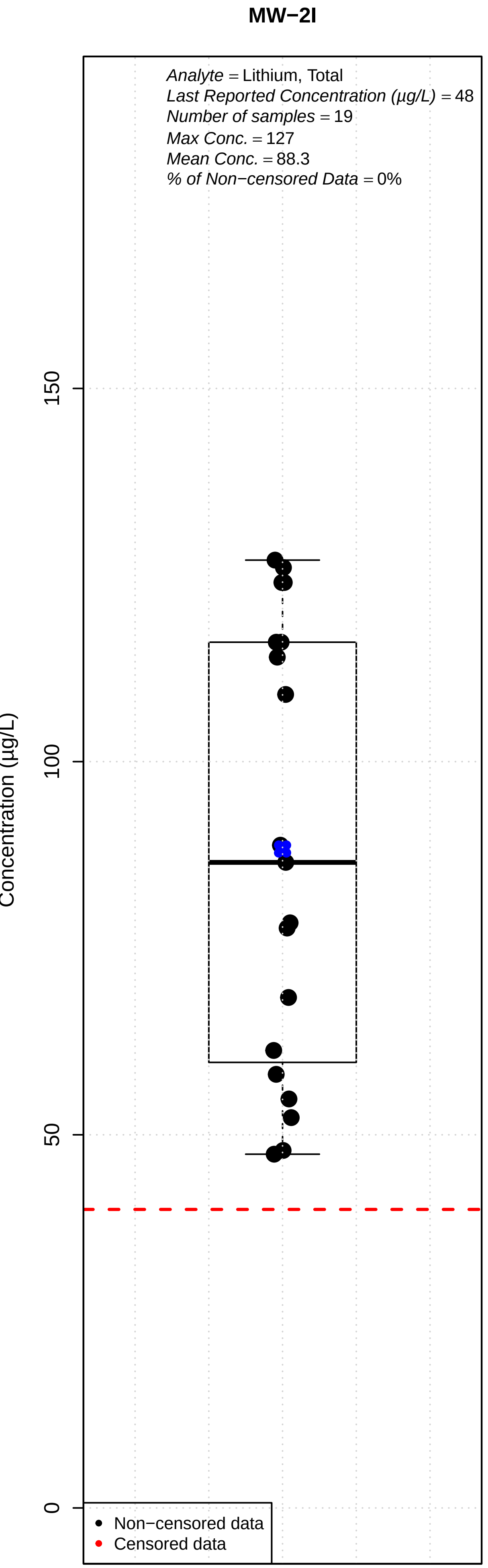

MW−1D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 89
Least−Squares Regression Calculations
R^2 = 0.13
Slope (µg/L per year) = −1.54
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.5875
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

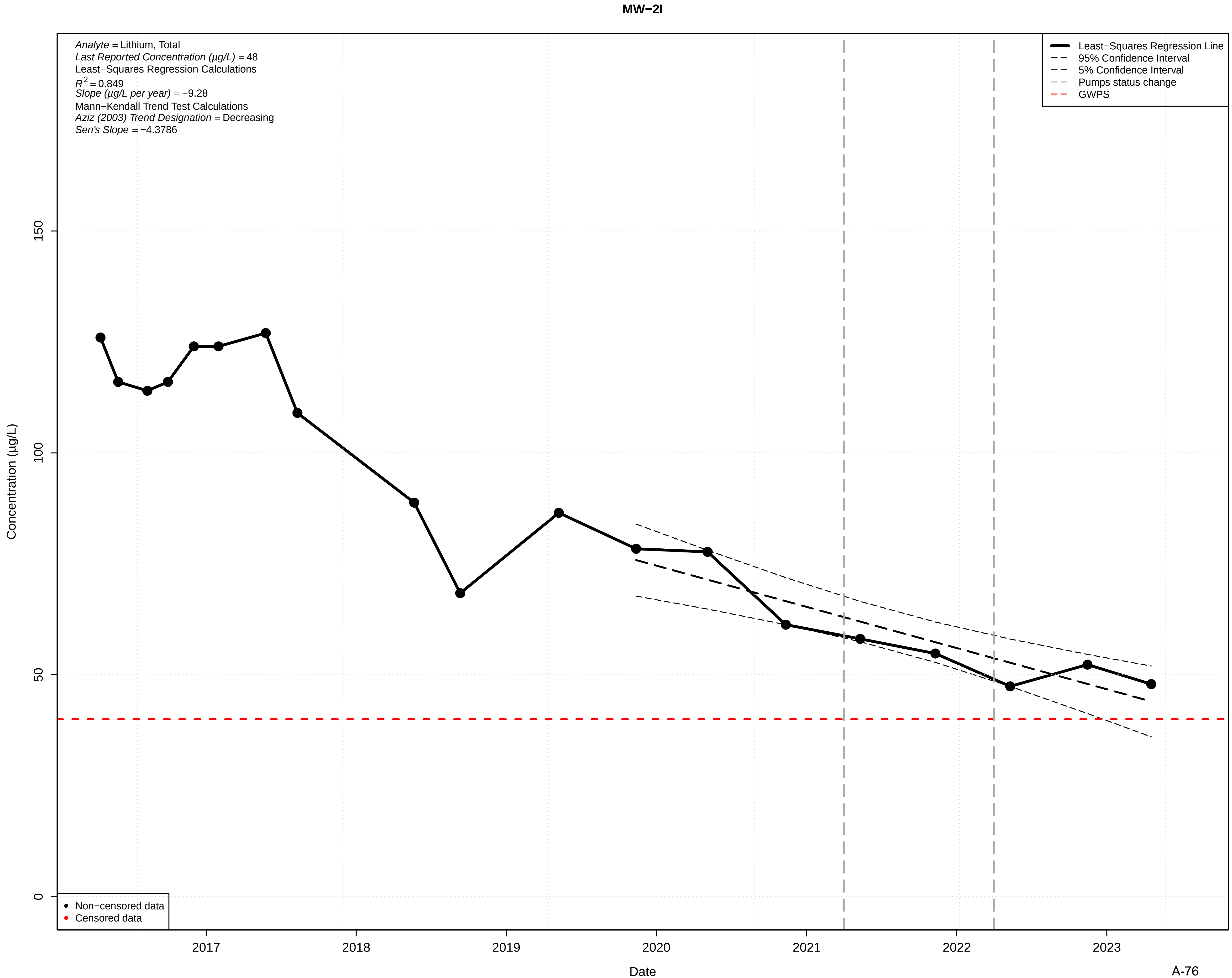


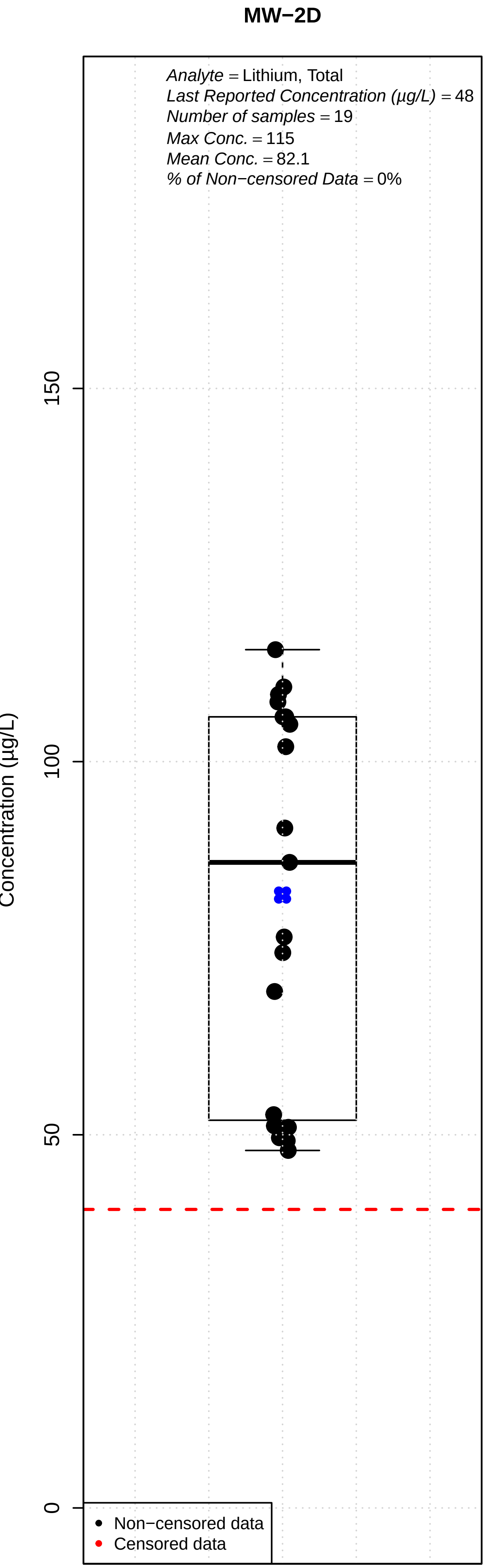
MW−2S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 39
Number of samples = 19
Max Conc. = 107
Mean Conc. = 80.2
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

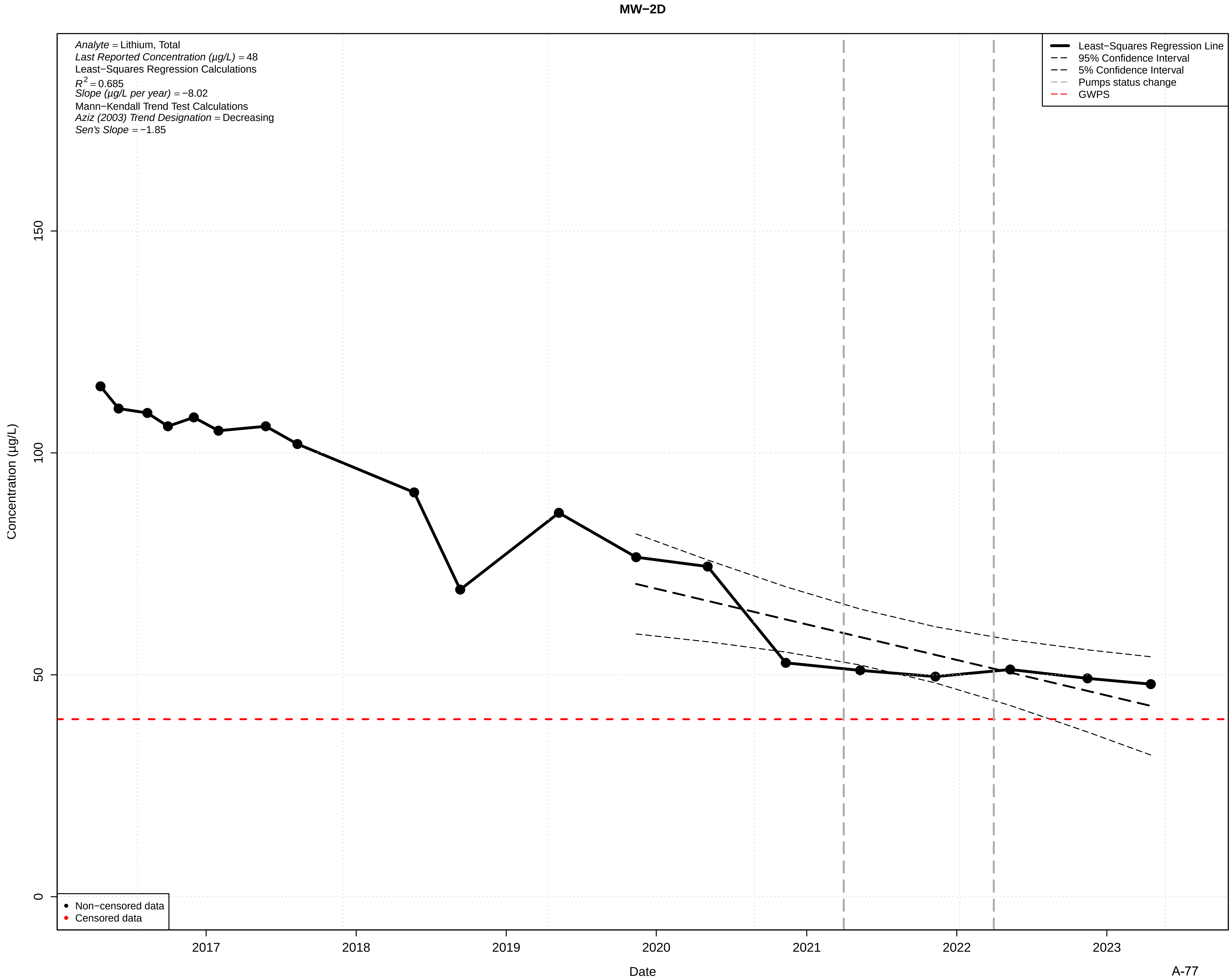


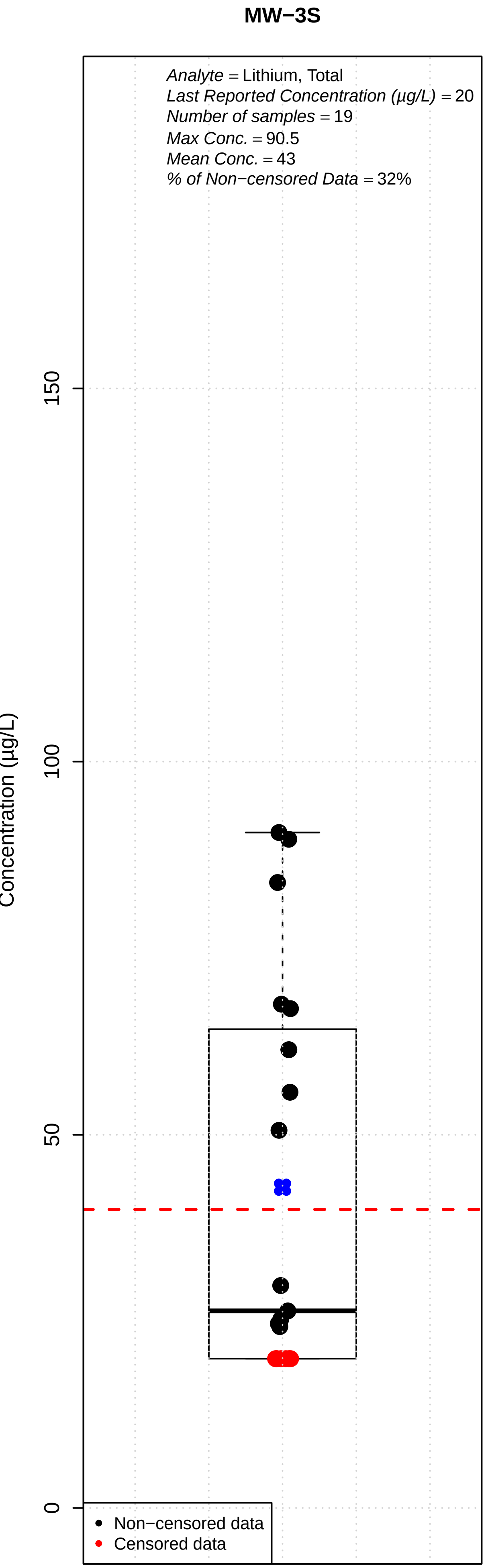
MW−2S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 39
Least−Squares Regression Calculations
R^2 = 0.759
Slope (µg/L per year) = −15.3
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −7.5929
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

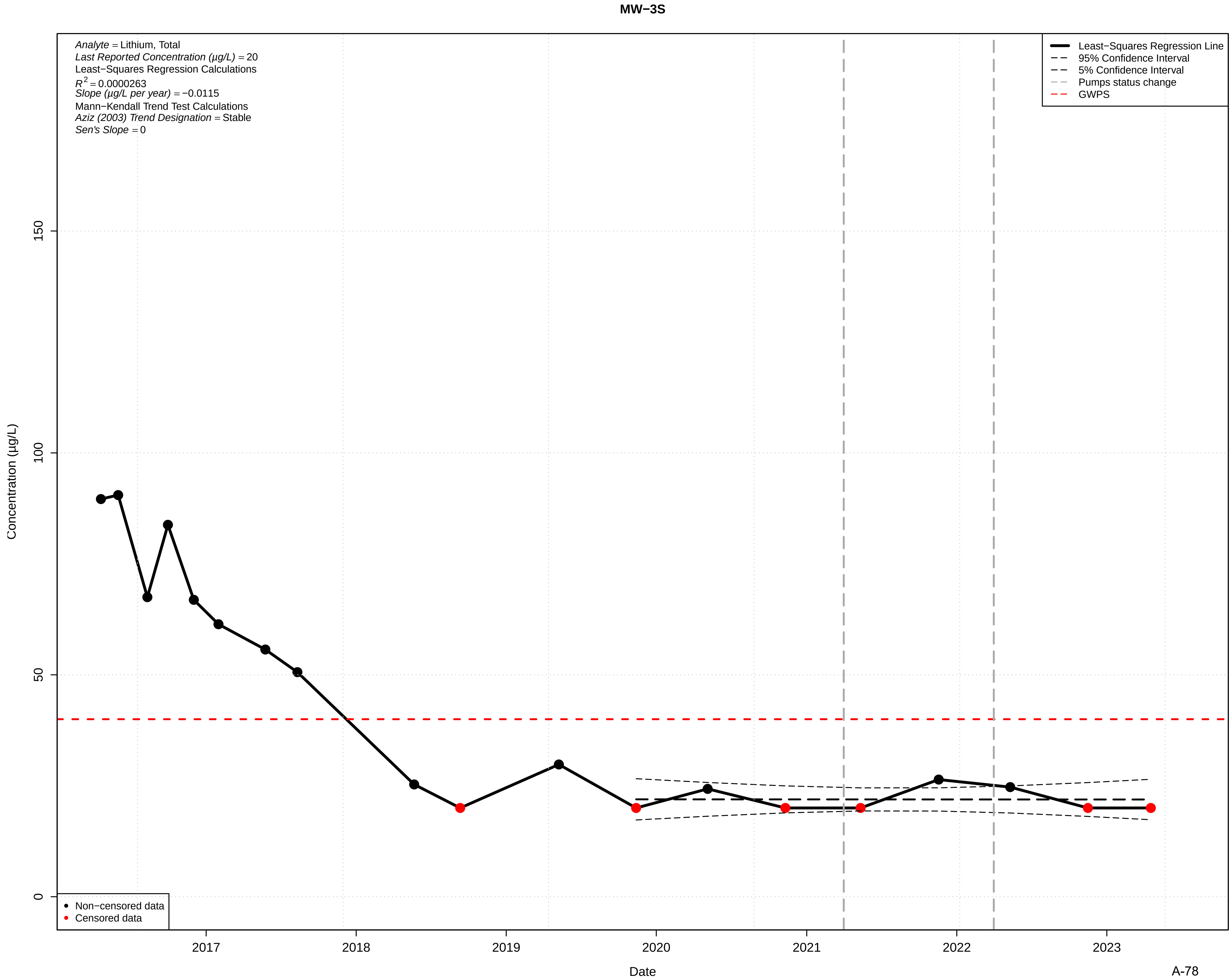

MW−2I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 48
Number of samples = 19
Max Conc. = 127
Mean Conc. = 88.3
% of Non−censored Data = 0%
Concentration (µg/L)
Non−censored data
Censored data

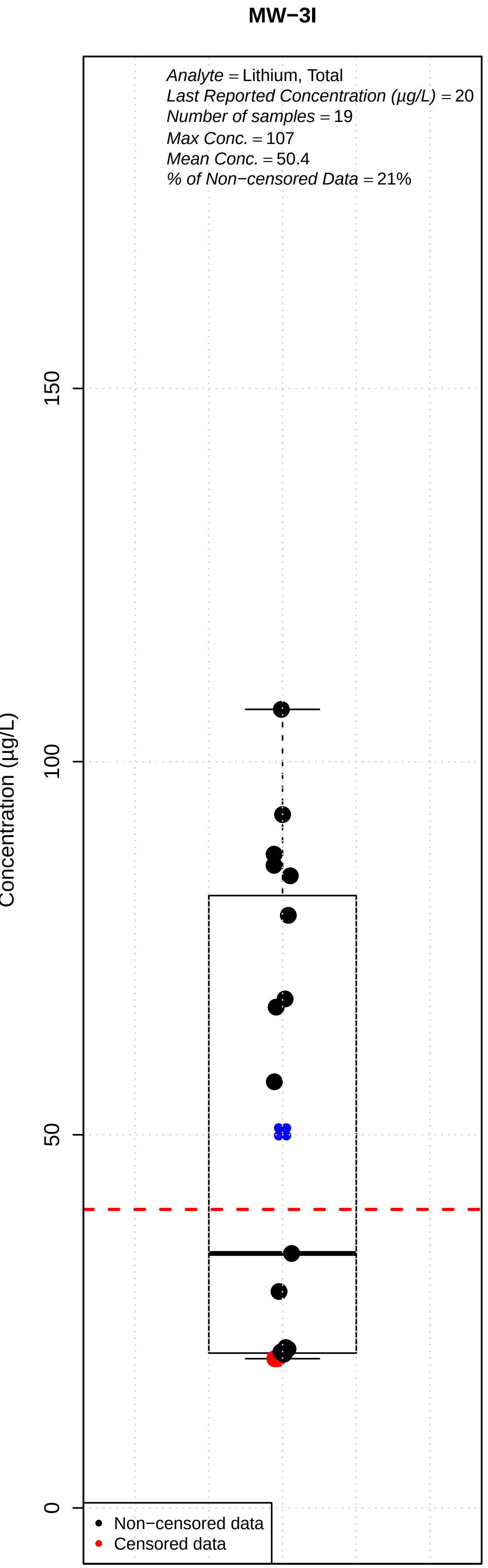

MW−2I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 48
Least−Squares Regression Calculations
R2 = 0.849
Slope (µg/L per year) = −9.28
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −4.3786
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Date
Non−censored data
Censored data

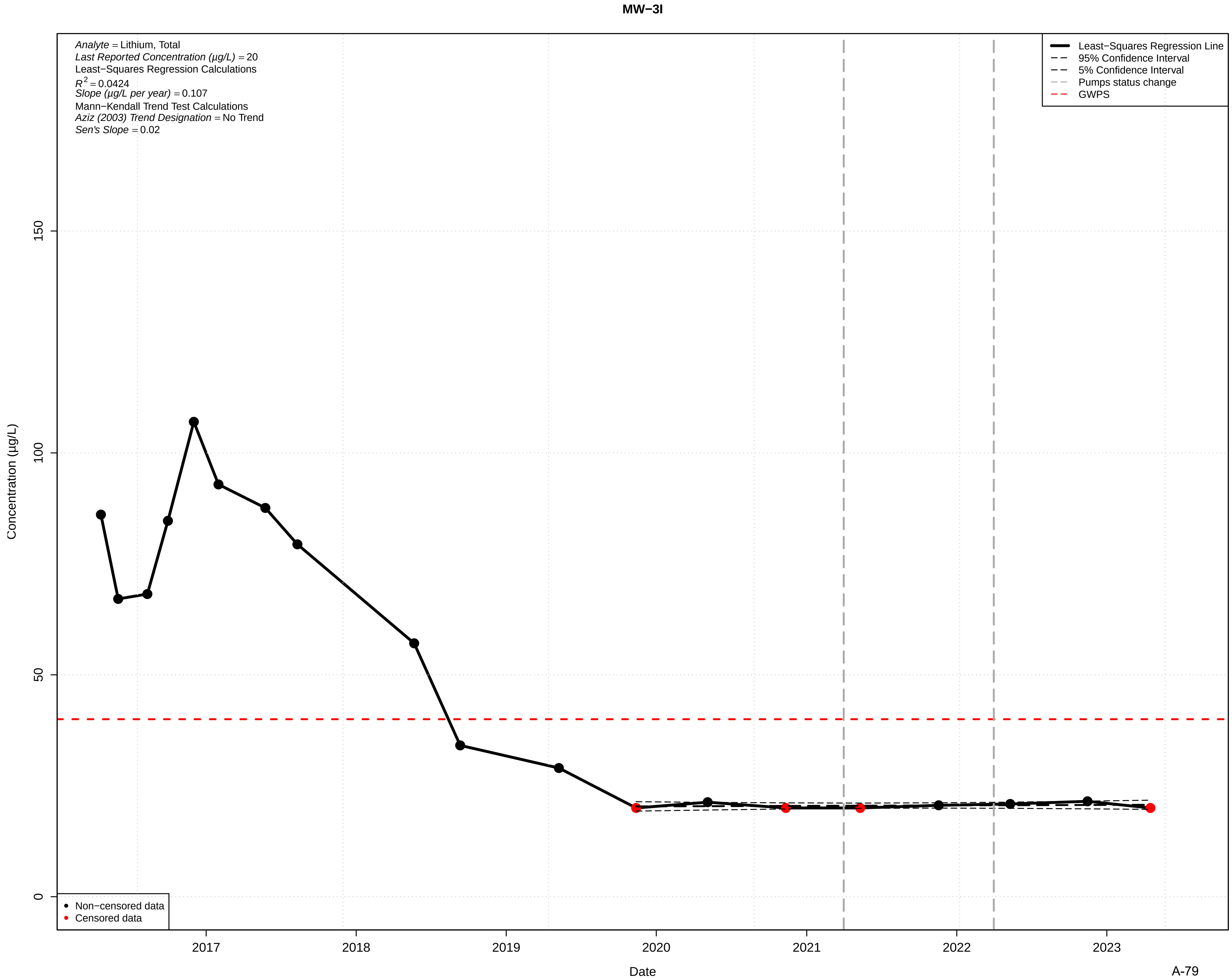

MW−2D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 48
Number of samples = 19
Max Conc. = 115
Mean Conc. = 82.1
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

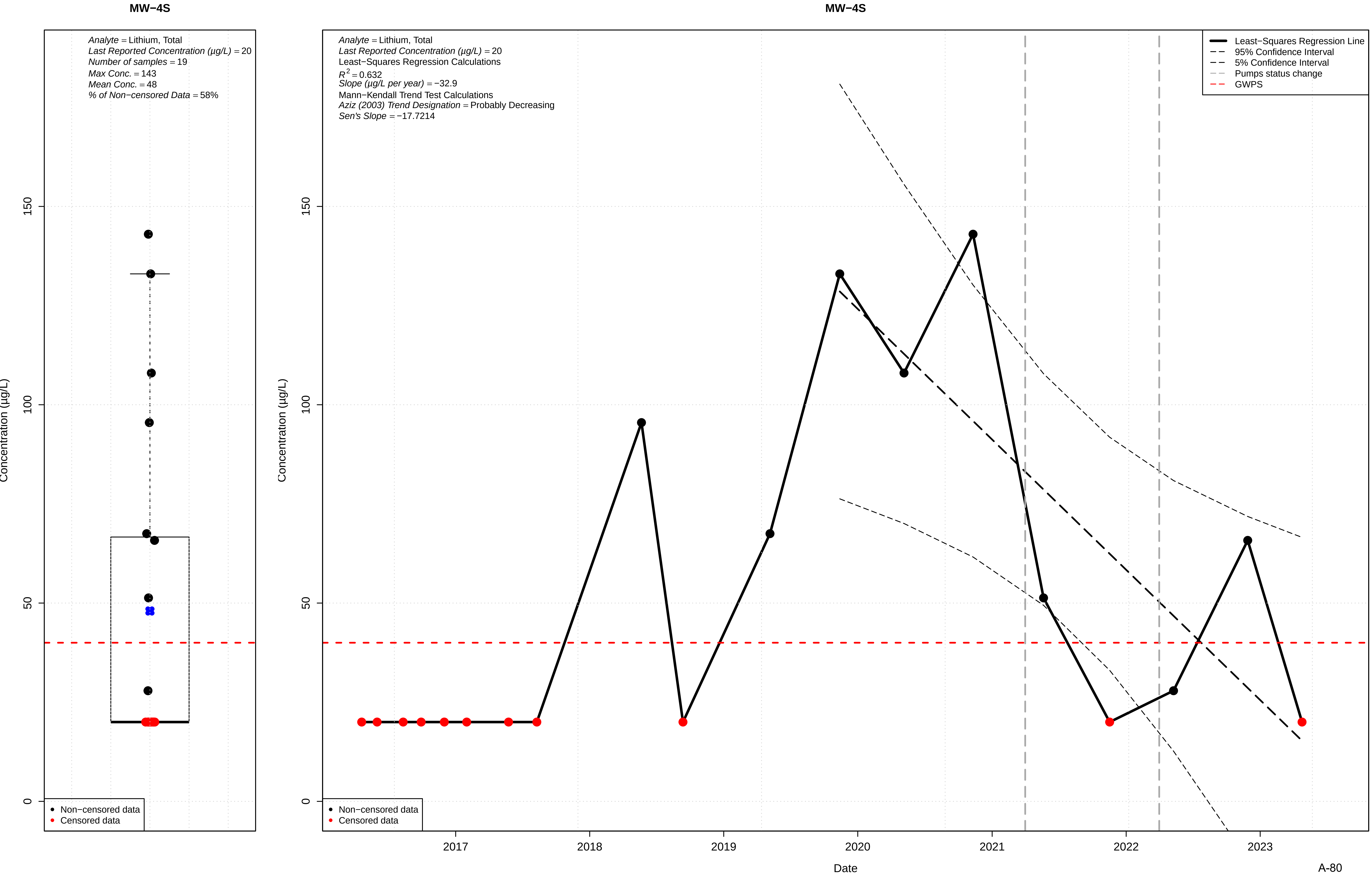

MW−2D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 48
Least−Squares Regression Calculations
R^2 = 0.685
Slope (µg/L per year) = −8.02
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −1.85
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

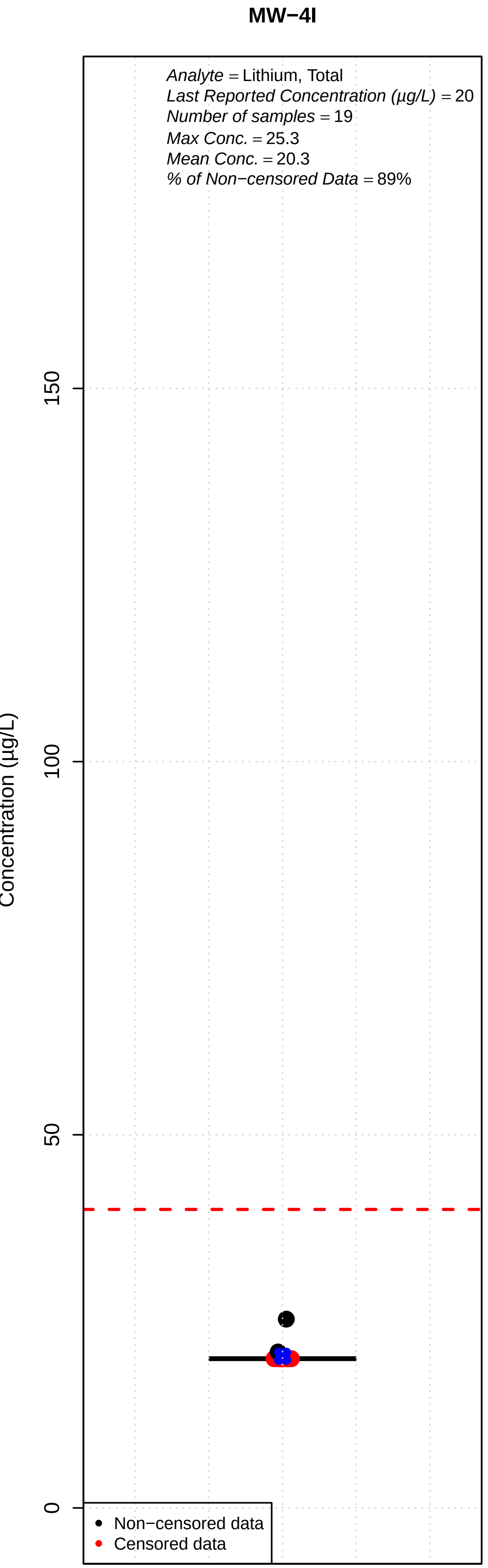

MW−3S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 19
Max Conc. = 90.5
Mean Conc. = 43
% of Non−censored Data = 32%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

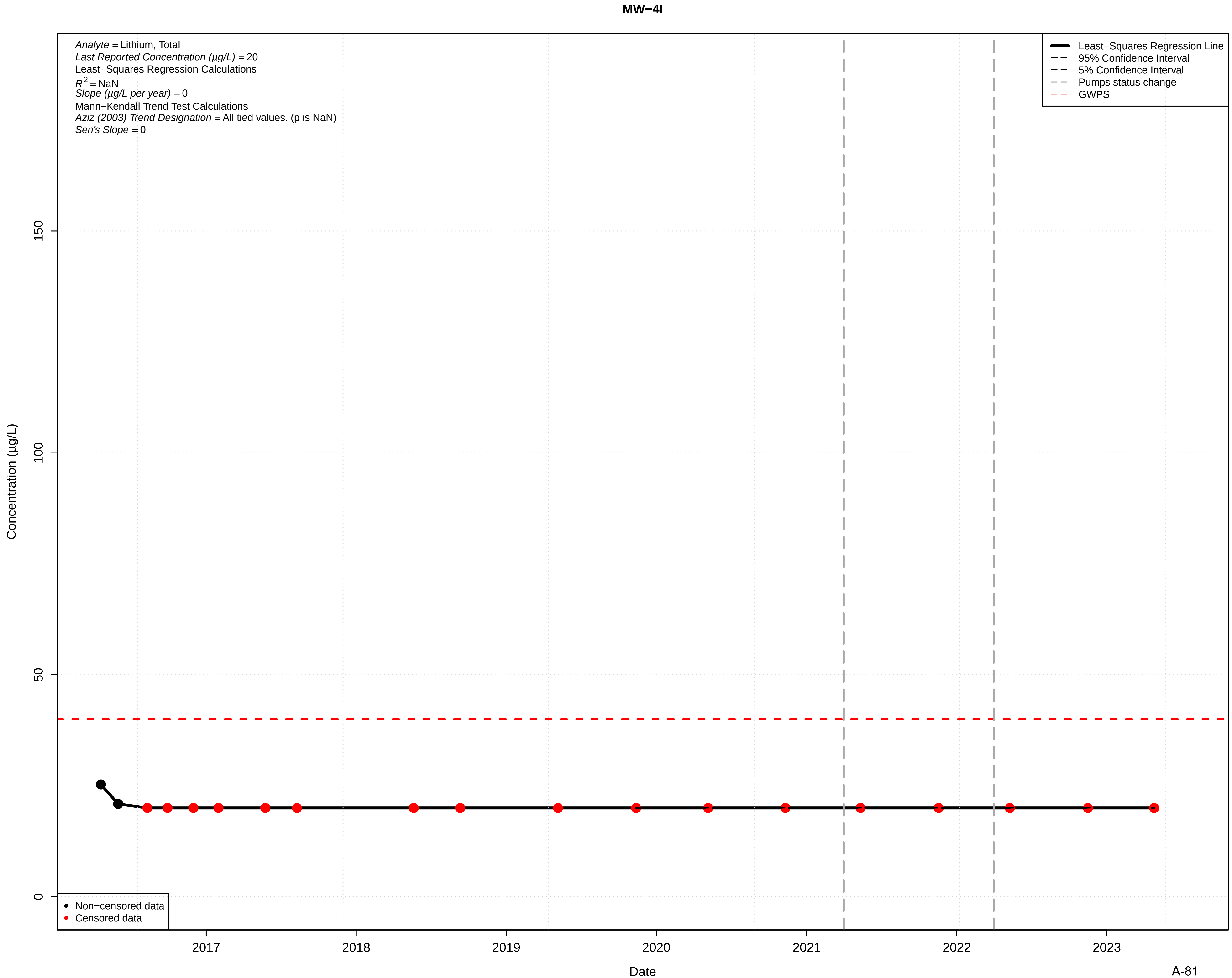

MW−3S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R^2 = 0.0000263
Slope (µg/L per year) = −0.0115
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

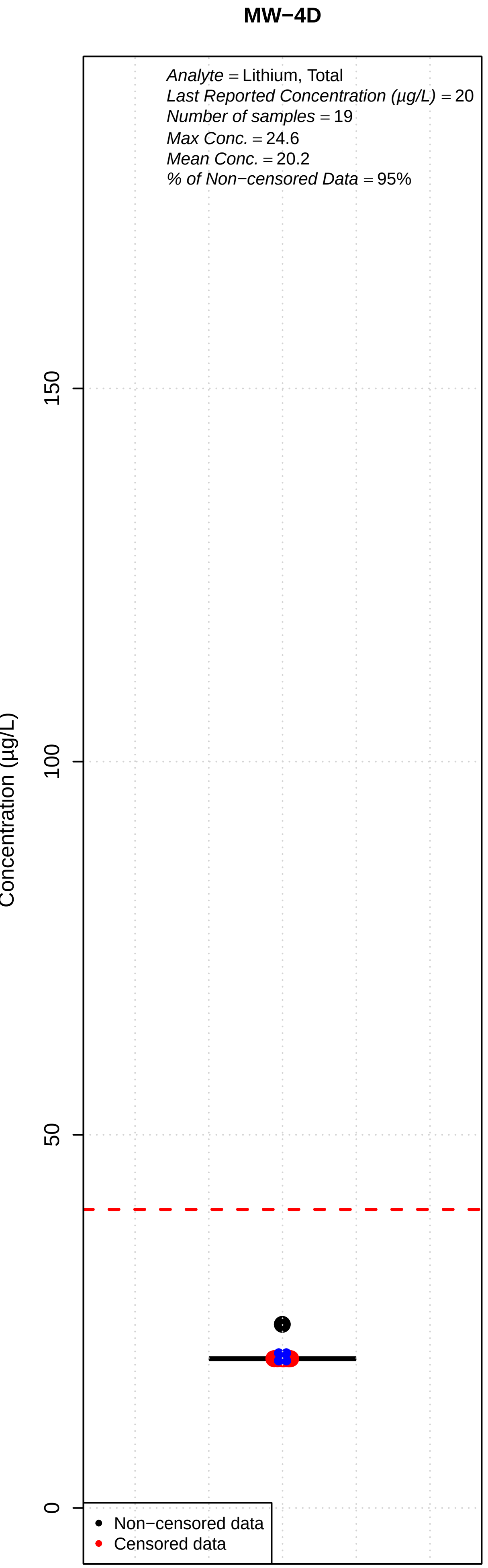

MW−3I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 19
Max Conc. = 107
Mean Conc. = 50.4
% of Non−censored Data = 21%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

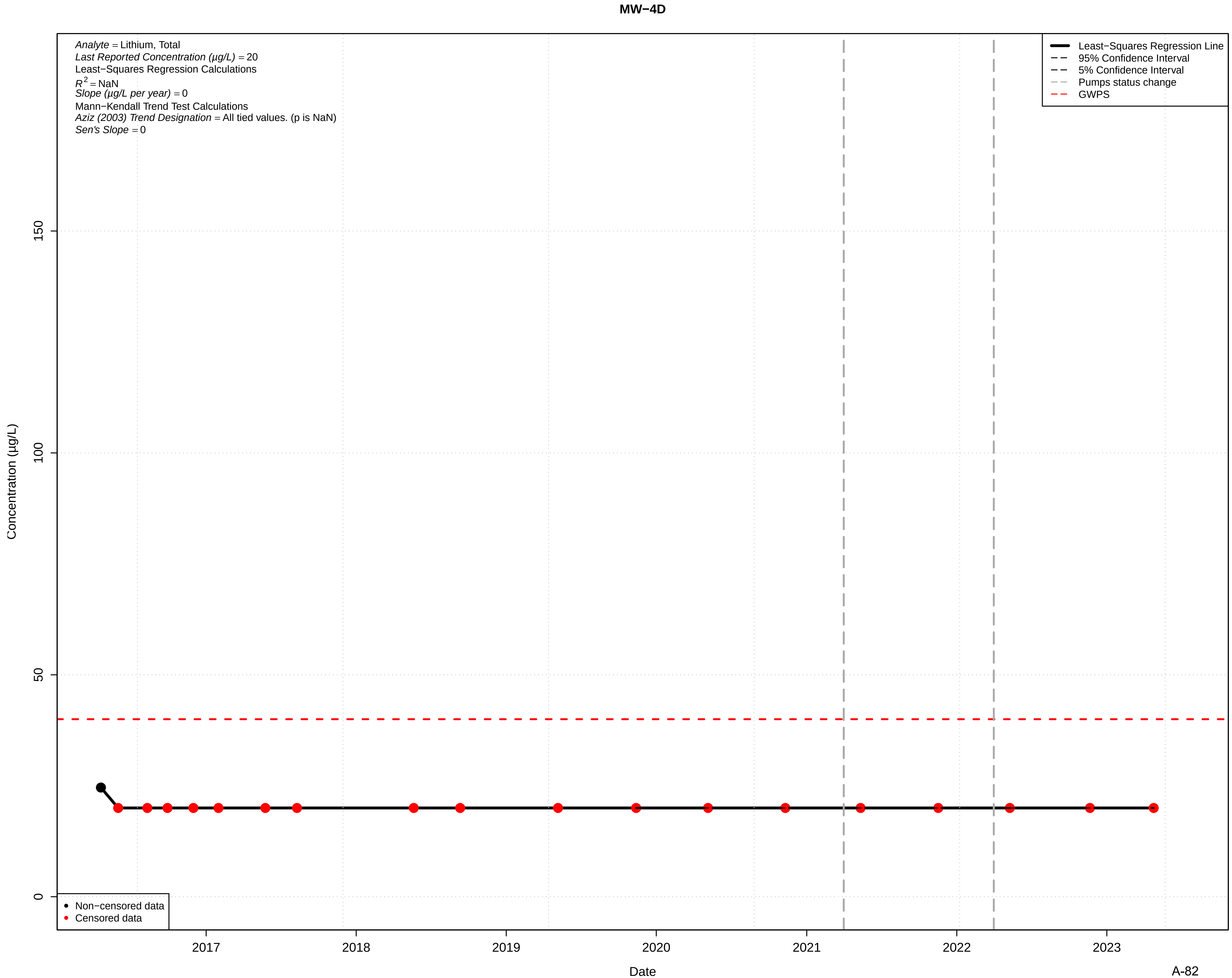

MW−3I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R^2 = 0.0424
Slope (µg/L per year) = 0.107
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.02
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

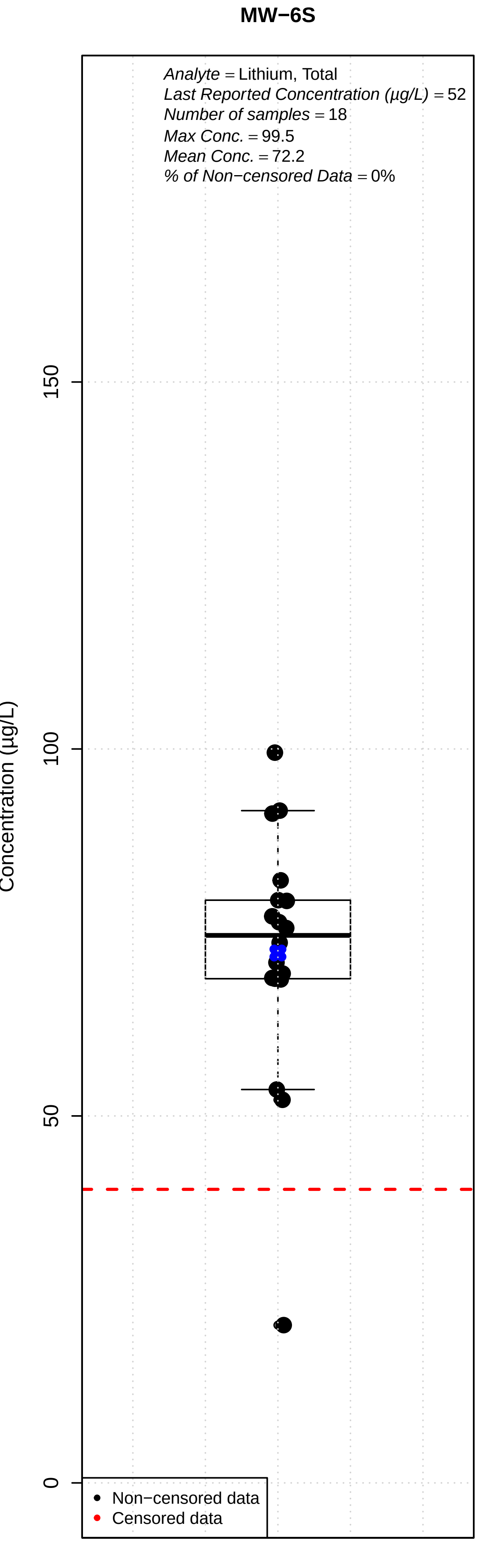

MW−4S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 19
Max Conc. = 143
Mean Conc. = 48
% of Non−censored Data = 58%
Non−censored data
Censored data
Concentration (µg/L)
MW−4S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R2 = 0.632
Slope (µg/L per year) = −32.9
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Probably Decreasing
Sen's Slope = −17.7214
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Non−censored data
Censored data
Concentration (µg/L)
Date


MW−4I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 19
Max Conc. = 25.3
Mean Conc. = 20.3
% of Non−censored Data = 89%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

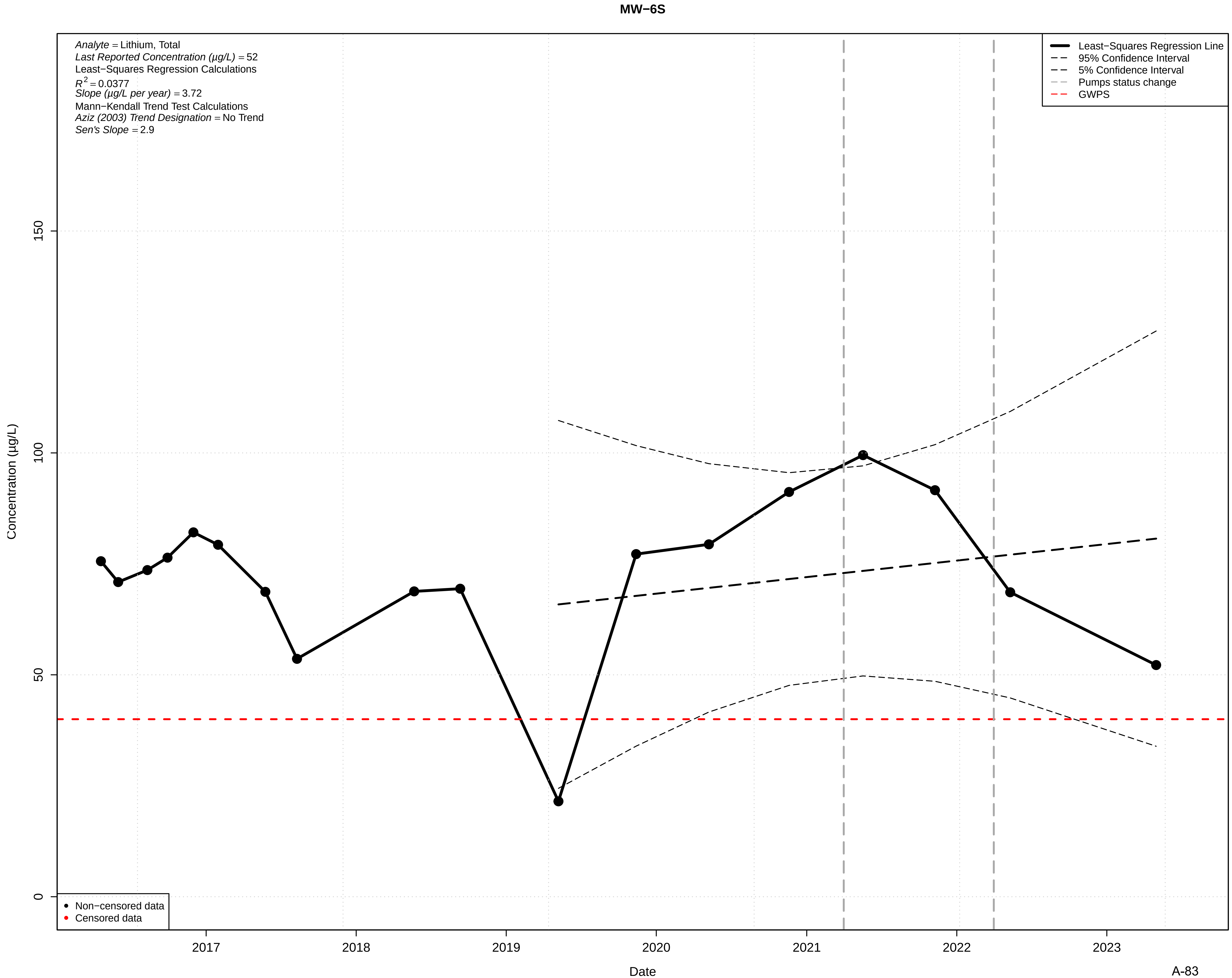

MW−4I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R2 = NaN
Slope (µg/L per year) = 0
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−4D
Analyte = Lithium, Total
Last Reported Concentration (μg/L) = 20
Number of samples = 19
Max Conc. = 24.6
Mean Conc. = 20.2
% of Non−censored Data = 95%
Concentration (μg/L)
0
50
100
150
Non−censored data
Censored data

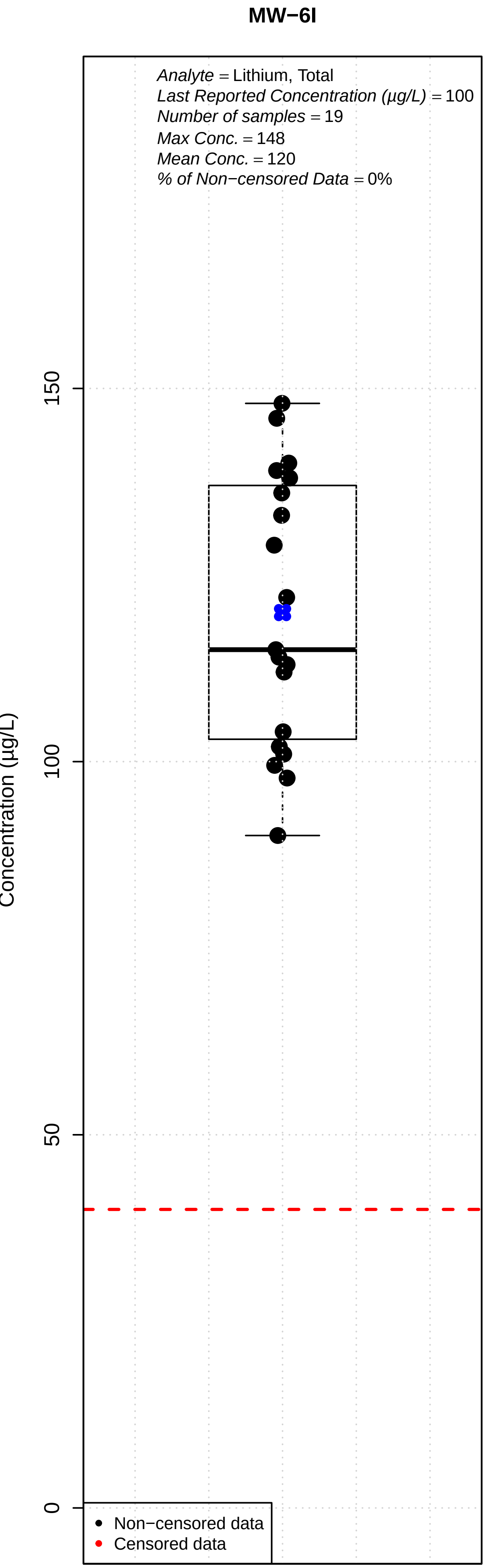

MW−4D
Analyte = Lithium, Total
Last Reported Concentration (μg/L) = 20
Least−Squares Regression Calculations
R^2 = NaN
Slope (μg/L per year) = 0
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (μg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

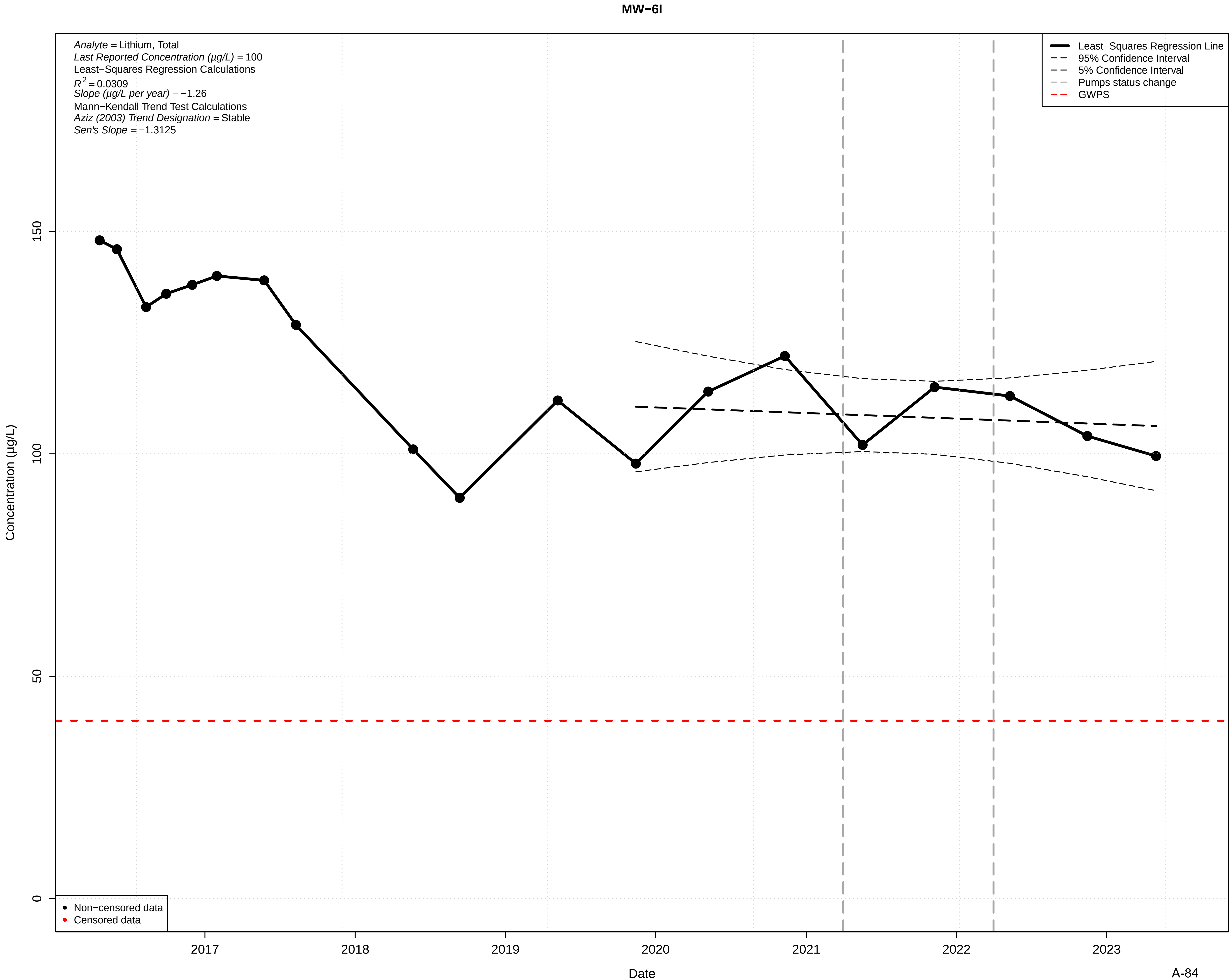


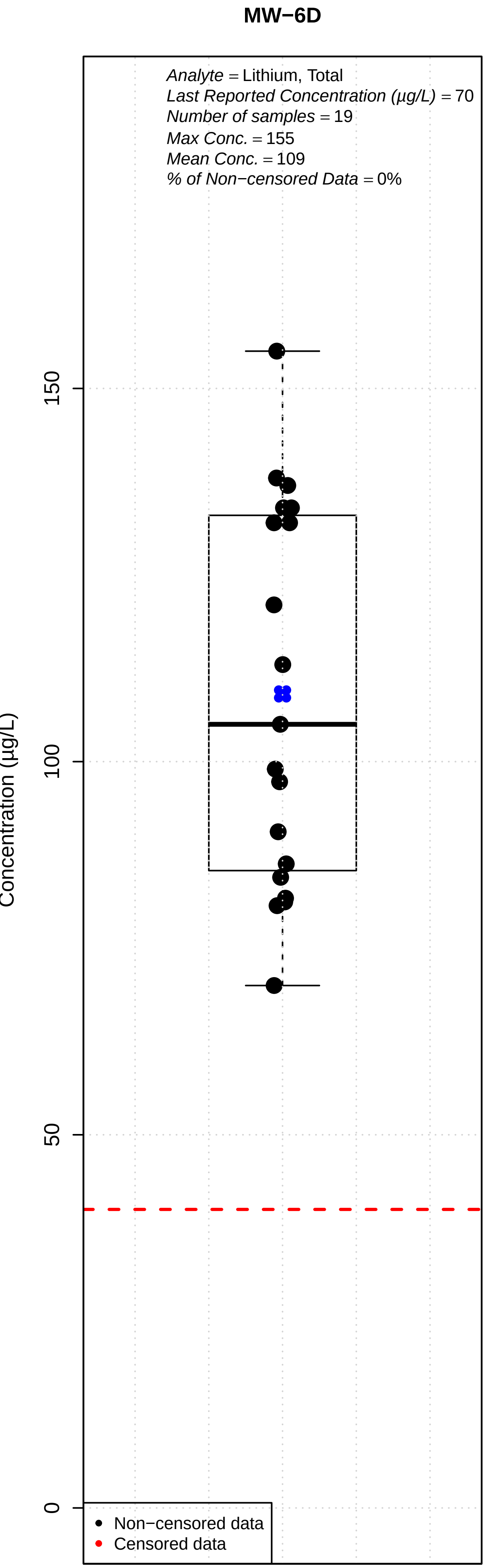
MW−6S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 52
Number of samples = 18
Max Conc. = 99.5
Mean Conc. = 72.2
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

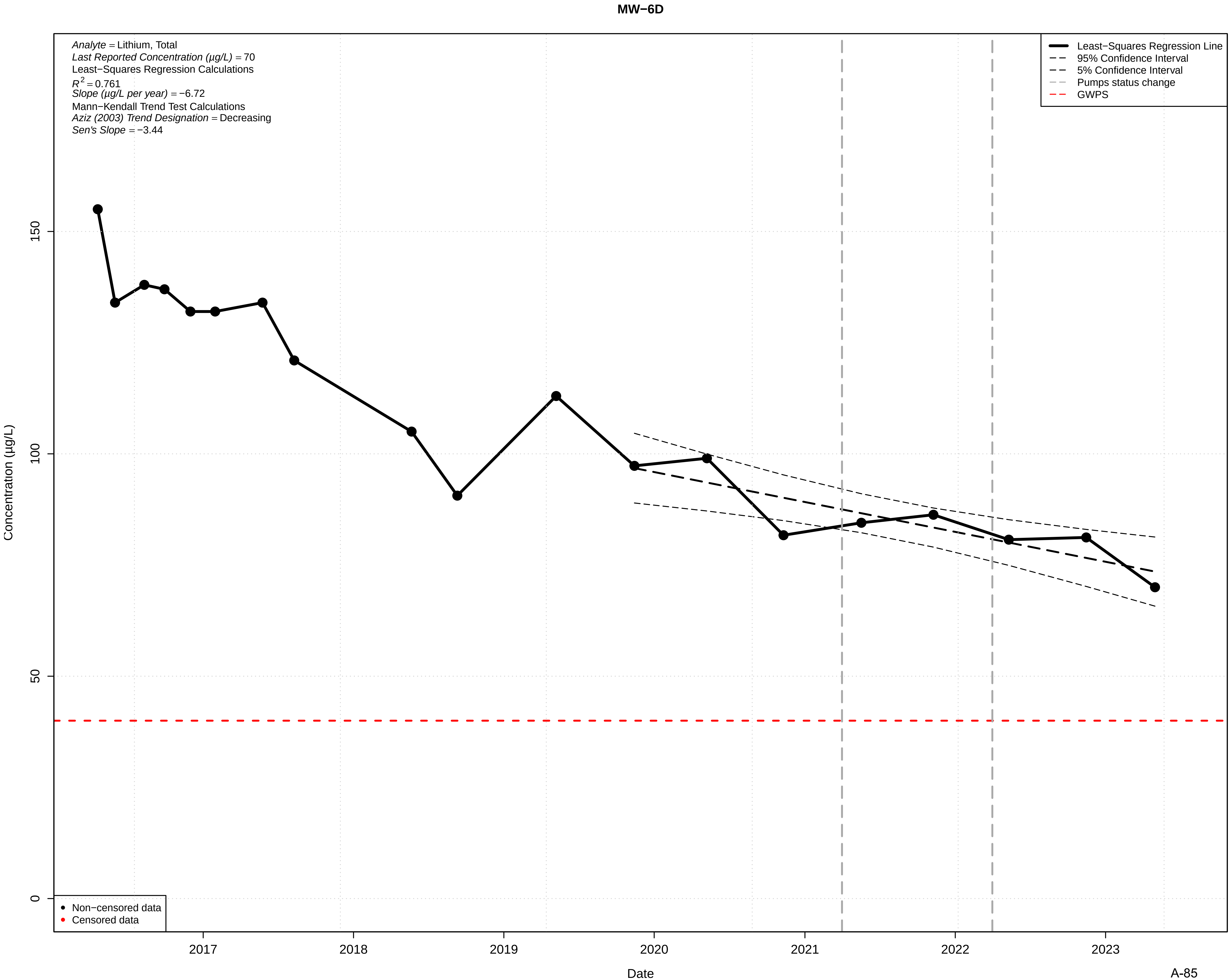


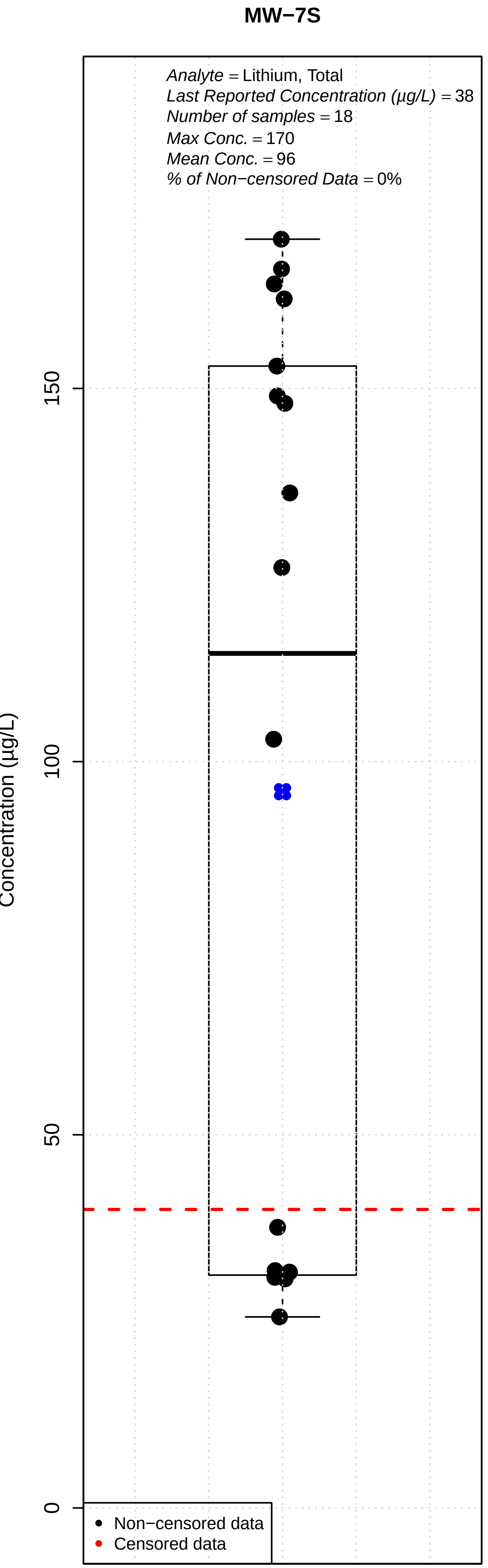
MW−6S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 52
Least−Squares Regression Calculations
R2 = 0.0377
Slope (µg/L per year) = 3.72
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 2.9
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−6I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 100
Number of samples = 19
Max Conc. = 148
Mean Conc. = 120
% of Non−censored Data = 0%
Concentration (µg/L)
Non−censored data
Censored data

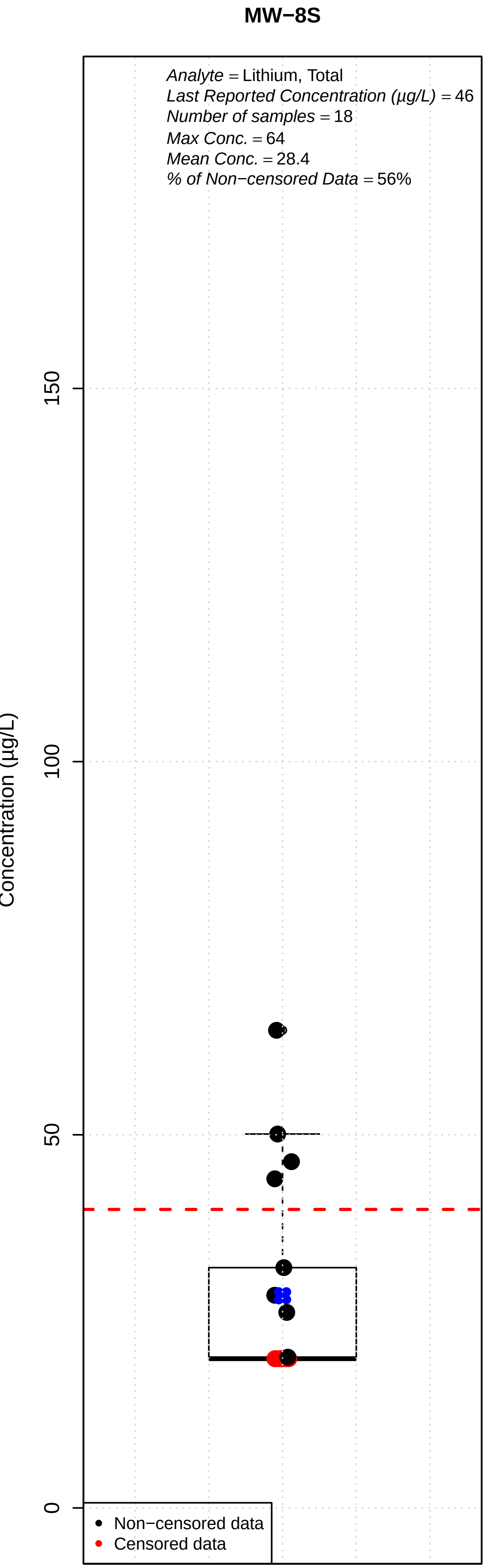

MW−6I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 100
Least−Squares Regression Calculations
R^2 = 0.0309
Slope (µg/L per year) = −1.26
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −1.3125
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Non−censored data
Censored data
Date

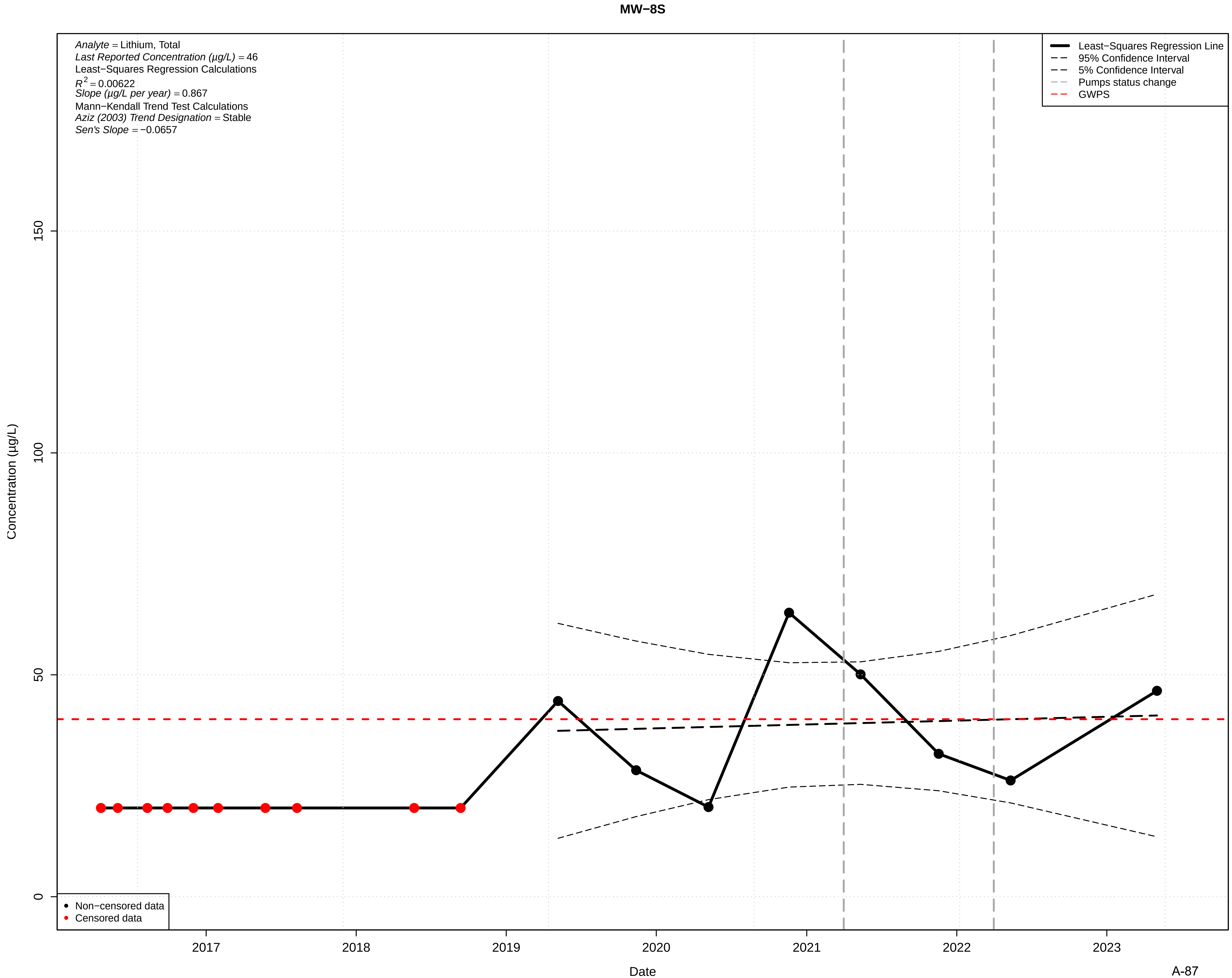

MW−6D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 70
Number of samples = 19
Max Conc. = 155
Mean Conc. = 109
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

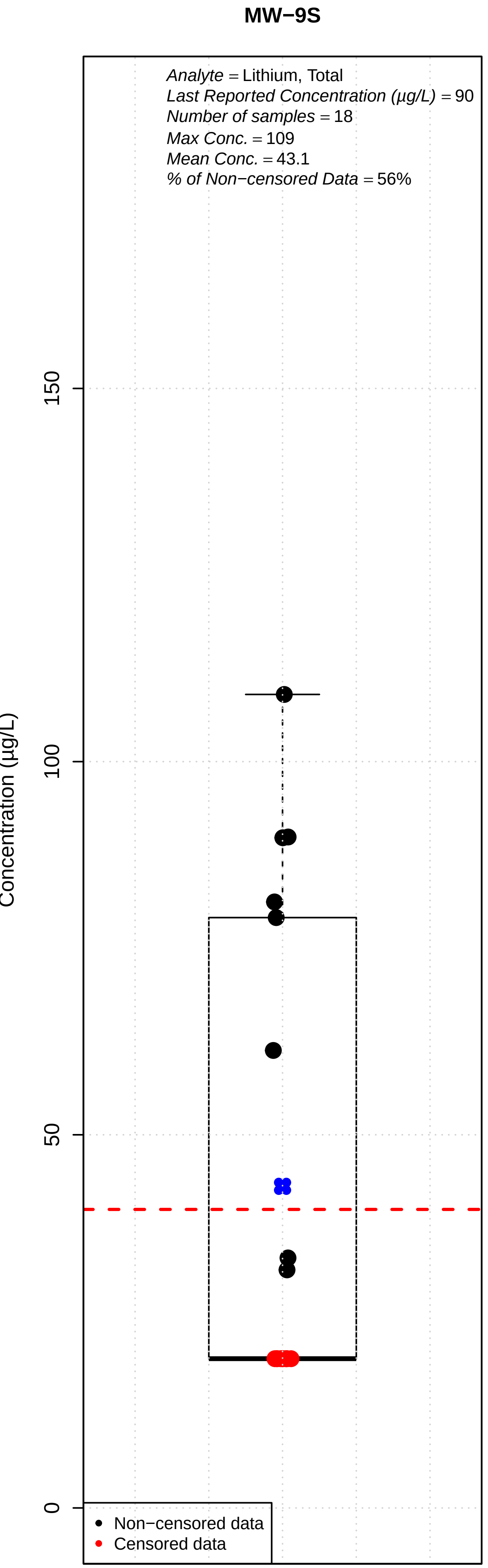

MW−6D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 70
Least−Squares Regression Calculations
R^2 = 0.761
Slope (µg/L per year) = −6.72
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −3.44
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

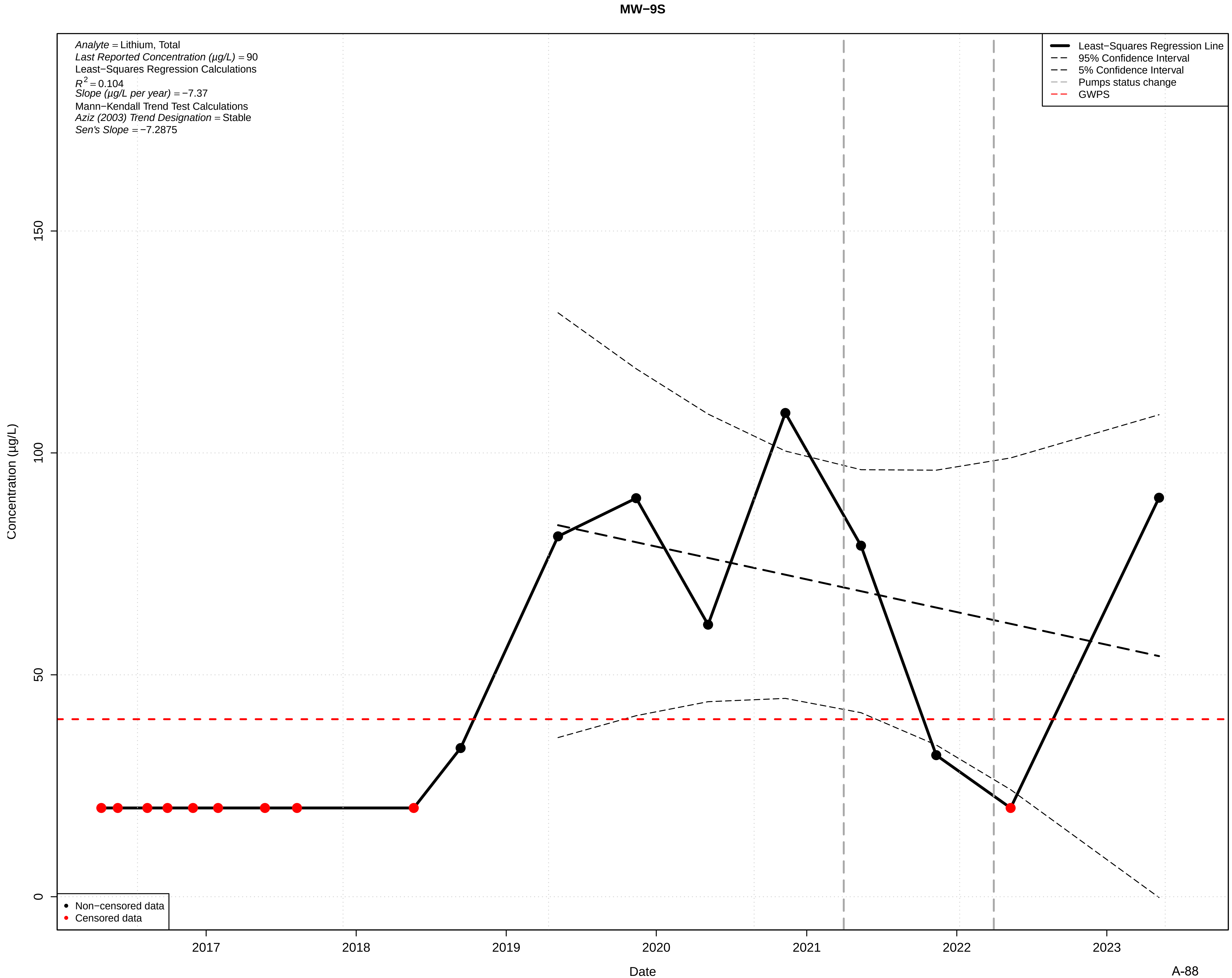

MW−7S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 38
Number of samples = 18
Max Conc. = 170
Mean Conc. = 96
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

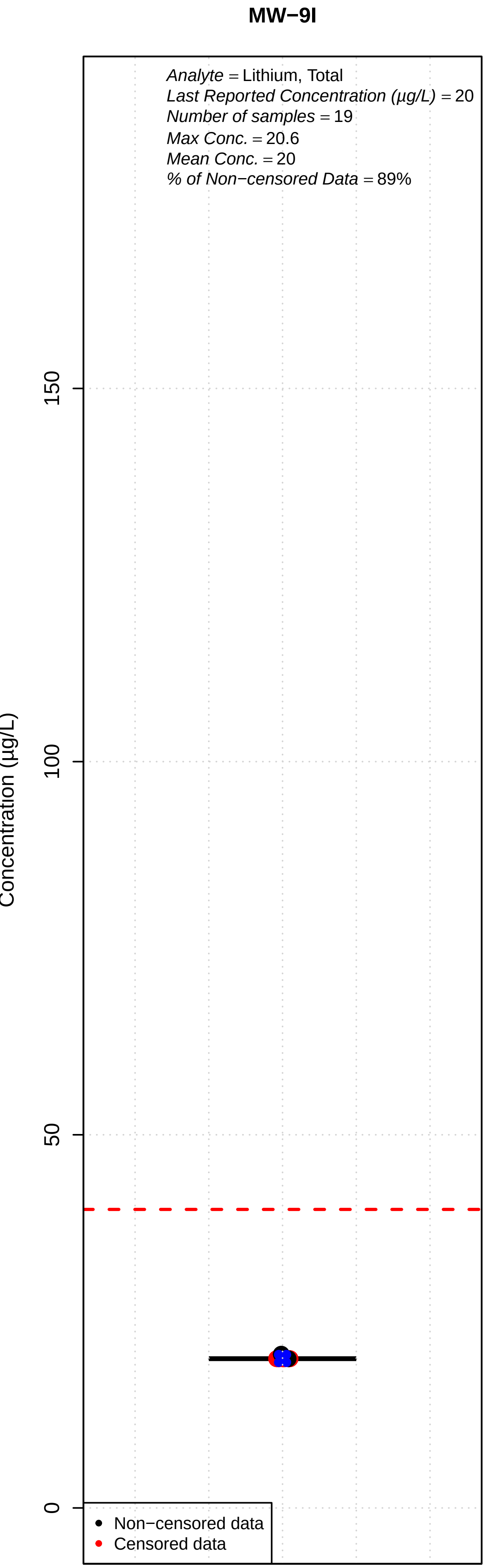

MW−7S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 38
Least−Squares Regression Calculations
R^2 = 0.298
Slope (µg/L per year) = 1.32
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.2625
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

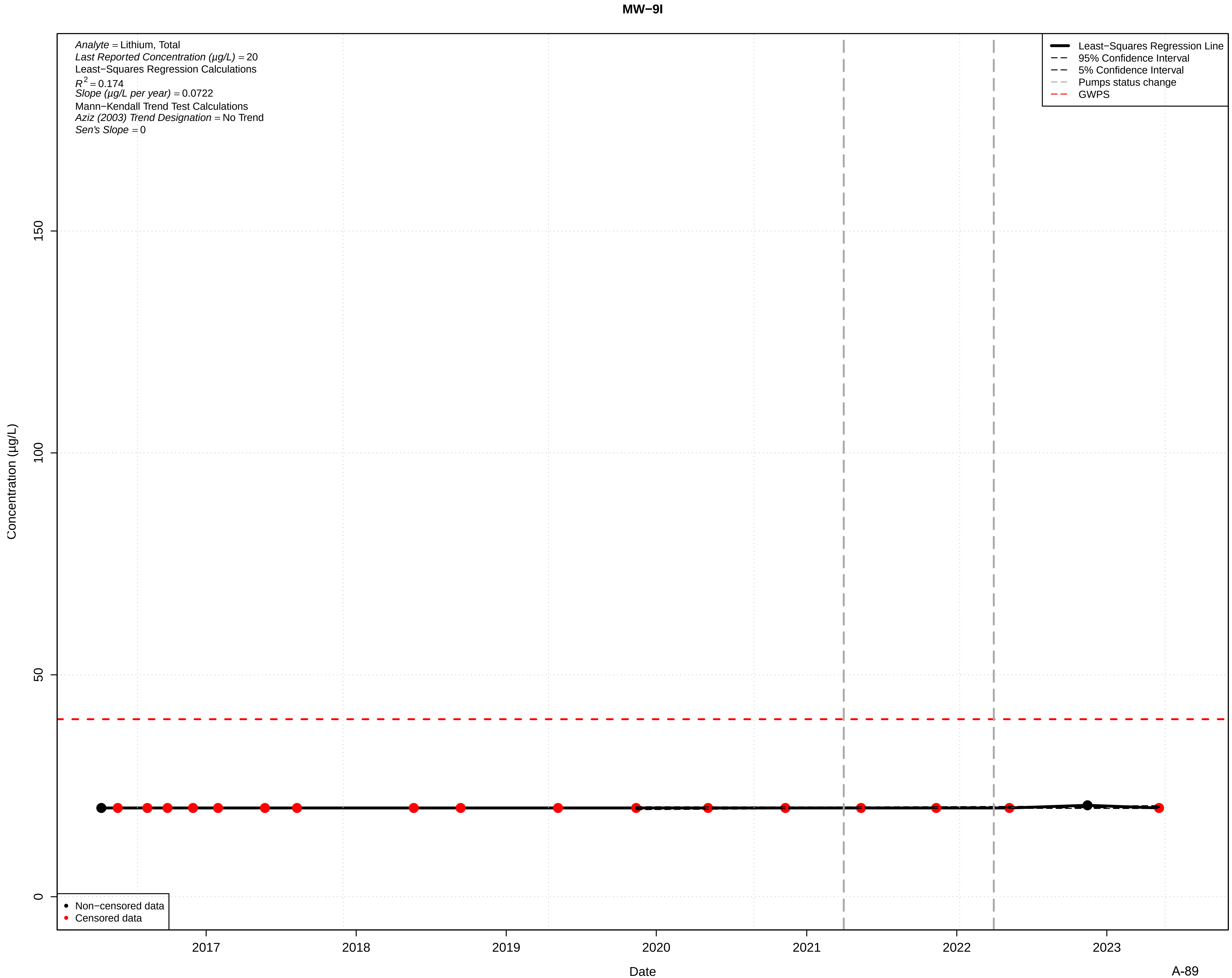

MW−8S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 46
Number of samples = 18
Max Conc. = 64
Mean Conc. = 28.4
% of Non−censored Data = 56%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

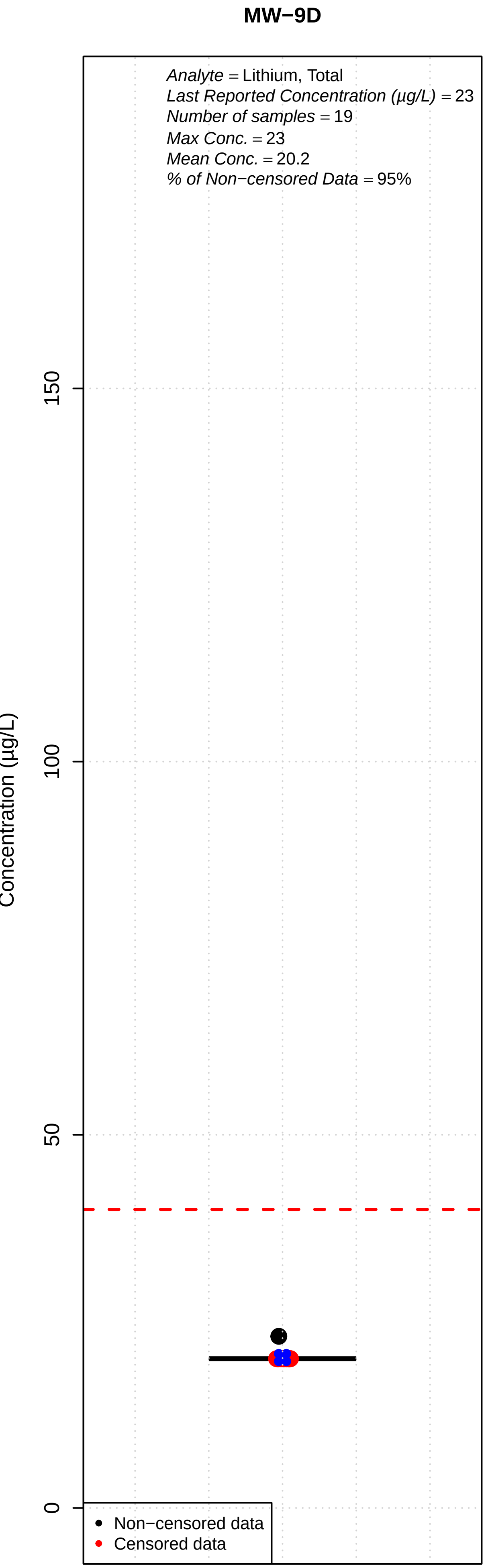

MW−8S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 46
Least−Squares Regression Calculations
R^2 = 0.00622
Slope (µg/L per year) = 0.867
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.0657
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

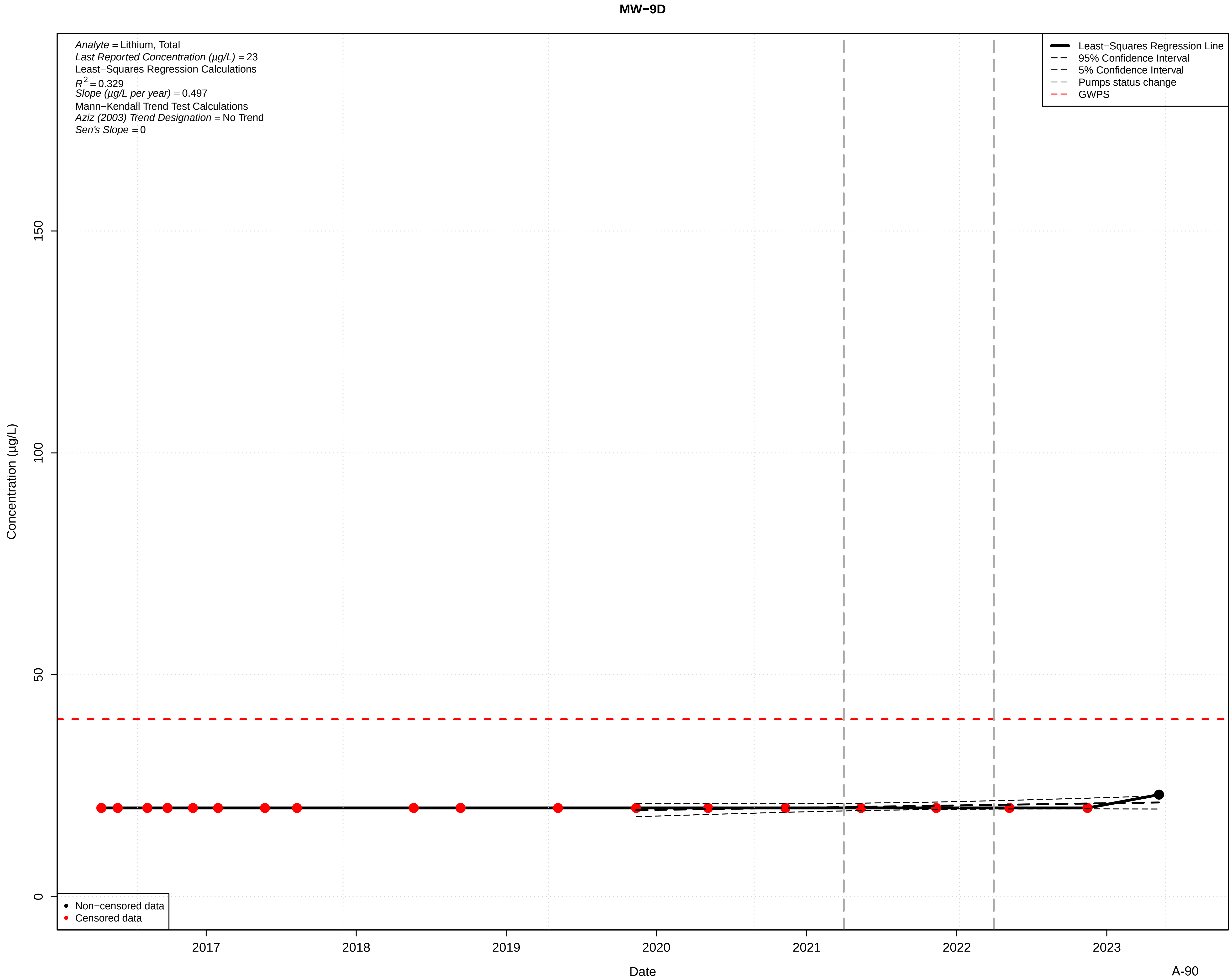

MW−9S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 90
Number of samples = 18
Max Conc. = 109
Mean Conc. = 43.1
% of Non−censored Data = 56%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

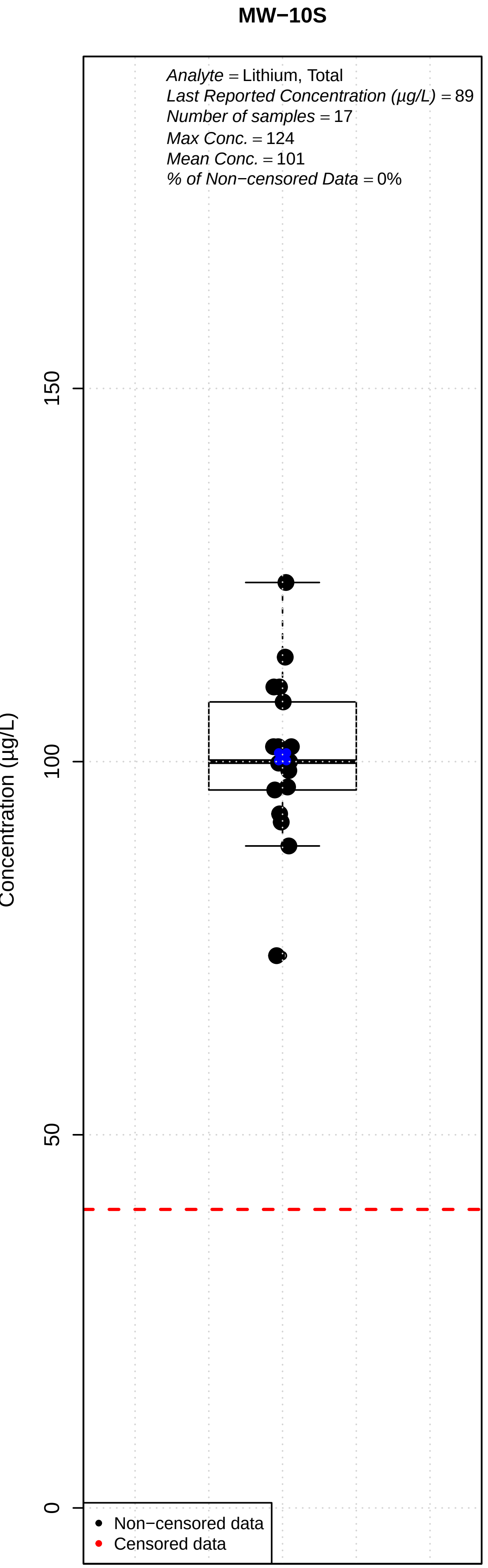

MW−9S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 90
Least−Squares Regression Calculations
R2 = 0.104
Slope (µg/L per year) = −7.37
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −7.2875
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−9I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 19
Max Conc. = 20.6
Mean Conc. = 20
% of Non−censored Data = 89%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

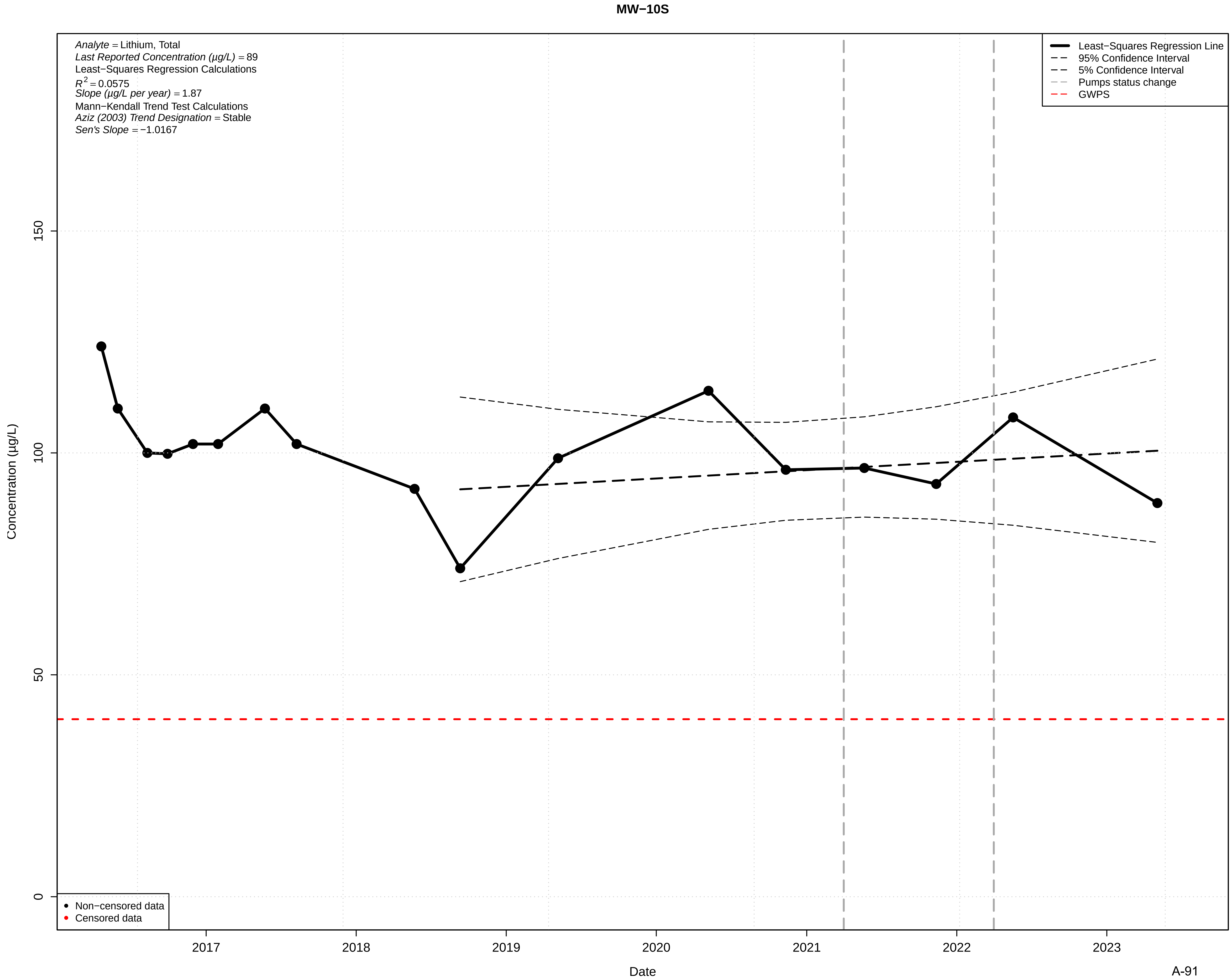

MW−9I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R2 = 0.174
Slope (µg/L per year) = 0.0722
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−9D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 23
Number of samples = 19
Max Conc. = 23
Mean Conc. = 20.2
% of Non−censored Data = 95%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

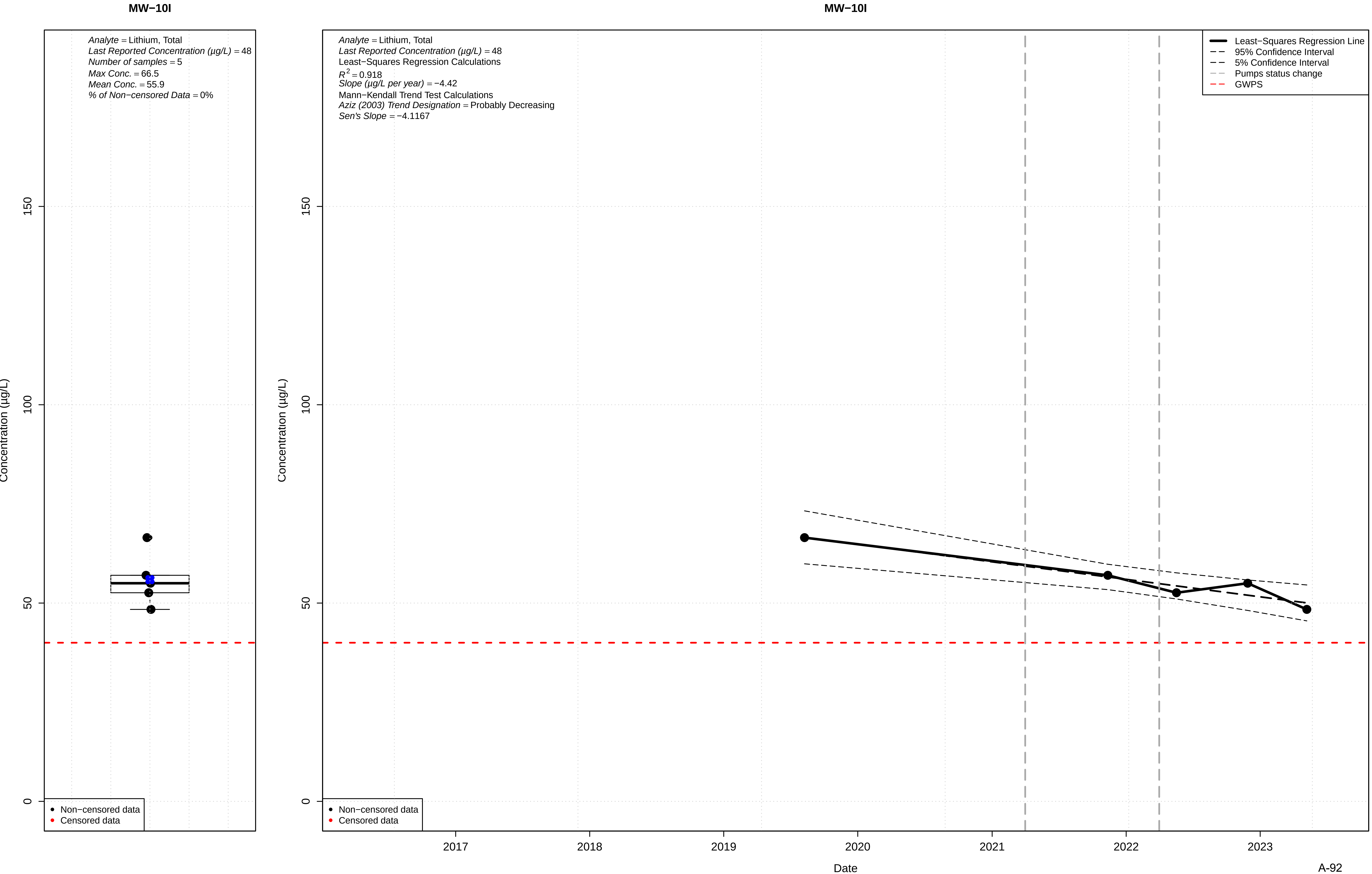

MW−9D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 23
Least−Squares Regression Calculations
R^2 = 0.329
Slope (µg/L per year) = 0.497
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

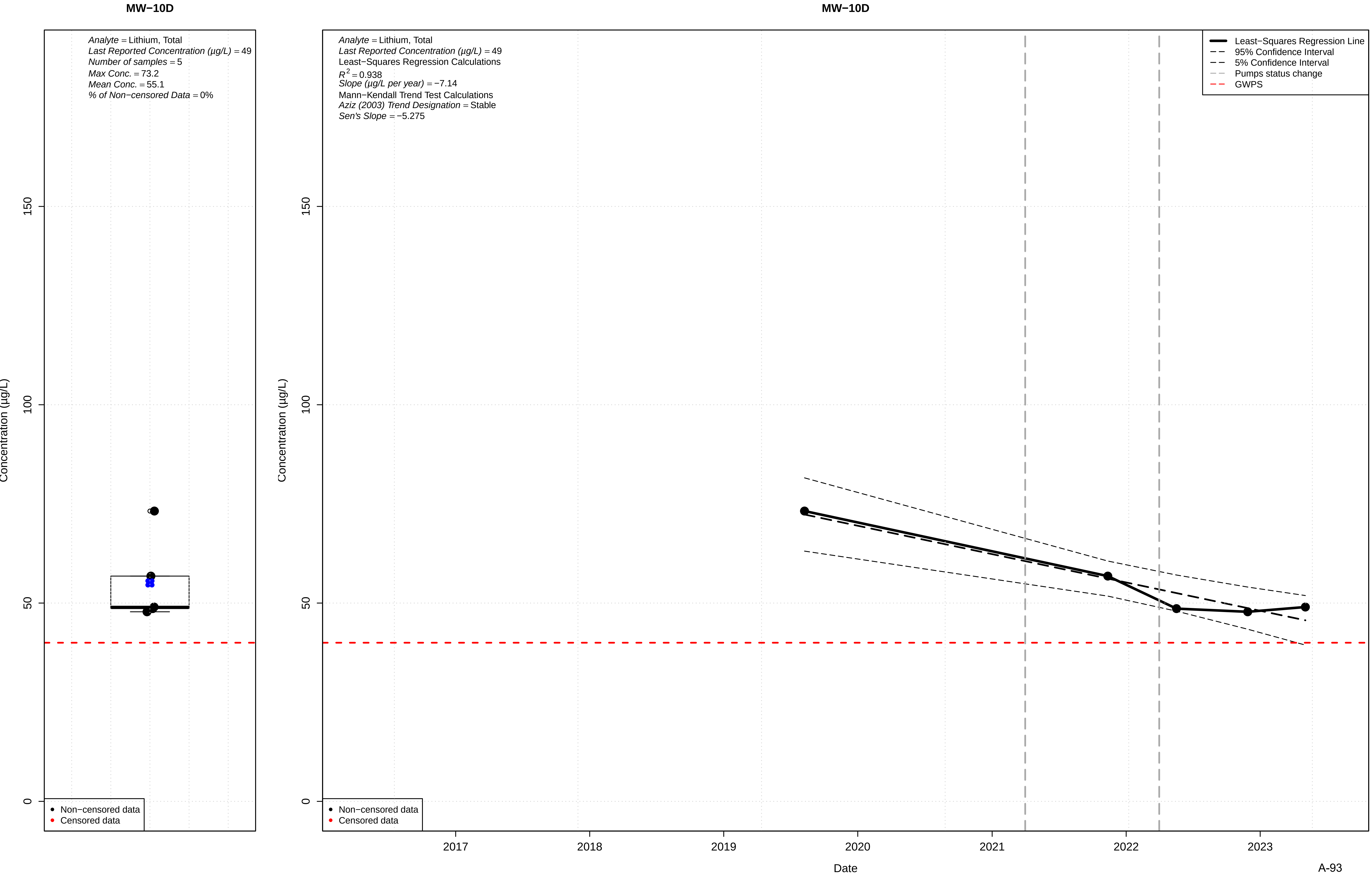


MW−10S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 89
Number of samples = 17
Max Conc. = 124
Mean Conc. = 101
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

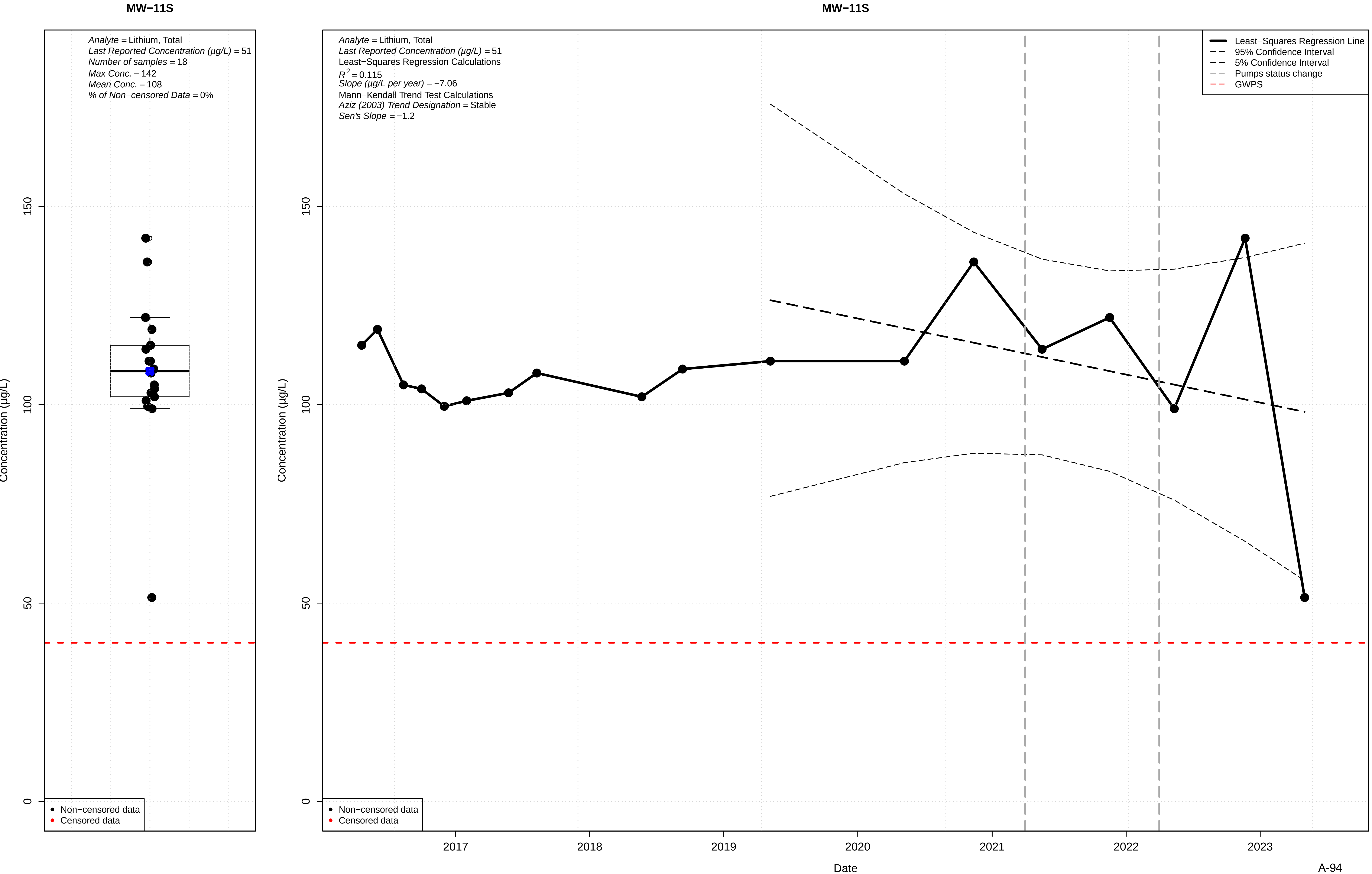


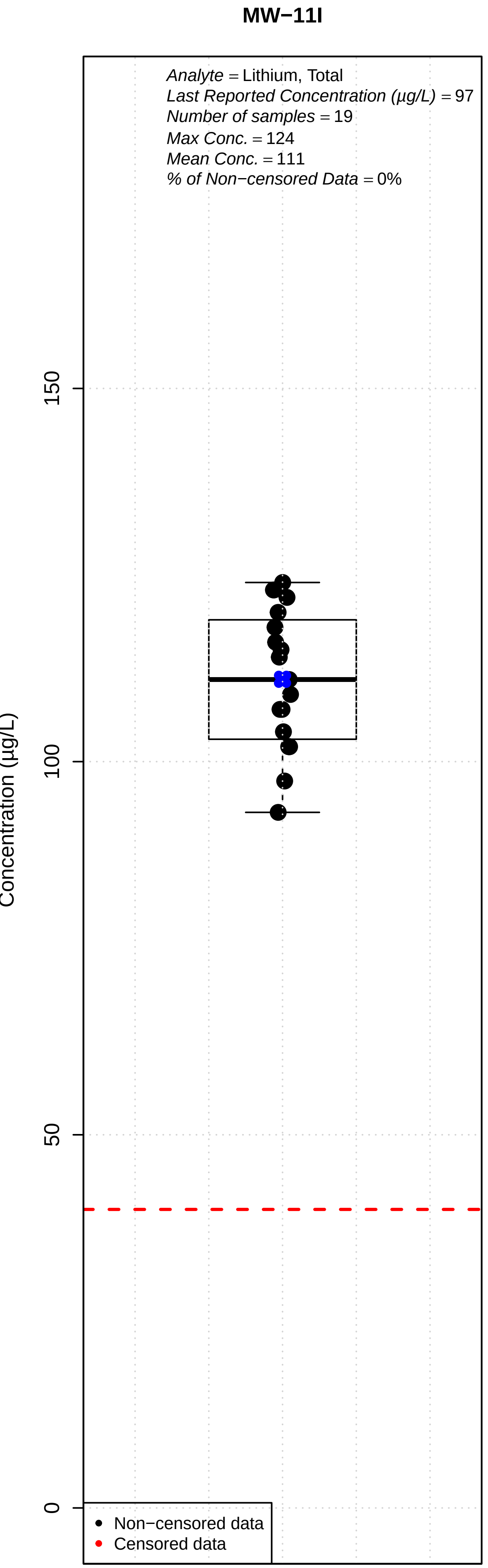
MW−10S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 89
Least−Squares Regression Calculations
R^2 = 0.0575
Slope (µg/L per year) = 1.87
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −1.0167
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

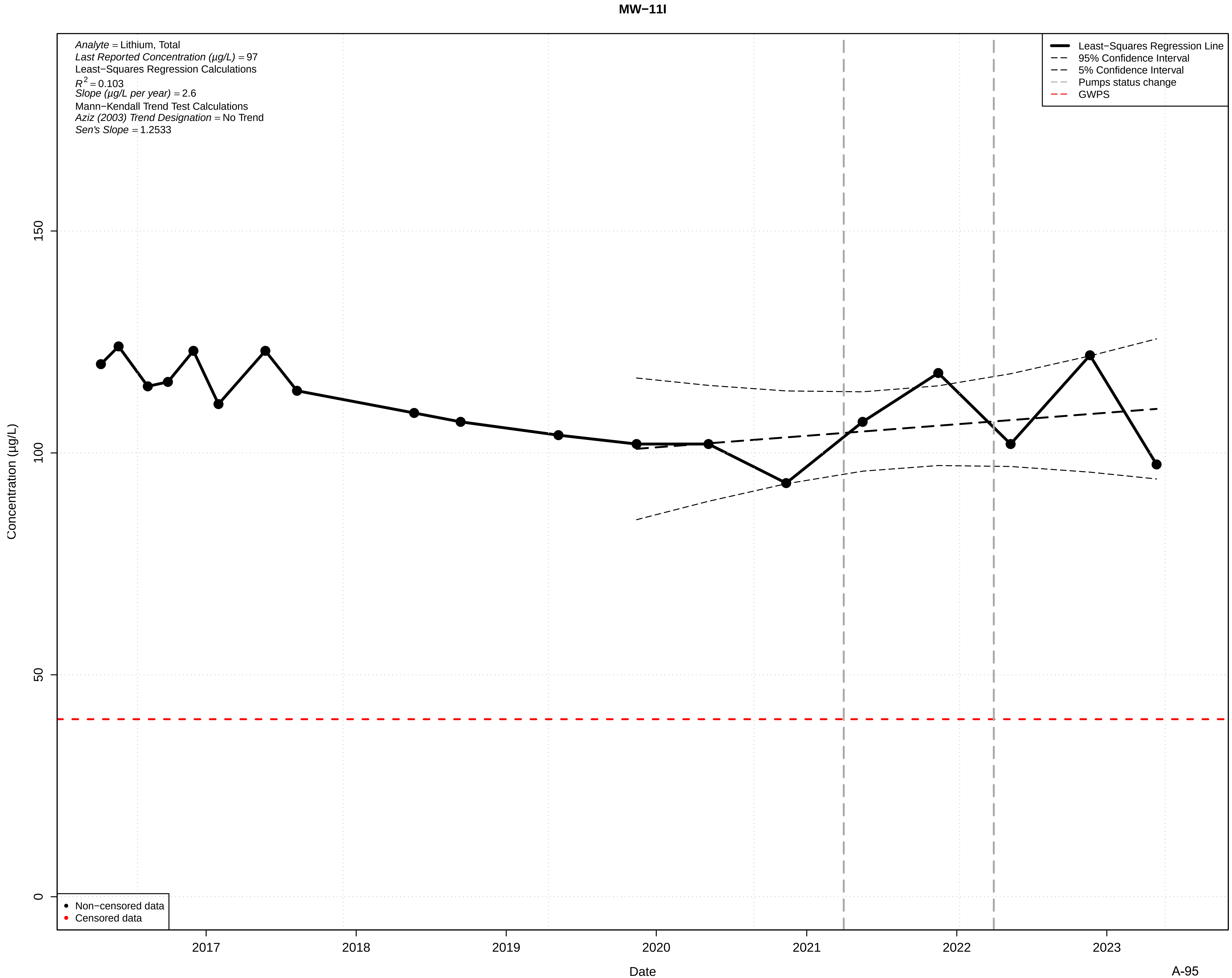

MW−10I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 48
Number of samples = 5
Max Conc. = 66.5
Mean Conc. = 55.9
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
MW−10I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 48
Least−Squares Regression Calculations
R^2 = 0.918
Slope (µg/L per year) = −4.42
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Probably Decreasing
Sen's Slope = −4.1167
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
2017
2018
2019
2020
2021
2022
2023
Date

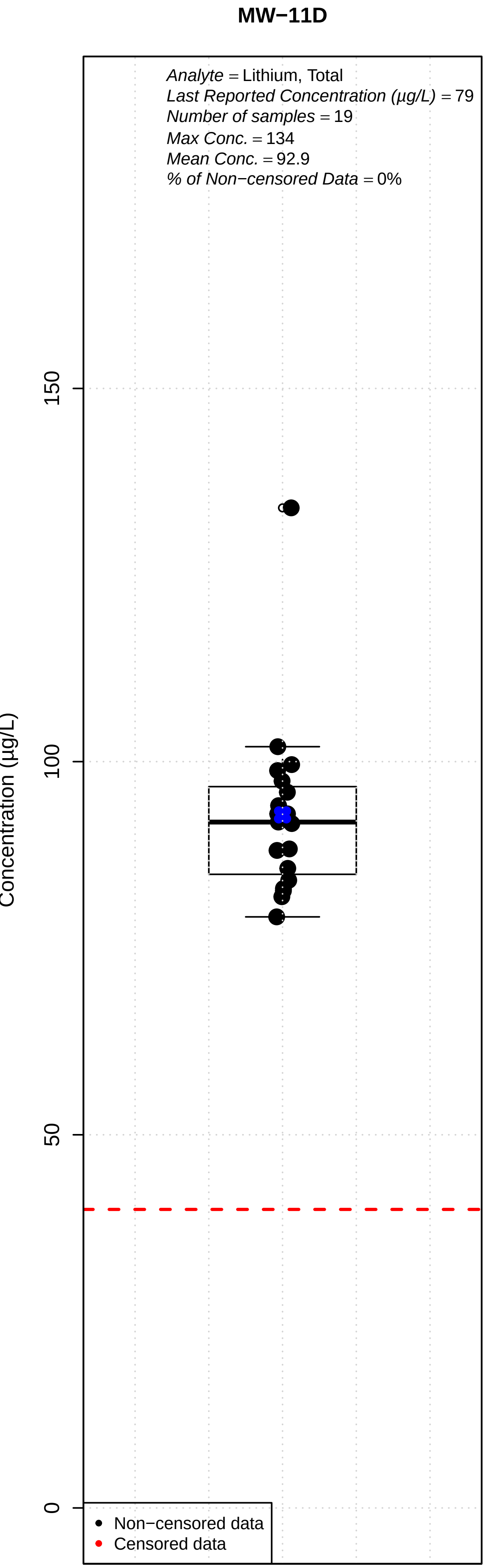


MW−10D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 49
Number of samples = 5
Max Conc. = 73.2
Mean Conc. = 55.1
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
MW−10D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 49
Least−Squares Regression Calculations
R^2 = 0.938
Slope (µg/L per year) = −7.14
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −5.275
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

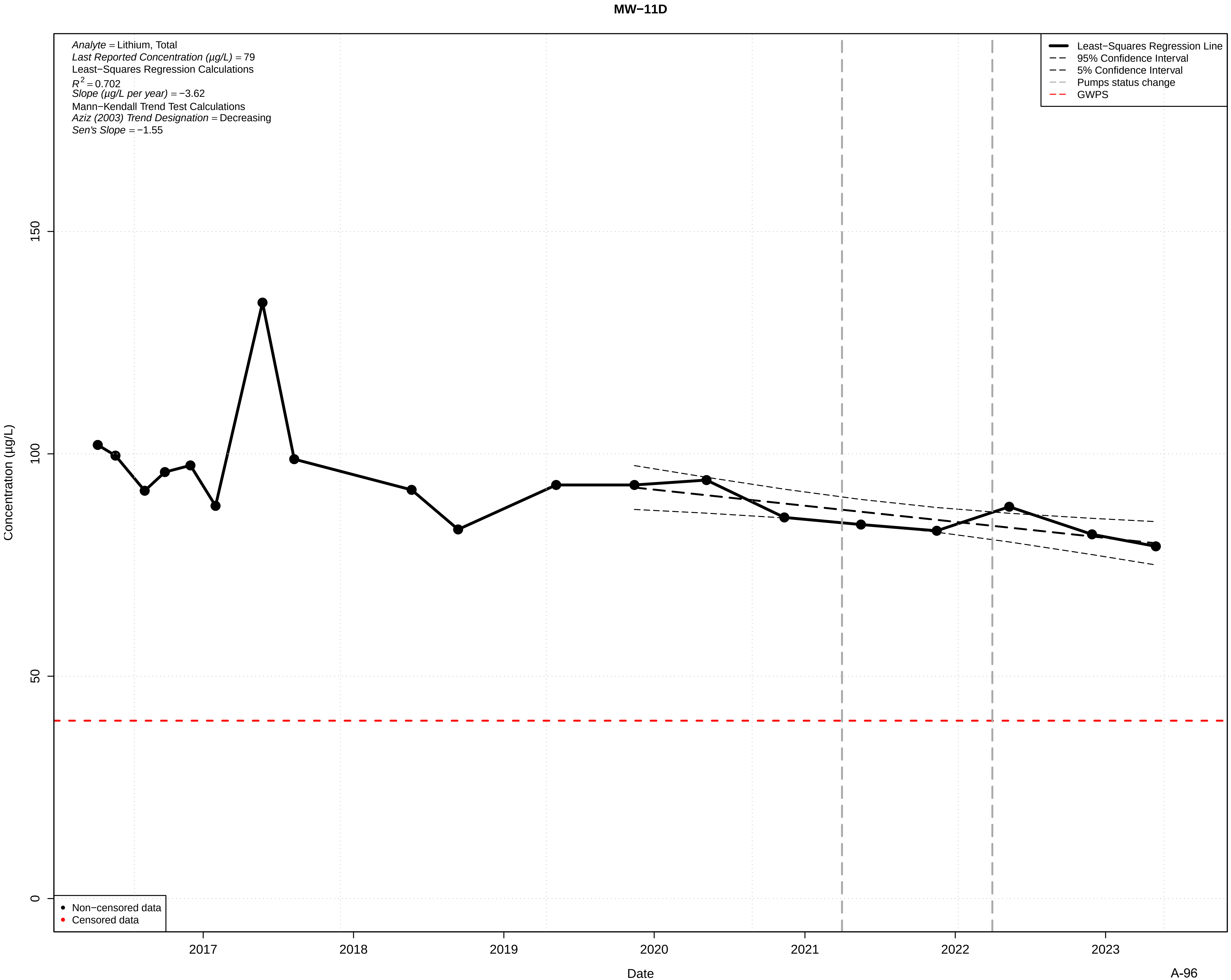

MW−11S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 51
Number of samples = 18
Max Conc. = 142
Mean Conc. = 108
% of Non−censored Data = 0%
Non−censored data
Censored data
Concentration (µg/L)
MW−11S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 51
Least−Squares Regression Calculations
R2 = 0.115
Slope (µg/L per year) = −7.06
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −1.2
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Date
0
50
100
150
2017
2018
2019
2020
2021
2022
2023


MW−11I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 97
Number of samples = 19
Max Conc. = 124
Mean Conc. = 111
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

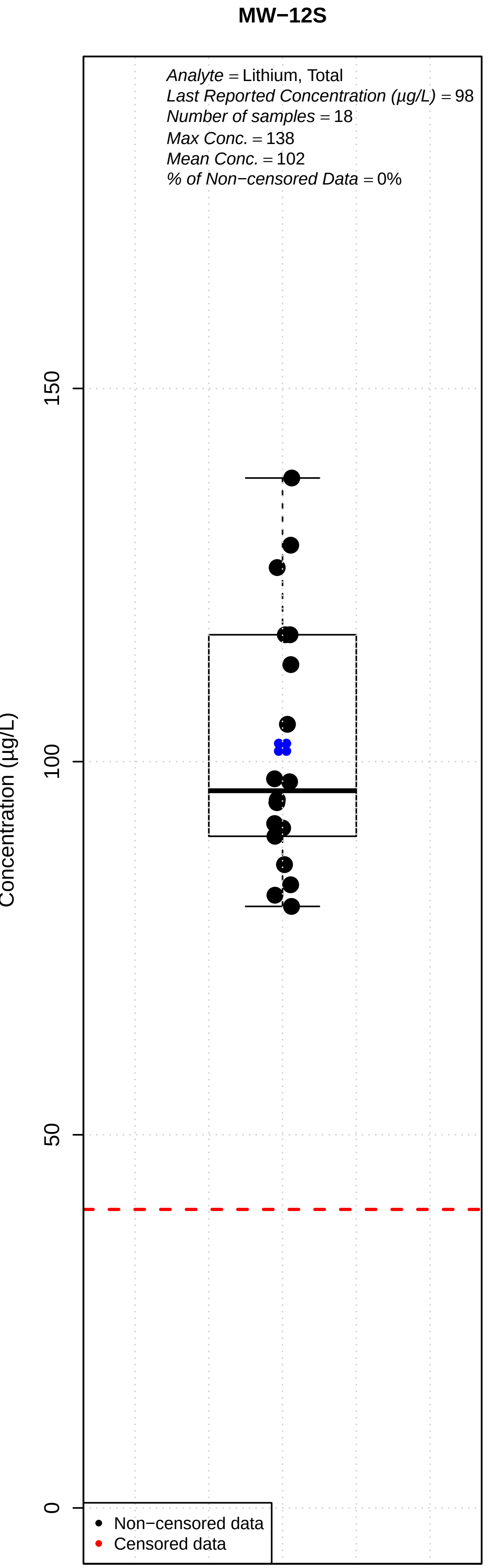

MW−11I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 97
Least−Squares Regression Calculations
R2 = 0.103
Slope (µg/L per year) = 2.6
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 1.2533
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

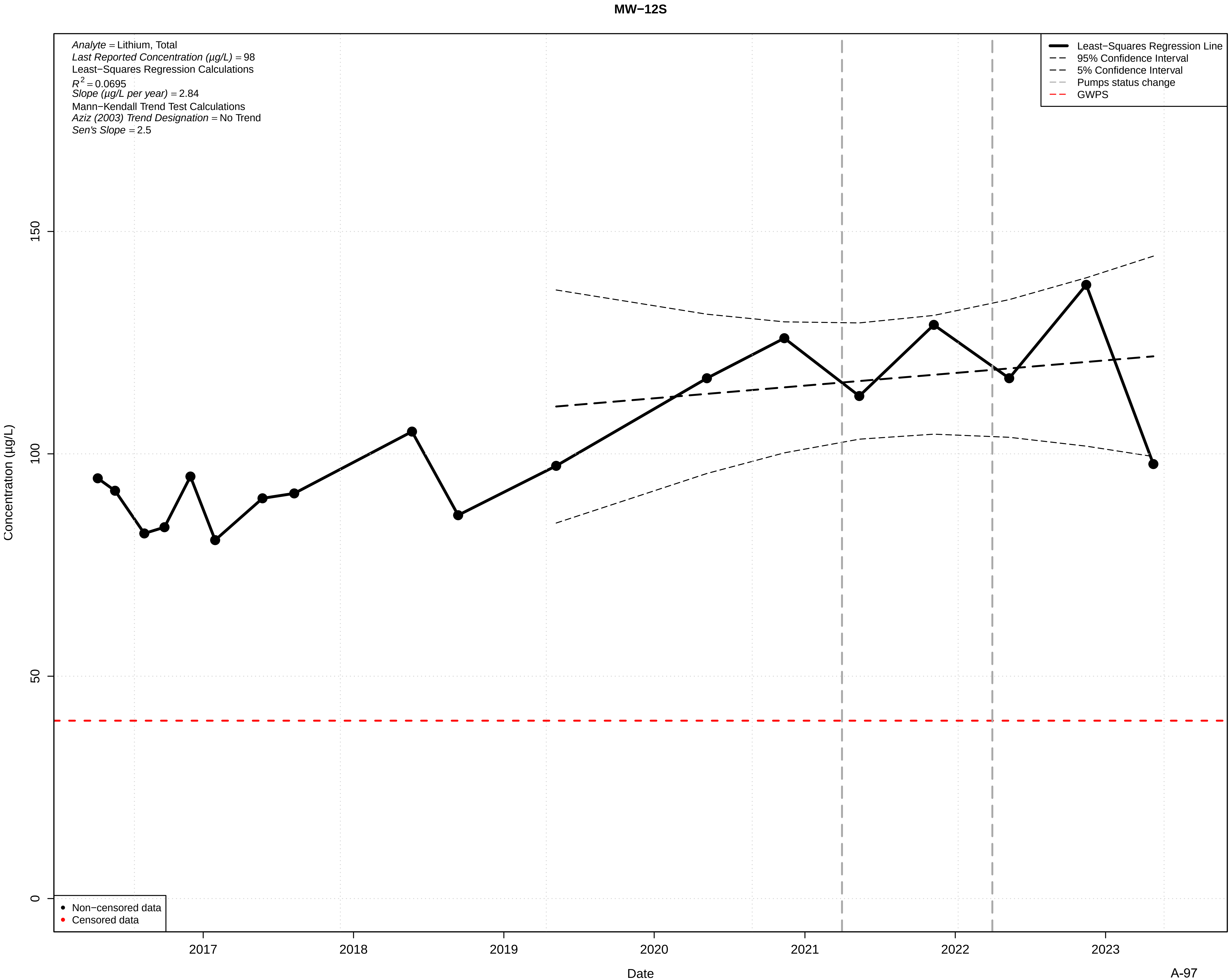


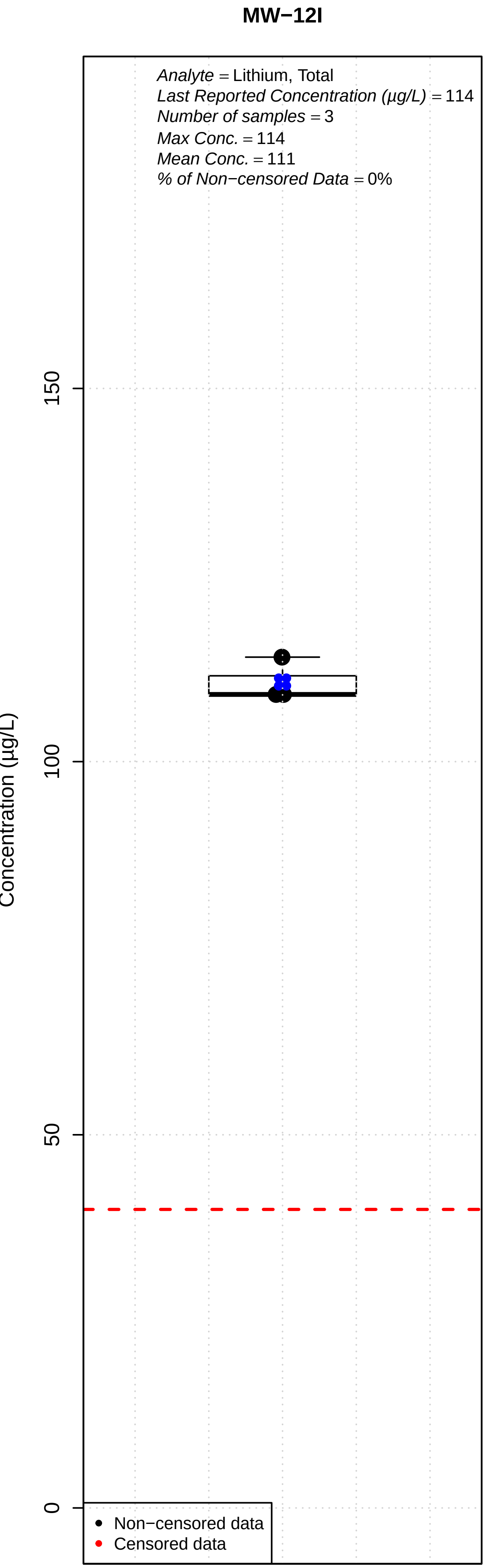
MW−11D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 79
Number of samples = 19
Max Conc. = 134
Mean Conc. = 92.9
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data



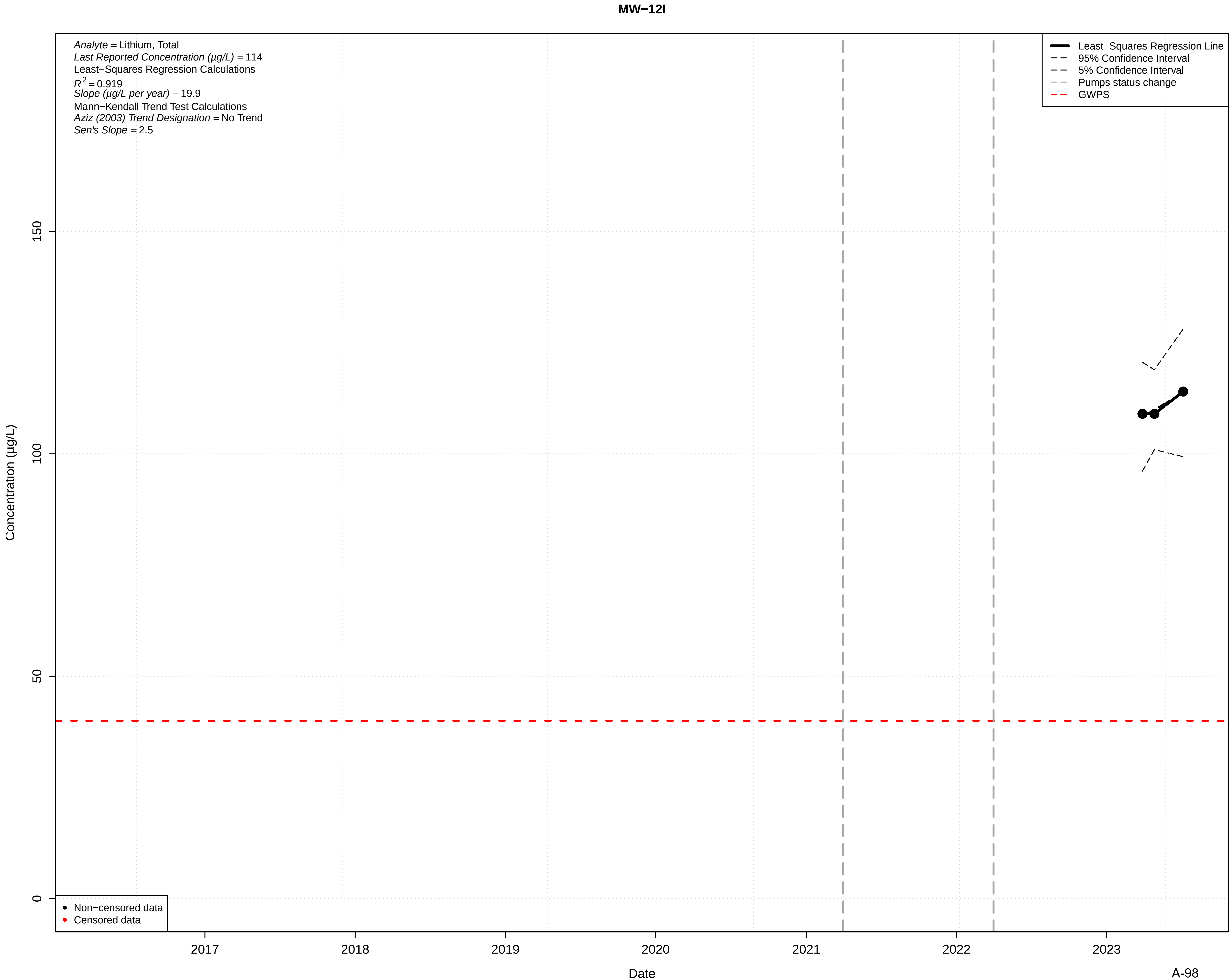
MW−11D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 79
Least−Squares Regression Calculations
R^2 = 0.702
Slope (µg/L per year) = −3.62
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −1.55
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−12S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 98
Number of samples = 18
Max Conc. = 138
Mean Conc. = 102
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

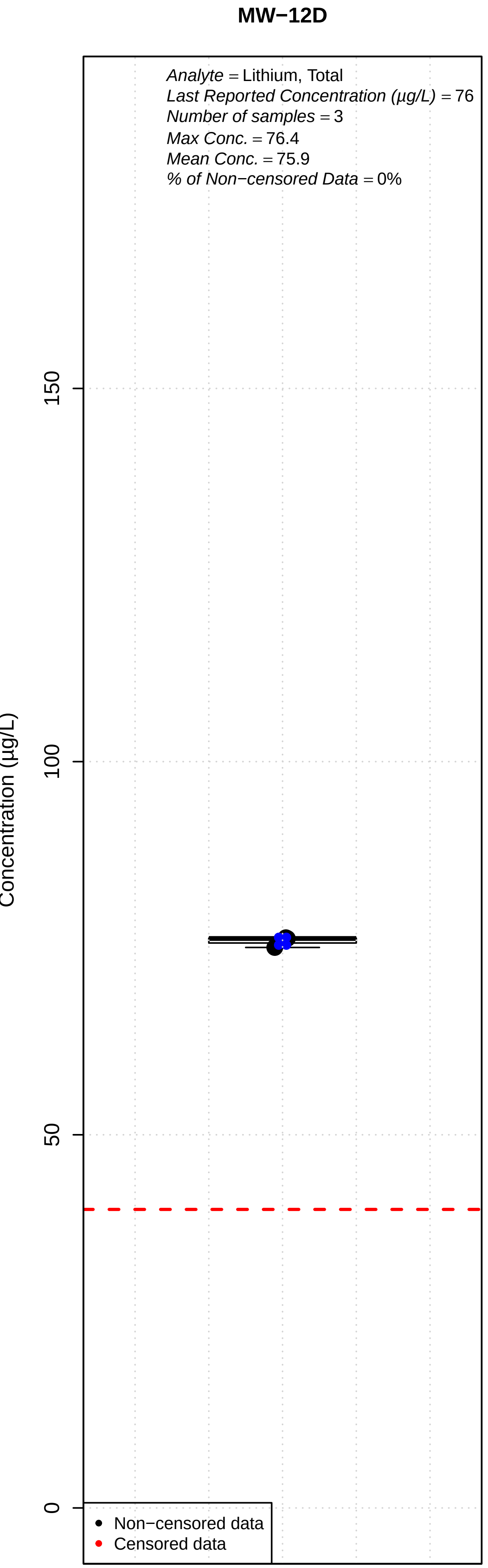

MW−12S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 98
Least−Squares Regression Calculations
R^2 = 0.0695
Slope (µg/L per year) = 2.84
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 2.5
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date



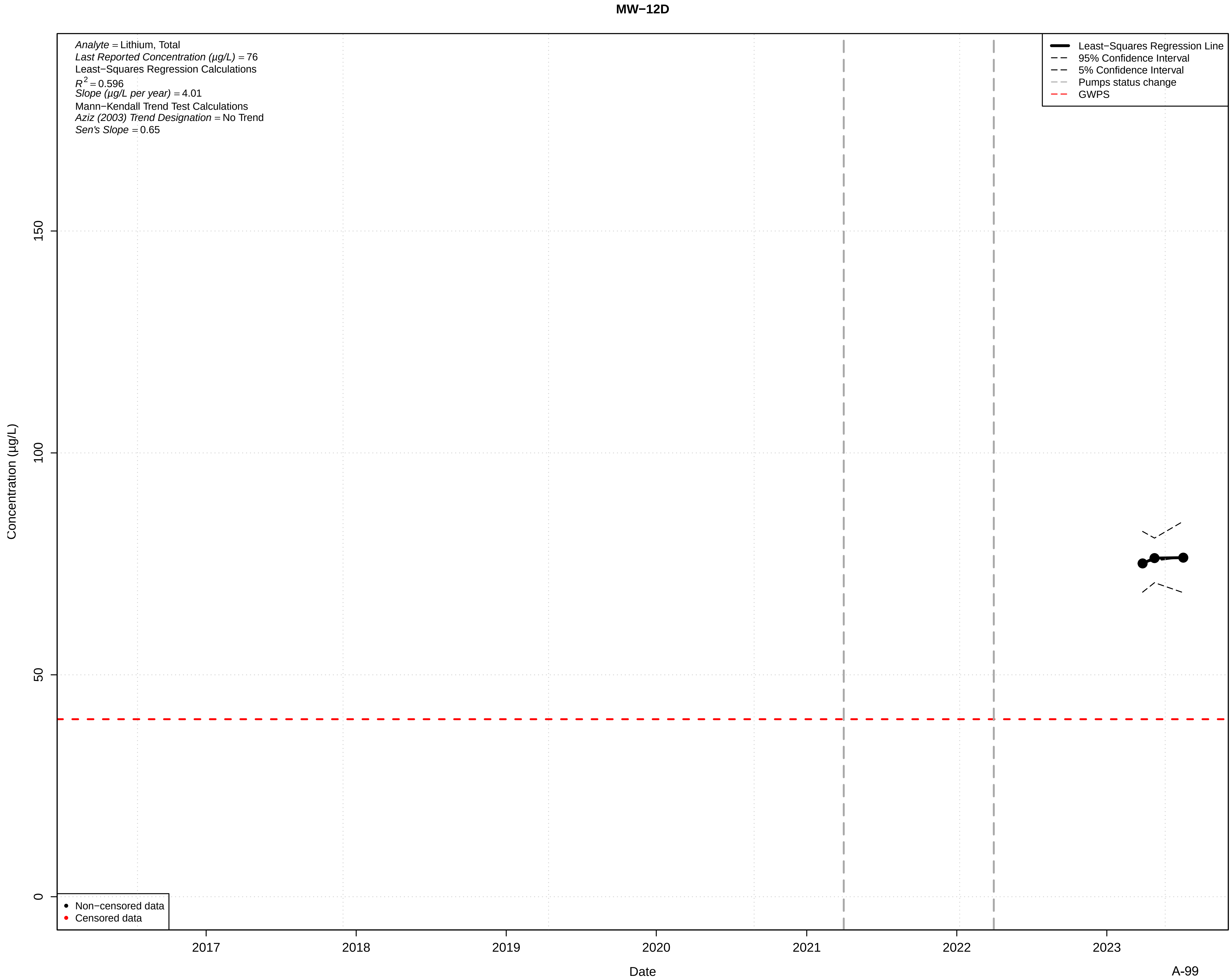
MW−12I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 114
Number of samples = 3
Max Conc. = 114
Mean Conc. = 111
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data



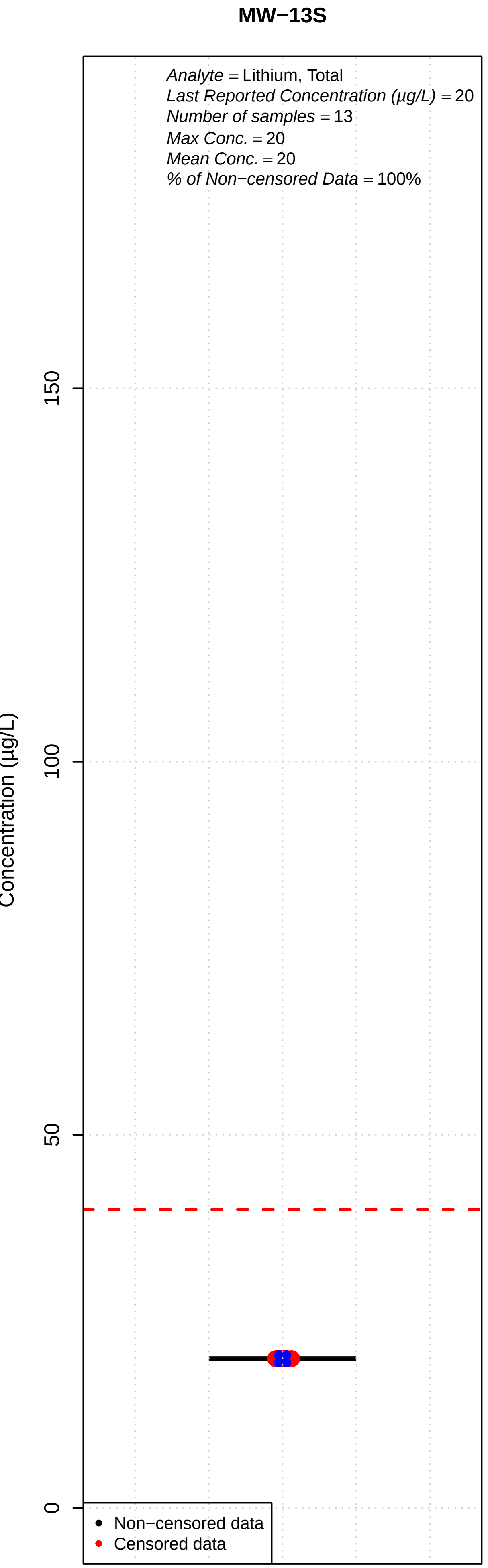
MW−12I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 114
Least−Squares Regression Calculations
R^2 = 0.919
Slope (µg/L per year) = 19.9
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 2.5
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date



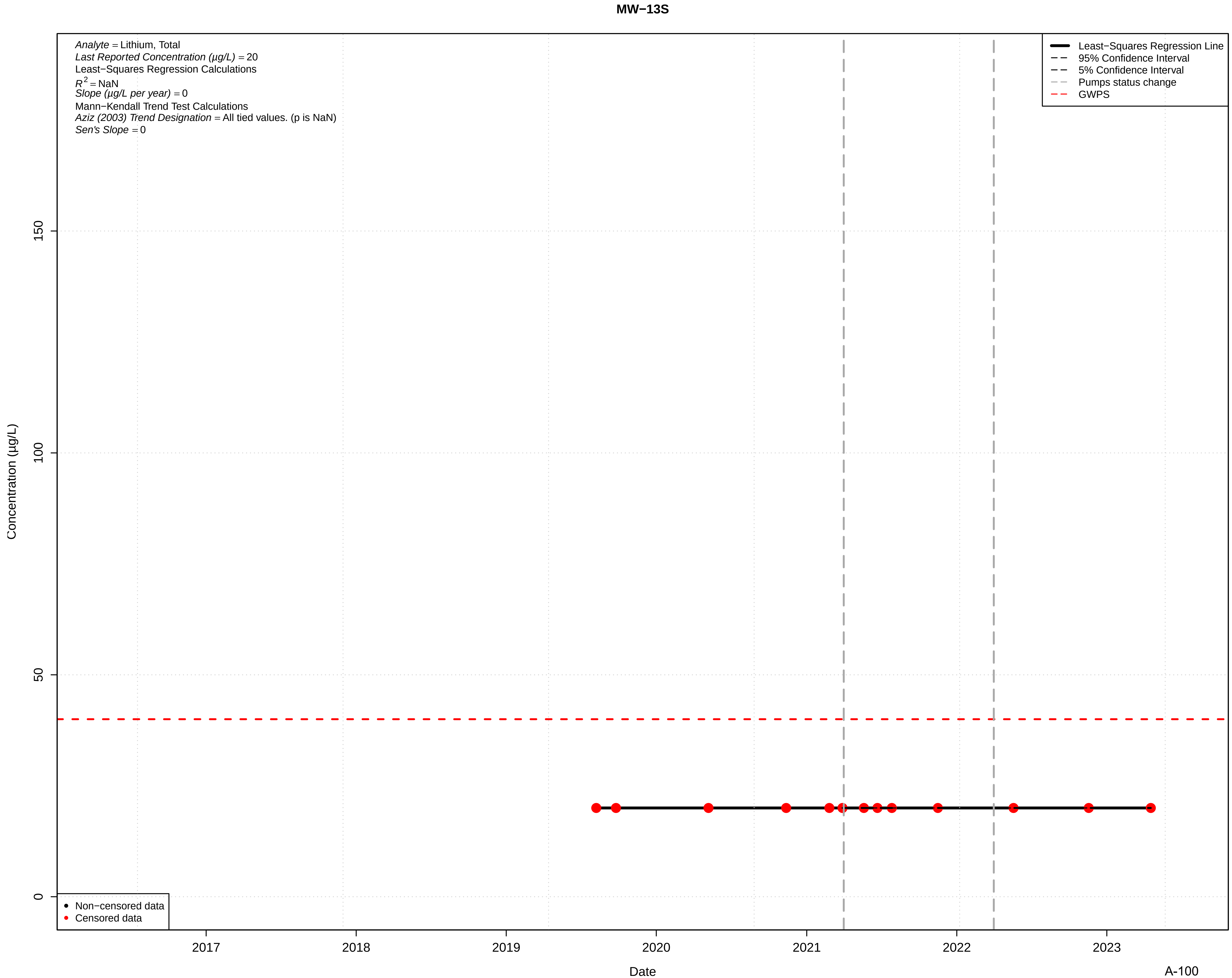
MW−12D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 76
Number of samples = 3
Max Conc. = 76.4
Mean Conc. = 75.9
% of Non−censored Data = 0%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data



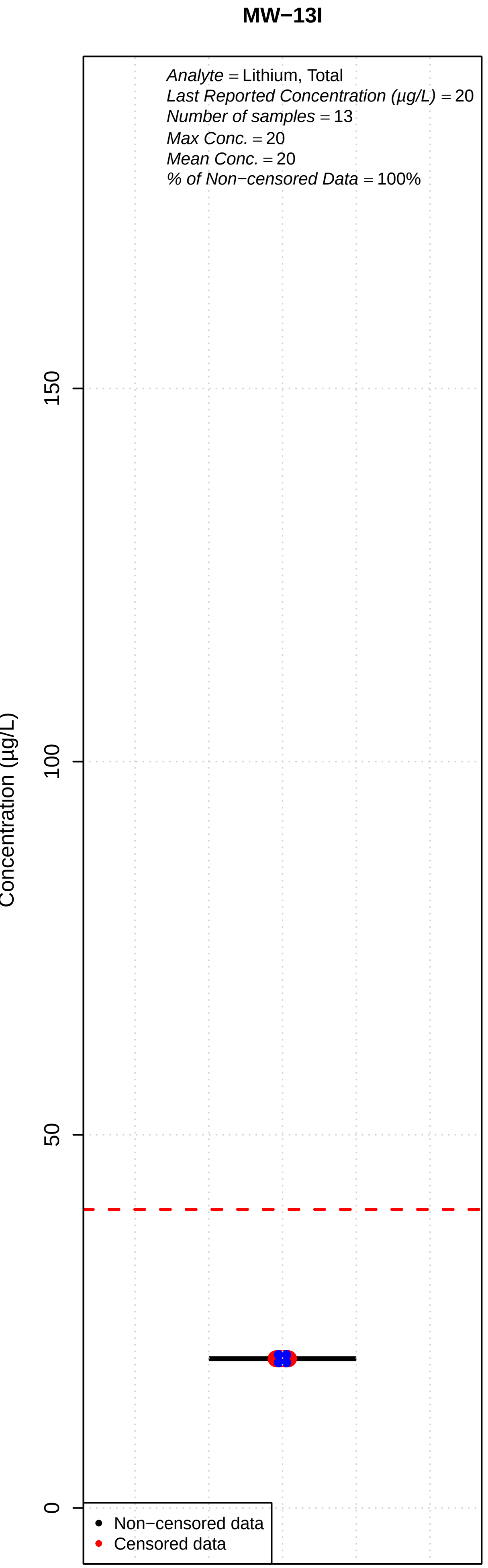
MW−12D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 76
Least−Squares Regression Calculations
R^2 = 0.596
Slope (µg/L per year) = 4.01
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.65
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

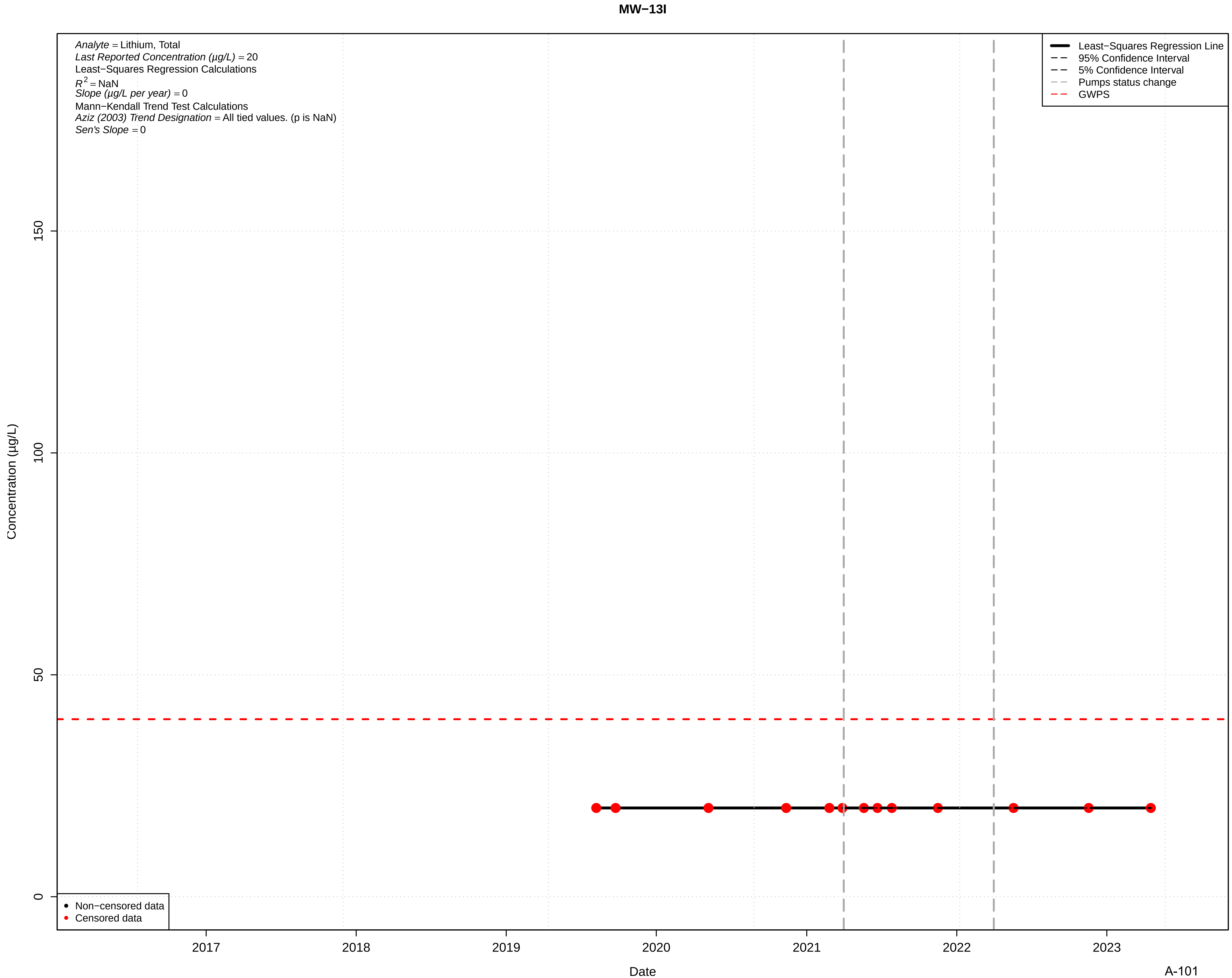


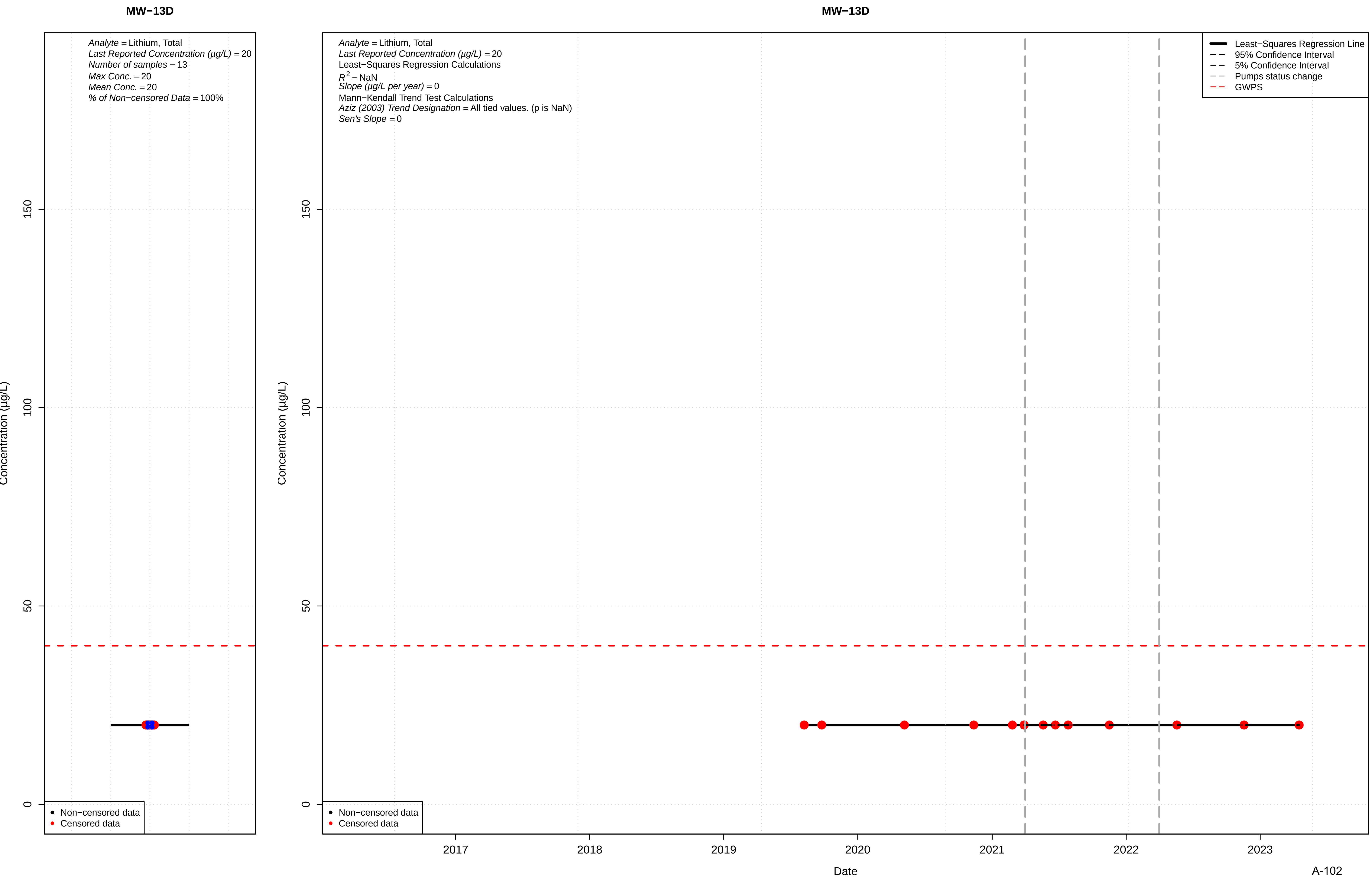
MW−13S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 13
Max Conc. = 20
Mean Conc. = 20
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

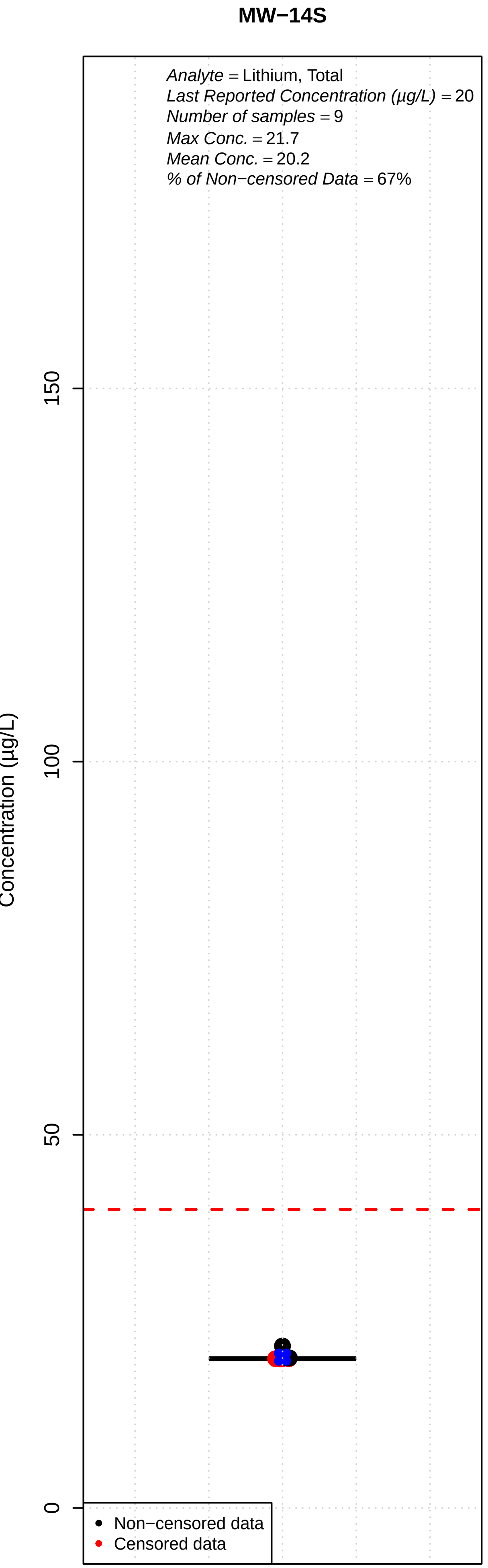


MW−13S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R2 = NaN
Slope (µg/L per year) = 0
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

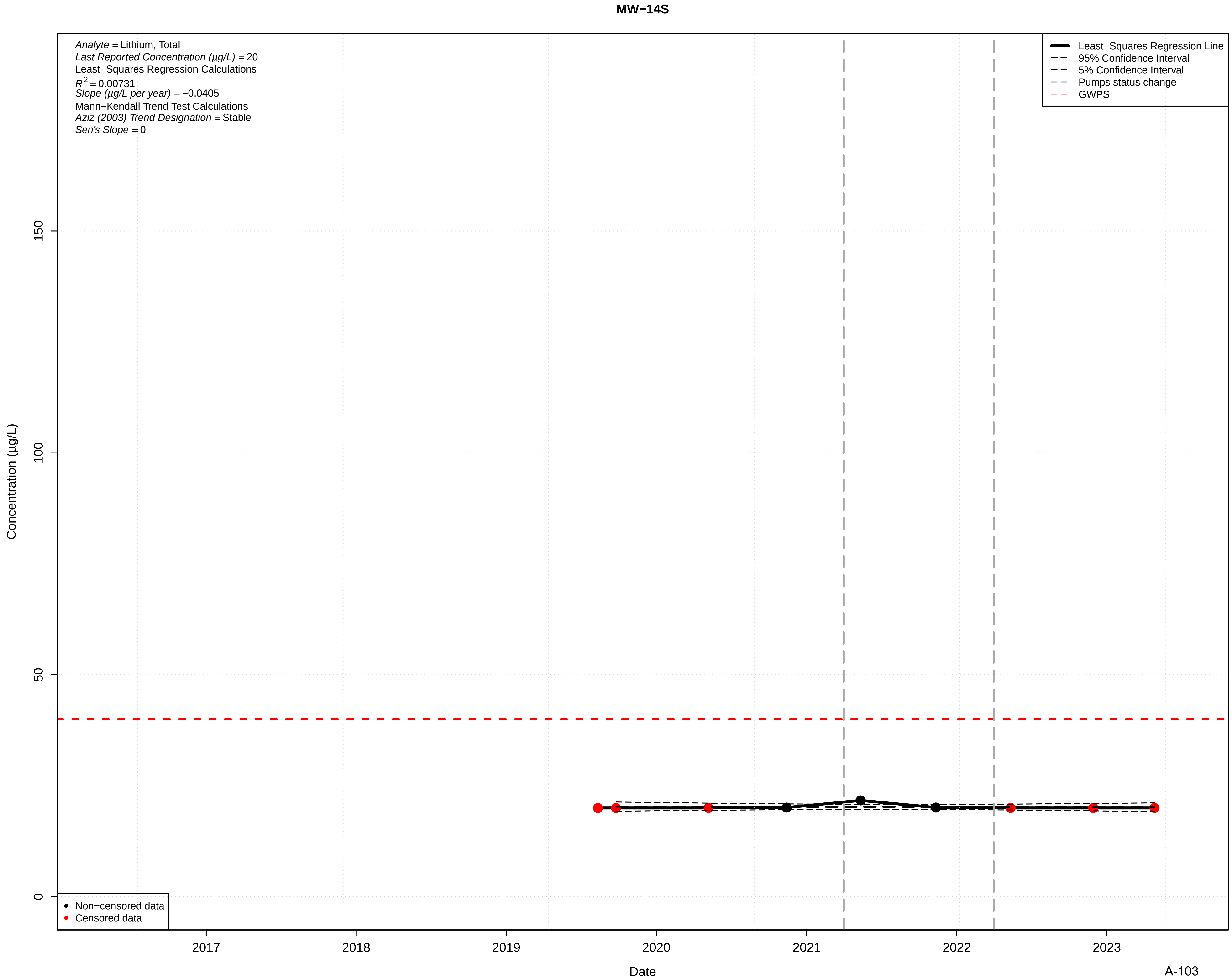

MW−13I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 13
Max Conc. = 20
Mean Conc. = 20
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data


MW−13I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R^2 = NaN
Slope (µg/L per year) = 0
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

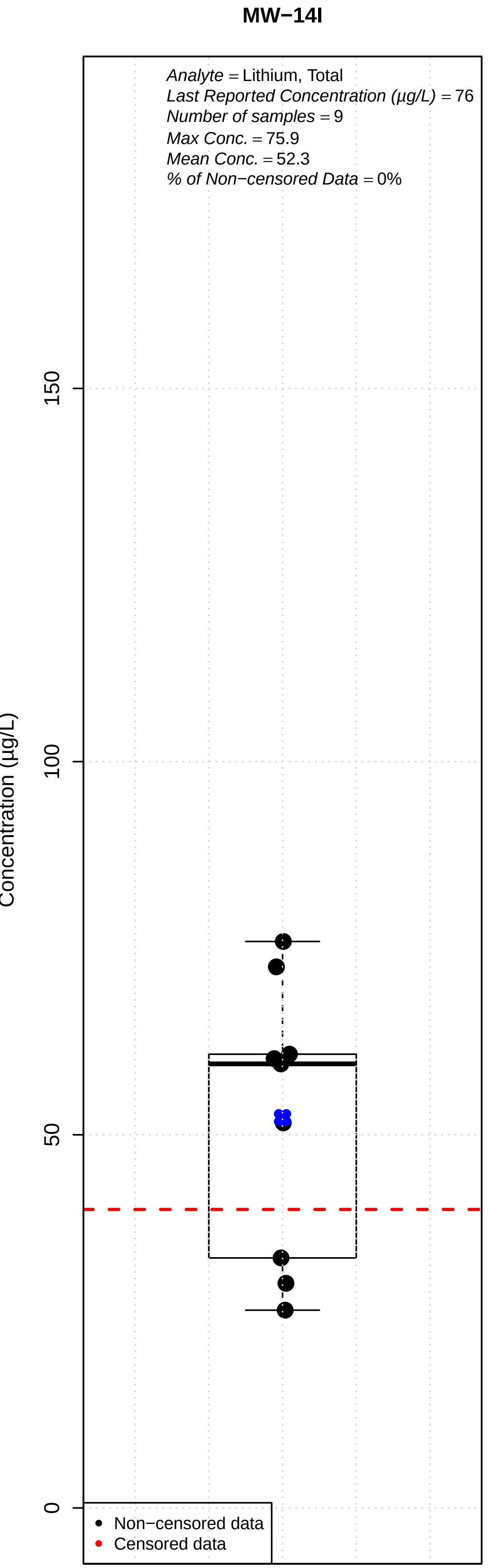

MW−13D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 13
Max Conc. = 20
Mean Conc. = 20
% of Non−censored Data = 100%
Concentration (µg/L)
Non−censored data
Censored data
MW−13D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R2 = NaN
Slope (µg/L per year) = 0
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Non−censored data
Censored data
Date

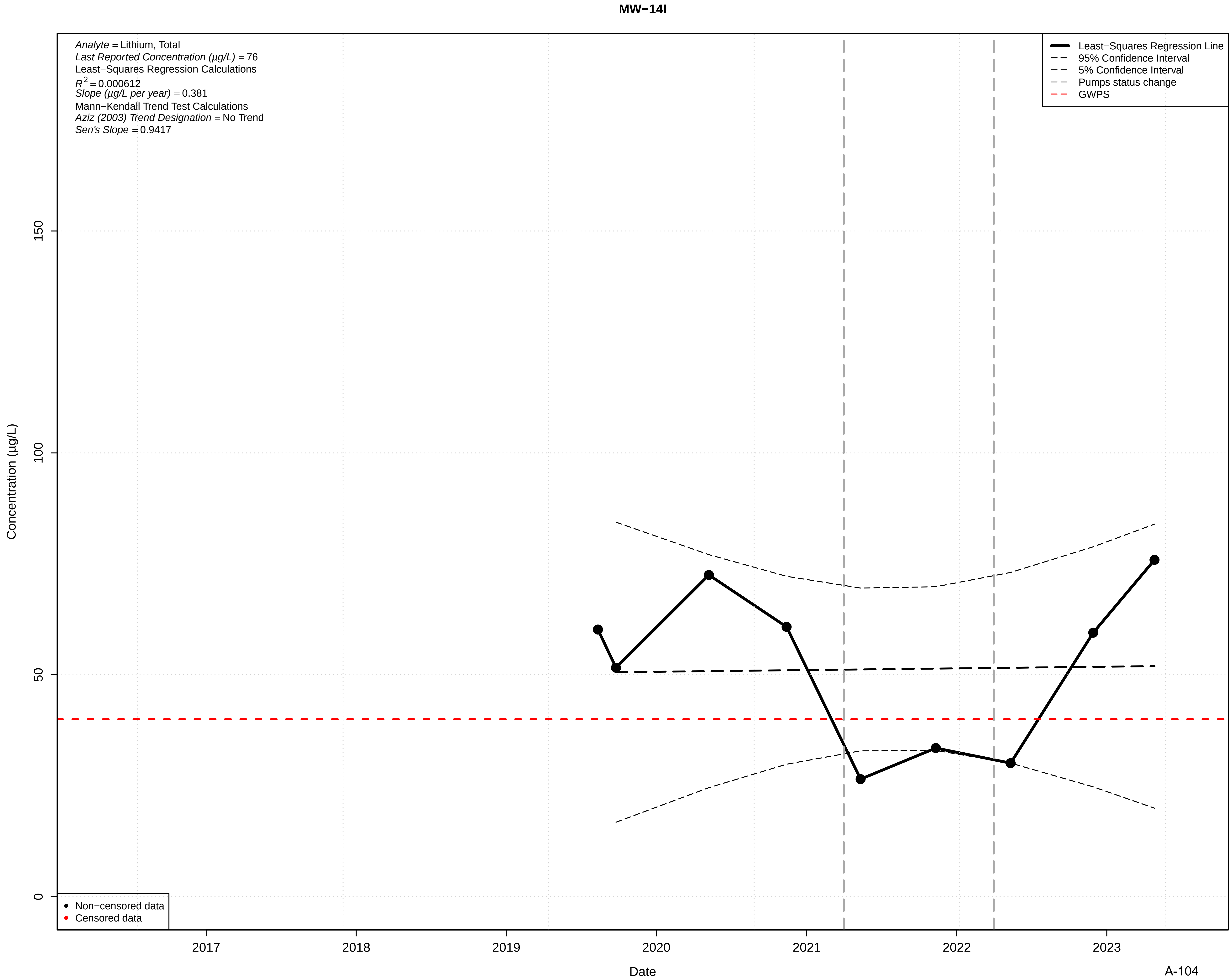


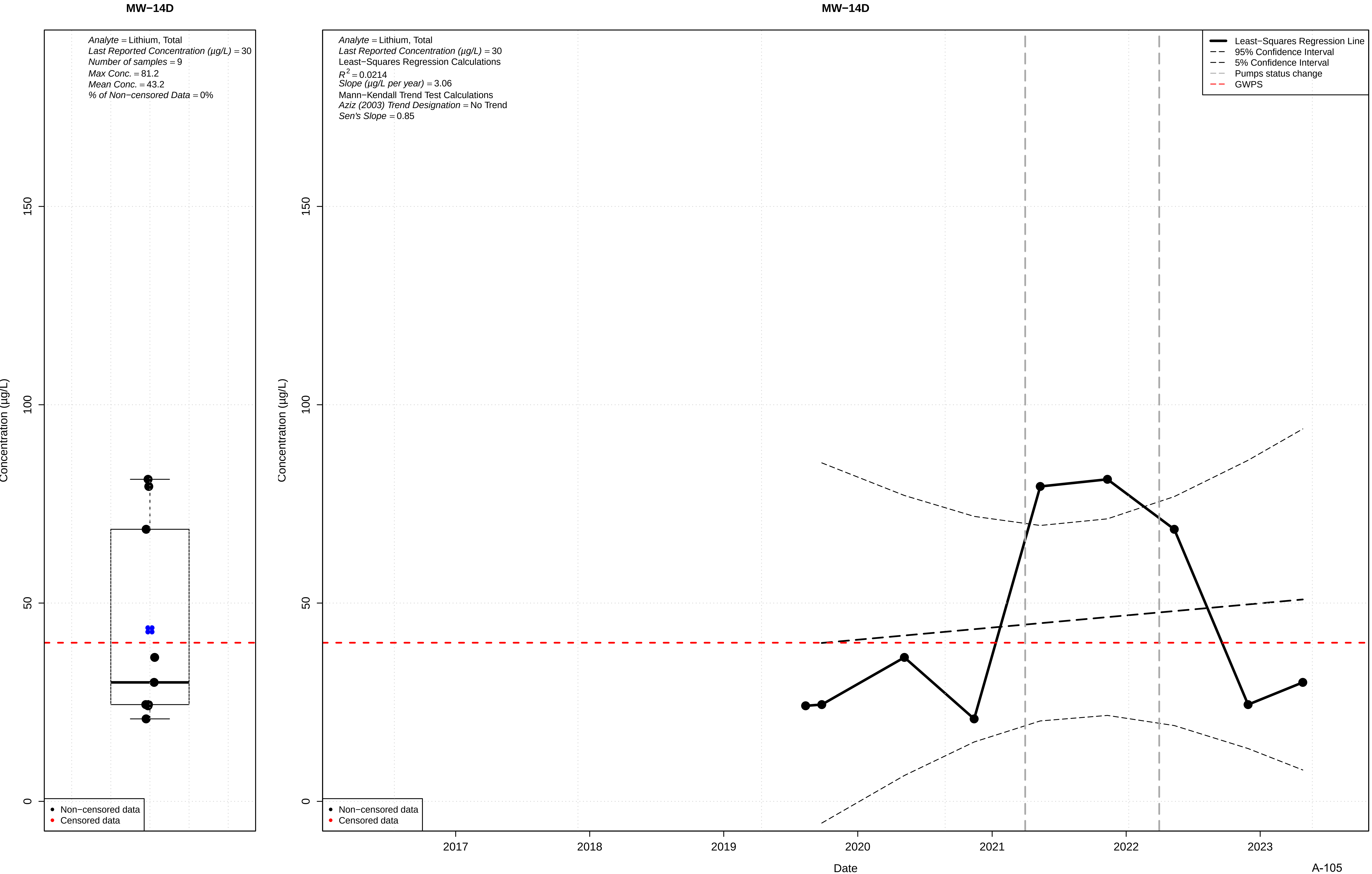
MW−14S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 9
Max Conc. = 21.7
Mean Conc. = 20.2
% of Non−censored Data = 67%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data



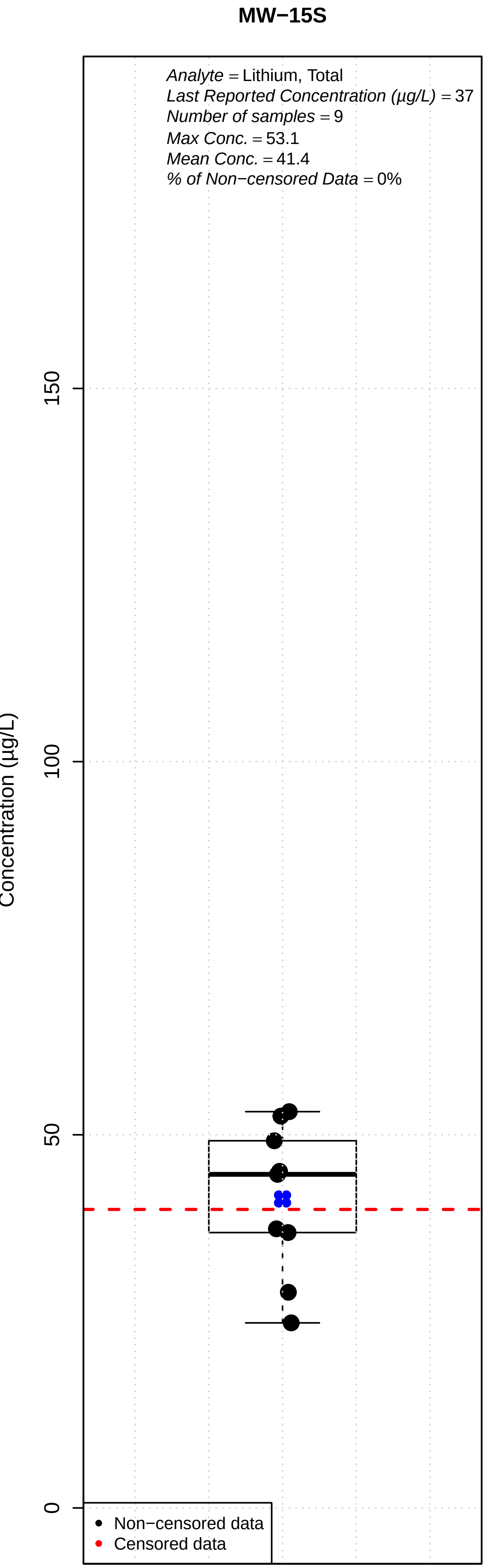
MW−14S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R^2 = 0.00731
Slope (µg/L per year) = −0.0405
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−14I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 76
Number of samples = 9
Max Conc. = 75.9
Mean Conc. = 52.3
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

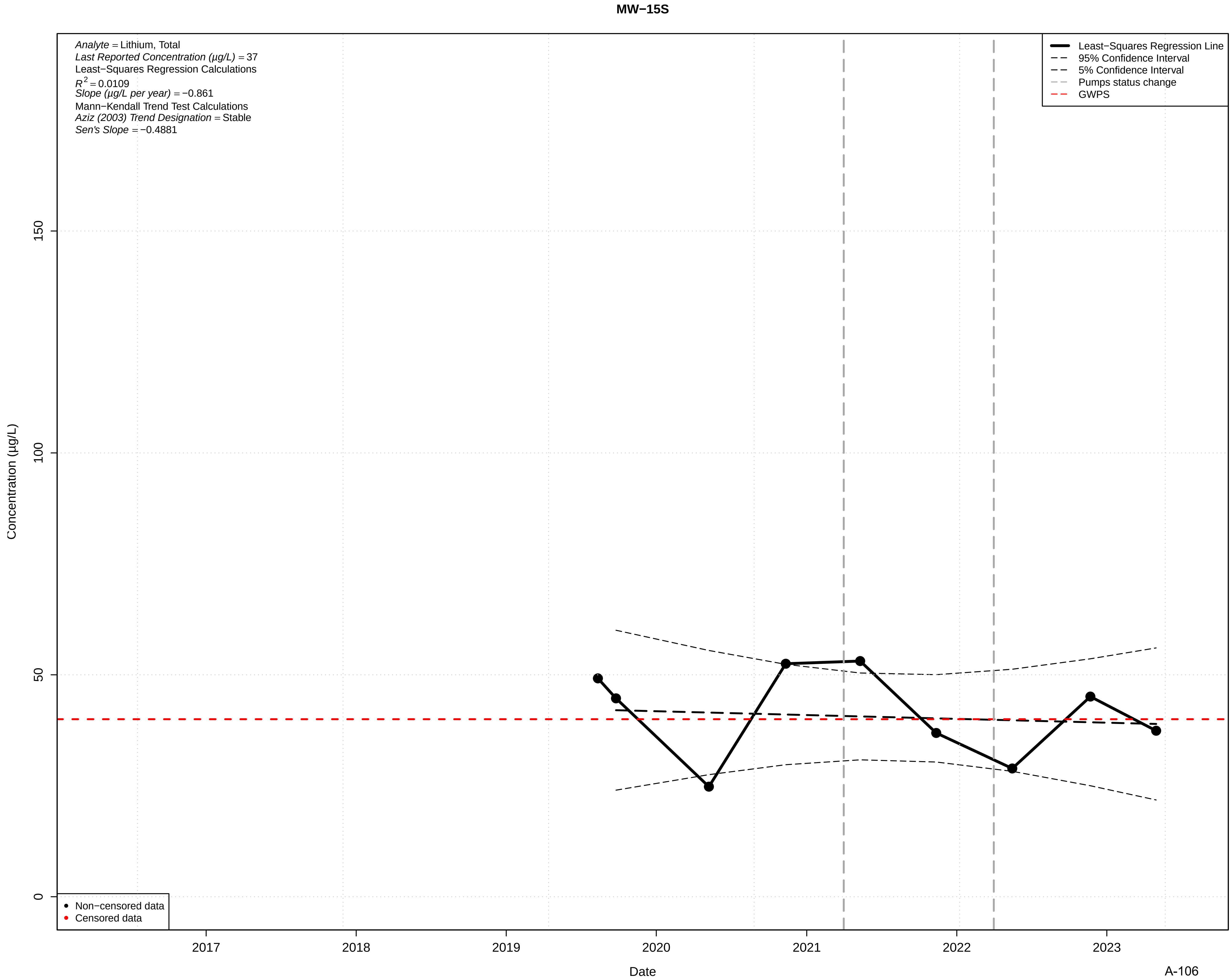

MW−14I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 76
Least−Squares Regression Calculations
R^2 = 0.000612
Slope (µg/L per year) = 0.381
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.9417
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date



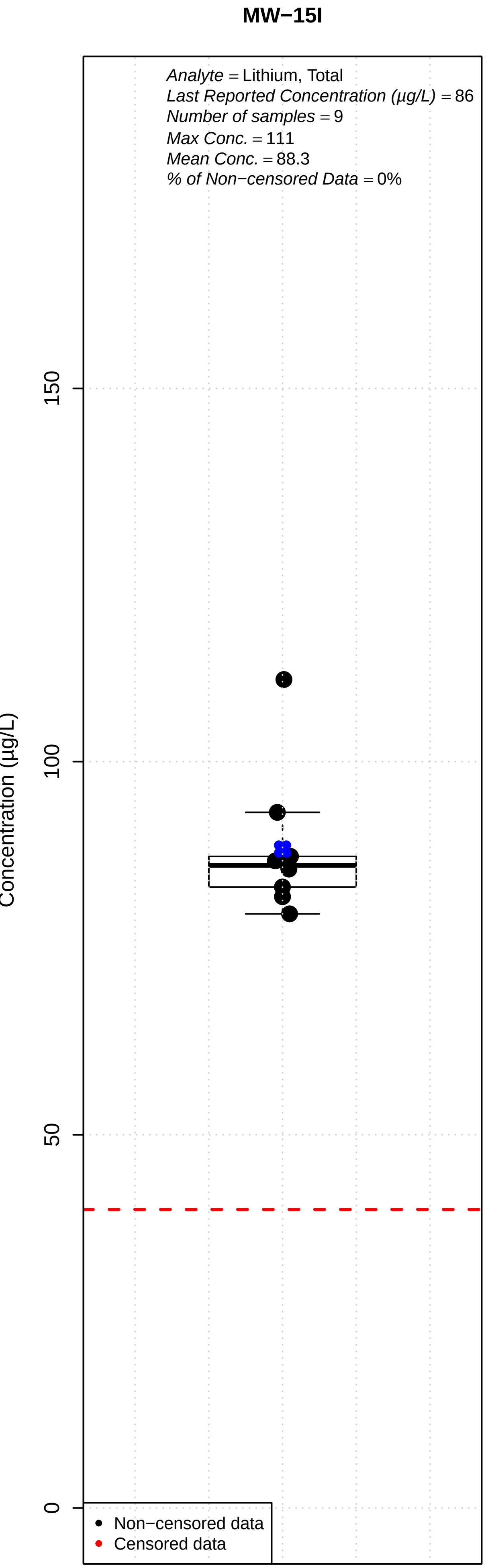
MW−14D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 30
Number of samples = 9
Max Conc. = 81.2
Mean Conc. = 43.2
% of Non−censored Data = 0%
Concentration (µg/L)
Non−censored data
Censored data
MW−14D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 30
Least−Squares Regression Calculations
R^2 = 0.0214
Slope (µg/L per year) = 3.06
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.85
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Non−censored data
Censored data
Date

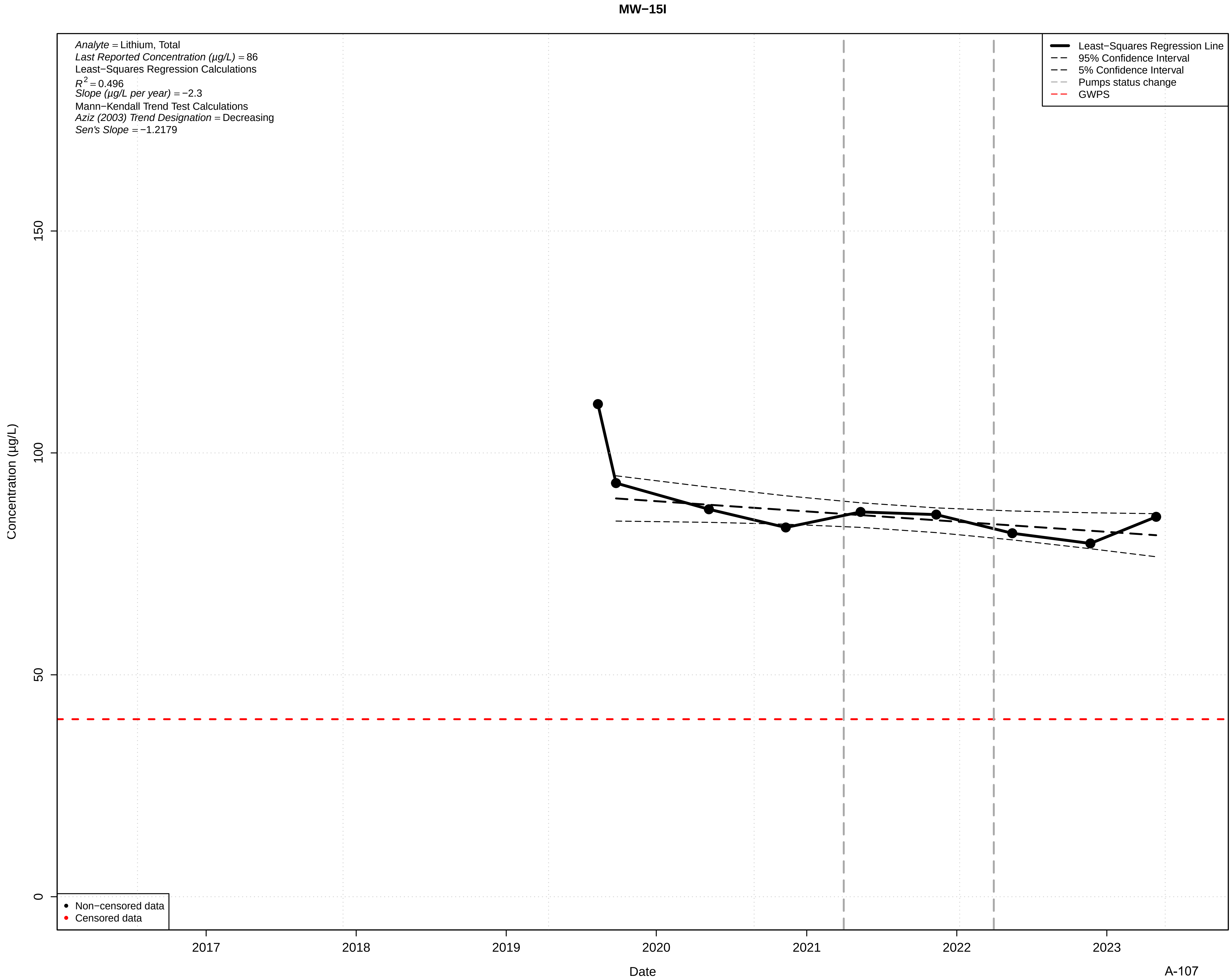


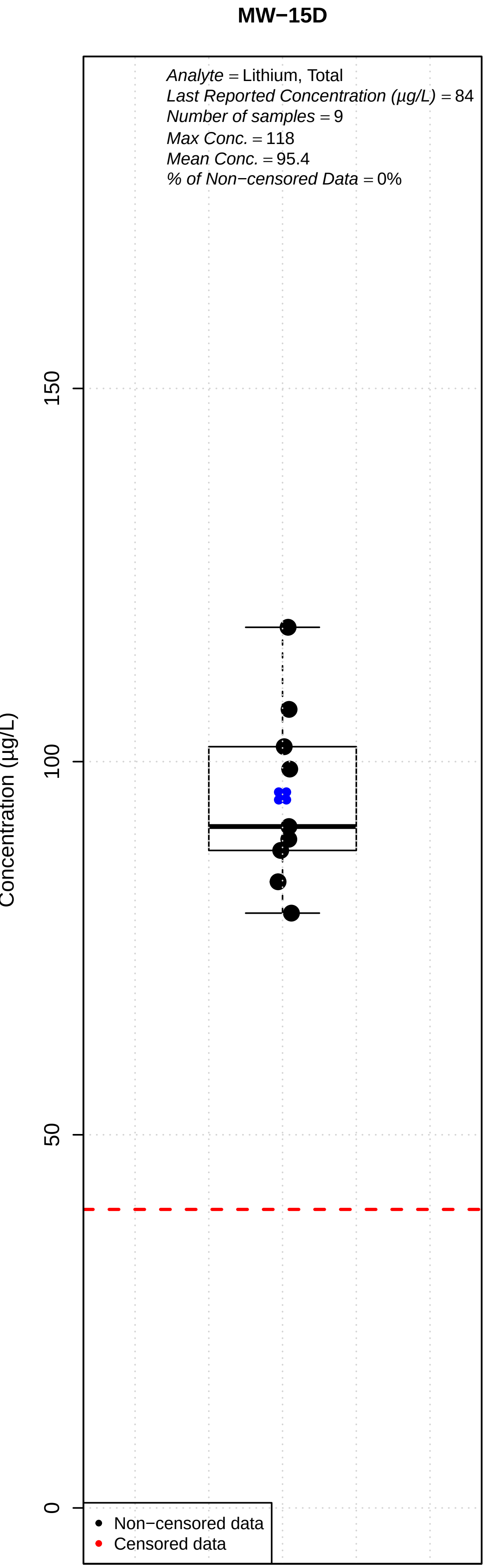
MW−15S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 37
Number of samples = 9
Max Conc. = 53.1
Mean Conc. = 41.4
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

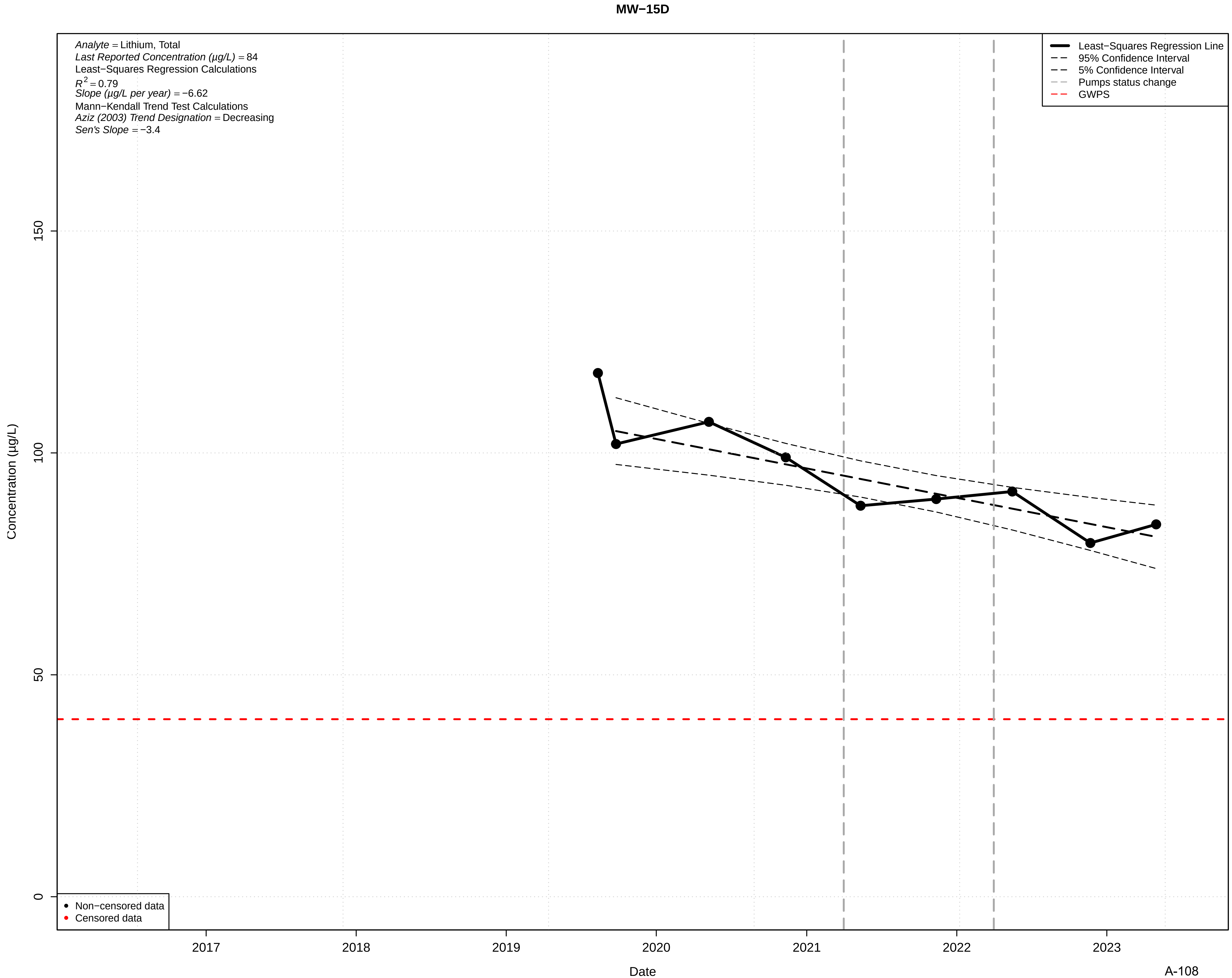


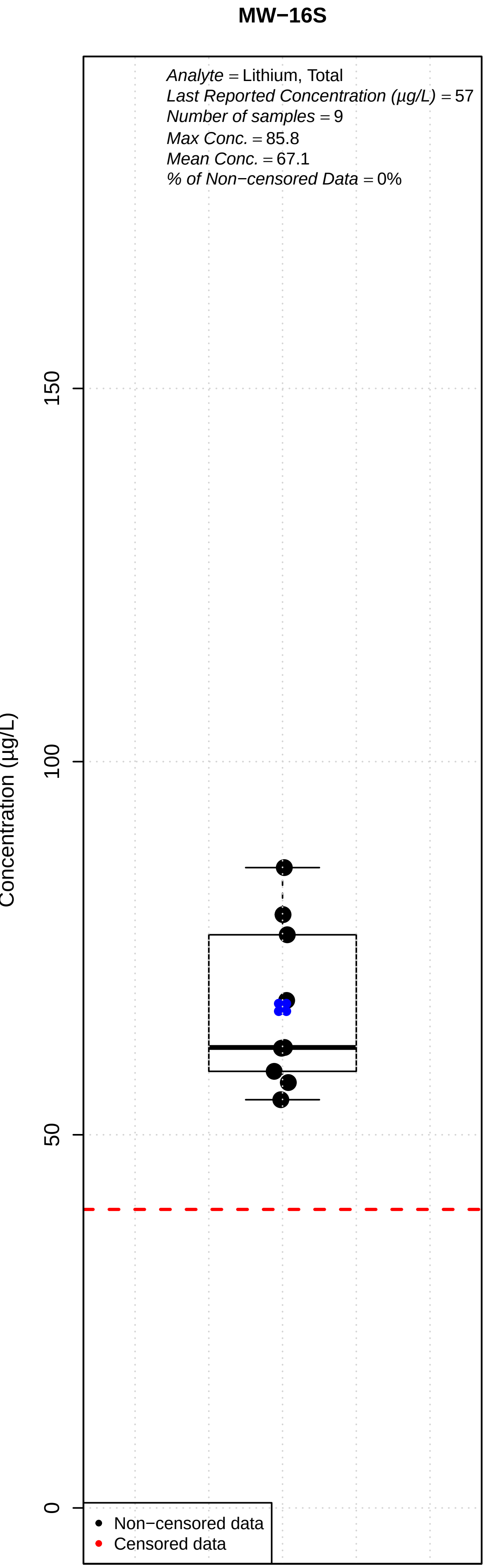
MW−15S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 37
Least−Squares Regression Calculations
R2 = 0.0109
Slope (µg/L per year) = −0.861
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.4881
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

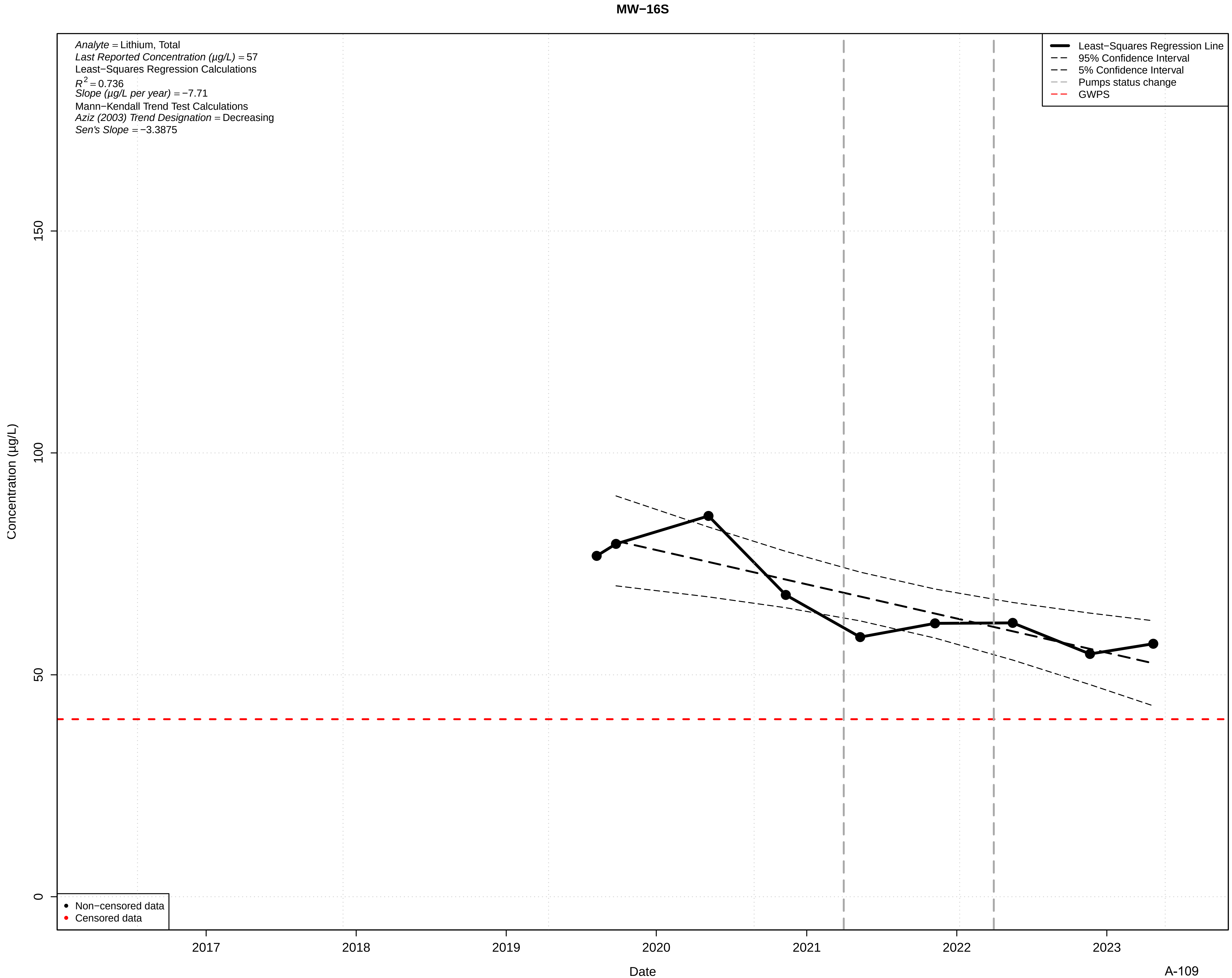

MW−15I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 86
Number of samples = 9
Max Conc. = 111
Mean Conc. = 88.3
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data


MW−15I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 86
Least−Squares Regression Calculations
R^2 = 0.496
Slope (µg/L per year) = −2.3
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −1.2179
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−15D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 84
Number of samples = 9
Max Conc. = 118
Mean Conc. = 95.4
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data


MW−15D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 84
Least−Squares Regression Calculations
R^2 = 0.79
Slope (µg/L per year) = −6.62
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −3.4
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−16S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 57
Number of samples = 9
Max Conc. = 85.8
Mean Conc. = 67.1
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data


MW−16S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 57
Least−Squares Regression Calculations
R^2 = 0.736
Slope (µg/L per year) = −7.71
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −3.3875
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
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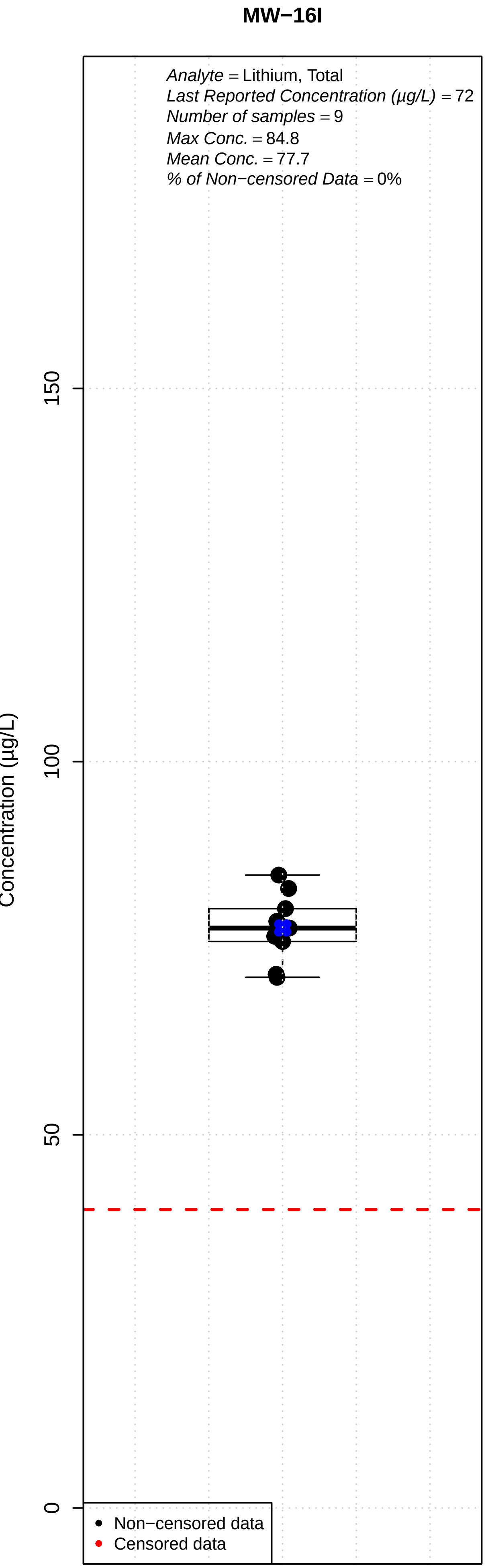
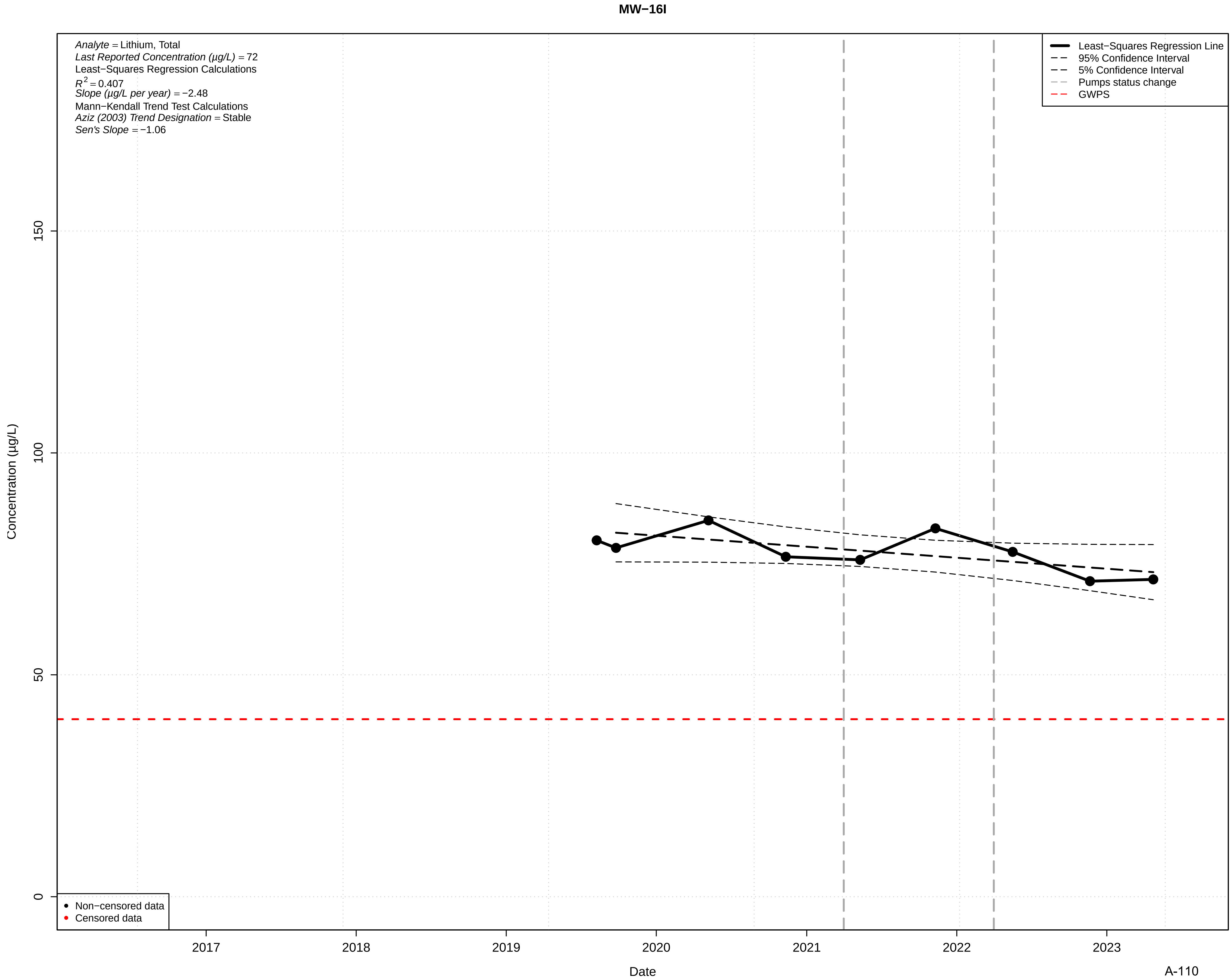
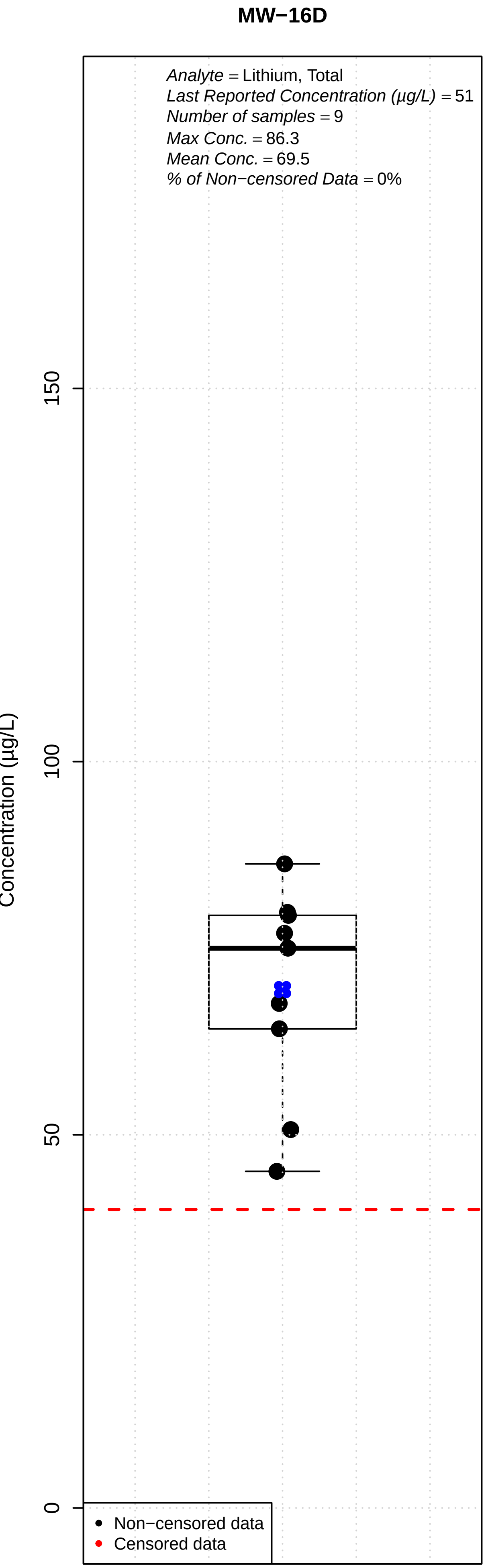
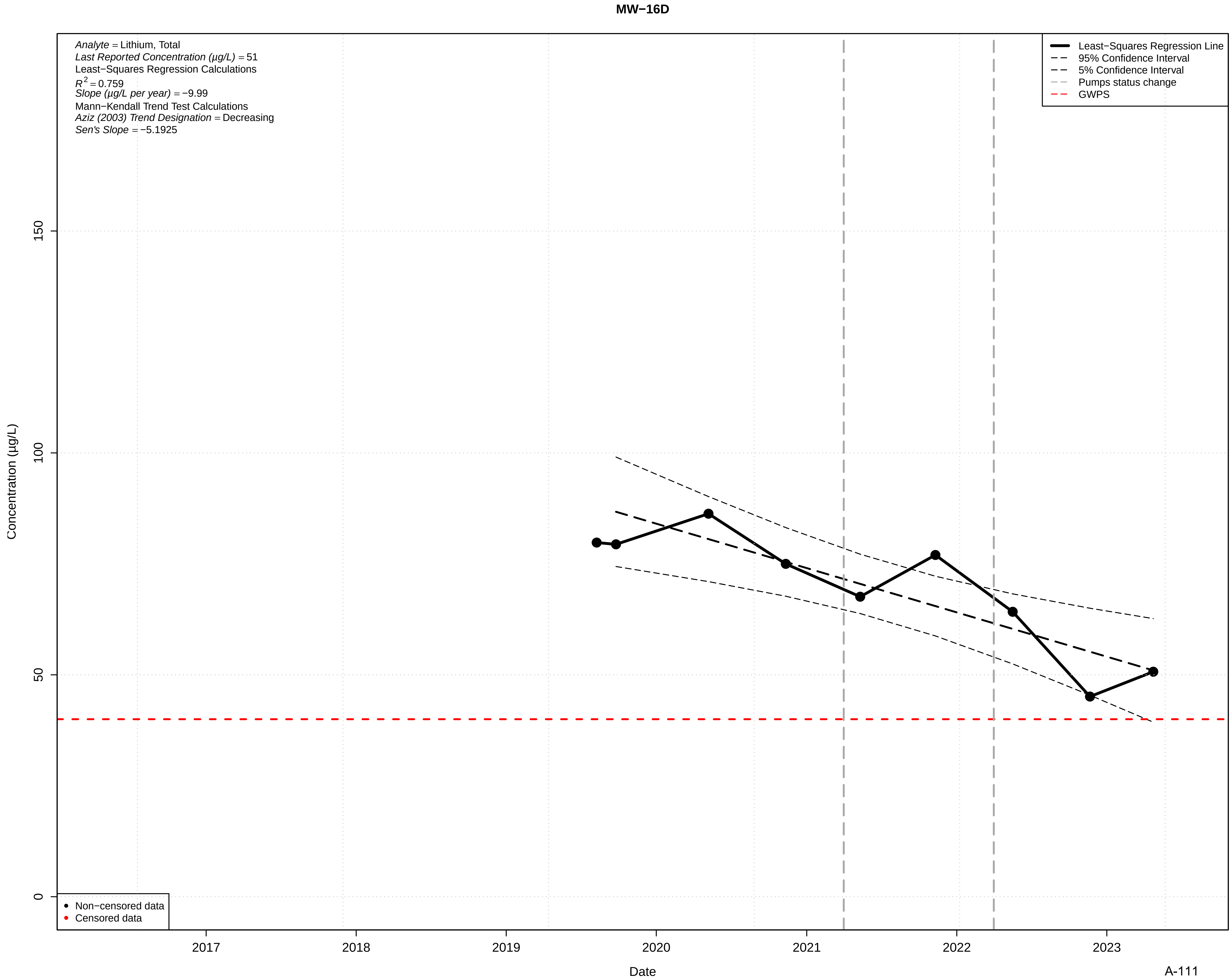
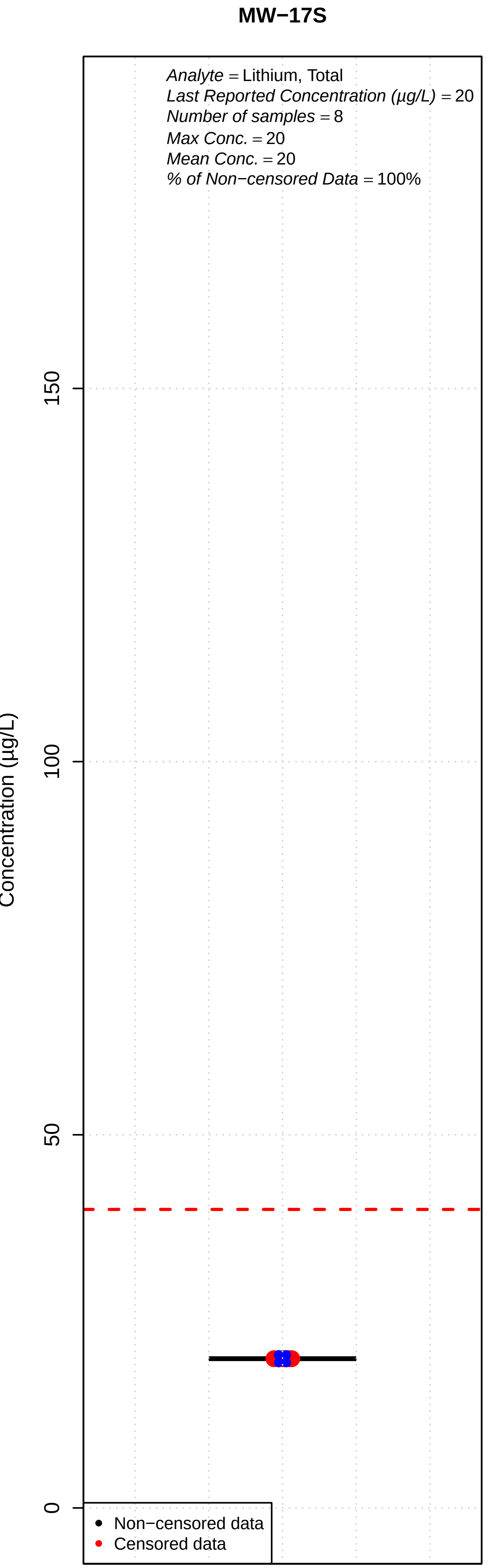
2020
2021
2022
2023
Date

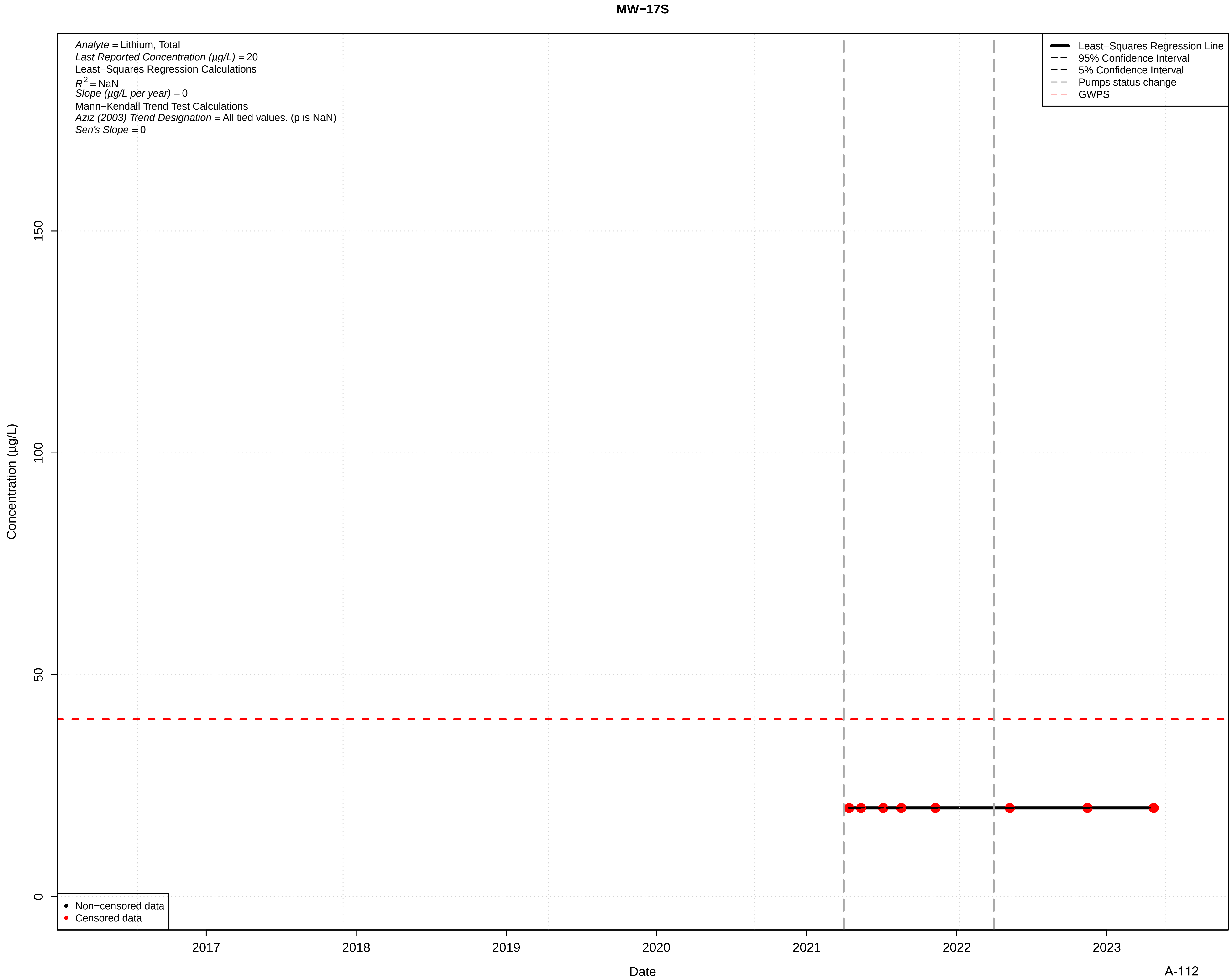

MW−16I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 72
Number of samples = 9
Max Conc. = 84.8
Mean Conc. = 77.7
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

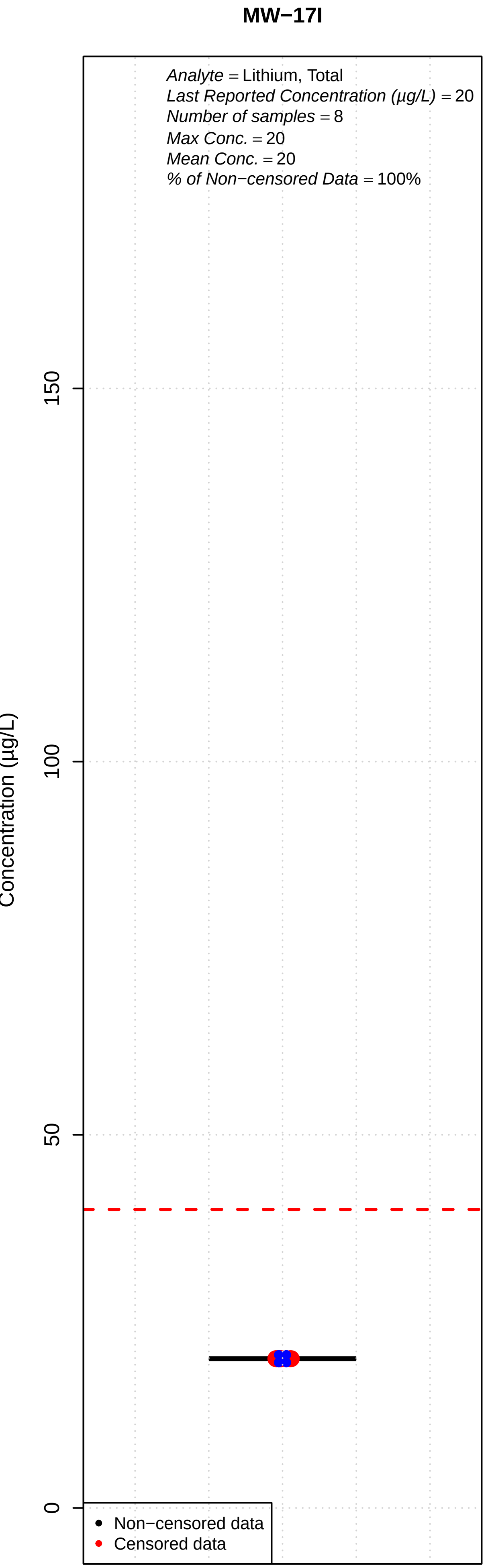

MW−16I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 72
Least−Squares Regression Calculations
R^2 = 0.407
Slope (µg/L per year) = −2.48
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −1.06
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

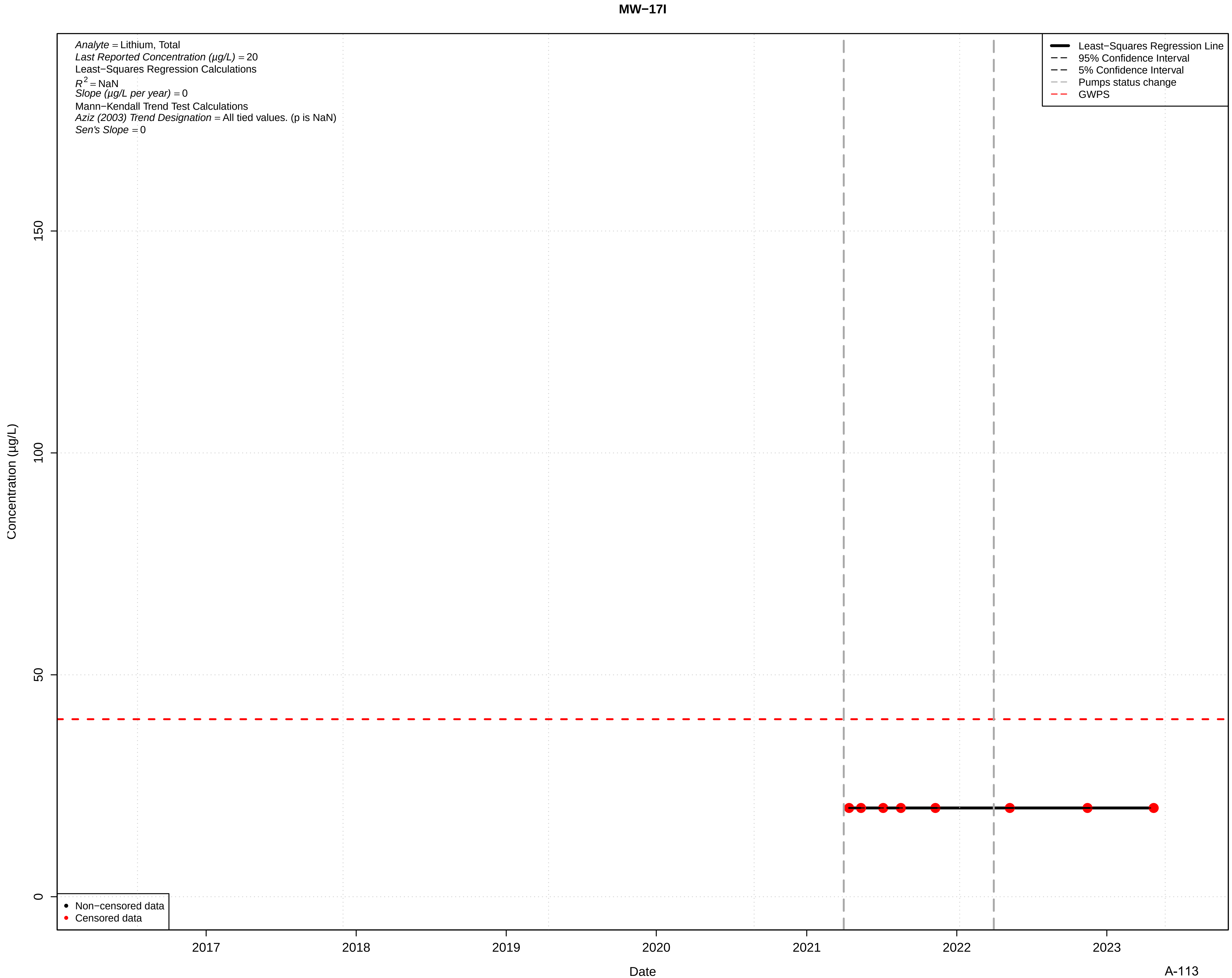

MW−16D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 51
Number of samples = 9
Max Conc. = 86.3
Mean Conc. = 69.5
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

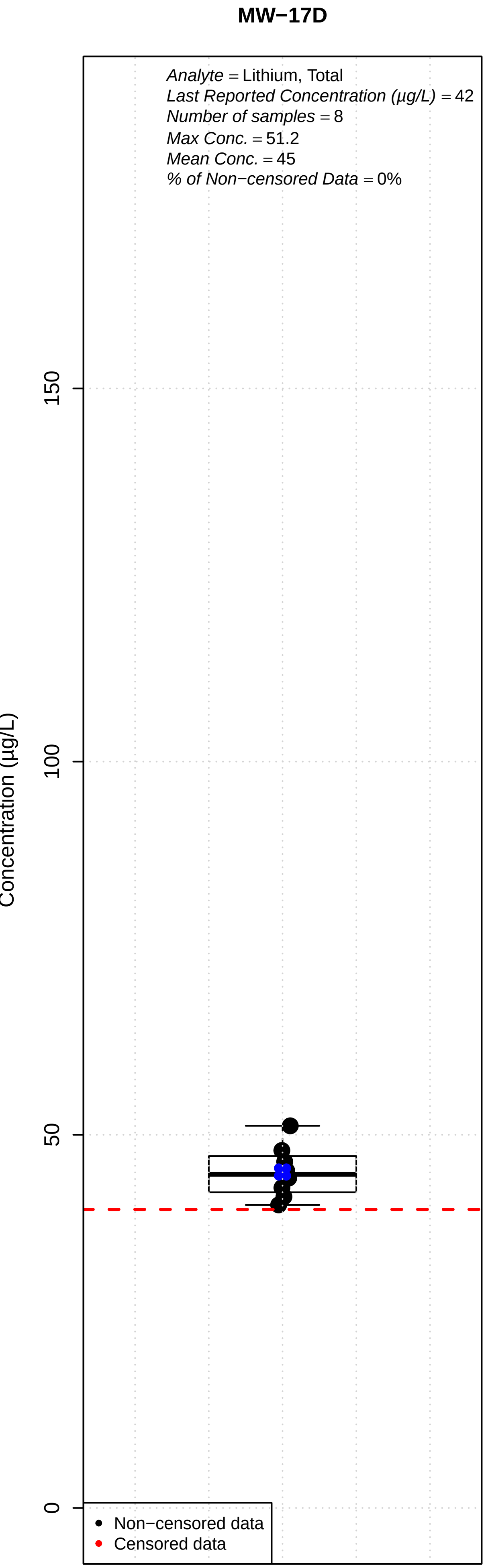

MW−16D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 51
Least−Squares Regression Calculations
R² = 0.759
Slope (µg/L per year) = −9.99
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −5.1925
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

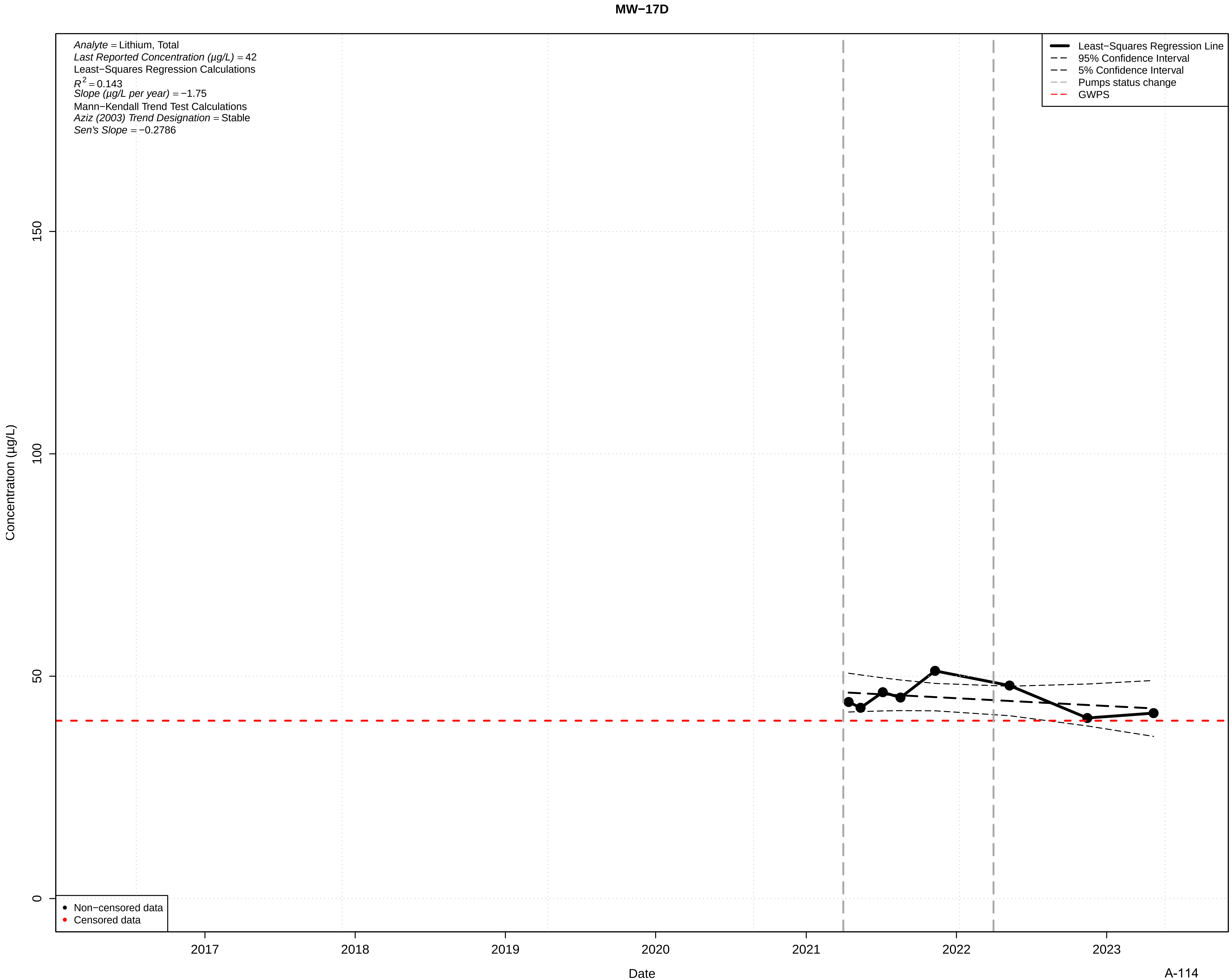

MW−17S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 8
Max Conc. = 20
Mean Conc. = 20
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

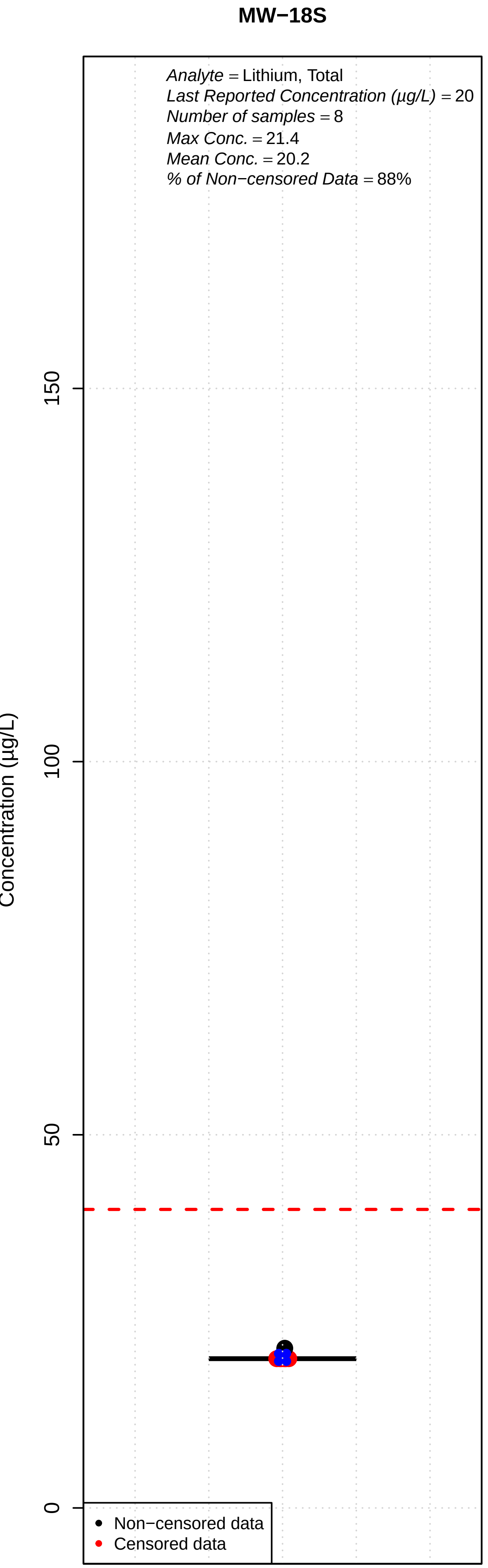

MW−17S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R^2 = NaN
Slope (µg/L per year) = 0
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

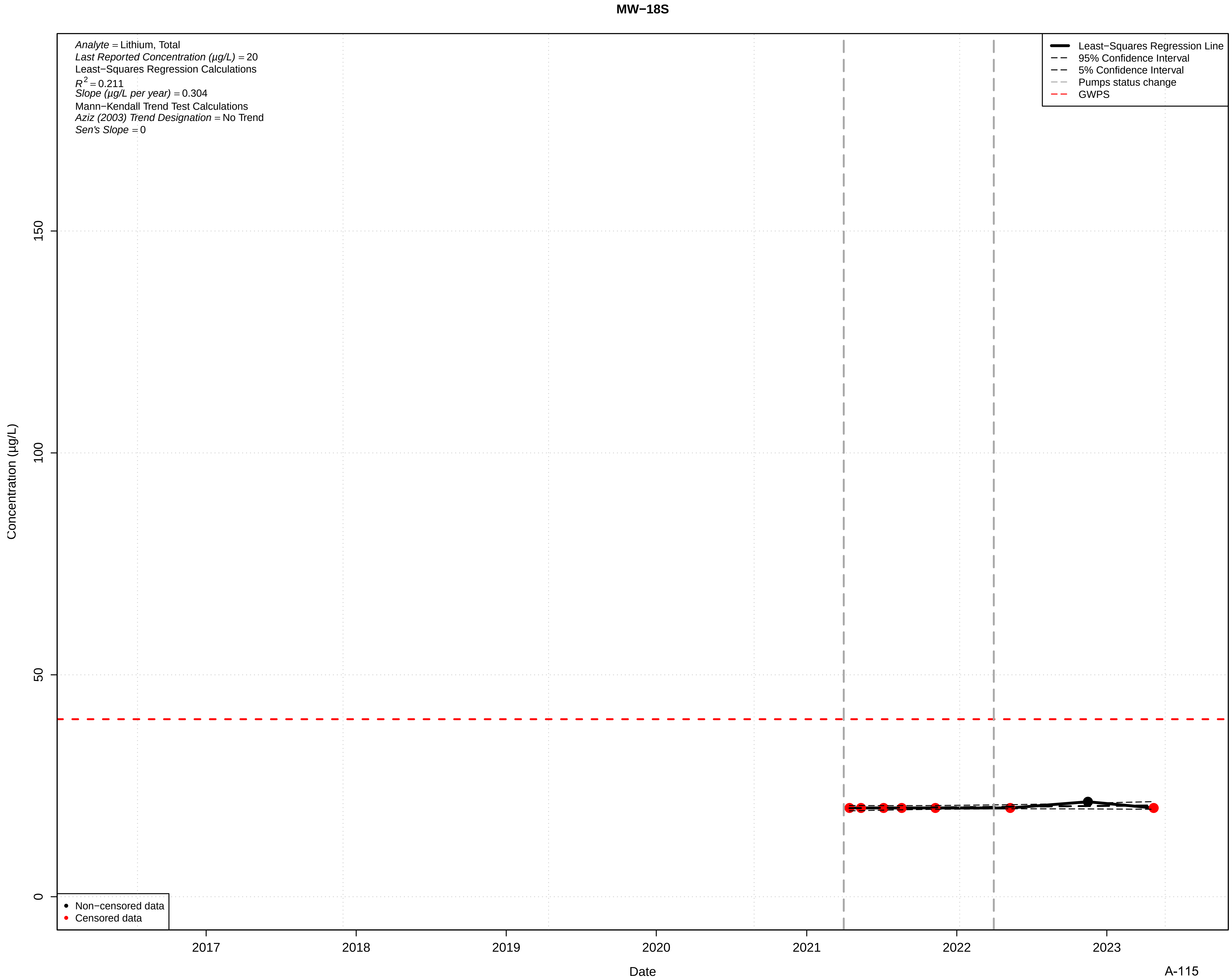

MW−17I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 8
Max Conc. = 20
Mean Conc. = 20
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

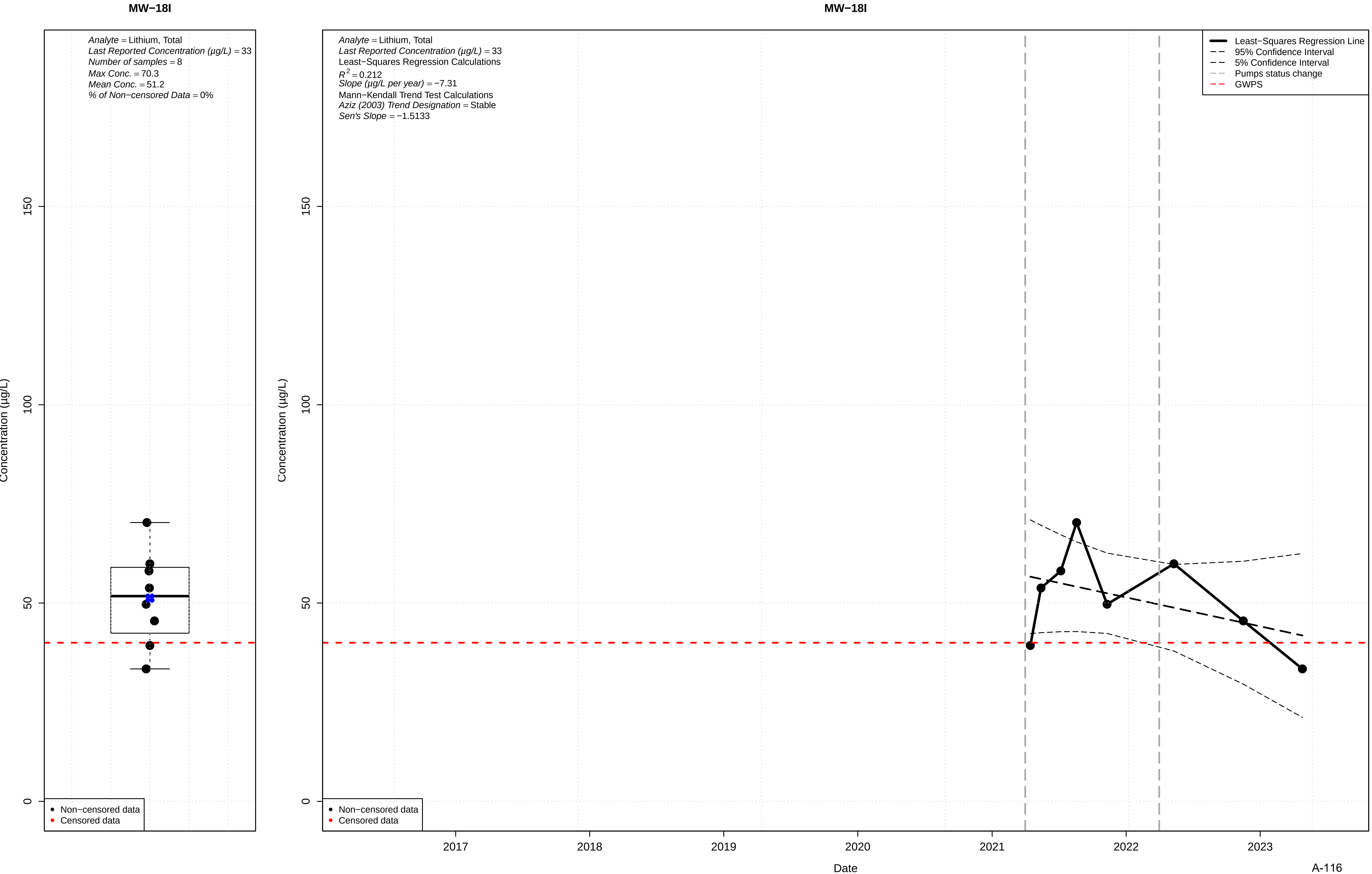

MW−17I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R^2 = NaN
Slope (µg/L per year) = 0
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−17D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 42
Number of samples = 8
Max Conc. = 51.2
Mean Conc. = 45
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

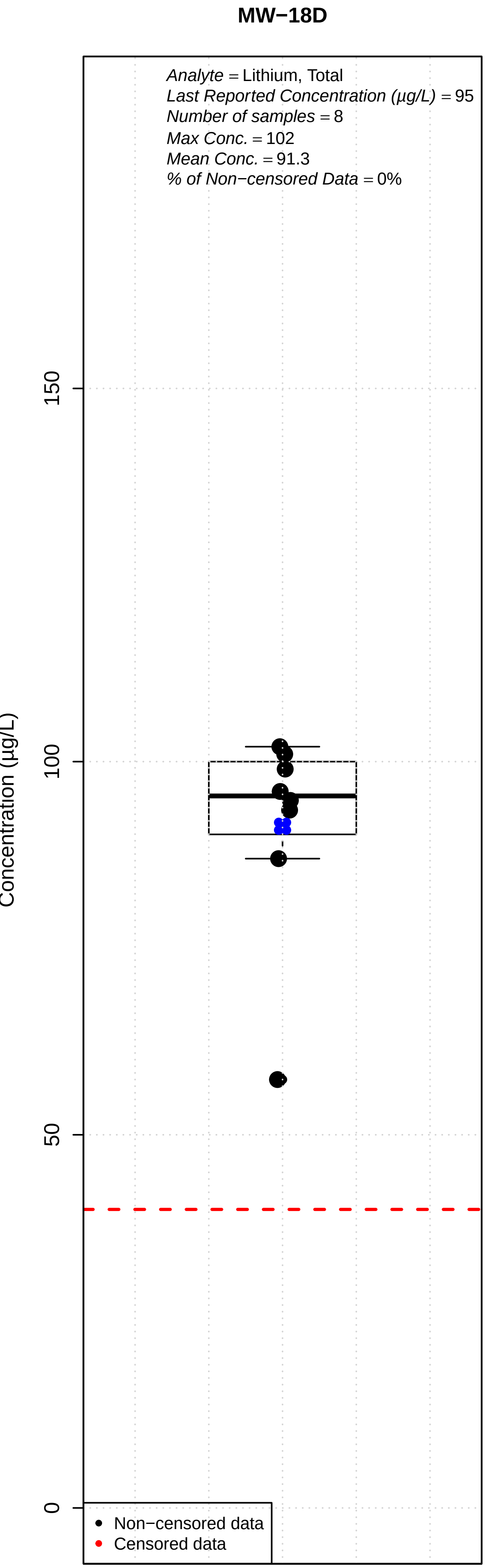

MW−17D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 42
Least−Squares Regression Calculations
R^2 = 0.143
Slope (µg/L per year) = −1.75
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.2786
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

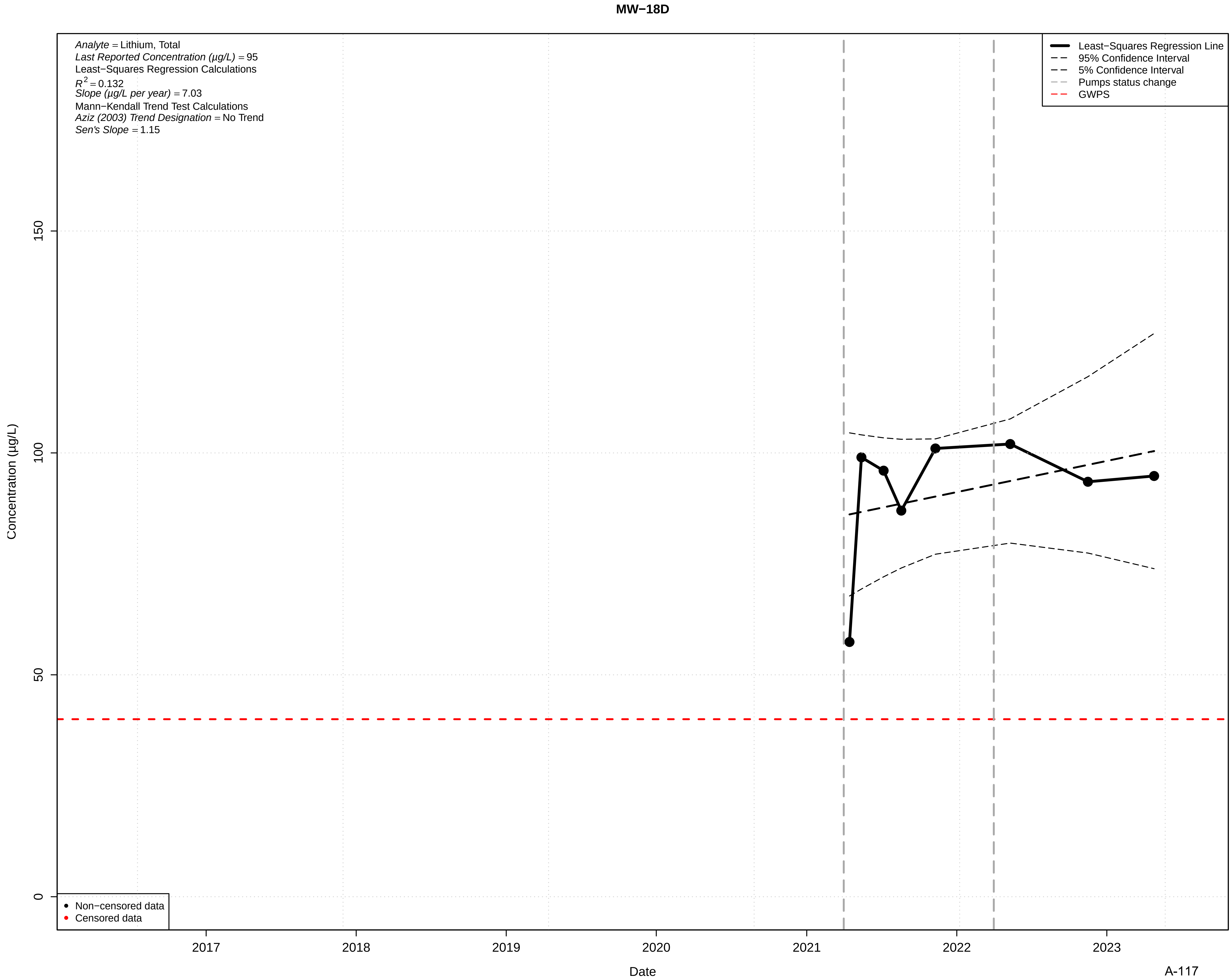

MW−18S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 8
Max Conc. = 21.4
Mean Conc. = 20.2
% of Non−censored Data = 88%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

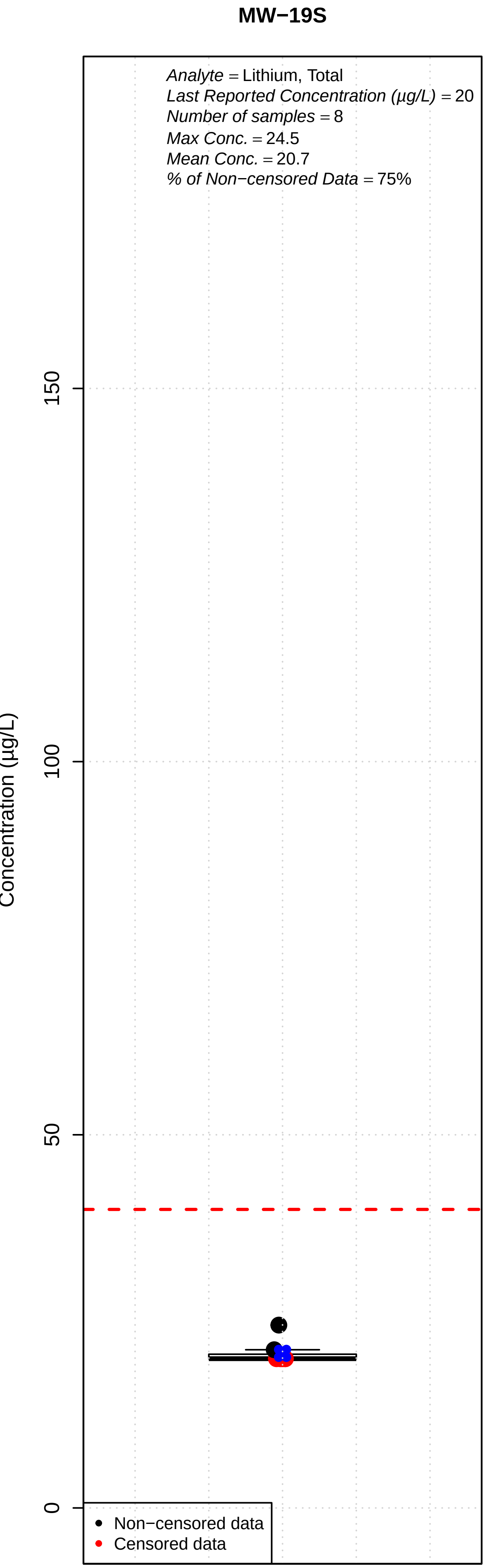

MW−18S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R2 = 0.211
Slope (µg/L per year) = 0.304
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data



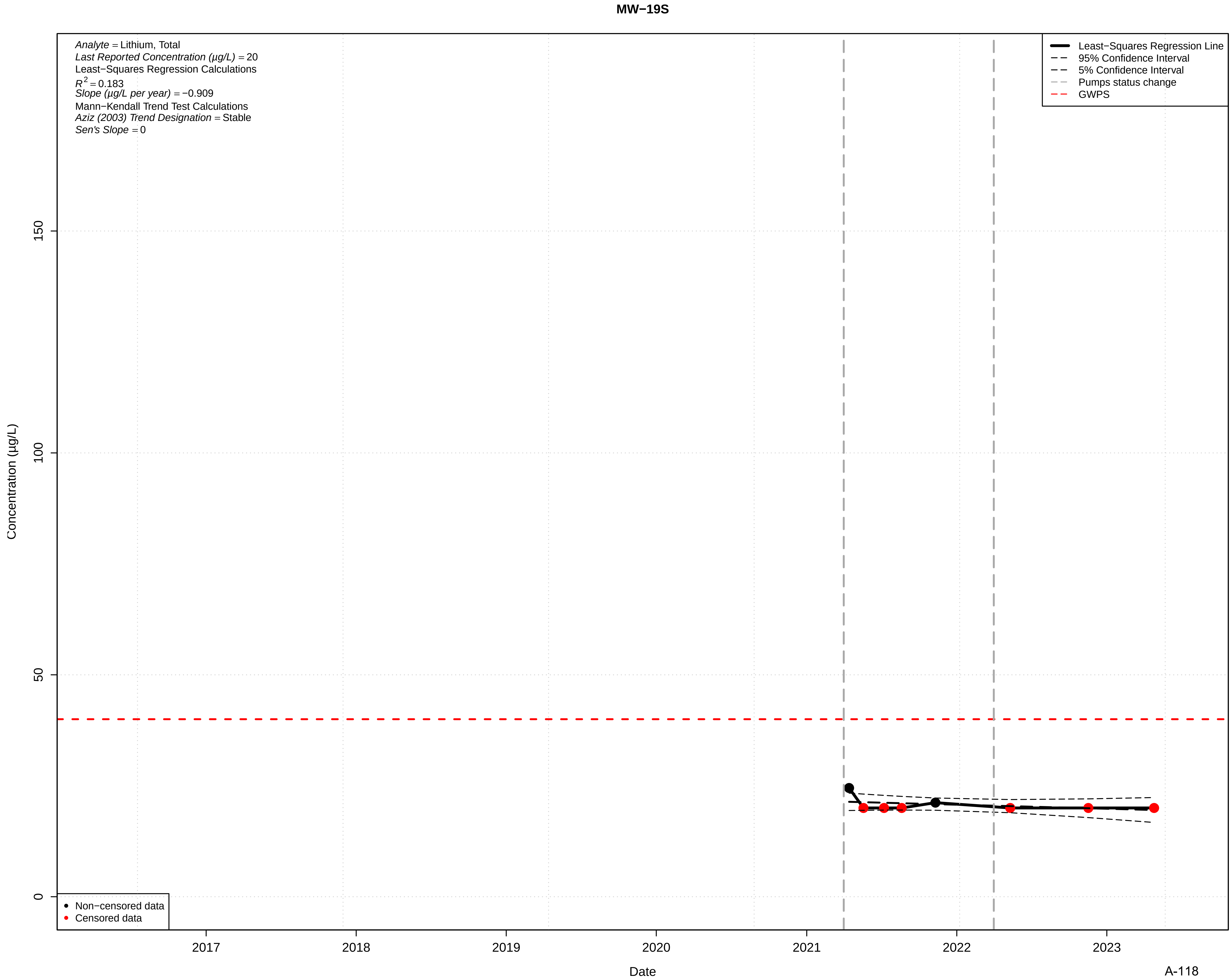
MW−18I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 33
Number of samples = 8
Max Conc. = 70.3
Mean Conc. = 51.2
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
MW−18I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 33
Least−Squares Regression Calculations
R2 = 0.212
Slope (µg/L per year) = −7.31
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −1.5133
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−18D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 95
Number of samples = 8
Max Conc. = 102
Mean Conc. = 91.3
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

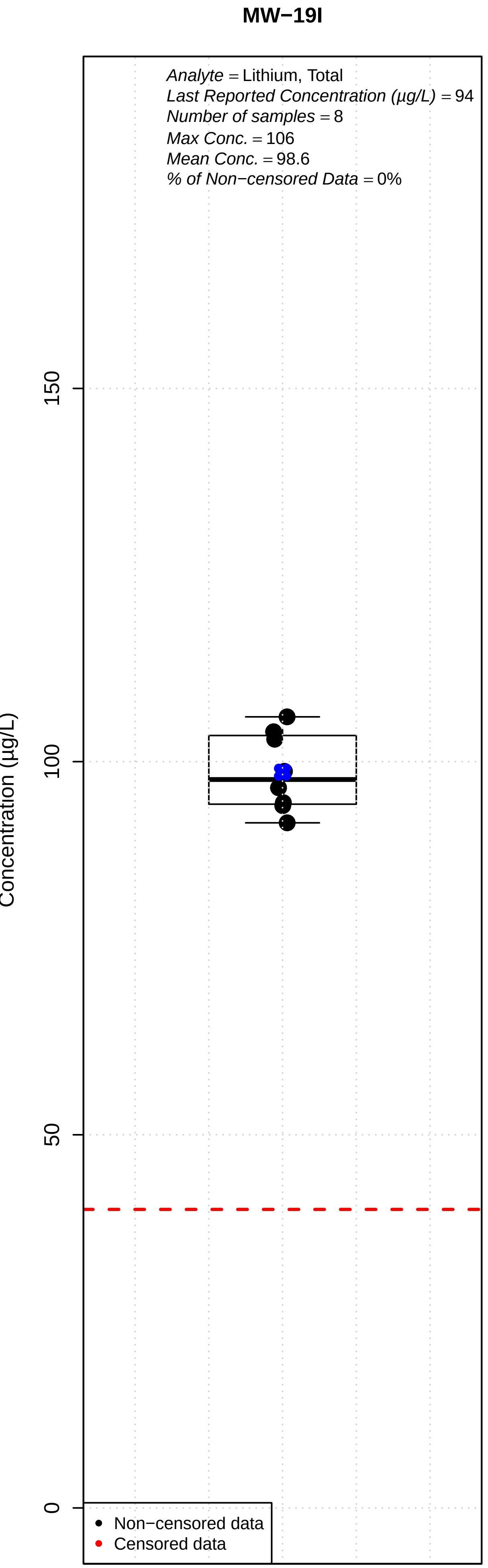

MW−18D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 95
Least−Squares Regression Calculations
R2 = 0.132
Slope (µg/L per year) = 7.03
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 1.15
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

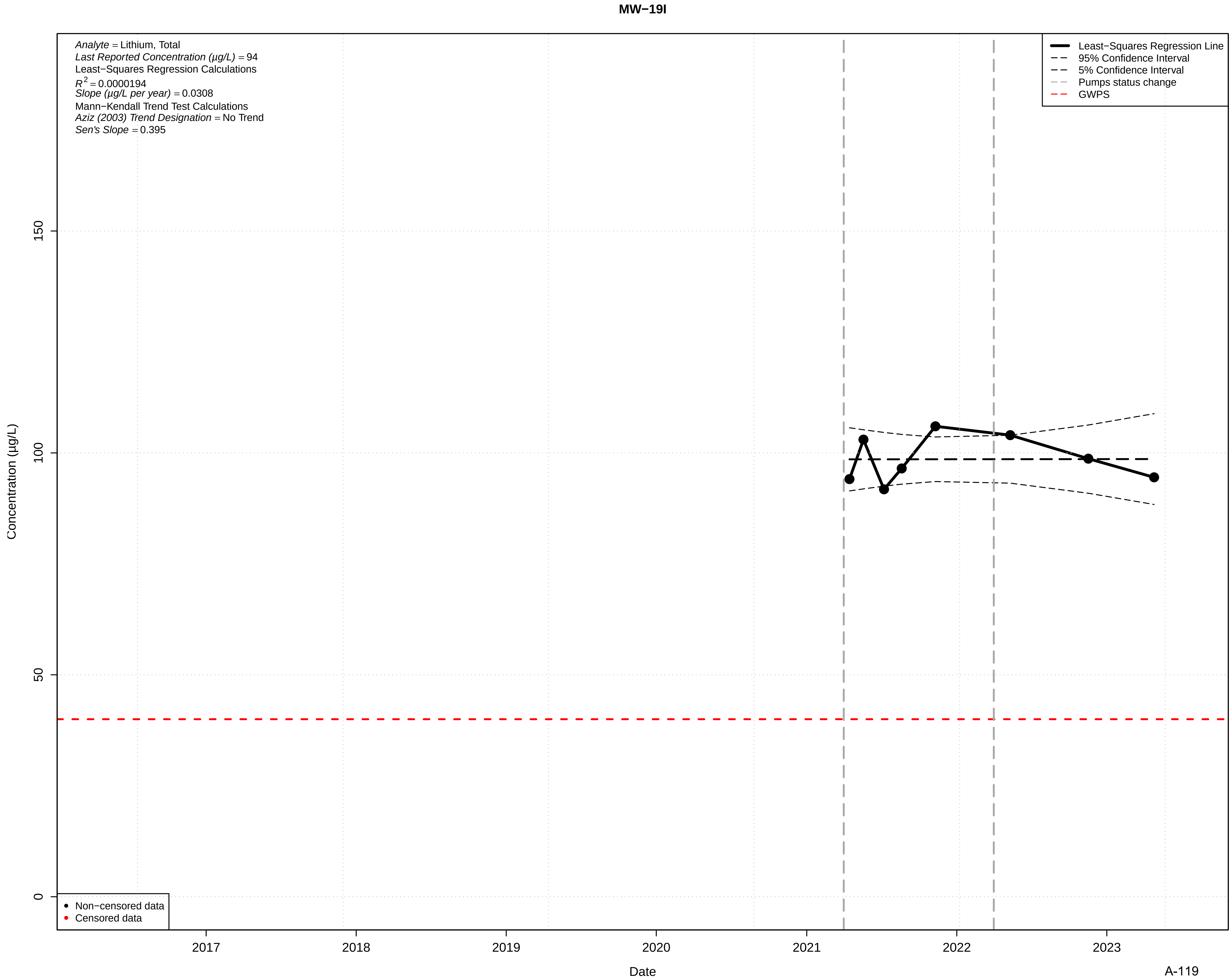


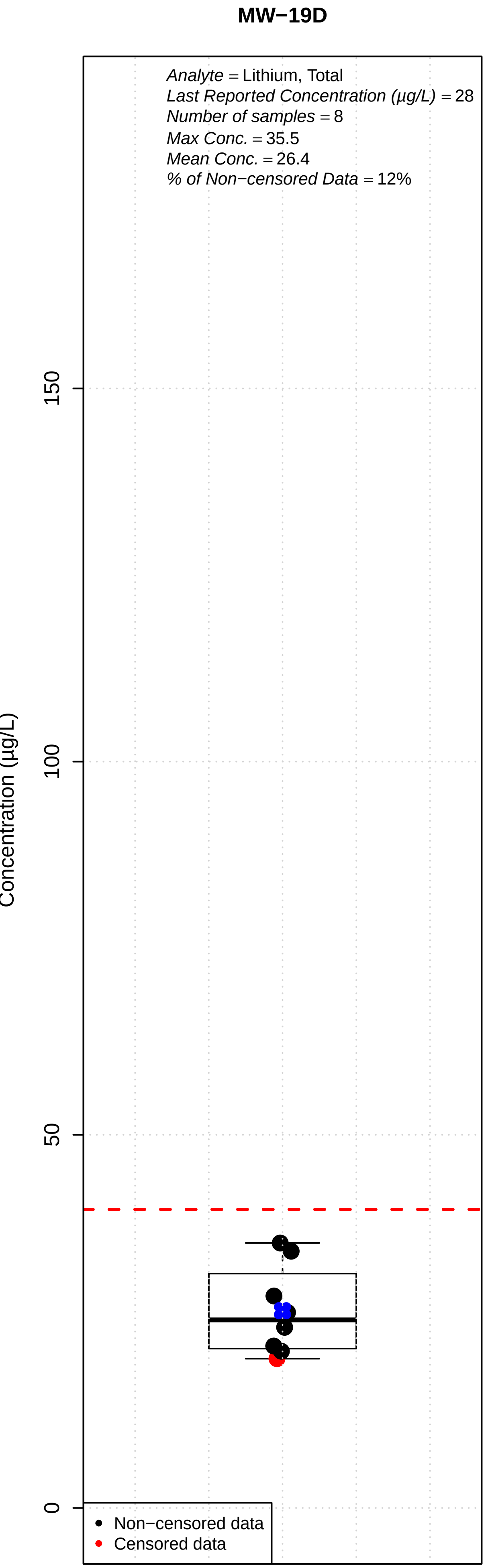
MW−19S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 8
Max Conc. = 24.5
Mean Conc. = 20.7
% of Non−censored Data = 75%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

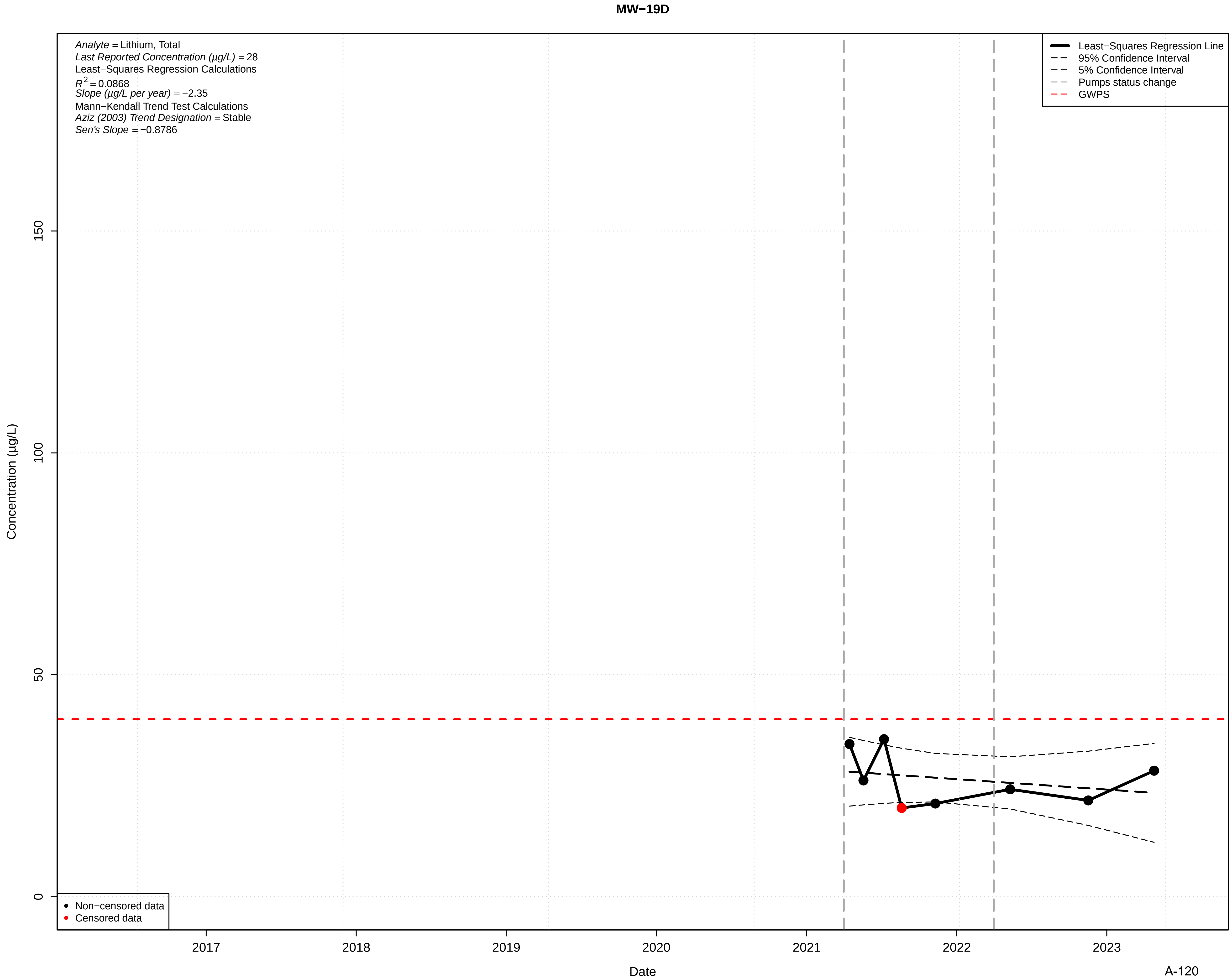


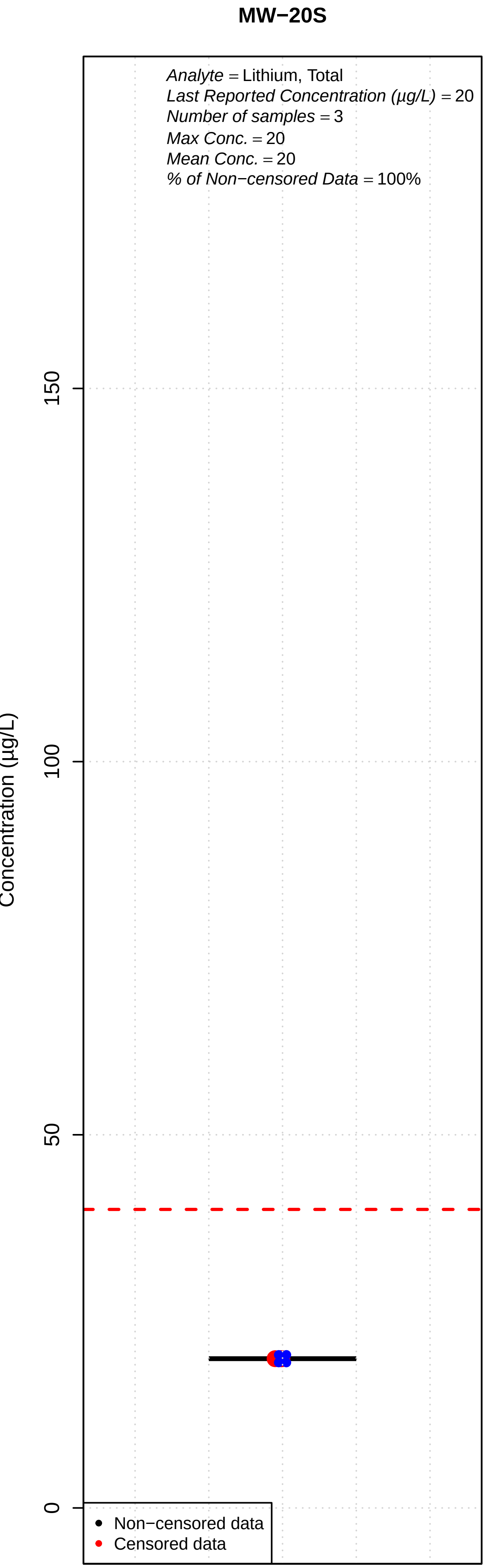
MW−19S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R2 = 0.183
Slope (µg/L per year) = −0.909
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−19I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 94
Number of samples = 8
Max Conc. = 106
Mean Conc. = 98.6
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

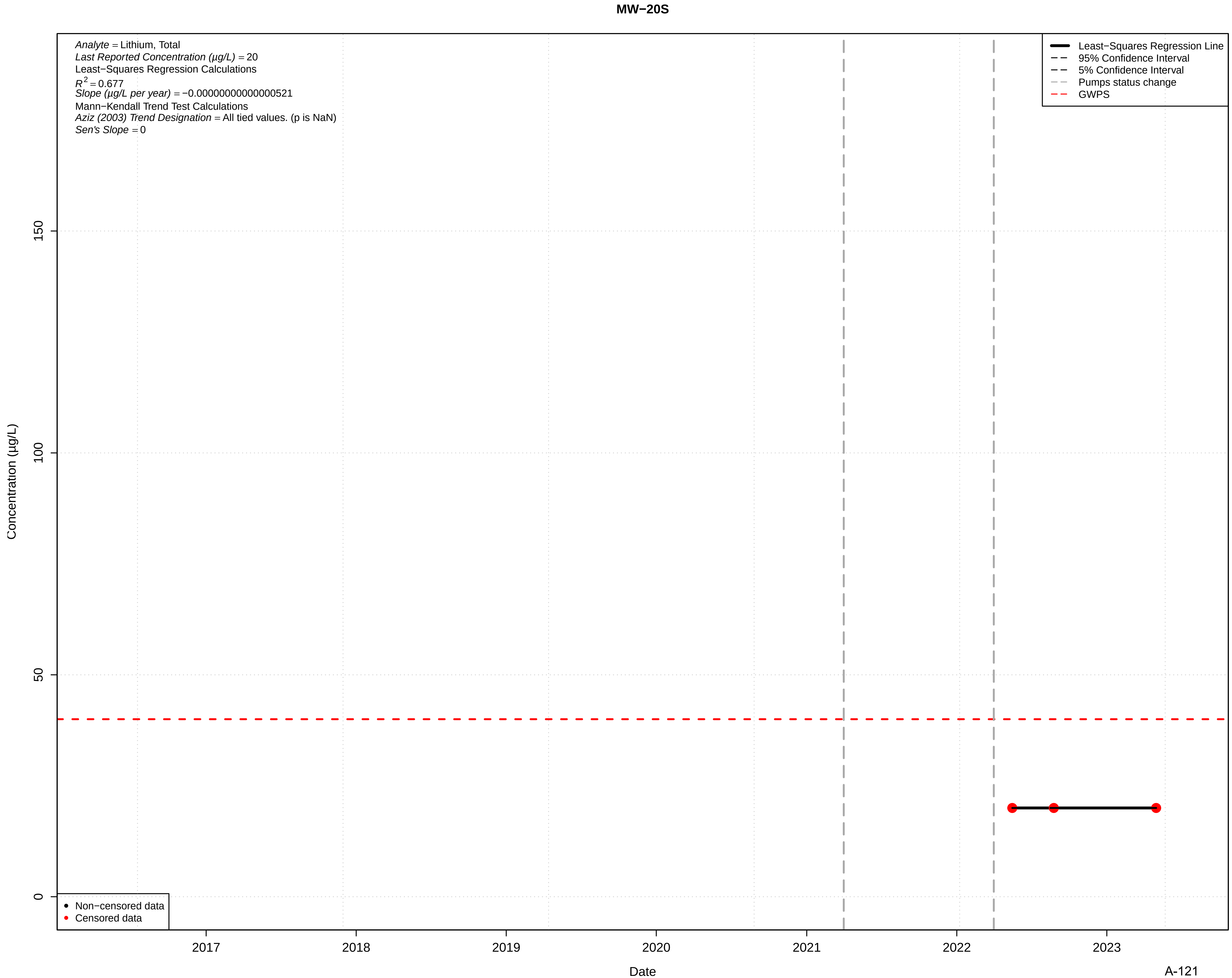

MW−19I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 94
Least−Squares Regression Calculations
R2 = 0.0000194
Slope (µg/L per year) = 0.0308
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.395
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−19D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 28
Number of samples = 8
Max Conc. = 35.5
Mean Conc. = 26.4
% of Non−censored Data = 12%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

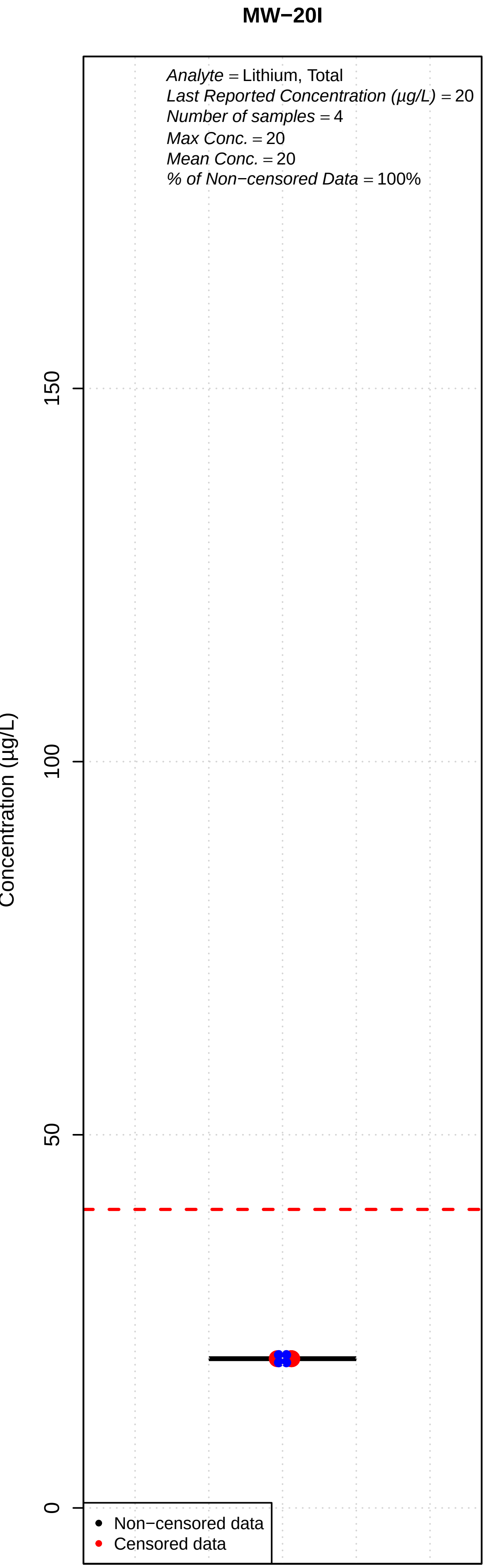

MW−19D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 28
Least−Squares Regression Calculations
R2 = 0.0868
Slope (µg/L per year) = −2.35
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.8786
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date



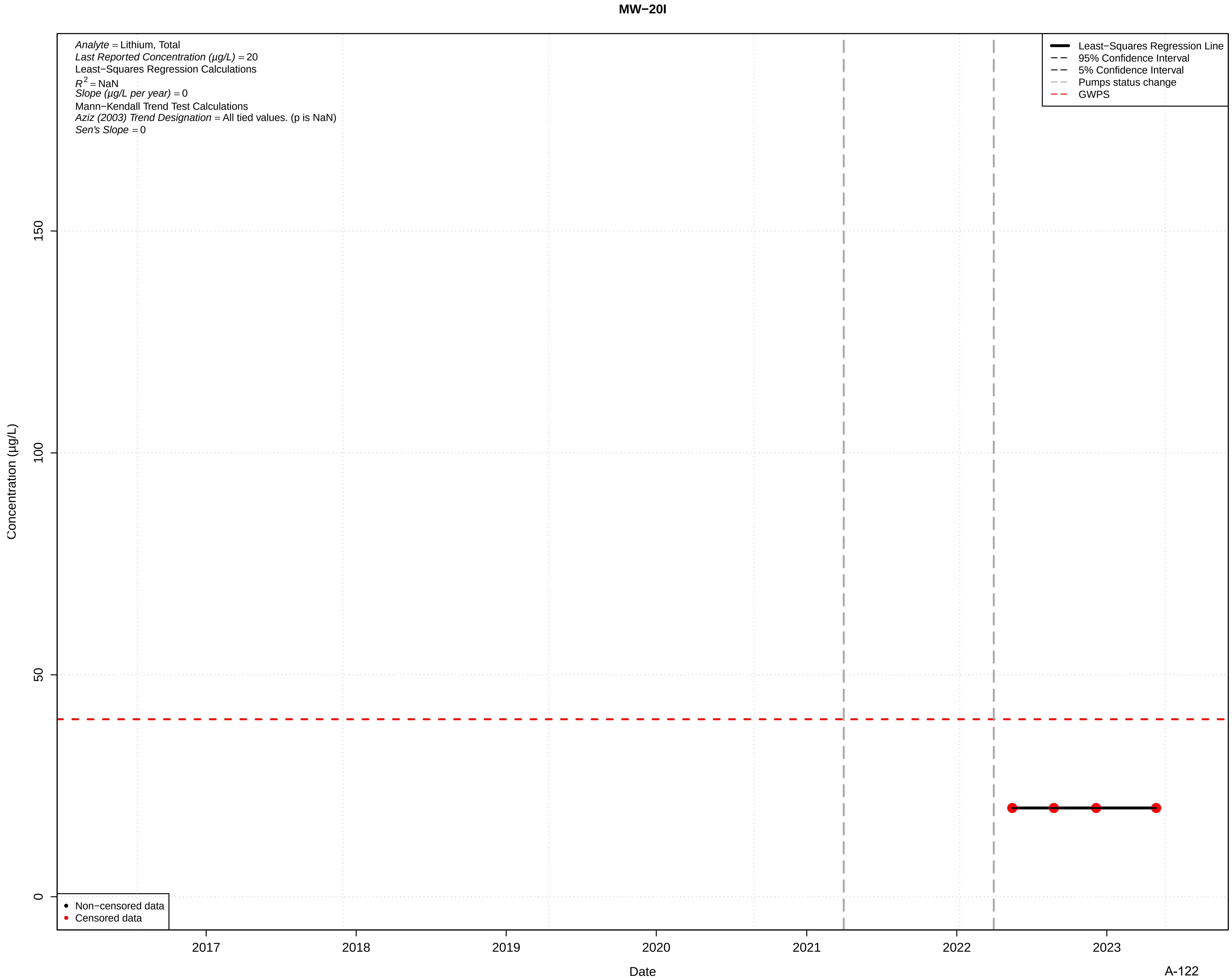
MW−20S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 3
Max Conc. = 20
Mean Conc. = 20
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data



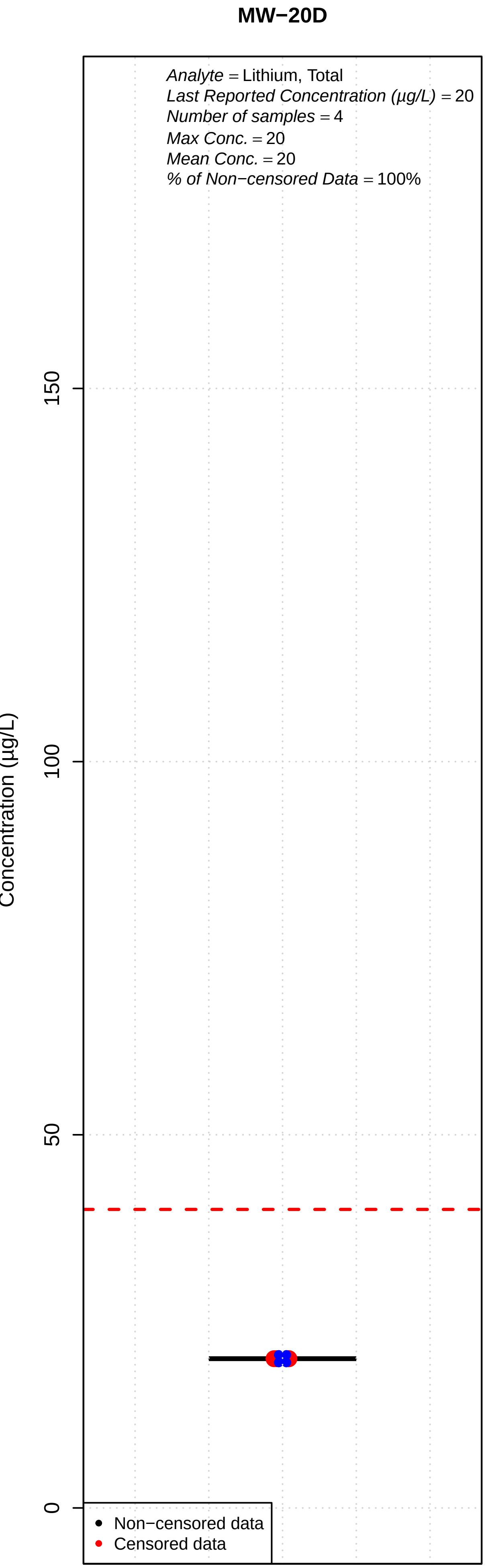
MW−20S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R² = 0.677
Slope (µg/L per year) = −0.00000000000000521
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

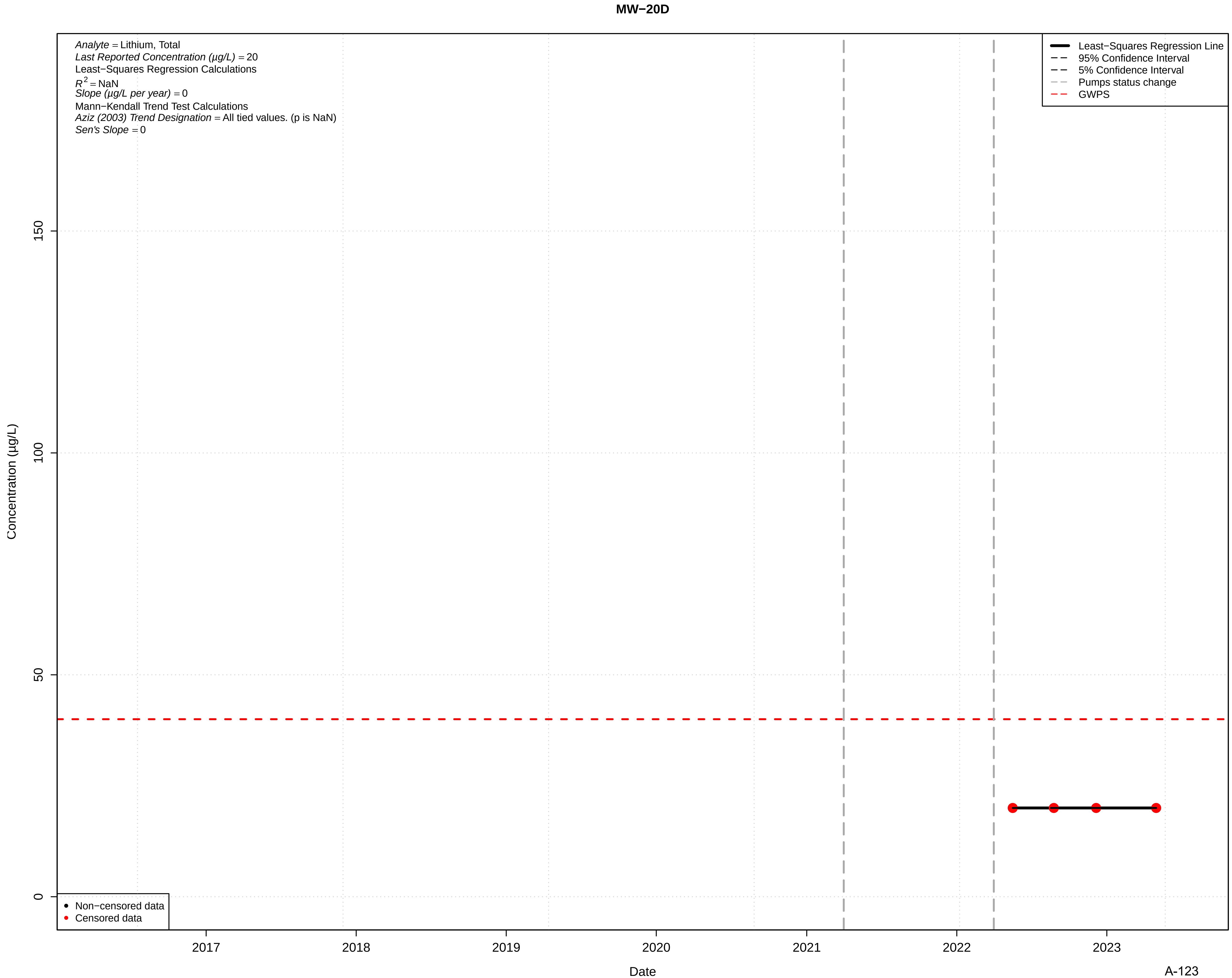


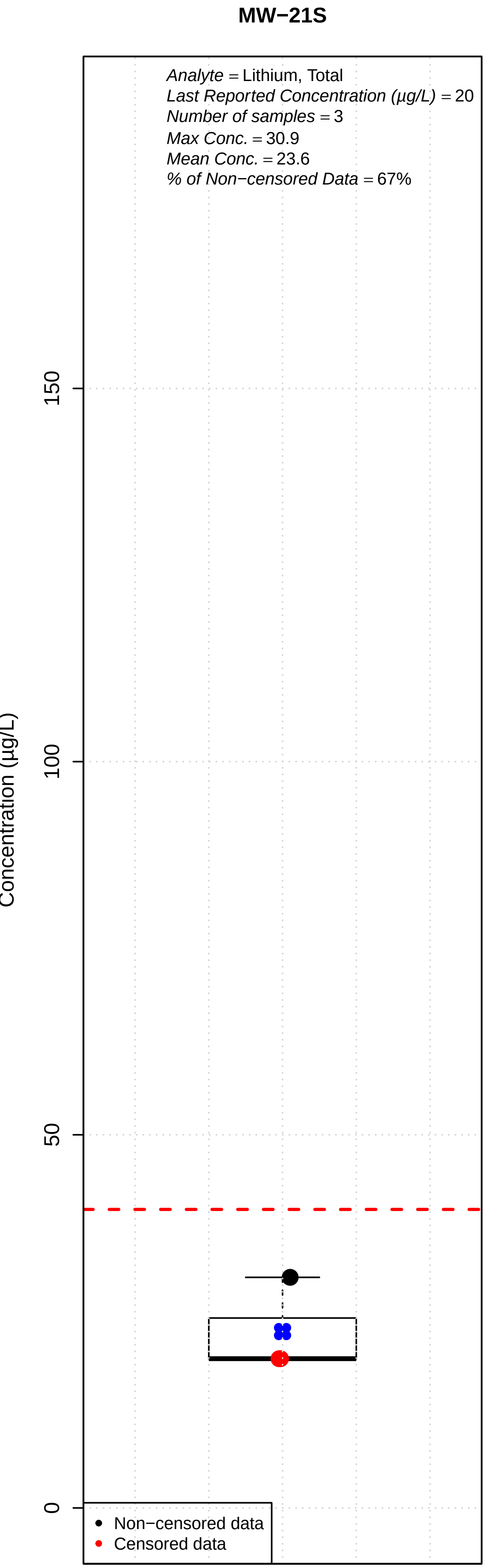
MW−20I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 4
Max Conc. = 20
Mean Conc. = 20
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

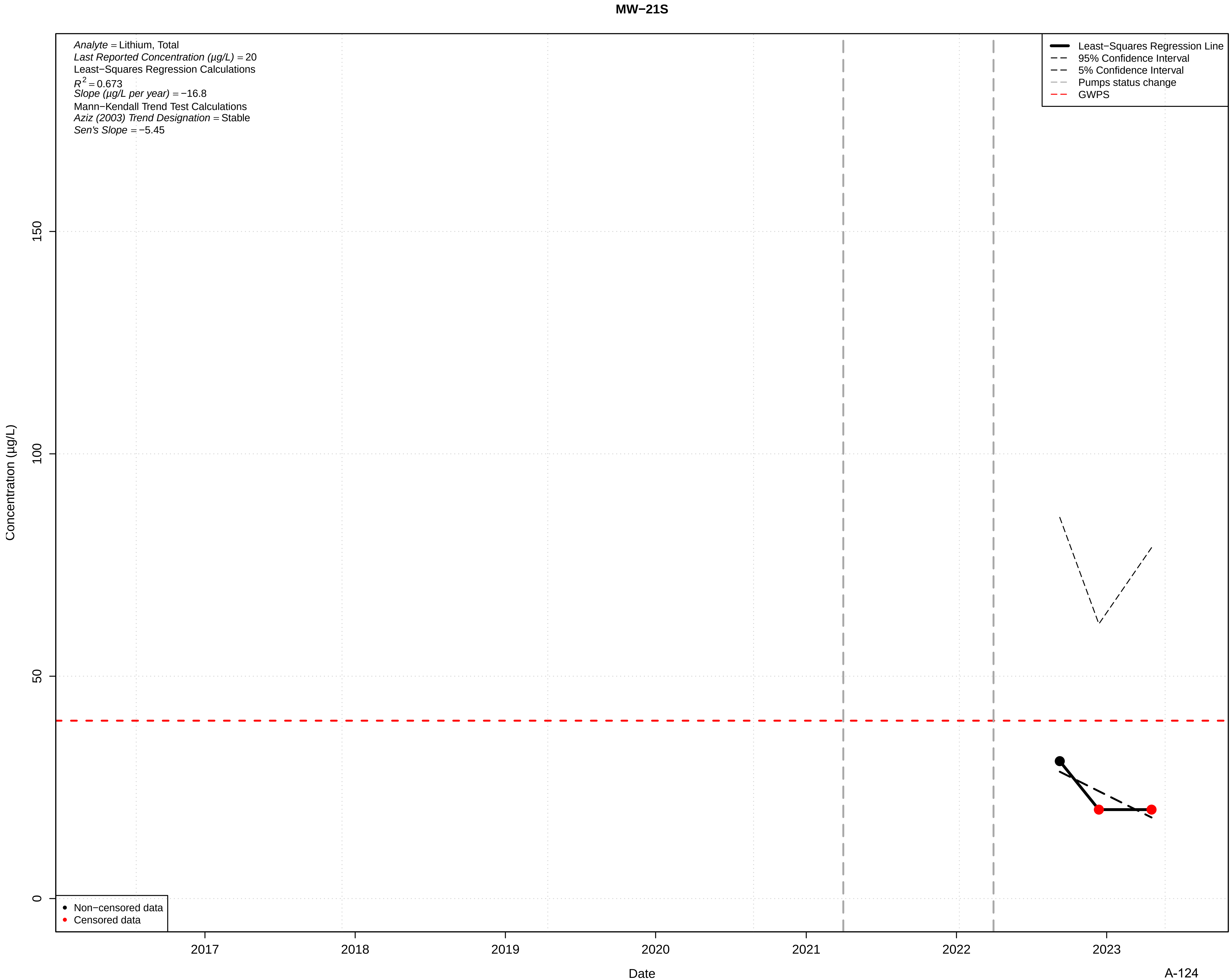


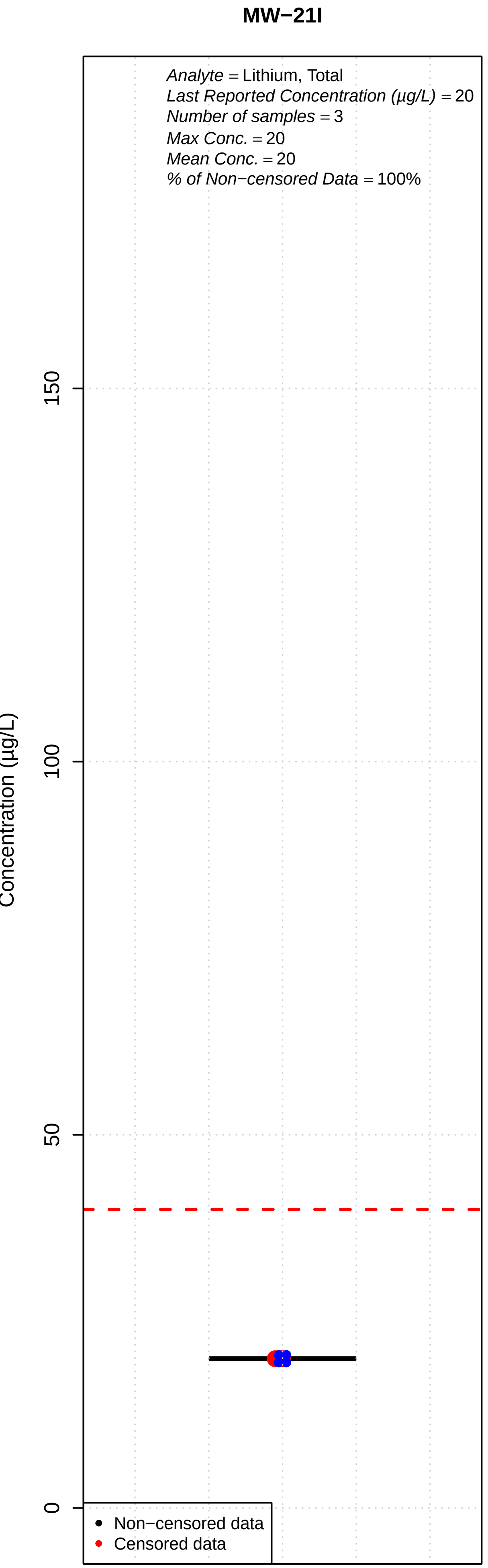
MW−20I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R² = NaN
Slope (µg/L per year) = 0
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

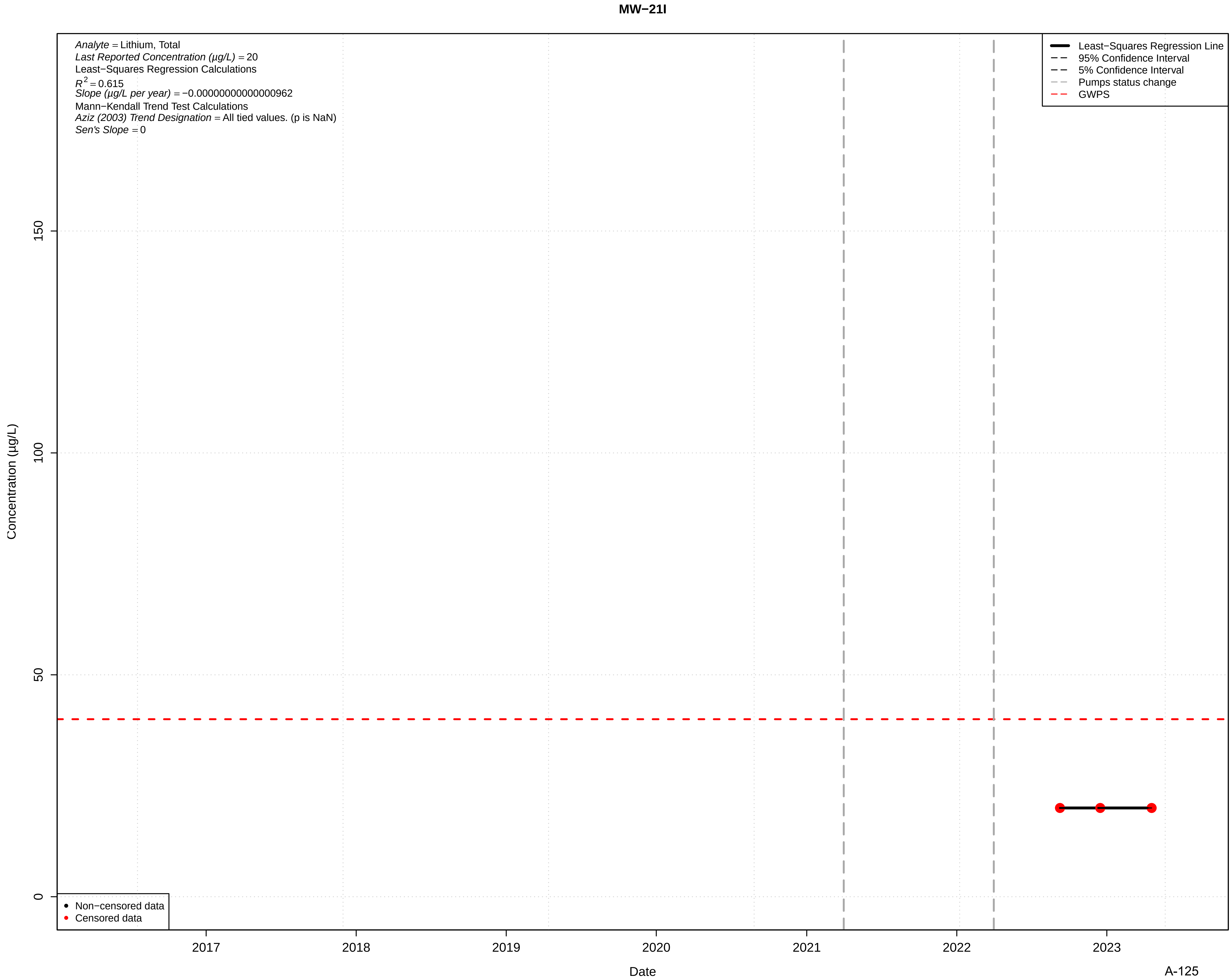

MW−20D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 4
Max Conc. = 20
Mean Conc. = 20
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

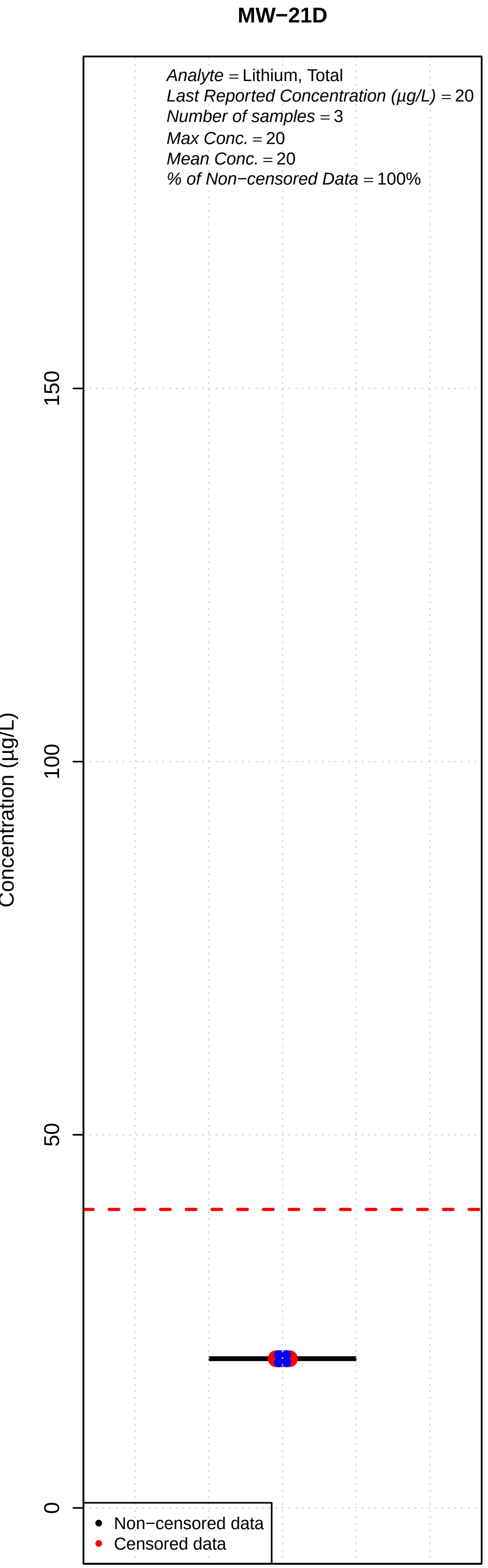

MW−20D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R2 = NaN
Slope (µg/L per year) = 0
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

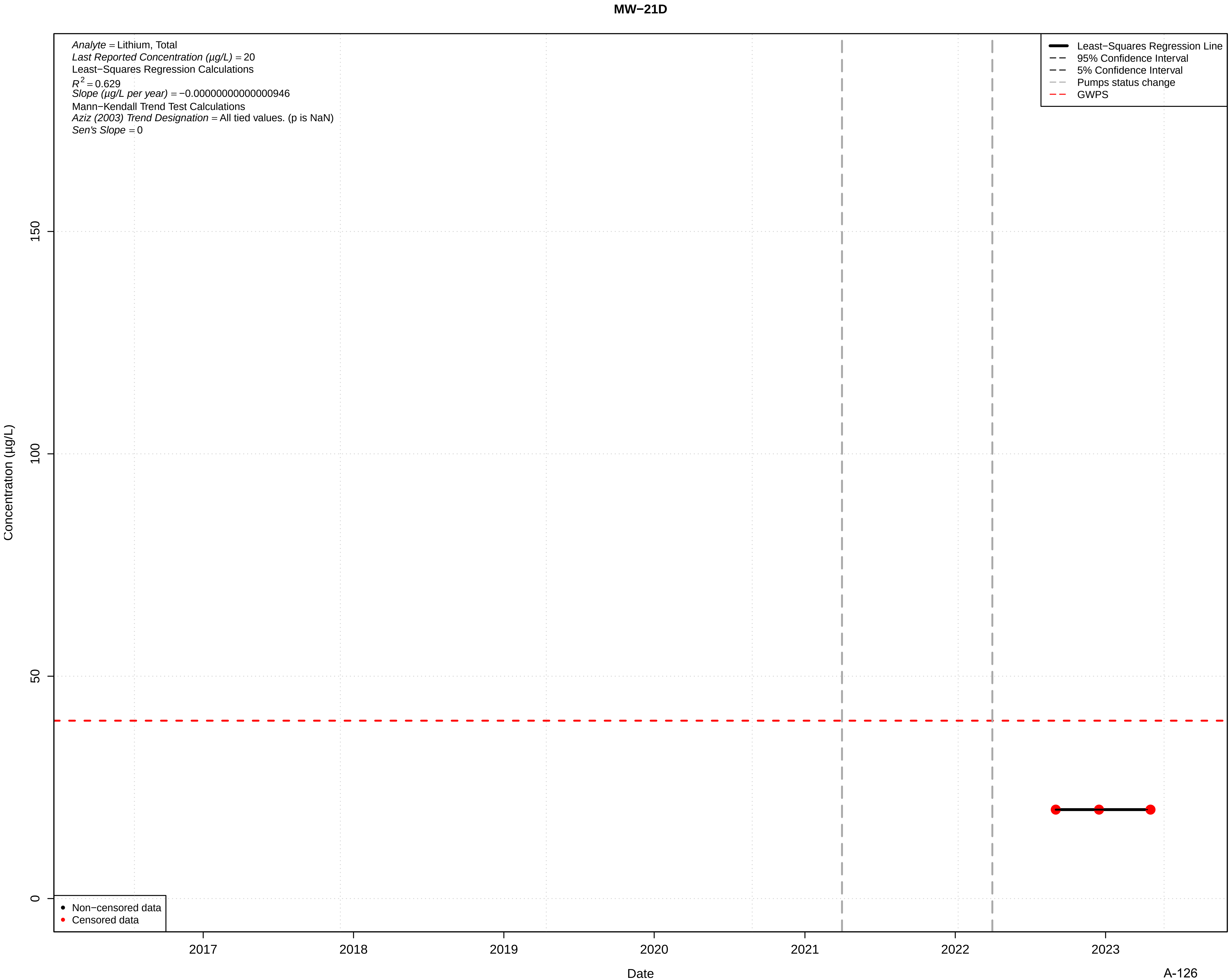

MW−21S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 3
Max Conc. = 30.9
Mean Conc. = 23.6
% of Non−censored Data = 67%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

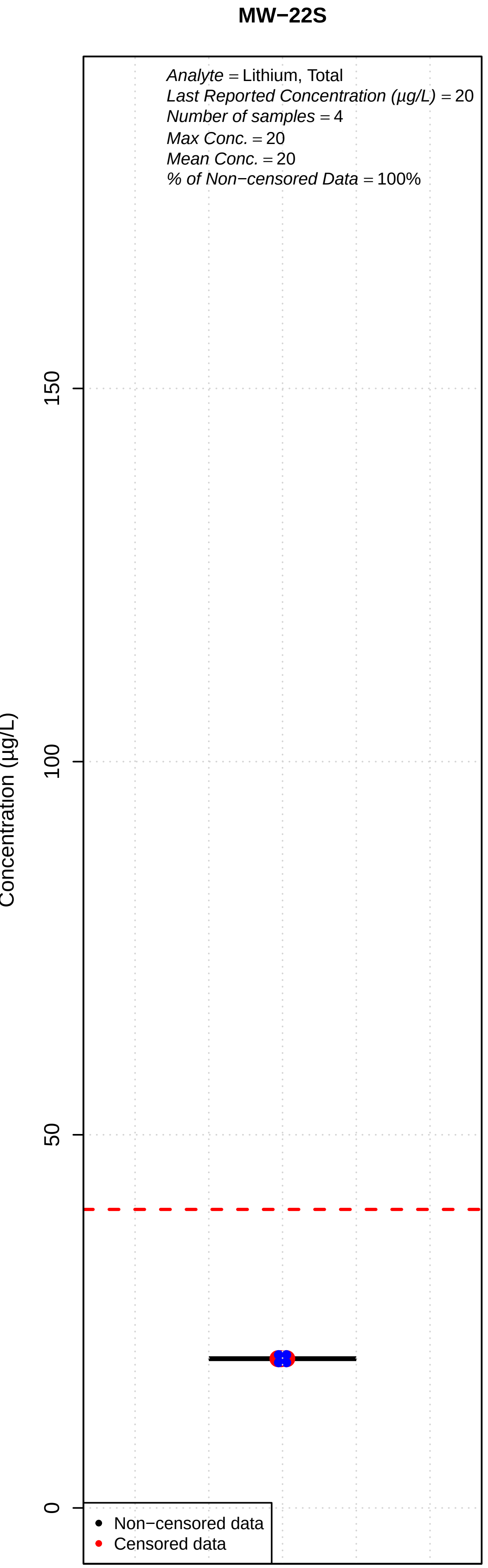

MW−21S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R2 = 0.673
Slope (µg/L per year) = −16.8
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −5.45
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

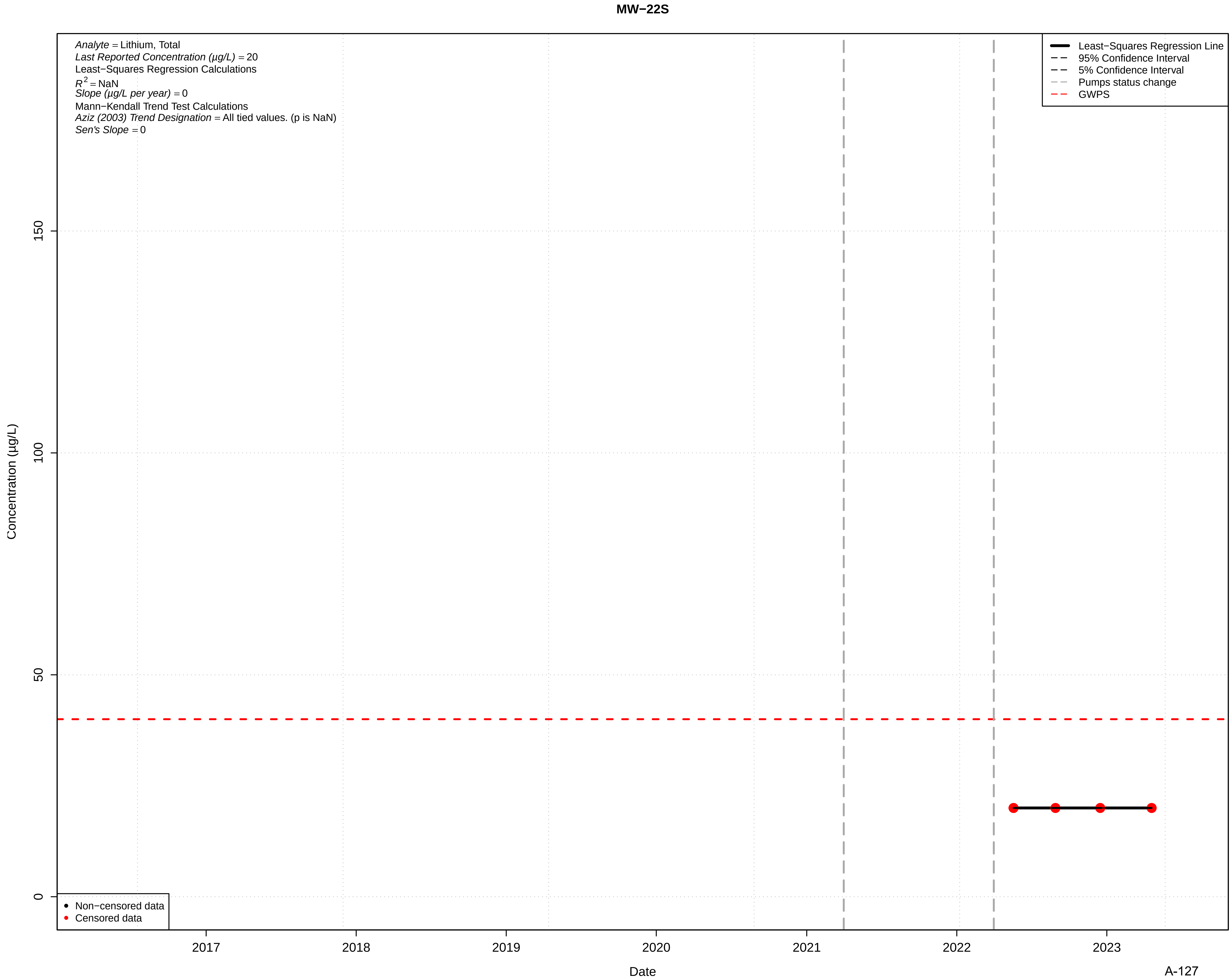

MW−21I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 3
Max Conc. = 20
Mean Conc. = 20
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data


MW−21I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R^2 = 0.615
Slope (µg/L per year) = −0.00000000000000962
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−21D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 3
Max Conc. = 20
Mean Conc. = 20
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data


MW−21D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R^2 = 0.629
Slope (µg/L per year) = −0.00000000000000946
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data


MW−22S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 4
Max Conc. = 20
Mean Conc. = 20
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data


MW−22S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R2 = NaN
Slope (µg/L per year) = 0
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
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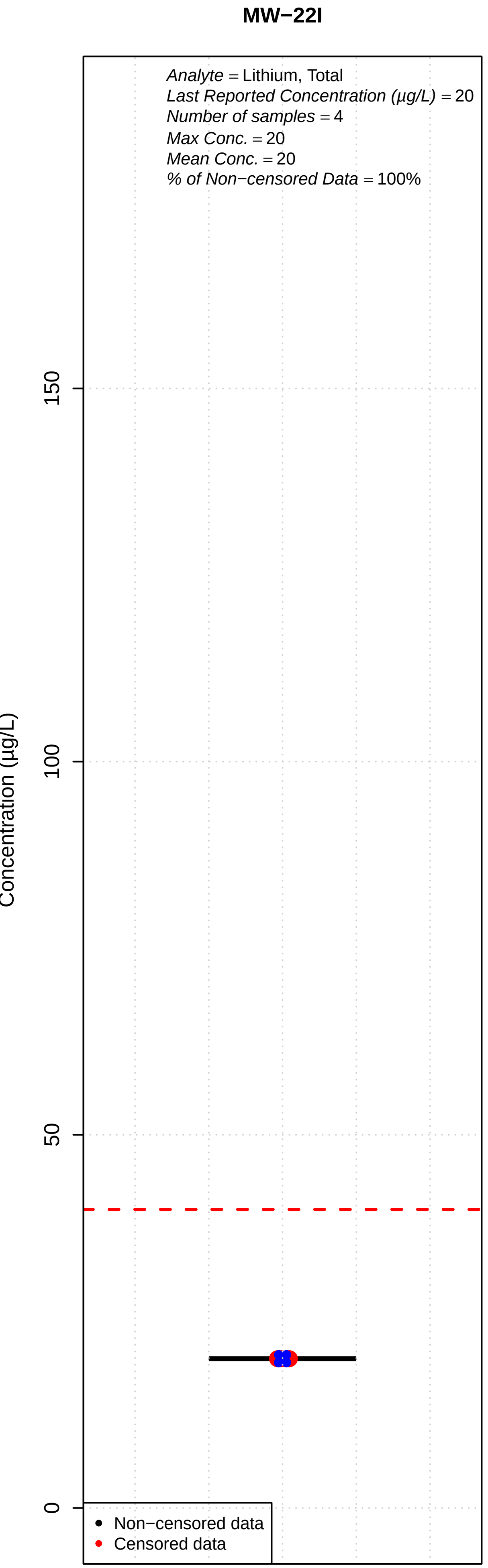
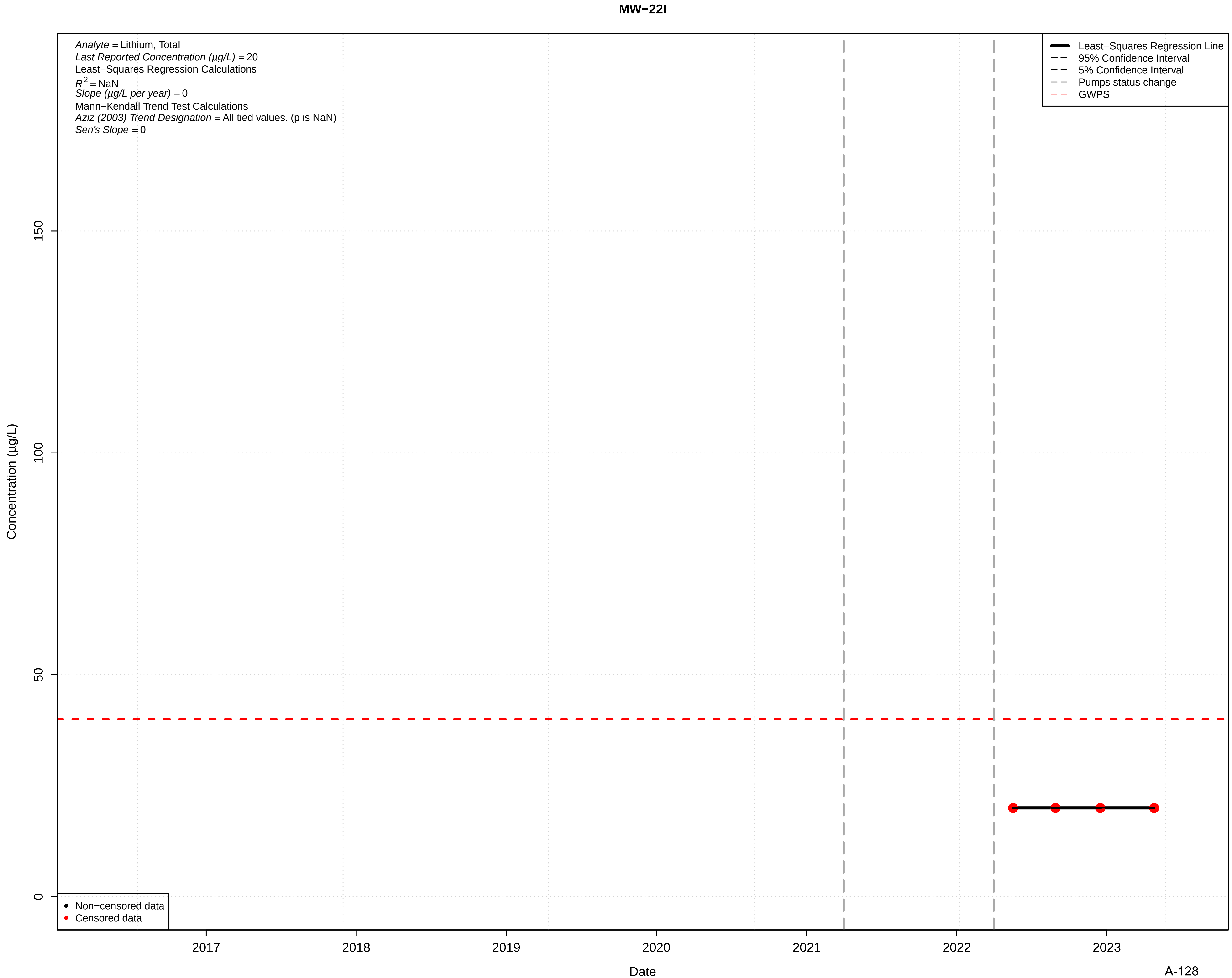
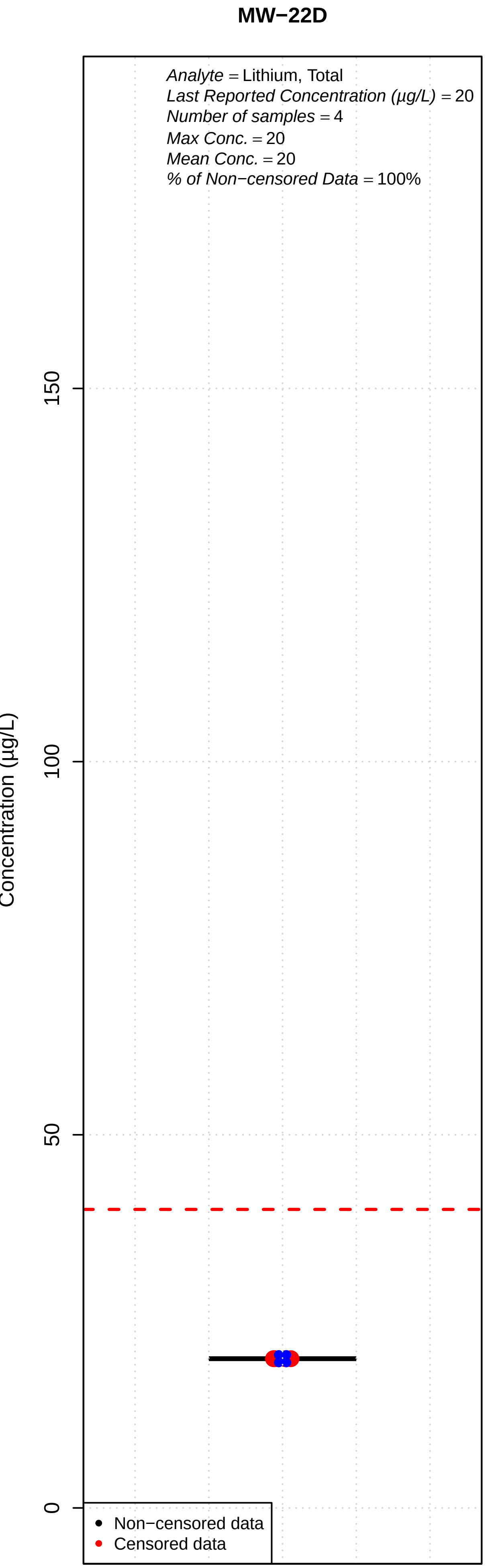
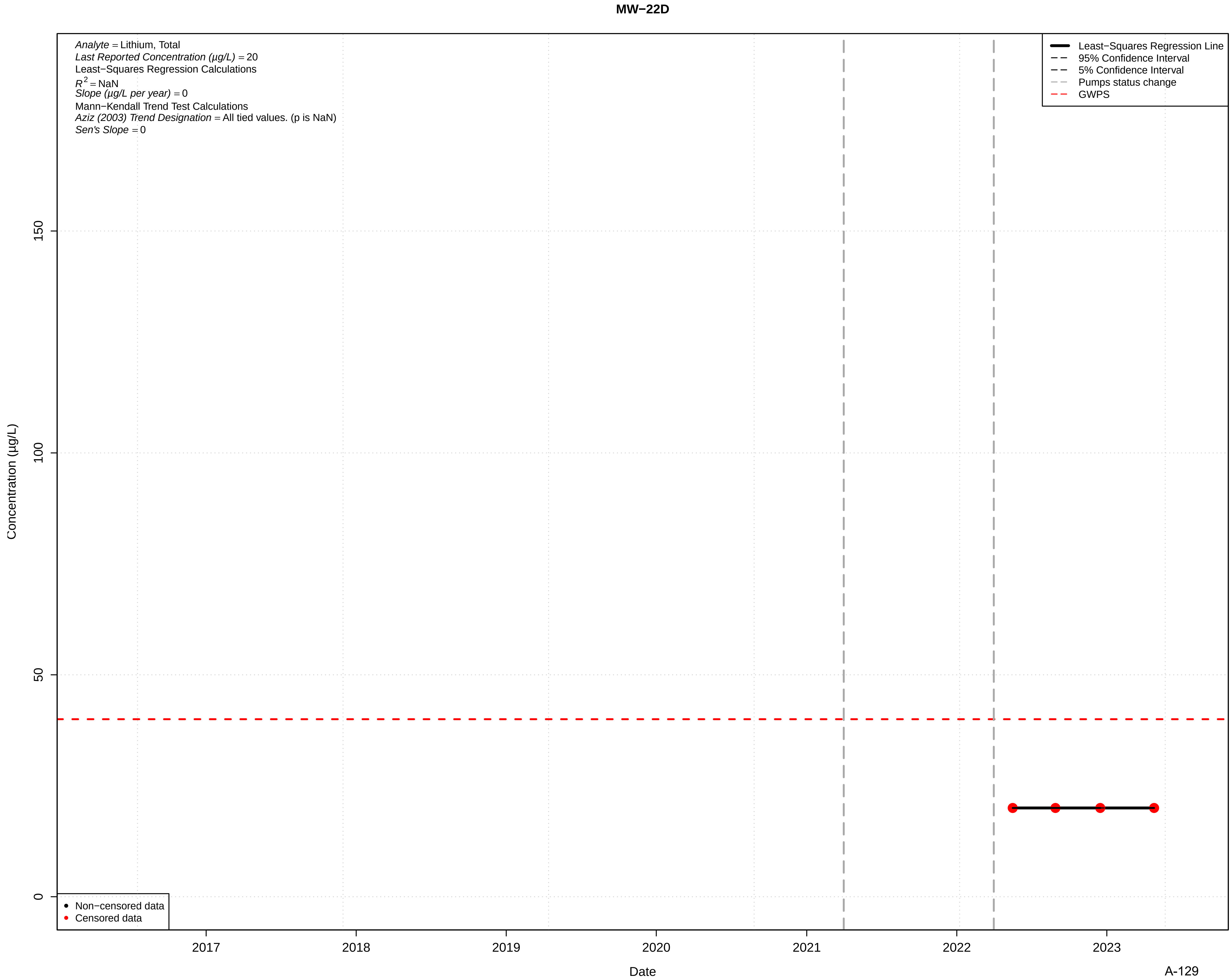
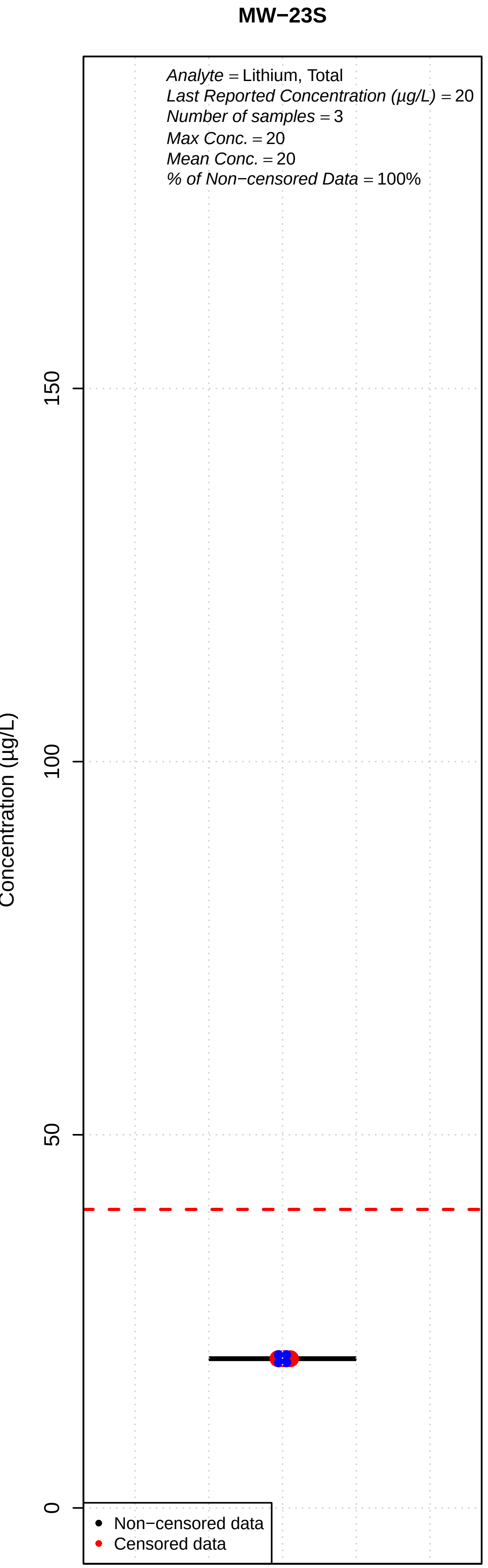
2022
2023
Date


MW−22I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 4
Max Conc. = 20
Mean Conc. = 20
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

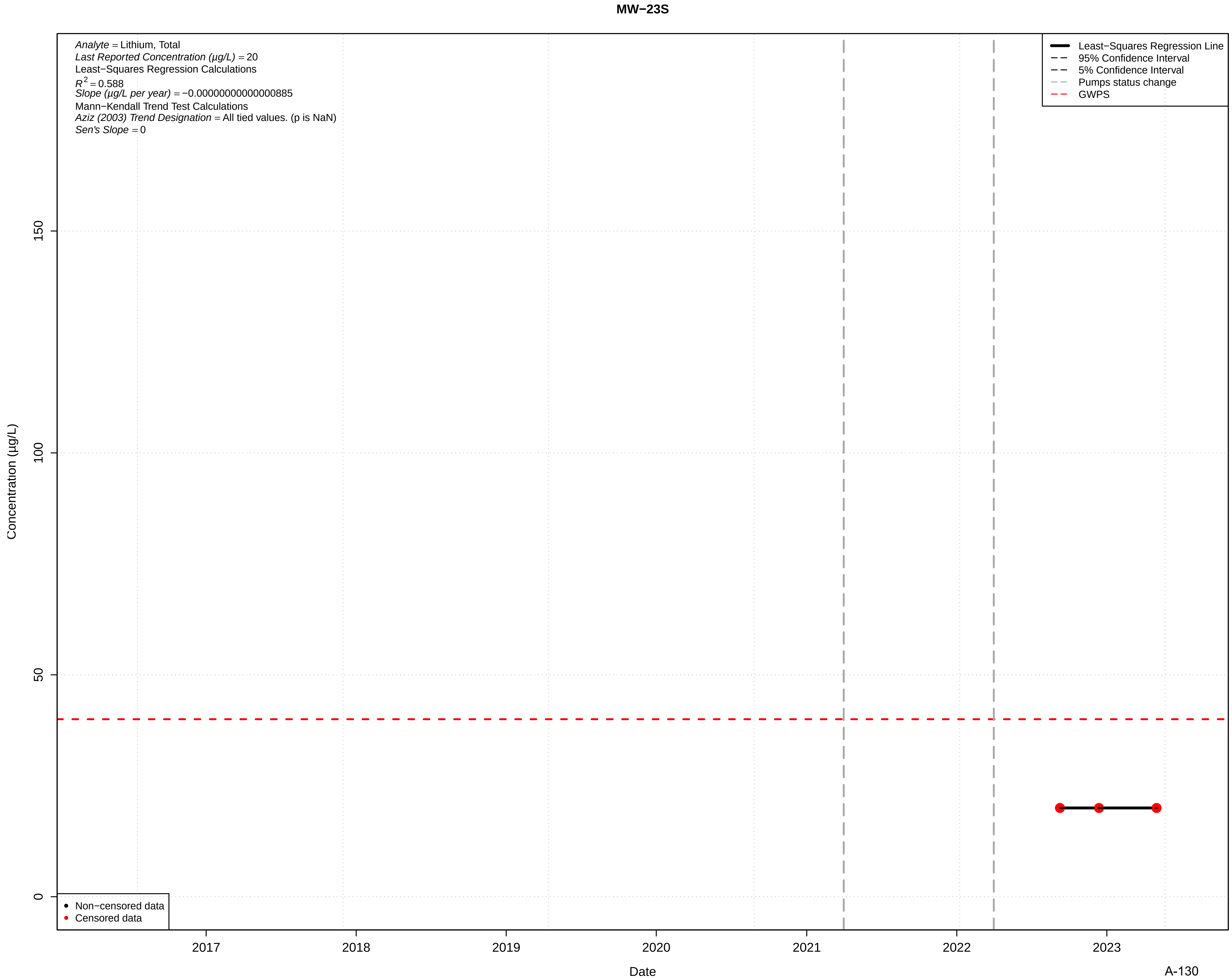

MW−22I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R2 = NaN
Slope (µg/L per year) = 0
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−22D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 4
Max Conc. = 20
Mean Conc. = 20
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

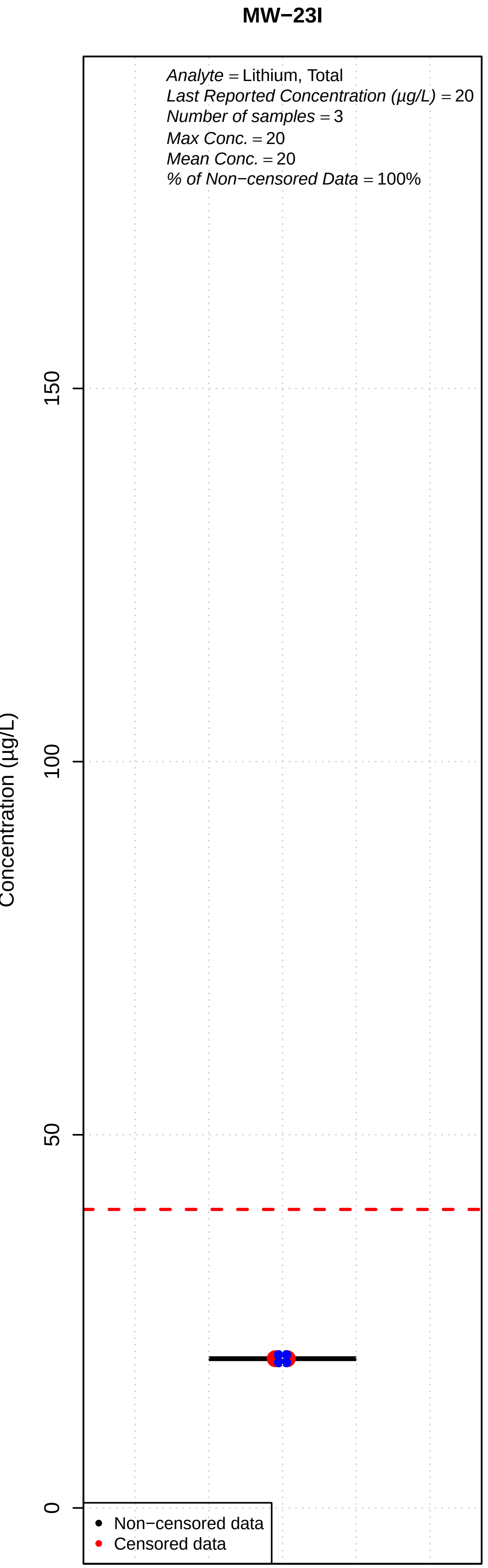

MW−22D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R^2 = NaN
Slope (µg/L per year) = 0
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

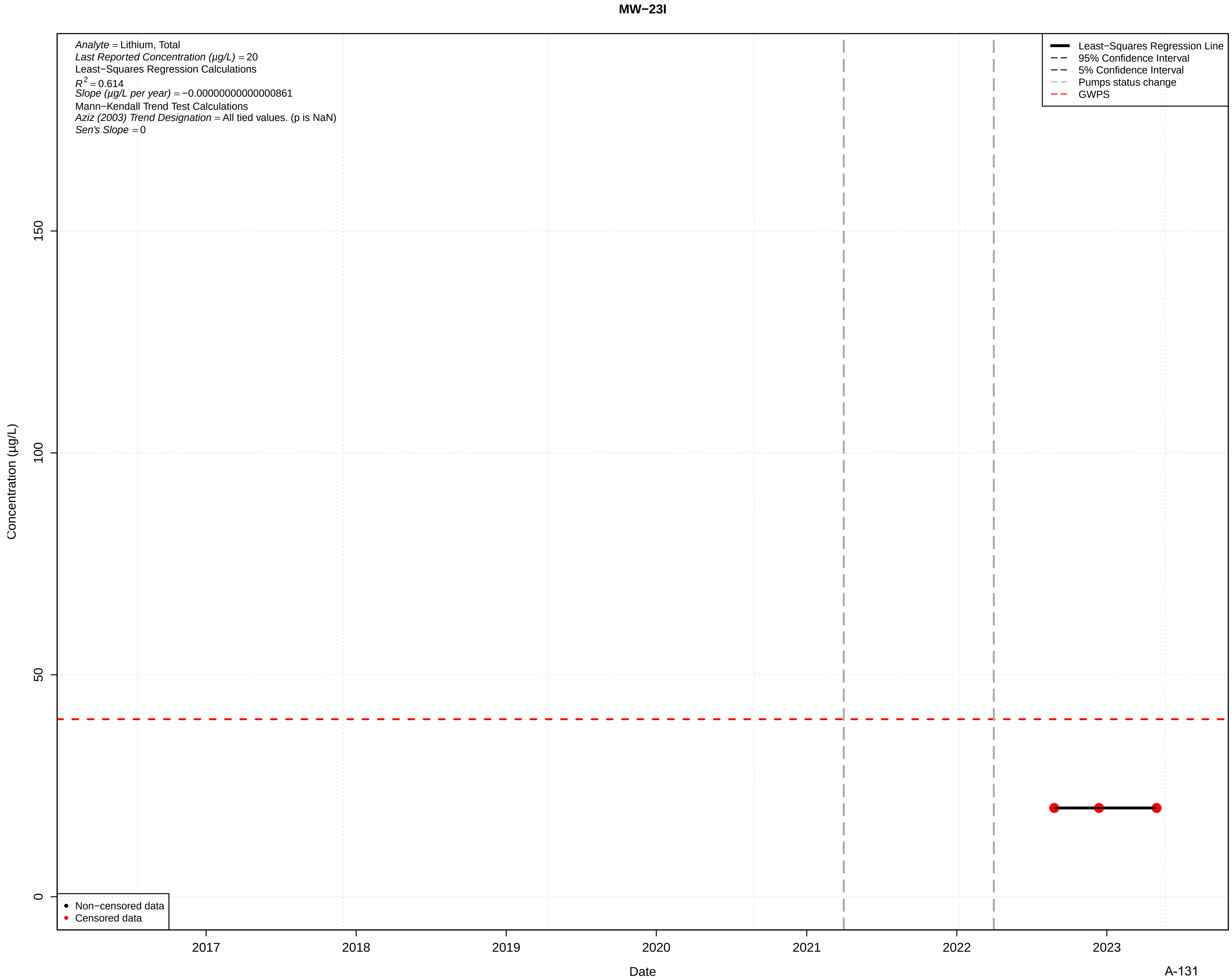


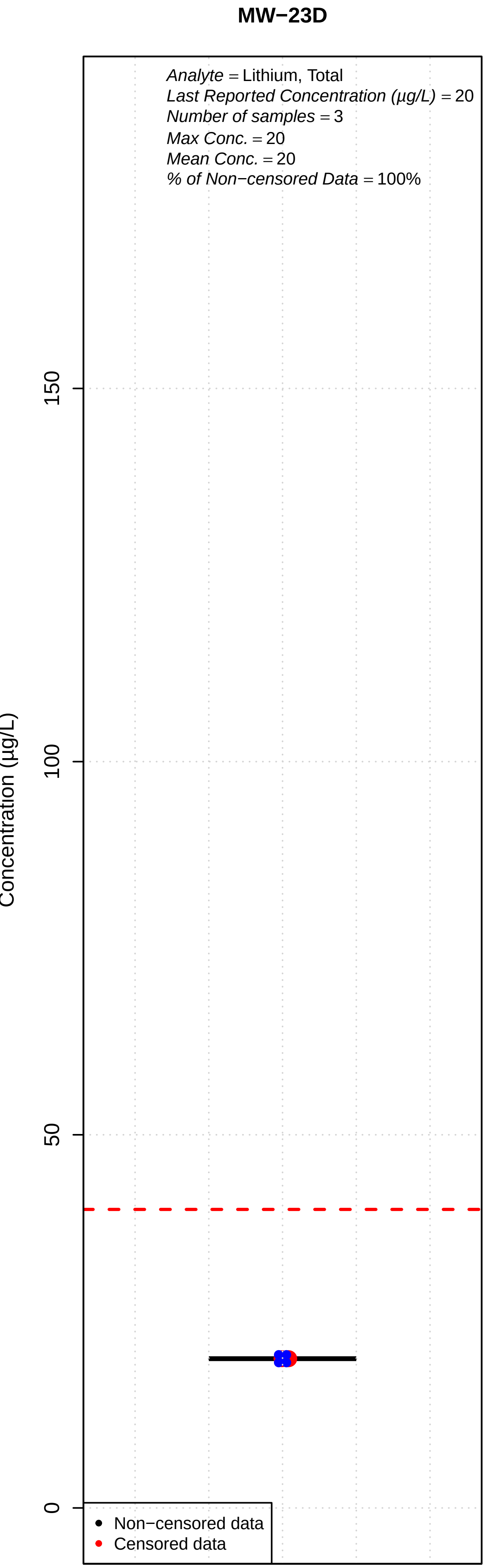
MW−23S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 3
Max Conc. = 20
Mean Conc. = 20
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

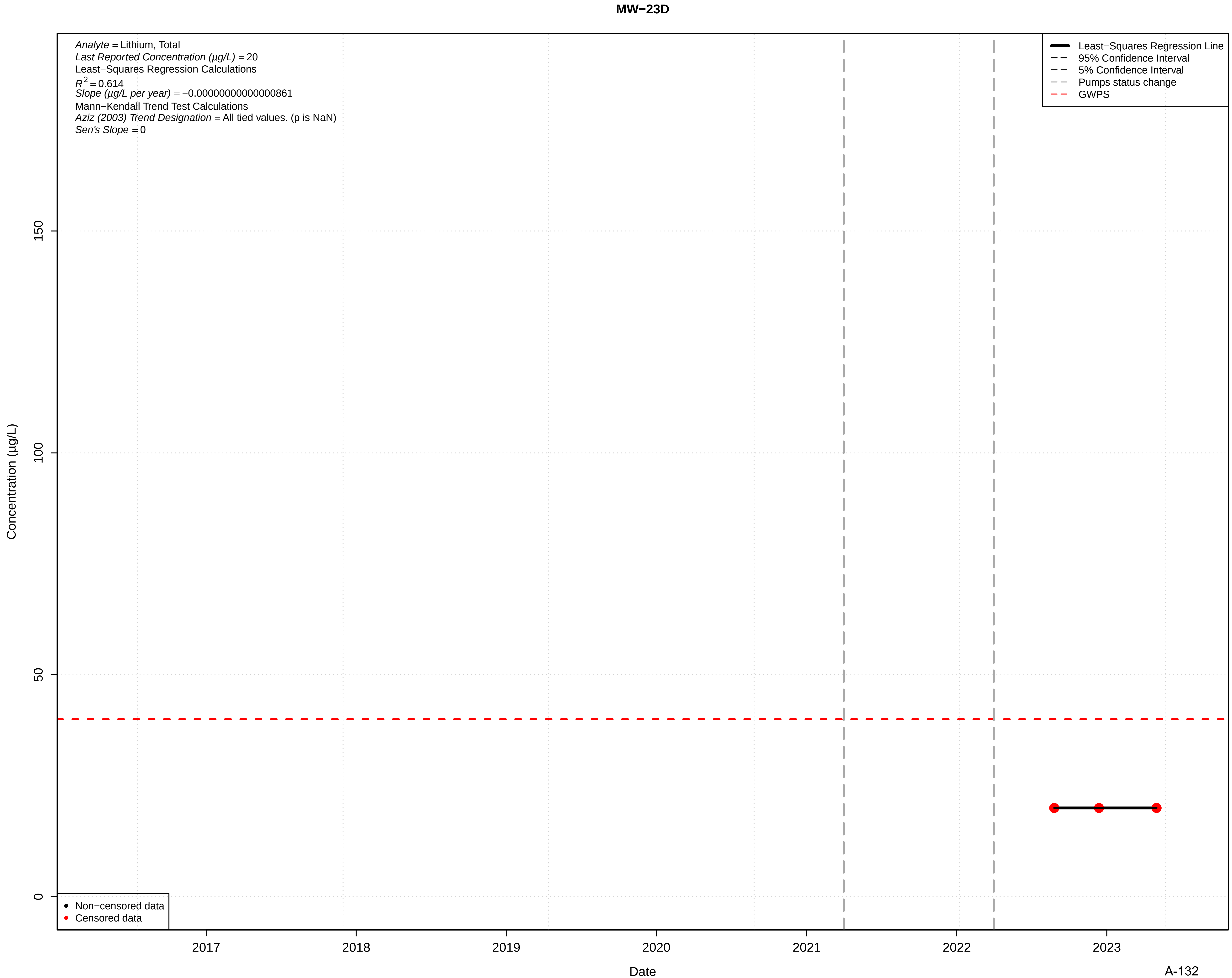


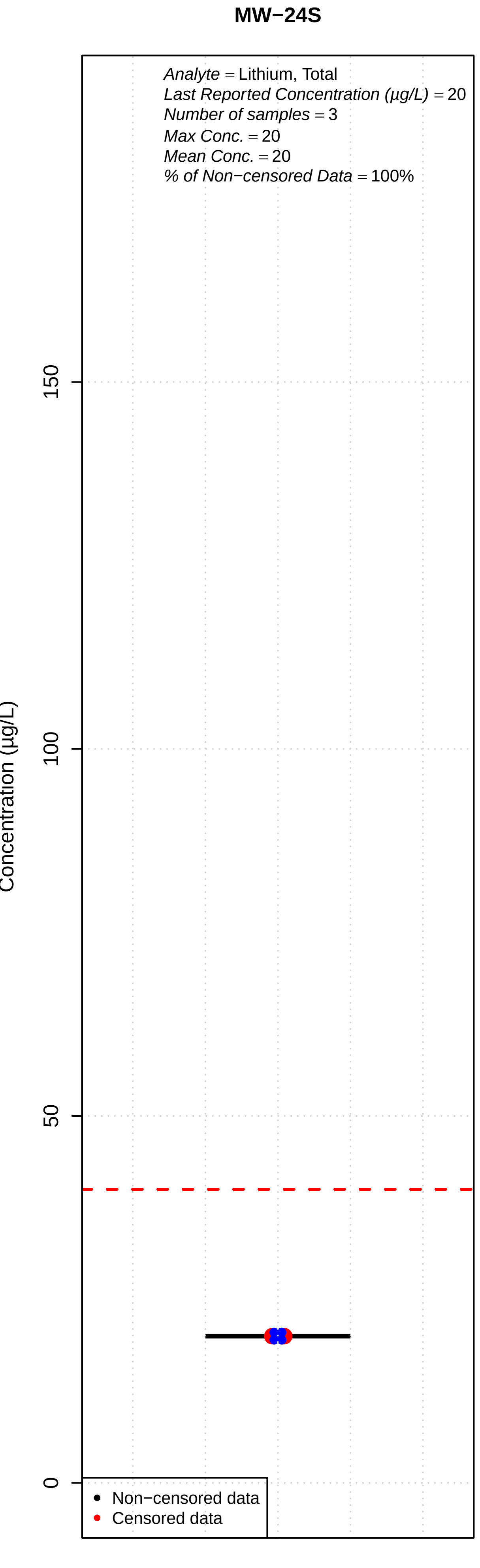
MW−23S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R2 = 0.588
Slope (µg/L per year) = −0.00000000000000885
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

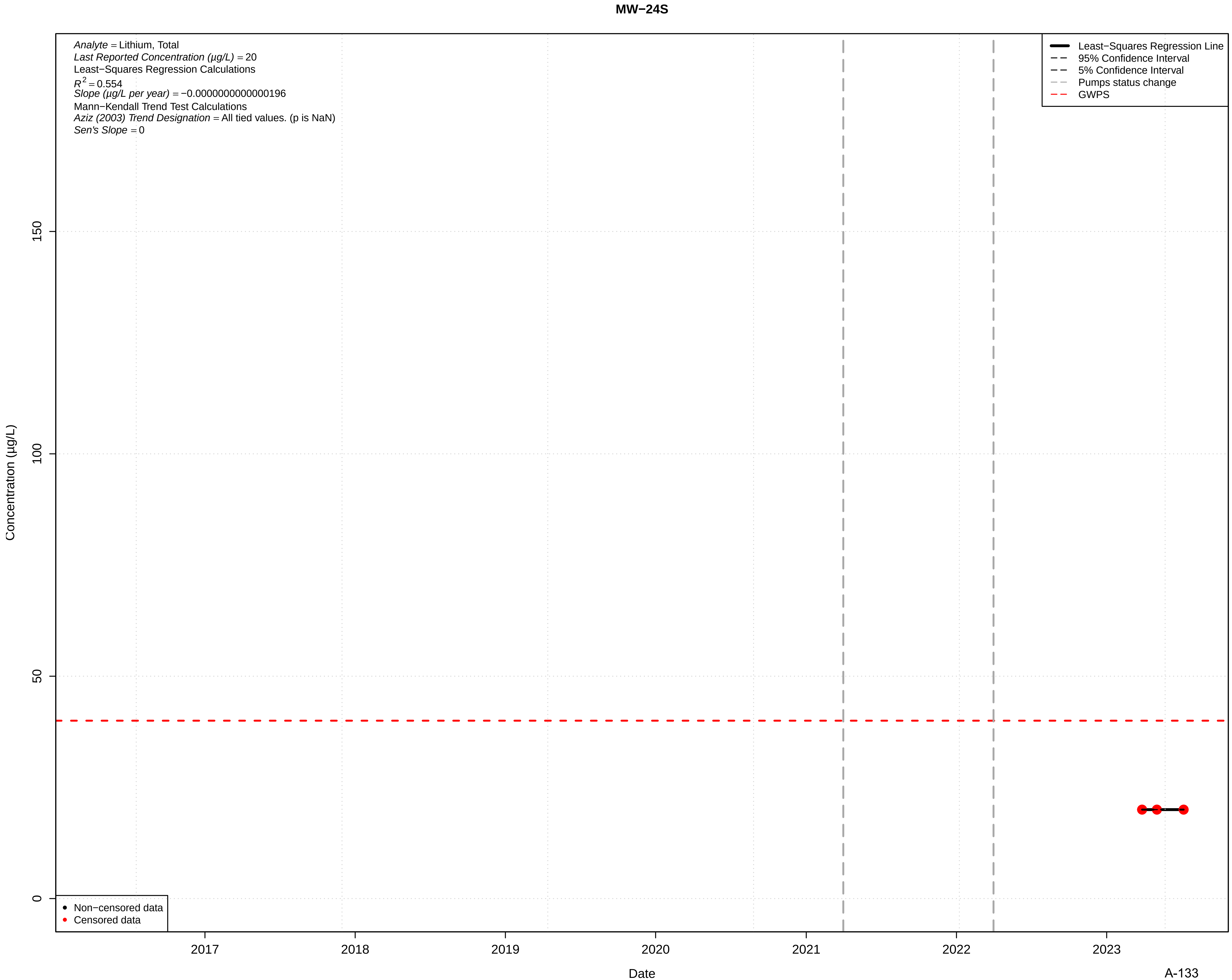

MW−23I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 3
Max Conc. = 20
Mean Conc. = 20
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

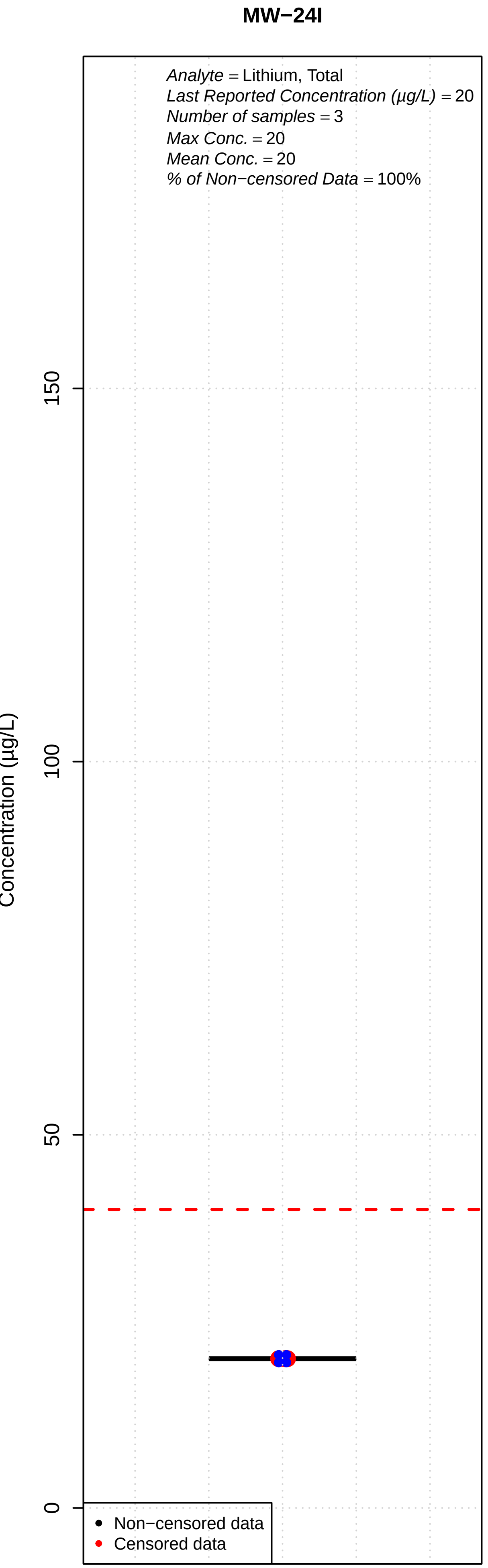

MW−23I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R2 = 0.614
Slope (µg/L per year) = −0.00000000000000861
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−23D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 3
Max Conc. = 20
Mean Conc. = 20
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

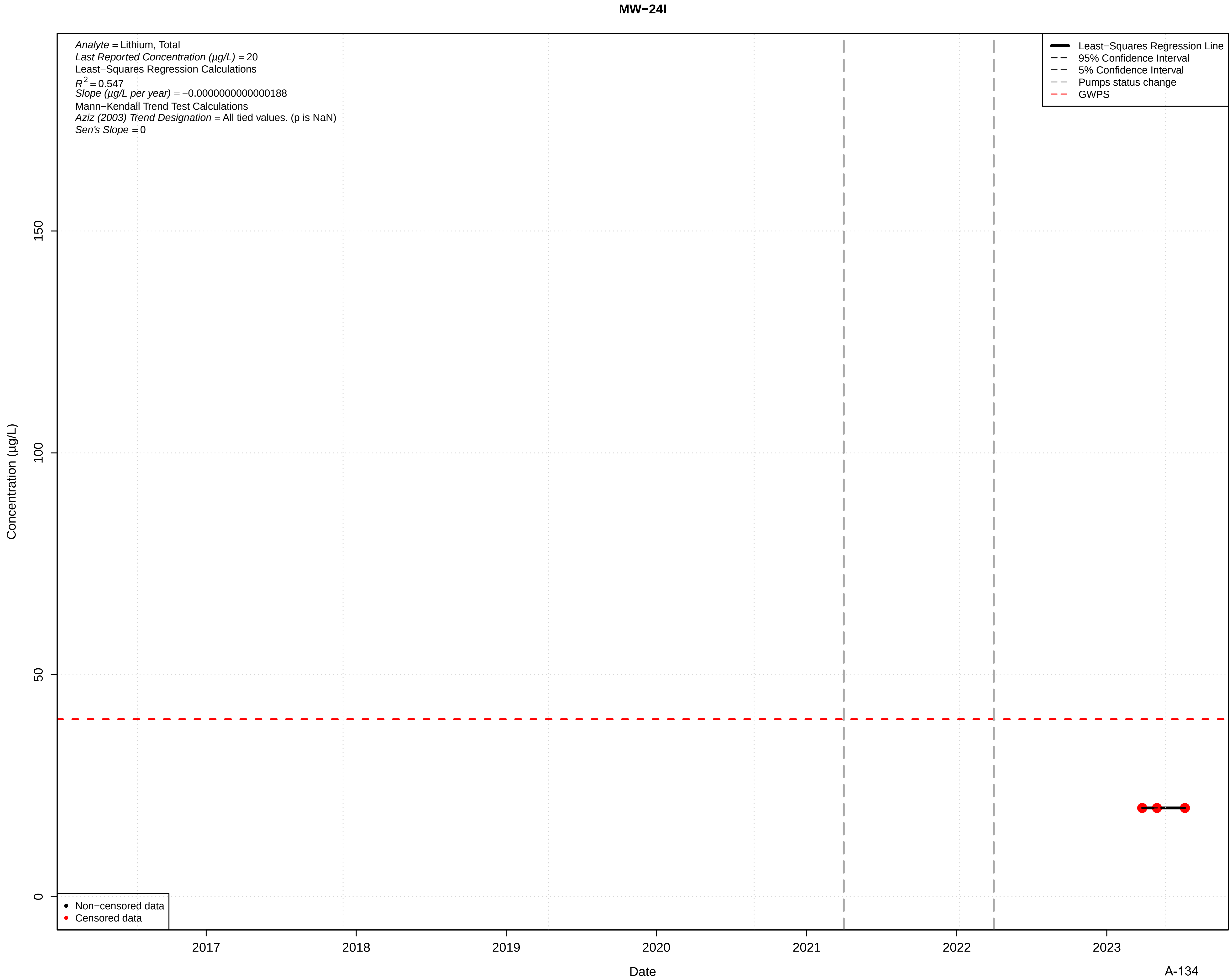

MW−23D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R2 = 0.614
Slope (µg/L per year) = −0.00000000000000861
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−24S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 3
Max Conc. = 20
Mean Conc. = 20
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

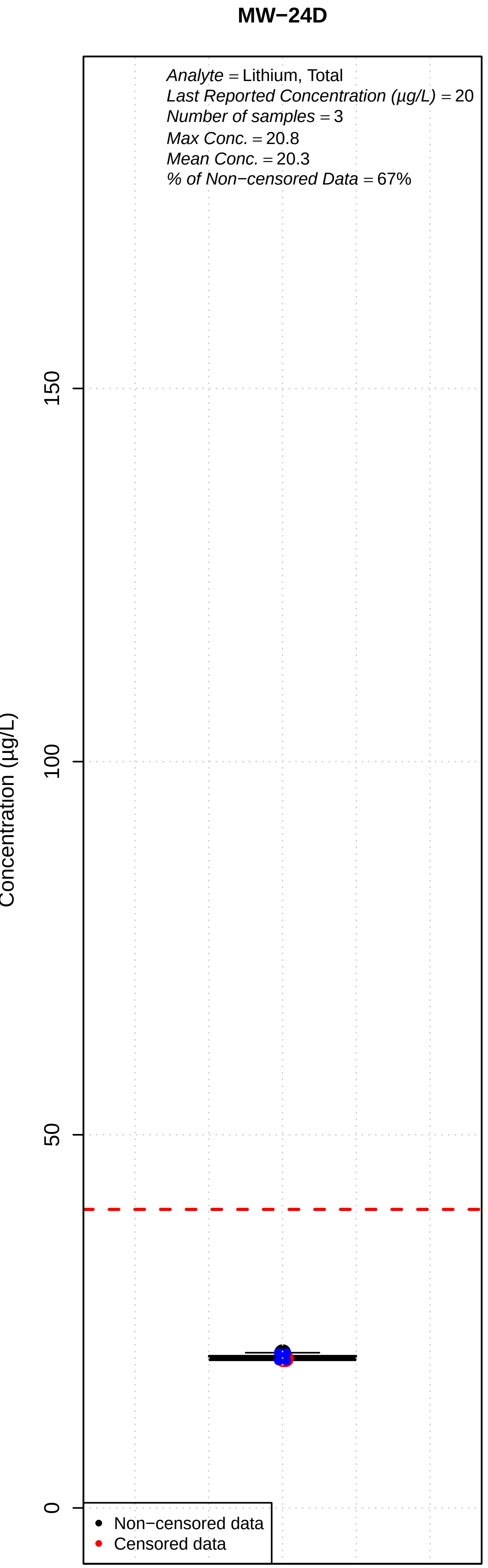

MW−24S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R2 = 0.554
Slope (µg/L per year) = −0.0000000000000196
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

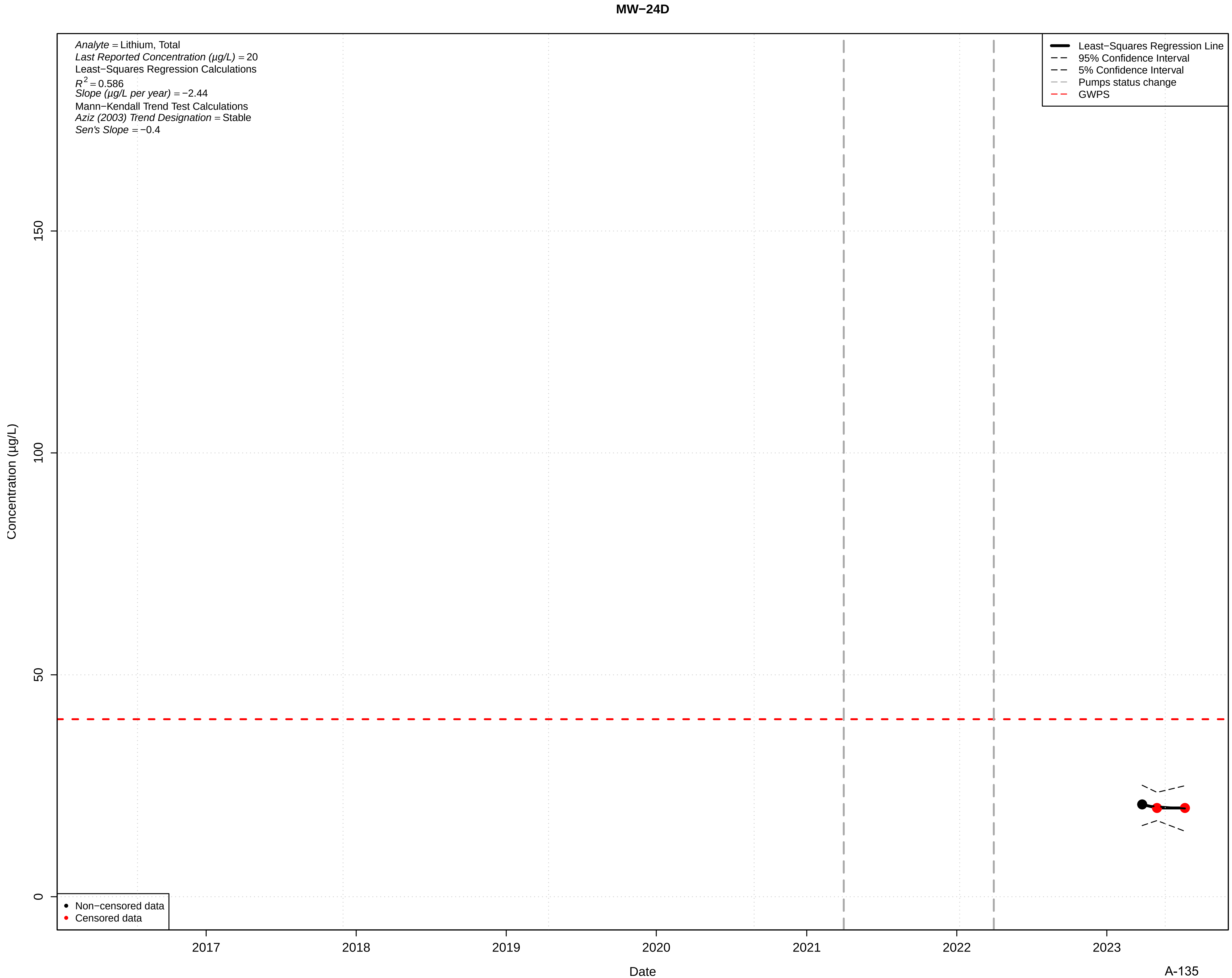


MW−24I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 3
Max Conc. = 20
Mean Conc. = 20
% of Non−censored Data = 100%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

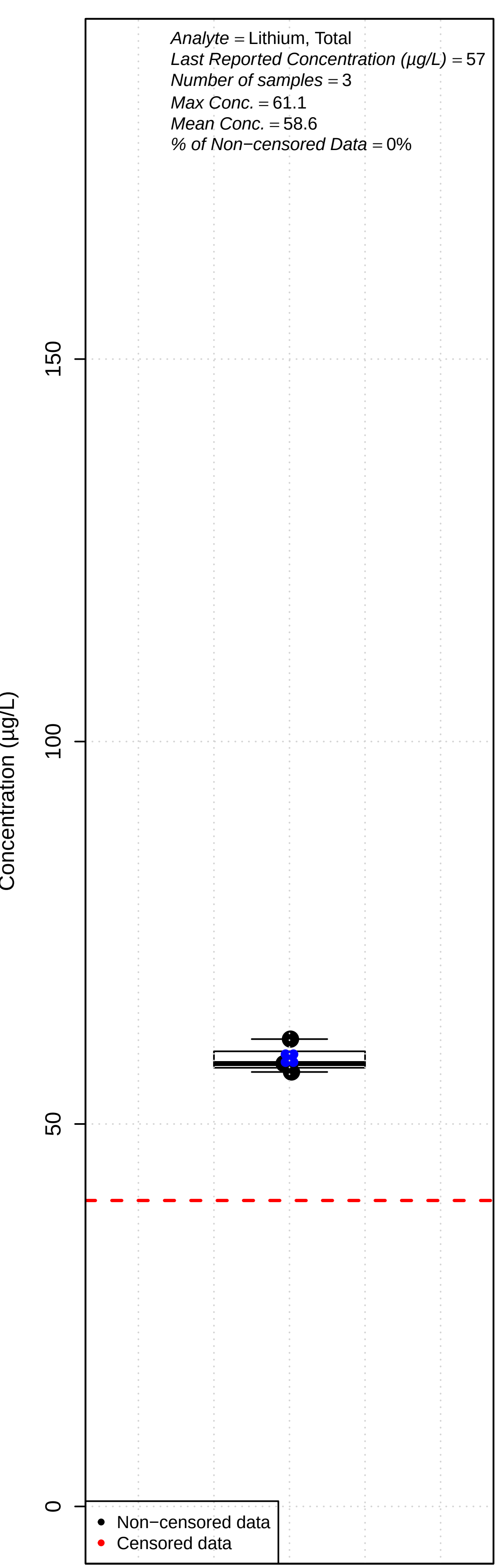


MW−24I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R2 = 0.547
Slope (µg/L per year) = −0.0000000000000188
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−24D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 3
Max Conc. = 20.8
Mean Conc. = 20.3
% of Non−censored Data = 67%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

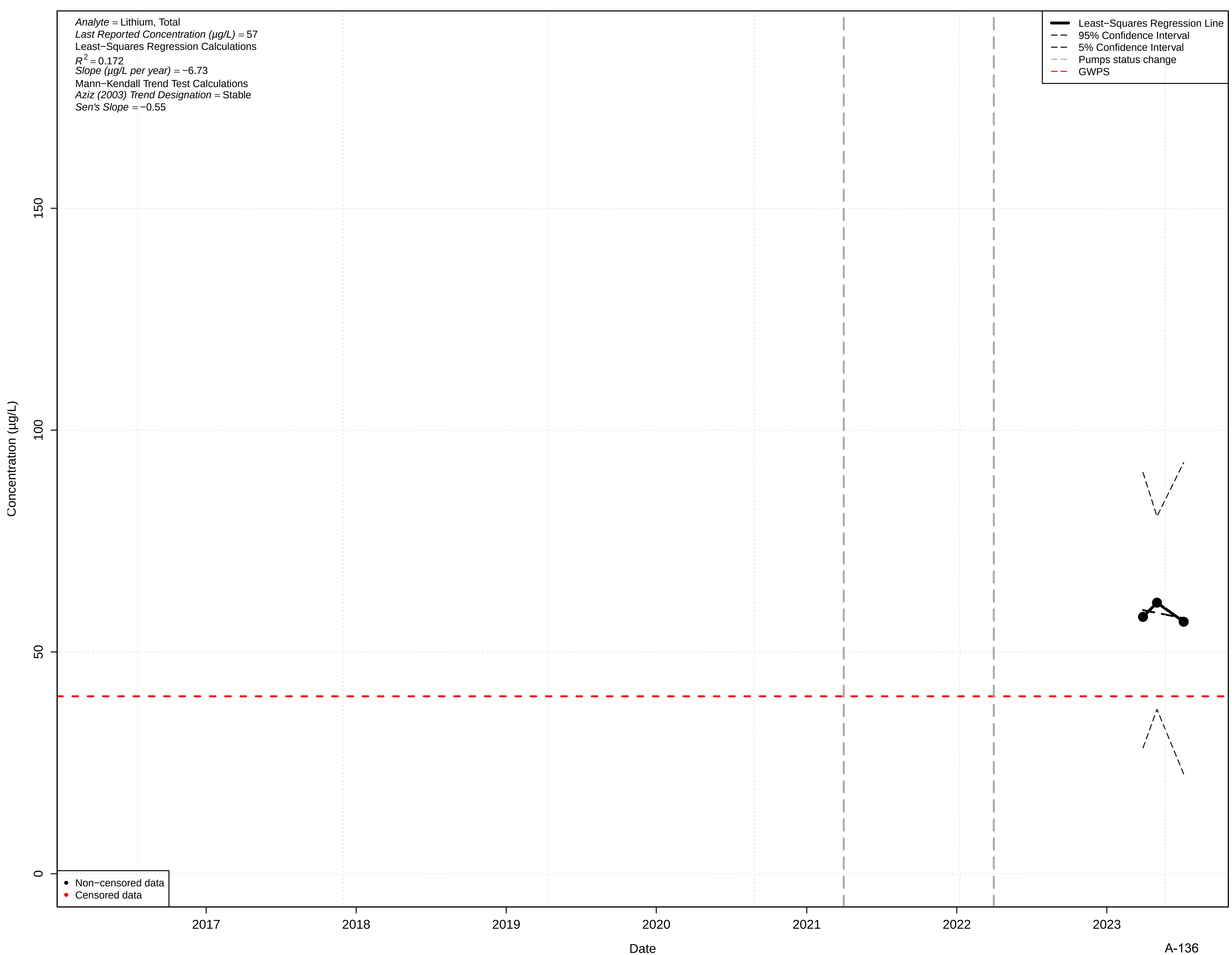

MW−24D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R2 = 0.586
Slope (µg/L per year) = −2.44
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.4
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

MW−25S

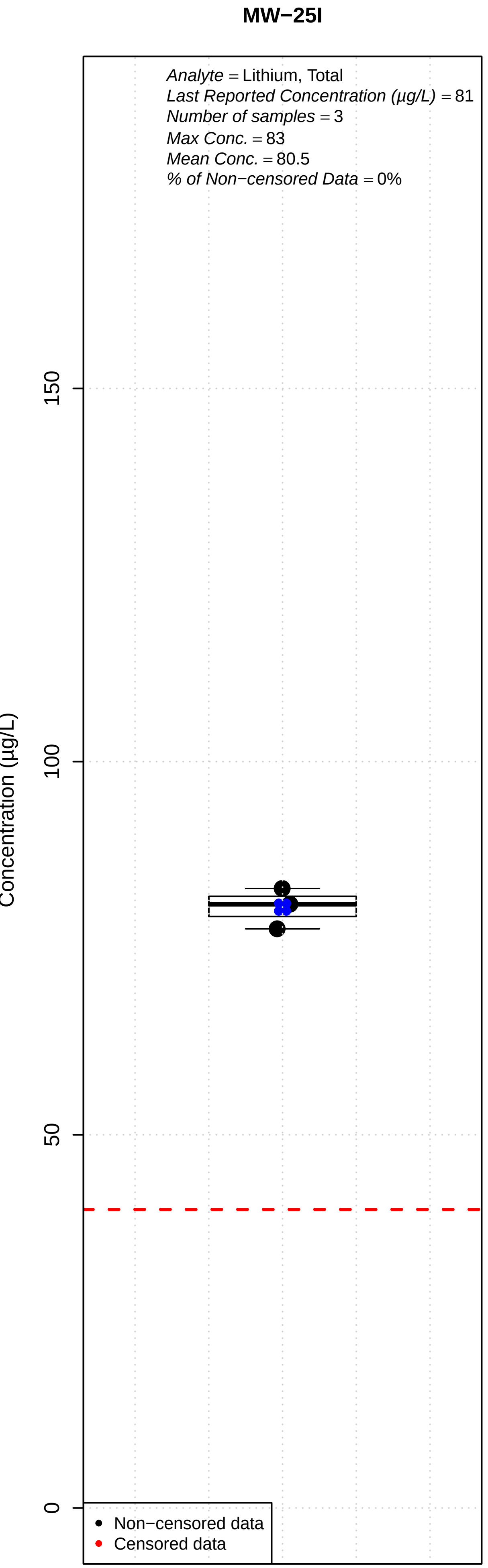


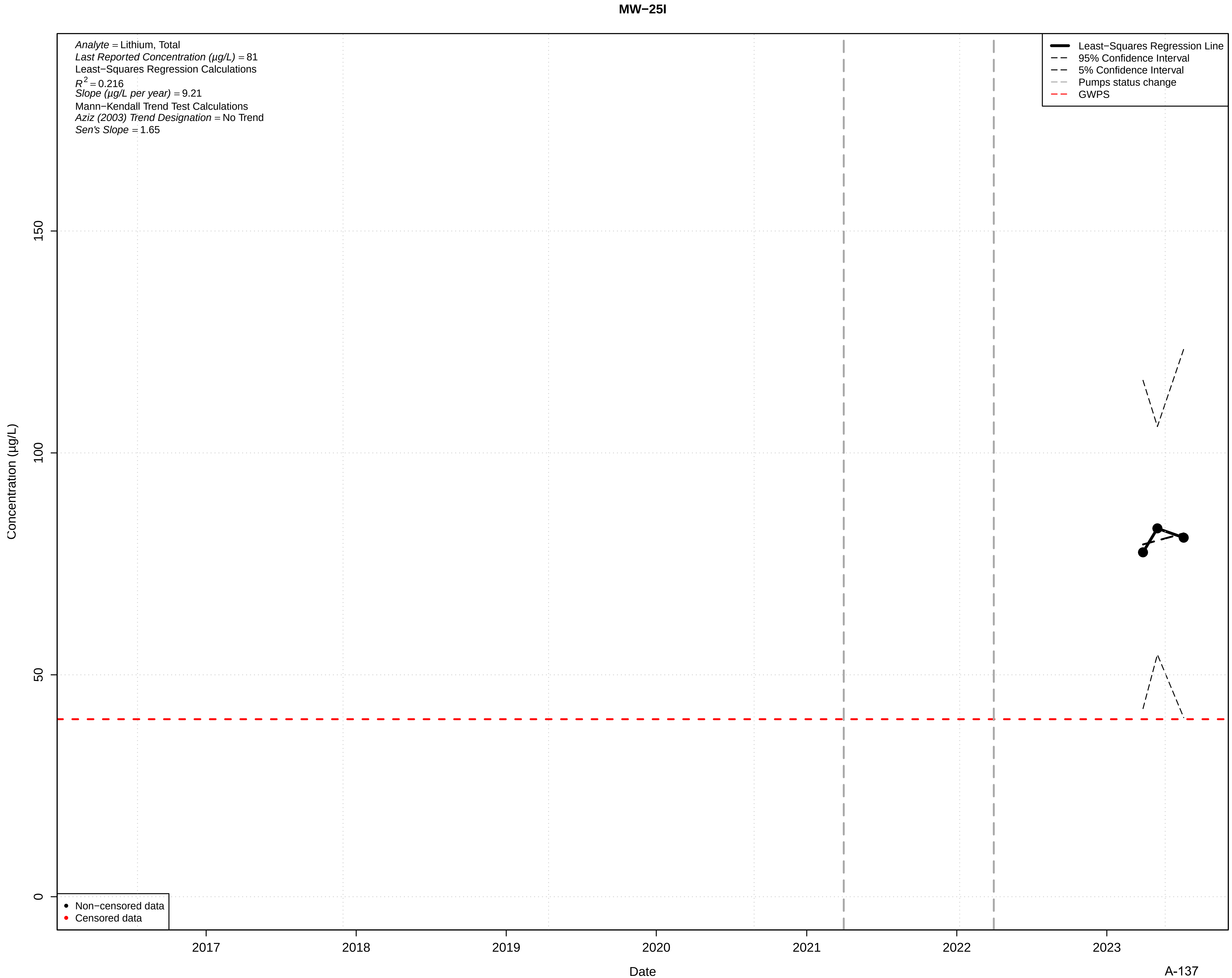
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 57
Number of samples = 3
Max Conc. = 61.1
Mean Conc. = 58.6
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

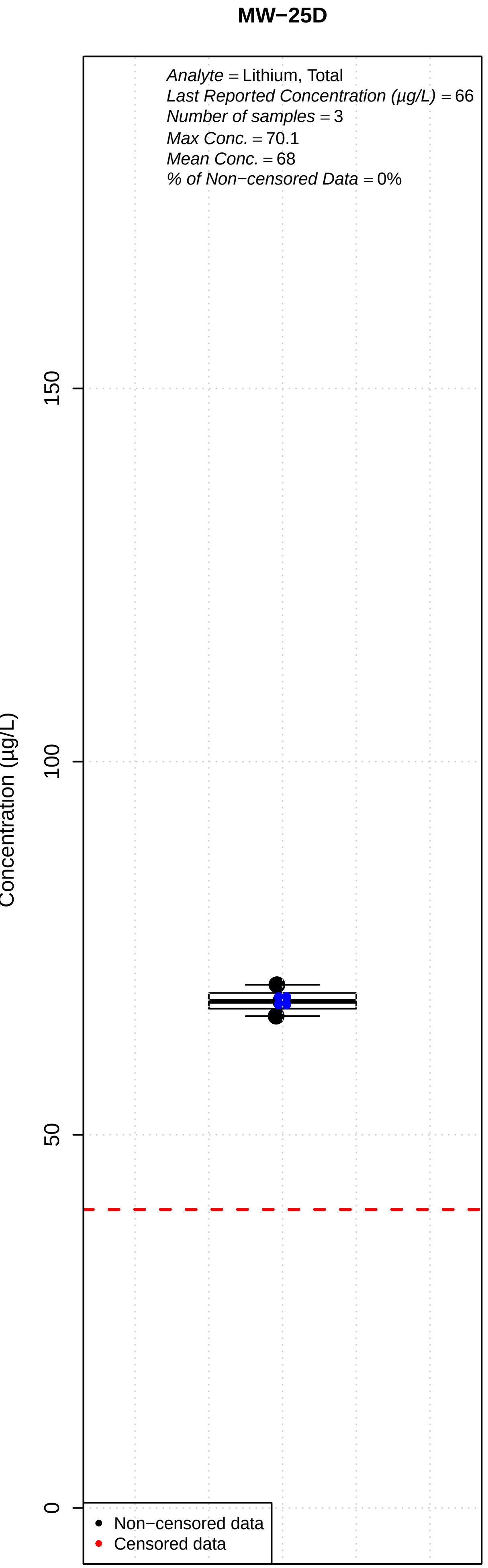
MW−25S

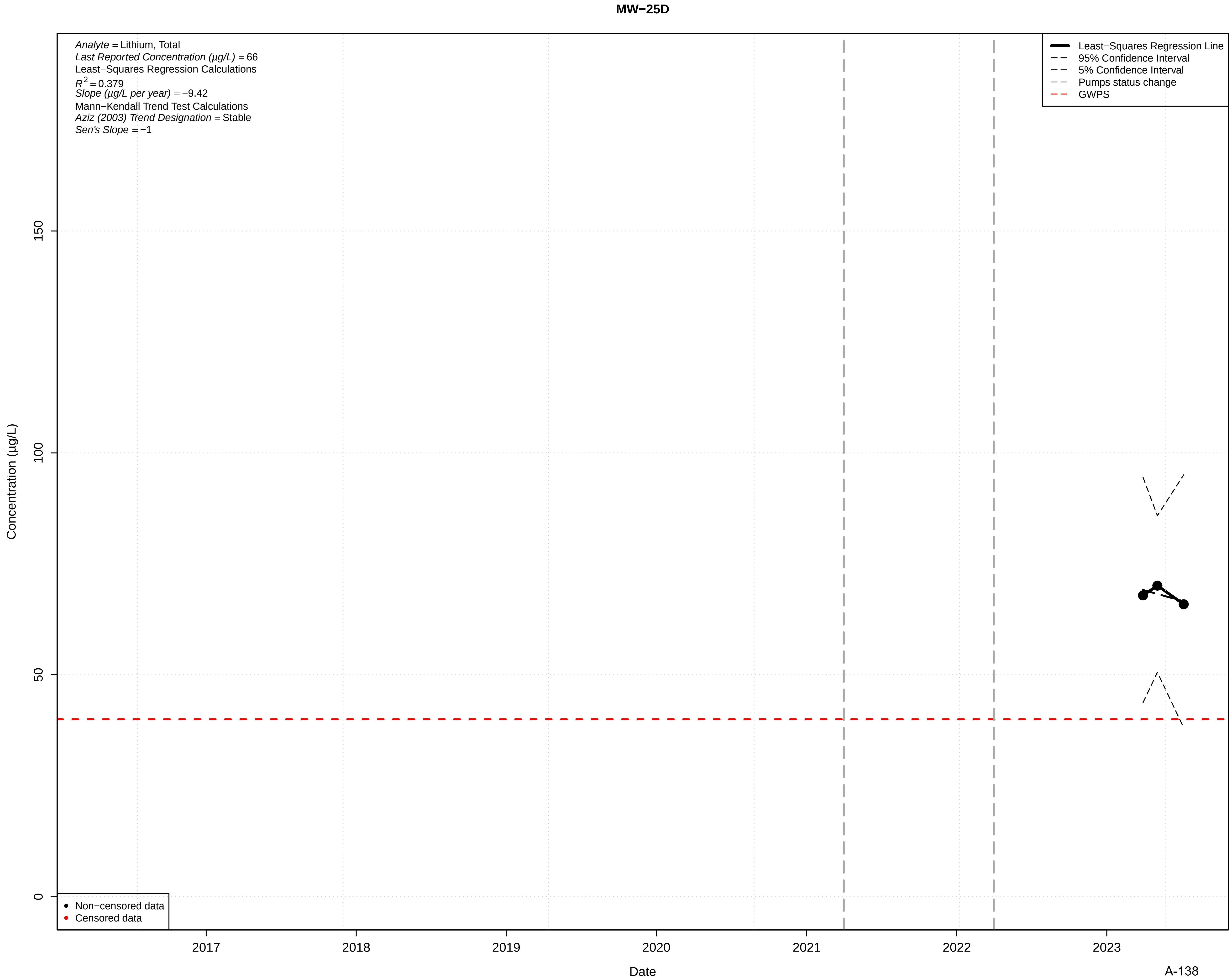


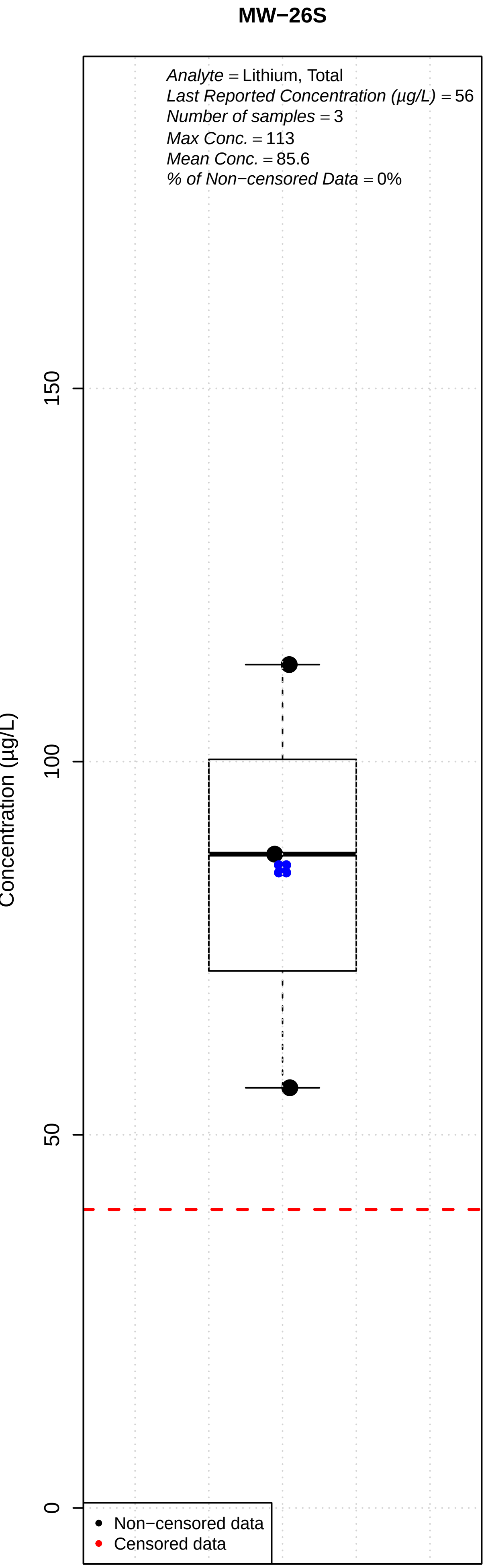
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 57
Least−Squares Regression Calculations
R2 = 0.172
Slope (µg/L per year) = −6.73
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.55
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

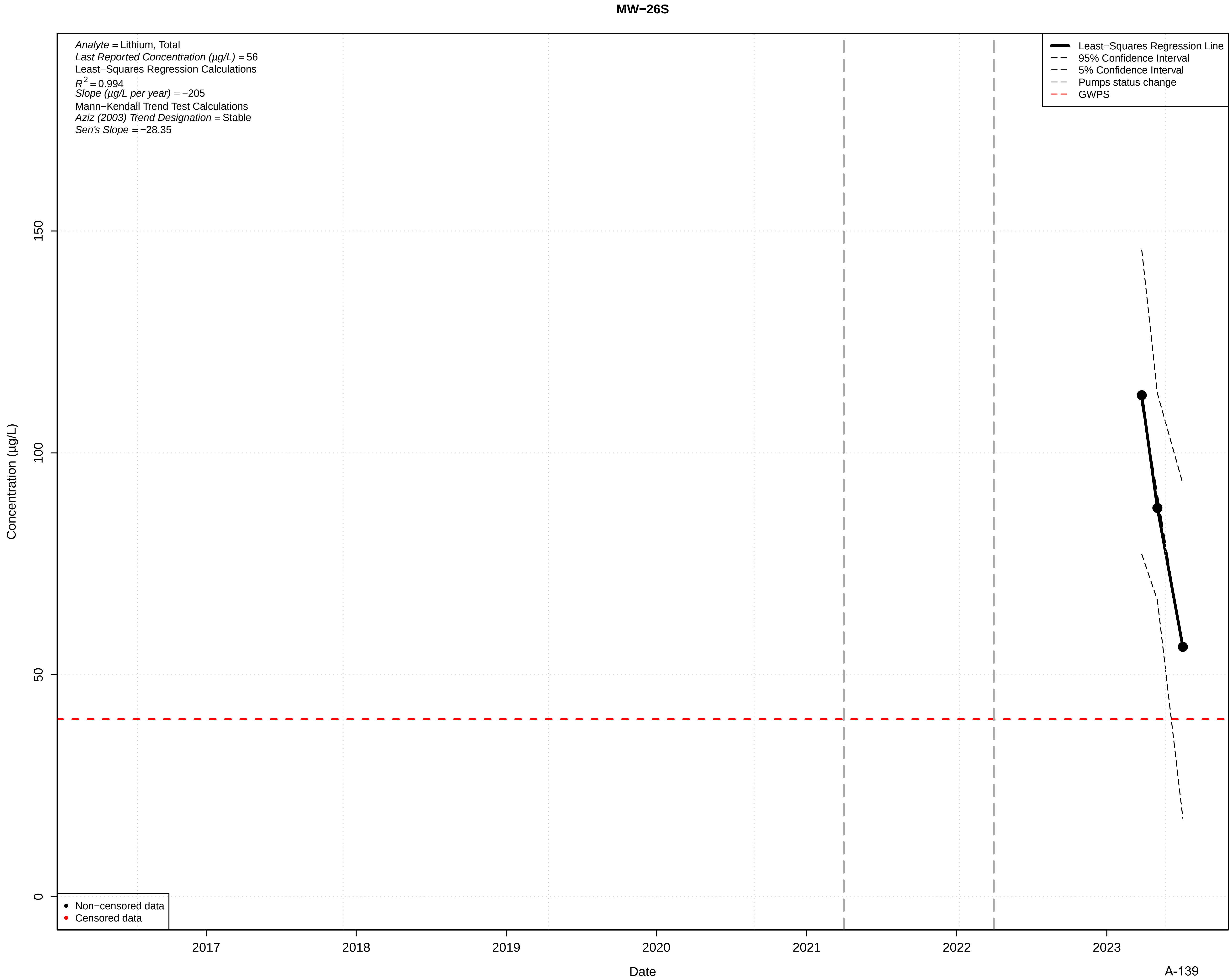

MW−25I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 81
Number of samples = 3
Max Conc. = 83
Mean Conc. = 80.5
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

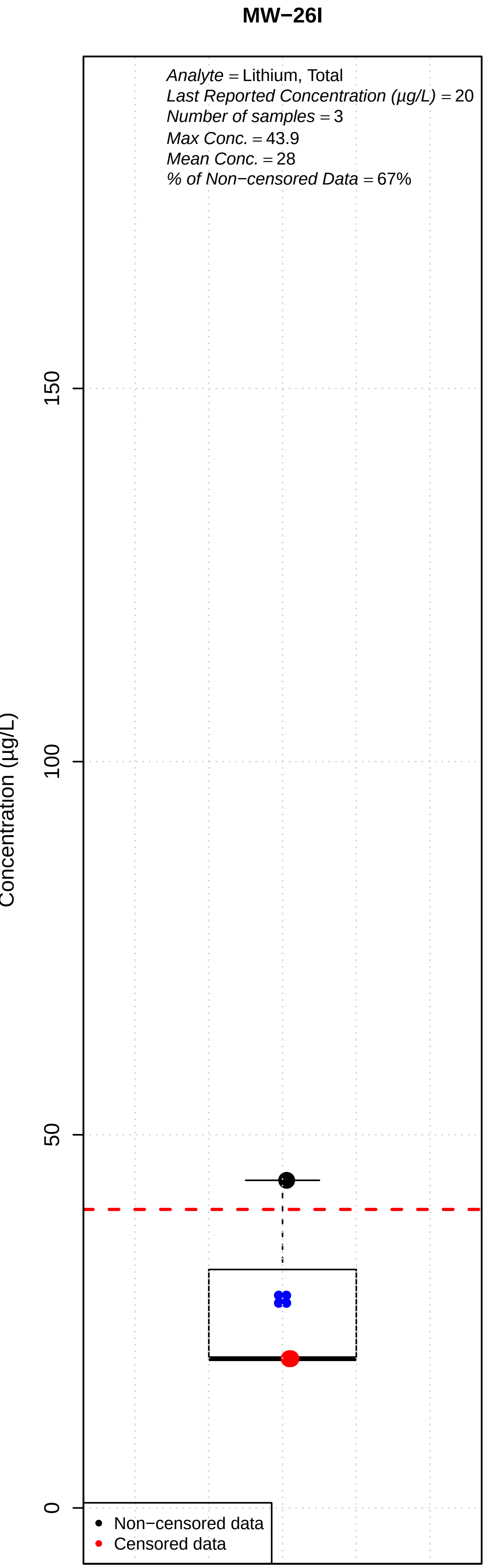

MW−25I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 81
Least−Squares Regression Calculations
R^2 = 0.216
Slope (µg/L per year) = 9.21
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 1.65
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−25D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 66
Number of samples = 3
Max Conc. = 70.1
Mean Conc. = 68
% of Non−censored Data = 0%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data

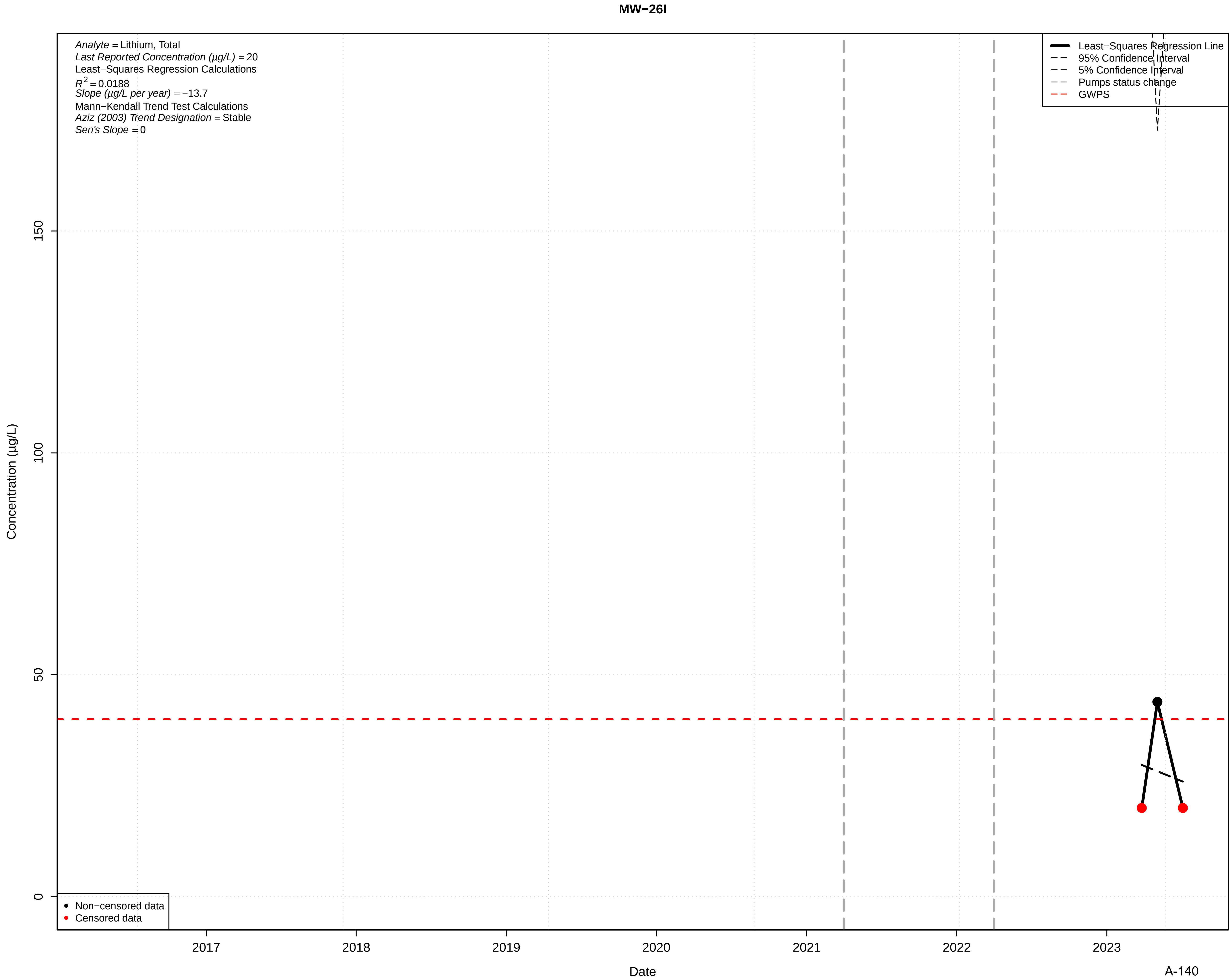

MW−25D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 66
Least−Squares Regression Calculations
R² = 0.379
Slope (µg/L per year) = −9.42
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −1
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−26S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 56
Number of samples = 3
Max Conc. = 113
Mean Conc. = 85.6
% of Non−censored Data = 0%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

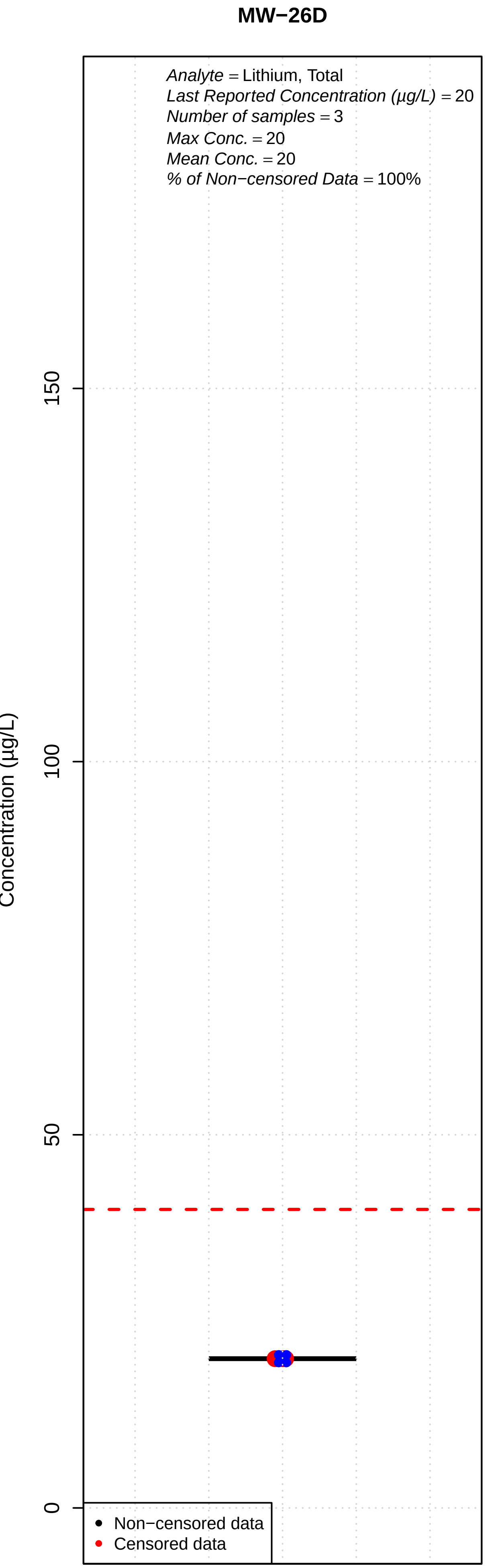

MW−26S
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 56
Least−Squares Regression Calculations
R^2 = 0.994
Slope (µg/L per year) = −205
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −28.35
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

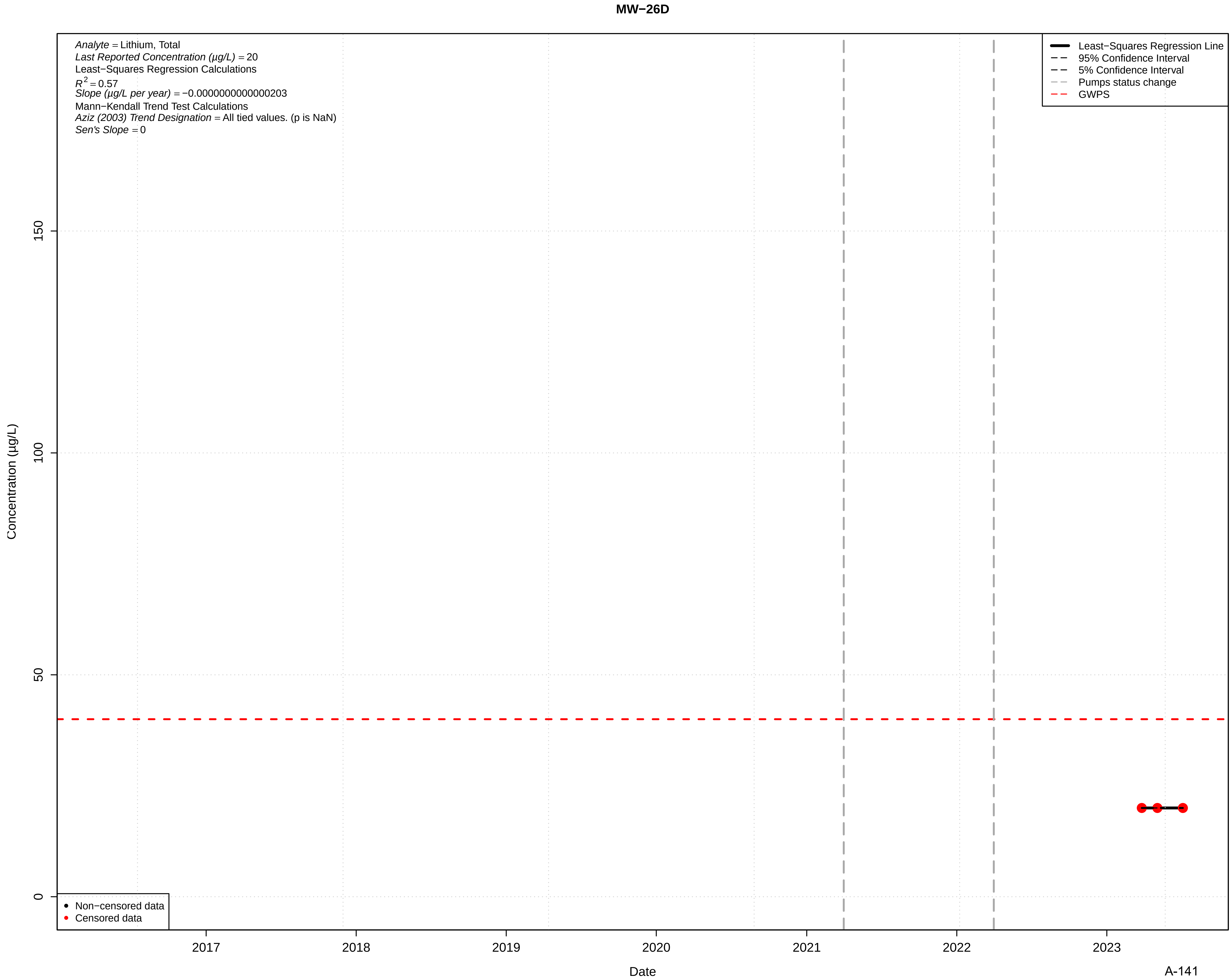


MW−26I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 3
Max Conc. = 43.9
Mean Conc. = 28
% of Non−censored Data = 67%
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data

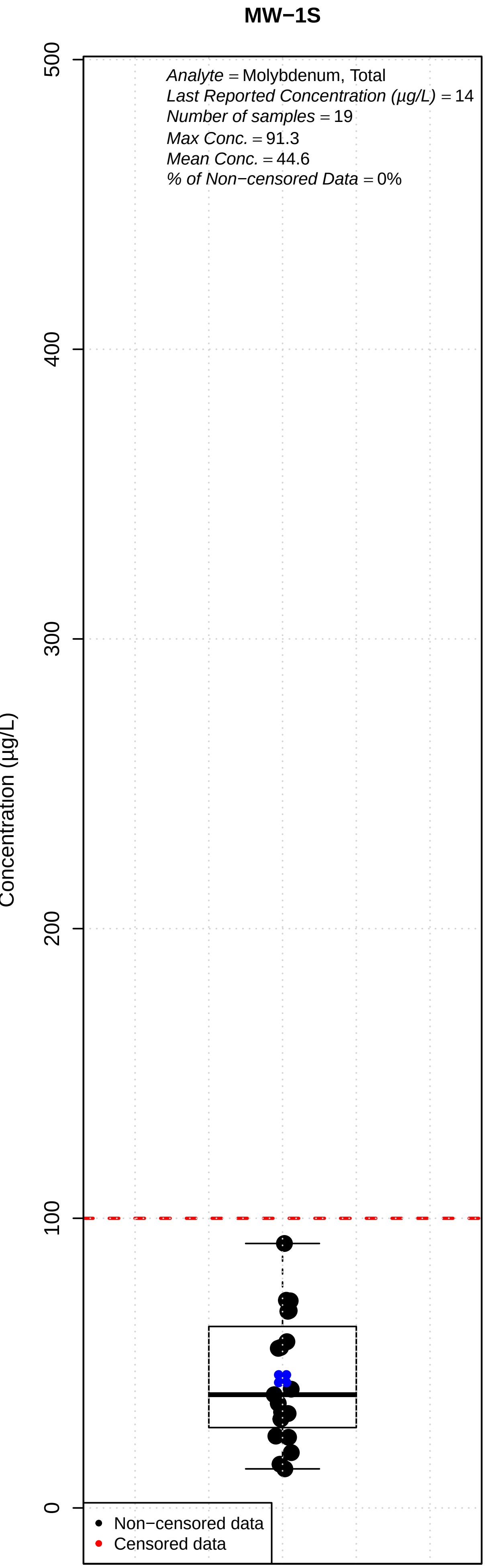


MW−26I
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R^2 = 0.0188
Slope (µg/L per year) = −13.7
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
50
100
150
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

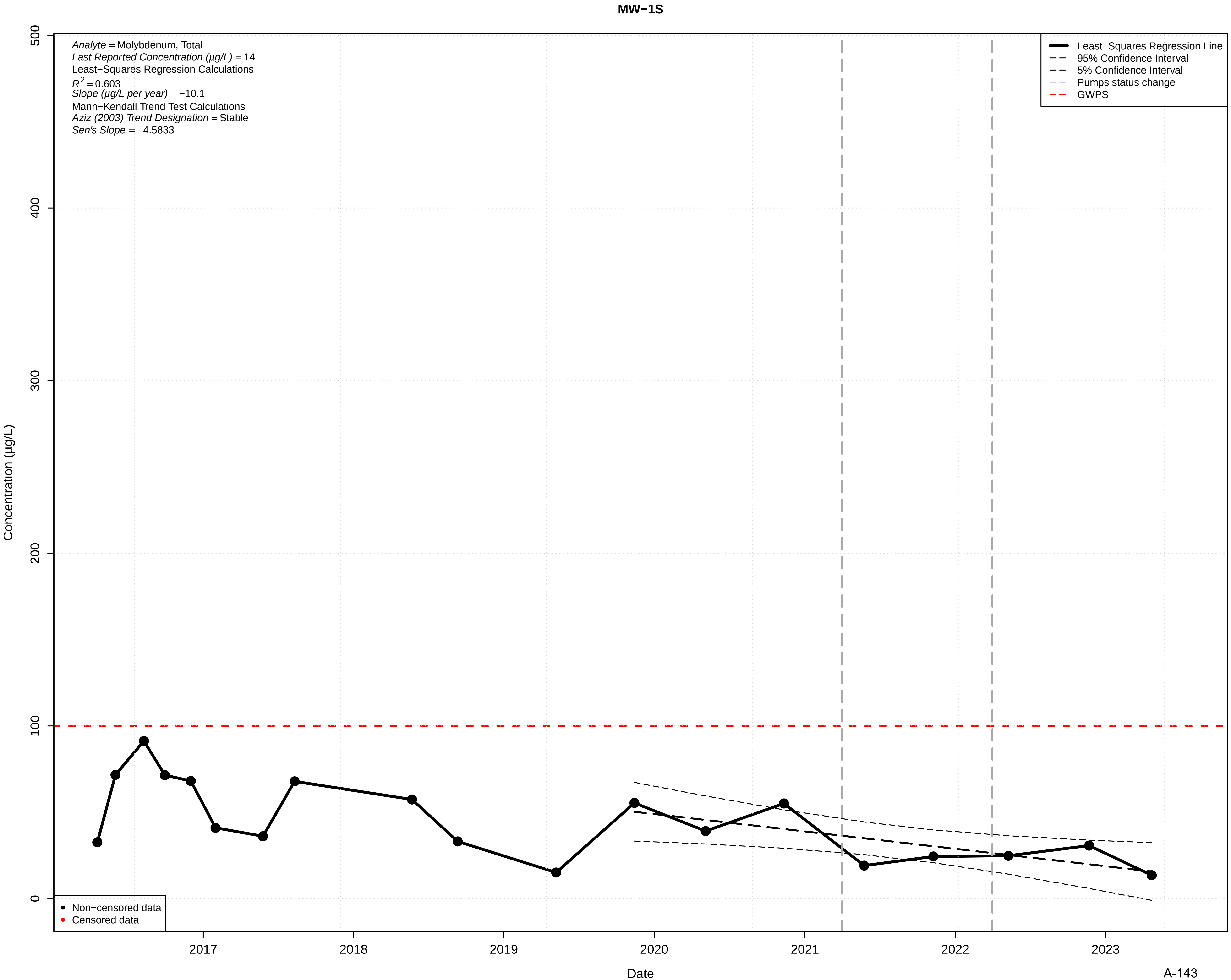

MW−26D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 3
Max Conc. = 20
Mean Conc. = 20
% of Non−censored Data = 100%
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data


MW−26D
Analyte = Lithium, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R2 = 0.57
Slope (µg/L per year) = −0.0000000000000203
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = All tied values. (p is NaN)
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
150
100
50
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

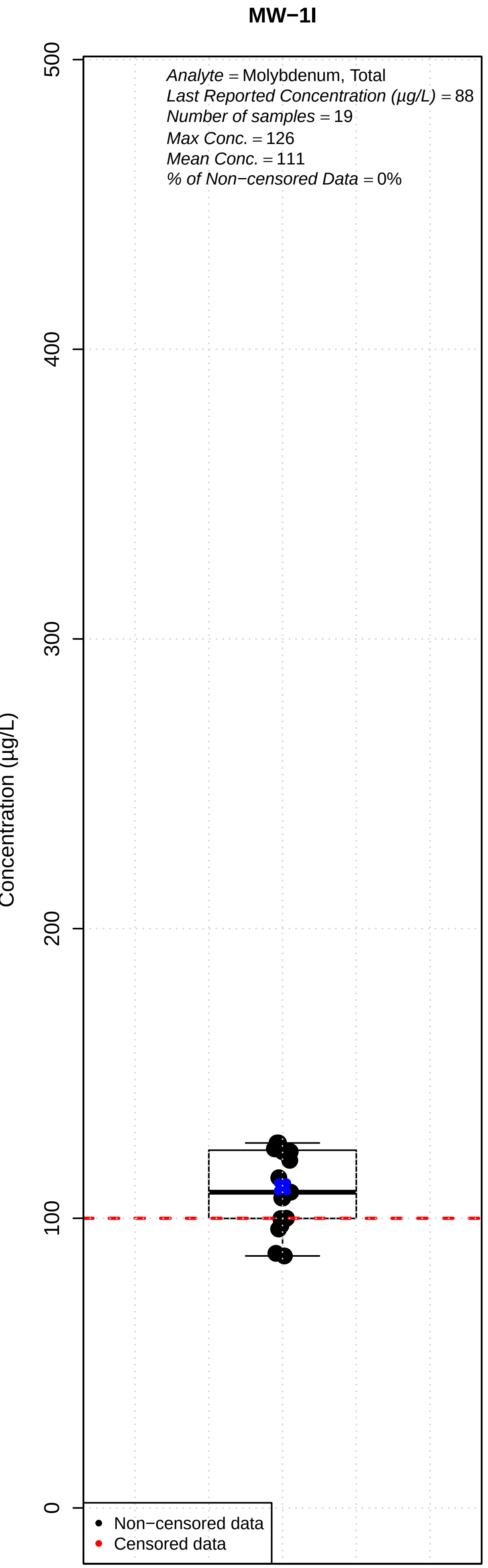
MOLYBDENUM

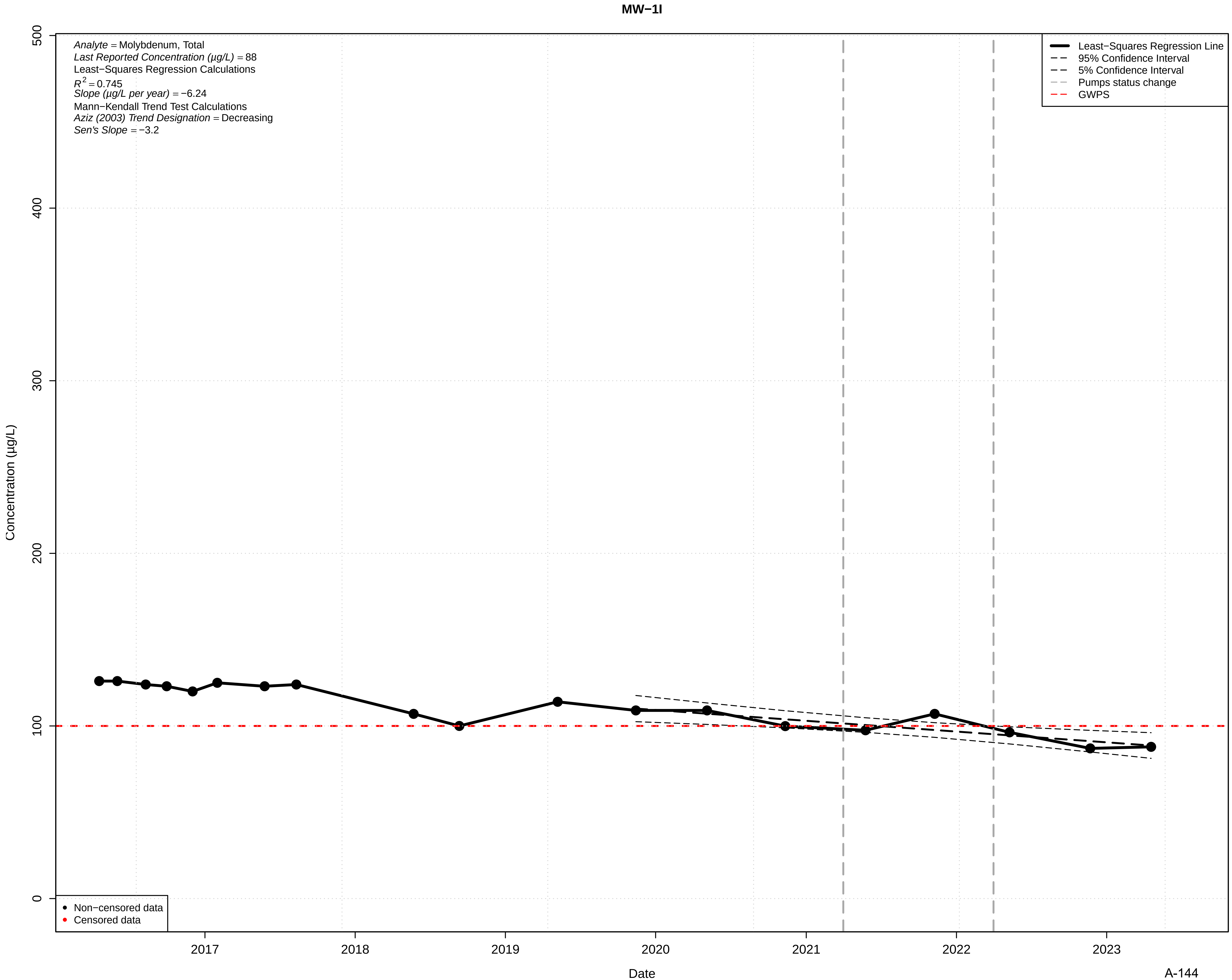


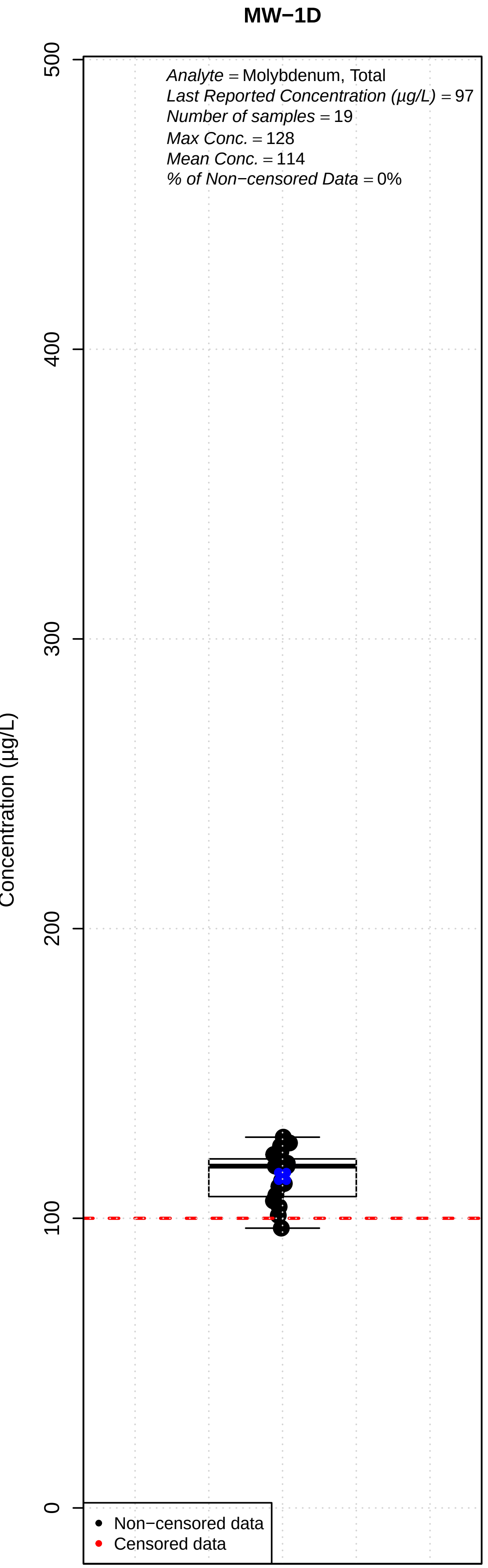
MW−1S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 14
Number of samples = 19
Max Conc. = 91.3
Mean Conc. = 44.6
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data



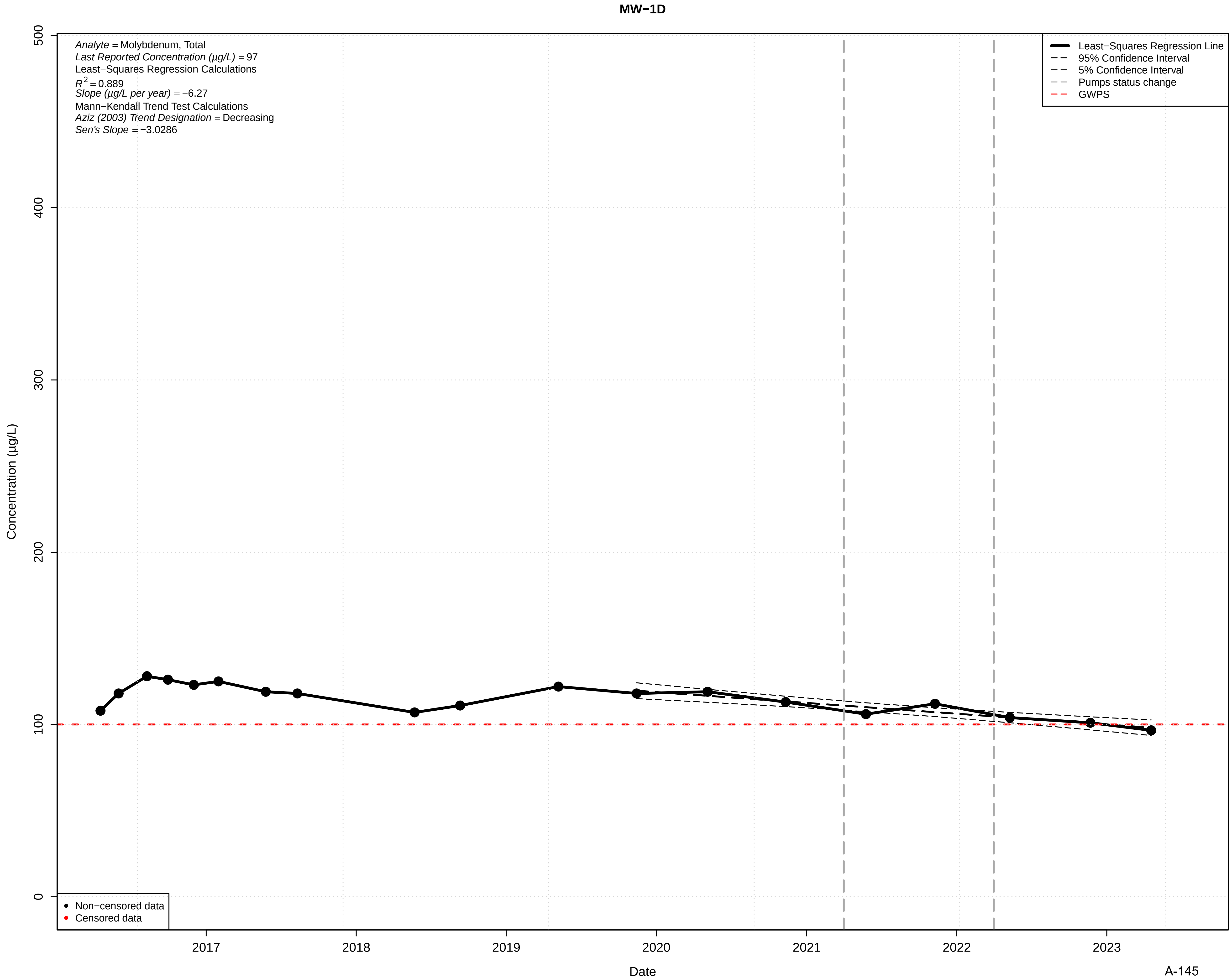
MW−1S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 14
Least−Squares Regression Calculations
R2 = 0.603
Slope (µg/L per year) = −10.1
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −4.5833
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data


MW−1I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 88
Number of samples = 19
Max Conc. = 126
Mean Conc. = 111
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

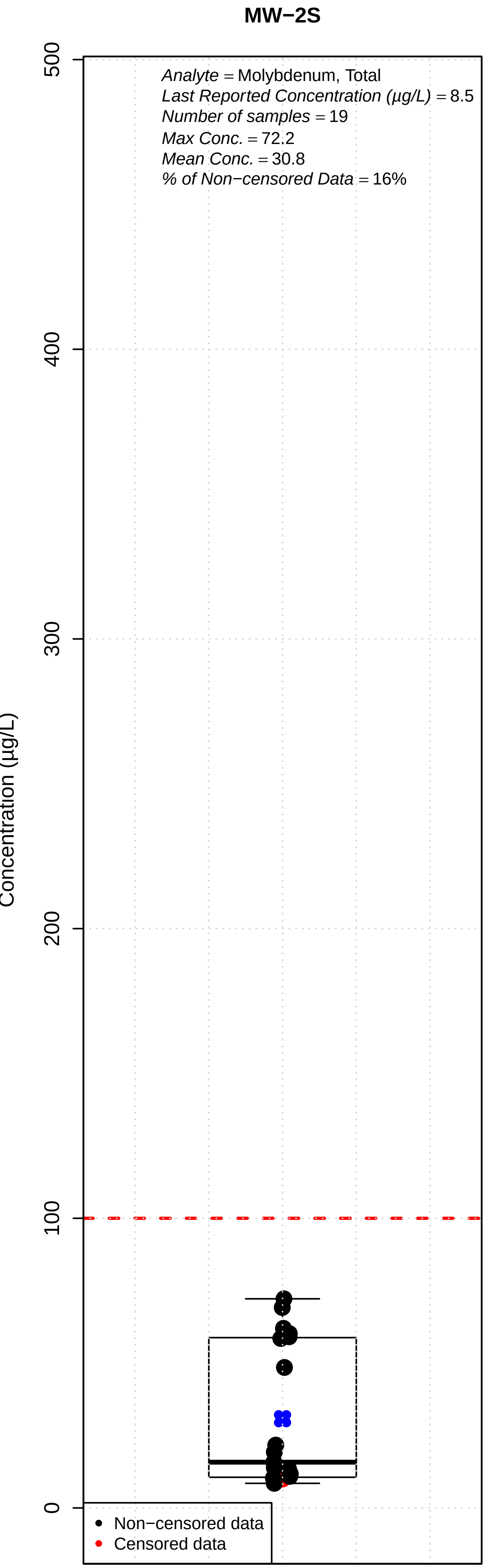

MW−1I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 88
Least−Squares Regression Calculations
R² = 0.745
Slope (µg/L per year) = −6.24
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −3.2
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

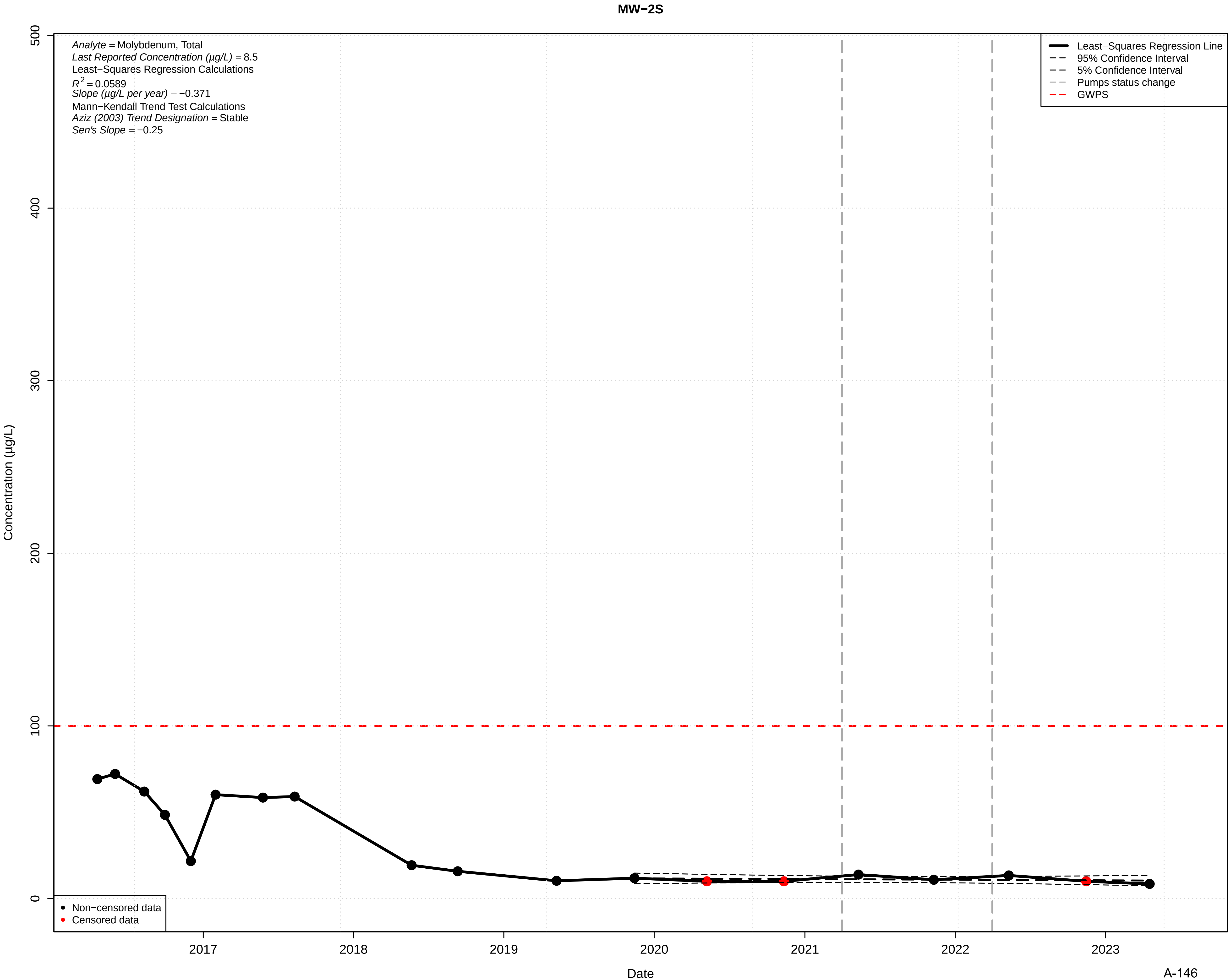


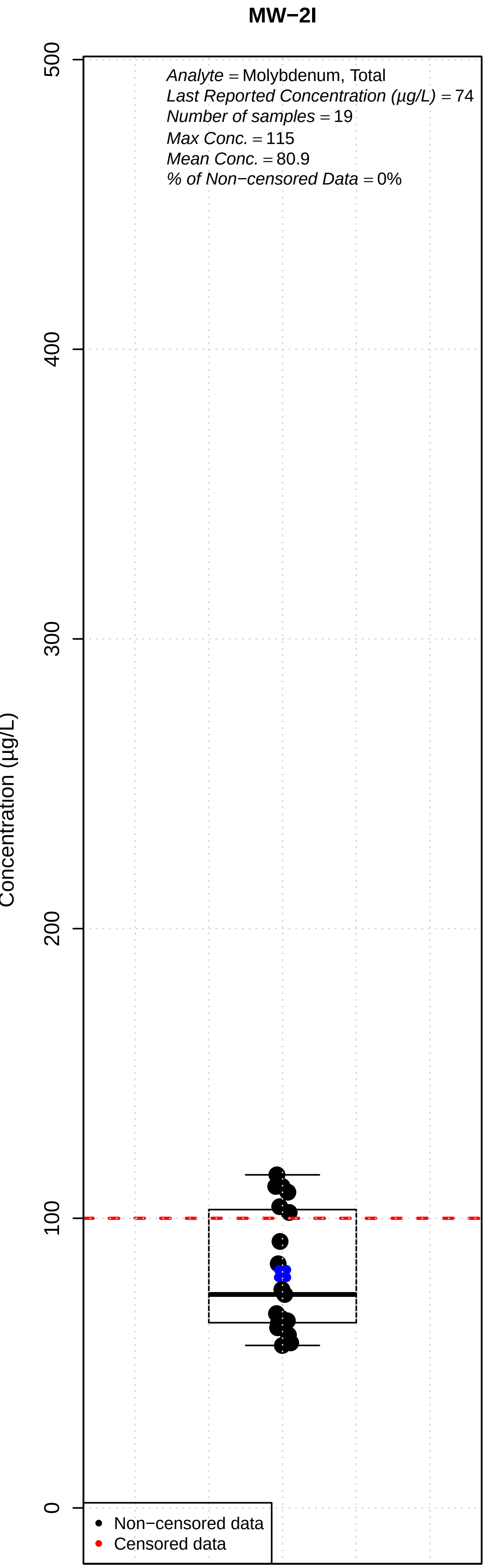
MW−1D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 97
Number of samples = 19
Max Conc. = 128
Mean Conc. = 114
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

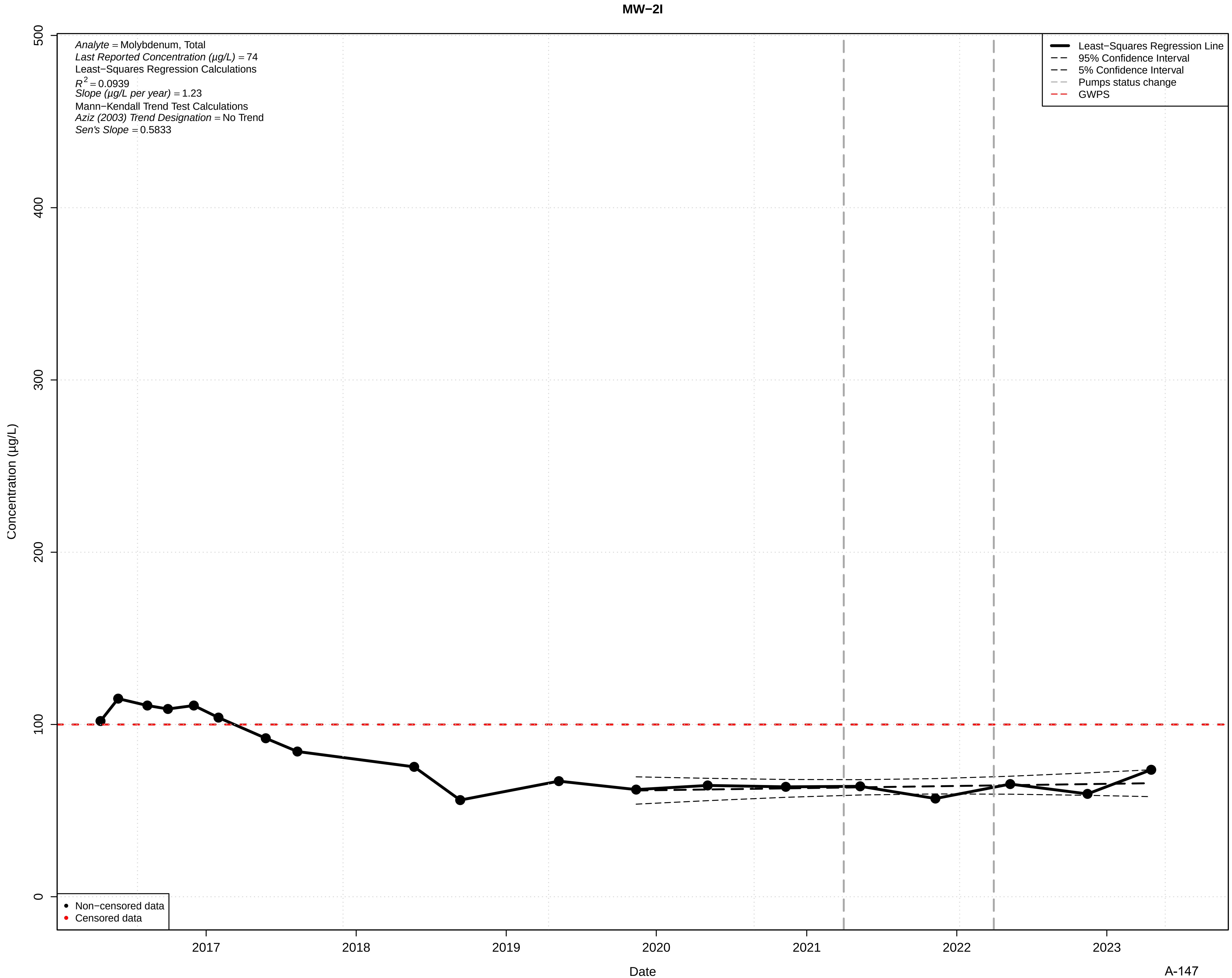


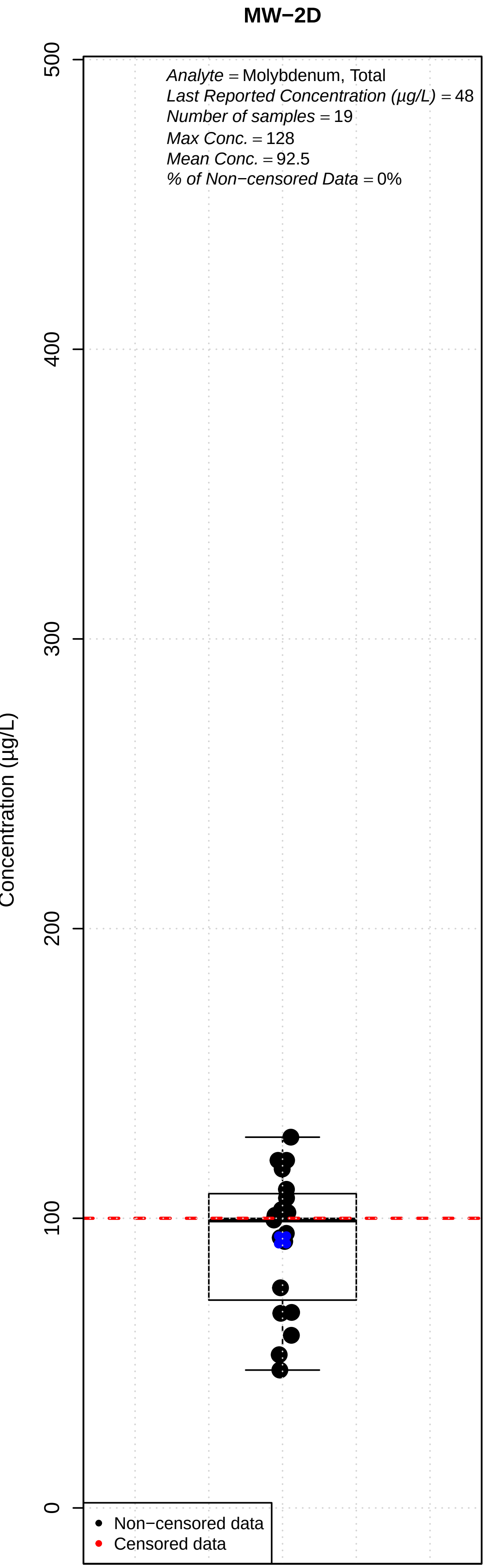
MW−1D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 97
Least−Squares Regression Calculations
R^2 = 0.889
Slope (µg/L per year) = −6.27
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −3.0286
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data


MW−2S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 8.5
Number of samples = 19
Max Conc. = 72.2
Mean Conc. = 30.8
% of Non−censored Data = 16%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

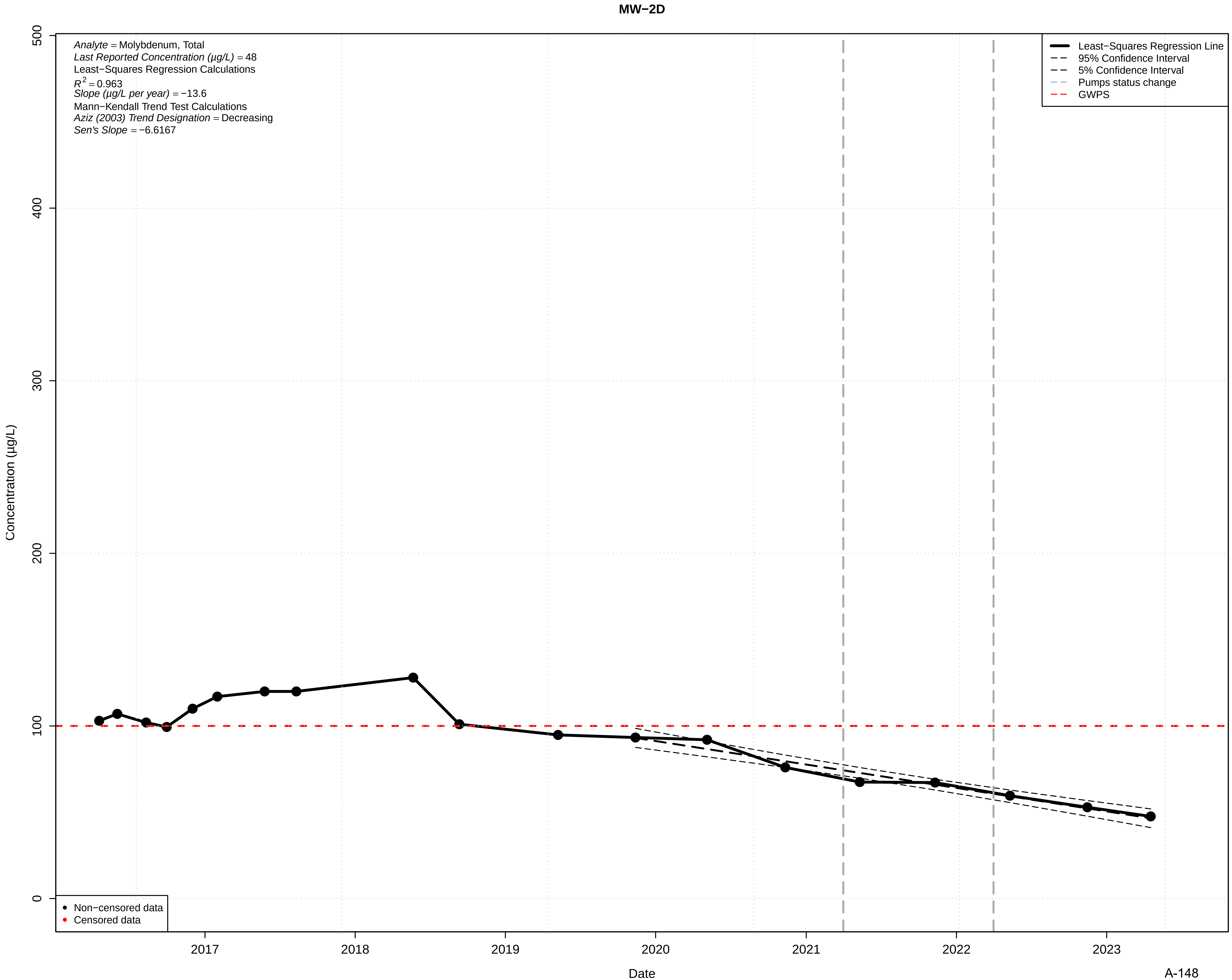

MW−2S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 8.5
Least−Squares Regression Calculations
R^2 = 0.0589
Slope (µg/L per year) = −0.371
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.25
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−2I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 74
Number of samples = 19
Max Conc. = 115
Mean Conc. = 80.9
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

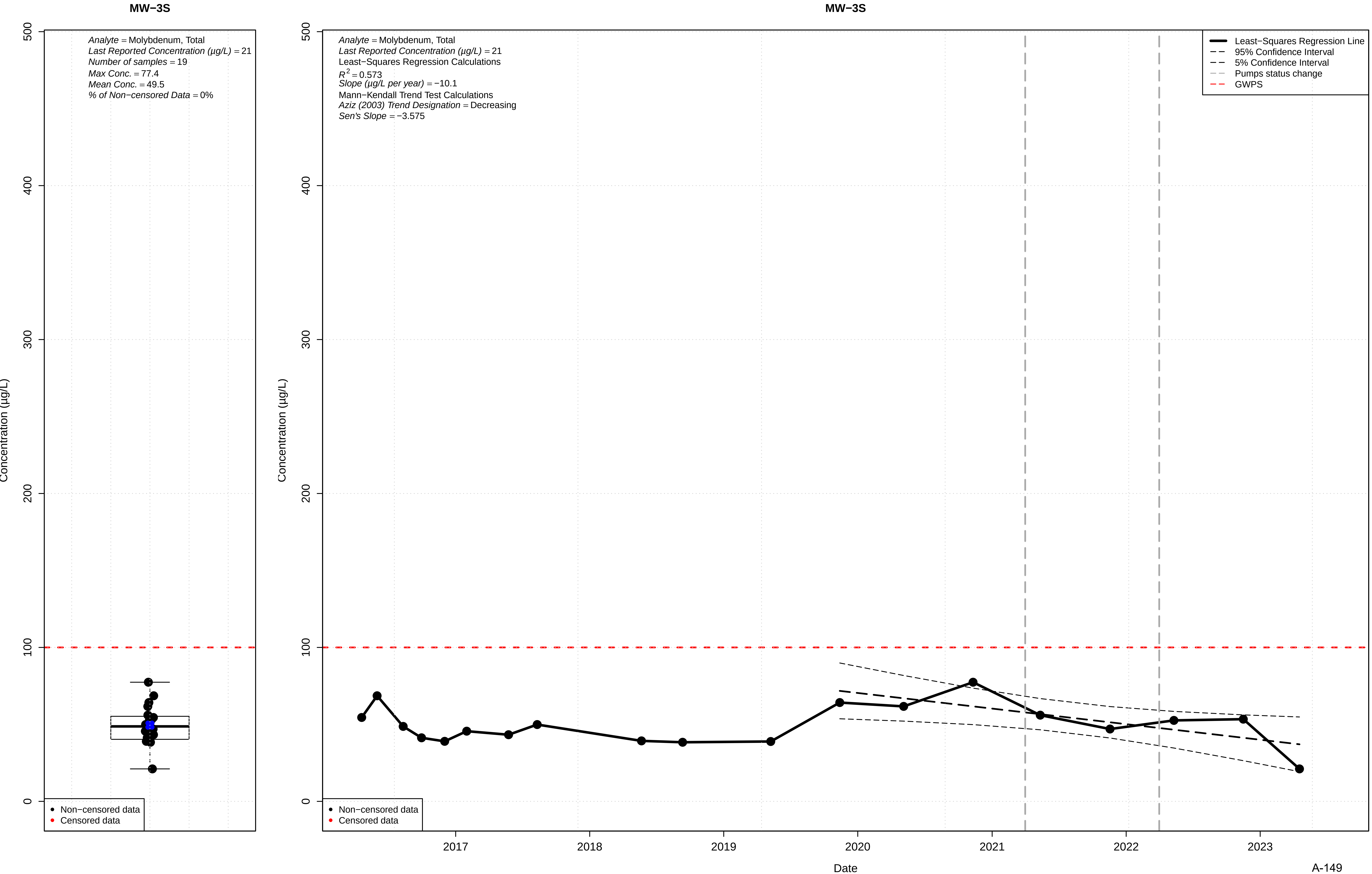

MW−2I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 74
Least−Squares Regression Calculations
R2 = 0.0939
Slope (µg/L per year) = 1.23
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.5833
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data

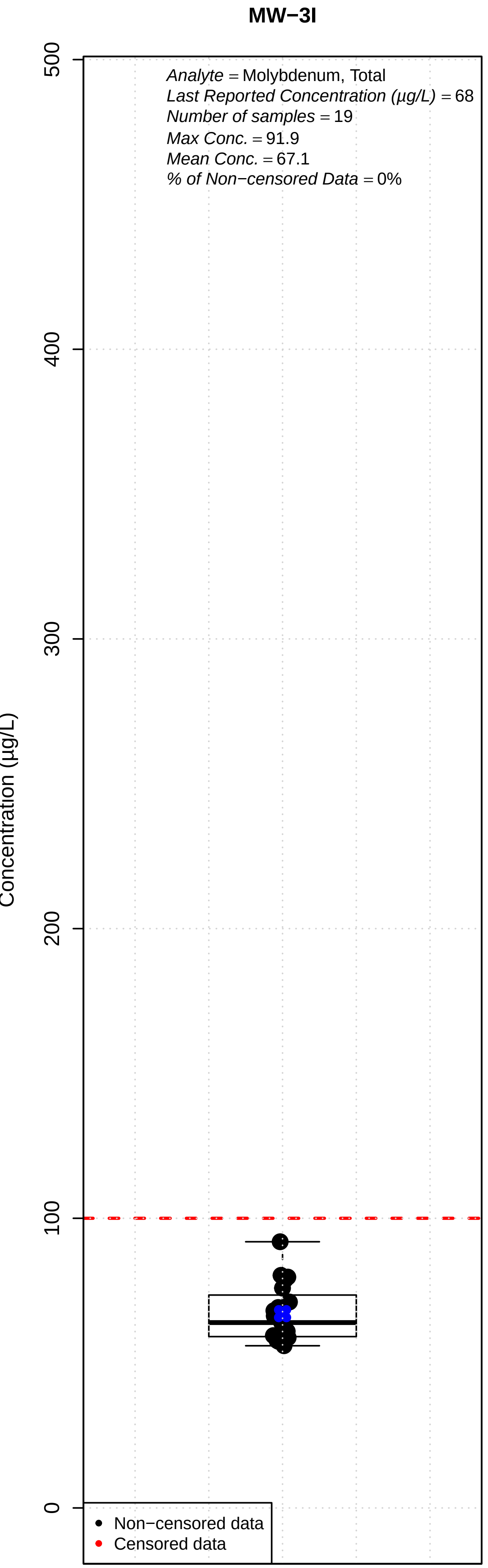


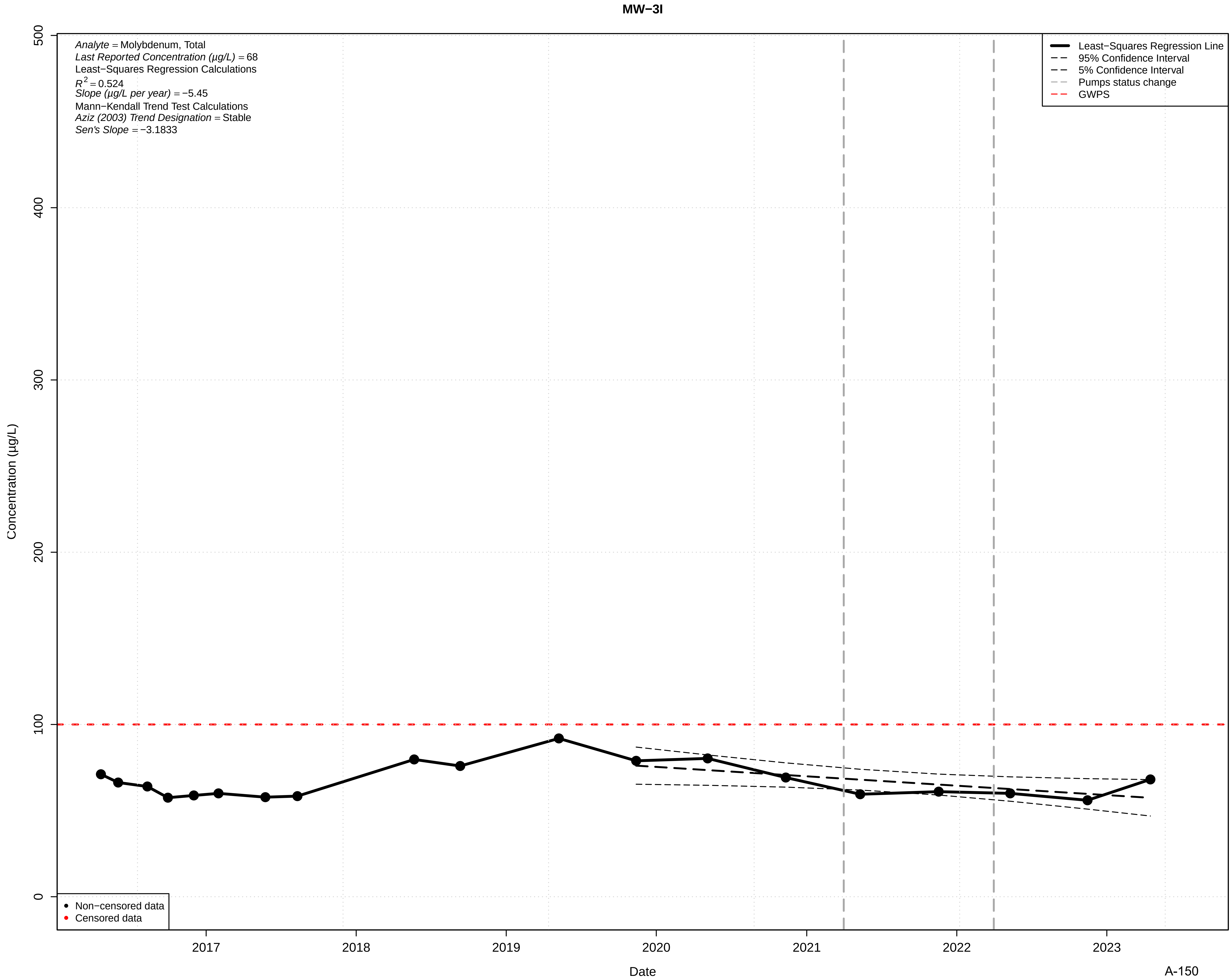
MW−2D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 48
Number of samples = 19
Max Conc. = 128
Mean Conc. = 92.5
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

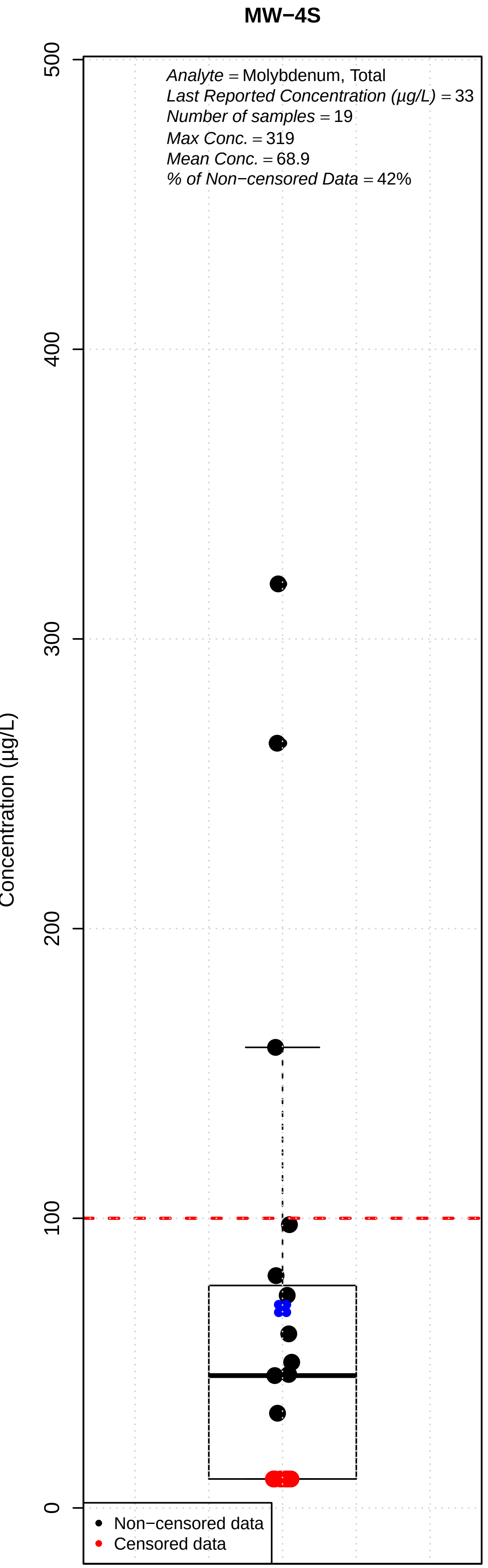


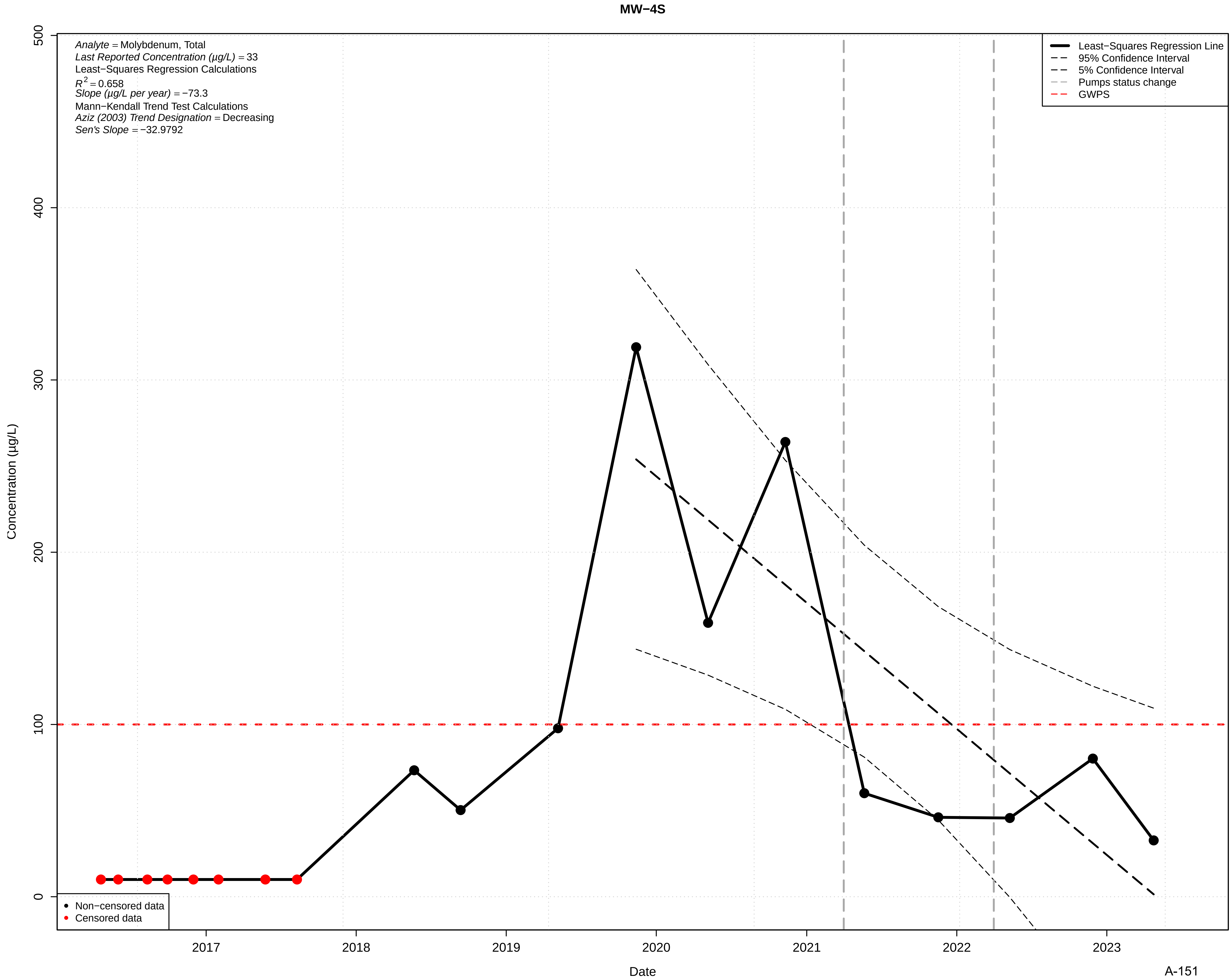
MW−2D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 48
Least−Squares Regression Calculations
R^2 = 0.963
Slope (µg/L per year) = −13.6
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −6.6167
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

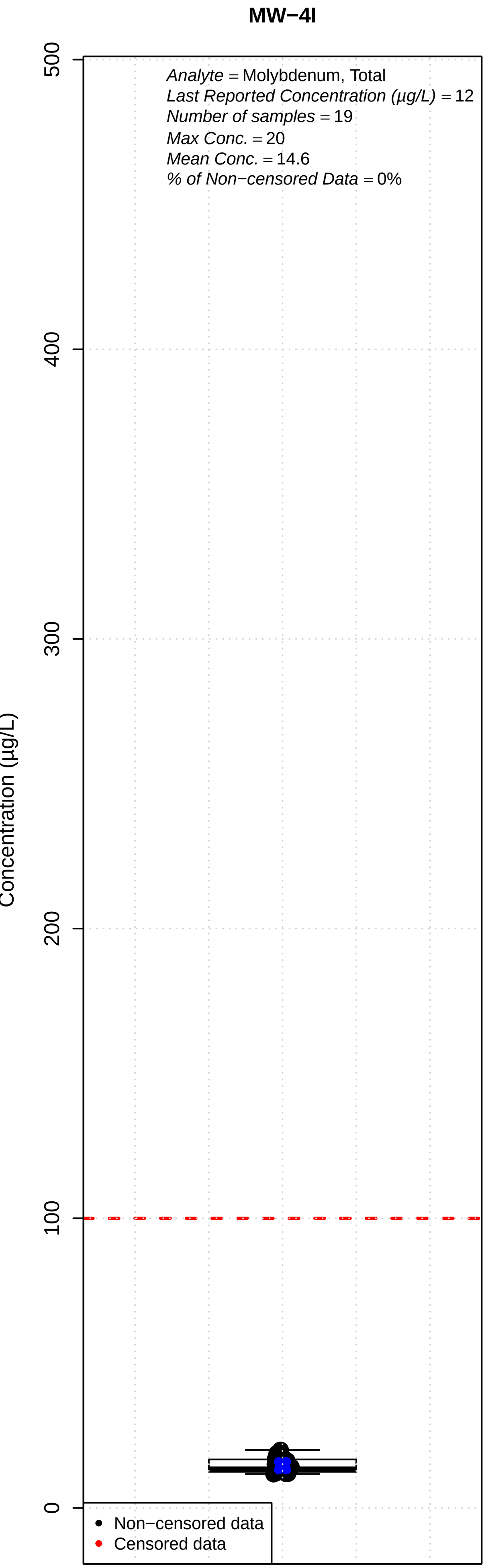

MW−3S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 21
Number of samples = 19
Max Conc. = 77.4
Mean Conc. = 49.5
% of Non−censored Data = 0%
Concentration (µg/L)
Non−censored data
Censored data
MW−3S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 21
Least−Squares Regression Calculations
R^2 = 0.573
Slope (µg/L per year) = −10.1
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −3.575
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Date
0
100
200
300
400
500
2017
2018
2019
2020
2021
2022
2023

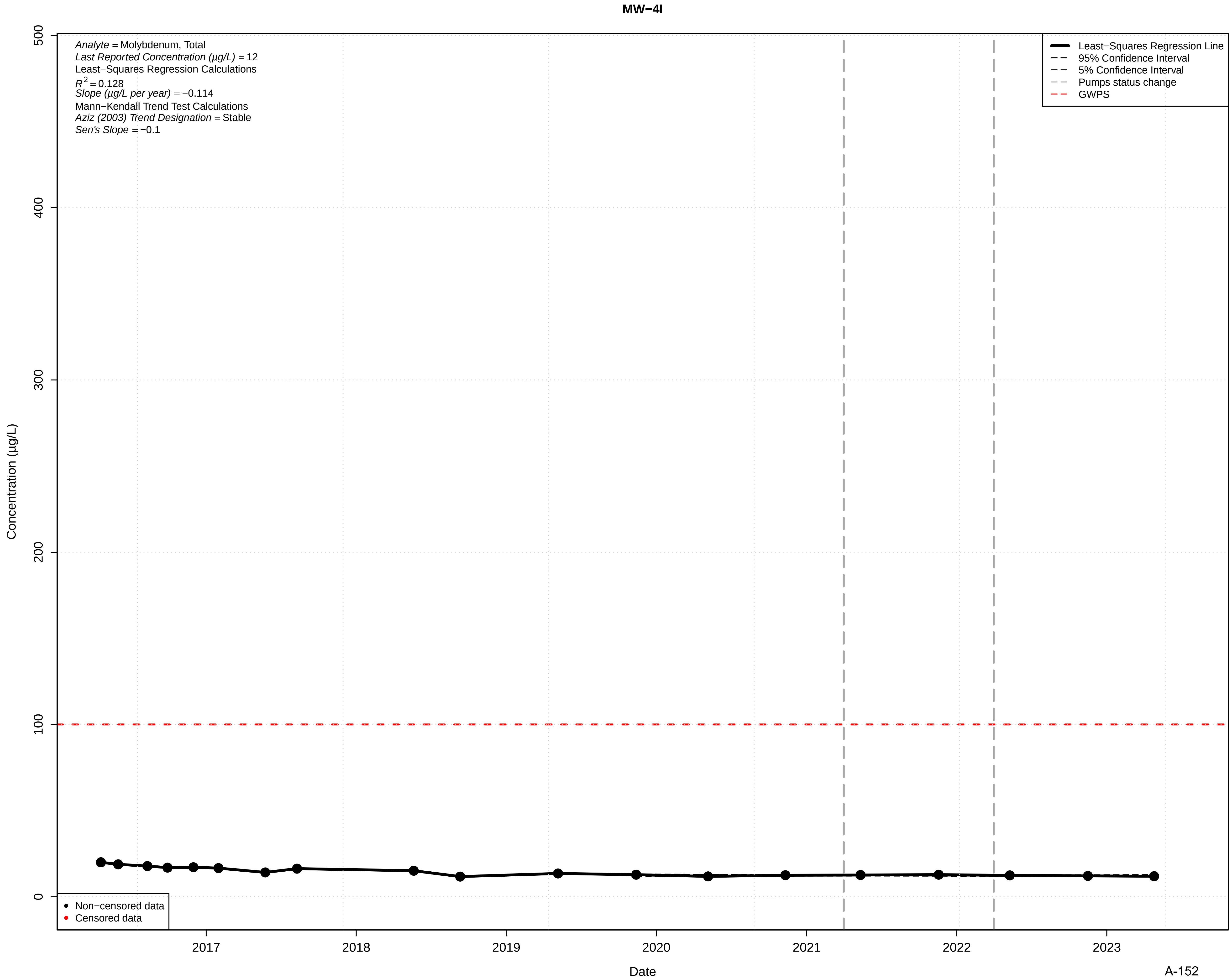

MW−3I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 68
Number of samples = 19
Max Conc. = 91.9
Mean Conc. = 67.1
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

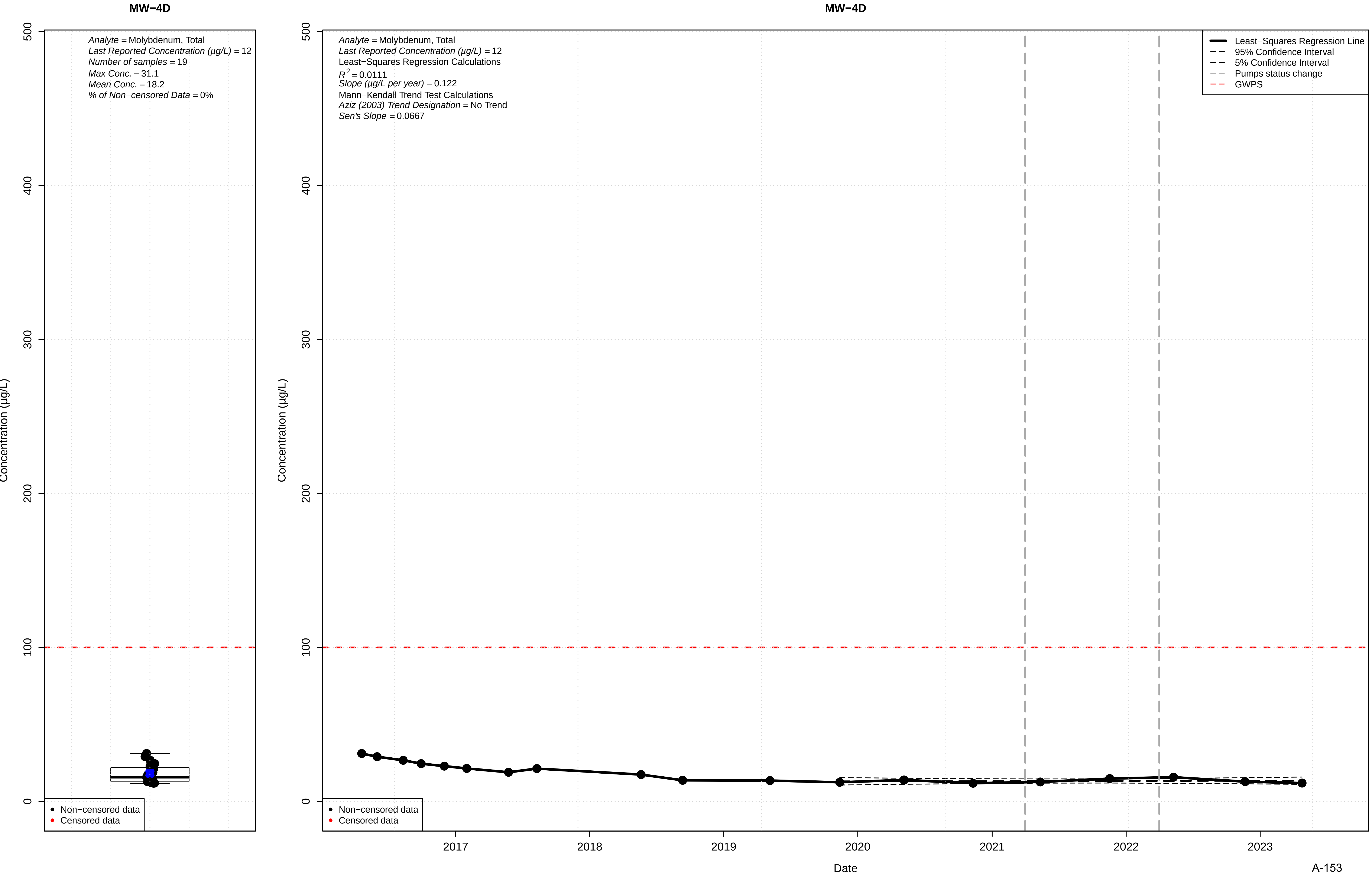

MW−3I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 68
Least−Squares Regression Calculations
R² = 0.524
Slope (µg/L per year) = −5.45
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −3.1833
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data

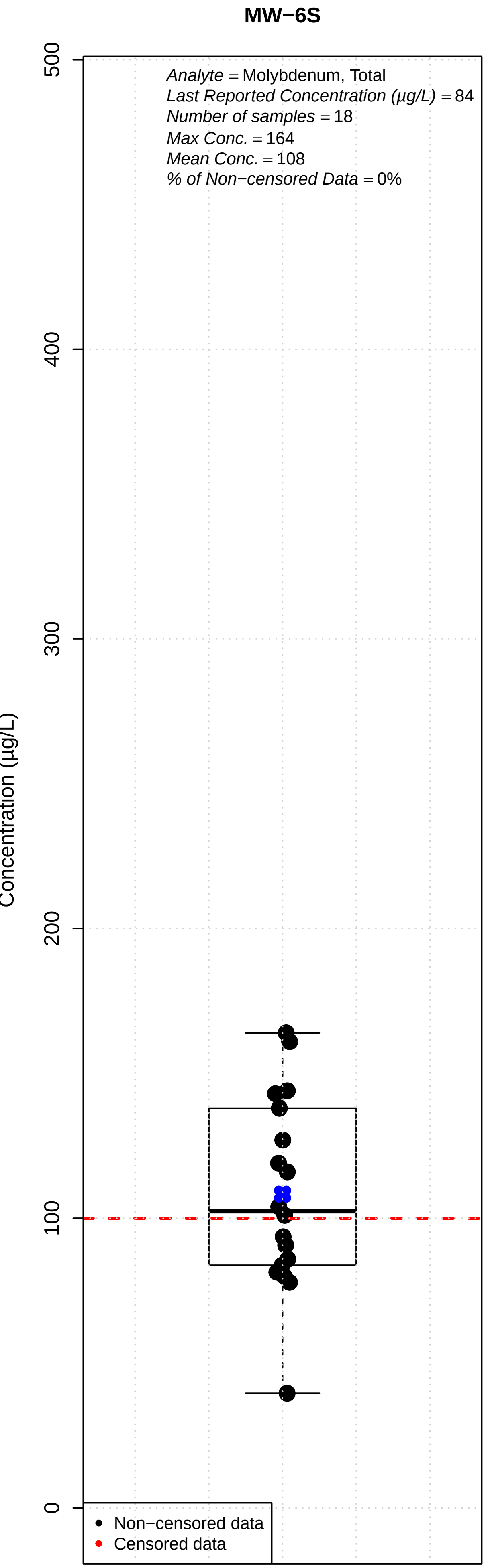

MW−4S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 33
Number of samples = 19
Max Conc. = 319
Mean Conc. = 68.9
% of Non−censored Data = 42%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

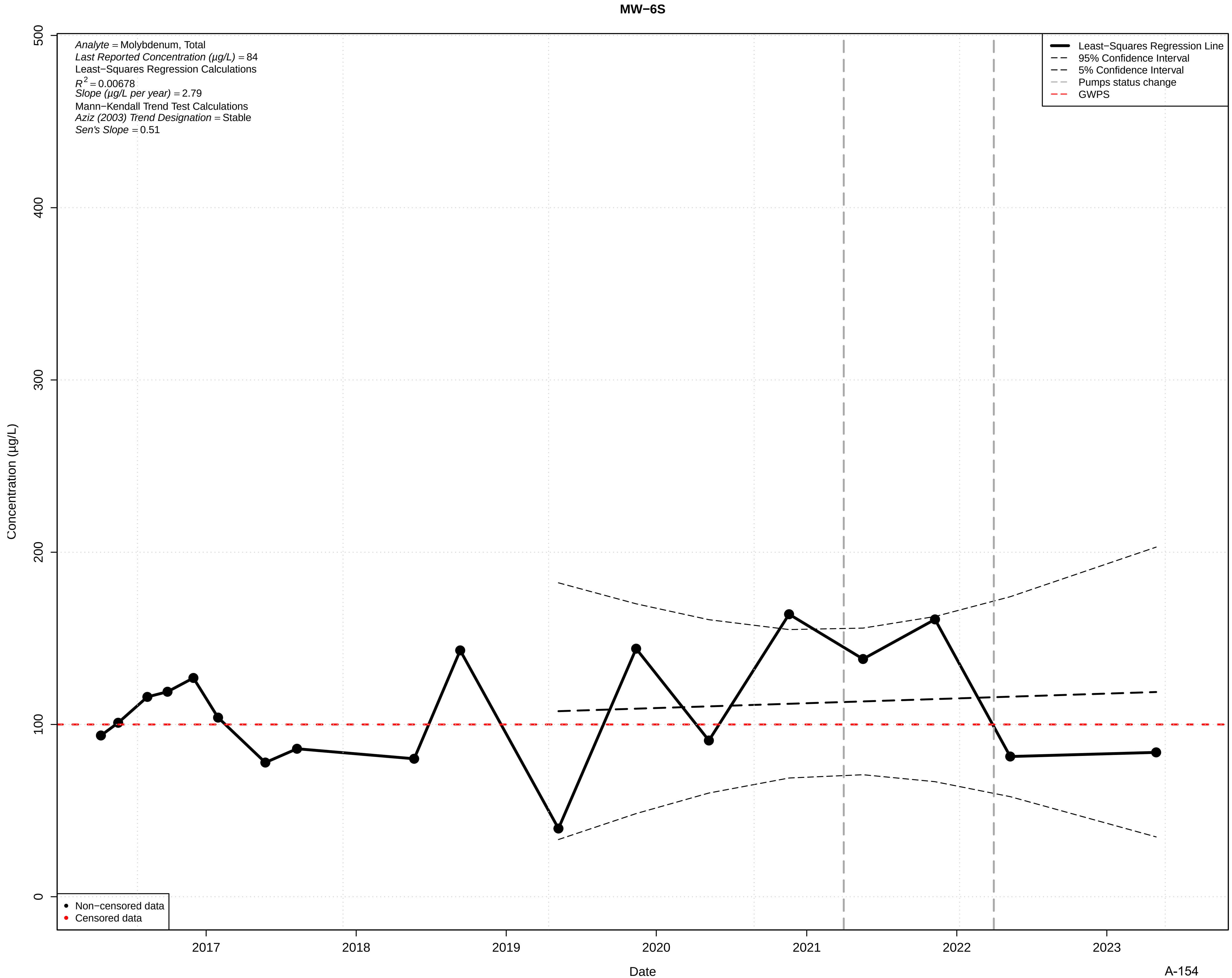

MW−4S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 33
Least−Squares Regression Calculations
R^2 = 0.658
Slope (µg/L per year) = −73.3
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −32.9792
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data

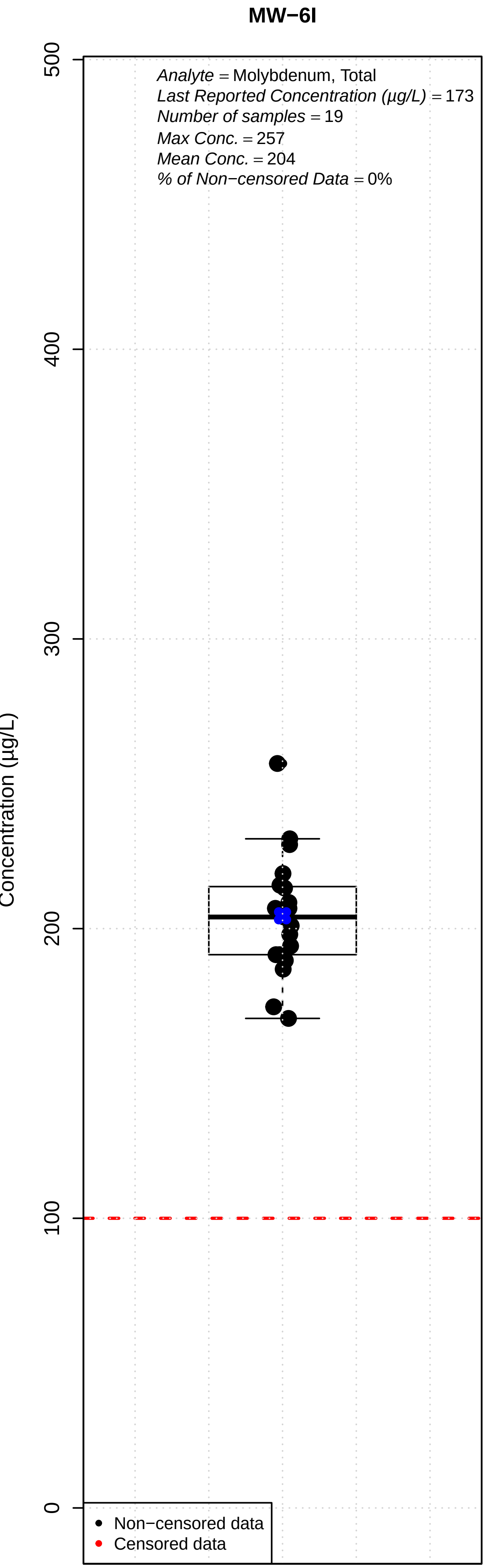

MW−4I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 12
Number of samples = 19
Max Conc. = 20
Mean Conc. = 14.6
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data


MW−4I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 12
Least−Squares Regression Calculations
R^2 = 0.128
Slope (µg/L per year) = −0.114
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.1
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data

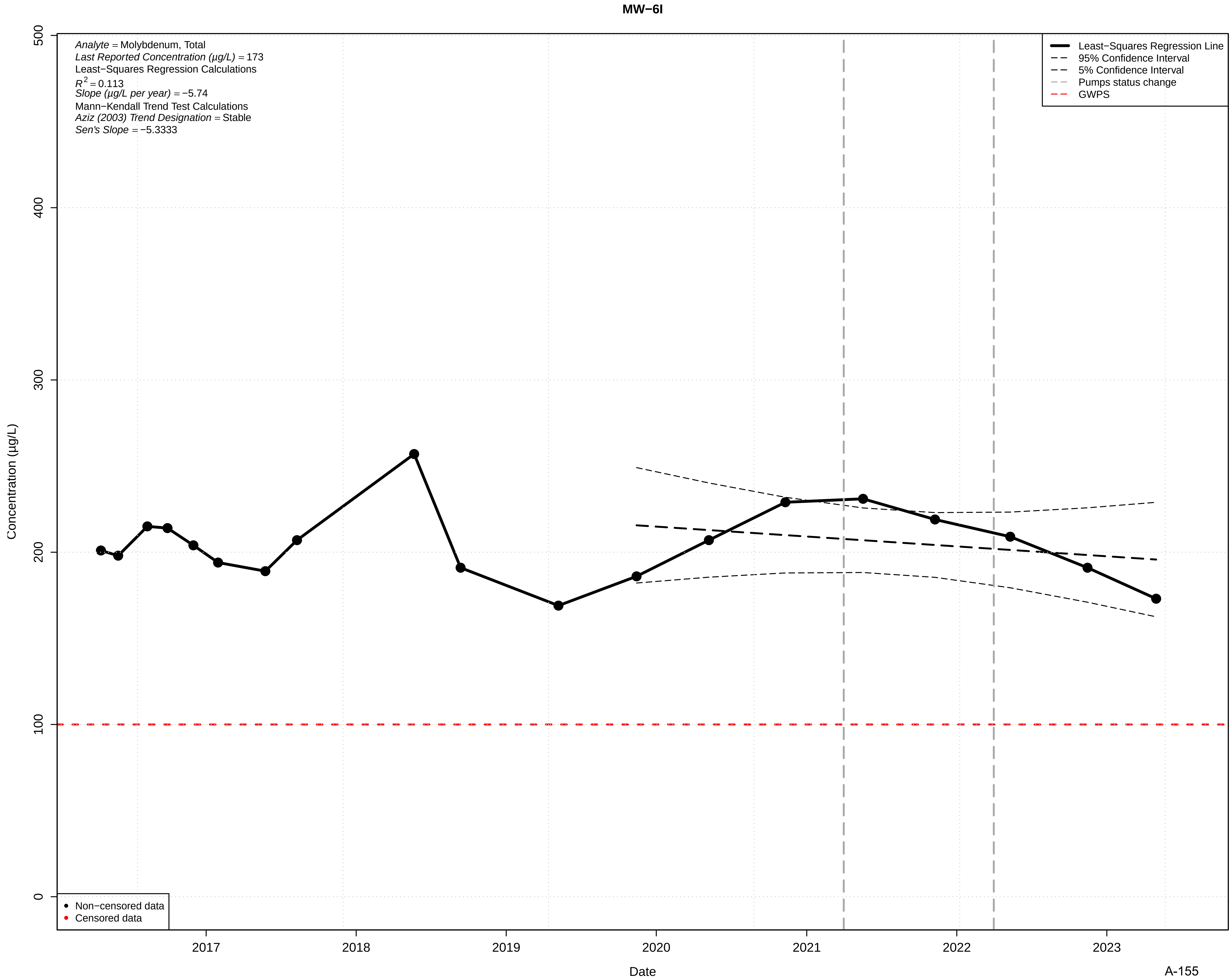

MW−4D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 12
Number of samples = 19
Max Conc. = 31.1
Mean Conc. = 18.2
% of Non−censored Data = 0%
Concentration (µg/L)
Non−censored data
Censored data
MW−4D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 12
Least−Squares Regression Calculations
R2 = 0.0111
Slope (µg/L per year) = 0.122
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.0667
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−6S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 84
Number of samples = 18
Max Conc. = 164
Mean Conc. = 108
% of Non−censored Data = 0%
Concentration (µg/L)
500
400
300
200
100
0
Non−censored data
Censored data

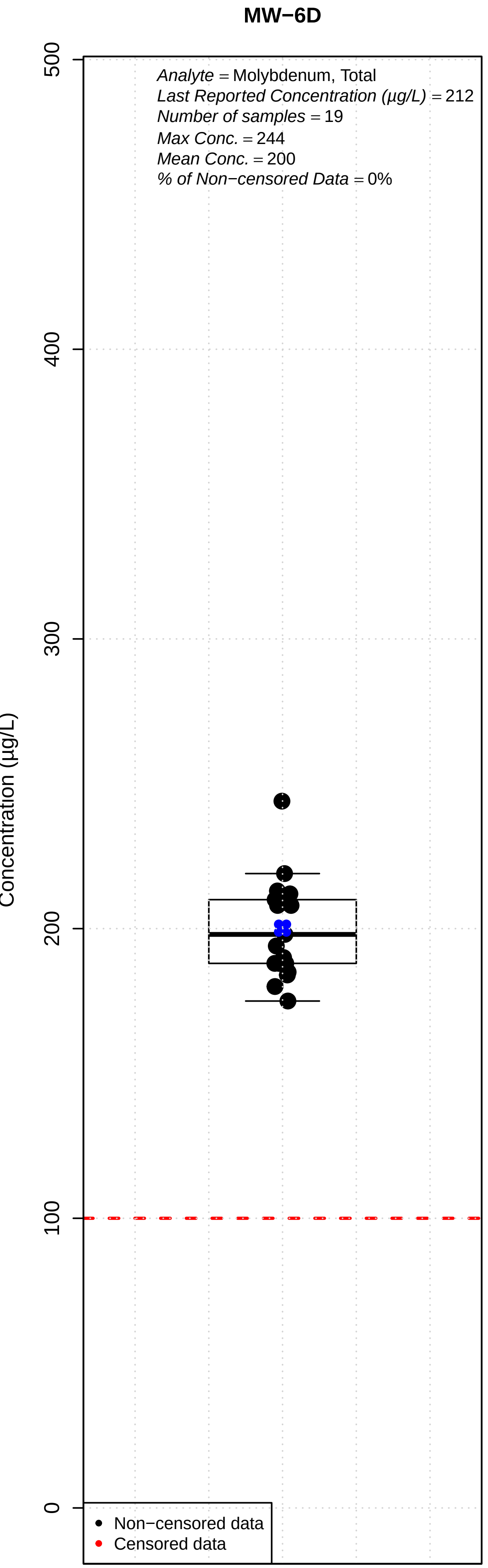

MW−6S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 84
Least−Squares Regression Calculations
R^2 = 0.00678
Slope (µg/L per year) = 2.79
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0.51
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
500
400
300
200
100
0
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

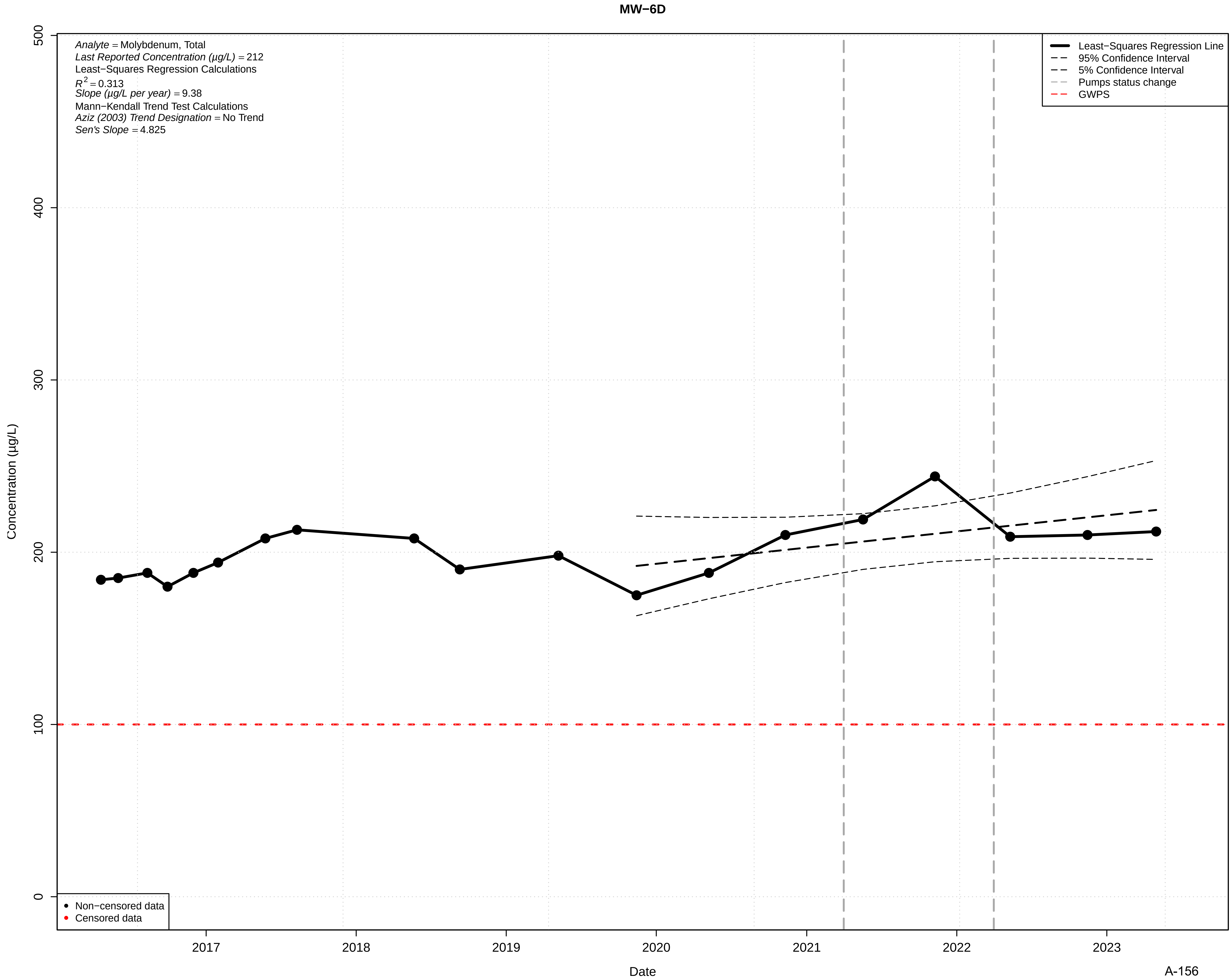


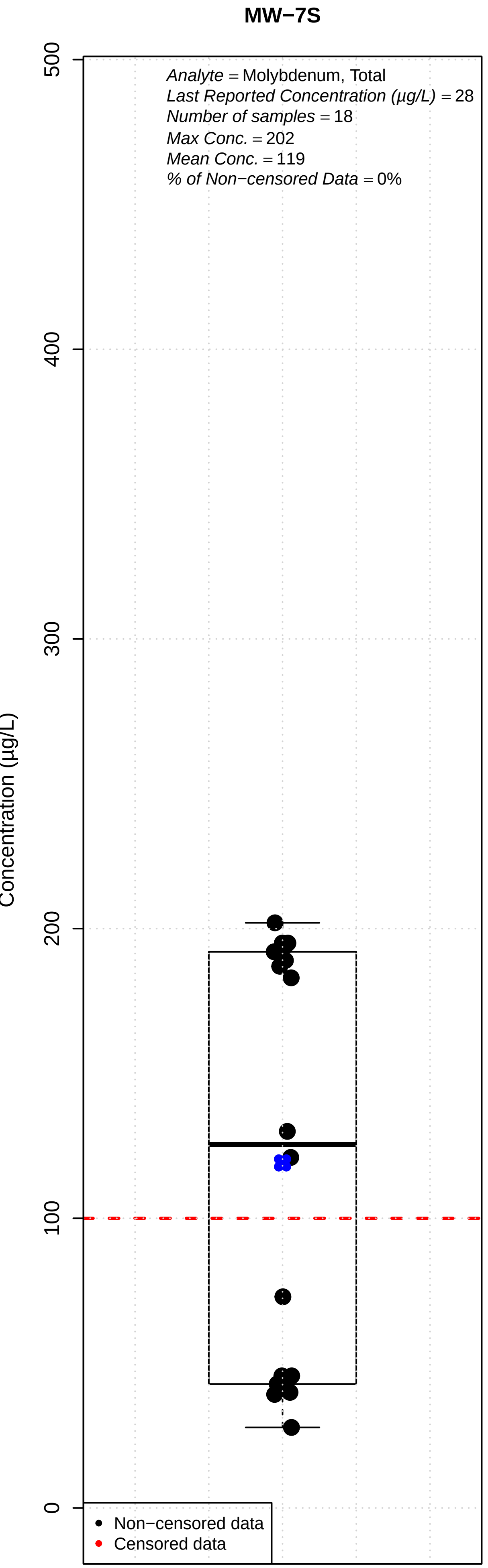
MW−6I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 173
Number of samples = 19
Max Conc. = 257
Mean Conc. = 204
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

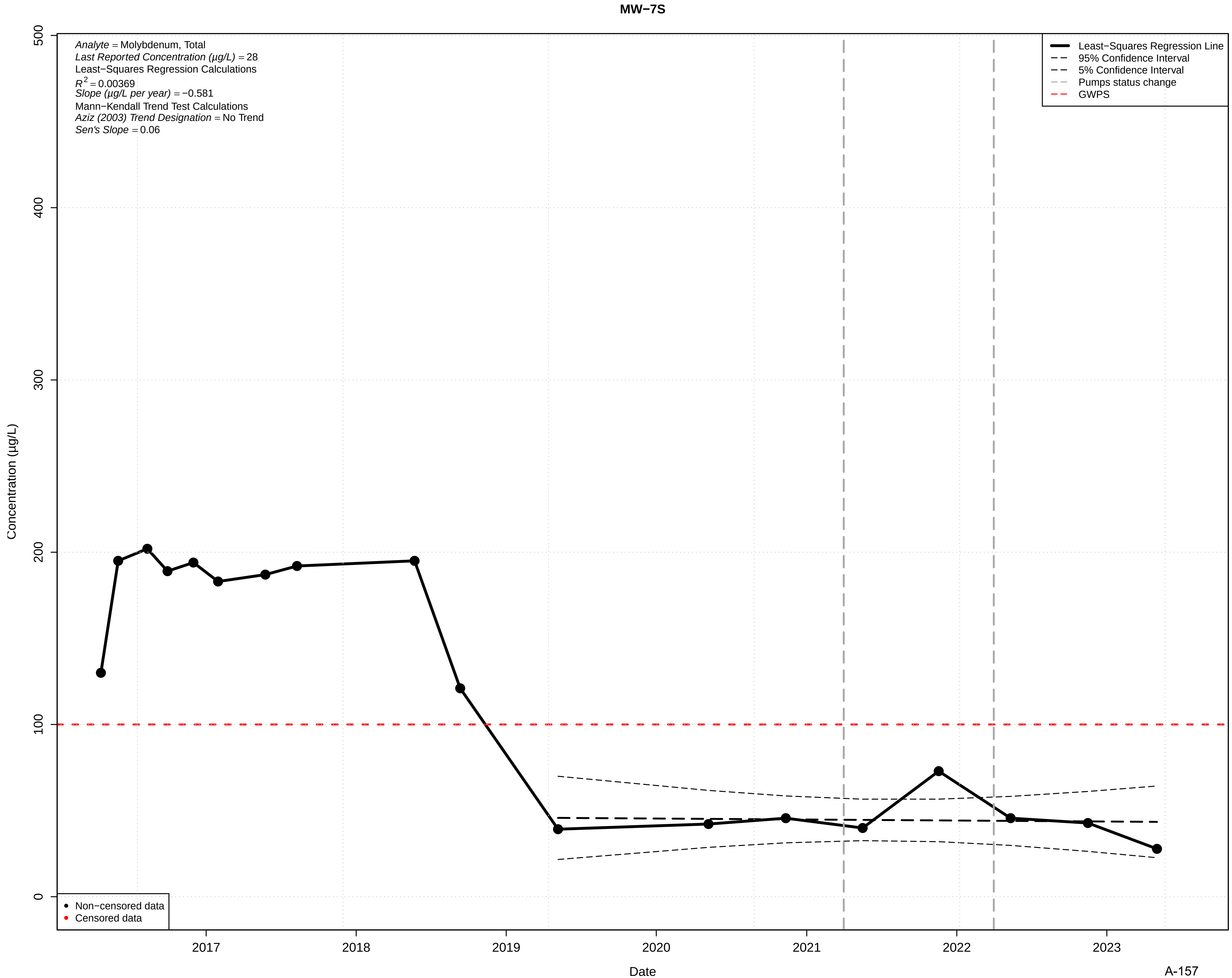


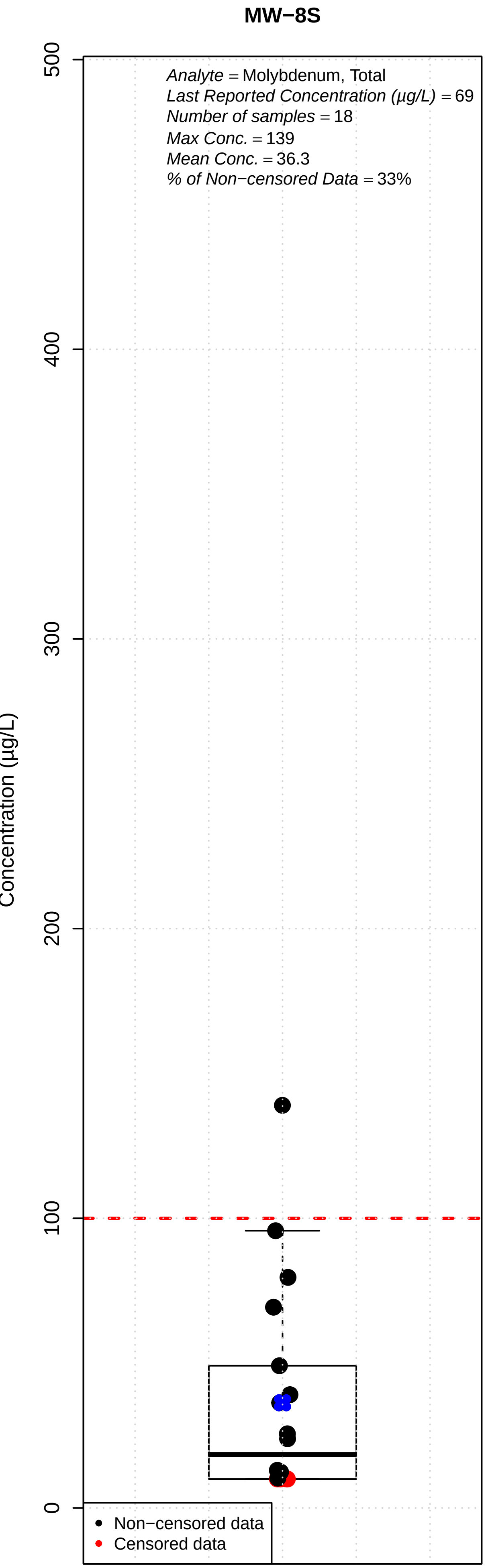
MW−6I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 173
Least−Squares Regression Calculations
R^2 = 0.113
Slope (µg/L per year) = −5.74
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −5.3333
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−6D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 212
Number of samples = 19
Max Conc. = 244
Mean Conc. = 200
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

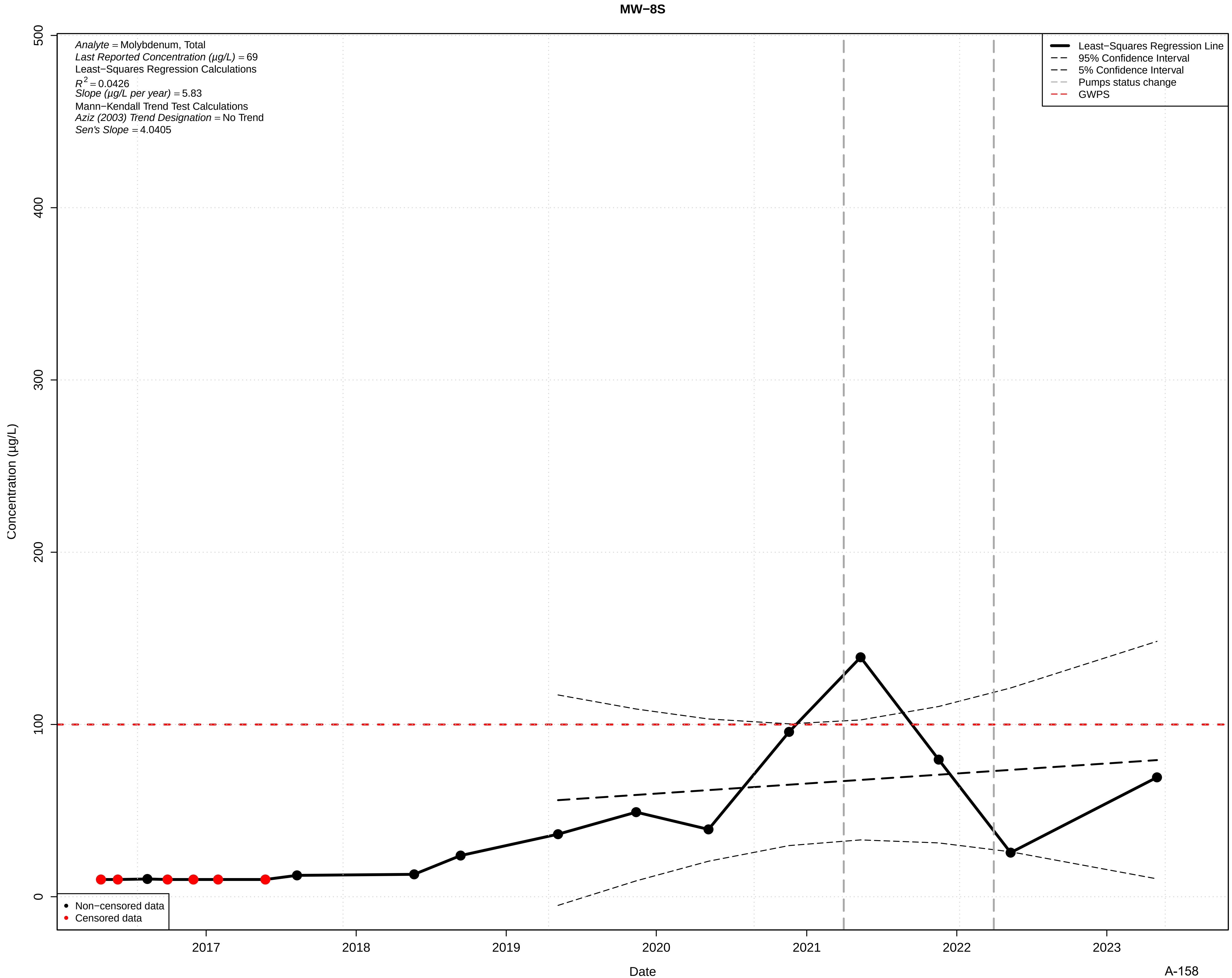

MW−6D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 212
Least−Squares Regression Calculations
R2 = 0.313
Slope (µg/L per year) = 9.38
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 4.825
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data


MW−7S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 28
Number of samples = 18
Max Conc. = 202
Mean Conc. = 119
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

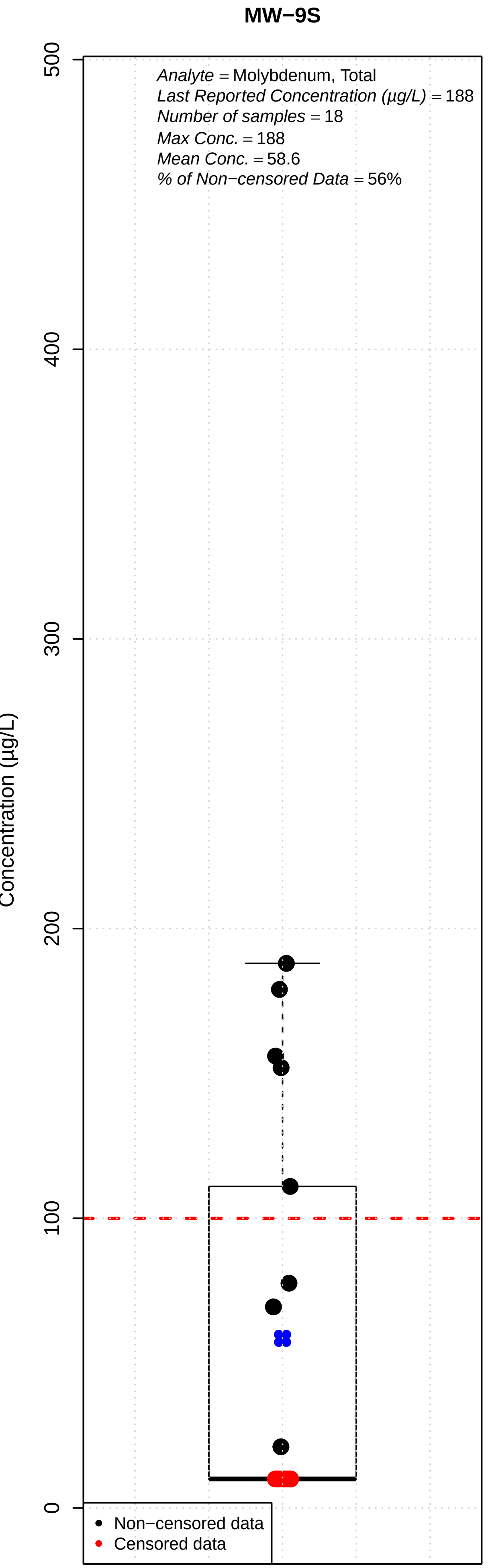

MW−7S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 28
Least−Squares Regression Calculations
R^2 = 0.00369
Slope (µg/L per year) = −0.581
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.06
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data

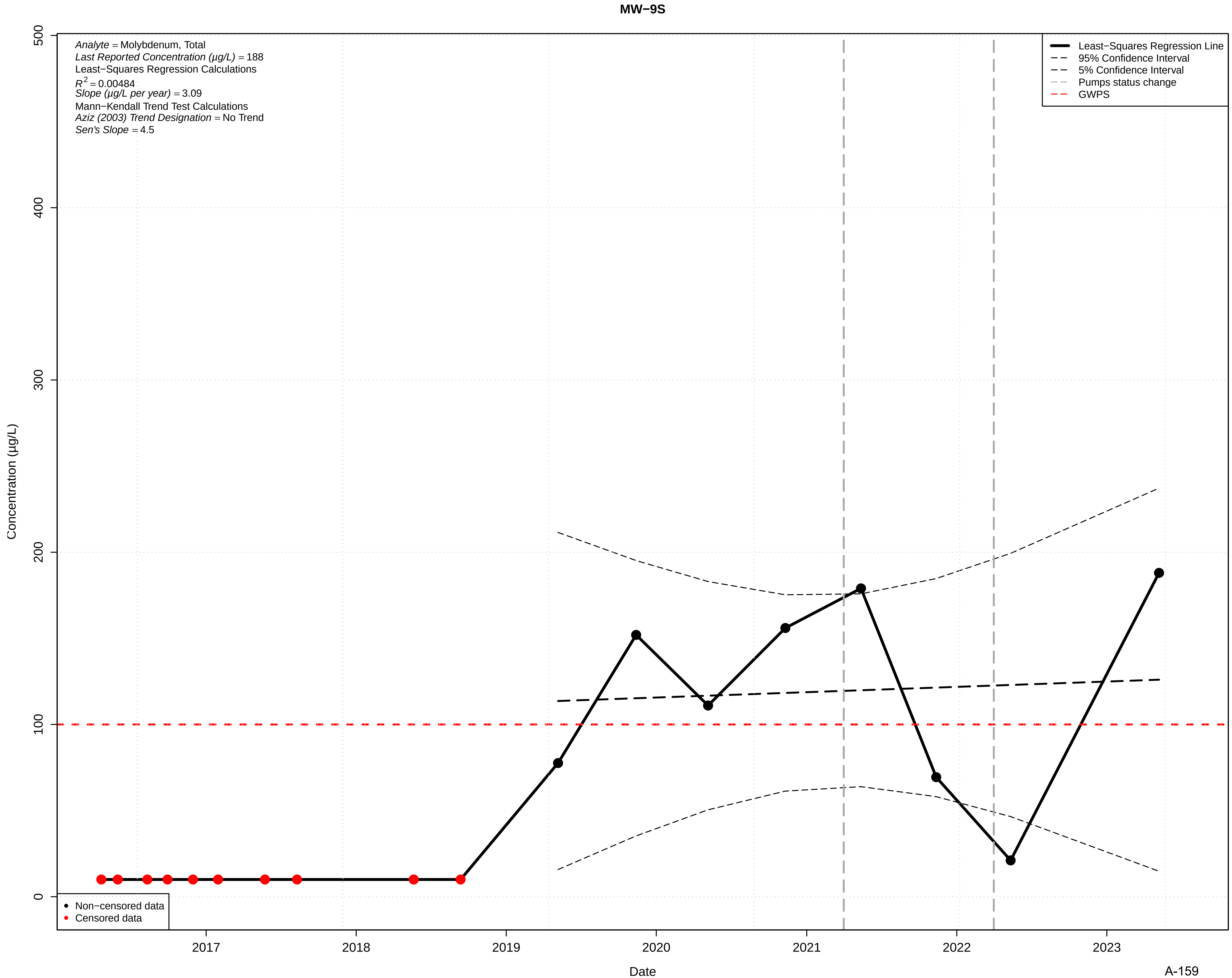


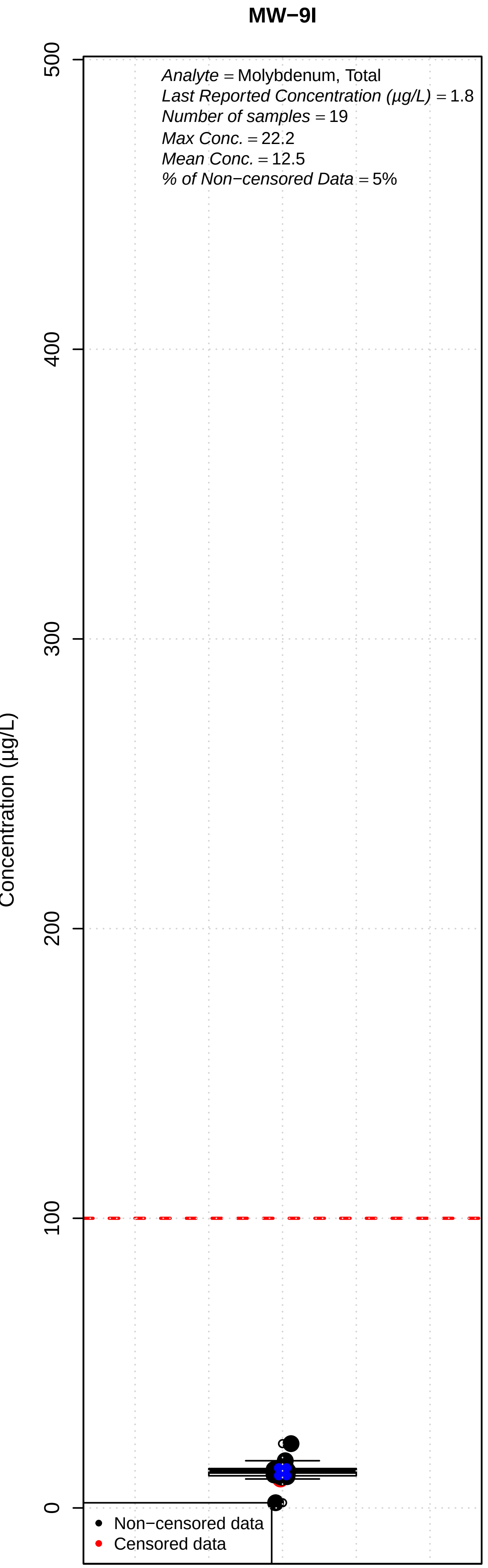
MW−8S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 69
Number of samples = 18
Max Conc. = 139
Mean Conc. = 36.3
% of Non−censored Data = 33%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

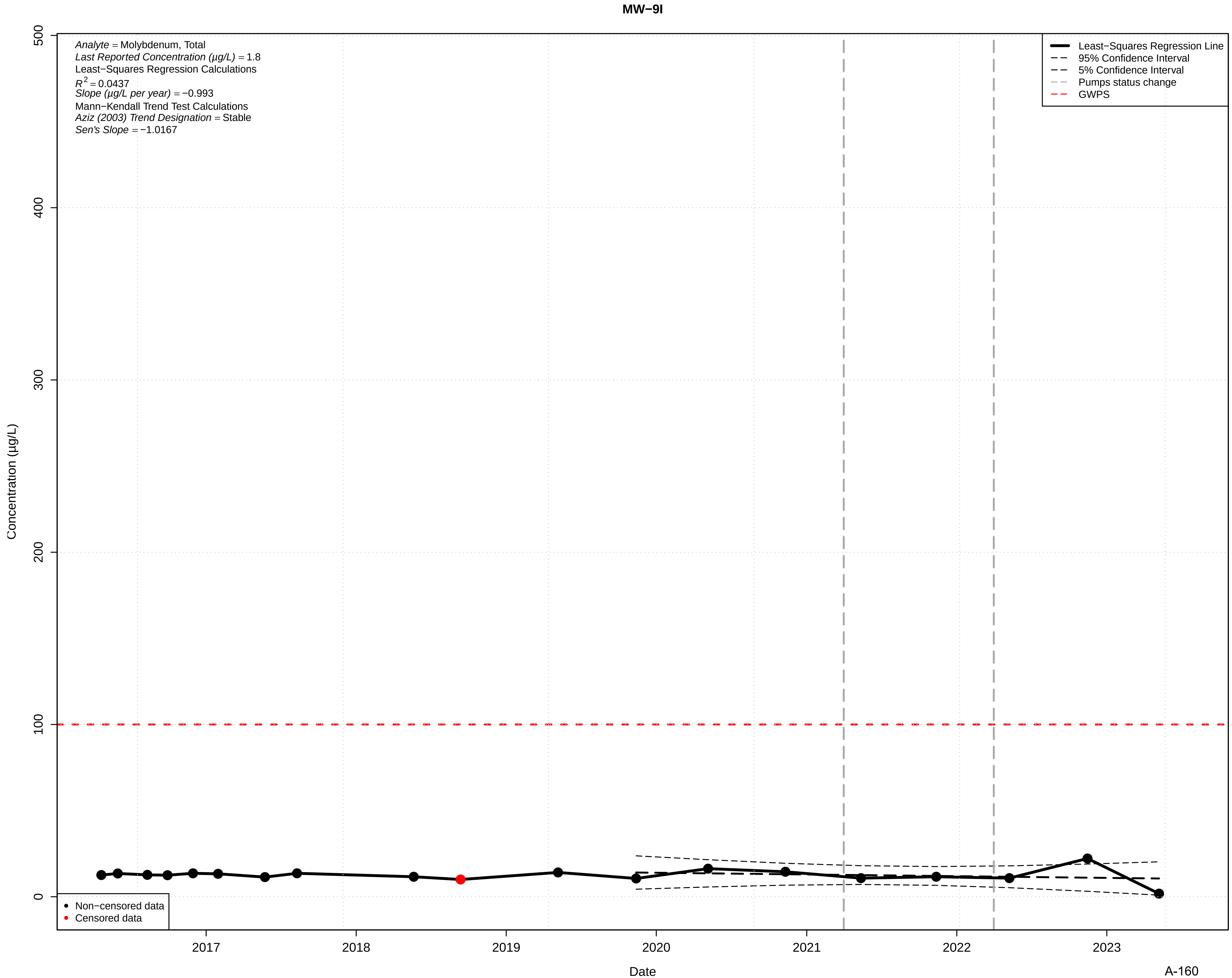


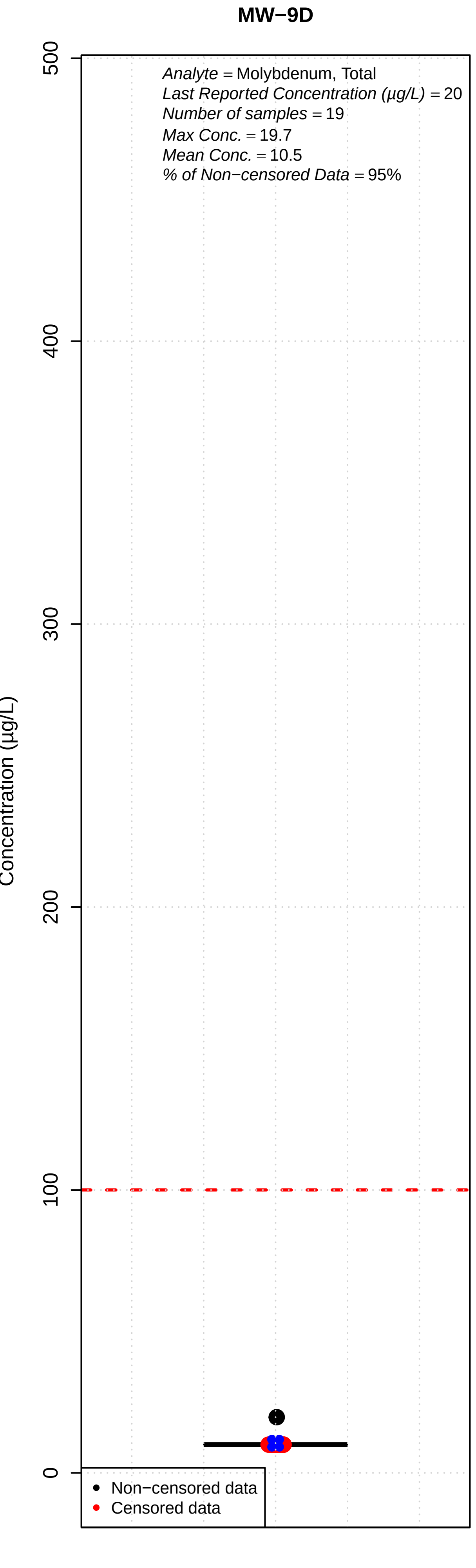
MW−8S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 69
Least−Squares Regression Calculations
R^2 = 0.0426
Slope (µg/L per year) = 5.83
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 4.0405
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

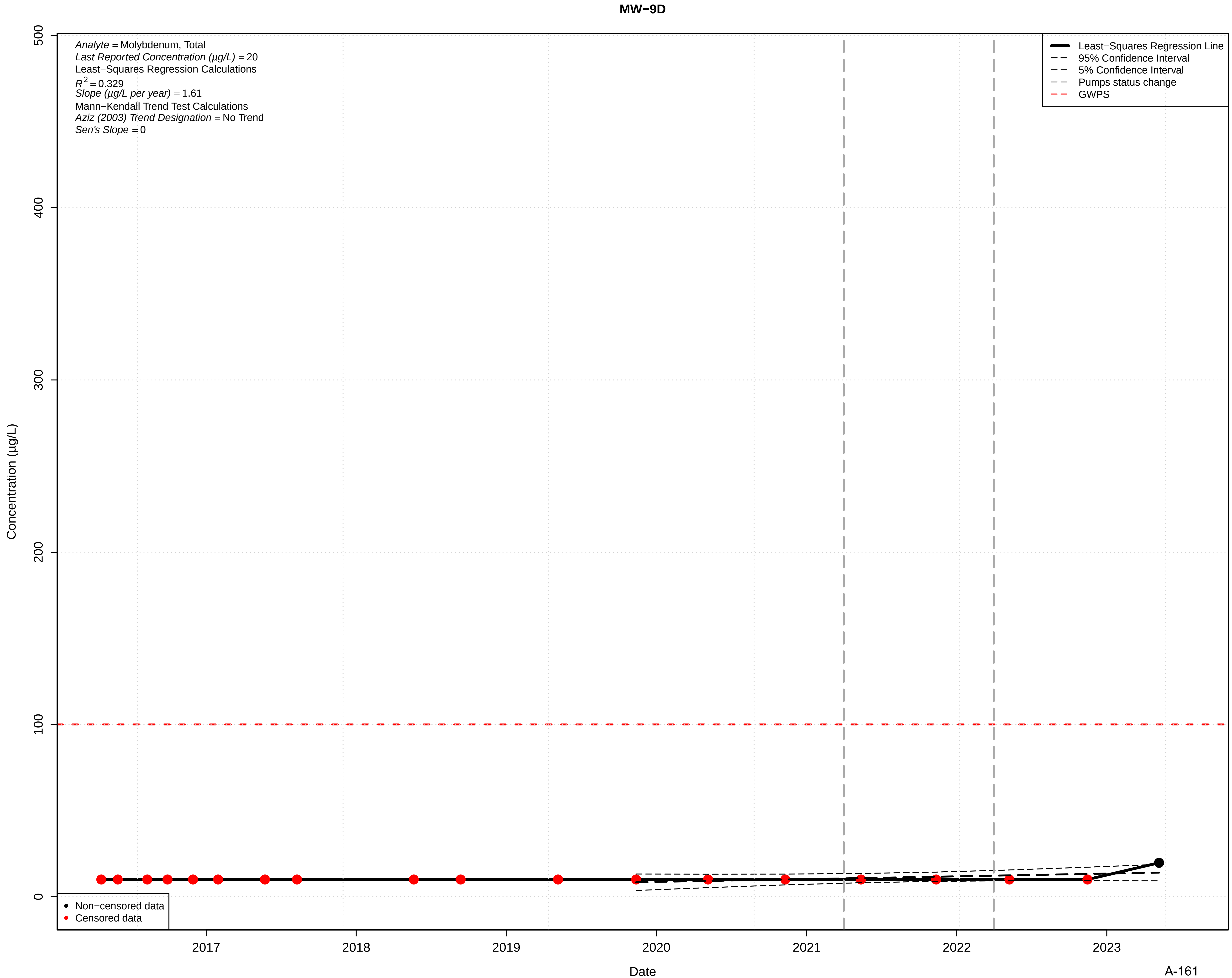

MW−9S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 188
Number of samples = 18
Max Conc. = 188
Mean Conc. = 58.6
% of Non−censored Data = 56%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

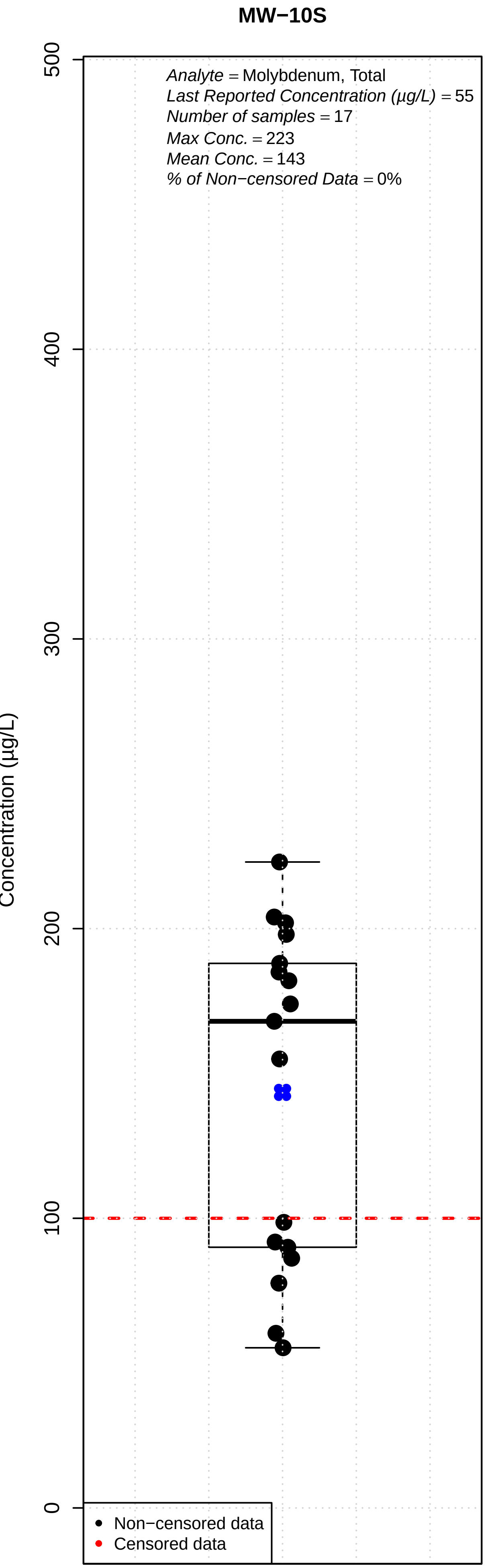

MW−9S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 188
Least−Squares Regression Calculations
R^2 = 0.00484
Slope (µg/L per year) = 3.09
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 4.5
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

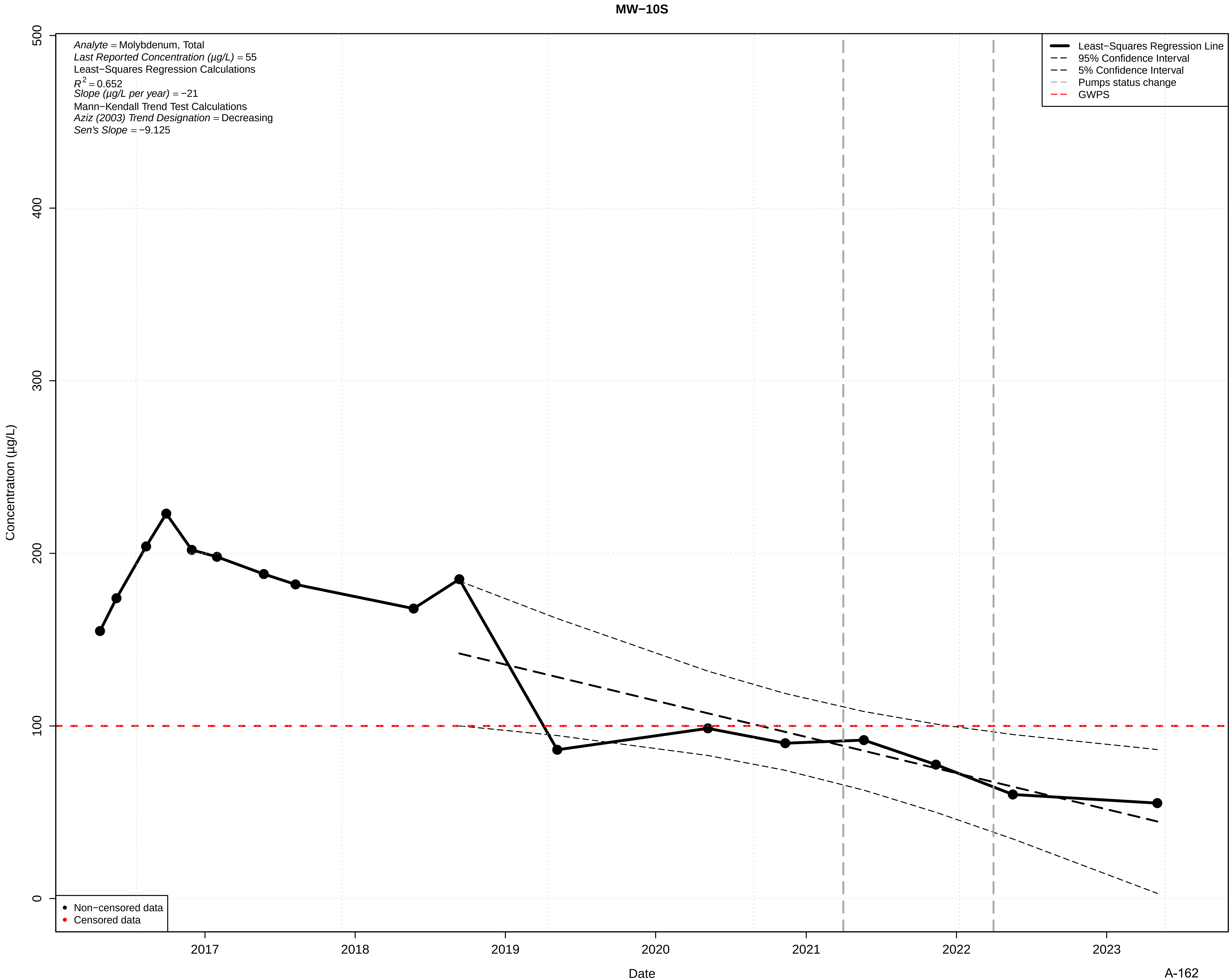

MW−9I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1.8
Number of samples = 19
Max Conc. = 22.2
Mean Conc. = 12.5
% of Non−censored Data = 5%
Concentration (µg/L)
Non−censored data
Censored data

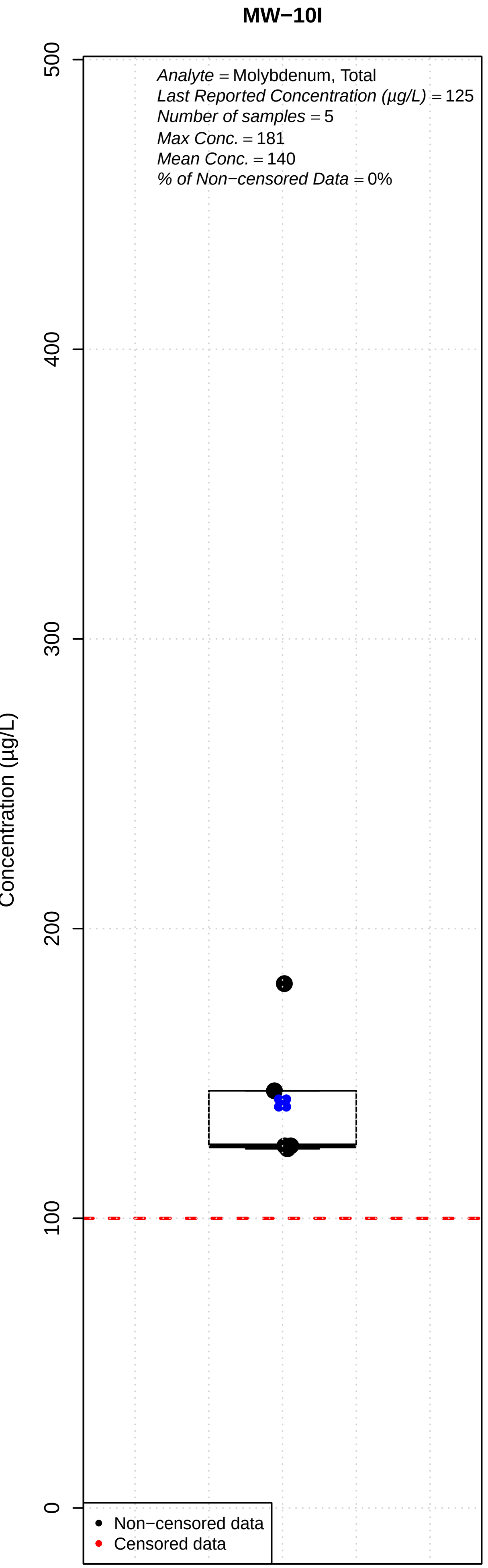

MW−9I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1.8
Least−Squares Regression Calculations
R² = 0.0437
Slope (µg/L per year) = −0.993
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −1.0167
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Date
Non−censored data
Censored data


MW−9D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 20
Number of samples = 19
Max Conc. = 19.7
Mean Conc. = 10.5
% of Non−censored Data = 95%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

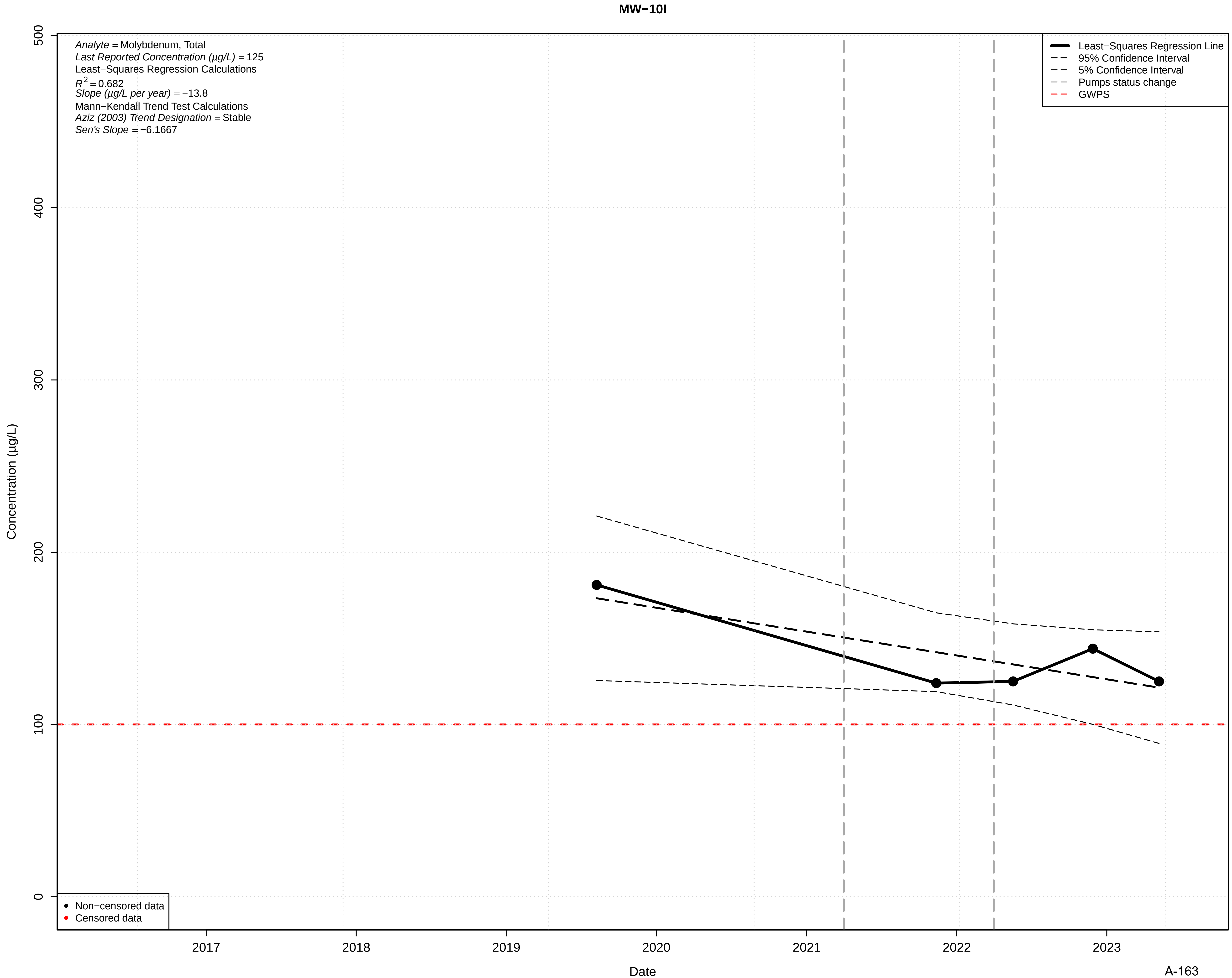

MW−9D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 20
Least−Squares Regression Calculations
R^2 = 0.329
Slope (µg/L per year) = 1.61
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−10S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 55
Number of samples = 17
Max Conc. = 223
Mean Conc. = 143
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

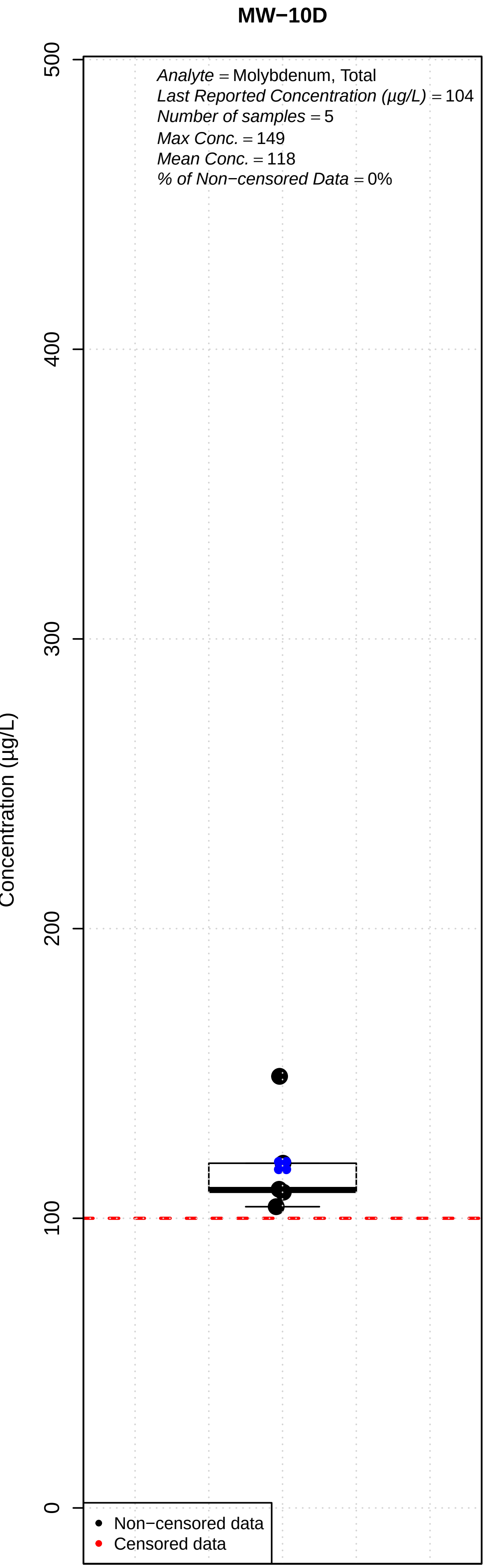

MW−10S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 55
Least−Squares Regression Calculations
R² = 0.652
Slope (µg/L per year) = −21
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −9.125
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

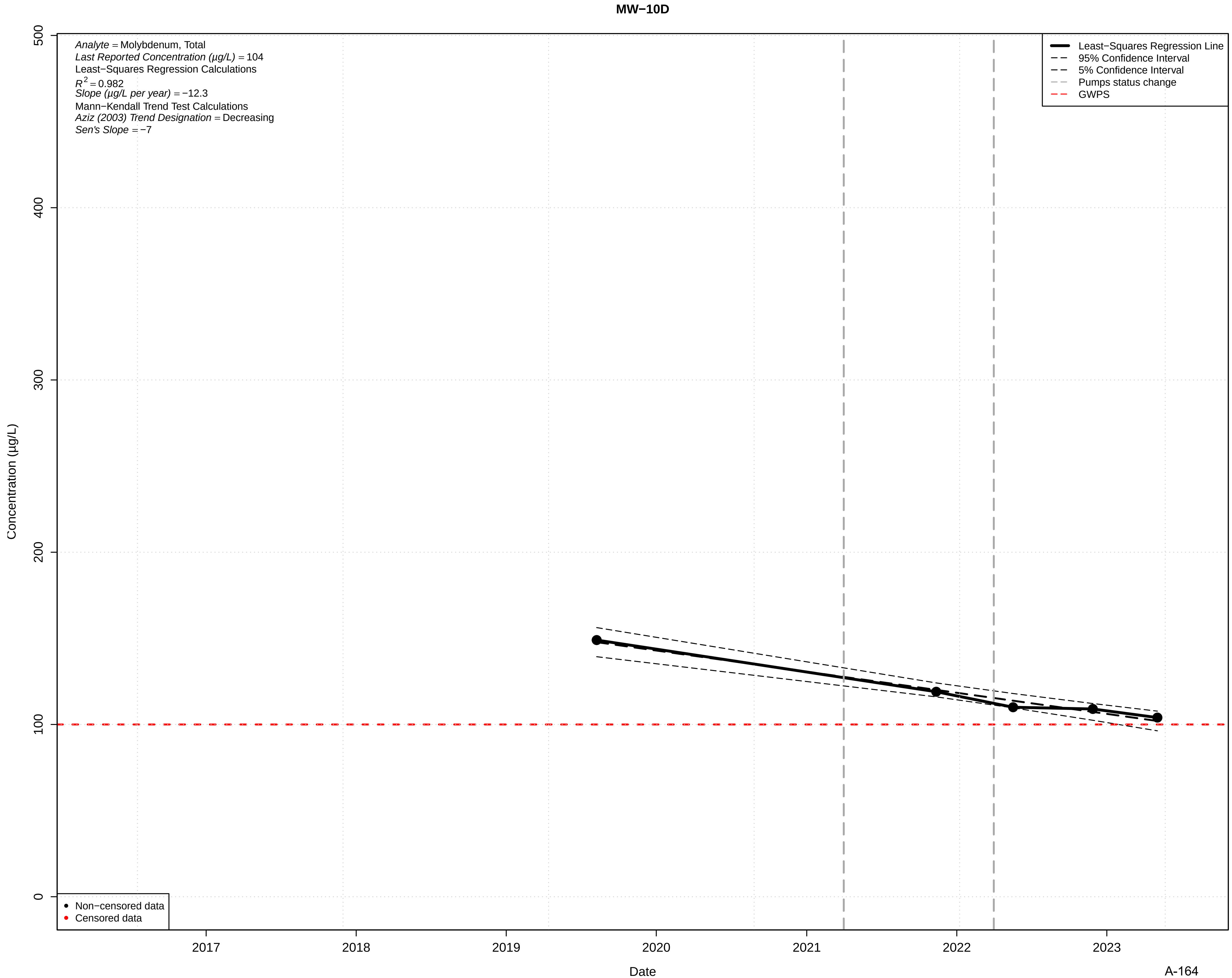


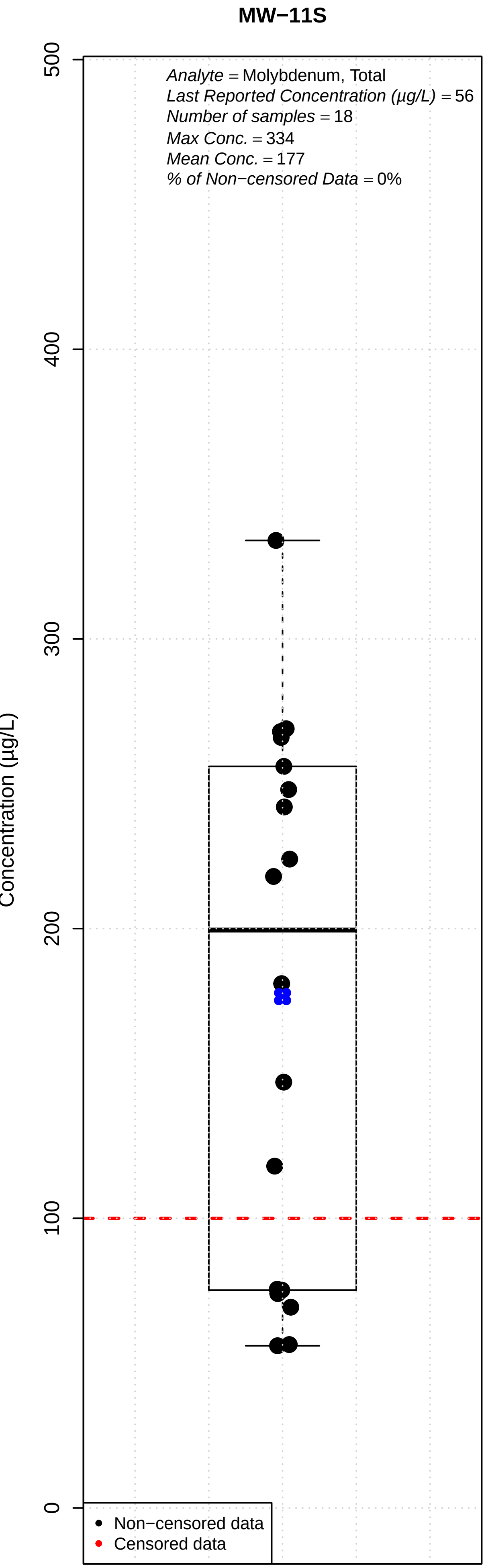
MW−10I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 125
Number of samples = 5
Max Conc. = 181
Mean Conc. = 140
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

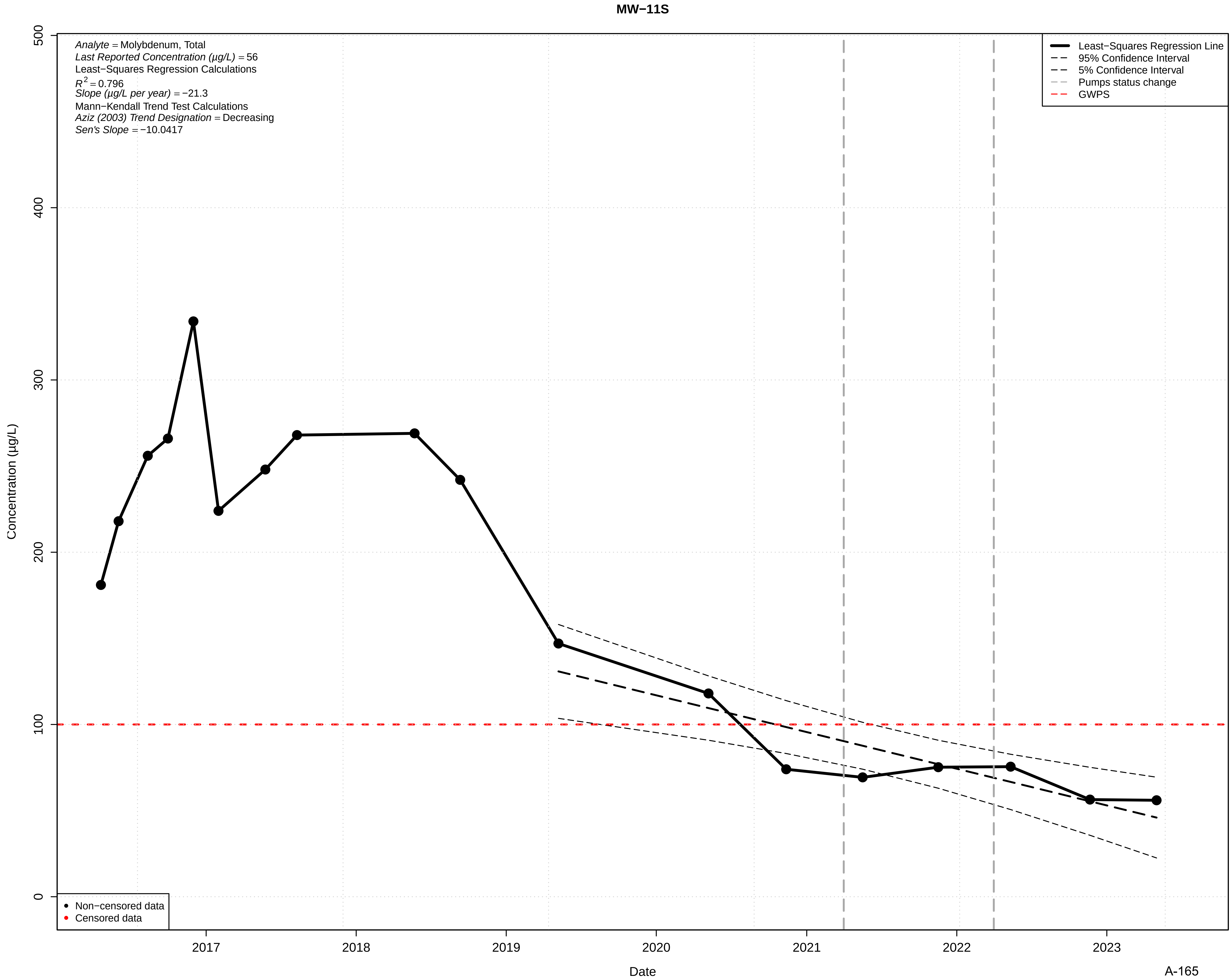


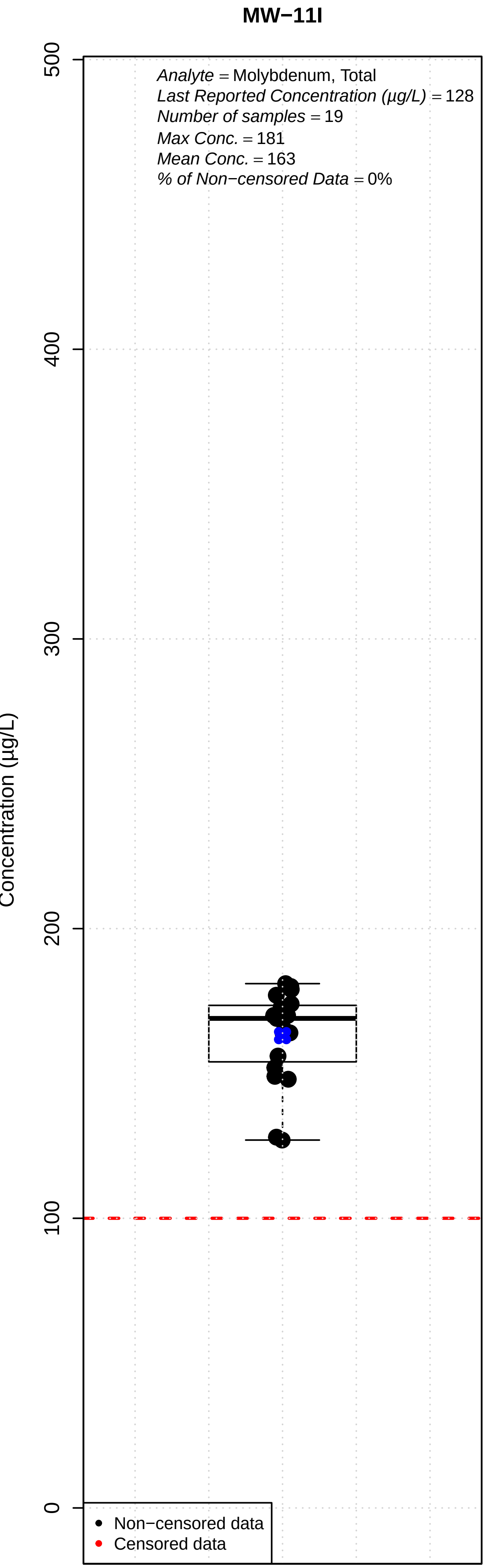
MW−10I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 125
Least−Squares Regression Calculations
R2 = 0.682
Slope (µg/L per year) = −13.8
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −6.1667
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

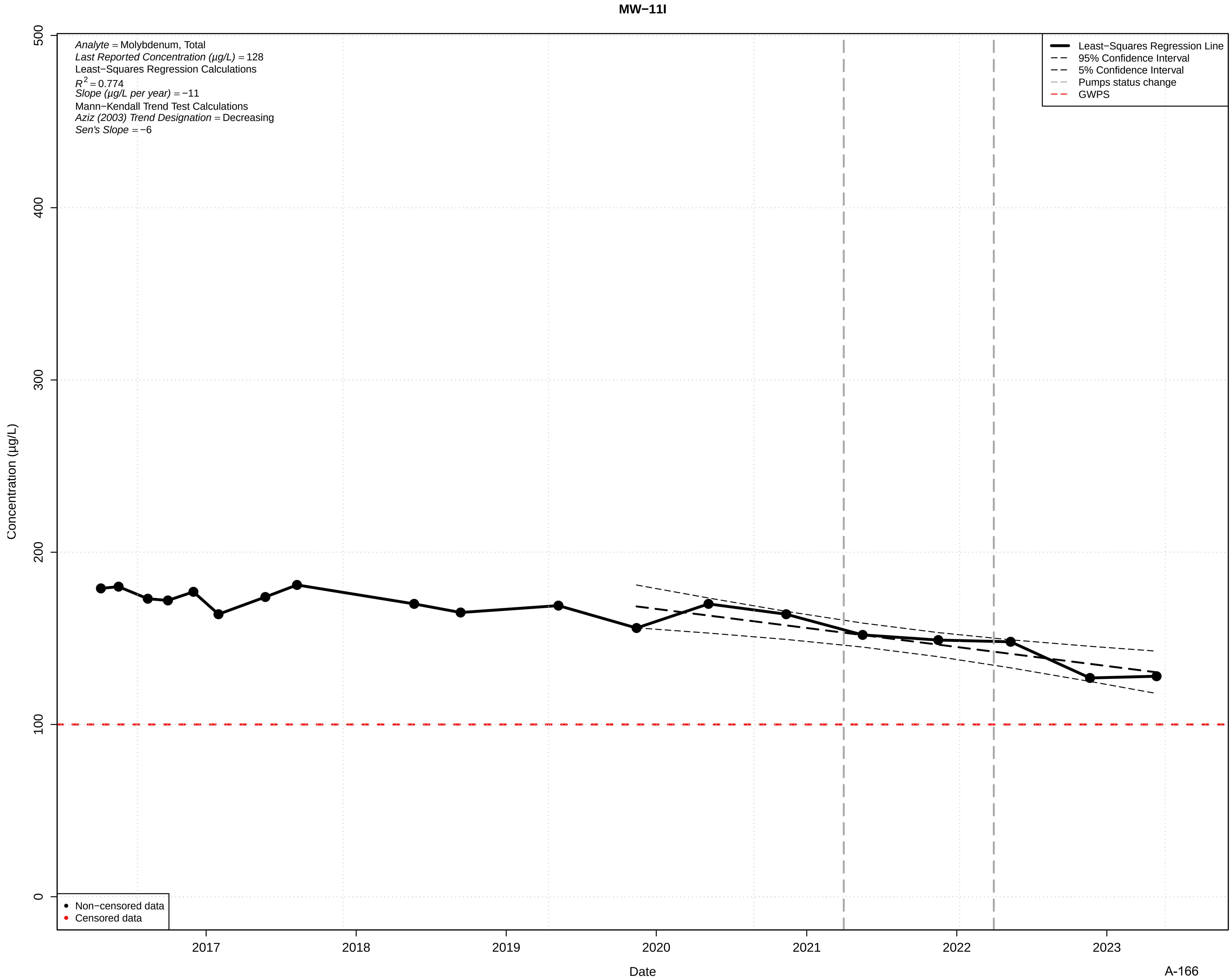

MW−10D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 104
Number of samples = 5
Max Conc. = 149
Mean Conc. = 118
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

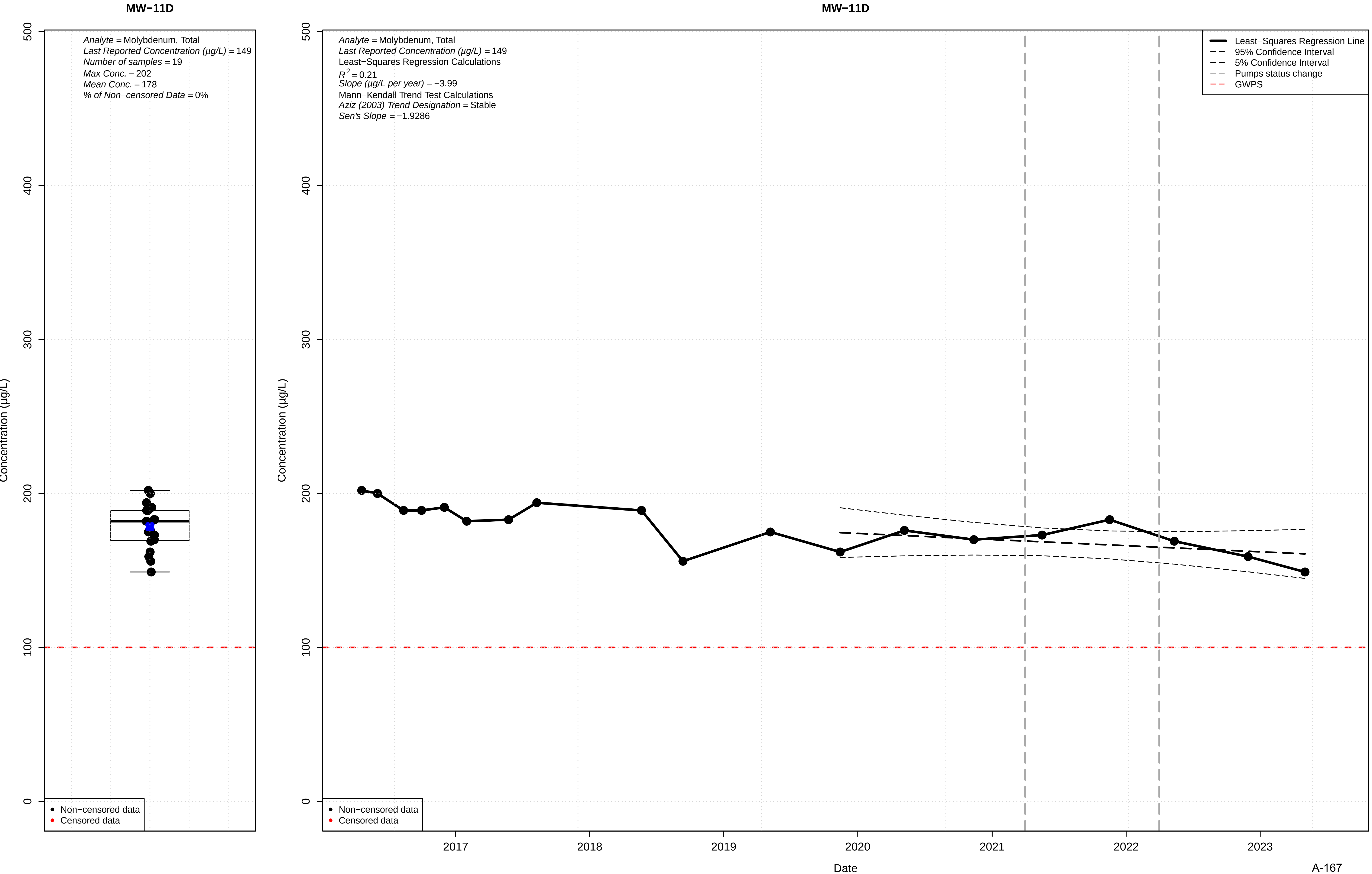

MW−10D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 104
Least−Squares Regression Calculations
R^2 = 0.982
Slope (µg/L per year) = −12.3
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −7
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

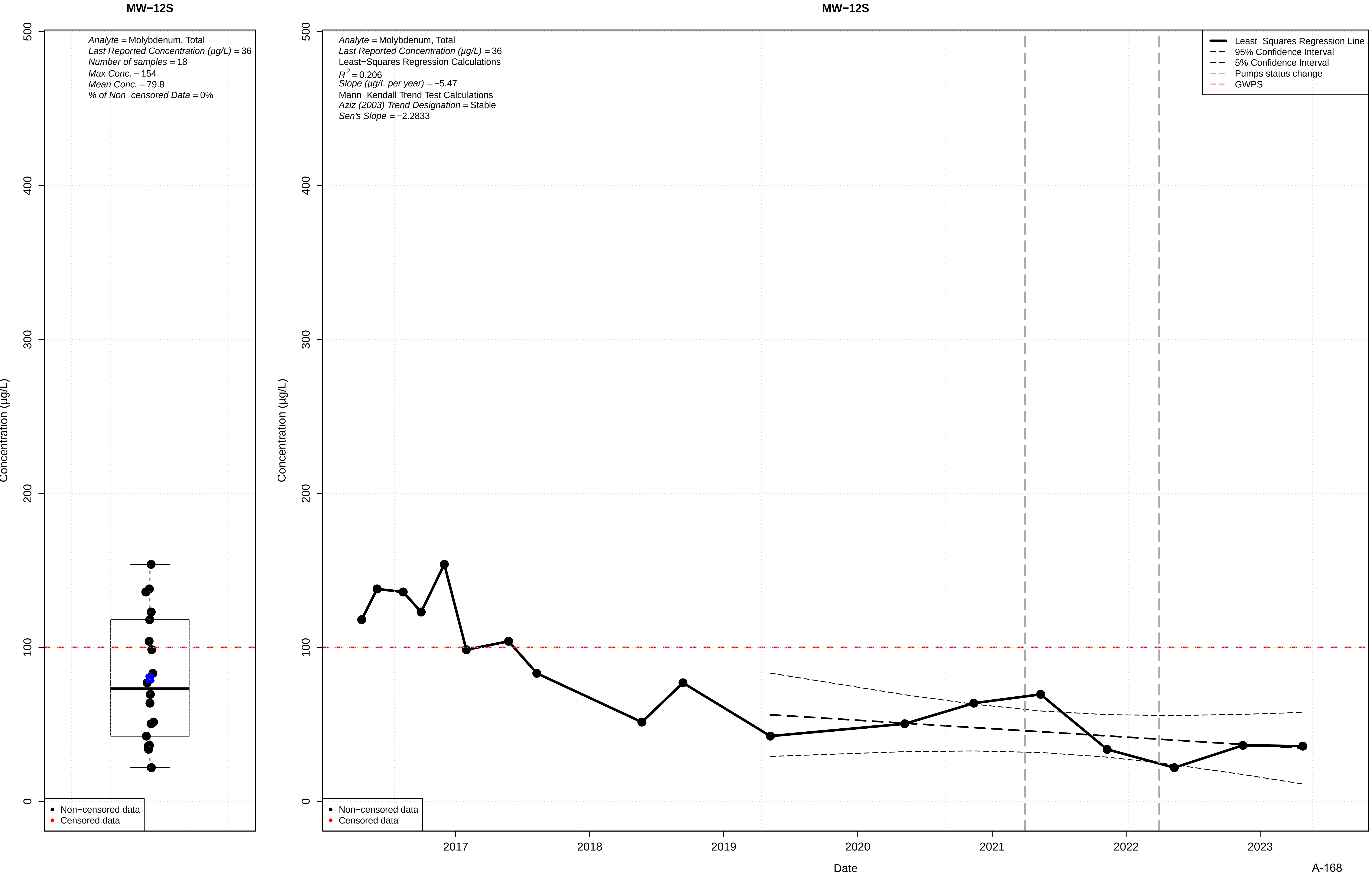

MW−11S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 56
Number of samples = 18
Max Conc. = 334
Mean Conc. = 177
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

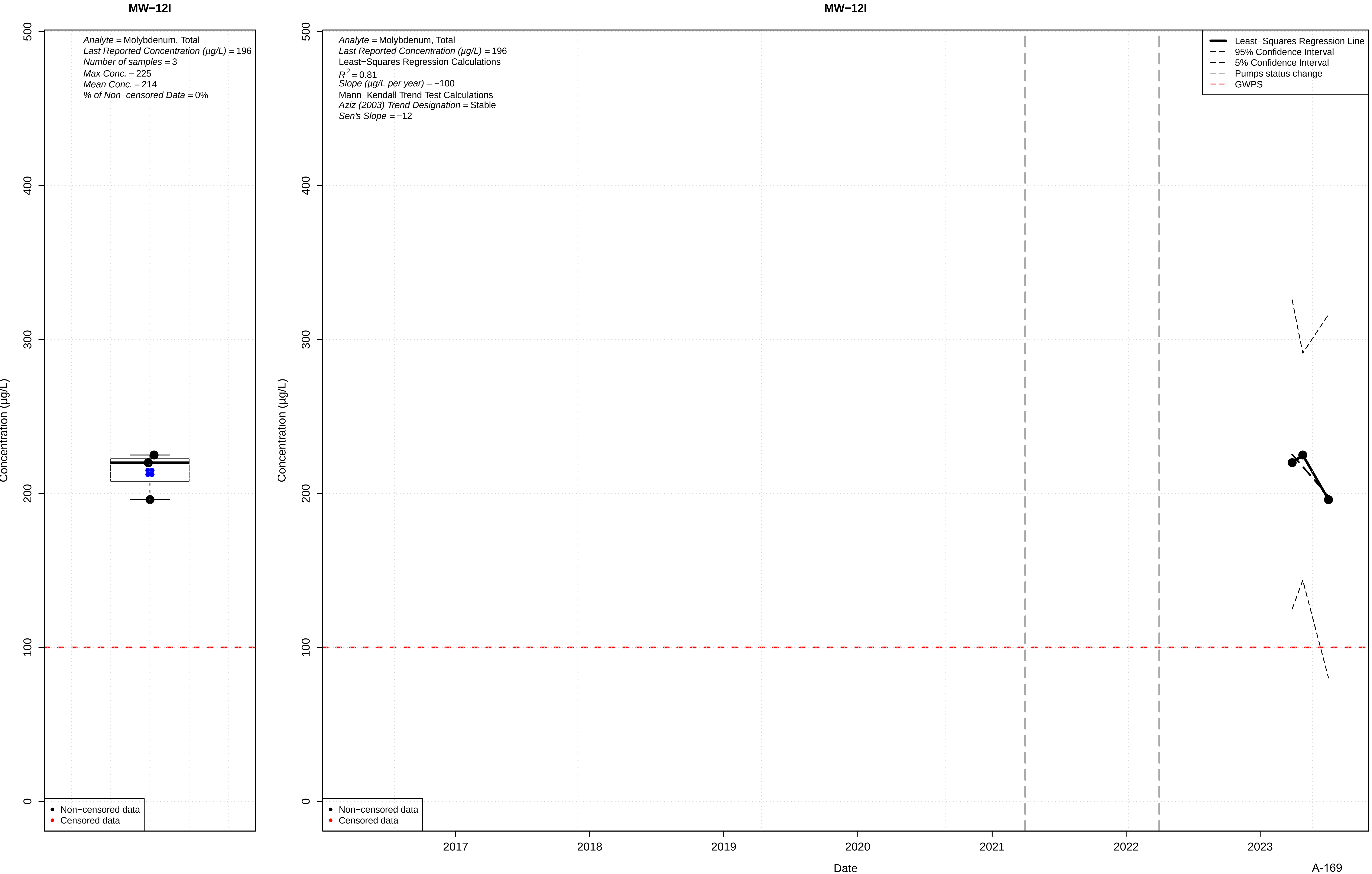

MW−11S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 56
Least−Squares Regression Calculations
R^2 = 0.796
Slope (µg/L per year) = −21.3
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −10.0417
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data

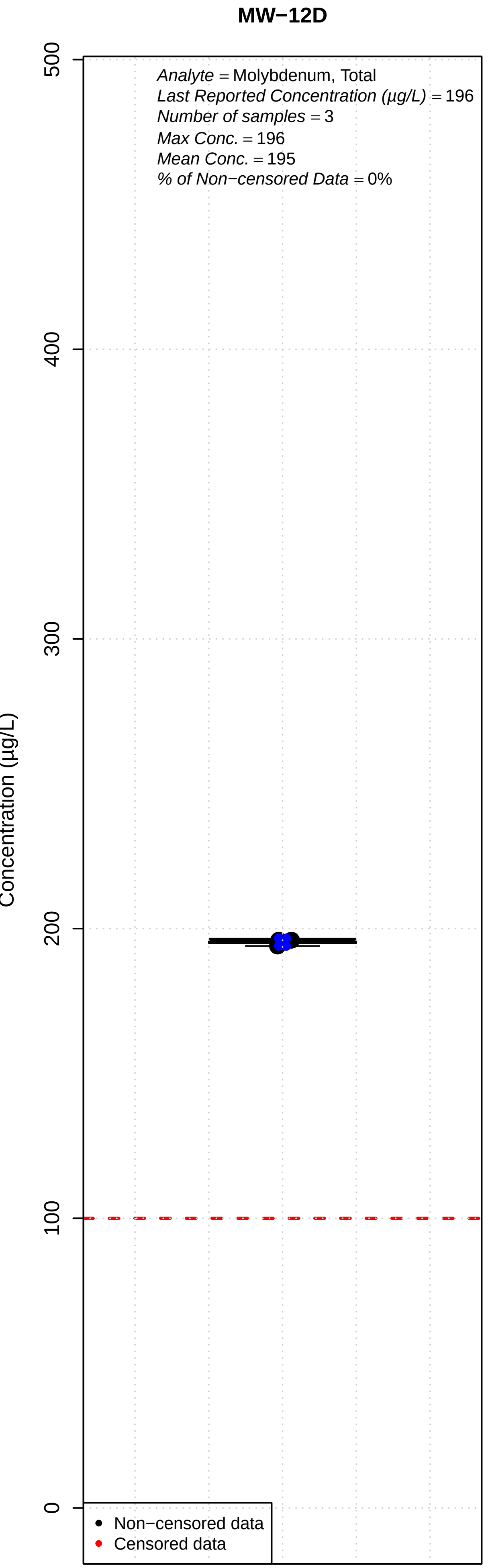

MW−11I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 128
Number of samples = 19
Max Conc. = 181
Mean Conc. = 163
% of Non−censored Data = 0%
Concentration (µg/L)
Non−censored data
Censored data


MW−11I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 128
Least−Squares Regression Calculations
R2 = 0.774
Slope (µg/L per year) = −11
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −6
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Non−censored data
Censored data
Date

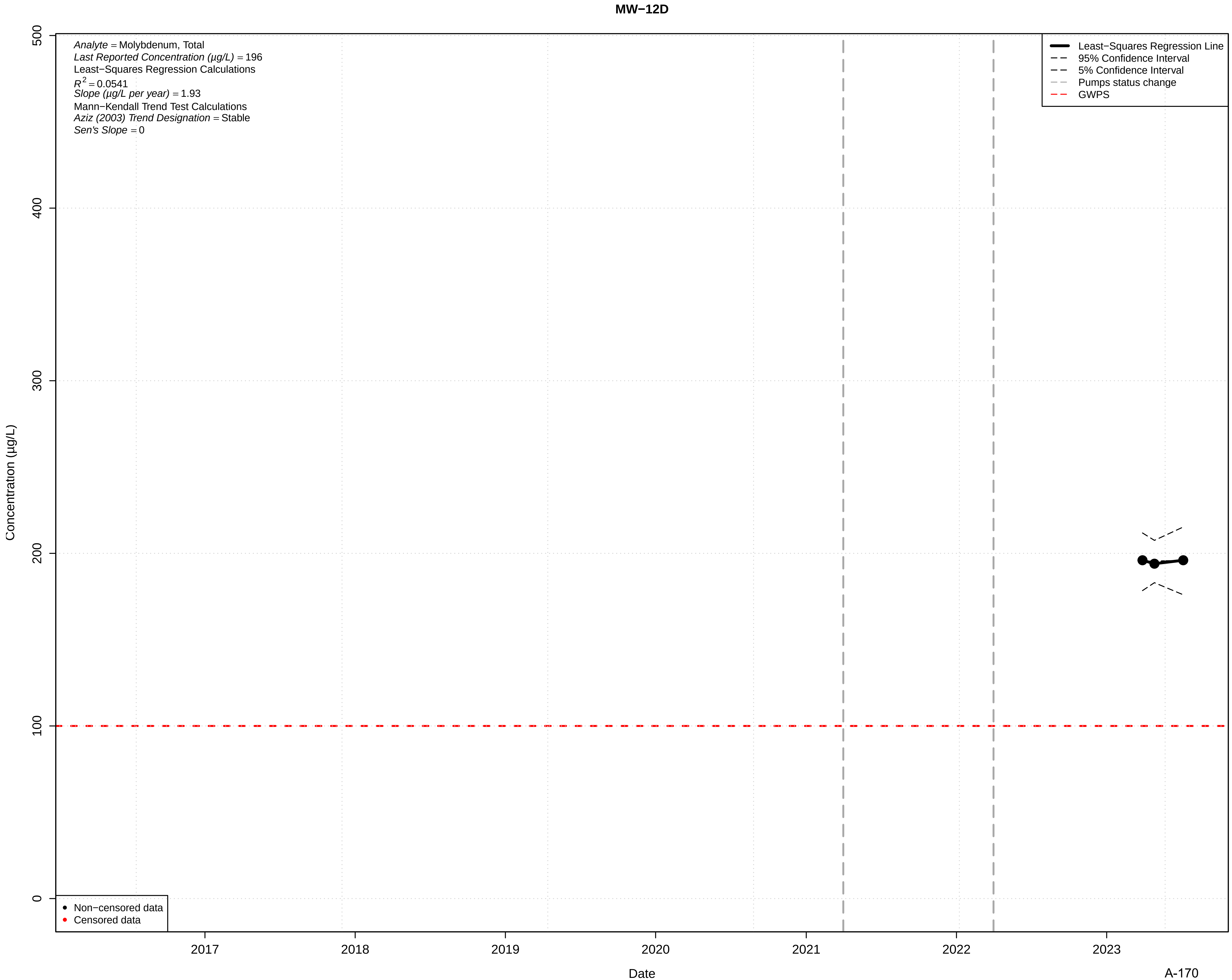

MW−11D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 149
Number of samples = 19
Max Conc. = 202
Mean Conc. = 178
% of Non−censored Data = 0%
Concentration (µg/L)
Non−censored data
Censored data
MW−11D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 149
Least−Squares Regression Calculations
R^2 = 0.21
Slope (µg/L per year) = −3.99
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −1.9286
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Date
Non−censored data
Censored data


MW−12S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 36
Number of samples = 18
Max Conc. = 154
Mean Conc. = 79.8
% of Non−censored Data = 0%
Concentration (µg/L)
Non−censored data
Censored data
MW−12S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 36
Least−Squares Regression Calculations
R2 = 0.206
Slope (µg/L per year) = −5.47
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −2.2833
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

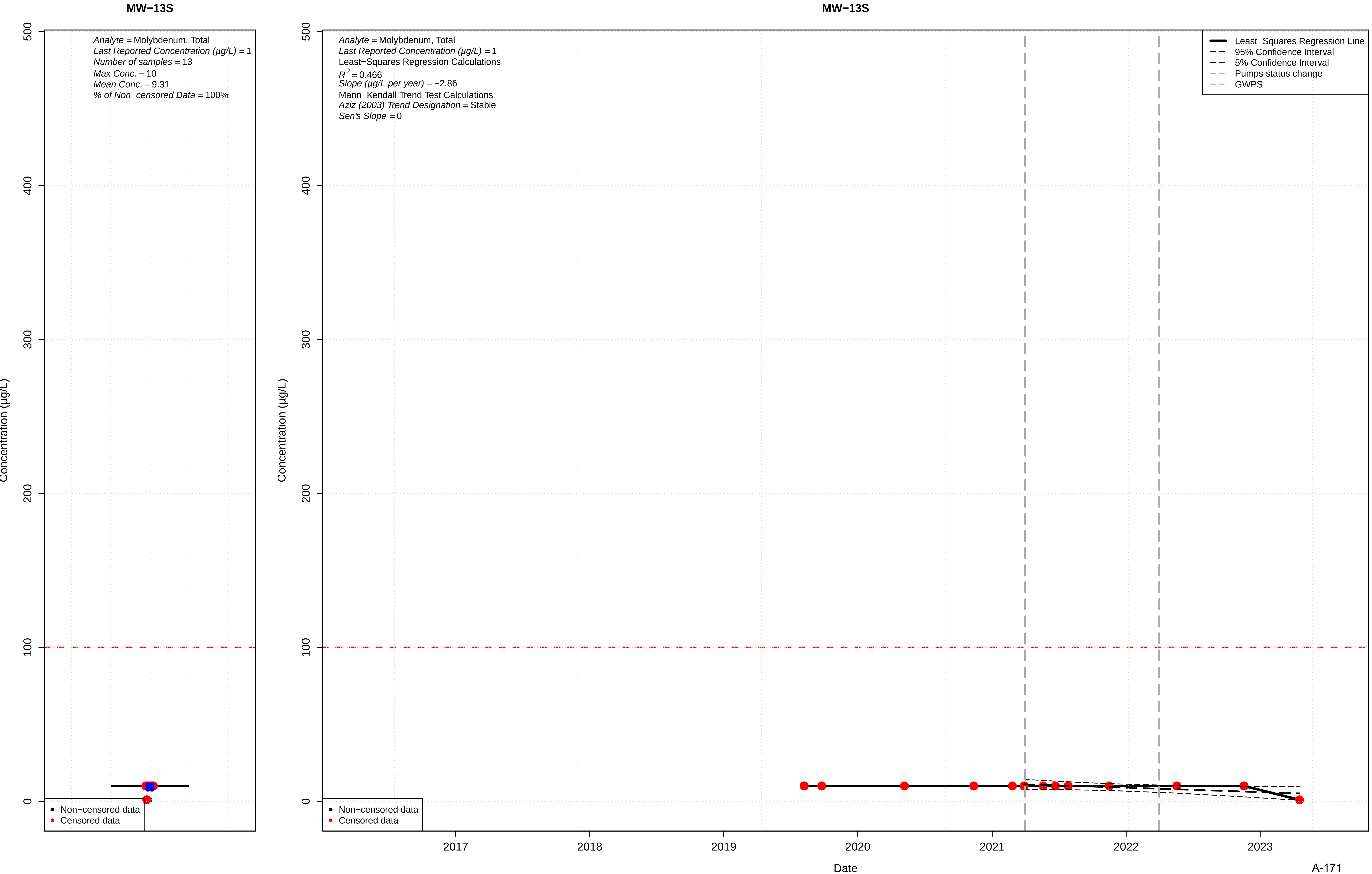

MW−12I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 196
Number of samples = 3
Max Conc. = 225
Mean Conc. = 214
% of Non−censored Data = 0%
Concentration (µg/L)
Non−censored data
Censored data
MW−12I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 196
Least−Squares Regression Calculations
R2 = 0.81
Slope (µg/L per year) = −100
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −12
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Non−censored data
Censored data
Date

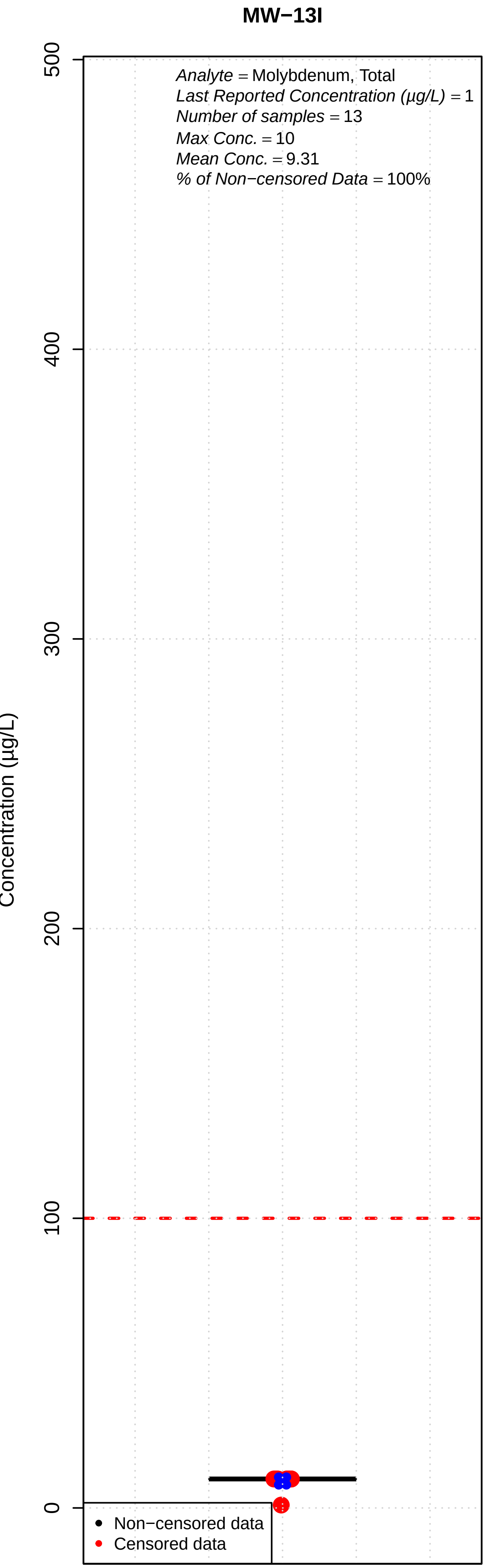


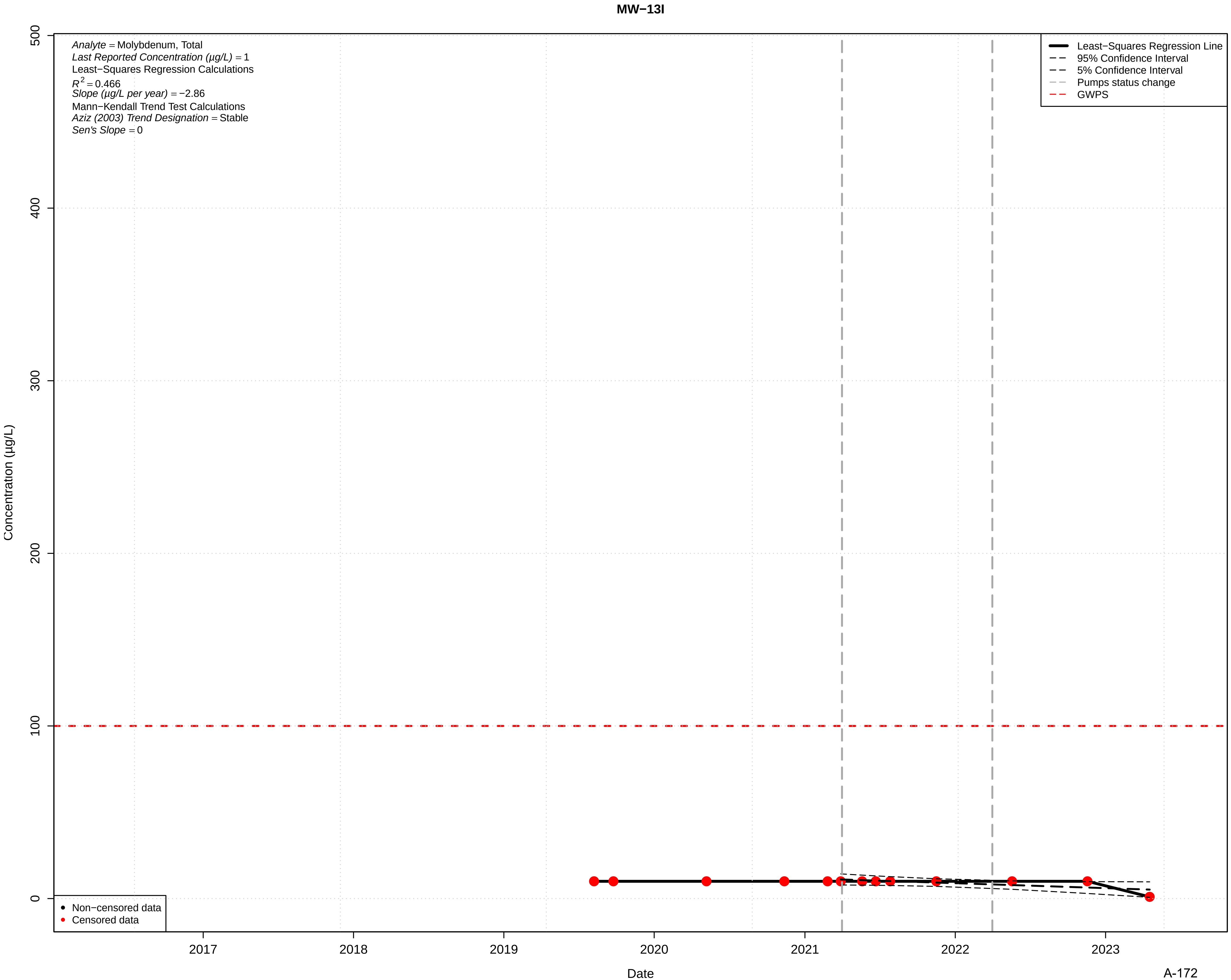
MW−12D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 196
Number of samples = 3
Max Conc. = 196
Mean Conc. = 195
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

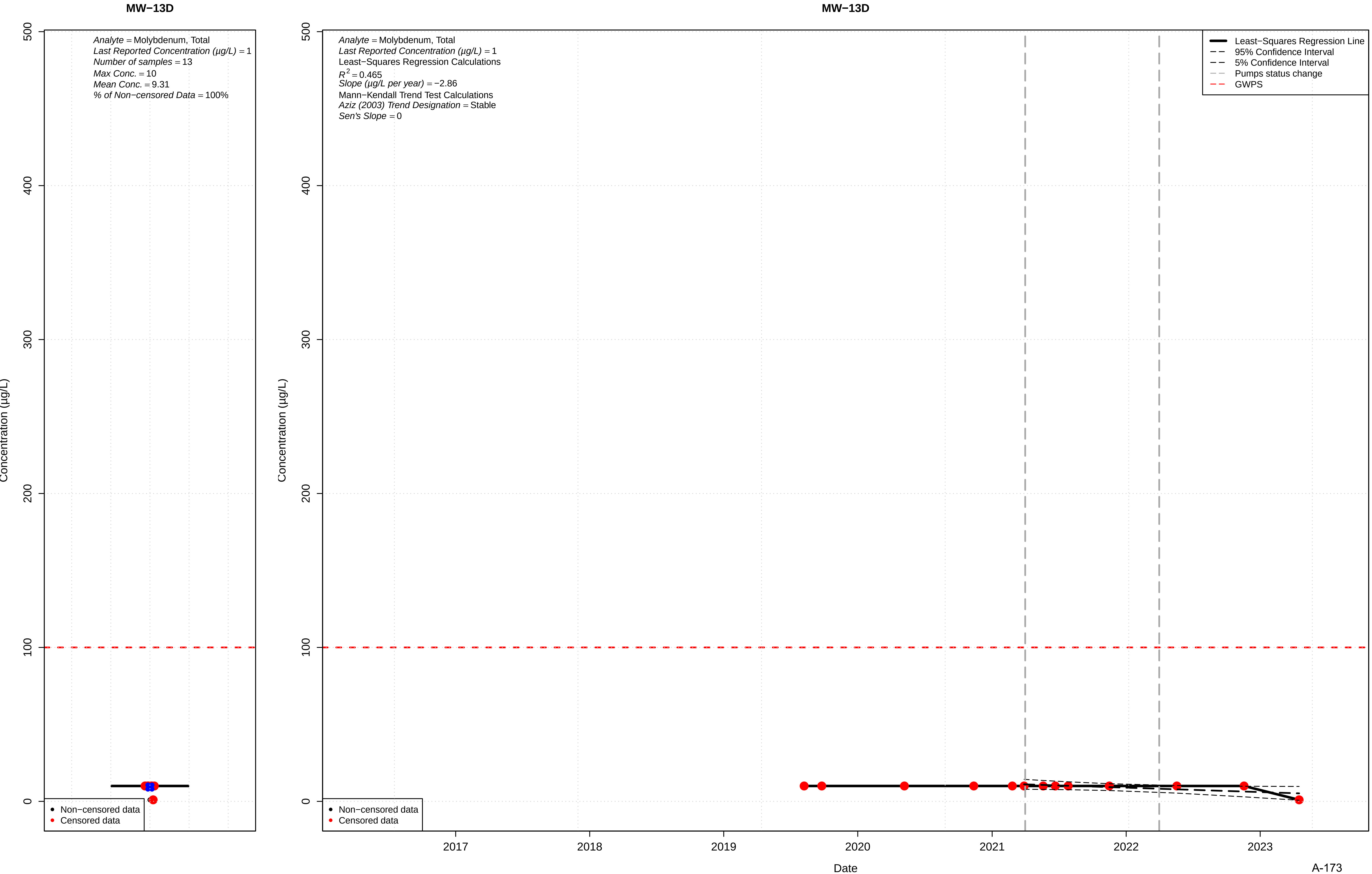


MW−12D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 196
Least−Squares Regression Calculations
R^2 = 0.0541
Slope (µg/L per year) = 1.93
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

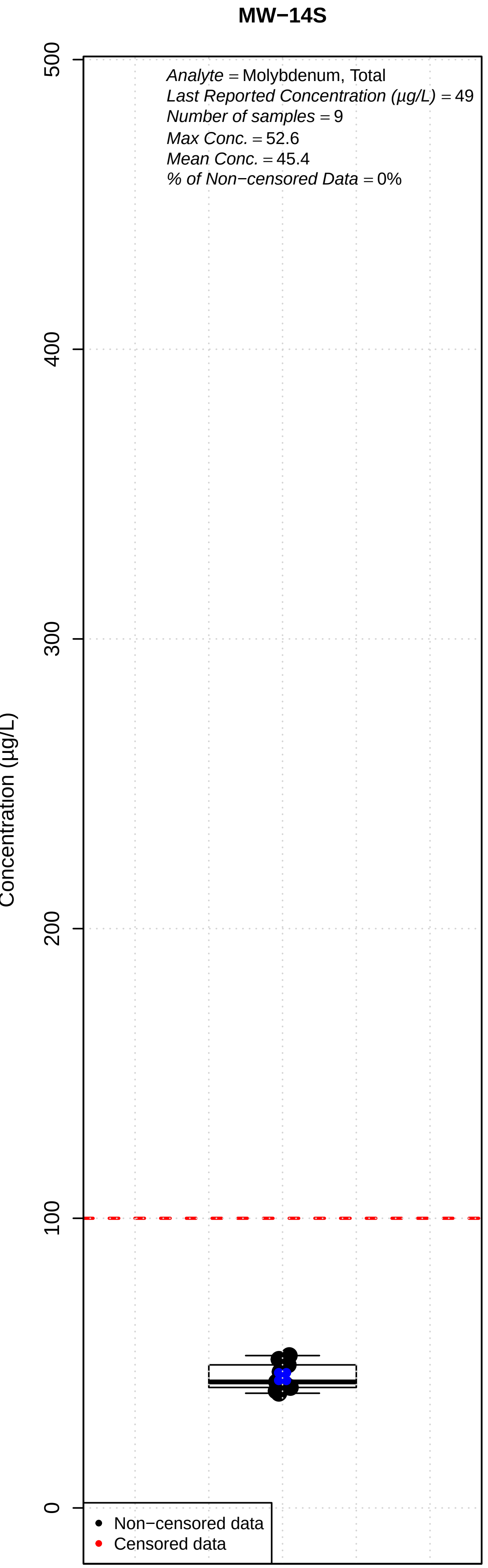

MW−13S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 13
Max Conc. = 10
Mean Conc. = 9.31
% of Non−censored Data = 100%
Non−censored data
Censored data
Concentration (µg/L)
0
100
200
300
400
500
MW−13S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.466
Slope (µg/L per year) = −2.86
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Non−censored data
Censored data
Concentration (µg/L)
Date
2017
2018
2019
2020
2021
2022
2023

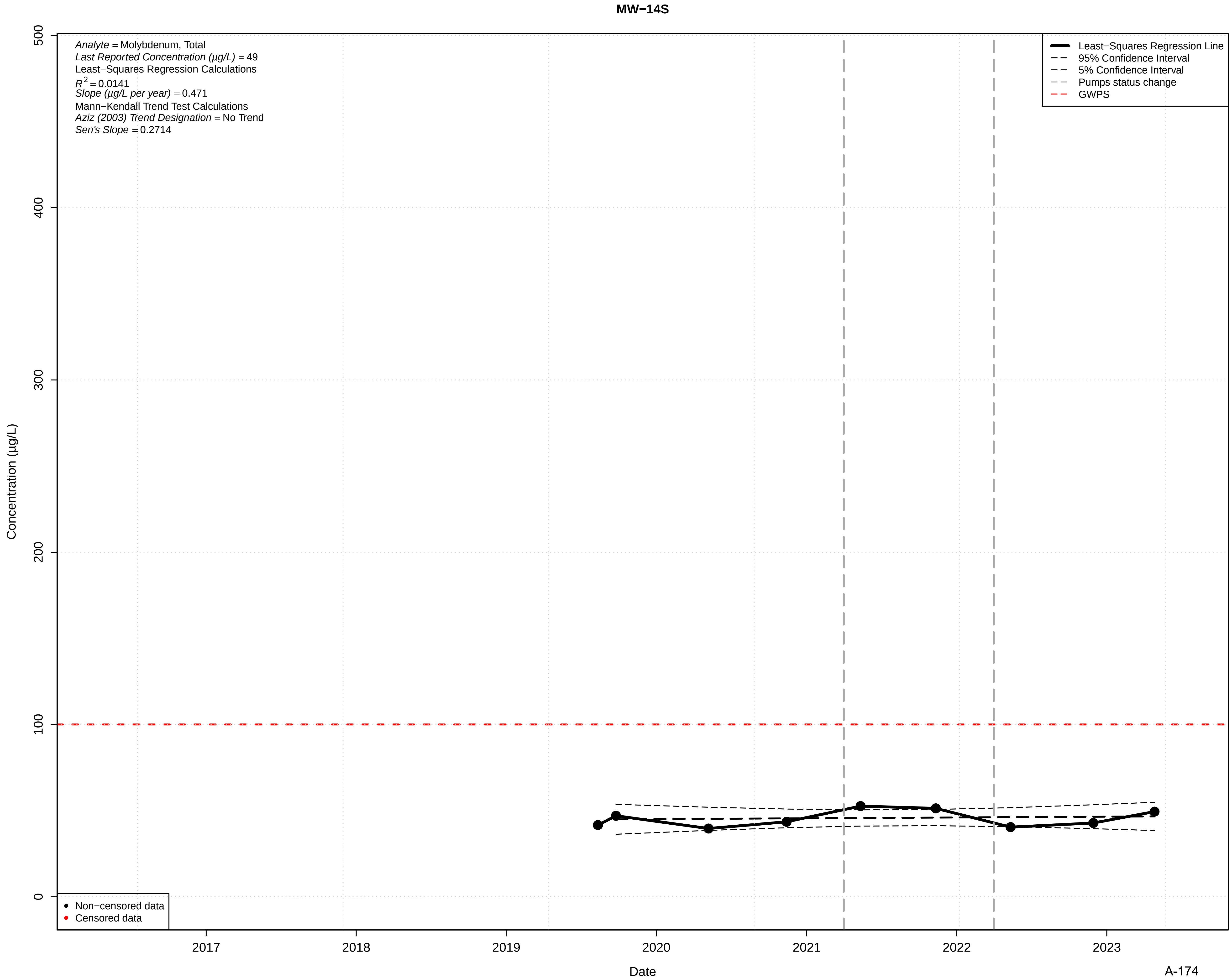

MW−13I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 13
Max Conc. = 10
Mean Conc. = 9.31
% of Non−censored Data = 100%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

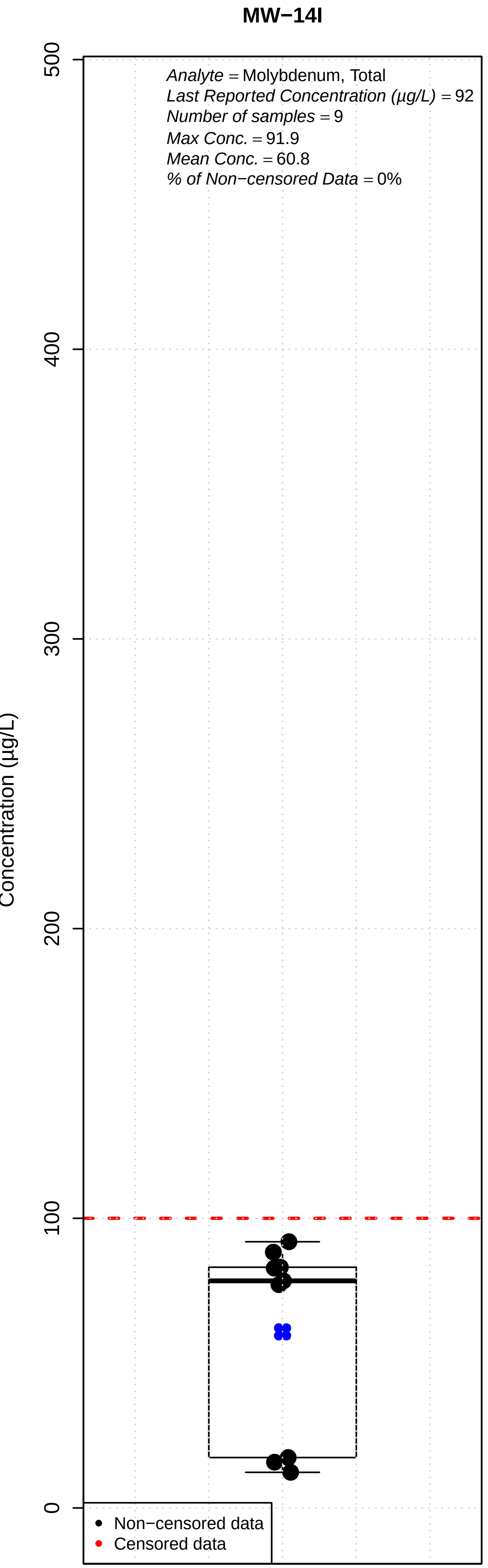

MW−13I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.466
Slope (µg/L per year) = −2.86
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data



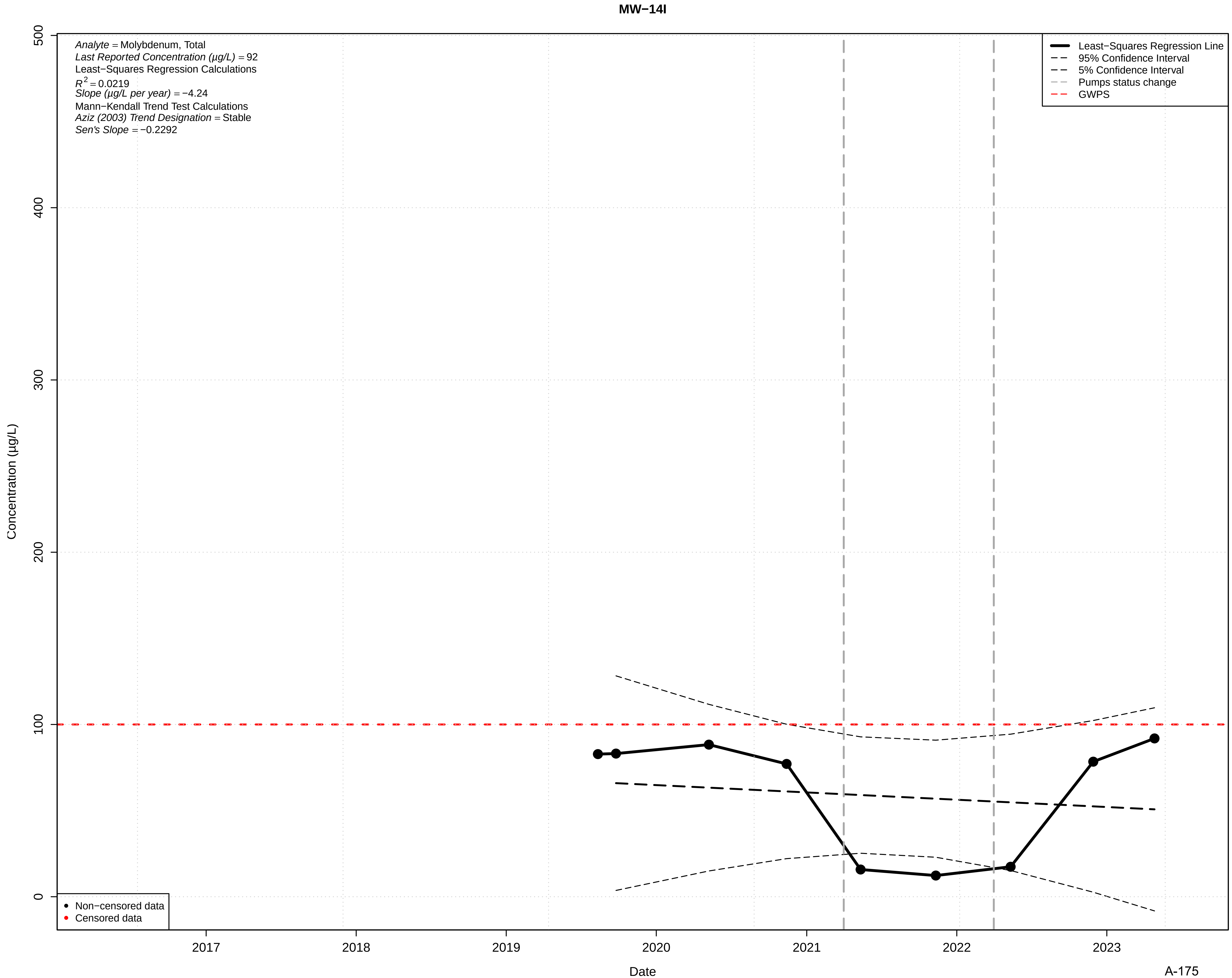
MW−13D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 13
Max Conc. = 10
Mean Conc. = 9.31
% of Non−censored Data = 100%
Concentration (µg/L)
Non−censored data
Censored data
MW−13D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R² = 0.465
Slope (µg/L per year) = −2.86
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Non−censored data
Censored data
Date


MW−14S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 49
Number of samples = 9
Max Conc. = 52.6
Mean Conc. = 45.4
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

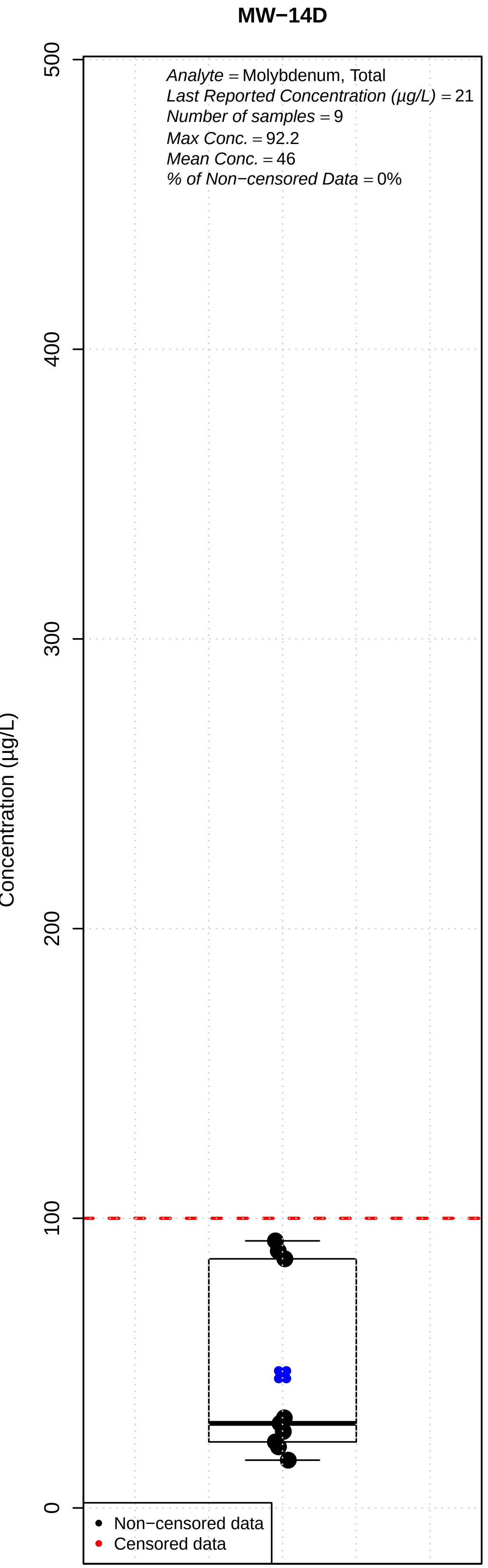

MW−14S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 49
Least−Squares Regression Calculations
R2 = 0.0141
Slope (µg/L per year) = 0.471
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.2714
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

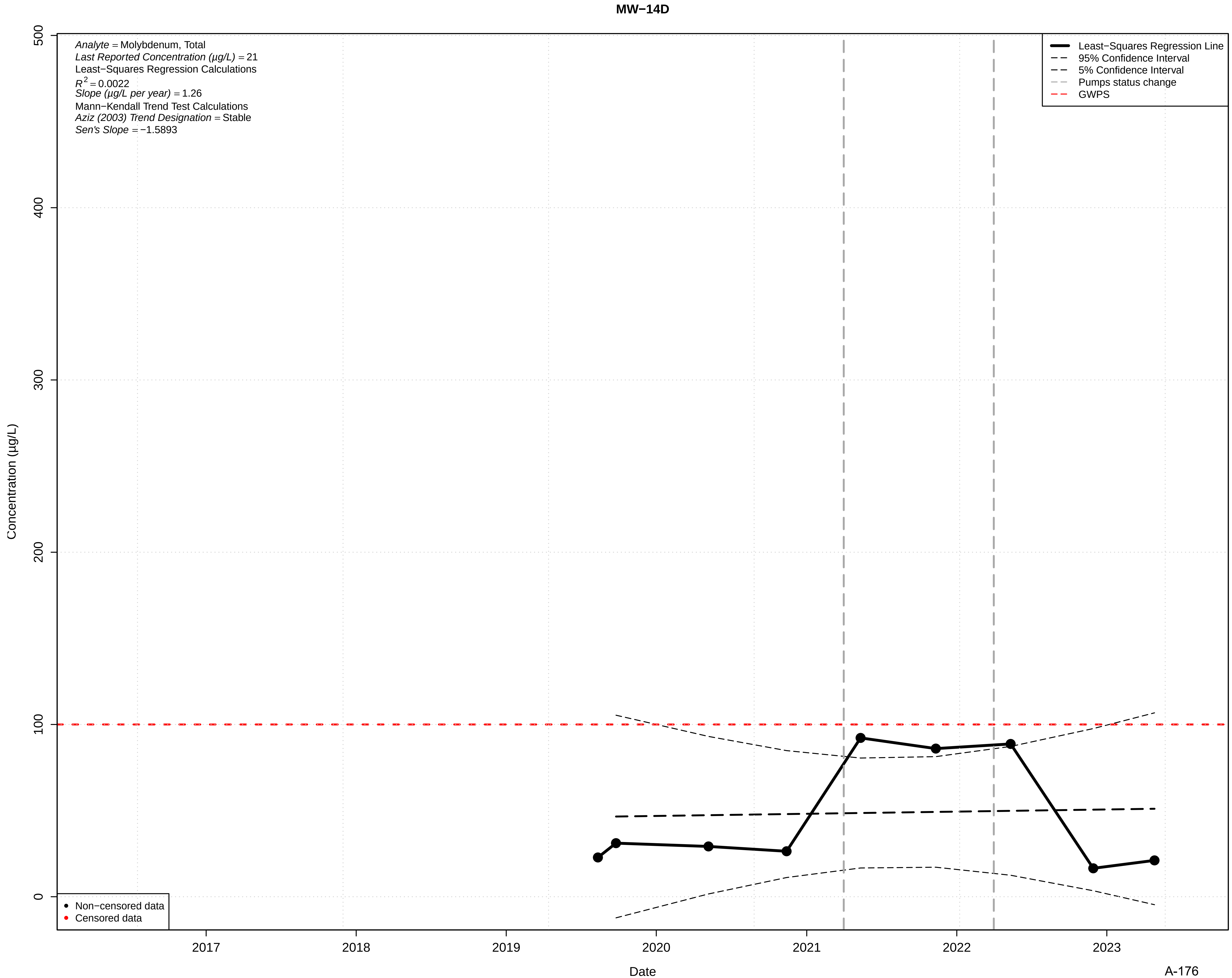


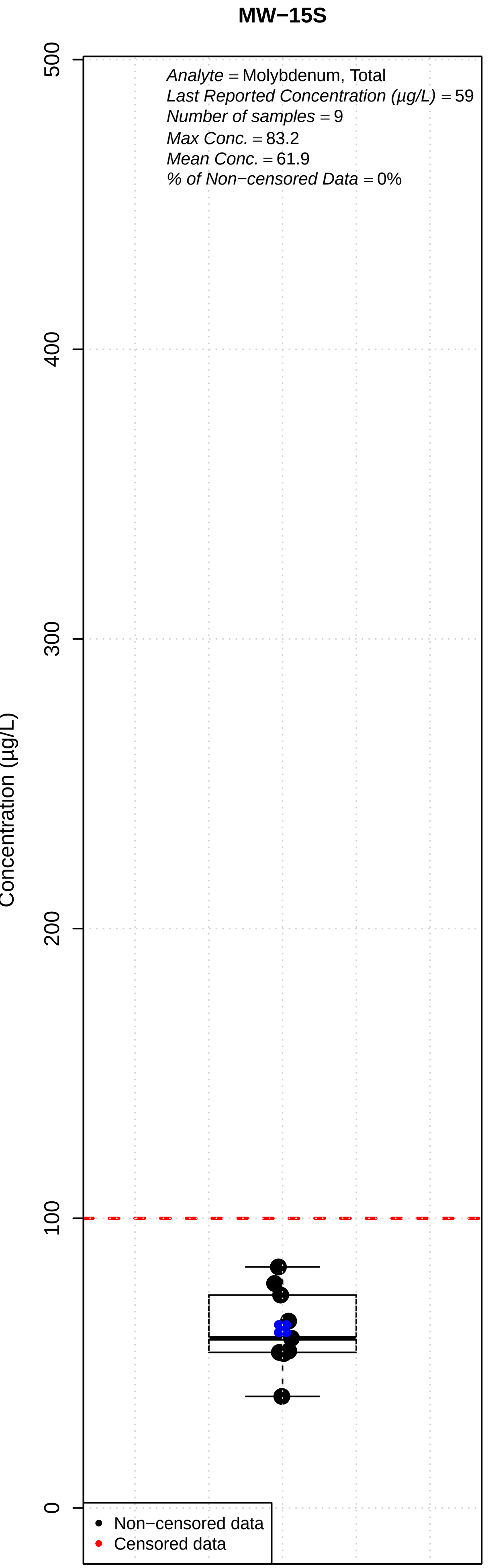
MW−14I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 92
Number of samples = 9
Max Conc. = 91.9
Mean Conc. = 60.8
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

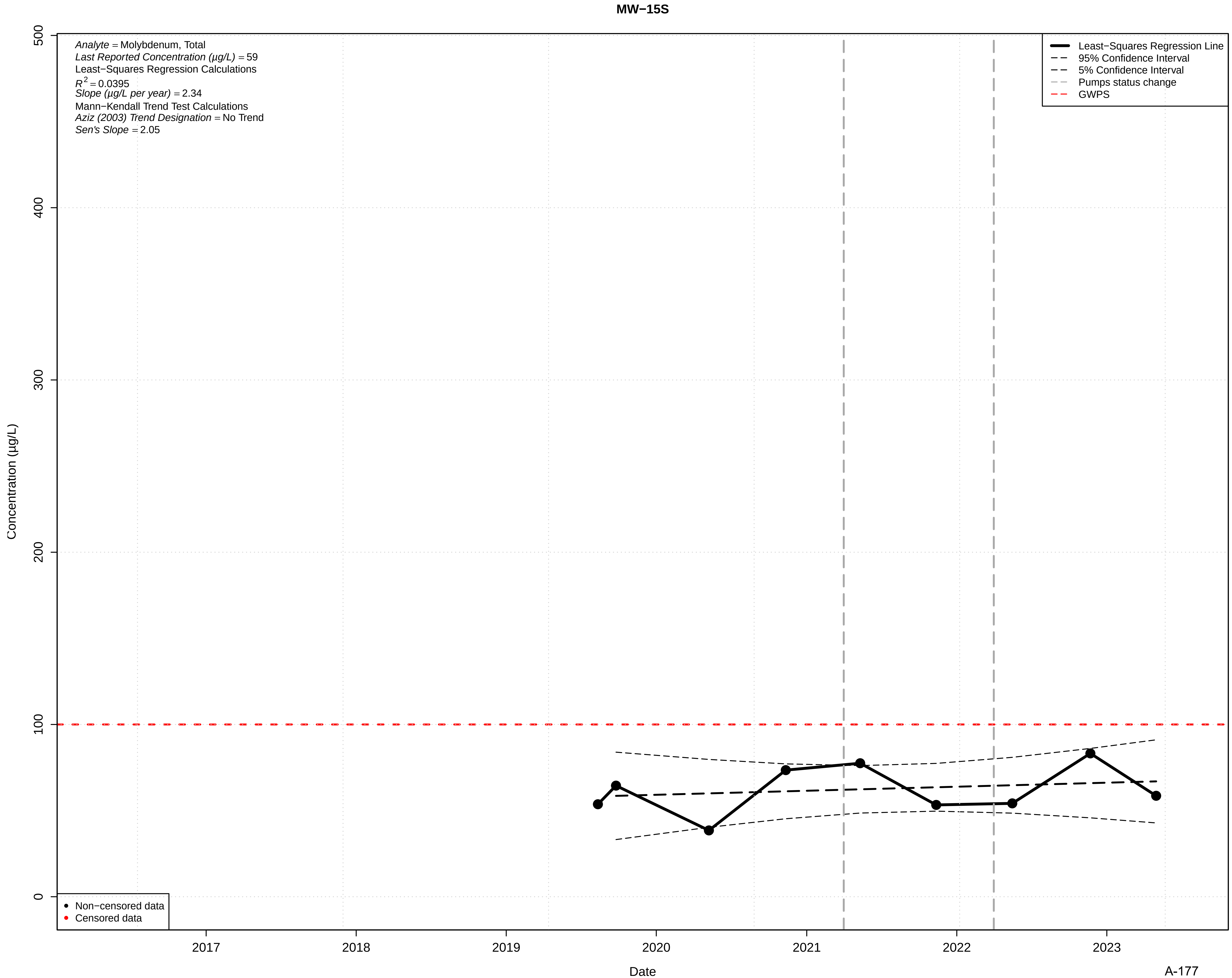


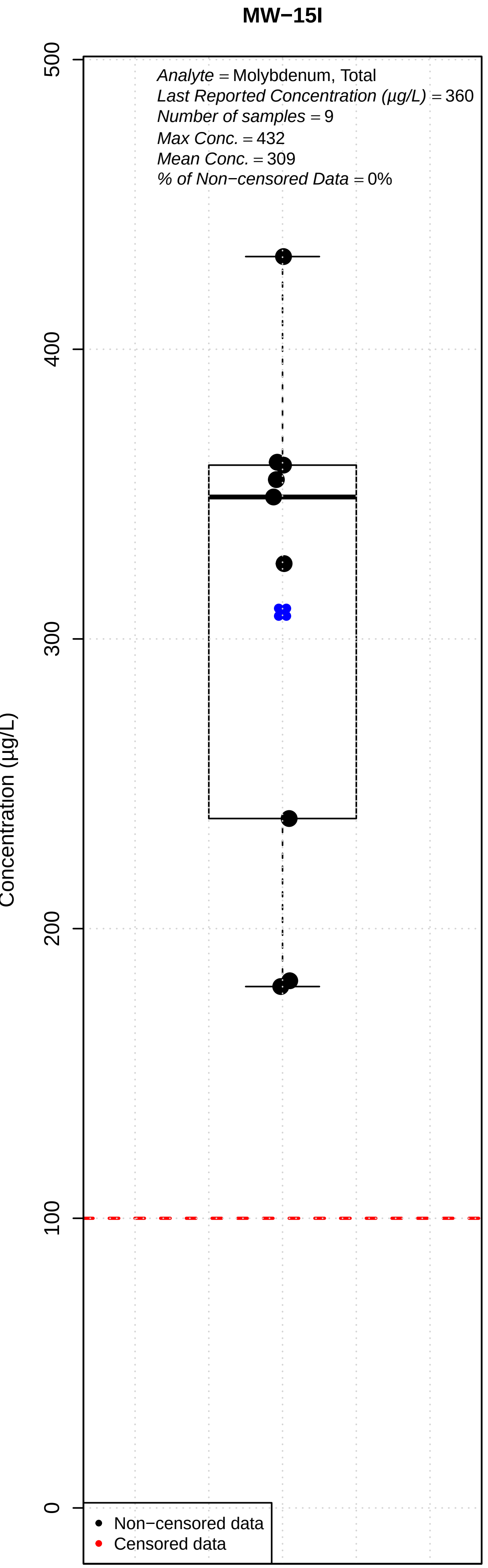
MW−14I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 92
Least−Squares Regression Calculations
R^2 = 0.0219
Slope (µg/L per year) = −4.24
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.2292
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

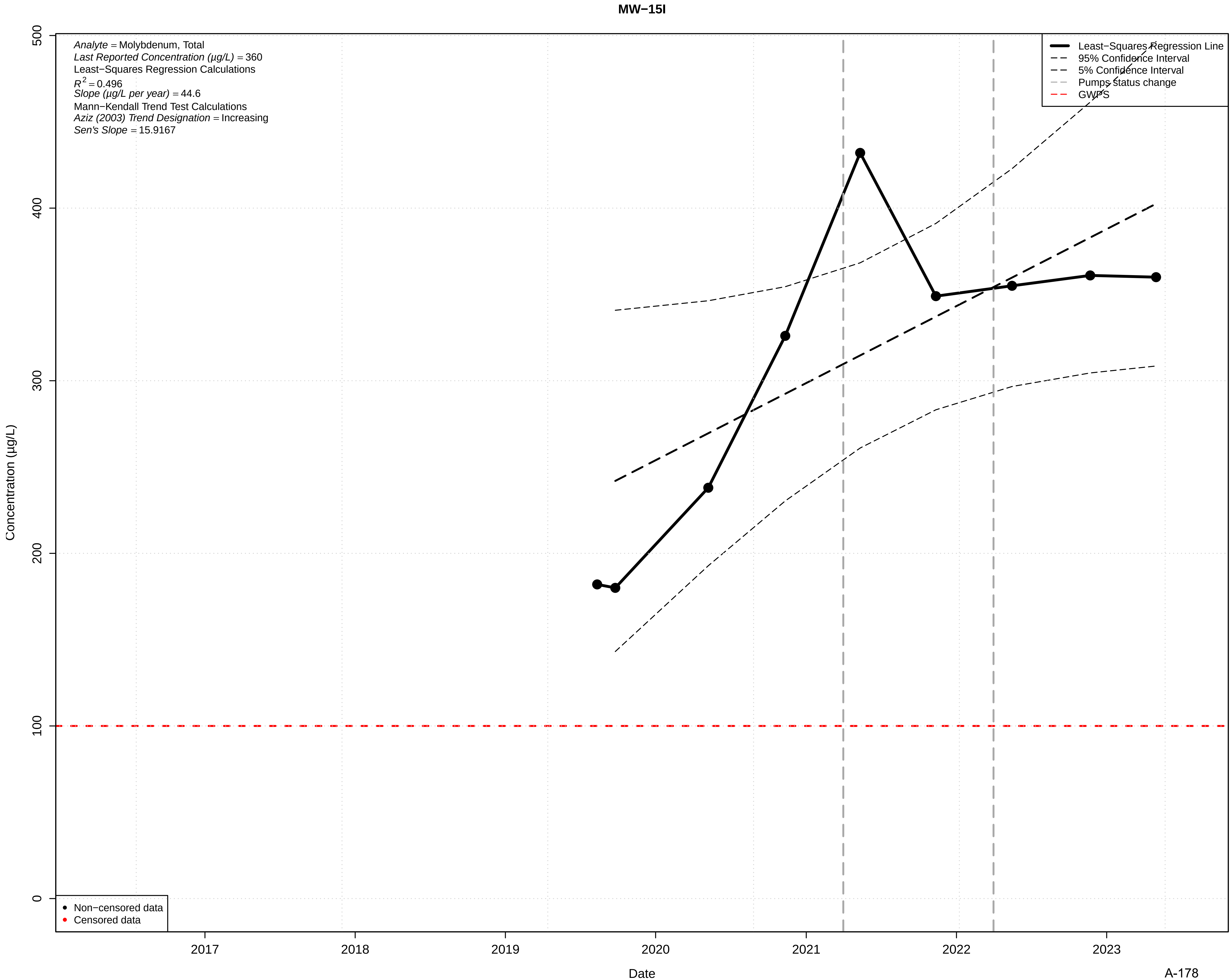

MW−14D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 21
Number of samples = 9
Max Conc. = 92.2
Mean Conc. = 46
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

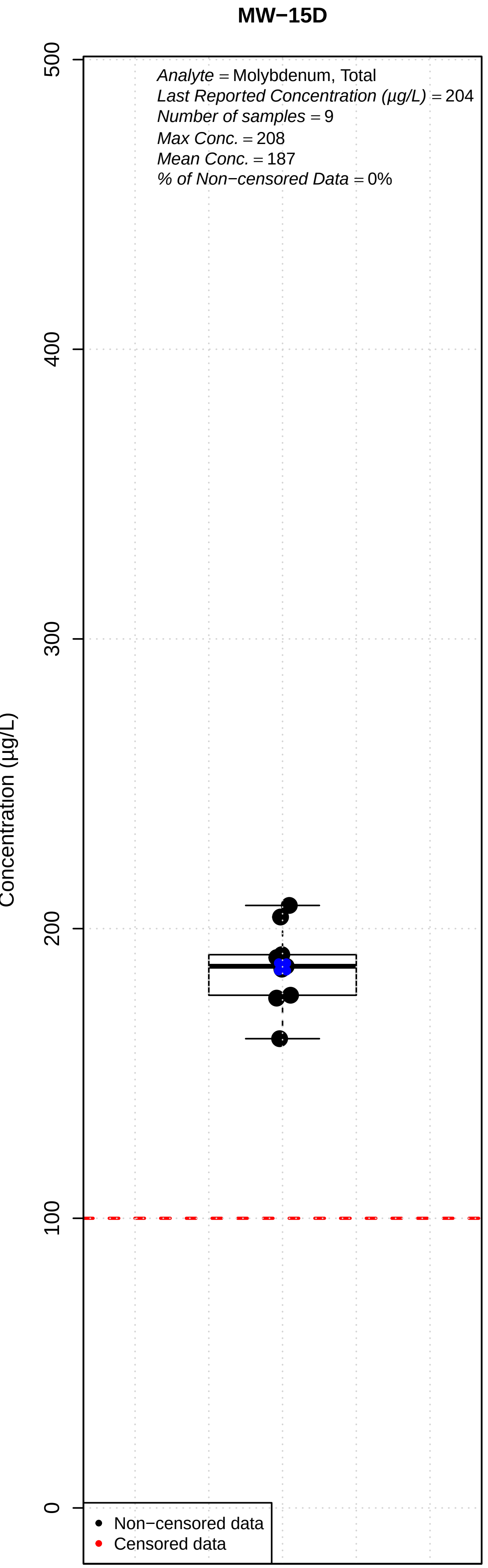

MW−14D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 21
Least−Squares Regression Calculations
R^2 = 0.0022
Slope (µg/L per year) = 1.26
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −1.5893
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−15S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 59
Number of samples = 9
Max Conc. = 83.2
Mean Conc. = 61.9
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

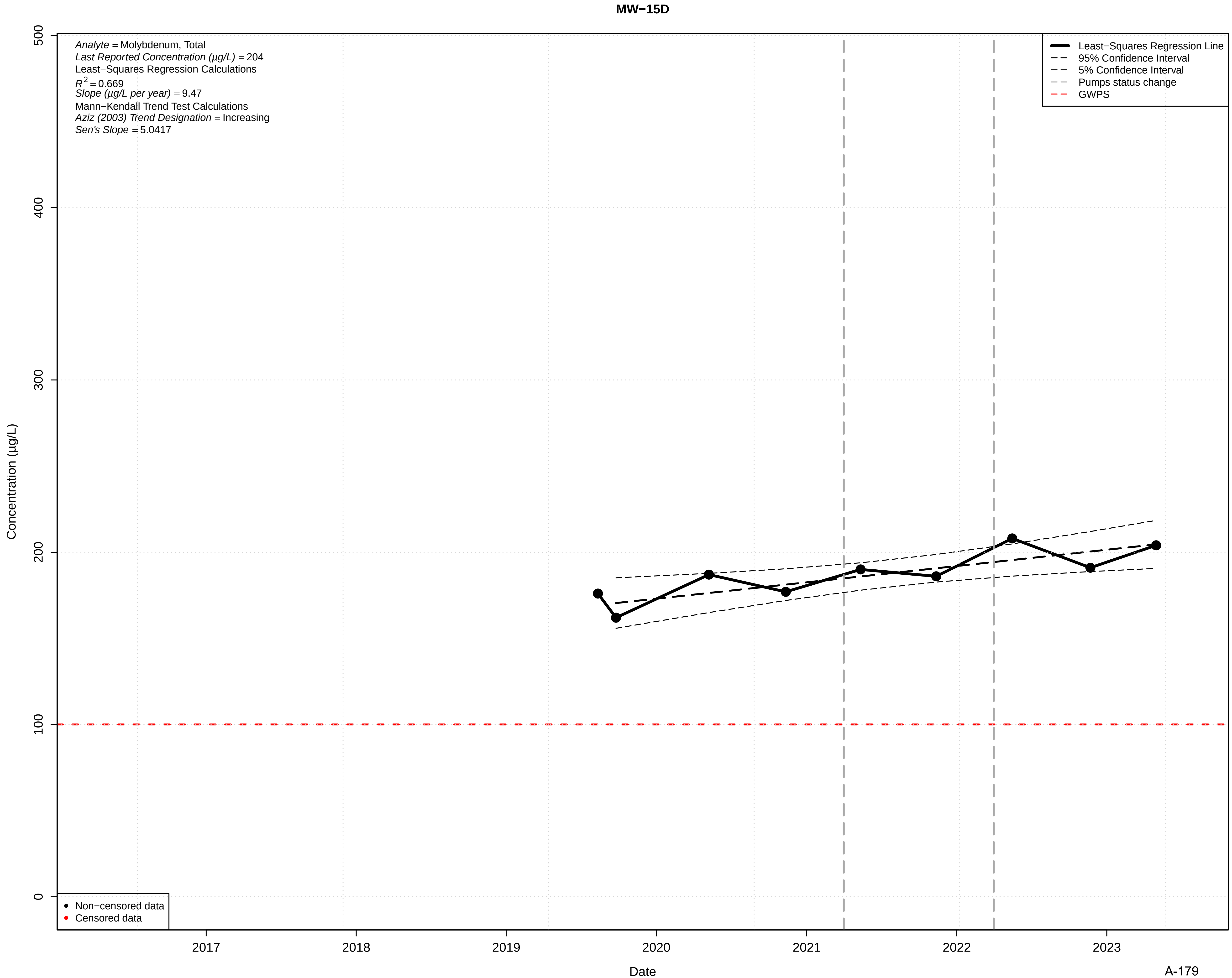

MW−15S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 59
Least−Squares Regression Calculations
R2 = 0.0395
Slope (µg/L per year) = 2.34
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 2.05
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−15I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 360
Number of samples = 9
Max Conc. = 432
Mean Conc. = 309
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

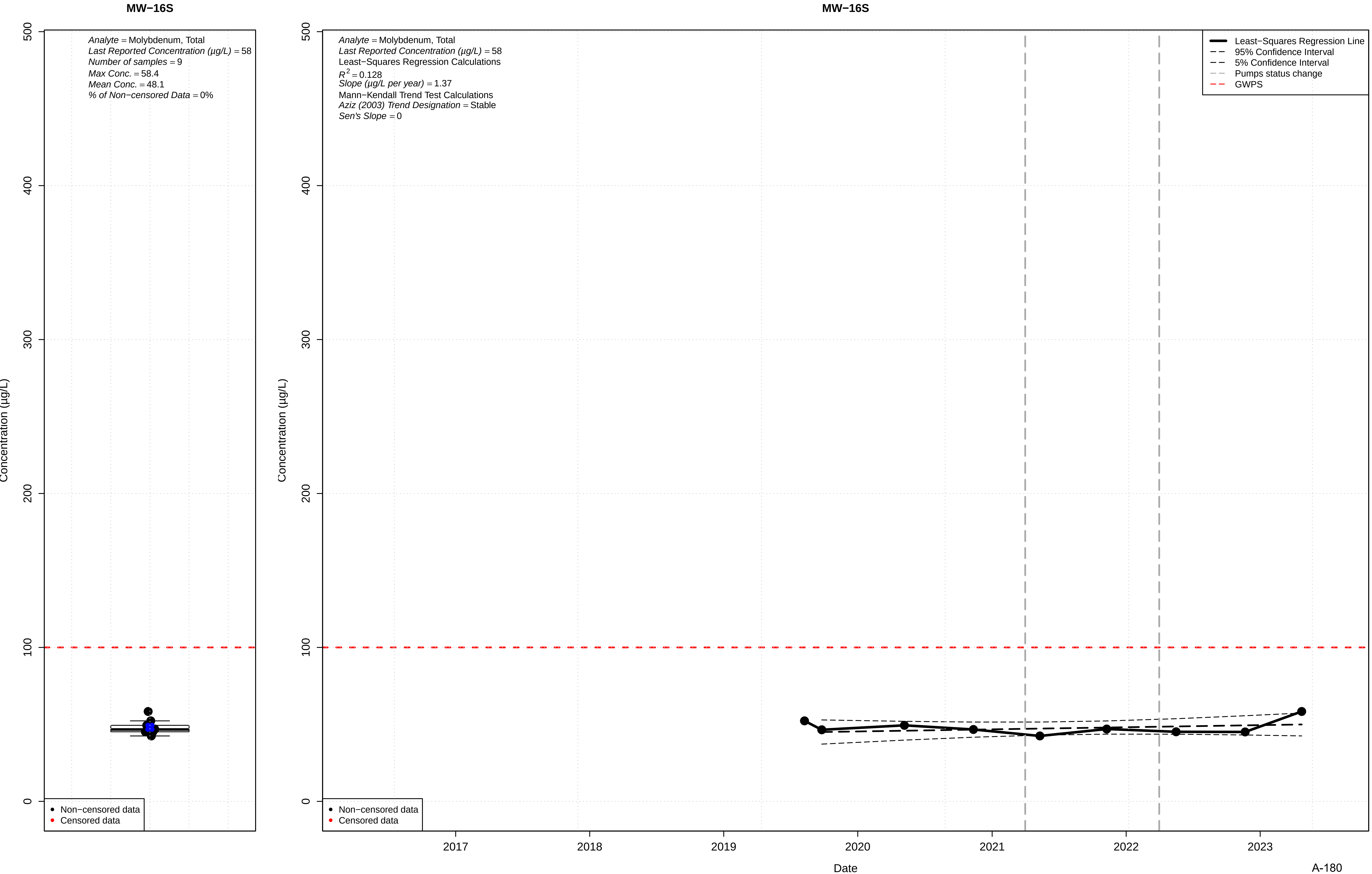

MW−15I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 360
Least−Squares Regression Calculations
R^2 = 0.496
Slope (µg/L per year) = 44.6
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Increasing
Sen's Slope = 15.9167
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date



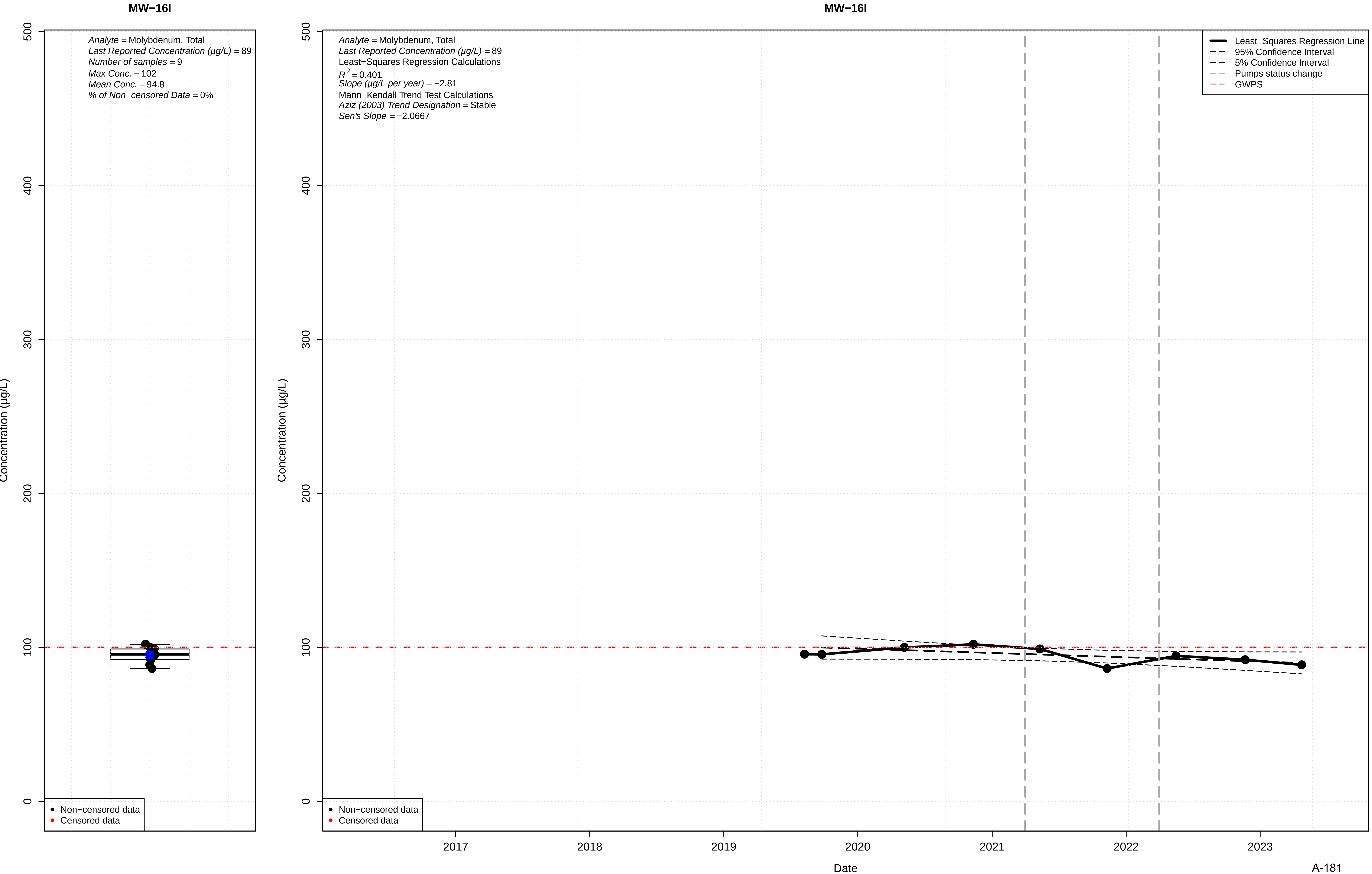
MW−15D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 204
Number of samples = 9
Max Conc. = 208
Mean Conc. = 187
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

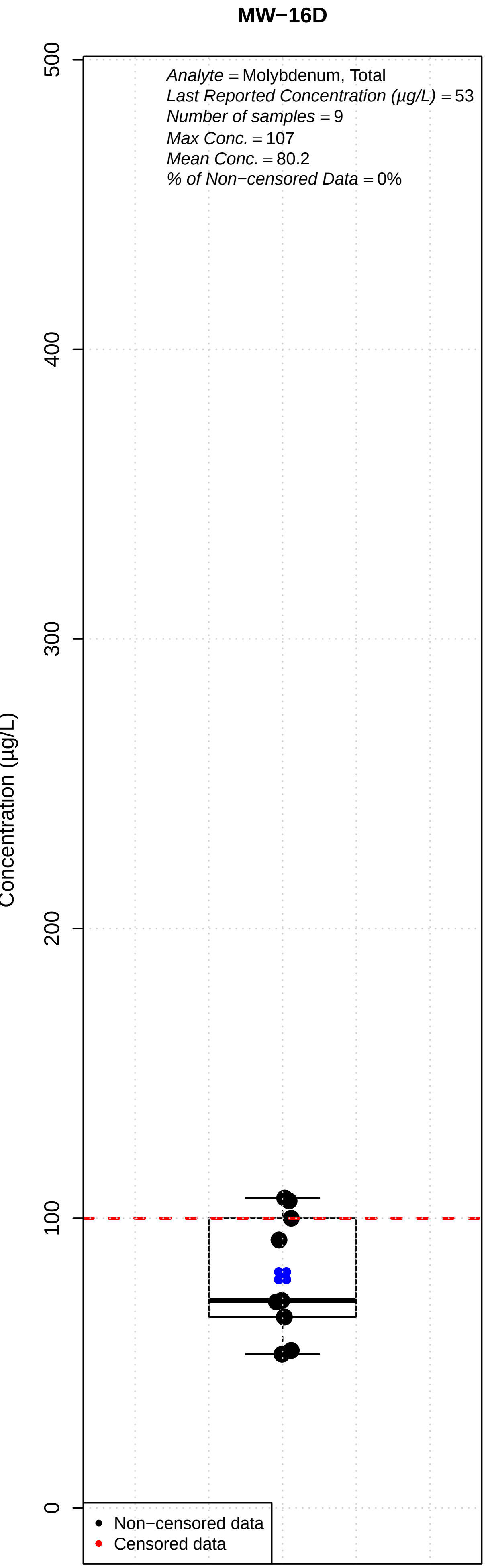


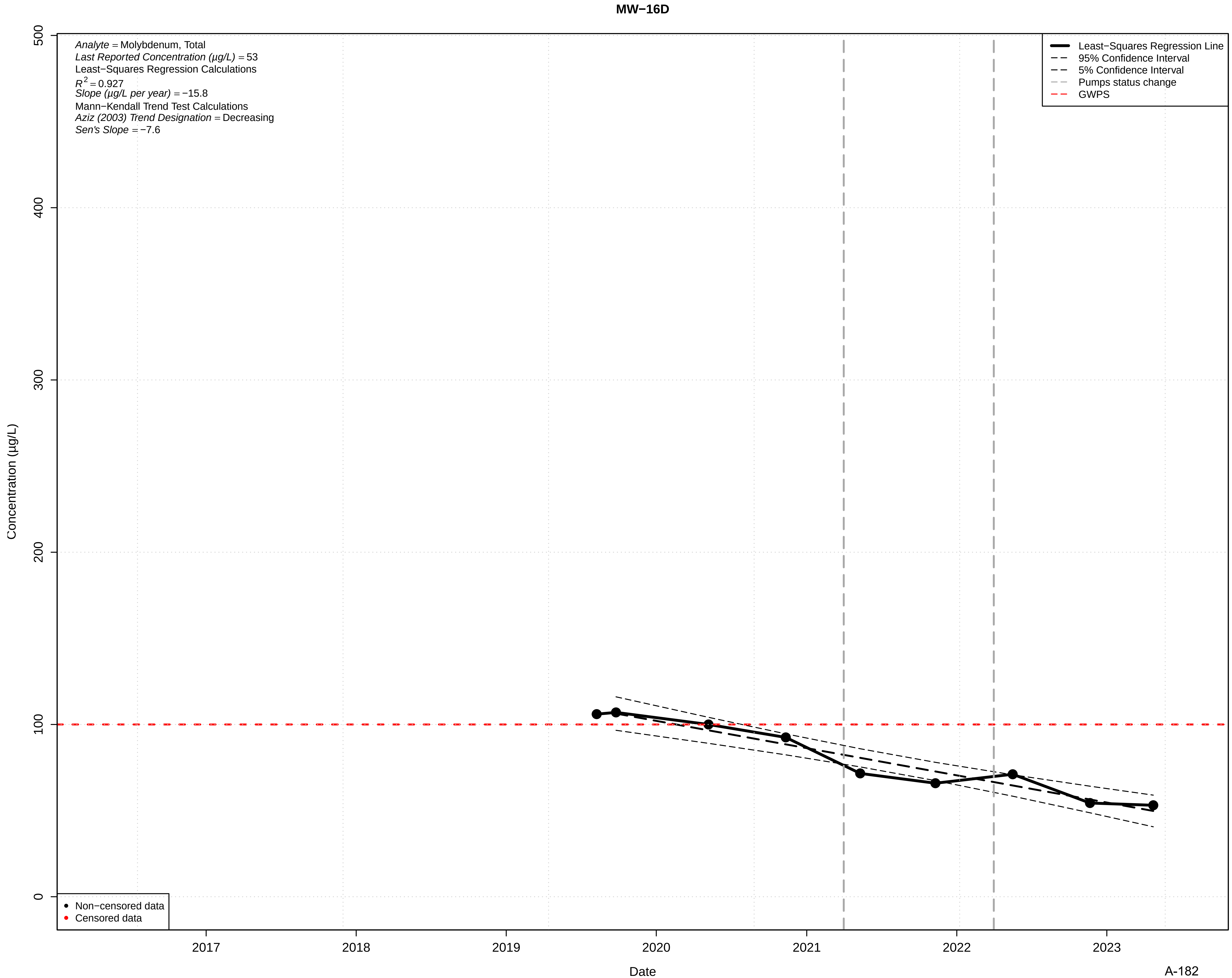
MW−15D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 204
Least−Squares Regression Calculations
R2 = 0.669
Slope (µg/L per year) = 9.47
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Increasing
Sen's Slope = 5.0417
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

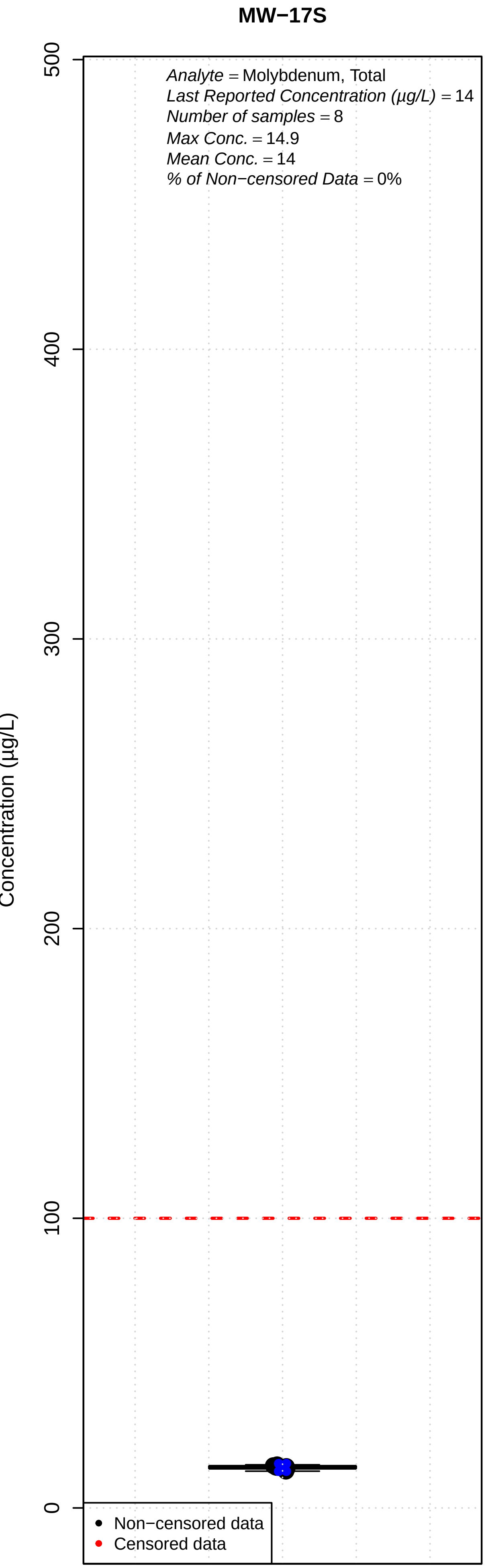


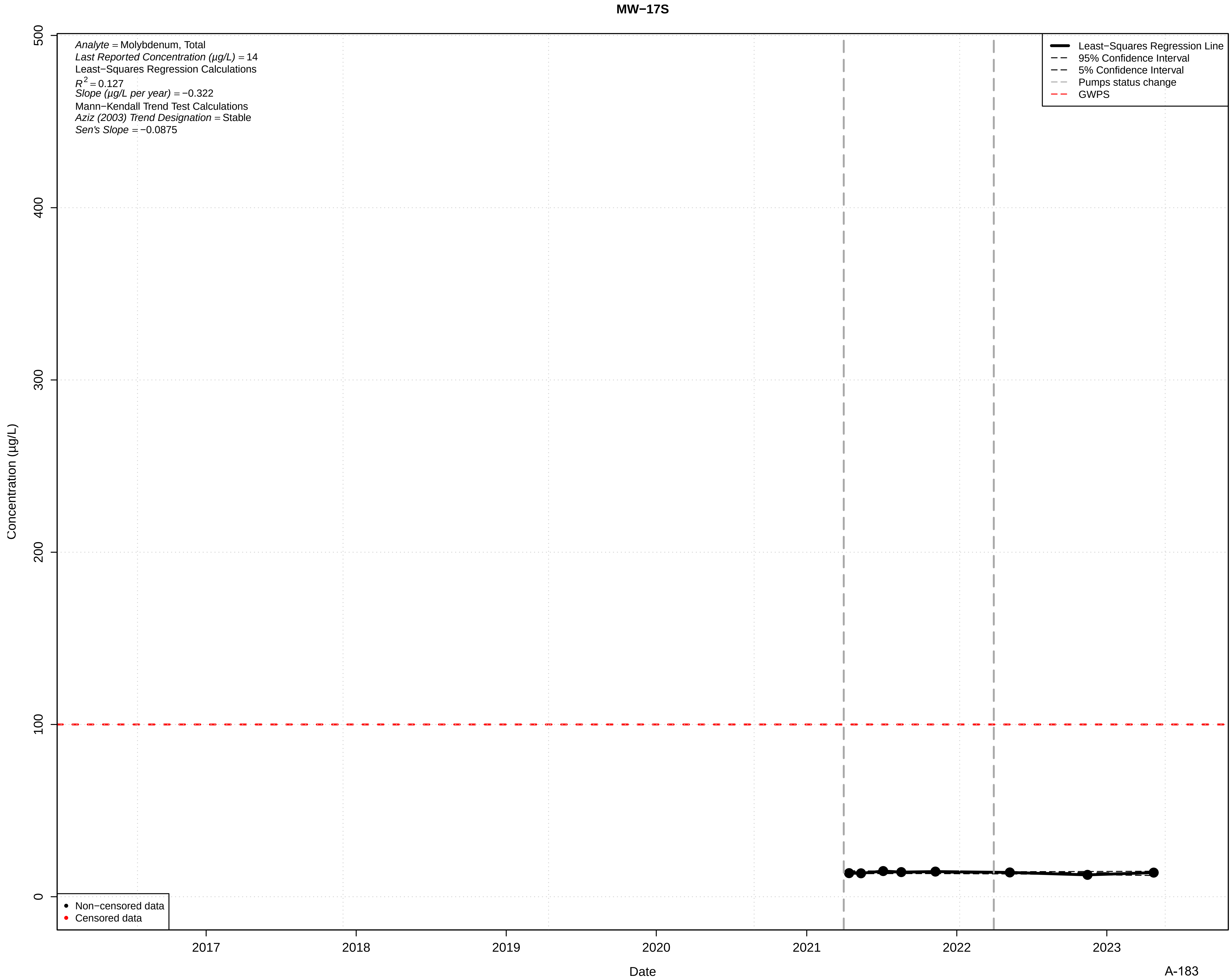
MW−16S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 58
Number of samples = 9
Max Conc. = 58.4
Mean Conc. = 48.1
% of Non−censored Data = 0%
Concentration (µg/L)
Non−censored data
Censored data
MW−16S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 58
Least−Squares Regression Calculations
R2 = 0.128
Slope (µg/L per year) = 1.37
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

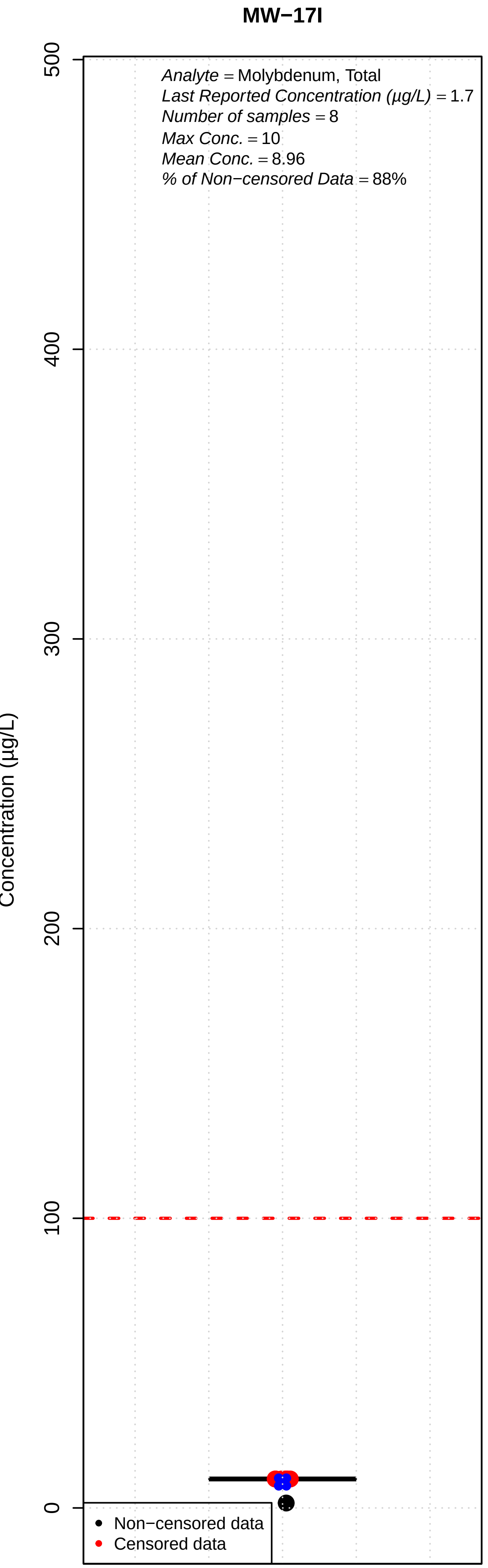

MW−16I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 89
Number of samples = 9
Max Conc. = 102
Mean Conc. = 94.8
% of Non−censored Data = 0%
Non−censored data
Censored data
Concentration (µg/L)
MW−16I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 89
Least−Squares Regression Calculations
R2 = 0.401
Slope (µg/L per year) = −2.81
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −2.0667
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Date

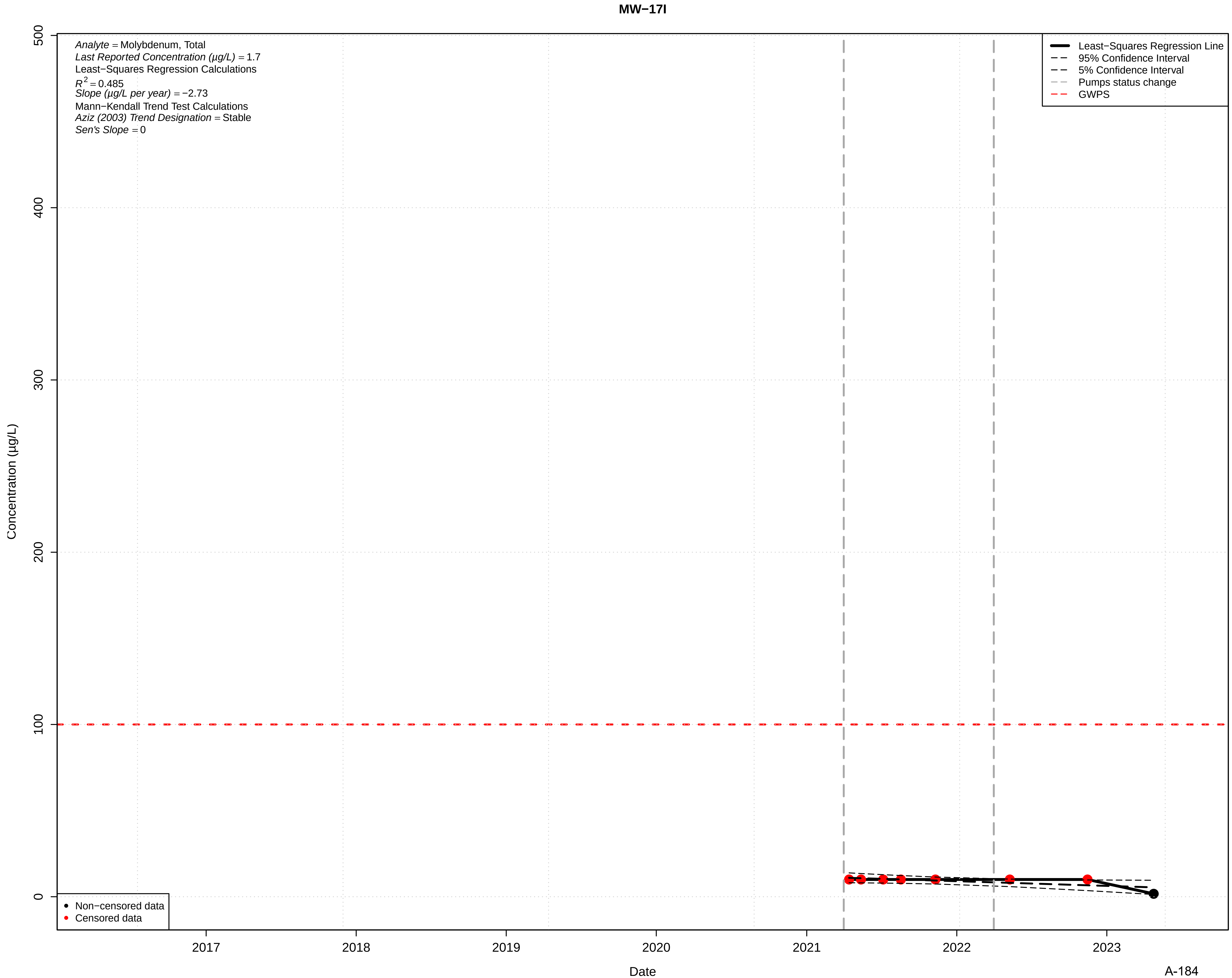

MW−16D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 53
Number of samples = 9
Max Conc. = 107
Mean Conc. = 80.2
% of Non−censored Data = 0%
Concentration (µg/L)
Non−censored data
Censored data

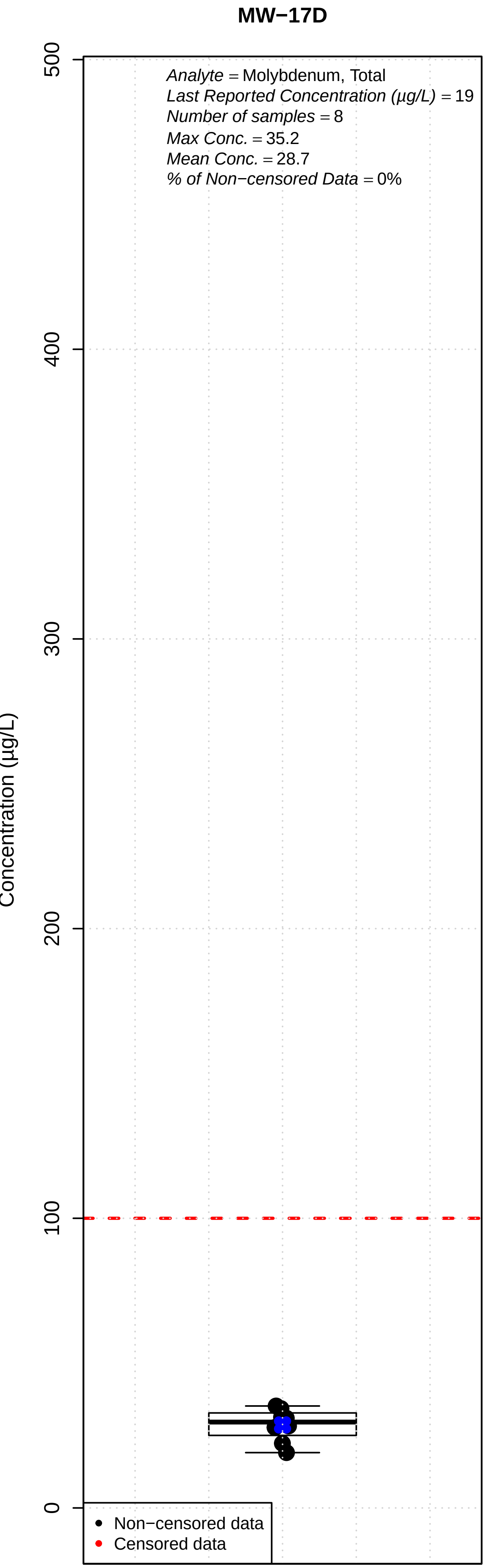

MW−16D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 53
Least−Squares Regression Calculations
R2 = 0.927
Slope (µg/L per year) = −15.8
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Decreasing
Sen's Slope = −7.6
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Date
Non−censored data
Censored data

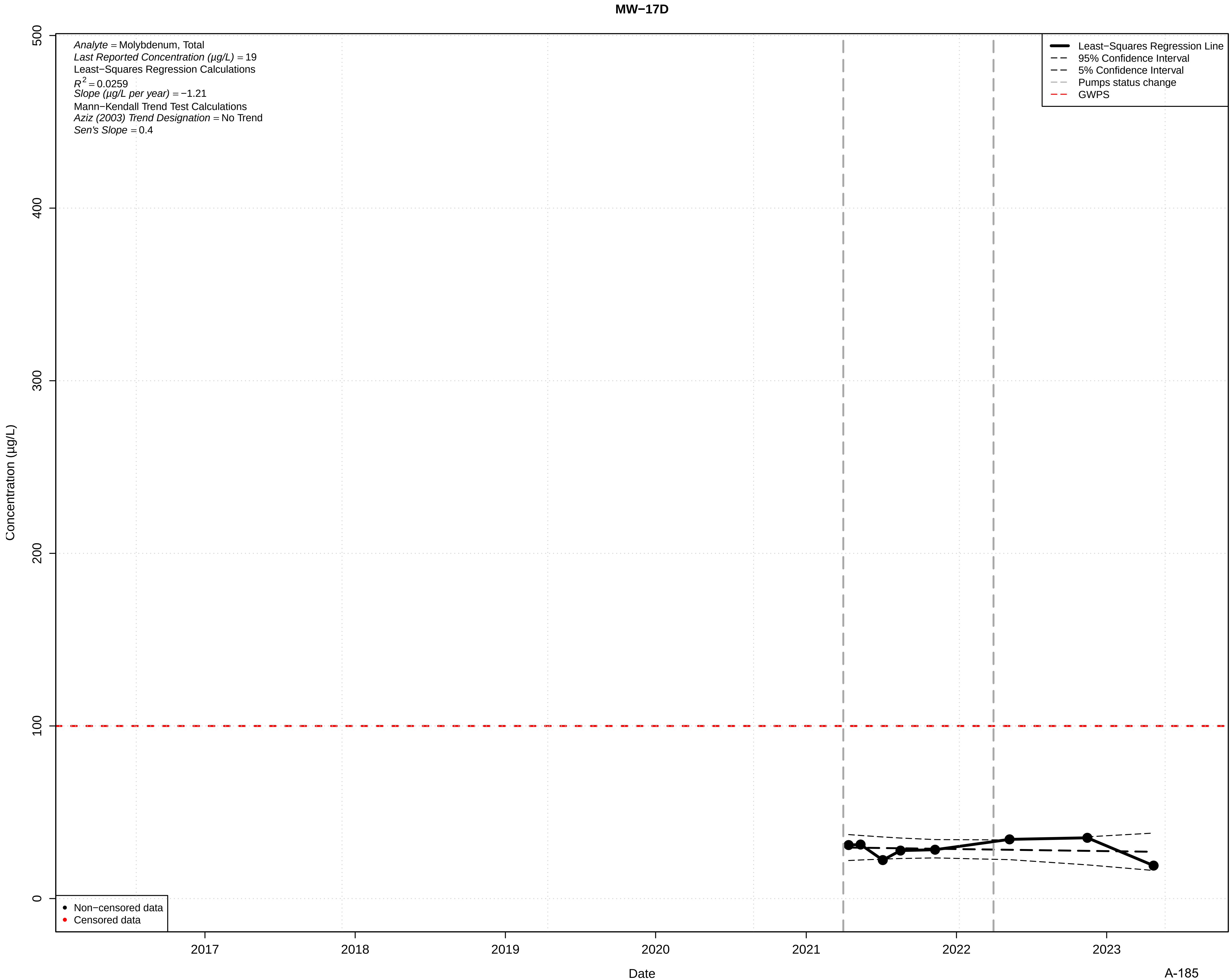

MW−17S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 14
Number of samples = 8
Max Conc. = 14.9
Mean Conc. = 14
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

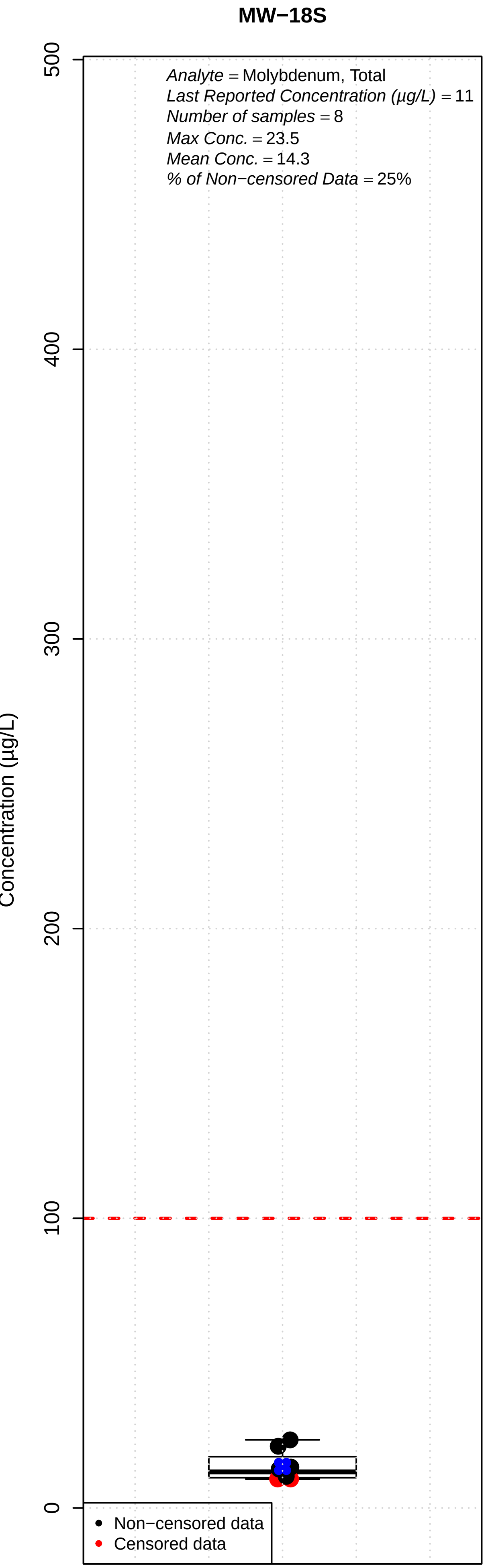

MW−17S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 14
Least−Squares Regression Calculations
R2 = 0.127
Slope (µg/L per year) = −0.322
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.0875
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

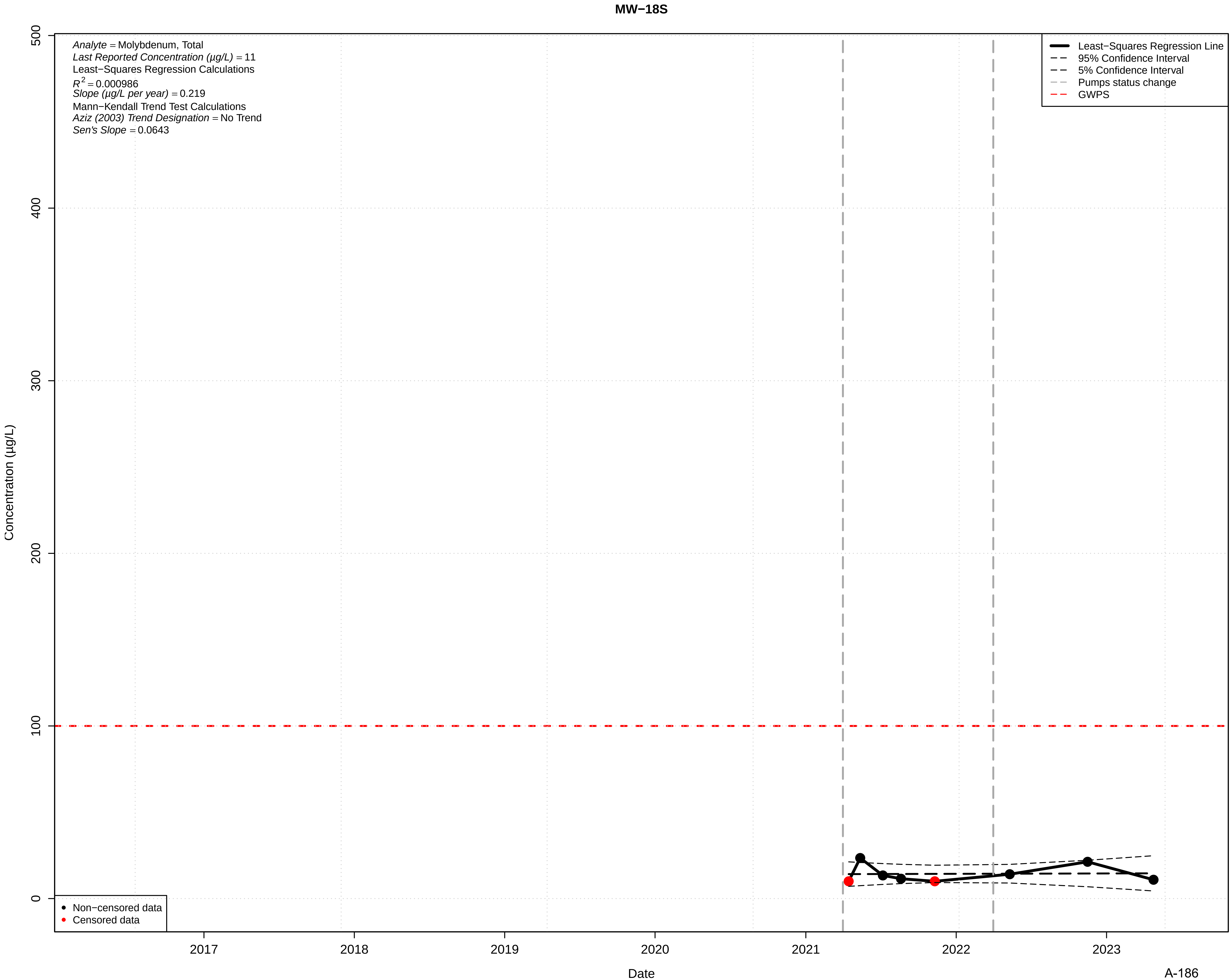

MW−17I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1.7
Number of samples = 8
Max Conc. = 10
Mean Conc. = 8.96
% of Non−censored Data = 88%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

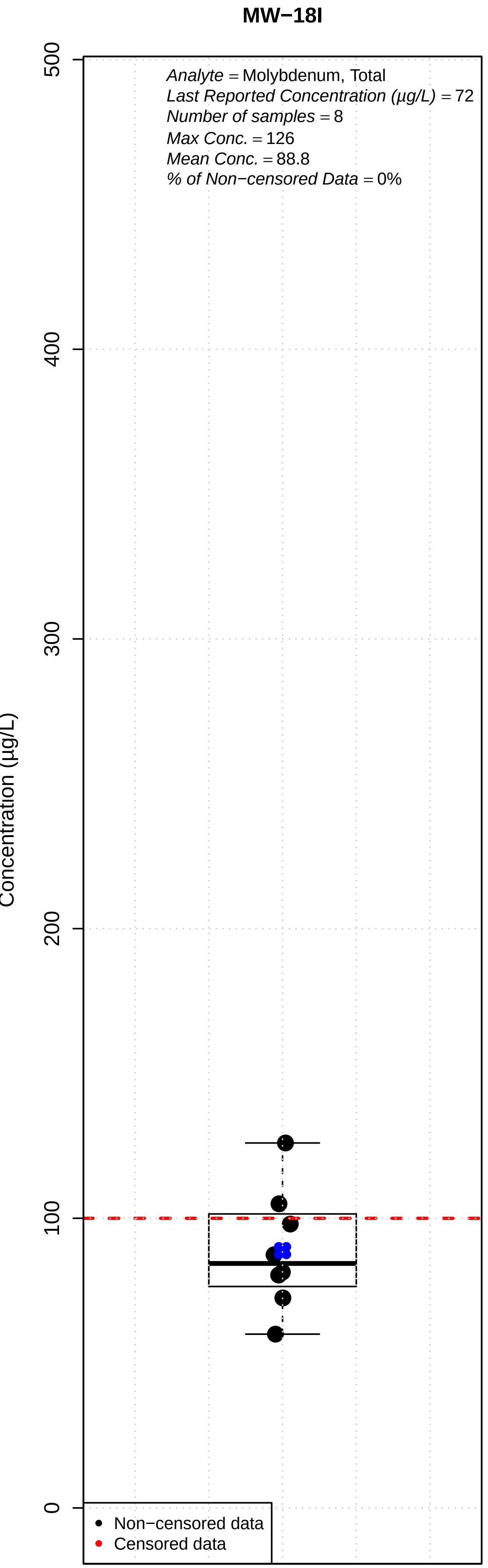

MW−17I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1.7
Least−Squares Regression Calculations
R2 = 0.485
Slope (µg/L per year) = −2.73
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data

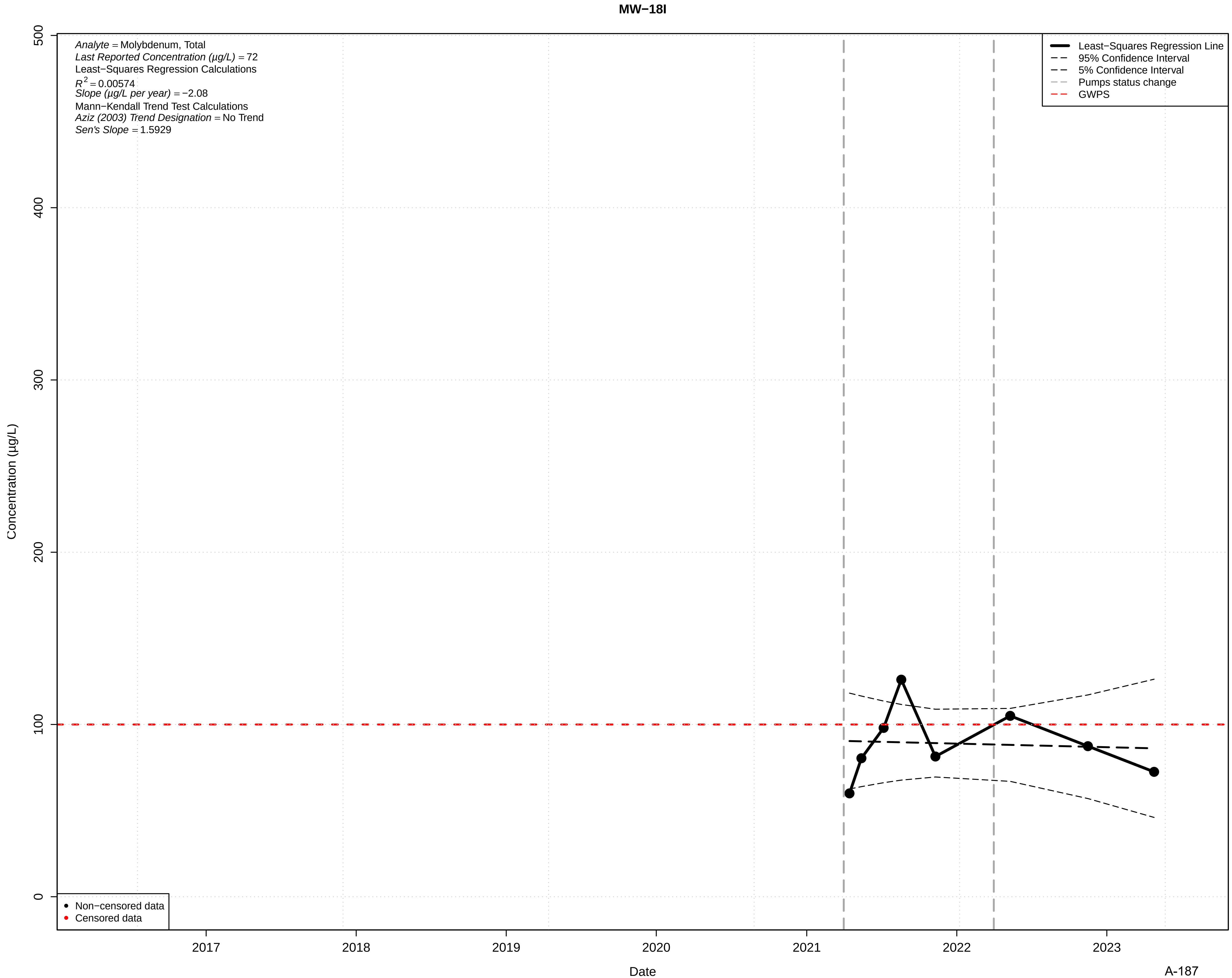

MW−17D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 19
Number of samples = 8
Max Conc. = 35.2
Mean Conc. = 28.7
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

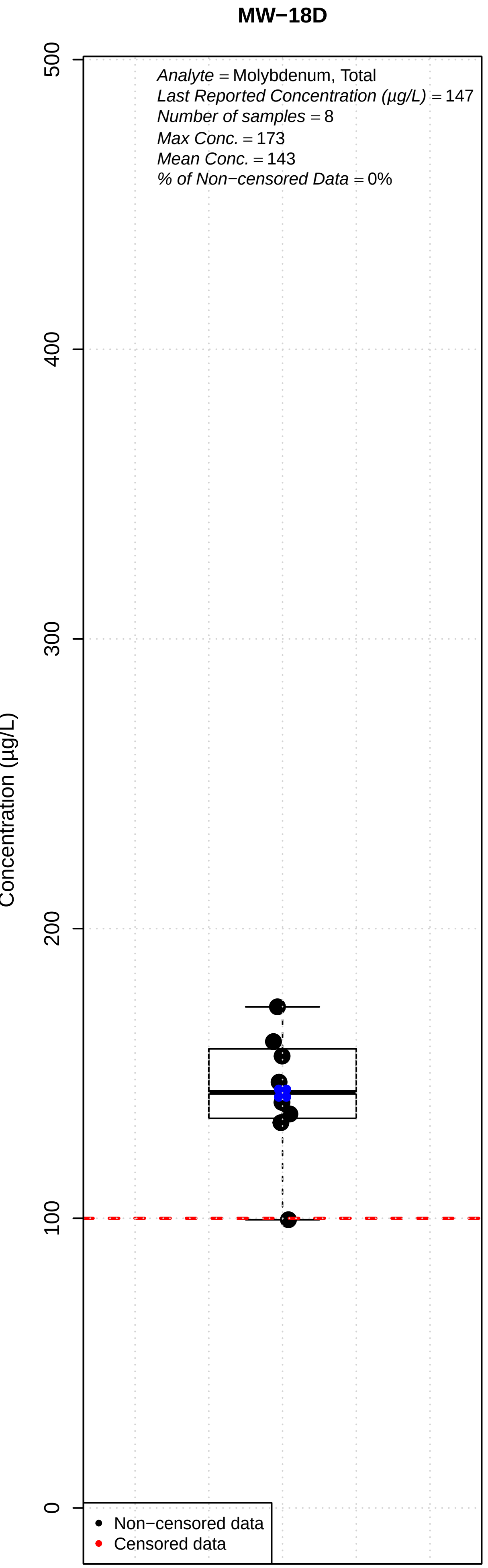

MW−17D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 19
Least−Squares Regression Calculations
R2 = 0.0259
Slope (µg/L per year) = −1.21
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.4
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−18S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 11
Number of samples = 8
Max Conc. = 23.5
Mean Conc. = 14.3
% of Non−censored Data = 25%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

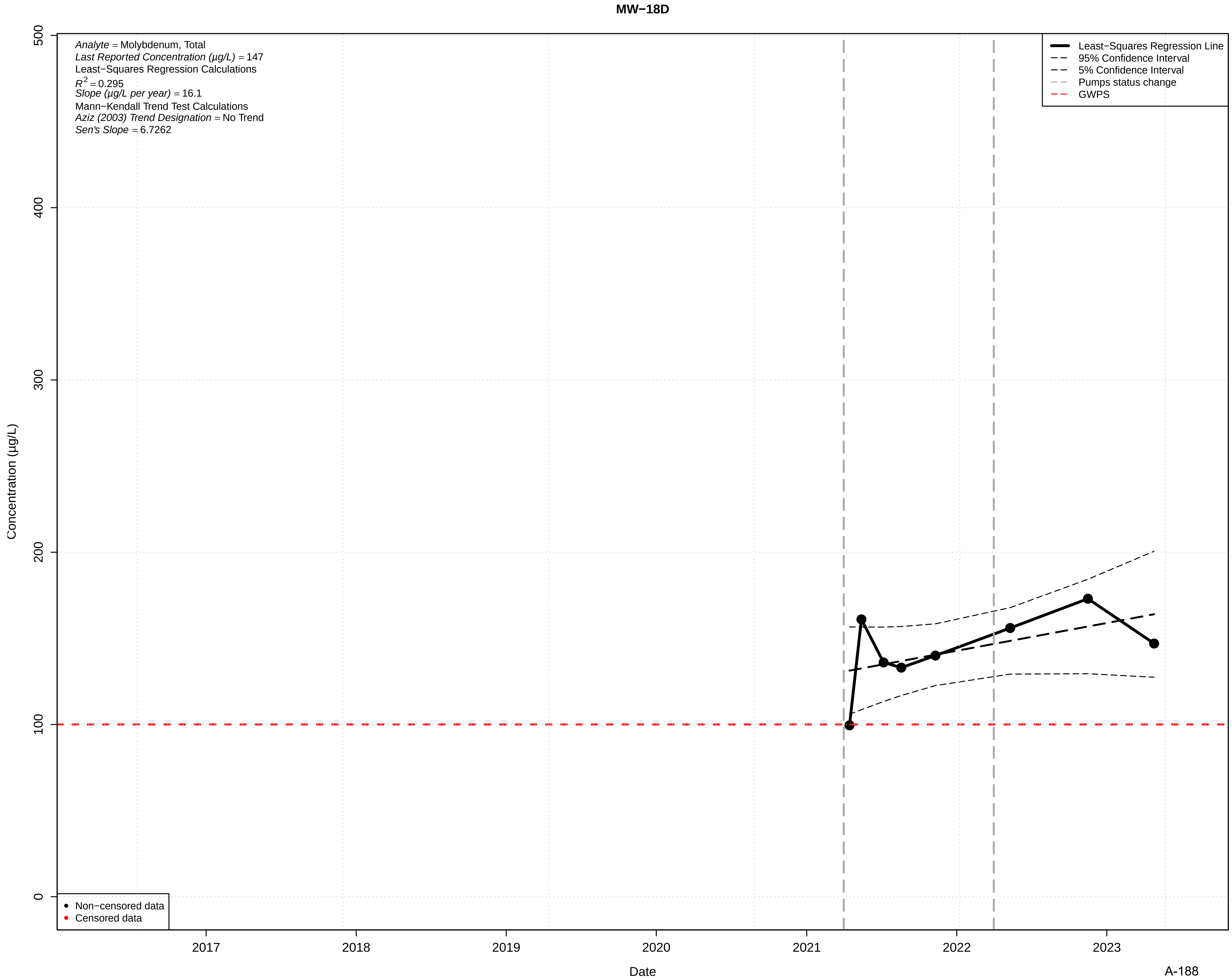

MW−18S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 11
Least−Squares Regression Calculations
R2 = 0.000986
Slope (µg/L per year) = 0.219
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.0643
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data


MW−18I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 72
Number of samples = 8
Max Conc. = 126
Mean Conc. = 88.8
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

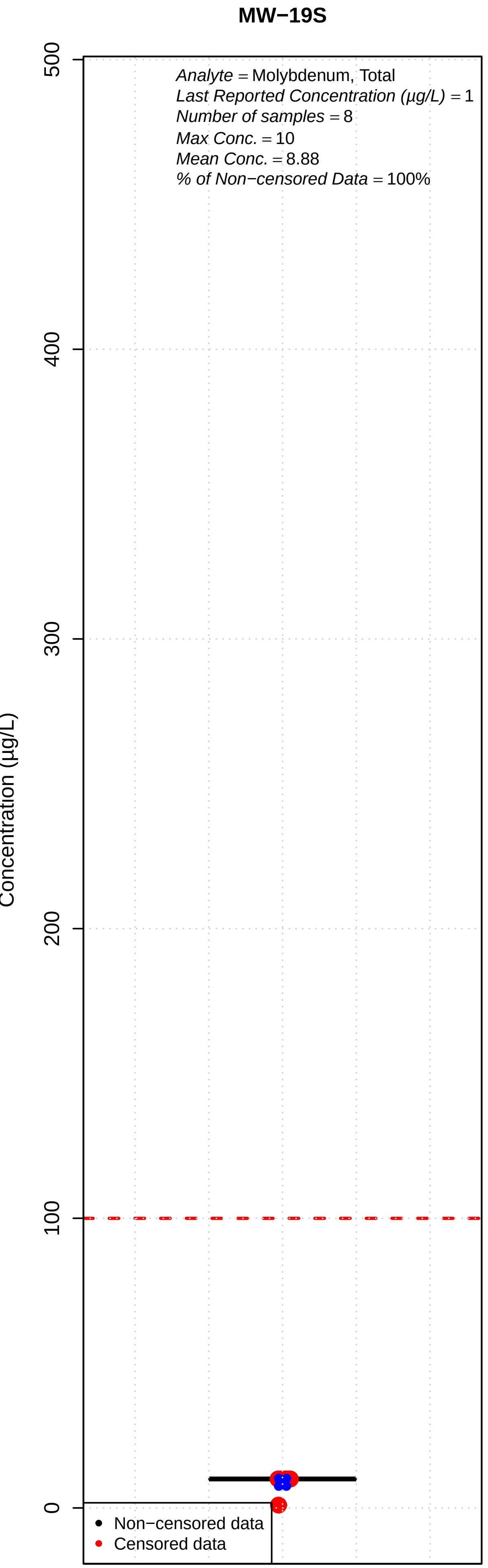

MW−18I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 72
Least−Squares Regression Calculations
R^2 = 0.00574
Slope (µg/L per year) = −2.08
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 1.5929
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date



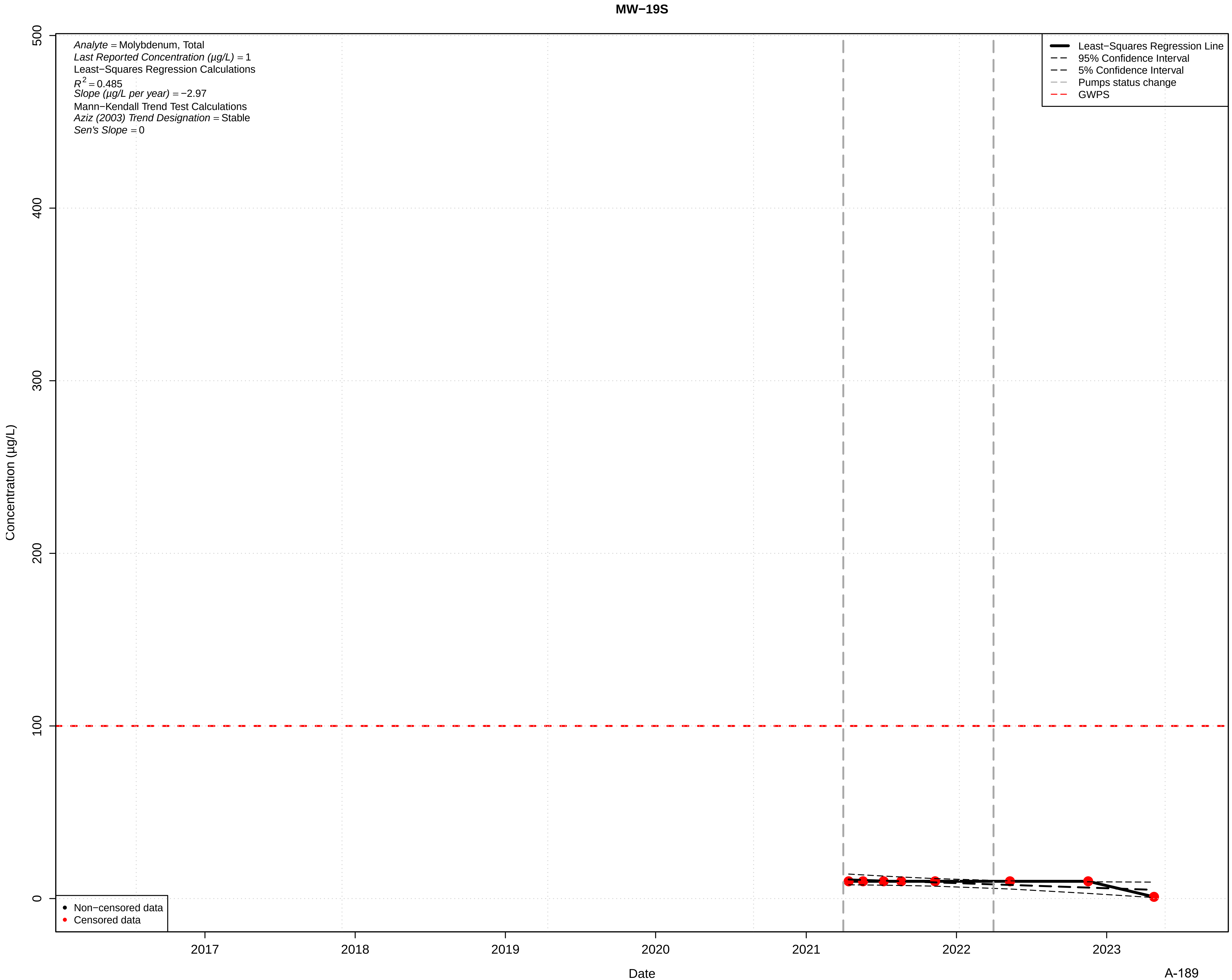
MW−18D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 147
Number of samples = 8
Max Conc. = 173
Mean Conc. = 143
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data



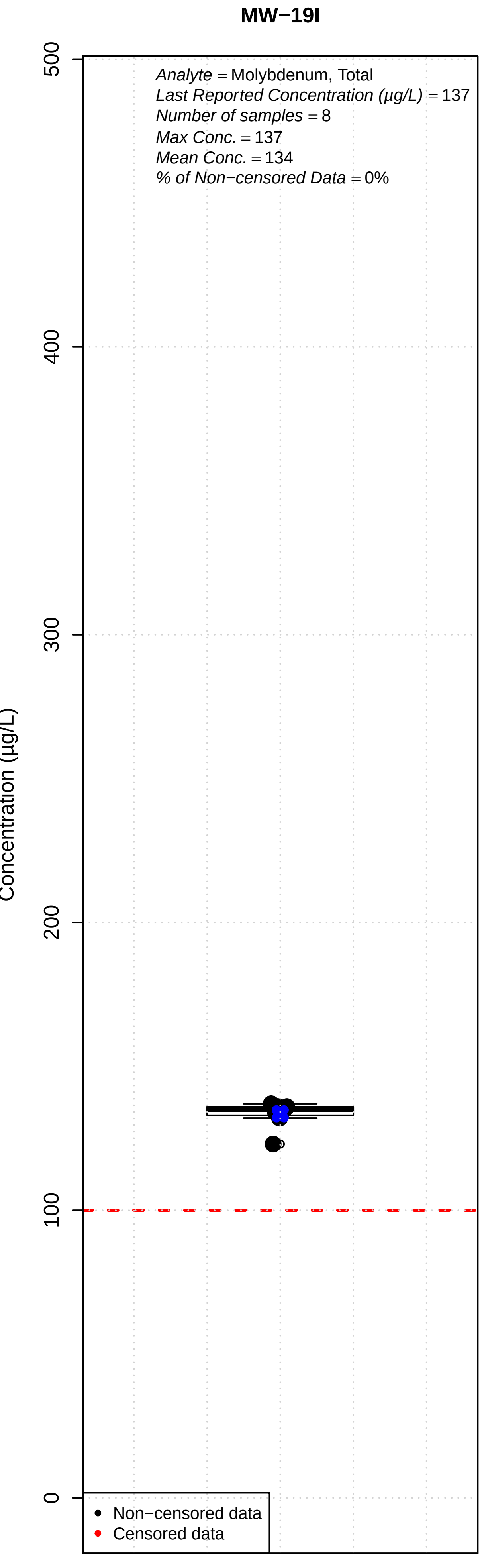
MW−18D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 147
Least−Squares Regression Calculations
R^2 = 0.295
Slope (µg/L per year) = 16.1
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 6.7262
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

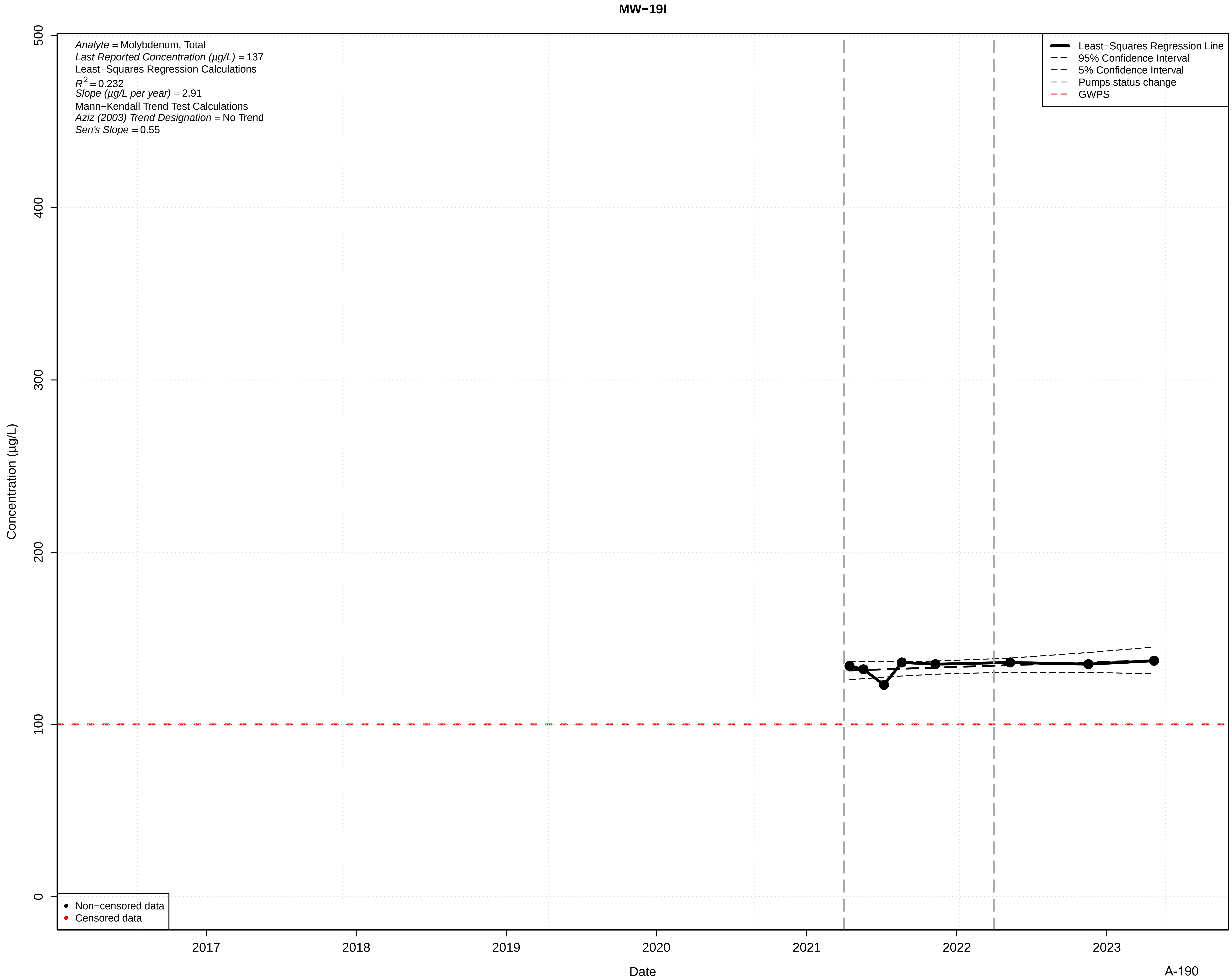


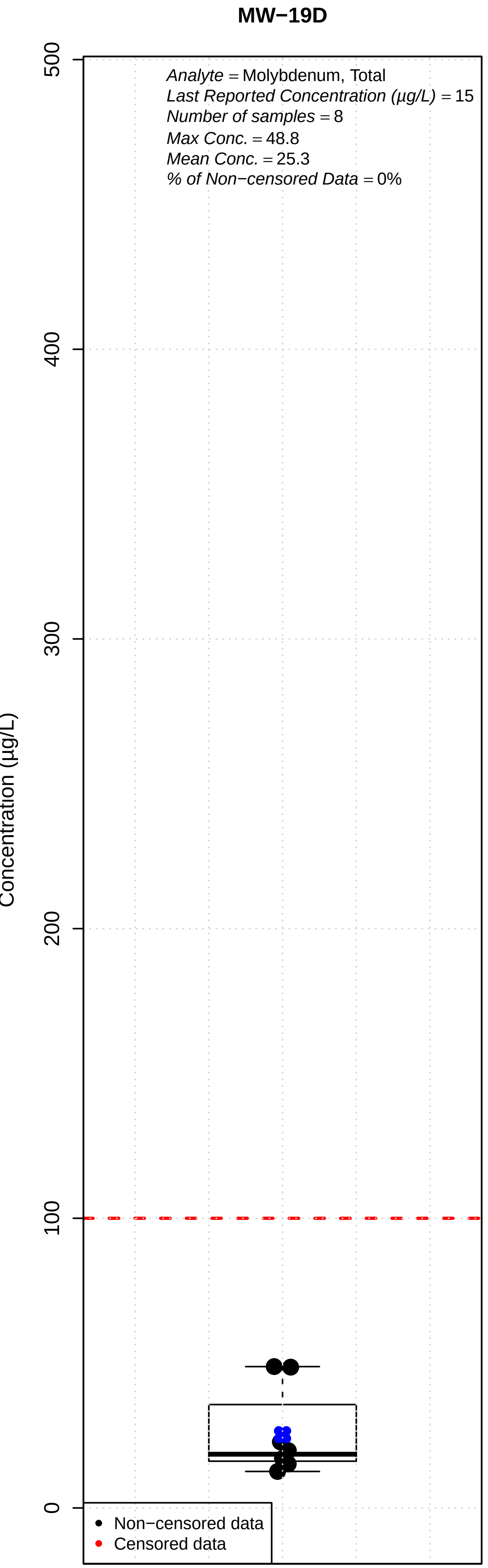
MW−19S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 8
Max Conc. = 10
Mean Conc. = 8.88
% of Non−censored Data = 100%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data



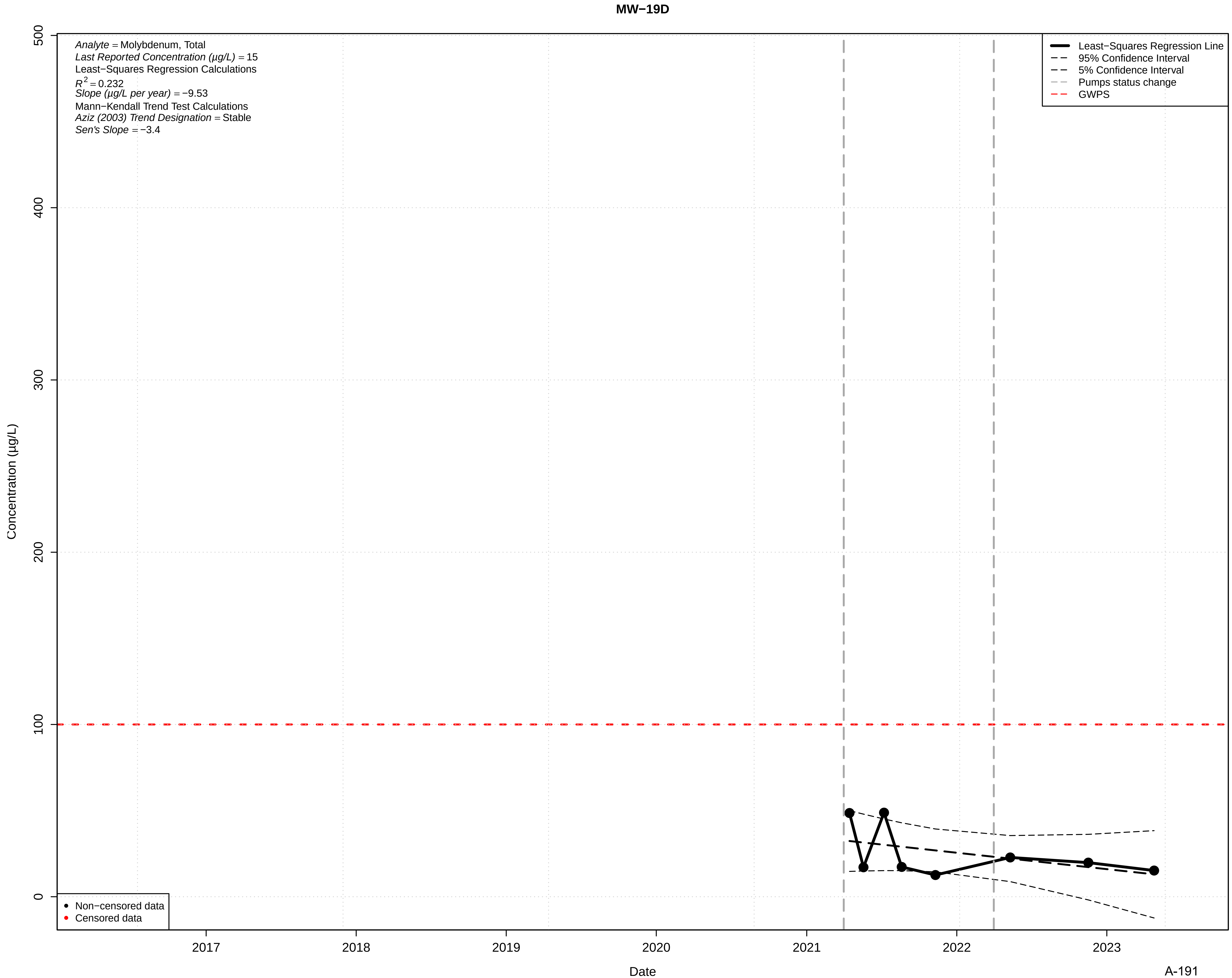
MW−19S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.485
Slope (µg/L per year) = −2.97
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data


MW−19I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 137
Number of samples = 8
Max Conc. = 137
Mean Conc. = 134
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

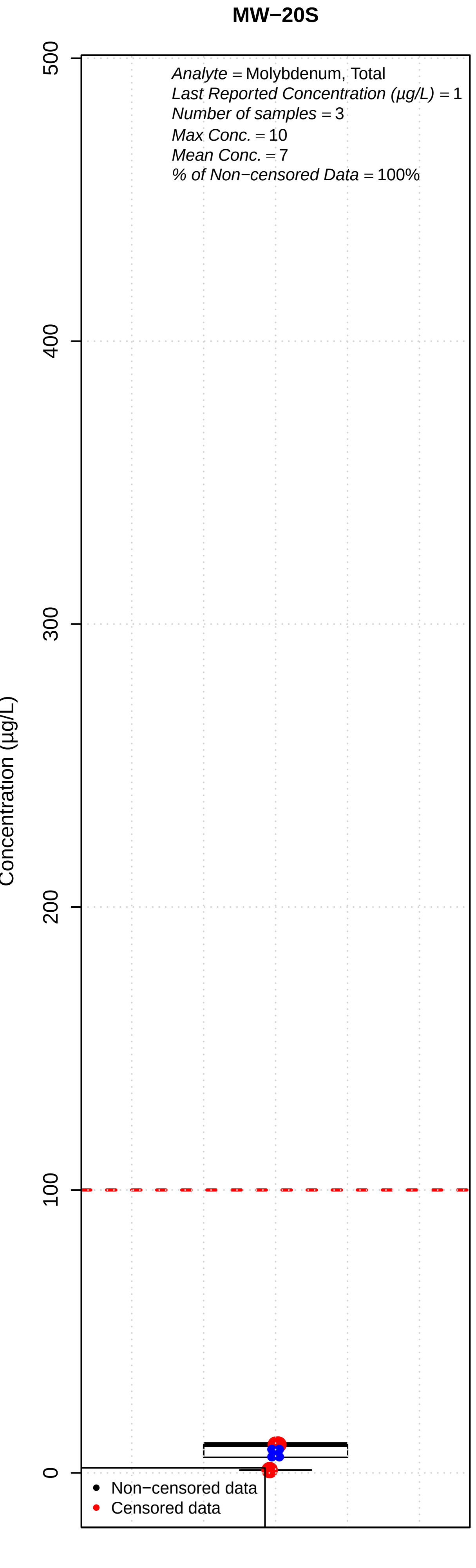

MW−19I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 137
Least−Squares Regression Calculations
R2 = 0.232
Slope (µg/L per year) = 2.91
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 0.55
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data

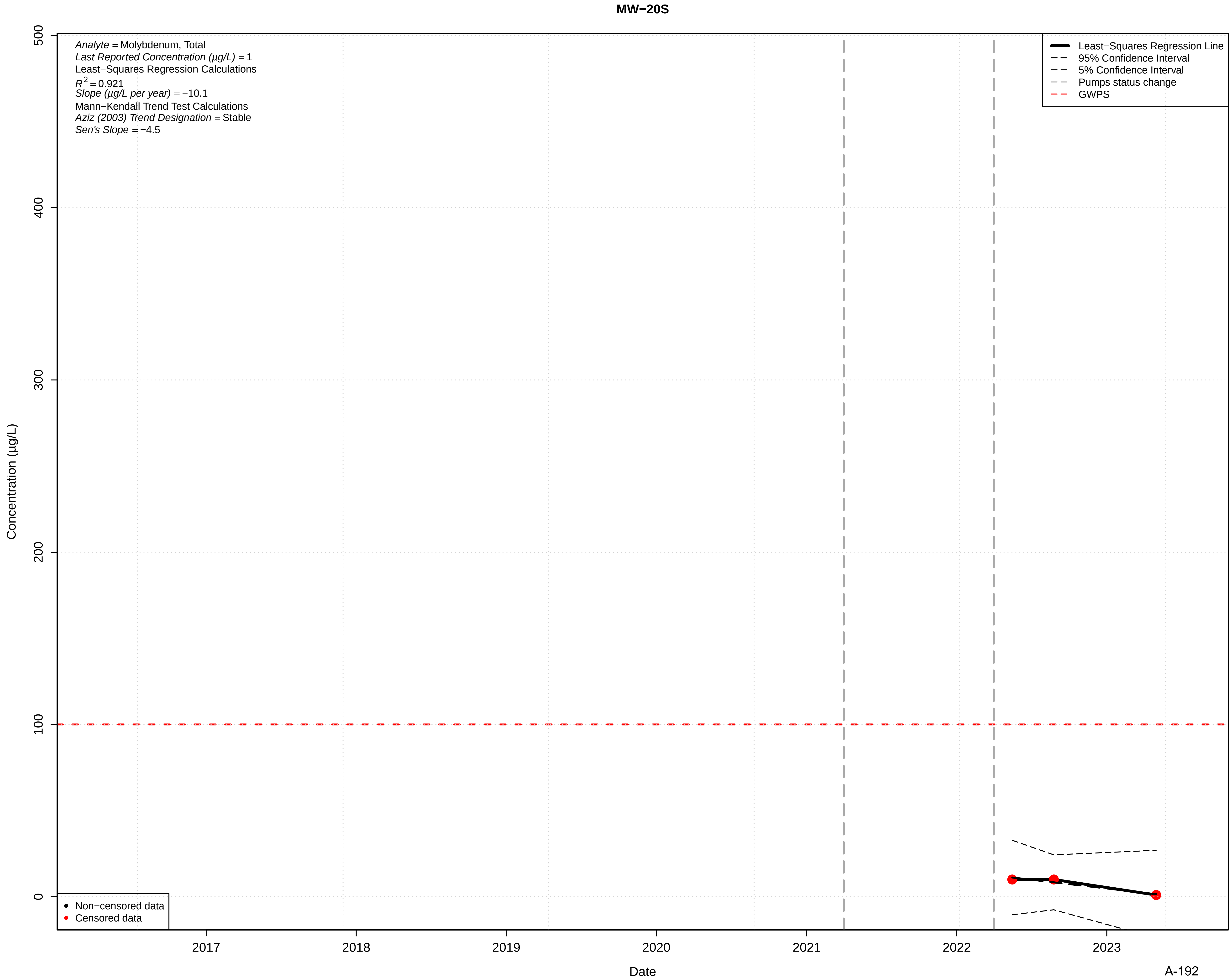


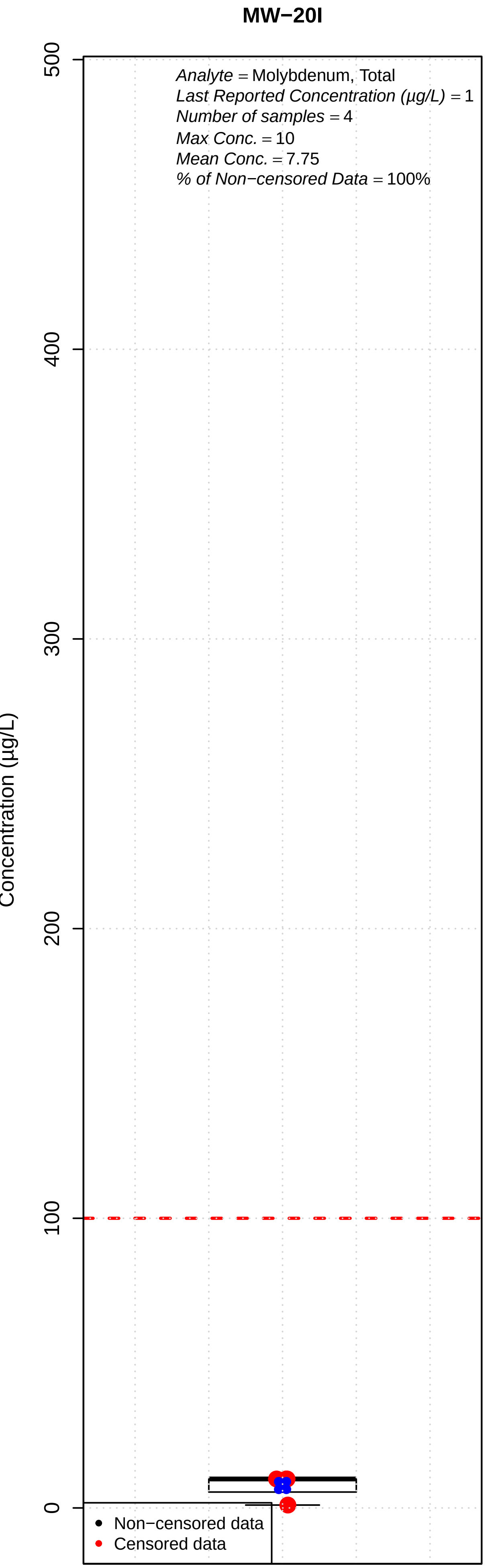
MW−19D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 15
Number of samples = 8
Max Conc. = 48.8
Mean Conc. = 25.3
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

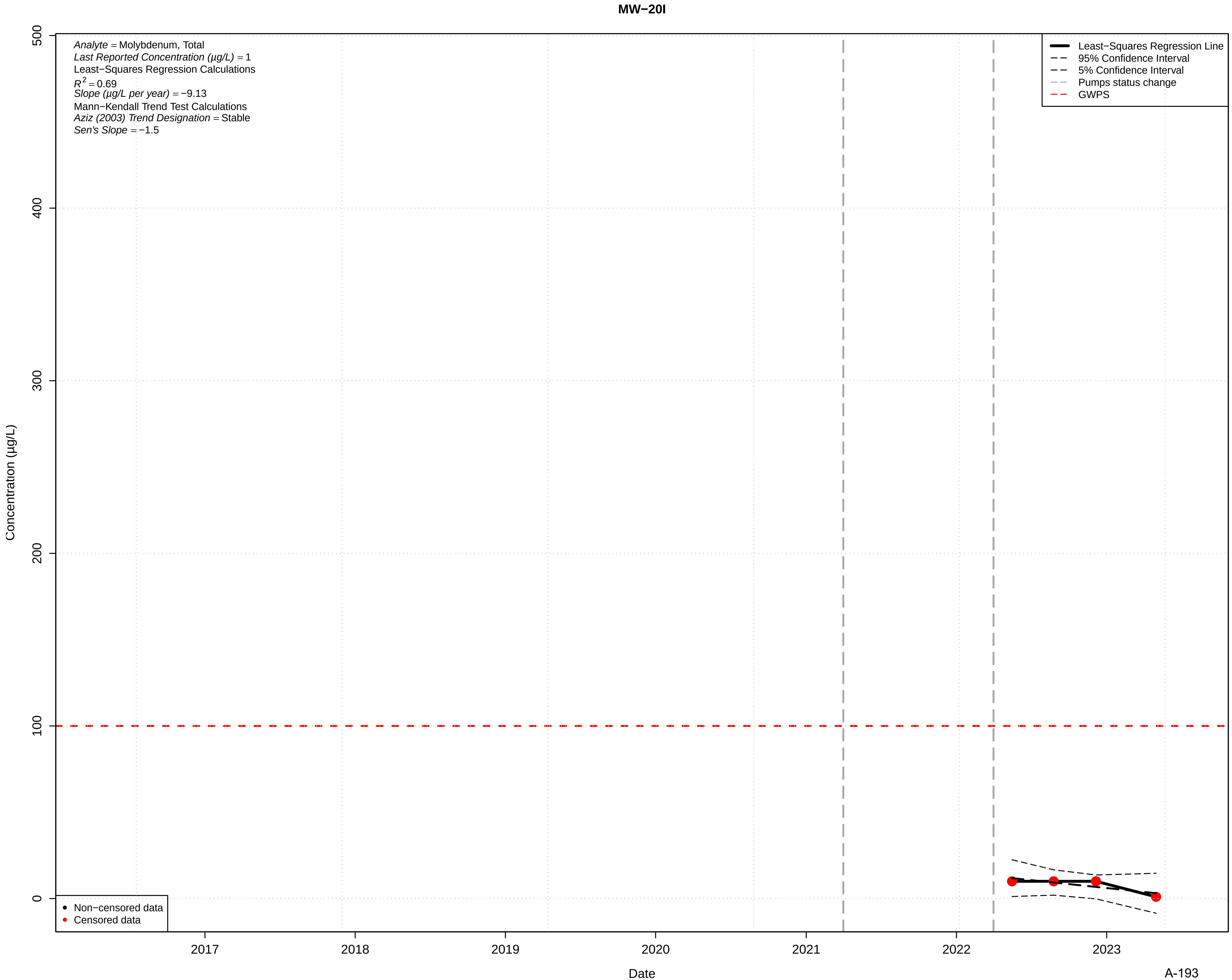


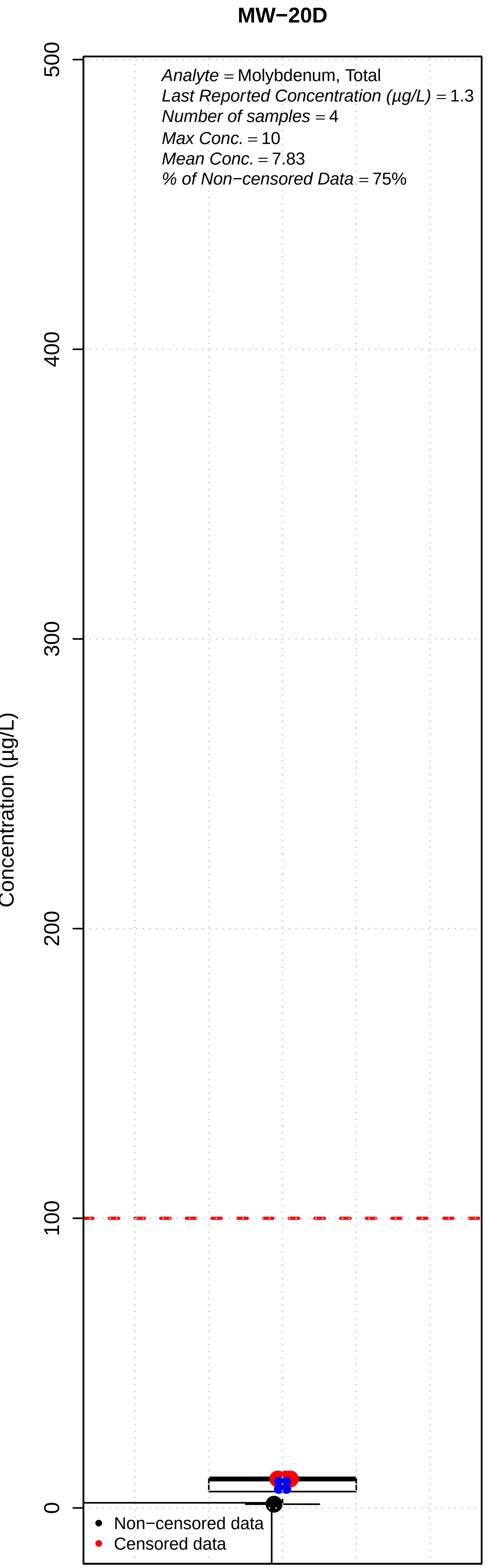
MW−19D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 15
Least−Squares Regression Calculations
R^2 = 0.232
Slope (µg/L per year) = −9.53
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −3.4
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−20S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 3
Max Conc. = 10
Mean Conc. = 7
% of Non−censored Data = 100%
Concentration (µg/L)
Non−censored data
Censored data

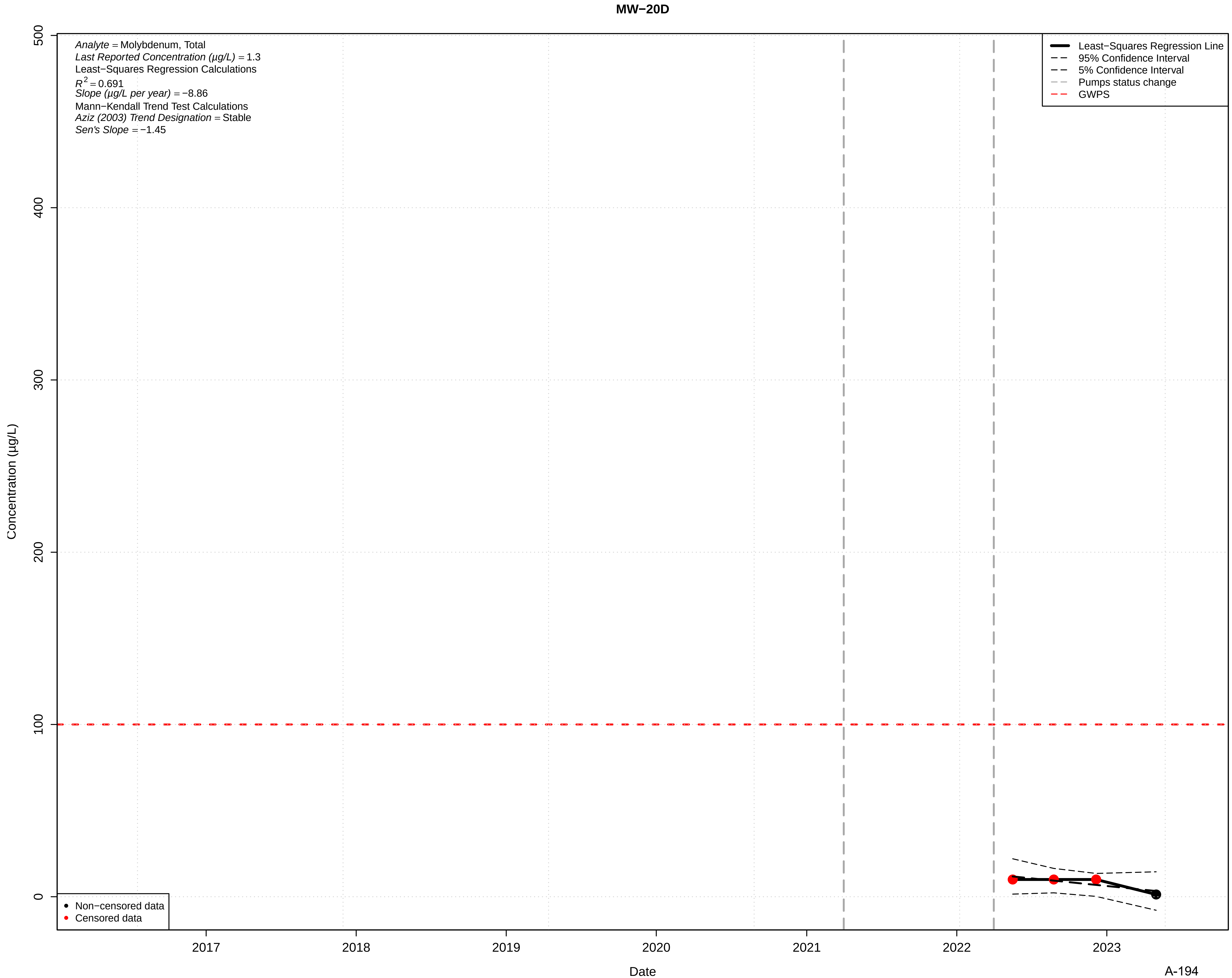

MW−20S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.921
Slope (µg/L per year) = −10.1
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −4.5
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Non−censored data
Censored data
Date


MW−20I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 4
Max Conc. = 10
Mean Conc. = 7.75
% of Non−censored Data = 100%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

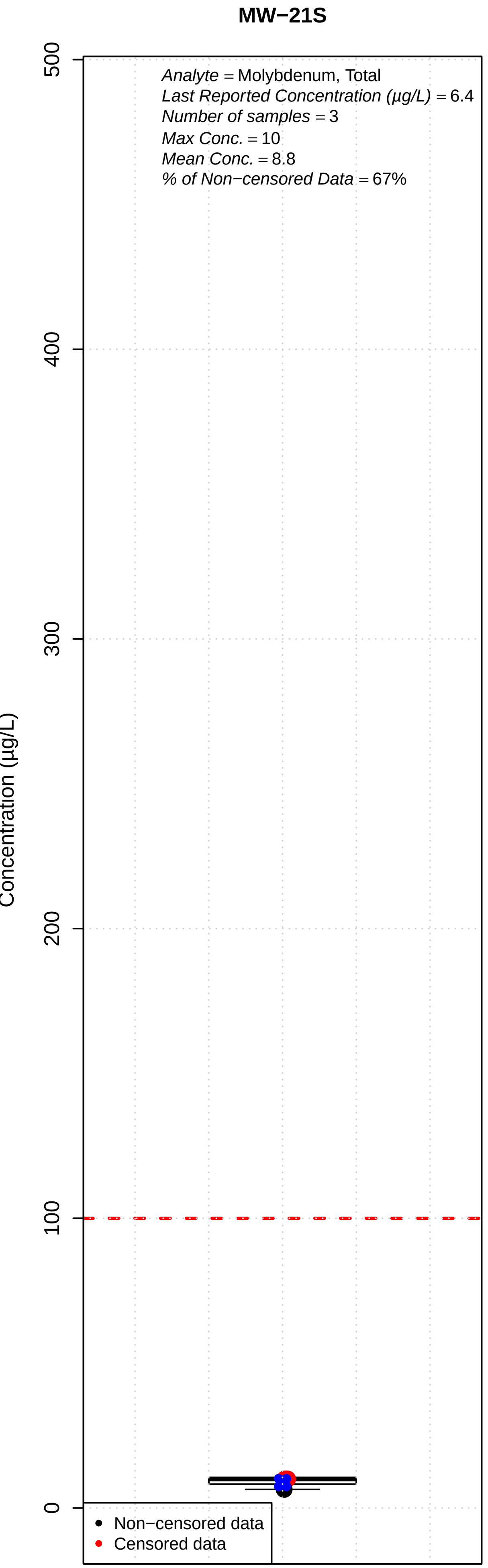

MW−20I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R^2 = 0.69
Slope (µg/L per year) = −9.13
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −1.5
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

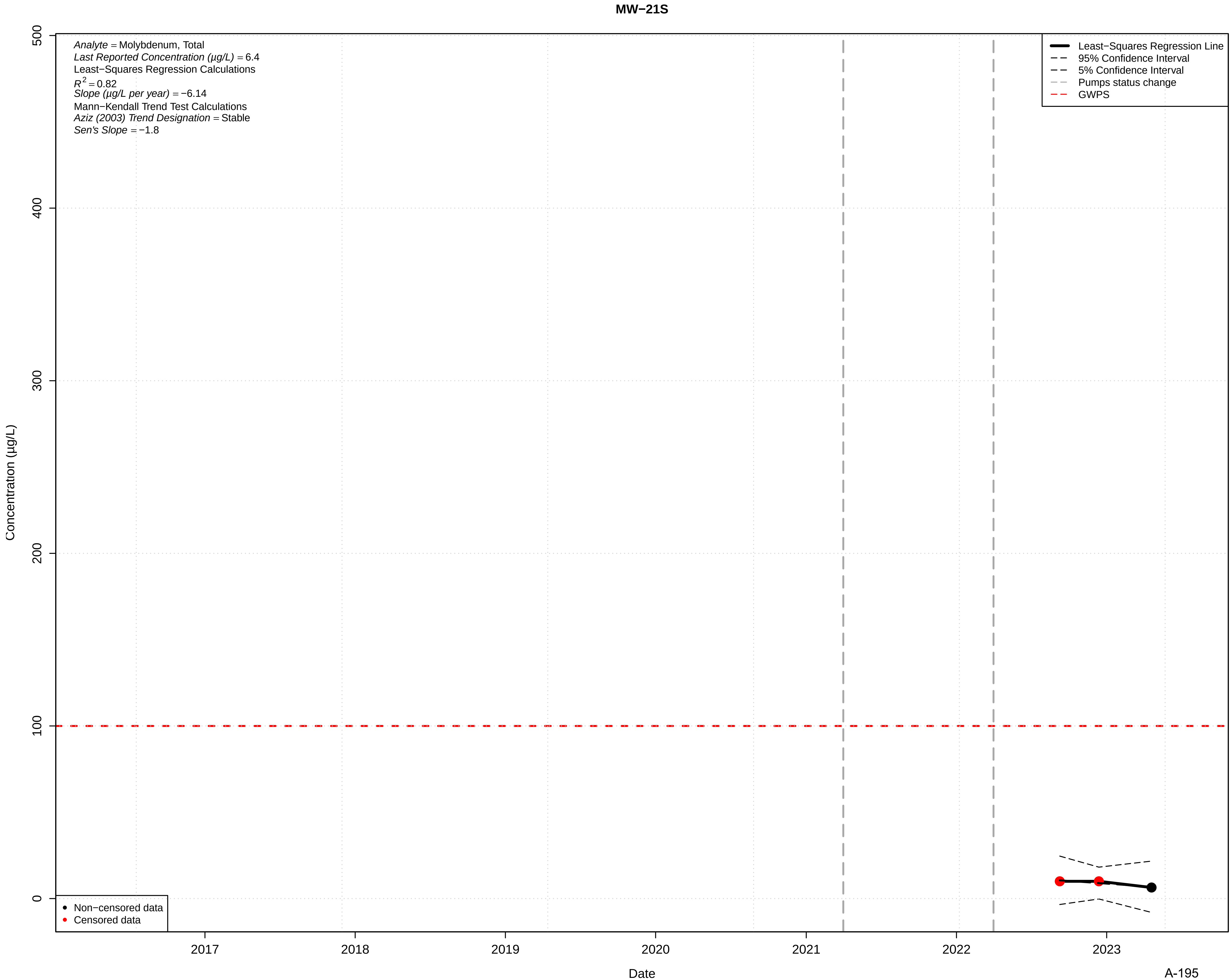


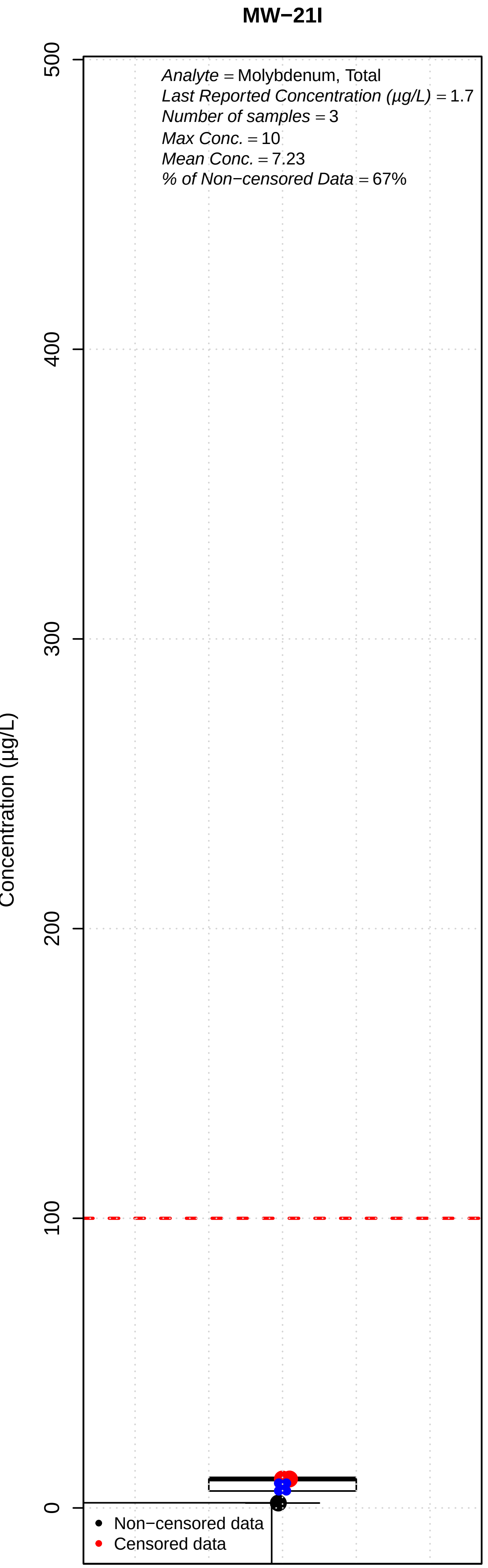
MW−20D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1.3
Number of samples = 4
Max Conc. = 10
Mean Conc. = 7.83
% of Non−censored Data = 75%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data



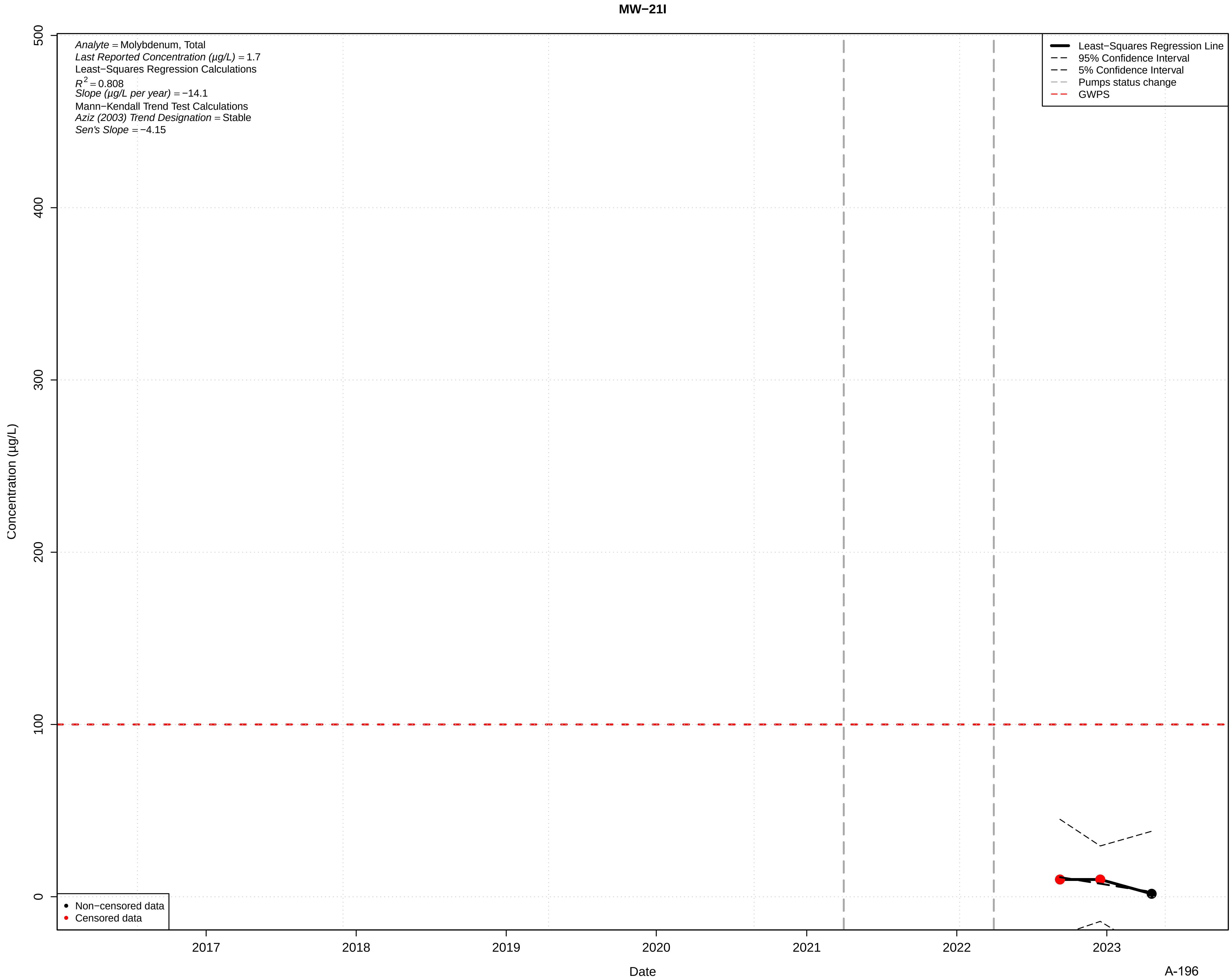
MW−20D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1.3
Least−Squares Regression Calculations
R^2 = 0.691
Slope (µg/L per year) = −8.86
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −1.45
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−21S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 6.4
Number of samples = 3
Max Conc. = 10
Mean Conc. = 8.8
% of Non−censored Data = 67%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

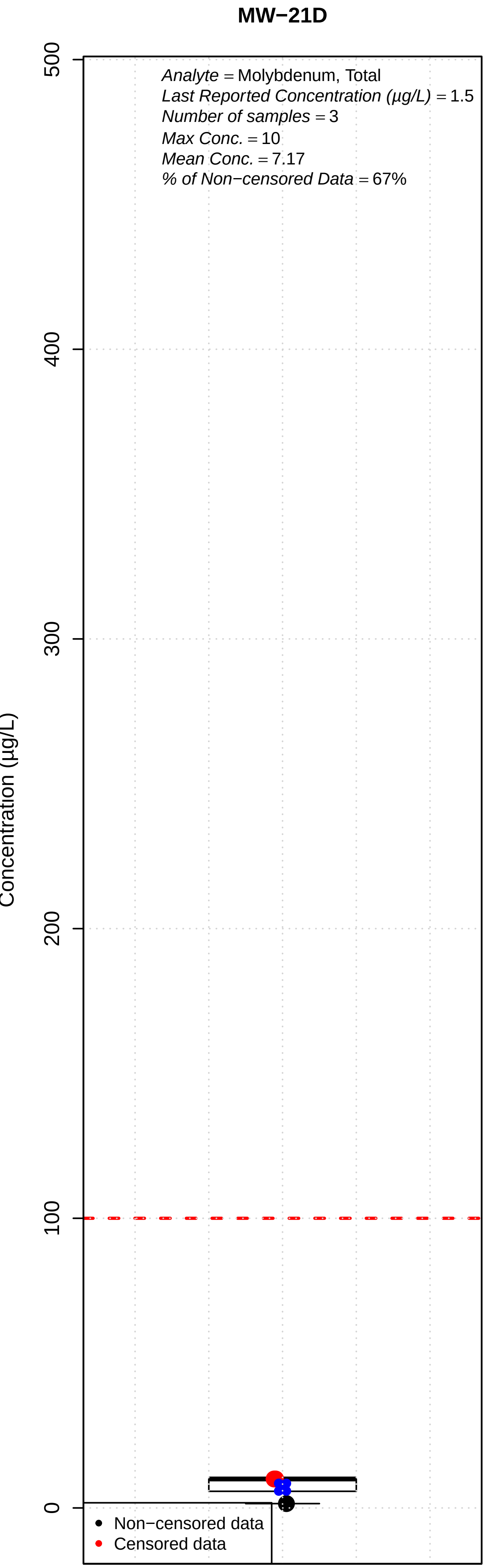

MW−21S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 6.4
Least−Squares Regression Calculations
R^2 = 0.82
Slope (µg/L per year) = −6.14
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −1.8
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data



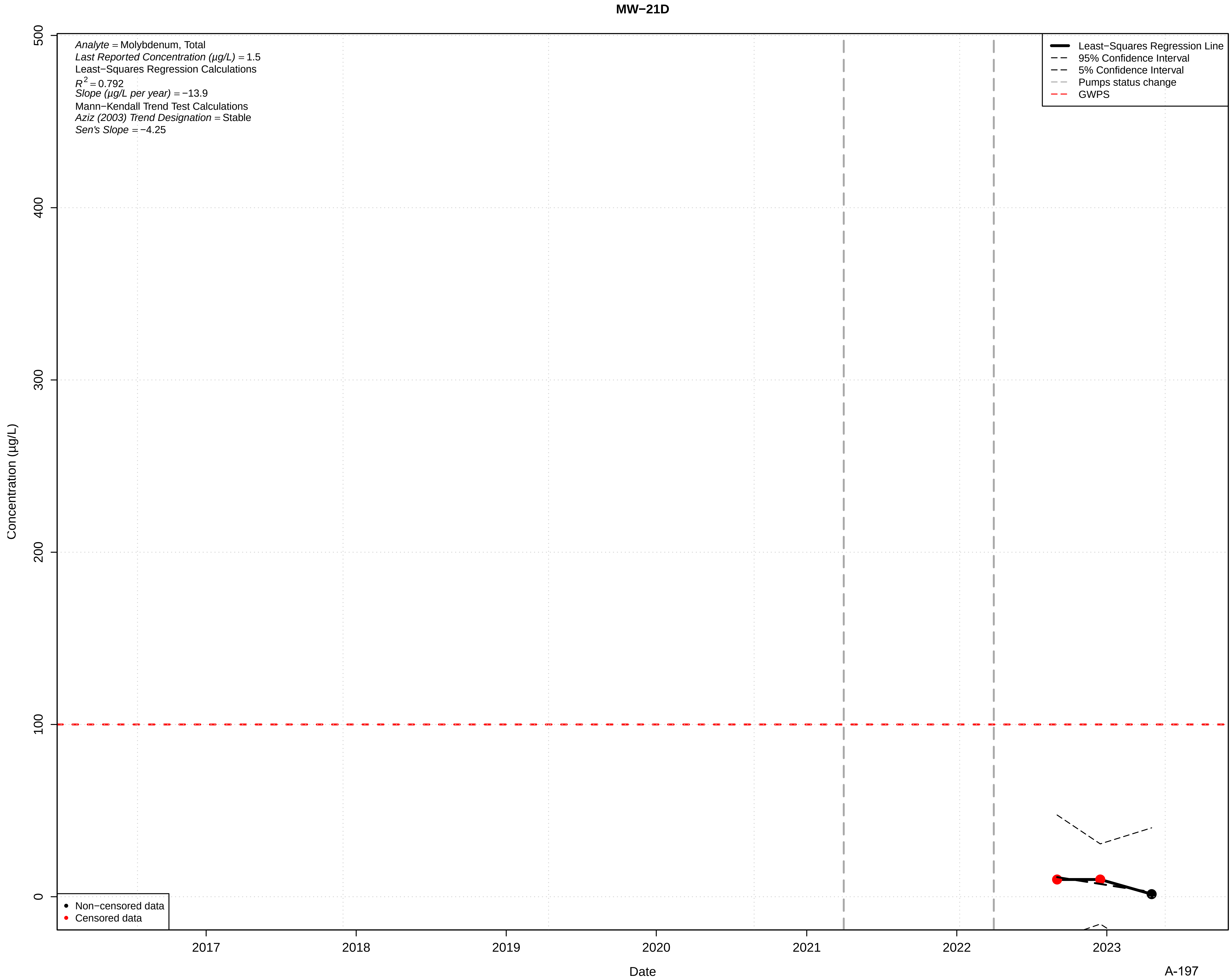
MW−21I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1.7
Number of samples = 3
Max Conc. = 10
Mean Conc. = 7.23
% of Non−censored Data = 67%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data



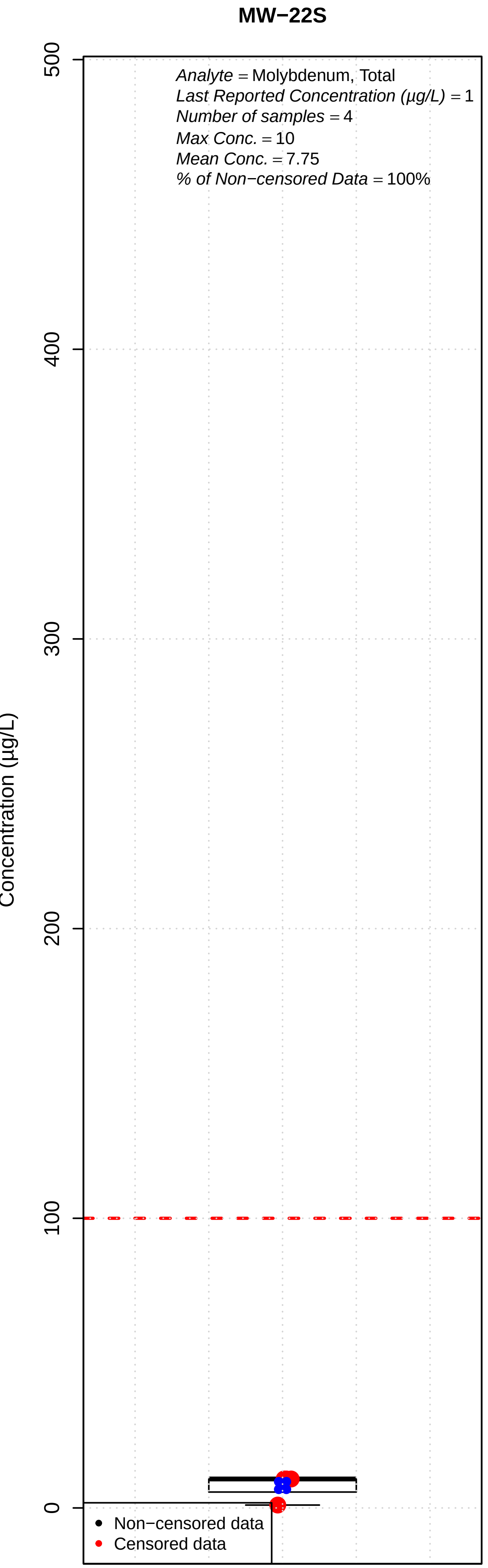
MW−21I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1.7
Least−Squares Regression Calculations
R2 = 0.808
Slope (µg/L per year) = −14.1
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −4.15
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date



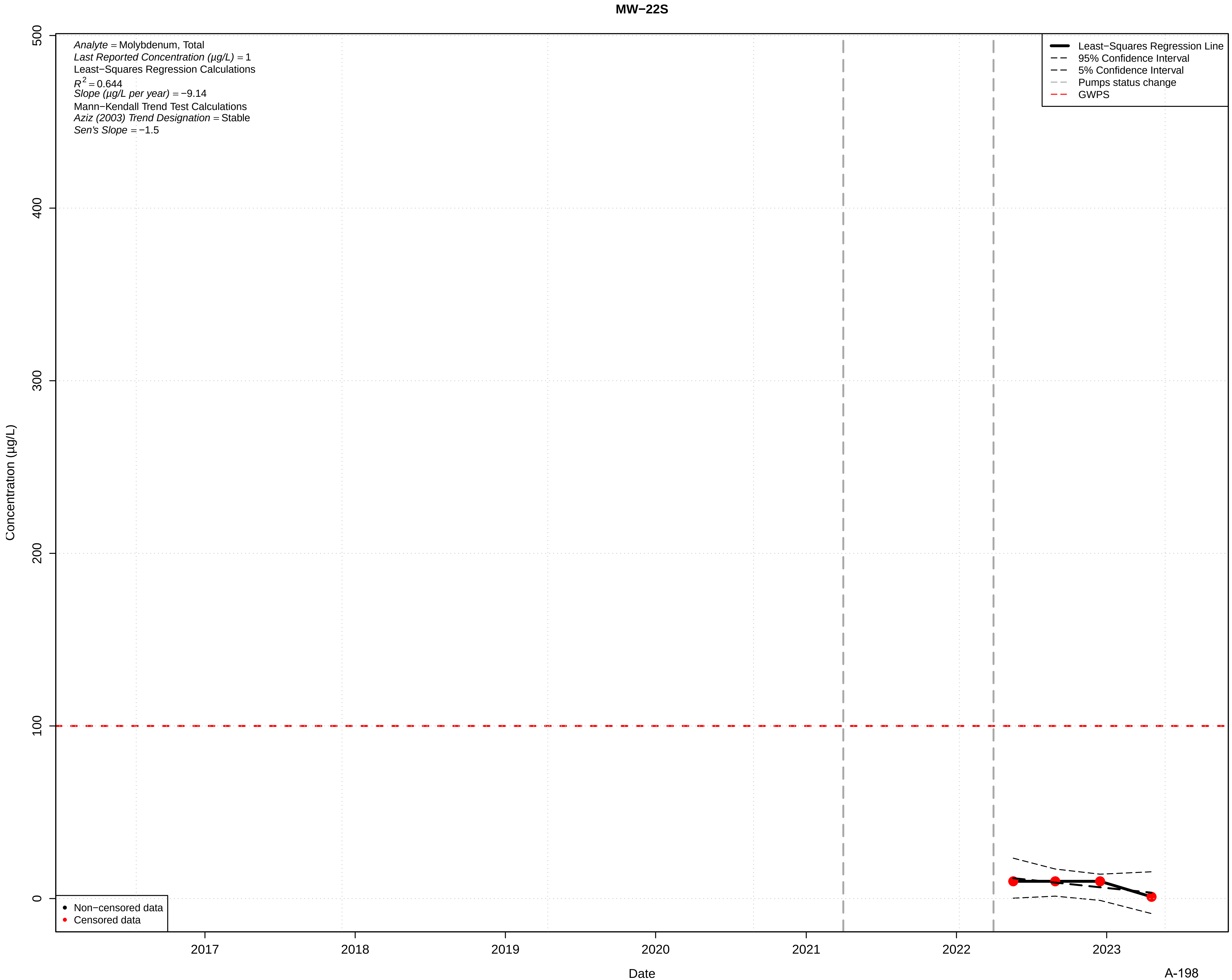
MW−21D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1.5
Number of samples = 3
Max Conc. = 10
Mean Conc. = 7.17
% of Non−censored Data = 67%
Concentration (µg/L)
Non−censored data
Censored data



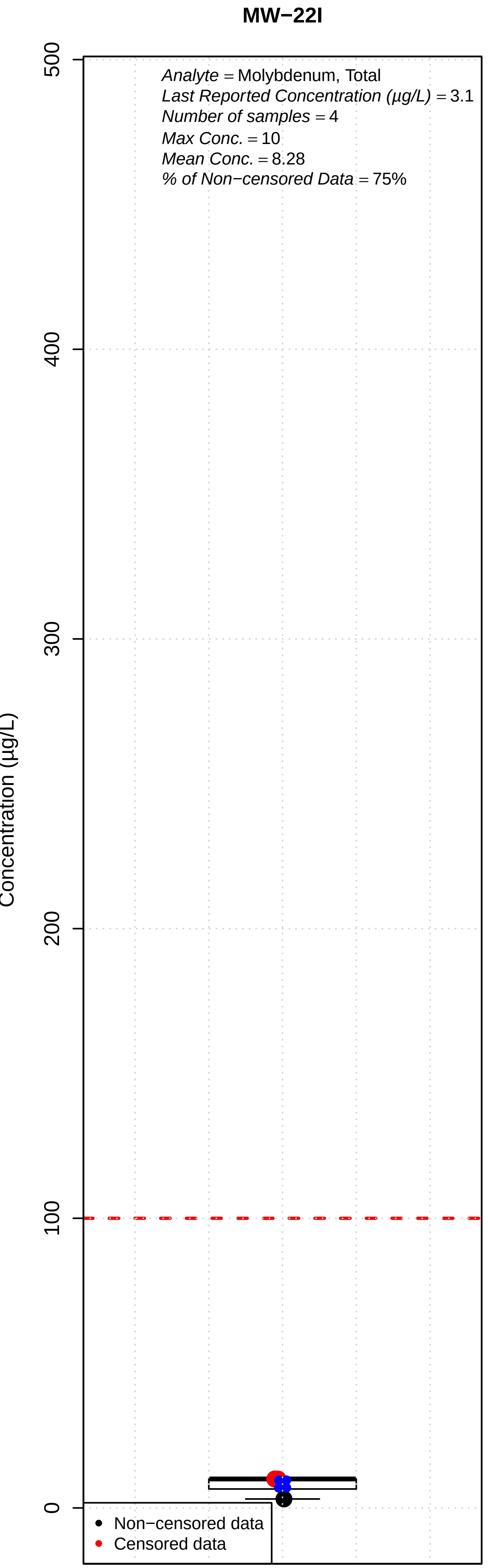
MW−21D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1.5
Least−Squares Regression Calculations
R^2 = 0.792
Slope (µg/L per year) = −13.9
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −4.25
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Non−censored data
Censored data
Date



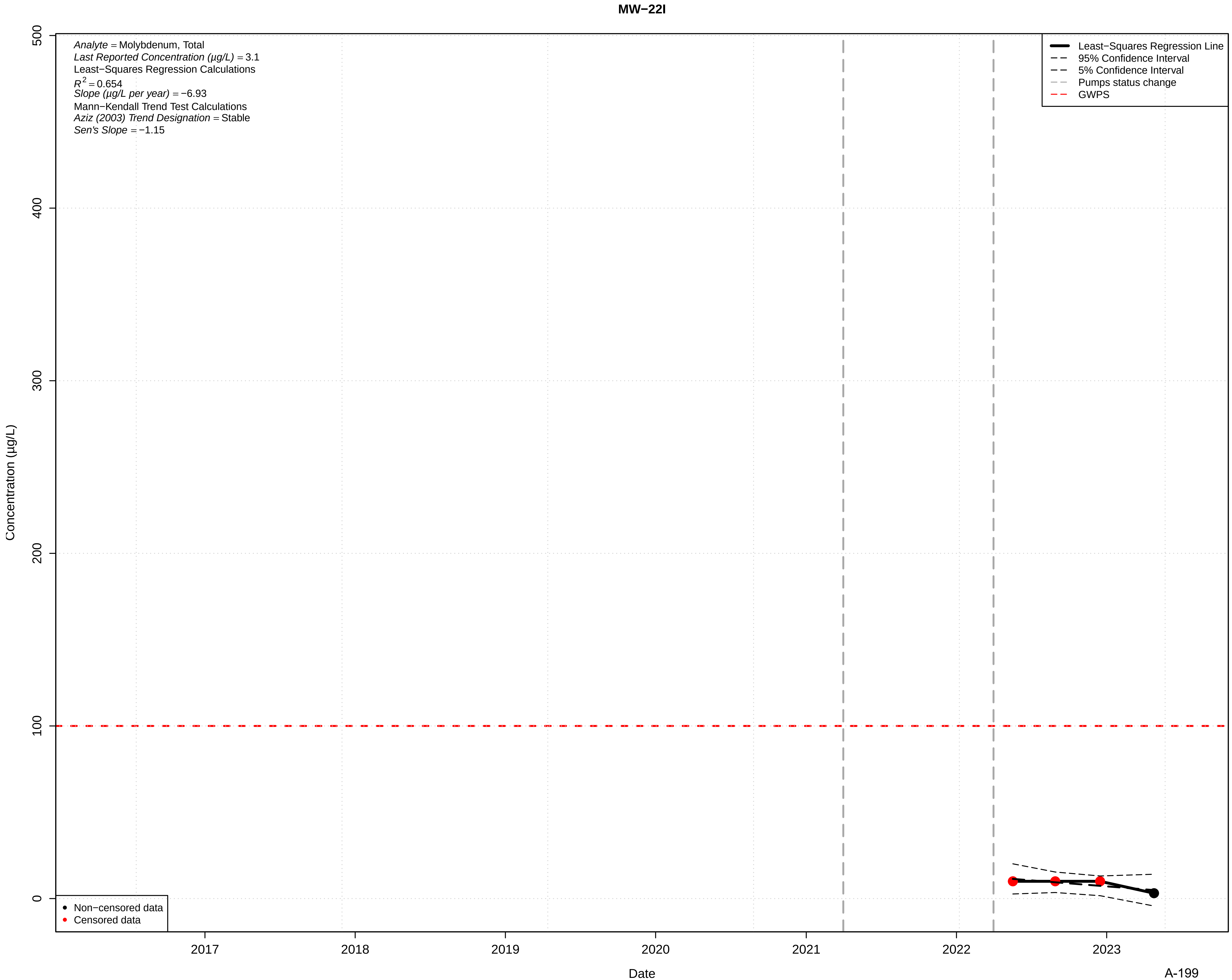
MW−22S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 4
Max Conc. = 10
Mean Conc. = 7.75
% of Non−censored Data = 100%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data



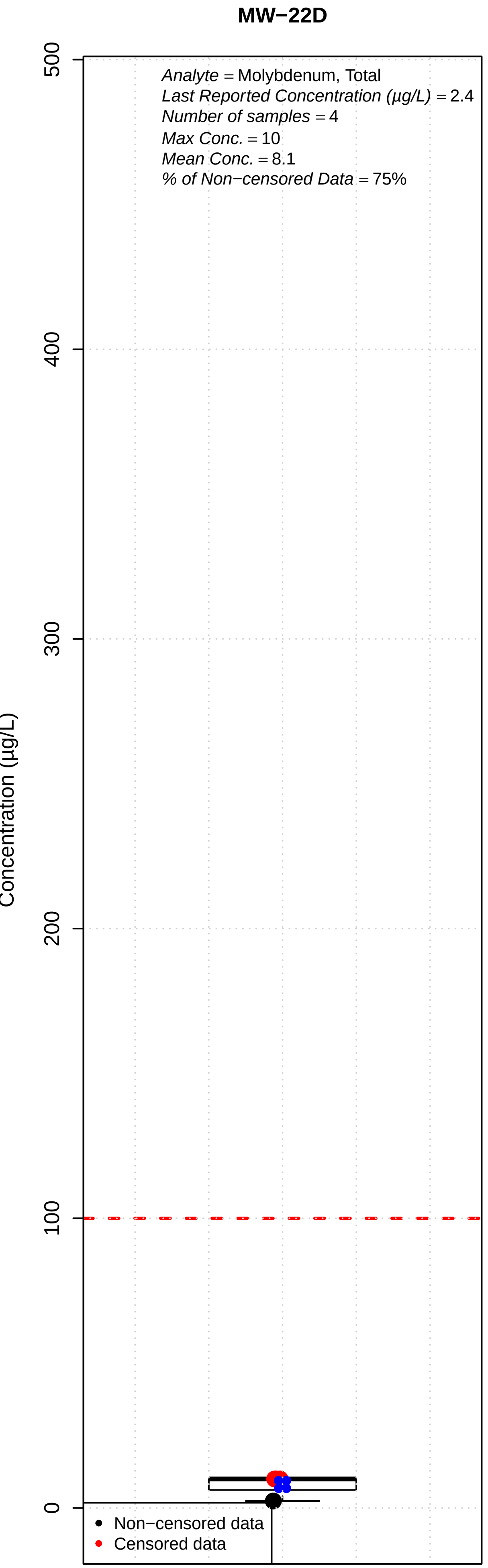
MW−22S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R² = 0.644
Slope (µg/L per year) = −9.14
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −1.5
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date



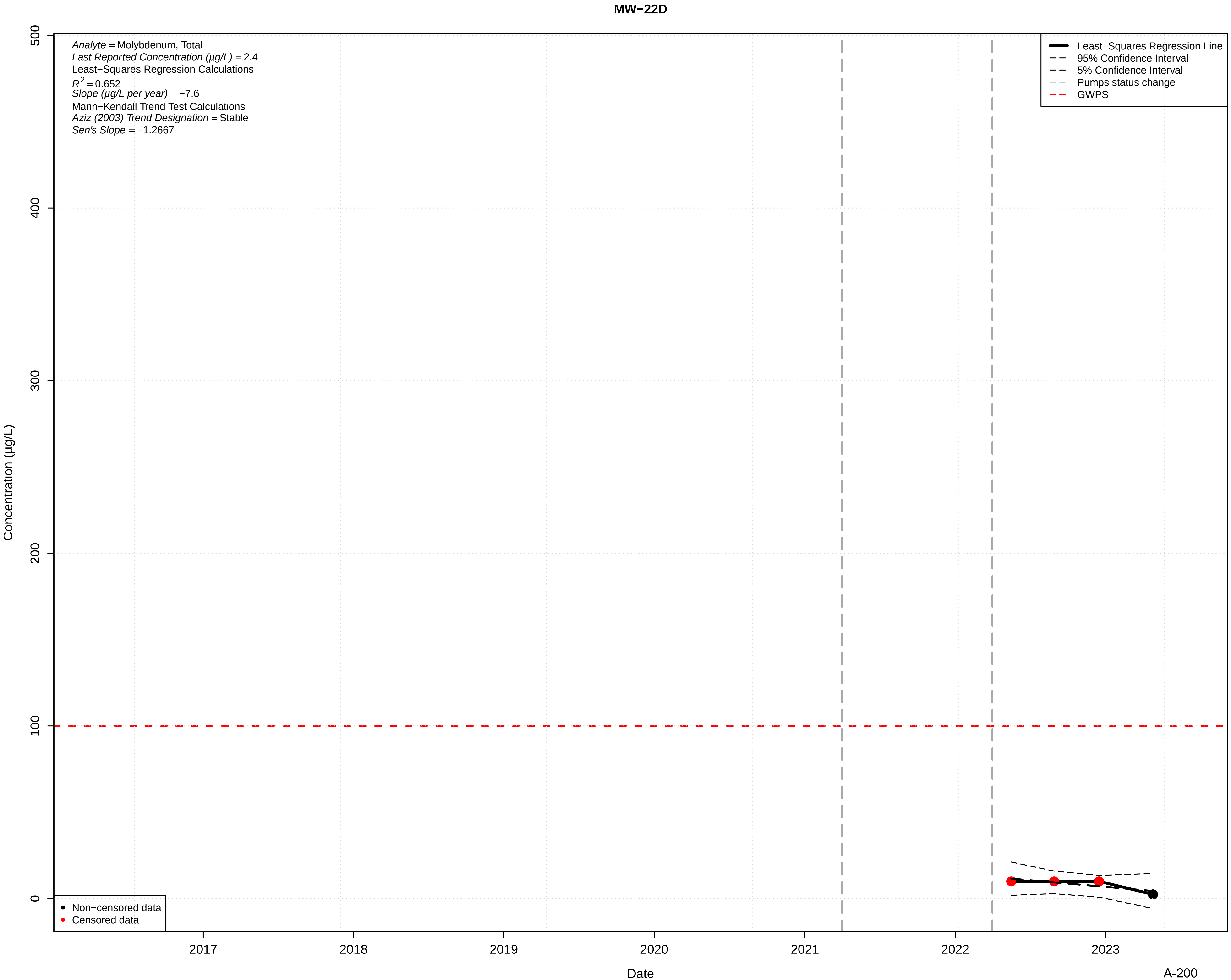
MW−22I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 3.1
Number of samples = 4
Max Conc. = 10
Mean Conc. = 8.28
% of Non−censored Data = 75%
Concentration (µg/L)
Non−censored data
Censored data



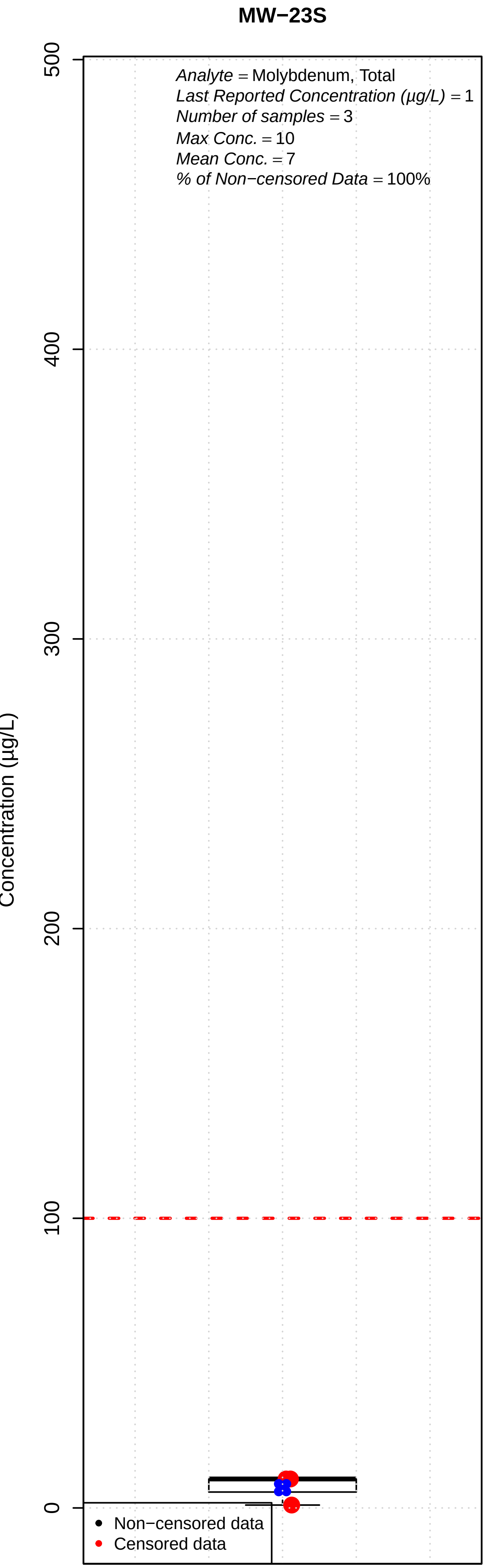
MW−22I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 3.1
Least−Squares Regression Calculations
R^2 = 0.654
Slope (µg/L per year) = −6.93
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −1.15
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Non−censored data
Censored data
Date

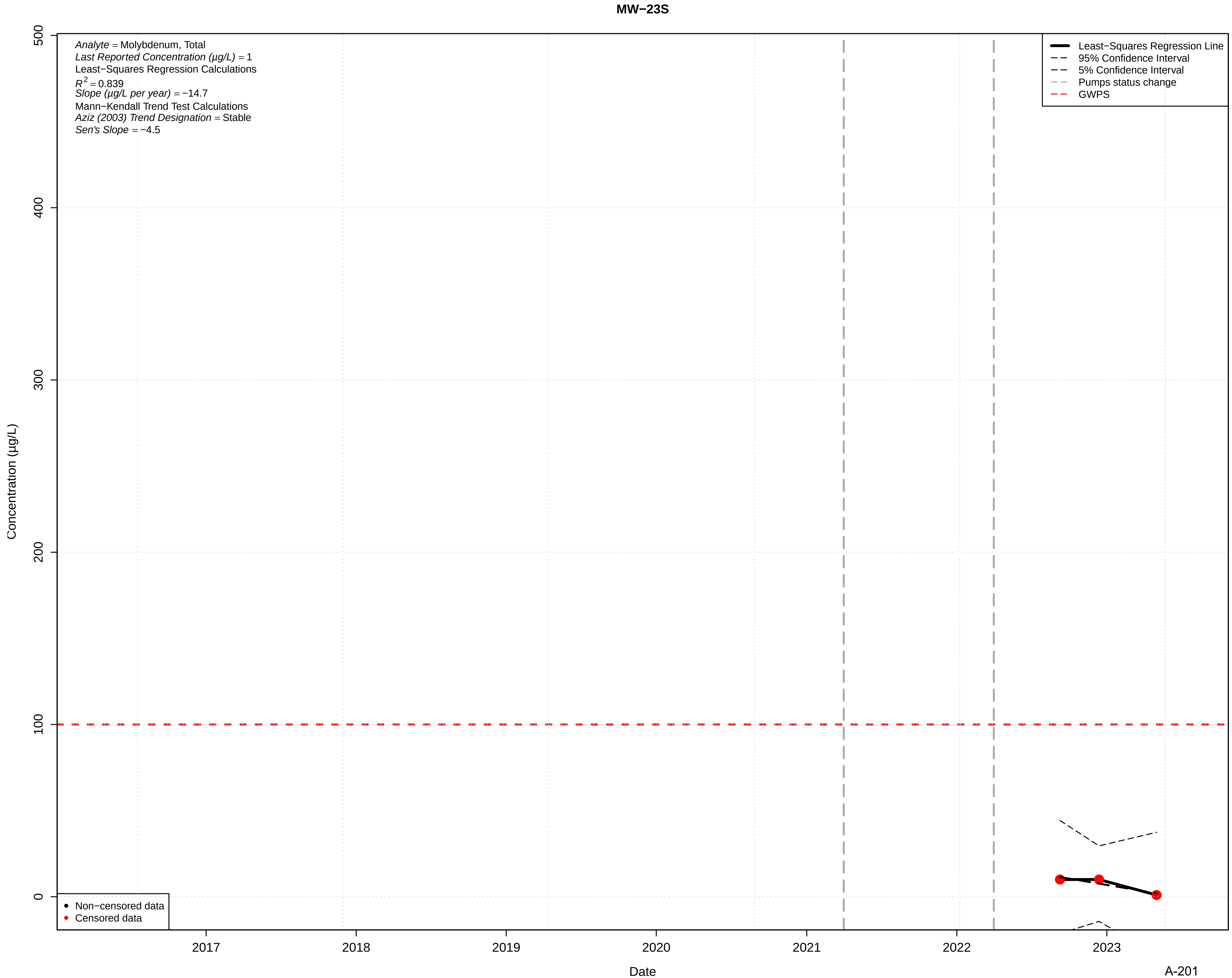


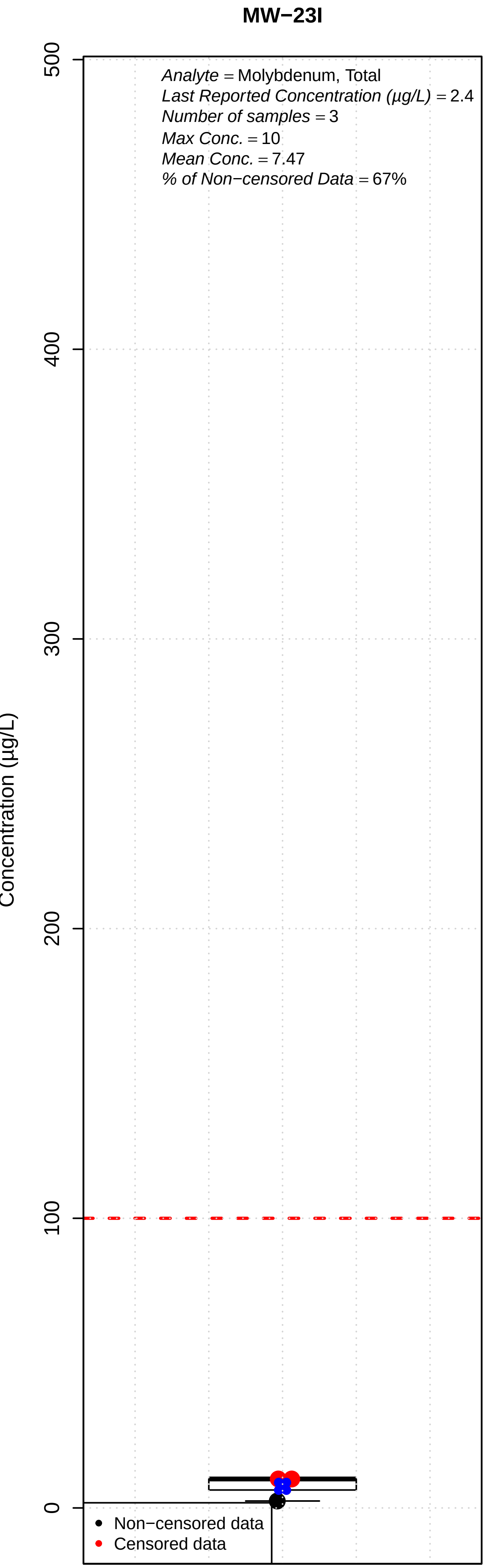
MW−22D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 2.4
Number of samples = 4
Max Conc. = 10
Mean Conc. = 8.1
% of Non−censored Data = 75%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data



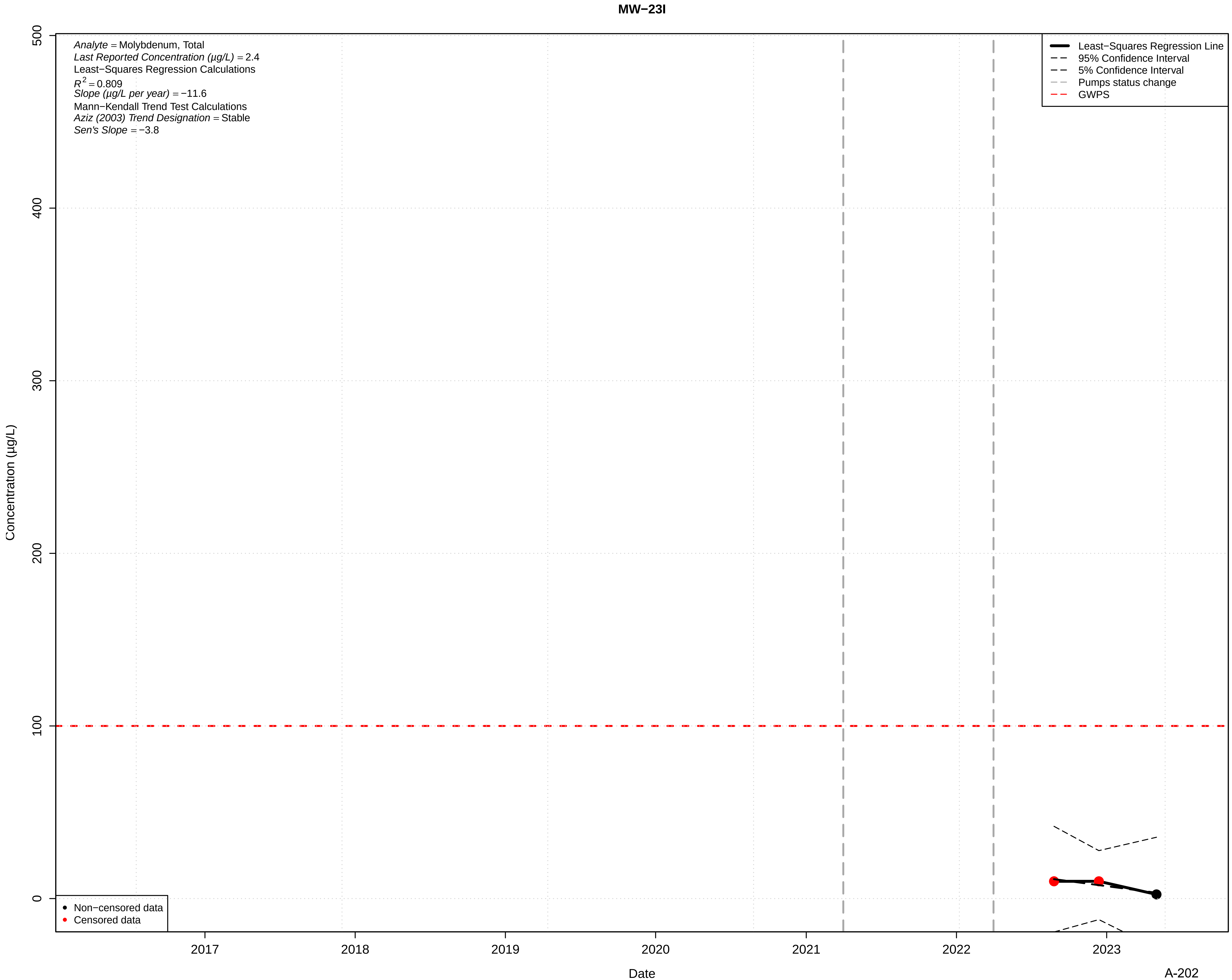
MW−22D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 2.4
Least−Squares Regression Calculations
R^2 = 0.652
Slope (µg/L per year) = −7.6
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −1.2667
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−23S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1
Number of samples = 3
Max Conc. = 10
Mean Conc. = 7
% of Non−censored Data = 100%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

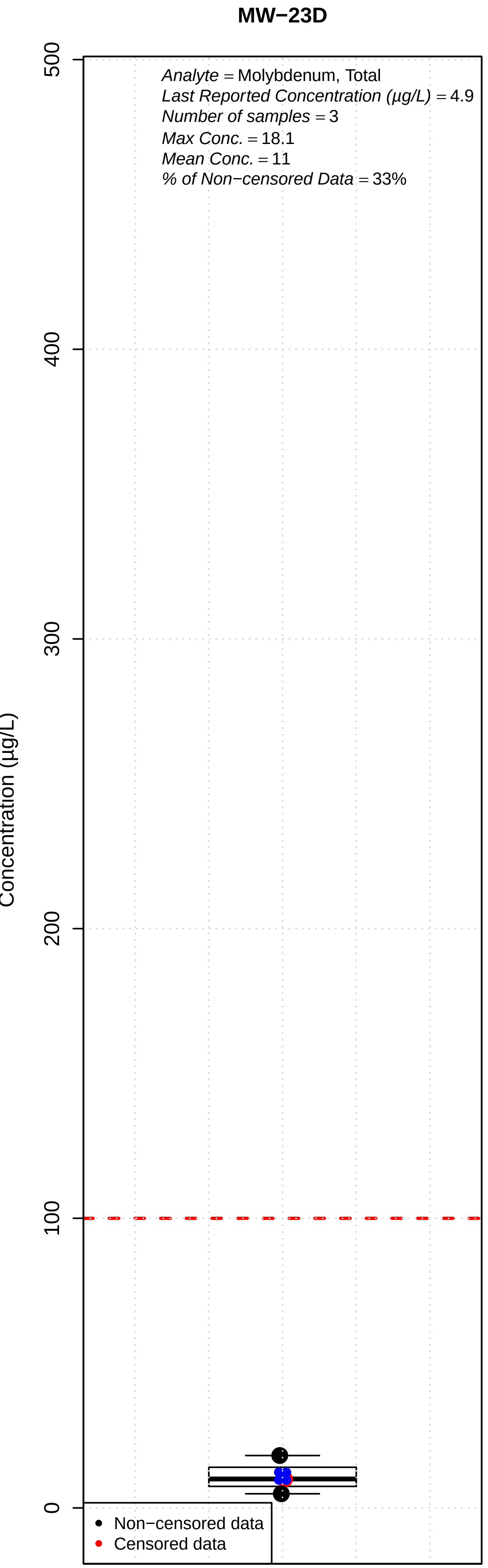

MW−23S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 1
Least−Squares Regression Calculations
R2 = 0.839
Slope (µg/L per year) = −14.7
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −4.5
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data

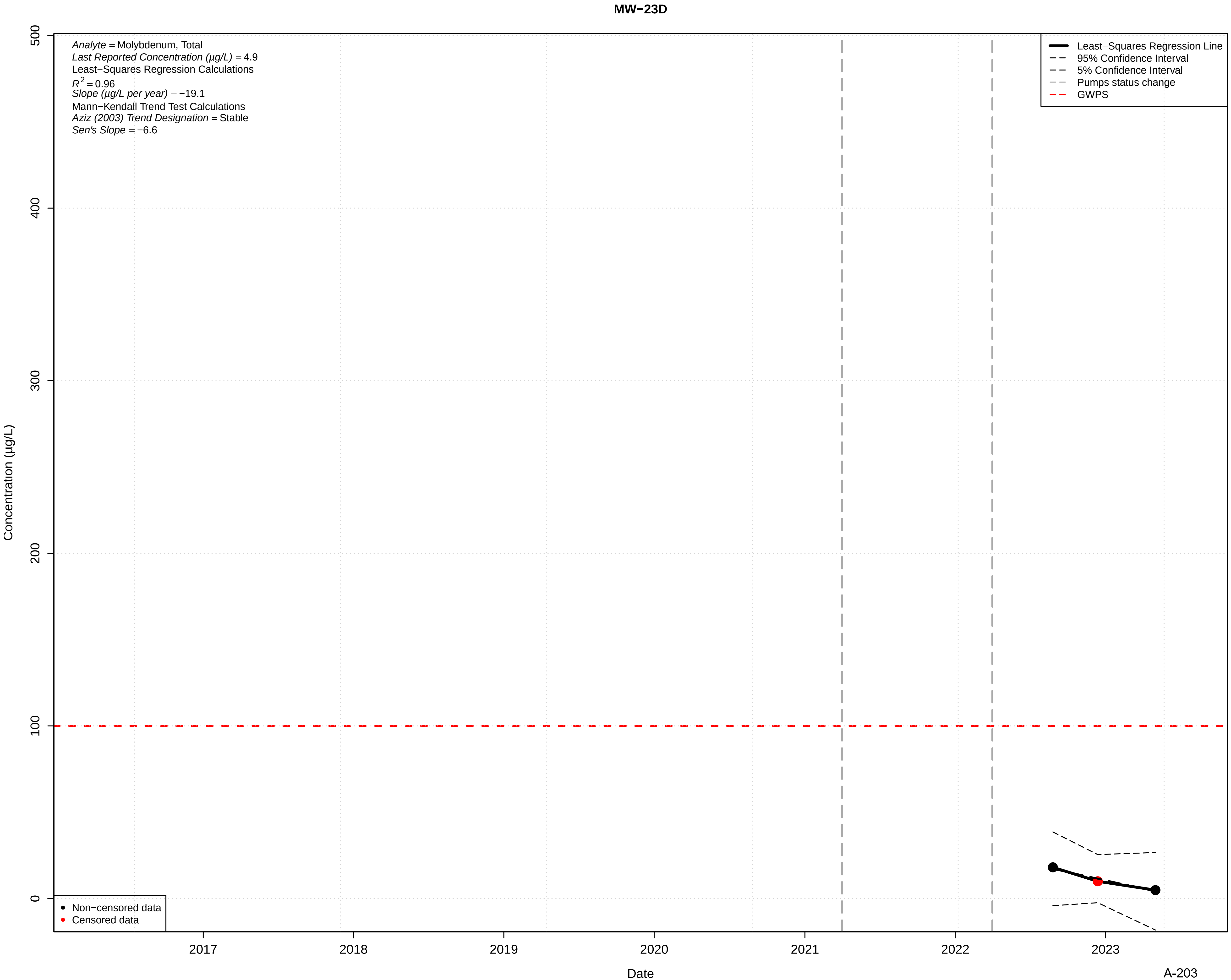


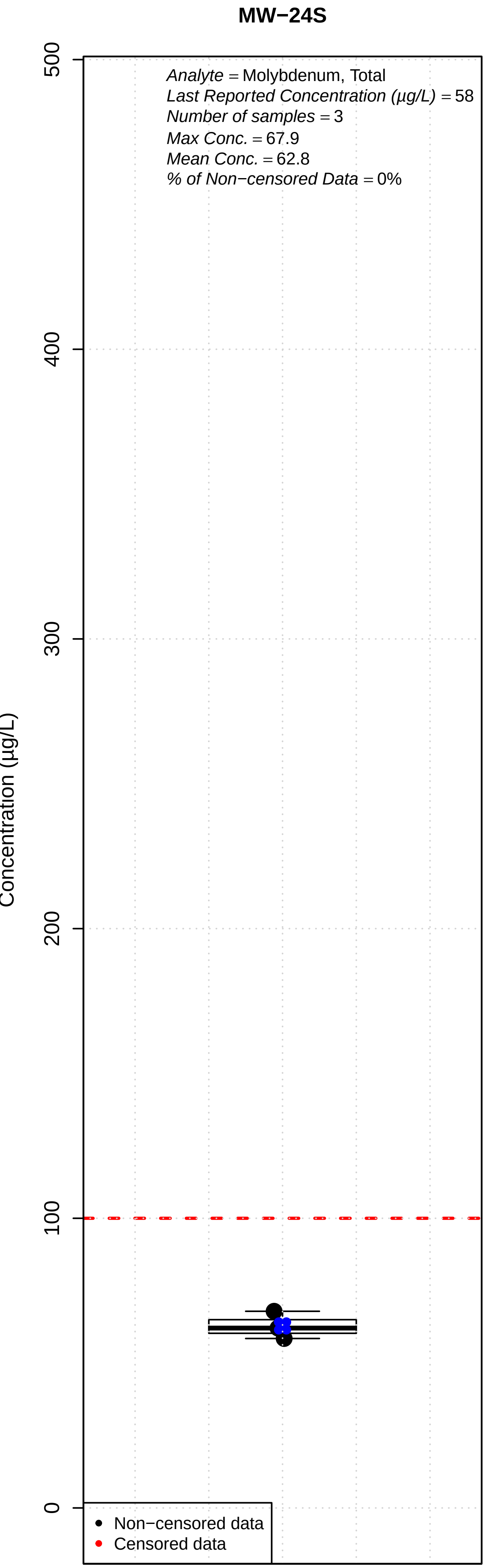
MW−23I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 2.4
Number of samples = 3
Max Conc. = 10
Mean Conc. = 7.47
% of Non−censored Data = 67%
Concentration (µg/L)
Non−censored data
Censored data

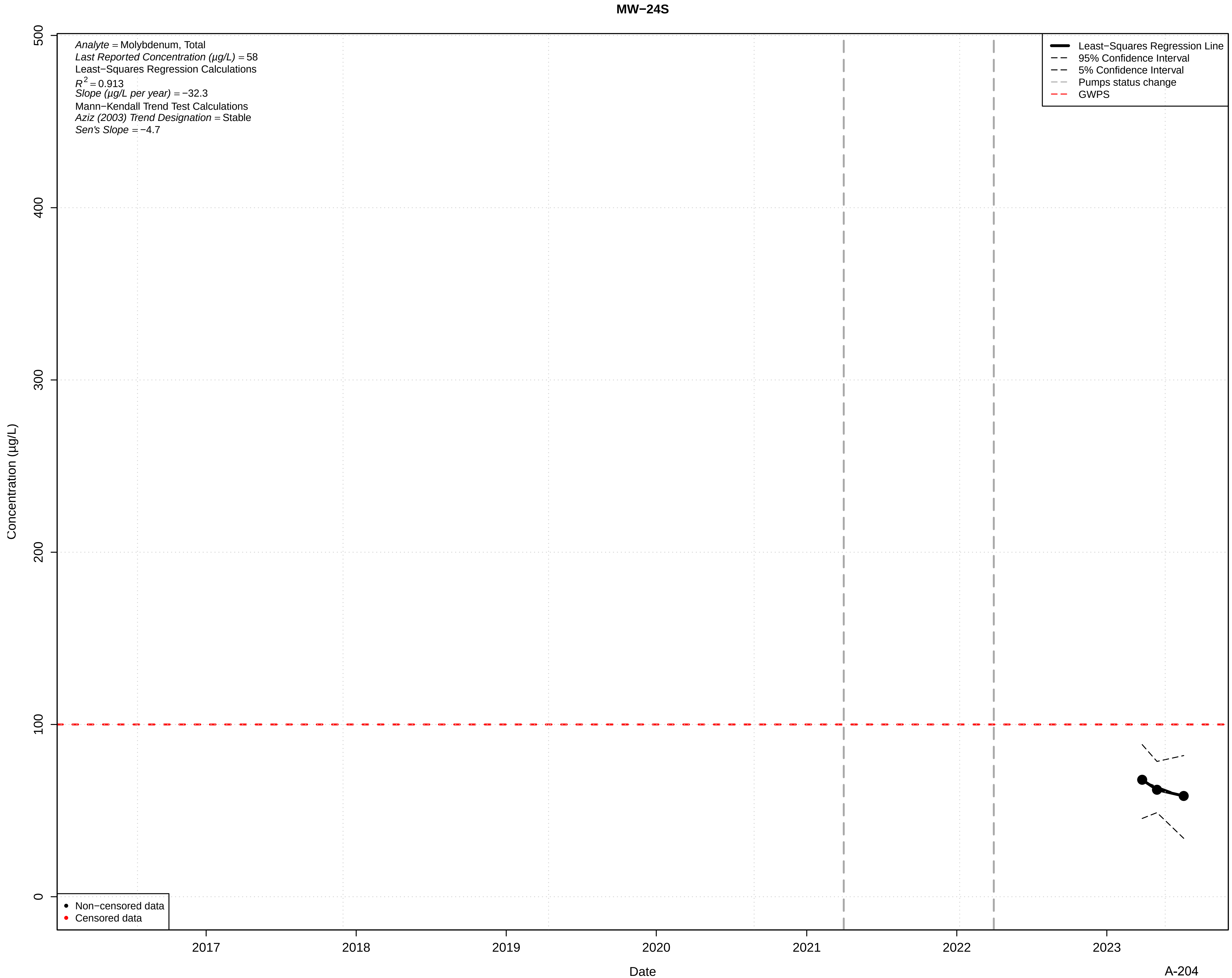


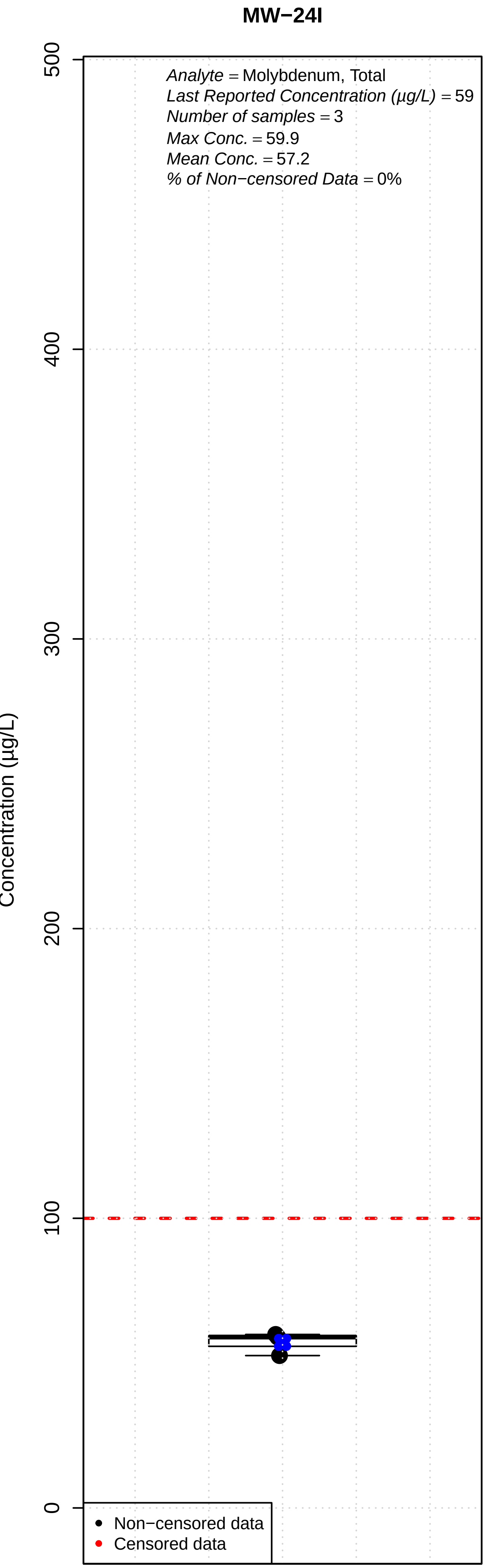
MW−23I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 2.4
Least−Squares Regression Calculations
R² = 0.809
Slope (µg/L per year) = −11.6
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −3.8
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
Date
Non−censored data
Censored data


MW−23D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 4.9
Number of samples = 3
Max Conc. = 18.1
Mean Conc. = 11
% of Non−censored Data = 33%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

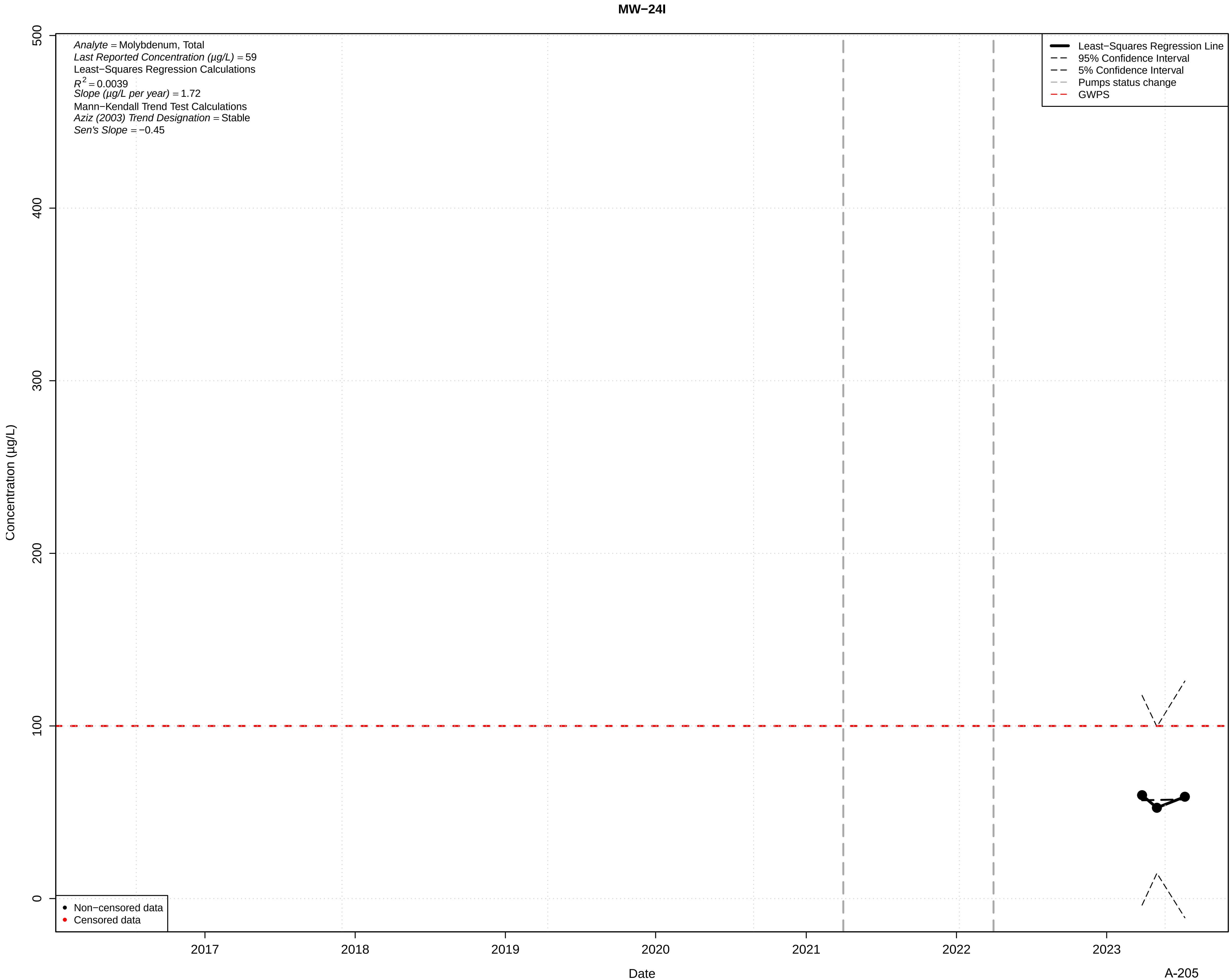

MW−23D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 4.9
Least−Squares Regression Calculations
R^2 = 0.96
Slope (µg/L per year) = −19.1
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −6.6
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−24S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 58
Number of samples = 3
Max Conc. = 67.9
Mean Conc. = 62.8
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

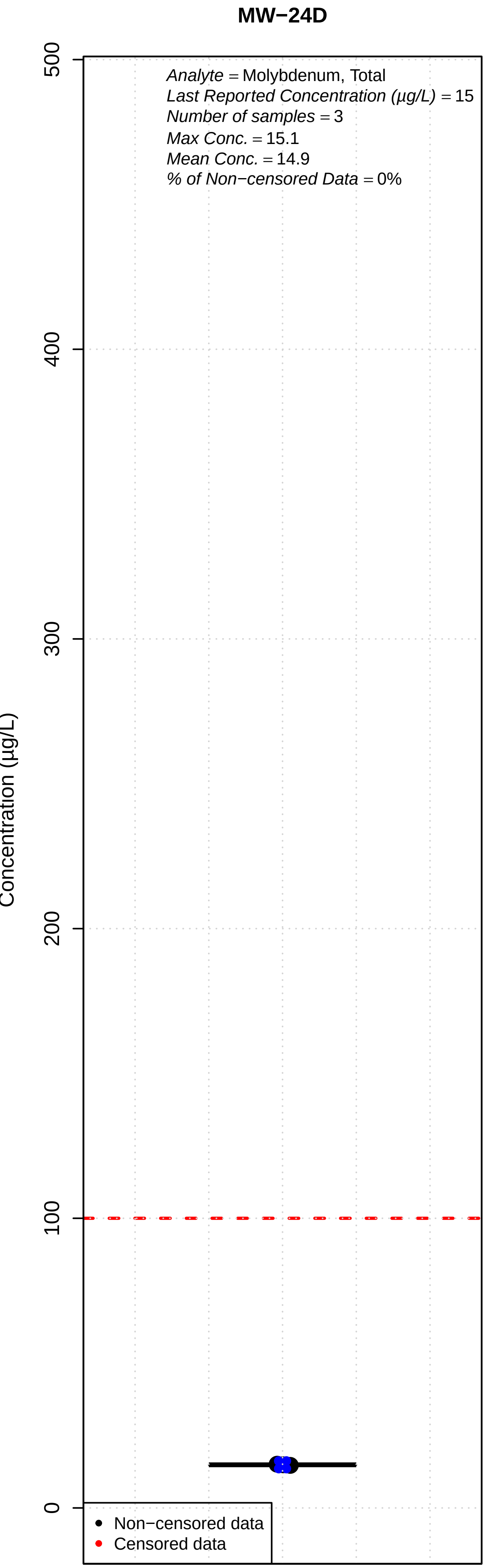

MW−24S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 58
Least−Squares Regression Calculations
R2 = 0.913
Slope (µg/L per year) = −32.3
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −4.7
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data



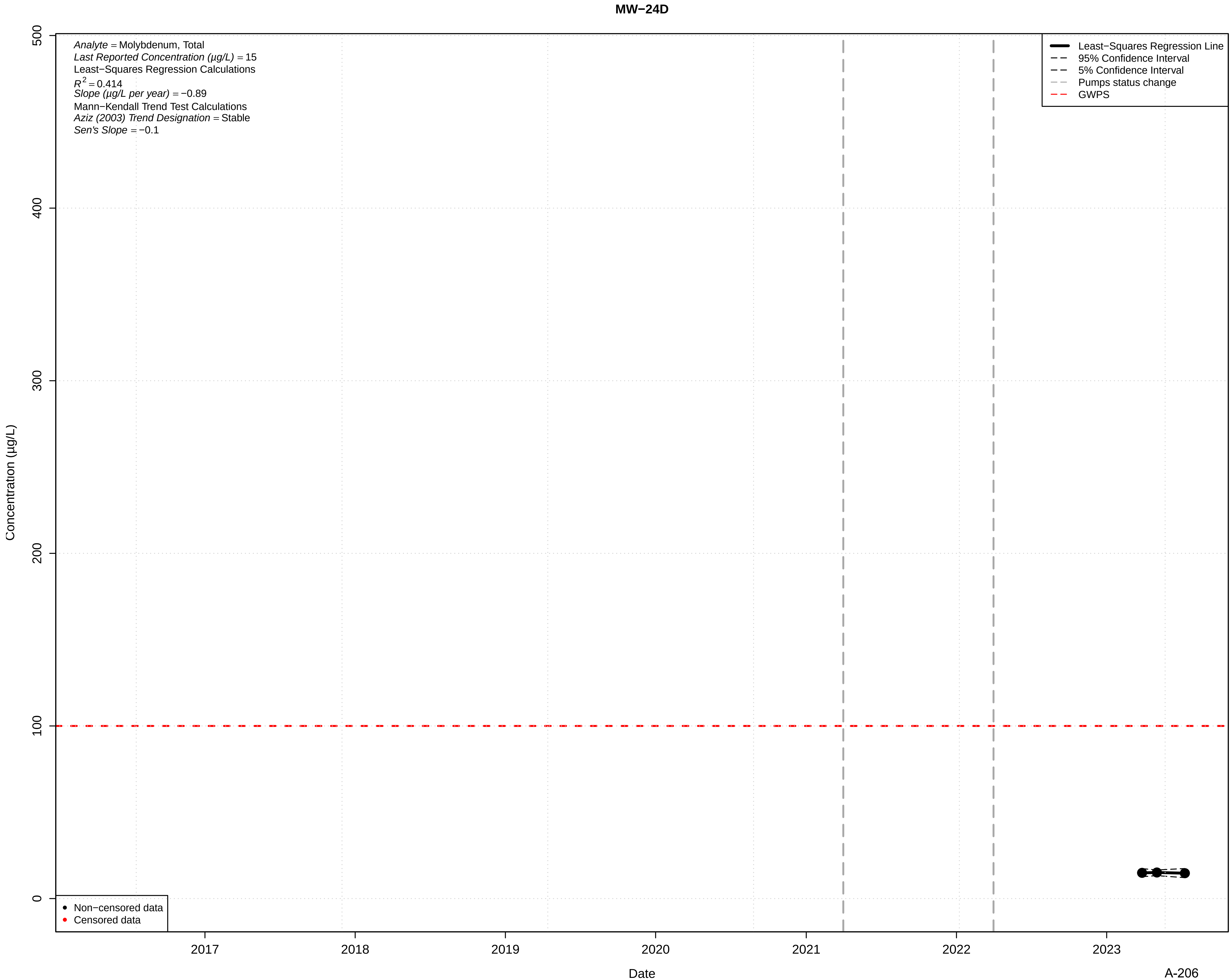
MW−24I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 59
Number of samples = 3
Max Conc. = 59.9
Mean Conc. = 57.2
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data



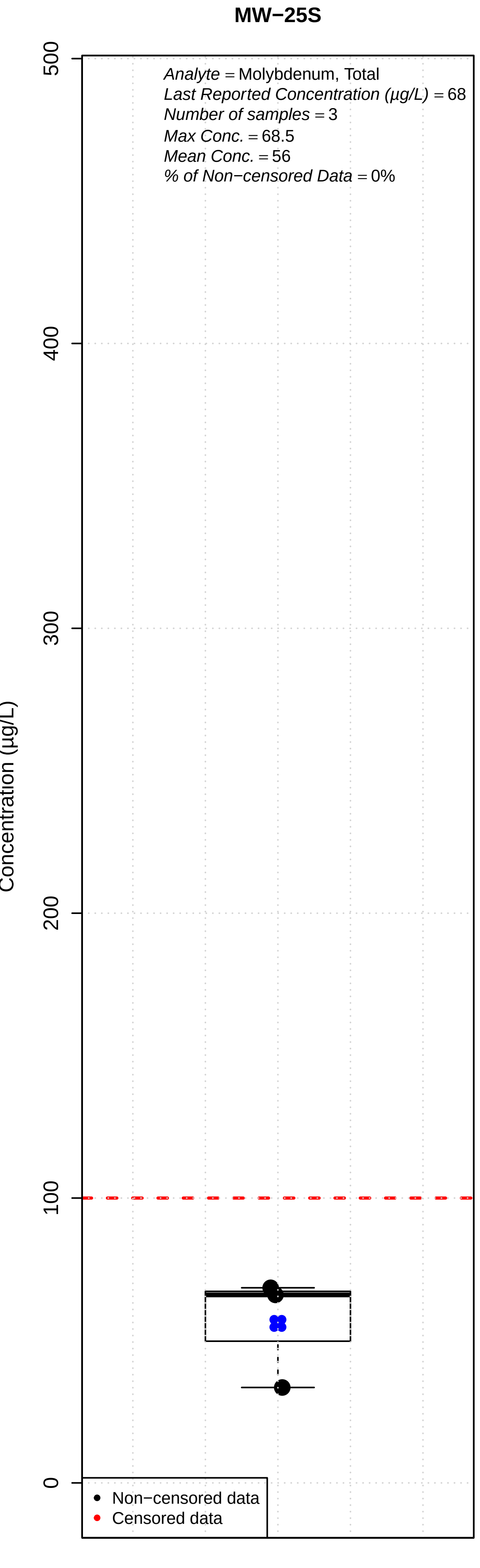
MW−24I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 59
Least−Squares Regression Calculations
R2 = 0.0039
Slope (µg/L per year) = 1.72
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.45
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date



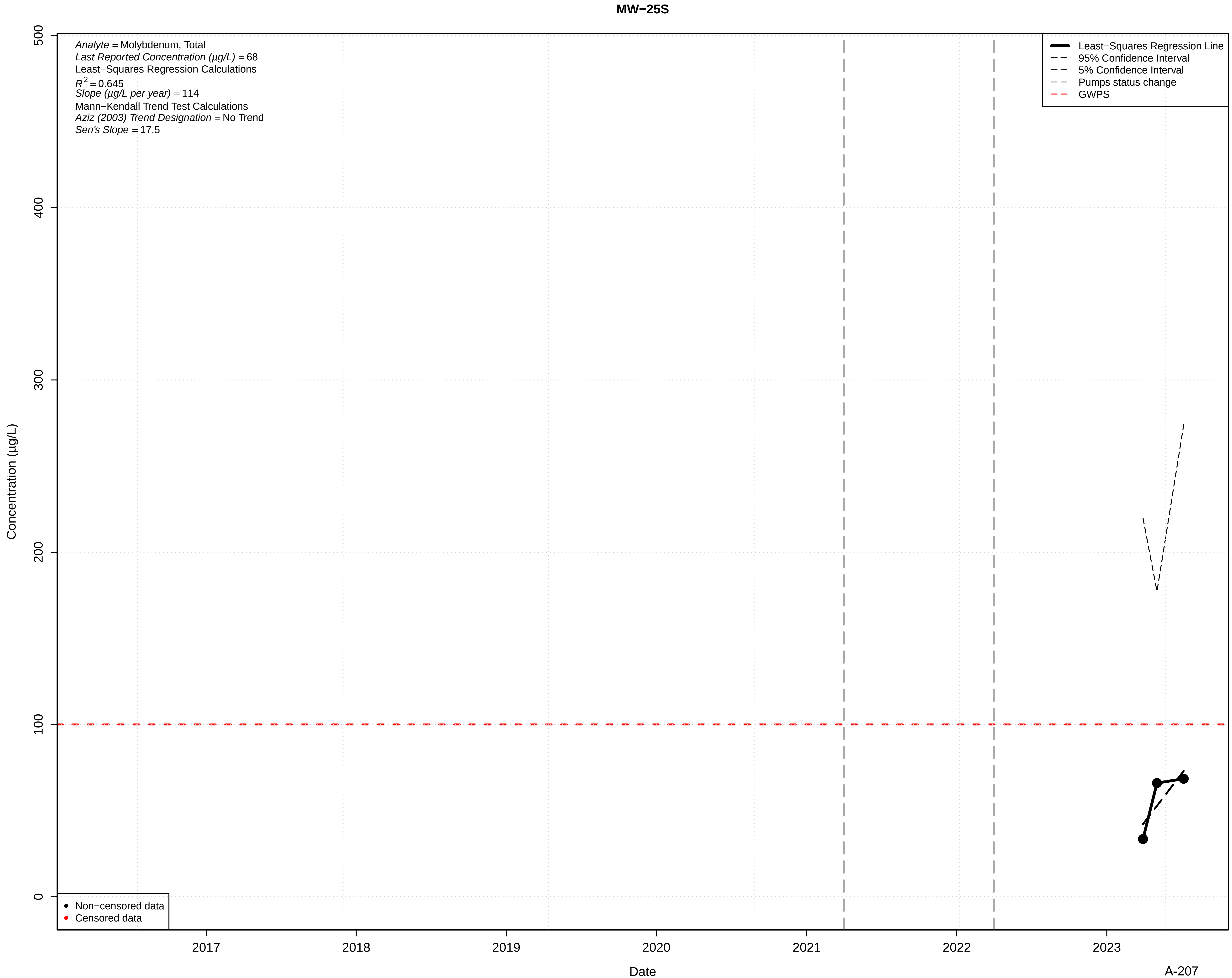
MW−24D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 15
Number of samples = 3
Max Conc. = 15.1
Mean Conc. = 14.9
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data



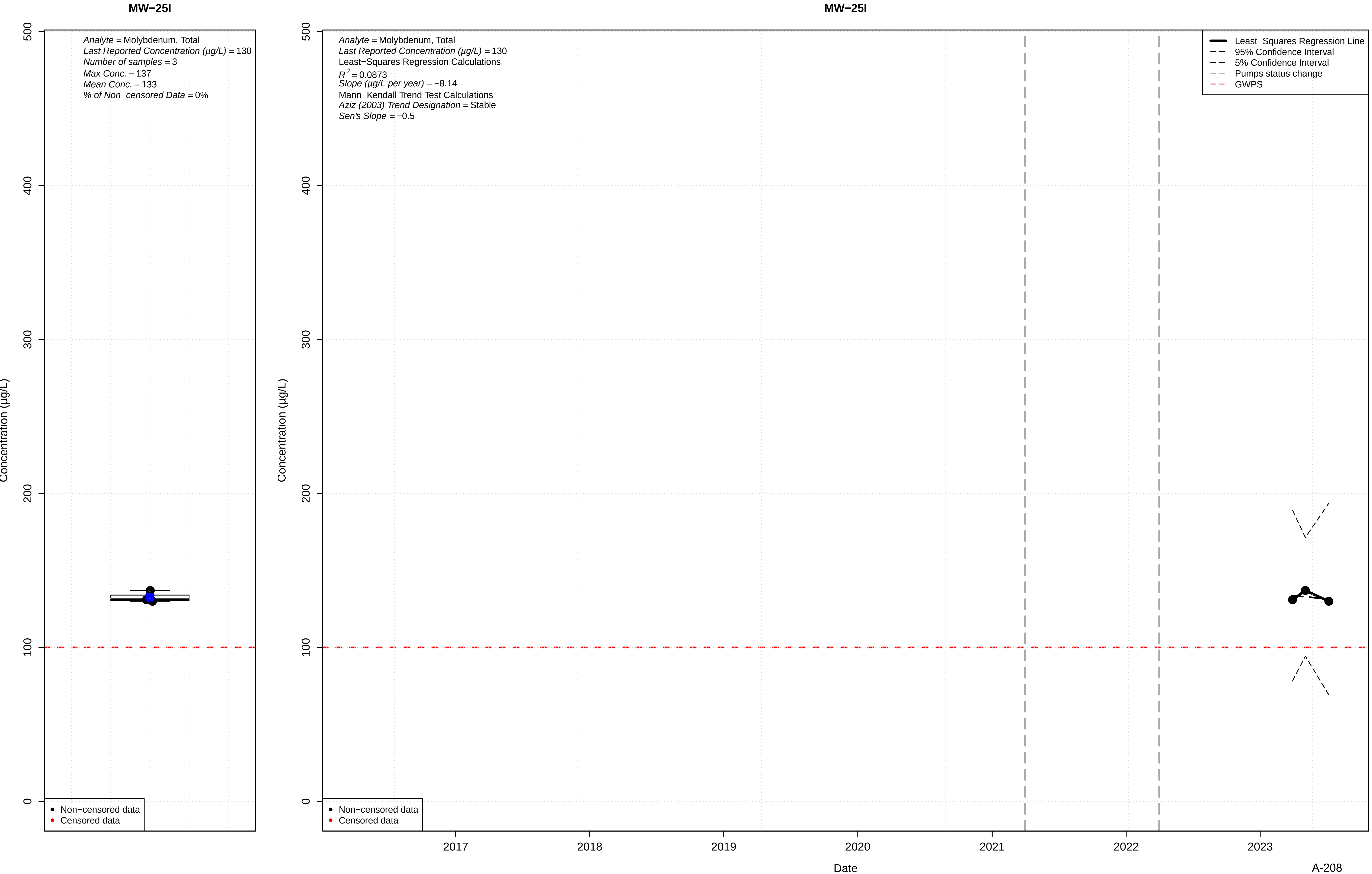
MW−24D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 15
Least−Squares Regression Calculations
R2 = 0.414
Slope (µg/L per year) = −0.89
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.1
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data



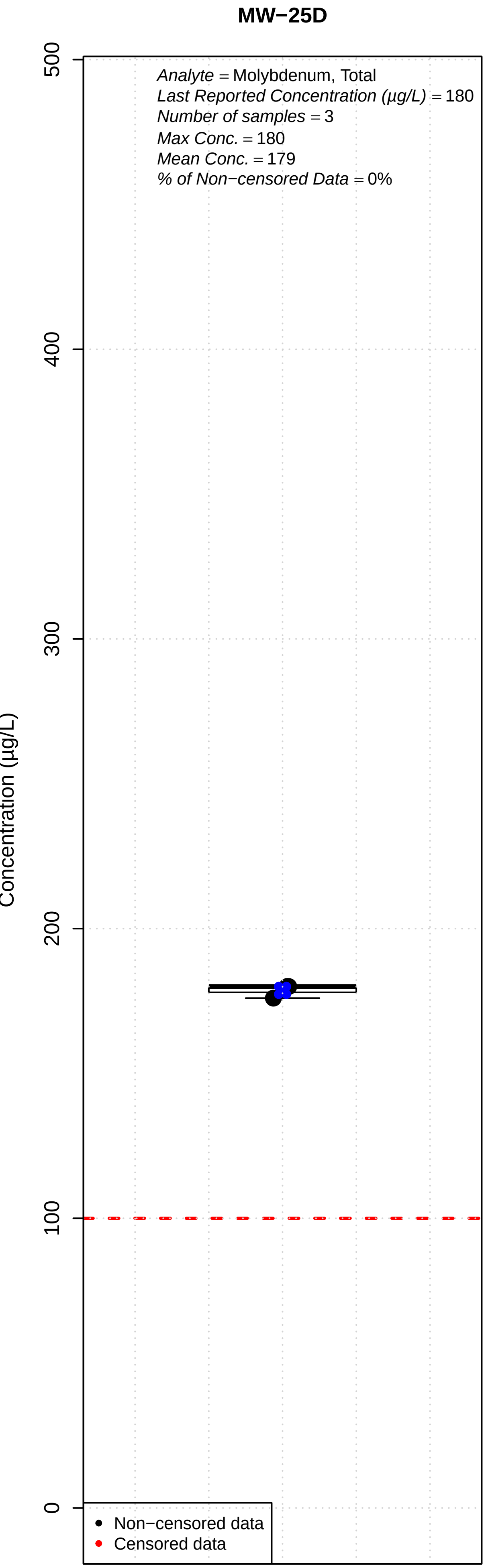
MW−25S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 68
Number of samples = 3
Max Conc. = 68.5
Mean Conc. = 56
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

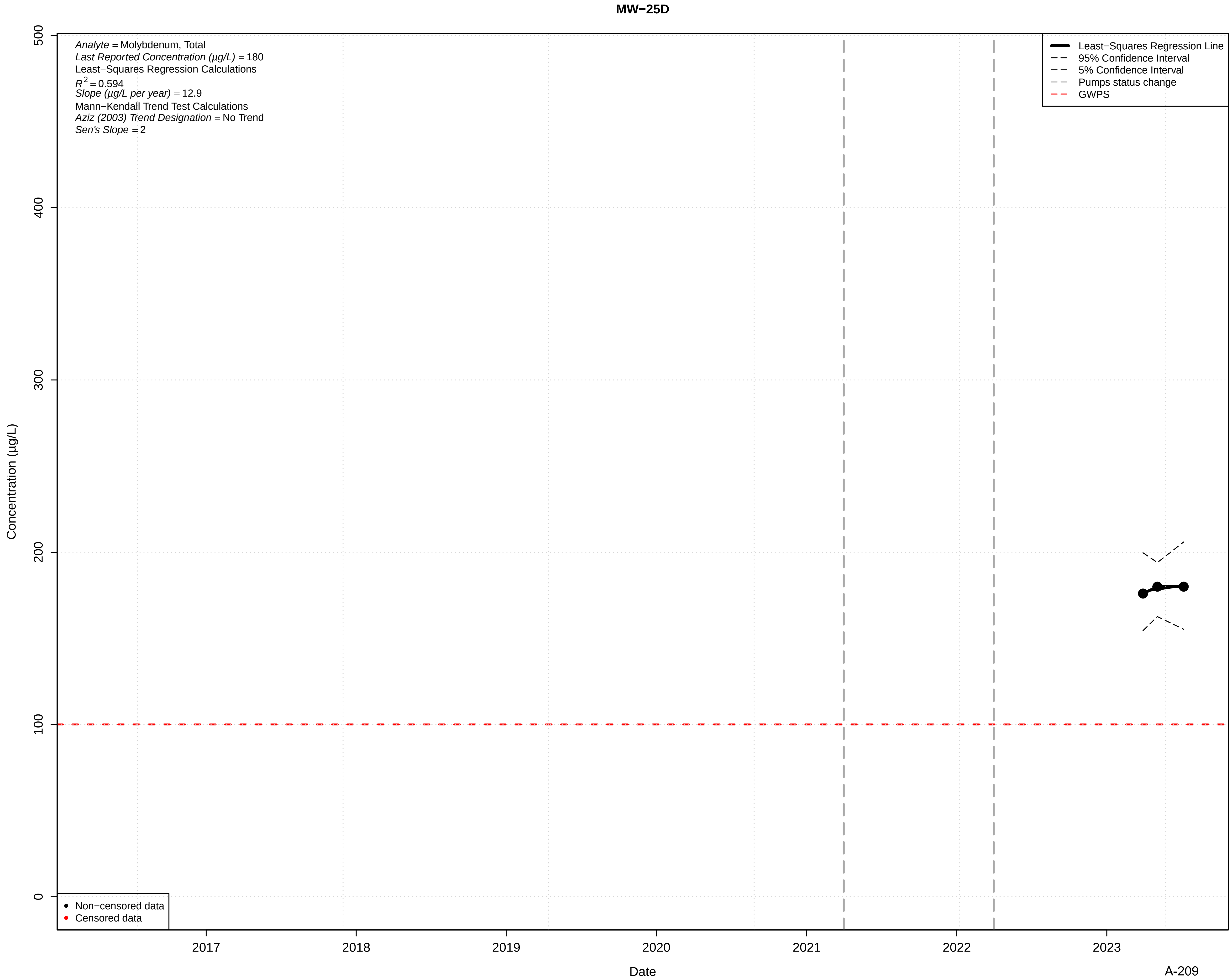


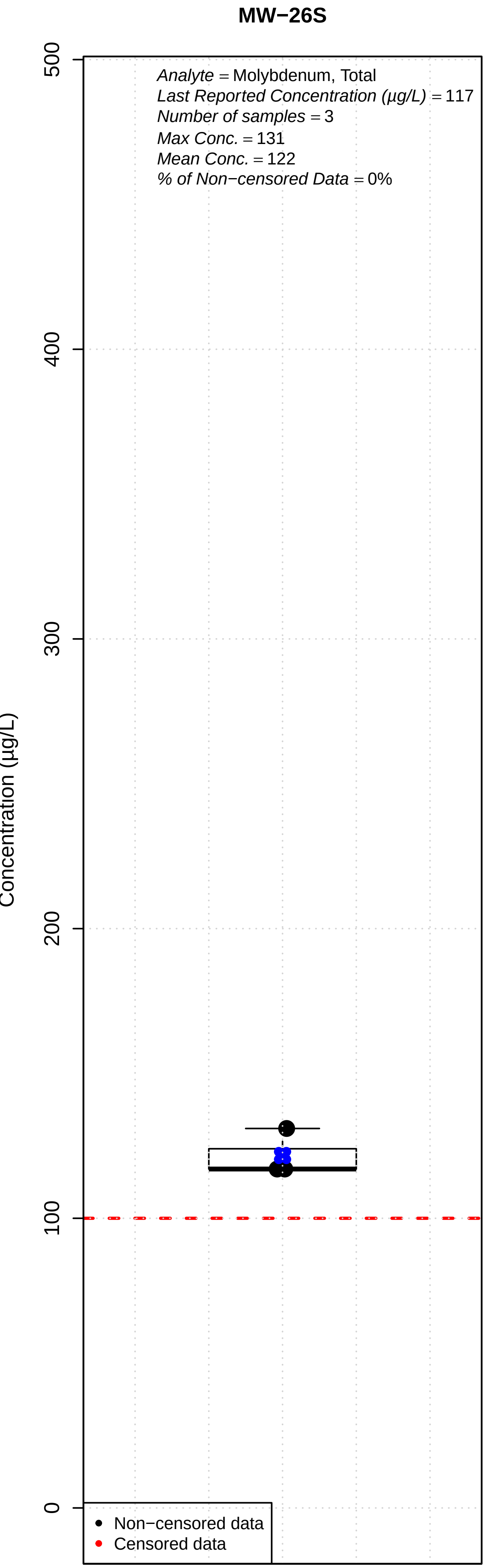
MW−25S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 68
Least−Squares Regression Calculations
R^2 = 0.645
Slope (µg/L per year) = 114
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 17.5
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

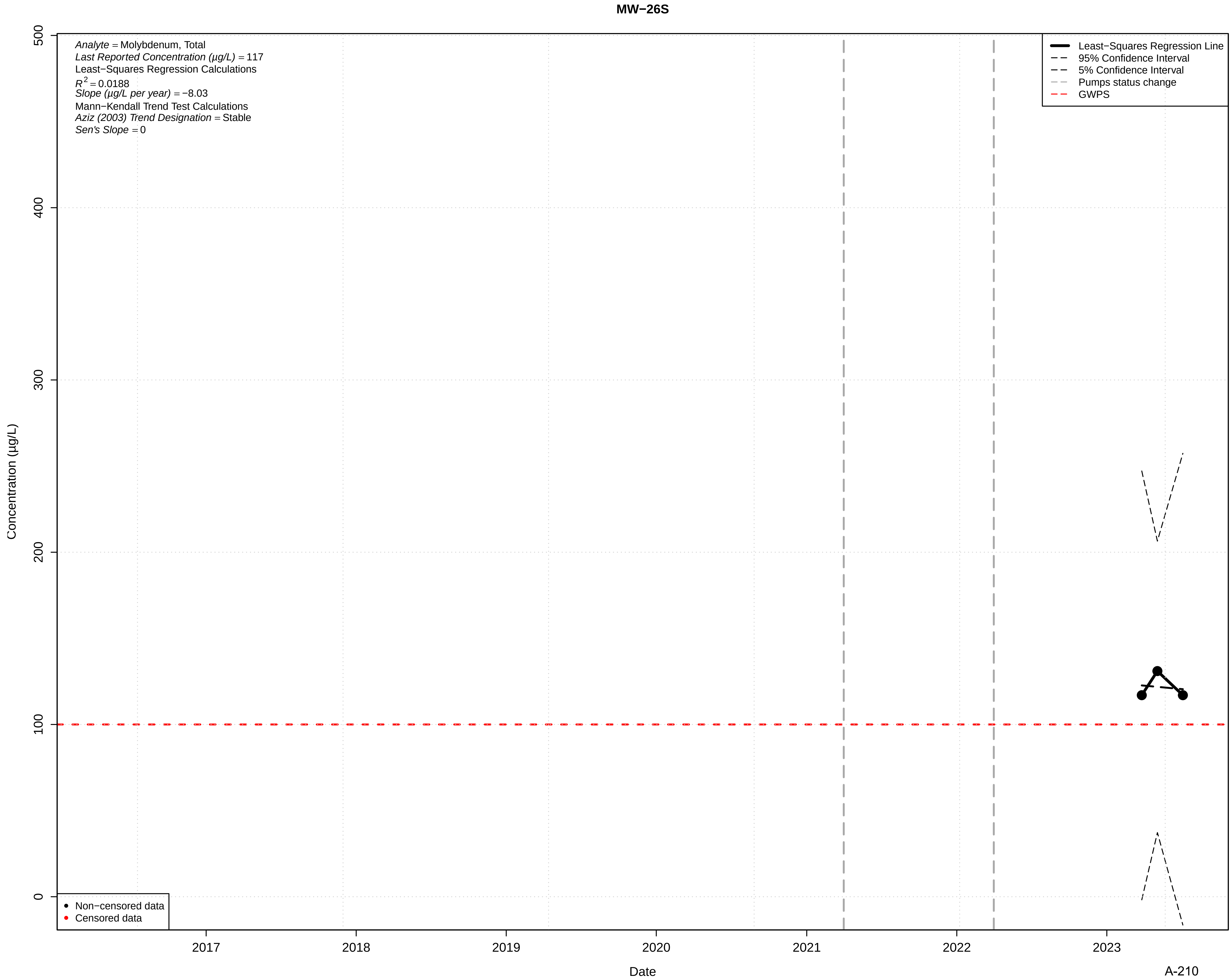


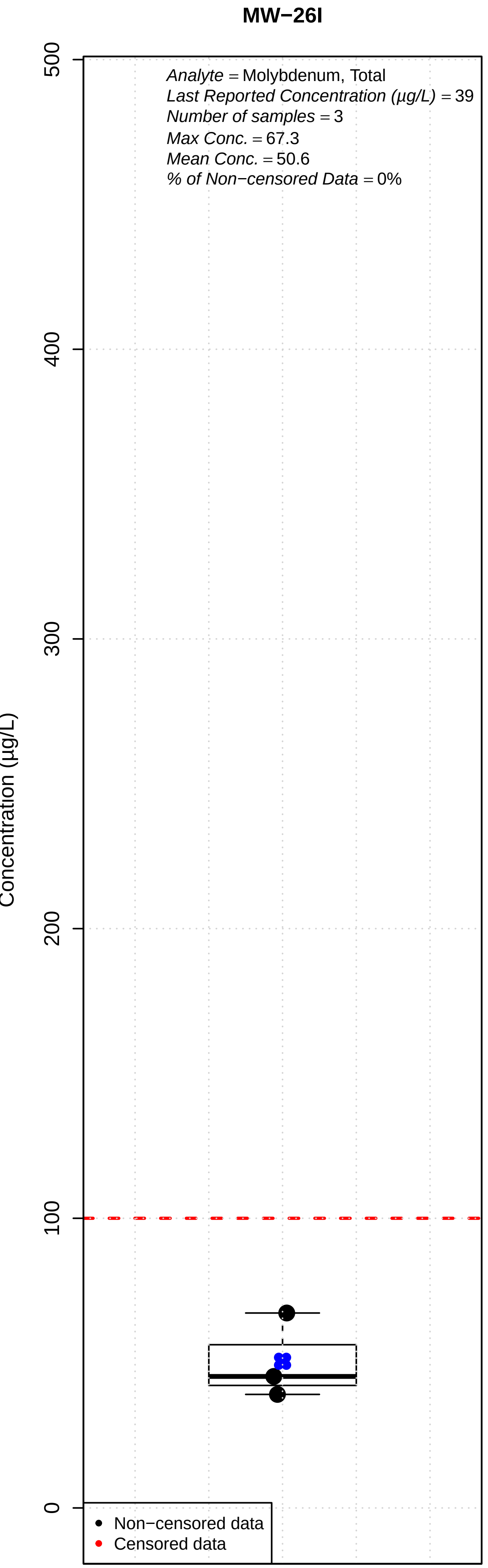
MW−25I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 130
Number of samples = 3
Max Conc. = 137
Mean Conc. = 133
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
MW−25I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 130
Least−Squares Regression Calculations
R^2 = 0.0873
Slope (µg/L per year) = −8.14
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.5
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
2017
2018
2019
2020
2021
2022
2023
Date

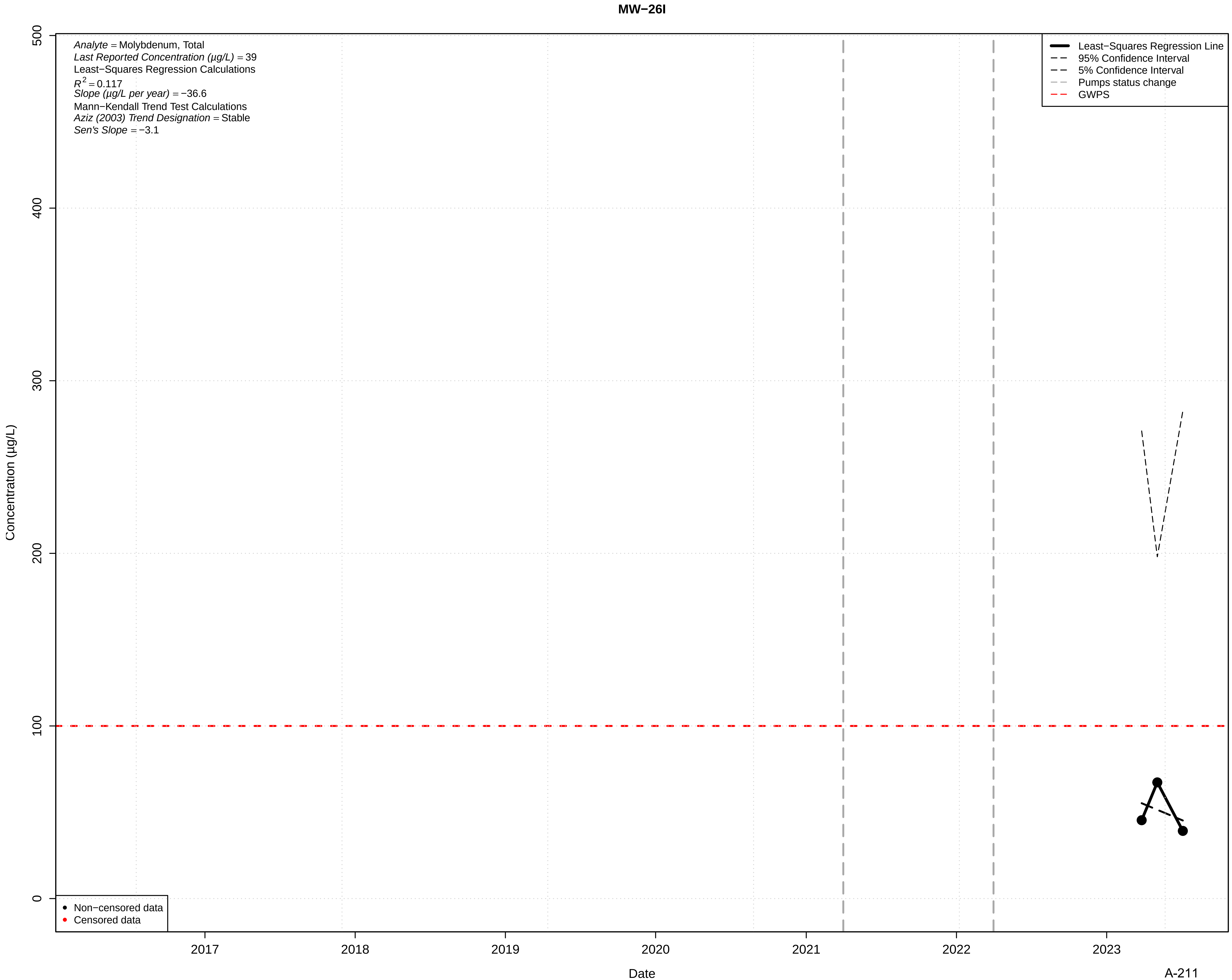

MW−25D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 180
Number of samples = 3
Max Conc. = 180
Mean Conc. = 179
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

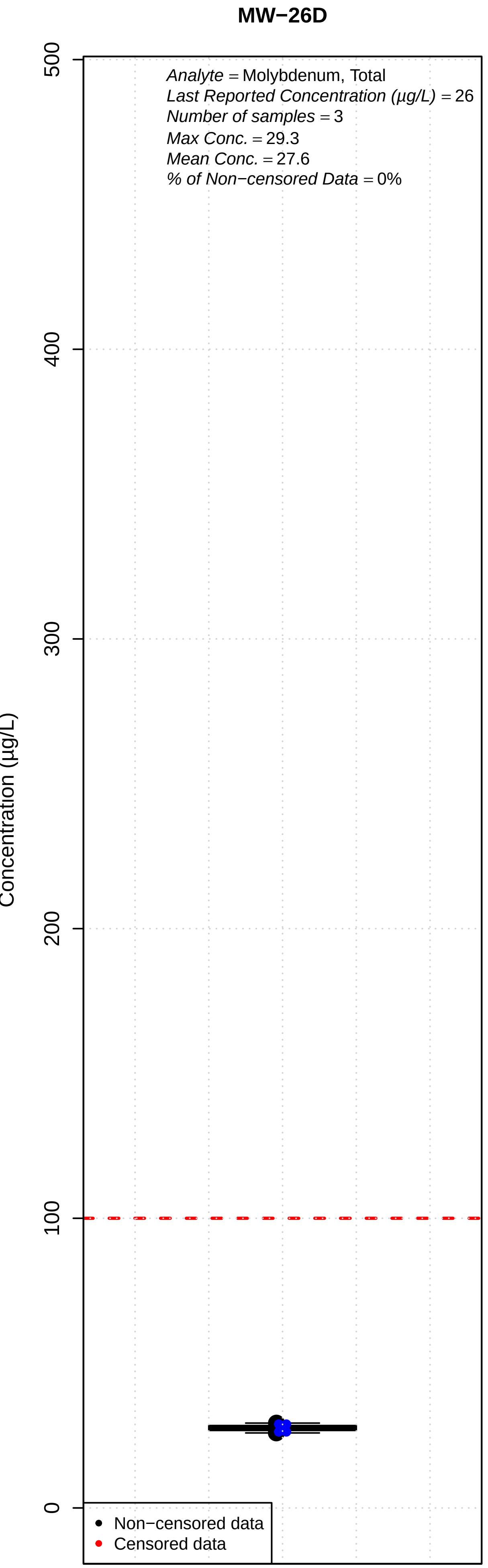

MW−25D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 180
Least−Squares Regression Calculations
R^2 = 0.594
Slope (µg/L per year) = 12.9
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = No Trend
Sen's Slope = 2
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−26S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 117
Number of samples = 3
Max Conc. = 131
Mean Conc. = 122
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data

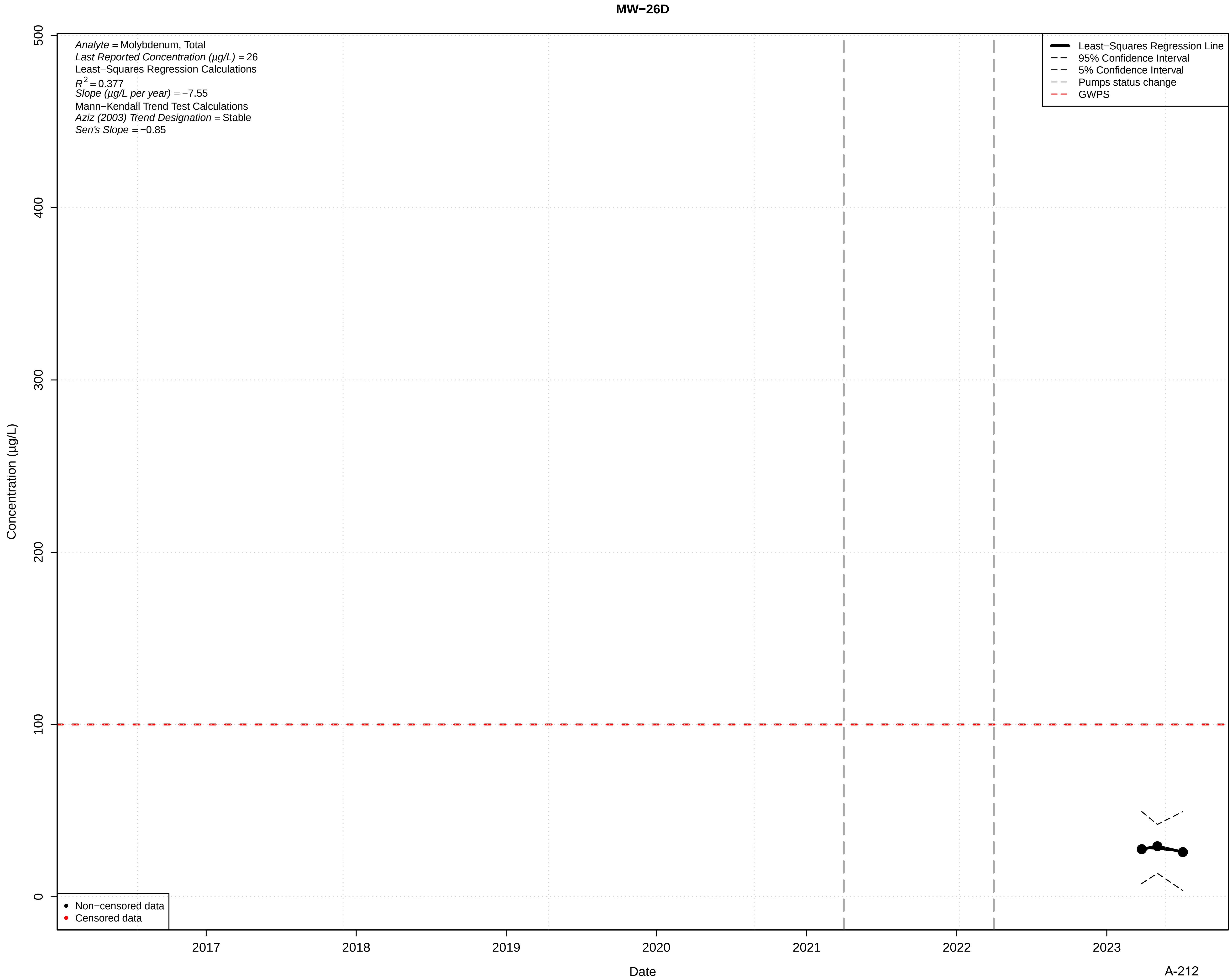

MW−26S
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 117
Least−Squares Regression Calculations
R2 = 0.0188
Slope (µg/L per year) = −8.03
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = 0
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date


MW−26I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 39
Number of samples = 3
Max Conc. = 67.3
Mean Conc. = 50.6
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data


MW−26I
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 39
Least−Squares Regression Calculations
R2 = 0.117
Slope (µg/L per year) = −36.6
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −3.1
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
2017
2018
2019
2020
2021
2022
2023
Date
Non−censored data
Censored data

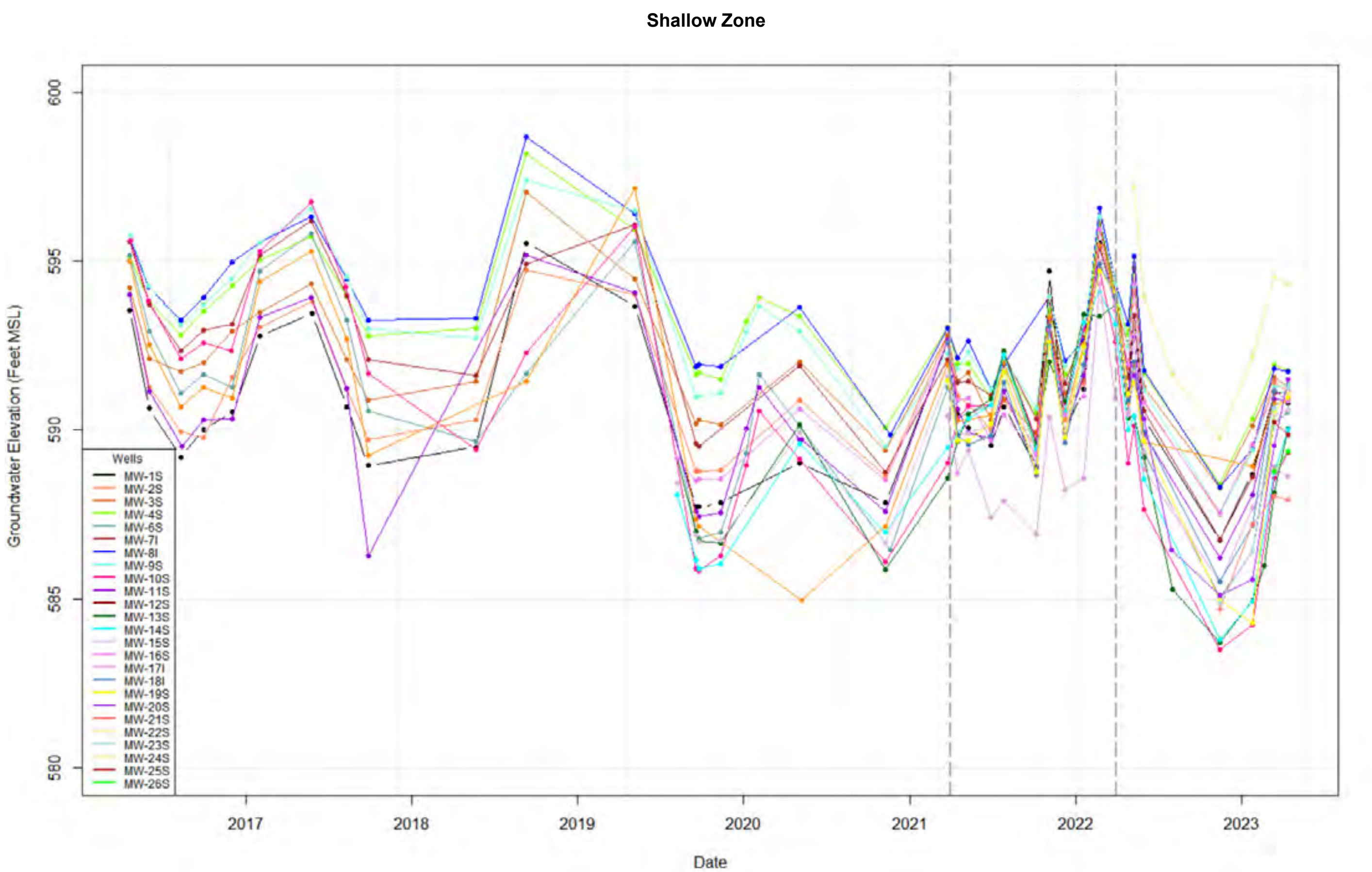


MW−26D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 26
Number of samples = 3
Max Conc. = 29.3
Mean Conc. = 27.6
% of Non−censored Data = 0%
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data



MW−26D
Analyte = Molybdenum, Total
Last Reported Concentration (µg/L) = 26
Least−Squares Regression Calculations
R^2 = 0.377
Slope (µg/L per year) = −7.55
Mann−Kendall Trend Test Calculations
Aziz (2003) Trend Designation = Stable
Sen's Slope = −0.85
Least−Squares Regression Line
95% Confidence Interval
5% Confidence Interval
Pumps status change
GWPS
Concentration (µg/L)
0
100
200
300
400
500
Non−censored data
Censored data
2017
2018
2019
2020
2021
2022
2023
Date

GROUNDWATER ELEVATIONS



Notes

1. STRATIGRAPHIC COLUMN TAKEN FROM: Thompson et al. (2016)

HALEY ALDRICH

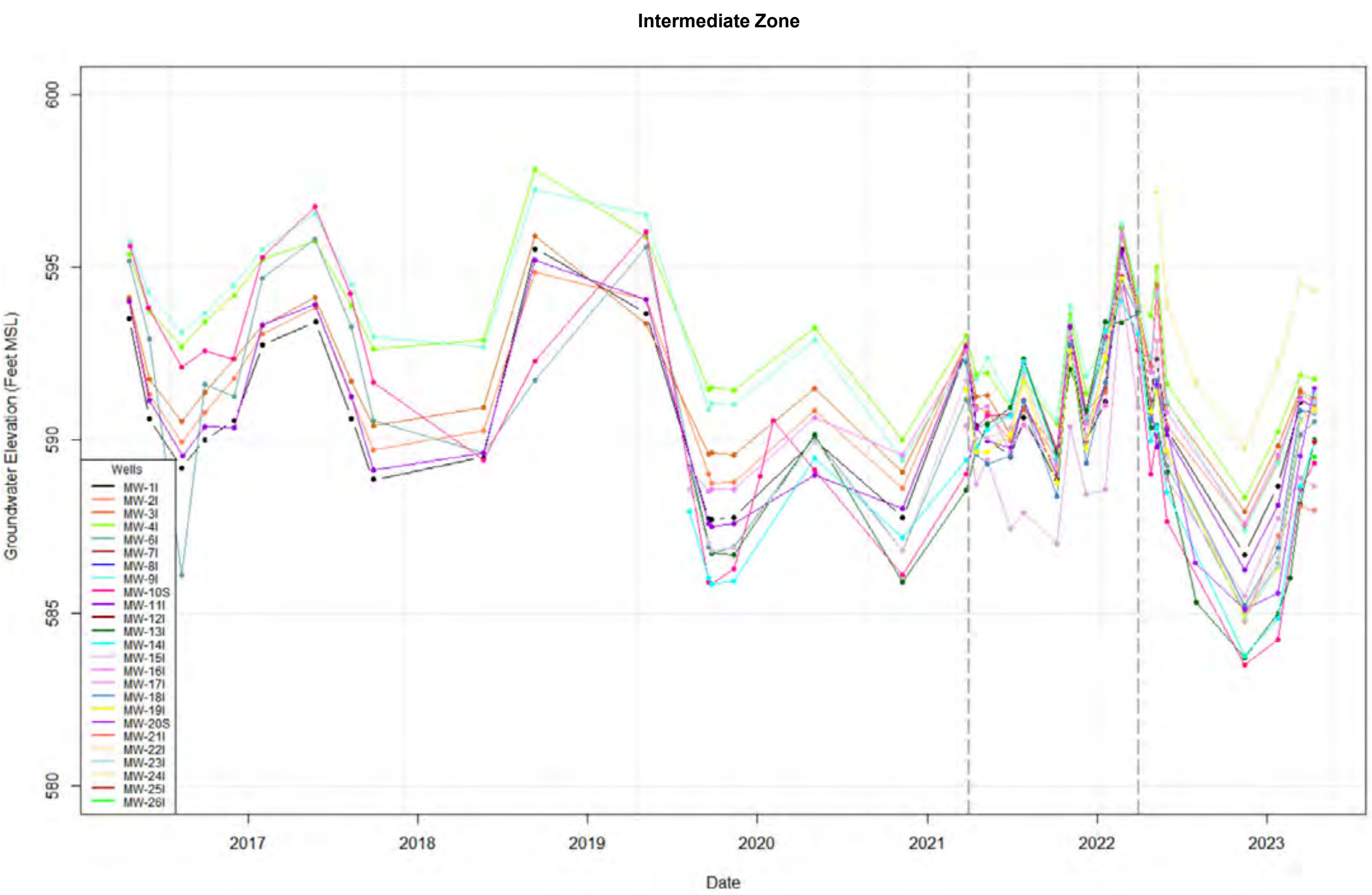
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

GROUNDWATER ELEVATIONS FOR
“SHALLOW” SCREENED
MONITORING WELLS

FEBRUARY 2024

FIGURE A-214

FILE PATH: C:/



Notes

1. STRATIGRAPHIC COLUMN TAKEN FROM: Thompson et al. (2016)

HALEY ALDRICH

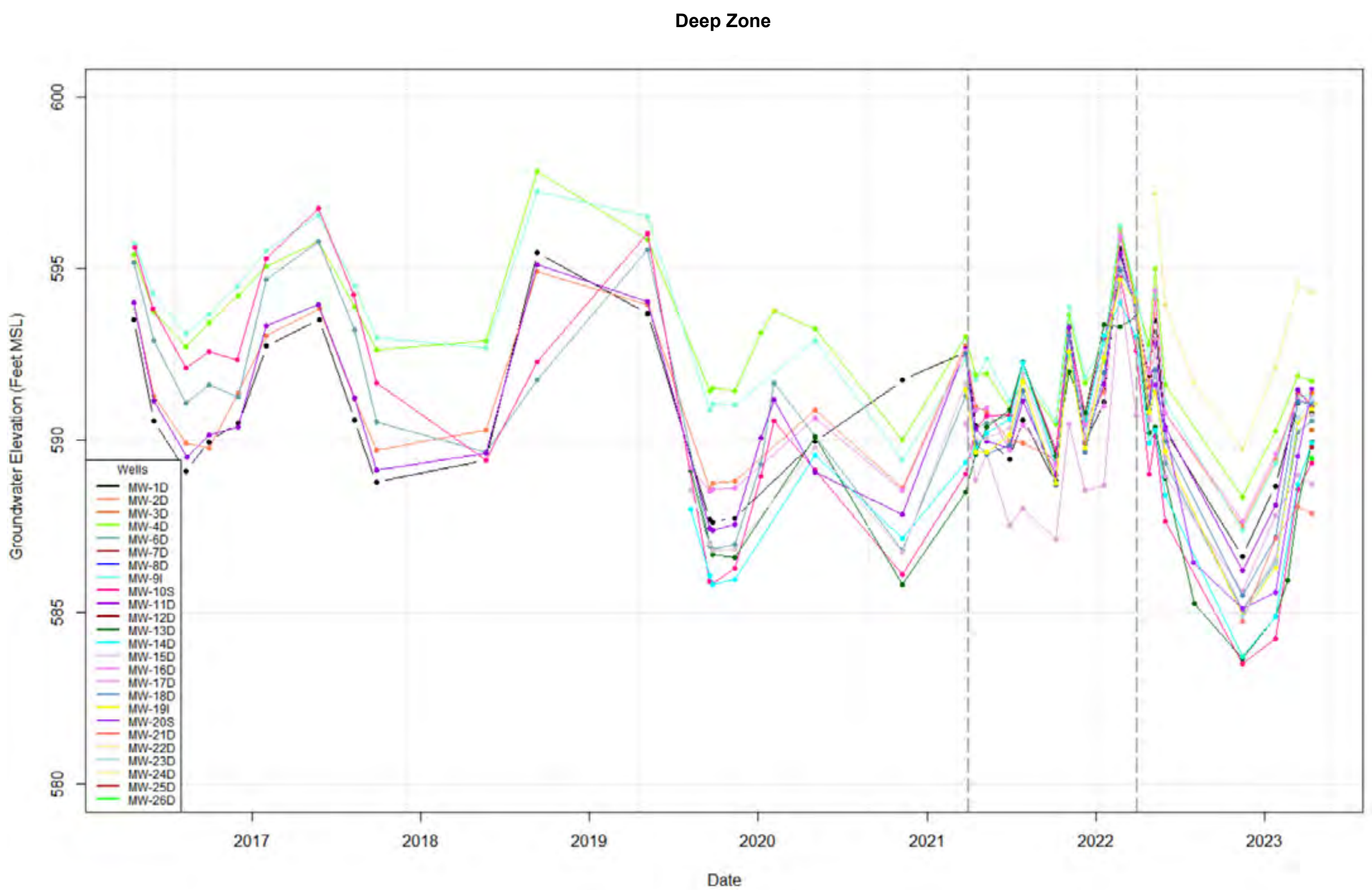
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

GROUNDWATER ELEVATIONS FOR "INTERMEDIATE" SCREENED MONITORING WELLS

FEBRUARY 2024

FIGURE A-215

FILE PATH: C:/



Notes

1. STRATIGRAPHIC COLUMN TAKEN FROM: Thompson et al. (2016)

HALEY ALDRICH

EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

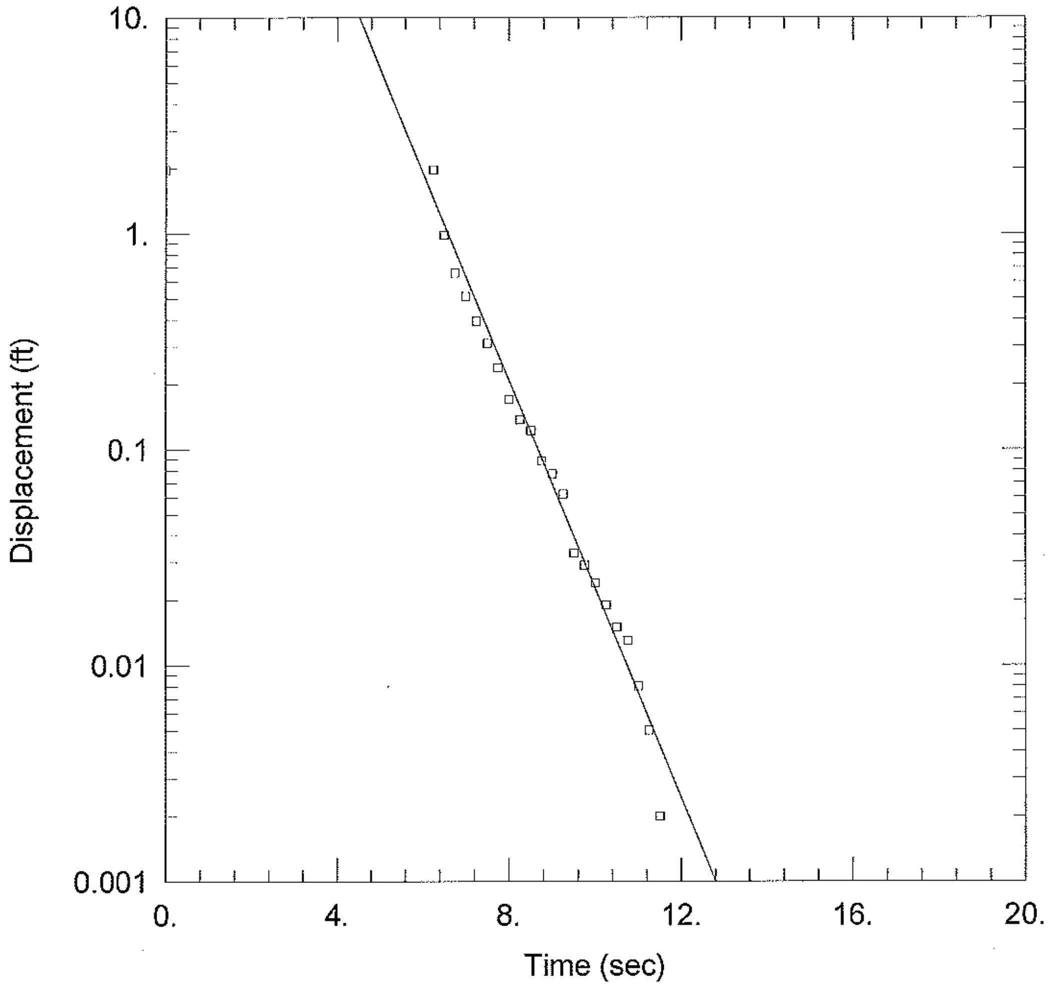
GROUNDWATER ELEVATIONS FOR "DEEP" SCREENED MONITORING WELLS

FEBRUARY 2024

FIGURE A-216

FILE PATH: C:/

APPENDIX B
Slug Test Data



MW-1S

Data Set: C:\Users\tricker\Desktop\SlugTests\Completed Slug Tests\MW-1S.aqt
Date: 10/16/15 Time: 13:30:53

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Sargent & Lundy
Project: 2524-302-01-00
Location: Eagle Valley Station
Test Well: MW-1S
Test Date: 10/5/2015

AQUIFER DATA

Saturated Thickness: 76. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-1S)

Initial Displacement: 1.976 ft
Total Well Penetration Depth: 29. ft
Casing Radius: 0.083 ft
Static Water Column Height: 7.91 ft
Screen Length: 10. ft
Well Radius: 0.344 ft
Gravel Pack Porosity: 0.42

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.2287 cm/sec
y0 = 1514.8 ft

Data Set: C:\Users\tricker\Desktop\SlugTests\Completed Slug Tests\MW-1S.aqt
Title: MW-1S
Date: 10/16/15
Time: 08:21:45

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Sargent & Lundy
Project: 2524-302-01-00
Location: Eagle Valley Station
Test Date: 10/5/2015
Test Well: MW-1S

AQUIFER DATA

Saturated Thickness: 76. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-1S

X Location: 1542237.384 ft
Y Location: 3136989.777 ft

Initial Displacement: 1.976 ft
Static Water Column Height: 7.91 ft
Casing Radius: 0.083 ft
Well Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 29. ft
Corrected Casing Radius (Bouwer-Rice Method): 0.2317 ft
Gravel Pack Porosity: 0.42

No. of Observations: 22

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
6.251	1.976	9.001	0.077
6.501	0.983	9.251	0.062
6.751	0.657	9.501	0.033
7.001	0.512	9.751	0.029
7.251	0.393	10.	0.024
7.501	0.31	10.25	0.019
7.751	0.239	10.5	0.015
8.001	0.17	10.75	0.013
8.251	0.137	11.	0.008
8.501	0.122	11.25	0.005
8.751	0.088	11.5	0.002

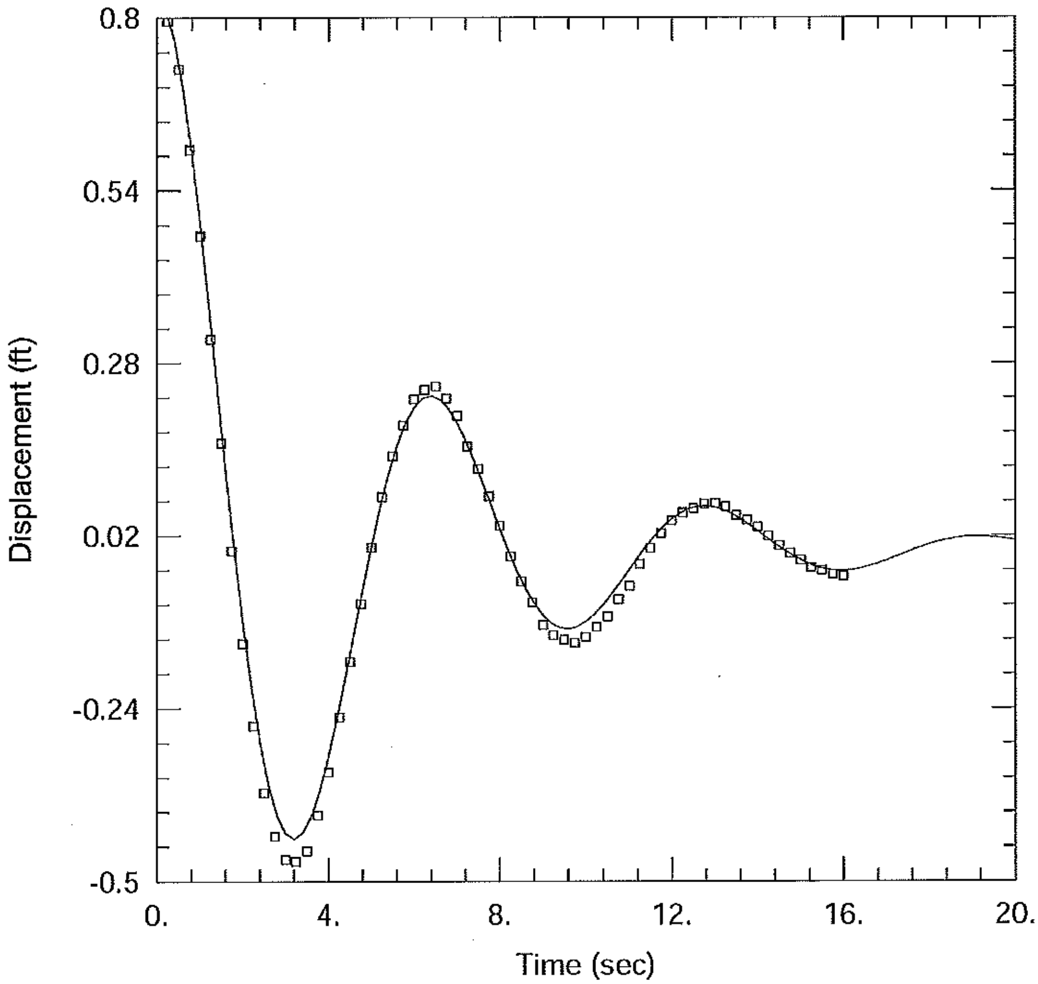
SOLUTION

Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 2.516

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.2287	cm/sec
y0	1514.8	ft



WELL TEST ANALYSIS

Data Set: K:\...\MW-1I-4.aqt
Date: 05/11/16 Time: 08:25:48

AQUIFER DATA

Saturated Thickness: 41.21 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-1I)

Initial Displacement: 0.829 ft
Total Well Penetration Depth: 41.21 ft
Casing Radius: 0.038 ft
Static Water Column Height: 41.21 ft
Screen Length: 10. ft
Wellbore Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar

K = 0.01865 cm/sec C(D) = 0.2

Data Set: K:\Wbgm\Client Information\2500-2599\2524\302\01\01 EVS\SlugTests\Completed Slug Tests Apr 201
Date: 05/11/16
Time: 08:28:18

AQUIFER DATA

Saturated Thickness: 41.21 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : MW-1I

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 0.829 ft
Static Water Column Height: 41.21 ft
Casing Radius: 0.038 ft
Wellbore Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 41.21 ft

No. of Observations: 64

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.25	0.794	8.25	-0.012
0.5	0.722	8.5	-0.049
0.75	0.601	8.75	-0.081
1.	0.471	9.	-0.115
1.25	0.316	9.25	-0.13
1.5	0.159	9.5	-0.137
1.75	-0.003	9.75	-0.142
2.	-0.143	10.	-0.133
2.25	-0.267	10.25	-0.118
2.5	-0.367	10.5	-0.102
2.75	-0.433	10.75	-0.076
3.	-0.467	11.	-0.056
3.25	-0.47	11.25	-0.023
3.5	-0.455	11.5	0.001
3.75	-0.401	11.75	0.023
4.	-0.336	12.	0.042
4.25	-0.253	12.25	0.054
4.5	-0.17	12.5	0.06
4.75	-0.083	12.75	0.067
5.	0.002	13.	0.068
5.25	0.078	13.25	0.063
5.5	0.139	13.5	0.05
5.75	0.186	13.75	0.043
6.	0.225	14.	0.033
6.25	0.239	14.25	0.019
6.5	0.244	14.5	0.005

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
6.75	0.226	14.75	-0.007
7.	0.2	15.	-0.018
7.25	0.154	15.25	-0.029
7.5	0.12	15.5	-0.033
7.75	0.079	15.75	-0.039
8.	0.034	16.	-0.042

SOLUTION

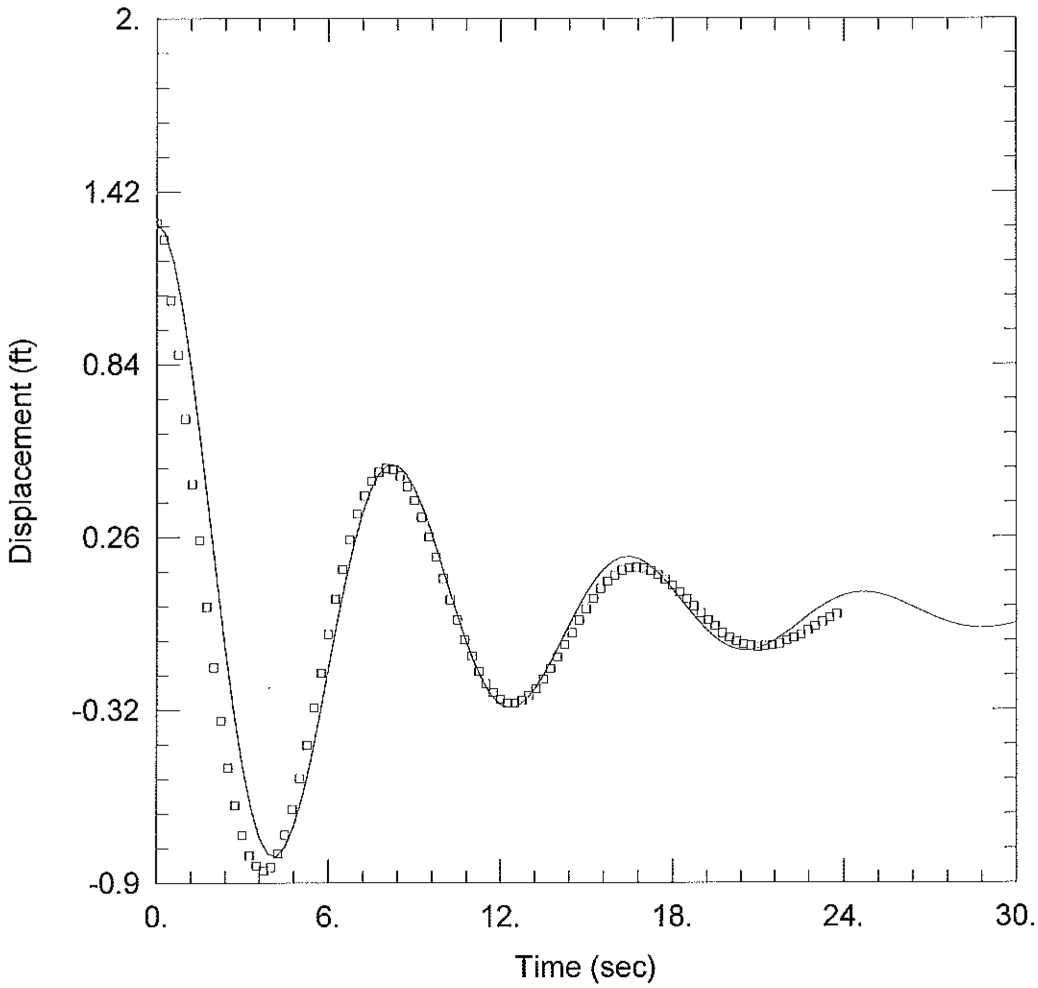
Aquifer Model: Unconfined
Solution Method: Springer-Gelhar
Shape Factor: 3.372

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.01865	cm/sec
C(D)	0.2	

Solution is critically damped when C(D) = 1.



MW-1D

Data Set: C:\Users\tricker\Desktop\SlugTests\Completed Slug Tests\MW-1D.aqt
Date: 10/16/15 Time: 13:29:18

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Sargent & Lundy
Project: 2524-302-01-00
Location: Eagle Valley Station
Test Well: MW-1D
Test Date: 10/5/2015

AQUIFER DATA

Saturated Thickness: 76. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-1D)

Initial Displacement: 1.314 ft
Total Well Penetration Depth: 83. ft
Casing Radius: 0.084 ft
Static Water Column Height: 75.5 ft
Screen Length: 10. ft
Well Radius: 0.344 ft
Gravel Pack Porosity: 0.42

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.1118 cm/sec
Le = 53.92 ft

Data Set: C:\Users\tricker\Desktop\SlugTests\Completed Slug Tests\MW-1D.aqt
Title: MW-1D
Date: 10/16/15
Time: 08:22:03

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Sargent & Lundy
Project: 2524-302-01-00
Location: Eagle Valley Station
Test Date: 10/5/2015
Test Well: MW-1D

AQUIFER DATA

Saturated Thickness: 76. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-1D

X Location: 1542245.342 ft
Y Location: 3136997.153 ft

Initial Displacement: 1.314 ft
Static Water Column Height: 75.5 ft
Casing Radius: 0.084 ft
Well Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 83. ft
Corrected Casing Radius (Bouwer-Rice Method): 0.084 ft
Gravel Pack Porosity: 0.42

No. of Observations: 95

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.25	1.259	12.25	-0.298
0.5	1.054	12.5	-0.298
0.75	0.872	12.75	-0.289
1.	0.656	13.	-0.273
1.25	0.437	13.25	-0.25
1.5	0.249	13.5	-0.218
1.75	0.025	13.75	-0.182
2.	-0.178	14.	-0.144
2.25	-0.357	14.25	-0.102
2.5	-0.514	14.5	-0.062
2.75	-0.64	14.75	-0.02
3.	-0.741	15.	0.018
3.25	-0.809	15.25	0.053
3.5	-0.844	15.5	0.086
3.75	-0.859	15.75	0.11
4.	-0.848	16.	0.131
4.25	-0.802	16.25	0.147
4.5	-0.739	16.5	0.155
4.75	-0.653	16.75	0.157
5.	-0.55	17.	0.154
5.25	-0.439	17.25	0.146
5.5	-0.312	17.5	0.133
5.75	-0.196	17.75	0.117
6.	-0.067	18.	0.097
6.25	0.052	18.25	0.074
6.5	0.151	18.5	0.051
6.75	0.25	18.75	0.027

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
7.	0.337	19.	0.004
7.25	0.398	19.25	-0.02
7.5	0.447	19.5	-0.039
7.75	0.477	19.75	-0.063
8.	0.49	20.	-0.078
8.25	0.486	20.25	-0.09
8.5	0.465	20.5	-0.1
8.75	0.429	20.75	-0.105
9.	0.382	21.	-0.109
9.25	0.326	21.25	-0.106
9.5	0.26	21.5	-0.104
9.75	0.192	21.75	-0.099
10.	0.12	22.	-0.088
10.25	0.048	22.25	-0.078
10.5	-0.019	22.5	-0.068
10.75	-0.085	22.75	-0.054
11.	-0.141	23.	-0.04
11.25	-0.192	23.25	-0.025
11.5	-0.232	23.5	-0.011
11.75	-0.263	23.75	0.001
12.	-0.285		

SOLUTION

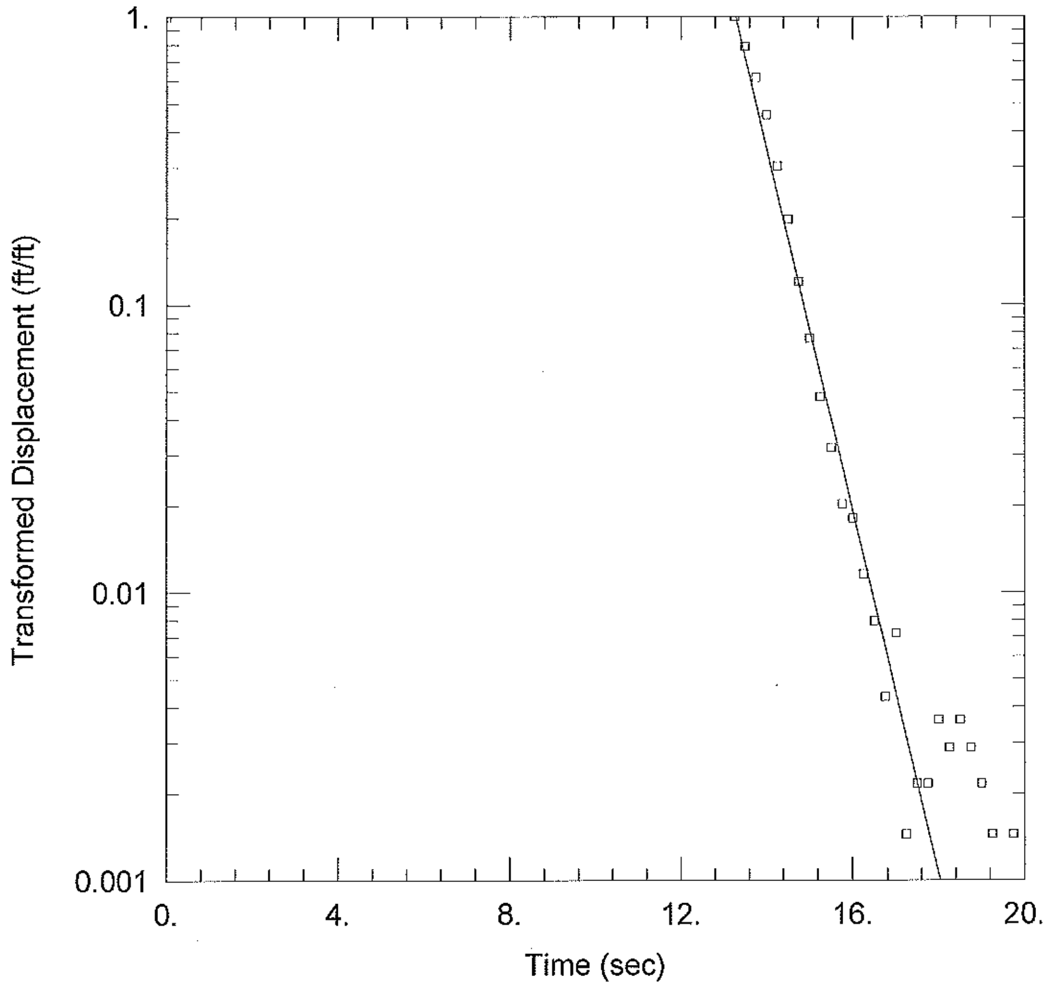
Slug Test
Aquifer Model: Unconfined
Solution Method: Springer-Gelhar
ln(Re/rw): 3.742

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.1118	cm/sec
Le	53.92	ft

T = K*b = 259.1 cm²/sec
Le = 53.92 ft
Solution is critically damped when C(D) = 1.



MW-2S

Data Set: C:\Users\tricker\Desktop\SlugTests\Completed Slug Tests\MW-2S.aqt
Date: 10/16/15 Time: 13:31:33

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Sargent & Lundy
Project: 2524-302-01-00
Location: Eagle Valley Station
Test Well: MW-2S
Test Date: 10/5/2015

AQUIFER DATA

Saturated Thickness: 76. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (New Well)

Initial Displacement: 1.295 ft
Total Well Penetration Depth: 25. ft
Casing Radius: 0.083 ft
Static Water Column Height: 9.89 ft
Screen Length: 10. ft
Well Radius: 0.344 ft
Gravel Pack Porosity: 0.42

SOLUTION

Aquifer Model: Unconfined
Solution Method: Dagan

K = 0.3033 cm/sec
y0 = 20. ft

Data Set: C:\Users\tricker\Desktop\SlugTests\Completed Slug Tests\MW-2S.aqt
Title: MW-2S
Date: 10/16/15
Time: 08:22:33

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Sargent & Lundy
Project: 2524-302-01-00
Location: Eagle Valley Station
Test Date: 10/5/2015
Test Well: MW-2S

AQUIFER DATA

Saturated Thickness: 76. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: New Well

X Location: 1542898.014 ft
Y Location: 3137255.978 ft

Initial Displacement: 1.295 ft
Static Water Column Height: 9.89 ft
Casing Radius: 0.083 ft
Well Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 25. ft
Corrected Casing Radius (Bouwer-Rice Method): 0.2317 ft
Gravel Pack Porosity: 0.42

No. of Observations: 28

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
13.25	1.295	16.75	0.006
13.5	1.035	17.	0.01
13.75	0.816	17.25	0.002
14.	0.612	17.5	0.003
14.25	0.411	17.75	0.003
14.5	0.27	18.	0.005
14.75	0.165	18.25	0.004
15.	0.105	18.5	0.005
15.25	0.066	18.75	0.004
15.5	0.044	19.	0.003
15.75	0.028	19.26	0.002
16.	0.025	19.5	0.001
16.25	0.016	19.75	0.002
16.5	0.011	20.	0.

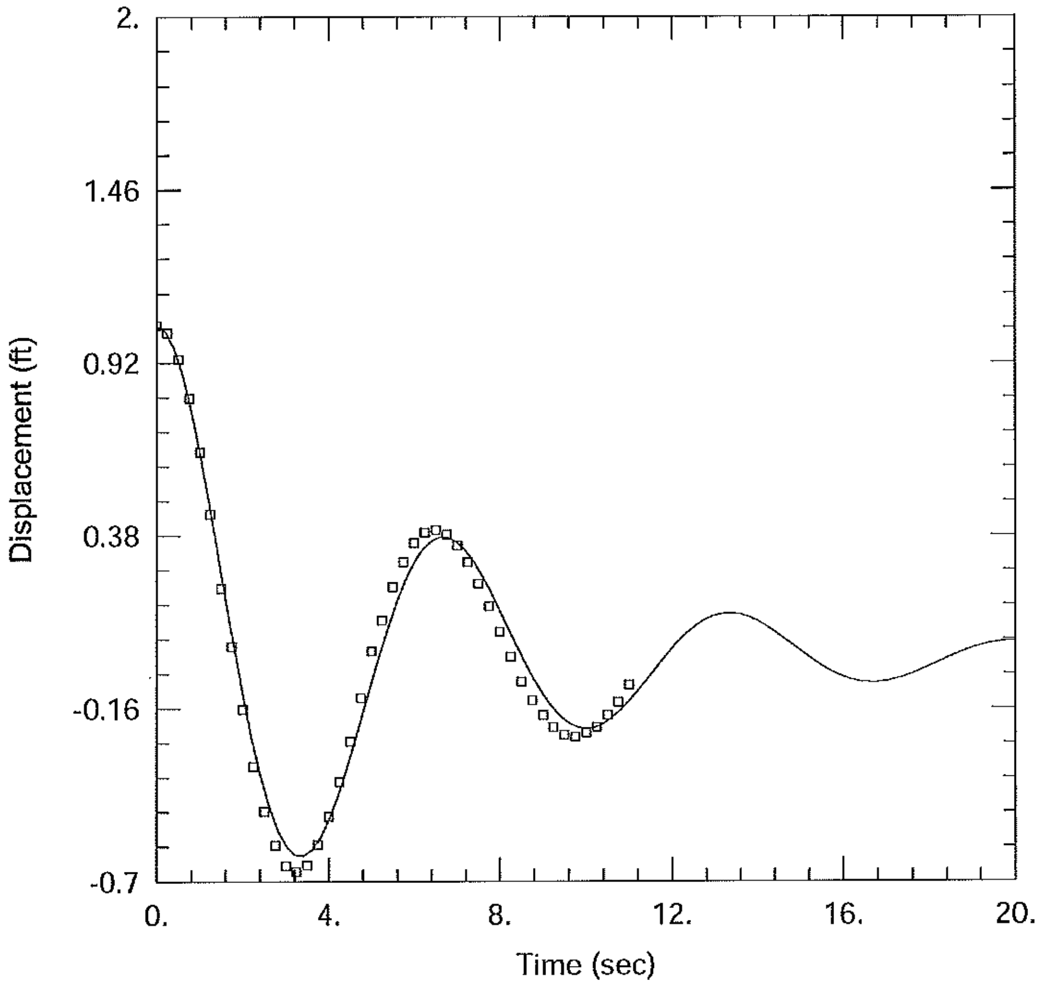
SOLUTION

Slug Test
Aquifer Model: Unconfined
Solution Method: Dagan
Dimensionless Flow Parameter, P: 0.3919

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate



WELL TEST ANALYSIS

Data Set: K:\...\MW-2I-2.aqt
Date: 05/11/16 Time: 08:32:15

AQUIFER DATA

Saturated Thickness: 41.71 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-2I)

Initial Displacement: 1.036 ft
Total Well Penetration Depth: 41.71 ft
Casing Radius: 0.038 ft
Static Water Column Height: 41.71 ft
Screen Length: 10. ft
Wellbore Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined
K = 0.02217 cm/sec
Solution Method: Springer-Gelhar
C(D) = 0.16

Data Set: K:\Wbgm\Client Information\2500-2599\2524\302\01\01 EVS\SlugTests\Completed Slug Tests Apr 201
Date: 05/11/16
Time: 08:34:22

AQUIFER DATA

Saturated Thickness: 41.71 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : MW-2I

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 1.036 ft
Static Water Column Height: 41.71 ft
Casing Radius: 0.038 ft
Wellbore Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 41.71 ft

No. of Observations: 44

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.25	1.013	5.75	0.296
0.5	0.931	6.	0.356
0.75	0.808	6.25	0.389
1.	0.64	6.5	0.396
1.25	0.446	6.75	0.383
1.5	0.215	7.	0.348
1.75	0.033	7.25	0.297
2.	-0.163	7.5	0.229
2.25	-0.341	7.75	0.159
2.5	-0.481	8.	0.078
2.75	-0.588	8.25	0.001
3.	-0.651	8.5	-0.078
3.25	-0.669	8.75	-0.136
3.5	-0.649	9.	-0.182
3.75	-0.586	9.25	-0.219
4.	-0.498	9.5	-0.243
4.25	-0.39	9.75	-0.249
4.5	-0.264	10.	-0.237
4.75	-0.128	10.25	-0.219
5.	0.018	10.5	-0.182
5.25	0.115	10.75	-0.142
5.5	0.218	11.	-0.087

SOLUTION

Aquifer Model: Unconfined

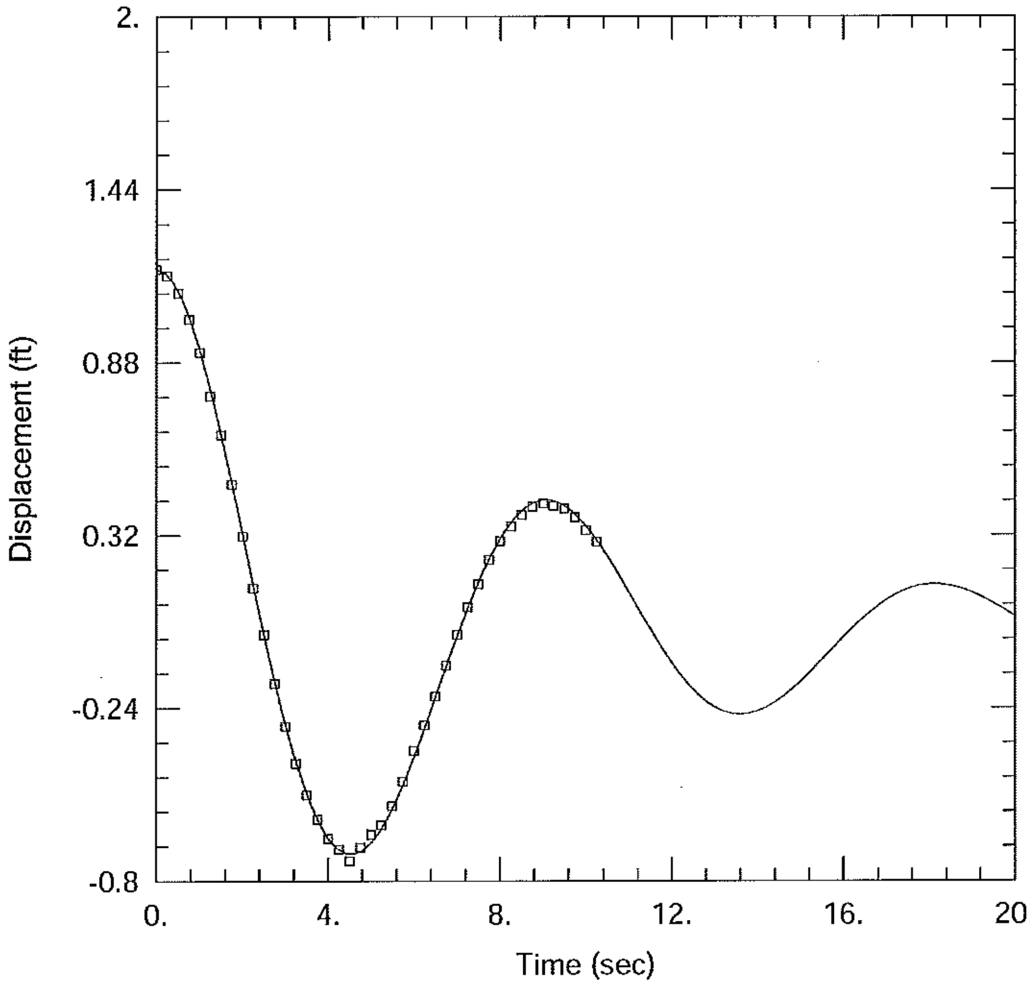
Solution Method: Springer-Gelhar
Shape Factor: 3.378

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.02217	cm/sec
C(D)	0.16	

Solution is critically damped when C(D) = 1.



WELL TEST ANALYSIS

Data Set: K:\...\MW-2D-3.aqt
Date: 05/11/16 Time: 08:42:11

AQUIFER DATA

Saturated Thickness: 73.13 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-2D)

Initial Displacement: 1.18 ft
Total Well Penetration Depth: 73.13 ft
Casing Radius: 0.083 ft
Static Water Column Height: 73.12 ft
Screen Length: 10. ft
Wellbore Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.08593 cm/sec
C(D) = 0.1576

Data Set: K:\Wbgm\Client Information\2500-2599\2524\302\01\01 EVS\SlugTests\Completed Slug Tests Apr 201
Date: 05/11/16
Time: 08:43:31

AQUIFER DATA

Saturated Thickness: 73.13 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : MW-2D

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 1.18 ft
Static Water Column Height: 73.12 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 73.13 ft

No. of Observations: 41

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.25	1.16	5.5	-0.557
0.5	1.105	5.75	-0.478
0.75	1.018	6.	-0.379
1.	0.911	6.25	-0.295
1.25	0.77	6.5	-0.202
1.5	0.643	6.75	-0.103
1.75	0.483	7.	-0.004
2.	0.315	7.25	0.085
2.25	0.148	7.5	0.161
2.5	-0.004	7.75	0.239
2.75	-0.161	8.	0.3
3.	-0.3	8.25	0.347
3.25	-0.421	8.5	0.384
3.5	-0.522	8.75	0.411
3.75	-0.601	9.	0.421
4.	-0.664	9.25	0.413
4.25	-0.698	9.5	0.405
4.5	-0.735	9.75	0.376
4.75	-0.692	10.	0.334
5.	-0.65	10.25	0.298
5.25	-0.619		

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

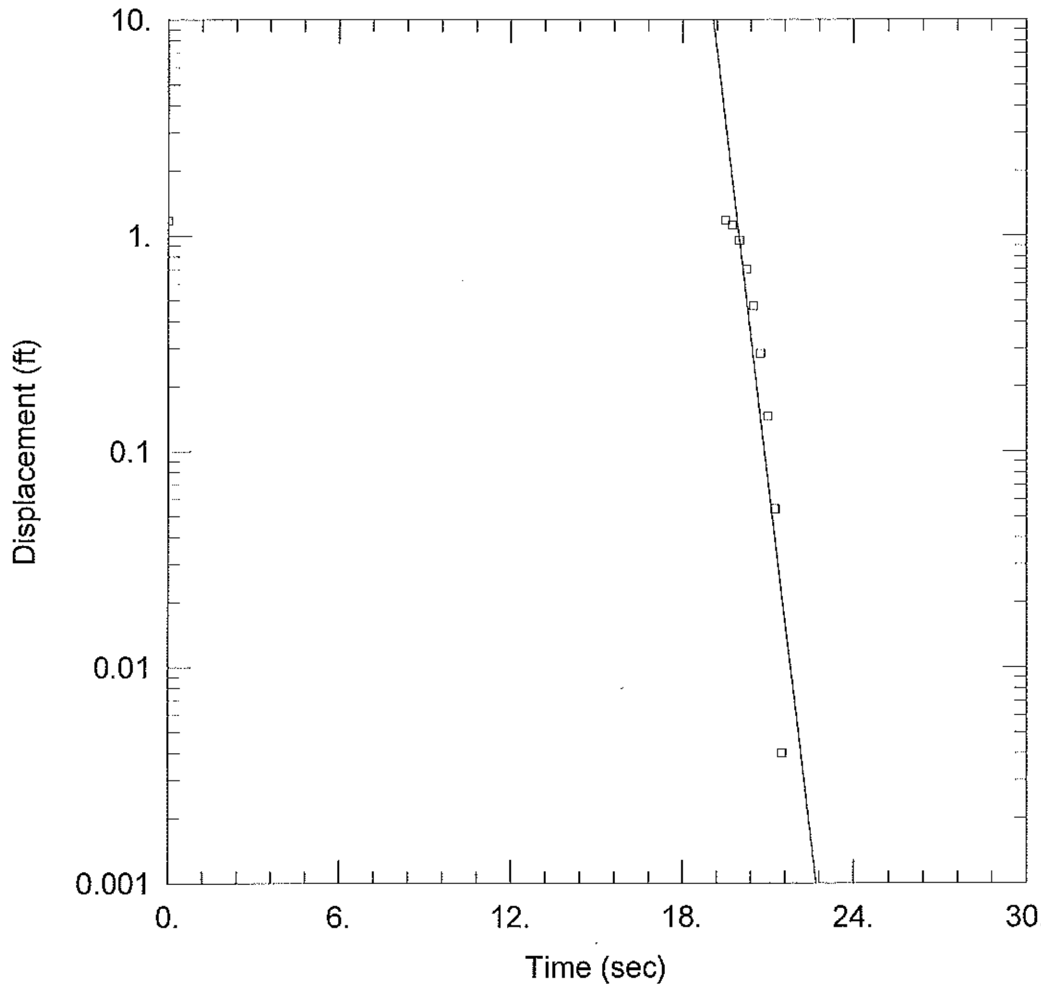
Shape Factor: 3.677

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.08593	cm/sec
C(D)	0.1576	

Solution is critically damped when C(D) = 1.



WELL TEST ANALYSIS

Data Set: C:\Users\tricker\Desktop\SlugTests\Completed Slug Tests\MW-3S.aqt
Date: 10/16/15 Time: 13:36:43

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Sargent & Lundy
Project: 2524-302-01-00
Location: Eagle Valley Station
Test Well: MW-3S
Test Date: 10/5/2015

AQUIFER DATA

Saturated Thickness: 76. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-3S)

Initial Displacement: 1.174 ft
Total Well Penetration Depth: 29. ft
Casing Radius: 0.083 ft

Static Water Column Height: 12.24 ft
Screen Length: 10. ft
Well Radius: 0.344 ft
Gravel Pack Porosity: 0.42

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.5247 cm/sec
y0 = 1.31E+22 ft

AQTESOLV for Windows

Data Set: C:\Users\tricker\Desktop\SlugTests\Completed Slug Tests\MW-3S.aqt
Date: 10/16/15
Time: 13:37:11

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Sargent & Lundy
Project: 2524-302-01-00
Location: Eagle Valley Station
Test Date: 10/5/2015
Test Well: MW-3S

AQUIFER DATA

Saturated Thickness: 76. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-3S

X Location: 1543550.919 ft
Y Location: 3137589.753 ft

Initial Displacement: 1.174 ft
Static Water Column Height: 12.24 ft
Casing Radius: 0.083 ft
Well Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 29. ft
Corrected Casing Radius (Bouwer-Rice Method): 0.2317 ft
Gravel Pack Porosity: 0.42

No. of Observations: 9

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
19.5	1.174	20.75	0.284
19.75	1.117	21.	0.145
20.	0.95	21.25	0.054
20.25	0.696	21.5	0.004
20.5	0.471		

SOLUTION

Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 2.516

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.52	cm/sec
y0	1.31E+22	ft

T = K*b = 1204.7 cm²/sec

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	Approx. C.I.	t-Ratio

K	0.5247	0.001893	+/- 0.004477	277.2	cm/sec
y0	1.31E+22	0.888	+/- 2.1	1.475E+22	ft

C.I. is approximate 95% confidence interval for parameter
t-ratio = estimate/std. error
No estimation window

T = K*b = 1215.5 cm²/sec

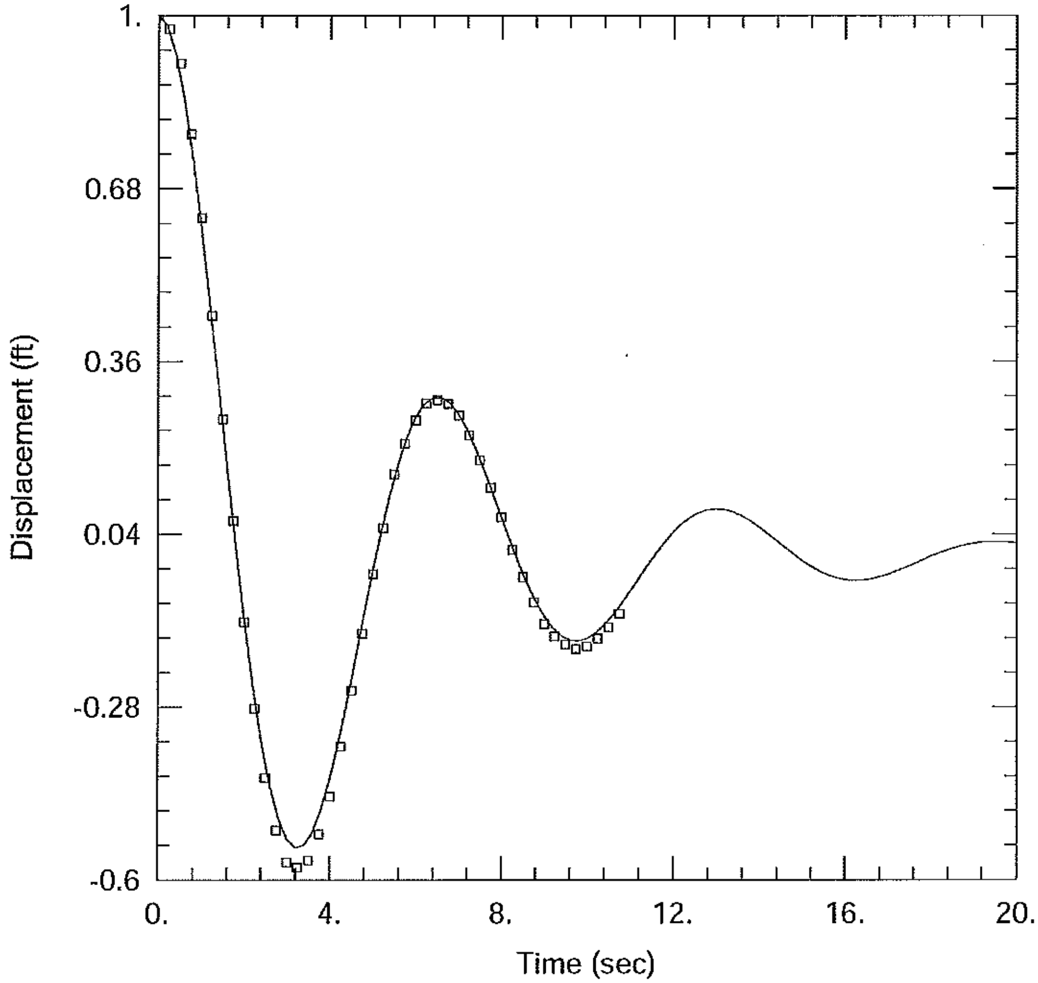
Parameter Correlations

	K	y0
K	1.00	0.00
y0	0.00	1.00

Residual Statistics

for weighted residuals

Sum of Squares ...... 5.52 ft^2
Variance .... 0.7886 ft^2
Std. Deviation .... 0.888 ft
Mean .... -0.2553 ft
No. of Residuals 9
No. of Estimates 2



WELL TEST ANALYSIS

Data Set: K:\...\MW-3I-3.aqt
Date: 05/11/16 Time: 08:48:13

AQUIFER DATA

Saturated Thickness: 40.44 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-3I)

Initial Displacement: 1. ft
Total Well Penetration Depth: 40.44 ft
Casing Radius: 0.038 ft
Static Water Column Height: 40.44 ft
Screen Length: 10. ft
Wellbore Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar

K = 0.01902 cm/sec C(D) = 0.1915

Data Set: K:\Wbgm\Client Information\2500-2599\2524\302\01\01 EVS\SlugTests\Completed Slug Tests Apr 201
Date: 05/11/16
Time: 08:49:25

AQUIFER DATA

Saturated Thickness: 40.44 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : MW-3I

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 1. ft
Static Water Column Height: 40.44 ft
Casing Radius: 0.038 ft
Wellbore Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 40.44 ft

No. of Observations: 43

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.25	0.975	5.75	0.207
0.5	0.911	6.	0.25
0.75	0.781	6.25	0.282
1.	0.625	6.5	0.288
1.25	0.444	6.75	0.281
1.5	0.252	7.	0.259
1.75	0.064	7.25	0.222
2.	-0.124	7.5	0.176
2.25	-0.283	7.75	0.125
2.5	-0.412	8.	0.071
2.75	-0.509	8.25	0.01
3.	-0.568	8.5	-0.04
3.25	-0.577	8.75	-0.087
3.5	-0.565	9.	-0.127
3.75	-0.516	9.25	-0.15
4.	-0.446	9.5	-0.165
4.25	-0.354	9.75	-0.173
4.5	-0.25	10.	-0.169
4.75	-0.145	10.25	-0.154
5.	-0.035	10.5	-0.133
5.25	0.051	10.75	-0.108
5.5	0.15		

SOLUTION

Aquifer Model: Unconfined

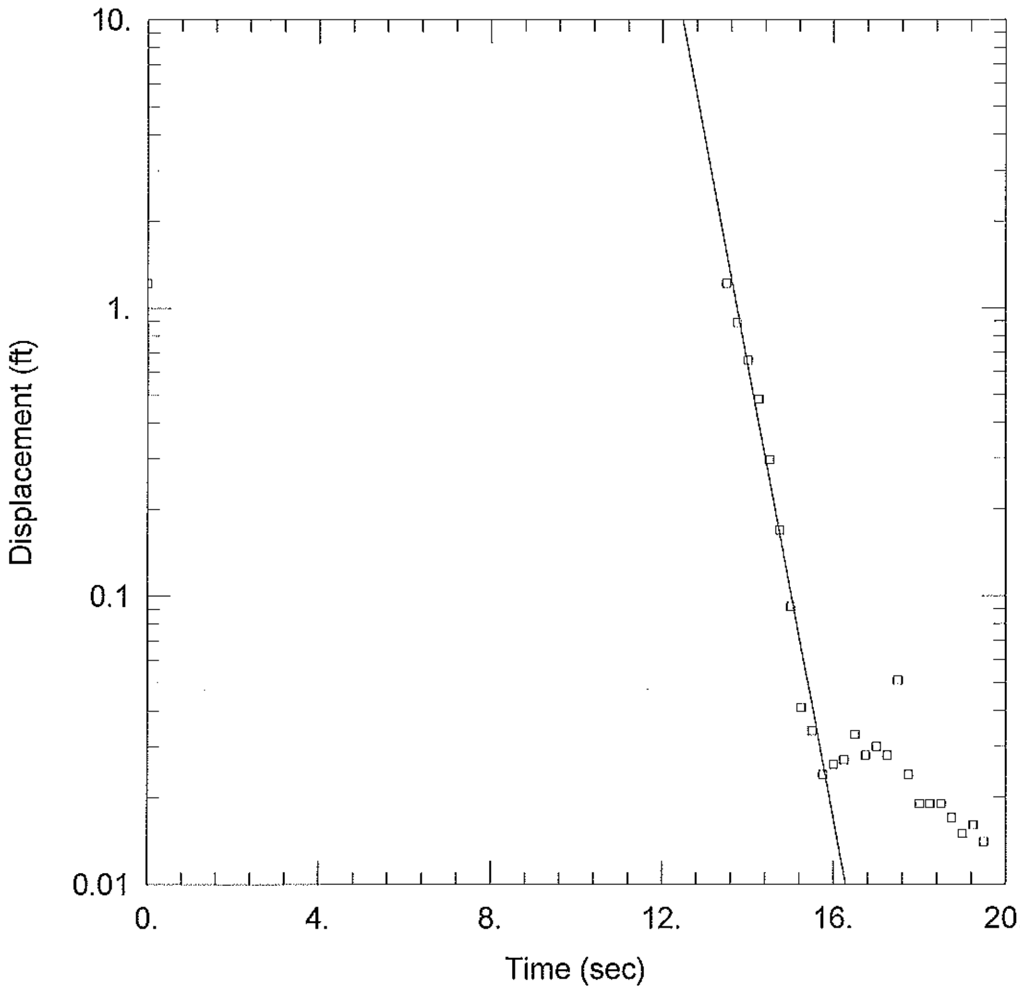
Solution Method: Springer-Gelhar
Shape Factor: 3.362

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.01902	cm/sec
C(D)	0.1915	

Solution is critically damped when C(D) = 1.



MW-4S

Data Set: C:\Users\tricker\Desktop\SlugTests\Completed Slug Tests\MW-4S.aqt
Date: 10/16/15 Time: 13:39:19

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Sargent & Lundy
Project: 2524-302-01-00
Location: Eagle Valley Station
Test Well: MW-4S
Test Date: 10/5/2015

AQUIFER DATA

Saturated Thickness: 76. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-4S)

Initial Displacement: 1.219 ft
Total Well Penetration Depth: 36. ft
Casing Radius: 0.083 ft
Static Water Column Height: 9.62 ft
Screen Length: 10. ft
Well Radius: 0.344 ft
Gravel Pack Porosity: 0.42

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.3852 cm/sec y0 = 6.083E+10 ft

Data Set: C:\Users\tricker\Desktop\SlugTests\Completed Slug Tests\MW-4S.aqt
Title: MW-4S
Date: 10/16/15
Time: 13:39:40

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Sargent & Lundy
Project: 2524-302-01-00
Location: Eagle Valley Station
Test Date: 10/5/2015
Test Well: MW-4S

AQUIFER DATA

Saturated Thickness: 76. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-4S

X Location: 1543840.549 ft
Y Location: 3138359.381 ft

Initial Displacement: 1.219 ft
Static Water Column Height: 9.62 ft
Casing Radius: 0.083 ft
Well Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 36. ft
Corrected Casing Radius (Bouwer-Rice Method): 0.2317 ft
Gravel Pack Porosity: 0.42

No. of Observations: 25

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
13.5	1.219	16.75	0.028
13.75	0.888	17.	0.03
14.	0.659	17.25	0.028
14.25	0.482	17.5	0.051
14.5	0.297	17.75	0.024
14.75	0.169	18.	0.019
15.	0.092	18.25	0.019
15.25	0.041	18.5	0.019
15.5	0.034	18.75	0.017
15.75	0.024	19.	0.015
16.	0.026	19.25	0.016
16.25	0.027	19.5	0.014
16.5	0.033		

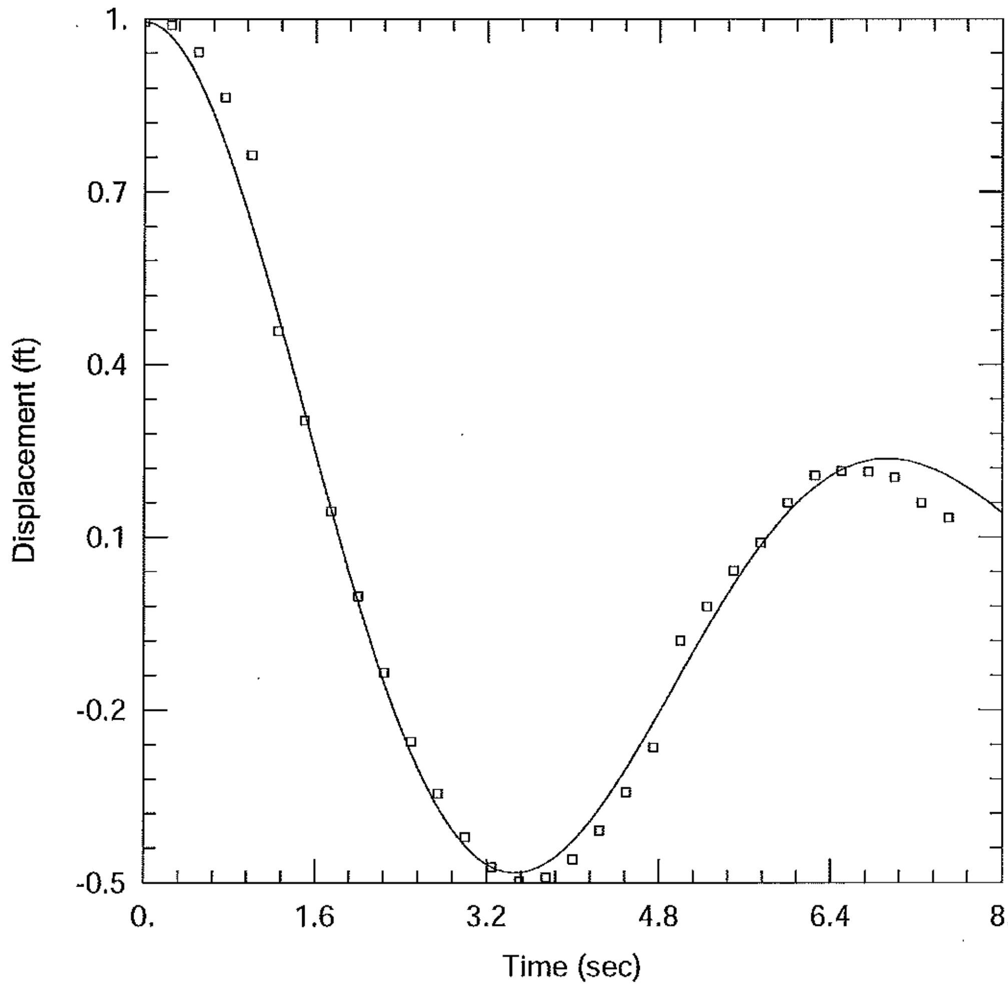
SOLUTION

Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 2.606

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.3852	cm/sec



WELL TEST ANALYSIS

Data Set: K:\...\MW-4I-2.aqt
Date: 05/11/16 | Time: 08:56:55

AQUIFER DATA

Saturated Thickness: 43.82 ft | Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-4I)

Initial Displacement: 0.994 ft
Total Well Penetration Depth: 43.82 ft
Casing Radius: 0.083 ft

Static Water Column Height: 43.82 ft
Screen Length: 10. ft
Wellbore Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined | Solution Method: Springer-Gelhar

K = 0.07451 cm/sec | C(D) = 0.2234

Data Set: K:\Wbgm\Client Information\2500-2599\2524\302\01\01 EVS\SlugTests\Completed Slug Tests Apr 201
Date: 05/11/16
Time: 08:52:06

AQUIFER DATA

Saturated Thickness: 43.82 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : MW-4I

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 0.994 ft
Static Water Column Height: 43.82 ft
Casing Radius: 0.083 ft
Wellbore Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 43.82 ft

No. of Observations: 30

Observation Data

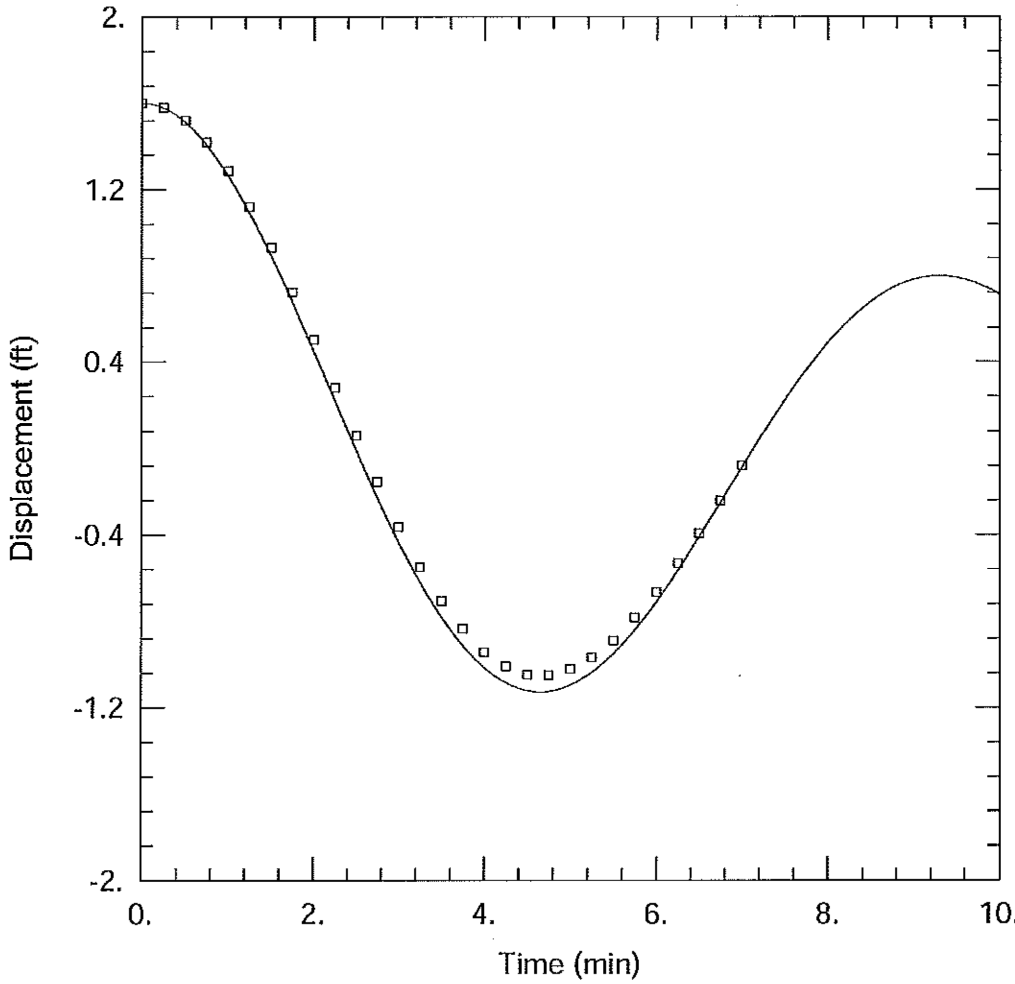
Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.25	0.989	4.	-0.46
0.5	0.942	4.25	-0.41
0.75	0.863	4.5	-0.343
1.	0.763	4.75	-0.265
1.25	0.458	5.	-0.08
1.5	0.302	5.25	-0.021
1.75	0.144	5.5	0.041
2.	-0.003	5.75	0.09
2.25	-0.136	6.	0.159
2.5	-0.255	6.25	0.207
2.75	-0.346	6.5	0.215
3.	-0.421	6.75	0.213
3.25	-0.473	7.	0.203
3.5	-0.498	7.25	0.159
3.75	-0.491	7.5	0.133

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar
Shape Factor: 3.405

VISUAL ESTIMATION RESULTS

Estimated Parameters



WELL TEST ANALYSIS

Data Set: K:\...\MW-4D-2.aqt
Date: 05/11/16 Time: 09:01:46

AQUIFER DATA

Saturated Thickness: 77.48 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-2D)

Initial Displacement: 1.6 ft
Total Well Penetration Depth: 77.48 ft
Casing Radius: 0.038 ft
Static Water Column Height: 77.48 ft
Screen Length: 10. ft
Wellbore Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar
K = 0.00042 cm/sec
C(D) = 0.11

Data Set: K:\Wbgm\Client Information\2500-2599\2524\302\01\01 EVS\SlugTests\Completed Slug Tests Apr 201
Date: 05/11/16
Time: 09:04:49

AQUIFER DATA

Saturated Thickness: 77.48 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : MW-2D

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 1.6 ft
Static Water Column Height: 77.48 ft
Casing Radius: 0.038 ft
Wellbore Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 77.48 ft

No. of Observations: 28

Observation Data

Time (min)	Displacement (ft)	Time (min)	Displacement (ft)
0.25	1.578	3.75	-0.835
0.5	1.519	4.	-0.944
0.75	1.419	4.25	-1.009
1.	1.286	4.5	-1.048
1.25	1.121	4.75	-1.051
1.5	0.931	5.	-1.023
1.75	0.724	5.25	-0.97
2.	0.504	5.5	-0.891
2.25	0.28	5.75	-0.785
2.5	0.059	6.	-0.666
2.75	-0.157	6.25	-0.534
3.	-0.363	6.5	-0.394
3.25	-0.552	6.75	-0.243
3.5	-0.707	7.	-0.081

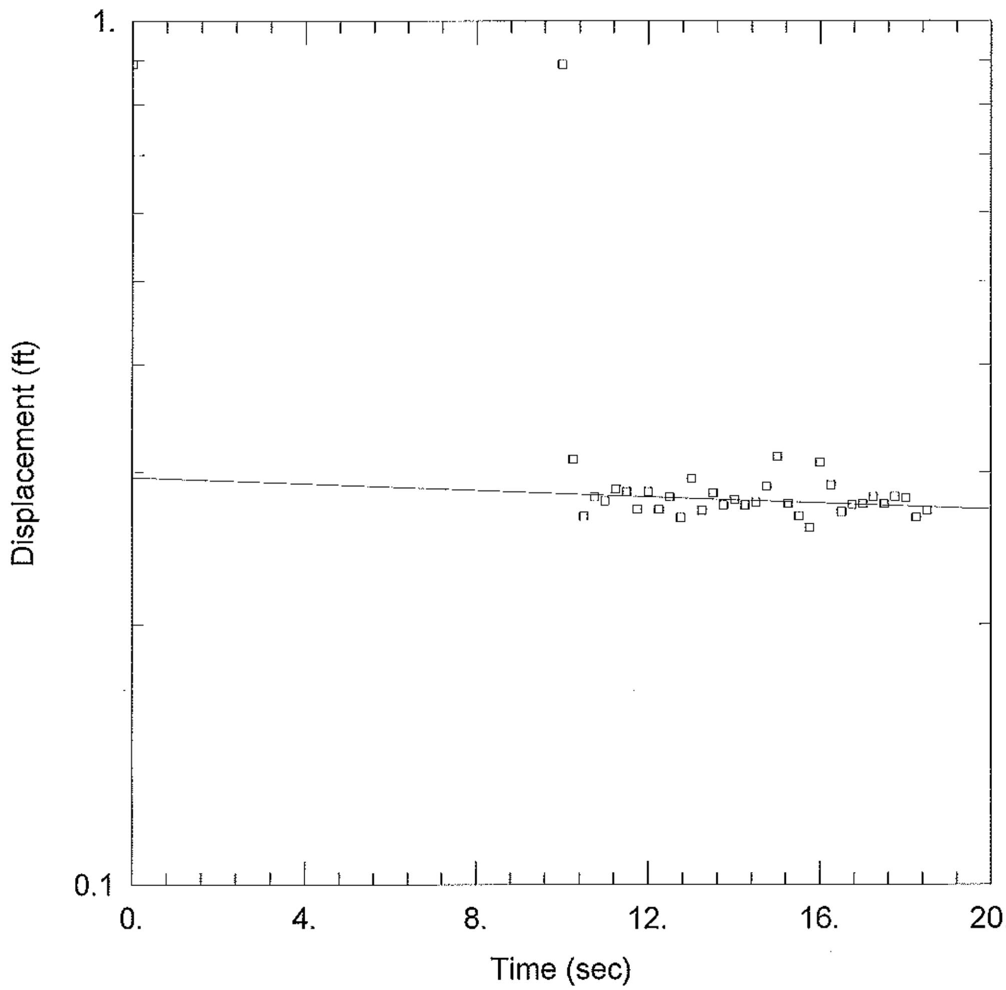
SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar
Shape Factor: 3.707

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate



MW-5S

Data Set: C:\Users\tricker\Desktop\SlugTests\Completed Slug Tests\MW-5S.aqt
Date: 10/16/15 Time: 13:41:03

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Sargent & Lundy
Project: 2524-302-01-00
Location: Eagle Valley Station
Test Well: MW-5S
Test Date: 10/5/2015

AQUIFER DATA

Saturated Thickness: 76. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-3S)

Initial Displacement: 0.891 ft
Total Well Penetration Depth: 36. ft
Casing Radius: 0.083 ft
Static Water Column Height: 0.14 ft
Screen Length: 10. ft
Well Radius: 0.344 ft
Gravel Pack Porosity: 0.42

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0009073 cm/sec
y0 = 0.2959 ft

Data Set: C:\Users\tricker\Desktop\SlugTests\Completed Slug Tests\MW-5S.aqt
Title: MW-5S
Date: 10/16/15
Time: 13:41:19

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Sargent & Lundy
Project: 2524-302-01-00
Location: Eagle Valley Station
Test Date: 10/5/2015
Test Well: MW-5S

AQUIFER DATA

Saturated Thickness: 76. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-3S

X Location: 1542632.004 ft
Y Location: 3138431.566 ft

Initial Displacement: 0.891 ft
Static Water Column Height: 0.14 ft
Casing Radius: 0.083 ft
Well Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 36. ft
Corrected Casing Radius (Bouwer-Rice Method): 0.2317 ft
Gravel Pack Porosity: 0.42

No. of Observations: 35

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
10.	0.891	14.5	0.277
10.25	0.311	14.75	0.289
10.5	0.267	15.	0.313
10.75	0.281	15.25	0.276
11.	0.278	15.5	0.267
11.25	0.287	15.75	0.259
11.5	0.285	16.	0.308
11.75	0.272	16.25	0.29
12.	0.285	16.5	0.27
12.25	0.272	16.75	0.275
12.5	0.281	17.	0.276
12.75	0.266	17.25	0.281
13.	0.295	17.5	0.276
13.25	0.271	17.75	0.281
13.5	0.284	18.	0.28
13.75	0.275	18.25	0.266
14.	0.279	18.5	0.271
14.25	0.275		

SOLUTION

Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 2.606

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.0009073	cm/sec
y0	0.2959	ft

T = K*b = 2.102 cm²/sec

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	Approx. C.I.	t-Ratio	
K	0.01001	0.004876	+/- 0.009918	2.053	cm/sec
y0	0.5762	0.1823	+/- 0.3708	3.161	ft

C.I. is approximate 95% confidence interval for parameter
t-ratio = estimate/std. error
No estimation window

T = K*b = 23.19 cm²/sec

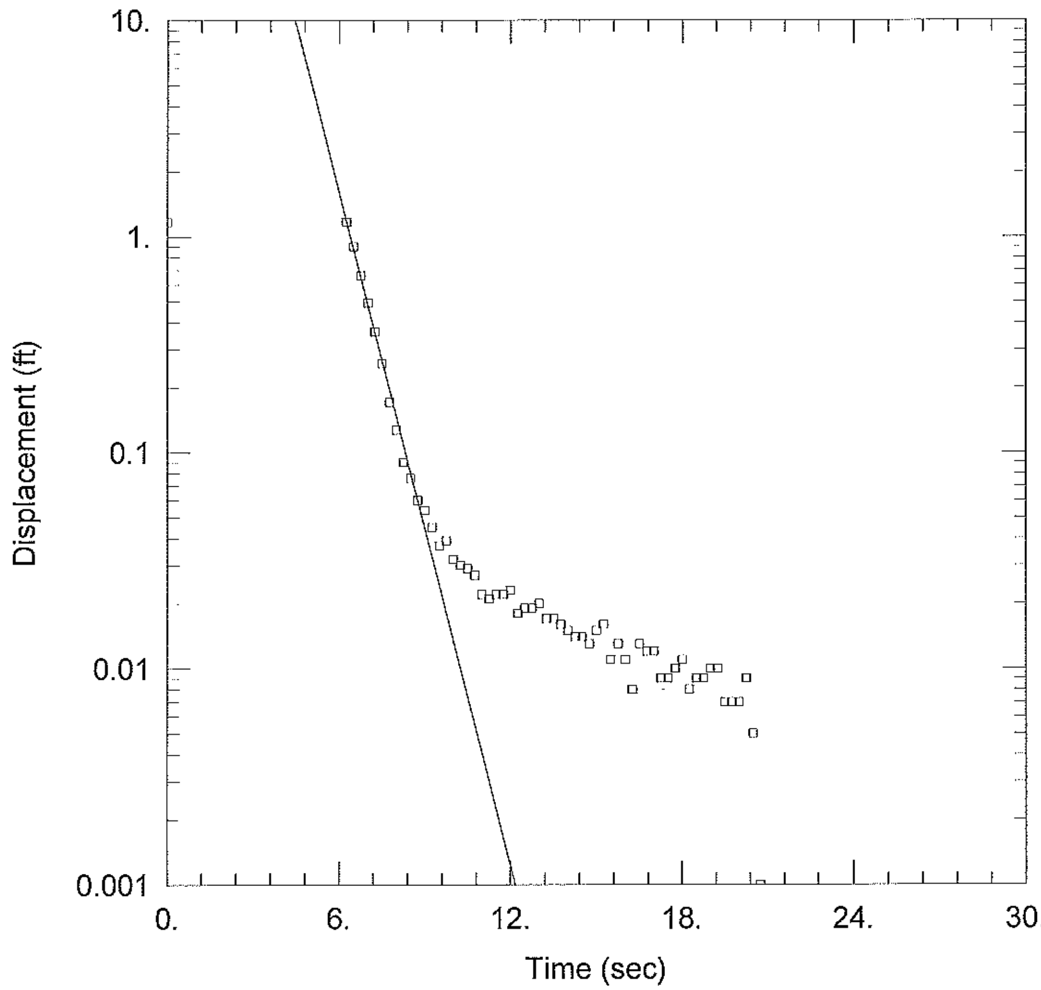
Parameter Correlations

	K	y0
K	1.00	0.98
y0	0.98	1.00

Residual Statistics

for weighted residuals

Sum of Squares . . . . . . 0.3292 ft^2
Variance . . . . 0.009975 ft^2
Std. Deviation . . . . 0.09988 ft
Mean . . . . 0.0002328 ft
No. of Residuals 35
No. of Estimates 2



MW-6S

Data Set: C:\Users\tricker\Desktop\SlugTests\Completed Slug Tests\MW-6S.aqt
Date: 10/16/15 Time: 13:42:06

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Sargent & Lundy
Project: 2524-302-01-00
Location: Eagle Valley Station
Test Well: MW-6S
Test Date: 10/5/2015

AQUIFER DATA

Saturated Thickness: 76. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-6S)

Initial Displacement: 1.168 ft
Total Well Penetration Depth: 34. ft
Casing Radius: 0.083 ft

Static Water Column Height: 10.04 ft
Screen Length: 10. ft
Well Radius: 0.344 ft
Gravel Pack Porosity: 0.42

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.2521 cm/sec
y0 = 2054.2 ft

Data Set: K:\Wbgm\Client Information\2500-2599\2524\302\01\01 EVS\SlugTests\Completed Slug Tests\MW-6S
Title: MW-6S
Date: 10/16/15
Time: 15:32:37

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Sargent & Lundy
Project: 2524-302-01-00
Location: Eagle Valley Station
Test Date: 10/5/2015
Test Well: MW-6S

AQUIFER DATA

Saturated Thickness: 76. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-6S

X Location: 1541915.911 ft
Y Location: 3138402.515 ft

Initial Displacement: 1.168 ft
Static Water Column Height: 10.04 ft
Casing Radius: 0.083 ft
Well Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 34. ft
Corrected Casing Radius (Bouwer-Rice Method): 0.2317 ft
Gravel Pack Porosity: 0.42

No. of Observations: 59

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
6.25	1.168	13.75	0.016
6.5	0.899	14.	0.015
6.75	0.66	14.25	0.014
7.	0.492	14.5	0.014
7.25	0.362	14.75	0.013
7.5	0.258	15.	0.015
7.75	0.171	15.25	0.016
8.	0.127	15.5	0.011
8.25	0.09	15.75	0.013
8.5	0.076	16.	0.011
8.75	0.06	16.25	0.008
9.	0.054	16.5	0.013
9.251	0.045	16.75	0.012
9.501	0.037	17.	0.012
9.751	0.039	17.25	0.009
10.	0.032	17.5	0.009
10.25	0.03	17.75	0.01
10.5	0.029	18.	0.011
10.75	0.027	18.25	0.008
11.	0.022	18.5	0.009
11.25	0.021	18.75	0.009
11.5	0.022	19.	0.01
11.75	0.022	19.25	0.01
12.	0.023	19.5	0.007
12.25	0.018	19.75	0.007
12.5	0.019	20.	0.007
12.75	0.019	20.25	0.009

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
13.	0.02	20.5	0.005
13.25	0.017	20.77	0.001
13.5	0.017		

SOLUTION

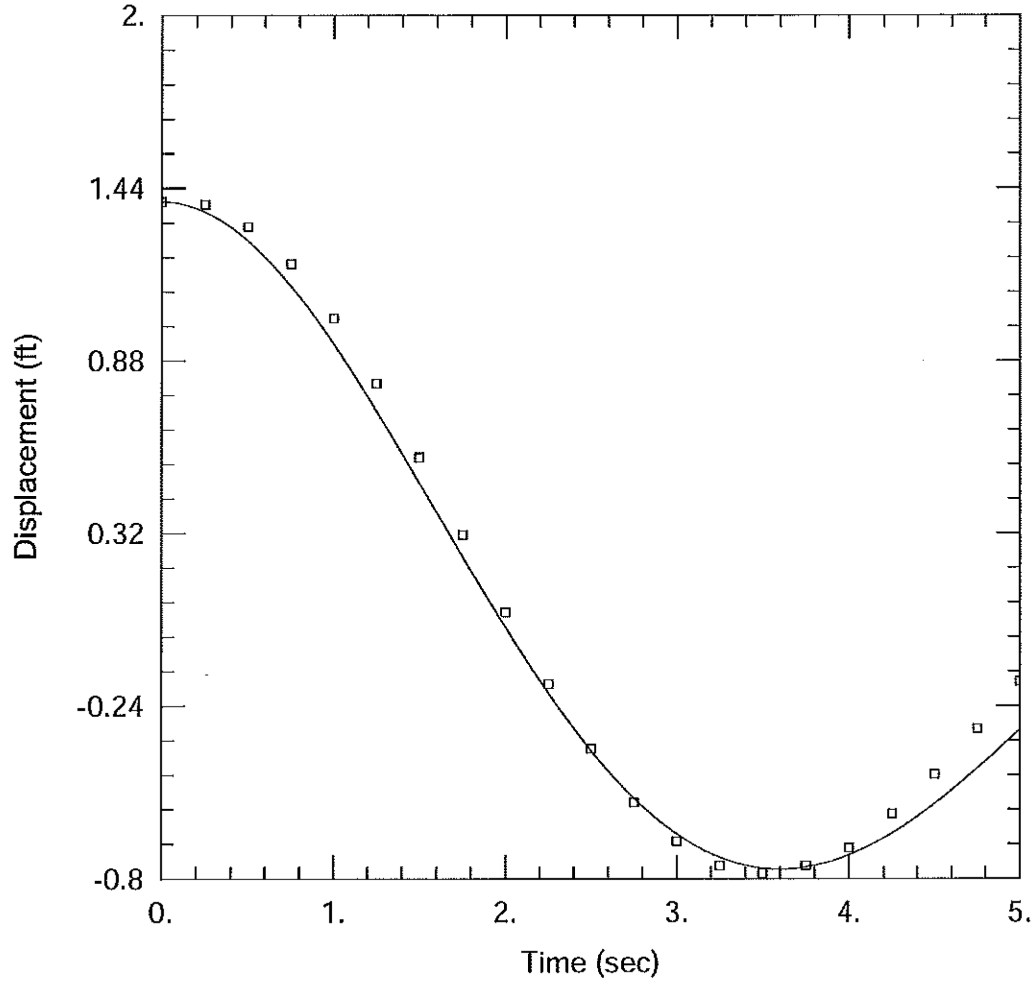
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 2.581

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.2521	cm/sec
y0	2054.2	ft

T = K*b = 584. cm^2/sec



WELL TEST ANALYSIS

Data Set: K:\...\MW-6I-2.aqt
Date: 05/11/16 Time: 09:08:45

AQUIFER DATA

Saturated Thickness: 45.98 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-6I)

Initial Displacement: 1.395 ft
Total Well Penetration Depth: 45.98 ft
Casing Radius: 0.038 ft
Static Water Column Height: 45.98 ft
Screen Length: 10. ft
Wellbore Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar
K = 0.01803 cm/sec
C(D) = 0.1858

Data Set: K:\Wbgm\Client Information\2500-2599\2524\302\01\01 EVS\SlugTests\Completed Slug Tests Apr 201
Date: 05/11/16
Time: 09:13:45

AQUIFER DATA

Saturated Thickness: 45.98 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : MW-6I

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 1.395 ft
Static Water Column Height: 45.98 ft
Casing Radius: 0.038 ft
Wellbore Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 45.98 ft

No. of Observations: 20

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.25	1.386	2.75	-0.554
0.5	1.314	3.	-0.679
0.75	1.194	3.25	-0.758
1.	1.017	3.5	-0.784
1.25	0.806	3.75	-0.758
1.5	0.565	4.	-0.7
1.75	0.314	4.25	-0.591
2.	0.062	4.5	-0.462
2.25	-0.169	4.75	-0.314
2.5	-0.379	5.	-0.162

SOLUTION

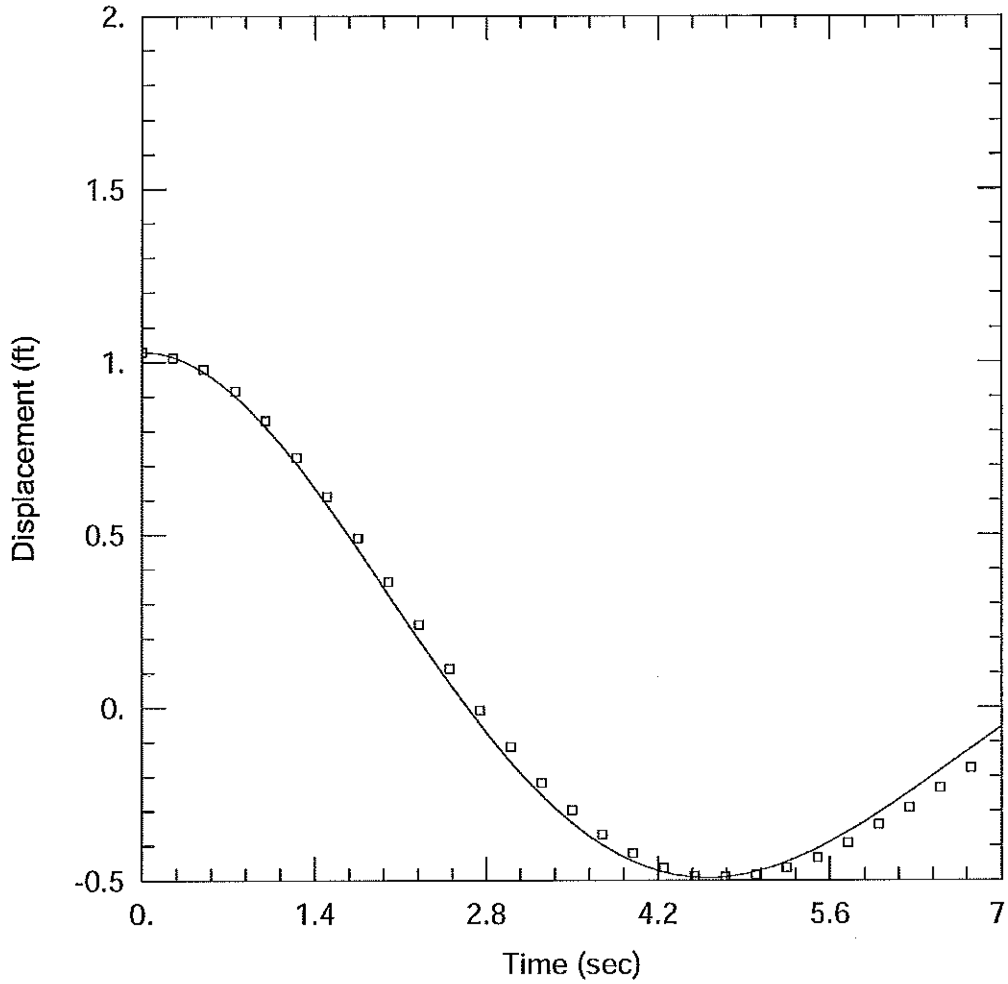
Aquifer Model: Unconfined
Solution Method: Springer-Gelhar
Shape Factor: 3.431

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.01803	cm/sec
C(D)	0.1858	

Solution is critically damped when C(D) = 1.



WELL TEST ANALYSIS

Data Set: K:\...\MW-6D-2.aqt
Date: 05/11/16 Time: 09:10:22

AQUIFER DATA

Saturated Thickness: 76.73 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-6D)

Initial Displacement: 1.028 ft
Total Well Penetration Depth: 76.73 ft
Casing Radius: 0.038 ft
Static Water Column Height: 76.73 ft
Screen Length: 10. ft
Wellbore Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar
K = 0.01254 cm/sec
C(D) = 0.2274

Data Set: K:\Wbgm\Client Information\2500-2599\2524\302\01\01 EVS\SlugTests\Completed Slug Tests Apr 201
Date: 05/11/16
Time: 09:11:42

AQUIFER DATA

Saturated Thickness: 76.73 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : MW-6D

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 1.028 ft
Static Water Column Height: 76.73 ft
Casing Radius: 0.038 ft
Wellbore Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 76.73 ft

No. of Observations: 27

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.25	1.011	3.75	-0.369
0.5	0.977	4.	-0.423
0.75	0.914	4.25	-0.464
1.	0.828	4.5	-0.488
1.25	0.722	4.75	-0.49
1.5	0.609	5.	-0.485
1.75	0.489	5.25	-0.464
2.	0.363	5.5	-0.436
2.25	0.238	5.75	-0.393
2.5	0.111	6.	-0.339
2.75	-0.01	6.25	-0.291
3.	-0.115	6.5	-0.234
3.25	-0.218	6.75	-0.176
3.5	-0.298		

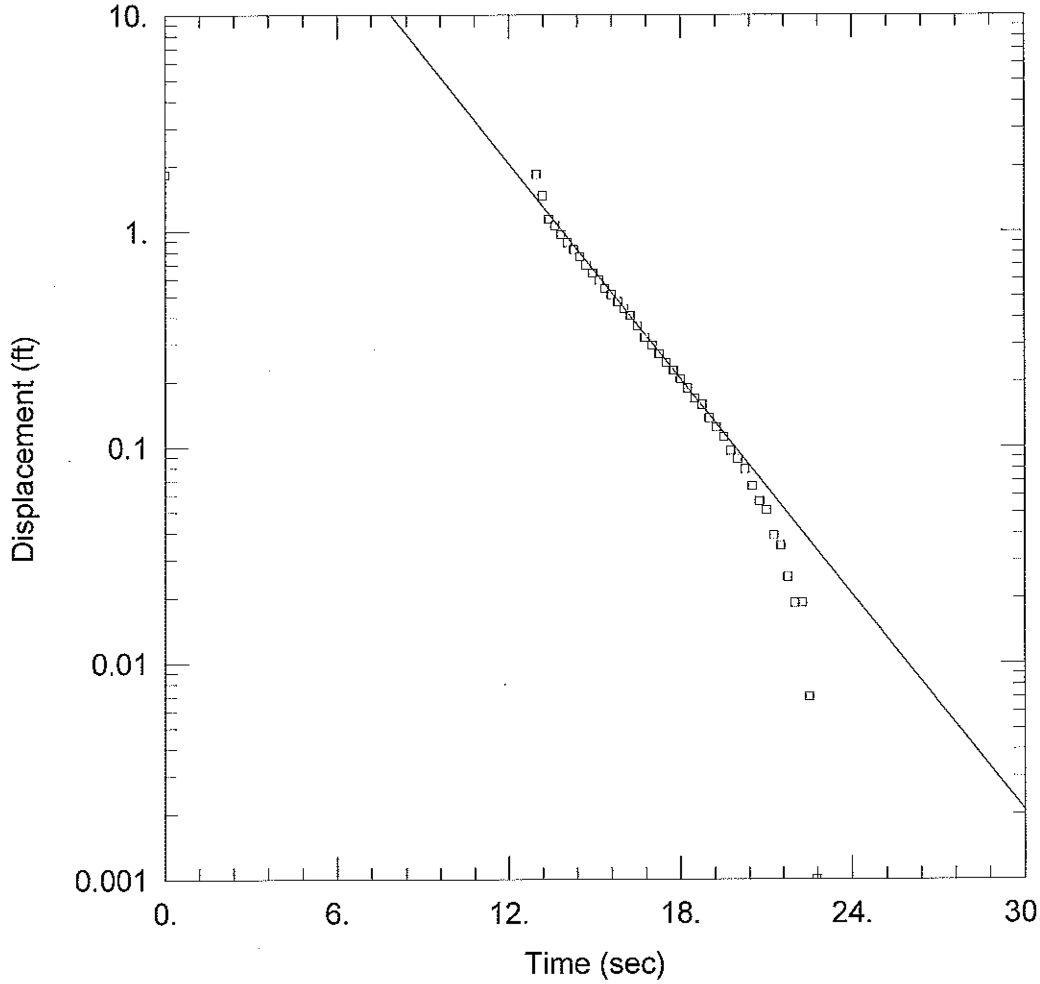
SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar
Shape Factor: 3.702

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate



MW-7S

Data Set: K:\...\MW-7S.aqt
Date: 10/16/15 Time: 15:51:13

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Sargent & Lundy
Project: 2524-302-01-00
Location: Eagle Valley Station
Test Well: MW-7S
Test Date: 10/5/2015

AQUIFER DATA

Saturated Thickness: 76. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-7S)

Initial Displacement: 1.834 ft
Total Well Penetration Depth: 30. ft
Casing Radius: 0.083 ft
Static Water Column Height: 8.36 ft
Screen Length: 10. ft
Well Radius: 0.344 ft
Gravel Pack Porosity: 0.42

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0792 cm/sec y0 = 202.6 ft

Data Set: K:\Wbgm\Client Information\2500-2599\2524\302\01\01 EVS\SlugTests\Completed Slug Tests\MW-7S
Title: MW-7S
Date: 10/16/15
Time: 15:33:28

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Sargent & Lundy
Project: 2524-302-01-00
Location: Eagle Valley Station
Test Date: 10/5/2015
Test Well: MW-7S

AQUIFER DATA

Saturated Thickness: 76. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-7S

X Location: 1543230.701 ft
Y Location: 3138684.612 ft

Initial Displacement: 1.834 ft
Static Water Column Height: 8.36 ft
Casing Radius: 0.083 ft
Well Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 30. ft
Corrected Casing Radius (Bouwer-Rice Method): 0.2317 ft
Gravel Pack Porosity: 0.42

No. of Observations: 42

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
12.96	1.834	17.75	0.226
13.18	1.462	18.	0.206
13.4	1.137	18.25	0.187
13.62	1.063	18.5	0.168
13.84	0.964	18.75	0.157
14.06	0.885	19.	0.136
14.28	0.823	19.25	0.123
14.49	0.762	19.5	0.111
14.71	0.696	19.75	0.096
14.93	0.639	20.	0.088
15.15	0.593	20.25	0.079
15.37	0.543	20.5	0.066
15.59	0.508	20.75	0.056
15.81	0.471	21.	0.051
16.02	0.438	21.25	0.039
16.25	0.406	21.5	0.035
16.5	0.364	21.75	0.025
16.75	0.322	22.	0.019
17.	0.296	22.25	0.019
17.25	0.269	22.5	0.007
17.5	0.246	22.75	0.001

SOLUTION

Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

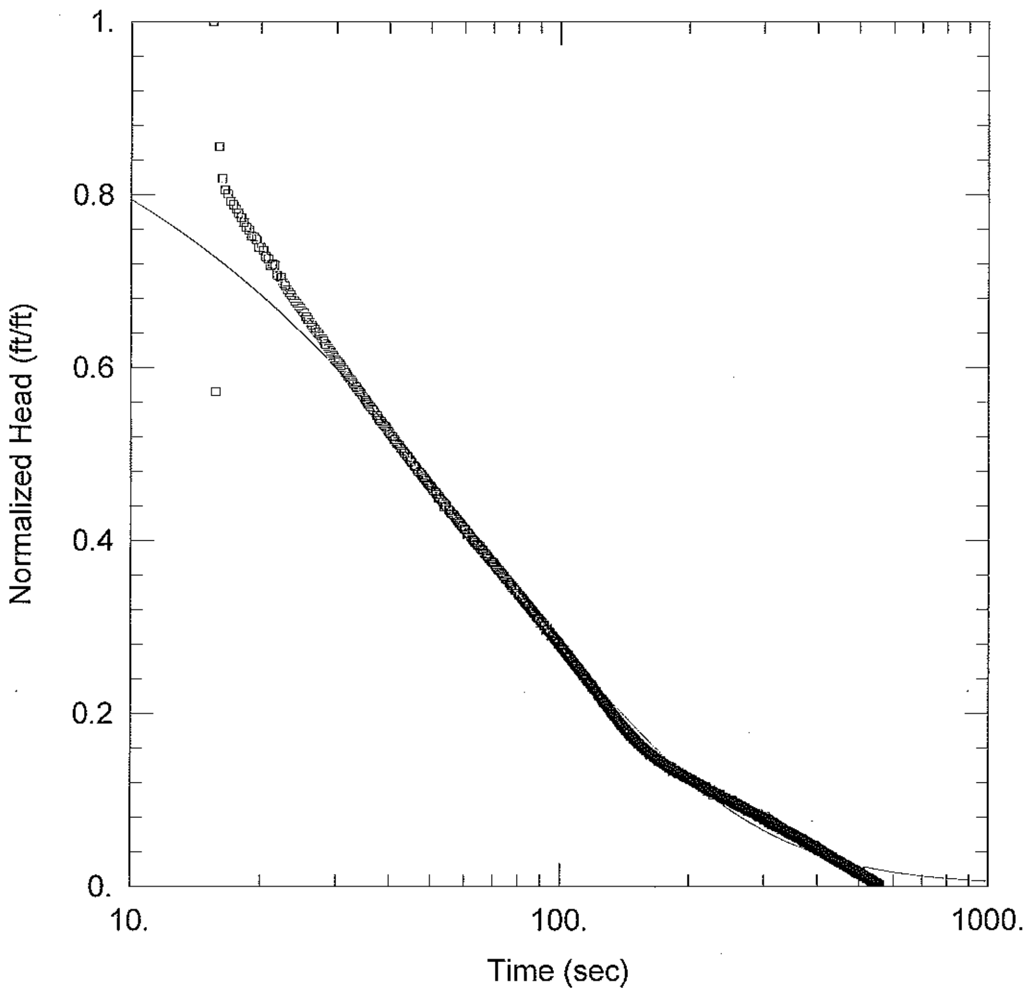
ln(Re/rw): 2.53

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.0792	cm/sec
y0	202.6	ft

T = K*b = 183.5 cm^2/sec



MW-8S

Data Set: C:\Users\tricker\Desktop\SlugTests\Completed Slug Tests\MW-8S.aqt
Date: 10/16/15 Time: 13:50:53

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Sargent & Lundy
Project: 2524-302-01-00
Location: Eagle Valley Station
Test Well: MW-8S
Test Date: 10/5/2015

AQUIFER DATA

Saturated Thickness: 76. ft

WELL DATA (MW-8S)

Initial Displacement: 2.317 ft
Total Well Penetration Depth: 27. ft
Casing Radius: 0.083 ft

Static Water Column Height: 5.87 ft
Screen Length: 10. ft
Well Radius: 0.344 ft
Gravel Pack Porosity: 0.42

SOLUTION

Aquifer Model: Unconfined

Solution Method: KGS Model

Kr = 0.0003191 cm/sec
Kz/Kr = 1

Ss = 9.362E-5 ft^{-1}

Data Set: C:\Users\tricker\Desktop\SlugTests\Completed Slug Tests\MW-8S.aqt
Title: MW-8S
Date: 10/16/15
Time: 13:52:22

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Sargent & Lundy
Project: 2524-302-01-00
Location: Eagle Valley Station
Test Date: 10/5/2015
Test Well: MW-8S

AQUIFER DATA

Saturated Thickness: 76. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-8S

X Location: 1543861.693 ft
Y Location: 3139276.536 ft

Initial Displacement: 2.317 ft
Static Water Column Height: 5.87 ft
Casing Radius: 0.083 ft
Well Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 27. ft
Corrected Casing Radius (Bouwer-Rice Method): 0.083 ft
Gravel Pack Porosity: 0.42

No. of Observations: 2176

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
15.5	2.317	287.5	0.194
15.75	1.326	287.8	0.192
16.	1.983	288.	0.192
16.25	1.897	288.3	0.191
16.5	1.867	288.5	0.192
16.75	1.856	288.8	0.191
17.	1.836	289.	0.192
17.25	1.827	289.3	0.192
17.5	1.816	289.5	0.191
17.75	1.804	289.8	0.19
18.	1.793	290.	0.19
18.25	1.78	290.3	0.192
18.5	1.767	290.5	0.192
18.75	1.76	290.8	0.19
19.	1.743	291.	0.186
19.25	1.741	291.3	0.19
19.5	1.734	291.5	0.188
19.75	1.713	291.8	0.194
20.	1.713	292.	0.188
20.25	1.704	292.3	0.188
20.5	1.688	292.5	0.191
20.75	1.682	292.8	0.185
21.	1.664	293.	0.185
21.25	1.668	293.3	0.186
21.5	1.665	293.5	0.187
21.75	1.639	293.8	0.184
22.	1.636	294.	0.184

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
22.25	1.632	294.3	0.188
22.5	1.616	294.5	0.187
22.75	1.61	294.8	0.188
23.	1.599	295.	0.184
23.25	1.592	295.3	0.187
23.5	1.585	295.5	0.189
23.75	1.577	295.8	0.185
24.	1.569	296.	0.186
24.25	1.563	296.3	0.186
24.5	1.555	296.5	0.184
24.75	1.549	296.8	0.186
25.	1.541	297.	0.185
25.25	1.536	297.3	0.185
25.5	1.526	297.5	0.183
25.75	1.519	297.8	0.184
26.	1.511	298.	0.185
26.25	1.504	298.3	0.185
26.5	1.497	298.5	0.183
26.75	1.492	298.8	0.182
27.	1.485	299.	0.182
27.25	1.481	299.3	0.183
27.5	1.475	299.5	0.183
27.75	1.467	299.8	0.177
28.	1.461	300.	0.184
28.25	1.453	300.3	0.184
28.5	1.448	300.5	0.18
28.75	1.441	300.8	0.179
29.	1.435	301.	0.177
29.25	1.43	301.3	0.181
29.5	1.423	301.5	0.179
29.75	1.417	301.8	0.177
30.	1.411	302.	0.18
30.25	1.406	302.3	0.179
30.5	1.401	302.5	0.183
30.75	1.396	302.8	0.178
31.	1.39	303.	0.187
31.25	1.384	303.3	0.179
31.5	1.377	303.5	0.182
31.78	1.373	303.8	0.179
32.	1.366	304.	0.178
32.25	1.361	304.3	0.176
32.5	1.356	304.5	0.181
32.75	1.352	304.8	0.177
33.	1.346	305.	0.183
33.25	1.34	305.3	0.176
33.5	1.337	305.5	0.18
33.75	1.331	305.8	0.183
34.	1.327	306.	0.177
34.25	1.323	306.3	0.178
34.5	1.317	306.5	0.174
34.75	1.312	306.8	0.177
35.	1.306	307.	0.177
35.25	1.302	307.3	0.175
35.5	1.297	307.5	0.175
35.75	1.292	307.8	0.175
36.	1.286	308.	0.17
36.25	1.284	308.3	0.18
36.5	1.278	308.5	0.176
36.75	1.275	308.8	0.171
37.	1.27	309.	0.174
37.25	1.263	309.3	0.175
37.5	1.261	309.5	0.178
37.75	1.254	309.8	0.177
38.	1.248	310.	0.169
38.25	1.246	310.3	0.173
38.5	1.241	310.5	0.168

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
38.75	1.237	310.8	0.174
39.	1.234	311.	0.17
39.25	1.231	311.3	0.173
39.5	1.225	311.5	0.169
39.75	1.22	311.8	0.172
40.	1.216	312.	0.174
40.25	1.212	312.3	0.169
40.5	1.207	312.5	0.174
40.75	1.205	312.8	0.165
41.	1.198	313.	0.169
41.25	1.197	313.3	0.172
41.5	1.191	313.5	0.169
41.75	1.186	313.8	0.171
42.	1.183	314.	0.167
42.25	1.182	314.3	0.166
42.5	1.175	314.5	0.172
42.76	1.172	314.8	0.166
43.	1.167	315.	0.171
43.25	1.165	315.3	0.164
43.5	1.161	315.5	0.166
43.75	1.159	315.8	0.165
44.	1.154	316.	0.17
44.25	1.151	316.2	0.163
44.5	1.148	316.5	0.168
44.75	1.143	316.8	0.172
45.	1.139	317.	0.166
45.25	1.135	317.3	0.166
45.5	1.129	317.5	0.167
45.75	1.127	317.8	0.169
46.	1.125	318.	0.164
46.25	1.123	318.3	0.167
46.5	1.118	318.5	0.164
46.75	1.112	318.8	0.166
47.	1.11	319.	0.167
47.25	1.108	319.3	0.165
47.5	1.105	319.5	0.164
47.75	1.102	319.8	0.167
48.	1.098	320.	0.16
48.25	1.094	320.3	0.163
48.5	1.093	320.5	0.163
48.75	1.088	320.8	0.164
49.	1.086	321.	0.161
49.25	1.081	321.3	0.163
49.5	1.077	321.5	0.164
49.75	1.075	321.8	0.16
50.	1.073	322.	0.164
50.25	1.07	322.3	0.165
50.5	1.067	322.5	0.164
50.75	1.061	322.8	0.162
51.	1.058	323.	0.165
51.25	1.057	323.3	0.163
51.5	1.054	323.5	0.165
51.76	1.05	323.8	0.159
52.	1.041	324.	0.163
52.36	1.044	324.3	0.16
52.58	1.038	324.5	0.162
52.8	1.037	324.8	0.161
53.17	1.033	325.	0.162
53.39	1.029	325.3	0.159
53.6	1.029	325.5	0.159
53.82	1.017	325.8	0.156
54.17	1.023	326.	0.161
54.39	1.017	326.3	0.155
54.61	1.019	326.5	0.159
54.98	1.013	326.8	0.157
55.19	1.009	327.	0.158

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
55.41	1.007	327.3	0.157
55.63	1.002	327.5	0.158
55.85	1.002	327.8	0.157
56.07	0.998	328.	0.156
56.29	0.997	328.3	0.156
56.51	0.997	328.5	0.156
56.75	0.995	328.8	0.156
57.	0.99	329.	0.159
57.26	0.988	329.3	0.157
57.5	0.985	329.5	0.154
57.75	0.982	329.8	0.151
58.	0.978	330.	0.155
58.25	0.976	330.3	0.152
58.5	0.973	330.5	0.156
58.75	0.972	330.8	0.156
59.	0.967	331.	0.157
59.25	0.965	331.3	0.153
59.5	0.963	331.5	0.154
59.75	0.961	331.8	0.153
60.	0.957	332.	0.152
60.25	0.956	332.3	0.153
60.5	0.954	332.5	0.152
60.75	0.943	332.8	0.154
61.12	0.947	333.	0.154
61.34	0.944	333.3	0.152
61.56	0.943	333.5	0.151
61.93	0.938	333.8	0.153
62.15	0.935	334.	0.15
62.37	0.934	334.3	0.151
62.59	0.93	334.5	0.15
62.87	0.929	334.8	0.153
63.09	0.927	335.	0.149
63.3	0.925	335.3	0.15
63.52	0.921	335.5	0.149
63.75	0.921	335.8	0.15
64.	0.918	336.	0.15
64.25	0.917	336.3	0.15
64.5	0.914	336.5	0.151
64.75	0.915	336.8	0.146
65.	0.912	337.	0.15
65.25	0.906	337.3	0.149
65.5	0.91	337.5	0.149
65.75	0.903	337.8	0.15
66.	0.901	338.	0.149
66.25	0.901	338.3	0.149
66.5	0.9	338.5	0.15
66.75	0.893	338.8	0.146
67.	0.892	339.	0.151
67.25	0.89	339.3	0.146
67.5	0.891	339.5	0.149
67.75	0.886	339.8	0.145
68.	0.884	340.	0.149
68.25	0.881	340.3	0.146
68.5	0.878	340.5	0.144
68.75	0.876	340.8	0.147
69.	0.877	341.	0.145
69.25	0.871	341.3	0.146
69.5	0.871	341.5	0.145
69.79	0.87	341.8	0.144
70.01	0.867	342.	0.146
70.25	0.867	342.3	0.143
70.5	0.862	342.5	0.144
70.75	0.862	342.8	0.15
71.	0.858	343.	0.142
71.25	0.855	343.3	0.141
71.5	0.853	343.5	0.147

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
71.75	0.848	343.8	0.146
72.	0.85	344.	0.143
72.25	0.847	344.3	0.145
72.5	0.845	344.5	0.141
72.75	0.846	344.8	0.143
73.	0.841	345.	0.142
73.25	0.839	345.3	0.142
73.5	0.838	345.5	0.14
73.75	0.836	345.8	0.143
74.	0.832	346.	0.143
74.25	0.831	346.3	0.141
74.5	0.829	346.5	0.144
74.75	0.825	346.8	0.142
75.	0.822	347.	0.141
75.25	0.822	347.3	0.139
75.5	0.82	347.5	0.141
75.75	0.82	347.8	0.14
76.	0.814	348.	0.143
76.25	0.816	348.3	0.142
76.5	0.811	348.5	0.14
76.75	0.812	348.8	0.139
77.	0.807	349.	0.14
77.25	0.806	349.3	0.139
77.5	0.806	349.5	0.139
77.75	0.799	349.8	0.14
78.	0.799	350.	0.14
78.25	0.8	350.3	0.137
78.5	0.795	350.5	0.137
78.75	0.795	350.8	0.136
79.	0.791	351.	0.137
79.25	0.791	351.3	0.136
79.5	0.791	351.5	0.14
79.75	0.786	351.8	0.138
80.	0.783	352.	0.137
80.25	0.786	352.3	0.135
80.5	0.779	352.5	0.137
80.75	0.779	352.8	0.14
81.	0.778	353.	0.136
81.25	0.773	353.3	0.137
81.5	0.778	353.5	0.136
81.75	0.77	353.8	0.135
82.	0.771	354.	0.135
82.25	0.767	354.3	0.135
82.5	0.767	354.5	0.136
82.75	0.765	354.8	0.134
83.	0.76	355.	0.136
83.25	0.76	355.3	0.135
83.5	0.759	355.5	0.134
83.75	0.757	355.8	0.135
84.	0.755	356.	0.131
84.25	0.753	356.3	0.134
84.5	0.752	356.5	0.133
84.75	0.751	356.8	0.134
85.	0.749	357.	0.133
85.25	0.745	357.3	0.132
85.5	0.745	357.5	0.134
85.75	0.743	357.8	0.133
86.	0.741	358.	0.131
86.25	0.739	358.3	0.133
86.5	0.737	358.5	0.131
86.75	0.734	358.8	0.133
87.	0.735	359.	0.129
87.25	0.731	359.3	0.13
87.5	0.73	359.5	0.131
87.75	0.729	359.8	0.133
88.	0.726	360.	0.13

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
88.25	0.722	360.3	0.132
88.5	0.724	360.5	0.131
88.75	0.718	360.8	0.131
89.	0.719	361.	0.13
89.25	0.717	361.3	0.13
89.5	0.718	361.5	0.13
89.75	0.714	361.8	0.131
90.	0.705	362.	0.131
90.45	0.71	362.3	0.13
90.67	0.709	362.5	0.127
90.89	0.707	362.8	0.128
91.11	0.706	363.	0.127
91.6	0.698	363.3	0.131
91.82	0.7	363.5	0.128
92.04	0.7	363.8	0.129
92.25	0.698	364.	0.128
92.47	0.686	364.3	0.128
92.94	0.689	364.5	0.129
93.16	0.688	364.8	0.126
93.38	0.693	365.	0.127
93.6	0.688	365.3	0.128
93.82	0.687	365.5	0.126
94.32	0.682	365.8	0.129
94.54	0.683	366.	0.127
94.76	0.681	366.3	0.129
94.98	0.679	366.5	0.125
95.46	0.67	366.8	0.129
95.68	0.671	367.	0.127
95.9	0.675	367.3	0.126
96.12	0.672	367.5	0.128
96.39	0.67	367.8	0.126
96.61	0.669	368.	0.123
96.83	0.666	368.3	0.124
97.05	0.664	368.5	0.122
97.27	0.663	368.8	0.128
97.48	0.662	369.	0.125
97.7	0.66	369.3	0.126
97.92	0.659	369.5	0.124
98.14	0.657	369.8	0.119
98.36	0.659	370.	0.124
98.58	0.656	370.3	0.124
98.8	0.656	370.5	0.12
99.02	0.649	370.8	0.124
99.24	0.654	371.	0.122
99.45	0.65	371.3	0.118
99.67	0.648	371.5	0.125
99.89	0.645	371.8	0.126
100.1	0.645	372.	0.117
100.3	0.644	372.3	0.124
100.5	0.641	372.5	0.123
100.8	0.64	372.8	0.117
101.	0.64	373.	0.123
101.3	0.637	373.3	0.12
101.5	0.637	373.5	0.118
101.8	0.635	373.8	0.117
102.	0.632	374.	0.118
102.3	0.633	374.3	0.12
102.5	0.633	374.5	0.12
102.8	0.628	374.8	0.118
103.	0.627	375.	0.12
103.3	0.624	375.3	0.121
103.5	0.625	375.5	0.118
103.8	0.622	375.8	0.119
104.	0.623	376.	0.121
104.3	0.618	376.3	0.116
104.5	0.618	376.5	0.119

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
104.8	0.62	376.8	0.118
105.	0.614	377.	0.12
105.3	0.614	377.3	0.118
105.5	0.613	377.5	0.117
105.8	0.611	377.8	0.118
106.	0.61	378.	0.115
106.3	0.607	378.3	0.119
106.5	0.605	378.5	0.114
106.8	0.603	378.8	0.116
107.	0.602	379.	0.115
107.3	0.598	379.3	0.116
107.5	0.6	379.5	0.116
107.8	0.6	379.8	0.115
108.	0.595	380.	0.118
108.3	0.597	380.3	0.115
108.5	0.593	380.5	0.115
108.8	0.59	380.8	0.115
109.	0.591	381.	0.116
109.3	0.59	381.3	0.115
109.5	0.588	381.5	0.115
109.8	0.586	381.8	0.116
110.	0.586	382.	0.11
110.3	0.584	382.3	0.113
110.5	0.579	382.5	0.115
110.8	0.582	382.8	0.112
111.	0.58	383.	0.113
111.3	0.577	383.3	0.114
111.5	0.575	383.5	0.111
111.8	0.573	383.8	0.113
112.	0.573	384.	0.11
112.3	0.57	384.3	0.114
112.5	0.572	384.5	0.113
112.8	0.568	384.8	0.108
113.	0.565	385.	0.113
113.3	0.566	385.3	0.109
113.5	0.564	385.5	0.108
113.8	0.565	385.8	0.111
114.	0.563	386.	0.112
114.3	0.562	386.3	0.109
114.5	0.558	386.5	0.107
114.8	0.559	386.8	0.111
115.	0.557	387.	0.109
115.3	0.554	387.3	0.107
115.5	0.552	387.5	0.11
115.8	0.549	387.8	0.112
116.	0.553	388.	0.11
116.3	0.548	388.3	0.108
116.5	0.547	388.5	0.107
116.8	0.547	388.8	0.107
117.	0.546	389.	0.109
117.3	0.543	389.3	0.109
117.5	0.543	389.5	0.108
117.8	0.54	389.8	0.109
118.	0.54	390.	0.109
118.2	0.542	390.3	0.105
118.5	0.541	390.5	0.108
118.8	0.532	390.8	0.106
119.	0.533	391.	0.106
119.3	0.536	391.3	0.108
119.5	0.531	391.5	0.109
119.8	0.528	391.8	0.102
120.	0.53	392.	0.106
120.3	0.529	392.3	0.104
120.5	0.525	392.5	0.107
120.8	0.525	392.8	0.106
121.	0.524	393.	0.108

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
121.3	0.524	393.3	0.11
121.5	0.523	393.5	0.109
121.8	0.521	393.8	0.107
122.	0.521	394.	0.106
122.3	0.517	394.3	0.107
122.5	0.515	394.5	0.105
122.8	0.513	394.8	0.106
123.	0.511	395.	0.104
123.3	0.509	395.3	0.104
123.5	0.511	395.5	0.103
123.8	0.508	395.8	0.103
124.	0.507	396.	0.103
124.3	0.507	396.3	0.11
124.5	0.505	396.5	0.107
124.8	0.503	396.8	0.102
125.	0.501	397.	0.103
125.3	0.502	397.3	0.103
125.5	0.498	397.5	0.103
125.8	0.502	397.8	0.106
126.	0.496	398.	0.101
126.3	0.498	398.3	0.102
126.5	0.493	398.5	0.1
126.8	0.491	398.8	0.101
127.	0.493	399.	0.102
127.3	0.491	399.3	0.101
127.5	0.491	399.5	0.102
127.8	0.489	399.8	0.101
128.	0.486	400.	0.103
128.3	0.488	400.3	0.101
128.5	0.484	400.5	0.098
128.8	0.48	400.8	0.097
129.	0.48	401.	0.098
129.3	0.484	401.3	0.098
129.5	0.48	401.5	0.098
129.8	0.478	401.8	0.098
130.	0.476	402.	0.099
130.3	0.475	402.3	0.095
130.5	0.474	402.5	0.095
130.8	0.472	402.8	0.096
131.	0.472	403.	0.097
131.3	0.467	403.3	0.098
131.5	0.469	403.5	0.098
131.8	0.468	403.8	0.097
132.	0.466	404.	0.098
132.3	0.465	404.3	0.098
132.5	0.463	404.5	0.1
132.8	0.465	404.8	0.101
133.	0.461	405.	0.099
133.3	0.459	405.3	0.1
133.5	0.46	405.5	0.099
133.8	0.456	405.8	0.099
134.	0.457	406.	0.099
134.3	0.457	406.3	0.094
134.5	0.455	406.5	0.096
134.8	0.453	406.8	0.095
135.	0.454	407.	0.095
135.3	0.451	407.3	0.097
135.5	0.449	407.5	0.095
135.8	0.449	407.8	0.093
136.	0.448	408.	0.095
136.3	0.446	408.3	0.097
136.5	0.445	408.5	0.094
136.8	0.445	408.8	0.095
137.	0.442	409.	0.093
137.3	0.439	409.3	0.093
137.5	0.441	409.5	0.093

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
137.8	0.436	409.8	0.091
138.	0.439	410.	0.092
138.3	0.436	410.3	0.092
138.5	0.435	410.5	0.096
138.8	0.431	410.8	0.092
139.	0.434	411.	0.093
139.3	0.433	411.3	0.094
139.5	0.43	411.5	0.092
139.8	0.43	411.8	0.093
140.	0.43	412.	0.093
140.3	0.428	412.3	0.091
140.5	0.428	412.5	0.091
140.8	0.424	412.8	0.091
141.	0.429	413.	0.091
141.3	0.422	413.3	0.091
141.5	0.423	413.5	0.092
141.8	0.423	413.8	0.09
142.	0.421	414.	0.09
142.3	0.415	414.3	0.091
142.5	0.419	414.5	0.09
142.8	0.416	414.8	0.091
143.	0.419	415.	0.089
143.3	0.415	415.3	0.091
143.5	0.415	415.5	0.09
143.8	0.413	415.8	0.087
144.	0.414	416.	0.089
144.3	0.409	416.3	0.088
144.5	0.409	416.5	0.088
144.8	0.411	416.8	0.09
145.	0.408	417.	0.09
145.3	0.407	417.3	0.089
145.5	0.402	417.5	0.088
145.8	0.412	417.8	0.089
146.	0.403	418.	0.088
146.3	0.403	418.3	0.09
146.5	0.404	418.5	0.087
146.8	0.404	418.8	0.086
147.	0.4	419.	0.089
147.3	0.4	419.3	0.089
147.5	0.402	419.5	0.087
147.8	0.4	419.8	0.086
148.	0.398	420.	0.087
148.3	0.394	420.3	0.088
148.5	0.396	420.5	0.084
148.8	0.395	420.8	0.086
149.	0.394	421.	0.084
149.3	0.393	421.3	0.087
149.5	0.39	421.5	0.086
149.8	0.393	421.8	0.084
150.	0.393	422.	0.084
150.3	0.391	422.3	0.086
150.6	0.388	422.5	0.085
150.8	0.39	422.8	0.083
151.	0.385	423.	0.086
151.3	0.386	423.3	0.084
151.5	0.386	423.5	0.085
151.8	0.382	423.8	0.081
152.	0.383	424.	0.085
152.3	0.383	424.3	0.084
152.5	0.379	424.5	0.084
152.8	0.384	424.8	0.082
153.	0.379	425.	0.085
153.3	0.382	425.3	0.081
153.5	0.381	425.5	0.082
153.8	0.38	425.8	0.084
154.	0.38	426.	0.08

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
154.3	0.375	426.3	0.082
154.5	0.376	426.5	0.08
154.8	0.374	426.8	0.083
155.	0.375	427.	0.081
155.3	0.374	427.3	0.082
155.5	0.373	427.5	0.082
155.8	0.373	427.8	0.079
156.	0.372	428.	0.081
156.3	0.372	428.3	0.08
156.5	0.368	428.5	0.078
156.8	0.371	428.8	0.082
157.	0.368	429.	0.081
157.3	0.367	429.3	0.08
157.5	0.368	429.5	0.081
157.8	0.367	429.8	0.081
158.	0.365	430.	0.081
158.3	0.366	430.3	0.079
158.5	0.364	430.5	0.079
158.8	0.361	430.8	0.076
159.	0.364	431.	0.078
159.3	0.361	431.3	0.077
159.5	0.361	431.5	0.079
159.8	0.362	431.8	0.078
160.	0.361	432.	0.079
160.3	0.361	432.3	0.076
160.5	0.36	432.5	0.078
160.8	0.358	432.8	0.079
161.	0.36	433.	0.078
161.3	0.356	433.3	0.076
161.5	0.354	433.5	0.075
161.8	0.355	433.8	0.08
162.	0.354	434.	0.077
162.3	0.351	434.3	0.077
162.5	0.353	434.5	0.077
162.8	0.354	434.8	0.076
163.	0.355	435.	0.078
163.3	0.352	435.3	0.076
163.5	0.352	435.5	0.075
163.8	0.353	435.8	0.074
164.	0.353	436.	0.074
164.3	0.351	436.3	0.076
164.5	0.35	436.5	0.074
164.8	0.351	436.8	0.073
165.	0.349	437.2	0.072
165.3	0.346	437.4	0.071
165.5	0.35	437.7	0.073
165.8	0.345	437.9	0.073
166.	0.345	438.1	0.073
166.3	0.345	438.6	0.073
166.5	0.344	438.8	0.073
166.8	0.345	439.	0.073
167.	0.345	439.2	0.072
167.3	0.344	439.7	0.071
167.5	0.341	439.9	0.072
167.8	0.344	440.2	0.073
168.	0.342	440.4	0.071
168.3	0.342	440.6	0.068
168.5	0.338	441.1	0.071
168.8	0.338	441.3	0.071
169.	0.341	441.5	0.072
169.3	0.34	441.7	0.071
169.5	0.338	442.3	0.07
169.8	0.334	442.5	0.071
170.	0.336	442.7	0.073
170.3	0.334	442.9	0.069
170.5	0.337	443.1	0.07

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
170.8	0.334	443.4	0.069
171.	0.335	443.6	0.071
171.3	0.333	443.8	0.072
171.5	0.332	444.	0.069
171.8	0.333	444.2	0.068
172.	0.332	444.4	0.069
172.3	0.336	444.7	0.067
172.5	0.331	444.9	0.071
172.8	0.332	445.1	0.069
173.	0.331	445.3	0.067
173.3	0.329	445.5	0.068
173.5	0.331	445.8	0.07
173.8	0.329	446.	0.069
174.	0.329	446.2	0.067
174.3	0.329	446.4	0.07
174.5	0.33	446.6	0.068
174.8	0.328	446.9	0.068
175.	0.326	447.1	0.068
175.3	0.328	447.3	0.064
175.5	0.325	447.5	0.066
175.8	0.328	447.8	0.068
176.	0.326	448.	0.067
176.3	0.325	448.3	0.065
176.5	0.325	448.5	0.065
176.8	0.323	448.8	0.068
177.	0.325	449.	0.067
177.3	0.324	449.3	0.065
177.5	0.323	449.5	0.066
177.8	0.322	449.8	0.065
178.	0.322	450.	0.068
178.3	0.324	450.3	0.065
178.5	0.323	450.5	0.065
178.8	0.321	450.8	0.064
179.	0.319	451.	0.067
179.3	0.32	451.3	0.066
179.5	0.321	451.5	0.064
179.8	0.319	451.8	0.066
180.	0.316	452.	0.063
180.3	0.316	452.3	0.065
180.5	0.32	452.5	0.064
180.8	0.316	452.8	0.064
181.	0.321	453.	0.061
181.3	0.317	453.3	0.063
181.5	0.318	453.5	0.063
181.8	0.316	453.8	0.064
182.	0.316	454.	0.064
182.3	0.313	454.3	0.064
182.5	0.319	454.5	0.063
182.8	0.311	454.8	0.062
183.	0.317	455.	0.061
183.3	0.315	455.3	0.063
183.5	0.307	455.5	0.061
183.8	0.308	455.8	0.062
184.	0.31	456.	0.062
184.3	0.31	456.3	0.062
184.5	0.311	456.5	0.062
184.8	0.311	456.8	0.06
185.	0.311	457.	0.063
185.3	0.308	457.3	0.062
185.5	0.309	457.5	0.061
185.8	0.311	457.8	0.06
186.	0.309	458.	0.059
186.3	0.31	458.3	0.059
186.5	0.311	458.5	0.059
186.8	0.309	458.8	0.059
187.	0.306	459.	0.059

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
187.3	0.309	459.3	0.057
187.5	0.307	459.6	0.059
187.8	0.305	459.8	0.059
188.	0.307	460.	0.06
188.3	0.302	460.4	0.058
188.5	0.303	460.6	0.057
188.8	0.304	460.8	0.057
189.	0.303	461.1	0.057
189.3	0.302	461.4	0.058
189.5	0.303	461.6	0.058
189.8	0.306	461.8	0.057
190.	0.301	462.2	0.057
190.3	0.304	462.4	0.055
190.5	0.303	462.6	0.056
190.8	0.3	462.9	0.056
191.	0.301	463.1	0.057
191.3	0.302	463.3	0.057
191.5	0.302	463.5	0.057
191.8	0.3	463.7	0.055
192.	0.3	464.	0.057
192.3	0.299	464.3	0.059
192.5	0.299	464.5	0.058
192.8	0.3	464.8	0.057
193.	0.299	465.	0.057
193.3	0.301	465.3	0.056
193.5	0.297	465.6	0.054
193.8	0.295	465.9	0.056
194.	0.295	466.1	0.055
194.3	0.298	466.3	0.054
194.5	0.298	466.5	0.055
194.8	0.293	466.8	0.055
195.	0.297	467.	0.055
195.3	0.296	467.3	0.057
195.5	0.296	467.5	0.056
195.8	0.295	467.8	0.055
196.	0.295	468.	0.054
196.3	0.294	468.3	0.054
196.5	0.291	468.5	0.054
196.8	0.294	468.8	0.056
197.	0.293	469.	0.051
197.3	0.292	469.3	0.052
197.5	0.292	469.6	0.053
197.8	0.292	469.8	0.054
198.	0.292	470.	0.055
198.3	0.291	470.4	0.054
198.5	0.29	470.6	0.051
198.8	0.289	470.8	0.052
199.	0.291	471.	0.052
199.3	0.292	471.3	0.053
199.5	0.289	471.5	0.053
199.8	0.29	471.8	0.053
200.	0.29	472.	0.052
200.3	0.287	472.3	0.053
200.5	0.286	472.5	0.052
200.8	0.287	472.8	0.05
201.	0.288	473.	0.05
201.3	0.288	473.3	0.051
201.5	0.285	473.5	0.051
201.8	0.288	473.9	0.051
202.	0.286	474.1	0.05
202.3	0.286	474.3	0.05
202.5	0.288	474.5	0.049
202.8	0.285	474.9	0.048
203.	0.284	475.1	0.049
203.3	0.286	475.3	0.048
203.5	0.284	475.5	0.049

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
286.3	0.195	558.3	0.002
286.5	0.193	558.5	0.003
286.8	0.193	558.8	0.002
287.	0.193	559.	0.002
287.3	0.195	559.3	0.

SOLUTION

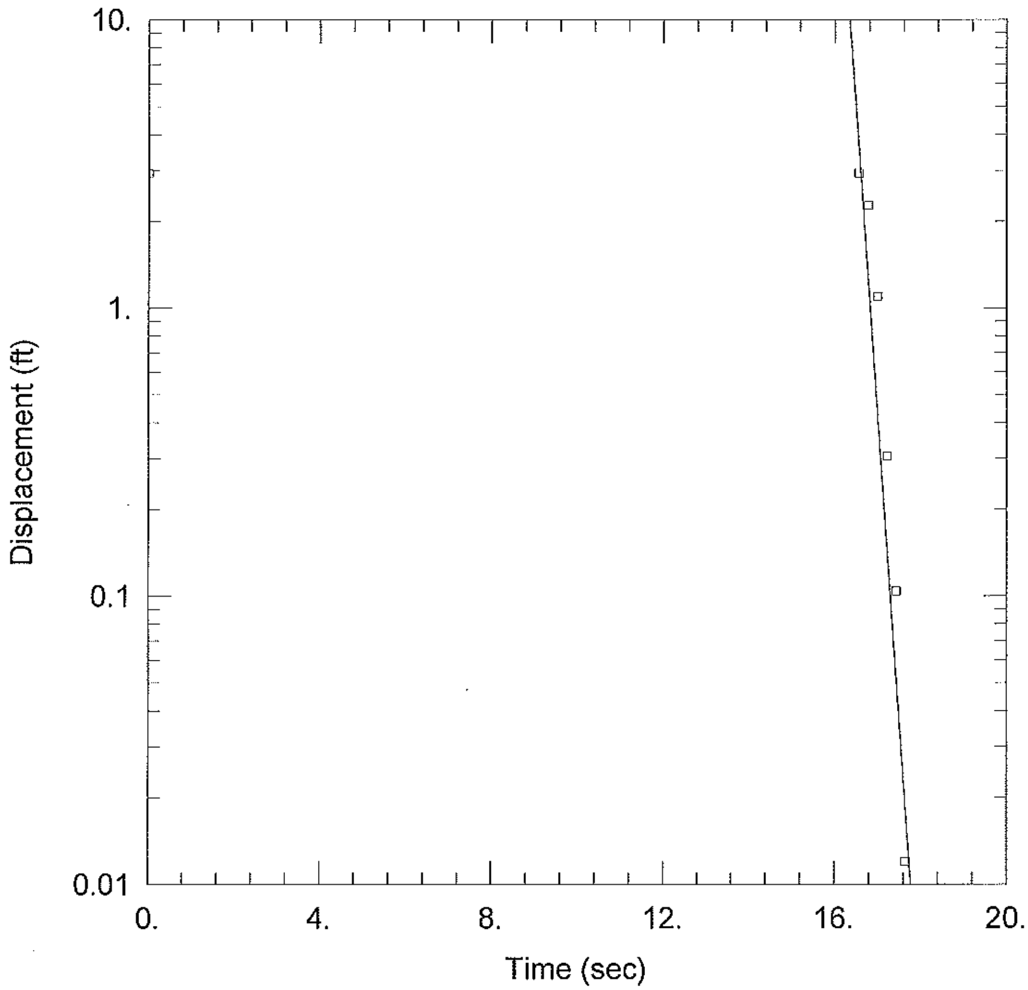
Slug Test
Aquifer Model: Unconfined
Solution Method: KGS Model

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
Kr	0.0003191	cm/sec
Ss	9.362E-5	ft^{-1}
Kz/Kr	1.	

T = K*b = 0.7391 cm^2/sec



MW-10S

Data Set: K:\...\MW-10S.aqt
Date: 10/16/15
Time: 15:52:20

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Sargent & Lundy
Project: 2524-302-01-00
Location: Eagle Valley Station
Test Well: MW-10S
Test Date: 10/5/2015

AQUIFER DATA

Saturated Thickness: 76. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-10S)

Initial Displacement: 2.934 ft
Total Well Penetration Depth: 28. ft
Casing Radius: 0.083 ft
Static Water Column Height: 8.41 ft
Screen Length: 10. ft
Well Radius: 0.344 ft
Gravel Pack Porosity: 0.42

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.9897 cm/sec
y0 = 2.081E+35 ft

Data Set: K:\Wbgm\Client Information\2500-2599\2524\302\01\01 EVS\SlugTests\Completed Slug Tests\MW-10:
Title: MW-10S
Date: 10/16/15
Time: 15:34:23

PROJECT INFORMATION

Company: Weaver Consultants Group
Client: Sargent & Lundy
Project: 2524-302-01-00
Location: Eagle Valley Station
Test Date: 10/5/2015
Test Well: MW-10S

AQUIFER DATA

Saturated Thickness: 76. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: MW-10S

X Location: 1542433.637 ft
Y Location: 3139192.406 ft

Initial Displacement: 2.934 ft
Static Water Column Height: 8.41 ft
Casing Radius: 0.083 ft
Well Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 28. ft
Corrected Casing Radius (Bouwer-Rice Method): 0.2317 ft
Gravel Pack Porosity: 0.42

No. of Observations: 6

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
16.55	2.934	17.21	0.306
16.77	2.272	17.43	0.104
16.99	1.096	17.65	0.012

SOLUTION

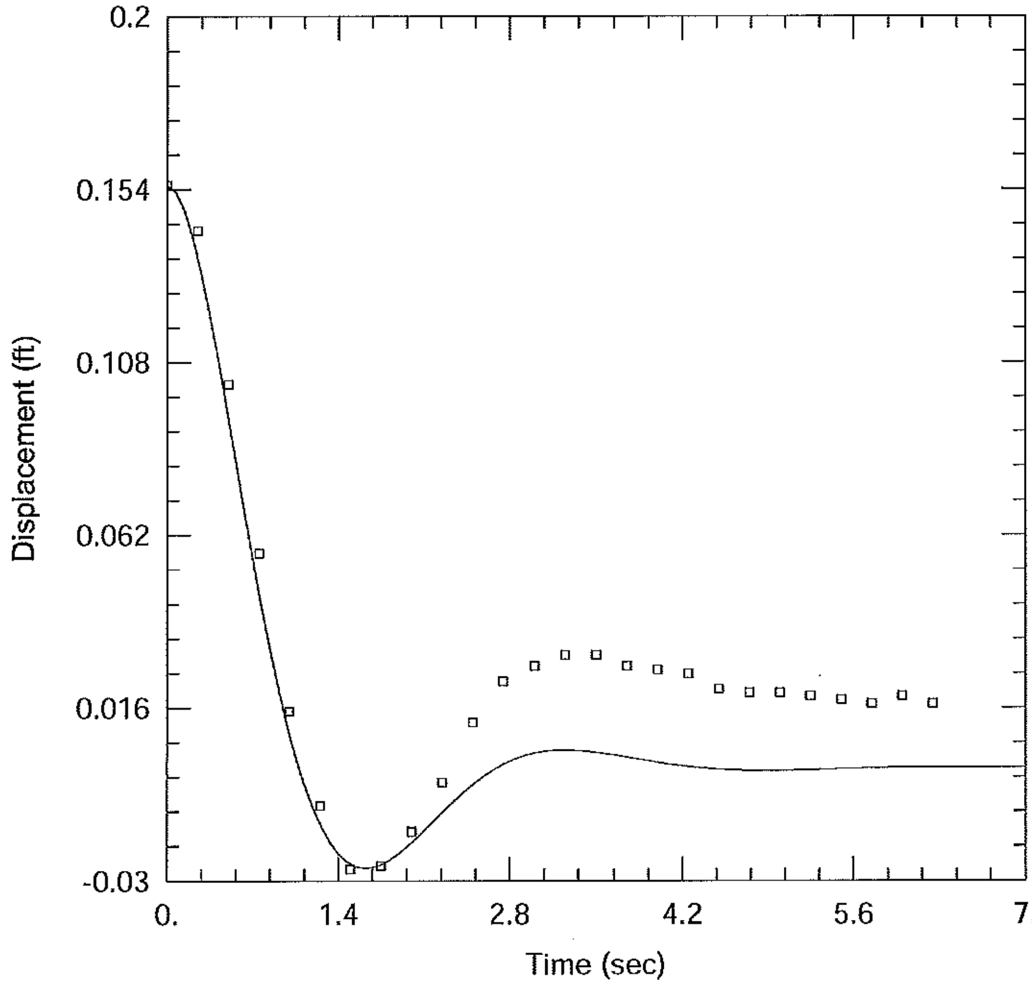
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 2.501

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.9897	cm/sec
y0	2.081E+35	ft

T = K*b = 2292.6 cm²/sec



WELL TEST ANALYSIS

Data Set: K:\...\MW-11S-1.aqt
Date: 05/11/16 Time: 09:26:13

AQUIFER DATA

Saturated Thickness: 14.22 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-11S)

Initial Displacement: 0.155 ft
Total Well Penetration Depth: 14.22 ft
Casing Radius: 0.038 ft
Static Water Column Height: 14.22 ft
Screen Length: 10. ft
Wellbore Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar
K = 0.01379 cm/sec
C(D) = 0.4879

Data Set: K:\Wbgm\Client Information\2500-2599\2524\302\01\01 EVS\SlugTests\Completed Slug Tests Apr 201
Date: 05/11/16
Time: 09:27:37

AQUIFER DATA

Saturated Thickness: 14.22 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : MW-11S

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 0.155 ft
Static Water Column Height: 14.22 ft
Casing Radius: 0.038 ft
Wellbore Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 14.22 ft

No. of Observations: 25

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.25	0.143	3.5	0.03
0.5	0.102	3.75	0.027
0.75	0.057	4.	0.026
1.	0.015	4.25	0.025
1.25	-0.01	4.5	0.021
1.5	-0.027	4.75	0.02
1.75	-0.026	5.	0.02
2.	-0.017	5.25	0.019
2.25	-0.004	5.5	0.018
2.5	0.012	5.75	0.017
2.75	0.023	6.	0.019
3.	0.027	6.25	0.017
3.25	0.03		

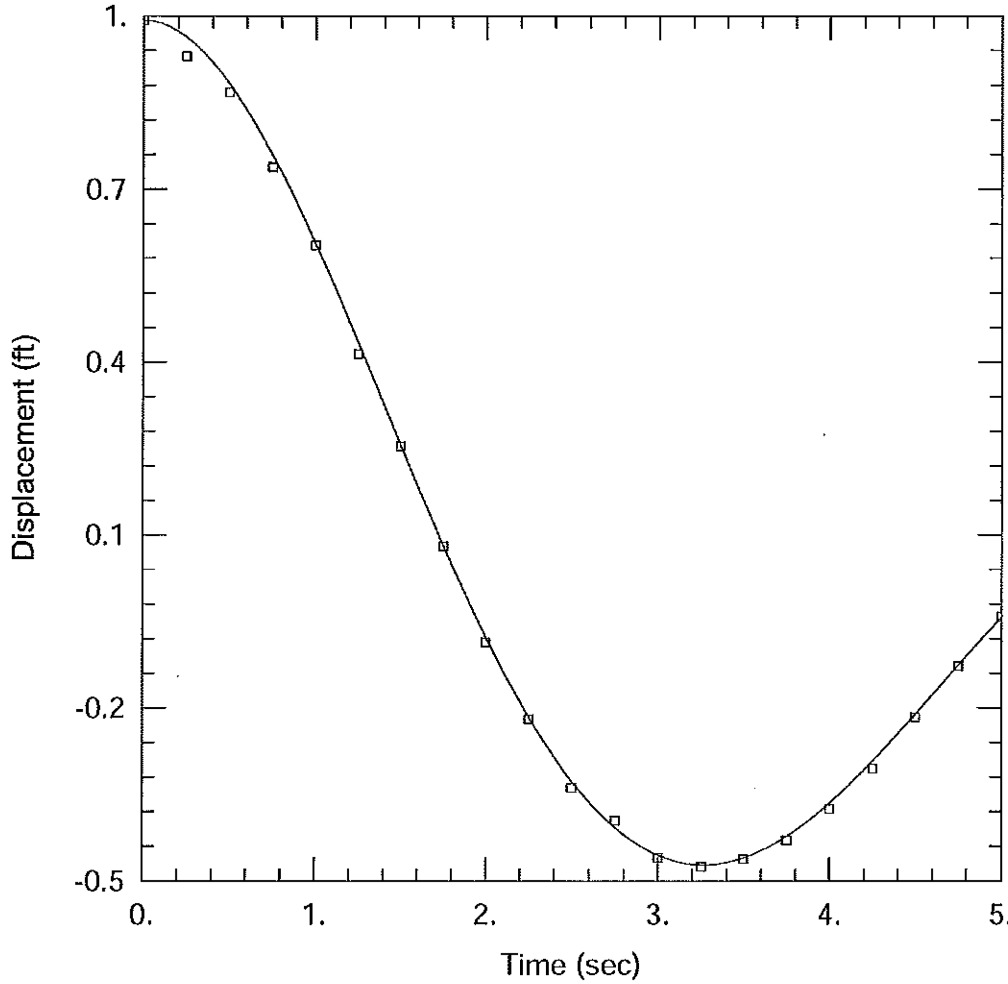
SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar
Shape Factor: 2.76

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.01379	cm/sec



WELL TEST ANALYSIS

Data Set: K:\...\MW-11I-2.aqt
Date: 05/11/16 Time: 09:28:40

AQUIFER DATA

Saturated Thickness: 45.39 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-11I)

Initial Displacement: 0.992 ft
Total Well Penetration Depth: 45.39 ft
Casing Radius: 0.038 ft
Static Water Column Height: 45.39 ft
Screen Length: 10. ft
Wellbore Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.01622 cm/sec
C(D) = 0.2296

Data Set: K:\Wbgm\Client Information\2500-2599\2524\302\01\01 EVS\SlugTests\Completed Slug Tests Apr 201
Date: 05/11/16
Time: 09:29:54

AQUIFER DATA

Saturated Thickness: 45.39 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : MW-11I

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 0.992 ft
Static Water Column Height: 45.39 ft
Casing Radius: 0.038 ft
Wellbore Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 45.39 ft

No. of Observations: 20

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.25	0.93	2.75	-0.396
0.5	0.868	3.	-0.46
0.75	0.738	3.25	-0.476
1.	0.602	3.5	-0.462
1.25	0.413	3.75	-0.43
1.5	0.253	4.	-0.376
1.75	0.08	4.25	-0.306
2.	-0.087	4.5	-0.217
2.25	-0.22	4.75	-0.128
2.5	-0.339	5.	-0.042

SOLUTION

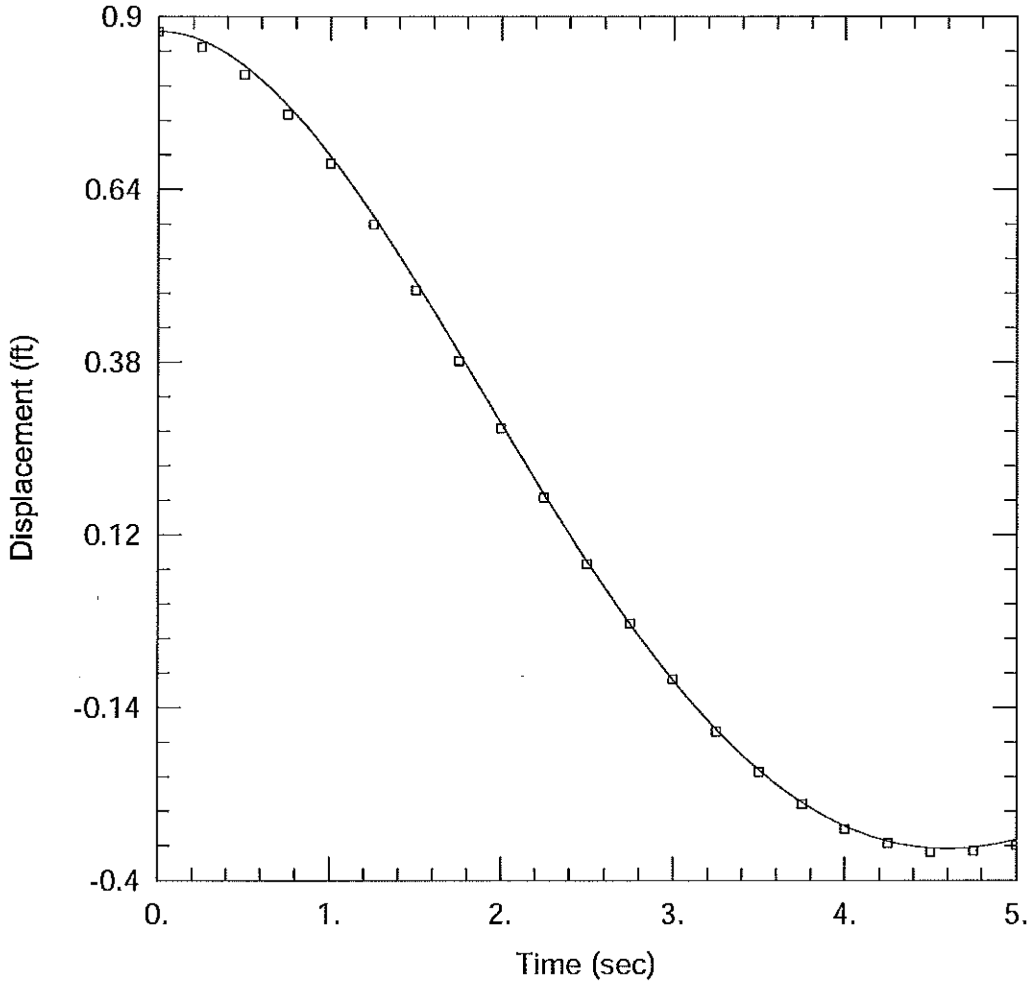
Aquifer Model: Unconfined
Solution Method: Springer-Gelhar
Shape Factor: 3.424

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.01622	cm/sec
C(D)	0.2296	

Solution is critically damped when C(D) = 1.



WELL TEST ANALYSIS

Data Set: K:\...\MW-11D-2.aqt
Date: 05/11/16 Time: 09:32:14

AQUIFER DATA

Saturated Thickness: 75.16 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-11D)

Initial Displacement: 0.877 ft Static Water Column Height: 75.16 ft
Total Well Penetration Depth: 75.16 ft Screen Length: 10. ft
Casing Radius: 0.038 ft Wellbore Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar

K = 0.01037 cm/sec C(D) = 0.2786

Data Set: K:\Wbgm\Client Information\2500-2599\2524\302\01\01 EVS\SlugTests\Completed Slug Tests Apr 201
Date: 05/11/16
Time: 09:39:43

AQUIFER DATA

Saturated Thickness: 75.16 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : MW-11D

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 0.877 ft
Static Water Column Height: 75.16 ft
Casing Radius: 0.038 ft
Wellbore Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 75.16 ft

No. of Observations: 20

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.25	0.854	2.75	-0.014
0.5	0.812	3.	-0.098
0.75	0.753	3.25	-0.177
1.	0.679	3.5	-0.237
1.25	0.587	3.75	-0.285
1.5	0.488	4.	-0.323
1.75	0.381	4.25	-0.344
2.	0.28	4.5	-0.358
2.25	0.175	4.75	-0.356
2.5	0.076	5.	-0.347

SOLUTION

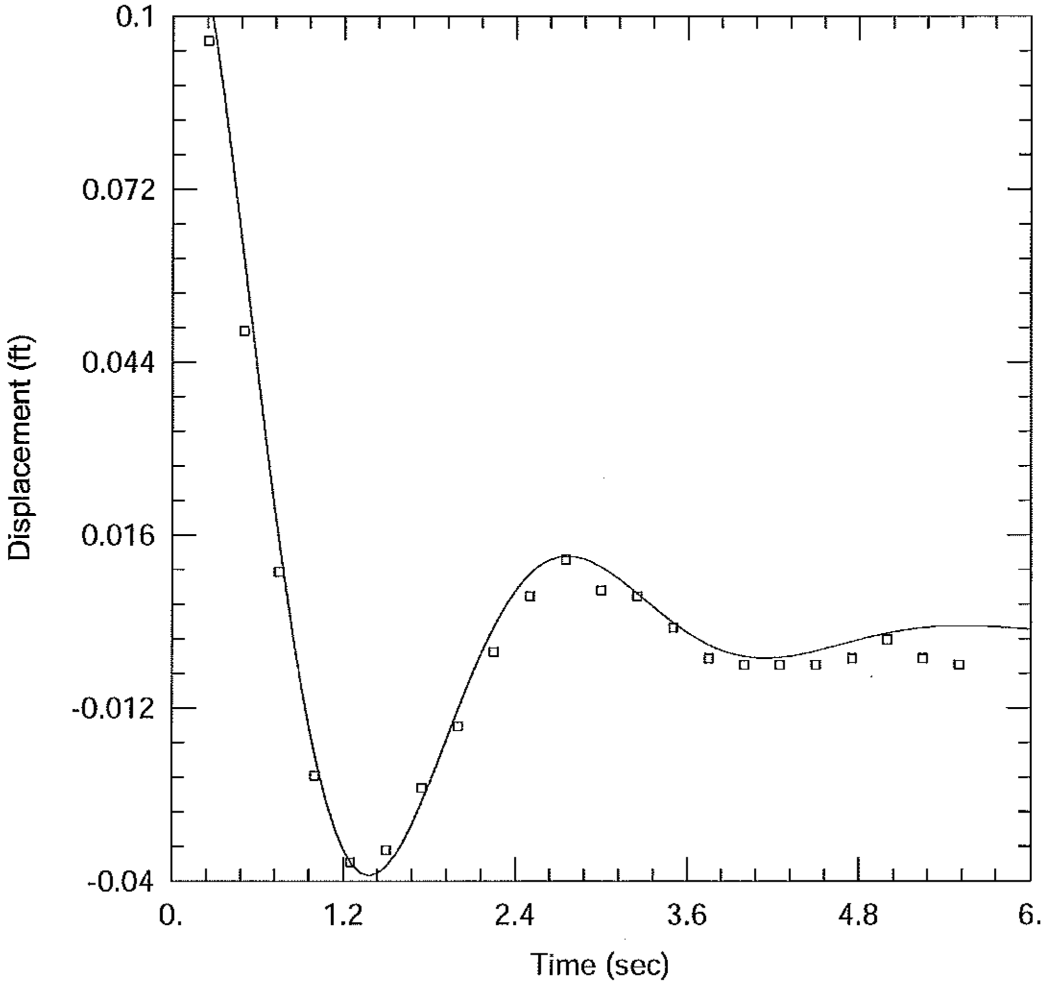
Aquifer Model: Unconfined
Solution Method: Springer-Gelhar
Shape Factor: 3.691

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.01037	cm/sec
C(D)	0.2786	

Solution is critically damped when C(D) = 1.



WELL TEST ANALYSIS

Data Set: K:\...\MW-12S-2.aqt
Date: 05/11/16 Time: 09:34:48

AQUIFER DATA

Saturated Thickness: 14.8 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-12S)

Initial Displacement: 0.123 ft
Total Well Penetration Depth: 14.8 ft
Casing Radius: 0.038 ft
Static Water Column Height: 14.8 ft
Screen Length: 10. ft
Wellbore Radius: 0.344 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.02167 cm/sec
C(D) = 0.3422

Data Set: K:\Wbgm\Client Information\2500-2599\2524\302\01\01 EVS\SlugTests\Completed Slug Tests Apr 201
Date: 05/11/16
Time: 09:37:16

AQUIFER DATA

Saturated Thickness: 14.8 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: : MW-12S

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 0.123 ft
Static Water Column Height: 14.8 ft
Casing Radius: 0.038 ft
Wellbore Radius: 0.344 ft
Well Skin Radius: 0.344 ft
Screen Length: 10. ft
Total Well Penetration Depth: 14.8 ft

No. of Observations: 22

Observation Data

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.25	0.096	3.	0.007
0.5	0.049	3.25	0.006
0.75	0.01	3.5	0.001
1.	-0.023	3.75	-0.004
1.25	-0.037	4.	-0.005
1.5	-0.035	4.25	-0.005
1.75	-0.025	4.5	-0.005
2.	-0.015	4.75	-0.004
2.25	-0.003	5.	-0.001
2.5	0.006	5.25	-0.004
2.75	0.012	5.5	-0.005

SOLUTION

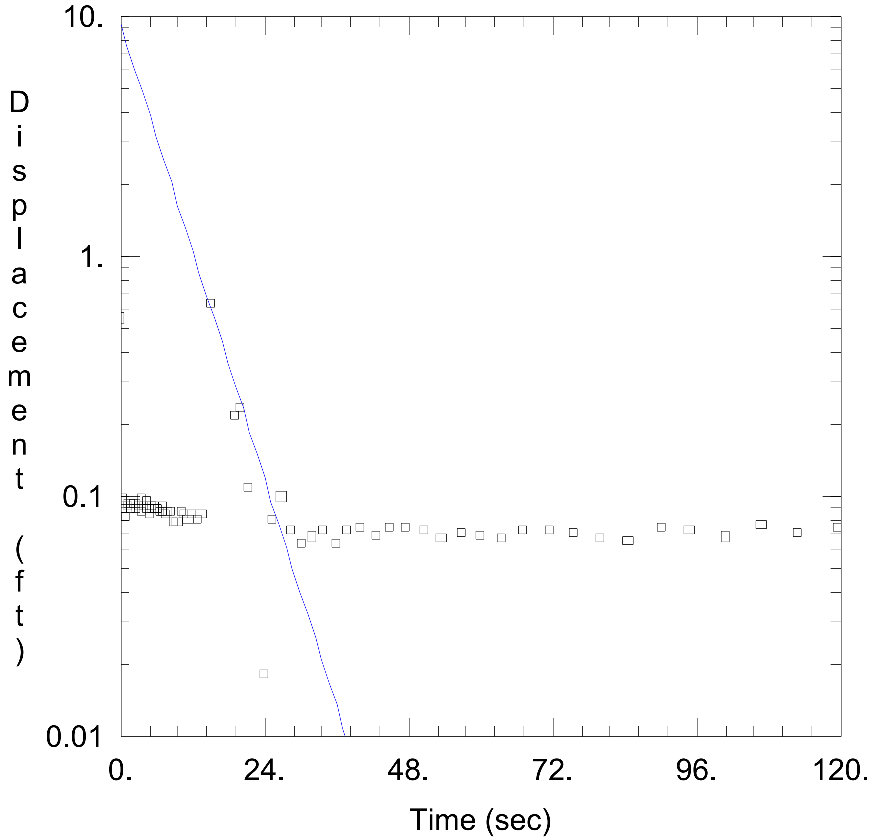
Aquifer Model: Unconfined
Solution Method: Springer-Gelhar
Shape Factor: 2.784

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.02167	cm/sec
C(D)	0.3422	

Appendix E: Hydraulic Conductivity Calculations



WELL TEST ANALYSIS

Data Set: G:\...\MW-10D SLUG IN.aqt
Date: 10/01/19 Time: 14:22:00

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-10I
Test Date: 8/8/2019

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

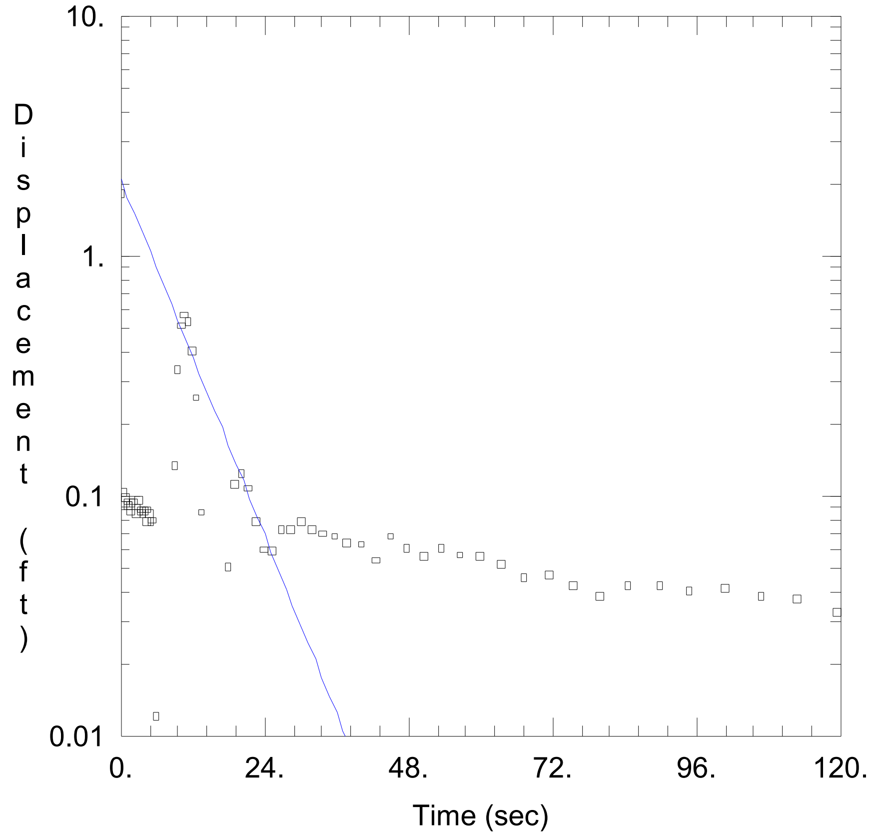
K = 0.005031 cm/sec
y0 = 9.297 ft

AQUIFER DATA

Saturated Thickness: 75.85 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-10I)

Initial Displacement: 0.553 ft
Total Well Penetration Depth: 35.91 ft
Casing Radius: 0.083 ft
Static Water Column Height: 35.94 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-10D SLUG OUT.aqt
Date: 09/26/19 Time: 14:06:06

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-10D
Test Date: 8/8/2019

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

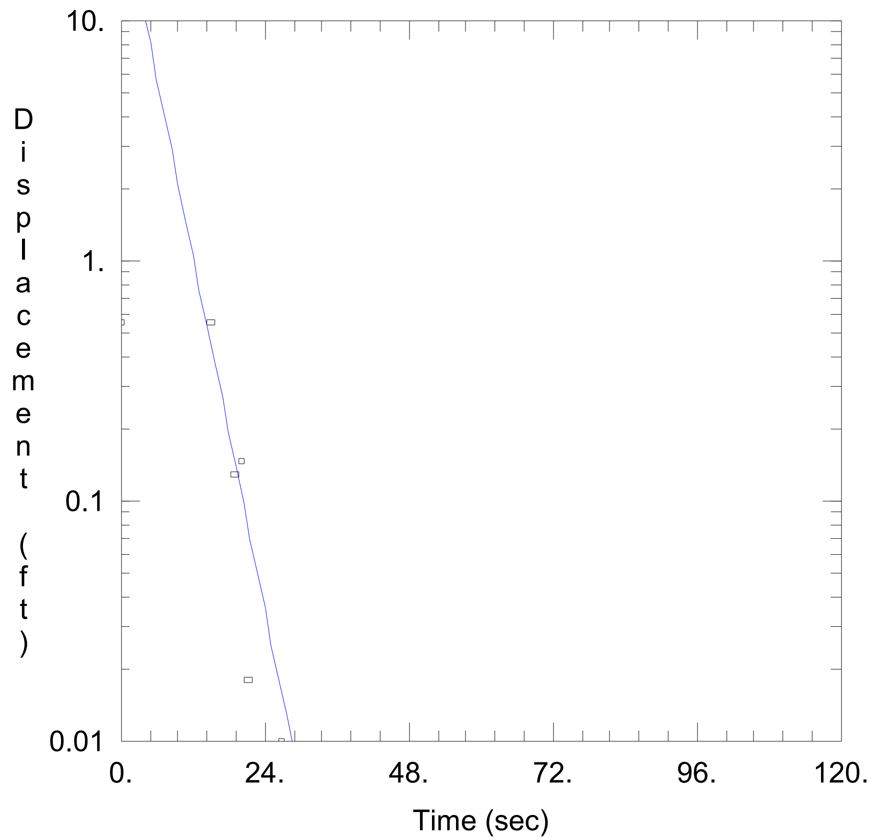
K = 0.004489 cm/sec
y0 = 2.095 ft

AQUIFER DATA

Saturated Thickness: 75.85 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-10D)

Initial Displacement: 1.816 ft
Total Well Penetration Depth: 66.25 ft
Casing Radius: 0.083 ft
Static Water Column Height: 66.21 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-10I SLUG IN.aqt
Date: 09/26/19 Time: 14:12:25

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-10I
Test Date: 8/8/2019

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

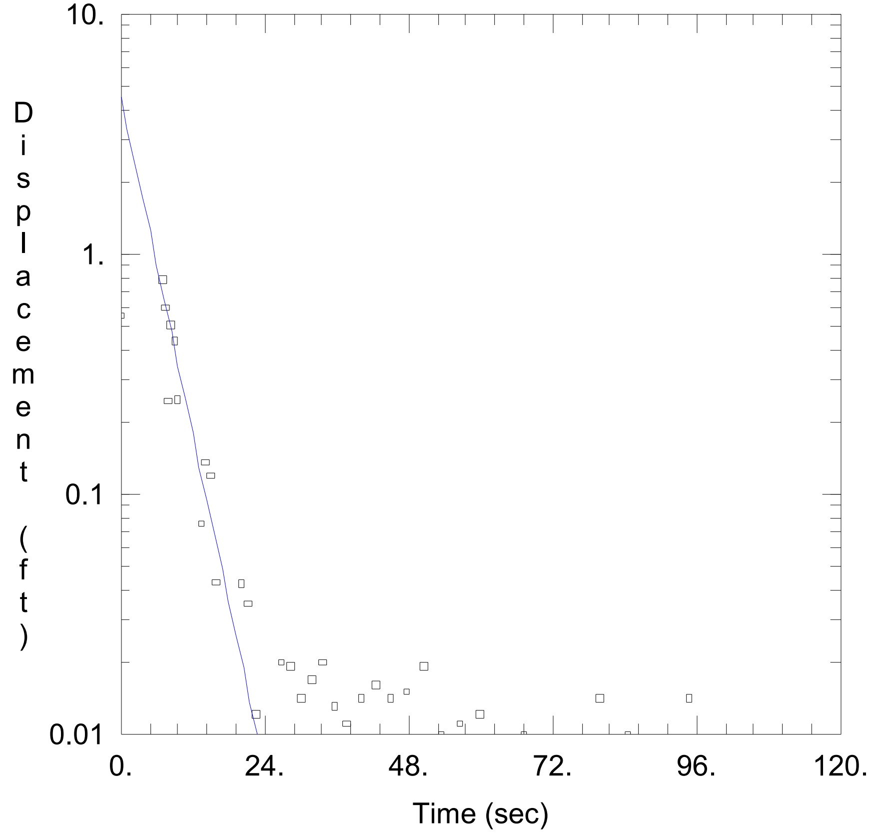
K = 0.007837 cm/sec
y0 = 31.29 ft

AQUIFER DATA

Saturated Thickness: 75.71 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-10I)

Initial Displacement: 0.553 ft
Total Well Penetration Depth: 35.91 ft
Casing Radius: 0.083 ft
Static Water Column Height: 35.94 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-10I SLUG OUT.aqt
Date: 09/26/19 Time: 14:12:46

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-10I
Test Date: 8/8/2019

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

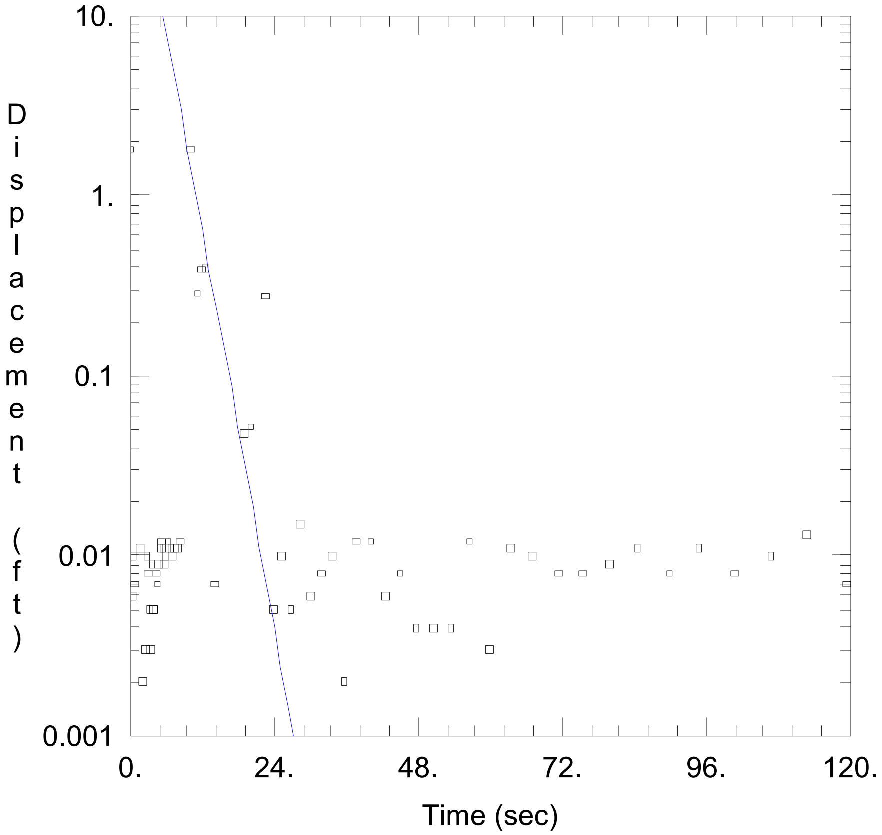
K = 0.00747 cm/sec
y0 = 4.548 ft

AQUIFER DATA

Saturated Thickness: 75.71 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-10I)

Initial Displacement: 0.553 ft
Total Well Penetration Depth: 35.91 ft
Casing Radius: 0.083 ft
Static Water Column Height: 35.94 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-13I SLUG IN.aqt
Date: 09/26/19 Time: 14:14:10

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-13I
Test Date: 8/8/19

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

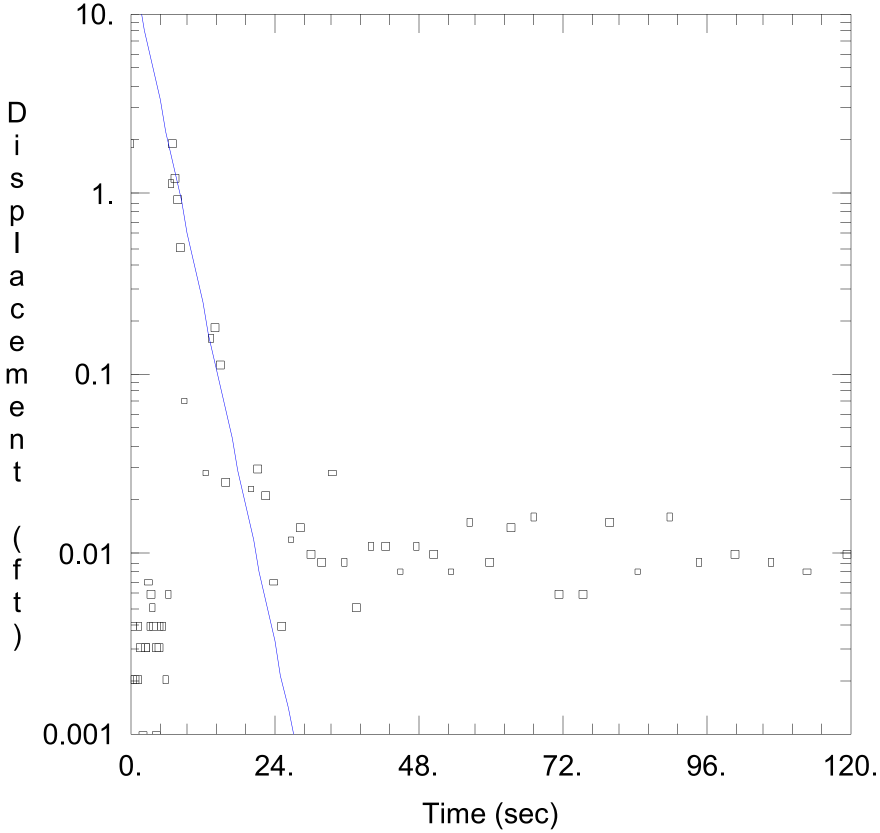
K = 0.01216 cm/sec
y0 = 109.5 ft

AQUIFER DATA

Saturated Thickness: 74.68 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-13I)

Initial Displacement: 1.818 ft
Total Well Penetration Depth: 42.68 ft
Casing Radius: 0.083 ft
Static Water Column Height: 43.05 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-13I SLUG OUT.aqt
Date: 09/26/19 Time: 14:14:29

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-13I
Test Date: 8/8/19

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

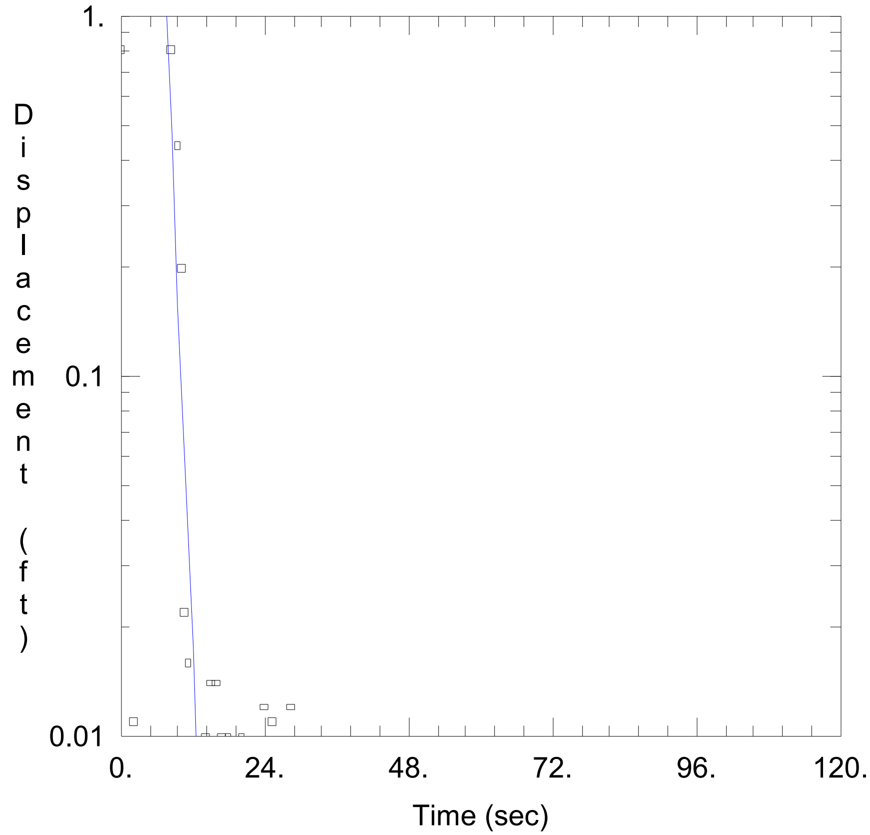
K = 0.01032 cm/sec
y0 = 19.21 ft

AQUIFER DATA

Saturated Thickness: 74.68 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-13I)

Initial Displacement: 1.926 ft
Total Well Penetration Depth: 42.68 ft
Casing Radius: 0.083 ft
Static Water Column Height: 43.05 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-13S SLUG IN.aqt
Date: 09/26/19 Time: 14:15:37

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-13S
Test Date: 8/8/19

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

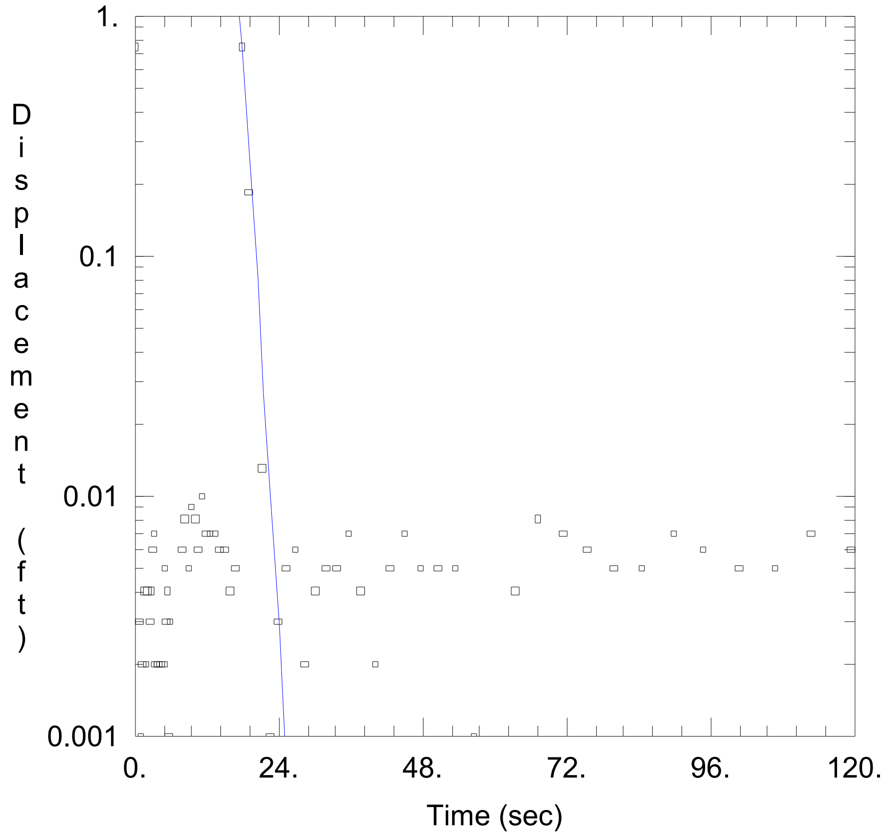
K = 0.02119 cm/sec
y0 = 999.4 ft

AQUIFER DATA

Saturated Thickness: 74.49 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-13S)

Initial Displacement: 0.808 ft
Total Well Penetration Depth: 12.59 ft
Casing Radius: 0.083 ft
Static Water Column Height: 12.76 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-13S SLUG OUT.aqt
Date: 09/26/19 Time: 14:16:02

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-13S
Test Date: 8/8/19

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

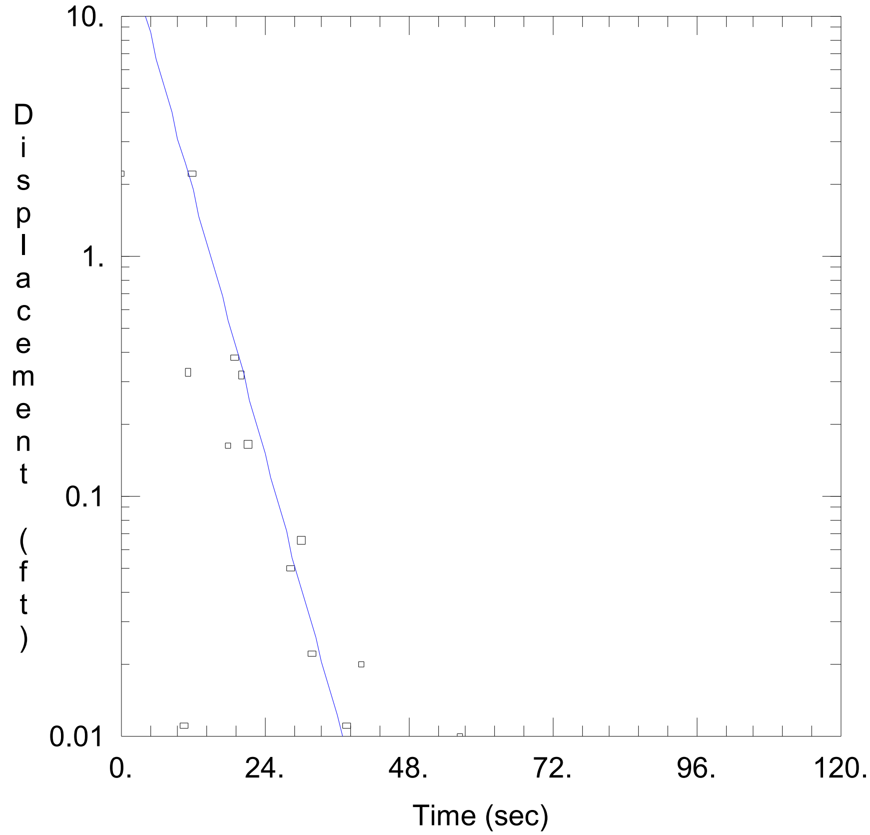
K = 0.02145 cm/sec
y0 = 1.229E+7 ft

AQUIFER DATA

Saturated Thickness: 74.49 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-13S)

Initial Displacement: 0.746 ft
Total Well Penetration Depth: 12.59 ft
Casing Radius: 0.083 ft
Static Water Column Height: 12.76 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-14D SLUG IN.aqt
Date: 09/26/19 Time: 14:16:21

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-14D
Test Date: 8/8/2019

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

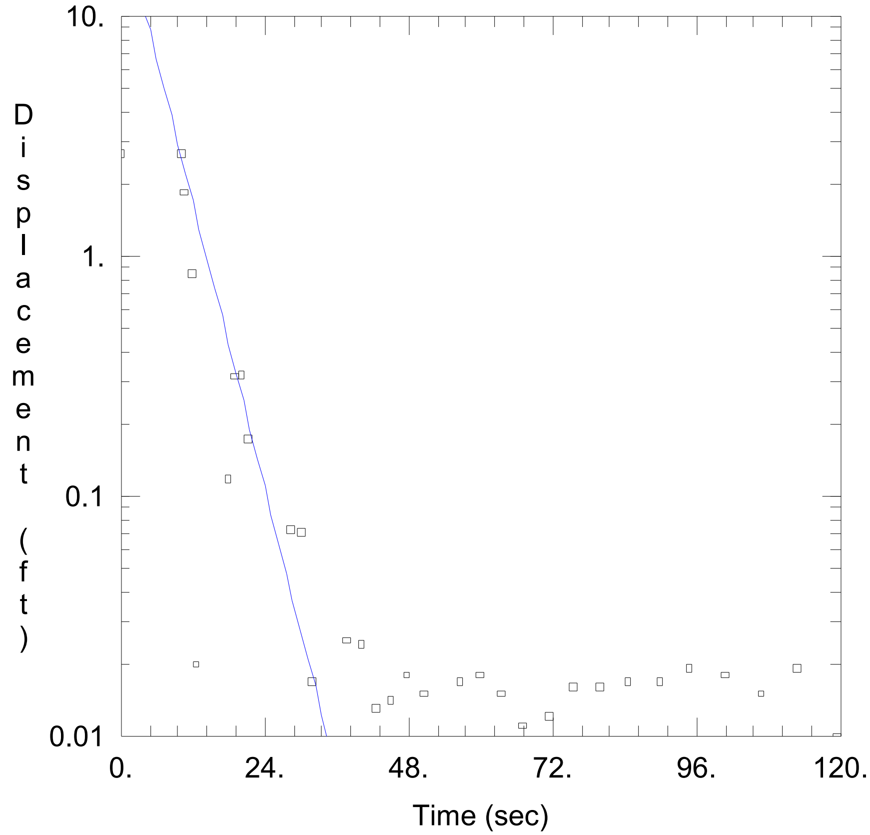
K = 0.007077 cm/sec
y0 = 23.28 ft

AQUIFER DATA

Saturated Thickness: 80.08 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-14D)

Initial Displacement: 2.198 ft
Total Well Penetration Depth: 77.18 ft
Casing Radius: 0.083 ft
Static Water Column Height: 77.48 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-14D SLUG OUT.aqt
Date: 09/26/19 Time: 14:16:40

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-14D
Test Date: 8/8/2019

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

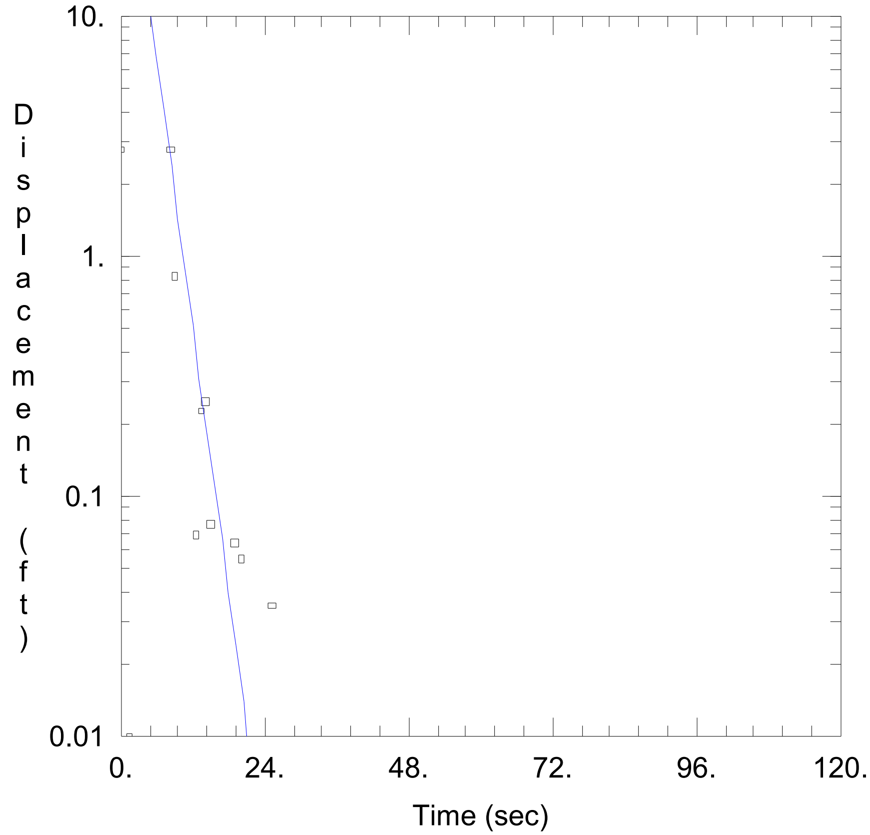
K = 0.007702 cm/sec
y0 = 26.15 ft

AQUIFER DATA

Saturated Thickness: 80.08 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-14D)

Initial Displacement: 2.694 ft
Total Well Penetration Depth: 77.18 ft
Casing Radius: 0.083 ft
Static Water Column Height: 77.48 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-14I SLUG IN.aqt
Date: 09/26/19 Time: 14:17:01

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-14I
Test Date: 8/8/2019

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

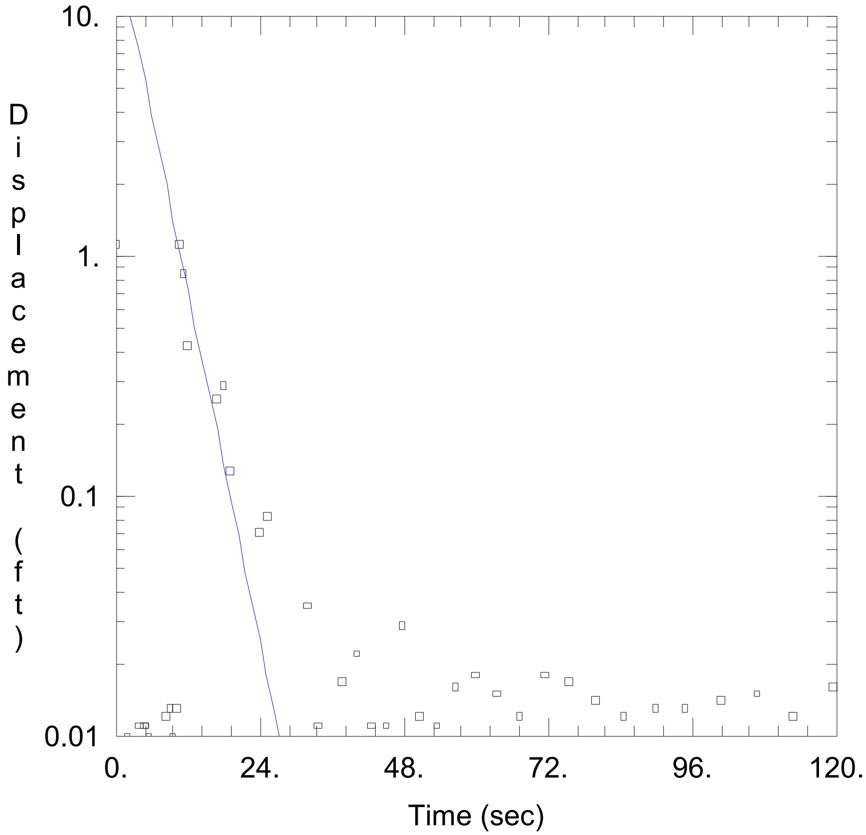
K = 0.01232 cm/sec
y0 = 87.88 ft

AQUIFER DATA

Saturated Thickness: 78.14 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-14I)

Initial Displacement: 2.786 ft
Total Well Penetration Depth: 45.34 ft
Casing Radius: 0.083 ft
Static Water Column Height: 45.53 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-14I SLUG OUT.aqt
Date: 09/26/19 Time: 14:17:20

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-14I
Test Date: 8/8/2019

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

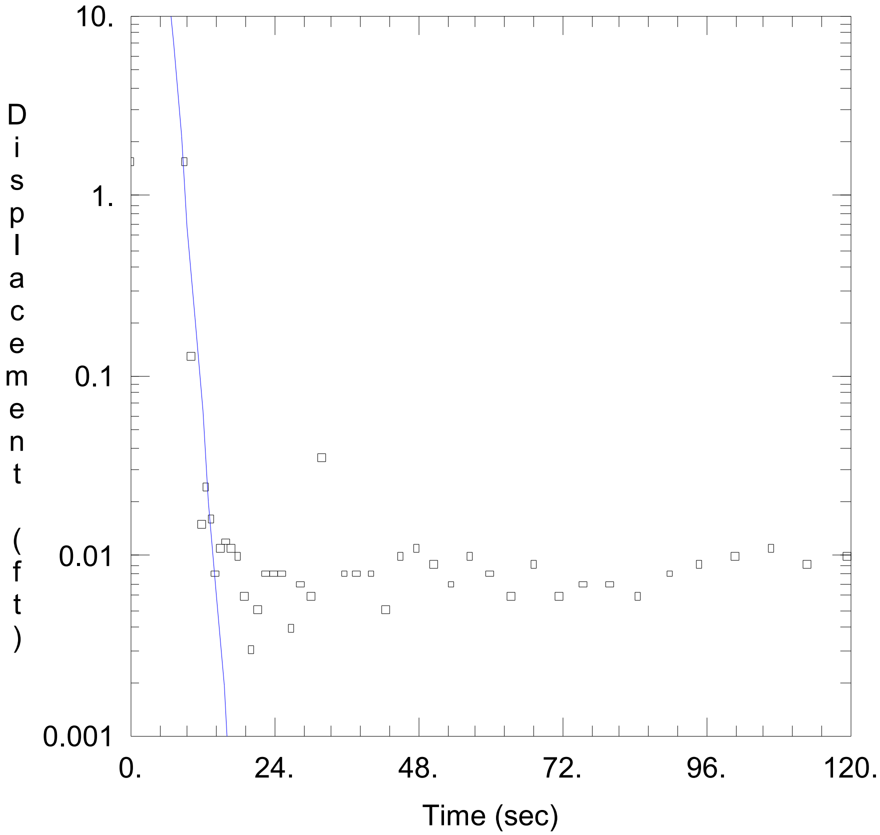
K = 0.008051 cm/sec
y0 = 20.69 ft

AQUIFER DATA

Saturated Thickness: 78.14 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-14I)

Initial Displacement: 1.114 ft
Total Well Penetration Depth: 45.34 ft
Casing Radius: 0.083 ft
Static Water Column Height: 45.53 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-14S SLUG IN.aqt
Date: 09/26/19 Time: 14:17:39

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-14S
Test Date: 8/8/19

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

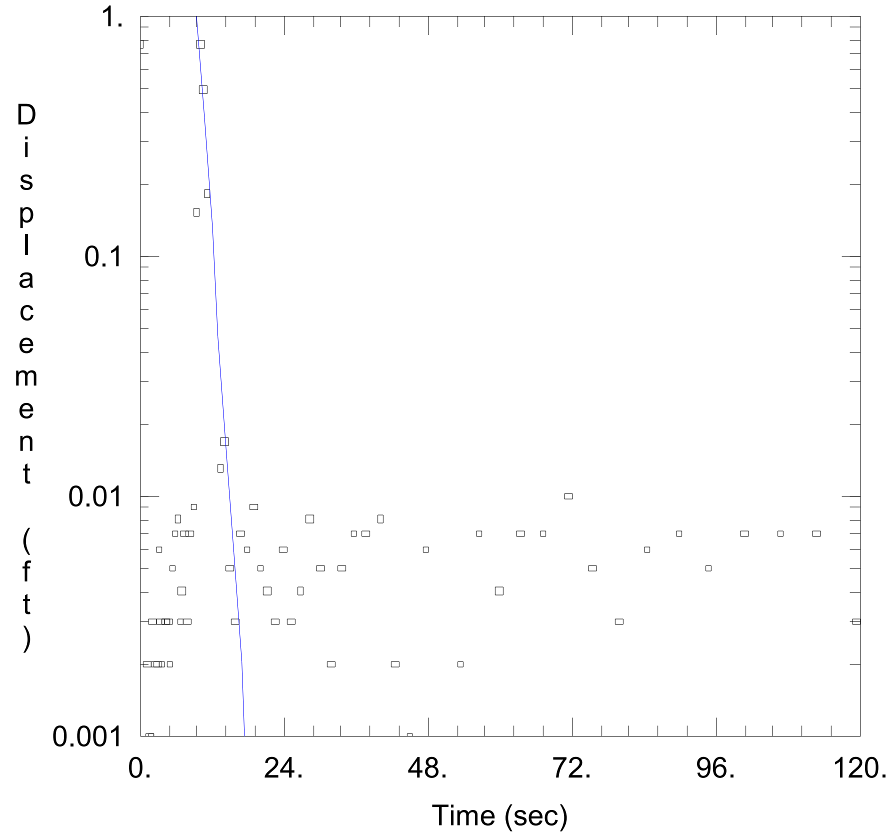
K = 0.02356 cm/sec
y0 = 7930.2 ft

AQUIFER DATA

Saturated Thickness: 78.18 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-14S)

Initial Displacement: 1.558 ft
Total Well Penetration Depth: 15.58 ft
Casing Radius: 0.083 ft
Static Water Column Height: 15.54 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-14S SLUG OUT.aqt
Date: 09/26/19 Time: 14:17:57

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-14S
Test Date: 8/8/19

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

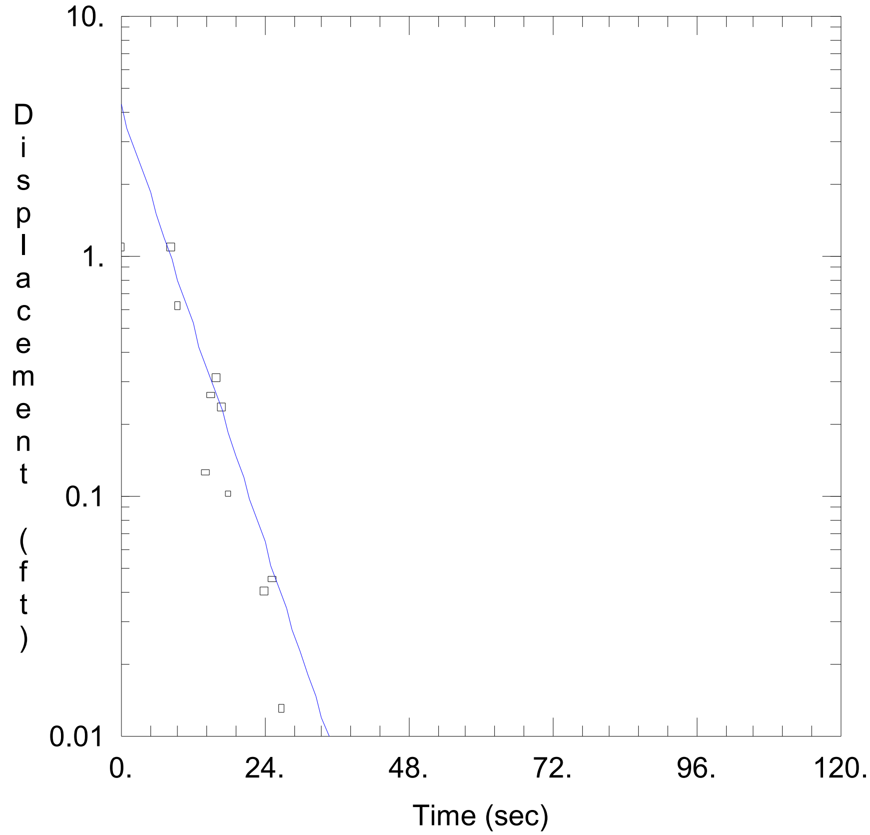
K = 0.02099 cm/sec
y0 = 4567. ft

AQUIFER DATA

Saturated Thickness: 78.18 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-14S)

Initial Displacement: 0.763 ft
Total Well Penetration Depth: 15.58 ft
Casing Radius: 0.083 ft
Static Water Column Height: 15.54 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-15D SLUG IN.aqt
Date: 09/26/19 Time: 14:18:19

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-15D
Test Date: 8/8/2019

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

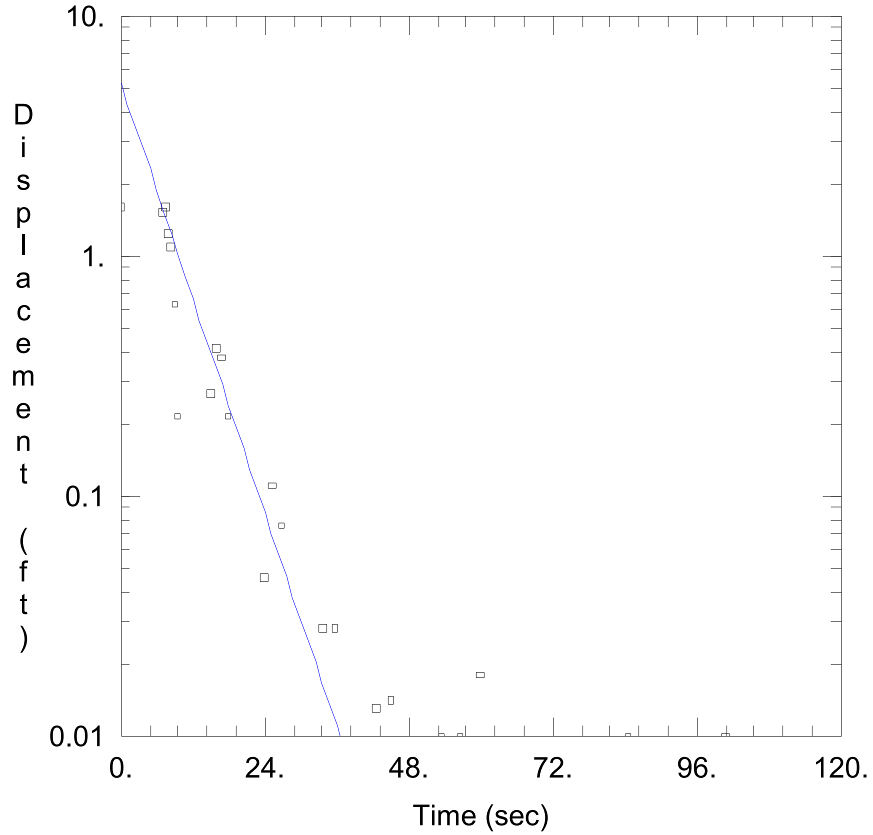
K = 0.005735 cm/sec
y0 = 4.234 ft

AQUIFER DATA

Saturated Thickness: 72.73 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-15D)

Initial Displacement: 1.099 ft
Total Well Penetration Depth: 68.73 ft
Casing Radius: 0.083 ft
Static Water Column Height: 68.91 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-15D SLUG OUT.aqt
Date: 09/26/19 Time: 14:19:03

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-15D
Test Date: 8/8/2019

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

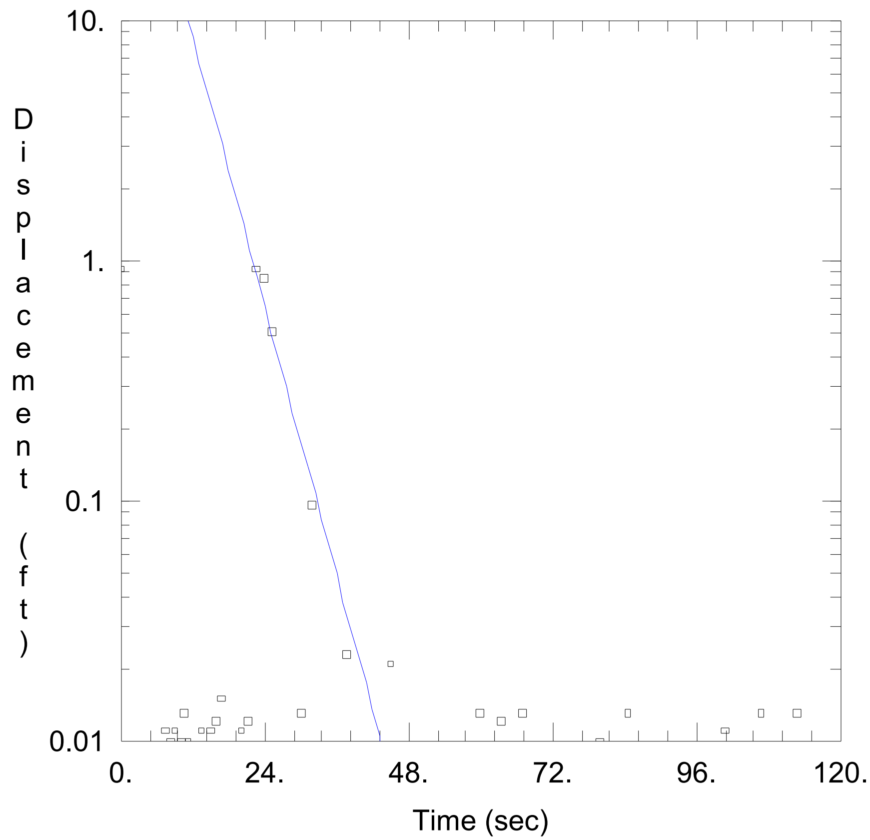
K = 0.005616 cm/sec
y0 = 5.218 ft

AQUIFER DATA

Saturated Thickness: 72.73 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-15D)

Initial Displacement: 1.602 ft
Total Well Penetration Depth: 68.73 ft
Casing Radius: 0.083 ft
Static Water Column Height: 68.91 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-15I SLUG IN.aqt
Date: 09/26/19 Time: 14:19:22

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-15I
Test Date: 8/8/2019

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

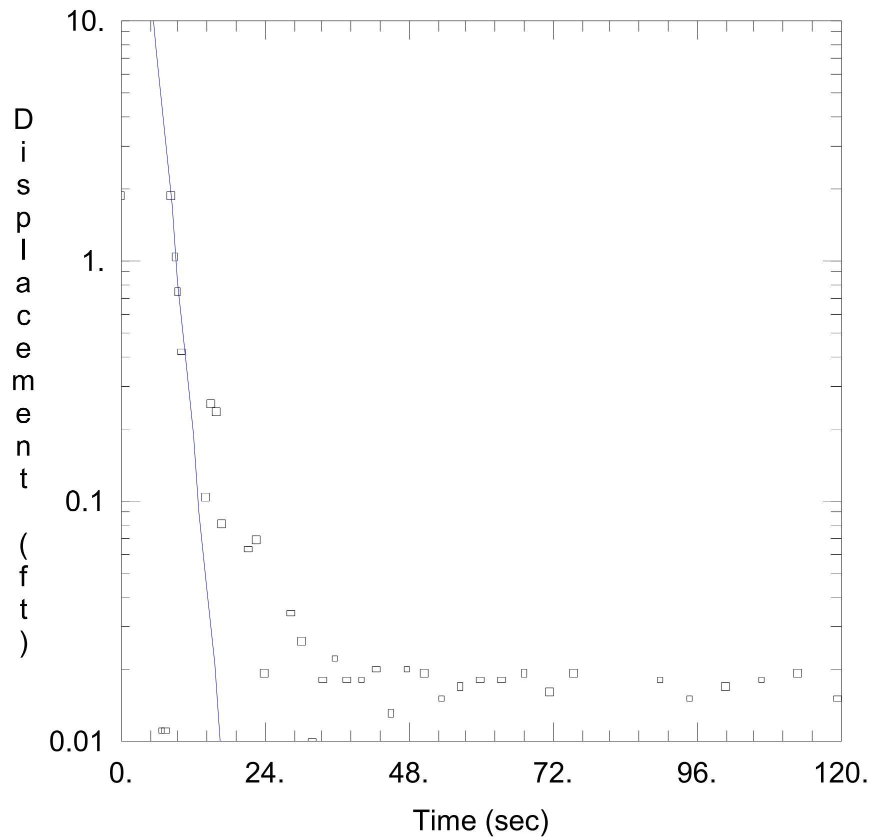
K = 0.006069 cm/sec
y0 = 113.6 ft

AQUIFER DATA

Saturated Thickness: 72.7 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-15I)

Initial Displacement: 0.925 ft
Total Well Penetration Depth: 39.3 ft
Casing Radius: 0.083 ft
Static Water Column Height: 39.53 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-15I SLUG OUT.aqt
Date: 09/26/19 Time: 14:19:50

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-15I
Test Date: 8/8/2019

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

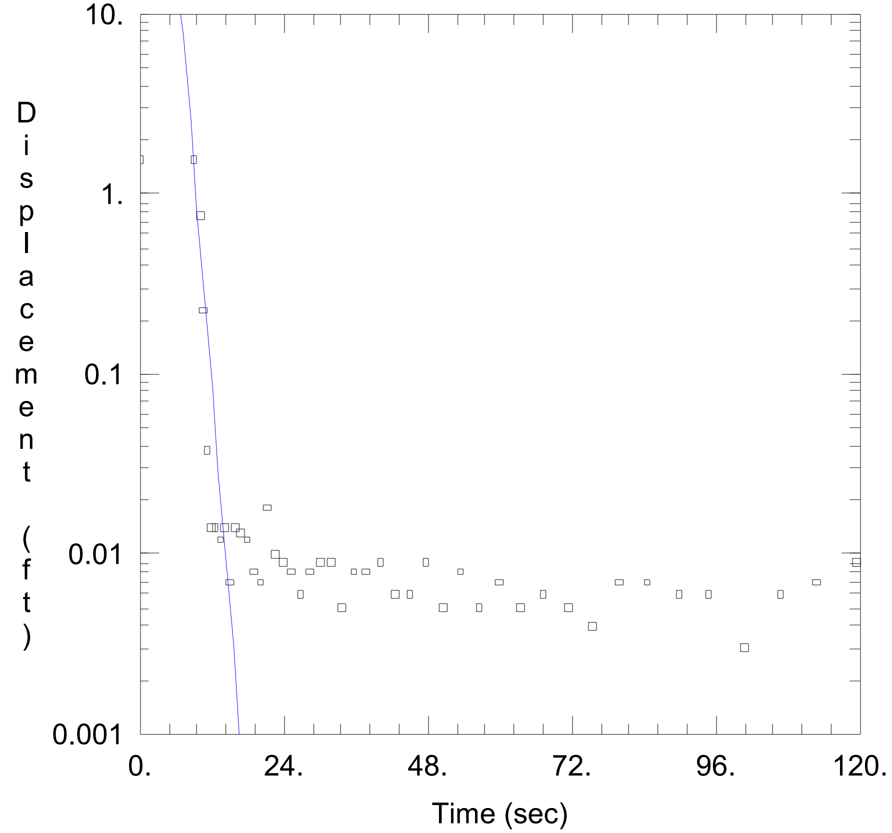
K = 0.01731 cm/sec
y0 = 295. ft

AQUIFER DATA

Saturated Thickness: 72.7 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-15I)

Initial Displacement: 1.878 ft
Total Well Penetration Depth: 39.3 ft
Casing Radius: 0.083 ft
Static Water Column Height: 39.53 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-15S SLUG IN.aqt
Date: 09/26/19 Time: 14:20:08

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-15S
Test Date: 8/8/19

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

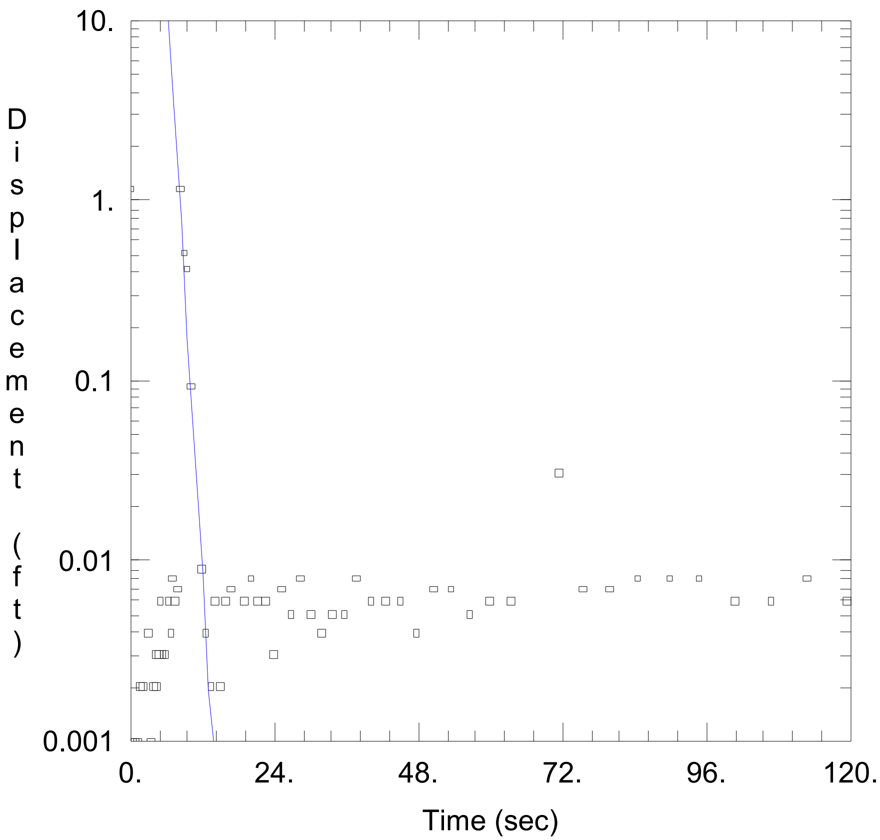
K = 0.02088 cm/sec
y0 = 6596.4 ft

AQUIFER DATA

Saturated Thickness: 73.46 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-15S)

Initial Displacement: 1.536 ft
Total Well Penetration Depth: 10.26 ft
Casing Radius: 0.083 ft
Static Water Column Height: 10.28 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-15S SLUG OUT.aqt
Date: 09/26/19 Time: 14:20:33

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-15S
Test Date: 8/8/19

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

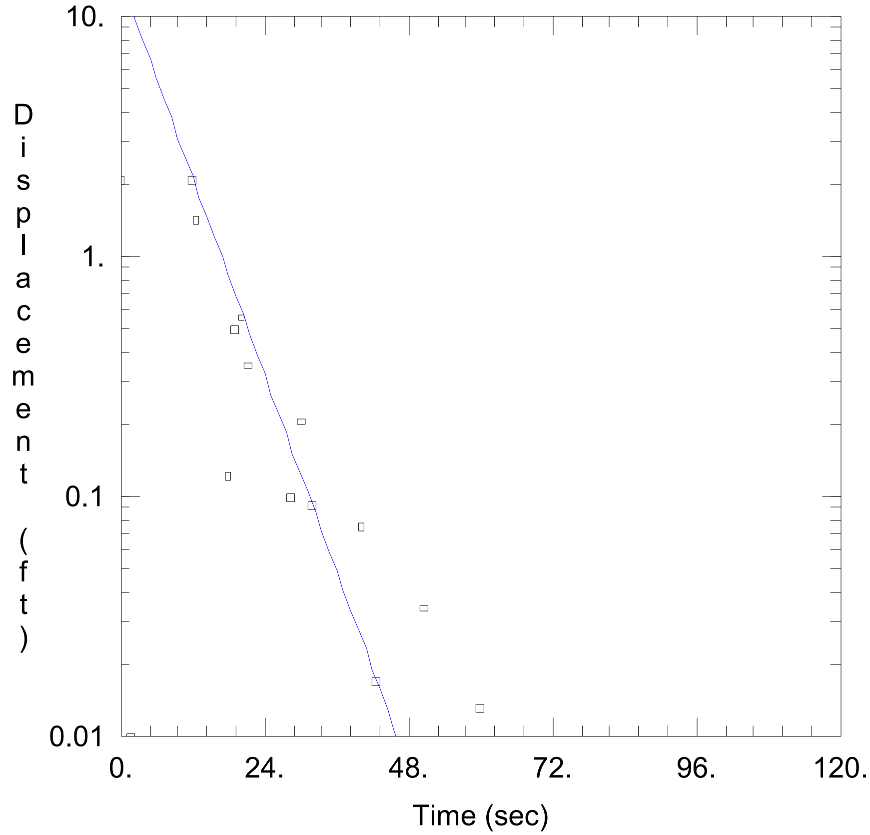
K = 0.02788 cm/sec
y0 = 2.762E+4 ft

AQUIFER DATA

Saturated Thickness: 73.46 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-15S)

Initial Displacement: 1.169 ft
Total Well Penetration Depth: 10.26 ft
Casing Radius: 0.083 ft
Static Water Column Height: 10.28 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-16D SLUG IN.aqt
Date: 09/26/19 Time: 14:20:49

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-16D
Test Date: 8/8/2019

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

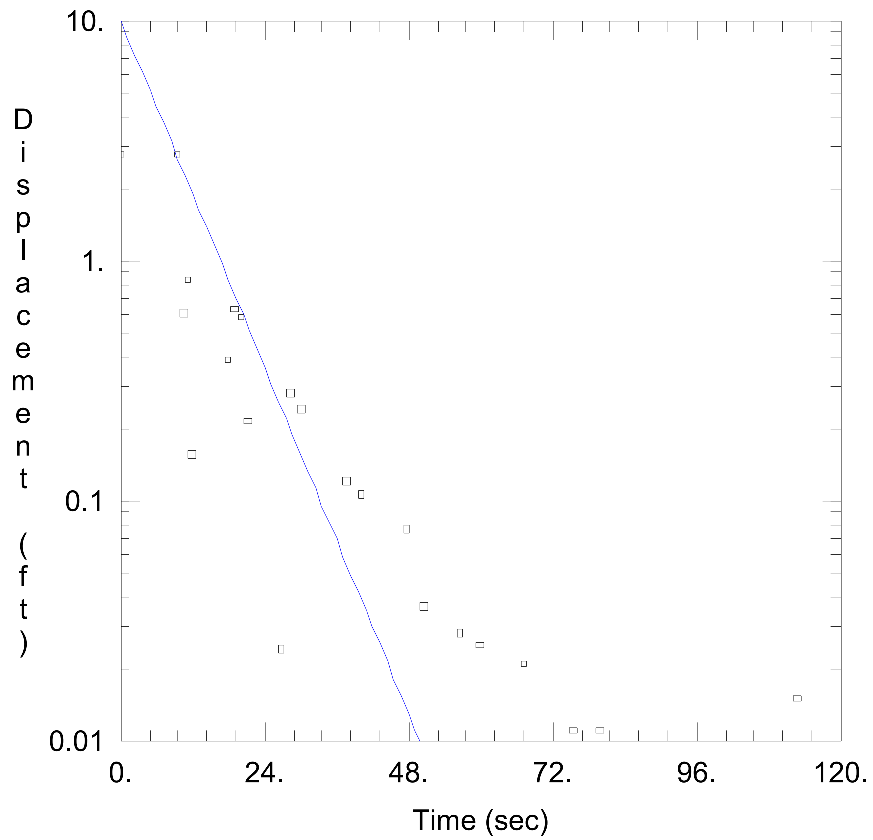
K = 0.005262 cm/sec
y0 = 14.05 ft

AQUIFER DATA

Saturated Thickness: 79.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-16D)

Initial Displacement: 2.056 ft
Total Well Penetration Depth: 76.1 ft
Casing Radius: 0.083 ft
Static Water Column Height: 77.88 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-16D SLUG OUT.aqt
Date: 09/26/19 Time: 14:21:16

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-16D
Test Date: 8/8/2019

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

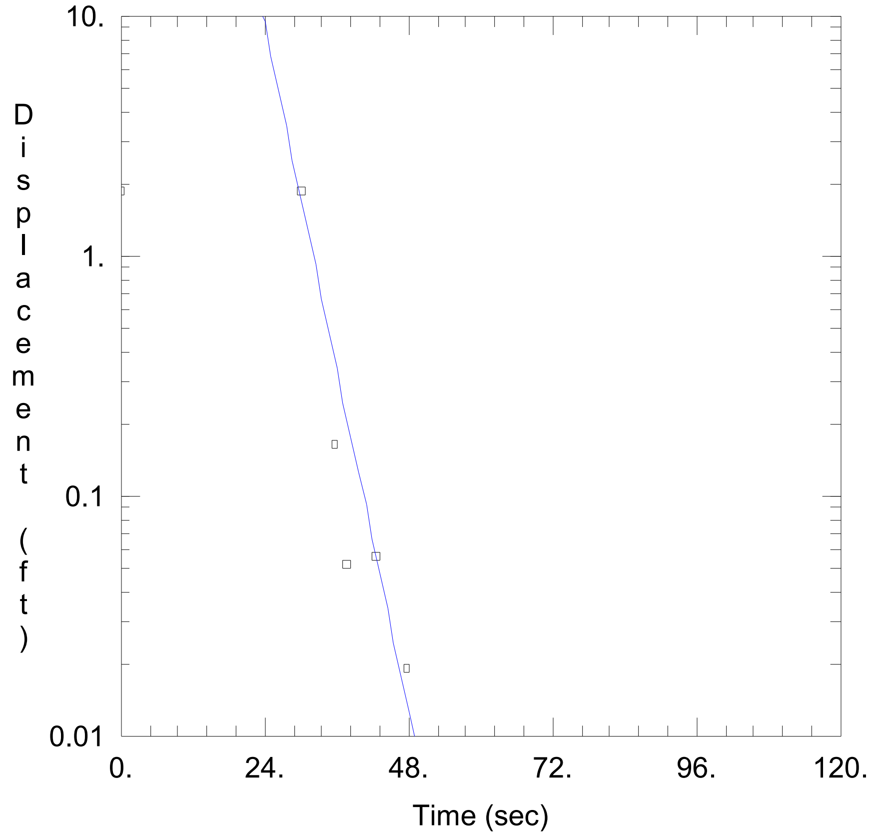
K = 0.004636 cm/sec
y0 = 10.1 ft

AQUIFER DATA

Saturated Thickness: 79.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-16D)

Initial Displacement: 2.783 ft
Total Well Penetration Depth: 76.1 ft
Casing Radius: 0.083 ft
Static Water Column Height: 77.88 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-16I SLUG IN.aqt
Date: 09/26/19 Time: 14:21:38

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-16I
Test Date: 8/8/2019

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

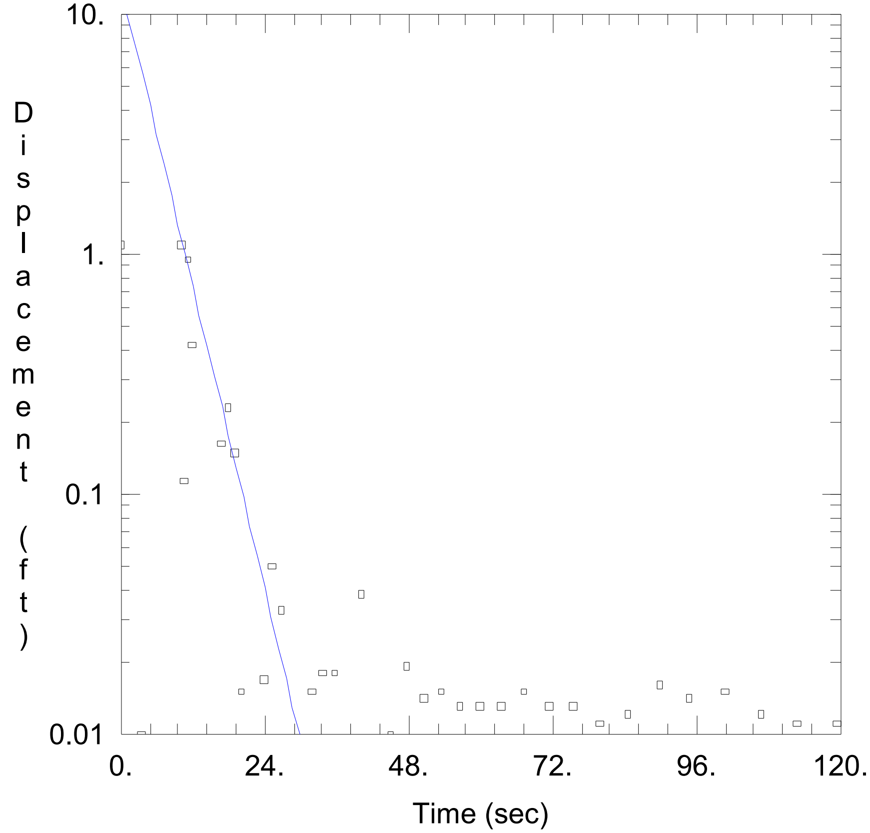
K = 0.007945 cm/sec
y0 = 6968.9 ft

AQUIFER DATA

Saturated Thickness: 79.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-16I)

Initial Displacement: 1.854 ft
Total Well Penetration Depth: 46.3 ft
Casing Radius: 0.083 ft
Static Water Column Height: 77.88 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-16I SLUG OUTaqt.aqt
Date: 09/26/19 Time: 14:21:58

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-16I
Test Date: 8/8/2019

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

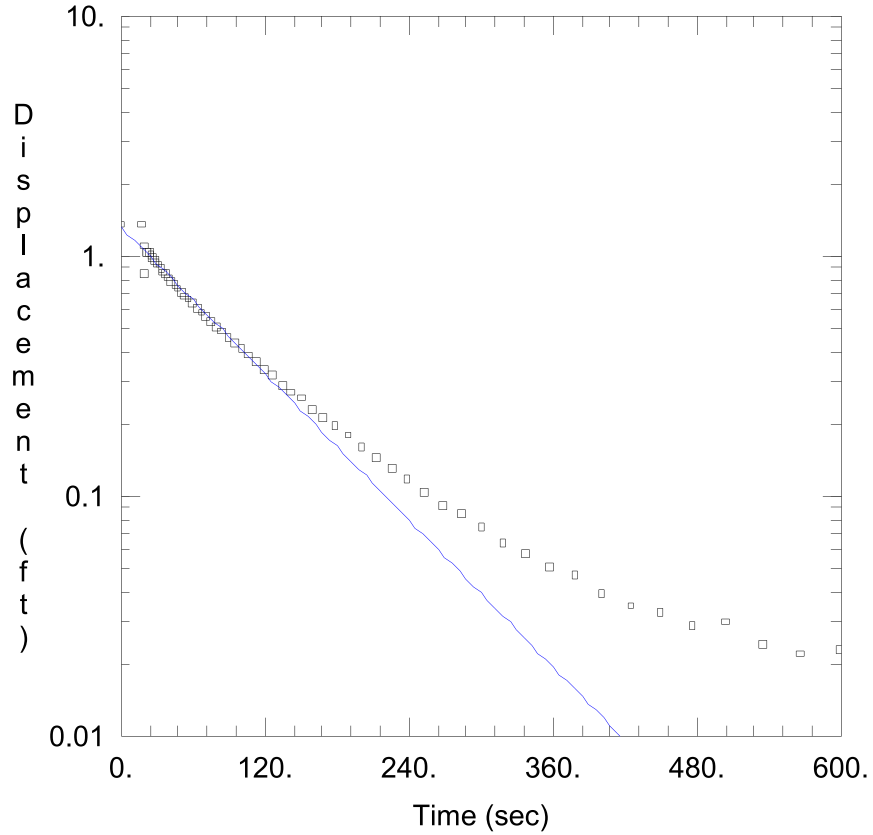
K = 0.006965 cm/sec
y0 = 13.48 ft

AQUIFER DATA

Saturated Thickness: 79.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-16I)

Initial Displacement: 1.096 ft
Total Well Penetration Depth: 46.3 ft
Casing Radius: 0.083 ft
Static Water Column Height: 77.88 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-16S SLUG IN.aqt
Date: 09/26/19 Time: 14:22:19

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-15S
Test Date: 8/8/19

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

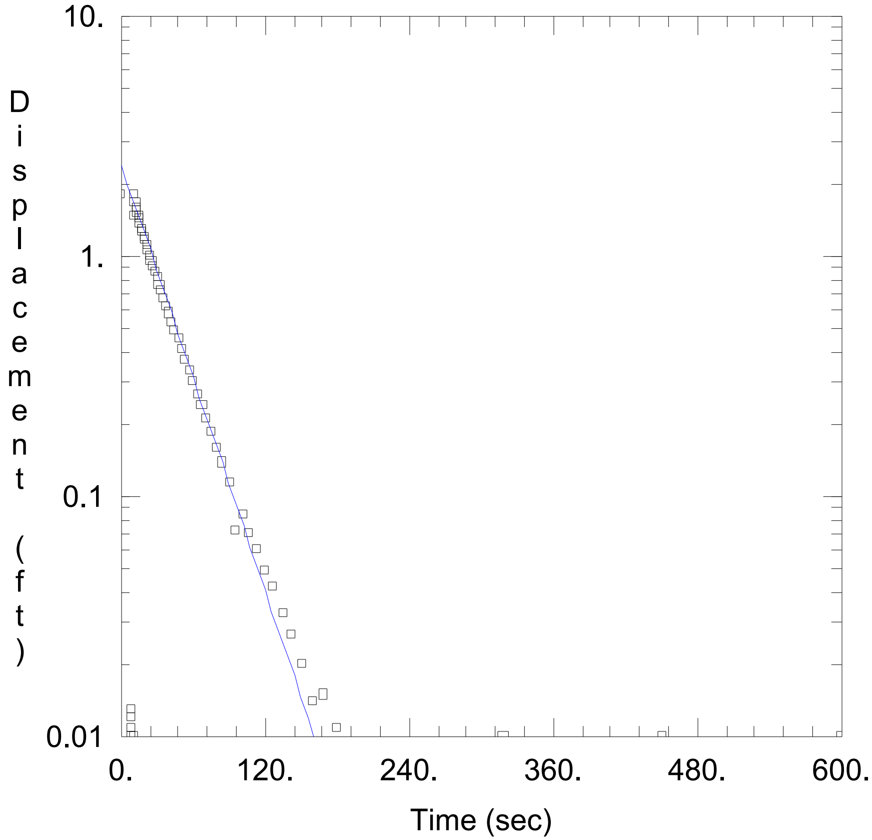
K = 0.0002853 cm/sec
y0 = 1.326 ft

AQUIFER DATA

Saturated Thickness: 79.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-16S)

Initial Displacement: 1.357 ft
Total Well Penetration Depth: 16.4 ft
Casing Radius: 0.083 ft
Static Water Column Height: 20.56 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-16S SLUG OUT.aqt
Date: 10/01/19 Time: 14:23:54

PROJECT INFORMATION

Company: ATC Group Services LLC
Client: IPL
Project: 170LF00710
Location: Eagle Valley Station
Test Well: MW-15S
Test Date: 8/8/19

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.0008272 cm/sec
y0 = 2.412 ft

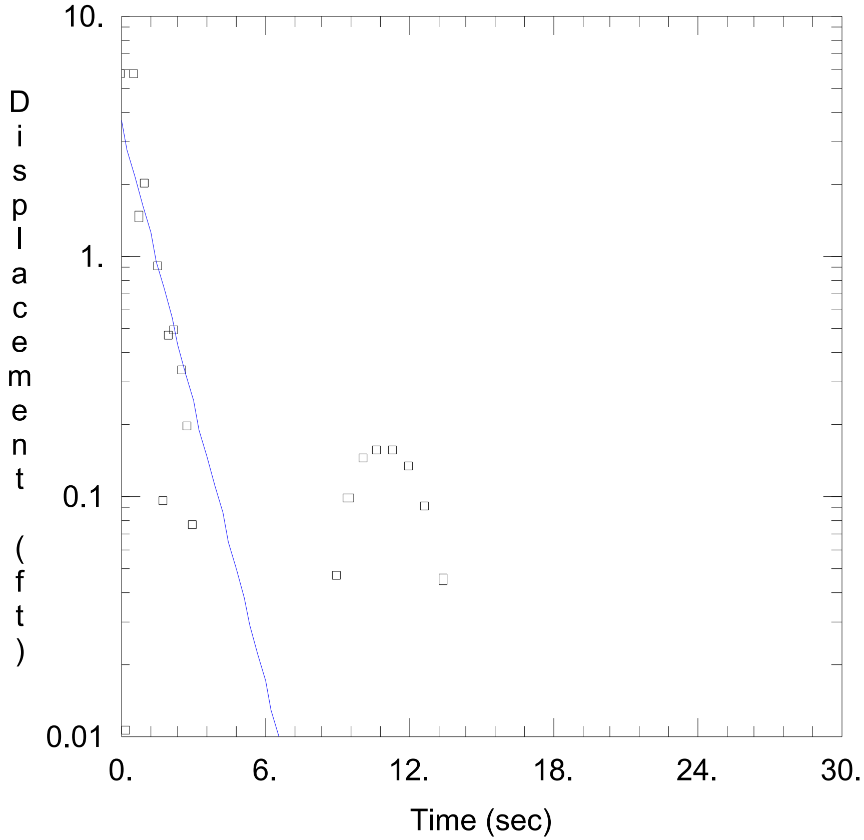
AQUIFER DATA

Saturated Thickness: 79.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-16S)

Initial Displacement: 1.833 ft
Total Well Penetration Depth: 16.4 ft
Casing Radius: 0.083 ft
Static Water Column Height: 20.56 ft
Screen Length: 10. ft
Well Radius: 0.33 ft

Appendix E: Hydraulic Conductivity Calculations



WELL TEST ANALYSIS

Data Set: G:\...\MW-17D IN.aqt
Date: 09/07/21 Time: 08:36:53

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: IPL EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-17D IN
Test Date: 4-19-21

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

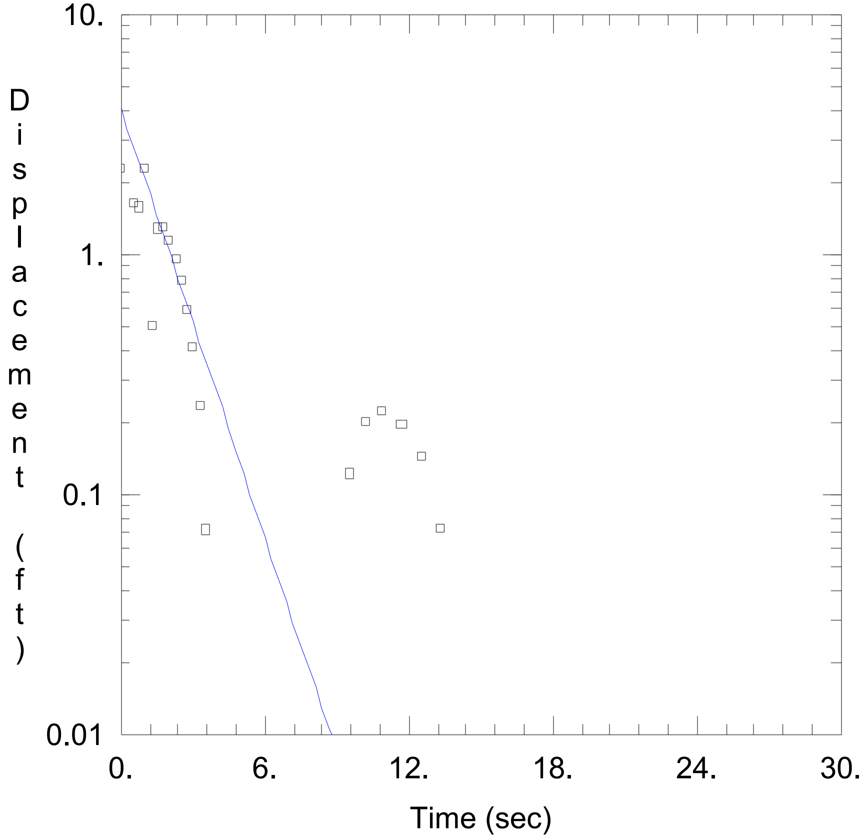
K = 0.03627 cm/sec
y0 = 3.635 ft

AQUIFER DATA

Saturated Thickness: 95.42 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-17D IN)

Initial Displacement: 5.822 ft
Total Well Penetration Depth: 97.48 ft
Casing Radius: 0.083 ft
Static Water Column Height: 85.7 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-17D OUT.aqt
Date: 09/07/21 Time: 08:36:00

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: IPL EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-17D OUT
Test Date: 4-19-21

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

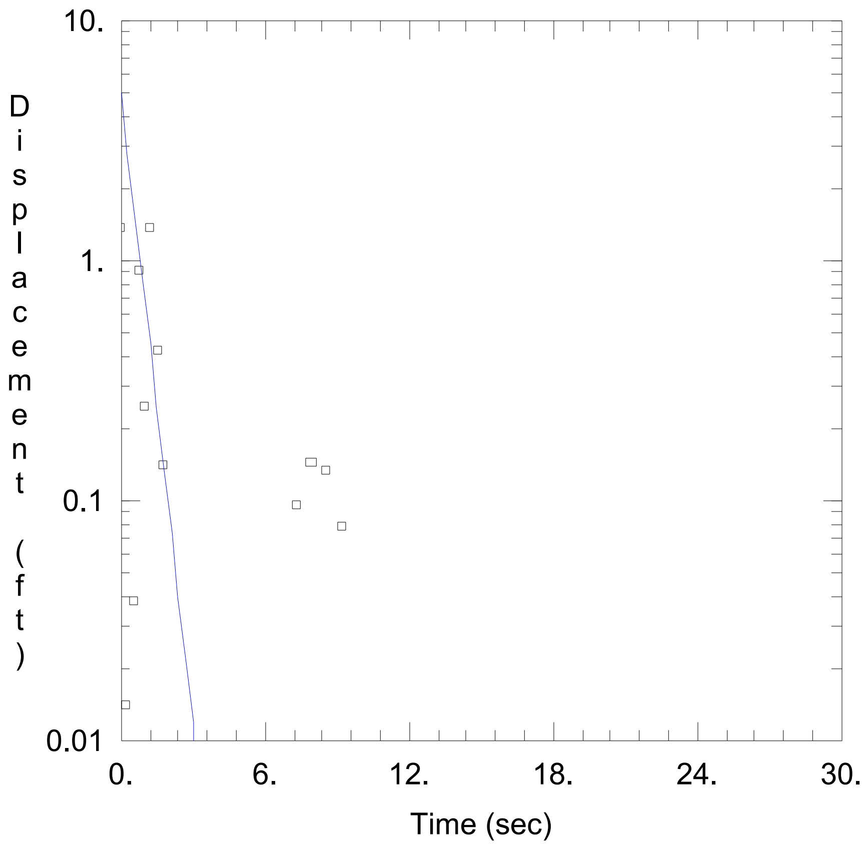
K = 0.02789 cm/sec
y0 = 4.115 ft

AQUIFER DATA

Saturated Thickness: 95.42 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-17D OUT)

Initial Displacement: 2.28 ft
Total Well Penetration Depth: 97.48 ft
Casing Radius: 0.083 ft
Static Water Column Height: 85.7 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-17I IN.aqt
Date: 09/07/21 Time: 08:36:16

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: IPL EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-17I IN
Test Date: 4-19-21

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

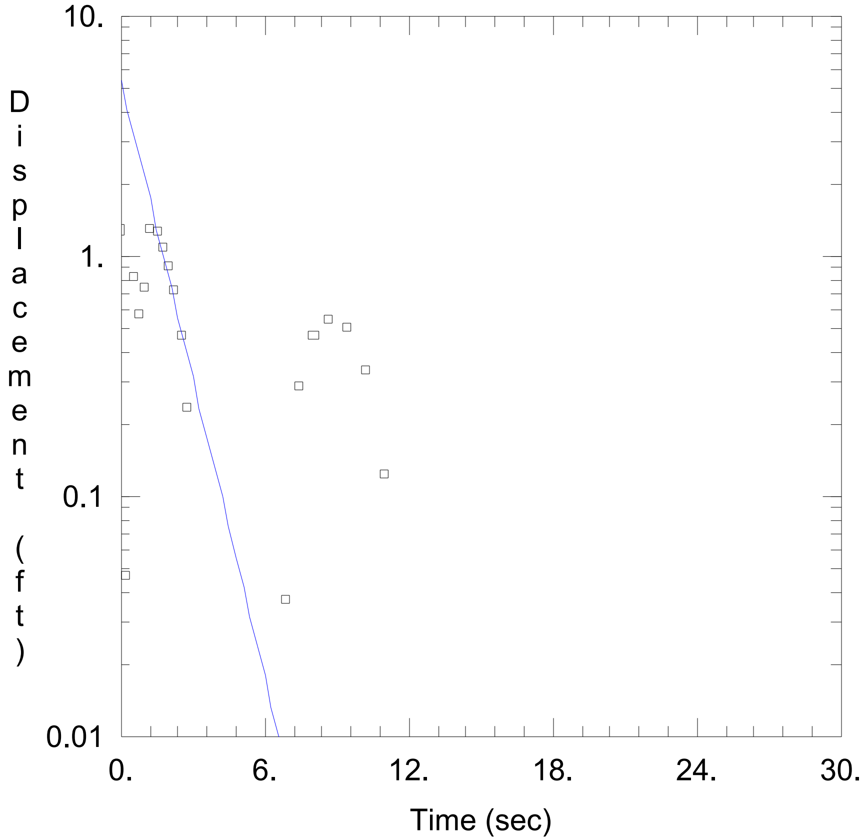
K = 0.06125 cm/sec
y0 = 5.043 ft

AQUIFER DATA

Saturated Thickness: 95.33 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-17I)

Initial Displacement: 1.36 ft
Total Well Penetration Depth: 67.88 ft
Casing Radius: 0.083 ft
Static Water Column Height: 55.69 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-17I OUT.aqt
Date: 09/07/21 Time: 08:36:31

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: IPL EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-17I OUT
Test Date: 4-19-21

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

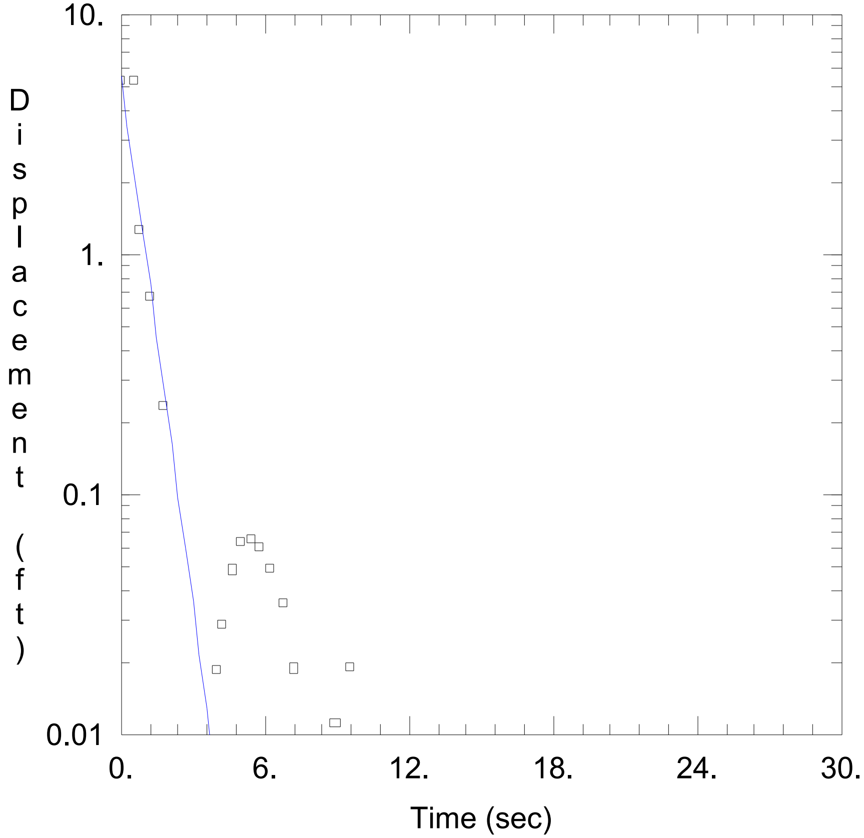
K = 0.02898 cm/sec
y0 = 5.455 ft

AQUIFER DATA

Saturated Thickness: 95.33 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-17I OUT)

Initial Displacement: 1.29 ft
Total Well Penetration Depth: 67.88 ft
Casing Radius: 0.083 ft
Static Water Column Height: 55.69 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-17S IN.aqt
Date: 09/07/21 Time: 08:37:10

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: IPL EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-17S IN
Test Date: 4-19-21

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.04641 cm/sec
y0 = 5.601 ft

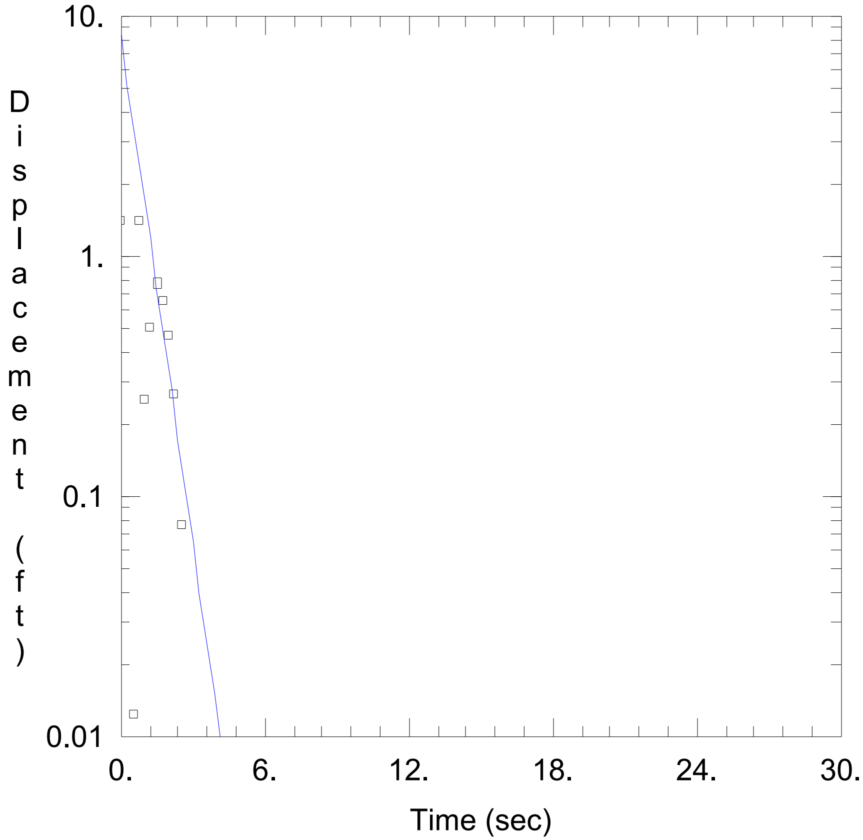
AQUIFER DATA

Saturated Thickness: 95.51 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-17S IN)

Initial Displacement: 5.267 ft
Total Well Penetration Depth: 37.85 ft
Casing Radius: 0.083 ft

Static Water Column Height: 26.09 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-17S OUT.aqt
Date: 09/07/21 Time: 08:37:26

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: IPL EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-17S OUT
Test Date: 4-19-21

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

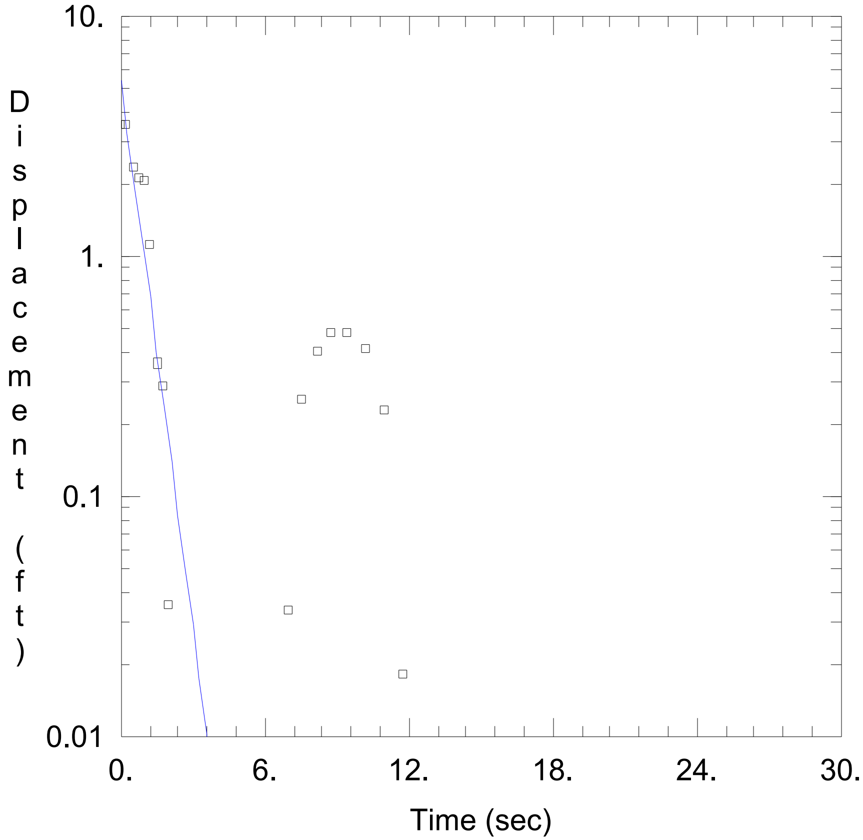
K = 0.06093 cm/sec
y0 = 8.372 ft

AQUIFER DATA

Saturated Thickness: 95.51 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-17S OUT)

Initial Displacement: 1.41 ft
Total Well Penetration Depth: 35.9 ft
Casing Radius: 0.08 ft
Static Water Column Height: 26.09 ft
Screen Length: 10. ft
Well Radius: 0.08 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-18D IN.aqt
Date: 09/07/21 Time: 08:37:58

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: IPL EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-18D IN
Test Date: 4-19-21

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

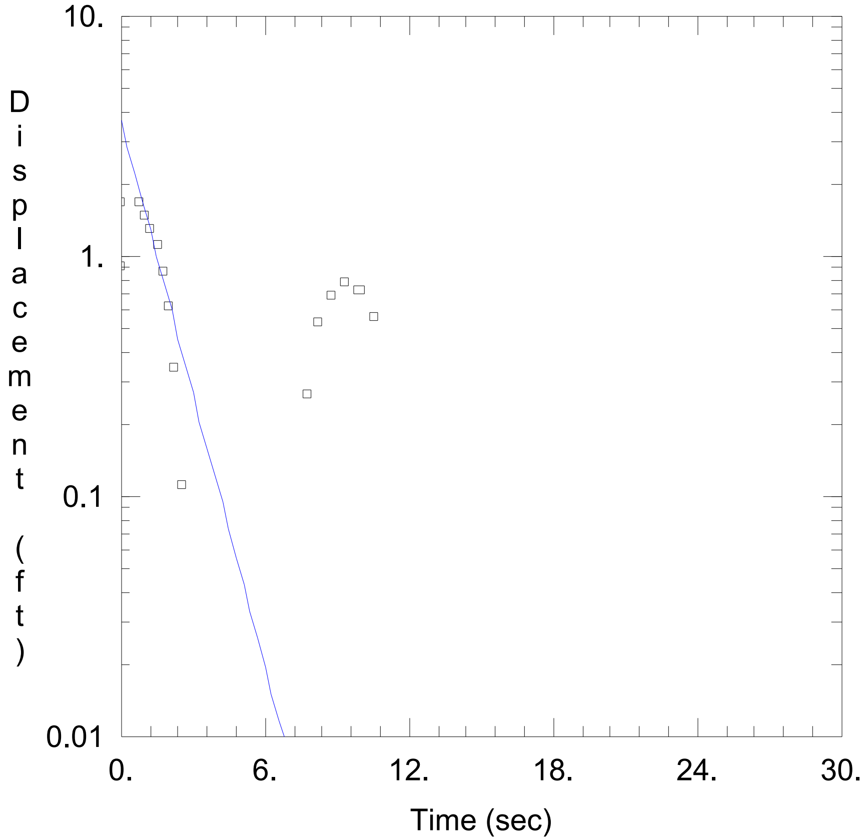
K = 0.06216 cm/sec
y0 = 5.422 ft

AQUIFER DATA

Saturated Thickness: 73.67 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-18D IN)

Initial Displacement: 3.53 ft
Total Well Penetration Depth: 73. ft
Casing Radius: 0.083 ft
Static Water Column Height: 72.87 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-18D OUT.aqt
Date: 09/07/21 Time: 08:37:43

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: IPL EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-18D OUT
Test Date: 4-19-21

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

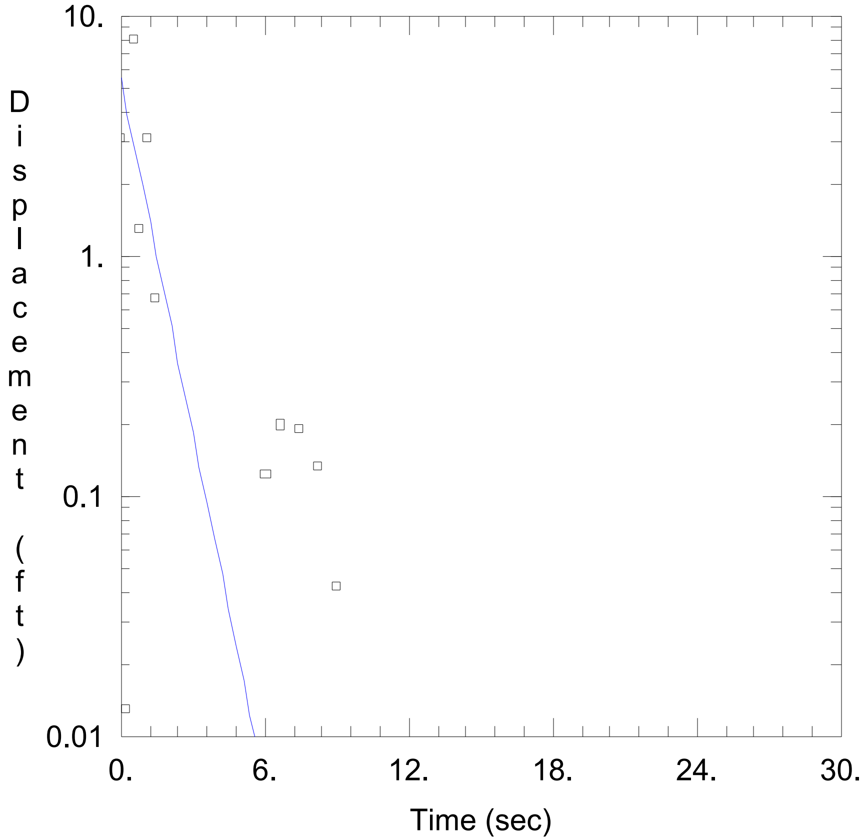
K = 0.03117 cm/sec
y0 = 3.689 ft

AQUIFER DATA

Saturated Thickness: 73.67 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-18 OUT)

Initial Displacement: 1.69 ft
Total Well Penetration Depth: 73. ft
Casing Radius: 0.083 ft
Static Water Column Height: 72.87 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-18I IN.aqt
Date: 09/07/21 Time: 08:38:14

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: IPL EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-18I IN
Test Date: 4-19-21

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

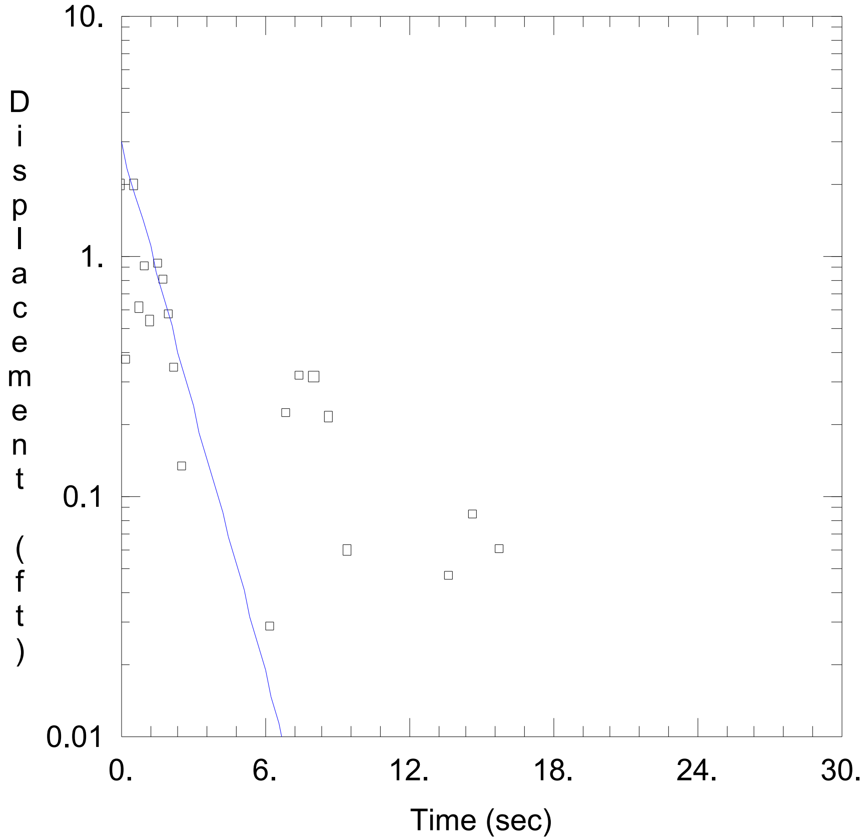
K = 0.03248 cm/sec
y0 = 5.467 ft

AQUIFER DATA

Saturated Thickness: 73.81 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-18I IN)

Initial Displacement: 3.15 ft
Total Well Penetration Depth: 43.87 ft
Casing Radius: 0.083 ft
Static Water Column Height: 43.91 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-18I OUT.aqt
Date: 09/07/21 Time: 08:38:29

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: IPL EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-18I OUT
Test Date: 4-19-21

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.02432 cm/sec
y0 = 3.022 ft

AQUIFER DATA

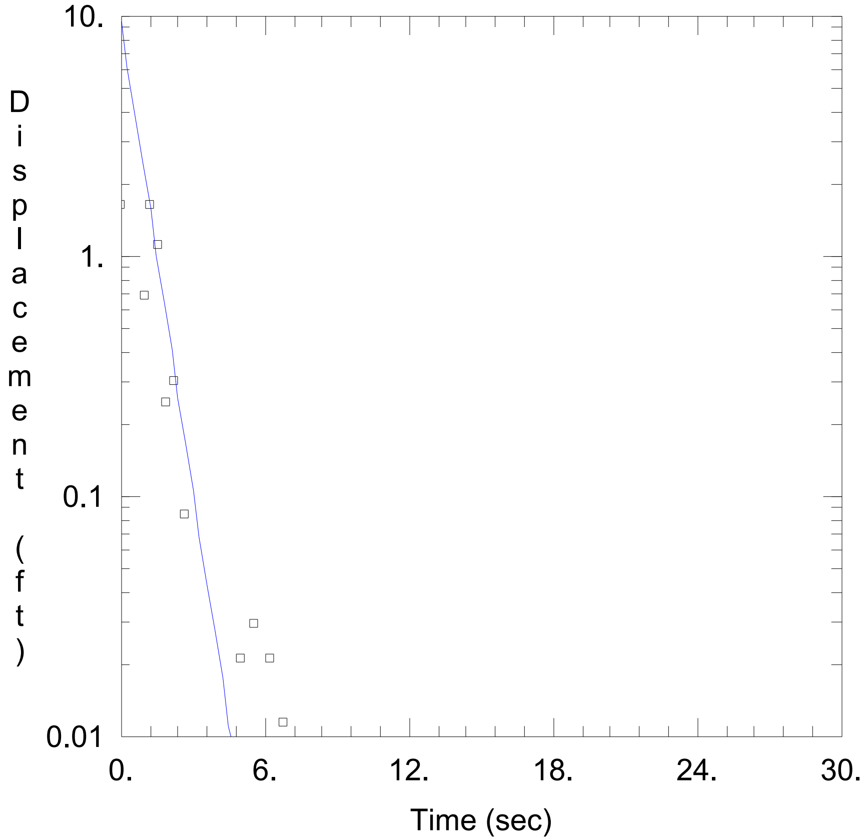
Saturated Thickness: 73.81 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-18I OUT)

Initial Displacement: 1.99 ft
Total Well Penetration Depth: 43.87 ft
Casing Radius: 0.083 ft

Static Water Column Height: 43.91 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-18S IN.aqt
Date: 09/07/21 Time: 08:38:45

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: IPL EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-18S IN
Test Date: 4-19-21

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

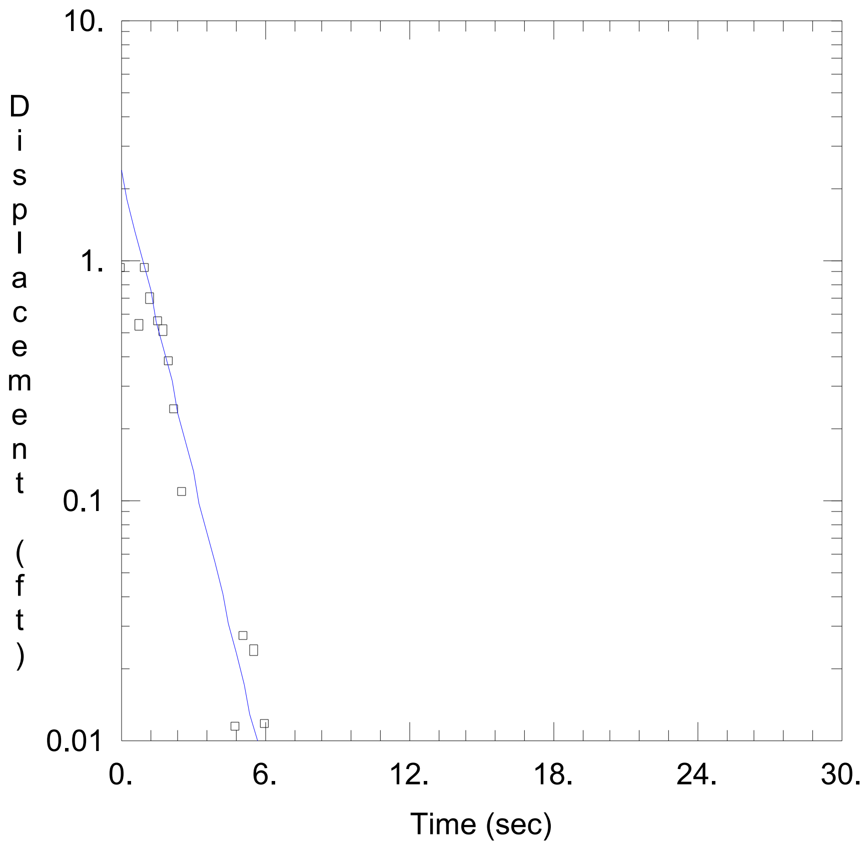
K = 0.03643 cm/sec
y0 = 9.511 ft

AQUIFER DATA

Saturated Thickness: 74.07 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-18S IN)

Initial Displacement: 1.63 ft
Total Well Penetration Depth: 16.04 ft
Casing Radius: 0.083 ft
Static Water Column Height: 16.24 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-18S OUT.aqt
Date: 09/07/21 Time: 08:40:00

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: IPL EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-18S OUT
Test Date: 4-19-21

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.02349 cm/sec
y0 = 2.392 ft

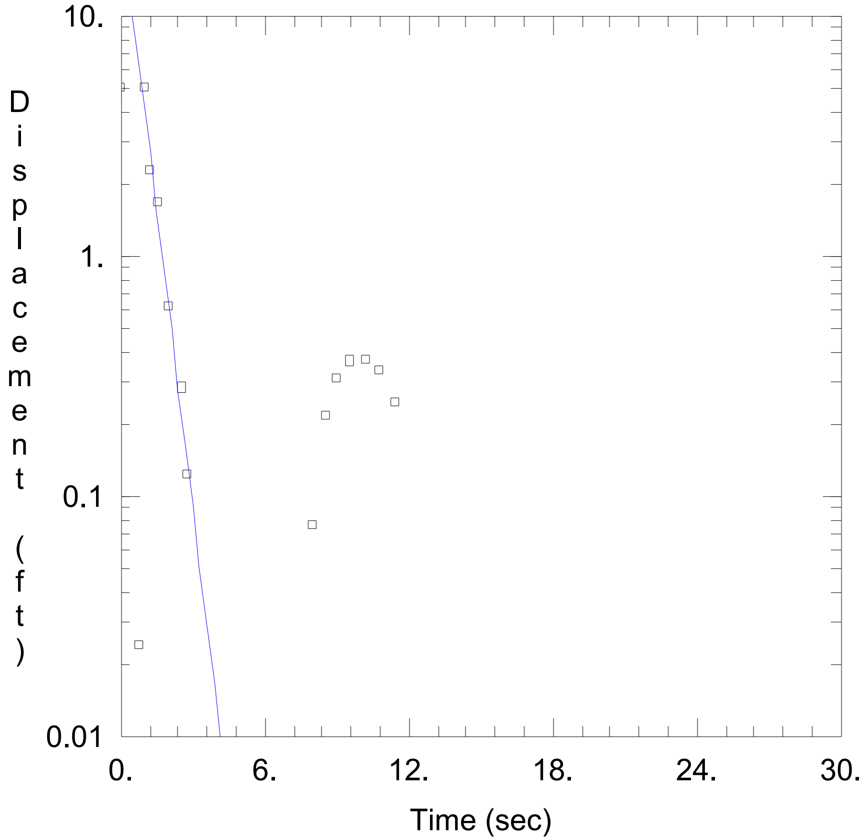
AQUIFER DATA

Saturated Thickness: 74.07 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-18S OUT)

Initial Displacement: 0.94 ft
Total Well Penetration Depth: 16.04 ft
Casing Radius: 0.083 ft

Static Water Column Height: 16.24 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-19D IN.aqt
Date: 09/07/21 Time: 08:39:17

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: IPL EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-19D IN
Test Date: 4-19-21

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

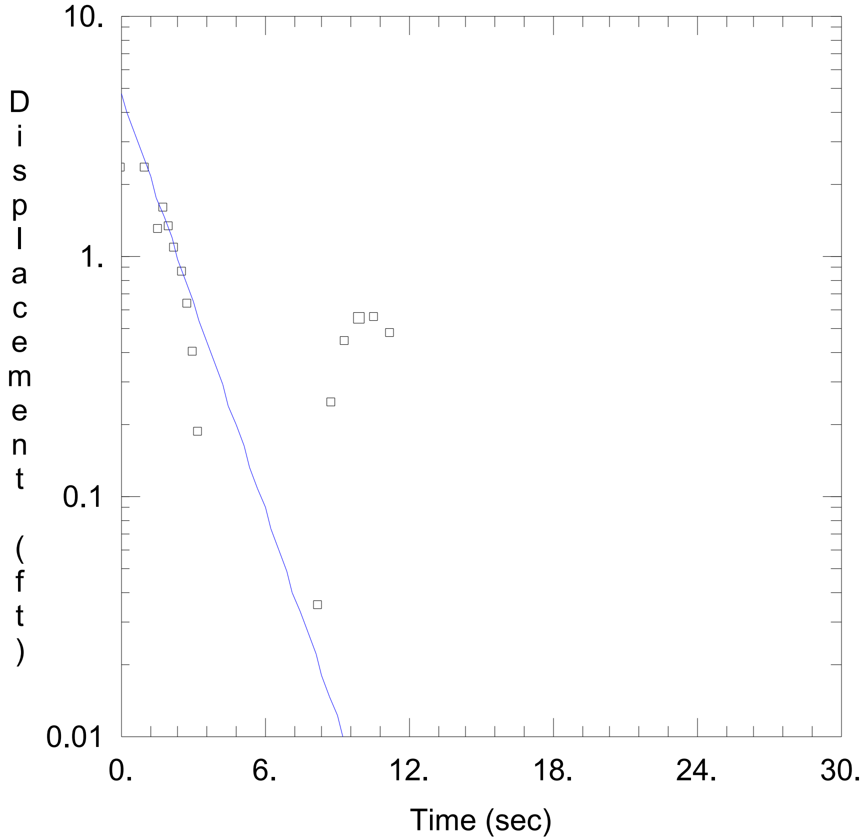
K = 0.06465 cm/sec
y0 = 25.49 ft

AQUIFER DATA

Saturated Thickness: 75.69 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-19D IN)

Initial Displacement: 5.1 ft
Total Well Penetration Depth: 74.09 ft
Casing Radius: 0.083 ft
Static Water Column Height: 74.72 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-19D OUT.aqt
Date: 09/07/21 Time: 08:39:00

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: IPL EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-19D OUT
Test Date: 4-19-21

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

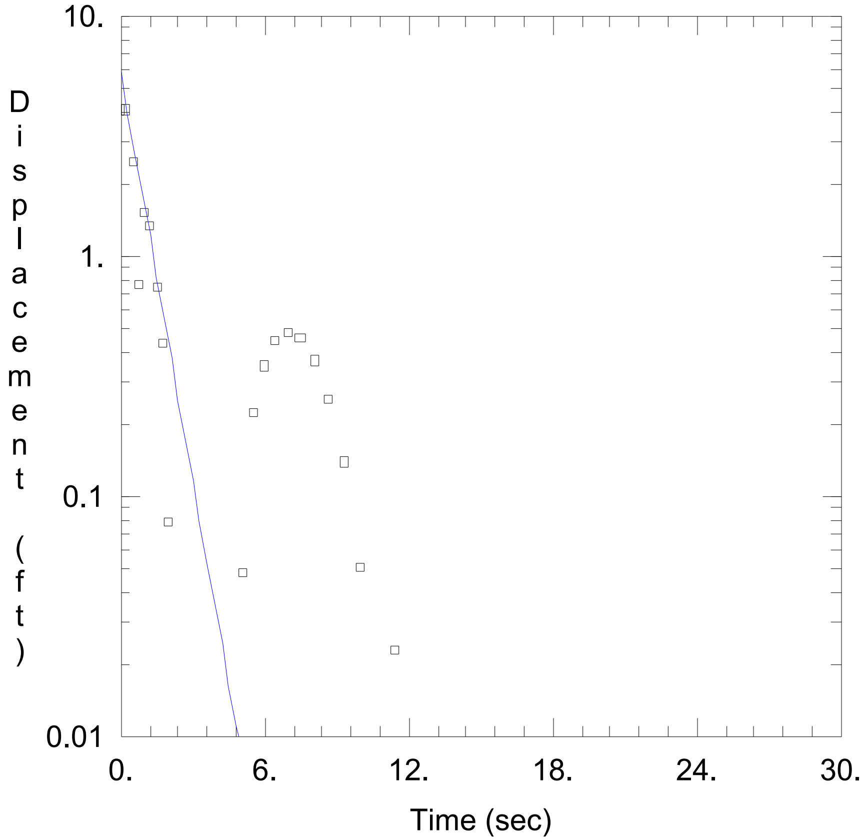
K = 0.02289 cm/sec
y0 = 4.807 ft

AQUIFER DATA

Saturated Thickness: 75.69 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-19D OUT)

Initial Displacement: 2.36 ft
Total Well Penetration Depth: 74.09 ft
Casing Radius: 0.083 ft
Static Water Column Height: 74.72 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-19I IN.aqt
Date: 09/07/21 Time: 08:39:31

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: IPL EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-19I IN
Test Date: 4-19-21

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.03737 cm/sec
y0 = 5.806 ft

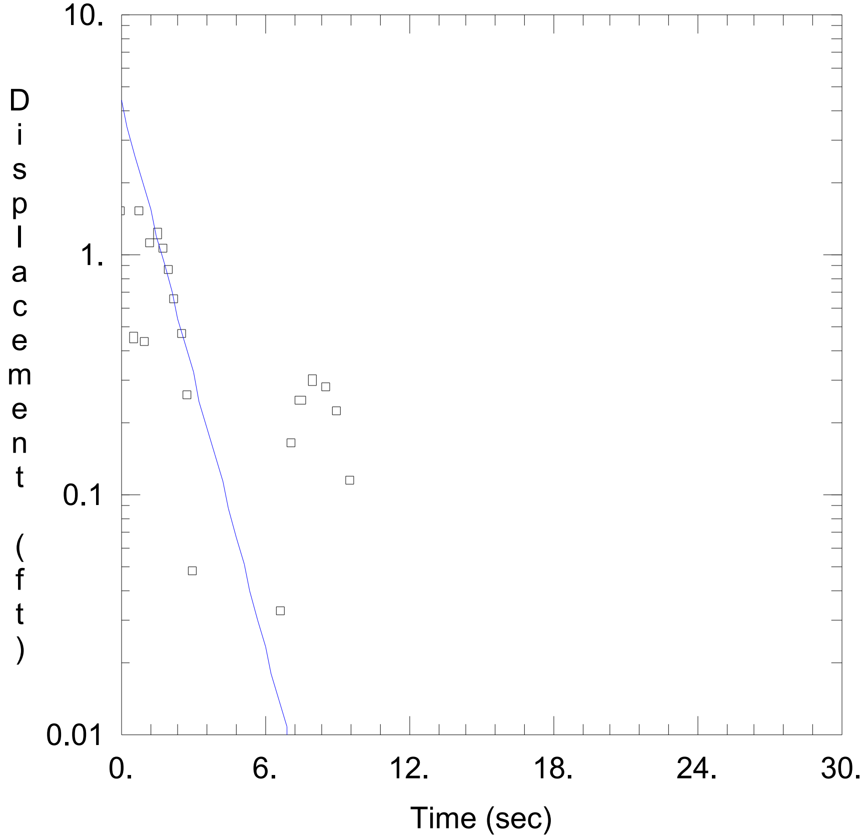
AQUIFER DATA

Saturated Thickness: 75.38 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-19I IN)

Initial Displacement: 4.07 ft
Total Well Penetration Depth: 43.41 ft
Casing Radius: 0.083 ft

Static Water Column Height: 44.09 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-19I OUT.aqt
Date: 09/07/21 Time: 08:35:33

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: IPL EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-19I OUT
Test Date: 4-19-21

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

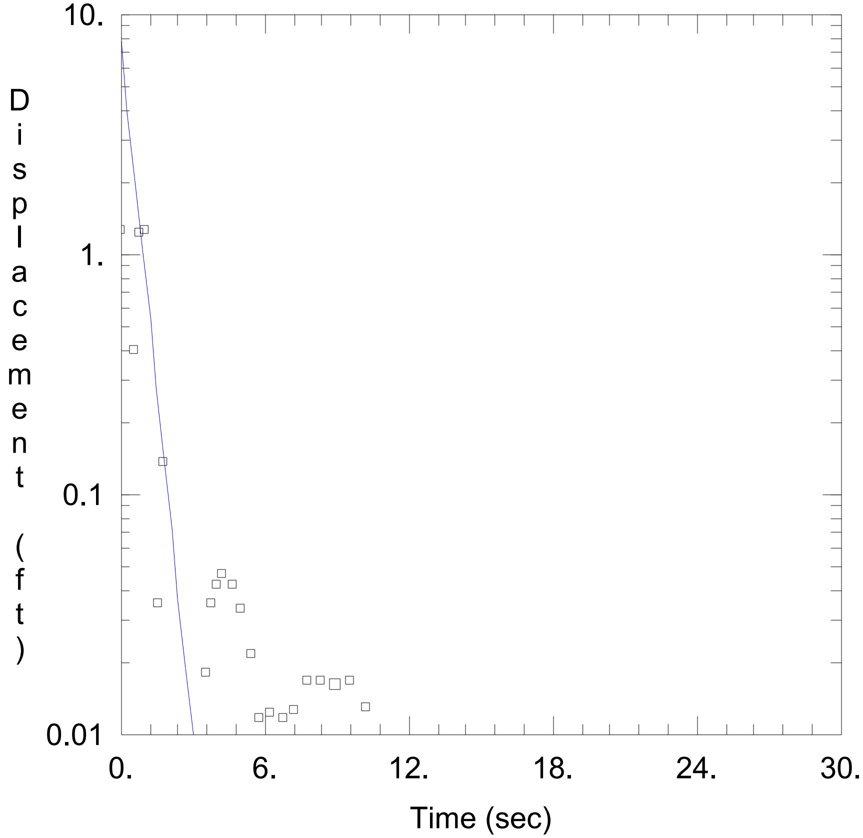
K = 0.02499 cm/sec
y0 = 4.396 ft

AQUIFER DATA

Saturated Thickness: 75.38 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-19I OUT)

Initial Displacement: 1.53 ft
Total Well Penetration Depth: 43.4 ft
Casing Radius: 0.083 ft
Static Water Column Height: 44.09 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-19S IN.aqt
Date: 09/07/21 Time: 08:39:46

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: IPL EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-19S IN
Test Date: 4-19-21

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

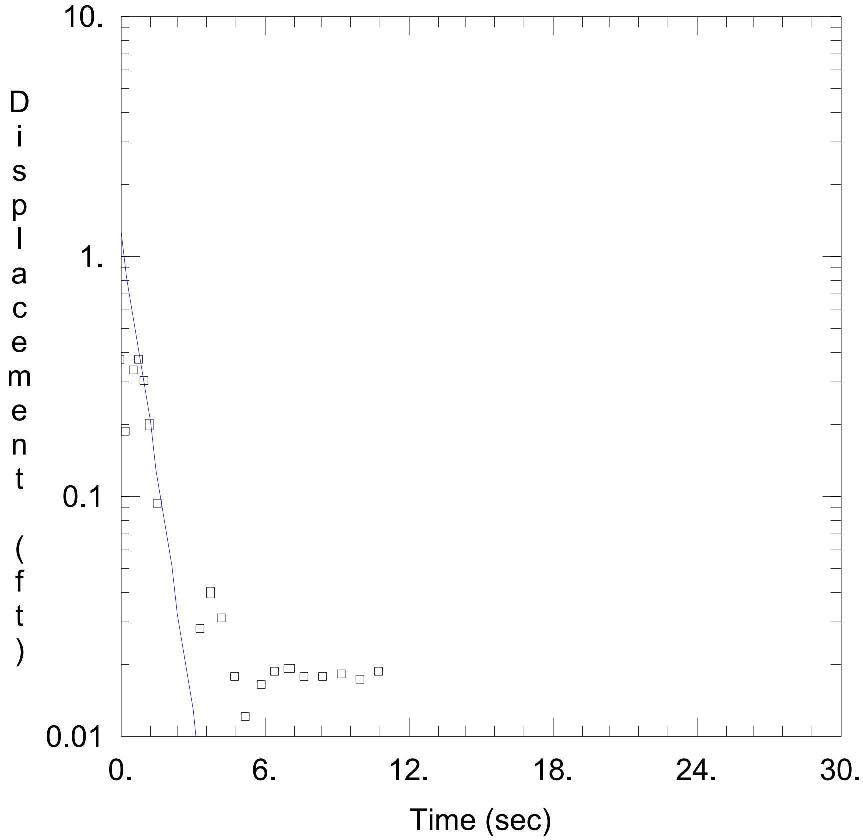
K = 0.05205 cm/sec
y0 = 7.651 ft

AQUIFER DATA

Saturated Thickness: 75.37 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-19S IN)

Initial Displacement: 1.28 ft
Total Well Penetration Depth: 13.25 ft
Casing Radius: 0.083 ft
Static Water Column Height: 13.87 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-19S OUT.aqt
Date: 09/07/21 Time: 08:34:39

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: IPL EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-19S OUT
Test Date: 4-19-21

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

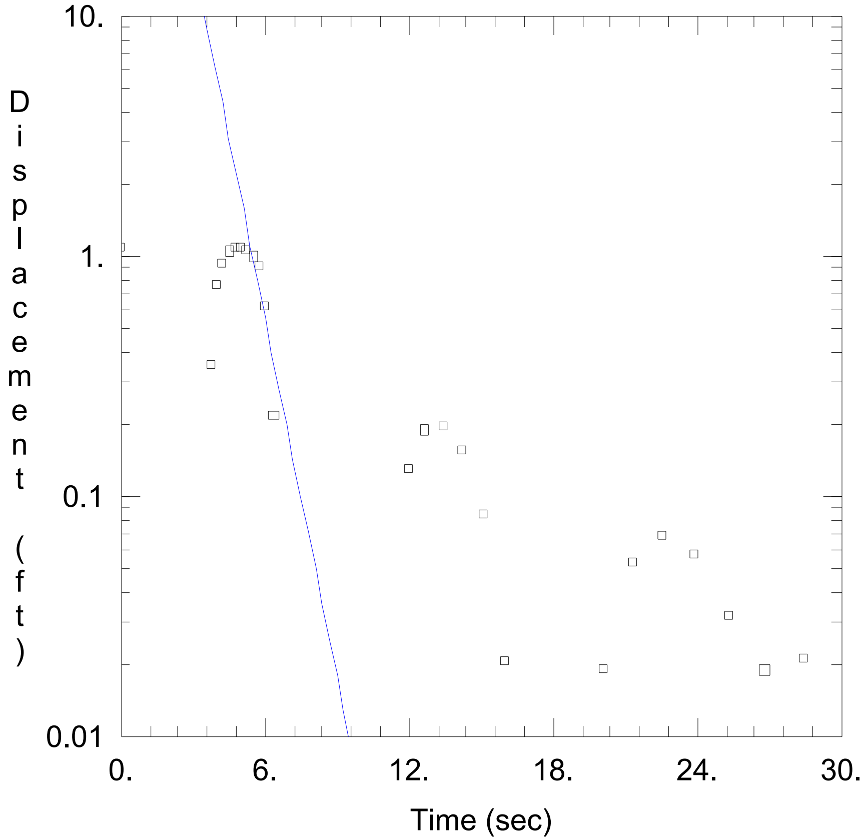
K = 0.0358 cm/sec
y0 = 1.268 ft

AQUIFER DATA

Saturated Thickness: 75.37 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-19S OUT)

Initial Displacement: 0.37 ft
Total Well Penetration Depth: 13.25 ft
Casing Radius: 0.083 ft
Static Water Column Height: 13.87 ft
Screen Length: 10. ft
Well Radius: 0.33 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-20D IN.aqt
Date: 05/12/23 Time: 10:31:02

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-20D IN
Test Date: 9-19-2022

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.04985 cm/sec
y0 = 538.2 ft

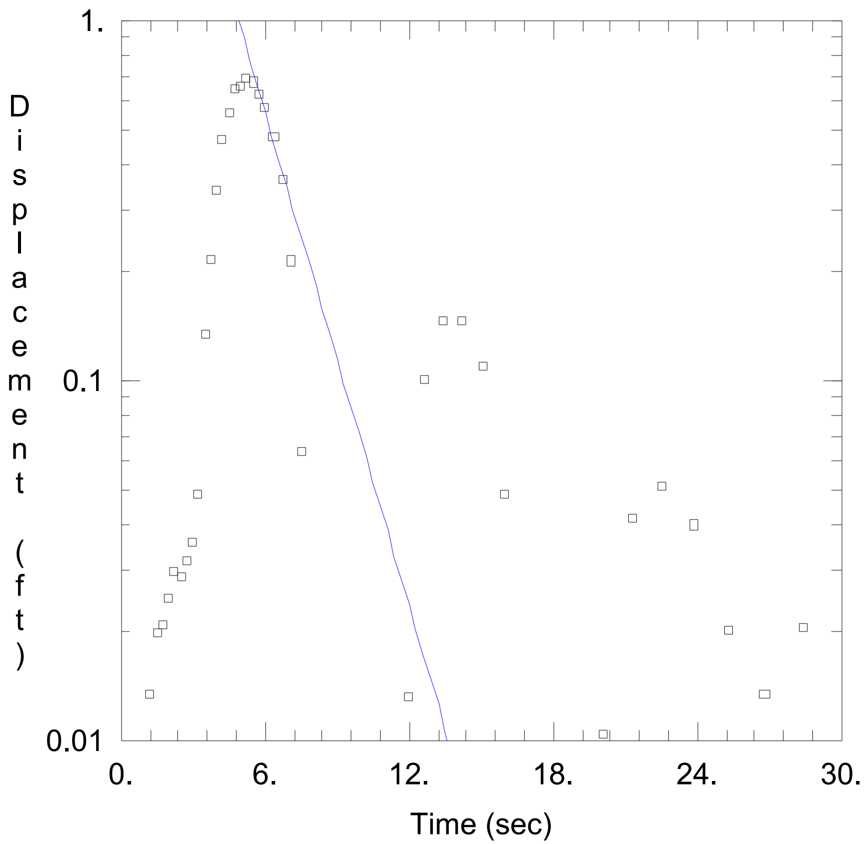
AQUIFER DATA

Saturated Thickness: 74.62 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-20D IN)

Initial Displacement: 1.099 ft
Total Well Penetration Depth: 61.12 ft
Casing Radius: 0.083 ft

Static Water Column Height: 61.12 ft
Screen Length: 10. ft
Well Radius: 0.083 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-20D OUT.aqt
Date: 05/12/23 Time: 10:55:07

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-20D OUT
Test Date: 9-19-2022

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

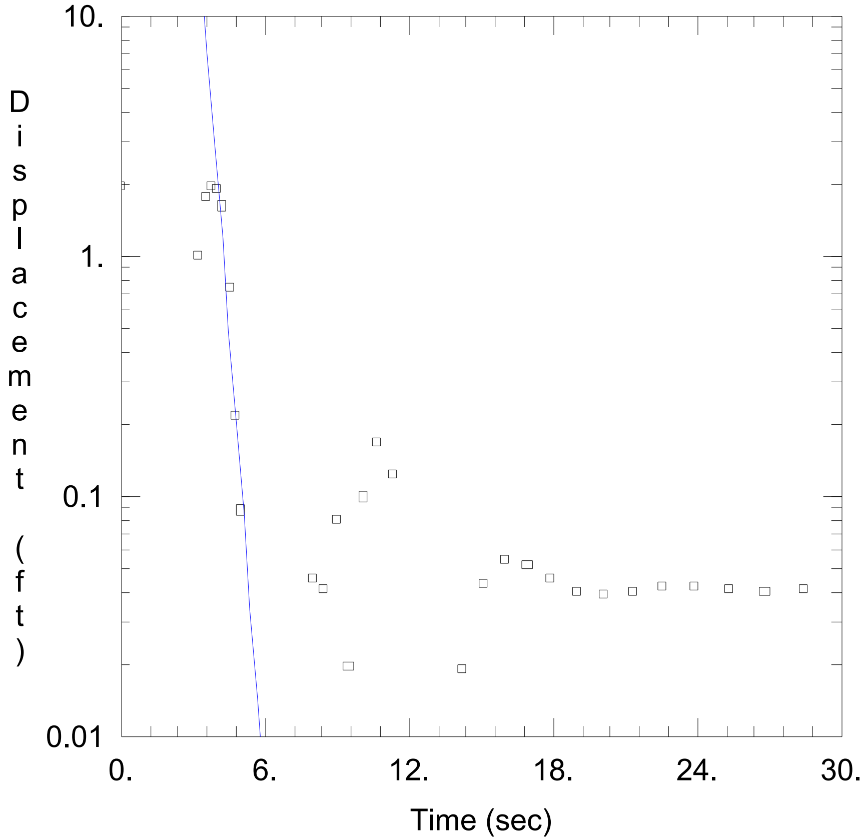
K = 0.02293 cm/sec
y0 = 13.19 ft

AQUIFER DATA

Saturated Thickness: 74.62 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-20D OUT)

Initial Displacement: 1.29 ft
Total Well Penetration Depth: 61.12 ft
Casing Radius: 0.083 ft
Static Water Column Height: 61.12 ft
Screen Length: 10. ft
Well Radius: 0.083 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-20I IN.aqt
Date: 05/12/23 Time: 10:33:05

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-20I
Test Date: 9/19/2022

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

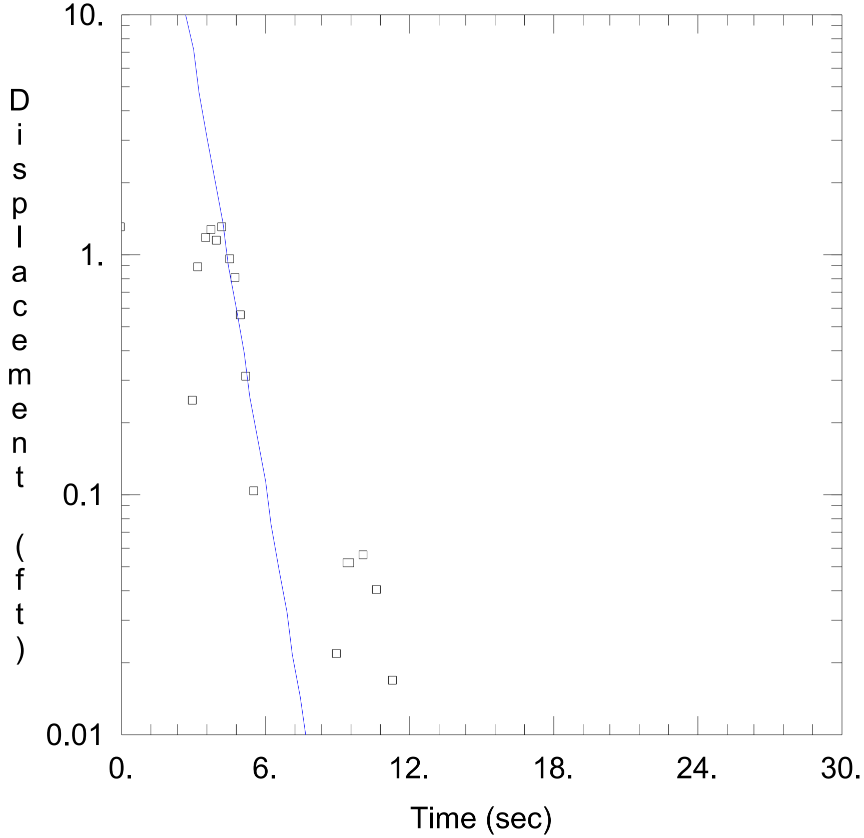
K = 0.1164 cm/sec
y0 = 2.879E+5 ft

AQUIFER DATA

Saturated Thickness: 72.67 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-20I IN)

Initial Displacement: 1.98 ft
Total Well Penetration Depth: 31.07 ft
Casing Radius: 0.083 ft
Static Water Column Height: 31.07 ft
Screen Length: 10. ft
Well Radius: 0.083 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-20I OUT.aqt
Date: 05/12/23 Time: 10:33:52

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-20I OUT
Test Date: 9/19/2022

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.05447 cm/sec
y0 = 449.5 ft

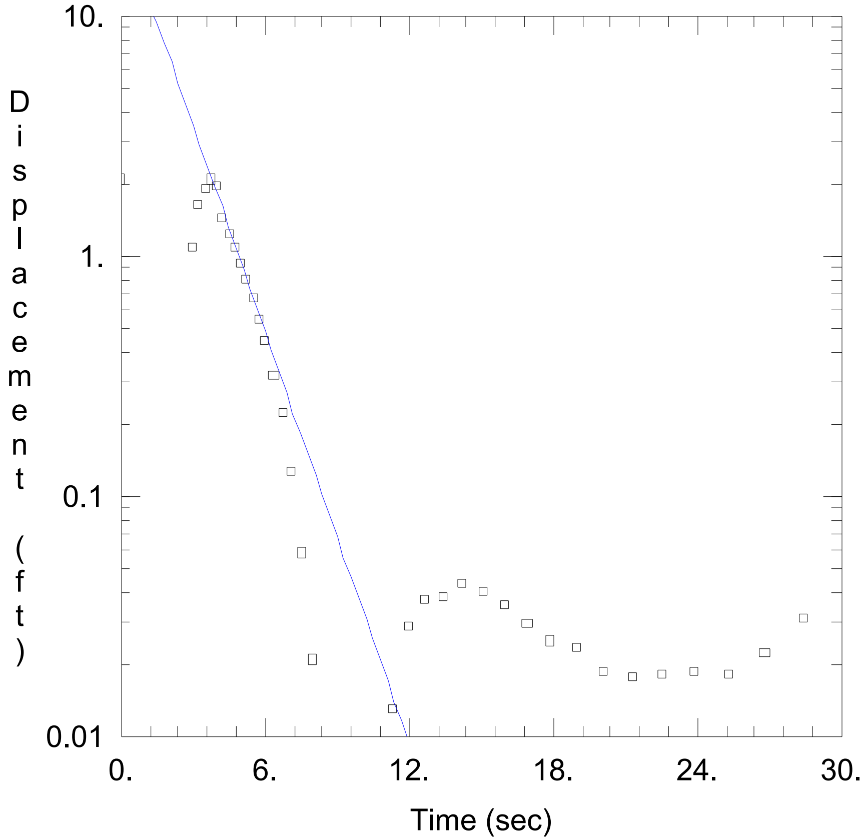
AQUIFER DATA

Saturated Thickness: 72.67 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-20I OUT)

Initial Displacement: 1.3 ft
Total Well Penetration Depth: 31.07 ft
Casing Radius: 0.083 ft

Static Water Column Height: 31.07 ft
Screen Length: 10. ft
Well Radius: 0.083 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-21D IN.aqt
Date: 05/12/23 Time: 10:37:49

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-21D IN
Test Date: 9-16-2022

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

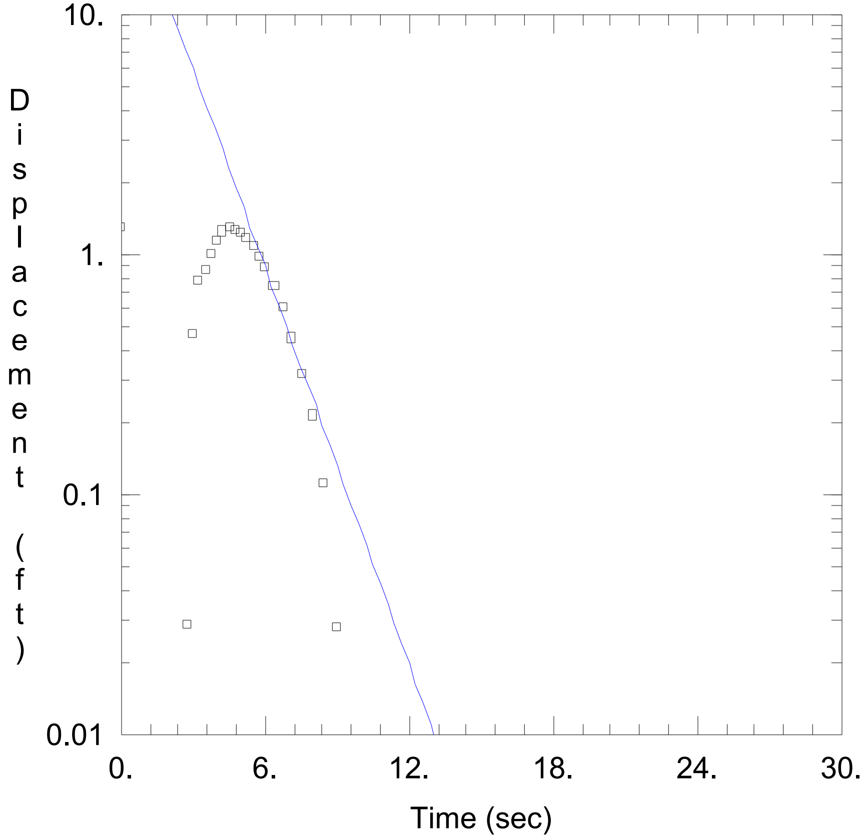
K = 0.03113 cm/sec
y0 = 25.34 ft

AQUIFER DATA

Saturated Thickness: 82.29 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-21D IN)

Initial Displacement: 2.09 ft
Total Well Penetration Depth: 80.29 ft
Casing Radius: 0.083 ft
Static Water Column Height: 80.29 ft
Screen Length: 10. ft
Well Radius: 0.083 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-21D OUT.aqt
Date: 05/12/23 Time: 10:41:26

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-21D OUT
Test Date: 9-16-2022

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

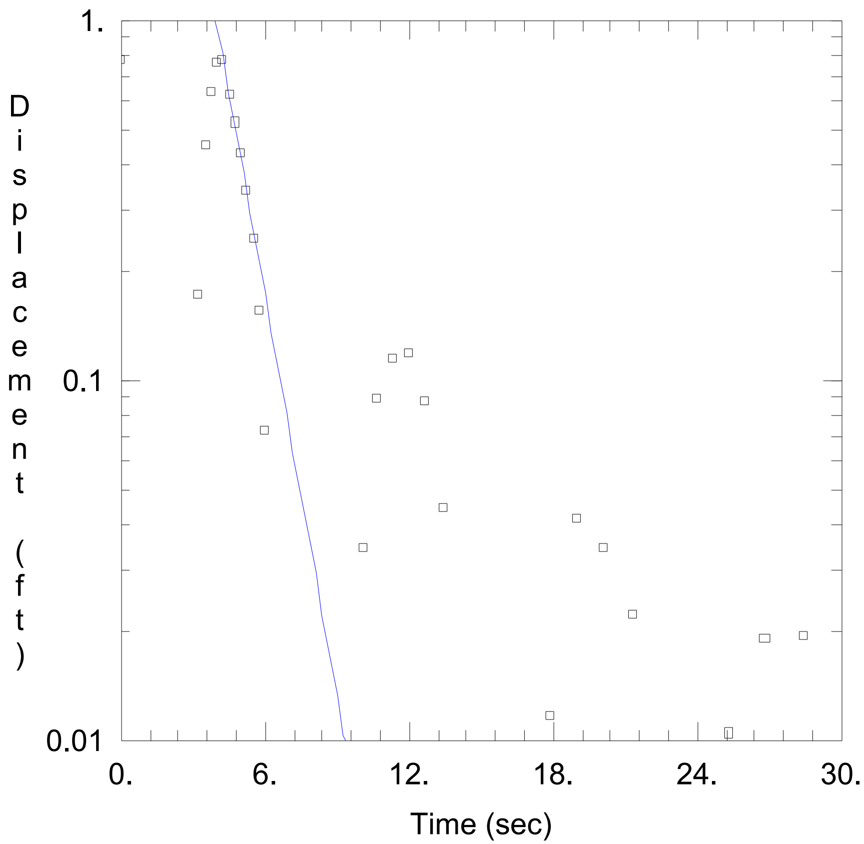
K = 0.03004 cm/sec
y0 = 40.11 ft

AQUIFER DATA

Saturated Thickness: 82.29 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-21D OUT)

Initial Displacement: 1.296 ft
Total Well Penetration Depth: 80.29 ft
Casing Radius: 0.083 ft
Static Water Column Height: 80.29 ft
Screen Length: 10. ft
Well Radius: 0.083 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-21I IN.aqt
Date: 05/12/23 Time: 10:36:52

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-21I IN
Test Date: 9-16-2022

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

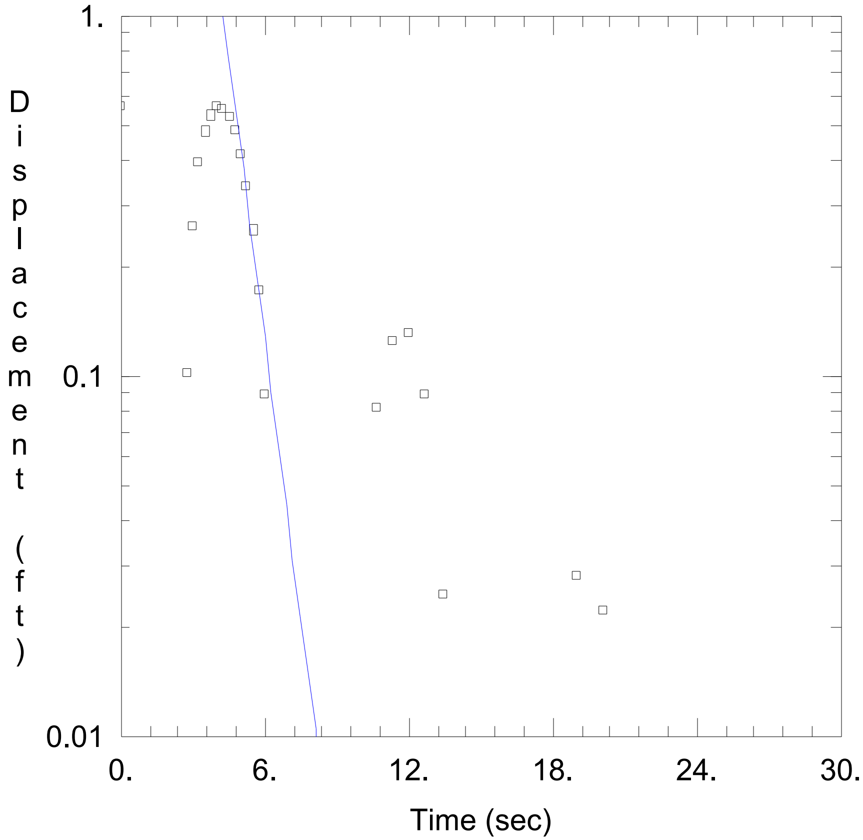
K = 0.03551 cm/sec
y0 = 29.47 ft

AQUIFER DATA

Saturated Thickness: 81.1 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-21I IN)

Initial Displacement: 0.7809 ft
Total Well Penetration Depth: 49.1 ft
Casing Radius: 0.083 ft
Static Water Column Height: 48.62 ft
Screen Length: 10. ft
Well Radius: 0.083 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-21I OUT.aqt
Date: 05/12/23 Time: 10:37:14

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-21I OUT
Test Date: 9-16-2022

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.04955 cm/sec
y0 = 165.6 ft

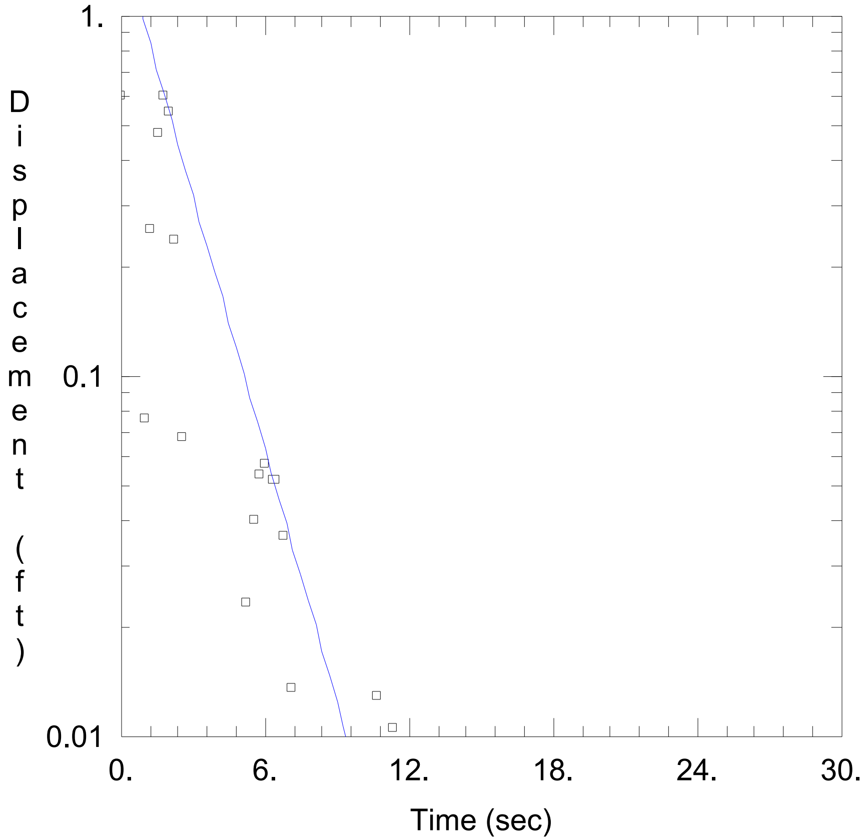
AQUIFER DATA

Saturated Thickness: 81.1 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-21I OUT)

Initial Displacement: 0.5602 ft
Total Well Penetration Depth: 49.1 ft
Casing Radius: 0.083 ft

Static Water Column Height: 48.62 ft
Screen Length: 10. ft
Well Radius: 0.083 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-21S IN.aqt
Date: 05/12/23 Time: 10:35:18

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-21S IN
Test Date: 9-16-2022

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

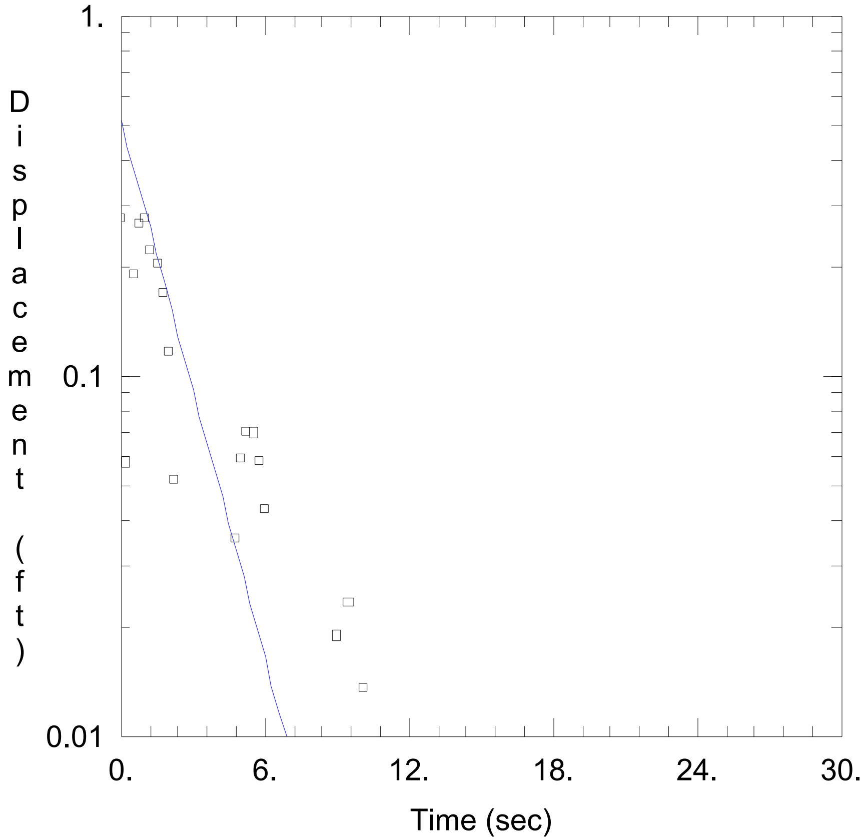
K = 0.01999 cm/sec
y0 = 1.596 ft

AQUIFER DATA

Saturated Thickness: 81.1 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-21S IN)

Initial Displacement: 0.608 ft
Total Well Penetration Depth: 19.11 ft
Casing Radius: 0.083 ft
Static Water Column Height: 18.72 ft
Screen Length: 10. ft
Well Radius: 0.083 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-21S OUT.aqt
Date: 05/12/23 Time: 10:35:43

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-21S OUT
Test Date: 9-16-2022

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

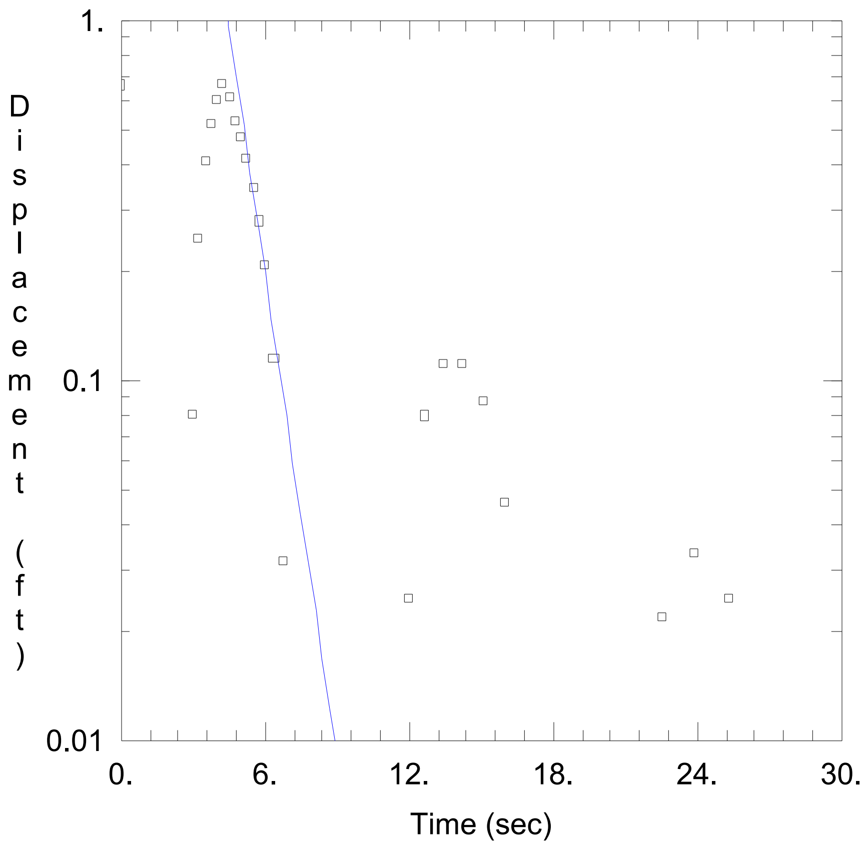
K = 0.02124 cm/sec
y0 = 0.5128 ft

AQUIFER DATA

Saturated Thickness: 81.11 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-21S OUT)

Initial Displacement: 0.2748 ft
Total Well Penetration Depth: 19.11 ft
Casing Radius: 0.083 ft
Static Water Column Height: 18.72 ft
Screen Length: 10. ft
Well Radius: 0.083 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-22D IN.aqt
Date: 05/12/23 Time: 10:44:27

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-22D IN
Test Date: 9-16-2022

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

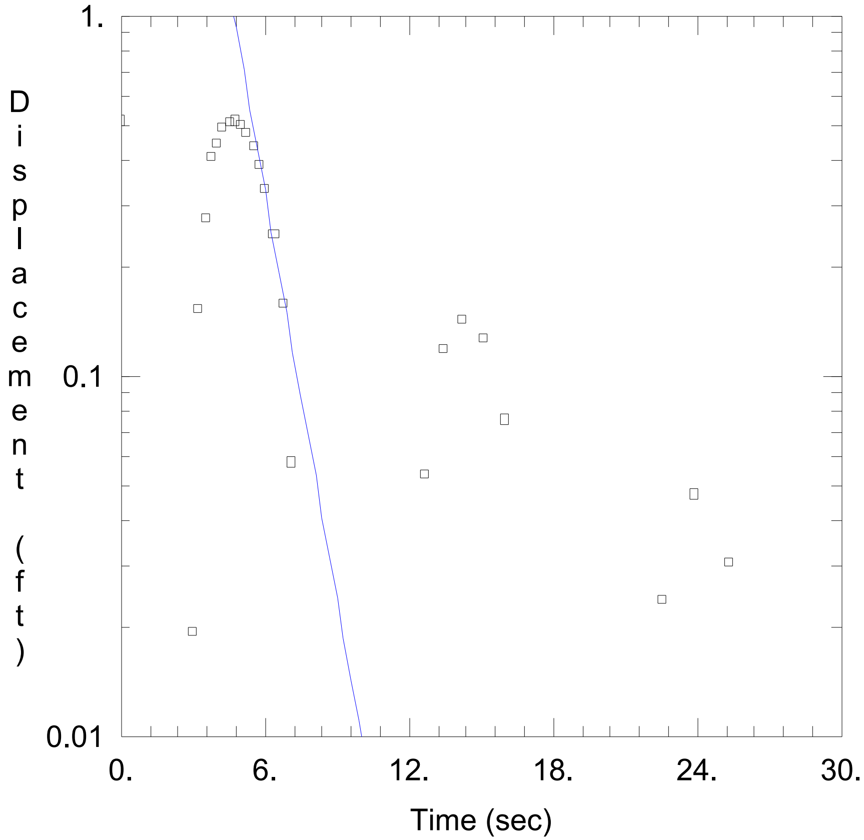
K = 0.04872 cm/sec
y0 = 101.6 ft

AQUIFER DATA

Saturated Thickness: 77.15 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-22D IN)

Initial Displacement: 0.664 ft
Total Well Penetration Depth: 75.15 ft
Casing Radius: 0.083 ft
Static Water Column Height: 75.15 ft
Screen Length: 10. ft
Well Radius: 0.083 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-22D OUT.aqt
Date: 05/12/23 Time: 10:44:46

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-22D OUT
Test Date: 9-16-2022

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

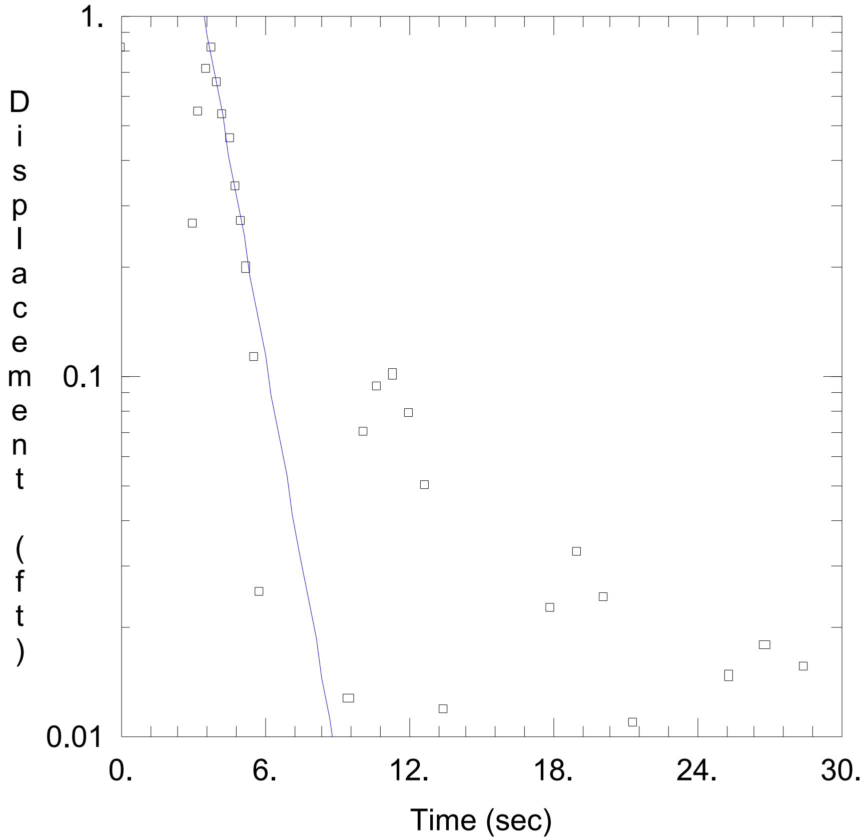
K = 0.04083 cm/sec
y0 = 59.99 ft

AQUIFER DATA

Saturated Thickness: 77.15 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-22D OUT)

Initial Displacement: 0.5134 ft
Total Well Penetration Depth: 75.15 ft
Casing Radius: 0.083 ft
Static Water Column Height: 75.15 ft
Screen Length: 10. ft
Well Radius: 0.083 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-22I IN.aqt
Date: 05/12/23 Time: 10:42:53

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-22I IN
Test Date: 9-16-2022

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

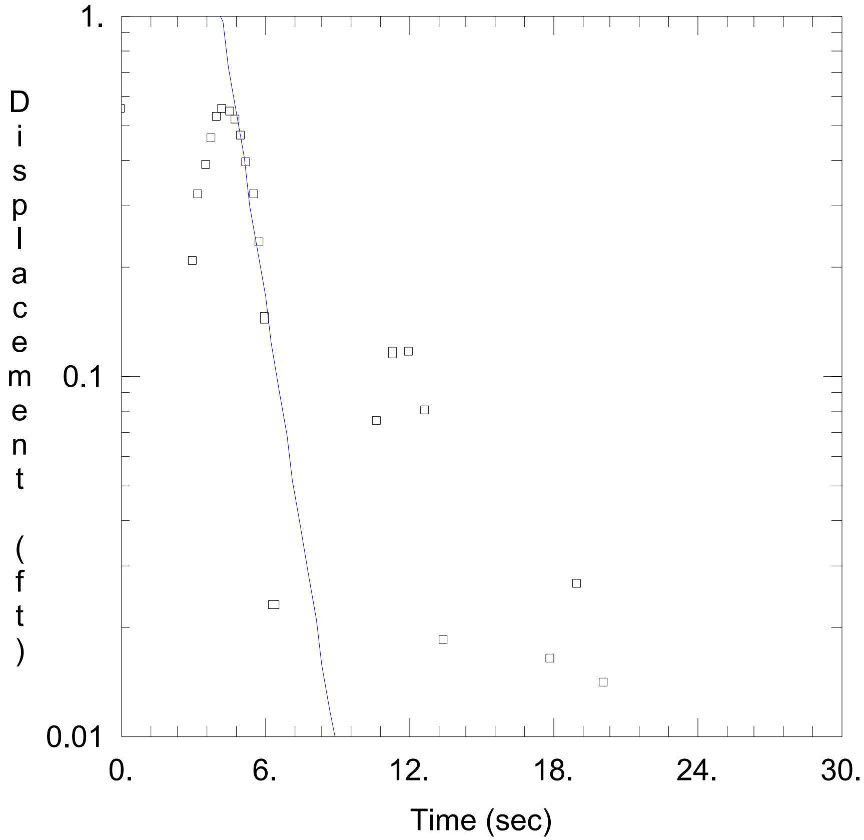
K = 0.03526 cm/sec
y0 = 19.48 ft

AQUIFER DATA

Saturated Thickness: 77.02 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-22I IN)

Initial Displacement: 0.8195 ft
Total Well Penetration Depth: 45.02 ft
Casing Radius: 0.083 ft
Static Water Column Height: 45.02 ft
Screen Length: 10. ft
Well Radius: 0.083 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-22I OUT.aqt
Date: 05/12/23 Time: 10:43:19

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-22I OUT
Test Date: 9-16-2022

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

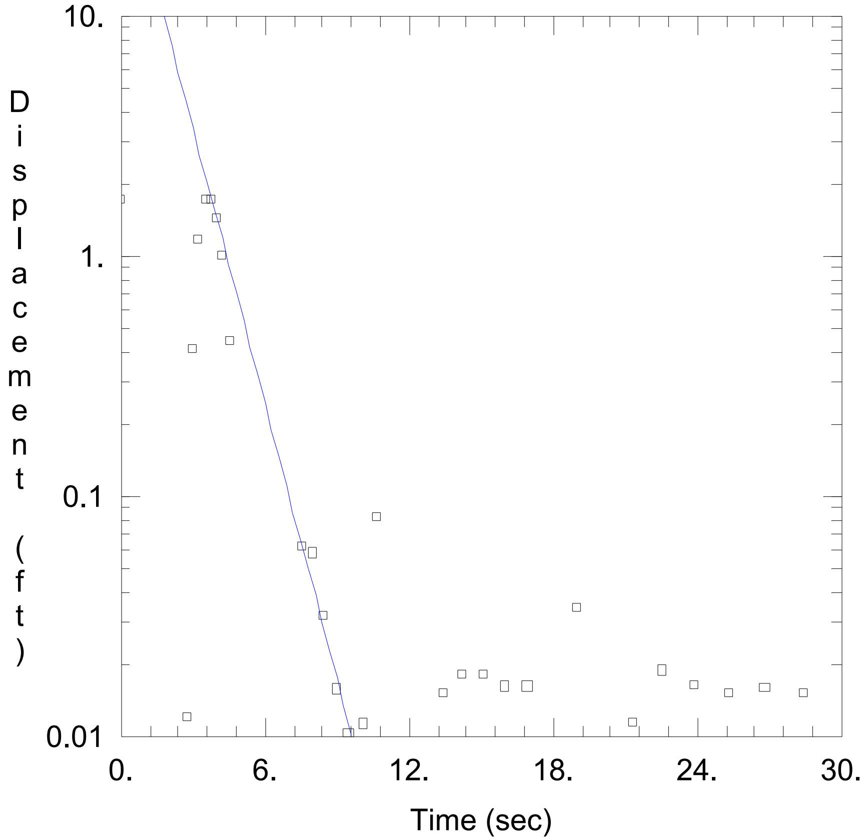
K = 0.04033 cm/sec
y0 = 59.42 ft

AQUIFER DATA

Saturated Thickness: 77.02 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-22I OUT)

Initial Displacement: 0.5519 ft
Total Well Penetration Depth: 45.02 ft
Casing Radius: 0.083 ft
Static Water Column Height: 45.02 ft
Screen Length: 10. ft
Well Radius: 0.083 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-22S IN.aqt
Date: 05/12/23 Time: 10:41:55

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-22S IN
Test Date: 9-16-2022

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

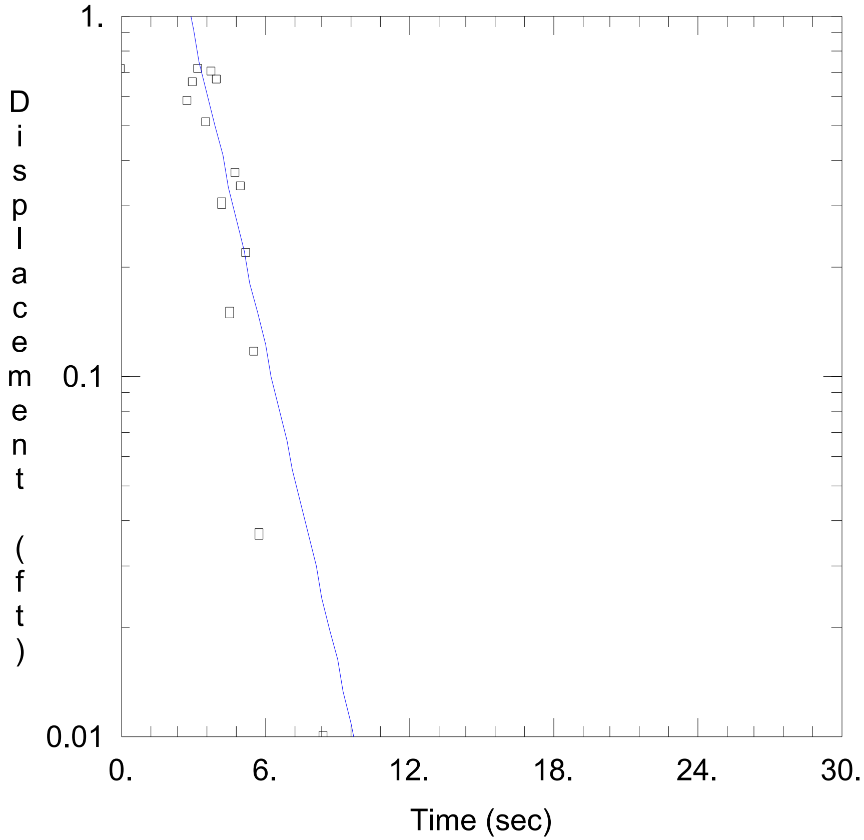
K = 0.03159 cm/sec
y0 = 48.2 ft

AQUIFER DATA

Saturated Thickness: 77.02 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-22S IN)

Initial Displacement: 1.74 ft
Total Well Penetration Depth: 15.02 ft
Casing Radius: 0.083 ft
Static Water Column Height: 14.83 ft
Screen Length: 10. ft
Well Radius: 0.083 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-22S OUT.aqt
Date: 05/12/23 Time: 10:42:22

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-22S OUT
Test Date: 9-16-2022

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.02413 cm/sec
y0 = 6.862 ft

AQUIFER DATA

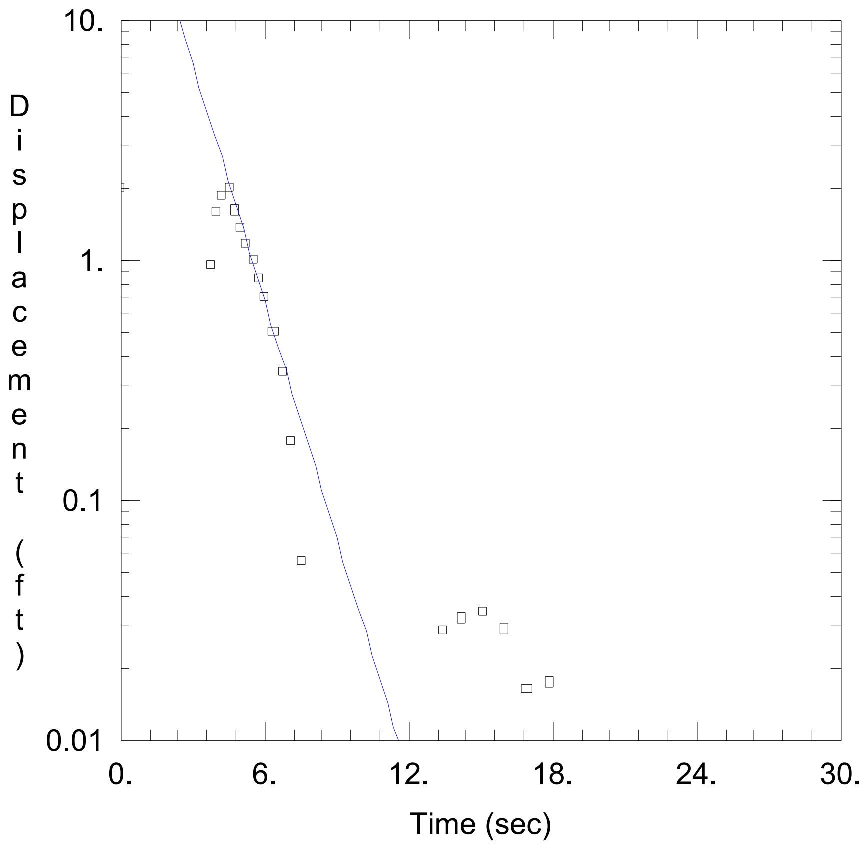
Saturated Thickness: 77.02 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-22S OUT)

Initial Displacement: 0.711 ft
Total Well Penetration Depth: 15.02 ft
Casing Radius: 0.083 ft

Static Water Column Height: 14.83 ft
Screen Length: 10. ft
Well Radius: 0.083 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-23D IN.aqt
Date: 05/12/23 Time: 10:48:18

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-23D IN
Test Date: 9-19-2022

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

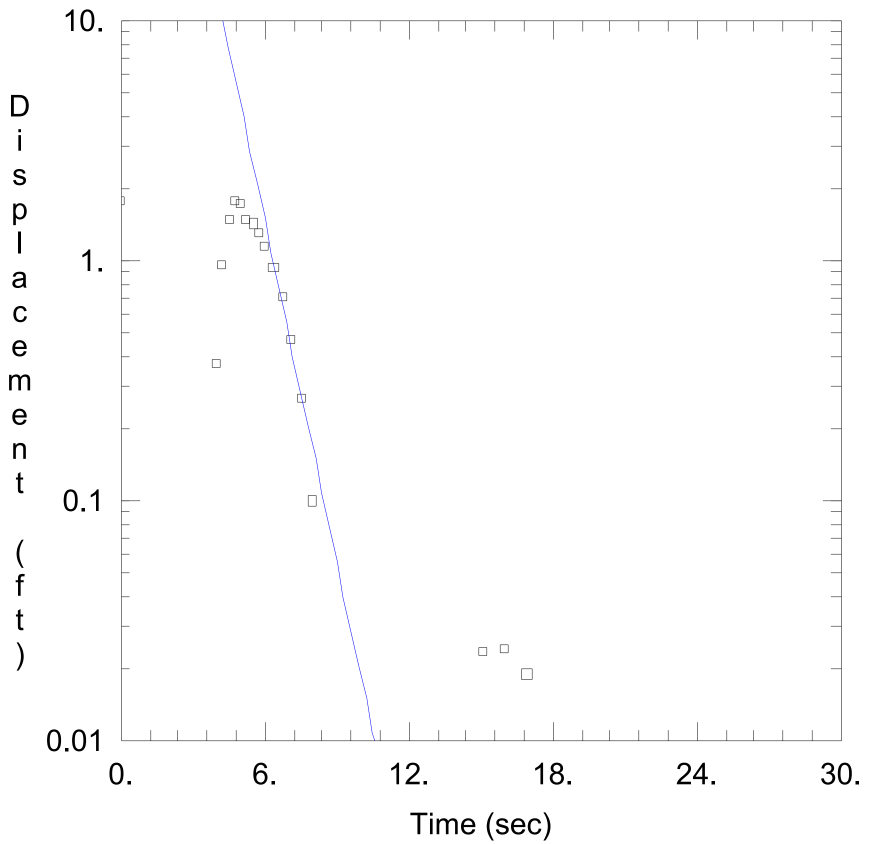
K = 0.03627 cm/sec
y0 = 64.84 ft

AQUIFER DATA

Saturated Thickness: 73. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-23D IN)

Initial Displacement: 2.025 ft
Total Well Penetration Depth: 72. ft
Casing Radius: 0.083 ft
Static Water Column Height: 72.81 ft
Screen Length: 10. ft
Well Radius: 0.083 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-23D OUT.aqt
Date: 05/12/23 Time: 10:48:32

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-23D OUT
Test Date: 9-19-2022

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

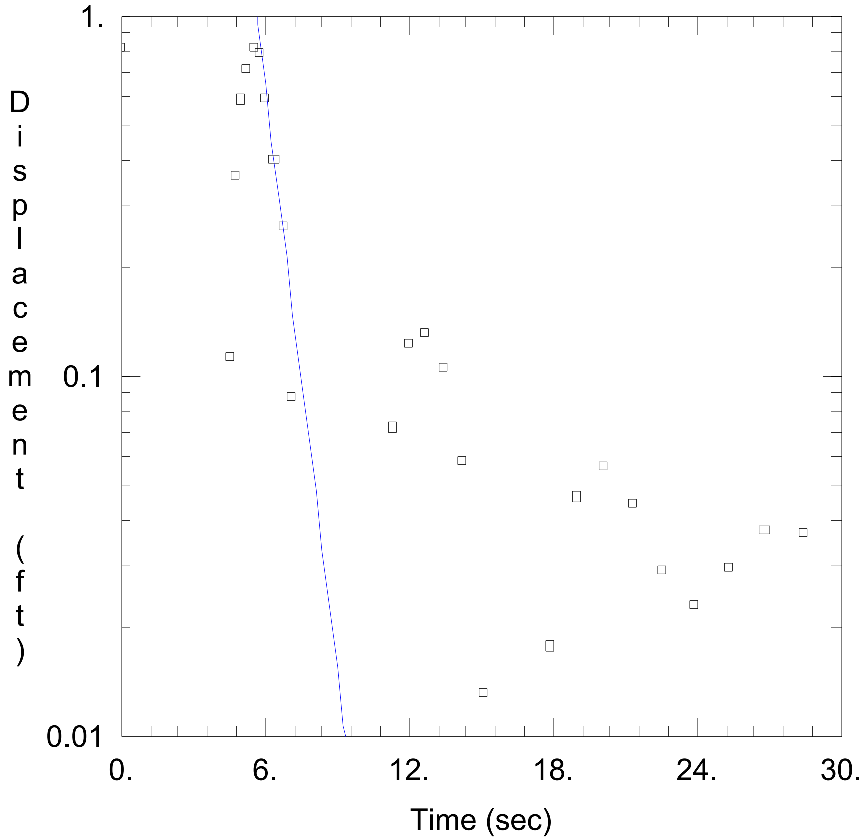
K = 0.05245 cm/sec
y0 = 1077.5 ft

AQUIFER DATA

Saturated Thickness: 73. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-23D OUT)

Initial Displacement: 1.769 ft
Total Well Penetration Depth: 72. ft
Casing Radius: 0.083 ft
Static Water Column Height: 72.81 ft
Screen Length: 10. ft
Well Radius: 0.083 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-23I IN.aqt
Date: 05/12/23 Time: 10:47:36

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-23I IN
Test Date: 9-16-2022

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

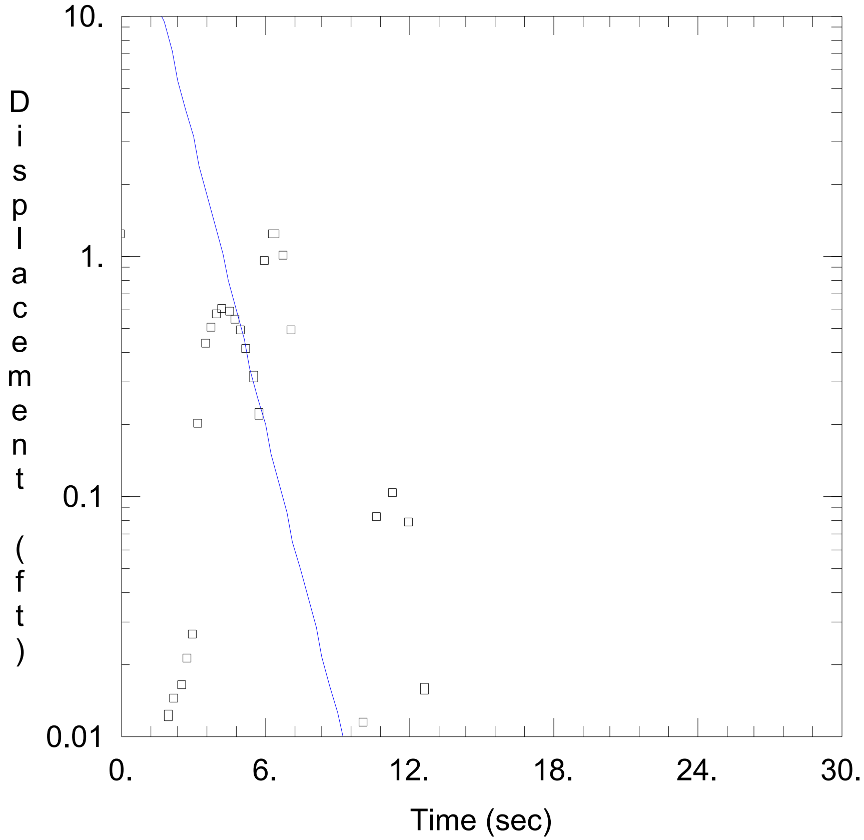
K = 0.05097 cm/sec
y0 = 1163.2 ft

AQUIFER DATA

Saturated Thickness: 73. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-23I IN)

Initial Displacement: 0.815 ft
Total Well Penetration Depth: 42. ft
Casing Radius: 0.083 ft
Static Water Column Height: 45.75 ft
Screen Length: 10. ft
Well Radius: 0.083 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-23I OUT.aqt
Date: 05/12/23 Time: 10:47:56

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-23I OUT
Test Date: 9-16-2022

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

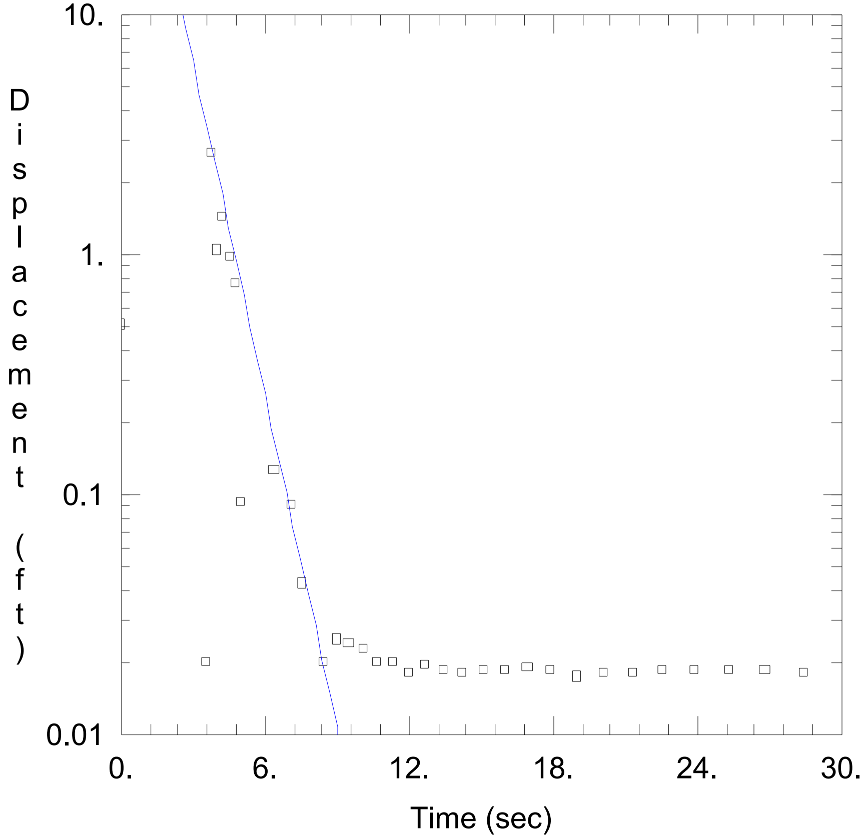
K = 0.03766 cm/sec
y0 = 49.48 ft

AQUIFER DATA

Saturated Thickness: 73. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-23I OUT)

Initial Displacement: 1.25 ft
Total Well Penetration Depth: 42. ft
Casing Radius: 0.083 ft
Static Water Column Height: 45.75 ft
Screen Length: 10. ft
Well Radius: 0.083 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-23S IN.aqt
Date: 05/12/23 Time: 12:18:14

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-23S IN
Test Date: 9-19-2023

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

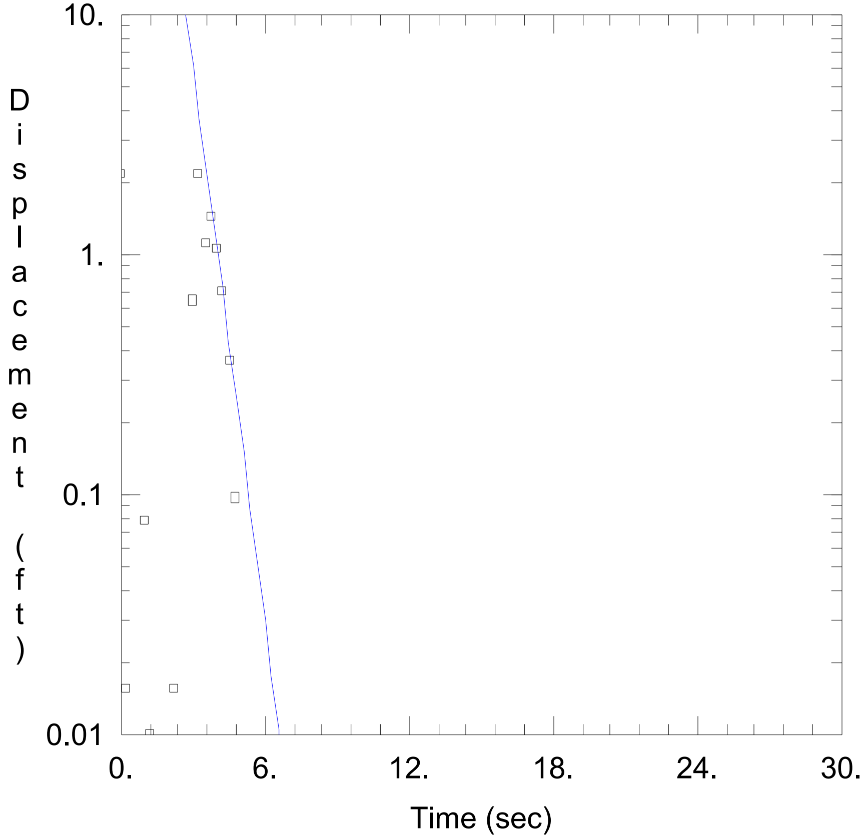
K = 0.03699 cm/sec
y0 = 155.5 ft

AQUIFER DATA

Saturated Thickness: 74. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-23S IN)

Initial Displacement: 0.5134 ft
Total Well Penetration Depth: 12. ft
Casing Radius: 0.083 ft
Static Water Column Height: 14.17 ft
Screen Length: 10. ft
Well Radius: 0.083 ft



WELL TEST ANALYSIS

Data Set: G:\...\MW-23S OUT.aqt
Date: 05/12/23 Time: 12:21:07

PROJECT INFORMATION

Company: ATC GROUP SERVICES
Client: AES EAGLE VALLEY
Project: 170LF00861
Location: EAGLE VALLEY
Test Well: MW-23S OUT
Test Date: 0-19-2022

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.06174 cm/sec
y0 = 1273.3 ft

AQUIFER DATA

Saturated Thickness: 74. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-23S OUT)

Initial Displacement: 2.179 ft
Total Well Penetration Depth: 12. ft
Casing Radius: 0.083 ft
Static Water Column Height: 14.17 ft
Screen Length: 10. ft
Well Radius: 0.083 ft

Table 2

Summary of Hydraulic Conductivity Results

AES Indiana

Eagle Valley Generating Station, Martinsville, Indiana

ATC Project No. 170LF00861

Well	Type of Test	r, ft	R, ft	L, ft	D, ft	K, ft/day	K, cm/sec
MW-20S	Insufficient water level in well to complete test						
MW-20I	Falling Head	0.083	0.083	10	72.67	330.0	1.16E-01
	Rising Head					154.4	5.45E-02
MW-20D	Falling Head	0.083	0.083	10	74.62	141.3	4.99E-02
	Rising Head					65.0	2.29E-02
MW-21S	Falling Head	0.083	0.083	10	81.1	56.7	2.00E-02
	Rising Head					60.2	2.12E-02
MW-21I	Falling Head	0.083	0.083	10	81.1	100.7	3.55E-02
	Rising Head					140.5	4.96E-02
MW-21D	Falling Head	0.083	0.083	10	82.29	88.2	3.11E-02
	Rising Head					85.2	3.00E-02
MW-22S	Falling Head	0.083	0.083	10	81.1	89.5	3.16E-02
	Rising Head					68.4	2.41E-02
MW-22I	Falling Head	0.083	0.083	10	77.02	99.9	3.53E-02
	Rising Head					114.3	4.03E-02
MW-22D	Falling Head	0.083	0.083	10	77.15	138.1	4.87E-02
	Rising Head					115.7	4.08E-02
MW-23S	Falling Head	0.083	0.083	10	74	104.9	3.70E-02
	Rising Head					175.0	6.17E-02
MW-23I	Falling Head	0.083	0.083	10	73	144.5	5.10E-02
	Rising Head					106.8	3.77E-02
MW-23D	Falling Head	0.083	0.083	10	73	102.8	3.63E-02
	Rising Head					148.7	5.25E-02
					Average	119.58	4.22E-02

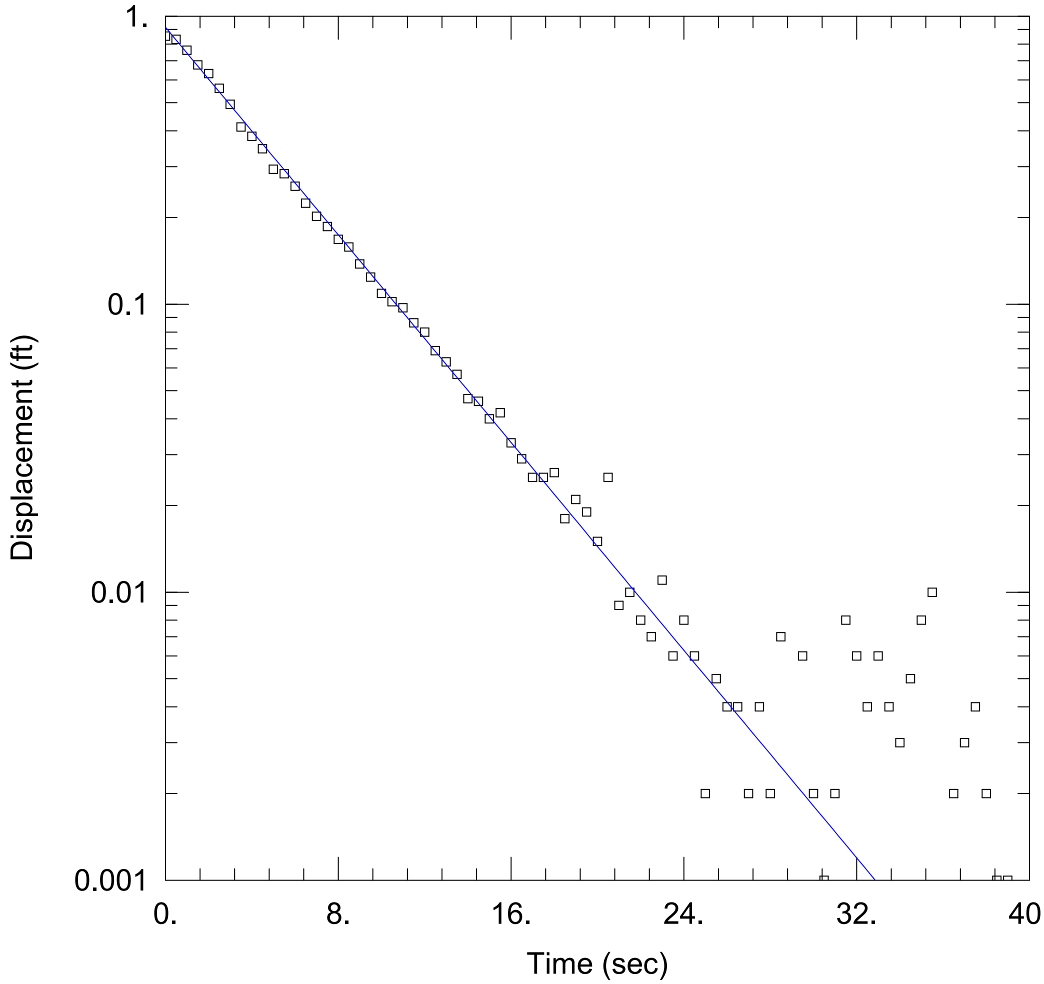
D= Approximate saturated aquifer thickness

L= Well screen length

r= Well casing radius

R= Well bore radius

K= Hydraulic conductivity



WELL TEST ANALYSIS

Data Set: \...\MW-3D_F1.aqt
Date: 04/28/23
Time: 14:44:37

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-3D
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 81.1 ft
Anisotropy Ratio (Kz/Kr): 1.

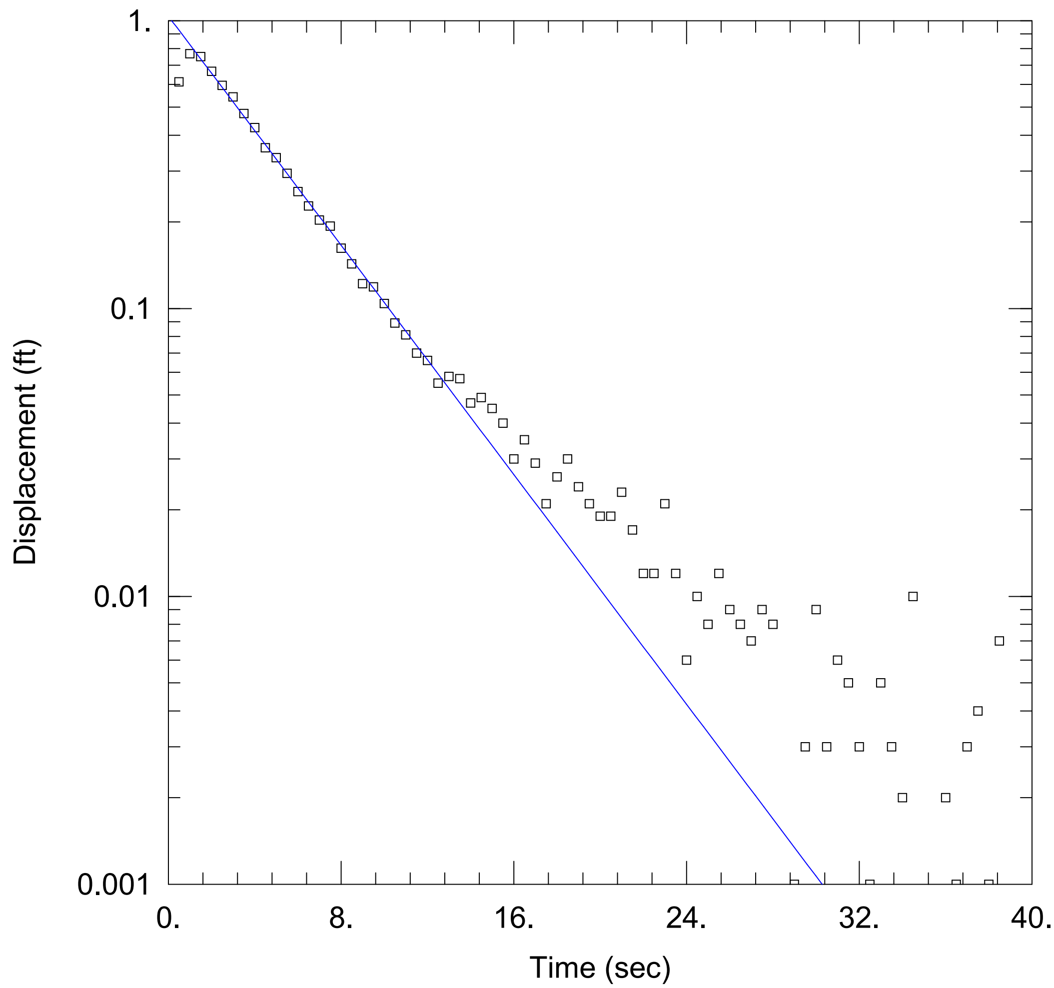
WELL DATA (MW-3D)

Initial Displacement: 0.853 ft
Total Well Penetration Depth: 80.1 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 80.1 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.007971 cm/sec
y0 = 0.9144 ft



WELL TEST ANALYSIS

Data Set: \...\MW-3D_F2.aqt
Date: 04/28/23 Time: 14:45:03

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-3D
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 81.1 ft Anisotropy Ratio (Kz/Kr): 1.

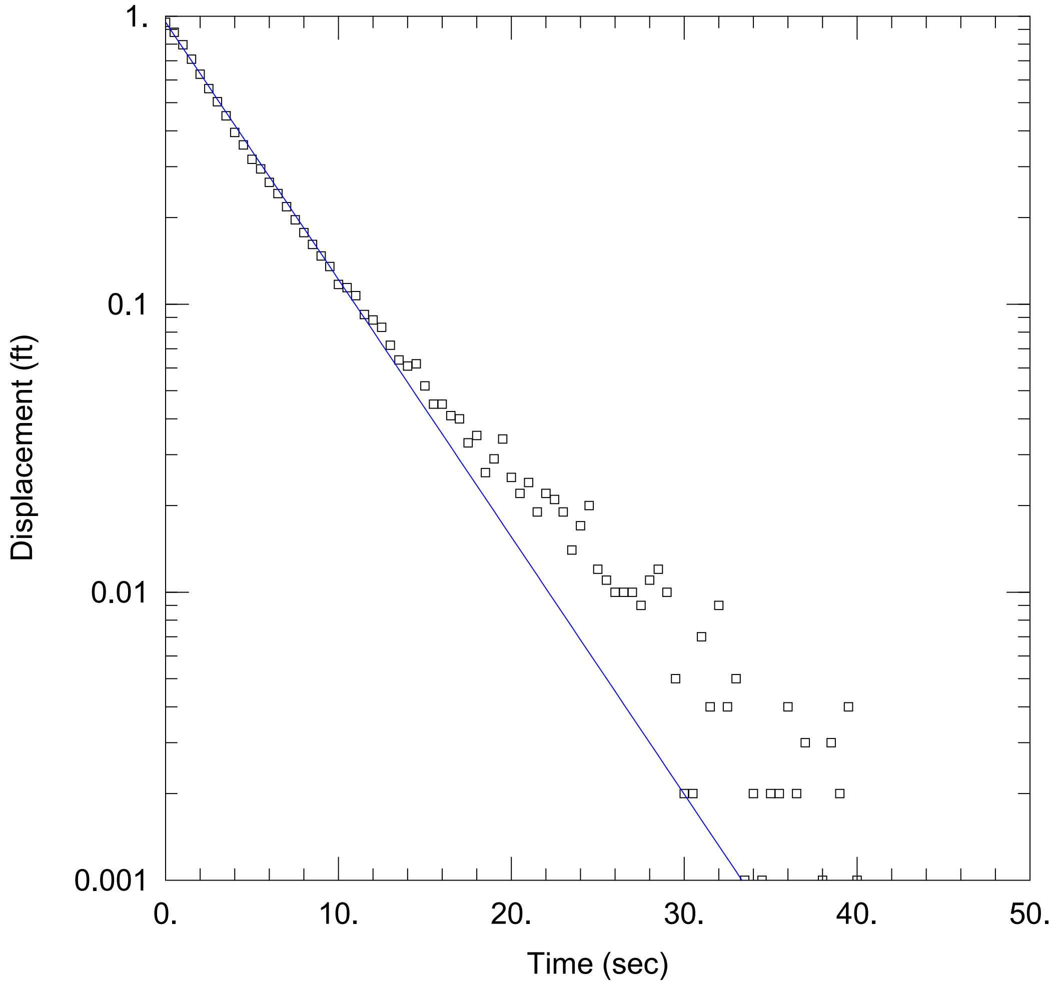
WELL DATA (MW-3D)

Initial Displacement: 1.109 ft
Total Well Penetration Depth: 80.1 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 80.1 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.00881 cm/sec y0 = 1.037 ft



WELL TEST ANALYSIS

Data Set: \...\MW-3D_R1.aqt
Date: 04/28/23 | Time: 14:45:16

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-3D
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 81.1 ft
Anisotropy Ratio (Kz/Kr): 1.

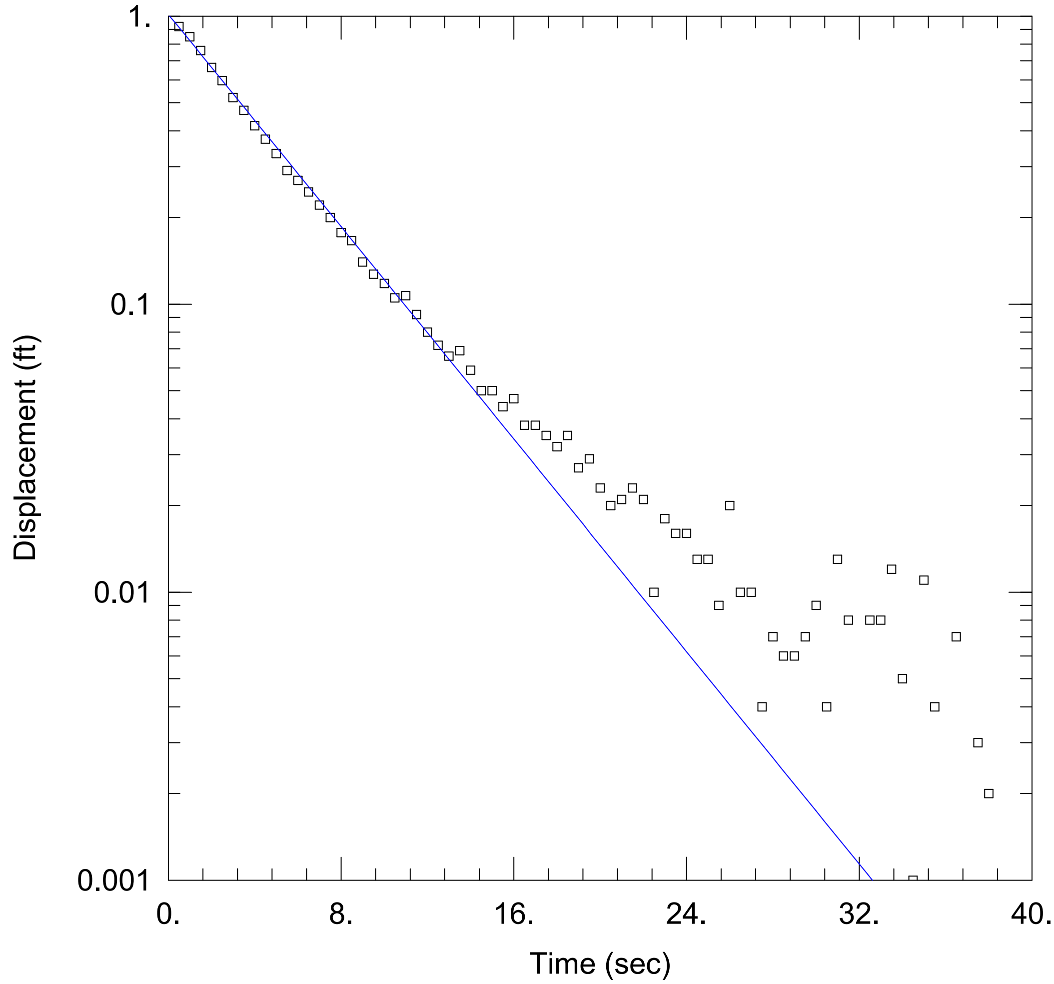
WELL DATA (MW-3D)

Initial Displacement: 0.952 ft
Total Well Penetration Depth: 80.1 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 80.1 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.007907 cm/sec
y0 = 0.9528 ft



WELL TEST ANALYSIS

Data Set: \...\MW-3D_R2.aqt
Date: 04/28/23
Time: 14:47:31

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-3D
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 81.1 ft
Anisotropy Ratio (Kz/Kr): 1.

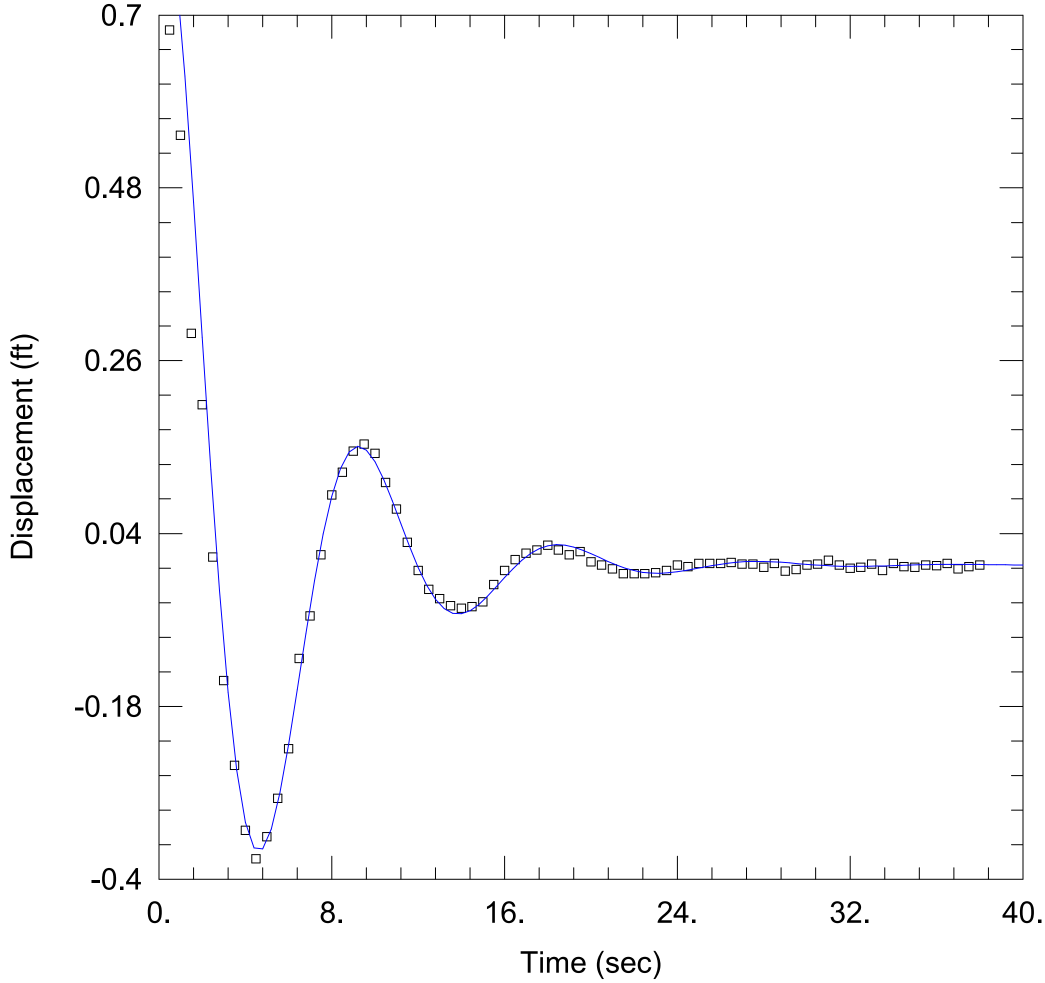
WELL DATA (MW-3D)

Initial Displacement: 1.164 ft
Static Water Column Height: 80.1 ft
Total Well Penetration Depth: 80.1 ft
Screen Length: 10. ft
Casing Radius: 0.0833 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.008156 cm/sec
y0 = 1.015 ft



WELL TEST ANALYSIS

Data Set: \...\MW-12D_F1.aqt
Date: 04/28/23 Time: 14:48:36

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-12D
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 77.5 ft Anisotropy Ratio (Kz/Kr): 1.

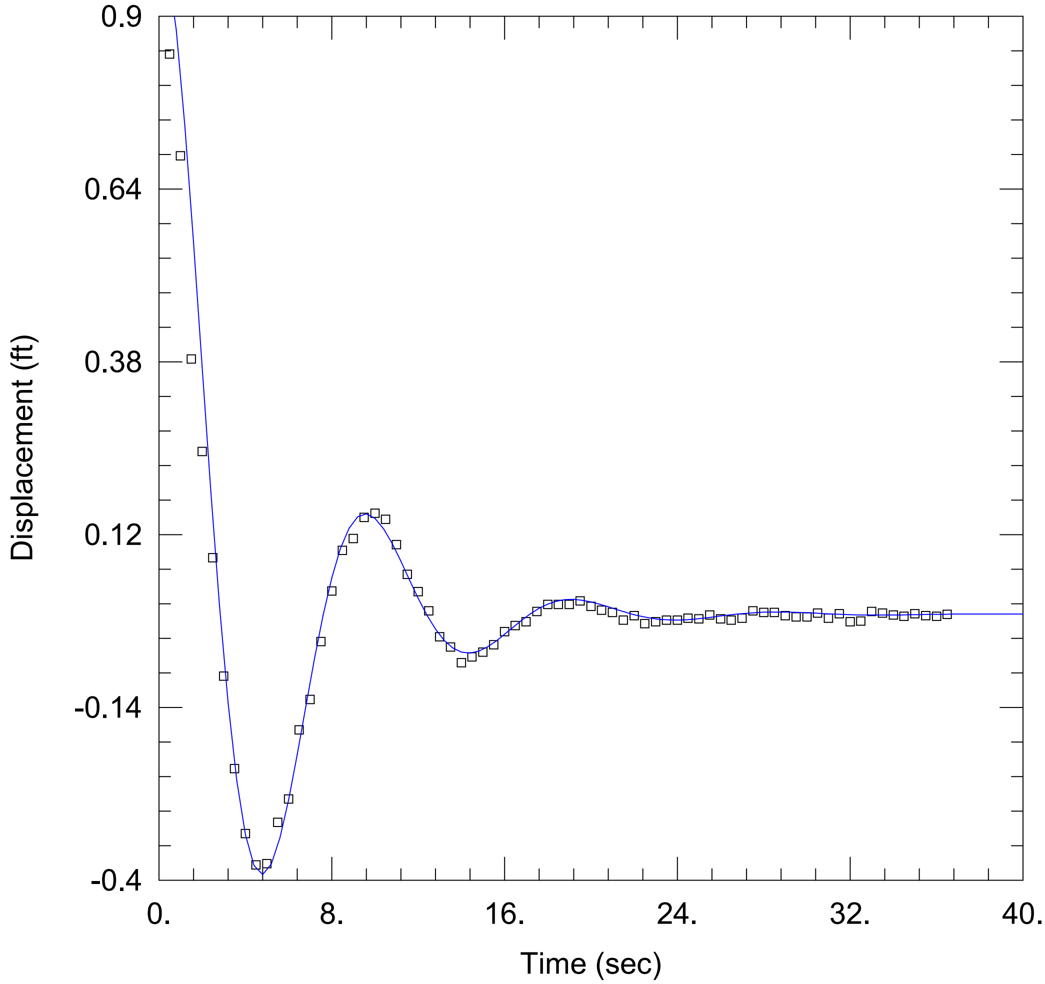
WELL DATA (MW-12D)

Initial Displacement: 0.88 ft
Total Well Penetration Depth: 76.5 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 76.5 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar

K = 0.0521 cm/sec Le = 64.44 ft



WELL TEST ANALYSIS

Data Set: \...\MW-12D_F2.aqt
Date: 04/28/23 Time: 14:48:49

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-12D
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 77.5 ft Anisotropy Ratio (Kz/Kr): 1.

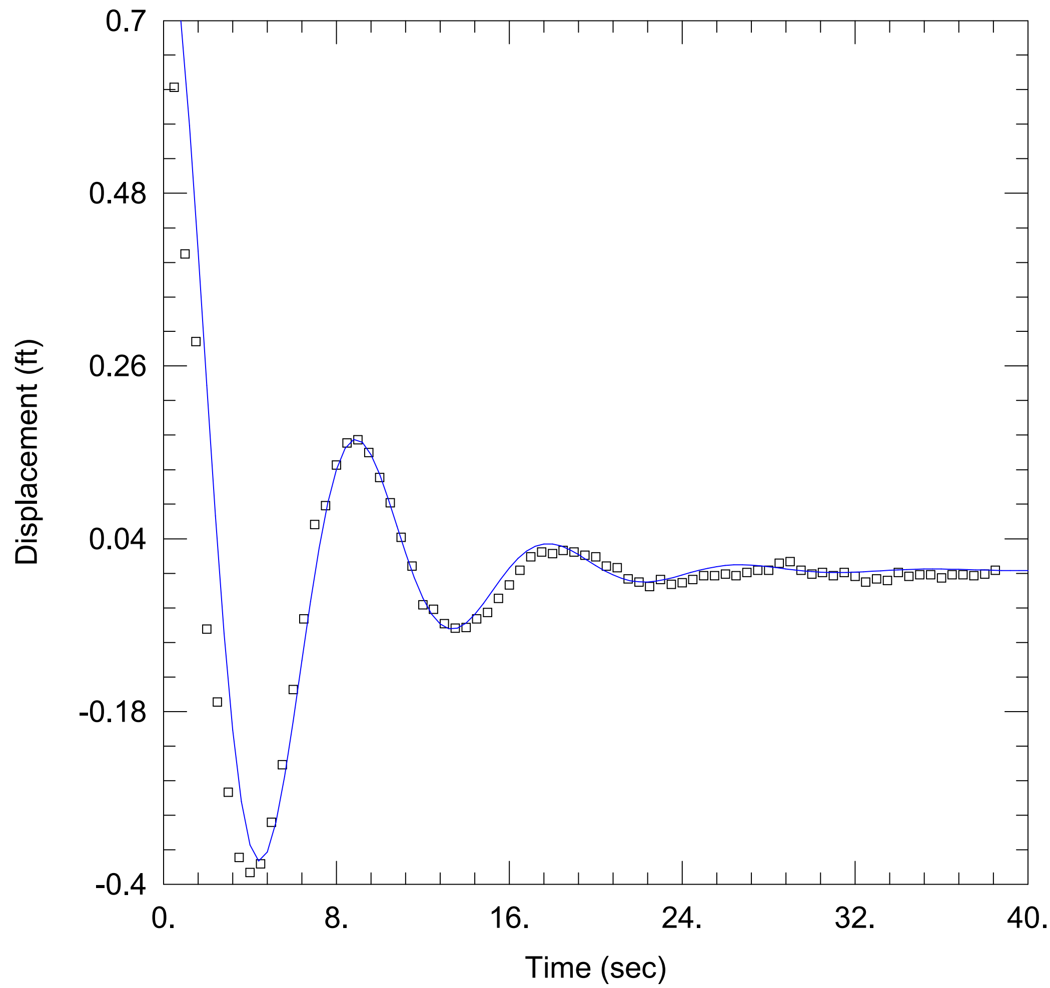
WELL DATA (MW-12D)

Initial Displacement: 1.014 ft
Total Well Penetration Depth: 76.5 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 76.5 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar

K = 0.04705 cm/sec Le = 68.04 ft



WELL TEST ANALYSIS

Data Set: \...\MW-12D_R1.aqt
Date: 04/28/23
Time: 14:49:04

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-12D
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 77.5 ft
Anisotropy Ratio (Kz/Kr): 1.

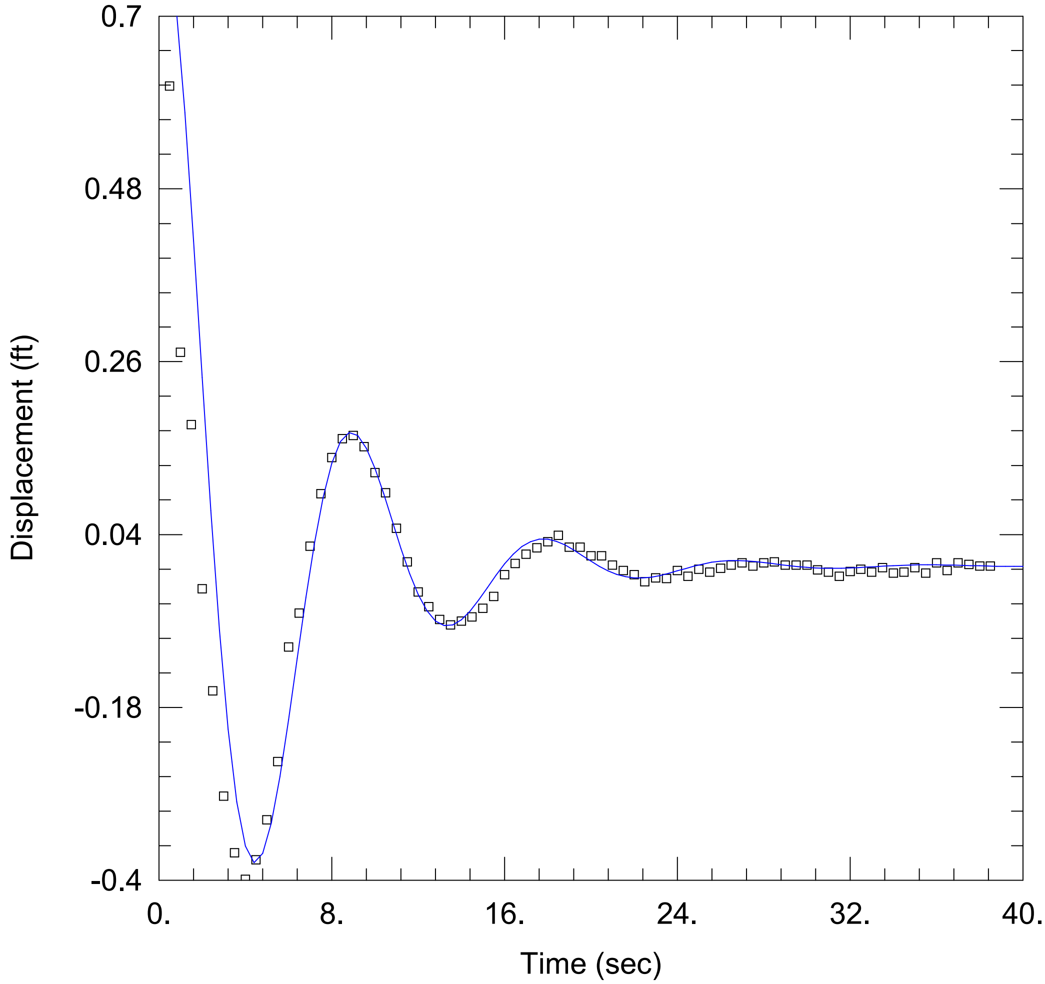
WELL DATA (MW-12D)

Initial Displacement: 0.824 ft
Total Well Penetration Depth: 76.5 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 76.5 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.0592 cm/sec
Le = 60.61 ft



WELL TEST ANALYSIS

Data Set: \...\MW-12D_R2.aqt
Date: 04/28/23
Time: 14:50:37

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-12D
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 77.5 ft
Anisotropy Ratio (Kz/Kr): 1.

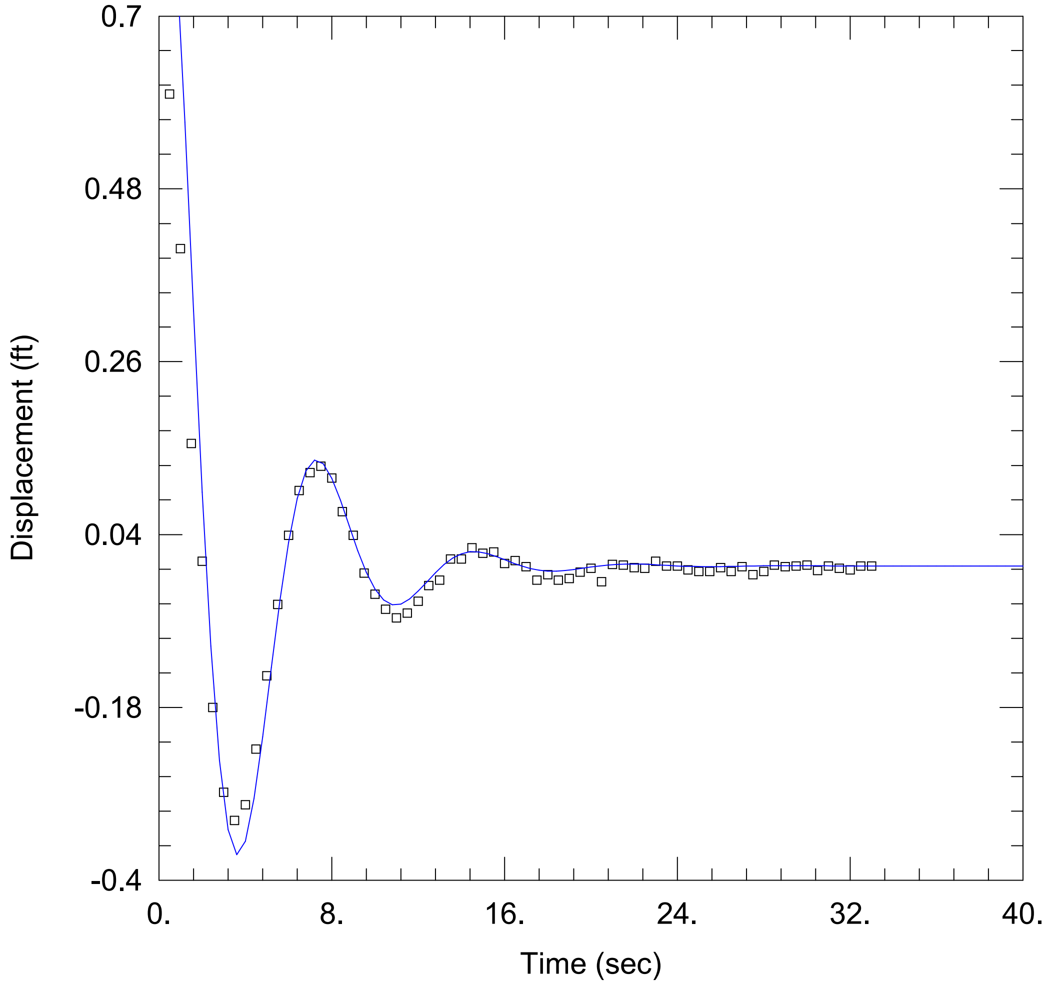
WELL DATA (MW-12D)

Initial Displacement: 0.84 ft
Total Well Penetration Depth: 76.5 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 76.5 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.0592 cm/sec
Le = 60.61 ft



WELL TEST ANALYSIS

Data Set: \...\MW-12I_F1.aqt
Date: 04/28/23 Time: 14:50:54

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-12I
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 77.7 ft Anisotropy Ratio (Kz/Kr): 1.

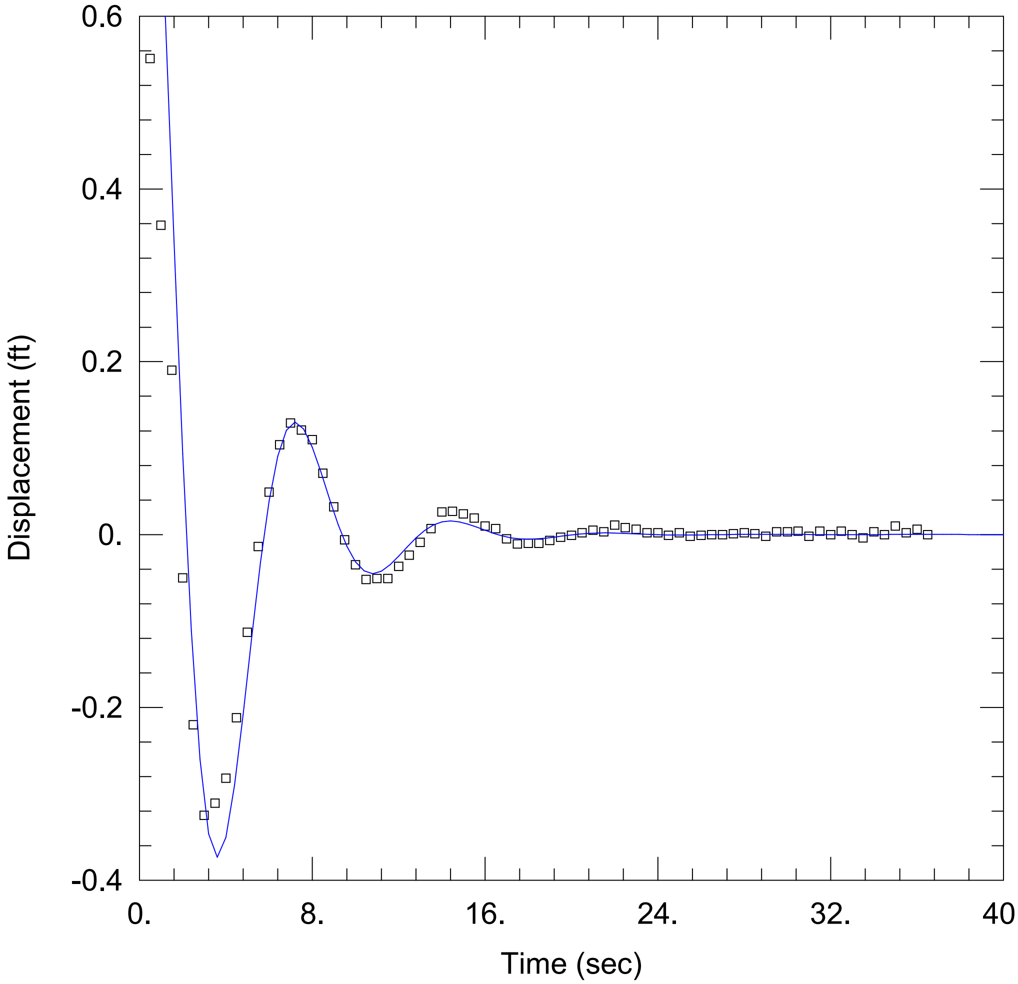
WELL DATA (MW-12I)

Initial Displacement: 1. ft
Total Well Penetration Depth: 46.7 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 46.7 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar

K = 0.04853 cm/sec Le = 39.35 ft



WELL TEST ANALYSIS

Data Set: \...\MW-12I_F2.aqt
Date: 04/28/23
Time: 14:51:08

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-12I
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 77.7 ft
Anisotropy Ratio (Kz/Kr): 1.

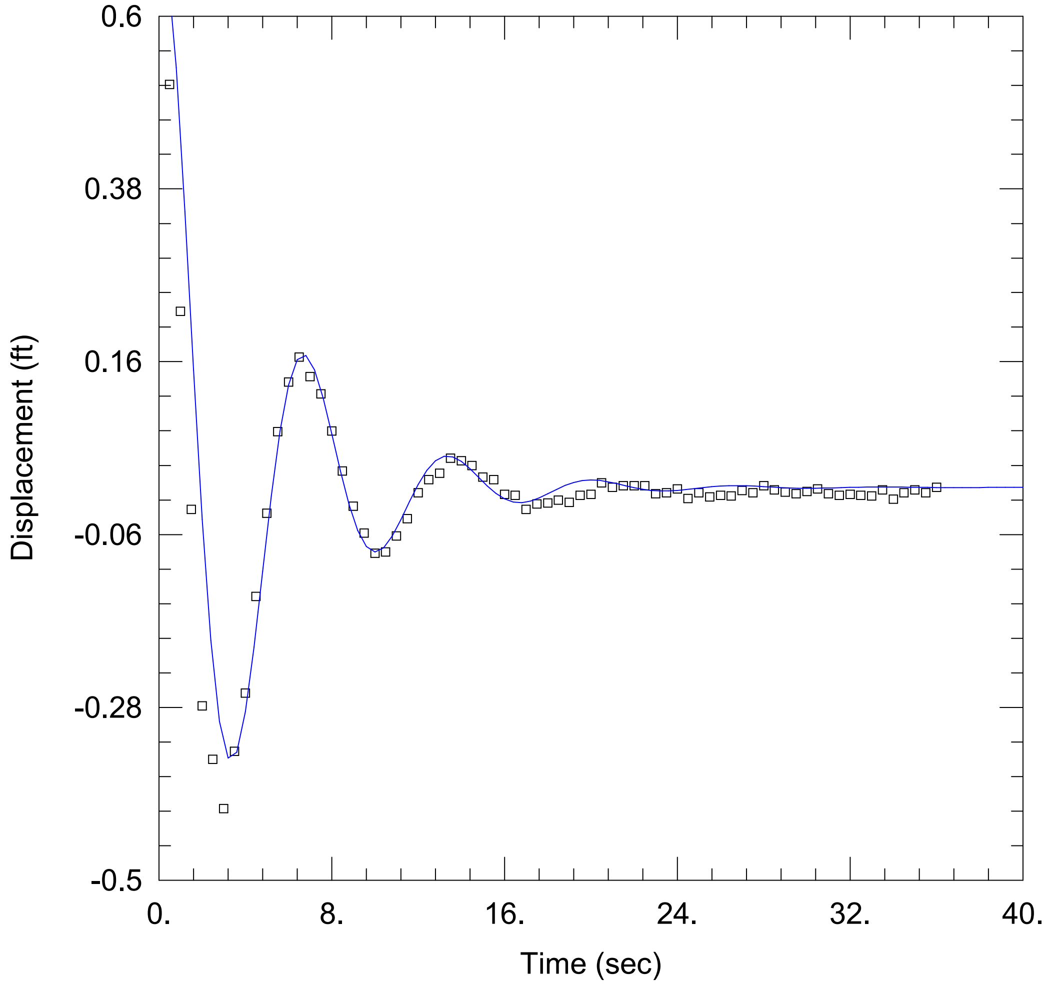
WELL DATA (MW-12I)

Initial Displacement: 1.074 ft
Total Well Penetration Depth: 46.7 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 46.7 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.04701 cm/sec
Le = 37.95 ft



WELL TEST ANALYSIS

Data Set: \...\MW-12I_R1.aqt
Date: 04/28/23 Time: 14:51:26

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-12I
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 77.7 ft
Anisotropy Ratio (Kz/Kr): 1.

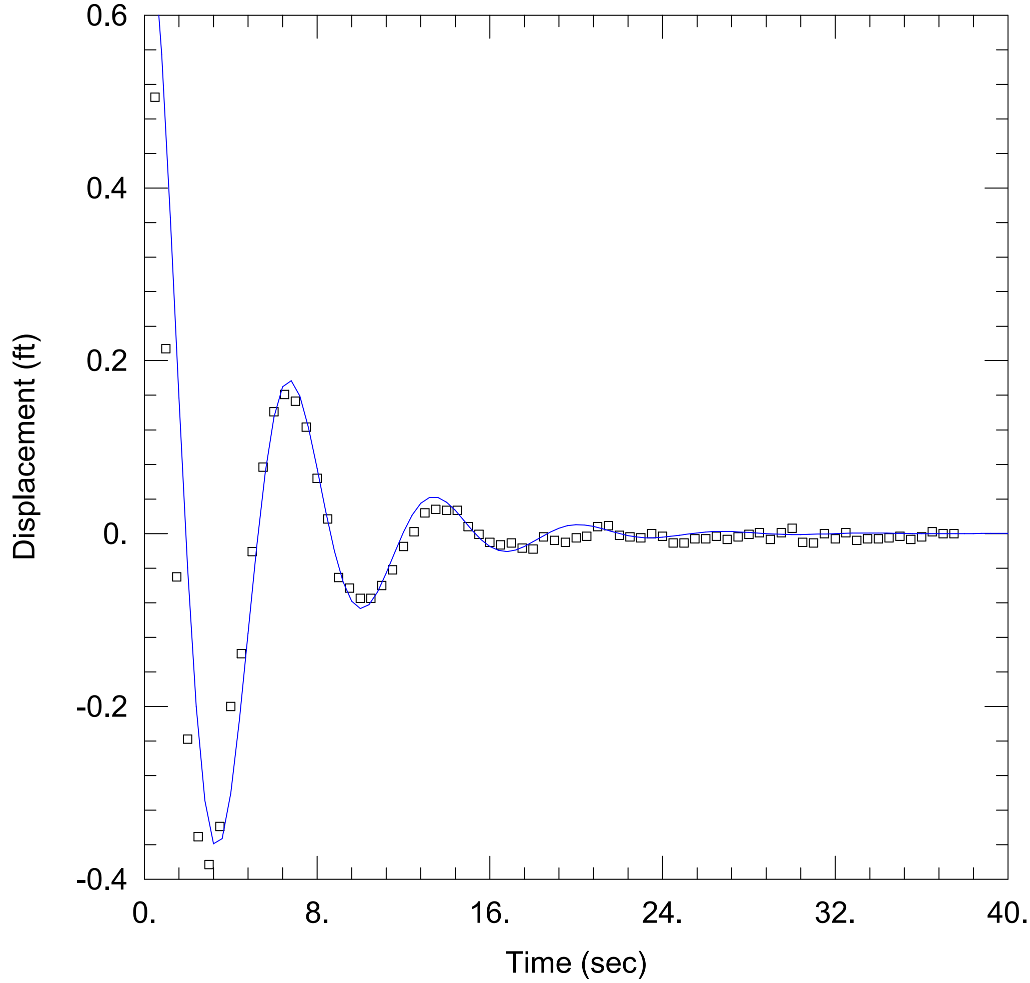
WELL DATA (MW-12I)

Initial Displacement: 0.716 ft
Static Water Column Height: 46.7 ft
Total Well Penetration Depth: 46.7 ft
Screen Length: 10. ft
Casing Radius: 0.0833 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.07101 cm/sec
Le = 34.51 ft



WELL TEST ANALYSIS

Data Set: \...\MW-12I_R2.aqt
Date: 04/28/23 Time: 14:51:40

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-12I
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 77.7 ft Anisotropy Ratio (Kz/Kr): 1.

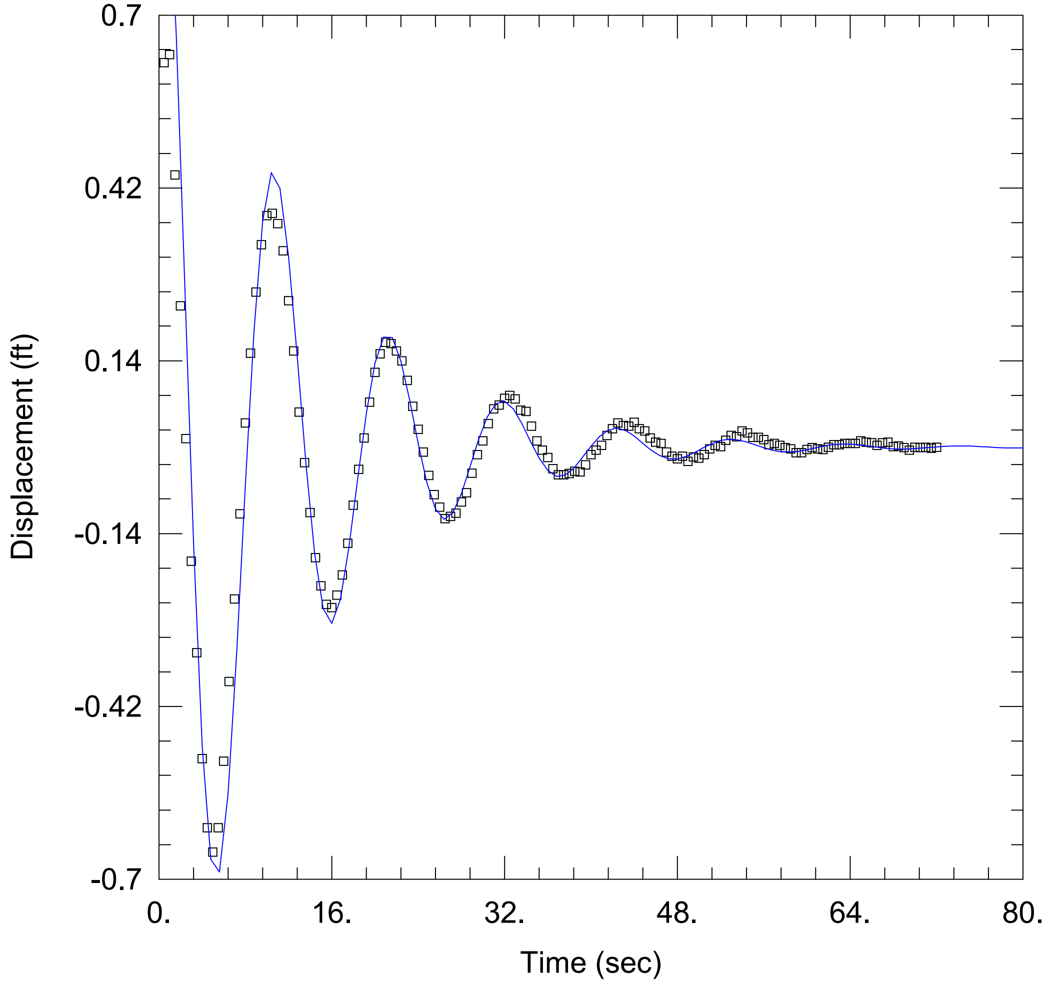
WELL DATA (MW-12I)

Initial Displacement: 0.742 ft
Total Well Penetration Depth: 46.7 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 46.7 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar

K = 0.07138 cm/sec Le = 34.8 ft



WELL TEST ANALYSIS

Data Set: \...\MW-24D_F1.aqt
Date: 04/28/23 Time: 14:51:56

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-24D
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 92. ft Anisotropy Ratio (Kz/Kr): 1.

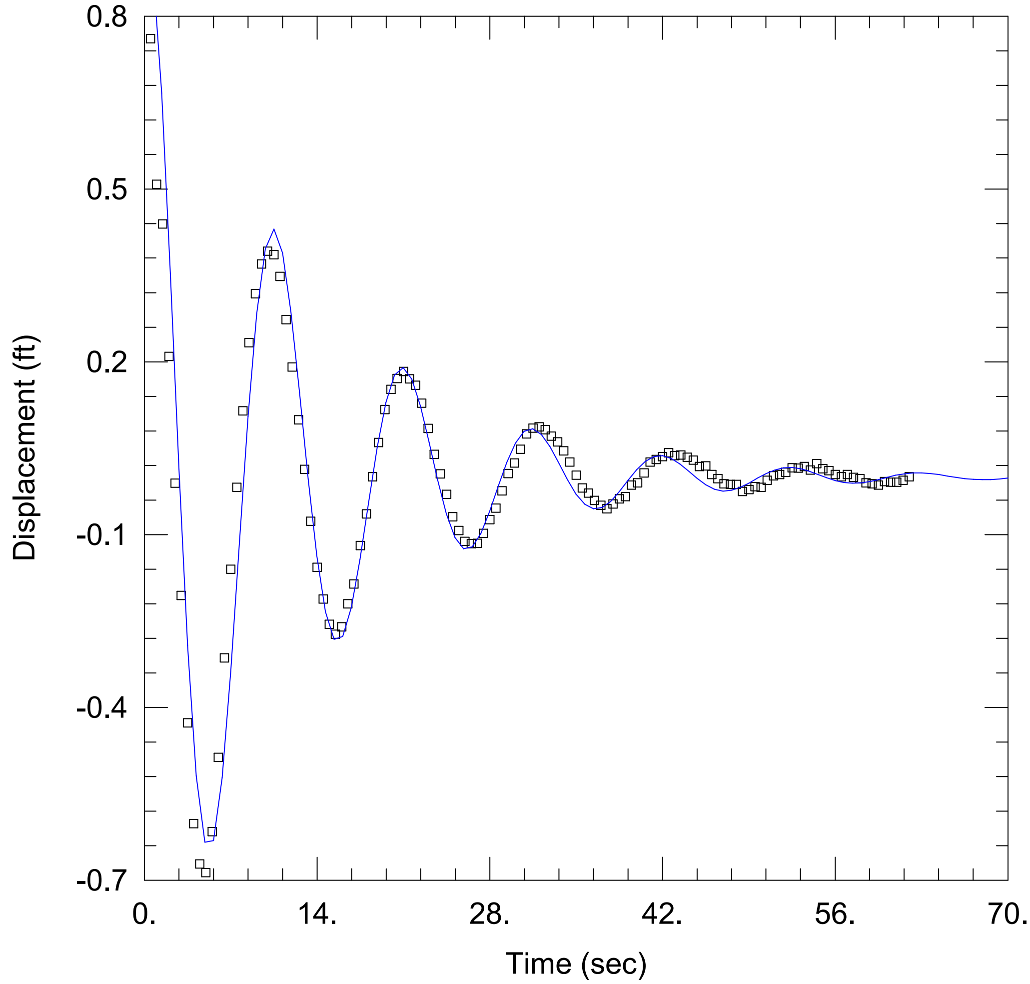
WELL DATA (MW-24D)

Initial Displacement: 1.094 ft Static Water Column Height: 93.1 ft
Total Well Penetration Depth: 91. ft Screen Length: 10. ft
Casing Radius: 0.0833 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined Solution Method: Butler

K = 0.09039 cm/sec Le = 89.6 ft



WELL TEST ANALYSIS

Data Set: \...\MW-24D_F2.aqt
Date: 04/28/23 Time: 14:52:14

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-24D
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 92. ft
Anisotropy Ratio (Kz/Kr): 1.

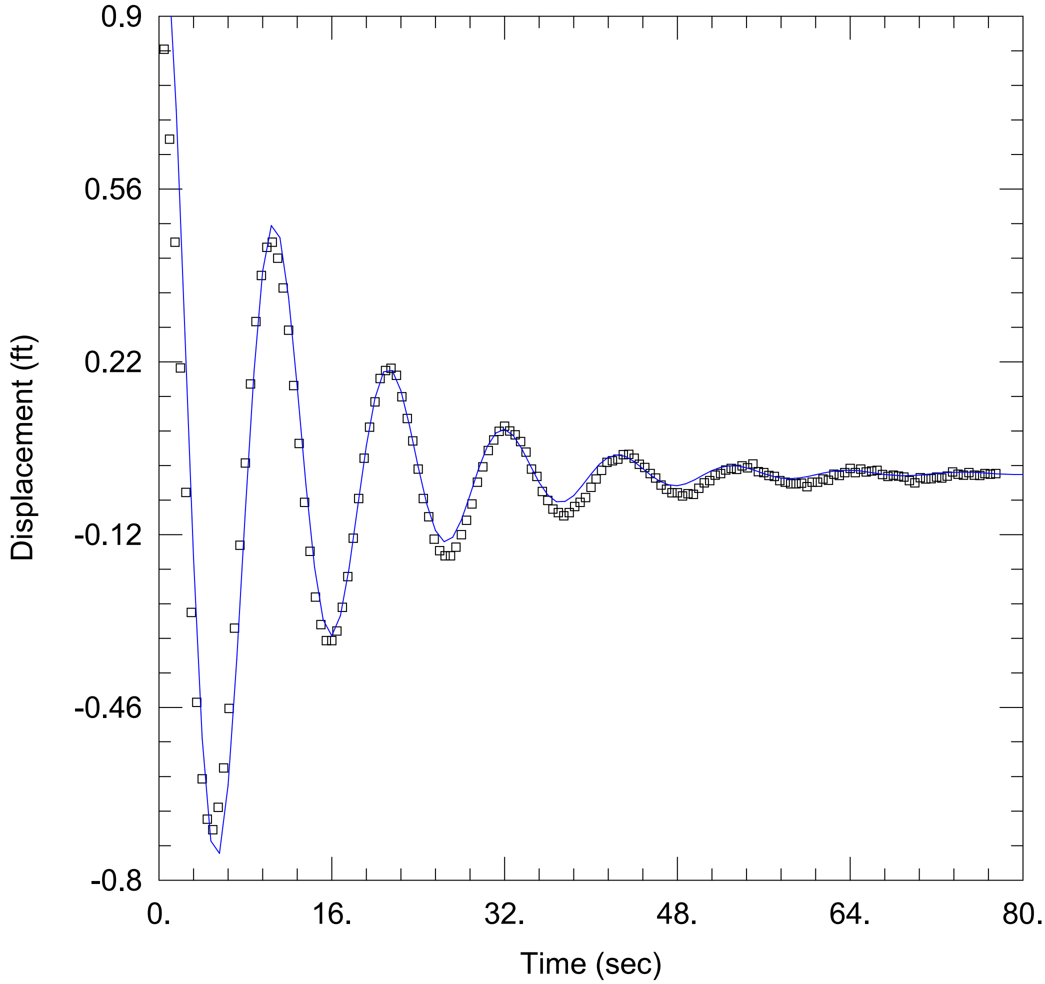
WELL DATA (MW-24D)

Initial Displacement: 0.974 ft
Total Well Penetration Depth: 91. ft
Casing Radius: 0.0833 ft
Static Water Column Height: 93.1 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.1008 cm/sec
Le = 87.6 ft



WELL TEST ANALYSIS

Data Set: \...\MW-24D_R1.aqt
Date: 04/28/23 Time: 14:52:28

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-24D
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 92. ft
Anisotropy Ratio (Kz/Kr): 1.

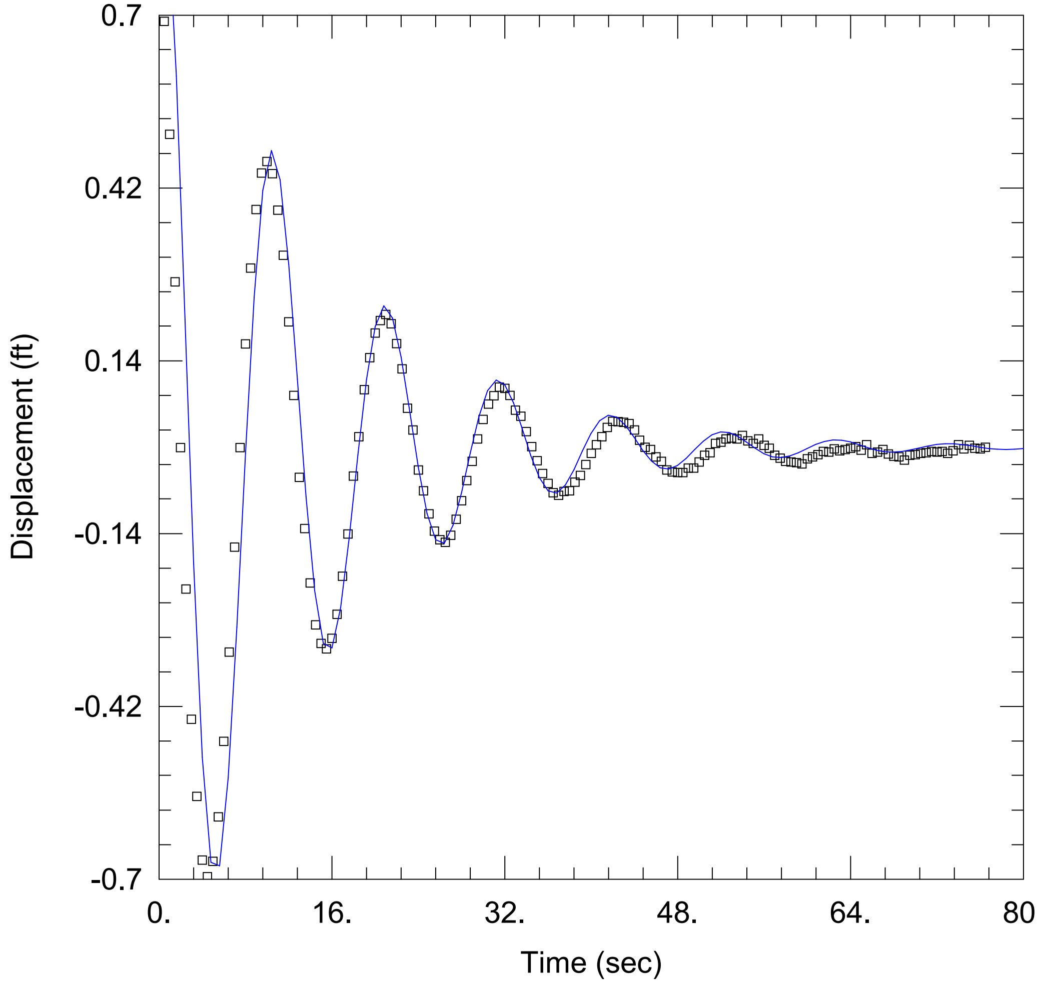
WELL DATA (MW-24D)

Initial Displacement: 1.169 ft
Static Water Column Height: 93.1 ft
Total Well Penetration Depth: 91. ft
Screen Length: 10. ft
Casing Radius: 0.0833 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.09329 cm/sec
Le = 90.25 ft



WELL TEST ANALYSIS

Data Set: \...\MW-24D_R2.aqt
Date: 04/28/23
Time: 14:52:45

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-24D
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 92. ft
Anisotropy Ratio (Kz/Kr): 1.

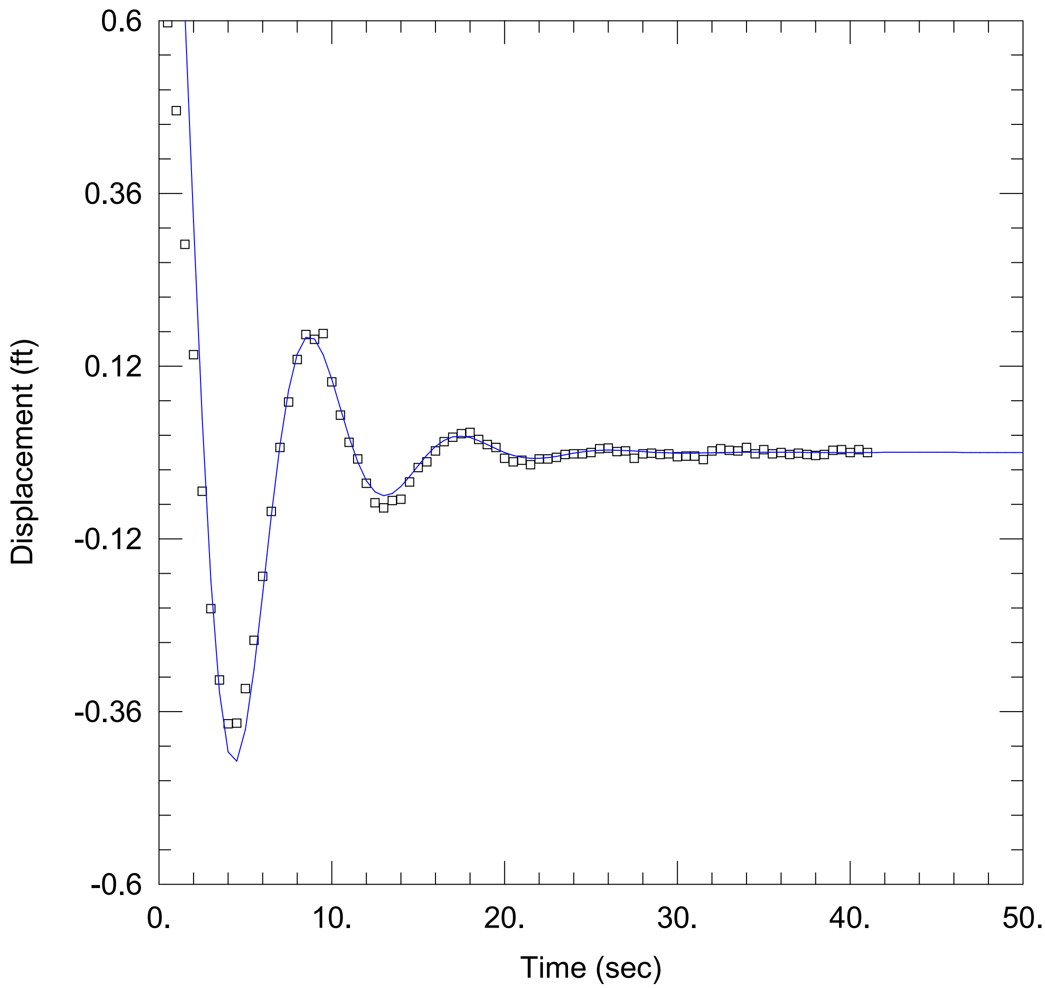
WELL DATA (MW-24D)

Initial Displacement: 1.008 ft
Total Well Penetration Depth: 91. ft
Casing Radius: 0.0833 ft
Static Water Column Height: 93.1 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.1121 cm/sec
Le = 87.71 ft



WELL TEST ANALYSIS

Data Set: \...\MW-24I_F1.aqt
Date: 04/28/23
Time: 14:53:01

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-24I
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 92. ft
Anisotropy Ratio (Kz/Kr): 1.

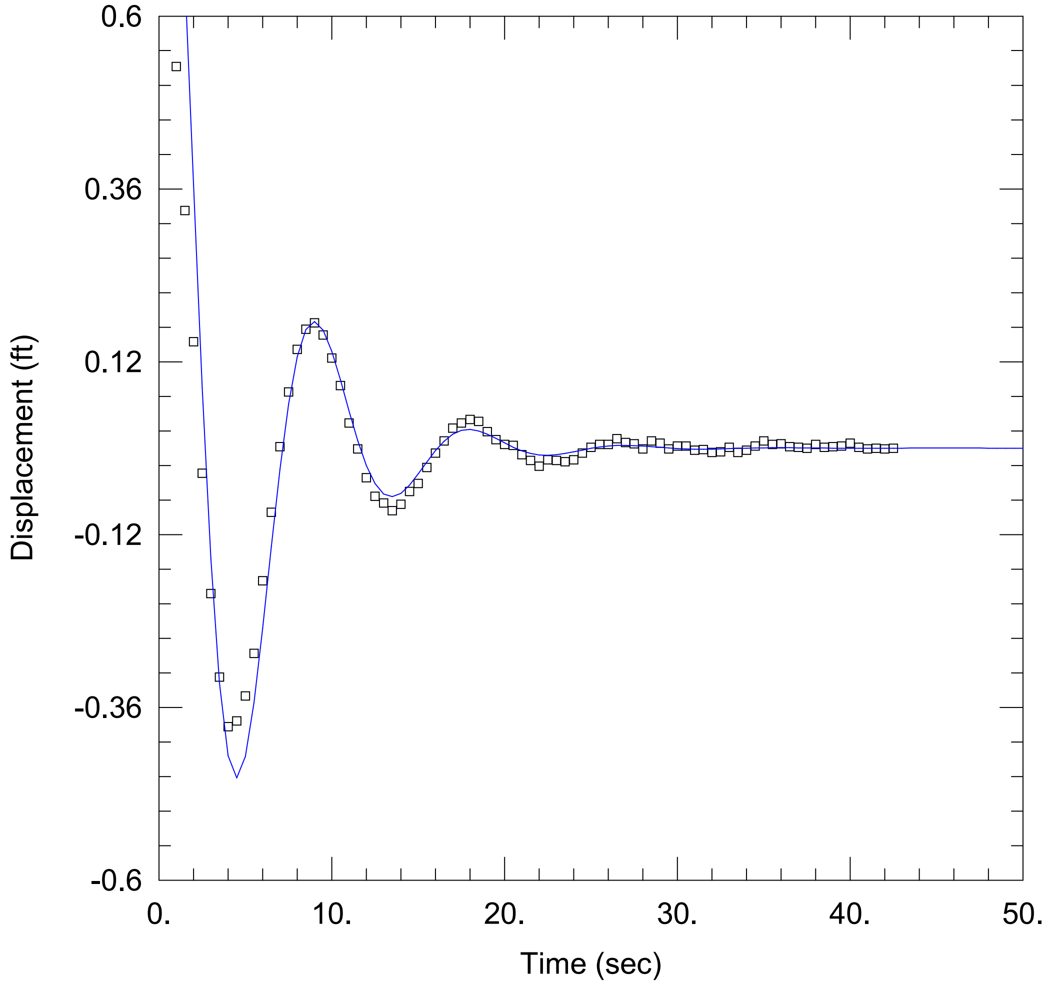
WELL DATA (MW-24I)

Initial Displacement: 1.155 ft
Static Water Column Height: 63.1 ft
Total Well Penetration Depth: 61. ft
Screen Length: 10. ft
Casing Radius: 0.0833 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.051 cm/sec
Le = 56.17 ft



WELL TEST ANALYSIS

Data Set: \...\MW-24I_F2.aqt
Date: 04/28/23 Time: 14:53:15

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-24I
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 92. ft
Anisotropy Ratio (Kz/Kr): 1.

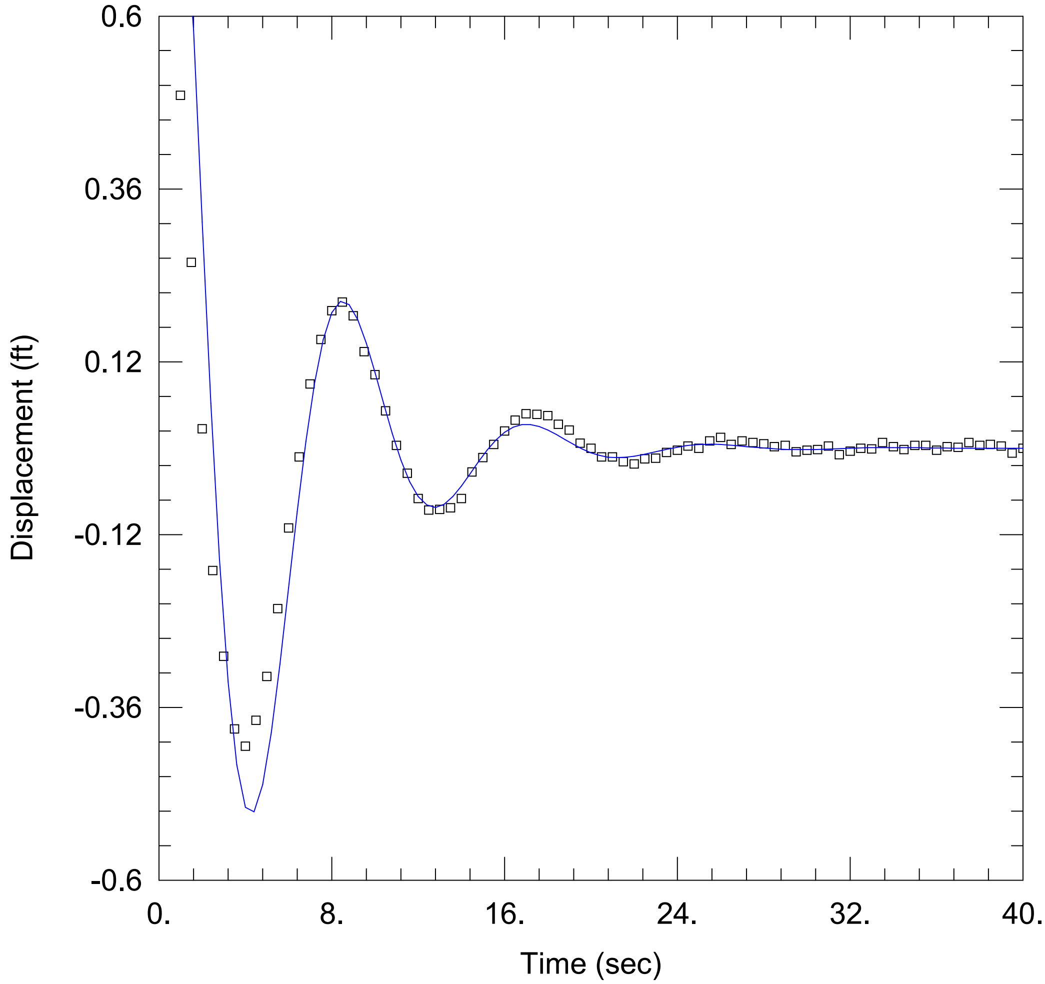
WELL DATA (MW-24I)

Initial Displacement: 1.193 ft
Static Water Column Height: 63.1 ft
Total Well Penetration Depth: 61. ft
Screen Length: 10. ft
Casing Radius: 0.0833 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.05057 cm/sec
Le = 60.03 ft



WELL TEST ANALYSIS

Data Set: \...\MW-24I_R1.aqt
Date: 04/28/23 Time: 14:53:27

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-24I
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 92. ft Anisotropy Ratio (Kz/Kr): 1.

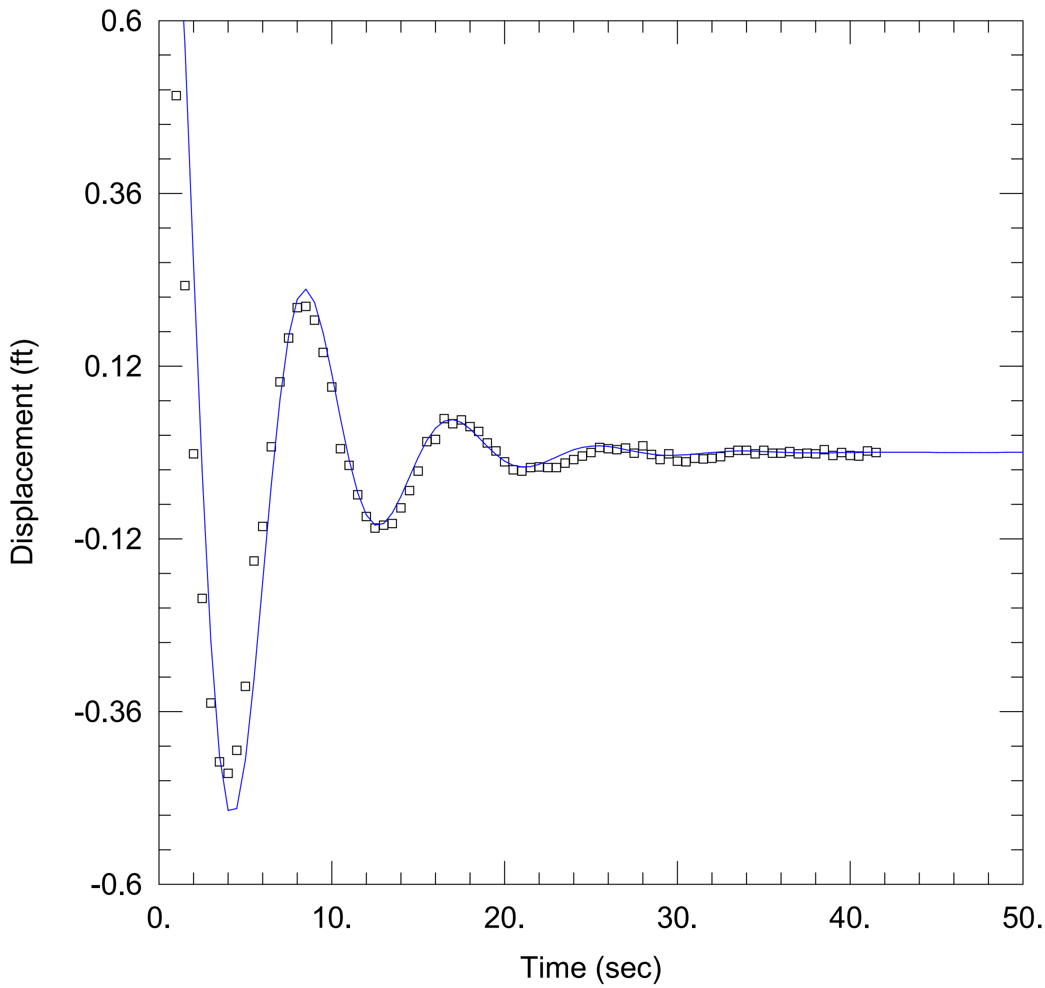
WELL DATA (MW-24I)

Initial Displacement: 1.264 ft
Total Well Penetration Depth: 61. ft
Casing Radius: 0.0833 ft
Static Water Column Height: 63.1 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined Solution Method: Butler

K = 0.05581 cm/sec Le = 54.36 ft



WELL TEST ANALYSIS

Data Set: \...\MW-24I_R2.aqt
Date: 04/28/23 Time: 14:53:45

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-24I
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 92. ft
Anisotropy Ratio (Kz/Kr): 1.

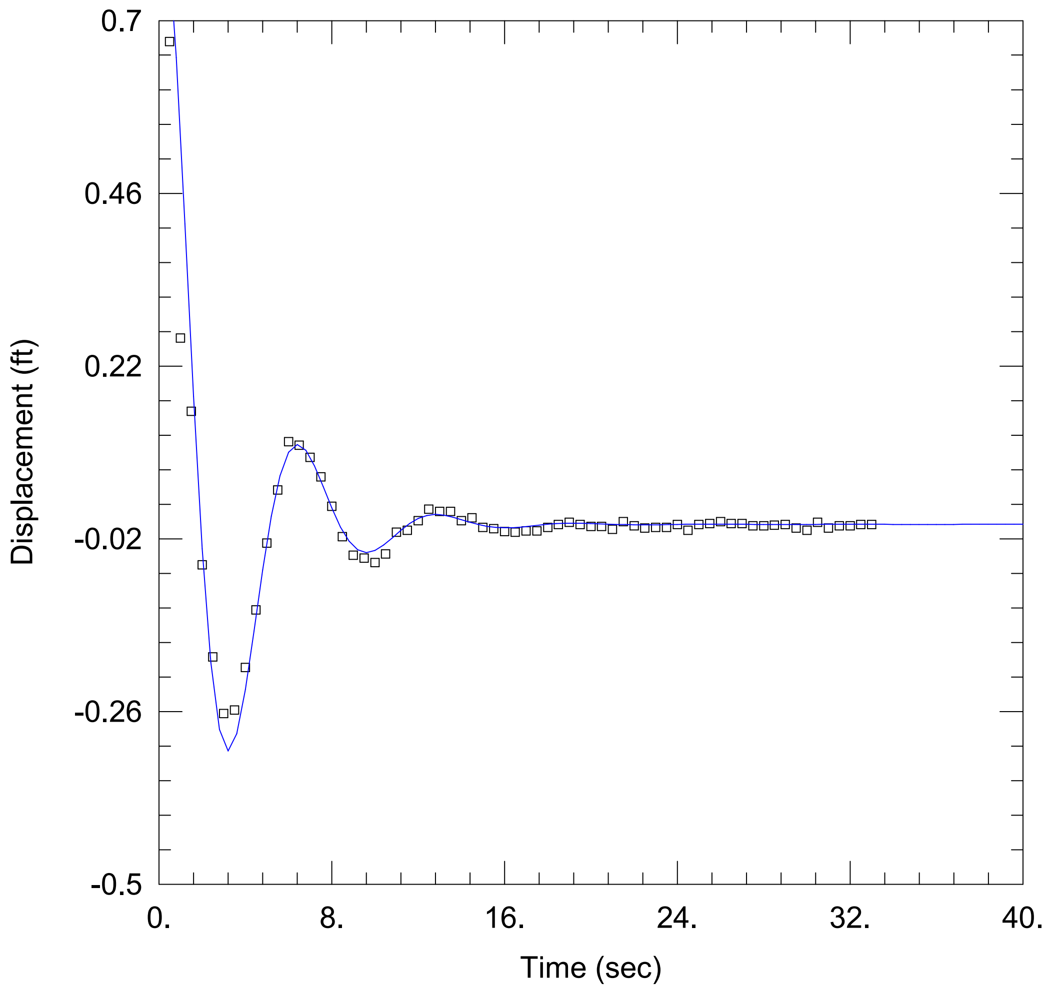
WELL DATA (MW-24I)

Initial Displacement: 1.126 ft
Total Well Penetration Depth: 61. ft
Casing Radius: 0.0833 ft
Static Water Column Height: 63.1 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.06297 cm/sec
Le = 54.72 ft



WELL TEST ANALYSIS

Data Set: \...\MW-24S_F1.aqt
Date: 04/28/23 Time: 14:54:02

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-24S
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 92. ft Anisotropy Ratio (Kz/Kr): 1.

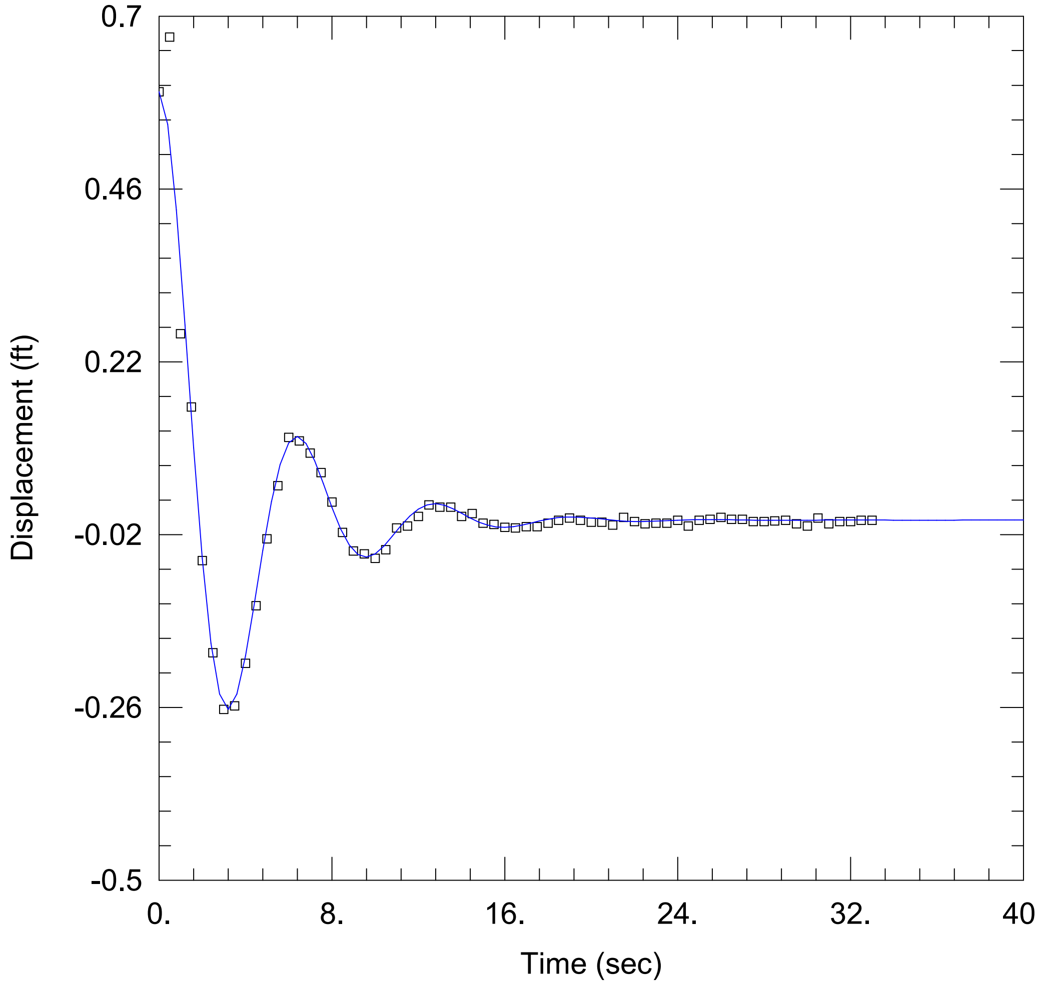
WELL DATA (MW-24S)

Initial Displacement: 0.893 ft
Total Well Penetration Depth: 31. ft
Casing Radius: 0.0833 ft
Static Water Column Height: 33.2 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined Solution Method: Butler

K = 0.06512 cm/sec Le = 30.16 ft



WELL TEST ANALYSIS

Data Set: \...\MW-24S_F2.aqt
Date: 04/28/23 Time: 14:54:17

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-24S
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 92. ft Anisotropy Ratio (Kz/Kr): 1.

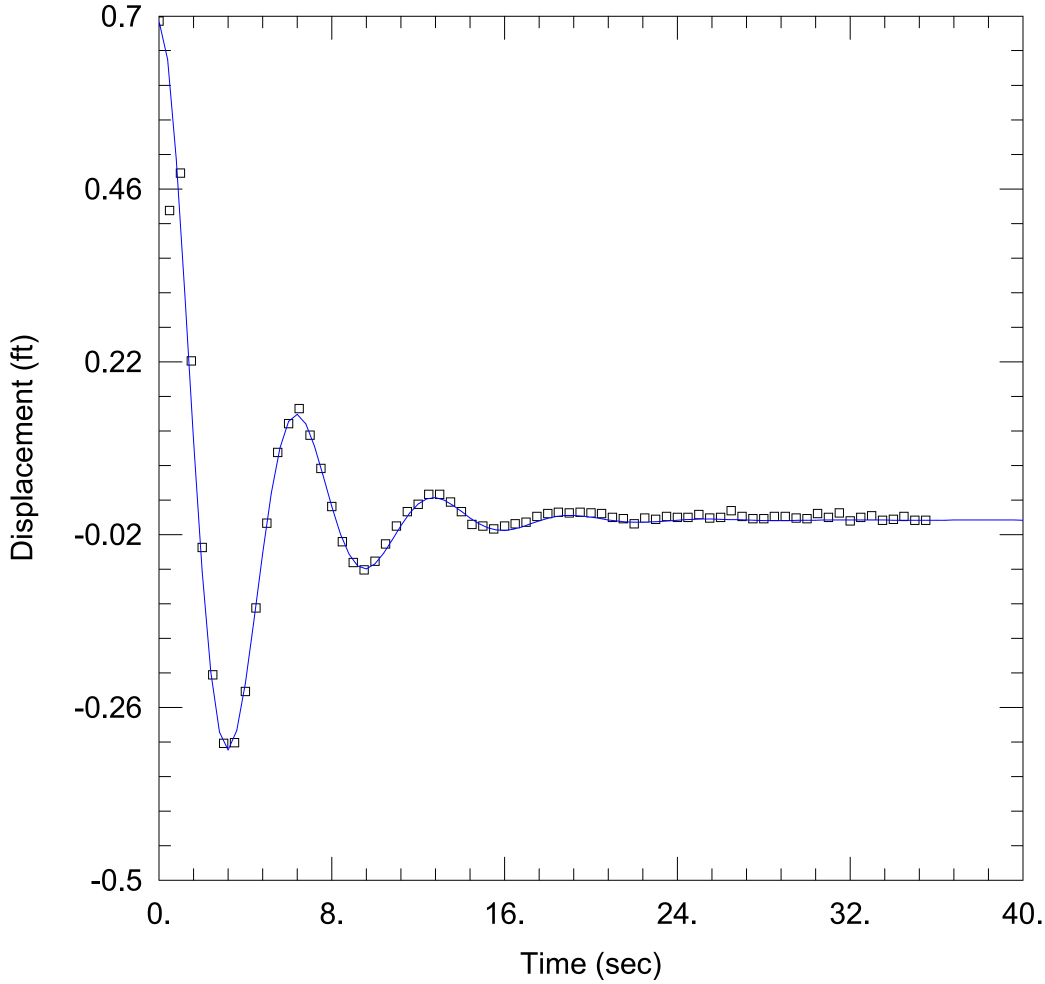
WELL DATA (MW-24S)

Initial Displacement: 0.595 ft Static Water Column Height: 33.2 ft
Total Well Penetration Depth: 31. ft Screen Length: 10. ft
Casing Radius: 0.0833 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined Solution Method: Butler

K = 0.08074 cm/sec Le = 31.03 ft



WELL TEST ANALYSIS

Data Set: \...\MW-24S_R1.aqt
Date: 04/28/23 Time: 14:54:29

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-24S
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 92. ft
Anisotropy Ratio (Kz/Kr): 1.

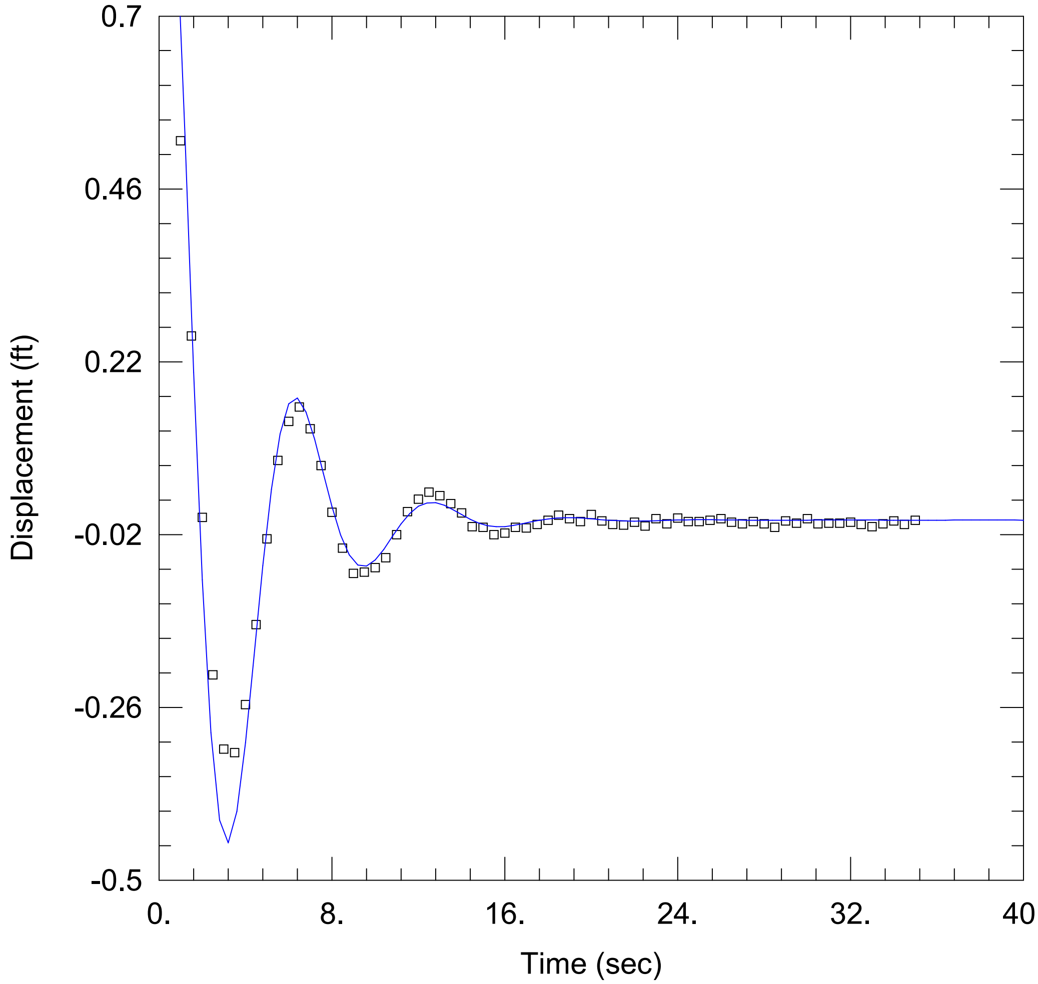
WELL DATA (MW-24S)

Initial Displacement: 0.693 ft
Static Water Column Height: 33.2 ft
Total Well Penetration Depth: 31. ft
Screen Length: 10. ft
Casing Radius: 0.0833 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.08494 cm/sec
Le = 31.03 ft



WELL TEST ANALYSIS

Data Set: \...\MW-24S_R2.aqt
Date: 04/28/23 Time: 14:54:44

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-24S
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 92. ft
Anisotropy Ratio (Kz/Kr): 1.

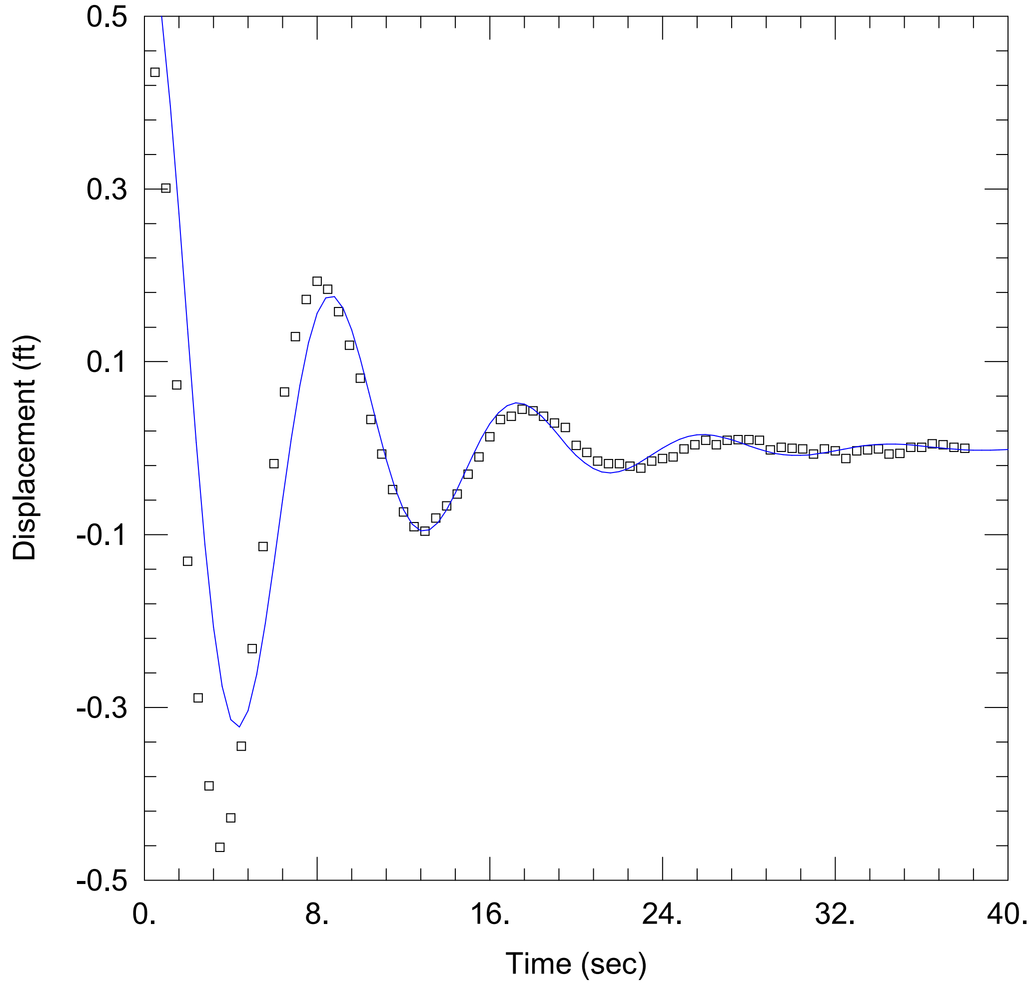
WELL DATA (MW-24S)

Initial Displacement: 1.182 ft
Total Well Penetration Depth: 31. ft
Casing Radius: 0.0833 ft
Static Water Column Height: 33.2 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 0.07043 cm/sec
Le = 29.57 ft



WELL TEST ANALYSIS

Data Set: \...\MW-25D_F1.aqt
Date: 04/28/23 Time: 14:55:06

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-25D
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 74.4 ft Anisotropy Ratio (Kz/Kr): 1.

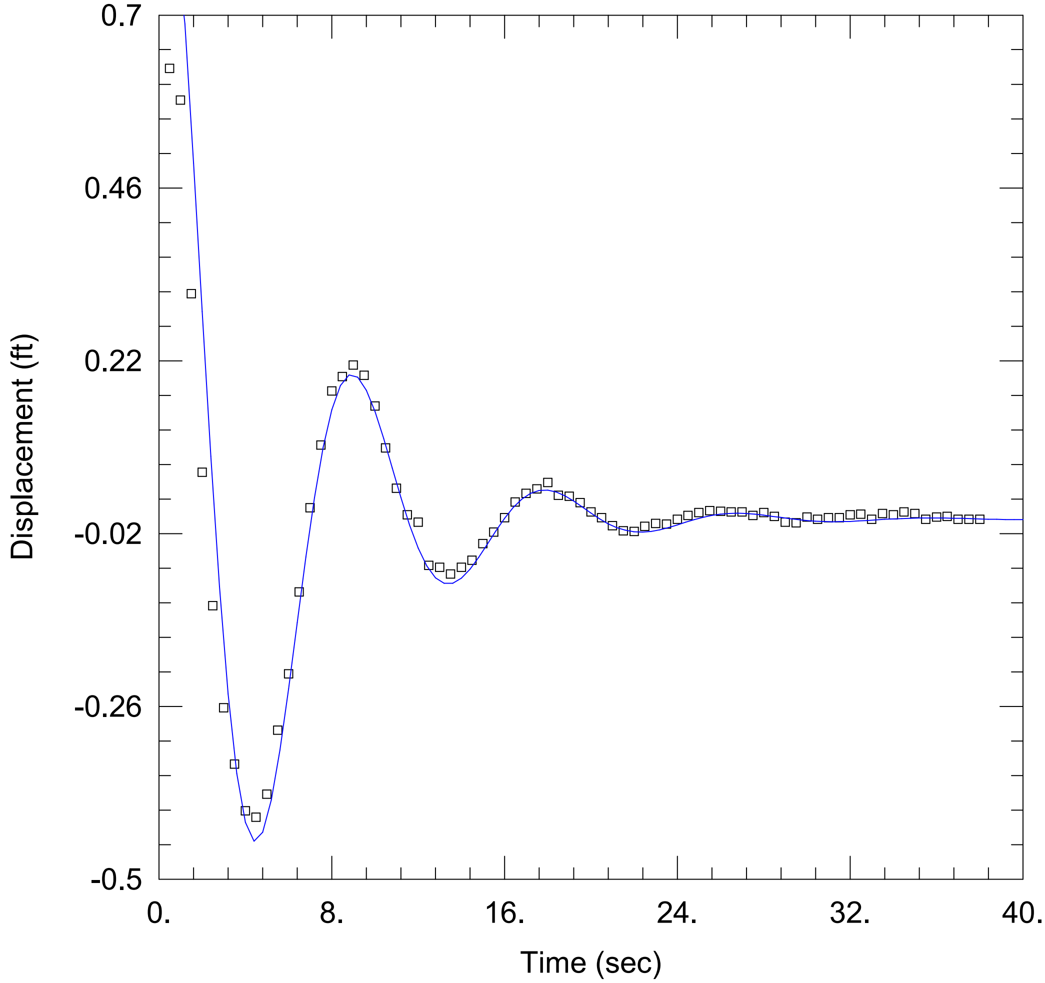
WELL DATA (MW-25D)

Initial Displacement: 0.593 ft
Total Well Penetration Depth: 73.4 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 73.4 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar

K = 0.07893 cm/sec Le = 58.58 ft



WELL TEST ANALYSIS

Data Set: \...\MW-25D_F2.aqt
Date: 04/28/23 Time: 14:55:18

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-25D
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 74.4 ft
Anisotropy Ratio (Kz/Kr): 1.

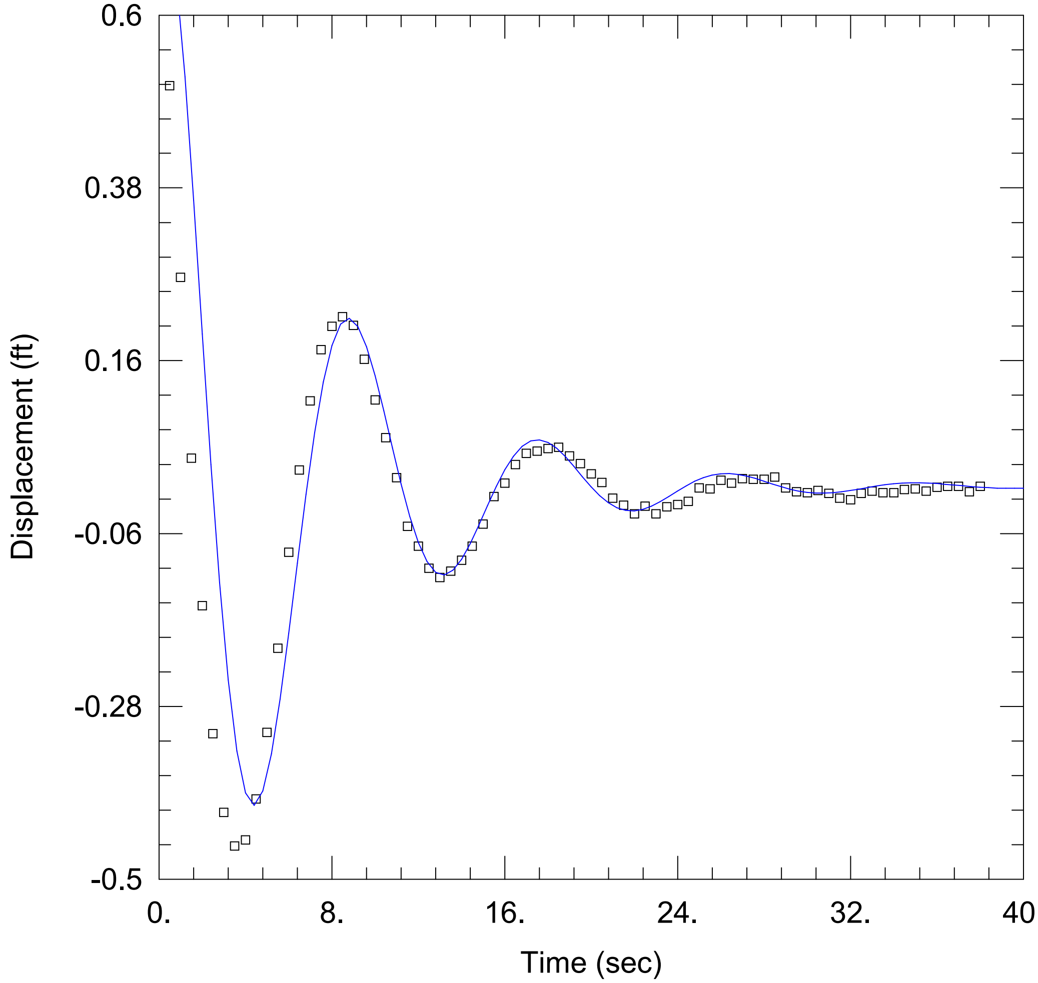
WELL DATA (MW-25D)

Initial Displacement: 0.998 ft
Static Water Column Height: 73.4 ft
Total Well Penetration Depth: 73.4 ft
Screen Length: 10. ft
Casing Radius: 0.0833 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.0584 cm/sec
Le = 60.94 ft



WELL TEST ANALYSIS

Data Set: \...\MW-25D_R1.aqt
Date: 04/28/23 Time: 14:55:34

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-25D
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 74.4 ft Anisotropy Ratio (Kz/Kr): 1.

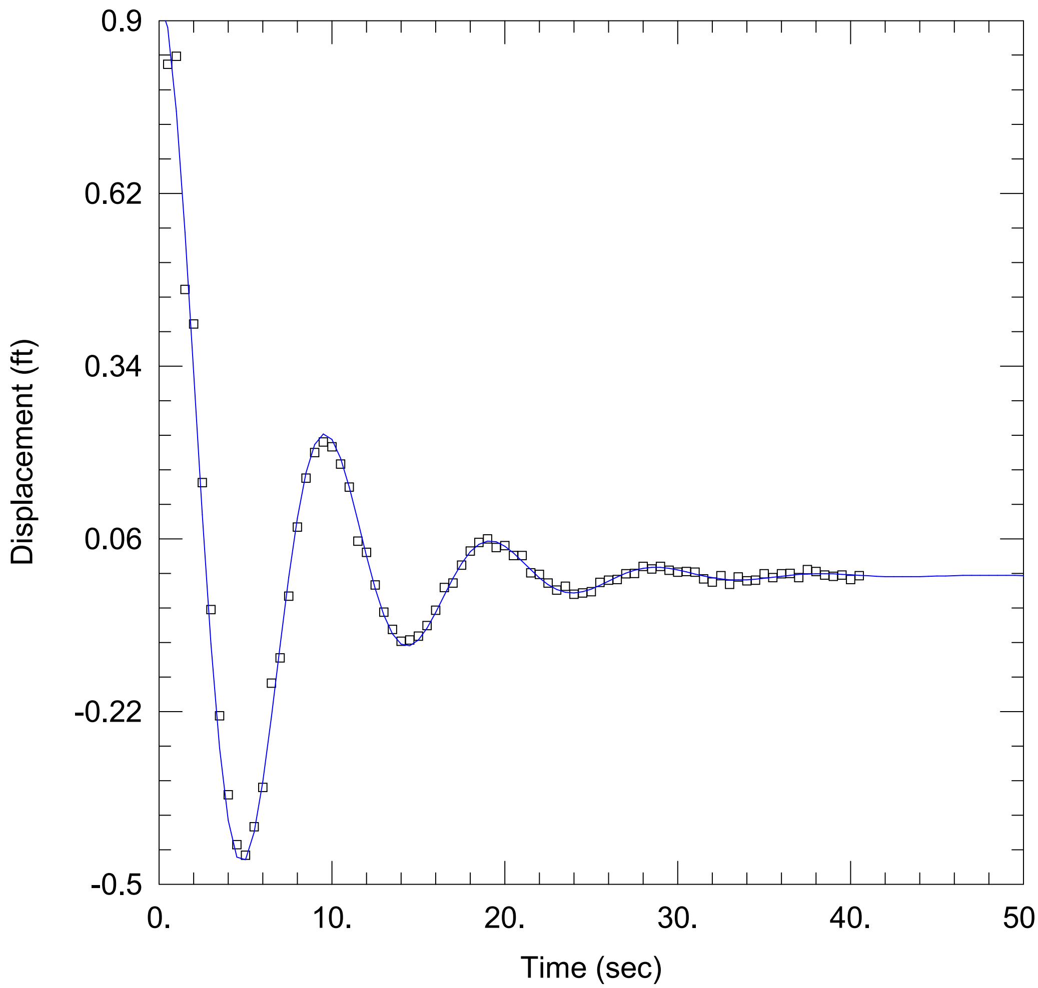
WELL DATA (MW-25D)

Initial Displacement: 0.771 ft
Total Well Penetration Depth: 73.4 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 73.4 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar

K = 0.07365 cm/sec Le = 60.01 ft



WELL TEST ANALYSIS

Data Set: \...\MW-25D_R2.aqt
Date: 04/28/23 Time: 14:55:46

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-25D
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 74.4 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-25D)

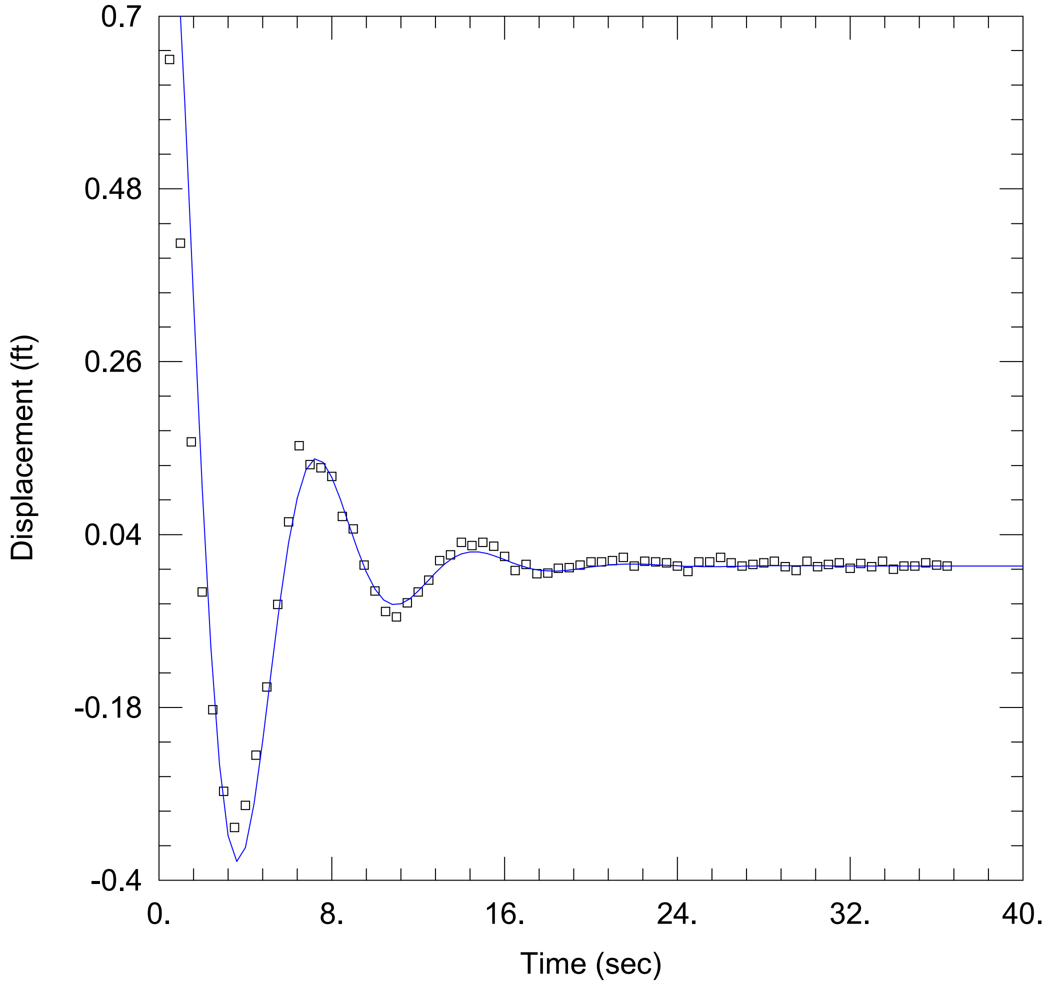
Initial Displacement: 0.939 ft
Total Well Penetration Depth: 73.4 ft
Casing Radius: 0.0833 ft

Static Water Column Height: 73.4 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar

K = 0.06138 cm/sec Le = 71.06 ft



WELL TEST ANALYSIS

Data Set: \...\MW-25I_F1.aqt
Date: 04/28/23
Time: 14:56:00

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-25I
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 74.4 ft
Anisotropy Ratio (Kz/Kr): 1.

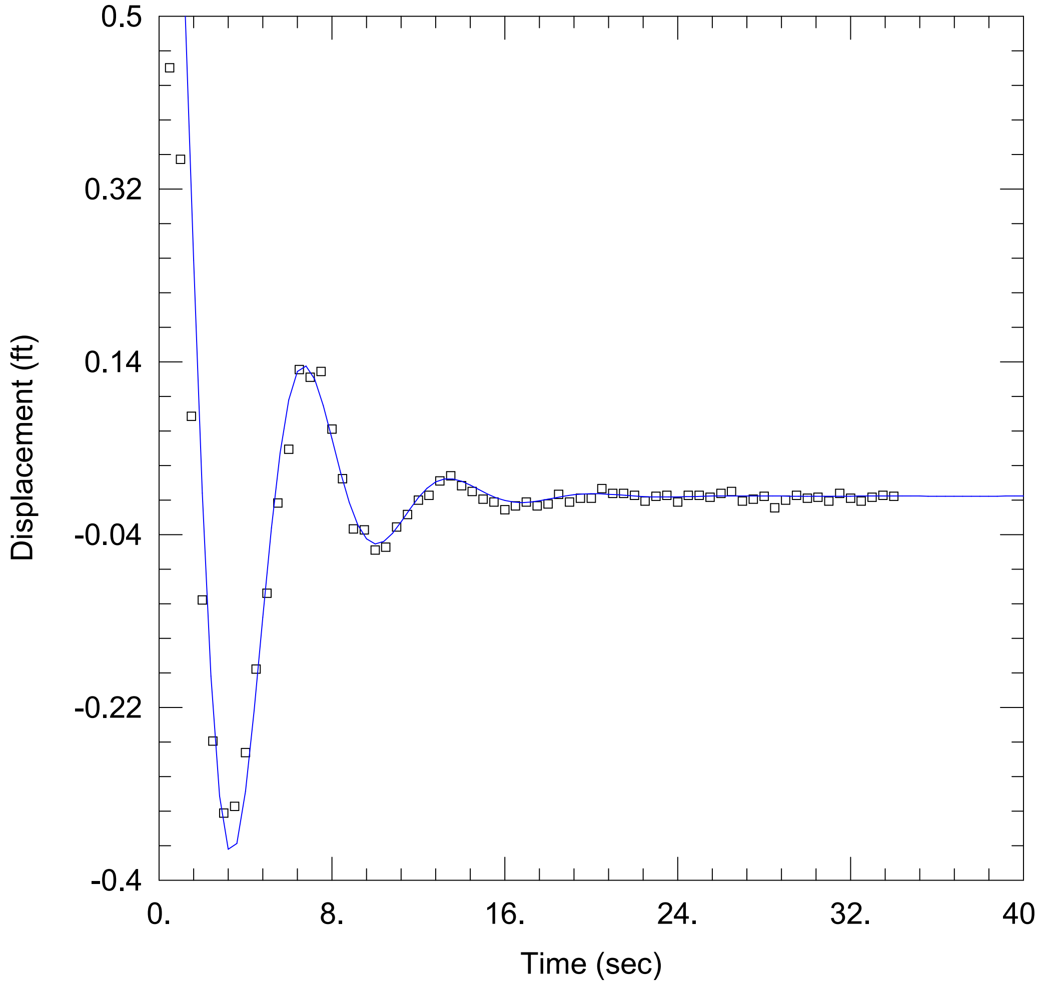
WELL DATA (MW-25I)

Initial Displacement: 1.038 ft
Total Well Penetration Depth: 45.9 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 45.9 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.04797 cm/sec
Le = 39.27 ft



WELL TEST ANALYSIS

Data Set: \...\MW-25I_F2.aqt
Date: 04/28/23 Time: 14:57:22

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-25I
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 74.4 ft Anisotropy Ratio (Kz/Kr): 1.

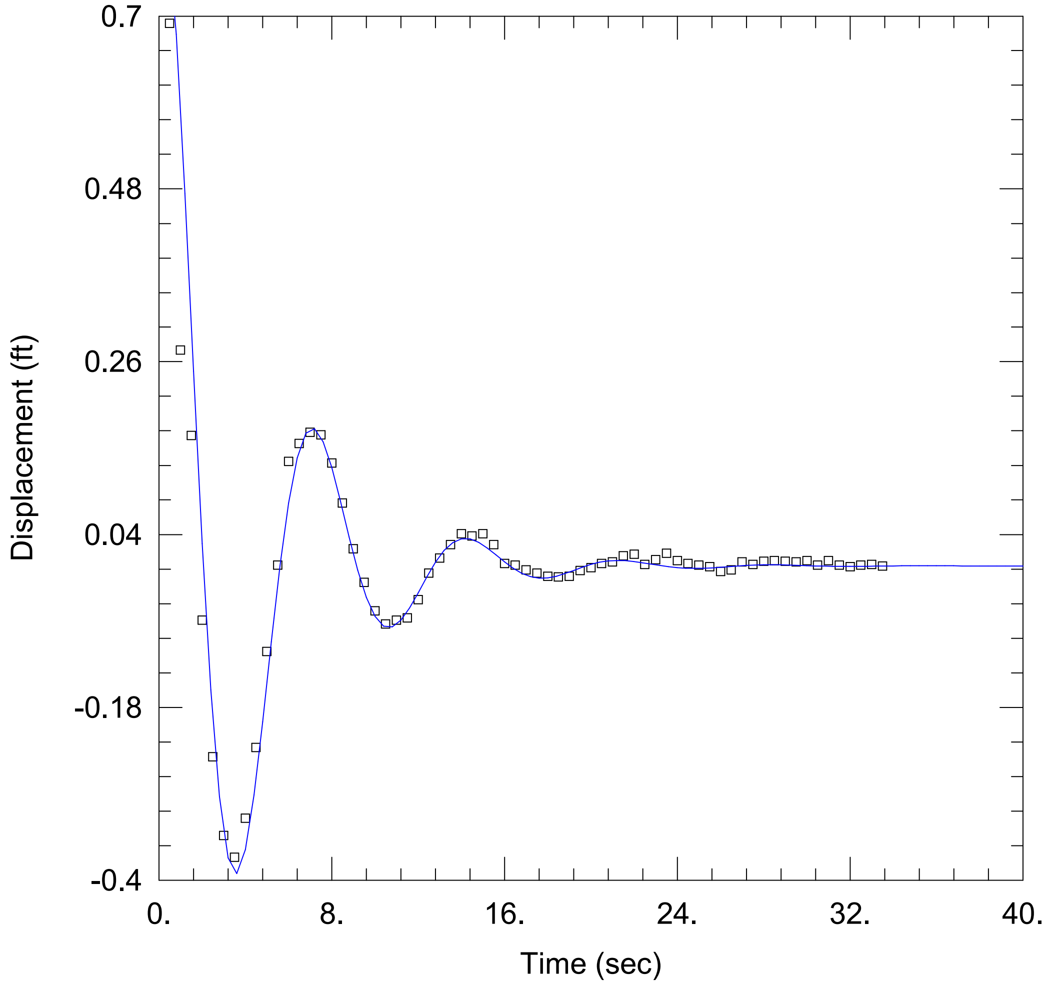
WELL DATA (MW-25I)

Initial Displacement: 1.017 ft
Total Well Penetration Depth: 45.9 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 45.9 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar

K = 0.05269 cm/sec Le = 33.21 ft



WELL TEST ANALYSIS

Data Set: \...\MW-25I_R1.aqt
Date: 04/28/23 Time: 14:57:36

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-25I
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 74.4 ft
Anisotropy Ratio (Kz/Kr): 1.

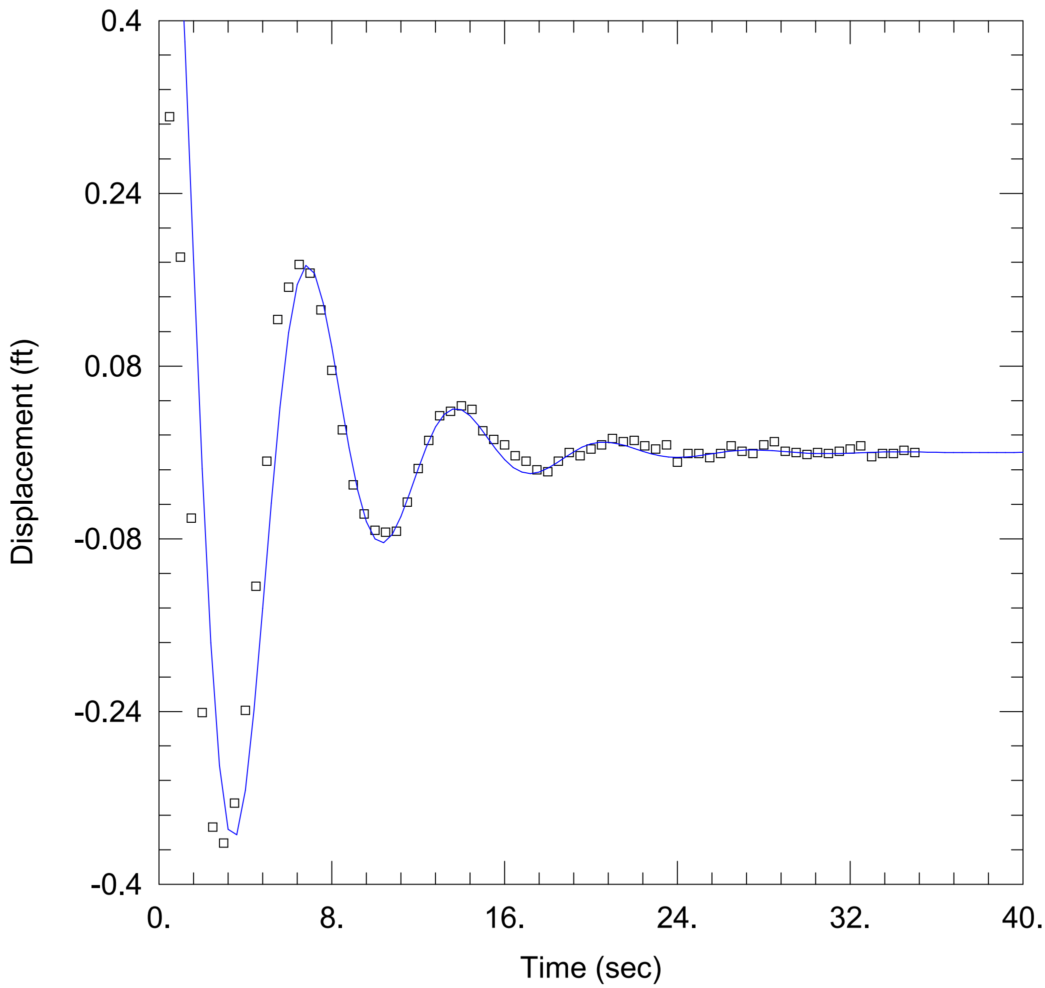
WELL DATA (MW-25I)

Initial Displacement: 0.877 ft
Total Well Penetration Depth: 45.9 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 45.9 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.06037 cm/sec
Le = 38.45 ft



WELL TEST ANALYSIS

Data Set: \...\MW-25I_R2.aqt
Date: 04/28/23 Time: 14:57:49

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-25I
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 74.4 ft
Anisotropy Ratio (Kz/Kr): 1.

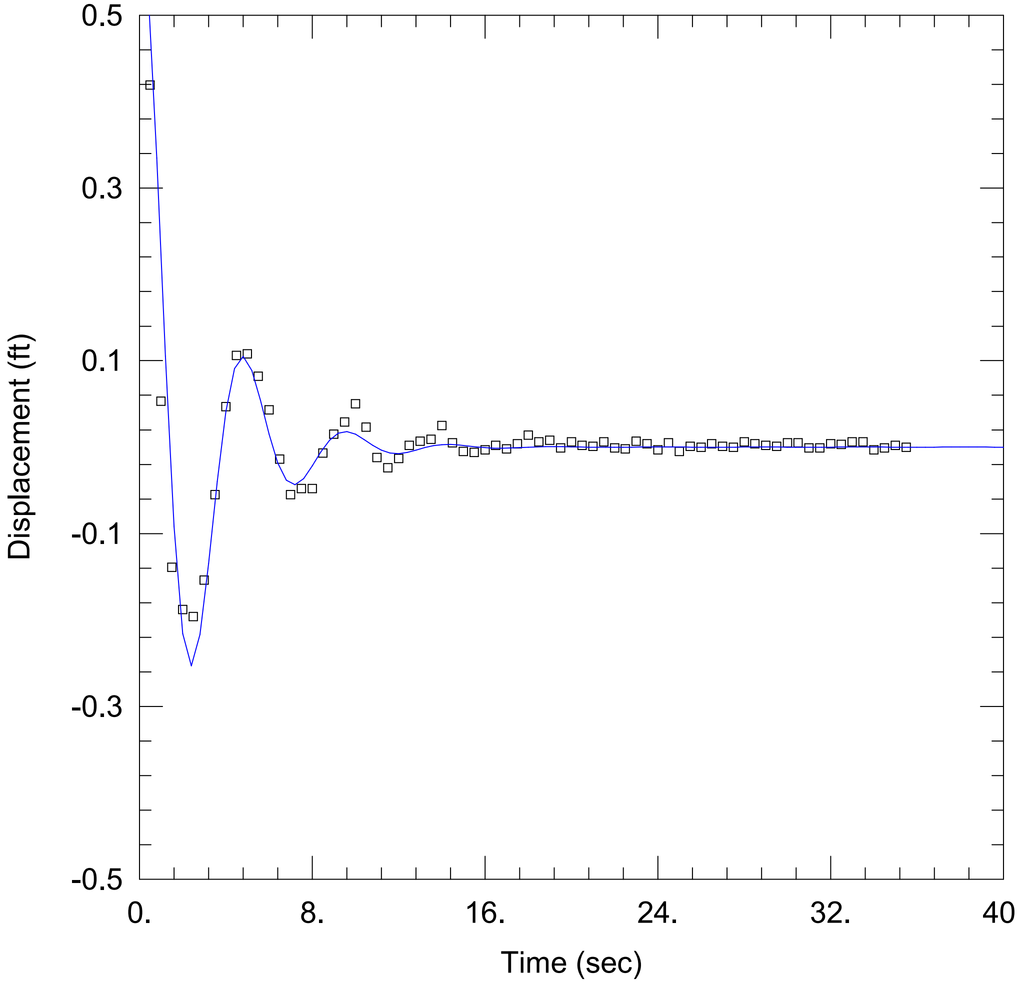
WELL DATA (MW-25I)

Initial Displacement: 0.74 ft
Static Water Column Height: 45.9 ft
Total Well Penetration Depth: 45.9 ft
Screen Length: 10. ft
Casing Radius: 0.0833 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.06859 cm/sec
Le = 36.56 ft



WELL TEST ANALYSIS

Data Set: \...\MW-25S_F1.aqt
Date: 04/28/23 Time: 14:58:06

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-25S
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 75.1 ft Anisotropy Ratio (Kz/Kr): 1.

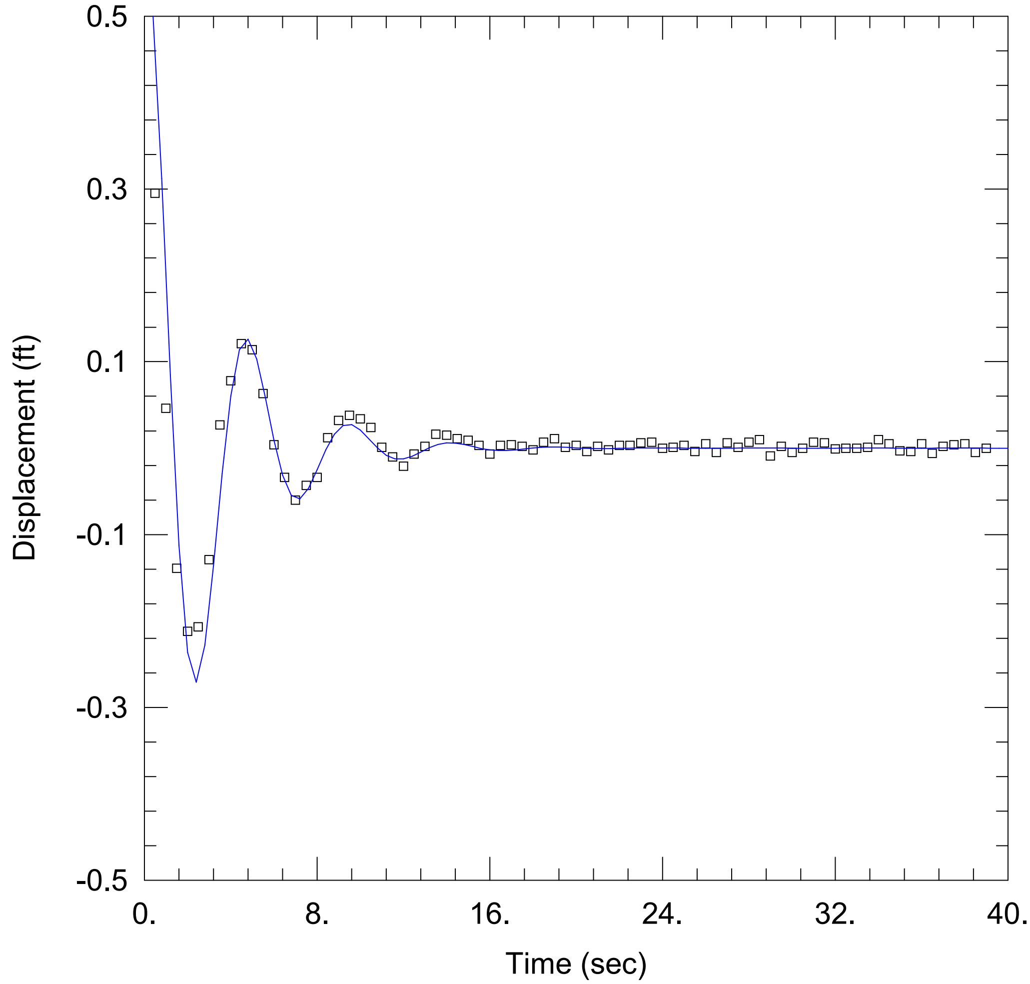
WELL DATA (MW-25S)

Initial Displacement: 0.61 ft Static Water Column Height: 23.6 ft
Total Well Penetration Depth: 23.6 ft Screen Length: 10. ft
Casing Radius: 0.0833 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar

K = 0.07362 cm/sec Le = 17.16 ft



WELL TEST ANALYSIS

Data Set: \...\MW-25S_F2.aqt
Date: 04/28/23 Time: 14:58:19

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-25S
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 75.1 ft
Anisotropy Ratio (Kz/Kr): 1.

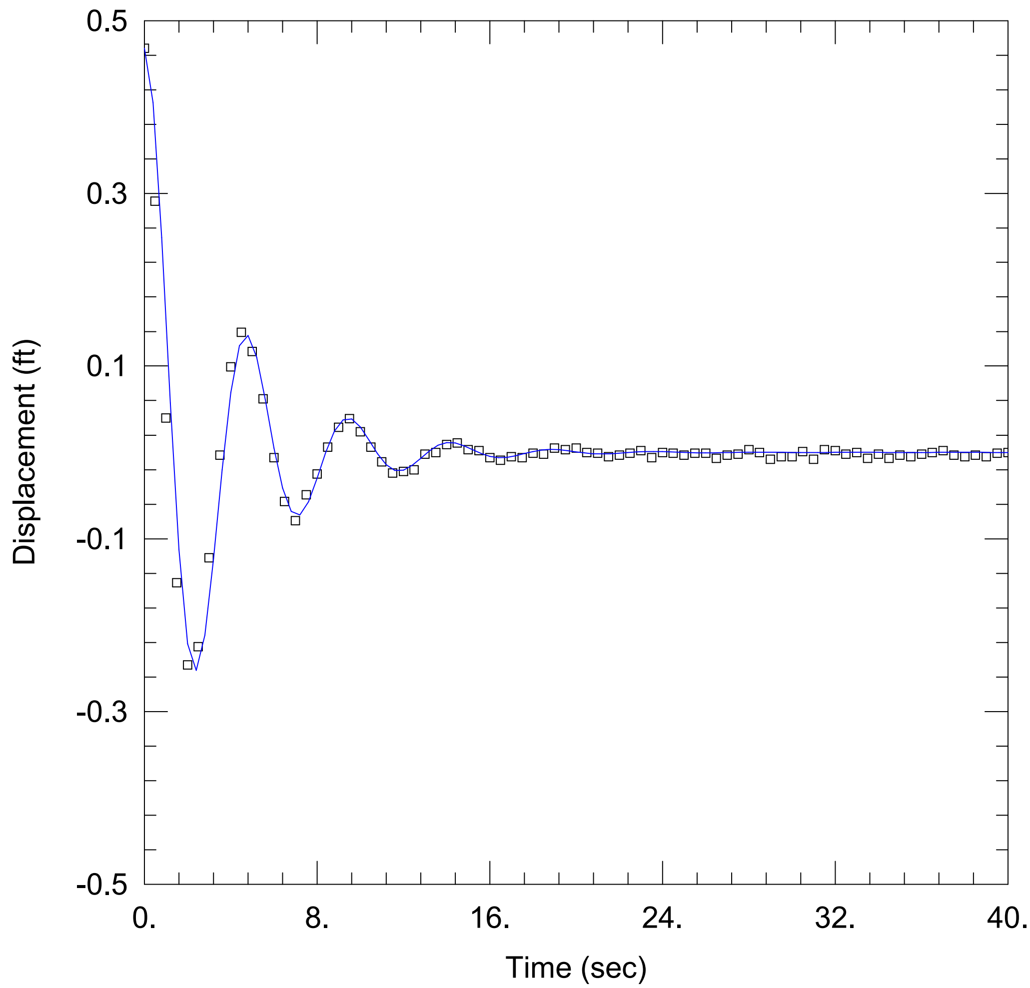
WELL DATA (MW-25S)

Initial Displacement: 0.58 ft
Static Water Column Height: 23.6 ft
Total Well Penetration Depth: 23.6 ft
Screen Length: 10. ft
Casing Radius: 0.0833 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.08471 cm/sec
Le = 17.16 ft



WELL TEST ANALYSIS

Data Set: \...\MW-25S_R1.aqt
Date: 04/28/23 Time: 14:58:32

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-25S
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 75.1 ft Anisotropy Ratio (Kz/Kr): 1.

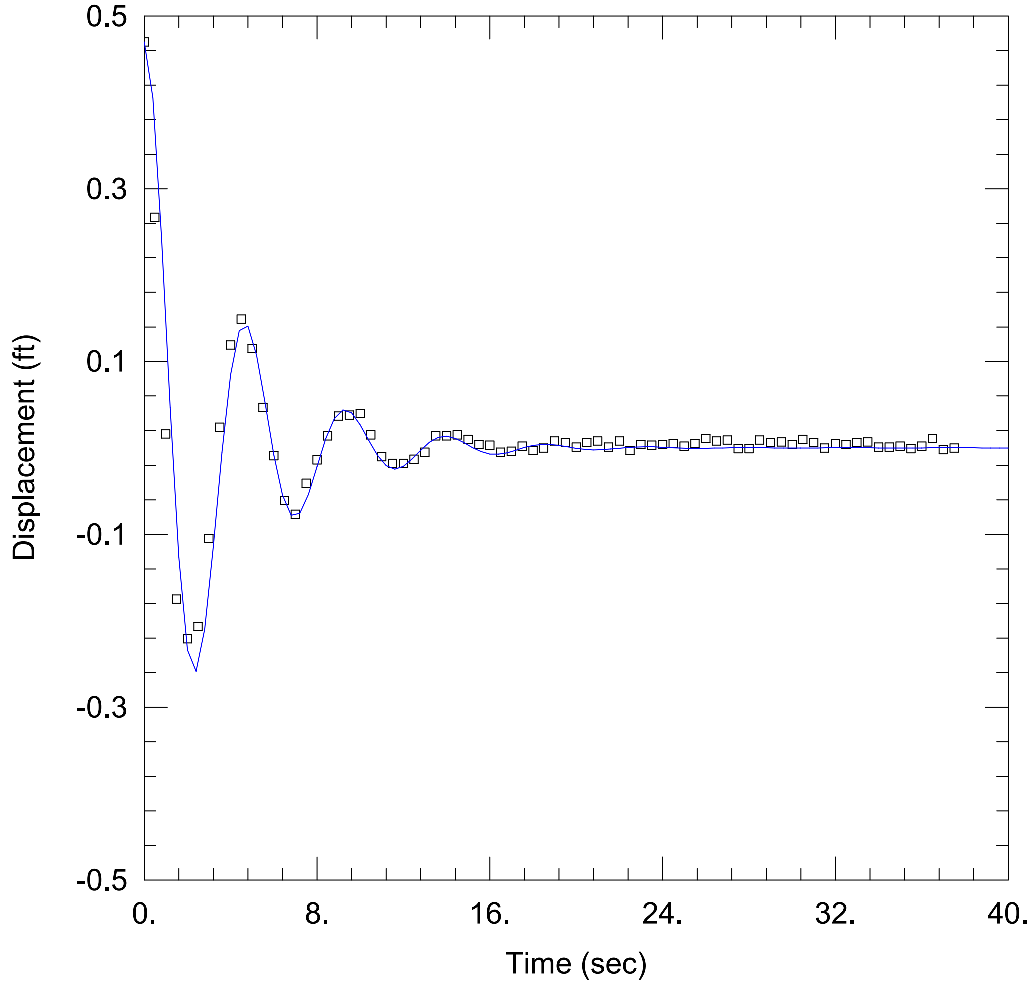
WELL DATA (MW-25S)

Initial Displacement: 0.468 ft
Total Well Penetration Depth: 23.6 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 23.6 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar

K = 0.103 cm/sec Le = 17.45 ft



WELL TEST ANALYSIS

Data Set: \...\MW-25S_R2.aqt
Date: 04/28/23 Time: 14:58:44

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-25S
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 75.1 ft Anisotropy Ratio (Kz/Kr): 1.

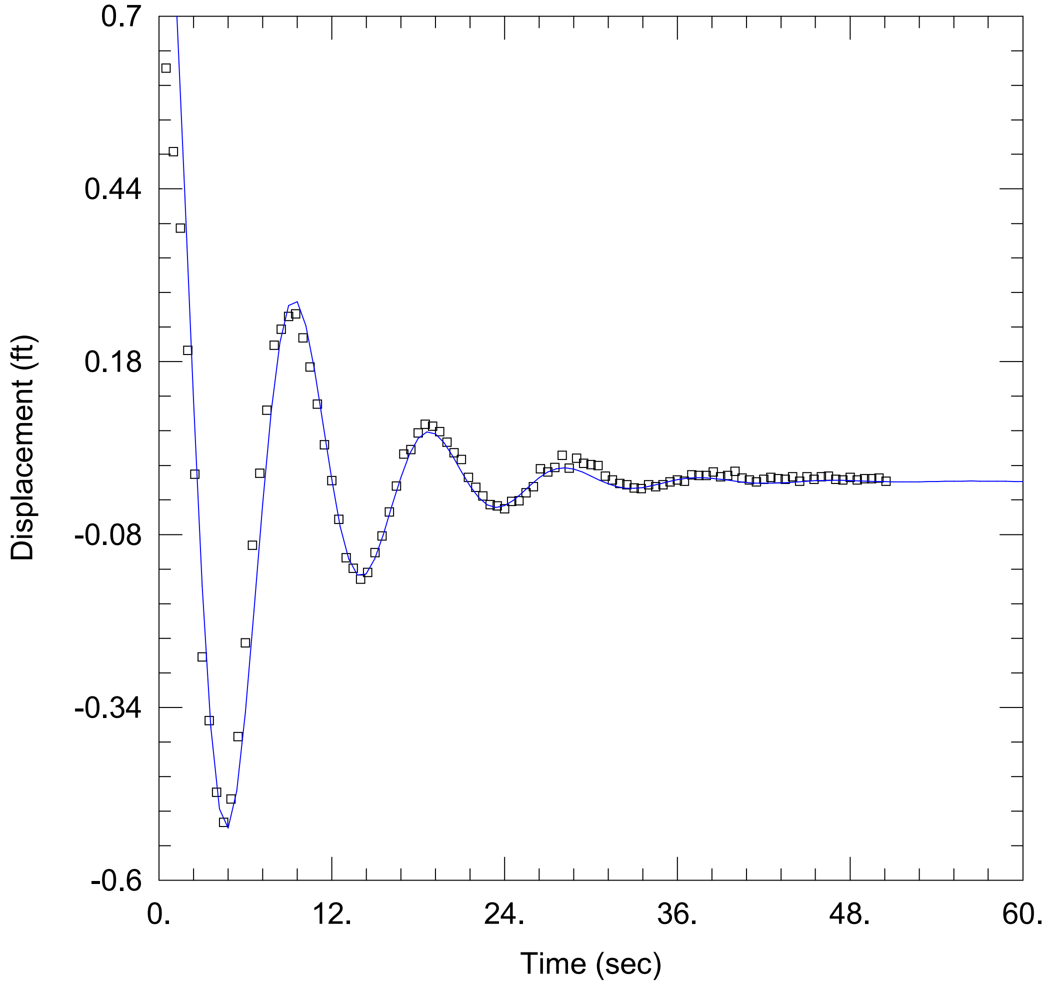
WELL DATA (MW-25S)

Initial Displacement: 0.47 ft
Total Well Penetration Depth: 23.6 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 23.6 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar

K = 0.1089 cm/sec Le = 16.97 ft



WELL TEST ANALYSIS

Data Set: \...\MW-26D_F1.aqt
Date: 04/28/23 Time: 14:59:02

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-26D
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 78.3 ft
Anisotropy Ratio (Kz/Kr): 1.

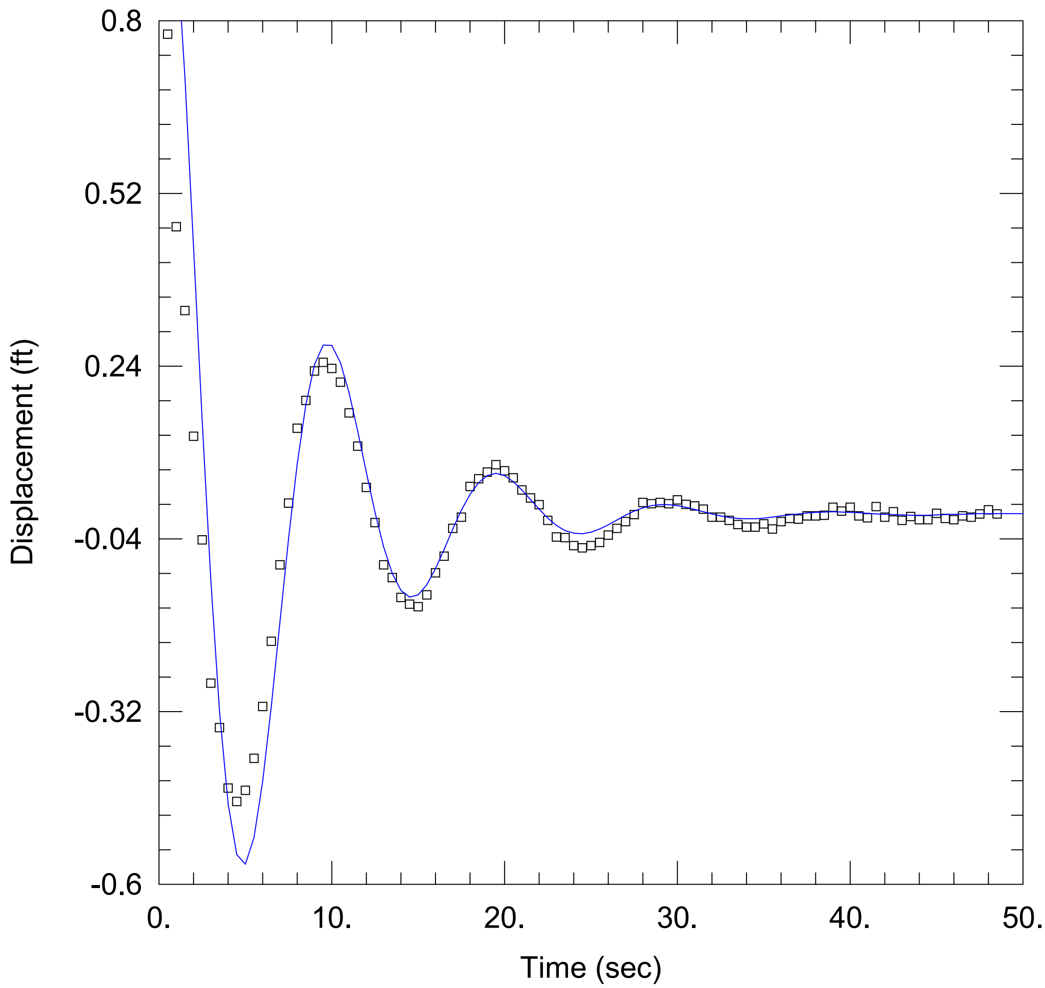
WELL DATA (MW-26D)

Initial Displacement: 1. ft
Static Water Column Height: 77.3 ft
Total Well Penetration Depth: 77.3 ft
Screen Length: 10. ft
Casing Radius: 0.0833 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.06843 cm/sec
Le = 68.71 ft



WELL TEST ANALYSIS

Data Set: \...\MW-26D_F2.aqt
Date: 04/28/23 Time: 14:59:14

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-26D
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 78.3 ft
Anisotropy Ratio (Kz/Kr): 1.

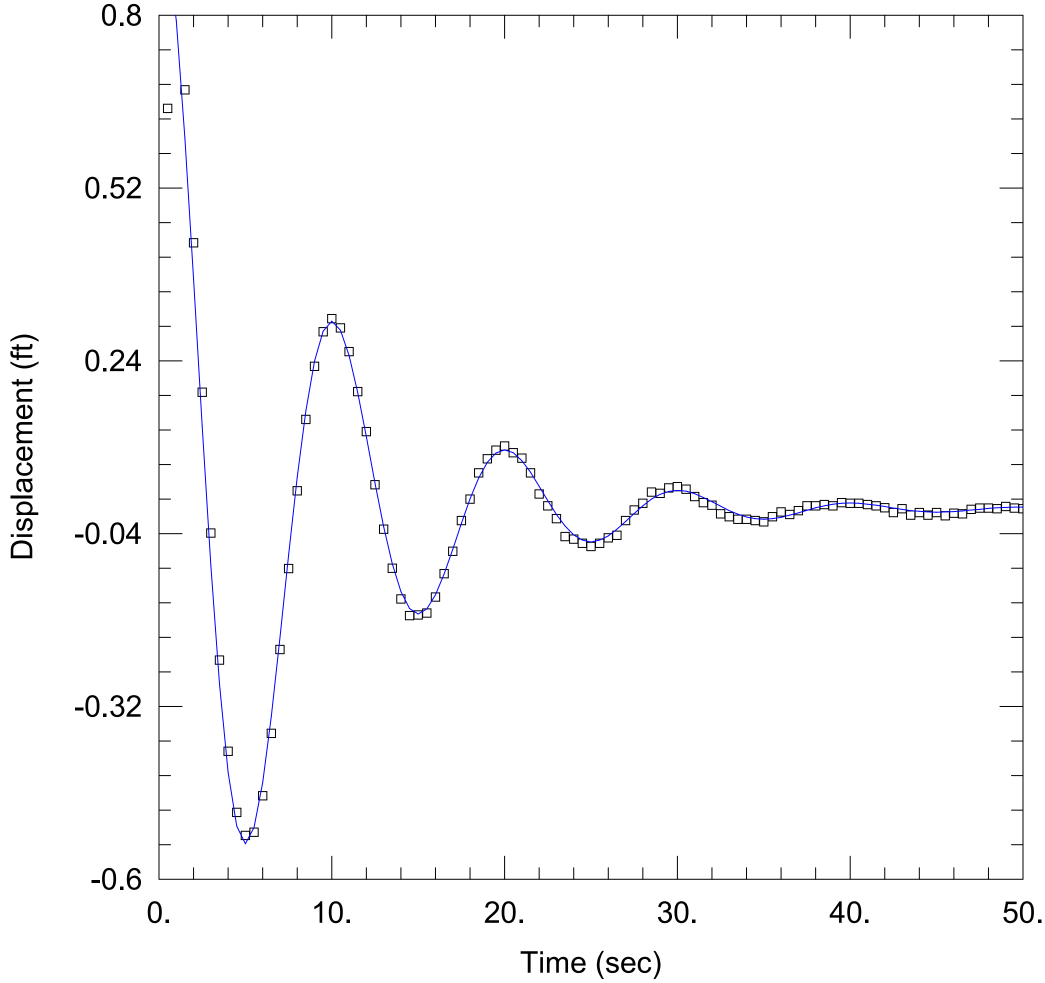
WELL DATA (MW-26D)

Initial Displacement: 1.17 ft
Static Water Column Height: 77.3 ft
Total Well Penetration Depth: 77.3 ft
Screen Length: 10. ft
Casing Radius: 0.0833 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.05948 cm/sec
Le = 73.46 ft



WELL TEST ANALYSIS

Data Set: \...\MW-26D_R1.aqt
Date: 04/28/23 Time: 14:59:28

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-26D
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 78.3 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-26D)

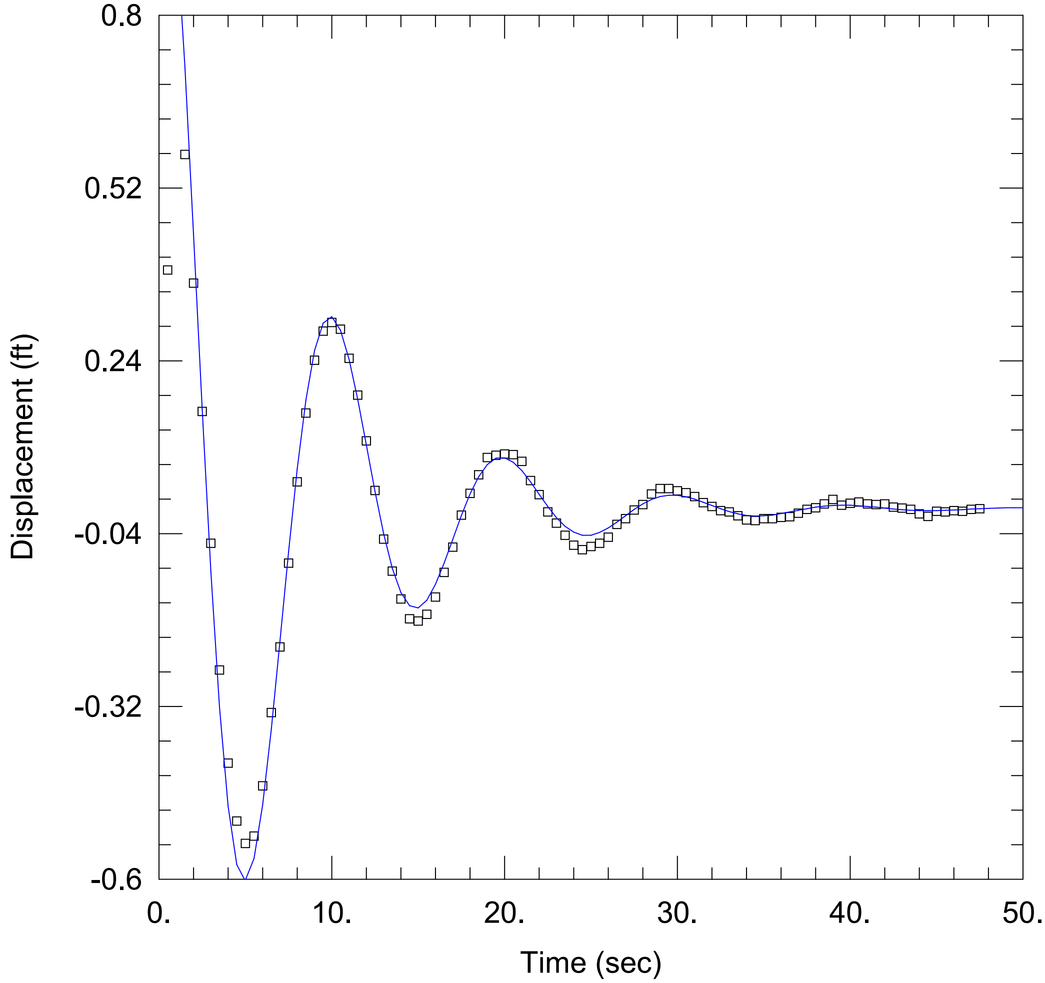
Initial Displacement: 0.969 ft
Total Well Penetration Depth: 77.3 ft
Casing Radius: 0.0833 ft

Static Water Column Height: 77.3 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar

K = 0.07133 cm/sec Le = 78.81 ft



WELL TEST ANALYSIS

Data Set: \...\MW-26D_R2.aqt
Date: 04/28/23 Time: 14:59:42

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-26D
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 78.3 ft Anisotropy Ratio (Kz/Kr): 1.

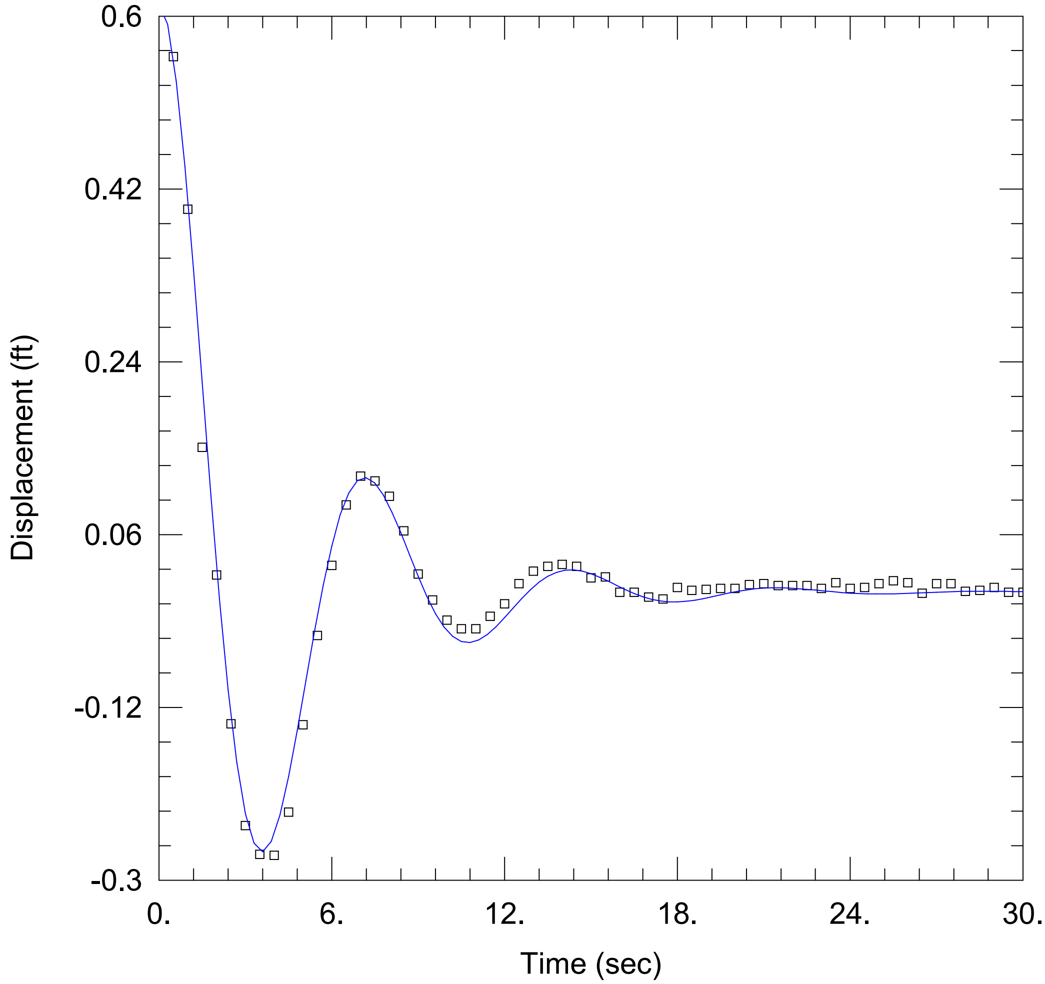
WELL DATA (MW-26D)

Initial Displacement: 1.165 ft
Total Well Penetration Depth: 77.3 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 77.3 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar

K = 0.06358 cm/sec Le = 76.48 ft



WELL TEST ANALYSIS

Data Set: \...\MW-26I_F1.aqt
Date: 04/28/23 Time: 14:59:58

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-26I
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 78.1 ft
Anisotropy Ratio (Kz/Kr): 1.

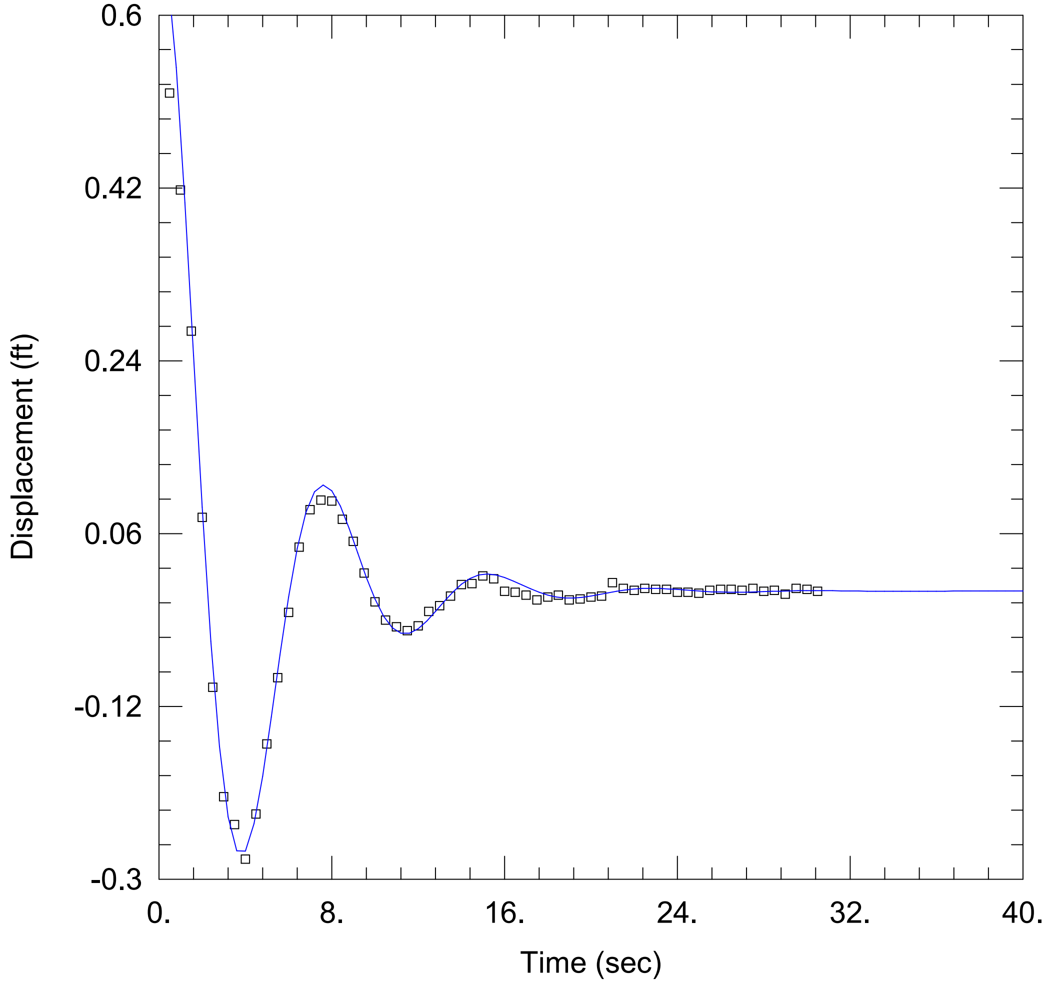
WELL DATA (MW-26I)

Initial Displacement: 0.613 ft
Total Well Penetration Depth: 47.1 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 47.1 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.05901 cm/sec
Le = 39.05 ft



WELL TEST ANALYSIS

Data Set: \...\MW-26I_F2.aqt
Date: 04/28/23 Time: 15:00:14

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-26I
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 78.1 ft Anisotropy Ratio (Kz/Kr): 1.

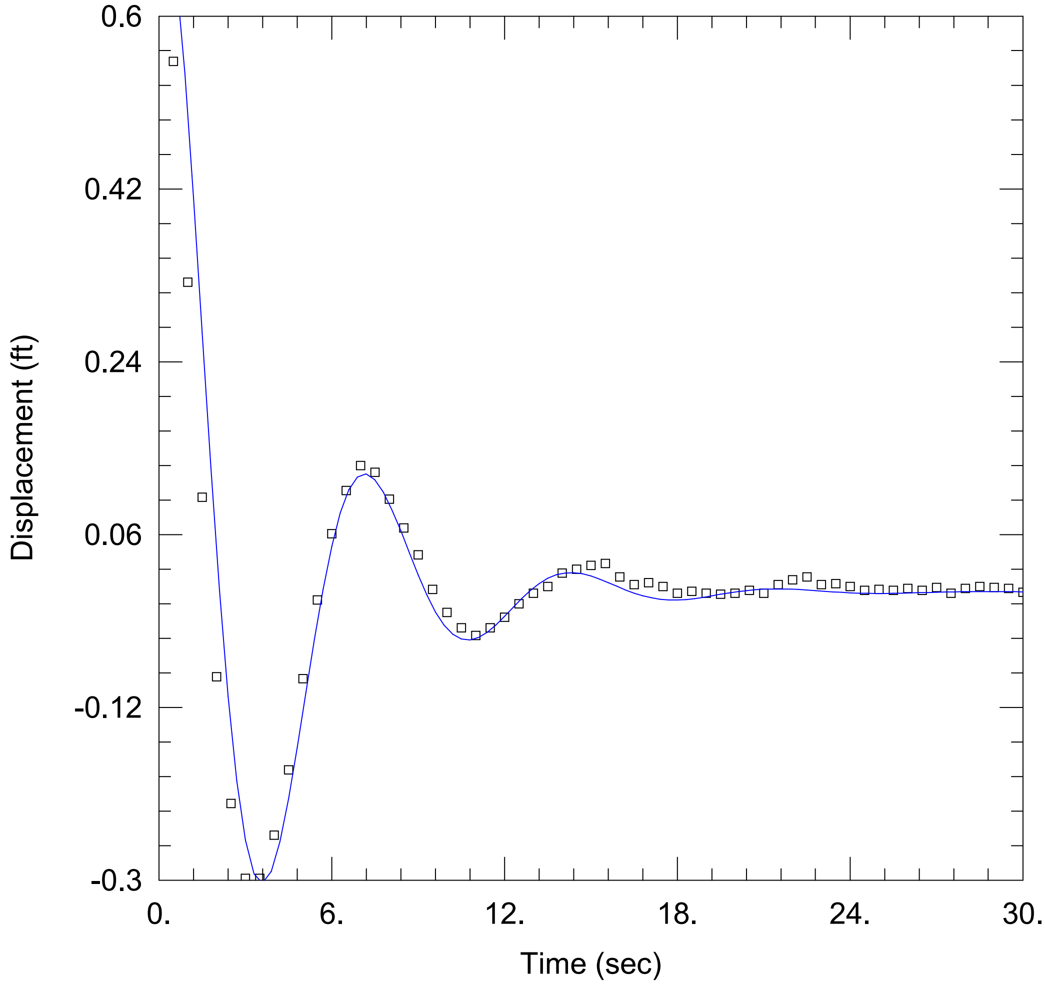
WELL DATA (MW-26I)

Initial Displacement: 0.683 ft
Total Well Penetration Depth: 47.1 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 47.1 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar

K = 0.05043 cm/sec Le = 43.45 ft



WELL TEST ANALYSIS

Data Set: \...\MW-26I_R1.aqt
Date: 04/28/23 Time: 15:00:32

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-26I
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 78.1 ft
Anisotropy Ratio (Kz/Kr): 1.

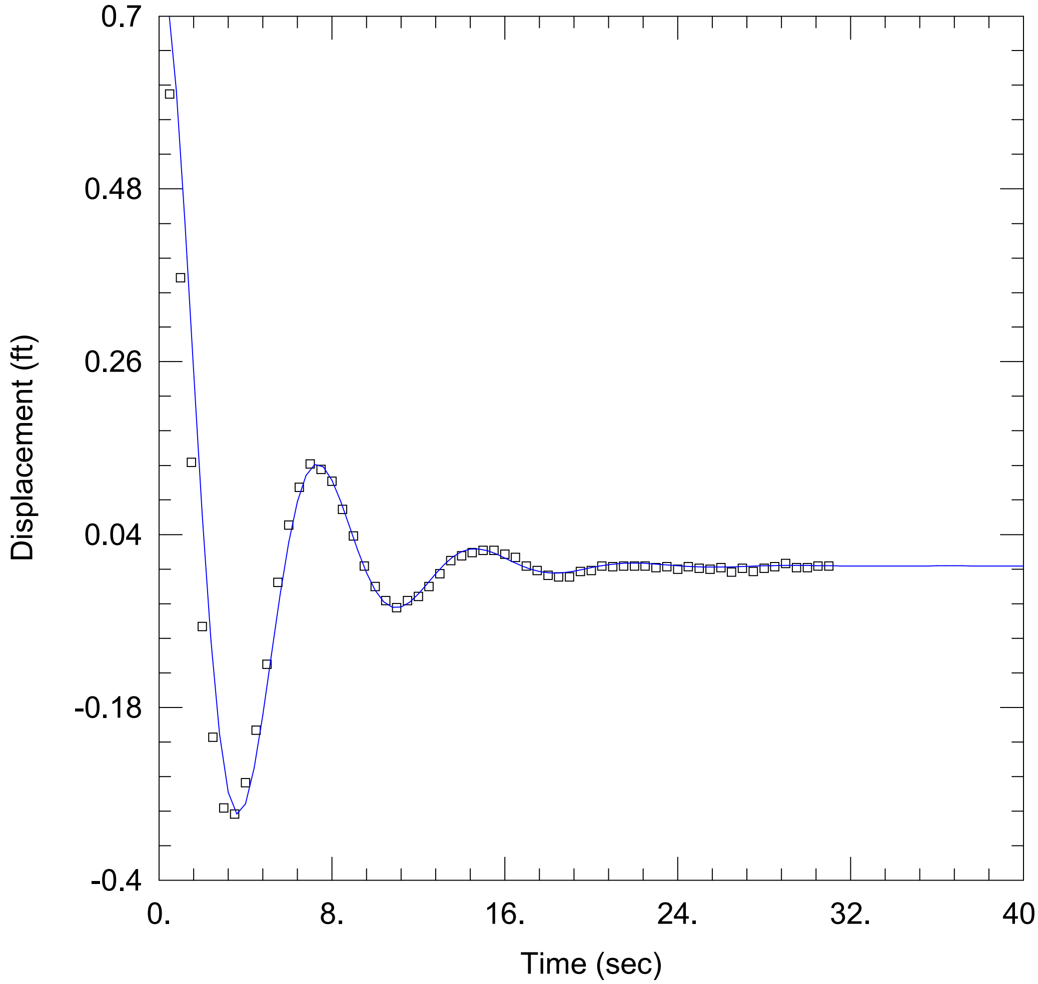
WELL DATA (MW-26I)

Initial Displacement: 0.747 ft
Total Well Penetration Depth: 47.1 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 47.1 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.0542 cm/sec
Le = 38.49 ft



WELL TEST ANALYSIS

Data Set: \...\MW-26I_R2.aqt
Date: 04/28/23
Time: 15:00:45

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-26I
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 78.1 ft
Anisotropy Ratio (Kz/Kr): 1.

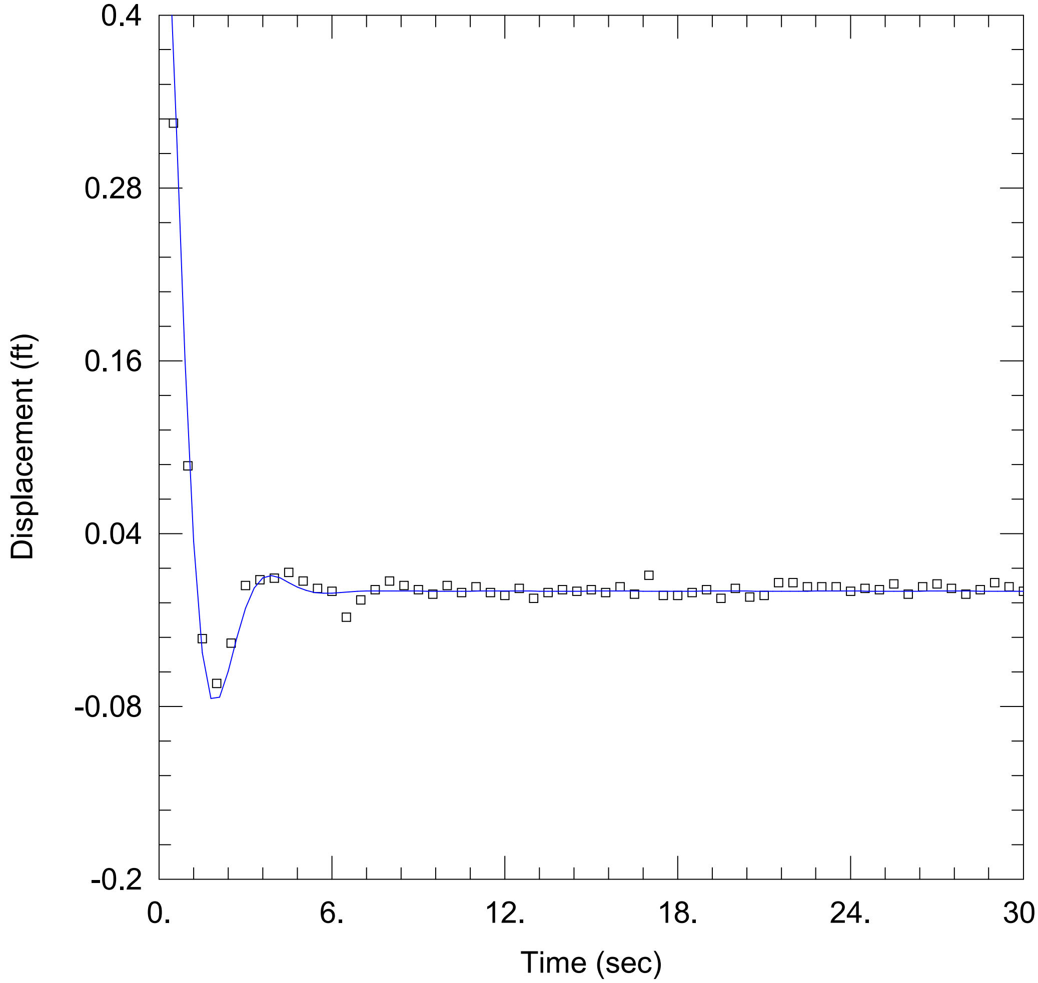
WELL DATA (MW-26I)

Initial Displacement: 0.771 ft
Static Water Column Height: 47.1 ft
Total Well Penetration Depth: 47.1 ft
Screen Length: 10. ft
Casing Radius: 0.0833 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.05347 cm/sec
Le = 40.4 ft



WELL TEST ANALYSIS

Data Set: \...\MW-26S_F1.aqt
Date: 04/28/23 Time: 15:01:09

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-26S
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 79.1 ft
Anisotropy Ratio (Kz/Kr): 1.

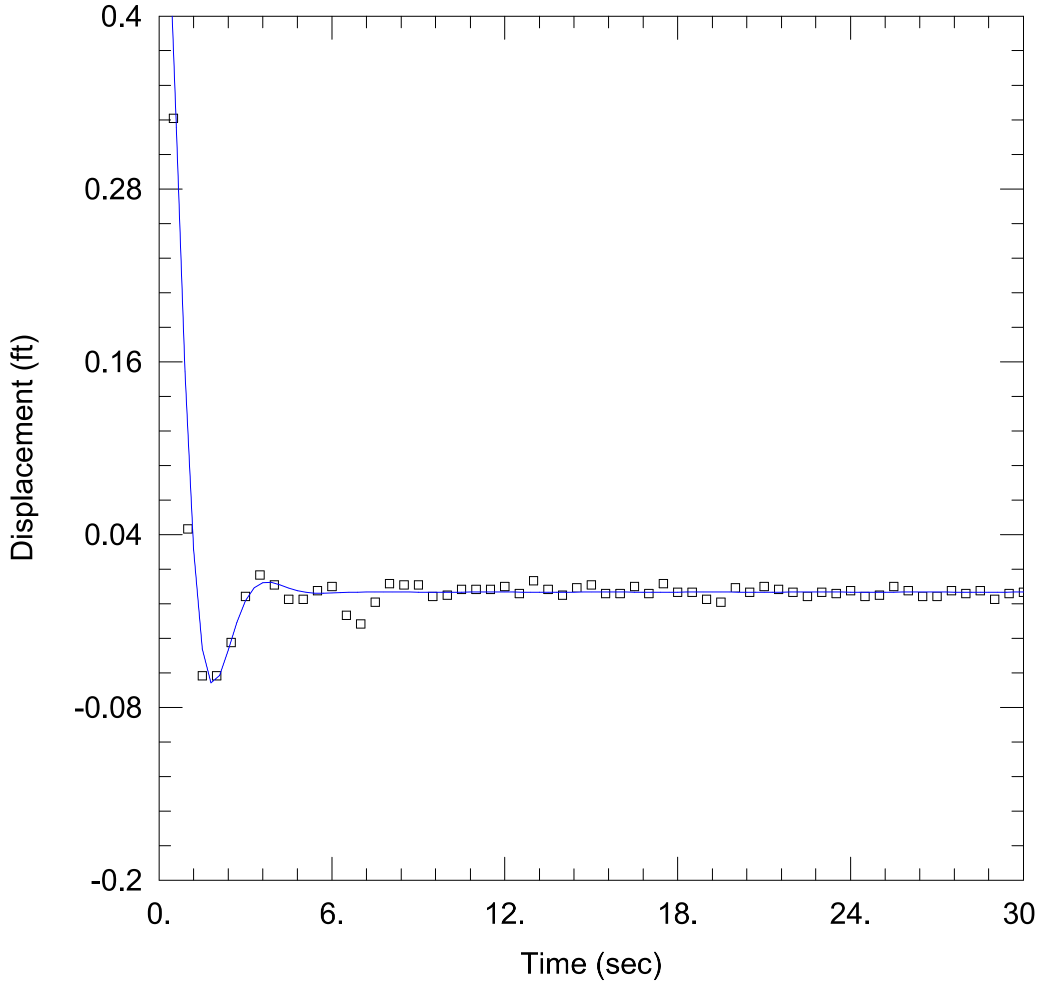
WELL DATA (MW-26S)

Initial Displacement: 0.55 ft
Total Well Penetration Depth: 18.1 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 18.1 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.04969 cm/sec
Le = 8.764 ft



WELL TEST ANALYSIS

Data Set: \...\MW-26S_F2.aqt
Date: 04/28/23 Time: 15:01:31

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-26S
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 79.1 ft
Anisotropy Ratio (Kz/Kr): 1.

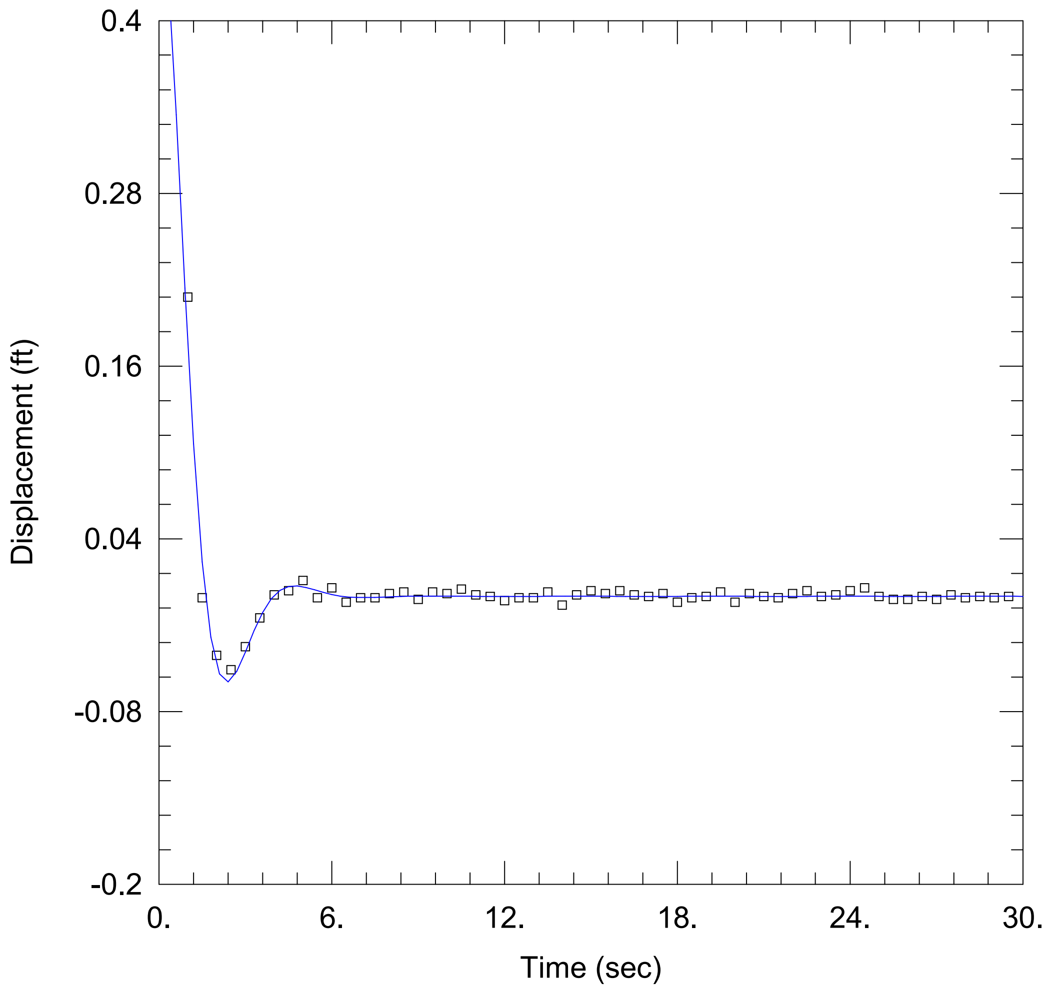
WELL DATA (MW-26S)

Initial Displacement: 0.58 ft
Total Well Penetration Depth: 18.1 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 18.1 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.049 cm/sec
Le = 7.648 ft



WELL TEST ANALYSIS

Data Set: \...\MW-26S_R1.aqt
Date: 04/28/23 Time: 15:01:44

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-26S
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 79.1 ft
Anisotropy Ratio (Kz/Kr): 1.

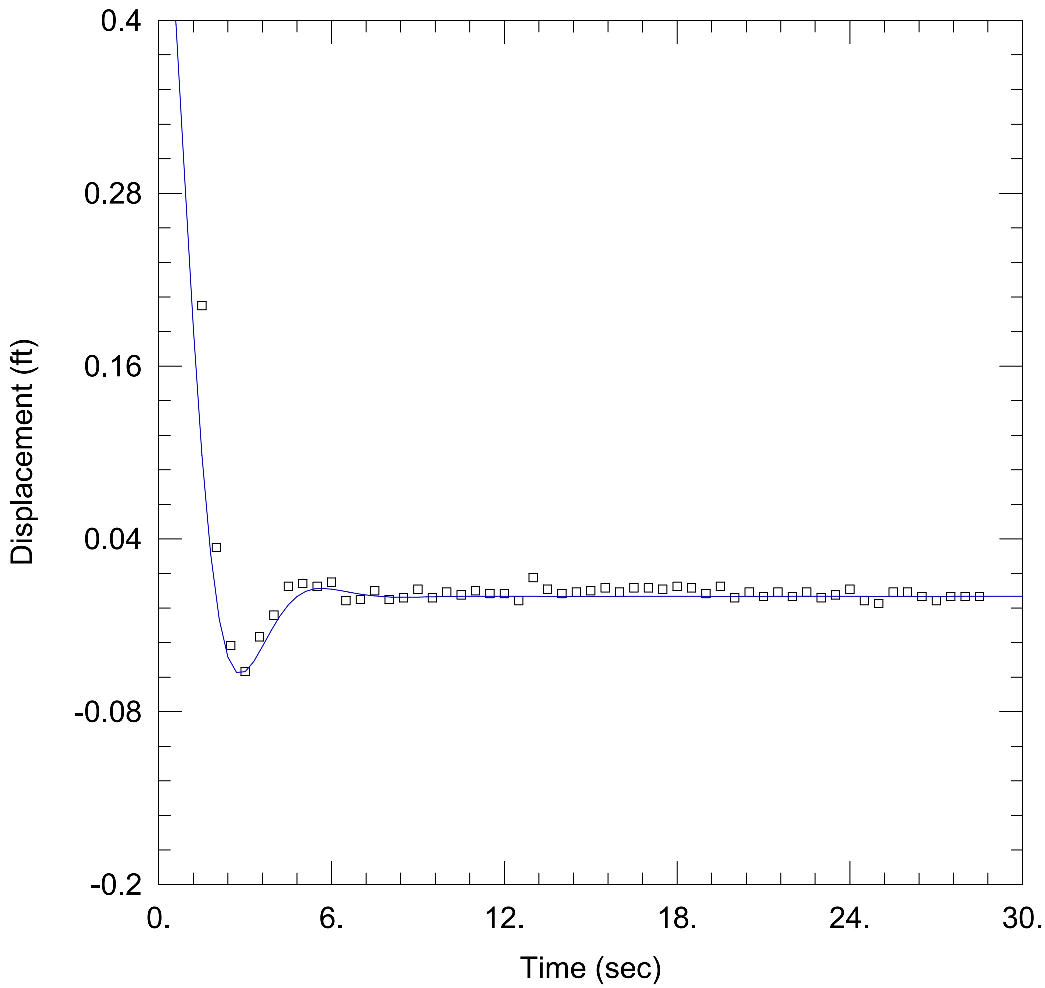
WELL DATA (MW-26S)

Initial Displacement: 0.486 ft
Total Well Penetration Depth: 18.1 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 18.1 ft
Screen Length: 10. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.03968 cm/sec
Le = 12.47 ft



WELL TEST ANALYSIS

Data Set: \...\MW-26S_R2.aqt
Date: 04/28/23 Time: 15:01:58

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES
Project: 0133274-037
Location: Eagle Valley-Martinsville, IN
Test Well: MW-26S
Test Date: 3/30/2023

AQUIFER DATA

Saturated Thickness: 79.1 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-26S)

Initial Displacement: 0.521 ft Static Water Column Height: 18.1 ft
Total Well Penetration Depth: 18.1 ft Screen Length: 10. ft
Casing Radius: 0.0833 ft Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar

K = 0.03204 cm/sec Le = 17.15 ft

APPENDIX C
Packer Test Data

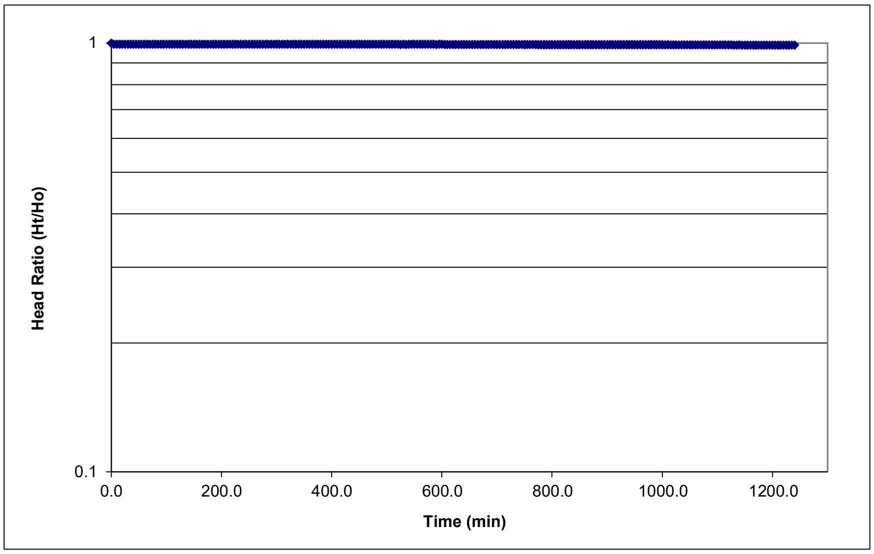
HALEY& ALDRICH

VARIABLE HEAD PERMEABILITY TEST DATA SUMMARY

Boring No. MW-3
Test No. 1

Project	AES Indiana Eagle Valley Generating Station	**File Number**	133274
Location	Martinsville, Indiana	**Field Rep.**	ATC Associates Inc.
Client	Indianapolis Power & Light Company AES Indiana	**Test Date**	2/22/2023

Boring Location:	MW-3	
Type of Installation:	Cased Borehole	
Reference Point:	Data Logger	
Reference Elevation:		
Initial Depth to Groundwater:		feet
Initial Head of Water, Ho:	54.639	feet
Type of Test	Rising Head	
Test Depth:	115-120'	
Test Zone Material:	Bedrock	
Length of Test Zone:	5.0	feet
Diameter of Test Zone:	5.3	inches
Diameter of Cased Length	5.3	inches



Plotting values used in curve match:

Y (Ht/Ho)	X (Time mins)
0.993	645
0.990	1085

Hydraulic Conductivity: **5.23E-08** **cm/s**

Equation Used:

$$K_h = \frac{d^2 ln\left[\frac{mL}{D} + \sqrt{1+\left(\frac{mL}{D}\right)^2}\right]}{8L(t_2 - t_1)} ln\frac{H_1}{H_2}$$

$$K_h = \frac{d^2 ln}{8L(t_2-t_1)} ln\frac{H_1}{H_2} \; for = \frac{mL}{D} > 4$$

$K_h = horizontal\ coefficient\ of\ permeability$
$H_1 = piezometer\ head\ at\ time\ t_1$
$H_2 = piezometer\ head\ at\ time\ t_2$
$L = length\ intake\ of\ sample$
$D = diameter\ intake\ of\ sample$
$d = diameter\ of\ standpipe$
$m = transformation\ ratio$ $\quad K_m = \sqrt{k_h k_v}; m = \sqrt{\frac{k_h}{k_v}}$

Notes:
1. Test performed using packer test section.

2. Calculation of the coefficient of permeability based on Case G as recommended in a publication by the U.S. Army Corps Waterways Experiment Station, Bulletin No. 35, "Time Lag and Soil Permeability in Groundwater Observations," Vicksburg, Mississippi, by M. Juul Hvorslev, April 1951.

Elapsed time, t (min)	Head of water at time t, Ht (feet)	Head Ratio at time t, Ht/Ho
0.0	54.639	1
5.0	54.32	0.994161679
10.0	54.32	0.994161679
15.0	54.315	0.99407017
20.0	54.314	0.994051868
25.0	54.318	0.994125075
30.0	54.308	0.993942056
35.0	54.308	0.993942056
40.0	54.305	0.99388715
45.0	54.305	0.99388715
50.0	54.303	0.993850546
55.0	54.302	0.993832244
60.0	54.301	0.993813942
65.0	54.301	0.993813942
70.0	54.294	0.993685829
75.0	54.299	0.993777339
80.0	54.299	0.993777339
85.0	54.296	0.993722433
90.0	54.293	0.993667527
95.0	54.303	0.993850546
100.0	54.285	0.993521111
105.0	54.291	0.993630923
110.0	54.295	0.993704131
115.0	54.293	0.993667527
120.0	54.29	0.993612621
125.0	54.286	0.993539413
130.0	54.292	0.993649225
135.0	54.292	0.993649225
140.0	54.288	0.993576017
145.0	54.287	0.993557715
150.0	54.29	0.993612621
155.0	54.292	0.993649225
160.0	54.288	0.993576017
165.0	54.29	0.993612621
170.0	54.284	0.993502809
175.0	54.287	0.993557715
180.0	54.287	0.993557715
185.0	54.289	0.993594319
190.0	54.284	0.993502809
195.0	54.286	0.993539413
200.0	54.287	0.993557715
205.0	54.281	0.993447904
210.0	54.287	0.993557715
215.0	54.286	0.993539413
220.0	54.286	0.993539413
225.0	54.289	0.993594319
230.0	54.283	0.993484507
235.0	54.287	0.993557715
240.0	54.29	0.993612621
245.0	54.282	0.993466205
250.0	54.286	0.993539413
255.0	54.28	0.993429602
260.0	54.279	0.9934113
265.0	54.284	0.993502809
270.0	54.282	0.993466205
275.0	54.287	0.993557715
280.0	54.284	0.993502809
285.0	54.285	0.993521111
290.0	54.285	0.993521111
295.0	54.286	0.993539413
300.0	54.28	0.993429602
305.0	54.277	0.993374696
310.0	54.281	0.993447904
315.0	54.277	0.993374696
320.0	54.284	0.993502809
325.0	54.285	0.993521111
330.0	54.28	0.993429602
335.0	54.276	0.993356394
340.0	54.273	0.993301488
345.0	54.276	0.993356394
350.0	54.28	0.993429602
355.0	54.278	0.993392998
360.0	54.281	0.993447904
365.0	54.282	0.993466205
370.0	54.281	0.993447904
375.0	54.278	0.993392998
380.0	54.273	0.993301488
385.0	54.278	0.993392998

HALEY& ALDRICH

VARIABLE HEAD PERMEABILITY TEST
DATA SUMMARY

Boring No. MW-3
Test No. 1

Project	AES Indiana Eagle Valley Generating Station	File Number	133274
Location	Martinsville, Indiana	Field Rep.	ATC Associates Inc.
Client	Indianapolis Power & Light Company AES Indiana	Test Date	2/22/2023

390.0	54.279	0.9934113
395.0	54.281	0.993447904
400.0	54.278	0.993392998
405.0	54.281	0.993447904
410.0	54.272	0.993283186
415.0	54.277	0.993374696
420.0	54.281	0.993447904
425.0	54.276	0.993356394
430.0	54.283	0.993484507
435.0	54.276	0.993356394
440.0	54.28	0.993429602
445.0	54.273	0.993301488
450.0	54.277	0.993374696
455.0	54.276	0.993356394
460.0	54.273	0.993301488
465.0	54.283	0.993484507
470.0	54.275	0.993338092
475.0	54.274	0.99331979
480.0	54.277	0.993374696
485.0	54.278	0.993392998
490.0	54.274	0.99331979
495.0	54.277	0.993374696
500.0	54.279	0.9934113
505.0	54.28	0.993429602
510.0	54.273	0.993301488
515.0	54.274	0.99331979
520.0	54.279	0.9934113
525.0	54.27	0.993246582
530.0	54.278	0.993392998
535.0	54.27	0.993246582
540.0	54.273	0.993301488
545.0	54.273	0.993301488
550.0	54.276	0.993356394
555.0	54.273	0.993301488
560.0	54.273	0.993301488
565.0	54.276	0.993356394
570.0	54.276	0.993356394
575.0	54.272	0.993283186
580.0	54.273	0.993301488
585.0	54.274	0.99331979
590.0	54.27	0.993246582
595.0	54.273	0.993301488
600.0	54.272	0.993283186
605.0	54.271	0.993264884
610.0	54.271	0.993264884
615.0	54.271	0.993264884
620.0	54.271	0.993264884
625.0	54.265	0.993155072
630.0	54.261	0.993081865
635.0	54.26	0.993063563
640.0	54.258	0.993026959
645.0	54.262	0.993100167
650.0	54.251	0.992898845
655.0	54.252	0.992917147
660.0	54.255	0.992972053
665.0	54.254	0.992953751
670.0	54.253	0.992935449
675.0	54.25	0.992880543
680.0	54.249	0.992862241
685.0	54.248	0.992843939
690.0	54.245	0.992789033
695.0	54.241	0.992715826
700.0	54.244	0.992770732
705.0	54.248	0.992843939
710.0	54.243	0.99275243
715.0	54.25	0.992880543
720.0	54.24	0.992697524
725.0	54.236	0.992624316
730.0	54.24	0.992697524
735.0	54.241	0.992715826
740.0	54.234	0.992587712
745.0	54.234	0.992587712
750.0	54.215	0.992239975
755.0	54.218	0.992294881
760.0	54.217	0.992276579
765.0	54.218	0.992294881
770.0	54.219	0.992313183
775.0	54.214	0.992221673
780.0	54.207	0.99209356
785.0	54.21	0.992148465
790.0	54.203	0.992020352
795.0	54.209	0.992130163
800.0	54.208	0.992111861
805.0	54.202	0.99200205
810.0	54.199	0.991947144
815.0	54.196	0.991892238

HALEY & ALDRICH

VARIABLE HEAD PERMEABILITY TEST DATA SUMMARY

Boring No.	MW-3	Test No.	1
Project	AES Indiana Eagle Valley Generating Station	File Number	133274
Location	Martinsville, Indiana	Field Rep.	ATC Associates Inc.
Client	Indianapolis Power & Light Company AES Indiana	Test Date	2/22/2023

820.0	54.197	0.99191054
825.0	54.196	0.991892238
830.0	54.193	0.991837332
835.0	54.197	0.99191054
840.0	54.198	0.991928842
845.0	54.196	0.991892238
850.0	54.195	0.991873936
855.0	54.201	0.991983748
860.0	54.193	0.991837332
865.0	54.185	0.991690917
870.0	54.193	0.991837332
875.0	54.185	0.991690917
880.0	54.186	0.991709219
885.0	54.187	0.991727521
890.0	54.18	0.991599407
895.0	54.18	0.991599407
900.0	54.176	0.991526199
905.0	54.18	0.991599407
910.0	54.175	0.991507897
915.0	54.179	0.991581105
920.0	54.173	0.991471293
925.0	54.178	0.991562803
930.0	54.176	0.991526199
935.0	54.172	0.991452991
940.0	54.171	0.99143469
945.0	54.175	0.991507897
950.0	54.174	0.991489595
955.0	54.17	0.991416388
960.0	54.173	0.991471293
965.0	54.165	0.991324878
970.0	54.161	0.99125167
975.0	54.169	0.991398086
980.0	54.167	0.991361482
985.0	54.166	0.99134318
990.0	54.167	0.991361482
995.0	54.166	0.99134318
1000.0	54.162	0.991269972
1005.0	54.16	0.991233368
1010.0	54.163	0.991288274
1015.0	54.159	0.991215066
1020.0	54.156	0.99116016
1025.0	54.125	0.9905928
1030.0	54.122	0.990537894
1035.0	54.124	0.990574498
1040.0	54.12	0.99050129
1045.0	54.12	0.99050129
1050.0	54.119	0.990482988
1055.0	54.117	0.990446384
1060.0	54.118	0.990464686
1065.0	54.113	0.990373177
1070.0	54.12	0.99050129
1075.0	54.111	0.990336573
1080.0	54.111	0.990336573
1085.0	54.12	0.99050129
1090.0	54.115	0.990409781
1095.0	54.117	0.990446384
1100.0	54.115	0.990409781
1105.0	54.109	0.990299969
1110.0	54.109	0.990299969
1115.0	54.109	0.990299969
1120.0	54.11	0.990318271
1125.0	54.106	0.990245063
1130.0	54.101	0.990153553
1135.0	54.104	0.990208459
1140.0	54.105	0.990226761
1145.0	54.099	0.990116949
1150.0	54.103	0.990190157
1155.0	54.103	0.990190157
1160.0	54.103	0.990190157
1165.0	54.1	0.990135251
1170.0	54.096	0.990062044
1175.0	54.1	0.990135251
1180.0	54.101	0.990153553
1185.0	54.1	0.990135251
1190.0	54.096	0.990062044
1195.0	54.096	0.990062044
1200.0	54.094	0.99002544
1205.0	54.094	0.99002544
1210.0	54.091	0.989970534
1215.0	54.088	0.989915628
1220.0	54.091	0.989970534
1225.0	54.093	0.990007138
1230.0	54.092	0.989988836
1235.0	54.09	0.989952232
1240.0	54.092	0.989988836

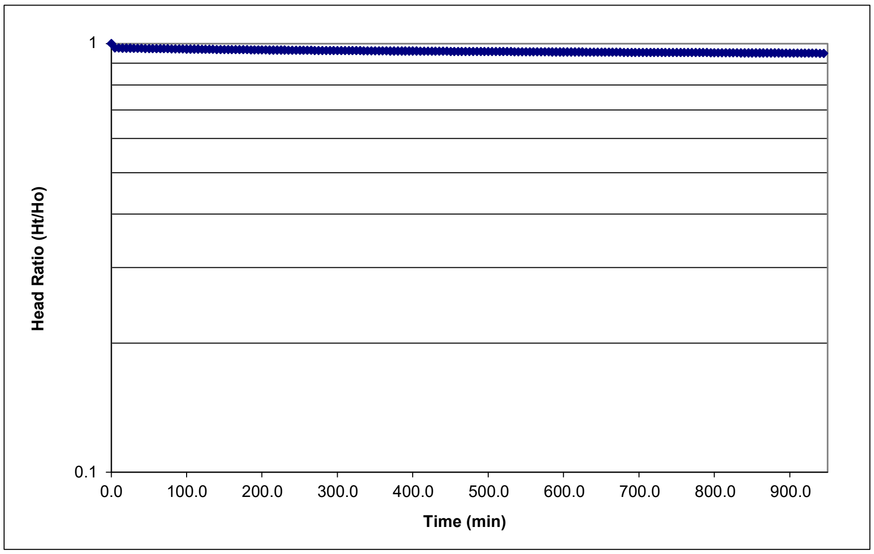
HALEY & ALDRICH

VARIABLE HEAD PERMEABILITY TEST
DATA SUMMARY

Boring No. MW-12
Test No. 1

Project	AES Indiana Eagle Valley Generating Station	**File Number**	133274
Location	Martinsville, Indiana	**Field Rep.**	ATC Associates Inc.
Client	Indianapolis Power & Light Company AES Indiana	**Test Date**	2/16/2023

Boring Location:	MW-12	
Type of Installation:	Cased Borehole	
Reference Point:	Data Logger	
Reference Elevation:		
Initial Depth to Groundwater:		feet
Initial Head of Water, Ho:	71.17	feet
Type of Test	Rising Head	
Test Depth:	105-110'	
Test Zone Material:	Bedrock	
Length of Test Zone:	5.0	feet
Diameter of Test Zone:	5.3	inches
Diameter of Cased Length	5.3	inches



Plotting values used in curve match:

Y (Ht/Ho)	X (Time mins)
0.960	415
0.950	905

Hydraulic Conductivity: **1.63E-07** **cm/s**

Equation Used:

$$K_h = \frac{d^2 \ln\left[\frac{mL}{D} + \sqrt{1+\left(\frac{mL}{D}\right)^2}\right]}{8L(t_2 - t_1)} \ln\frac{H_1}{H_2}$$

$$K_h = \frac{d^2 \ln}{8L(t_2-t_1)} \ln\frac{H_1}{H_2} \; for = \frac{mL}{D} > 4$$

$K_h = horizontal\ coefficient\ of\ permeability$
$H_1 = piezometer\ head\ at\ time\ t_1$
$H_2 = piezometer\ head\ at\ time\ t_2$
$L = length\ intake\ of\ sample$
$D = diameter\ intake\ of\ sample$
$d = diameter\ of\ standpipe$
$m = transformation\ ratio$ $\quad K_m = \sqrt{k_h k_v}; m = \sqrt{\frac{k_h}{k_v}}$

Notes:
1. Test performed using packer test section.

2. Calculation of the coefficient of permeability based on Case G as recommended in a publication by the U.S. Army Corps Waterways Experiment Station, Bulletin No. 35, "Time Lag and Soil Permeability in Groundwater Observations," Vicksburg, Mississippi, by M. Juul Hvorslev, April 1951.

Elapsed time, t (min)	Head of water at time t, Ht (feet)	Head Ratio at time t, Ht/Ho
0.0	71.17	1
5.0	69.532	0.976984685
10.0	69.505	0.976605311
15.0	69.476	0.976197836
20.0	69.447	0.975790361
25.0	69.427	0.975509344
30.0	69.4	0.97512997
35.0	69.38	0.974848953
40.0	69.351	0.974441478
45.0	69.331	0.974160461
50.0	69.312	0.973893494
55.0	69.288	0.973556274
60.0	69.263	0.973205002
65.0	69.244	0.972938036
70.0	69.219	0.972586764
75.0	69.207	0.972418154
80.0	69.189	0.972165238
85.0	69.17	0.971898272
90.0	69.146	0.971561051
95.0	69.135	0.971406491
100.0	69.108	0.971027118
105.0	69.086	0.970717999
110.0	69.073	0.970535338
115.0	69.054	0.970268372
120.0	69.033	0.969973303
125.0	69.019	0.969776591
130.0	69.005	0.969579879
135.0	68.984	0.969284811
140.0	68.968	0.969059997
145.0	68.95	0.968807082
150.0	68.938	0.968638471
155.0	68.921	0.968399607
160.0	68.909	0.968230996
165.0	68.897	0.968062386
170.0	68.881	0.967837572
175.0	68.861	0.967556555
180.0	68.843	0.967303639
185.0	68.837	0.967219334
190.0	68.825	0.967050724
195.0	68.808	0.966811859
200.0	68.797	0.966657299
205.0	68.779	0.966404384
210.0	68.766	0.966221723
215.0	68.751	0.96601096
220.0	68.737	0.965814248
225.0	68.732	0.965743993
230.0	68.714	0.965491078
235.0	68.697	0.965252213
240.0	68.688	0.965125755
245.0	68.674	0.964929043
250.0	68.669	0.964858789
255.0	68.65	0.964591822
260.0	68.642	0.964479415
265.0	68.631	0.964324856
270.0	68.625	0.964240551
275.0	68.612	0.96405789
280.0	68.599	0.963875228
285.0	68.587	0.963706618
290.0	68.572	0.963495855
295.0	68.564	0.963383448
300.0	68.547	0.963144583
305.0	68.544	0.963102431
310.0	68.526	0.962849515
315.0	68.523	0.962807363
320.0	68.511	0.962638752
325.0	68.499	0.962470142
330.0	68.488	0.962315582
335.0	68.484	0.962259379
340.0	68.47	0.962062667
345.0	68.467	0.962020514
350.0	68.45	0.96178165
355.0	68.436	0.961584937
360.0	68.427	0.96145848
365.0	68.424	0.961416327
370.0	68.414	0.961275818
375.0	68.401	0.961093157
380.0	68.39	0.960938598

HALEY & ALDRICH

VARIABLE HEAD PERMEABILITY TEST
DATA SUMMARY

Boring No. MW-12
Test No. 1

Project	AES Indiana Eagle Valley Generating Station	File Number	133274
Location	Martinsville, Indiana	Field Rep.	ATC Associates Inc.
Client	Indianapolis Power & Light Company AES Indiana	Test Date	2/16/2023

385.0	68.382	0.960826191
390.0	68.378	0.960769987
395.0	68.368	0.960629479
400.0	68.355	0.960446817
405.0	68.353	0.960418716
410.0	68.336	0.960179851
415.0	68.335	0.9601658
420.0	68.32	0.959955037
425.0	68.315	0.959884783
430.0	68.304	0.959730223
435.0	68.296	0.959617816
440.0	68.29	0.959533511
445.0	68.279	0.959378952
450.0	68.269	0.959238443
455.0	68.266	0.959196291
460.0	68.255	0.959041731
465.0	68.245	0.958901222
470.0	68.235	0.958760714
475.0	68.225	0.958620205
480.0	68.224	0.958606154
485.0	68.217	0.958507798
490.0	68.204	0.958325137
495.0	68.199	0.958254883
500.0	68.187	0.958086272
505.0	68.181	0.958001967
510.0	68.166	0.957791204
515.0	68.169	0.957833357
520.0	68.156	0.957650696
525.0	68.148	0.957538289
530.0	68.14	0.957425882
535.0	68.129	0.957271322
540.0	68.126	0.95722917
545.0	68.113	0.957046508
550.0	68.108	0.956976254
555.0	68.096	0.956807644
560.0	68.092	0.95675144
565.0	68.087	0.956681186
570.0	68.072	0.956470423
575.0	68.066	0.956386118
580.0	68.064	0.956358016
585.0	68.052	0.956189406
590.0	68.048	0.956133202
595.0	68.037	0.955978643
600.0	68.033	0.955922439
605.0	68.021	0.955753829
610.0	68.017	0.955697625
615.0	68.007	0.955557117
620.0	68	0.955458761
625.0	67.995	0.955388506
630.0	67.987	0.955276099
635.0	67.977	0.955135591
640.0	67.973	0.955079387
645.0	67.964	0.95495293
650.0	67.957	0.954854574
655.0	67.962	0.954924828
660.0	67.95	0.954756218
665.0	67.939	0.954601658
670.0	67.934	0.954531404
675.0	67.934	0.954531404
680.0	67.915	0.954264437
685.0	67.919	0.954320641
690.0	67.908	0.954166081
695.0	67.9	0.954053674
700.0	67.888	0.953885064
705.0	67.882	0.953800759
710.0	67.885	0.953842911
715.0	67.877	0.953730504
720.0	67.866	0.953575945
725.0	67.859	0.953477589
730.0	67.858	0.953463538
735.0	67.846	0.953294928
740.0	67.845	0.953280877
745.0	67.836	0.953154419
750.0	67.827	0.953027961
755.0	67.821	0.952943656
760.0	67.818	0.952901503
765.0	67.809	0.952775046
770.0	67.804	0.952704791
775.0	67.794	0.952564283
780.0	67.788	0.952479978
785.0	67.787	0.952465927
790.0	67.782	0.952395672
795.0	67.772	0.952255164
800.0	67.766	0.952170859
805.0	67.761	0.952100604

HALEY& ALDRICH

VARIABLE HEAD PERMEABILITY TEST DATA SUMMARY

Boring No.	MW-12	**Test No.**	1
Project	AES Indiana Eagle Valley Generating Station	**File Number**	133274
Location	Martinsville, Indiana	**Field Rep.**	ATC Associates Inc.
Client	Indianapolis Power & Light Company AES Indiana	**Test Date**	2/16/2023

810.0	67.753	0.951988197
815.0	67.743	0.951847689
820.0	67.736	0.951749333
825.0	67.734	0.951721231
830.0	67.725	0.951594773
835.0	67.709	0.951369959
840.0	67.701	0.951257552
845.0	67.693	0.951145145
850.0	67.681	0.950976535
855.0	67.678	0.950934382
860.0	67.672	0.950850077
865.0	67.669	0.950807925
870.0	67.661	0.950695518
875.0	67.654	0.950597162
880.0	67.649	0.950526907
885.0	67.649	0.950526907
890.0	67.637	0.950358297
895.0	67.633	0.950302094
900.0	67.616	0.950063229
905.0	67.617	0.95007728
910.0	67.61	0.949978924
915.0	67.6	0.949838415
920.0	67.597	0.949796262
925.0	67.588	0.949669805
930.0	67.581	0.949571449
935.0	67.578	0.949529296
940.0	67.571	0.94943094
945.0	67.569	0.949402838

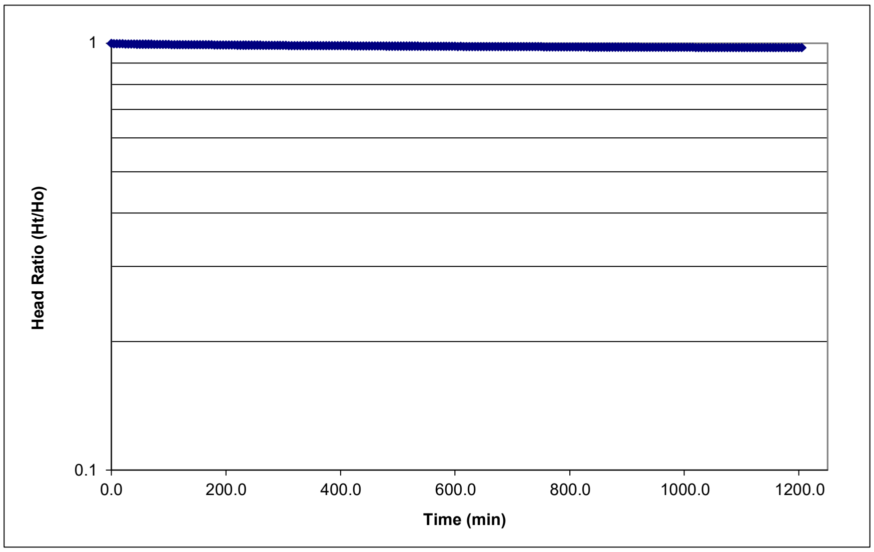
HALEY& ALDRICH

VARIABLE HEAD PERMEABILITY TEST DATA SUMMARY

Boring No. MW-26
Test No. 1

Project	AES Indiana Eagle Valley Generating Station	**File Number**	133274
Location	Martinsville, Indiana	**Field Rep.**	ATC Associates Inc.
Client	Indianapolis Power & Light Company AES Indiana	**Test Date**	2/3/2023

Boring Location:	MW-28 (MW-26)	
Type of Installation:	Cased Borehole	
Reference Point:	Data Logger	
Reference Elevation:		
Initial Depth to Groundwater:		feet
Initial Head of Water, Ho:	78.759	feet
Type of Test	Rising Head	
Test Depth:	112-117	
Test Zone Material:	Bedrock	
Length of Test Zone:	5.0	feet
Diameter of Test Zone:	5.3	inches
Diameter of Cased Length	5.3	inches



Plotting values used in curve match:

Y (Ht/Ho)	X (Time mins)
0.987	410
0.977	1180

Hydraulic Conductivity: **1.01E-07** **cm/s**

Equation Used:

$$K_h = \frac{d^2 ln\left[\frac{mL}{D} + \sqrt{1 + \left(\frac{mL}{D}\right)^2}\right]}{8L(t_2 - t_1)} ln\frac{H_1}{H_2}$$

$$K_h = \frac{d^2 ln}{8L(t_2 - t_1)} ln\frac{H_1}{H_2}\ for = \frac{mL}{D} > 4$$

$K_h = horizontal\ coefficient\ of\ permeability$
$H_1 = piezometer\ head\ at\ time\ t_1$
$H_2 = piezometer\ head\ at\ time\ t_2$
$L = length\ intake\ of\ sample$
$D = diameter\ intake\ of\ sample$
$d = diameter\ of\ standpipe$
$m = transformation\ ratio$ $K_m = \sqrt{k_h k_v};\ m = \sqrt{\frac{k_h}{k_v}}$

Notes:
1. Test performed using packer test section.

2. Calculation of the coefficient of permeability based on Case G as recommended in a publication by the U.S. Army Corps Waterways Experiment Station, Bulletin No. 35, "Time Lag and Soil Permeability in Groundwater Observations," Vicksburg, Mississippi, by M. Juul Hvorslev, April 1951.

Elapsed time, t (min)	Head of water at time t, Ht (feet)	Head Ratio at time t, Ht/Ho
0.0	78.759	1
5.0	78.602	0.998006577
10.0	78.614	0.998158941
15.0	78.565	0.997536789
20.0	78.563	0.997511396
25.0	78.517	0.996927335
30.0	78.495	0.996648002
35.0	78.508	0.996813063
40.0	78.489	0.99657182
45.0	78.446	0.996025851
50.0	78.441	0.995962366
55.0	78.438	0.995924275
60.0	78.409	0.995556063
65.0	78.376	0.995137064
70.0	78.388	0.995289427
75.0	78.372	0.995086276
80.0	78.34	0.994679973
85.0	78.33	0.994553003
90.0	78.34	0.994679973
95.0	78.329	0.994540307
100.0	78.295	0.99410861
105.0	78.275	0.993854671
110.0	78.256	0.993613428
115.0	78.263	0.993702307
120.0	78.264	0.993715004
125.0	78.218	0.993130944
130.0	78.244	0.993461065
135.0	78.203	0.992940489
140.0	78.193	0.99281352
145.0	78.198	0.992877005
150.0	78.199	0.992889701
155.0	78.184	0.992699247
160.0	78.17	0.99252149
165.0	78.161	0.992407217
170.0	78.149	0.992254853
175.0	78.134	0.992064399
180.0	78.121	0.991899338
185.0	78.115	0.991823157
190.0	78.099	0.991620005
195.0	78.093	0.991543824
200.0	78.082	0.991404157
205.0	78.074	0.991302581
210.0	78.068	0.9912264
215.0	78.053	0.991035945
220.0	78.041	0.990883582
225.0	78.028	0.990718521
230.0	78.022	0.990642339
235.0	78.012	0.99051537
240.0	78.01	0.990489976
245.0	78.004	0.990413794
250.0	77.99	0.990236037
255.0	77.977	0.990070976
260.0	77.973	0.990020188
265.0	77.961	0.989867825
270.0	77.96	0.989855128
275.0	77.944	0.989651976
280.0	77.935	0.989537704
285.0	77.927	0.989436128
290.0	77.924	0.989398037
295.0	77.91	0.98922028
300.0	77.908	0.989194886
305.0	77.893	0.989004431
310.0	77.883	0.988877462
315.0	77.88	0.988839371
320.0	77.87	0.988712401
325.0	77.863	0.988623522
330.0	77.854	0.98850925
335.0	77.846	0.988407674
340.0	77.838	0.988306098
345.0	77.831	0.98821722
350.0	77.821	0.98809025
355.0	77.814	0.988001371
360.0	77.81	0.987950583
365.0	77.802	0.987849008
370.0	77.798	0.98779822
375.0	77.787	0.987658553
380.0	77.778	0.987544281

HALEY& ALDRICH

VARIABLE HEAD PERMEABILITY TEST DATA SUMMARY

Boring No. MW-26
Test No. 1

Project	AES Indiana Eagle Valley Generating Station	File Number	133274
Location	Martinsville, Indiana	Field Rep.	ATC Associates Inc.
Client	Indianapolis Power & Light Company AES Indiana	Test Date	2/3/2023

385.0	77.776	0.987518887
390.0	77.762	0.987341129
395.0	77.764	0.987366523
400.0	77.747	0.987150675
405.0	77.744	0.987112584
410.0	77.739	0.987049099
415.0	77.729	0.98692213
420.0	77.725	0.986871342
425.0	77.717	0.986769766
430.0	77.711	0.986693584
435.0	77.699	0.986541221
440.0	77.697	0.986515827
445.0	77.688	0.986401554
450.0	77.683	0.986338069
455.0	77.674	0.986223797
460.0	77.671	0.986185706
465.0	77.662	0.986071433
470.0	77.655	0.985982554
475.0	77.648	0.985893676
480.0	77.639	0.985779403
485.0	77.642	0.985817494
490.0	77.63	0.98566513
495.0	77.627	0.985627039
500.0	77.617	0.98550007
505.0	77.611	0.985423888
510.0	77.599	0.985271525
515.0	77.593	0.985195343
520.0	77.599	0.985271525
525.0	77.582	0.985055676
530.0	77.58	0.985030282
535.0	77.569	0.984890616
540.0	77.565	0.984839828
545.0	77.559	0.984763646
550.0	77.555	0.984712858
555.0	77.543	0.984560495
560.0	77.539	0.984509707
565.0	77.534	0.984446222
570.0	77.527	0.984357343
575.0	77.524	0.984319252
580.0	77.52	0.984268465
585.0	77.51	0.984141495
590.0	77.503	0.984052616
595.0	77.498	0.983989131
600.0	77.489	0.983874859
605.0	77.479	0.983747889
610.0	77.486	0.983836768
615.0	77.477	0.983722495
620.0	77.474	0.983684404
625.0	77.462	0.983532041
630.0	77.466	0.983582829
635.0	77.458	0.983481253
640.0	77.453	0.983417768
645.0	77.446	0.983328889
650.0	77.435	0.983189223
655.0	77.431	0.983138435
660.0	77.423	0.983036859
665.0	77.422	0.983024162
670.0	77.416	0.982947981
675.0	77.415	0.982935284
680.0	77.407	0.982833708
685.0	77.396	0.982694041
690.0	77.398	0.982719435
695.0	77.389	0.982605163
700.0	77.387	0.982579769
705.0	77.372	0.982389314
710.0	77.374	0.982414708
715.0	77.365	0.982300436
720.0	77.366	0.982313132
725.0	77.351	0.982122678
730.0	77.357	0.98219886
735.0	77.348	0.982084587
740.0	77.347	0.98207189
745.0	77.338	0.981957618
750.0	77.33	0.981856042
755.0	77.323	0.981767163
760.0	77.323	0.981767163
765.0	77.319	0.981716375
770.0	77.318	0.981703678
775.0	77.306	0.981551315
780.0	77.3	0.981475133
785.0	77.3	0.981475133
790.0	77.294	0.981398951
795.0	77.29	0.981348163
800.0	77.282	0.981246588
805.0	77.283	0.981259285

HALEY & ALDRICH

VARIABLE HEAD PERMEABILITY TEST DATA SUMMARY

Boring No. MW-26
Test No. 1

Project	AES Indiana Eagle Valley Generating Station	**File Number**	133274
Location	Martinsville, Indiana	**Field Rep.**	ATC Associates Inc.
Client	Indianapolis Power & Light Company AES Indiana	**Test Date**	2/3/2023

810.0	77.272	0.981119618
815.0	77.269	0.981081527
820.0	77.264	0.981018042
825.0	77.261	0.980979951
830.0	77.249	0.980827588
835.0	77.245	0.9807768
840.0	77.24	0.980713315
845.0	77.239	0.980700618
850.0	77.231	0.980599043
855.0	77.228	0.980560952
860.0	77.23	0.980586346
865.0	77.218	0.980433982
870.0	77.218	0.980433982
875.0	77.209	0.980319709
880.0	77.205	0.980268922
885.0	77.201	0.980218134
890.0	77.194	0.980129255
895.0	77.193	0.980116558
900.0	77.185	0.980014982
905.0	77.178	0.979926104
910.0	77.178	0.979926104
915.0	77.173	0.979862619
920.0	77.167	0.979786437
925.0	77.161	0.979710255
930.0	77.163	0.979735649
935.0	77.157	0.979659467
940.0	77.156	0.979646771
945.0	77.147	0.979532498
950.0	77.14	0.979443619
955.0	77.14	0.979443619
960.0	77.132	0.979342043
965.0	77.128	0.979291256
970.0	77.122	0.979215074
975.0	77.117	0.979151589
980.0	77.117	0.979151589
985.0	77.111	0.979075407
990.0	77.103	0.978973832
995.0	77.101	0.978948438
1000.0	77.099	0.978923044
1005.0	77.096	0.978884953
1010.0	77.089	0.978796074
1015.0	77.087	0.97877068
1020.0	77.082	0.978707195
1025.0	77.072	0.978580226
1030.0	77.077	0.978643711
1035.0	77.071	0.978567529
1040.0	77.064	0.97847865
1045.0	77.064	0.97847865
1050.0	77.06	0.978427862
1055.0	77.052	0.978326287
1060.0	77.052	0.978326287
1065.0	77.042	0.978199317
1070.0	77.042	0.978199317
1075.0	77.04	0.978173923
1080.0	77.032	0.978072347
1085.0	77.028	0.978021559
1090.0	77.024	0.977970772
1095.0	77.02	0.977919984
1100.0	77.017	0.977881893
1105.0	77.012	0.977818408
1110.0	77.01	0.977793014
1115.0	77.001	0.977678741
1120.0	76.999	0.977653348
1125.0	77.002	0.977691438
1130.0	76.996	0.977615257
1135.0	76.984	0.977462893
1140.0	76.99	0.977539075
1145.0	76.983	0.977450196
1150.0	76.977	0.977374014
1155.0	76.975	0.97734862
1160.0	76.962	0.97718356
1165.0	76.969	0.977272439
1170.0	76.965	0.977221651
1175.0	76.959	0.977145469
1180.0	76.954	0.977081984
1185.0	76.958	0.977132772
1190.0	76.943	0.976942318
1195.0	76.949	0.977018499
1200.0	76.941	0.976916924
1205.0	76.937	0.976866136

APPENDIX D
Vertical Hydraulic Conductivity Laboratory Reports

BENCHMARK GEOTECHNICAL LABS

Hydraulic Conductivity
ASTM D 5084
Method C: Falling Head Rising Tailwater

BGL Job No:	063-012	**Boring:**	MW-3D	**Date:**	05/11/23
Client:	Haley & Aldrich	**Sample:**	MW-3D	**By:**	PJ
Proj. Name:	AESI Eagle Valley Generating Station	**Depth, ft.:**	116.5-117.2		
Proj. No.:	0133274-037	**Remolding Data:**	Undisturbed		

Visual Classification: Dark Gray Rock (desiccated)

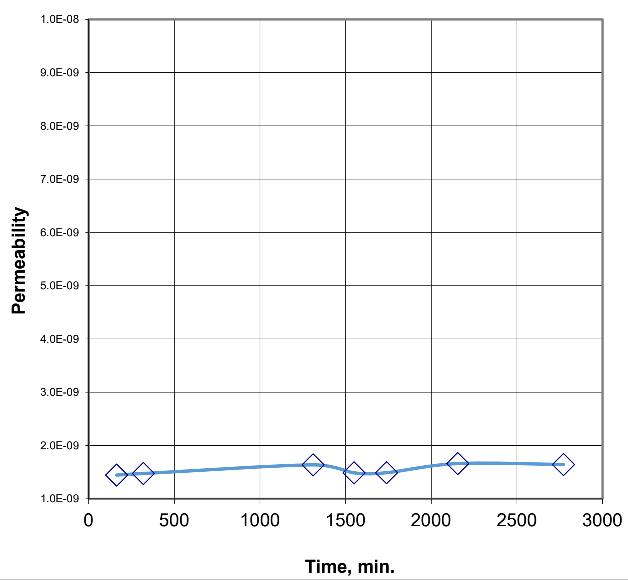
Max Sample Pressures, psi:

Cell:	Bottom	Top	Avg. Sigma3
25	21	19	5

B: = >0.95 ("B" is an indication of saturation)

Max Hydraulic Gradient: = 36

Date	Minutes	Head, (cm)	K,cm/sec
5/4/2023	0.00	167.84	Start of Test
5/4/2023	163.00	167.79	1.4E-09
5/4/2023	319.00	167.73	1.5E-09
5/5/2023	1310.00	167.33	1.6E-09
5/5/2023	1549.00	167.29	1.5E-09
5/5/2023	1739.00	167.22	1.5E-09
5/5/2023	2154.00	166.99	1.7E-09
5/6/2023	2772.00	166.76	1.6E-09



Approximate Hydraulic Conductivity: 2.E-09 cm/sec

Sample Data:	Initial (As-Received)		Final (At-Test)
Height, in	1.75		1.84
Diameter, in	3.09		3.11
Area, in2	7.52		7.61
Volume in3	13.12		13.96
Total Volume, cc	215.0		228.7
Volume Solids, cc	183.0		183.0
Volume Voids, cc	32.0		45.7
Void Ratio	0.2		0.2
Total Porosity, %	14.9		20.0
Air-Filled Porosity (θa),%	2.1		0.4
Water-Filled Porosity (θw),%	12.8		19.6
Saturation, %	86.1		98.1
Specific Gravity	2.75	Assumed	2.75
Wet Weight, gm	530.8		548.1
Dry Weight, gm	503.2		503.2
Tare, gm	0.00		0.00
Moisture, %	5.5		8.9
Wet Bulk Density, pcf	154.1		149.5
Dry Bulk Density, pcf	146.1		137.3
Wet Bulk Dens.ρb, (g/cm^3)	2.47		2.40
Dry Bulk Dens.ρb, (g/cm^3)	2.34		2.20

Remarks: Sample tested with 5 psi confining pressure. Ends of specimen flaking during trimming. Planar ends could not be achieved during trimming. Specimen height and associated values are close but approximate. Permeabilities in the range of 10^{-9} cm/sec are difficult to measure accurately. The reported value should be considered to be approximate.

BENCHMARK GEOTECHNICAL LABS

Hydraulic Conductivity
ASTM D 5084
Method C: Falling Head Rising Tailwater

BGL Job No:	063-012	**Boring:**	MW-12D	**Date:**	05/11/23
Client:	Haley & Aldrich	**Sample:**	MW-12D	**By:**	PJ
Proj. Name:	AESI Eagle Valley Generating Station	**Depth, ft.:**	109.2-109.8		
Proj. No.:	0133274-037	**Remolding Data:**	Undisturbed		
Visual Classification:	Dark Gray Rock				

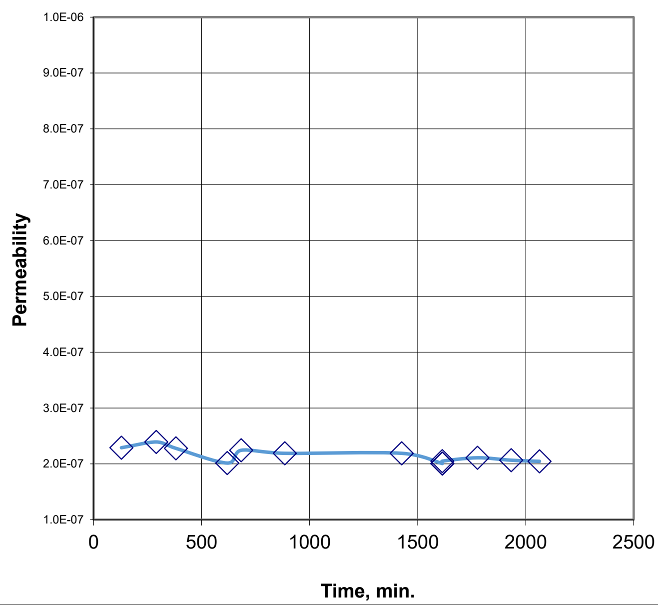
Max Sample Pressures, psi:

Cell:	Bottom	Top	Avg. Sigma3
25	20	20	5

B: = >0.95 ("B" is an indication of saturation)

Max Hydraulic Gradient: = 6

Date	Minutes	Head, (cm)	K,cm/sec
5/3/2023	0.00	27.34	Start of Test
5/3/2023	129.00	26.21	2.3E-07
5/3/2023	290.00	24.72	2.4E-07
5/3/2023	381.00	24.10	2.3E-07
5/3/2023	619.00	22.79	2.0E-07
5/3/2023	683.00	21.88	2.2E-07
5/3/2023	885.00	20.62	2.2E-07
5/4/2023	1426.00	17.55	2.2E-07
5/4/2023	1614.00	16.98	2.0E-07
5/4/2023	1777.00	15.95	2.1E-07
5/4/2023	1933.00	15.38	2.1E-07
5/4/2023	2064.00	14.81	2.0E-07



Approximate Hydraulic Conductivity: 2.E-07 cm/sec

Sample Data:	Initial (As-Received)		Final (At-Test)
Height, in	1.78		1.81
Diameter, in	3.10		3.09
Area, in2	7.54		7.49
Volume in3	13.46		13.56
Total Volume, cc	220.6		222.3
Volume Solids, cc	166.3		166.3
Volume Voids, cc	54.3		56.0
Void Ratio	0.3		0.3
Total Porosity, %	24.6		25.2
Air-Filled Porosity (θa),%	3.0		0.1
Water-Filled Porosity (θw),%	21.6		25.1
Saturation, %	87.7		99.6
Specific Gravity	2.75	Assumed	2.75
Wet Weight, gm	504.9		513.0
Dry Weight, gm	457.3		457.3
Tare, gm	0.00		0.00
Moisture, %	10.4		12.2
Wet Bulk Density, pcf	142.8		144.0
Dry Bulk Density, pcf	129.4		128.4
Wet Bulk Dens.pb, (g/cm^3)	2.29		2.31
Dry Bulk Dens.pb, (g/cm^3)	2.07		2.06

Remarks: Sample tested with 5 psi confining pressure. Ends of specimen flaking during trimming. Planar ends could not be achieved during trimming. Specimen height and associated values are close but approximate.

BENCHMARK GEOTECHNICAL LABS

Hydraulic Conductivity
ASTM D 5084
Method C: Falling Head Rising Tailwater

BGL Job No:	063-012	**Boring:**	MW-26D	**Date:**	05/11/23
Client:	Haley & Aldrich	**Sample:**		**By:**	PJ
Proj. Name:	AESI Eagle Valley Generating Station	**Depth, ft.:**	113-113.8		
Proj. No.:	0133274-037	**Remolding Data:**	Undisturbed		

Visual Classification: Dark Gray Rock (desiccated)

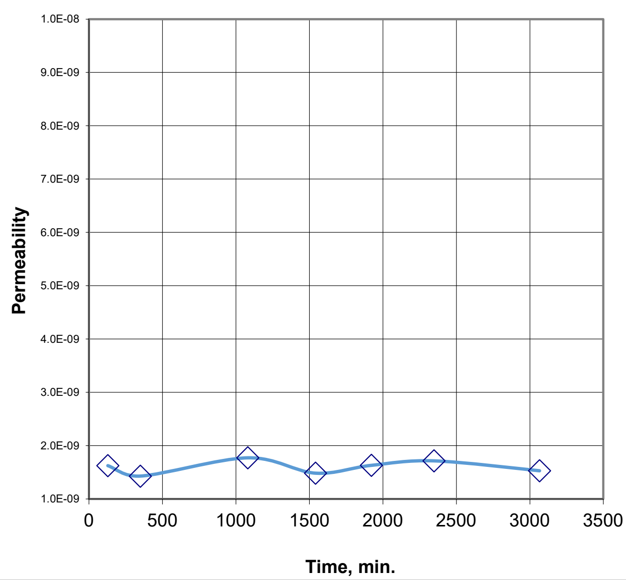
Max Sample Pressures, psi:

Cell:	Bottom	Top	Avg. Sigma3
25	21	19	5

B: = >0.95 ("B" is an indication of saturation)

Max Hydraulic Gradient: = 40

Date	Minutes	Head, (cm)	K,cm/sec
5/8/2023	0.00	167.96	Start of Test
5/8/2023	128.00	167.90	1.6E-09
5/8/2023	349.00	167.82	1.4E-09
5/9/2023	1080.00	167.43	1.8E-09
5/9/2023	1541.00	167.33	1.5E-09
5/9/2023	1922.00	167.10	1.6E-09
5/10/2023	2348.00	166.88	1.7E-09
5/10/2023	3066.00	166.68	1.5E-09

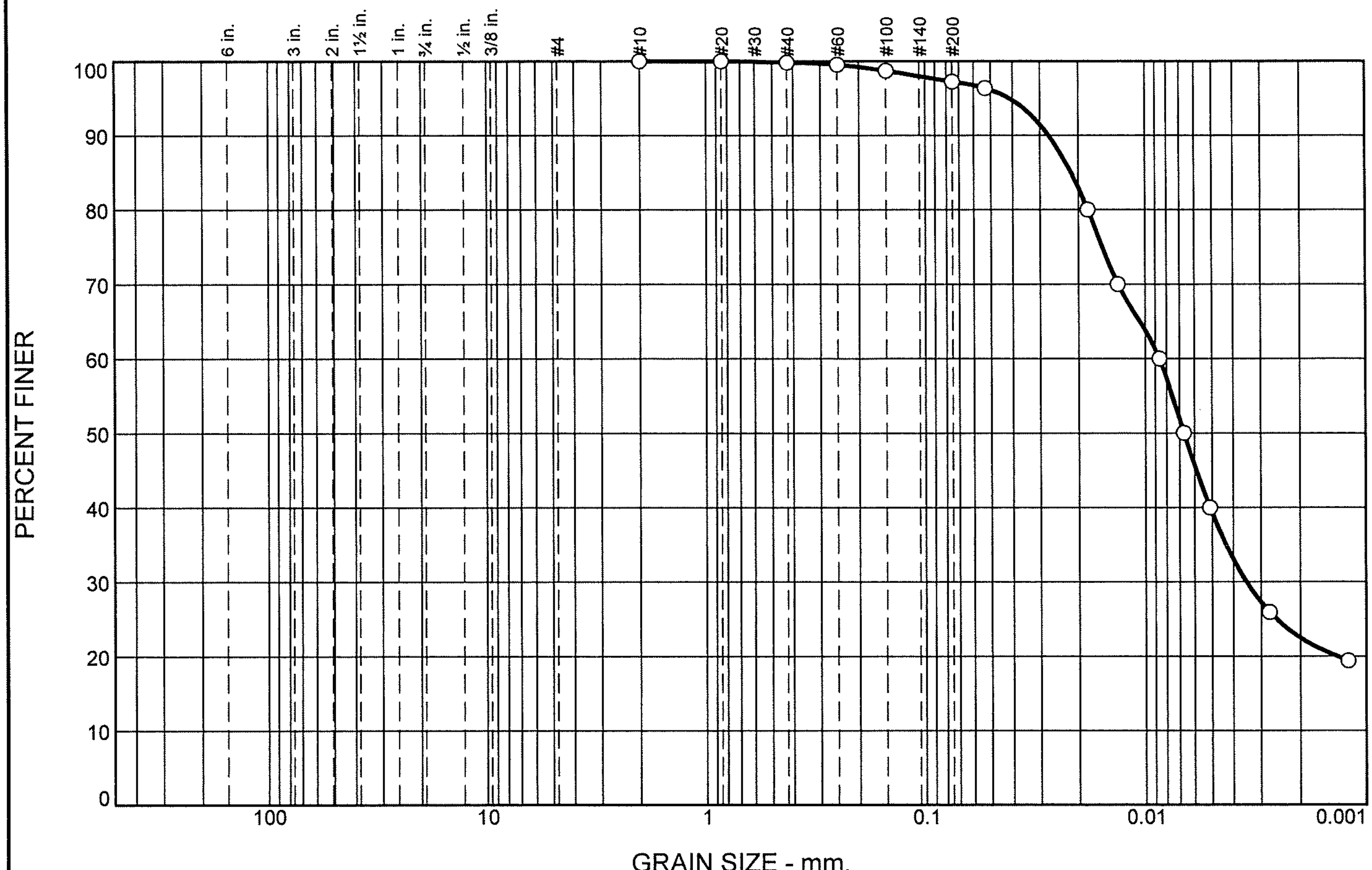


Aproximate Hydraulic Conductivity: 2.E-09 cm/sec

Sample Data:	Initial (As-Received)		Final (At-Test)
Height, in	1.53		1.64
Diameter, in	3.08		3.12
Area, in2	7.47		7.65
Volume in3	11.41		12.55
Total Volume, cc	187.0		205.7
Volume Solids, cc	159.4		159.4
Volume Voids, cc	27.6		46.3
Void Ratio	0.2		0.3
Total Porosity, %	14.7		22.5
Air-Filled Porosity (θa),%	2.0		0.2
Water-Filled Porosity (θw),%	12.8		22.3
Saturation, %	86.5		99.1
Specific Gravity	2.75	Assumed	2.75
Wet Weight, gm	462.3		484.3
Dry Weight, gm	438.4		438.4
Tare, gm	0.00		0.00
Moisture, %	5.4		10.5
Wet Bulk Density, pcf	154.3		146.9
Dry Bulk Density, pcf	146.3		133.0
Wet Bulk Dens.ρb, (g/cm^3)	2.47		2.35
Dry Bulk Dens.ρb, (g/cm^3)	2.34		2.13

Remarks: Sample tested with 5 psi confining pressure. Ends of specimen flaking during trimming. Planar ends could not be achieved during trimming. Specimen height and associated values are close but approximate. Permeabilities in the range of 10^{-9} cm/sec are difficult to measure accurately. The reported value should be considered to be approximate.

Particle Size Distribution Report



% Stones	% +3"	% Gravel			% Sand					% Silt		% Clay
		Coarse	Medium	Fine	V. Crs.	Crs.	Med.	Fine	V. Fine	Crs.	Fine	
0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	1.7	1.5	13.4	60.4	22.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	99.8		
#60	99.5		
#100	98.7		
#200	97.2		
#270	96.3		

* (no specification provided)

Material Description

MW-26I

Atterberg Limits

PL= 21 LL= 45 PI= 24

Coefficients

D_{90}= 0.0274 D_{85}= 0.0216 D_{60}= 0.0086
D_{50}= 0.0067 D_{30}= 0.0035 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-7-6(25)

Remarks

Finer than 0.062mm = 96.8%

Source of Sample: 15080 **Depth:** 18.0'-20.0'
Sample Number: 15080-1 **Date:**

Atlas

Indianapolis, Indiana

Client: AES Indiana
Project: Eagle Valley MWI On-Site
Project No: 170LF01388 **Figure**

SB4I

ATC
ENVIRONMENTAL • GEOTECHNICAL
BUILDING SCIENCES • MATERIALS TESTING

Particle Size Analysis
(ASTM D-422/AASHTO T-88)

7988 Centerpoint Road
Indianapolis, Indiana 46256

Date: ______ **Work Order:** 15080 **Computer File No.:** ______

Proj. No.: 170LF01388 **Project Name:** AES Eagle Valley N+E 2022

Client: AES **Boring:** MW-26I **Sample:** 15080-1 **Depth, ft.:** 18-20'

Required Classification: USCS ___ AASHTO ___ USDA ___ IDEM ___ **Balance No. used:** ______

LL	PL	PI

Total wt.of air dry soil & tare, g:	337.47
Wt.of + #10 & tare, g:	
Wt. of air dry - #10 w/o tare, g:	
Wt. of tare for sieve of + #10, g:	105.18 > Tare No. 9712
Corrected Weight of - #10, g:	
Composite Correction @ 68F(20C)	
Hygro. MC wet wt. & tare, g	34.71
Hygro. MC dry wt. & tare, g	34.38
Hygroscopic MC tare wt., g	11.34 > Tare No. 305
Hygroscopic MC,%:	1.4
Wt. - #10 used in hydrometer, g:	50.00
Wt. of tare for sieve of - #10, g:	68.24 > Tare No. 1628
Oven dry wt. - #10 in hydro., g:	49.29
Hydrometer Type:	152H

DESCRIPTION + #10:

Rounded ____
Angular ____
Hard ____ Soft ____
Weathered ____

Corr. Total Sample Wt.: (AASHTO) ____

Calc.+ #10 ____

For INDOT samples
Decant over #270

SIEVE; COARSE (+ #10)

Sieve Size	Cummul. Wt. Retained	Cummul. % Retained	% Finer of Total Sample
1 1/2" (37.5)			
1" (25.0)			
3/4" (19.0)			
1/2" (12.5)			
3/8" (9.5)			
#4 (4.75)			
#8 (2.36)			
#10 (2.00)	105.18		

SIEVE; (- #10)

Sieve Size	Cummul. Wt. Retained	Cummul. % Retained	% Finer of Total Sample
#20 (0.850)	68.24		
#40 (0.425)	68.33		
#60 (0.250)	68.48		
#100 (0.150)	68.84		
#200 (0.075)	69.60		
#270 (0.053)	70.04		

Hydrometer No.: **HYDROMETER - #10** Graduate No.:

Reading Time (11:03)	Elapse Time	Hydro. Reading	Temp., F Suspension	Composite Correction	Corr. Hydr. Reading	L, mm	K	Diam. Soil Part., mm	% Finer of Total Sample
11:03	0								
11:05	2	47	21.8						
11:08	5	42	21.7						
11:18	15	37	21.7						
11:33	30	32	21.7						
12:03	60	27	21.6						
3:13	250	20	21.5						
	480								
11:03	1440	17	20.3						

Specific Gravity of Solids: ______ (use 2.70 if not determined) Sp. Gravity Correction Factor (a): ______

Sample Condition (organic, contaminated, other unusual observation): ______

Technician: ______

Rev. 09/18 ParticleSize.XLS (blank form)

SB4I

ATC

Atterberg Limits

7988 Centerpoint Road
Indianapolis, Indiana 46256

Date:

Project: AES Eagle Valley N&E 2022

Proj. No.: 170LF01388

Client: AES

WO No.: 15080

Boring No.: MW-26I Sample No.: 15080-1

Balance No.:

Sample Depth: 18-20'

Technician.:

	Date	Initials
In Gint?		

PLASTIC LIMIT

Ranges	25-35	20-30	15-25	
Tare No.	183A	229		
Wet Soil + Tare	18.92	18.72		
Dry Soil + Tare	17.65	17.45		
Weight / Water				
Tare Weight	11.64	11.38		
Weight / Dry Soil				
Water Content	21.1	20.9		

LIQUID LIMIT

Tare No.	181	201	208	
Wet Soil + Tare	16.87	15.59	14.30	
Dry Soil + Tare	15.19	14.21	13.30	
Weight / Water				
Tare Weight	11.27	11.24	11.21	
Weight / Dry Soil				
Water Content	42.9	46.5	47.8	
No. of Blows	35	20	15	

LL	PL	PI
48	21	24

C

Permeability Test (Constant volume panel) ASTM D-5084, Method F

Client: AES Proj. #: 170LF01388

Project: AES Eagle Valley N+E 2022

Date: 6/29/23 Cell Press: 75 Back Press: 70

Location: MW-26I Depth: 18-20' Sample #: 15080-1

Length: 2.874 Diameter: 2.844 Permeant: Tap water

Temp (C): 22 G: 12.5435 Rt: 0.953

Molded sample?: Y (N) Molded to:

Date	Time	E. Time (s)	Outer Read	Inner Read	Permeability	Temp Corrected
6/29	1037		0.79	22.00		
	1039	120	0.83	20.80	2.19 x 10⁻⁷	2.09 x 10⁻⁷
	1043	240	0.89	19.60	1.16 x 10⁻⁷	1.11 x 10⁻⁷
	1047	240	0.95	18.50	1.14 x 10⁻⁷	1.08 x 10⁻⁷
	1052	300	0.99	17.30	1.06 x 10⁻⁷	1.01 x 10⁻⁷
	1057	300	1.04	16.20	1.05 x 10⁻⁷	1.00 x 10⁻⁷

$\bar{X}$ (last four rows bracketed)

Avg: 1.10 x 10⁻⁷ | 1.05 x 10⁻⁷

hgbrd.xls 3/23/2016

ATEC ASSOCIATES, INC.

THINWALL TUBE LOG

Client: AES

Project No.: 170LF01388

Project: AES Eagle Valley N+E 2022

Client Proj. No.:

Location:

Date: 6/28/23

Boring No.: MW-26I

Sample No.: 15080-1

Depth (ft): 18-20'

Recovery: 27"

Surface Elevation:

Logged By: [signature]

Scale (in)	Soil Description	Laboratory Tests / Remarks
6	γ_1	
12	γ_2	FWP, GS, PI, CEC
18	γ_3	
24	γ_4	
	γ_5	
30		

Water Content:	Initial	Final
Tare No.	509	9722
Wet Wt. (g)	129.19	692.27
Dry Wt. (g)	107.29	567.01
Water Loss (g)		
Tare Wt. (g)	24.98	100.80
Solids Wt. (g)		
Water Content (%)	26.6	26.9
Unit Weight:		
Diameter (in)	2.844	2.817
Area (sq cm)		
Height (in)	2.874	2.852
Volume (cu cm)		
Wet Wt. (g)	590.12	591.47
Dry Wt. (g)		
Density, Dry (pcf)	97.3	99.9

TRIAXIAL
BACK PRESSURE SATURATION DATA

Cell No. C

Spec. Ht: Initial ______ CU Conf. Press ______ Job No. 170LF01388

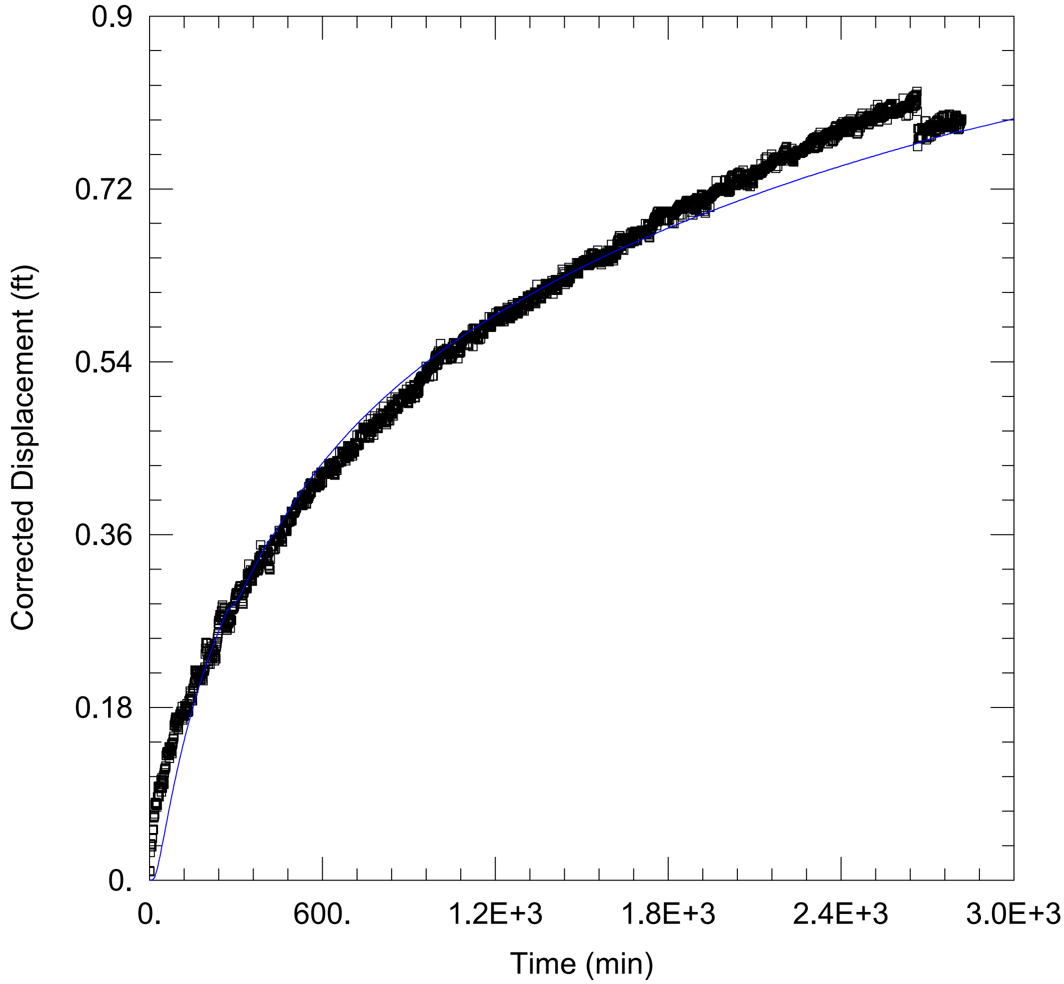
After BP Sat ______ Over BP Press ______ Boring No. MW-26I

After Consol ______ Total Conf. Press ______ Sample No. 15080-1

Dial Reading ______ Depth 18-20'

Date	Time	Ext. Cell Press	Int. Press	Cell Burette Reading	Bottom Burette Reading	Top Burette Reading	Pore Press	Pore Press Change	% Sat.
6/28	1215	0	0	0.00	3.10	—	0.0		
		10	0	1.30	|	—	5.7		
		10	5	1.40	3.20	—	5.2		
	1235	15	10						
	1255	20	15						
	1310	25	20						
	1330	30	25						
	1345	35	30						
	1400	40	35						
	1415	50	45						
	1435	60	55						
	1450	70	65						
6/29	1015	70	65	8.10	3.50	—	66.4		
		75	65	8.20	|	—	71.2	4.8	96
		75	70	8.20	3.55	—	70.6		

APPENDIX E
Pumping Test Data



WELL TEST ANALYSIS

Data Set: \...\MW-10D Drawdown Evaluation.aqt
Date: 09/30/21 Time: 07:35:10

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES Indiana
Location: Eagle Valley
Test Well: Pump 5
Test Date: 8/30/2021

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
Pump 5	3139426.339	1542314.322

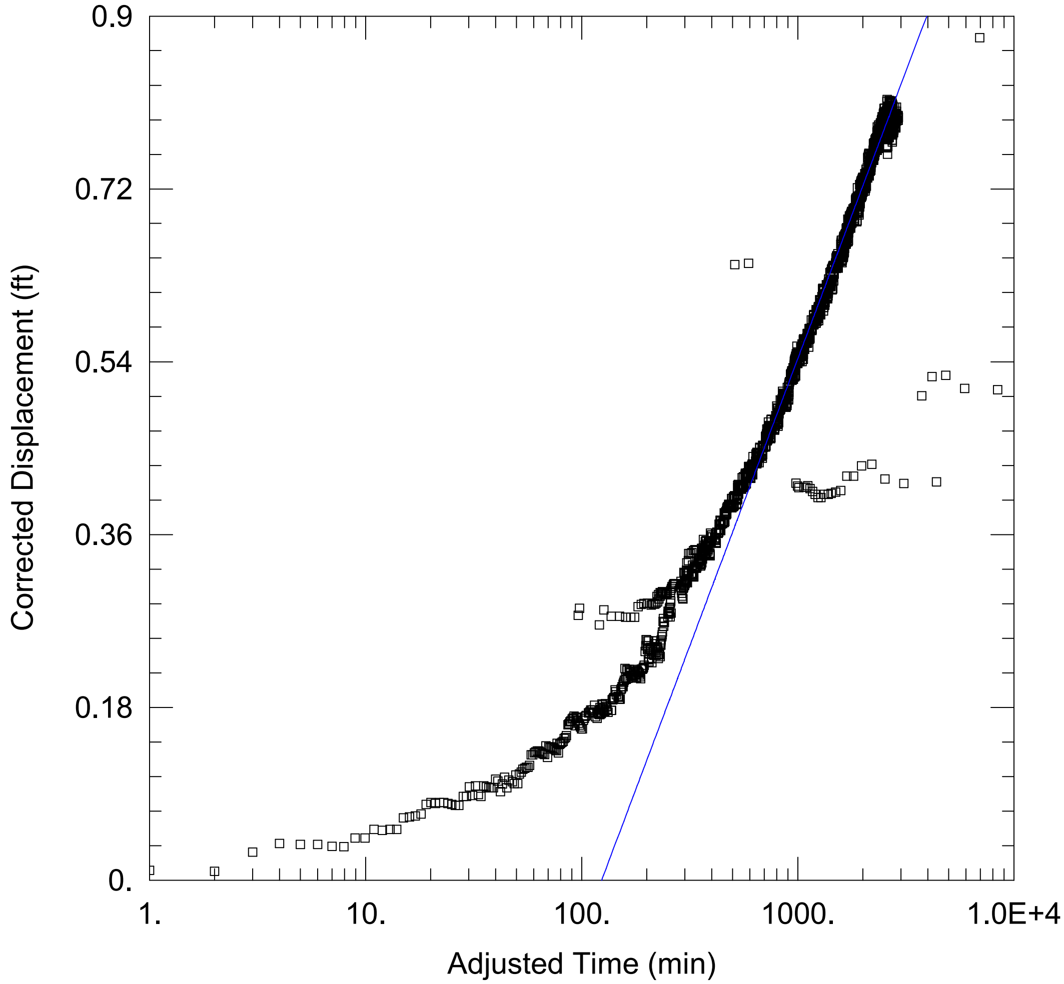
Observation Wells

Well Name	X (ft)	Y (ft)
□ MW-10D	3139181.9	1542425.28

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 626.4 cm^2/sec
S = 0.1187
Kz/Kr = 1.
b = 76.5 ft



WELL TEST ANALYSIS

Data Set: \...\MW-10D Drawdown Evaluation_Jacob46.aqt
Date: 09/30/21 Time: 07:41:22

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES Indiana
Location: Eagle Valley
Test Well: Pump 5
Test Date: 8/30/2021

AQUIFER DATA

Saturated Thickness: 76.5 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
Pump 5	3139426.339	1542314.322

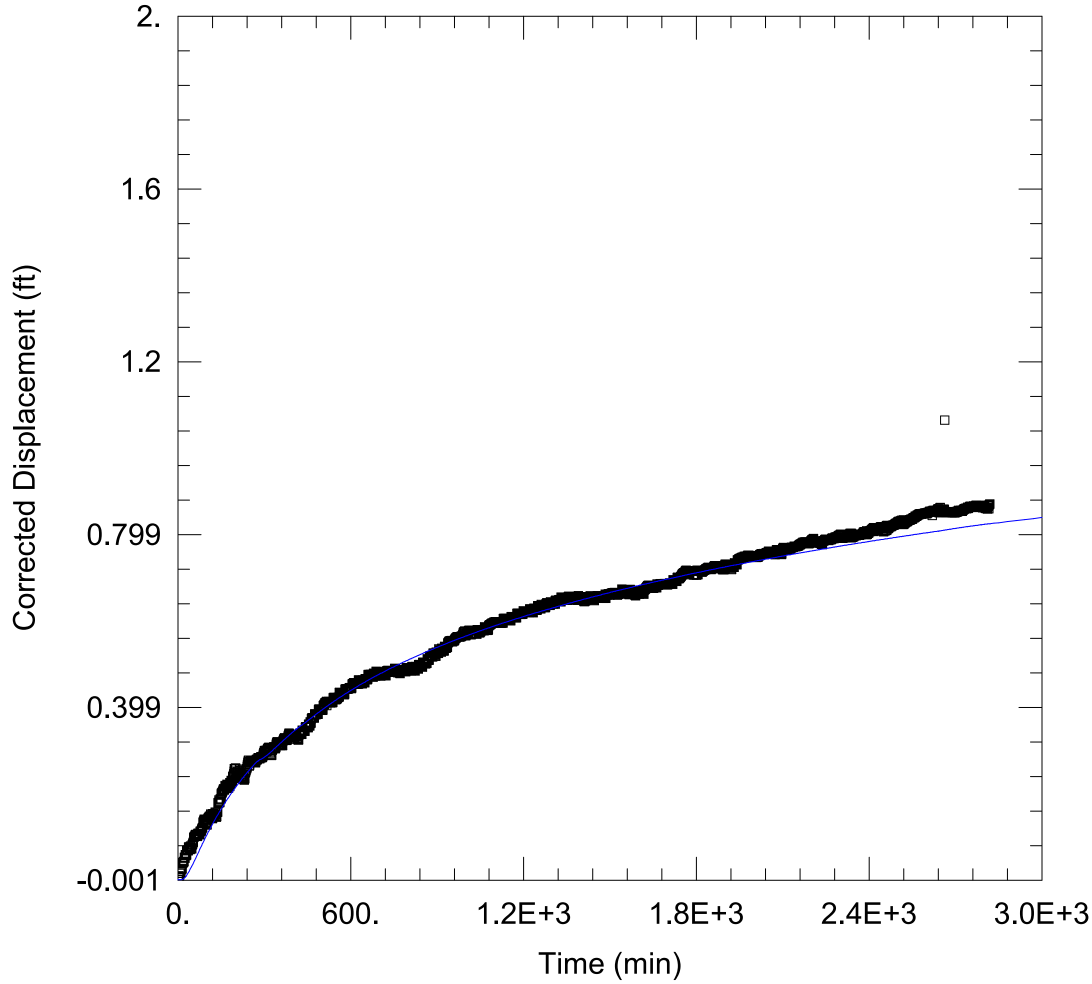
Observation Wells

Well Name	X (ft)	Y (ft)
□ MW-10D	3139181.9	1542425.28

SOLUTION

Aquifer Model: Unconfined Solution Method: Cooper-Jacob

T = 548.6 cm^2/sec S = 0.1368



WELL TEST ANALYSIS

Data Set: \...\MW-10S Drawdown Evaluation.aqt
Date: 09/30/21 Time: 07:34:19

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES Indiana
Location: Eagle Valley
Test Well: Pump 5
Test Date: 8/30/2021

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
Pump 5	3139426.339	1542314.322

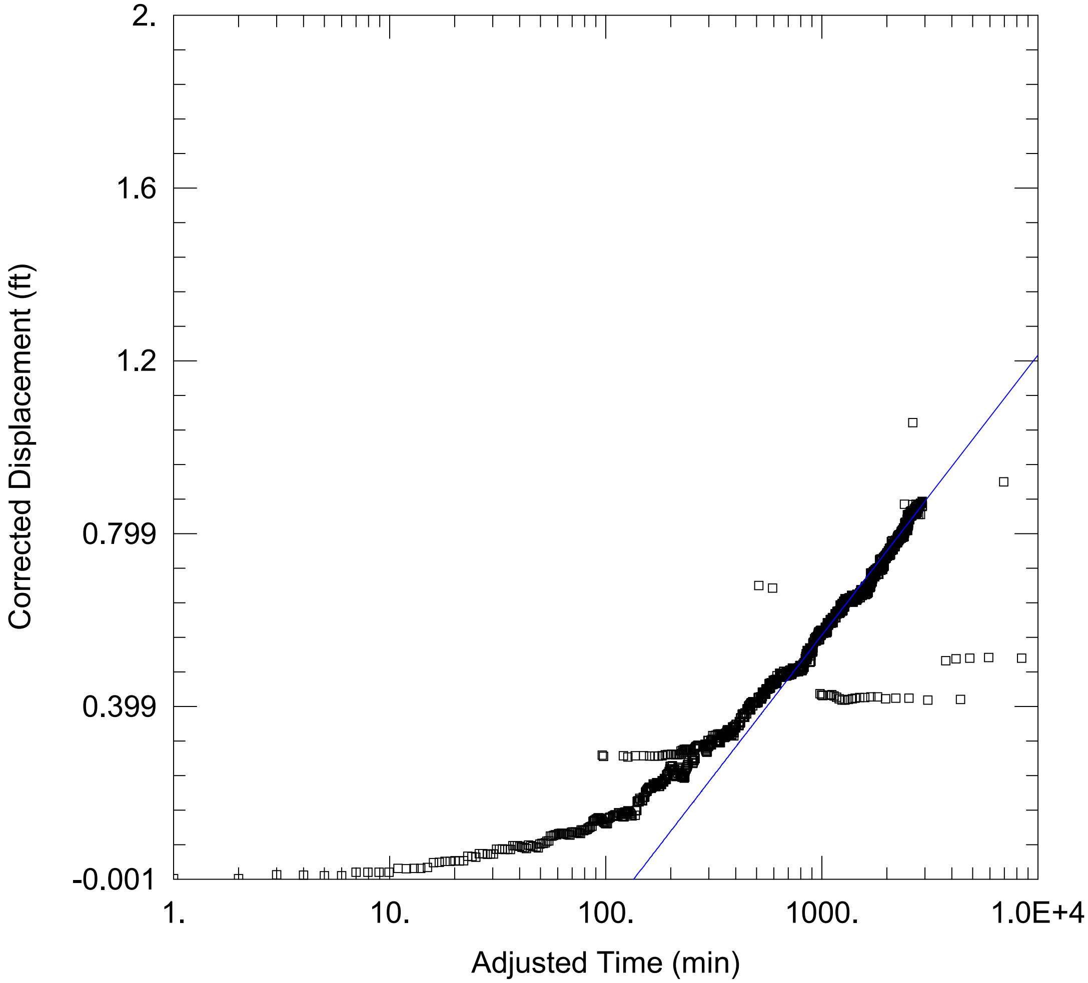
Observation Wells

Well Name	X (ft)	Y (ft)
□ MW-10S	3139192.36	1542433.64

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 554.7 cm^2/sec
Kz/Kr = 1.
S = 0.1376
b = 76.5 ft



WELL TEST ANALYSIS

Data Set: \...\MW-10S Drawdown Evaluation_Jacob46.aqt
Date: 09/30/21 Time: 07:33:47

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES Indiana
Location: Eagle Valley
Test Well: Pump 5
Test Date: 8/30/2021

AQUIFER DATA

Saturated Thickness: 76.5 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
Pump 5	3139426.339	1542314.322

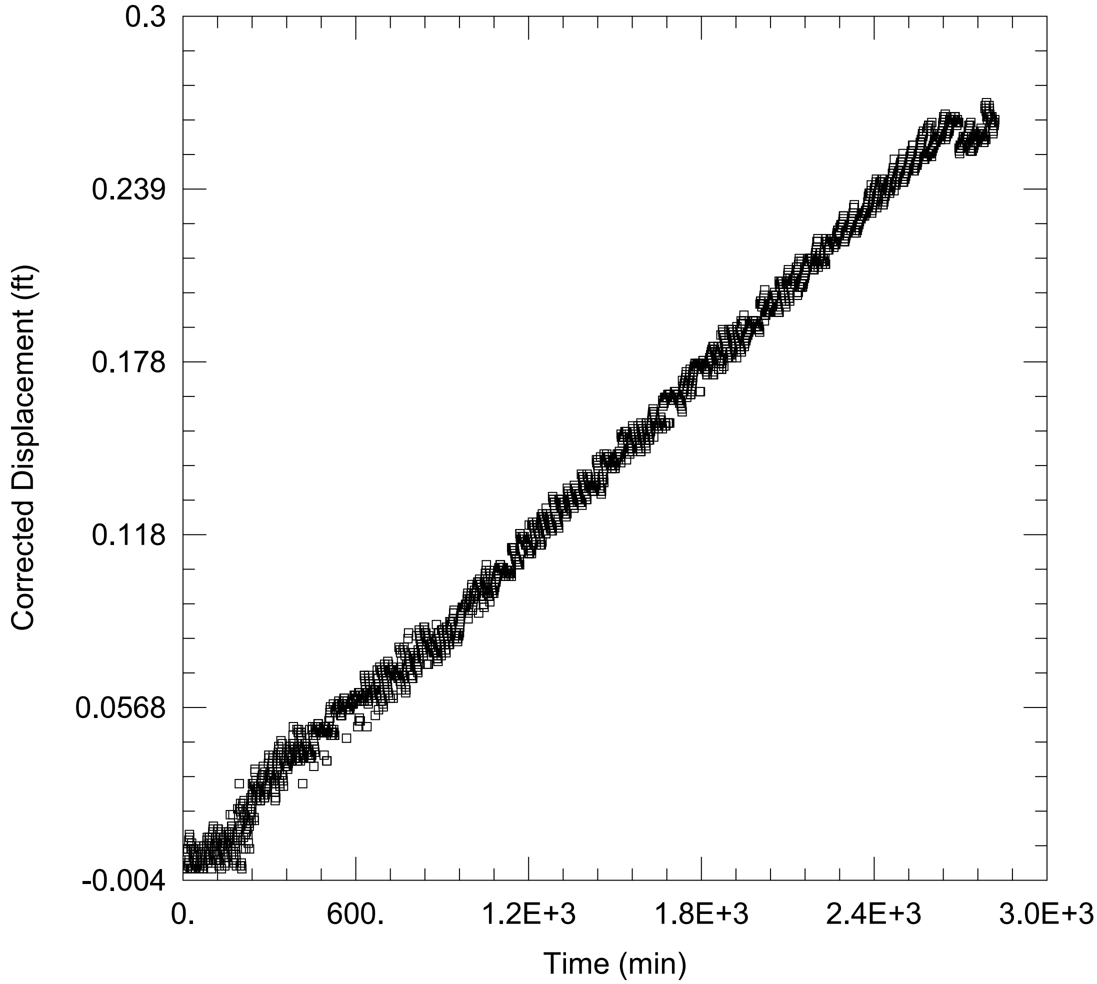
Observation Wells

Well Name	X (ft)	Y (ft)
□ MW-10S	3139192.36	1542433.64

SOLUTION

Aquifer Model: Unconfined Solution Method: Cooper-Jacob

T = 505.9 cm^2/sec S = 0.144



WELL TEST ANALYSIS

Data Set: \...\MW-14D Drawdown Evaluation.aqt
Date: 09/30/21 Time: 07:33:33

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES Indiana
Location: Eagle Valley
Test Well: Pump 5
Test Date: 8/30/2021

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
Pump 5	3139426.339	1542314.322

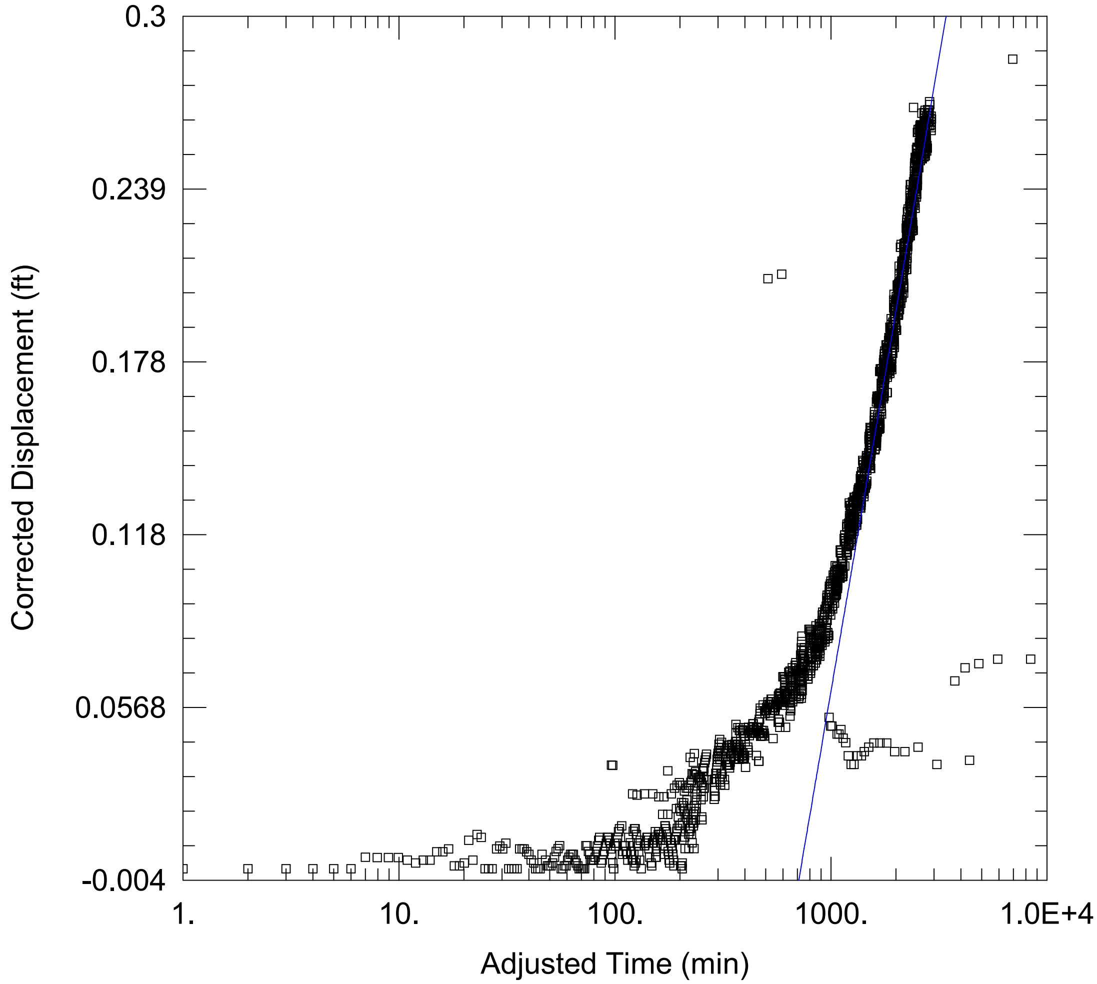
Observation Wells

Well Name	X (ft)	Y (ft)
□ MW-14D	3139190.94	1541408.93

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 516. cm^2/sec
S = 0.121
Kz/Kr = 1.
b = 77.91 ft



WELL TEST ANALYSIS

Data Set: \...\MW-14D Drawdown Evaluation_Jacob46.aqt
Date: 09/30/21 Time: 07:42:10

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES Indiana
Location: Eagle Valley
Test Well: Pump 5
Test Date: 8/30/2021

AQUIFER DATA

Saturated Thickness: 77.91 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
Pump 5	3139426.339	1542314.322

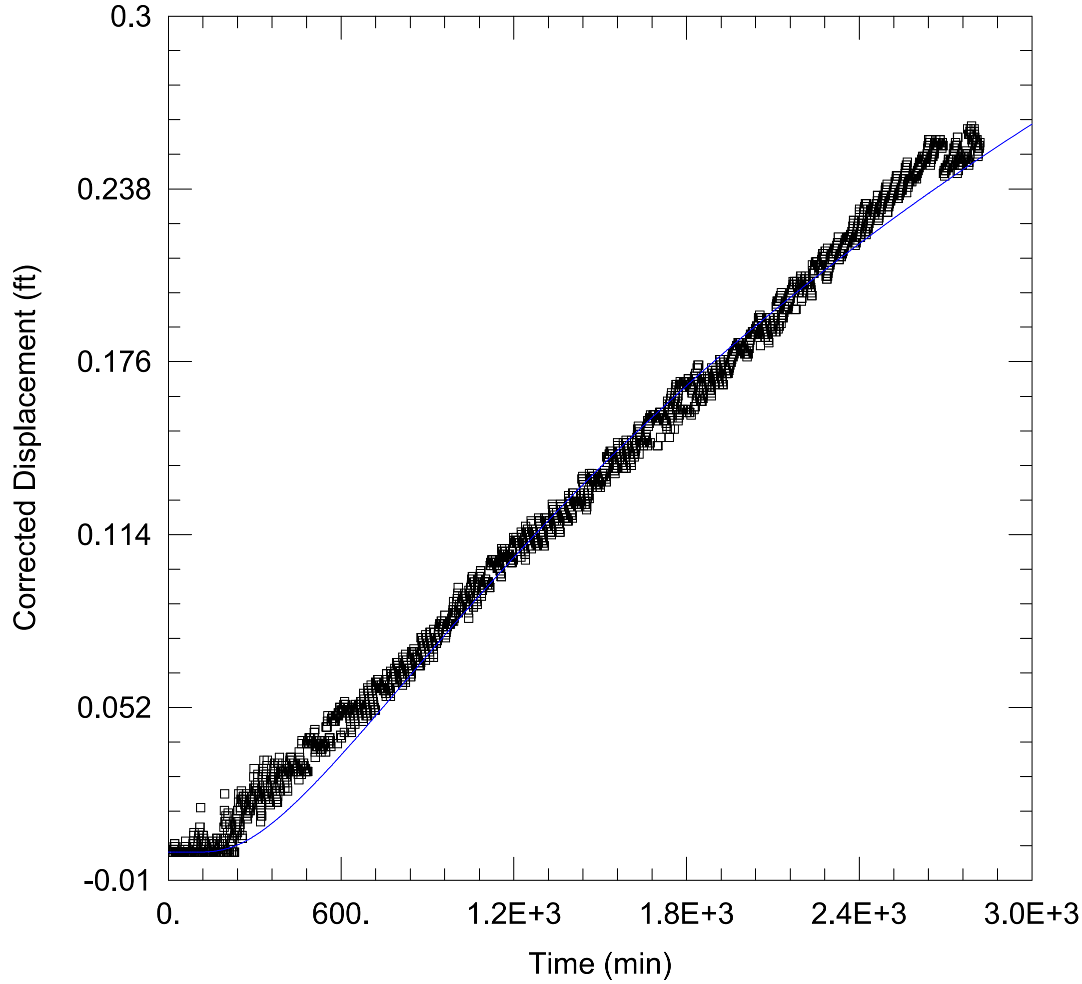
Observation Wells

Well Name	X (ft)	Y (ft)
▫ MW-14D	3139190.94	1541408.93

SOLUTION

Aquifer Model: Unconfined Solution Method: Cooper-Jacob

T = 736.9 cm^2/sec S = 0.0886



WELL TEST ANALYSIS

Data Set: \...\MW-14S Drawdown Evaluation.aqt
Date: 09/30/21 Time: 07:32:03

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES Indiana
Location: Eagle Valley
Test Well: Pump 5
Test Date: 8/30/2021

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
Pump 5	3139426.339	1542314.322

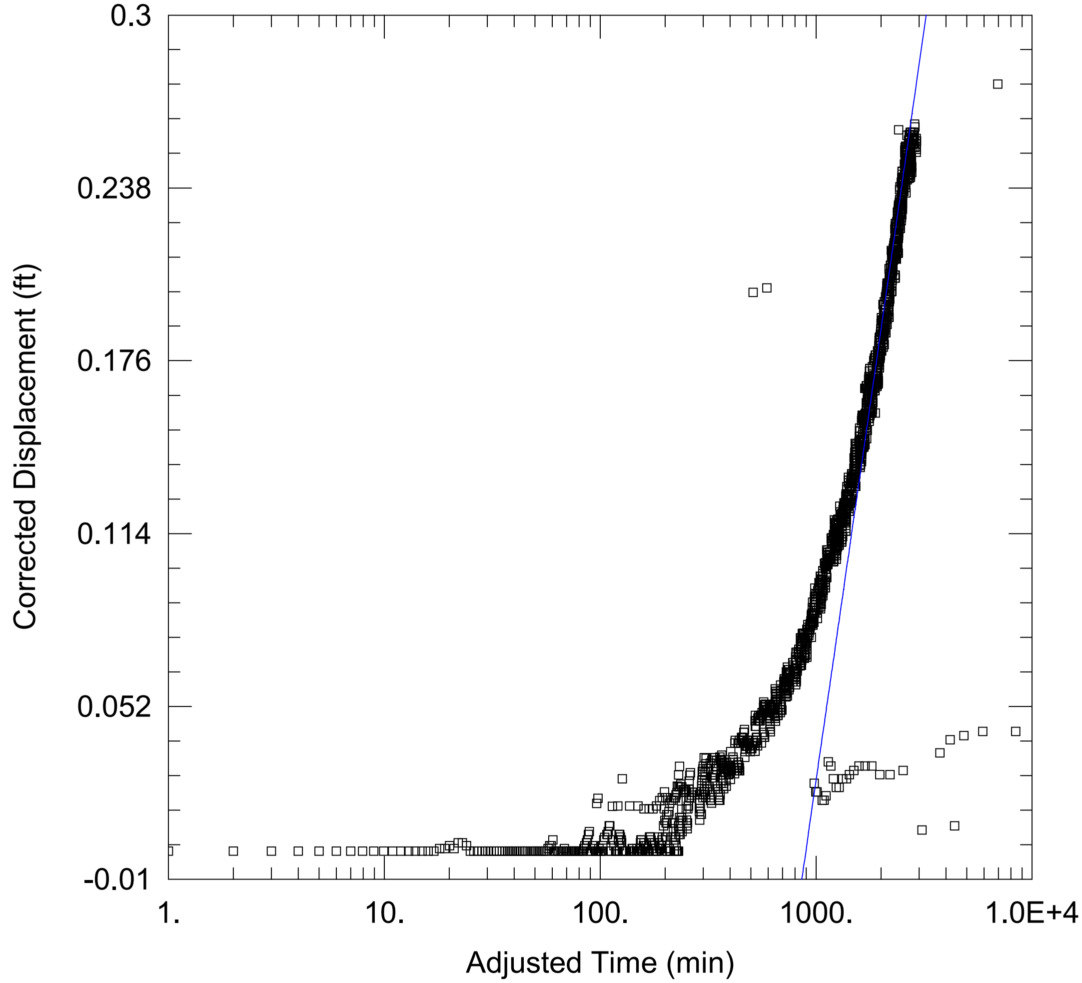
Observation Wells

Well Name	X (ft)	Y (ft)
□ MW-14S	3139179.71	1541409.81

SOLUTION

Aquifer Model: Unconfined Solution Method: Theis

T = 561.5 cm^2/sec
Kz/Kr = 1.
S = 0.1263
b = 77.91 ft



WELL TEST ANALYSIS

Data Set: \...\MW-14S Drawdown Evaluation_Jacob46.aqt
Date: 09/30/21 Time: 07:40:46

PROJECT INFORMATION

Company: Haley & Aldrich
Client: AES Indiana
Location: Eagle Valley
Test Well: Pump 5
Test Date: 8/30/2021

AQUIFER DATA

Saturated Thickness: 77.91 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
Pump 5	3139426.33	1542314.322

Observation Wells

Well Name	X (ft)	Y (ft)
□ MW-14S	3139179.71	1541409.81

SOLUTION

Aquifer Model: Unconfined Solution Method: Cooper-Jacob

T = 610.3 cm^2/sec S = 0.09043

Aquifer Pumping Test Results (August/September 2021)
IPL Eagle Valley Generating Station
Martinsville, Indiana

	Pump Test Evaluation			
Well ID	**T (Theis)** cm^2/sec	**K (Theis)** cm/sec	**T (Cooper-Jacob)** cm^2/sec	**K (Cooper-Jacob)** cm/sec
MW-10S	554.7	2.4E-01	505.9	2.2E-01
MW-10D	626.4	2.7E-01	548.6	2.4E-01
MW-14S	561.5	2.4E-01	610.3	2.6E-01
MW-14D	516	2.2E-01	736.9	3.1E-01
Geometric Mean	563.3	2.4E-01	594.4	2.5E-01

APPENDIX B
Groundwater Risk Evaluation

www.haleyaldrich.com

GROUNDWATER RISK EVALUATION
EAGLE VALLEY GENERATING STATION
4040 BLUE BLUFF ROAD
MARTINSVILLE, INDIANA

by
Haley & Aldrich, Inc.
Cleveland, Ohio

for
AES Indiana
Indianapolis, Indiana

File No. 133274-013
April 2024

HALEY ALDRICH

HALEY & ALDRICH, INC.
6500 ROCKSIDE ROAD
SUITE 200
CLEVELAND, OH 44131
216.739.0555

SIGNATURE PAGE FOR

GROUNDWATER RISK EVALUATION
EAGLE VALLEY GENERATING STATION
4040 BLUE BLUFF ROAD
MARTINSVILLE, INDIANA

PREPARED FOR
AES INDIANA
INDIANAPOLIS, INDIANA

PREPARED BY:

Todd Bernhardt
Associate Toxicologist/Risk Assessor
Haley & Aldrich, Inc.

REVIEWED AND APPROVED BY:

Dimitri Quafisi
Technical Expert/Geologist
Haley & Aldrich, Inc.

Jay Peters
Principal Risk Assessor
Haley & Aldrich, Inc.

Executive Summary

This “Groundwater Risk Evaluation” report was prepared by Haley & Aldrich, Inc. for the Eagle Valley Generating Station (EVGS or Site), a former coal-fired power plant located approximately four miles north of Martinsville, Indiana, in Morgan County. Coal combustion residuals (CCR) produced by the Site were historically managed in several surface impoundments/ash ponds, referred to collectively as the Ash Pond System, which cover an area of approximately 70 acres. Coal-fired power-generating operations at the Site ceased in April 2016, and AES Indiana now operates a natural gas-fired combined cycle generating station located southwest of the former coal-fired facility.

The purpose of this report is to review the analytical data collected from groundwater monitoring at the Site and Site vicinity, identify the pathways by which human and ecological receptors could potentially contact groundwater, and evaluate if the pathways could pose an adverse human health or ecological effect. Potential risks to human health or the environment were evaluated by comparing analytical results from groundwater monitoring to screening levels drawn or derived from United States Environmental Protection Agency (USEPA) and Indiana Department of Environmental Management (IDEM) sources. Due to the conservative methods used to derive screening levels, exposures to concentrations below screening levels will not result in adverse health effects, and no further evaluation is necessary. Concentrations above conservative screening levels do not necessarily indicate that a potential risk exists but indicate that further evaluation may be warranted.

Groundwater data collected in accordance with the CCR Rule from Site monitoring wells (CCR monitoring wells installed around the perimeter of the Ash Pond System, and nature and extent monitoring wells installed south and west of the Ash Pond System) was used for the risk evaluation dataset. Additional data collected from three high yield groundwater production wells located southeast of the Ash Pond System was also included.

Offsite areas consist of the White River and wetland areas to the north, west, and southwest, farmland and fields to the south, and various residential homes and wooded areas to the east. Environmental media of interest for the risk evaluation include groundwater as well as White River surface water, assuming CCR constituents in groundwater could potentially be introduced into the White River with groundwater flow. Potentially exposed receptors identified for the risk evaluation include onsite workers, offsite residents, offsite farmers, offsite recreational users of the White River, and offsite aquatic ecological receptors. However, potential exposure to groundwater via direct exposure pathways is considered incomplete for the following reasons:

- onsite workers do not use groundwater for drinking water;
- groundwater does not flow towards the offsite residential areas (east of the Site); and,
- there are no groundwater supply wells in the offsite farmland areas (south of the Site).

Potentially complete indirect exposure pathways through which receptors are assumed to be potentially exposed to CCR constituents in groundwater consist of the following, assuming such constituents could potentially be introduced into the adjacent White River:

- Consumption of White River surface water as drinking water (by offsite residents);
- Recreational exposure to White River surface water (dermal contact and incidental ingestion by swimmers or waders, dermal contact by boaters);

- Consumption of fish from the White River (by recreational fishermen); and,
- Aquatic receptor exposure to White River surface water.

Screening levels were compiled from USEPA and IDEM sources (or derived using the USEPA Regional Screening Level calculator) protective of White River surface water for the types of potential exposures identified as potentially complete above. From the selected or derived surface water screening levels, target groundwater screening levels were then calculated from the lowest (i.e. most protective) surface water screening levels based upon the amount of dilution and attenuation estimated to occur as groundwater flows into the White River.

Risks associated with the potential introduction of CCR constituents in groundwater to the White River were evaluated by conservatively comparing maximum groundwater constituent concentrations (from all Site monitoring wells dating back to initial sampling events in April 2016, and the high yield groundwater production wells) to the target screening levels for groundwater that are protective of White River surface water. The comparison demonstrates that detected groundwater concentrations do not pose an adverse impact to the river. Detected concentrations would need to be 6 to 1,400 times higher than measured levels before a potential adverse impact to the river might occur. This means that the present concentrations of constituents in groundwater do not pose a risk to human health or the environment, and even higher concentrations in groundwater are unlikely to be harmful.

This is further illustrated by comparing the maximum groundwater concentrations from the wells closest to the river to the derived target groundwater screening levels. This comparison shows an even wider margin of safety between the two values. The ratios between the target groundwater screening levels and maximum groundwater concentrations from the wells closest to the river range from 45 to 1,700 for detected constituents. This means that concentrations of detected constituents in these wells could be more than 45 times higher than currently measured levels before a potential adverse impact to the river might occur. The results of these comparisons demonstrate that detected concentrations of CCR constituents in groundwater do not pose an adverse impact to the White River and do not pose a risk to human health or ecological receptors.

Haley & Aldrich also evaluated the water discharged to the White River in accordance with a National Pollutant Discharge Elimination System Permit (at Outfall 003). The results of this risk evaluation demonstrate that detected discharge concentrations do not pose an adverse impact to the river and do not pose a risk to human health or the environment.

In conclusion, the completed groundwater risk evaluation demonstrates that there are no adverse impacts on human health or the environment from groundwater affected by the Ash Pond System at the EVGS.

Table of Contents

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List of Abbreviations

Abbreviation	Definition
AESI	AES Indiana
Ash Pond System	Ponds A, B, and C, and Former Ponds D and E
ATC	ATC Group Services, LLC
Bgs	below ground surface
CCGT	combined cycle gas turbine
CCR	coal combustion residuals
CCR Rule	USEPA's final rule for "Disposal of Coal Combustion Residuals from Electric Utilities"
CFR	Code of Federal Regulations
CSM	Conceptual Site Model
DAF	Dilution-Attenuation Factor
EVGS	Eagle Valley Generating Station
Former Ponds D and E	former Ash Ponds D and E
GWPS	Groundwater Protection Standard
Haley & Aldrich	Haley & Aldrich, Inc.
HHRA	Human Health Risk Assessment
IAC	Indiana Administrative Code
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources
IPL	Indianapolis Power & Light Company
IWPCD	Indiana Water Pollution Control Division
MCL	Maximum Contaminant Level
mg/L	milligram per liter
N&E	Nature and Extent
Ponds A, B, and C	Ash Ponds A, B, and C
RBSL	Risk-based Screening Level
RSL	Regional Screening Level
Site	Eagle Valley Generating Station
SSI	statistically significant increase
SSL	statistically significant level
USEPA	United States Environmental Protection Agency

1. Introduction

AES Indiana (AESI) owns and operates the Eagle Valley Generating Station (EVGS or Site), a former coal-fired power plant located approximately four miles north of Martinsville, Indiana, in Morgan County. The Site is bounded to the north, west, and southwest by the White River and wetland areas, to the south by farmland and fields, and to the east by residences and wooded areas. EVGS has been in operation since 1949; coal-fired power-generating operations ceased in April 2016 and AESI now operates a natural gas-fired combined cycle generating station located southwest of the former coal-fired facility. Coal combustion residuals (CCR) produced by the Site were historically managed in several surface impoundments which cover an area of approximately 70 acres. The north-south running Indiana Southern Railroad traverses the Site and divides the ash ponds into the westerly Ash Ponds A, B, and C (Ponds A, B, and C; regulated units per the United States Environmental Protection Agency 's [USEPA's] final rule for "Disposal of Coal Combustion Residuals from Electric Utilities" [CCR Rule]) and the eastern subsystem of former Ash Ponds D and E (Former Ponds D and E; not regulated under the CCR Rule). Collectively, Ponds A, B, and C and Former Ponds D and E are referred to as the Ash Pond System. **Figure 1** shows the location of the facility and the Ash Pond System.

The CCR Rule requires the evaluation of groundwater monitoring data from CCR units using groundwater protection standards (GWPSs), which are Federal primary drinking water standards, also known as Maximum Contaminant Levels or MCLs (USEPA, 2023a)[1], or site-specific background concentrations. Analyses of groundwater results against GWPSs are presented in annual groundwater monitoring and corrective action reports required by the CCR Rule.[2] This "Groundwater Risk Evaluation" report has been prepared by Haley & Aldrich, Inc. (Haley & Aldrich) to provide a risk-based analysis of the groundwater results, identifying the pathways by which human and ecological receptors could potentially contact groundwater, and evaluating if the pathways could pose an adverse human health or ecological effect. As discussed in this report, there are no direct exposure pathways to groundwater (groundwater is not used as a source of drinking water). Potential exposures are limited to surface water, assuming CCR constituents in groundwater could be introduced into the White River. While a risk-based evaluation of such exposures is not required by the CCR Rule, the risk-based analysis provides relevant context for the groundwater monitoring results.

[1] MCLs are enforceable for municipal drinking water supplies.
[2] AESI has been conducting groundwater monitoring and reporting the monitoring data publicly as required by the CCR Rule. AESI has posted the required information in annual groundwater monitoring and corrective action reports on the publicly available website for EVGS: https://www.aesindiana.com/eagle-valley-generating-station.

2. Approach

The analysis presented in this report was conducted by evaluating the environmental setting of the Site and Site vicinity, including the Ash Pond System where CCR management has occurred at the facility. Information on where groundwater is located at the facility, the rate(s) and direction(s) of groundwater flow, and where waterbodies may intercept groundwater flow were reviewed and assessed.

A conceptual site model (CSM) was developed based on the environmental setting, and the CSM was used to identify human populations that could be in contact with groundwater and/or surface water at the Site or Site vicinity. This information was also used to identify where ecological populations could come into contact with nearby surface water.

Using the CSM, the human health risk assessment (HHRA) process was used to estimate the potential that contact with constituents in the environment may result in harm to people. Generally, there are four components to the HHRA process (USEPA, 1989): (1) Hazard Identification/Data Evaluation, (2) Toxicity Assessment, (3) Exposure Assessment, and (4) Risk Characterization. In support of this process, the USEPA and other regulatory agencies, including the Indiana Department of Environmental Management (IDEM), develop "screening levels" of constituent concentrations in groundwater (and other media) that are considered protective of specific human exposures. In developing screening levels, USEPA uses a specific target risk level (component 4 of the HHRA process) combined with an assumed exposure scenario (component 3) and toxicity information from USEPA (component 2) to derive an estimate of a concentration of a constituent in an environmental medium, for example groundwater, (component 1) that is protective of a person in that exposure scenario (for example, drinking water). Similarly, ecological screening levels for surface water are developed by USEPA and IDEM to be protective of the wide range of potential aquatic ecological resources, or receptors.

Analytical results from the groundwater monitoring events completed at the Site and Site vicinity were then compared to screening levels developed by USEPA and IDEM, or site-specific risk-based screening levels (RBSLs) derived by Haley & Aldrich (further discussion of the RBSLs is provided in Section 5.1.3). Screening levels are designed to provide a conservative estimate of the concentration to which a receptor (human or ecological) can be exposed without experiencing adverse health effects. Due to the conservative methods used to derive screening levels, exposures to concentrations below screening levels will not result in adverse health effects, and no further evaluation is necessary. Concentrations above conservative screening levels do not necessarily indicate that a potential risk exists, but rather indicate that further evaluation may be warranted. Human health and ecological screening levels are used to determine if the concentrations of constituents in groundwater could pose a risk to human health or the environment that warrants further evaluation.

2.1 REPORT ORGANIZATION

The remaining sections of this "Groundwater Risk Evaluation" report are organized according to the typical steps in a risk assessment, as outlined below.

- Section 3 summarizes the analytical groundwater data included in the risk evaluation;
- Section 4 presents the exposure assessment, including the sources and migration pathways for CCR constituents in groundwater, identification of potentially exposed populations, and specific

pathways through which populations could become exposed to CCR constituents in groundwater;

- Section 5 presents the screening levels used to evaluate the constituent concentrations for potential risks to human health or the environment;
- Section 6 presents the results of the evaluation; and,
- Section 7 presents a summary of the evaluation.

The following appendices are included in the evaluation:

- Appendix A – Derivation of RBSLs for recreational use of surface water
- Appendix B – Dilution-attenuation factor (DAF) calculations
- Appendix C – Technical Memorandum: Discharge Water Risk Evaluation
- Appendix D - Preparer resumes

3. Available Site Data

Groundwater data collected in accordance with the CCR Rule provides the basis for the risk evaluation dataset. Sections 3.1 and 3.2 provide an overview of monitoring well installation and sampling events for the different phases of groundwater monitoring at the EVGS. The data from these groundwater monitoring events are provided in annual groundwater monitoring and corrective action reports required by the CCR Rule.[3] Additional data collected from the high yield groundwater production wells, located southeast of Former Ponds D and E (wells 5, 6, and 7 on **Figure 1**), are provided in **Table 1**.

3.1 MONITORING WELLS

Monitoring wells were initially installed in September/October 2015 and March 2016 to support compliance with the CCR Rule. Monitoring wells were installed to monitor groundwater at various depths within the alluvial deposits (sand and gravel aquifer zone) below the base of the Ash Pond System. Monitoring wells designated MW-#S are screened in the upper (or shallow) part of the saturated zone; wells designated MW-#I are screened in the middle (or intermediate) part of the saturated zone; and wells designated MW-#D are screened in the lower (or deep) part of the saturated zone. Monitoring wells are frequently installed as a monitoring well cluster, which is a group of two or more monitoring wells installed in close proximity to each other but screened in groundwater at differing depths; for instance, MW-1S, MW-1I, and MW-1D comprise the MW-1 well cluster.

The certified CCR Rule groundwater monitoring system, used for detection and assessment monitoring, consists of 27 monitoring wells (11 well clusters screened in the shallow, intermediate, and deep zones) around the perimeter of the Ash Pond System. In addition, 44 nature and extent (N&E) monitoring wells have been installed and monitored to further delineate the horizontal and vertical extent of affected groundwater.

The initial CCR Rule groundwater monitoring system included seven background monitoring wells located along the northern boundary of the Ash Pond System, MW-4S, MW-4I, MW-4D, MW-8S, MW-9S, MW-9I, and MW-9D (**Figure 1**). Those monitoring wells were initially selected to represent background groundwater quality because they are located upgradient of the Ash Pond System during normal Site operations. Normal Site operation is considered as the time when the three production wells are pumping near capacity and groundwater flow direction is toward the production wells. Data from those initial background monitoring wells were initially used to establish statistically derived background concentrations for each Appendix III and Appendix IV constituent. Use of those initial background monitoring wells to determine background concentrations was reviewed in 2019 due to data variability attributed to proximity to the Ash Pond System and discharge canal. Monitoring wells MW-13S, MW-13I, and MW-13D (MW-13 well cluster) were installed in 2019 and identified as potential replacement for the previously installed initial background monitoring wells due to the location of the MW-13 well cluster approximately 1,400 feet southeast of the Ash Pond System, in an area of the Site that is unaffected by the Ash Pond System. After collecting eight rounds of baseline monitoring samples, the CCR Rule groundwater monitoring system was recertified on 17 December 2021 to designate the MW-13 well cluster as the new background wells. The seven initial background monitoring wells are

[3] Groundwater analytical results are provided in annual groundwater monitoring and corrective action reports required by the CCR Rule, which are posted on the publicly available website for EVGS: https://www.aesindiana.com/eagle-valley-generating-station.

currently identified in the CCR Rule groundwater monitoring system as CCR monitoring wells and are no longer used as background wells.

The N&E investigation was initiated in 2019 by installing supplemental monitoring wells (N&E wells) to further delineate the area of affected groundwater, primarily south and/or west of the Ash Pond System as shown on **Figure 1**. Based on analytical results collected from these wells, additional monitoring wells were installed offsite to the south of the Ash Pond System in 2021 and 2022 and onsite to the west of the Ash Pond System in 2023.

The current complete Site monitoring well network includes the CCR monitoring wells around the perimeter of the Ash Pond System and the supplemental monitoring wells installed for the N&E investigation to the south and west of the Ash Pond System. The complete Site monitoring well network currently consists of 71 wells, including 25 shallow zone wells (generally screened between 20 and 40 feet below ground surface [bgs]), 23 intermediate zone wells (generally screened between 40 and 70 feet bgs), and 23 deep zone wells (screened between 70 and 107 feet bgs).

3.2 MONITORING EVENTS

Detection monitoring of the CCR Rule groundwater monitoring system per the Code of Federal Regulations Title 40 (40 CFR) §257.94 consisted of nine sampling events completed between April 2016 and September 2017. Samples collected from wells in the CCR Rule monitoring system during these rounds were analyzed for the constituents listed below, as required by the CCR Rule:

Appendix III		Appendix IV		
Boron	Sulfate	Antimony	Chromium	Mercury
Calcium	Total dissolved solids	Arsenic	Cobalt	Molybdenum
Chloride		Barium	Fluoride	Selenium
Fluoride		Beryllium	Lead	Thallium
pH		Cadmium	Lithium	Radium 226/228

The results of these sampling events were then compared to statistically derived background concentrations from the initial background well network described in Section 3.1. Based on statistical evaluation of detection monitoring results (described in the *Certification of Selected Statistical Method for Groundwater Monitoring Data Evaluation* [ATC, 2017]), statistically significant increases (SSIs) above background concentrations for Appendix III constituent concentrations were determined to have occurred in CCR monitoring wells downgradient of the Ash Pond System, indicating the possibility of leaching of CCR constituents from the Ash Pond System to groundwater. The detection monitoring program transitioned to an assessment monitoring program in 2018 after no alternative source was identified for the SSI constituents.

Assessment monitoring events per 40 CFR §257.95 began in May 2018. Samples were analyzed for the Appendix III and Appendix IV constituents as required by 40 CFR §257.95(b) and 40 CFR §257.95(d)(1). Concurrent with the second assessment monitoring event in September 2018, and as required by 40 CFR §257.95(h), GWPSs were established for detected Appendix IV constituents, and it was determined that arsenic, lithium, and molybdenum were present in groundwater at statistically significant levels (SSLs) above the GWPSs.

Assessment monitoring has occurred semiannually in May and November since May 2018. Although eight of the 15 Appendix IV constituents have been detected at concentrations above GWPSs, only three constituents (arsenic, lithium, and molybdenum) have been detected at SSLs above GWPSs. A prediction interval statistical analysis performed on results from each of the semiannual assessment monitoring events per 40 CFR §257.90(b) has determined that arsenic, lithium, and molybdenum continue to be present in groundwater at CCR monitoring wells at SSLs above the GWPSs. The data from groundwater monitoring events are provided in annual groundwater monitoring and corrective action reports required by the CCR Rule.[4]

3.3 PRODUCTION WELLS

Groundwater from the high yield groundwater production wells (wells 5, 6, and 7 on **Figure 1**) was also sampled on 13 separate occasions, on a weekly basis from May to June 2020, and October 2020 to January 2021 and analyzed for selected Appendix III and Appendix IV constituents. The sampling was conducted by Quality Data Systems, Inc. The results of this sampling are presented in **Table 1**.

[4] Groundwater analytical results are provided in annual groundwater monitoring and corrective action reports required by the CCR Rule, which are posted on the publicly available website for EVGS: https://www.aesindiana.com/eagle-valley-generating-station.

4. Exposure Assessment

Exposure assessment is the process of describing, measuring, or estimating the intensity, frequency, and duration of potential exposure to chemicals of potential concern in environmental media (e.g., groundwater, surface water, etc.). This section discusses the mechanisms by which human or ecological receptors might come in contact with the CCR constituents present in groundwater, concluding with the identification of potentially complete and incomplete exposure pathways.

An exposure assessment is best conducted within the context of a risk-based CSM. A CSM is used to show the relationships between a chemical source, exposure pathway, and potential receptor. The CSM identifies chemical sources, potentially impacted media, migration pathways, exposure routes, and possible exposure scenarios (USEPA, 1988). These source-pathway-receptor relationships provide the basis for the quantitative exposure assessment. Only potentially complete source-pathway-receptor relationships are included in the risk evaluation.

4.1 CHEMICAL SOURCES, POTENTIAL RELEASE MECHANISMS, AND ENVIRONMENTAL MEDIA OF INTEREST

For the CSM, the CCR stored in the Ash Pond System is the potential source. Constituents present in the CCR can be dissolved into infiltrating water that could flow into groundwater. Constituents could move with the groundwater, usually in a downgradient/downhill direction.

However, groundwater flow direction at the EVGS is influenced by the operation of three high yield groundwater production wells (wells 5, 6, and 7; located southeast of Former Ponds D and E). The high yield production wells are screened at the base of the alluvial aquifer (73 to 103-feet bgs) and produce cooling water for plant operations. Except for scheduled temporary shut-down periods each year (and a period of reduced pumping during a plant shutdown between April 2021 through March 2022), the plant and production wells run continuously. When operating at capacity, groundwater average annual withdrawal from the three production wells combined is approximately 2,500 gallons per minute.

In the absence of pumping from the production wells, groundwater flows to the west, beneath the Ash Pond System towards the White River. In contrast, during normal production well operation, the groundwater flow field near the Ash Pond System is reversed with groundwater being captured by the production wells. Water level elevations during normal production well operation indicate a groundwater divide exists near the western boundary of the Ash Pond System in the shallow, intermediate, and deep flow zones, where groundwater to the east flows towards the production wells and groundwater to the west flows towards the White River. An illustration of this groundwater flow divide, and approximate groundwater flow directions on either side of it during normal production well operation, is depicted in **Figure 2.** Water level elevation measurements also indicate the groundwater flow divide shifts seasonally. It is suspected that variation in rainfall, White River stage fluctuations, and production well pumping rates play a role in this variation. Assuming CCR constituents in groundwater could potentially be introduced into the White River with groundwater flow, the environmental media of interest for this evaluation include groundwater as well as White River surface water.

4.2 POTENTIAL RECEPTORS

Populations identified in this risk evaluation include those who could potentially be exposed to CCR constituents present in groundwater. As discussed above in Section 1, coal-fired power-generating operations at the Site ceased in April 2016; a natural gas-fired combined cycle generating station currently operates southwest of the former coal-fired facility. The Site is bounded to the north, west, and southwest by the White River and wetland areas, to the south by farmland and fields, and to the east by various residential homes and wooded areas.

Based on this setting, potentially exposed receptors identified for this risk evaluation include:

- onsite workers;
- offsite residents;
- offsite farmers;
- offsite recreational users of the White River; and,
- offsite aquatic ecological receptors.

4.3 POTENTIALLY COMPLETE AND INCOMPLETE EXPOSURE PATHWAYS

A plot of water wells within a half-mile of the Ash Pond System boundary is presented in **Figure 3**. Locations for identified wells were obtained from the Water Well Record Database of the Indiana Department of Natural Resources (IDNR; 2024b). As presented in **Figure 3**, most of the identified wells within a half-mile of the Ash Pond System (17 of the 26 identified water supply wells) are listed as being owned by Indianapolis Power and Light (IPL; doing business as AESI) or AESI, including the three high yield production wells discussed above. Twelve of these wells are abandoned, one is not believed to exist at its plotted location or elsewhere within a half-mile of the Ash Pond System, and the remaining well, located northeast of the Ash Pond System, is inactive and was last used for dust control purposes during demolition of the former coal plant. According to AESI personnel, the inactive well is screened at a depth of approximately 100 feet and there are no plans to abandon it as it could be used for dust control purposes during pond closure activities. If the use of this well is required for dust control during pond closure activities, potential exposure during such activities would be prevented by compliance with the requirements of a site health and safety plan. There is no other use of groundwater by onsite workers, including for drinking water purposes, and therefore no potential for exposure by these individuals.

Aside from IPL or AESI wells, nine private wells are within a half-mile of the Ash Pond System. Eight of these wells are residential water wells located southeast of the Site, and the last well is an abandoned well formerly owned by the United States Geological Survey west of the Site across the White River (see **Figure 3**). The cluster of residential water wells is upgradient of the Ash Pond System because groundwater under the Ash Pond System is captured by the three production wells and in the absence of pumping by the three production wells (e.g., extended plant shutdown) groundwater flows towards the White River. Therefore, potential residential exposure to CCR constituents in groundwater at these wells is incomplete because groundwater from the Ash Pond System does not flow towards these offsite residential water wells (regardless of production well operational status).

There are no groundwater supply wells located within the downgradient agricultural land area where monitoring well sampling results indicate constituents are present in groundwater (**Figure 3**).

Consequently, potential exposure to CCR constituents in groundwater for offsite agricultural operations is incomplete.

The White River is potentially used for recreation (i.e., wading, swimming, boating, fishing) and as a habitat for aquatic species (i.e., fish, amphibians, etc.). Although the river is also a supply source for drinking water, there are no surface water intakes for significant public water supply (i.e., with the aggregate capacity to withdraw more than 100,000 gallons in one day) within 20 miles downstream of the EVGS based on the IDNR's map of "Significant Water Withdrawal Facilities" (IDNR, 2024a). However, in an abundance of caution, exposure to river surface water as a potential source of drinking water was evaluated as if it were complete for offsite residents. In total, exposure pathways to river surface water are evaluated as potentially complete for offsite residents through use of the river water as drinking water, offsite recreational users through direct contact with the water and consumption of fish, and aquatic life in the river.

The closest public downstream water supply wells (located proximate the White River) are the Morgan County Rural Water Company and the City of Martinsville Water Supply wells. These two water users are located more than two and three miles, respectively, downriver of the EVGS. The evaluation of river surface water as a potential drinking water source is protective for downgradient uses of public water.

AESI has also delineated wetland in areas offsite to the southwest of the Ash Pond System and west of the White River. Potential wetland areas identified by the National Wetland Inventory are shown on **Figure 3**. Standing water only appears seasonally in the wetland areas southwest of the Ash Pond System, related to precipitation events and backwater flooding from the White River. Since standing surface water results from precipitation events and backwater flooding, migration of groundwater from beneath the Ash Pond System represents a negligible contribution to any standing surface water in this wetland and consequently is not evaluated as a complete pathway in this assessment. Additional surface water features shown in **Figure 3** include freshwater ponds outside the area of affected groundwater north/northwest of the Site (west of the White River) and east/southeast of the Ash Pond System. A larger pond is also present approximately 4,000 feet south of the Ash Pond System (beyond the limits shown in **Figure 3**), which is not directly downgradient of the Ash Pond System regardless of production well operational status. Based on these locations, groundwater migration in the direction of these ponds is considered incomplete and is not evaluated further in this assessment.

In summary, potentially complete exposure pathways through which potential receptors are assumed to be potentially exposed to CCR constituents are limited to the following, assuming CCR constituents in groundwater could potentially be introduced into the adjacent White River:

- Consumption of White River surface water as drinking water (by offsite residents);
- Recreational exposure to White River surface water (dermal contact and incidental ingestion by swimmers or waders, dermal contact by boaters);
- Consumption of fish from the White River (by recreational fishermen); and,
- Aquatic receptor exposure to White River surface water.

A depiction of the CSM illustrating the identified chemical source(s), release mechanisms/migration pathways, exposure media, potential receptors, and the potentially complete exposure pathways listed above is shown in **Figure 4**.

5. Screening Levels

Screening levels have been compiled or derived for this evaluation for the types of potential exposures identified in the CSM discussion above:

- Drinking water consumption;
- Recreational exposure to surface water;
- Consumption of fish (from the White River); and,
- Aquatic receptor exposure to surface water.

5.1 SCREENING LEVELS FOR THE PROTECTION OF SURFACE WATER

This section outlines the human health and ecological screening levels that are protective of White River surface water in accordance with the CSM presented in Section 4 and **Figure 3**. For Appendix III and Appendix IV constituents detected in groundwater, **Table 2** provides, in addition to MCLs, published human health screening levels for drinking water and surface water available from IDEM and USEPA sources; **Table 3** provides site-specific RBSLs derived for recreational exposure to surface water; and **Table 4** provides published ecological screening levels for surface water from USEPA and IDEM sources.[5]

Human health screening levels for surface water are identified for the following exposure settings: 1) use of surface water as a drinking water source, 2) the consumption of fish from a surface water body, and 3) recreational uses of surface water.

5.1.1 Drinking Water Screening Levels

The human health screening levels for drinking water are from IDEM and USEPA sources and address the drinking water exposure pathway. The IDEM criteria for drinking water class groundwater are the same as the Federal primary drinking water standards, also known as Maximum Contaminant Levels or MCLs. USEPA Regional Screening Levels (RSLs) (USEPA, 2023d) for tapwater (drinking water, or untreated groundwater used as potable water) have also been included for constituents which do not have promulgated IDEM/MCL criteria. The tapwater RSLs are RBSLs based on USEPA default assumptions for residential exposure to tapwater.

These sources, in the order in which they were used, are:

- USEPA MCLs. (USEPA, 2023a)
- USEPA RSLs, November 2023. Values for tapwater. (USEPA, 2023d)
- Indiana Administrative Code (IAC) Title 327 – Water Pollution Control Division (IWPCD). 327 IAC 2-11-6. Criteria for drinking water class ground water. (IWPCD, 2023b)

Human health screening levels for drinking water are provided in **Table 2**.

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[5] Screening levels are not provided for mercury and thallium in Tables 2 through 4 as these Appendix IV constituents have not been detected in groundwater (and thus, mercury and thallium have been excluded from this risk evaluation).

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5.1.2 Published Recreational Screening Levels

Published human health screening levels for surface water are derived to be protective of the use of surface water as a drinking water source and the consumption of fish from a surface water body. The drinking water screening levels are also protective of, but highly conservative for, recreational uses of a surface water body (such as swimming, wading, or boating) because drinking water exposure is of a higher magnitude and frequency than incidental water consumption exposures which may occur during recreational uses.

The human health screening levels for surface water are from federal and state sources. Values that address use of surface water as drinking water are the values for drinking water provided in **Table 2**. Values that address the fish consumption pathway are USEPA values for human health for "the consumption of organism only," and IDEM surface water quality criteria for protection of human health (where the surface water body is not within the Great Lakes System).

These screening level sources, in the order in which they were used, are:

- USEPA Ambient Water Quality Criteria for Human Health Consumption of Organisms. (USEPA, 2023c)
- IWPCD. 327 IAC 2-1-6. Minimum Surface Water Quality Standards, surface water quality criteria for protection of human health (continuous criterion concentrations outside of mixing zone). (IWPCD, 2023a)

The published human health screening levels for surface water are provided in **Table 2**.

5.1.3 Calculated Risk-Based Screening Levels for Recreational Use

In accordance with USEPA and IDEM guidance (USEPA, 1989, 2023e; IDEM, 2022), site-specific information may warrant the development of site-specific RBSLs, which are refined values from RBSLs for default exposure scenarios that account for site-specific receptor population characteristics and exposure pathways. Site-specific RBSLs are more representative of site-specific conditions than published RBSLs based on default assumptions and, therefore, are useful for evaluating whether constituents may have the potential to pose adverse health effects. For example, whereas surface water that is used as a recreational water body for swimming could be evaluated using drinking water standards which assume that people are drinking and bathing in the water daily, site-specific RBSLs for surface water will reflect incidental ingestion and dermal contact at an exposure rate and magnitude commensurate with swimming activities.

Potential exposures to constituents in surface water could, in general, occur through ingestion and dermal contact. However, the specific nature of the potential exposures is dependent on the type of water body. Specifically:

- Incidental ingestion and dermal contact with shallow surface water (e.g., less than two feet in depth) can only occur via wading because the water is not deep enough to permit swimming. Exposures during wading could be potentially complete in the White River.
- Incidental ingestion and dermal contact with deeper surface water (e.g., more than three feet in depth) could occur via swimming. Exposures during swimming could be potentially complete in the White River.

- Dermal contact with surface water could occur during boating or fishing activities in the White River. Since these types of activities are not associated with intense exposures to water (such as is the case with swimming), incidental ingestion of surface water would be insignificant.

Site-specific RBSLs derived for recreational exposures to surface water for a recreational swimmer, wader, and boater are presented in **Table 3**. The RBSLs were calculated using USEPA-derived exposure factors and equations, as well as site-specific inputs where appropriate, using the USEPA RSL calculator (USEPA, 2023f). The RSL calculator output, including the exposure parameters used, is provided in **Appendix A**.

5.1.4 Ecological Screening Levels

Ecological screening levels for surface water are published to provide a conservative estimate of the concentration to which an ecological receptor can be exposed without experiencing adverse effects. Due to the conservative methods used to derive published reference screening levels, it can be assumed with reasonable certainty that concentrations at or below screening levels will not result in any adverse effects to survival, growth and/or reproduction. Concentrations above published ecological screening levels for surface water, however, do not necessarily indicate that a potential ecological risk exists, but rather that further evaluation may be warranted.

Table 4 presents the published ecological screening levels for surface water. Some of the screening levels are expressed as a function of the hardness of water, specifically the criteria for cadmium, chromium, and lead. Values presented in **Table 4** for these constituents are based on a Site-specific hardness value of 242 milligrams per liter (mg/L), derived from hardness data collected by IDEM as part of the 2020 White River Mainstem Project (IDEM, 2021).

Water quality criteria are concentrations calculated from controlled laboratory tests on freshwater or marine organisms that are protective of the most sensitive organism (often zooplankton such as daphnids) for the most sensitive life stage (typically reproduction).

The screening level sources, in the order in which they were used, are:

- USEPA National Recommended Water Quality Criteria, Freshwater Chronic and Acute. (USEPA, 2023b)
- IWPCD. 327 IAC 2-1-6. Minimum Surface Water Quality Standards; acute aquatic criteria and chronic aquatic criteria. (IWPCD, 2023a)
- USEPA Region 4 Ecological Risk Assessment Supplemental Guidance, Surface Water Screening Values. (USEPA, 2018b)

5.1.5 Selected Screening Levels

Table 5 presents a summary of the selected surface water screening levels (from **Tables 2 through 4**), identifying the lowest selected screening levels for: 1) the use of surface water as a drinking water source, 2) the consumption of fish from a surface water body, 3) Site-specific recreational uses of surface water, and 4) potential ecological exposure scenarios.

5.2 TARGET SCREENING LEVELS FOR GROUNDWATER (PROTECTIVE OF WHITE RIVER SURFACE WATER)

Impacts to groundwater do not mean that White River surface waters are impaired. The degree to which groundwater – which is a fraction of the volume and flow rate of the river – may interact with the White River is variable and complex, and dependent upon a variety of factors including gradient and flow rate. It is possible, however, to determine maximum concentration levels in onsite groundwater that would be sufficiently protective of the White River surface water environment, assuming gradient and flow rates are such that groundwater flows into the river. Groundwater and surface waters flow at very different rates and volumes. The White River is a large river system and as depicted in **Appendix B**, as groundwater flows into the river, it is diluted by more than 180 times.[6]

Based upon the amount of dilution and attenuation estimated to occur as groundwater flows into the White River, target screening levels for groundwater were calculated. The target screening levels for groundwater identify the concentrations at which groundwater entering the river system may pose an adverse human health or ecological effect.

Table 5 shows the application of the DAF to the lowest selected surface water screening levels (selected as described in Section 5.1 above) to calculate target screening levels for groundwater, which are protective of White River surface water for detected Appendix III and Appendix IV constituents.

[6] As shown in Appendix B, estimated dilution-attenuation of groundwater is influenced by pumping conditions from the three high yield groundwater production wells (wells 5, 6, and 7), with estimated dilution-attenuation factors (DAF) ranging from 380 to 500 under normal production well operation (based on hydraulic conductivity values and pumping conditions gradients collected in April 2023), and 180 to 360 under atypical minimal pumping conditions (based on hydraulic conductivity values and pumping conditions gradients collected in January 2022, during the period of reduced pumping/plant shutdown between April 2021 through March 2022).

6. Results

Table 6 presents a comparison of the maximum groundwater constituent concentrations from all Site monitoring wells[7] (dating back to the initial sampling event from April 2016) and the high yield groundwater production wells, to the target screening levels for groundwater, protective of White River surface water. A summary of this comparison is presented in the in-text **Table 6-1** below. The comparison demonstrates that detected groundwater concentrations (conservatively, maximum concentrations) do not pose an adverse impact to the river. In fact, there is a wide margin of safety between the screening levels and detected concentrations, which is shown in the last column of the table. To illustrate, concentrations of arsenic, lithium, and molybdenum would need to be more than 12, 42, and 41 times higher, respectively, than currently measured levels before a potential adverse impact to the river might occur.

Table 6-1 – Comparison of Maximum Groundwater Concentrations against Target Screening Levels (Protective of White River Surface Water)

Constituents	Target Groundwater Screening Level - White River (mg/L)	Maximum Groundwater Concentration (mg/L)		Ratio Between Target Groundwater Screening Level and the Maximum Groundwater Concentration
Detection Monitoring - USEPA Appendix III Constituents				
Boron	720	13.3	MW-12S	>54
Fluoride	490	1.9	MW-14I	>250
Assessment Monitoring - USEPA Appendix IV Constituents				
Antimony	1.1	0.0063	MW-1S, MW-11S	>170
Arsenic	1.8	0.146	MW-11S	>12
Barium	40	0.255	MW-4S	>150
Beryllium	0.72	0.00049	MW-19S	>1,400
Cadmium	0.25	0.0022	MW-26S	>1,100
Chromium (Total)	18	0.0243	MW-11D	>740
Cobalt	1.1	0.0201	MW-19S	>53
Lead	1.2	0.0351	MW-11D	>33
Lithium	7.2	0.17	MW-7S	>42
Molybdenum	18	0.438	MW-15I	>41
Selenium	0.56	0.0976	MW-2S	>6
Radiological Constituent (pCi/L)				
Radium	900	7.11	MW-11D	>120

This means that the present concentrations of constituents in groundwater do not pose a risk to human health or the environment and even much higher concentrations in groundwater are unlikely to be harmful. This is further illustrated by the second comparison presented in **Table 6**, between the maximum groundwater concentrations from the wells closest to the White River to the derived target groundwater screening levels. This comparison, which is summarized in the in-text **Table 6-2** below,

[7] "Site" monitoring wells refers to CCR monitoring wells and N&E wells combined.

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shows an even wider margin of safety between the two values. As presented, the ratios between the target groundwater screening levels and maximum groundwater concentrations from the N&E wells closest to the river range from 45 to 1,700 for detected constituents. This means that concentrations of detected constituents in these wells could be more than 45 times higher than currently measured levels before a potential adverse impact to the river might occur.

Table 6-2 – Comparison of Maximum Groundwater Concentrations from N&E Wells Closest to White River against Target Screening Levels (Protective of White River Surface Water)

Constituents	Target Groundwater Screening Level - White River (mg/L)	Maximum Groundwater Concentration (mg/L)		Ratio Between Target Groundwater Screening Level and the Maximum Groundwater Concentration
Detection Monitoring - USEPA Appendix III Constituents				
Boron	720	4.52	MW-17D	>150
Fluoride	490	0.41	MW-24S	>1,100
Assessment Monitoring - USEPA Appendix IV Constituents				
Arsenic	1.8	0.0109	MW-17D	>160
Barium	40	0.156	MW-16S	>250
Chromium (Total)	18	0.0103	MW-17I	>1,700
Cobalt	1.1	0.0043	MW-16S	>250
Lead	1.2	0.0026	MW-17D	>440
Lithium	7.2	0.0863	MW-16D	>83
Molybdenum	18	0.18	MW-25D	>100
Selenium	0.56	0.0124	MW-21I	>45
Radiological Constituent (pCi/L)				
Radium	900	2.94	MW-16D	>300

The results of these comparisons demonstrate that detected concentrations of CCR constituents in groundwater do not pose an adverse impact to the White River and do not pose a risk to human health or ecological receptors.

6.1 RISK EVALUATION OF DISCHARGE WATER

As a supplemental evaluation, water discharged to the White River in accordance with a National Pollutant Discharge Elimination System Permit (at Outfall 003), which is sourced from groundwater by pumping from the production wells and utilized in operating the facility's combined cycle gas turbine (CCGT), was separately evaluated for potential impacts to the White River. The methodology and results of this evaluation are presented in **Appendix C**. As presented in **Appendix C**, risks were specifically evaluated by conservatively comparing maximum detected concentrations of Appendix III and Appendix IV CCR constituents in discharge samples to target discharge screening levels derived from the surface water screening levels identified as protective of White River surface water (described in Section 5 above). After accounting for dilution, the ratios between the target discharge screening levels and maximum discharge concentrations range from 9 to 3,400 for detected constituents. This means that concentrations of detected constituents in discharge water would need to be more than 9 times higher than the maximum level measured before a potential adverse impact to the river might occur.

Consequently, the discharge to the White River of extracted groundwater effluent from the existing CCGT production wells does not pose a risk to human health or the environment.

7. Summary

This comprehensive evaluation demonstrates that there are no adverse impacts on human health or the environment from groundwater affected by the Ash Pond System at the EVGS.

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TABLES

TABLE 1
GROUNDWATER DATA FROM HIGH YIELD GROUNDWATER PRODUCTION WELLS
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

Parameter	Units	Sampling Method	Well #5			Well #6			Well #7		
			05/29/20	06/05/20	06/12/20	05/29/20	06/05/20	06/12/20	05/29/20	06/05/20	06/12/20
Chloride	mg/L	EPA 300.0	98.2	118	125	56.8	62.5	54.2	104	103	97.4
Fluoride	mg/L	EPA 300.0	0.16	0.15	0.14	J 0.011	J 0.024	J 0.02	0.13	0.14	0.14
Sulfate	mg/L	EPA 300.0	129	184	241	93.9	96.9	85.6	216	212	208
Lithium	ug/L	EPA 200.7	NSD	NSD	38.3	NSD	NSD	J 16.6	NSD	NSD	79.4
Antimony	ug/L	EPA 200.8	J 0.18	J 0.25	J 0.21	< 0.1	J 0.11	< 0.1	< 0.1	J 0.14	< 0.1
Arsenic	ug/L	EPA 200.8	J 0.30	J 0.16	< 0.20	J 0.67	J 0.14	< 0.20	J 0.22	J 0.15	J 0.21
Barium	ug/L	EPA 200.8	76.7	83.9	85.3	66.7	61.2	60.3	77.6	79.1	74.5
Beryllium	ug/L	EPA 200.8	< 0.022	< 0.038	< 0.022	< 0.022	< 0.038	< 0.022	< 0.022	< 0.038	< 0.022
Boron	ug/L	EPA 200.8	456	597	981	209	209	191	2580	2500	2440
Cadmium	ug/L	EPA 200.8	J 0.066	J 0.060	J 0.051	< 0.022	< 0.024	< 0.022	J 0.067	J 0.045	J 0.054
Chromium	ug/L	EPA 200.8	J 0.11	< 0.19	J 0.14	J 0.89	< 0.19	< 0.11	J 0.12	< 0.19	< 0.11
Cobalt	ug/L	EPA 200.8	J 0.33	J 0.28	J 0.42	J 0.27	J 0.18	J 0.3	J 0.38	J 0.29	J 0.4
Lead	ug/L	EPA 200.8	J 0.041	< 0.15	< 0.034	< 0.034	< 0.15	< 0.034	J 0.041	< 0.15	< 0.034
Molybdenum	ug/L	EPA 200.8	123	120	108	15.8	15.3	13.8	146	150	145
Selenium	ug/L	EPA 200.8	< 0.41	< 0.27	< 0.41	< 0.41	< 0.27	< 0.41	1.3	J 1.0	1.3
Thallium	ug/L	EPA 200.8	< 0.031	< 0.05	< 0.031	< 0.031	< 0.05	< 0.031	< 0.031	< 0.05	< 0.031
TOC	mg/L	SM 5310C	1.1	1.1	1.1	J 0.67	J 0.71	J 0.77	J 0.69	J 0.83	J 0.84

Notes:
ug/L - micrograms per liter.
mg/L - milligrams per liter.
NSD – No Sampling Data
J-: Estimated Result, biased low

TABLE 1
GROUNDWATER DATA FROM HIGH YIELD GROUNDWATER PRODUCTION WELLS
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

Parameter	Units	Sampling Method	Sampling Data									
			10/23/20	10/30/20	11/06/20	11/13/20	12/04/20	12/11/20	12/18/20	01/08/21	01/15/21	01/22/21
Well #5												
Fluoride	mg/L	EPA 300.0	0.22	0.21	0.23	0.22	0.2	0.21	0.21	0.19	0.19	0.22
Sulfate	mg/L	EPA 300.0	210	193	175	183	130	131	208	139	197	195
Lithium	ug/L	EPA 200.7	NSD	NSD	NSD	32	30.9	31.6	32.8	NSD	30.7	NSD
Barium	ug/L	EPA 200.8	72.0	75.2	67.1	70.1	65.0	67.1	71.5	63.8	74.9	72.6
Boron	ug/L	EPA 200.8	808	834	758	775	552	582	922	534	946	975
Cadmium	ug/L	EPA 200.8	J 0.049	J 0.053	J 0.066	J 0.073	J 0.059	J 0.055	J 0.060	J 0.057	J 0.065	J 0.065
Chromium	ug/L	EPA 200.8	J 0.25	J 0.28	J 0.25	J 0.20	J 0.30	J 0.19	J 0.20	J 0.31	J 0.20	J 0.31
Cobalt	ug/L	EPA 200.8	J 0.37	J 0.40	J 0.39	J 0.38	J 0.41	J 0.36	J 0.37	J 0.42	J 0.38	J 0.39
Molybdenum	ug/L	EPA 200.8	99.9	99	102	106	114	112	97.1	109	101	102
Selenium	ug/L	EPA 200.8	< 0.24	J 0.25	< 0.27	< 0.41	< 0.24	< 0.24	< 0.41	< 0.27	< 0.41	< 0.27
Well #6												
Fluoride	mg/L	EPA 300.0	J 0.092	J 0.09	J 0.084	J 0.082	J 0.047	J 0.06	J 0.089	J 0.049	J 0.056	J 0.09
Sulfate	mg/L	EPA 300.0	71.3	68.6	81.3	94.3	110	101	69.9	95	87.8	82.8
Lithium	ug/L	EPA 200.7	NSD	NSD	NSD	J 13.7	J 14.3	J 17.5	J 9.1	NSD	J 11.3	NSD
Barium	ug/L	EPA 200.8	57.3	61.3	63.3	74.7	67.0	66.0	55.8	60.9	60.7	60.4
Boron	ug/L	EPA 200.8	160	181	171	165	167	167	176	161	163	162
Cadmium	ug/L	EPA 200.8	< 0.027	< 0.027	< 0.024	< 0.022	< 0.027	< 0.027	< 0.022	< 0.024	J 0.022	J 0.035
Chromium	ug/L	EPA 200.8	J 0.28	J 0.20	J 0.22	J 0.20	J 0.24	J 0.18	J 0.25	J 0.26	J 0.20	J 0.36
Cobalt	ug/L	EPA 200.8	J 0.22	J 0.26	J 0.26	J 0.27	J 0.33	J 0.27	J 0.24	J 0.33	J 0.38	J 0.25
Molybdenum	ug/L	EPA 200.8	7.5	4	11	11.7	12.5	10.5	4.5	9.8	10.4	10.4
Selenium	ug/L	EPA 200.8	< 0.24	J 0.24	< 0.27	< 0.41	< 0.24	< 0.24	< 0.41	< 0.27	< 0.41	< 0.27
Well #7												
Fluoride	mg/L	EPA 300.0	0.22	0.21	0.21	0.21	0.17	0.18	0.2	0.18	0.18	0.21
Sulfate	mg/L	EPA 300.0	216	206	211	201	204	215	196	211	217	217
Lithium	ug/L	EPA 200.7	NSD	NSD	NSD	76.7	76.9	82.6	75.7	NSD	78.3	NSD
Barium	ug/L	EPA 200.8	72.3	73.6	72.1	75.2	74.9	74.6	73.1	71.0	75.9	74.0
Boron	ug/L	EPA 200.8	2080	2060	2070	2130	2180	2180	2330	2000	2370	2440
Cadmium	ug/L	EPA 200.8	J 0.05	J 0.062	J 0.046	J 0.063	J 0.070	J 0.052	J 0.062	J 0.068	J 0.055	J 0.063
Chromium	ug/L	EPA 200.8	J 0.29	J 0.26	< 0.19	J 0.17	J 0.23	J 0.20	J 0.26	J 0.64	J 0.16	J 0.45
Cobalt	ug/L	EPA 200.8	J 0.34	J 0.36	J 0.37	J 0.37	J 0.43	J 0.37	J 0.35	J 0.45	J 0.37	J 0.39
Molybdenum	ug/L	EPA 200.8	136	129	134	139	135	132	137	136	147	137
Selenium	ug/L	EPA 200.8	1.2	1.4	1.2	1.4	1.1	1.3	1.2	1.5	1.1	1.3

Notes:
ug/L - micrograms per liter.
mg/L - milligrams per liter.
NSD – No Sampling Data
J-: Estimated Result, biased low

TABLE 2
PUBLISHED HUMAN HEALTH SCREENING LEVELS FOR DRINKING WATER AND SURFACE WATER
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

		Published Human Health Screening Level - Drinking Water			Published Human Health Screening Level - Surface Water		Selected Screening Levels for Drinking Water and Surface Water	
Constituent	**CAS RN**	**USEPA MCL (a) (mg/L)**	**USEPA RSL Tap Water (b) (mg/L)**	**IDEM Criteria for Drinking Water Class Groundwater (c) (mg/L)**	**USEPA NRWQC Consumption of Organism Only (d) (mg/L)**	**IDEM CCC HLSC Consumption of Organism Only (e) (mg/L)**	**Selected Screening Level - Drinking Water (f) (mg/L)**	**Selected Screening Level - Surface Water Consumption of Organism Only (g) (mg/L)**
Detection Monitoring - USEPA Appendix III Constituents (h)								
Boron	7440-42-8	NA	4	NA	NA	NA	4	NA
Fluoride	16984-48-8	4	0.8	4	NA	NA	4	NA
Assessment Monitoring - USEPA Appendix IV Constituents								
Antimony	7440-36-0	0.006	0.0078	0.006	0.64	0.64	0.006	0.64
Arsenic	7440-38-2	0.01	0.0052 (i)	0.01	0.014 (i, j)	0.00175 (i,k)	0.01	0.014
Barium	7440-39-3	2	3.8	2	NA	NA	2	NA
Beryllium	7440-41-7	0.004	0.025	0.004	NA	NA	0.004	NA
Cadmium	7440-43-9	0.005	0.0018	0.005	NA	NA	0.005	NA
Chromium (Total)	7440-47-3	0.1	22 (l)	0.1	NA	NA	0.1	NA
Cobalt	7440-48-4	NA	0.006	NA	NA	NA	0.006	NA
Lead	7439-92-1	0.015 (m)	0.015 (m)	0.015 (m)	NA	NA	0.015	NA
Lithium	7439-93-2	NA	0.04	NA	NA	NA	0.04	NA
Molybdenum	7439-98-7	NA	0.1	NA	NA	NA	0.1	NA
Selenium	7782-49-2	0.05	0.1	0.05	4.2	4.2	0.05	4.2
Radiological (pCi/L)								
Radium-226 & 228	7440-14-4	5	NA	5	NA	NA	5	NA

Notes:

CAS RN - Chemical Abstracts Service Registry Number.
CCC HLSC - Continuous Criterion Concentration. Human Life-Cycle Safe Concentration.
IDEM - Indiana Department of Environmental Management.
MCL - Maximum Contaminant Level.
mg/L - milligrams/liter.
NA - Not Available.
NRWQC - National Recommended Water Quality Criteria.
pCi/L - picoCuries/liter.
RSL - Regional Screening Level.
USEPA - United States Environmental Protection Agency.

TABLE 2
PUBLISHED HUMAN HEALTH SCREENING LEVELS FOR DRINKING WATER AND SURFACE WATER
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

Additional Notes:

(a) - USEPA, 2023. National Primary Drinking Water Regulations.
https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations

(b) - USEPA, 2023. Regional Screening Levels (November 2023). Values for Tap Water, Hazard Index = 1.0. TR = 1E-06.
https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables

(c) - IDEM Water Quality Standards. Title 327 of the Indiana Administrative Code (IAC). Article 2. Water Quality Standards. Rule 11. Ground Water Quality Standards. Part 327 IAC 2-11-6. Criteria for Drinking Water Class Ground Water.
http://iac.iga.in.gov/iac//title327.html

(d) - USEPA National Recommended Water Quality Criteria - Human Health Criteria Table. USEPA NRWQC - Human Health Criteria for the Consumption of Organism Only apply to total concentrations.
https://www.epa.gov/wqc/national-recommended-water-quality-criteria-human-health-criteria-table

(e) - IDEM Water Quality Standards. Title 327 of the IAC. Article 2. Water Quality Standards. Rule 1. Water Quality Standards Applicable to All State Waters Except Waters of the State Within the Great Lakes System. Part 327 IAC 2-1-6 Minimum Surface Water Quality Standards. Table 6-4. Surface Water Quality C riteria for Protection of Human Health, Continuous Criterion Concentrations Outside of Mixing Zone. For metals, surface water quality criteria apply to total recoverable concentrations. For carcinogenic substances, criteria are to protect human health from unacceptable cancer risk of greater than one (1) additional occurrence of cancer per one hundred thousand (100,000) population.
http://iac.iga.in.gov/iac//title327.html

(f) - The hierarchy for the selection of published human health screening levels for drinking water is:
1) USEPA MCL
2) USEPA RSL - Tap Water
3) IDEM Criteria for Drinking Water Class Groundwater

(g) - The hierarchy for selection of published human health screening levels for surface water - "consumption of organisms only" is:
1) USEPA NRWQC - Consumption of Organism Only.
2) IDEM CCC HLSC - Consumption of Organism Only.

(h) - Detection Monitoring - EPA Appendix III Constituents without health risk-based screening levels are not included.

(i) - Value based on a target lifetime excess cancer risk of 1E-04, the cancer risk per the CCR Rule (USEPA, 2015) generally “considered to pose a substantial present or potential hazard to human health and the environment and generally will be regulated,” and the cumulative target cancer risk that should not be exceeded per IDEM risk assessment guidance (2022). Cancer risk-based screening levels for arsenic (based on a target cancer risk of 1E-05 or 1E-06) were adjusted to values based on a target cancer risk of 1E-04 as arsenic is the only constituent evaluated that is carcinogenic (via the oral and/or dermal pathways accounted for in the screening levels).

(j) - Value for inorganic arsenic.

(k) - Value for inorganic arsenic as arsenite, As(III), derived from nonthreshold cancer risk.

(l) - Value for chromium (III).

(m) - Lead Action Level. This is a drinking water treatment action level applicable to regulated Community and Non-Transient Non-Community public water systems.
http://www.in.gov/idem/files/factsheet_owq_pws_lead_copper.pdf
https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=60001N8P.txt

References:

Indiana Department of Environmental Management (IDEM). 2022. Risk-based Closure Guide. Office of Land Quality. July 8.

United States Environmental Protection Agency (USEPA). 2015. Final Rule: Disposal of Coal Combustion Residuals (CCRs) for Electric Utilities. 80 FR 21301-21501. U.S. Environmental Protection Agency, Washington, D.C. Available at: https://www.epa.gov/coalash/coal-ash-rule

TABLE 3
SITE-SPECIFIC, RISK-BASED SCREENING LEVELS FOR RECREATIONAL USE OF SURFACE WATER
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

		Human Health Calculated RBSL - Recreational Use of Surface Water (a)						
Constituent	**CAS RN**	**Current/Future Off-Site Recreational Swimmer Age-Adjusted (Ages 1 - 26) (b) (mg/L)**		**Current/Future Off-Site Recreational Wader Age-Adjusted (Ages 1 - 26) (b) (mg/L)**		**Current/Future Off-Site Recreational Boater (Adult) (b) (mg/L)**		**Selected Human Health Calculated RBSL - Recreational Use of Surface Water (c) (mg/L)**
Detection Monitoring - USEPA Appendix III Constituents (d)								
Boron	7440-42-8	216		235		10700		216
Fluoride	16984-48-8	43		47		2140		43
Assessment Monitoring - USEPA Appendix IV Constituents								
Antimony	7440-36-0	0.263		0.395		3.20		0.26
Arsenic	7440-38-2	0.32	(e, f)	0.35	(e, g)	16	(e, h)	0.32
Barium	7440-39-3	86		162		748		86
Beryllium	7440-41-7	0.13		0.41		0.75		0.13
Cadmium	7440-43-9	0.034		0.072		0.27		0.034
Chromium (Total)	7440-47-3	169	(i)	494	(i)	1040	(i)	169
Cobalt	7440-48-4	0.35		0.36		40		0.35
Lead	7439-92-1	0.015	(j)	0.015	(j)	0.015	(j)	0.015
Lithium	7439-93-2	2.2		2.4		107		2.2
Molybdenum	7439-98-7	5.4		5.9		267		5.4
Selenium	7782-49-2	5.4		5.9		267		5.4
Radiological (pCi/L)								
Radium-226 & 228	7440-14-4	NA		NA		NA		NA

Notes:

CAS RN - Chemical Abstracts Service Registry Number.
mg/L - micrograms/liter.
NA - Not Available.
pCi/L - picoCuries/liter.
RBSL - Risk-Based Screening Level.
USEPA - United States Environmental Protection Agency.

(a) - Some calculated values may be above solubility limits.
(b) - Documentation for the risk-based screening level (RBSL) calculations for recreational use of surface water is provided in Attachment A. RBSLs calculated using the USEPA RSL calculator (USEPA, 2023b).
(c) - The selected RBSL for recreational use of surface water is the minimum value from amongst the Current/Future Off-Site Recreational Swimmer, Current/Future Off-Site Recreational Wader, and Current/Future Off-Site Recreational Boater RBSLs.
(d) - Detection Monitoring - EPA Appendix III Constituents without health risk-based screening levels are not included.
(e) - Arsenic RBSLs are based on the lower of the values based on a hazard index of 1 and an excess lifetime cancer risk of 1E-04. Per the CCR Rule (USEPA, 2015), a cancer risk level of 1E-04 is generally "considered to pose a substantial present or potential hazard to human health and the environment and generally will be regulated," and per the Indiana Department of Environmental Management (IDEM) risk assessment guidance (IDEM, 2022), cumulative cancer risk should not exceed 1E-04. Cancer RBSLs for arsenic were therefore calculated using a target cancer risk of 1E-04 as arsenic is the only constituent evaluated that is carcinogenic via the oral and/or dermal pathways accounted for in the RBSLs.
(f) - RBSL based on noncancer endpoint (cancer-based RBSL is 0.43 mg/L).
(g) - RBSL based on noncancer endpoint (cancer-based RBSL is 0.741 mg/L).
(h) - RBSL based on noncancer endpoint (cancer-based RBSL is 24.9 mg/L).
(i) - Value for chromium (III).
(j) - USEPA lead action level of 0.015 mg/L for lead in drinking water (USEPA, 2023a) is used as the RBSL.

References:

Indiana Department of Environmental Management (IDEM). 2022. Risk-based Closure Guide. Office of Land Quality. July 8.
United States Environmental Protection Agency (USEPA). 2023a. National Primary Drinking Water Regulations. Available at: https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations. Last updated on 9 January 2023
USEPA. 2023b. RSL Calculator. Available at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search

TABLE 4
PUBLISHED ECOLOGICAL SCREENING LEVELS FOR SURFACE WATER
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

		Published Ecological Screening Levels - Surface Water															
		USEPA NRWQC Aquatic Life Criteria CMC - Freshwater (acute) (a) (mg/L)		USEPA NRWQC Aquatic Life Criteria CCC - Freshwater (chronic) (a) (mg/L)		IDEM AAC Aquatic Life Criterion (acute) (b)(c) (mg/L)		IDEM CAC Aquatic Life Criterion (chronic) (b)(c) (mg/L)		USEPA Region 4 Surface Water Screening Values for Hazardous Waste Sites (freshwater - acute) (d) (mg/L)		USEPA Region 4 Surface Water Screening Values for Hazardous Waste Sites (freshwater - chronic) (d) (mg/L)		Selected Ecological Screening Level (acute) (e) (mg/L)		Selected Ecological Screening Level (chronic) (e) (mg/L)	
Constituent	**CAS RN**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**	**Total**	**Dissolved**
Detection Monitoring - USEPA Appendix III Constituents (f)																	
Boron	7440-42-8	NA	NA	NA	NA	NA	NA	NA	NA	34	34	7.2	7.2	34	34	7.2	7.2
Fluoride	16984-48-8	NA	NA	NA	NA	NA	NA	NA	NA	9.8	NA	2.7	NA	9.8	NA	2.7	NA
Assessment Monitoring - USEPA Appendix IV Constituents																	
Antimony	7440-36-0	NA	NA	NA	NA	NA	NA	NA	NA	0.9	NA	0.19	NA	0.9	NA	0.19	NA
Arsenic	7440-38-2	0.34 (g)	0.34 (g)	0.15 (g)	0.15 (g)	0.34	0.34	0.15	0.15	0.34	0.34	0.15	0.15	0.34	0.34	0.15	0.15
Barium	7440-39-3	NA	NA	NA	NA	NA	NA	NA	NA	2	NA	0.22	NA	2	NA	0.22	NA
Beryllium	7440-41-7	NA	NA	NA	NA	NA	NA	NA	NA	0.093	NA	0.011	NA	0.093	NA	0.011	NA
Cadmium	7440-43-9	0.0045 (h)	0.0041 (h)	0.0016 (h)	0.0014 (h)	0.0045 (h)	0.0041 (h)	0.0016 (h)	0.0014 (h)	0.0045 (h)	0.0041 (h)	0.0016 (h)	0.0014 (h)	0.0045	0.0041	0.0016	0.0014
Chromium (Total)	7440-47-3	3.7 (h)	1.2 (h)	0.18 (h)	0.15 (h)	3.7 (h)	1.2 (h)	0.18 (h)	0.15 (h)	3.7 (h, i)	1.2 (h)	0.18 (h, i)	0.153 (h)	3.7	1.2	0.18	0.15
Cobalt	7440-48-4	NA	NA	NA	NA	NA	NA	NA	NA	0.12	NA	0.019	NA	0.12	NA	0.019	NA
Lead	7439-92-1	0.25 (h)	0.17 (h)	0.0098 (h)	0.0065 (h)	0.25 (h)	0.17 (h)	0.0098 (h)	0.0065 (h)	0.25 (h)	0.17 (h)	0.0098 (h)	0.0065 (h)	0.25	0.17	0.0098	0.0065
Lithium	7439-93-2	NA	NA	NA	NA	NA	NA	NA	NA	0.91	NA	0.44	NA	0.91	NA	0.44	NA
Molybdenum	7439-98-7	NA	NA	NA	NA	NA	NA	NA	NA	7.2	NA	0.8	NA	7.2	NA	0.8	NA
Selenium	7782-49-2	NA	NA	NA	0.0031 (j)	NA	NA	NA	0.0031 (j)	0.02	NA	0.005	NA	0.02	NA	0.005	0.0031
Radiological (pCi/L)																	
Radium-226 & 228	7440-14-4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

AAC - Acute Aquatic Criterion
CAC - Chronic Aquatic Criterion
CAS RN - Chemical Abstracts Service Registry Number.
CCC - Continuous Criterion Concentration
CMC - Criterion Maximum Concentration
IDEM - Indiana Department of Environmental Management
mg/L - micrograms/liter.
NA - Not Available
NRWQC - National Recommended Water Quality Criteria
pCi/L - picoCuries/liter.
USEPA - United States Environmental Protection Agency

Additional Notes:

(a) - USEPA Water Quality Criteria. Current Water Quality Criteria Tables. National Recommended Water Quality Criteria - Aquatic Life Criteria Table.
https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table

(b) - IDEM Water Quality Standards. Title 327 of the IAC. Article 2. Water Quality Standards. Rule 1. Water Quality Standards Applicable to All State Waters Except Waters of the State Within the Great Lakes System. Part 327 IAC 2-1-6 Minimum Surface Water Quality Standards. Tables 6-1, 6-2, and 6-3. For metals, surface water quality criteria apply to total recoverable concentrations.
http://iac.iga.in.gov/iac//title327.html

(c) - IDEM. Water Quality Standards.
https://www.in.gov/idem/cleanwater/resources/water-quality-standards/

(d) - USEPA Region 4 Ecological Risk Assessment Supplemental Guidance. Table 1a: Region 4 Surface Water Screening Values for Hazardous Waste Sites. Freshwater Screening Values.
https://www.epa.gov/sites/default/files/2018-03/documents/era_regional_supplemental_guidance_report-march-2018_update.pdf

(e) - The hierarchy for the selection of ecological screening levels is:
1) USEPA NRWQC. Aquatic Life Criteria - Freshwater.
2) IDEM Aquatic Life Criterion.
3) USEPA Region 4. Freshwater Screening Values.

(f) - Detection Monitoring - EPA Appendix III Constituents without health risk-based screening levels are not included.

(g) - Value for inorganic arsenic only.

(h) - Criterion expressed as a function of total hardness (as $CaCO_3$). Value displayed is based on a Site-specific hardness value of 242 mg/L, obtained from IDEM, 2021. Value is the minimum hardness concentration in surface water samples collected from the nearest upstream and nearest downstream station locations (i.e., stations WWU-15-0006 and WWU-15-0007, located upstream and downstream of the facility, respectively).

(i) - Value for chromium (III).

(j) - USEPA Office of Water. Final Criterion: Aquatic Life Ambient Water Quality Criterion for Selenium - Freshwater. 30 June 2016. Freshwater value for chronic (30 day) water column concentration (mg/L) of dissolved selenium in lotic (flowing) surface water. The criterion is based on fish ovary concentrations, and in lieu of that, the water column values are used.
https://www.epa.gov/sites/production/files/2016-07/documents/aquatic_life_awqc_for_selenium_-_freshwater_2016.pdf

Reference:

Indiana Department of Environmental Management (IDEM). 2021. 2020 White River Mainstem Project Surface Water Results Summaries. October 14.

TABLE 5

SELECTED SURFACE WATER SCREENING LEVELS AND DERIVATION OF TARGET SCREENING LEVELS FOR GROUNDWATER (PROTECTIVE OF WHITE RIVER SURFACE WATER)

EAGLE VALLEY GENERATING STATION

MARTINSVILLE, INDIANA

									Dilution-Attenuation Factor for White River (e)	**180**
Constituent	**CAS RN**	**HH DW SL (a) (mg/L)**	**HH REC SL - Consumption of Organism Only (b) (mg/L)**	**HH Recreational Calculated RBSL (c) (mg/L)**	**ECO SL - Total (acute) (d) (mg/L)**	**ECO SL - Dissolved (acute) (d) (mg/L)**	**ECO SL - Total (chronic) (d) (mg/L)**	**ECO SL - Dissolved (chronic) (d) (mg/L)**	**Lowest of the Human Health and Ecological Screening Levels (mg/L)**	**Target Groundwater Screening Level - White River (f) (mg/L)**
Detection Monitoring - USEPA Appendix III Constituents (g)										
Boron	7440-42-8	4	NA	216	34	34	7.2	7.2	4	720
Fluoride	16984-48-8	4	NA	43	9.8	NA	2.7	NA	2.7	490
Assessment Monitoring - USEPA Appendix IV Constituents										
Antimony	7440-36-0	0.006	0.64	0.26	0.9	NA	0.19	NA	0.006	1.1
Arsenic	7440-38-2	0.01	0.014	0.32	0.34	0.34	0.15	0.15	0.01	1.8
Barium	7440-39-3	2	NA	86.3	2	NA	0.22	NA	0.22	40
Beryllium	7440-41-7	0.004	NA	0.13	0.093	NA	0.011	NA	0.004	0.72
Cadmium	7440-43-9	0.005	NA	0.034	0.0045	0.0041	0.0016	0.0014	0.0014	0.25
Chromium (Total)	7440-47-3	0.1	NA	169	3.7	1.2	0.18	0.15	0.1	18
Cobalt	7440-48-4	0.006	NA	0.35	0.12	NA	0.019	NA	0.006	1.1
Lead	7439-92-1	0.015	NA	0.015	0.25	0.17	0.0098	0.0065	0.0065	1.2
Lithium	7439-93-2	0.04	NA	2.2	0.91	NA	0.44	NA	0.04	7.2
Molybdenum	7439-98-7	0.1	NA	5.4	7.2	NA	0.8	NA	0.1	18
Selenium	7782-49-2	0.05	4.2	5.4	0.02	NA	0.005	0.0031	0.0031	0.56
Radiological (pCi/L)										
Radium-226 & 228	7440-14-4	5	NA	NA	NA	NA	NA	NA	5	900

TABLE 5

SELECTED SURFACE WATER SCREENING LEVELS AND DERIVATION OF TARGET SCREENING LEVELS FOR GROUNDWATER (PROTECTIVE OF WHITE RIVER SURFACE WATER)

EAGLE VALLEY GENERATING STATION

MARTINSVILLE, INDIANA

Notes:

CAS RN - Chemical Abstracts Service Registry Number.

ECO SL - Ecological Screening Level.

HH DW SL - Human Health Drinking Water Screening Level.

HH REC SL - Human Health Recreational Use Screening Level.

mg/L - milligram per liter.

NA - Not Available.

pCi/L - picoCuries/liter.

RBSL - Risk-Based Screening Level.

(a) - Human health screening levels for drinking water selected in Table 2 using the following hierarchy:
- *1) United States Environmental Protection Agency (USEPA) Maximum Contaminant Levels*
- *2) USEPA Regional Screening Level - Tap Water*
- *3) Indiana Department of Environmental Management (IDEM) Criteria for Drinking Water Class Groundwater*

(b) - Human health screening levels for surface water, "consumption of organism only," selected in Table 2 using the following hierarchy:
- *1) USEPA National Recommended Water Quality Criteria (NRWQC) - Consumption of Organism Only.*
- *2) IDEM Continuous Criterion Concentration. Human Life-Cycle Safe Concentration - Consumption of Organism Only.*

(c) - Minimum human health risk-based screening level (RBSL) for current/future off-site recreational swimmer, current/future off-site recreational wader, and current/future off-site recreational boater, obtained from Table 3.

(d) - Ecological Screening Levels selected in Table 4 using the following hierarchy:
- *1) USEPA NRWQC. Aquatic Life Criteria - Freshwater.*
- *2) IDEM Aquatic Life Criterion.*
- *3) USEPA Region 4. Freshwater Screening Values.*

(e) - Estimated value, see Attachment B for derivation.

(f) - The Target Groundwater Screening Level = Minimum Screening Level x Dilution Factor.

(g) - Detection Monitoring - EPA Appendix III Constituents without health risk-based screening levels are not included.

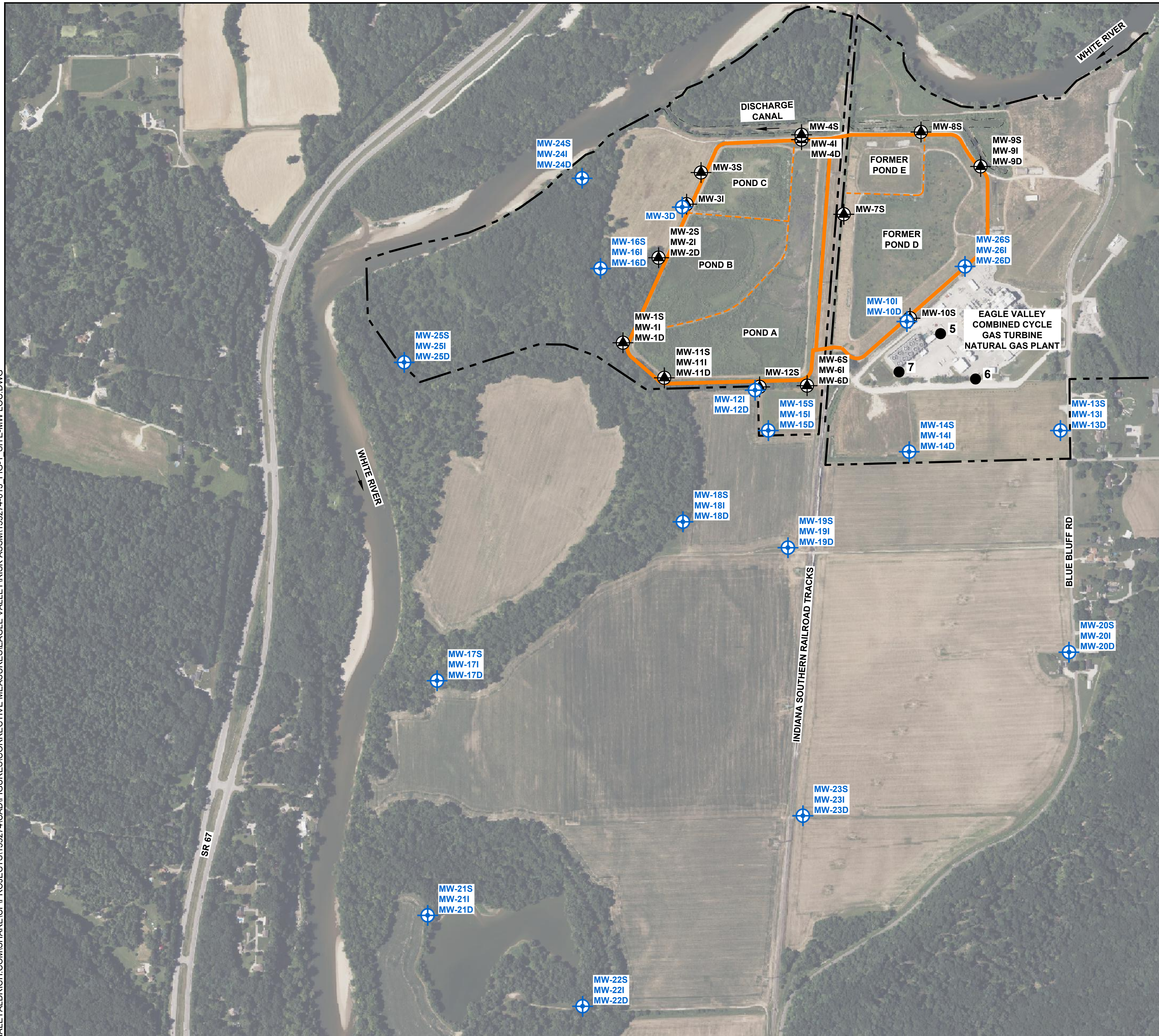
TABLE 6
COMPARISON OF GROUNDWATER CONCENTRATIONS AGAINST TARGET SCREENING LEVELS (PROTECTIVE OF WHITE RIVER SURFACE WATER)
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

Constituent	CAS RN	Target Groundwater Screening Level - White River (a) (mg/L)	Maximum Groundwater Concentration - All Wells (mg/L)		Ratio Between Target Groundwater Screening Level and the Maximum Groundwater Concentration (b) (all wells)	Maximum Groundwater Concentration - Nature and Extent Wells Closest to White River (c) (mg/L)		Ratio Between Target Groundwater Screening Level and the Maximum Groundwater Concentration (b) (nature and extent wells closest to White River)
Detection Monitoring - USEPA Appendix III Constituents (d)								
Boron	7440-42-8	720	13.3	MW-12S	> 54	4.52	MW-17D	> 150
Fluoride	16984-48-8	490	1.9	MW-14I	> 250	0.41	MW-24S	> 1,100
Assessment Monitoring - USEPA Appendix IV Constituents								
Antimony	7440-36-0	1.1	0.0063	MW-1S, MW-11S	> 170	0.001 U		ND
Arsenic	7440-38-2	1.8	0.146	MW-11S	> 12	0.0109	MW-17D	> 160
Barium	7440-39-3	40	0.255	MW-4S	> 150	0.156	MW-16S	> 250
Beryllium	7440-41-7	0.72	0.00049	MW-19S	> 1,400	0.0002 U		ND
Cadmium	7440-43-9	0.25	0.00022	MW-26S	> 1,100	0.002 U		ND
Chromium (Total)	7440-47-3	18	0.0243	MW-11D	> 740	0.0103	MW-17I	> 1,700
Cobalt	7440-48-4	1.1	0.0201	MW-19S	> 53	0.0043	MW-16S	> 250
Lead	7439-92-1	1.2	0.0351	MW-11D	> 33	0.0026	MW-17D	> 440
Lithium	7439-93-2	7.2	0.17	MW-7S	> 42	0.0863	MW-16D	> 83
Molybdenum	7439-98-7	18	0.438	MW-15I	> 41	0.18	MW-25D	> 100
Selenium	7782-49-2	1	0.0976	MW-2S	> 6	0.0124	MW-21I	> 45
Radiological (pCi/L)								
Radium-226 & 228	7440-14-4	900	7.11	MW-11D	> 120	2.94	MW-16D	> 300

Notes:

CAS RN - Chemical Abstracts Service Registry Number.
mg/L - milligram per liter.
ND - Not Detected.
pCi/L - picoCuries/liter.
(a) - The Target Groundwater Screening Level = Minimum Screening Level x Dilution Factor (Table 5).
(b) - Ratio = Target Groundwater Screening Level / Maximum Groundwater Concentration.
(c) - Maximum groundwater concentrations from nature and extent wells MW-16, MW-17, MW-21, MW-24, and MW-25.
(d) - Detection Monitoring - EPA Appendix III Constituents without health risk-based screening levels are not included.

FIGURES



LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF ASH POND SYSTEM
- APPROXIMATE BOUNDARY OF ASH POND
- MW-3 — CCR MONITORING WELL
- MW-15 — NATURE AND EXTENT MONITORING WELL
- 5 — PRODUCTION WELL

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
3. CCR = COAL COMBUSTION RESIDUALS

N

0 800 1600
SCALE IN FEET

HALEY ALDRICH

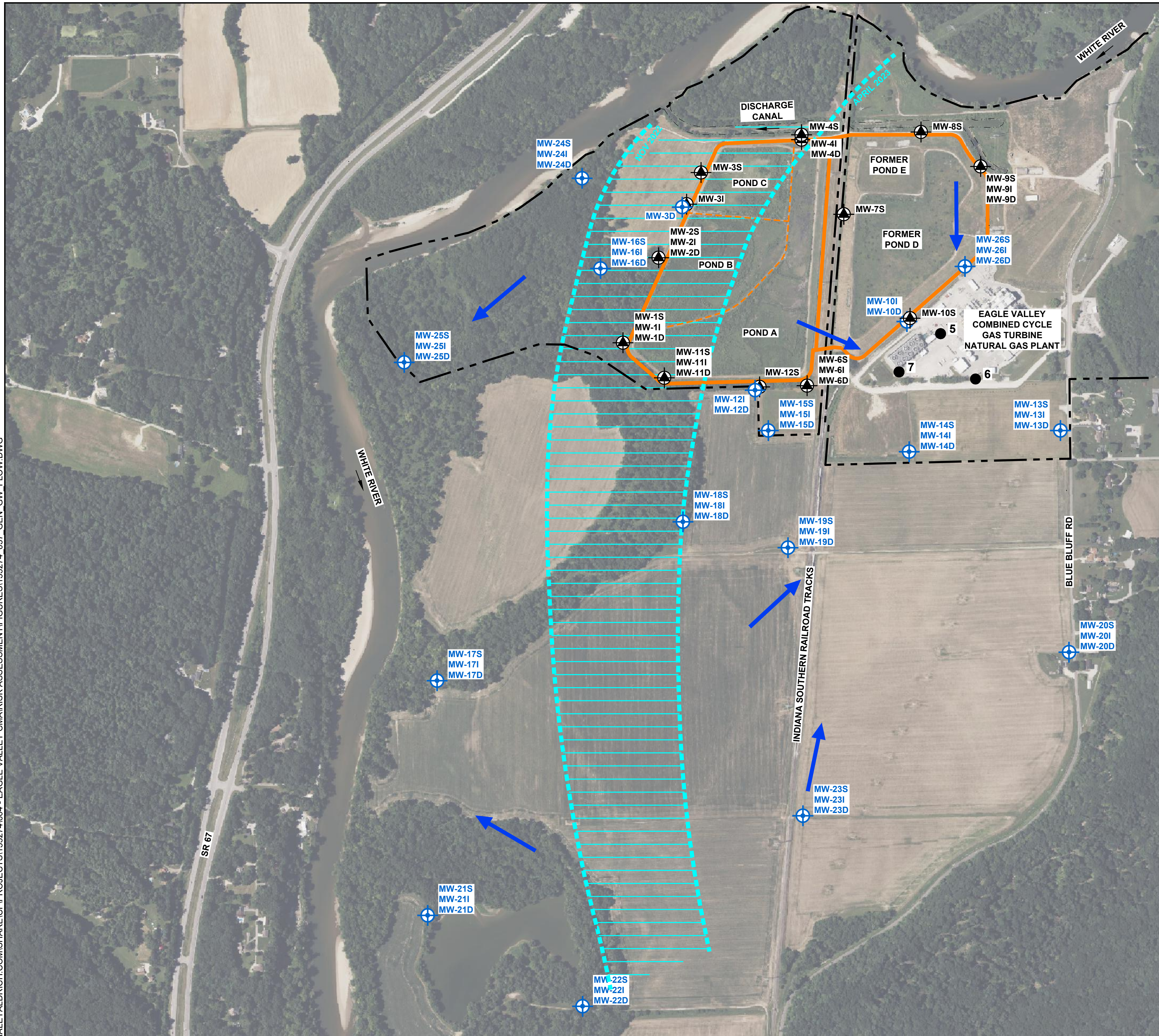
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

SITE FEATURES AND MONITORING WELL LOCATIONS

SCALE: AS SHOWN
APRIL 2024

FIGURE 1

YEOMAN, ROB Saved: 1/12/2024 7:07 AM Layout: L
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\133274\CAD\FIGURES\CORRECTIVE MEASURES\EAGLE VALLEY\RISK ASSM\133274-013_FIG-1_SITE-MW LOC.DWG



LEGEND

- APPROXIMATE LIMITS OF PROPERTY
- APPROXIMATE LIMITS OF ASH POND SYSTEM
- APPROXIMATE BOUNDARY OF ASH POND
- MW-3 CCR MONITORING WELL
- MW-15 NATURE AND EXTENT MONITORING WELL
- 5 PRODUCTION WELL
- = AREA WITH SEASONAL GROUNDWATER FLOW DIRECTION CHANGE
- GROUNDWATER FLOW DIVIDE (SHALLOW ZONE)
- APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTES

1. AERIAL IMAGE FROM MICROSOFT BING MAPS, 2022.
2. WELL DESIGNATION:
   - S = SHALLOW WELL
   - I = INTERMEDIATE WELL
   - D = DEEP WELL
3. CCR = COAL COMBUSTION RESIDUALS
4. EXTENT OF PRODUCTION WELL INFLUENCE IS APPROXIMATE AND BASED ON NOVEMBER 2023 GROUNDWATER ELEVATION DATA
5. GROUNDWATER FLOW DIVIDE SHIFTS SEASONALLY AND CHANGES WITH PUMPING CONDITIONS

N

0 800 1600
SCALE IN FEET

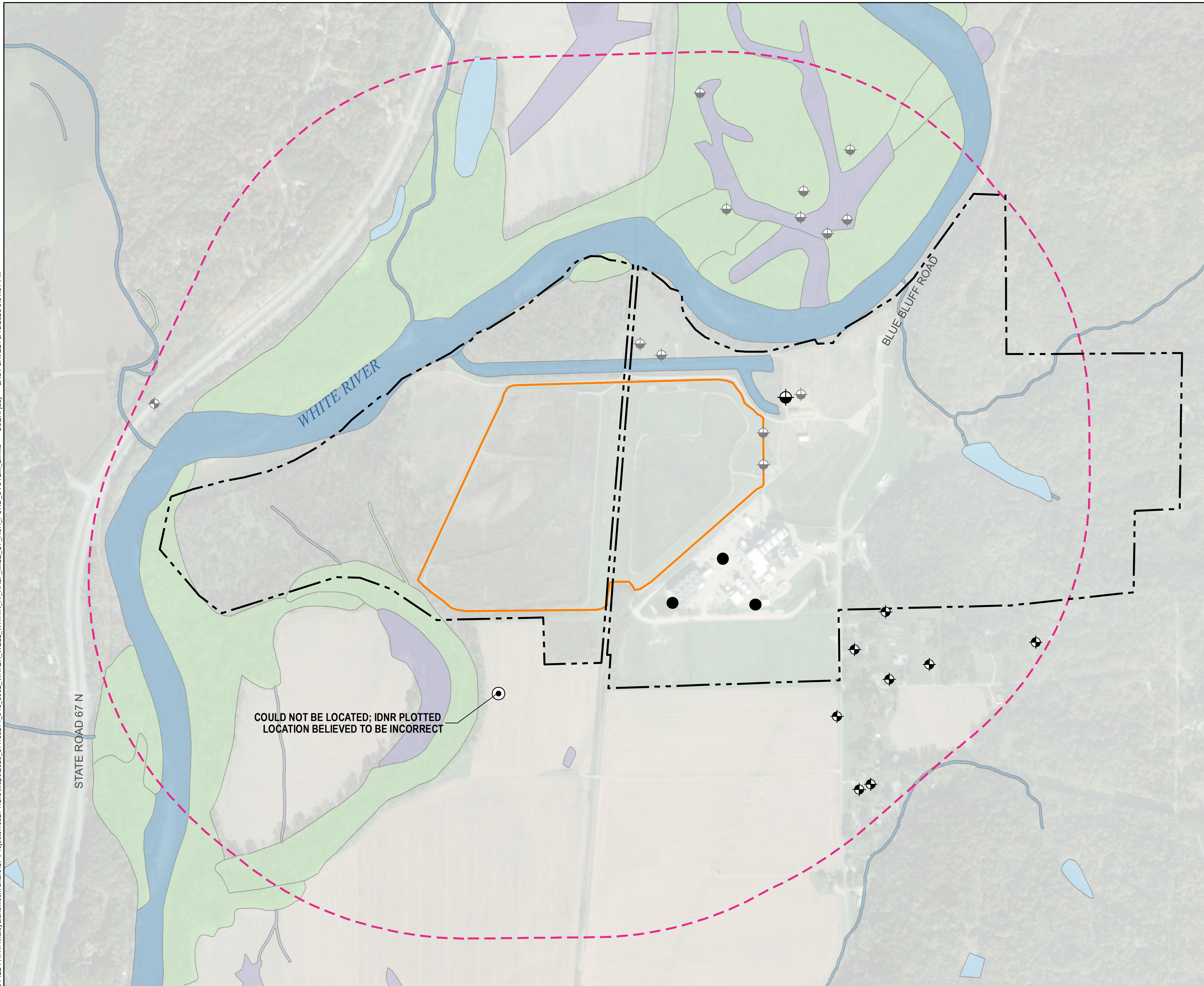
HALEY ALDRICH

EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

GENERALIZED GROUNDWATER FLOW DIRECTION

SCALE: AS SHOWN
APRIL 2024

FIGURE 2



LEGEND

- OPERATIONAL AESI PRODUCTION WELL
- OPERATIONAL IPL WELL
- ABANDONED IPL WELL
- OFF-SITE PRIVATE WELL
- ABANDONED OFF-SITE PRIVATE WELL
- REPORTED IPL WELL
- LIMITS OF ASH POND SYSTEM
- 0.5-MILE OFFSET
- LIMITS OF PROPERTY

NATIONAL WETLANDS INVENTORY (NWI)

- FRESHWATER EMERGENT WETLAND
- FRESHWATER FORESTED/SHRUB WETLAND
- FRESHWATER POND
- RIVERINE

NOTES

1. ALL LOCATIONS ARE APPROXIMATE.
2. WELL LOCATION SOURCE: INDIANA DEPARTMENT OF NATURAL RESOURCES (IDNR) AND INFORMATION FROM AES INDIANA
3. THE NATIONAL WETLANDS INVENTORY (NWI) BOUNDARIES ARE FROM THE U.S. FISH AND WILDLIFE SERVICE NATIONAL WETLANDS INVENTORY, MAY 2023 (https://www.fws.gov/program/national-wetlands-inventory)
3. AESI = AES INDIANA
4. IPL = INDIANA POWER AND LIGHT

N

0 800 1,600
SCALE IN FEET

HALEY ALDRICH

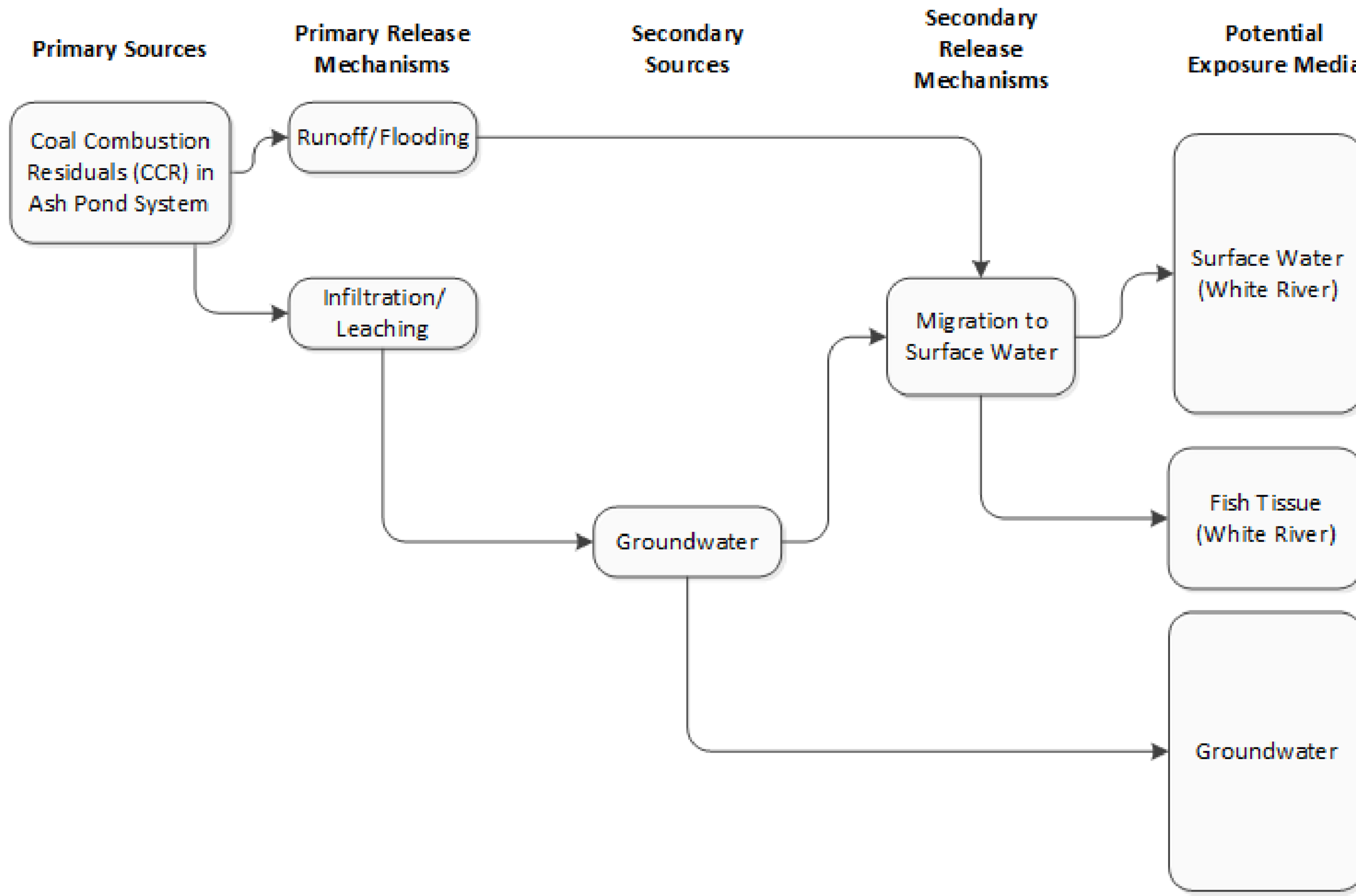
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

WATER WELL LOCATIONS WITHIN A HALF-MILE OF ASH POND SYSTEM

APRIL 2024

FIGURE 3

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\133274\GISMaps\2023_07\133274_013_0002_WATER_WELL_WITHIN_A_HALF_MILE_OF_ASH_POND_SYSTEM_2.mxd — USER: jday — LAST SAVED: 8/15/2023 3:01:31 PM



Potential Human Health Receptors					Potential Ecological Receptors
Potential Exposure Route	Current/Future Off-Site Resident Adult/Child	Current/Future Off-Site Swimmer or Wader	Current/Future Off-Site Boater	Current/Future Off-Site Recreational Fisher	Aquatic Receptors
Ingestion	●	●	○	○	NA
Dermal Contact	●	●	●	○	NA
Aquatic Exposure	NA	NA	NA	NA	●
Ingestion	○	○	○	●	NA
Ingestion	○ (a)	○	○	○	NA
Dermal Contact	○ (a)	○	○	○	NA
Aquatic Exposure	NA	NA	NA	NA	○ (b)

Notes:

● Pathway evaluated and found potentially complete

○ Pathway evaluated and found incomplete

(a) As groundwater does not flow from the Ash Pond System towards off-site residential water wells, potential exposures to CCR constituents in groundwater at these wells is incomplete.

(b) Ecological Receptors are not exposed to groundwater.

NA – Not Applicable.

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EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

CONCEPTUAL SITE MODEL

APRIL 2024

FIGURE 4

GIS FILE PATH: \\haleyaldrich\share\CF\Projects\133274\GIS\Maps\2024_03_EAGLE_VALLEY\133274_013_0004_CONCEPTUAL_SITE_MODEL.mxd — USER: Vpehlivan — LAST SAVED: 3/7/2024 9:16:14 AM

APPENDIX A
Derivation of Risk-Based Screening Levels for Recreational Use of Surface Water

TABLE A-1
EXPOSURE PARAMETERS FOR DERIVATION OF RISK-BASED SCREENING LEVELS FOR RECREATIONAL USE OF SURFACE WATER
EAGLE VALLEY GENERATING STATION
MARTINSVILLE, INDIANA

			Current/Future Off-Site Recreational Swimmer								Current/Future Off-Site Recreational Wader								Current/Future Off-Site Recreational Boater	
			Child (Age <6)		Adolescent (6-<16 years)		Adult		Child, Adolescent and Adult (Ages 1 - 26)		Child (Age <6)		Adolescent (6-<16 years)		Adult		Child, Adolescent and Adult (Ages 1 - 26)		Adult	
Exposure Parameter		Units	Value / Source		Value / Source		Value / Source		Value / Source		Value / Source		Value / Source		Value / Source		Value / Source		Value / Source	
Standard Parameters																				
Body Weight	BW	kg	15	USEPA, 2014a	44	USEPA, 2011 [1]	80	USEPA, 2014a	NA		15	USEPA, 2014a	44	USEPA, 2011 [1]	80	USEPA, 2014a	NA		80	USEPA, 2014a
Exposure Duration	ED	years	6	Ages <6	10	Ages 6 - <16	10	Balance of 26-yr exposure	26		6	Ages <6	10	Ages 6 - <16	10	Balance of 26-yr exposure	26		10	Balance of 26-yr exposure
Non–carcinogenic Averaging Time	ATnc	days	2190	ED expressed in days	3650	ED expressed in days	3650	ED expressed in days	9490	ED expressed in days	2190	ED expressed in days	3650	ED expressed in days	3650	ED expressed in days	9490	ED expressed in days	3650	ED expressed in days
Carcinogenic Averaging Time	ATc	days	25550	70 year lifetime	25550	70 year lifetime	25550	70 year lifetime	25550	70 year lifetime	25550	70 year lifetime	25550	70 year lifetime	25550	70 year lifetime	25550	70 year lifetime	25550	70 year lifetime
Incidental Ingestion of Surface Water																				
Exposure Frequency	EF	days/year	45	USEPA, 2018 [2]	45	USEPA, 2018 [2]	45	USEPA, 2018 [2]	45	USEPA, 2018 [2]	45	USEPA, 2018 [2]	45	USEPA, 2018 [2]	45	USEPA, 2018 [2]	45	USEPA, 2018 [2]	NA	
Water Ingestion Rate	IR	L/day	0.10	USEPA, 2014b [3]	0.10	USEPA, 2014b [3]	0.10	USEPA, 2014b [3]	NA		0.10	USEPA, 2014b [4]	0.02	USEPA, 2014b [4]	0.02	USEPA, 2014b [4]	NA		NA	
Fraction Ingested	FI	unitless	1.0	Assumption	1.0	Assumption	1.0	Assumption	1.0	Assumption	1.0	Assumption	1.0	Assumption	1.0	Assumption	1.0	Assumption	NA	
Age-Adjusted Water Ingestion Factor	IFWadj	L/kg	NA		NA		NA		3.39		NA		NA		NA		2.12		NA	
Age-Adjusted Water Ingestion Factor-Mutagenic	IFWM	L/kg	NA		NA		NA		13.23		NA		NA		NA		10.33		NA	
Dermal Exposure with Surface Water																				
Exposure Frequency	EF	days/year	45	USEPA, 2018 [2]	45	USEPA, 2018 [2]	45	USEPA, 2018 [2]	45	USEPA, 2018 [2]	45	USEPA, 2018 [2]	45	USEPA, 2018 [2]	45	USEPA, 2018 [2]	45	USEPA, 2018 [2]	45	USEPA, 2018 [2]
Exposed Skin Surface Area	SA	cm^2	6365	USEPA, 2014a	13350	USEPA, 2011 [5]	19652	USEPA, 2014a	NA		1749	USEPA, 2011 [6]	3944	USEPA, 2011 [6]	6075	USEPA, 2011 [6]	NA		6075	USEPA, 2011 [6]
Exposure Time	t-event	hr/event	2	Site-specific [7]	2	Site-specific [7]	2	Site-specific [7]	2	Site-specific [7]	2	Site-specific [7]	2	Site-specific [7]	2	Site-specific [7]	2	Site-specific [7]	2	Site-specific [7]
Events per Day	EV	event/day	1	Site-specific [7]	1	Site-specific [7]	1	Site-specific [7]	1	Site-specific [7]	1	Site-specific [7]	1	Site-specific [7]	1	Site-specific [7]	1	Site-specific [7]	1	Site-specific [7]
Age-Adjusted Dermal Contact Factor	DFWadj	events-cm^2/kg	NA		NA		NA		361647		NA		NA		NA		105990		NA	
Age-Adjusted Dermal Contact Factor-Mutagenic	DFWM	events-cm^2/kg	NA		NA		NA		1131185		NA		NA		NA		323085		NA	

Notes and Abbreviations:

NA = not applicable
USEPA, 2011 - Exposure Factors Handbook. USEPA/600/R-10/030. October, 2011.
USEPA, 2014a - Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER 9200.1-120. February 6, 2014.
USEPA, 2014b - Region 4 Human Health Risk Assessment Supplemental Guidance. January 2014. Draft Final.
USEPA, 2018 - Region 4 Human Health Risk Assessment Supplemental Guidance. March 2018 Update.
[1] - Table 8-1 of USEPA (2011); weighted average of mean body weights (6 to <16 years)
[2] - Default exposure frequency for swimming in the southeast
[3] - Based on USEPA Region 4-recommended ingestion rate of 50 mL/hour for exposures to water during swimming (USEPA, 2014b), site-specific exposure time (2 hours per event), and site-specific events per day (1).
The water ingestion rate in liters/day is calculated as follows: ingestion (mL/hr) x exposure time (hr/event)/1000 (mL/L) x events per day (1)
[4] - Based on USEPA Region 4-recommended ingestion rates of 50 mL/hour for children (age <6) and 10 mL/hour for adolescents and adults for exposures to water during wading (USEPA, 2014b), site-specific exposure time (2 hours per event), and site-specific events per day (1).
The water ingestion rate in liters/day is calculated as follows: ingestion (mL/hr) x exposure time (hr/event)/1000 (mL/L) x events per day (1)
[5] - Table 7-1 of USEPA (2011); weighted average of mean skin surface area (6 to <16 years)
[6] - Based on surface area of hands, forearms, lower legs, and feet
[7] - Assumes 2 hours per event, 1 event per day, and that on days when recreation in water occurs, all daily exposure to water is derived from locations at the Site.

Values based on a time-weighted average of child, adolescent, and adult exposure values are calculated as follows:
Water
IFWadj = (child ED [0-2] x child EF [0-2] x child IR [0-2] / child BW [0-2]) + (child ED [2-6] x child EF [2-6] x child IR [2-6] / child BW [2-6]) + (older child ED [6-16] x older child EF [6-16] x older child IR [6-16] / older child BW [6-16]) + (adult ED x adult EF x adult IR / adult BW)
DFWadj = (child EF [0-2] x child ED [0-2] x child SA [0-2] x child EV [0-2] / child BW [0-2]) + (child EF [2-6] x child ED [2-6] x child SA [2-6] x child EV [2-6] / child BW [2-6]) + (older child EF [6-16] x older child ED [6-16] x older child SA [6-16] x older child EV [6-16] / older child BW [6-16]) + (adult EF x adult ED x adult SA x adult EV / adult BW)
Water - mutagenic
IFWM = (child ED [0-2] x child EF [0-2] x child IR [0-2] x ADAF [0-2] / child BW [0-2]) + (child ED [2-6] x child EF [2-6] x child IR [2-6] x ADAF [2-6] / child BW [2-6]) + (older child ED [6-16] x child EF [6-16] x older child IR [6-16] x ADAF [6-16] / older child BW [6-16]) + (adult ED x adult EF x adult IR x adult ADAF / adult BW)
DFWM = (child EF [0-2] x child ED [0-2] x child SA [0-2] x child EV [0-2] x ADAF [0-2] / child BW [0-2]) + (child EF [2-6] x child ED [2-6] x child SA [2-6] x child EV [2-6] x ADAF [2-6] / child BW [2-6]) + (older child EF [6-16] x older child ED [6-16] x older child SA [6-16] x older child EV [6-16] x ADAF [6-16] / older child BW [6-16]) +
(adult EF x adult ED x adult SA x adult EV x adult ADAF / adult BW)

USEPA guidance for early life exposure to carcinogens (USEPA, 2005) requires that risks for potentially carcinogenic constituents that are presumed to act by a mutagenic mode of action be calculated differently than for constituents that do not act via a mutagenic mode of action.
Therefore, the age-dependent adjustment factors (ADAF) will be applied for calculations involving children under the age of 16. The ADAFs are as follows:
Age 0 to 2 years (2 year interval from birth until 2nd birthday) – ADAF = 10
Ages 2 to 16 years (14 year interval from 2nd birthday to 16th birthday) – ADAF = 3
Ages 16 and up (after 16th birthday) – no adjustment - ADAF = 1
The exposure parameters for children ages <6 are applied to children 0 - 2 and 2- 6.

APPENDIX A

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGIONAL SCREENING LEVEL CALCULATOR

INPUT VALUES - RECREATIONAL SWIMMER

Variable	Recreator Surface Water Default Value	Site-Specific Value
BW_{0-2} (body weight) kg	15	15
BW_{2-6} (body weight) kg	15	15
BW_{6-16} (body weight) kg	80	44
BW_{16-30} (body weight) kg	80	80
BW_{a} (body weight - adult) kg	80	62
BW_{rec-a} (body weight - adult) kg	80	62
$DFW_{rec-adj}$ (age-adjusted dermal factor) cm^2-event/kg	0	354100.645
$DFWM_{rec-adj}$ (mutagenic age-adjusted dermal factor) cm^2-event/kg	0	1131184.77
ED_{rec} (exposure duration - recreator) years	26	26
ED_{0-2} (exposure duration) years	2	2
ED_{2-6} (exposure duration) years	4	4
ED_{6-16} (exposure duration) years	10	10
ED_{16-30} (exposure duration) years	10	10
ED_{rec-a} (exposure duration - adult) years	20	20
EF_{rec-w} (exposure frequency) days/year	0	45
EF_{2-6} (exposure frequency) days/year	0	45
EF_{6-16} (exposure frequency) days/year	0	45
EF_{16-30} (exposure frequency) days/year	0	45
EF_{rec-a} (adult exposure frequency) days/year	0	45
ET_{0-2} (exposure time) hours/event	0	2
ET_{2-6} (exposure time) hours/event	0	2
ET_{6-16} (exposure time) hours/event	0	2
ET_{16-30} (exposure time) hours/event	0	2
ET_{rec-a} (adult exposure time) hours/event	0	2
EV_{0-2} (events) events/day	0	1
EV_{2-6} (events) events/day	0	1
EV_{6-16} (events) events/day	0	1
EV_{16-30} (events) events/day	0	1
EV_{rec-a} (adult) events/day	0	1
THQ (target hazard quotient) unitless	0.1	1
$IFW_{rec-adj}$ (age-adjusted water intake rate) L/kg	0	3.252
$IFWM_{rec-adj}$ (mutagenic age-adjusted water intake rate) L/kg	0	13.231
IRW_{0-2} (water intake rate) L/hour	0.12	0.05
IRW_{2-6} (water intake rate) L/hour	0.12	0.05
IRW_{6-16} (water intake rate) L/hour	0.124	0.05
IRW_{16-30} (water intake rate) L/hour	0.0985	0.05
IRW_{rec} (water intake rate - adult) L/day	0.11	0.05
IRW_{rec-a} (water intake rate - adult) L/hr	0.11	0.05
LT (lifetime - recreator) years	70	70
SA_{0-2} (skin surface area) cm^2	6365	6365
SA_{2-6} (skin surface area) cm^2	6365	6365
SA_{6-16} (skin surface area) cm^2	19652	13350
SA_{16-30} (skin surface area) cm^2	19652	19652
SA_{rec} (skin surface area - adult) cm^2	19652	16501
SA_{rec-a} (skin surface area - adult) cm^2	19652	16501
Apparent thickness of stratum corneum (cm)	0.001	0.001
TR (target risk) unitless	0.000001	0.0001

Output generated 13SEP2023:17:55:17

APPENDIX A
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGIONAL SCREENING LEVEL CALCULATOR
OUTPUT VALUES - RECREATIONAL SWIMMER

Site-specific

Recreator Risk-Based Regional Screening Levels (RSL) for Surface Water

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = OW; W = TEF applied; E = RPF applied; G = see user guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	Chemical Type	SF_o (mg/kg-day)$^{-1}$	SF_o Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	RAGSe GIABS (unitless)	K_p (cm/hr)	MW	FA (unitless)	In EPD?	$DA_{event\ (ca)}$	$DA_{event\ (nc\ child)}$	$DA_{event\ (nc\ adult)}$	Ingestion SL TR=0.0001 (ug/L)	Dermal SL TR=0.0001 (ug/L)	Carcinogenic SL TR=0.0001 (ug/L)	Ingestion SL (Child) THQ=1 (ug/L)	Dermal SL (Child) THQ=1 (ug/L)	Noncarcinogenic SL (Child) THQ=1 (ug/L)	Ingestion SL (Adult) THQ=1 (ug/L)	Dermal SL (Adult) THQ=1 (ug/L)	Noncarcinogenic SL (Adult) THQ=1 (ug/L)	Screening Level (ug/L)
Antimony (metallic)	7440-36-0	No	No	Inorganics	Inorganics	-		4.00E-04	I	3.00E-04	A	1.50E-01	1.00E-03	1.22E+02	1.00E+00	Yes	-	1.15E-03	1.83E-03	-	-	-	4.87E+02	5.73E+02	2.63E+02	2.01E+03	9.14E+02	6.29E+02	**2.63E+02 nc**
Arsenic, Inorganic	7440-38-2	No	No	Inorganics	Inorganics	1.50E+00	I	3.00E-04	I	1.50E-05	C	1.00E+00	1.00E-03	7.49E+01	1.00E+00	Yes	4.81E-03	5.73E-03	9.14E-03	5.24E+02	2.41E+03	4.30E+02	3.65E+02	2.87E+03	3.24E+02	1.51E+03	4.57E+03	1.13E+03	**3.24E+02 nc**
Barium	7440-39-3	No	No	Inorganics	Inorganics	-		2.00E-01	I	5.00E-04	H	7.00E-02	1.00E-03	1.37E+02	1.00E+00	Yes	-	2.68E-01	4.27E-01	-	-	-	2.43E+05	1.34E+05	8.63E+04	1.01E+06	2.13E+05	1.76E+05	**8.63E+04 nc**
Beryllium and compounds	7440-41-7	No	No	Inorganics	Inorganics	-		2.00E-03	I	2.00E-05	I	7.00E-03	1.00E-03	9.01E+00	1.00E+00	Yes	-	2.68E-04	4.27E-04	-	-	-	2.43E+03	1.34E+02	1.27E+02	1.01E+04	2.13E+02	2.09E+02	**1.27E+02 nc**
Boron And Borates Only	7440-42-8	No	No	Inorganics	Inorganics	-		2.00E-01	I	2.00E-02	H	1.00E+00	1.00E-03	1.38E+01	1.00E+00	Yes	-	3.82E+00	6.10E+00	-	-	-	2.43E+05	1.91E+06	2.16E+05	1.01E+06	3.05E+06	7.56E+05	**2.16E+05 nc max**
Cadmium (Water)	7440-43-9	No	No	Inorganics	Inorganics	-		1.00E-04	A	1.00E-05	A	5.00E-02	1.00E-03	1.12E+02	1.00E+00	Yes	-	9.56E-05	1.52E-04	-	-	-	1.22E+02	4.78E+01	3.43E+01	5.03E+02	7.62E+01	6.62E+01	**3.43E+01 nc**
Chromium(III), Insoluble Salts	16065-83-1	No	No	Inorganics	Inorganics	-		1.50E+00	I	-		1.30E-02	1.00E-03	5.20E+01	1.00E+00	Yes	-	3.73E-01	5.94E-01	-	-	-	1.83E+06	1.86E+05	1.69E+05	7.54E+06	2.97E+05	2.86E+05	**1.69E+05 nc max**
Cobalt	7440-48-4	No	No	Inorganics	Inorganics	-		3.00E-04	P	6.00E-06	P	1.00E+00	4.00E-04	5.89E+01	1.00E+00	Yes	-	5.73E-03	9.14E-03	-	-	-	3.65E+02	7.17E+03	3.47E+02	1.51E+03	1.14E+04	1.33E+03	**3.47E+02 nc**
Fluoride	16984-48-8	No	No	Inorganics	Inorganics	-		4.00E-02	C	1.30E-02	C	1.00E+00	1.00E-03	3.80E+01	1.00E+00	Yes	-	7.65E-01	1.22E+00	-	-	-	4.87E+04	3.82E+05	4.32E+04	2.01E+05	6.10E+05	1.51E+05	**4.32E+04 nc**
Lead and Compounds	7439-92-1	No	No	Inorganics	Inorganics	-		-		-		1.00E+00	1.00E-04	2.07E+02	1.00E+00	Yes	-	-	-	-	-	-	-	-	-	-	-	-	
Lithium	7439-93-2	No	No	Inorganics	Inorganics	-		2.00E-03	P	-		1.00E+00	1.00E-03	6.94E+00	1.00E+00	Yes	-	3.82E-02	6.10E-02	-	-	-	2.43E+03	1.91E+04	2.16E+03	1.01E+04	3.05E+04	7.56E+03	**2.16E+03 nc**
Mercuric Chloride	7487-94-7	No	No	Inorganics	Inorganics	-		3.00E-04	I	3.00E-04	G	7.00E-02	1.00E-03	2.72E+02	1.00E+00	Yes	-	4.01E-04	6.40E-04	-	-	-	3.65E+02	2.01E+02	1.29E+02	1.51E+03	3.20E+02	2.64E+02	**1.29E+02 nc**
Molybdenum	7439-98-7	No	No	Inorganics	Inorganics	-		5.00E-03	I	2.00E-03	A	1.00E+00	1.00E-03	9.59E+01	1.00E+00	Yes	-	9.56E-02	1.52E-01	-	-	-	6.08E+03	4.78E+04	5.40E+03	2.51E+04	7.62E+04	1.89E+04	**5.40E+03 nc**
Selenium	7782-49-2	No	No	Inorganics	Inorganics	-		5.00E-03	I	2.00E-02	C	1.00E+00	1.00E-03	7.90E+01	1.00E+00	Yes	-	9.56E-02	1.52E-01	-	-	-	6.08E+03	4.78E+04	5.40E+03	2.51E+04	7.62E+04	1.89E+04	**5.40E+03 nc**
Thallium (Soluble Salts)	7440-28-0	No	No	Inorganics	Inorganics	-		1.00E-05	X	-		1.00E+00	1.00E-03	2.04E+02	1.00E+00	Yes	-	1.91E-04	3.05E-04	-	-	-	1.22E+01	9.56E+01	1.08E+01	5.03E+01	1.52E+02	3.78E+01	**1.08E+01 nc**

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APPENDIX A

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGIONAL SCREENING LEVEL CALCULATOR

INPUT VALUES - RECREATIONAL WADER

Variable	Recreator Surface Water Default Value	Site-Specific Value
BW_{0-2} (body weight) kg	15	15
BW_{2-6} (body weight) kg	15	15
BW_{6-16} (body weight) kg	80	44
BW_{16-30} (body weight) kg	80	80
BW_{a} (body weight - adult) kg	80	62
BW_{rec-a} (body weight - adult) kg	80	62
$DFW_{rec-adj}$ (age-adjusted dermal factor) cm^2-event/kg	0	104200.548
$DFWM_{rec-adj}$ (mutagenic age-adjusted dermal factor) cm^2-event/kg	0	323084.966
ED_{rec} (exposure duration - recreator) years	26	26
ED_{0-2} (exposure duration) years	2	2
ED_{2-6} (exposure duration) years	4	4
ED_{6-16} (exposure duration) years	10	10
ED_{16-30} (exposure duration) years	10	10
ED_{rec-a} (exposure duration - adult) years	20	20
EF_{rec-w} (exposure frequency) days/year	0	45
EF_{2-6} (exposure frequency) days/year	0	45
EF_{6-16} (exposure frequency) days/year	0	45
EF_{16-30} (exposure frequency) days/year	0	45
EF_{rec-a} (adult exposure frequency) days/year	0	45
ET_{0-2} (exposure time) hours/event	0	2
ET_{2-6} (exposure time) hours/event	0	2
ET_{6-16} (exposure time) hours/event	0	2
ET_{16-30} (exposure time) hours/event	0	2
ET_{rec-a} (adult exposure time) hours/event	0	2
EV_{0-2} (events) events/day	0	1
EV_{2-6} (events) events/day	0	1
EV_{6-16} (events) events/day	0	1
EV_{16-30} (events) events/day	0	1
EV_{rec-a} (adult) events/day	0	1
THQ (target hazard quotient) unitless	0.1	1
$IFW_{rec-adj}$ (age-adjusted water intake rate) L/kg	0	2.09
$IFWM_{rec-adj}$ (mutagenic age-adjusted water intake rate) L/kg	0	10.326
IRW_{0-2} (water intake rate) L/hour	0.12	0.05
IRW_{2-6} (water intake rate) L/hour	0.12	0.05
IRW_{6-16} (water intake rate) L/hour	0.124	0.01
IRW_{16-30} (water intake rate) L/hour	0.0985	0.01
IRW_{rec} (water intake rate - adult) L/day	0.11	0.01
IRW_{rec-a} (water intake rate - adult) L/hr	0.11	0.01
LT (lifetime - recreator) years	70	70
SA_{0-2} (skin surface area) cm^2	6365	1749
SA_{2-6} (skin surface area) cm^2	6365	1749
SA_{6-16} (skin surface area) cm^2	19652	3944
SA_{16-30} (skin surface area) cm^2	19652	6075
SA_{rec} (skin surface area - adult) cm^2	19652	5009.5
SA_{rec-a} (skin surface area - adult) cm^2	19652	5009.5
Apparent thickness of stratum corneum (cm)	0.001	0.001
TR (target risk) unitless	0.000001	0.0001

Output generated 13SEP2023:17:48:37

APPENDIX A
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGIONAL SCREENING LEVEL CALCULATOR
OUTPUT VALUES - RECREATIONAL WADER

Site-specific

Recreator Risk-Based Regional Screening Levels (RSL) for Surface Water

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = OW; W = TEF applied; E = RPF applied; G = see user guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	Chemical Type	SF_o(mg/kg-day)$^{-1}$	SF_o Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	RAGSe GIABS (unitless)	K_p (cm/hr)	MW	FA (unitless)	In EPD?	$DA_{event\ (ca)}$	$DA_{event\ (nc\ child)}$	$DA_{event\ (nc\ adult)}$	Ingestion SL TR=0.0001 (ug/L)	Dermal SL TR=0.0001 (ug/L)	Carcinogenic SL TR=0.0001 (ug/L)	Ingestion SL (Child) THQ=1 (ug/L)	Dermal SL (Child) THQ=1 (ug/L)	Noncarcinogenic SL (Child) THQ=1 (ug/L)	Ingestion SL (Adult) THQ=1 (ug/L)	Dermal SL (Adult) THQ=1 (ug/L)	Noncarcinogenic SL (Adult) THQ=1 (ug/L)	Screening Level (ug/L)
Antimony (metallic)	7440-36-0	No	No	Inorganics	Inorganics	-		4.00E-04	I	3.00E-04	A	1.50E-01	1.00E-03	1.22E+02	1.00E+00	Yes	-	4.17E-03	6.02E-03	-	-	-	4.87E+02	2.09E+03	3.95E+02	1.01E+04	3.01E+03	2.32E+03	**3.95E+02 nc**
Arsenic, Inorganic	7440-38-2	No	No	Inorganics	Inorganics	1.50E+00	I	3.00E-04	I	1.50E-05	C	1.00E+00	1.00E-03	7.49E+01	1.00E+00	Yes	1.63E-02	2.09E-02	3.01E-02	8.15E+02	8.17E+03	7.41E+02	3.65E+02	1.04E+04	3.53E+02	7.54E+03	1.51E+04	5.03E+03	**3.53E+02 nc**
Barium	7440-39-3	No	No	Inorganics	Inorganics	-		2.00E-01	I	5.00E-04	H	7.00E-02	1.00E-03	1.37E+02	1.00E+00	Yes	-	9.74E-01	1.41E+00	-	-	-	2.43E+05	4.87E+05	1.62E+05	5.03E+06	7.03E+05	6.17E+05	**1.62E+05 nc max**
Beryllium and compounds	7440-41-7	No	No	Inorganics	Inorganics	-		2.00E-03	I	2.00E-05	I	7.00E-03	1.00E-03	9.01E+00	1.00E+00	Yes	-	9.74E-04	1.41E-03	-	-	-	2.43E+03	4.87E+02	4.06E+02	5.03E+04	7.03E+02	6.93E+02	**4.06E+02 nc**
Boron And Borates Only	7440-42-8	No	No	Inorganics	Inorganics	-		2.00E-01	I	2.00E-02	H	1.00E+00	1.00E-03	1.38E+01	1.00E+00	Yes	-	1.39E+01	2.01E+01	-	-	-	2.43E+05	6.96E+06	2.35E+05	5.03E+06	1.00E+07	3.35E+06	**2.35E+05 nc max**
Cadmium (Water)	7440-43-9	No	No	Inorganics	Inorganics	-		1.00E-04	A	1.00E-05	A	5.00E-02	1.00E-03	1.12E+02	1.00E+00	Yes	-	3.48E-04	5.02E-04	-	-	-	1.22E+02	1.74E+02	7.16E+01	2.51E+03	2.51E+02	2.28E+02	**7.16E+01 nc**
Chromium(III), Insoluble Salts	16065-83-1	No	No	Inorganics	Inorganics	-		1.50E+00	I	-		1.30E-02	1.00E-03	5.20E+01	1.00E+00	Yes	-	1.36E+00	1.96E+00	-	-	-	1.83E+06	6.78E+05	4.94E+05	3.77E+07	9.79E+05	9.54E+05	**4.94E+05 nc max**
Cobalt	7440-48-4	No	No	Inorganics	Inorganics	-		3.00E-04	P	6.00E-06	P	1.00E+00	4.00E-04	5.89E+01	1.00E+00	Yes	-	2.09E-02	3.01E-02	-	-	-	3.65E+02	2.61E+04	3.60E+02	7.54E+03	3.76E+04	6.28E+03	**3.60E+02 nc**
Fluoride	16984-48-8	No	No	Inorganics	Inorganics	-		4.00E-02	C	1.30E-02	C	1.00E+00	1.00E-03	3.80E+01	1.00E+00	Yes	-	2.78E+00	4.02E+00	-	-	-	4.87E+04	1.39E+06	4.70E+04	1.01E+06	2.01E+06	6.70E+05	**4.70E+04 nc**
Lead and Compounds	7439-92-1	No	No	Inorganics	Inorganics	-		-		-		1.00E+00	1.00E-04	2.07E+02	1.00E+00	Yes	-	-	-	-	-	-	-	-	-	-	-	-	
Lithium	7439-93-2	No	No	Inorganics	Inorganics	-		2.00E-03	P	-		1.00E+00	1.00E-03	6.94E+00	1.00E+00	Yes	-	1.39E-01	2.01E-01	-	-	-	2.43E+03	6.96E+04	2.35E+03	5.03E+04	1.00E+05	3.35E+04	**2.35E+03 nc**
Mercuric Chloride	7487-94-7	No	No	Inorganics	Inorganics	-		3.00E-04	I	3.00E-04	G	7.00E-02	1.00E-03	2.72E+02	1.00E+00	Yes	-	1.46E-03	2.11E-03	-	-	-	3.65E+02	7.30E+02	2.43E+02	7.54E+03	1.05E+03	9.25E+02	**2.43E+02 nc**
Molybdenum	7439-98-7	No	No	Inorganics	Inorganics	-		5.00E-03	I	2.00E-03	A	1.00E+00	1.00E-03	9.59E+01	1.00E+00	Yes	-	3.48E-01	5.02E-01	-	-	-	6.08E+03	1.74E+05	5.88E+03	1.26E+05	2.51E+05	8.38E+04	**5.88E+03 nc**
Selenium	7782-49-2	No	No	Inorganics	Inorganics	-		5.00E-03	I	2.00E-02	C	1.00E+00	1.00E-03	7.90E+01	1.00E+00	Yes	-	3.48E-01	5.02E-01	-	-	-	6.08E+03	1.74E+05	5.88E+03	1.26E+05	2.51E+05	8.38E+04	**5.88E+03 nc**
Thallium (Soluble Salts)	7440-28-0	No	No	Inorganics	Inorganics	-		1.00E-05	X	-		1.00E+00	1.00E-03	2.04E+02	1.00E+00	Yes	-	6.96E-04	1.00E-03	-	-	-	1.22E+01	3.48E+02	1.18E+01	2.51E+02	5.02E+02	1.68E+02	**1.18E+01 nc**

Output generated 13SEP2023:17:48:37

APPENDIX A
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGIONAL SCREENING LEVEL CALCULATOR
INPUT VALUES - RECREATIONAL BOATER

Variable	Recreator Surface Water Default Value	Site-Specific Value
BW_{0-2} (body weight) kg	15	0
BW_{2-6} (body weight) kg	15	0
BW_{6-16} (body weight) kg	80	0
BW_{16-30} (body weight) kg	80	80
BW_{a} (body weight - adult) kg	80	80
BW_{rec-a} (body weight - adult) kg	80	80
$DFW_{rec-adj}$ (age-adjusted dermal factor) cm^2-event/kg	0	34171.875
$DFWM_{rec-adj}$ (mutagenic age-adjusted dermal factor) cm^2-event/kg	0	34171.875
ED_{rec} (exposure duration - recreator) years	26	10
ED_{0-2} (exposure duration) years	2	0
ED_{2-6} (exposure duration) years	4	0
ED_{6-16} (exposure duration) years	10	0
ED_{16-30} (exposure duration) years	10	10
ED_{rec-a} (exposure duration - adult) years	20	10
EF_{rec-w} (exposure frequency) days/year	0	45
EF_{2-6} (exposure frequency) days/year	0	0
EF_{6-16} (exposure frequency) days/year	0	0
EF_{16-30} (exposure frequency) days/year	0	45
EF_{rec-a} (adult exposure frequency) days/year	0	45
ET_{0-2} (exposure time) hours/event	0	0
ET_{2-6} (exposure time) hours/event	0	0
ET_{6-16} (exposure time) hours/event	0	0
ET_{16-30} (exposure time) hours/event	0	2
ET_{rec-a} (adult exposure time) hours/event	0	2
EV_{0-2} (events) events/day	0	0
EV_{2-6} (events) events/day	0	0
EV_{6-16} (events) events/day	0	0
EV_{16-30} (events) events/day	0	1
EV_{rec-a} (adult) events/day	0	1
THQ (target hazard quotient) unitless	0.1	1
$IFW_{rec-adj}$ (age-adjusted water intake rate) L/kg	0	0
$IFWM_{rec-adj}$ (mutagenic age-adjusted water intake rate) L/kg	0	0
IRW_{0-2} (water intake rate) L/hour	0.12	0
IRW_{2-6} (water intake rate) L/hour	0.12	0
IRW_{6-16} (water intake rate) L/hour	0.124	0
IRW_{16-30} (water intake rate) L/hour	0.0985	0
IRW_{rec} (water intake rate - adult) L/day	0.11	0
IRW_{rec-a} (water intake rate - adult) L/hr	0.11	0
LT (lifetime - recreator) years	70	70
SA_{0-2} (skin surface area) cm^2	6365	0
SA_{2-6} (skin surface area) cm^2	6365	0
SA_{6-16} (skin surface area) cm^2	19652	0
SA_{16-30} (skin surface area) cm^2	19652	6075
SA_{rec} (skin surface area - adult) cm^2	19652	6075
SA_{rec-a} (skin surface area - adult) cm^2	19652	6075
Apparent thickness of stratum corneum (cm)	0.001	0.001
TR (target risk) unitless	0.000001	0.0001

Output generated 13SEP2023:18:18:55

APPENDIX A
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGIONAL SCREENING LEVEL CALCULATOR
OUTPUT VALUES - RECREATIONAL BOATER

Site-specific

Recreator Risk-Based Regional Screening Levels (RSL) for Surface Water

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = OW; W = TEF applied; E = RPF applied; G = see user guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	Chemical Type	SF_o (mg/kg-day)$^{-1}$	SF_o Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	RAGSe GIABS (unitless)	K_p (cm/hr)	MW	FA (unitless)	In EPD?
Antimony (metallic)	7440-36-0	No	No	Inorganics	Inorganics	-		4.00E-04	I	3.00E-04	A	1.50E-01	1.00E-03	1.22E+02	1.00E+00	Yes
Arsenic, Inorganic	7440-38-2	No	No	Inorganics	Inorganics	1.50E+00	I	3.00E-04	I	1.50E-05	C	1.00E+00	1.00E-03	7.49E+01	1.00E+00	Yes
Barium	7440-39-3	No	No	Inorganics	Inorganics	-		2.00E-01	I	5.00E-04	H	7.00E-02	1.00E-03	1.37E+02	1.00E+00	Yes
Beryllium and compounds	7440-41-7	No	No	Inorganics	Inorganics	-		2.00E-03	I	2.00E-05	I	7.00E-03	1.00E-03	9.01E+00	1.00E+00	Yes
Boron And Borates Only	7440-42-8	No	No	Inorganics	Inorganics	-		2.00E-01	I	2.00E-02	H	1.00E+00	1.00E-03	1.38E+01	1.00E+00	Yes
Cadmium (Water)	7440-43-9	No	No	Inorganics	Inorganics	-		1.00E-04	A	1.00E-05	A	5.00E-02	1.00E-03	1.12E+02	1.00E+00	Yes
Chromium(III), Insoluble Salts	16065-83-1	No	No	Inorganics	Inorganics	-		1.50E+00	I	-		1.30E-02	1.00E-03	5.20E+01	1.00E+00	Yes
Cobalt	7440-48-4	No	No	Inorganics	Inorganics	-		3.00E-04	P	6.00E-06	P	1.00E+00	4.00E-04	5.89E+01	1.00E+00	Yes
Fluoride	16984-48-8	No	No	Inorganics	Inorganics	-		4.00E-02	C	1.30E-02	C	1.00E+00	1.00E-03	3.80E+01	1.00E+00	Yes
Lead and Compounds	7439-92-1	No	No	Inorganics	Inorganics	-		-		-		1.00E+00	1.00E-04	2.07E+02	1.00E+00	Yes
Lithium	7439-93-2	No	No	Inorganics	Inorganics	-		2.00E-03	P	-		1.00E+00	1.00E-03	6.94E+00	1.00E+00	Yes
Mercuric Chloride	7487-94-7	No	No	Inorganics	Inorganics	-		3.00E-04	I	3.00E-04	G	7.00E-02	1.00E-03	2.72E+02	1.00E+00	Yes
Molybdenum	7439-98-7	No	No	Inorganics	Inorganics	-		5.00E-03	I	2.00E-03	A	1.00E+00	1.00E-03	9.59E+01	1.00E+00	Yes
Selenium	7782-49-2	No	No	Inorganics	Inorganics	-		5.00E-03	I	2.00E-02	C	1.00E+00	1.00E-03	7.90E+01	1.00E+00	Yes
Thallium (Soluble Salts)	7440-28-0	No	No	Inorganics	Inorganics	-		1.00E-05	X	-		1.00E+00	1.00E-03	2.04E+02	1.00E+00	Yes

Chemical	$DA_{event (ca)}$	DA_{event} (nc child)	DA_{event} (nc adult)	Ingestion SL TR=0.0001 (ug/L)	Dermal SL TR=0.0001 (ug/L)	Carcinogenic SL TR=0.0001 (ug/L)	Ingestion SL (Child) THQ=1 (ug/L)	Dermal SL (Child) THQ=1 (ug/L)	Noncarcinogenic SL (Child) THQ=1 (ug/L)	Ingestion SL (Adult) THQ=1 (ug/L)	Dermal SL (Adult) THQ=1 (ug/L)	Noncarcinogenic SL (Adult) THQ=1 (ug/L)	Screening Level (ug/L)
Antimony (metallic)	-	-	6.41E-03	-	-	-	-	-	-	-	3.20E+03	3.20E+03	**3.20E+03 nc**
Arsenic, Inorganic	4.98E-02	-	3.20E-02	-	2.49E+04	2.49E+04	-	-	-	-	1.60E+04	1.60E+04	**1.60E+04 nc**
Barium	-	-	1.50E+00	-	-	-	-	-	-	-	7.48E+05	7.48E+05	**7.48E+05 nc max**
Beryllium and compounds	-	-	1.50E-03	-	-	-	-	-	-	-	7.48E+02	7.48E+02	**7.48E+02 nc**
Boron And Borates Only	-	-	2.14E+01	-	-	-	-	-	-	-	1.07E+07	1.07E+07	**1.07E+07 nc max**
Cadmium (Water)	-	-	5.34E-04	-	-	-	-	-	-	-	2.67E+02	2.67E+02	**2.67E+02 nc**
Chromium(III), Insoluble Salts	-	-	2.08E+00	-	-	-	-	-	-	-	1.04E+06	1.04E+06	**1.04E+06 nc max**
Cobalt	-	-	3.20E-02	-	-	-	-	-	-	-	4.01E+04	4.01E+04	**4.01E+04 nc**
Fluoride	-	-	4.27E+00	-	-	-	-	-	-	-	2.14E+06	2.14E+06	**2.14E+06 nc max**
Lead and Compounds	-	-	-	-	-	-	-	-	-	-	-	-	
Lithium	-	-	2.14E-01	-	-	-	-	-	-	-	1.07E+05	1.07E+05	**1.07E+05 nc max**
Mercuric Chloride	-	-	2.24E-03	-	-	-	-	-	-	-	1.12E+03	1.12E+03	**1.12E+03 nc**
Molybdenum	-	-	5.34E-01	-	-	-	-	-	-	-	2.67E+05	2.67E+05	**2.67E+05 nc max**
Selenium	-	-	5.34E-01	-	-	-	-	-	-	-	2.67E+05	2.67E+05	**2.67E+05 nc max**
Thallium (Soluble Salts)	-	-	1.07E-03	-	-	-	-	-	-	-	5.34E+02	5.34E+02	**5.34E+02 nc**

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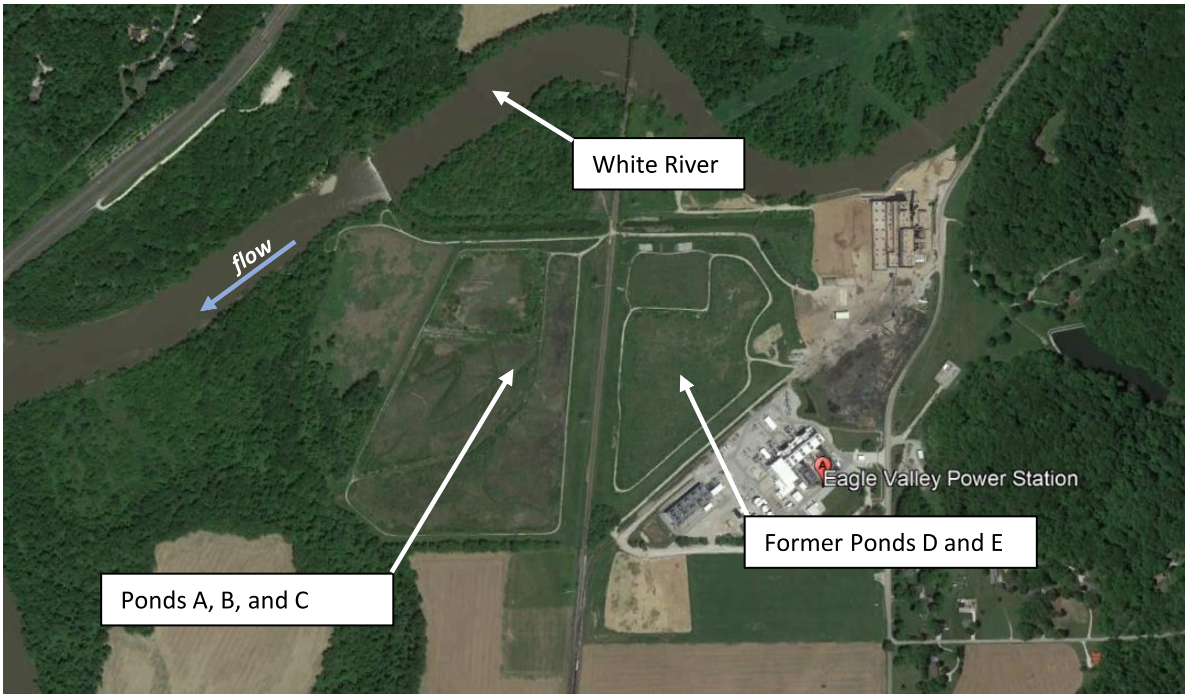
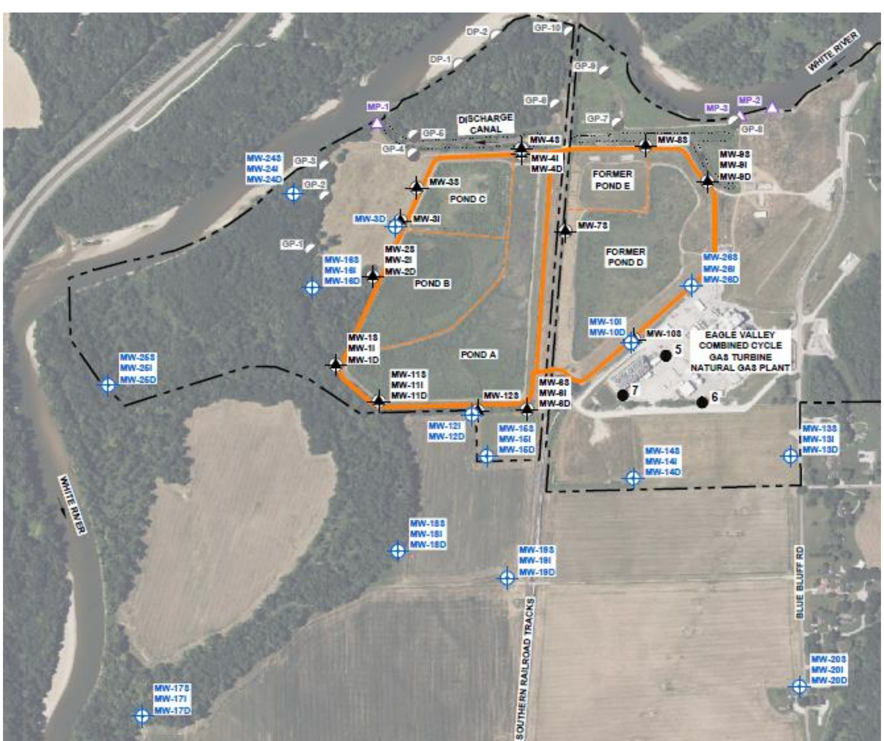
APPENDIX B
Dilution-Attenuation Factor Calculations



Google Earth Perspective View, Facing North



Former Pond Locations

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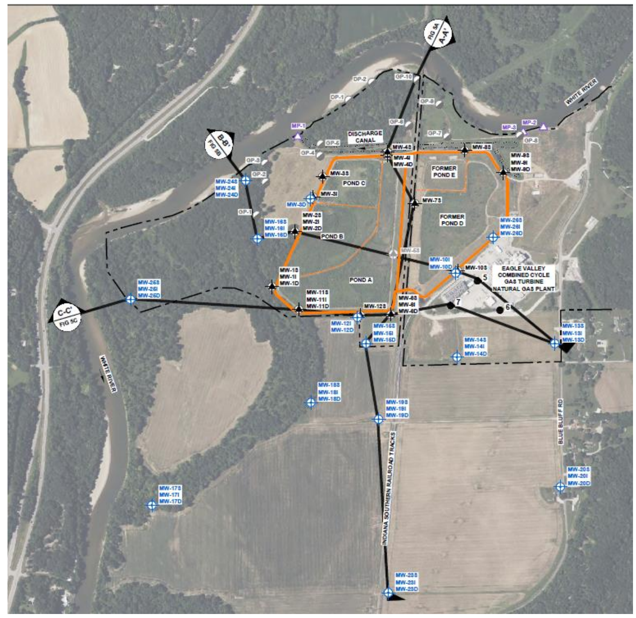
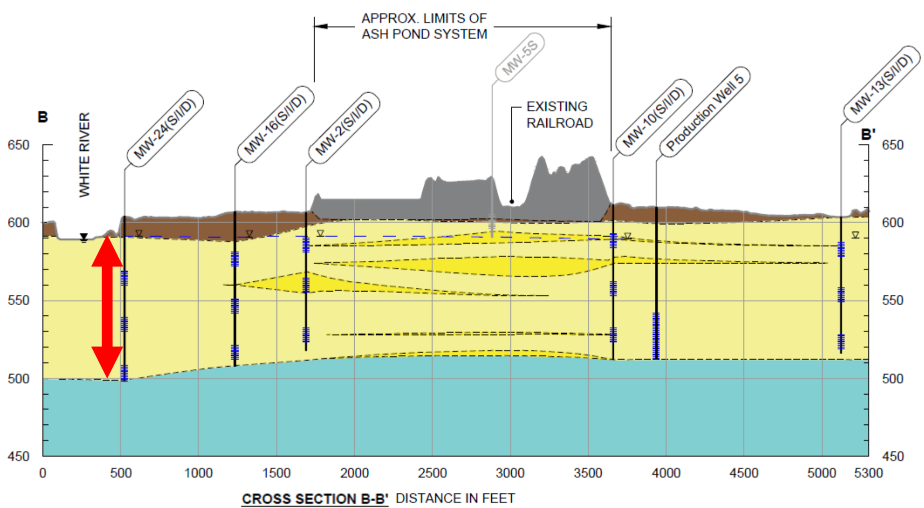
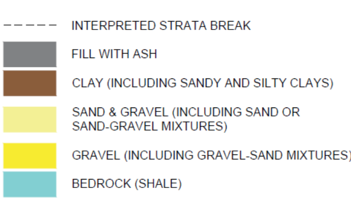
A Conceptual Model was developed for the Eagle Valley Ash Pond System using subsurface cross section interpretations from boring logs, and surveyed elevations. Four basic subsurface units were identified: bedrock, fine grained overburden, sand and gravel, and coal-combustion residuals (CCR, or "ash").

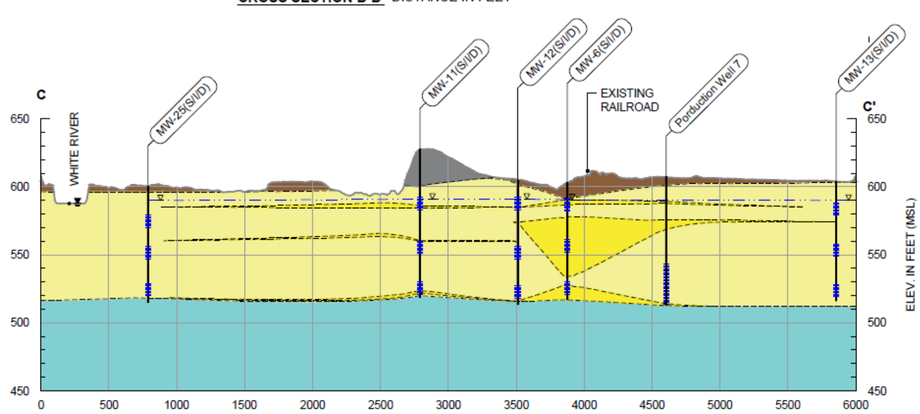
The sand and gravel is the primary flow pathway at the Site and was utilized for this calculation.



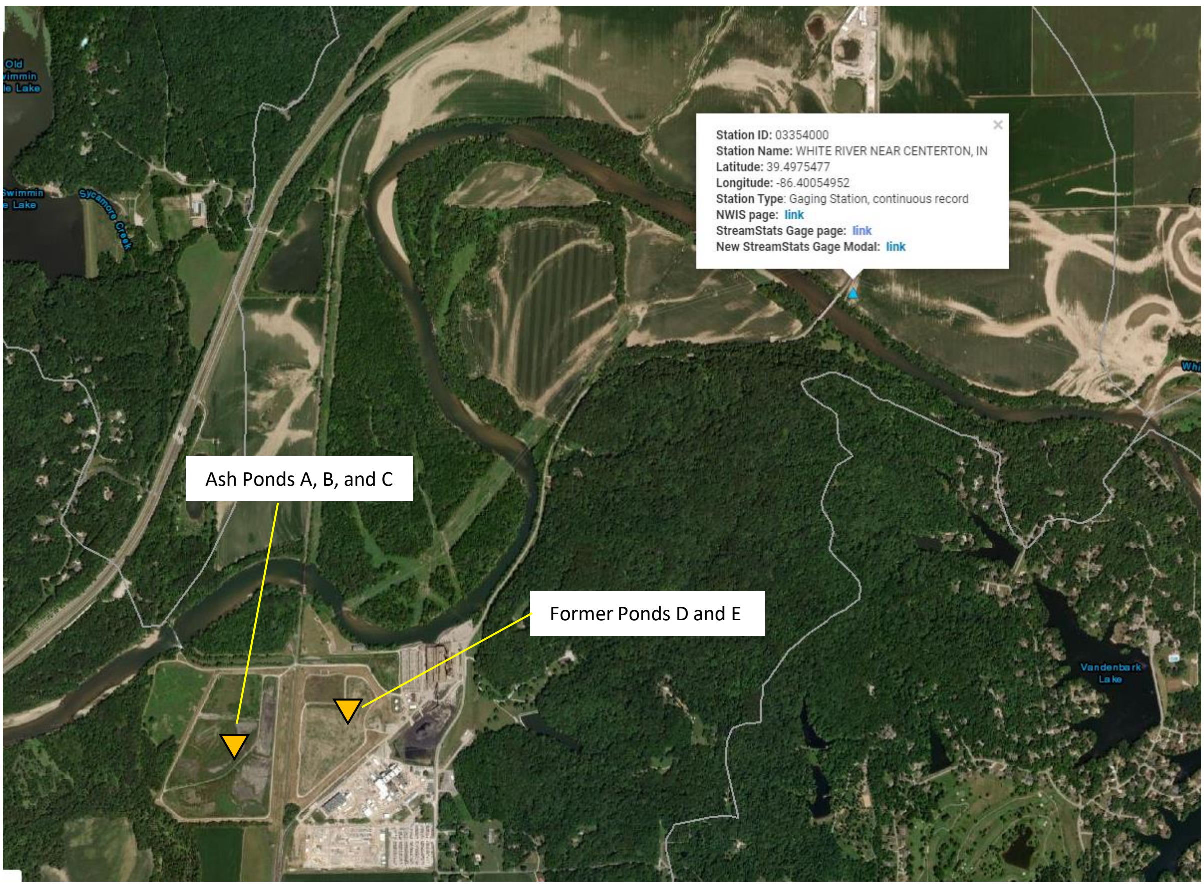


Aquifer approximately 90 feet thick based on wells within the vicinity.





River discharge calculations were obtained from the White River Near Centerton, IN gauging station upstream of the Site. The dam seen in the aerial image has been removed and the 7Q10 should be the same across the north and west of the Site. The station and stream statistics are maintained by the USGS (USGS Stream Stats)

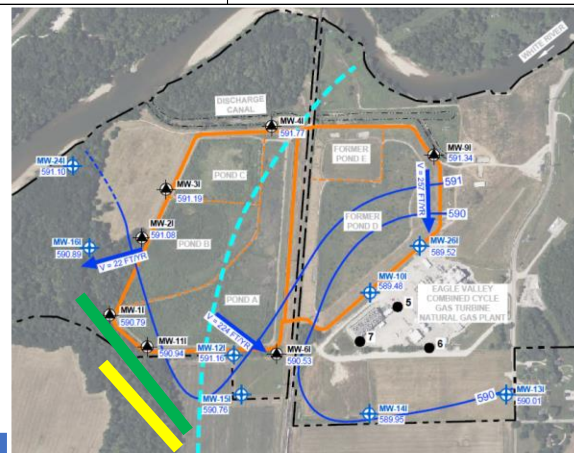


Low-Flow Statistics

Statistic Name	Value	Units	Preferred?	Years of Record	Standard Error, percent	Citation	Comments
1 Day 10 Year Low Flow	260	cubic feet per second	✔	65		151	Statistic Date Range 4/1/1947 - 3/31/2011
7 Day 10 Year Low Flow	274	cubic feet per second	✔	65		151	Statistic Date Range 4/1/1947 - 3/31/2011
30 Day 10 Year Low Flow	297	cubic feet per second	✔	65		151	Statistic Date Range 4/1/1947 - 3/31/2011

CALCULATIONS

Client	AES Indiana	File No.	0133274-013
Project	Eagle Valley Generating Station	Sheet	4 of 6
Subject	Dilution-Attenuation Factor Calculation	Date	01 April 2024
		Computed By	Dimitri Quafisi
		Checked By	John Blue



__Scenario 1__ Pumping Conditions gradients collected from April 14, 2023.

__Groundwater Flux Calculations:__

$$Q = KAI$$

$$K = Hydraulic\ Conductivity$$

Unit	Horizontal K (cm/sec)	Horizontal K (ft/day)
Sand and Gravel	2.66 x 10-1	755

$$A = Area$$

Cross-section	Length (ft)	Thickness (ft)	Area (ft²)
Full Pond	1,550	90	139,500
Half Pond	860	90	77,400

Cross-sectional Area Used for Calculations. Groundwater flow map from the April 14, 2023 gauging event. Arrows indicate groundwater flow direction.

Full Pond
Half Pond

$$I = Gradient$$

Cross-section	Head (ft)	Distance (ft)	Gradient (ft/ft)
Near MW-1S	0.19	300	0.0006
Near MW-2S	0.15	190	0.0008

$$Q = Groundwater\ Flux$$

Cross-section	Horizontal K (ft/day)	Area (ft²)	Gradient (ft/ft)	Groundwater Flux (ft³/day)
Full Pond	755	139,500	0.0006	63,000
Half Pond	755	77,400	0.0008	47,000

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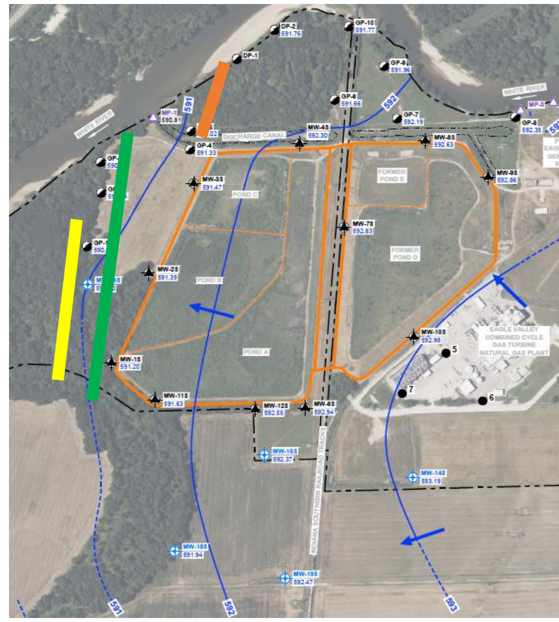
HALEY ALDRICH	CALCULATIONS	File No.	0133274-013
		Sheet	5 of 6
Client	AES Indiana	Date	01 April 2024
Project	Eagle Valley Generating Station	Computed By	Dimitri Quafisi
Subject	Dilution-Attenuation Factor Calculation	Checked By	John Blue



Scenario 2

Minimal Pumping Conditions gradients collected from January 18, 2022.

Groundwater Flux Calculations:

$$Q = KAI$$

$$K = Hydraulic\ Conductivity$$

Unit	Horizontal K (cm/sec)	Horizontal K (ft/day)
Sand and Gravel	2.66 x 10-1	755

$$A = Area$$

Cross-section	Length (ft)	Thickness (ft)	Area (ft^2)
Northern Area	645	90	58,000
Full Pond	1,900	90	171,000
Half Pond	950	90	85,500

Cross-sectional Area Used for Calculations. Groundwater flow map from the January 18, 2022 gauging event. Arrows indicate groundwater flow direction.

- Northern Area
- Full Pond
- Half Pond

$$I = Gradient$$

Cross-section	Head (ft)	Distance (ft)	Gradient (ft/ft)
North	1	610	0.002
Middle	1	860	0.001
South	1	850	0.001

$$Q = Groundwater\ Flux$$

Cross-section	Horizontal K (ft/day)	Area (ft^2)	Gradient (ft/ft)	Groundwater Flux (ft^3/day)
Northern Area	755	58,000	0.002	88,000
Full Pond	755	171,000	0.001	130,000
Half Pond	755	85,500	0.001	65,000

\\haleyaldrich\share\CF\Projects\133274\004 - Eagle Valley CMA\Client Info\DAF Calcs\2021_0930_IPL Eagle Valley DAF.pptx

![HALEY ALDRICH]

CALCULATIONS

Client	AES Indiana	File No.	0133274-013
Project	Eagle Valley Generating Station	Sheet	6 of 6
Subject	Dilution-Attenuation Factor Calculation	Date	01 April 2024
		Computed By	Dimitri Quafisi
		Checked By	John Blue

River Flow Calculations:

$Q_R =$ Discharge of White River near Eagle Valley, at Low-Flow conditions.

$Q_R =$ $274\ ft^3$/sec = 23,700,000 ft^3/day

DAF Calculations:

$DAF = \frac{Q_R}{Q_G}$ Where: $Q_R =$ Discharge of White River near Eagle Valley, at Low-Flow conditions.

$Q_G =$ Calculated Discharge from Eagle Valley Pond to White River

Scenario 1: Pumping Conditions

Pond Elevation (feet)83,	Q_G(ft³/day)	Q_R (ft³/day)	DAF
Full Pond	63,000	23,700,000	**380**
Half Pond	47,000	23,700,000	**500**

Scenario 2: Minimal Pumping Conditions

Pond Elevation (feet)83,	Q_G(ft³/day)	Q_R (ft³/day)	DAF
Northern Area	88,000	23,700,000	**270**
Full Pond	130,000	23,700,000	**180**
Half Pond	65,000	23,700,000	**360**

APPENDIX C
Technical Memorandum:
Discharge Water Risk Evaluation

HALEY & ALDRICH, INC.
6500 Rockside Road
Suite 200
Cleveland, OH 44131
216.739.0555

TECHNICAL MEMORANDUM

04 April 2024

File No. 0133274-013

TO: AES Indiana

FROM: Haley & Aldrich, Inc.

SUBJECT: Discharge Water Risk Evaluation
Eagle Valley Generating Station – Martinsville, Indiana

The Eagle Valley Generating Station (EVGS or the "facility") utilizes groundwater in operating its combined cycle turbine (CCGT) that is extracted by existing groundwater pumping from the facility's production wells. Ultimately, extracted groundwater from those production wells becomes effluent that is monitored and discharged to the White River in accordance with a National Pollutant Discharge Elimination System (NPDES) Permit at Outfall 003. To determine whether this discharge poses a risk to human health or the environment, Haley & Aldrich compared publicly-available, reported data for water samples collected from Outfall 003 to site specific surface water screening levels for Appendix III and Appendix IV constituents that are protective of human health and the environment. The screening levels utilized for this assessment were derived from the surface water screening levels compiled in the Groundwater Risk Evaluation Report (Appendix B of the Updated Corrective Measures Assessment). Target discharge screening levels were calculated from the White River surface water screening levels by applying a dilution-attenuation factor (DAF) of 75 that accounts for the dilution and attenuation that would occur as discharge water flows to and mixes with water in the White River.[1]

AES provides analytical results for water discharged from Outfall 003 in its Monthly Monitoring Reports (MMRs) required by the facility's Industrial Discharge Permits. The Indiana Department of Environmental Management maintains these MMRs and other publicly-available information on the agency's Virtual File Cabinet.[2] Below **Table 1** shows the application of the DAF to the selected surface water screening levels to calculate the target discharge screening levels, and the comparison of the

[1] The DAF of 75, which simulates the mixing and dilution that would occur at the interface of the Discharge Canal and the White River, was derived as follows: [7Q10 White River low flow] / [highest daily flow from the pipe outlet (Outfall 003) from 3/1/21 to 11/30/23] = 274 CFS / 3.63 CFS = 75.

[2] https://vfc.idem.in.gov. Sample results for CCR constituents in discharge water in the monthly monitoring reports for Outfall 003 are available from April 2023 to December 2023. Additional Outfall 003 discharge water data is available on the IDEM website as referenced herein.

maximum discharge concentrations to the resulting target discharge screening levels, protective of White River surface water (i.e. human health and the environment).

Table 1 – Comparison of Maximum Discharge Concentrations against Target Discharge Screening Levels (Protective of White River Surface Water)

Constituents	Surface Water Screening Level (a) (mg/L)	Target Discharge Screening Level (b) (mg/L)	Maximum Outfall 003 Discharge Concentration (mg/L)	Ratio Between Target Discharge Screening Level and the Maximum Discharge Concentration
Detection Monitoring - USEPA Appendix III Constituents (c)				
Boron	4	300	6.7	>44
Fluoride	2.7	200	0.89	>220
Assessment Monitoring - USEPA Appendix IV Constituents				
Antimony	0.006	0.45	0.0009	>500
Arsenic	0.01	0.75	0.01	>75
Barium	0.22	17	0.361	>45
Cadmium	0.0014	0.1	0.0007	>140
Chromium (Total)	0.1	7.5	0.006	>1,200
Cobalt	0.006	0.45	0.0014	>320
Lead	0.0065	0.49	0.00014	>3,400
Lithium	0.04	3.0	0.248	>12
Mercury	0.00015	0.011	0.0000801	>140
Molybdenum	0.1	7.5	0.493	>15
Selenium	0.0031	0.23	0.0045	>51
Thallium	0.00047	0.035	0.004	>9

Notes:
mg/L = milligrams per liter
(a) The lowest of the human health and ecological screening levels protective of White River surface water, obtained from Table 5 of the Groundwater Risk Evaluation report.
(b) Target discharge screening levels = Surface water screening level x DAF of 75
(c) Detection Monitoring - EPA Appendix III Constituents without screening levels are not included.

The comparison demonstrates that detected discharge concentrations (conservatively, maximum concentrations) do not pose an adverse impact to the river. As presented, the ratios between the target discharge screening levels and maximum discharge concentrations range from 9 to 3,400 for detected constituents. This means that concentrations of detected constituents in discharge water could be more than 9 times higher than the maximum level measured before a potential adverse impact to the river might occur. Consequently, the discharge to the White River of extracted groundwater effluent from the existing CCGT production wells does not pose a risk to human health or the environment.

APPENDIX D
Preparer Resumes

HALEY ALDRICH

TODD BERNHARDT

Technical Expert | Risk Assessor

EDUCATION

M.S., Environmental Toxicology and Risk Assessment, Duke University
B.A., Biochemistry, Occidental College

Todd is a technical expert with over 24 years of experience in the fields of human health risk assessment (HHRA), site investigation and characterization, fate and transport modeling, toxic tort litigation support, and toxics regulation compliance. He has served as the HHRA lead on projects for over 20 years, leveraging prior work experience and expertise in the realm of multi-chemical, multi-pathway exposure assessment, and regulatory compliance under both federal and state programs. Todd's cross-regional experience includes extensive project work in California, under regulatory oversight of the California Environmental Protection Agency, Department of Toxic Substances Control and Regional Water Quality Control Boards or United States Environmental Protection Agency Region 9, plus project work in Arizona, Indiana, Kansas, Louisiana, Ohio, Puerto Rico, South Carolina, and Texas. Specific areas of project experience include vapor intrusion, power plant sites, utility service stations, petroleum sites, former manufactured gas plant sites, coal combustion residuals, and sites with heavy metals (including firing ranges). Todd has also been the lead human health risk assessor for multiple naval installations, and currently serves as the lead oversight consultant for a multi-site, multi-year risk-based corrective action pilot program in Puerto Rico, serving as the primary client and agency point of contact for all site characterization and risk-related issues. Todd has also performed several third-party technical reviews of HHRAs and has provided technical support for testimony in toxics-related litigation.

JAY PETERS

Principal Consultant | Risk Assessment Practice Leader

EDUCATION

M.S., Environmental Engineering, Tufts University
B.S., Toxicology, Northeastern University

PROFESSIONAL SOCIETIES

American Nuclear Society, Decommissioning and Environmental Services Division
Massachusetts Licensed Site Professionals Association, Technical Practices Committee
Society of Risk Analysis

Jay develops risk-based regulatory strategies for commercial and industrial clients, as well as legal professionals. With 30 years of experience as a risk assessor, he has successfully managed large and complex risk assessment projects for state and federal Superfund and Resource Conservation and Recovery Act sites, as well as brownfield redevelopment and property transfer sites under the regulatory frameworks of more than twenty state cleanup programs and seven Environmental Protection Agency (EPA) regions.

Jay's extensive cross-regional experience conducting risk assessments allows his clients to take advantage of risk-based strategies that stem from an in-depth insight into the latitude that can be afforded by EPA and state risk assessment procedures and the directions that agencies are taking on various initiatives. He has used this experience to leverage risk-based strategies that achieve his clients' end vision goals while also gaining approval by regulators, thereby substantially reducing his client's remedial liabilities.

Jay's specialized areas of risk assessment expertise include radiological risk and dose assessments, Toxic Substances Control Act 761.61(c) risk-based approaches for polychlorinated biphenyl (PCB) sites, application of bioavailability assessments, and developing risk-based site investigation and closure strategies that contribute to the cost-benefit analysis of remedial alternatives. Jay's areas of project experience include mixed chemical/radiological, coal combustion residuals, mining and smelting, petroleum, vapor intrusion, chemical manufacturing, foundry, and manufactured gas plant sites, as well as sites and heavy metals (including firing ranges). Jay has provided litigation support by performing third party technical reviews, developing expert opinions, and giving testimony.

Jay routinely communicates to community groups and regulatory stakeholders on numerous topics ranging from conceptual site models and nature and extent delineation to human health and ecological risk assessment. His ability to communicate technically complicated information in terms that are understandable to these entities has been successful in resolving comments and in facilitating concurrence with his clients end vision strategies.

DIMITRI QUAFISI, PG

Technical Expert |Geologist

EDUCATION

M.S., Geology, East Carolina University
B.S., Marine Science, Coastal Carolina University

PROFESSIONAL REGISTRATIONS

PA: Professional Geologist (PG Reg No. PG005284)

PROFESSIONAL SOCIETIES

Geological Society of America

Dimitri has over 10 years of experience completing Site related data evaluations for Hydrogeologic and geologic conceptual Site Modeling. He has also provided groundwater fate and transport modeling efforts in support of Corrective Measures Assessment evaluations at various CCR Sites around the country. IN addition to technical support for projects, Dimitri has been a task manager and assistant project manager helping to shepherd projects through regulatory programs to closure.

Dimitri's previous work experience includes completing Phase I, II, and III site assessments and attainment sampling. He has extensive experience working with State agencies such as the Pennsylvania Department of Environmental Protection, the Pennsylvania Department of Transportation, and the New Jersey Department of Environmental Protection. He has also acted as a liaison between several clients and their respective agencies.

Dimitri routinely communicates to community groups and regulatory stakeholders on numerous topics ranging from conceptual site models, nature and extent delineation, contaminate fate and transport, and remedial effort evaluations.

APPENDIX C
Technical Memorandum:
Groundwater Flow and Transport Modeling

HALEY & ALDRICH, INC.
6500 Rockside Road
Suite 200
Cleveland, OH 44131
216.739.0555

TECHNICAL MEMORANDUM

01 April 2024

File No. 0133274-013

TO: AES Indiana

FROM: Haley & Aldrich, Inc.

SUBJECT: Groundwater Fate and Transport Modeling
Eagle Valley Generating Station – Martinsville, Indiana

Introduction

On behalf of AES Indiana (AESI), Haley & Aldrich, Inc. (Haley & Aldrich) has prepared this memorandum to provide a summary of the groundwater flow and solute transport model that was constructed to evaluate and compare potential correct measures in support of the Corrective Measures Assessment (CMA) for the multi-unit Ash Pond System at the Eagle Valley Generating Station (Site) near Martinsville, Indiana. The Appendix IV constituents above the Groundwater Protection Standard (GWPS) at the Site include Arsenic, Lithium, and Molybdenum. Molybdenum was chosen for the solute transport portion of the model as it was observed to be the most conservative, widespread constituent which would require the most amount of time to attenuate for each remedial option. The following text describes the methods, model construction, assumptions, model calibration, and subsequent simulation of remedy alternatives.

Methods and Assumptions

The numerical model MODFLOW-2005 (Harbaugh, 2005) was selected for the modeling effort and is a three-dimensional, finite difference groundwater flow model capable of simulating the groundwater conditions under various scenarios including pumping and changes to infiltration over time. MODFLOW uses a rectangular grid within the domain and allows for establishing irregular groundwater flow boundary conditions that represent actual and Site-specific features in the study area. The setup is facilitated by assigning boundary types and values to specific grid cells.

The three-dimensional finite difference groundwater flow model domain covers an approximate length of 7,350 feet in the x-direction (west to east), 9,800 feet in the y-direction (north to south), and approximately 250 feet in the z-direction (vertical). The model consists of 259 rows, 266 columns, and 17 layers for a total of 1,171,198 cells.

Boundary conditions define the locations and manner in which water enters and exits the active model domain. The following boundary conditions were utilized in the MODFLOW-2005 model:

- The White River is represented using the River Package and is used to estimate the northern and western boundary elevations and is assigned an elevation of 593.0 feet (North American Vertical Datum of 1988 [NAVD88]) to the north, decreasing incrementally to an elevation of 587.6 feet (NAVD88) to the south.
- The cooling water production wells south of Former Ponds D and E are a major groundwater withdrawal feature, creating radial groundwater flow to the Site and away from the White River. The extraction wells are presented using the Well Package and simulate the following rates estimated from flow rate data collected concurrent with the March 2023 synoptic groundwater level gauging event used for model calibration:
  - PW-5: 200 gpm
  - PW-6: 840 gpm
  - PW-7: 960 gpm
- Recharge was assigned to the model domain equal to 6.1 x 10^{-3} ft/day or 27 inches per year.

Hydraulic properties were initially assigned consistent with observations presented in borehole logs for onsite wells. Values were assigned for horizontal hydraulic conductivity and vertical hydraulic conductivity. These parameters were iteratively varied during model calibration to achieve the best fit to observed hydraulic patterns including head elevations, hydraulic gradients, and flow directions. The simulated hydraulic conductivity values used in the model are presented below for hydrogeologic units underlying the Site:

- Fill, Lean Clay, and Silty Clay: 0.5 ft/day or 1.7 x 10^{-4} centimeters per second (cm/s)
- Silty Sand or Sandy Silt: 1.3 ft/day or 4.5 x 10^{-4} cm/s
- Sand or Sand and Gravel: 200.0 ft/day to 1200.0 ft/day or 7.0 x 10^{-2} cm/s to 4.2 x 10-1 cm/s

Calibration

Model calibration is the process of refining the model representation of the hydrogeologic framework, hydraulic properties, and boundary conditions to minimize the difference between the simulated heads to the measured data. The quality of model fit can be assessed from many statistical and graphic methods. One method is based on the difference between simulated and observed heads, or residuals. The overall magnitude of the residuals is considered, but the distribution of those residuals, both statistically and spatially, can be equally important. The evaluation of collected groundwater elevation data resulted in the selection of a flow period that is considered representative for the Site, synoptic groundwater levels collected in March 2023. Below is a scatter plot of model-simulated values as a function of observed values from Site monitoring.

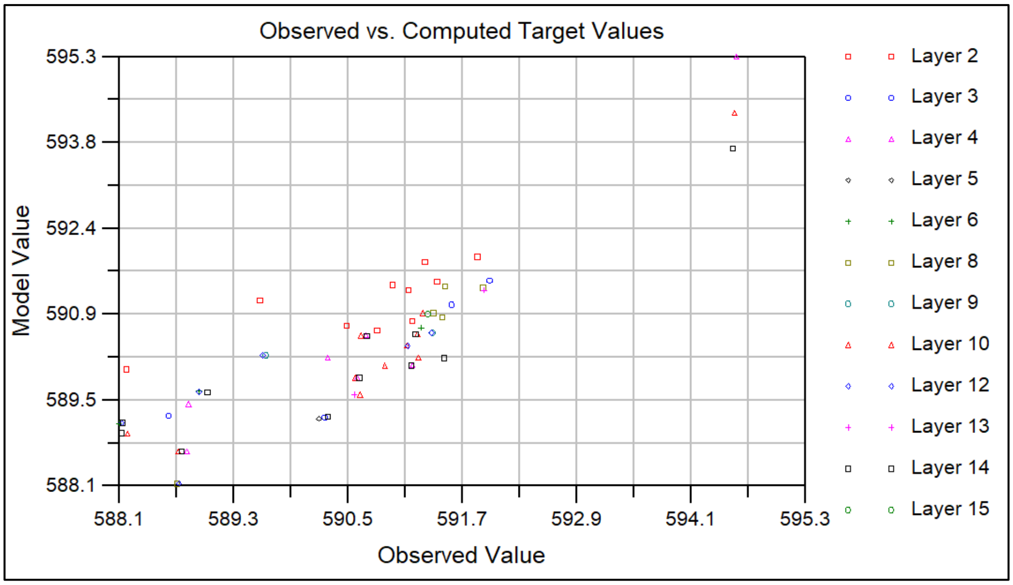


Figure 1: Calibration scatter plot. Values represent steady-state targets.

Based on the outcome of the model fit evaluation, it is concluded that the numerical calibration goals have been achieved. The mean error in head was 0.72 feet, or 11.1 percent (%) of the head observation range, 6.48 feet. The calibration assessment has achieved industry-accepted calibration goals, and therefore, the groundwater flow model was deemed suitable for the development of the solute fate and transport models described below.

Fate and Transport Modeling

Solute fate and transport modeling was completed using the three-dimensional, numerical model MT3DMS (Version 5 of MT3D) (Zheng, C. and Wang, P.P., 1999). MT3DMS interfaces directly with MODFLOW for the head solution and supports all the hydrologic and discretization features of MODFLOW. Parameters affecting transport such as advection, diffusion, dispersion, and adsorption are utilized within the MT3DMS package to estimate solute transport within the model domain.
For this modeling effort, the MT3DMS model utilized the flow regime from the steady-state, calibrated Site groundwater flow model to simulate transport of molybdenum. In addition to the MODFLOW groundwater flow field parameters and boundary conditions, the fate and transport models require inputs of adsorption rate (K_d) for molybdenum. In this modeling effort, input parameter values were defined from Site data, whenever possible, or using conservative literature values. Fate & transport timelines are directly related to the K_d for the solute. As part of the modeling exercise, molybdenum K_d was assigned a value of 0.1 or 1.0 within the aquifer soils, and a value of 5.0 within the CCR material present at the Site.

The extent of the molybdenum groundwater plume assigned within the model domain was generated from current groundwater concentrations in the CCR Rule groundwater monitoring system observed during the April/May 2023 CCR Rule groundwater sampling event. To simulate additional mass entering the system from source areas, the source area was defined utilizing initial concentration and constant sources in the form of recharge.

Limitations

Models were built using available information to support CMA evaluations and conclusions. The model's level of accuracy is directly dependent on the data available to construct the model and should not be construed by the user as a definitive predictor of the future. Instead, the CMA alternatives model simulations should be primarily considered relative to one another to enable the user to determine (when appropriate) most favorable, less favorable, and least favorable CMA alternatives.