Quality Assurance Project Plan

Water Level Assessment Northeastern Lincoln County Groundwater Conditions Monitoring

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1.0 BACKGROUND AND PROJECT DESCRIPTION

1.1. Introduction

This document presents a Quality Assurance Project Plan (QAPP) for planned groundwater data collection for the Lincoln County Conservation District's (LCCD) Northeastern Lincoln County Groundwater Conditions Monitoring Project (the Project). This QAPP includes methods and procedures for selecting wells from which to collect water level data and collecting water level measurements from wells. This QAPP was prepared in accordance with Washington Department of Ecology's (Ecology) Office, Water Resources Program and Office of the Columbia River (OCR) Grant Special Terms and Conditions QAPP Guidance (Ecology Publication 17-11-013, 2018a) using the Ecology QAPP template (Publication 18-11-018, 2018b).

The Project is funded by an Office of Columbia River grant from the Washington State Department of Ecology (Ecology), agreement number WROCR-2123-LiCoCD-00030. The goal of the Project is to collect groundwater level data in northeastern Lincoln County to verify, revise, and characterize groundwater level change trends suggested by previous work in the area. Groundwater levels will be measured in up to 36 wells on a semi-annual and quarterly basis.

Lincoln County leaders want to have the data upon which to build the robust, science-based water management tools needed to reverse widespread groundwater level declines. Data and information collected under this QAPP will be used to:

- Understand the potential effects of future growth on the groundwater budget in the northeastern portion of the County,
- Evaluate the extent of late summer pumping drawdown in the western portion of the County, and
- Provide technical guidance for prioritizing groundwater mitigation efforts and get in front of groundwater supply crises that will be driven by growth and peak demand season shortfalls.

Proposed project tasks will focus on:

- Collecting water level data.
- Placing new and existing data in a geospatial and hydrostratigraphic context.
- Assessing groundwater pumping conditions using geospatial tools.
- Characterizing the nature of groundwater changes in the northeastern County.

The study area for the Project is comprised of the northeastern portion of Lincoln County, Washington (Figure 1), generally within a rough polygon defined by the municipalities of Reardan, Davenport, Harrington, and Edwall (Figure 2).

1.2. Background

Groundwater is used to meet almost all domestic, municipal, agricultural, and industrial needs in the County. Historical water level monitoring (GWMA 2012a, 2012b, 2012c, EAEST 2017, GeoEngineers 2021) has shown that groundwater levels, except in a few areas where they appear to be balanced between recharge and pumping, are declining across the County. This data is summarized below and provided in Appendices A and B. Future growth and changing climate could disrupt this balance and accelerate existing declines.

In the northeastern County understanding and maintaining this balance is becoming critical in the Reardan, Davenport, Harrington, and Edwall areas and along the Highway 2 corridor where anecdotal reports, and previously collected data summarized later in this document suggest increasing numbers of domestic wells are experiencing seasonal water level declines and pumping shortfalls. Residential growth is expected to continue in this area as the Spokane metropolitan area grows west into Lincoln County where land and home prices coupled with improving communications and access make this area attractive and accessible. In the eastern part of the County peak demand season water level declines could trigger water rationing scenarios for potable water systems that have no access to other supplies. And yet, potential peak demand effects are not being systematically assessed.

The work described in this QAPP is anticipated to build on previous projects and ongoing or concurrent projects. The following previous projects/studies have been identified as relevant to the project:

- Columbia Basin Groundwater Management Projects (GWMA) completed prior to 2014, including water level data for incorporated municipalities.

- EA Engineering, Science, and Technology, Inc., PBC (EAEST 2017). Technical Memorandum for the Initial Data Analysis for the Water Level Assessment for the Lincoln County Sustainable Water Supply Study, which focused on 56 well with 20 or more measurements. Generally, included irrigation and water system supply wells. The EA study underrepresented domestic wells.
- GeoEngineers Inc. 2021. Groundwater Level Summary Report, which included 79 basalt aquifer systems water level data collected by LCCD for 2018 to 2021 and expanded upon the previous long-term statistical analysis performed by EA.

GWMA municipal groundwater supply reports relevant to the project area were prepared for Davenport (GWMA 2012a), Harrington (GWMA 2012b), and Reardan (GWMA 2012c). All of these reports noted the presence of declining groundwater levels in basalt aquifers being used by these municipalities. These observations were one reason that LCCD embarked on the work later reported in EAEST (2017).

The EAEST report concluded that long-term water level data collected from Columbia River basalt aquifer system wells generally shows groundwater levels are decreasing in the Columbia River basalt aquifer system across the central to southwestern portions of the County. There are several areas of the county however where little or no data was available, and it was impossible to evaluate long-term water level trends. These areas are generally in the northern and western portion of the County (north of Highway 2) and the eastern part of the County (east of Reardan and Harrington). The late winter and early spring water levels in wells interpreted to be open to the Wanapum aquifer, the Grande Ronde aquifer, or the combined/comingled Wanapum-Grande Ronde aquifers have been declining for several decades. While the rate of water level change varies from well to well, the overall trend is unequivocal. Columbia River basalt aquifer water levels are, with few exceptions, declining across most, if not all, of the County. Hydrographs with trend analysis from this effort are provided in Appendix A. The 2017 report (EAEST) recommended that wells be identified in the areas where the original study lacked coverage and potentially targeting water system wells in an effort to collect digital water levels because small water system were not included in the original network.

The 2021 GeoEngineers report followed the EAEST report recommendations by looking at shallow and domestic wells primarily in the eastern part of Lincoln County. The GeoEngineers report concluded that water levels are more commonly falling than rising across the County. While this decline was more pronounced in the deeper basalt aquifer wells it was also observed in numerous shallow domestic and small water system wells. The study also concluded that the declines will persist if current pumping rates and recharge conditions prevail into the future. Data summaries from that report are included in Appendix B.

The following ongoing or concurrent projects also have been identified as relevant to the project:

- Department of Ecology Eastern Region Office (ERO) annual later winter/early spring groundwater level monitoring data reported online in the Environmental Information Management (EIM) database.
- Washington State University (WSU) Water Science Center groundwater level monitoring.
- Columbia Basin Sustainable Water Coalition (CBSWC) groundwater level monitoring.

1.3. Project Description

The **goal** of this Project is to collect new groundwater level data that will be combined with previously collected data and data concurrently collected by other entities in order to: 1) understand the potential effects of future growth on the groundwater budget in the northeastern portion of the County, 2) evaluate the extent of the late summer pumping drawdown in the northeastern portion of the County, and 3) provide technical guidance for prioritizing groundwater mitigation efforts to confront the predicted groundwater supply challenges that could be driven by growth and peak demand season shortfalls.

The ***objectives*** of the Project are to:

- Collect groundwater level measurements from previously measured wells in the Project area.
- Identify additional wells in the Project area from which to collect groundwater level data.
- Collect water level measurements from these additional wells.
- Compile data from previous and concurrent water level measurement efforts in the Project area.
- Analyze the water level data to evaluate groundwater level trends.
- Use Project findings in outreach efforts to build stakeholder understanding of the issues and possible solutions.

Project **tasks** are as follows:

- Task 1, QAPP Preparation, under which this document was prepared.
- Task 2, Data Collection, which includes identifying and locating wells from which to collect new water level data and/or continuing previously implemented water level data collection activity; getting access to the selected wells; and water level data collection
- Task 3, Data Review, which includes placing new and existing data in a geospatial and hydrostratigraphic context, assessing groundwater pumping conditions using geospatial tools, and characterizing the nature of groundwater changes in the northeastern County.
- Task 4, Reporting, which includes identifying small water systems and areas of permit except wells in the northeastern County that may be most at risk from water level declines during the peak demand season and preparing the final project report.

Table 1 describes the information to be collected/used in the project and a description of the anticipated sources.

Table 1. Information Needs and Sources

Information Need	Anticipated Source(s)
Groundwater Level Data in northeastern Lincoln County	Quarterly or semi-annual measurements in up to 36 identified project wells
Concurrently Collected Water Levels	Ecology ERO Database WSU Water Science Center CBSWC
Previously Collected Water Levels	EAEST 2017 GeoEngineers 2021 GWMA
Well Location (Latitude, Longitude, elevation)	Previous and Concurrent Studies (ERO data base, EA 2017, USGS long term monitoring, GWMA, GeoEngineers 2021). Newly wells will be located using a GPS, and or known surveyed location.
Well Construction/ Hydrostratigraphic Completion	GWMA subsurface GIS shapefiles for hydrostratigraphic units of interest Well logs/driller logs for well open intervals/production intervals

2.0 ORGANIZATION AND SCHEDULE

2.1. Organization

Elsa Bowen of Lincoln County Conservation District (LCCD) has overall fiscal oversight and contract management responsibility under the grant contract with Ecology. For LCCD, Elsa Bowen will coordinate the field technicians for the field monitoring program. LCCD staff will conduct the field activities under their agreement with Ecology. Alicia Candelaria will serve as the project manager and principal investigator for the consultant team. Dr. Kevin Lindsey, LHG will serve as the lead hydrogeologist on the Project.

Key overall project responsibilities of each of the project participants are defined below:

- LCCD
  - Overall project fiscal management.
  - Conduct field data collection.
  - Responsible for entering data into the EIM database.
  - LCCD field staff will be trained by GeoEngineers and will work under sampling plans prepared by the project hydrogeologists.
- GeoEngineers
  - Lead investigator in charge of project organization
  - Track consultant budget expenses and make every reasonable effort to accomplish the project within approved budget.
  - Prepare sampling plans, including this QAPP.
  - Assist in development of geospatial databases in which data collected for the project is stored, perform data entry.
  - Plan and conduct oversight activities of the hydrogeologic data collection.
  - Conduct evaluation, and data validation activities as determined by the project scientific team.
  - Oversee the progress of data collection, evaluation, and database compilation; provide project oversight; and check data validity.
- Landau Inc.
  - Assist with new well location selection.
  - Assist with recognizing and coordinating with concurrent studies.
  - Water rights review (CWRE) support.

In addition to these formal roles and responsibilities, the LCCD project team is in regular communication with Ecology staff to share data and insights into the hydrogeology of Lincoln County and surrounding area. While Ecology staff members are not a formal part of the LCCD team, we anticipate continued discussions with them, to include but not be limited to, data sharing and peer review.

Table 2 presents the organizational chart and contact information for the project. It includes key staff, their rolls, and their contact information.

Table 2. Project Rolls and Organization

Roll	Person	Organization	Phone Number	Email
Project Manager	Elsa Bowen	Lincoln County Conservation District	509.725.4181	ebowen@lincolncd.com
Field Data Collection	To Be Determined	Lincoln County Conservation District	509.725.4181	To Be Determined
Lead Project Hydrogeologist	Kevin Lindsey Ph.D., L.Hg, LG	GeoEngineers, Inc.	509.209.2848	klindsey@geoengineers.com
Project Manager, Data Analyst	Alicia Candelaria, PM	GeoEngineers, Inc.	509.209.2820	acandelaria@geoengineers.com
Project Hydrogeologist, Data Analyst	Jonathan Travis, LG	GeoEngineers, Inc.	509.209.2839	jtravis@geoengineers.com
CBSWC Liaison	Benjamin Lee, PE, CWRE	Landau, Inc.	253.84.4884	blee@landauinc.com
Water Rights Review	Katherine Ryf, CWRE	Landau, Inc.	253.926.2493	kryf@landauinc.com
WDOE-OCR Project Manager and QA Coordinator	Scott Tarbutton	Ecology-OCR	509.867.6534	scta461@ecy.wa.gov

2.2. Proposed Project Schedule

The general project schedule for the Project is described in the project work plan and summarized here. We anticipate that field data collection work done under this QAPP will begin in early 2023 and continue through the autumn of 2024. The actual project schedule will be dictated by data collection needs, well access, actual conditions encountered in the field, and new information and insights into Lincoln County groundwater conditions as the work proceeds.

2.3. Budget and Funding

The Project is funded by an Office of Columbia River grant from the Washington State Department of Ecology (Ecology), agreement number WROCR-2123-LiCoCD-00030. Project funding is being distributed to LCCD per monthly invoices billed on a time and expense reimbursement basis.

3.0 QUALITY OBJECTIVES

The data and measurement quality objectives (MQOs) for water level measurement devices and for determining well locations for the project are provided in this chapter. Decision quality objectives are also described in this chapter.

3.1. Measurement Quality Objectives for New Data

The project MQOs are developed to collect representative and accurate groundwater level data from up to 36 wells. Wells which do not have any pumping equipment in them will be prioritized for data collection, LCCD anticipates that some wells will contain pumping equipment and water level measurements will be collected for both static and dynamic pumping conditions.

The **representativeness** of new water level data collected for the Project will be based on the measurements being taken from water wells where the technical team can determine the depth and elevation of the open interval(s) within the well, and the geologic unit(s) that open interval corresponds to. The open interval of a well is defined as the interval(s) that is in direct hydraulic communication with the aquifer such that the water level measured in the well is affected by stresses within that interval. In Lincoln County, this interval commonly consists of the open borehole and any cased interval in connection with the open borehole in which a cement or bentonite seal is not present. Open interval depth and elevation will be established using written records and invasive data (such as well videos) provided by the well owner and/or other sources. Geologic unit interpretation will be based on that information and previous subsurface geologic mapping efforts by the Columbia Basin GWMA and U.S. Geological Survey.

Completeness will be evaluated by collecting multiple water level data over time during the Project. This will allow LCCD to assess variability in the data and whether an adequate amount of data has been collected.

Electronic water level sounders will be the primary tool used to measure and record water level data. Where access limitations preclude measurement using a water level sounder or transducer, and a functioning airline is present, the water level will be measured using the airline. As an alternative, a sonic water level sounder may be used to collect water level data. The decision to use this device will be made by the field technician, and it will only be considered if no other method can be successfully employed. The type of instrument used will be dictated by accessibility considerations. In all cases, the specific measurement device used and any special circumstances affecting the **accuracy** (e.g., cascading water) will be recorded in the field measurement form so that the precision of the measurement can be assessed. Table 3 lists measurement methods to be used, associated measurement quality objectives, and anticipated method accuracy.

Table 3. Measurement Methods, Accuracy and Resolution

Measurement Method	Accuracy	Resolution
Solinst, Slope Indicator, or Waterline water level meter	0.05 feet	0.01 foot
Powers water level meter	0.2 feet	0.1 foot
Sonic water level meter[1]	0.2 feet for <100ft deep 2% for >100ft deep	0.1 foot
Airline (depends on gauge found on well)	2 feet	1 foot
Pressure Transducers[2]	0.02 feet	0.01 foot (0.0001 PSI)
Barometric Pressure Transducer[3]	0.0001 PSI	0.0001 PSI

Notes:

[1] Ravensgate Corporation Sonic water level indicator, Model Number 200U RC or Model Number 300 RGI

[2]HOBO (On set Computer Corporation) Transducers, Model Number HOBO U20-001-02

[3]HOBO U20I-04

All wellheads will be surveyed for horizontal control using a hand-held GPS unit, unless this has been done by LCCD staff during previous water level data collection efforts. At each well the ground surface at the well and water level access port will be surveyed to allow water level measurements to be converted to groundwater elevations. With respect to these measurements:

- Latitude and longitude of each well will be measured using a handheld GPS unit using WGS84 and recorded in UTM. The horizontal well locations will later be converted to NAD83HARN within ArcGIS. Horizontal accuracy will be within 20.0 feet, to the extent possible given instrument accuracy and map accuracy.
- Land surface elevation of the well as located on a Digital Elevation Model (DEM) in ArcGIS will be based on the GPS-generated latitude and longitude (single unit GPS locations are typically much more accurate in the XY plane compared to the vertical elevation estimate). Elevations will be reported in NAVD88 format.

3.2. Measurement Quality Objectives for Existing Data

Existing data available from previously prepared reports and collected under an approved Ecology QAPP (described earlier), Ecology's on-line EIM database, and the ongoing WSU study will be used as is. We will evaluate the quality of the existing data using professional judgement and experience in the area. Existing data quality and its use will be handled on a case-by-case basis, if necessary.

3.3. Decision Quality Objectives

This project does not have any decision quality objectives (DQO) and modeling quality objectives because the data will not be used to select between different alternative conditions and analytical modeling is not planned for this effort.

4.0 STUDY DESIGN

4.1. Introduction

LCCD plans to collect water level measurements from up to 36 wells in northeastern Lincoln County. These wells will be reviewed for geologic conditions and a good distributive selection of wells will occur focusing on small water systems, permit exempt wells, and accessible wells in northeastern Lincoln County. This portion of the QAPP is therefore focused more on methods and procedures to be used in selection, sampling, and analysis, rather than providing a list of sampling locations.

The lateral/areal study boundaries in northeastern Lincoln County are generally within a rough polygon defined by the towns/cities of Davenport, Reardan, Edwall, and Harrington (Figures 1 and 2). Vertical boundaries of the project are based on the completion depth of the public and private (permit exempt) water well completion intervals. This project intends to focus on alluvial and shallow basalt completed wells. Due to the large lateral extent and the variability of the depth and thickness of the alluvial and basalt units, the vertical boundaries of the project will be driven by project wells selected and geospatial hydrostratigraphic evaluation.

4.2. Field Data Collection

Field data will be collected from water wells identified for use in this project. As noted previously, field data to be collected under this QAPP includes the following:

- Groundwater Levels.
- Well locations.

Table 4 Summarizes anticipated measurements frequency. For data collection procedures see Section 5.0.

Table 4. Data Collection Frequency

Parameter	Measurement Type	Measurement Frequency	Download Frequency
Groundwater	Manual/Non-Instrumented	Quarterly	NA
Groundwater	Transducer	Hourly	Quarterly
Barometric Pressure	Transducer	Hourly	Quarterly
Well Location	Handheld GPS	Once – First Event	Once – First Event

4.3. Analysis Design

The Project is designed to expand upon existing groundwater level data sets for Lincoln County, while taking advantage of and sharing information with concurrent studies. The design of this analysis is developed in two parts, 1) candidate well selection to support the development of the hydrogeologic context and 2) the measurement of water levels to support trend analysis.

The following selection criteria will be used to identify candidate wells to potentially be used for measuring water levels:

- Candidate wells will have known geology and suitable aquifer completion (e.g., have a geologic log) and well construction details.
- Possible surface water recharge sources, other measurement points, and known or suspected pumping wells relative to candidate wells will be identified.
- The candidate well must be physically accessible and have a sampling port or other suitable opening/device to use to collect data of sufficient accuracy and precision to be usable for the project.
- The well owner must give permission to LCCD for the well to be monitored.

An initial list of candidate wells will be compiled by LCCD investigators using existing subsurface geologic well log databases the Project team has, subsurface geology maps, and personal contact. This initial list will be based on the first two criteria listed above. The last two criteria will be verified by the investigators and include evaluating hydrostratigraphic context, water rights, and if the well is being used by a concurrent study. Finally, the wells will also be evaluated during an initial site visit. Wells satisfying all four criteria will be scheduled for data collection.

Once the water level data is collected, it will be corrected for barometric pressure (if needed) and converted to groundwater elevation per Ecology publication 18-03-2017 (SOP for transducers). Then it will be evaluated for trend analysis using industry standard means and methods. The statistical method selected will be dependent on the number of data points (n), data variability such as seasonality and pumping stresses, relationship to other wells completed in similar geohydrologic context. We anticipate using industry standard tools including ProUCL version 5.2 (https://www.epa.gov/land-research/proucl-software) an EPA software for environmental trend analysis and or Microsoft excel. Potential analytical methods include linear regression and/or Mann Kendal trend analysis. The trends and their statistical significance will be included in the final report.

4.4. Possible Challenges and Contingencies

This study assumes that LCCD will be granted access to up to 36 wells in the northeastern part of the county. Possible challenges, and their contingencies, for the project include:

- Fewer than anticipated wells are available for monitoring/measuring. In this case, a well may be selected slightly outside of the target area, or fewer wells will make up the monitoring set.
- Wellhead field conditions prohibit measurement. For example, a well may go dry or a new pump may be installed without an access port. If the well goes dry, then that will be recorded, and the well will continue to be monitored in case it a seasonal occurrence. If the well becomes physically inaccessible, then that will be noted in the field form and the point of contact for the well will be contacted to determine if that lack of access is permanent or temporary. In the case of a temporary lack of access

a note will be made, and the well will be measured at the next event when it becomes available. If the well will no longer be accessible, it will be noted and dropped from the monitoring set.

- Pumping effects on candidate wells. Every attempt will be made to obtain static non-pumping water levels. However, if a well is on during measuring it will be noted on the field form, so that this field condition can be accounted for in the data evaluation.

5.0 FIELD PROCEDURES

The purpose of the water levels collected during this project is to determine basic aquifer groundwater level properties. The field procedures described in this section include water level measurements and GPS well location measurements.

5.1. Water Level Measurement Procedures

The LCCD investigators will, to the extent possible given actual on-site conditions, follow the field groundwater measurement procedures as outlined in the Ecology SOPs available online, https://ecology.wa.gov/Issues-and-local-projects/Investing-in-communities/Scientific-services/Quality-assurance. The SOPs used include EAP052, Ecology Publication 18-03-215 for manual water level measurements, and EAP074, Ecology Publication 18-03-217 for submersible transducers.

Items that need to be considered when selecting the appropriate measurement method are as follows:

- Solinst/Slope Indicator/Waterline e-tape:
  - If the well has a pump installed this method is generally not recommended, unless the well has a dedicated sounding tube installed.
  - Dedicated monitoring wells and wells without pumps are generally acceptable for using a sounder to measure water levels.
- Datalogging transducer:
  - If the well has a pump installed this method is generally not recommended, unless the well has a dedicated sounding tube installed.
  - Dedicated monitoring wells and wells without pumps are generally acceptable for using a transducer to measure water levels.
  - Downloading the transducer will be done per the manufacturer's instructions. Following downloading, the date, time, well identification, manual water level measurement and serial number of the transducer will be recorded in the field measurement form.
- Airline measurements:
  - This is the recommended method that is acceptable to use when a well has a pump installed without a dedicated sounding tube.
  - The length of the airline must be known, or the airline measurement will be unusable for a water level elevation determination. Relative water level changes can still be calculated if the airline length is unknown.

- Airlines can be compromised by either being plugged our punctured. Previous water level measurements need to be considered when measuring airlines.

- Sonic water level indicator:
  - If all other measurement techniques are infeasible, then a sonic water level meter may be used if the project manager decides that water level data is needed from the well in question and no other alternative well is available.
  - If the well has a pump installed this method is generally not recommended unless the measurement can be verified by other means.
  - Wells that have a known obstruction or deviation to the borehole this method is generally not recommended.
  - Dedicated monitoring wells and wells without pumps are generally acceptable for using a sonic water level indicator to measure water levels.

5.2. Well Location Procedures

All wellheads will be surveyed for horizontal control using a hand-held GPS unit. Land surface elevation of the well as located on a Digital Elevation Model (DEM) in ArcGIS by using the GPS-generated latitude and longitude (single unit GPS locations are typically much more accurate in the XY plane compared to the vertical elevation estimate). At each well, the ground surface at the well and water level access port will be surveyed using WGS84 and recorded in UTM. Unless noted otherwise in field measurement form, the water level measuring point will be the access port on the top of the well casing/measurement port.

6.0 QUALITY CONTROL

In addition to the standardized procedures described in Section 5, the following additional steps in this section are designed to ensure an adequate level of quality control during sampling.

6.1. Preparing for Field Work

Prior to deploying to the field:

- Field instruments will be checked in accordance with the manufacturer's instructions on a daily basis at the beginning of each measurement day, and as needed during the day.
- Appropriate software to complete downloads from a transducer checked for functionality on the computer to be used.
- Field personnel will keep health and safety as their highest priority. Since this work will take place at all times of the year considerations need to be made for heat and cold stresses as well as wet and dry conditions. The field vehicle will always be equipped with at least one first aid kit and fire extinguisher. The following items should be considered before leaving for the field on a daily basis:
  - Field vehicle will have a full tank of gas.
  - Field personnel will have plenty of drinking water on hand.
  - Field personnel will make sure LCCD office staff is aware of their plan for the day.

- Field personnel will always carry a working cell phone with local emergency phone numbers. They will also have on hand contact information for the well owners they will be working with. A map to the nearest hospital will be on hand as well.
- Field personnel will be prepared for cold or heat stresses based on the time of year the work is taking place.

6.2. Steps Taken in Field

While in the field quality control will include:

- Maintaining accurate field notes that describe field procedures, record values for measured field parameters, track well identification, and note any variation from the planned procedure. Including recording pertinent information on the field form (Appendix C).
- Use of field procedures and SOPs cited in the previous section will be followed.
- Cleaning all non-dedicated, non-disposable field equipment coming into contact with a well between uses at subsequent measurement locations to prevent cross-contamination between wells. The procedure for cleaning non-disposable field equipment will be as follows:
    - Using a 1-gallon small mouth jug mix approximately 1-gallon tap water with 4-5 drops of phosphate free biodegradable liquid soap, and a capful of household bleach.
    - Following acquiring an accurate water level wipe debris from the tape while removing from the well.
    - Place approximately 1 foot of tape in the prepared wash jug. Let stand for 5 minutes.
    - Rinse with clean tap water and let air dry.

7.0 DATA MANAGEMENT PROCEDURES

Field data will be recorded by field personnel at the time of measurement or sampling on a field measurement form, an example of the form is included in Appendix C. Data to be entered on field measurement form include names of field personnel, well identification, well location, dates and times of measurement/download, transducer serial number, appropriate field measurement values and units of measure, and detailed notes on any deviations from prescribed procedures. Field personnel will review data recorded in field measurement forms for correctness, clarity, and completeness at the end of each measurement activity. All field hydrogeologic data will be reviewed and supervised by a licensed hydrogeologist in the State of Washington.

The documentation for each measurement location will include the completed field measurement forms. Full documentation for all field monitoring activities will be compiled and stored at the principal investigator's office, and at the LCCD office.

All data collected is subject to review by the principal investigator to determine if the data meets QAPP objectives. Decisions to reject or qualify data will be made by the principal investigator in conjunction with the other investigators. Data may be rejected because of inadequate or deficient documentation or because the measurements fail to meet the MQOs identified in Section 3.1

The lead data analyst will be responsible for reviewing water level data spreadsheets for transcription errors and completeness. The principal investigator will make the changes and notify all users. Anomalous data will be flagged for investigation. The principal investigator also will review QA results for adherence to the data quality objectives identified in Section 3.2. If the quality objectives are not being met, the principal investigator will isolate the cause of the problem and take appropriate action with respect to the future use of the suspect data. Noted suspect or anomalous data that has been flagged will be described in the report including its usability in the analysis.

Data will be entered into an electronic database hosted by the principal investigator. The managed electronic database will be provided to LCCD. LCCD will enter the newly collected data into Ecology's EIM database quarterly. EIM data entry will follow Ecology requirements and templates, and these are located in the EIM database at https://apps.ecology.wa.gov/eim/help/.

8.0 REPORTING AND FIELD ACTIVITY ASSESSMENTS

LCCD will submit quarterly project status reports to Ecology summarizing the sampling activities completed during the previous quarter. All data collected will be entered in the Ecology Environmental Information System (EIM) at least quarterly by LCCD staff.

A draft final report will be prepared that will include tabulations of all the water level data, a discussion of the data quality and usability, a statistical analysis of water level changes, and assign each well to a specific part of the hydrostratigraphic system. The report will also include a preliminary evaluation or assessment of the water level data, to the extent possible given the water level data, geographic and hydrostratigraphic variation in the data, in support of the Northeastern Lincoln County Groundwater Conditions Monitoring Project. This report will include a map of the well locations monitored in the report. It will present hydrographs of water level measurements of the wells discussed in the report. It will include a discussion of data gaps. It will have an appendix with copies of all the well logs available for the monitored wells. This draft report will be submitted to Ecology for review. The final report will incorporate changes and comments received from the review. The final report is due before the expiration of the grant. An electronic copy will be delivered to Ecology and loaded into Ecology's Administration of Grants and Loans (EAGL) database.

9.0 REFERENCES

Ecology 2018a. Water Resources Program and Office of Columbia River Grant Special Terms and Conditions, Quality Assurance Project Plan (QAPP) Template for Projects Without Water Quality Sampling. Publication 18-11-018

Ecology. 2018b. Grant Special Terms and Conditions Quality Assurance Project Plan Guidance. Publication No. 17-11-013.

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GWMA, 2012b, City of Harrington, Washington Groundwater Supply Review. Consultant's report prepared for the City of Harrington and the Office of Columbia River.

GWMA, 2012a, City of Reardan, Washington Groundwater Supply Review. Consultant's report prepared for the City of Reardan and the Office of Columbia River.

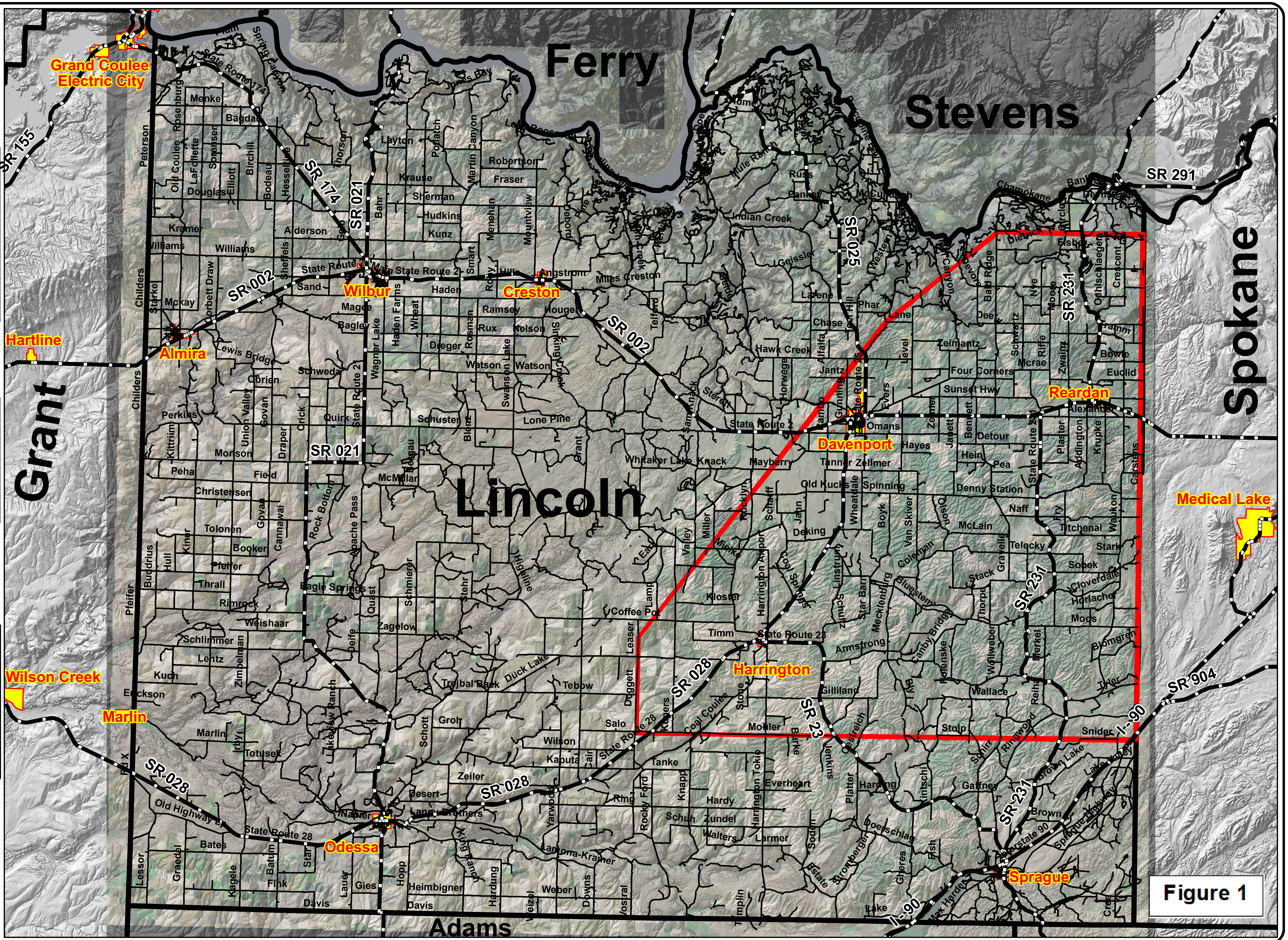
USEPA. ProUCL: Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations. Version 5.2. https://www.epa.gov/land-research/proucl-software, 2022.

USGS, 2003. Techniques of Water Resources Investigations Reports. U.S. Geological Survey, U.S. Government Printing Office. https://pubs.usgs.gov/wdr/WDR-WA-03-1/pdf/ADR_O.pdf. Links to descriptions of the procedures listed are available at: https://pubs.usgs.gov/twri/index090905.html.

Figures

Northeastern Lincoln County Groundwater Conditions Monitoring Grant Map
Scale = 1:310,000
WGS84 UTM11 Projection
Lincoln County CD
09/23/2022

The Northeastern Lincoln County Groundwater Conditions Monitoring Grant project area is located within the red outlined polygon in the northeast portion of Lincoln County, Washington,



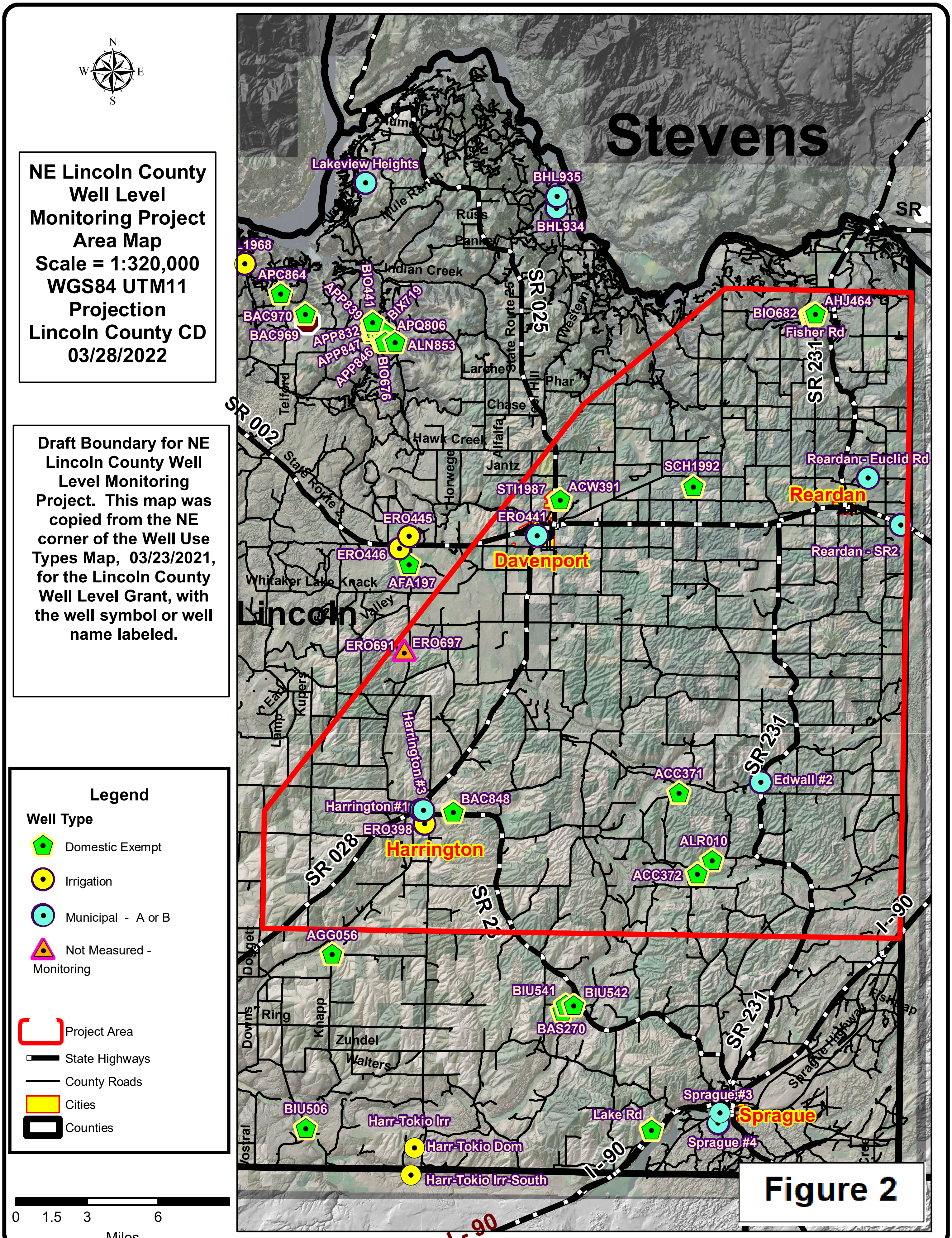
Legend
- State Highways
- County Roads
- Cities
- NE Lincoln Co. Well Area
- Counties

0 1.25 2.5 5 7.5 10
Miles

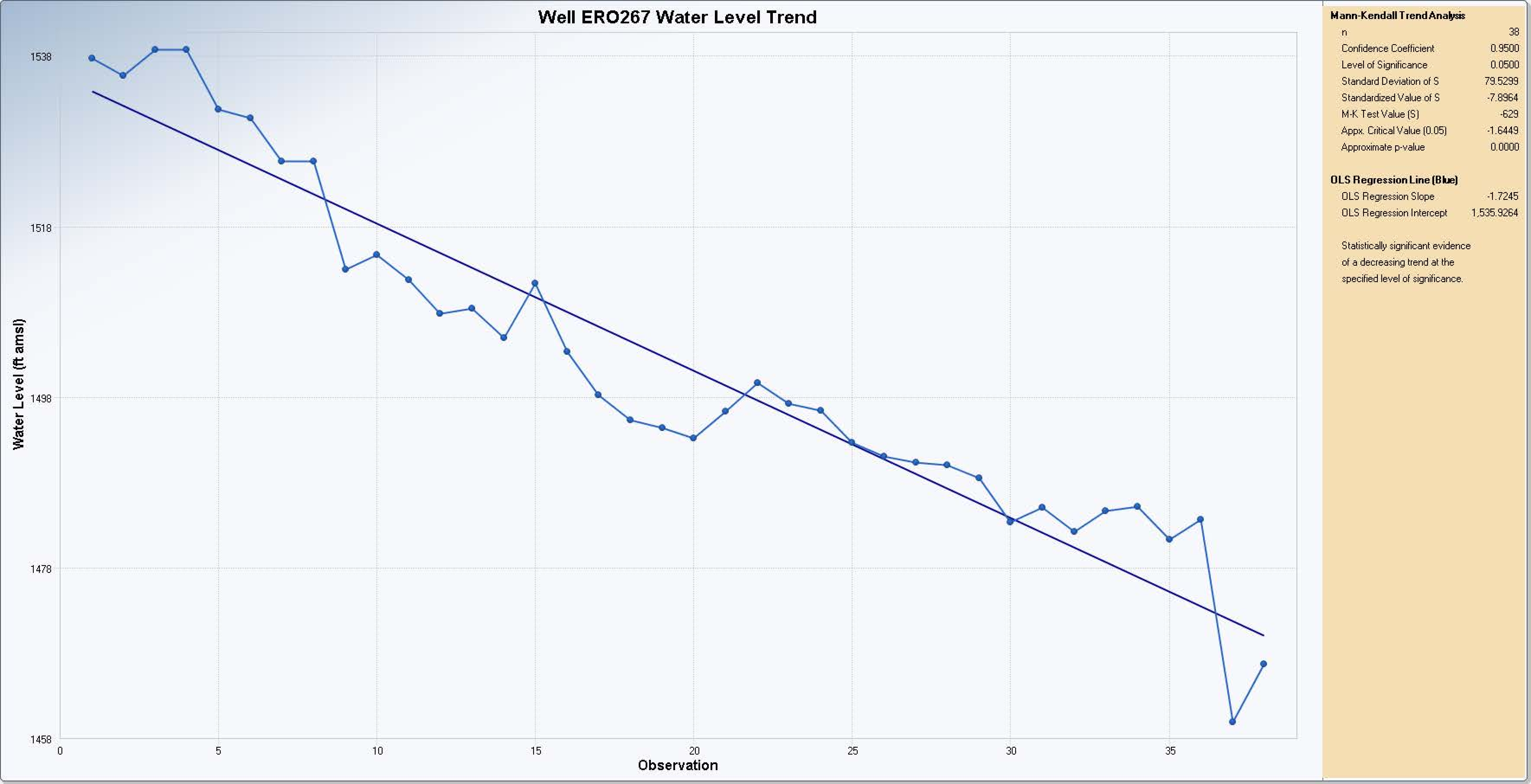
Figure 1

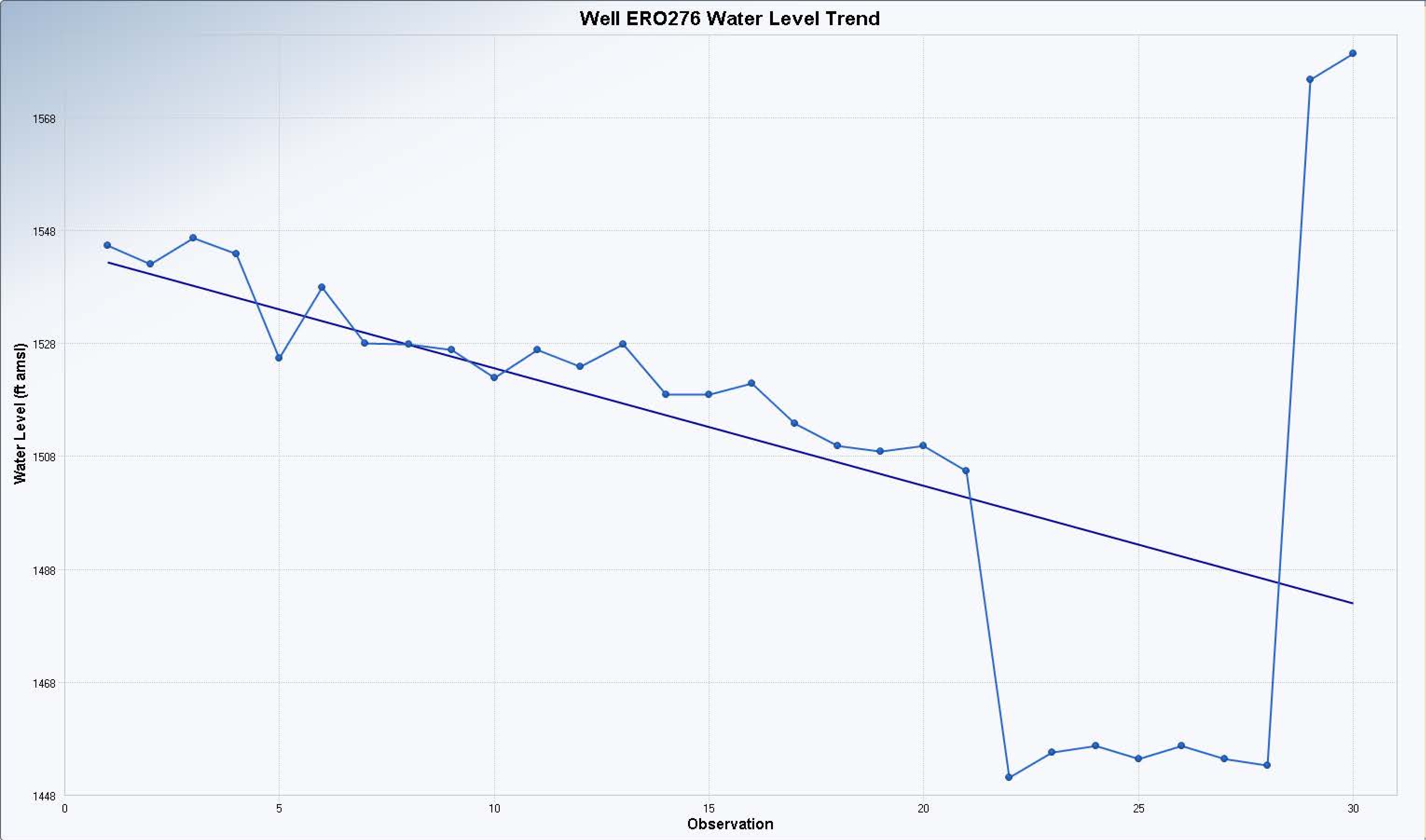
NE Lincoln County Well Level Monitoring Project Area Map
Scale = 1:320,000
WGS84 UTM11 Projection
Lincoln County CD
03/28/2022

Draft Boundary for NE Lincoln County Well Level Monitoring Project. This map was copied from the NE corner of the Well Use Types Map, 03/23/2021, for the Lincoln County Well Level Grant, with the well symbol or well name labeled.



APPENDIX A
EA 2017 Trends Analysis Hydrographs


Well ERO267 Water Level Trend
Water Level (ft amsl)
1538
1518
1498
1478
1458
0
5
10
15
20
25
30
35
Observation
Mann-Kendall Trend Analysis
n 38
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 79.5299
Standardized Value of S -7.8964
M-K Test Value (S) -629
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.0000
OLS Regression Line (Blue)
OLS Regression Slope -1.7245
OLS Regression Intercept 1,535.9264
Statistically significant evidence
of a decreasing trend at the
specified level of significance.



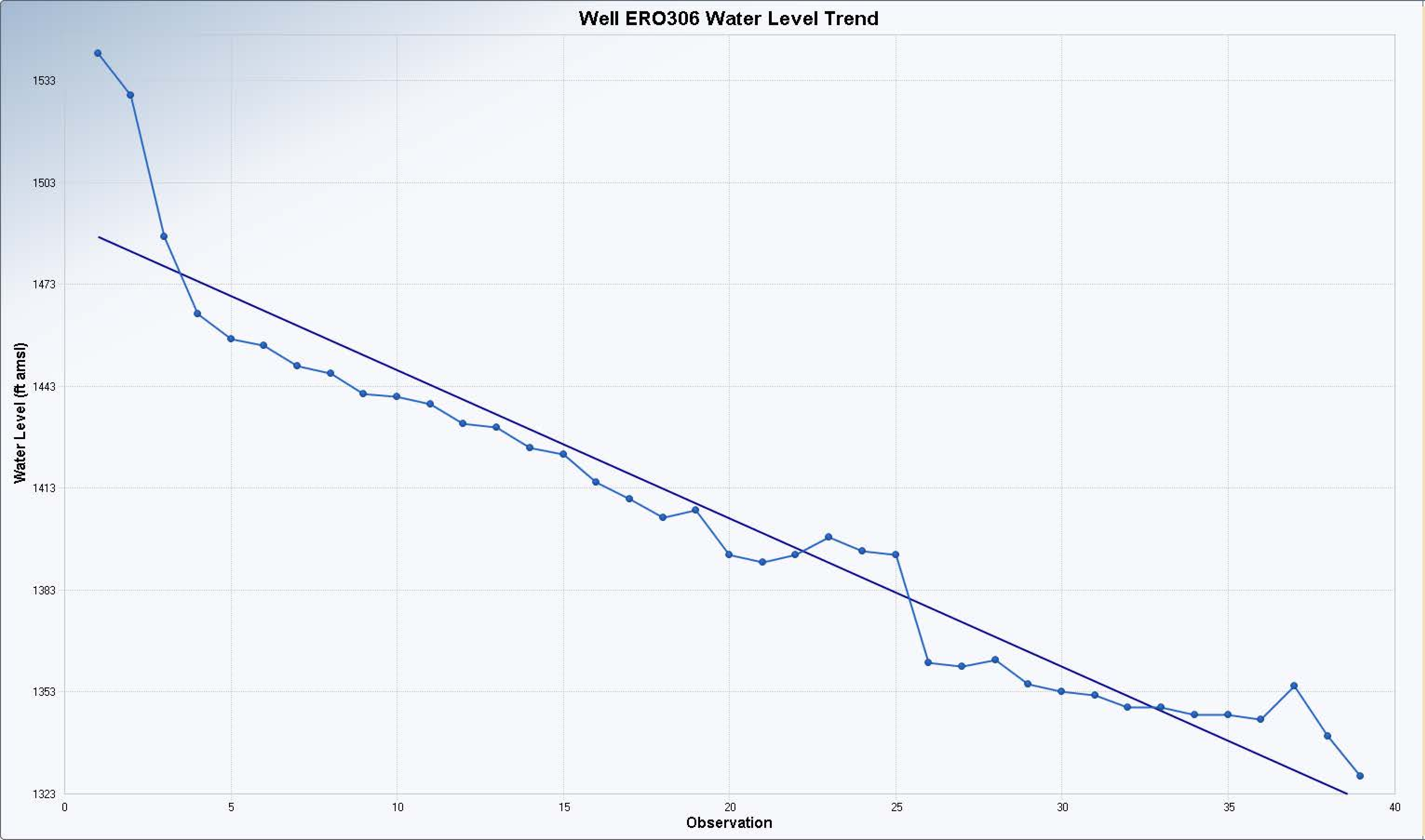
Mann-Kendall Trend Analysis

n	30
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	55.9970
Standardized Value of S	-4.6431
M-K Test Value (S)	-261
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-2.0821
OLS Regression Intercept	1,544.6550

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

n	39
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	82.6317
Standardized Value of S	-8.4592
M-K Test Value (S)	-700
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-4.3678
OLS Regression Intercept	1,491.5599

Statistically significant evidence of a decreasing trend at the specified level of significance.

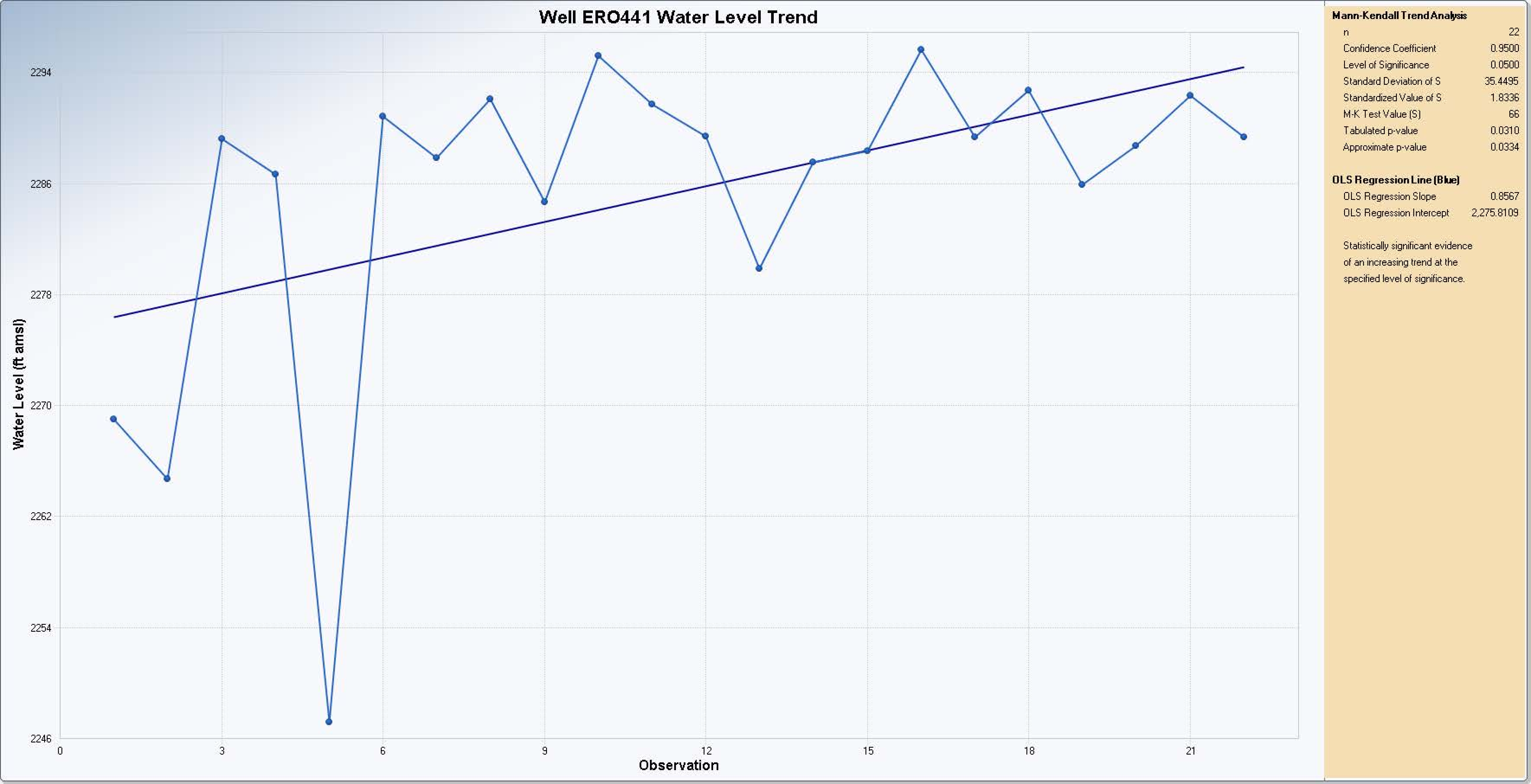
Mann-Kendall Trend Analysis

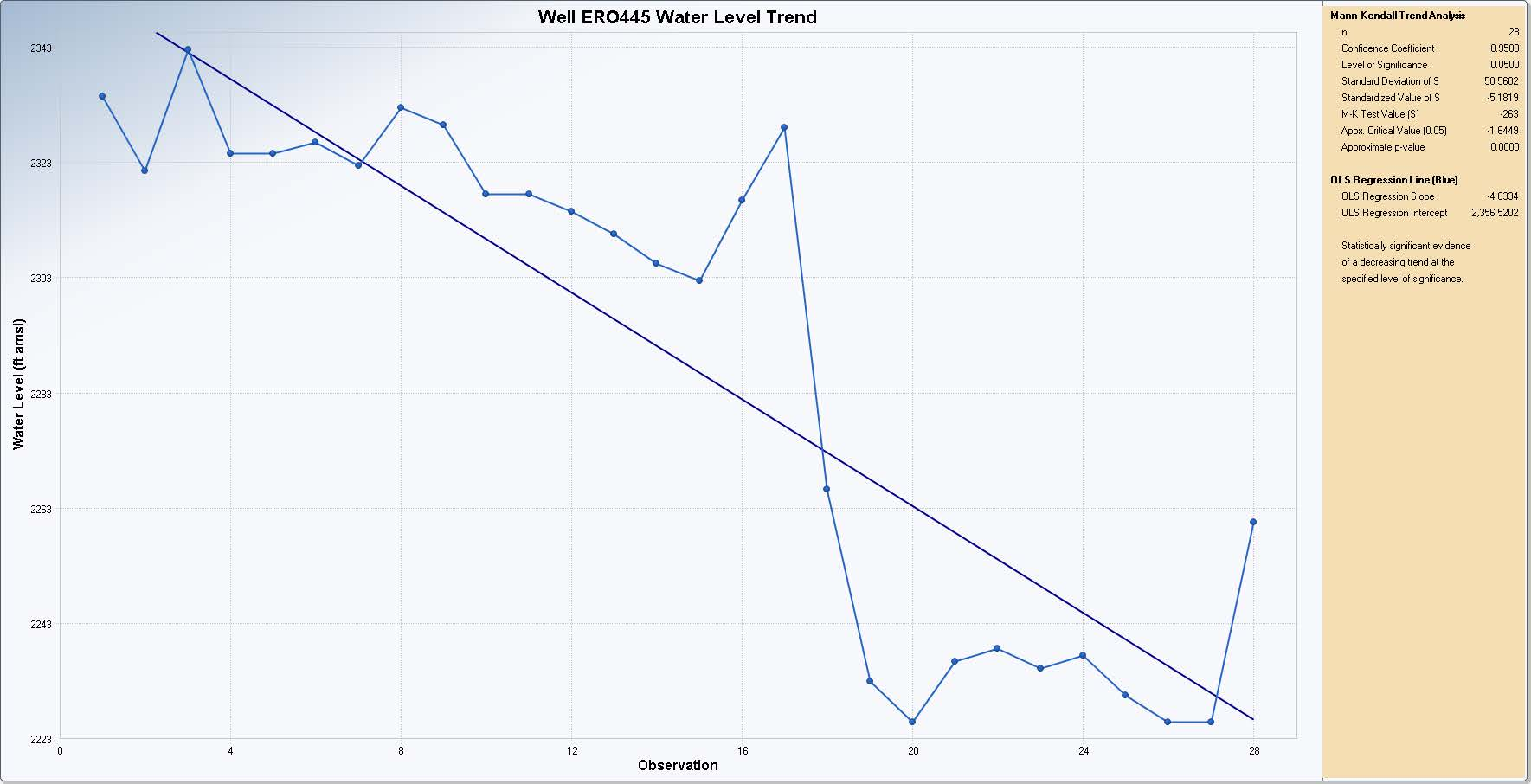
n	43
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	95.4673
Standardized Value of S	-5.7716
M-K Test Value (S)	-552
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

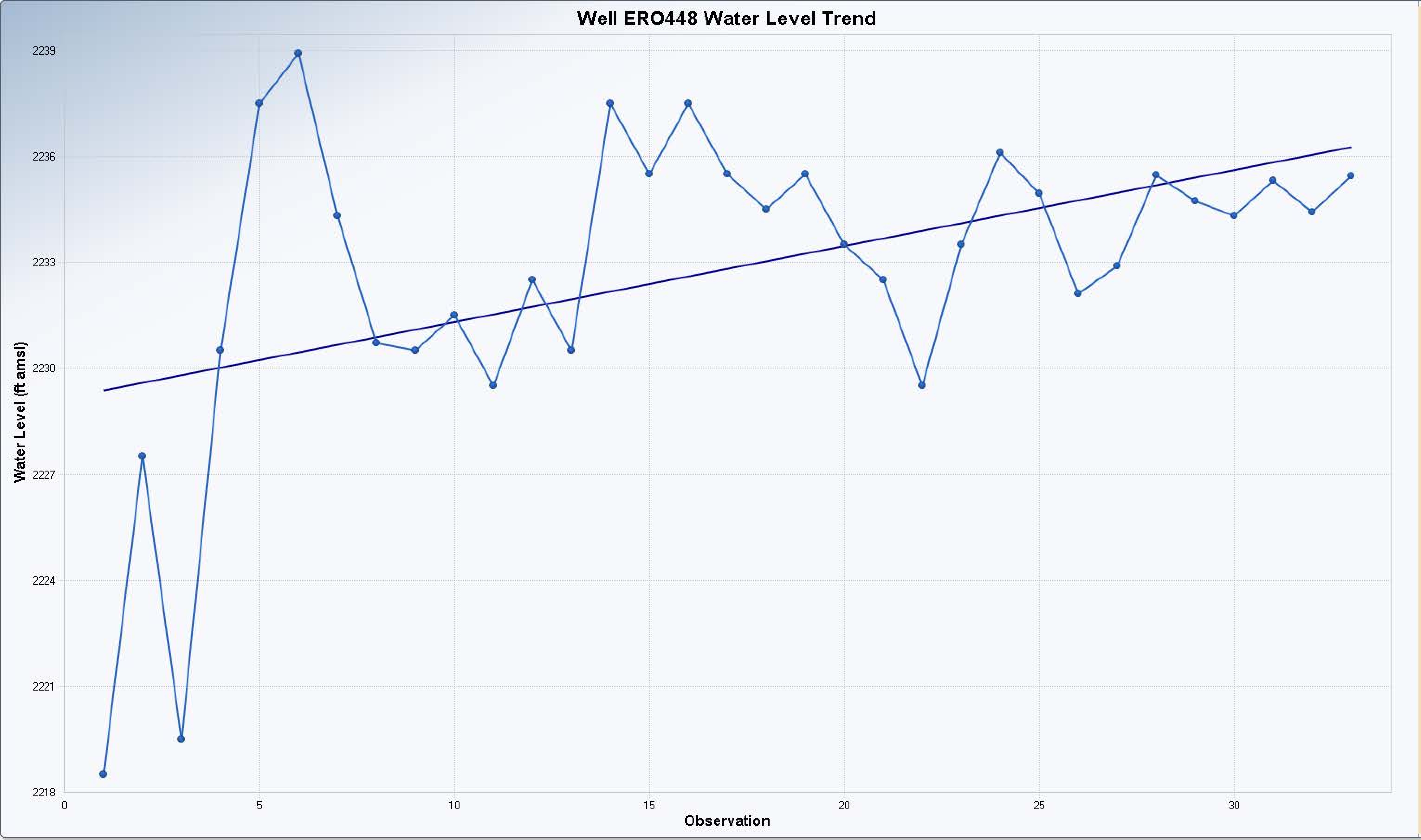
OLS Regression Line (Blue)

OLS Regression Slope	-0.7274
OLS Regression Intercept	2,021.8747

Statistically significant evidence of a decreasing trend at the specified level of significance.


Well ERO441 Water Level Trend
Water Level (ft amsl)
Observation
2294
2286
2278
2270
2262
2254
2246
0
3
6
9
12
15
18
21
Mann-Kendall Trend Analysis
n 22
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 35.4495
Standardized Value of S 1.8336
M-K Test Value (S) 66
Tabulated p-value 0.0310
Approximate p-value 0.0334
OLS Regression Line (Blue)
OLS Regression Slope 0.8567
OLS Regression Intercept 2,275.8109
Statistically significant evidence
of an increasing trend at the
specified level of significance.


Well ERO445 Water Level Trend
Water Level (ft amsl)
2343
2323
2303
2283
2263
2243
2223
0
4
8
12
16
20
24
28
Observation
Mann-Kendall Trend Analysis
n 28
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 50.5602
Standardized Value of S -5.1819
M-K Test Value (S) -263
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.0000
OLS Regression Line (Blue)
OLS Regression Slope -4.6334
OLS Regression Intercept 2,356.5202
Statistically significant evidence
of a decreasing trend at the
specified level of significance.



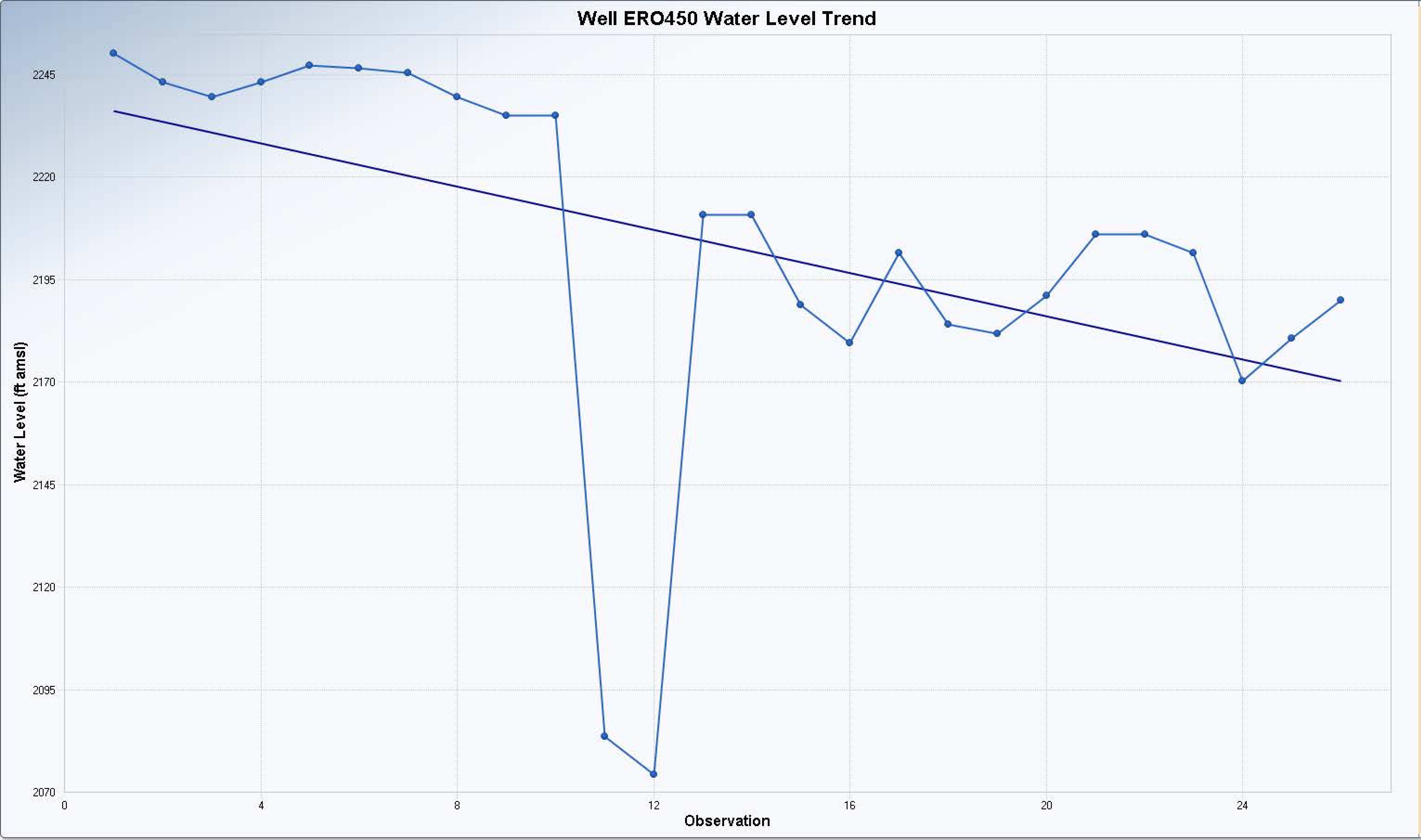
Mann-Kendall Trend Analysis

n	33
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	64.4308
Standardized Value of S	1.9711
M-K Test Value (S)	128
Appx. Critical Value (0.05)	1.6449
Approximate p-value	0.0244

OLS Regression Line (Blue)

OLS Regression Slope	0.2149
OLS Regression Intercept	2,229.6528

Statistically significant evidence of an increasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

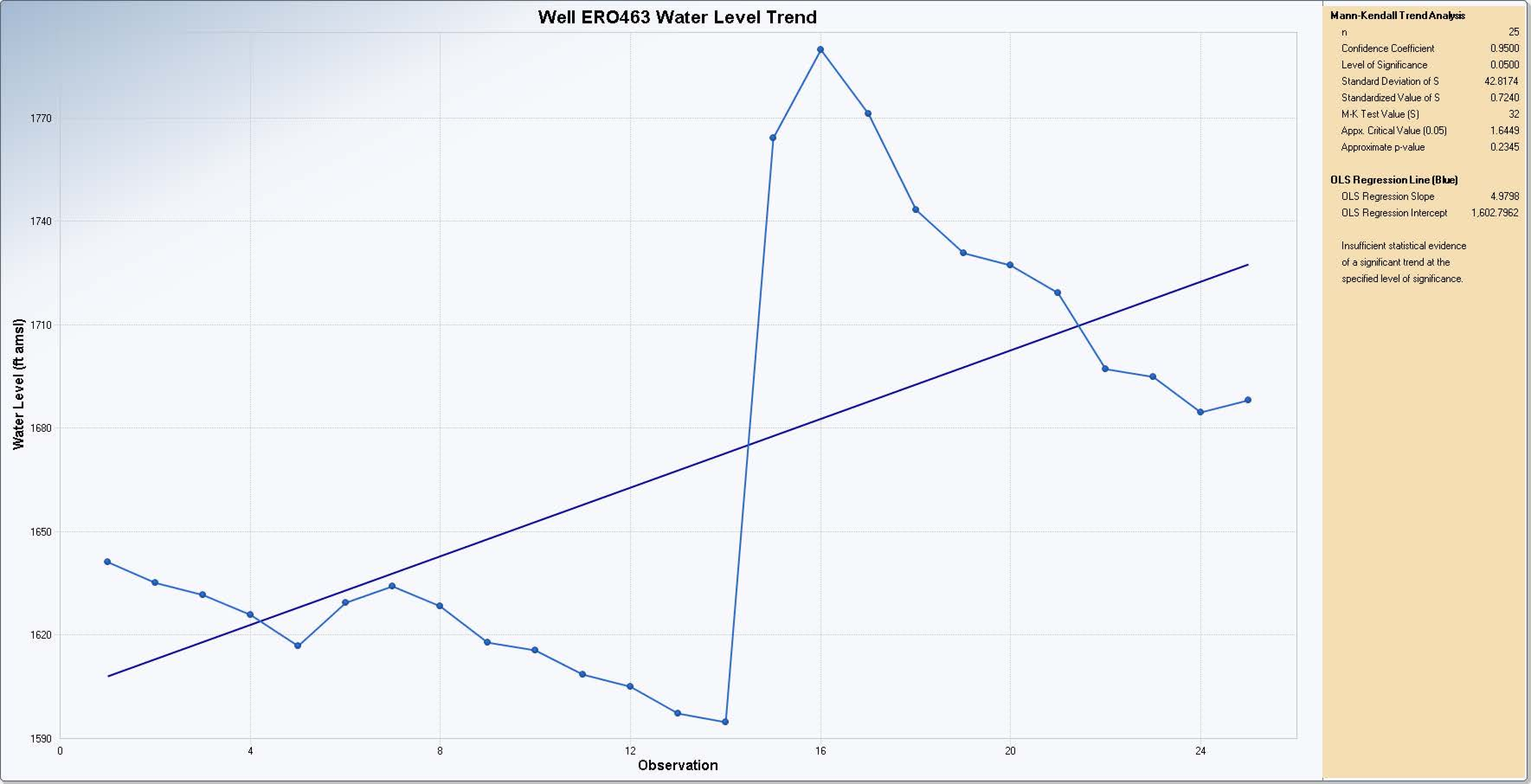
n	26
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	45.3027
Standardized Value of S	-3.8850
M-K Test Value (S)	-177
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0001

OLS Regression Line (Blue)

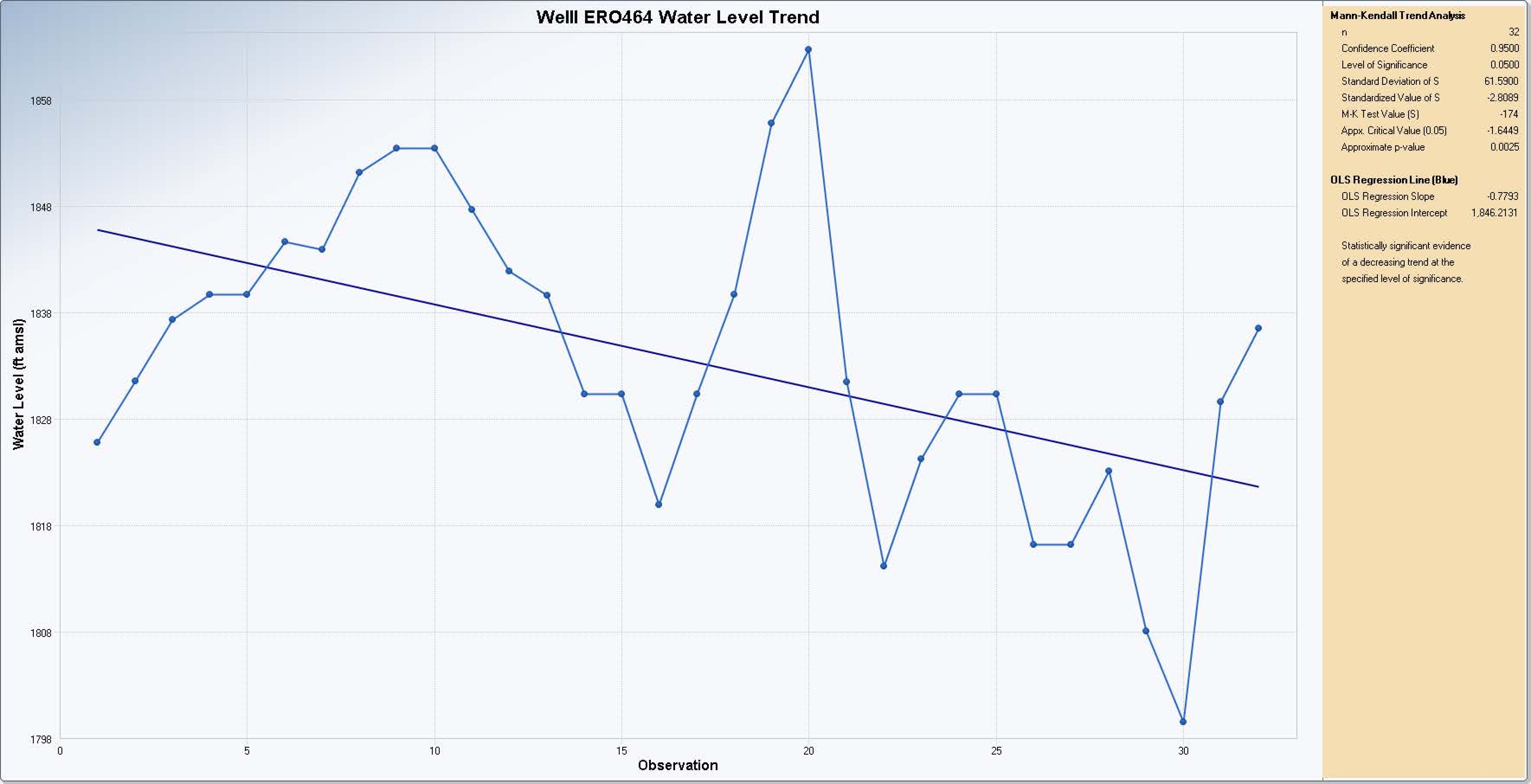
OLS Regression Slope	-2.6338
OLS Regression Intercept	2,238.5518

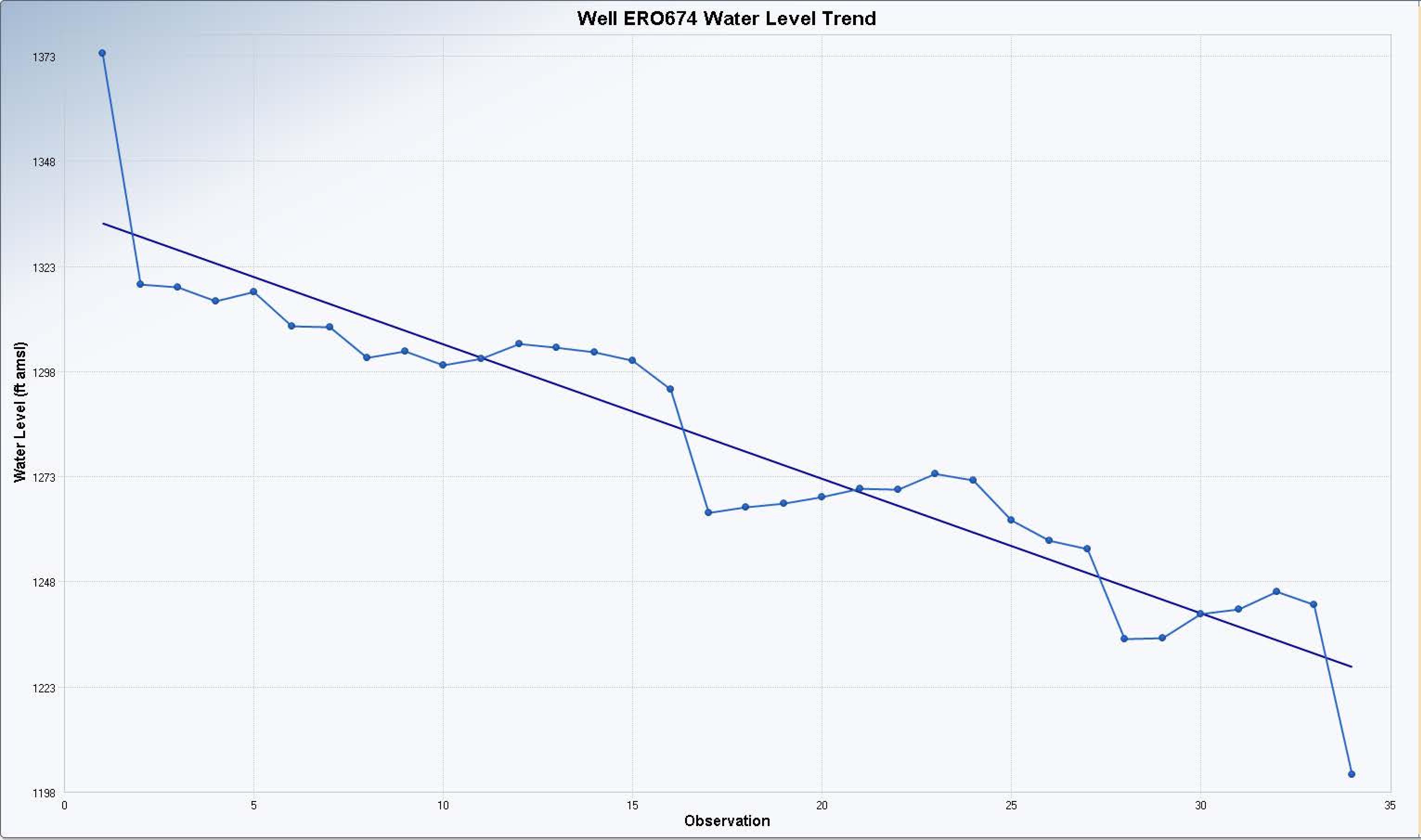
Statistically significant evidence of a decreasing trend at the specified level of significance.


Well ERO453 Water Level Trend
Water Level (ft amsl)
1963
1943
1923
1903
1883
1863
1843
1823
0
5
10
15
20
25
30
Observation
Mann-Kendall Trend Analysis
n 32
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 61.6360
Standardized Value of S -4.7375
M-K Test Value (S) -293
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.0000
OLS Regression Line (Blue)
OLS Regression Slope -3.1481
OLS Regression Intercept 1,965.2503
Statistically significant evidence of a decreasing trend at the specified level of significance.



Well ERO463 Water Level Trend
Water Level (ft amsl)
Observation
1590
1620
1650
1680
1710
1740
1770
0
4
8
12
16
20
24
Mann-Kendall Trend Analysis
n 25
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 42.8174
Standardized Value of S 0.7240
M-K Test Value (S) 32
Appx. Critical Value (0.05) 1.6449
Approximate p-value 0.2345
OLS Regression Line (Blue)
OLS Regression Slope 4.9798
OLS Regression Intercept 1,602.7962
Insufficient statistical evidence of a significant trend at the specified level of significance.


Welll ERO464 Water Level Trend
Water Level (ft amsl)
1858
1848
1838
1828
1818
1808
1798
0
5
10
15
20
25
30
Observation
Mann-Kendall Trend Analysis
n 32
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 61.5900
Standardized Value of S -2.8089
M-K Test Value (S) -174
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.0025
OLS Regression Line (Blue)
OLS Regression Slope -0.7793
OLS Regression Intercept 1,846.2131
Statistically significant evidence
of a decreasing trend at the
specified level of significance.



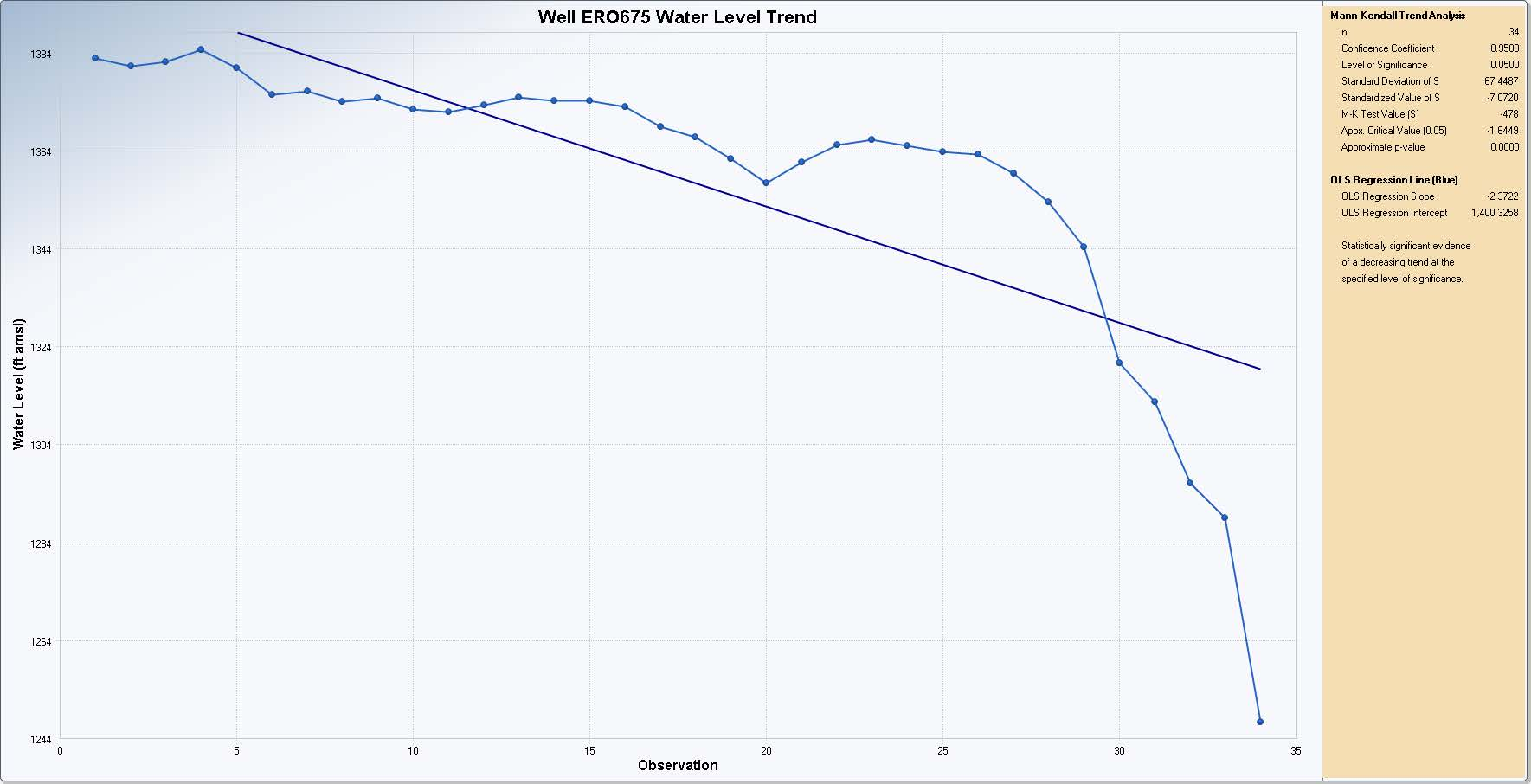
Mann-Kendall Trend Analysis

n	34
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	67.4562
Standardized Value of S	-6.6710
M-K Test Value (S)	-451
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

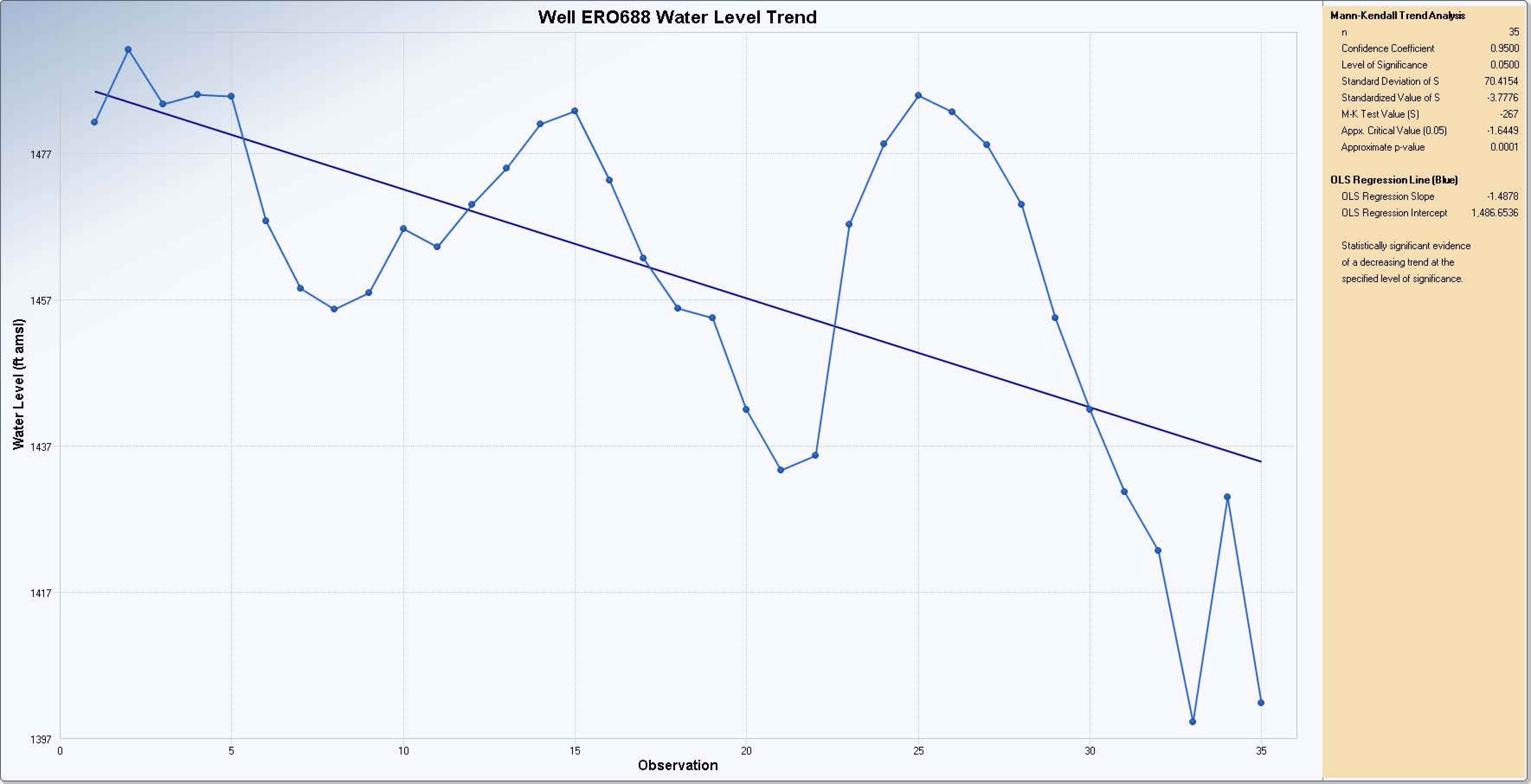
OLS Regression Line (Blue)

OLS Regression Slope	-3.1975
OLS Regression Intercept	1,336.4708

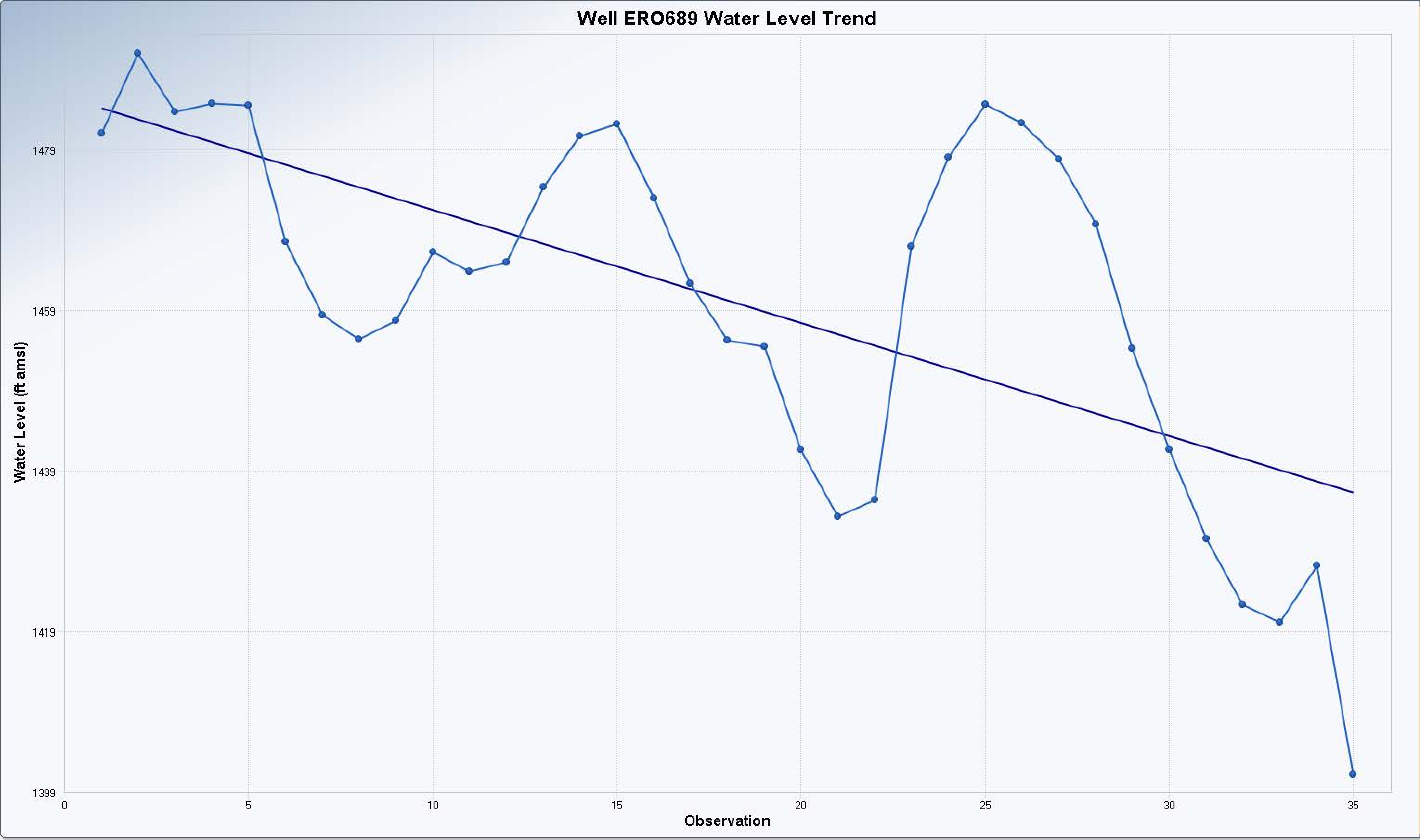
Statistically significant evidence of a decreasing trend at the specified level of significance.



Well ERO675 Water Level Trend
Water Level (ft amsl)
1384
1364
1344
1324
1304
1284
1264
1244
0
5
10
15
20
25
30
35
Observation
Mann-Kendall Trend Analysis
n 34
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 67.4487
Standardized Value of S -7.0720
M-K Test Value (S) -478
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.0000
OLS Regression Line (Blue)
OLS Regression Slope -2.3722
OLS Regression Intercept 1,400.3258
Statistically significant evidence of a decreasing trend at the specified level of significance.



Well ERO688 Water Level Trend
Water Level (ft amsl)
1477
1457
1437
1417
1397
0
5
10
15
20
25
30
35
Observation
Mann-Kendall Trend Analysis
n 35
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 70.4154
Standardized Value of S -3.7776
M-K Test Value (S) -267
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.0001
OLS Regression Line (Blue)
OLS Regression Slope -1.4878
OLS Regression Intercept 1,486.6536
Statistically significant evidence
of a decreasing trend at the
specified level of significance.



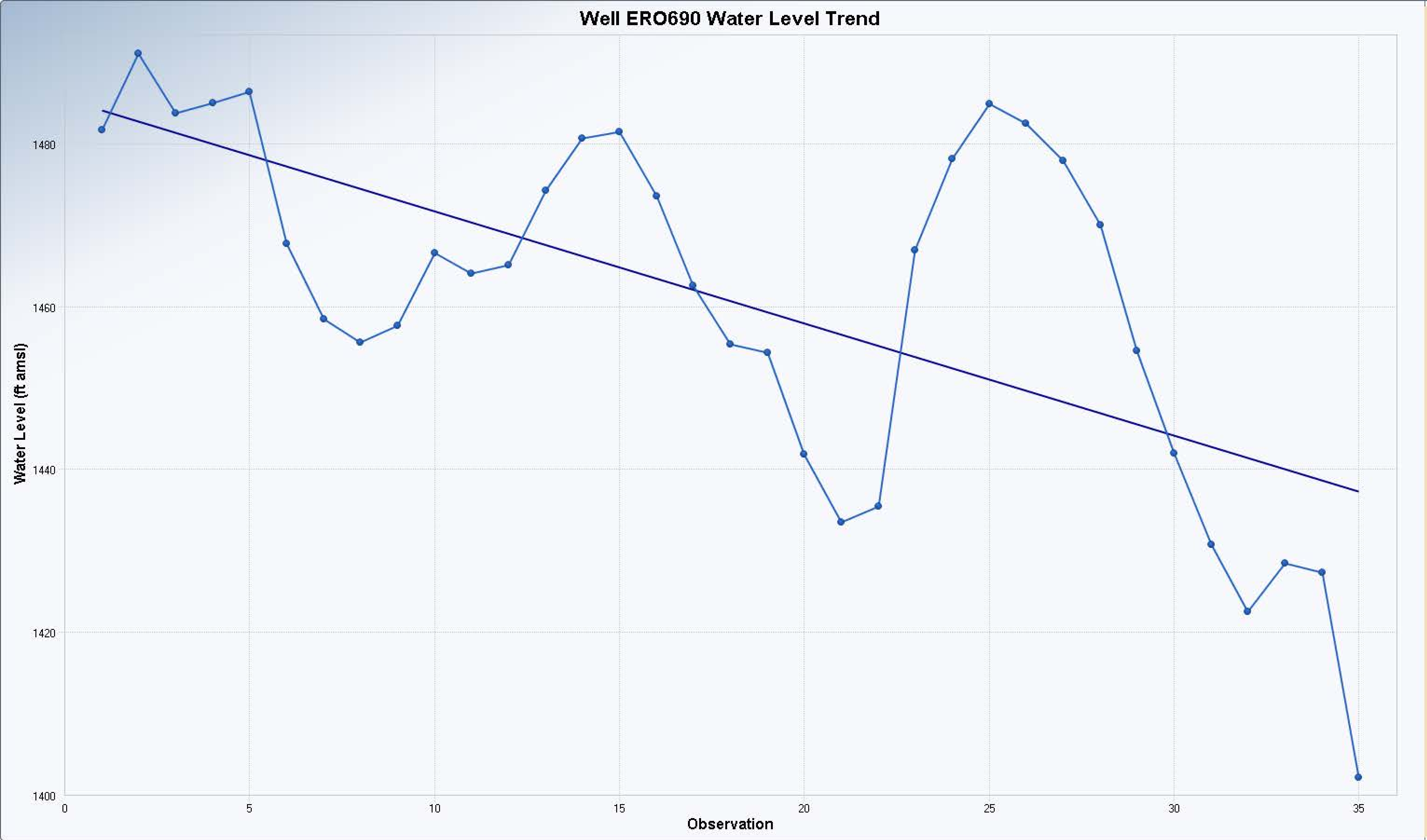
Mann-Kendall Trend Analysis

n	35
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	70.4154
Standardized Value of S	-3.8628
M-K Test Value (S)	-273
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0001

OLS Regression Line (Blue)

OLS Regression Slope	-1.4058
OLS Regression Intercept	1,485.5709

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

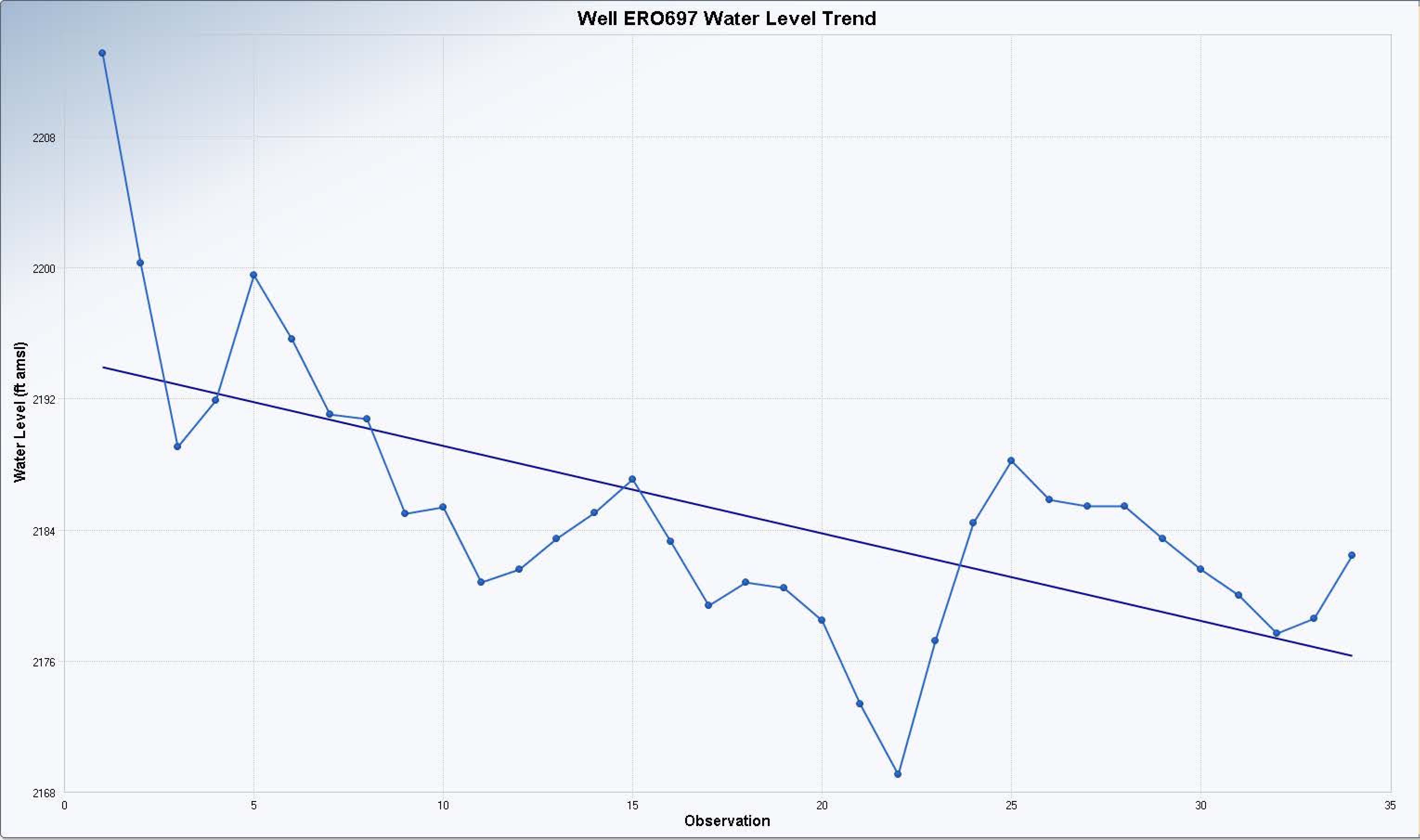
n	35
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	70.4154
Standardized Value of S	-3.8628
M-K Test Value (S)	-273
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0001

OLS Regression Line (Blue)

OLS Regression Slope	-1.3747
OLS Regression Intercept	1,485.4367

Statistically significant evidence of a decreasing trend at the specified level of significance.

Well ERO696 Water Level Trend
Water Level (ft amsl)
Observation
2345
2342
2339
2336
2333
2330
2327
2324
2321
0
5
10
15
20
25
30
35
Mann-Kendall Trend Analysis
n 34
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 67.4562
Standardized Value of S 1.4528
M-K Test Value (S) 99
Appx. Critical Value (0.05) 1.6449
Approximate p-value 0.0731
OLS Regression Line (Blue)
OLS Regression Slope 0.1392
OLS Regression Intercept 2,331.6818
Insufficient statistical evidence of a significant trend at the specified level of significance.



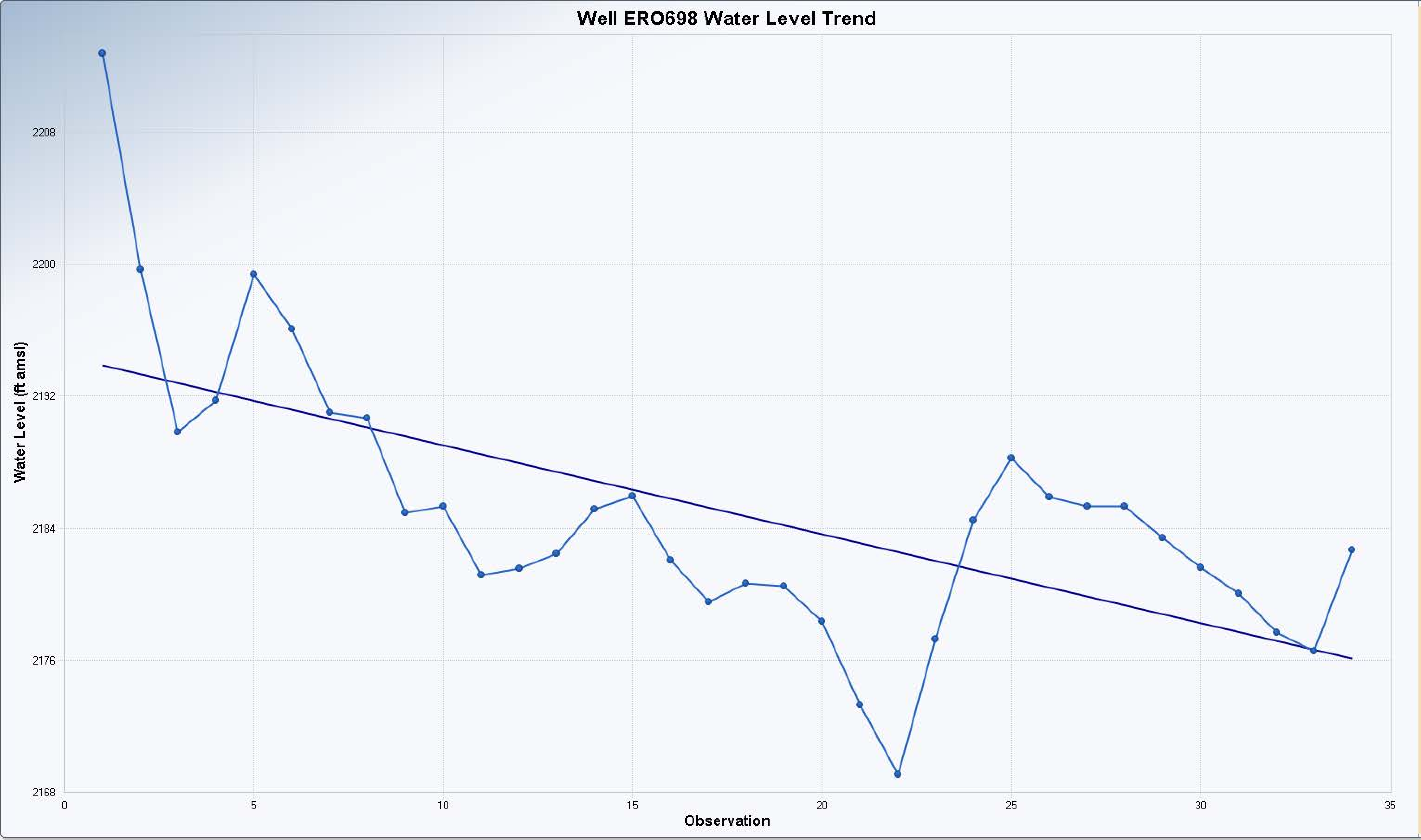
Mann-Kendall Trend Analysis

n	34
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	67.4339
Standardized Value of S	-4.0187
M-K Test Value (S)	-272
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-0.5332
OLS Regression Intercept	2,194.2021

Statistically significant evidence of a decreasing trend at the specified level of significance.



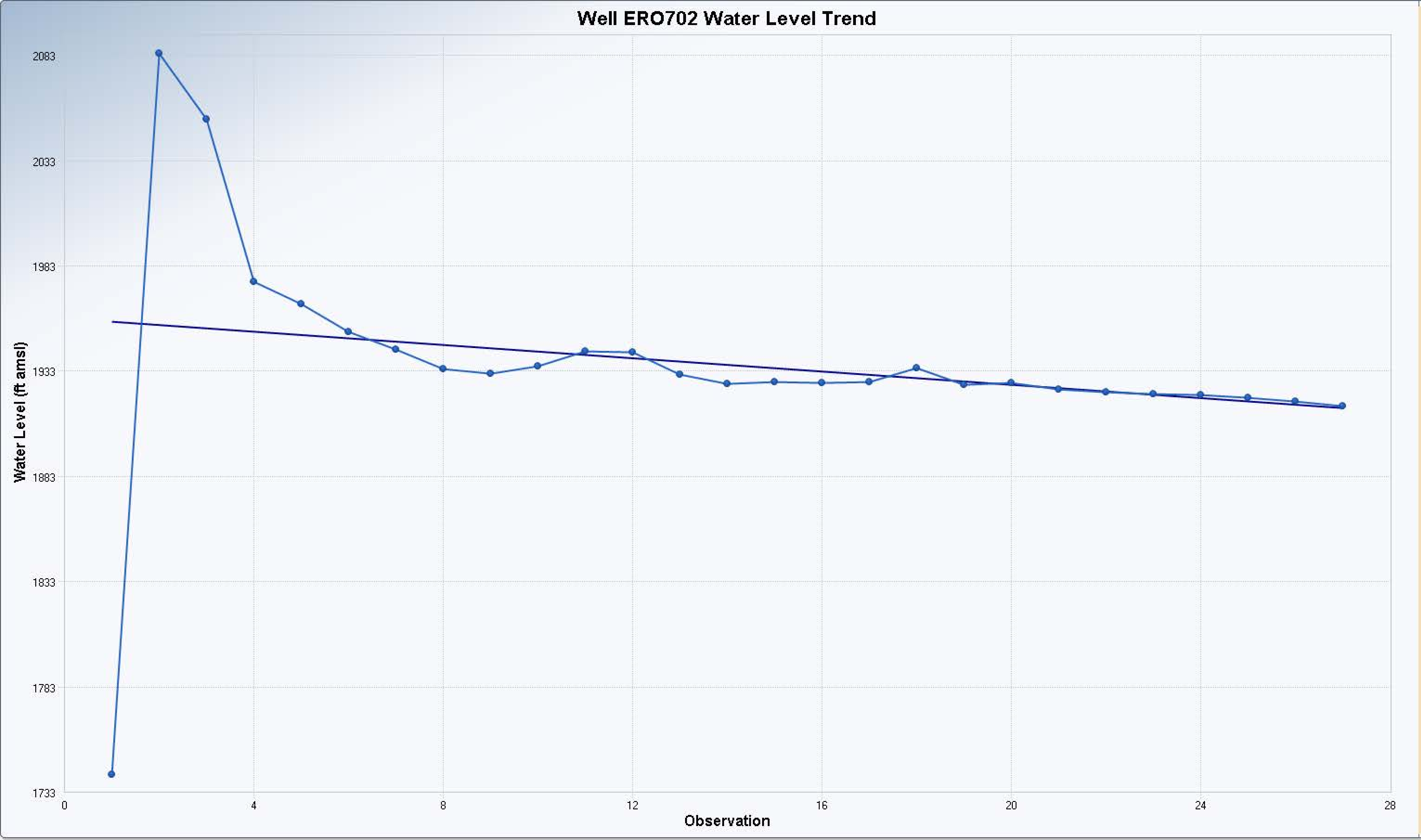
Mann-Kendall Trend Analysis

n	34
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	67.4487
Standardized Value of S	-4.0772
M-K Test Value (S)	-276
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-0.5381
OLS Regression Intercept	2,194.1603

Statistically significant evidence of a decreasing trend at the specified level of significance.



Mann-Kendall Trend Analysis

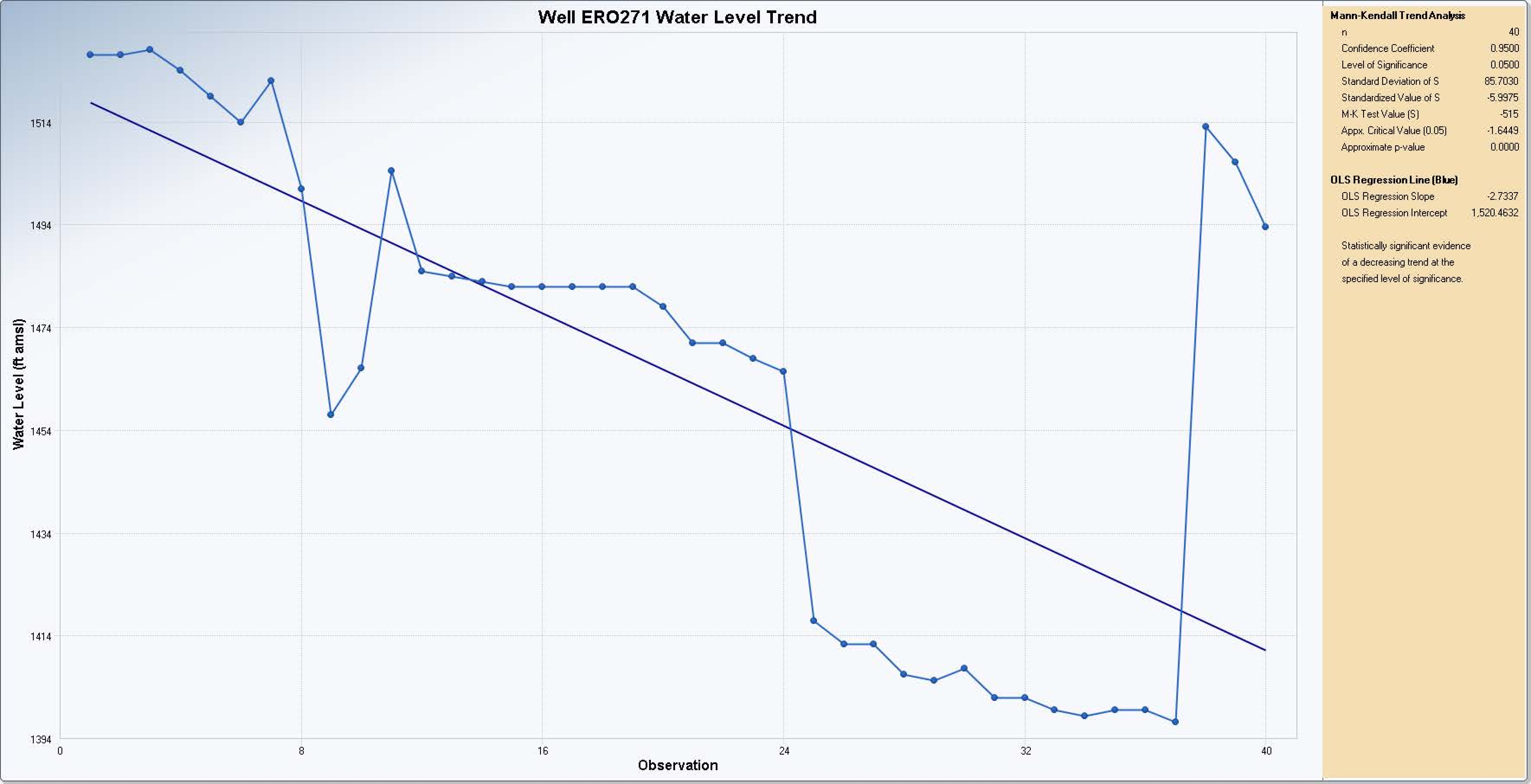
n	27
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	47.9687
Standardized Value of S	-5.2951
M-K Test Value (S)	-255
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

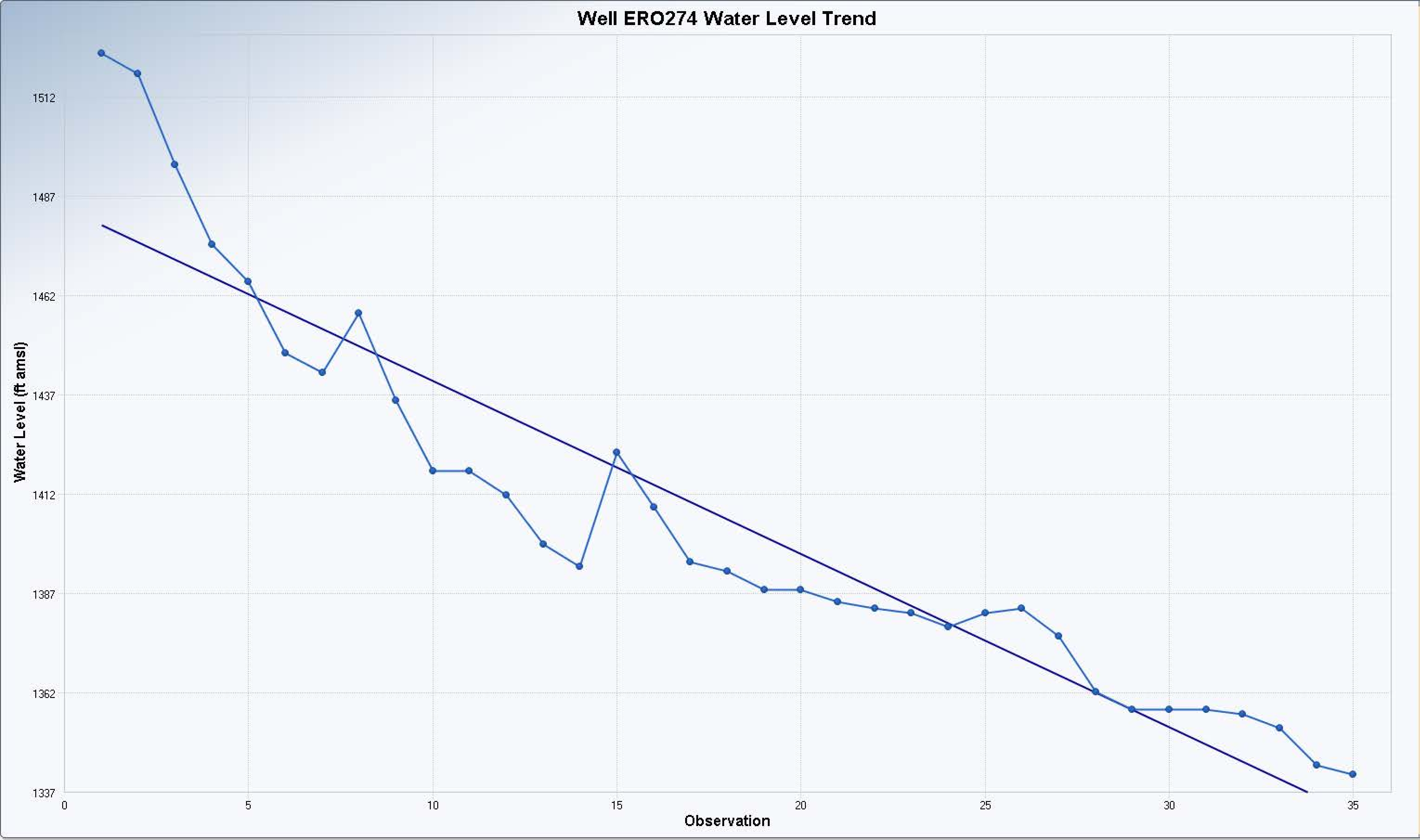
OLS Regression Slope	-1.5864
OLS Regression Intercept	1,958.0669

Statistically significant evidence of a decreasing trend at the specified level of significance.


Well ERO263 Water Level Trend
Water Level (ft amsl)
1403
1383
1363
1343
1323
0
5
10
15
20
25
30
35
Observation
Mann-Kendall Trend Analysis
n 34
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 67.4265
Standardized Value of S 2.3136
M-K Test Value (S) 157
Appx. Critical Value (0.05) 1.6449
Approximate p-value 0.0103
OLS Regression Line (Blue)
OLS Regression Slope 1.4487
OLS Regression Intercept 1,341.9885
Statistically significant evidence
of an increasing trend at the
specified level of significance.



Well ERO271 Water Level Trend
Water Level (ft amsl)
1514
1494
1474
1454
1434
1414
1394
0
8
16
24
32
40
Observation
Mann-Kendall Trend Analysis
n 40
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 85.7030
Standardized Value of S -5.9975
M-K Test Value (S) -515
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.0000
OLS Regression Line (Blue)
OLS Regression Slope -2.7337
OLS Regression Intercept 1,520.4632
Statistically significant evidence
of a decreasing trend at the
specified level of significance.



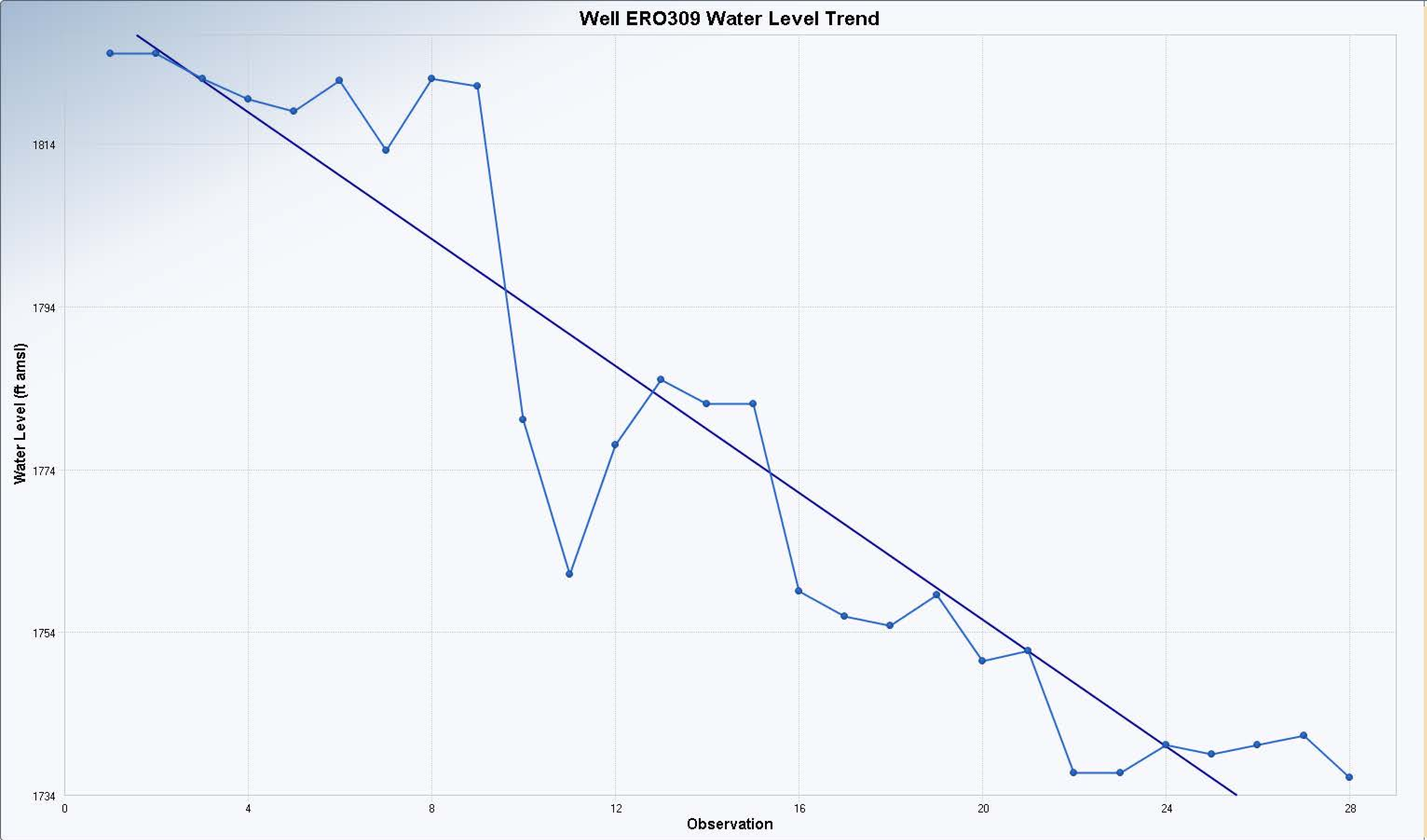
Mann-Kendall Trend Analysis

n	35
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	70.3681
Standardized Value of S	-7.9297
M-K Test Value (S)	-559
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-4.3591
OLS Regression Intercept	1,484.2063

Statistically significant evidence of a decreasing trend at the specified level of significance.



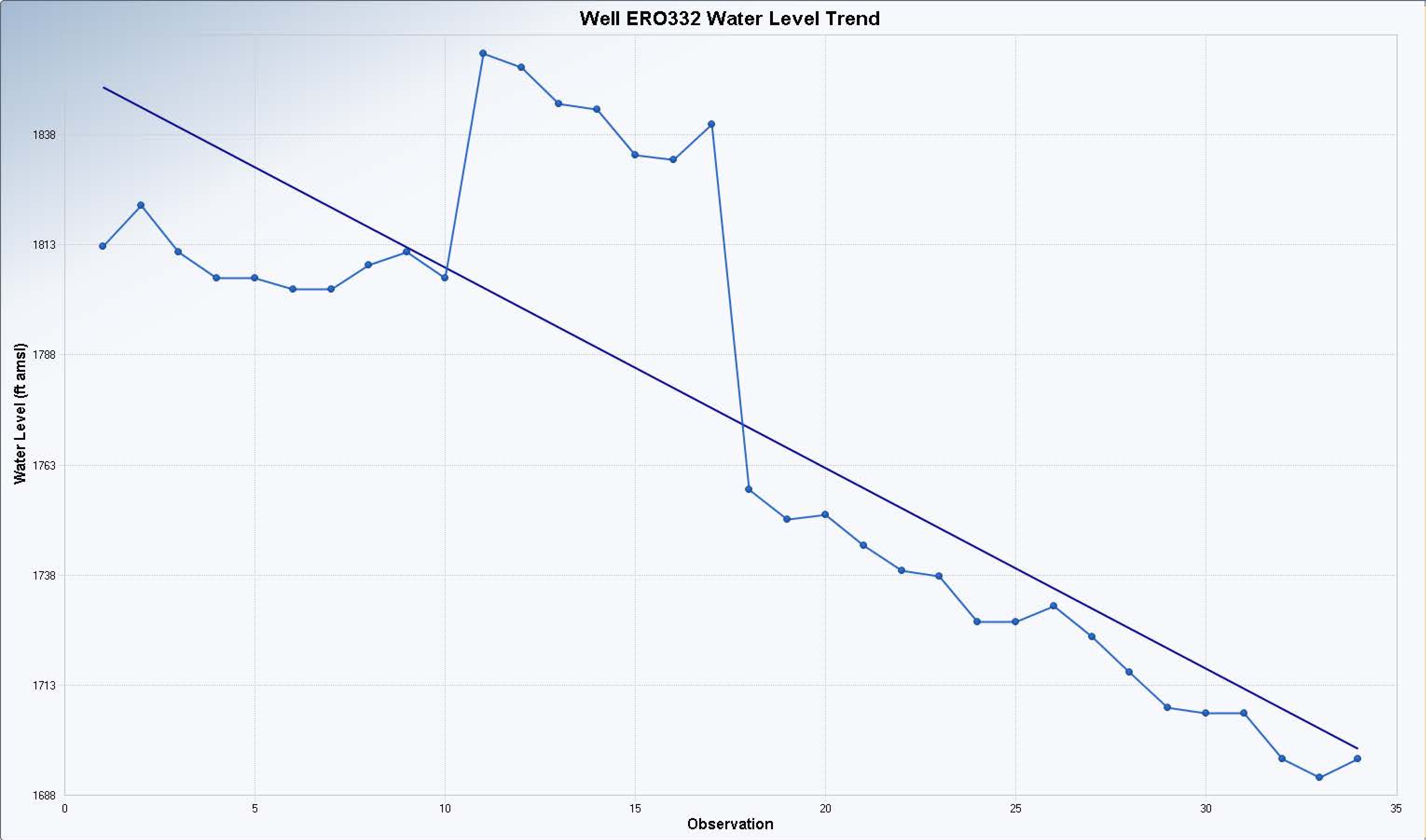
Mann-Kendall Trend Analysis

n	28
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	50.5668
Standardized Value of S	-6.0119
M-K Test Value (S)	-305
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-3.9014
OLS Regression Intercept	1,833.4907

Statistically significant evidence of a decreasing trend at the specified level of significance.



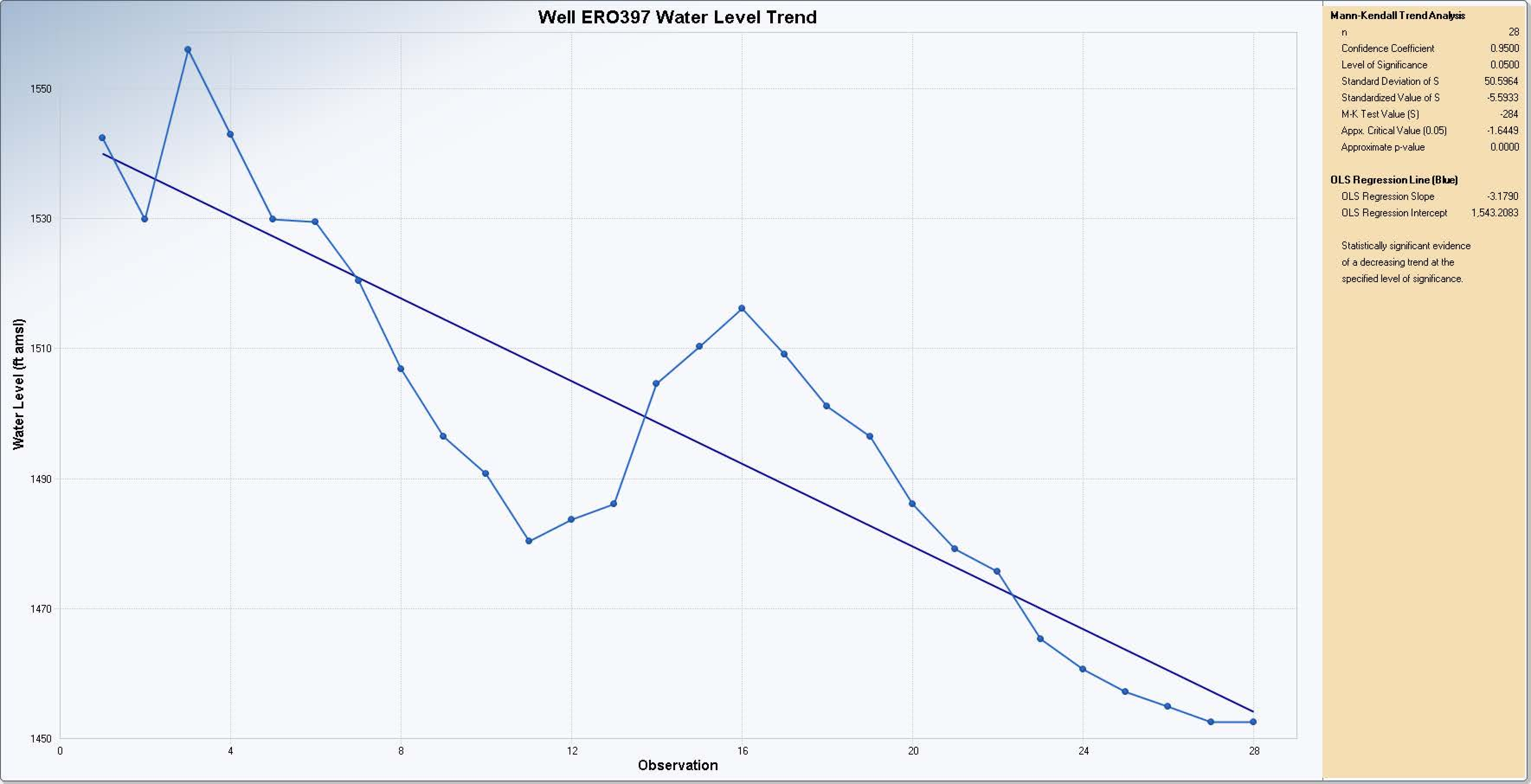
Mann-Kendall Trend Analysis

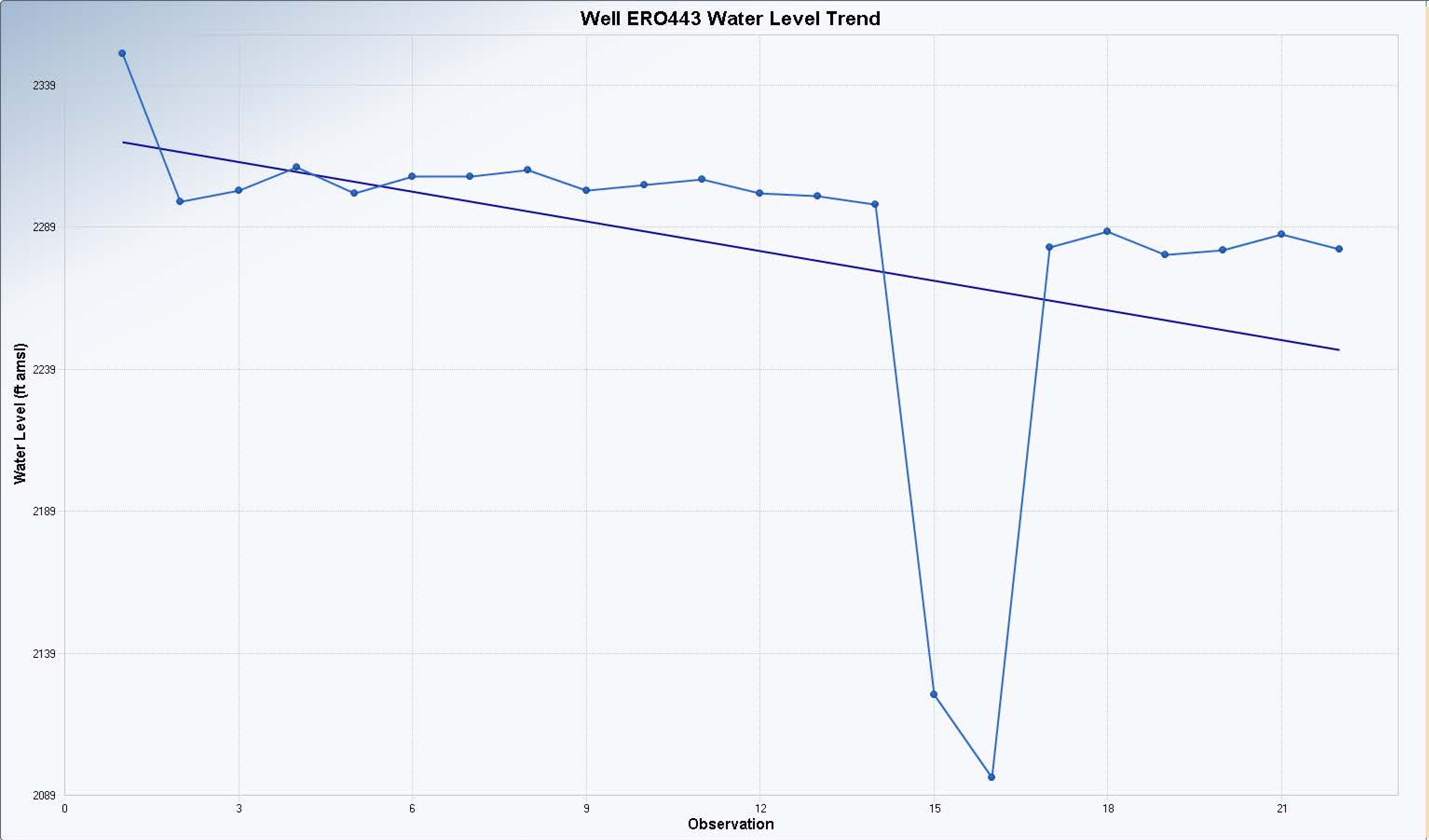
n	34
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	67.4067
Standardized Value of S	-5.5781
M-K Test Value (S)	-377
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-4.5555
OLS Regression Intercept	1,853.0203

Statistically significant evidence of a decreasing trend at the specified level of significance.


Well ERO397 Water Level Trend
Water Level (ft amsl)
Observation
1450
1470
1490
1510
1530
1550
0
4
8
12
16
20
24
28
Mann-Kendall Trend Analysis
n 28
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 50.5964
Standardized Value of S -5.5933
M-K Test Value (S) -284
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.0000
OLS Regression Line (Blue)
OLS Regression Slope -3.1790
OLS Regression Intercept 1,543.2083
Statistically significant evidence
of a decreasing trend at the
specified level of significance.



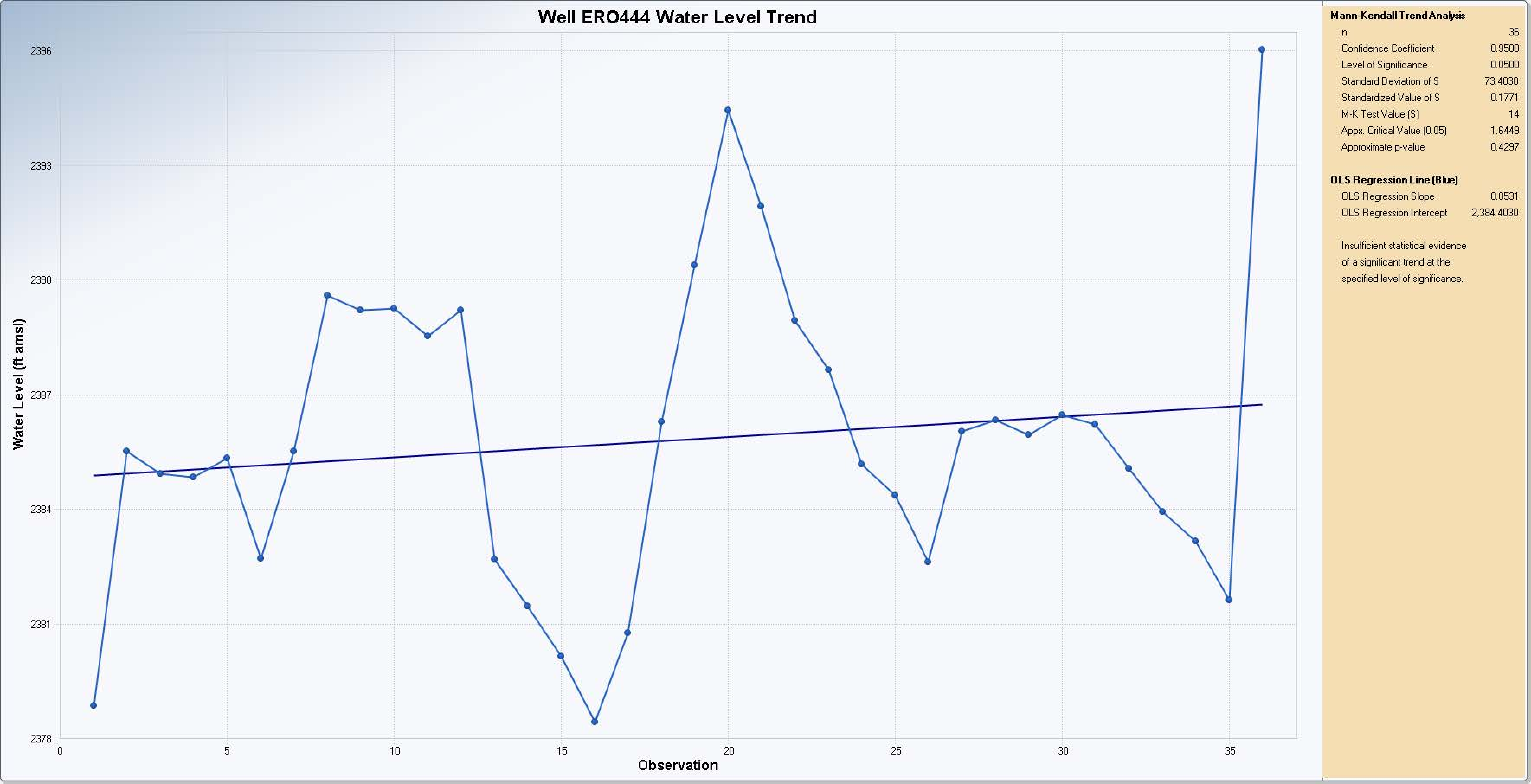
Mann-Kendall Trend Analysis

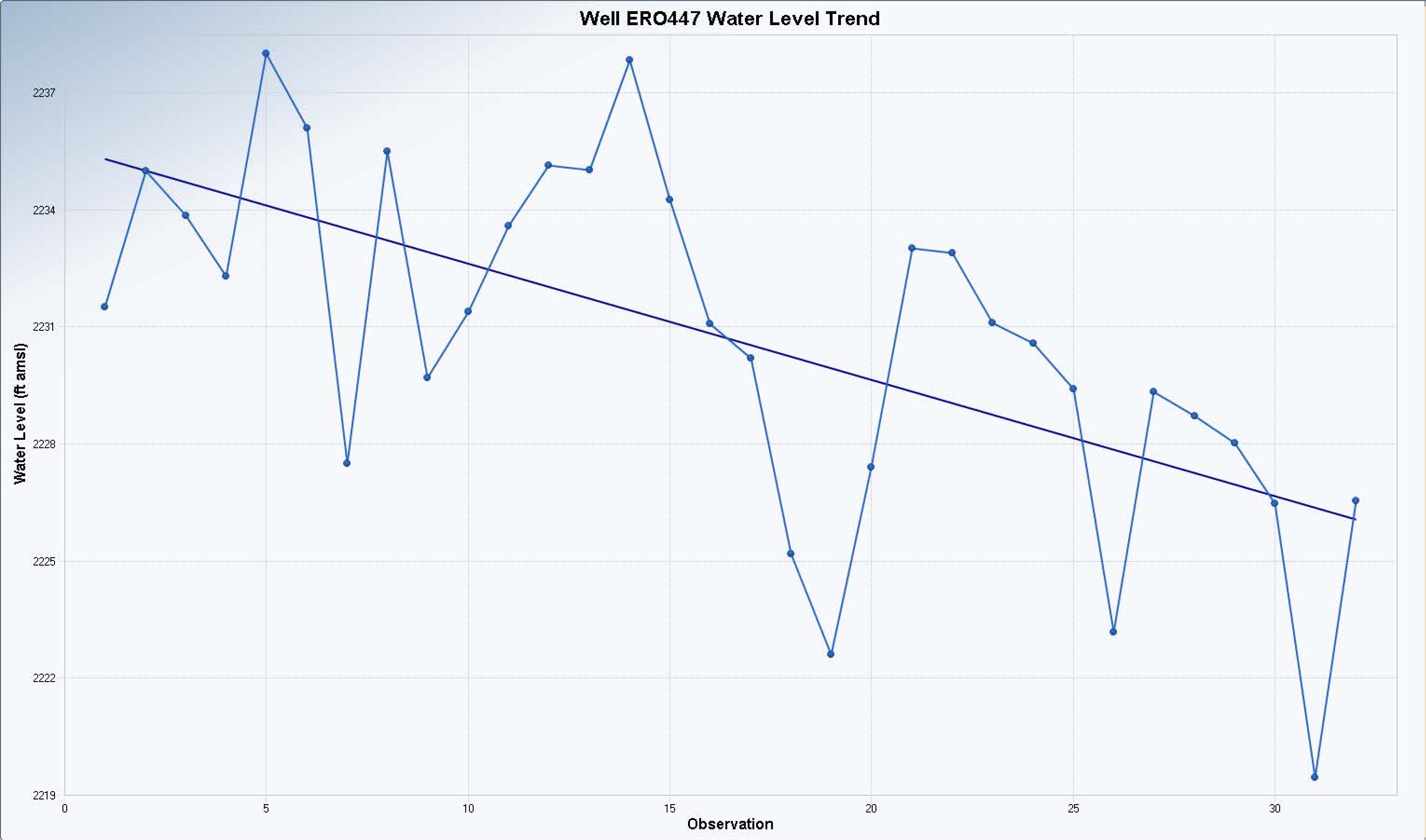
n	22
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	35.4213
Standardized Value of S	-3.7548
M-K Test Value (S)	-134
Tabulated p-value	0.0000
Approximate p-value	0.0001

OLS Regression Line (Blue)

OLS Regression Slope	-3.4849
OLS Regression Intercept	2,322.4032

Statistically significant evidence of a decreasing trend at the specified level of significance.


Well ERO444 Water Level Trend
Water Level (ft amsl)
Observation
2396
2393
2390
2387
2384
2381
2378
0
5
10
15
20
25
30
35
Mann-Kendall Trend Analysis
n 36
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 73.4030
Standardized Value of S 0.1771
M-K Test Value (S) 14
Appx. Critical Value (0.05) 1.6449
Approximate p-value 0.4297
OLS Regression Line (Blue)
OLS Regression Slope 0.0531
OLS Regression Intercept 2,384.4030
Insufficient statistical evidence
of a significant trend at the
specified level of significance.



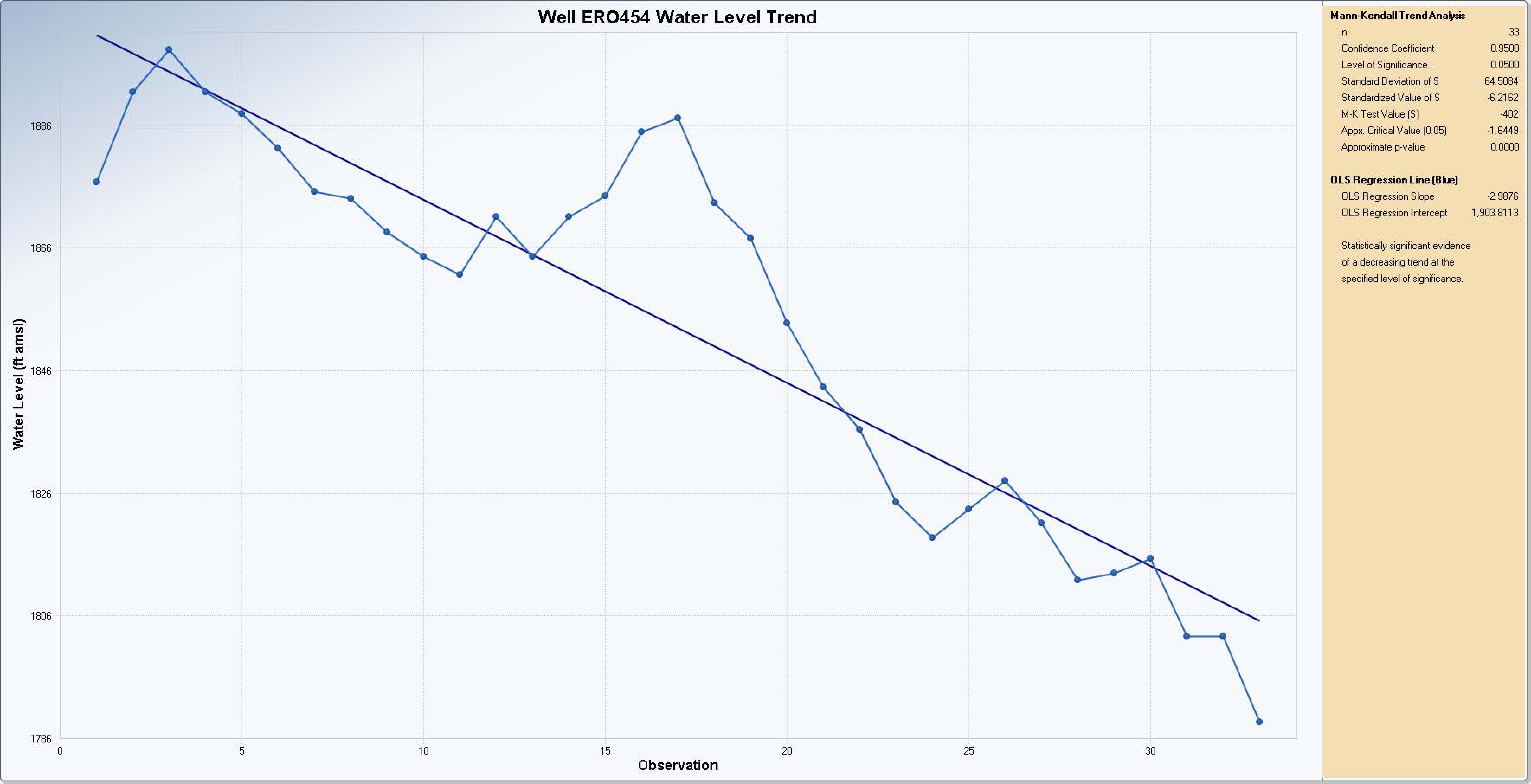
Mann-Kendall Trend Analysis

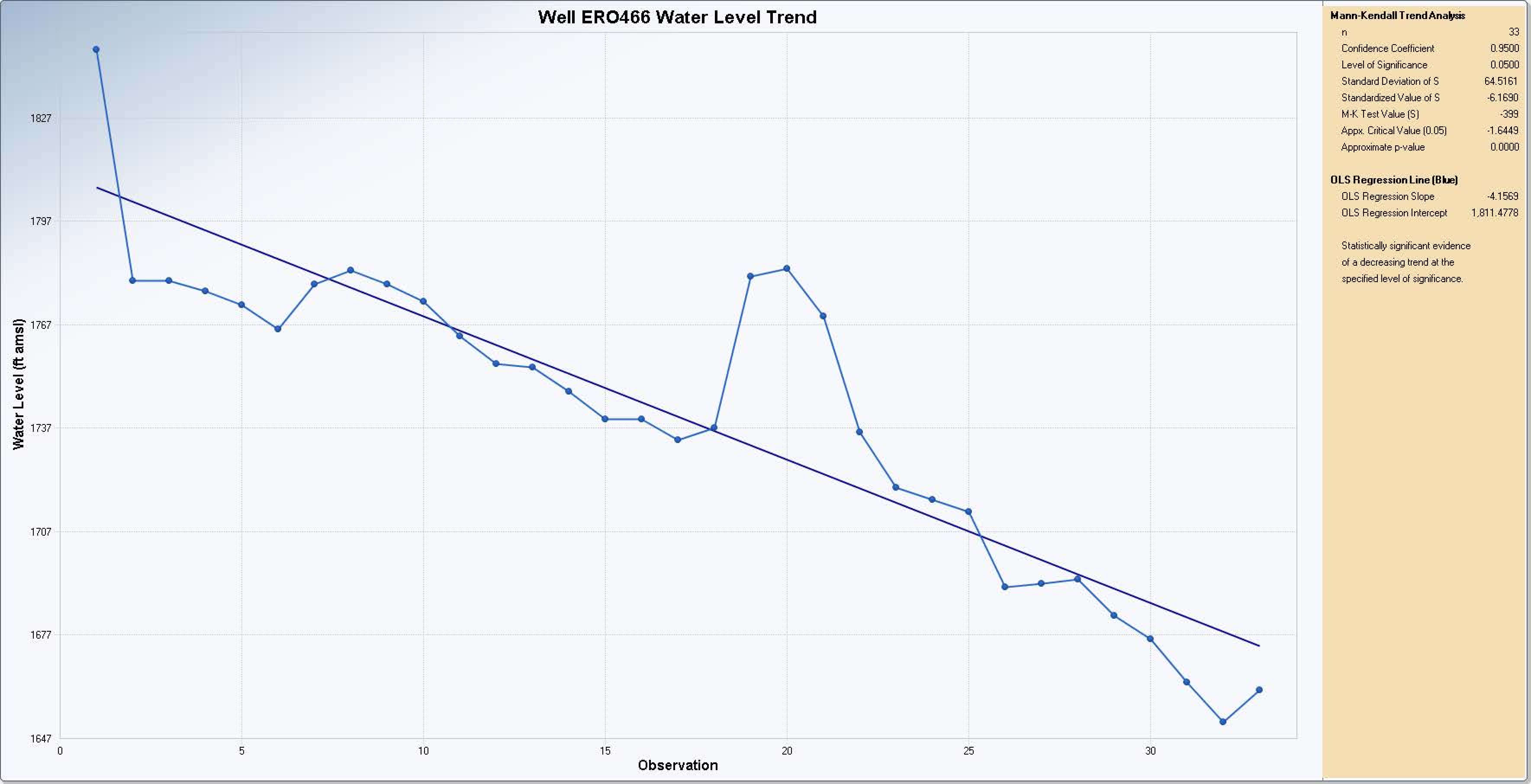
n	32
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	61.6658
Standardized Value of S	-3.9406
M-K Test Value (S)	-244
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-0.2981
OLS Regression Intercept	2,235.5091

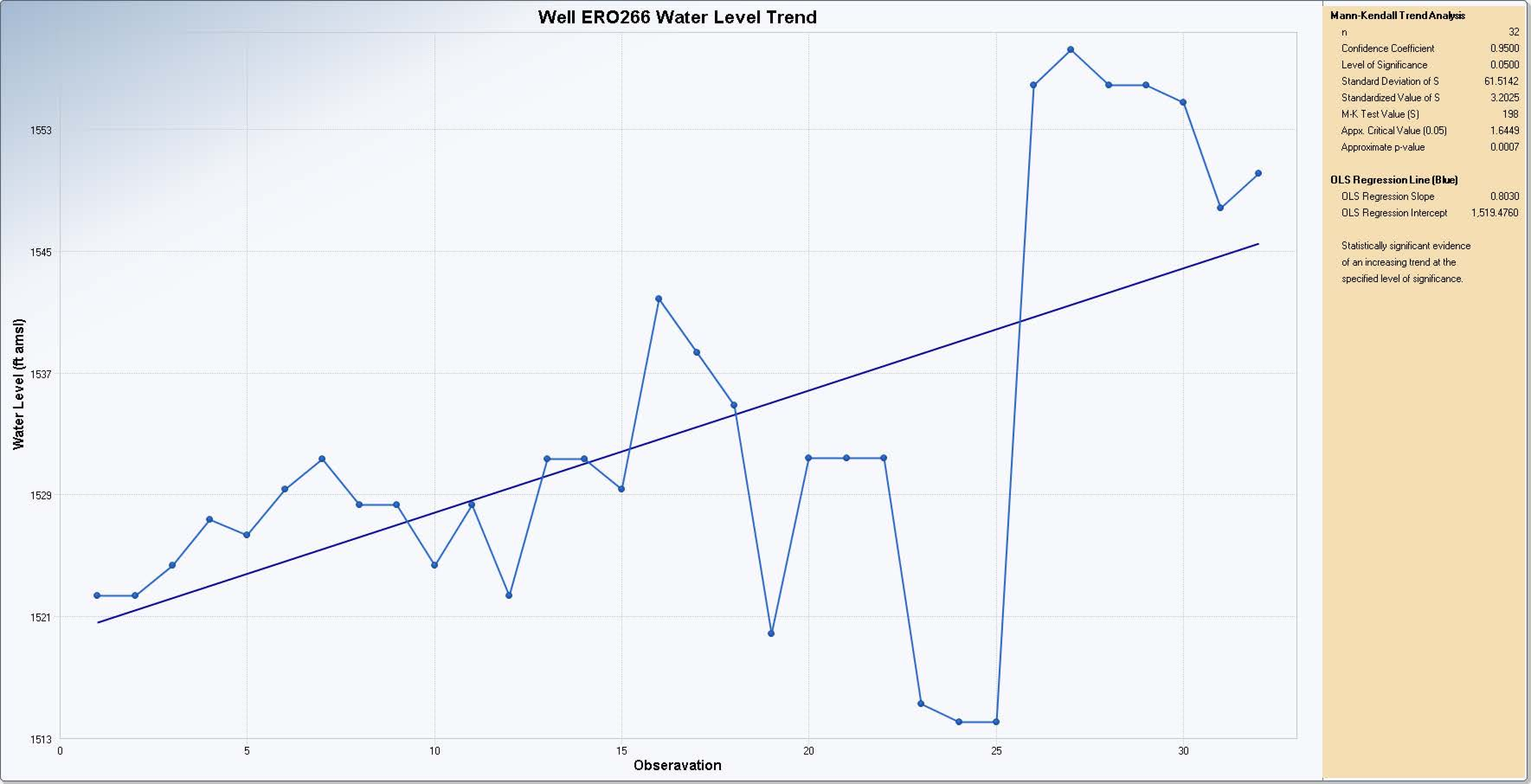
Statistically significant evidence of a decreasing trend at the specified level of significance.

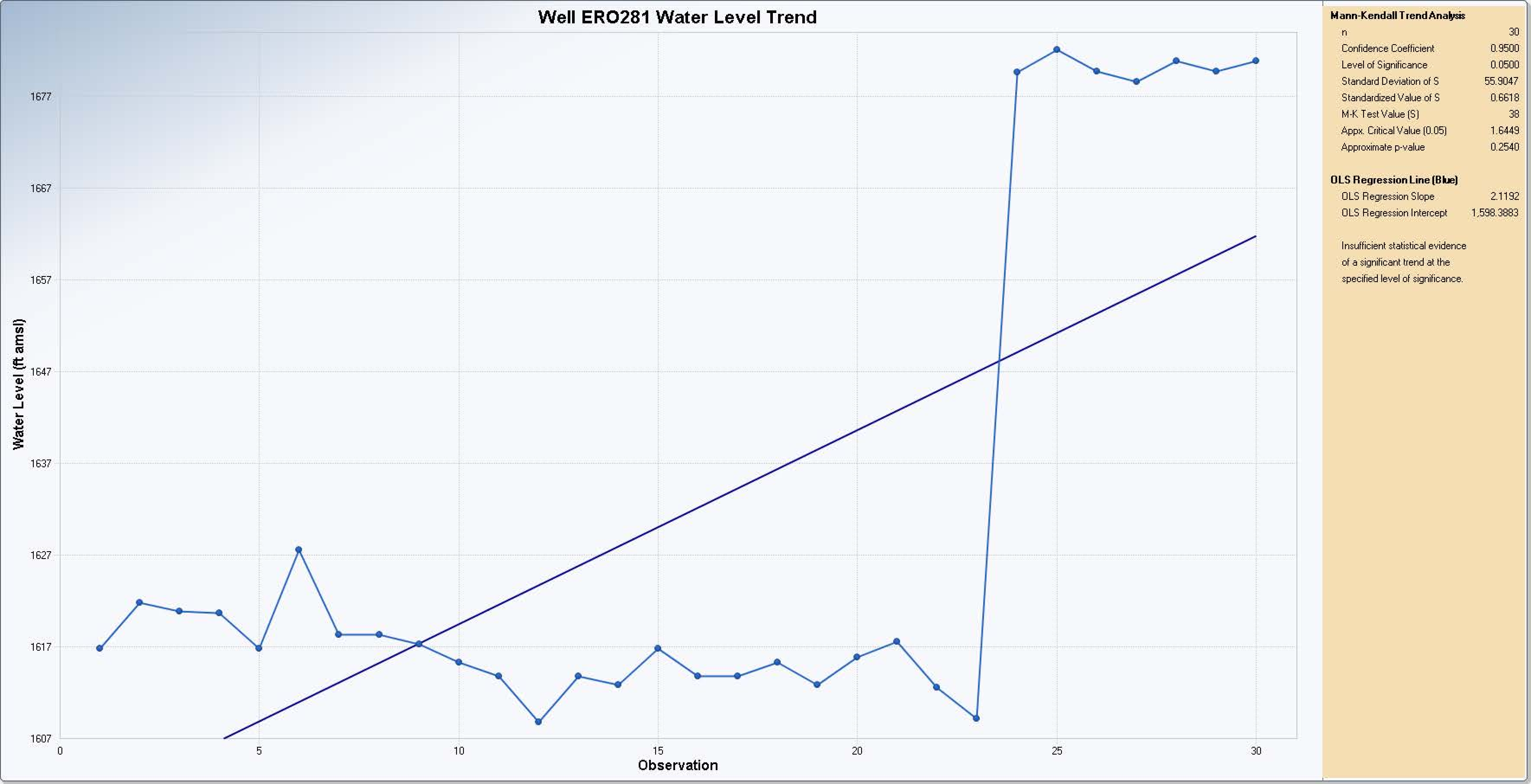

Well ERO454 Water Level Trend
Water Level (ft amsl)
1786
1806
1826
1846
1866
1886
Observation
0
5
10
15
20
25
30
Mann-Kendall Trend Analysis
n 33
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 64.5084
Standardized Value of S -6.2162
M-K Test Value (S) -402
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.0000
OLS Regression Line (Blue)
OLS Regression Slope -2.9876
OLS Regression Intercept 1,903.8113
Statistically significant evidence of a decreasing trend at the specified level of significance.

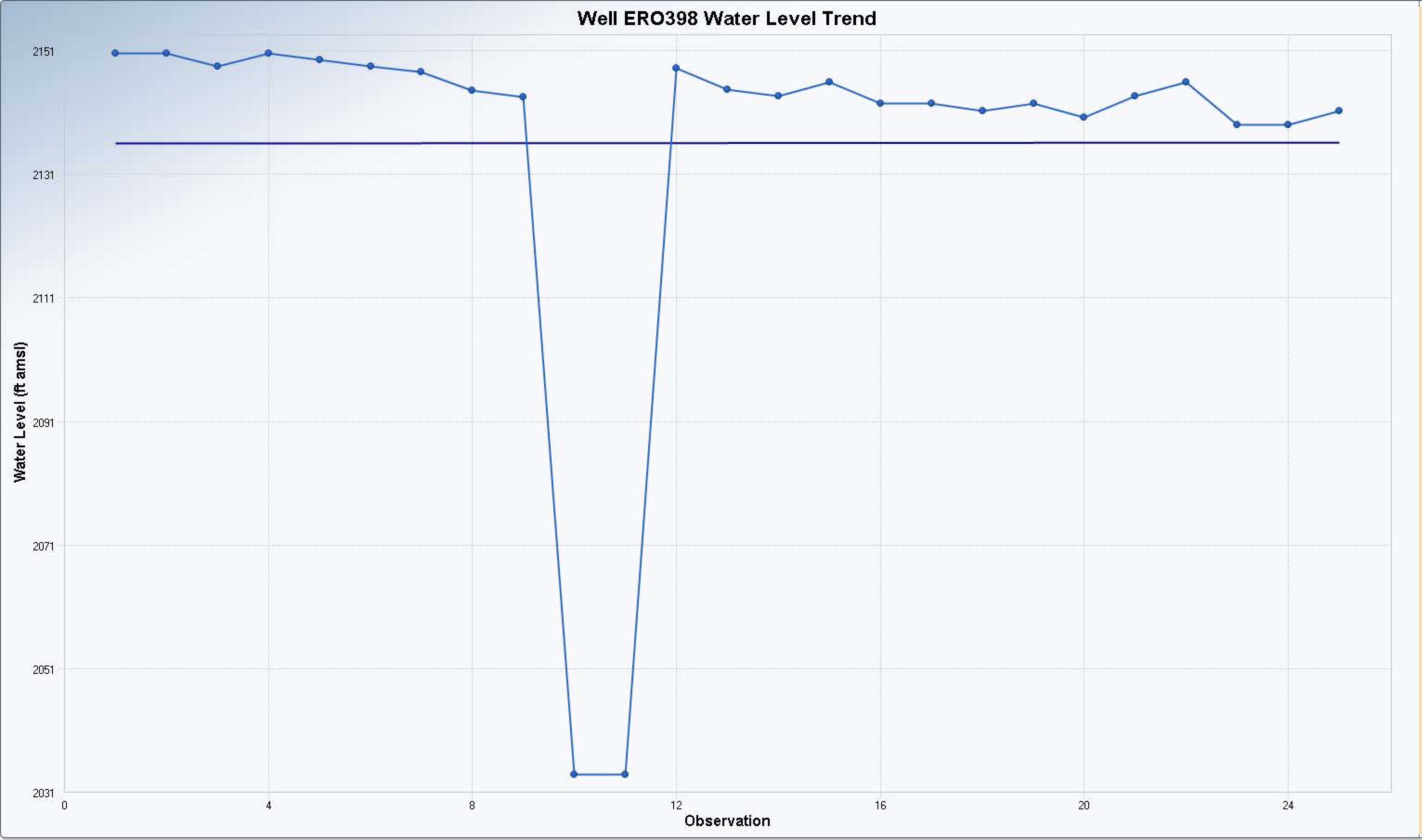


Well ERO466 Water Level Trend
Water Level (ft amsl)
1827
1797
1767
1737
1707
1677
1647
Observation
0
5
10
15
20
25
30
Mann-Kendall Trend Analysis
n 33
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 64.5161
Standardized Value of S -6.1690
M-K Test Value (S) -399
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.0000
OLS Regression Line (Blue)
OLS Regression Slope -4.1569
OLS Regression Intercept 1,811.4778
Statistically significant evidence of a decreasing trend at the specified level of significance.


Well ERO673 Water Level Trend
Water Level (ft amsl)
1369
1349
1329
1309
1289
0
5
10
15
20
25
30
Observation
Mann-Kendall Trend Analysis
n 33
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 64.5394
Standardized Value of S -6.5541
M-K Test Value (S) -424
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.0000
OLS Regression Line (Blue)
OLS Regression Slope -1.6800
OLS Regression Intercept 1,351.5055
Statistically significant evidence
of a decreasing trend at the
specified level of significance.


Well ERO266 Water Level Trend
Water Level (ft amsl)
1553
1545
1537
1529
1521
1513
0
5
10
15
20
25
30
Obseravation
Mann-Kendall Trend Analysis
n 32
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 61.5142
Standardized Value of S 3.2025
M-K Test Value (S) 198
Appx. Critical Value (0.05) 1.6449
Approximate p-value 0.0007
OLS Regression Line (Blue)
OLS Regression Slope 0.8030
OLS Regression Intercept 1,519.4760
Statistically significant evidence
of an increasing trend at the
specified level of significance.


Well ERO281 Water Level Trend
Water Level (ft amsl)
1677
1667
1657
1647
1637
1627
1617
1607
0
5
10
15
20
25
30
Observation
Mann-Kendall Trend Analysis
n 30
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 55.9047
Standardized Value of S 0.6618
M-K Test Value (S) 38
Appx. Critical Value (0.05) 1.6449
Approximate p-value 0.2540
OLS Regression Line (Blue)
OLS Regression Slope 2.1192
OLS Regression Intercept 1,598.3883
Insufficient statistical evidence
of a significant trend at the
specified level of significance.



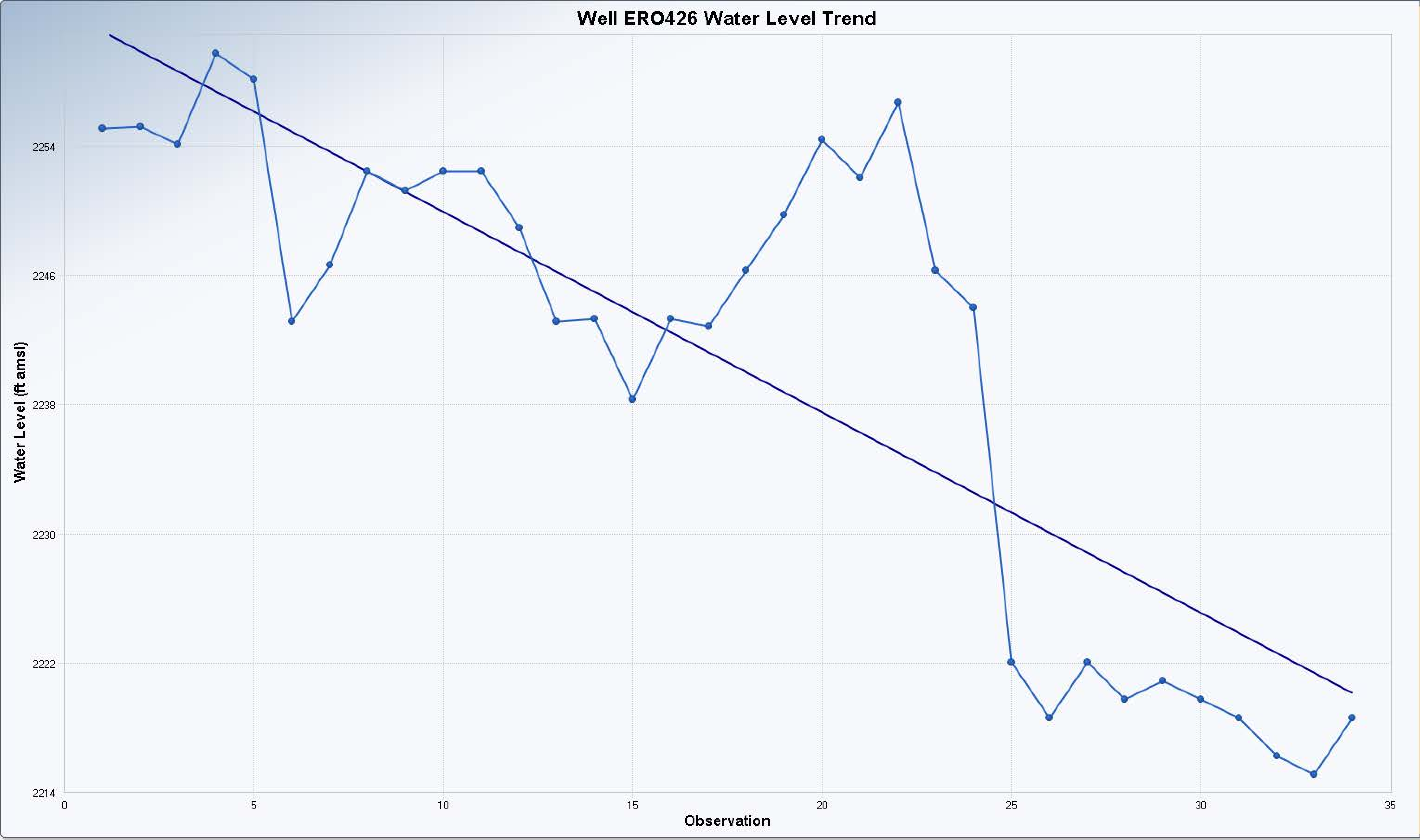
Mann-Kendall Trend Analysis

n	25
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	42.6927
Standardized Value of S	-3.9585
M-K Test Value (S)	-170
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	0.0115
OLS Regression Intercept	2,136.4031

Statistically significant evidence of a decreasing trend at the specified level of significance.



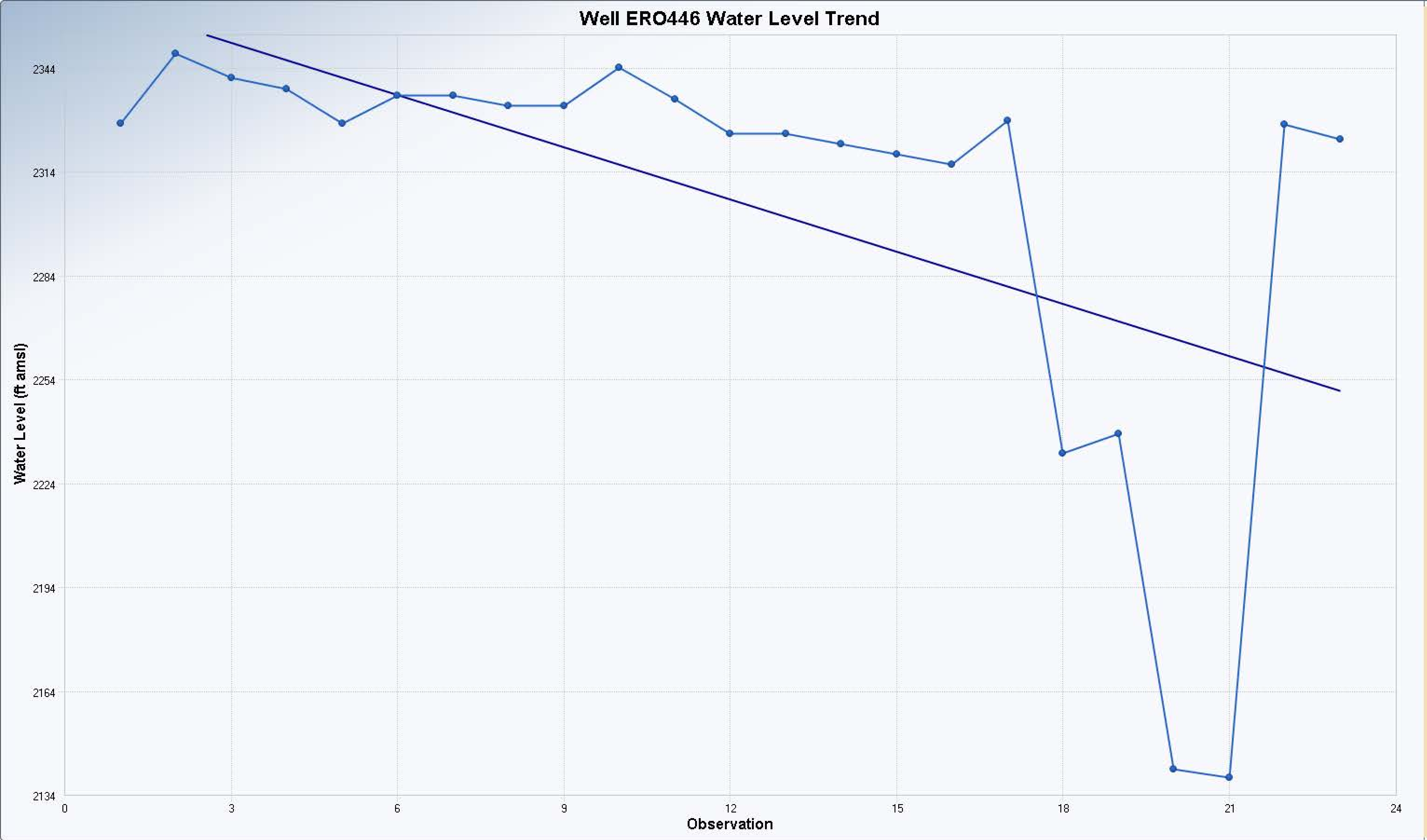
Mann-Kendall Trend Analysis

n	34
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	67.3721
Standardized Value of S	-5.0466
M-K Test Value (S)	-341
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	-1.2424
OLS Regression Intercept	2,262.0478

Statistically significant evidence of a decreasing trend at the specified level of significance.



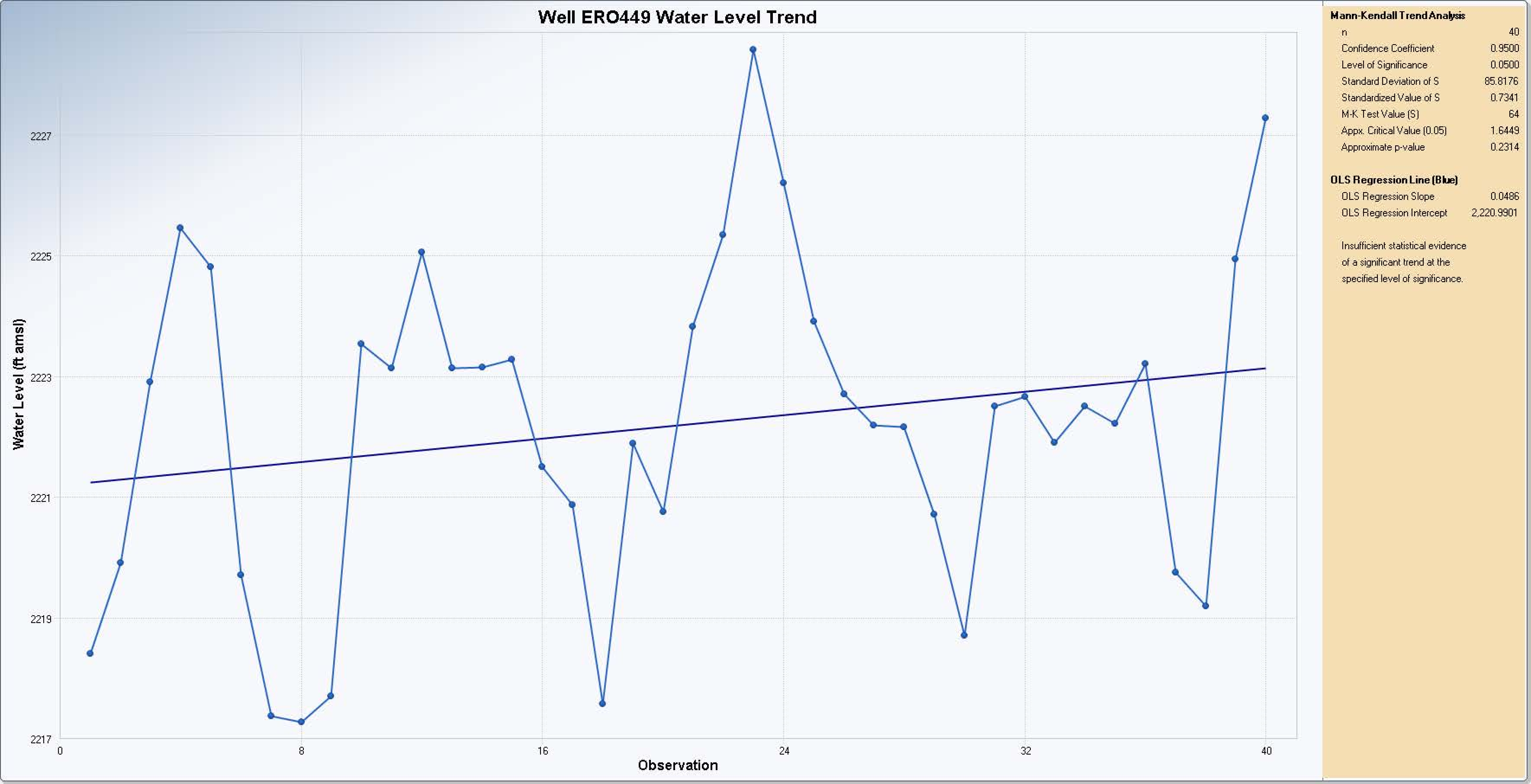
Mann-Kendall Trend Analysis

n	23
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	37.8109
Standardized Value of S	-4.0729
M-K Test Value (S)	-155
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0000

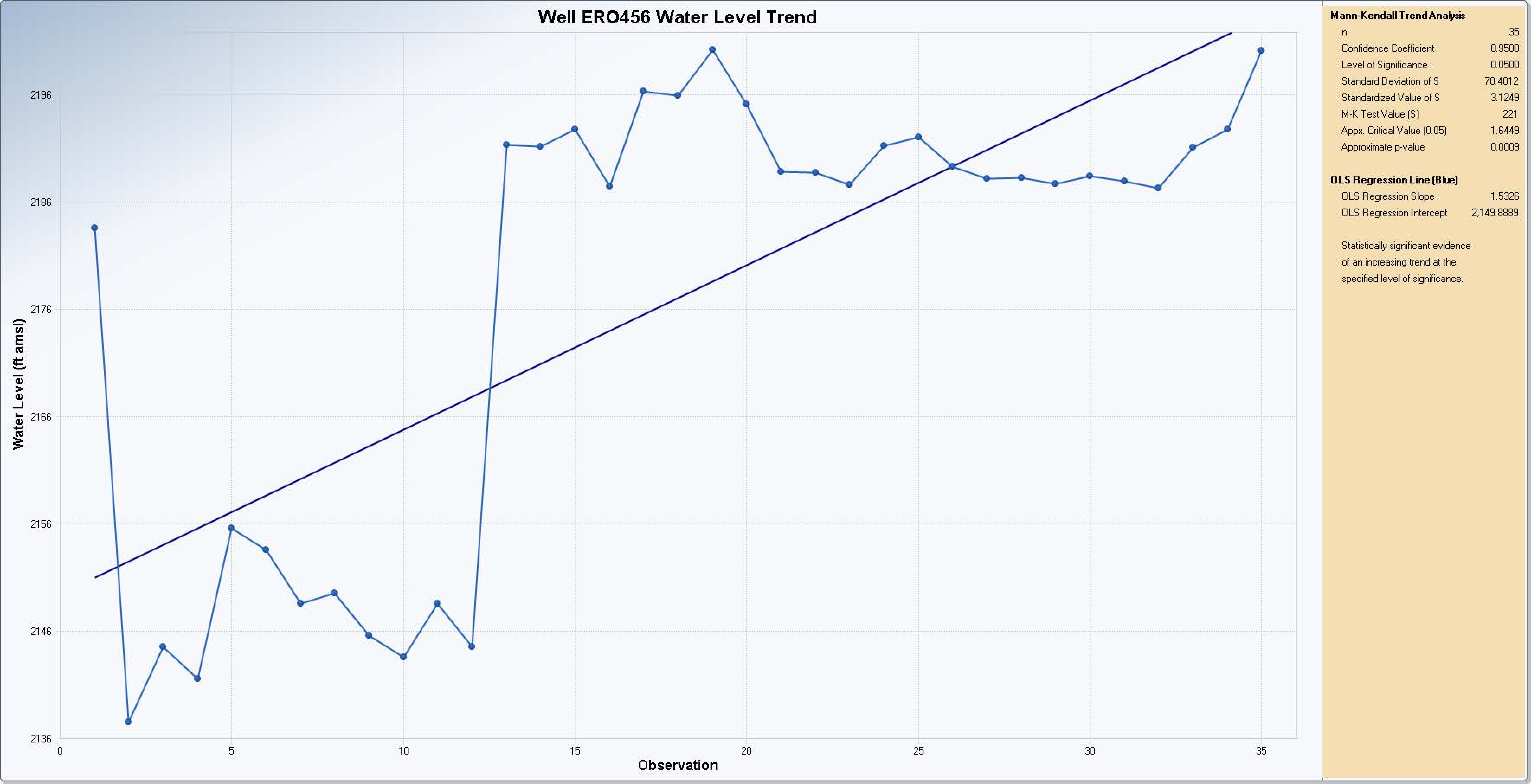
OLS Regression Line (Blue)

OLS Regression Slope	-5.0308
OLS Regression Intercept	2,366.3869

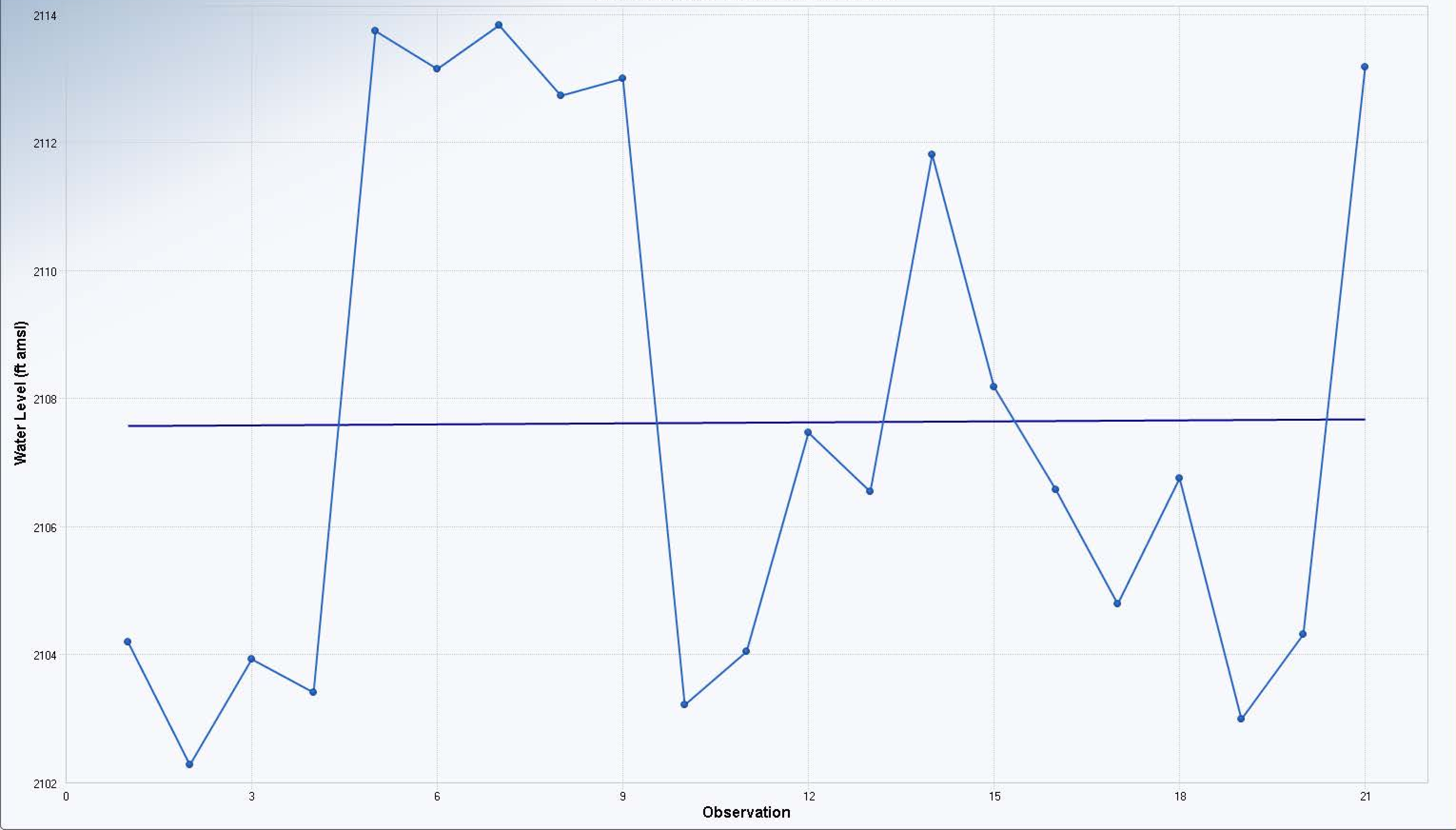
Statistically significant evidence of a decreasing trend at the specified level of significance.



Well ERO449 Water Level Trend
Water Level (ft amsl)
2227
2225
2223
2221
2219
2217
0
8
16
24
32
40
Observation
Mann-Kendall Trend Analysis
n 40
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 85.8176
Standardized Value of S 0.7341
M-K Test Value (S) 64
Appx. Critical Value (0.05) 1.6449
Approximate p-value 0.2314
OLS Regression Line (Blue)
OLS Regression Slope 0.0486
OLS Regression Intercept 2,220.9901
Insufficient statistical evidence of a significant trend at the specified level of significance.


Well ERO456 Water Level Trend
Water Level (ft amsl)
2196
2186
2176
2166
2156
2146
2136
0
5
10
15
20
25
30
35
Observation
Mann-Kendall Trend Analysis
n 35
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 70.4012
Standardized Value of S 3.1249
M-K Test Value (S) 221
Appx. Critical Value (0.05) 1.6449
Approximate p-value 0.0009
OLS Regression Line (Blue)
OLS Regression Slope 1.5326
OLS Regression Intercept 2,149.8889
Statistically significant evidence
of an increasing trend at the
specified level of significance.

Well ERO535 Water Level Trend



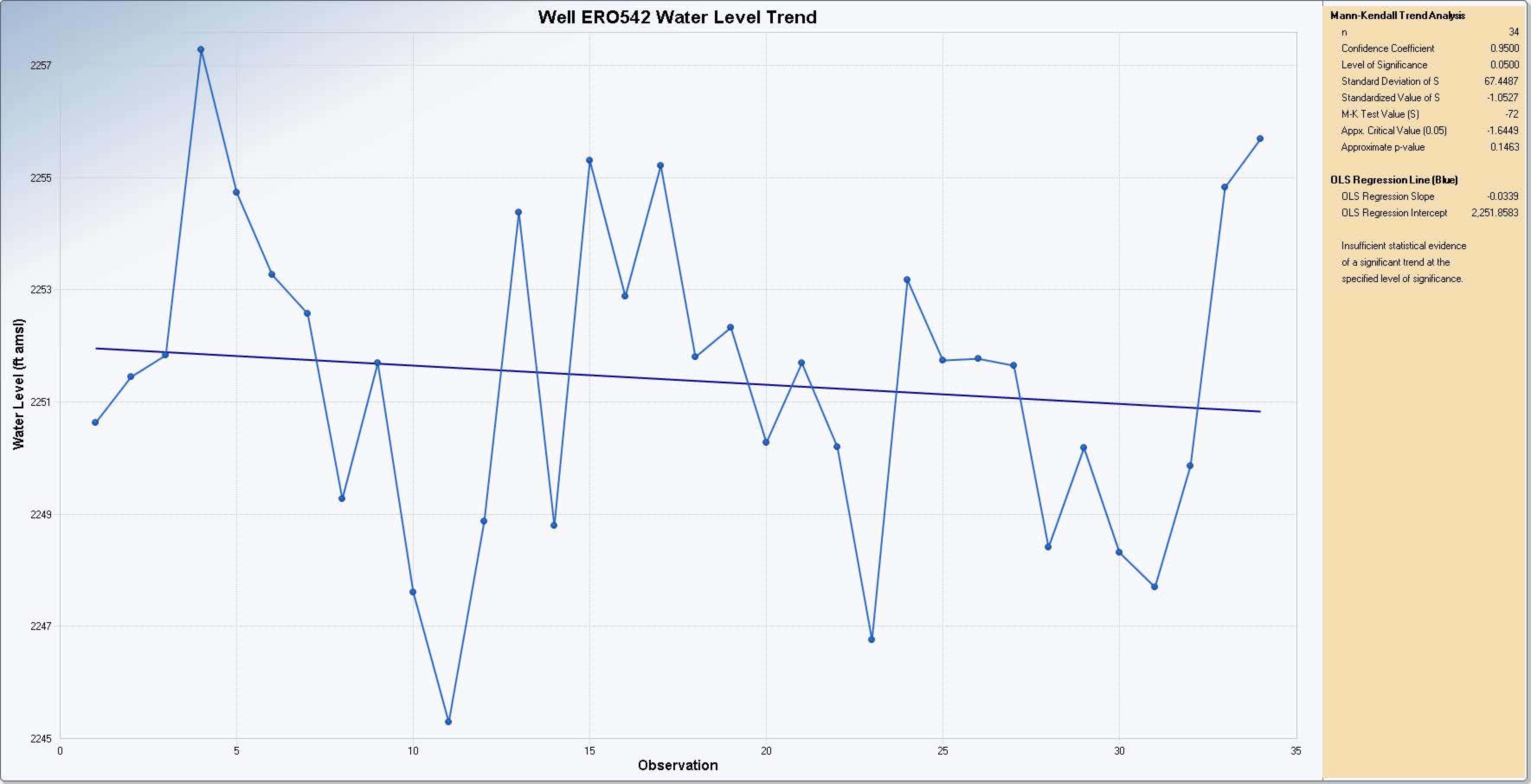
Mann-Kendall Trend Analysis

n	21
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	33.1160
Standardized Value of S	0.0302
M-K Test Value (S)	2
Tabulated p-value	0.4880
Approximate p-value	0.4880

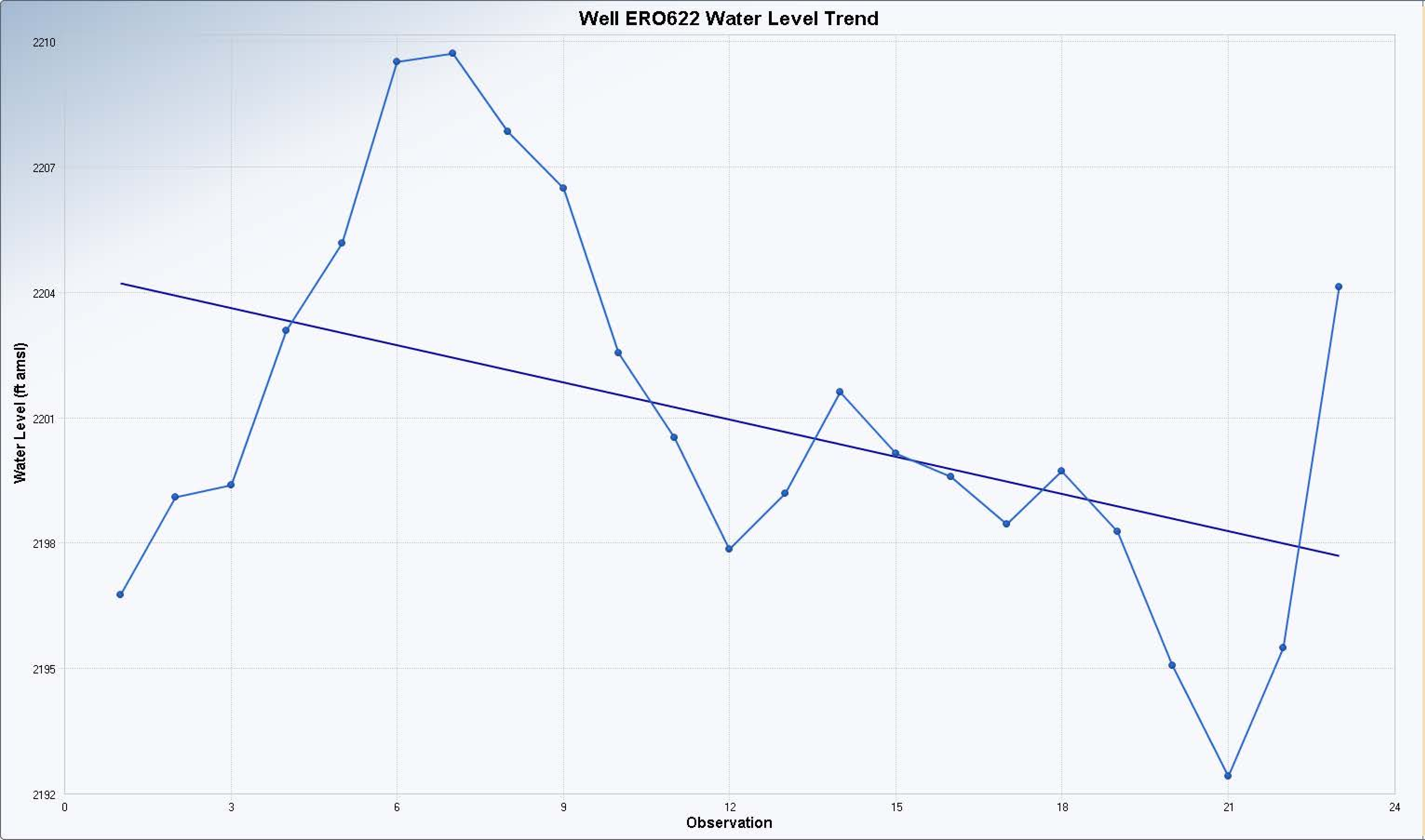
OLS Regression Line (Blue)

OLS Regression Slope	0.0046
OLS Regression Intercept	2,107.7193

Insufficient statistical evidence of a significant trend at the specified level of significance.



Well ERO542 Water Level Trend
Water Level (ft amsl)
Observation
2257
2255
2253
2251
2249
2247
2245
0
5
10
15
20
25
30
35
Mann-Kendall Trend Analysis
n 34
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 67.4487
Standardized Value of S -1.0527
M-K Test Value (S) -72
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.1463
OLS Regression Line (Blue)
OLS Regression Slope -0.0339
OLS Regression Intercept 2,251.8583
Insufficient statistical evidence
of a significant trend at the
specified level of significance.



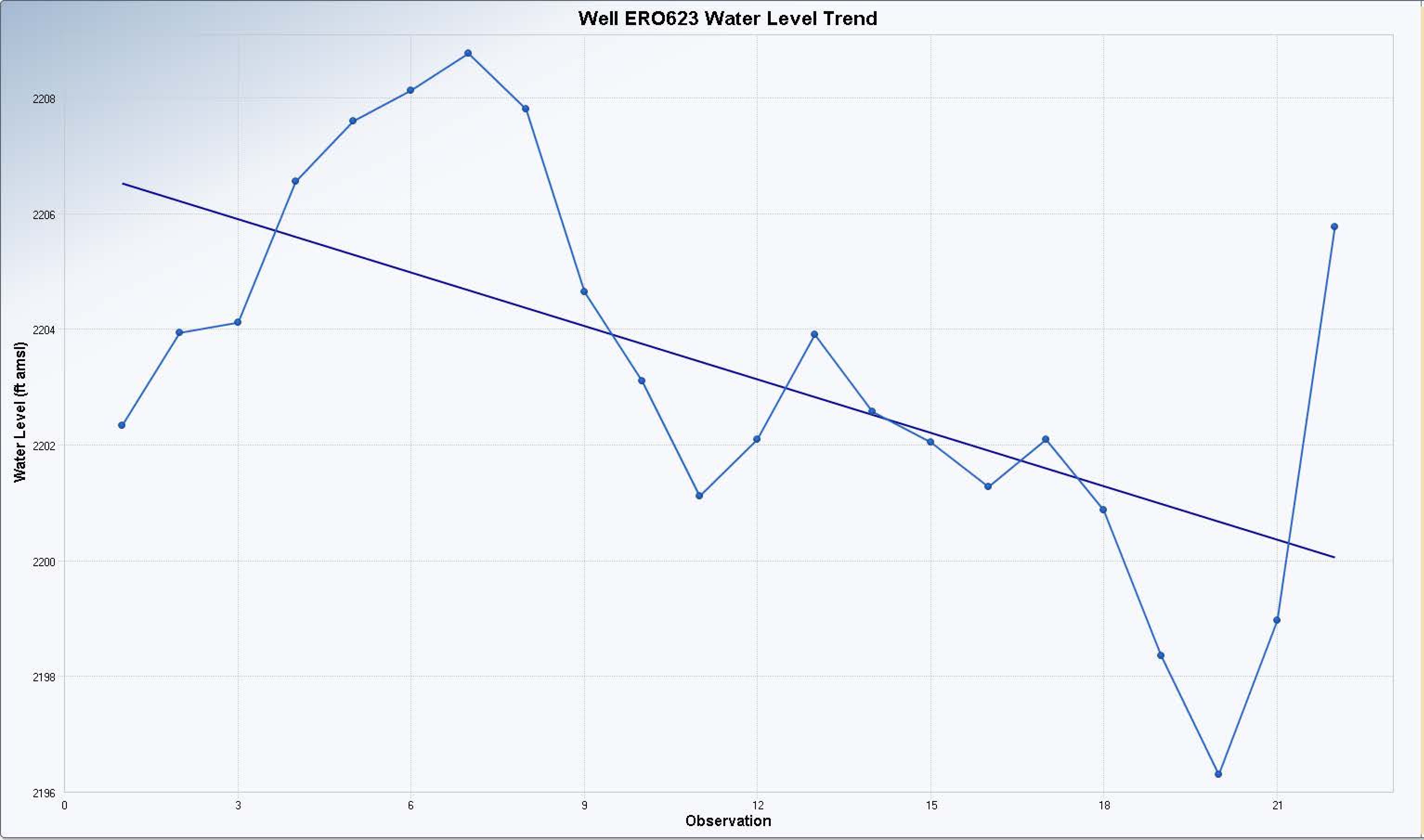
Mann-Kendall Trend Analysis

n	23
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	37.8638
Standardized Value of S	-2.0600
M-K Test Value (S)	-79
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0197

OLS Regression Line (Blue)

OLS Regression Slope	-0.2964
OLS Regression Intercept	2,204.1168

Statistically significant evidence of a decreasing trend at the specified level of significance.



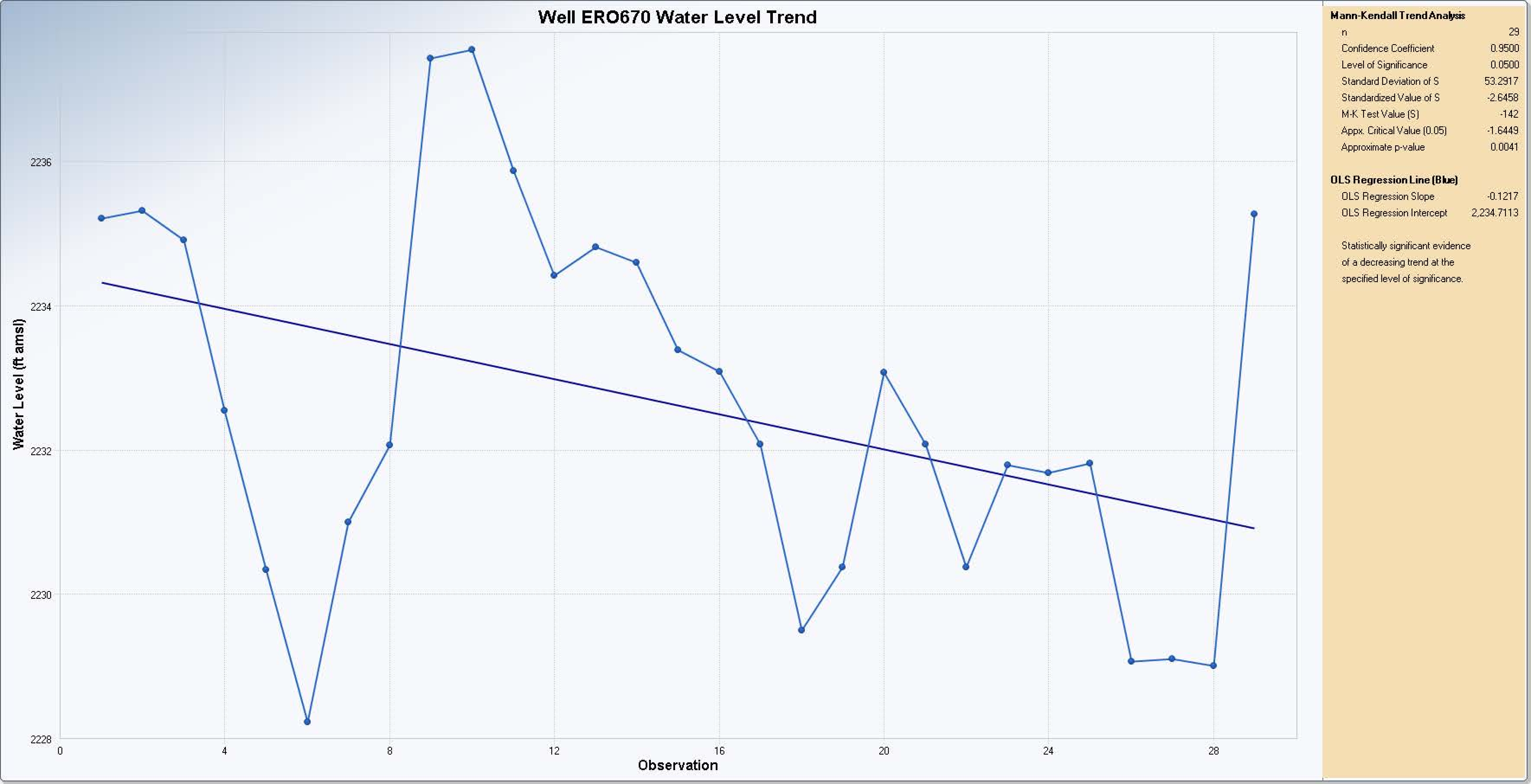
Mann-Kendall Trend Analysis

n	22
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	35.4495
Standardized Value of S	-3.0184
M-K Test Value (S)	-108
Tabulated p-value	0.0010
Approximate p-value	0.0013

OLS Regression Line (Blue)

OLS Regression Slope	-0.3085
OLS Regression Intercept	2,206.7249

Statistically significant evidence of a decreasing trend at the specified level of significance.


Well ERO670 Water Level Trend
Water Level (ft amsl)
Observation
2228
2230
2232
2234
2236
0
4
8
12
16
20
24
28
Mann-Kendall Trend Analysis
n 29
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 53.2917
Standardized Value of S -2.6458
M-K Test Value (S) -142
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.0041
OLS Regression Line (Blue)
OLS Regression Slope -0.1217
OLS Regression Intercept 2,234.7113
Statistically significant evidence
of a decreasing trend at the
specified level of significance.

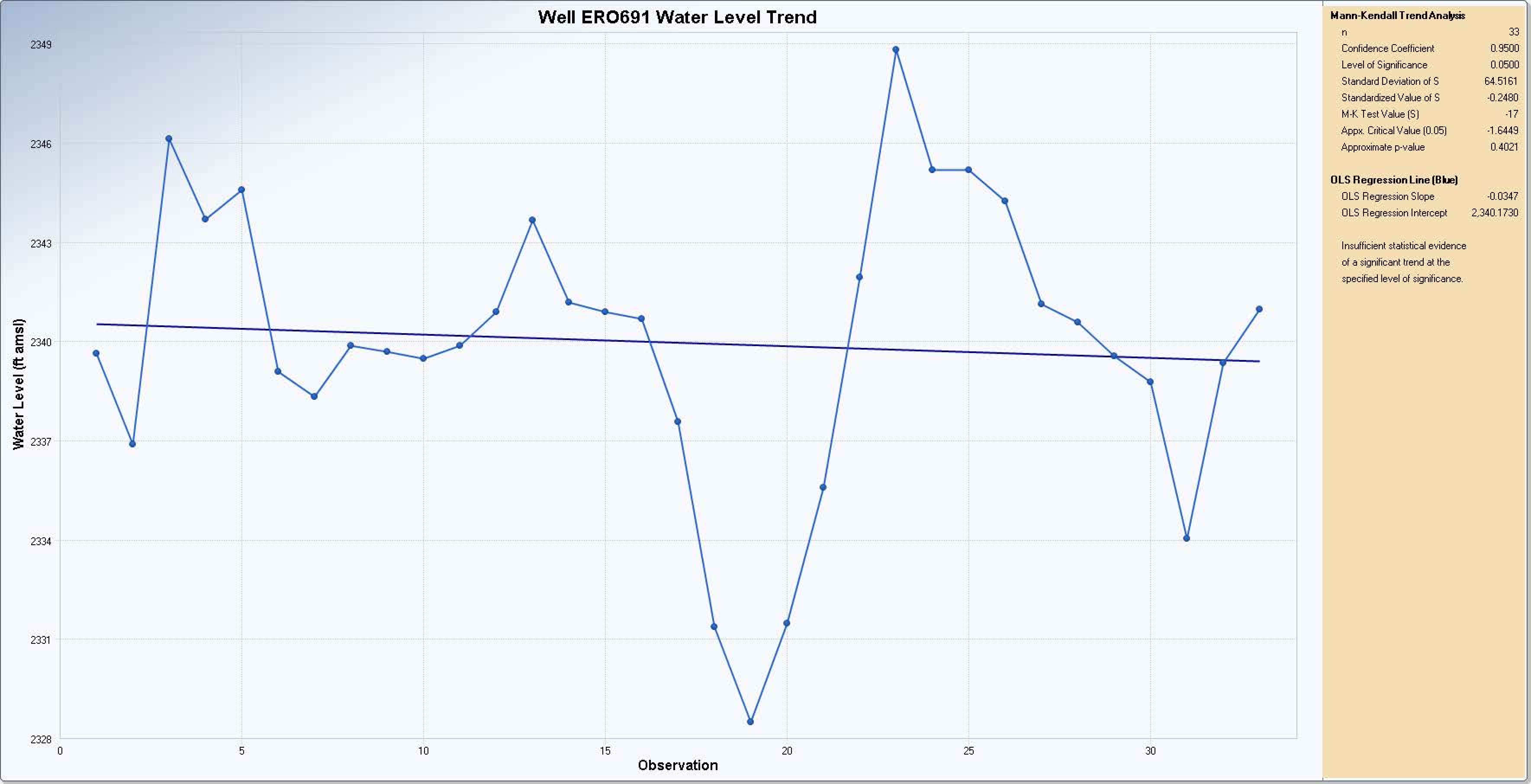
Mann-Kendall Trend Analysis

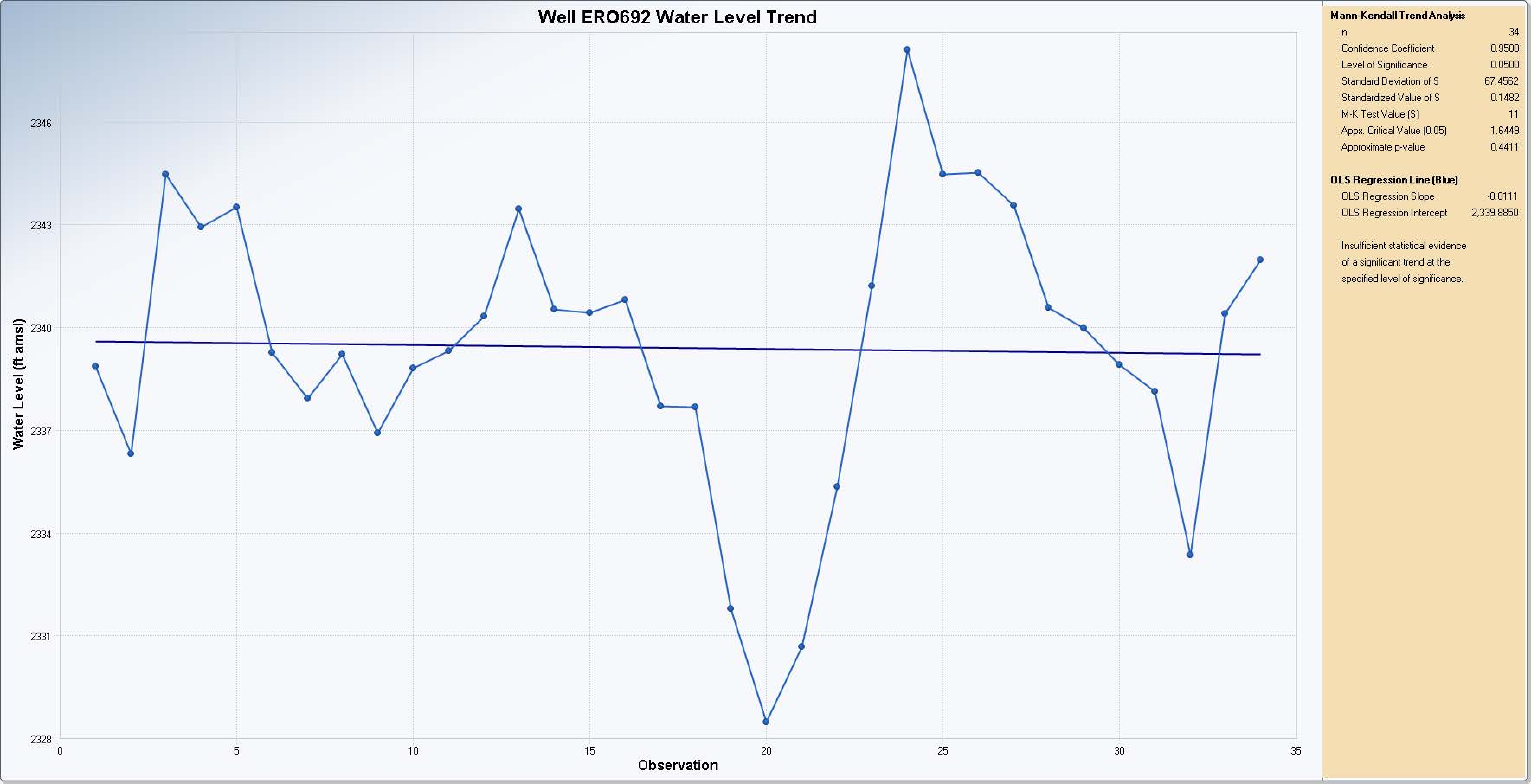
n	27
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	47.9305
Standardized Value of S	1.1892
M-K Test Value (S)	58
Appx. Critical Value (0.05)	1.6449
Approximate p-value	0.1172

OLS Regression Line (Blue)

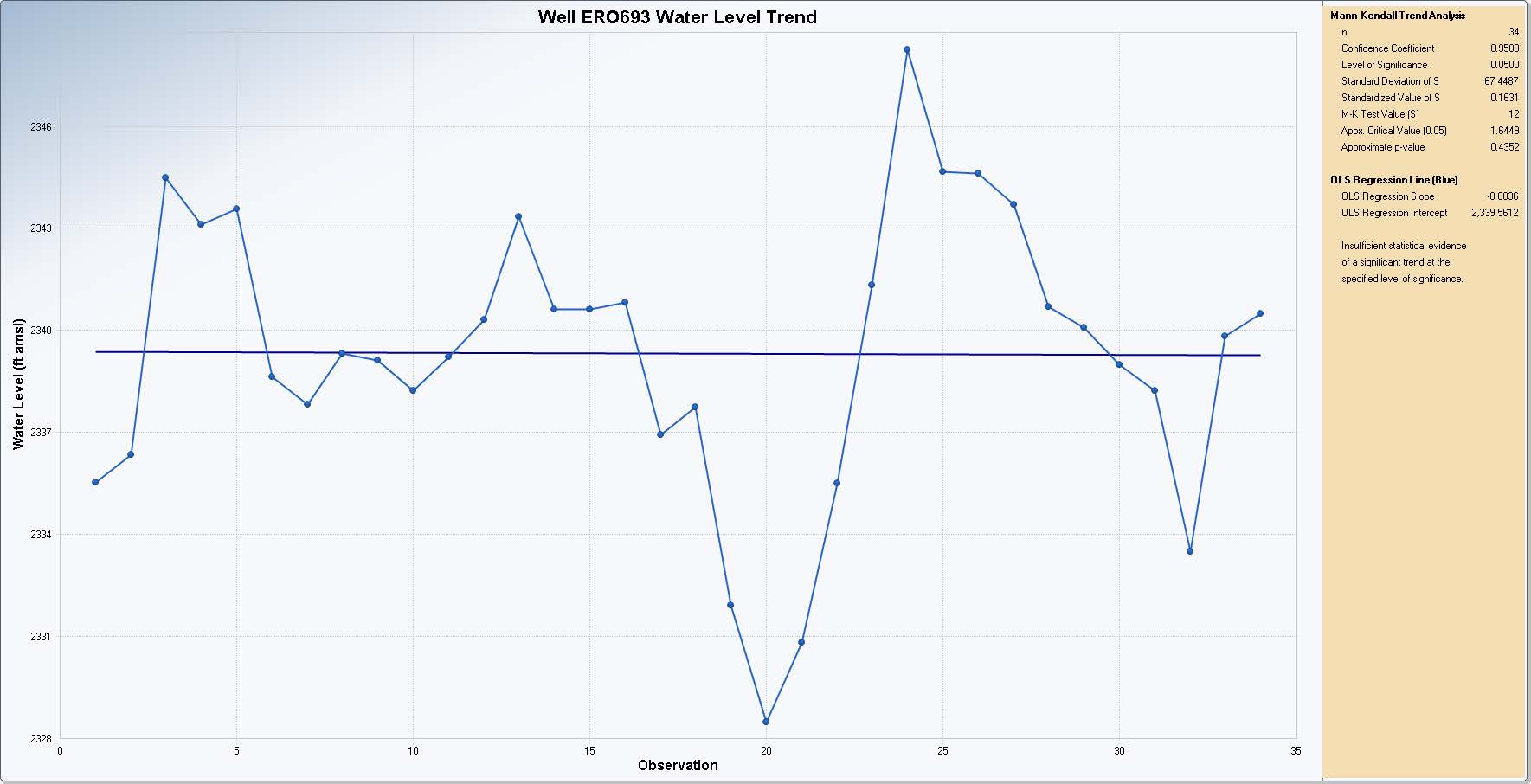
OLS Regression Slope	0.1180
OLS Regression Intercept	1,665.6449

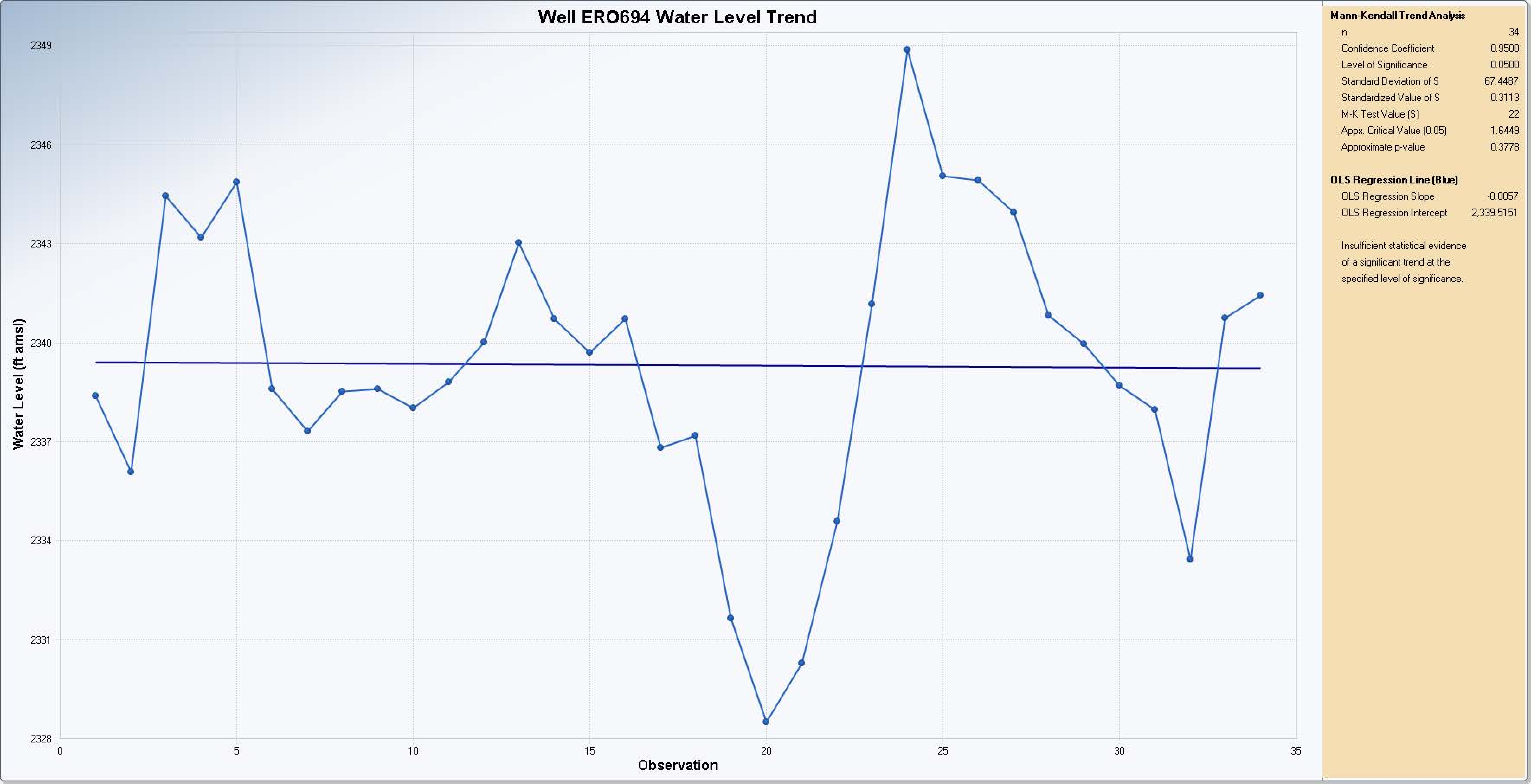
Insufficient statistical evidence of a significant trend at the specified level of significance.


Well ERO691 Water Level Trend
Water Level (ft amsl)
2349
2346
2343
2340
2337
2334
2331
2328
0
5
10
15
20
25
30
Observation
Mann-Kendall Trend Analysis
n 33
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 64.5161
Standardized Value of S -0.2480
M-K Test Value (S) -17
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.4021
OLS Regression Line (Blue)
OLS Regression Slope -0.0347
OLS Regression Intercept 2,340.1730
Insufficient statistical evidence of a significant trend at the specified level of significance.

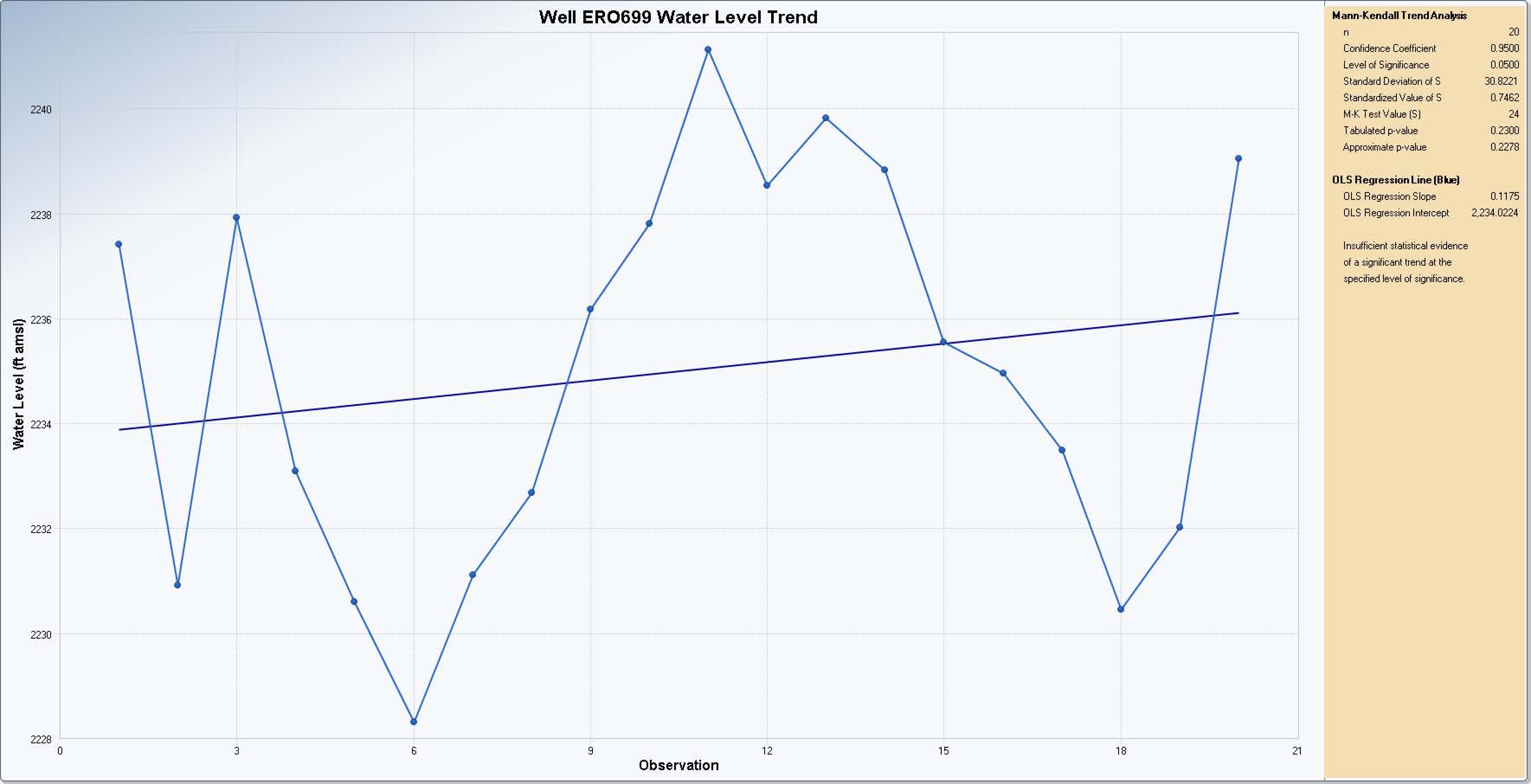


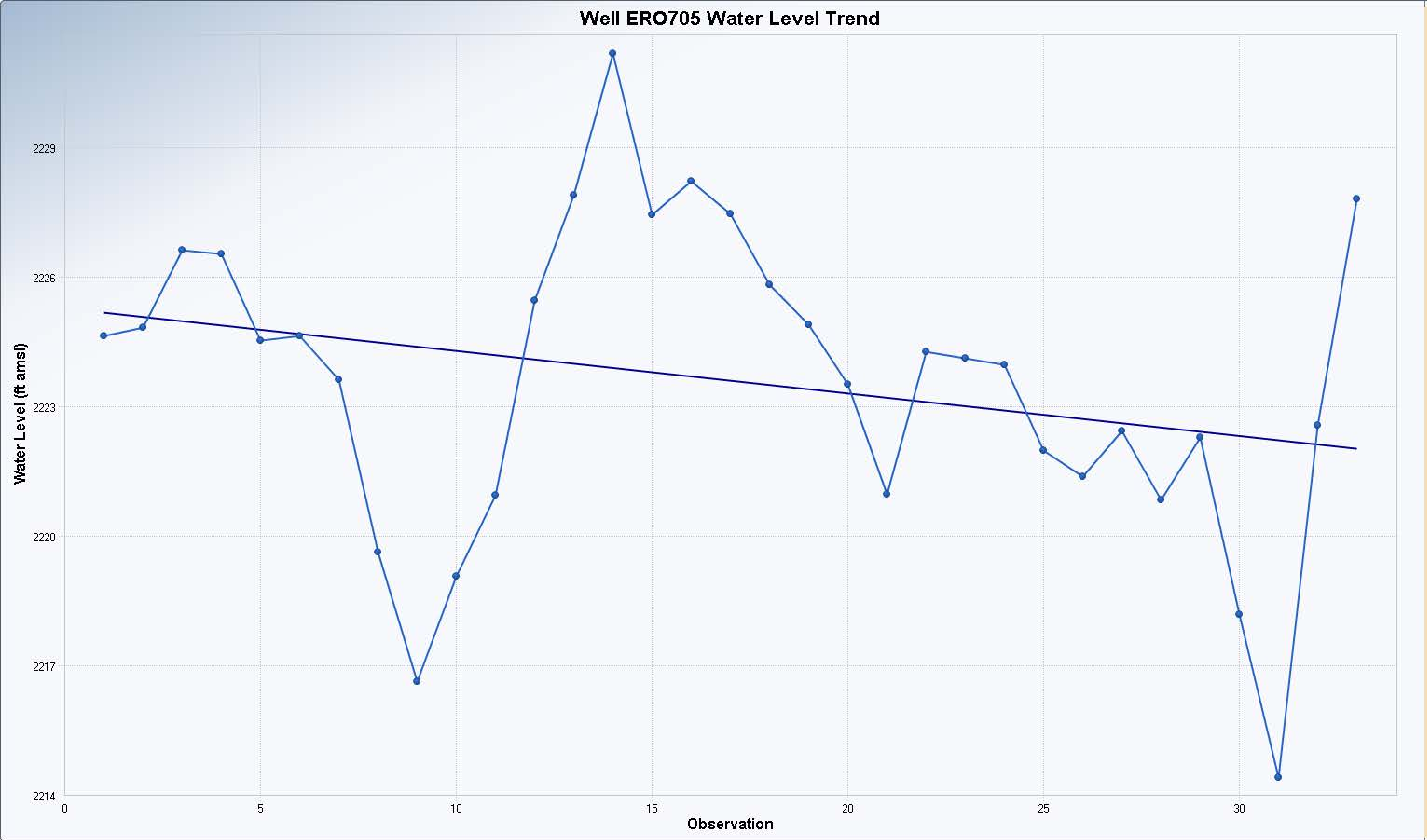
Well ERO692 Water Level Trend
Water Level (ft amsl)
2346
2343
2340
2337
2334
2331
2328
0
5
10
15
20
25
30
35
Observation
Mann-Kendall Trend Analysis
n 34
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 67.4562
Standardized Value of S 0.1482
M-K Test Value (S) 11
Appx. Critical Value (0.05) 1.6449
Approximate p-value 0.4411
OLS Regression Line (Blue)
OLS Regression Slope -0.0111
OLS Regression Intercept 2,339.8850
Insufficient statistical evidence
of a significant trend at the
specified level of significance.


Well ERO693 Water Level Trend
Water Level (ft amsl)
Observation
2346
2343
2340
2337
2334
2331
2328
0
5
10
15
20
25
30
35
Mann-Kendall Trend Analysis
n 34
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 67.4487
Standardized Value of S 0.1631
M-K Test Value (S) 12
Appx. Critical Value (0.05) 1.6449
Approximate p-value 0.4352
OLS Regression Line (Blue)
OLS Regression Slope -0.0036
OLS Regression Intercept 2,339.5612
Insufficient statistical evidence
of a significant trend at the
specified level of significance.


Well ERO694 Water Level Trend
Water Level (ft amsl)
Observation
2349
2346
2343
2340
2337
2334
2331
2328
0
5
10
15
20
25
30
35
Mann-Kendall Trend Analysis
n 34
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 67.4487
Standardized Value of S 0.3113
M-K Test Value (S) 22
Appx. Critical Value (0.05) 1.6449
Approximate p-value 0.3778
OLS Regression Line (Blue)
OLS Regression Slope -0.0057
OLS Regression Intercept 2,339.5151
Insufficient statistical evidence
of a significant trend at the
specified level of significance.


Well ERO695 Water Level Trend
Water Level (ft amsl)
2346
2343
2340
2337
2334
2331
2328
2325
2322
0
5
10
15
20
25
30
35
Observation
Mann-Kendall Trend Analysis
n 34
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 67.4562
Standardized Value of S -0.4447
M-K Test Value (S) -31
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.3283
OLS Regression Line (Blue)
OLS Regression Slope -0.0124
OLS Regression Intercept 2,335.7203
Insufficient statistical evidence of a significant trend at the specified level of significance.


Well ERO699 Water Level Trend
Water Level (ft amsl)
Observation
2228
2230
2232
2234
2236
2238
2240
0
3
6
9
12
15
18
21
Mann-Kendall Trend Analysis
n 20
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 30.8221
Standardized Value of S 0.7462
M-K Test Value (S) 24
Tabulated p-value 0.2300
Approximate p-value 0.2278
OLS Regression Line (Blue)
OLS Regression Slope 0.1175
OLS Regression Intercept 2,234.0224
Insufficient statistical evidence of a significant trend at the specified level of significance.



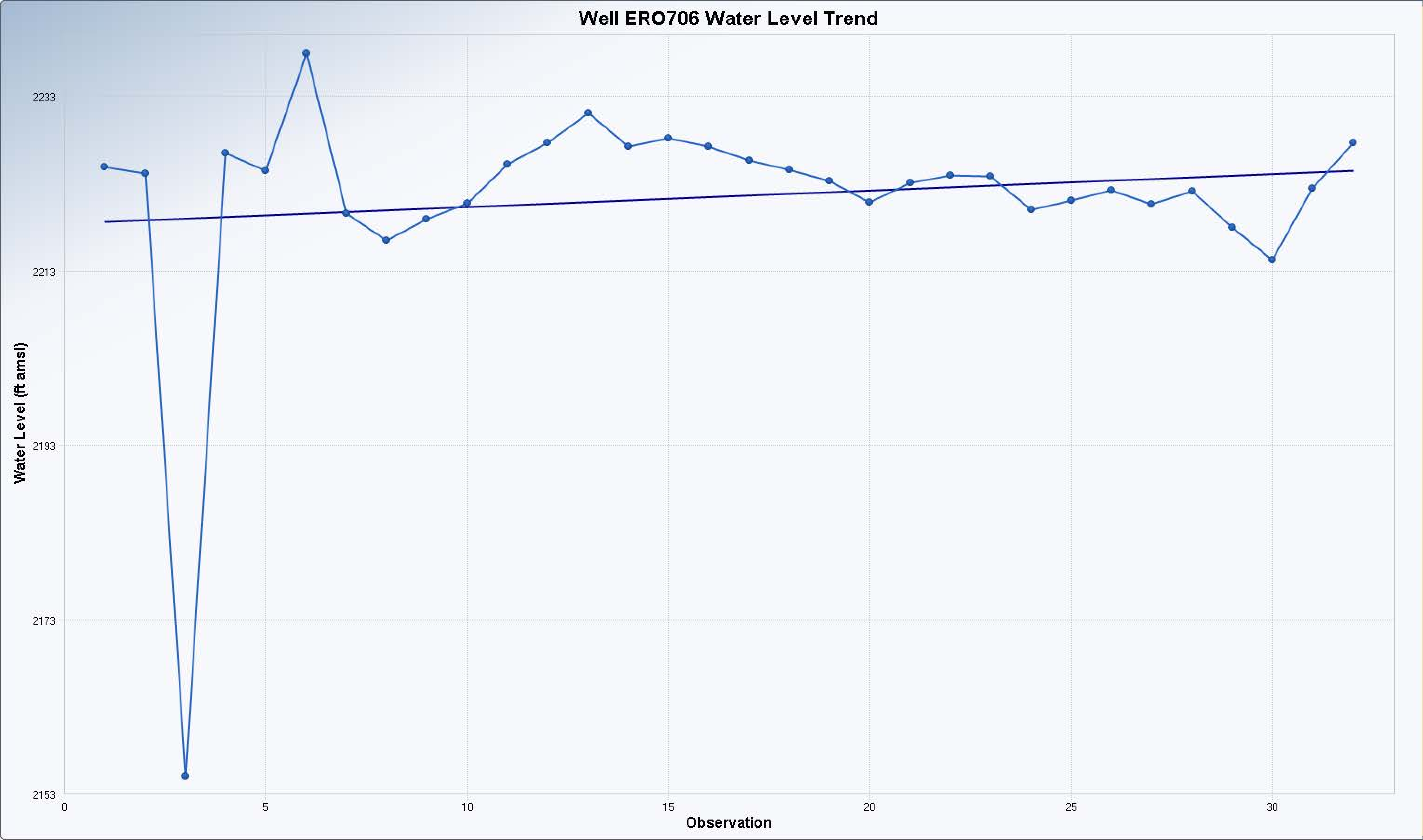
Mann-Kendall Trend Analysis

n	33
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	64.5316
Standardized Value of S	-1.9215
M-K Test Value (S)	-125
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0273

OLS Regression Line (Blue)

OLS Regression Slope	-0.0986
OLS Regression Intercept	2,225.1486

Statistically significant evidence of a decreasing trend at the specified level of significance.



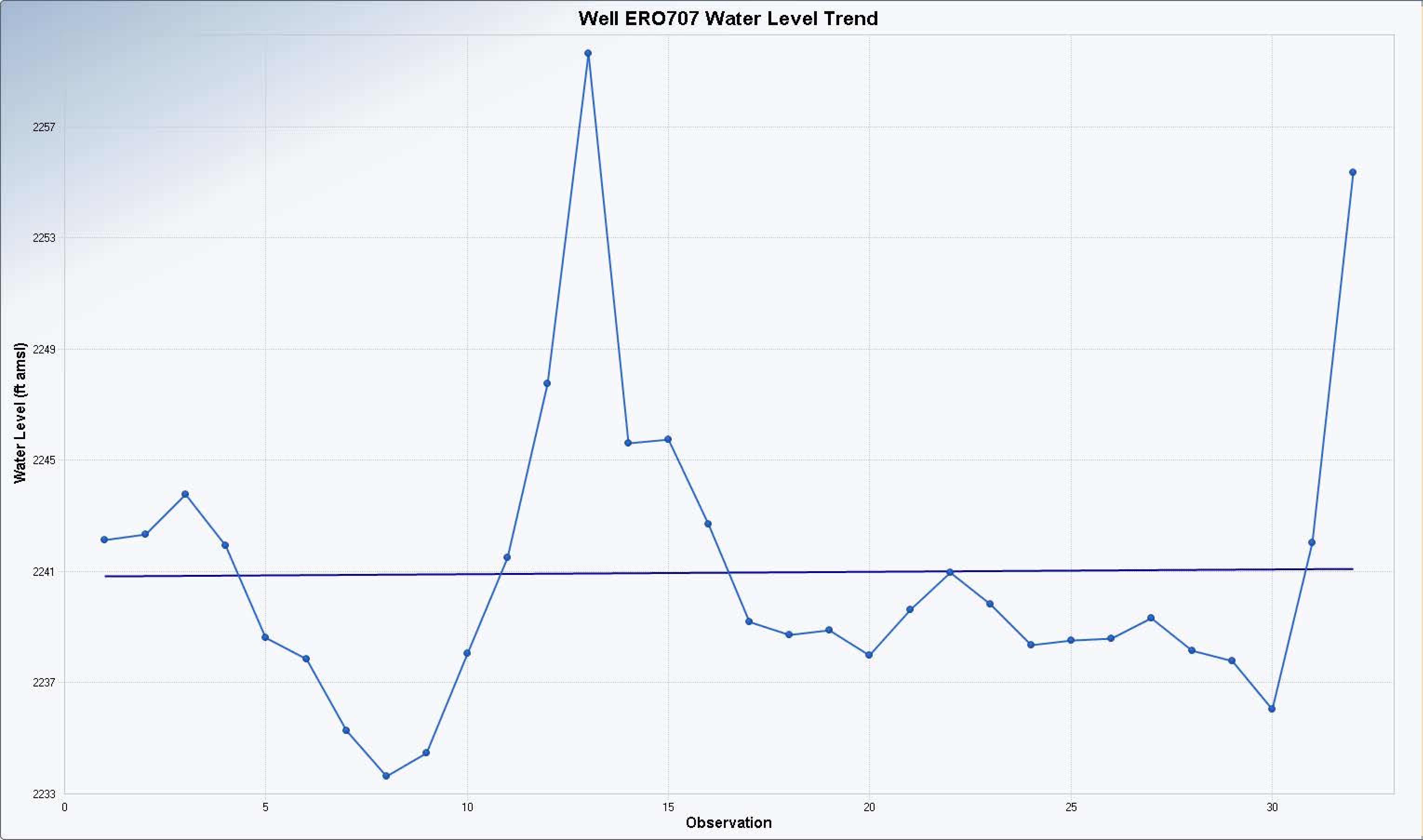
Mann-Kendall Trend Analysis

n	32
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	61.6658
Standardized Value of S	-1.4108
M-K Test Value (S)	-88
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.0791

OLS Regression Line (Blue)

OLS Regression Slope	0.1893
OLS Regression Intercept	2,218.4363

Insufficient statistical evidence of a significant trend at the specified level of significance.



Mann-Kendall Trend Analysis

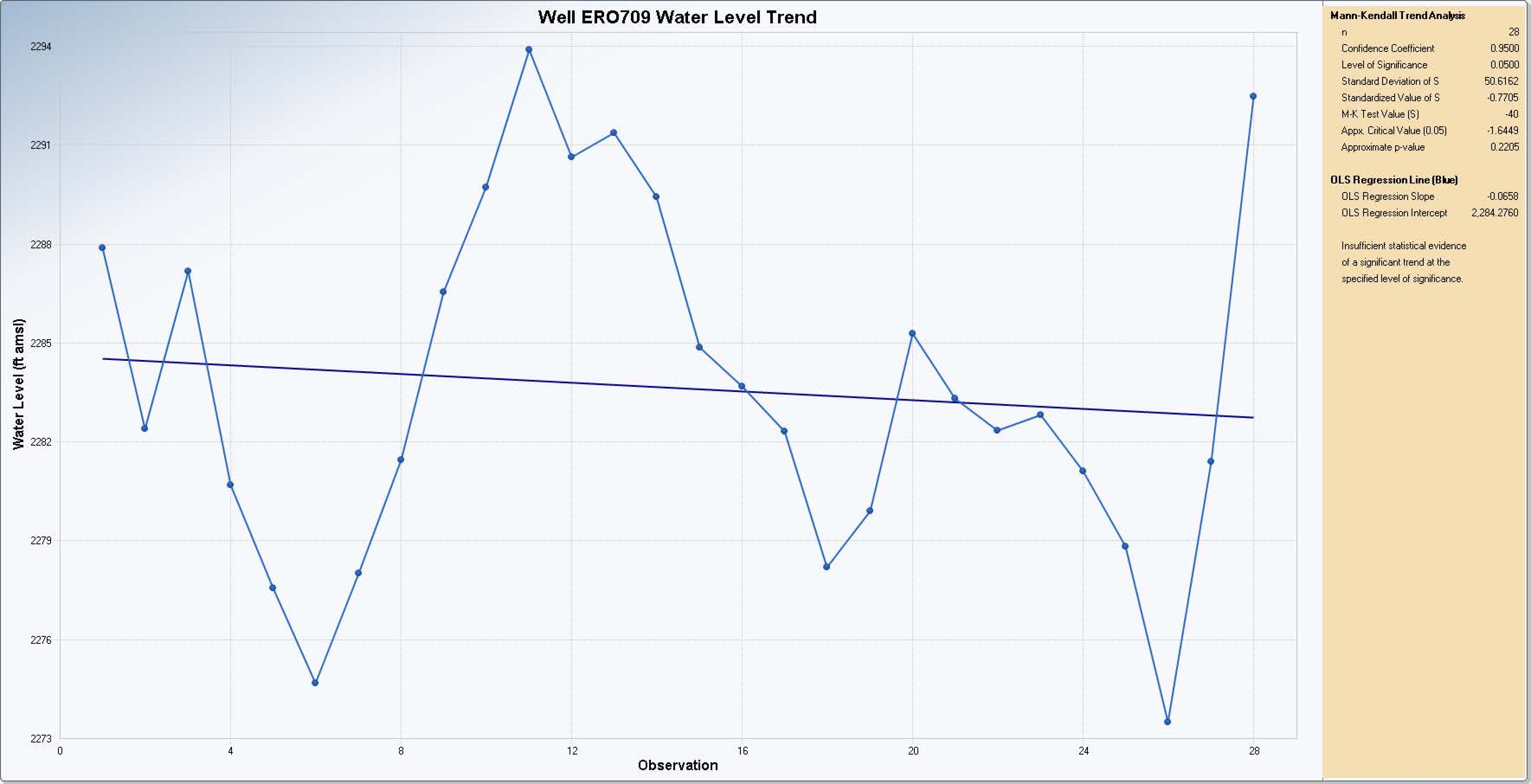
n	32
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	61.6658
Standardized Value of S	-0.7946
M-K Test Value (S)	-50
Appx. Critical Value (0.05)	-1.6449
Approximate p-value	0.2134

OLS Regression Line (Blue)

OLS Regression Slope	0.0083
OLS Regression Intercept	2,240.8659

Insufficient statistical evidence of a significant trend at the specified level of significance.


Well ERO708 Water Level Trend
Water Level (ft amsl)
2289
2286
2283
2280
2277
2274
Observation
0
4
8
12
16
20
24
28
Mann-Kendall Trend Analysis
n 29
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 53.3104
Standardized Value of S -1.0692
M-K Test Value (S) -58
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.1425
OLS Regression Line (Blue)
OLS Regression Slope -0.0788
OLS Regression Intercept 2,284.2717
Insufficient statistical evidence
of a significant trend at the
specified level of significance.



Well ERO709 Water Level Trend
Water Level (ft amsl)
2294
2291
2288
2285
2282
2279
2276
2273
0
4
8
12
16
20
24
28
Observation
Mann-Kendall Trend Analysis
n 28
Confidence Coefficient 0.9500
Level of Significance 0.0500
Standard Deviation of S 50.6162
Standardized Value of S -0.7705
M-K Test Value (S) -40
Appx. Critical Value (0.05) -1.6449
Approximate p-value 0.2205
OLS Regression Line (Blue)
OLS Regression Slope -0.0658
OLS Regression Intercept 2,284.2760
Insufficient statistical evidence of a significant trend at the specified level of significance.

APPENDIX B
GeoEngineers 2021 Trend Summary Table

Table 1

All-Well Data Summary

Groundwater Level Data Review

Lincoln County, Washington

Well ID	Well Depth (feet)	Initial Water Level (feet amsl)	Initial Water Level Date	Final Water Level (feet amsl)	Final Water Level Date	Water Level Change (feet)	Annual Change Rate (feet/year)	Pumping Effects Apparent
AAL726	284	2124.3	4/26/2019	2125.1	4/21/2021	0.8	0.4	x
AAN570	290	1874.7	4/30/2019	1868.7	4/15/2021	-6.0	-3.0	x
ABR561	375	2178.0	4/6/2011	2176.0	4/21/2021	-2.0	-0.2	x
ABR564 1979-1989	660	1504.0	3/8/1979	1492.0	3/29/1989	-12.0	-1.2	
ABR564 2012-2021	660	1476.2	2/15/2012	1441.4	4/7/2021	-34.8	-3.5	x
ABR763	452	2360.5	4/20/2011	2371.5	4/26/2021	11.1	1.1	x
ABR822	300	2469.4	4/20/2011	2465.5	4/26/2021	-3.9	-0.4	
ACC371		2161.8	4/26/2019	2162.1	4/21/2021	0.3	0.1	
ACC372	105	2151.1	4/26/2019	2149.5	4/21/2021	-1.6	-0.8	x
ACW391 2011-2015	80	2413.0	2/22/2011	2410.3	2/25/2015	-2.7	-0.7	x
ACW391 2019-2021	80	2418.2	4/16/2019	2415.8	4/29/2021	-2.4	-1.2	x
AFA197 2011-2015	180	2331.8	4/12/2011	2318.9	4/29/2015	-12.9	-3.2	
AFA197 2019-2021	180	2342.6	4/24/2019	2326.9	4/26/2021	-15.7	-7.8	x
AGG056	178	1950.6	4/24/2019	1949.0	4/21/2021	-1.6	-0.8	x
AHC420	300	1369.7	1/19/2010	1360.1	4/12/2021	-9.6	-1.0	x
AHJ464	397	1480.5	4/30/2019	1443.3	4/26/2021	-37.2	-18.6	x
AHP752	1615	1519.4	12/21/1967	1282.3	3/4/2021	-237.1	-4.5	x
AHP783	2430	1165.6	4/9/2019	1151.8	3/4/2021	-13.8	-6.9	x
AK0215	236	1326.7	4/23/2019	1321.7	4/12/2021	-5.0	-2.5	x
Almira #4	377	1715.2	11/8/2018	1709.5	10/15/2020	-5.7	-2.9	x
ALN853 2010-2015	680	1520.1	3/8/2010	1511.5	2/24/2015	-8.6	-1.7	
ALN853 2019-2021	680	1521.7	4/1/2019	1518.9	4/15/2021	-2.8	-1.4	x
ALR010	350	2174.7	7/19/2018	2171.8	4/21/2021	-2.9	-1.4	x
APC864 2011-2015	178	2338.6	3/24/2011	2332.5	4/30/2015	-6.1	-1.5	
APC864 2019-2021	178	2342.6	4/18/2019	2336.7	4/29/2021	-5.9	-0.6	x
APC865 2010-2015	404	1300.6	3/9/2010	1260.0	3/11/2015	-40.6	-8.1	
APC865 2019-2021	404	1299.2	4/23/2019	1311.0	4/12/2021	11.8	5.9	x
APP832		2328.6	10/23/2019	2329.3	4/15/2021	0.7	0.4	x
APP839	300	2214.3	3/8/2010	2190.6	4/15/2021	-23.7	-2.2	x
APP846	120	2273.7	4/28/2020	2272.5	4/15/2021	-1.2	-1.2	x
APP847	100	2298.0	4/18/2019	2293.1	4/15/2021	-4.9	-2.5	x
APP852	260	2349.4	4/26/2019	2343.6	4/21/2021	-5.8	-2.9	x
APQ806 2010-2015	420	1966.4	4/20/2010	1953.9	2/24/2015	-12.5	-2.5	
APQ806 2019-2021	420	1972.9	4/18/2019	1970.9	4/15/2021	-2.0	-1.0	x
APQ847	235	1273.9	4/22/2019	1272.7	4/30/2021	-1.2	-0.6	
BAC848	205	2200.8	4/13/2011	2168.0	4/21/2021	-32.8	-3.3	x
BAC970 2010-2015	242	2328.1	4/27/2010	2326.7	4/30/2015	-1.4	-0.3	
BAC970 2019-2021	242	2337.0	4/18/2019	2334.7	4/29/2021	-2.3	-0.2	
BAS270		1919.1	11/2/2018	1919.3	11/19/2020	0.2	0.1	
BHL934	396	1289.8	7/13/2018	1289.6	7/21/2020	-0.2	-0.1	
BHL935	375	1290.3	7/13/2018	1290.9	7/21/2020	0.6	0.3	
BHP252		1884.9	4/23/2019	1880.3	4/12/2021	-4.6	-0.7	x
BIO441		1680.4	4/28/2020	1672.1	11/20/2020	-8.3	-8.3	
BIO676		2119.0	5/31/2019	2116.2	4/28/2020	-2.8	-2.8	

Well ID	Well Depth (feet)	Initial Water Level (feet amsl)	Initial Water Level Date	Final Water Level (feet amsl)	Final Water Level Date	Water Level Change (feet)	Annual Change Rate (feet/year)	Pumping Effects Apparent
BIO682	300	1614.4	4/30/2019	1614.7	4/26/2021	0.3	0.1	x
BIU506	140	1684.8	3/11/2017	1683.3	4/3/2021	-1.5	-0.3	x
BIU541	160	1927.7	4/24/2019	1926.7	4/21/2021	-1.0	-0.5	x
BIU542	120	1929.7	11/2/2018	1929.9	11/19/2020	0.2	0.1	x
BIX719	390	2064.6	4/18/2019	2061.0	4/15/2021	-3.6	-3.6	x
Coffeepot Domestic		1838.1	4/17/2019	1837.6	4/16/2020	-0.5	-0.5	
Creston North	766	2268.2	2/3/2012	2279.4	4/21/2020	11.2	1.4	
Douglas Rd Irr		2209.3	3/28/2010	2210.6	4/12/2021	1.3	0.1	x
ER0266 2011-2017	200	1555.6	3/31/2011	1549.8	3/27/2017	-5.8	-1.0	
ER0266 2018-2021	200	1523.1	4/26/2018	1510.5	3/4/2021	-12.6	-4.2	x
ER0269 1968-1984	595	1418.5	3/12/1968	1288.0	4/2/1984	-130.5	-8.2	
ER0269 2012-2021	595	1319.2	2/15/2012	1278.2	4/7/2021	-41.0	-4.6	x
ER0274	722	1518.0	3/12/1969	1325.8	3/4/2021	-192.2	-3.7	x
ER0276 1968-1995	737	1545.4	3/8/1968	1505.6	3/2/1995	-39.8	-1.5	
ER0276 2016-2021	737	1574.8	3/24/2016	1521.2	3/4/2021	-53.6	-10.7	x
ER0332 1998-2017	682	1757.1	3/24/1998	1695.9	3/27/2017	-61.2	-3.2	
ER0332 2019-2021	682	1737.5	3/12/2020	1732.9	3/5/2021	-4.6	-2.3	
ER0398	300	2151.0	3/13/1983	2139.5	3/2/2021	-11.5	-0.3	x
ER0426 2004-2016	320	2221.7	3/29/2004	2218.3	4/14/2016	-3.4	-0.3	
ER0426 2019-2021	320	2249.3	4/11/2019	2240.0	3/5/2021	-9.3	-4.7	x
ER0441 1999-2015	360	2295.9	3/25/1999	2289.0	2/5/2015	-6.9	-0.4	
ER0441 2019-2021	360	2302.6	4/16/2019	2299.5	3/2/2021	-3.1	-0.1	
ER0445 1972-2002	450	2335.0	3/16/1972	2266.8	4/4/2002	-68.2	-2.3	
ER0445 2017-2021	450	2261.1	4/13/2017	2230.7	4/6/2021	-30.4	-7.6	x
ER0446 1974-1995	400	2348.0	2/19/1974	2328.8	3/24/1995	-19.2	-0.9	
ER0446 1995-2004	400	2328.8	3/24/1995	2139.1	3/25/2004	-189.7	-21.1	
ER0446 2019-2021	400	2343.2	4/24/2019	2322.2	4/6/2021	-21.0	-10.5	x
ER0450 1980-2017	610	2249.8	3/25/1980	2189.6	4/13/2017	-60.2	-1.6	
ER0450 2019-2021	610	2249.1	4/11/2019	2241.0	3/5/2021	-8.1	-4.0	x
ER0453	900	1959.3	3/29/1978	1833.8	3/5/2021	-125.5	-2.9	x
ER0454	635	1891.4	3/7/1984	1773.8	3/5/2021	-117.6	-3.2	x
ER0463 1978-1993	635	1641.0	3/29/1978	1594.7	4/8/1993	-46.3	-3.1	
ER0463 1998-2016	635	1789.5	3/25/1998	1687.8	4/14/2016	-101.7	-5.7	x
ER0463 2018-2021	635	1693.6	4/26/2018	1682.0	3/5/2021	-11.6	-3.9	
ER0464	1653	1831.2	3/29/1978	1780.3	3/12/2021	-50.9	-1.2	x
ER0674	4525	1373.6	3/16/1973	1154.1	4/7/2021	-219.5	-4.7	
ER0688	750	1490.8	3/16/1973	1415.3	3/5/2021	-75.5	-1.5	
ER0706	352	2216.3	12/1/1983	2203.2	11/24/2020	-13.1	-0.4	x
ER0709	116	2292.2	4/27/2017	2282.6	4/20/2021	-9.6	-2.4	x
ER0782		2191.2	4/3/2018	2182.3	4/20/2021	-8.9	-2.2	x
Fisher Rd Old		1327.8	6/26/2018	1333.0	4/26/2021	5.2	1.7	
Harrington #1	300	2123.0	4/26/2019	2122.1	4/21/2021	-0.9	-0.5	x
IAN1991	168	1283.6	4/11/2013	1275.4	3/3/2021	-8.2	-1.0	x
Irby Rd Irre	500	1301.9	3/11/2011	1297.4	3/9/2020	-4.5	-0.5	
Kagele Rd 24 Irr	650	1257.8	4/17/2019	1254.3	4/7/2021	-3.5	-1.8	x
Kagele Rd 36 Irr		1207.7	4/17/2019	1199.6	3/4/2021	-8.1	-4.1	x
Lake Rd Dom	270	2055.5	10/26/2018	2055.5	11/19/2020	0.0	0.0	
NEL1968 2010-2015	240	1509.8	3/16/2010	1501.2	4/30/2015	-8.6	-1.7	
NEL1968 2019-2021	240	1545.8	4/18/2019	1527.1	4/29/2021	-18.7	-9.4	
ROY1991	178	1288.8	4/22/2010	1278.2	4/28/2021	-10.6	-1.1	x
SCH1992 2010-2015	125	2498.7	6/10/2010	2491.4	6/8/2015	-7.3	-1.5	
SCH1992 2019-2021	125	2505.5	4/30/2019	2497.6	4/26/2021	-7.9	-4.0	
Schlimmer Rd Irr	1200	1293.9	3/5/2012	1278.3	3/5/2021	-15.6	-1.7	x
Sprague #4	500	1882.1	4/13/2011	1891.5	11/19/2020	9.4	1.0	
STI1987	78	2416.7	4/16/2019	2414.0	4/29/2021	-2.7	-1.3	x
Sunny Hills	150	1292.4	7/13/2018	1292.2	7/9/2020	-0.2	-0.1	
Wilbur #3	294	2160.2	2/3/2012	2083.4	4/21/2020	-76.8	-9.6	x

Notes:

amsl - feet above mean sea level

APPENDIX C
Field Form

Project: Well Level Assessment for the NE Lincoln County Groundwater Study (Revised 09/20/2022)

GPS elevation (ft. amsl):		Start Time:		End Time: (Optional)	
Weather:			Well Name:		
Well ID:		Well Tag:		Well Depth	
Surface Casing Diameter (in.):	Date Drilled:	SWL (ft.), Drilled:		PVC Liner?	
Well Location (Lat/Long decimal degrees to 5 digits):	Lat N:	Long W:		EPE: WP:	
GPS elevation (ft. amsl):		GPS Topo Map or Google Earth Elev ft.			
Measured by:		Well Pump Running?			
Transducer: Yes No	Serial #:	**Tranducer Measurement:**		**Pump Intake Depth:**	
Other Measurement Type (circle):	E-tape		Sonic Meter	Airline	
Other Measurement Instument ID (circle):	Solinst 101, P6, M2	Solinst 102, P10, M2	Ravensgate 200U RC	Weiss Solar Metrix	Other
Measuring Point Height (feet):	Above Ground Below Ground		Where Measured:		
Airline Length (Feet):	Length Source:			Airline Kind:	
Airline Measurement	Max Air Blow:	Air Blow (twice):	Valve Off (twice):		
Well PSI Gauge? Direct SWL ft. Gauge?			Well Gauge PSI or Feet:		
Final Pressure Reading (psi):			Time:		
Final Pressure Reading x 2.31 (ft/psi) = height of water column:					
Airline length - height of water column = water level below measuring point:				*Previous Depth(s):*	
E-Tape Measurement		Cascading Water?			
Depth to water (feet below measuring point):			Time:	*Previous Depth(s):*	
Sonic Measurement	Temp, Region:	____ ˚F 7, 8, 9	Gain: (circle) Variable Fixed	Mode: (circle)	Normal Deep
Depth to water (feet below measuring point):			Time:	*Previous Depth(s):*	

Notes: