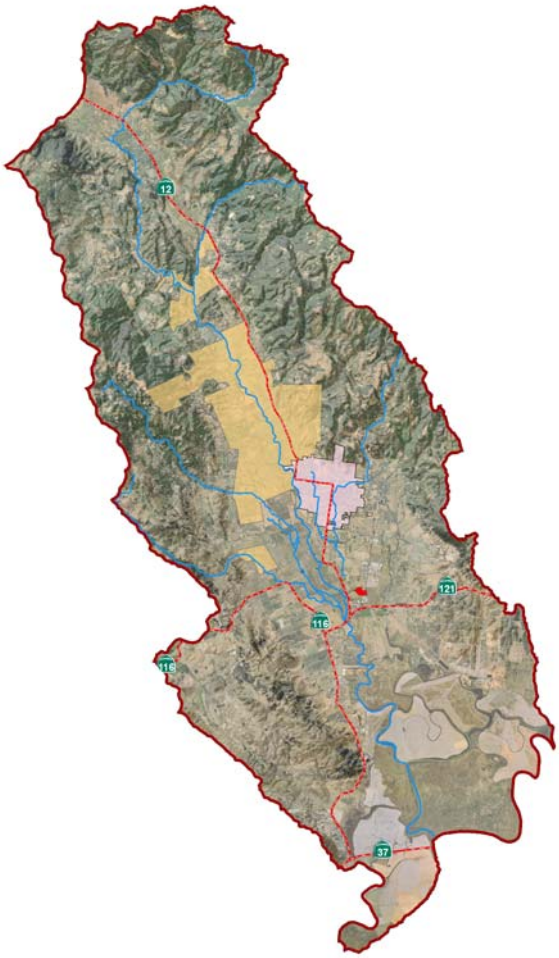
2008 Annual Report
Sonoma Valley
Groundwater Management Program



Sonoma County Water Agency

March 2009

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EXECUTIVE SUMMARY

This report provides a summary of the progress and results of the first year of implementation of the voluntary, non-regulatory Sonoma Valley Groundwater Management Program (GMP) and presents a summary of proposed activities for 2009.

Groundwater resources have long played a significant role in the development, growth and sustainability of the Sonoma Valley, with more than half the water demand in a given year met by local groundwater resources. With increasing demand on local groundwater supplies, declines in the amount of groundwater in storage in the Sonoma Valley may continue, unless appropriate actions are taken in the near future. To help balance increasing demand with finite supplies, the GMP identifies a range of water management options, including groundwater recharge projects and increasing water conservation and water use efficiency.

The GMP is being implemented under the Sonoma Valley Groundwater Management Plan (Plan), which was developed in 2007 in coordination with the Sonoma County Water Agency (Agency), the Valley of the Moon Water District (VOMWD), and City of Sonoma (City) through a collaborative and cooperative process that also included a broad range of local stakeholders, including representatives from the agricultural community, dairies, government, business, environmental stewardship groups, and private well owners. These stakeholders have continued their involvement in the GMP through ongoing participation on the Basin Advisory Panel (Panel) that meets quarterly, and through a Technical Advisory Committee (TAC) that meets monthly, providing guidance on the implementation of the GMP. Implementation of the GMP has been structured to encourage an open, collaborative and cooperative process for groundwater management activities and to maximize coordination of the many actions envisioned by the Panel. The elements of the Sonoma Valley GMP, including Basin Management Objectives (BMOs), have been grouped into five Plan Component Actions (shown on Figure ES-1) which collectively are designed to attain the stated goal of the GMP, which is:

> "***to locally manage, protect, and enhance groundwater resources for all beneficial uses, in a sustainable, environmentally sound, economical, and equitable manner for generations to come"***.

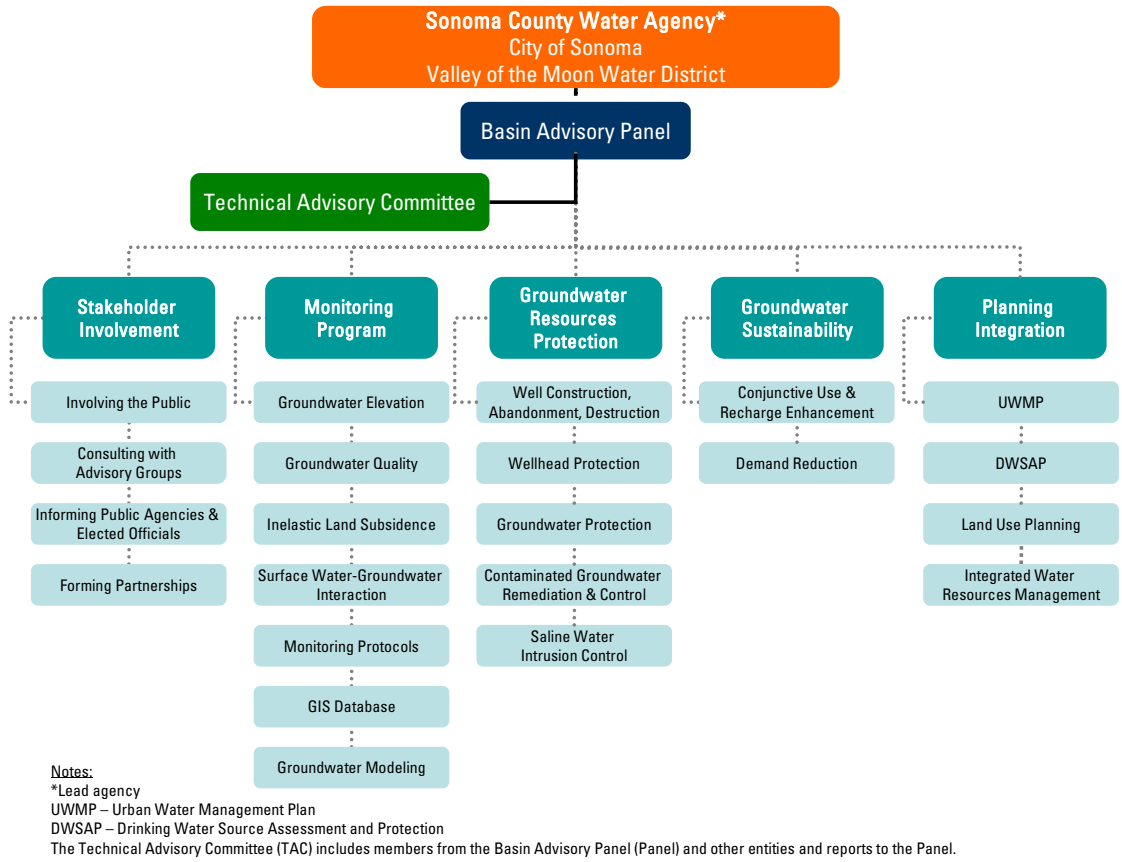

Figure ES-1. Plan Action Implementation Organizational Chart

2008 GMP Progress

Substantial progress has been achieved during the first year of implementation of the GMP. Activities performed in support of the GMP in 2008 have addressed each of the five Plan Component Actions, as summarized below.

- Stakeholder Involvement:
  - Developed and implemented a public outreach plan for GMP implementation;
  - Conducted outreach and briefings including quarterly Panel meetings, monthly TAC meetings, several targeted briefings, and focused outreach for expanding the monitoring network with additional volunteer wells;
  - Communicated meeting announcements and supporting materials in advance to stakeholders, provided periodic informational newsletters and progress reports, developed and distributed fact sheets, maintained email distribution lists of stakeholders, and developed a project website; and
  - Developed media relationships and worked with local media to provide press releases on key events and milestones for the GMP.
- Monitoring Program:
  - Developed a sampling and analysis plan for groundwater monitoring;
  - Performed coordinated groundwater level monitoring in the spring and fall 2008;
  - Expanded the groundwater level monitoring network to include 41 additional volunteer wells;

  - Adopted WebH2O as the GMP data management system;
  - Obtained a total of $250,000 in AB303 grant funds, a portion of which will be used to install two new multi-depth monitoring wells; and
  - Installed a new stream gauge on Sonoma Creek in the north end of Sonoma Valley.
- Groundwater Quality Protection:

The two new multi-depth monitoring wells have been designed and located to further characterize and monitor water quality issues in southern Sonoma Valley, including salinity issues.

- Improve Groundwater Sustainability:
  - A portion of the AB303 funding will be used to develop an updated map of groundwater recharge areas in Sonoma Valley; and
  - Obtained $25,000 in grant funds from North Bay Watershed Association for a pilot program to evaluate water use and conservation in areas in Sonoma Valley outside of the VOMWD and City service areas.
- Planning Integration:

Regular meetings of local stakeholders and government agencies associated with implementing the GMP in 2008 have been used for forums for planning and program integration.

2008 Groundwater Monitoring Results

The results of monitoring performed in 2008 indicate the following:

- Groundwater flows down the valley to the south generally mimicking the topography, with a higher flow gradient in the north valley (0.01 feet per foot), and a relatively flat gradient in the south (0.005 feet per foot);
- Two primary groundwater pumping depressions have remained prevalent over the past 5 to 10 years where localized groundwater levels are below sea level
  - Southeast of the City
  - Southwest of El Verano
- Some wells in localized areas have exhibited sustained declining trends of up to two feet per year; and
- Additional wells for the purpose of long-term monitoring are required across the valley to better understand and track groundwater level trends.

Management Actions and Progress on BMOs

The above-described activities have resulted in good progress in the first year of the GMP towards meeting the BMOs.

2009 GMP Proposed Activities

Activities proposed for continuing implementation of the GMP in 2009 include the following elements:

- Stakeholder involvement will continue to provide the foundation for implementing the GMP through the following activities:
  - Continuing regular BAP and TAC meetings, and outreach and briefings of stakeholder groups on GMP progress and activities; and
  - Working with local media to provide press releases on key events and milestones

- Continuation of the development and expansion of the Monitoring Program will further assist in filling key data gaps. Programs planned to address this component include:
  - Perform coordinated semiannual groundwater level monitoring and expand the monitoring network to include more volunteer wells;
  - Encourage greater utilization of WebH2O as the GMP data management system through focused participant training; and
  - Install and monitor the two new multi-depth monitoring wells.
- The following Groundwater Quality Protection activities will identify and help address potential water quality issues:
  - Develop a well owners guide and distribute to private well owners;
  - Develop a cooperative long-term groundwater quality monitoring program using existing data collection efforts by water purveyors, mutual water companies, and small distribution systems; and
  - Incorporate California Department of Public Health (CDPH) data into the data base and enlist additional private well owners to provide WQ testing data.
- Groundwater Sustainability efforts will improve conservation efforts in Sonoma Valley and will endeavor to identify groundwater recharge areas for future recharge planning through the following activities:
  - Conduct groundwater recharge mapping under AB303 grant funds; and
  - Conduct water use assessments to evaluate water use and conservation in the unincorporated areas of the valley under grant funds from North Bay Watershed Association.
  - Conjunctive Use/Groundwater Banking Feasibility Study to assess options to optimize the use of wet year and seasonally wet years supplies.

Depending upon the availability of funding, additional 2009 activities could include investigating the feasibility and opportunities for groundwater banking projects, improvements to the groundwater flow model, and development of a pilot project for stormwater capture and recharge. Planning Integration will provide opportunities for developing additional plans and mechanisms for sustaining Sonoma Valley's groundwater resources.

2009 GMP Funding

Program staffing and management will continue to be funded collectively by the Agency, City, VOMWD, Sonoma County, and Sonoma Valley County Sanitation District. A substantial number of additional activities will continue to be conducted through the voluntary time of Panel members, TAC members, and volunteer monitors. Due to economic uncertainties and other budgetary constraints, it is apparent that 2009 will be a challenging year in terms of program funding. Nevertheless, additional outside funding opportunities, such as state grants under AB303, will need to be obtained for some of the proposed activities.

Table of Contents

List of Figures

List of Tables

1. Introduction

This 2008 Annual Report presents an update on the progress of the Sonoma Valley Groundwater Management Program (GMP) during 2008. The Sonoma Valley GMP is being implemented in accordance with the Sonoma Valley Groundwater Management Plan (Plan), which was completed in 2007 by a broad coalition of local stakeholders. The Plan was prepared to inform and guide the Sonoma County Water Agency (Agency), as the lead agency, as well as stakeholders and other interested parties for the purpose of maintaining a sustainable, high-quality groundwater resource for the users of the groundwater basin underlying the Sonoma Valley (Figure 1-1).

This report covers the first year of implementation of the Sonoma Valley GMP and is organized as follows:

- Section 1 provides the purpose of this annual report and background information on the Plan, including the GMP organization and structure;
- Section 2 presents a summary of activities conducted in 2008;
- Section 3 provides an update on the Sonoma Valley hydrologic conditions;
- Section 4 presents an assessment of 2008 GMP activities relative to the basin management objectives (BMOs); and
- Section 5 provides an overview of GMP activities planned for 2009.

1.1 Purpose of the Annual Report

The purpose of this Annual Report is: (1) to summarize and document the activities conducted and accomplishments achieved in 2008; (2) to provide an overview of groundwater conditions and monitoring results during 2008; (3) to assess whether management activities are achieving BMOs; and (4) to present a summary of planned future management activities. This Annual Report is also intended to be a tool for updating and obtaining feedback from stakeholder constituency groups and other interested parties on various aspects of the Sonoma Valley GMP, including the progress made to date on Plan implementation and plans for the future.

1.2 Overview of Sonoma Valley Groundwater Management Plan

1.2.1. Description of Plan Area

The area subject to the Plan and GMP is shown in Figure 1-1, and lies within the San Francisco Bay Hydrologic Region. The GMP area encompasses the Sonoma Creek Watershed and includes the Sonoma Valley and the southern portion of the Kenwood Valley, designated basins 2-2.02 and 2-19, respectively, as determined by the California Department of Water Resources (DWR). For the purposes of this report, the GMP Area is referred to as the Sonoma Valley and includes the communities of Kenwood, the southern portion of Oakmont, Glen Ellen, Boyes Hot Springs, and the City of Sonoma.

D:\Projects\Sonoma\GIS\MXDs\0901_GMP Annual Report\Figure 1-1 Sonoma Valley Groundwater Management Program Area_8x11.mxd

Sonoma Valley
Groundwater Management Program 2008 Annual Report
Sonoma Valley Groundwater Management Program Area

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Figure 1-1

1.2.2. Background of Plan

Groundwater resources have long played a significant role in the development, growth and sustainability of the Sonoma Valley, with more than half the water demand in a given year met by local groundwater resources. With increasing demand on local groundwater supplies, the overall decline in groundwater storage in the Sonoma Valley may continue unless appropriate actions are taken in the near future. In response, a collaborative group of twenty stakeholders, representing varied groundwater interests, developed a groundwater management plan for the Sonoma Valley. The Plan identifies a range of water management options, including groundwater recharge and greater conservation, to help balance the demands with the supplies.

The Plan was prepared under the authority of the Groundwater Management Act, California Water Code (Water Code) § 10750 *et seq.*, originally enacted as Assembly Bill (AB) 3030 in 1992 to encourage voluntary, non-regulatory groundwater management at the local level. The legislation also provides encouragement for local public agencies to work cooperatively towards groundwater management and to adopt formal plans to manage groundwater resources. Furthermore, in 2002, the passage of Senate Bill (SB) 1938 mandated that all water agencies adopt or participate in a groundwater management plan to be eligible for state funds for groundwater supply and groundwater quality projects.

1.2.3. Lead Agency, Basin Advisory Panel and Technical Advisory Committee

The Plan was developed in coordination with the Agency, the Valley of the Moon Water District (VOMWD) and the City of Sonoma (City) under a collaborative and cooperative process that included a broad range of 20 stakeholders participating on the Basin Advisory Panel (Panel). The Panel consists of representatives from local agriculture, dairies, government, business and environmental interests, and domestic well users. Beginning in August 2006, the Panel developed the non-regulatory Plan, which was adopted by the Agency, City, VOMWD, and the Sonoma Valley County Sanitation District in late 2007. Additionally, letters of support and endorsement for the Plan were received from the Sonoma Valley Vintners & Growers Alliance, the Sonoma Ecology Center, the Mission Highlands Mutual Water Company, and the Sonoma County Water Coalition.

The Agency is the lead agency and is responsible for managing GMP activities and progress. The lead agency directs and is responsible for all GMP studies, projects, and programs it directly or indirectly finances. The lead agency coordinates with Sonoma Valley stakeholders through the Panel, who provide input and direction to the lead agency in implementing the GMP. The VOMWD and the City, in coordination with the lead agency and the Panel, undertake actions identified in the Plan. In addition, a Technical Advisory Committee (TAC) provides technical support to the Panel and the Agency.

1.2.4. GMP Goal, Basin Management Objectives, Management Components and Actions

The stated goal of the Sonoma Valley GMP, as presented in the Plan is:

> *To locally manage, protect, and enhance groundwater resources for all beneficial uses in a sustainable, environmentally sound, economical, and equitable manner for generations to come.*

The purpose of the GMP is to serve as the initial framework for integrating the many independent groundwater management activities to meet this goal. An additional purpose of this GMP is to be in conformance with Water Code § 10750 *et seq.*

As part of the Plan, Basin Management Objectives (BMOs) were developed by the Panel to provide measurable and verifiable accomplishments for meeting the overall goal of the Plan. The following ten BMOs provide the foundation for achieving the Plan's goal:

- BMO-1 Maintain groundwater elevations for the support of beneficial uses of groundwater and to protect against inelastic land subsidence.
- BMO-2 Improve water use efficiency and conservation.
- BMO-3 Identify and protect groundwater recharge areas and enhance the recharge of groundwater where appropriate.
- BMO-4 Manage groundwater in conjunction with other water sources.
- BMO-5 Protect groundwater quality for beneficial uses including minimizing saline intrusion.
- BMO-6 Protect against adverse interactions between groundwater and surface water flows.
- BMO-7 Improve the community's awareness of groundwater planning, water resources, and legal issues.
- BMO-8 Improve the groundwater database and basin understanding through consistent monitoring and additional surveys, and improve basin analytical tools including the groundwater simulation model.
- BMO-9 Manage groundwater with local control.
- BMO-10 Explore, identify and maximize non-regulatory approaches to manage the groundwater resource.

The Plan includes a variety of components that are required by Water Code § 10753.7, recommended in DWR Bulletin 118 California's Groundwater (DWR 2003), and identified as optional programs under Water Code § 10753.8. It also includes groundwater management elements that were already in place. These components are grouped into five general categories termed Plan Component Actions:

1. Stakeholder Involvement
2. Monitoring Program
3. Groundwater Resource Protection
4. Groundwater Sustainability
5. Planning Integration

Management actions for each Plan Component Action form the foundation for meeting the BMOs and goal. Management actions, management components, and the Sonoma Valley GMP organization are illustrated in Figure 1-2. Details on the GMP actions are provided in the Plan, which is available for review at www.scwa.ca.gov/projects/svgroundwater/management_plan.php. For further information, contact Marcus Trotta, SCWA (707) 547-1978, mtrotta@scwa.ca.gov.

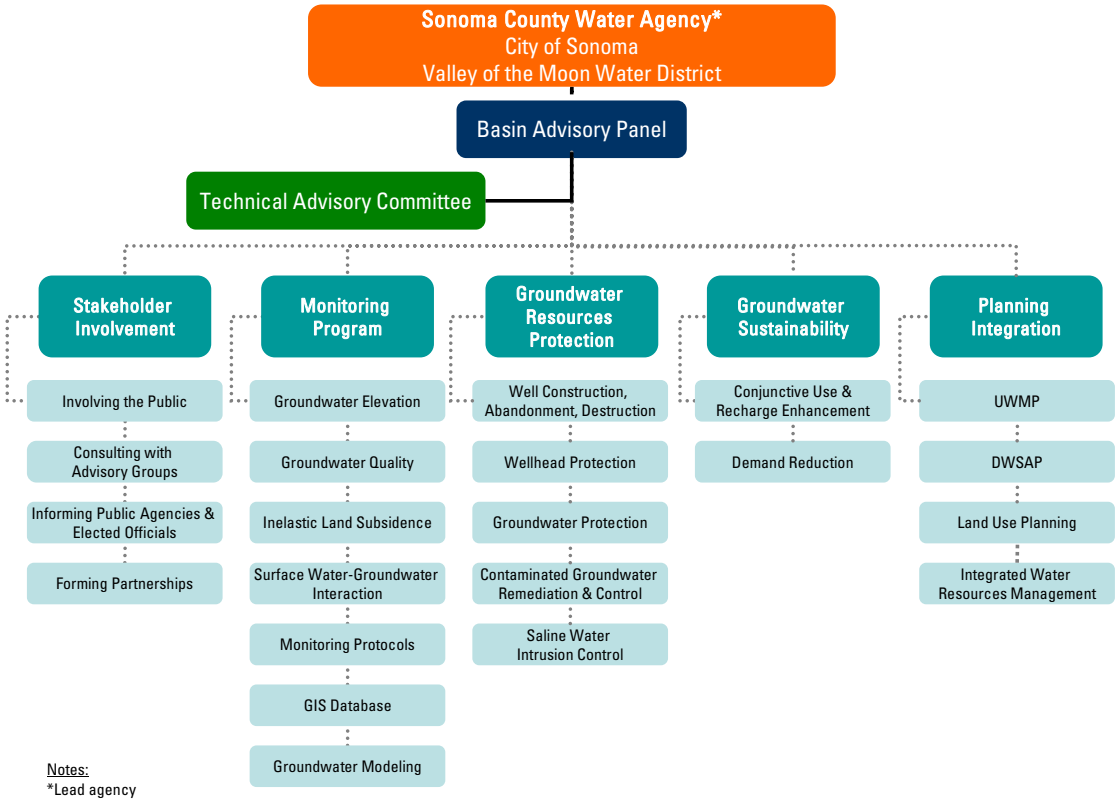


Figure 1-2 Groundwater Management Program Implementation Organization Chart

2. 2008 Sonoma Valley Groundwater Management Program Activities and Progress

This section presents a summary of Sonoma Valley GMP activities conducted and accomplishments achieved in 2008. These activities are grouped and described according to the five Plan Component Actions described in Section 1.2.4, above.

2.1 Component 1 - Stakeholder Involvement

Active stakeholder involvement forms the foundation for a continued, successful collaborative process of decision-making and actions during GMP implementation. Stakeholders interests represented on the Panel include economic, agricultural, environmental, local agencies with jurisdiction in Sonoma Valley, land use, residential groundwater users, and special districts with a broad geographic distribution across the Sonoma Valley.

Key tasks in this Plan component completed during 2008 are summarized below.

- **Development of a public outreach plan for GMP implementation**
  A public outreach plan was developed by Center for Collaborative Policy to guide the process by which stakeholders stay informed about and provide input on the implementation of the GMP, share information, and demonstrate progress in GMP implementation. The outreach plan, which was implemented in 2008, addresses outreach and briefings, communications, and media activities.
- **Outreach and briefings** - Quarterly Panel meetings, monthly TAC meetings, several targeted briefings, and focused outreach for expanding the monitoring network with additional volunteer wells were conducted in 2008. Several subgroups of the TAC were also established, including the monitoring work group and funding work group and several meetings were conducted.
- **Communications** - Communications include sending out meeting announcements and supporting materials in advance to stakeholders, providing periodic informational newsletters and progress reports, and fact sheets, maintaining email distribution lists of stakeholders, and developing and updating a website on the Sonoma Valley GMP (http://sonomacountywater.org/projects/svgroundwater/).
- **Media** – GMP staff, Panel members, and local stakeholders developed relationships and worked with local media to provide press releases on key events and milestones for the GMP.
- **Facilitation.** The GMP meetings and stakeholder involvement effort continued to be facilitated by the Center for Collaborative Policy in 2008 through funding provided by the DWR.

2.2 Component 2 - Monitoring Program

The long-term groundwater monitoring program for the GMP was developed and expanded in 2008. The monitoring program was formed from previously existing groundwater monitoring programs in Sonoma Valley, comprising a total of 56 wells monitored by DWR (10 wells as of 2007), the City (12 wells as of 2007), and VOMWD

(34 wells as of 2007). An additional 41 wells were added to the volunteer monitoring program in 2008 for a total of 97 wells.

The groundwater monitoring program is a critically important component of the GMP and serves as a foundation to develop and improve decision-analysis tools, such as the Sonoma Valley groundwater model, used to forecast trends and guide the design, implementation and monitoring of groundwater management and protection programs. The purpose of the monitoring program is to provide information to sustainably manage the Sonoma Valley groundwater basin, including trends in groundwater elevations and quality, and to provide information necessary to predict responses of the groundwater basin to possible future management actions. The monitoring data will be evaluated on an annual basis to explore basin trends, to periodically update and improve the monitoring program, and to guide decisions on water management strategies.

2.2.1. Developed and Implemented Monitoring Protocols and Expanded the Monitoring Network

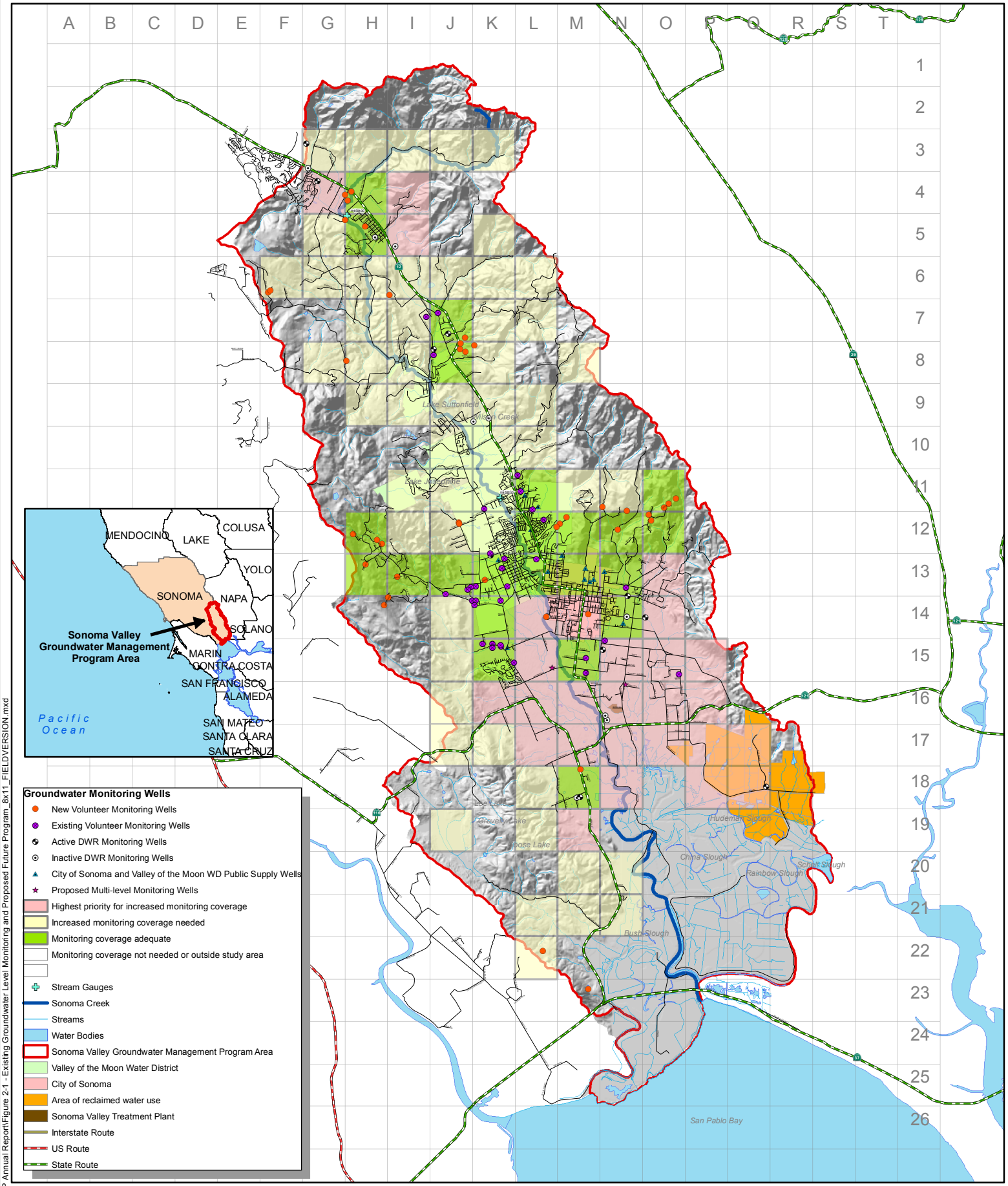
Several actions, as summarized below, have been completed to develop, focus and expand groundwater monitoring efforts in the Sonoma Valley.

- **Developed sampling and analysis plan (SAP) for monitoring well data collection.** The SAP was developed to establish monitoring protocols to ensure the adequacy and consistency of data collected, and to provide a framework and format for data collection and maintenance. The SAP includes information on the current monitoring network and identifies areas where additional wells are needed, data quality objectives, sampling and analysis procedures, quality assurance/quality control, data management and reporting. The SAP also includes a standard operating procedure for water level measurements and equipment sanitization.
- **Expanded the groundwater monitoring network**
  Outreach efforts have resulted in the addition of 41 voluntary wells to the existing monitoring network, most of which were measured for water levels during the fall 2008 monitoring event (See Figure 2-1).

2.2.2. Coordinated Groundwater Level Data Collection

The coordination of groundwater level data collection was initiated at the beginning of 2008. The coordinated monitoring allows for contemporaneous groundwater level data to be collected and evaluated throughout Sonoma Valley. The effort included the following actions:

- Coordinated groundwater monitoring events were performed twice in 2008, in April (spring monitoring event) and October/November (fall monitoring event) when the water table is typically at its highest and lowest, respectively.
- Measurements from the new wells added to the network in 2008 were predominantly limited to the fall 2008 monitoring event.
- The spring and fall groundwater level measurements were synchronized and coordinated to ensure data representing similar hydrologic conditions can be combined for use in evaluating Sonoma Valley groundwater conditions.



Sonoma Valley
Groundwater Management Program 2008 Annual Report
Groundwater Level Monitoring Network

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Figure 2-1

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- The groundwater monitoring events were conducted by DWR, the City, VOMWD, and trained private volunteers.

2.2.3. Developed Groundwater Data Management Tools

In 2008, WEBH2O, a web-hosted environmental information management system that combines database features with geographic information system (GIS) and technical analysis tools, was developed. This tool allows groundwater level data and other well information to be stored electronically in a secure web-based platform, where the data can be displayed and analyzed. WEBH2O is currently being utilized as the main repository for groundwater level data collected as part of the monitoring program.

2.2.4. Obtained Funding to Install Two New Wells

In late 2007, a grant application was prepared and submitted for AB303 funds through the California Department of Water Resources for constructing two new multi-depth groundwater monitoring wells in the southern Sonoma Valley to measure water levels and water quality. The $230,000 grant was awarded in late 2008.

2.2.5. Installed a New Stream Gage and Initiated Stream Gage Monitoring

A new stream gage was installed by the U.S. Geological Survey in coordination with the Agency in the north portion of Sonoma Valley along Sonoma Creek near Kenwood. The new stream gage will be used to collect stream flow data in the northern part of the valley and will be extremely useful in measuring surface water flows and facilitating the estimation of groundwater recharge and discharge characteristics.

2.3 Component 3 - Groundwater Quality Protection

Groundwater quality protection is a key factor to ensuring a sustainable groundwater resource in the Sonoma Valley. In the Plan, groundwater quality protection includes both the prevention and minimization of groundwater quality degradation, as well as measures for the mitigation of groundwater contamination. Prevention measures include proper well construction and destruction practices, development of wellhead protection measures, and source control of potential contaminants. The primary focus of 2008 work in this component was the control of saline intrusion.

The monitoring of potential saline intrusion within the southern portions of Sonoma Valley has been expanded with additional voluntary monitoring wells, and will be further augmented through the construction of the two multi-depth wells (described in Section 2.2.4 above).

2.4 Component 4 - Groundwater Sustainability

To ensure a long-term, viable, sustainable supply of groundwater, the GMP seeks to increase the amount of groundwater in storage in the Sonoma Valley over the long term. As part of the Plan analysis, several conceptual water management options were considered using the Sonoma Valley groundwater model developed by the U.S. Geological Survey including stormwater recharge, groundwater banking, increased recycled water use, and increased conservation. Results of the modeling indicate that

each of these water management options is necessary for increasing the amount of groundwater storage in Sonoma Valley.

To improve the sustainability of water resources in the Sonoma Valley, the Agency, VOMWD and the City have continued to pursue and investigate appropriate water management options that include additional surface water supplies, implementation of the California Urban Water Conservation Council (CUWCC) water conservation elements, conjunctive use opportunities, agricultural conservation and increased use of recycled water. Specific activities that were conducted in 2008 include focused recharge discussion at the TAC meetings and field visits to a number of possible recharge locations by TAC members.

2.4.1. Groundwater Recharge Mapping

In late 2007, a grant application was prepared and submitted for AB303 funds through the California Department of Water Resources for conducting recharge mapping using the existing GIS data management system constructed by compiled by the Sonoma Ecology Center, USGS, and the Agency . The $20,000 grant was awarded in late 2008.

2.4.2. Conservation & Demand Reduction

In 2008, a grant application was prepared and submitted for North Bay Watershed Association (NBWA) funds to support the GMP efforts to provide a scope of work for conducting a pilot program to evaluate water conservation programs for areas within the NBWA service area that currently do not have formal conservation programs (unincorporated areas). The $25,000 grant was awarded in late 2008.

The Panel members toured a graywater (i.e., water reuse) facility, which is the first legally permitted graywater system in Sonoma County, at a housing complex in Sebastopol and are now exploring the possibility of a project in the Sonoma Valley. Graywater is wastewater from hand sinks, showers, washing machines, etc.; this non-industrial wastewater comprises an estimated 50 to 80 percent of residential wastewater.

2.5 Component 5 - Planning Integration

Planning integration involves making decisions and taking actions while considering multiple viewpoints of how groundwater and other related resources should be managed in the Sonoma Valley. Such integration also promotes resource enhancements and reliability, operational efficiency, cost savings, and in some cases generates larger system and environmental benefits. Planning integration for the GMP involves urban water management planning, drinking water source control, land use planning, integrated water resources planning, and watershed enhancement planning efforts. Integrated water resources management is a process for coordinating policies and actions for the development and management of water, land, and related resources in order to maximize resource use and benefits while promoting sustainability.

The Agency, VOMWD and the City, are already implementing integrated management in the region through cooperation to obtain Russian River surface water, participation in the CUWCC Memorandum of Understanding (MOU) for water conservation, the recycled water program, the Sonoma Creek Watershed Enhancement project, and implementation

of this GMP. Continued efforts and discussions at the GMP Panel, TAC, outreach meetings and focused briefings have facilitated this integrated planning and coordination.

2.6 2008 Program Funding

The 2008 GMP was funded collectively by the Agency, the City, VOMWD, Sonoma County, and Sonoma Valley County Sanitation District (SVCSD). Facilitation services were funded by the DWR. Additionally, stakeholder participation, including participation in the Panel and TAC meetings and briefings, as well as voluntary monitoring efforts were conducted through the voluntary contribution of time and resources from GMP stakeholders.

3. Summary of 2008 Hydrologic Conditions

This section provides a summary of results of precipitation, stream flow, and groundwater data collected in 2008.

3.1 Climate Conditions

The climate of the study area is Mediterranean, with moderate temperatures and distinct wet and dry seasons. About 90 percent of the annual precipitation occurs during the months of November through April. Mean annual precipitation at Sonoma averaged 29.8 inches during the 50-year period from 1953 through 2002 (USGS SIR 2006-5092), as calculated from rainfall measurements collected at the California Irrigation Management Information System (CIMIS) Station SONOMA.C (NCDC #8351, Sonoma). This station is located approximately 0.5 miles northwest of the Sonoma Post Office at latitude 38°17'55" N, longitude 122°27'43"W, elevation 97 ft (NGVD 29). However, note that rainfall in Sonoma Valley varies considerably from one location to another.

Figure 3-1 presents the annual precipitation measured at the City of Sonoma rain gage from 1953 through 2008 (UC IPM Online), along with the cumulative departure of precipitation. A cumulative departure plot provides an indication of wet and dry periods during the period plotted. When portions of the graph have a positive slope, precipitation is greater than average, such as in a wet cycle. A negative slope occurs when precipitation less than average, such as in a drought cycle.

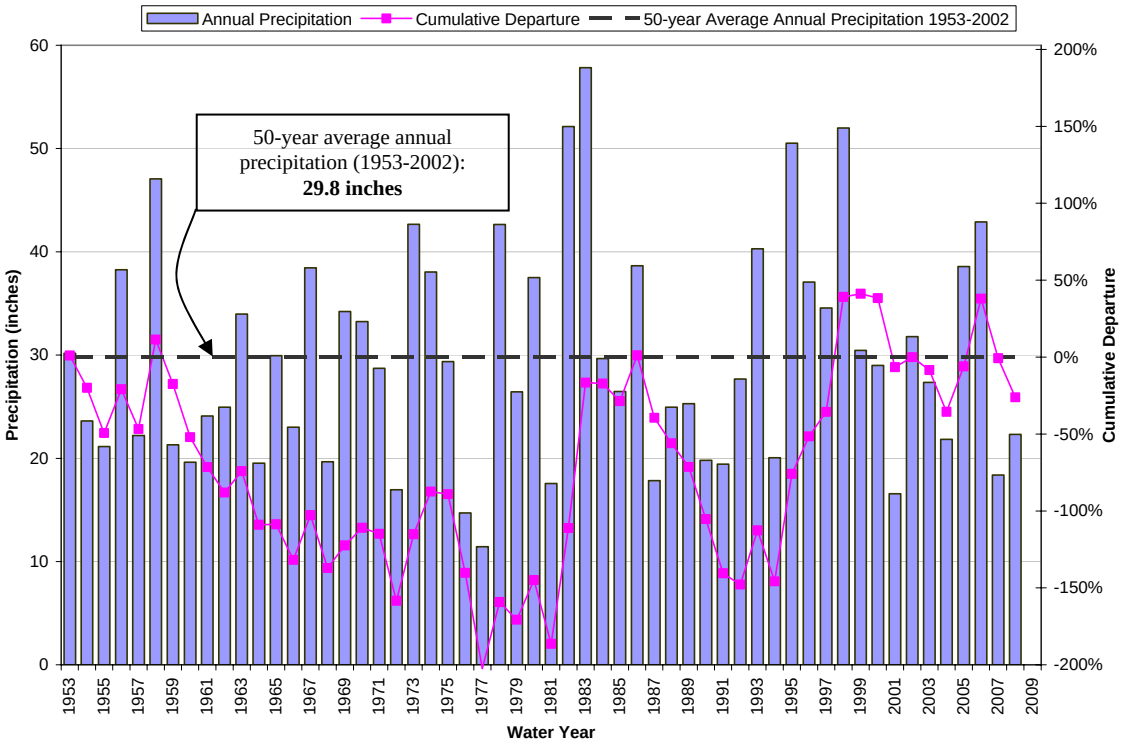
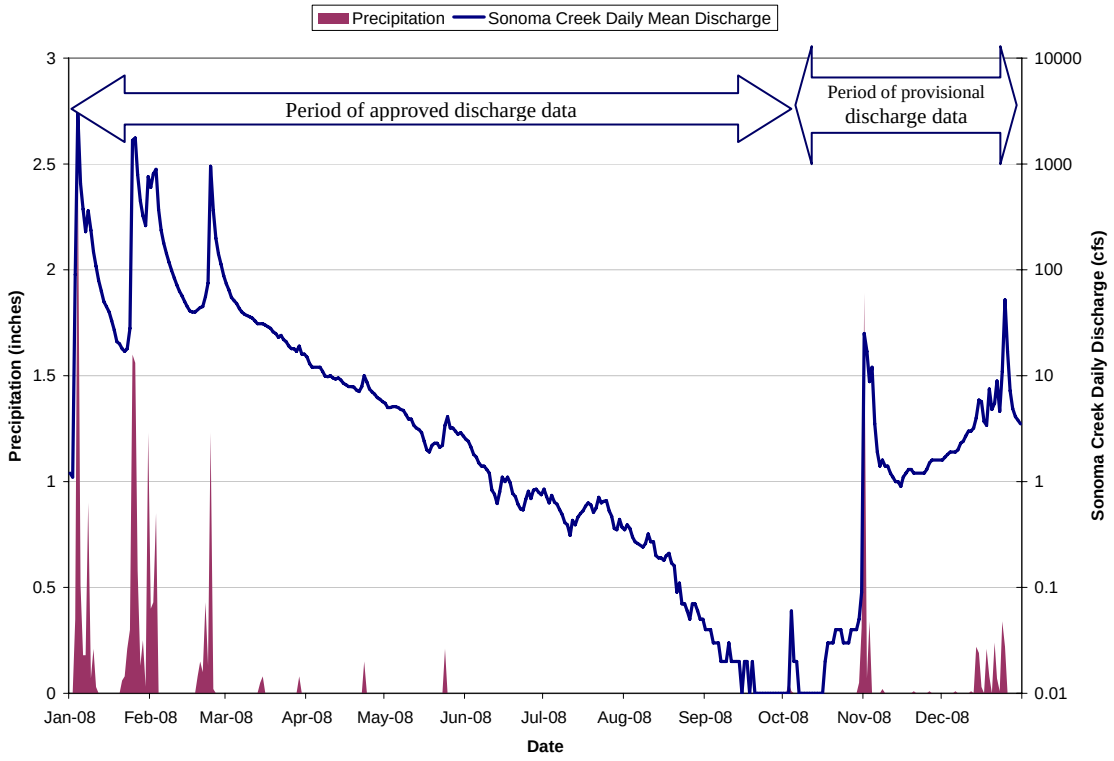


Figure 3-1 **Annual Precipitation and Cumulative Departure of Precipitation for 1953-2008 at City Of Sonoma, Sonoma County, California**

The cumulative departure plot was created by first calculating the difference between each water year's annual precipitation and the mean annual precipitation. For this plot, this mean value used was 29.8 inches calculated from1953 through 2002, which was the same that was used in a similar plot generated by the USGS for their 2006 report (USGS SIR 2006-5092, Figure 7). Each difference was then added cumulatively from the beginning of the period, water year 1953, to the end of the period, water year 2008. Finally, the cumulative value was divided by the mean value of 29.8 inches to arrive at a cumulative departure of precipitation from the mean for each water year.

As shown in Figure 3-1, annual precipitation at the City of Sonoma rain gage can deviate significantly from the 50-year average of 29.8 inches. The water years 2007 and 2008 were relatively dry, with total precipitation of about 18 and 22 inches, respectively. The majority of the rainfall for 2008 fell during the months of January through March and in November through December, as shown in Figure 3-2. Figure 3-2 also presents the average daily flow rate in Sonoma Creek measured at the Agua Caliente USGS stream gage, which is discussed in Section 3.2. The maximum daily rainfall for the year was 2.55 inches measured on January 4, 2008.



Notes:

- Average daily Sonoma Creek flow rate data is provided on the USGS National Water Information System (NWIS) website based on data collected at the USGS stream gage 11458500 located in Agua Caliente, California
- Average daily precipitation data measured at CIMIS Station SONOMA.C (NCDC #8351, Sonoma) provided by the UC IPM Online website.

Figure 3-2 2008 Daily Precipitation at City Of Sonoma, Sonoma County, California, and Daily Mean Discharge of Sonoma Creek Measured at the Agua Caliente Stream Gage

3.2 Surface Water Conditions

Discharge in Sonoma Creek is gaged near the middle part of the valley at the Agua Caliente Avenue bridge near Agua Caliente (USGS station number 11458500), and near Kenwood (USGS station number 11458433) (shown previously in Figure 2-1). The Kenwood stream gage was installed in the fall of 2008, and has very limited data; therefore, the following discussion focuses on the Agua Caliente stream gage.

The Agua Caliente gage operated from 1955 through 1981 and was then temporarily discontinued until 2001 when it was restarted. Discharge varies considerably seasonally and inter-annually, as shown in the graph of daily discharge in cubic feet per second (Figure 3-3). The mean annual discharge is 51,839 acre-ft, on the basis of records for water years 1956–81 and 2002–08 (1 acre foot = 43,560 cubic feet = 325,900 gallons). A maximum annual discharge of 123,402 acre-ft was measured in 2006, and a minimum discharge of 1,002 acre-ft was measured in 1977. Compared to the mean, 2008 showed relatively lower daily discharge with a total annual discharge of 38,613 acre-ft

In most water years, discharge does not increase markedly until November or December, after which it begins to rapidly decrease in April or May in response to the normal annual cycle of precipitation. In 2008, the discharge pattern was relatively normal, with the peak flow occurring in early January, and steep discharge declines in April-May, and with no measurable flow in a couple of periods in late September through early October.

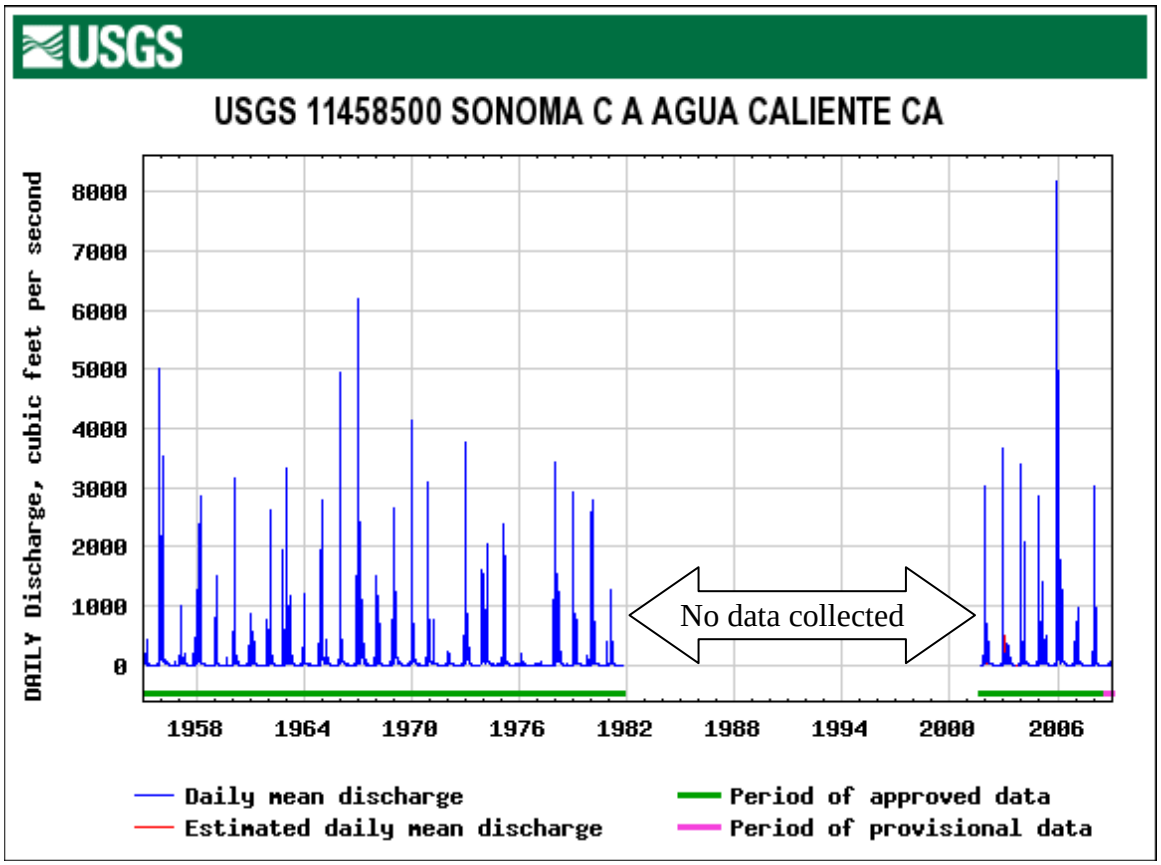


Figure 3-3 Historic Daily Mean Discharge of Sonoma Creek at the Agua Caliente Stream Gage

3.3 Groundwater Conditions

This section presents the results of the groundwater level monitoring program in the Sonoma Valley performed as part of the GMP (see Section 2.2).

3.3.1. Groundwater Level Elevations

Groundwater level elevations ranged from approximately 457 feet mean sea level (msl) in the north end of the Sonoma Valley to -126 feet msl in the south end measured in fall 2008 (see Figure 3-4). The groundwater gradient (or slope of the groundwater table) ranged from 0.01 feet per foot (ft/ft) in the north portion of the valley to 0.005 ft/ft in the south portion of the valley.

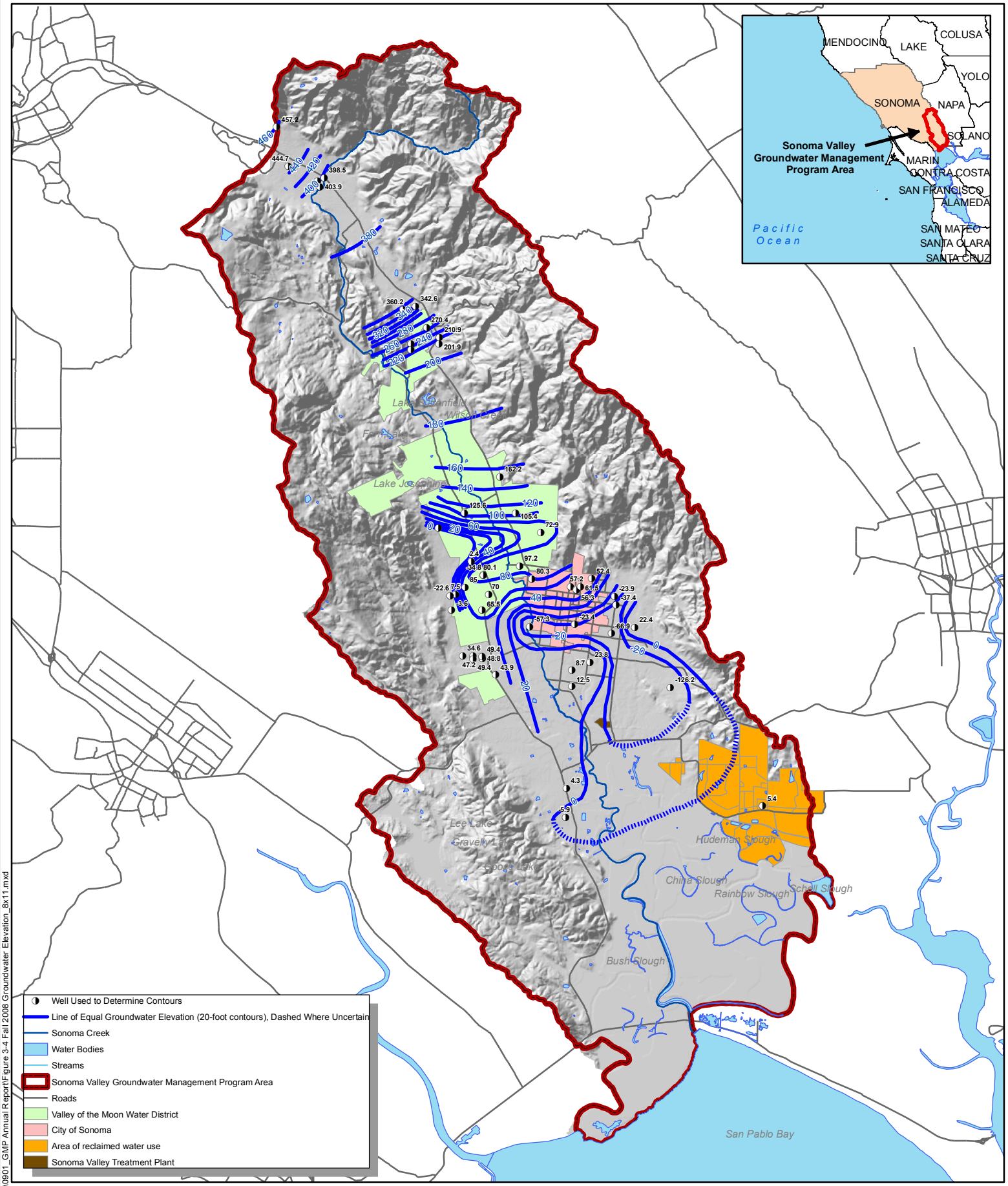
Two groundwater pumping depressions described in the 2006 USGS report remain apparent in the 2008 groundwater level contour map. Southeast of the City of Sonoma, measured groundwater levels are as low as 126 feet below sea level and southwest of El Verano, groundwater levels are as low as 35 feet below sea level.

It is important to note that groundwater elevations measured in nearby wells can be highly variable due to differences in well design (i.e., the depth and length of well screen intervals) and the spatial variations in aquifer materials (which can vary abruptly due to the complex geologic conditions and numerous fault zones present in Sonoma Valley). Therefore, the associated groundwater level contour map represents very generalized groundwater level flow patterns and should not be used to interpret more localized or site-specific conditions.

3.3.2. Groundwater Level Trends

Groundwater level trends are provided in Figure 3-5, showing a select number of well hydrographs distributed throughout the valley. These hydrographs present the change in groundwater elevation (vertical axis in feet) over time (horizontal axis in years). Numerous well hydrographs shown on Figure 3-5 exhibit groundwater level declines over the last 30 years, some ranging up to 80 feet. The maximum reported groundwater level decline in the valley is approximately 90 feet between 1975 and 2008 at DWR monitoring well 05N06W02N002M located in the El Verano area. Some volunteer monitoring wells also show water level declines over the last eight years of measurement (such as wells N13-01 and O15-01). The hydrographs for these wells are included in Appendix A, along with all other available hydrographs for the valley.

In general, of the 57 hydrographs in the appendix, 30 appear to have relatively stable water levels, 6 have upward trending water levels, and the remainder appears to be showing slight to sharp downward trends. Many of the hydrographs have less than 10 years of monitoring record, making it unclear whether these are long-term trends, recent accelerated declines, or a reflection of the dry years in 2000, 2007, 2008. Most of the groundwater level declines are considered to likely to have resulted from increased groundwater withdrawals in localized areas (USGS 2006), southeast of Sonoma and southwest of El Varano. During 2008, groundwater elevations were generally lower than historical groundwater elevations throughout Sonoma Valley likely due to the relatively low amounts of precipitation in 2007 and 2008.



D:\Projects\Sonoma\GIS\MXDs\0901_GMP Annual Report\Figure 3-4 Fall 2008 Groundwater Elevation_8x11.mxd

Sonoma Valley
Groundwater Management Program 2008 Annual Report
Fall 2008 Groundwater Levels in Sonoma Valley

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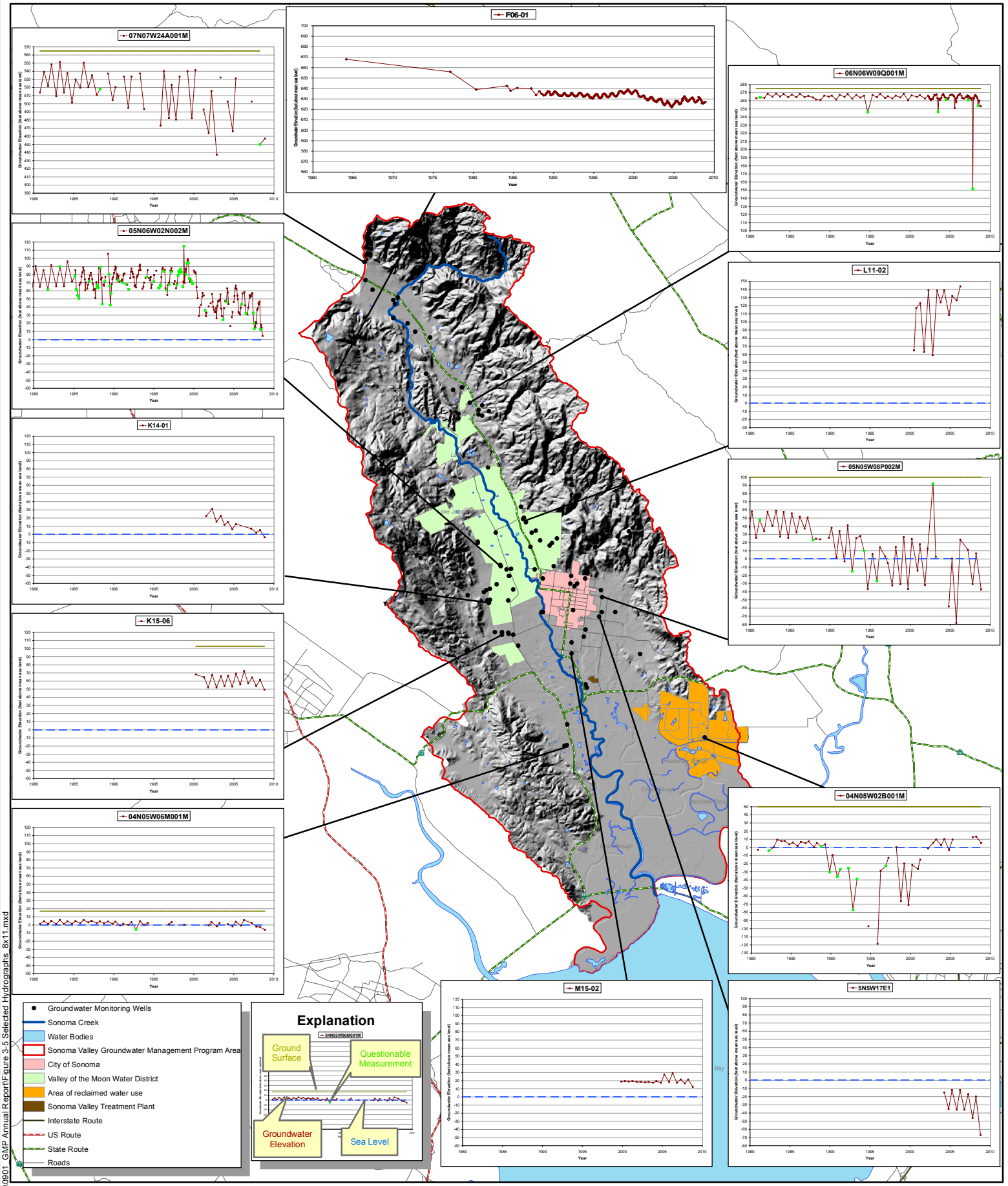
Miles

Note: Map must be printed at paper size 8.5x11 for the representative fraction to be correct

N W E S

Figure 3-4

Created: February 16, 2009



D:\Projects\Sonoma\GIS\MXDs\0901_GMP Annual Report\Figure 3-5 Selected Hydrographs_8x11.mxd

Sonoma Valley
Groundwater Management Program 2008 Annual Report
Selected Hydrographs

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Note: Map must be printed at paper size 8.5x11 for the representative fraction to be correct

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Figure 3-5

Created: February 16, 2009

Groundwater Level Monitoring Data Gaps

Areas where increased monitoring coverage is considered necessary are shown in Figure 2-1. While there has been significant progress in adding new wells to the monitoring program (i.e., addition of the new wells shown on Figure 2-1 have increased the number of dark green grid cells identified as "monitoring coverage adequate"), some grid cells do not contain monitoring wells and indicate areas where additional wells are needed. Areas requiring additional monitoring data include the north-central portions of Sonoma Valley (i.e., between Kenwood and Glen Ellen, particularly along Sonoma Creek) and the southern portions of the valley. At least another 30 wells would be required to provide adequate spatial distribution across the valley.

4. Management Actions and Progress on Plan Component Actions

Substantial progress toward implementing plan component actions was accomplished in 2008, the first year of implementation of the Sonoma Valley GMP. The accomplishments made and programs planned for 2009 and beyond are identified in Tables 4-1 and 4-2.

Table 4-1 - Management Components and Actions - Progress and Plans

Management Components/Actions	Year 1	Accomplished	Year 2	Relative Cost
4.1 Stakeholder Involvement				
4.1.1 Involving the Public				
-- Meetings, coordination, and communication	❖ ❖ ❖ ❖	√	❖ ❖ ❖ ❖	----
3 Develop Public Outreach Plan for implementation	❖	√		----
4.1.2 Advisory Groups				
1 Reform Panel and form TAC	❖	√		----
4 Hold Quarterly Meetings with the Panel	❖ ❖ ❖ ❖	√	❖ ❖ ❖ ❖	----
4.1.3 Informing Public Agencies and Stakeholders				
-- Meetings, coordination, and communication	❖ ❖ ❖ ❖	√	❖ ❖ ❖ ❖	----
4.1.4 Partnerships & Coordination				
-- Meetings, coordination, and communication	❖ ❖ ❖ ❖	√	❖ ❖ ❖ ❖	----
3 Seek grant funding for Plan actions	❖ ❖ ❖ ❖	√	❖ ❖ ❖ ❖	----
4.2 Monitoring Program				
4.2.2 Groundwater Elevation Monitoring				
5 Groundwater Elevation Monitoring & Expand Volunteer Wells	❖ ❖	√	❖ ❖	----
6 Project - Install New Multi-depth Monitoring Wells	❖ ❖	1	❖ ❖	1
4.2.3 Groundwater Quality Monitoring				
3 Groundwater Quality Monitoring- Compile Exsting	❖ ❖		❖ ❖	$
4.2.4 Land Subsidence Monitoring				
1 Study - Establish Long-Term Monitoring Program for Land Subsidence			❖	$
4.2.5 Surface Water-Groundwater Interaction Monitoring				
3 Study - Tracer Test and Modeling				
4 Study - Stable Isotope Analysis				
5 Project - Install and Maintain New Stream Gauge	❖ ❖	√		
6 Project - Conduct Seepage Runs and Install Piezometers			❖ ❖	$$$
4.2.6 Monitoring Protocols				
-- Adopt and implement protocols & monitoring program	❖ ❖	√		
4.2.7 Central GIS Data Management System				
6 Study - GIS Mapping of Drainage Network				
7 Study - Additional GIS Layers & Analysis				
8 Pilot- WEBH2O Web-Based Data Management System	❖ ❖ ❖ ❖	√	❖ ❖ ❖ ❖	$
4.3 Groundwater Quality Protection				
4.3.1 Well Construction, Abandonment, and Destruction				
5 Study - Obtain Better information during Well Installations	❖ ❖			
6 Study - Conduct Well/Abandoned Well Survey				
7 Project - Develop Guide for Well Owners				
4.3.2 Wellhead Protection				
1 Incorporate Information from DWSAP Plans	❖ ❖			
4.3.3 Control Migration and Remediation of Contaminated Groundwater				
1 Provide Well Owners with County Guide	❖			
-- Incorporate & Distribute Information on Sources				
4.3.4 Control of Saline Water Intrusion				
3 Study - Salinity Sources and Distribution				
4 Study - Seawater Intrusion Mitigation Measures				
4.4 Groundwater Sustainability				
4.4.1 Stormwater Recharge				
1 Study - Groundwater Recharge Area Mapping & Analysis	❖ ❖	1	❖ ❖ ❖ ❖	1
2 Study - Recharge Area Alternatives				
3 Project - Public Outreach Program	❖ ❖			
4 Study - Recapture Unused Groundwater				
5 Study/Pilot - Feasibility Analysis/Pilot Stormwater Capture & Recharge			❖ ❖ ❖ ❖	$$$
4.4.2 Groundwater Banking				
1 Study - Conduct Conjunctive Use Assessment			❖ ❖ ❖ ❖	$$$
2 Study/Pilot - Feasibility Analysis/Pilot Groundwater Banking				
4.4.3 Recycled Water Supply				
1 Study - Evaluate Graywater				
2 Project - Recycled Water for Irrigation				
3 Study - Evaluate Recycled Water Groundwater Recharge Feasibility				
4.4.4 Conservation & Demand Reduction				
1 Continue Implementing BMPs & Report Annually	❖ ❖ ❖ ❖	√	❖ ❖ ❖ ❖	----
2 Water Conservation BMPs for Non-Viticulture Agriculture				
3 Encourage Additional Conservation and Best Practices for Viticulture				
4 Project - Voluntary Water Conservation BMPs for Uninc. Areas		1	❖ ❖ ❖ ❖	1
5 Project - Landscape Irrigation Efficiency				
6 Pilot/Project - Stormwater Capture and Reuse for Irrigation				
4.4.5 Groundwater Modeling				
1 Study - Update Land Cover Map & Water Use Estimates				
2 Study - Recharge and Infiltration Modeling				
3 Project - Improve Groundwater Flow Model			❖ ❖ ❖	$$
4.5 Planning Integration				
4 Project - Develop Multi-Beneficial Projects for Flood Hazards				
5 Implementation Administration				
Implementation Prioritization and Financing	❖	√		
Annual Plan Implementation Report		√	❖	----
Future Review				

Notes:

---- - Funded action

$$$ - Unfunded action; indicates relative order magnitude cost

1 - Obtained funding in 2008, implementation in 2009.

Table 4-2
Groundwater Management Program Progress in 2008 and Plans for 2009

Basin Management Objective	Progress to Date	Plans for 2009 and Future
BMO-1 Maintain groundwater elevations for the support of beneficial uses of groundwater and to protect against inelastic land subsidence.	Public outreach and stakeholder involvement on groundwater, increased voluntary monitoring, and obtained funding for two new multi-depth wells.	Public outreach and stakeholder involvement on groundwater, increased voluntary monitoring, and obtained funding for two new multi-depth wells.
BMO-2 Improve water use efficiency and conservation.	Obtained funds for pilot program for water conservation in unincorporated areas.	Conduct conservation pilot program for unincorporated areas.
BMO-3 Identify and protect groundwater recharge areas and enhance the recharge of groundwater where appropriate.	Obtained funds for recharge study.	Recharge study to be completed next year.
BMO-4 Manage groundwater in conjunction with other water sources.	Under the GMP, groundwater is being managed in conjunction with other water resources.	Continue implementation of the GMP. Continue water conservation, economic analysis of recycled water. Consider conjunctive us (stormwater management and/or groundwater banking
BMO-5 Protect groundwater quality for beneficial uses including minimizing saline intrusion.	Coordinated monitoring efforts and increased number of wells through voluntary efforts, and obtained funding for two new multi-depth monitoring wells.	Continue coordinating monitoring efforts and increase number of wells through voluntary efforts, and install two new multi-depth monitoring wells. Increase recycled water use.
BMO-6 Protect against adverse interactions between groundwater and surface water flows.	Installed a new stream gage on the north portion of Sonoma Creek, and initiated discussion on possible additional groundwater-surface water studies.	Continue stream gage monitoring of Sonoma Creek, and further consider possible additional groundwater-surface water studies.
BMO-7 Improve the community's awareness of groundwater planning, water resources, and legal issues.	Public outreach and stakeholder involvement through Panel and TAC meetings, newsletters, fact sheets, press releases and the GMP website.	Continue public outreach and stakeholder involvement through Panel and TAC meetings, newsletters, fact sheets, press releases and the GMP website.
BMO-8 Improve the groundwater database and basin understanding through consistent monitoring and additional surveys, and improve basin analytical tools including the groundwater simulation model.	Developed WebH2O, a web-hosted repository of groundwater data. Coordinated monitoring efforts and increased number of wells through voluntary efforts, and obtained funding for two new multi-depth monitoring wells.	Utilize WebH2O as a web-hosted repository of groundwater data. Continue coordinating monitoring efforts and increase number of wells through voluntary efforts, and install two new multi-depth monitoring wells.
BMO-9 Manage groundwater with local control.	Initiated implementation of GMP.	Continue implementation of GMP
BMO-10 Explore, identify and maximize non-regulatory approaches to manage the groundwater resource.	Initiated implementation of GMP.	Continue implementation of GMP

5. Proposed 2009 Program and Funding

This section provides a description of planned and proposed Sonoma Valley GMP activities for 2009 and a discussion of funding sources for 2009.

Activities and actions are recommended to be conducted in 2009 based on the BMOs identified in the Plan and subsequent stakeholder involvement. These activities and actions are described in the following sections and grouped according to the Plan Component Actions (i.e., Stakeholder Involvement, Monitoring Program, Groundwater Quality Protection, Groundwater Sustainability, and Planning Integration).

5.1 Component 1 - Stakeholder Involvement

Stakeholder involvement will continue to provide the foundation for the collaborative process of decision-making and actions during GMP implementation. Key tasks planned for 2009 are discussed below.

- **Continue to update and improve the public outreach plan under the GMP**
  The public outreach plan will continue to be updated to share information and demonstrate progress in GMP implementation. Such outreach activities identified in the plan, which was developed and initiated in 2008, include briefings, communications, and media activities.
- **Expand outreach and conduct briefings** - Quarterly Panel meetings, monthly TAC meetings, several targeted briefings, and focused outreach for water conservation, stormwater capture and recharge, and groundwater banking will continue to be implemented. Additional focused outreach will be performed to expand the volunteer monitoring well network, particularly with agricultural groundwater users, and promote water conservation in the unincorporated areas of Sonoma Valley. Panel members will conduct annual stakeholder briefings early in 2009. The focused monitoring work group and funding work group will also continue to meet, as needed.
- **Communications** – Communications will be heightened by preparing and disseminating this annual report, sending out meeting announcements and supporting materials in advance to stakeholders, providing periodic informational newsletters and progress reports, developing and distributing fact sheets on the volunteer groundwater monitoring program, maintaining email distribution lists of Sonoma Valley stakeholders, including the Panel and TAC, and maintaining the project website.
- **Media -** GMP staff and stakeholders will further develop relationships and work with local media to provide press releases on key events and milestones for the GMP.
- **Facilitated meetings and stakeholder involvement (funding pending)**
  While funding for facilitation of the Sonoma Valley GMP meetings and stakeholder involvement effort by the Center for Collaborative Policy has recently been suspended by the DWR, the Agency is pursuing other means to fund facilitation by the Center during the Fiscal Year 2009/2010 beginning in July 2009.

5.2 Component 2 - Monitoring Program

- **Install two dedicated multi-level monitoring wells (funding pending)**
  Two multi-depth monitoring wells will be installed in the southern Sonoma Valley under an AB303 grant awarded to the Agency in 2008, pending the resolution of state budgetary issues. The objectives of the wells are to monitor water levels and salinity at several depth intervals in the southern portions of Sonoma Valley (see Figure 2-1).
- **Continue to expand the groundwater monitoring network and perform groundwater level monitoring**
  Coordinated groundwater-level monitoring events will be performed in the spring and fall in 2009, and this will incorporate the two new multi-depth monitoring wells, and any additional wells added in 2009. Outreach efforts will continue with the objective to add another 30 wells to provide for wider spatial distribution of added wells. The vast majority of wells currently in the volunteer groundwater-level monitoring program represent wells associated with urban and rural domestic water uses (e.g., wells associated with monitoring programs conducted by the City and VOMWD, small private mutual water company wells, and individual private domestic well owners). Participation in the volunteer groundwater-level monitoring program from agricultural groundwater users and local businesses has been limited. Therefore, focused outreach to local agricultural groundwater users and local businesses will be performed in 2009. The emphasis of the focused outreach will be to convey the critical importance of groundwater-level monitoring in assessing and sustaining the long-term groundwater resources of Sonoma Valley for the benefit of all groundwater users.
- **Conduct additional training for volunteer monitors**
  Additional training for volunteer monitors will be conducted in 2009 based on experiences and lessons learned from implementing the groundwater monitoring program in 2008. Many issues associated with measuring groundwater levels were identified by volunteer monitors in 2008 including: (1) logistical constraints associated with sounding probe access at the wellhead; (2) dealing with obstructions encountered within well casings; and (3) determining "static" versus "recovering" water-level conditions from recently pumped wells. These issues and applicable solutions will be provided in a document to be developed by the monitoring subgroup of the TAC and appended to the project Sampling and Analysis Plan. Additionally, volunteers will be offered training on entering, managing, and viewing their data through WEBH2O (the web-based project database).
- **Continue monitoring stream gages**
  The two stream gages on Sonoma Creek will continue to be used to collect stream flow data in Sonoma Valley. Stream gage data will be extremely useful in measuring flow and facilitating the estimation of groundwater recharge and discharge in the area.
- **Surface Water – Groundwater Interaction Study for Sonoma Creek - Conduct seepage runs and/or install piezometers (funding dependent)**
  Envisioned as a cooperative study between the DWR, USGS, Sonoma Ecology Center, and the Agency, the objectives of such a study would be to better understand the interaction of surface water and groundwater along Sonoma Creek, and to assist in quantifying recharge of groundwater in the Sonoma Valley. The information obtained

from this study would be used to refine gains and losses of Sonoma Creek, spatially and temporally, in the existing MODFLOW model. This model improvement will enhance our understanding of recharge mechanisms in the valley.

- **Develop plan for future subsidence monitoring**
  While land subsidence has not been identified as an issue in Sonoma Valley, land subsidence monitoring is a GMP action that will be conducted periodically to monitor the potential for lowering of the land surface due to groundwater extractions. A long term, monitoring program will be developed to assess the potential for land subsidence related to groundwater extractions. This will include coordination with VOMWD and the City to assess if there are other suitable benchmarks in the Sonoma Valley to aid in monitoring for potential land subsidence.

5.3 Component 3 - Groundwater Quality Protection

- **Conduct depth-specific salinity monitoring in southern Sonoma Valley**
  As discussed in preceding sections, two multi-level monitoring wells are planned for installation in 2009, which will be used to monitor potential salinity intrusion in southern Sonoma Valley.
- **Develop and provide well owners with guide**
  A well owner's guide will be developed for distribution to private well owners. The guide will include well owner responsibilities, information on well construction and well maintenance, water quality protection, water quality sampling and treatment, and a resource guide for contact information for well-related local, state and federal agencies, analytical laboratories, and private organizations. The well guide will be developed largely from existing well guides and information, and customized for the local citizenry.
- **Work with DWR, Local Water Agencies and Mutual Water Companies to develop a long-term water quality monitoring program (funding dependent)**
  Several water quality issues were identified as potential concern in USGS SIR 2006-5092, including salinity intrusion from San Pablo Bay in the southern portions of Sonoma Valley, and localized geothermal water upwelling. It may be possible to use select, limited existing water quality data collected by public water suppliers (the City, VOMWD), and mutual water companies coupled with expanded DWR water quality sampling to improve long-term monitoring of salinity and, perhaps, a few other components like boron, manganese, iron and nitrate. The TAC should consider this in meeting discussions, and if support exists, develop a plan for implementation.

5.4 Component 4 - Groundwater Sustainability

- **Conservation and demand reduction**
  A pilot program to evaluate water conservation programs for areas within the Sonoma Valley that currently do not have formal conservation programs (unincorporated areas) will be conducted under a $25,000 grant obtained by the Agency from NBWA (Section 2.4.2). The pilot program includes conducting residential and agricultural site assessments involving water use surveys to educate private well users (residential and agricultural water users) regarding water conservation practices, and will be conducted in 2009. The site assessments will provide information that can be used to develop future water conservation and efficiency programs and incentives for

well users throughout the NBWA service area. Conservation materials will also be developed for distribution at local events within unincorporated areas to educate residents and businesses about the need for and benefits of water conservation. Further, results of the activities will be used to identify grant funding opportunities for conservation, and a report will be prepared summarizing the results of the assessments and other efforts.

- **Groundwater recharge study (Pending the release of State grant funding)**
  Recharge mapping will use the existing GIS data management system constructed and compiled by Sonoma Ecology Center, USGS, and the Agency to obtain available data and existing and new maps to update the Agency GIS. New mapping information including permeability and porosity will be used to assign recharge values spatially. This updated information will be subsequently incorporated into a multitude of future planning activities including groundwater quality protection, recharge protection and enhancement, and updating the existing groundwater flow model. The groundwater recharge mapping will be conducted in 2009 pending the resolution of State budgetary issues.
- **Conduct conjunctive use/groundwater banking assessment (funding pending)**
  Conduct a feasibility study of conjunctive use opportunities within the Sonoma Valley groundwater basin area. This would include assessing methods to optimize the temporal use of surface water and groundwater, by using excess or imported surface water when it is available during the wet season or wet years for storage within groundwater aquifers for subsequent withdrawal during dry seasons and/or dry years.
- **Improve groundwater flow model (funding dependent)**
  Enhance and improve the groundwater flow model, addressing limitations in recharge, discharge, and the conceptual hydrogeologic model. The focus of this effort would be to further compile and thoroughly analyze existing lithologic data from water well logs in the valley and update the regional conceptual model and flow model.
- **Develop pilot project for stormwater capture and recharge (funding dependent)**
  Recharge of surplus flows from Sonoma Creek and its tributaries is a desirable goal, based on discussions at the Panel and TAC meetings. Conceptual design and implementation of pilot projects will be further considered in 2009.

5.5 Component 5 - Planning Integration

Planning integration through efforts and discussions will be continued at the GMP Panel, TAC, outreach meetings and focused briefings to facilitate integrated planning and coordination at the basin and regional scale.

5.6 2009 Annual Plan Implementation Report

The Agency will report on 2009 implementation progress in an annual report (to prepared in early 2010) that summarizes the groundwater conditions in the Sonoma Valley. This report will include the following information:

- Activities and progress made in implementing the Plan

- Groundwater conditions and monitoring results and trends of groundwater levels and quality
- Information on the improved characterization of the Sonoma Valley through continued data collection and analysis
- A discussion, supported by monitoring results, of whether management actions are meeting BMOs
- Any plan component changes, including modification of BMOs during the period covered by the report
- An outline of future Sonoma Valley management actions

5.7 2009 Funding

Proposed actions discussed in Section 5 are identified as currently funded, funding pending, or funding dependent. Currently funded programs include ongoing stakeholder involvement, groundwater elevation monitoring program, stream gage monitoring, and water conservation programs, which are currently funded collectively by Agency, City, VOMWD, and volunteer services from several BAP and TAC members. Facilitation would continue if funding is available from DWR, otherwise another funding mechanism would need to be found.

It is worth further noting that the funding pending for the two new well installations and groundwater recharge study, which were awarded under the AB303 grant program in 2008, has been temporarily suspended by the State of California pending resolution of state budgetary issues.

For the remaining proposed actions for 2009, outside funding mechanisms will need to be identified and pursued. Potential funding mechanisms include state grants, such as AB303 and the Integrated Regional Water Management Program grants. Considering the current economic situation, uncertainties and other budgetary constraints, it is apparent that 2009 will be a challenging year in terms of program funding, and this may require being more resourceful and innovative to secure funding in 2009 and the next few years.

6. References

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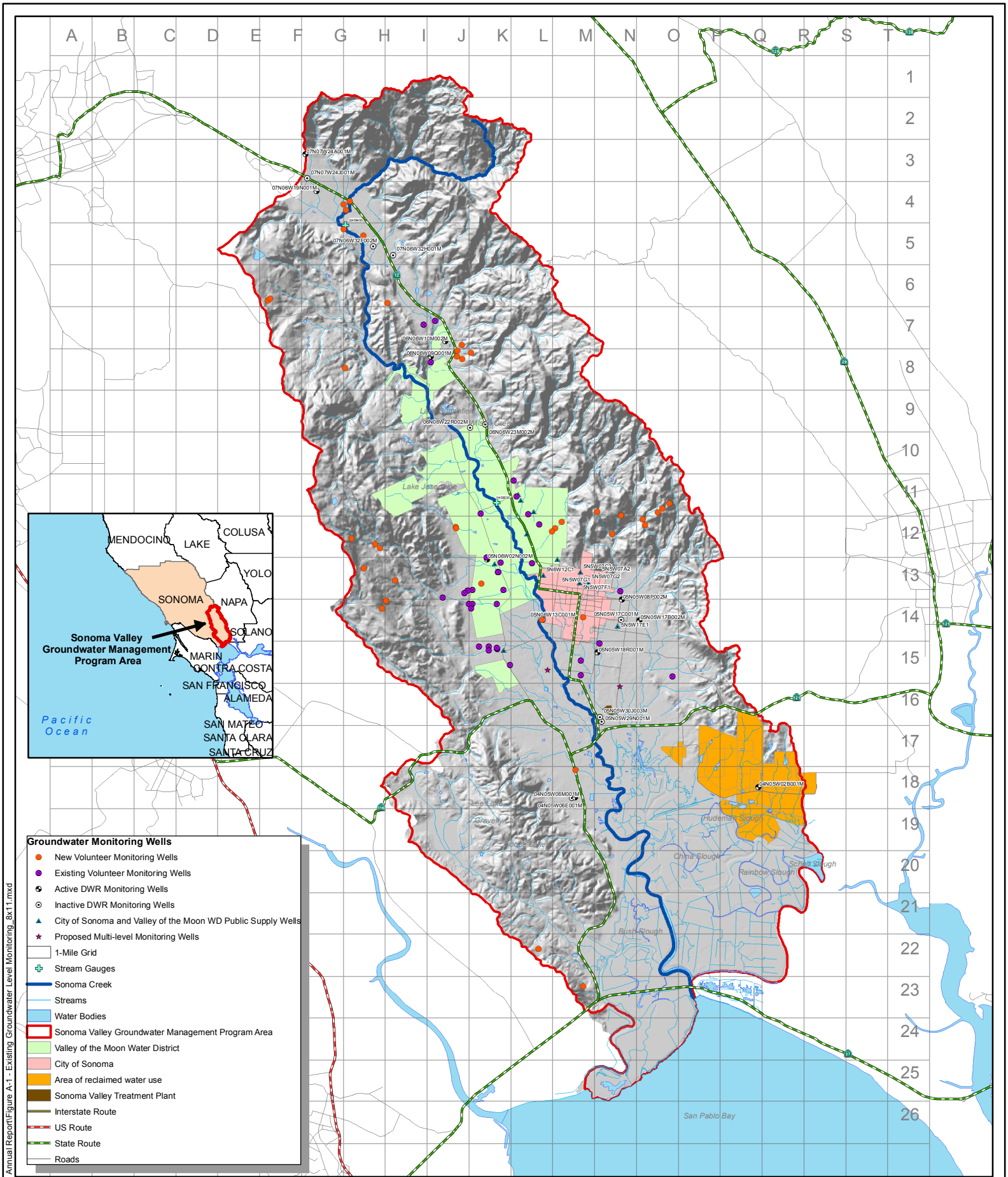
Appendix A
Sonoma Valley Hydrographs

Well Location Map



\Sonoma\GIS\MXDs\0901_GMP Annual Report\Figure A-1 - Existing Groundwater Level Monitoring_8x11.mxd

Sonoma Valley
Groundwater Management Program 2008 Annual Report
Groundwater Level Monitoring Network

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Note: Map must be printed at paper size 8.5x11 for the representative fraction to be correct

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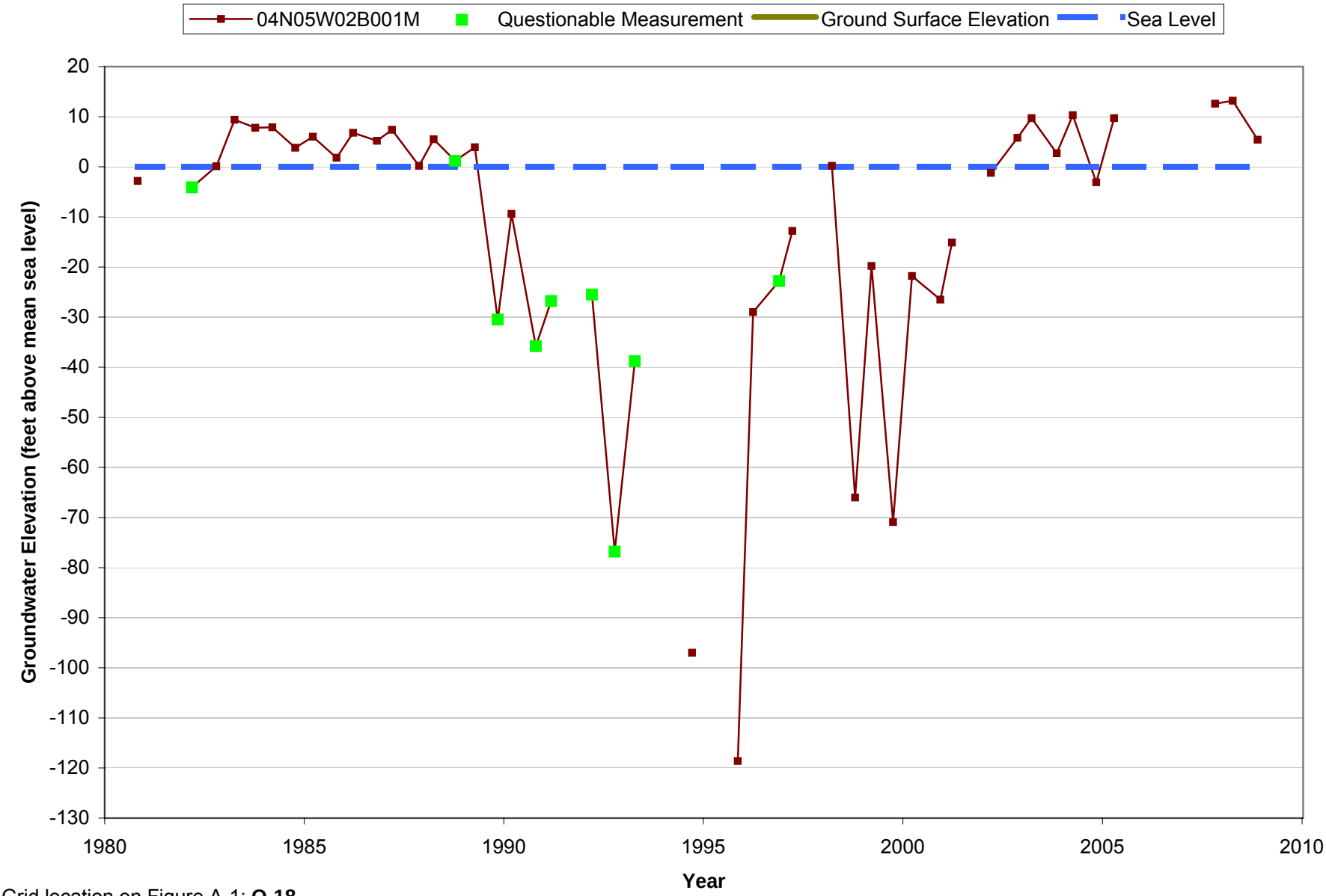
Figure A-1

Created: February 2009

Active DWR Monitoring Well Hydrographs



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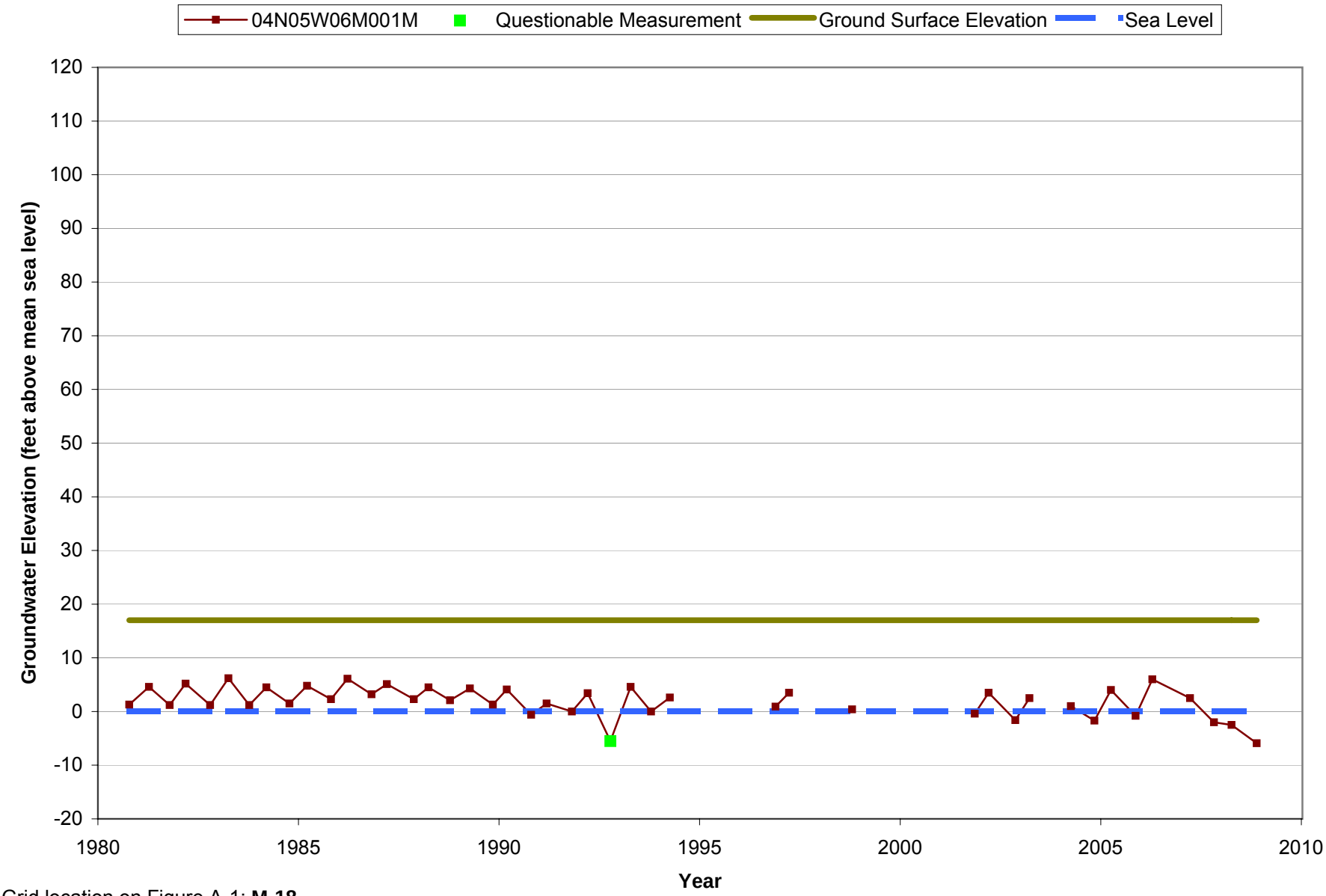

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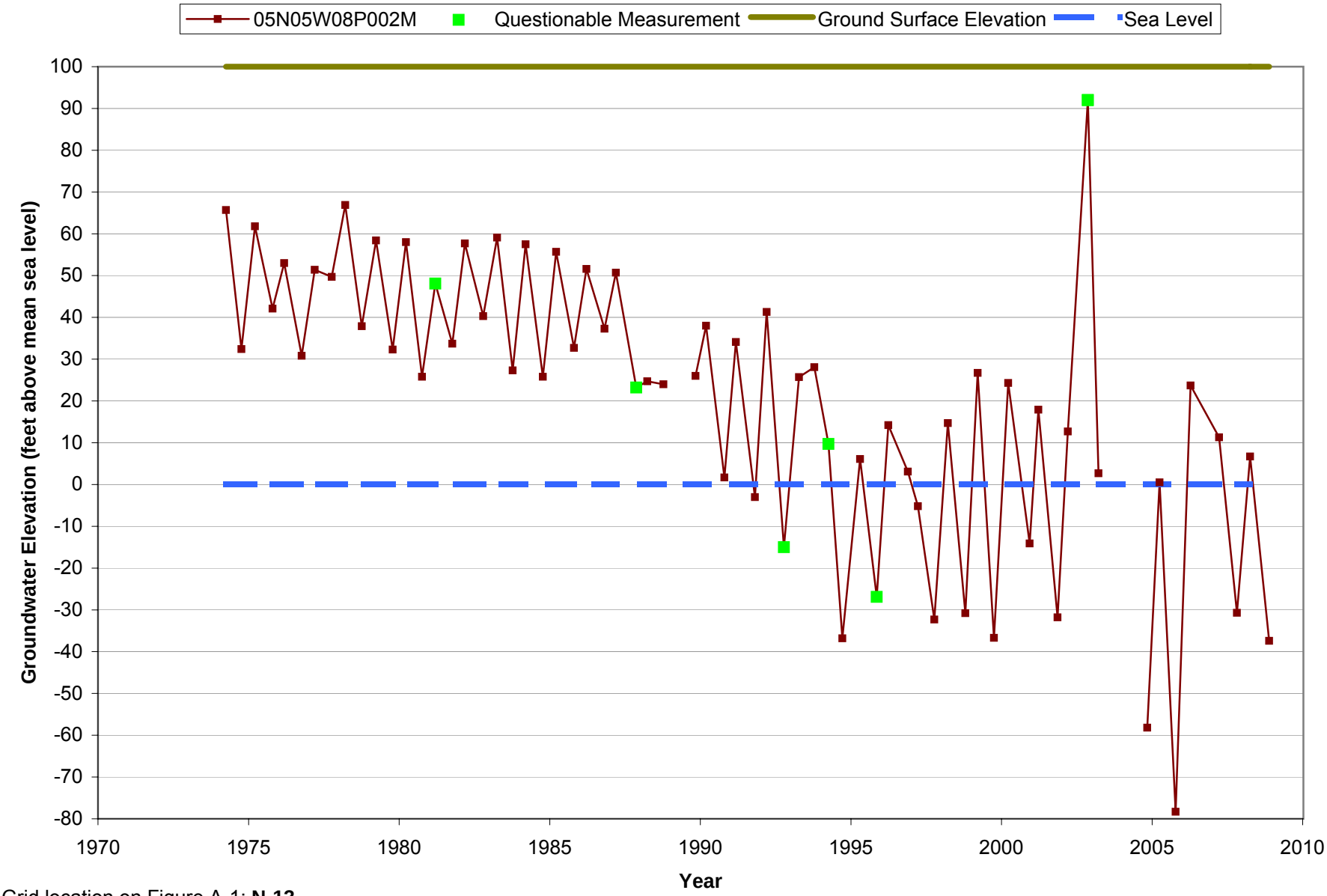

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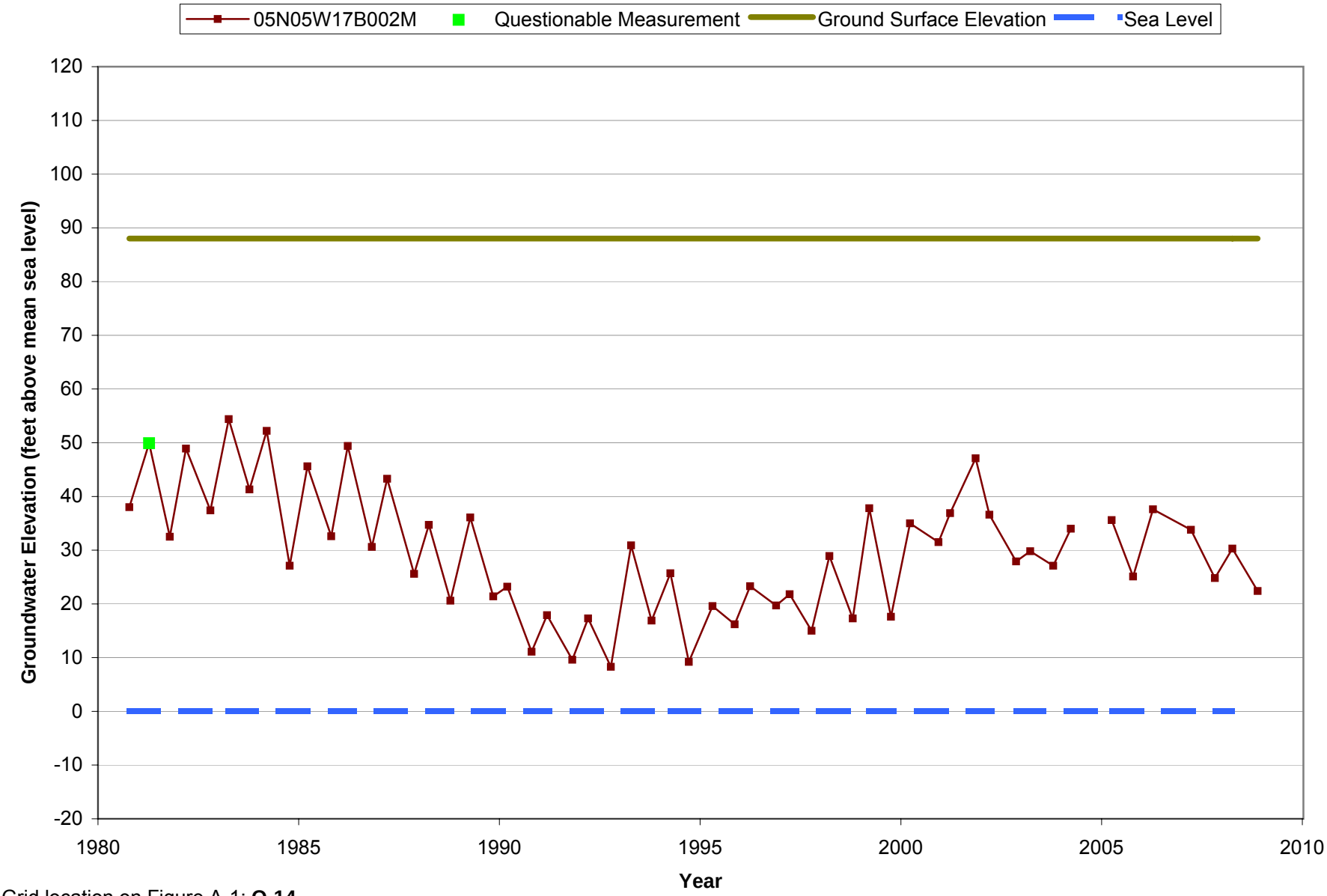

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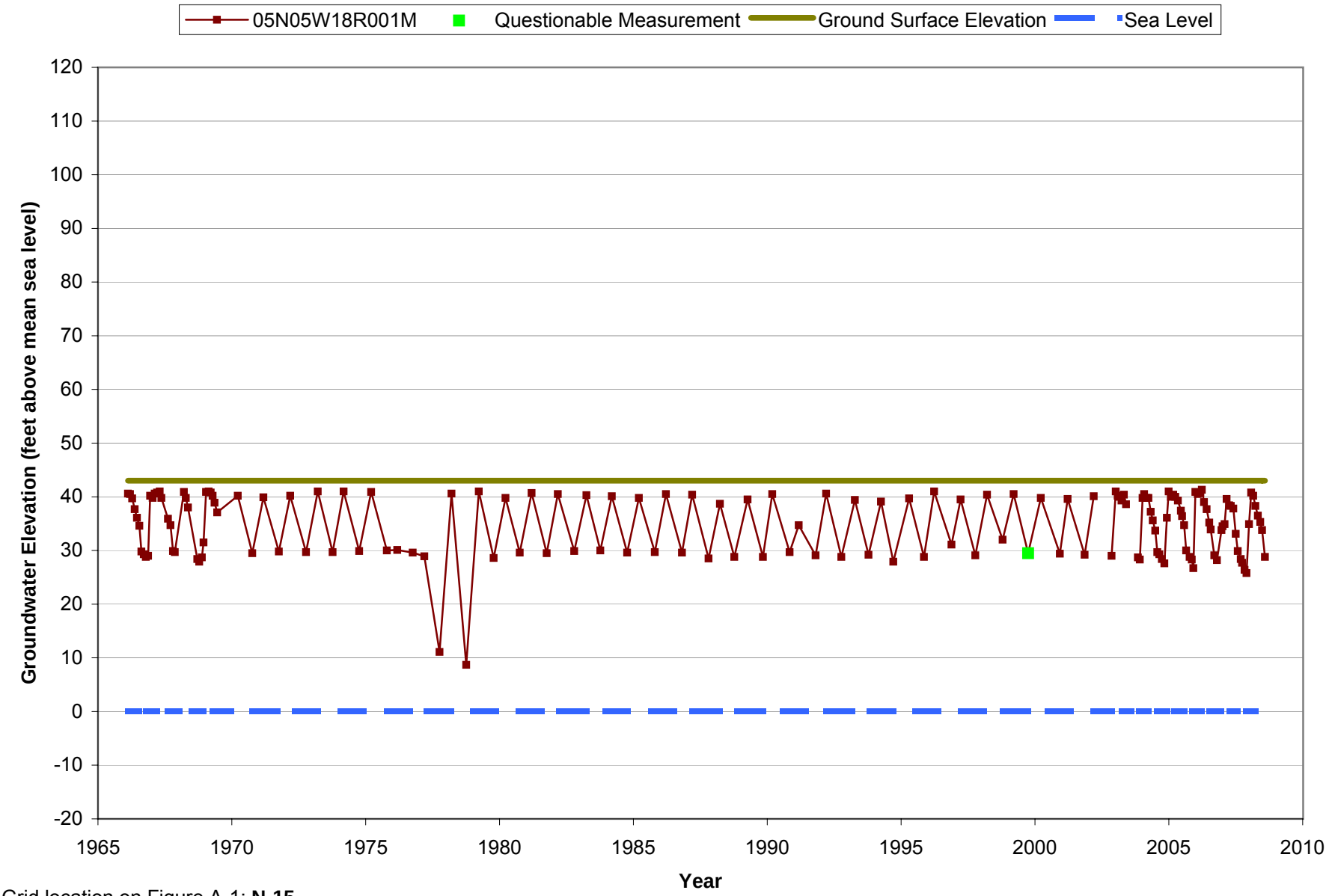

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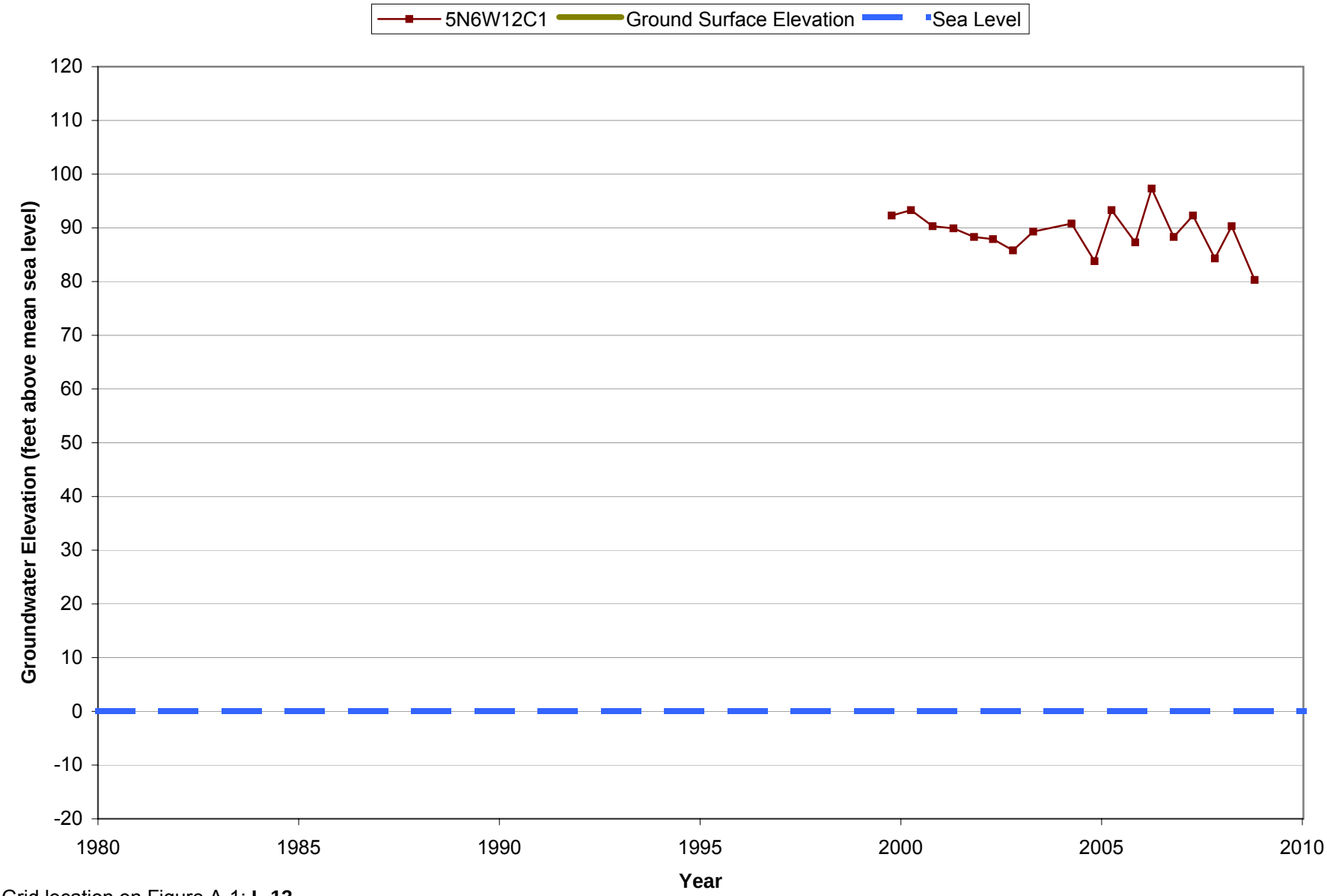

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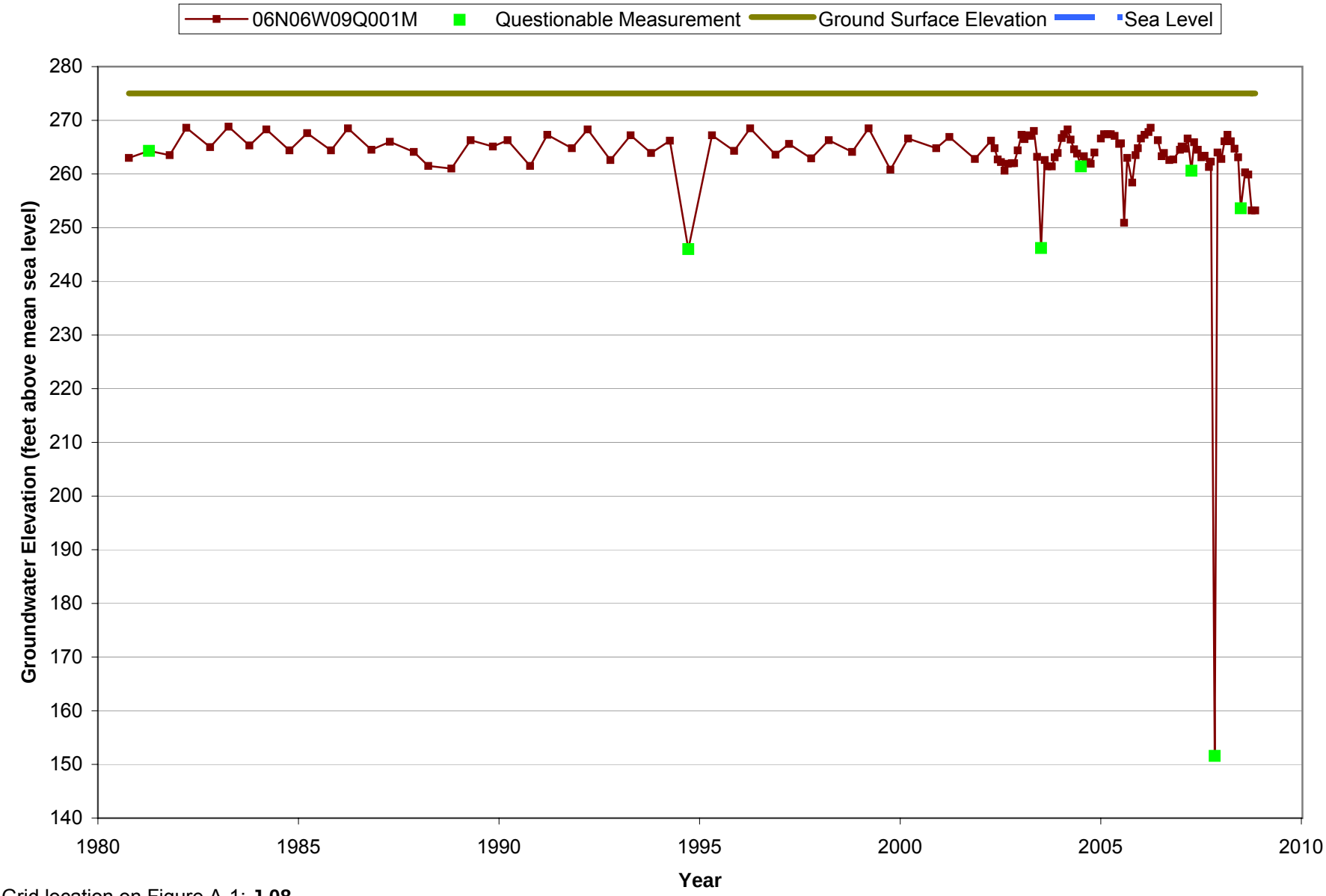

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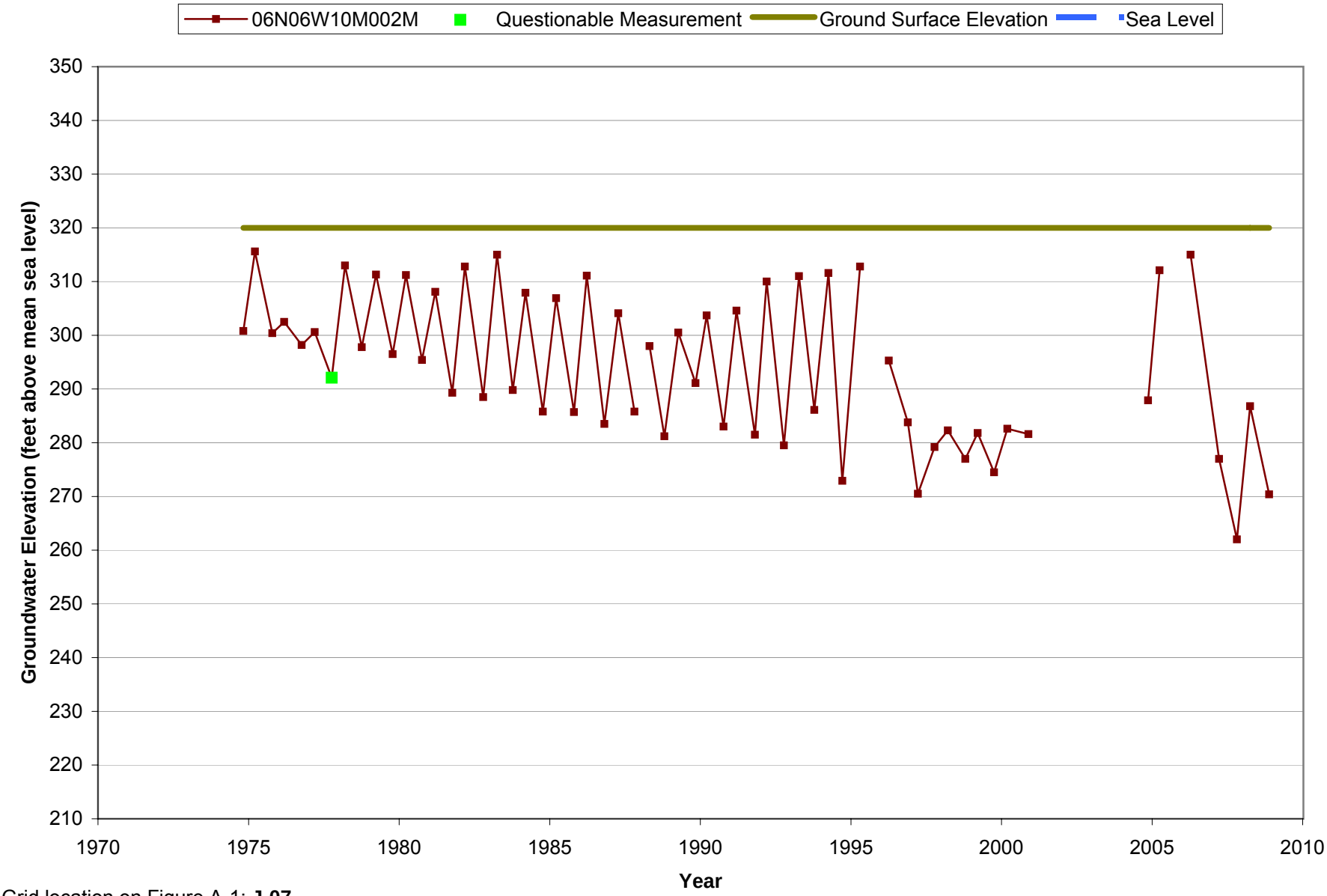

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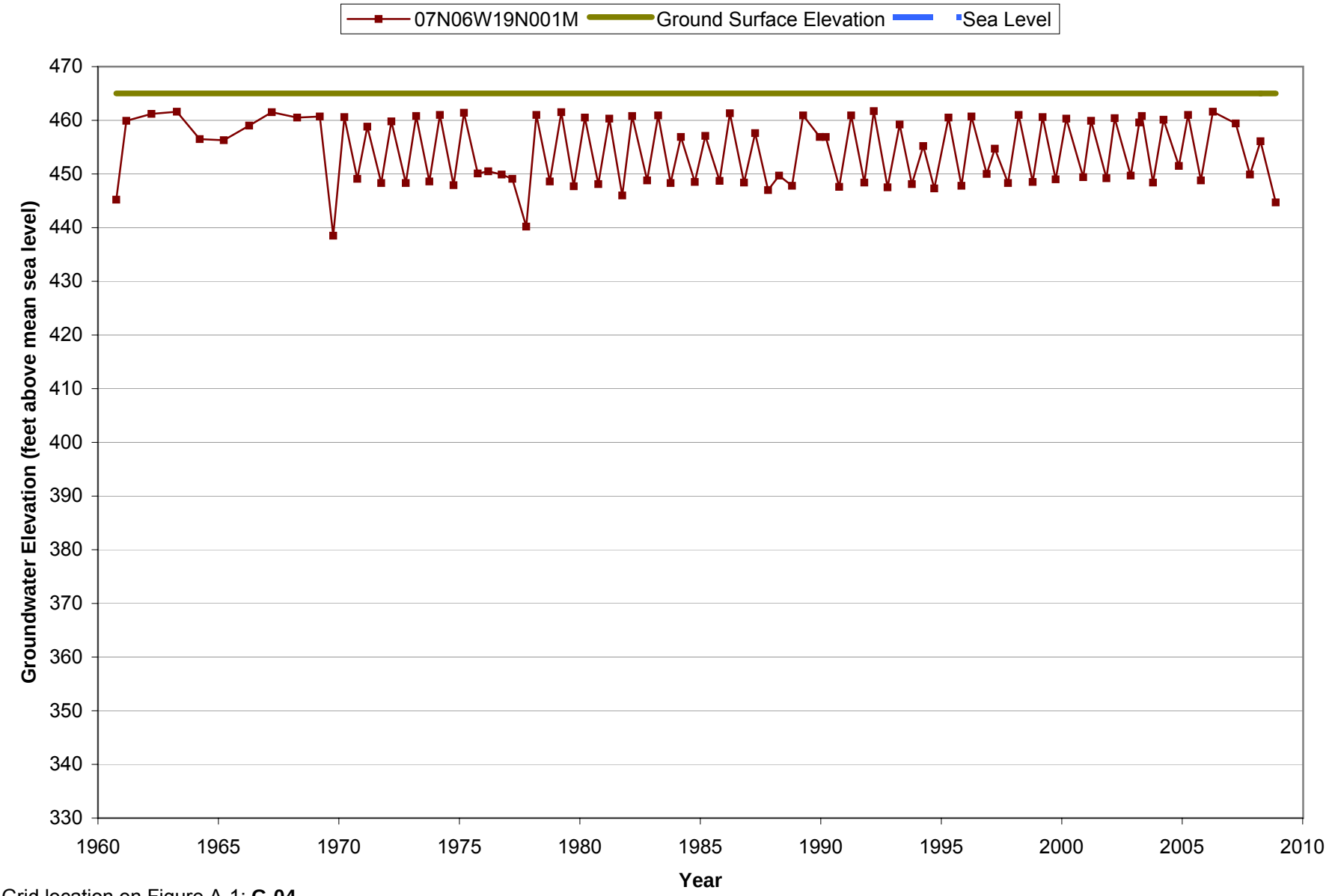
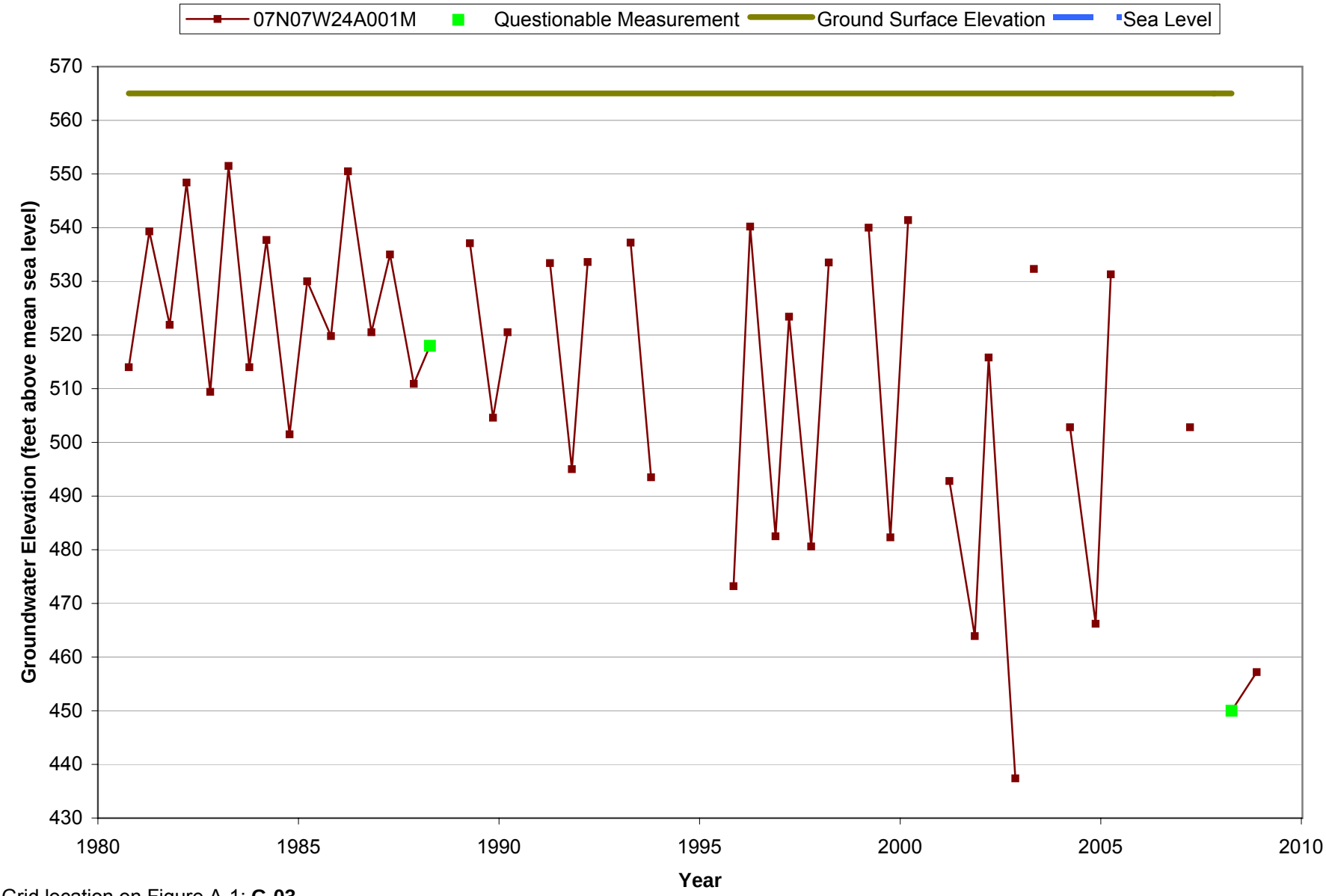
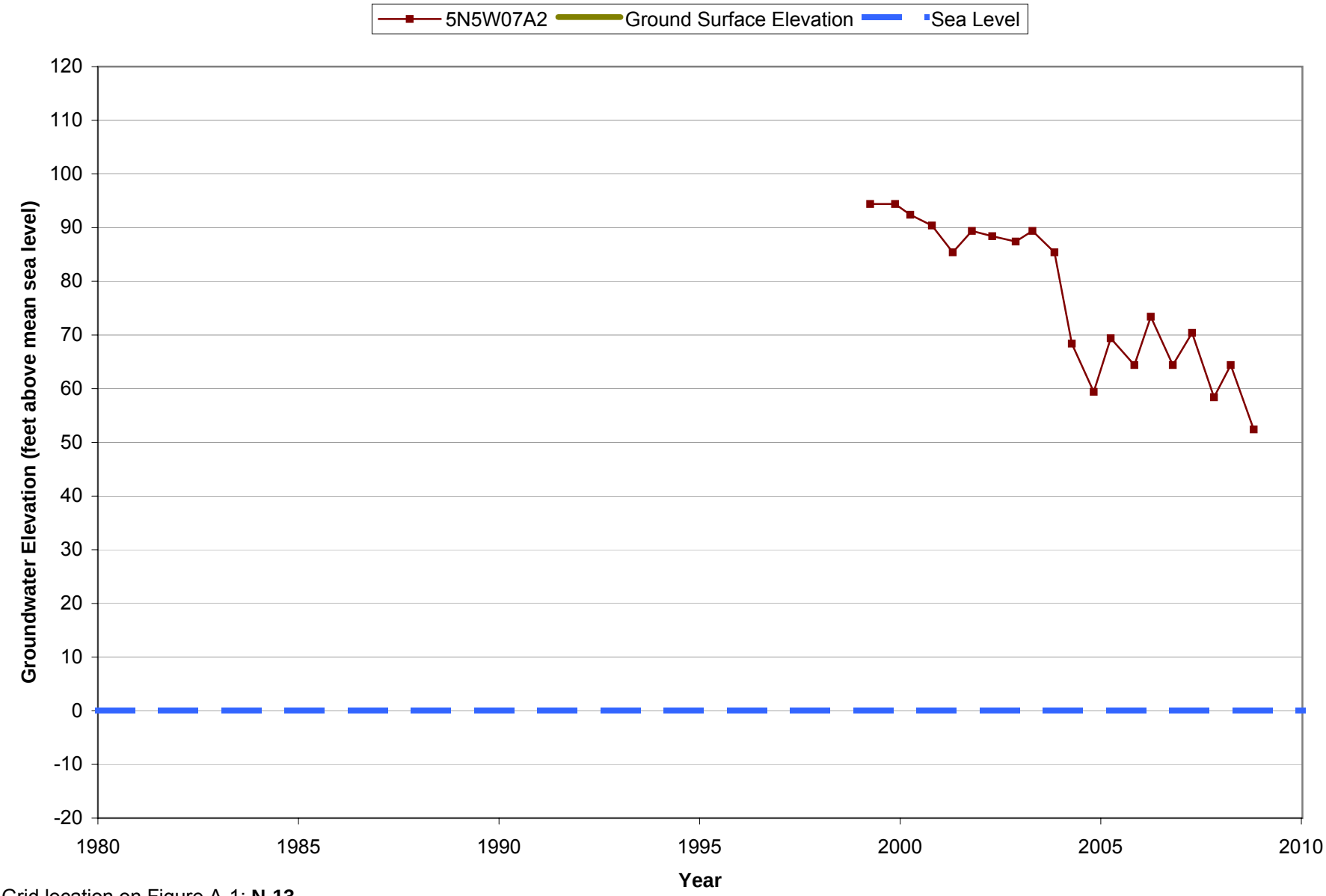


Grid location on Figure A-1: **G-04**

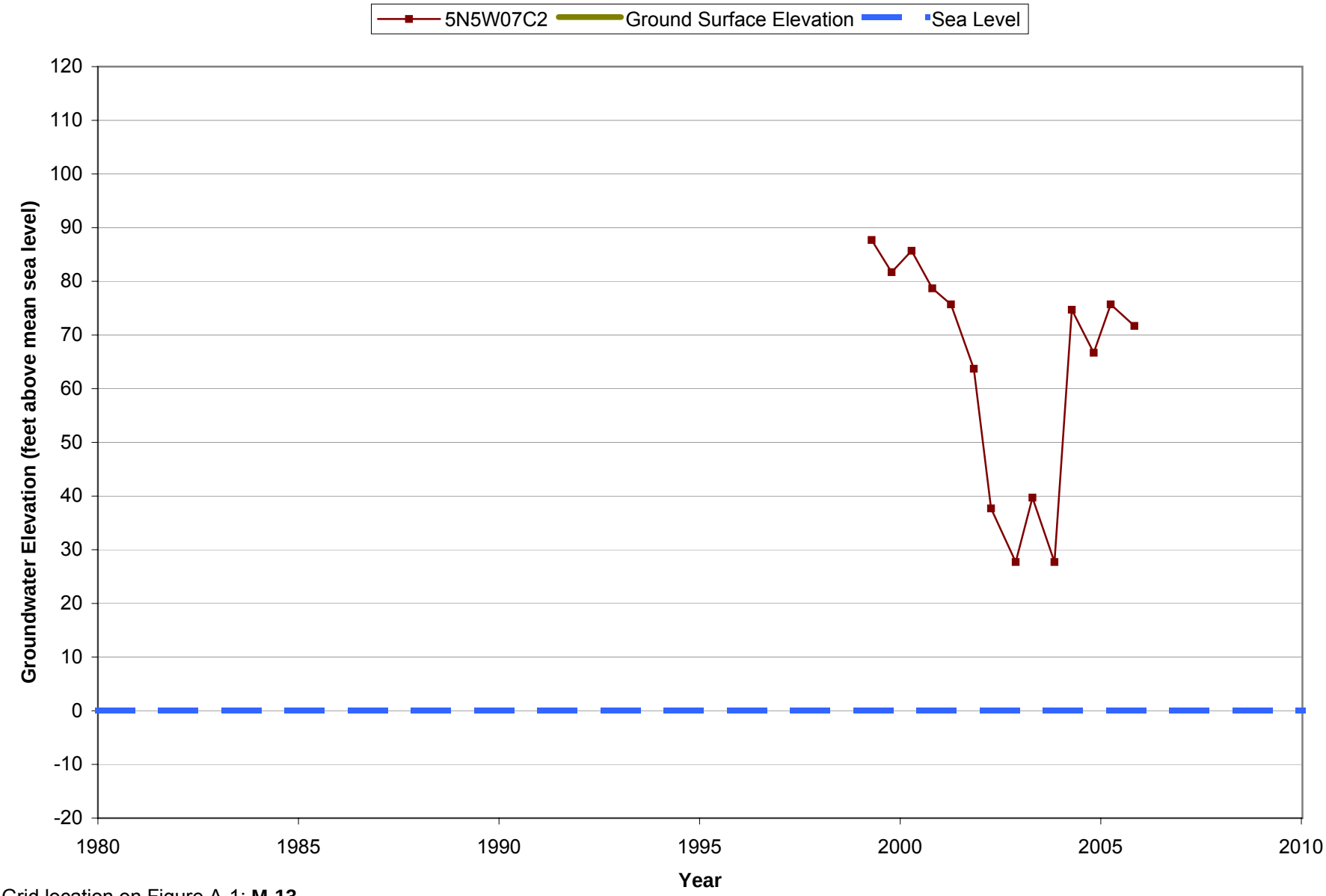


Grid location on Figure A-1: **G-03**

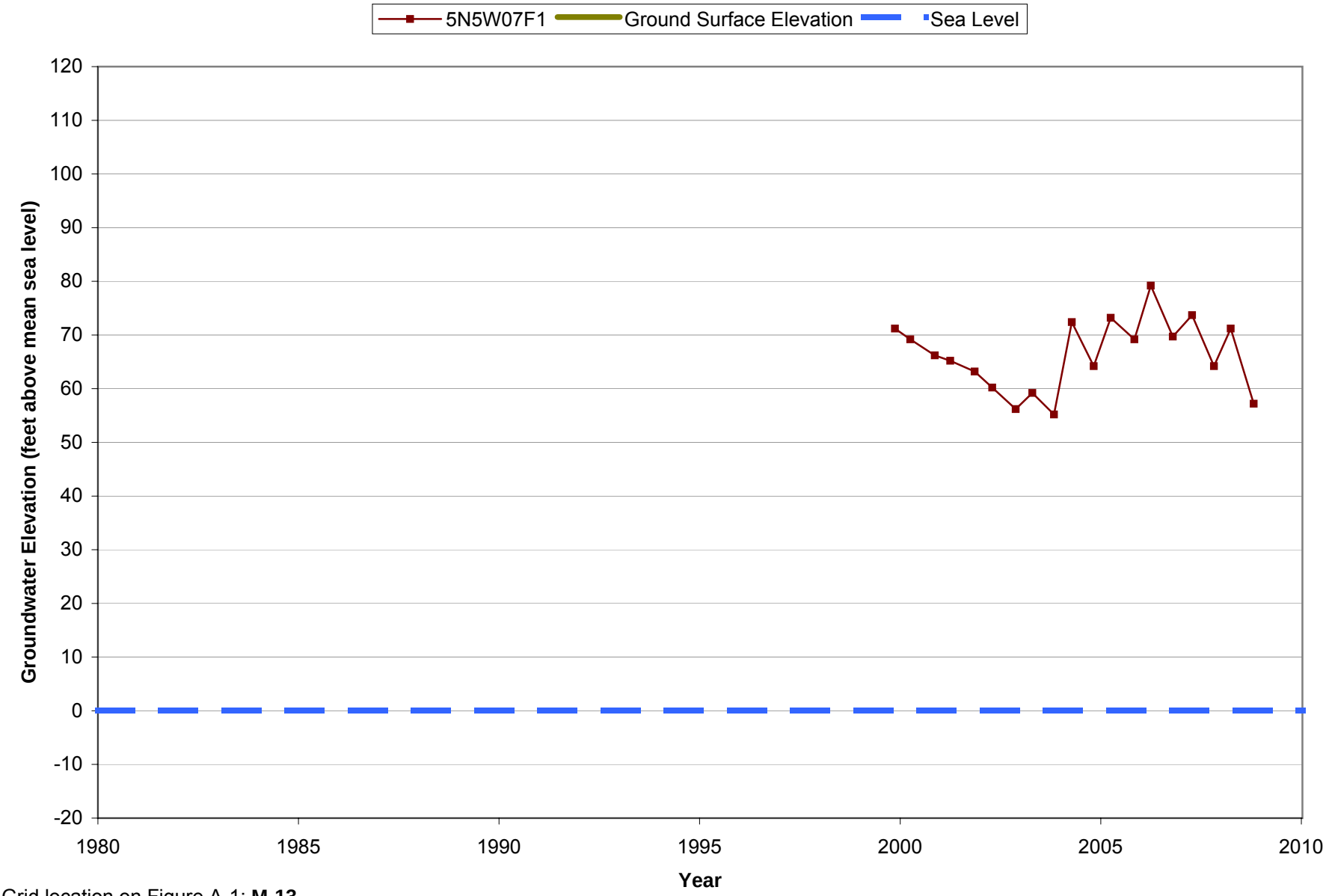
City of Sonoma Well Hydrographs



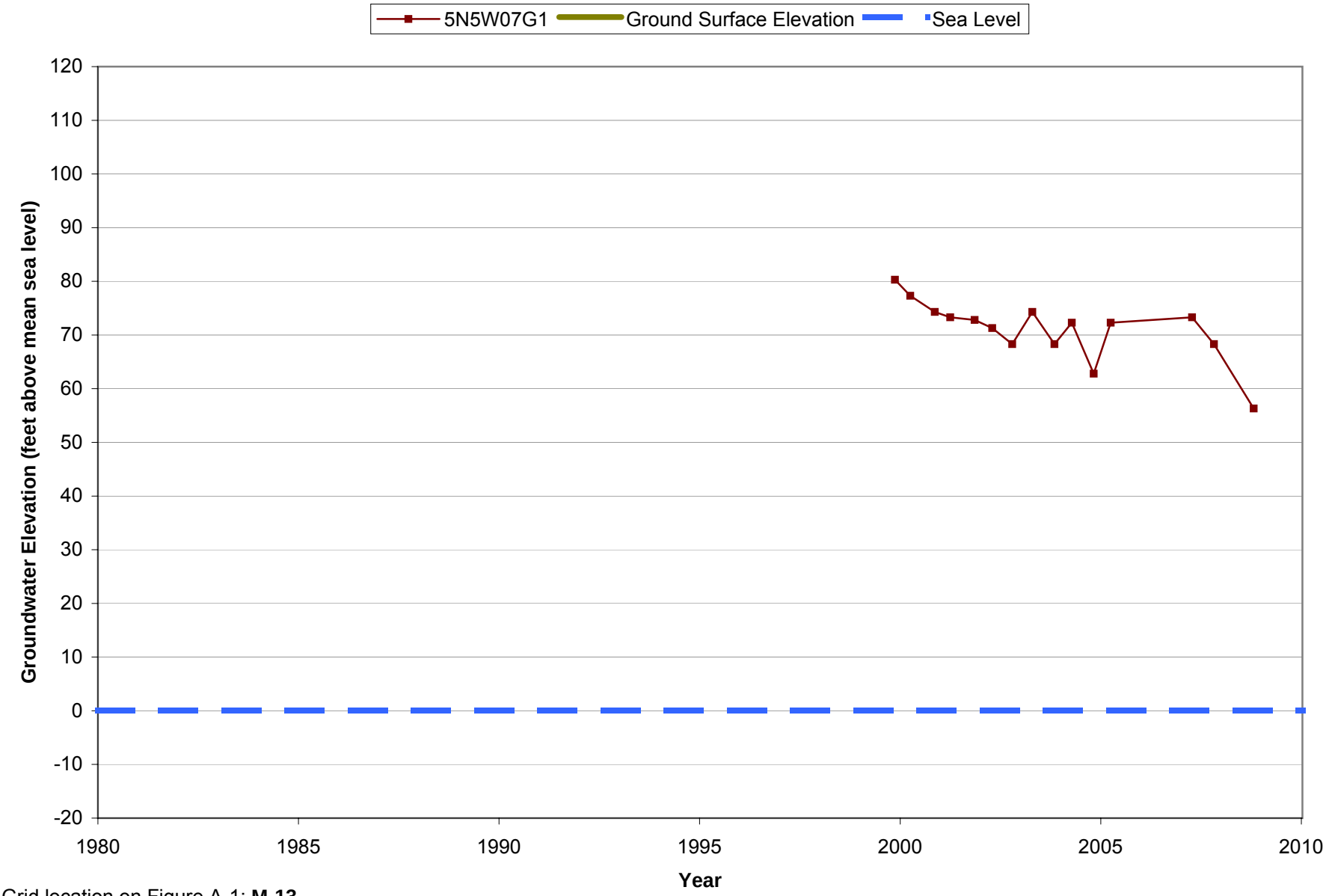
Grid location on Figure A-1: **N-13**



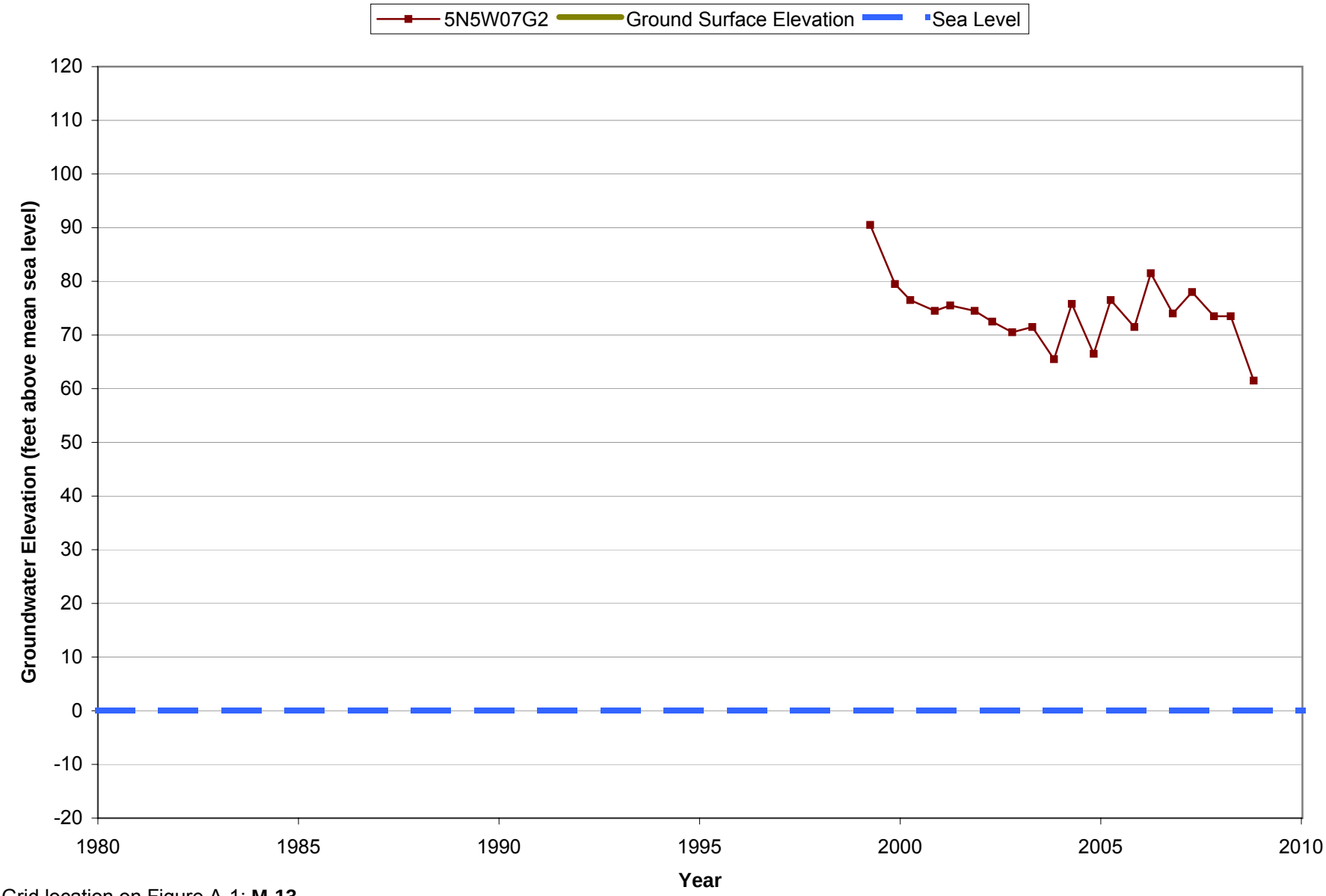
Grid location on Figure A-1: **M-13**



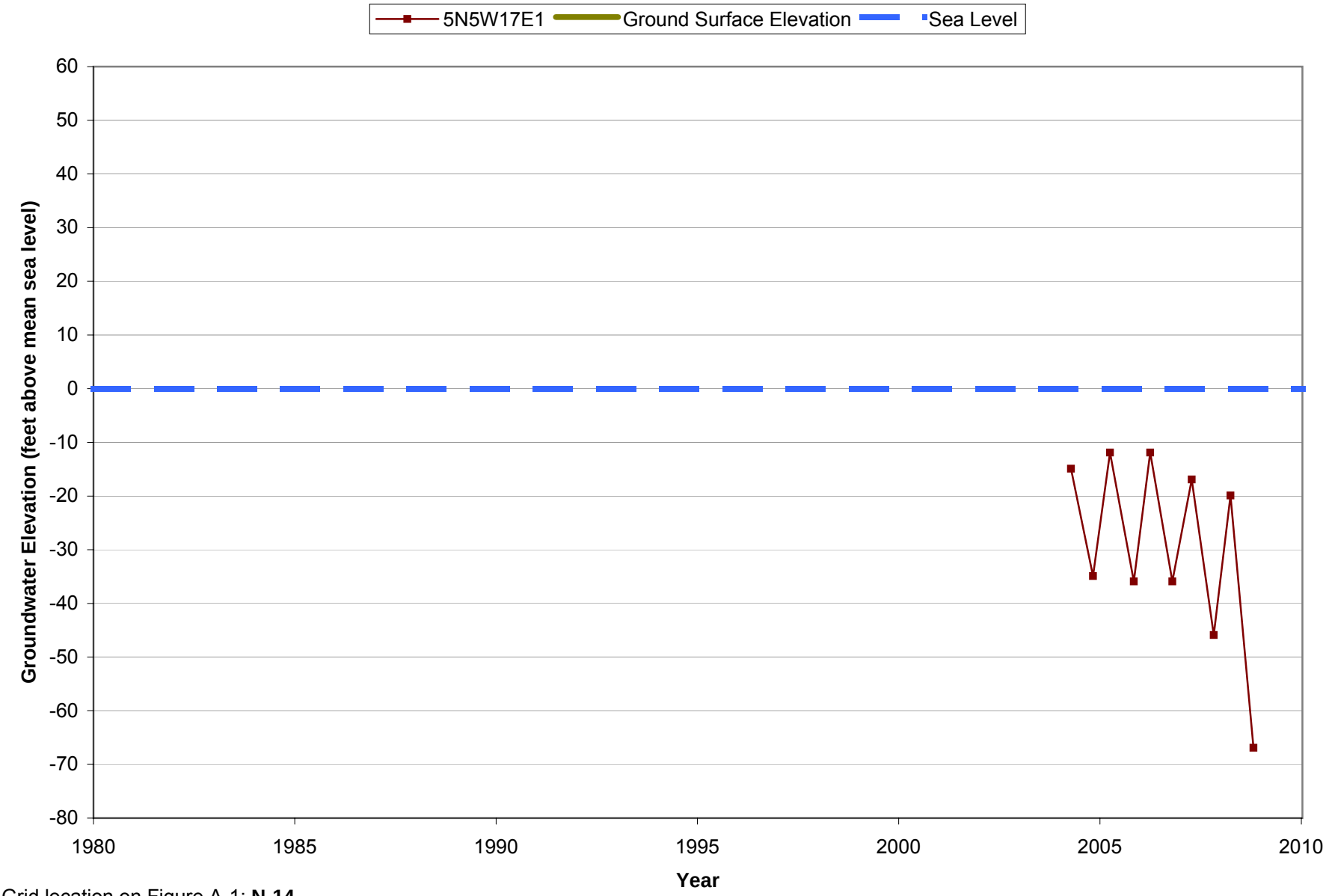
Grid location on Figure A-1: **M-13**



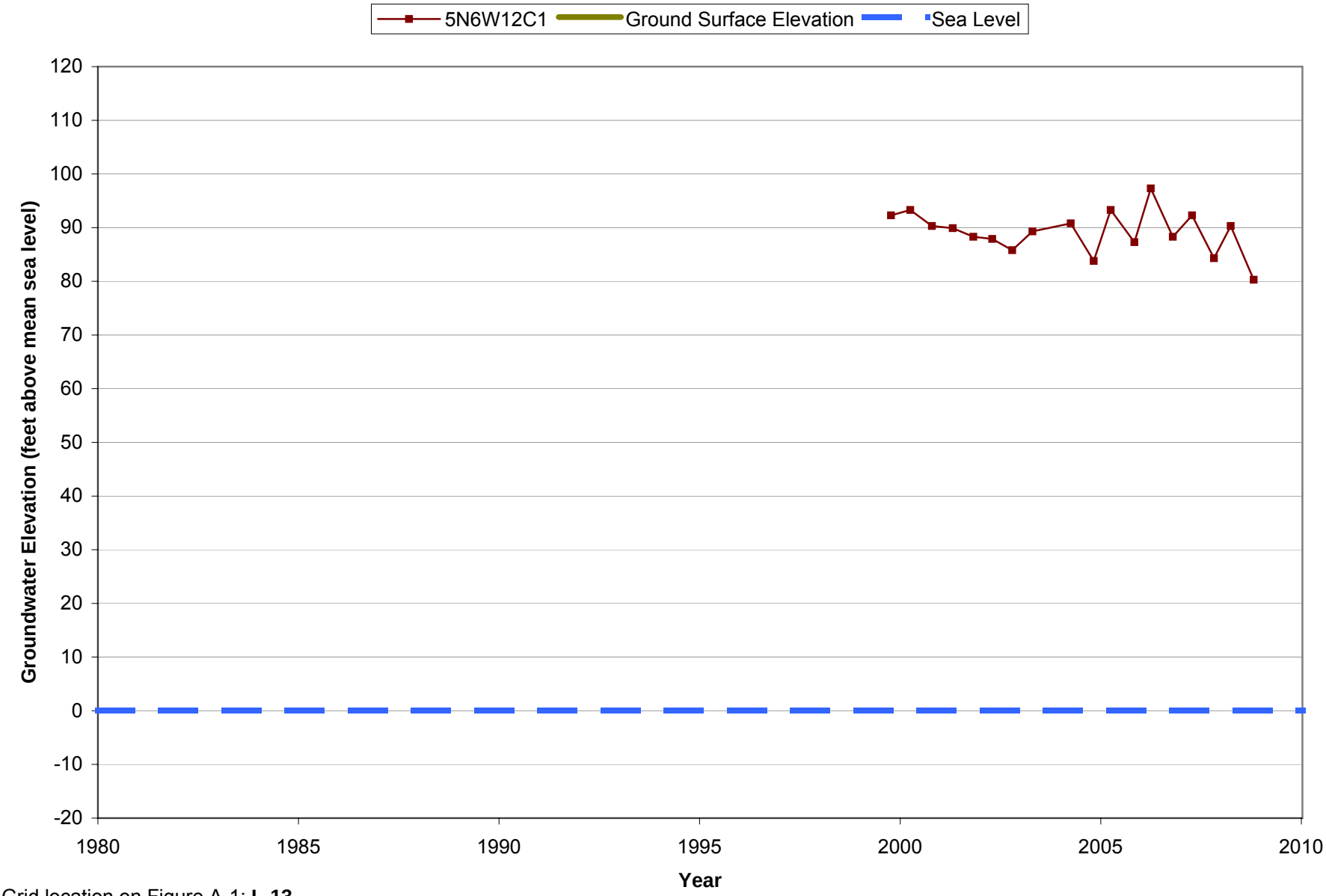
Grid location on Figure A-1: **M-13**



Grid location on Figure A-1: **M-13**



Grid location on Figure A-1: **N-14**



Grid location on Figure A-1: **L-13**

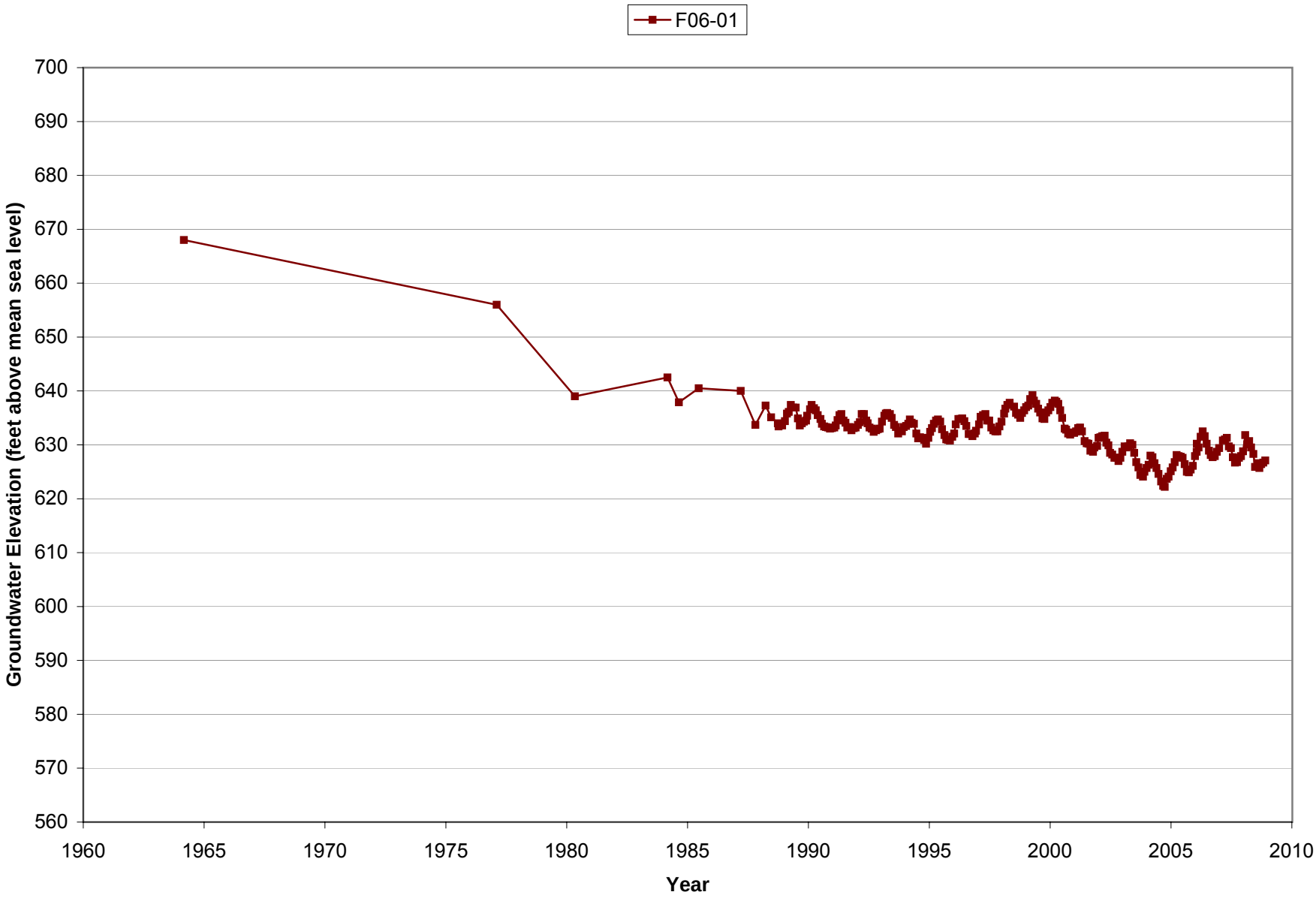
Volunteer Well Hydrographs

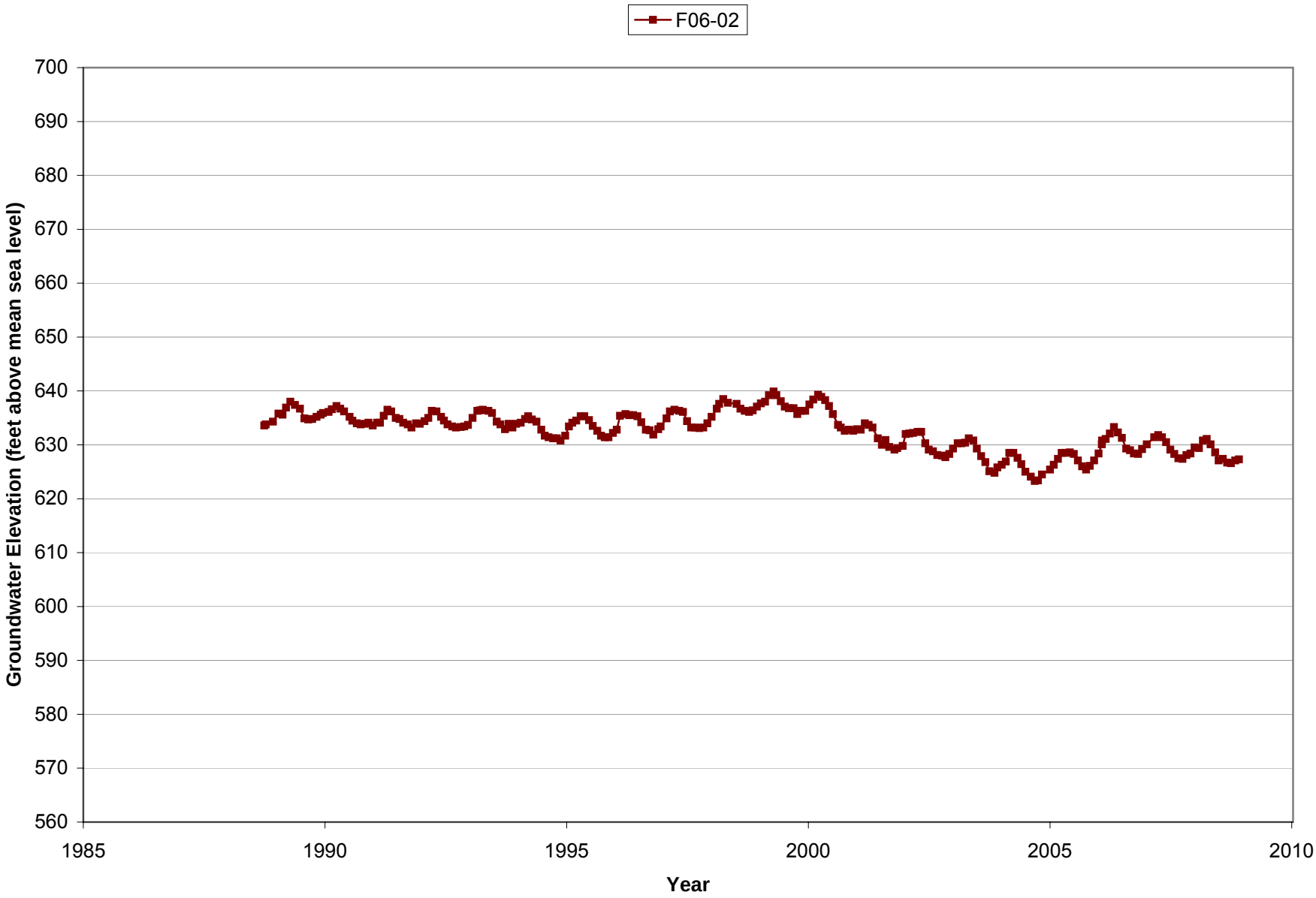
*Note:
These hydrographs are identified by an anonymous Well ID in the following format:

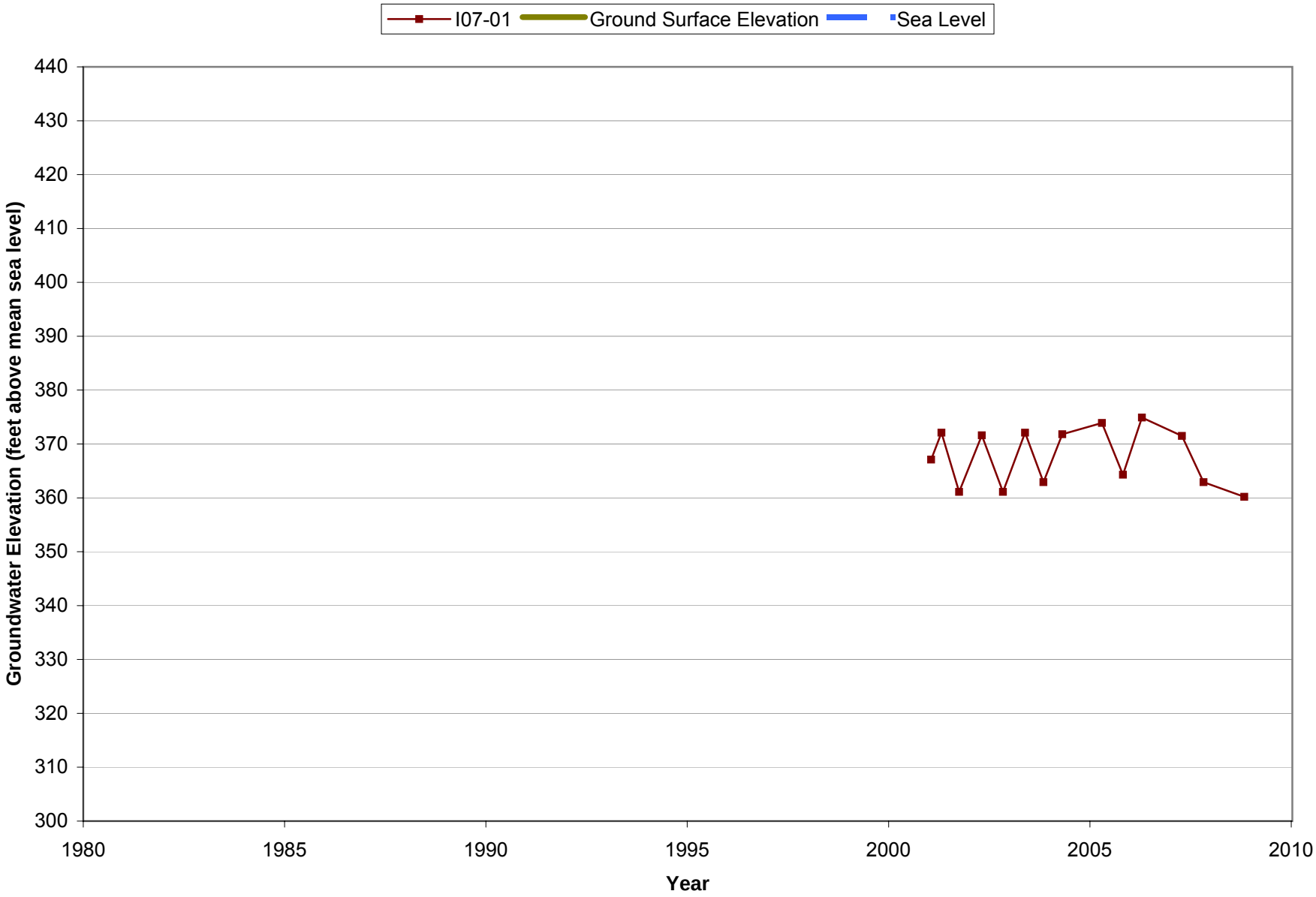
<Column><Row>-<ID>

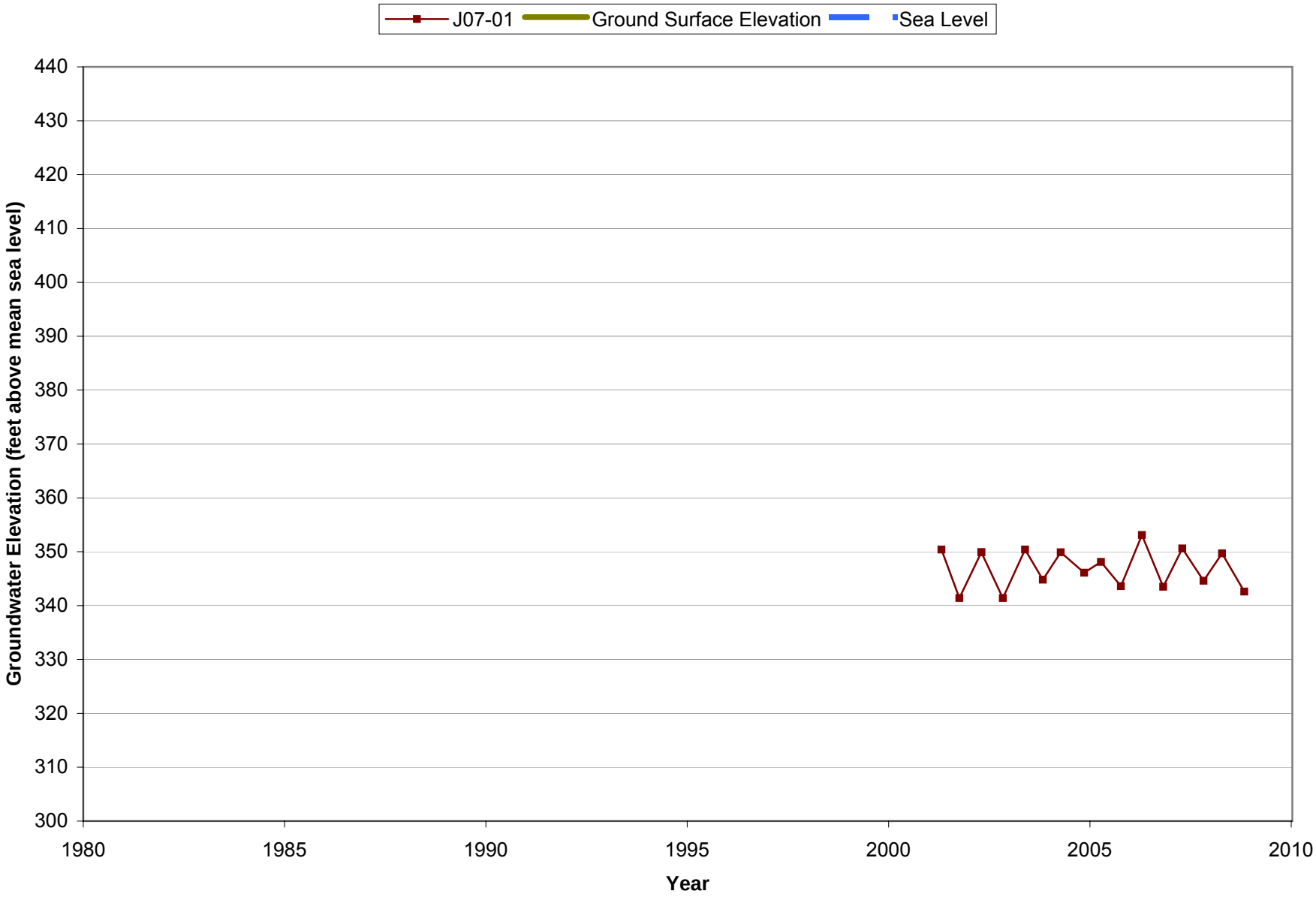
The column and row IDs correspond to the 1-mile grid shown in the well location map in Figure A-1. For example, well K13-06 is located in column K, row 13, and is the 6th well in that 1-mile cell.

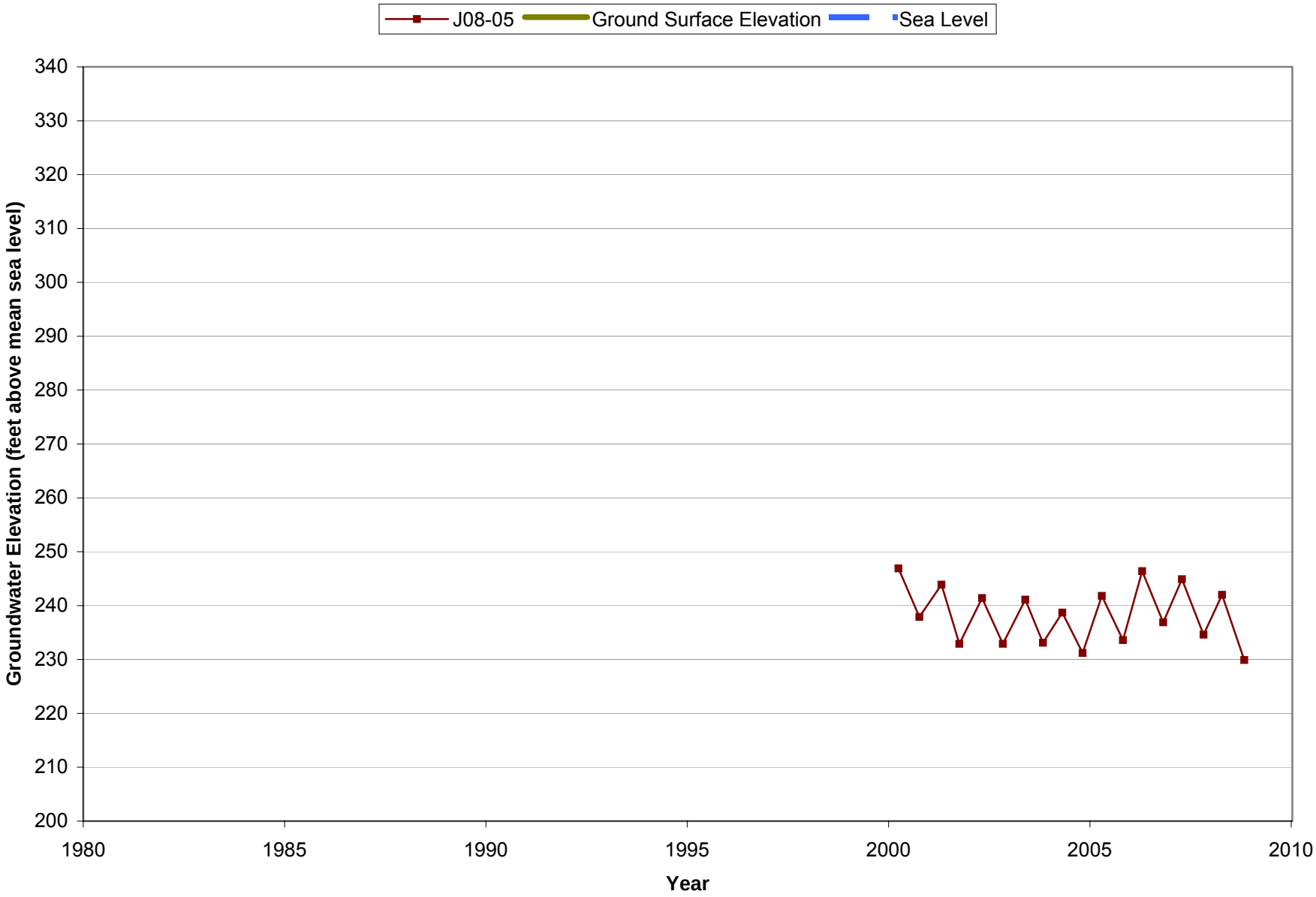
They hydrographs are included in this section from north to south (increasing rows) in the valley.

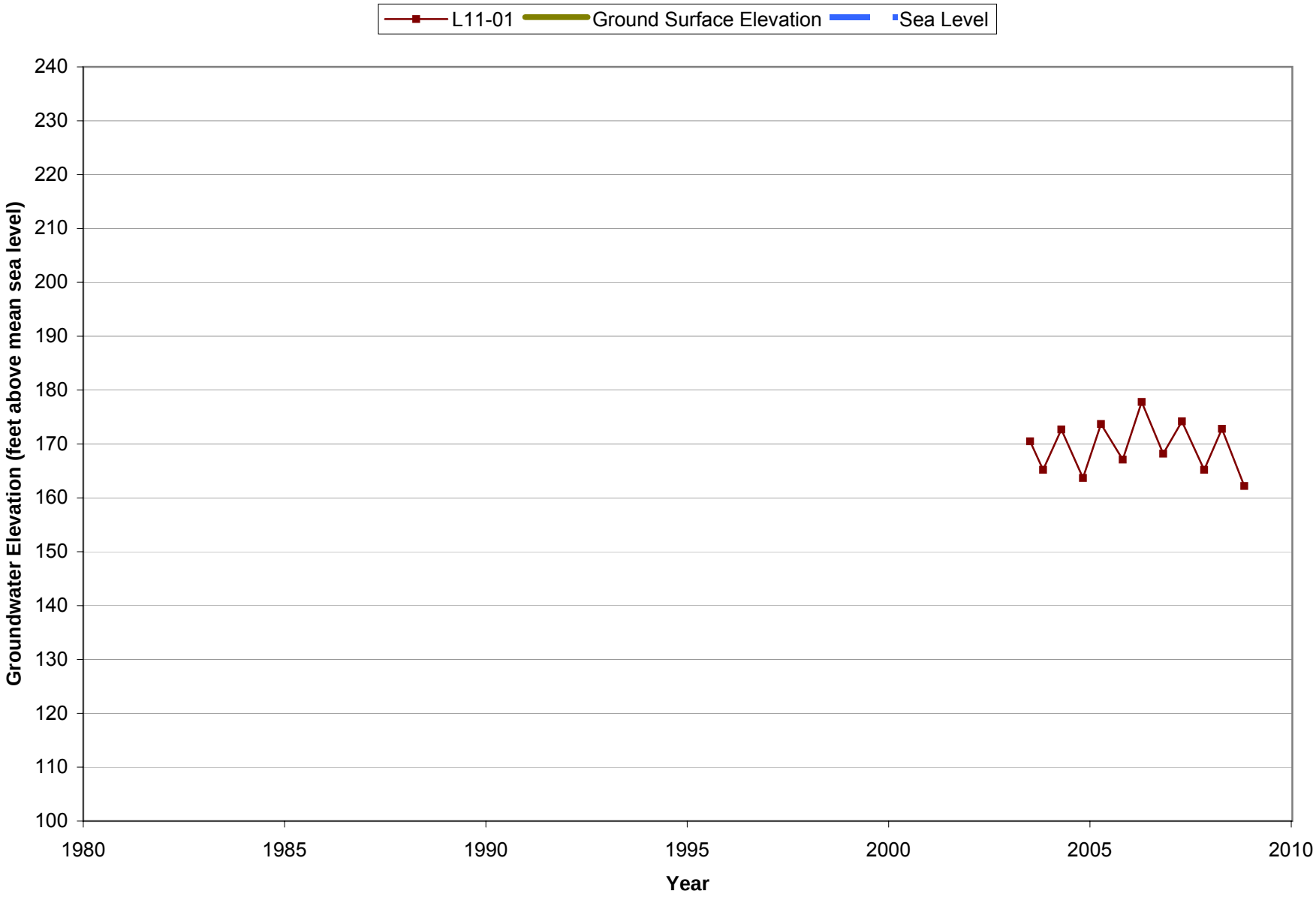

F06-01
Groundwater Elevation (feet above mean sea level)
700
690
680
670
660
650
640
630
620
610
600
590
580
570
560
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
Year

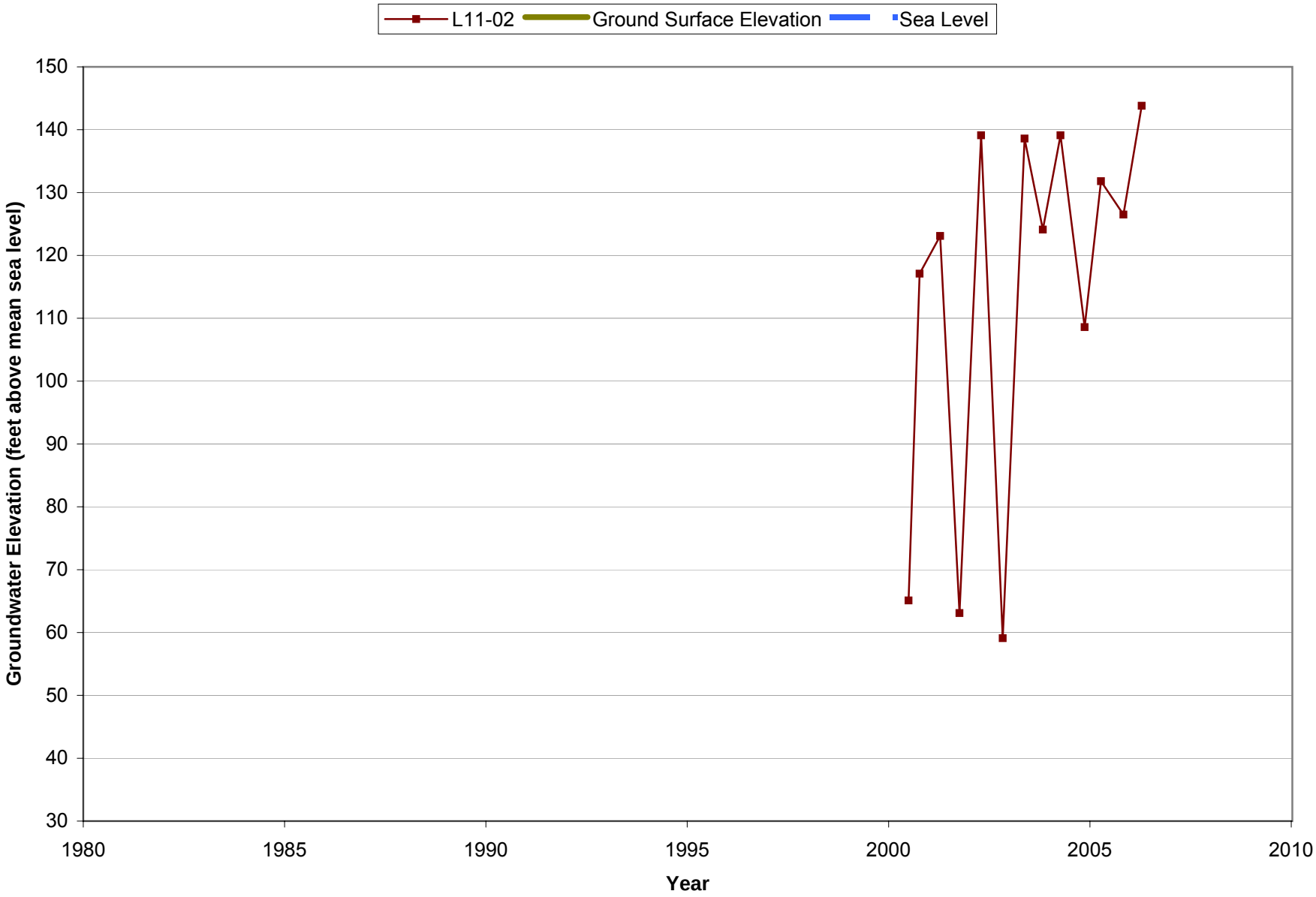

F06-02
700
690
680
670
660
650
640
630
620
610
600
590
580
570
560
Groundwater Elevation (feet above mean sea level)
1985
1990
1995
2000
2005
2010
Year

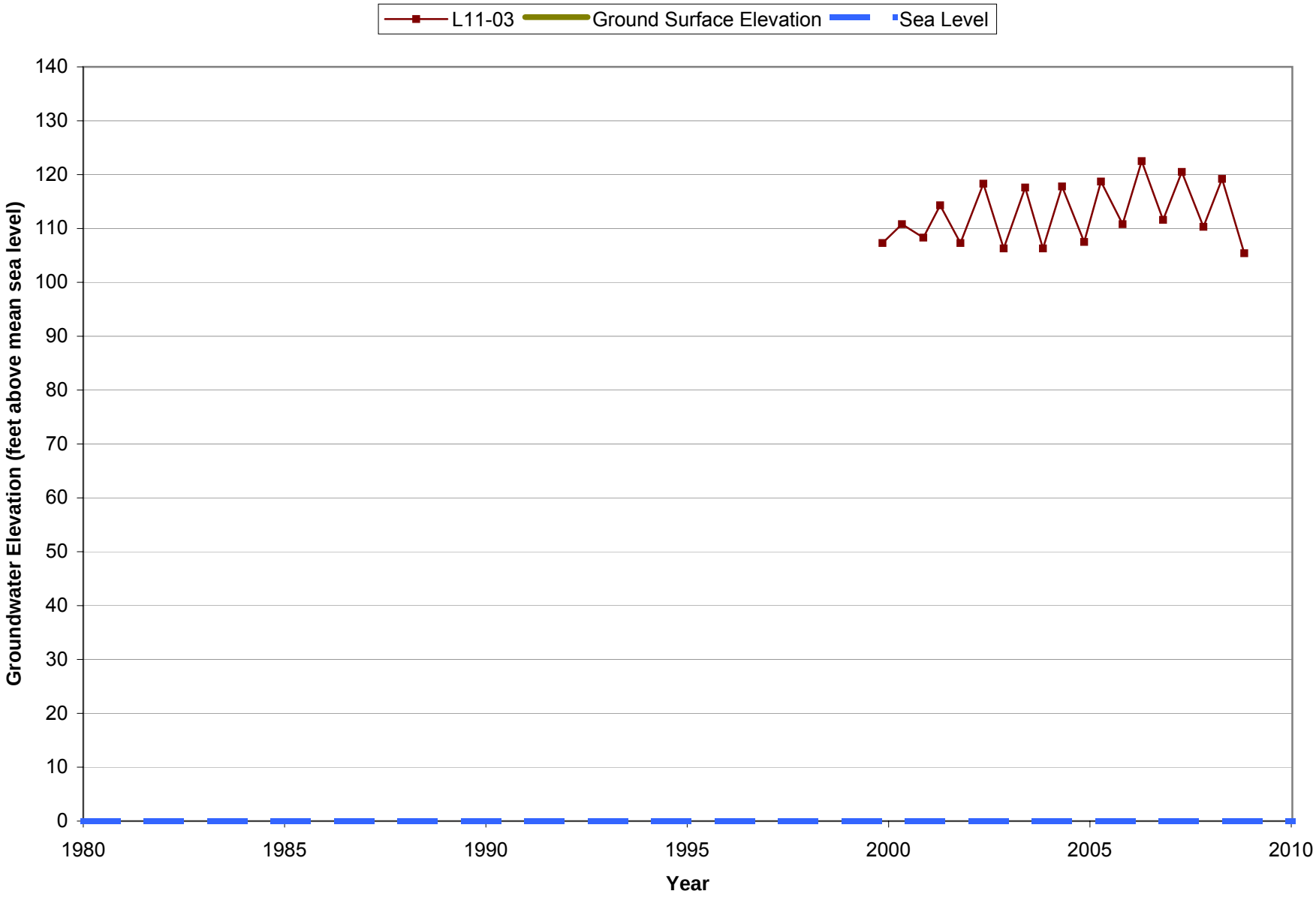

I07-01
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
440
430
420
410
400
390
380
370
360
350
340
330
320
310
300
1980
1985
1990
1995
2000
2005
2010
Year

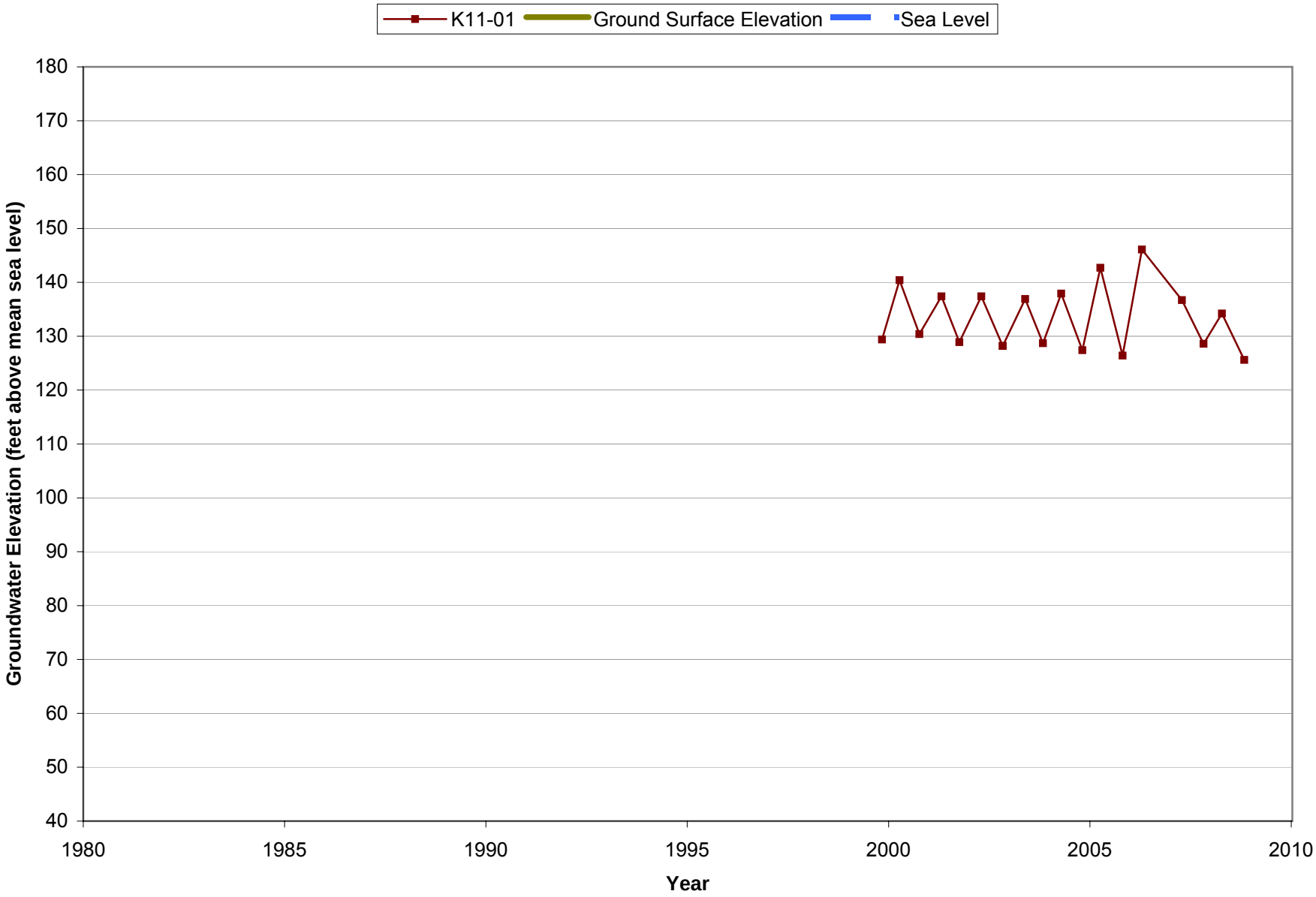

J07-01
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
440
430
420
410
400
390
380
370
360
350
340
330
320
310
300
1980
1985
1990
1995
2000
2005
2010
Year

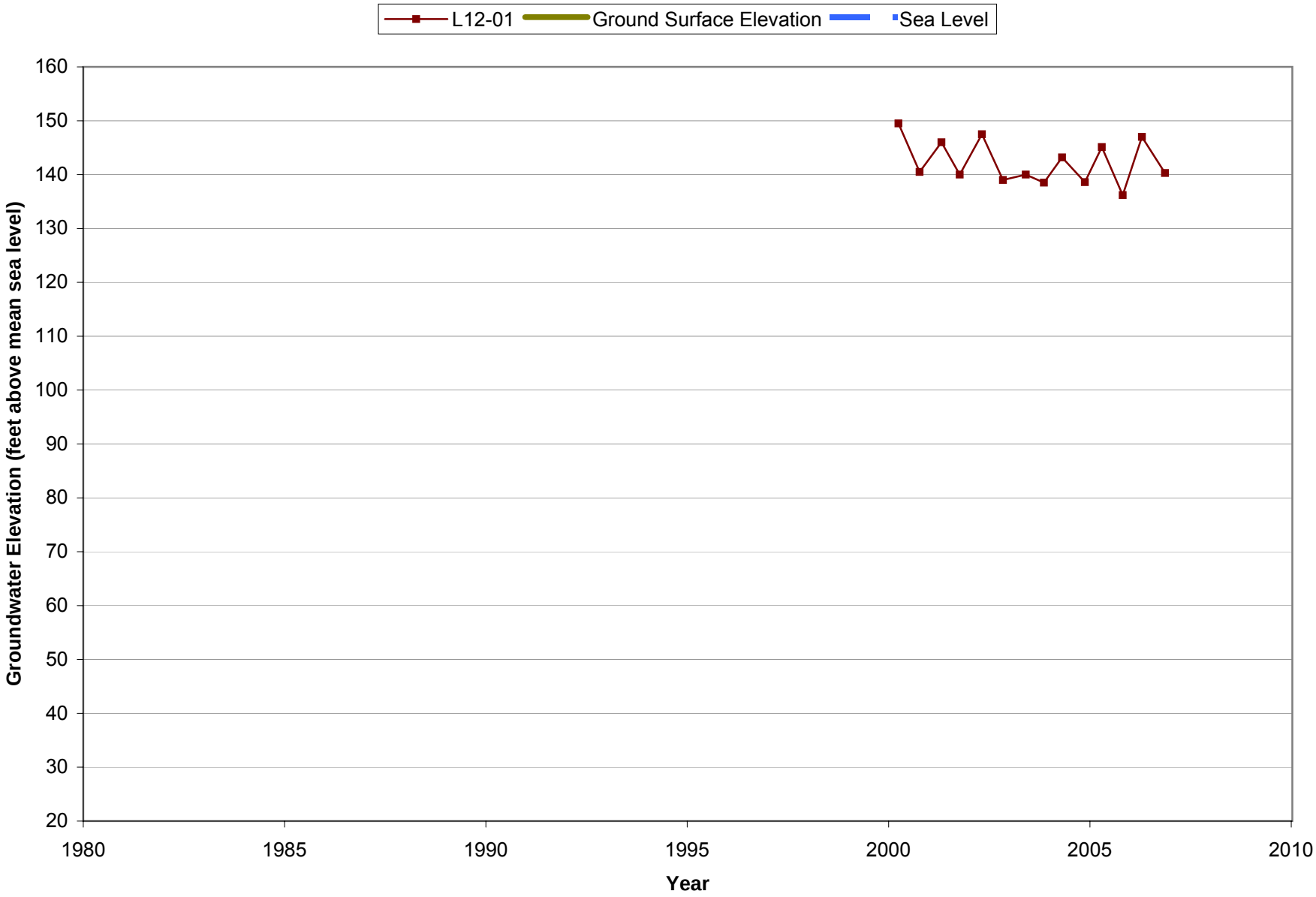

J08-05
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
340
330
320
310
300
290
280
270
260
250
240
230
220
210
200
1980
1985
1990
1995
2000
2005
2010
Year

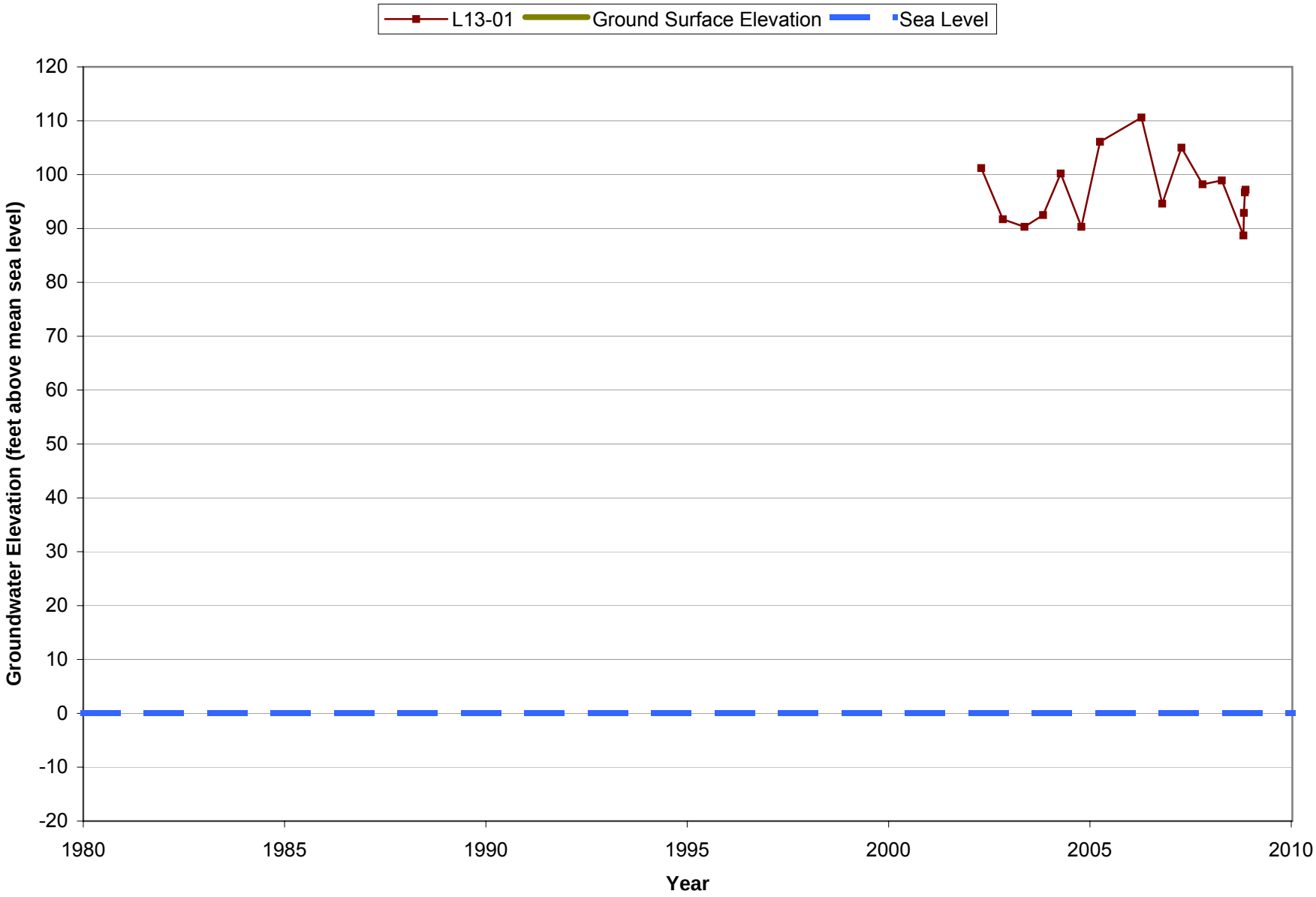

L11-01
Ground Surface Elevation
Sea Level
240
230
220
210
200
190
180
170
160
150
140
130
120
110
100
Groundwater Elevation (feet above mean sea level)
1980
1985
1990
1995
2000
2005
2010
Year

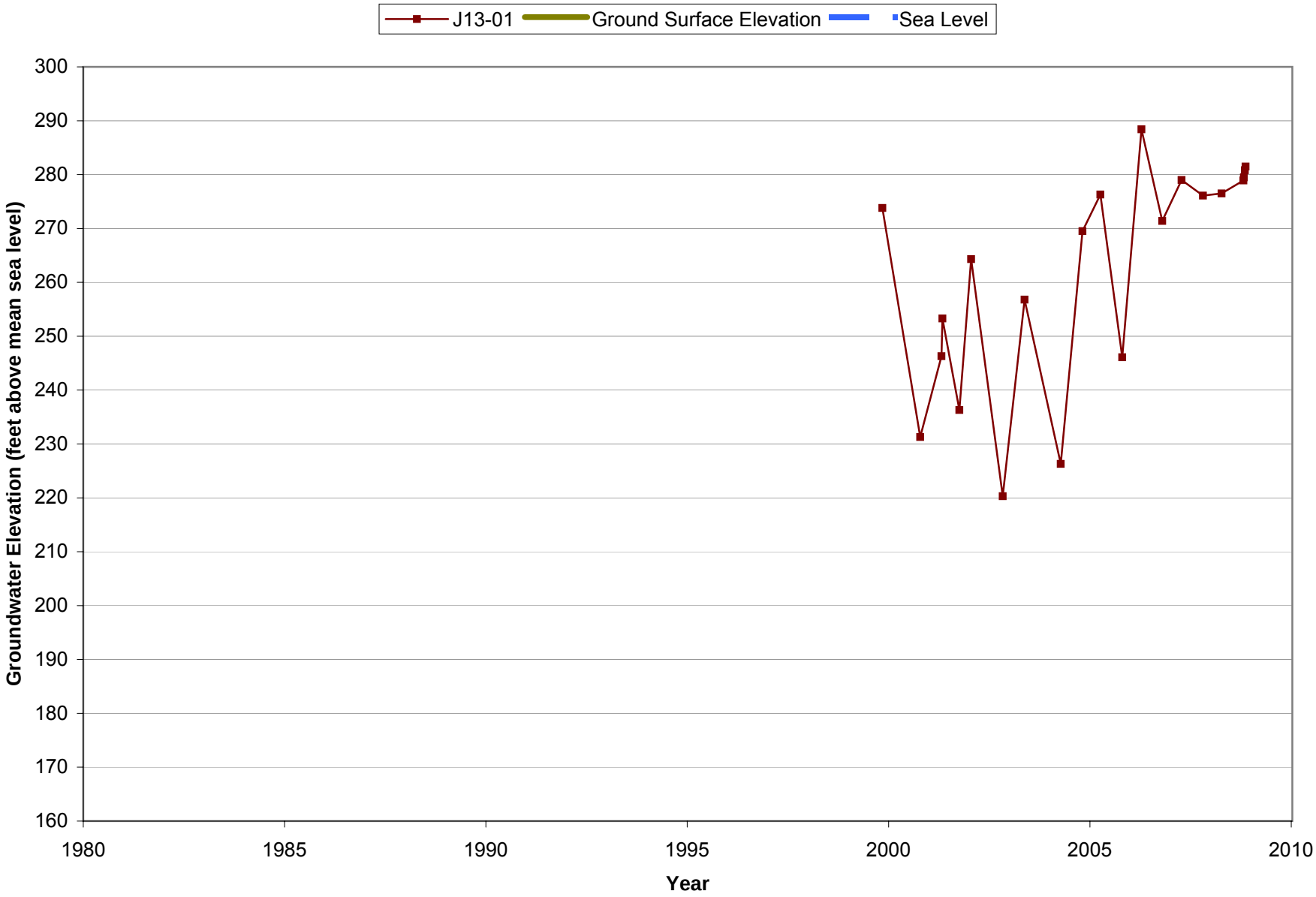

L11-02
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
150
140
130
120
110
100
90
80
70
60
50
40
30
1980
1985
1990
1995
2000
2005
2010
Year

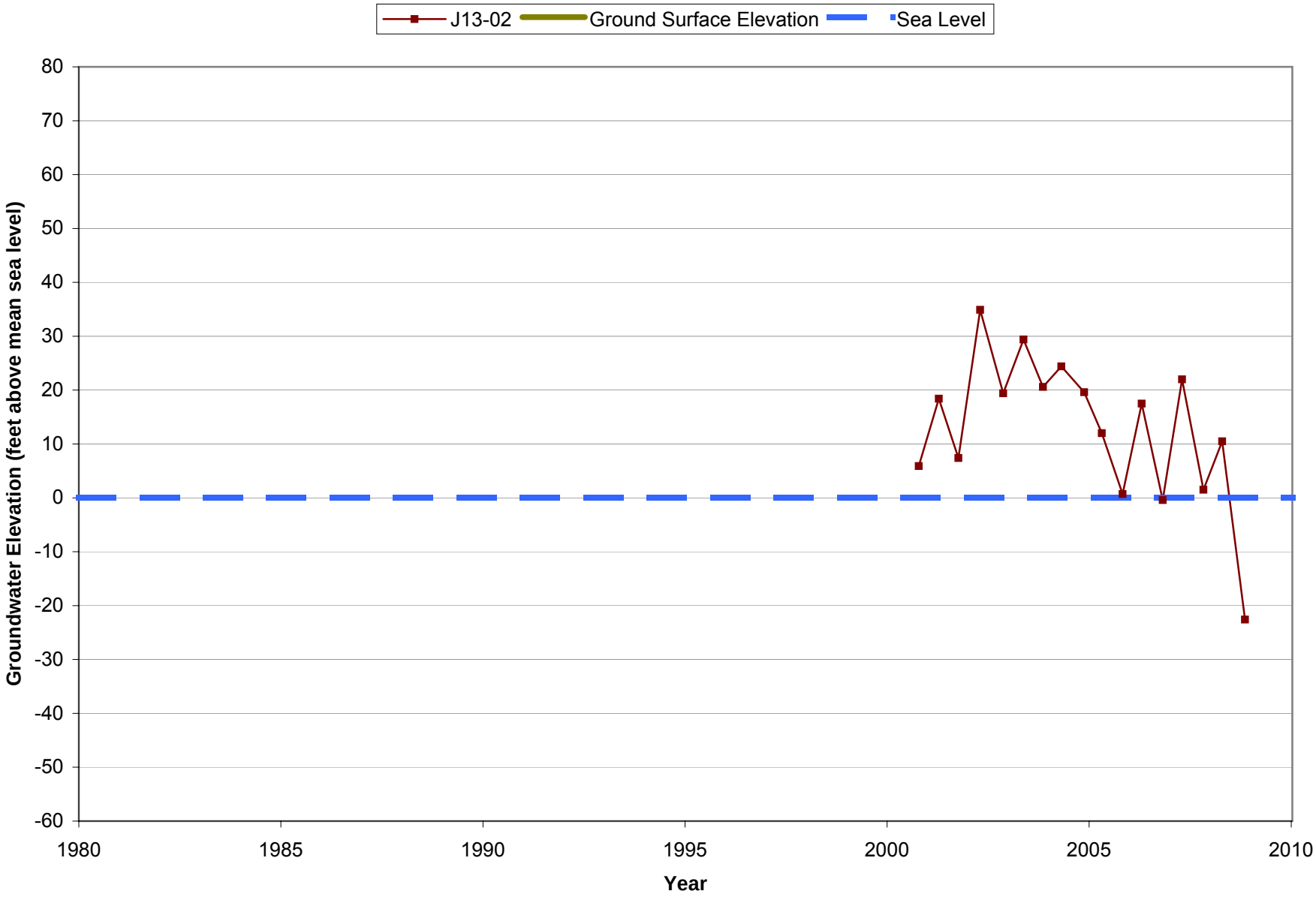

L11-03
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
1980
1985
1990
1995
2000
2005
2010
Year

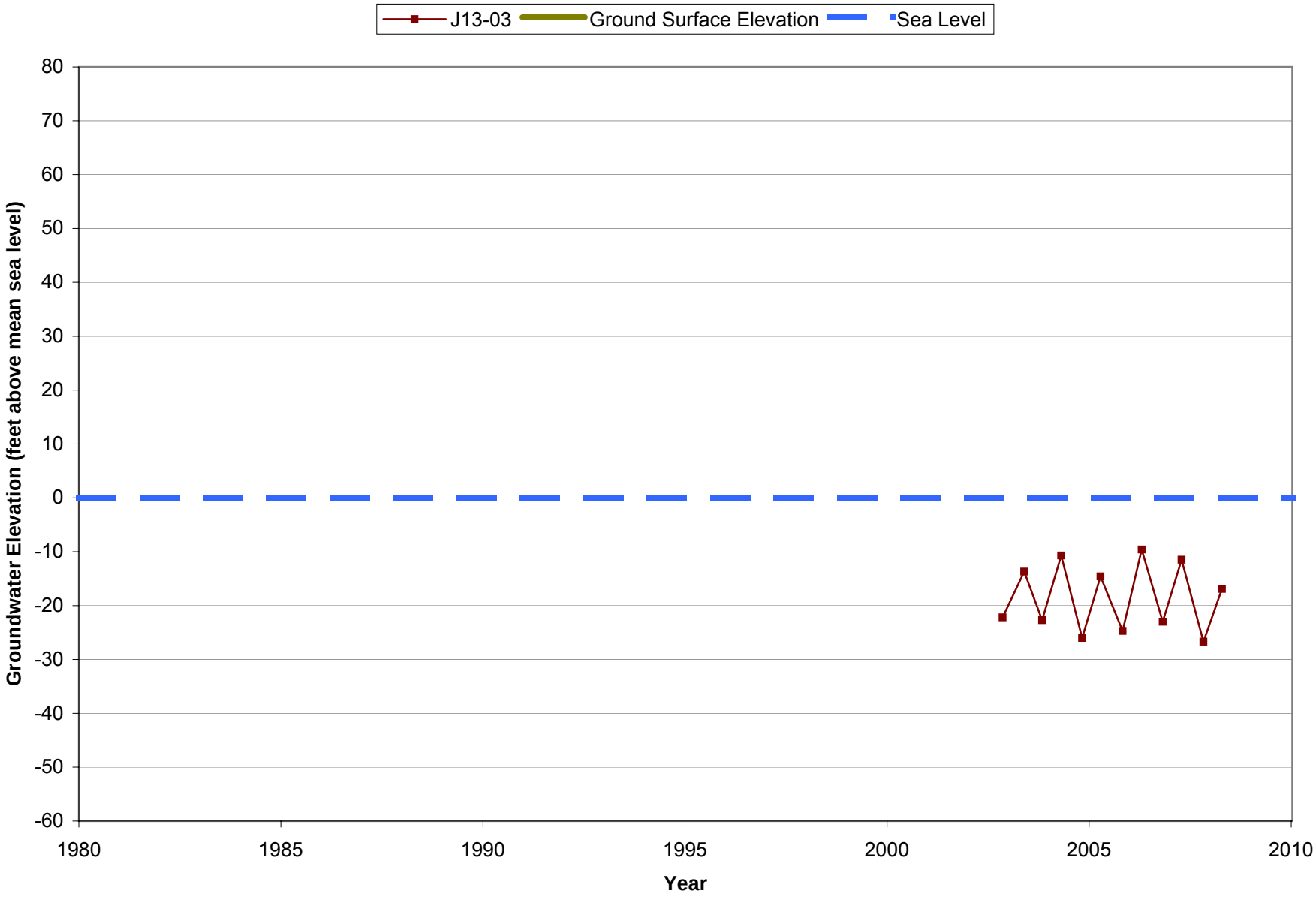

K11-01
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
1980
1985
1990
1995
2000
2005
2010
Year

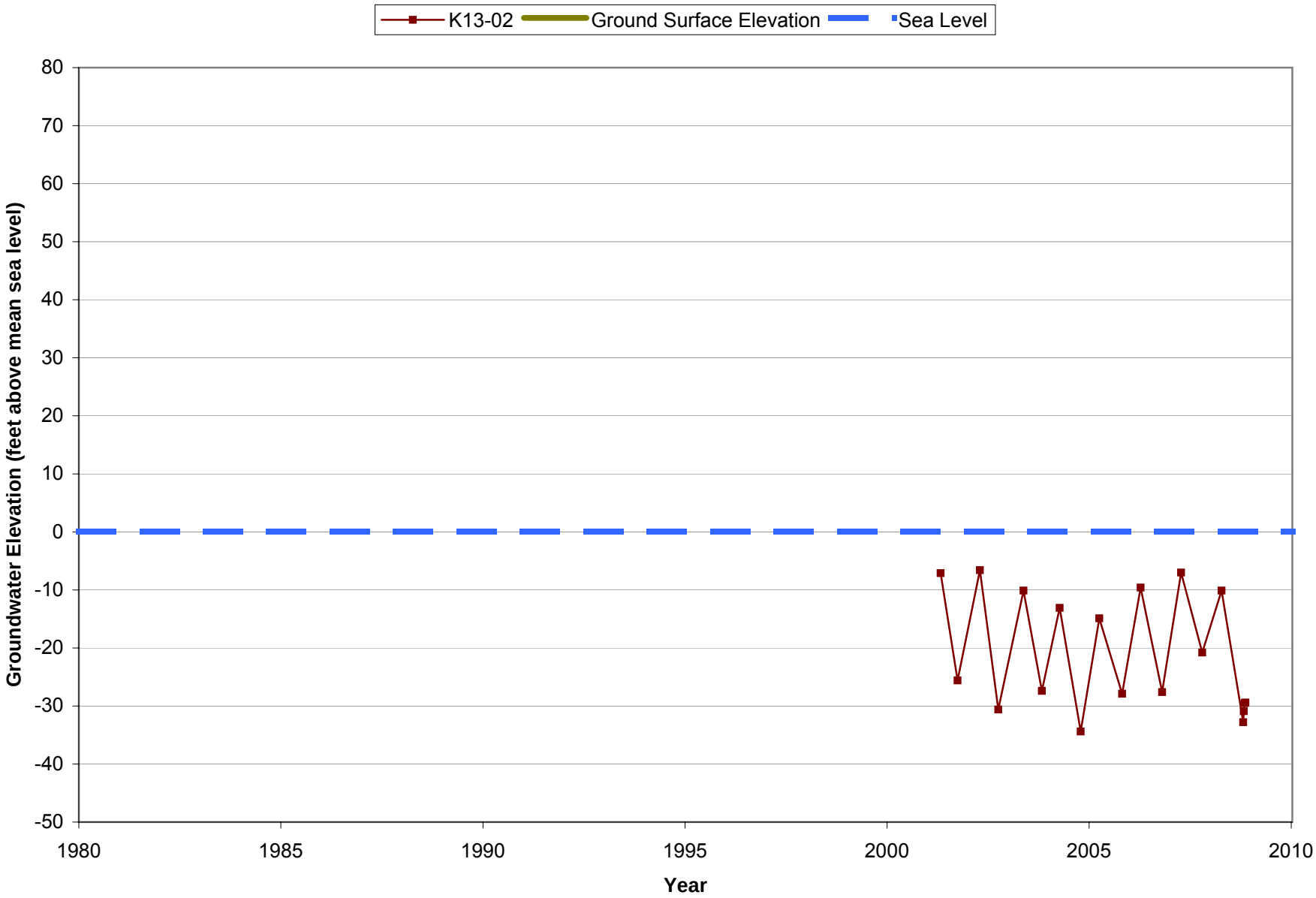

L12-01
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
1980
1985
1990
1995
2000
2005
2010
Year

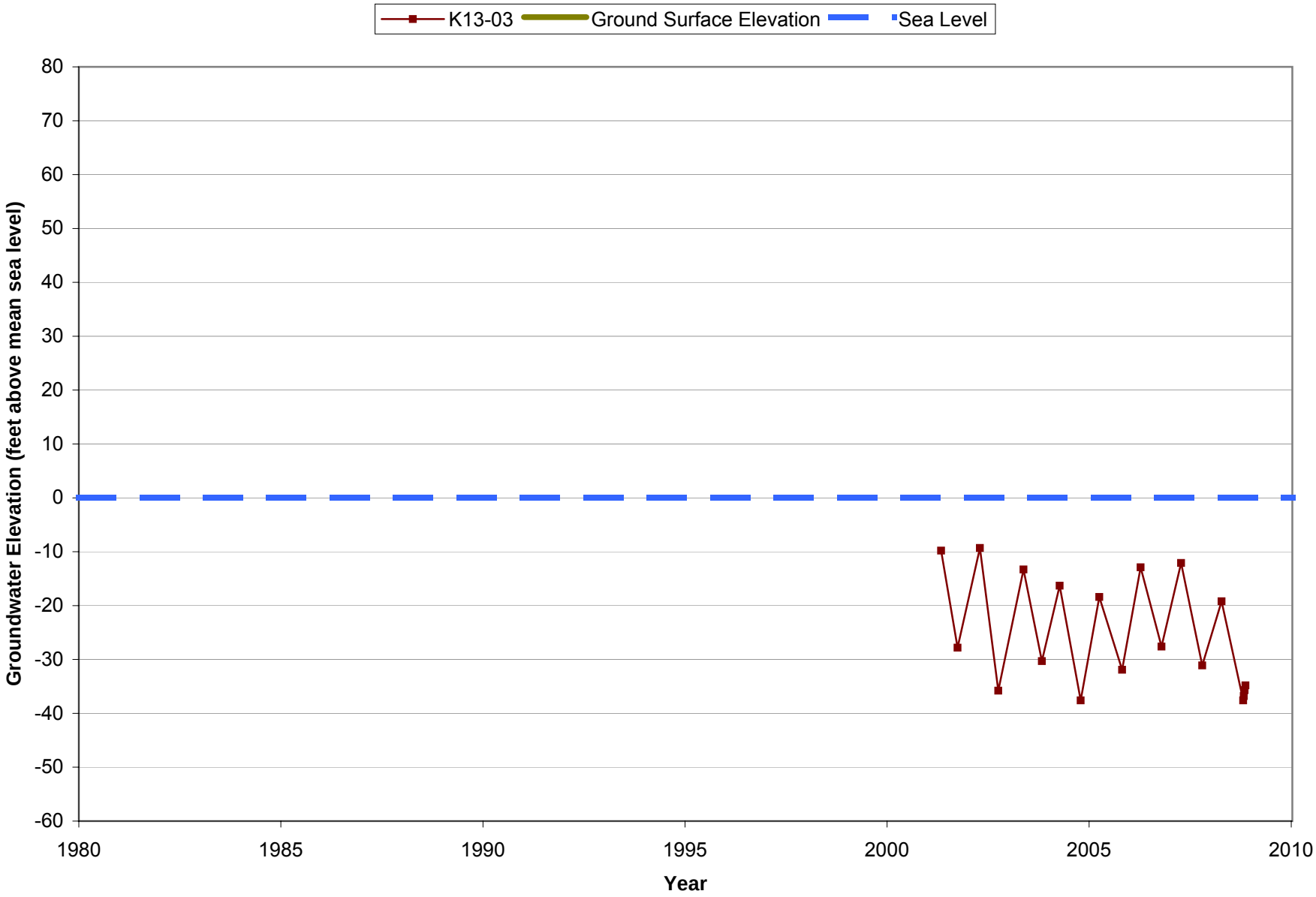

L13-01
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
1980
1985
1990
1995
2000
2005
2010
Year

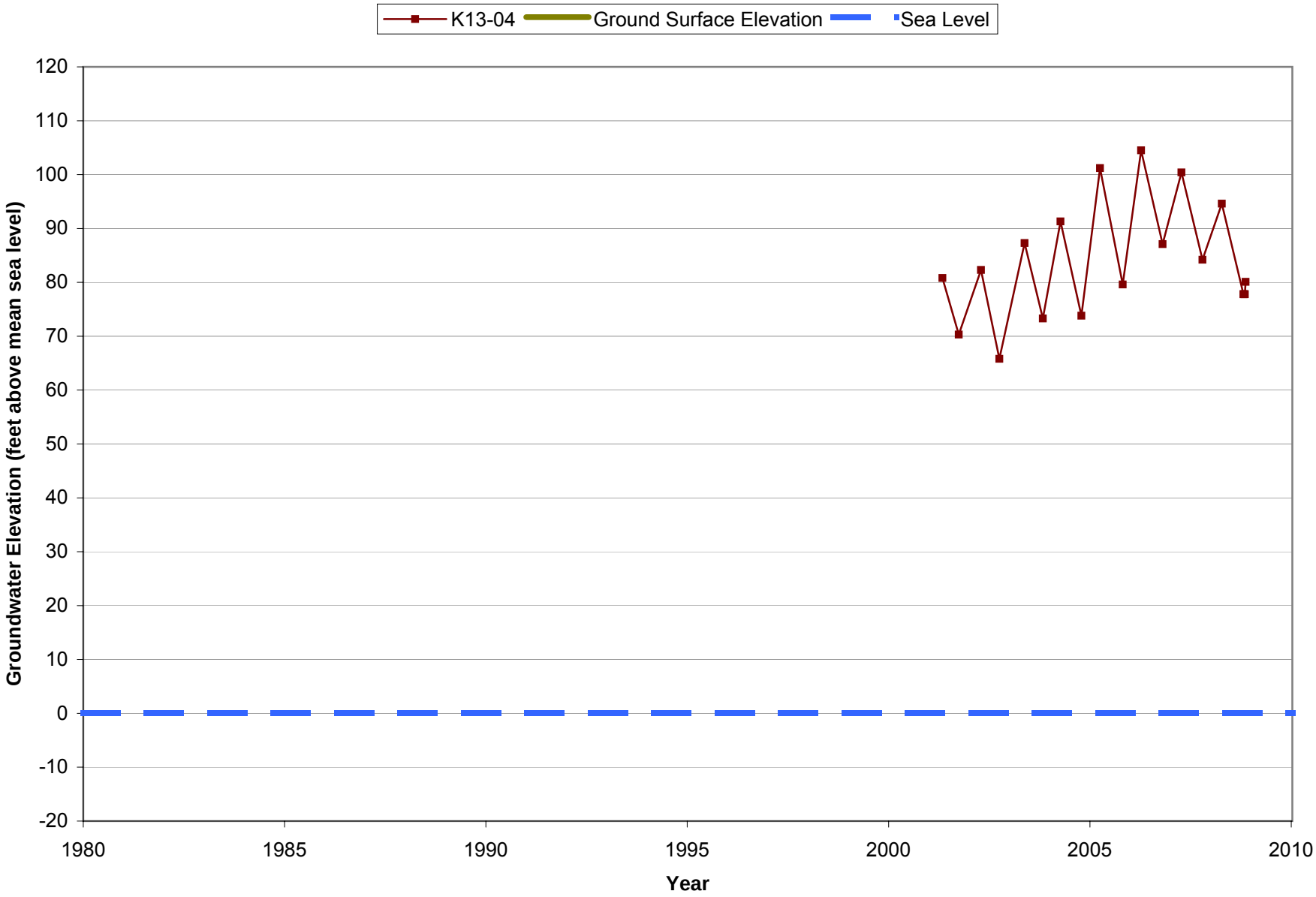

J13-01
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
300
290
280
270
260
250
240
230
220
210
200
190
180
170
160
1980
1985
1990
1995
2000
2005
2010
Year

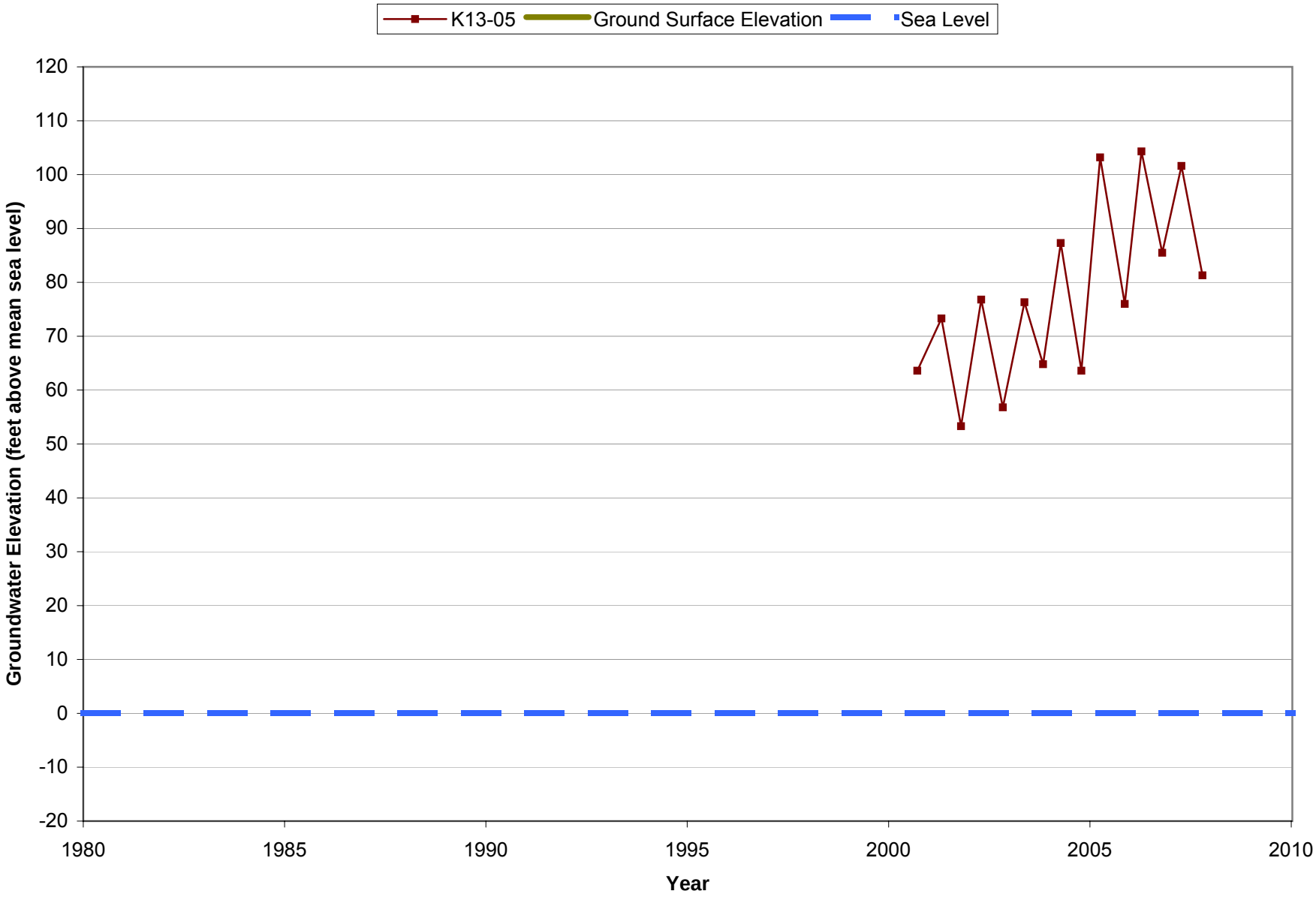

J13-02
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
-60
1980
1985
1990
1995
2000
2005
2010
Year

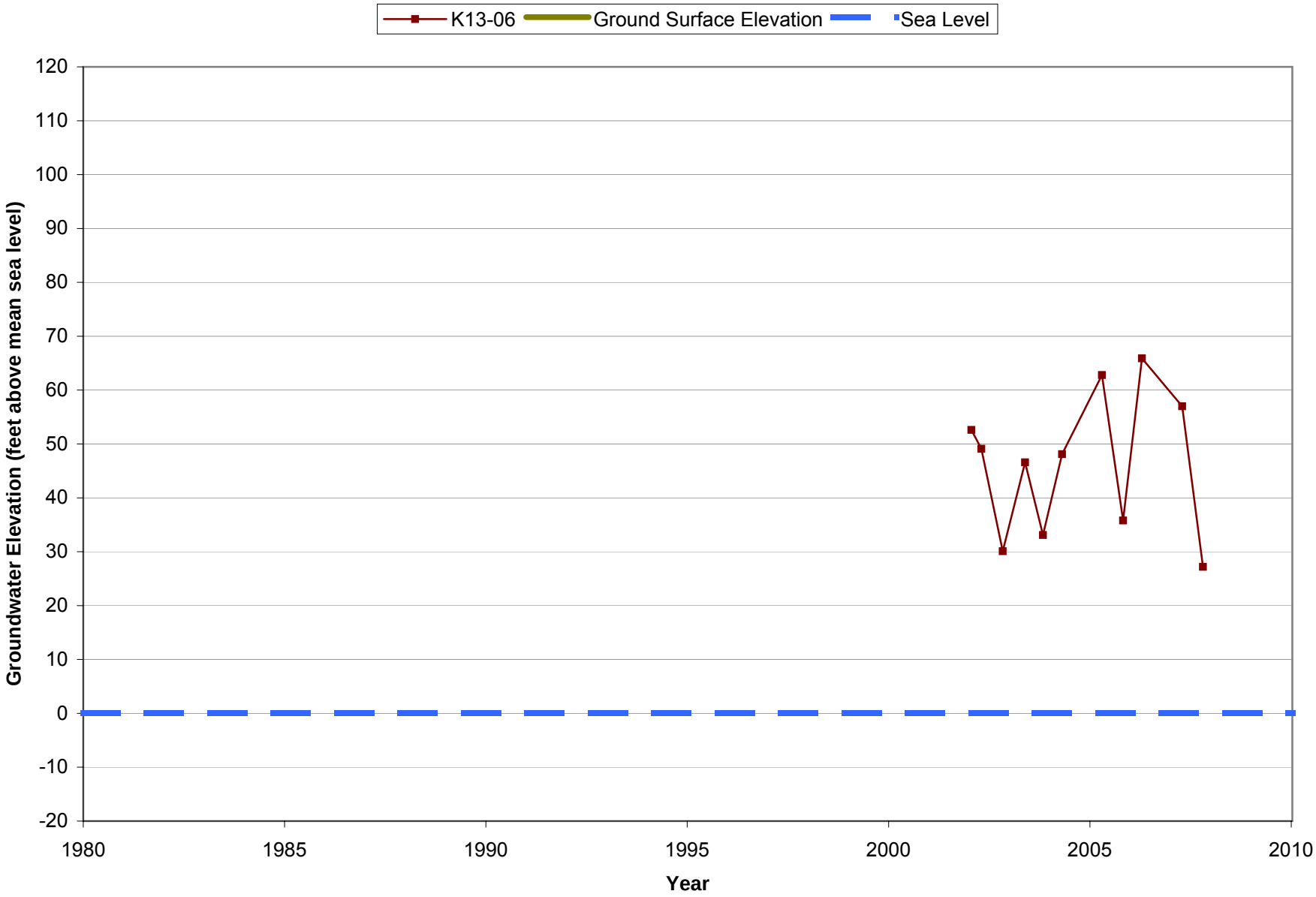

J13-03
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
-60
1980
1985
1990
1995
2000
2005
2010
Year

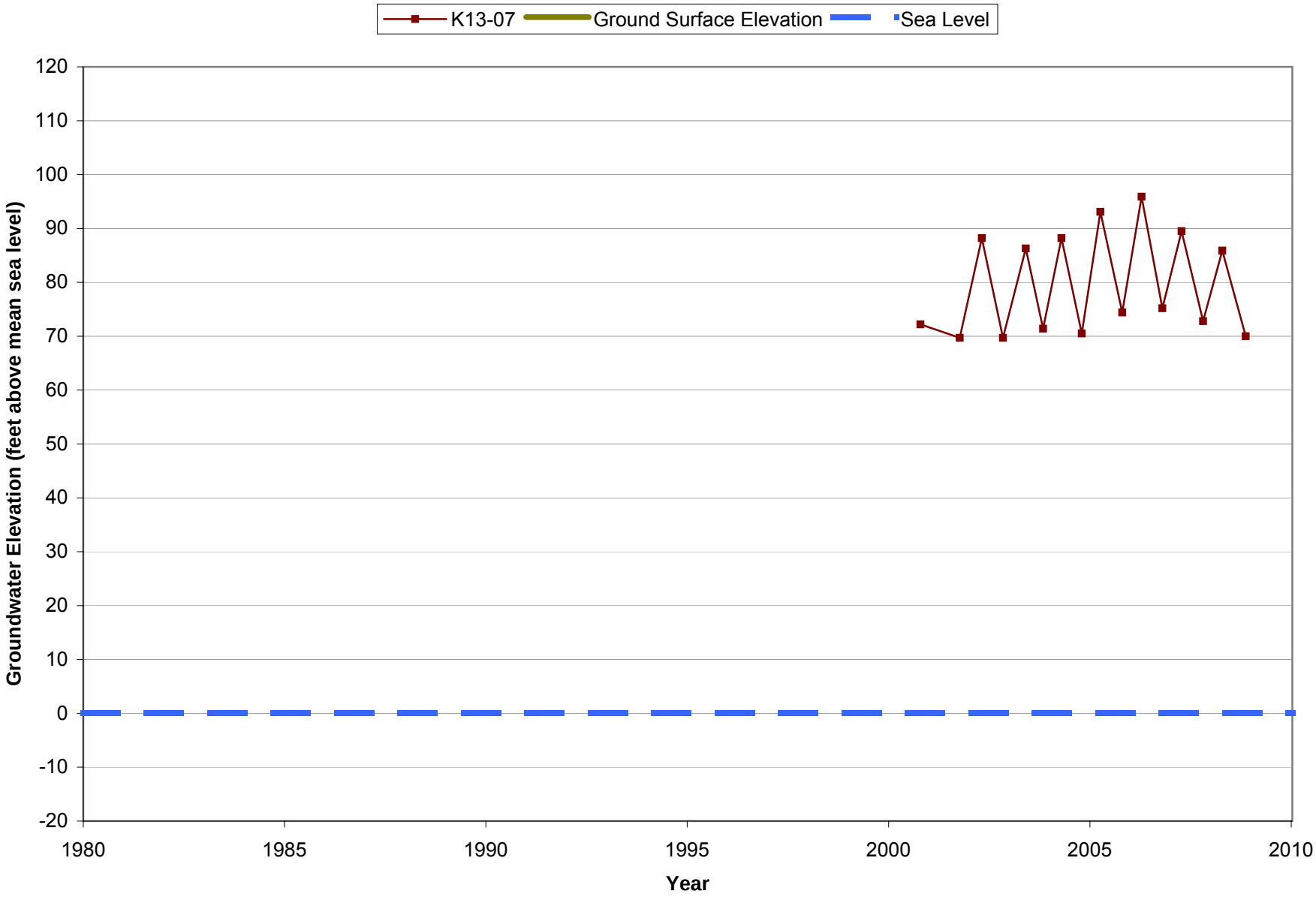

K13-02
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
1980
1985
1990
1995
2000
2005
2010
Year

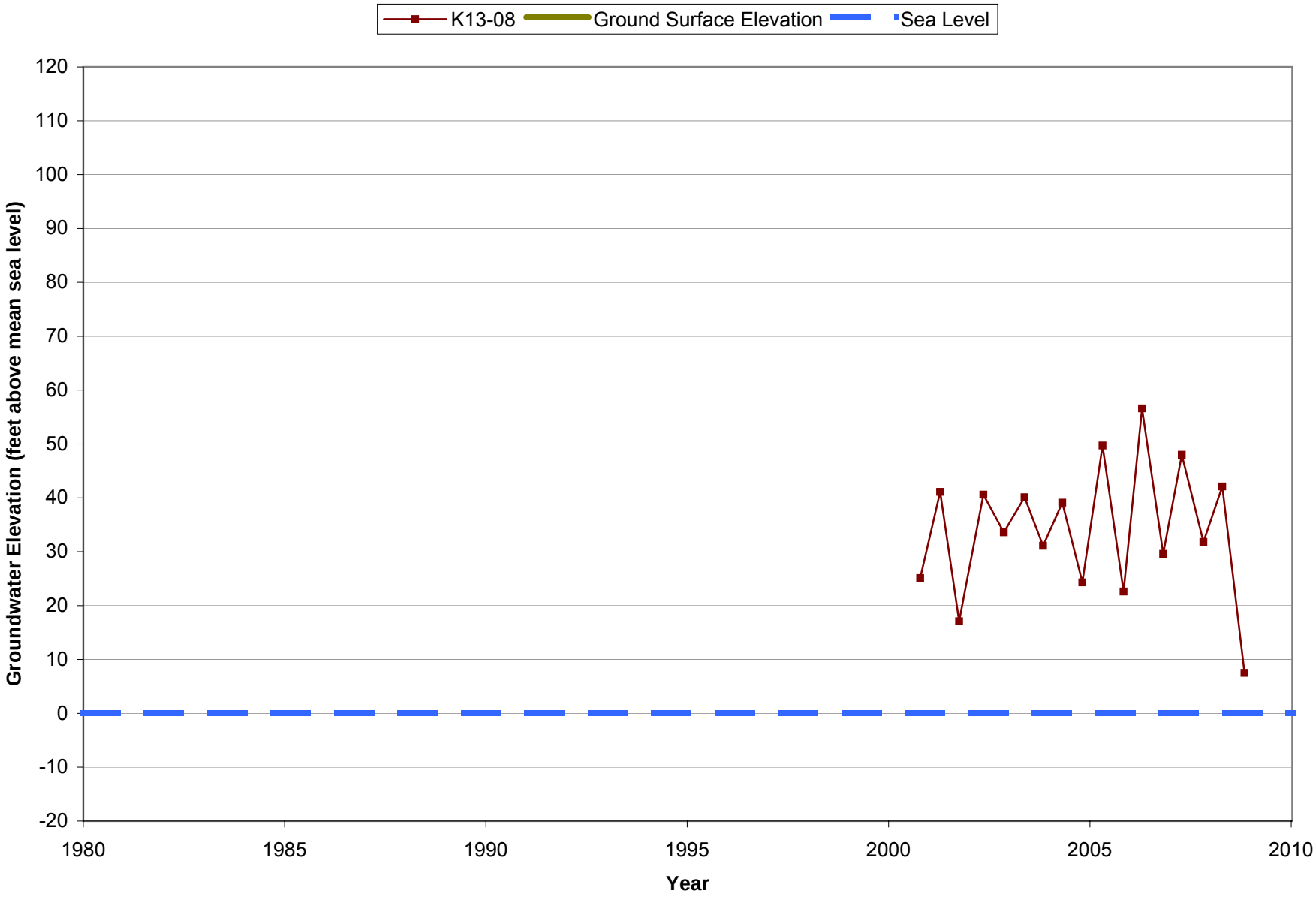

K13-03
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
-60
1980
1985
1990
1995
2000
2005
2010
Year

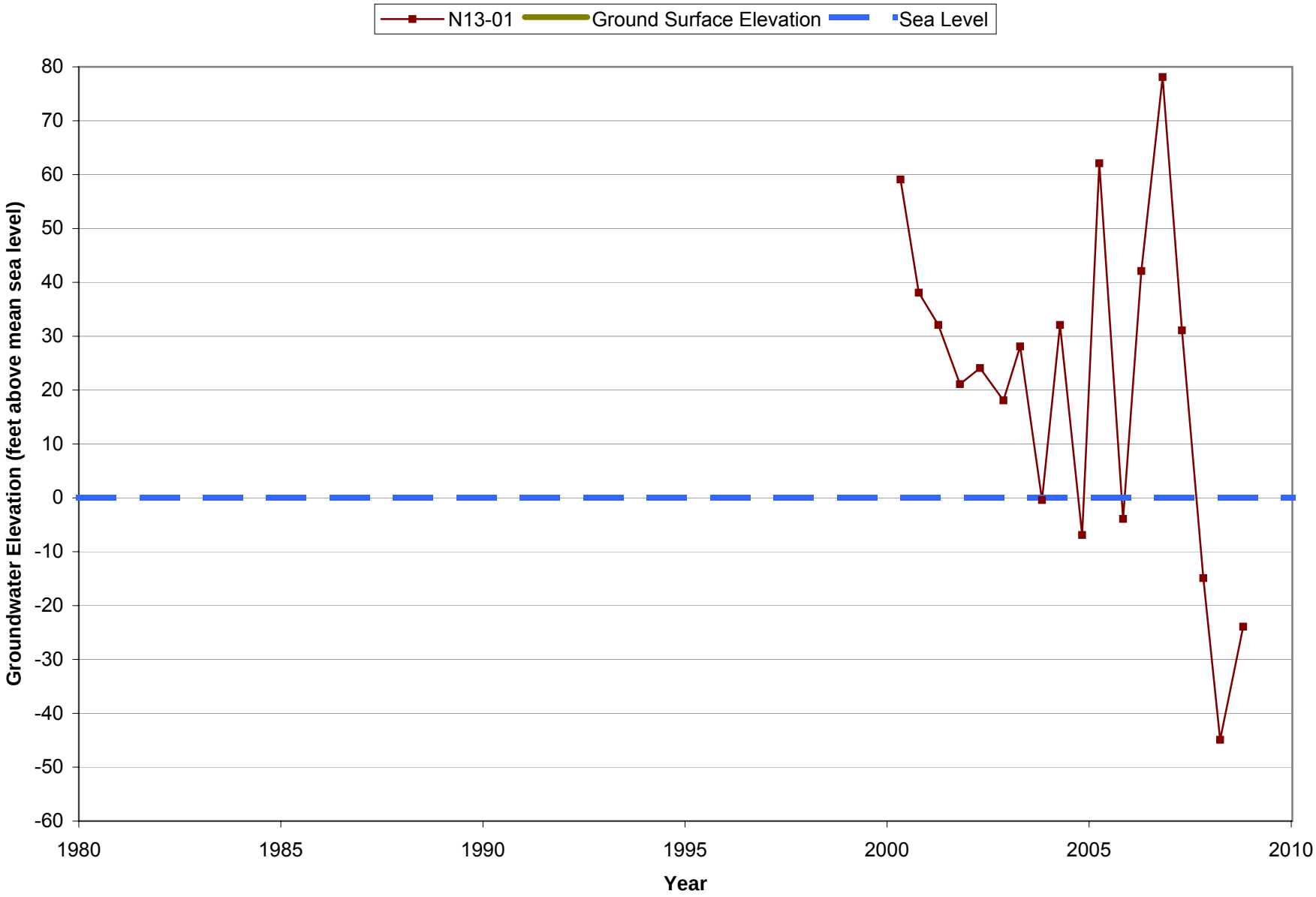

K13-04
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
1980
1985
1990
1995
2000
2005
2010
Year

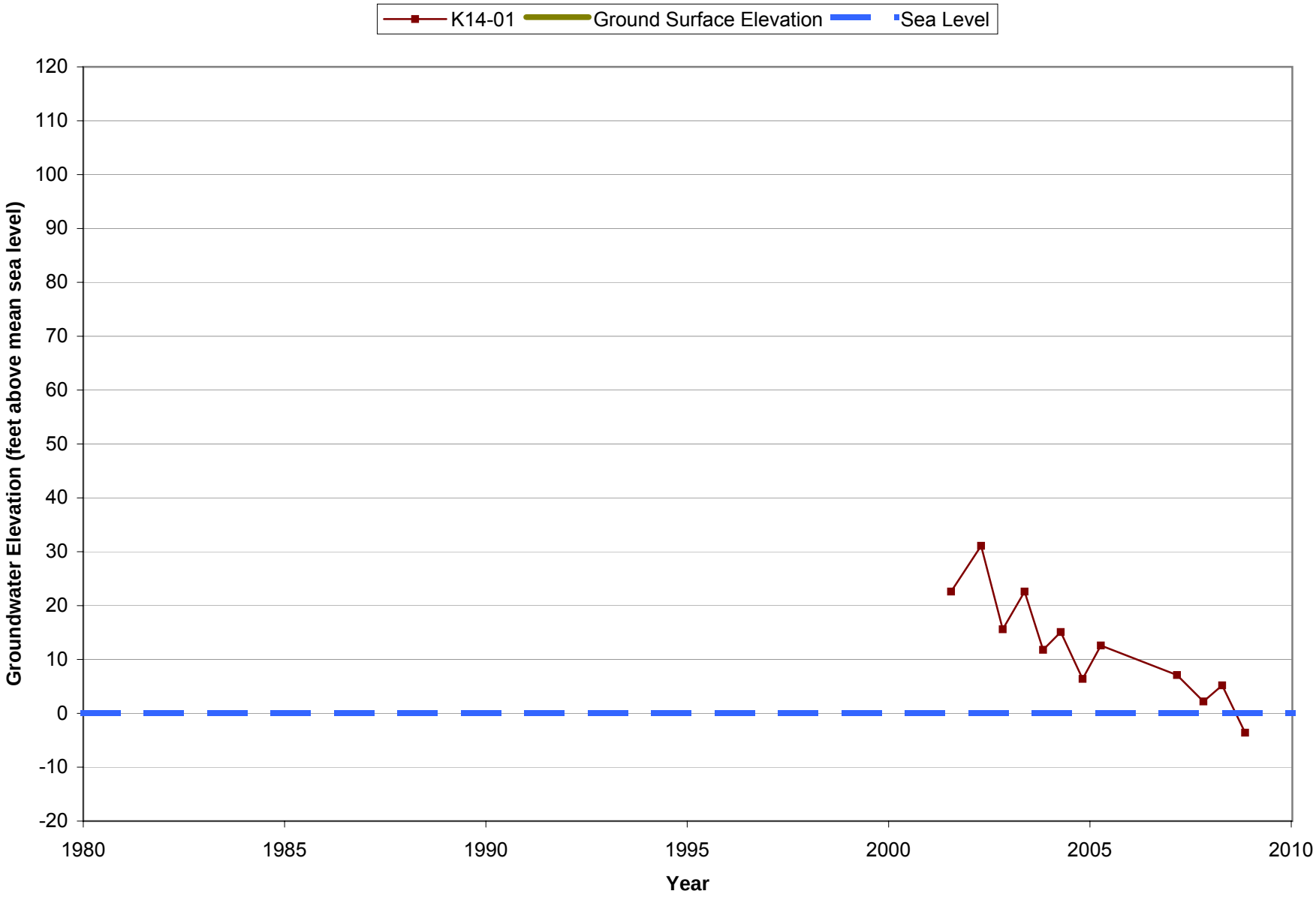

K13-05
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
1980
1985
1990
1995
2000
2005
2010
Year

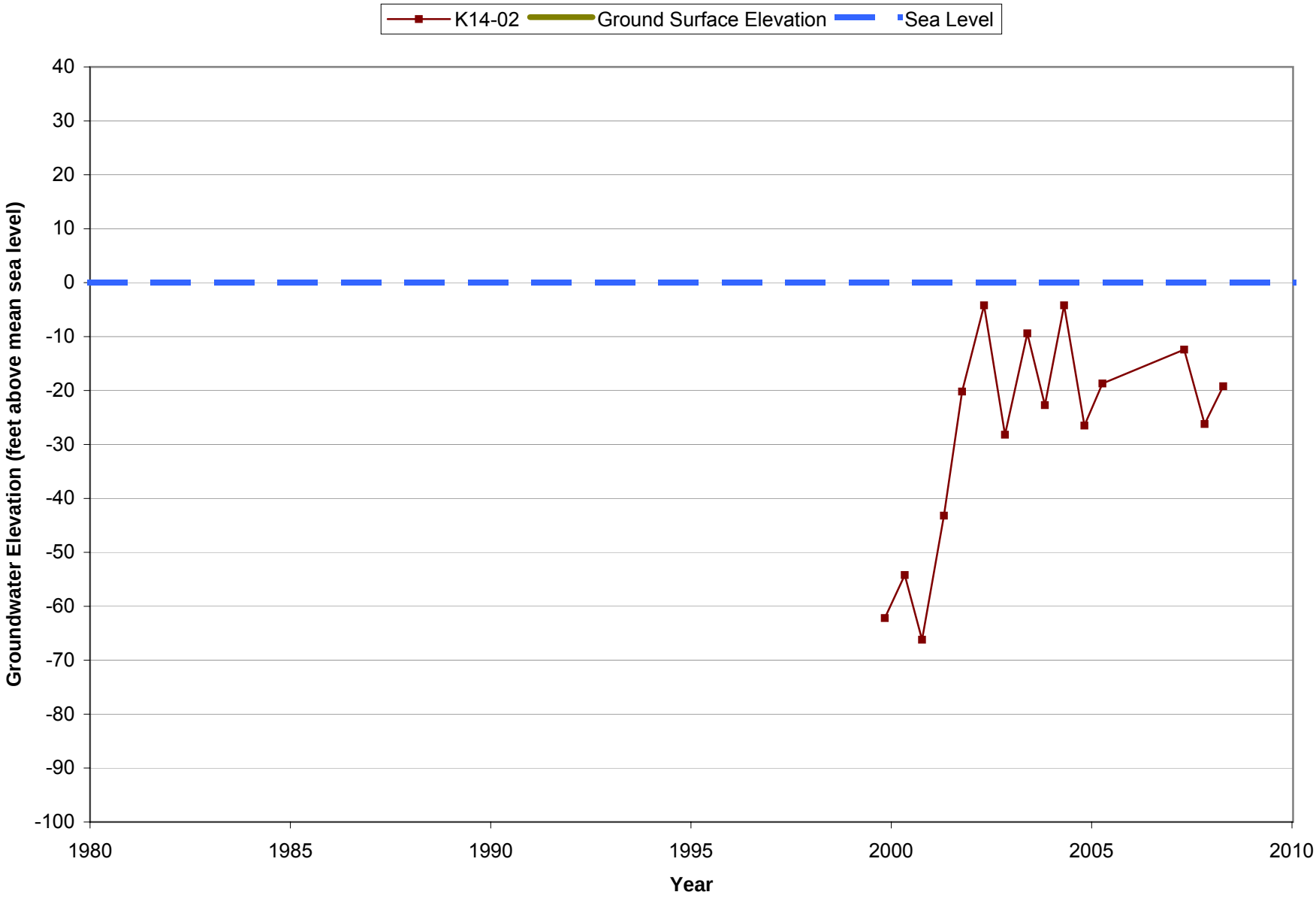

K13-06
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
1980
1985
1990
1995
2000
2005
2010
Year

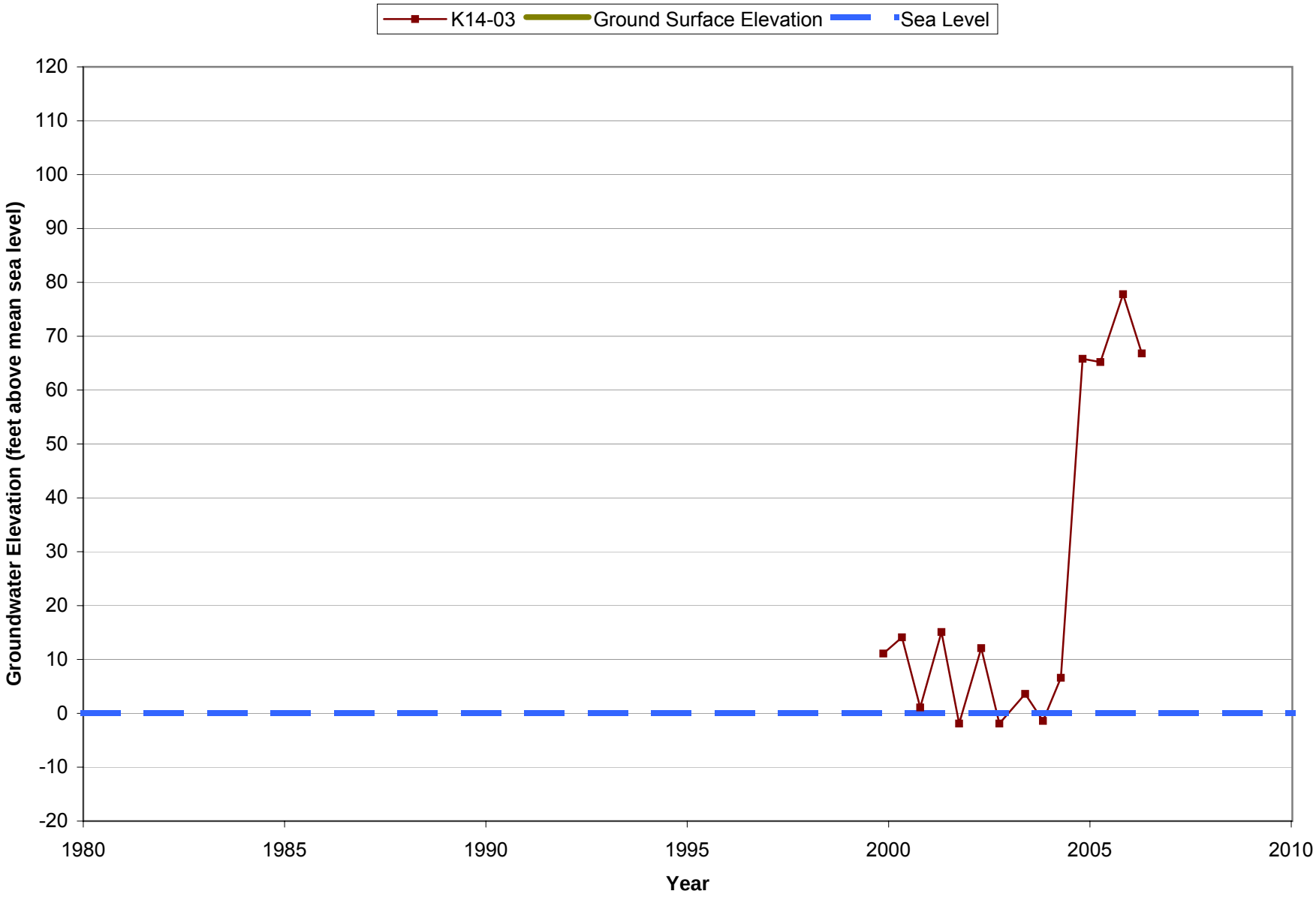

K13-07
Ground Surface Elevation
Sea Level
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
Groundwater Elevation (feet above mean sea level)
1980
1985
1990
1995
2000
2005
2010
Year

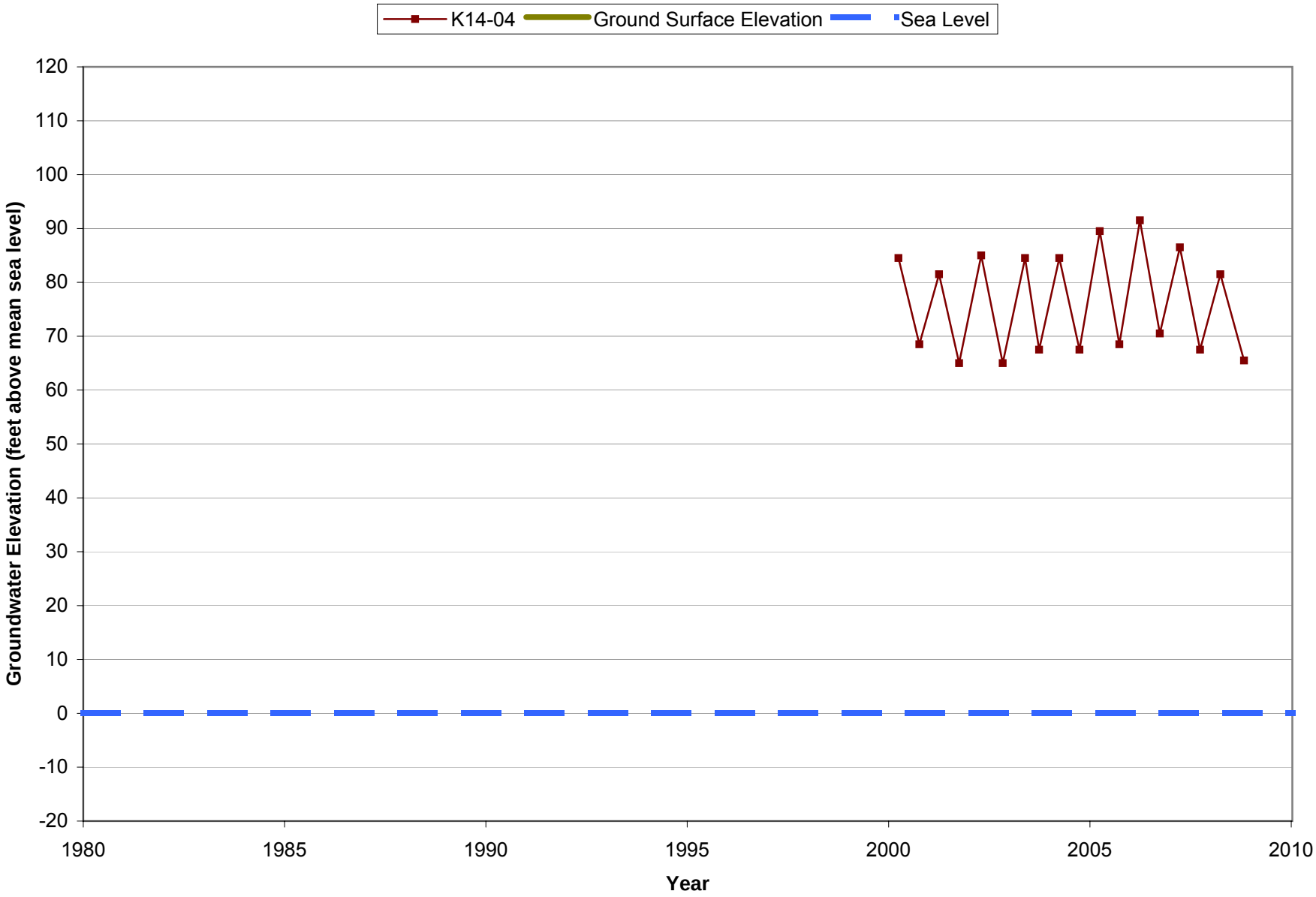

K13-08
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
1980
1985
1990
1995
2000
2005
2010
Year

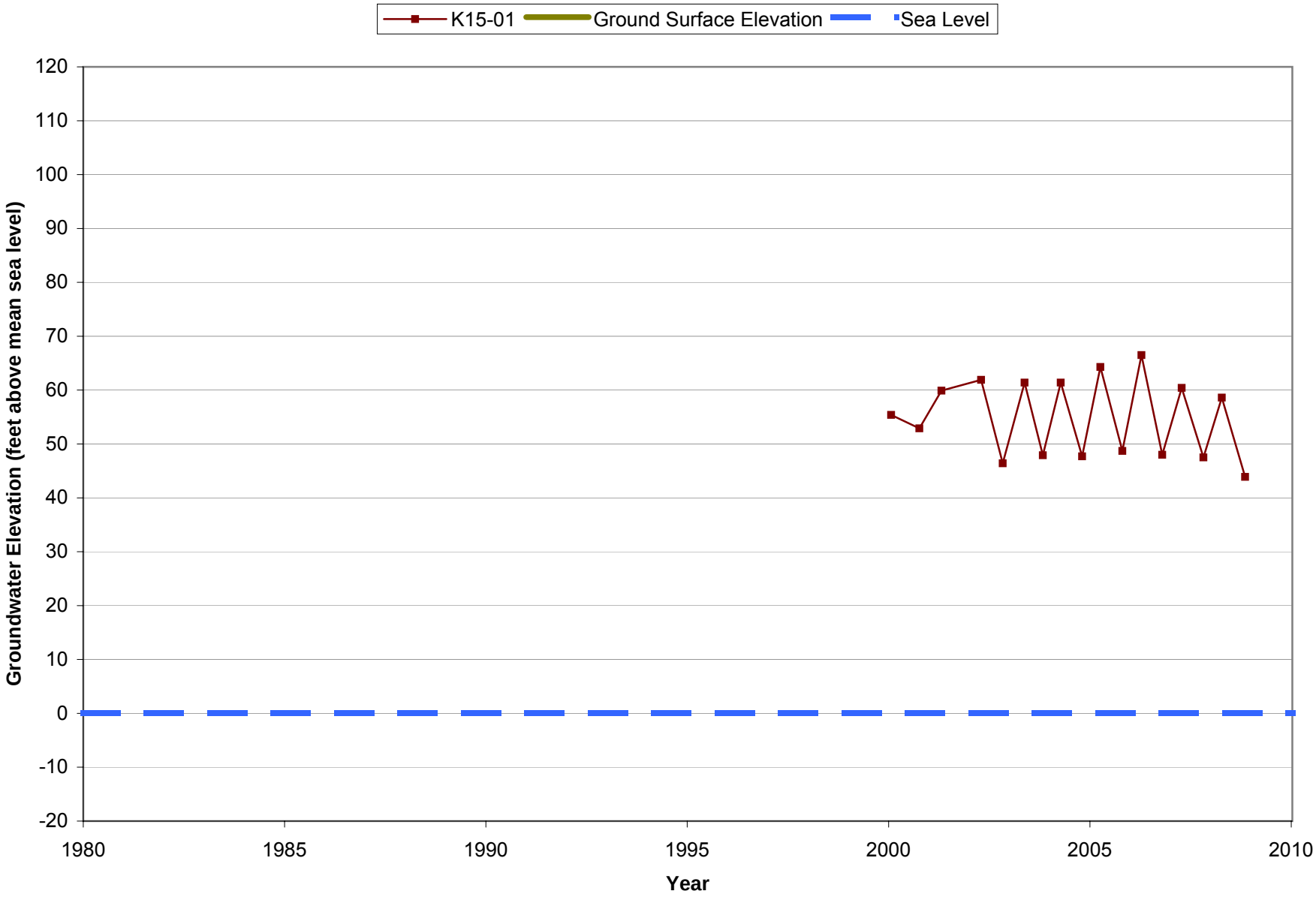

N13-01
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
-60
1980
1985
1990
1995
2000
2005
2010
Year

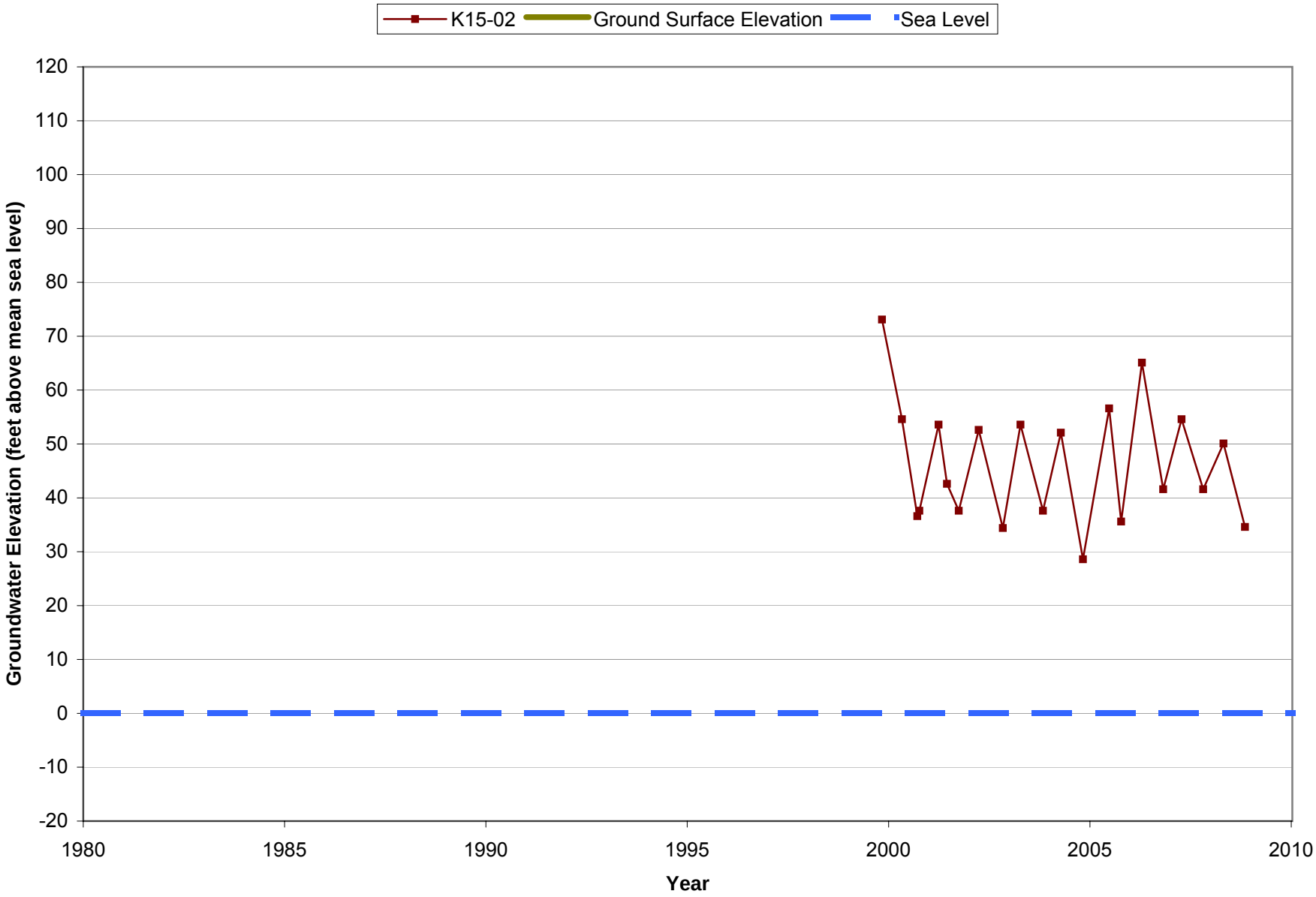

K14-01
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
1980
1985
1990
1995
2000
2005
2010
Year

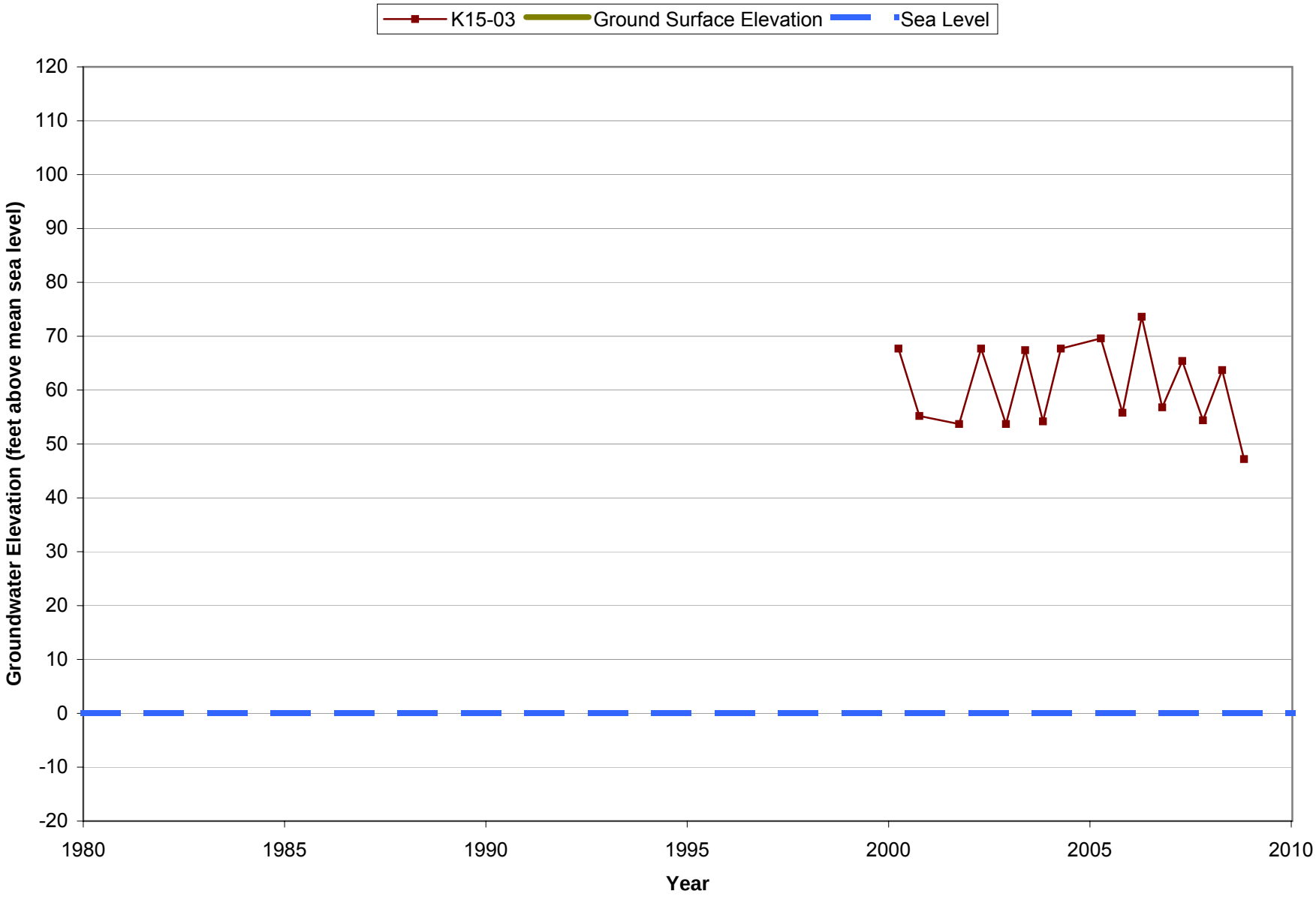

K14-02
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
40
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1980
1985
1990
1995
2000
2005
2010
Year

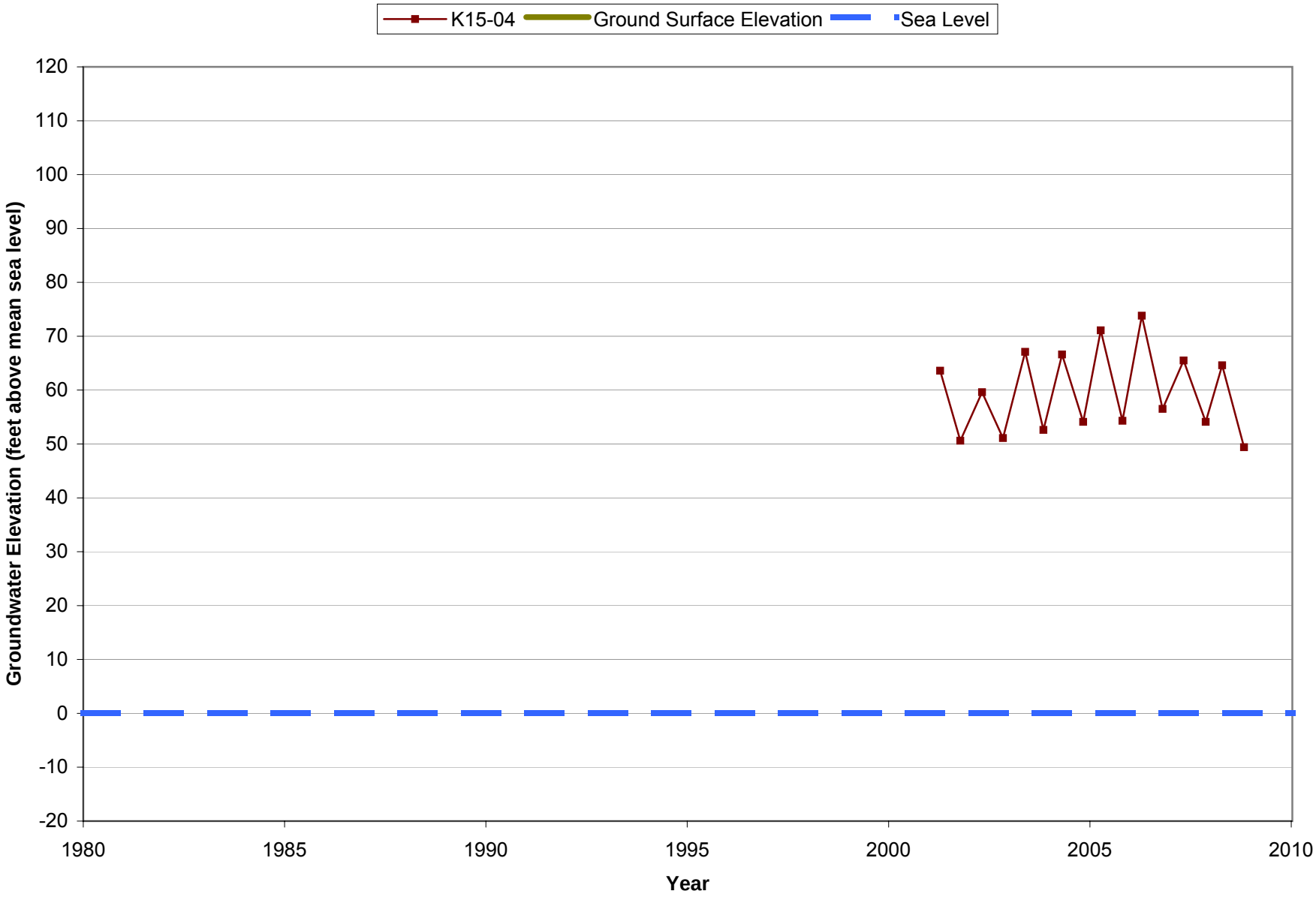

K14-03
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
1980
1985
1990
1995
2000
2005
2010
Year

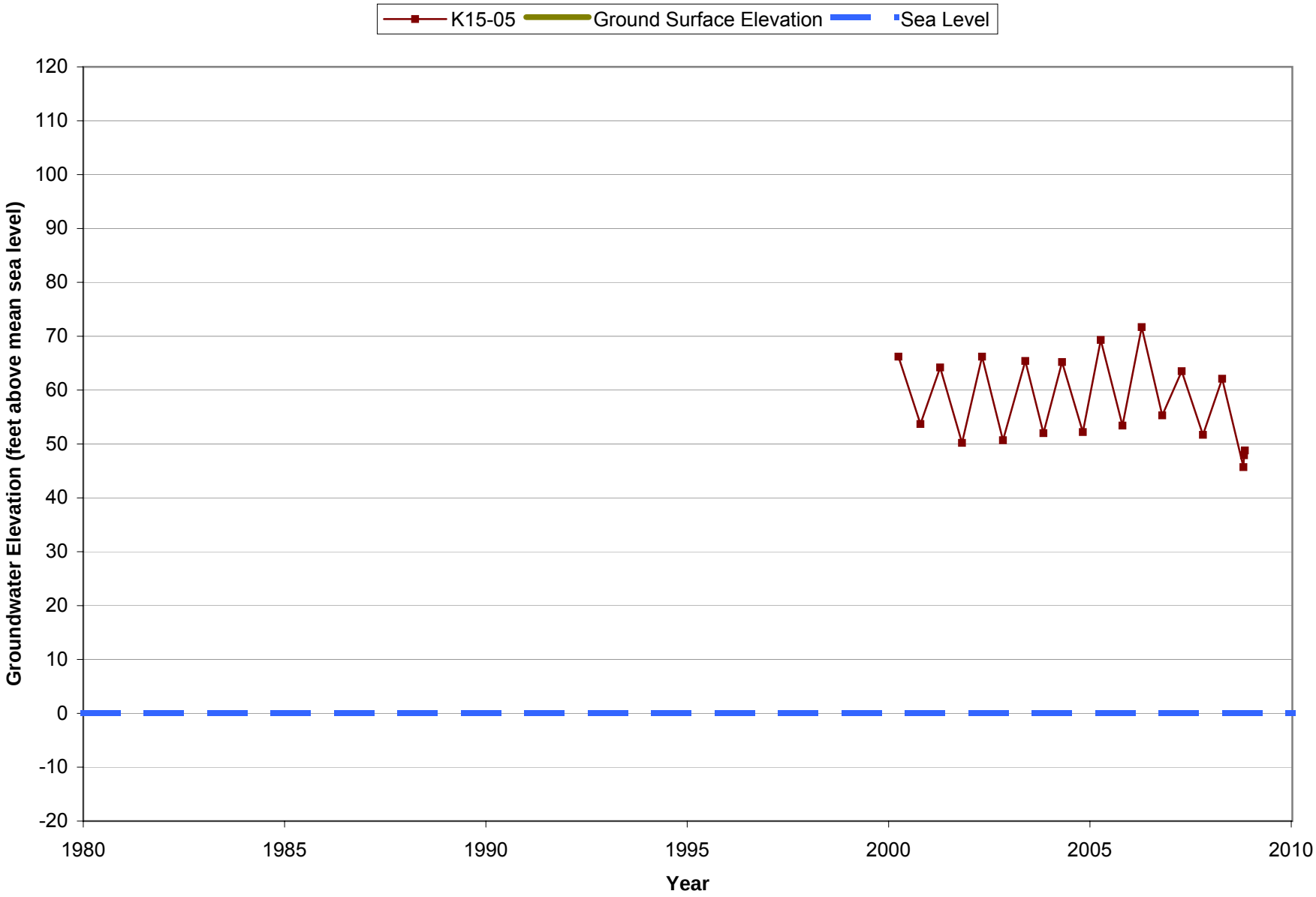

K14-04
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
1980
1985
1990
1995
2000
2005
2010
Year

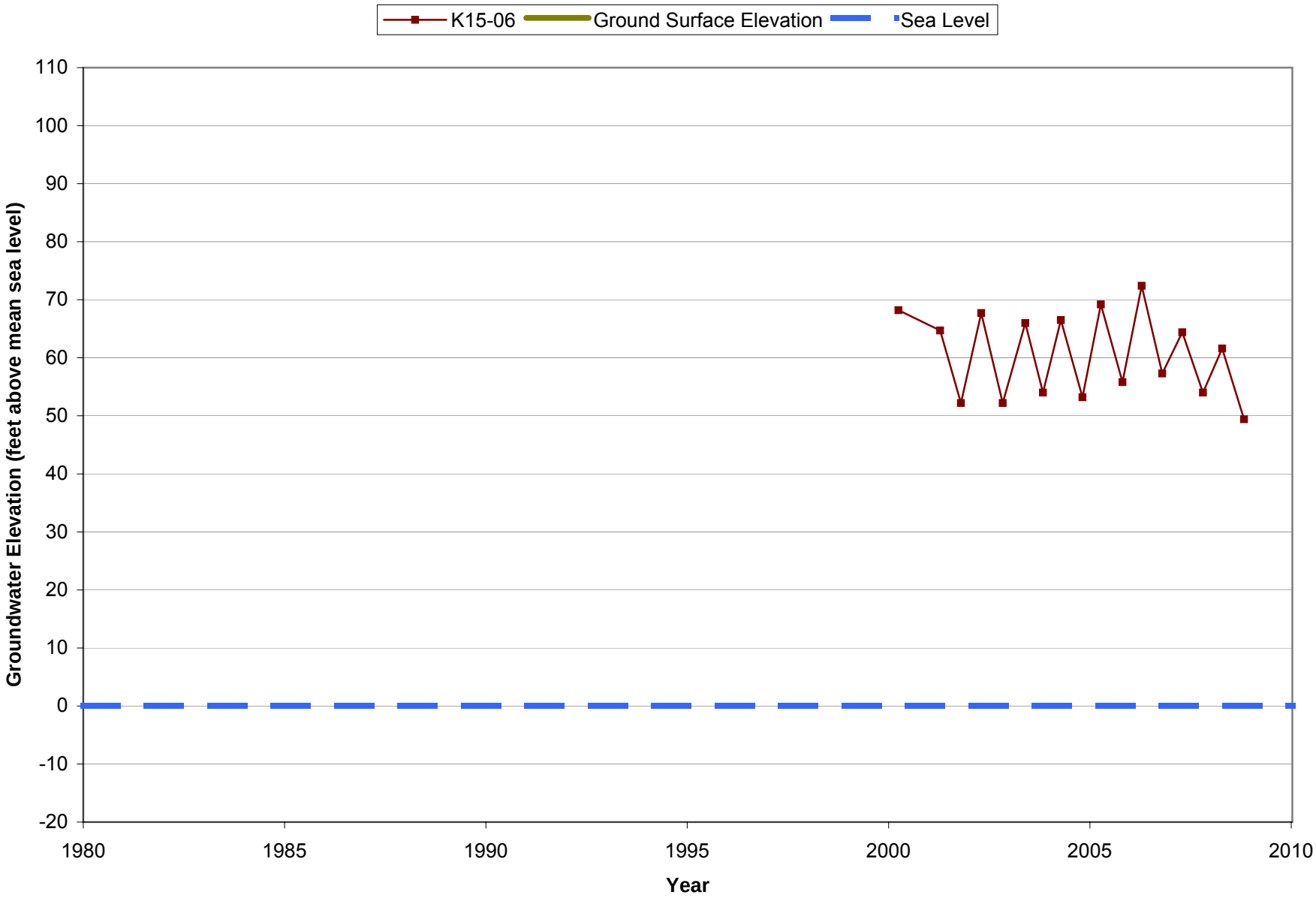

K15-01
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
1980
1985
1990
1995
2000
2005
2010
Year

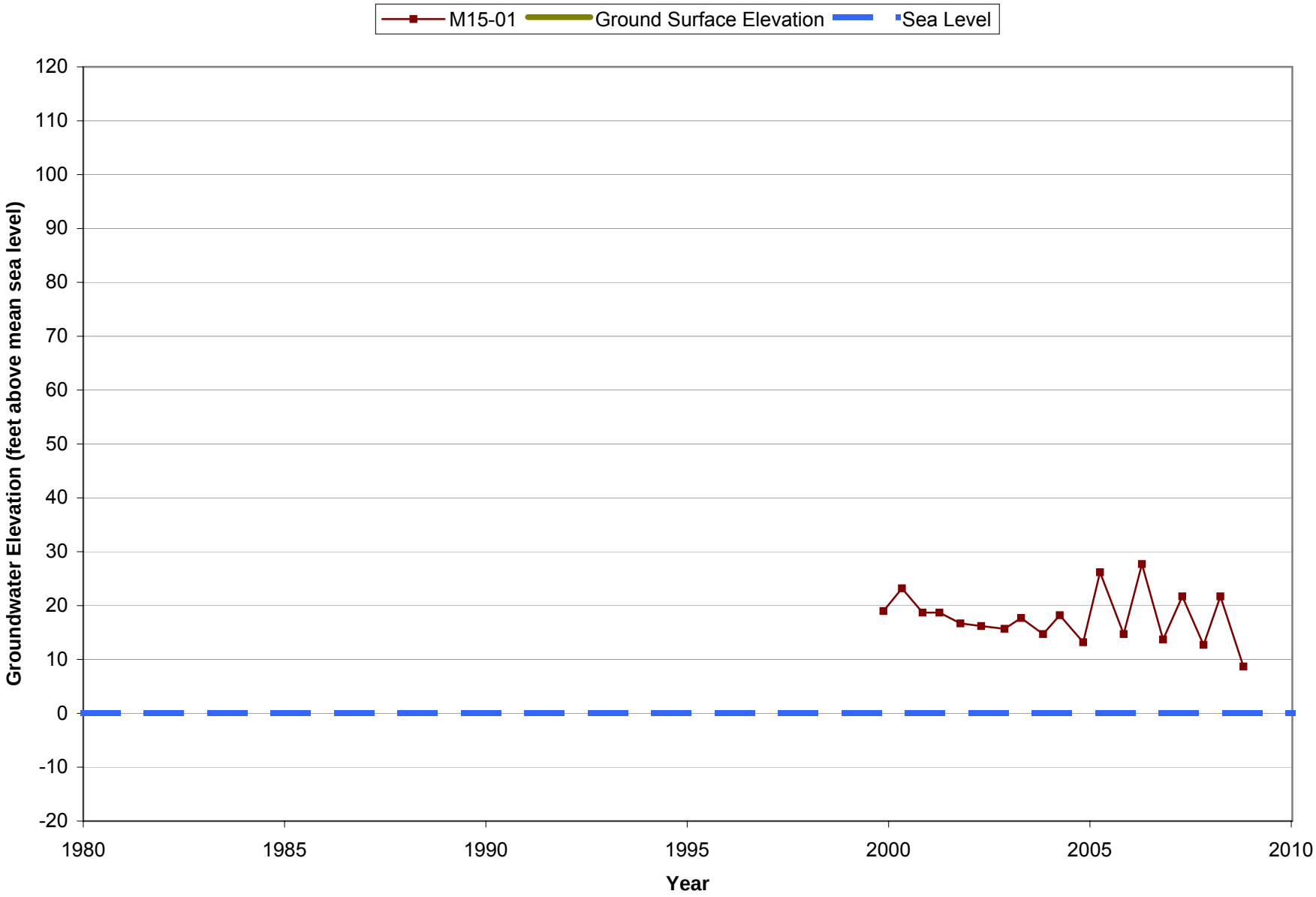

K15-02
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
1980
1985
1990
1995
2000
2005
2010
Year

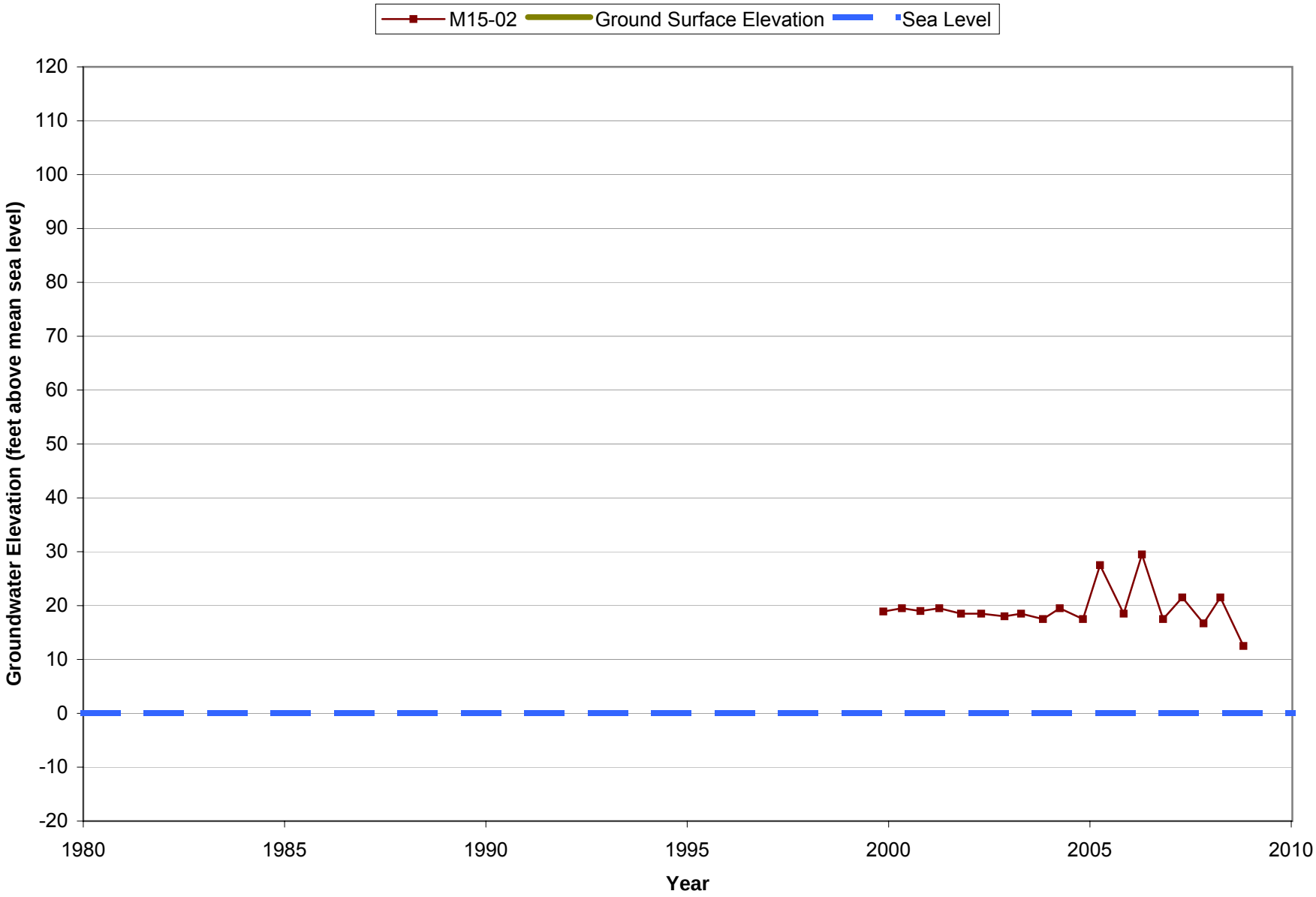

K15-03
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
1980
1985
1990
1995
2000
2005
2010
Year

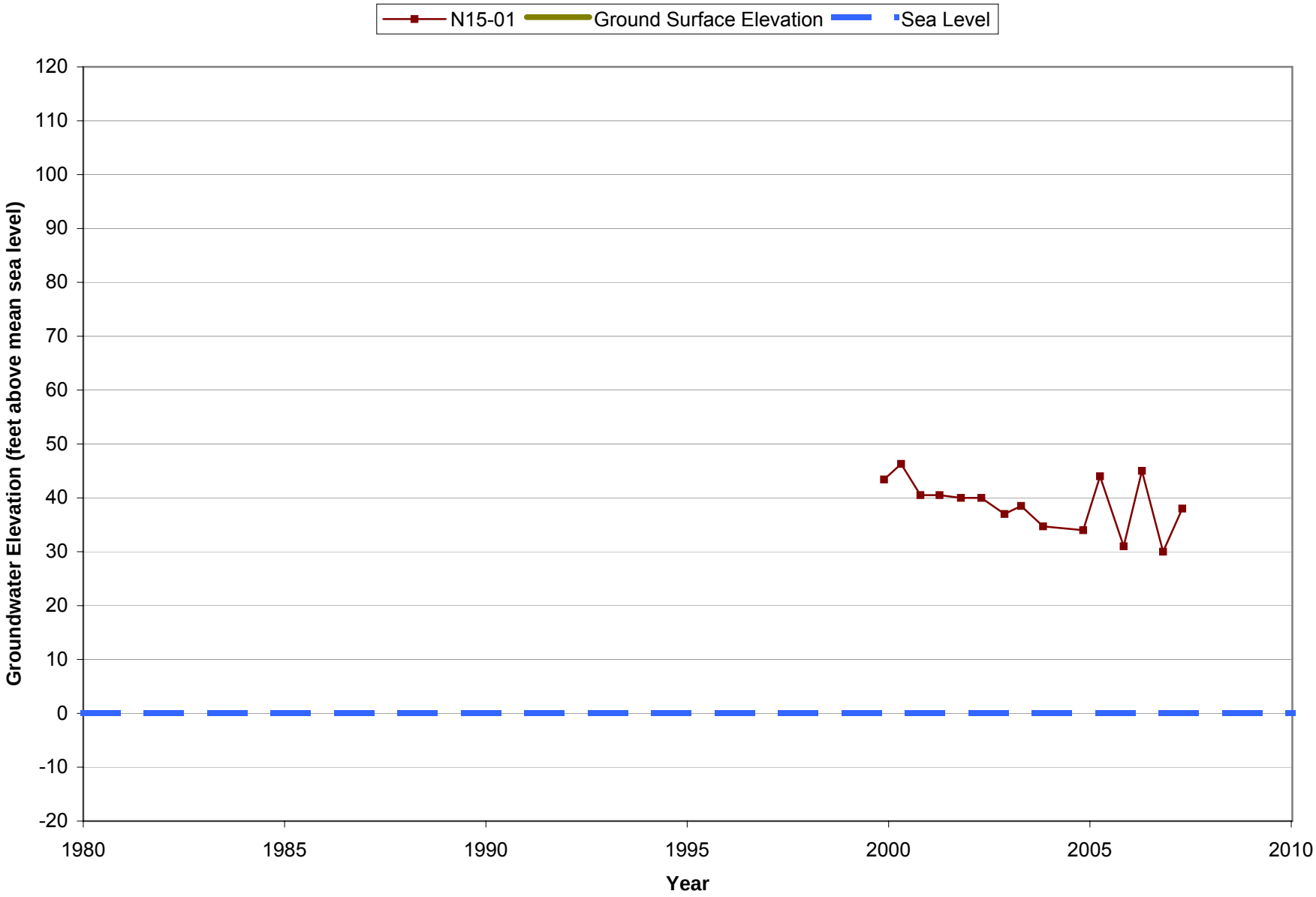

K15-04
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
1980
1985
1990
1995
2000
2005
2010
Year

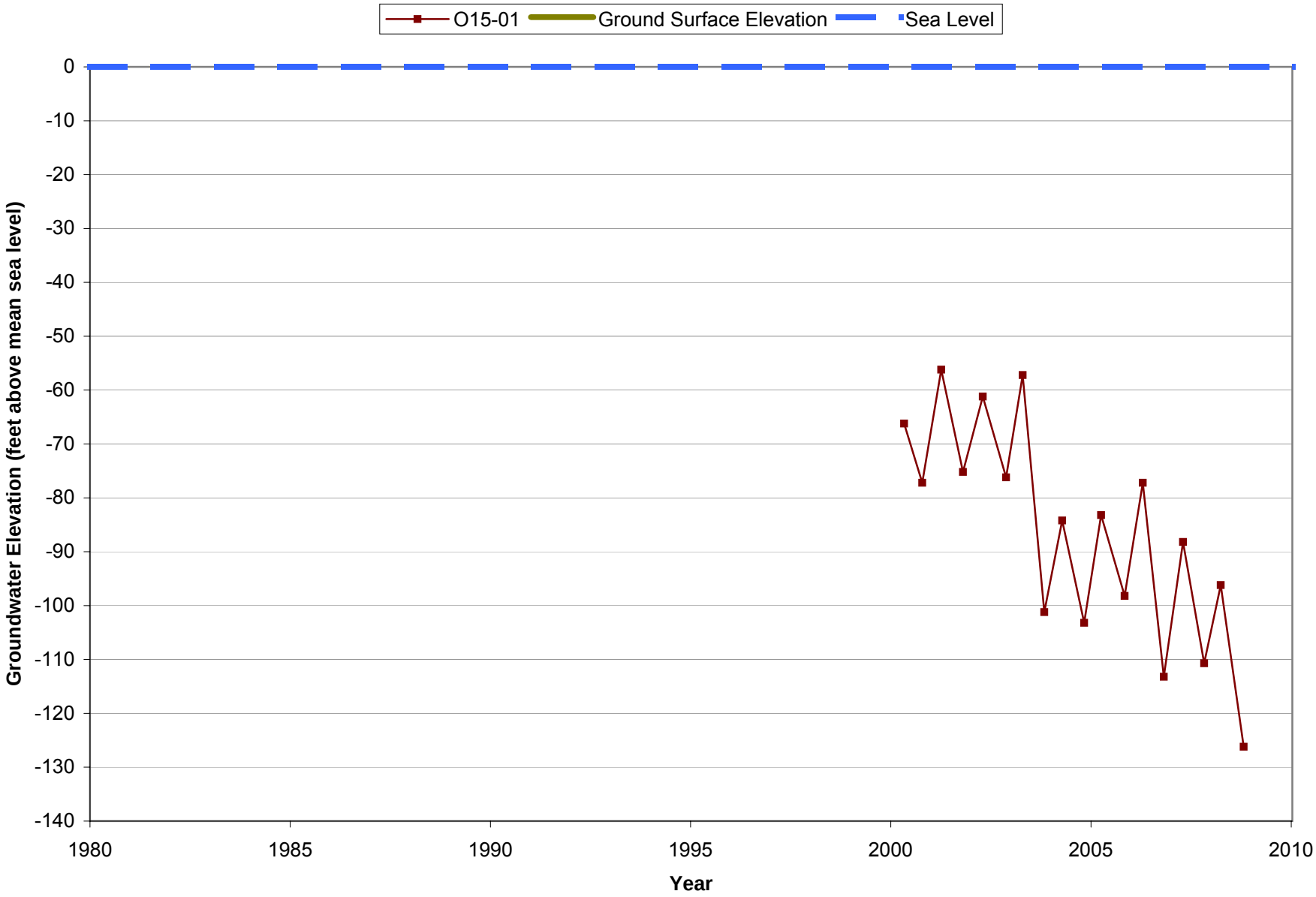

K15-05
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
1980
1985
1990
1995
2000
2005
2010
Year


K15-06
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
1980
1985
1990
1995
2000
2005
2010
Year


M15-01
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
1980
1985
1990
1995
2000
2005
2010
Year


M15-02
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
1980
1985
1990
1995
2000
2005
2010
Year


N15-01
Ground Surface Elevation
Sea Level
Groundwater Elevation (feet above mean sea level)
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
1980
1985
1990
1995
2000
2005
2010
Year


O15-01
Ground Surface Elevation
Sea Level
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
Groundwater Elevation (feet above mean sea level)
1980
1985
1990
1995
2000
2005
2010
Year