

**Basin Management Objective
Butte County
Sub-Inventory Unit – BUTTE SINK**

Butte County Water Advisory Committee Member – Gary Kerhoulas

Contact Information

Phone Number: 530- 846-3577

Email Address: wetlands@succeed.net

Description of the Butte Sink Sub-inventory Unit –

The Butte Sink Sub-inventory Unit (SIU) covers an area of about 10,300 acres. It is bordered by the Biggs/West Gridley SIU to the north and east, Sutter County to the south, and Colusa County to the west. Much of the Butte Sink area consists of waterfowl refuges surrounded by native riparian vegetation. A smaller portion of the SIU supports agricultural production of rice and grain crops. Waterfowl refuges and agricultural land uses in this area are supported by the application of a combination of surface and groundwater. The Butte Sink SIU is the lowest point in elevation in all of Butte County. The most southwestern portion of this unit has rights to surface water and therefore uses little groundwater. Most of the groundwater pumping occurring within the SIU is in the Grey Lodge Wildlife Refuge, and outside of the SIU to the south in Sutter County. This surrounding groundwater pumping likely affects the groundwater levels monitored within the SIU. Land in this SIU receives extensive rice runoff and surface water from Biggs/West Gridley Water District and Western Canal Water District. If surface water deliveries were cut in the Butte Sink, groundwater use would increase significantly.

Management Objective –

To maintain the groundwater surface elevation in all aquifer systems at a level that will assure the continued sustainability and health of the Butte Sink wetlands. It is also the intent of this management objective to assure a sustainable agricultural and wildlife management water supply of good quality for now and into the future, and to assure the water supply can be utilized without injuring groundwater quality or inducing inelastic land subsidence. The management objective also strives to assure an adequate supply of good quality groundwater for all users in the sub-inventory unit.

Geologic Formations Identified In Sub-Inventory Unit –

Geologic formations in the Butte Sink SIU, from youngest (shallowest) to oldest (deepest), include:

- Quaternary Alluvium
- Basin Deposits

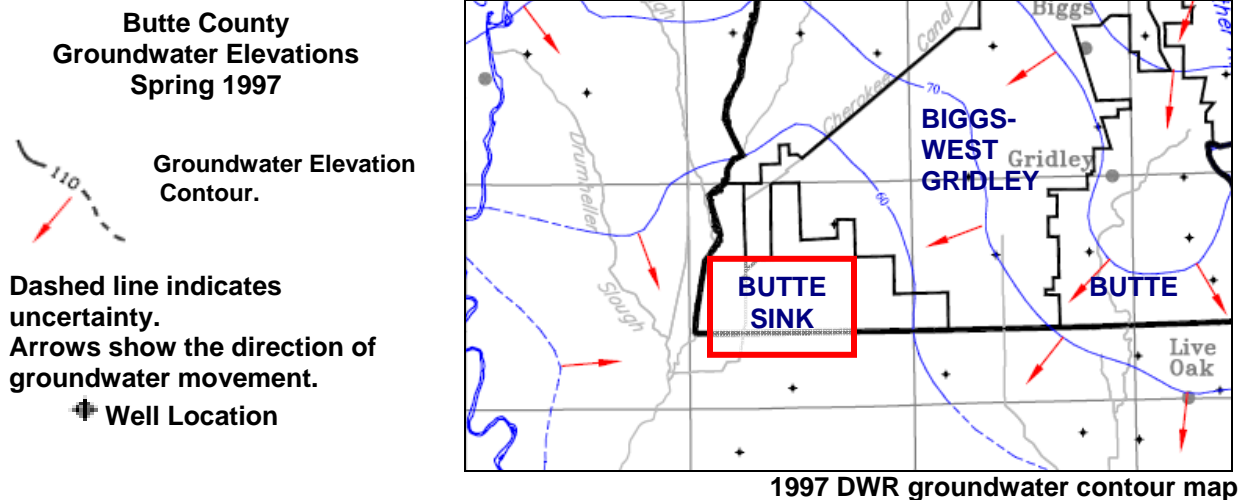
Modesto Formation
Riverbank Formation
Sutter Formation

Fresh Water-bearing Units. In the Sacramento Valley Region of Butte County, fresh groundwater-bearing units include, from youngest (shallowest) to oldest (deepest), the Modesto, Riverbank, Laguna, Tehama and Tuscan Formations. Those included in the Butte Sink SIU are:

Modesto Formation
Riverbank Formation
Laguna Formation

Groundwater Flow in the Butte Sink Sub-Inventory Unit –

The below figure is a cropped segment of a map prepared by DWR Northern District. It shows the groundwater elevation contours in your sub-inventory unit with arrows indicating the direction of groundwater movement. This graphic indicates that the regional pattern of spring groundwater movement in the Butte Sink SIU is in a southwesterly direction, at a gradient of about 3 feet per mile, toward Butte Creek.



BMO Key Wells Selected for Groundwater Level Monitoring –

A new multi-completion dedicated monitoring well was installed by DWR Northern District within the Grey Lodge Wildlife Refuge, SWN 17N01E24A02-6. Groundwater elevation data will be presented in this BMO once enough years of data have been collected for analyzation.

SPRING

Well ID	Well Type	Aquifer	Spring Stage 1 & 2 Alerts**		Stage 3 Alerts**	
			Elev. (ft)	Depth (ft)	Elev. (ft)	Depth (ft)
17N01E17F001M	Monitoring	Riverbank	54.44	7.56	54.12	7.88
17N01E17F002M	Monitoring	Sutter Formation	57.04	5.76	56.87	5.93
17N01E17F003M	Monitoring	Sutter Formation	57.96	4.54	57.47	5.03
17N02E19J001M	Irrigation	Sutter Formation	63.41	7.29	63.10	7.60

FALL

Well ID	Well Type	Aquifer	Fall Stage 1 & 2 Alerts**		Fall Stage 3 Alerts**	
			Elev. (ft)	Depth (ft)	Elev. (ft)	Depth (ft)
17N01E17F001M	Monitoring	Riverbank	51.76	10.24	50.92	11.08
17N01E17F002M	Monitoring	Sutter Formation	51.70	11.10	51.60	11.20
17N01E17F003M	Monitoring	Sutter Formation	51.52	10.98	50.97	11.53
17N02E19J001M	Irrigation	Sutter Formation	61.10	9.60	60.50	10.20

BMO Key Wells Selected for Groundwater Quality Monitoring–

Stakeholders in the Butte Sink SIU will continue to work with staff to locate additional wells, either irrigation or domestic with sufficient historical construction information, suitable to include in the water quality monitoring network, and initiate data collection in August 2008.

BMO Key Well(s) Selected for Land Subsidence Monitoring–

Land Subsidence is continuously monitored by the Department of Water Resources and Butte County Department of Water and Resource Conservation. The closest extensometer to the sub-inventory unit is in Biggs West-Gridley Water District (18N01E35L001M).

BMO Alert Stage Definitions and Compliance Methodologies–

The Butte Sink Sub Area will use the following guidelines in the management of the groundwater resources. The groundwater level and land subsidence management objectives are intended to initiate predetermined voluntary Ground Water Management Actions, as defined in the accompanying cover report, to remedy declining ground water levels that are not recovering to compliance levels for each index well, or prevent further inelastic land subsidence. Groundwater quality trend monitoring will start in the Butte Sink sub-inventory unit this year.

Groundwater Level – Standard Deviation and Lowest Record

For the Butte Sink SIU the groundwater level objectives were chosen to support both groundwater levels that support wetland habitat and available groundwater in storage in the deeper aquifer systems. The spring groundwater level measurement is intended to measure the change in groundwater in storage in

the deeper aquifers and the fall measurements are intended to support the wetlands habitat.

Stage 1: The first year that spring or fall groundwater levels fall below one standard deviation below the mean spring or fall groundwater level established for the well but still above two standard deviations below the mean spring or fall level for the well.

Stage 2: Stage 2 is reached if spring or fall groundwater levels, for a second consecutive year, remain below one standard deviation below the mean spring or fall groundwater level of the well but still above two standard deviations below the mean spring or fall level for the well.

Stage 3: Stage 3 is reached when the spring or fall groundwater level measurement is below the respective lowest historic groundwater level measurement on record.

Groundwater Quality –

Appropriate water quality monitoring wells will be selected prior to the August 2008 monitoring period.

Land Subsidence –

Stage 1 is reached when the annual elastic subsidence exceeds the average annual elastic subsidence measured over the period of record of the extensometer.

Stage 2 is reached when the annual elastic subsidence exceeds the maximum recorded elastic subsidence over the period of record for the extensometer.

Stage 3 is when inelastic subsidence is detected. Inelastic subsidence shall be detected by comparing reading from the extensometer taken on March 1 of each year against previous March 1 measurements.

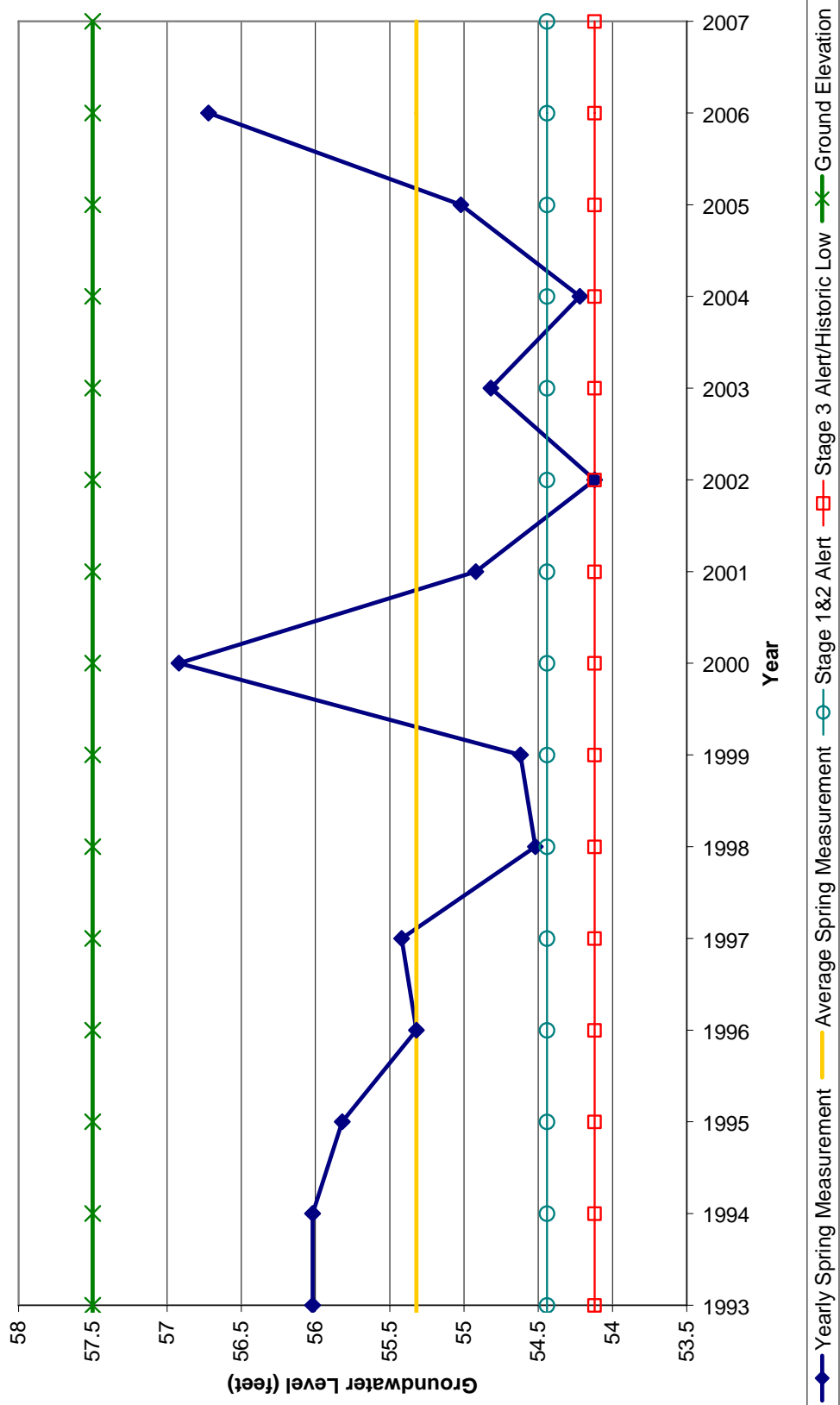
Future Monitoring Recommendations –

Efforts will be made to identify additional wells that could be added to the existing monitoring well network for water quality trend monitoring. Locate additional wells, either irrigation or domestic, with sufficient historical construction information to include in the water quality monitoring network, and initiate data collection in August 2008.

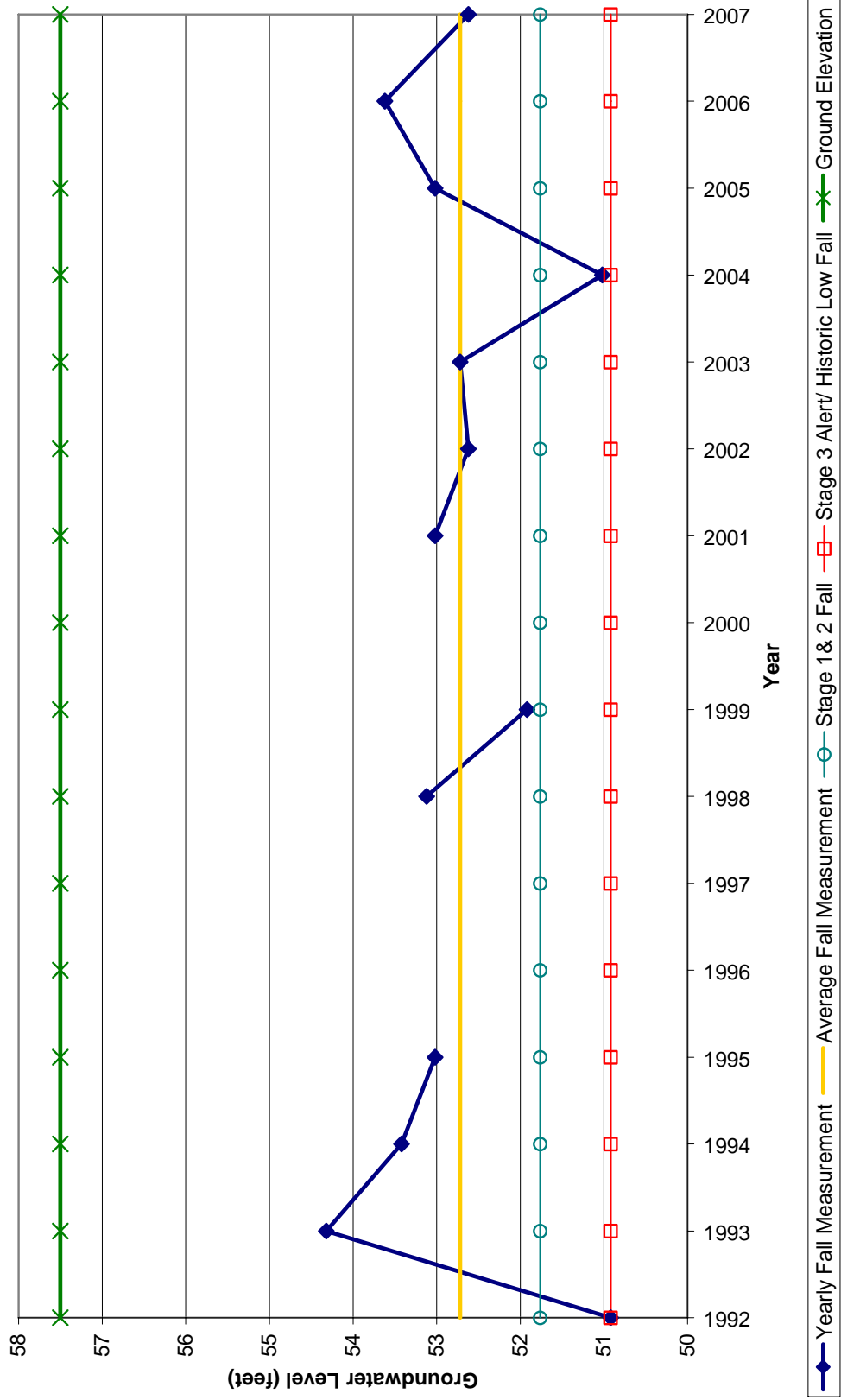
Supporting Data –

Hydrographs depicting yearly spring level measurements, including 2007 data, with established alert levels.

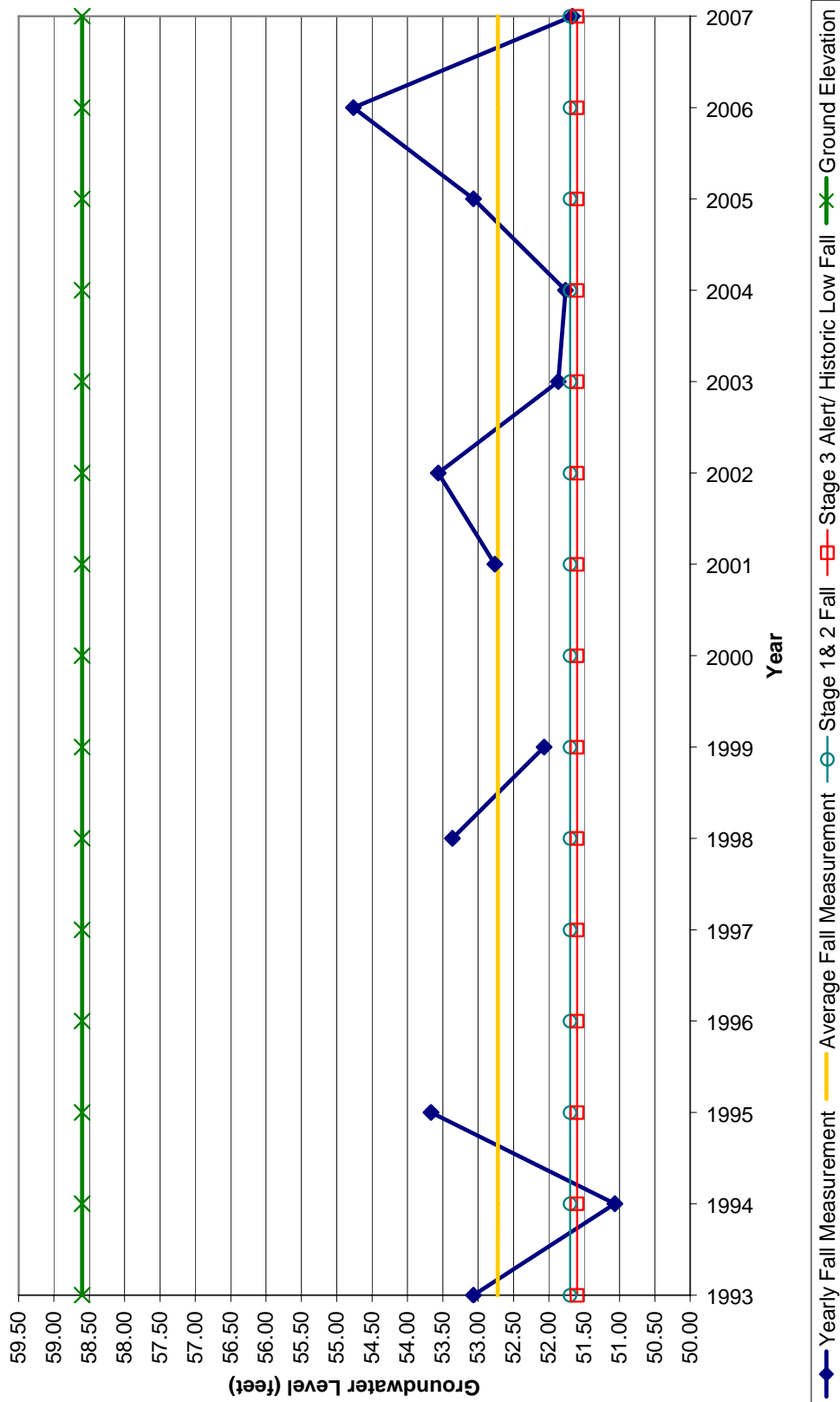
Spring Groundwater Levels
Butte Sink - 17N01E17F001



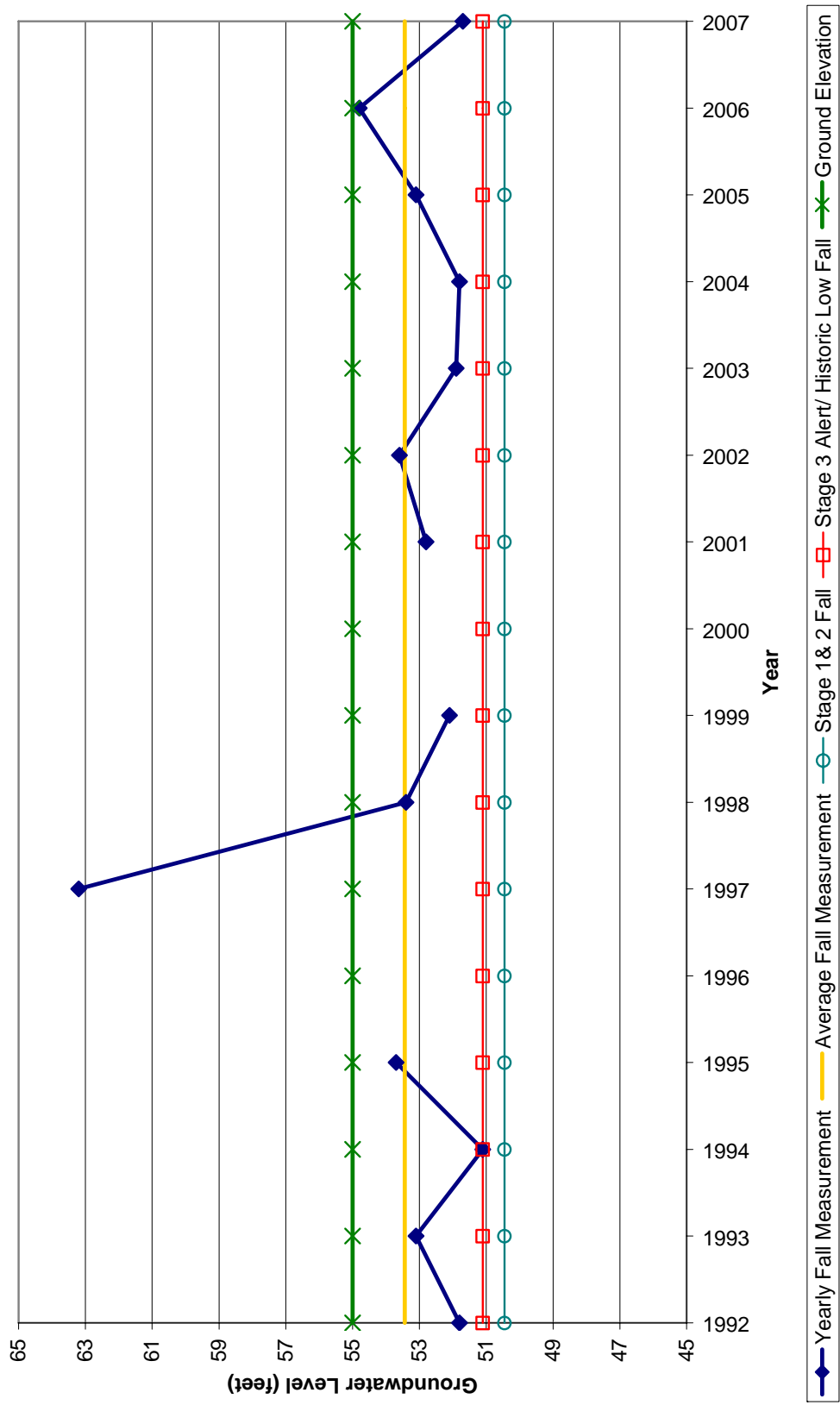
Fall Groundwater Levels
Butte Sink - 17N01E17F001



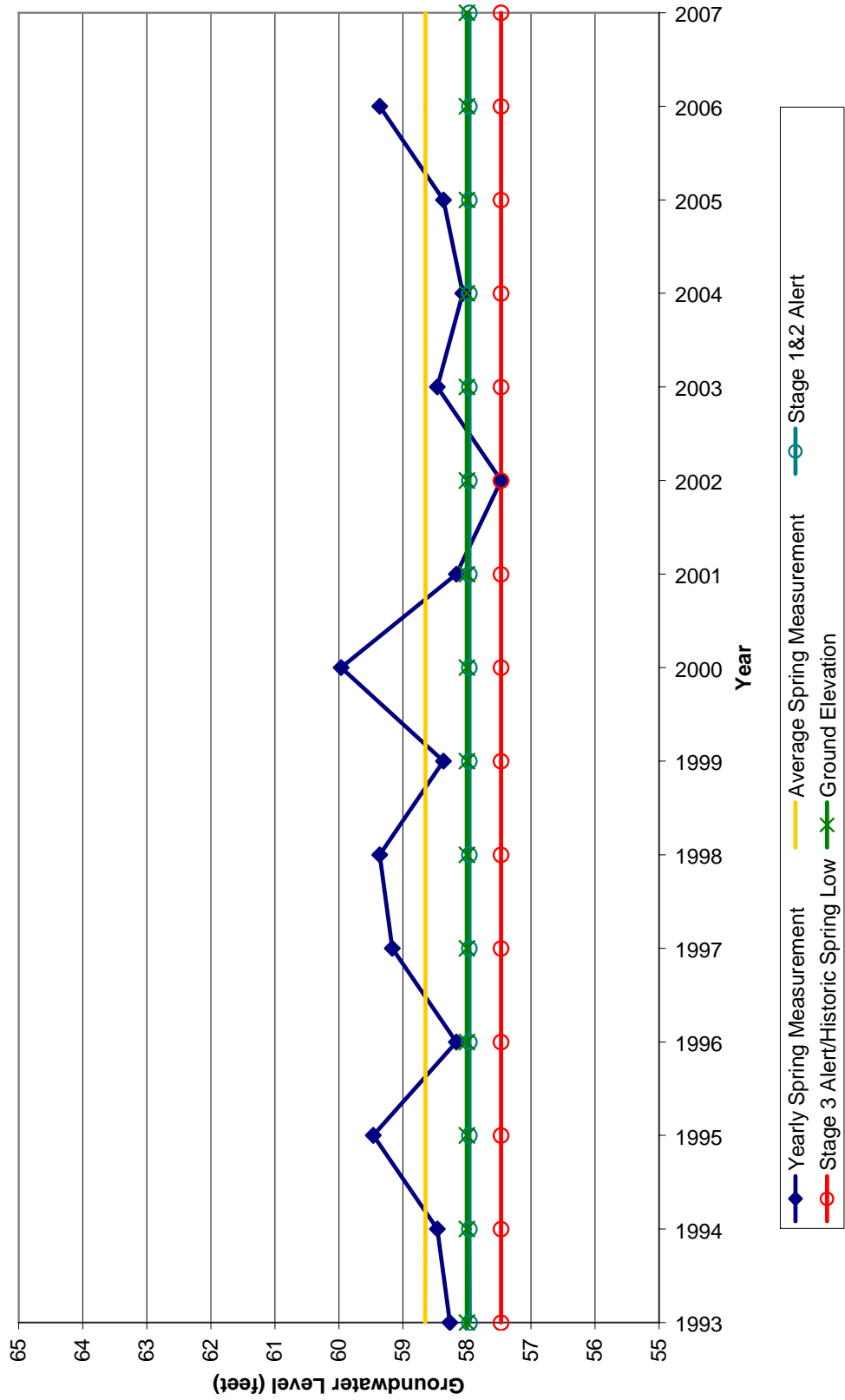
Fall Groundwater Levels
Butte Sink - 17N01E17F002



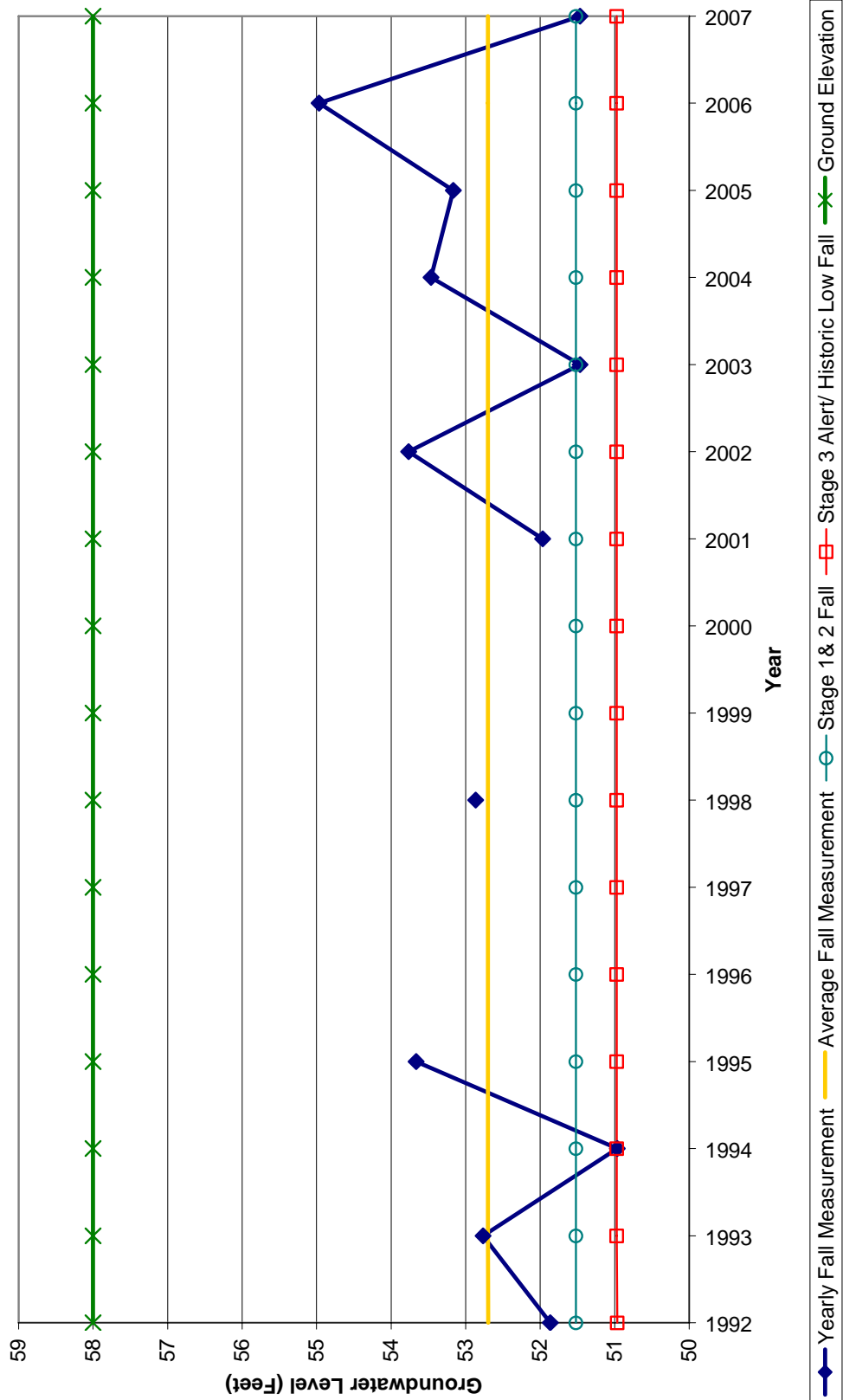
Fall Groundwater Levels
Butte Sink - 17N01E17F002



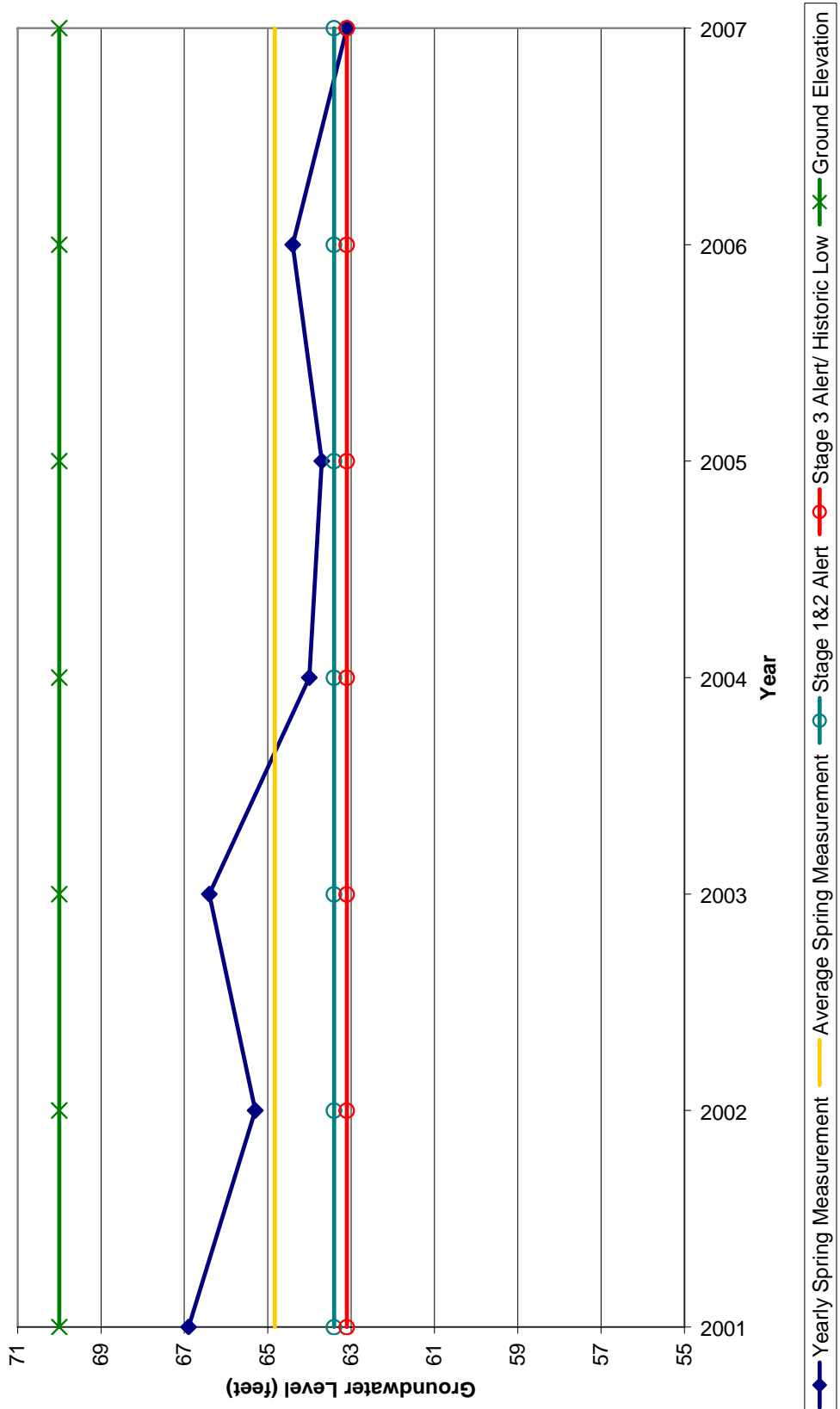
**Spring Groundwater Levels
Butte Sink - 17N01E17F003**



Fall Groundwater Levels
Butte Sink - 17N01E17F003



Spring Groundwater Levels
Butte Sink - 17N02E19J001



Fall Groundwater Levels
Butte Sink - 17N02E19J001

