

**Basin Management Objective  
Butte County  
Sub-Inventory Unit – DURHAM DAYTON**

**Butte County Water Advisory Committee Member – Carol Perkins**

**Contact Information**

Phone Number: 530-898-8645

Email Address: [carol@cuestageo.com](mailto:carol@cuestageo.com)

**Description of the Durham Dayton Sub-Inventory Unit –**

The Durham Dayton Sub-Inventory Unit (SIU) covers an area of about 40,000 acres in the heart of the West Butte Inventory Unit. It is bordered by Big Chico Creek to the north, Butte Creek and the Western Canal SUI to the south, foothills to the east, and the M&T and Llano Seco SIUs to the west. IN a normal year, 67% of the Durham Dayton SIU in summer agricultural production is supported by groundwater. In addition, 18% of the SIU is within the California Water Service Company area and uses groundwater as a municipal water source.

**Management Objective –**

To maintain the groundwater surface elevation during the peak summer irrigation season (July and August) in all aquifer systems at a level that will assure an adequate and affordable irrigation groundwater supply and to insure that spring groundwater elevations return to historical levels. It is the intent of this management objective to assure a sustainable agricultural supply of good quality water now and into the future, and to assure the water supply can be utilized without injuring groundwater quality or inducing land subsidence. The management objective is also to assure an adequate groundwater supply of adequate quality from the alluvial aquifer system for all domestic users in the SIU.

**Geologic Formations Identified In Sub-Inventory Unit –**

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

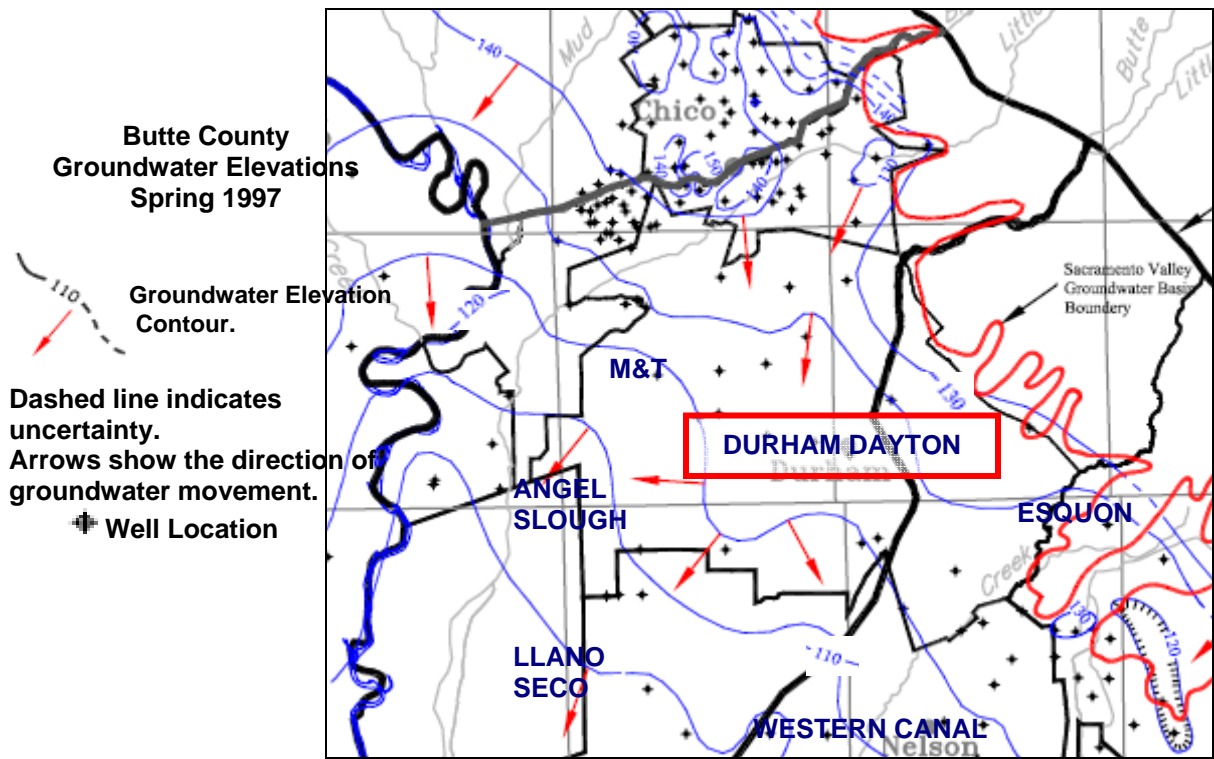
- Basin Deposits
- Modesto Formation
- Tuscan Unit C (Upper Tuscan)
- Tuscan Unit B (Lower Tuscan)

**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 Durham Dayton SIU are:

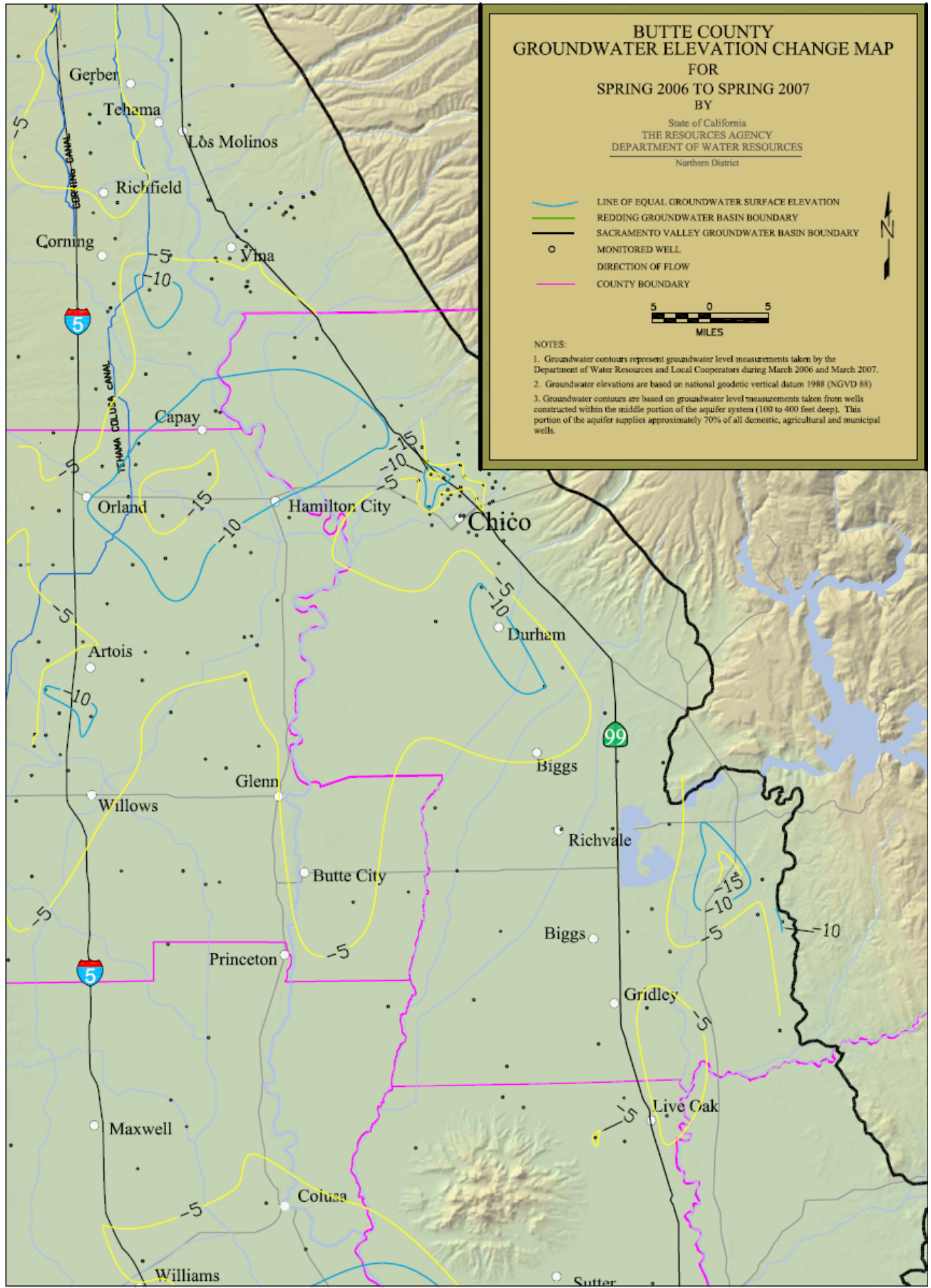
Modesto Formation  
Tuscan Unit C (Upper Tuscan)  
Tuscan Unit B (Lower Tuscan)

**Groundwater Flow in the Durham Dayton 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 Durham Dayton SIU is in a south-to-southwesterly direction, at a gradient of about 5 feet per mile, toward the Sacramento River and Butte Creek. The direction of groundwater movement indicates that both the Sacramento River and Butte Creek serve as groundwater drains in the Durham Dayton SIU.









1997 DWR groundwater contour map



**BUTTE COUNTY  
GROUNDWATER ELEVATION CHANGE MAP  
FOR  
SPRING 2006 TO SPRING 2007  
BY**

State of California  
THE RESOURCES AGENCY  
DEPARTMENT OF WATER RESOURCES  
Northern District

-  LINE OF EQUAL GROUNDWATER SURFACE ELEVATION
-  REDDING GROUNDWATER BASIN BOUNDARY
-  SACRAMENTO VALLEY GROUNDWATER BASIN BOUNDARY
-  MONITORED WELL
-  DIRECTION OF FLOW
-  COUNTY BOUNDARY



**NOTES:**

1. Groundwater contours represent groundwater level measurements taken by the Department of Water Resources and Local Cooperators during March 2006 and March 2007.
2. Groundwater elevations are based on national geodetic vertical datum 1988 (NGVD 88).
3. Groundwater contours are based on groundwater level measurements taken from wells constructed within the middle portion of the aquifer system (100 to 400 feet deep). This portion of the aquifer supplies approximately 70% of all domestic, agricultural and municipal wells.

**BMO Key Wells Selected for Groundwater Level Monitoring –**

Well ID	Aquifer System	Well Type	Spring Stage 1&2 Alert Elev. (ft)	Spring Stage 3 Alert Elev. (ft)	Fall Stage 1&2 Alert Elev. (ft)	Fall Stage 3 Alert Elev. (ft)
20N01E10C02M	Basin Deposits	Irrigation	111.68	107.19	101.31	95.67
20N02E06Q01M	Basin Deposits	Irrigation	120.22	115.87	110.72	105.20
21N01E08K02M	Modesto	Irrigation	122.50	118.07	111.72	107.57
21N01E10B03M	Upper Tuscan	Irrigation	127.33	121.74	113.87	108.16
21N01E25K01M	Modesto	Domestic	117.16	111.35	99.26	92.09
21N01E27B01M	Modesto	Irrigation	113.60	108.11	100.78	95.98
21N01E27D01M	Modesto	Domestic	110.56	95.54	101.84	93.80
21N02E07C01M	Upper Tuscan	Irrigation	129.30	122.09	118.44	108.81

**BMO Key Wells Selected for Groundwater Quality Monitoring–**

*Unfortunately, staff were unable to obtain samples in the Durham/Dayton sub-inventory unit this year. Access was not feasible due to an early almond harvest.*

**Groundwater Temperature - 2002 through 2007**

State Well Number	2002 Temp °C	2003 Temp °C	2004 Temp °C	2005 Temp °C	2006 Temp °C	2007 Temp °C
21N01E15EO2M	18.8	19.9	21.8	20.4	17.4	n/a

**Groundwater pH - 2002 through 2007**

State Well Number	2002 pH	2003 pH	2004 pH	2005 pH	2006 pH	2007 pH
21N01E15EO2M	7.7	7.2	7.6	7.6	7.5	n/a

**Groundwater EC - 2002 through 2007**

State Well Number	2002 EC	2003 EC	2004 EC	2005 EC	2006 EC	2007 EC
21N01E15EO2M	315	348	259	340	322	n/a

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

Land Subsidence will be monitored at the closest extensometers located in the M&T and Western Canal sub inventory units. Maximum annual inelastic land subsidence shall not exceed 0.01 feet per year.

**BMO Alert Stage Definitions and Compliance Methodologies–**

The Durham Dayton SIU will use the following guidelines in the management of the groundwater resources. The groundwater level and land subsidence management objectives are intended to trigger 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 the index well.

### **Groundwater Level – Standard Deviation and Two Standard Deviations**

Stage 1: The first year that spring or fall groundwater levels fall below one standard deviation below the average spring or fall groundwater level established 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 average spring or fall groundwater level of the well.

Stage 3: Stage 3 is reached if the spring or fall groundwater levels fall below the average minus two standard deviations.

### **Groundwater Quality –**

Any change that exceeds a 20 percent change from Butte County's 2007 water quality assessment done in August of each year will be cause for review and investigation by the Technical Advisory Committee.

### **Land Subsidence –**

Land Subsidence will be monitored at the closest extensometers located in the M&T and Western Canal sub inventory units. Maximum annual inelastic land subsidence shall not exceed 0.01 feet per year.

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 –**

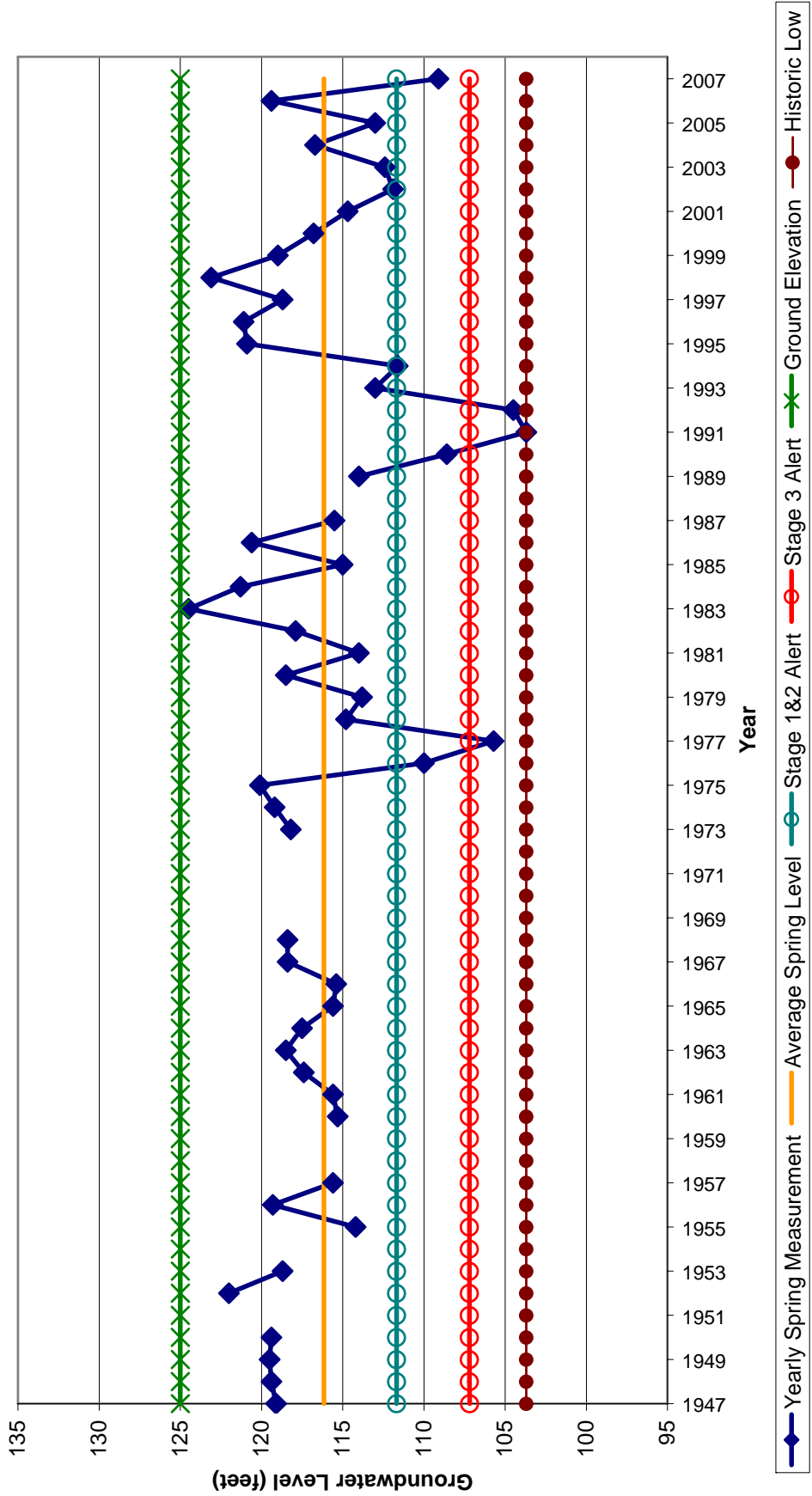
Possibly secure funding for the installation of an extensometer to monitor land subsidence in the Durham Dayton Sub-Inventory Unit. Explore options for installing multi-completion monitoring wells to more accurately measure aquifer specific water quality and levels.

### **Supporting Data –**

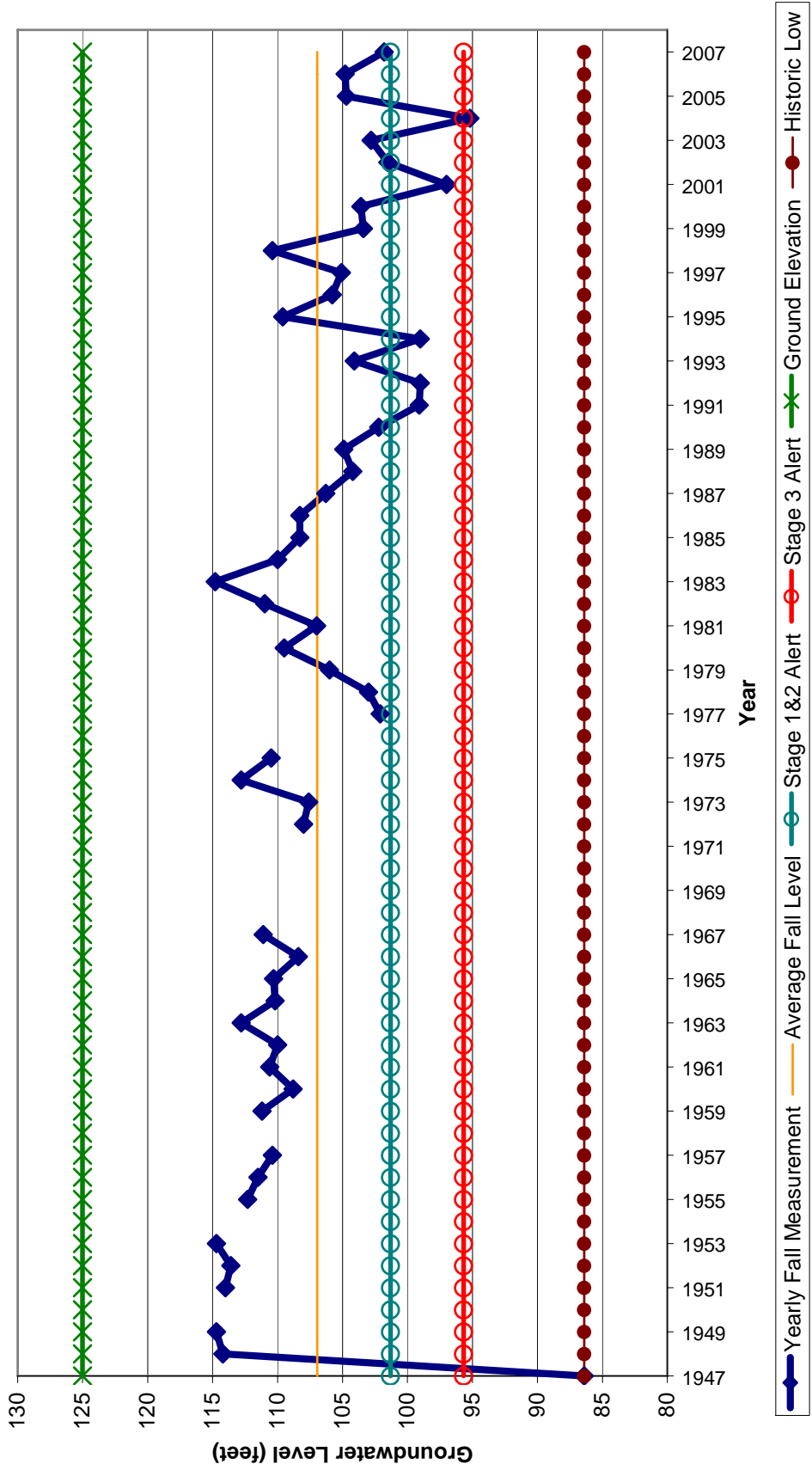
Hydrographs depicting yearly spring level measurements, including 2007 data, with established alert levels.

Summary charts of water quality monitoring.

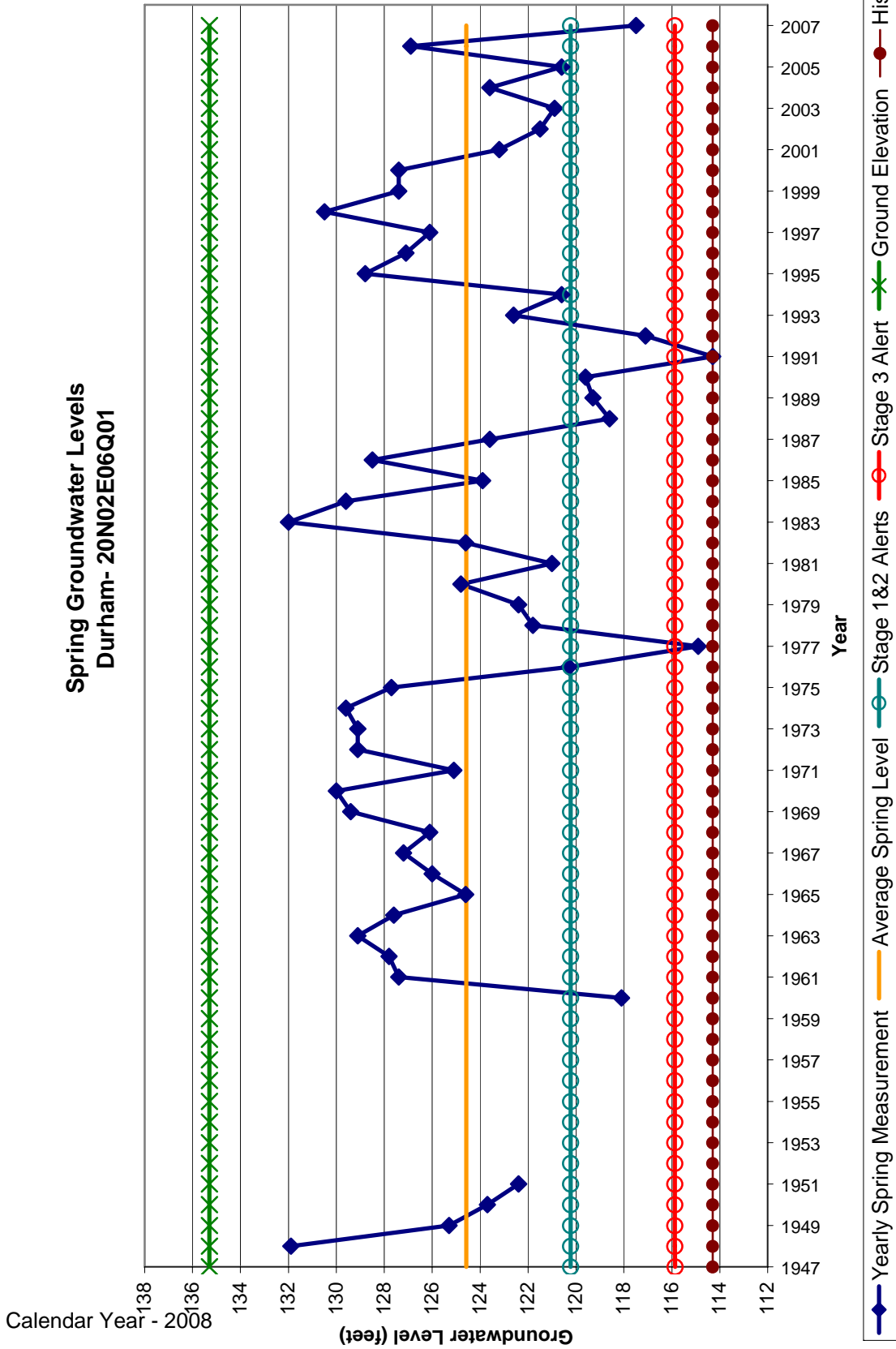
Spring Groundwater Levels  
Durham Dayton- 20N01E10C02



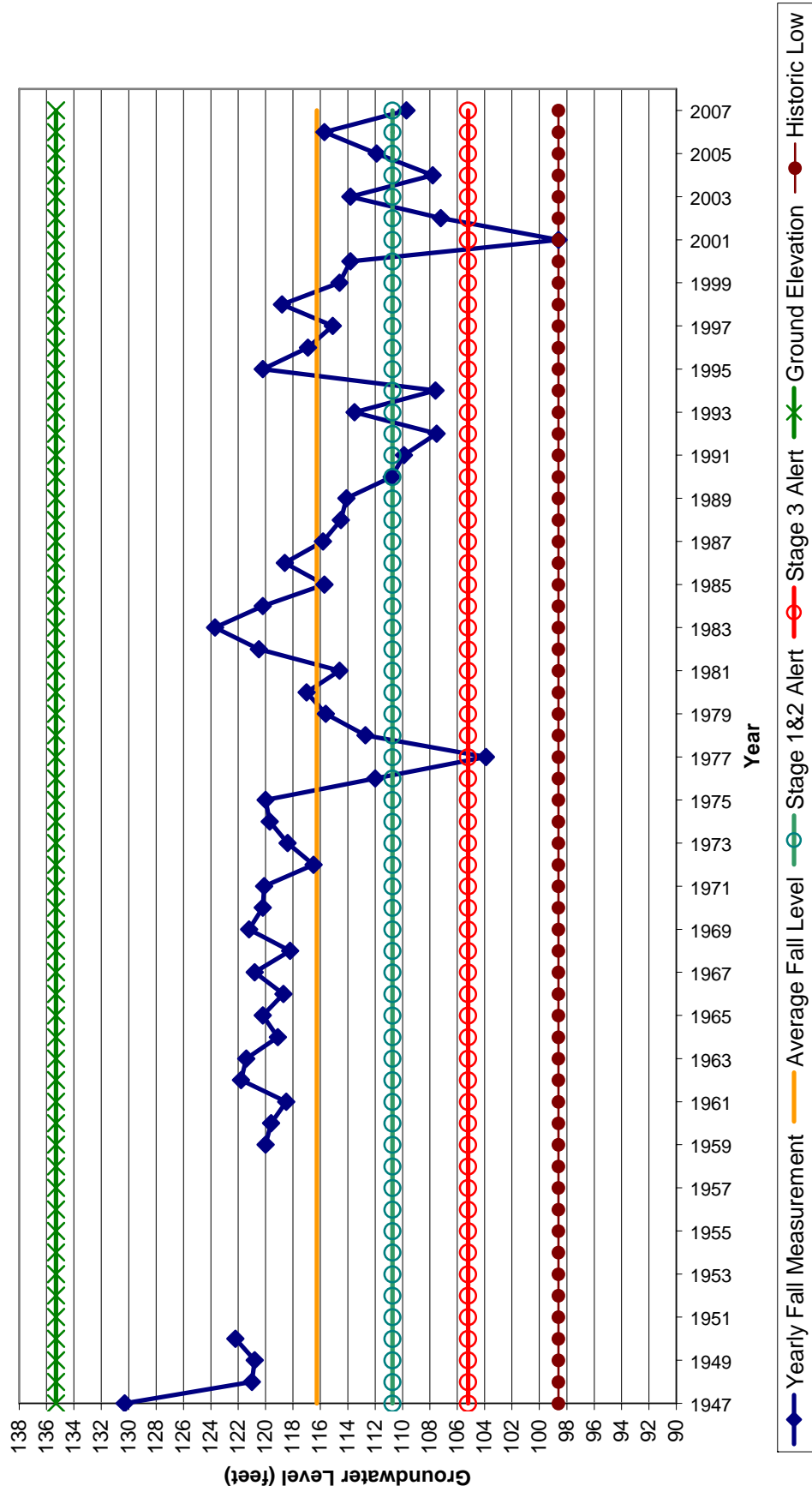
Fall Groundwater Levels  
Durham Dayton - 20N01E10C02



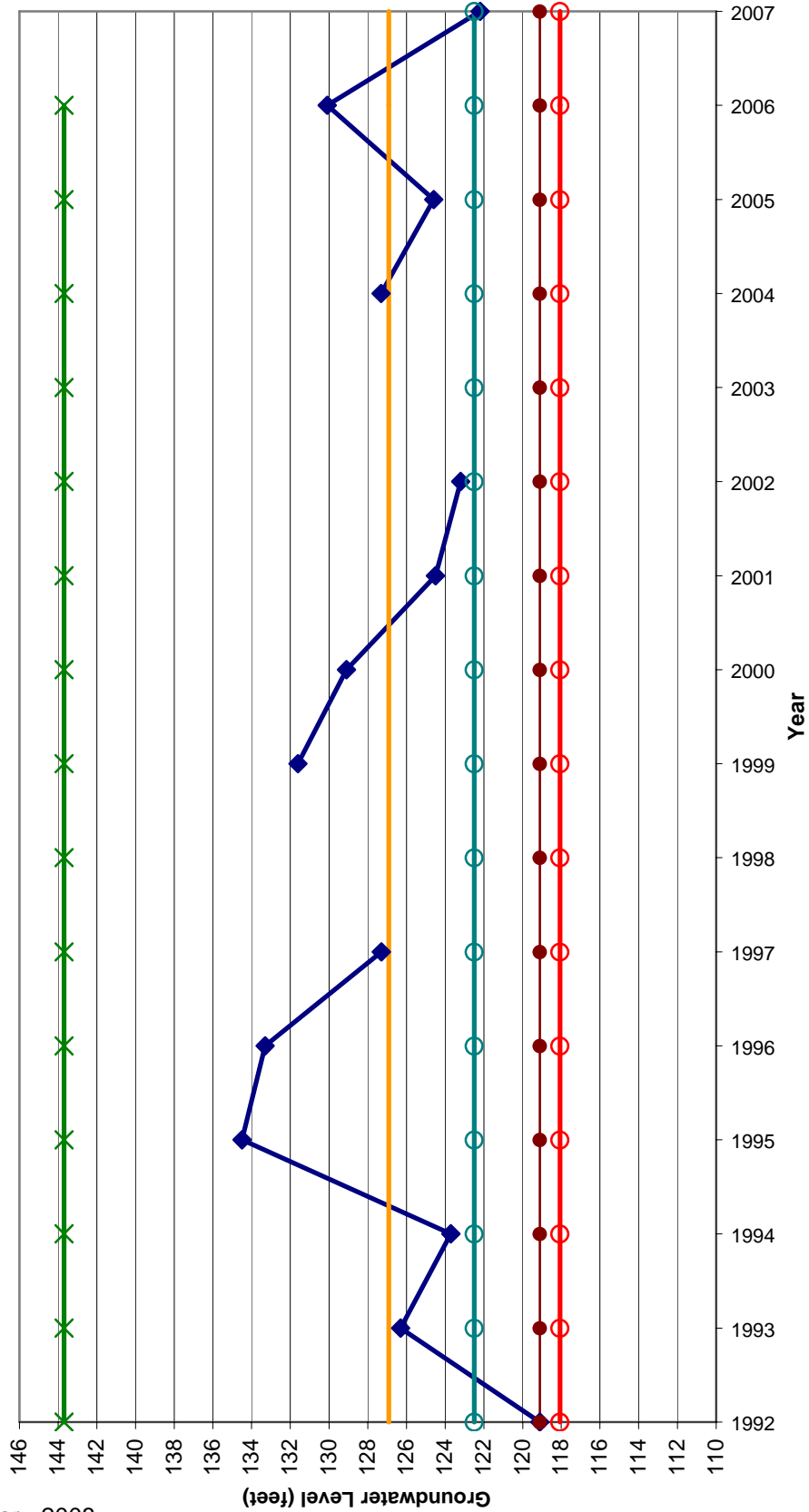
### Spring Groundwater Levels Durham- 20N02E06Q01



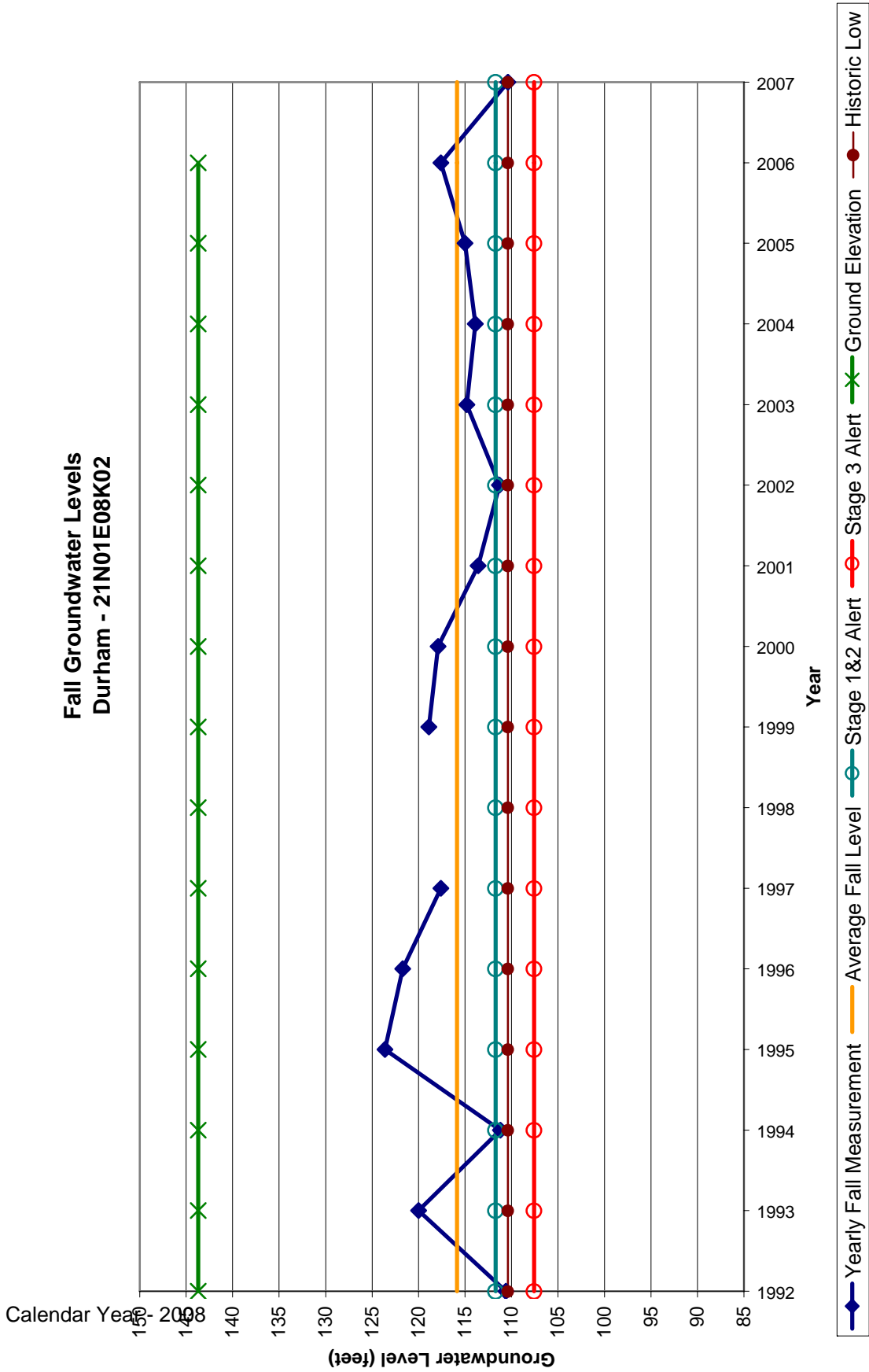
Fall Groundwater Levels  
Durham - 20N02E06Q01



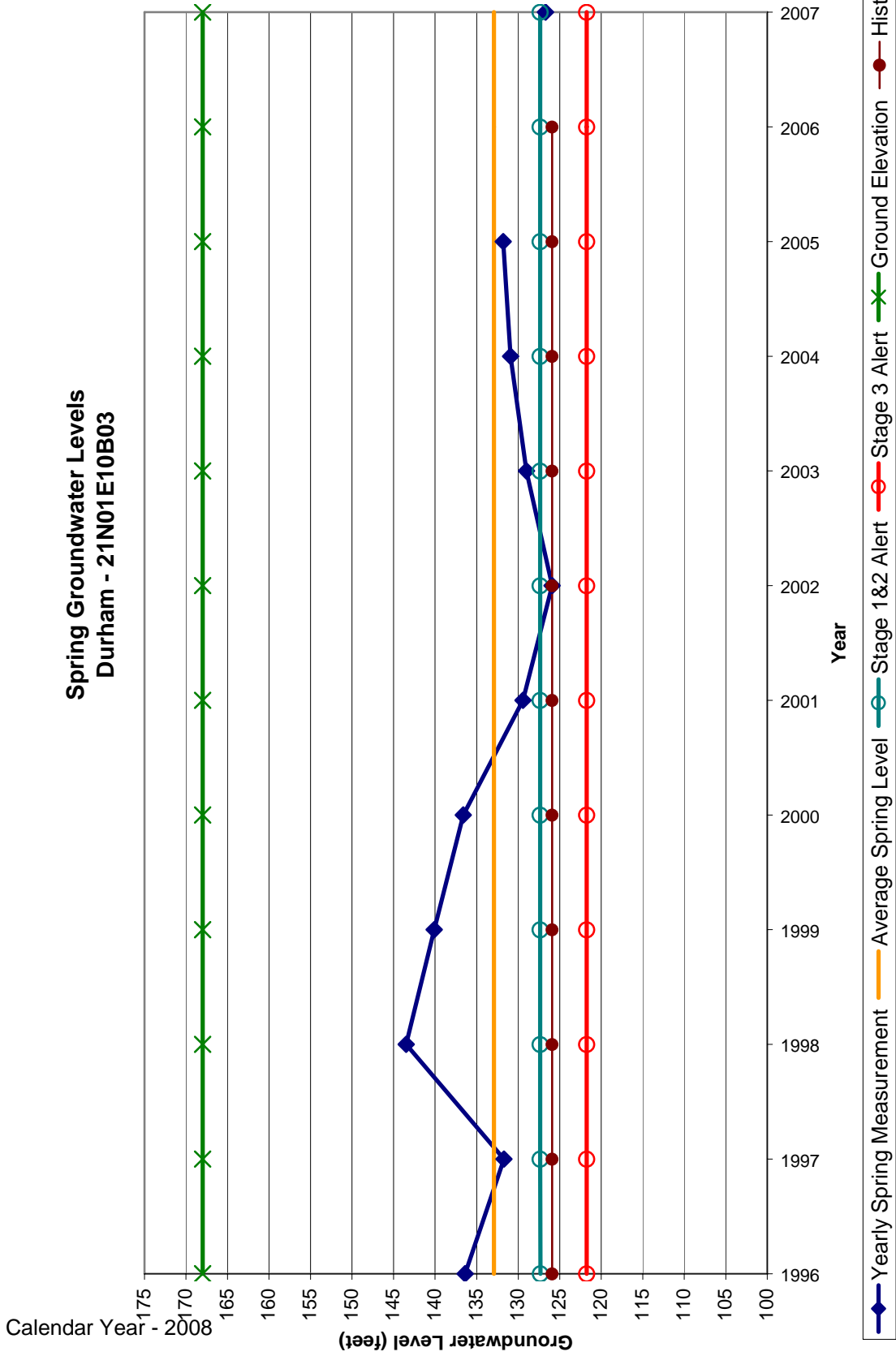
### Spring Groundwater Levels Durham - 21N01E08K02



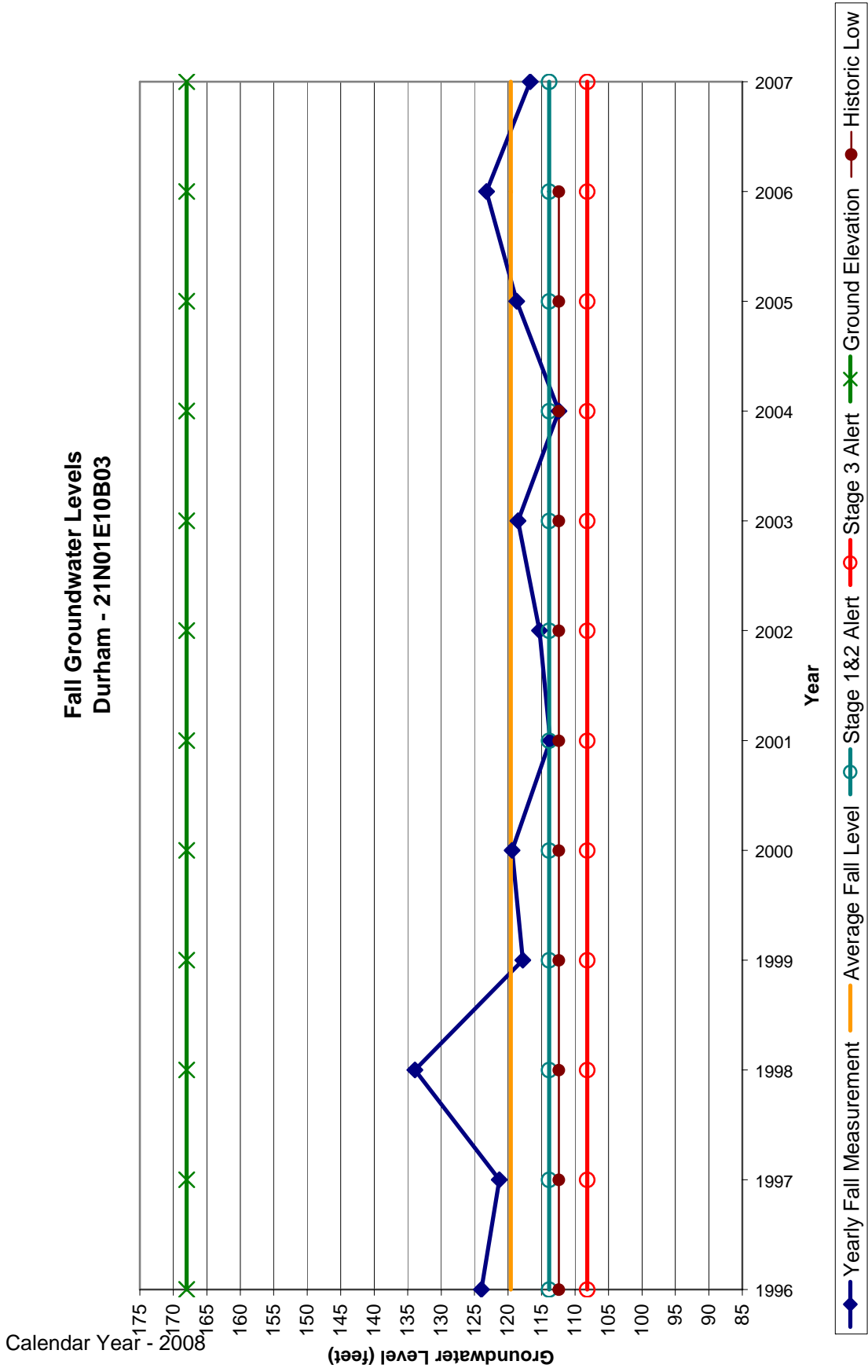
### Fall Groundwater Levels Durham - 21N01E08K02



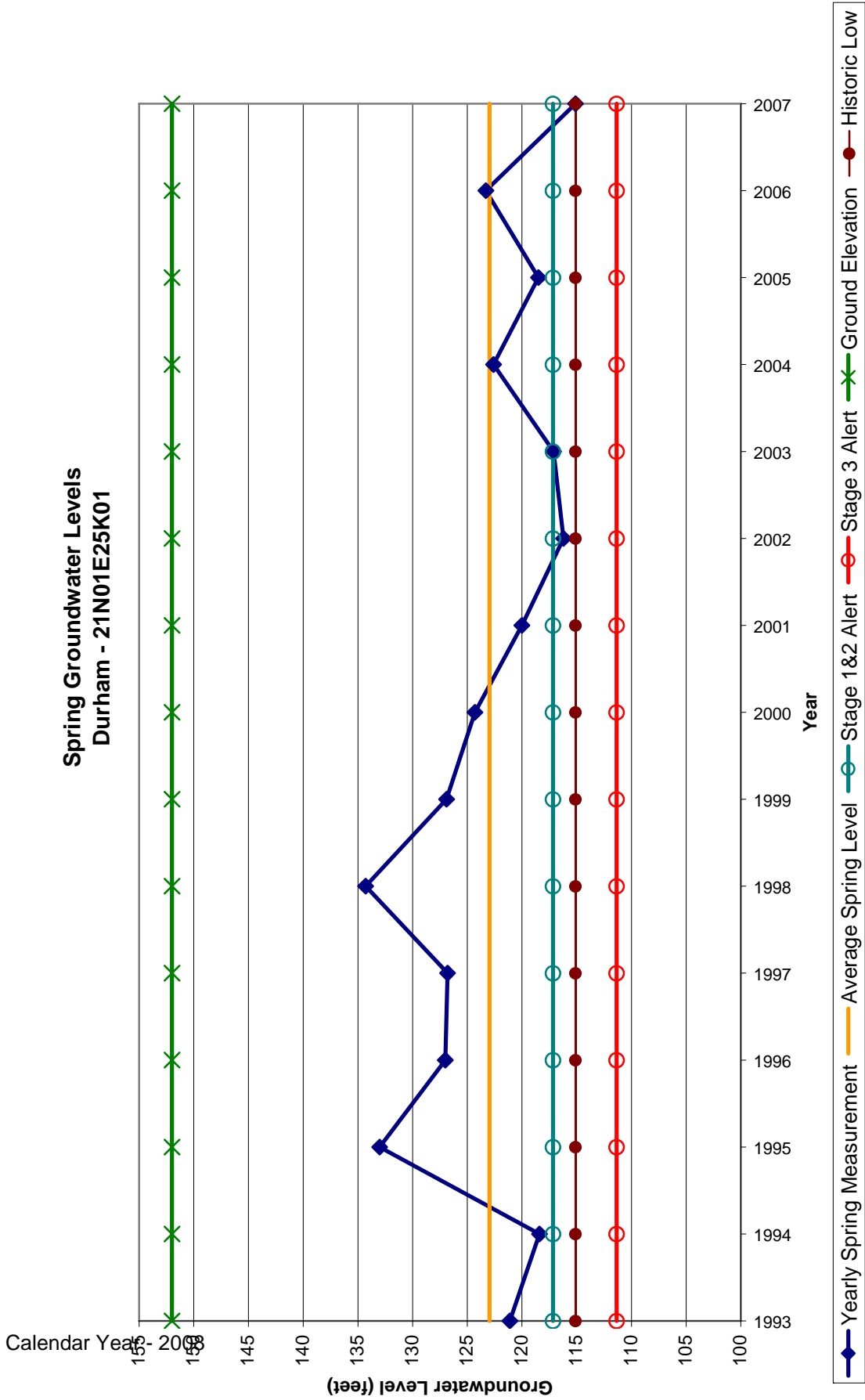
### Spring Groundwater Levels Durham - 21N01E10B03



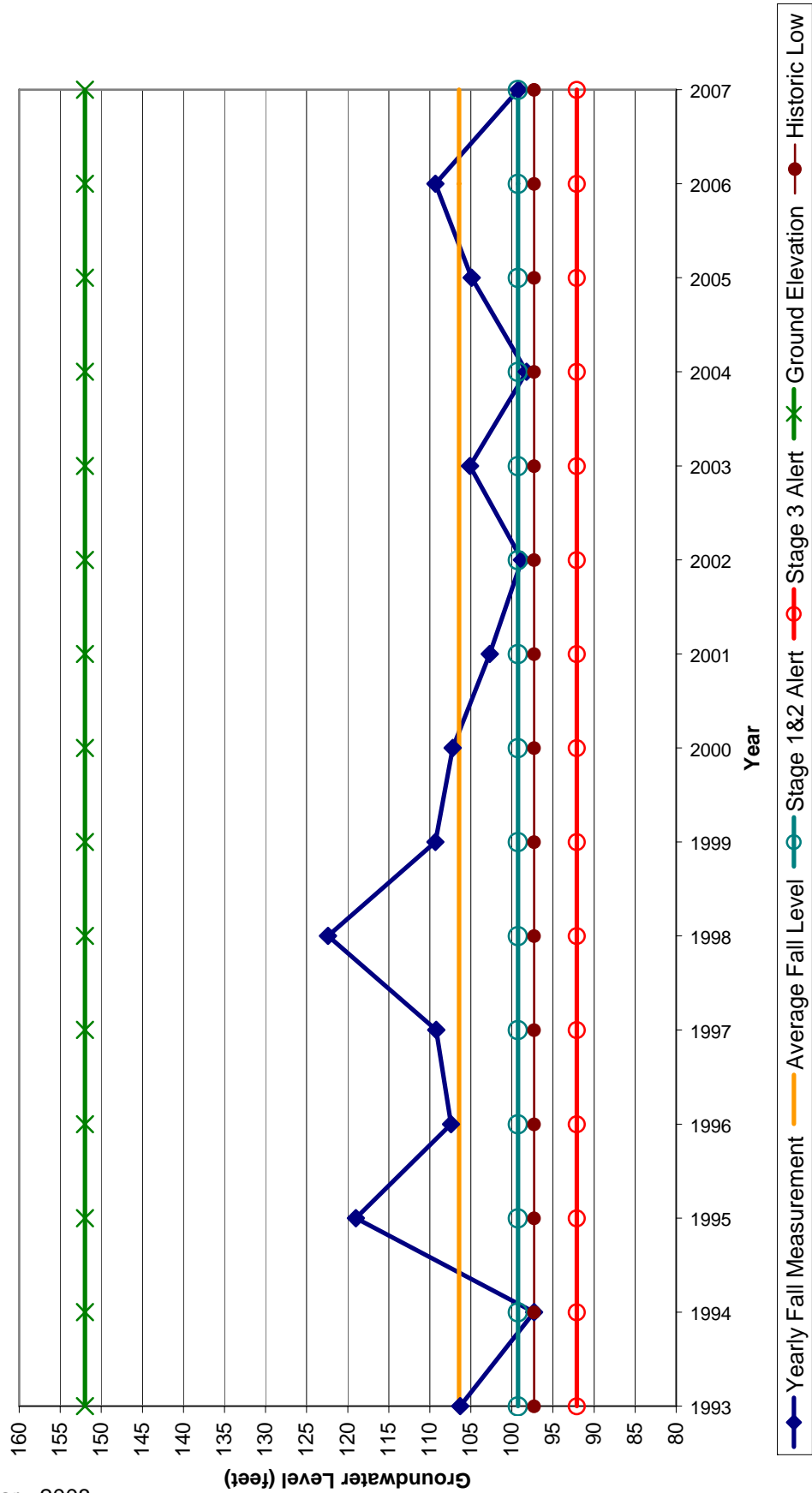
### Fall Groundwater Levels Durham - 21N01E10B03

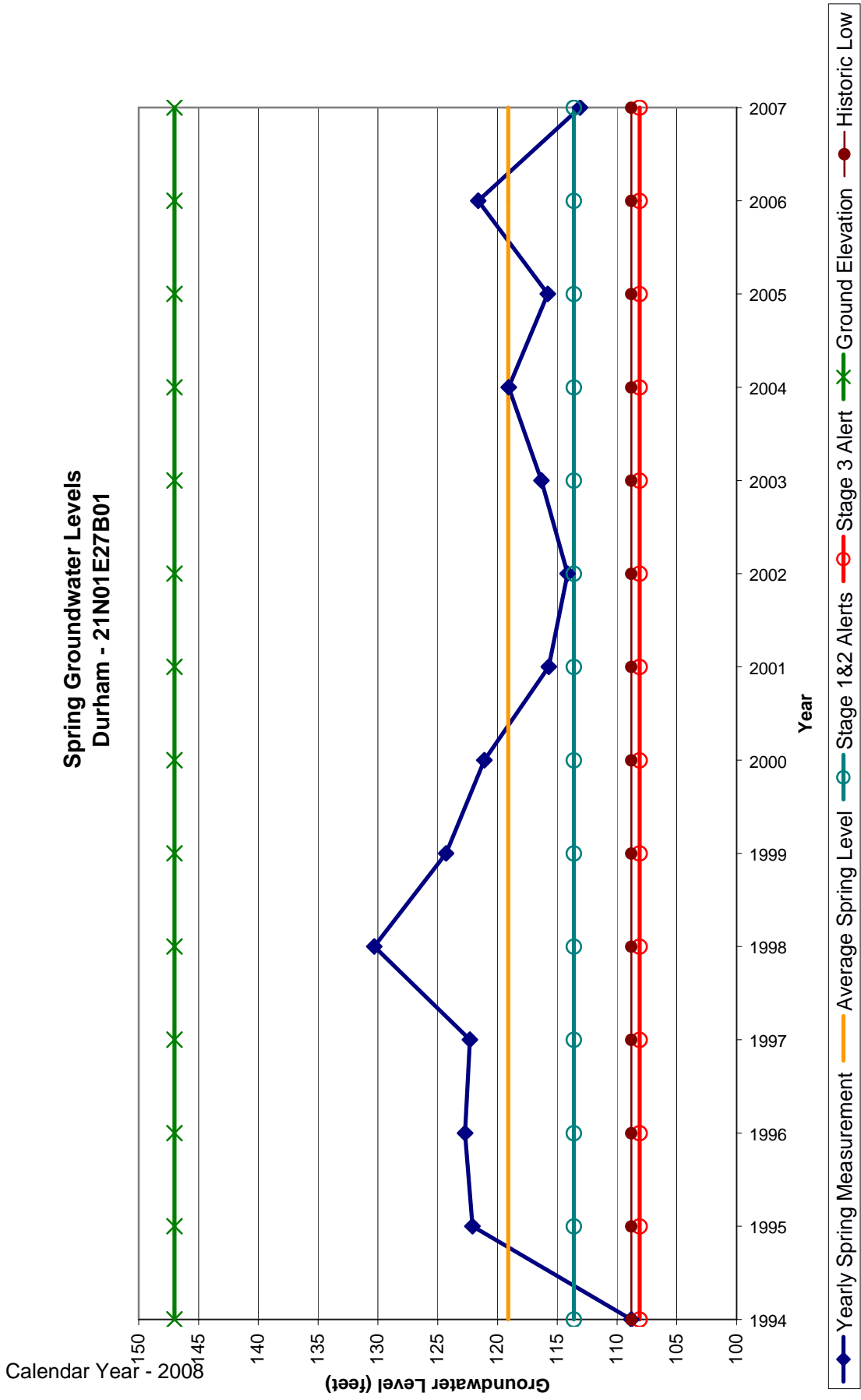


Spring Groundwater Levels  
Durham - 21N01E25K01

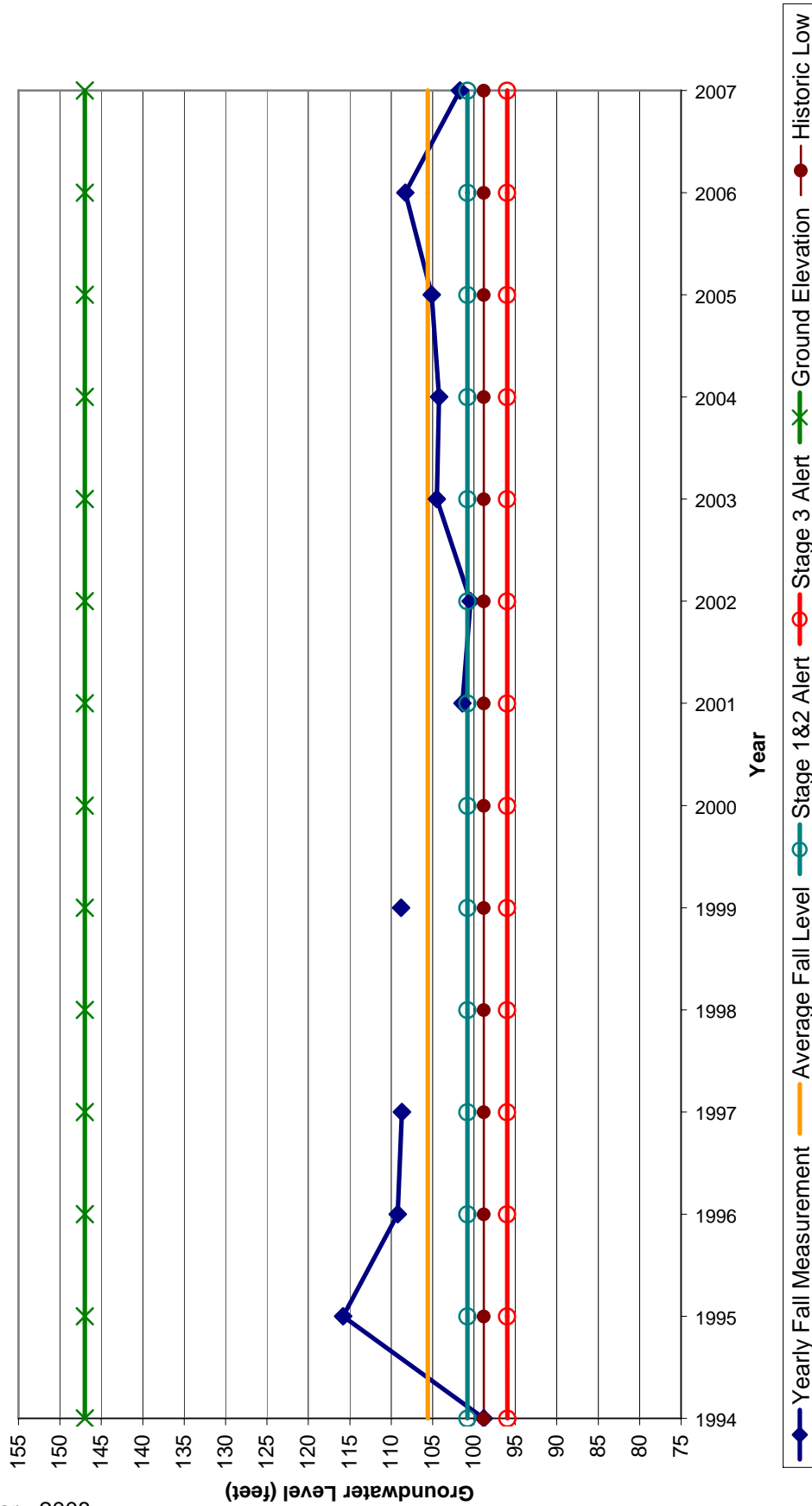


Fall Groundwater Levels  
Durham - 21N01E25K01

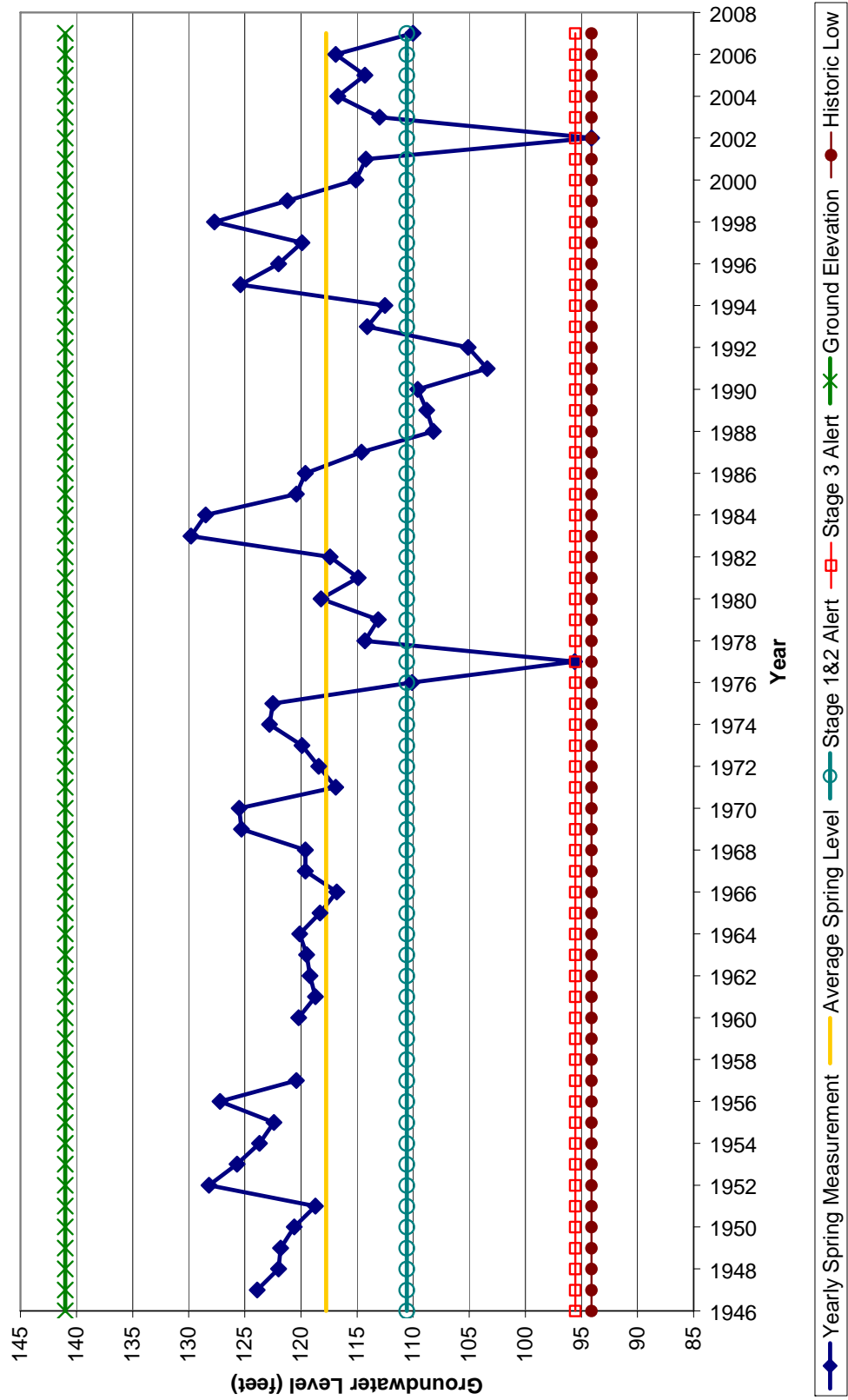




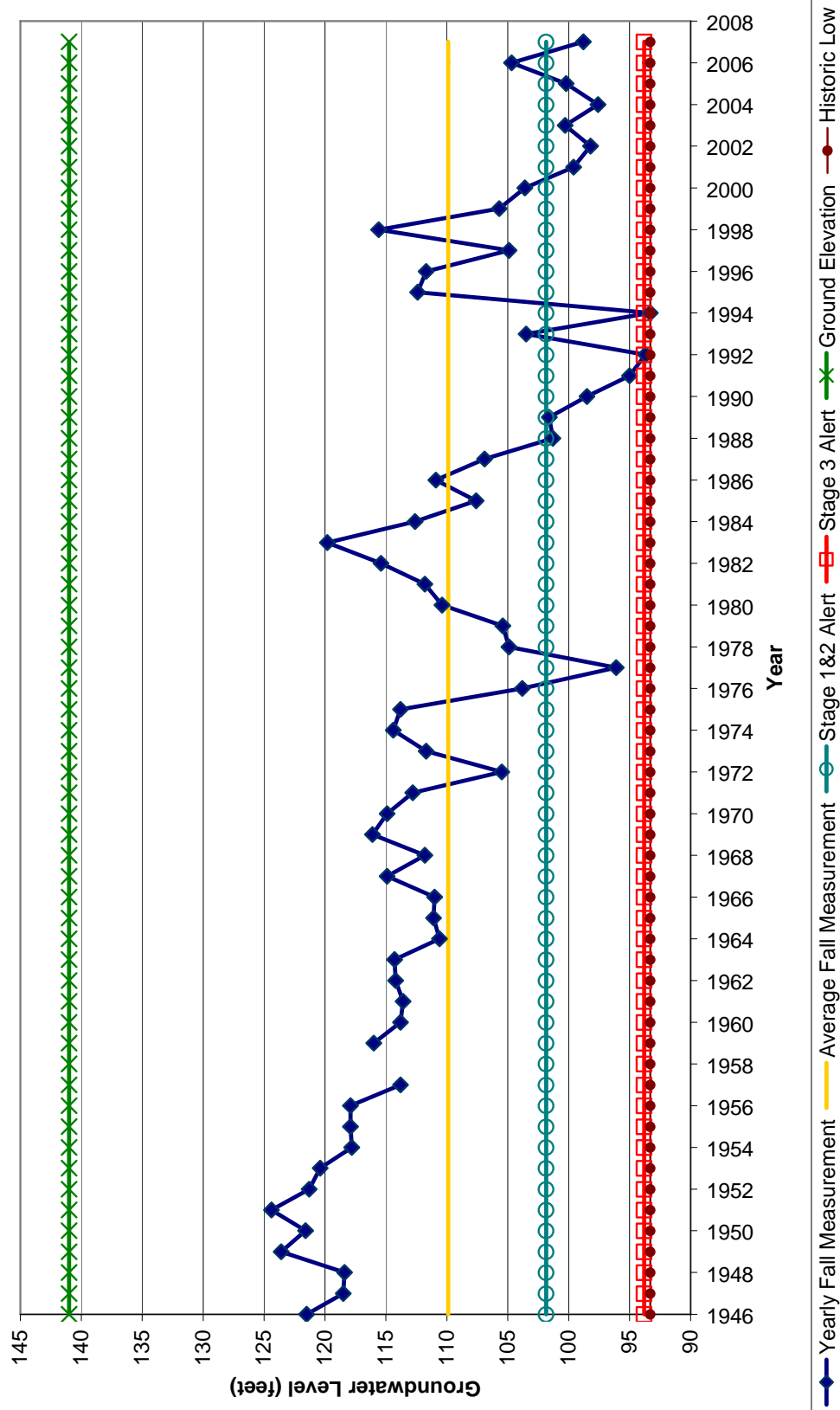
Fall Groundwater Levels  
Durham - 21N01E27B01



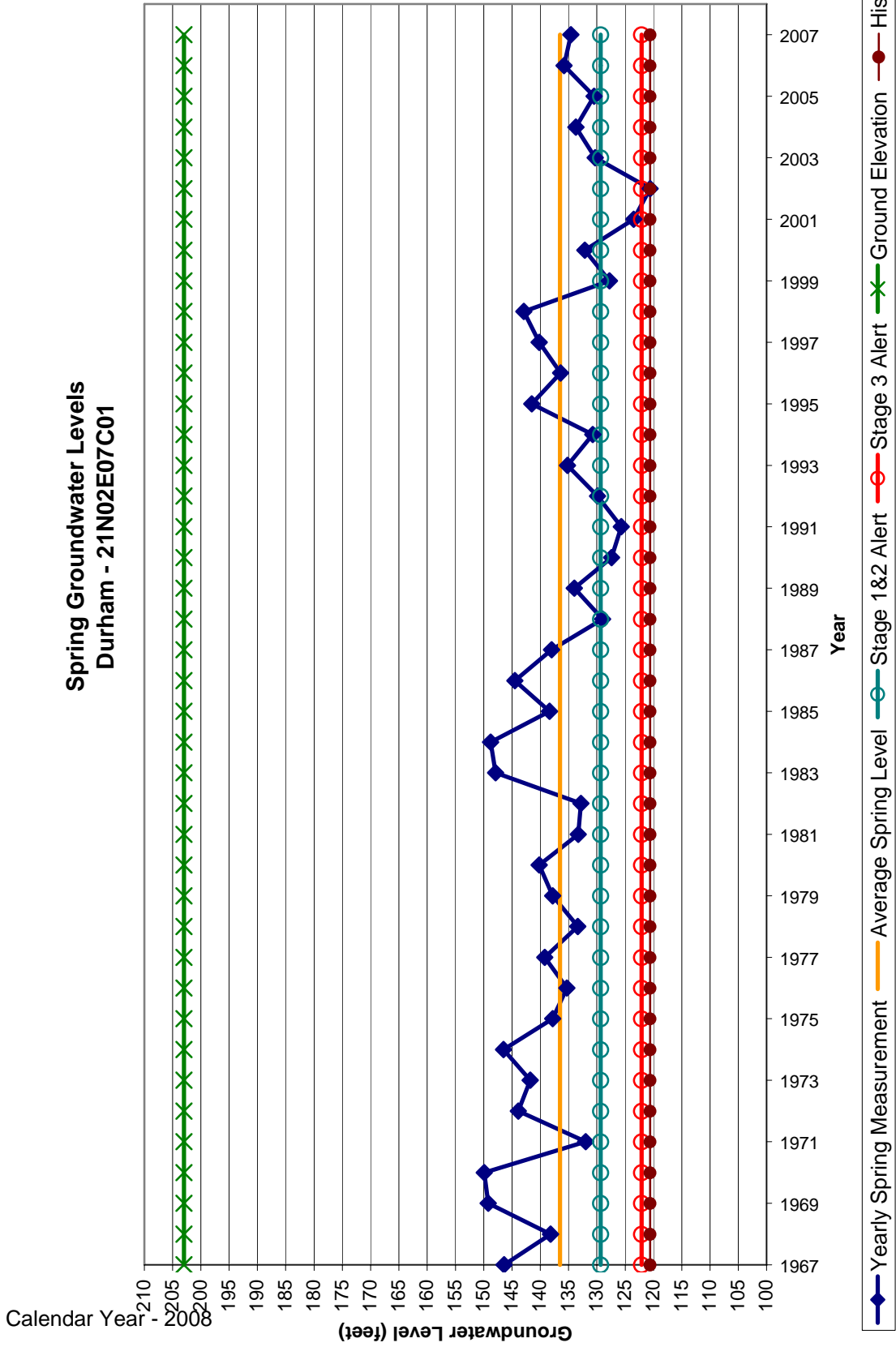
Spring Groundwater Levels  
Durham Dayton - 21N01E27D01



Fall Groundwater Levels  
Durham 21N01E27D01



### Spring Groundwater Levels Durham - 21N02E07C01



Fall Groundwater Levels  
Durham - 21N02E07C01

