

**Basin Management Objective
Butte County
Sub-Inventory Unit – ESQUON**

Butte County Water Advisory Committee Member – Rick Ponciano

Contact Information

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Description of the Esquon Sub-Inventory Unit –

The Esquon Sub-Inventory Unit (SIU) covers an area of about 11,600 acres in the northern portion of the East Butte Inventory Unit. It is bordered by the Pentz SUI to the north, Western Canal SIU to the south, Cherokee SIU to the east, and Butte Creek to the west. The Esquon SIU almost corresponds to the water service areas associated with the Durham Mutual Water Company and Rancho Esquon. Agricultural land use within the SIU includes production of orchards, rice, and grain crops supported by both surface water and groundwater. In a normal year, about 27% of the Esquon SIU is in summer agricultural productions supported by groundwater.

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. 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 Esquon SIU, from youngest (shallowest) to oldest (deepest), include:

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

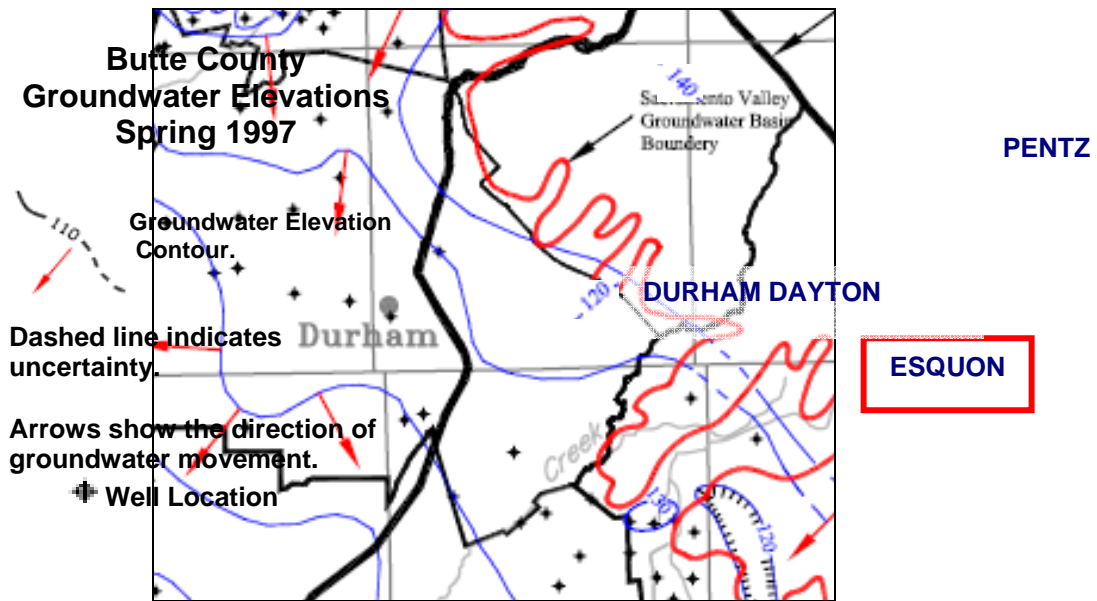
Fresh Water-bearing Units. In the Sacramento Valley Region of Butte County, fresh groundwater-bearing units include, from youngest (shallowest) to oldest

(deepest), the Modesto, Riverbank, Laguna, Tehama and Tuscan Formations. Those included in the Esquon SIU are:

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

Groundwater Flow in the Esquon 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 Esquon SIU is in a south-to-southwesterly direction, at a gradient of about 4 feet per mile, adjacent to Butte Creek.



1997 DWR groundwater contour map

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

Well ID	Aquifer System	Well Type	Stage 1 & 2 Alerts Mid point of Average & Historic Low Elev. (ft)	Stage 3 Alerts Lowest Recorded Elev. (ft)
20N02E09G01M	Lower Tuscan	Monitoring	119.12	114.74
20N02E09L01M	Lower Tuscan	Irrigation	123.56	118.50
21N02E20P01M	Upper Tuscan	Irrigation	125.58	119.60

FALL

Well ID	Aquifer System	Well Type	Stage 1 & 2 Alerts Mid point of Average & Historic Low Elev. (ft)	Stage 3 Alerts Lowest Recorded Elev. (ft)
20N02E09G01M	Lower Tuscan	Monitoring	114.34	114.74
20N02E09L01M	Lower Tuscan	Irrigation	113.35	104.50
21N02E20P01M	Upper Tuscan	Irrigation	112.47	106.60

BMO Key Wells Selected for Groundwater Quality Monitoring–

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
20N02E09M02M	19.7	18.9	19.6	20.1	20.7	19.0

Groundwater pH - 2002 through 2007

State Well Number	2002 pH	2003 pH	2004 pH	2005 pH	2006 pH	2007 pH
20N02E09M02M	7.3	7.5	7.1	7.4	7.5	7.4

Groundwater EC - 2002 through 2007

State Well Number	2002 EC	2003 EC	2004 EC	2005 EC	2006 EC	2007 EC
20N02E09M02M	388	526	470	557	507	480

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

State Well Number 20N01E18L03M located in the Western Canal Water District. Maximum annual inelastic land subsidence shall not exceed 0.01 feet per year.

BMO Alert Stage Definitions and Compliance Methodologies–

The Esquon Sub-Inventory Unit 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 staff report, to remedy declining ground water levels that are not recovering to compliance levels for each index well.

Groundwater Levels – Specific Depth and Lowest Record

Stage 1: The first year that spring groundwater levels reach or fall below the alert level established for the well. *This alert level represents the mid point between the average spring measurement and the historic low.* The BMO Representative has first hand historic knowledge of agricultural practices throughout the sub-

inventory unit. Access to Rancho Esquon historical groundwater data coupled with the historic knowledge serves as the basis for selecting this specific depth methodology.

Stage 2: Stage 2 is reached if spring groundwater levels, for a second consecutive year, remain at or below the Stage 1 alert level established for the well while still above the lowest record spring level for the well.

Stage 3: Stage 3 is reached if the spring groundwater levels reach or fall below the lowest historic water level on record for each respective well.

Groundwater Quality –

Any change that exceeds a 20 percent change from Butte County's 2007 water quality assessment 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 –

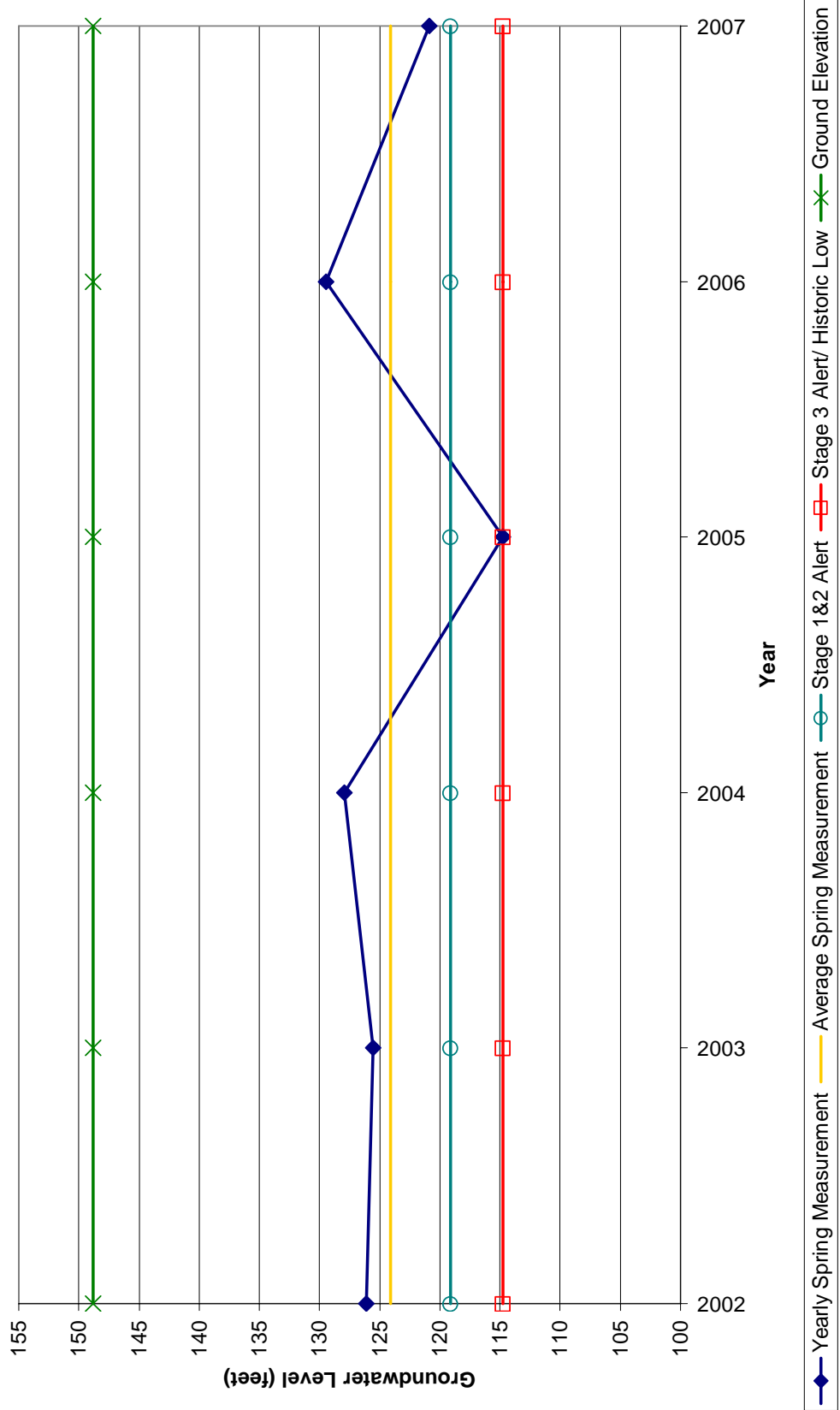
Possibly secure funding for the installation of an extensometer to monitor land subsidence in the Esquon SIU. Explore options for installing multi-completion monitoring wells to more accurately measure aquifer specific water quality and levels.

Supporting Data –

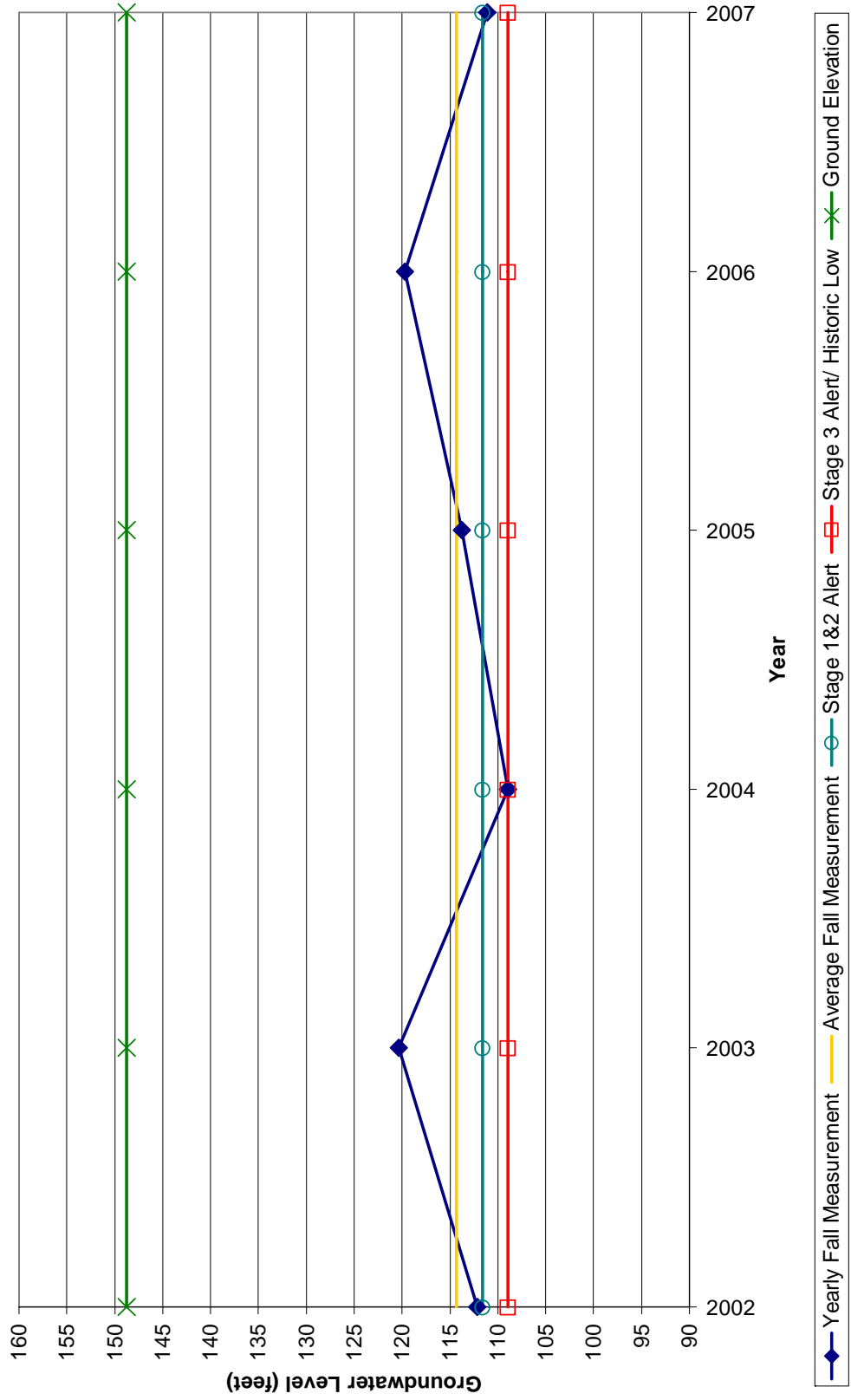
Hydrographs depicting yearly spring level measurements, including 2007 data, with established alert levels.

Summary charts of water quality monitoring.

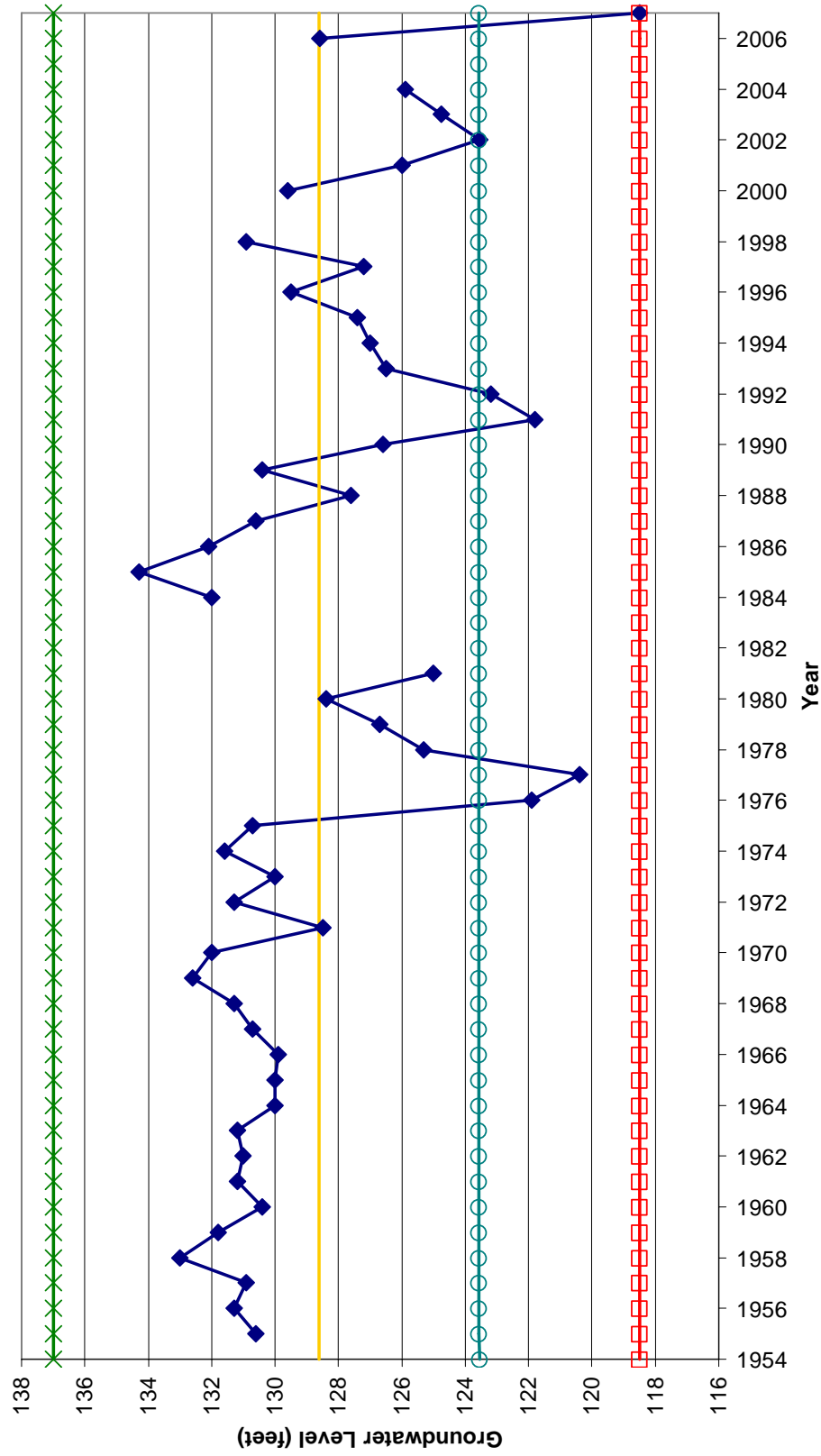
Spring Groundwater Levels
Esquon - 20N02E09G01



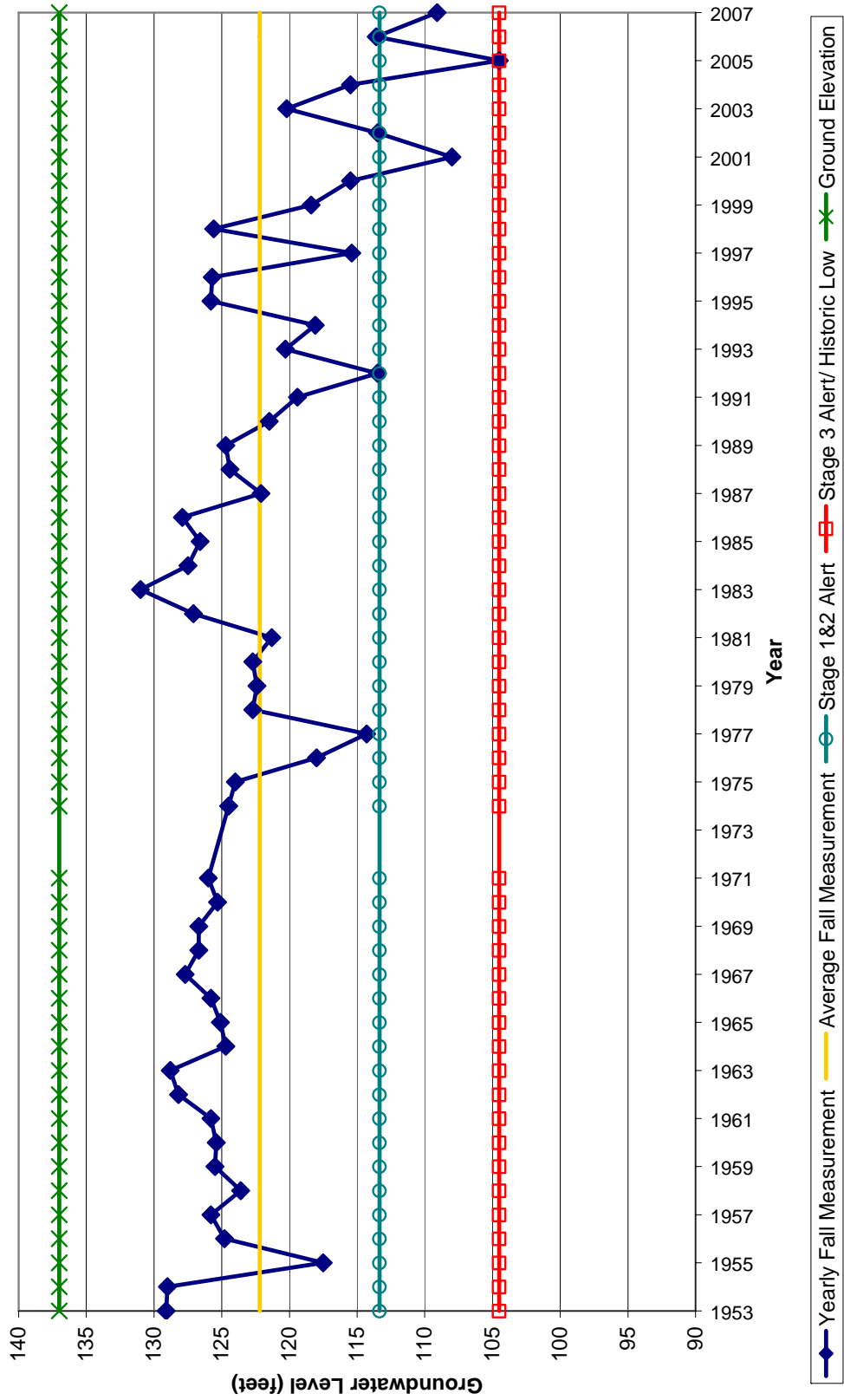
Fall Groundwater Levels
Esquon - 20N02E09G01



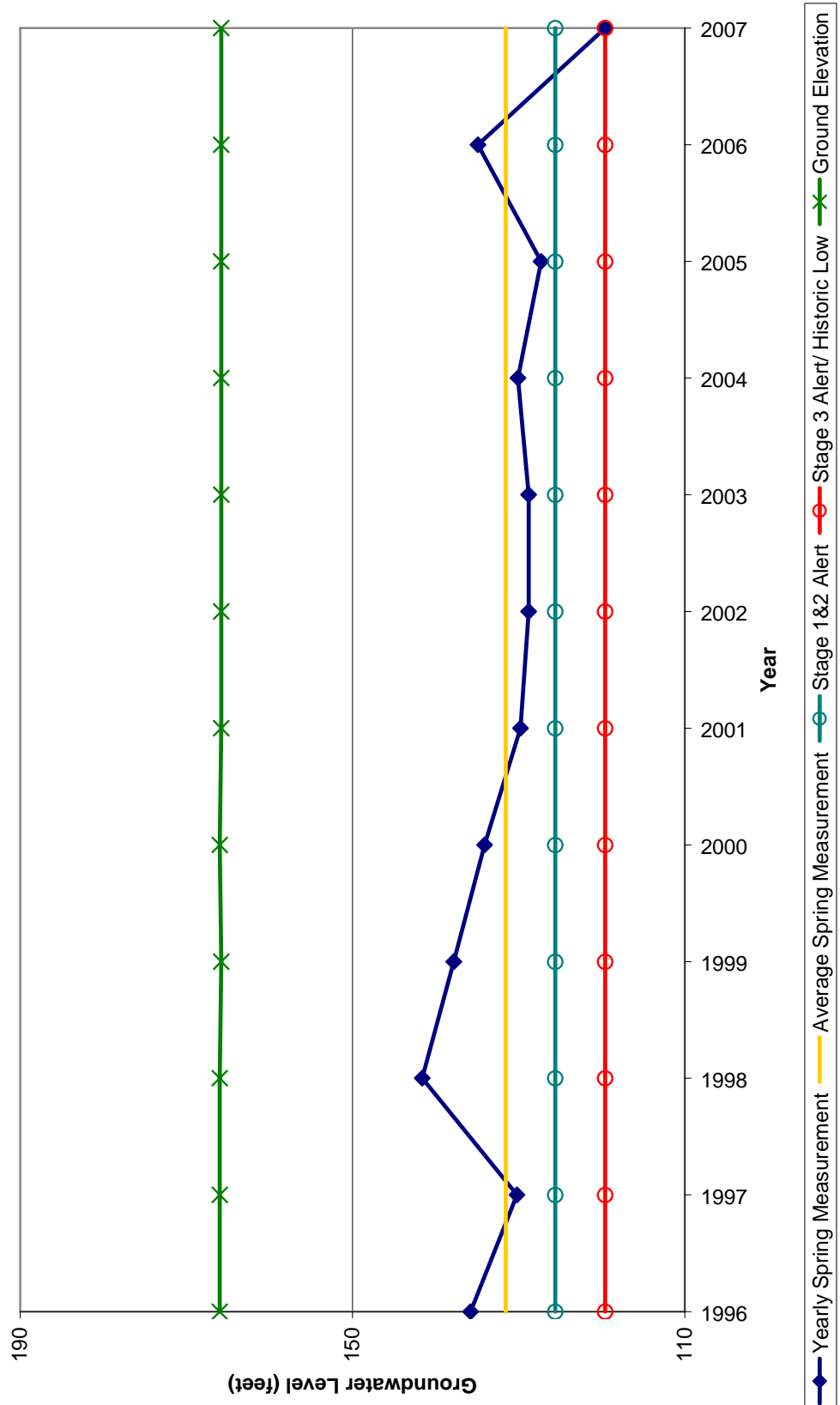
Spring Groundwater Levels
Esquon - 20N02E09L01



Fall Groundwater Levels
Esquon - 20N02E09L01



Spring Groundwater Levels
Esquon - 21N02E20P01



Fall Groundwater Levels
Esquon - 21N02E20P01

