

**Basin Management Objective
Butte County
Sub-InVENTORY Unit – WESTERN CANAL
Western Canal Water District**

Butte County Water Advisory Committee Member – Ted Trimble

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Description of the Western Canal Sub-InVENTORY Unit –

The Western Canal Sub-InVENTORY Unit (SIU) covers an area of about 44,750 acres. About one-third of the sub-inventory unit is in the West Butte Inventory Unit and the remainder is in the East Butte Inventory Unit. The Western Canal SIU corresponds roughly to the Butte County portion of the Western Canal Water District. A portion of the southwestern corner of the water district is in Glenn County. Agricultural production in the Western Canal SIU consists primarily of rice supported by surface water. In normal years, about 7% of the SIU is in summer agricultural production supported by groundwater. During drought years, the area of summer agricultural production supported by groundwater increases to about 13%. The data presented in this section includes the entire Butte County portion of the Western Canal SIU.

Management Objective –

To maintain sufficient volumes of groundwater in storage within the Upper and Lower Tuscan Formation aquifer systems to provide an adequate and affordable irrigation water supply, of adequate quality for agriculture purposes, including during periods of extended drought and to assure that groundwater in storage is not depleted over time. It is the intent of this management objective to assure a sustainable agricultural water supply 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 supply for groundwater from the alluvial aquifer system for all domestic users in the sub-inventory unit.

Geologic Formations Identified In Sub-InVENTORY Unit –

Geologic formations in the Western Canal SIU from youngest (shallowest) to oldest (deepest) include:

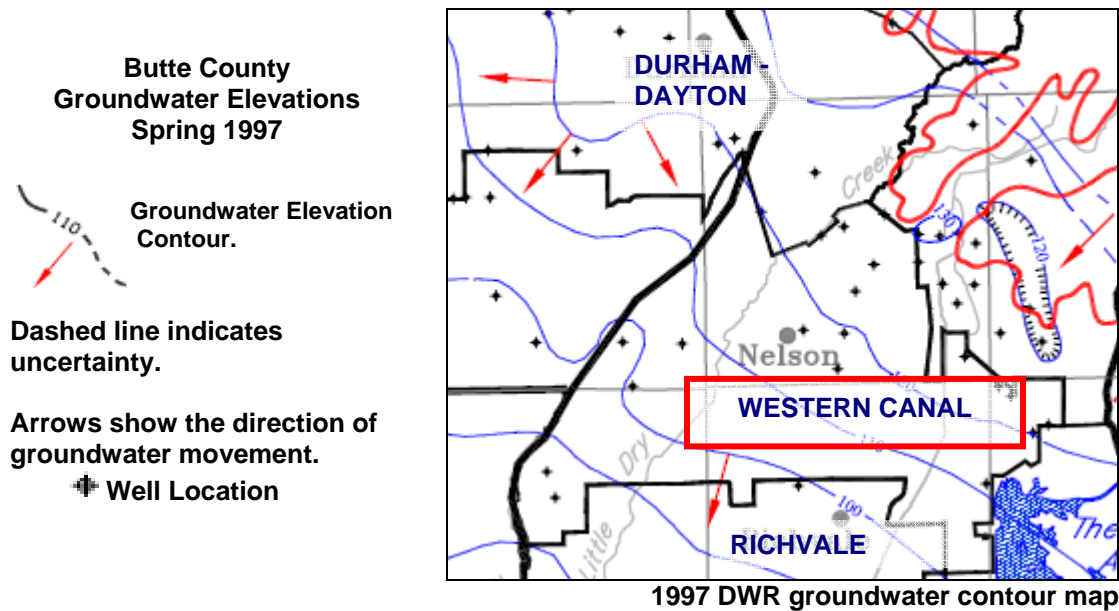
- Basin Deposits
- Laguna Formation
- Tuscan Unit C (Upper Tuscan)
- Tuscan Unit B (Lower Tuscan)

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 Western Canal SIU are:

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

Groundwater Flow in the Western Canal 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 Western Canal SIU is in a southwesterly direction, at a gradient of about 5 feet per mile, toward the Sacramento River and adjacent to Butte Creek.



BMO Key Wells Selected for Groundwater Level Monitoring –

Well ID	Aquifer System	Well Type	Stage 1 & 2Alerts**		Stage 3Alerts**	
			Elev. (ft)	Depth (ft)	Elev. (ft)	Depth (ft)
19N01E09Q01M	Lower Tuscan	Irrigation	82.13	10.58	77.13	15.58
20N01E18L01M	Lower Tuscan	Monitoring	104.00	8.20	94.00	13.20
20N01E18L02M	Upper Tuscan	Monitoring	99.29	9.61	94.29	14.61
20N01E18L03M	Alluvial	Monitoring	99.57	9.43	94.57	14.43
20N01E35C01M	Alluvial	Domestic	91.87	9.63	86.87	14.63
20N02E16P01M	Unknown	Irrigation	117.83	15.07	112.83	20.07
20N02E28N01M	Alluvial	Domestic	111.42	9.68	106.42	14.68

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
20N02E15RO1M	18.4	18.2	19.9	20.5	18.8	18.6
20N01E15D01M	19	18.1	19.8	20.8	18.5	20.6

Groundwater pH - 2002 through 2007

State Well Number	2002 pH	2003 pH	2004 pH	2005 pH	2006 pH	2007 pH
20N02E15RO1M	7	6.6	6.8	6.9	7.3	6.9
20N01E15D01M	7.8	8.1	7.1	6.9	7.9	7.9

Groundwater EC - 2002 through 2007

State Well Number	2002 EC	2003 EC	2004 EC	2005 EC	2006 EC	2007 EC
20N02E15RO1M	447	344	400	524	492	471
20N01E15D01M	464	248	407	501	309	477

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

State Well Number 20N01E18L03M. Maximum annual inelastic land subsidence shall not exceed 0.01 feet per year.

BMO Alert Stage Definitions and Compliance Methodologies–

The Western Canal 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

The methodology for establishing the groundwater level Basin Management Objective in the Western Canal Sub-Inventory Unit was to utilize the spring groundwater levels data from the wells identified above. From this data the average spring groundwater level was calculated.

Stage 1: The first year that spring groundwater levels fall five feet below the average spring groundwater level established for the well.

Stage 2: Stage 2 is reached if spring groundwater levels, for a second consecutive year, remain five feet below the average groundwater level established for the well.

Stage 3: Stage 3 is reached if the spring groundwater levels fall ten feet below the average spring groundwater level established for the well.

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 –

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:

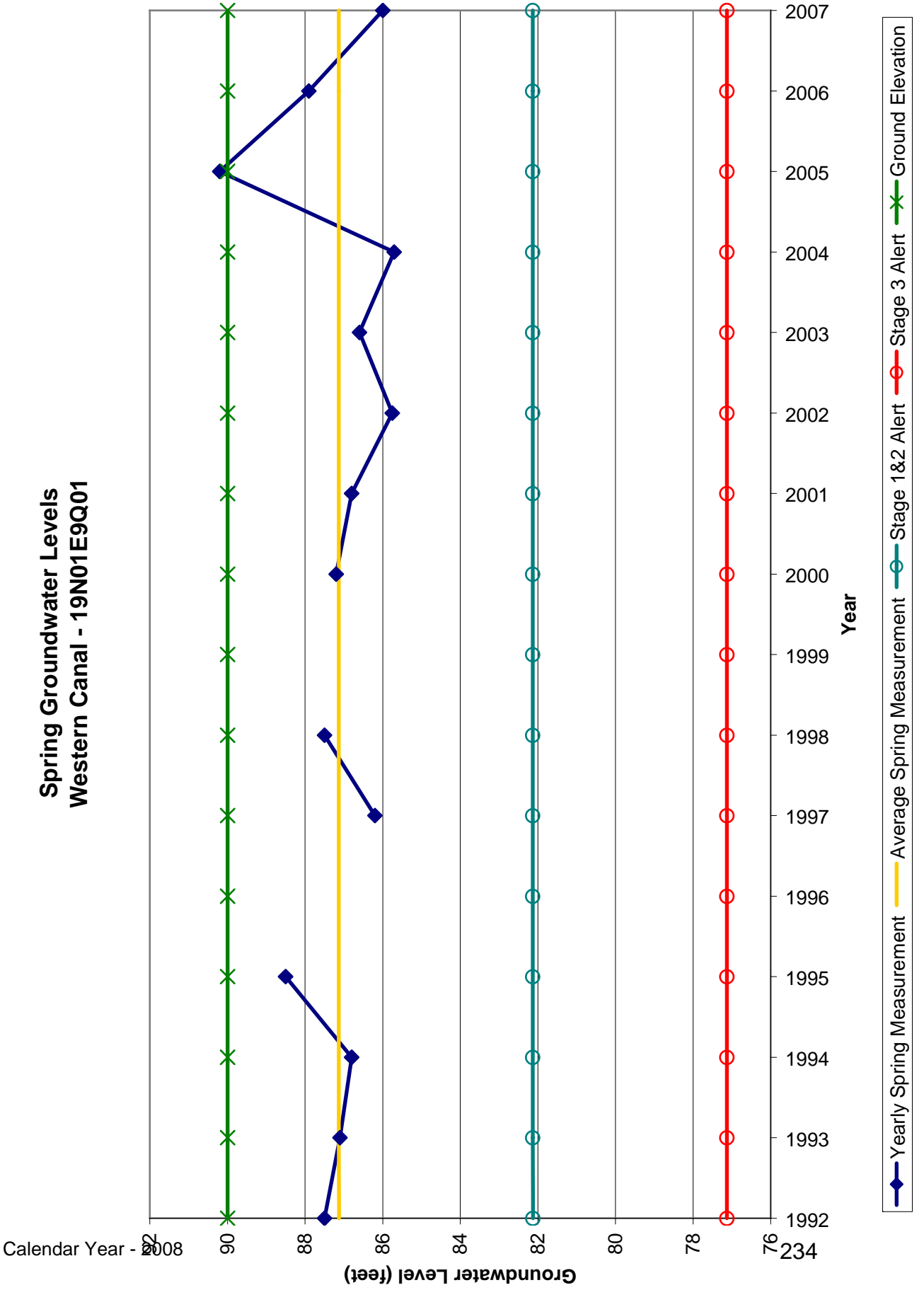
Efforts will be made to identify several domestic wells that could be added to the existing monitoring well network in sub-inventory unit to allow development of management objectives for the alluvial aquifer system. Efforts will also be made to identify more wells in all aquifers which meet the criteria developed.

Supporting Data –

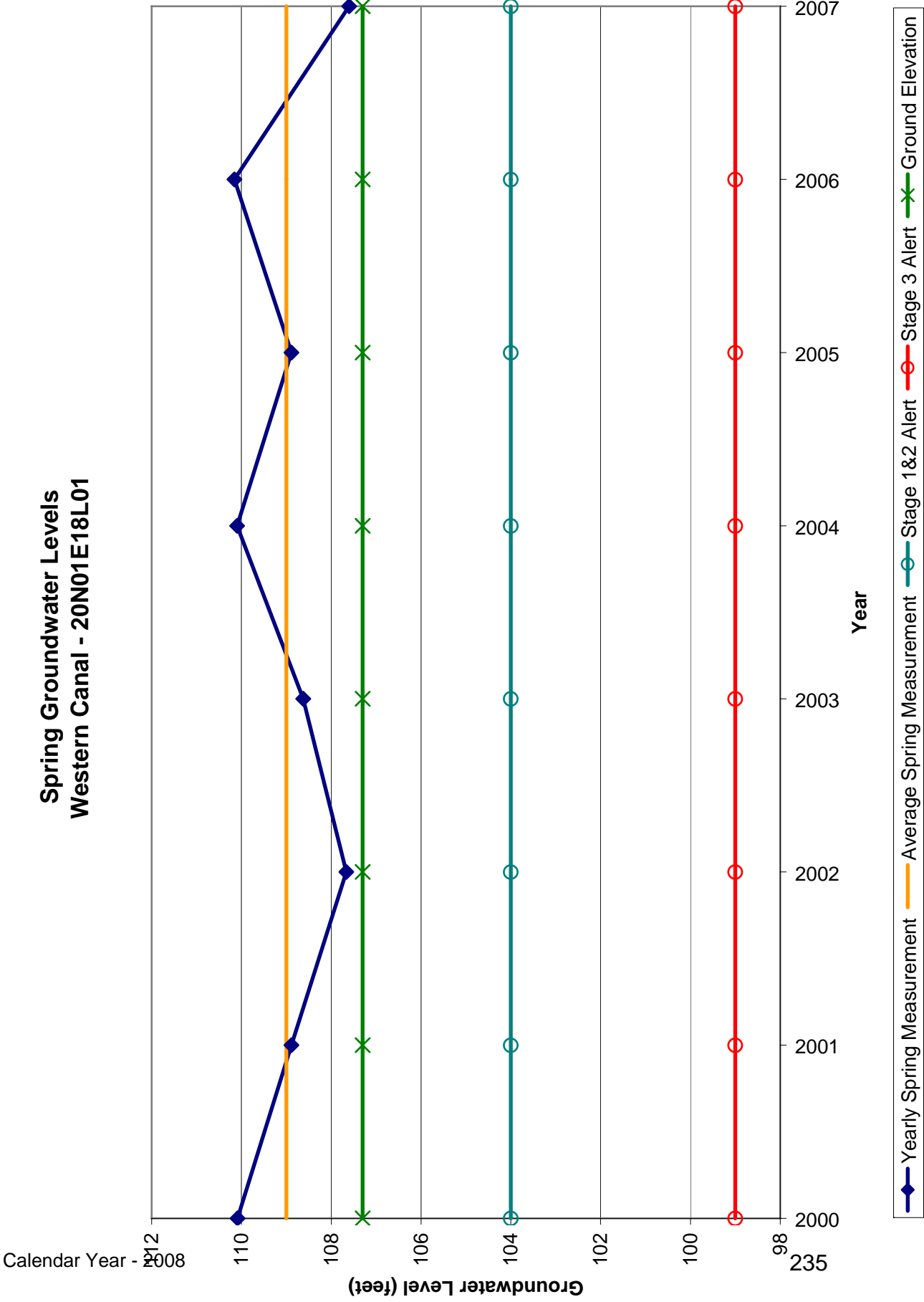
Hydrographs depicting yearly spring level measurements, including 2007 data, with established alert levels.

Summary charts of water quality monitoring.

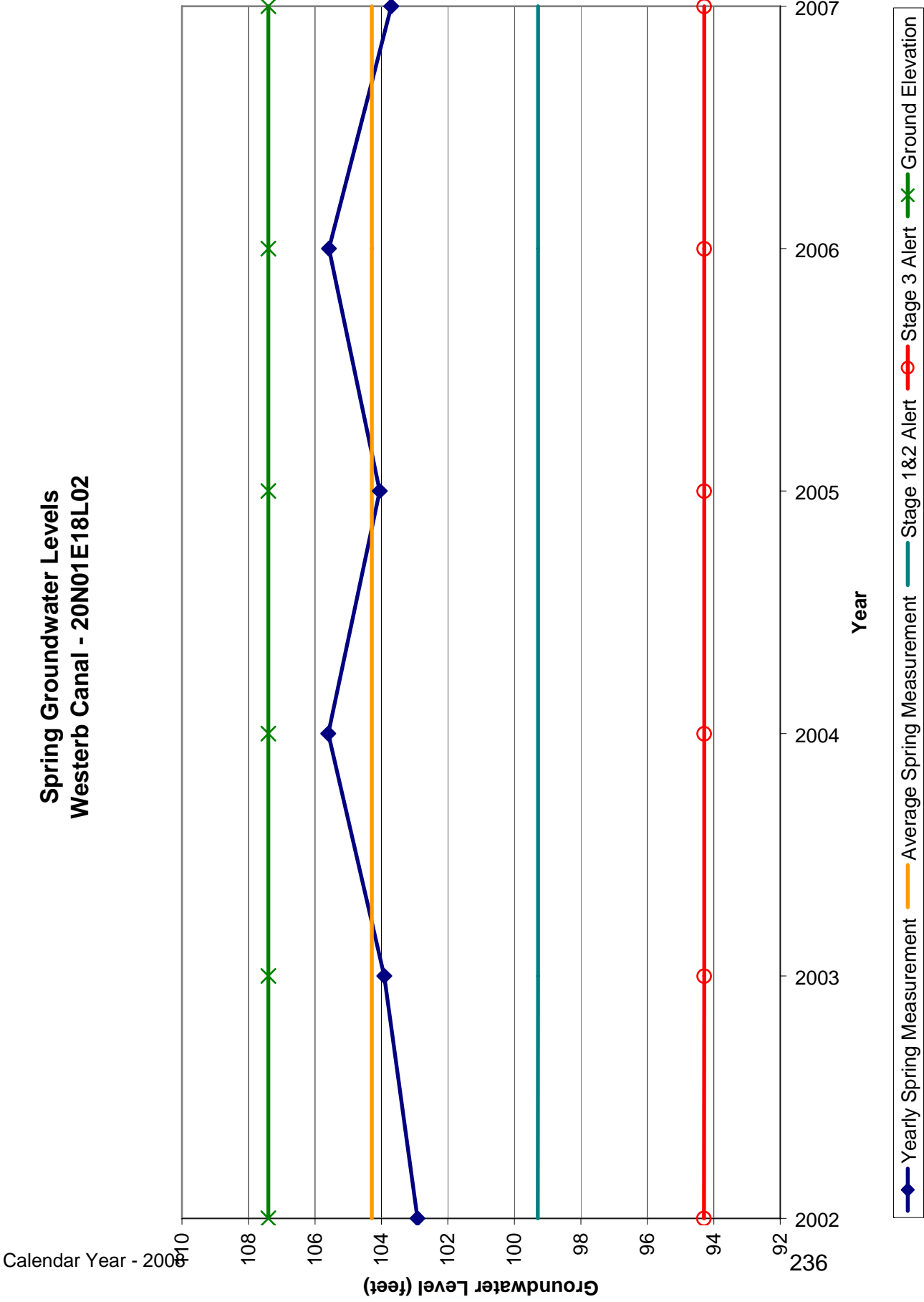
Spring Groundwater Levels Western Canal - 19N01E9Q01



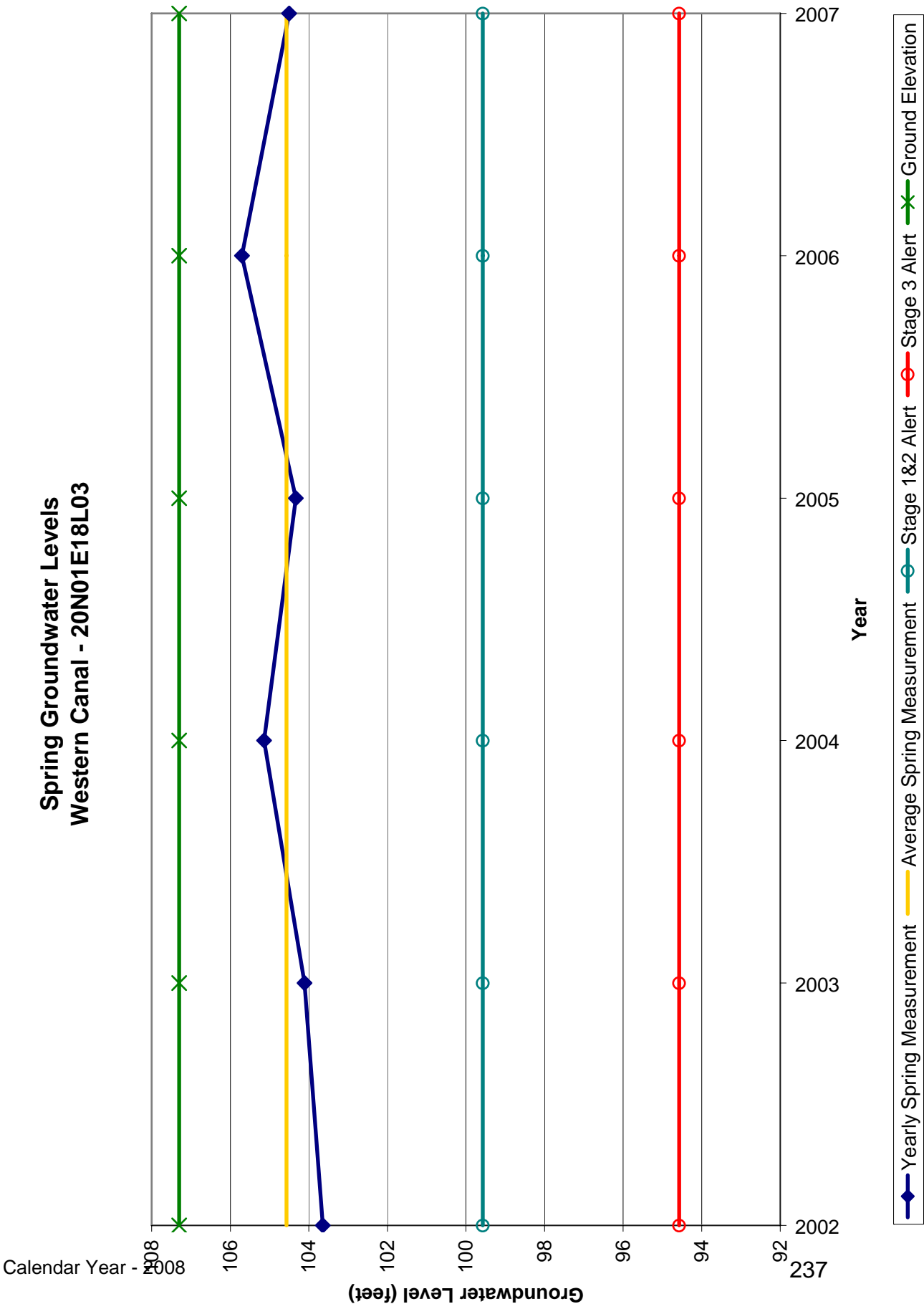
Spring Groundwater Levels Western Canal - 20N01E18L01



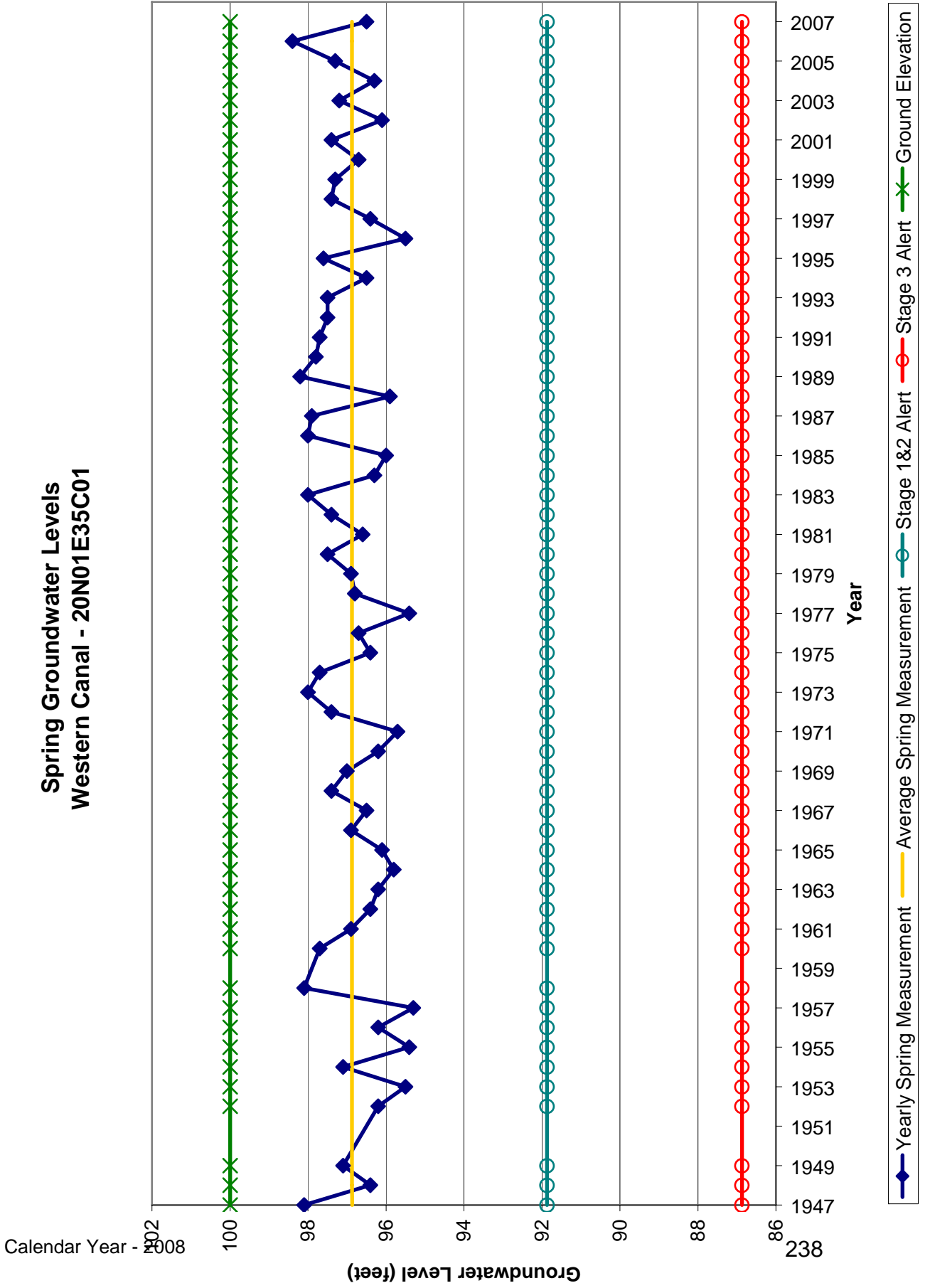
Spring Groundwater Levels Westerb Canal - 20N01E18L02



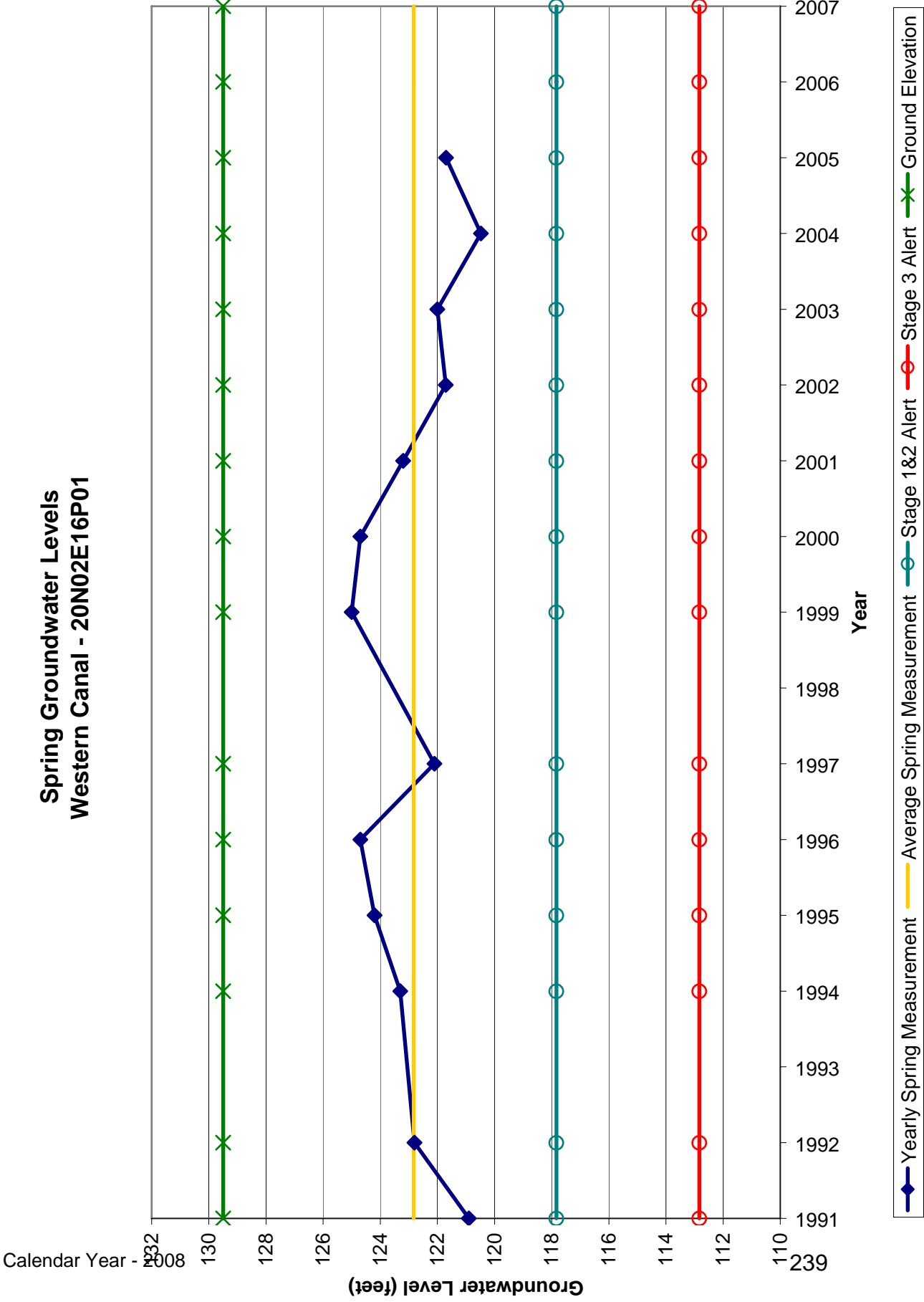
Spring Groundwater Levels Western Canal - 20N01E18L03



Spring Groundwater Levels Western Canal - 20N01E35C01



Spring Groundwater Levels Western Canal - 20N02E16P01



Spring Groundwater Levels Western Canal - 20N02E28N01

