

**Basin Management Objective
Butte County
Inventory Unit – NORTH YUBA
California Water Service Co., Oroville District**

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Description of the North Yuba Inventory Unit –

The North Yuba Inventory Unit (IU) covers about 47,500 acres in the southeastern portion of Butte County. It is bordered by the Feather River to the north and west, Yuba County to the south, and foothills to the east. In the northern portion of the IU, in areas surrounding Oroville, the land use is primarily urban. In the central and southern portions of the IU, the land uses are a mix of rural residential and agricultural. Agricultural land use is fairly diverse and consists of a combination of rice, orchards, grain, pasture, and field crops. The primary source of agricultural water in the North Yuba IU is groundwater. In a normal water year, about 25% of the North Yuba IU is in summer agricultural production supported by groundwater. Groundwater is also used as a municipal water source for portions of Oroville. *The North Yuba IU is not divided into sub-inventory units.*

Management Objective –

To maintain sufficient volumes of groundwater in storage within all aquifer systems to provide an adequate and affordable domestic water supply of adequate quality for consumption, including 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 domestic 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 Laguna Formation for all domestic users in the Inventory Unit.

Geologic Formations Identified In Sub-Inventory Unit –

Geologic formations in the North Yuba Inventory Unit, from youngest (shallowest) to oldest (deepest), include:

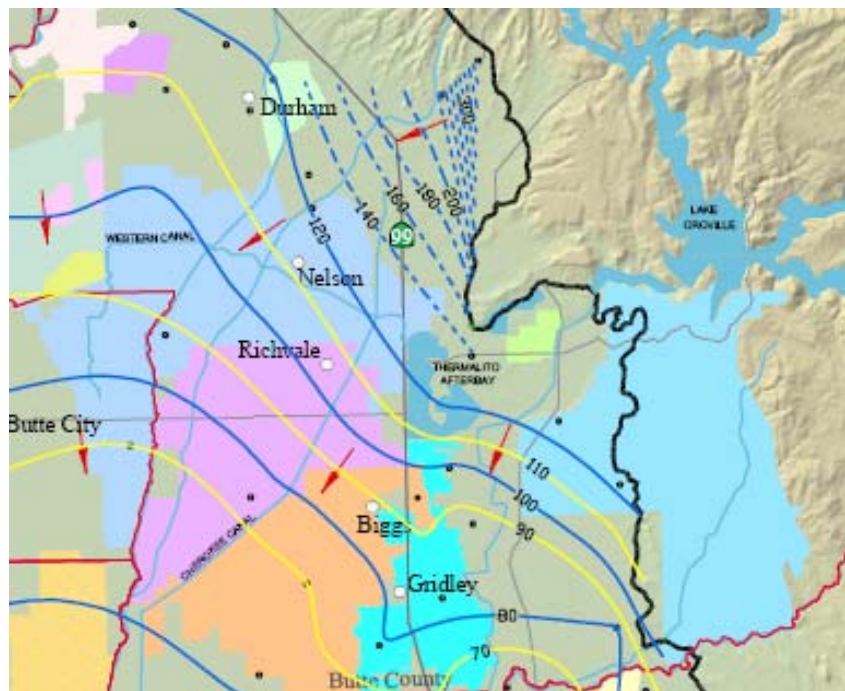
- Quaternary Alluvium
- Modesto Formation
- Riverbank Formation
- Laguna Formation

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 North Yuba Inventory Unit are:

- Modesto Formation
- Riverbank Formation
- Laguna Formation

Groundwater Flow in the North Yuba 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 northern portion of the North Yuba IU is to the west and south, away from the foothills and parallel to the Feather River. In the central and southern portions of the North Yuba IU, the groundwater flow tends to converge toward the south-central area of the inventory unit, away from the Feather River and foothill areas. Groundwater movement away from the Feather River in this area indicates that the river is contributing surface water to the recharge of the aquifer system.



Arrows show the direction of groundwater movement.

2008 Groundwater contours were constructed using groundwater level measurements taken by the Department of Water Resources and Local Cooperators between March 1st and March 20th, 2008. 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. Blue contour lines represent 20 foot intervals and yellow contour lines represent 10 foot intervals. Full size contour maps are included in the annual Groundwater Status Report posted on the Department of Water and Resource Conservation website.

BMO Key Wells Selected for Groundwater Level Monitoring –

Wells used for groundwater level measurements within the California Water Service Company Oroville service area, and have been assigned arbitrary well numbers in the interest of safety. The Alert Stages for wells CWS01, CWS02, CWS03 were calculated using the static water levels for the years 1980 through 2008, in the months of April and October. This information mirrors and reflects the historically data prior to 1980.

SPRING

Well ID	Aquifer System	Well Type	Stage 1 & 2Alerts**		Stage 3Alerts**	
			Elev. (ft)	Depth (ft)	Elev. (ft)	Depth (ft)
CWS-01	Laguna Formation	Domestic	124.85	35.15	119.85	40.15
CWS-02	Laguna Formation	Domestic	144.30	33.70	139.30	38.70
CWS-03	Laguna Formation	Domestic	160.5	34.5	155.5	39.5
17N03E03D01	Modesto Formation	Irrigation				
17N04E09N02	Laguna Formation	Irrigation				
17N04E22B01	Riverbank Formation	Domestic				
19N04E31F01	Laguna/Lower Tuscan	Domestic				

FALL

Well ID	Aquifer System	Well Type	Stage 1 & 2Alerts**		Stage 3Alerts**	
			Elev. (ft)	Depth (ft)	Elev. (ft)	Depth (ft)
CWS-01	Laguna Formation	Domestic	121.18	38.82	116.18	43.82
CWS-02	Laguna Formation	Domestic	136.89	41.11	131.89	46.11
CWS-03	Laguna Formation	Domestic	158.29	36.71	153.29	41.71
17N03E03D01	Modesto Formation	Irrigation				
17N04E09N02	Laguna Formation	Irrigation				
17N04E22B01	Riverbank Formation	Domestic				
19N04E31F01	Laguna/Lower Tuscan	Domestic				

BMO Key Wells Selected for Groundwater Quality Monitoring–

In 2008 water quality samples were taken as per Environmental Protection Agency (EPA) and California Department of Public Health (CDPH) guidelines and requirements for wells within the service area. No water quality issues or violations were found.

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

Butte County staff participated in the Sacramento Valley Height Modernization Project during March 2008 as a means to enhance the subsidence monitoring program in the county and the region. This cooperative project between the Department of Water Resources (DWR), the Bureau of Reclamation and local County agencies helped to establish baseline ground elevations in Butte County and other portions of the valley. Land elevations were measured using Global Positioning System (GPS) survey equipment and survey monuments located on an approximate three to five mile grid. Re-observations are to be done in approximately three years, and will give measurements to compare against the baseline data in order to determine whether or not any subsidence has occurred.

BMO Alert Stage Definitions and Compliance Methodologies–

The North Yuba 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 Groundwater 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.

Groundwater Levels – Specific Depth

The methodology for establishing the groundwater level Basin Management Objective in the North Yuba Inventory Unit was to utilize the spring and fall groundwater level data from the wells identified above. From this data the average spring and fall groundwater levels were calculated, and therefore the Alert Stages.

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

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

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

Groundwater Quality –

In 2008 water quality samples were taken as per EPA and CDPH guidelines and requirements. No water quality issues or violations were found. In 2009 water samples will be conducted as per EPA & CDPH guidelines. For 2009 we will continue to sample and test quarterly for the physical parameters of Ph and Temperature, as well as bacteriological sampling.

Land Subsidence –

No equipment available for measurements in this Inventory unit.

Future Monitoring Recommendations –

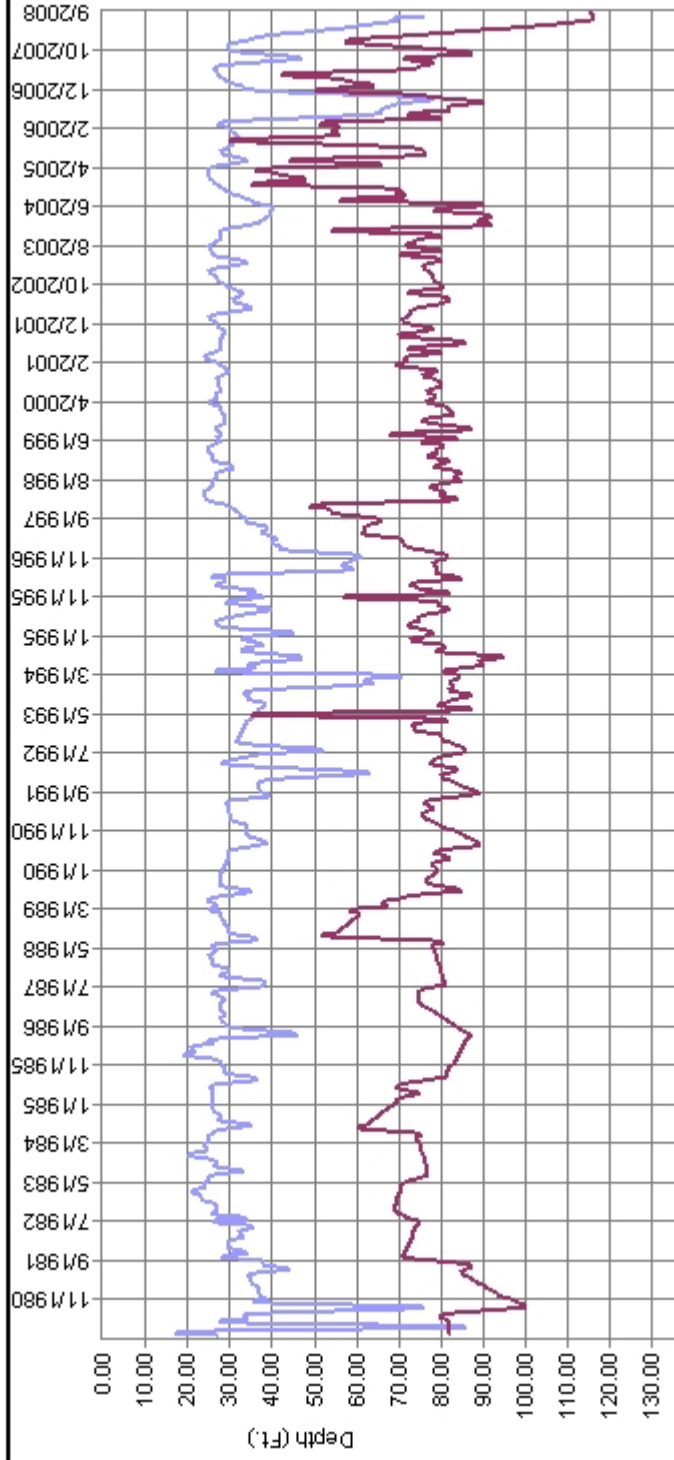
Work with staff to explore options for installing multi-completion monitoring wells to more accurately measure aquifer specific water quality and levels as funding becomes available.

Supporting Data –

Hydrographs depicting yearly spring level measurements, including 2008 data, with established alert levels.

WATER LEVEL GRAPHIC

District: OROVILLE Station: CWS 1 from the year 1980 to 2008 As Of: 10/16/2008
Critical Pumping Level: 100

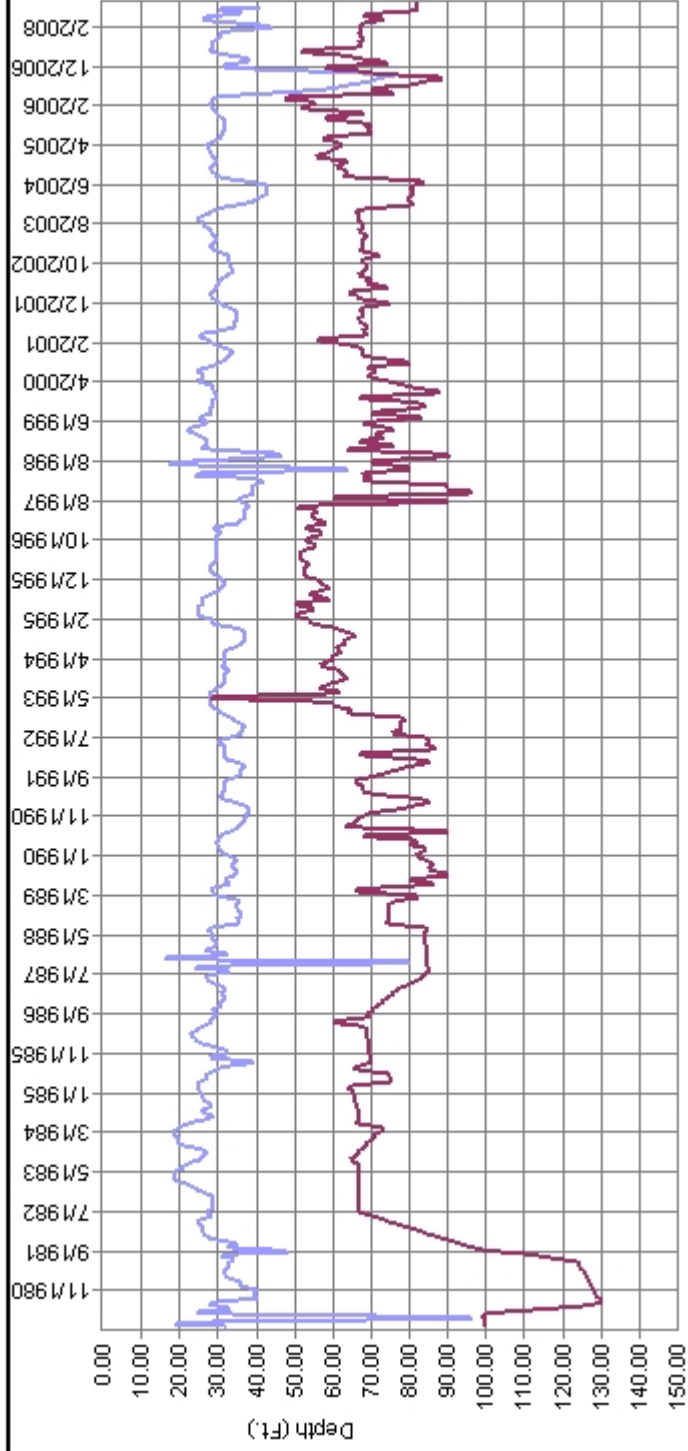


Distance to Water Static

Distance to Water Pumping

WATER LEVEL GRAPHIC

District: OROVILLE Station: CWS 2 from the year 1980 to 2008 As Of: 10/16/2008
Critical Pumping Level: 154

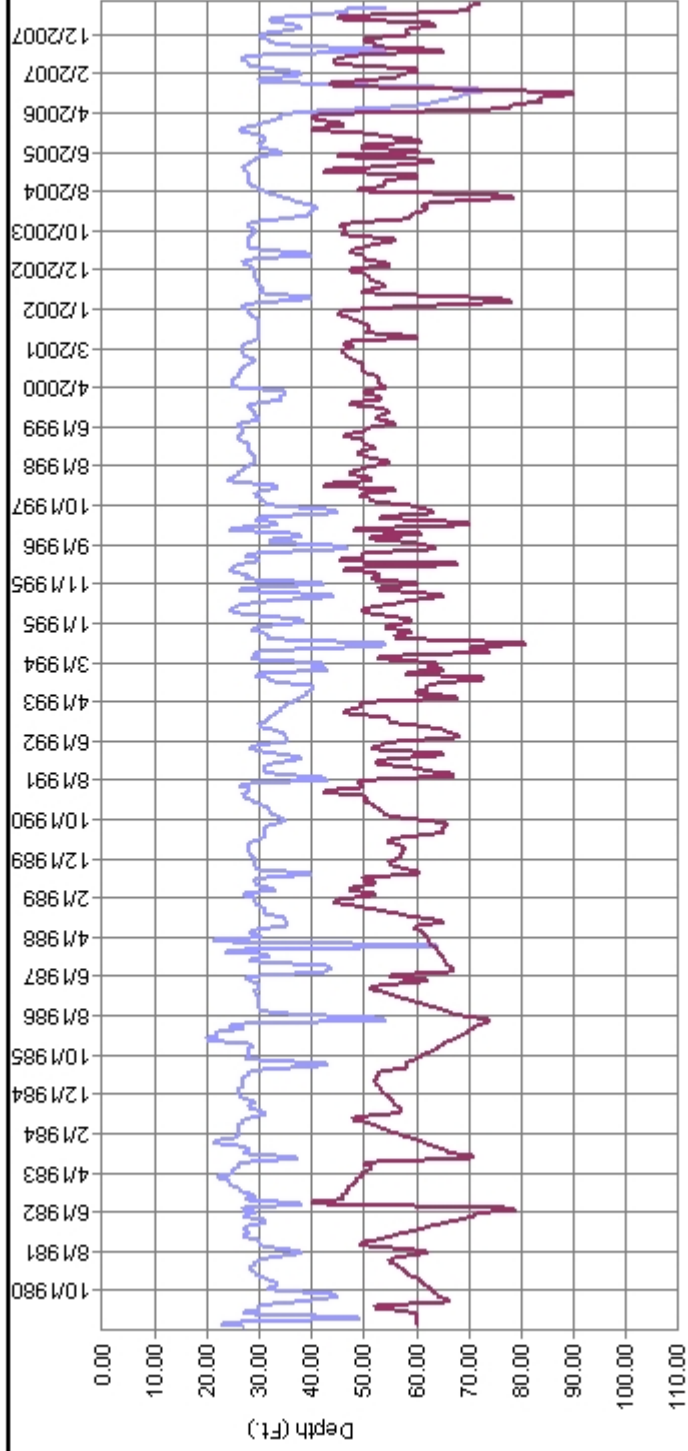


— Distance to Water Static

— Distance to Water Pumping

WATER LEVEL GRAPHIC

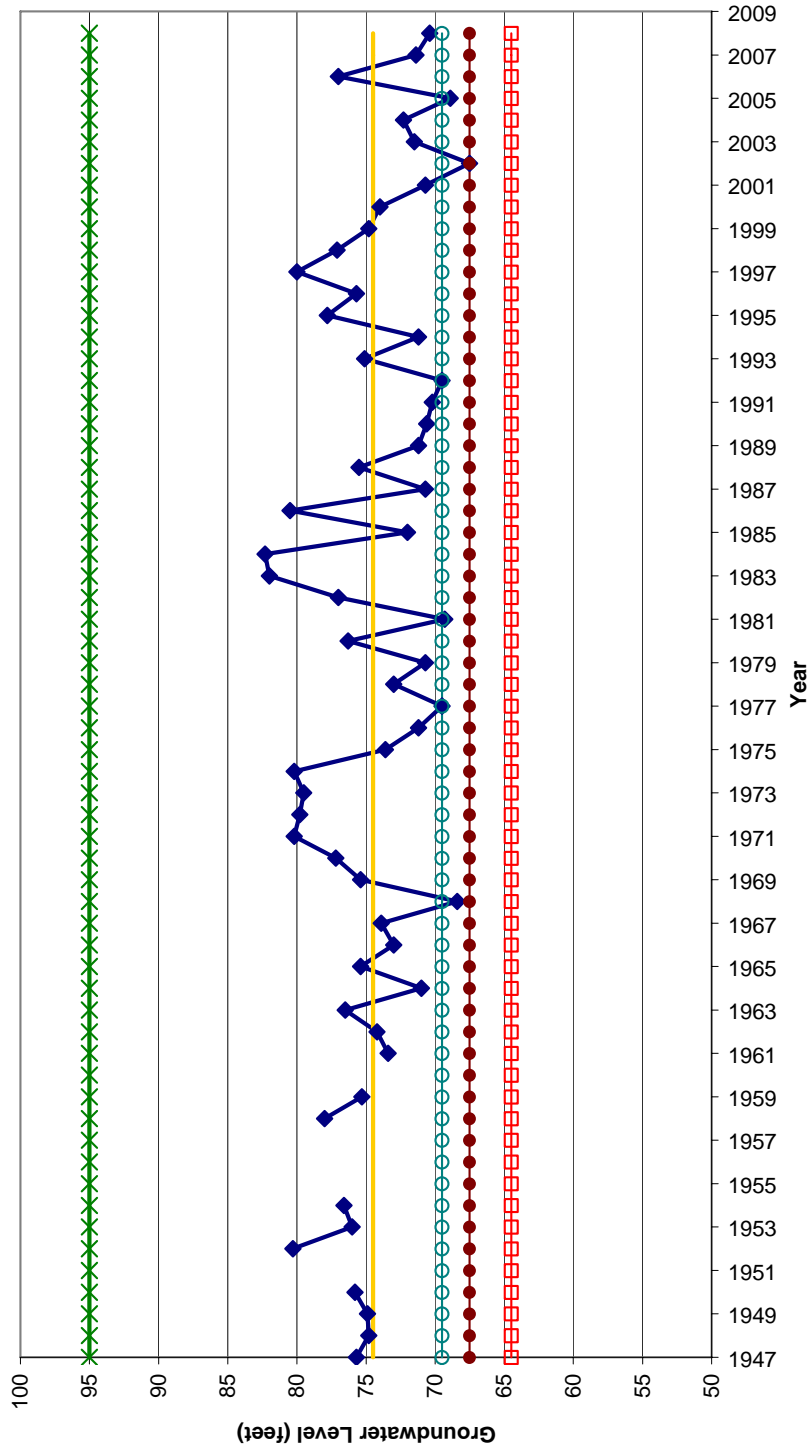
District: OROVILLE Station: CWS 3 from the year 1980 to 2008 As Of: 10/16/2008
Critical Pumping Level: 96



— Distance to Water Static

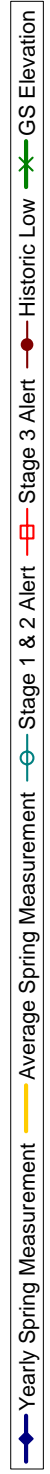
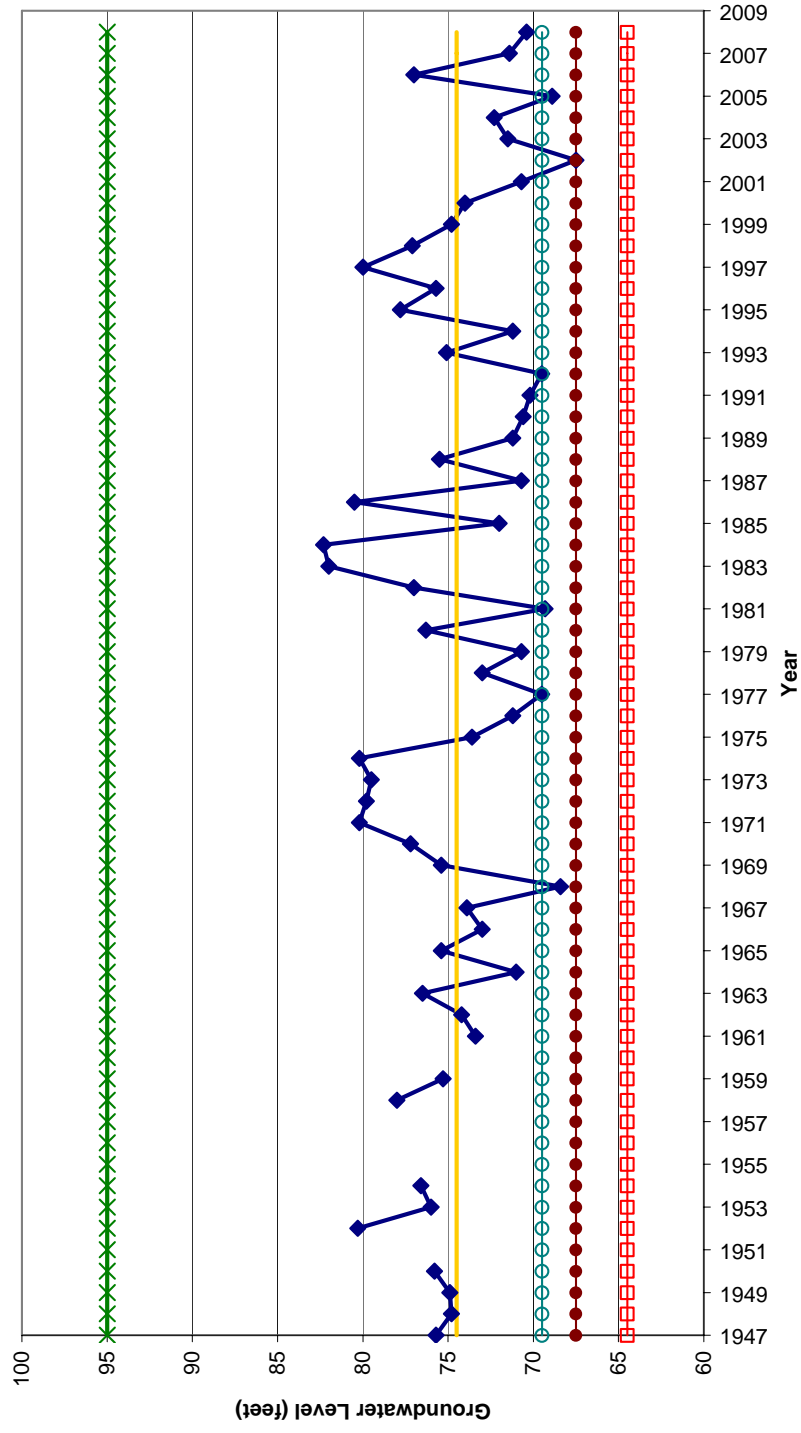
— Distance to Water Pumping

Spring Groundwater Levels
 North Yuba - 17N03E03D01

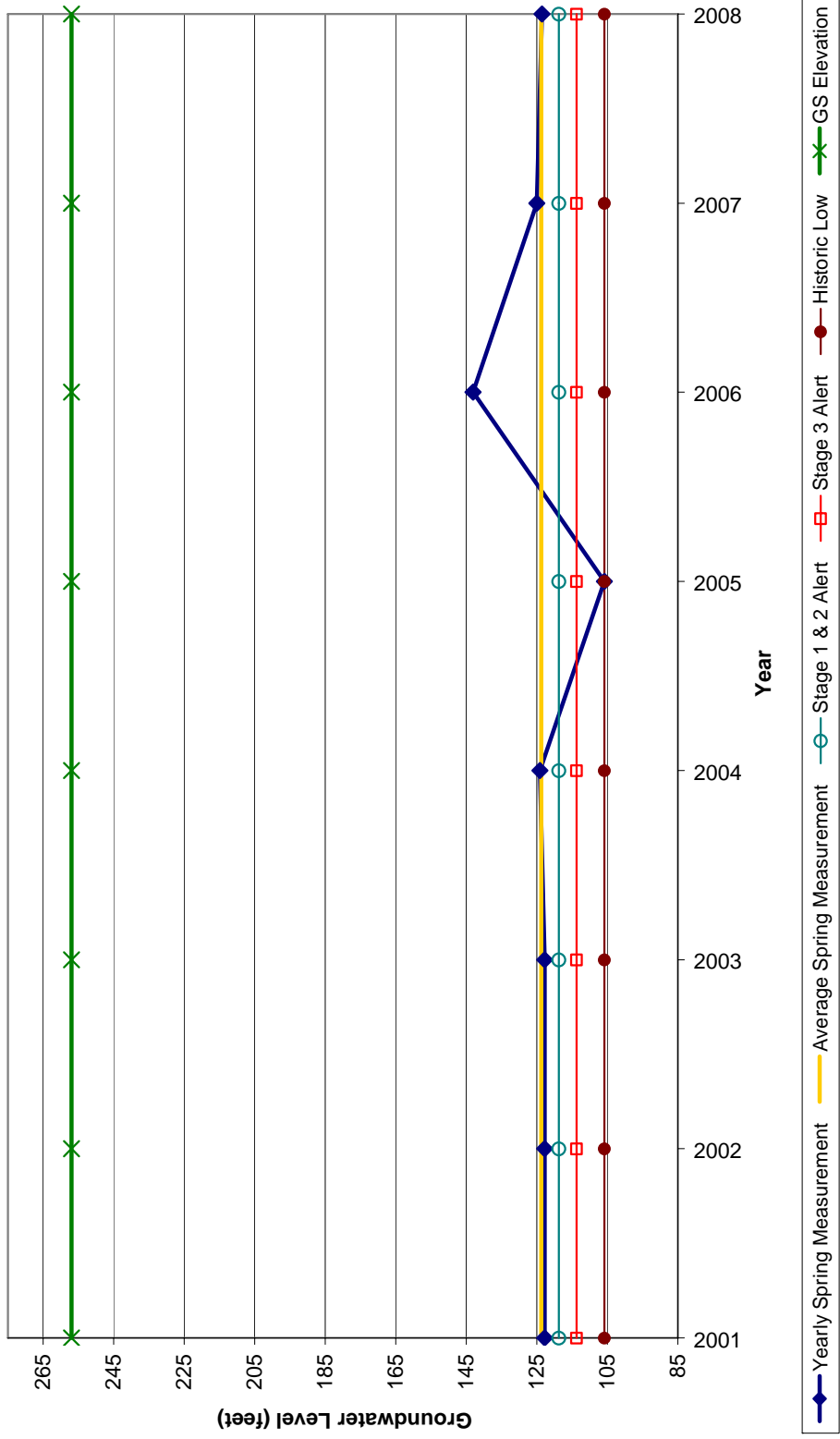


Legend:
 - Yearly Spring Measurement (Blue line with diamond markers)
 - Average Spring Measurement (Yellow horizontal line)
 - GS Elevation (Green line with 'x' markers)
 - Historic Low (Black horizontal line)
 - Stage 3 Alert (Red horizontal line)
 - Stage 1 & 2 Alert (Cyan horizontal line)

Fall Groundwater Levels
 North Yuba - SWN 17N03E2001



**Spring Groundwater Levels
North Yuba - 19N04E31F001**



Fall Groundwater Levels
North Yuba - SWN 19N04E31F001

