

**Basin Management Objective
Butte County
Sub-Inventory Unit – BIGGS/WEST GRIDLEY**

Butte County Water Advisory Committee Member – Bernoy Bradford

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Description of the Biggs/West Gridley Sub-inventory Unit –

The Biggs/West Gridley Sub-inventory Unit (SIU) covers an area of about 34,000 acres. It is bordered by the Richvale SIU to the north, Sutter County to the south, the Thermalito and Butte SIUs to the east, and the Butte Sink SIU to the southwest. The Biggs/West Gridley SIU corresponds roughly to the service area of the Biggs/West Gridley Irrigation District. Land use within the SIU is mainly agricultural, although portions of the cities of Biggs and Gridley fall within the eastern edge of the SIU boundary. Agricultural crops consist mainly of rice production, with small areas of orchard, grain, and field crops. A mixture of surface water and groundwater supports agricultural production. IN a normal year, about 7% of the Biggs/West Gridley SIU is in summer agricultural production supported by groundwater. In a drought year, about 13% of the SIU is in summer agricultural production 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 sub-inventory unit.

Geologic Formations Identified In Sub-Inventory Unit –

Geologic formations in the Biggs/West Gridley SIU, from youngest (shallowest) to oldest (deepest), include:

- Basin Deposits
- Modesto Formation
- Sutter Formation
- 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 Biggs/West Gridley SIU are:

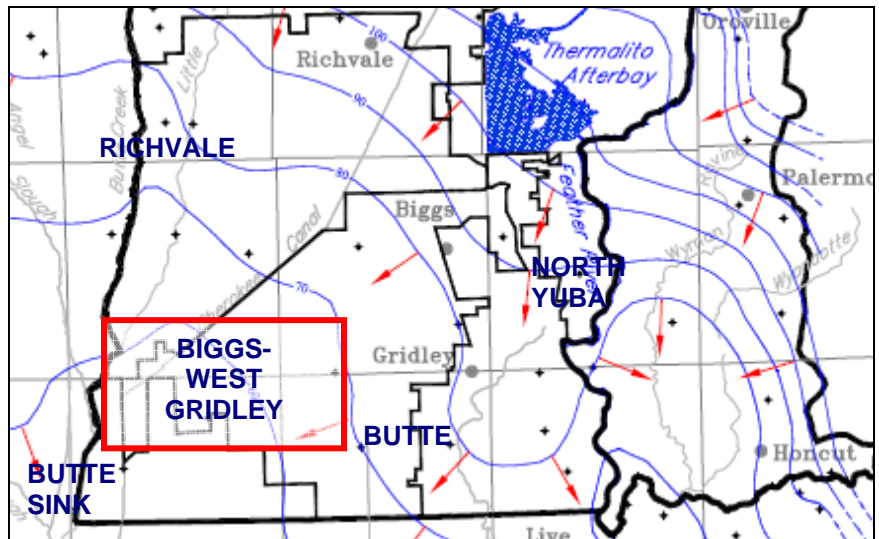
- Modesto Formation
- Laguna Formation
- Lower Tuscan (Formation Unit B) Aquifer System

Groundwater Flow in the Biggs /West Gridley 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 Biggs/West Gridley SIU is in a southwesterly direction, at a gradient of about 3 feet per mile, toward Butte Creek and the Butte Sink SIU.

**Butte County
Groundwater Elevations
Spring 1997**

-  Groundwater Elevation Contour.
- Dashed line indicates uncertainty.
- Arrows show the direction of groundwater movement.
-  Well Location



1997 DWR groundwater contour map

BMO Key Wells Selected for Groundwater Level Monitoring –

Well ID	Aquifer System	Well Type	Stage 1 & 2 Alerts Spring Avg. Elev. (ft)	Stage 3 Alerts Lowest Recorded Elev. (ft)
17N01E10A01M	Riverbank	Domestic	53.42	48.90
18N02E16F01M	Basin Deposits	Irrigation	72.94	71.90
18N02E25M01M	Modesto	Irrigation	80.05	79.60
18N02E32H01M	Riverbank/Modesto	Domestic	68.40	68.50

BMO Key Wells Selected for Groundwater Quality Monitoring–

Groundwater Temperature in °Celsius - 2002 through 2007

State Well Number	2002 Temp °C	2003 Temp °C	2004 Temp °C	2005 Temp °C	2006 Temp °C	2007 Temp °C
18NO2E35R01M	18.5	18.5	18.1	20.5	18.2	18.3

Groundwater pH - 2002 through 2007

State Well Number	2002 pH	2003 pH	2004 pH	2005 pH	2006 pH	2007 pH
18NO2E35R01M	7.6	7.5	7.5	7.04	7.6	7.6

Groundwater EC - 2002 through 2007

State Well Number	2002 EC	2003 EC	2004 EC	2005 EC	2006 EC	2007 EC
18NO2E35R01M	346	370	323	361	351	382

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

Land Subsidence is continuously monitored by the Department of Water Resources and Butte County Water and Resource Conservation at the closest extensometers in the Western Canal Water District and M&T Ranch sub-inventory units.

BMO Alert Stage Definitions and Compliance Methodologies–

The Biggs/West Gridley 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 each index well.

Groundwater Level – Standard Deviation and Lowest Record

Stage 1: The first year that spring groundwater levels fall below the average spring groundwater level minus one standard deviation for the well and still remain above the lowest recorded spring level for the well.

Stage 2: Stage 2 is reached if spring groundwater levels, for a second consecutive year, remain below the average minus one groundwater level established for the well and still above the lowest record spring level for the well.

Stage 3: Stage 3 is reached if the spring groundwater levels fall below the lowest historic water level since the first year of monitoring for each respective 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 –

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 –

Efforts will be made to identify additional 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. Continued efforts will be made to gather all relative historical information on the existing water quality monitoring well. Stakeholders in the Biggs/West Gridley SIU will work with staff to 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 –

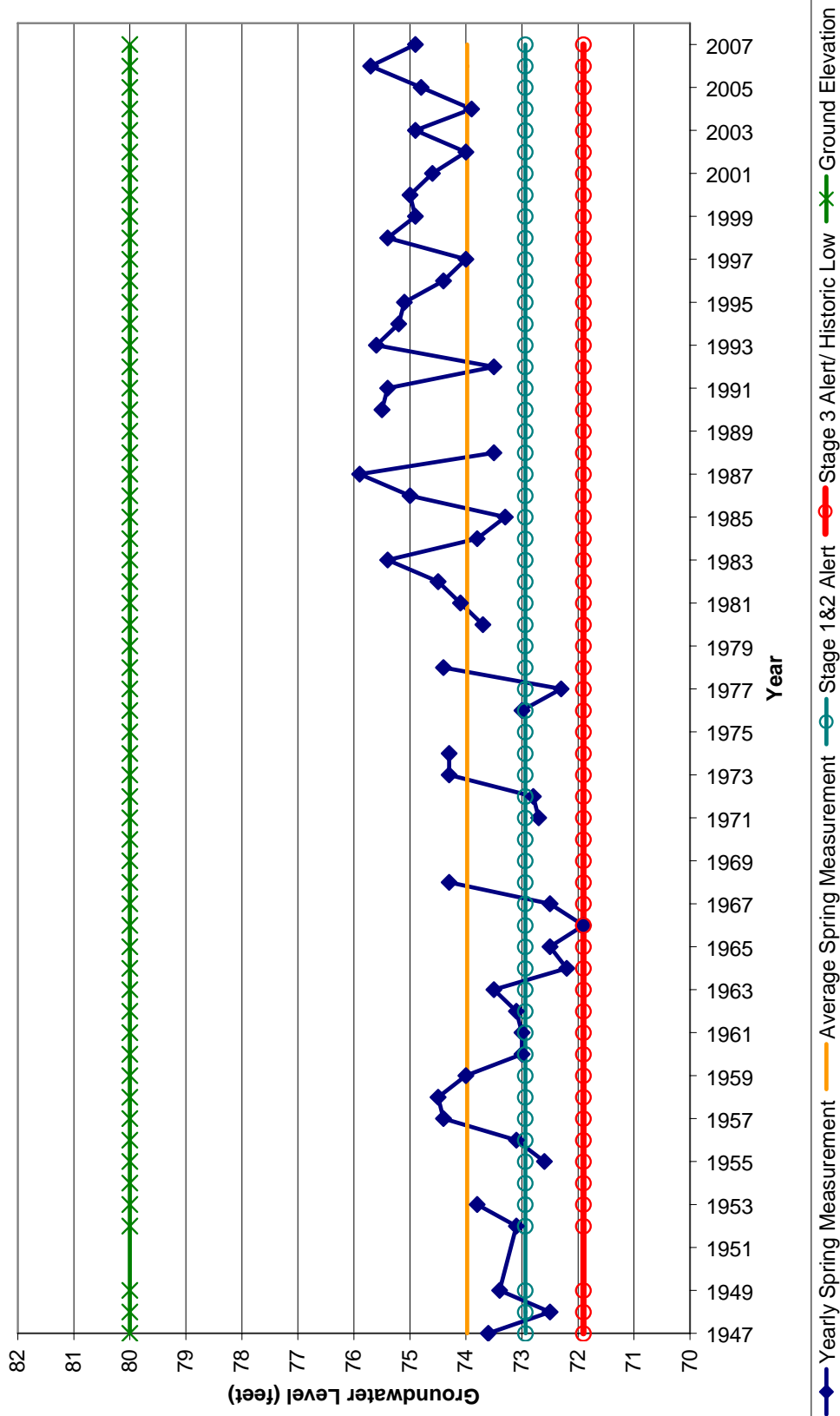
Hydrographs depicting yearly spring level measurements, including 2007 data, with established alert levels.

Summary charts of water quality monitoring.

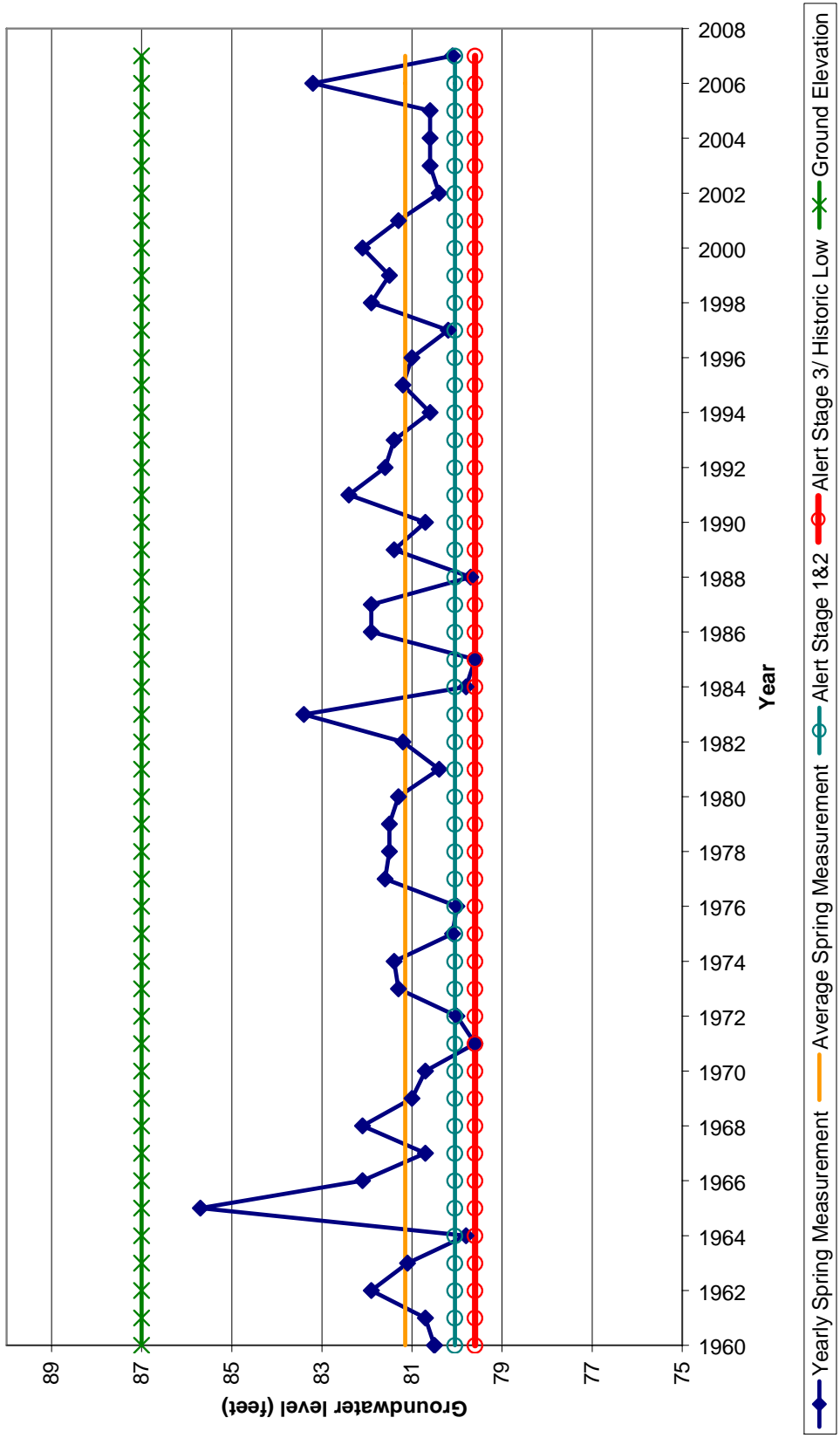
Spring Groundwater Levels
Biggs West Gridley - 17N01E10A01



Spring Groundwater Levels
Biggs West Gridley - 18N02E16F01



Spring Groundwater Levels
Biggs West Gridley - 18N02E25M01



Spring Groundwater Levels
Biggs West Gridley - 18N02E32H01

