Basin Management Objective
Butte County
Sub-Inventory Unit – BUTTE
Butte Water District

Butte County Water Advisory Committee Member – Mark Orme

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Description of the Butte Sub-inventory Unit –
The Butte Sub-inventory Unit (SIU) covers an area of about 21,400 acres. It is bordered by the Biggs/West Gridley and Thermalito SIUs to the north and west, the North Yuba Inventory Unit to the east, and Sutter County to the south. The Butte SIU corresponds roughly to the service area for the Butte Water District. Land use within the sub-inventory unit is mainly agricultural, but also includes most of the urban area for the cities of Biggs and Gridley. Agricultural production consists mainly of orchard crops with smaller areas of rice and field crops. A mixture of surface water and groundwater supports agricultural production. In a normal year, about 29% of the Butte SIU is in summer agricultural production supported by groundwater. Groundwater is also used as the municipal water source for much of the urban area surrounding the cities of Biggs and Gridley.

Management Objective –
To maintain the groundwater surface elevation at a level that will assure an adequate and affordable irrigation water supply from the Alluvial, Sutter Buttes Rampart, Lower and Upper Tuscan Formations aquifer systems. It is the intent of this management objective to assure a sustainable agricultural groundwater supply of good quality now and into the future, and to assure the water supply can be utilized to the maximum extent possible without injuring groundwater quality or inducing land subsidence. The intent of this management objective is also to assure an adequate supply of groundwater from the alluvial aquifer system of suitable quality for all domestic groundwater users in the Sub-Inventory Unit.

Geologic Formations Identified In Sub-Inventory Unit –
Geologic formations in the Butte SIU, from youngest (shallowest) to oldest (deepest), include:

Quaternary Alluvium
Modesto Formation
Riverbank Formation
Laguna Formation

Tuscan Unit B (Lower Tuscan)

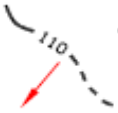
Fresh Water-bearing Units. In the Sacramento Valley Region of Butte County, fresh groundwater-bearing units include, from youngest (shallowest) to oldest (deepest), the Modesto, Riverbank, Laguna, Tehama and Tuscan Formations. Those included in the Butte SIU are:

Quaternary Alluvium
Modesto Formation
Riverbank Formation
Laguna Formation
Tuscan Unit B (Lower Tuscan)

Groundwater Flow in the Butte 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 Butte SIU is in a southerly direction. Locally, groundwater mounding, due to recharge from the Thermalito Afterbay, causes groundwater to move in a southeasterly direction toward the Feather River and in a southwesterly directions toward the Biggs/West Gridley SIU. The average groundwater gradient in the Butte SIU is about 4 feet per mile.

Butte County
Groundwater Elevations
Spring 1997

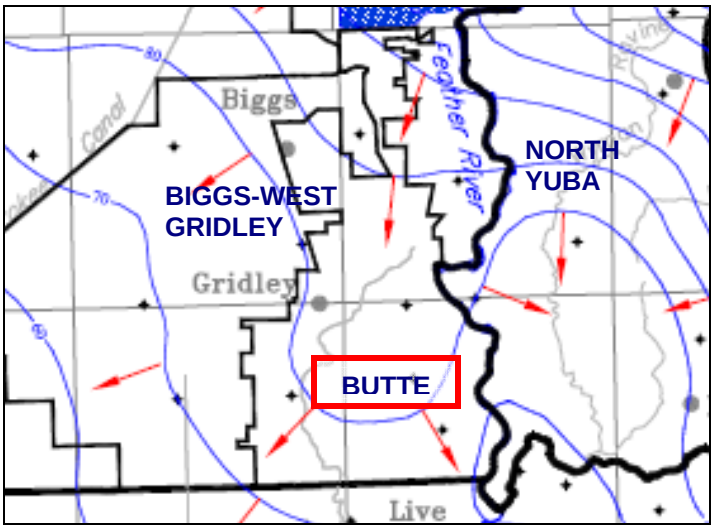


Groundwater Elevation Contour.

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 & 2Alerts** Elev. (ft)	Depth (ft)	Stage 3Alerts** Elev. (ft)	Depth (ft)
17N02E14A01M	Modesto Formation	Irrigation	73.34	6.16	68.34	11.16
17N02E14H01M	Basin Deposits	Domestic	72.39	13.31	67.39	18.31
17N03E16N01M	Riverbank Formation	Domestic	70.70	14.80	65.70	19.80

BMO Key Wells Selected for Groundwater Quality Monitoring–
Appropriate water quality monitoring wells will be selected prior to the August 2008 monitoring period.

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 Butte 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 accompanying cover report, to remedy declining ground water levels that are not recovering to compliance levels for the index well.

Groundwater Level – Specific Depth
Stage 1: The first year that spring groundwater levels fall below the average spring groundwater level minus five feet for the well.

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

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

Groundwater Quality Monitoring–
Appropriate water quality monitoring wells will be selected prior to the August 2008monitoring period.

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.

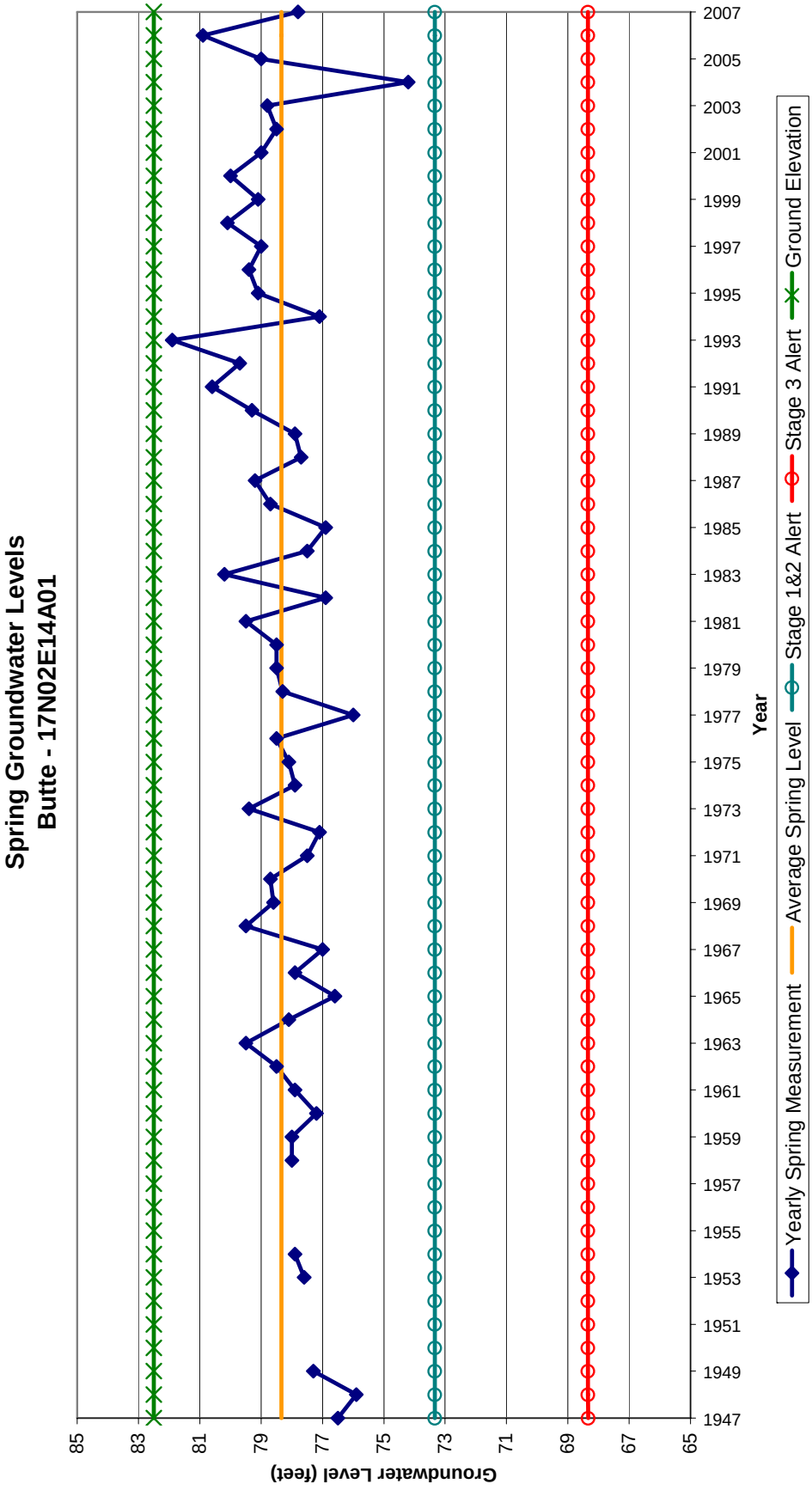
Stage 2: is reached when the annual elastic subsidence exceeds the maximum recorded elastic subsidence over the period of record for the extensometer.

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 –
Well logs from key DWR monitoring wells will be obtained to determine which aquifers are being monitored. The monitoring network will be reevaluated and adjusted as necessary to monitor groundwater levels in each aquifer at key locations. Data collection will be initiated for the development of groundwater quality management objectives in 2008.

Explore avenues to install an extensometer within the District to monitor for subsidence.

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


Spring Groundwater Levels
Butte - 17N02E14A01
Groundwater Level (feet)
85
83
81
79
77
75
73
71
69
67
65
Year
2007
2005
2003
2001
1999
1997
1995
1993
1991
1989
1987
1985
1983
1981
1979
1977
1975
1973
1971
1969
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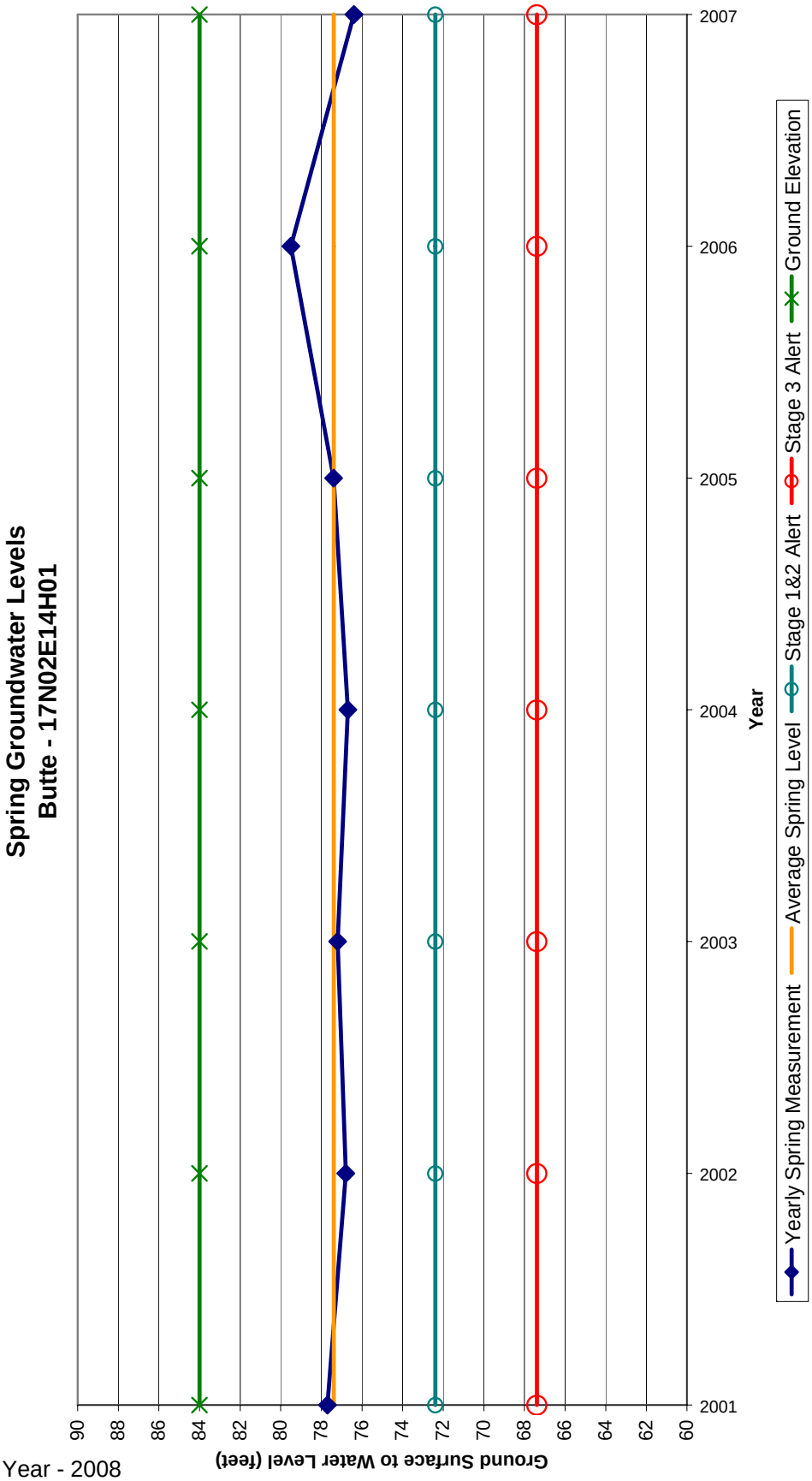
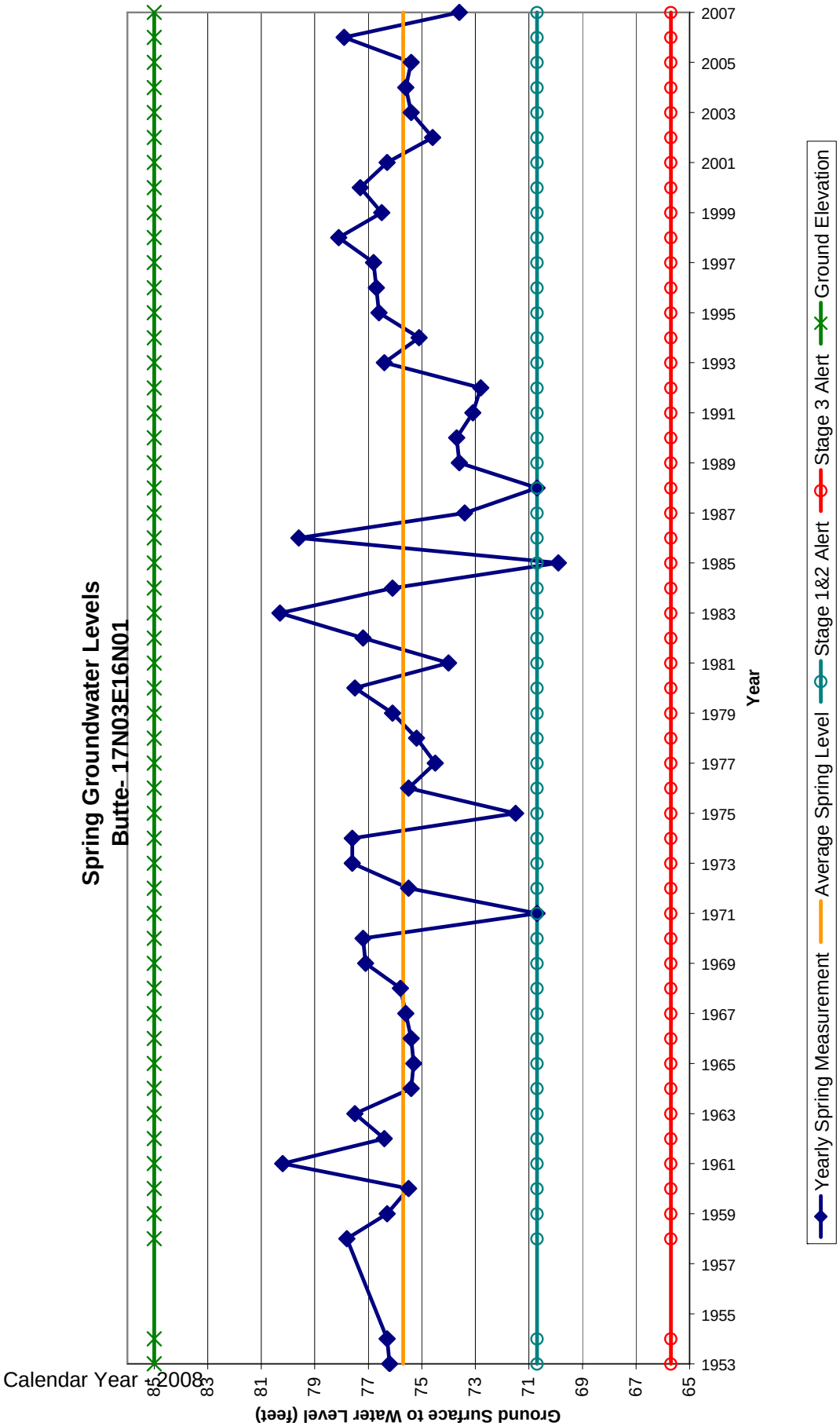
1953
1951
1949
1947
Yearly Spring Measurement
Average Spring Level
Stage 1&2 Alert
Stage 3 Alert
Ground Elevation


Spring Groundwater Levels
Butte - 17N02E14H01
Ground Surface to Water Level (feet)
90
88
86
84
82
80
78
76
74
72
70
68
66
64
62
60
Year
2007
2006
2005
2004
2003
2002
2001
Yearly Spring Measurement
Average Spring Level
Stage 1&2 Alert
Stage 3 Alert
Ground Elevation


Spring Groundwater Levels
Butte- 17N03E16N01
Ground Surface to Water Level (feet)
85
83
81
79
77
75
73
71
69
67
65
Year
2007
2005
2003
2001
1999
1997
1995
1993
1991
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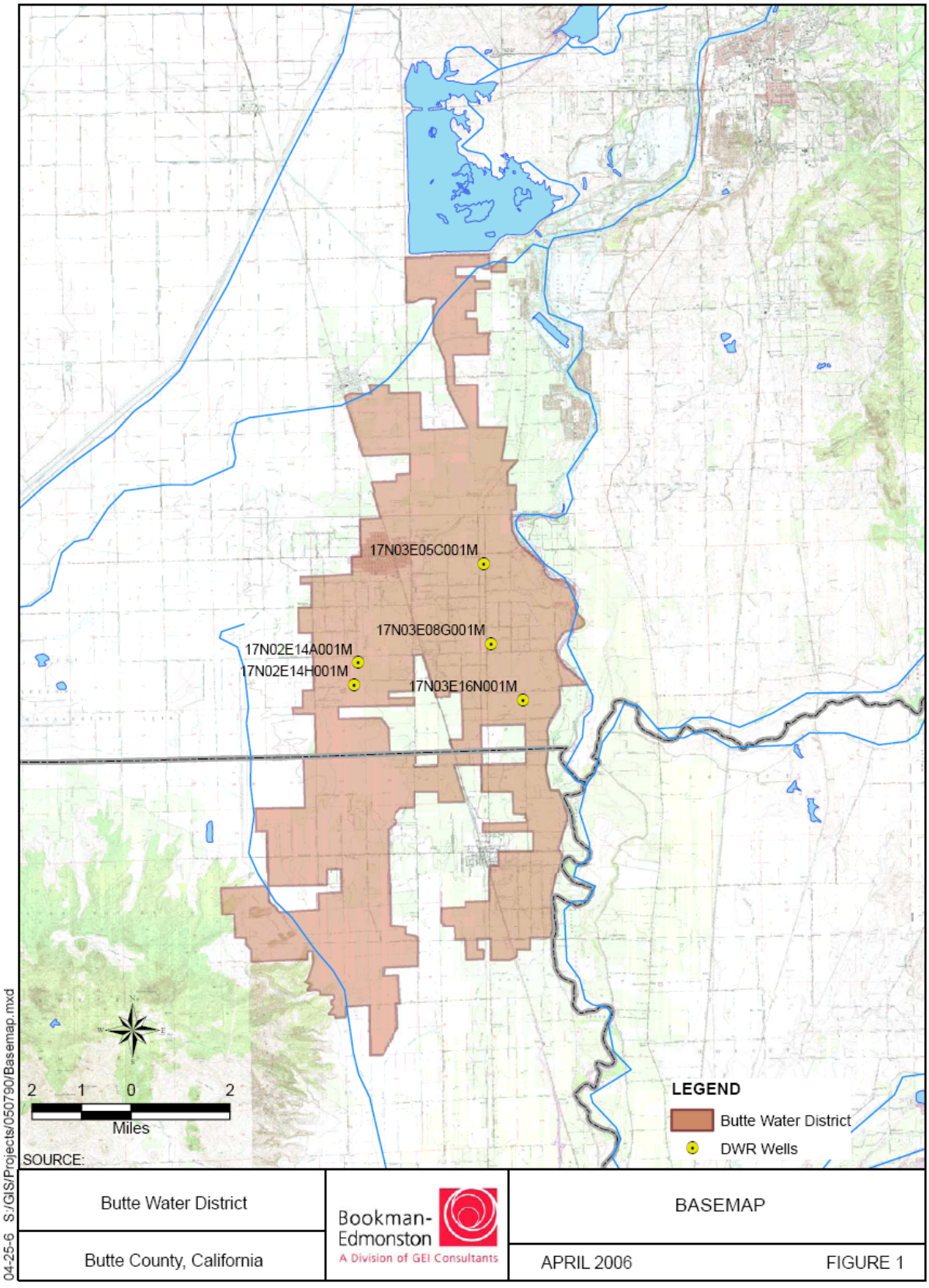
Yearly Spring Measurement
Average Spring Level
Stage 1&2 Alert
Stage 3 Alert
Ground Elevation



Butte Water District Base map