

**Basin Management Objective
Butte County
Sub-Inventory Unit – M & T RANCH**

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Contact Information

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Description of the M&T Sub-Inventory Unit –

The M&T Sub-Inventory Unit (SIU) covers an area of about 8,200 acres in the northwestern portion of the West Butte Inventory Unit. It is bordered by Big Chico Creek to the north, the Llano Seco and Durham Dayton SIUs to the south and east, and the Sacramento River and Angel Slough SIU to the west. The M&T SIU corresponds roughly to the water serviced area of the M&T Chico Ranch. Agricultural land use includes orchards, rice, and row crops supported by groundwater and surface water. In a normal year, about 27% of the M&T 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 M&T SIU, from youngest (shallowest) to oldest (deepest) include:

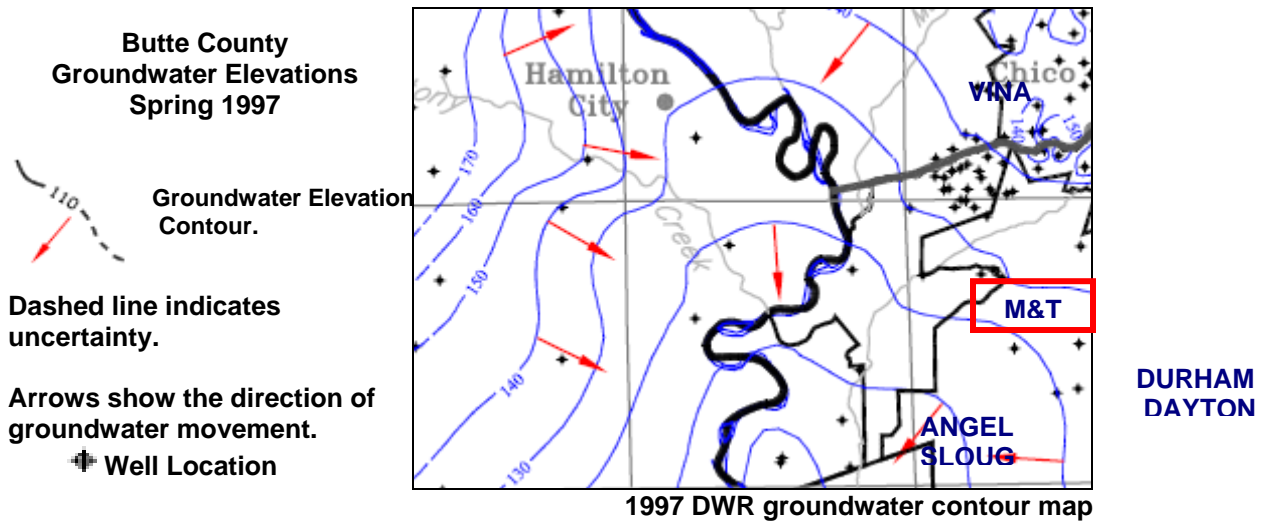
- Quaternary Alluvium
- Basin Deposits
- Modesto Formation
- Tuscan Unit C (Upper Tuscan)

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 M&T SIU are:

Modesto Formation
 Tuscan Unit C (Upper Tuscan)

Groundwater Flow in the M & T 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 M&T SIU is in a south-to-southwesterly direction toward the Sacramento River and Angel Slough.



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)
21N01W24B01M	Lower Tuscan (B)	Monitoring	115.0	110.0
22N01E29R01M	Upper Tuscan (C)	Irrigation	130.0	125.0
22N01E32E04M	Modesto Formation	Domestic	125.0	120.0

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
22N01E15DO2M	17.6	18.2	17.8	19.2	18.6	18.0

Groundwater pH - 2002 through 2007

State Well Number	2002 pH	2003 pH	2004 pH	2005 pH	2006 pH	2007 pH
22N01E15DO2M	7.2	7.5	6.9	7.8	7.9	7.6

Groundwater EC - 2002 through 2007

State Well Number	2002 EC	2003 EC	2004 EC	2005 EC	2006 EC	2007 EC
22N01E15DO2M	418	551	678	504	465	451

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

Land Subsidence is continuously monitored by the Department of Water Resources and Butte County Department of Water and Resource Conservation from State Well number 21N01W24B01M, which is within this Sub-Inventory Unit.

BMO Alert Stage Definitions and Compliance Methodologies–

The M & T Ranch 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 each index well.

Groundwater Levels – Specific Depth

The Stage 1, 2, and 3 Alerts were set from long-term experience in the area. The elevations correspond to groundwater levels that are problematic to existing pump bowl settings.

Stage 1: A Stage 1 alert shall occur the first year that spring groundwater elevations are below the Stage 1 & 2 elevation, but remain above the Stage 3 Alert elevation.

Stage 2: A Stage 2 alert shall occur when spring groundwater elevations for a second, or subsequent, consecutive year, are below the Stage 1 & 2 elevation but remain above the Stage 3 Alert elevation.

Stage 3: A Stage 3 Alert shall occur when the spring groundwater levels fall below the Stage 3 Alert elevation as identified on the hydrograph.

Groundwater Quality –

Any change that exceeds a 20 percent change from Butte County's 2008 water quality assessment 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 –

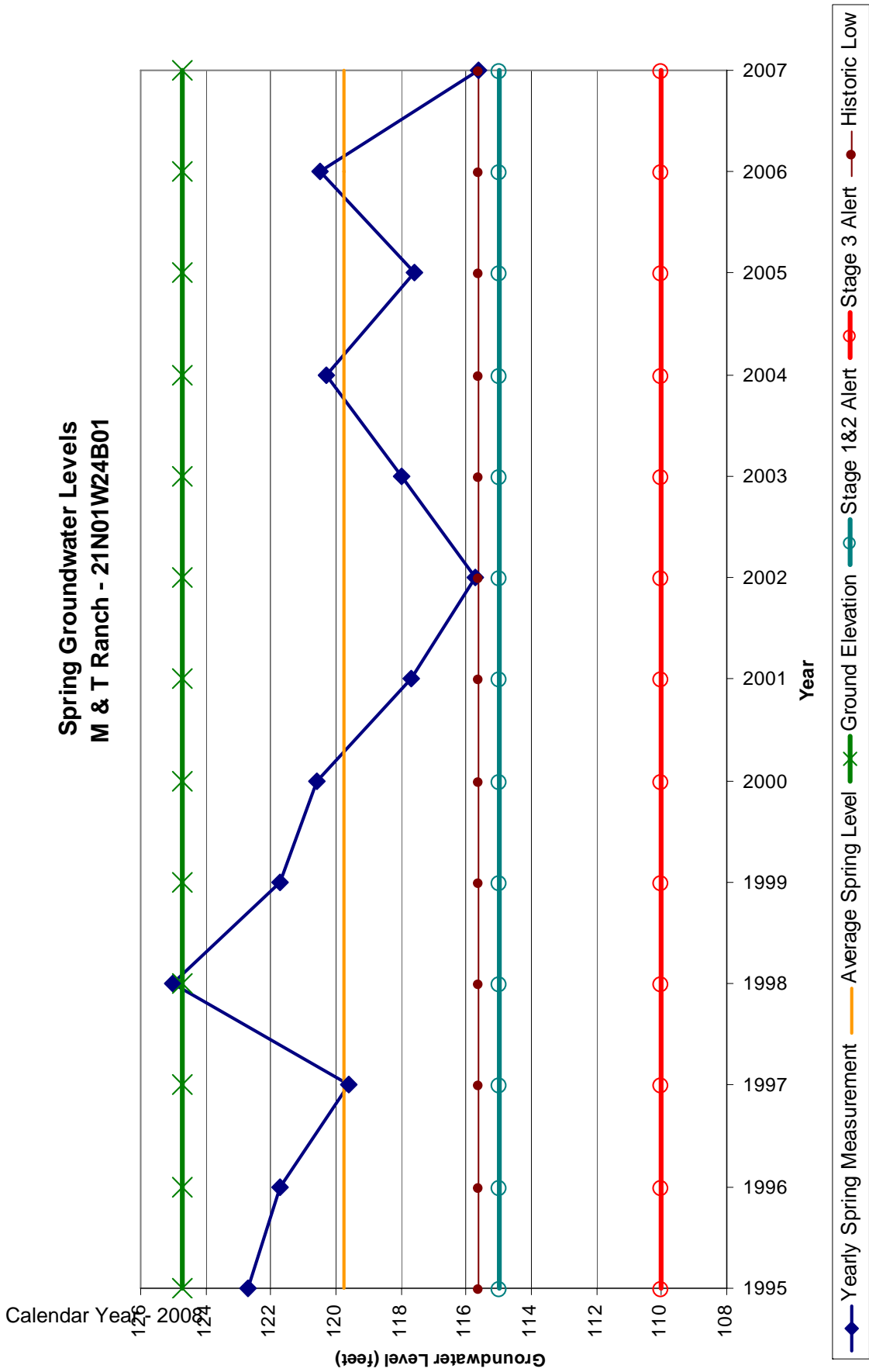
Efforts will be made to identify several domestic wells that could be added to the existing monitoring well network in the sub-inventory unit to allow development of management objectives for the alluvial aquifer system.

Supporting Data –

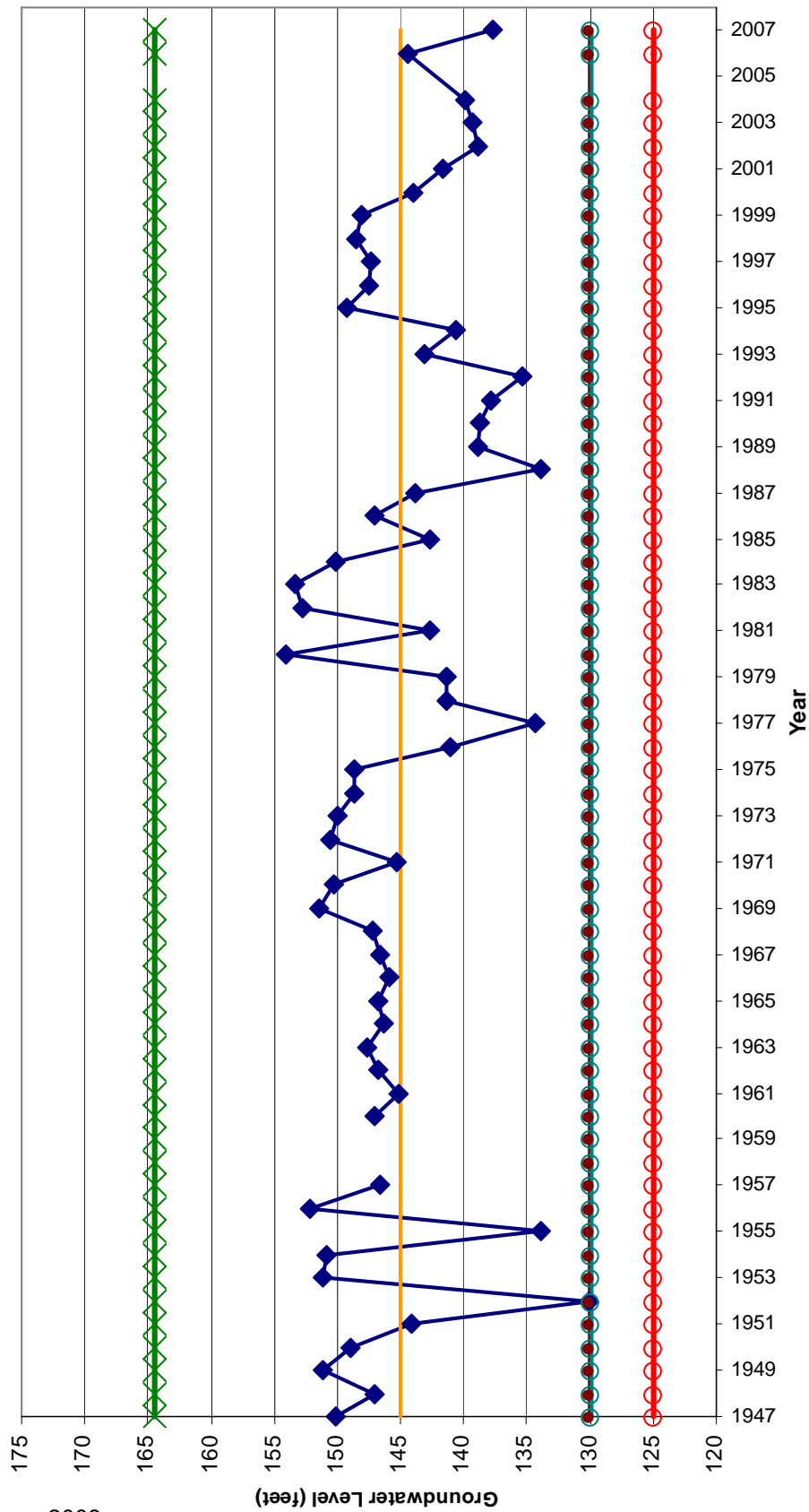
Hydrographs depicting yearly spring level measurements, including 2008 data, with established alert levels.

Summary charts of water quality monitoring.

Spring Groundwater Levels M & T Ranch - 21N01W24B01



Spring Groundwater Levels
M & T Ranch- 22N01E29R01



Spring Groundwater Levels
M & T Ranch- 22N01E32E04

