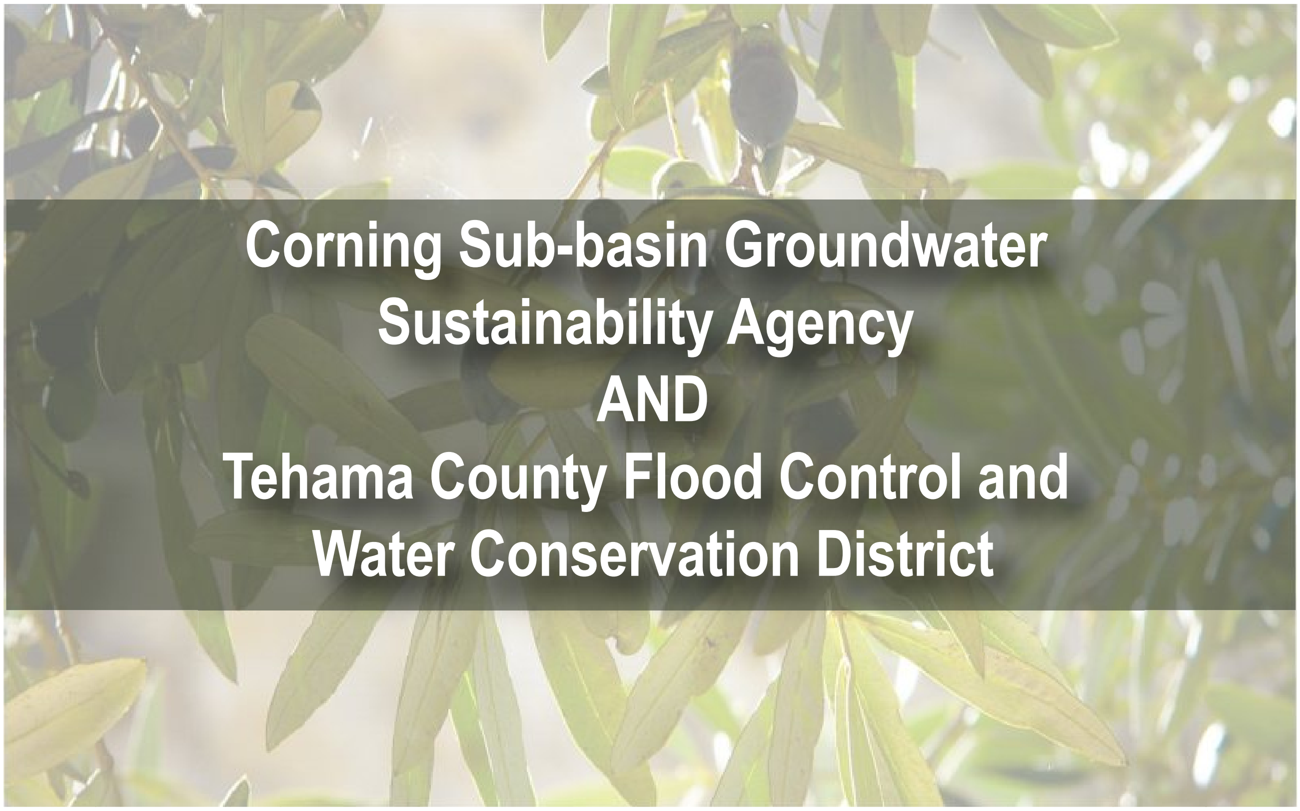
Corning Subbasin Groundwater Sustainability Plan Water Year 2021 Annual Report



Corning Sub-basin Groundwater Sustainability Agency
AND
Tehama County Flood Control and Water Conservation District



Prepared by:

MONTGOMERY & ASSOCIATES
Water Resource Consultants

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corningsubbasingsp.org

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ACRONYMS & ABBREVIATIONS

μS/cm ....microsiemens per centimeter
Advisory Board or CSAB ......Corning Subbasin Advisory Board
AF ....acre-feet / acre-foot
AF/yr ....acre-feet per year
bgs ....below ground surface
CDEC ....California Data Exchange Center
CDFW ....California Department of Fish and Wildlife
CSGSA ....Corning Sub-basin GSA
CVP ....Central Valley Project
DMS ....Data Management System
DWR ....California Department of Water Resources
EC ....electrical conductivity
ET ....evapotranspiration
GCID ....Glenn-Colusa Irrigation District
GSA ....Groundwater Sustainability Agency
GSP ....Groundwater Sustainability Plan
HCM ....Hydrogeologic Conceptual Model
ILRP ....Irrigated Lands Regulatory Program
InSAR ....Interferometric Synthetic Aperture Radar
MCL ....Maximum Contaminant Level
mg/L ....milligrams per Liter
NSac Model ....C2VSimFG model
OUWUA ....Orland Unit Water Users' Association
Paskenta Band ....Paskenta Band of Nomlaki Indians
Paskenta Reservation ....Paskenta Band of Nomlaki Indians Reservation
RMP ....representative monitoring point
RWQCB ....Regional Water Quality Control Board
SGMA ....California Sustainable Groundwater Management Act
SMC ....Sustainable Management Criteria
SMCL ....Secondary Maximum Contaminant Level
Subbasin ....Corning Subbasin
TCCA ....Tehama-Colusa Canal Authority
TCFCWCD ....Tehama County Flood Control and Water Conservation District
TDS ....total dissolved solids
USBR ....United States Bureau of Reclamation
WD ....Water District
WY ....water year

EXECUTIVE SUMMARY

The Corning Subbasin Groundwater Sustainability Plan (GSP) 2021 Annual Report was prepared on behalf of the Groundwater Sustainability Agencies (the GSAs; Corning Sub-basin GSA, and the Tehama County Flood Control and Water Conservation District). Per GSP Regulation §356.2, the first Corning Subbasin GSP Annual Report covers the 2021 Water Year (WY 2021) time frame from October 1, 2020, through September 30, 2021.

This Annual Report provides WY 2021 groundwater conditions data and implementation information for the Corning Subbasin GSP. Extended drought conditions for all but a few years since WY 2012 have resulted in groundwater levels declining to historically low levels in much of the Subbasin. Areas that were able to recover in the past during the wet season have not recovered as efficiently in recent years.

The primary factors leading to groundwater level declines are extended dry conditions, increasing groundwater pumping, and decreasing surface water deliveries. WY 2020 and 2021 are classified as dry and critically dry, respectively. Groundwater pumping in WY 2021 is likely greater than any prior year, and surface water deliveries are less than any year since at least 1974. Factors leading to increased groundwater pumping include the fact that irrigated tree crops are expanding, replacing surface water irrigated hay crops and pasture; surface water allocations are curtailed more frequently because of lack of supply, environmental considerations, and extended dry conditions; and growers prefer using groundwater because of its convenience, compatibility with efficient drip irrigation systems, and cost relative to surface water.

Fall groundwater elevations are used to assess progress towards sustainability. Fall groundwater level data are collected in October, which is the start of the Water Year. Fall 2020 groundwater levels are above minimum thresholds in all wells, but are mostly below measurable objectives. Groundwater elevations in spring and summer WY 2021 are generally lower than levels reported previously for these seasons because WY 2021 is drier and less surface water is available than in previous years. October 2021 groundwater levels will be evaluated in the WY 2022 Annual Report.

Groundwater elevations are used as a proxy to assess reduction in groundwater storage. Although not required for assessing sustainable management criteria (SMC), groundwater storage is calculated from annual fall groundwater elevation data to meet Annual Report requirements. Similar to the description above for groundwater levels, the measurements from October 2020 are the only available fall data for WY 2021. From fall 2019 to 2020 groundwater storage declined by about 100,000 acre-feet (AF), which is a greater reduction of groundwater in storage than any water year since 1977.

Despite recent groundwater level declines, data show other sustainability indicators are generally stable and meet the SMC defined in the GSP. Groundwater quality remains good in the Subbasin with no recent exceedances of regulatory drinking water standards or minimum thresholds. Subsidence data show that most of the Subbasin has little to no inelastic subsidence. Some elastic subsidence occurs during the year but land surface compaction during the pumping season is offset by expansion in the wet season. Depletion of interconnected surface water is evaluated using groundwater elevations near interconnected streams as a proxy. Groundwater levels typically recover in the wet season and wet years despite seasonal groundwater level declines during the dry season and dry years. Due to dry conditions, groundwater levels in surface water depletion monitoring wells were slightly lower in WY 2020 and WY 2021 than in prior wet years but are above the minimum thresholds.

WY 2021 coincided with the GSP development phase of SGMA, so the GSAs were active with stakeholder engagement and outreach, identifying monitoring networks, defining SMC, and establishing a list of priority projects and management actions to focus on during GSP implementation. During WY 2021 there is limited new information to report on GSP implementation tasks that is not already included in the GSP. During the early stages of GSP implementation, the GSAs are establishing funding mechanisms to implement the GSP. Once funding is available the GSAs will focus on GSP implementation, including developing plans to address data gaps and advancing projects and management actions to achieve sustainability.

Annual Report Elements Guide Checklist

Groundwater Sustainability Plan Annual Report Elements Guide			
Basin Name	**Corning Subbasin**		
GSP Local ID	**5-021.51**		
California Code of Regulations - GSP Regulation Sections	**Groundwater Sustainability Plan Elements**	**Document page number(s) that address the applicable GSP element.**	**Notes: Briefly describe the GSP element does not apply.**
Article 5	**Plan Contents**		
Subarticle 4	**Monitoring Networks**		
§354.40	**Reporting Monitoring Data to the Department**		
	Monitoring data shall be stored in the data management system developed pursuant to Section 352.6. A copy of the monitoring data shall be included in the Annual Report and submitted electronically on forms provided by the Department.	74	Section 4.2.5; Monitoring data are uploaded to GSP Portal.
	Note: Authority cited: Section 10733.2, Water Code. Reference: Sections 10728, 10728.2, 10733.2 and 10733.8, Water Code.		
Article 7	**Annual Reports and Periodic Evaluations by the Agency**		
§356.2	**Annual Reports**		
	Each Agency shall submit an annual report to the Department by April 1 of each year following the adoption of the Plan. The annual report shall include the following components for the preceding water year:		
	(a) General information, including an executive summary and a location map depicting the basin covered by the report.	6-7, 12	ES; Fig 1-1
	(b) A detailed description and graphical representation of the following conditions of the basin managed in the Plan:		
	(1) Groundwater elevation data from monitoring wells identified in the monitoring network shall be analyzed and displayed as follows:		
	(A) Groundwater elevation contour maps for each principal aquifer in the basin illustrating, at a minimum, the seasonal high and seasonal low groundwater conditions.	26-27	Fig 3-1 and 3-2

Basin Name	Corning Subbasin		
GSP Local ID	5-021.51		
California Code of Regulations - GSP Regulation Sections	**Groundwater Sustainability Plan Elements**	**Document page number(s) that address the applicable GSP element.**	**Notes: Briefly describe the GSP element does not apply.**
	(B) Hydrographs of groundwater elevations and water year type using historical data to the greatest extent available, including from January 1, 2015, to current reporting year.	81-173	Appendix B
	(2) Groundwater extraction for the preceding water year. Data shall be collected using the best available measurement methods and shall be presented in a table that summarizes groundwater extractions by water use sector and identifies the method of measurement (direct or estimate) and accuracy of measurements, and a map that illustrates the general location and volume of groundwater extractions.	30-35	Section 3.2.1; Table 3-1; Figure 3-5
	(3) Surface water supply used or available for use, for groundwater recharge or in-lieu use shall be reported based on quantitative data that describe the annual volume and sources for the preceding water year.	35-36	Section 3.2.2; Table 3-2; Surface water was not available for groundwater recharge or in-lieu use. In WY 2021 available surface water is used to the extent possible.
	(4) Total water use shall be collected using the best available measurement methods and shall be reported in a table that summarizes total water use by water use sector, water source type, and identifies the method of measurement (direct or estimate) and accuracy of measurements. Existing water use data from the most recent Urban Water Management Plans or Agricultural Water Management Plans within the basin may be used, as long as the data are reported by water year.	36-37	Section 3.2.3; Table 3-3
	(5) Change in groundwater in storage shall include the following:		
	(A) Change in groundwater in storage maps for each principal aquifer in the basin.	42	Figure 3-9

Basin Name	Corning Subbasin		
GSP Local ID	5-021.51		
California Code of Regulations - GSP Regulation Sections	**Groundwater Sustainability Plan Elements**	**Document page number(s) that address the applicable GSP element.**	**Notes: Briefly describe the GSP element does not apply.**
	(B) A graph depicting water year type, groundwater use, the annual change in groundwater in storage, and the cumulative change in groundwater in storage for the basin based on historical data to the greatest extent available, including from January 1, 2015, to the current reporting year.	41	Figure 3-8
	(c) A description of progress towards implementing the Plan, including achieving interim milestones, and implementation of projects or management actions since the previous annual report.	54-74	Section 4

1 INTRODUCTION

1.1 Purpose

This Groundwater Sustainability Plan (GSP) Annual Report (Annual Report) for the Corning Subbasin (Subbasin) fulfills the requirements of Water Code §10733.6 and the Sustainable Groundwater Management Act (SGMA). The purpose of this Annual Report is to compile and transmit groundwater conditions data to the California Department of Water Resources (DWR), evaluate conditions relative to the Sustainable Management Criteria (SMC), summarize total water use, estimate change in groundwater storage, and provide WY 2021 progress updates on projects, management actions, and other tasks associated with GSP implementation. This first Annual Report for the Subbasin provides an annual update on groundwater conditions and GSP implementation for Water Year (WY) 2021, from October 1, 2020, to September 30, 2021. Since this is the first Annual Report following preparation of the GSP, the report and associated data transmittal to DWR also include WY 2020 data that were collected after the GSP was prepared (which had a data cutoff of Fall 2019).

1.2 Corning Subbasin Groundwater Sustainability Plan

The Corning Subbasin (5-021.51) was required by SGMA to develop, approve, and submit a GSP by January 31, 2022, based on its classification by DWR as a high priority subbasin in the 2019 Basin Boundary Modifications process (DWR, 2020) and as not critically overdrafted in the Bulletin 118 - 2016 Update (DWR, 2016). The GSP was developed by 2 Groundwater Sustainability Agencies (GSAs) shown on Figure 1-1: The Tehama County Flood Control and Water Conservation District (TCFCWCD) and the Corning Sub-basin GSA (CSGSA). The TCFCWCD is the exclusive GSA for the portion of the Subbasin within Tehama County. The CSGSA is the exclusive GSA for the Glenn County portion of the Subbasin. The CSGSA was formed by a Memorandum of Agreement between Glenn County, Glenn-Colusa Irrigation District (GCID), and the Monroeville Water District (WD). The GSP was submitted by the GSAs to the SGMA Portal (https://sgma.water.ca.gov/portal/) on January 28, 2022, and was made available by DWR for a 75-day public comment period on February 7, 2022. DWR is required under SGMA to complete the GSP technical assessment by January 31, 2024.

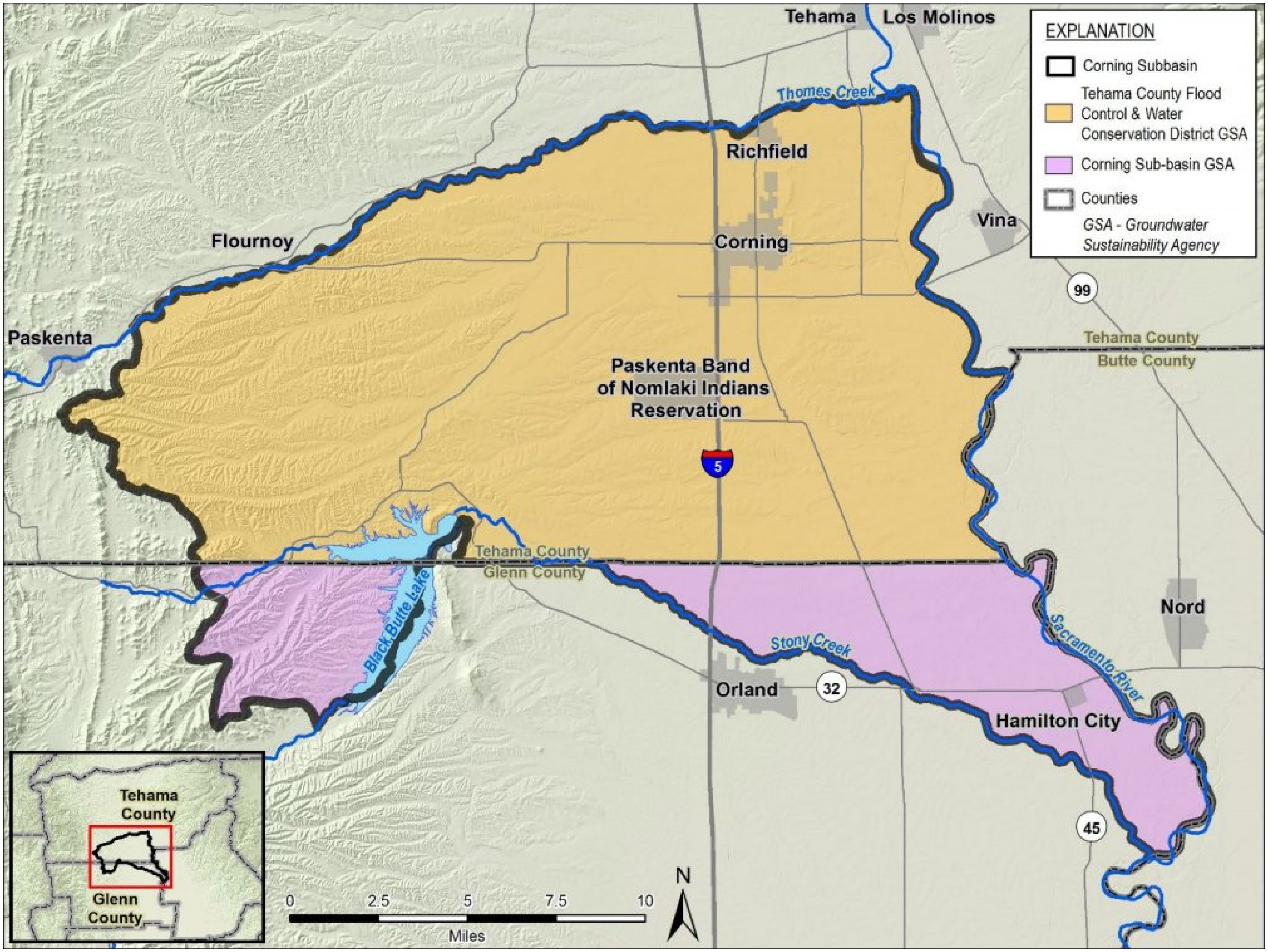

Figure 1-1. Corning Subbasin GSAs

2 BASIN SETTING

2.1 Subbasin Description

The Corning Subbasin shown on Figure 1-1 is 1 of 15 subbasins defined by DWR in the greater Sacramento Valley Groundwater Basin. The Subbasin covers approximately 207,342 acres; 78% of the land area is within Tehama County and 22% is within Glenn County. The Subbasin contains the City of Corning and the census-designated places of Richfield and Hamilton City. The Paskenta Band of Nomlaki Indians (Paskenta Band) is a federally recognized tribe and has jurisdiction over the Paskenta Band of Nomlaki Indians Reservation (Paskenta Reservation) shown on Figure 1-1.

The Subbasin extent is defined by a combination of geologic, hydrologic, and jurisdictional boundaries including the Coast Range to the west, Thomes Creek to the north, Sacramento River to the east, and Black Butte Lake, Orland Buttes, Stony Creek, and the Tehama-Glenn County line to the south (Figure 1-1). The Coast Range mountains to the west and the Orland Buttes to the south of Black Butte Lake are not defined as groundwater basins by DWR and consequently are not subject to SGMA. The Subbasin is bounded by 5 subbasins subject to SGMA: Red Bluff, Los Molinos, Vina, Butte, and Colusa (Figure 2-1). There are no geologic barriers between the Corning Subbasin and its neighboring subbasins.

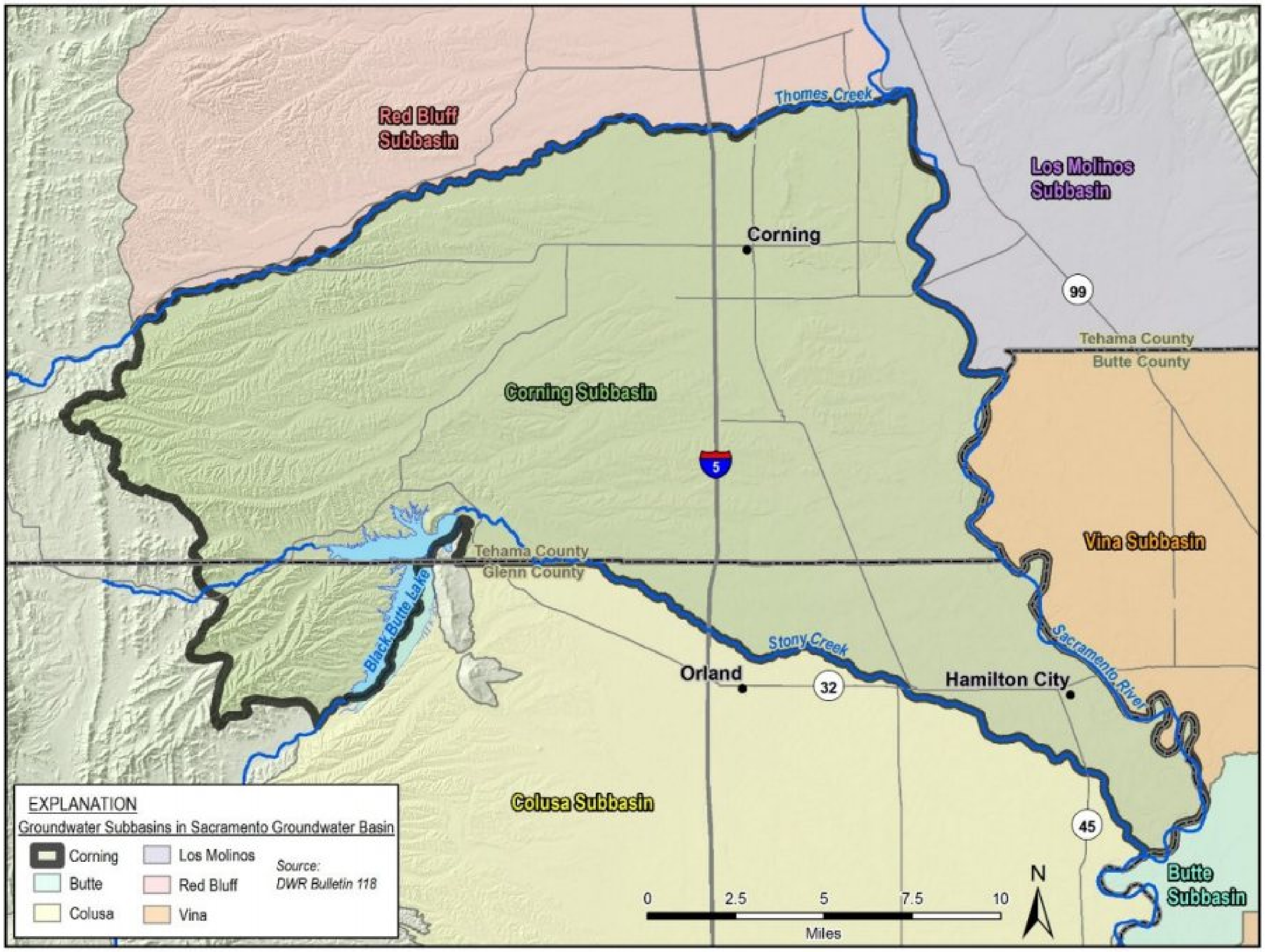

Figure 2-1. Corning Subbasin and Adjacent Subbasin Locations

The Corning Subbasin hydrogeologic conceptual model (HCM) is described in detail in the GSP (Section 3.1). Subbasin geology is largely consistent with the regional Sacramento Valley depositional environment, consisting of alternating and sometimes interbedded layers of sedimentary and volcanic materials. The Subbasin generally overlies a single principal aquifer that lacks a laterally continuous aquitard to impede hydrogeologic interconnection between the productive geologic layers at different depths. The primary geologic formations in the principal aquifer, from shallowest to deepest, are the Quaternary Alluvium, Tehama, and Tuscan Formations. The Tehama and Tuscan Formations are interfingered in eastern areas of the Subbasin, with portions of the Tehama Formation found above and below the Tuscan Formation. The Tuscan Formation is only present in the eastern portion of the Subbasin.

The Sacramento River is the most prominent local surface water source, bisecting the Northern Sacramento Valley from north to south, and forming the Subbasin eastern boundary as shown on Figure 2-2. Sacramento River flow is regulated by the United States Bureau of Reclamation (USBR) upstream of the Subbasin at Shasta Dam. Surface water is conveyed by the Tehama-Colusa Canal Authority (TCCA) to agricultural water providers and water districts both in the Subbasin and in neighboring Subbasins via USBR Central Valley Project (CVP) contracts. The 2 CVP contractors in the Subbasin that actively use Sacramento River water are the Corning WD and Thomes Creek WD via the Red Bluff diversion to the Corning Canal. The Tehama-Colusa Canal originates at the Red Bluff diversion and runs north to south through the Subbasin, but is not currently used as a water source in the Subbasin. The Tehama-Colusa Canal historically conveyed irrigation supply to the Kirkwood WD near the City of Corning, but this district has not used its surface water allocation in recent years. The Glenn-Colusa Canal diversion on the Sacramento River near Hamilton City is in the Subbasin, but the water is used on GCID land to the south in the Colusa Subbasin.

Other tributaries of the Sacramento River located in the Subbasin are used for water supply and to provide natural groundwater recharge and riparian habitat. Stony Creek, which forms part of the Subbasin's southern boundary, is a perennial stream that flows eastward from Black Butte Lake to the Sacramento River. Stony Creek is regulated at Black Butte Dam by the United States Army Corps of Engineers and USBR for flood control and irrigation supply, respectively. The Orland Project Northside Distribution System supplies water for irrigation to a portion of the Subbasin north of Stony Creek. The Southside Distribution System supplies water for irrigation to the south of the creek in the Colusa Subbasin. Thomes Creek, which forms the Subbasin's northern boundary, flows west to east, is not regulated by a dam, and frequently runs dry in the Subbasin during the summer. Numerous other intermittent streams form in the Subbasin in wet weather and flow generally from west to east toward the Sacramento River. The perennial streams, intermittent streams, and conveyance canals are shown on Figure 2-2.

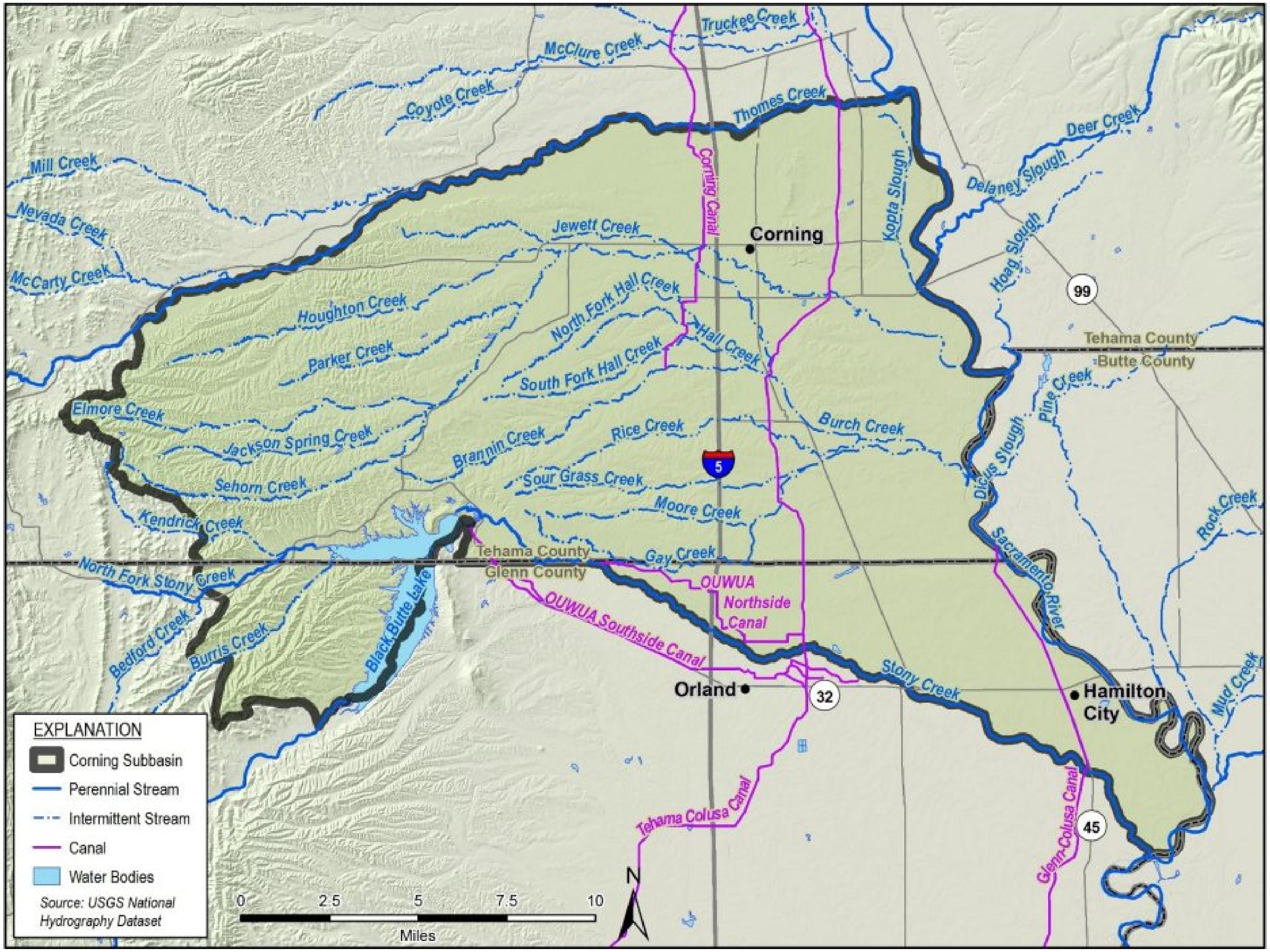

Figure 2-2. Surface Water Features

2.2 Precipitation and Water Year Type

The Subbasin has a Mediterranean climate characterized by warm, dry summers and cool, wet winters with transitional months in the spring and fall. Precipitation that falls within the Subbasin contributes to runoff to streams and groundwater recharge. DWR determines a water year type annually for the Sacramento Valley based on unimpaired runoff calculations from several stream gauges dispersed throughout the region.[1] Data collected each water year from 1906 to present are classified by the DWR as 'wet,' 'above normal,' 'below normal,' 'dry,' and 'critical' depending on the amount of precipitation and water availability in the Sacramento River and major tributaries.

Annual average precipitation in the Corning Subbasin from 1974 to 2015 is approximately 22.6 inches per year in the Northern Sacramento Valley portion of the NSac model. A weather station at the Corning airport, maintained by Cal Fire, has reported precipitation data from 2000 to present.[2] Total precipitation measured at the Corning weather station was 10.4 inches in WY 2020 and 7.7 inches in WY 2021. Annual precipitation records are shown on Figure 2-3 in comparison to water year type. WY 2020 was classified as dry, and WY 2021 was critically dry. Nearly all precipitation in WY 2021 fell in December, January, and March, as shown on the monthly bar chart on Figure 2-4.

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[1] http://cdec.water.ca.gov/reportapp/javareports?name=WSIHIST

[2] https://cdec.water.ca.gov/webgis/?appid=cdecstation&sta=CRG

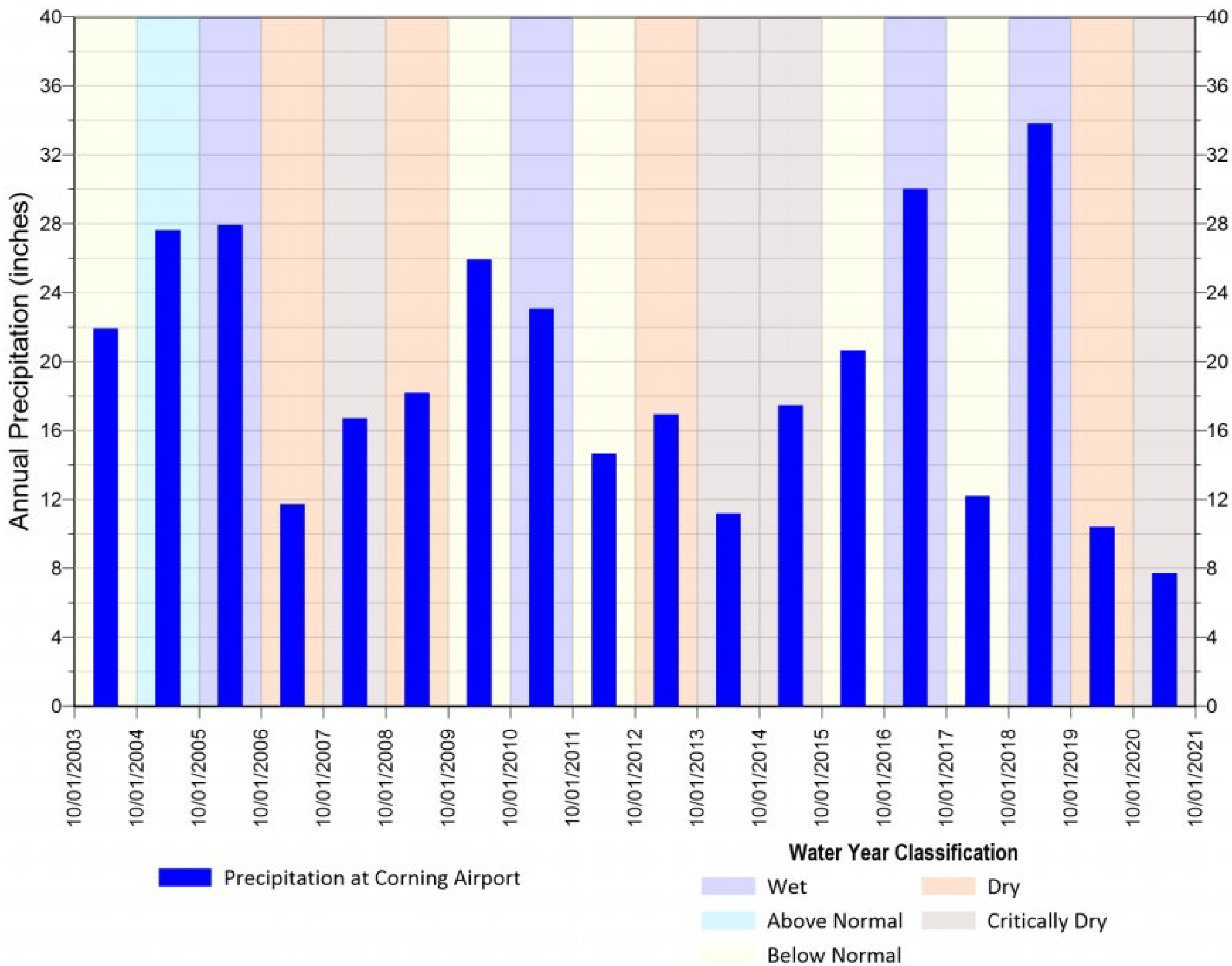


Figure 2-3. Precipitation at Corning Airport and Water Year Type, WY 2003 – 2021

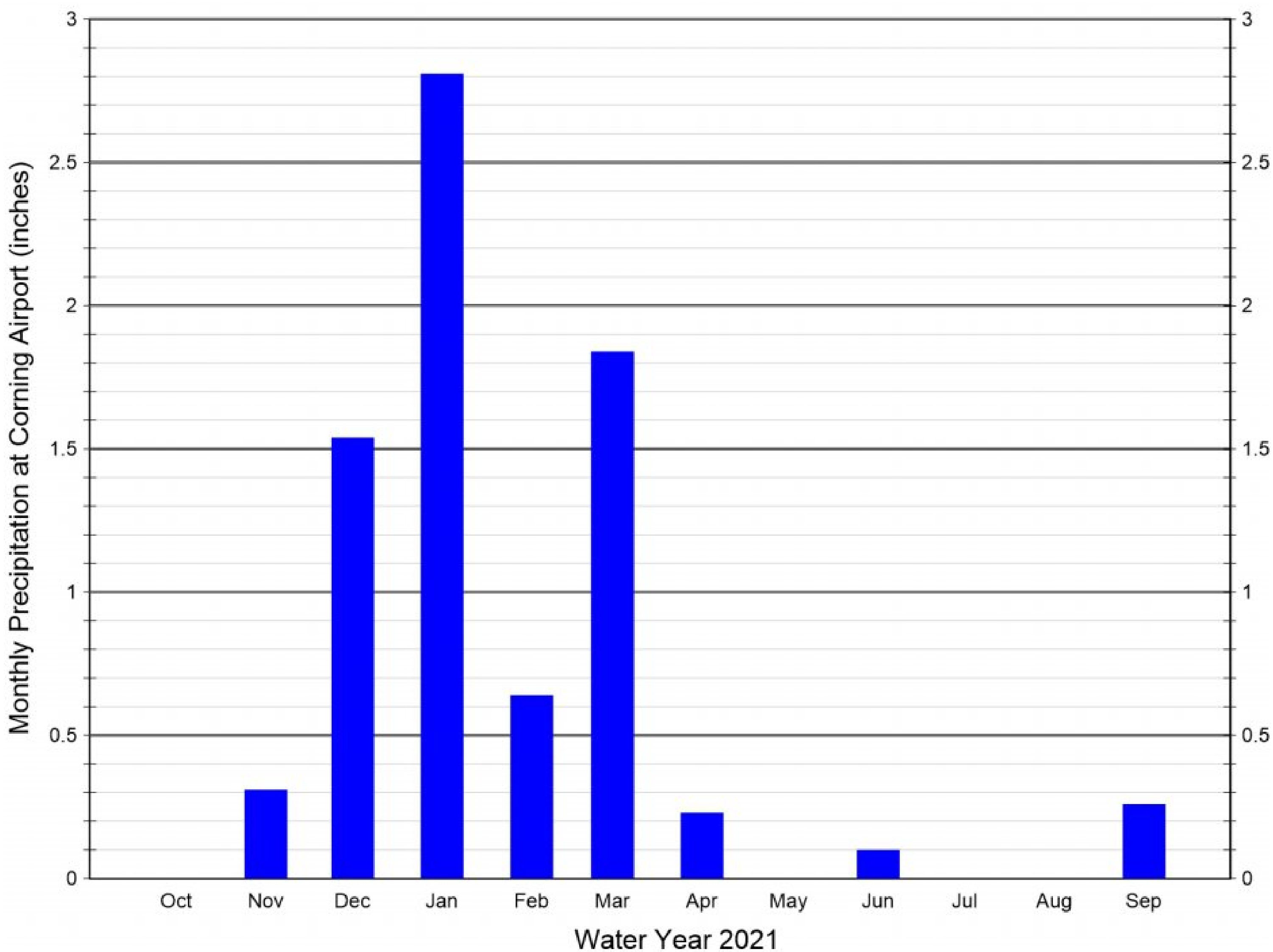


Figure 2-4. Monthly Precipitation at Corning Airport, WY 2021

2.3 Water Supply and Use

Water use in the Corning Subbasin is primarily for agriculture. Smaller volumes of water are used for industrial, municipal, tribal, and domestic purposes. Groundwater also supports designated wildlife and habitat protection areas near the Sacramento River, Thomes Creek, and Stony Creek. Water sources utilized in the Subbasin include groundwater, surface water, and to a lesser extent reused water from canal tailwater and agricultural drains.

Total water use in the Corning Subbasin averages approximately 204,000 AF per year (AF/yr) as reported in the GSP current water budget simulated by the calibrated C2VSimFG model (NSac Model). Groundwater and surface water are the only water sources used extensively in the Subbasin. Surface water is only accessible in limited portions of the Subbasin via CVP contracts conveyed by TCCA, and through minor riparian diversions, described in detail in the GSP (Section 2.4.3). Water use by source in 2018 is shown spatially on Figure 2-5.

Nearly all groundwater use in the Subbasin is for agricultural irrigation, with smaller volumes extracted for public and private drinking and industrial water supplies. The average annual groundwater use in the Subbasin estimated in the GSP current water budget is 158,000 AF, which is about 75% of total water use. About 97% of groundwater pumping in an average year is for irrigation. About 3% of total groundwater pumping in an average year is for domestic, municipal, tribal, and industrial purposes. Many growers use groundwater to either supplement available surface water supplies or as their sole water source. Annual groundwater use is variable based on climate and surface water supplies, but is generally increasing over the past decade.

Surface water use is solely for agricultural irrigation in the Subbasin. The average annual surface water use in the GSP current water budget is 48,300 AF, which is about 25% of total water use. Unlike groundwater, surface water use in the Subbasin has decreased over time, particularly in recent dry and critically dry years. Historically, surface water is only used extensively in the Subbasin by growers within the Corning WD, Thomes Creek WD, and Orland Unit Water Users Association (OUWUA) (i.e., the agricultural water providers). Growers within the Corning WD and Thomes Creek WD use surface water available from the CVP on some of their lands and supplement their supply with groundwater pumping. Thomes Creek WD has not used surface water extensively since 2017. Kirkwood WD, who is also a CVP contractor in the Subbasin, does not currently use their surface water allocations and growers within the district only irrigate with groundwater. Growers in the OUWUA service area use Orland Project surface water supplemented by groundwater. There are some growers near Thomes Creek and the Sacramento River that utilize riparian rights to irrigate their crops.

The Glenn-Colusa Canal, owned and operated by GCID, diverts water from the Sacramento River in the southeastern portion of the Subbasin near Hamilton City for use within GCID's service area in the Colusa Subbasin, to the south of the Corning Subbasin. Surface water use by

GCID averages 708,400 AF/yr between 2000 and 2021. GCID owns 2 groundwater production wells within the Subbasin. GCID may incorporate the groundwater wells into their operations in dry and critically dry years. GCID used their production wells during the dry season in WY 2011 to 2015 to extract on average 1,000 AF/yr. The GCID wells were not used from 2016 to 2020.

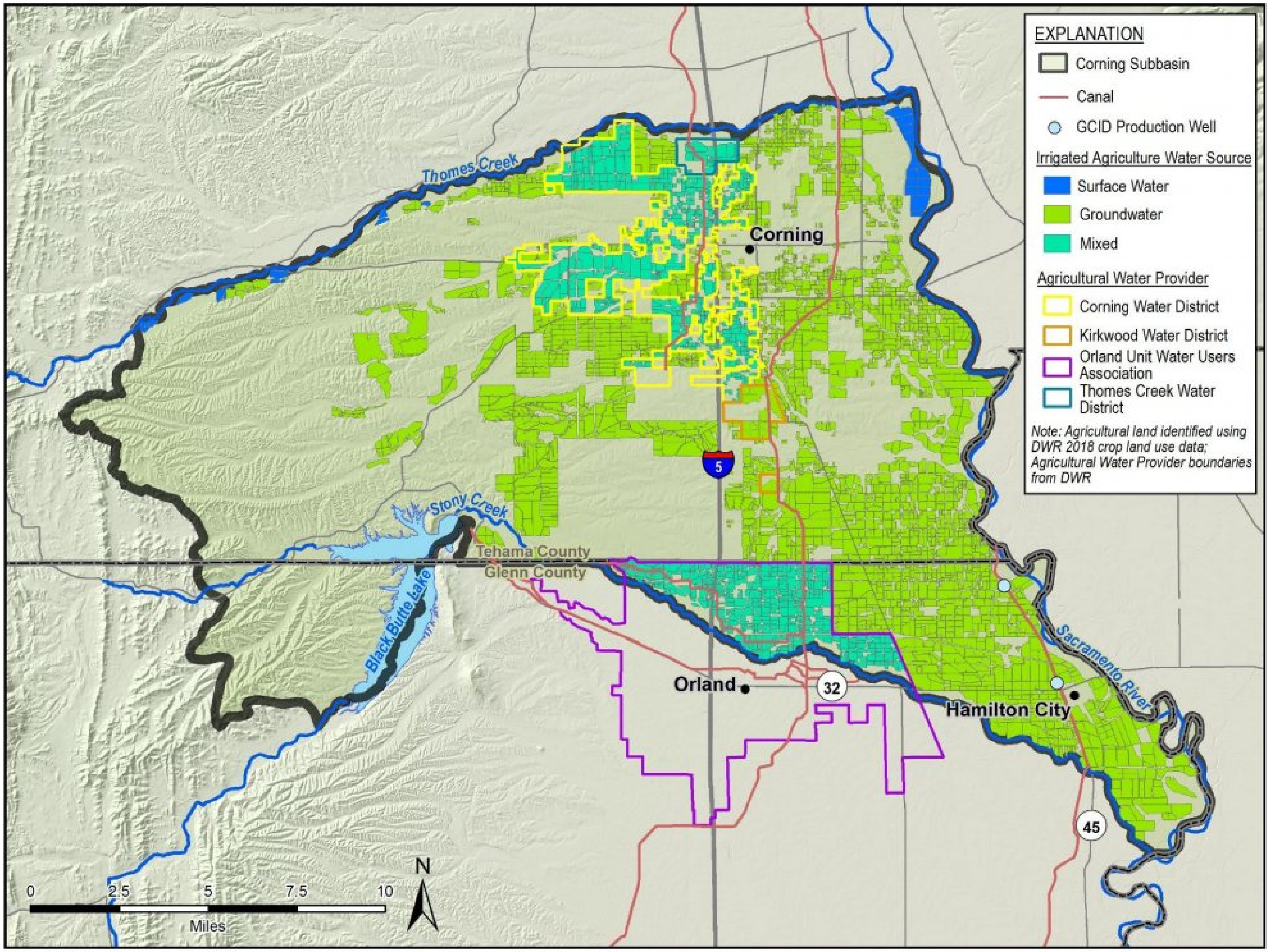


Figure 2-5. Water Sources and Agricultural Water Provider Jurisdiction

3 WY 2021 DATA AND SUBBASIN CONDITIONS

The Corning Subbasin GSP monitoring networks consist of existing locations and datasets that historically have been monitored or compiled by agencies predating the GSAs. For this WY 2021 Annual Report, groundwater data collected from the GSP monitoring networks for WY 2020 and WY 2021 are compiled and uploaded to the Corning Subbasin Data Management System (DMS). Data are independently verified before being uploaded to the DMS to confirm that collection methods and standards are consistent with the monitoring protocols detailed in the GSP. The data compiled for the WY 2021 Annual Report include groundwater levels, urban and agricultural metered groundwater pumping data, surface water deliveries, groundwater quality data, land subsidence, and stream stage measurements. Groundwater pumping for irrigation and change in groundwater storage are not measured directly, but are estimated in this Annual Report using land use and groundwater elevation maps, respectively.

3.1 Groundwater Elevations

3.1.1 Groundwater Elevation Monitoring Network

The GSP groundwater elevation monitoring network comprises 94 wells that are routinely monitored by DWR and cooperators including Glenn County and Tehama County staff. The wells include observation wells that are dedicated for groundwater monitoring, as well as irrigation, domestic, industrial, and stock watering wells. A subset of 54 wells were identified in the GSP as representative monitoring points (RMPs) for evaluating groundwater levels and identifying undesirable results during GSP implementation. The RMP wells are divided into wells screened in the shallow portion and wells screened in the deep portion of the single principal aquifer in the Subbasin, following typical DWR separation of well depths. There are 35 RMPs that are shallow wells typically screened from 100 to 450 feet below ground surface (bgs) and 19 RMPs that are deep wells, typically screened deeper than 450 feet bgs.

Groundwater levels are usually measured in most GSP monitoring network wells 3 times per year in the spring (March), summer (August), and fall (October). Groundwater level data are hand measured in each well during routine monitoring events. Most groundwater levels are measured using electronic sounders. Groundwater levels in extraction wells with oil for pump lubrication are measured using a steel tape and water level indicator paste. Staff record groundwater levels and any other useful information about data quality during each monitoring event. Some observation wells are equipped with pressure transducers that record daily measurements. Staff download the transducer data during routine groundwater level monitoring events and upload the data to DWR databases which are available to view at DWR Water Data Library.

Hand measured groundwater level data are evaluated for data quality and completeness and missing or questionable measurements are annotated. A data quality summary for WY 2021 data is included in Appendix A. In WY 2021, 28 of 280 scheduled groundwater level measurements were not collected for various reasons. Reasons included lack of access (especially related to Covid-19 social distancing measures), the well or neighboring well was pumping, the measuring tape was hanging up in the well casing, casing obstruction, and the well was dry. Of 252 collected measurements, 20 were flagged as questionable for reasons such as potential influence by pumping, pump lubricating oil floating on the water surface, and leaky well casings.

3.1.2 Groundwater Elevation Conditions

Hydrographs showing groundwater elevation data collected since WY 2000 at each GSP monitoring well are provided in Appendix B. The hydrographs include the water year type, well name, reference point elevation, well depth, screen interval(s), and an inset location map for each well in the GSP monitoring network. Hydrographs indicate if the well is a groundwater level RMP and show the SMC discussed in Section 4.1.1, if applicable.

Groundwater elevation data collected in the fall and spring are compiled by DWR and used to generate groundwater elevation contour maps, available on SGMA Data Viewer. The Corning Subbasin groundwater level data and contours for fall 2020 and spring 2021 are shown on Figure 3-1 and Figure 3-2, respectively. Fall data generally represent the seasonal low groundwater elevation at the end of the irrigation season and spring data generally represent the seasonal high groundwater elevation at the end of the wet season. Some wells, particularly in the Stony Creek area, have lower groundwater elevations in August monitoring events than in October monitoring events.

Nearly all wells in the Subbasin experienced lowering of groundwater levels in WY 2021 to elevations below historical lows. The groundwater elevation was measured in fall 2019, fall 2020, and summer 2021 at 19 wells in the shallow RMP network and 16 wells in the deep RMP network. Groundwater levels between fall 2019 and fall 2020 decreased on average by 6 feet in shallow RMP wells and 10 feet in deep RMP wells. Groundwater levels between fall 2020 and summer 2021 continued to decline at greater rates. Groundwater levels between fall 2020 and summer 2021 decreased on average by 17 feet in shallow RMP wells and 22 feet in deep RMP wells.

Groundwater level declines are notable in WY 2021 in wells in both Tehama and Glenn County portions of the Subbasin. In the OUWUA area and further downstream near Stony Creek, groundwater level declines departed from long-term stable or slightly declining trends. Surface water availability is usually more consistent on an annual basis in this part of the Subbasin, providing both an irrigation and groundwater recharge source. The lack of surface water in WY 2021 is apparent in the groundwater level response. Areas in the northern and western portions of the Subbasin in Tehama County continued a longer-term declining groundwater level trend since at least 2012.

Hydrographs showing representative conditions in an area with groundwater level declines in both shallow and deep RMP observation wells are included on Figure 3-3 and Figure 3-4, respectively. These observation wells are installed in the center of the Subbasin in Tehama County in an area that relies solely on groundwater for irrigation (Figure 2-5). During WY 2020, groundwater levels decreased about 10 feet in the shallow well and 20 feet in the deep well. WY 2021 is critically dry resulting in groundwater elevations that are substantially lower than prior measurements in the wells. Compared to August and October 2020, the groundwater levels in August 2021 are about 20 feet lower in each well and lower than minimum thresholds, discussed in Section 4.1.1.1.

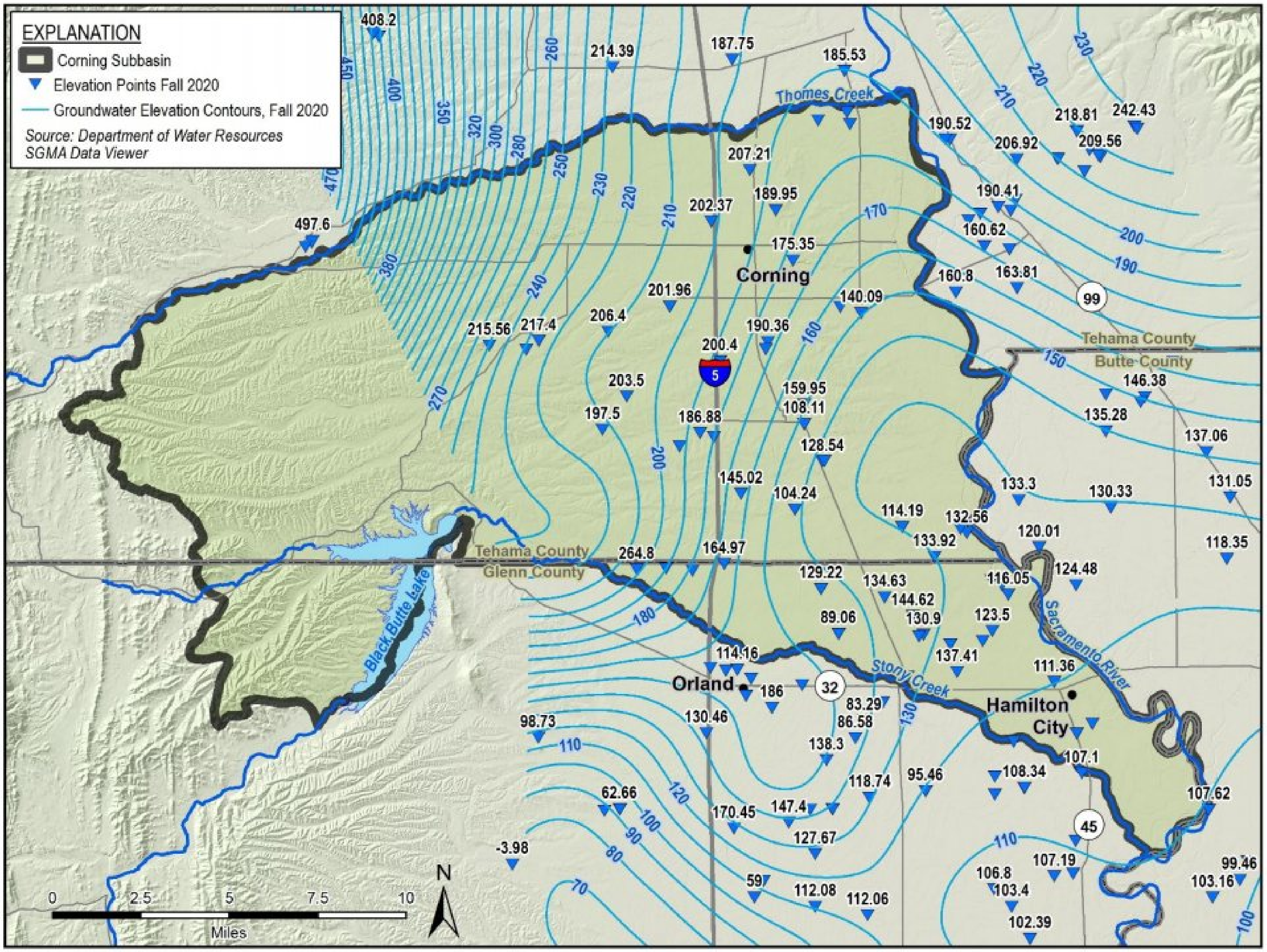


Figure 3-1. DWR Groundwater Elevation Contours, Fall 2020

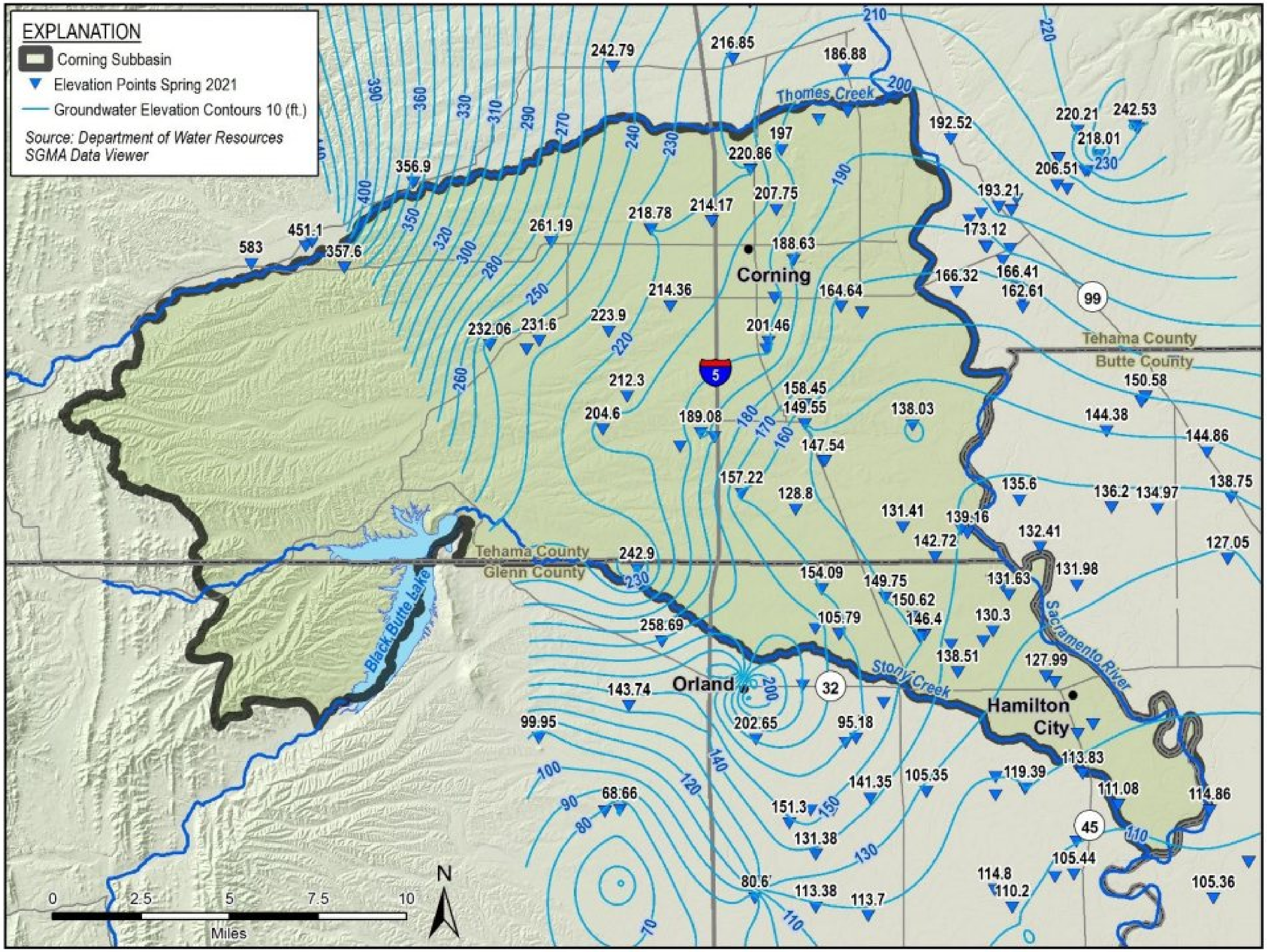


Figure 3-2. DWR Groundwater Elevation Contours, Spring 2021

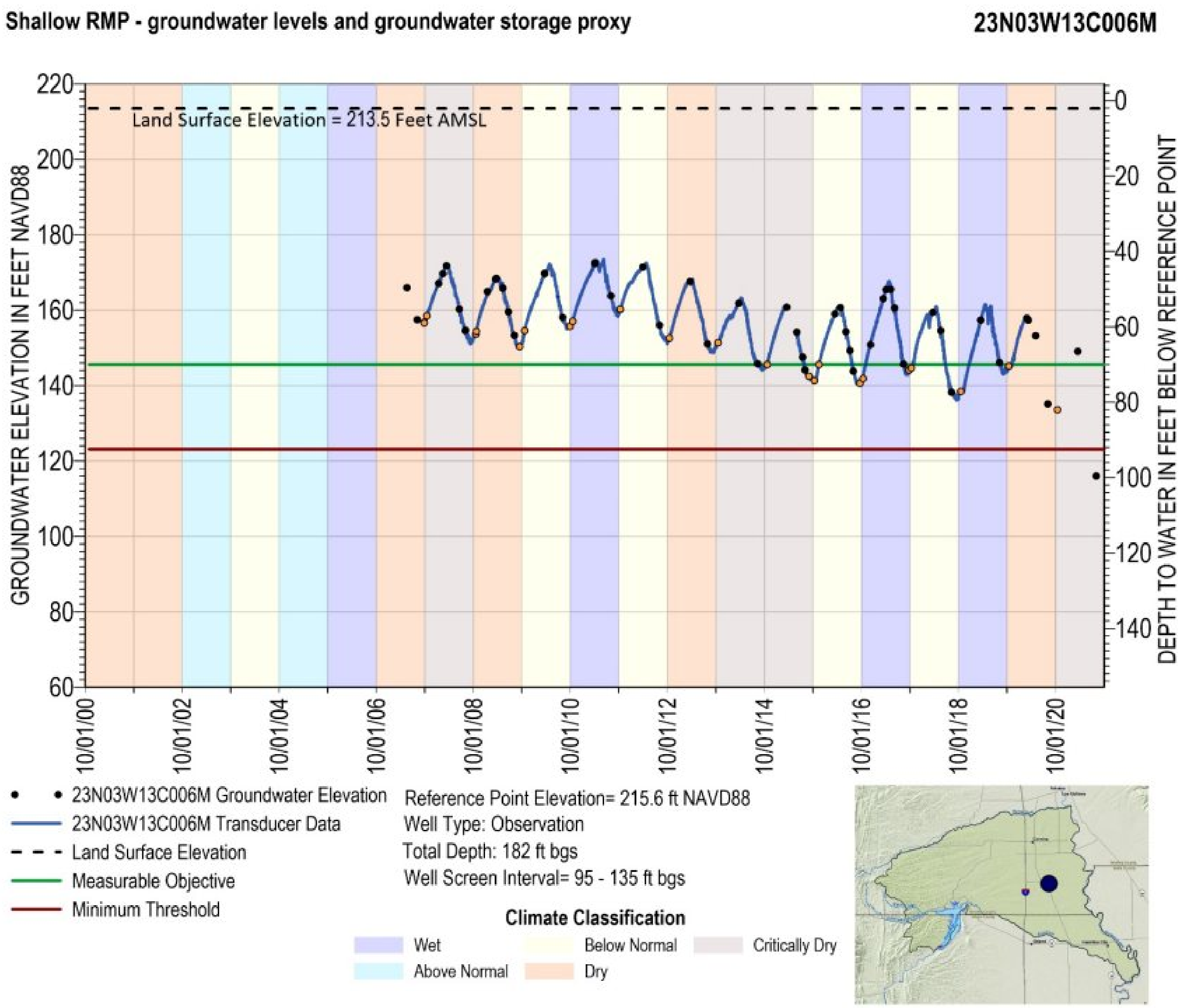
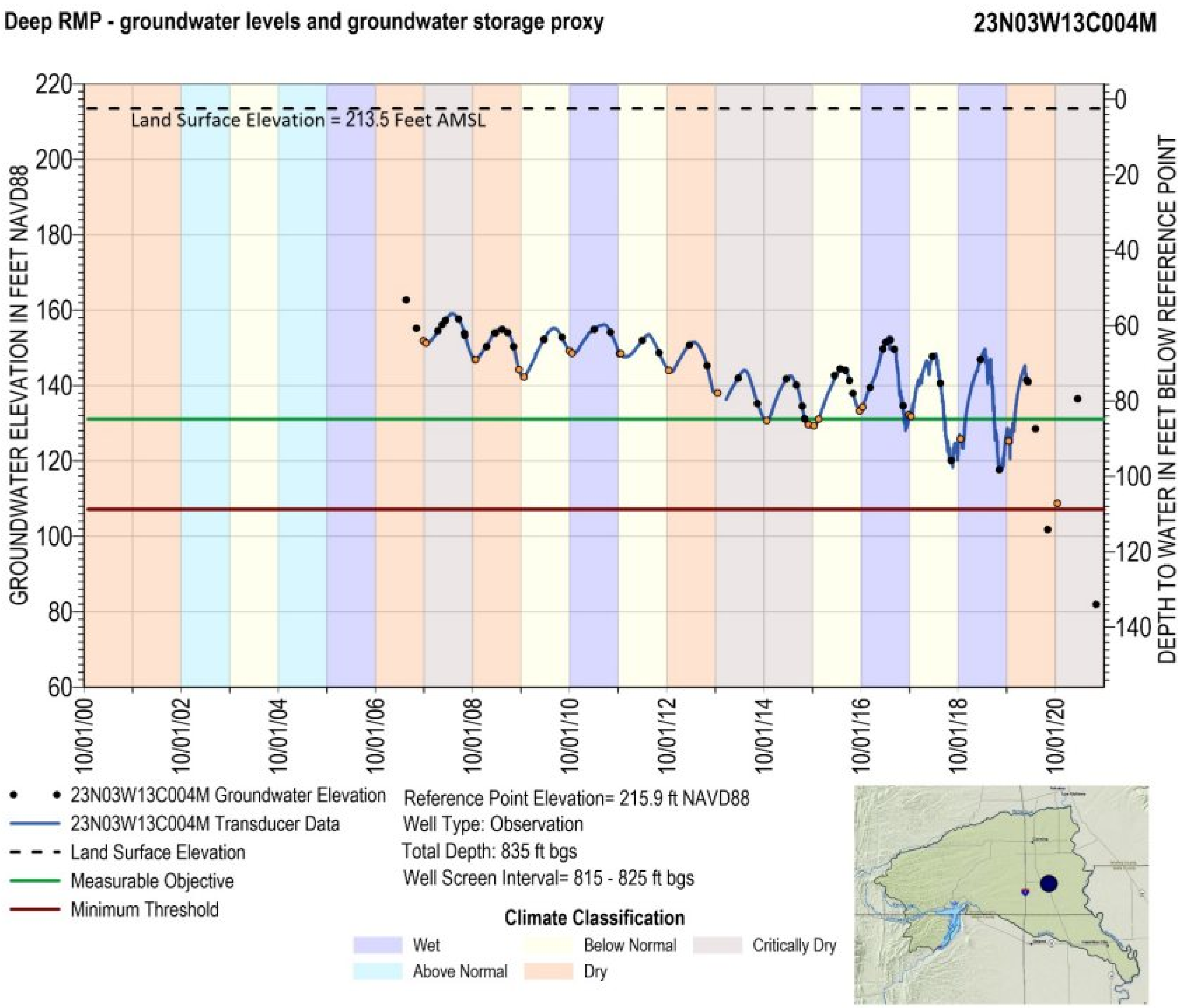


Figure 3-3. Representative Groundwater Level Hydrograph for Shallow RMPs (23N03W13C006M)



Note: Fall hand measurements are shown in gold (September and October)

Figure 3-4. Representative Groundwater Level Hydrograph for Deep RMPs (23N03W13C004M)

3.2 Water Supply and Use

Groundwater and surface water uses in the Subbasin in WY 2021 are summarized using measured pumping for municipal and some irrigation wells, reported surface water diversions, and estimated pumping for un-metered irrigation, industrial, and rural residential wells.

3.2.1 Groundwater Extraction

WY 2021 groundwater extraction from the Subbasin principal aquifer is 257,200 AF. About 252,400 AF (98%) of groundwater pumping in WY 2021 is used to irrigate crops. About 250,200 AF of the agricultural pumping is used in the Subbasin and 2,200 AF is supplied by GCID to growers in the Colusa Subbasin. The remaining 4,750 AF (2%) of groundwater extraction in WY 2021 is for urban public supply, industrial, and rural residential use. Table 3-1 presents groundwater extractions by water use sector rounded to the nearest 100 AF, the measurement method, and relative measurement accuracy. Pumping is measured using flow meters and totalizers for urban supply wells and GCID drought emergency wells. Pumping is estimated for irrigation, industrial, small water systems, and domestic uses, using methods described in the following sections. Figure 3-5 maps total WY 2021 groundwater pumping from both metered and estimated uses, totaled by Public Land Survey System section. Groundwater extraction and surface water deliveries from WY 2000 to 2021 are shown on Figure 3-6.

Table 3-1. Groundwater Extraction by Water Use Sector, WY 2021

<table>
<tr><th>Water Use Sector</th><th>Agency or Extraction Type</th><th>Measurement Method and Relative Accuracy</th><th>Extraction (AF)</th><th>Total Groundwater Use by Sector (AF)</th></tr>
<tr><td rowspan="2">Agricultural</td><td>Irrigated agriculture</td><td>Estimated from land use map, crop evapotranspiration and irrigation efficiency in groundwater model, and surface water deliveries (less accurate)</td><td>250,200</td><td rowspan="2">252,400</td></tr>
<tr><td>GCID drought emergency wells (not used in Corning Subbasin)</td><td>Metered (more accurate)</td><td>2,200</td></tr>
<tr><td rowspan="5">Urban / Industrial</td><td>City of Corning</td><td>Metered (more accurate)</td><td>2,330</td><td rowspan="5">4,500</td></tr>
<tr><td>Hamilton City</td><td>Metered (more accurate)</td><td>350</td></tr>
<tr><td>Paskenta Reservation</td><td>Metered (more accurate)*</td><td>170</td></tr>
<tr><td>Industrial</td><td>Estimated value (less accurate)**</td><td>1,500</td></tr>
<tr><td>Small Water Systems</td><td>Estimated value (less accurate)**</td><td>150</td></tr>
<tr><td>Rural Residential</td><td>Private Domestic Wells</td><td>Estimated value (less accurate)**</td><td>250</td><td>250</td></tr>
<tr><td colspan="3">Total Groundwater Extraction (rounded to nearest 100 AF):</td><td colspan="2">257,200</td></tr>
</table>

* LACO Associates, 2019
**Value estimated during GSP development and not updated for this Annual Report.

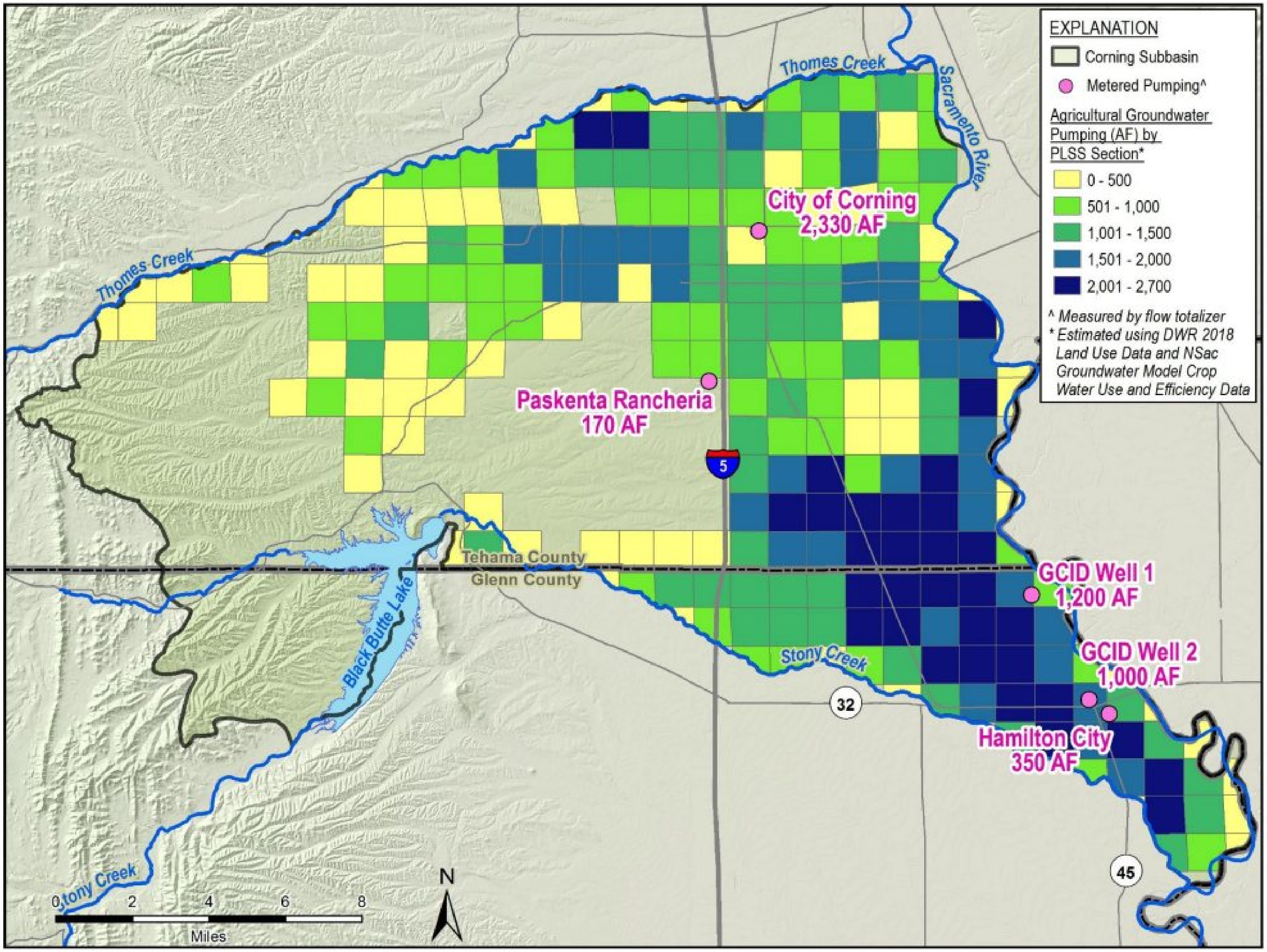


Figure 3-5. Groundwater Extraction, WY 2021

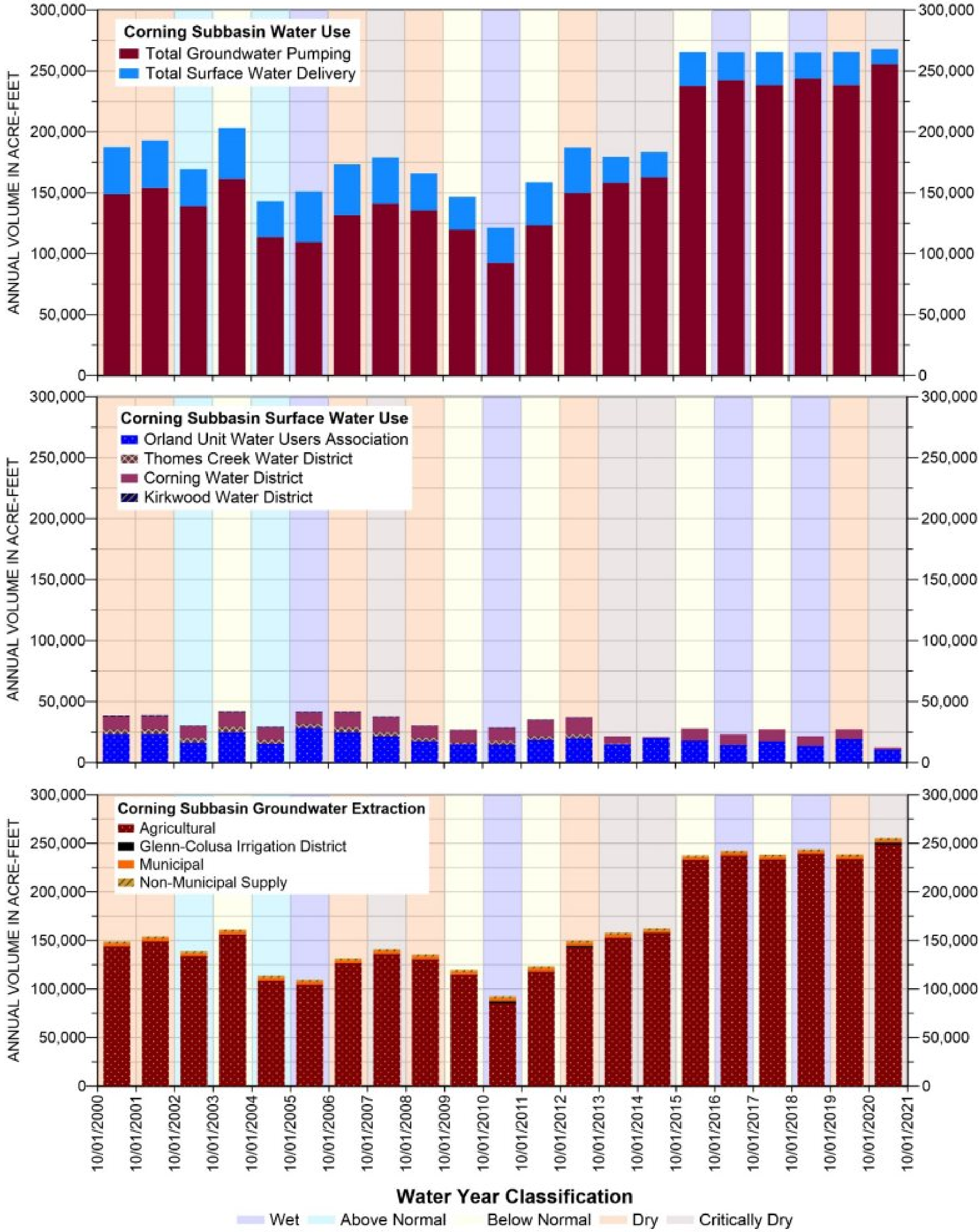


Figure 3-6. Water Use by Sector and Water Use Type, WY 2000 – 2021

3.2.1.1 Agricultural Extraction

3.2.1.1.1 Agricultural Extraction Estimation Method

WY 2021 agricultural water use is estimated for this Annual Report based on the most recent 2018 land use map available from DWR, crop water use data from the historical NSac Model, and surface water deliveries, as summarized in Appendix C. The approach yields a conservative (biased high) estimate for groundwater pumping per the assumptions below. The following general procedure and assumptions were used to estimate agricultural groundwater extraction:

- There are approximately 76,700 total acres of developed land mapped in the Subbasin by DWR on their 2018 land use map; 62,500 acres are irrigated crops and 14,200 acres are developed land that is not irrigated.
- The crop types from the DWR 2018 land use map are correlated to the crops simulated in the NSac Model to estimate approximate average crop evapotranspiration (ET) and irrigation efficiency. The amount of water from precipitation used by growers in lieu of pumping is too variable to estimate with accuracy, so is omitted from the calculation. The crop ET used to estimate water demand only considers ET from applied water sources.
- The approach assumes that all pasture is irrigated, which is a conservative assumption and likely overestimates water use. Pasture in areas with no surface water may practice dryland farming methods where little to no irrigation is applied.
- The approach does not account for deficit irrigation that some growers may employ, where only the minimum amount of water is applied when surface water is not available.
- In some areas, growers use surface water and groundwater to irrigate crops. Groundwater extraction for agriculture is calculated by subtracting measured surface water deliveries by agricultural water providers from the total agricultural water use within the surface water service areas. Note that diversions under riparian surface water rights are not included, further adding to a conservative estimate of groundwater extraction in the Subbasin.

GCID has 2 drought emergency wells that may be used to supply water to lands in the Colusa Subbasin during dry years with curtailed surface water availability. Groundwater extracted from these wells is measured and directly incorporated into the agricultural groundwater extraction totals.

3.2.1.1.2 Agricultural Extraction Summary

Since the GSP was prepared, groundwater pumping for irrigation has increased mainly because groundwater irrigated tree crops are expanding and replacing surface water irrigated hay crops and pasture. Additionally, surface water deliveries have decreased because of dry conditions and growers have become increasingly reliant on groundwater even in wet years when surface water is available.

The WY 2018 crop footprint requires about 261,000 AF/yr of water, which is supplied by groundwater pumping and surface water deliveries. Surface water deliveries in WY 2021 were smaller than any year in the historical record, totaling 12,300 AF (Section 3.2.2). Therefore, pumping for irrigation in the Subbasin in WY 2021 is approximately 252,700 AF. For comparison, annual agricultural pumping estimated from 1974 to 2015 in the current conditions NSac Model in the GSP ranges from 126,400 to 182,800 AF/yr with variation largely dependent on climate and surface water use. The 2 methods used for calculating agricultural water demands have different assumptions so may not be directly comparable.

GCID surface water allocations are severely curtailed in WY 2021, so the drought emergency wells were used by GCID to pump 2,200 AF of groundwater to meet irrigation demands in the Colusa Subbasin.

3.2.1.2 Urban and Industrial Extraction

Urban and industrial groundwater use is very small compared to the agricultural groundwater use in the Subbasin. Urban groundwater use data were compiled from the following municipal water systems and the Paskenta Reservation:

- City of Corning pumping from the Corning Public Utilities Department.
- Hamilton City pumping from the California Water Service Company.
- Paskenta Reservation pumping from supply wells.

Water use in the Subbasin's 3 main urban centers is consistent on an annual basis, making up about 1% of total water use. In WY 2021, the City of Corning pumped 2,330 AF and Hamilton City pumped 350 AF. Annual extraction for the Paskenta Reservation was 170 AF/yr when last estimated in 2019 (Laco Associates, 2019), as discussed in GSP Section 2.4.5. The locations and volumes of groundwater pumping for municipal and tribal use are shown on Figure 3-5.

Other unmetered groundwater pumping for public supply and industrial use is estimated for this Annual Report. There are 17 small water systems in the Subbasin that serve small, seasonal, or transient populations such as schools, mobile home parks, and rural commercial businesses. Small water system pumping volumes are not measured. Food processing industrial sites use groundwater sourced by private wells. Industrial sites do not measure groundwater use; therefore little is known about the total volume extracted for industrial use in the Subbasin. Estimated groundwater pumping for unmetered small water systems and industrial sites is approximately 1% of total water use.

3.2.1.3 Rural Residential Extraction

Rural residential, or domestic groundwater use is not measured. The GSP estimated that 2015 domestic pumping averaged 250 AF/yr, based on per-capita water use assumptions. There were approximately 1,850 domestic wells in the Subbasin in 2015 and approximately 131 new domestic wells have been installed from 2015 to 2021. It is not known how many of these were installed to replace older wells that are no longer used. The relatively small number of new domestic wells and unknown number of older wells that are no longer used, likely results in little to no change in groundwater extraction for rural residential use since the GSP was prepared. Rural residential extraction is about 0.1% of total groundwater pumping in the Subbasin.

3.2.2 Surface Water Supply

Surface water is only used consumptively for agriculture irrigation in the Subbasin. Surface water diversions and deliveries are measured by agricultural water providers. Measured diversions and deliveries follow standards described in the respective District Agricultural Water Management Plans (CH2M Hill, 2012; Davids Engineering, 2017; Davids Engineering, 2020). Surface water use data are compiled and summarized from the following sources:

- Surface water delivery data from the CVP Corning Canal recorded by the Corning WD and Thomes Creek WD (Corning WD occasionally receives transfers from other CVP contractors)
- Surface water delivery data from the Orland Project Northside Distribution System recorded by the OUWUA
- Surface water diversion data from the Hamilton City Sacramento River diversion to the Glenn Colusa Canal recorded by GCID

Surface water from the Tehama-Colusa Canal is not currently used in the Subbasin, as Kirkwood WD has not used their surface water allocations in recent years. Thomes Creek WD has also not delivered surface water for irrigation in recent years. Some small diversions are made under riparian and appropriative water rights, but the total diversions are negligeable compared to diversions by agricultural water providers. In WY 2021, approximately 548,000 AF is diverted from the Sacramento River in the Subbasin near Hamilton City and delivered to GCID lands in the Colusa Subbasin.

The WY 2021 total surface water delivery in the Subbasin is 12,200 AF as shown in Table 3-2. In OUWUA delivered 10,700 AF and Corning WD delivered 1,500 AF. 500 AF of the Corning WD supply was transferred from other CVP contractors. Surface water use over time is summarized on Figure 3-6. Surface water use in WY 2021 is substantially lower than the historical surface water deliveries in the Subbasin that ranged from 21,000 to 42,000 AF/yr in 2000 to 2020.

Table 3-2. Surface Water Use by Water District, WY 2021

Agricultural Water Provider	WY 2021 Surface Water Diversion or Delivery (AF)
OUWUA	10,700
Corning WD*	1,500
Thomes Creek WD	0
Total Surface Water Use Within Subbasin:	**12,200**

* Includes approximately 500 AF transferred to Corning WD from other CVP contractors

3.2.3 Total Water Use

Total water use is the sum of groundwater extractions and surface water deliveries. A table of total water use in WY 2021 summarizing water use by sector, water source type, the method of measurement, and accuracy of measurement is provided in Table 3-3. Total water use over time is summarized on Figure 3-6.

Total water use in the Subbasin in WY 2021 is about 269,400 AF. Water use since the GSP is estimated using a similar approach based on 2018 crop mapping, so is very consistent annually between WY 2016 and 2021 (Figure 3-6). Total water use from WY 2000 to 2015 estimated using the NSac Model ranged from 121,300 to 203,200 AF/yr. As previously stated, the assumptions used for both water use estimation methods are different, so the results are not strictly comparable.

Table 3-3. Total Water Use by Sector, WY 2021

Water Use Sector	Agency or Water Use Type	Measurement Method and Relative Accuracy	Water Use (AF)	Total Water Use by Sector (AF)
Agriculture	Irrigated agriculture - groundwater	Estimated from land use map, crop ET and irrigation efficiency in groundwater model, and surface water deliveries (less accurate)	250,200	264,600
	Irrigated agriculture – surface water	Reported by agricultural water providers	12,200	
	Groundwater extracted by GCID in Corning Subbasin used for irrigation in Colusa Subbasin	Metered (more accurate)	2,200	
Urban / Industrial	City of Corning	Metered (more accurate)	2,330	4,500
	Hamilton City	Metered (more accurate)	350	
	Paskenta Reservation	Estimated for GSP (less accurate)	170	
	Small Water Systems	Estimated for GSP (less accurate)	150	
	Industrial	Estimated for GSP (less accurate)	1,500	
Rural Residential	Private Domestic Wells	Estimated for GSP (less accurate)	250	250
Total Water Use (rounded to nearest 100 AF):			**269,400**	

3.3 Change in Groundwater Storage

Change in groundwater storage is a measure of how much water is gained or lost from the Subbasin principal aquifer during the water year. Change in groundwater storage is assessed in the GSP using the historical NSac Model through WY 2015. Change in groundwater storage is estimated for WY 2015 through WY 2021 for this Annual Report using groundwater elevation data from DWR. Change in storage will be reassessed using the updated Nsac groundwater model during the 5-year GSP update and preliminary values presented in the Annual Report will be refined.

3.3.1 Method for Estimating Change in Groundwater Storage

Annual change in groundwater storage from fall 2014 through fall 2020 is estimated from the difference between annual groundwater elevation contours available on DWR's SGMA Data Viewer (Figure 3-1; Appendix C). Because groundwater elevation contours do not extend across the entire Subbasin, the storage change was not calculated in the areas in the western portion of the Subbasin that are primarily rangeland and only have minimal domestic water use. The difference in aquifer volume between groundwater contours is calculated at annual intervals. The fall 2019 to 2020 change in groundwater elevation is shown on Figure 3-7.

Change in groundwater storage is calculated by multiplying the groundwater elevation change by a storage coefficient. The storage coefficient used in these calculations is 0.087. This coefficient was derived by equating the fall 2013 to 2015 change in storage from the Nsac model to the fall 2013 to 2015 groundwater elevation change. The storage coefficient is within the range of values used by DWR to estimate change in groundwater storage using a similar method in Bulletin 118 (DWR, 2020).

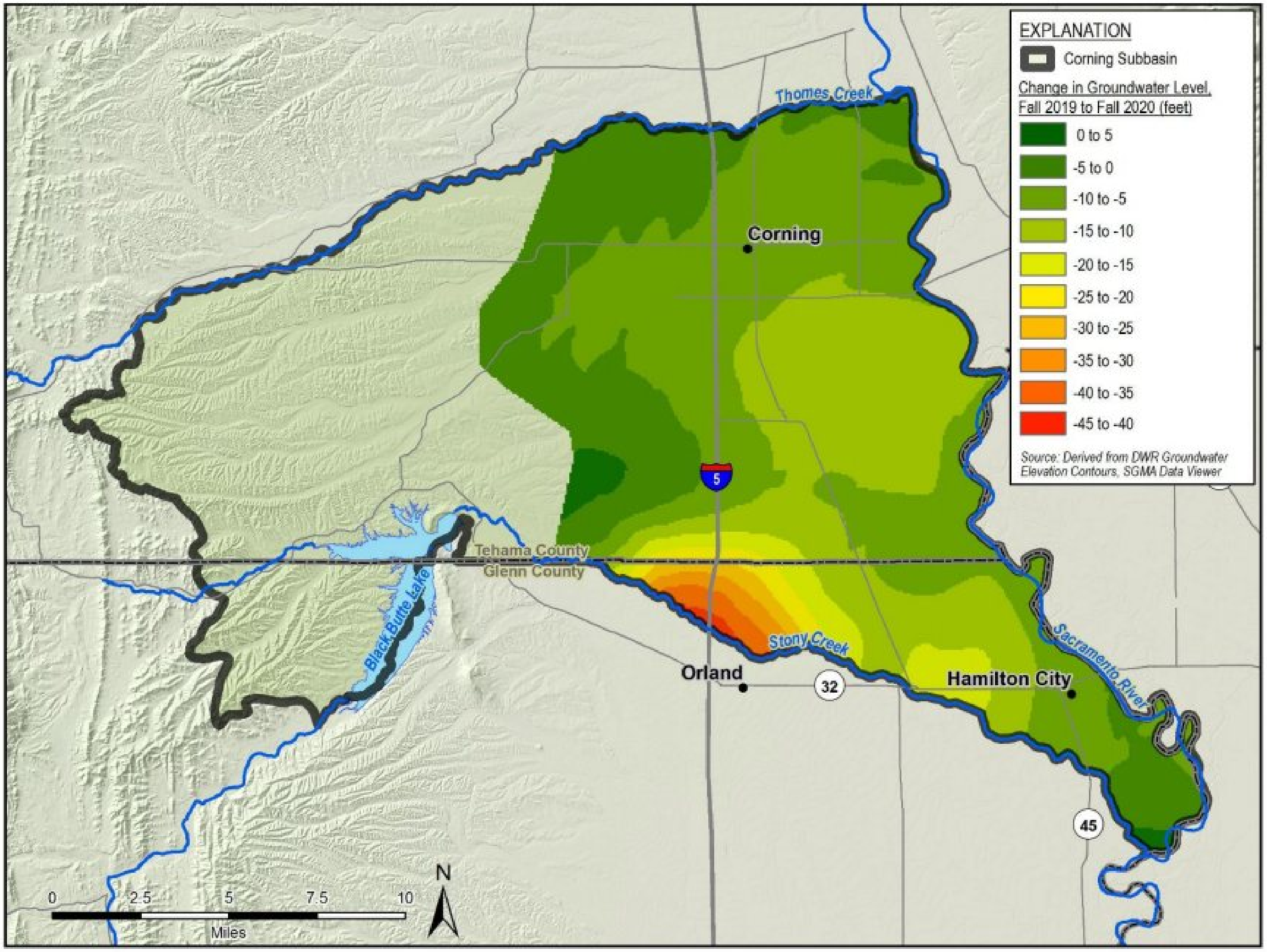


Figure 3-7. Change in Groundwater Elevation, Fall 2019 – 2020

3.3.2 Change in Groundwater Storage Conditions

Fall 2019 to 2020 change in groundwater storage was about -100,000 AF, which is the largest estimated storage decrease in the Subbasin since 1977. The annual change in groundwater storage between fall 2014 and fall 2019 ranged from 48,000 to -84,000 AF/yr, with positive storage changes occurring during wet years like 2017 and 2019 and negative storage changes occurring in dry and critically dry years like 2015 and 2020. A graph depicting water year type, annual change in groundwater in storage, and cumulative change in groundwater in storage for the Subbasin from fall 2014 through fall 2020 is shown on Figure 3-8. A map showing spatially where changes in groundwater storage occur between fall 2019 and fall 2020 is shown on Figure 3-9. Total water use over time, including groundwater pumping and surface water deliveries, is shown on Figure 3-6.

Between fall 2019 and 2020 groundwater elevations declined by at least 5 feet in nearly the entire Subbasin (Figure 3-7), correlating to storage decline up to 1 AF/acre (Figure 3-9). A large area south of the City of Corning and in most of the portion of the Subbasin in eastern Glenn County had groundwater elevation declines up to 15 feet and storage decline between 1 and 2 AF/acre. The greatest groundwater elevation declines are up to 45 feet in a small area on the Colusa Subbasin border north of Orland, correlating to storage decline up to 4 AF/acre. Based on review of the data, the large storage change mapped north of Orland appears to be related more to DWR groundwater elevation mapping assumptions than an actual groundwater elevation decrease. Fall groundwater elevation maps included as Figure 3-1 and in Appendix C show relatively high variability in groundwater elevations measured in wells and depicted in contours derived by DWR in the Stony Creek fan area. Groundwater elevation contour variability causes greater error in the method used to calculate groundwater storage change.

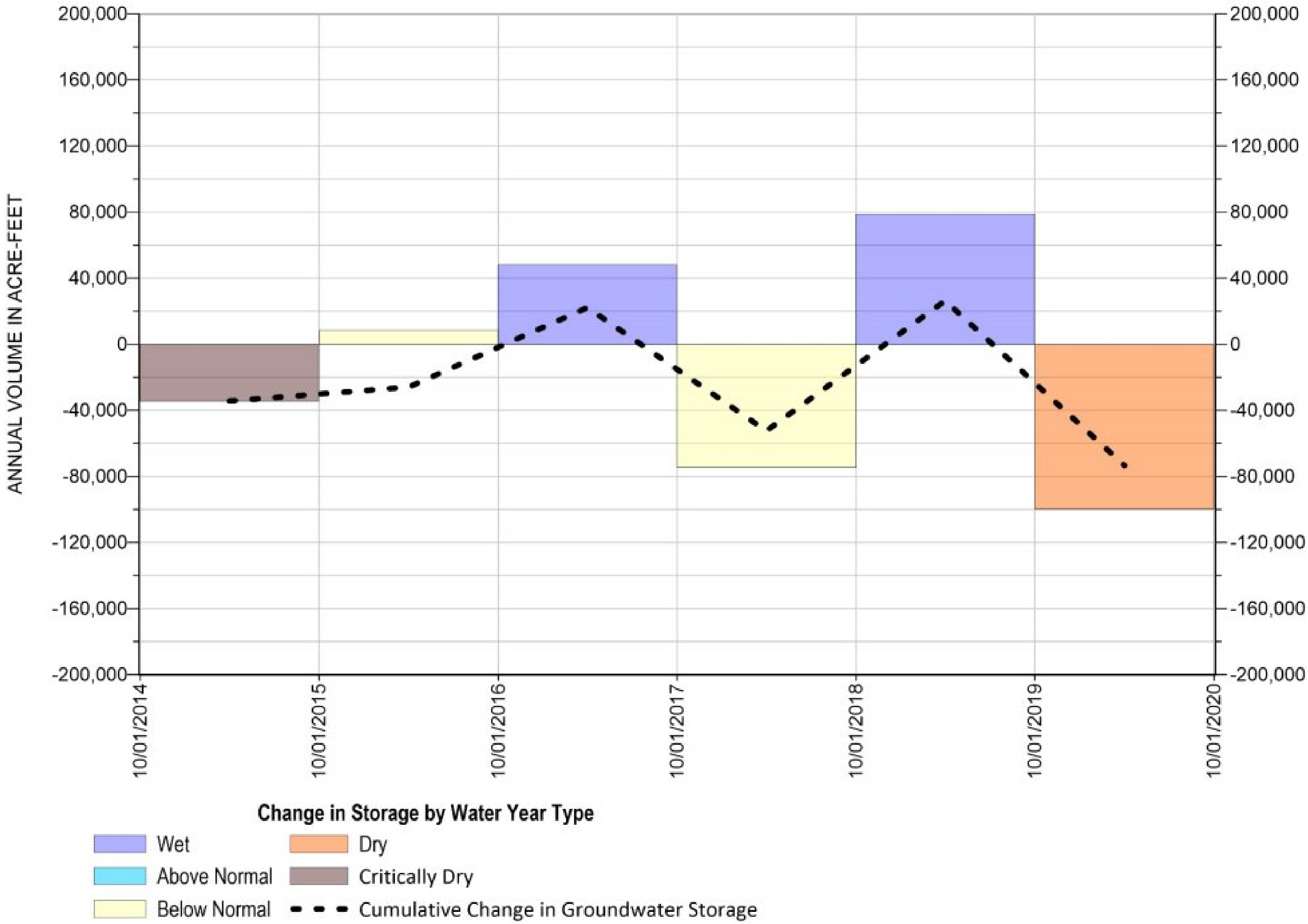


Figure 3-8. Cumulative Change in Groundwater Storage, Fall 2015 – 2020

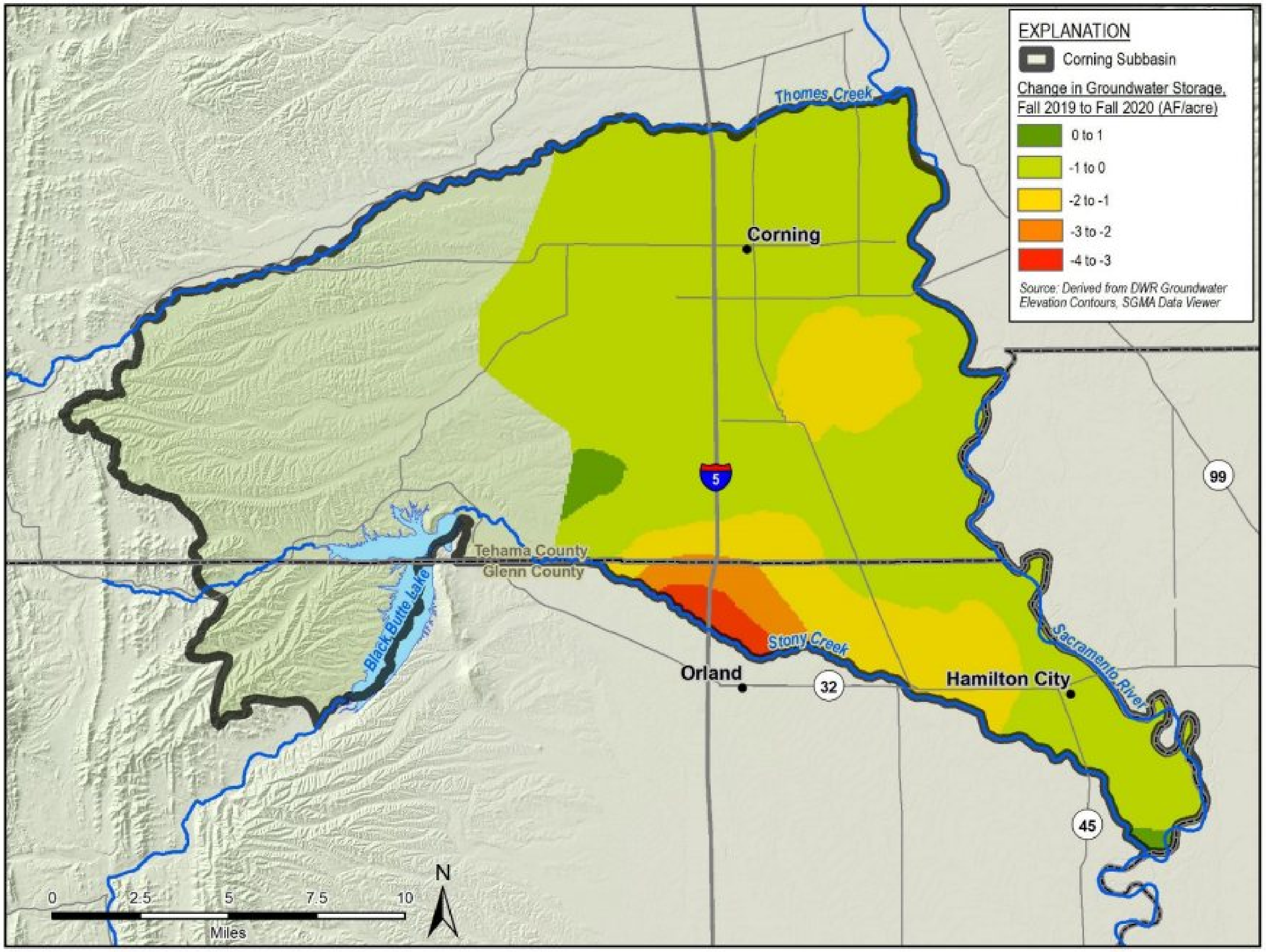


Figure 3-9. Change in Groundwater Storage, Fall 2019 – 2020

3.4 Groundwater Quality

3.4.1 Groundwater Quality Monitoring Network

Groundwater quality in the Subbasin is suitable for all beneficial uses and there are no regionally extensive point-source contaminant plumes. The primary regional groundwater quality concerns are salinity (monitored as total dissolved solids [TDS] and electrical conductivity [EC]), nitrate, and arsenic. There are other analytes that are monitored for drinking water quality program compliance that are either not detected or are well below applicable drinking water standards.

Groundwater quality data collected by other agencies are made available, compiled in the DMS, and reviewed for the Annual Report. Groundwater quality monitoring data is available for public supply wells through the State Water Resources Control Board Division of Drinking Water, the Regional Water Quality Control Board (RWQCB) Irrigated Lands Reporting Program (ILRP), and the RWQCB Dairy Program. A subset of the DWR observation wells is periodically monitored by DWR for groundwater quality, but no recent monitoring data are available from this network.

3.4.2 Groundwater Quality Conditions

TDS concentrations measured in the Subbasin are typically less than half the 500 milligrams per Liter (mg/L) lower limit secondary maximum contaminant level (SMCL). Nitrate is the most commonly monitored constituent in wells in the Subbasin and the nitrate concentration in almost all samples are less than half the maximum contaminant level (MCL) of 10 mg/L for drinking water. Arsenic is not commonly monitored in the Subbasin, except for in public supply wells, and results reported are almost always less than the MCL of 0.01 mg/L.

In WY 2021 and other recent years, concentrations of sampled constituents are below drinking water standards, with exception of a single ILRP well that has been slightly greater than the nitrate MCL. It is not the GSA's responsibility to improve groundwater quality degradation that occurred prior to SGMA, and this location is addressed by RWQCB program oversight.

In WY 2021, TDS was only monitored in the City of Corning Fripp Street well (5210001-009) and the concentration is 209 mg/L. In WY 2020, the TDS concentration in Hamilton City well 01-01 was 280 mg/L and the City of Corning Peach Street well was 230 mg/L. TDS is monitored for the RWQCB Dairy program in 5 non-RMP wells in southern Tehama County. The most recent TDS concentrations in the RWQCB Dairy wells from WY 2020 are between 190 and 340 mg/L. EC, which is another measure for salinity, is monitored by Glenn County using water quality meters in 4 irrigation wells in the Subbasin. The EC readings in WY 2020 and WY 2021 are between 446 and 820 microsiemens per centimeter (µS/cm), which typically corresponds to TDS concentrations between 245 and 450 mg/L (Rusydi, 2018).

There are 62 nitrate results reported for public supply wells in WY 2020 and WY 2021. Nitrate concentrations range from less than the reporting limit of 0.4 mg/L to 5.27 mg/L. Other RWQCB programs that include nitrate monitoring in the Subbasin are ILRP and the Dairy Program. One ILRP well routinely monitored for nitrate has been slightly greater than the MCL in recent years. The most recent nitrate result for the ILRP well in WY 2020 remained above the MCL at 11 mg/L. Nitrate concentrations in RWQCB Dairy wells in WY 2020 are between 2.9 and 8.4 mg/L.

There are 11 arsenic results reported for public supply wells in WY 2020 and WY 2021. Arsenic concentrations ranged from less than the reporting limit of 0.002 mg/L to 0.0024 mg/L. Reported arsenic concentrations in WY 2021 are about 4 times less than the MCL of 0.01 mg/L. No other programs include routine arsenic monitoring.

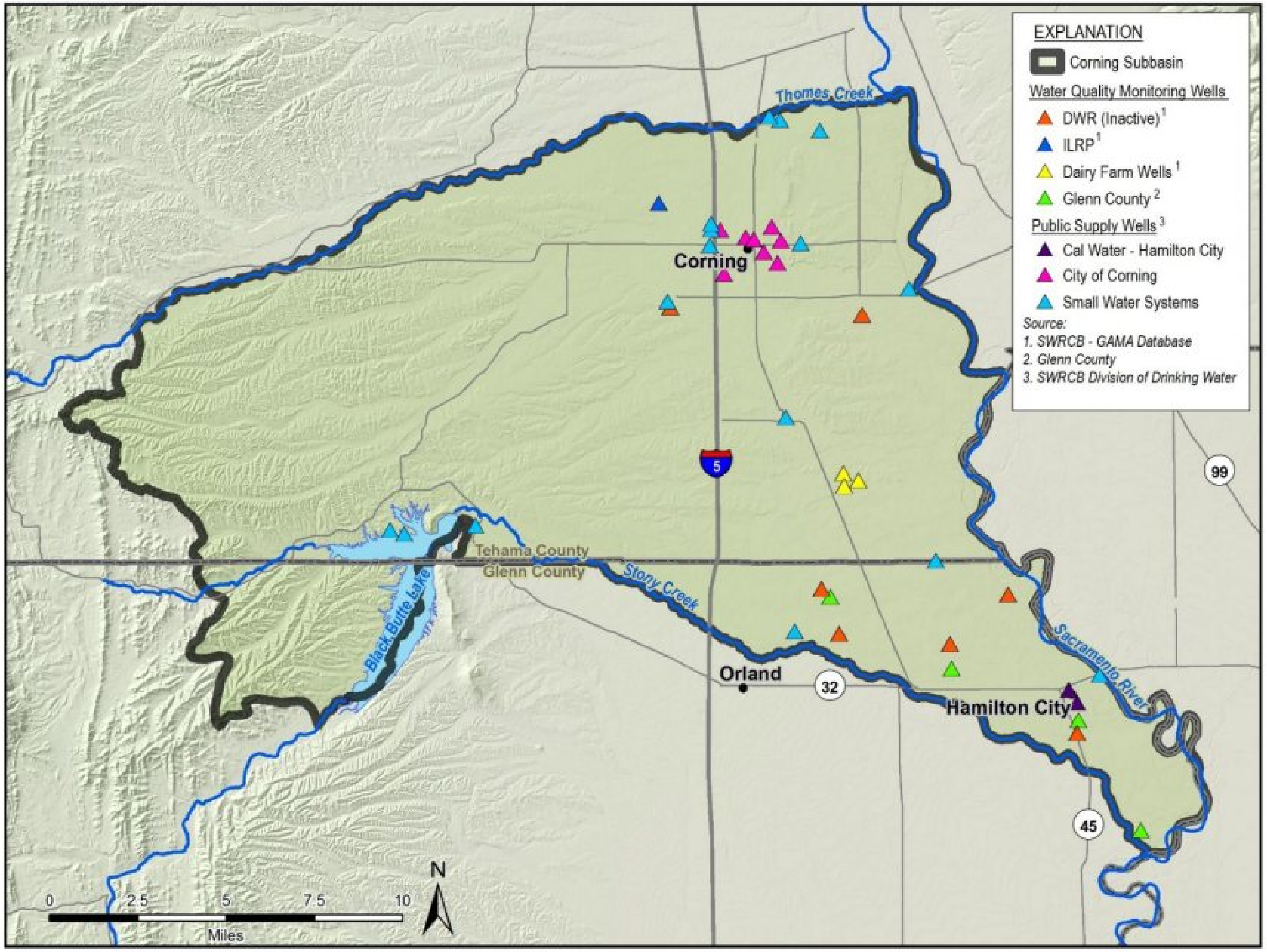


Figure 3-10. Groundwater Quality Well Monitoring Locations Within the Subbasin

3.5 Land Subsidence

Subsidence is historically measured by DWR in the Subbasin using several methods including Interferometric Synthetic-Aperture Radar (InSAR), extensometer, and by periodic elevation surveys at established benchmarks. In WY 2021 only InSAR and extensometer subsidence data were collected by DWR.

WY 2021 subsidence data show little to no inelastic subsidence in the Subbasin despite substantial groundwater level declines in some areas as discussed in Section 3.1. Land surface elevation change measured in WY 2021 using InSAR is within the +/- 0.1-foot measurement error range for the method (Figure 3-11). During GSP development, graphs of subsidence at the location with the greatest cumulative subsidence measured in the Sacramento Valley subsidence monitoring (benchmark 2966) were developed to show InSAR subsidence measurements over time. The WY 2021 land surface elevation near benchmark 2966 is within the error range for the measurement method in WY 2021 (Figure 3-12). The data show elastic subsidence of about 0.04 total feet during WY 2021 with slight land compaction in the summer offset by expansion in the summer.

Land displacement measured at an extensometer installed in a deep RMP groundwater elevation monitoring well 22N02W15C002M, also demonstrates elastic land surface change over a long-term measurement record even with declining groundwater elevation (Figure 3-13). During WY 2021 the groundwater level at this RMP lowered more than any other year in the historical record, totaling about 40 feet. Despite the groundwater level declines, the land surface elevation remained stable, with cumulative lowering of about 0.02 total feet or ¼ inch.

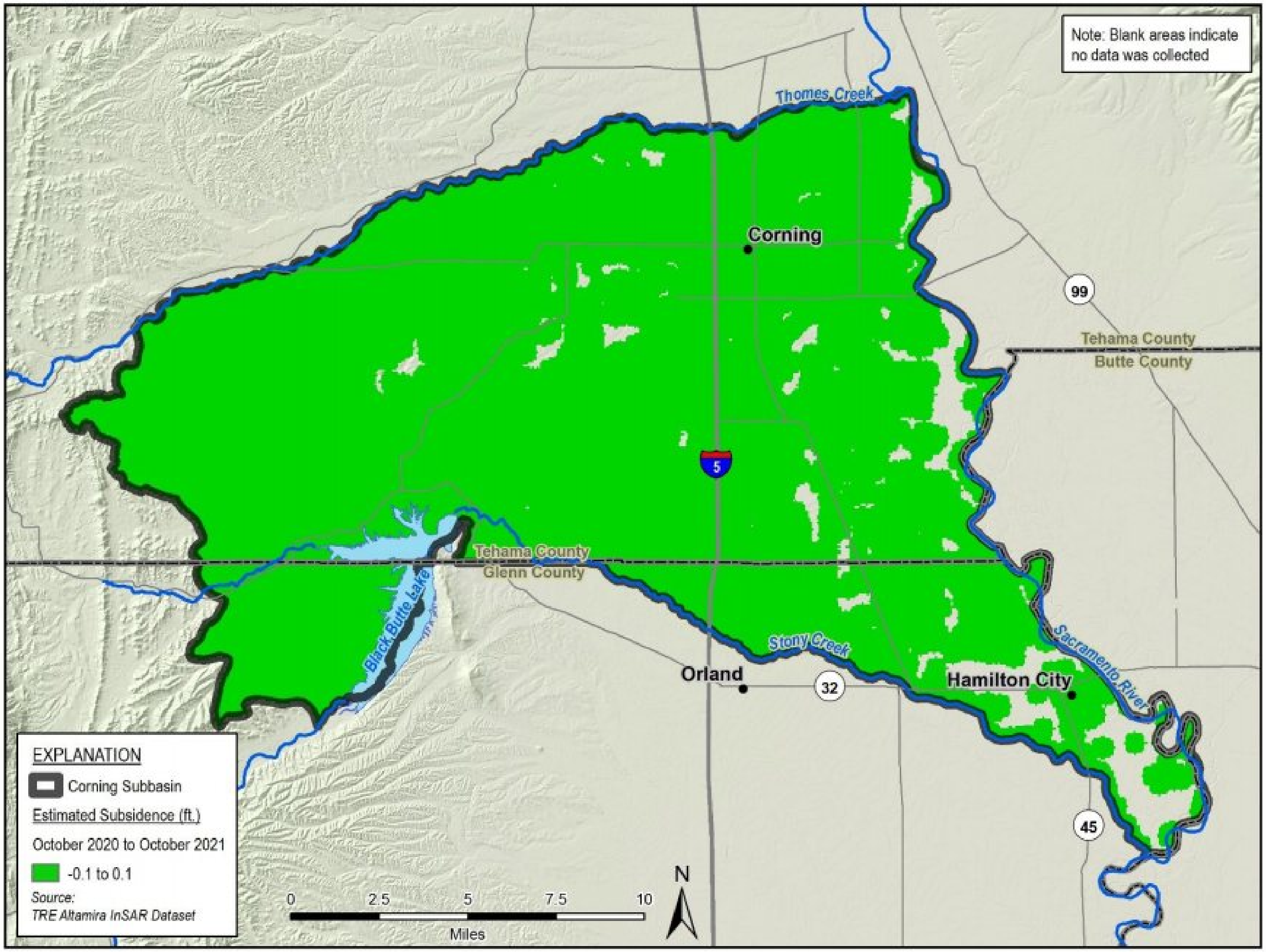
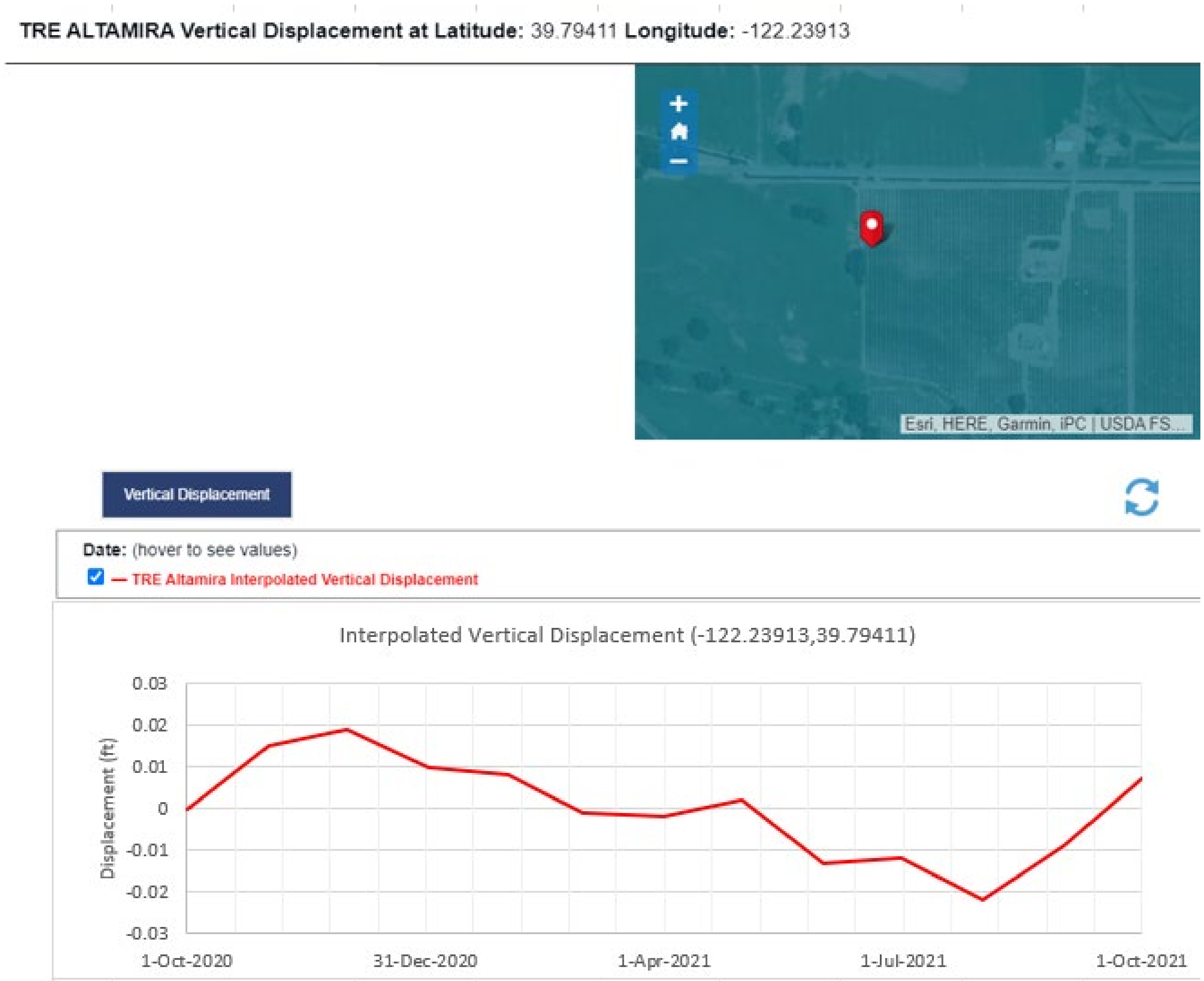


Figure 3-11. InSAR Subsidence, WY 2021



https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#gwlevels/

Figure 3-12. InSAR Subsidence Near Sacramento Valley Subsidence Benchmark 2966, WY 2021.

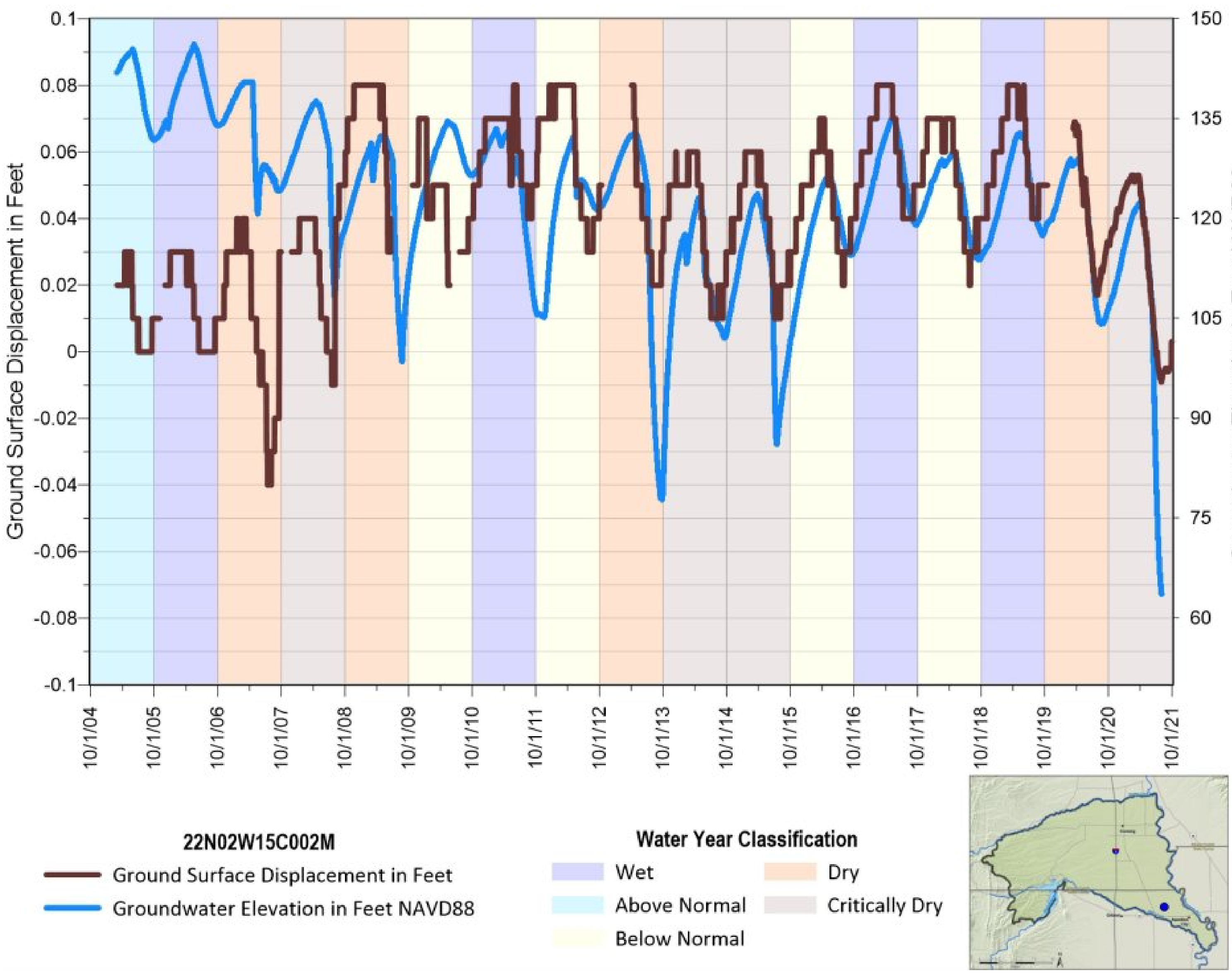


Figure 3-13. Extensometer 22N02W15C002M Ground Surface Displacement and Groundwater Elevation, WY 2004 – 2021

3.6 Interconnected Surface Water

3.6.1 Interconnected Surface Water Data

Depletion of interconnected surface water is assessed using groundwater levels as a proxy for stream depletion at a subset of shallow groundwater RMPs shown on Figure 3-14. Hydrographs providing groundwater level data over time are included in Appendix B and WY 2021 groundwater level data is summarized in detail in Section 3.1.

Stream gage data is collected by the Army Corp of Engineers, Bureau of Reclamation, and DWR and uploaded to the California Data Exchange Center (CDEC) database for the 5 gages shown on Figure 3-14. Stream stage data is provided in Appendix D.

There are data gaps for monitoring depletion of interconnected surface water that will be addressed in subsequent Annual Reports, as discussed in Section 4.2.4. The quantity and timing of interconnected surface water stream depletion is a data gap that will be resolved by 2025, per SGMA legislation.

3.6.2 Interconnected Surface Water Conditions

The Sacramento River is the primary stream connected to shallow groundwater in the Subbasin as discussed in Section 2.1. During high flow periods the Sacramento River is a losing stream and recharges shallow groundwater and during low flow periods the Sacramento River is a gaining stream and shallow groundwater discharges to the river. A representative hydrograph showing shallow groundwater elevations in RMP proxy location 22N02W01N003M near the Sacramento River is shown on Figure 3-15. This well shows seasonal groundwater level fluctuation with lower groundwater levels in dry years and recovery in wet years. The spring groundwater levels in WY 2020 and WY 2021 did not recover to levels observed in prior wet years, likely because conditions are dry.

Stony Creek is interconnected with groundwater and is highly dependent on releases from Black Butte Dam as discussed in Section 2.1. A representative hydrograph for an RMP well near Stony Creek (22N02W15C004M) is shown on Figure 3-16. Similar to the observation well near the Sacramento River, this RMP well shows seasonal groundwater level fluctuation with lower groundwater levels in dry years and recovery in wet years. The spring groundwater levels in WY 2020 and WY 2021 did not recover to levels observed in prior wet years, likely because conditions are dry.

Thomes Creek is likely disconnected from groundwater in most reaches except for where groundwater levels are potentially higher to the west where the creek flows into the Subbasin and to the east near its confluence with the Sacramento River.

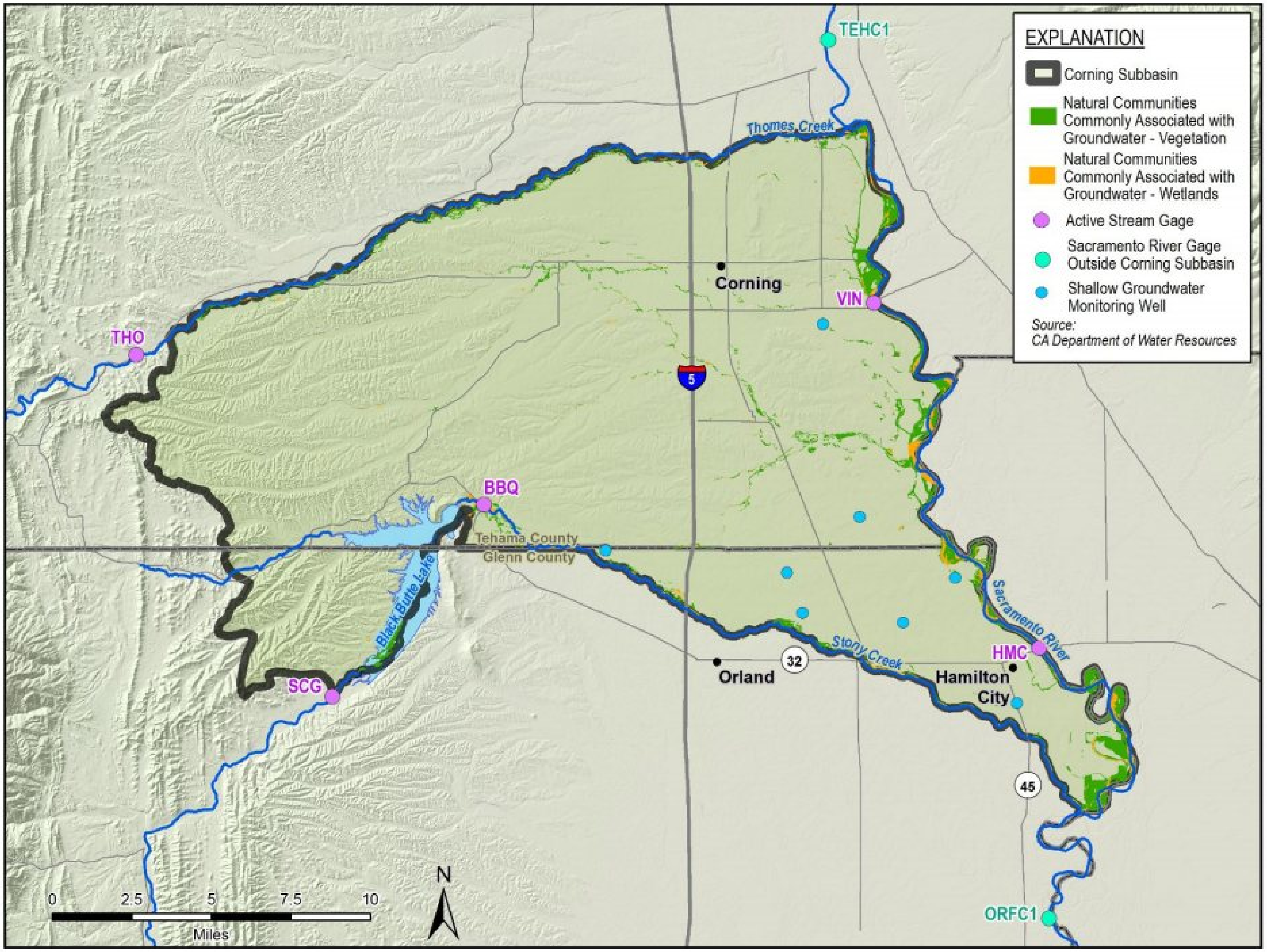


Figure 3-14. Interconnected Surface Water Monitoring Network

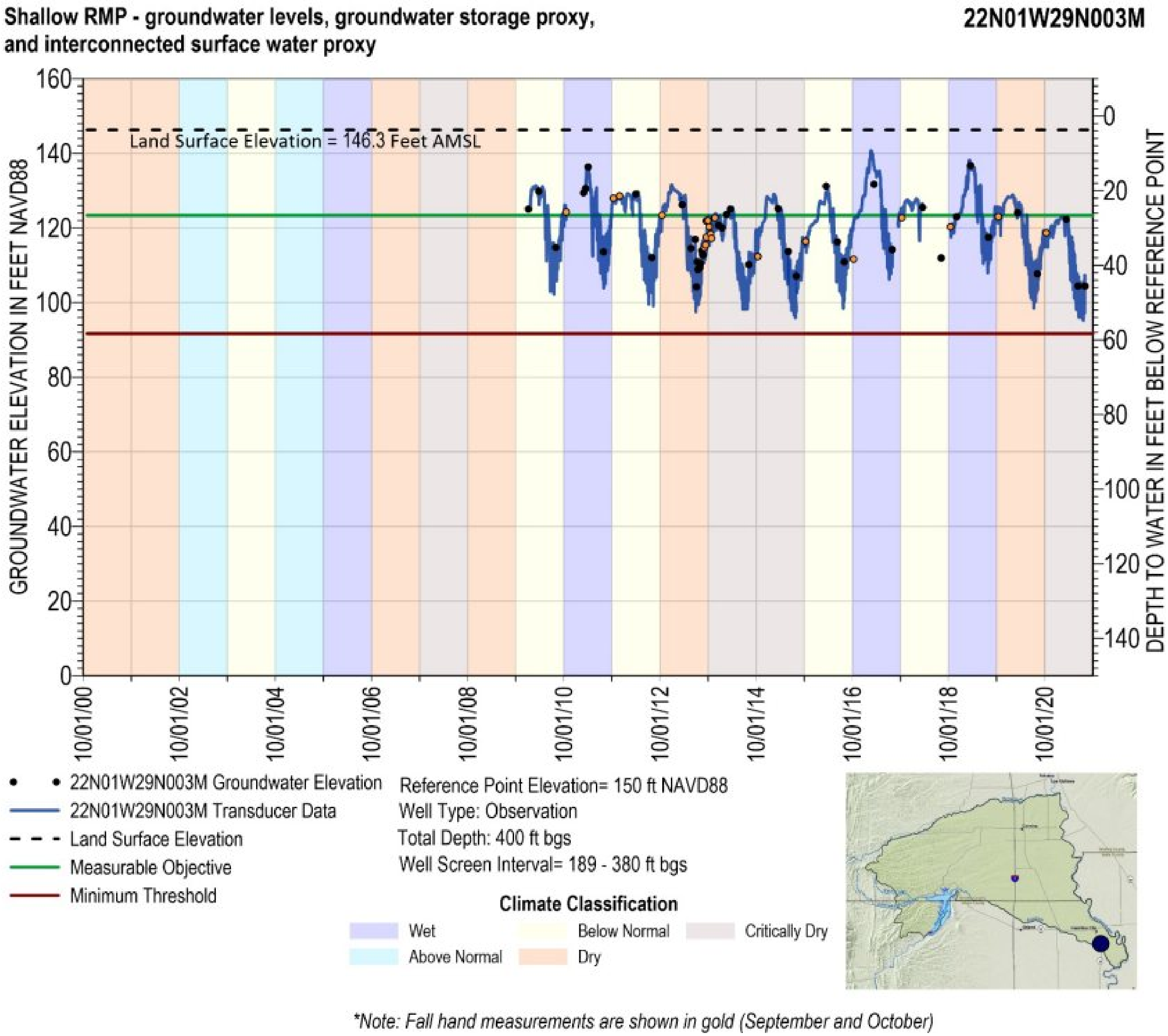
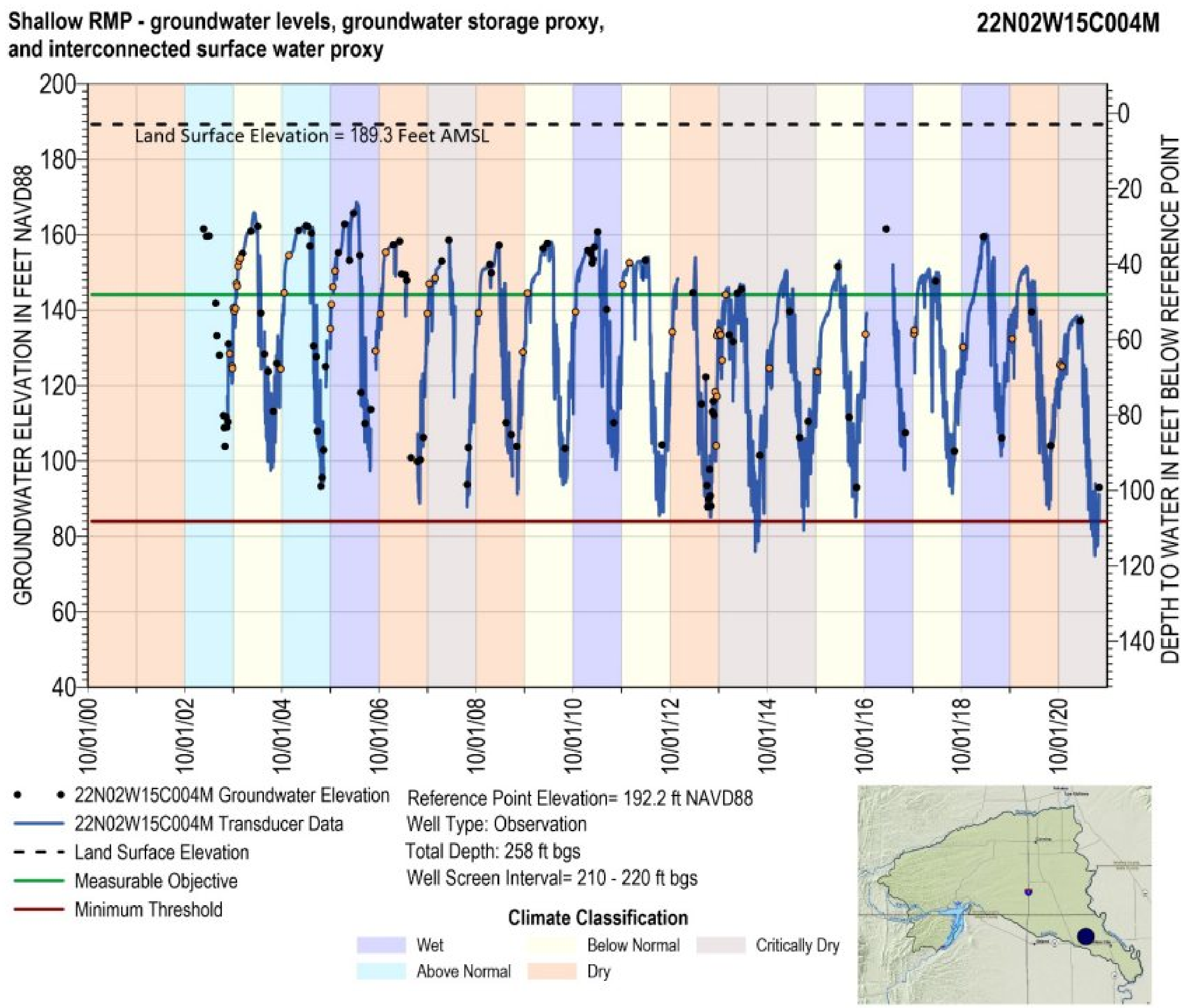


Figure 3-15. Representative Groundwater Level Hydrograph near Sacramento River (22N02W01N003M)



Note: Fall hand measurements are shown in gold (September and October)

Figure 3-16. Representative Groundwater Level Hydrograph near Stony Creek (22N02W15C004M)

4 ANNUAL PROGRESS TOWARDS IMPLEMENTING THE GSP

4.1 WY 2021 Groundwater Conditions Relative to SMC

Section 6 of the Corning Subbasin GSP includes descriptions of the SMC: the significant and unreasonable conditions, minimum thresholds, interim milestones, measurable objectives, and undesirable results for each of DWR's applicable sustainability indicators. The SMC are goals for the Subbasin based on local conditions, management considerations, advisory board input, public feedback, and direction from GSA staff. A brief comparison of the WY 2021 data and the SMC criteria are included for each sustainability indicator in the following sections.

The GSP is developed to avoid undesirable results under average hydrologic conditions with long-term, deliberate groundwater management. Groundwater levels or changes in groundwater storage that exceed minimum thresholds when conditions are dry but are able to recover in wet years do not constitute an undesirable result. As stated in the SMC Best Management Practice (DWR, 2017), "Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods."

WY 2021 was critically dry and WY 2020 was dry. Minimum thresholds have not been exceeded at this early stage of GSP implementation, but if drought conditions continue, undesirable results could occur. Areas with declining groundwater level trends during this current dry period will be monitored for recovery when wetter conditions prevail.

4.1.1 Chronic Lowering of Groundwater Levels SMC

Chronic lowering of groundwater levels is significant and unreasonable if it results in insufficient water supply to meet the needs of beneficial users in the Subbasin. Fall groundwater elevations in are compared to the SMC to identify any minimum threshold exceedances and progress to reaching measurable objectives. Spring 2021 groundwater level data is included in data tables to evaluate seasonal groundwater recovery relative to SMC, but these data are not used to identify minimum threshold exceedances. Groundwater level SMC are assessed at 35 shallow RMPs typically screened from 100 to 450 feet bgs and 19 deep RMPs, typically screened deeper than 450 feet bgs.

4.1.1.1 Minimum Thresholds

The minimum threshold for chronic lowering of groundwater levels is the groundwater elevation indicating a depletion of supply at a given location that may lead to undesirable results.

Minimum thresholds were established as follows, based on groundwater level trends identified in the GSP:

- *For wells that had recent historical (between 2010 and 2019) stable groundwater elevations (stable wells): Minimum fall groundwater elevation since 2012 minus 20-foot buffer*
- *For wells that had recent historical (between 2010 and 2019) declining groundwater elevations (declining wells): Minimum fall groundwater elevation since 2012 minus 20% of minimum groundwater level depth.*

There are some exceptions to these definitions described in the GSP for wells with shorter historical records.

Fall 2020 and spring 2021 groundwater elevation data and SMCs for each RMP well are provided in Table 4-1. Seasonal low groundwater elevation measurements in fall 2020 and seasonal high groundwater elevations measurements in spring 2021 are mapped for shallow and deep RMPs on Figure 4-1 through Figure 4-4. In fall 2020, no wells exceed the minimum thresholds defined in the GSP.

Groundwater levels in August 2021 are lower than other historical measurements in many wells, and in some cases exceed the minimum threshold. Groundwater level recovery in fall 2021 will be reviewed and assessed in the WY 2022 Annual Report.

Table 4-1. Chronic Lowering of Groundwater Levels RMP Data and SMC, WY 2021

State Well Number	RMP Network	Fall 2020 Minimum Groundwater Elevation (ft NAVD88)	Spring 2021 Maximum Groundwater Elevation (ft NAVD88)	Minimum Threshold (ft NAVD88)	2027 Interim Milestone (ft NAVD88)	Measurable Objective (ft NAVD88)
21N01W04N001M	Shallow	--	111.1	89.3	113.5	116.1
22N01W19E003M	Shallow	--	128.0	97.7	127.7	128.1
22N01W29N003M	Shallow	118.6	122.3	91.7	123.2	123.4
22N02W01N003M	Shallow	126.3	132.0	99.3	133.2	136.5
22N02W15C004M	Shallow	125.1	137.2	84.0	135.4	144.1
22N02W18C003M	Shallow	148.7	161.1	131.6	147.6	148.4
22N03W01R002M	Shallow	142.1	159.4	123.6	143.9	143.9
22N03W05F002M	Shallow	189.9	199.3	177.9	199.7	204.5
22N03W06B001M	Shallow	264.8	242.9	238.0	253.5	264.1
22N03W12Q003M	Shallow	--	177.2	163.2	174.8	174.8
23N02W16B001M	Shallow	--	138.0	98.4	132.8	135.3
23N02W28N004M	Shallow	129.5	144.3	104.3	139.3	142.7
23N02W34A003M	Shallow	131.1	139.8	109.2	135.1	135.5
23N02W34N001M	Shallow	133.9	142.7	111.8	145.9	145.9
23N03W04H001M	Shallow	200.4	--	180.4	194.0	194.0
23N03W13C006M	Shallow	133.6	149.1	123.1	145.3	145.6
23N03W16H001M	Shallow	189.9	190.7	174.3	193.4	193.4
23N03W22Q001M	Shallow	145.0	157.2	129.9	152.7	152.7
23N03W24A003M	Shallow	128.2	147.5	118.6	137.4	137.4
23N03W25M004M	Shallow	138.9	151.8	122.7	150.3	150.3
24N02W17A001M	Shallow	168.9	166.7	150.9	170.9	170.9
24N02W20B001M	Shallow	--	--	150.3	173.3	173.4
24N02W29N003M	Shallow	140.1	162.0	123.2	146.9	158.1
24N03W02R001M	Shallow	--	197.0	172.6	188.6	188.6
24N03W03R002M	Shallow	207.2	220.9	192.8	207.3	207.3
24N03W14B001M	Shallow	190.0	207.8	175.5	195.3	195.3
24N03W16A001M	Shallow	202.4	214.2	182.6	200.7	200.7
24N03W17M001M	Shallow	--	218.8	190.5	216.3	216.3
24N03W24E001M	Shallow	175.4	188.6	136.7	169.2	169.2
24N03W26K001M	Shallow	189.5	204.6	172.6	191.1	191.1
24N03W29Q001M	Shallow	202.0	214.4	179.3	210.5	211.6
24N03W35P005M	Shallow	191.1	202.2	180.1	192.0	192.0
24N04W14N002M	Shallow	--	261.2	221.8	247.4	247.4
24N05W23L001M	Shallow	345.8	357.6	312.0	345.8	345.8
25N02W31G002M	Shallow	190.1	193.9	169.3	191.4	191.4
Glenn TSS Well	Shallow	--	--	237.5	262.8	262.8
Tehama CWT Well	Shallow	--	--	181.8	199.6	199.6
22N01W29N002M	Deep	108.9	119.4	77.2	120.0	121.9
22N02W01N002M	Deep	114.2	131.7	74.5	134.7	134.7
22N02W15C002M	Deep	107.2	121.8	57.7	119.7	121.6

State Well Number	RMP Network	Fall 2020 Minimum Groundwater Elevation (ft NAVD88)	Spring 2021 Maximum Groundwater Elevation (ft NAVD88)	Minimum Threshold (ft NAVD88)	2027 Interim Milestone (ft NAVD88)	Measurable Objective (ft NAVD88)
22N02W18C001M	Deep	89.1	105.8	63.5	90.4	90.4
22N03W01R001M	Deep	129.2	154.1	116.6	135.2	135.2
23N02W28N002M	Deep	109.7	132.4	100.0	127.1	133.9
23N03W07F001M	Deep	203.5	212.3	188.4	209.9	209.9
23N03W13C004M	Deep	108.8	136.5	107.2	126.7	131.1
23N03W17R001M	Deep	201.1	209.4	187.3	207.7	207.7
23N03W25M002M	Deep	131.3	150.4	111.6	145.3	151.5
23N04W13G001M	Deep	197.5	204.6	159.7	198.6	198.6
24N02W29N004M	Deep	138.4	160.2	124.9	147.0	155.5
24N03W17M002M	Deep	--	220.8	172.8	196.8	196.8
24N03W29Q002M	Deep	196.9	218.0	174.9	207.5	212.6
24N04W33P001M	Deep	215.6	232.1	183.5	227.7	240.0
24N04W34K001M	Deep	217.4	231.6	184.4	223.9	223.9
24N04W34P001M	Deep	217.5	231.6	183.5	214.3	214.3
24N04W36G001M	Deep	206.4	223.9	183.2	214.4	214.4
25N03W36H001M	Deep	180.0	189.6	160.9	183.3	183.3
Glenn TSS Well	Deep	--	--	149.3	184.0	184.0
Tehama CWT Well	Deep	--	--	160.3	186.1	186.1

Green cells show groundwater elevations that meet the measurable objective.

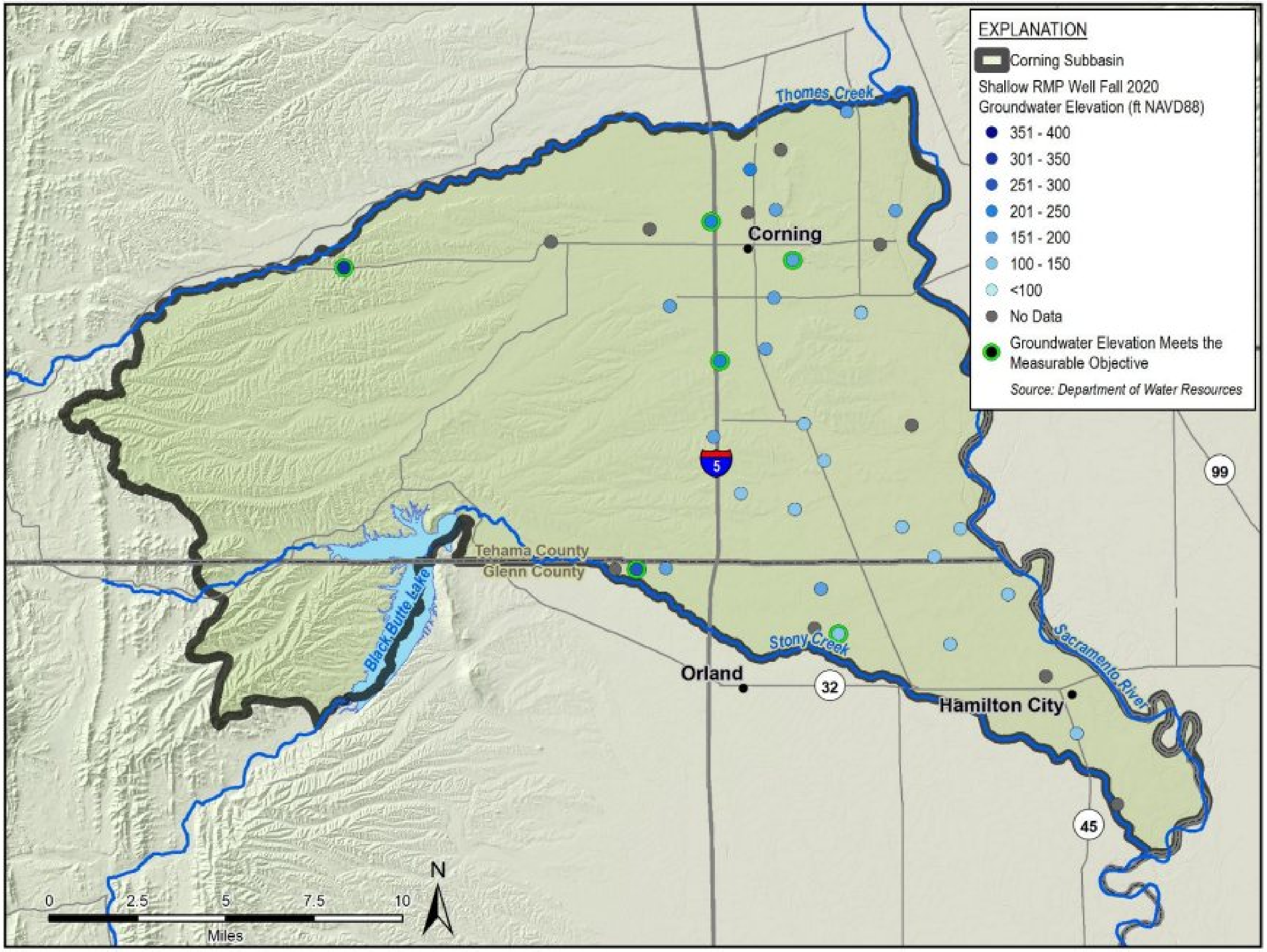


Figure 4-1. Groundwater Elevation in Shallow RMPs, Fall 2020

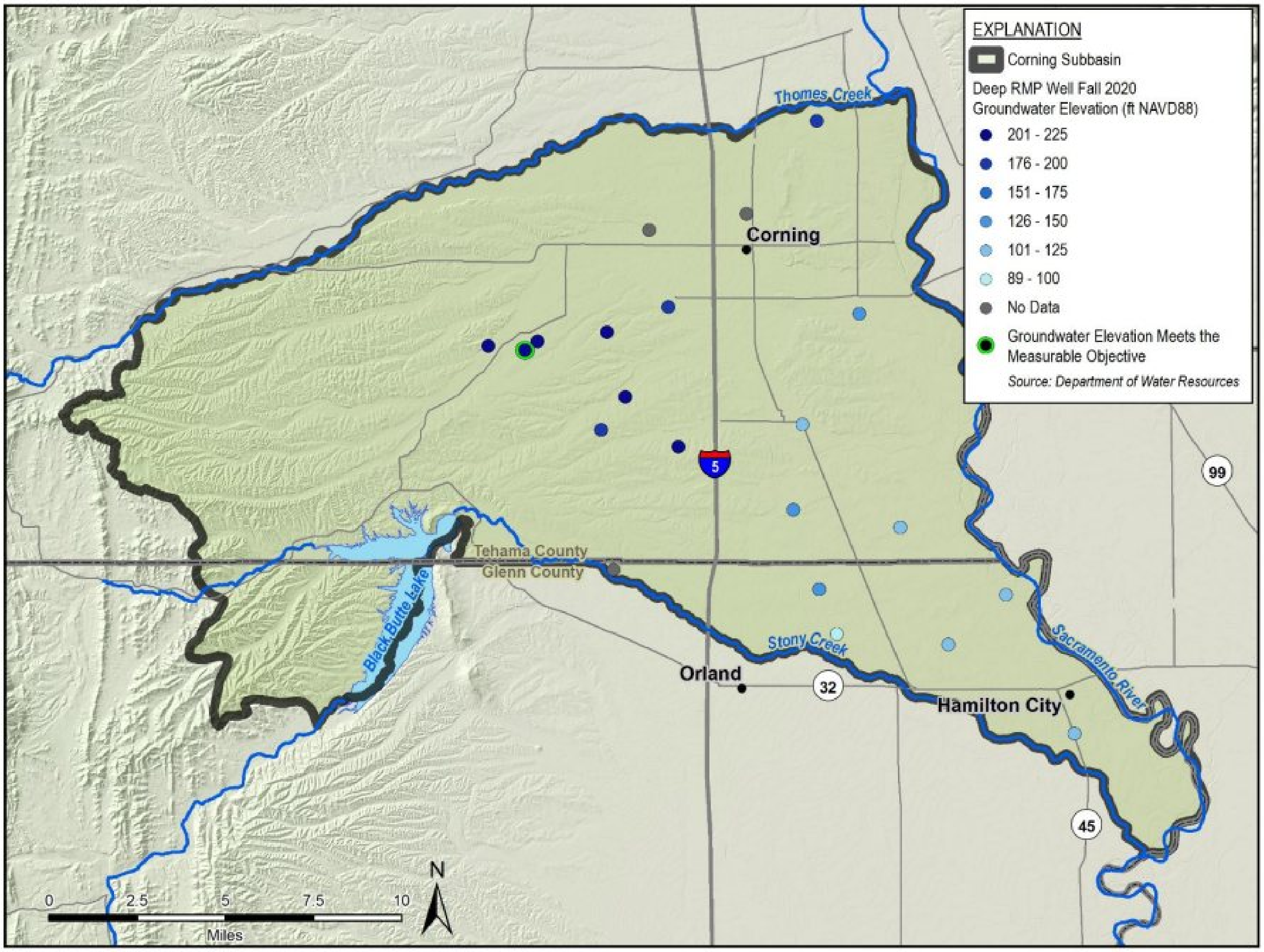


Figure 4-2. Groundwater Elevation in Deep RMPs, Fall 2020

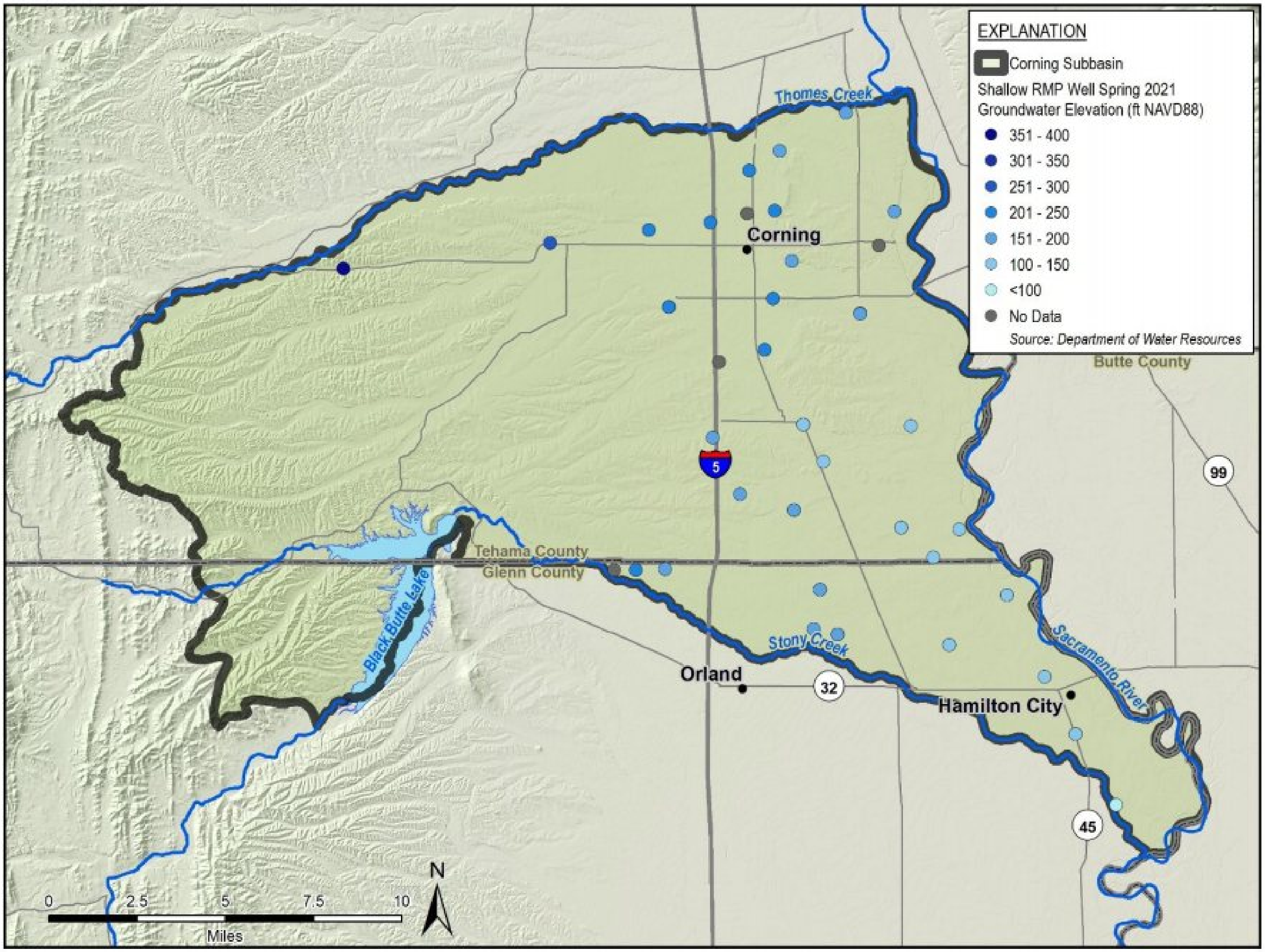


Figure 4-3. Groundwater Elevation in Shallow RMPs, Spring 2021

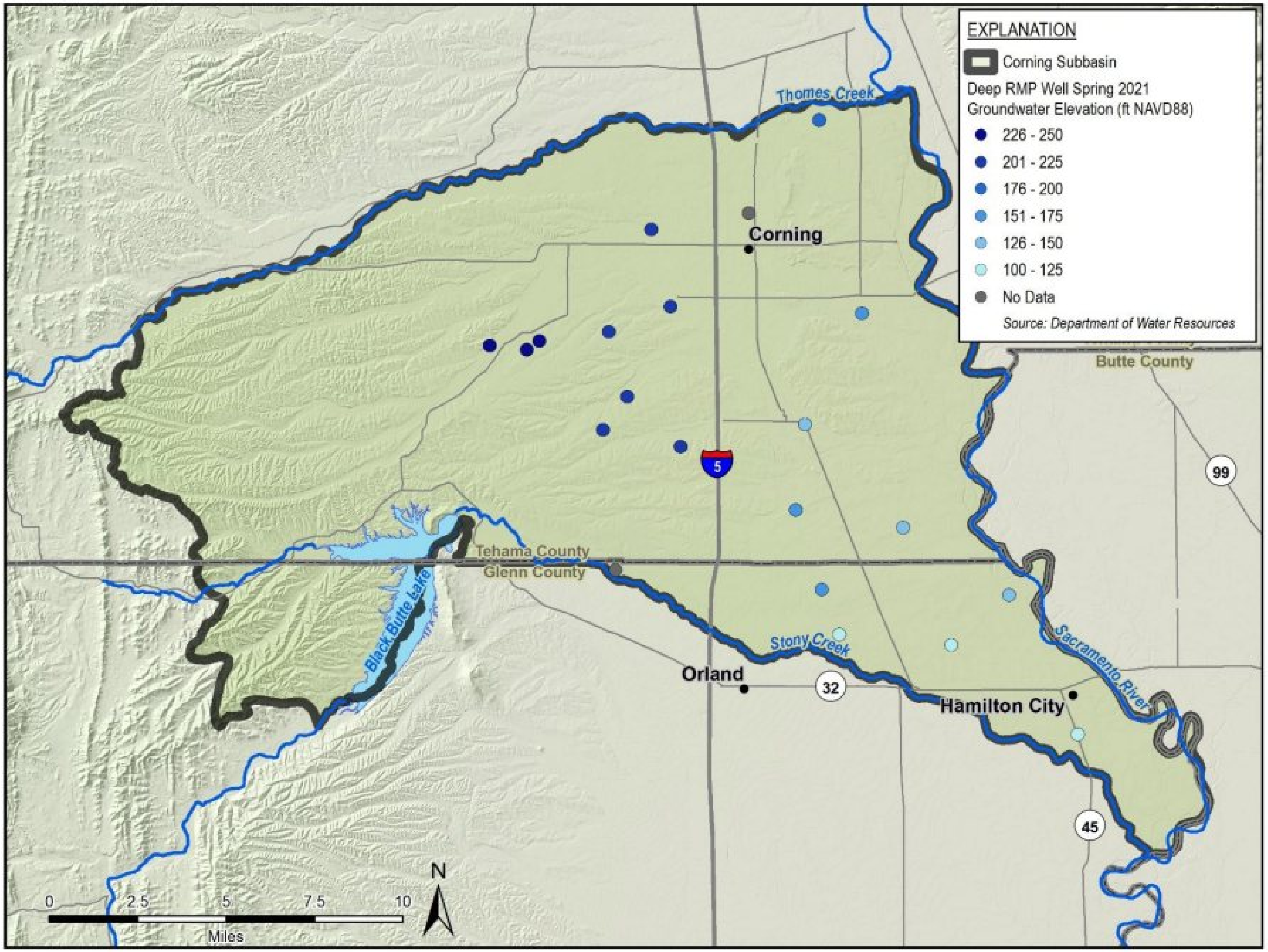


Figure 4-4. Groundwater Elevation in Deep RMPs, Spring 2021

4.1.1.2 Measurable Objectives and Interim Milestones

The measurable objectives for chronic lowering of groundwater levels represent target groundwater elevations that are higher than the minimum thresholds. These measurable objectives provide operational flexibility to ensure that the Subbasin can be managed sustainably over a reasonable range of hydrologic variability.

Measurable objectives were established as follows, based on groundwater level trends identified in the GSP:

- *For stable wells: maximum fall groundwater elevation since 2012*
- *For declining wells: maximum fall groundwater elevation in 2015*

Measurable objectives for the chronic lowering of groundwater levels are summarized in Table 4-1. Fall 2020 groundwater elevations in 7 wells (13%) are higher than the measurable objective as shown by the green cells in

Table 4-1. Although not strictly comparable to the measurable objectives per definitions in the GSP, 37 wells (69%) recovered to levels higher than the measurable objective in Spring 2021. Measurements that meet the measurable objective are displayed with a green halo around the well symbol for fall 2020 groundwater elevation figures (Figure 4-1 and Figure 4-2).

To track progress towards reaching measurable objectives, the GSP defined interim milestones at 5-year intervals. The 2027 interim milestones for groundwater elevations shown in Table 4-1 are often the same or similar to measurable objectives. Generally, wells that did not meet measurable objectives in WY 2021 are also less than 2027 interim milestones.

4.1.1.3 Undesirable Result

The chronic lowering of groundwater levels undesirable result is a quantitative combination of groundwater elevation minimum threshold exceedances. For the Subbasin, the groundwater elevation undesirable result is:

- *An undesirable result occurs when more than 20% of groundwater elevations measured at RMP wells, drops below the associated minimum threshold during 2 consecutive years.*
- *In addition, if the water year type (defined as the Sacramento Valley Water Year Index developed by DWR, per the calculation as used in 2021) is dry or critically dry then levels below the minimum threshold are not undesirable if groundwater management allows for recovery in average or wetter years.*

Since there are no minimum threshold exceedances in WY 2021, undesirable results are not occurring.

4.1.2 Reduction in Groundwater Storage SMC

4.1.2.1 Minimum Thresholds

The minimum thresholds for reduction in groundwater storage are measured using groundwater elevations; therefore, the minimum thresholds are identical to those described in Section 4.1.1.1.

4.1.2.2 Measurable Objective and Interim Milestones

The measurable objectives for reduction in groundwater storage are the same as those for groundwater elevations that are described in Section 4.1.1.2.

4.1.2.3 Undesirable Result

Undesirable results for reduction in groundwater storage are the same as those for groundwater elevations that are described in Section 4.1.1.3.

4.1.3 Degraded Groundwater Quality SMC

TDS is the only groundwater quality constituent with SMCs defined in the GSP. There are 15 public supply wells that are historically analyzed for TDS identified in the GSP as groundwater quality RMPs (Figure 4-5). Most public supply wells are not monitored for TDS annually, so the most recent TDS result is presented below.

4.1.3.1 Minimum Thresholds

A TDS minimum threshold was established in the GSP to protect public supply wells from exceeding the upper limit SMCL of 1,000 mg/L for TDS.

> *The minimum threshold for degraded groundwater for TDS is 750 mg/L at public supply wells.*

There were no exceedances of the minimum thresholds in WY 2021, or for the any of the most recent sample collected from the 15 RMPs, as shown in Table 4-2. The most recent TDS result in RMPs was 165 to 280 mg/L.

Table 4-2. Groundwater Quality RMP Data, WY 2021 or Most Recent

Program Site ID	Well Name	System Name	Most Recent TDS Measurement Date	Most Recent TDS Value (mg/L)
1110002-001	Well 01-01	Cal-Water Service Co – Hamilton City	6/24/2020	280
1110002-002	Well 02-01	Cal-Water Service Co – Hamilton City	4/23/2018	260
1110002-003	Well 02-02	Cal-Water Service Co – Hamilton City	7/15/2019	260
5200255-001	Well 01	Corning RV Park	9/12/2018	228
5200516-001	Well 01	Lazy Corral Mobile Home Park	7/12/2017	262
5200551-001	Well 01	Maywood Mobile Home Park	8/25/2010	220
5200556-001	Well 01	Woodson Bridge Mobile Home Park	5/23/2017	260
5210001-001	6th St Well	City of Corning	12/11/2019	196
5210001-002	Blackburn Ave Well	City of Corning	12/11/2019	214
5210001-003	Butte St Well	City of Corning	12/18/2019	209
5210001-005	Peach St Well	City of Corning	9/9/2020	230
5210001-008	Well 06 Edith Ave	City of Corning	12/18/2019	192
5210001-009	Fripp St Well	City of Corning	8/18/2021	209
5210001-010	Highway 99W Well	City of Corning	12/18/2019	165
5210001-019	Clark Park Well	City of Corning	5/16/2018	211

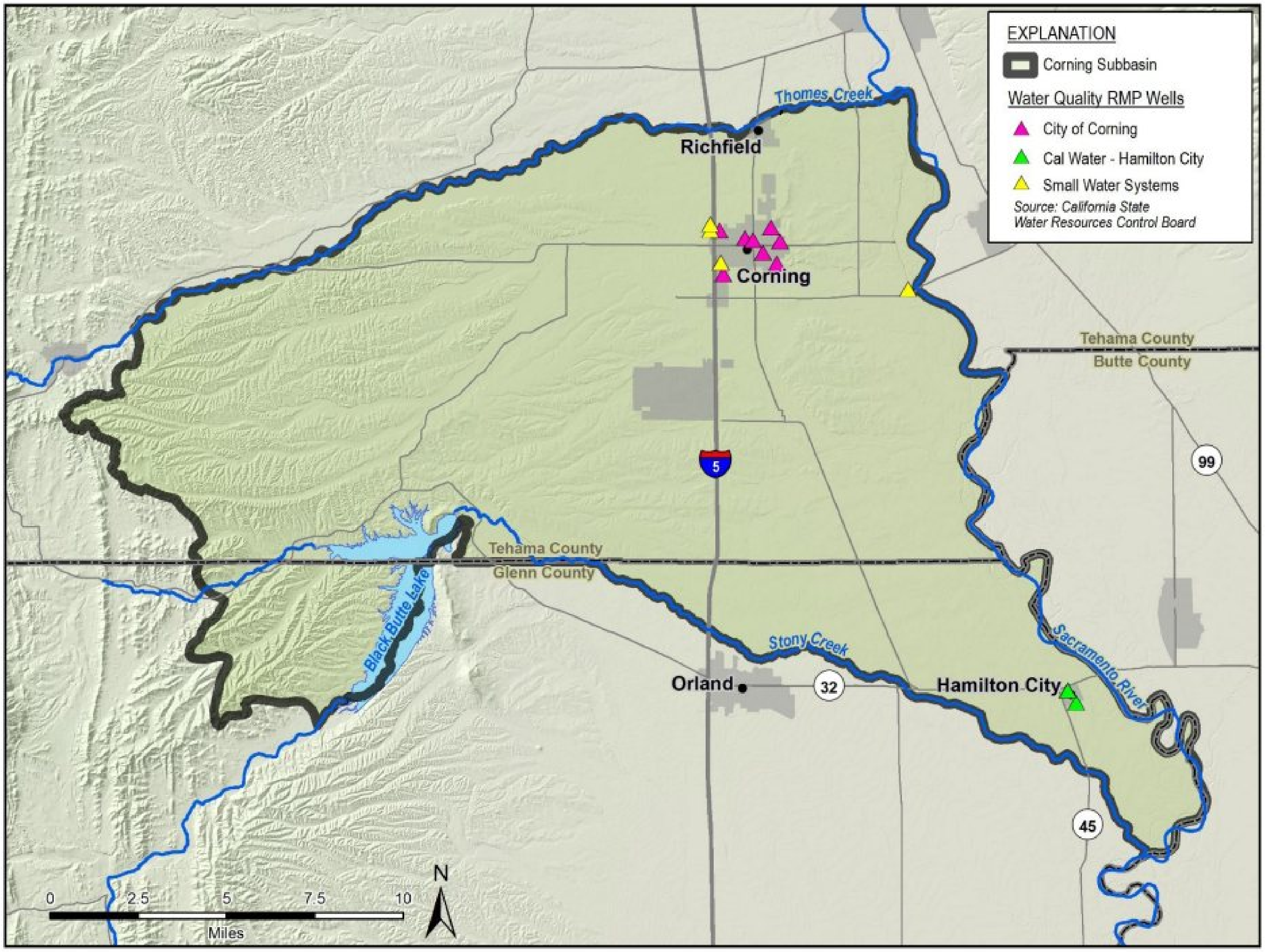


Figure 4-5. Groundwater Quality RMP Well Locations

4.1.3.2 Measurable Objectives and Interim Milestones

The measurable objective for groundwater quality represents target groundwater quality in the Subbasin.

> *The groundwater quality measurable objective is a TDS concentration of 500 mg/L measured in public supply wells.*

The measurable objective concentration is equal to the lower limit SMCL for TDS. This is the lowest regular threshold for TDS and is based on aesthetics for taste and odor. The measurable objectives are met in all monitored wells in WY 2021, or for the most recent sample collected from each RMP well, as shown in Table 4-2. Interim milestones are identical to the measurable objective.

4.1.3.3 Undesirable Result

The degradation of groundwater quality undesirable result is a quantitative combination of groundwater quality minimum threshold exceedances:

> *The Undesirable Result occurs when at least 25% of representative monitoring sites exceed the minimum threshold for water quality for 2 consecutive years at each location where it can be established that GSP implementation is the cause of the exceedance.*

Since there are no minimum threshold exceedances in WY 2021, undesirable results are not occurring.

4.1.4 Land Subsidence SMC

Subsidence data indicate little to no inelastic subsidence is occurring in the Subbasin in response to declines in groundwater elevation.

4.1.4.1 Minimum Thresholds

The minimum threshold for land subsidence is the rate and extent of subsidence that substantially interferes with surface land uses and may lead to undesirable results.

> *The minimum threshold for subsidence solely due to lowered groundwater elevations is no more than 0.5 foot of cumulative subsidence over a 5-year period (beyond the measurement error).*

The GSP describes factors that result in a 0.1-foot cumulative measurement error for InSAR measurements. As a result, cumulative InSAR measurements greater than 0.6 feet over a 5-year period is a minimum threshold exceedance. Subsidence measured in WY 2021 is less than

0.1 feet. If subsidence remains at this rate, it will not exceed the minimum threshold criteria (Figure 3-11). The cumulative 5-year subsidence from WY 2021 to 2026 will be evaluated in the first 5-year GSP update.

4.1.4.2 Measurable Objectives and Interim Milestones

The measurable objective for subsidence represents target subsidence rates in the Subbasin.

> *The measurable objective for inelastic subsidence solely due to lowered groundwater elevations is zero throughout the Subbasin, in addition to any measurement error.*

Land surface subsidence for WY 2021 is less than the measurement error of 0.1 feet and meets the measurable objective. The interim milestone is identical to the measurable objective.

4.1.4.3 Undesirable Result

The land subsidence undesirable result is a quantitative combination of subsidence minimum threshold exceedances.

> *Any exceedance of a minimum threshold is an undesirable result if the exceedance is irreversible and caused by lowering groundwater elevations.*

Since there are no minimum threshold exceedances in WY 2021, undesirable results are not occurring.

4.1.5 Depletion of Interconnected Surface Water SMC

4.1.5.1 Minimum Thresholds

The minimum thresholds for depletion of interconnected surface water are established by proxy using a subset of shallow groundwater elevation observation wells in the chronic lowering of groundwater levels and reduction in groundwater storage RMP networks. The minimum thresholds for depletion of interconnected surface water are the same as the minimum thresholds for the chronic lowering of groundwater levels for the subset of wells in both networks, as summarized in Table 4-3. There are no exceedances of the minimum threshold in WY 2021.

Table 4-3. Depletion of Interconnected Surface Water RMP Data and SMC, WY 2021

State Well Number	Fall 2020 Minimum Groundwater Elevation (ft NAVD88)	Spring 2021 Maximum Groundwater Elevation (ft NAVD88)	Minimum Threshold (ft NAVD88)	2027 Interim Milestone (ft NAVD88)	Measurable Objective (ft NAVD88)
22N01W29N003M	118.6	122.3	91.7	123.2	123.4
22N02W01N003M	126.3	132.0	99.3	133.2	136.5
22N02W15C004M	125.1	137.2	84.0	135.4	144.1
22N02W18C003M	148.7	161.1	131.6	147.6	148.4
22N03W01R002M	142.1	159.4	123.6	143.9	143.9
23N02W28N004M	129.5	144.3	104.3	139.3	142.7
24N02W29N003M	140.1	162.0	123.2	146.9	158.1
Glenn TSS Well	--	--	237.5	262.8	262.8

Green cells show groundwater elevations that meet the measurable objective.

4.1.5.2 Measurable Objectives and Interim Milestones

The measurable objectives for depletion of interconnected surface water are target groundwater elevations that are higher than the minimum thresholds. The measurable objectives for depletion of interconnected surface water are the same as the measurable objectives for the chronic lowering of groundwater levels for the subset of wells in both networks. The measurable objective and 2027 interim milestone values for each RMP well are provided in Table 4-3. One of 7 wells met the measurable objective in fall 2020. Although not strictly comparable to the measurable objectives per definitions in the GSP, groundwater levels in 4 of 7 wells met the measurable objective in spring 2021.

4.1.5.3 Undesirable Result

The depletion of interconnected surface water undesirable result is a quantitative combination of minimum threshold exceedances. The undesirable result for depletion of interconnected surface water is:

> *An undesirable result occurs if 20% of RMP wells exceed the minimum threshold during 2 consecutive years.*

Since there are no minimum threshold exceedances in WY 2021, undesirable results are not occurring.

4.2 WY 2021 GSP Implementation Activities

The GSP was adopted in December 2021 by both GSAs. Consequently, GSP implementation was not occurring during WY 2021 and started in January 2022. Future Annual Reports will document progress towards implementing the plan after the GSP was finalized. A few general activities summarized in the following sections were completed during WY 2021 to prepare for GSP implementation.

4.2.1 Funding Sources and Mechanism

In WY 2021 the GSAs refined the GSP implementation budget which was presented in the GSP. During GSP development, several potential options for funding were presented at Advisory Board meetings to local stakeholders and feedback was received on these initial options. The individual GSAs will continue discussions in WY 2022 with the goal of adopting funding mechanisms to fund GSP implementation that is suitable for their respective jurisdictions. Additionally, the GSAs will begin discussions on a cost-sharing mechanism for shared GSP implementation activities.

4.2.2 Stakeholder Engagement

GSP Section 2.16.4.3 and Appendix 2C included a detailed description and complete list of stakeholder meetings, outreach events, and Corning Subbasin Advisory Board (Advisory Board; CSAB) meetings through WY 2021. The events held in WY 2021 are compiled in Table 4-4 through Table 4-6.

Table 4-4. Stakeholder Engagement and Outreach Summary, WY 2021

Public Comment Opportunities	Objective of Public Comment Opportunity	Format for Engagement	Participating Stakeholders
Regional outreach meetings conducted by GSA staff (See Table 4-5**)**	Provide overview of the GSP process, invite them to participate in the CSAB meetings, and solicit initial interests and concerns	In-person Q&A and collection of public comments.	Private landowners Local government representatives Members of the public Paskenta Tribe
Public comment periods during CSAB meetings (See Table 4-6)	In accordance with the Brown Act, solicit public comment on all agenda items to inform CSAB recommendations to the GSAs. Public comment on items not on the agenda.	Mostly virtual meetings with 2-way videoconference interaction with public. Some hybrid meeting in-person with 2-way videoconference access with public. Solicitation of public comments and documentation in meeting summaries.	Private landowners: Westside landowners and ranchers, agricultural landowners Tribes: Paskenta Tribe Adjacent GSAs: in-basin and out-of-basin GSA members and consultants Local Government: Tehama and Glenn County local government representatives, City of Corning Other Organizations Glenn Farm Bureau Water Districts: Glenn-Colusa Irrigation District, Colusa Groundwater Authority, Tehama County Groundwater Commission, Stony Creek Water Master DWR: Various representatives

Public Comment Opportunities	Objective of Public Comment Opportunity	Format for Engagement	Participating Stakeholders
			Resources agency representatives: California Department of Fish and Wildlife (CDFW) and USBR Members of the public
CSAB Meetings Focused on Input on Draft GSP Sections (2) in Dec.2020, Jan. 2021	Solicit public comment and questions on the GSP process and content midway through the planning process. Public comment on items not on the agenda.	Virtual meetings with 2-way videoconference interaction with public. Solicitation of public comments and documentation in meeting summaries.	Private landowners: Westside landowners and ranchers, agricultural landowners Local Government: Tehama and Glenn County local government representatives, City of Corning Water and Groundwater Districts: Glenn-Colusa Irrigation District, Colusa Groundwater Authority DWR: Various representatives Resources agency representatives: CDFW and USBR Members of the public
Public Workshops (2) In Oct. 2021	Solicit public comment and questions on the Draft GSP	(1) In-person (1) virtual meetings with 2-way videoconference interaction with public.	Participating stakeholders unknown at this time. Members of the Public
Tehama County Public Workshops	Discuss GSP development progress updates and provide public opportunity to provide comments and ask questions Public comment on items not on the agenda.	Remote or in-person options One in person tailgate meeting with landowner group December 2020 webinar presented an update on the Corning Subbasin	Private landowners, residents of the Thomes Creek Estates Members of the public Paskenta Tribe
CSGSA and TCFCWCD Board of Director meetings TCFCWCD (~monthly frequency in WY 2021) CSGSA (~monthly frequency in WY 2021)	Provide public comment opportunities in accordance with the Brown Act to inform the GSP development.	CSGSA: Variety of virtual meetings with 2-way videoconference interaction with public, meeting in-person with public in attendance, and hybrid meeting in-person with 2-way video conference access with public. Solicitation of public comments and documentation in meeting summaries. TCFCWCD	The following are generally the types of stakeholders that have participated: Private Landowners: Westside landowners and ranchers, agricultural landowners Local Government: Tehama and Glenn County local government representatives City of Corning Water and Groundwater Districts: Glenn-Colusa Irrigation District, Colusa Groundwater Authority, Monroeville Water District DWR: Various representatives Resources agency representatives: CDFW and USBR Unidentified stakeholders and members of the public Facilitator

Public Comment Opportunities	Objective of Public Comment Opportunity	Format for Engagement	Participating Stakeholders
		in person with a phone call in option.	
Tehama County Groundwater Commission Meetings (~monthly frequency in WY 2021)	Provide public comment opportunities to inform the GSP development. Public comment on items not on the agenda.	Mixture of in-person and virtual meetings with public attendance	Private landowners and agricultural landowners Members of the public Facilitator (as needed) DWR: Various representatives Unidentified stakeholders and members of the public
Invitations to Participate and Comment emailed to the Interested Parties List	Encouraged members of the public to submit comments that exceeded 3 min. By email to GSA staff via email.	Email submissions with response from GSA staff and/or GSP Development Team	Members of the public, Paskenta Tribe

Table 4-5. Stakeholder Meetings and Outreach Events, WY 2021

Date	Stakeholder Meeting Subject / Description	Meeting Focus Topics	Main Outcomes
Jan 25, 2021	Orland Rotary Club	SGMA overview and GSP development	Provided information to public on SGMA and GSP Development
May 12, 2021	Glenn County Farm Bureau meeting	SGMA, GSA, and GSP updates	Provided information to public on SGMA and GSP Development
May 27, 2021	Glenn County Rangeland Association	SGMA, GSA, GSP updates	Provided information to public on SGMA and GSP Development
June 9, 2021	Glenn County Farm Bureau meeting	SGMA, GSA, and GSP updates	Provided information to public on SGMA and GSP Development
July 21, 2021	Glenn County Realtor group	SGMA overview and GSP development	Provided information to public on SGMA and GSP Development

Table 4-6. CSAB Meeting Summary, WY 2021

Date and #	Meeting Topics	Primary Outcomes
CSAB Meeting #6 (Oct. 7, 2020)	Potential Water Level SMC	Gathered initial feedback from CSAB and public regarding potential methods for determining water level SMC
CSAB Meeting #7 (Nov. 4, 2020)	Sustainable Management Goal for SMC, Integrated Model Updates, Revise of Water Budgets	Gathered CSAB and public feedback on Sustainable Management Criteria for Chronic Lowering of Groundwater Levels; Reviewed Integrated Model Updates and Water Budgets
CSAB Meeting #8 (Dec. 2, 2020)	Open Discussion on GSP Sections and Feedback: Overview of GSP sections, process for public review, and in-depth review of Section 1: Introduction, and	Shared understanding with participants of draft GSP Sections 1 and 2. Gathered public feedback.

Date and #	Meeting Topics	Primary Outcomes
	Section 2: Plan Area	
CSAB Meeting #9 (Jan. 6, 2021)	Open Discussion on GSP Sections and Feedback: Overview of GSP sections, process for public review, and in-depth review of Section 3: Basin Setting – Hydrogeologic Conceptual Model and Groundwater Conditions	Shared understanding with participants of draft GSP Section 3. Gathered public feedback.
CSAB Meeting #10 (Feb. 3, 2021)	Review Status and Path Forward on GSP Development; Introduction to Streamflow Depletion data and SMC; Introduction to Subsidence data and SMC	Public Comment on all agenda topics.
CSAB Meeting #11 (Mar. 3, 2021)	General GSP Updates, Priority Actions for Plan Implementation and Data Gaps, Continue to Evaluate Funding Mechanisms, Upcoming DWR Grant Opportunities, Open Discussion on GSP Sections and Feedback	Discussion on 1) Chronic Lowering of Groundwater Levels SMC, 2) Land Subsidence SMC, 3) Streamflow Depletion SMC, and 4) draft GSP Completion Process and Adoption Timeline. Public Comment on all agenda topics. Action to recommend to the GSAs statements on Chronic Lower of Groundwater Levels SMC, Land Subsidence SMC, and Streamflow Depletion SMC. Action: Make recommendation to GSAs on draft GSP Completion Process and Adoption Timeline
CSAB Meeting #12 (Apr. 7, 2021)	GSA Updates, Groundwater Level SMC, Subsidence SMC, Projected Water Budgets and Introduction to Storage Decline SMC, Initial Review of Projects and Management Actions	General CSAB agreement around Land Subsidence SMC. Public Comment on all agenda topics.
CSAB Meeting #13 (May 2021)	GSA Updates, Water Quality SMC, Streamflow Depletion SMC, Projects and Management Actions	Public Comment on all agenda topics.
Special CSAB Meeting (May 5, 2021)	Overview of Groundwater Level SMC Comments Received to Date, Monitoring Network Data Review and Well Locations, Potential Groundwater Level SMC Revisions	• Agreed to explore using fixed/static buffers for the MTs closer to the river where water levels are more stable and using the percentage approach for the western areas of the subbasin. • Divergent perspectives on the fixed numeric buffer and percentage buffer. • Request to revisit the measurable objectives to confirm feasibility and protectiveness. • Request for contour maps based on stable and declining wells and buffers in identified years to inform setting the minimum thresholds and measurable objectives
CSAB Meeting #14 (June 2, 2021)	GSA Updates, Degraded Water Quality SMC, Land Subsidence SMC, Chronic Lowering of Groundwater Levels SMC, Reduction in Storage SMC, Streamflow Depletion SMC	Action: Recommendations to GSAs on 1) Degraded Water Quality SMC, 2) Land Subsidence SMC, 3) Chronic Lowering of Groundwater Levels SMC, 4) Reduction in Storage SMC, and 5) Streamflow Depletion SMC. Public Comment on all agenda topics.

Date and #	Meeting Topics	Primary Outcomes
CSAB Meeting #15 (July 6, 2021)	General GSP Updates, Projects and Management Actions, Introduction to Funding Mechanisms	CSAB and Public Feedback on all topics
CSAB Meeting #16 (Aug. 4, 2021)	General GSP Updates, Priority Actions for Plan Implementation and Data Gaps, Continue to Evaluate Funding Mechanisms, Upcoming DWR Grant Opportunities, Open Discussion on GSP Sections and Feedback	CSAB and Public Feedback on all topics
CSAB Meeting #17 (Sept. 1, 2021)	Review and Release Final Draft GSP, Outreach Activities, and Next Steps for GSP Adoption and Implementation	CSAB and Public Feedback on all topics

4.2.3 Address HCM and Groundwater Conditions Data Gaps

Section 8 of the GSP identifies and provides recommendations for addressing data gaps in the HCM and groundwater conditions data. Since WY 2021 was concurrent with GSP development, no progress was made towards addressing data gaps. The WY 2022 Annual Report will revisit progress towards addressing data gaps following GSP submittal.

4.2.4 Expand and Refine Monitoring Networks

The GSP monitoring networks leverage existing monitoring programs to the extent possible. Two new observation well clusters (8 total wells) were installed by DWR in WY 2021 in areas of the Subbasin where spatial data gaps existed, as described in the monitoring network section of the GSP (Section 5.2.3). A shallow and deep well from each cluster is included in the RMP network; placeholder SMC were established for the locations in the GSP using minimum threshold and measurable objective groundwater elevation contour maps. SMC for these new wells will be reviewed and revised as necessary once sufficient data is available during the 5-year GSP update in 2027.

Two shallow RMP wells were unable to be monitored for groundwater elevations in WY 2021, which may necessitate replacement in the GSP monitoring network in the future. Well 24N03W17M001M was dry in August 2021. Well 23N03W04H001M has an obstruction in the casing that prevented groundwater level measurement. These wells are both located in the northwestern portion of the Subbasin in Tehama County, in areas with limited other available options for monitoring groundwater elevations.

4.2.5 Update Data Management System

The GSP DMS Access database was updated with WY 2021 monitoring data. The DMS is used to compile groundwater conditions data that is uploaded to the DWR SGMA Portal concurrent with upload of this Annual Report.

4.2.6 Projects and Management Actions

Since the GSP was not adopted until December 2021, implementation of the GSP was not occurring during WY 2021. The WY 2022 Annual Report will revisit progress towards implementing projects and management actions following GSP submittal.

A combination of projects and management actions will need to be implemented to achieve sustainability in the Subbasin. Section 7 of the GSP identifies potential priority projects and management actions that would help achieve sustainability. There are some ongoing projects and management actions that the GSAs will support, as appropriate. Priority project and management actions identified in the GSP that are not started yet will require feasibility assessment. The GSAs will help assess feasibility, develop revised timelines, and address permitting and planning during the first 5 years of GSP implementation. The projects and actions will be implemented in a coordinated fashion across the Subbasin to achieve sustainability. Refinement of the projects and actions will occur simultaneously with refinement of the funding mechanism that supports the projects and actions. Planned activities during the first 5 years of implementation will include the following tasks as needed:

- Performing feasibility studies, as needed, on potential projects
- Clarifying water rights and water availability for recharge opportunities
- Applying for new or change of diversion, place of use, or timing on new water rights as necessary
- Refining benefit analysis for proposed projects using the groundwater model
- Developing proposed project costs
- Producing preliminary design of projects if projects are adequately defined
- Initiating environmental permitting for projects as necessary
- Applying for grant funding

Cost-sharing agreements will be explored between the GSAs and local agencies that would help implement and benefit the projects and management actions.

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Appendix A

Groundwater Level Measurement Data Quality Summary

APPENDIX A. GROUNDWATER LEVEL DATA QUALITY SUMMARY

Hand measured groundwater level data is evaluated for data quality and completeness by DWR and missing or questionalbe measurements are annotated, as necessary. There were 280 scheduled groundwater level measurements for GSP monitoring network wells in WY 2021 and 28 groundwater level measurements were not collected for various reasons, as listed in Table A-1 and summarized below:

- Thirteen measurements were not collected because the well was actively pumping. Two measurements were not collected in October 2020, 1 was not collected in March 2021, and 10 were not collected in August 2021. There were 11 unique pumping wells that were not monitored during various events, 5 of which are RMPs.
- Nine measurements were not collected because DWR could not access the well. There were 8 unique wells that were not accessible at various times, 7 of which are RMPs. Five missed measurements were domestic RMP wells in October 2020 that were not monitored due to Covid-19 social distancing measures. Other reasons for missed measurements included the well owner was not available to meet at 1 RMP well in October 2020, the ground was too wet to access 1 well in March 2021, 1 RMP well was mistakenly omitted from the August 2021 monitoring event, and 1 well was temporarily inaccessible in August 2021.
- Three measurements were not collected because the water level sounder hung up in the casing above the water table. One of these measurements was scheduled for March 2021 and 2 were scheduled for August 2021. One of the wells that was not monitored was an RMP.
- Two measurements were not collected at a RMP well (23N03W04H001M) because an obstruction in the casing that prevented groundwater level measurement. Measurements were not collected in March and August 2021
- One measurement was not collected at a RMP well (24N03W17M001M) that was dry in August 2021. This well may need to be replaced in the GSP monitoring network if dry conditions persist, as discussed in Section 4.2.4.

In WY 2021, 20 of 252 collected measurements were flagged as questionable for various reasons, as listed in:

- Nine measurements were collected from wells potentially influenced by pumping. Two measurements were collected from active pumping RMP wells, 1 in Fall 2020 and 1 in March 2021. Four measurements were collected from recently pumped RMP wells, 1 in

October 2020 and 3 in August 2021. Two measurements were collected from RMP wells near an active pumping well, 1 in Fall 2020 and 1 in March 2021.

- Ten measurements were collected from 5 different wells with oil in the casing. Two of these wells are RMP wells. Oil was noted in wells during the October 2020, March 2021, and August 2021 events. Oil floating on the groundwater surface has the potential to depress the groundwater level, making groundwater level measurements in wells with oil less accurate and biased low. The oil thickness could be measured in future events and accounted for when calculating the groundwater elevation (Cunningham and Schalk, 2011).
- One measurement was collected in March 2021 from an RMP well with a leaky casing. The sampler noted that the field the well is situated in was not flooded but that it rained recently.

Table A-1. WY 2021 Not Collected Groundwater Level Measurements

Local Well Name	RMP Well	Measurement Date	Measurement Code	Comments
23N03W04H001M	X	8/2/2021	0	Blockage in well, dropping
22N01W19E003M	X	10/12/2020	1	Pumping
22N01W19E003M	X	8/2/2021	1	Pumping
22N01W19K005M		8/3/2021	1	Pumping
22N02W02J001M		8/2/2021	1	Pumping
22N02W02K001M		8/2/2021	1	Pumping
22N02W14C002M		8/2/2021	1	Pumping
22N02W16B002M		8/2/2021	1	Pumping
22N03W03D002M		3/15/2021	1	Measurement added to wrong well (22N03W03D001) that has been destroyed. 10/25/2021
22N03W03D002M		8/2/2021	1	Measurement added to wrong well (22N03W03D001) that has been destroyed. 10/25/2021
23N02W16B001M	X	10/13/2020	1	Pumping
23N03W16H001M	X	8/4/2021	1	
24N03W16A001M	X	8/4/2021	1	
24N04W34P001M	X	8/4/2021	1	
22N02W08B002M		8/2/2021	3	Tape hung up at ~ 78', nearby pumping.
22N03W04E001M		3/23/2021	3	Tape hung up at 69'.
24N03W14B001M	X	8/2/2021	3	Hung up about 105 feet.
21N01W04N001M	X	10/14/2020	7	Domestic wells not monitored during COVID-19 (Shelter in Place)
22N03W12Q003M	X	10/12/2020	7	Domestic wells not monitored during COVID-19 (Shelter in Place)
23N03W04H001M	X	3/17/2021	7	Can Removed, blockage in well
23N03W07F001M	X	8/4/2021	7	Missed
24N03W02R001M	X	10/13/2020	7	Domestic wells not being monitored during COVID-19
24N03W17M001M	X	10/13/2020	7	Domestic wells not being monitored during COVID-19
24N03W17M001M	X	8/4/2021	7	Dry at 108 feet
24N03W17M002M	X	10/13/2020	7	Owner not available to meet
24N04W14N002M	X	10/13/2020	7	Domestic wells not being monitored during COVID-19
25N02W31K001M		3/19/2021	7	Ground too wet to access
24N03W35P004M		8/2/2021	9	

No Measurement Codes	
Code #	**Description**
0	Measurement discontinued
1	Pumping
3	Tape hung up
7	Special/other
9	Temporary inaccessible

Table A-2. WY 2021 Questionable Groundwater Level Measurements

Local Well Name	RMP Well	Measurement Date	Measurement Code	Water Level Measurement Comments
24N02W17A001M	X	10/13/2020	1	
24N02W17A001M	X	3/19/2021	1	
24N03W26K001M	X	10/14/2020	1	
24N03W14B001M	X	10/12/2020	2	
24N03W17M002M	X	8/4/2021	2	
22N03W06B001M	X	3/15/2021	3	Leaky casing. Field not flooded but it rained recently.
23N02W34A003M	X	8/2/2021	3	Oil in casing, possibly pumped recently
23N02W16B001M	X	8/2/2021	4	
24N03W02R001M	X	8/4/2021	4	
24N03W03R002M	X	10/13/2020	4	
24N04W33P001M	X	8/4/2021	4	
22N02W09L003M		8/2/2021	8	Tape hanging up.
22N02W16B002M		10/12/2020	8	Owner gave verbal permission to measure 22N02W16B003M during COVID-19
22N02W16B002M		3/15/2021	8	
22N02W22B001M		10/12/2020	8	Hanging up at ~90'
22N02W22B001M		3/16/2021	8	
22N02W22B001M		8/2/2021	8	
23N02W34A003M	X	10/13/2020	8	
23N02W34A003M	X	3/17/2021	8	
25N02W31G002M	X	8/4/2021	8	

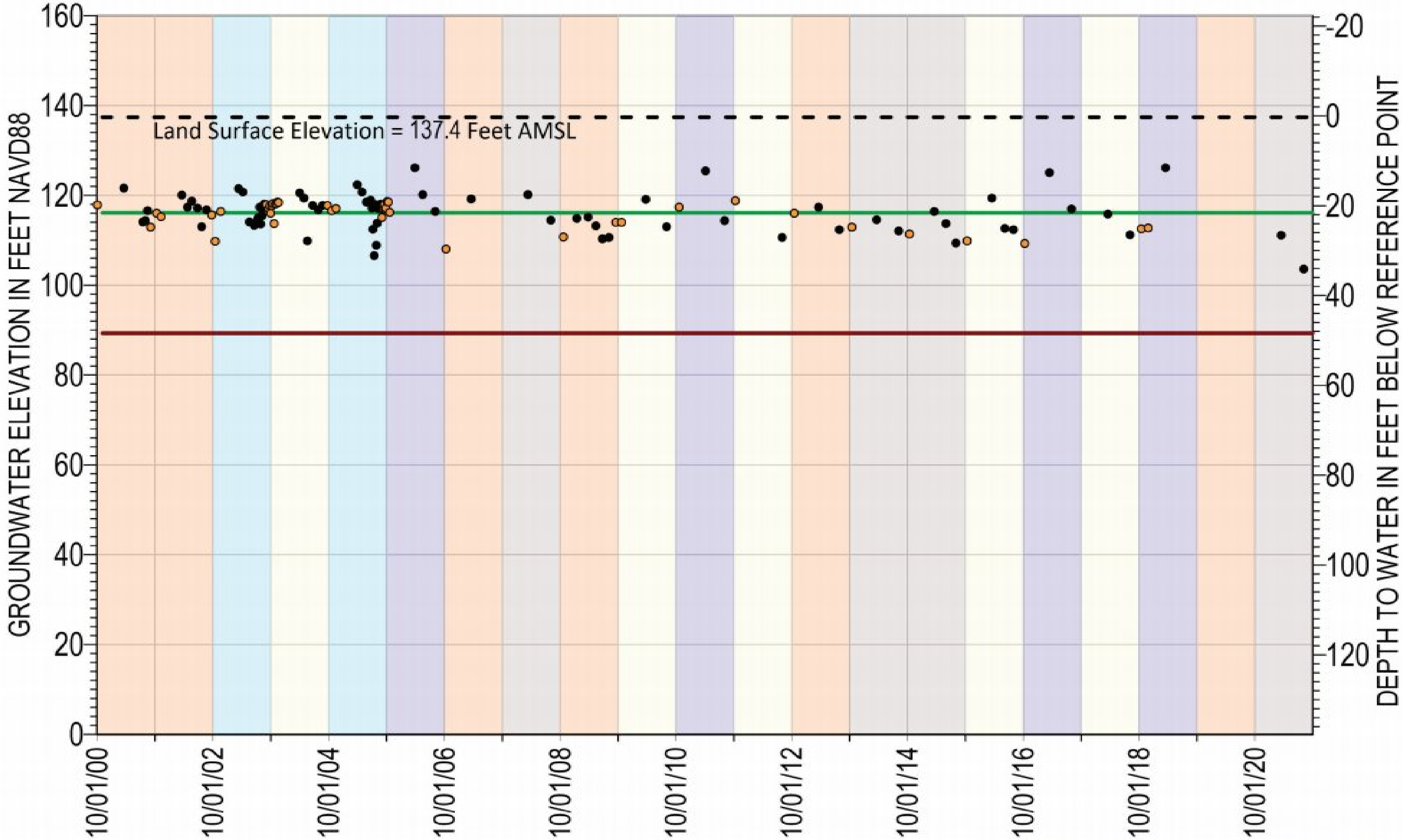
Questionable Measurement Codes	
Code #	**Description**
1	Pumping
2	Nearby pump operating
3	Casing leaking or wet
4	Pumped recently
8	Oil or foreign substance in casing

Appendix B

Groundwater Level Hydrographs

Shallow RMP - groundwater levels and groundwater storage proxy

21N01W04N001M



21N01W04N001M Groundwater Elevation

Land Surface Elevation

Measurable Objective

Minimum Threshold

Reference Point Elevation= 137.7 ft NAVD88

Well Type: Domestic

Total Depth: 100 ft bgs

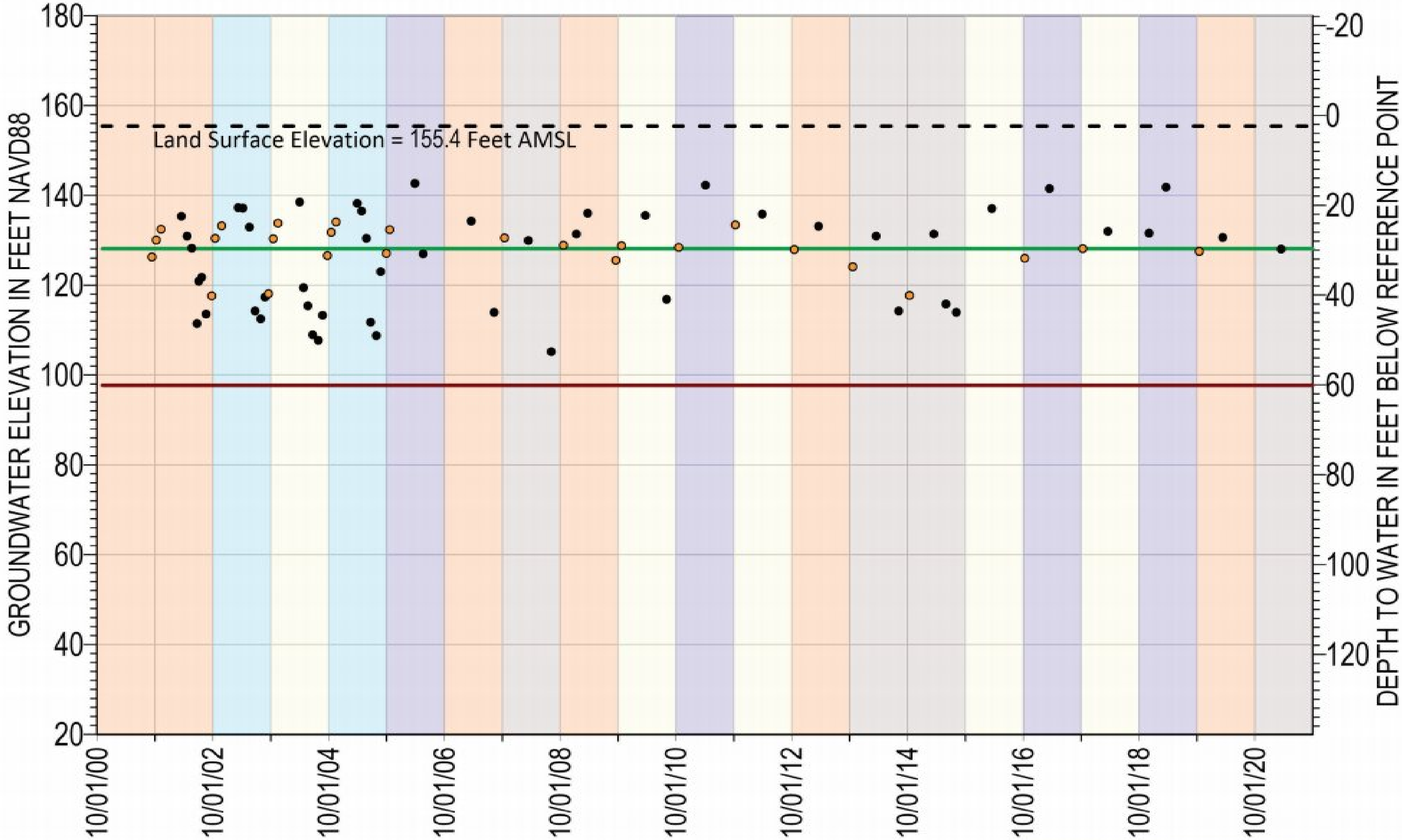
Well Screen Interval= Unknown ft bgs

Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy **22N01W19E003M**



- 22N01W19E003M Groundwater Elevation
- Land Surface Elevation
- Measurable Objective
- Minimum Threshold

Reference Point Elevation= 157.8 ft NAVD88
Well Type: Irrigation
Total Depth: 500 ft bgs
Well Screen Interval= 80 - 400 ft bgs

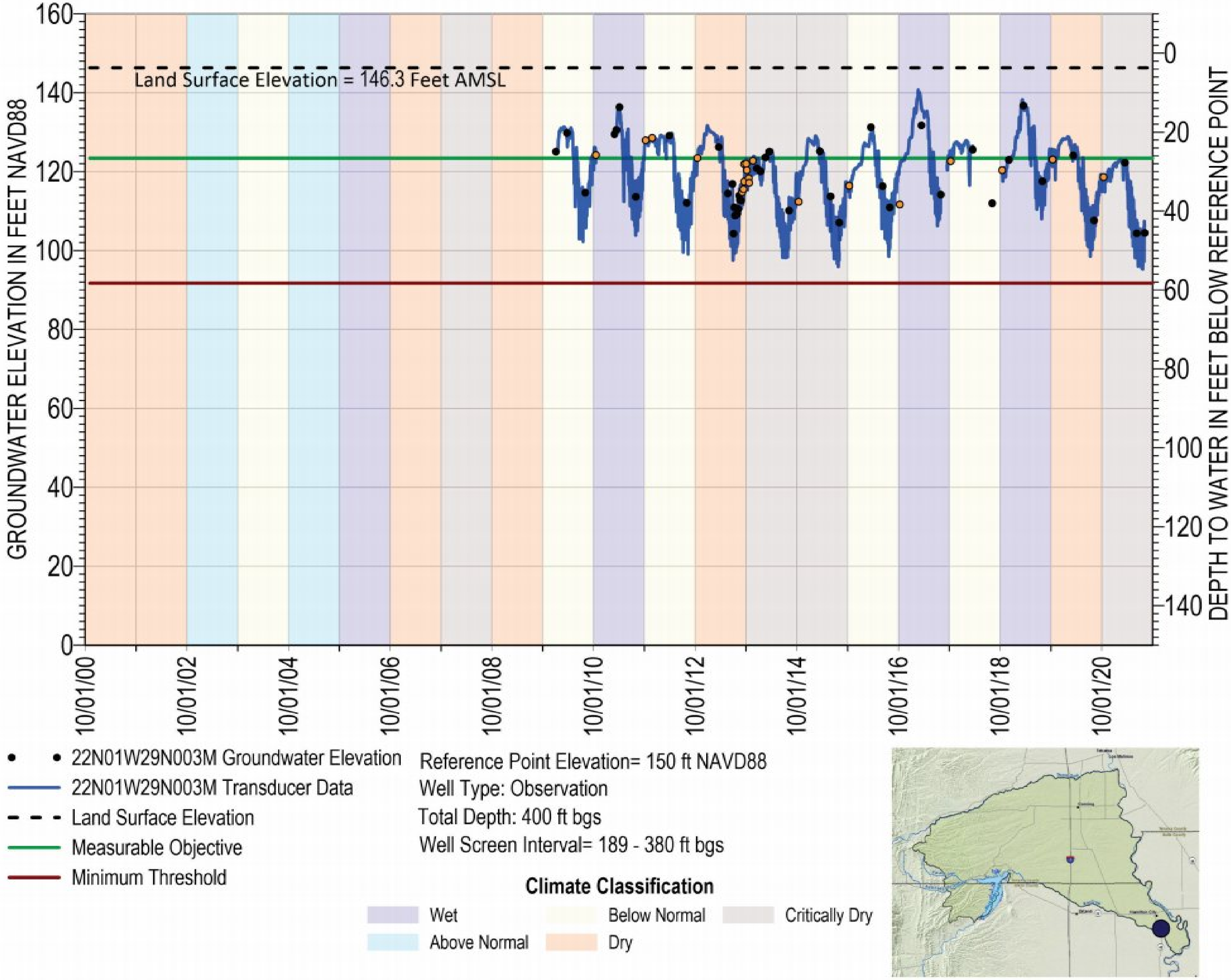
Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels, groundwater storage proxy, and interconnected surface water proxy

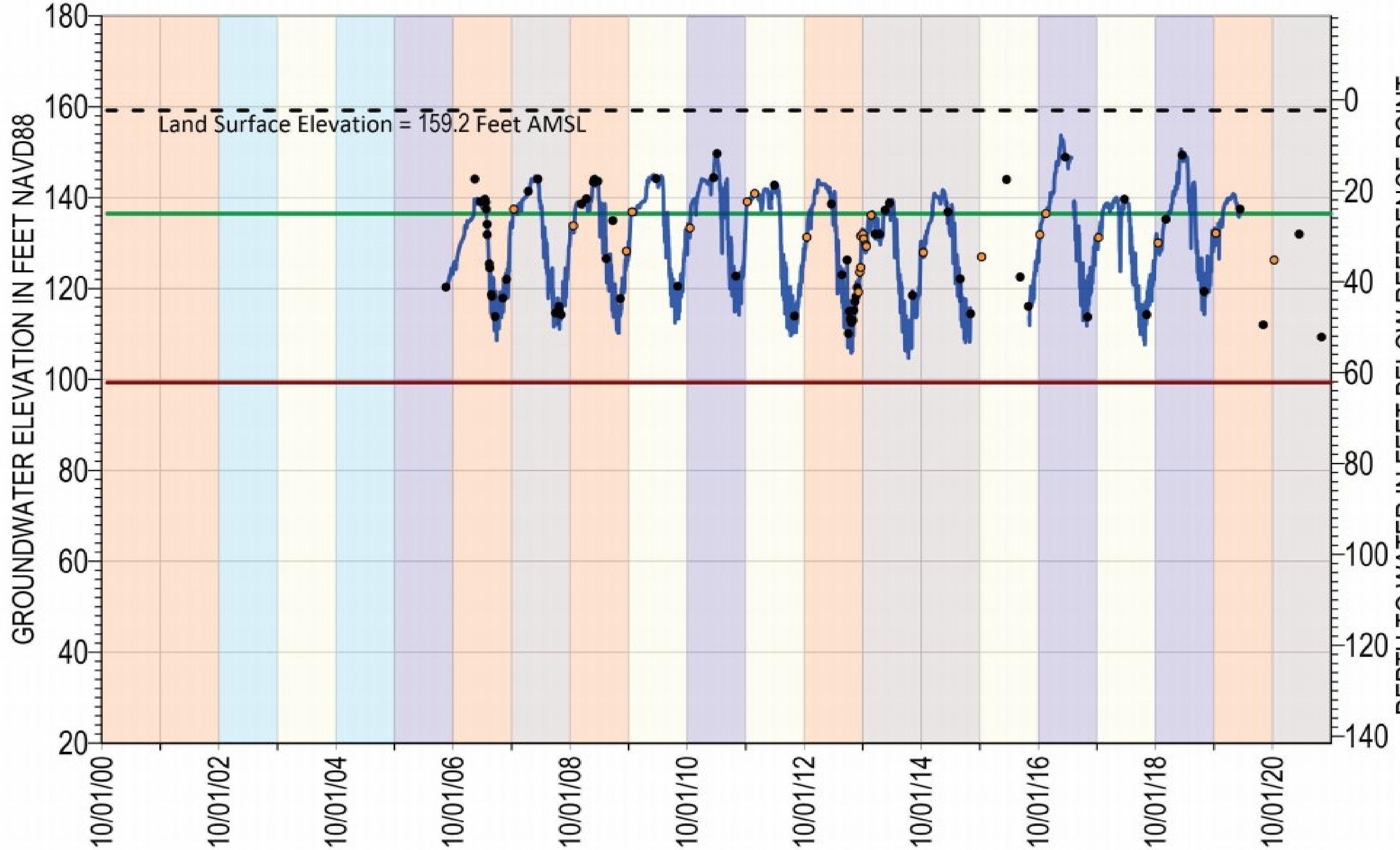
22N01W29N003M



**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels, groundwater storage proxy, and interconnected surface water proxy

22N02W01N003M



22N02W01N003M Groundwater Elevation
22N02W01N003M Transducer Data
Land Surface Elevation
Measurable Objective
Minimum Threshold

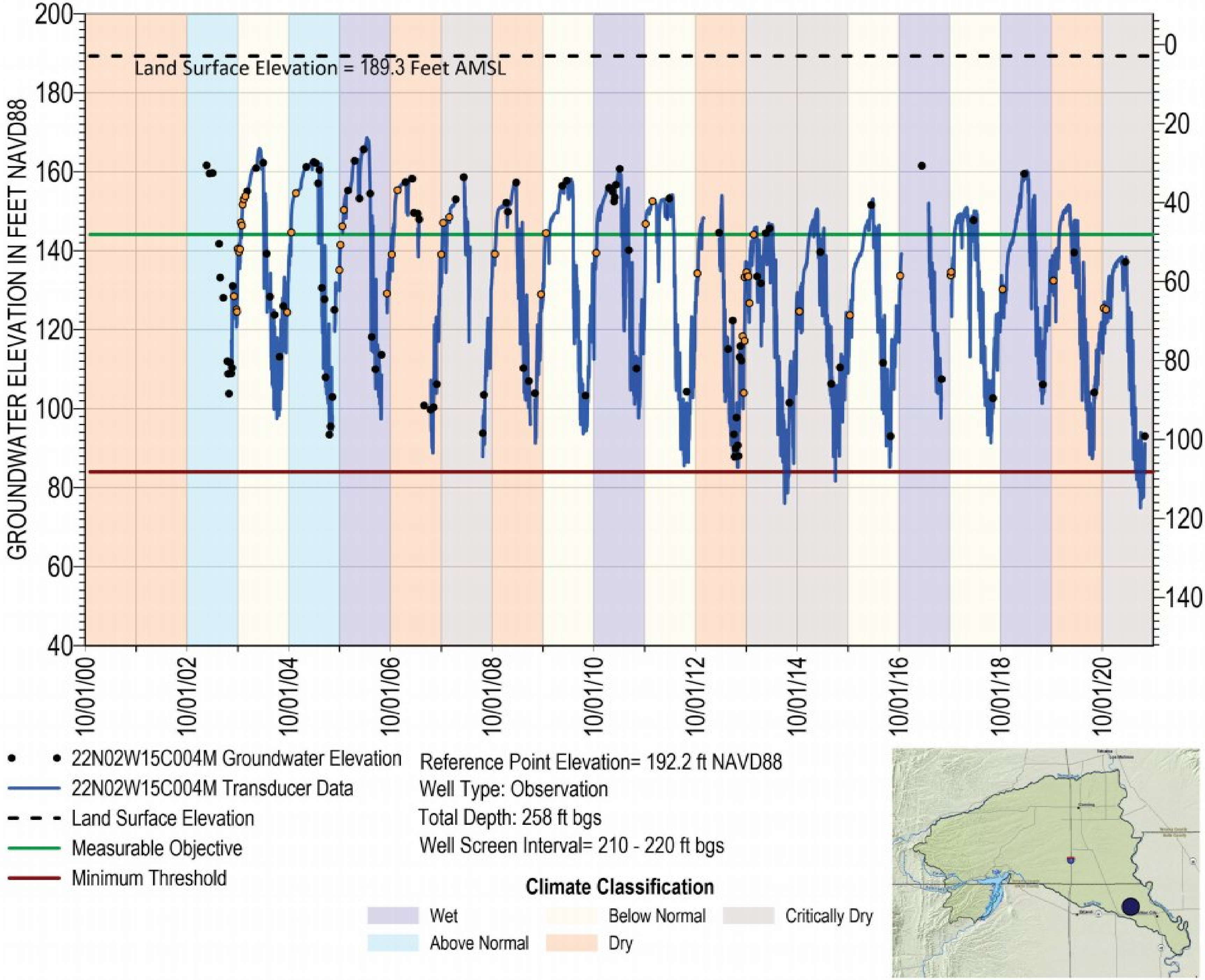
Reference Point Elevation= 161.5 ft NAVD88
Well Type: Observation
Total Depth: 440 ft bgs
Well Screen Interval= 210 - 370 ft bgs

Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry

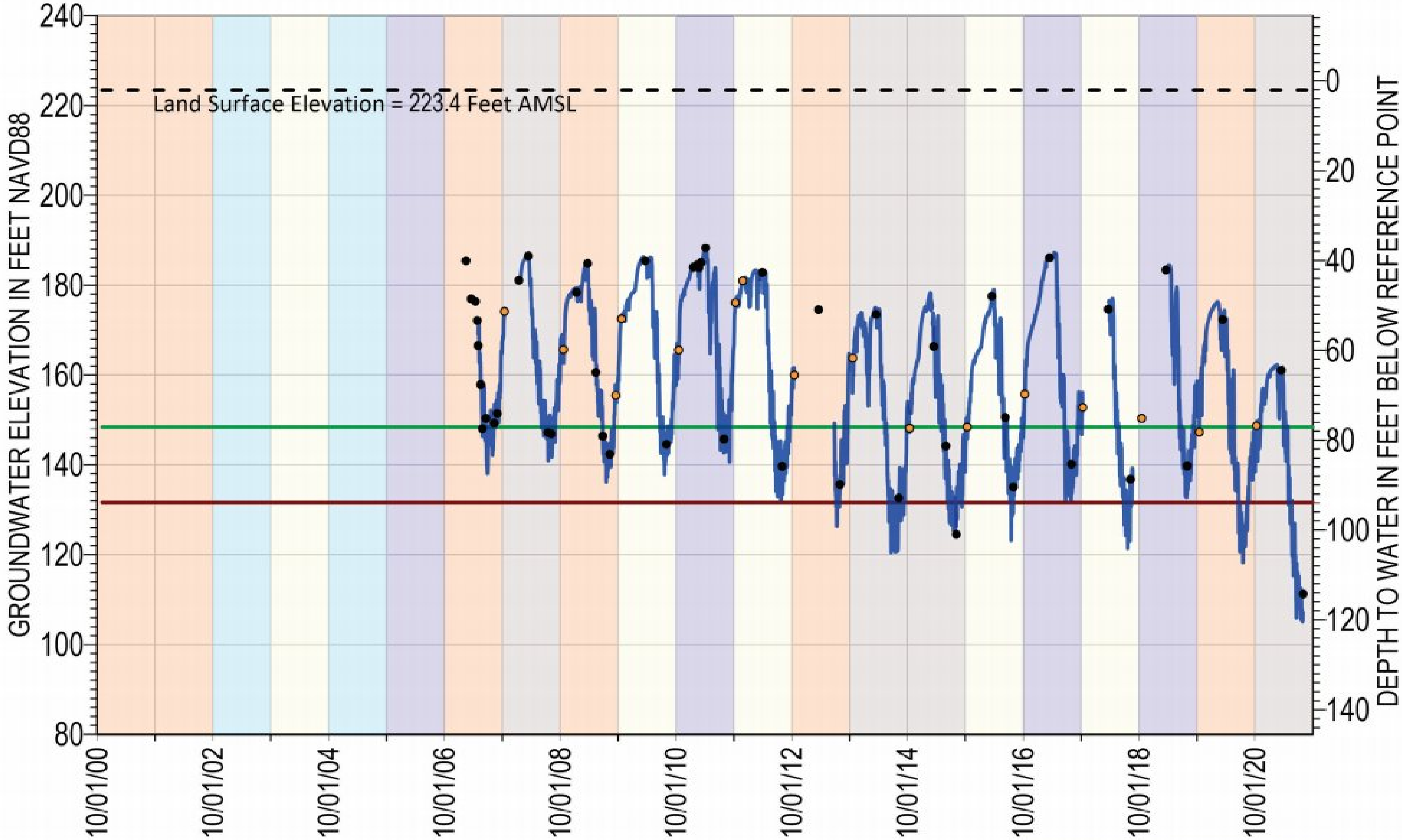
**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels, groundwater storage proxy, and interconnected surface water proxy **22N02W15C004M**



**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels, groundwater storage proxy, and interconnected surface water proxy **22N02W18C003M**



- • • 22N02W18C003M Groundwater Elevation
- 22N02W18C003M Transducer Data
- Land Surface Elevation
- Measurable Objective
- Minimum Threshold

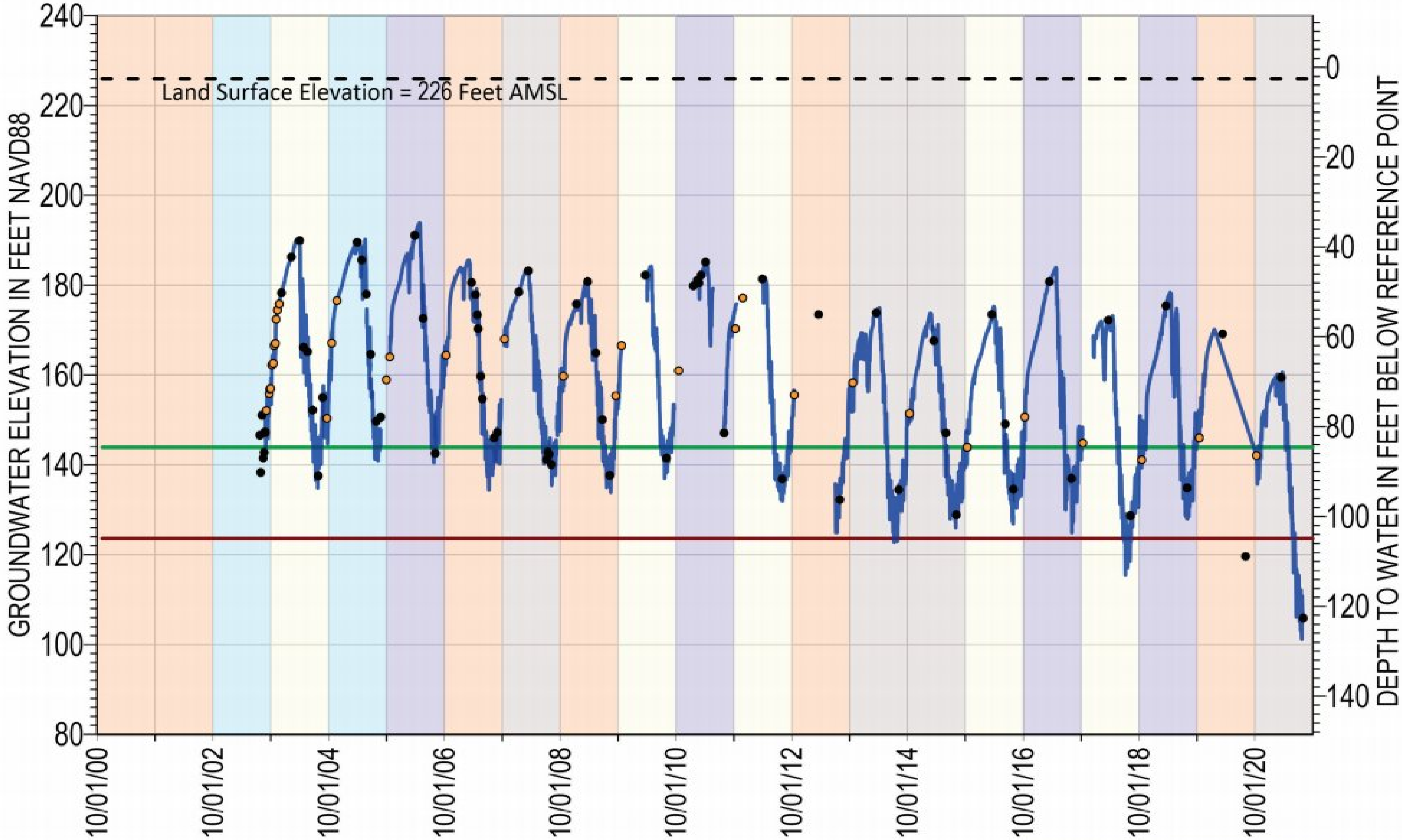
Reference Point Elevation= 225.5 ft NAVD88
Well Type: Observation
Total Depth: 188 ft bgs
Well Screen Interval= 165 - 175 ft bgs

Climate Classification

Wet, Above Normal, Below Normal, Dry, Critically Dry

**Note: Fall hand measurements are shown in gold (September and October)*

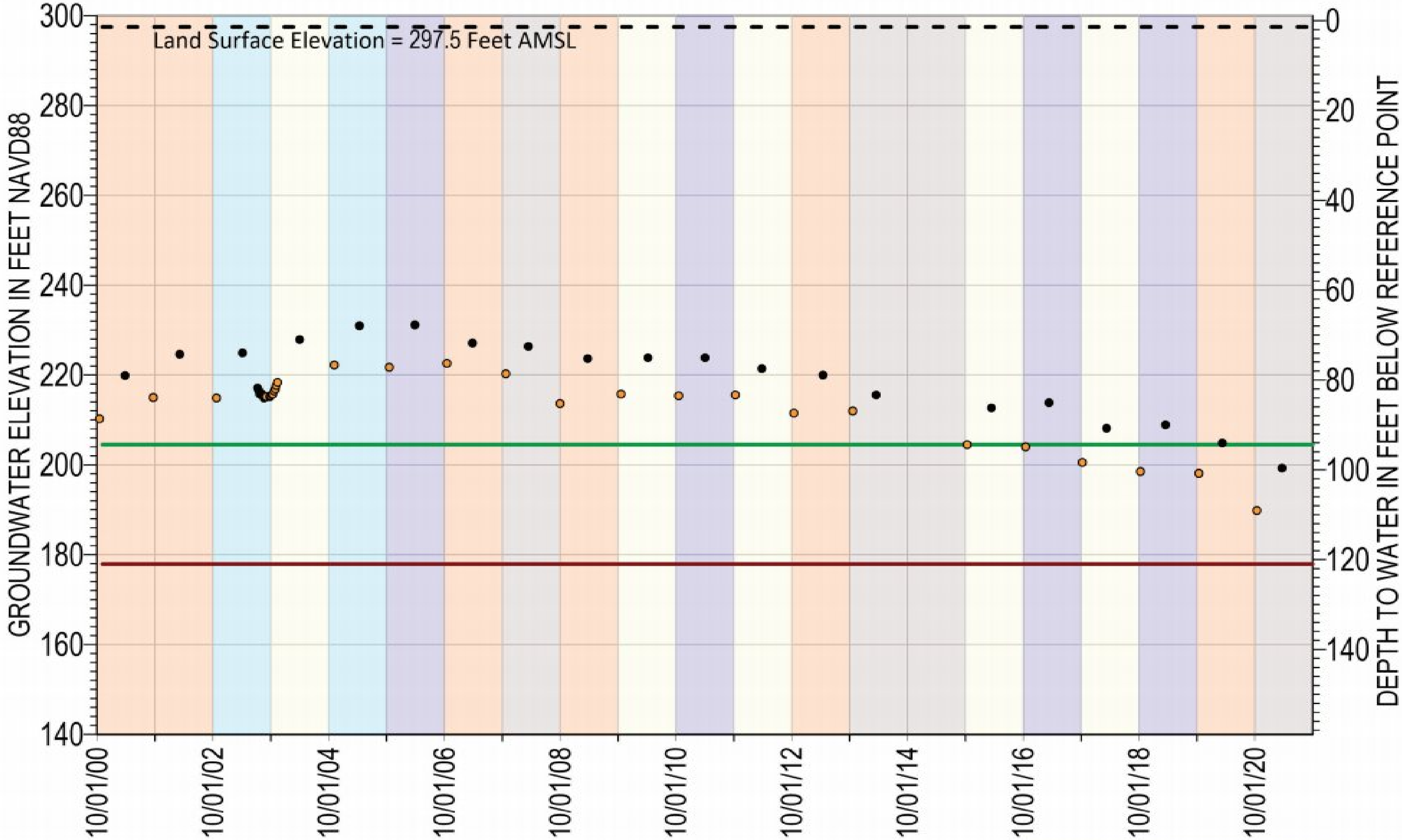
Shallow RMP - groundwater levels, groundwater storage proxy, and interconnected surface water proxy **22N03W01R002M**



Reference Point Elevation= 228.5 ft NAVD88
Well Type: Observation
Total Depth: 314 ft bgs
Well Screen Interval= 270 - 280 ft bgs

**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy **22N03W05F002M**



22N03W05F002M Groundwater Elevation
Land Surface Elevation
Measurable Objective
Minimum Threshold

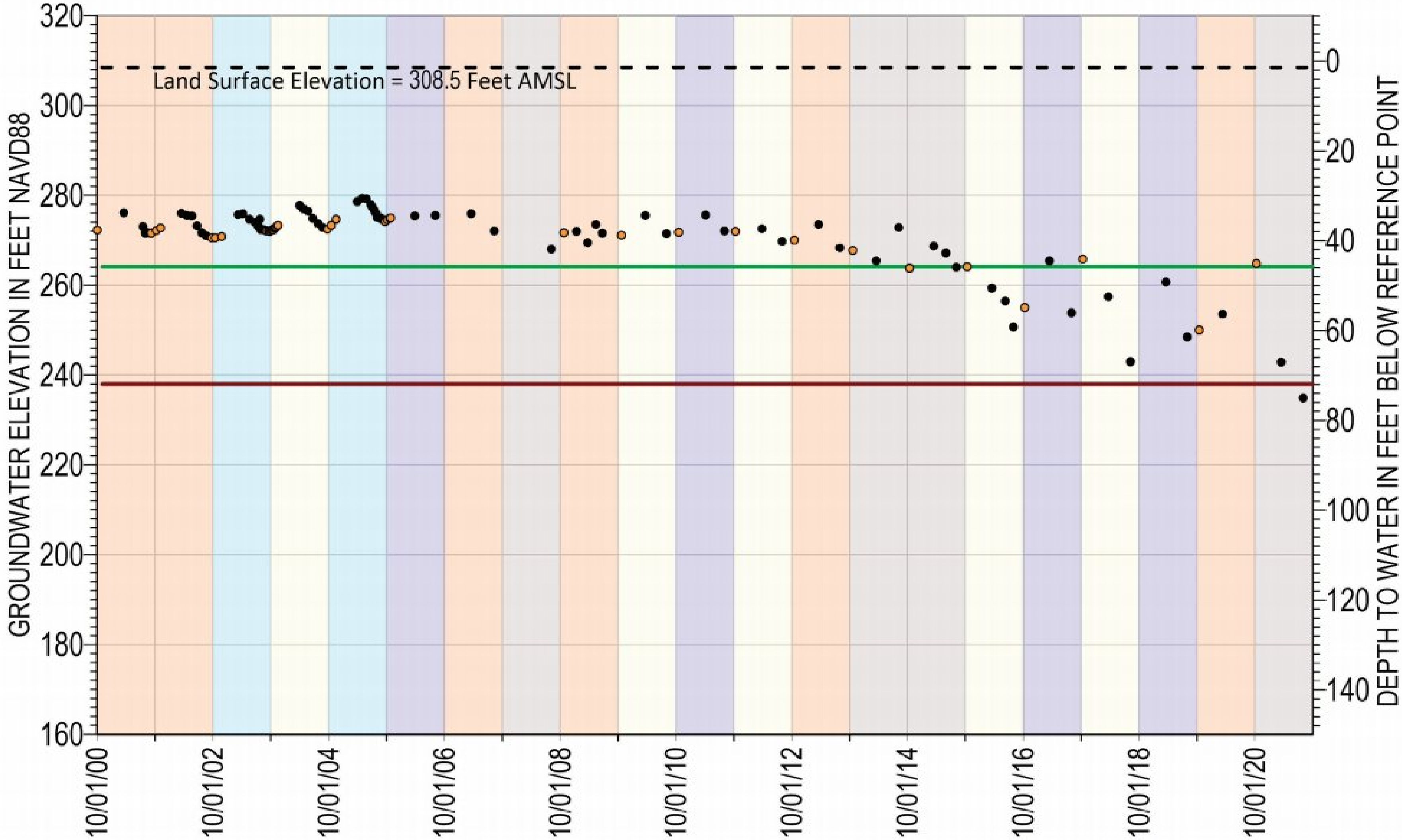
Reference Point Elevation= 298.9 ft NAVD88
Well Type: Irrigation
Total Depth: 218 ft bgs
Well Screen Interval= 188 - 218 ft bgs

Climate Classification

Wet, Above Normal, Below Normal, Dry, Critically Dry

**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy **22N03W06B001M**



- 22N03W06B001M Groundwater Elevation
- Land Surface Elevation
- Measurable Objective
- Minimum Threshold

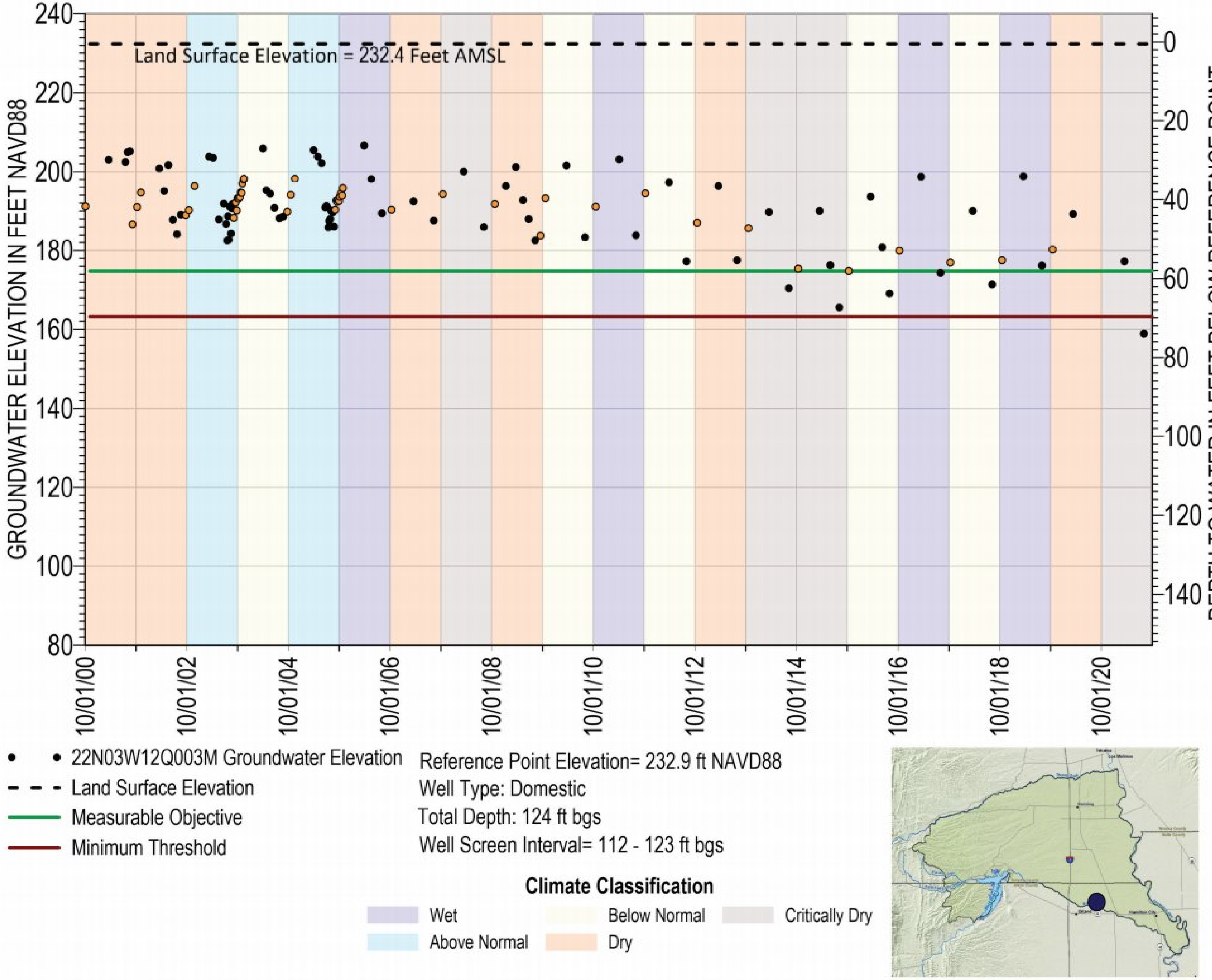
Reference Point Elevation= 309.9 ft NAVD88
Well Type: Domestic
Total Depth: 210 ft bgs
Well Screen Interval= 195 - 210 ft bgs

Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry

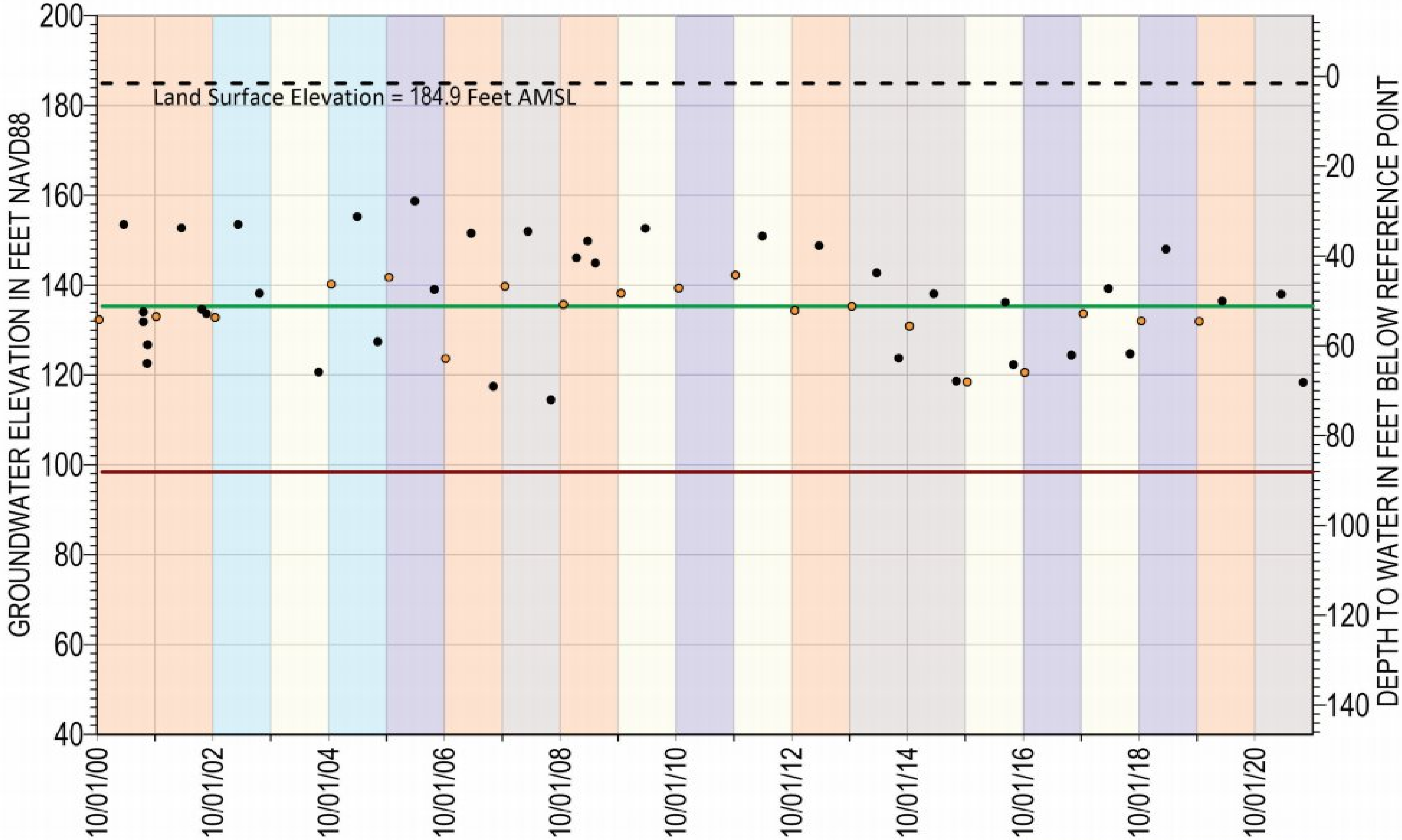
**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy **22N03W12Q003M**



**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy **23N02W16B001M**

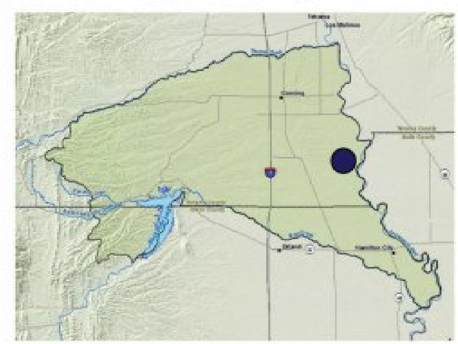


- 23N02W16B001M Groundwater Elevation
- Land Surface Elevation
- Measurable Objective
- Minimum Threshold

Reference Point Elevation= 186.5 ft NAVD88
Well Type: Irrigation
Total Depth: 120 ft bgs
Well Screen Interval= 100 - 120 ft bgs

Climate Classification

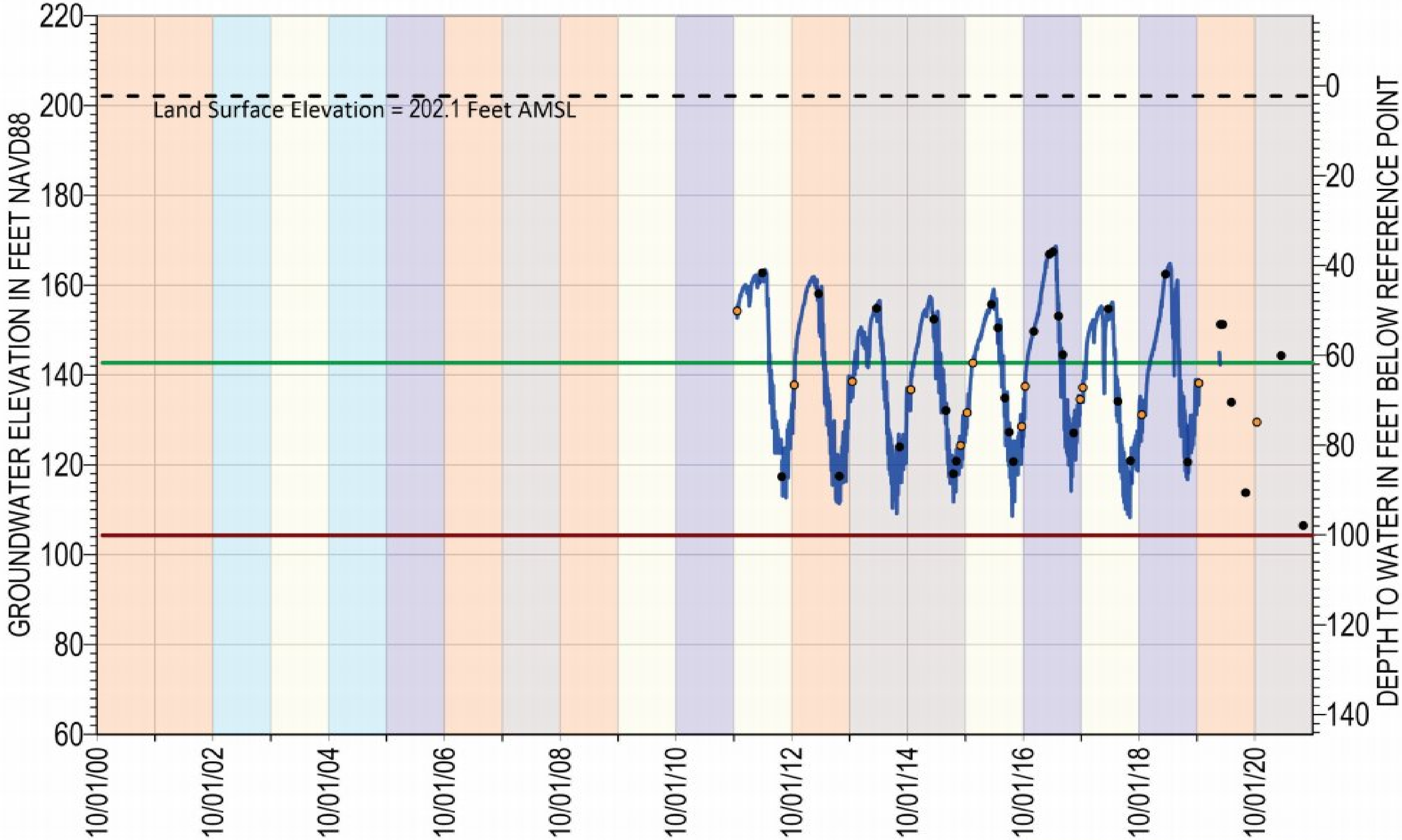
Wet | Below Normal | Critically Dry
Above Normal | Dry



**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels, groundwater storage proxy, and interconnected surface water proxy

23N02W28N004M



Reference Point Elevation= 204.4 ft NAVD88

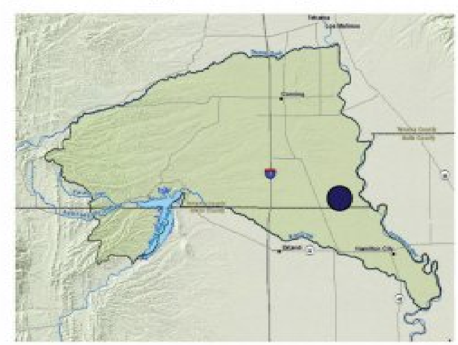
Well Type: Observation

Total Depth: 205 ft bgs

Well Screen Interval= 100 - 170 ft bgs

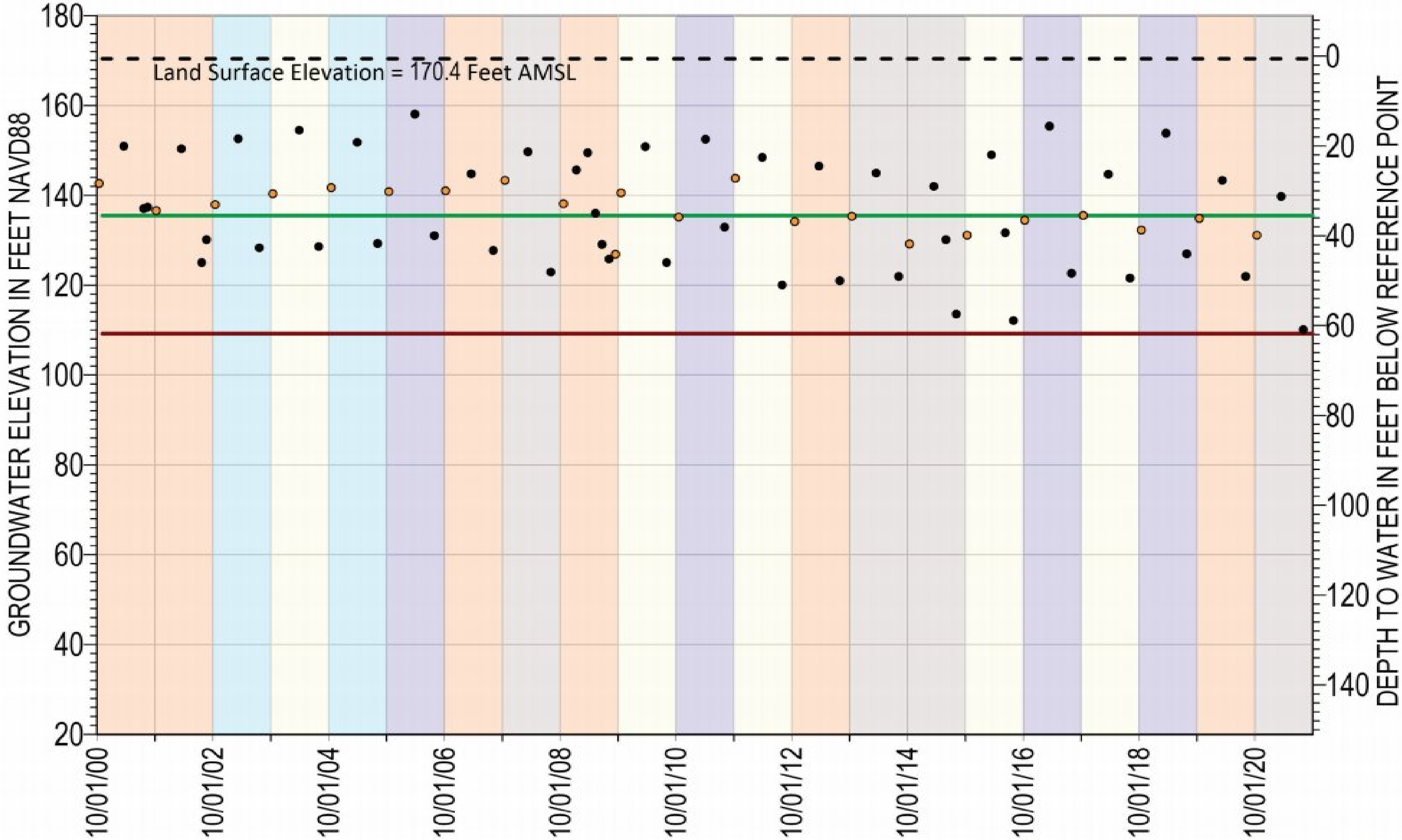
Climate Classification

Wet, Above Normal, Below Normal, Dry, Critically Dry



**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy **23N02W34A003M**



• • 23N02W34A003M Groundwater Elevation
- - - Land Surface Elevation
— Measurable Objective
— Minimum Threshold

Reference Point Elevation= 171 ft NAVD88
Well Type: Irrigation
Total Depth: 125 ft bgs
Well Screen Interval= 104 - 124 ft bgs

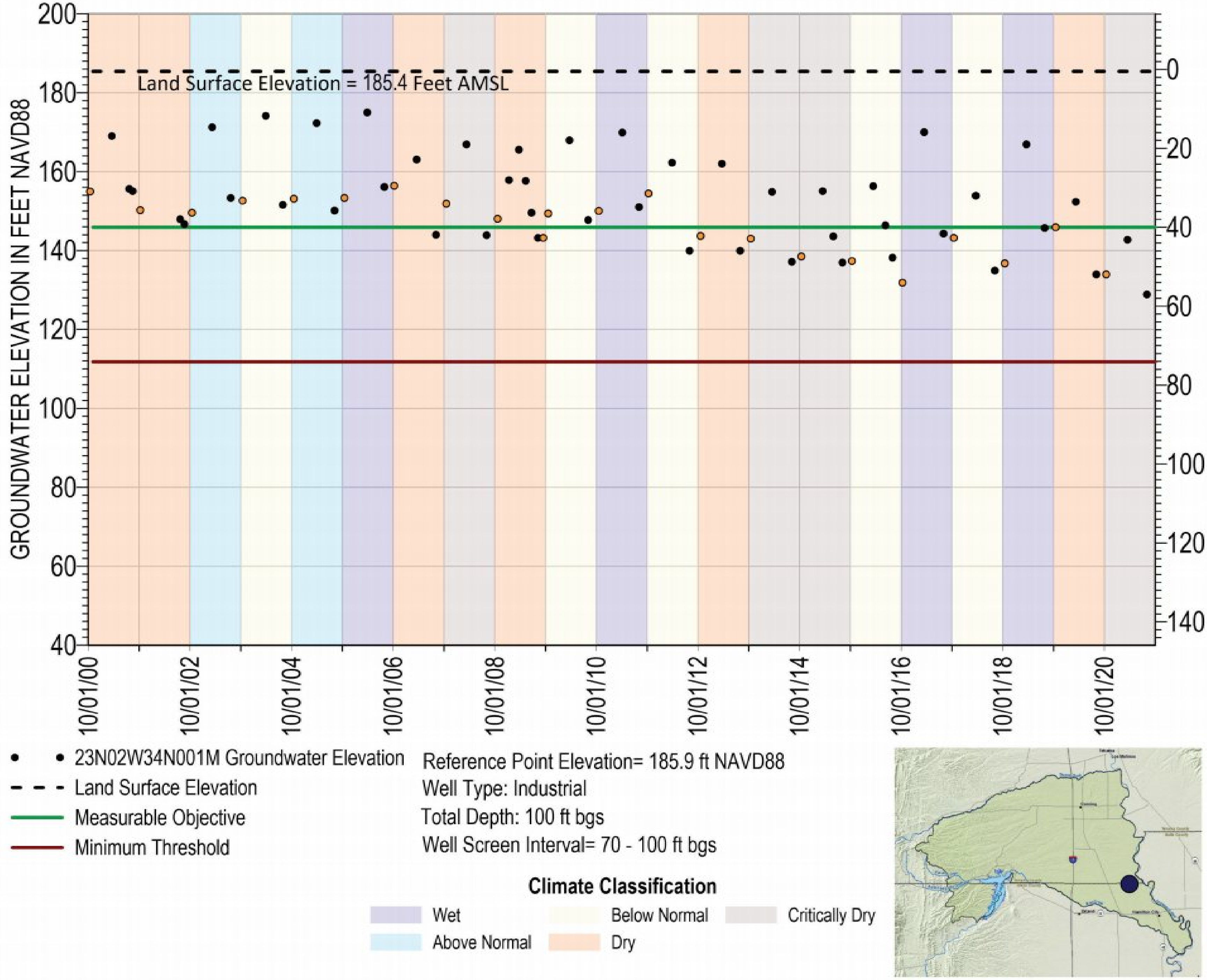
Climate Classification

Wet | Below Normal | Critically Dry
Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy

23N02W34N001M



23N02W34N001M Groundwater Elevation
Land Surface Elevation
Measurable Objective
Minimum Threshold

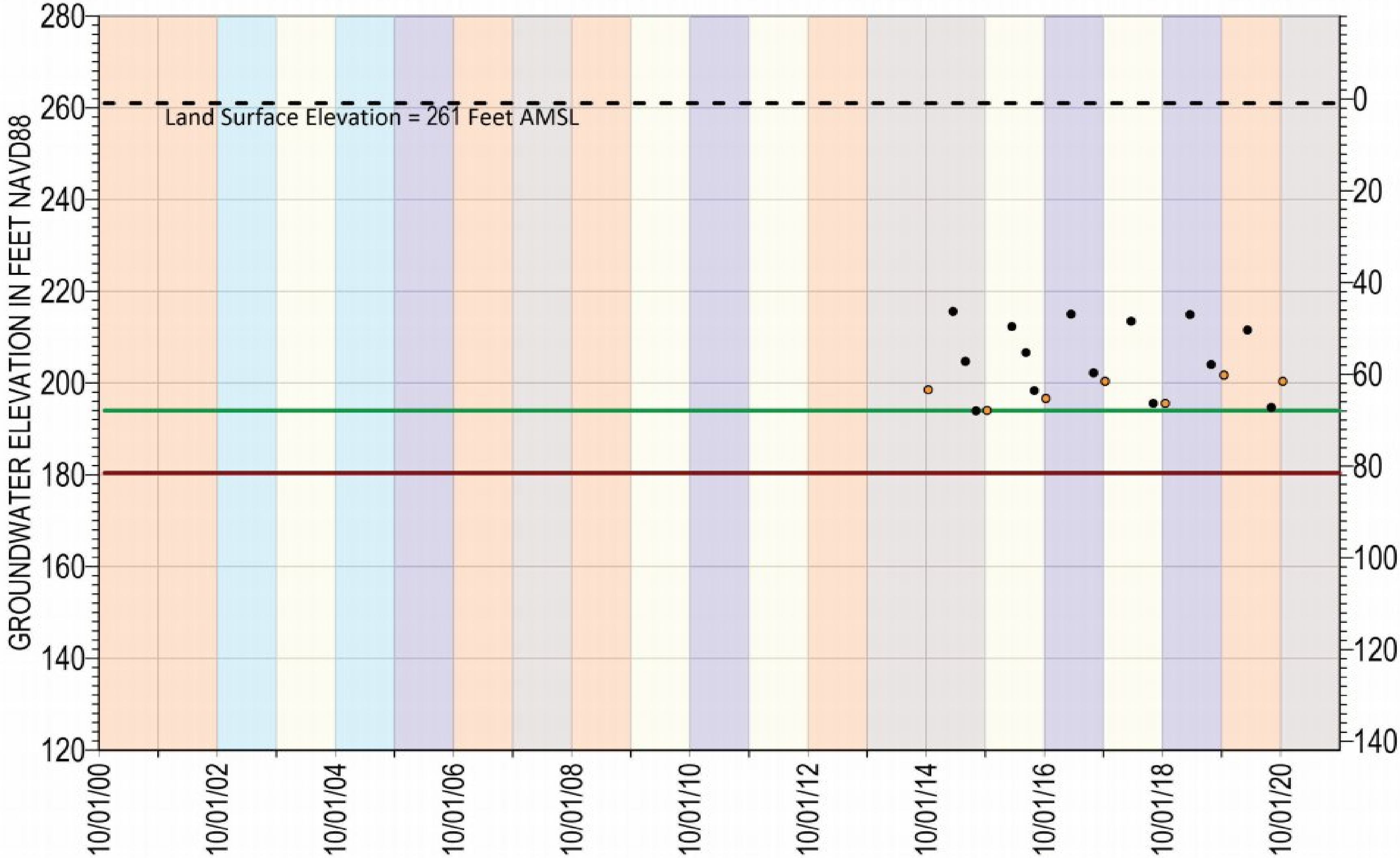
Reference Point Elevation= 185.9 ft NAVD88
Well Type: Industrial
Total Depth: 100 ft bgs
Well Screen Interval= 70 - 100 ft bgs

Climate Classification

Wet
Above Normal
Below Normal
Dry
Critically Dry

**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy **23N03W04H001M**



23N03W04H001M Groundwater Elevation

Land Surface Elevation

Measurable Objective

Minimum Threshold

Reference Point Elevation= 261.9 ft NAVD88

Well Type: Irrigation

Total Depth: 270 ft bgs

Well Screen Interval= 200 - 270 ft bgs

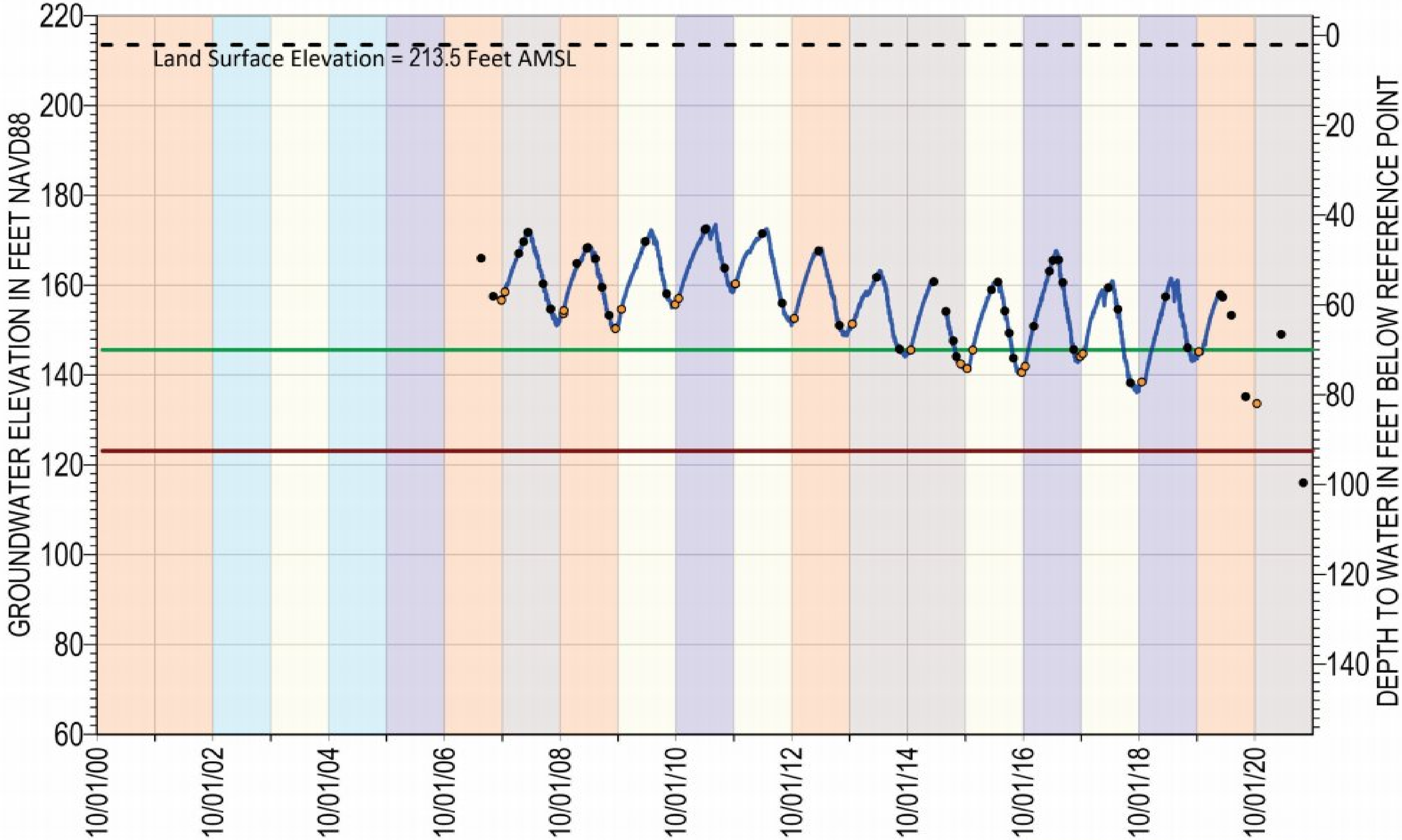
Climate Classification

Wet | Below Normal | Critically Dry

Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy **23N03W13C006M**



• • 23N03W13C006M Groundwater Elevation
23N03W13C006M Transducer Data
Land Surface Elevation
Measurable Objective
Minimum Threshold

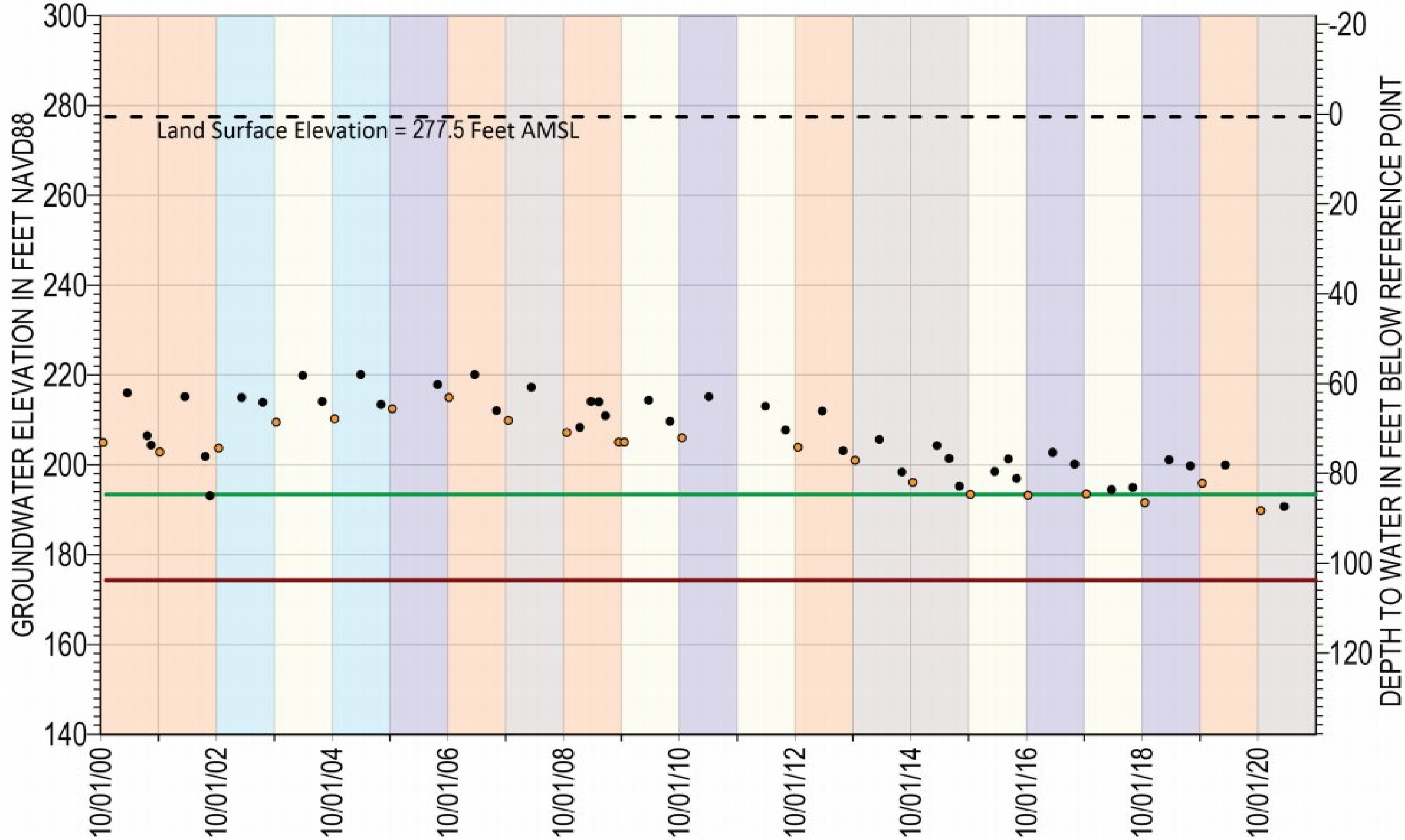
Reference Point Elevation= 215.6 ft NAVD88
Well Type: Observation
Total Depth: 182 ft bgs
Well Screen Interval= 95 - 135 ft bgs

Climate Classification

Wet | Below Normal | Critically Dry
Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy **23N03W16H001M**

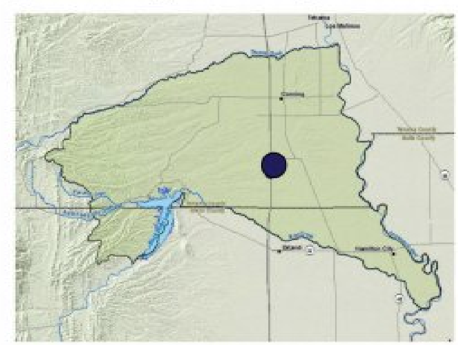


23N03W16H001M Groundwater Elevation
Land Surface Elevation
Measurable Objective
Minimum Threshold

Reference Point Elevation= 278.1 ft NAVD88
Well Type: Domestic
Total Depth: 150 ft bgs
Well Screen Interval= 144 - 150 ft bgs

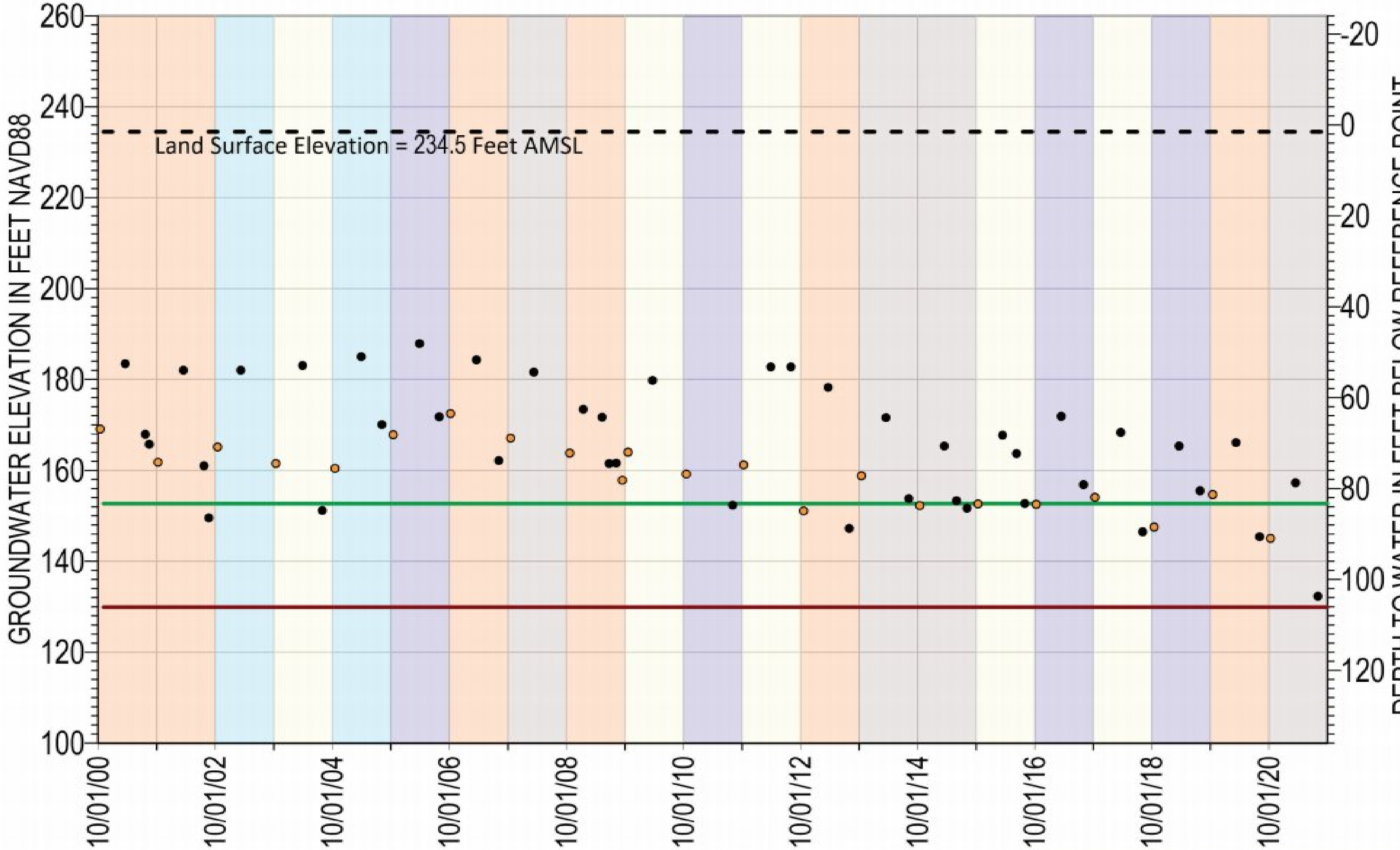
Climate Classification

Wet, Above Normal, Below Normal, Dry, Critically Dry



**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy **23N03W22Q001M**

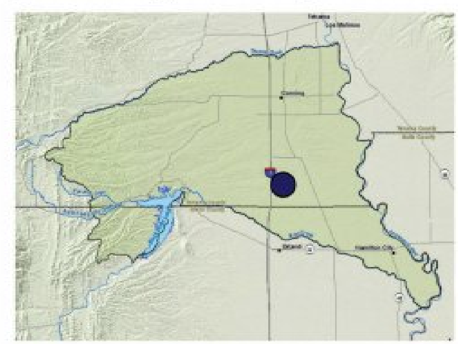


- 23N03W22Q001M Groundwater Elevation
- Land Surface Elevation
- Measurable Objective
- Minimum Threshold

Reference Point Elevation= 236 ft NAVD88
Well Type: Irrigation
Total Depth: 380 ft bgs
Well Screen Interval= Unknown ft bgs

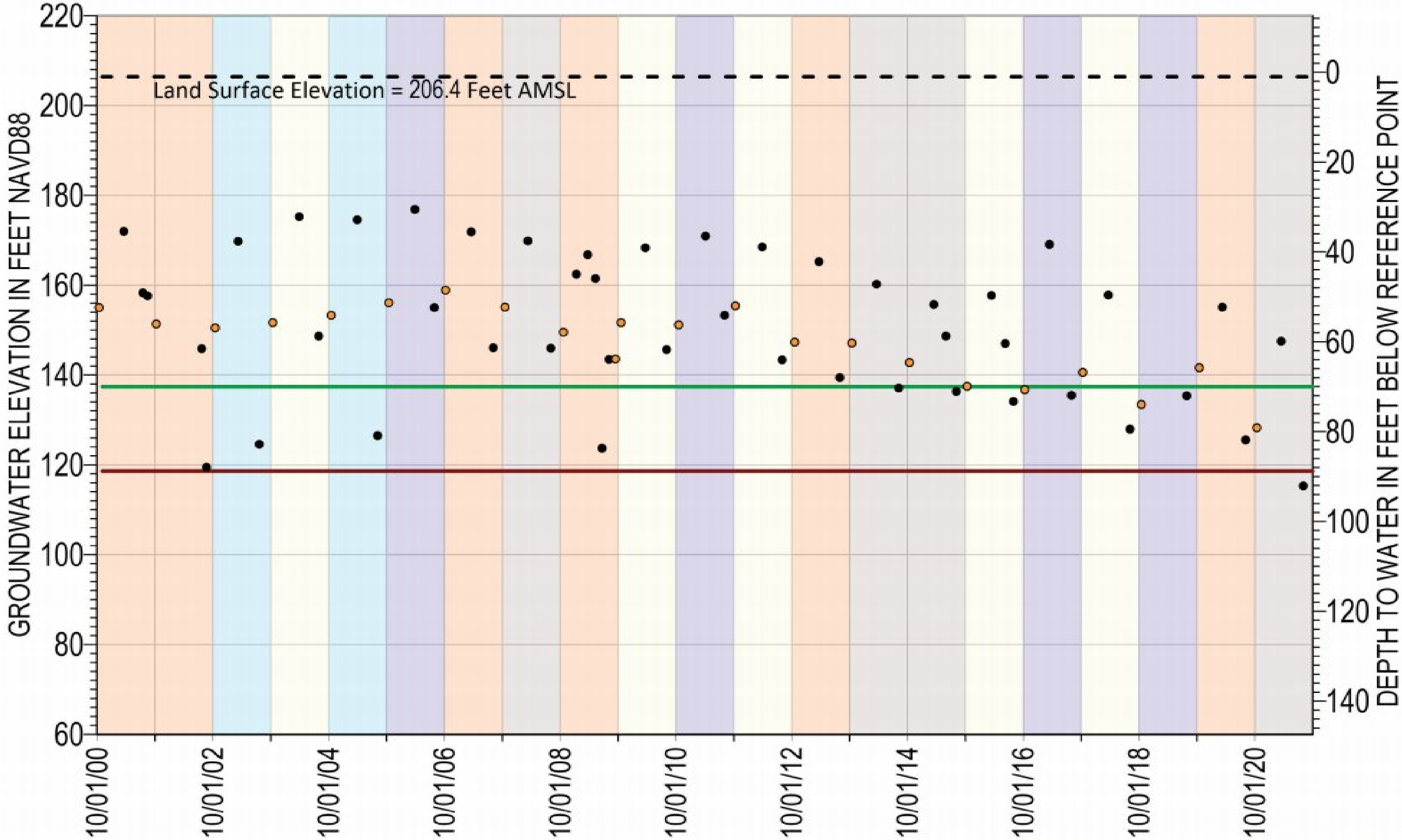
Climate Classification

Wet, Above Normal, Below Normal, Dry, Critically Dry



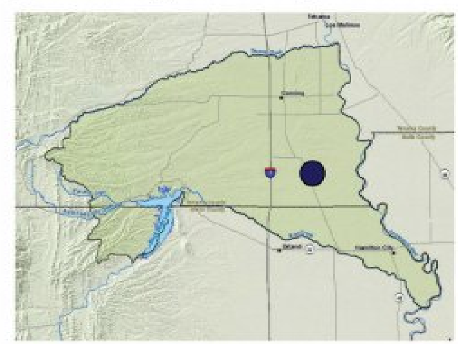
**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy **23N03W24A003M**



23N03W24A003M Groundwater Elevation
Land Surface Elevation
Measurable Objective
Minimum Threshold

Reference Point Elevation= 207.4 ft NAVD88
Well Type: Domestic
Total Depth: 199 ft bgs
Well Screen Interval= 180 - 199 ft bgs

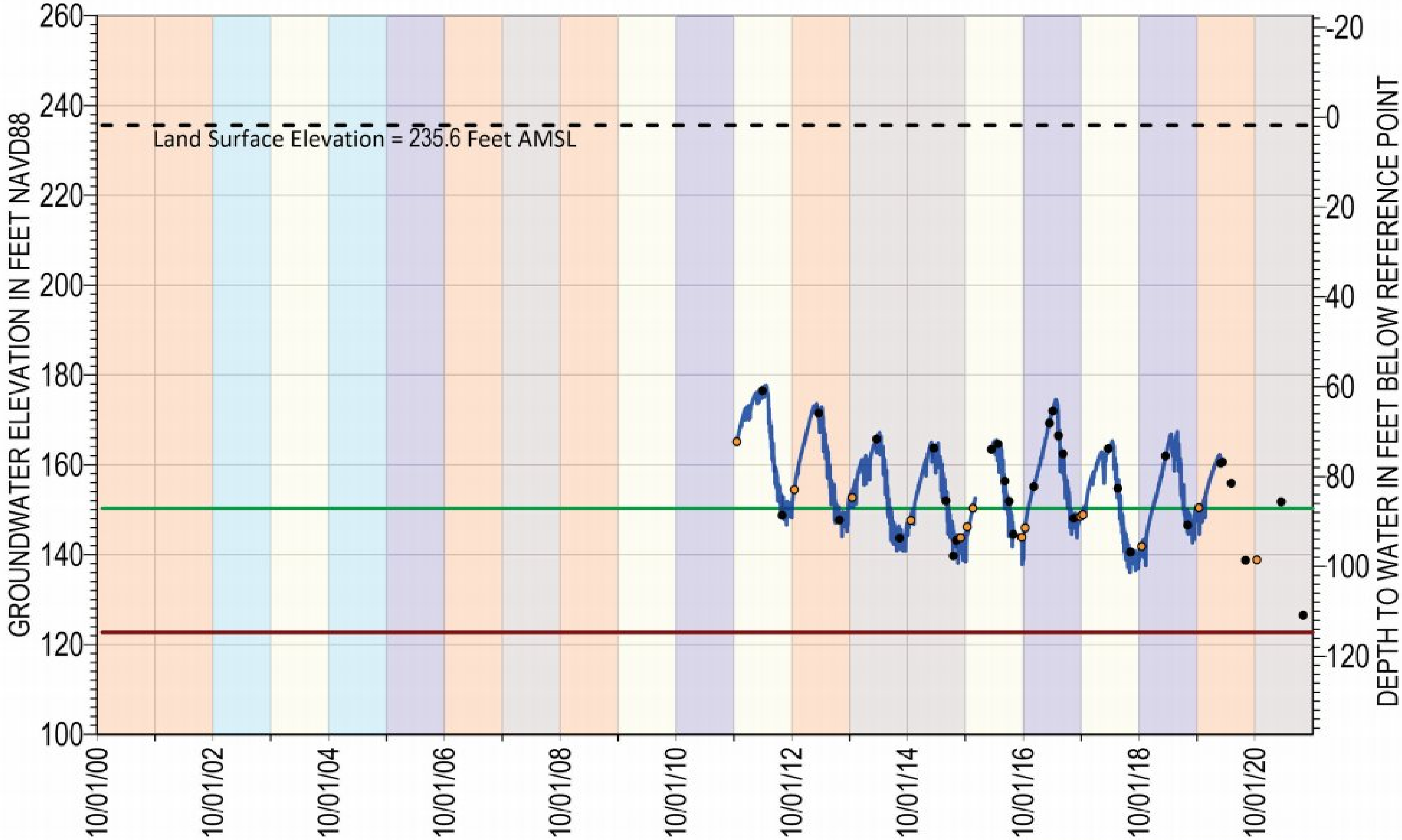


Climate Classification

Wet
Above Normal
Below Normal
Dry
Critically Dry

**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy **23N03W25M004M**



23N03W25M004M Groundwater Elevation
23N03W25M004M Transducer Data
Land Surface Elevation
Measurable Objective
Minimum Threshold

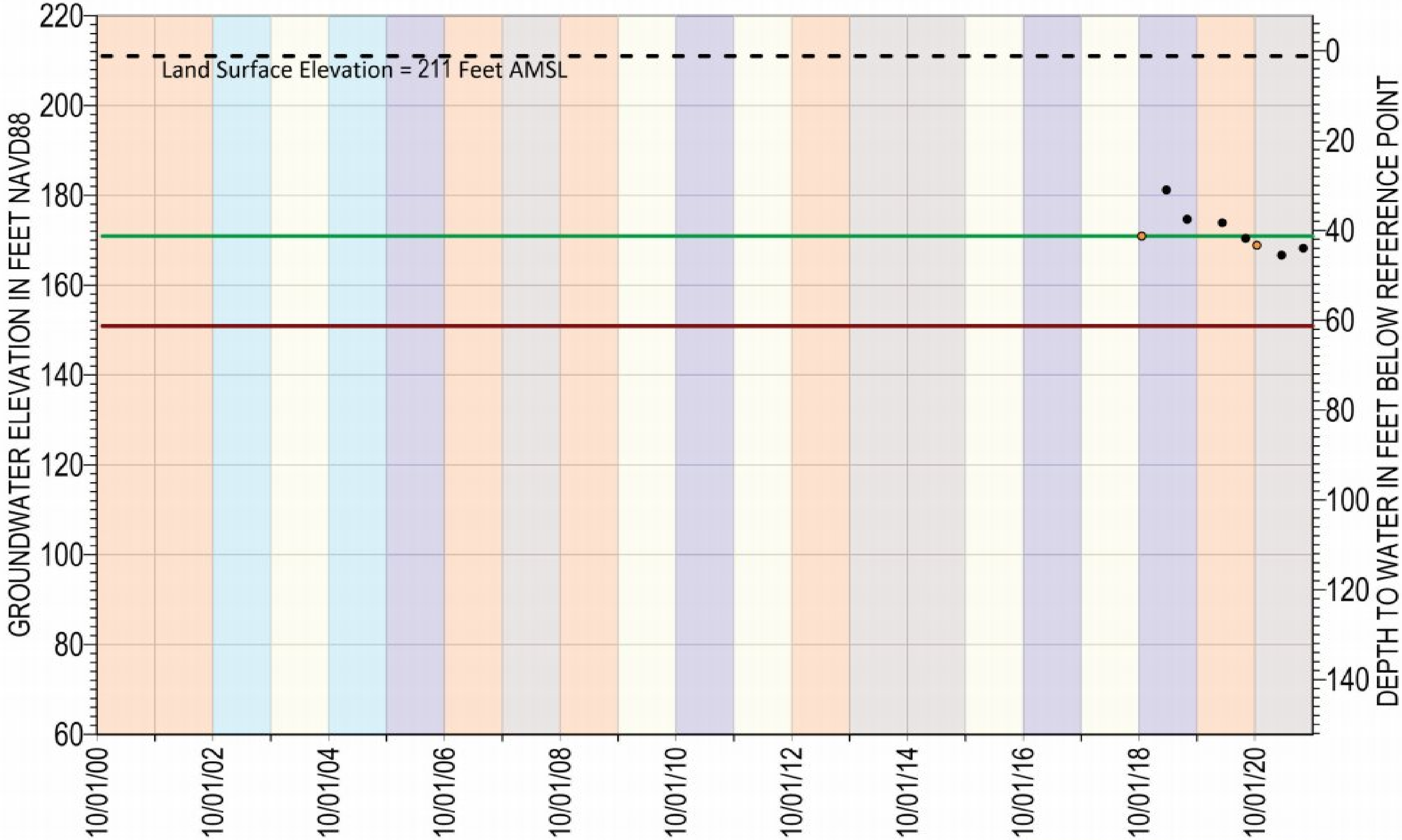
Reference Point Elevation= 237.4 ft NAVD88
Well Type: Observation
Total Depth: 155 ft bgs
Well Screen Interval= 120 - 130 ft bgs

Climate Classification

Wet
Above Normal
Below Normal
Dry
Critically Dry

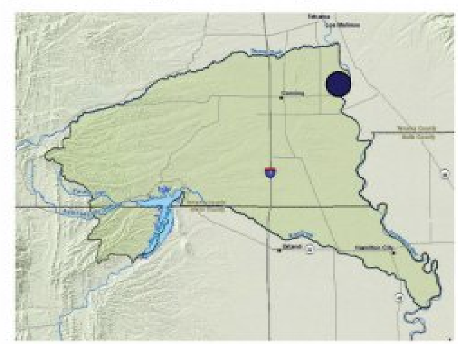
**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy **24N02W17A001M**



24N02W17A001M Groundwater Elevation
Land Surface Elevation
Measurable Objective
Minimum Threshold

Reference Point Elevation= 212.2 ft NAVD88
Well Type: Domestic
Total Depth: 140 ft bgs
Well Screen Interval= 120 - 140 ft bgs

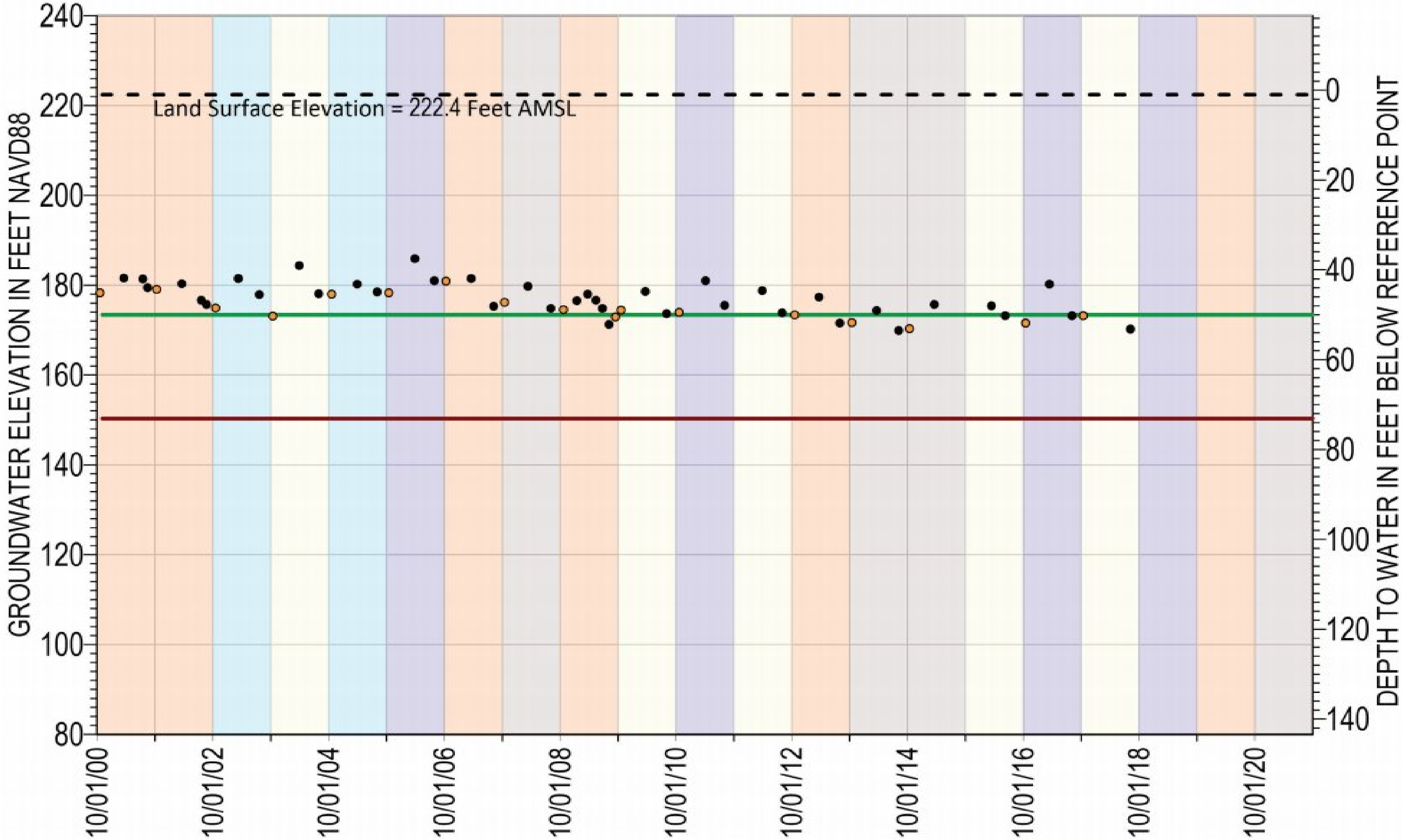


Climate Classification

Wet
Above Normal
Below Normal
Dry
Critically Dry

**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy **24N02W20B001M**

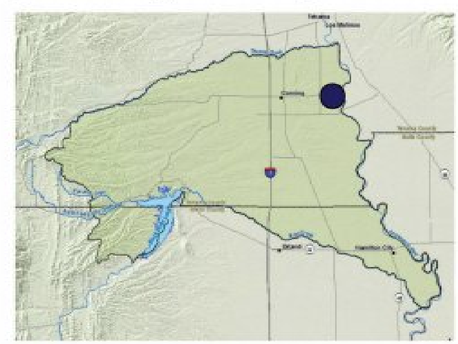


- 24N02W20B001M Groundwater Elevation
- Land Surface Elevation
- Measurable Objective
- Minimum Threshold

Reference Point Elevation= 223.4 ft NAVD88
Well Type: Domestic
Total Depth: 120 ft bgs
Well Screen Interval= 100 - 120 ft bgs

Climate Classification

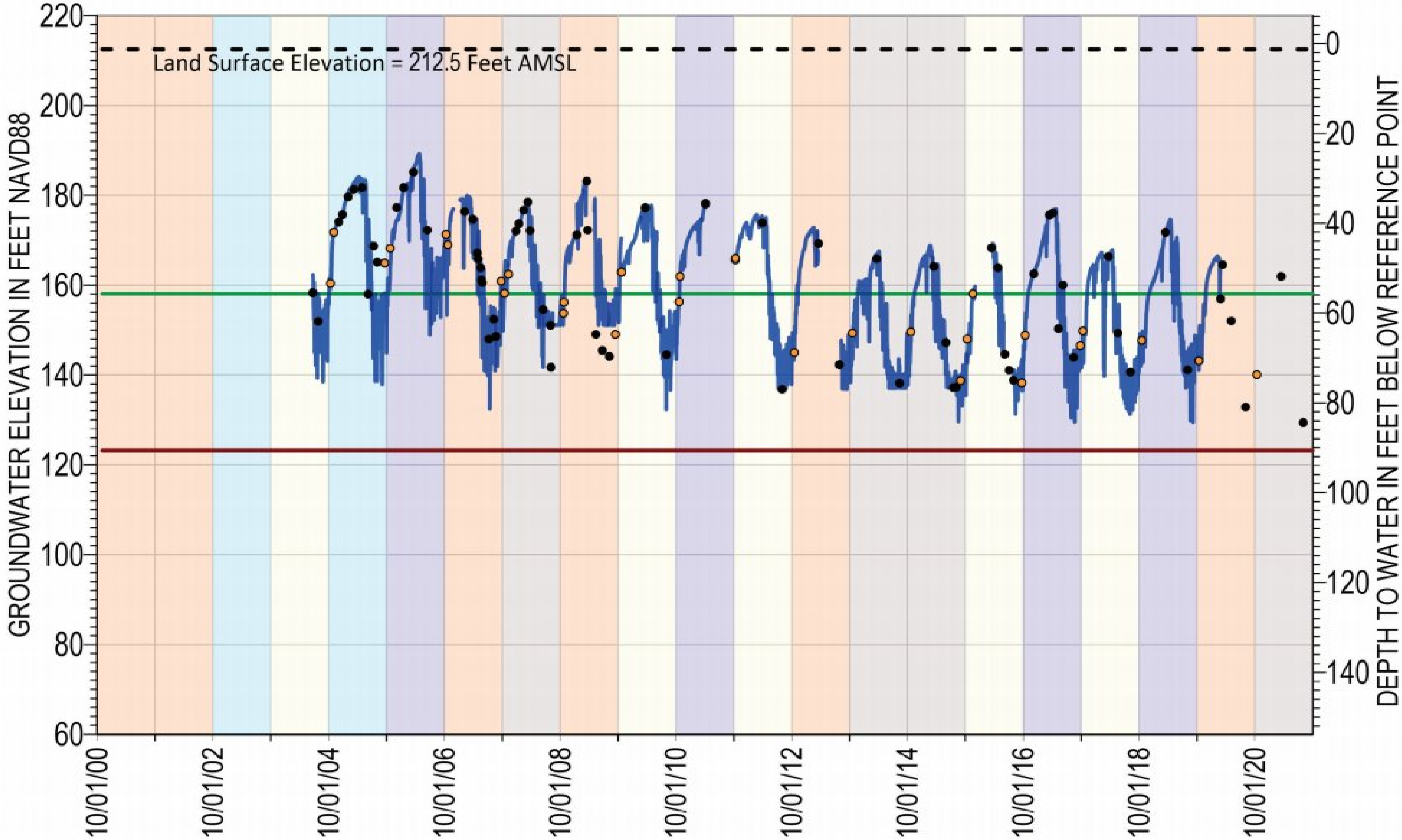
Wet | Below Normal | Critically Dry | Above Normal | Dry



**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels, groundwater storage proxy, and interconnected surface water proxy

24N02W29N003M

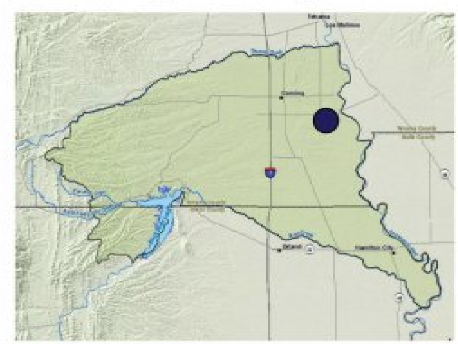


- 24N02W29N003M Groundwater Elevation
- 24N02W29N003M Transducer Data
- Land Surface Elevation
- Measurable Objective
- Minimum Threshold

Reference Point Elevation= 213.8 ft NAVD88
Well Type: Observation
Total Depth: 388 ft bgs
Well Screen Interval= 200 - 290 ft bgs

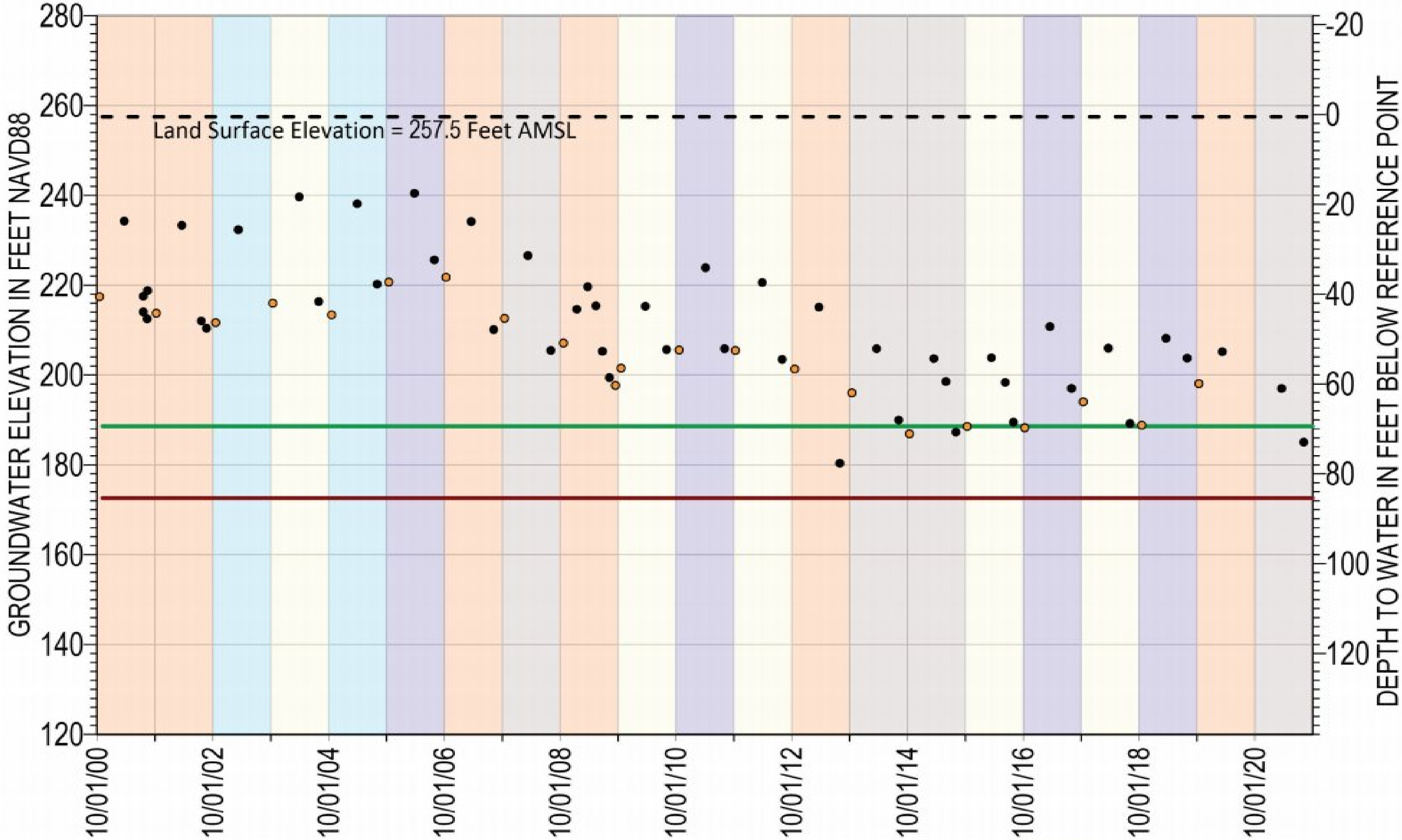
Climate Classification

Wet · Above Normal · Below Normal · Dry · Critically Dry



**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy **24N03W02R001M**



24N03W02R001M Groundwater Elevation
Land Surface Elevation
Measurable Objective
Minimum Threshold

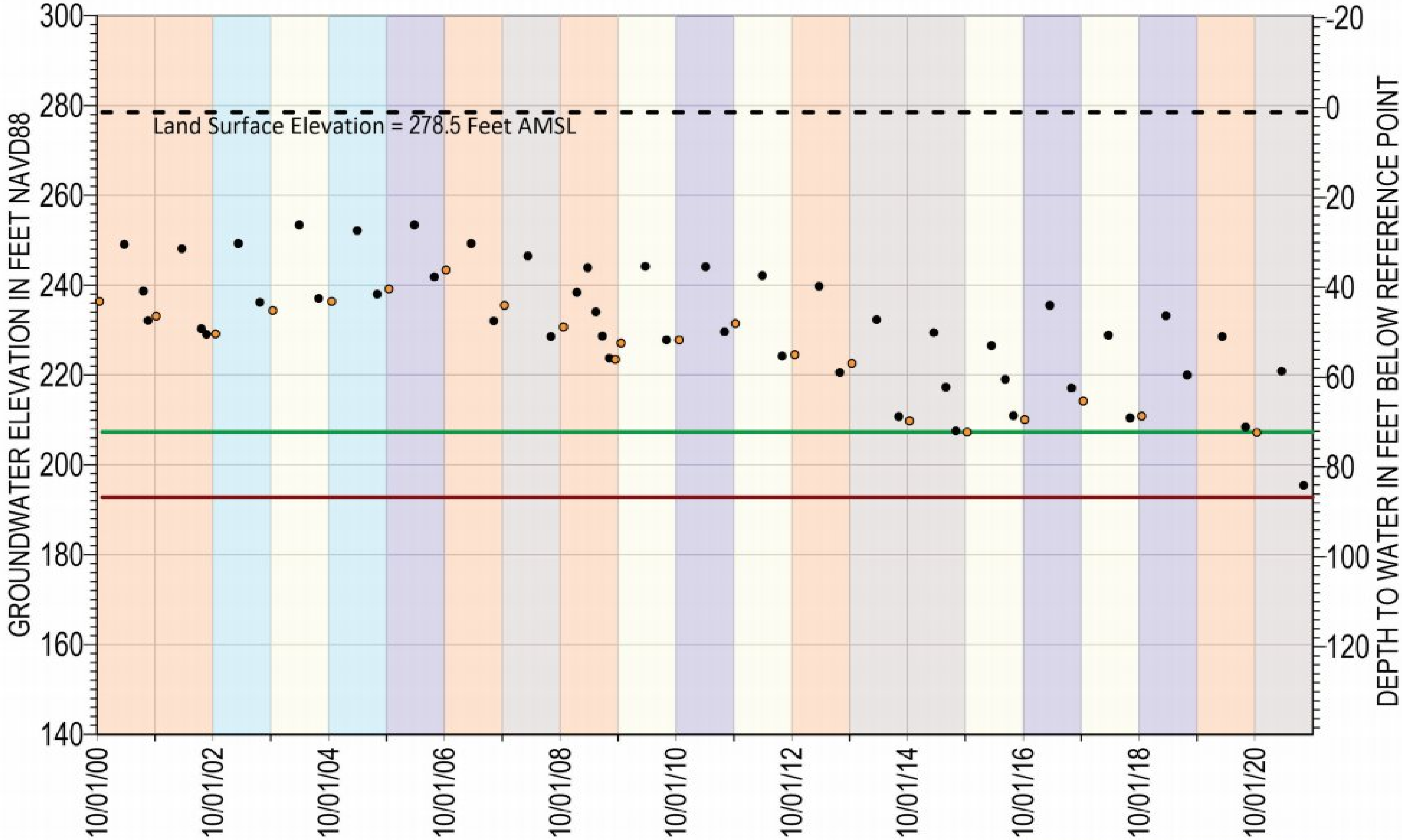
Reference Point Elevation= 258 ft NAVD88
Well Type: Domestic
Total Depth: 270 ft bgs
Well Screen Interval= Unknown ft bgs

Climate Classification

Wet
Above Normal
Below Normal
Dry
Critically Dry

**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy **24N03W03R002M**



24N03W03R002M Groundwater Elevation

Land Surface Elevation

Measurable Objective

Minimum Threshold

Reference Point Elevation= 279.5 ft NAVD88

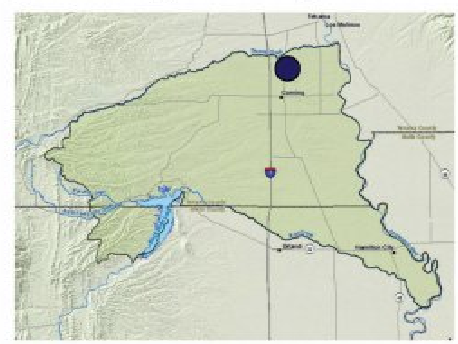
Well Type: Domestic

Total Depth: 132 ft bgs

Well Screen Interval= 112 - 132 ft bgs

Climate Classification

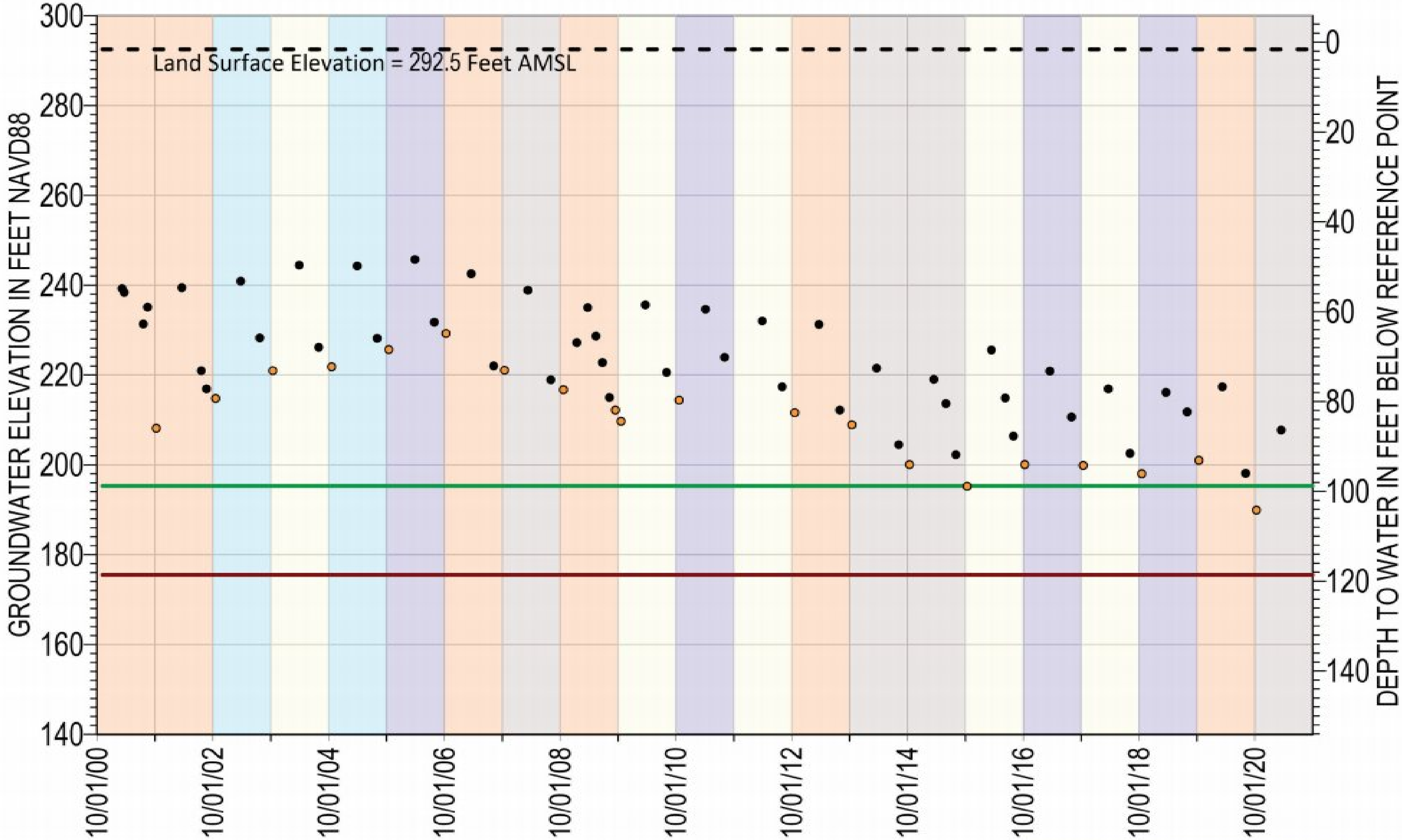
Wet | Below Normal | Critically Dry | Above Normal | Dry



**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy

24N03W14B001M

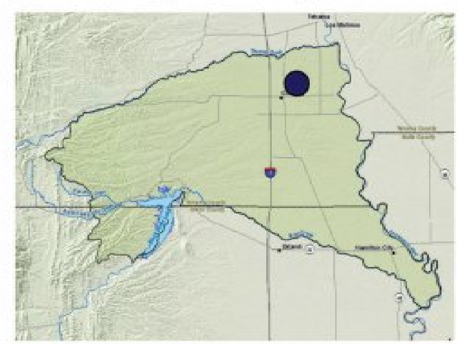


24N03W14B001M Groundwater Elevation
Land Surface Elevation
Measurable Objective
Minimum Threshold

Reference Point Elevation= 294.1 ft NAVD88
Well Type: Industrial
Total Depth: 140 ft bgs
Well Screen Interval= 130 - 140 ft bgs

Climate Classification

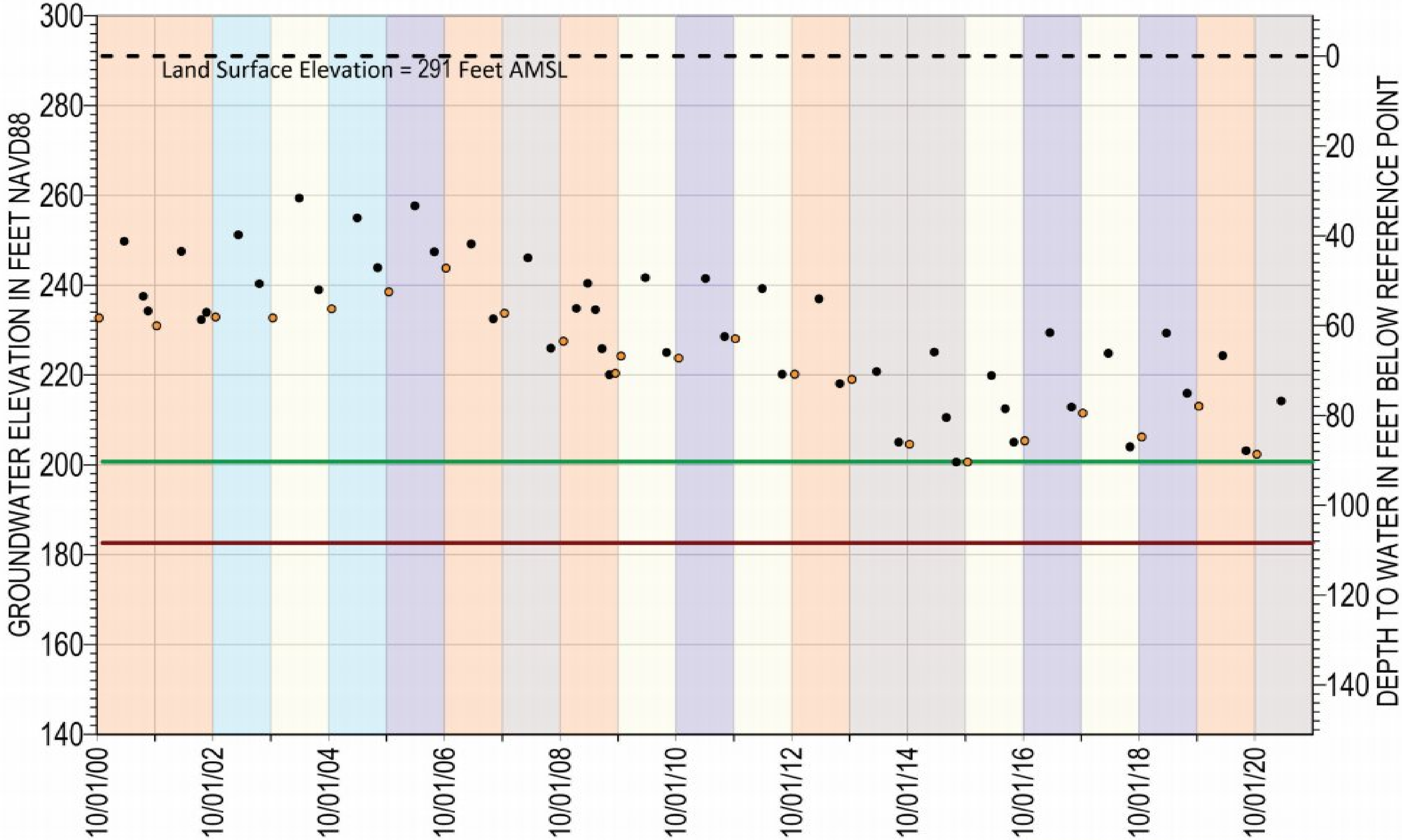
Wet
Above Normal
Below Normal
Dry
Critically Dry



**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy

24N03W16A001M

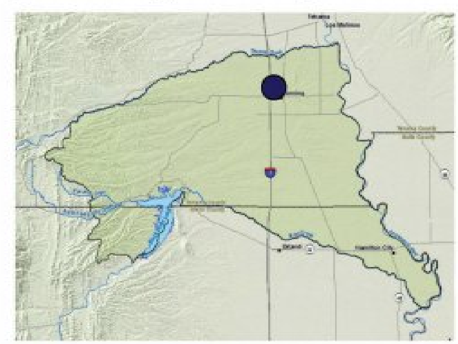


24N03W16A001M Groundwater Elevation
Land Surface Elevation
Measurable Objective
Minimum Threshold

Reference Point Elevation= 291 ft NAVD88
Well Type: Irrigation
Total Depth: 195 ft bgs
Well Screen Interval= 85 - 195 ft bgs

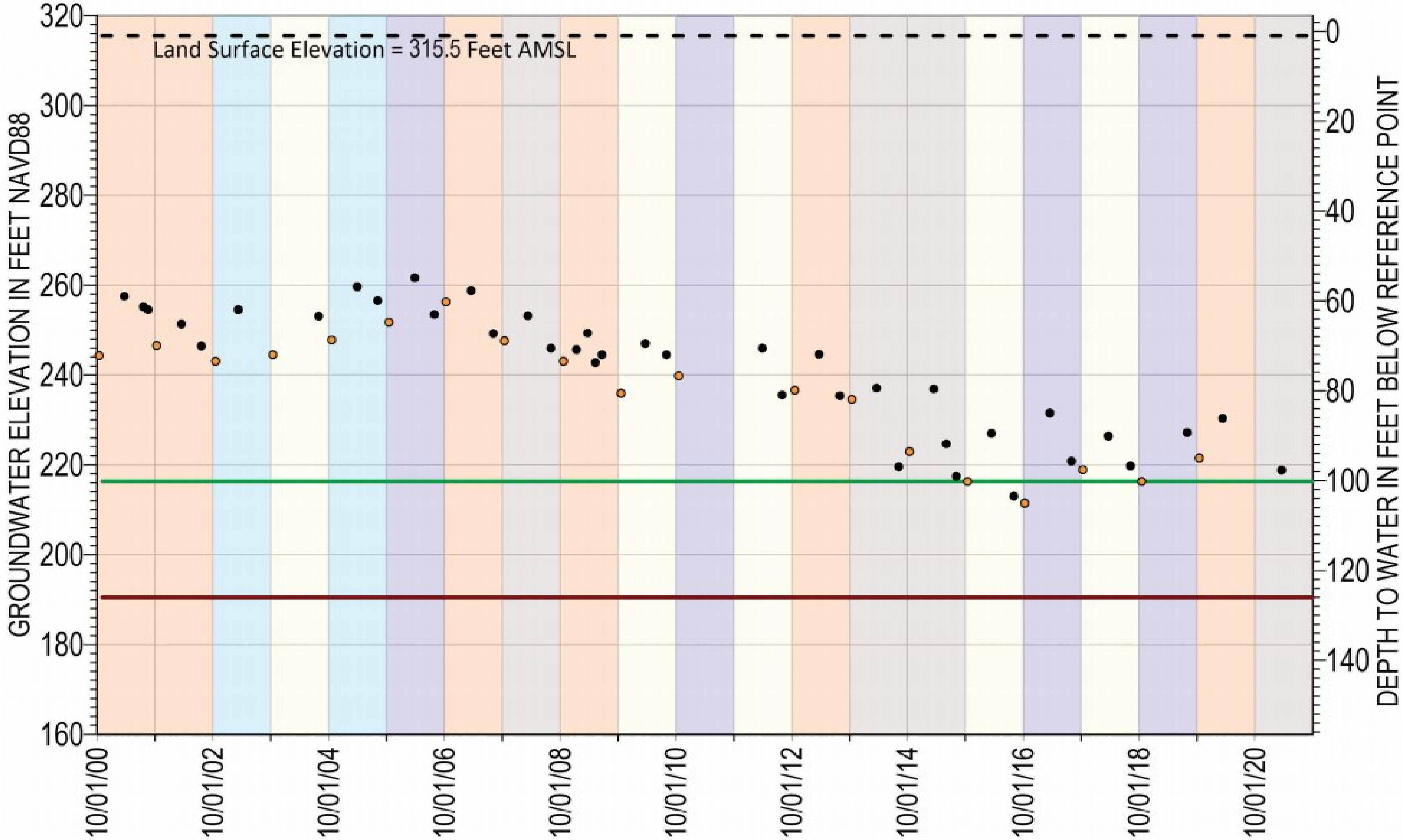
Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry



**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy **24N03W17M001M**

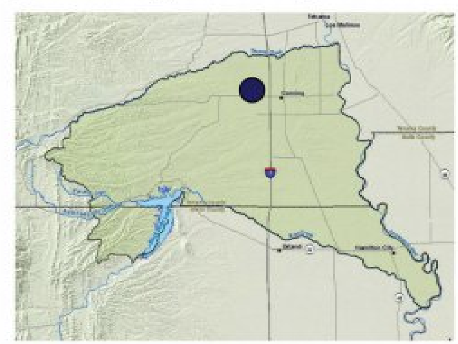


24N03W17M001M Groundwater Elevation
Land Surface Elevation
Measurable Objective
Minimum Threshold

Reference Point Elevation= 316.5 ft NAVD88
Well Type: Domestic
Total Depth: 108 ft bgs
Well Screen Interval= 100 - 108 ft bgs

Climate Classification

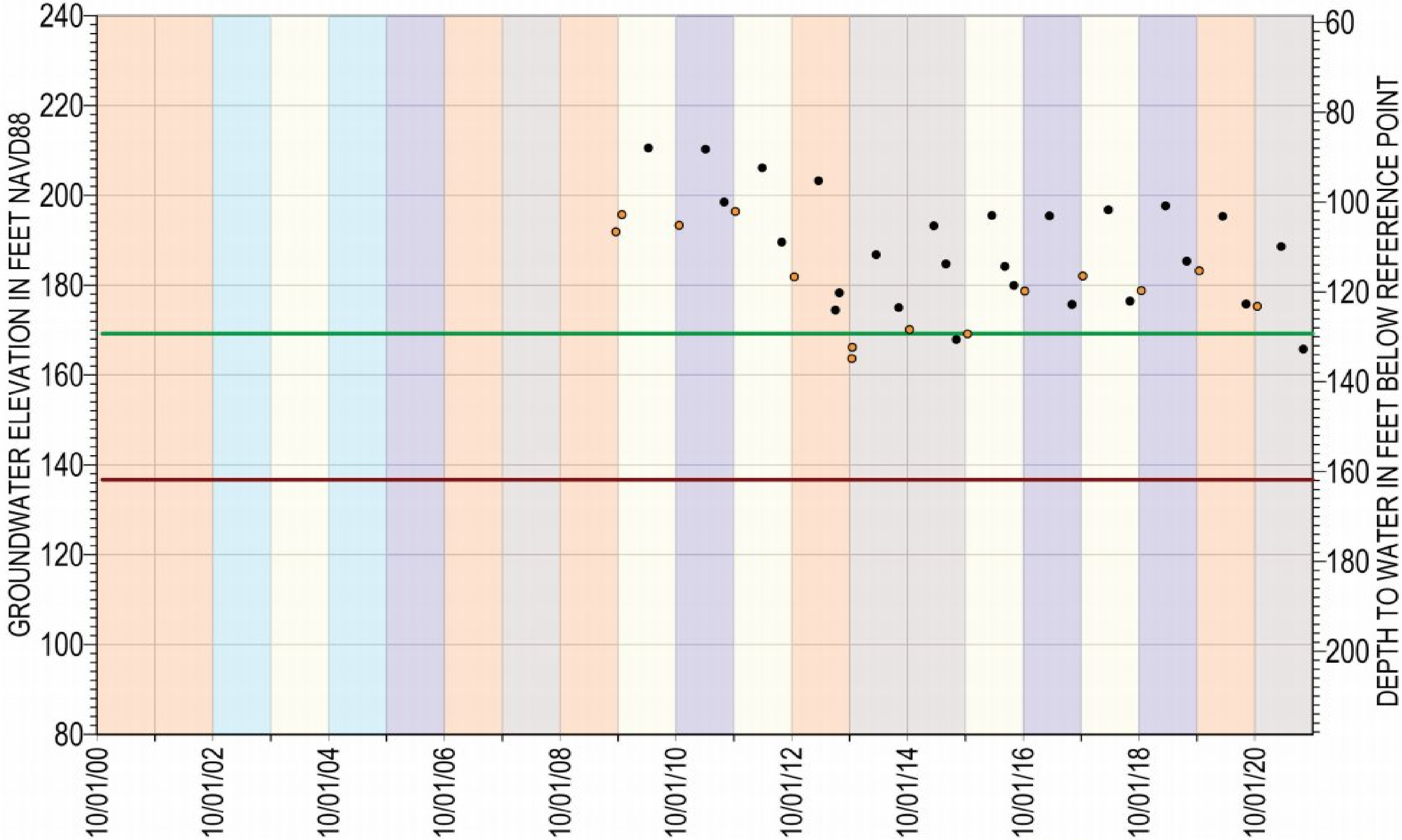
Wet
Above Normal
Below Normal
Dry
Critically Dry



**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy

24N03W24E001M



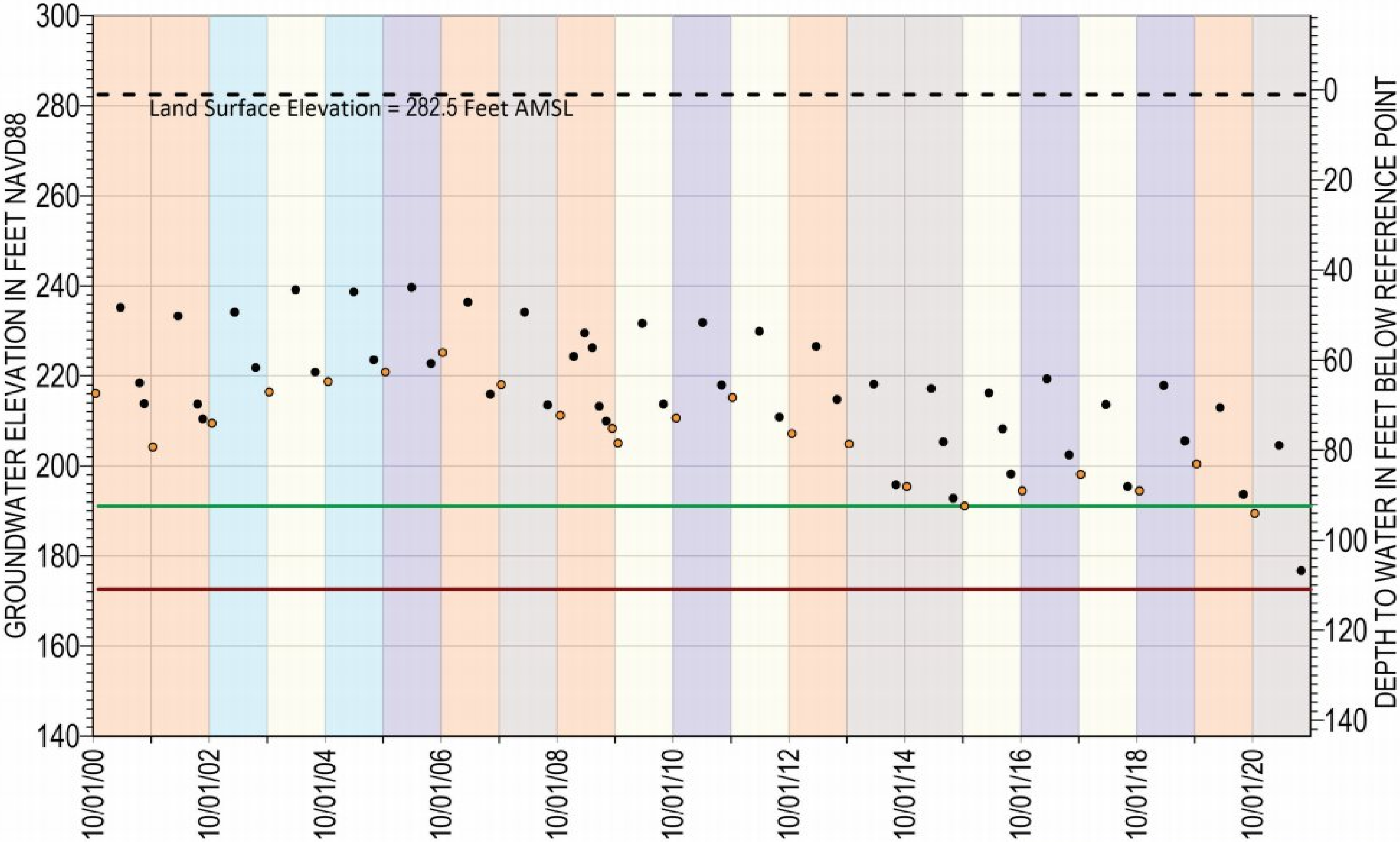
Reference Point Elevation= 298.5 ft NAVD88
Well Type: Domestic
Total Depth: 224 ft bgs
Well Screen Interval= 212 - 220 ft bgs

Climate Classification

**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy

24N03W26K001M



- 24N03W26K001M Groundwater Elevation
- Land Surface Elevation
- Measurable Objective
- Minimum Threshold

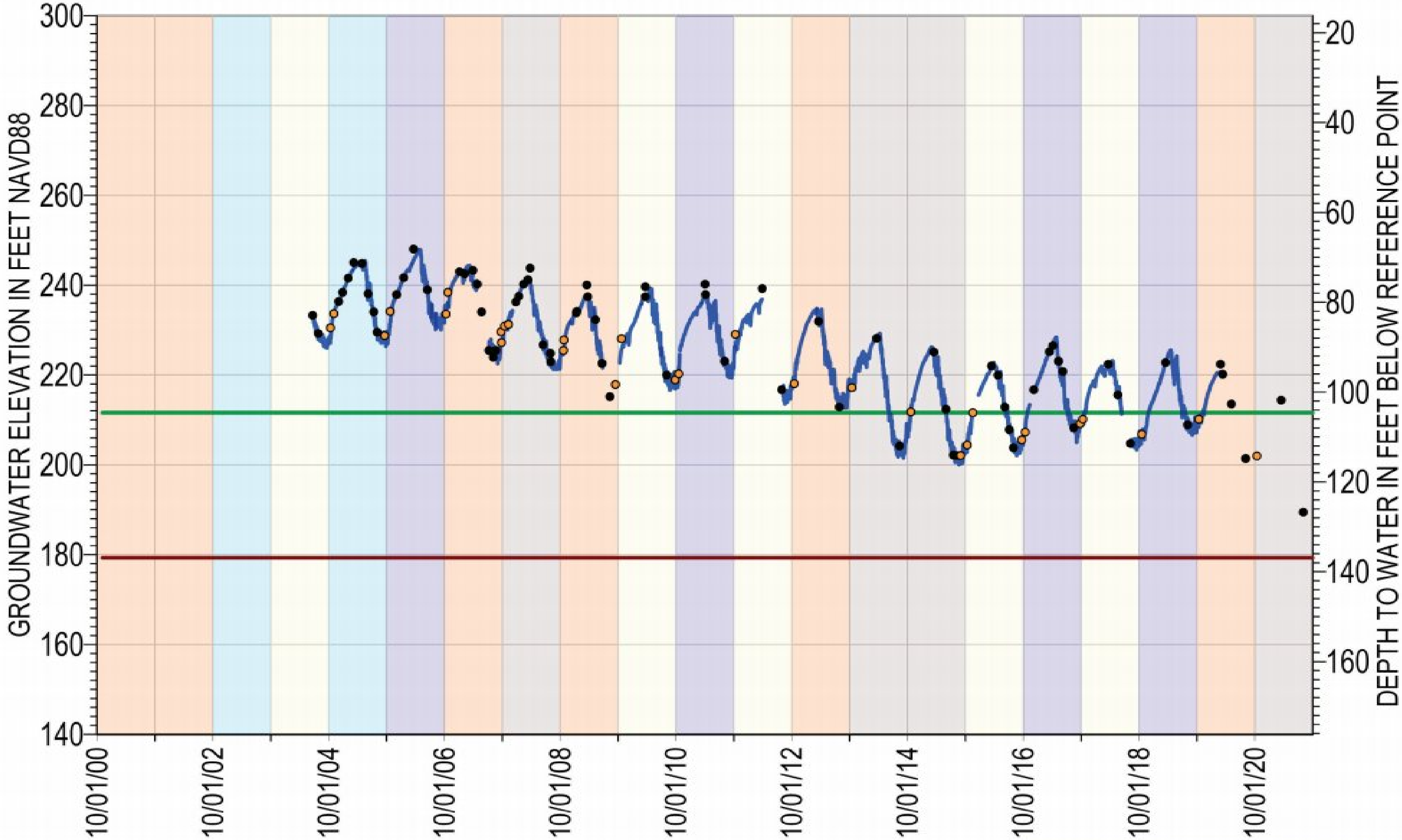
Reference Point Elevation= 283.5 ft NAVD88
Well Type: Irrigation
Total Depth: 245 ft bgs
Well Screen Interval= 103 - 175 ft bgs

Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy **24N03W29Q001M**

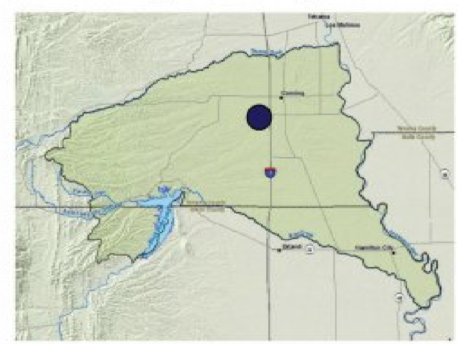


- 24N03W29Q001M Groundwater Elevation
- 24N03W29Q001M Transducer Data
- Measurable Objective
- Minimum Threshold

Reference Point Elevation= 316.2 ft NAVD88
Well Type: Observation
Total Depth: 372 ft bgs
Well Screen Interval= 130 - 360 ft bgs

Climate Classification

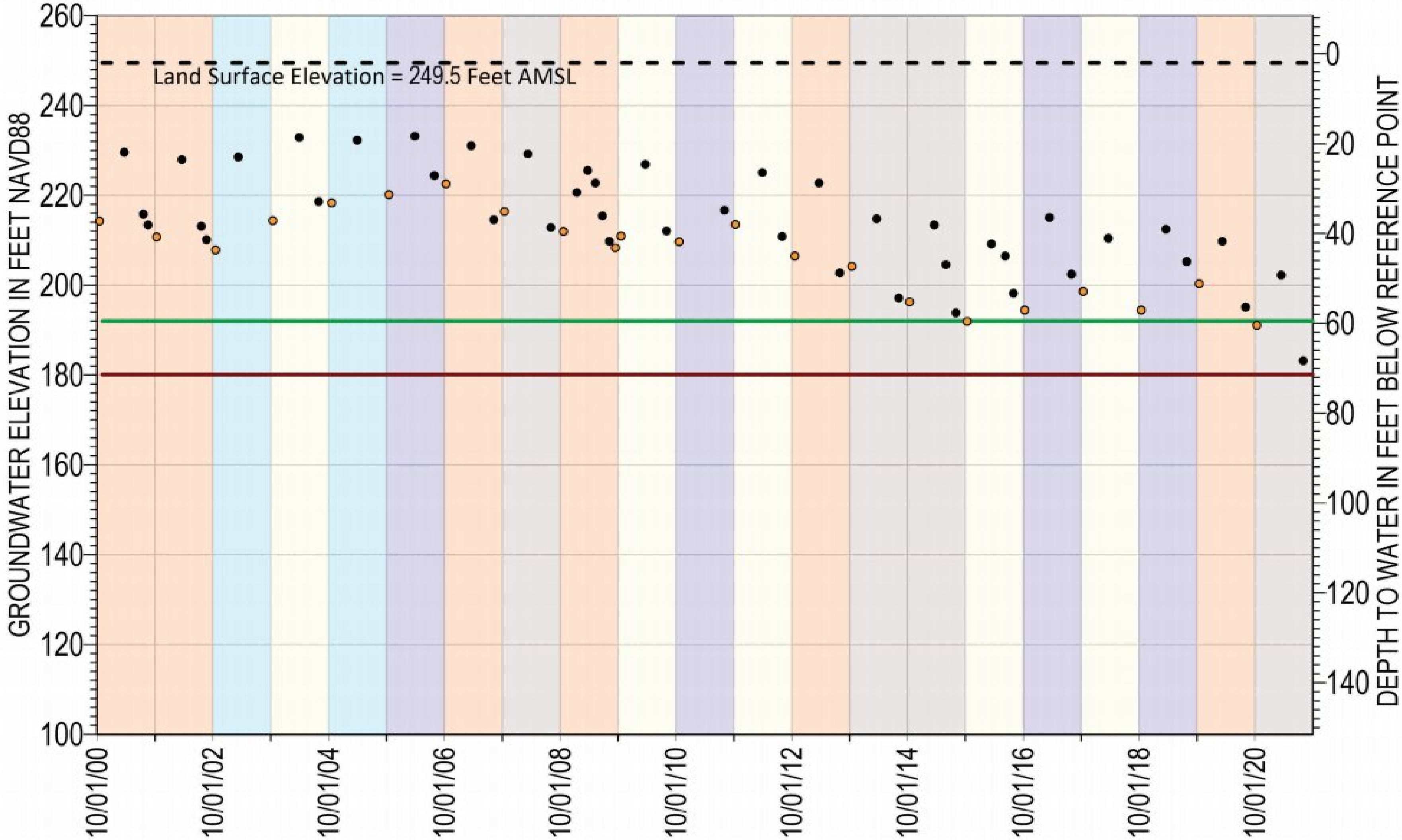
Wet | Above Normal | Below Normal | Dry | Critically Dry



**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy

24N03W35P005M



24N03W35P005M Groundwater Elevation

Land Surface Elevation

Measurable Objective

Minimum Threshold

Reference Point Elevation= 251.5 ft NAVD88

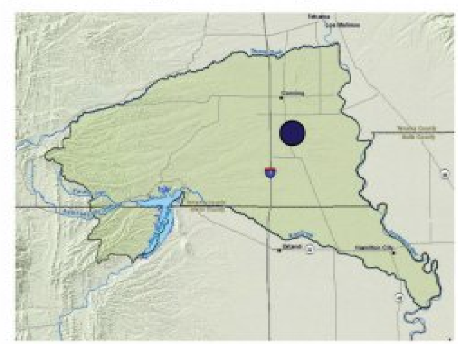
Well Type: Domestic

Total Depth: 120 ft bgs

Well Screen Interval= 100 - 120 ft bgs

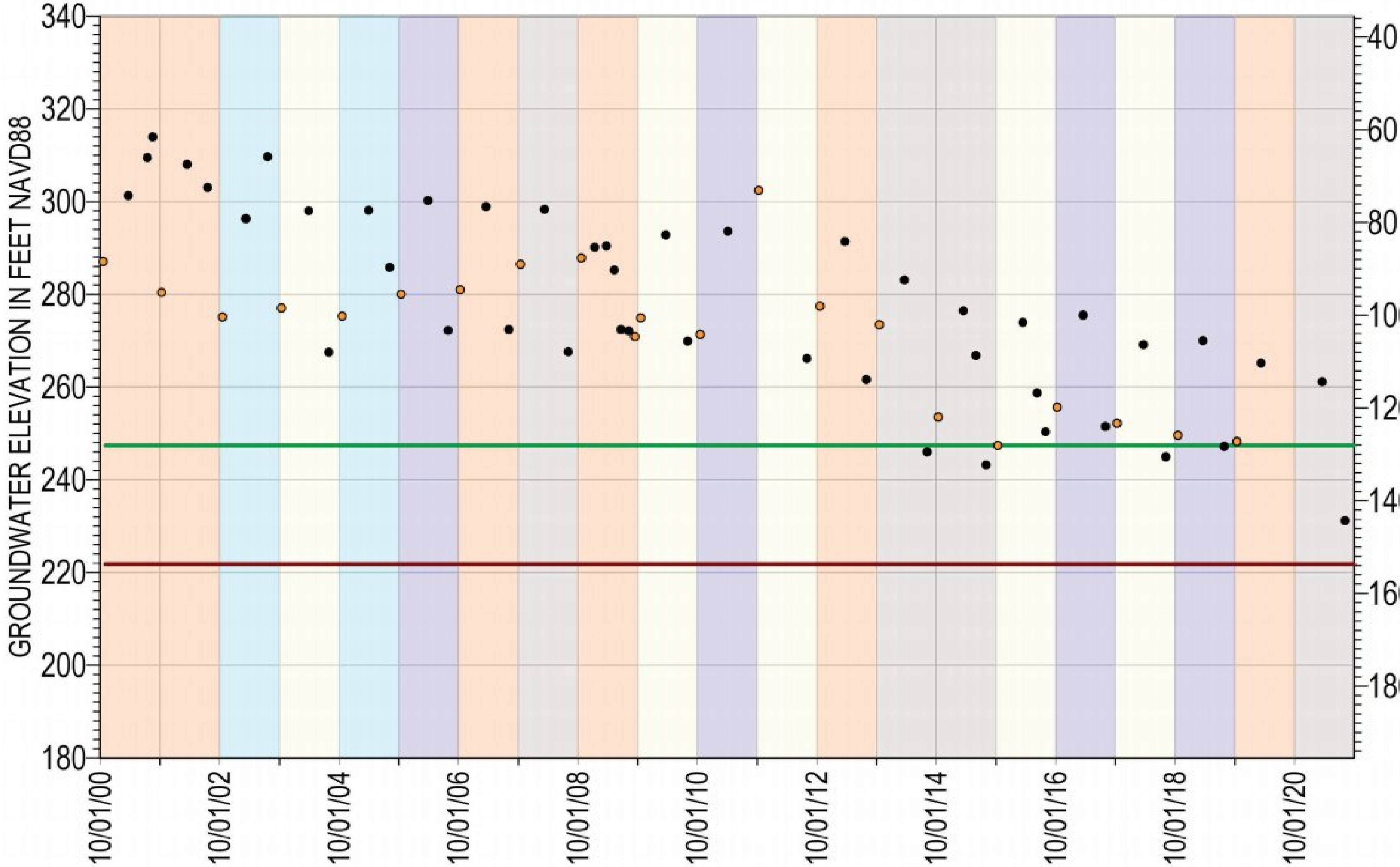
Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry



**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy **24N04W14N002M**



24N04W14N002M Groundwater Elevation
Measurable Objective
Minimum Threshold

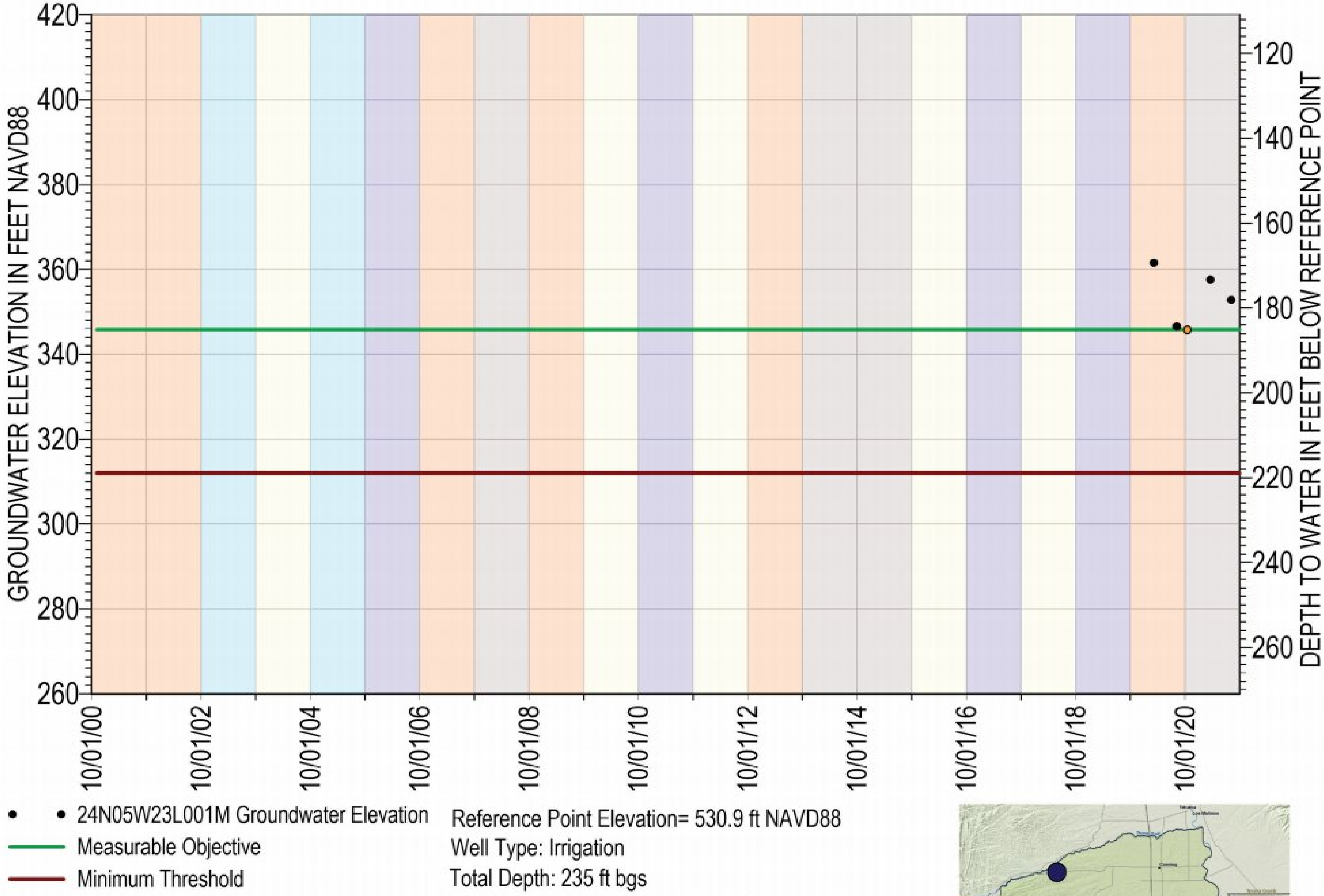
Reference Point Elevation= 375.5 ft NAVD88
Well Type: Domestic
Total Depth: 180 ft bgs
Well Screen Interval= Unknown ft bgs

Climate Classification

Wet
Above Normal
Below Normal
Dry
Critically Dry

**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy **24N05W23L001M**



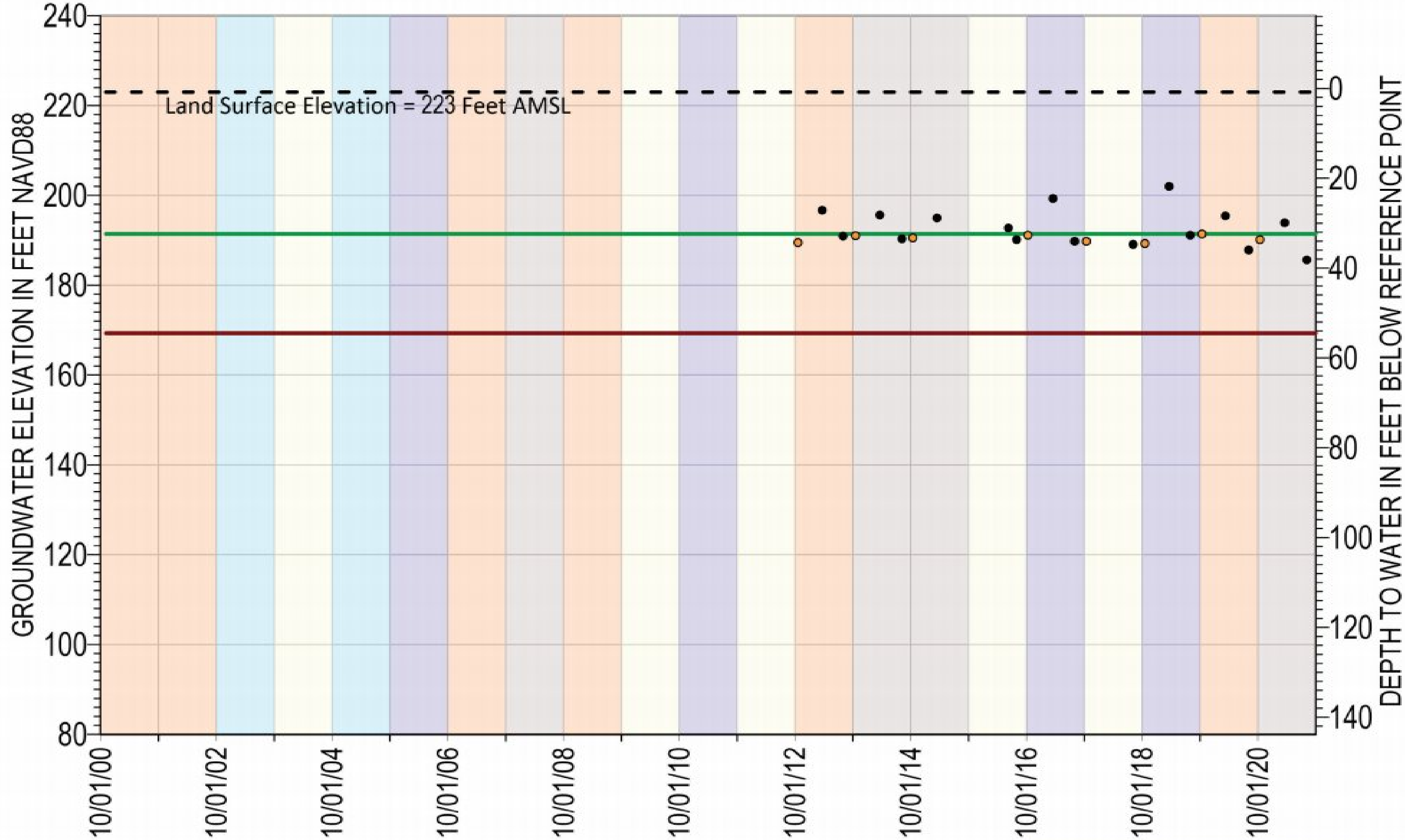
Reference Point Elevation= 530.9 ft NAVD88
Well Type: Irrigation
Total Depth: 235 ft bgs
Well Screen Interval= Unknown ft bgs

Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

Shallow RMP - groundwater levels and groundwater storage proxy **25N02W31G002M**



• • 25N02W31G002M Groundwater Elevation

- - - Land Surface Elevation

Measurable Objective

Minimum Threshold

Reference Point Elevation= 223.8 ft NAVD88

Well Type: Irrigation

Total Depth: 115 ft bgs

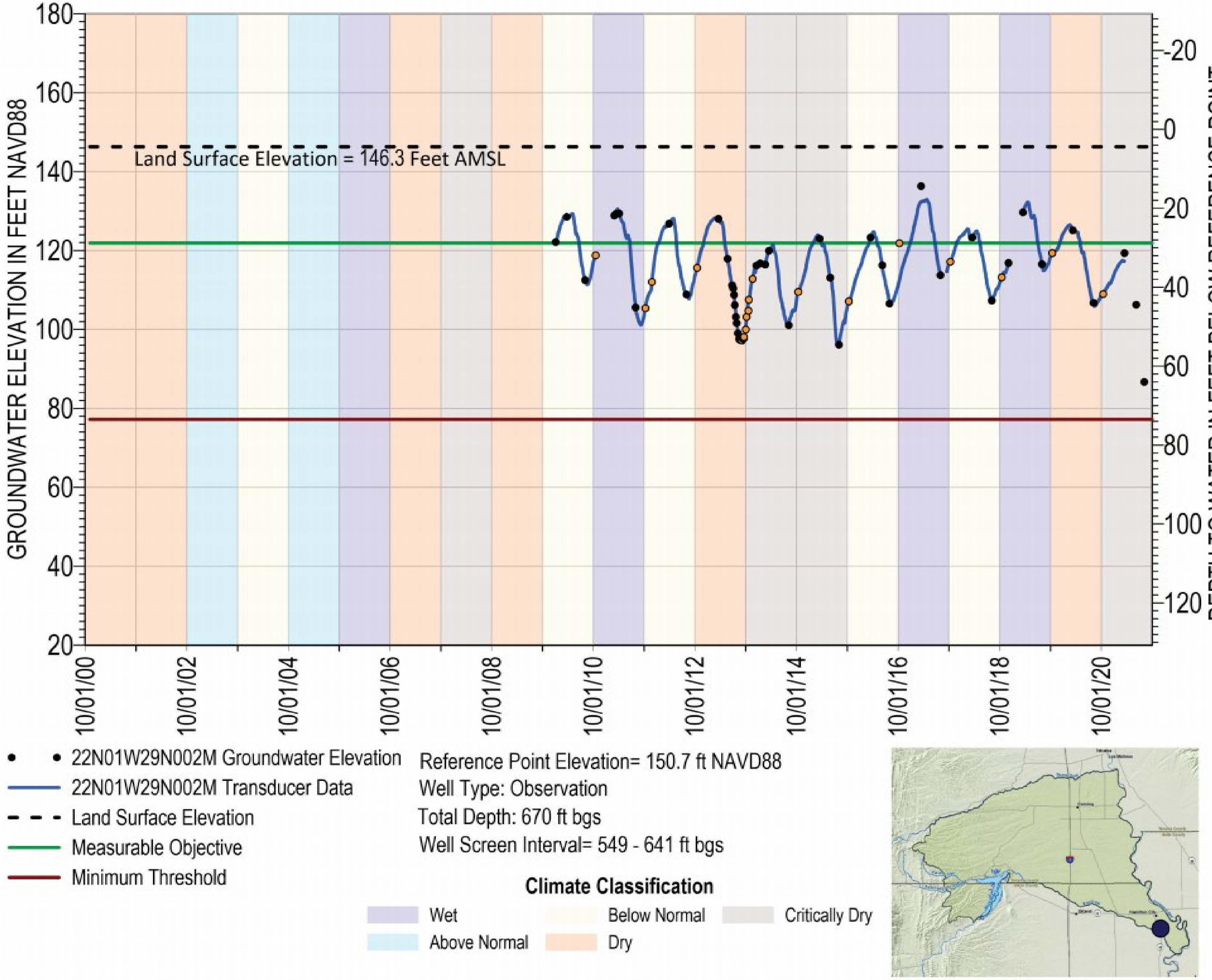
Well Screen Interval= 93 - 113 ft bgs

Climate Classification

Wet, Above Normal, Below Normal, Dry, Critically Dry

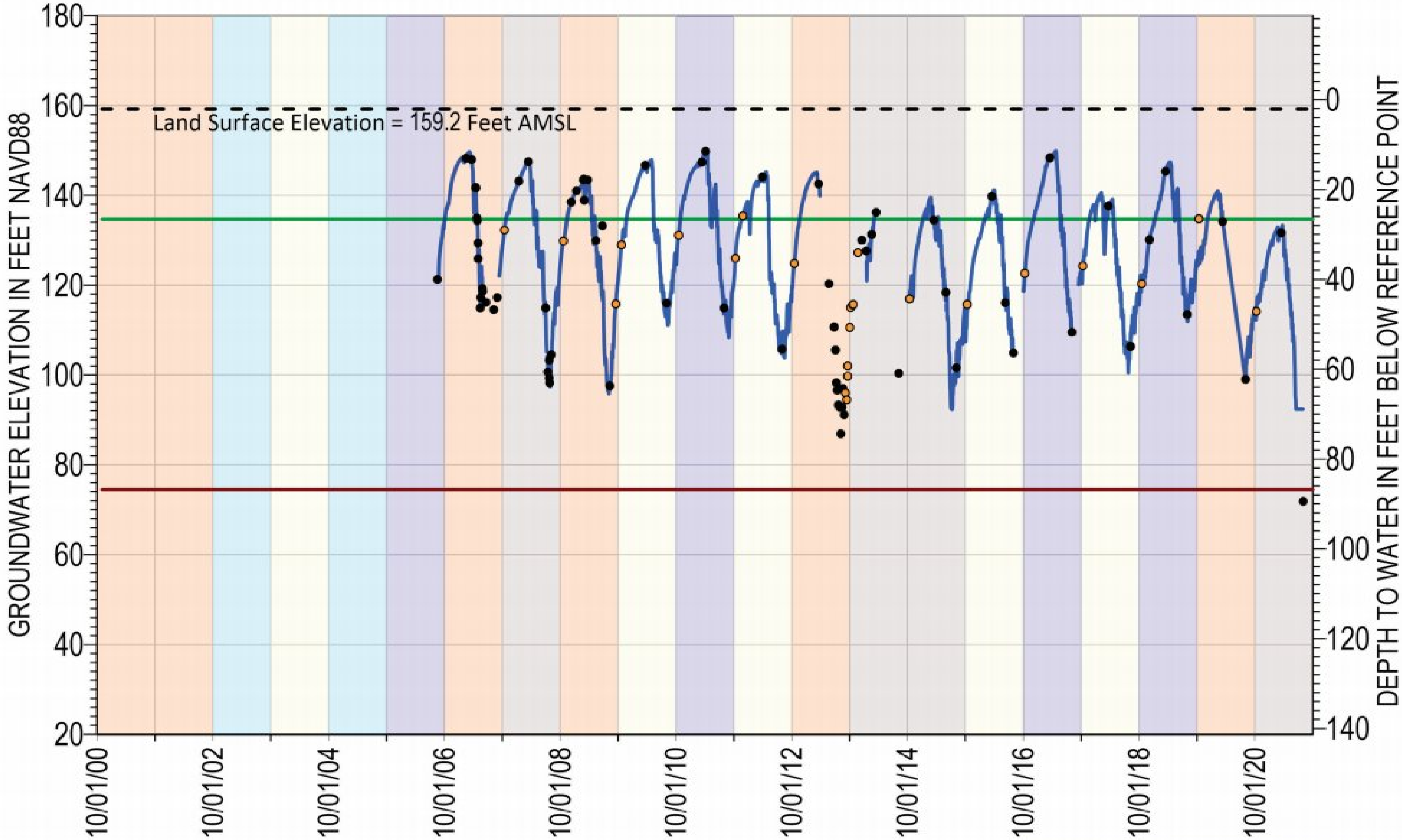
**Note: Fall hand measurements are shown in gold (September and October)*

Deep RMP - groundwater levels and groundwater storage proxy **22N01W29N002M**



**Note: Fall hand measurements are shown in gold (September and October)*

Deep RMP - groundwater levels and groundwater storage proxy **22N02W01N002M**



- • 22N02W01N002M Groundwater Elevation
- 22N02W01N002M Transducer Data
- Land Surface Elevation
- Measurable Objective
- Minimum Threshold

Reference Point Elevation= 161.3 ft NAVD88
Well Type: Observation
Total Depth: 730 ft bgs
Well Screen Interval= 700 - 710 ft bgs

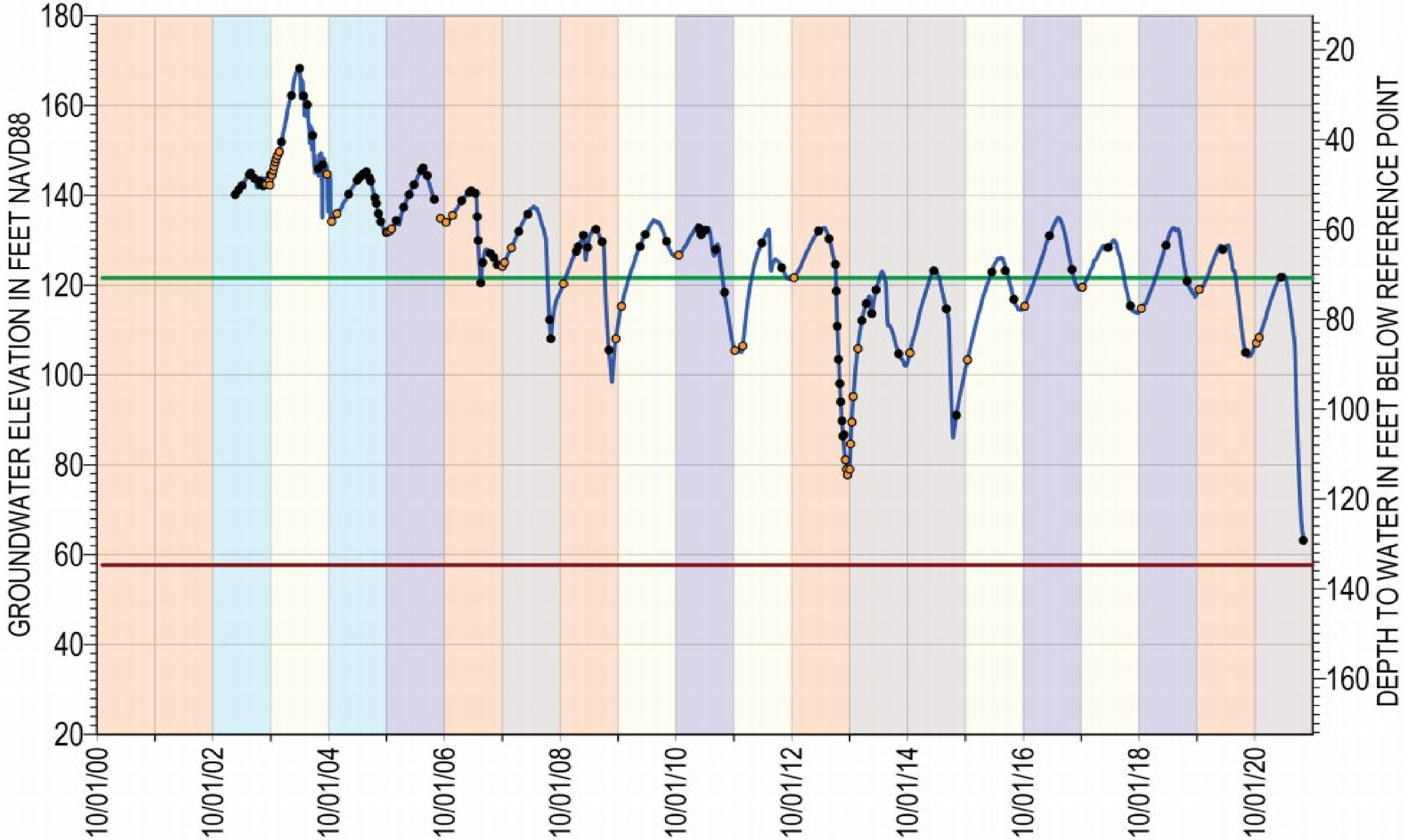
Climate Classification

Wet | Below Normal | Critically Dry
Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

Deep RMP - groundwater levels and groundwater storage proxy

22N02W15C002M



- 22N02W15C002M Groundwater Elevation
- 22N02W15C002M Transducer Data
- Measurable Objective
- Minimum Threshold

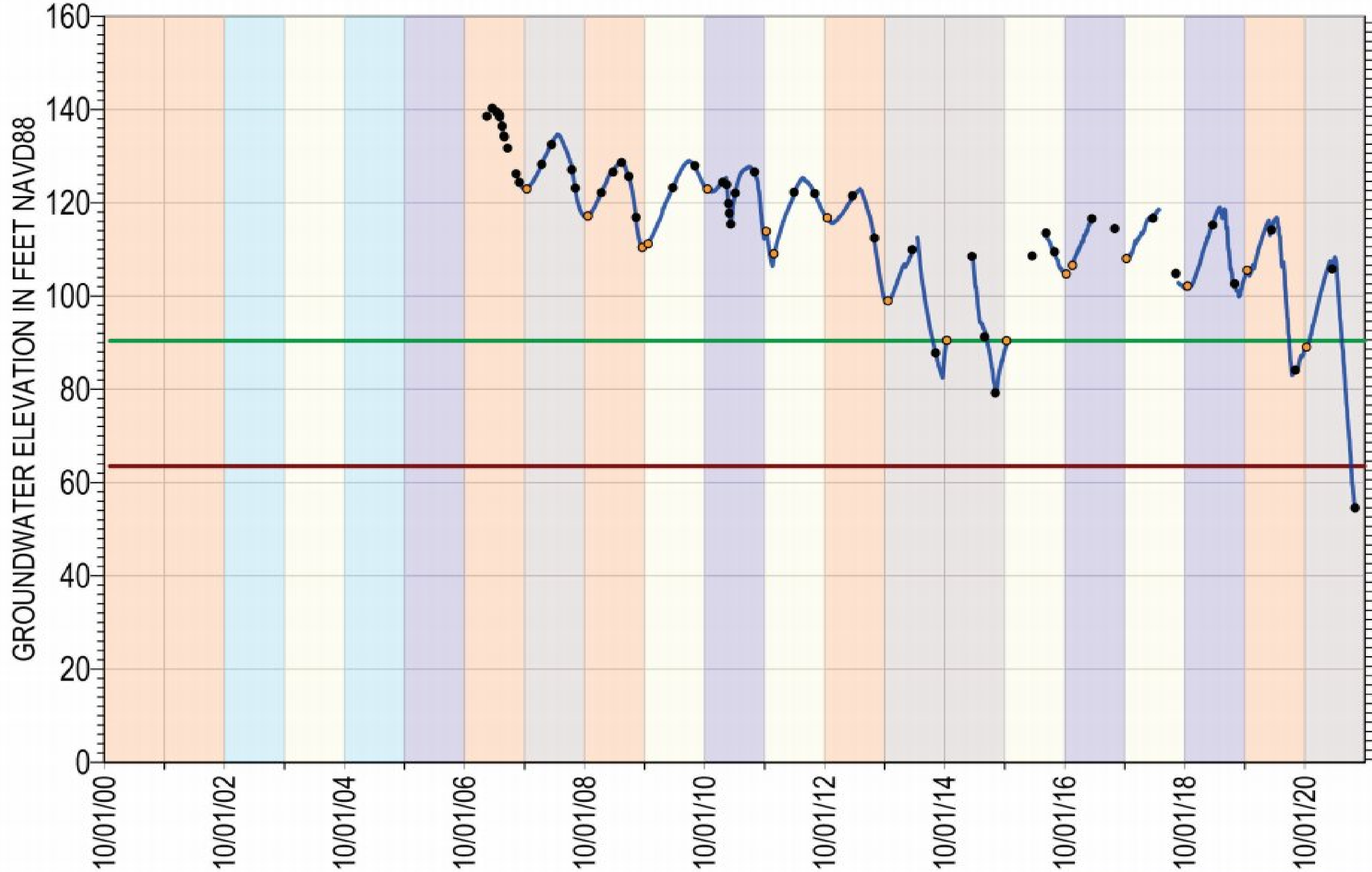
Reference Point Elevation= 192.4 ft NAVD88
Well Type: Observation
Total Depth: 825 ft bgs
Well Screen Interval= 760 - 781 ft bgs

Climate Classification

Wet | Below Normal | Critically Dry
Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

Deep RMP - groundwater levels and groundwater storage proxy **22N02W18C001M**



22N02W18C001M Groundwater Elevation
22N02W18C001M Transducer Data
Measurable Objective
Minimum Threshold

Reference Point Elevation= 224.6 ft NAVD88
Well Type: Observation
Total Depth: 1062 ft bgs
Well Screen Interval= 841 - 1029 ft bgs

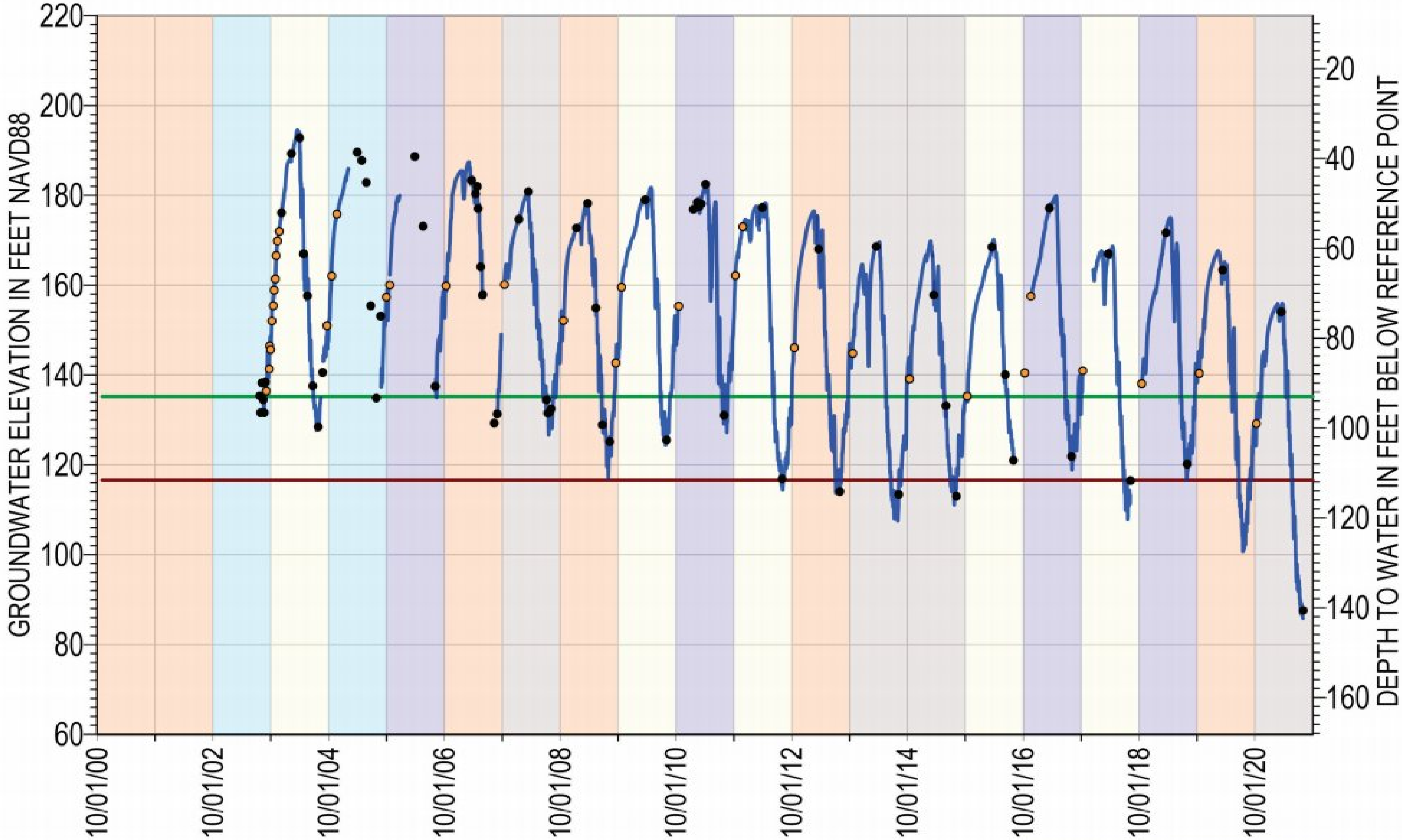
Climate Classification

Wet | Below Normal | Critically Dry
Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

Deep RMP - groundwater levels and groundwater storage proxy

22N03W01R001M



22N03W01R001M Groundwater Elevation
22N03W01R001M Transducer Data
Measurable Objective
Minimum Threshold

Reference Point Elevation= 228.2 ft NAVD88
Well Type: Observation
Total Depth: 515 ft bgs
Well Screen Interval= 470 - 480 ft bgs

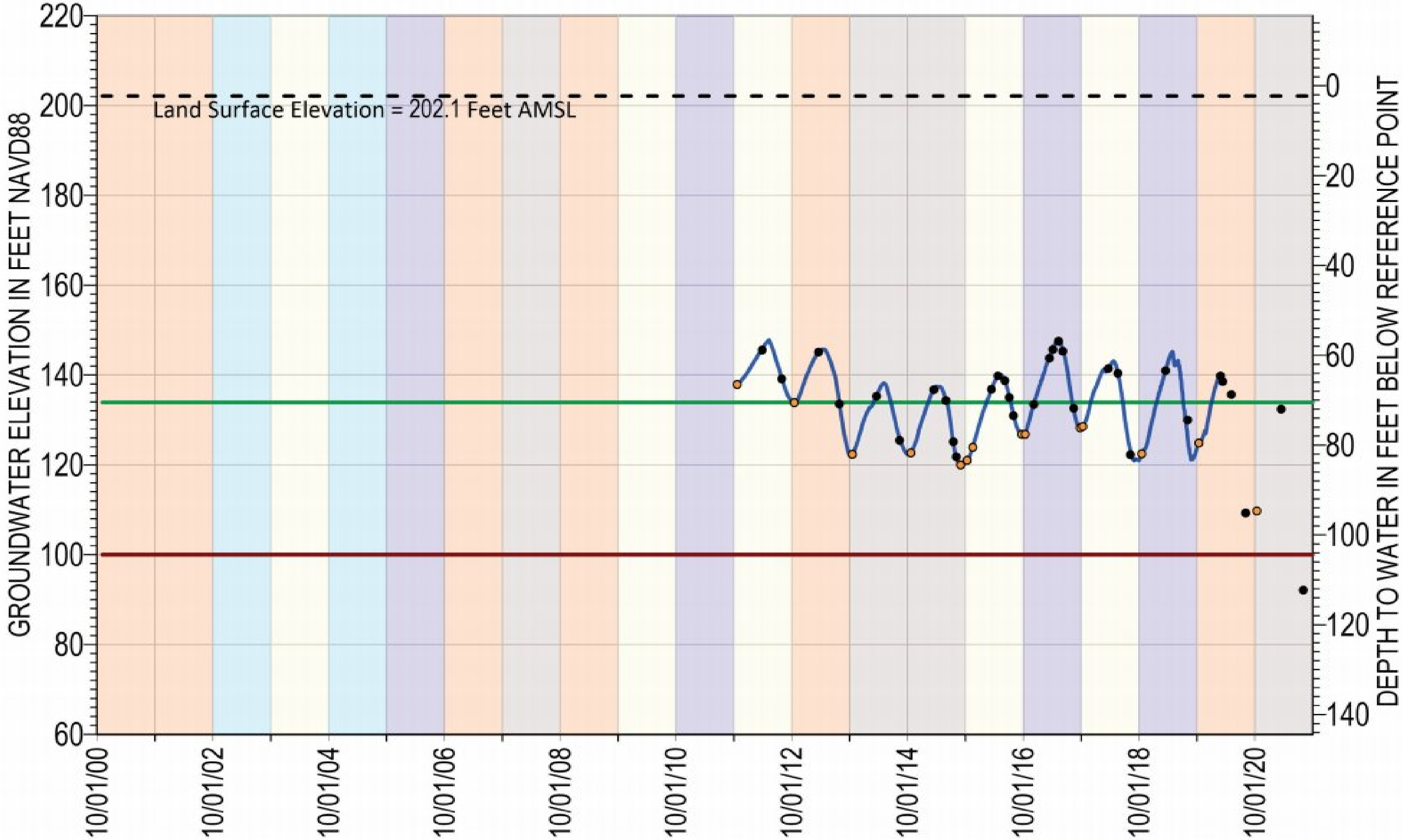
Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

Deep RMP - groundwater levels and groundwater storage proxy

23N02W28N002M

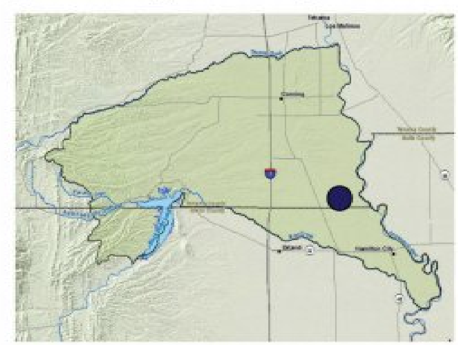


23N02W28N002M Groundwater Elevation
23N02W28N002M Transducer Data
Land Surface Elevation
Measurable Objective
Minimum Threshold

Reference Point Elevation= 204.4 ft NAVD88
Well Type: Observation
Total Depth: 580 ft bgs
Well Screen Interval= 550 - 570 ft bgs

Climate Classification

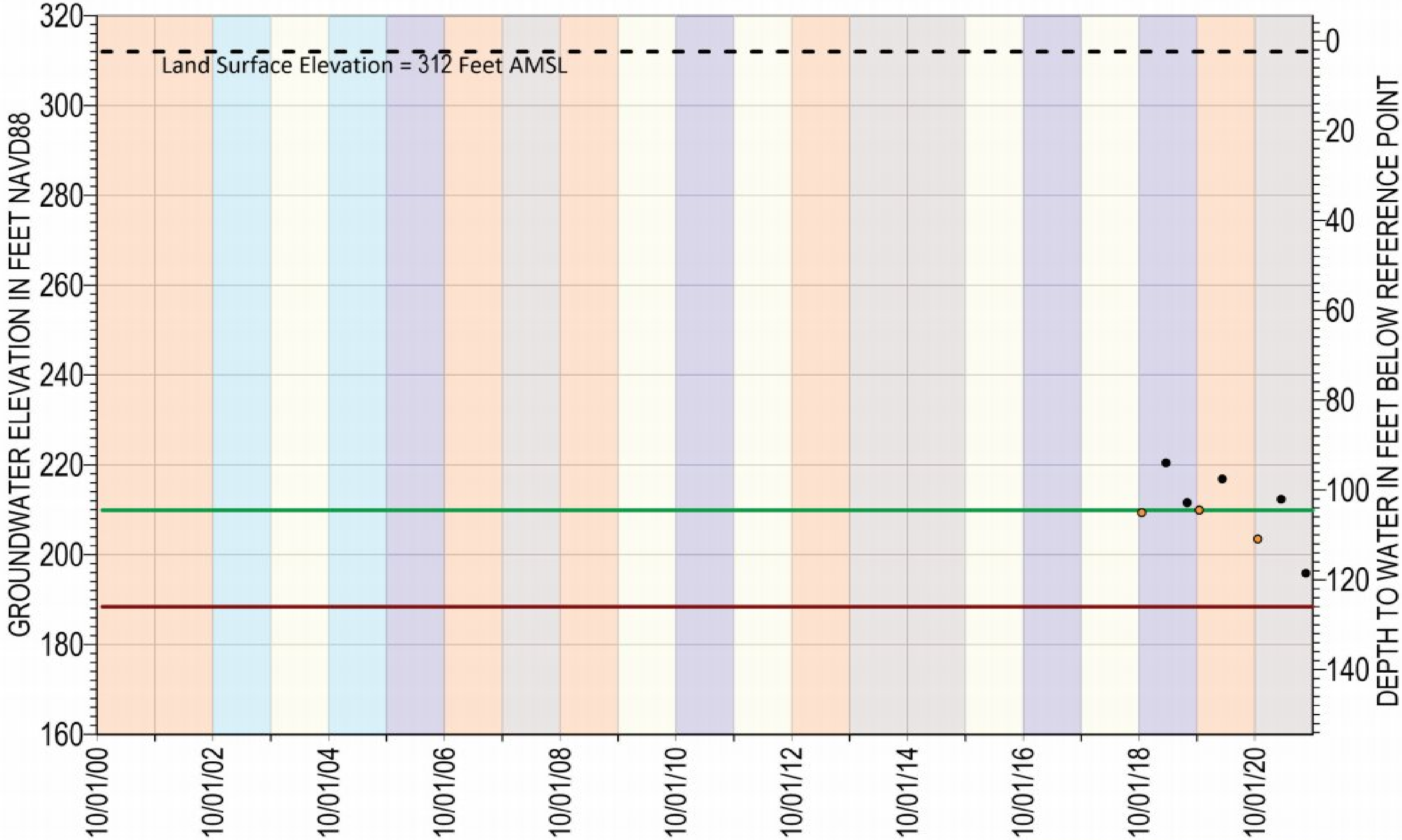
Wet | Below Normal | Critically Dry
Above Normal | Dry



**Note: Fall hand measurements are shown in gold (September and October)*

Deep RMP - groundwater levels and groundwater storage proxy

23N03W07F001M

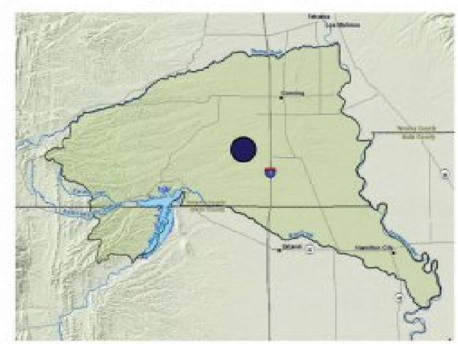


23N03W07F001M Groundwater Elevation
Land Surface Elevation
Measurable Objective
Minimum Threshold

Reference Point Elevation= 314.4 ft NAVD88
Well Type: Irrigation
Total Depth: 790 ft bgs
Well Screen Interval= 240 - 790 ft bgs

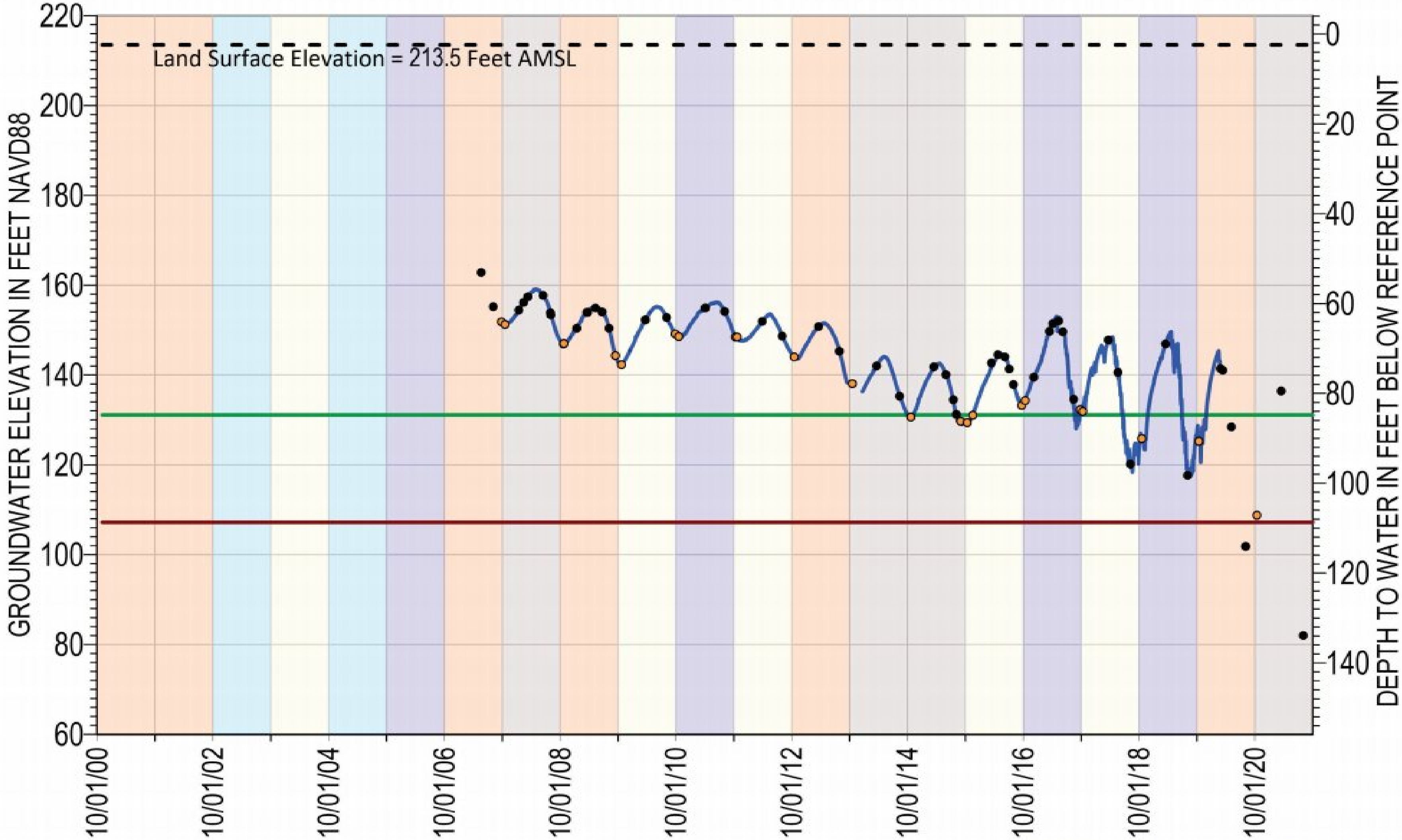
Climate Classification

Wet
Above Normal
Below Normal
Dry
Critically Dry



**Note: Fall hand measurements are shown in gold (September and October)*

Deep RMP - groundwater levels and groundwater storage proxy **23N03W13C004M**



- 23N03W13C004M Groundwater Elevation
- 23N03W13C004M Transducer Data
- Land Surface Elevation
- Measurable Objective
- Minimum Threshold

Reference Point Elevation= 215.9 ft NAVD88
Well Type: Observation
Total Depth: 835 ft bgs
Well Screen Interval= 815 - 825 ft bgs

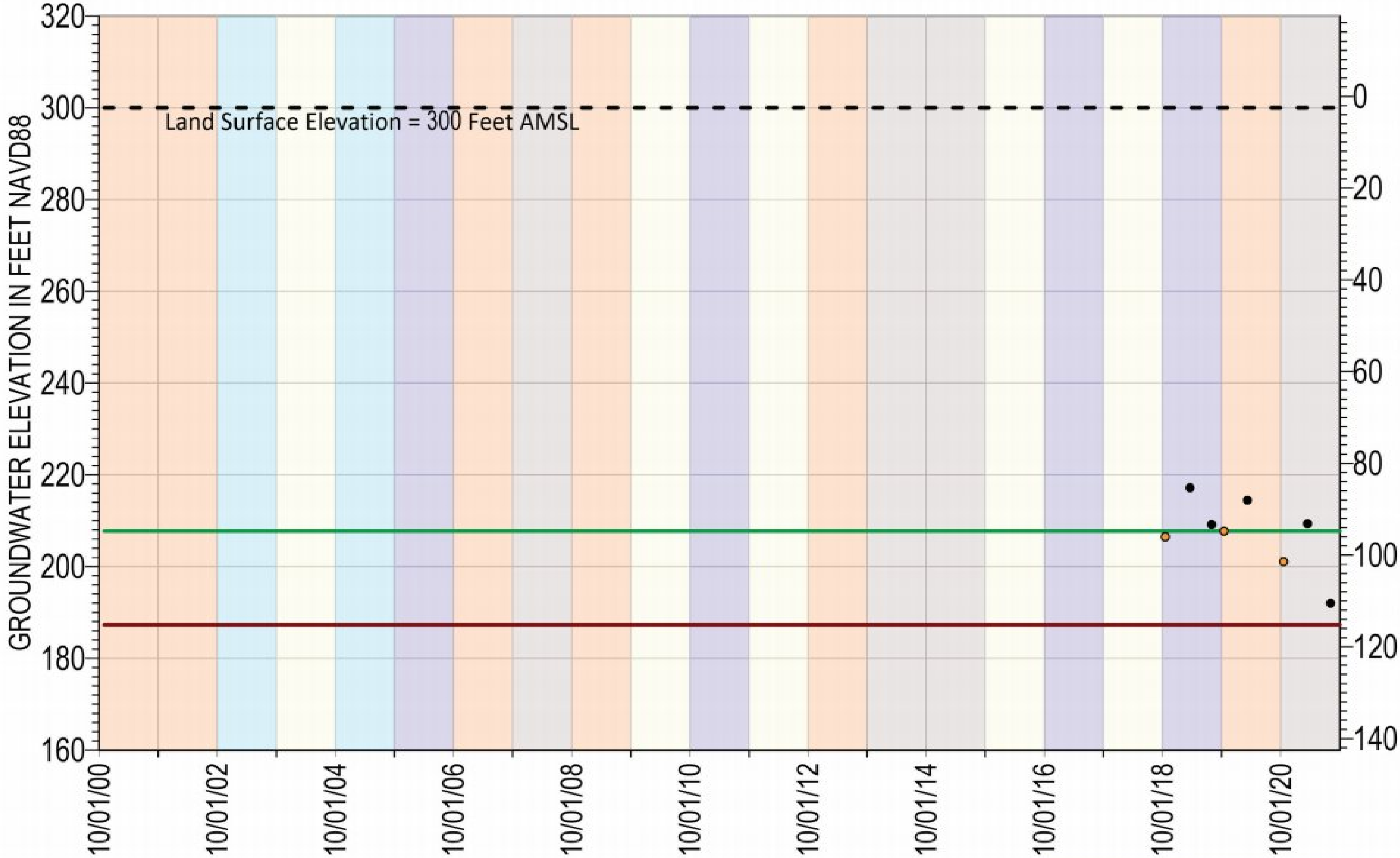
Climate Classification

Wet, Above Normal, Below Normal, Dry, Critically Dry

**Note: Fall hand measurements are shown in gold (September and October)*

Deep RMP - groundwater levels and groundwater storage proxy

23N03W17R001M

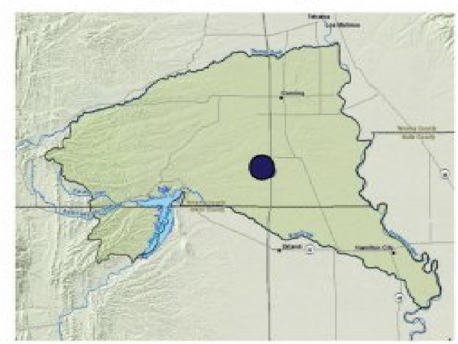


23N03W17R001M Groundwater Elevation
Land Surface Elevation
Measurable Objective
Minimum Threshold

Reference Point Elevation= 302.5 ft NAVD88
Well Type: Irrigation
Total Depth: 720 ft bgs
Well Screen Interval= 360 - 720 ft bgs

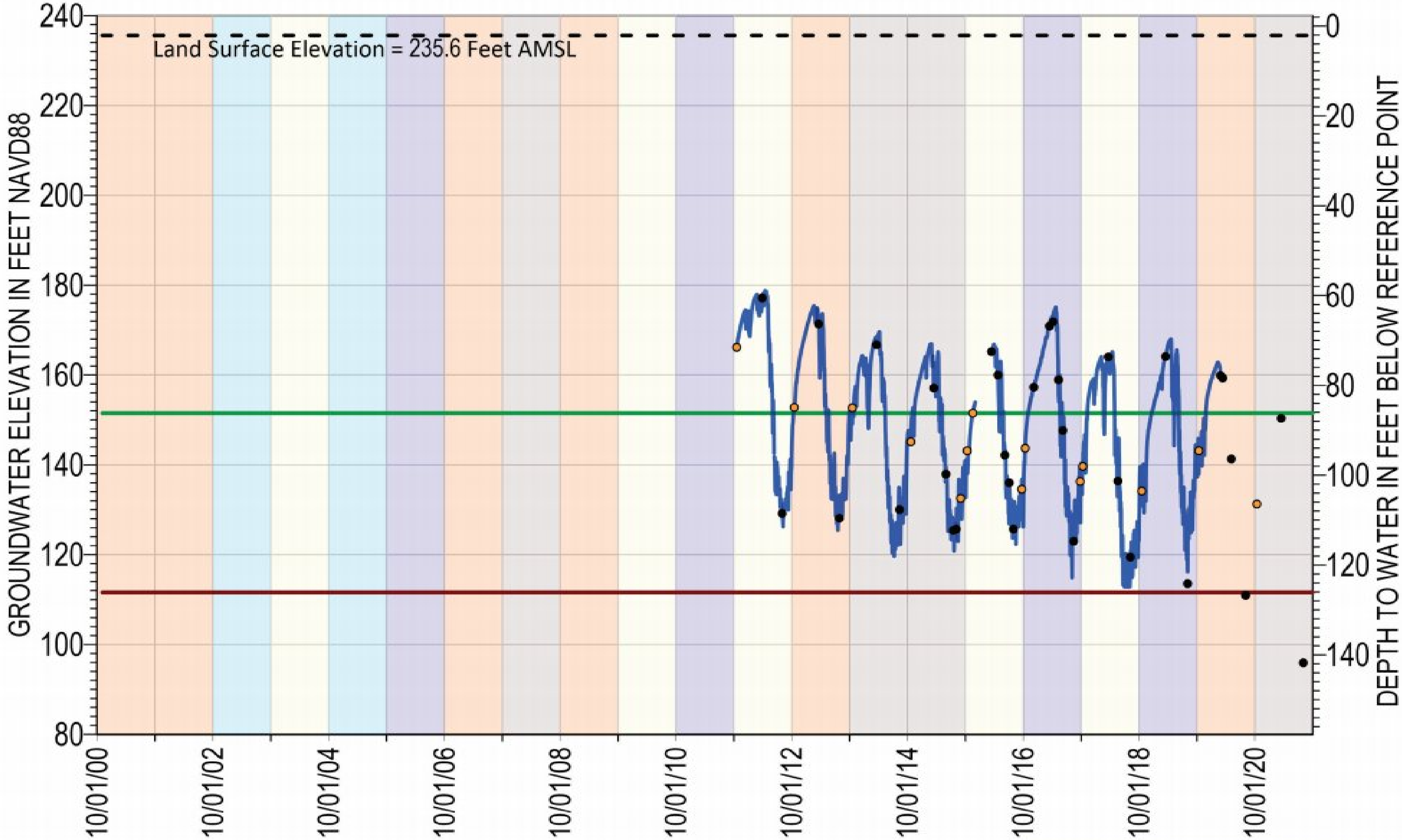
Climate Classification

Wet
Above Normal
Below Normal
Dry
Critically Dry



**Note: Fall hand measurements are shown in gold (September and October)*

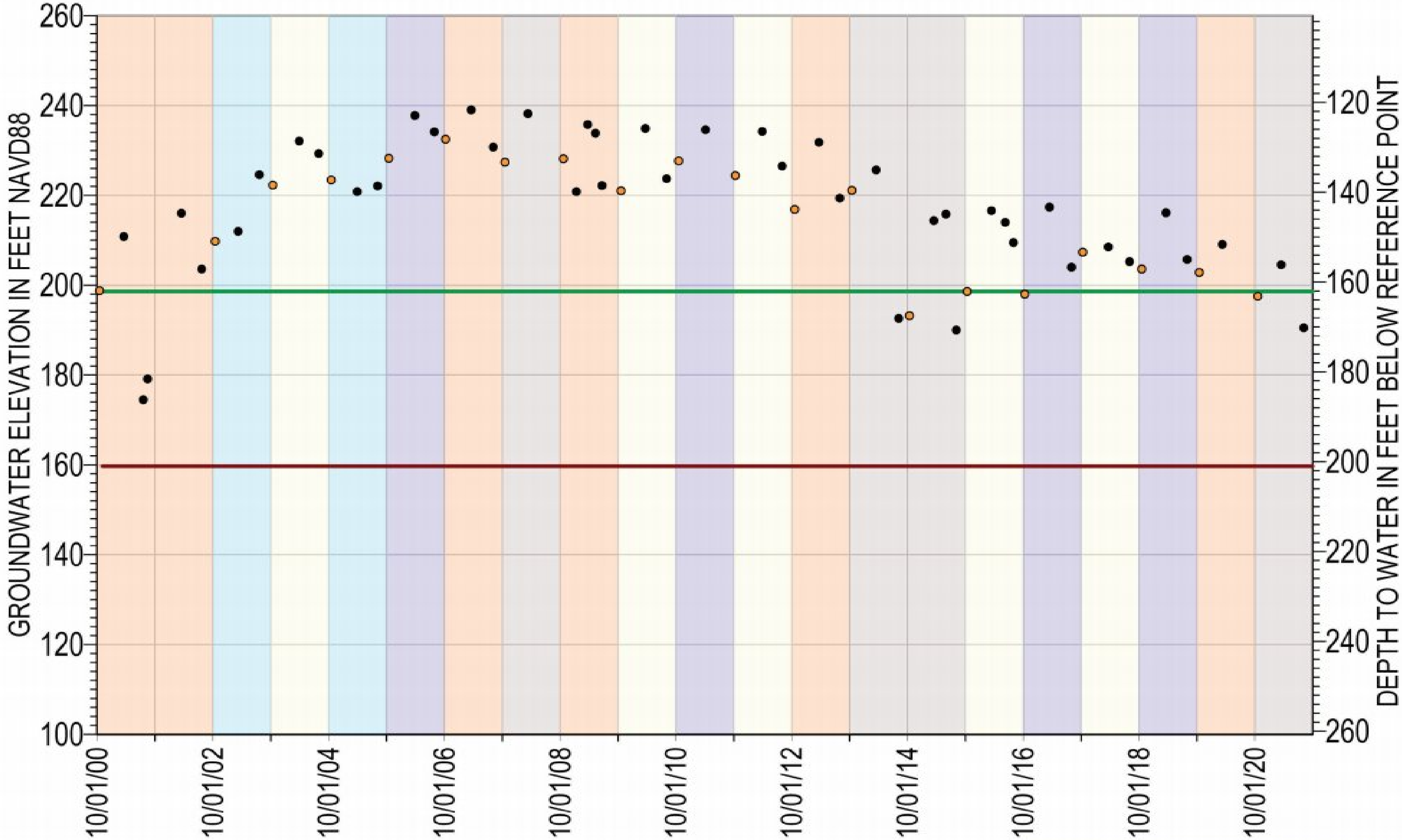
Deep RMP - groundwater levels and groundwater storage proxy **23N03W25M002M**



Reference Point Elevation= 237.7 ft NAVD88
Well Type: Observation
Total Depth: 513 ft bgs
Well Screen Interval= 470 - 500 ft bgs

**Note: Fall hand measurements are shown in gold (September and October)*

Deep RMP - groundwater levels and groundwater storage proxy **23N04W13G001M**

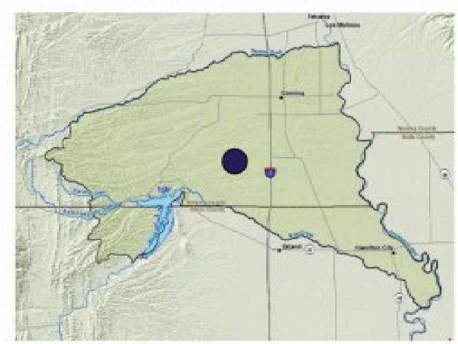


• • 23N04W13G001M Groundwater Elevation
Measurable Objective
Minimum Threshold

Reference Point Elevation= 360.7 ft NAVD88
Well Type: Irrigation
Total Depth: 560 ft bgs
Well Screen Interval= Unknown ft bgs

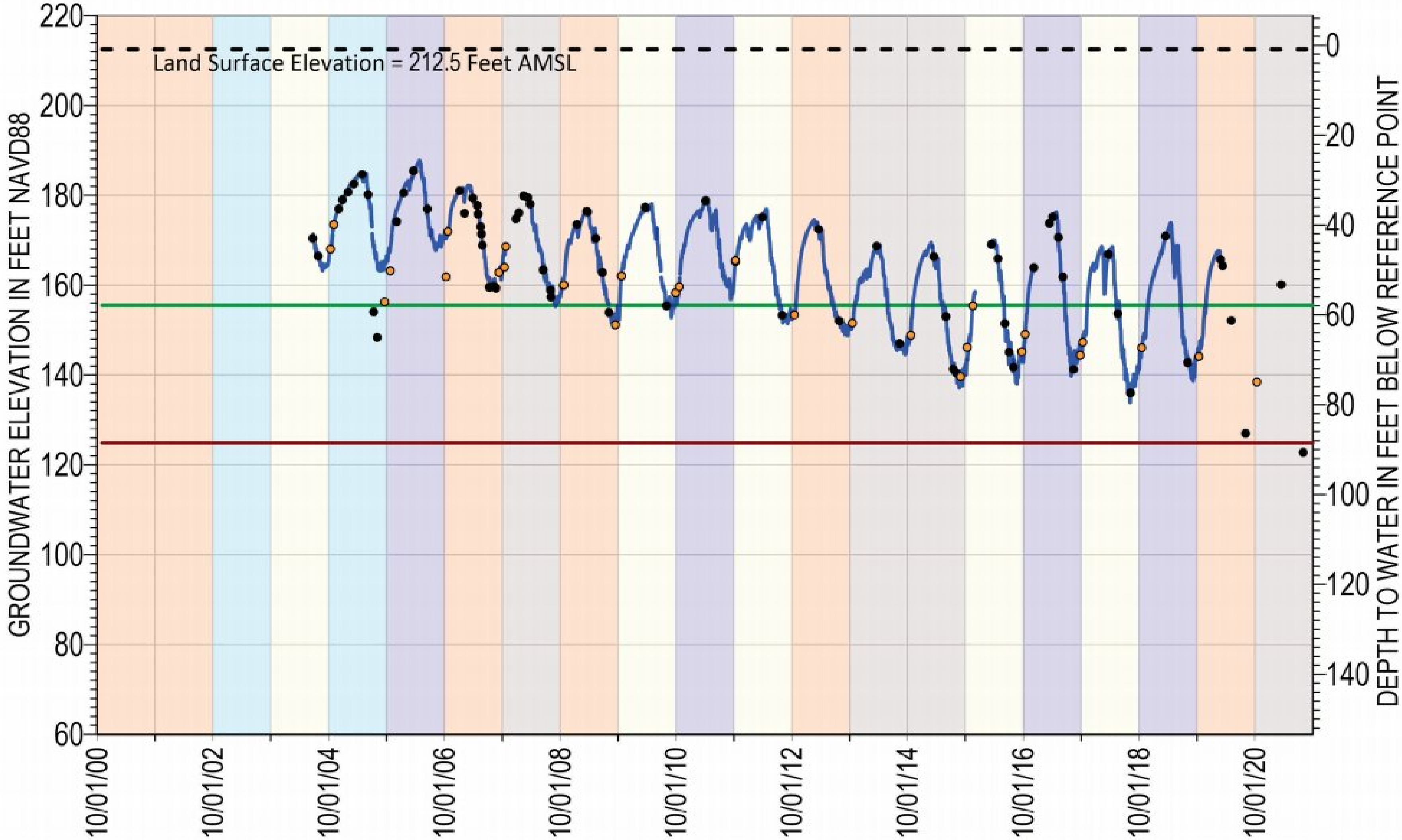
Climate Classification

Wet
Above Normal
Below Normal
Dry
Critically Dry



**Note: Fall hand measurements are shown in gold (September and October)*

Deep RMP - groundwater levels and groundwater storage proxy **24N02W29N004M**

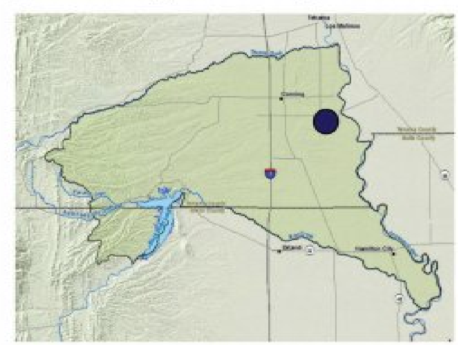


- 24N02W29N004M Groundwater Elevation
- 24N02W29N004M Transducer Data
- Land Surface Elevation
- Measurable Objective
- Minimum Threshold

Reference Point Elevation= 213.4 ft NAVD88
Well Type: Observation
Total Depth: 741 ft bgs
Well Screen Interval= 590 - 710 ft bgs

Climate Classification

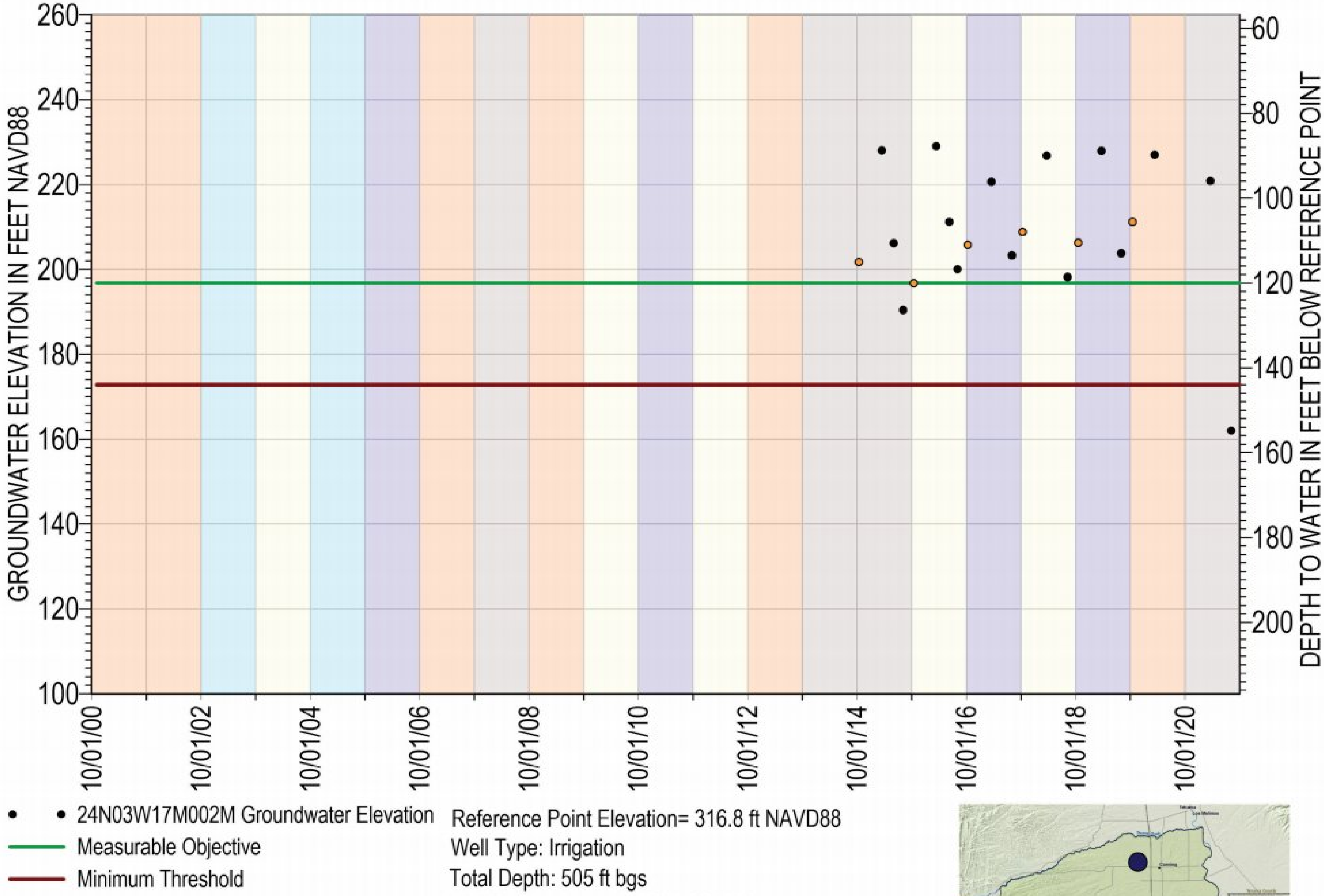
Wet, Above Normal, Below Normal, Dry, Critically Dry



**Note: Fall hand measurements are shown in gold (September and October)*

Deep RMP - groundwater levels and groundwater storage proxy

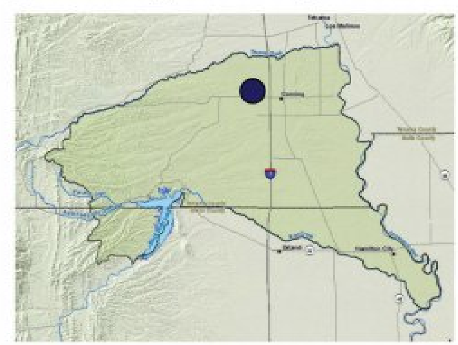
24N03W17M002M



Reference Point Elevation= 316.8 ft NAVD88
Well Type: Irrigation
Total Depth: 505 ft bgs
Well Screen Interval= 315 - 495 ft bgs

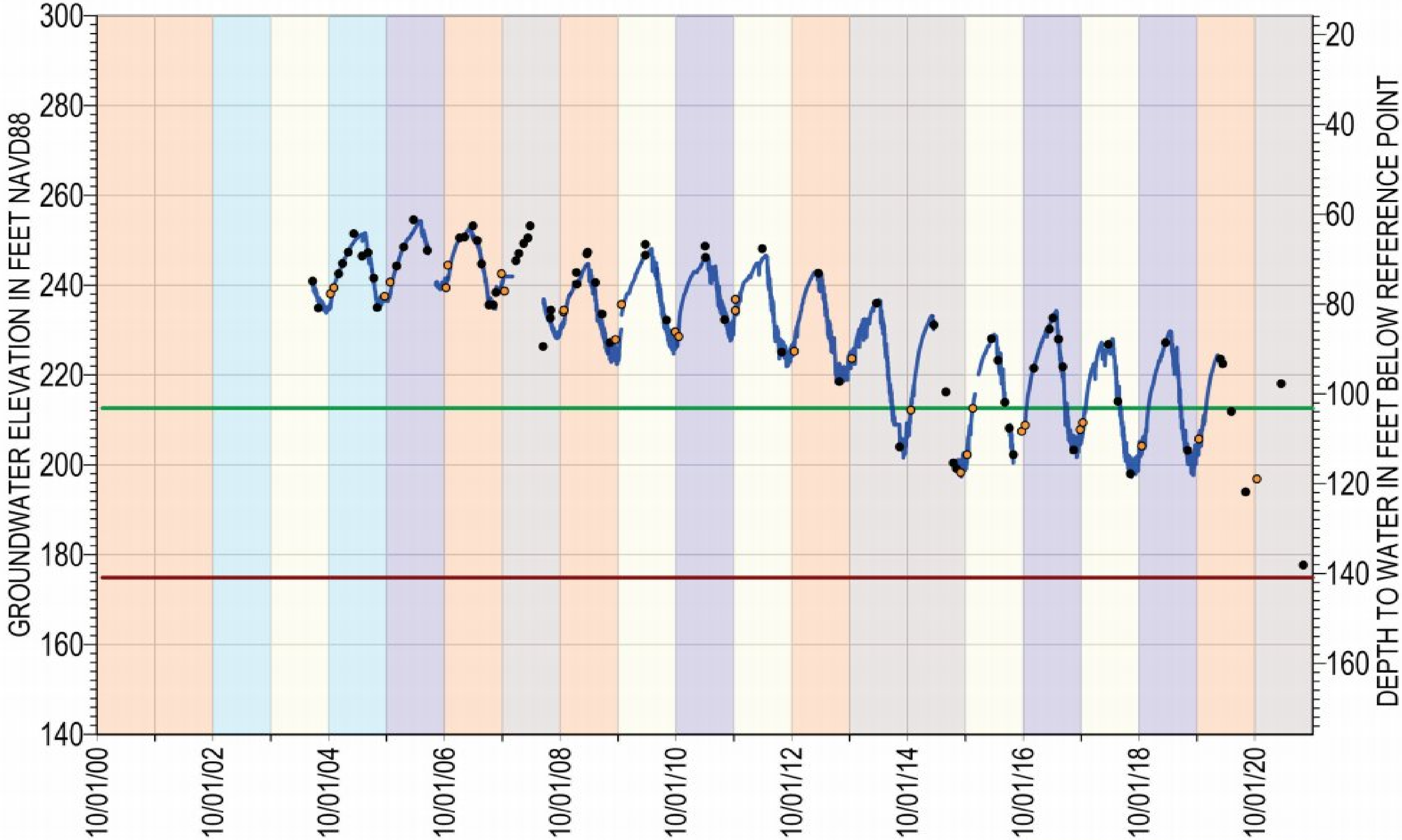
Climate Classification

Wet | Below Normal | Critically Dry
Above Normal | Dry



**Note: Fall hand measurements are shown in gold (September and October)*

Deep RMP - groundwater levels and groundwater storage proxy **24N03W29Q002M**

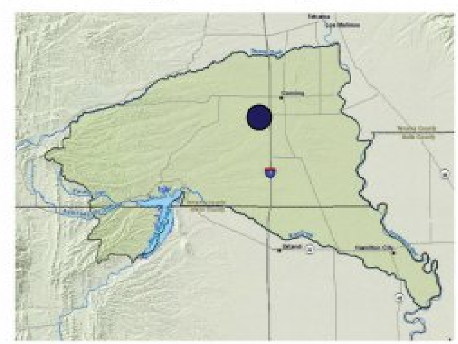


- 24N03W29Q002M Groundwater Elevation
- 24N03W29Q002M Transducer Data
- Measurable Objective
- Minimum Threshold

Reference Point Elevation= 315.8 ft NAVD88
Well Type: Observation
Total Depth: 575 ft bgs
Well Screen Interval= 490 - 550 ft bgs

Climate Classification

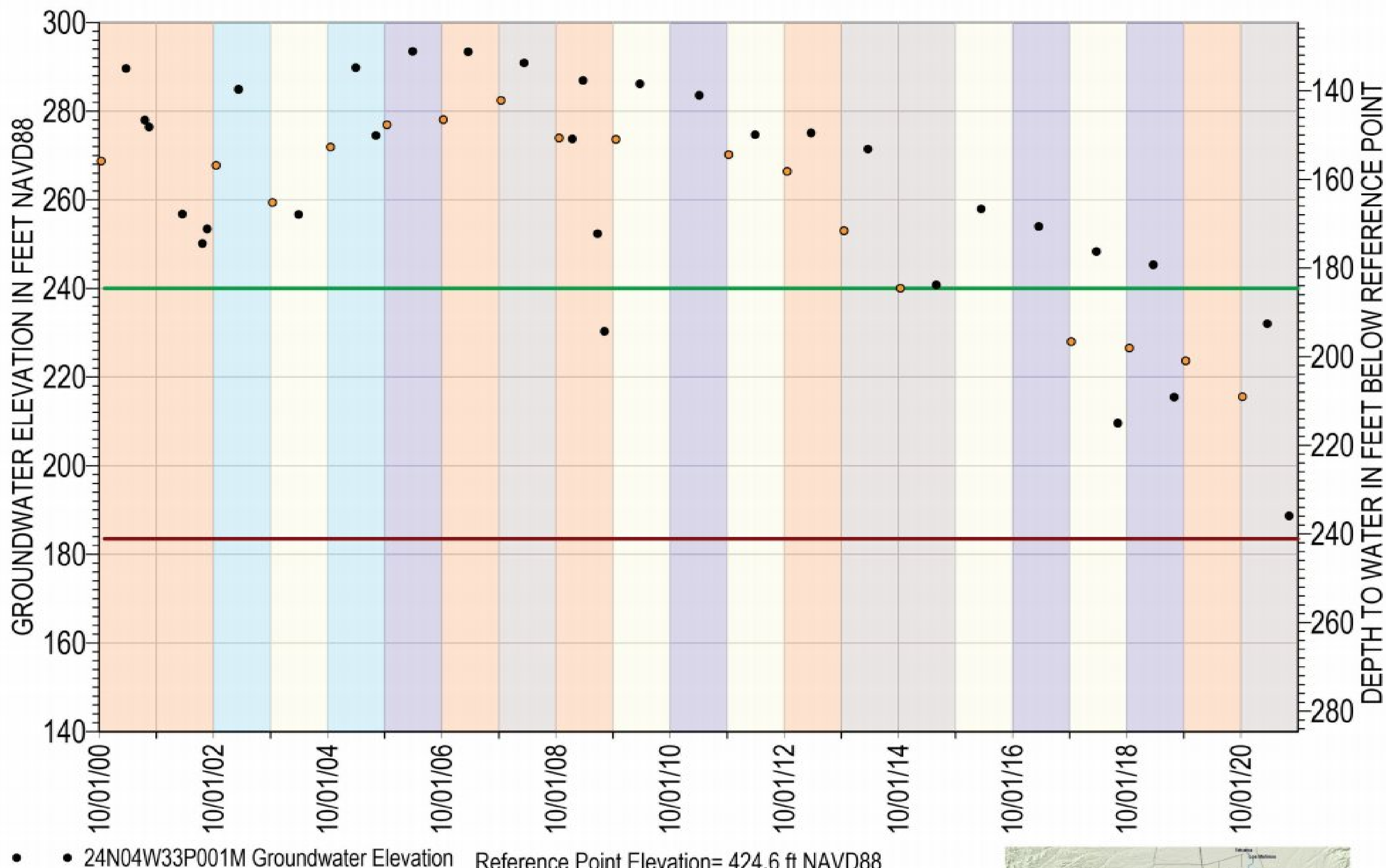
Wet | Below Normal | Critically Dry | Above Normal | Dry



**Note: Fall hand measurements are shown in gold (September and October)*

Deep RMP - groundwater levels and groundwater storage proxy

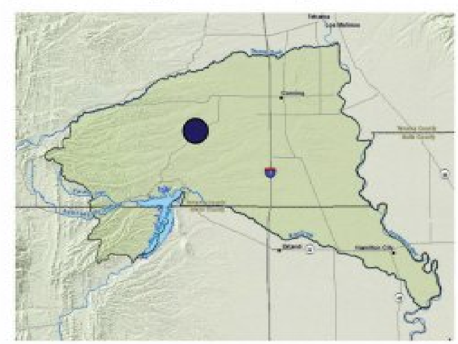
24N04W33P001M



Reference Point Elevation= 424.6 ft NAVD88
Well Type: Irrigation
Total Depth: 780 ft bgs
Well Screen Interval= 250 - 780 ft bgs

Climate Classification

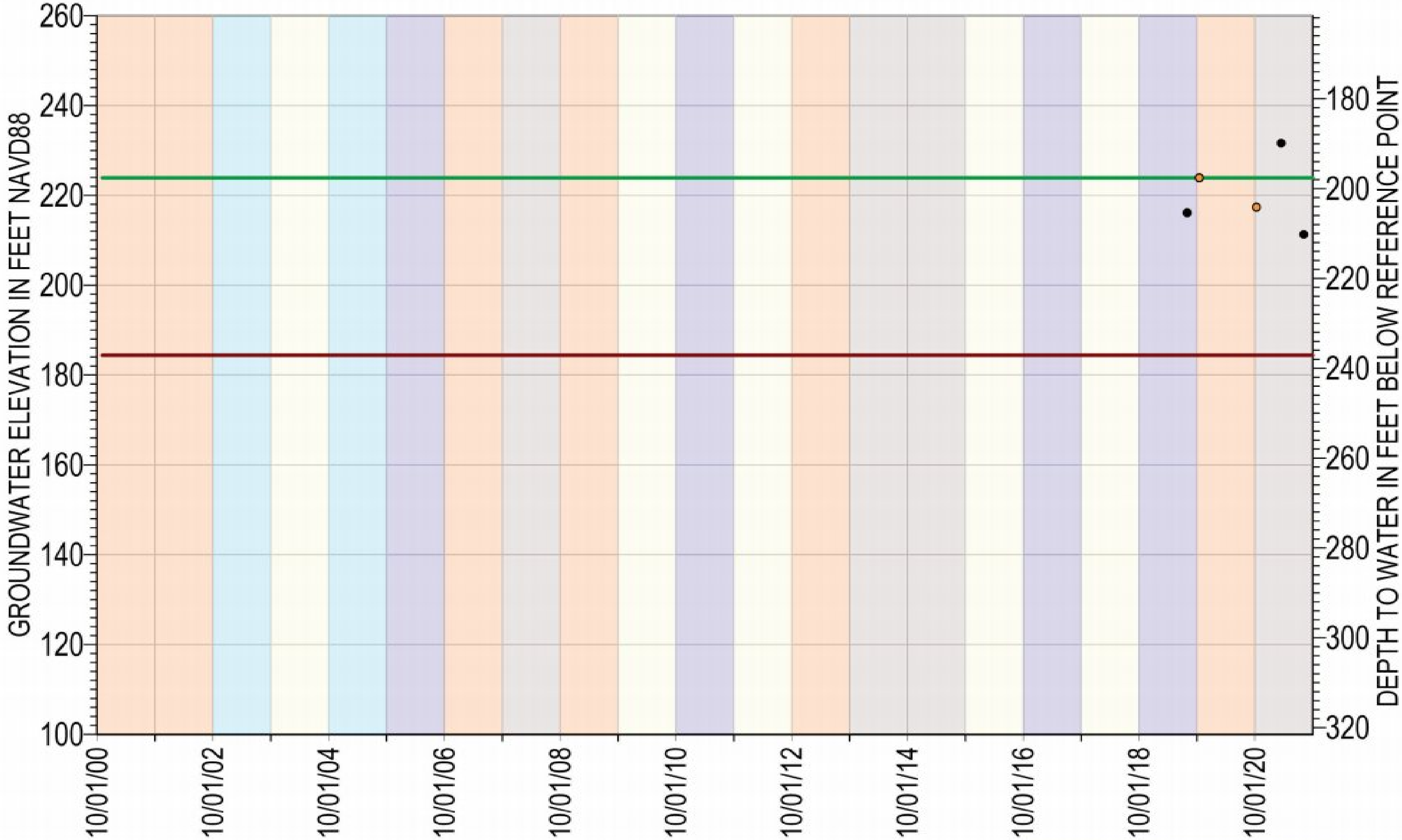
Wet
Below Normal
Critically Dry
Above Normal
Dry



**Note: Fall hand measurements are shown in gold (September and October)*

Deep RMP - groundwater levels and groundwater storage proxy

24N04W34K001M

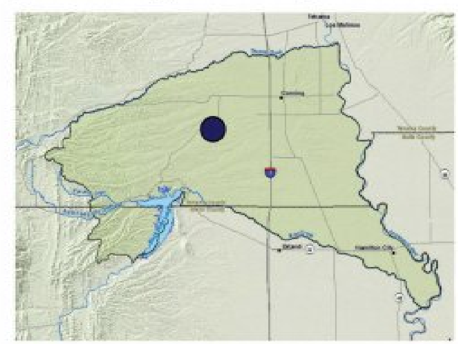


24N04W34K001M Groundwater Elevation
Measurable Objective
Minimum Threshold

Reference Point Elevation= 421.5 ft NAVD88
Well Type: Irrigation
Total Depth: 750 ft bgs
Well Screen Interval= 310 - 750 ft bgs

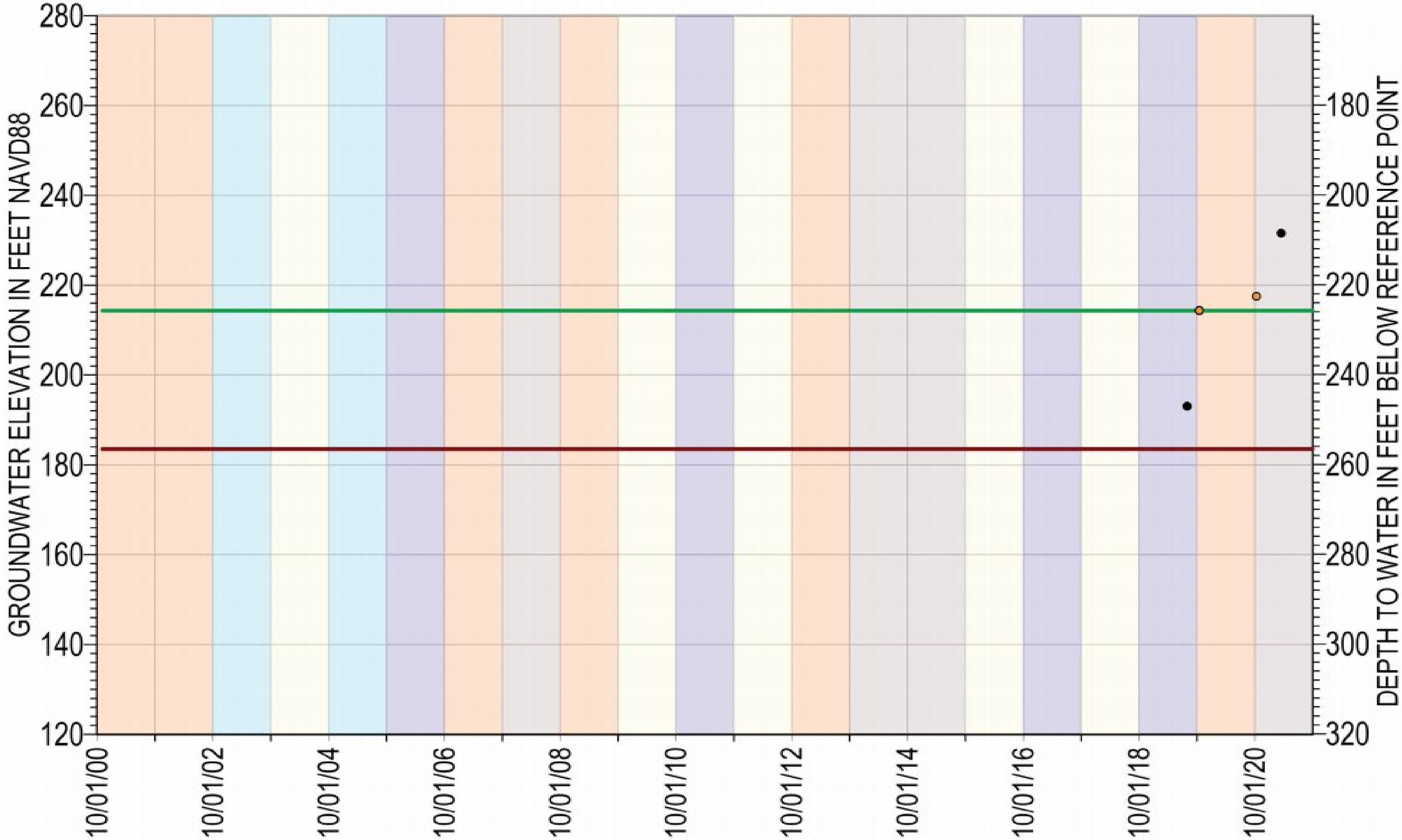
Climate Classification

Wet
Above Normal
Below Normal
Dry
Critically Dry



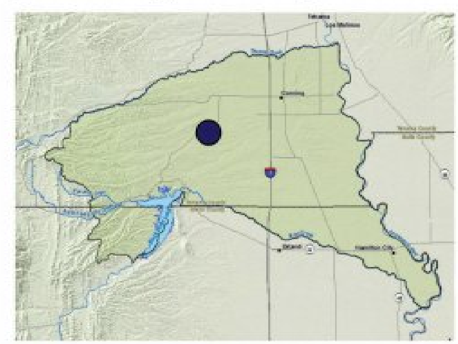
**Note: Fall hand measurements are shown in gold (September and October)*

Deep RMP - groundwater levels and groundwater storage proxy **24N04W34P001M**



24N04W34P001M Groundwater Elevation
Measurable Objective
Minimum Threshold

Reference Point Elevation= 440.1 ft NAVD88
Well Type: Irrigation
Total Depth: 535 ft bgs
Well Screen Interval= 290 - 475 ft bgs



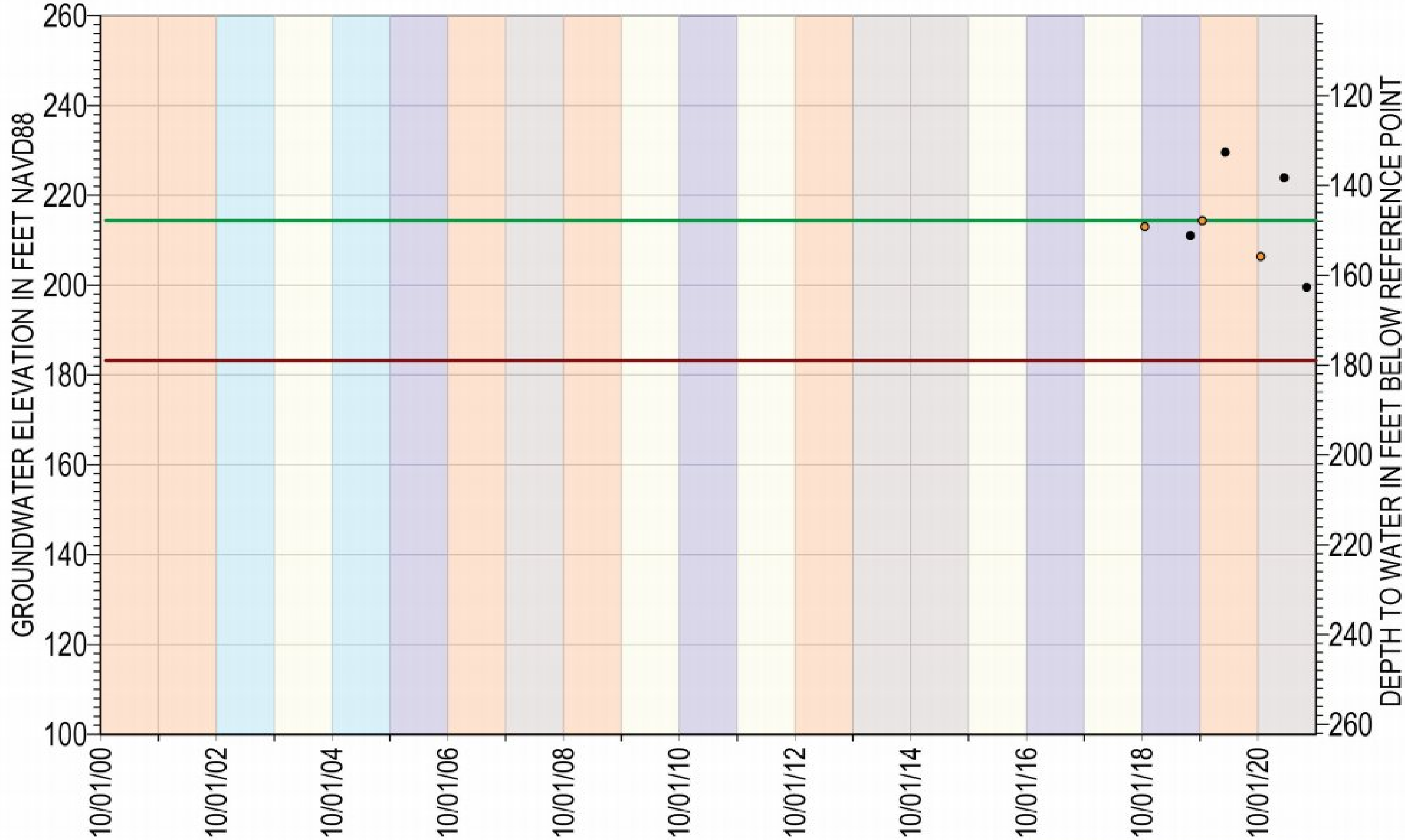
Climate Classification

Wet
Above Normal
Below Normal
Dry
Critically Dry

**Note: Fall hand measurements are shown in gold (September and October)*

Deep RMP - groundwater levels and groundwater storage proxy

24N04W36G001M



24N04W36G001M Groundwater Elevation

Measurable Objective

Minimum Threshold

Reference Point Elevation= 362.2 ft NAVD88

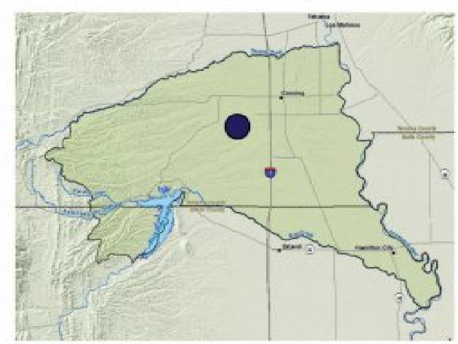
Well Type: Irrigation

Total Depth: 750 ft bgs

Well Screen Interval= 320 - 750 ft bgs

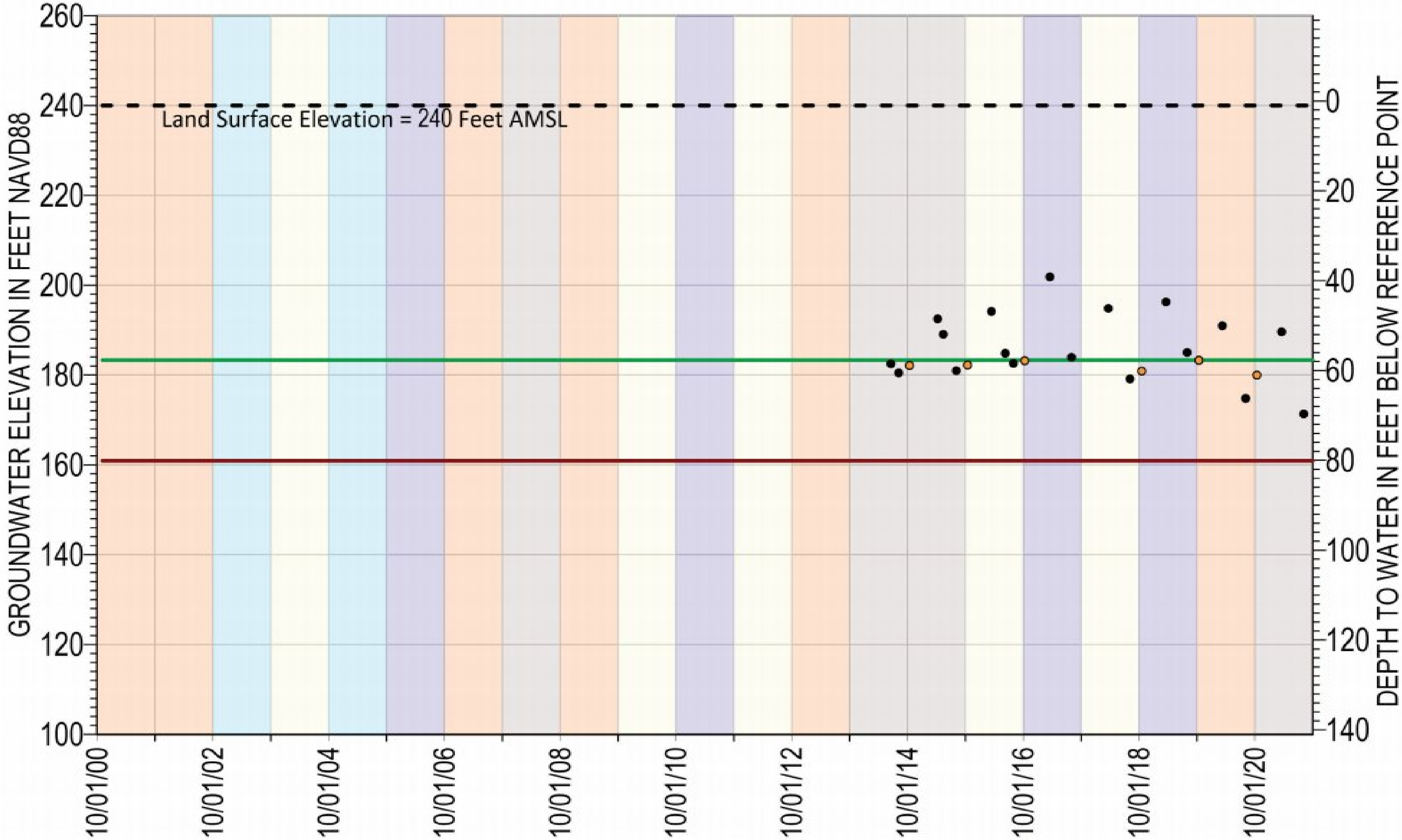
Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry



**Note: Fall hand measurements are shown in gold (September and October)*

Deep RMP - groundwater levels and groundwater storage proxy **25N03W36H001M**



25N03W36H001M Groundwater Elevation
Land Surface Elevation
Measurable Objective
Minimum Threshold

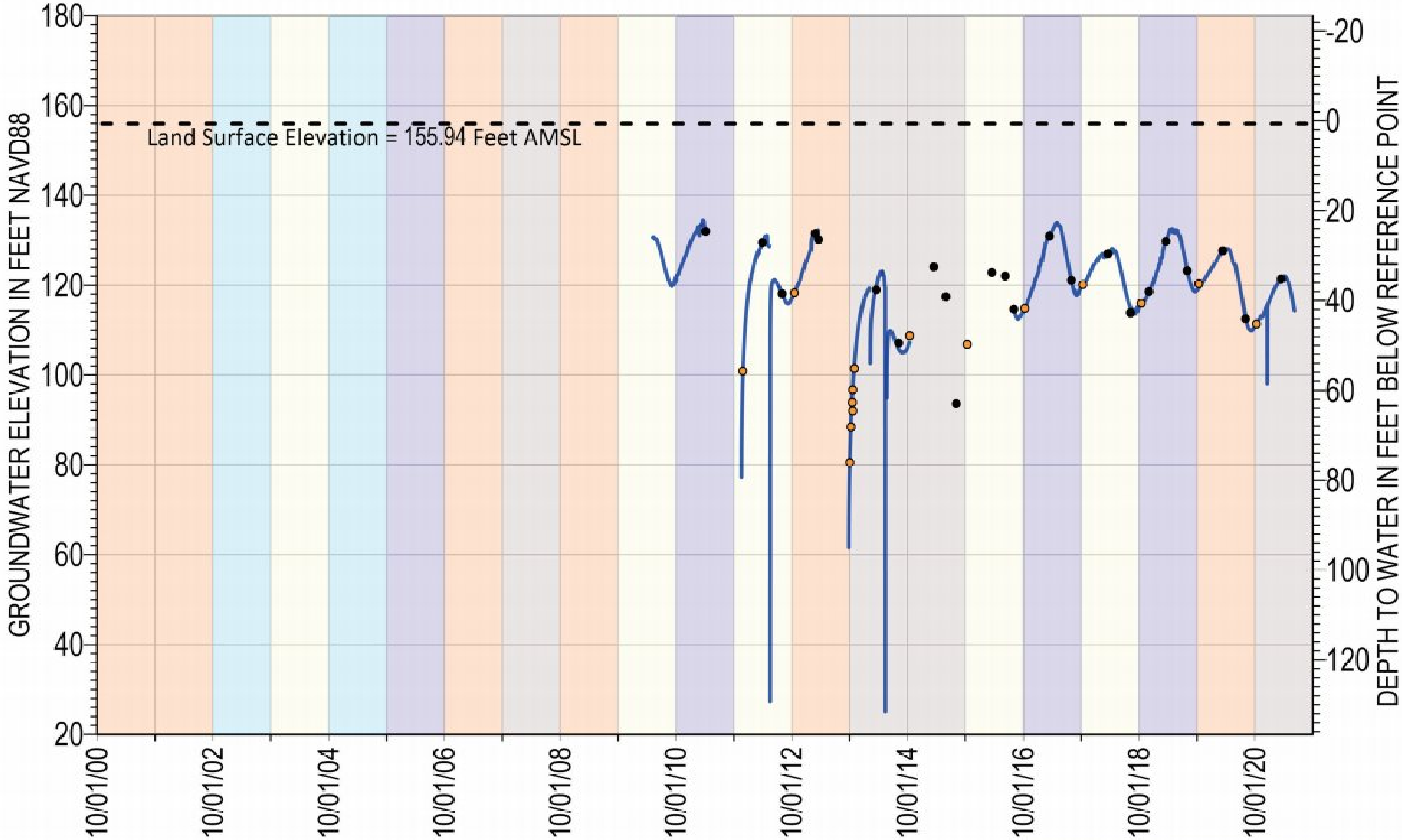
Reference Point Elevation= 241 ft NAVD88
Well Type: Irrigation
Total Depth: 524 ft bgs
Well Screen Interval= Unknown ft bgs

Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

22N01W19K005M



- 22N01W19K005M Groundwater Elevation
- 22N01W19K005M Transducer Data
- Land Surface Elevation

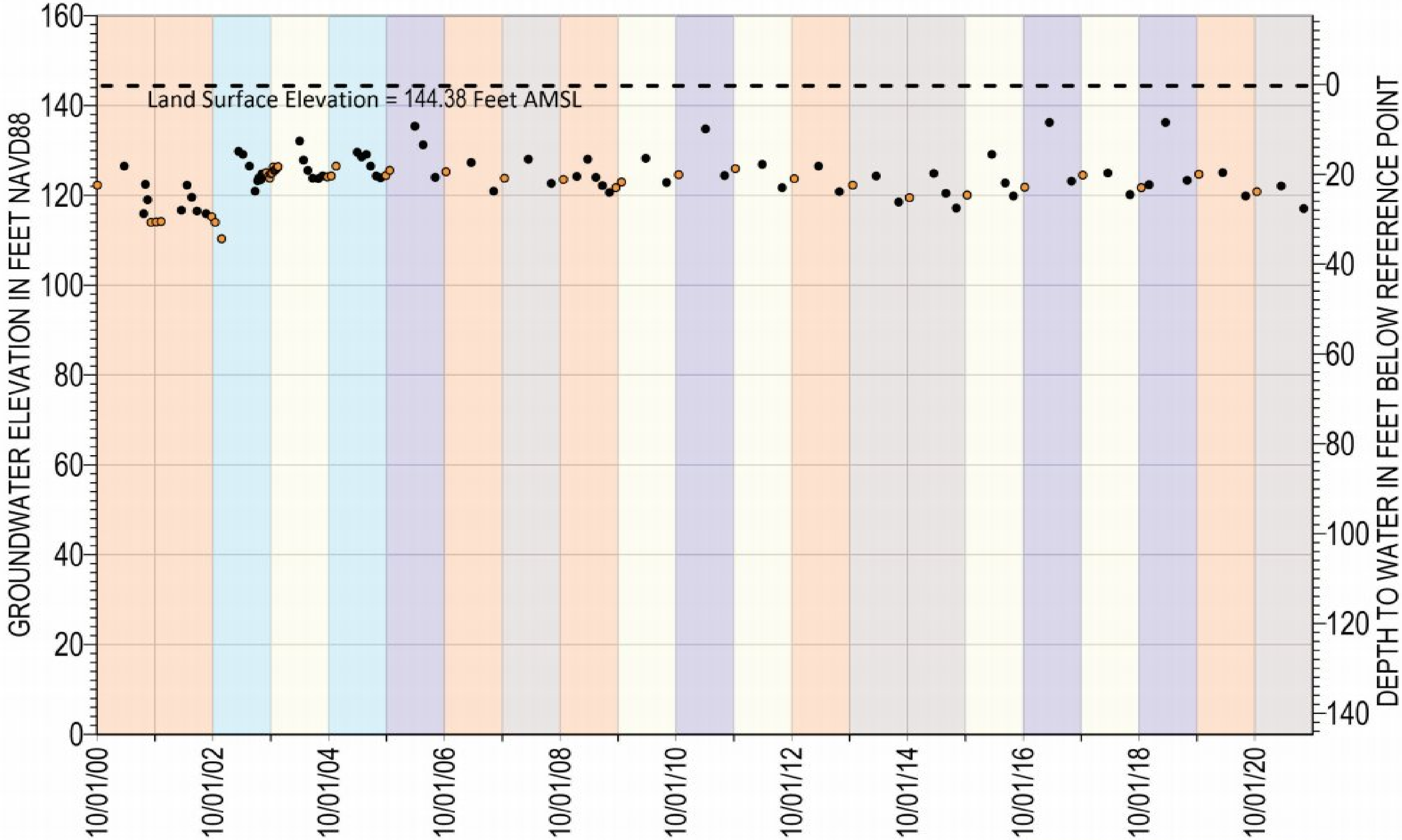
Reference Point Elevation= 156.58 ft NAVD88
Well Type: Irrigation
Total Depth: 1300 ft bgs
Well Screen Interval= 920 - 1230 ft bgs

Climate Classification

Wet, Below Normal, Critically Dry, Above Normal, Dry

**Note: Fall hand measurements are shown in gold (September and October)*

22N01W29K001M



• • 22N01W29K001M Groundwater Elevation

- - - Land Surface Elevation

Reference Point Elevation= 144.68 ft NAVD88

Well Type: Irrigation

Total Depth: 150 ft bgs

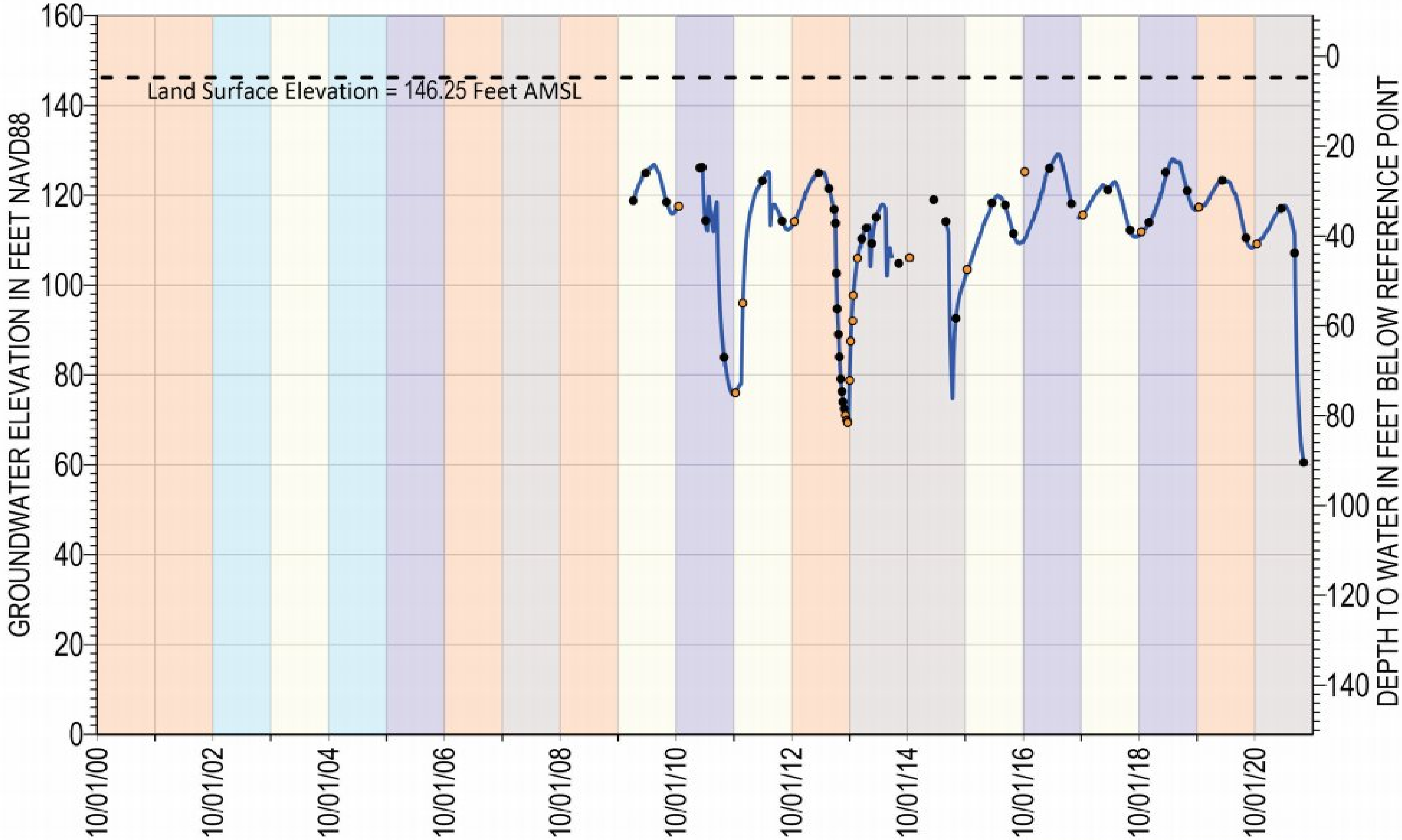
Well Screen Interval= Unknown ft bgs

Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

22N01W29N001M



- • 22N01W29N001M Groundwater Elevation
- 22N01W29N001M Transducer Data
- Land Surface Elevation

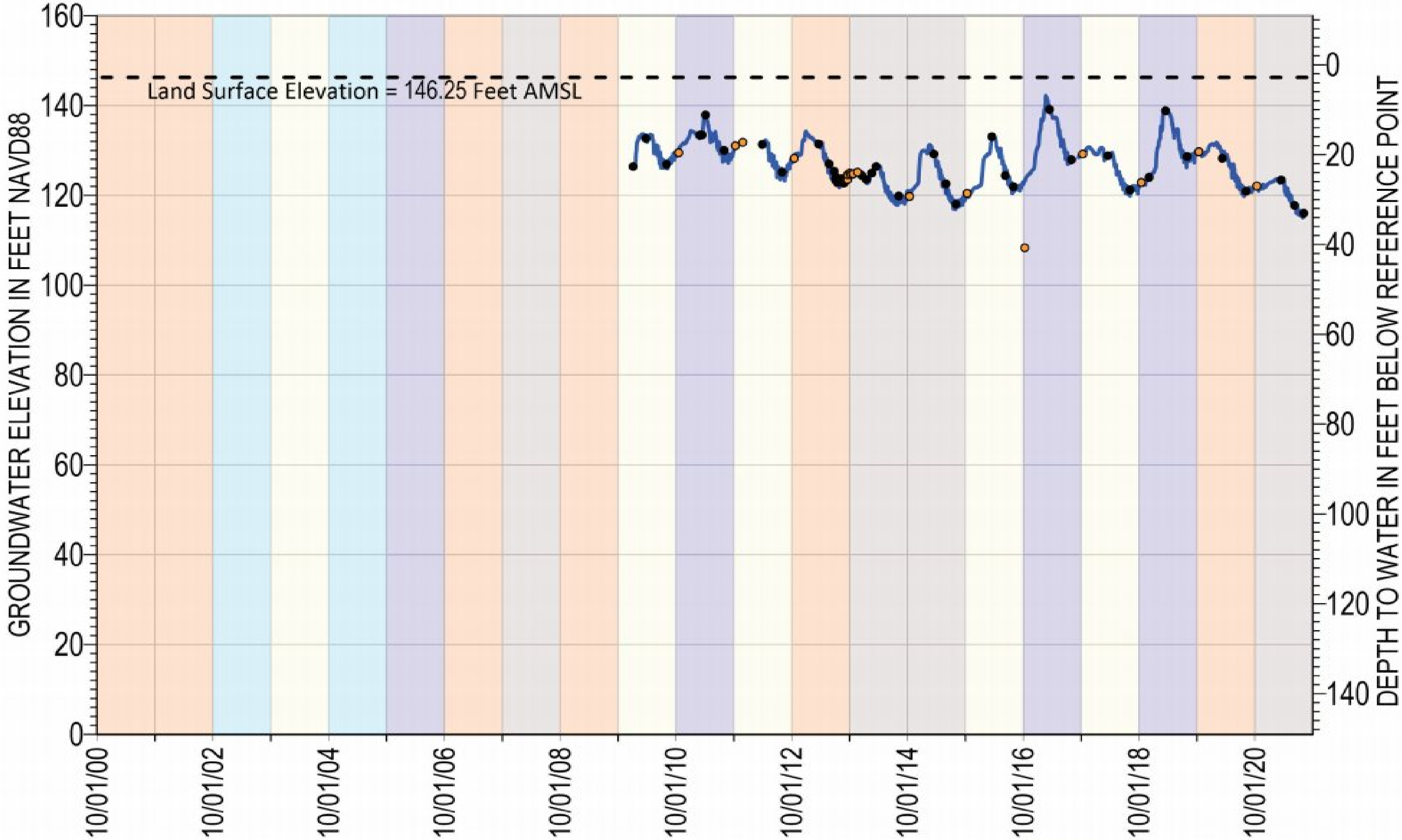
Reference Point Elevation= 150.95 ft NAVD88
Well Type: Observation
Total Depth: 1204 ft bgs
Well Screen Interval= 859 - 1135 ft bgs

Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

22N01W29N004M



- 22N01W29N004M Groundwater Elevation
- 22N01W29N004M Transducer Data
- Land Surface Elevation

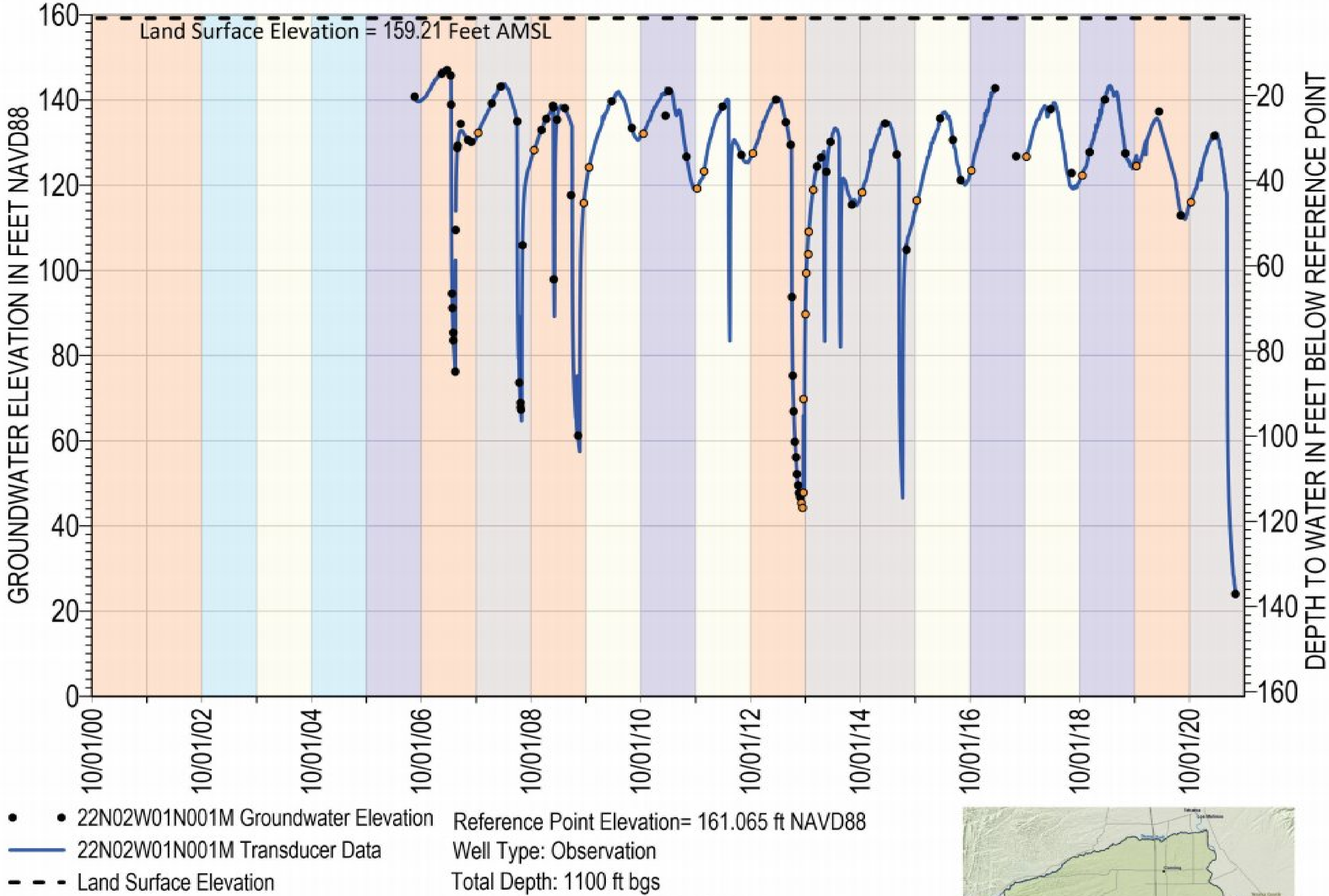
Reference Point Elevation= 149.06 ft NAVD88
Well Type: Observation
Total Depth: 120 ft bgs
Well Screen Interval= 89 - 99 ft bgs

Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry

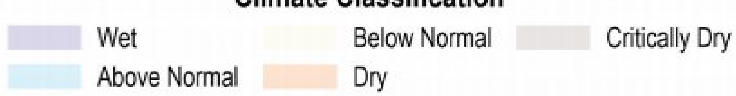
**Note: Fall hand measurements are shown in gold (September and October)*

22N02W01N001M



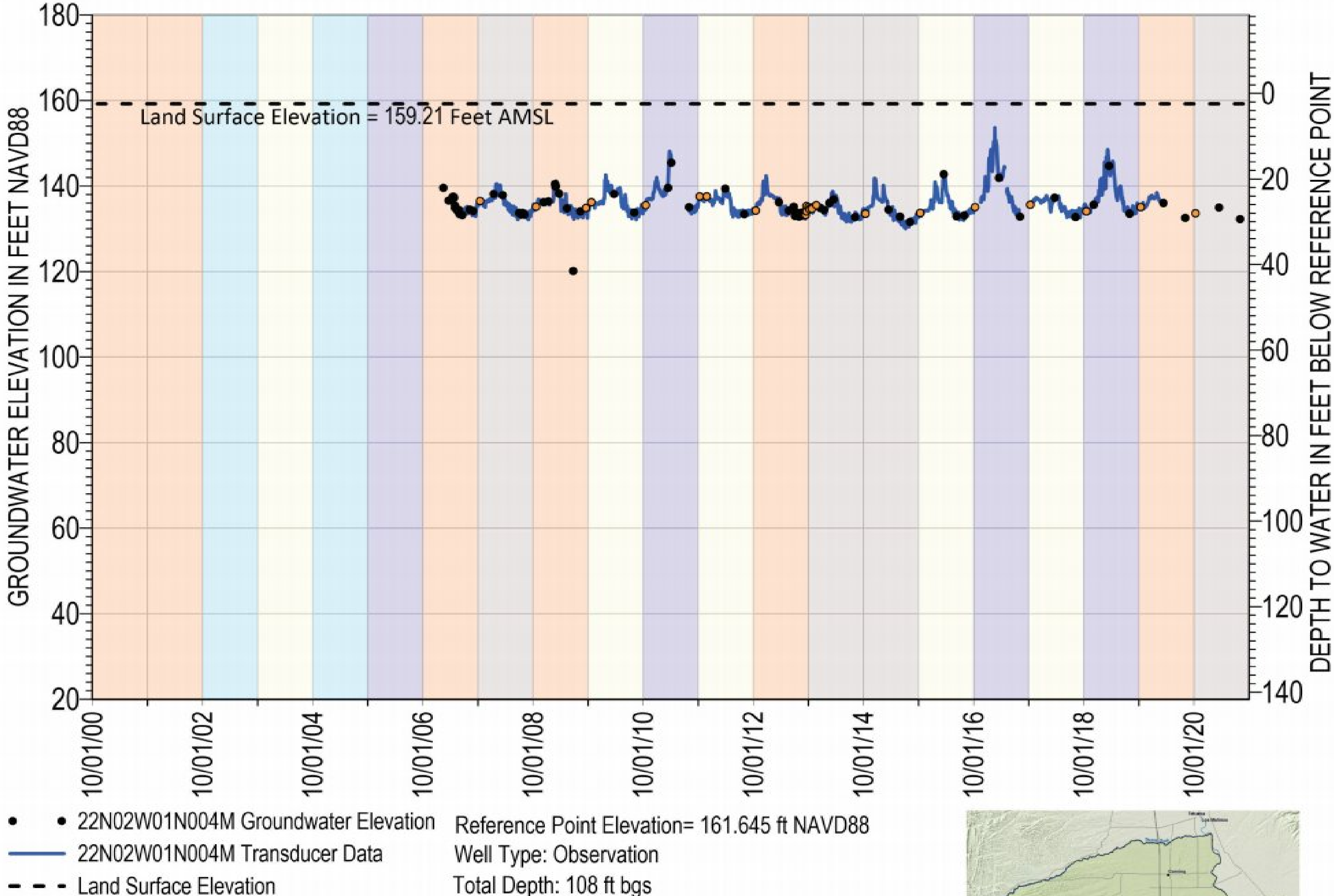
Reference Point Elevation= 161.065 ft NAVD88
Well Type: Observation
Total Depth: 1100 ft bgs
Well Screen Interval= 810 - 1050 ft bgs

Climate Classification



**Note: Fall hand measurements are shown in gold (September and October)*

22N02W01N004M



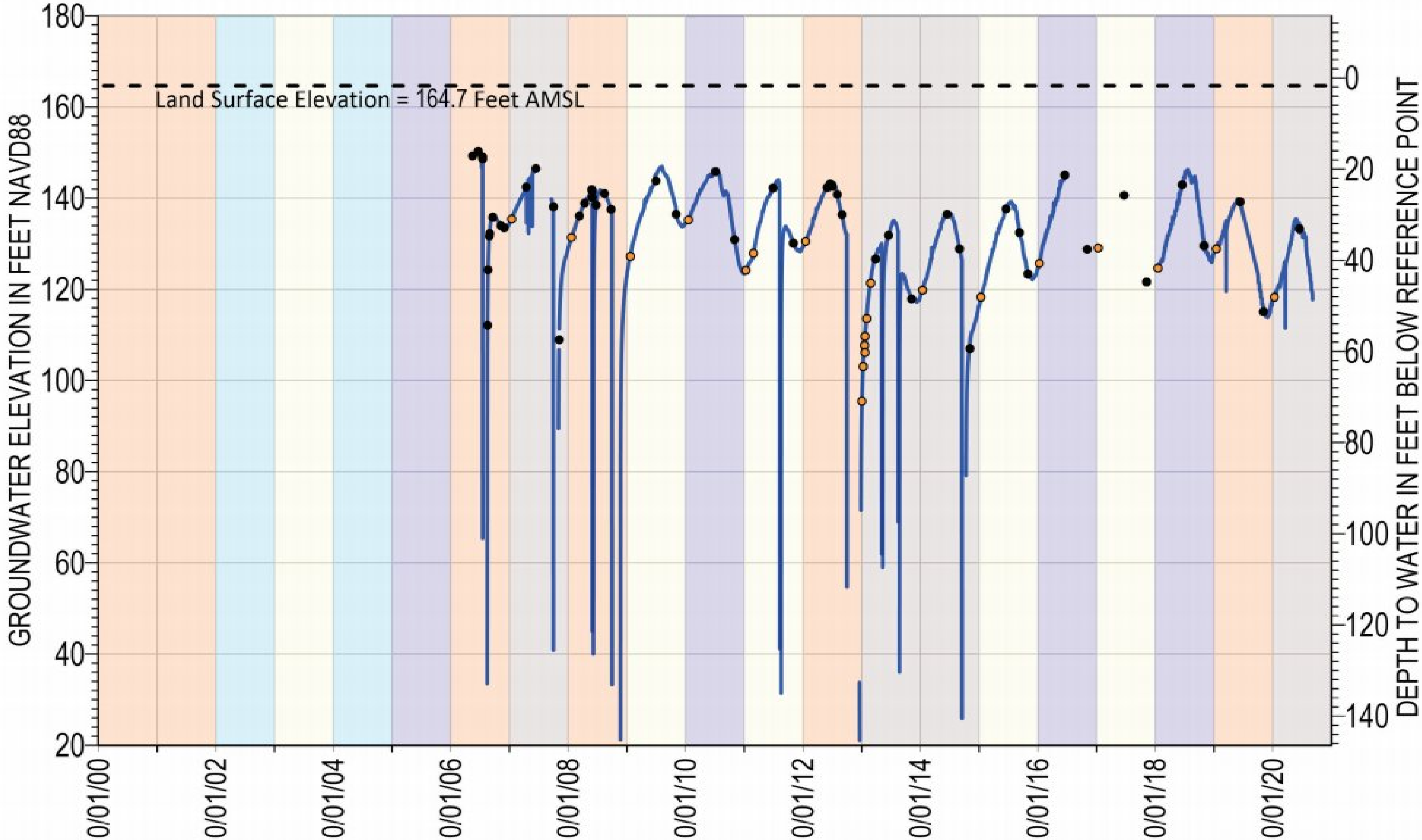
Reference Point Elevation= 161.645 ft NAVD88
Well Type: Observation
Total Depth: 108 ft bgs
Well Screen Interval= 70 - 80 ft bgs

Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

22N02W02J001M



22N02W02J001M Groundwater Elevation
22N02W02J001M Transducer Data
Land Surface Elevation

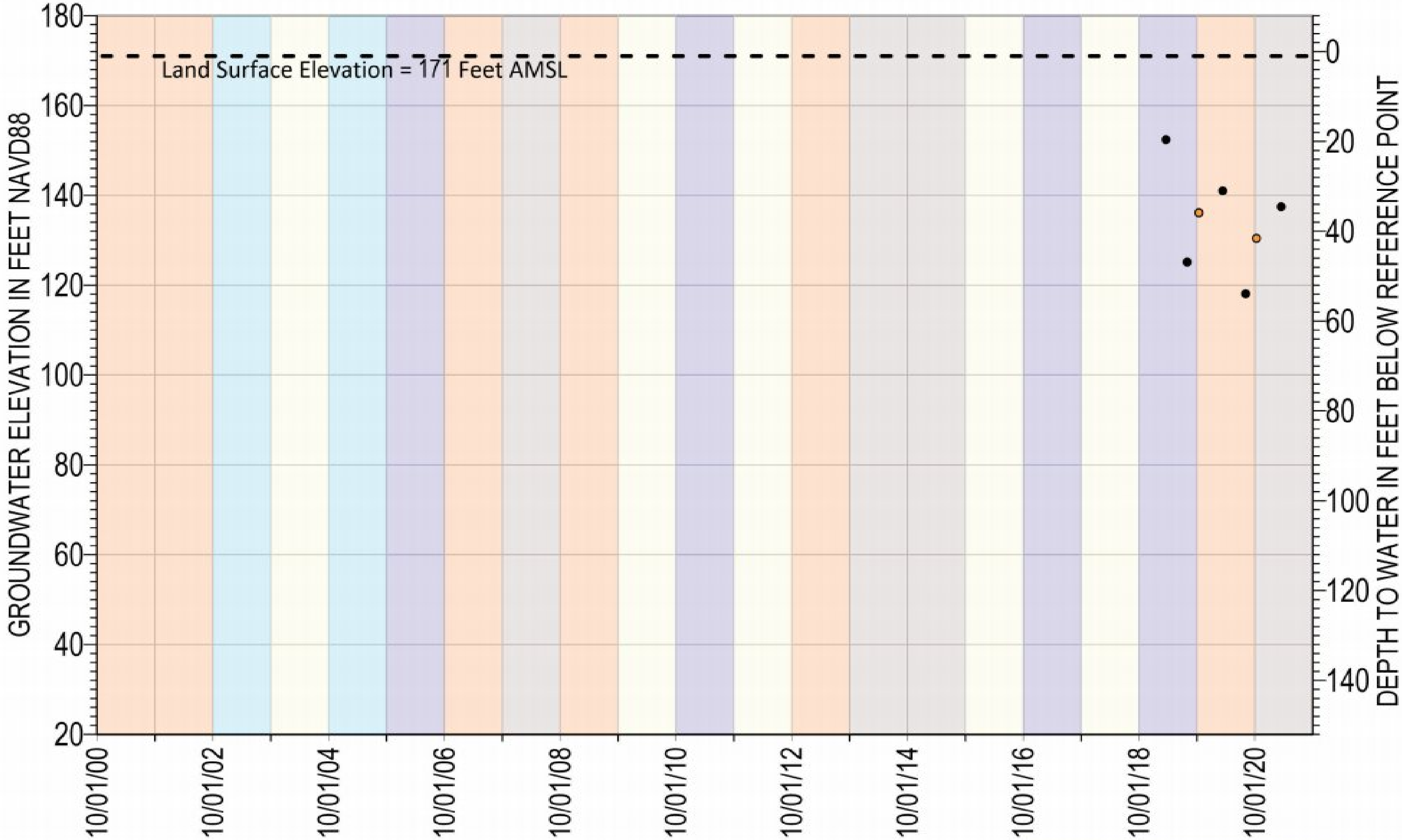
Reference Point Elevation= 166.4 ft NAVD88
Well Type: Irrigation
Total Depth: 1350 ft bgs
Well Screen Interval= 800 - 1300 ft bgs

Climate Classification

Wet
Above Normal
Below Normal
Dry
Critically Dry

**Note: Fall hand measurements are shown in gold (September and October)*

22N02W02K001M



• 22N02W02K001M Groundwater Elevation

- - - Land Surface Elevation

Reference Point Elevation= 172 ft NAVD88

Well Type: Irrigation

Total Depth: 250 ft bgs

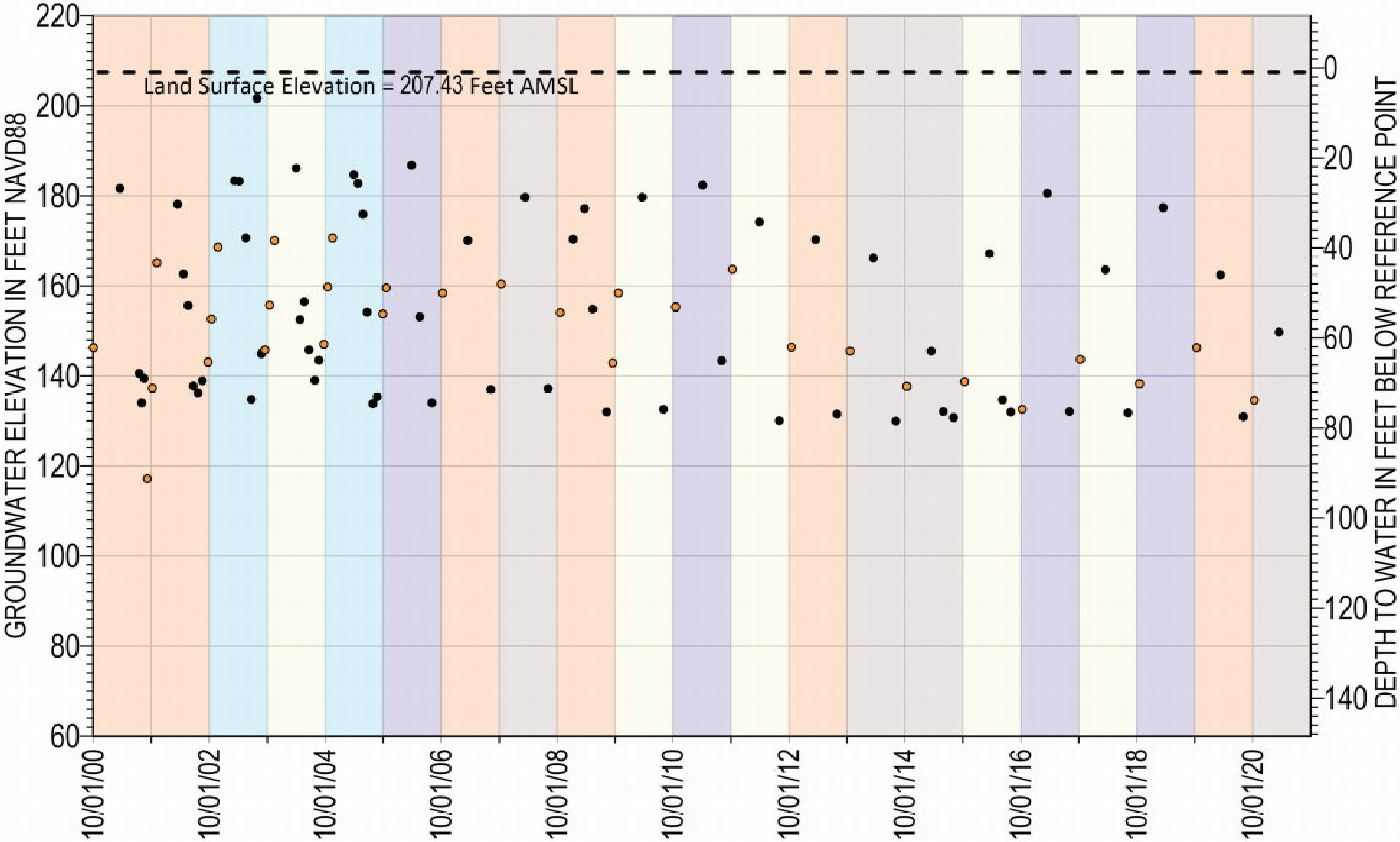
Well Screen Interval= 80 - 250 ft bgs

Climate Classification

Wet	Below Normal	Critically Dry
Above Normal	Dry	

**Note: Fall hand measurements are shown in gold (September and October)*

22N02W08B002M



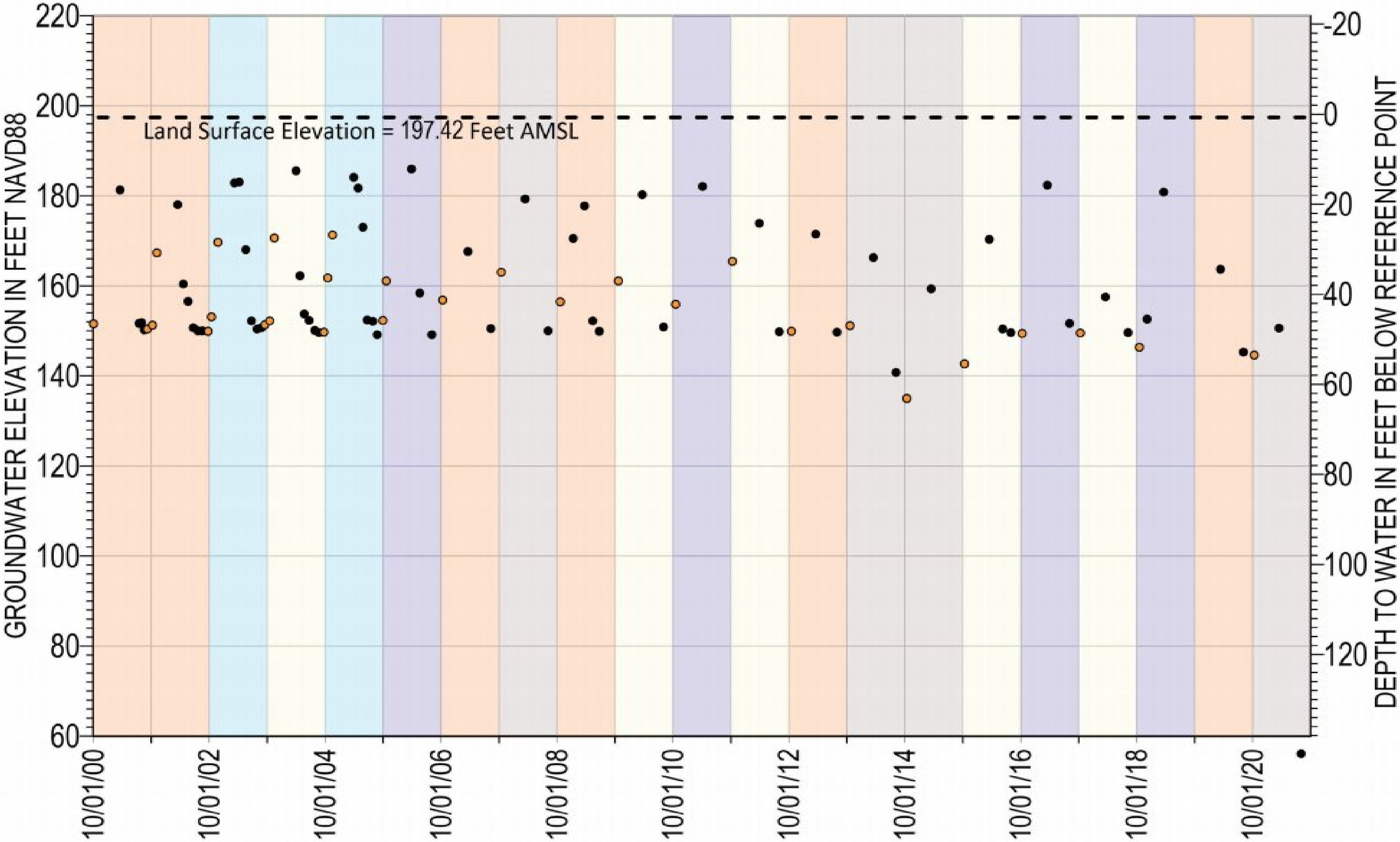
Reference Point Elevation= 208.43 ft NAVD88
Well Type: Other
Total Depth: 165 ft bgs
Well Screen Interval= Unknown ft bgs

Climate Classification

Wet | Above Normal | Below Normal | Dry | Critically Dry

**Note: Fall hand measurements are shown in gold (September and October)*

22N02W09L003M



• 22N02W09L003M Groundwater Elevation

- - - Land Surface Elevation

Reference Point Elevation= 198.12 ft NAVD88

Well Type: Irrigation

Total Depth: 550 ft bgs

Well Screen Interval= 40 - 536 ft bgs

Climate Classification

Wet

Below Normal

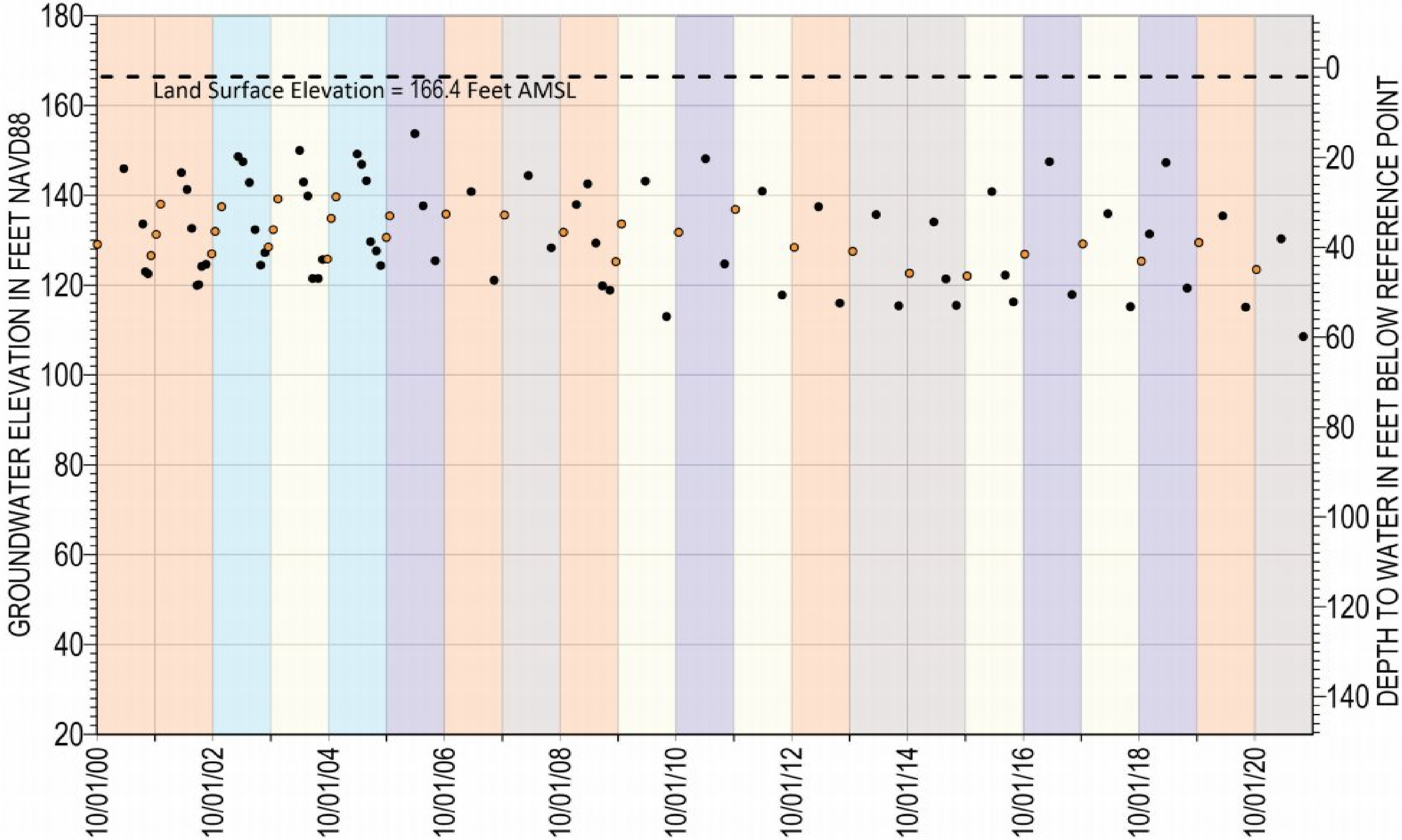
Critically Dry

Above Normal

Dry

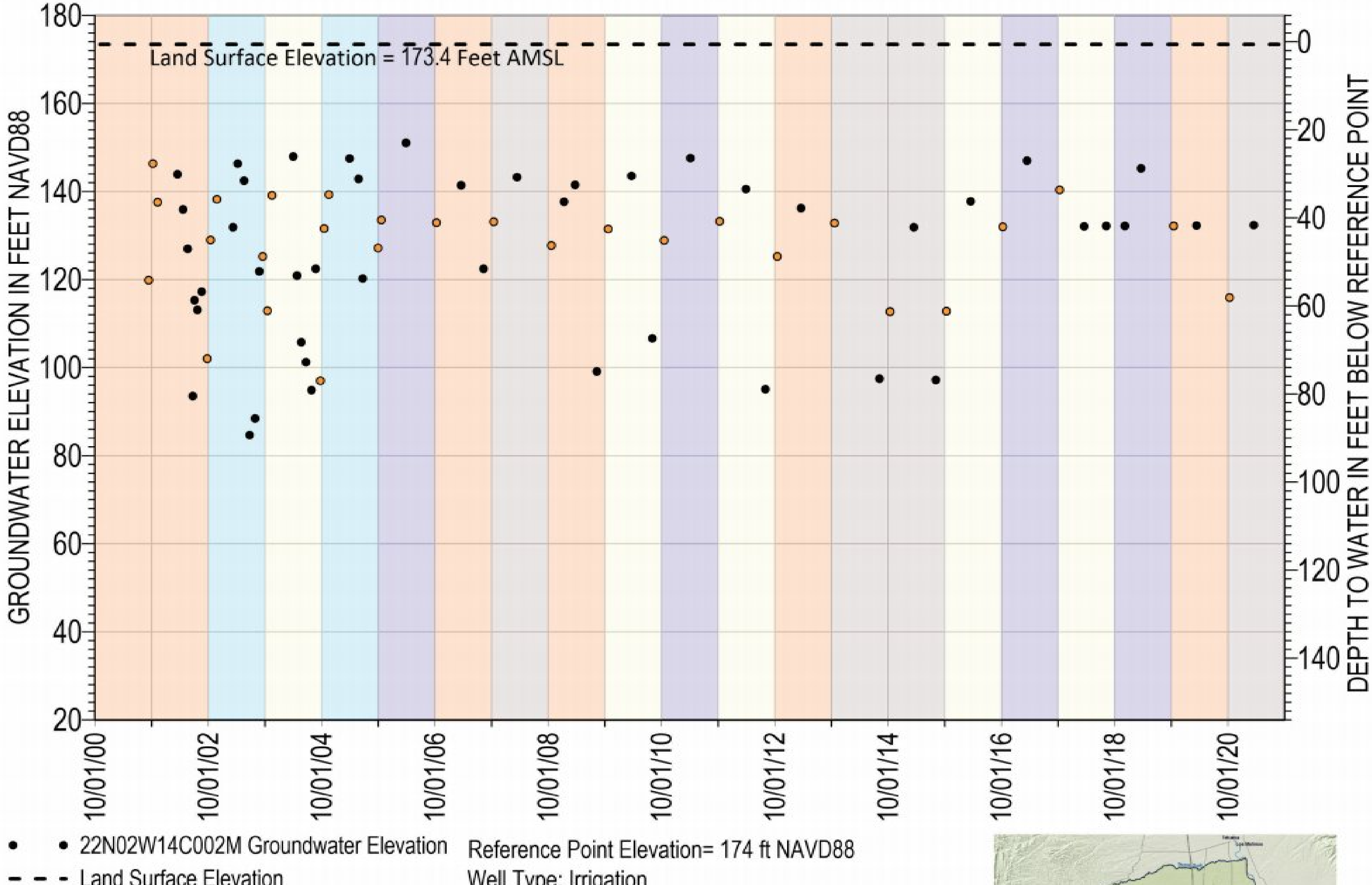
**Note: Fall hand measurements are shown in gold (September and October)*

22N02W11Q001M



**Note: Fall hand measurements are shown in gold (September and October)*

22N02W14C002M



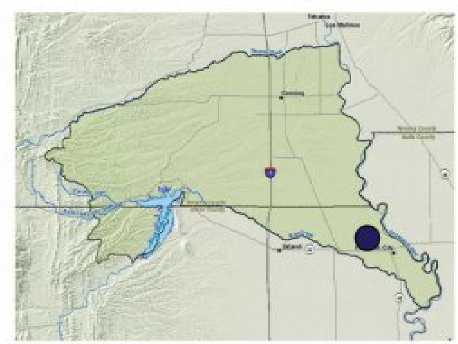
Reference Point Elevation= 174 ft NAVD88

Well Type: Irrigation

Total Depth: 540 ft bgs

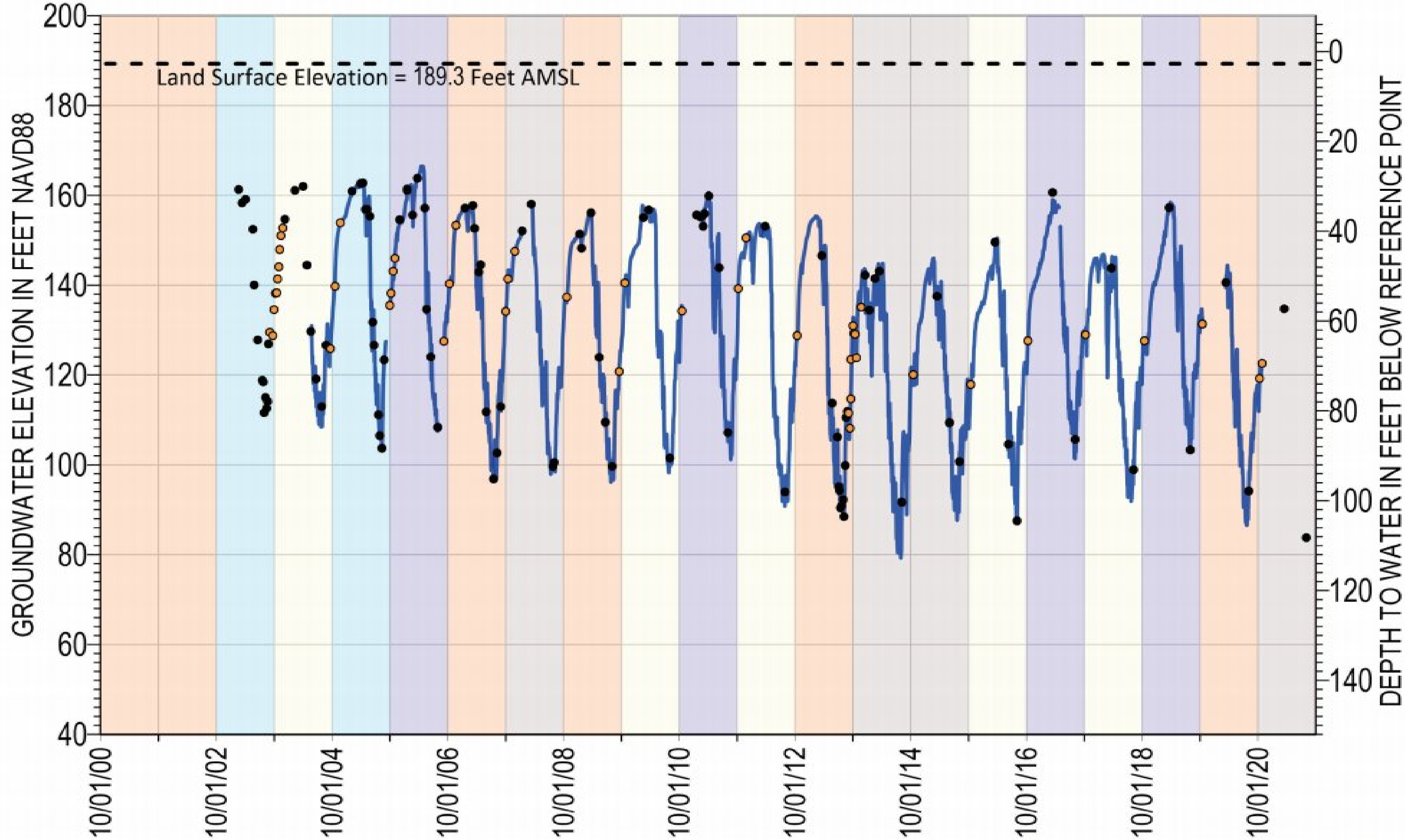
Well Screen Interval= 180 - 540 ft bgs

Climate Classification



**Note: Fall hand measurements are shown in gold (September and October)*

22N02W15C003M

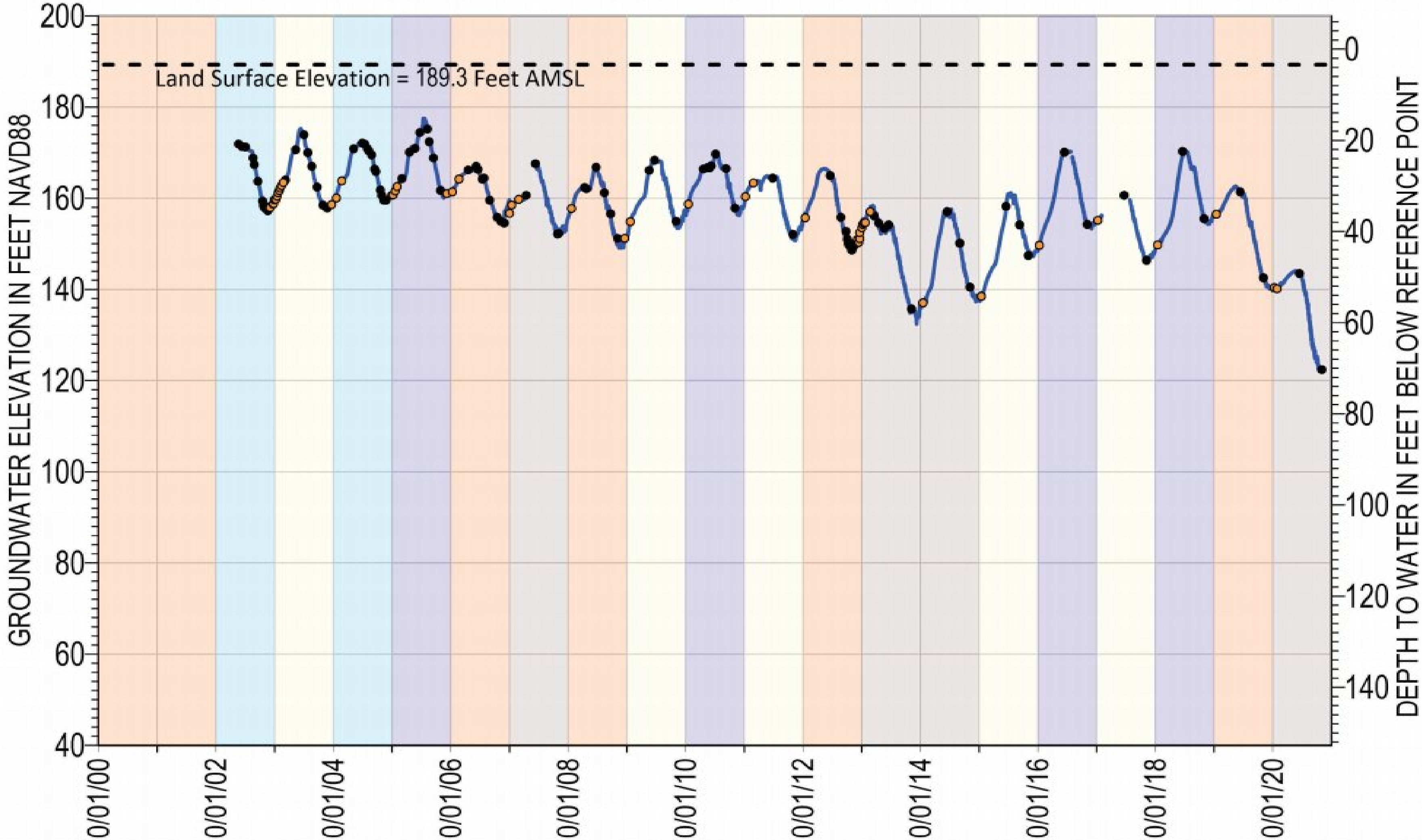


Reference Point Elevation= 192.01 ft NAVD88
Well Type: Observation
Total Depth: 422 ft bgs
Well Screen Interval= 370 - 380 ft bgs

Climate Classification

**Note: Fall hand measurements are shown in gold (September and October)*

22N02W15C005M



• 22N02W15C005M Groundwater Elevation
22N02W15C005M Transducer Data
Land Surface Elevation

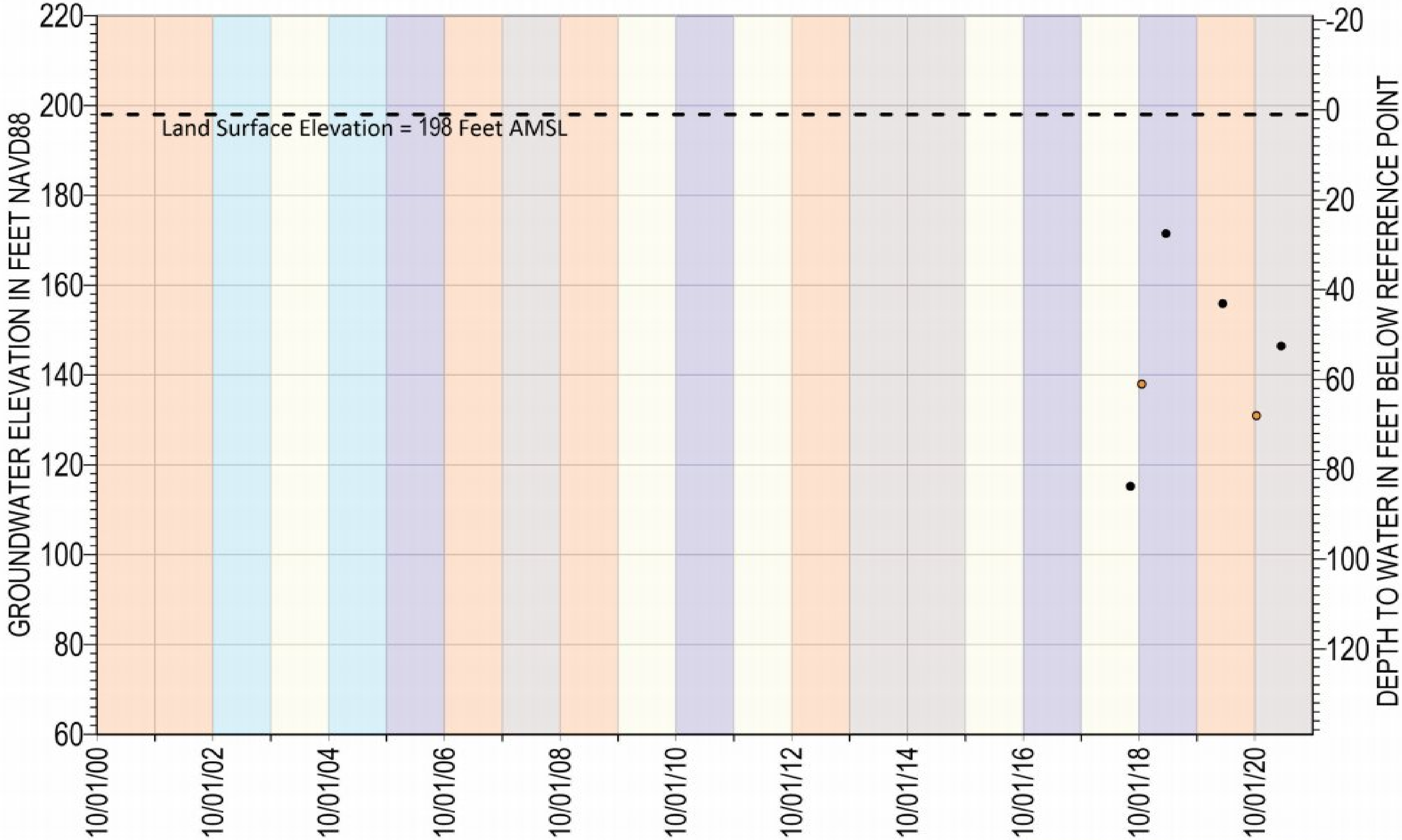
Reference Point Elevation= 192.705 ft NAVD88
Well Type: Observation
Total Depth: 100 ft bgs
Well Screen Interval= 60 - 70 ft bgs

Climate Classification

Wet
Above Normal
Below Normal
Dry
Critically Dry

**Note: Fall hand measurements are shown in gold (September and October)*

22N02W16B002M



• 22N02W16B002M Groundwater Elevation

- - - Land Surface Elevation

Reference Point Elevation= 199 ft NAVD88

Well Type: Irrigation

Total Depth: 349 ft bgs

Well Screen Interval= 150 - 349 ft bgs

Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

22N02W16B003M Groundwater Elevation

Land Surface Elevation

Reference Point Elevation= 199.5 ft NAVD88

Well Type: Domestic

Total Depth: 163 ft bgs

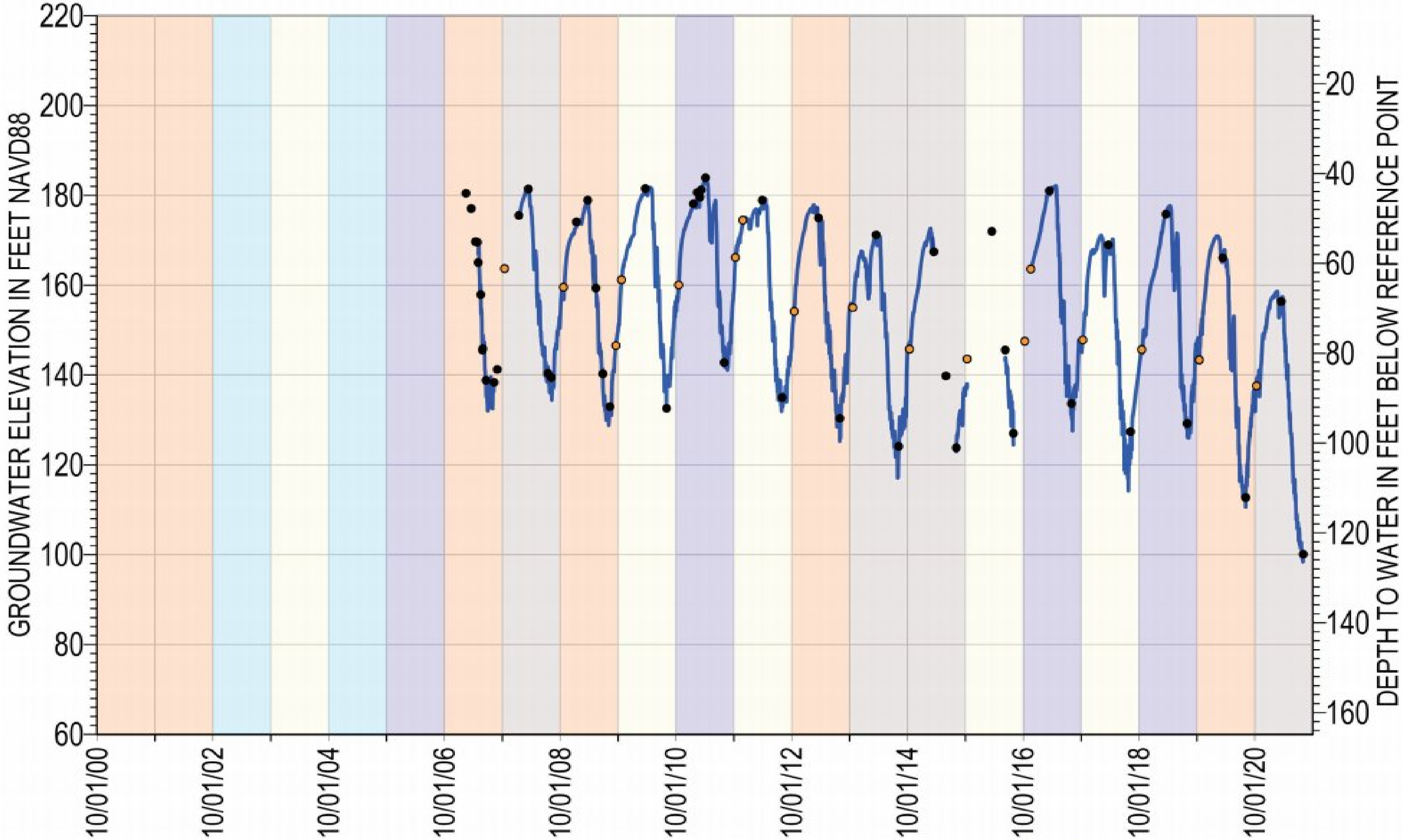
Well Screen Interval= 147 - 163 ft bgs

Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

22N02W18C002M

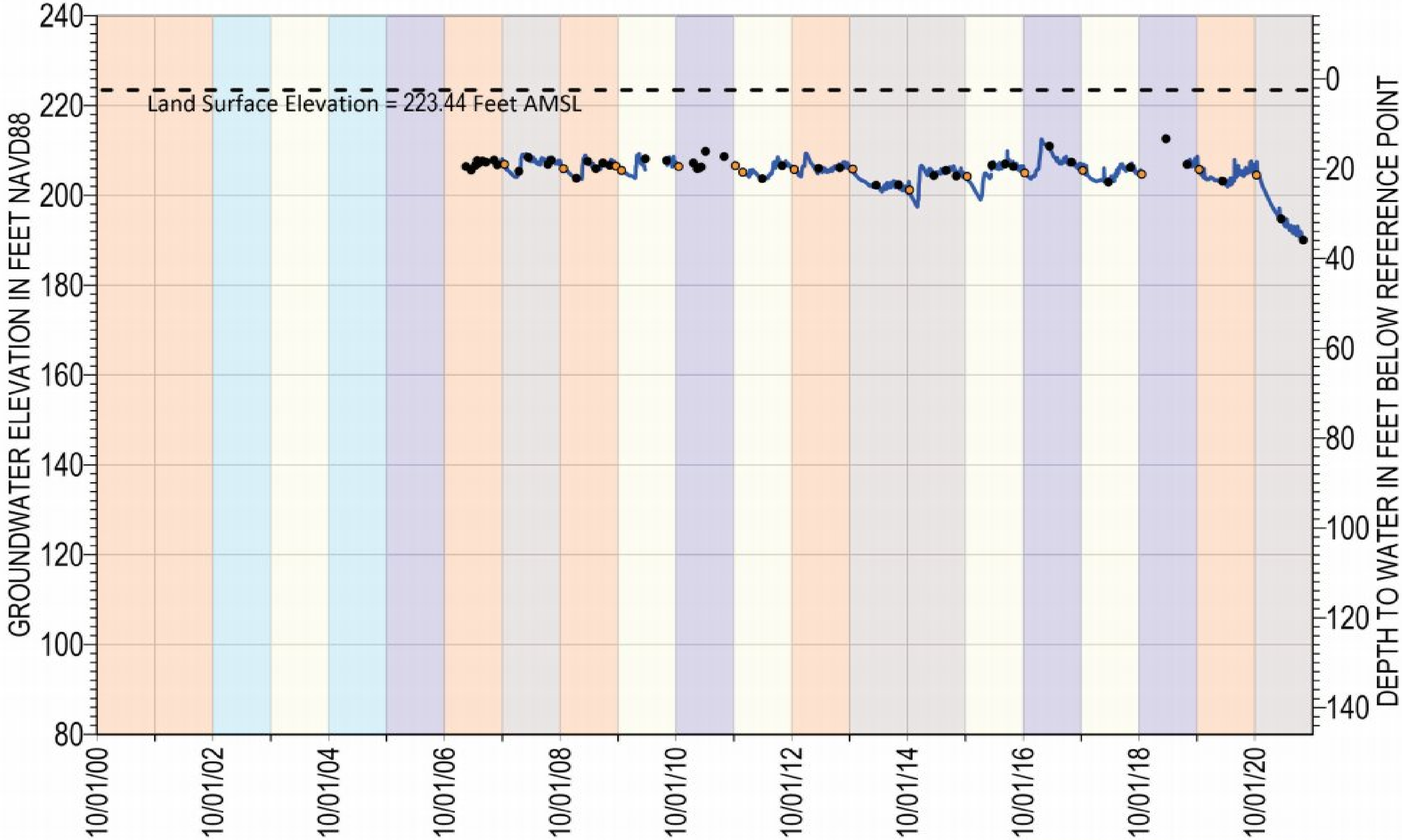


Reference Point Elevation= 224.84 ft NAVD88
Well Type: Observation
Total Depth: 482 ft bgs
Well Screen Interval= 414 - 434 ft bgs

Climate Classification

**Note: Fall hand measurements are shown in gold (September and October)*

22N02W18C004M



Reference Point Elevation= 225.94 ft NAVD88

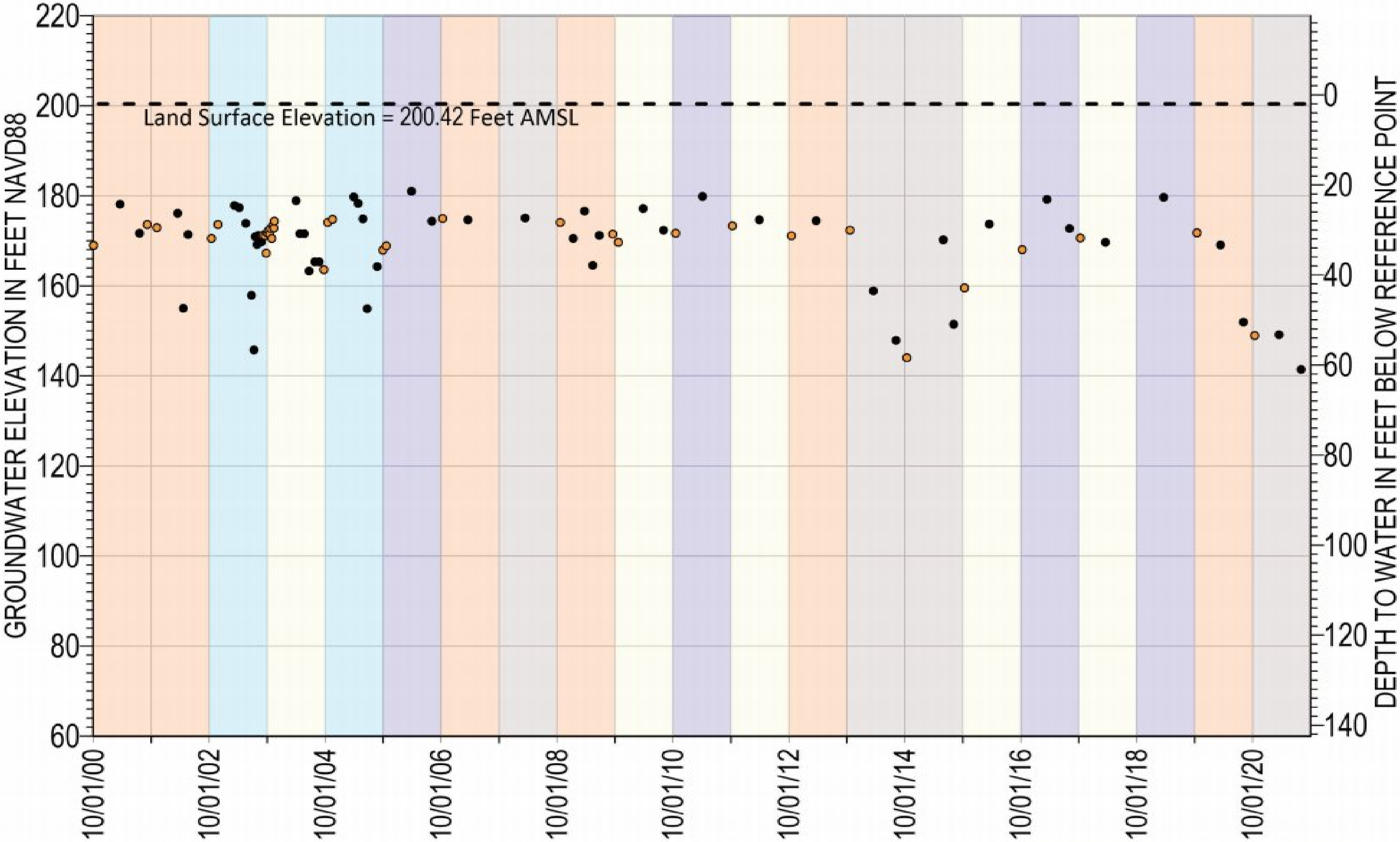
Well Type: Observation

Total Depth: 90 ft bgs

Well Screen Interval= 55 - 65 ft bgs

**Note: Fall hand measurements are shown in gold (September and October)*

22N02W21D001M



• • 22N02W21D001M Groundwater Elevation

– – – Land Surface Elevation

Reference Point Elevation= 202.42 ft NAVD88

Well Type: Irrigation

Total Depth: 90 ft bgs

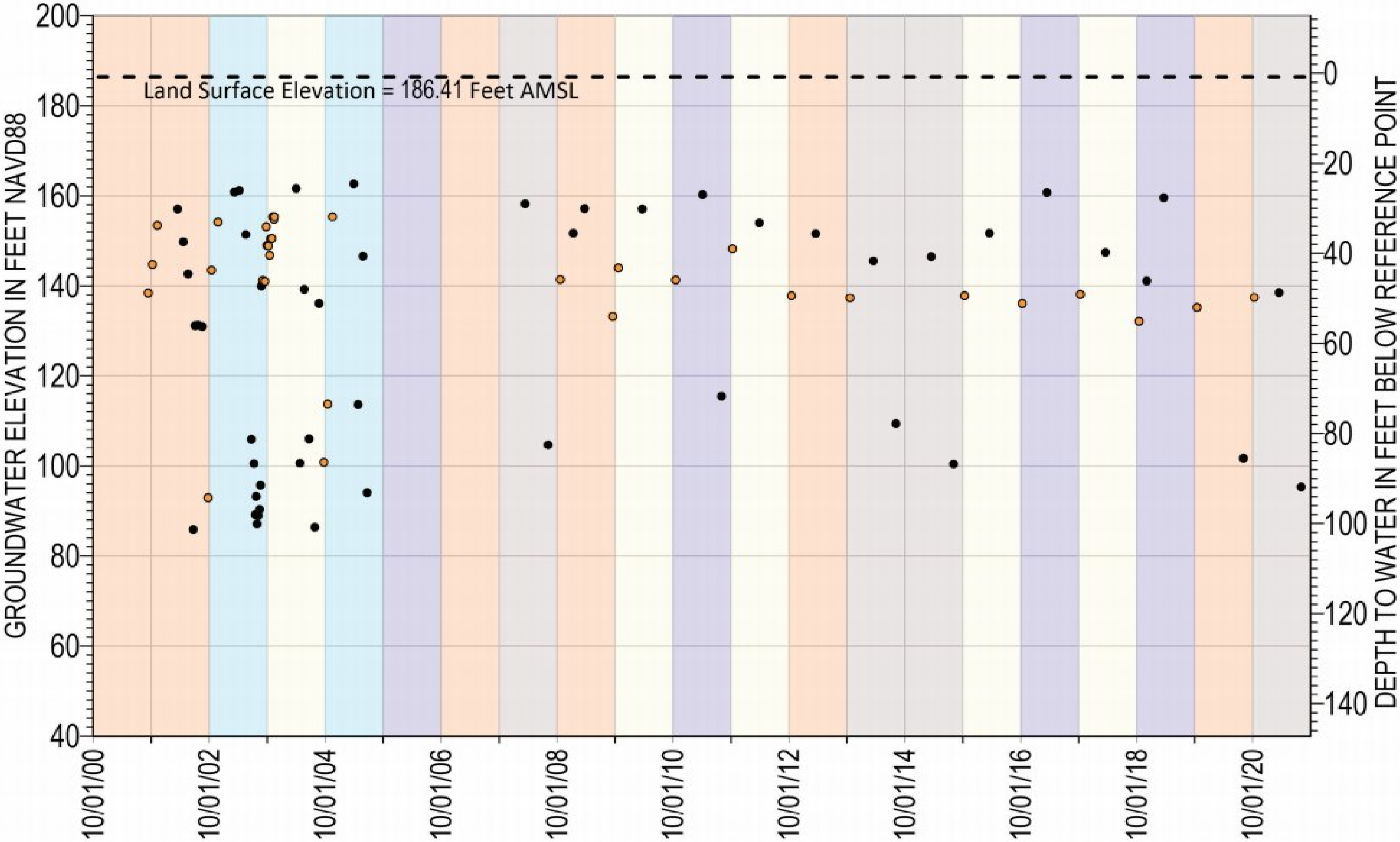
Well Screen Interval= Unknown ft bgs

Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

22N02W22B001M



Reference Point Elevation= 187.21 ft NAVD88

Well Type: Irrigation

Total Depth: 430 ft bgs

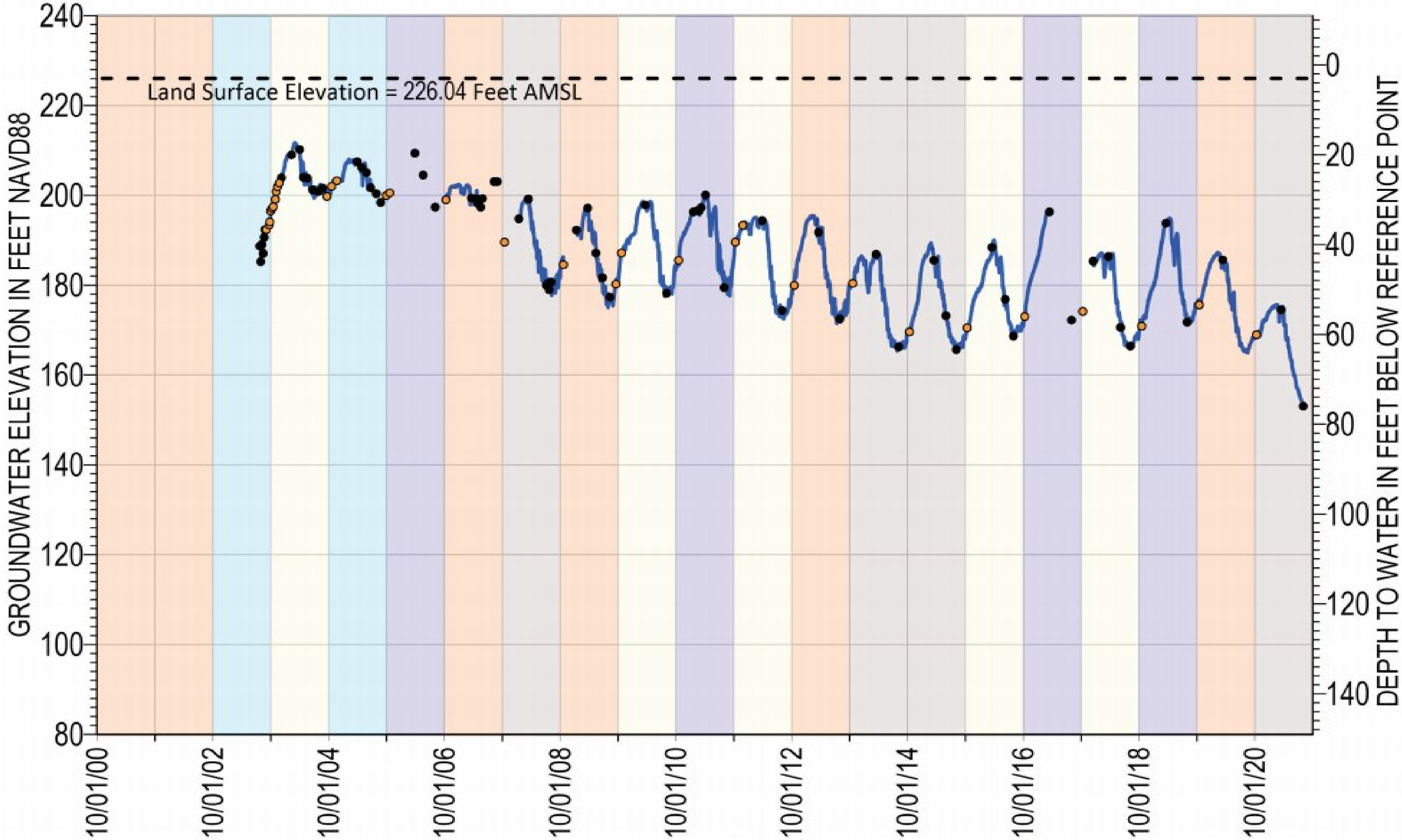
Well Screen Interval= 80 - 430 ft bgs

Climate Classification

Wet; Below Normal; Critically Dry; Above Normal; Dry

**Note: Fall hand measurements are shown in gold (September and October)*

22N03W01R003M



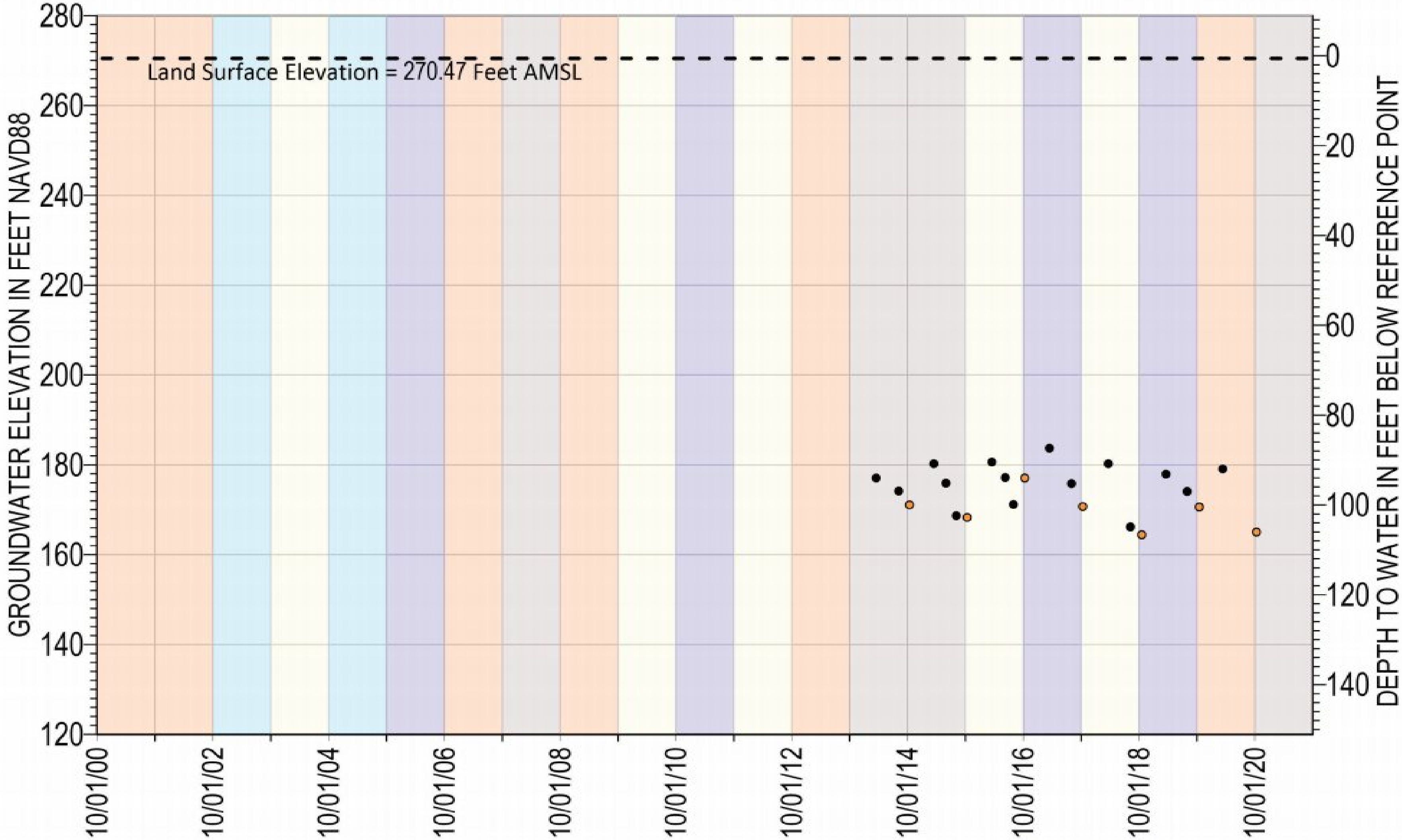
Reference Point Elevation= 229.039 ft NAVD88
Well Type: Observation
Total Depth: 103 ft bgs
Well Screen Interval= 60 - 70 ft bgs

Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

22N03W03D002M



• • 22N03W03D002M Groundwater Elevation
- - - Land Surface Elevation

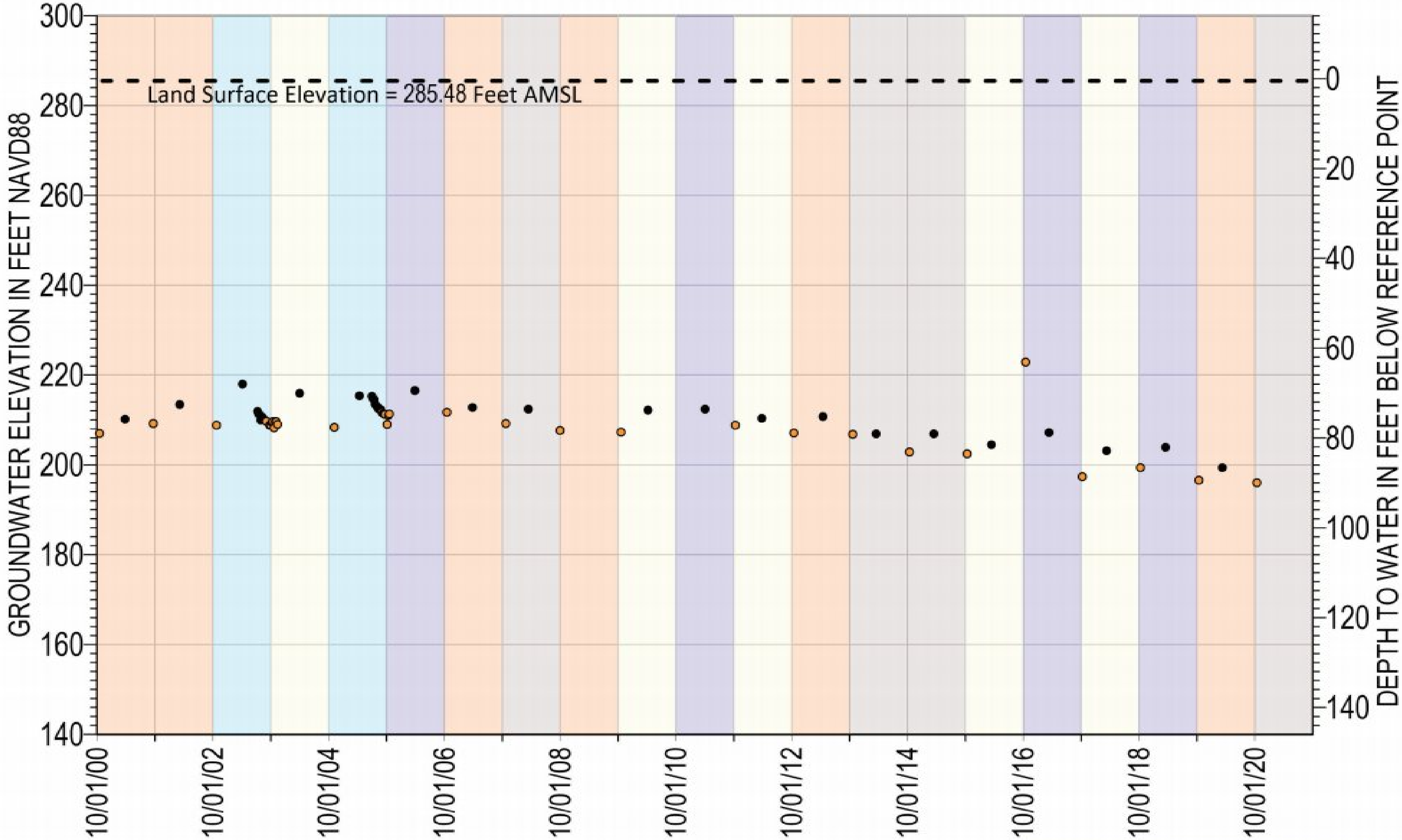
Reference Point Elevation= 271.07 ft NAVD88
Well Type: Domestic
Total Depth: 200 ft bgs
Well Screen Interval= 100 - 200 ft bgs

Climate Classification

Wet | Below Normal | Critically Dry
Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

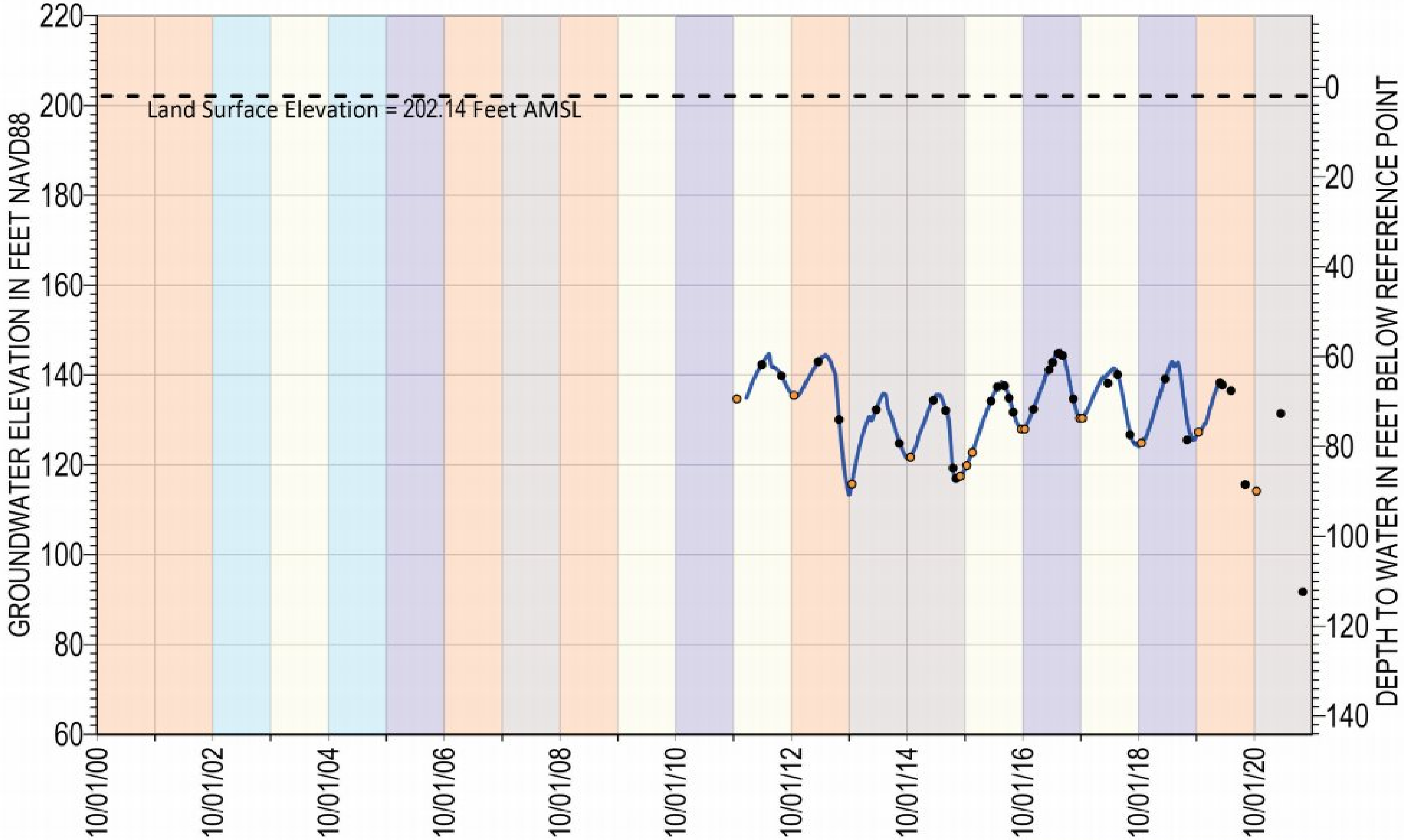
22N03W04E001M



Reference Point Elevation= 285.98 ft NAVD88
Well Type: Domestic
Total Depth: 180 ft bgs
Well Screen Interval= 40 - 180 ft bgs

**Note: Fall hand measurements are shown in gold (September and October)*

23N02W28N001M

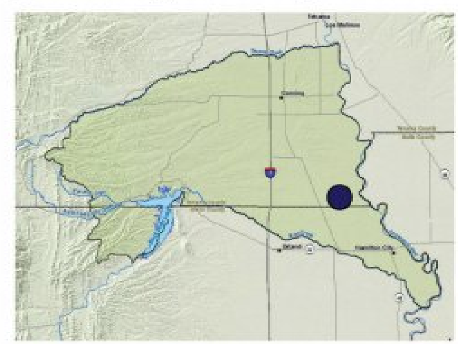


23N02W28N001M Groundwater Elevation
23N02W28N001M Transducer Data
Land Surface Elevation

Reference Point Elevation= 204.09 ft NAVD88
Well Type: Observation
Total Depth: 970 ft bgs
Well Screen Interval= 910 - 950 ft bgs

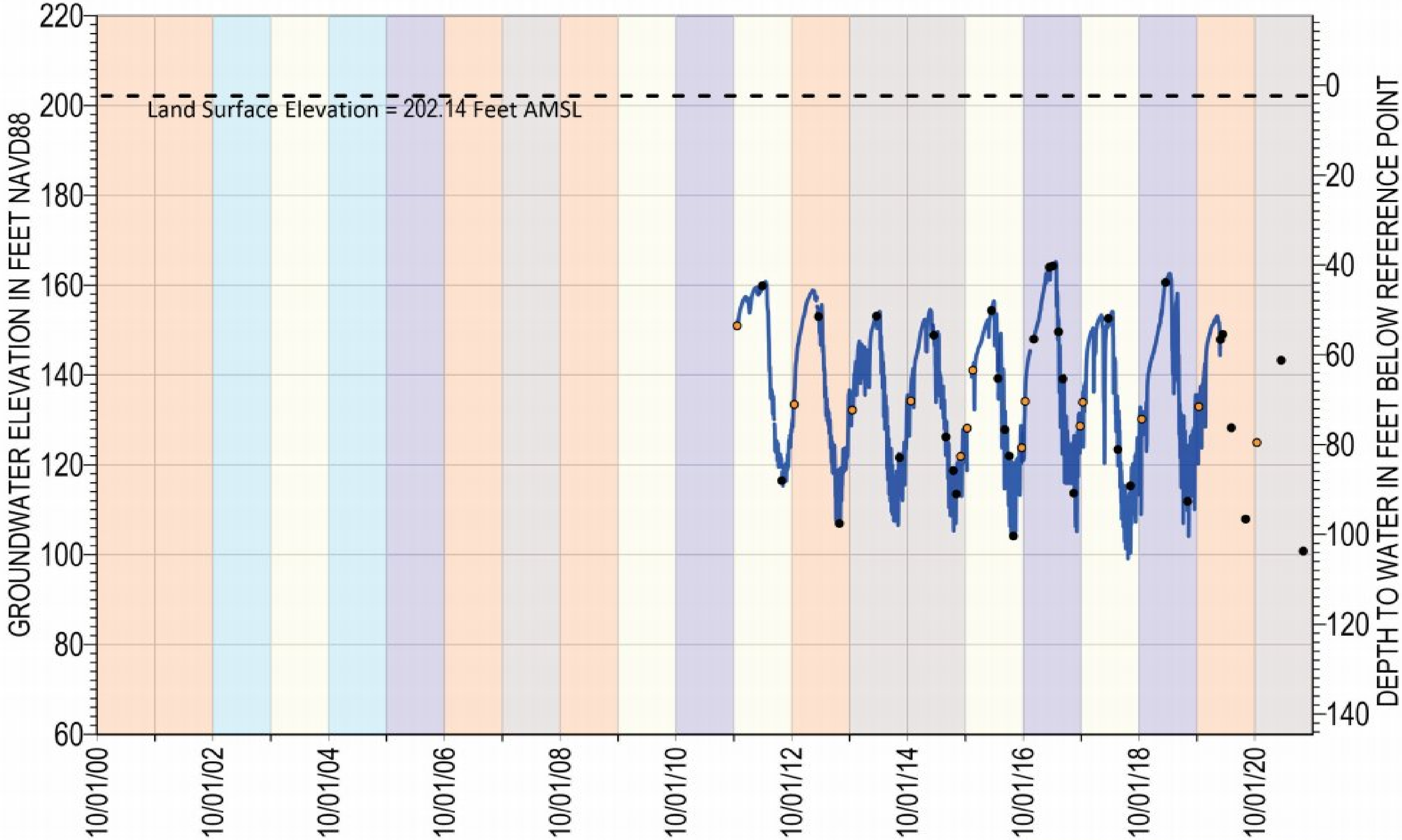
Climate Classification

Wet | Below Normal | Critically Dry
Above Normal | Dry



**Note: Fall hand measurements are shown in gold (September and October)*

23N02W28N003M

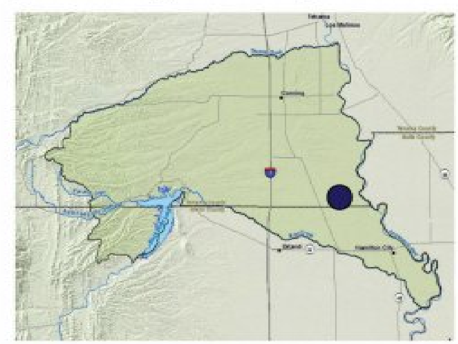


23N02W28N003M Groundwater Elevation
23N02W28N003M Transducer Data
Land Surface Elevation

Reference Point Elevation= 204.5 ft NAVD88
Well Type: Observation
Total Depth: 370 ft bgs
Well Screen Interval= 330 - 350 ft bgs

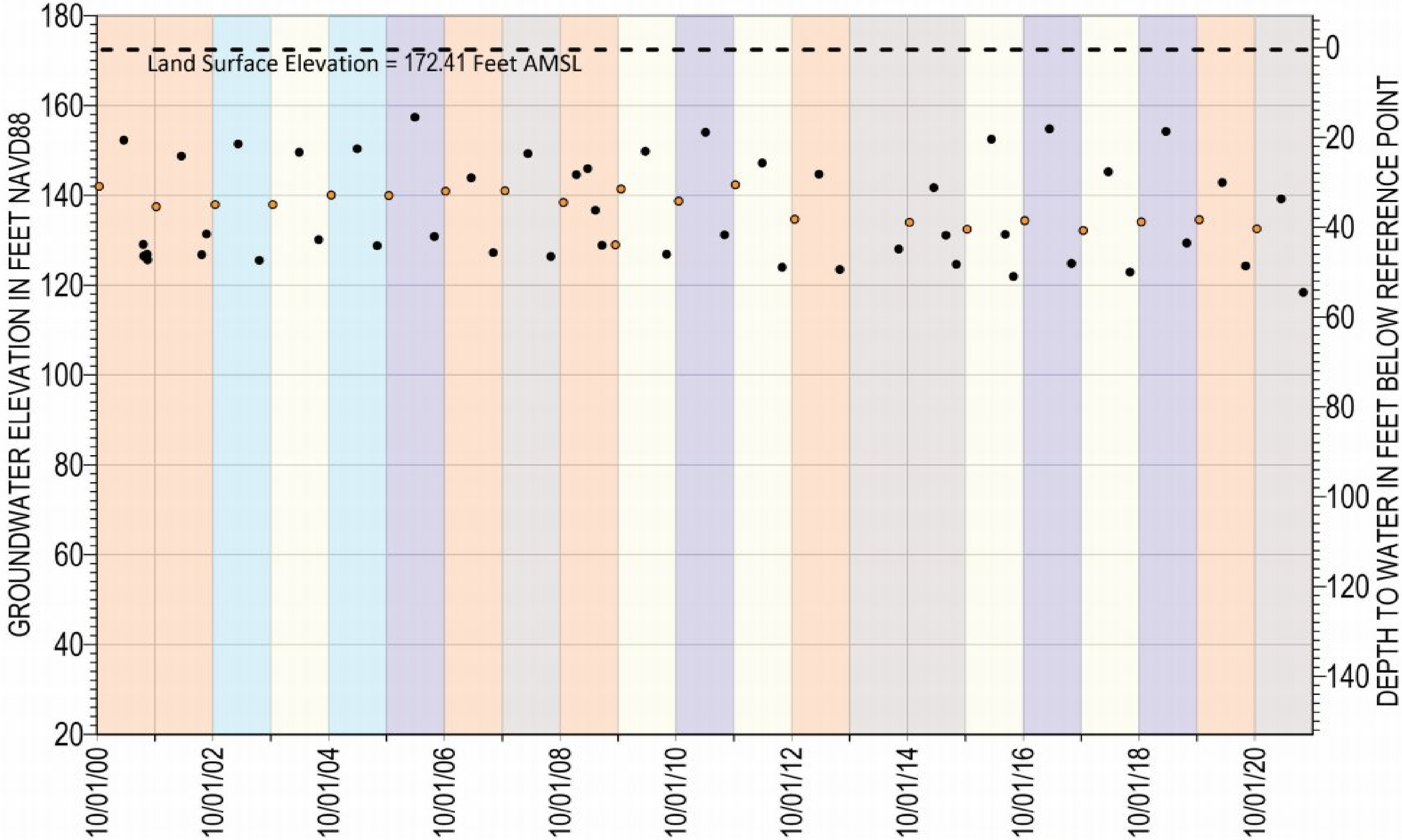
Climate Classification

Wet
Above Normal
Below Normal
Dry
Critically Dry



**Note: Fall hand measurements are shown in gold (September and October)*

23N02W34A001M



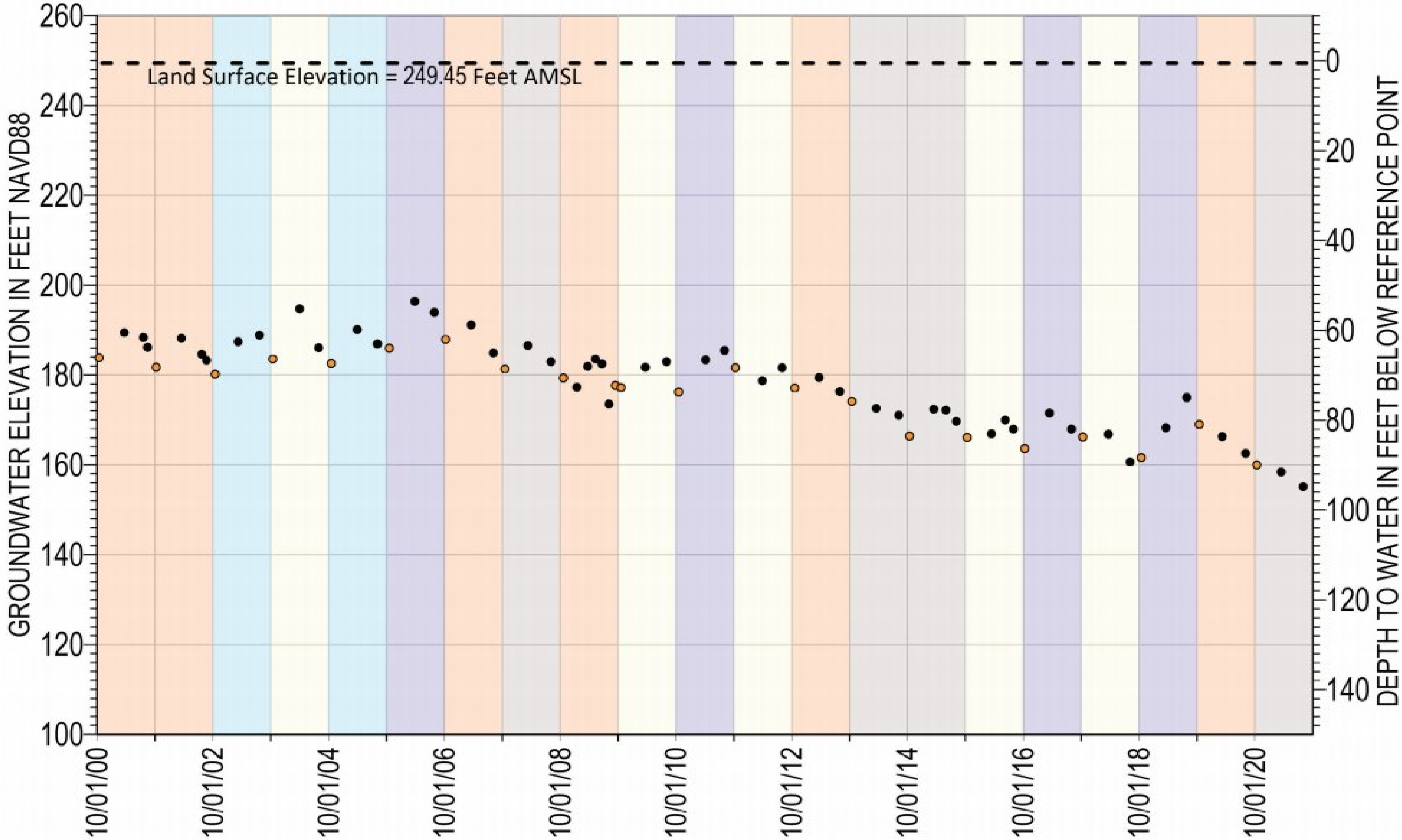
Reference Point Elevation= 172.91 ft NAVD88
Well Type: Irrigation
Total Depth: 130 ft bgs
Well Screen Interval= Unknown ft bgs

Climate Classification

Wet	Below Normal	Critically Dry
Above Normal	Dry	

**Note: Fall hand measurements are shown in gold (September and October)*

23N03W12L001M



• • 23N03W12L001M Groundwater Elevation

- - - Land Surface Elevation

Reference Point Elevation= 249.95 ft NAVD88

Well Type: Irrigation

Total Depth: 150 ft bgs

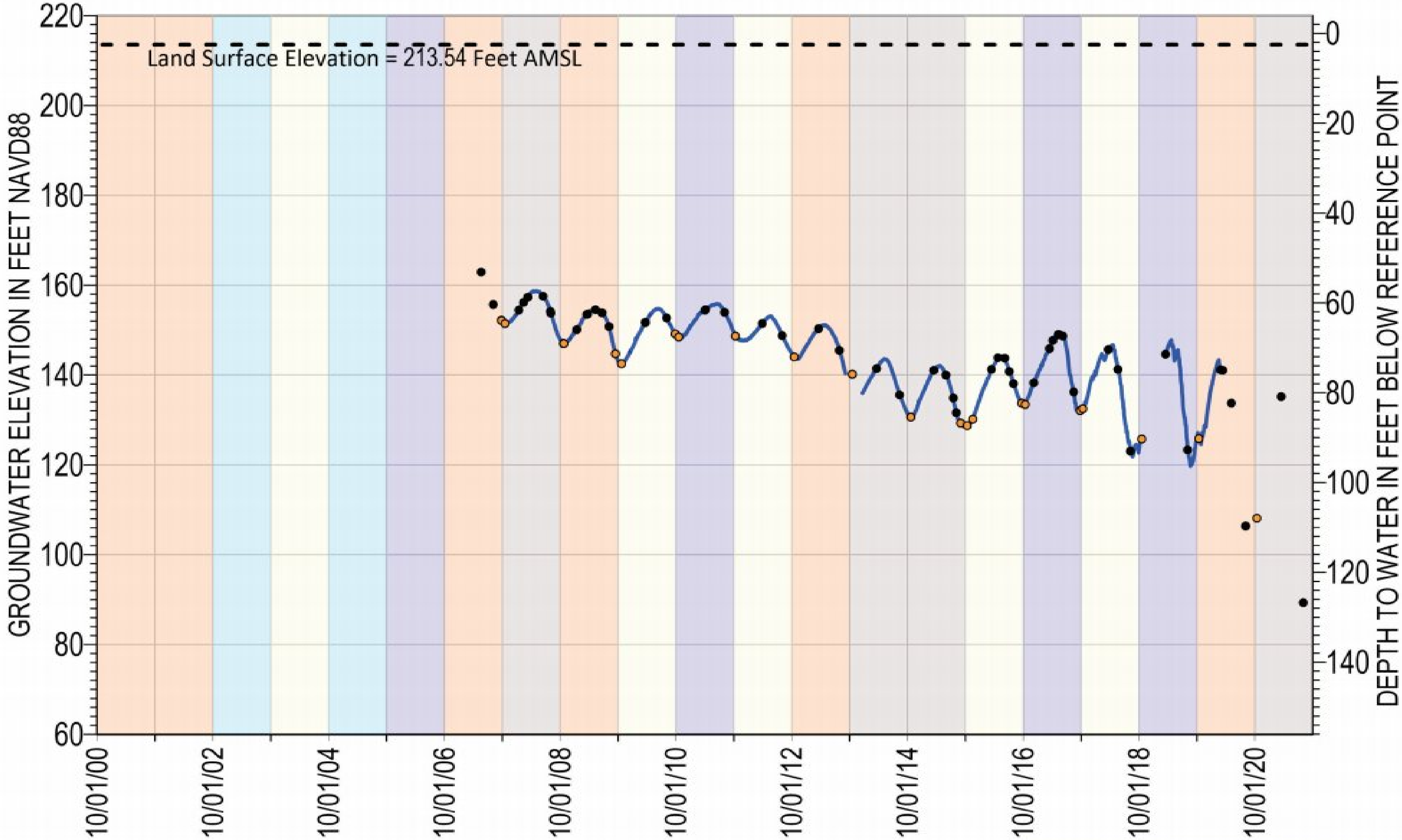
Well Screen Interval= 45 - 148 ft bgs

Climate Classification

Wet	Below Normal	Critically Dry
Above Normal	Dry	

**Note: Fall hand measurements are shown in gold (September and October)*

23N03W13C003M



- 23N03W13C003M Groundwater Elevation
- 23N03W13C003M Transducer Data
- Land Surface Elevation

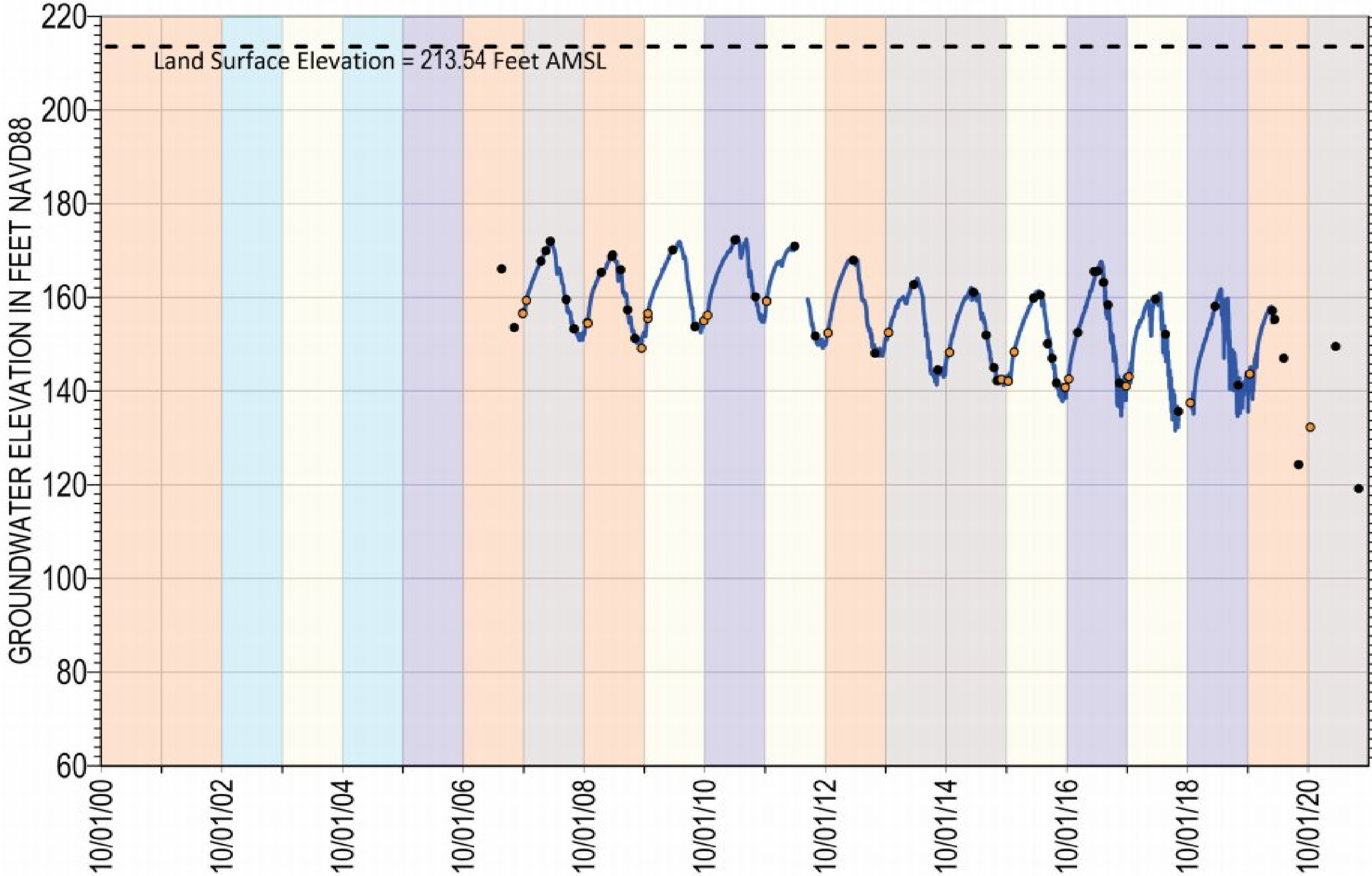
Reference Point Elevation= 216.06 ft NAVD88
Well Type: Observation
Total Depth: 980 ft bgs
Well Screen Interval= 900 - 970 ft bgs

Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

23N03W13C005M



23N03W13C005M Groundwater Elevation
23N03W13C005M Transducer Data
Land Surface Elevation

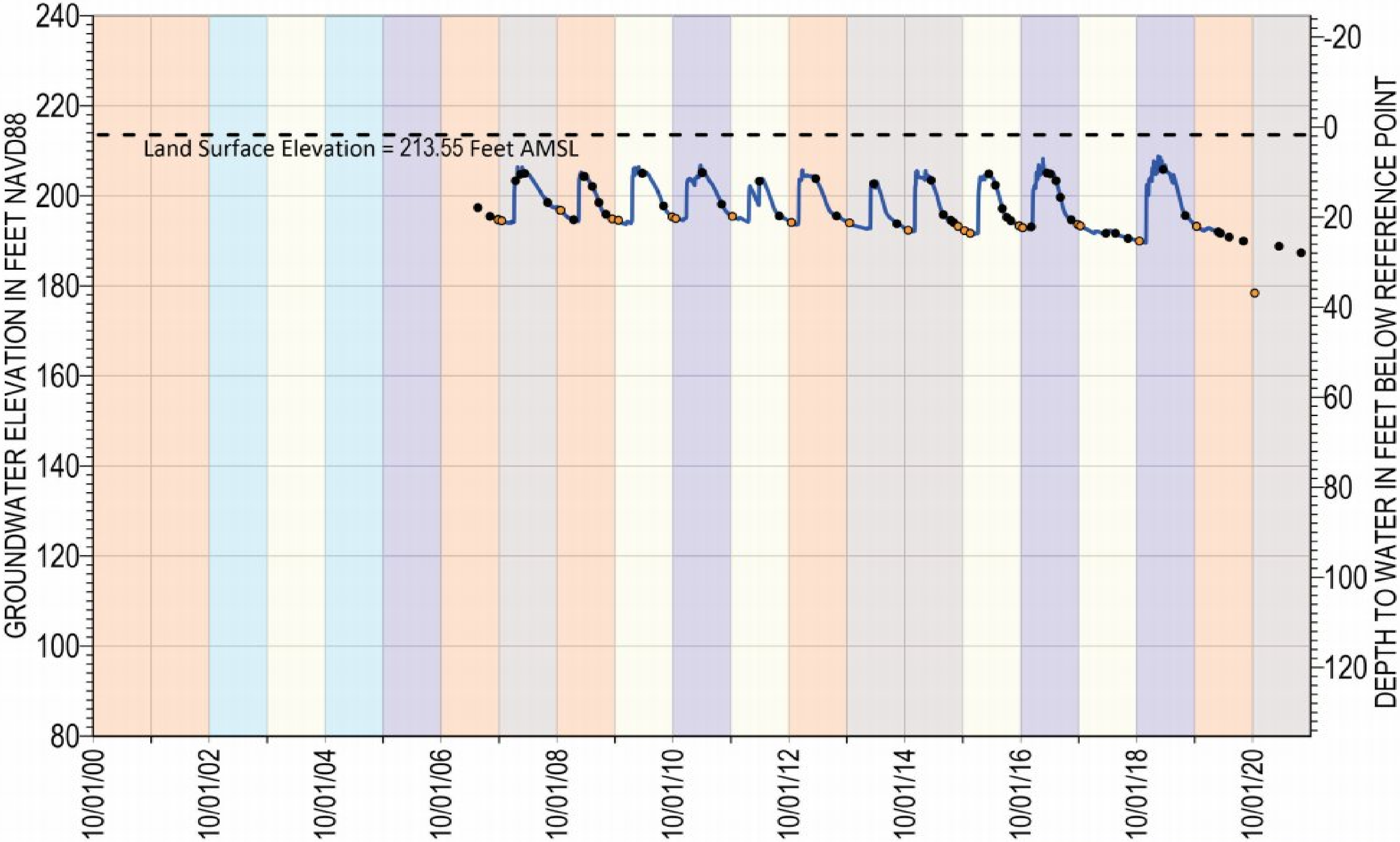
Reference Point Elevation= 215.73 ft NAVD88
Well Type: Observation
Total Depth: 381 ft bgs
Well Screen Interval= 345 - 355 ft bgs

Climate Classification

Wet
Below Normal
Critically Dry
Above Normal
Dry

**Note: Fall hand measurements are shown in gold (September and October)*

23N03W13C007M



23N03W13C007M Groundwater Elevation
23N03W13C007M Transducer Data
Land Surface Elevation

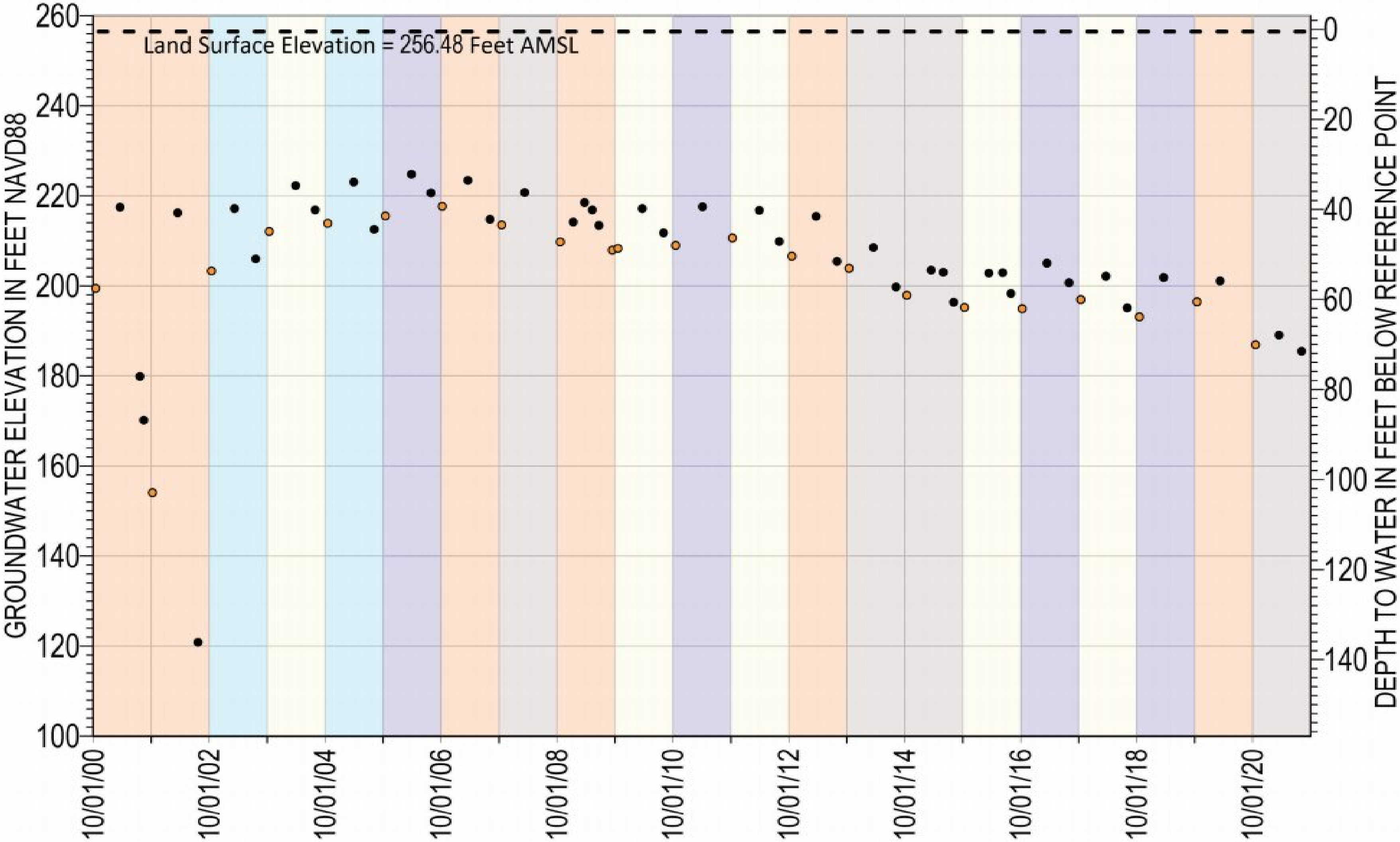
Reference Point Elevation= 215.25 ft NAVD88
Well Type: Observation
Total Depth: 71 ft bgs
Well Screen Interval= 25 - 35 ft bgs

Climate Classification

Wet | Above Normal | Below Normal | Dry | Critically Dry

**Note: Fall hand measurements are shown in gold (September and October)*

23N03W16F002M



● ● 23N03W16F002M Groundwater Elevation
- - - Land Surface Elevation

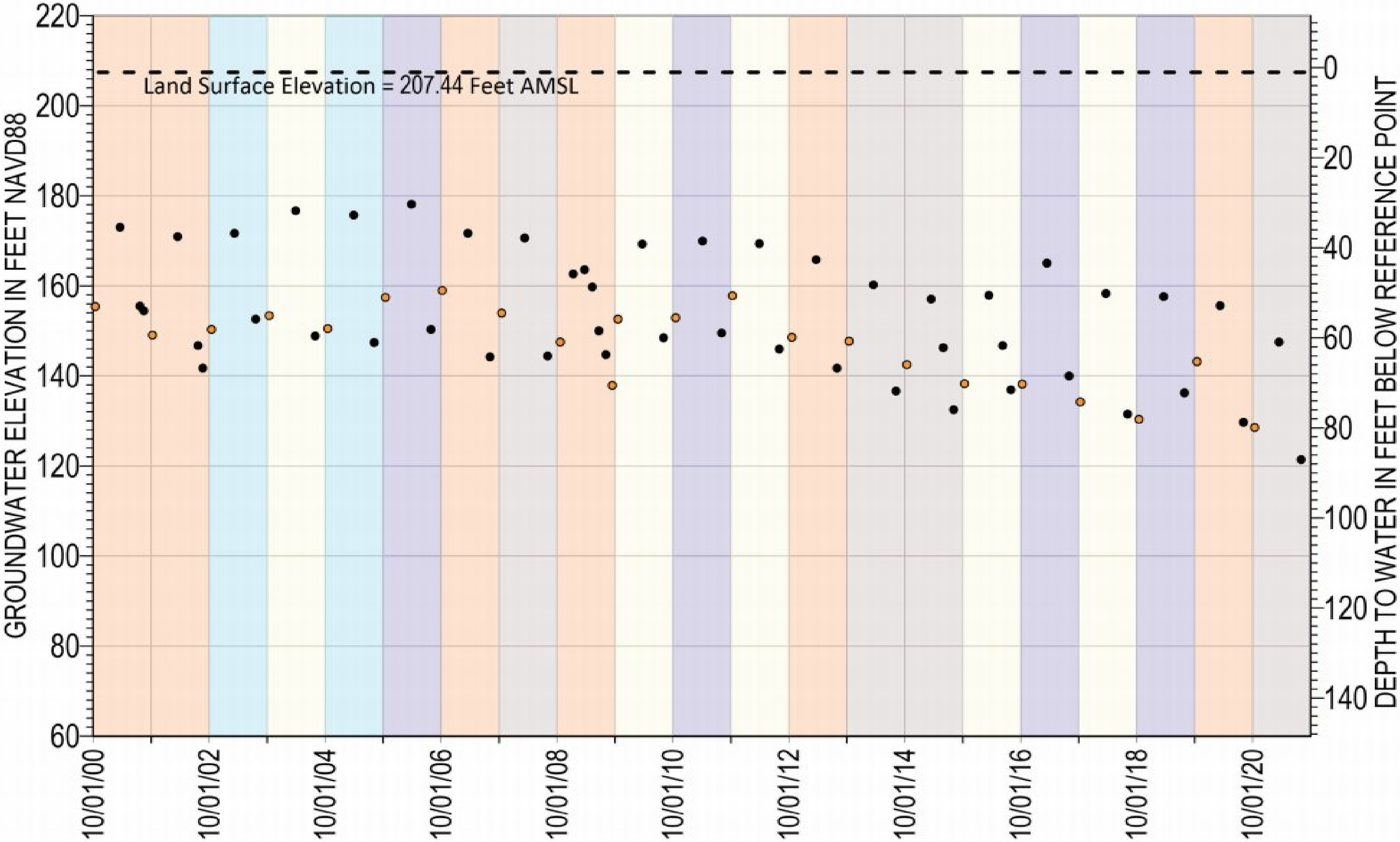
Reference Point Elevation= 256.98 ft NAVD88
Well Type: Irrigation
Total Depth: 450 ft bgs
Well Screen Interval= 110 - 445 ft bgs

Climate Classification

Wet | Below Normal | Critically Dry
Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

23N03W24A002M



• • 23N03W24A002M Groundwater Elevation

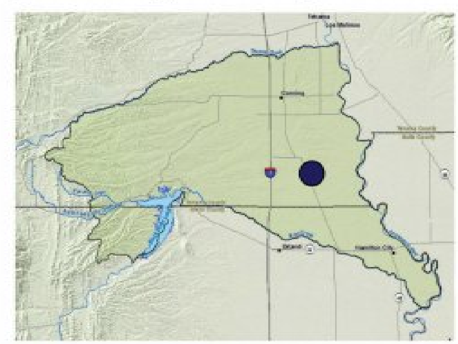
– – – Land Surface Elevation

Reference Point Elevation= 208.44 ft NAVD88

Well Type: Irrigation

Total Depth: 200 ft bgs

Well Screen Interval= Unknown ft bgs

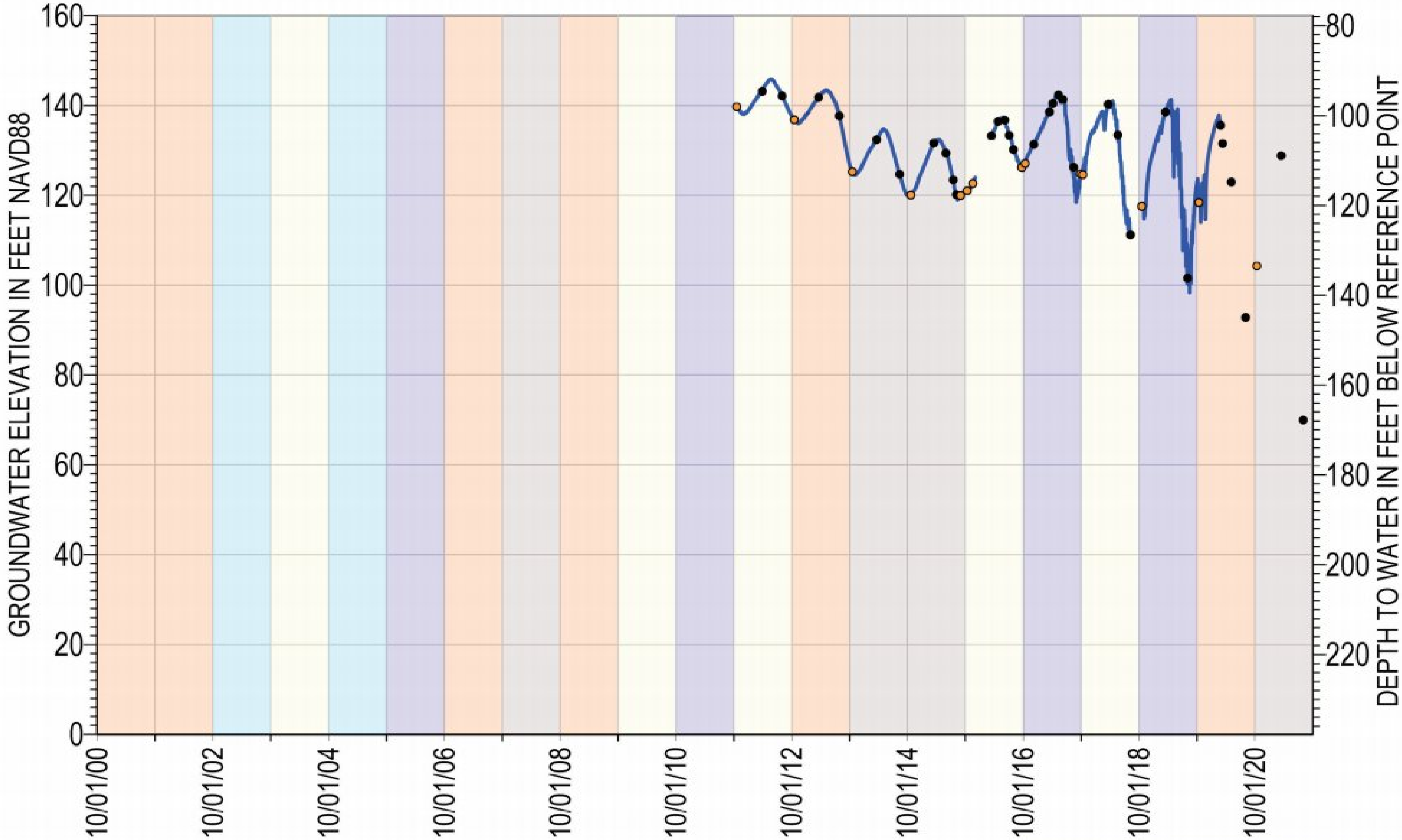


Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

23N03W25M001M



• • 23N03W25M001M Groundwater Elevation
— 23N03W25M001M Transducer Data

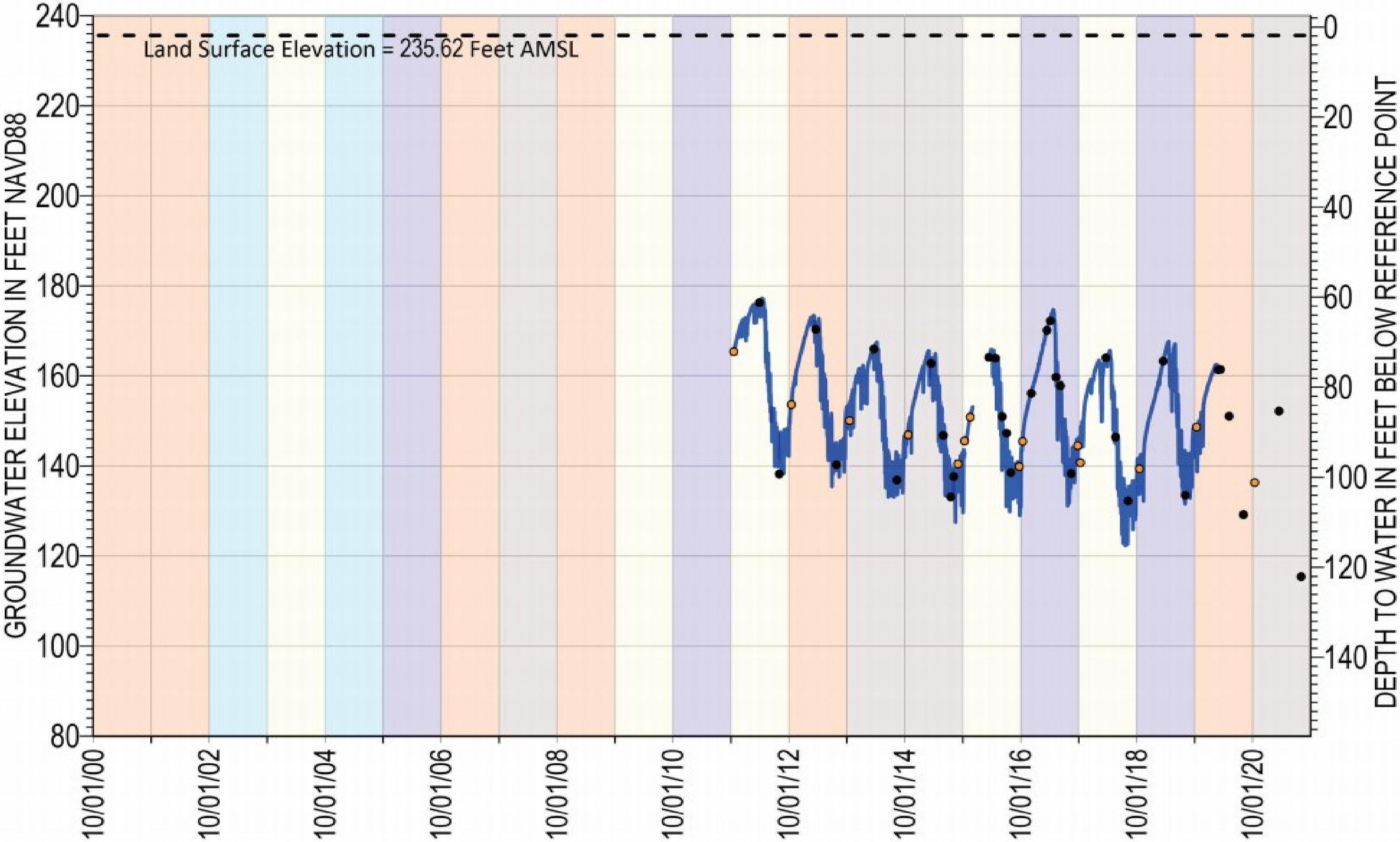
Reference Point Elevation= 237.76 ft NAVD88
Well Type: Observation
Total Depth: 988 ft bgs
Well Screen Interval= 965 - 975 ft bgs

Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry

**Note: Fall hand measurements are shown in gold (September and October)*

23N03W25M003M



23N03W25M003M Groundwater Elevation
23N03W25M003M Transducer Data
Land Surface Elevation

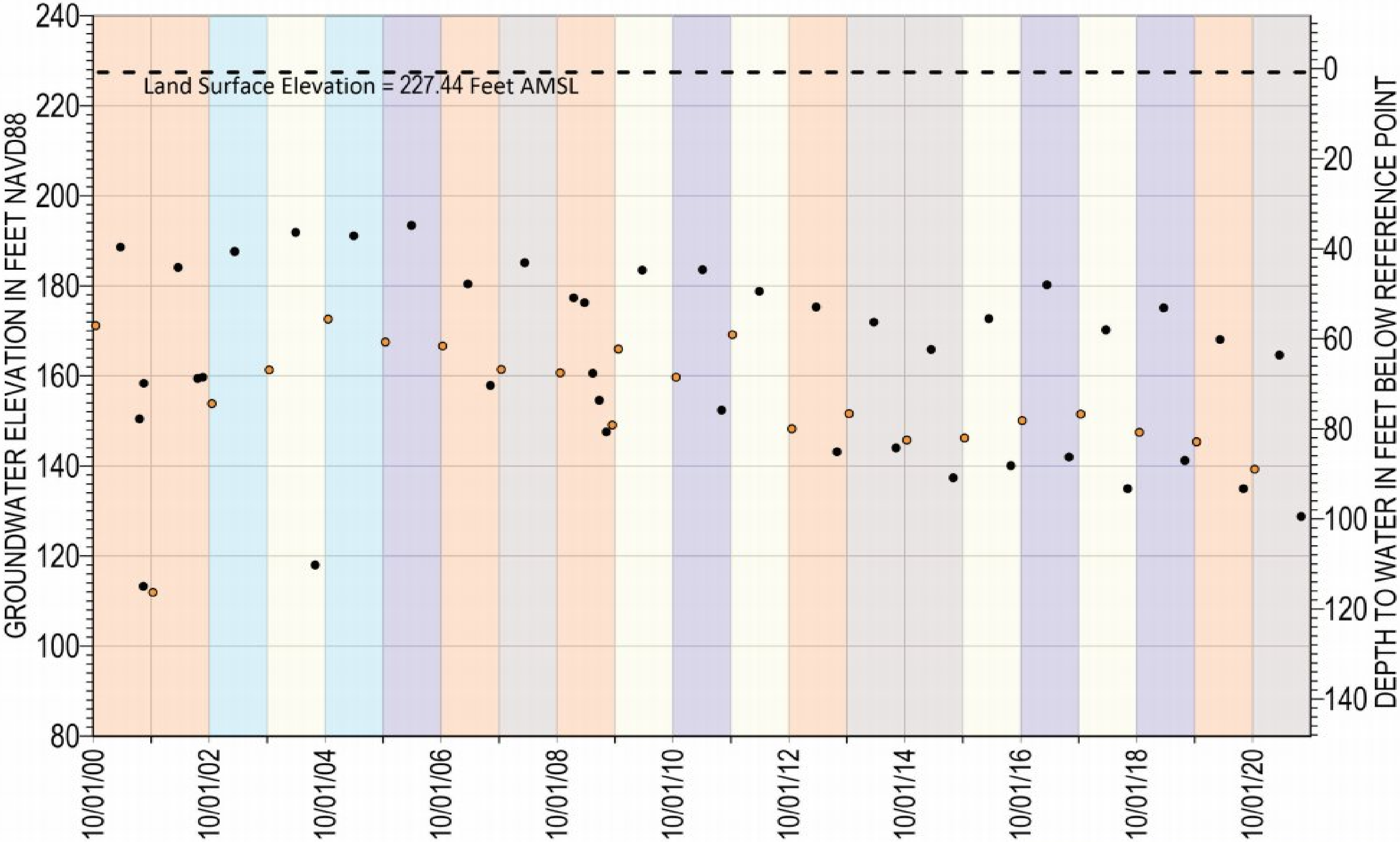
Reference Point Elevation= 237.48 ft NAVD88
Well Type: Observation
Total Depth: 262 ft bgs
Well Screen Interval= 240 - 250 ft bgs

Climate Classification

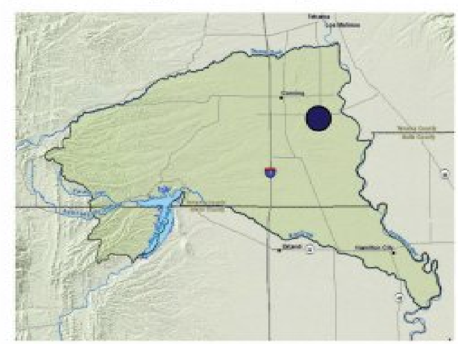
Wet
Above Normal
Below Normal
Dry
Critically Dry

**Note: Fall hand measurements are shown in gold (September and October)*

24N02W30P002M



Reference Point Elevation= 228.24 ft NAVD88
Well Type: Irrigation
Total Depth: 300 ft bgs
Well Screen Interval= 120 - 300 ft bgs

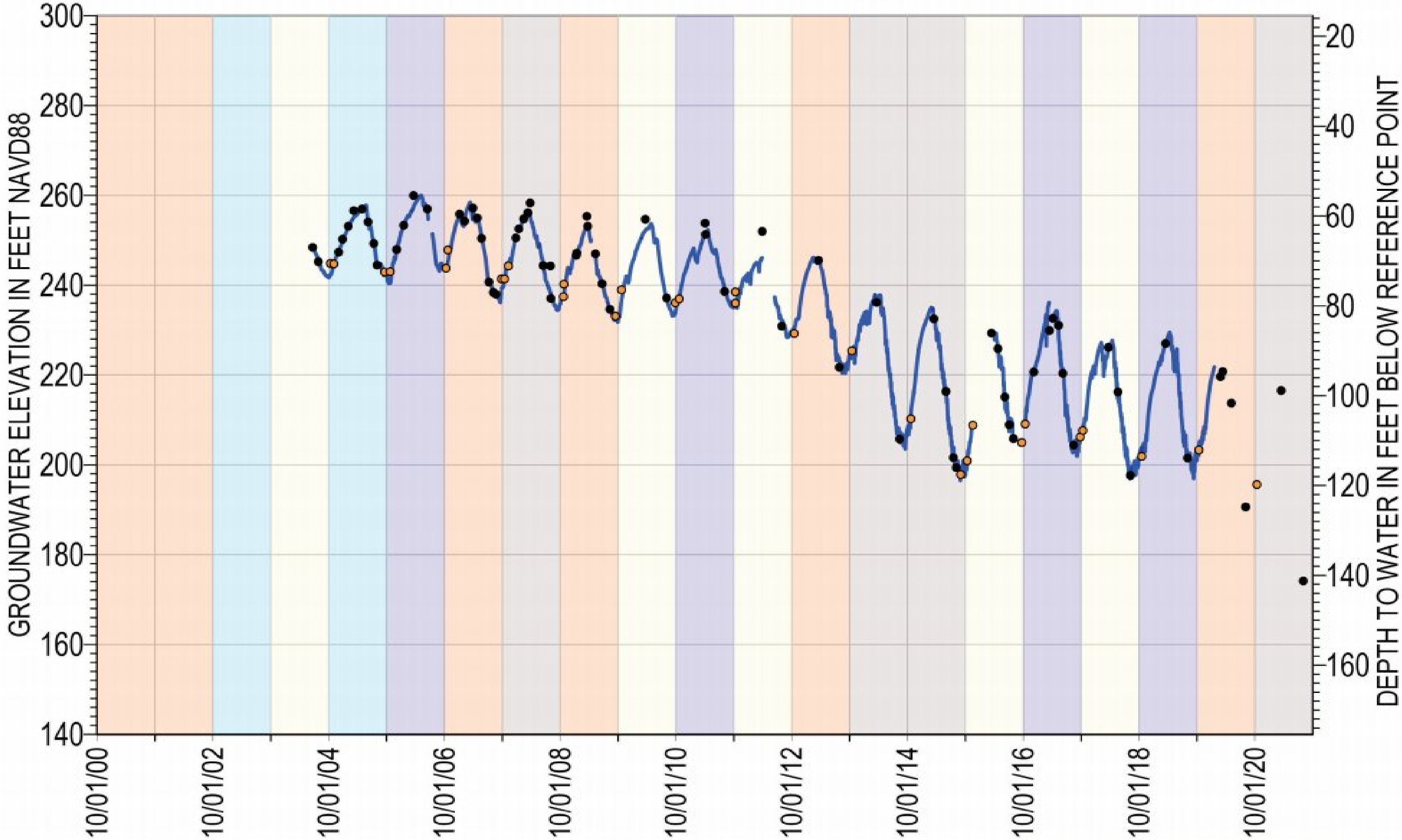


Climate Classification

Wet
Below Normal
Critically Dry
Above Normal
Dry

**Note: Fall hand measurements are shown in gold (September and October)*

24N03W29Q003M



24N03W29Q003M Groundwater Elevation

24N03W29Q003M Transducer Data

Reference Point Elevation= 315.403 ft NAVD88

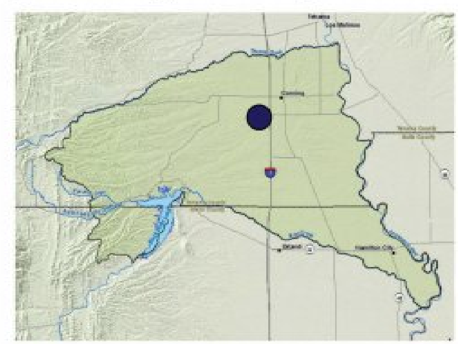
Well Type: Observation

Total Depth: 844 ft bgs

Well Screen Interval= 650 - 710 ft bgs

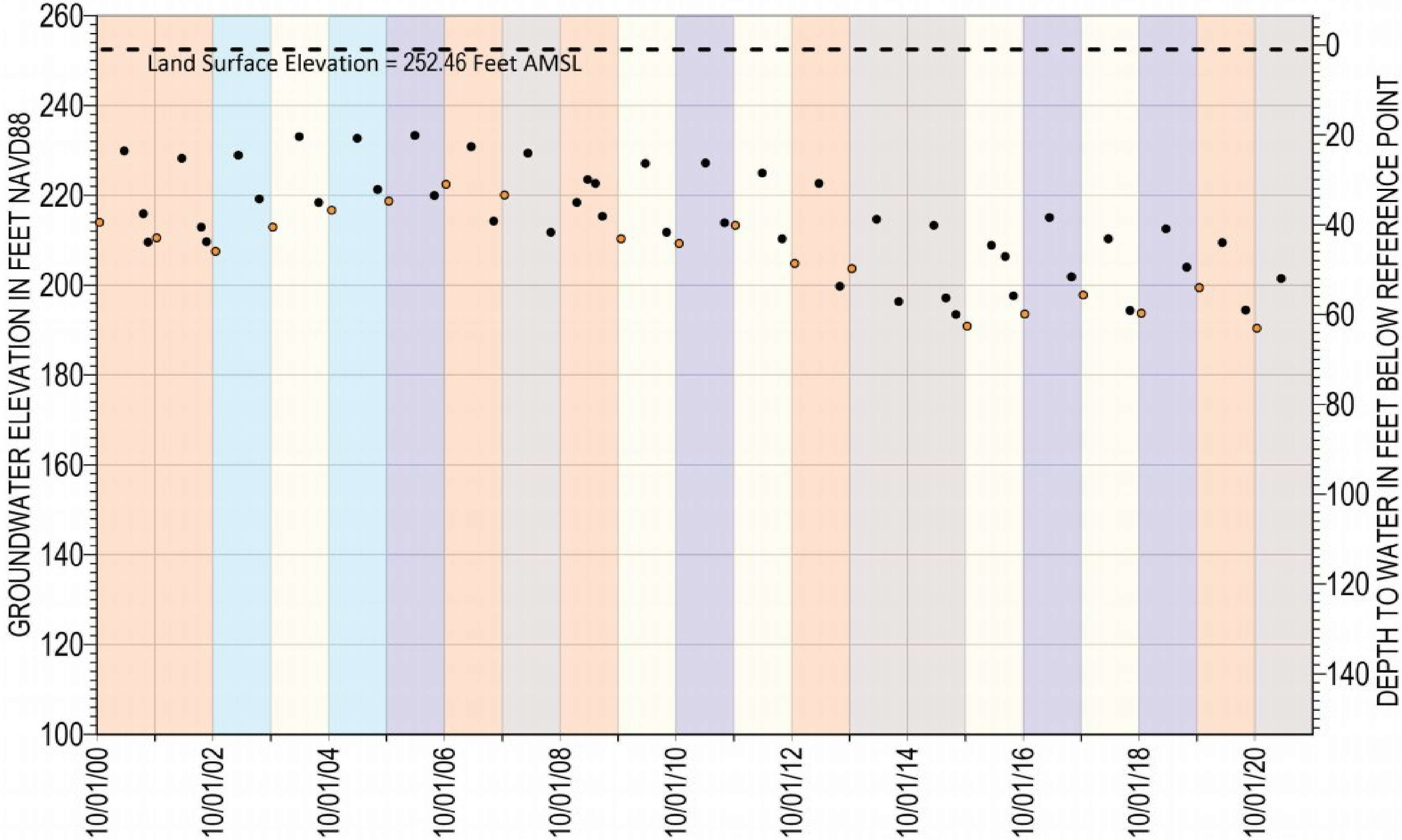
Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry



**Note: Fall hand measurements are shown in gold (September and October)*

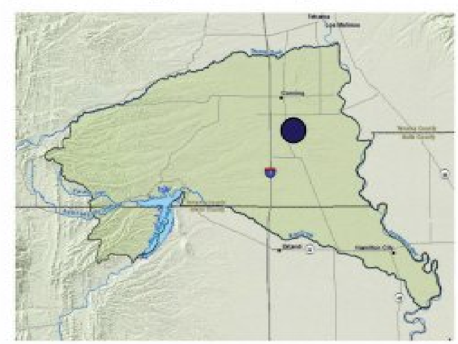
24N03W35P004M



Reference Point Elevation= 253.46 ft NAVD88
Well Type: Irrigation
Total Depth: 107 ft bgs
Well Screen Interval= Unknown ft bgs

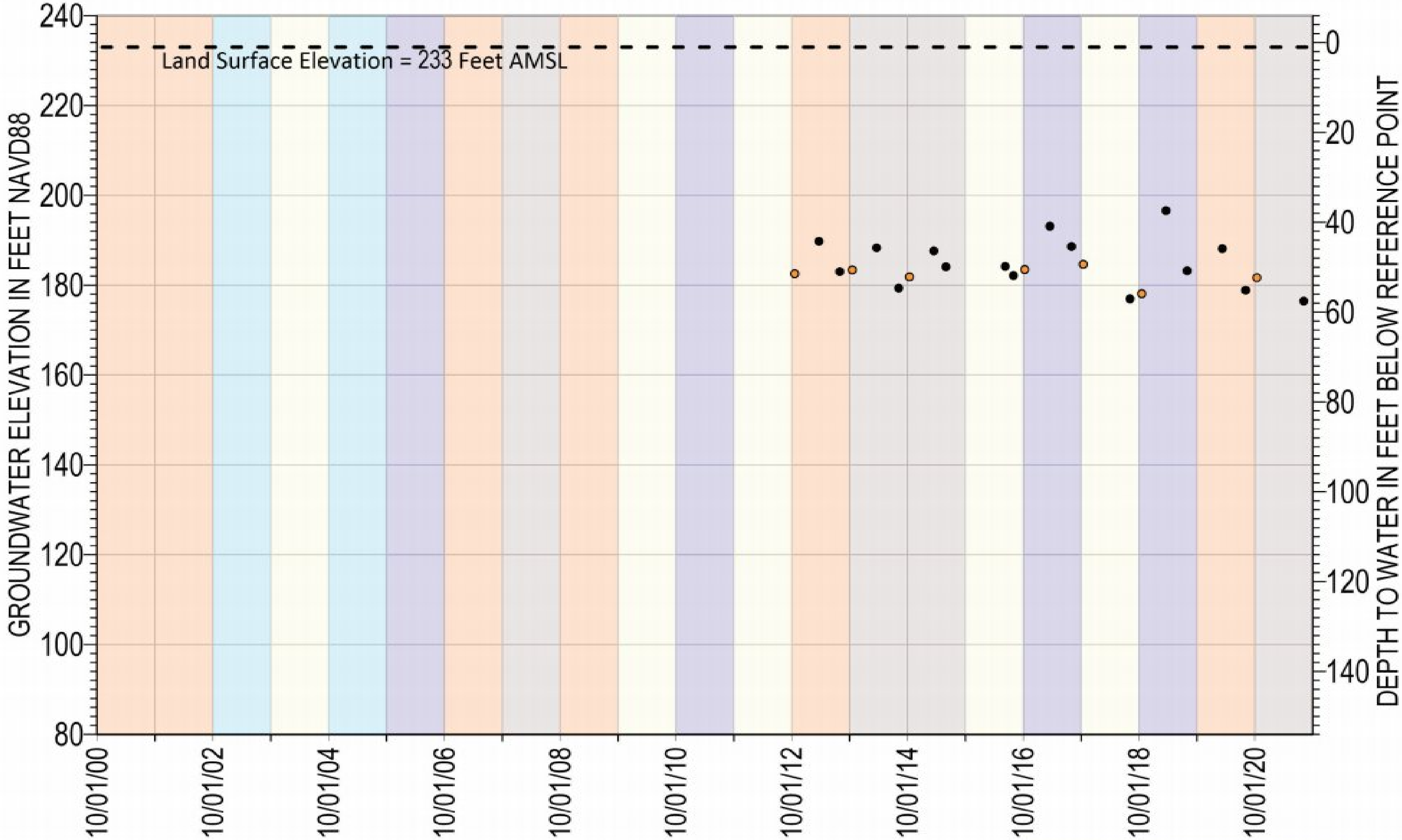
Climate Classification

Wet | Below Normal | Critically Dry | Above Normal | Dry



**Note: Fall hand measurements are shown in gold (September and October)*

25N02W31K001M



• 25N02W31K001M Groundwater Elevation

- - - Land Surface Elevation

Reference Point Elevation= 234 ft NAVD88

Well Type: Irrigation

Total Depth: 520 ft bgs

Well Screen Interval= 39 - 520 ft bgs

Climate Classification

Wet

Above Normal

Below Normal

Dry

Critically Dry

**Note: Fall hand measurements are shown in gold (September and October)*

Appendix C

DWR Fall Groundwater Elevation Contours WY 2015 - 2020

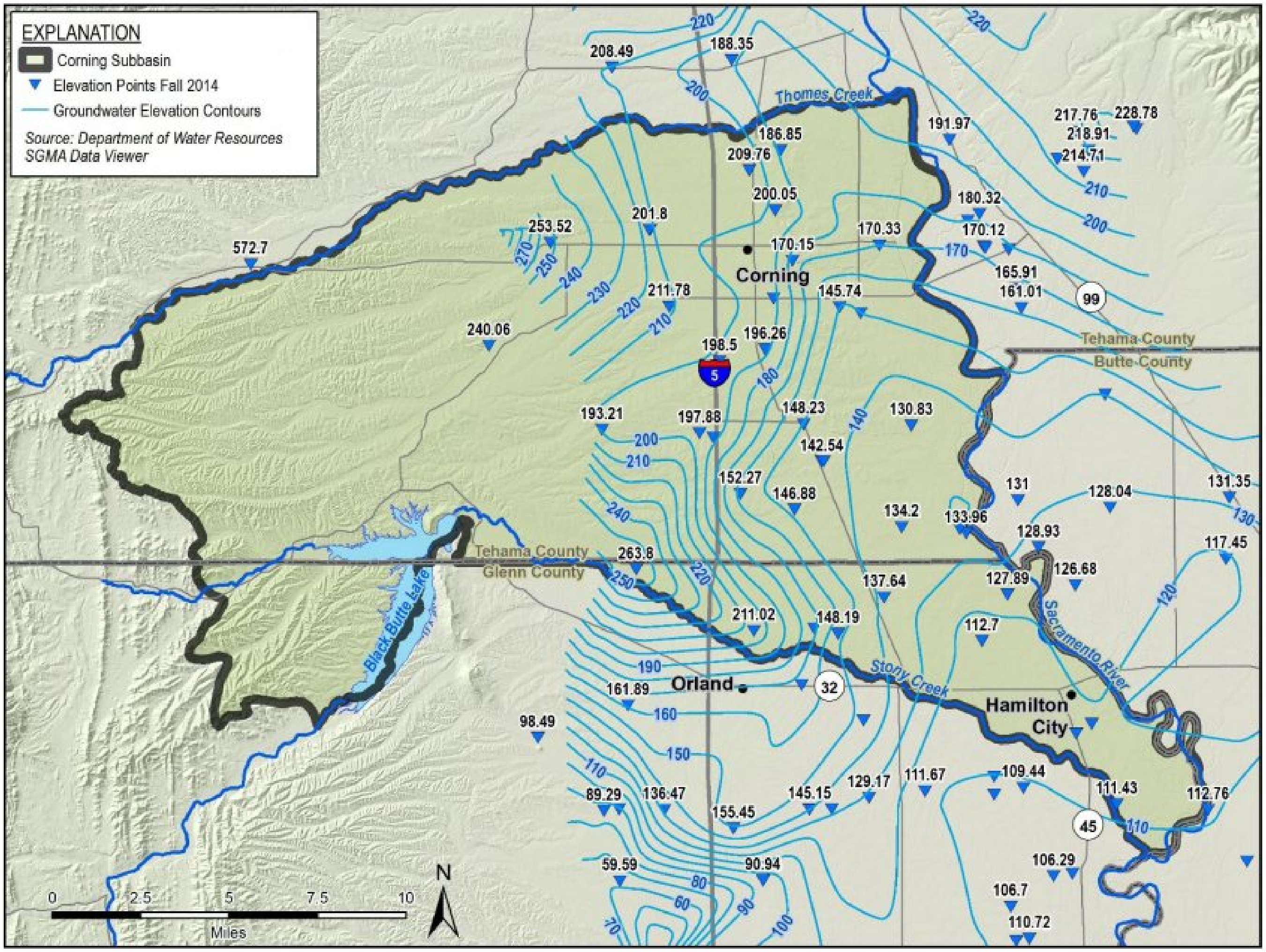


Figure 1. Fall 2014 DWR Groundwater Elevation Contour Map

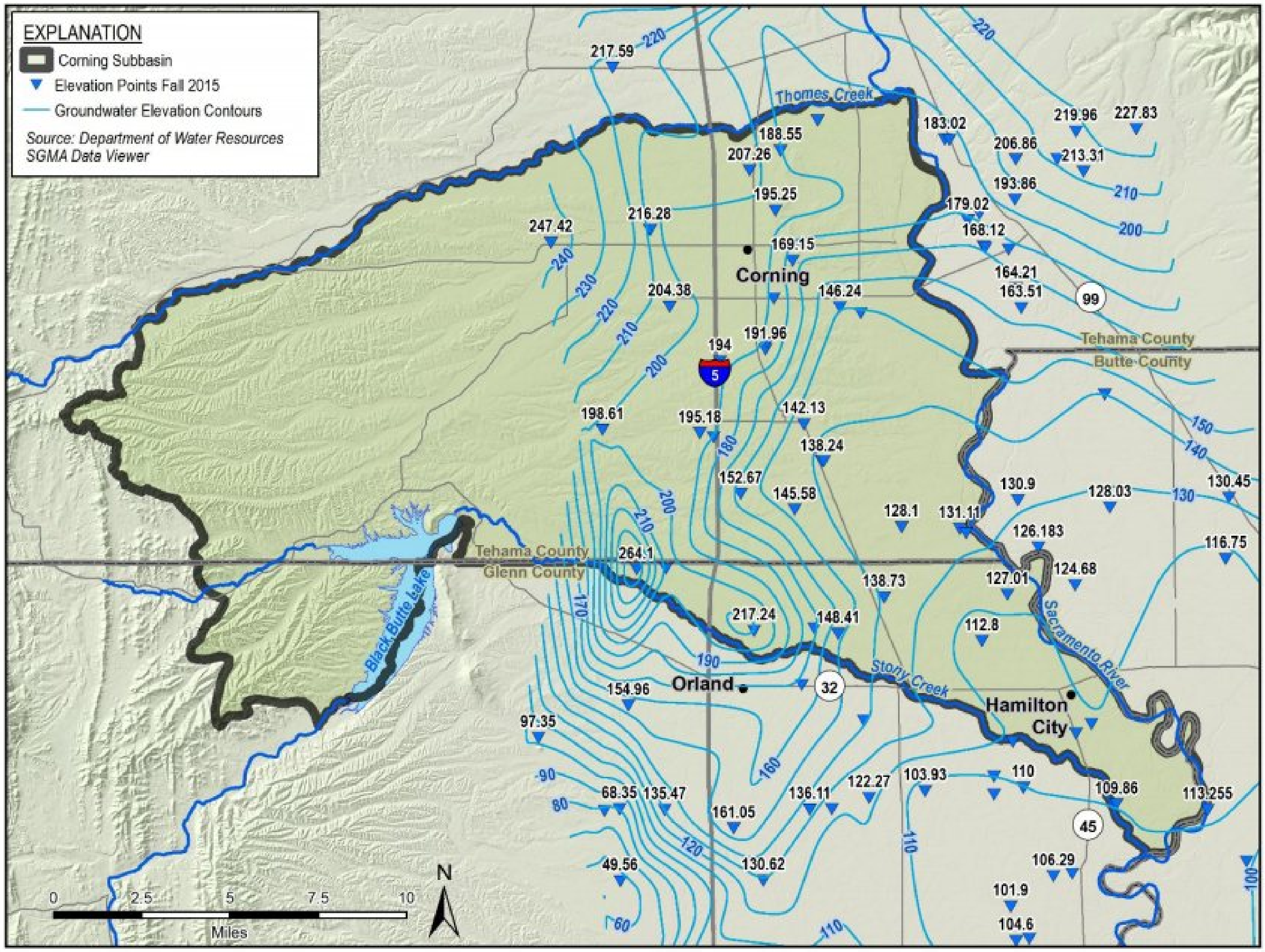


Figure 2. Fall 2015 DWR Groundwater Elevation Contour Map

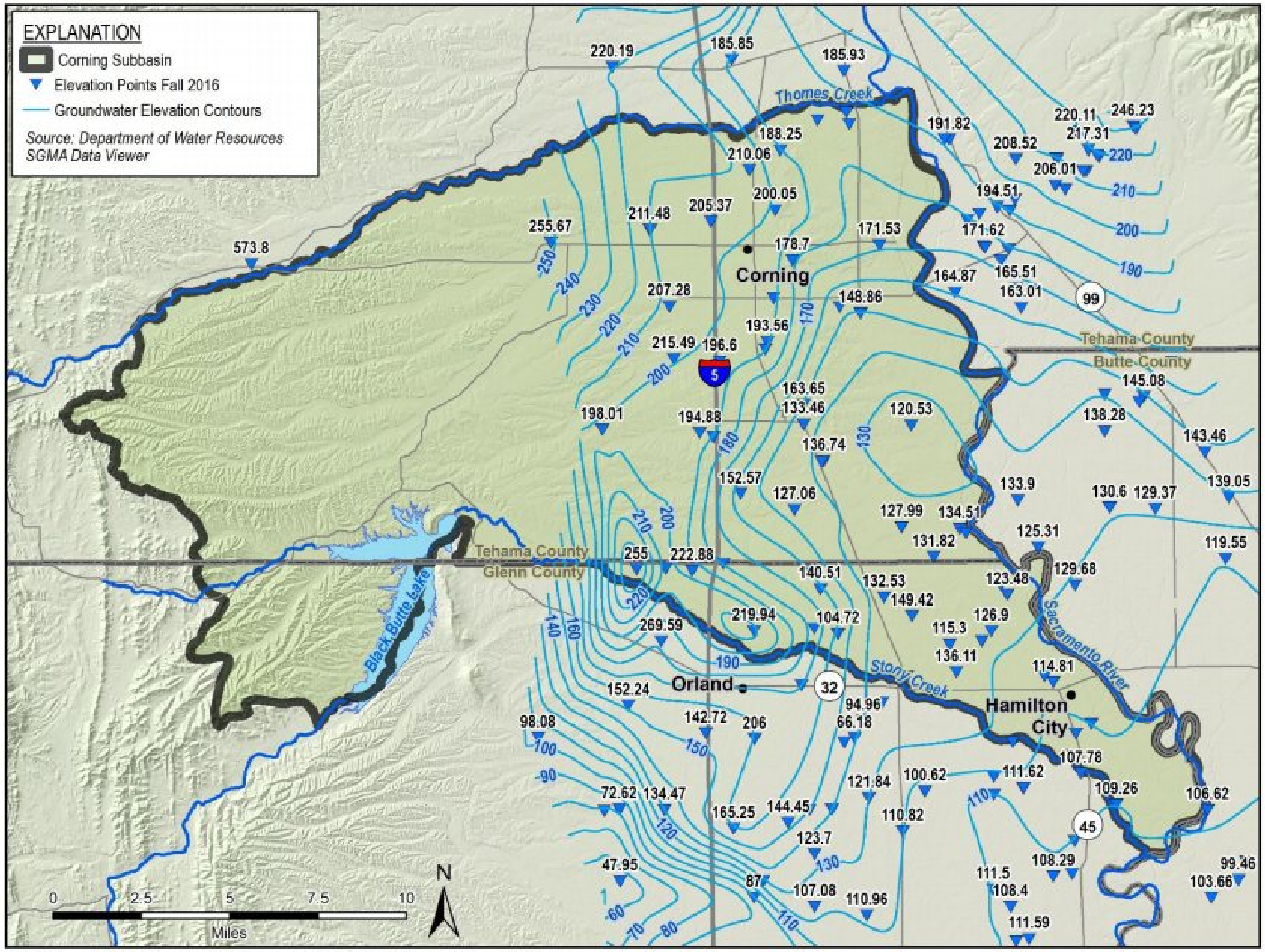


Figure 3. Fall 2016 DWR Groundwater Elevation Contour Map

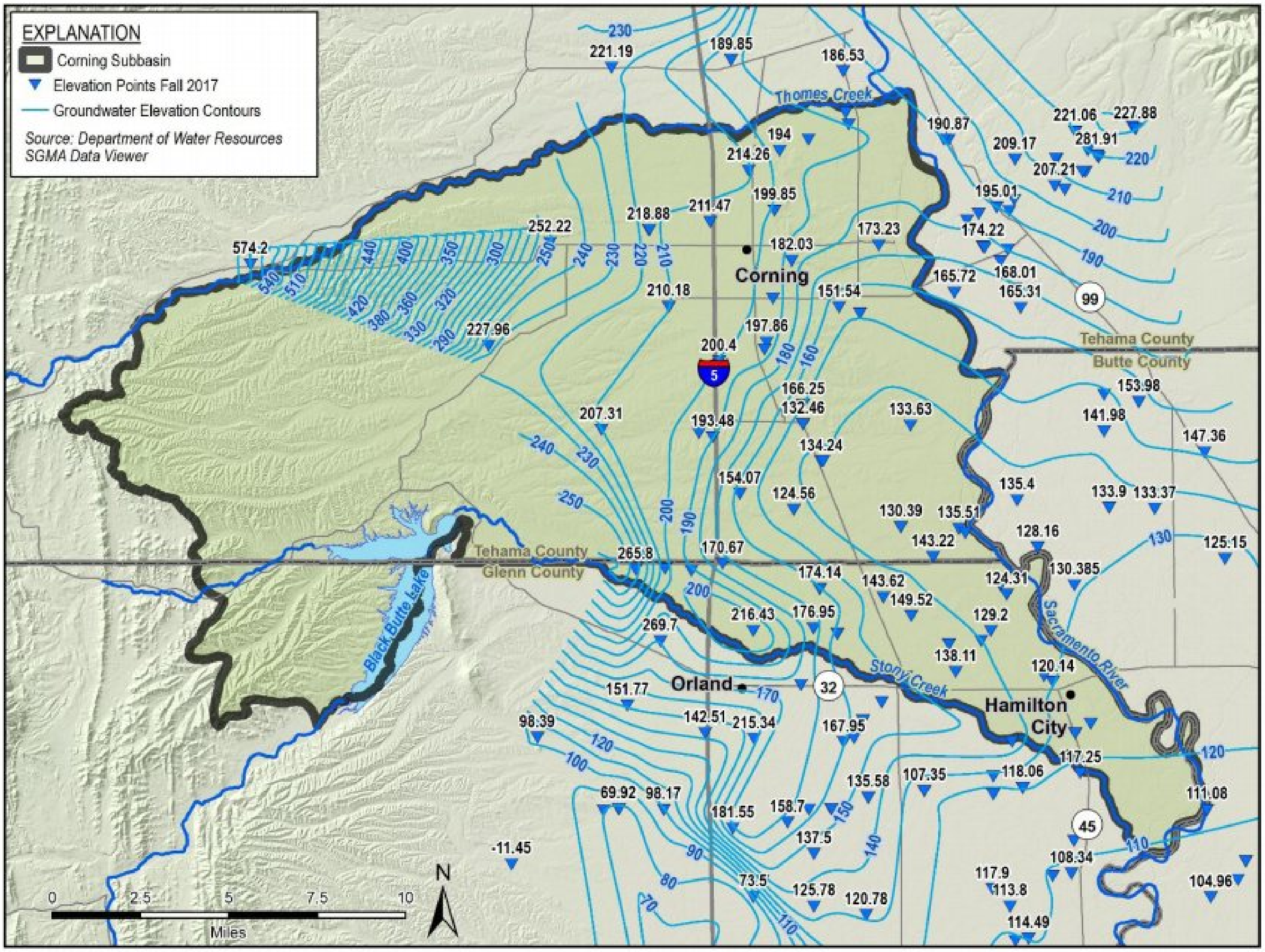


Figure 4. Fall 2017 DWR Groundwater Elevation Contour Map

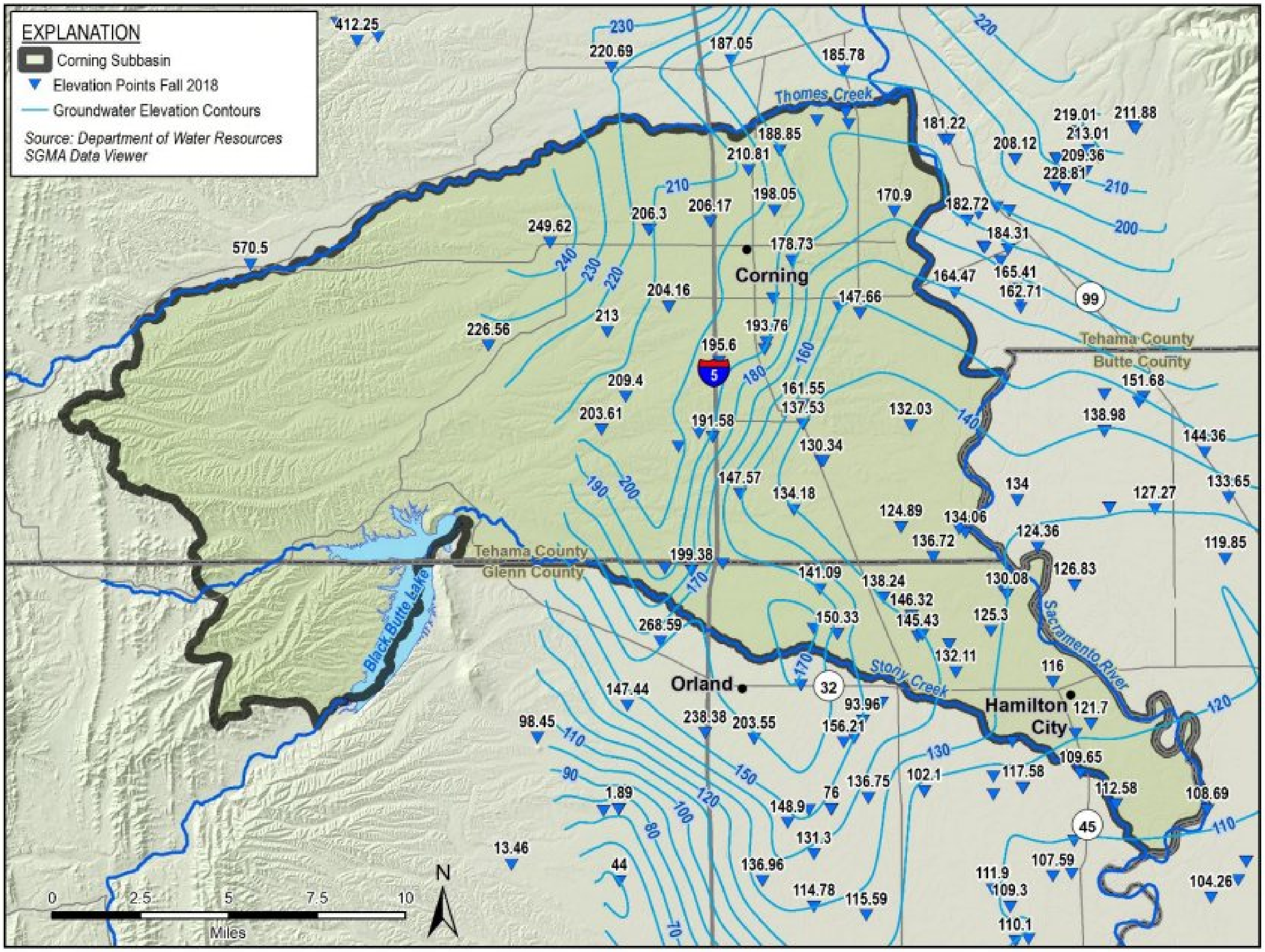


Figure 5. Fall 2018 DWR Groundwater Elevation Contour Map

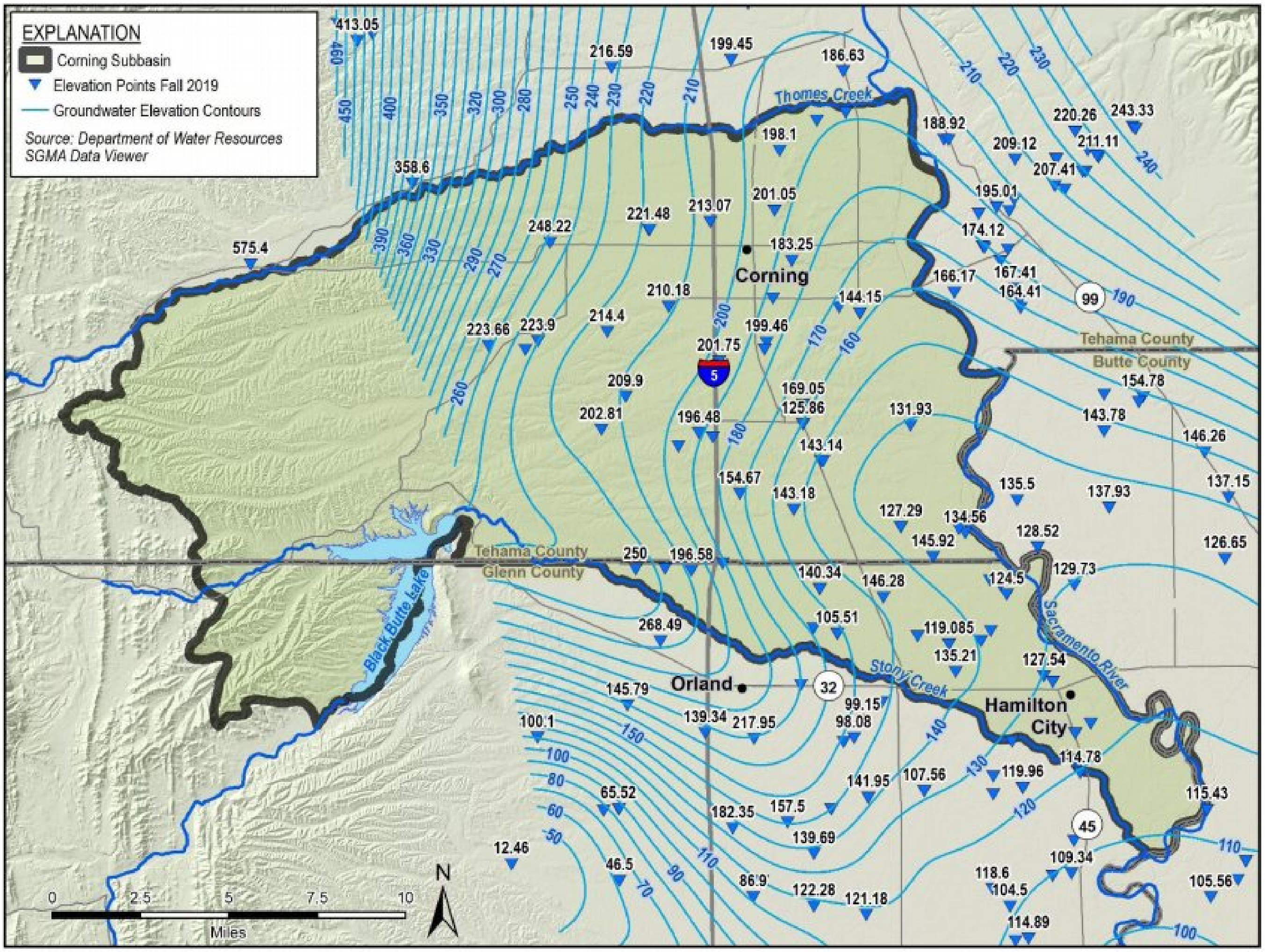


Figure 6. Fall 2019 DWR Groundwater Elevation Contour Map

Appendix D

Stream Stage Hydrographs

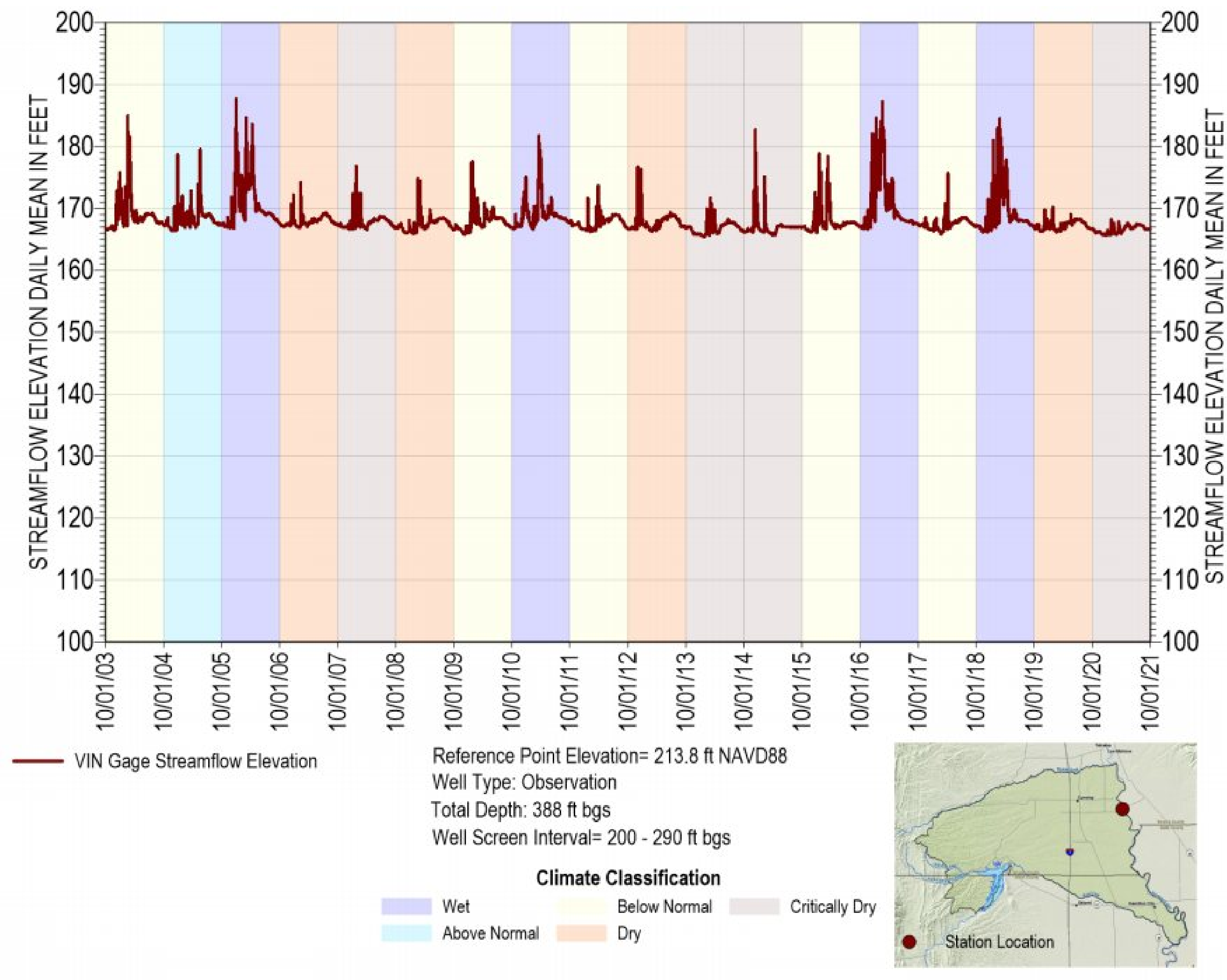


Figure 1. Sacramento River Stage at VIN

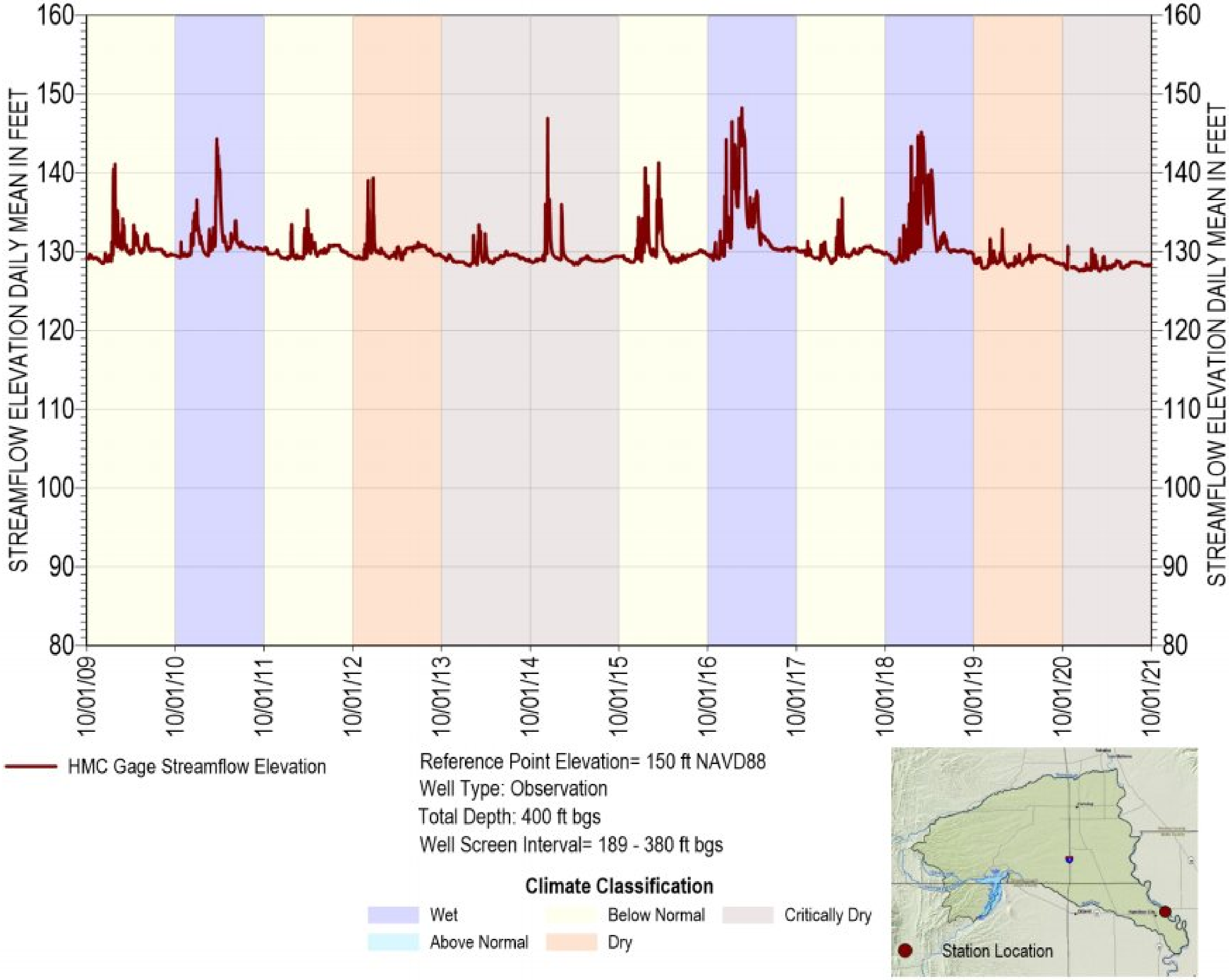


Figure 2. Sacramento River Stage at HMC

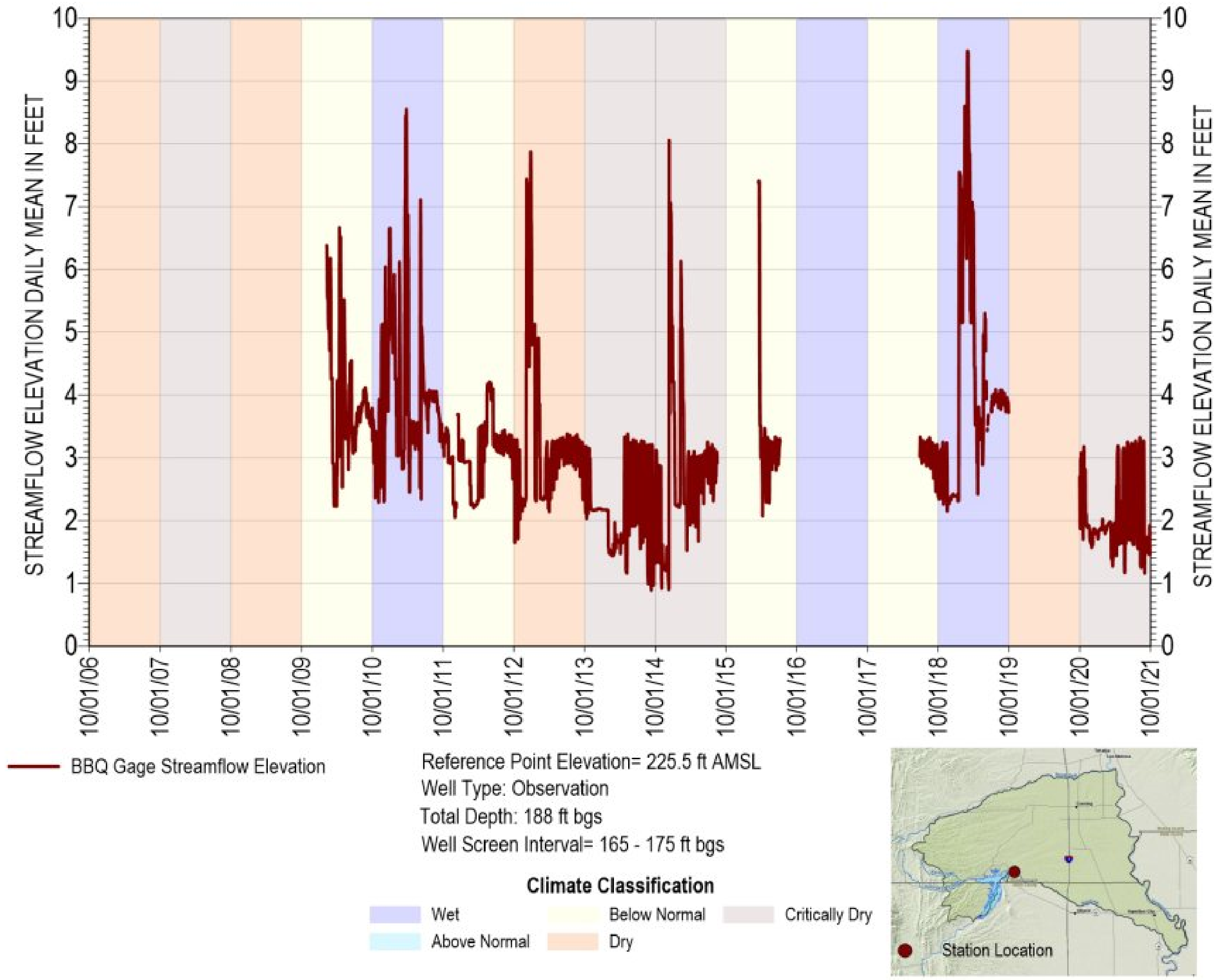


Figure 3. Stony Creek Stage at BBQ

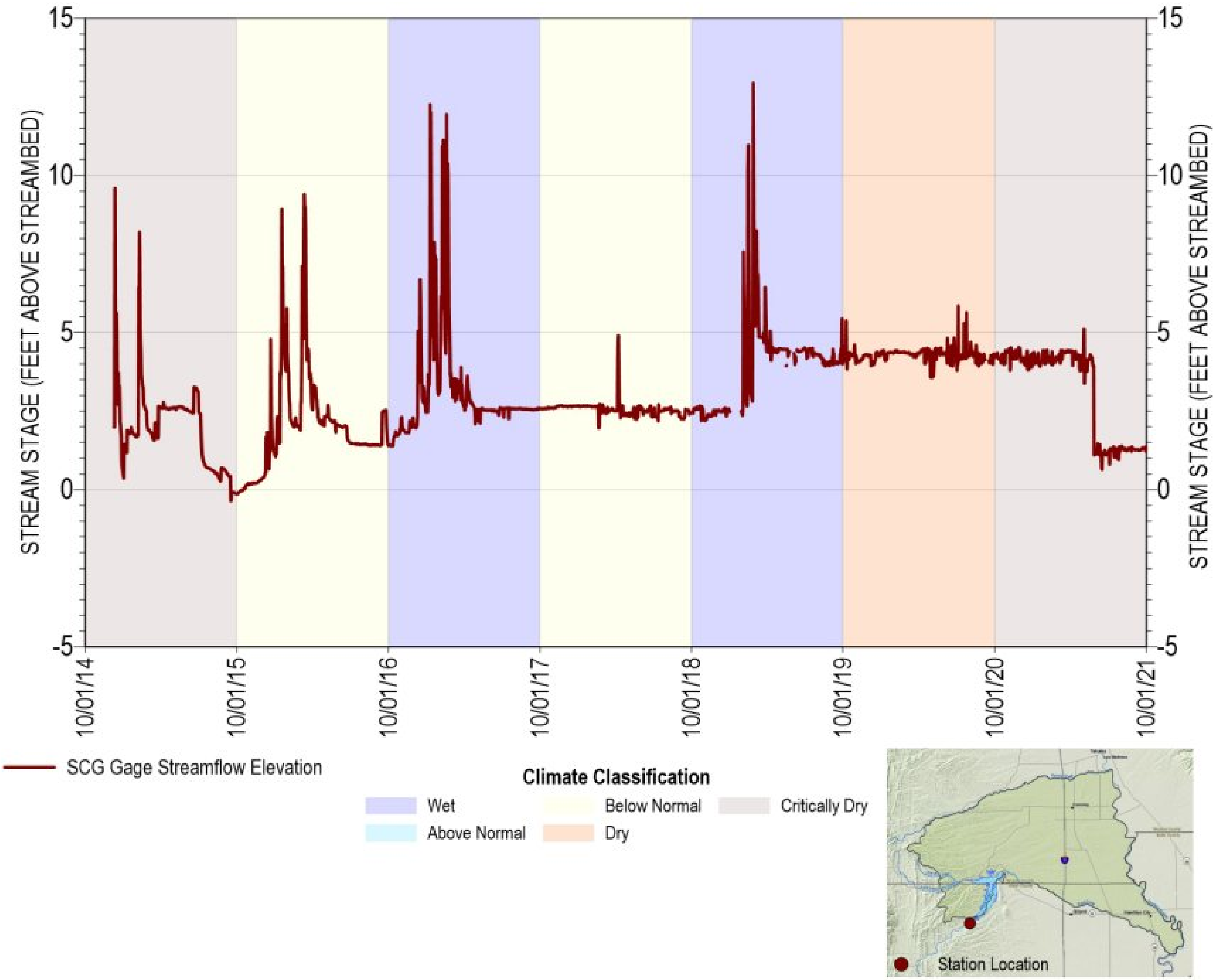


Figure 4. Stony Creek Stage at SCG

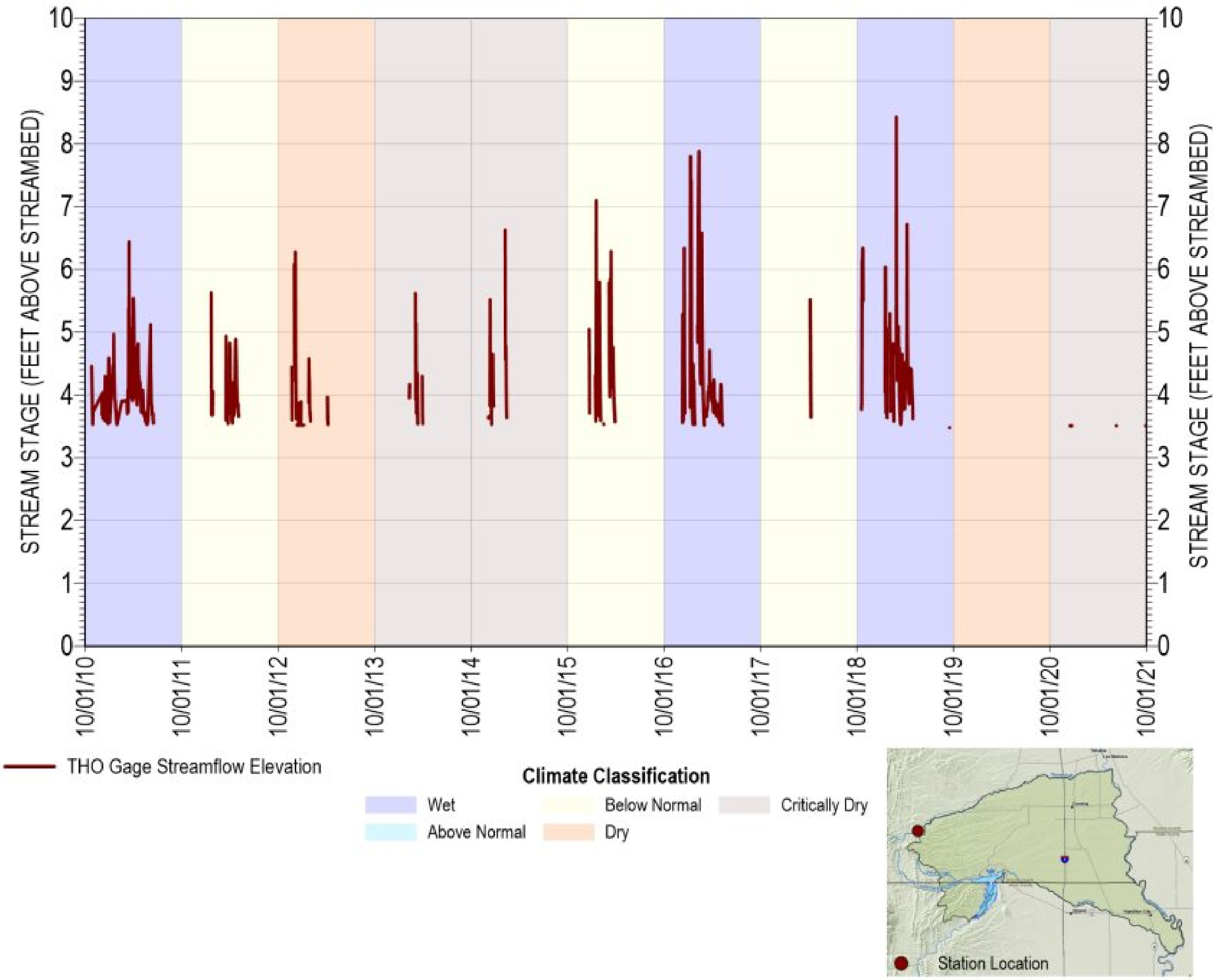


Figure 5. Thomes Creek Stage at THO