SANTA CRUZ MID-COUNTY GROUNDWATER AGENCY

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April 1, 2020

Subject: Submittal of First Annual Report for the Santa Cruz Mid-County Groundwater Agency Transmittal Letter.

To the California Department of Water Resources,

The Santa Cruz Mid-County Groundwater Agency (MGA) is the Groundwater Sustainability Agency (GSA) for the Santa Cruz Mid-County Groundwater Basin (Basin) number 3-001. The Basin is classified by the California Department of Water Resources (DWR) as a high priority basin in a state of critical overdraft.

The MGA formed in March 2016 as a Joint Powers Authority, with four member agencies: Central Water District, City of Santa Cruz, County of Santa Cruz, and Soquel Creek Water District. The MGA Board of Directors includes two representatives from each member agency and three private well owner representatives. The MGA initiated development of the Groundwater Sustainability Plan (GSP) in 2017 to guide ongoing management of the Basin with a goal to achieve and maintain groundwater sustainability over a 50-year planning and implementation horizon. GSP development was a collaborative effort among the member agencies and technical consultants, and was informed by input from resource management agencies, community members, and stakeholders.

The Draft GSP was released for a 60-day public comment period on July 18th, 2019. A total of 31 comments were received though comment cards, oral communications, electronic mail, and letters. After careful review, staff made appropriate changes to the GSP, which was adopted by the MGA Board on November 21, 2019 and submitted to the Department of Water Resources on January 30, 2020.

As required by the California Code of Regulations for Groundwater Sustainability Plans, the MGA is pleased to submit this Annual Report to the Department of Water Resources.

Feel free to contact me if you have any questions,

Sierra Ryan

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MONTGOMERY
& ASSOCIATES
Water Resource Consultants

March 30, 2020

Santa Cruz Mid-County Basin
Water Year 2019 Annual Report

Requirement of Groundwater Sustainability Plan Implementation

Prepared for:

Santa Cruz Mid-County Groundwater Agency

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EXECUTIVE SUMMARY

The Santa Cruz Mid-County Groundwater Agency (MGA) is required to submit an annual report for the Santa Cruz Mid-County Basin (Basin) to the California Department of Water Resources (DWR) by April 1 of each year following the MGA's 2019 adoption of its Groundwater Sustainability Plan (GSP or Plan). This first annual report covers Water Year 2019.

As described in the GSP, DWR lists the Basin as a high priority basin in critical overdraft. The high priority designation indicates that water users in the Basin have high dependence on groundwater. The Basin is listed in critical overdraft principally because active seawater intrusion impacts its productive aquifers as a result of historical over-pumping of the aquifers.

Several factors have improved groundwater conditions based on rising groundwater levels in the Basin in Water Year 2019 when compared to most recent conditions shown in the GSP (Water Years 2016 and 2017).

1. Water use and therefore groundwater pumping has been historically low over the last five water years.

2. Water Year 2019 is classified as a wet year, which is the second wet year in three years.

3. Pilot tests were conducted that provided surface water from outside the Basin into the Basin as groundwater recharge and for in-lieu use to reduce groundwater pumping.

Despite improving groundwater conditions, undesirable results for seawater intrusion continue to occur in the Basin based on chloride concentrations and coastal groundwater elevations. The Basin continues to be in a state of critical overdraft. In addition, the GSP calls for redistribution of groundwater pumping as an action to prevent significant and unreasonable seawater intrusion based on chloride concentrations exceeding trigger levels in Water Year 2019.

Net groundwater pumping remains above sustainable yields in two of three aquifer groups. Projects are included in the GSP to reduce net groundwater pumping in order to achieve sustainability. Work planning and implementing these projects continued in 2019. These projects include Pure Water Soquel, Aquifer Storage and Recovery, Water Transfers / In-Lieu Groundwater Recharge, and Distributed Storm Water Managed Aquifer Recharge.

1 INTRODUCTION

1.1 Purpose of Annual Report

This annual report is a requirement of Water Code §10733.6 and pertains to the Sustainable Groundwater Management Act (SGMA). The Santa Cruz Mid-County Groundwater Agency (MGA) as the groundwater sustainability agency for the Santa Cruz Mid-County Basin (Basin) is required to submit an annual report to the California Department of Water Resources (DWR) by April 1 of each year following the adoption of its Groundwater Sustainability Plan (GSP or Plan). The MGA Board of Directors unanimously adopted the final GSP after a public hearing on November 21, 2019. The GSP was submitted online to DWR on January 30, 2020 and posted for public comment by DWR on February 19, 2020.

The purpose of annual reports is to demonstrate to DWR during GSP implementation that progress is being made towards meeting interim milestones that are defined in the GSP and that lead to achieving groundwater sustainability. The content requirements of the annual report are outlined in §356.2 of the GSP Regulations.

This first annual report covers Water Year 2019 and includes a description of basin conditions through text, hydrographs, contour maps, estimation of change in groundwater in storage, and distribution of groundwater extraction across the Basin. A comparison of Water Year 2019 data against sustainability management criteria is provided as a measure of the Basin's progress towards the sustainability goal that must be reached by the end of Water Year 2040.

1.2 Santa Cruz Mid-County Groundwater Sustainability Agency

The MGA was created in March 2016 under a Joint Exercise of Powers Agreement. The MGA is governed by an 11-member board of directors consisting of representatives from each member agency and private well representatives within the boundaries of the MGA. The MGA board is composed of:

- Two representatives from the Central Water District appointed by the Central Water District Board of Directors.
- Two representatives from the City of Santa Cruz appointed by the City of Santa Cruz City Council.
- Two representatives from the County of Santa Cruz appointed by the County of Santa Cruz Board of Supervisors.
- Two representatives from the Soquel Creek Water District appointed by the Soquel Creek Water District Board of Directors.

- Three representatives of private well owners in the Basin appointed by majority vote of the eight public agency MGA directors.
- In addition, an alternate representative for each member agency and for the private well owners are appointed to act in the absence of a representative at Board meetings.

The MGA's jurisdictional area coincides exactly with the Santa Cruz Mid-County Basin depicted on Figure 1.

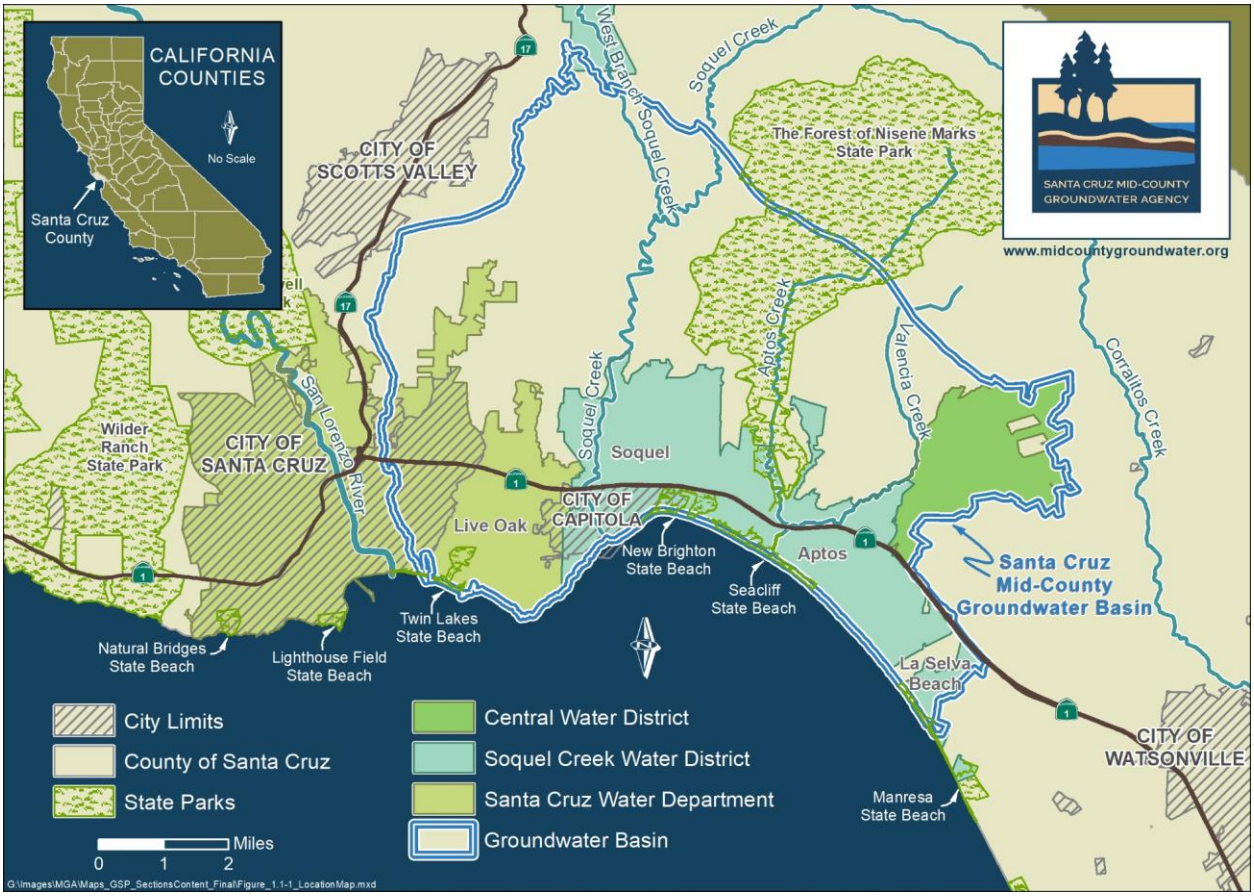

Figure 1. Santa Cruz Mid-County Basin Boundaries

2 BASIN SETTING

2.1 Basin Description

The Santa Cruz Mid-County Basin is identified by DWR as Basin 3-001 in Bulletin 118 Interim Update 2016. The Basin extends from the Santa Cruz Mountains to the Pacific Ocean and from the edge of the City of Santa Cruz near Twin Lakes in the west to La Selva Beach in the east (Figure 1). The Basin includes portions of the City of Santa Cruz, the entire City of Capitola, and Santa Cruz County census designated places of Twin Lakes, Live Oak, Pleasure Point, Soquel, Seacliff, Aptos, and Rio Del Mar. The Basin also includes portions of Santa Cruz County unincorporated census designated places of Day Valley, Corralitos, Aptos Hills-Larkin Valley, and La Selva Beach (DWR, Bulletin 118 Interim Update 2016).

The Basin boundary includes all areas where the stacked aquifer system of the Purisima Formation, Aromas Red Sands, and certain other Tertiary-age aquifer units underlying the Purisima Formation constitute the shared groundwater resource to be managed by the MGA. The Basin is defined by both geologic and jurisdictional boundaries. Basin boundaries to the west are primarily geologic. Basin boundaries to the east, adjacent to the Pajaro Valley Subbasin managed by PV Water, are primarily jurisdictional.

As described in the GSP, DWR lists the Basin as a high priority basin in critical overdraft. The high priority designation indicates that water supply in the Basin has high dependence on groundwater. The Basin is listed in critical overdraft principally because active seawater intrusion impacts its productive aquifers as a result of historical over-pumping of the aquifers.

2.2 Precipitation and Water Year Type

Precipitation at the Santa Cruz Cooperative climate station in Water Year 2019 was 36.5 inches. This is 7.3 inches more than the long-term average annual precipitation at this station of 29.1 inches per year.

The water year type in the Santa Cruz area is based on a classification used by the City of Santa Cruz Water Department (SCWD). The system is based on total annual runoff in the San Lorenzo River, the SCWD's most important water source, measured at the Big Trees gage in Henry Cowell Redwoods State Park. Under this classification system, Water Year 2019 (October 1-September 30) is designated as wet. This follows a dry year in Water Year 2018 and a wet year in Water Year 2017.

3 BASIN CONDITIONS

3.1 Groundwater Elevations

Contour maps representing spring and fall groundwater elevations for Water Year 2019 in each principal aquifer are included on Figure 2 through Figure 11. Spring groundwater elevations represent seasonal high conditions while fall groundwater elevations represent seasonal low conditions.

The contour maps intend to represent seasonal average conditions in the aquifer units. Sustainability with respect to seawater intrusion is evaluated based on average groundwater elevations. Therefore, data used for the contour maps are based on the following:

1. Average transducer groundwater elevations calculated over March (spring) or September (fall) from monitoring wells, where available.

2. Manual monthly measurements from monitoring wells where transducer data are not available, which are less accurate but are the best available representation of seasonal average conditions in the aquifers.

3. Groundwater elevations from monitoring wells adjacent to production wells. Using average groundwater elevations calculated from transducer data that include levels recorded when the adjacent production well is pumping is the best representation of conditions in the aquifer over this time period.

4. Static groundwater elevations from production wells without adjacent monitoring wells. Pumping groundwater elevations from production wells are not representative of groundwater elevations in the aquifers due to pumping inefficiencies. Therefore, static groundwater elevations are preferable over pumping elevations, but are less accurate than average groundwater elevations from adjacent monitoring wells. Static elevations are therefore the best available representation of seasonal average aquifer conditions for these locations without adjacent monitoring wells.

The contour maps include groundwater elevation proxies of minimum thresholds (green text) for representative monitoring points for seawater intrusion. Representative monitoring points with groundwater elevation proxies for seawater intrusion are included only in the principal aquifer unit where nearby municipal pumping takes place. This is because municipal pumping wells are assumed to be the deepest wells in the coastal areas. Groundwater elevation proxies are displayed for reference only as they cannot be directly compared to contours representing seasonal conditions to evaluate exceedances of minimum thresholds and undesirable results.

For that purpose, groundwater elevation proxies are compared to five-year averages at the seawater intrusion representative monitoring points as provided in Section 4.3.

Comparing Water Year 2019 fall contour maps to contour maps representing fall of Water Year 2016 included in the GSP (GSP Figures 2-27 through 2-31) shows higher groundwater elevations in Water Year 2019 than Water Year 2016 in the Tu aquifer, Purisima A/AA aquifer units, and Aromas Red Sands aquifer. Comparisons of Water Year 2019 fall contour maps shows lower groundwater elevations in Water Year 2019 than Water Year 2016 in the Purisima BC aquifer unit and the Purisima DEF/F aquifer units.

Contour maps for the Aromas Red Sands aquifer on Figure 2 and Figure 3 generally show groundwater flow from inland towards the coast with noticeable effects of pumping at Central Water District's (CWD's) Rob Roy wellfield (CWD #10 and #12) and Soquel Creek Water District's (SqCWD's) Bonita and San Andreas pumping wells. The flow from inland appears to include flow from the portion of the Pajaro Valley Subbasin inland of SqCWD service area in the Santa Cruz Mid-County Basin. Groundwater elevations are above sea level but below 10 feet near the coast. At the SC-A3A representative monitoring point, groundwater elevations are above the seawater intrusion minimum threshold in the spring but below the minimum threshold in the fall.

Contour maps for the Purisima F and DEF units on Figure 4 and Figure 5 show the effects of pumping at SqCWD's Bonita and San Andreas wells that are screened in both the Purisima F and Aromas Red Sands aquifer, a depression around the SqCWD's Aptos Jr. High well and CWD's Rob Roy #12 (CWD #12) well in the Purisima F unit, and a cone of depression around SqCWD's T. Hopkins well. Even with these pumping depressions, groundwater flows towards the coast. Flow from the Pajaro Valley Subbasin also appears to occur in these aquifer units. At the SC-A8A representative monitoring point in the Purisima F unit, groundwater elevations are below the seawater intrusion minimum threshold in the spring and the fall. At the SC-A2A and SC-A1B representative monitoring points in the Purisima F unit and the SC-8D representative monitoring point in the Purisima DEF unit, groundwater elevations are above the seawater intrusion minimum threshold in both the spring and fall.

Contour maps for the Purisima BC unit on Figure 6 and Figure 7 show the effects of pumping SqCWD's Ledyard and Madeline wells with more defined cones of depression in the fall. The contours indicate flow towards the coast in the spring but cones of depression extending to the coast in the fall. At the SC-9C representative monitoring points, groundwater elevations are above the seawater intrusion minimum threshold in the spring but below the minimum threshold in the fall. At the SC-8B representative monitoring point, groundwater elevations are well below the seawater intrusion minimum threshold in the spring and the fall. However, the groundwater

elevation proxy for seawater intrusion at SC-8B is included in the GSP to protect groundwater supply at SqCWD's Aptos Creek well, which is currently inactive.

Contour maps for the Purisima A and AA units on Figure 8 and Figure 9 generally show flow from inland to the coast with localized effects of pumping at SqCWD and SCWD production wells. Cones of depression are more defined in the fall, particularly at SqCWD's Main Street and Estates wells. Depressed groundwater elevations are also indicated inland around the SC-10AA well where non-municipal pumping occurs. Groundwater elevations at coastal wells SC-3A and SC-5A in the Purisima A unit are higher than seawater intrusion minimum thresholds in the spring, but lower than seawater intrusion minimum thresholds in the fall. At Moran Lake, Soquel Point, Pleasure Point, and SC-1A representative monitoring points in the Purisima A unit, groundwater elevations are higher than seawater intrusion minimum thresholds in both the spring and fall as pumping at the SCWD's Beltz #8, #9, and #10 wells and SqCWD's Garnet well was less than previous years in Water Year 2019. The Garnet well was off for most of December 2018-April 2019 during pilot surface water transfer from SCWD to SqCWD.

Contour maps for the Tu unit on Figure 10 and Figure 11 show a large difference between spring and fall. There was recharge at the Beltz #12 well in the spring as part of SCWD's Aquifer Storage and Recovery pilot testing, so there is a mound centered around the Cory #4 well resulting in increased flow towards the coast. Groundwater elevations were relatively high near SqCWD's O'Neill Ranch and Main Street where pumping was decreased from December 2018-April 2019 during pilot surface water transfer from SCWD to SqCWD. In the fall, groundwater level depression is centered around SqCWD's Main Street well as it was the municipal well with the most pumping from the Tu unit from May to September 2019, but a groundwater divide still exists that results in flow towards the coast.

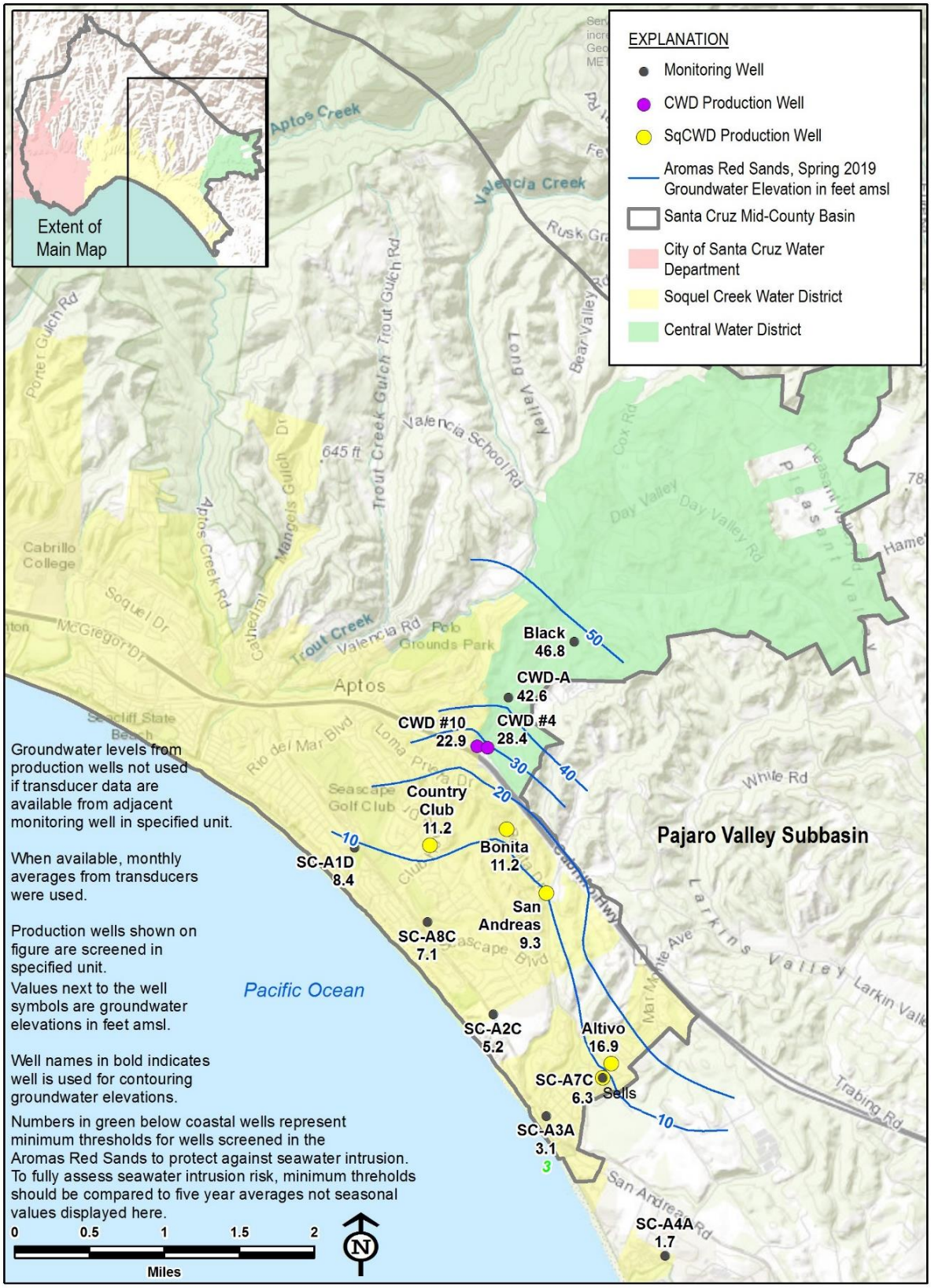

Figure 2. Aromas Red Sands Groundwater Elevations, Spring 2019

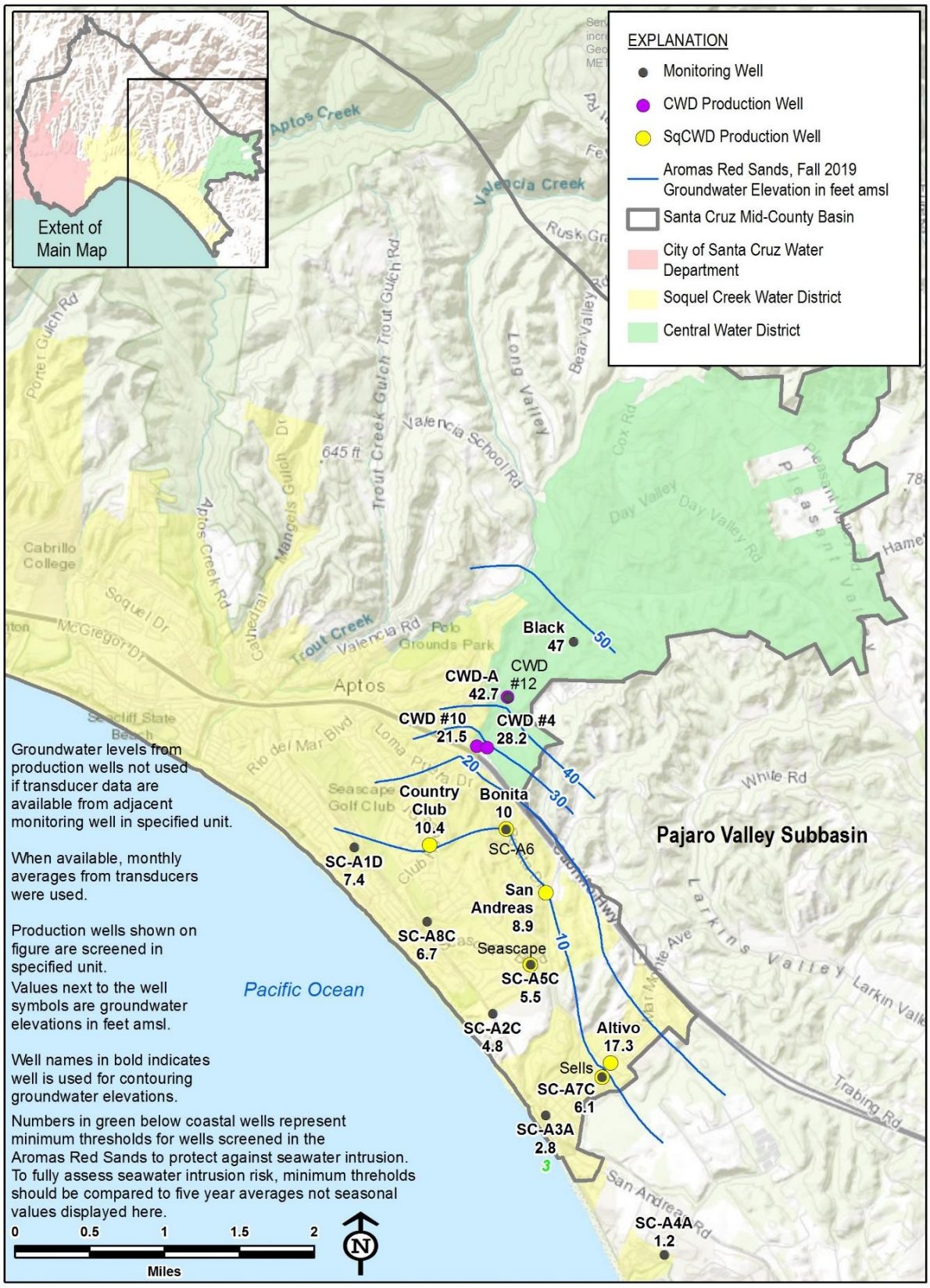

Figure 3. Aromas Red Sands Groundwater Elevations, Fall 2019

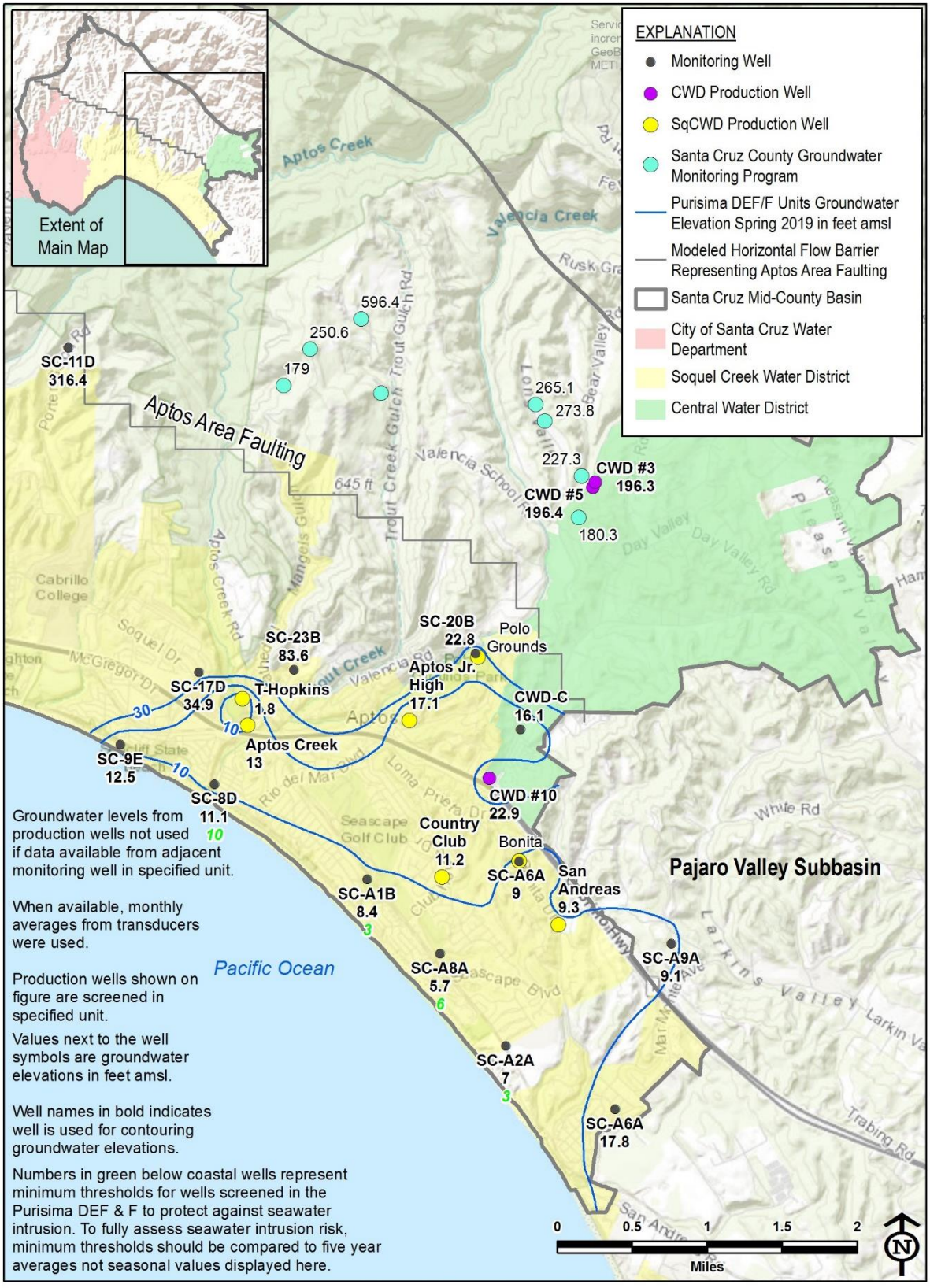

Figure 4. Purisima F and DEF Groundwater Elevations, Spring 2019

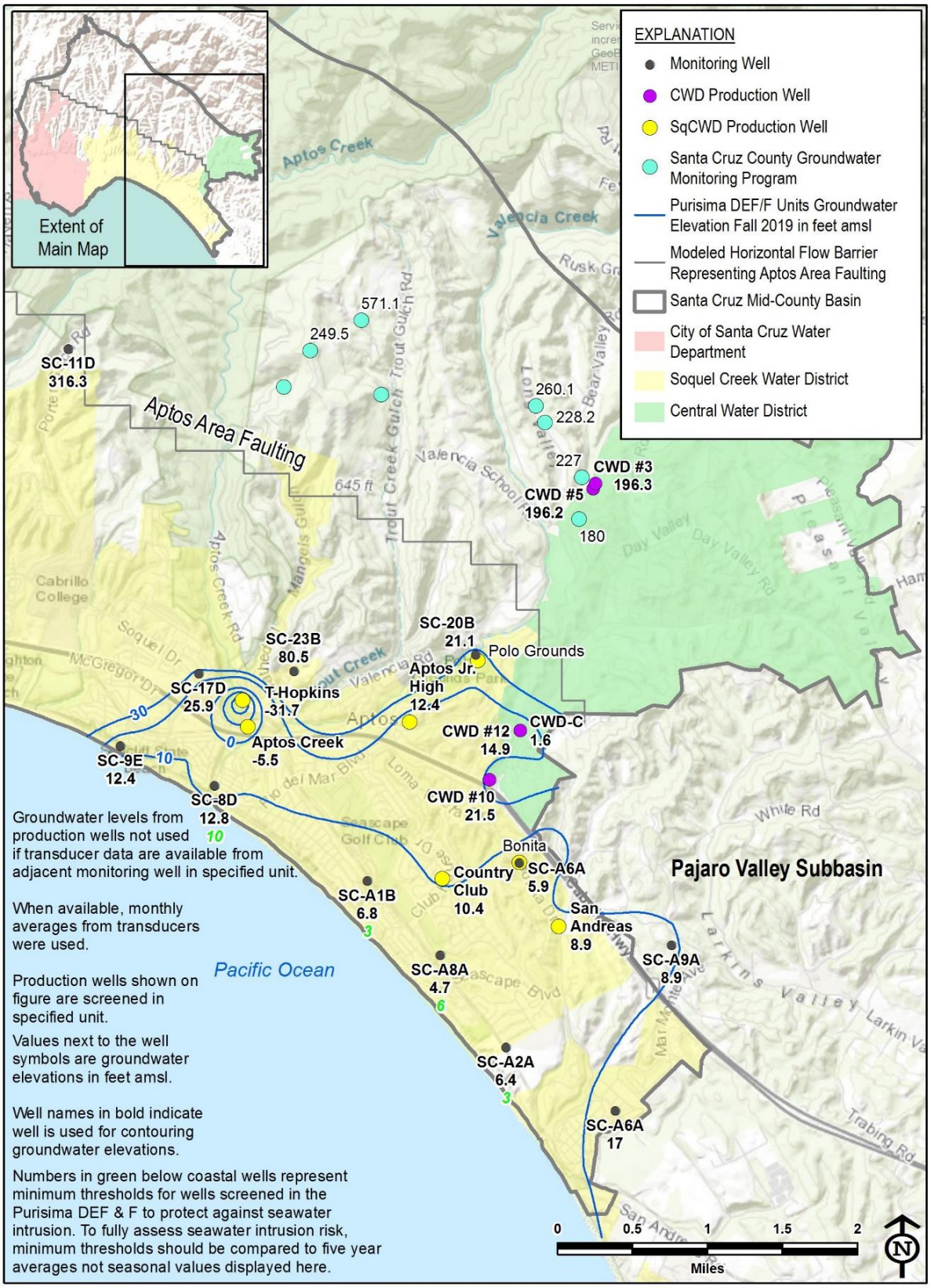

Figure 5. Purisima F and DEF Groundwater Elevations, Fall 2019

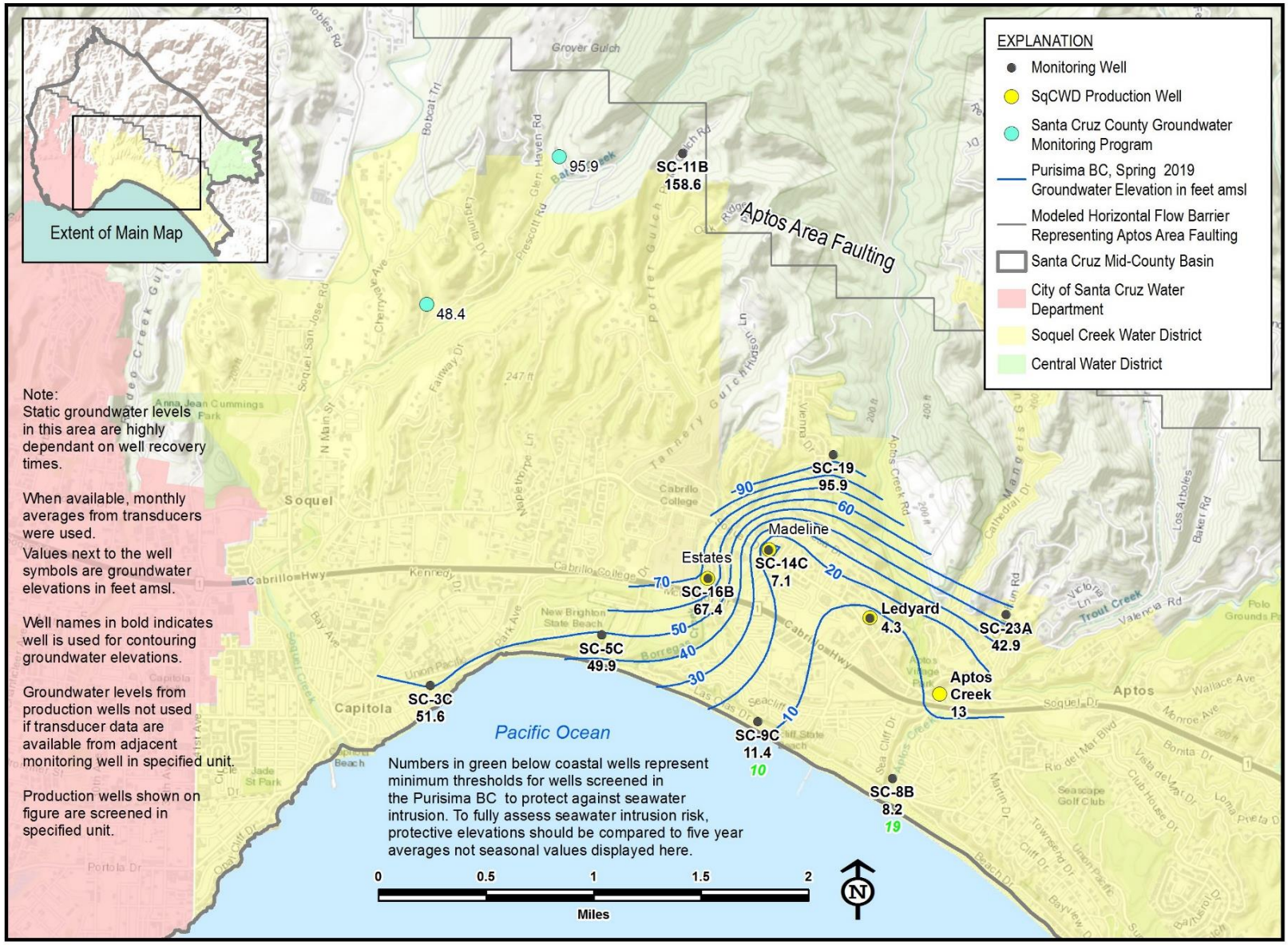

Figure 6. Purisima BC Groundwater Elevations, Spring 2019

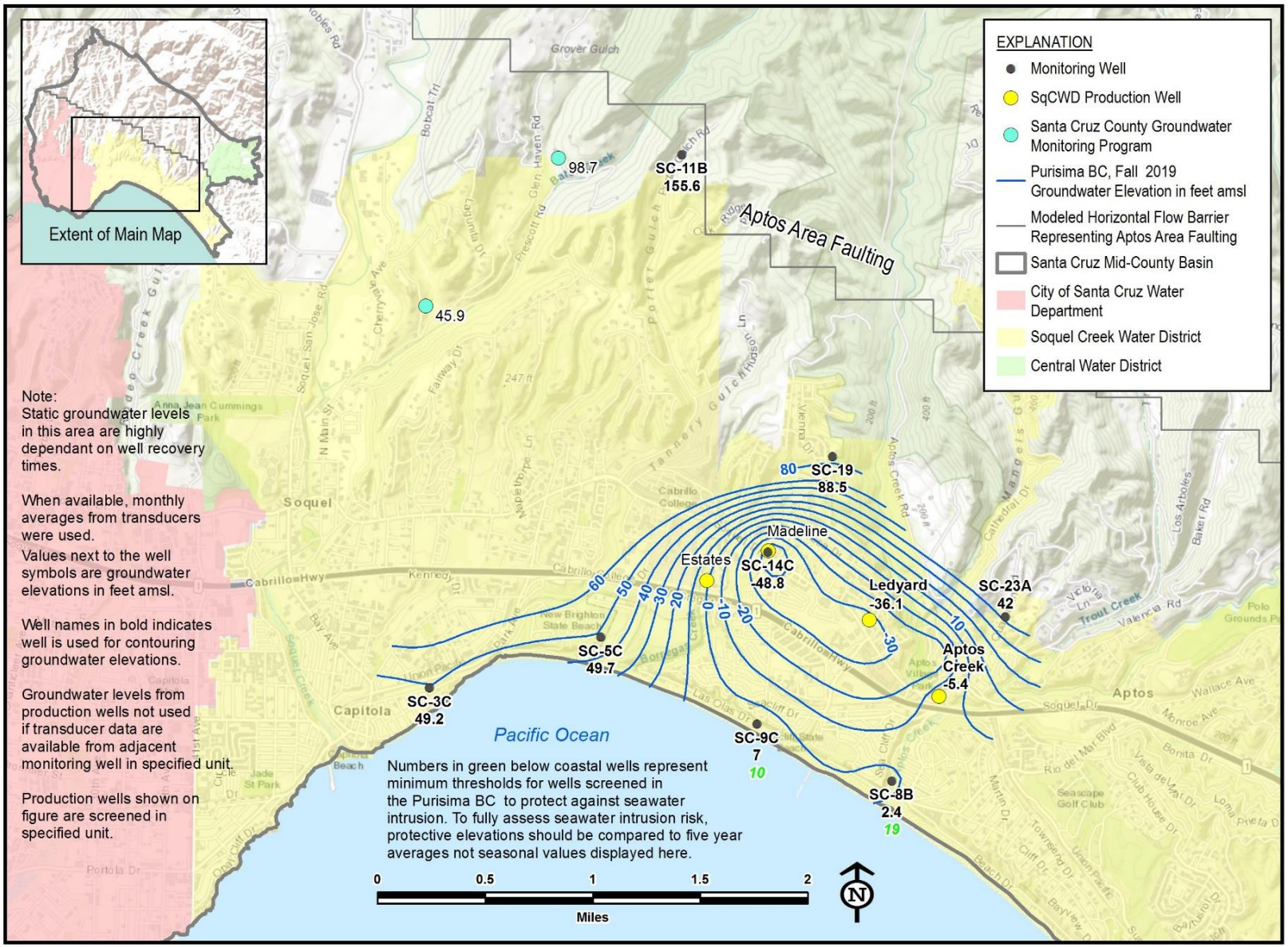

Figure 7. Purisima BC Groundwater Elevations, Fall 2019

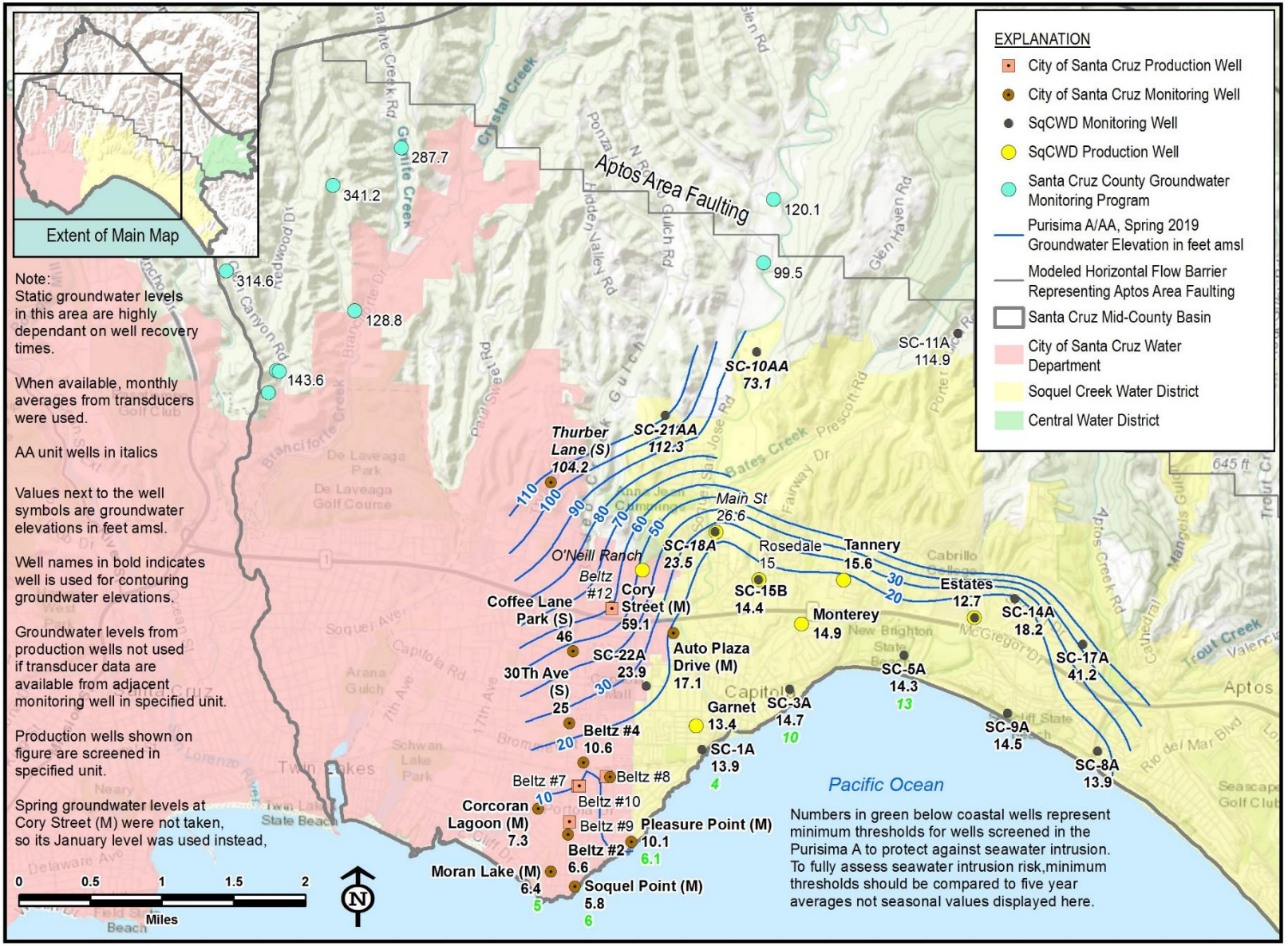

Figure 8. Purisima A and AA Groundwater Elevations, Spring 2019

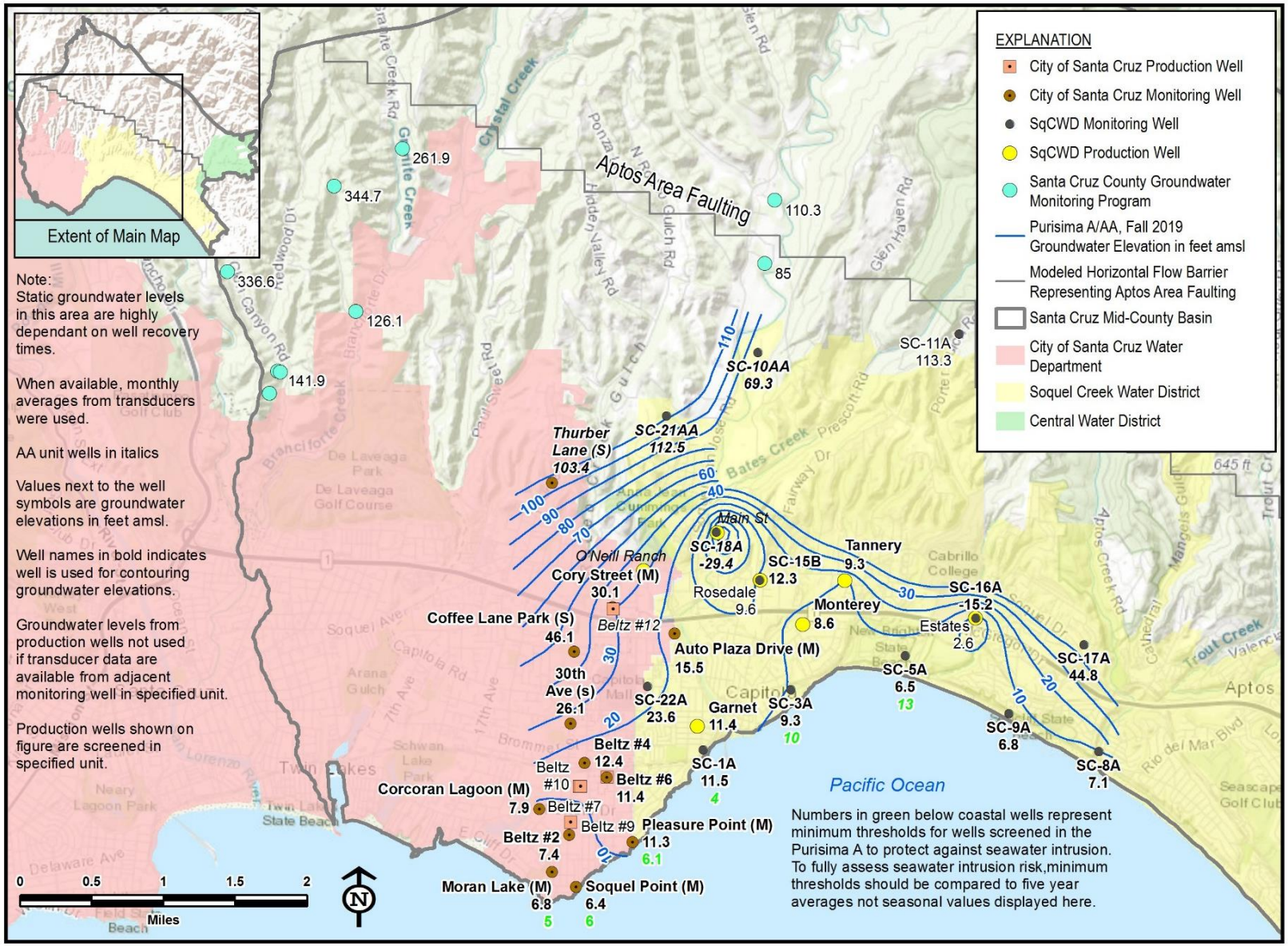

Figure 9. Purisima A and AA Groundwater Elevations, Fall 2019

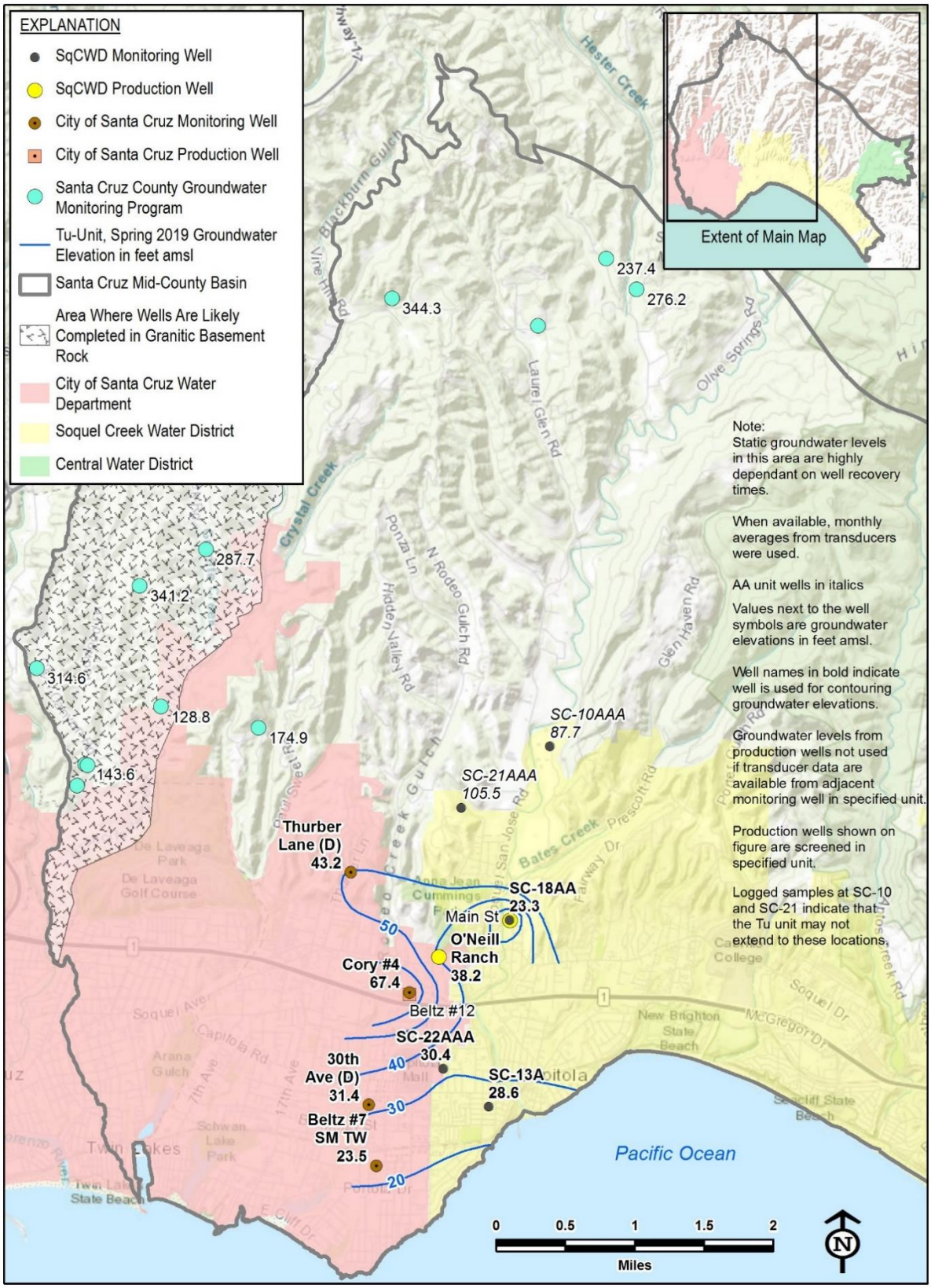

Figure 10.Tu Groundwater Elevations, Spring 2019

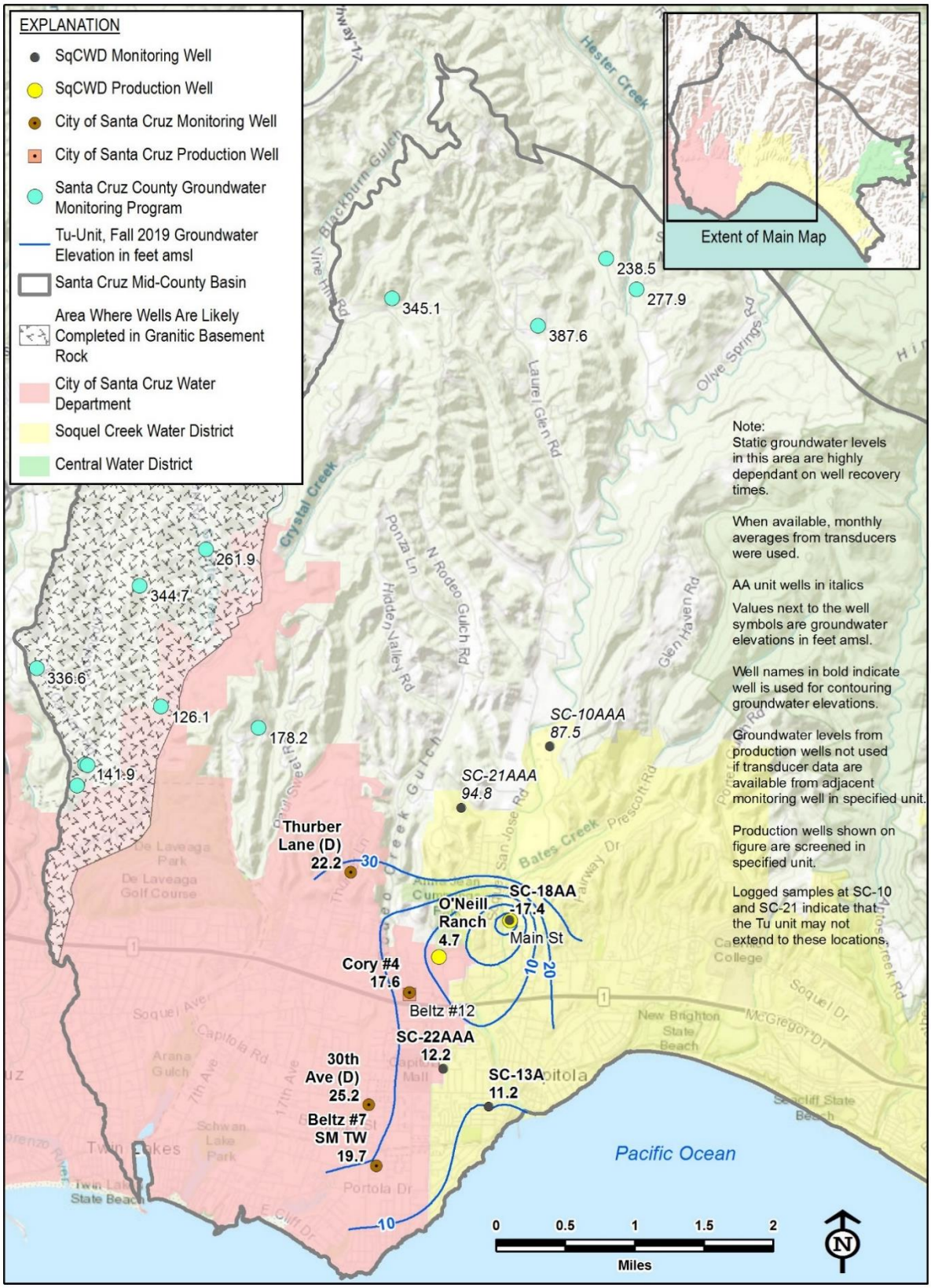

Figure 11.Tu Groundwater Elevations, Fall 2019

Hydrographs for representative monitoring points (RMPs) and other monitoring network wells used to evaluate the Basin are updated through Water Year 2019 and are provided in Appendix A. The hydrographs indicate the water year type and extend back historically the full period of record for each well. For RMPs, the minimum threshold and measurable objectives are included on the hydrographs (Figures A-1 through A-40).

Hydrographs in Appendix A are grouped based on the sustainability indicator for which groundwater elevations are used as sustainable management criteria as follows:

- Figures A-1 through A-17: Chronic Lowering of Groundwater Levels
- Figures A-18 through A-34: Seawater Intrusion Groundwater Elevation Proxies
- Figures A-35 through A-40: Depletion of Interconnected Surface Water Groundwater Elevation Proxies
- Figures A-41 through A-169: Wells in Monitoring Network not used as Representative Monitoring Points for Groundwater Elevations

Hydrographs for chronic lowering of groundwater levels RMPs (Figures A-1 through A-17) show groundwater elevations above minimum thresholds at all wells so there are no undesirable results for chronic lowering of groundwater levels. Groundwater levels are at measurable objectives for only a few wells.

Hydrographs for seawater intrusion groundwater elevation proxy RMPs (Figures A-18 through A-34) show five-year averages for comparison with groundwater elevation proxies for seawater intrusion sustainable management criteria. The hydrographs show an increasing trend for groundwater elevations in coastal monitoring wells related to historically low municipal pumping from the Basin over the last five years. However, five-year averages continue to be below minimum thresholds at SC-A3A in the Aromas Red Sands aquifer, SC-A8A in the Purisima F unit, SC-9C and SC-8B in the Purisima BC unit, SC-5A and Soquel Point Medium in the Purisima A unit, Moran Lake Deep and Pleasure Point Deep in the Purisima AA unit. Therefore, undesirable results for seawater intrusion continued to occur in Water Year 2019, and the Basin continues to be in a state of critical overdraft.

Hydrographs for depletion of interconnected surface water groundwater elevation proxy RMPs (Figures A-25 through A-40) show groundwater elevations at or above groundwater elevation proxies for minimum thresholds at the shallow wells along Soquel Creek that are representative monitoring points for surface water depletion. Therefore, there are no undesirable results for surface water depletion. Groundwater levels are at the measurable objective for only one of the five representative monitoring points.

3.2 Groundwater Extraction

The volume of Santa Cruz Mid-County Basin groundwater extracted in Water Year 2019 is provided in Table 1. The table summarizes groundwater extractions by water use sector and identifies the method of measurement, and accuracy of measurements. Appendix 2-B of the GSP describes the methodology for estimates. Figure 12 shows the general location and volume of groundwater extractions by use type. To meet requirements for annual reports in the SGMA regulations, Figure 12 only includes extractions and does not account for recharge at Beltz #12 during SCWD's Aquifer Storage and Recovery testing and recharge at the Twin Lakes Church pilot well installed by SqCWD in Water Year 2019. The percentage of municipal pumping and non-municipal pumping is estimated to be similar to the average reported on GSP Table 2-4.

Table 1. Water Year 2019 Groundwater Extracted in the Santa Cruz Mid-County Basin

Water Use Sector	Aquifer Group			Total (acre-feet)	Percentage
	Aromas Red Sands and Purisima F	Purisima DEF, BC, A and AA	Tu		
Private Domestic [1]	53	266	176	**495**	**10.4%**
Agricultural [2]	180	137	19	**336**	**7.0%**
Institutional [3]	198	103	7	**308**	**6.4%**
Municipal [4]	1,525	1,908	205	**3,638**	**76.2%**
Total	**1,956**	**2,414**	**407**	***4,777***	
Percentage	**41%**	**50%**	**9%**		

[1] Estimated based on annual water use factor (WUF) per connection determined from metered Small Water Systems and applied to each residence outside of municipal water service areas (less accurate). WUF for WY2019 was 0.25 acre-feet per connection..

[2] Estimated based on irrigation demand determined using the GFLOW model, crop acreage, and crop coefficient (less accurate).

[3] Estimated based on historical water usage for facility use including an estimate of turf irrigation based on irrigation demand determined using the GFLOW model, irrigation acreage, and turf's crop coefficient (less accurate)

[4] Direct measurement by meters (most accurate)

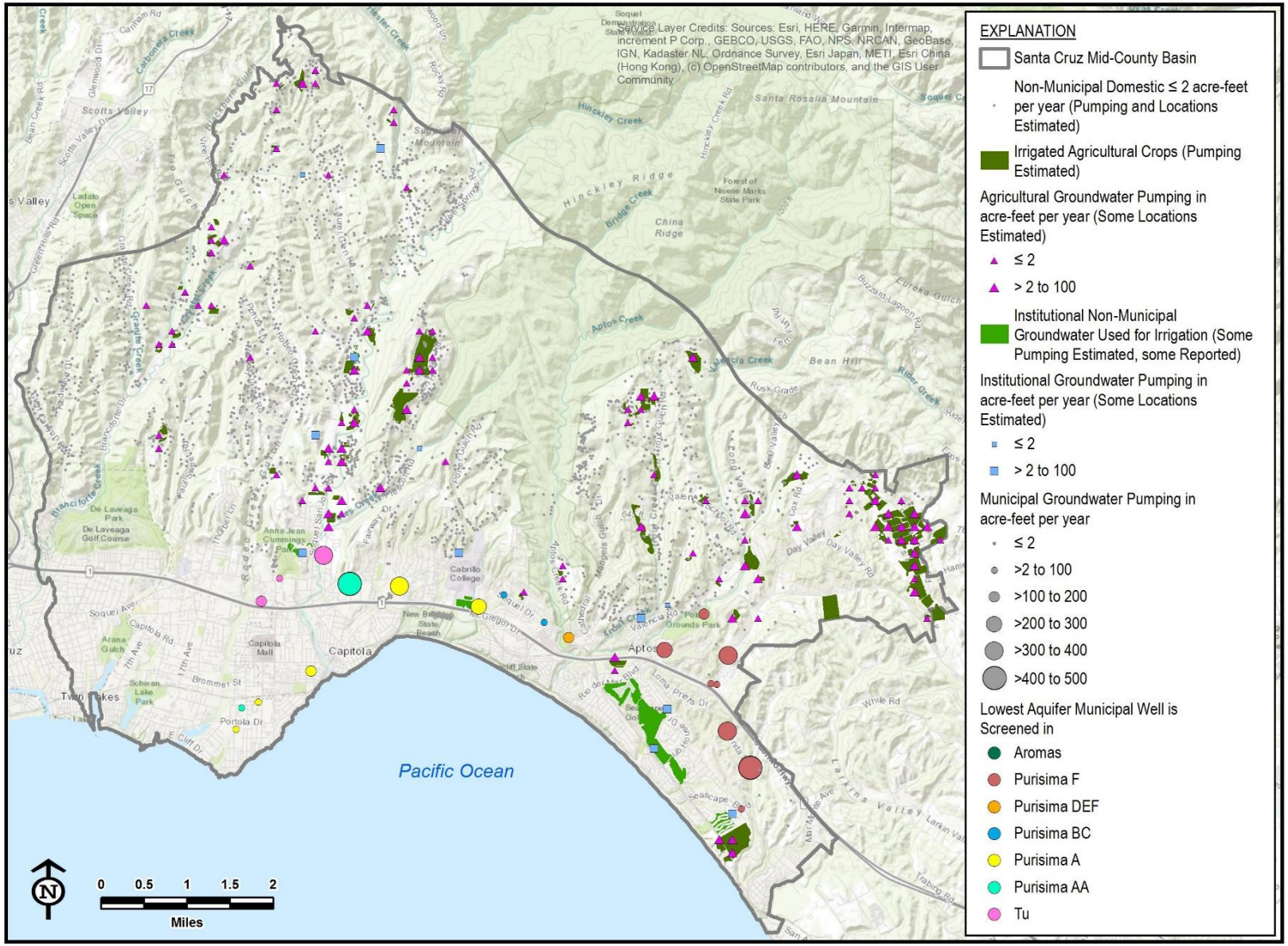

Figure 12. General Location of Water Year 2019 Groundwater Extracted in the Santa Cruz Mid-County Basin

3.3 Surface Water Supply Used for Groundwater Recharge or In-Lieu Use

In Water Year 2019, additional surface water supply was used to recharge the Basin for first time as part of two pilot projects:

1. The City of Santa Cruz Water Department (SCWD) performed pilot testing of Aquifer Storage and Recovery that included injection of some of its surface water supply at the Beltz #12 well into the Purisima AA unit and Tu unit.

2. The City of Santa Cruz Water Department and Soquel Creek Water District (SqCWD) initiated a pilot project to transfer surface water supply from the SCWD to SqCWD for in-lieu use. In Water Year 2019, the pilot transfer occurred from December 2018 to April 2019, allowing the District to reduce pumping from the Purisima A and AA units and Tu unit.

Table 2 summarizes surface water supply used in the Basin for groundwater recharge and in-lieu use for Water Year 2019.

Table 2. Water Year 2019 Surface Water Supply for Groundwater Recharge or In-Lieu Use

Purpose	Water User	Description	Total (acre-feet) [1]
Groundwater Recharge	City of Santa Cruz	Pilot Test of ASR at Beltz 12 Well	**64**
In-Lieu Use	Soquel Creek Water District	Pilot Transfer from City of Santa Cruz	**165**
Total			***229***

[1] Direct measurement by meters

3.4 Total Water Use

Total water use volumes in the Santa Cruz Mid-County Basin are included in Table 1. The table summarizes total water use by water use sector, water source type, and identifies the method of measurement. Total water use has been lower from Water Years 2015 through 2019 compared to previous years. As the majority of supply is provided by groundwater from the Basin, this reduced water use has resulted in reduced groundwater pumping in the Basin over the same period. In Water Year 2019, 54% of water use was provided by groundwater extraction in the Basin and 46% of water use was provided by surface water supply from outside the Basin.

The accuracy of measurement water use is directly correlated with the method used to determine the water use. Metered municipal data have the greatest accuracy while estimates of water use based on various assumptions (GSP Appendix 2-B) are less accurate. Although to the extent possible, reasonable checks are made to minimize order of magnitude inaccuracies.

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Table 3. Annual Water Use in the Santa Cruz Mid-County Basin

Water Year	Sources with the Basin							Sources Outside of the Basin		Total Water Use, acre-feet per year
	Groundwater Extractions, acre-feet per year							Surface Water, acre-feet per year		
	Private Domestic Use [1]	Agricultural Use [2]	Institutional Use [3]	Central Water District	City of Santa Cruz	Soquel Creek Water District	Total	City of Santa Cruz	Soquel Creek Water District [5]	
				Municipal Use [4]				Municipal Use [4]		
1985	980	352	408	394	181	4,319	6,634	6,413	0	13,047
1986	1,001	329	382	404	102	4,272	6,490	6,561	0	13,051
1987	1,022	398	445	444	526	5,235	8,070	6,415	0	14,485
1988	1,031	372	444	438	943	4,859	8,087	5,314	0	13,401
1989	1,004	355	410	406	756	4,797	7,728	4,993	0	12,721
1990	1,022	361	420	429	842	4,818	7,892	4,295	0	12,187
1991	1,012	349	397	426	254	4,703	7,141	4,628	0	11,769
1992	1,017	394	438	467	716	4,908	7,940	4,695	0	12,635
1993	1,025	331	390	481	260	4,863	7,350	5,191	0	12,541
1994	1,033	329	389	482	463	5,089	7,785	5,178	0	12,963
1995	1,036	273	334	459	212	4,855	7,169	5,564	0	12,733
1996	1,042	337	397	526	143	5,183	7,628	5,998	0	13,626
1997	1,035	386	442	604	245	5,571	8,283	6,381	0	14,664
1998	1,041	249	325	534	268	4,966	7,383	5,616	0	12,999
1999	1,048	304	363	539	359	5,211	7,824	5,829	0	13,653
2000	1,058	325	380	547	593	5,271	8,174	5,587	0	13,761
2001	1,044	337	383	557	95	5,175	7,591	6,157	0	13,748
2002	1,039	336	397	593	336	5,376	8,077	5,731	0	13,808
2003	1,031	327	390	584	416	5,332	8,080	5,653	0	13,733
2004	1,019	380	422	633	421	5,372	8,247	5,765	0	14,012

Water Year	Sources with the Basin							Sources Outside of the Basin		Total Water Use, acre-feet per year
	Groundwater Extractions, acre-feet per year							Surface Water, acre-feet per year		
	Private Domestic Use [1]	Agricultural Use [2]	Institutional Use [3]	Central Water District	City of Santa Cruz	Soquel Creek Water District	Total	City of Santa Cruz	Soquel Creek Water District [5]	
				Municipal Use [4]				Municipal Use [4]		
2005	937	275	330	514	316	4,544	6,916	5,459	0	12,375
2006	935	305	359	544	296	4,549	6,988	5,278	0	12,266
2007	933	362	408	596	420	4,626	7,345	5,054	0	12,399
2008	939	380	439	584	561	4,557	7,460	4,971	0	12,431
2009	874	371	416	594	582	4,162	6,999	4,254	0	11,253
2010	879	304	360	481	451	3,933	6,408	4,311	0	10,719
2011	882	270	311	487	637	4,011	6,598	3,931	0	10,529
2012	890	361	400	535	494	4,159	6,839	4,374	0	11,213
2013	828	423	326	559	515	4,218	6,869	4,560	0	11,429
2014	691	436	310	500	510	3,703	6,150	3,571	0	9,721
2015	553	431	300	391	613	3,154	5,442	3,222	0	8,664
2016	552	375	293	383	450	3,094	5,147	3,472	0	8,619
2017	600	218	288	383	463	3,169	5,121	3,726	0	8,847
2018	599	375	313	377	635	3,340	5,639	3,489	0	9,128
2019	595	336	308	385	198	3,037	4,661	3,794	165	8,620

[1] Estimated based on annual water use factor (WUF) per connection determined from metered Small Water Systems and applied to each residence outside of municipal water service areas (less accurate). WUF for WY2019 was 0.25 acre-feet per connection

[2] Estimated based on irrigation demand determined using the GFLOW model, crop acreage, and crop coefficient (less accurate).

[3] Estimated based on historical water usage for facility use including an estimate of turf irrigation based on irrigation demand determined using the GFLOW model, irrigation acreage, and turf's crop coefficient (less accurate).

[4] Direct measurement by meters (most accurate).

[5] Pilot water transfer from City of Santa Cruz to Soquel Creek Water District commenced in WY 2019.

3.5 Change in Groundwater in Storage

In order to estimate change of groundwater in storage, the Basin's integrated surface water/groundwater model (Model) was updated with climate data, metered pumping and injection, and estimates of non-municipal pumping through Water Year 2019. Change of groundwater in storage is based on water budget output calculated by the updated Basin Model. Appendix 2-D, 2-E, 2-F, and 2-G of the GSP describe development of the Model that incorporated data through Water Year 2016.

Updated climate data included the following:

- Precipitation data from the Santa Cruz Co-op and Watsonville Waterworks station. Missing data were estimated based on correlation with DAYMET output for the two station locations.
- Temperature data from the Santa Cruz Co-op station. Missing data were estimated based on correlation with DAYMET output for the station locations.
- Temperature output from DAYMET for the upper watershed location through Water Year 2018. Water Year 2019 was estimated based on correlation with the Santa Cruz Co-op station.

Updated pumping data included the following:

- Municipal pumping and recharge volumes provided by Central Water District, City of Santa Cruz, and Soquel Creek Water District.
- Domestic water use factor of 0.25 acre-feet/year.
- Non-municipal irrigation demand estimated based on Precipitation Runoff Modeling system (PRMS) watershed simulation of potential and actual evapotranspiration using updated climate data.

As described in Appendix 2-F, the Model was calibrated based on simulation of Water Years 1985-2015. The Model has not been recalibrated for the update through Water Year 2019.

Based on the updated Basin Model simulation through Water Year 2019, Figure 13 shows the annual water budget for the Basin including annual change of groundwater in storage and cumulative change of groundwater in storage. Since Water Year 2015, cumulative change of groundwater in storage has increased due to reduced pumping and wetter conditions. This increase has occurred in three of the last four years with Water Year 2018 being the exception due to drier conditions and higher pumping in that water year.

Figure 14 through Figure 19 show modeled change of groundwater in storage for Water Year 2019 for the principal aquifer units represented by model layers: Aromas Red Sands, Purisima F/DEF units, Purisima BC unit, Purisima A unit, Purisima AA unit, and Tu unit, respectively. These results from the Basin Model simulation show an increase (green and blue colors) of groundwater in storage for much of the Basin consistent with Figure 13.

In general, larger changes of groundwater in storage are limited to unconfined areas for the aquifer units. Therefore, these maps do not fully represent groundwater conditions in the Basin as many of the sustainable management criteria defining undesirable results relate to groundwater elevations in the confined areas of the aquifer units. In confined areas, groundwater elevations can change substantially with very small changes of groundwater in storage. For example, representative monitoring points with groundwater elevation proxies for the seawater intrusion sustainability indicator are located in the confined area and this indicator cannot be evaluated by these maps.

The maps also do not represent where more groundwater is extracted at wells as reduction of groundwater in storage can be a relatively small contribution of flow to wells. In fact, reduction of groundwater in storage can be greater where flows are lower due to lower transmissivity of the aquifer unit. For example, Figure 18 shows greater reduction (higher negative values represented by orange and red colors) of groundwater in storage in the Purisima AA unit where pumping occurs at the Main Street and Beltz 12 wells that are screened in the AA and Tu units. Reduction of groundwater in storage in these areas is lower (white) in the more transmissible Tu unit that provides more flow to the wells.

While these maps are required for the annual report, their main utility is evaluating how recharge over the water year has changed groundwater in storage in the unconfined areas of the Basin. In Water Year 2019, groundwater in storage in these areas increased.

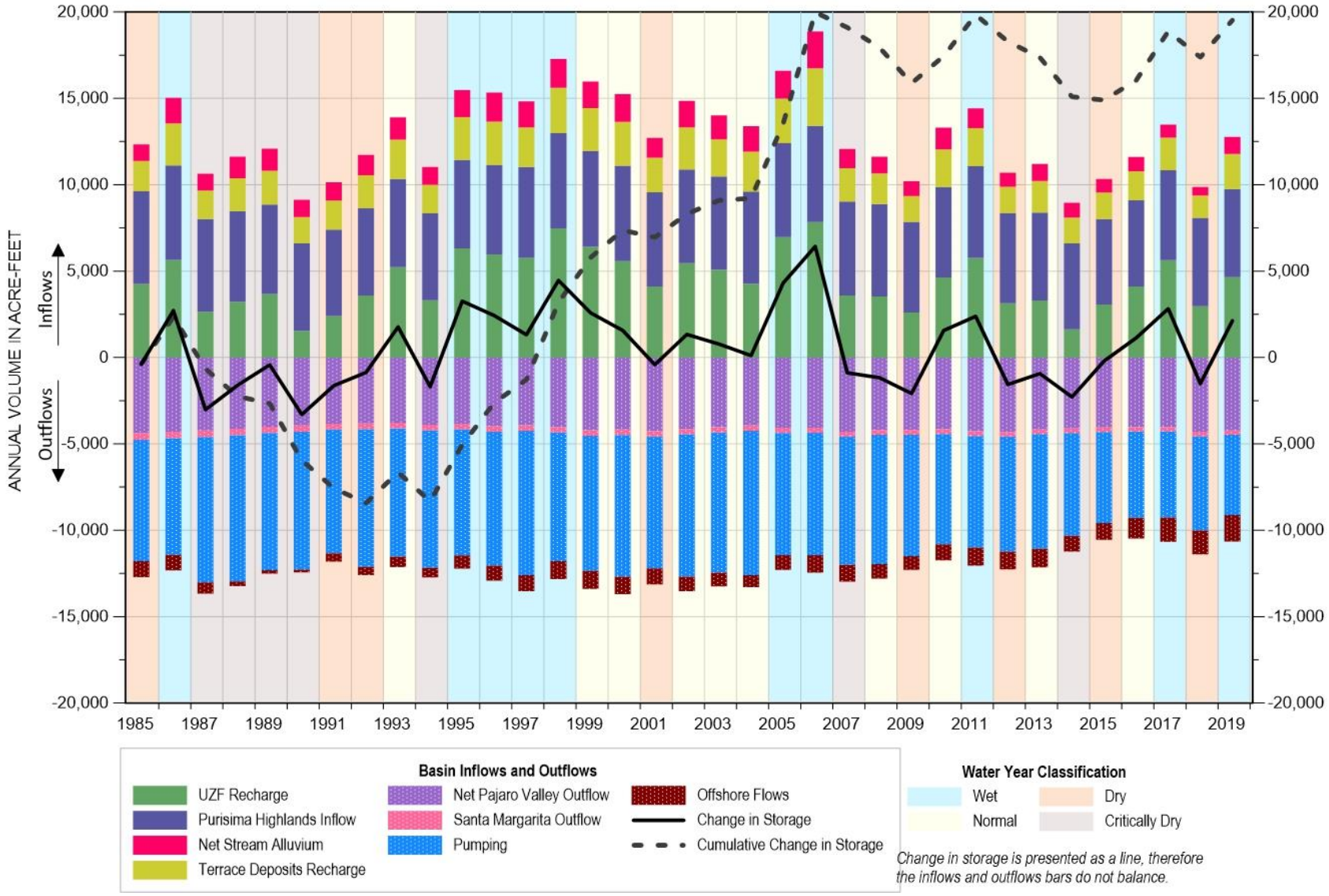

Figure 13. Annual Change in Groundwater in Storage for Santa Cruz Mid-County Basin

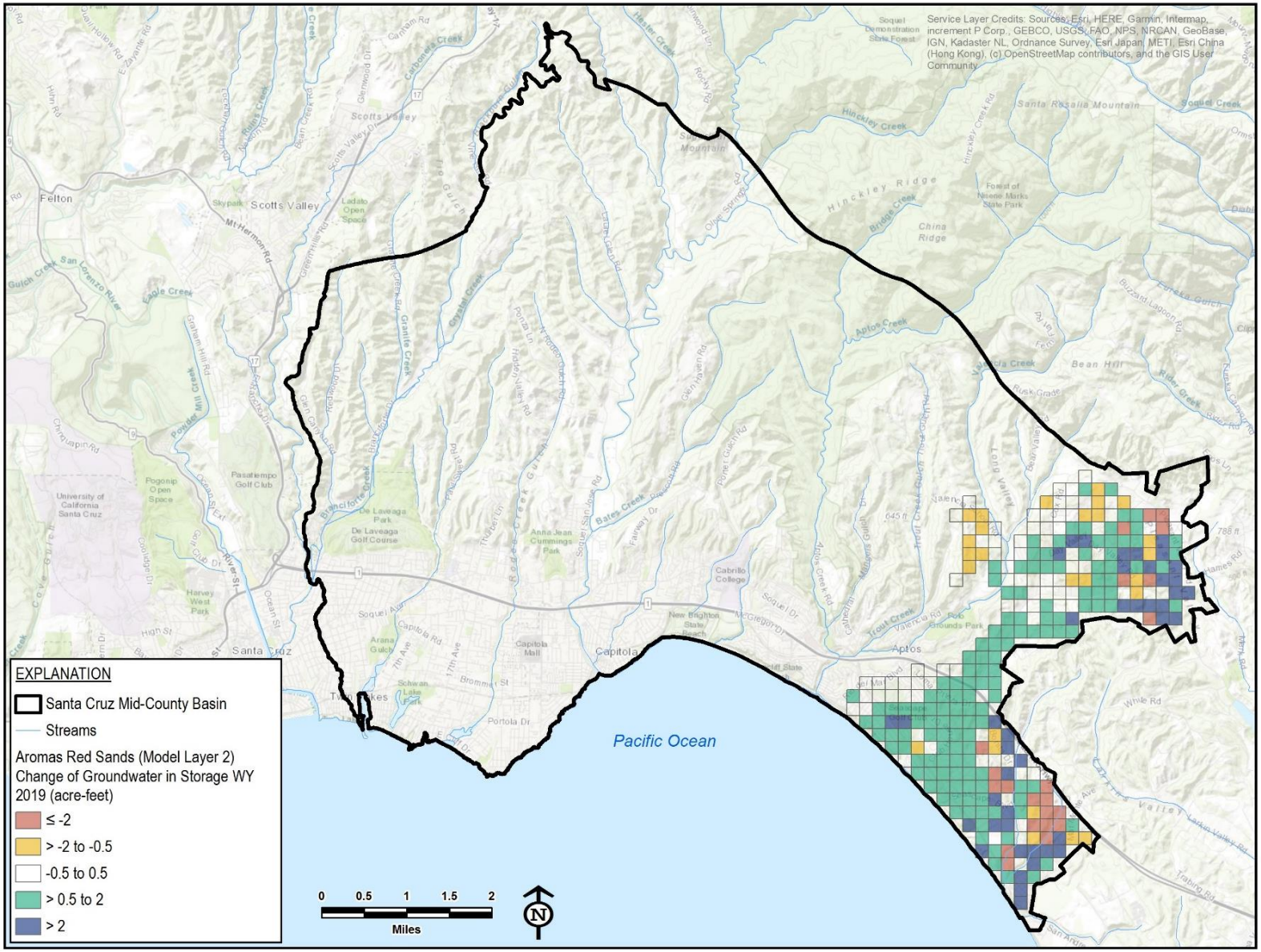

Figure 14. Water Year 2019 Change of Groundwater in Storage in Aromas Red Sands

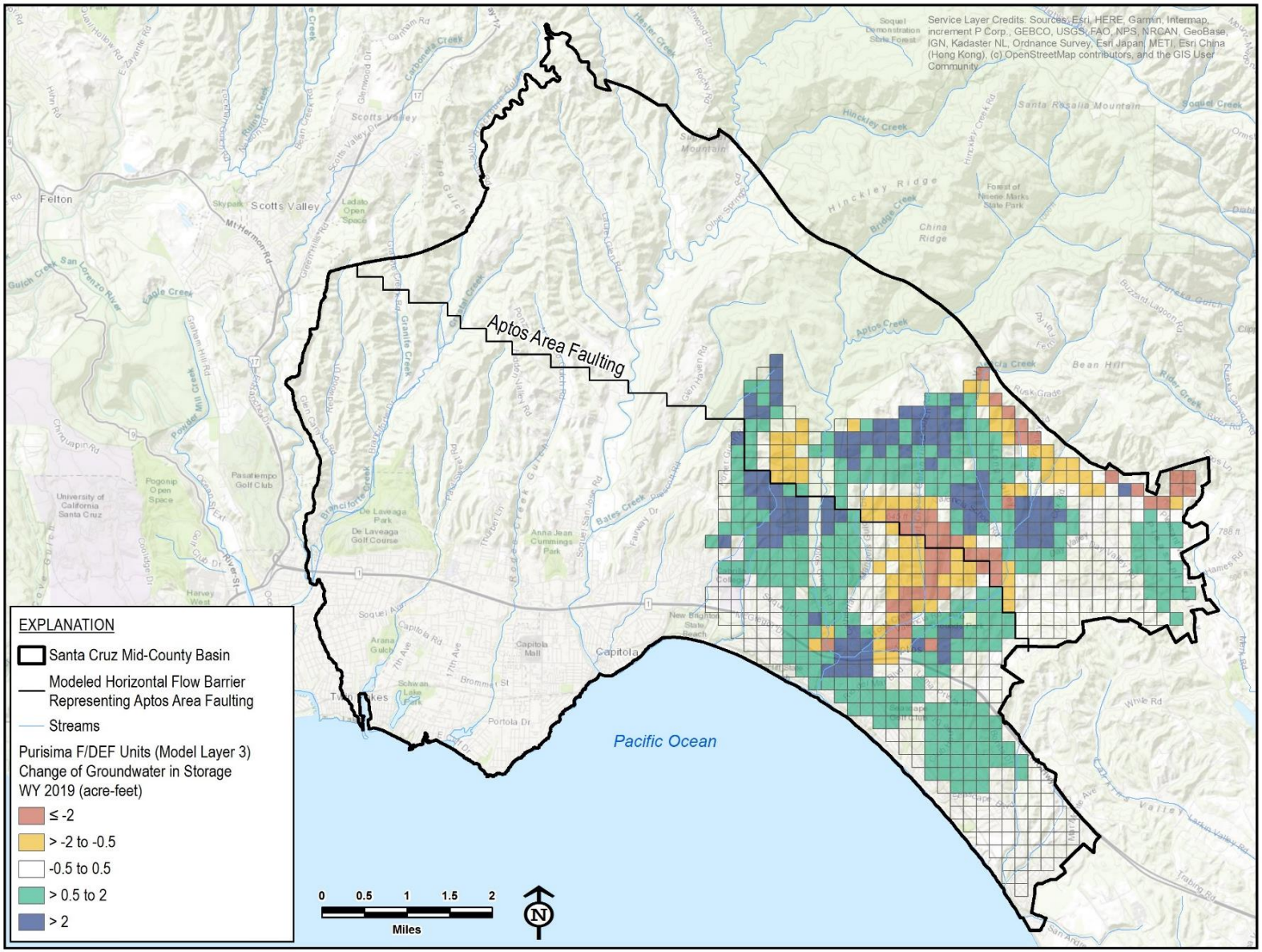

Figure 15. Water Year 2019 Change of Groundwater in Storage in Purisima F/DEF Units

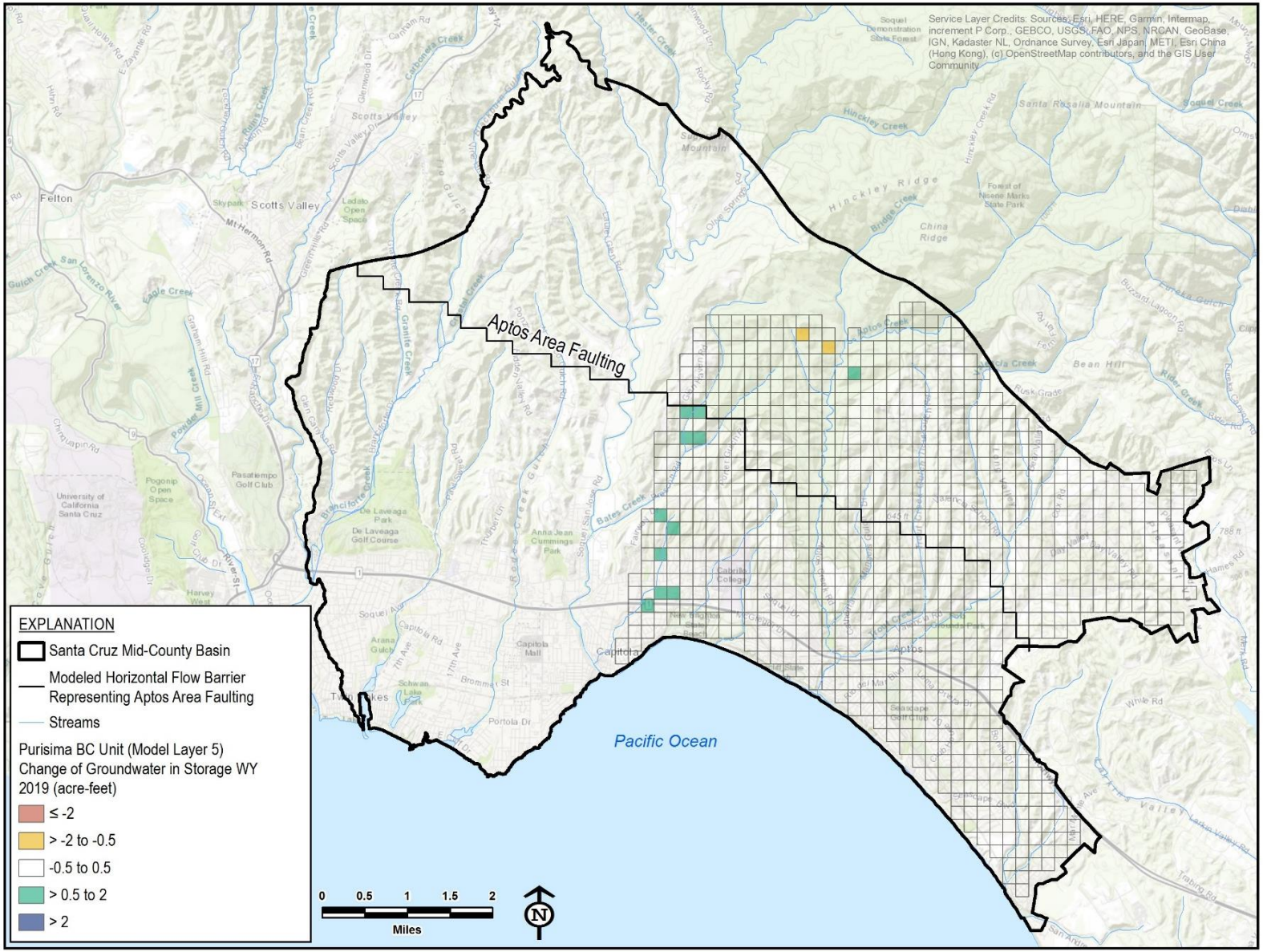

Figure 16. Water Year 2019 Change of Groundwater in Storage in Purisima BC Unit

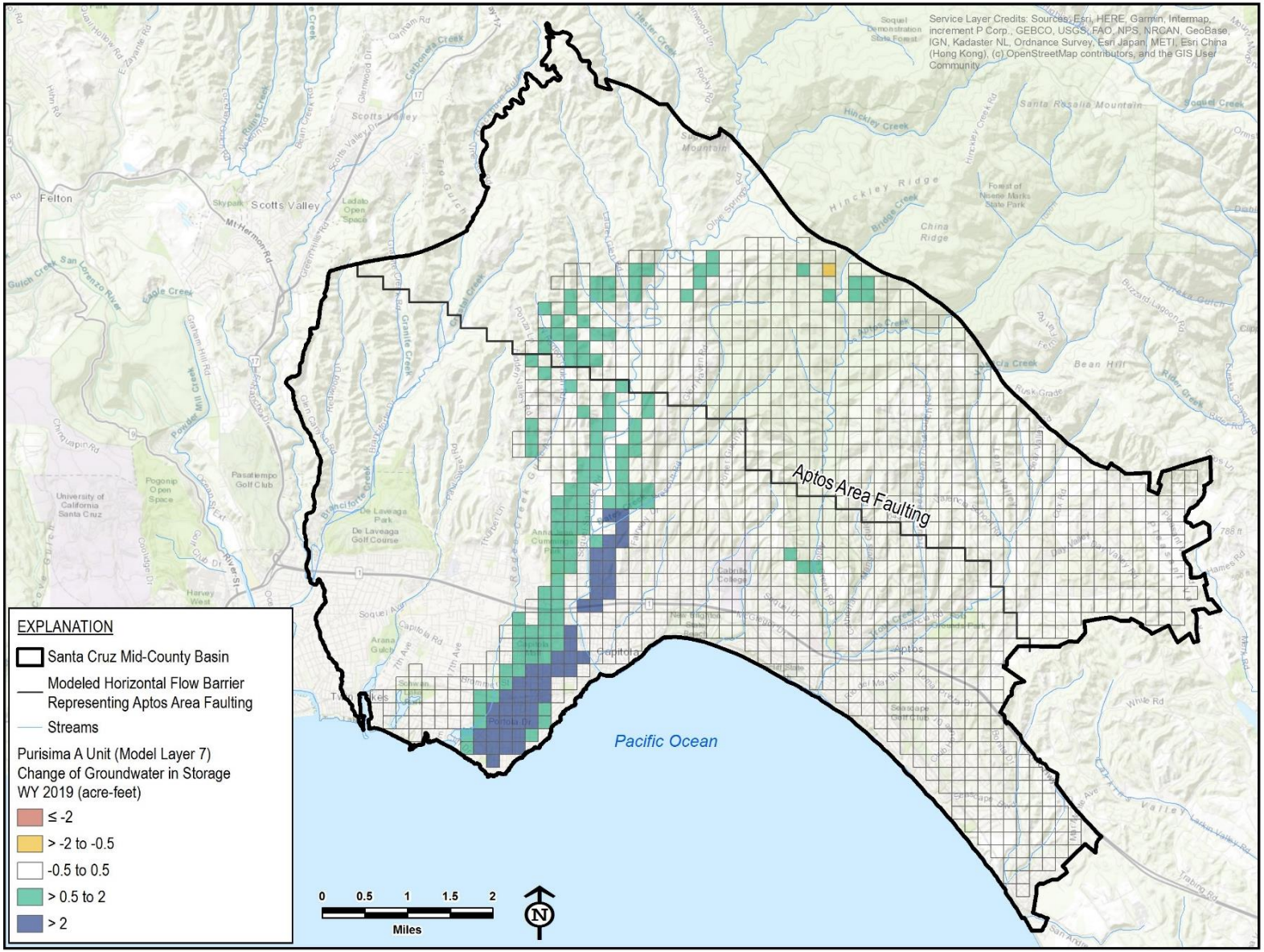

Figure 17. Water Year 2019 Change of Groundwater in Storage in Purisima A Unit

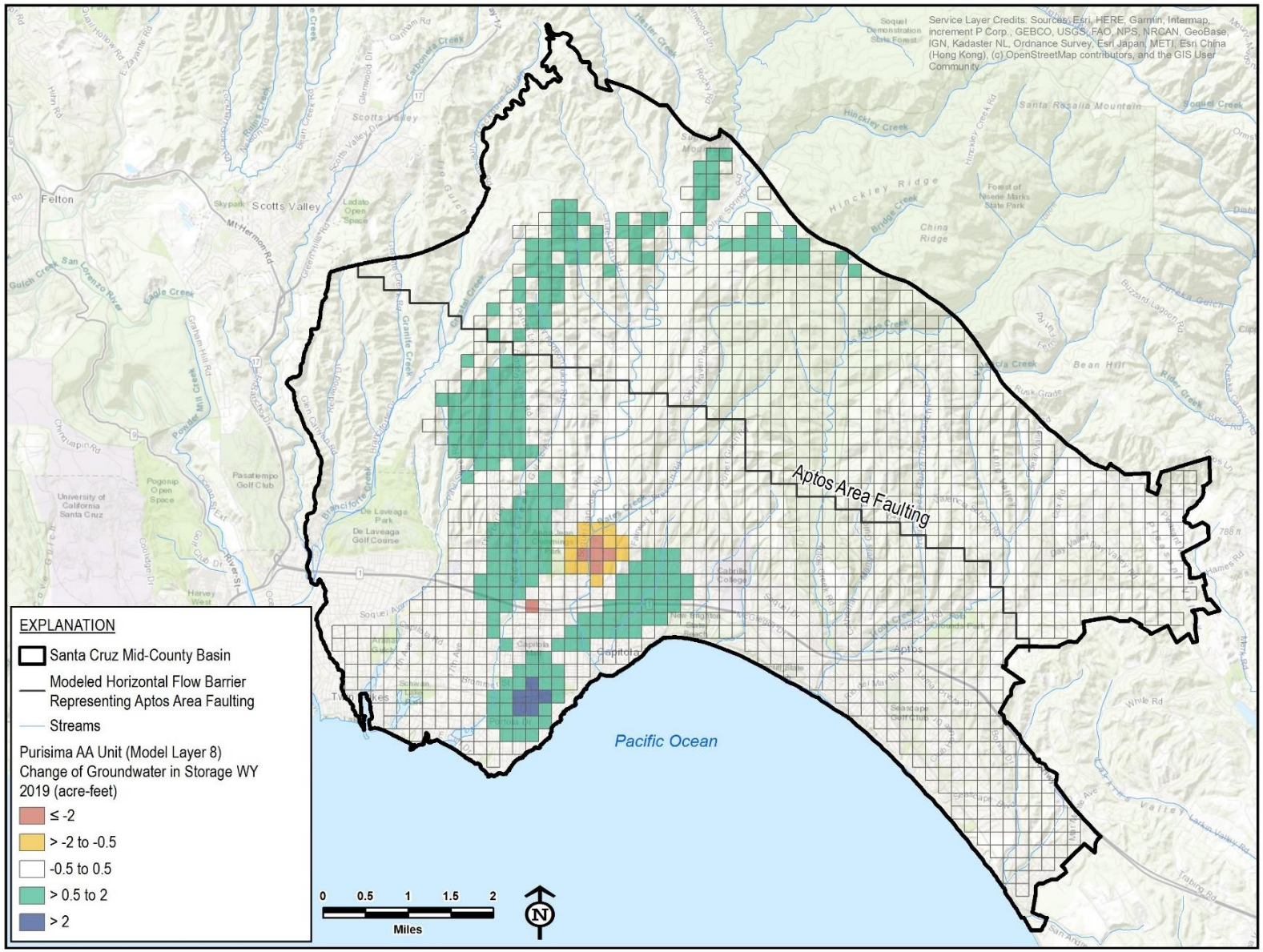

Figure 18. Water Year 2019 Change of Groundwater in Storage in Purisima AA Unit

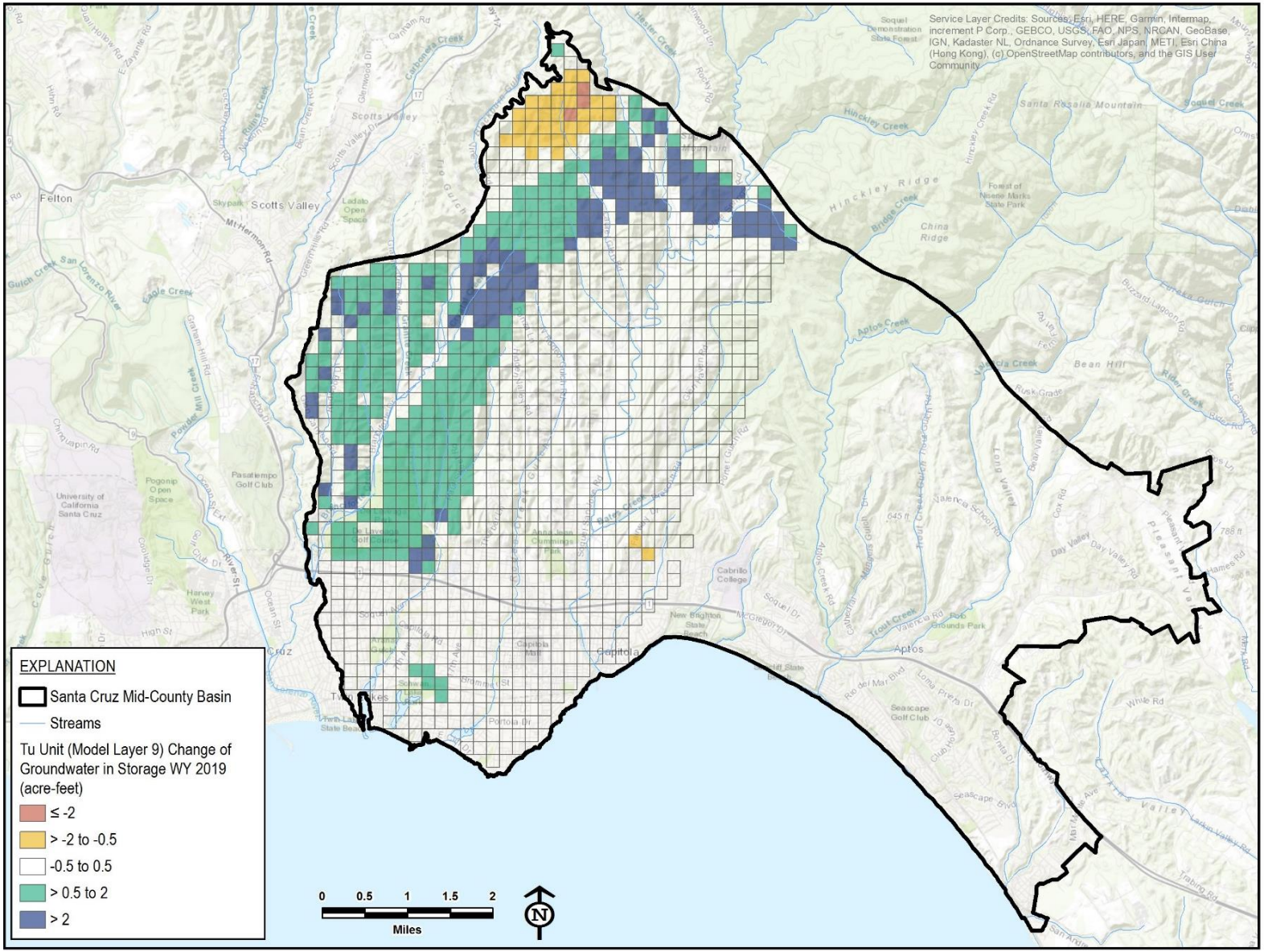

Figure 19. Water Year 2019 Change of Groundwater in Storage in Tu Unit

4 PROGRESS TOWARDS IMPLEMENTING THE PLAN

This section evaluates progress towards implementing the GSP by comparing groundwater conditions in Water Year 2019 to sustainable management criteria for each of the sustainability indicators required for SGMA. The section concludes with an update of implementation of projects and management actions to achieve sustainability.

4.1 Chronic Lowering of Groundwater Levels

Table 4 shows sustainable management criteria at RMPs for chronic lowering of groundwater levels. Sustainable management criteria for this indicator are met when groundwater elevations are at or above criteria. In Water Year 2019, groundwater levels at all representative monitoring points met minimum thresholds for this sustainability indicator. There were no undesirable results for chronic lowering of groundwater levels in Water Year 2019.

For this sustainability indicator, interim milestones are the same as the long-term measurable objectives so the GSP has a goal to meet measurable objectives by 2025. Measurable objectives were met at three of the 17 RMPs.

4.2 Reduction of Groundwater in Storage

Table 5 shows sustainable management criteria for reduction of groundwater in storage, which is based on sustainable yields for three aquifer groups. Sustainable management criteria for this indicator are met when pumping is at or below criteria or sustainable yields. As sustainable yield is primarily based on eliminating critical overdraft related to seawater intrusion, the five-year average net extraction is used to be consistent with five-year averages used for seawater intrusion groundwater elevation proxies. Five-year average net extraction below the minimum threshold is considered sustainable. The five-year net extraction through Water Year 2019 for the Tu unit was below the sustainable yield for the aquifer unit and therefore met the minimum threshold. Extraction from the Tu unit would be sustainable even without surface water supply used to recharge the Basin as part of two pilot projects in Water Year 2019 (Table 2). The five-year net extraction amounts for the Aromas Red Sands and Purisima F group and Purisima DEF, BC, A, and AA group did not meet the minimum thresholds. These exceedances indicate undesirable results for this sustainability indicator. Net extraction for these aquifer groups would need to be reduced to or below minimum thresholds to eliminate undesirable results.

The interim milestone for 2025 is based on planned schedule for implementation of projects and management actions to reduce net extraction to below sustainable yield. The five-year net

extraction for all three aquifer groups through Water Year 2019 did not meet these interim milestones as planned projects and management actions have not been implemented.

The measurable objective is based on annual net extraction that could occur while ensuring net annual groundwater extractions greater than the minimum threshold will not occur for any one of the three aquifer groups even if there were four subsequent years of maximum projected net groundwater extraction. Net extraction in Water Year 2019 did not meet this measurable objective for all three aquifer groups.

Table 4. Chronic Lowering of Groundwater Levels

Representative Monitoring Point	Well Type	Aquifer	Minimum Threshold	Measurable Objective	Interim Milestone 2025	WY2016	WY2017	WY2018	WY2019
			Groundwater Elevation, feet above mean sea level			Minimum Average Monthly Groundwater Elevation, feet above mean sea level			
SC-A7C	Monitoring	Aromas	0	8	8	5.4	4.7	6.0	6.0
Private Well #2	Production	Purisima F	562	596	596	592.8	596.4	no data	571.1
Black	Monitoring		10	41	41	41.0	40.5	42.0	46.1
CWD-5	Monitoring		140	194	194	191.7	192.0	195.3	195.1
SC-23C	Monitoring		15	49	49	46.5	46.3	45.9	45.8
SC-11RD	Monitoring	Purisima DEF	295	318	318	313.7	314.3	315.3	315.2
SC-23B	Monitoring		50	85	85	77.7	81.4	80.2	78.8
SC-11RB	Monitoring	Purisima BC	120	157	157	152.4	155.9	155.3	154.8
SC-19	Monitoring		56	95	95	87.2	89.8	88.5	78.4
SC-23A	Monitoring		0	44	44	30.5	41.6	39.8	38.8
Coffee Lane Shallow	Monitoring	Purisima A	27	47	47	43.3	43.6	45.3	44.7
SC-22A	Monitoring		2	44	44	20.9	20.9	22.3	22.2
SC-22AA	Monitoring	Purisima AA	0	22	22	18.7	18.6	20.4	20.3
SC-10RAA	Monitoring		35	76	76	71.5	70.8	70.3	69.3
Private Well #1	Production	Purisima AA/Tu	362	387	387	378.8	390.5	383.5	387.6
30th Ave Deep	Monitoring	Tu	0	30	30	22.2	20.7	24.0	27.4
Thurber Lane Deep	Monitoring		-10	33	33	6.3	10.4	12.8	19.1

Minimum threshold not met
Minimum threshold achieved but measurable objective not met
Measurable objective met

Table 5. Reduction in Groundwater in Storage

Aquifer Unit Group	Minimum Threshold	Interim Milestone 2025	WY2015-2019	Measurable Objective	WY2019
	Five-Year Average Net Extraction, acre-feet per year			Net Extraction, acre-feet per year	
Aromas Red Sands and Purisima F	1,740	1,930	1,978	1,680	1,955
Purisima DEF, BC, A and AA	2,280	2,110	2,506	960	2,110
Tu	930	720	798	620	733

Minimum threshold not met	Measurable objective not met
Minimum threshold met	Measurable objective met

4.3 Seawater Intrusion

Table 6 and Table 7 show sustainable management criteria at RMPs for seawater intrusion. Table 6 shows the sustainable management criteria for chloride concentrations compared to maximum concentrations for Water Year 2019. Sustainable management criteria for this indicator are met when chloride concentrations are at or below criteria. The only exceedance of minimum thresholds occurred at SC-A5B in the Purisima F unit near SqCWD's Seascape well. As three of four samples in the water year exceeded the minimum threshold, there is an undesirable result at this well.

Interim milestones are the same as measurable objectives for chloride concentrations. At other monitoring wells in the Aromas Red Sands and Purisima F units, chloride concentrations did meet the minimum threshold but did not meet the measurable objective. All RMPs in the deeper Purisima units met the measurable objective except at the Soquel Point Deep well in the Purisima AA unit.

Figure 20 shows maximum chloride concentrations mapped with the chloride isocontour established as a minimum threshold in the GSP. Appendix B includes chemographs for chloride concentrations at coastal monitoring wells.

Table 7 shows groundwater elevation proxies used for seawater intrusion sustainable management criteria. These groundwater elevations are protective elevations estimated to prevent further seawater intrusion over the long-term. Sustainable management criteria for this indicator are met at a specific RMP when five-year averages of groundwater elevations are at or above the groundwater elevation proxy for the RMP. In Water Year 2019, five-year averages of groundwater elevations were below minimum thresholds at RMPs in the Aromas

Red Sands, the Purisima F, Purisima BC, Purisima A, Purisima AA, and Tu aquifer units. Therefore, there were undesirable results for seawater intrusion occurring in all principal aquifer units except for the Purisima DEF unit. These undesirable results indicate the Basin remains in critical overdraft.

Measurable objectives for groundwater elevation proxies were met at several RMPs that are screened in the Purisima F and A units. Five-year averages of groundwater elevations did not meet the measurable objective at SC-8RD, the only RMP in the Purisima DEF unit, although the minimum threshold was met at this well.

Interim milestones for Water Year 2025 are based on modeled groundwater level recovery as a result of implementation of projects in the GSP. Table 7 shows that three of nine RMPs where undesirable results currently occur have five-year average groundwater elevations that meet interim milestones for Water Year 2025.

Although not required by the SGMA regulations, the GSP includes triggers for preemptive actions to prevent significant and unreasonable conditions of seawater intrusion, the indicator for which the Basin is in critical overdraft. Chloride concentration triggers are exceeded when annual average concentrations exceed the measurable objective and/or average concentration for 2013-2017. Chloride concentration triggers have been exceeded at SC-A3A in the Aromas Red Sands aquifer, SC-A8A, SC-A2RA, SC-A2RB, SC-A5A, and SC-A5B in the Purisima F unit, and Soquel Point Deep in the Purisima AA unit. The recommended management action is to reduce pumping in the closest municipal wells screened in the same aquifer unit as the monitoring well where chloride concentrations triggers from exceeded. The action can be revised as necessary to best raise groundwater elevations in the well in an attempt to reduce chloride concentrations.

The GSP also includes triggers for groundwater elevation proxies. The only RMP to reach a trigger elevation in Water Year 2019 was SC-8B in the Purisima BC unit, when its 30-day average groundwater elevation fell below the trigger level of 2 feet above mean sea level temporarily in October 2019 (see Appendix A: Figure A-24). The nearby Aptos Creek municipal well should not be re-activated until groundwater levels recover to be consistently above the trigger level.

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Table 6. Chloride Concentrations Adjacent to 250 mg/L Chloride Isocontour for Seawater Intrusion

Representative Monitoring Point	Aquifer	Minimum Threshold	Measurable Objective	Interim Milestone 2025	WY2016	WY2017	WY2018	WY2019
		Chloride Concentration, mg/L			Water Year Maximum Chloride Concentration, mg/L			
Coastal Monitoring Wells - Intruded								
SC-A3A	Aromas	22,000	17,955	17,955	18,000	18,000	18,000	18,400
SC-A3B	Aromas	4,330	676	676	1,200	1,200	1,000	1,100
SC-A8A	Purisima F	8,000	7,258	7,258	7,100	7,200	7,500	7,670
SC-A2RA	Purisima F	18,480	14,259	14,259	15,000	14,000	15,000	15,000
SC-A2RB	Purisima F	470	355	355	350	370	410	470
Moran Lake Med	Purisima A	700	147	147	149	120	78	60
Soquel Point Med	Purisima A	1,300	1,104	1,104	1,200	1,100	1,100	1,000
Coastal Monitoring Wells - Unintruded (undesirable results if > 250 mg/L in >=2 or more consecutive quarterly samples)								
SC-A8B	Aromas	250	100	100	35	33	32	39
SC-A1B	Purisima F	250	100	100	26	26	26	28
SC-A1A	Purisima DEF	250	100	100	29	28	26	28
SC-8RD	Purisima DEF	250	100	100	69	21	66	21
SC-9RC	Purisima BC	250	100	100	30	36	31	32
SC-8RB	Purisima BC	250	100	100	17	17	not sampled	19
Pleasure Point Medium	Purisima A	250	100	100	35	37	36	35
SC-1A	Purisima A	250	100	100	38	38	38	44
SC-5RA	Purisima A	250	100	100	53	56	58	58
Sc-3RA	Purisima A	250	100	100	66	64	63	65
Moran Lake Deep	Purisima AA	250	100	100	66	64	63	65
Pleasure Point Deep	Purisima AA	250	100	100	23	23	22	23
Soquel Point Deep	Purisima AA	250	100	100	144	140	160	160
Inland Monitoring Well- Intruded								
SC-A5A	Purisima F	9,800	8,575	8,575	8,600	9,100	9,310	9,220
Inland Production and Monitoring Wells- Unintruded (undesirable results if > 150 mg/L in >=2 or more consecutive quarterly samples)								
SC-A5B	Purisima F	150	100	100	94	120	130	159
San Andreas PW	Purisima F	150	100	100	24	21	29	30
Seascape PW	Purisima F	150	100	100	15		18	19
T. Hopkins PW	Purisima DEF	150	100	100	48	44	24	42
Estates PW	Purisima BC & A	150	100	100	44	49	50	45
Ledyard PW	Purisima BC	150	100	100	32	38	31	33
Garnet PW	Purisima A	150	100	100	76	81	76	84
Beltz #2	Purisima A	150	100	100	65	61	63	64

Representative Monitoring Point	Aquifer	Minimum Threshold	Measurable Objective	Interim Milestone 2025	WY2016	WY2017	WY2018	WY2019
		Chloride Concentration, mg/L			Water Year Maximum Chloride Concentration, mg/L			
Beltz #8 PW	Purisima A	150	100	100	54	52	49	50
SC-22AA	Purisima AA	150	100	100	37	39	38	46
Corcoran Lagoon Deep	Purisima AA	150	100	100	21	20	21	22
Schwan Lake	Purisima AA	150	100	100	89	94	93	94

Minimum threshold not met

Minimum threshold achieved but measurable objective not met

Measurable objective met

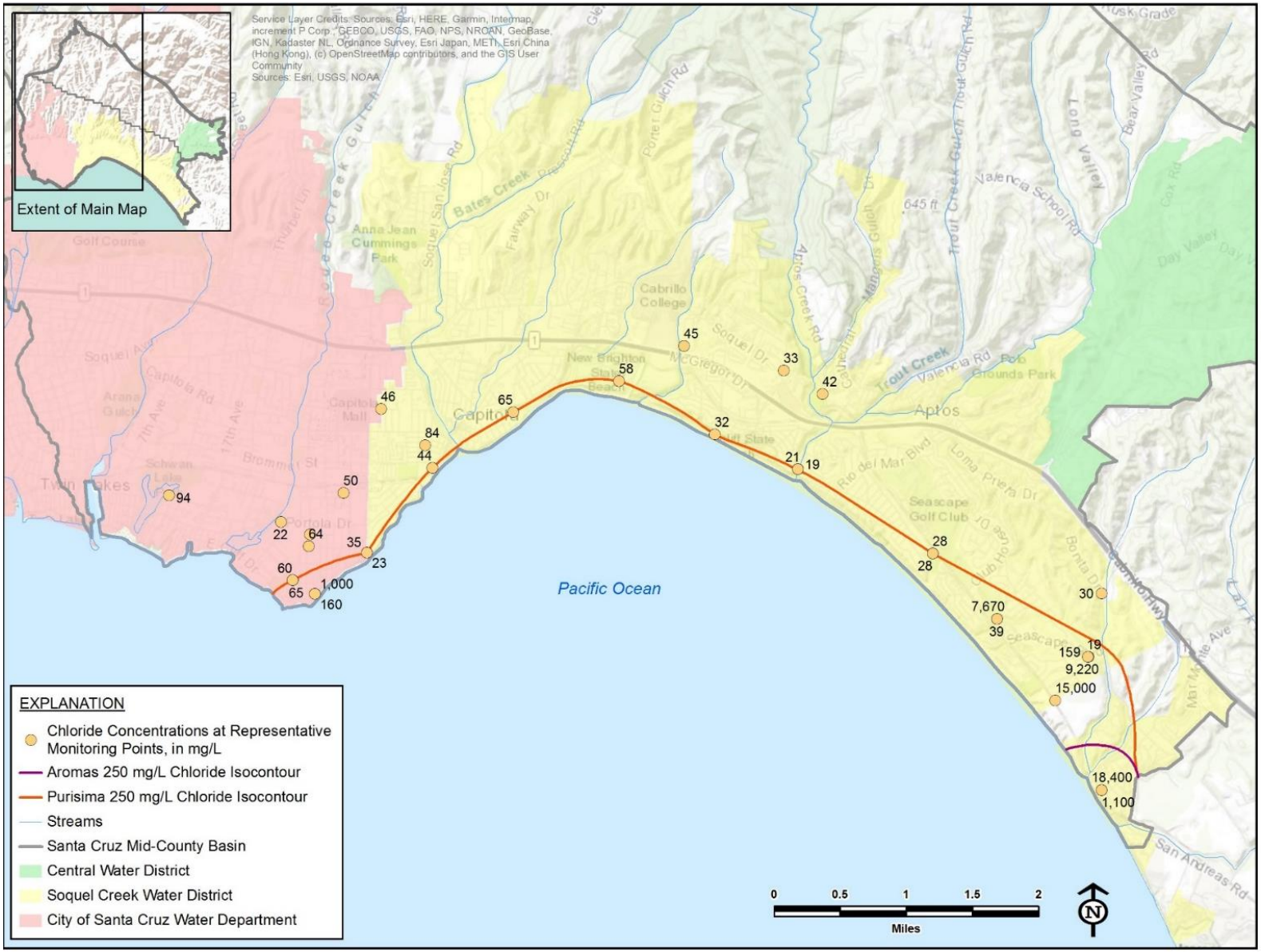

Figure 20. Water Year 2019 Chloride Concentration Map

Table 7. Groundwater Elevation Proxies for Seawater Intrusion

Representative Monitoring Point	Aquifer	Minimum Threshold	Measurable Objective	Interim Milestone 2025	WY2016	WY2017	WY2018	WY2019
		Groundwater Elevation, feet above mean sea level			Minimum of Five-Year Average Groundwater Elevation by Water Year, feet above mean sea level			
SC-A3A	Aromas	3	4	3	2.8	2.9	2.9	2.9
SC-A1B	Purisima F	3	5	3	7.3	7.4	7.5	7.5
SC-A8A	Purisima F	6	7	4.5	5.2	5.3	5.3	5.4
SC-A2RA	Purisima F	3	4	3	2.9	3.8	4.5	5.7
SC-8RD	Purisima DEF	10	11	10	4.9	7.5	9.4	10.1
SC-9RC	Purisima BC	10	11	4.6	-5.3	-1.6	2.2	5.2
SC-8RB	Purisima BC	19	20	8.4	-5.5	-2.4	0.2	2.7
SC-5RA	Purisima A	13	15	13	4.8	6.3	7.8	8.5
SC-3RA	Purisima A	10	12	10	7.6	8.8	9.6	10.6
SC-1A	Purisima A	4	6	4	9.5	9.6	9.5	9.5
Moran Lake Medium	Purisima A	5	6.8	5	5.4	5.5	5.6	5.6
Soquel Point Medium	Purisima A	6	7.1	6	4.9	5.1	5.2	5.3
Pleasure Point Medium	Purisima A	6.1	6.5	6.1	6.8	6.5	6.8	7.1
Moran Lake Deep	Purisima AA	6.7	16	6.7	6.0	6.2	6.4	6.5
Soquel Point Deep	Purisima AA	7.5	16	7.5	5.7	5.8	5.9	6.0
Pleasure Point Deep	Purisima AA	7.7	16	7.7	6.6	7.4	7.8	8.2
SC-13A	Tu	17.2	19	8.3	not previously measured			17.1

Minimum threshold not met
Minimum threshold achieved but measurable objective not met
Measurable objective met

4.4 Groundwater Quality

Table 8 shows sustainable management criteria and WY 2019 concentrations at RMPs for degraded groundwater quality. Sustainable management criteria for this indicator are met when concentrations are at or below criteria. The minimum thresholds are based on drinking water standards for each constituent. Maximum concentrations at each well are also compared to measurable objectives specific to each well based on average concentrations observed during Water Years 2013-2017. Interim milestones for groundwater quality are identical to measurable objectives.

In Water Year 2019, iron concentrations at several representative monitoring points exceed measurable objectives that are higher than minimum thresholds, indicating an increase in concentration since Water Years 2013-2017. This is not considered an undesirable result because it is a preexisting natural condition that is not associated with pumping or managed aquifer recharge.

Exceedances of minimum threshold for chloride are related to seawater intrusion and addressed by that indicator. The increase of total dissolved solids (TDS) and chloride at SC-22AAA in the Tu unit only occurred in one sample so is not considered an undesirable result as two exceedances in four quarterly samples are required for an undesirable result.

4.5 Subsidence

Subsidence is not applicable in the Santa Cruz Mid-County Basin as an indicator of groundwater sustainability.

4.6 Interconnected Surface Water

Table 9 shows groundwater elevation proxies for sustainable management criteria at representative monitoring points for depletion of interconnected surface water. Sustainable management criteria for this indicator are met when groundwater elevations are at or below proxies. In Water Year 2019, groundwater levels at all representative monitoring points met minimum thresholds for this sustainability indicator. There were no undesirable results for depletion of interconnected surface water in Water Year 2019.

The measurable objective was met at only one of the five representative monitoring points, but the Water Year 2025 interim milestone was met in Water Year 2019 for all five RMPs.

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Table 8. Water Year 2019 Groundwater Quality

Representative Monitoring Point	Total Dissolved Solids, mg/L	Chloride, mg/L	Iron, µg/L	Manganese, µg/L	Arsenic, µg/L	Chromium (Total), µg/L	Chromium VI, µg/L	Nitrate as Nitrogen, mg/L	Organic Compound Detects, µg/L
Minimum Threshold	**1,000**	**250**	**300**	**50**	**10**	**50**	**NA**	**10**	
	Water Year 2019 Maximum Concentration								
CWD-10 PW	not sampled	not sampled	not sampled	not sampled	not sampled	not sampled	not sampled	not sampled	not sampled
SC-A1C	385	31	14	1160	not sampled	not sampled	not sampled	1.2	not sampled
SC-A2RC	508	47	5170	446	not sampled	not sampled	not sampled	4	not sampled
SC-A3A	35000	18400	184	180	not sampled	not sampled	not sampled	0	not sampled
SC-A3C	344	87	26	4	not sampled	not sampled	not sampled	6.7	not sampled
SC-A8B	332	39	16	186	not sampled	not sampled	not sampled	1.5	not sampled
SC-A8C	306	46	24	4	not sampled	not sampled	not sampled	5.2	not sampled
Polo Grounds PW	297	22.3	0.017	216	not sampled	1.1	not sampled	0.1	not sampled
Aptos Jr. High 2 PW	270	33.7	19	258	0.8	not sampled	not sampled	0.1	not sampled
Country Club PW	330	33	0	0	not sampled	not sampled	not sampled	4.6	not sampled
Bonita PW	322	31	0	0	0.7	8.3	not sampled	2.6	not sampled
San Andreas PW	290	30	0	10	0.8	14.8	not sampled	1.5	not sampled
Seascape PW	222	19	14	0	not sampled	15.5	not sampled	1	not sampled
CWD-4 PW	not available	not available	not available	not available	not available	not available	not available	not available	not available
CWD-12 PW	not available	not available	not available	not available	not available	not available	not available	not available	not available
SC-A2RA*	28500	15000	128	568	not sampled	not sampled	not sampled	0	not sampled
SC-A8A	15600	7670	392	3190	not sampled	not sampled	not sampled	0.2	not sampled
SC-8RD	338	64.76	0	0	not sampled	not sampled	not sampled	0	not sampled
SC-9RE	534	48	64	56	not sampled	not sampled	not sampled	0	not sampled
SC-A1A	236	28	1430	66	not sampled	not sampled	not sampled	0.1	not sampled
T. Hopkins PW	330	42	32	88	not sampled	not sampled	not sampled	0	not sampled
Madeline 2 PW	410	34	230	8.8	not sampled	not sampled	not sampled	0	not sampled
Aptos Creek PW	not available	not available	not available	not available	not available	not available	not available	not available	not available
SC-23A	369	18	0	0	not sampled	not sampled	not sampled	0	not sampled
SC-8RB	420	19	31	0	not sampled	not sampled	not sampled	0	not sampled
SC-9RC	420	32	0	0	not sampled	not sampled	not sampled	0.07	not sampled

30th Ave Shallow	820	47	120	1300	not sampled	not sampled	not sampled	0	not sampled
Pleasure Point Shallow	270	32	92	100	not sampled	not sampled	not sampled	0	not sampled
Estates PW	470	45	150	88	not sampled	not sampled	not sampled	0	not sampled
Garnet PW	630	84	1500	410	not sampled	not sampled	not sampled	0	not sampled
Tannery 2 PW	540	61	220	140	not sampled	not sampled	not sampled	0	not sampled
Rosedale 2 PW	480	44	750	250	not sampled	not sampled	not sampled	0	not sampled
Beltz #8 PW	480	53	1900	197	1.9	not sampled	not sampled	0	not sampled
Beltz #9 PW	510	48	970	218	0	not sampled	not sampled	0	not sampled
SC-3RC	not sampled	not sampled	not sampled	not sampled	not sampled	not sampled	not sampled	not sampled	not sampled
SC-5RA	573	58	440	170	not sampled	not sampled	not sampled	0	not sampled
SC-9RA	408	16	470	26	not sampled	not sampled	not sampled	0	not sampled
SC-10RA	489	25	540	600	not sampled	not sampled	not sampled	0	not sampled
SC-22A	396	22	591	532	not sampled	not sampled	not sampled	0	not sampled
Beltz #10 PW	620	65	3000	330	3.2	not sampled	not sampled	0	not sampled
SC-10RAA	276	9.5	120	54	not sampled	not sampled	not sampled	0	not sampled
SC-22AAA	1230	133	22	41	not sampled	not sampled	not sampled	0	not sampled
Coffee Lane Deep	920	42	24	120	not sampled	not sampled	not sampled	0	not sampled
Pleasure Point Deep	610	23	620	230	not sampled	not sampled	not sampled	0	not sampled
Thurber Lane Shallow	not available	not available	not available	not available	not available	not available	not available	not available	not available
Schwan Lake	400	94	960	110	not sampled	not sampled	not sampled	0	not sampled
O'Neill Ranch PW	0	0	444	176	not sampled	not sampled	not sampled	0	not sampled
Beltz #12 PW	440	39	1100	340	not sampled	not sampled	not sampled	0	not sampled
SC-18RAA	236	14	120	42	not sampled	not sampled	not sampled	0	not sampled
Thurber Lane Deep	not available	not available	not available	not available	not available	not available	not available	not available	not available

Maximum of minimum threshold and measurable objective not met
Minimum threshold met but measurable objective not met
Measurable objective met

Table 9. Groundwater Elevation Proxy for Depletion of Interconnected Surface Water

Well Name	Aquifer	Minimum Threshold	Measurable Objective	Interim Milestone 2025	WY2016	WY2017	WY2018	WY2019
		Groundwater Elevation, feet above mean sea level			Minimum Average Monthly Groundwater Elevation, feet above mean sea level			
Balogh	Shallow Groundwater	29.1	30.6	29.1	29.2	29.7	29.2	29.1
Main St. Shallow		22.4	25.3	20.7	22.6	22.7	22.8	22.5
Wharf Road		11.9	12.1	11.3	12.1	12.1	12.2	12.1
Nob Hill		8.6	10.3	7.3	5.7	8.8	8.7	8.7
SC-10RA	Purisima A	68	70	68	69.8	69.6	69.2	69.2

Minimum threshold not met
Minimum threshold achieved but measurable objective not met
Measurable objective met

4.7 Update on Implementation of Projects and Management Actions

Below are current updates for 2019 for projects and management actions planned to reach sustainability, described as Group 2 in the GSP.

4.7.1 Pure Water Soquel

As described in the GSP, Soquel Creek Water District completed the California Environmental Quality Act (CEQA) review for Pure Water Soquel in December 2018 and is undergoing the permitting and design phase of project implementation.

Also, in 2019 the State Water Resources Control Board awarded a $50 million Prop 1 Groundwater Implementation Grant and approved a $36 million loan through its State Seawater Intrusion Control Loan Program for the project. U.S. Environmental Protection Agency also invited Soquel Creek Water District to submit an application for a $49 million Water Infrastructure Finance and Innovation Act (WIFIA) loan.

As stated in the GSP, construction is anticipated to be complete in late 2022 with the project to come online in early 2023.

4.7.2 Aquifer Storage and Recovery

As described in the GSP, City of Santa Cruz conducted pilot tests for Aquifer Storage and Recovery (ASR) at its Beltz #12 well. Additional pilot testing at an additional Beltz well is slated to occur in 2020.

An Environmental Impact Report to comply with CEQA and updated water rights and petitions are being developed. As stated in the GSP, phased in implementation of full-scale ASR at the SCWD's existing Beltz wells would commence in 2021.

4.7.3 Water Transfers / In Lieu Groundwater Recharge

As described in the GSP, a water transfer pilot test was conducted between December 2018 and April 2019 in which SCWD delivered treated drinking water to SqCWD to serve a portion of SqCWD's service area. Subsequent to Water Year 2019, a second round of pilot testing to serve a larger portion of SqCWD's service area began in December 2019. However, the water transfer was put on hold at the end of January 2020 due to a lack of rain, SCWD water supply conditions and the water available from SCWD's north coast sources.

As stated in the GSP, longer term implementation of water transfers will require a new agreement, including compliance with Proposition 218 requirements to set the cost of service

for water delivered and, depending on the annual quantity transferred, waiting for resolution of the places of use changes of the SCWD's San Lorenzo River water rights. Given these and potential other factors, a likely timeline for implementation of a longer-term water transfer project is a minimum of two years.

4.7.4 Distributed Storm Water Managed Aquifer Recharge

The County continues to operate two Distributed Storm Water Managed Aquifer Recharge (DSWMAR) projects, one in Aptos at Polo Grounds County Park and another in Live Oak at Brommer Street Park. Total estimated recharge is 20 acre-feet per year.

The timetable for development at additional DSWMAR project sites is not available and continues to be speculative at this time.

REFERENCES

HydroMetrics WRI, 2017. *Santa Cruz Mid-County Basin Groundwater Management Biennial Review and Report, Water Years 2015-2016.* Prepared for the Santa Cruz Mid-County Groundwater Agency. July

Santa Cruz Mid-County Groundwater Agency (MGA), 2019. *Santa Cruz Mid-County Basin Groundwater Sustainability Plan*. November.

MONTGOMERY & ASSOCIATES

ACRONYMS & ABBREVIATIONS

ASR ..... Aquifer Storage and Recovery
Basin ..... Santa Cruz Mid-County Basin
CEQA ..... California Environmental Quality Act
CWD ..... Central Water District
DSWMAR ..... Distributed Storm Water Managed Aquifer Recharge
DWR ..... California Department of Water Resources
GSP ..... Groundwater Sustainability Plan
MGA ..... Santa Cruz Mid-County Groundwater Agency
PRMS ..... Precipitation Runoff Modeling system
RMP ..... representative monitoring point
SCWD …… City of Santa Cruz Water Department
SGMA ..... Sustainable Groundwater Management Act
SqCWD ..... Soquel Creek Water District
TDS ..... total dissolved solids
WIFIA ..... Water Infrastructure Finance and Innovation Act
WUF ..... water use factor
WY ..... Water Year

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Appendix A

Well Hydrographs

SC-A7C

FIGURE A-1

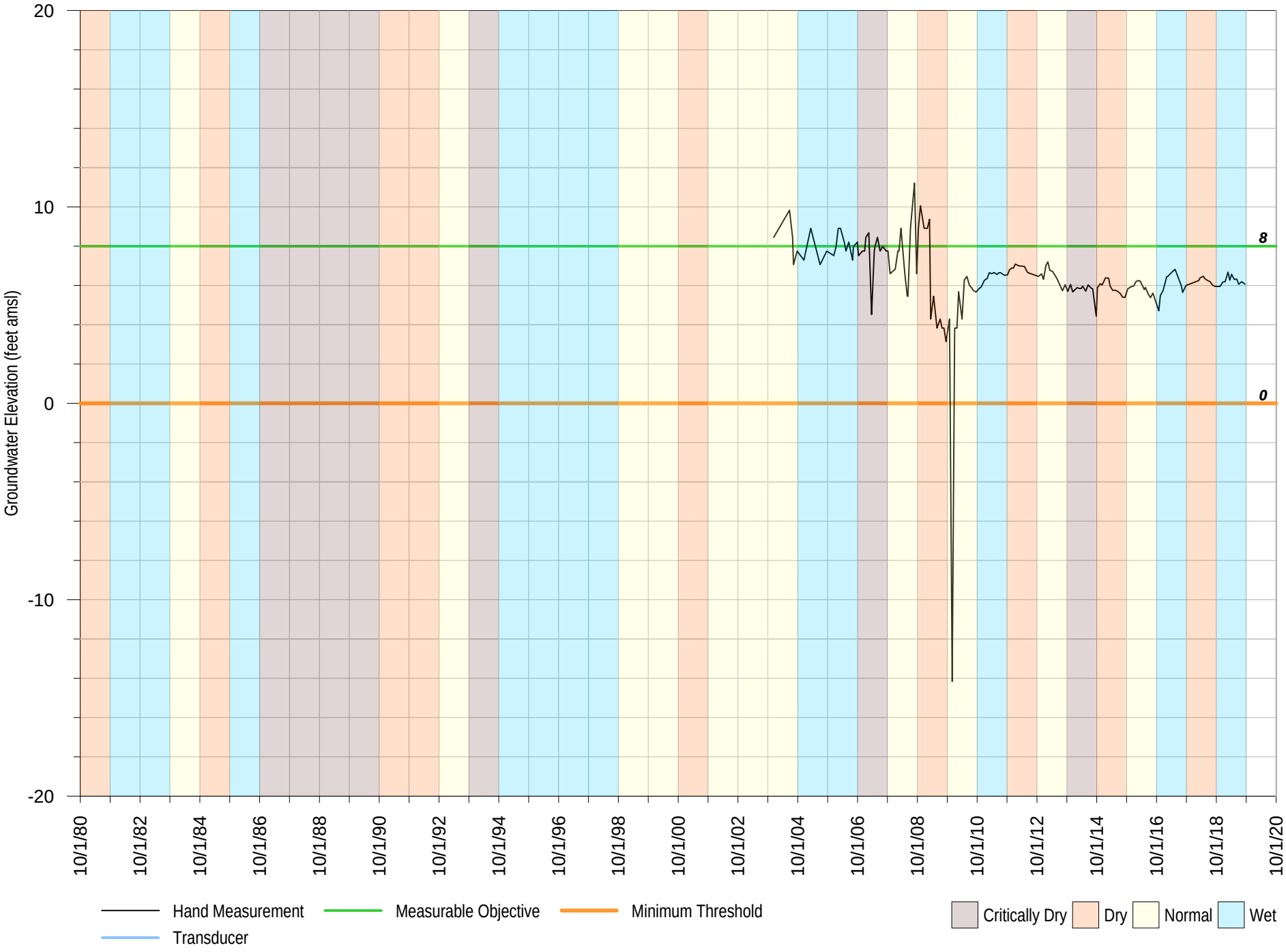
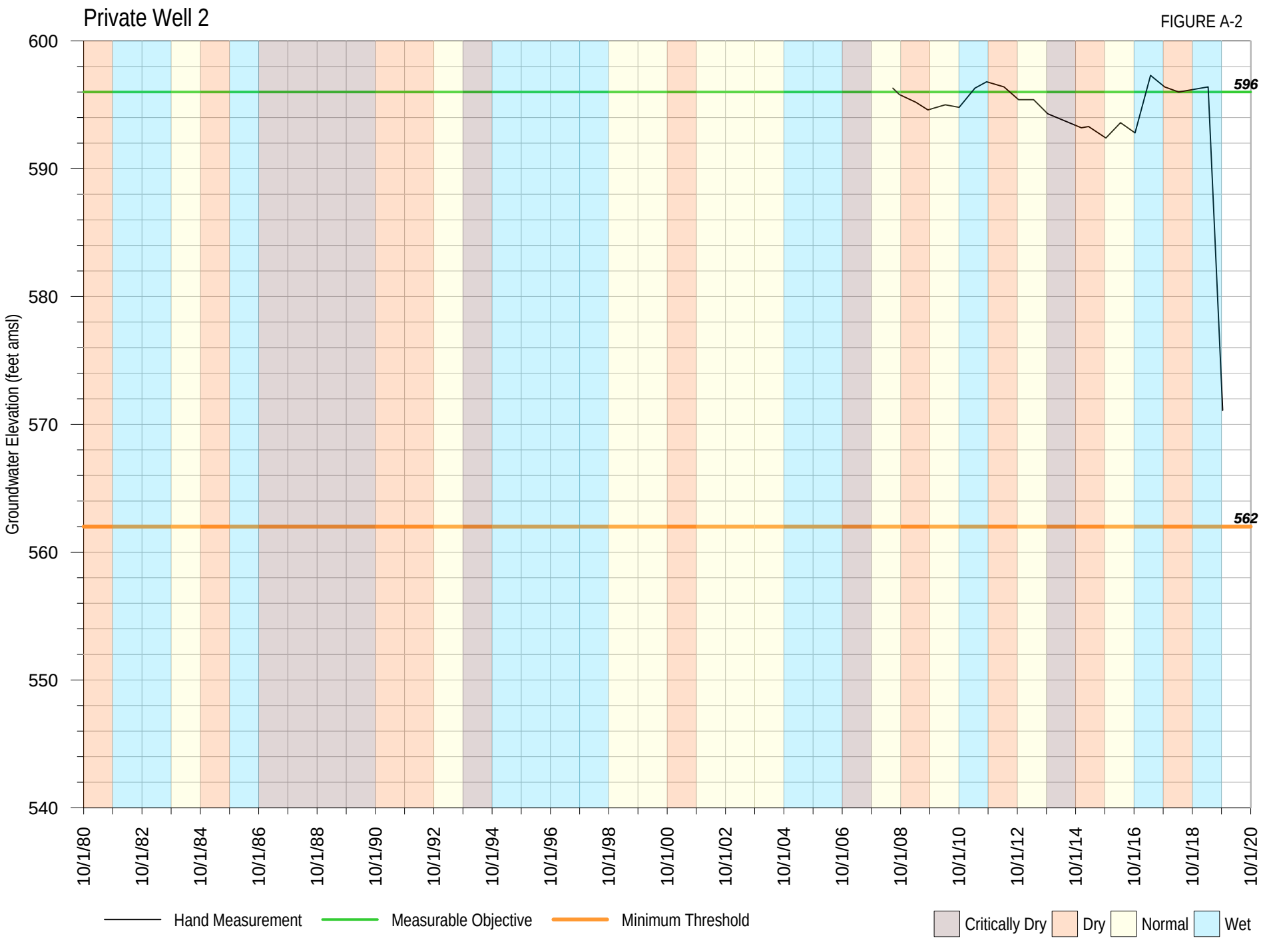


FIGURE A-2


Private Well 2
Groundwater Elevation (feet amsl)
600
590
580
570
560
550
540
596
562
10/1/80
10/1/82
10/1/84
10/1/86
10/1/88
10/1/90
10/1/92
10/1/94
10/1/96
10/1/98
10/1/00
10/1/02
10/1/04
10/1/06
10/1/08
10/1/10
10/1/12
10/1/14
10/1/16
10/1/18
10/1/20
Hand Measurement
Measurable Objective
Minimum Threshold
Critically Dry
Dry
Normal
Wet

Black

FIGURE A-3

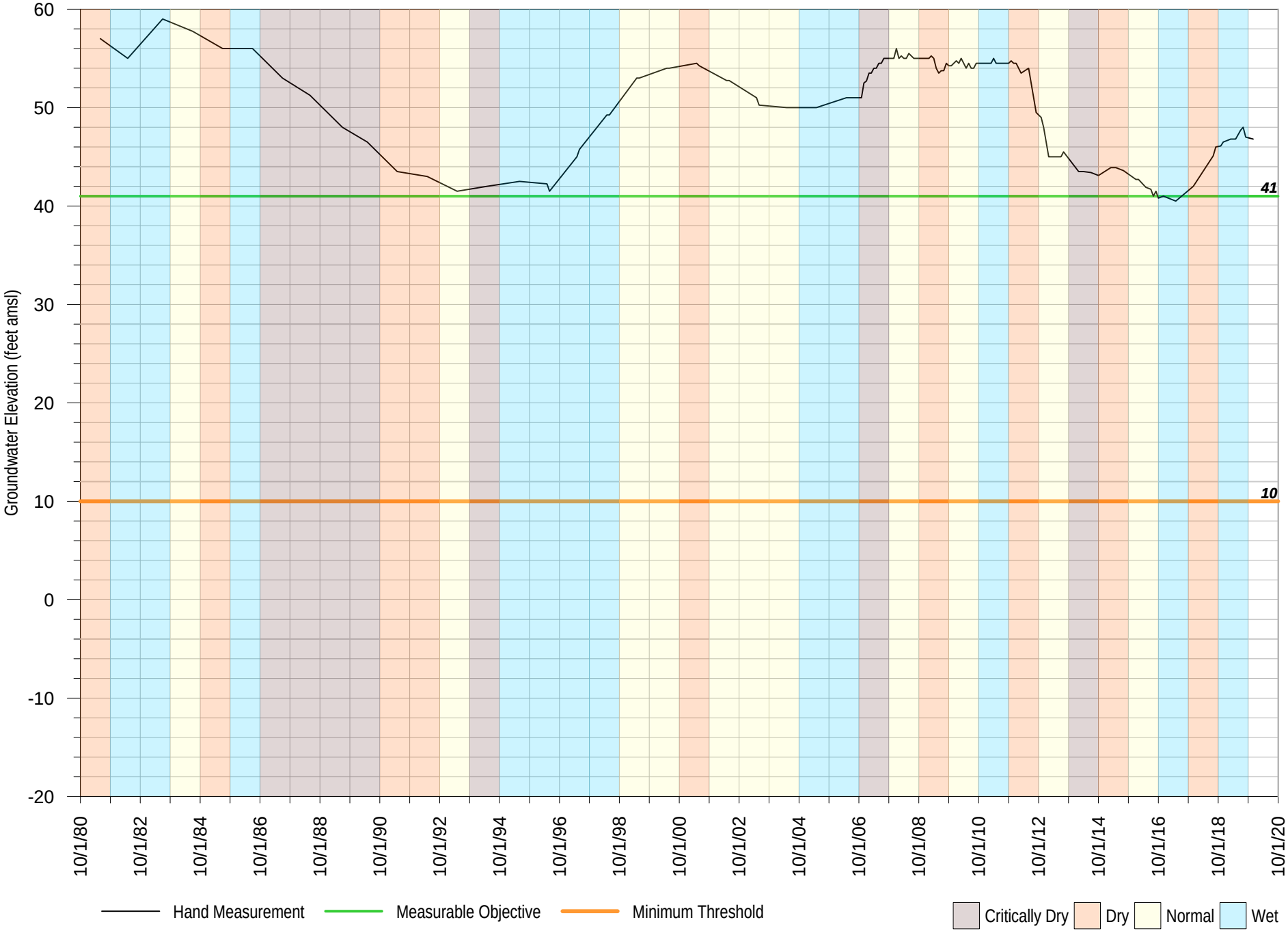
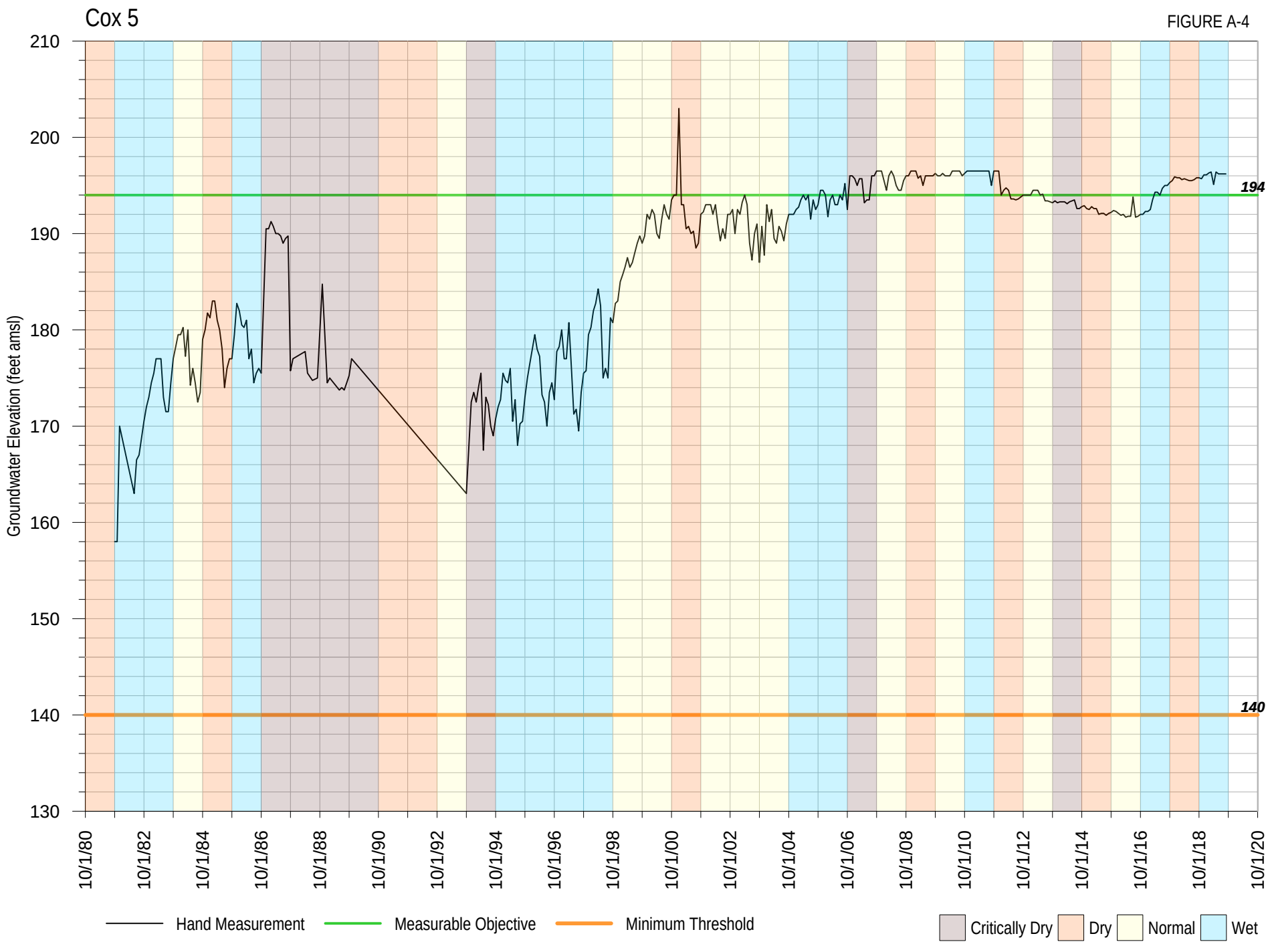
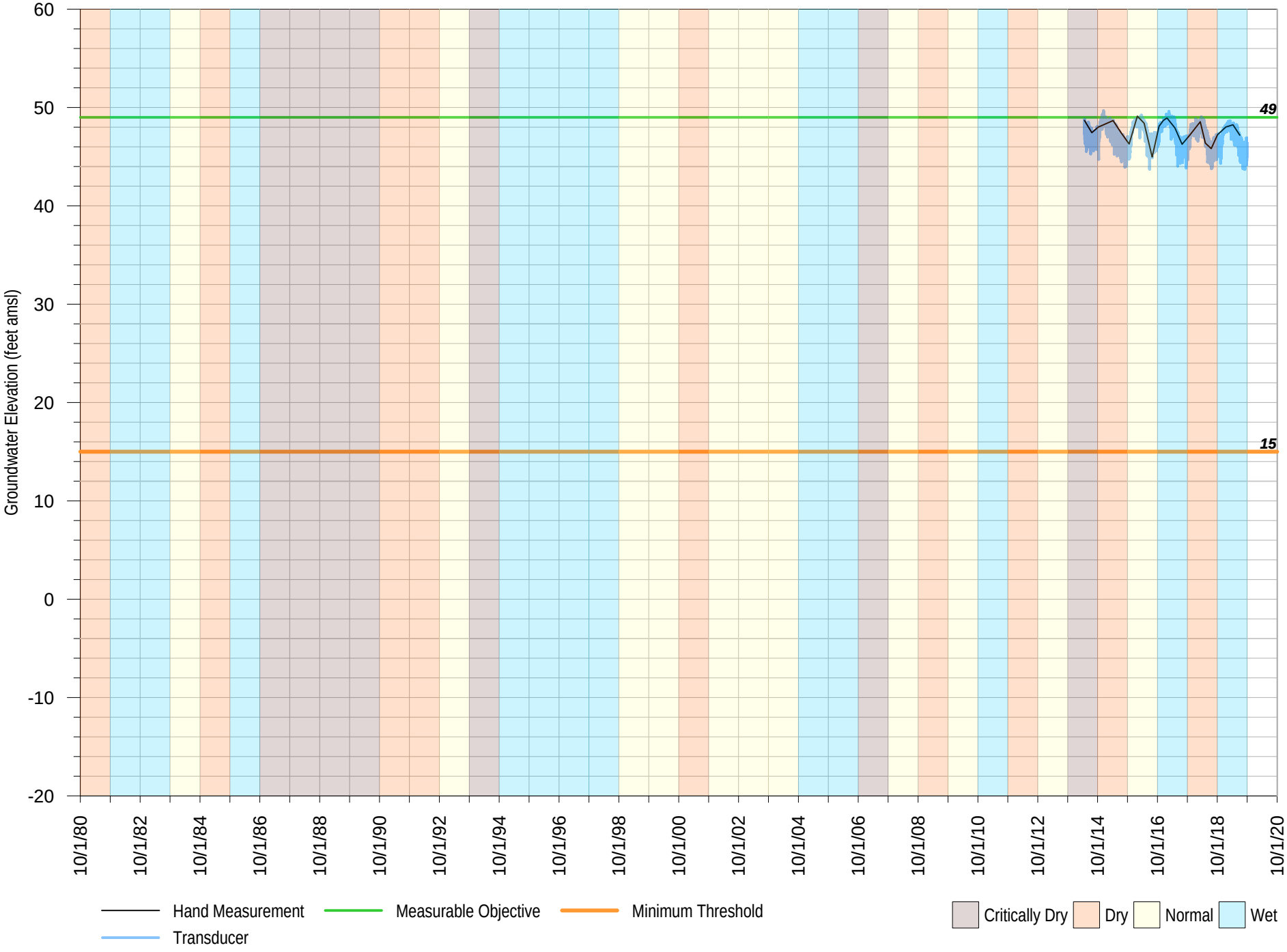


FIGURE A-4


Cox 5
Groundwater Elevation (feet amsl)
210
200
190
180
170
160
150
140
130
194
140
10/1/80
10/1/82
10/1/84
10/1/86
10/1/88
10/1/90
10/1/92
10/1/94
10/1/96
10/1/98
10/1/00
10/1/02
10/1/04
10/1/06
10/1/08
10/1/10
10/1/12
10/1/14
10/1/16
10/1/18
10/1/20
Hand Measurement
Measurable Objective
Minimum Threshold
Critically Dry
Dry
Normal
Wet

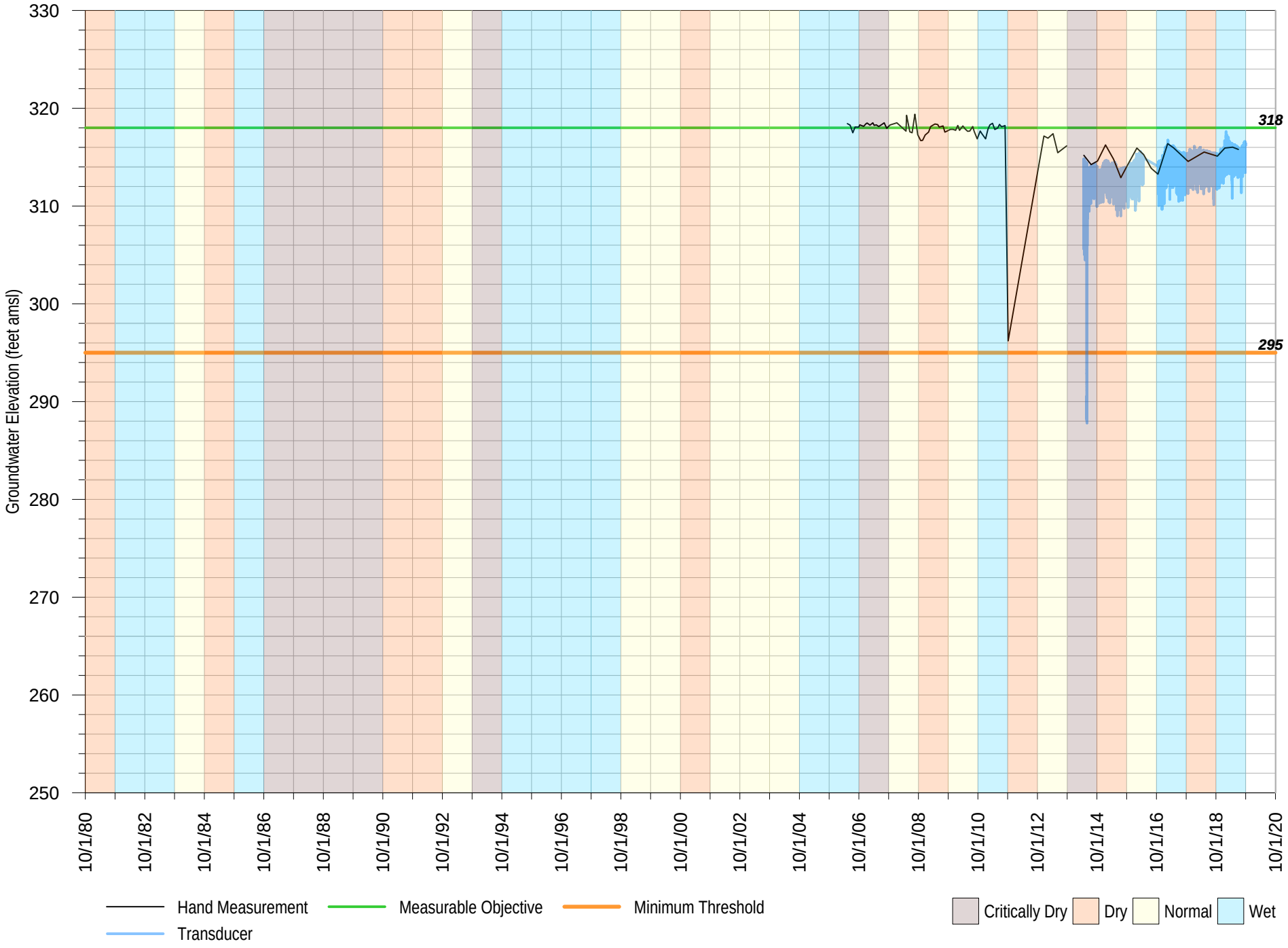
SC-23C

FIGURE A-5



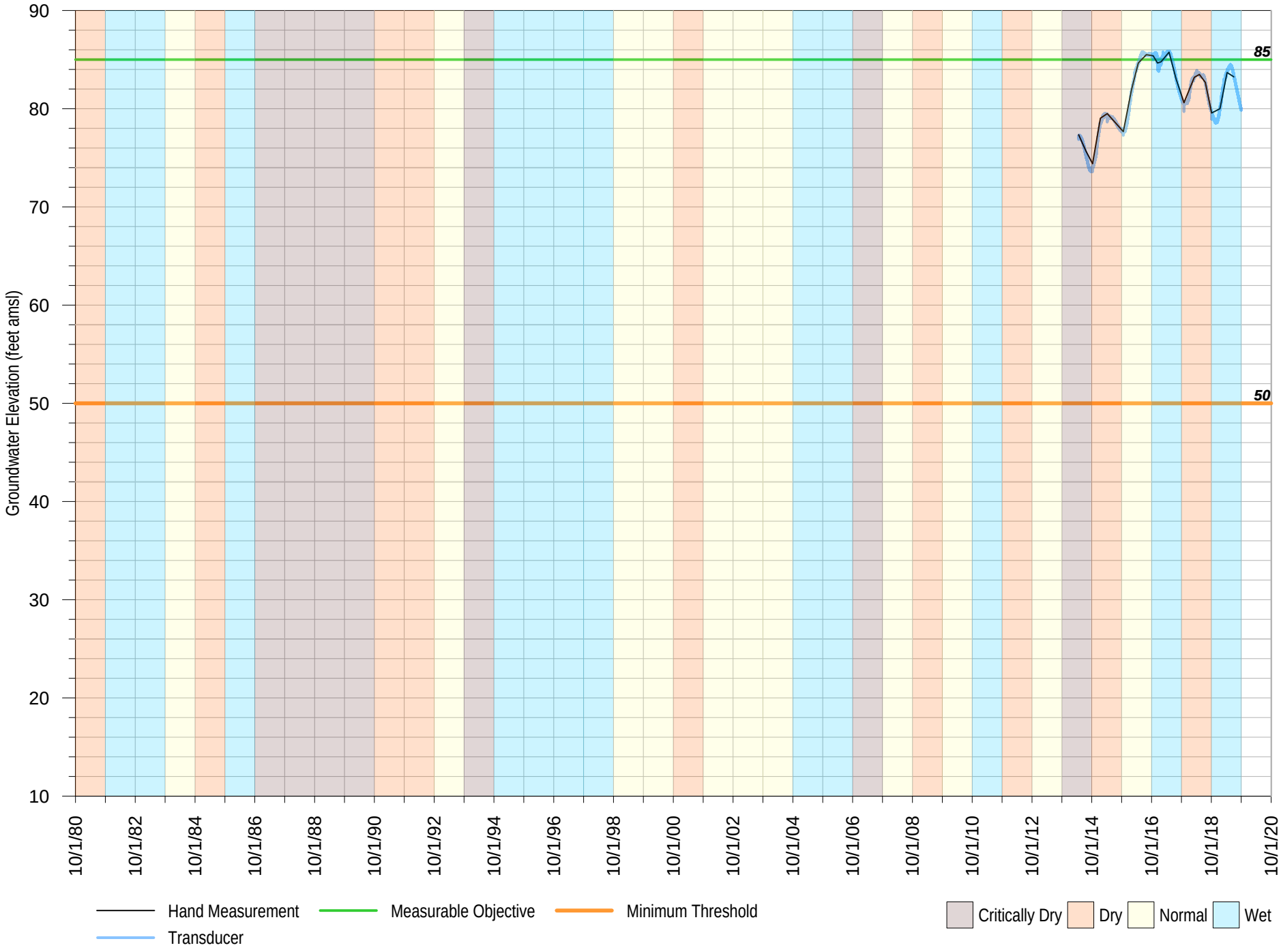
SC-11D

FIGURE A-6



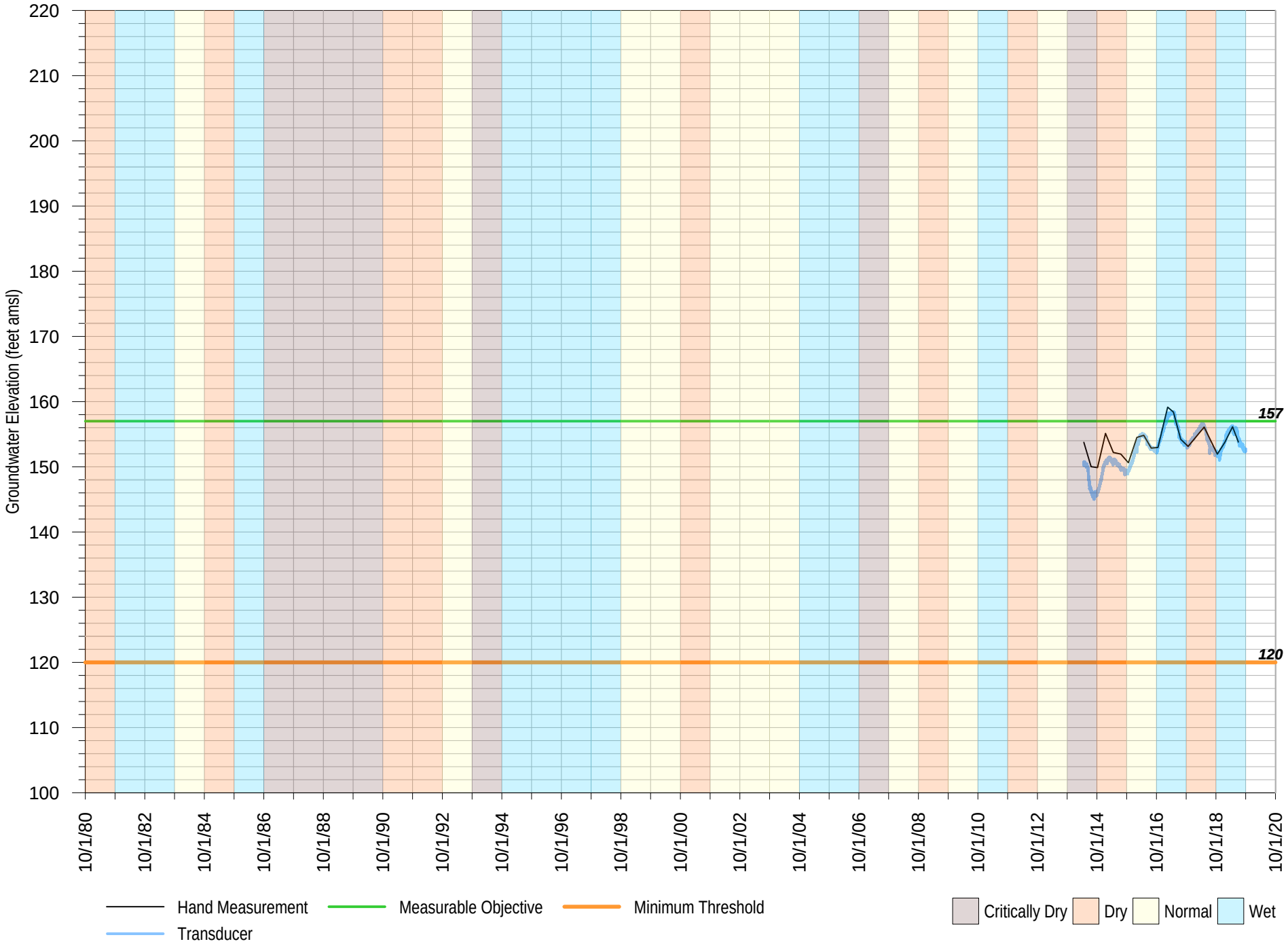
SC-23B

FIGURE A-7



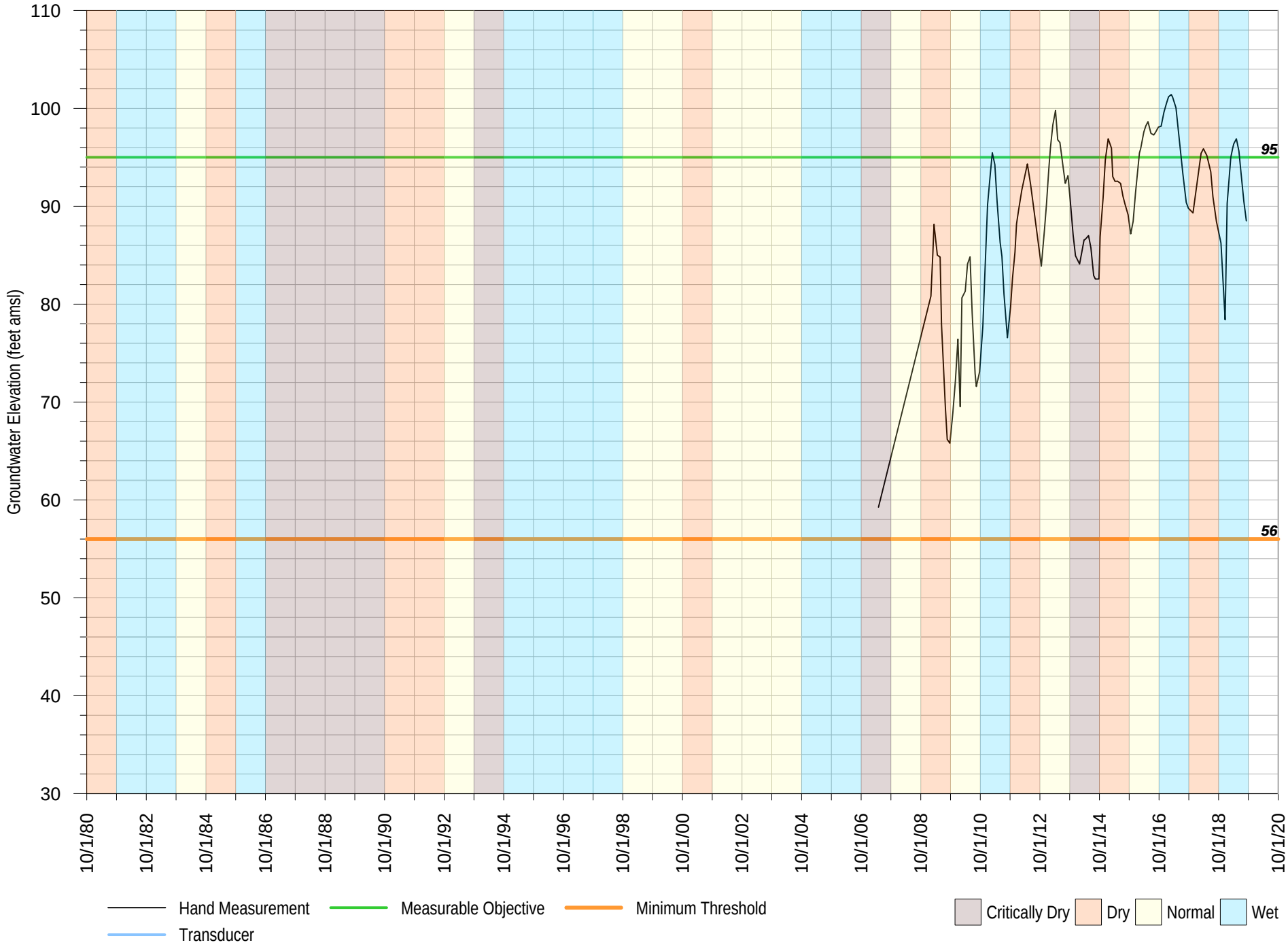
SC-11B

FIGURE A-8



SC-19

FIGURE A-9



SC-23A

FIGURE A-10

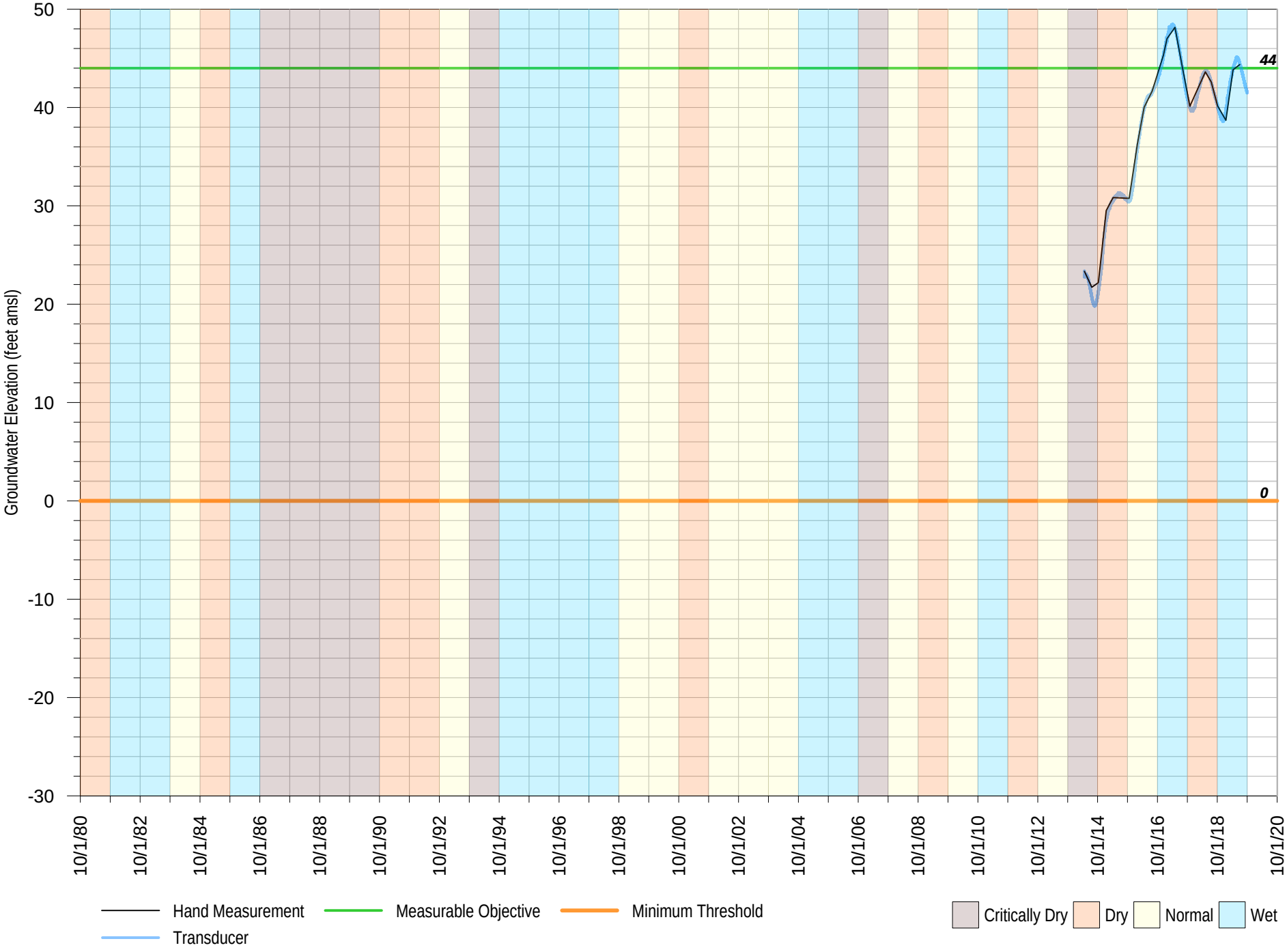
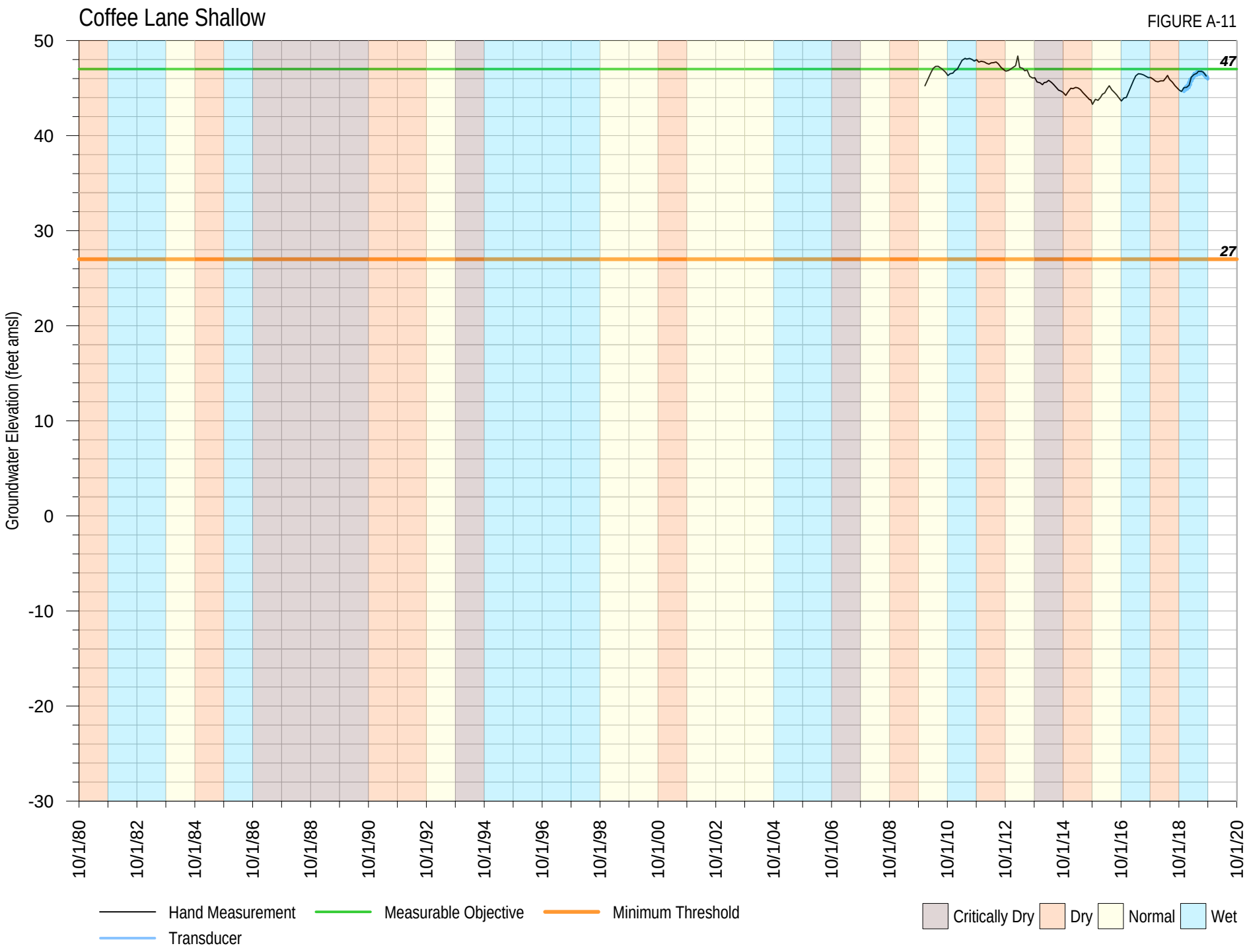
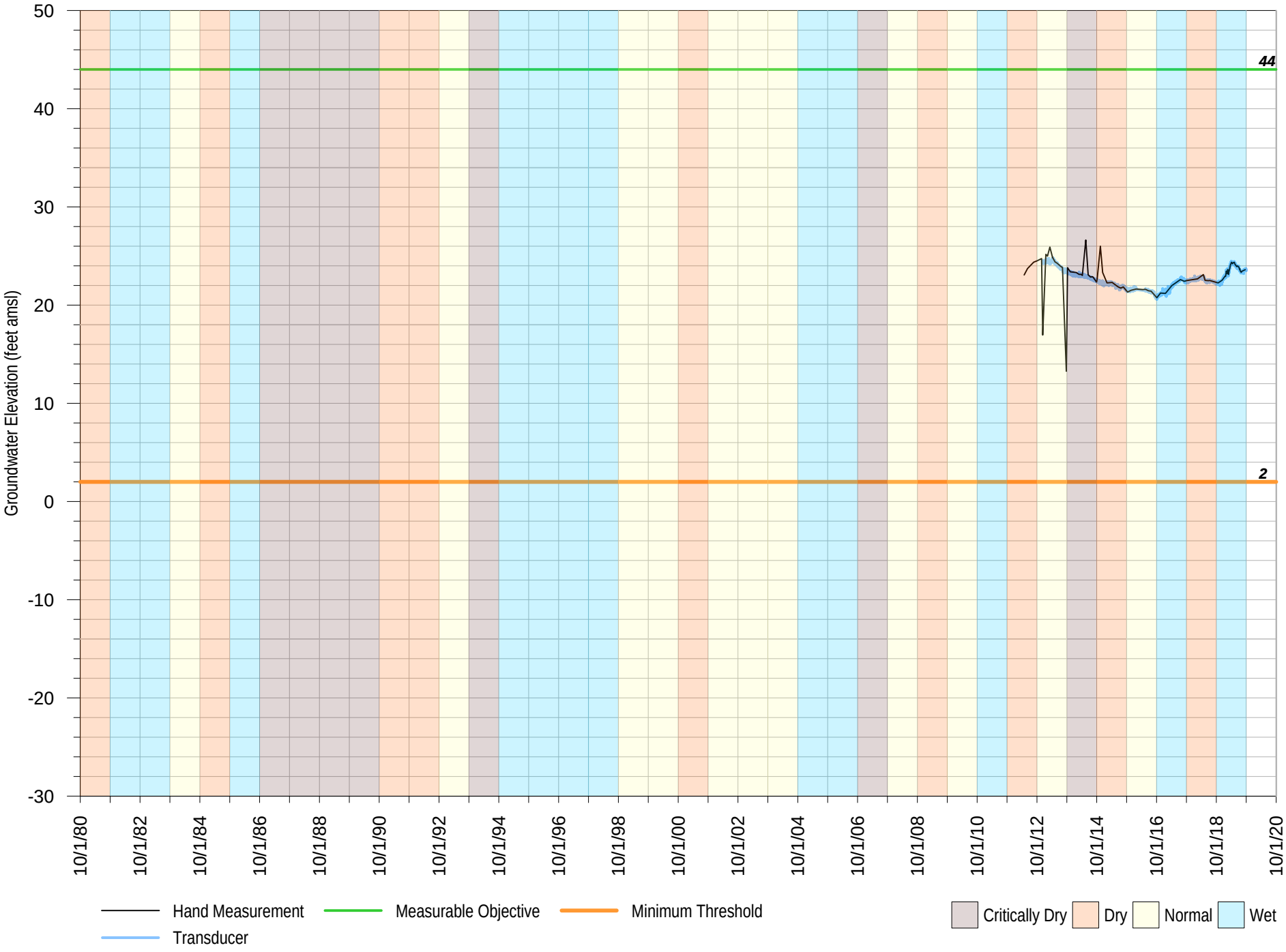


FIGURE A-11


Coffee Lane Shallow
Groundwater Elevation (feet amsl)
50
40
30
20
10
0
-10
-20
-30
47
27
10/1/80
10/1/82
10/1/84
10/1/86
10/1/88
10/1/90
10/1/92
10/1/94
10/1/96
10/1/98
10/1/00
10/1/02
10/1/04
10/1/06
10/1/08
10/1/10
10/1/12
10/1/14
10/1/16
10/1/18
10/1/20
Hand Measurement
Measurable Objective
Minimum Threshold
Transducer
Critically Dry
Dry
Normal
Wet

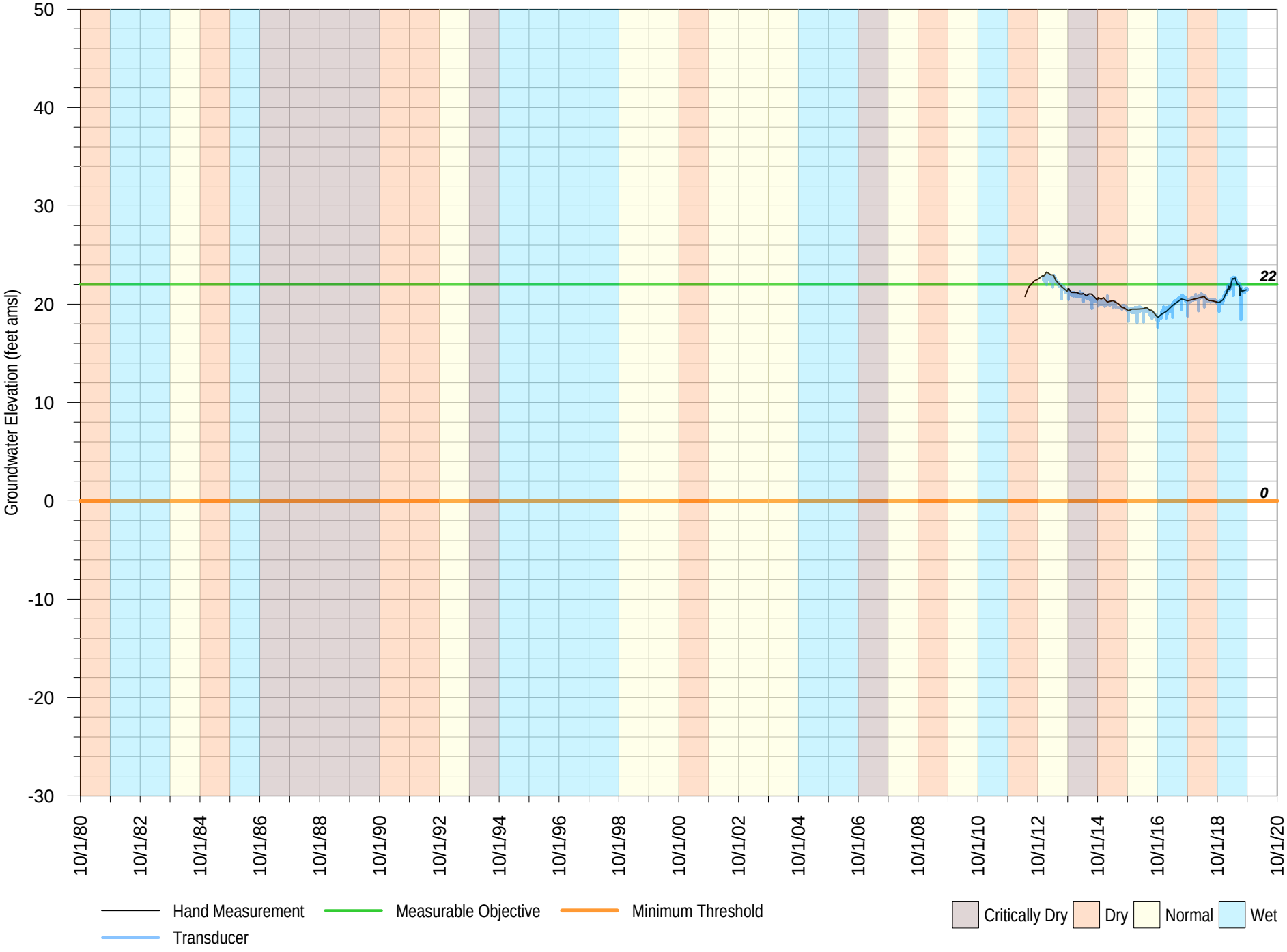
SC-22A

FIGURE A-12



SC-22AA

FIGURE A-13



SC-10AA

FIGURE A-14

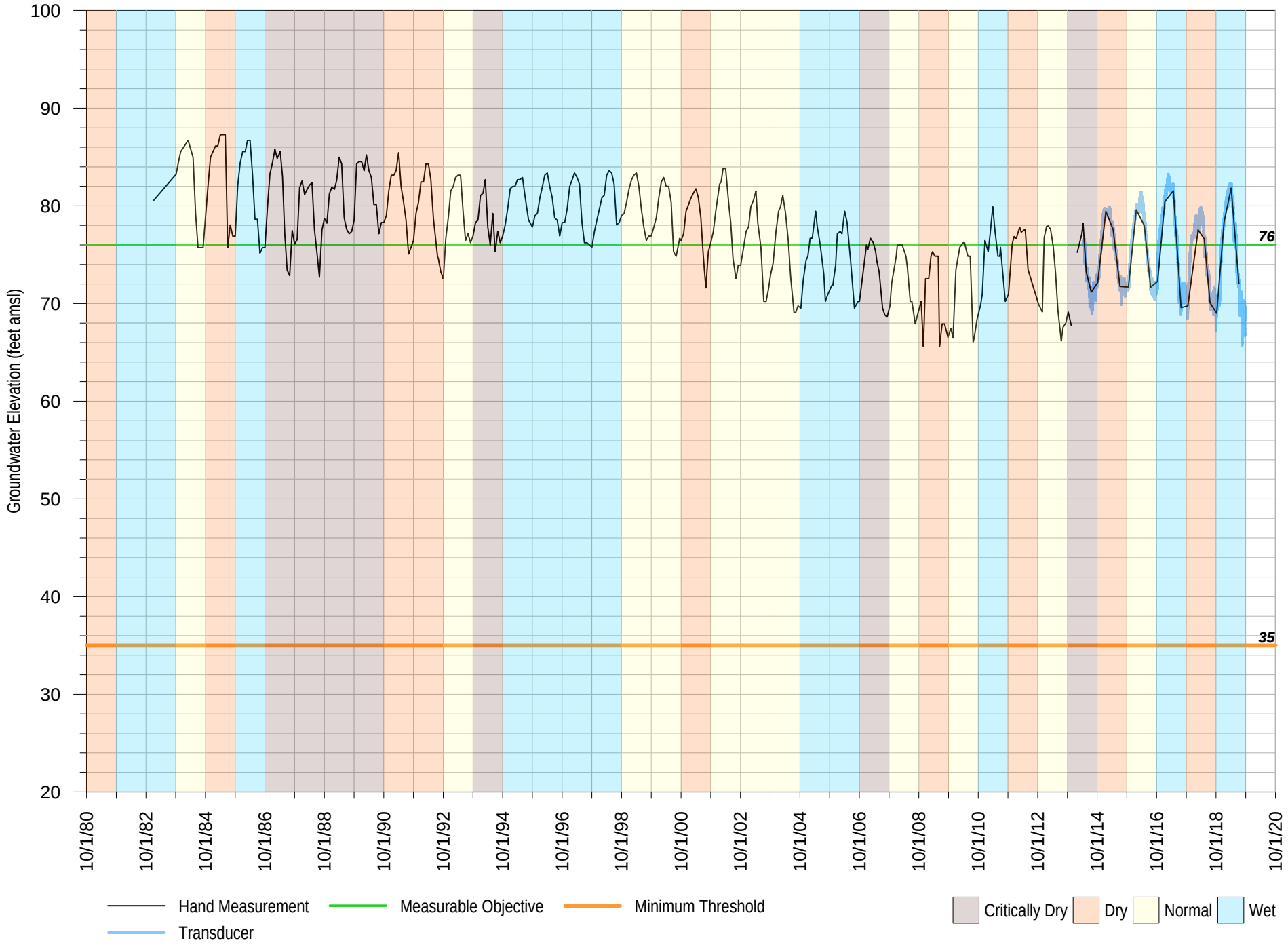
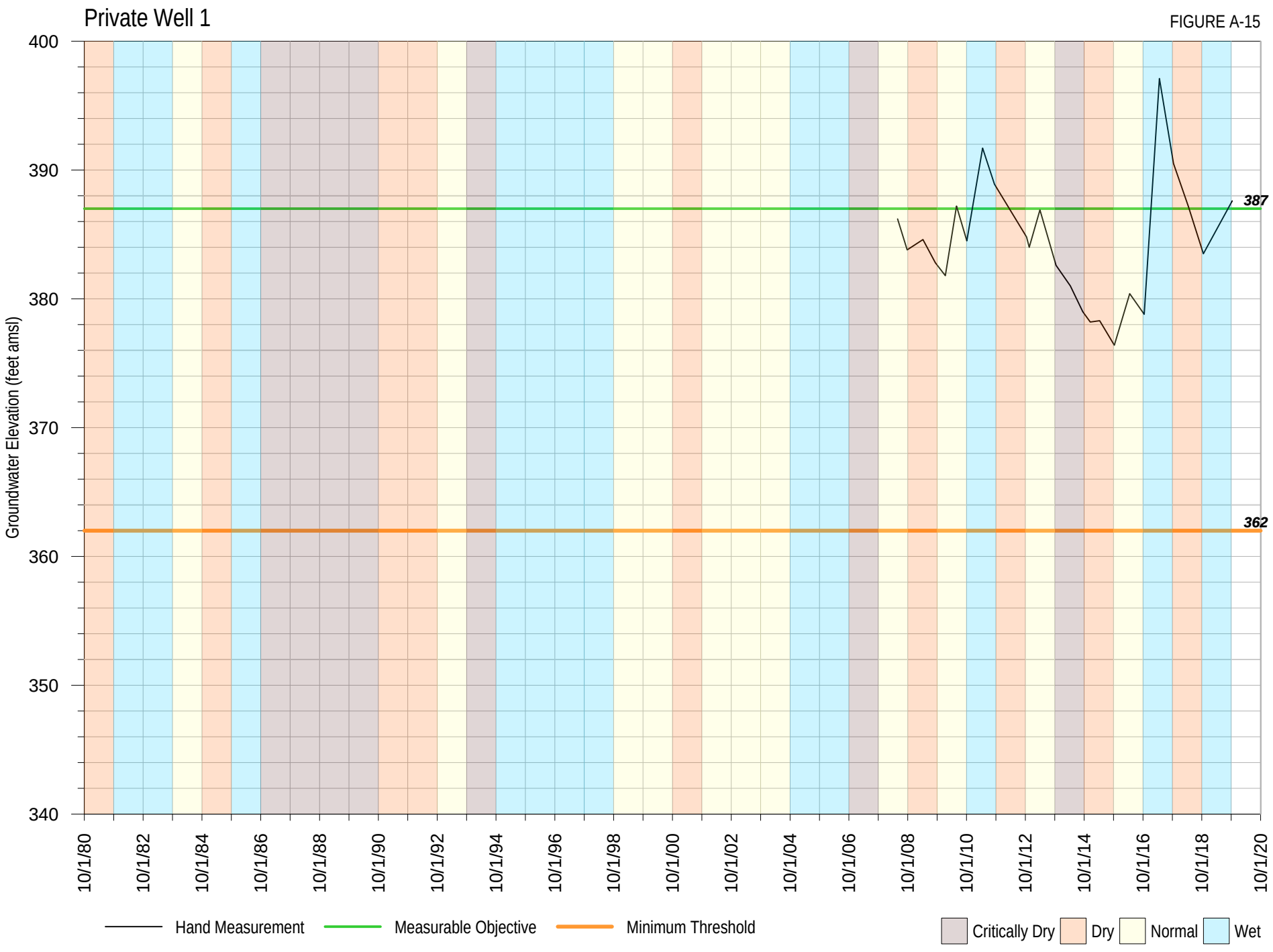
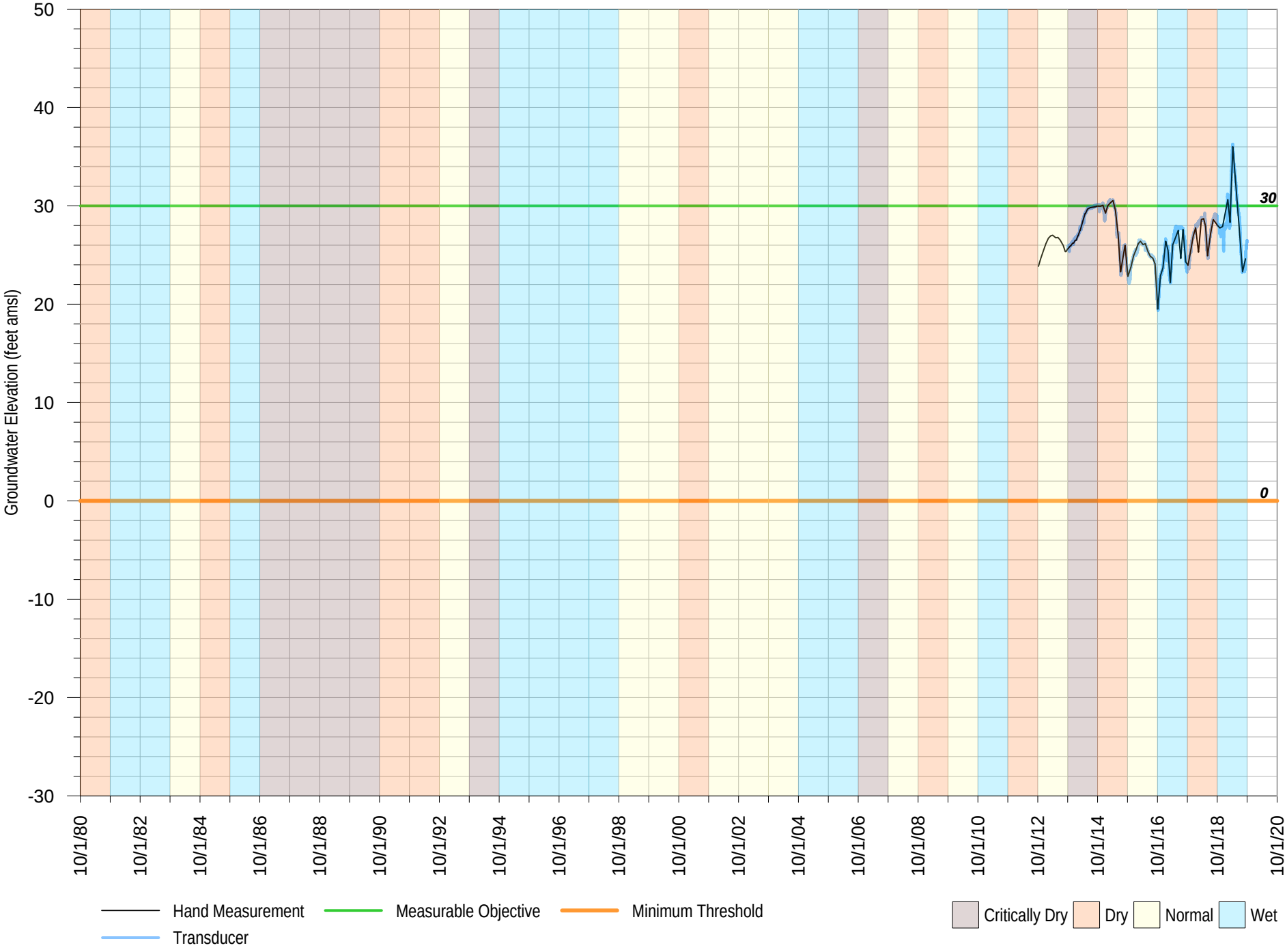


FIGURE A-15


Private Well 1
Groundwater Elevation (feet amsl)
400
390
380
370
360
350
340
387
362
10/1/80
10/1/82
10/1/84
10/1/86
10/1/88
10/1/90
10/1/92
10/1/94
10/1/96
10/1/98
10/1/00
10/1/02
10/1/04
10/1/06
10/1/08
10/1/10
10/1/12
10/1/14
10/1/16
10/1/18
10/1/20
Hand Measurement
Measurable Objective
Minimum Threshold
Critically Dry
Dry
Normal
Wet

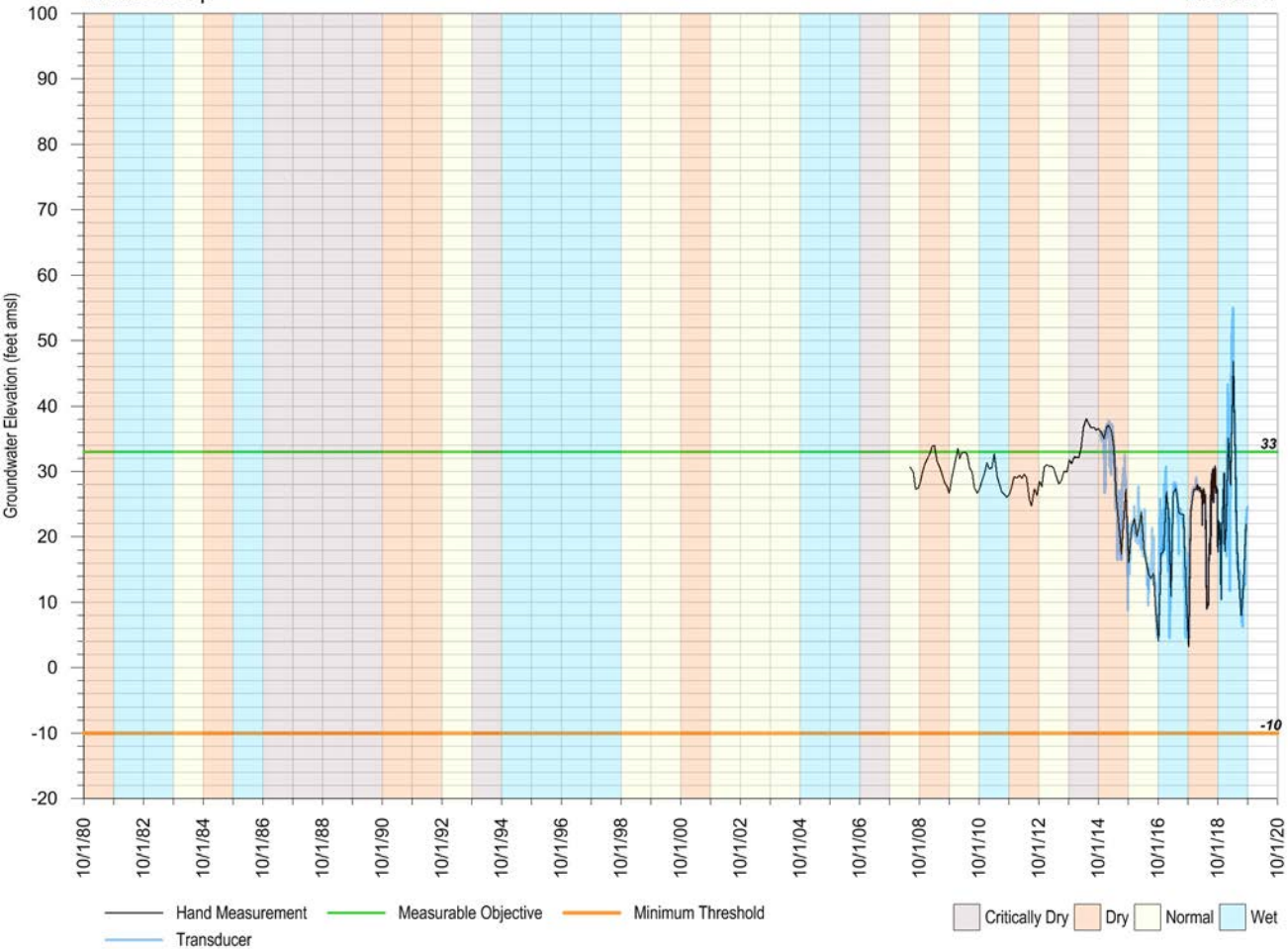
30th Ave Deep

FIGURE A-16



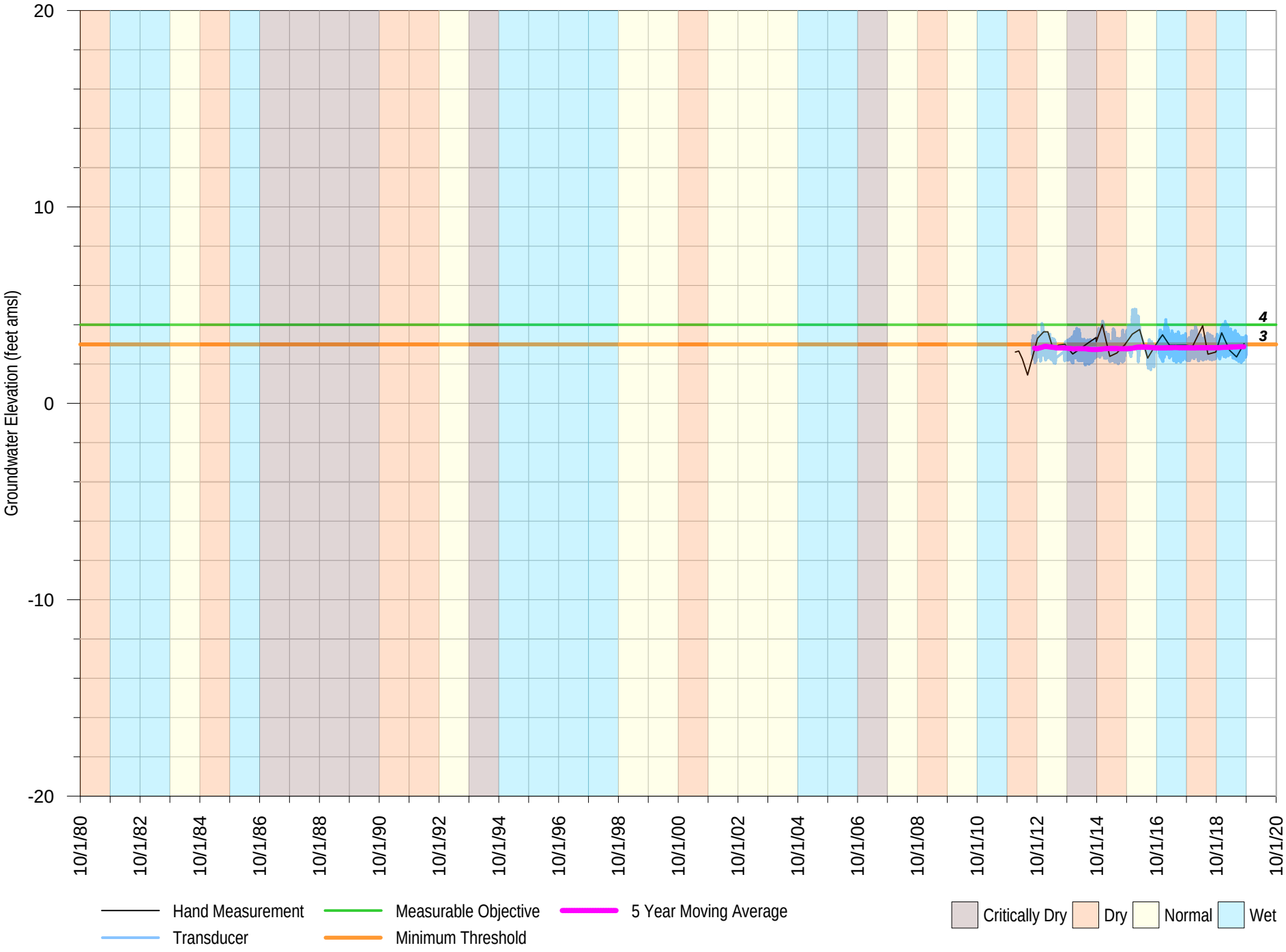
Thurber Deep

FIGURE A-17



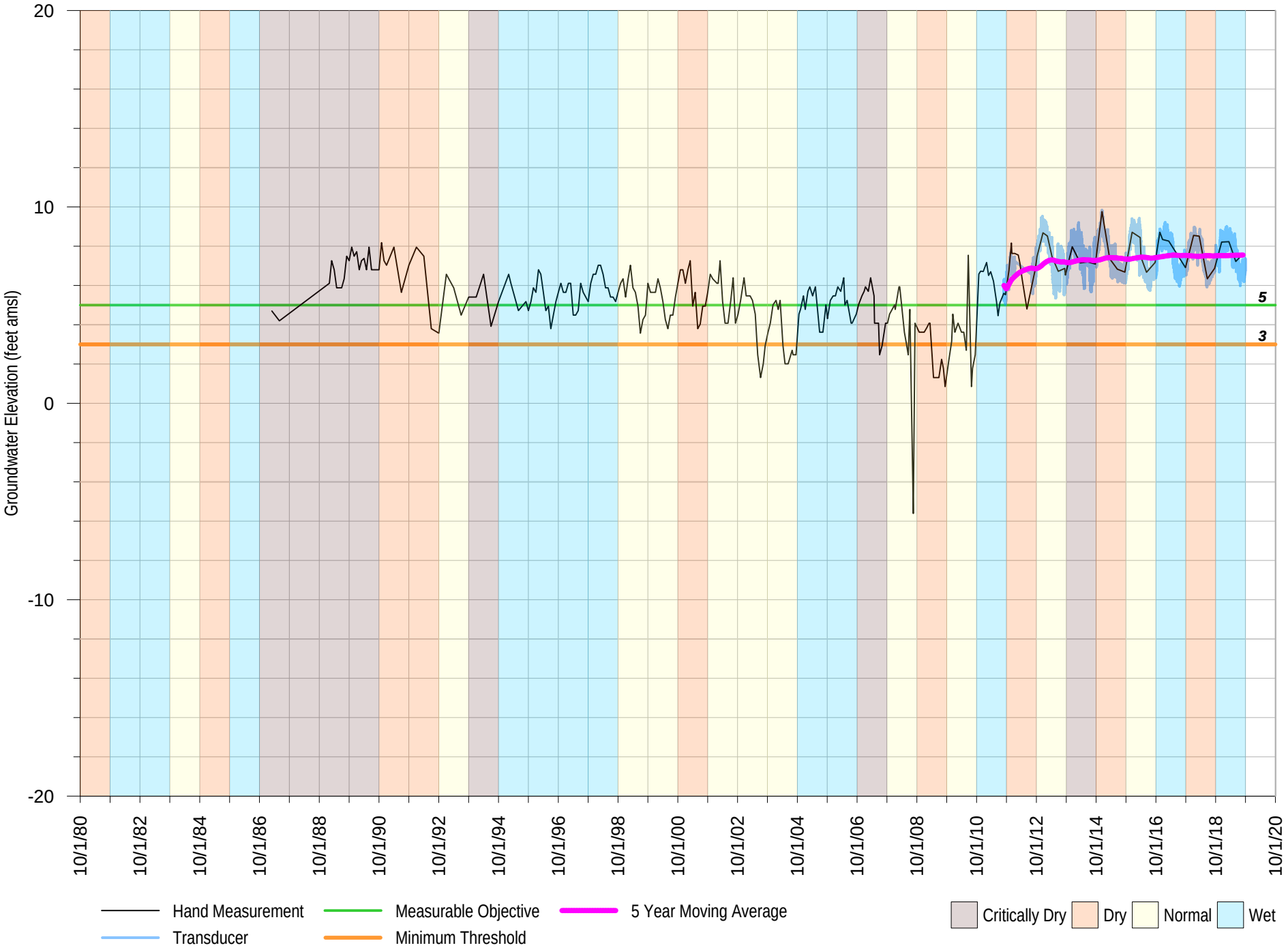
SC-A3A

FIGURE A-18



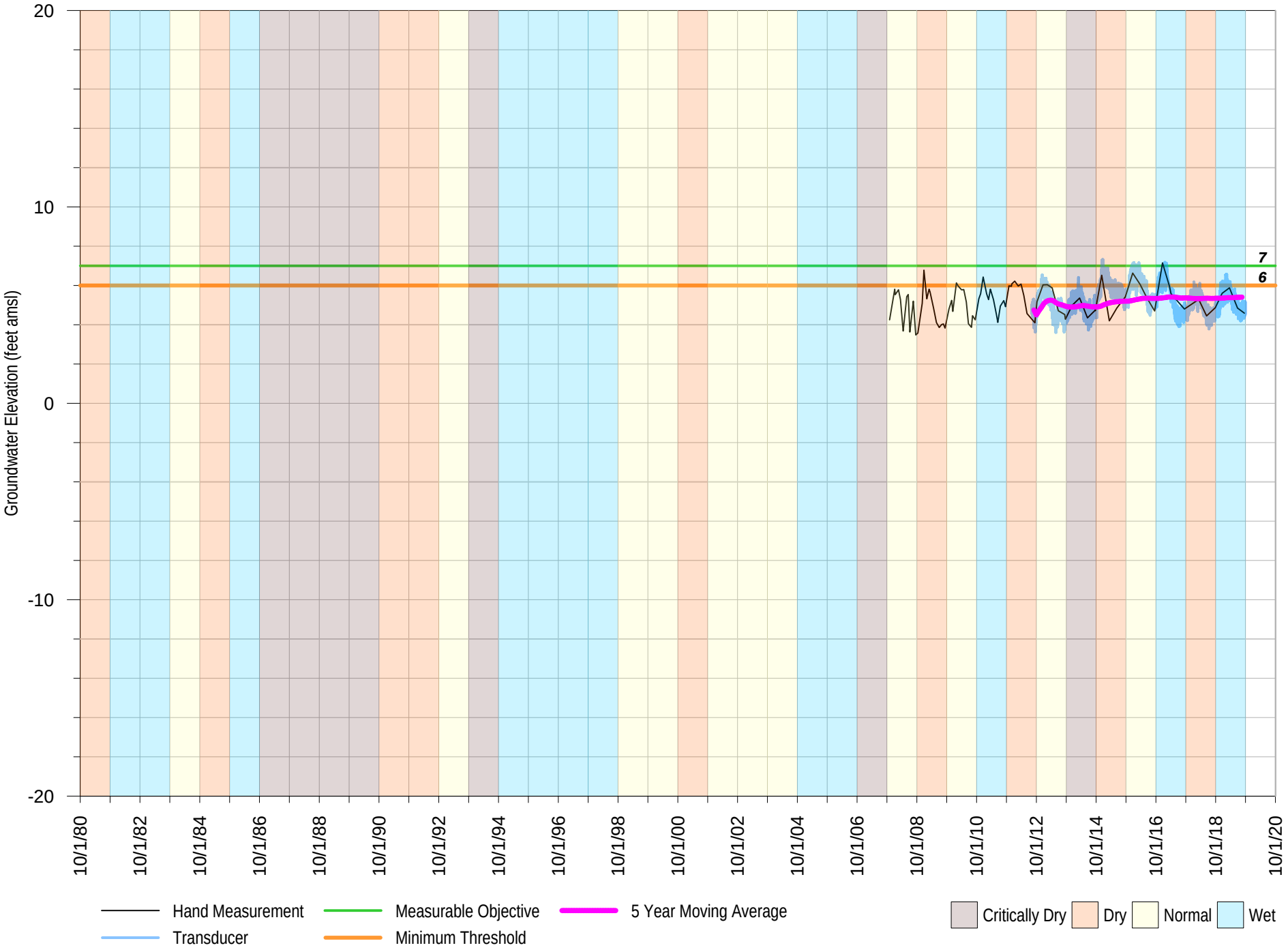
SC-A1B

FIGURE A-19



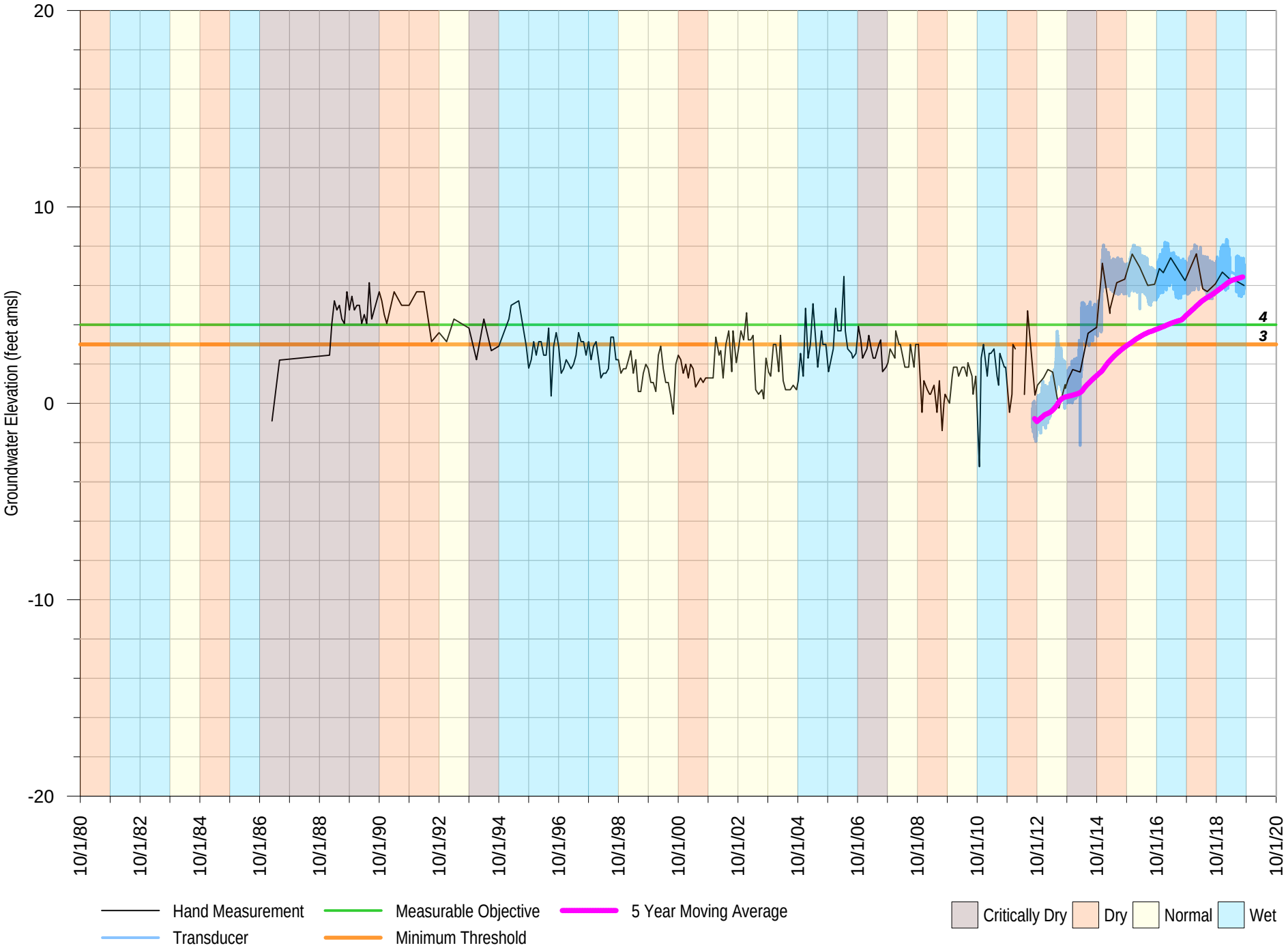
SC-A8A

FIGURE A-20



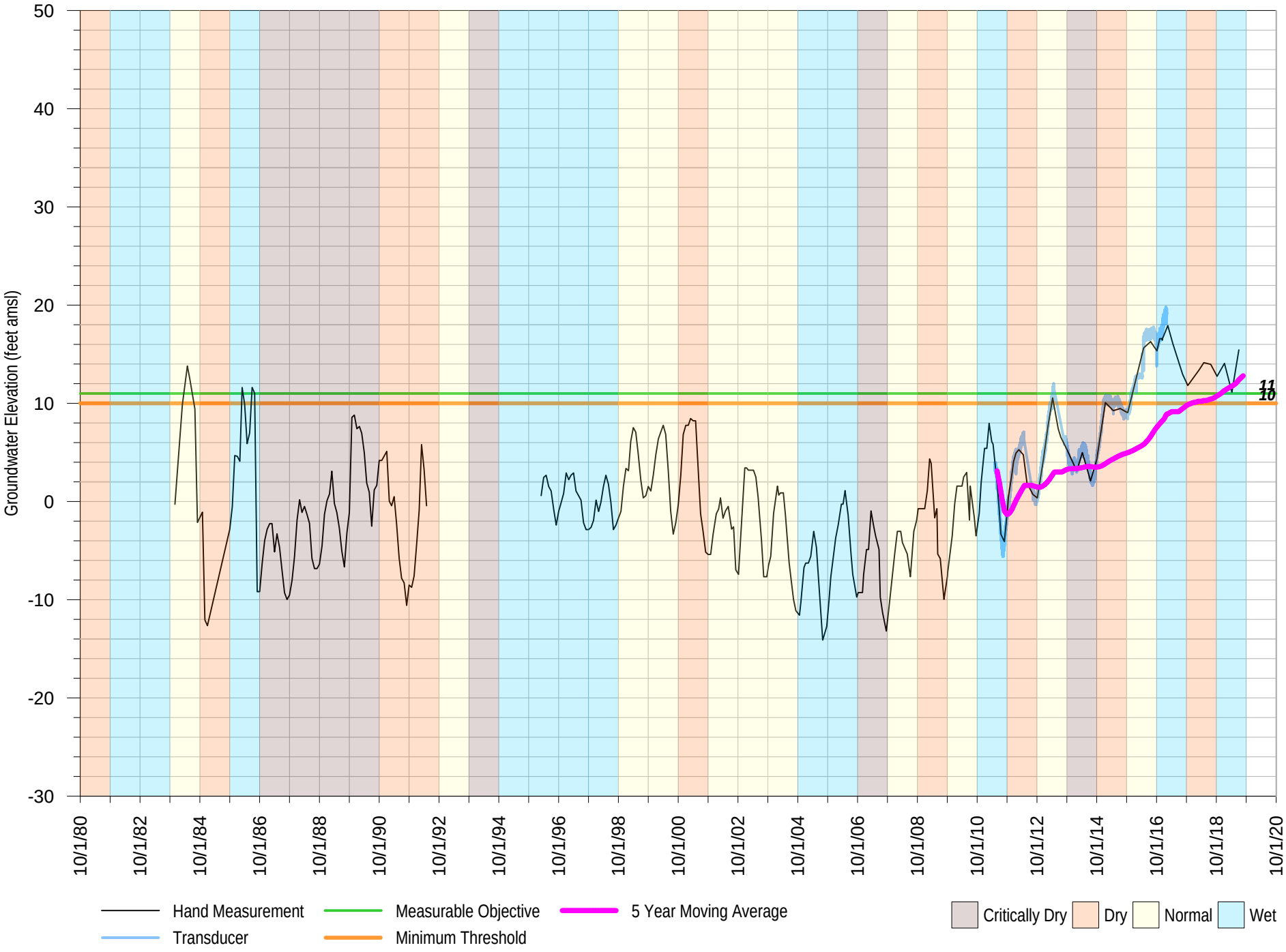
SC-A2A

FIGURE A-21



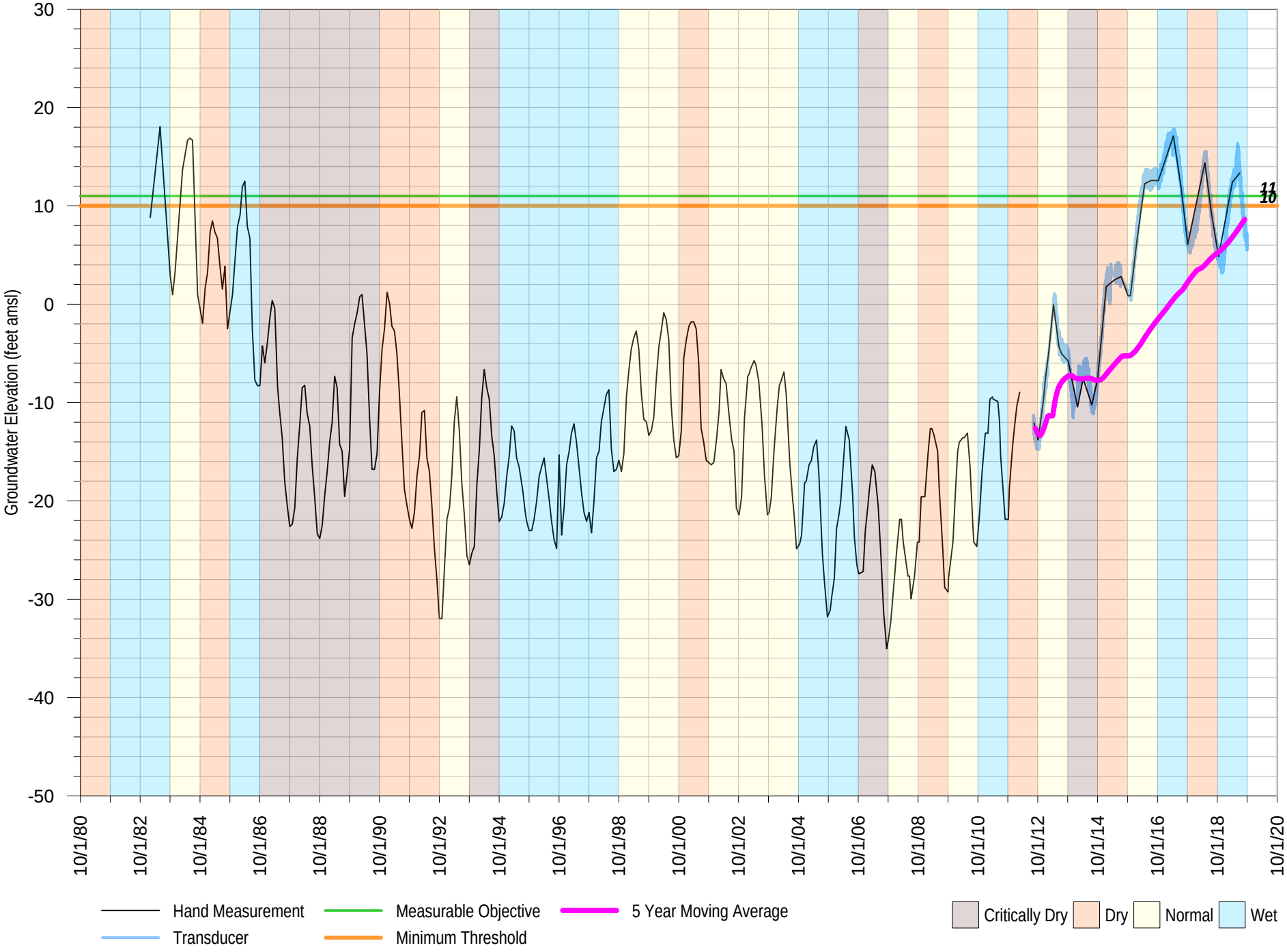
SC-8D

FIGURE A-22



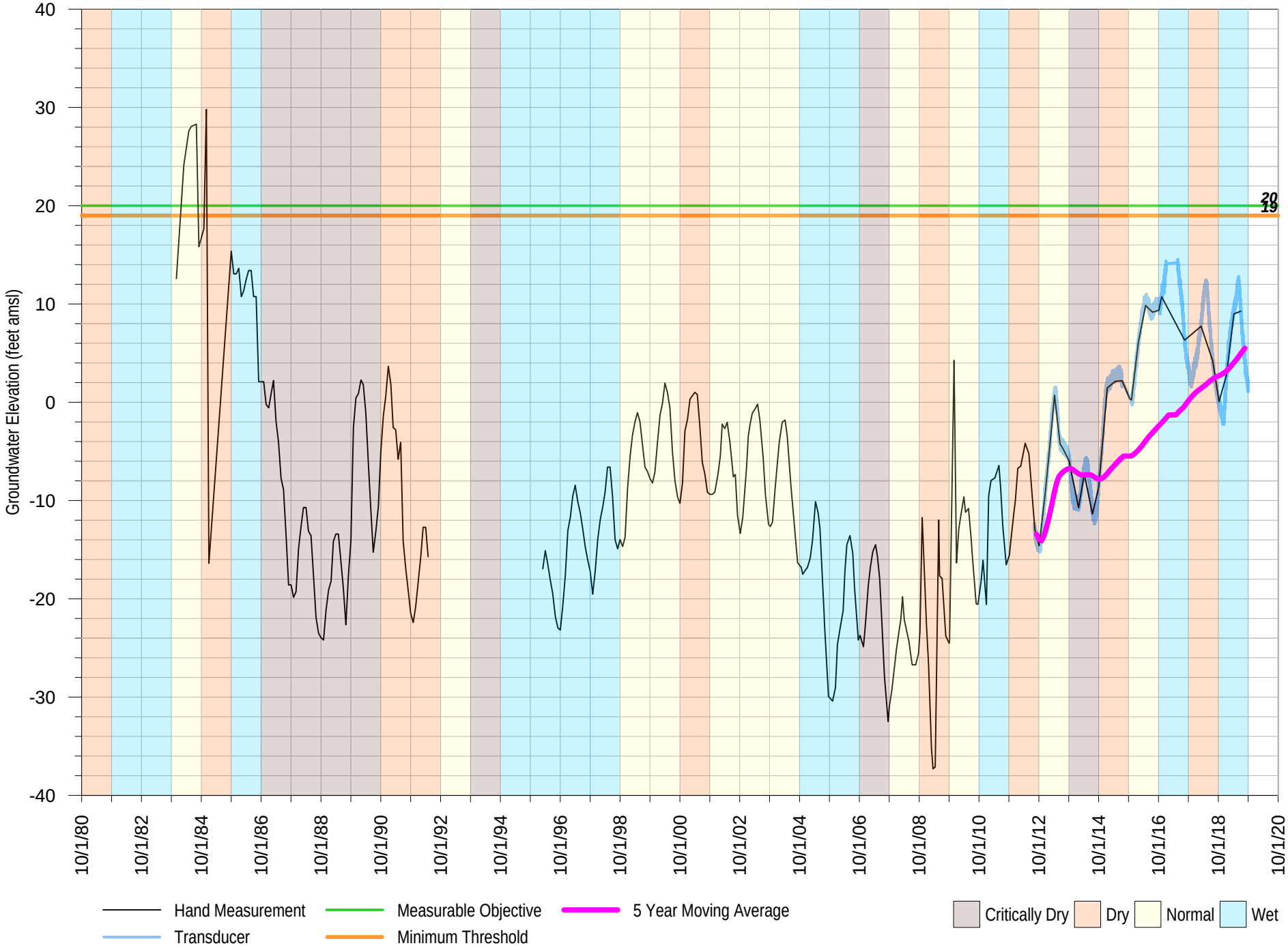
SC-9C

FIGURE A-23



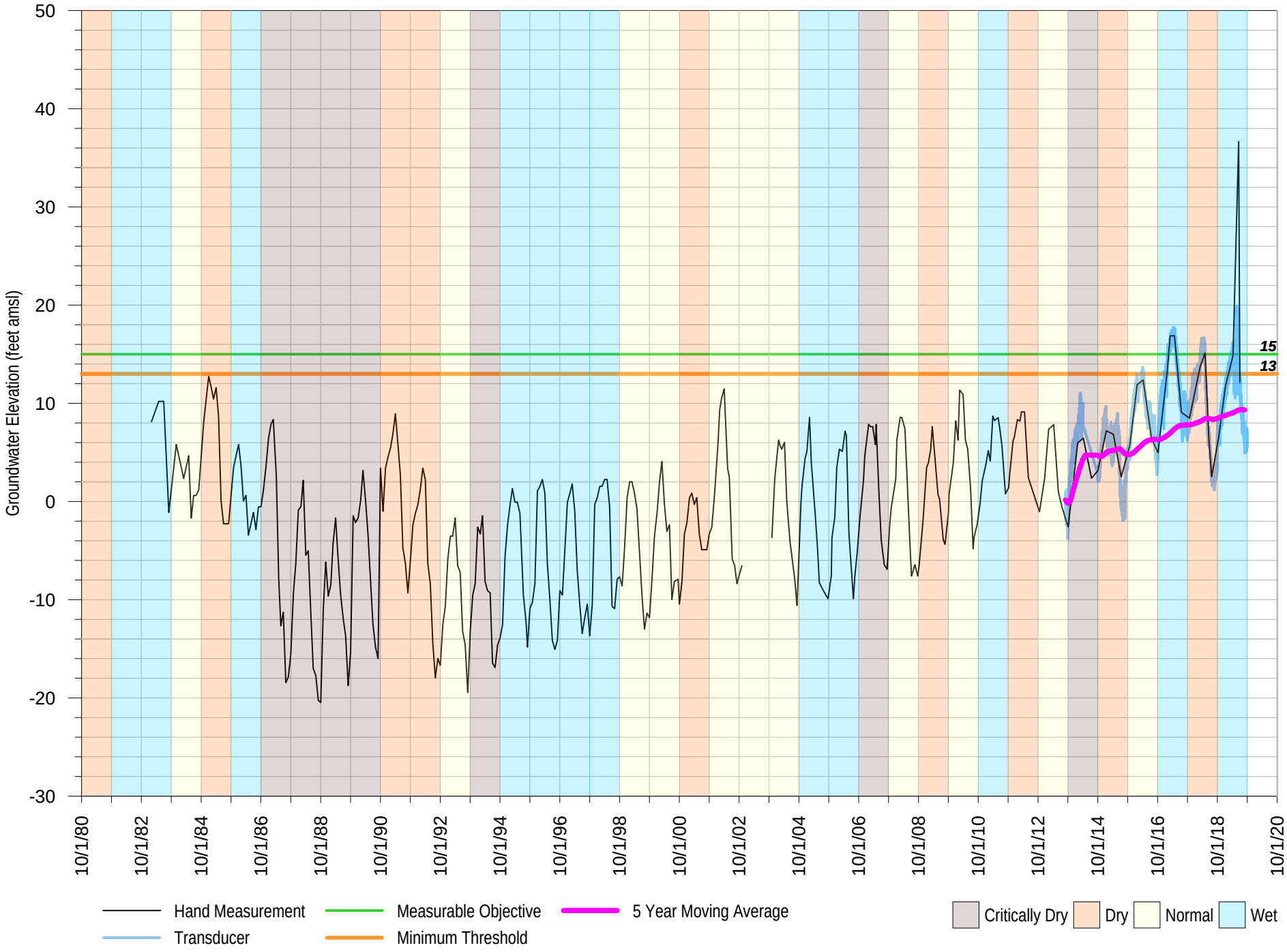
SC-8B

FIGURE A-24



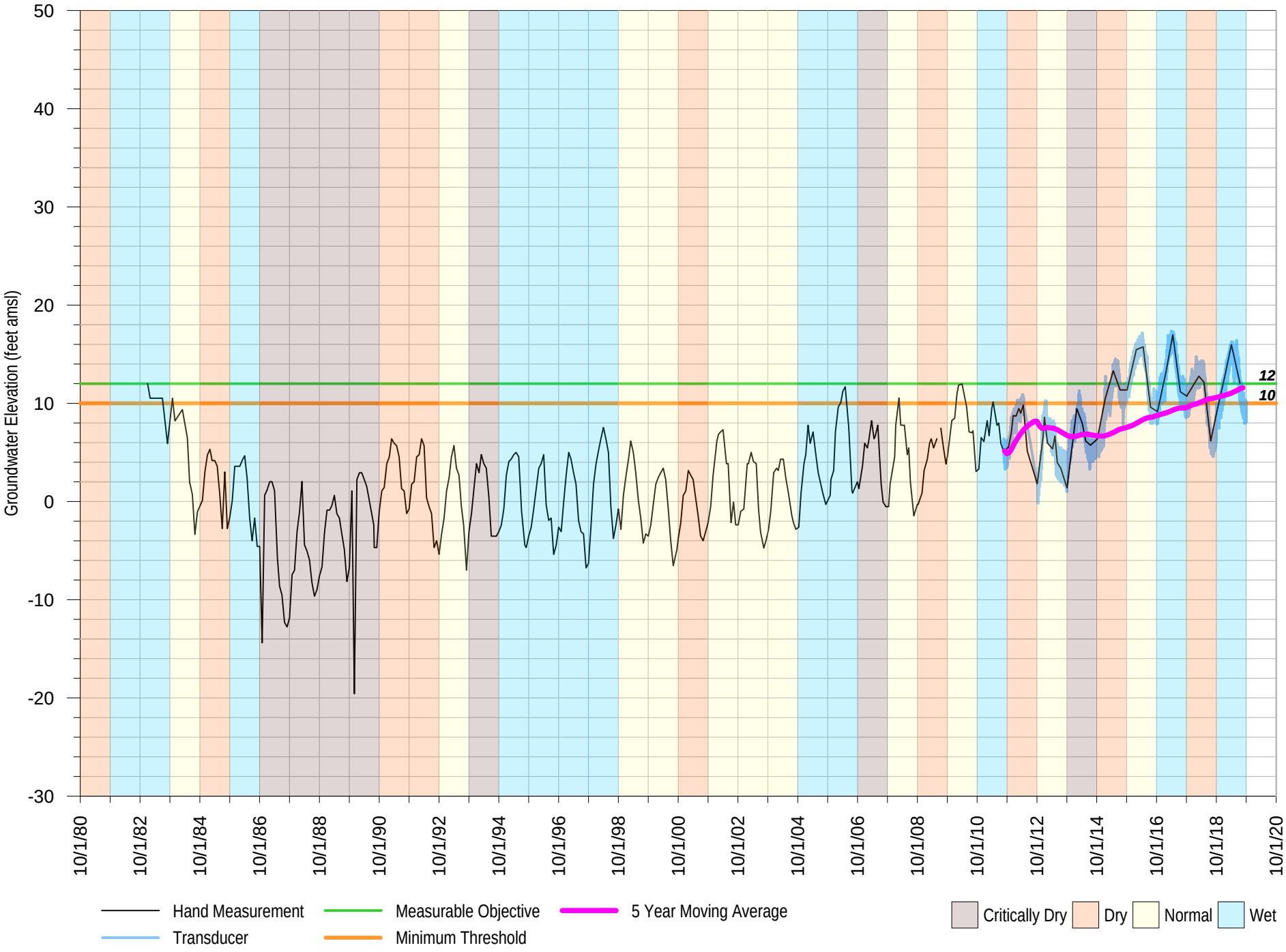
SC-5A

FIGURE A-25



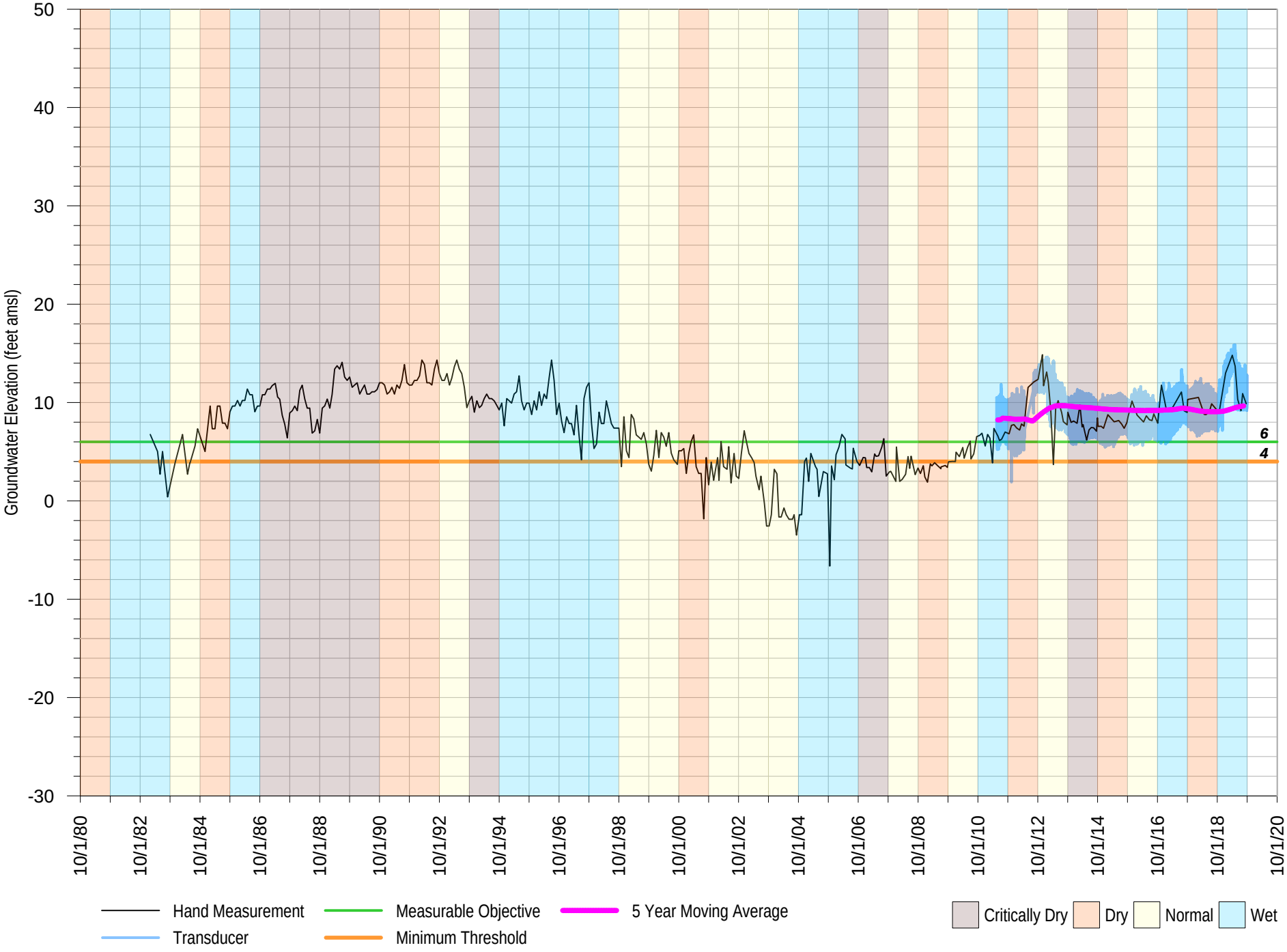
SC-3A

FIGURE A-26



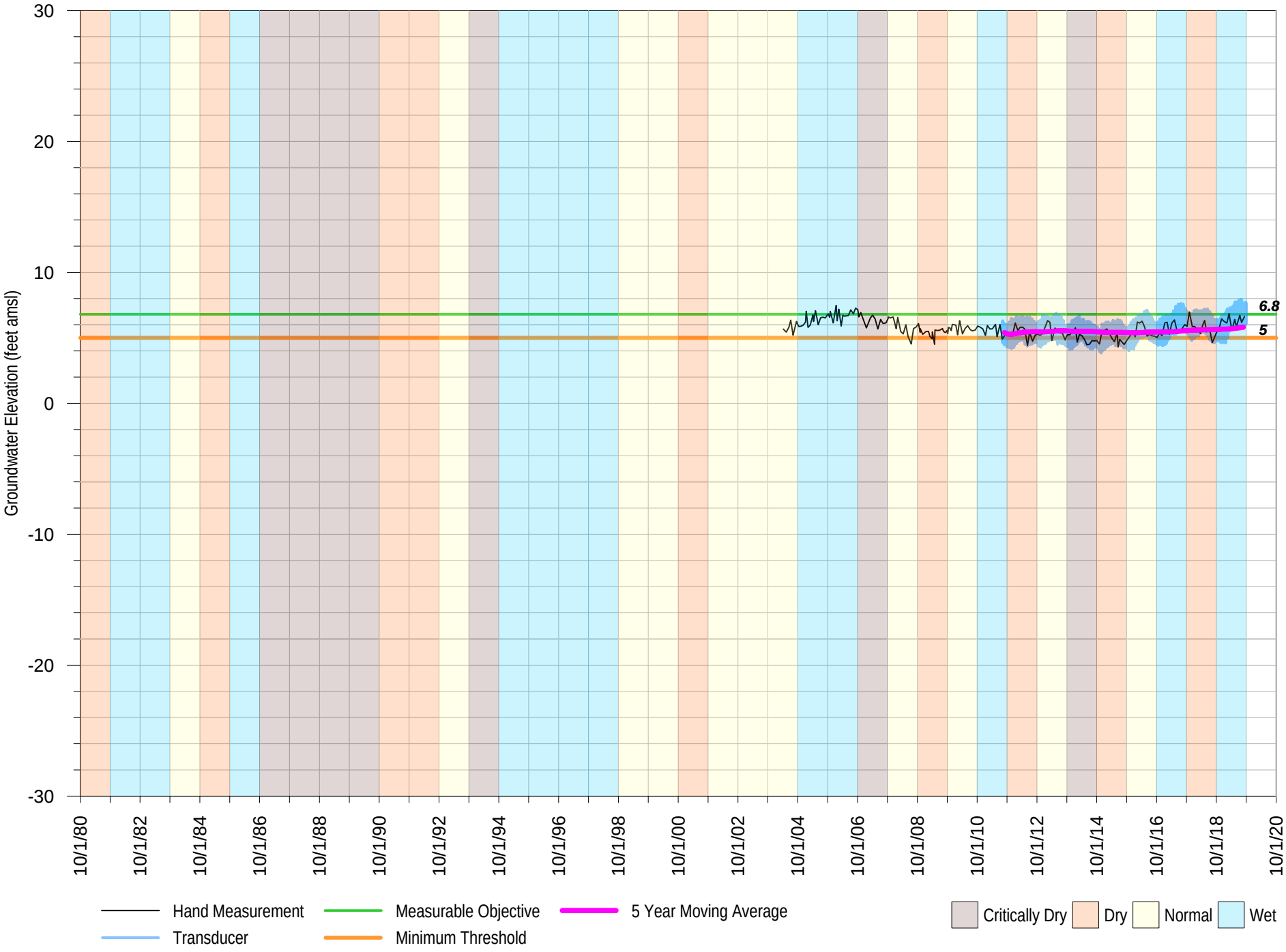
SC-1A

FIGURE A-27



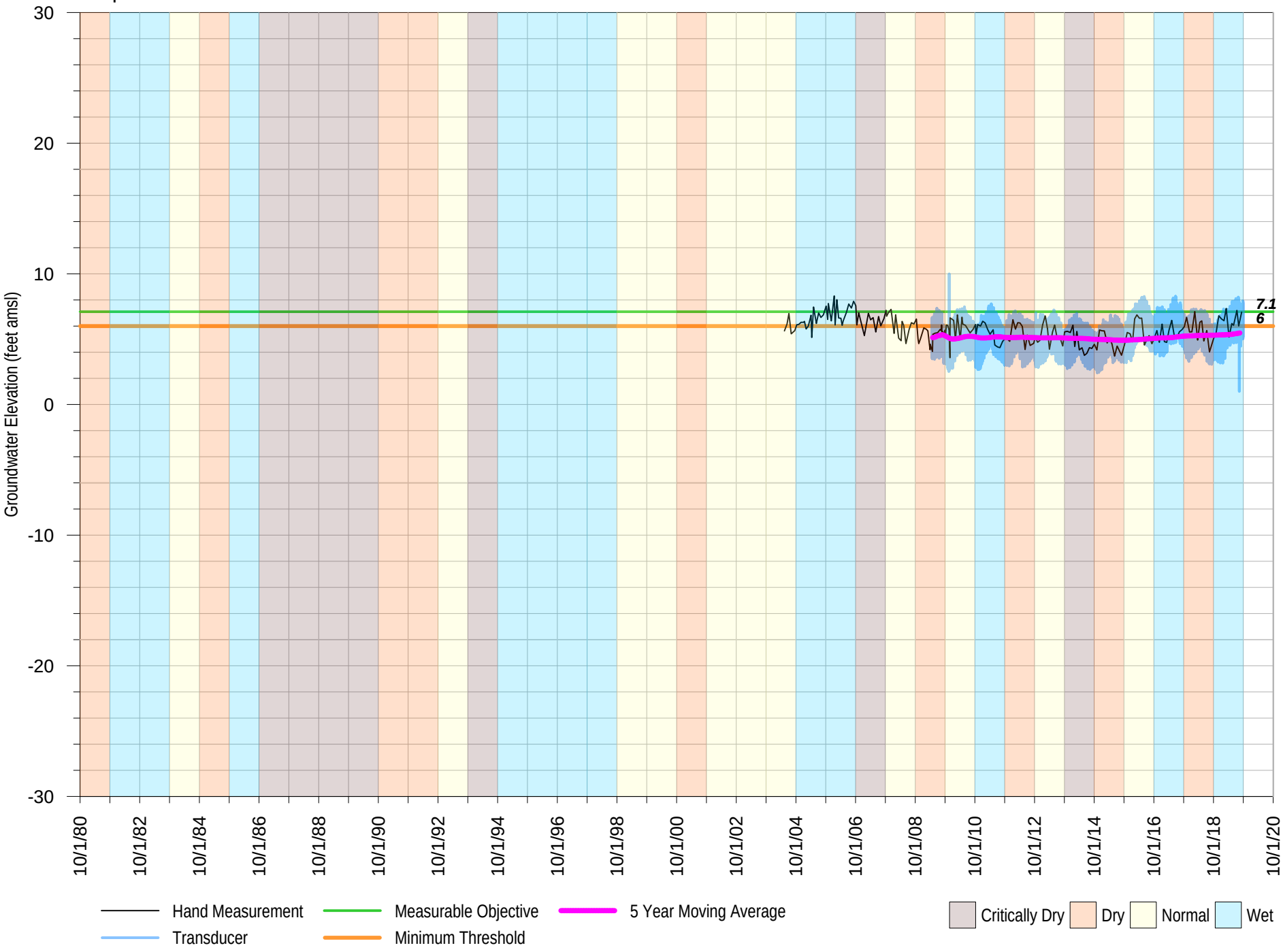
Moran Lake Medium

FIGURE A-28



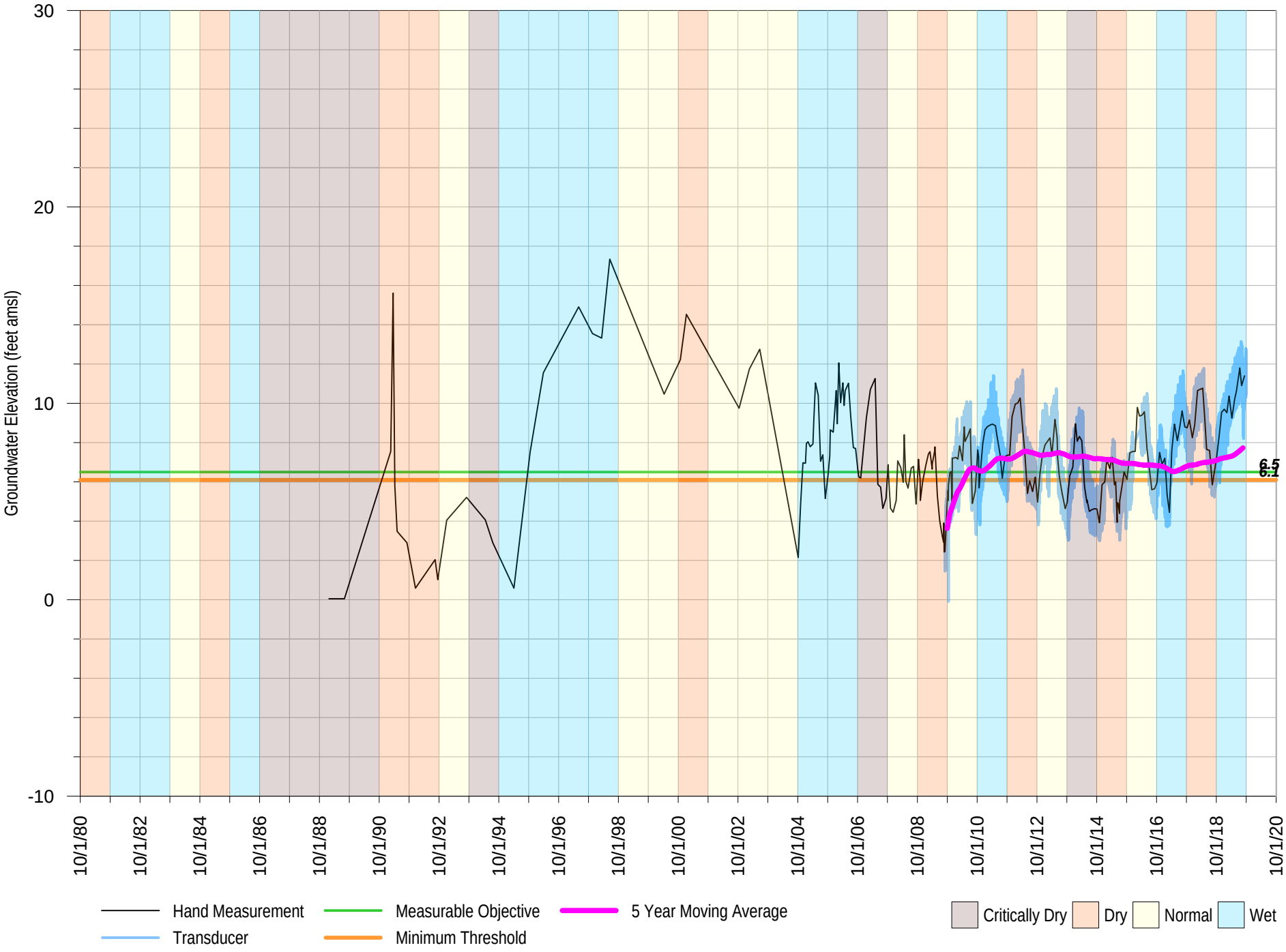
Soquel Point Medium

FIGURE A-29



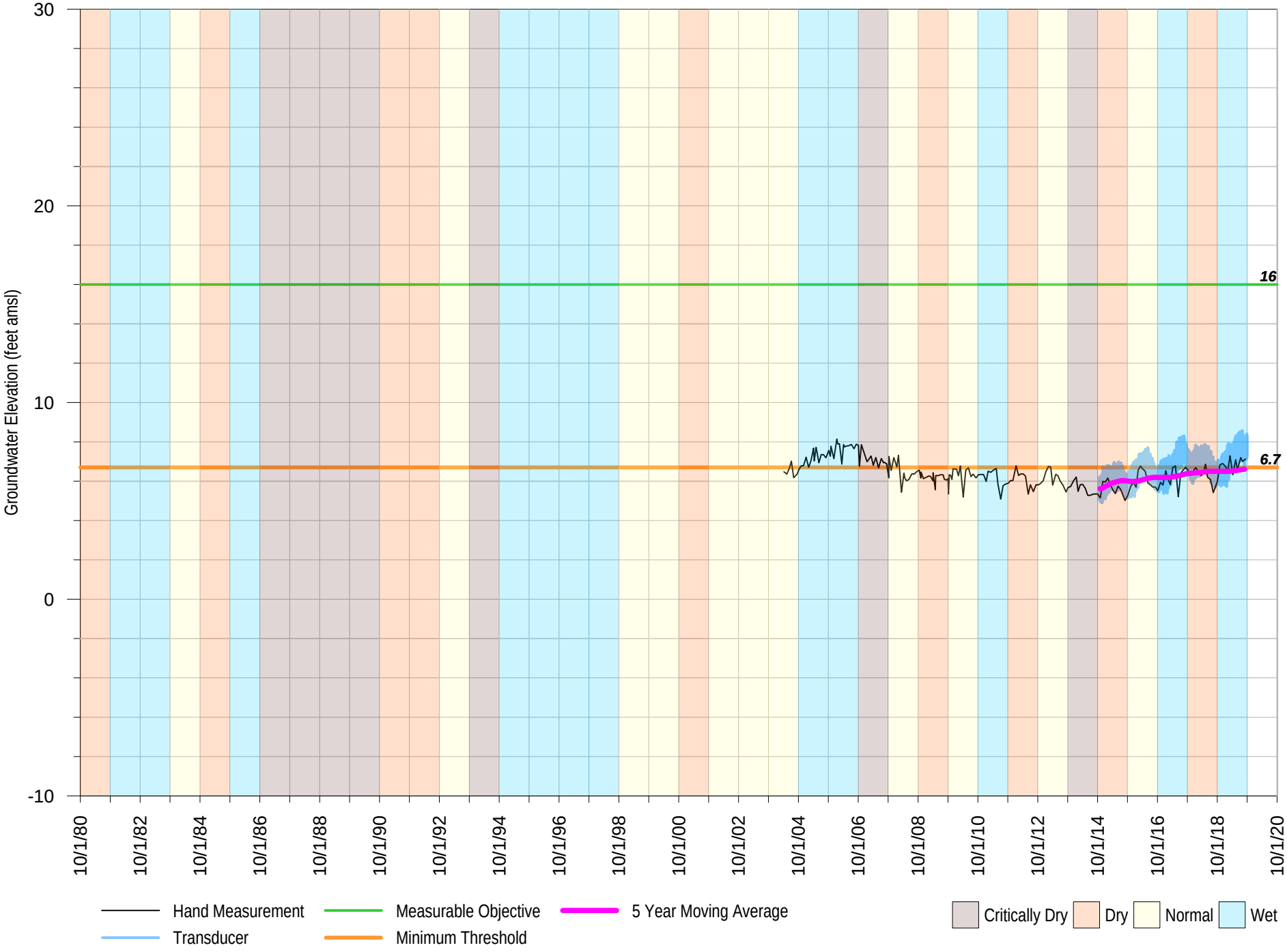
Pleasure Point Medium

FIGURE A-30



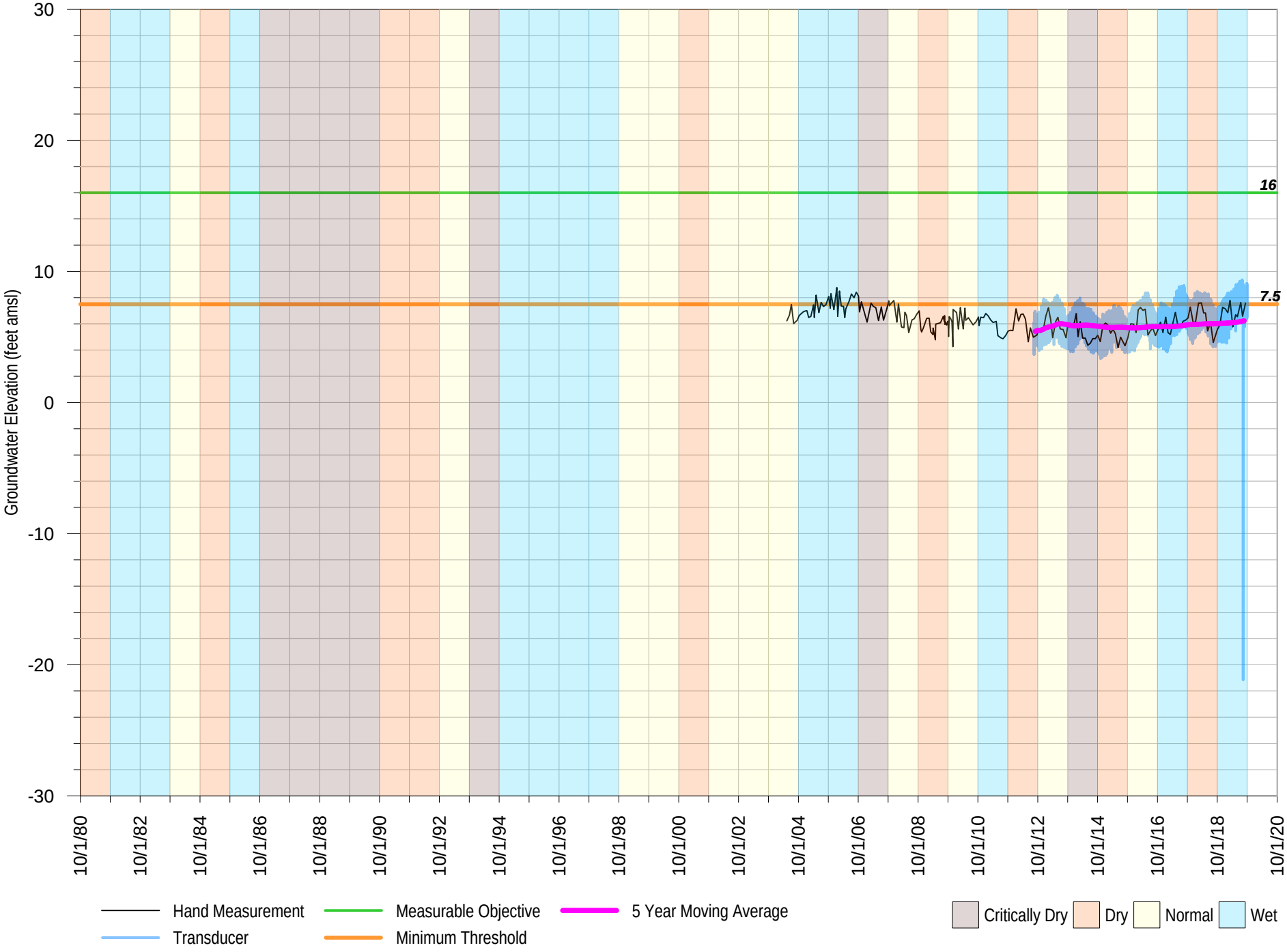
Moran Lake Deep

FIGURE A-31



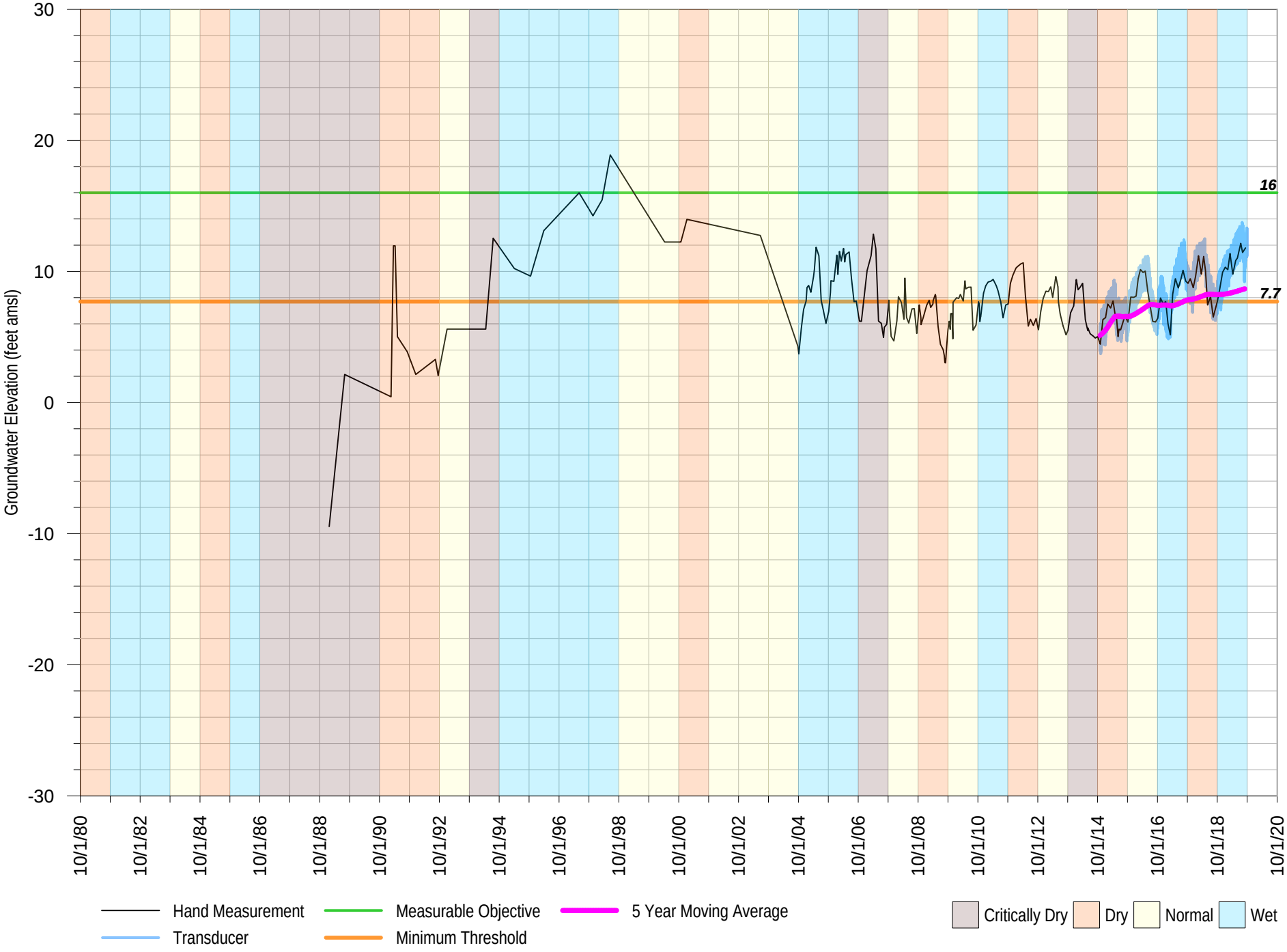
Soquel Point Deep

FIGURE A-32



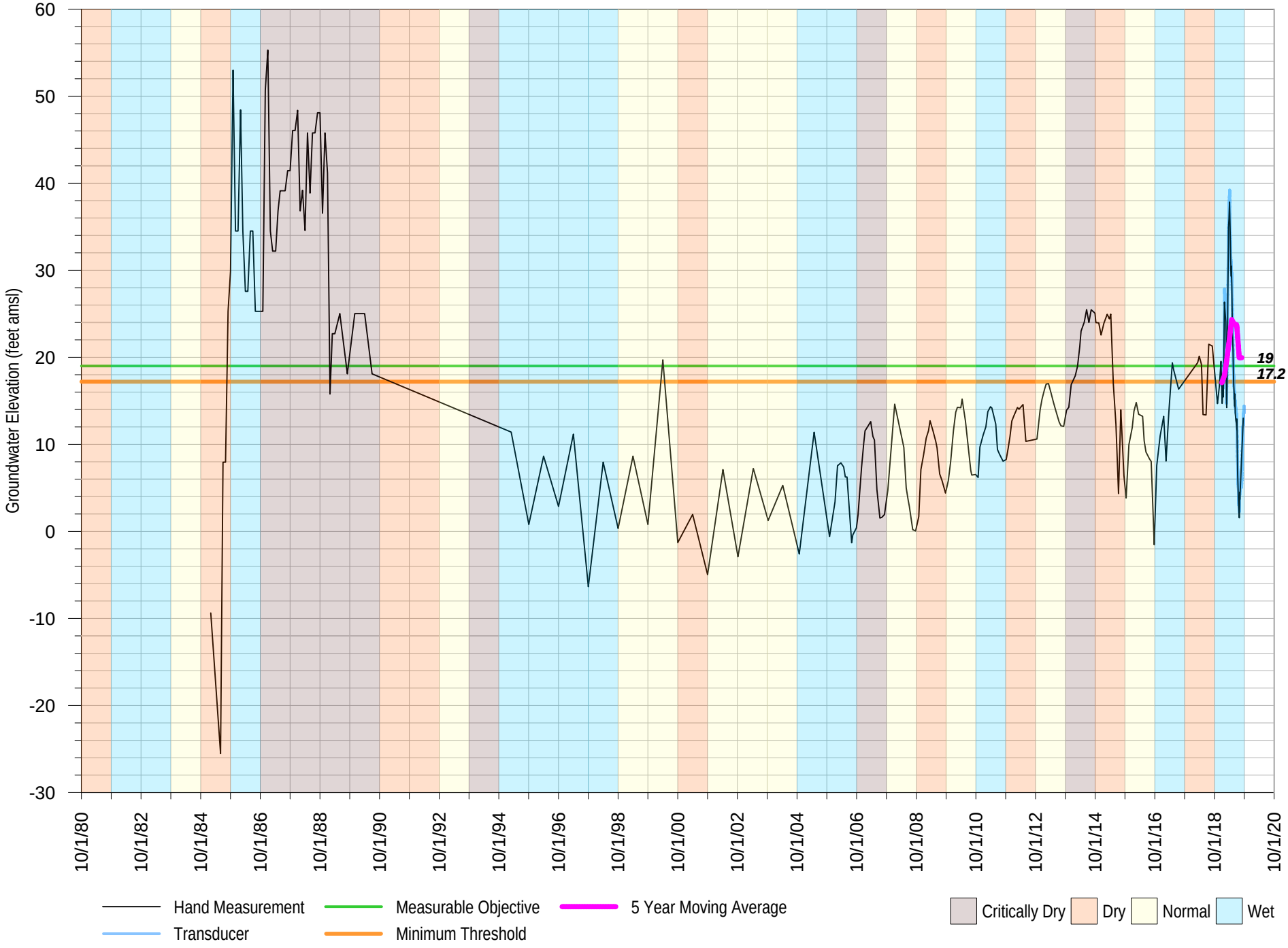
Pleasure Point Deep

FIGURE A-33



SC-13A

FIGURE A-34



Balogh Shallow Well

FIGURE A-35

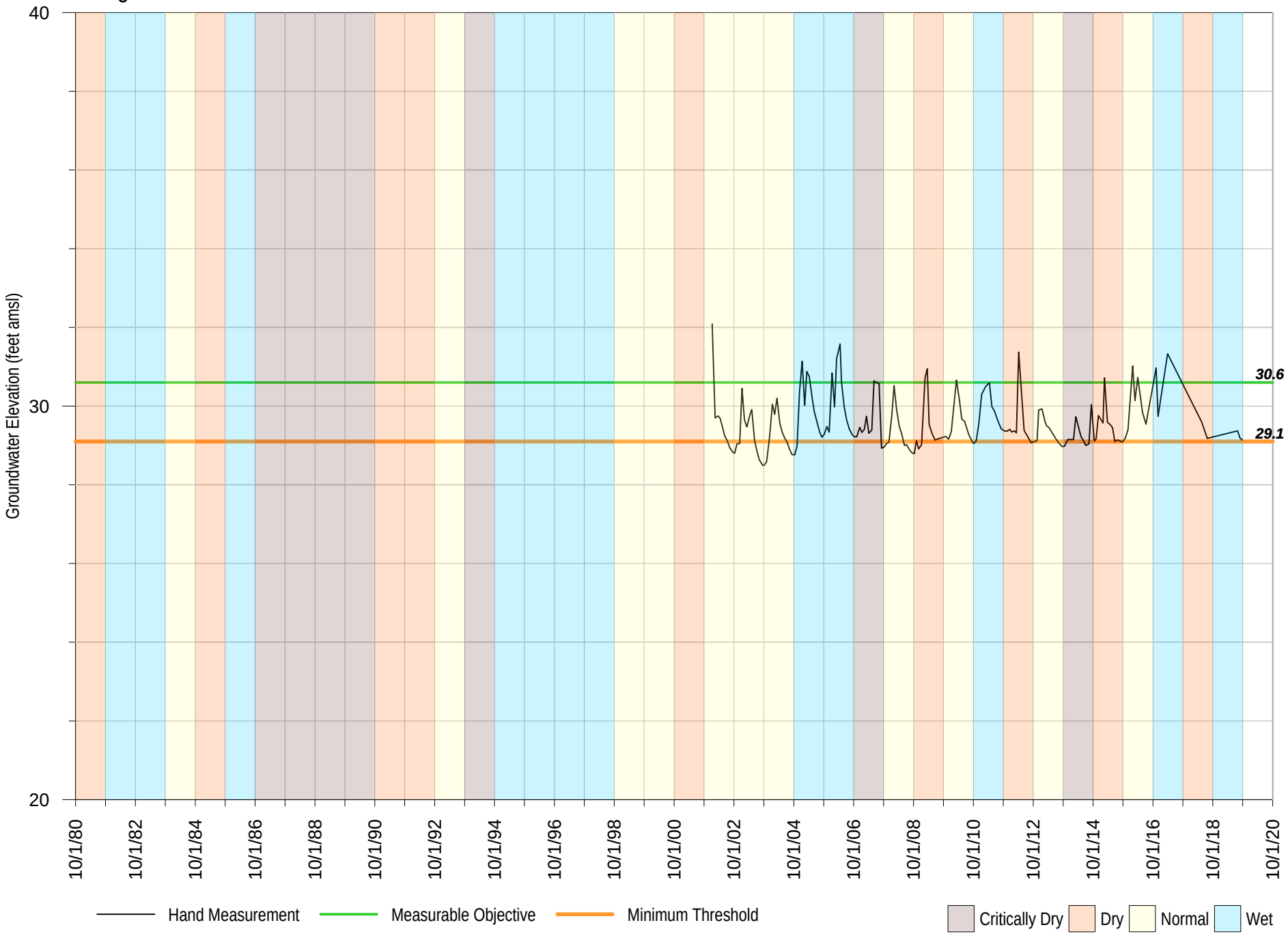
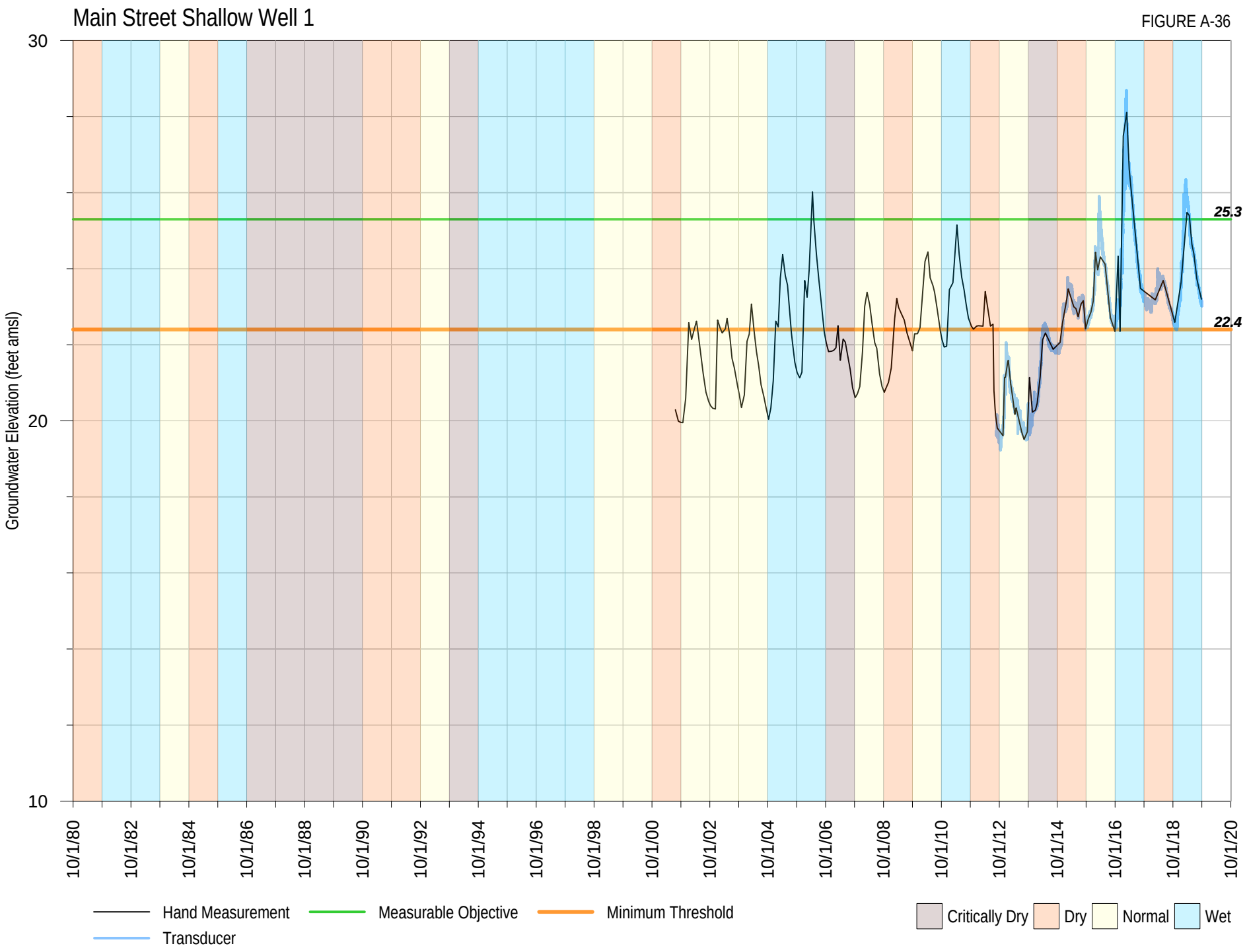
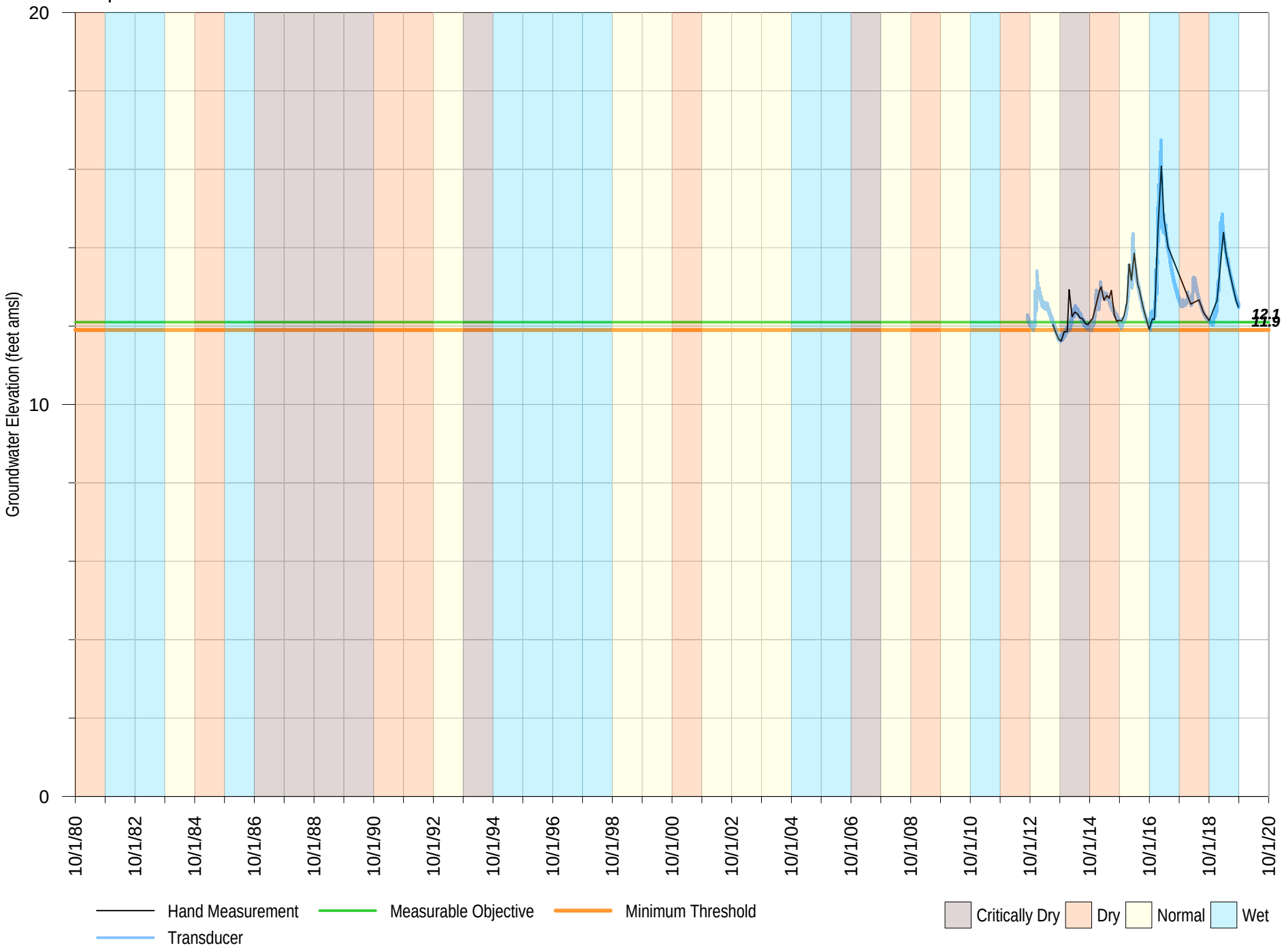


FIGURE A-36


Main Street Shallow Well 1
Groundwater Elevation (feet amsl)
30
20
10
25.3
22.4
10/1/80
10/1/82
10/1/84
10/1/86
10/1/88
10/1/90
10/1/92
10/1/94
10/1/96
10/1/98
10/1/00
10/1/02
10/1/04
10/1/06
10/1/08
10/1/10
10/1/12
10/1/14
10/1/16
10/1/18
10/1/20
Hand Measurement
Transducer
Measurable Objective
Minimum Threshold
Critically Dry
Dry
Normal
Wet

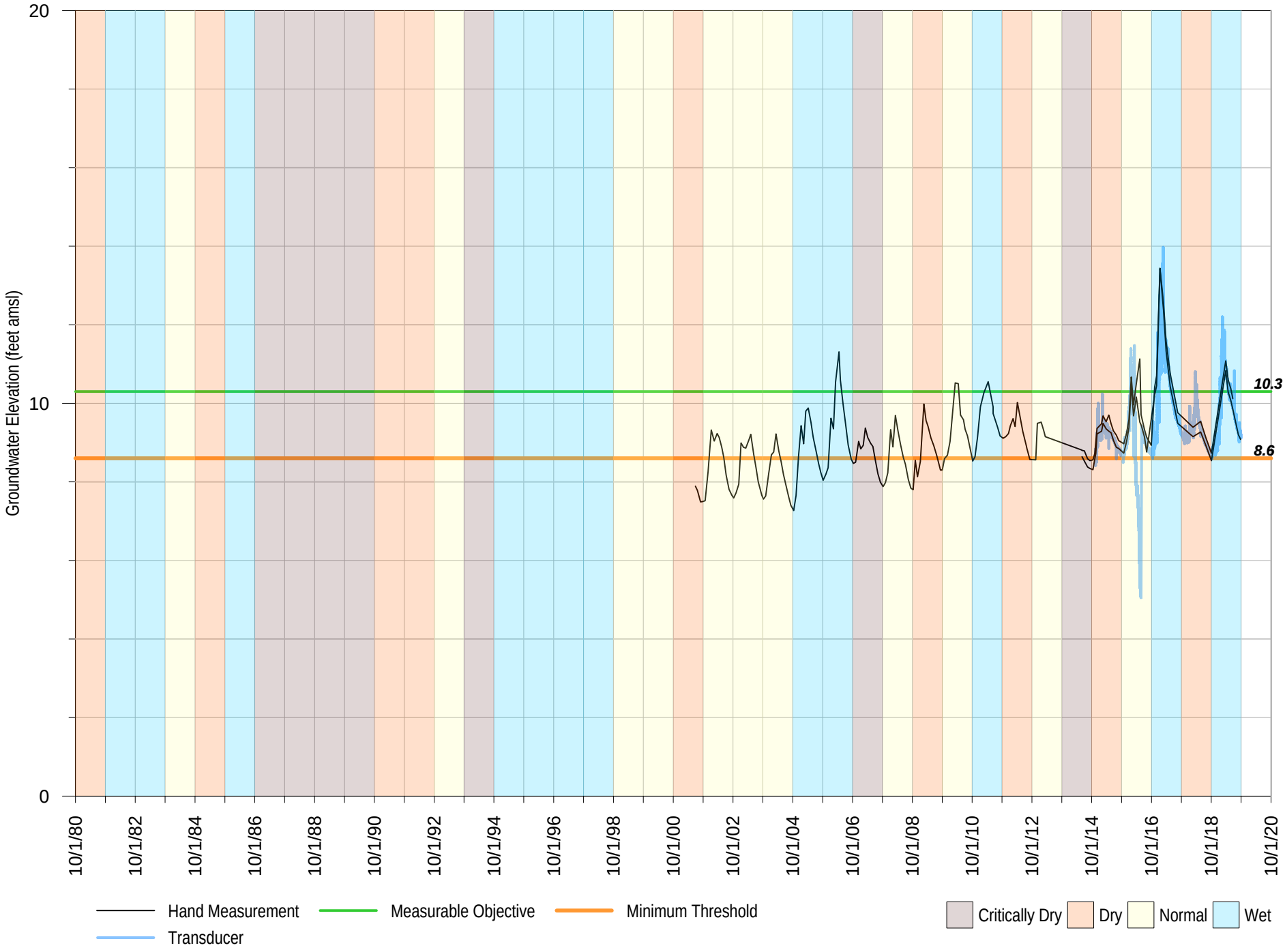
Soquel Wharf Shallow Well

FIGURE A-37



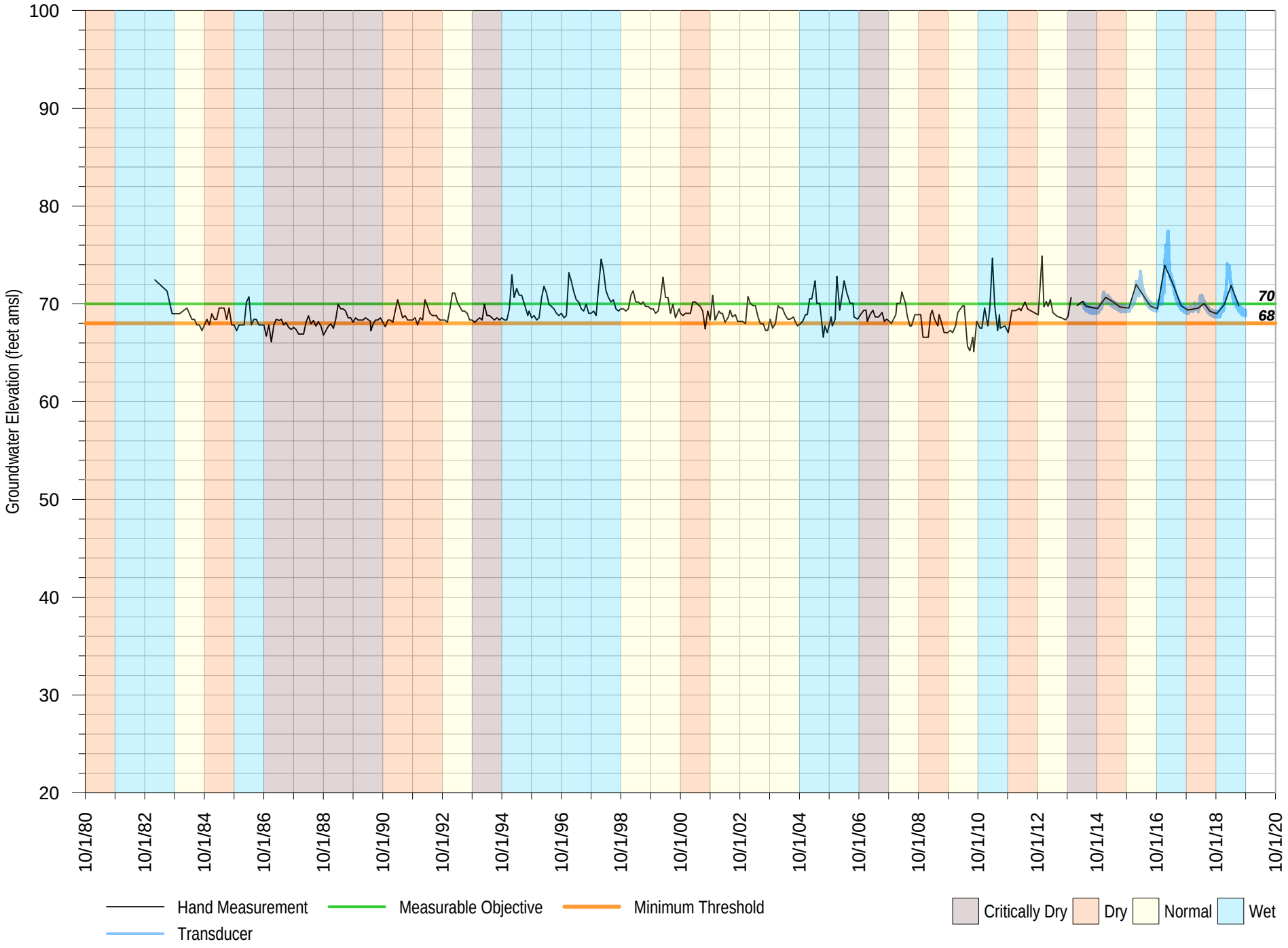
Nob Hill Shallow Well

FIGURE A-38



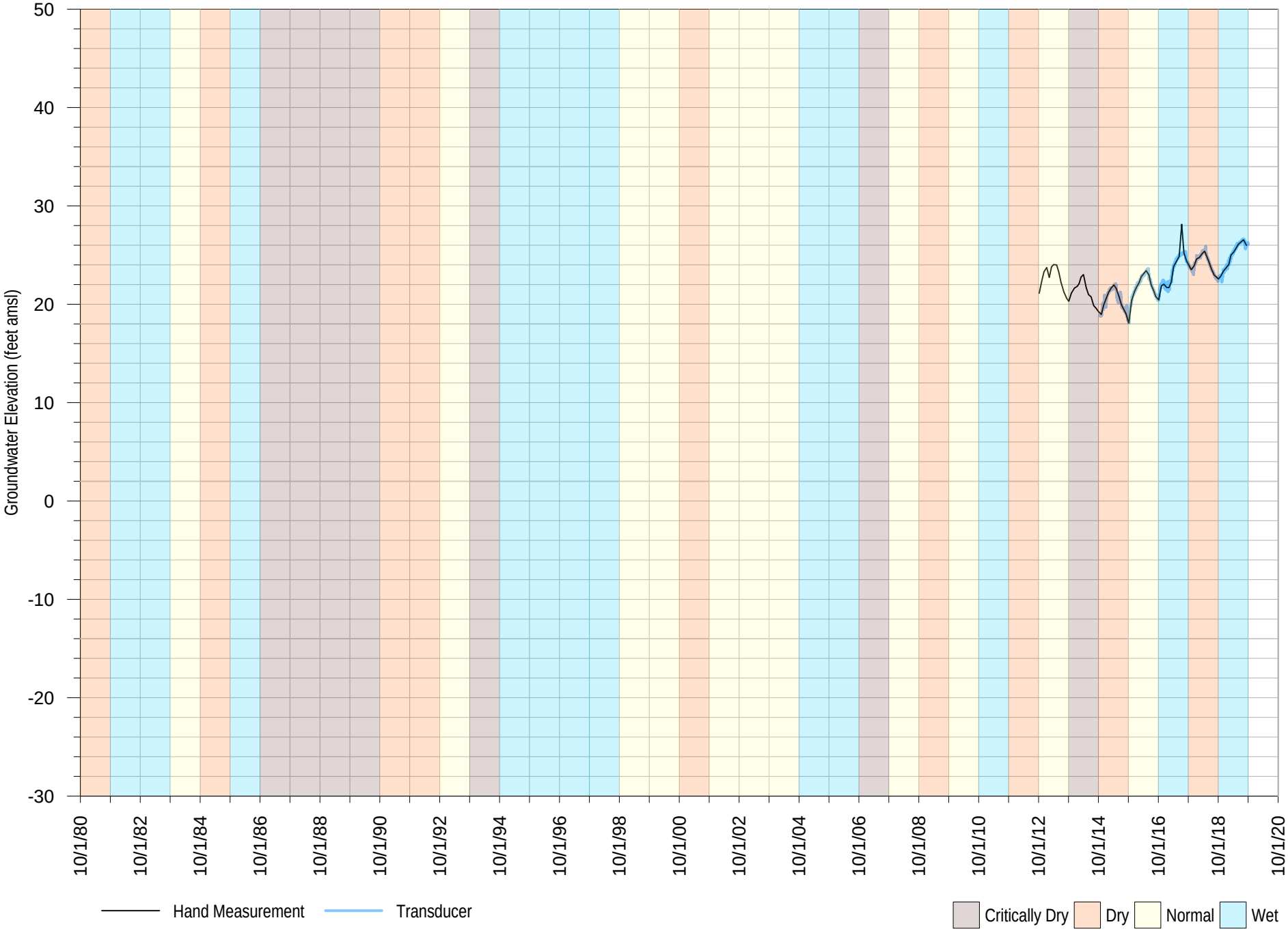
SC-10A

FIGURE A-39



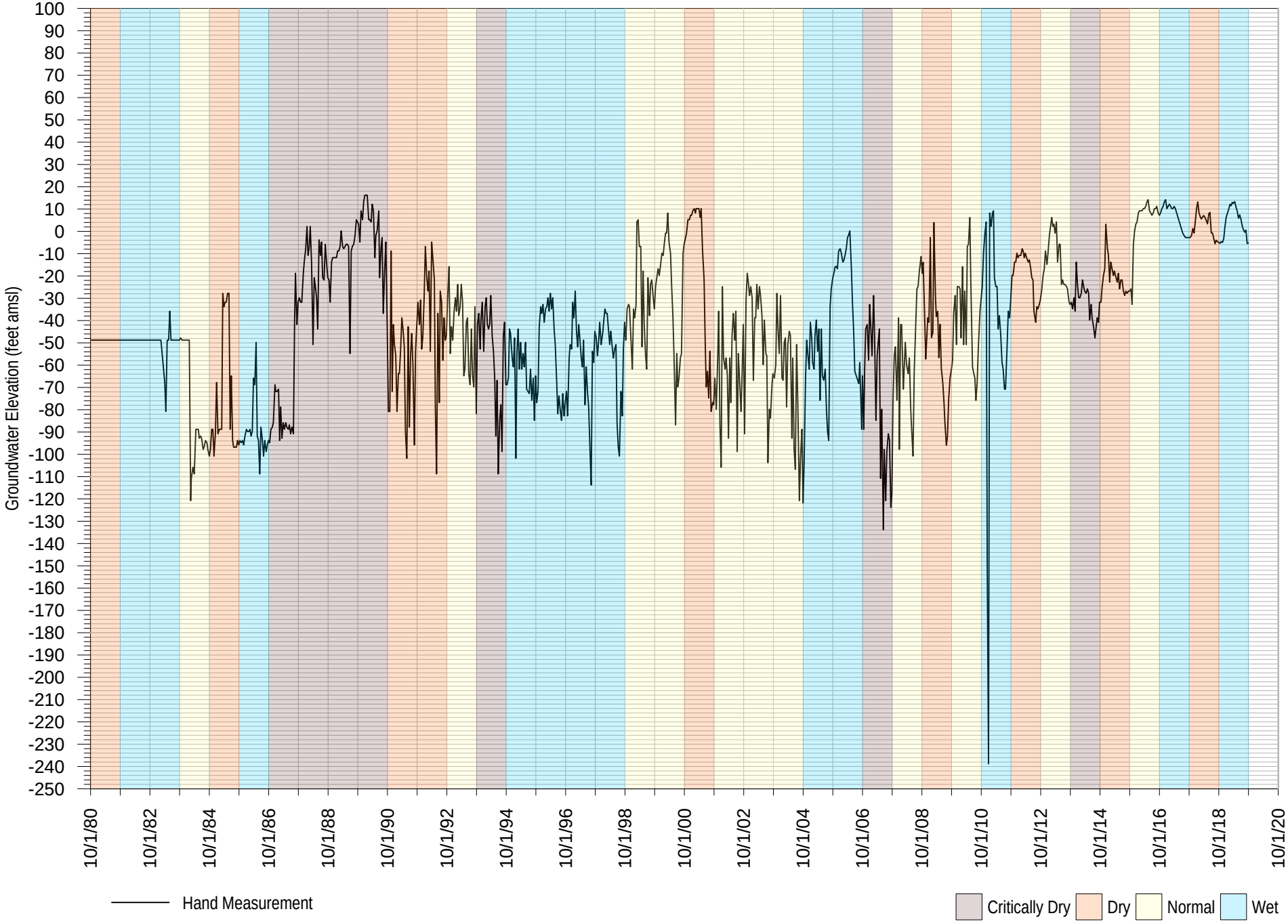
30th Ave Shallow

FIGURE A-40



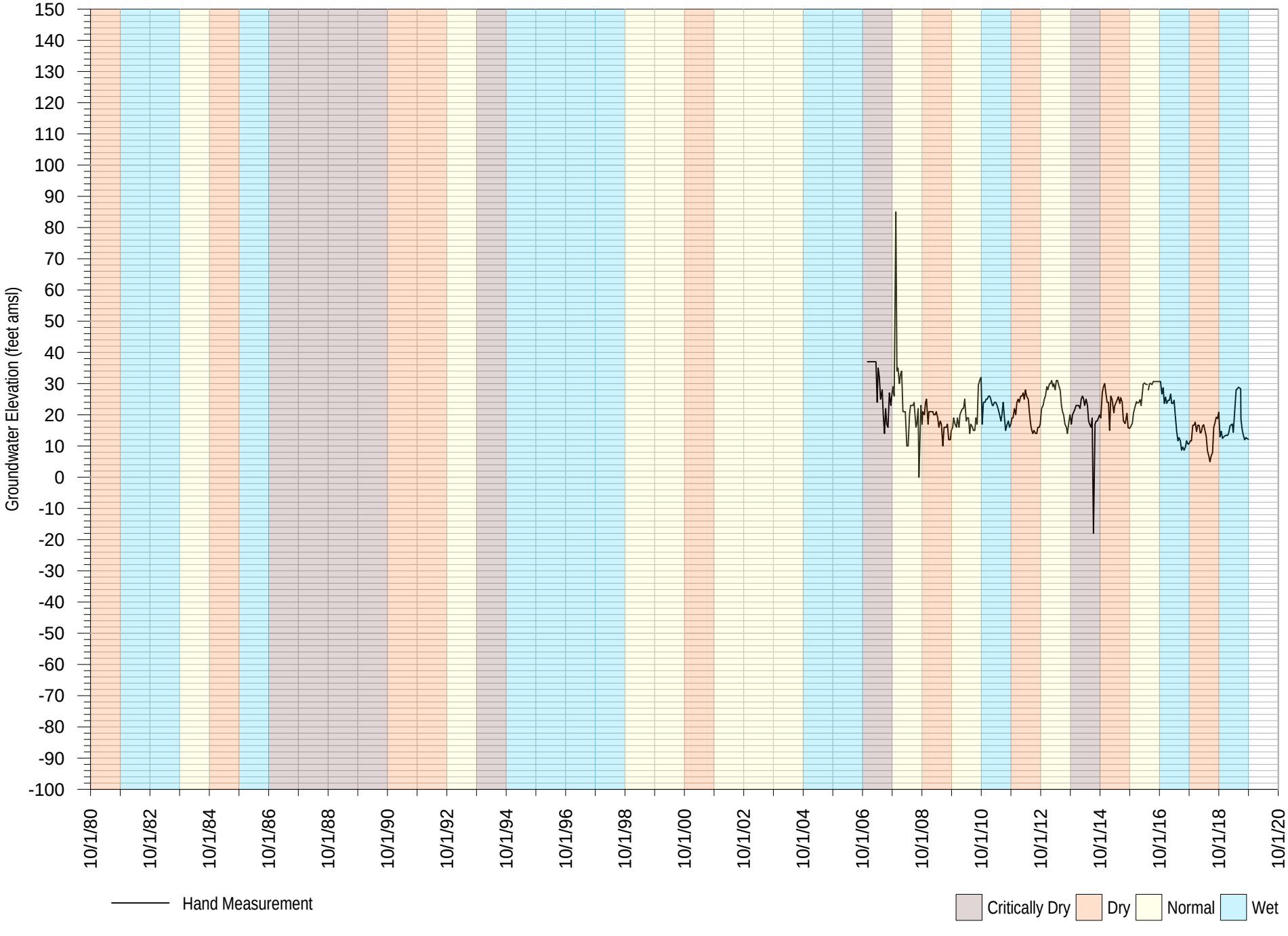
Aptos Creek

FIGURE A-41



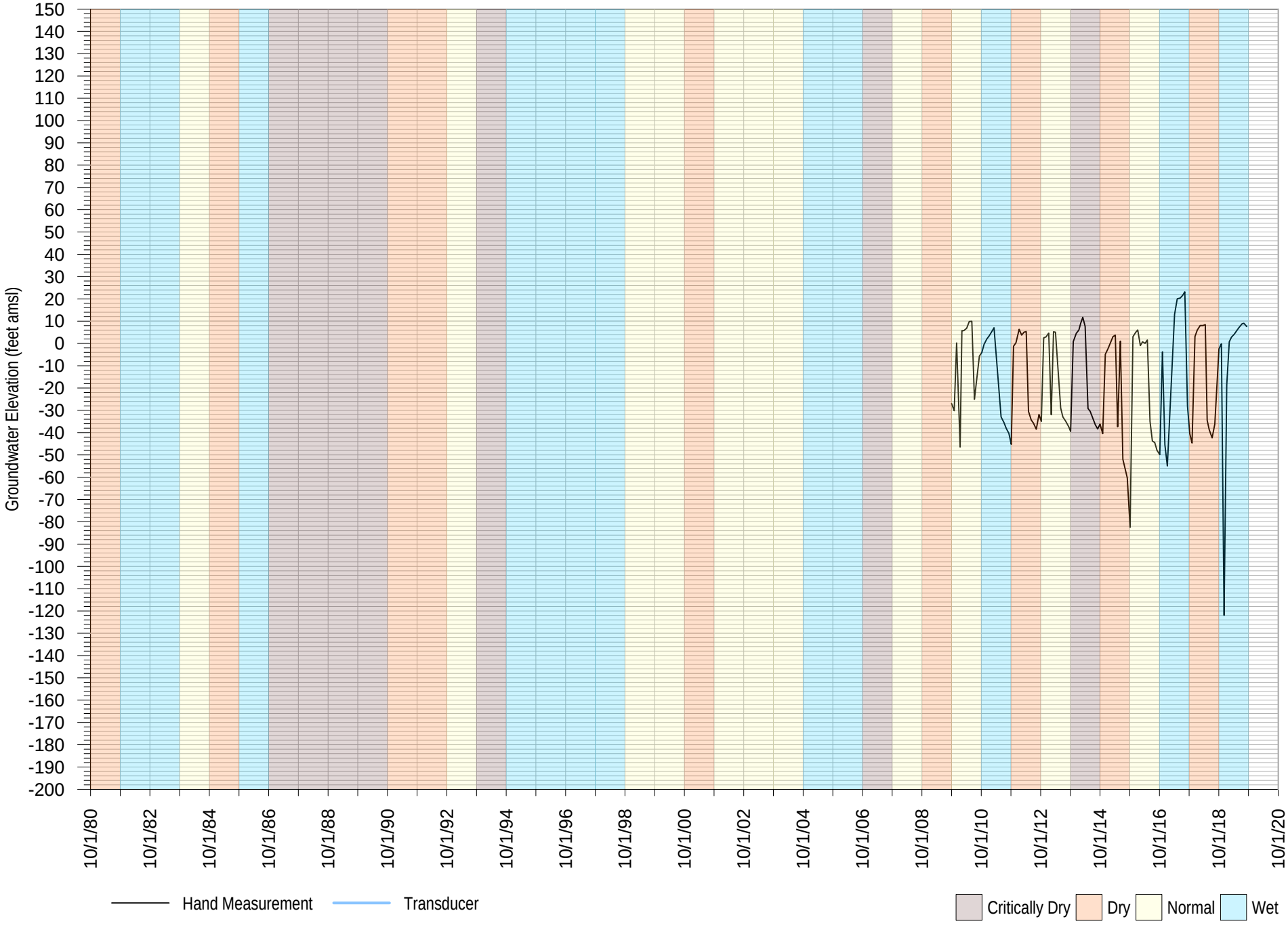
Aptos Jr High

FIGURE A-42



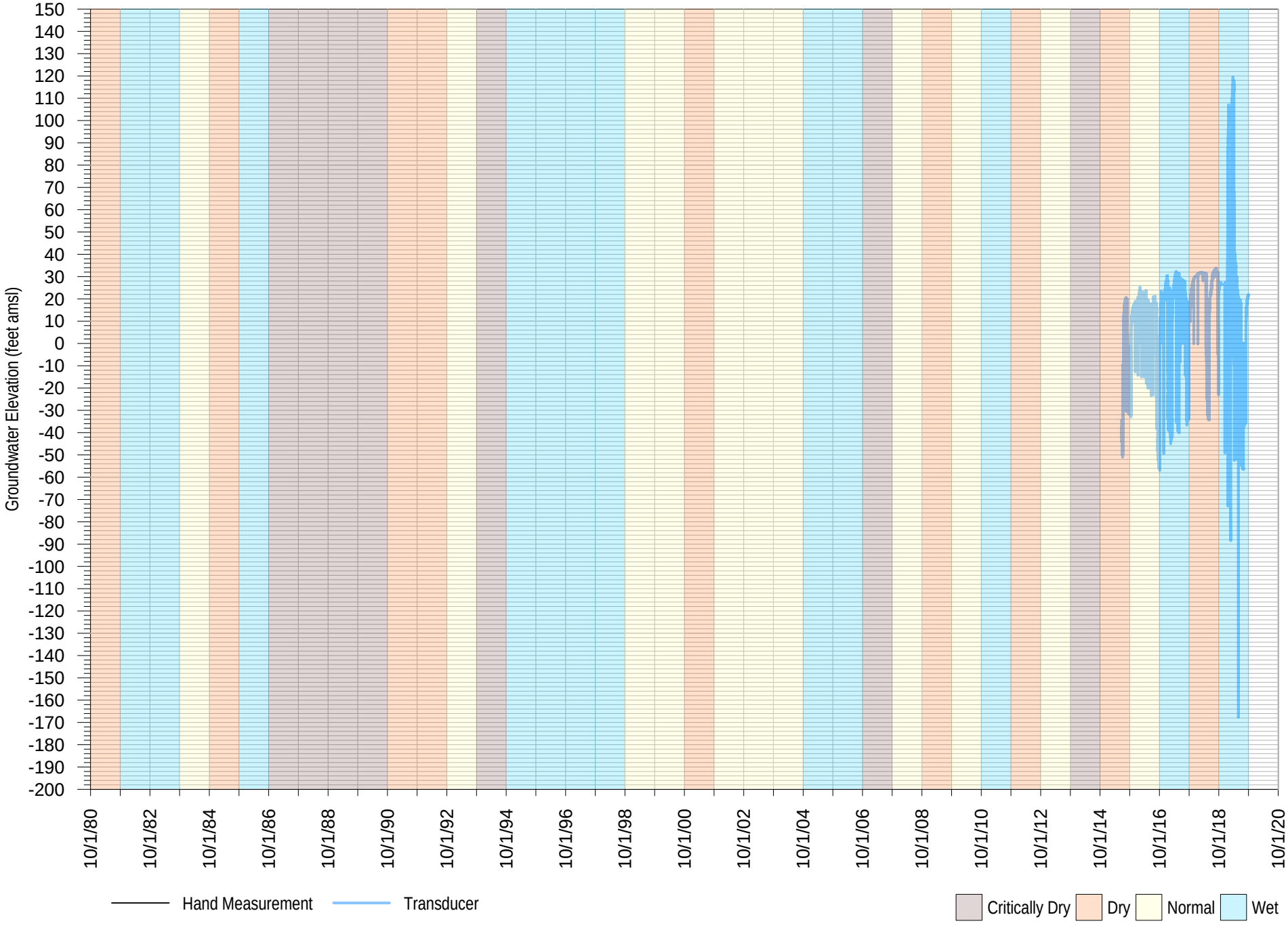
Beltz 10

FIGURE A-43



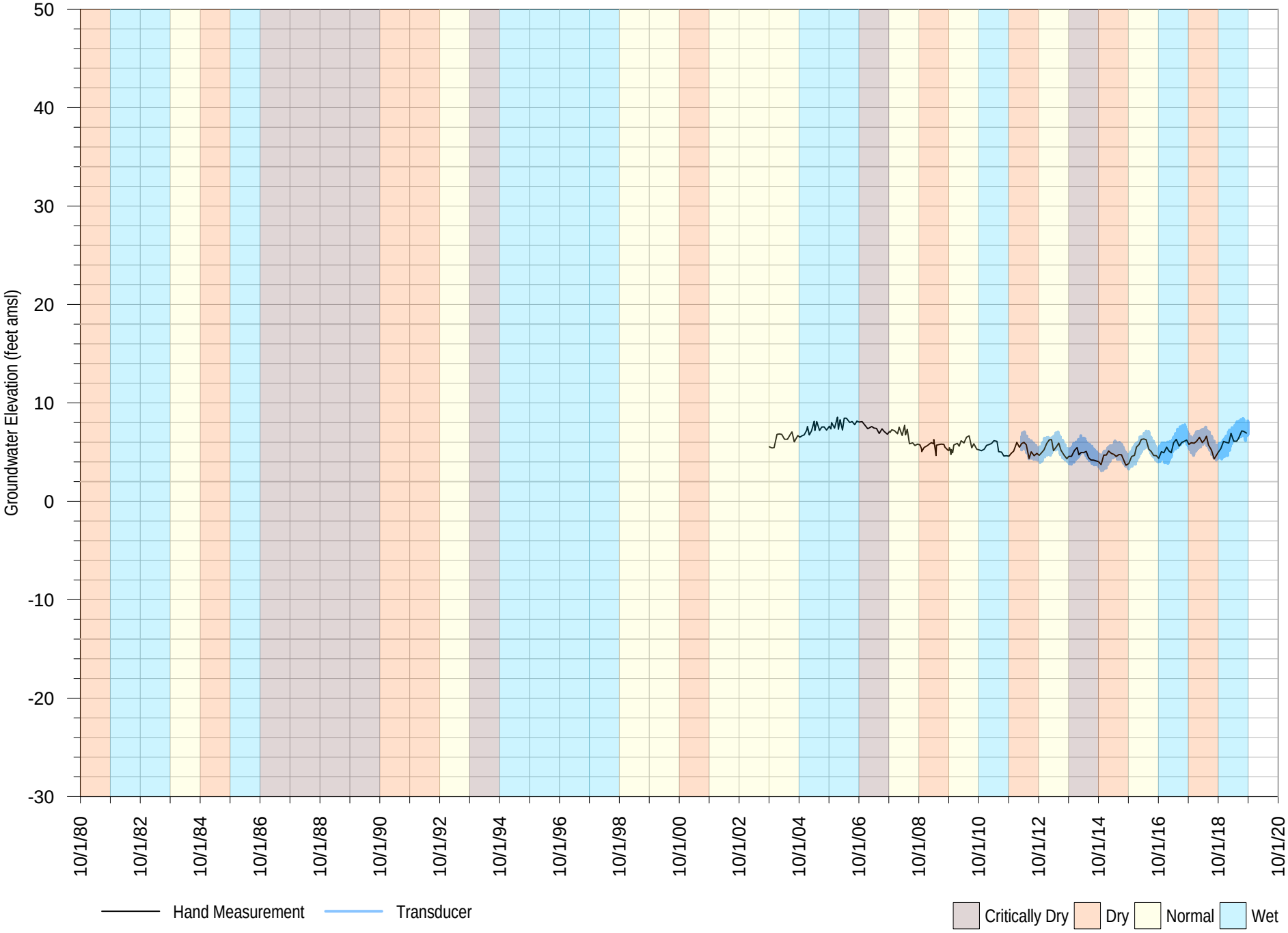
Beltz 12

FIGURE A-44



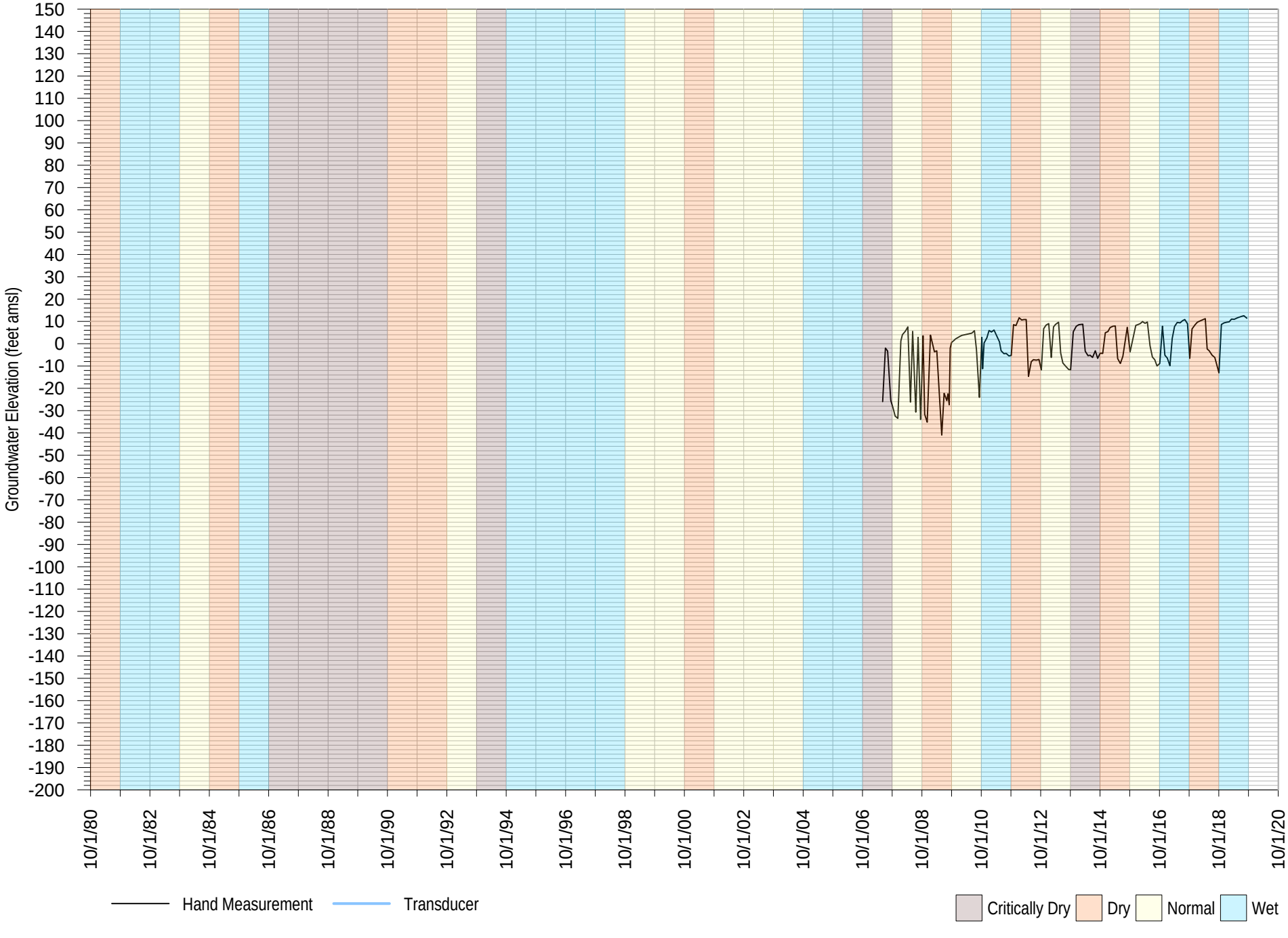
Beltz 2

FIGURE A-45



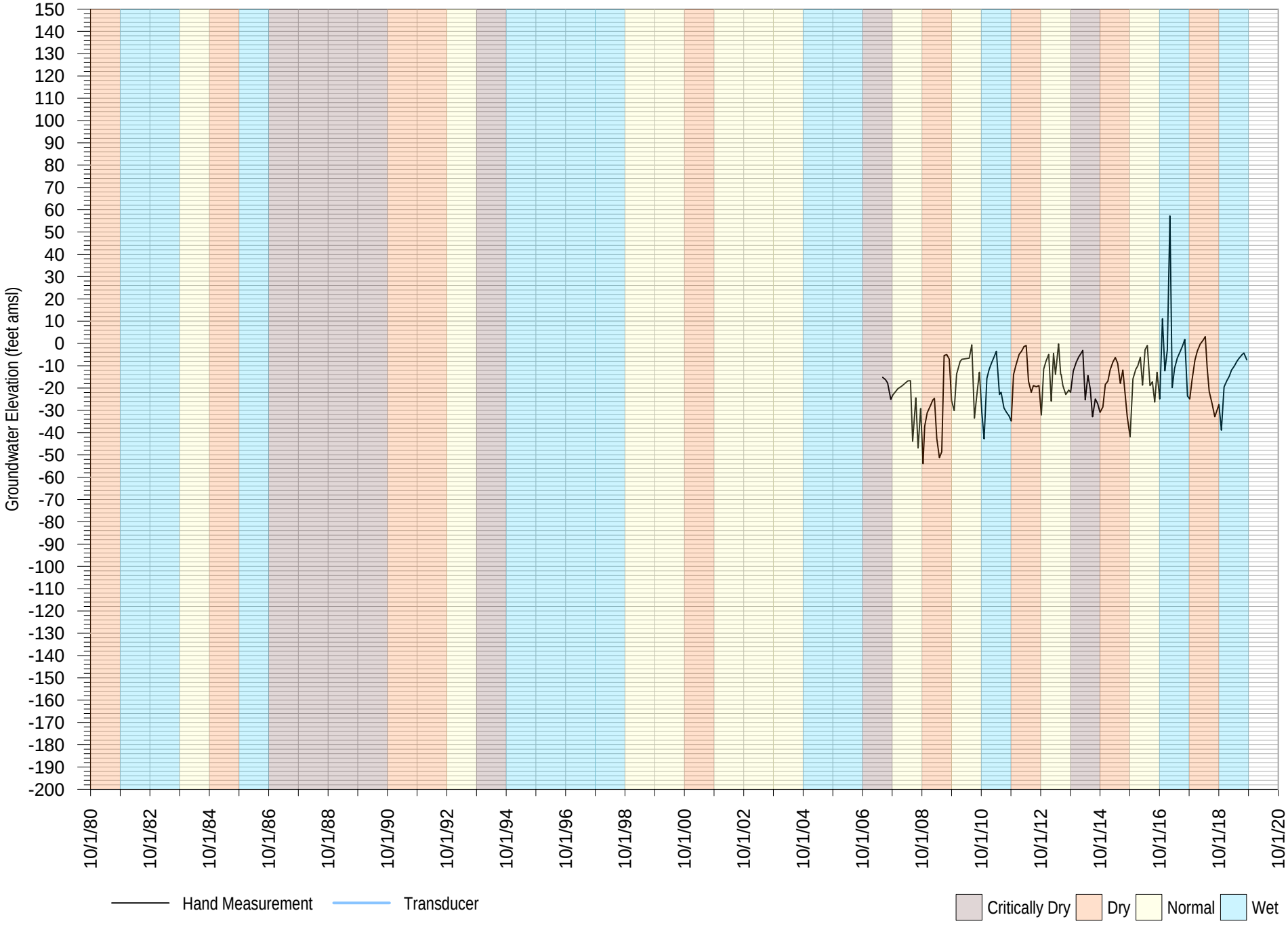
Beltz 8

FIGURE A-46



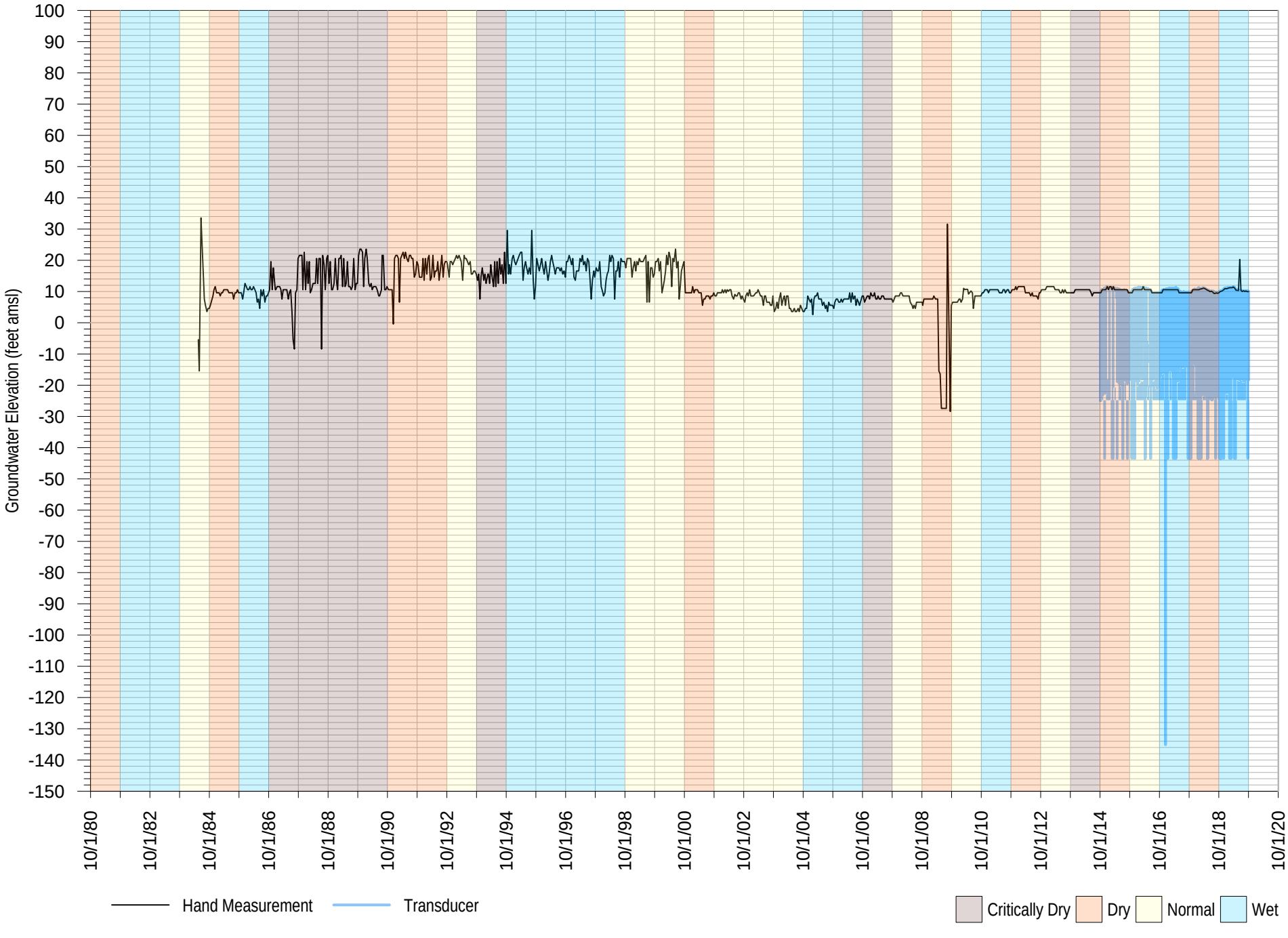
Beltz 9

FIGURE A-47



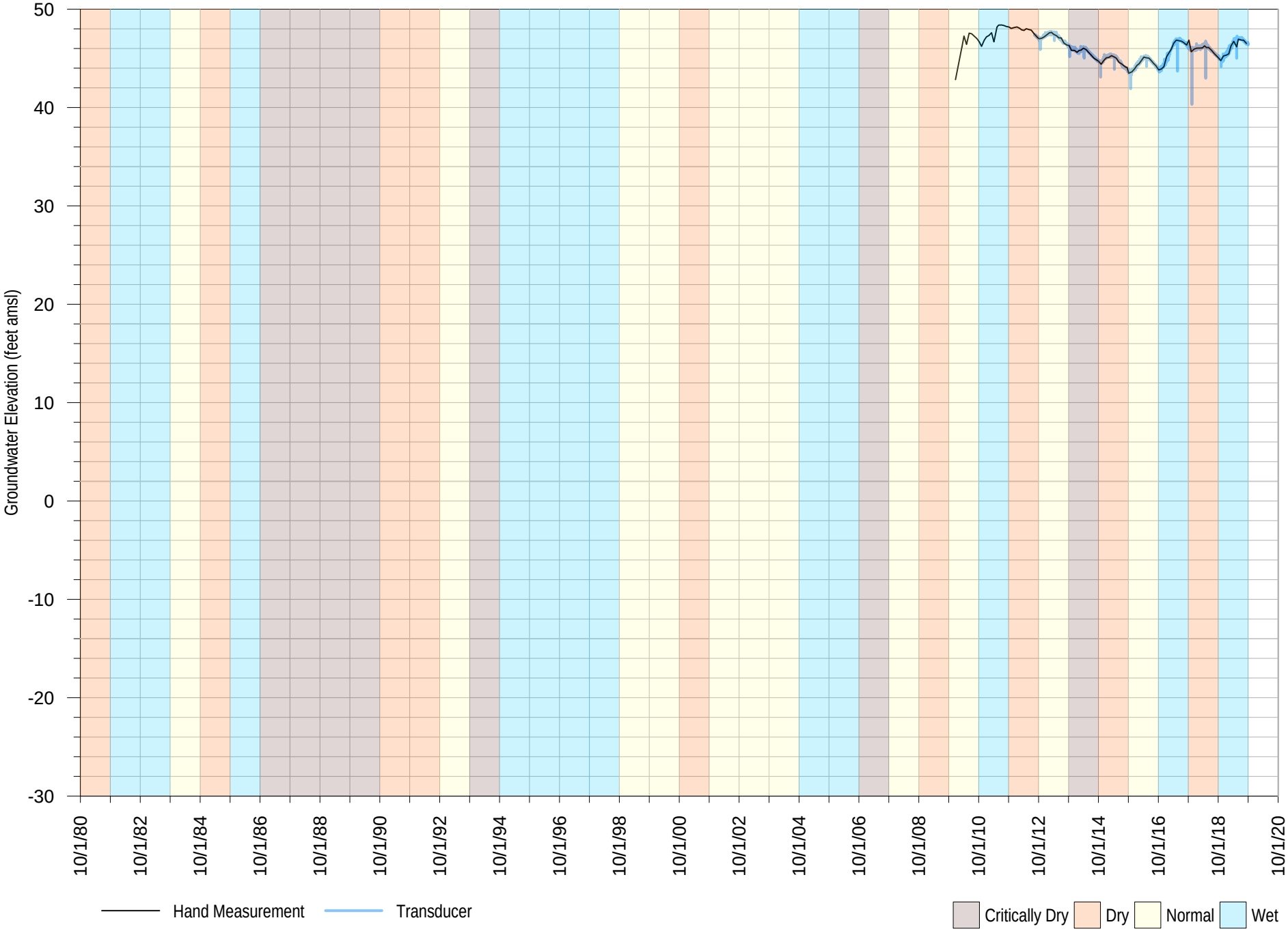
Bonita

FIGURE A-48



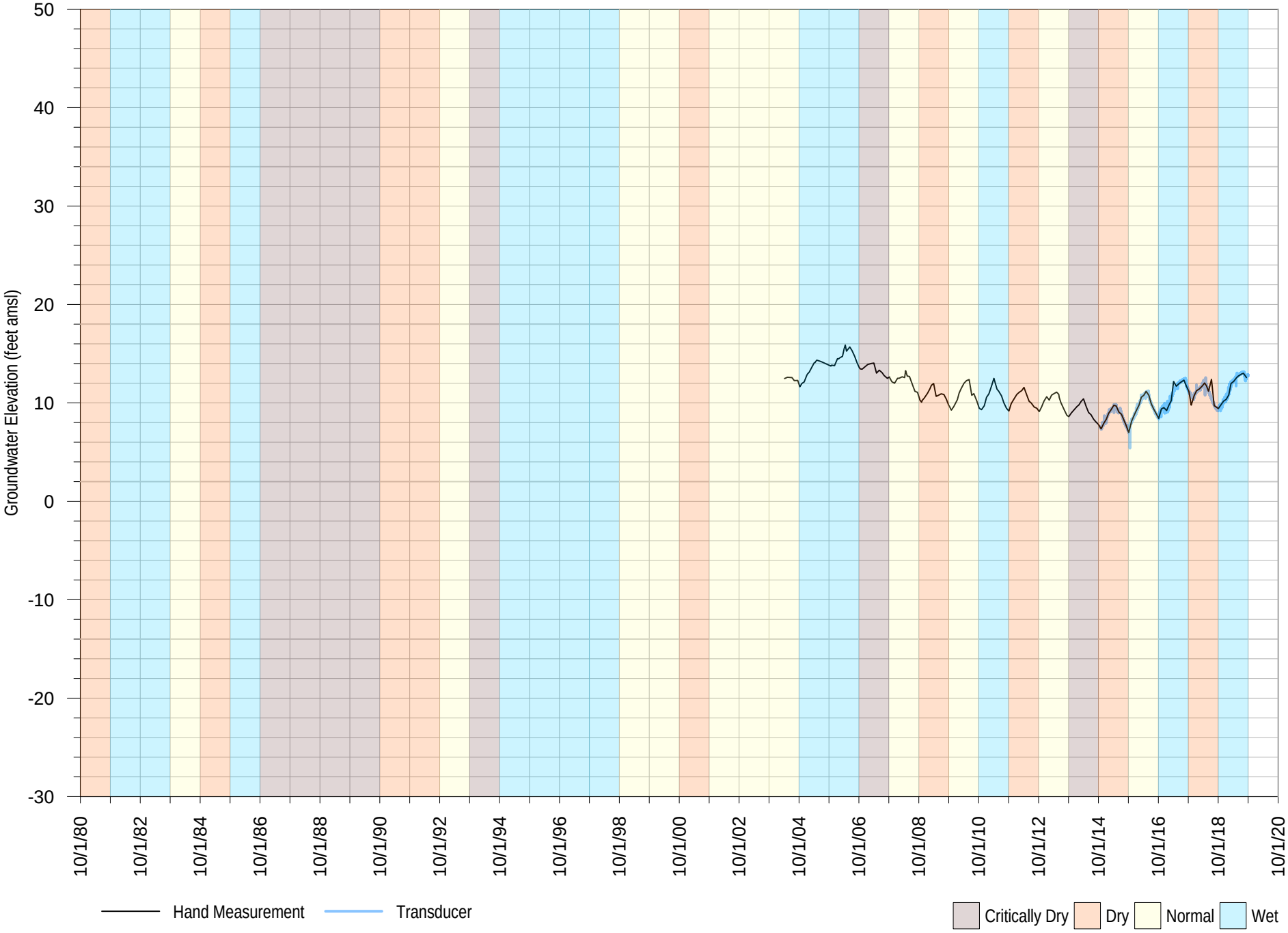
Coffee Lane Deep

FIGURE A-49



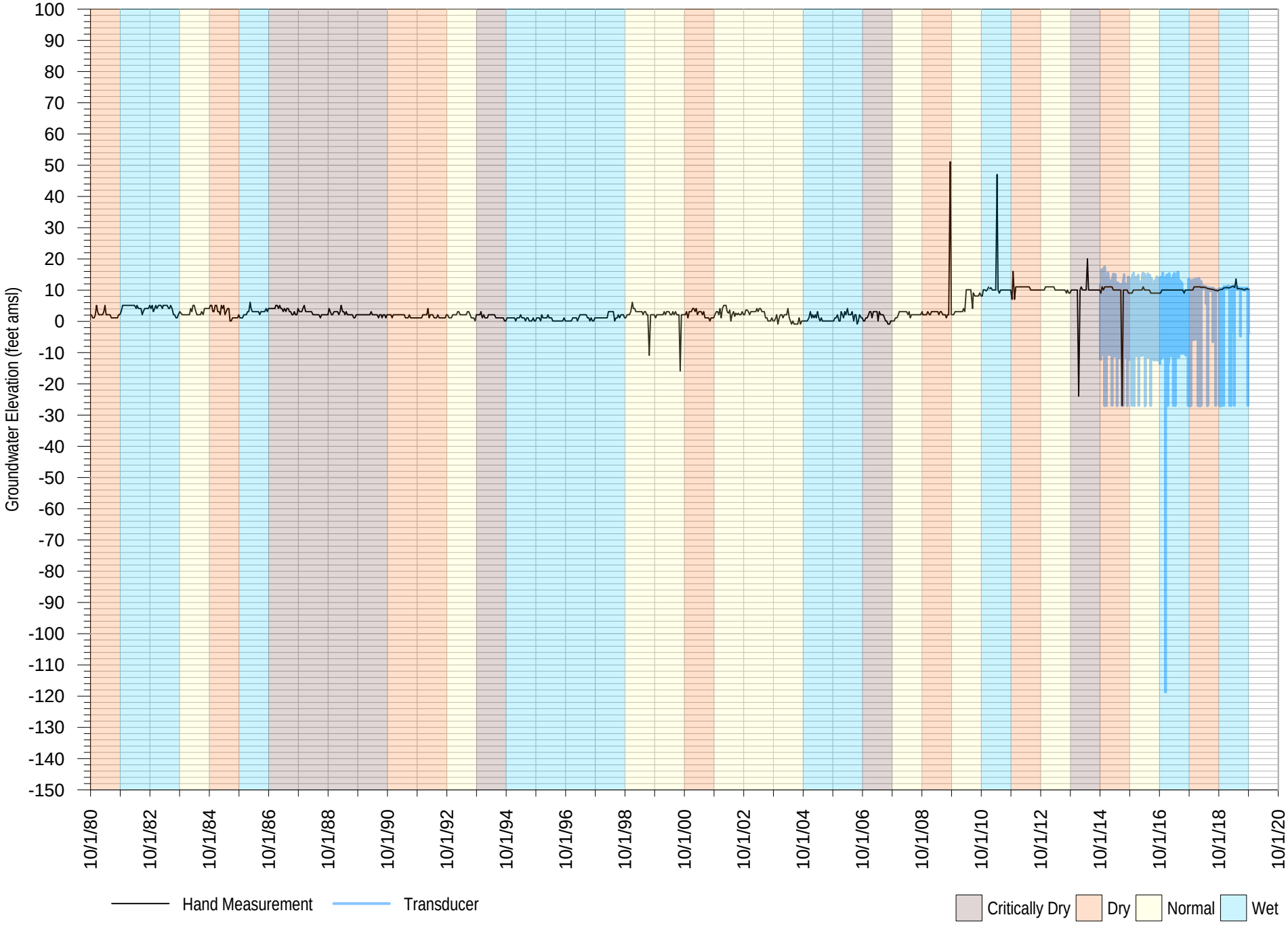
Corcoran Deep

FIGURE A-50



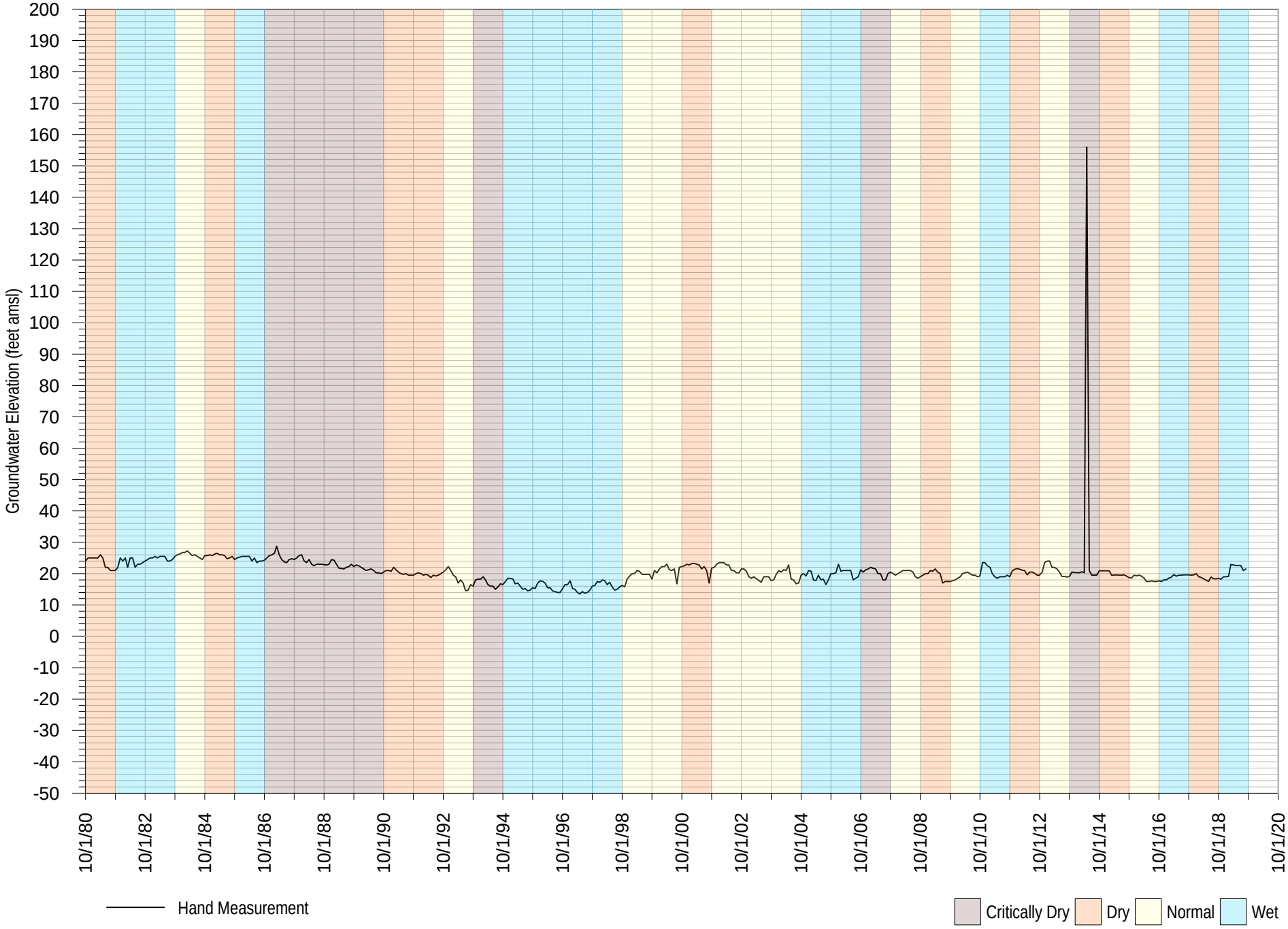
Country Club

FIGURE A-51



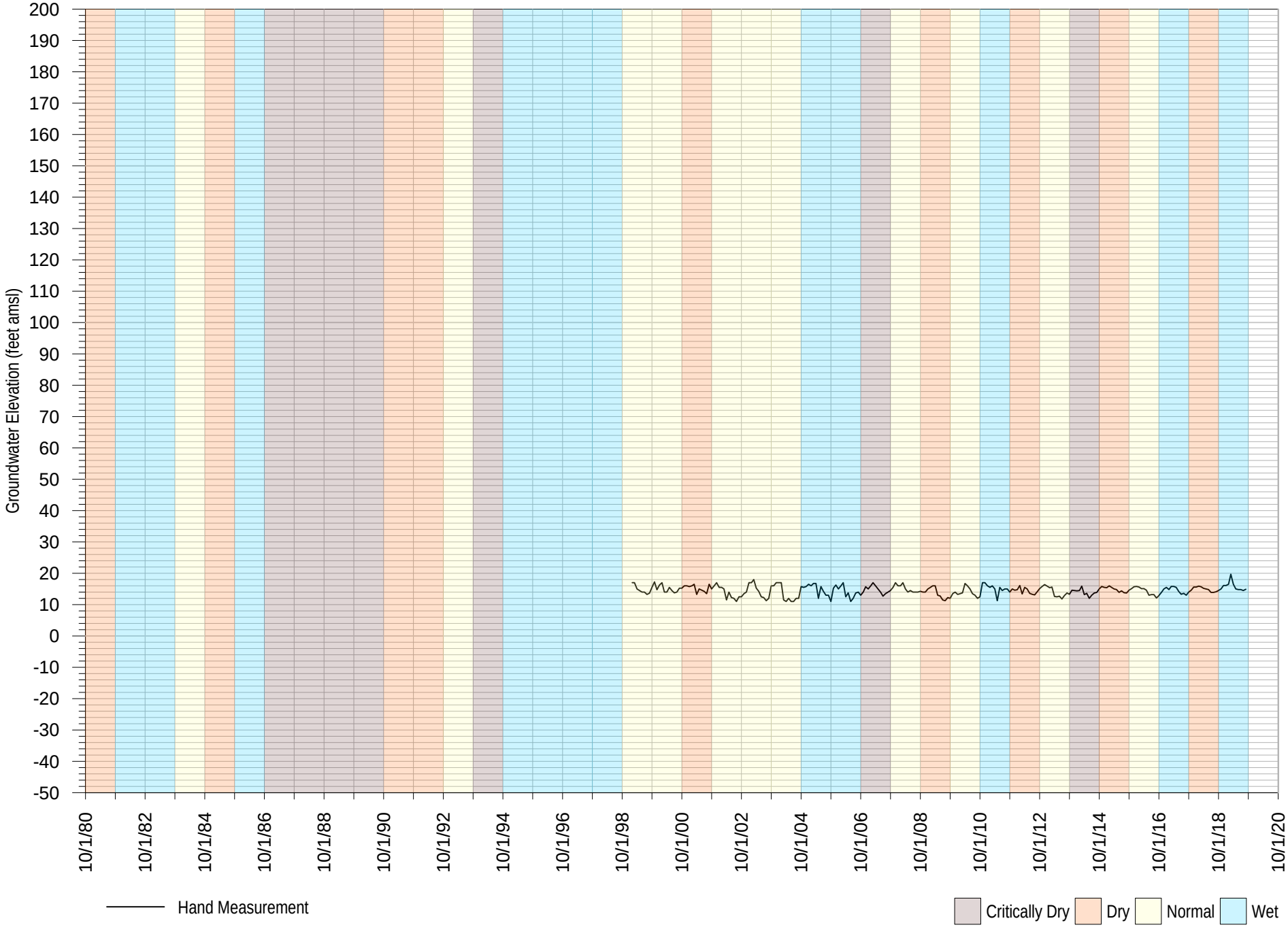
Rob Roy 10

FIGURE A-52



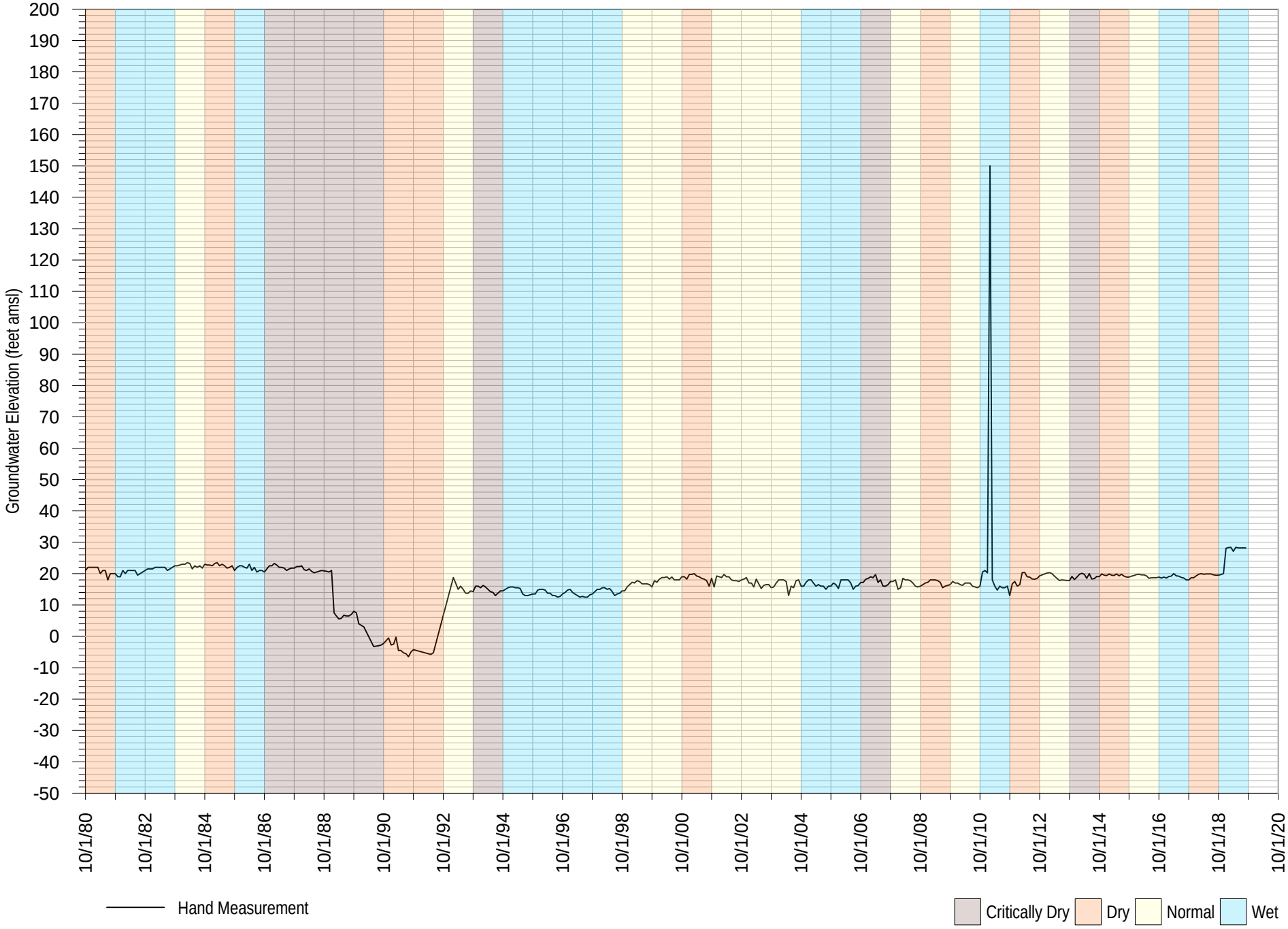
Rob Roy 12

FIGURE A-53



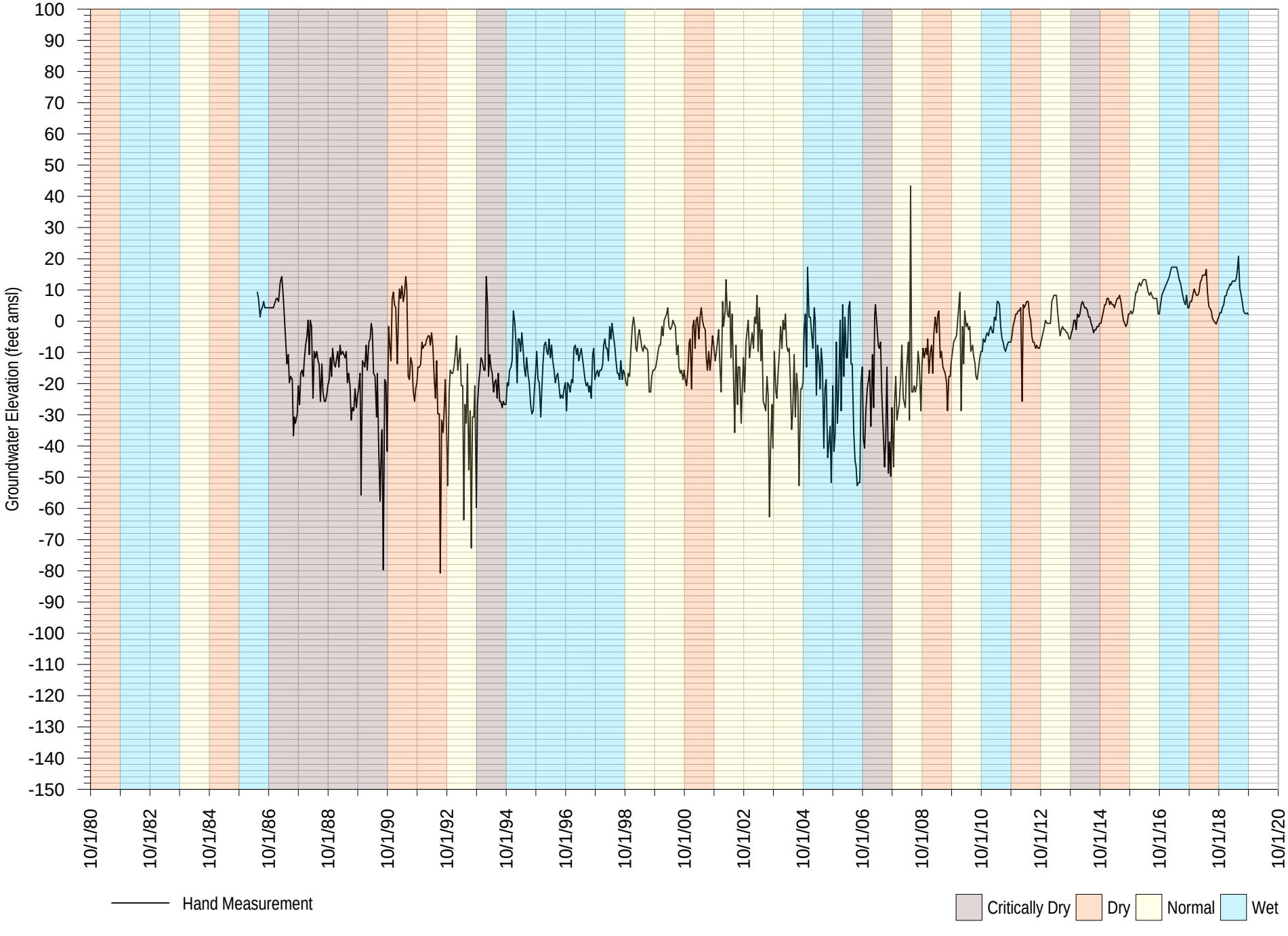
Rob Roy 4

FIGURE A-54



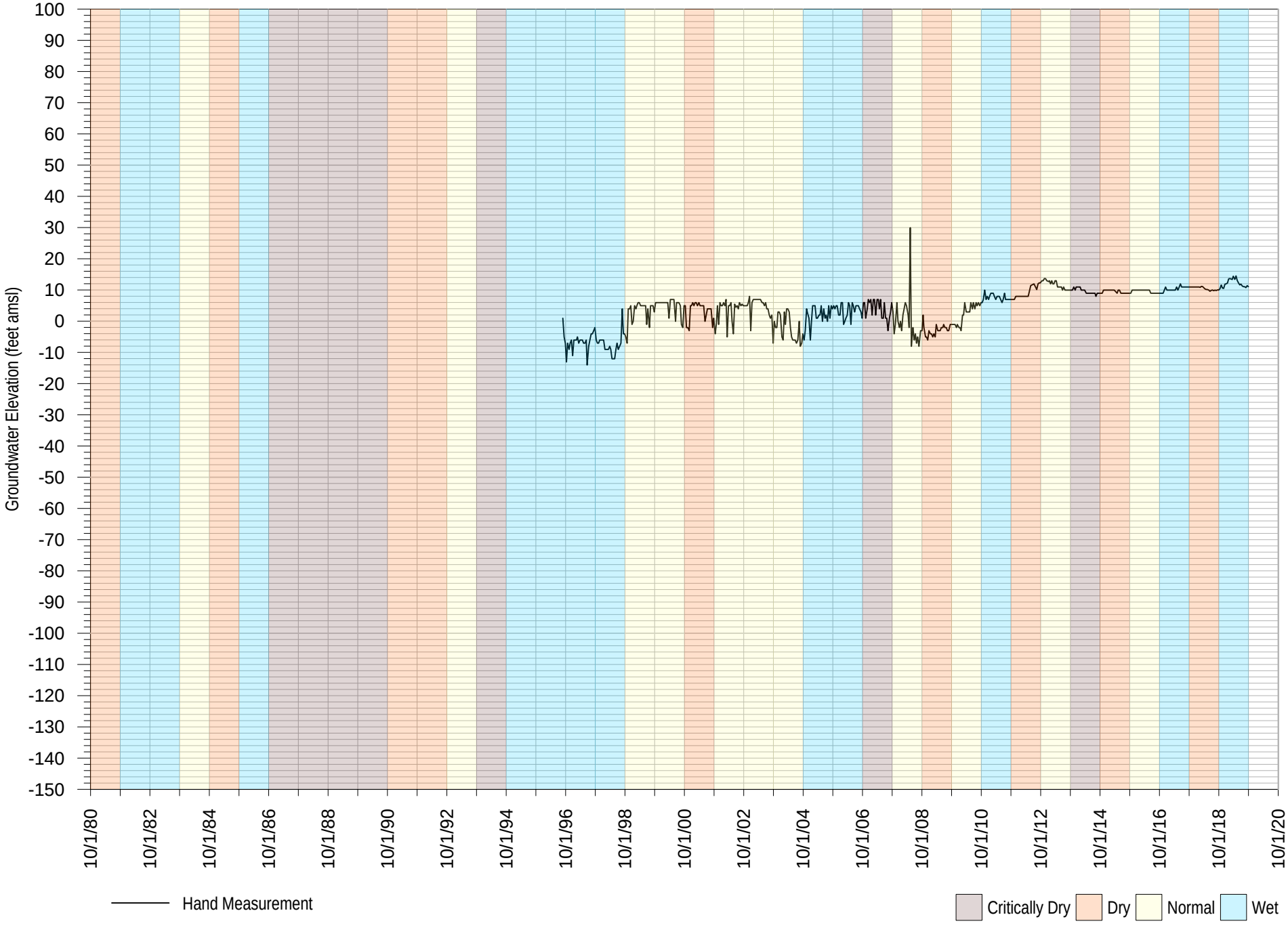
Estates

FIGURE A-55



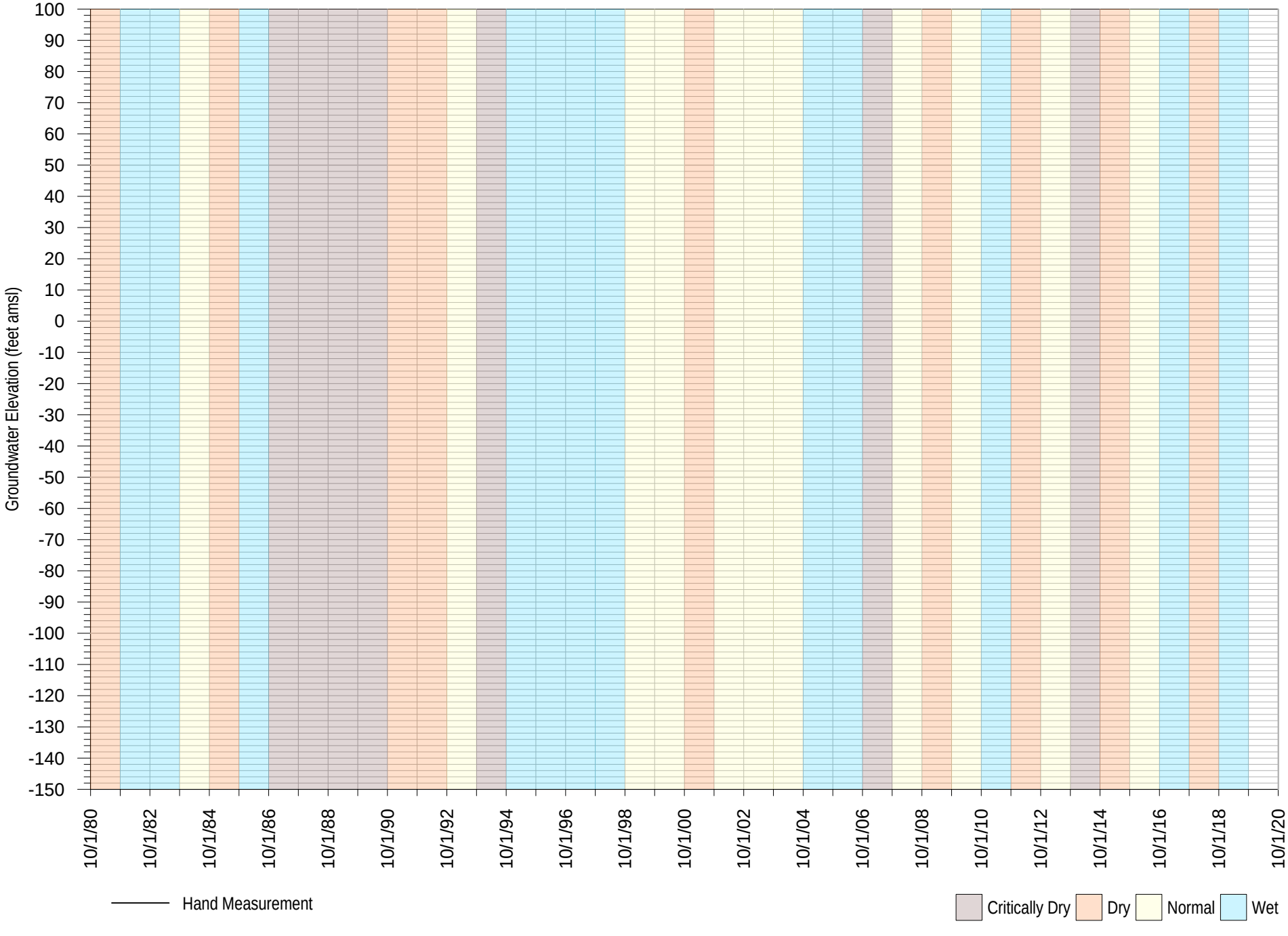
Garnet

FIGURE A-56



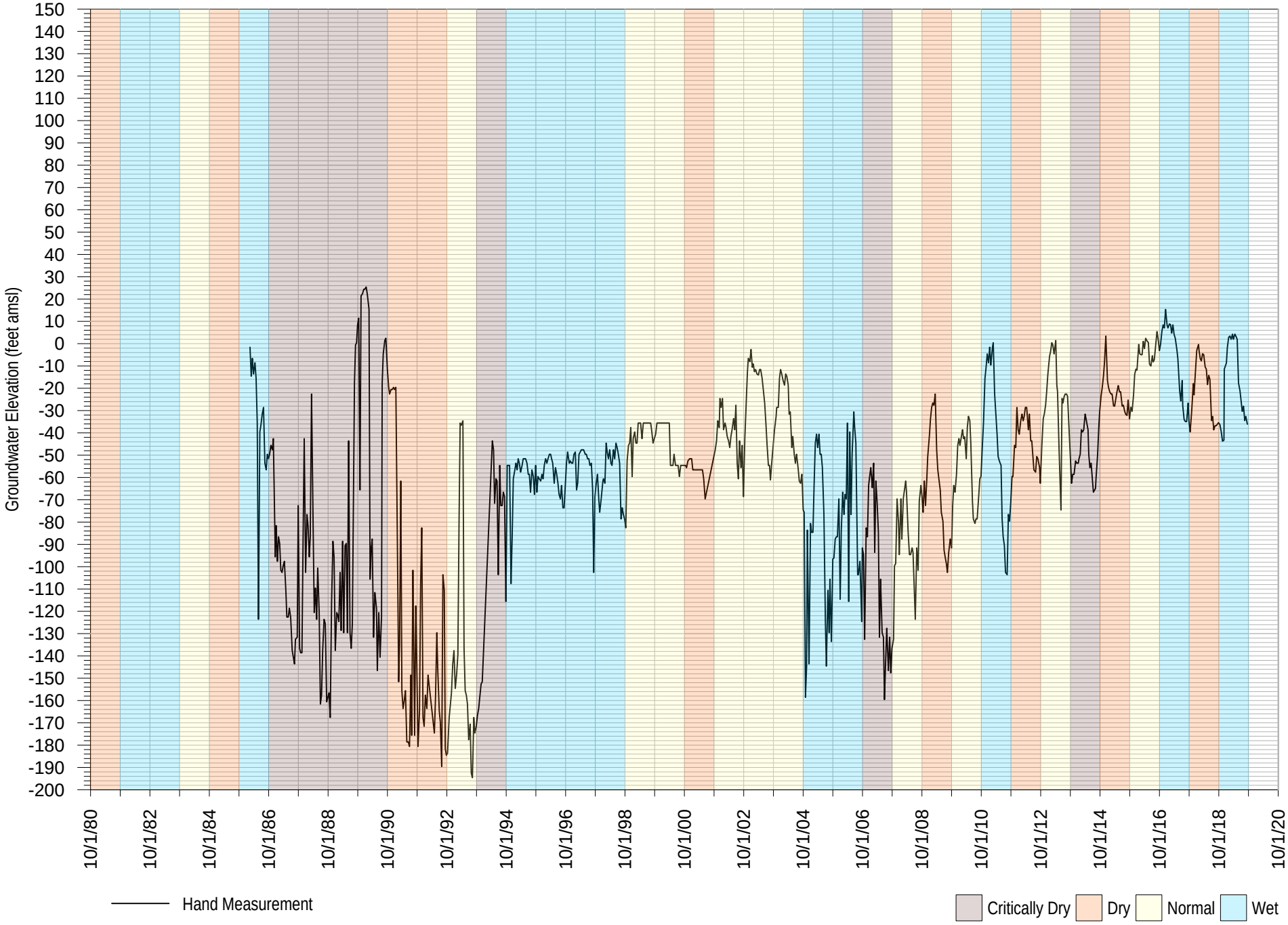
Granite Way

FIGURE A-57



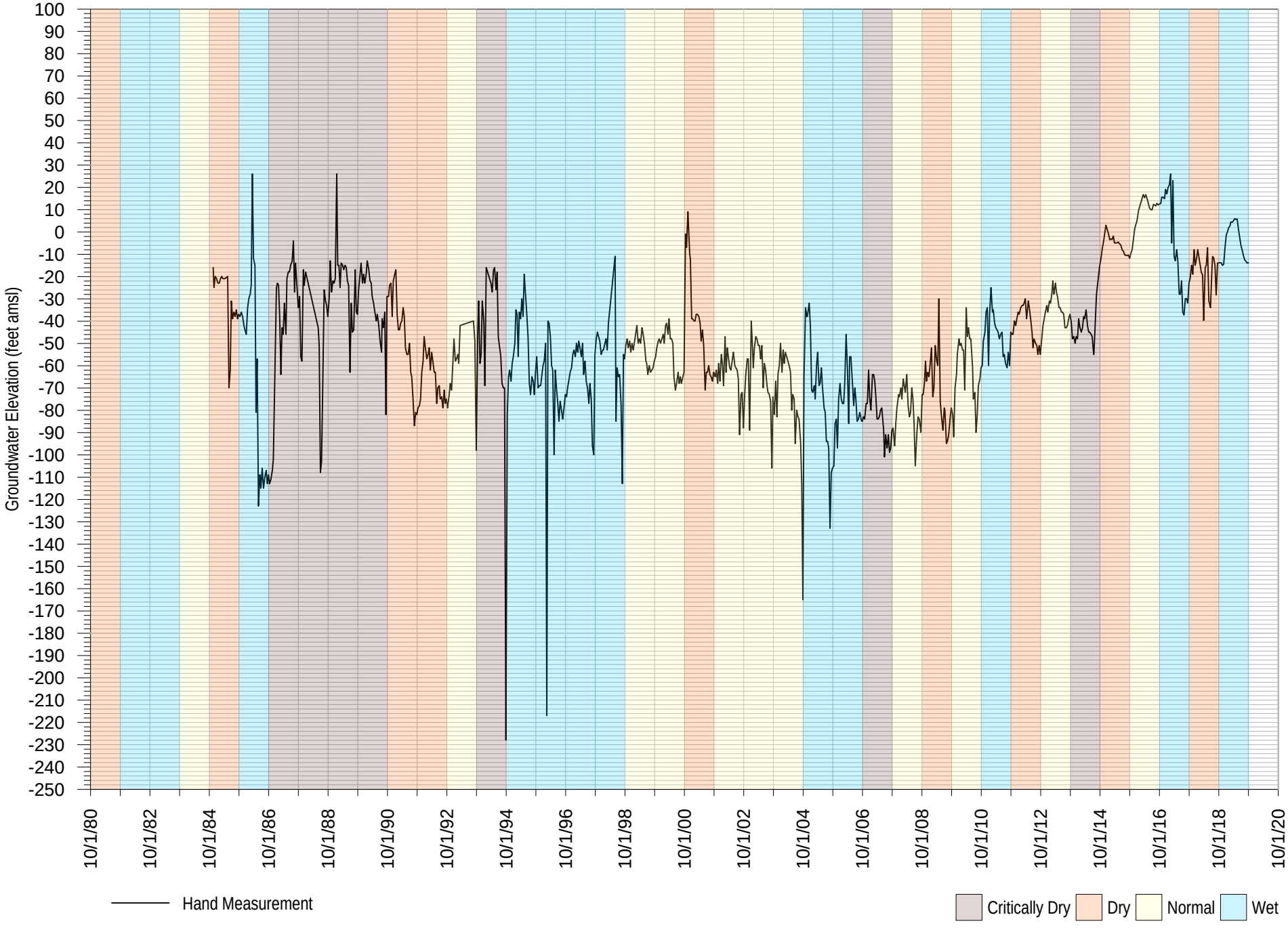
Ledyard

FIGURE A-58



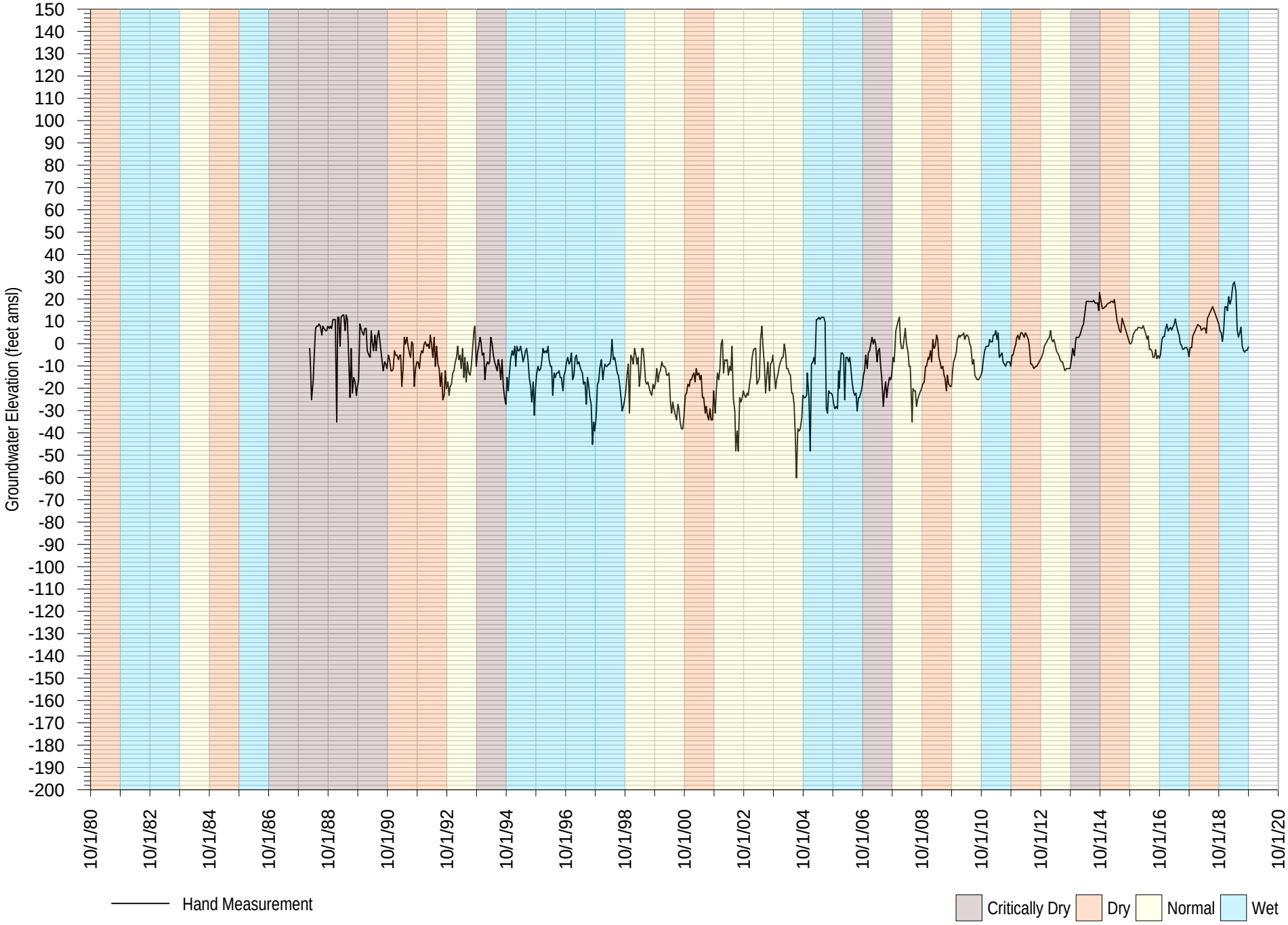
Madeline

FIGURE A-59



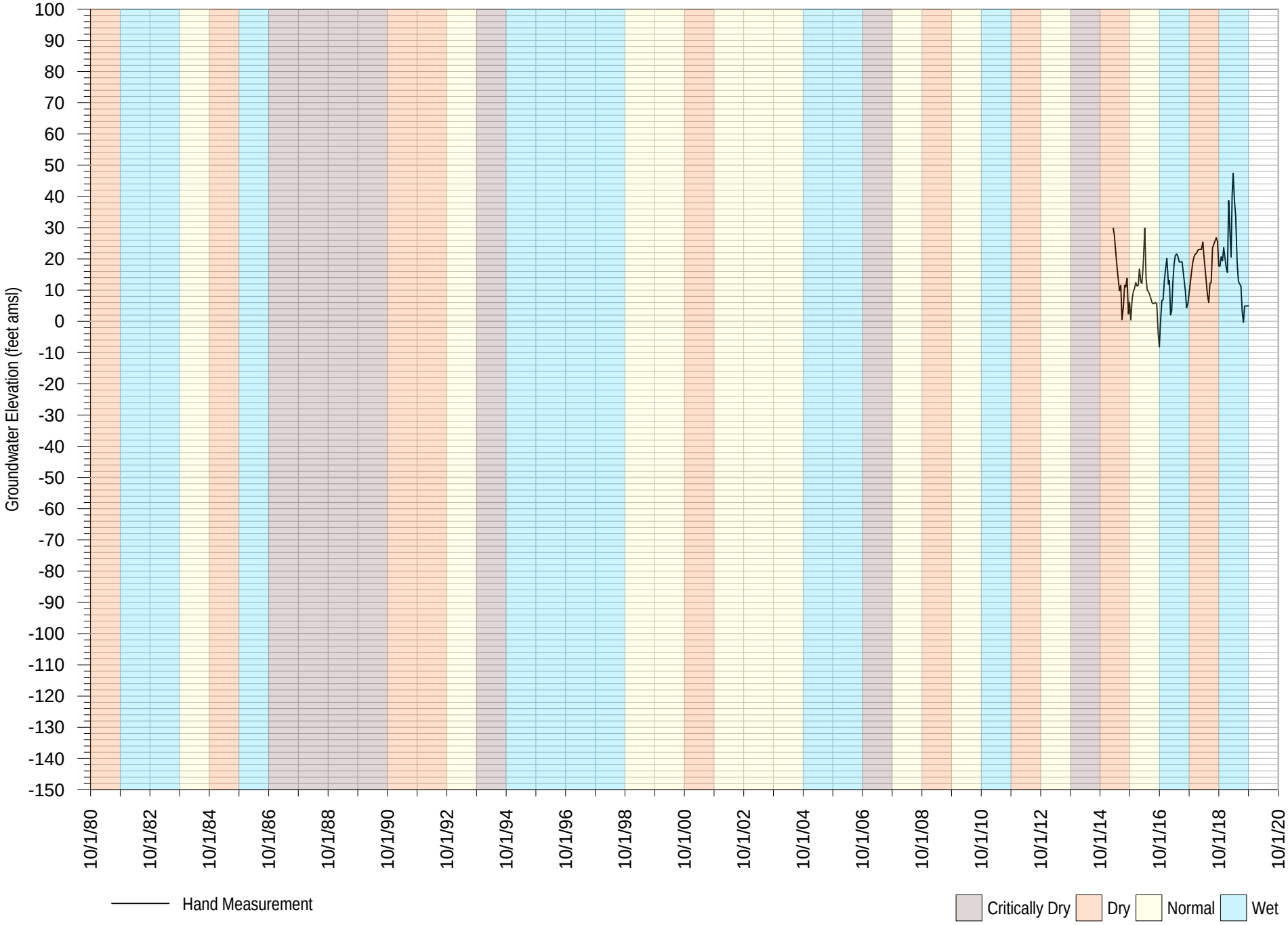
Main Street

FIGURE A-60



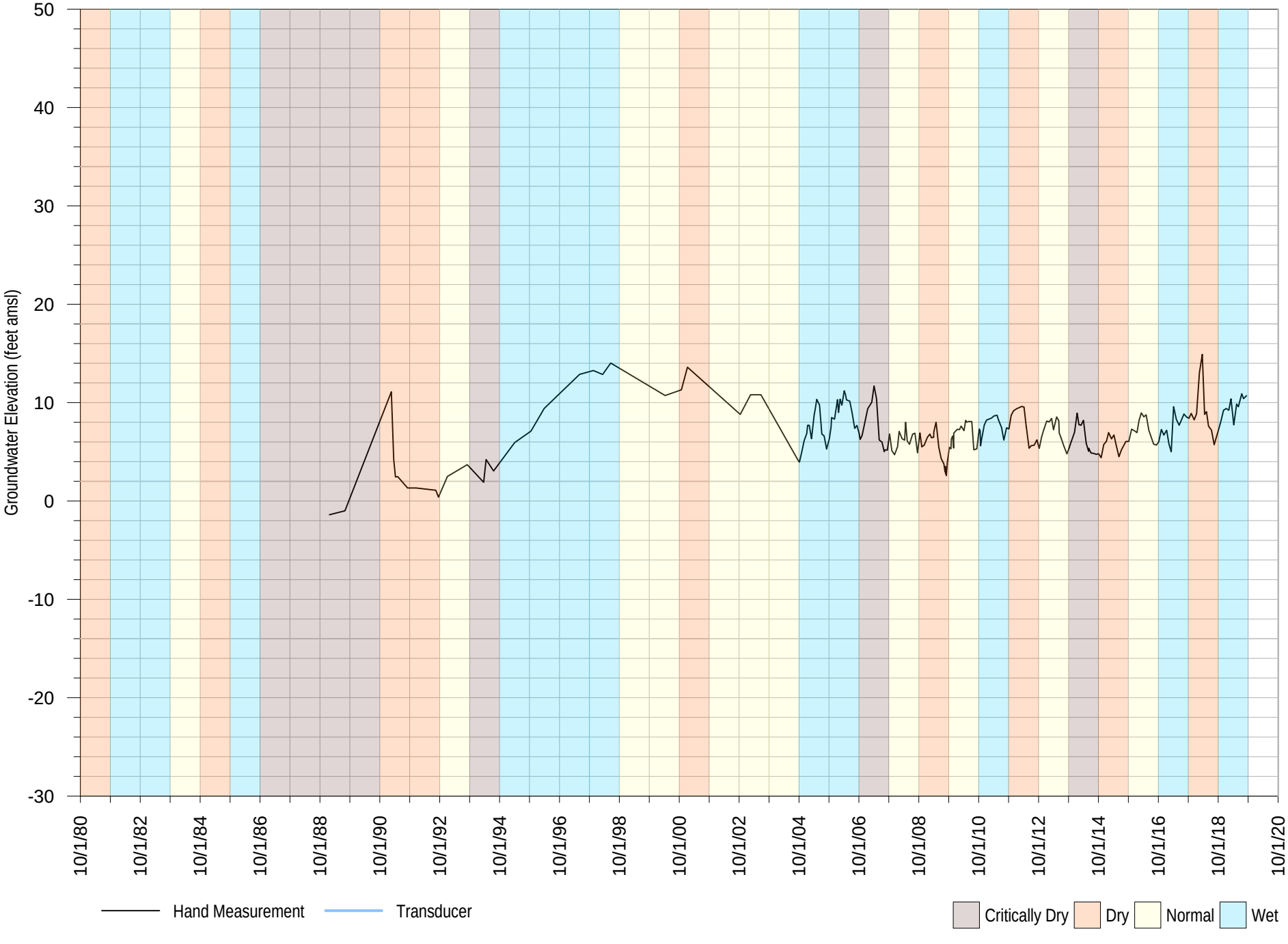
O'Neill Ranch

FIGURE A-61



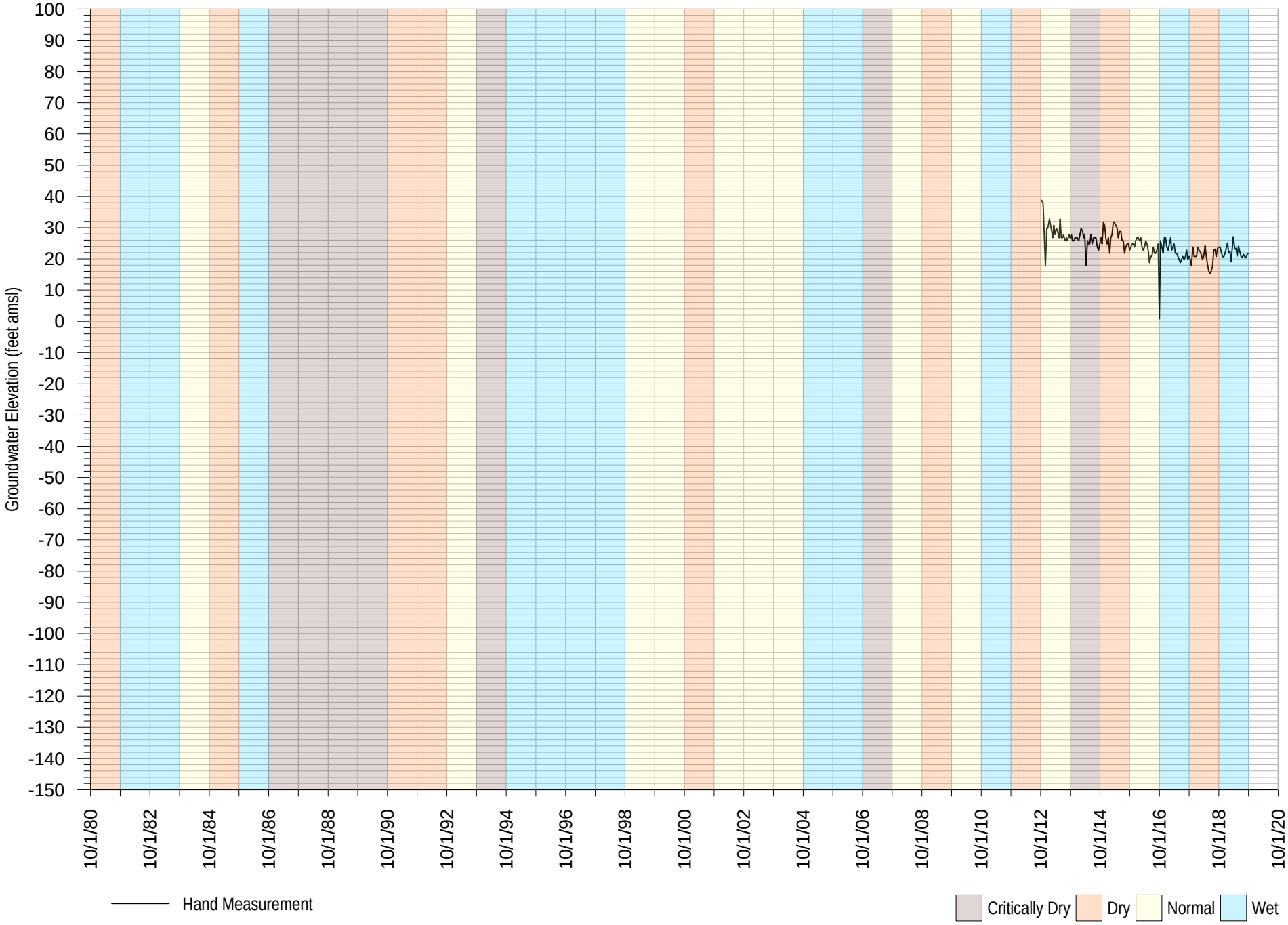
Pleasure Point Shallow

FIGURE A-62



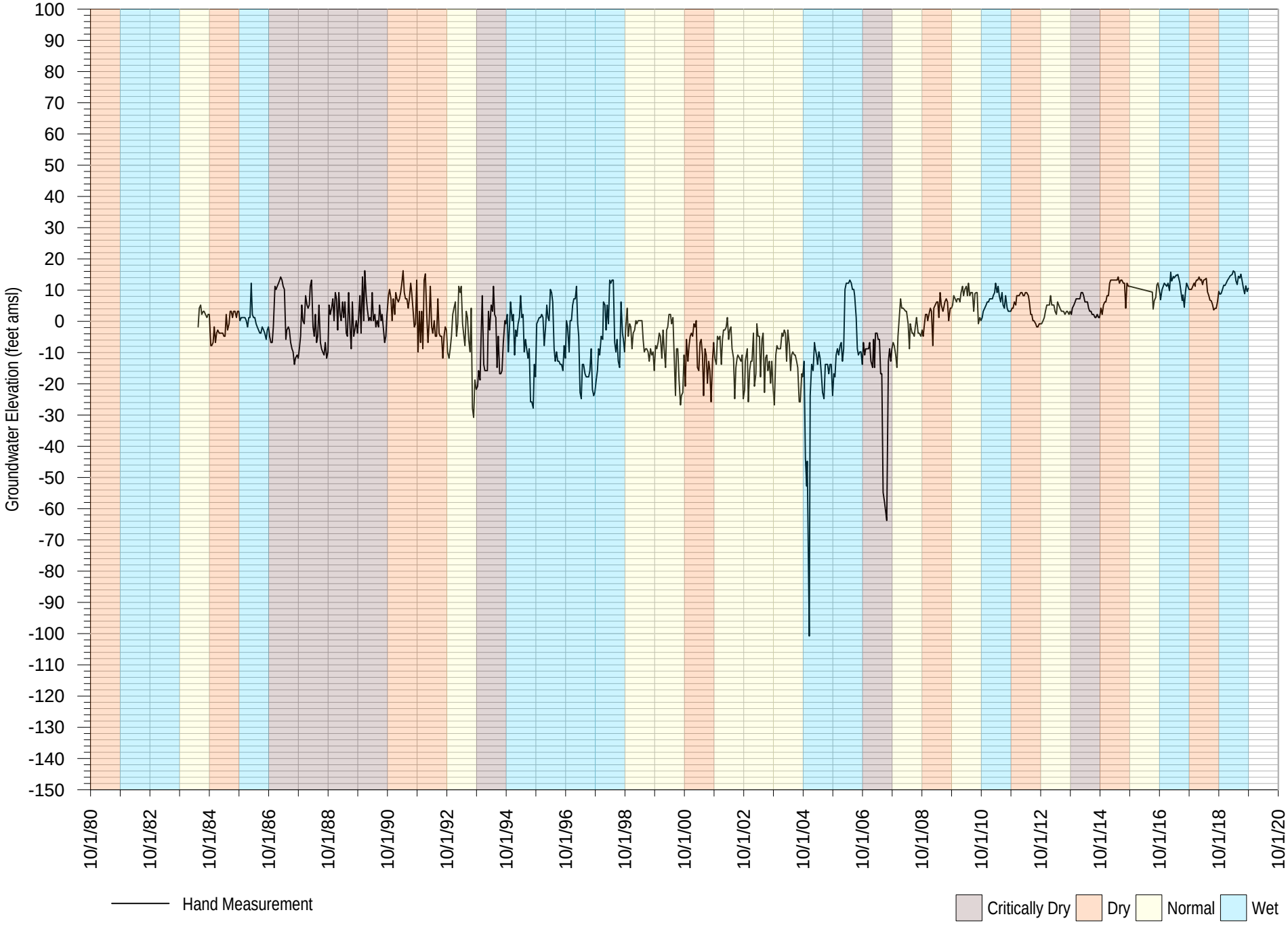
Polo Grounds

FIGURE A-63



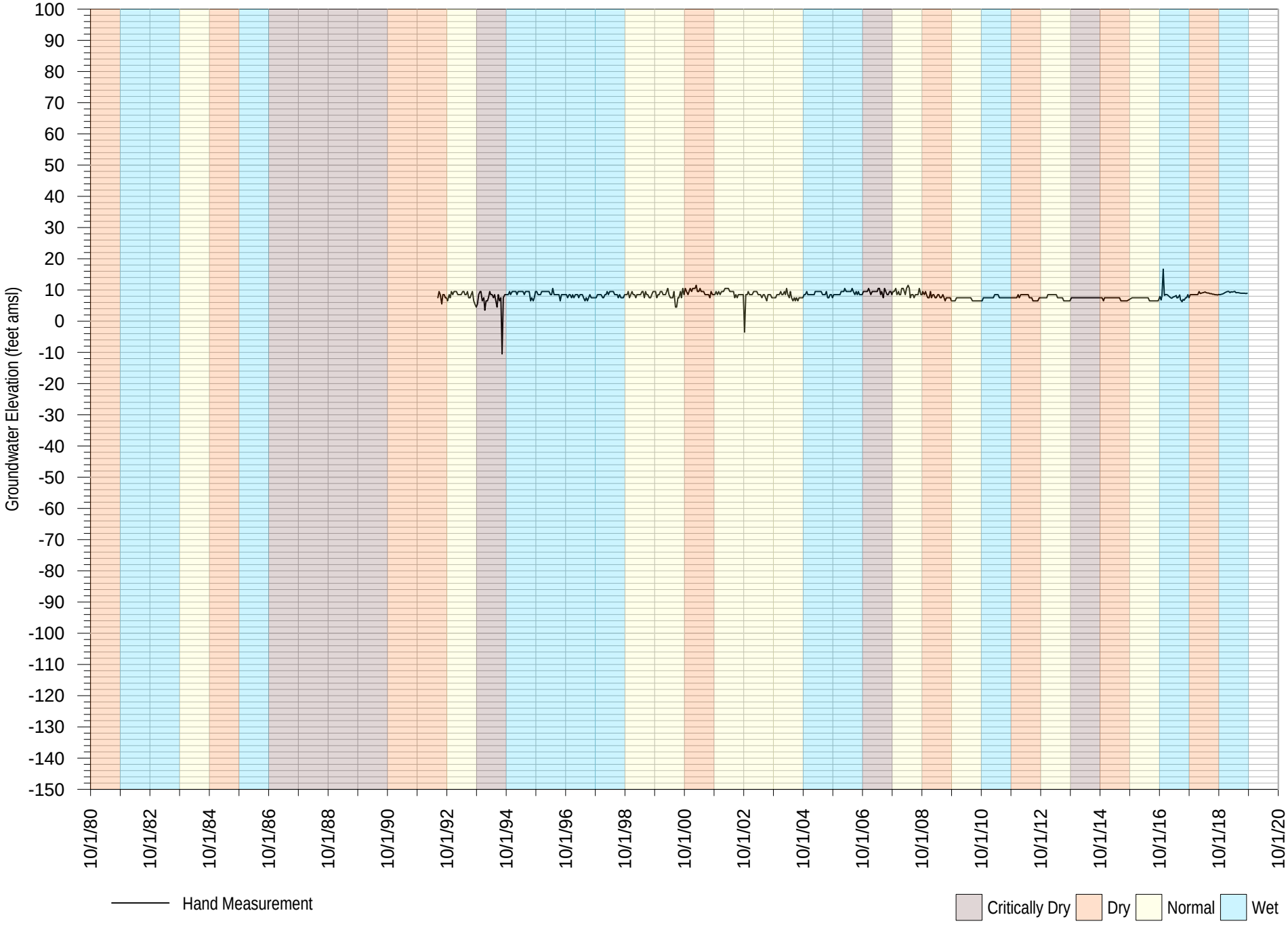
Rosedale

FIGURE A-64



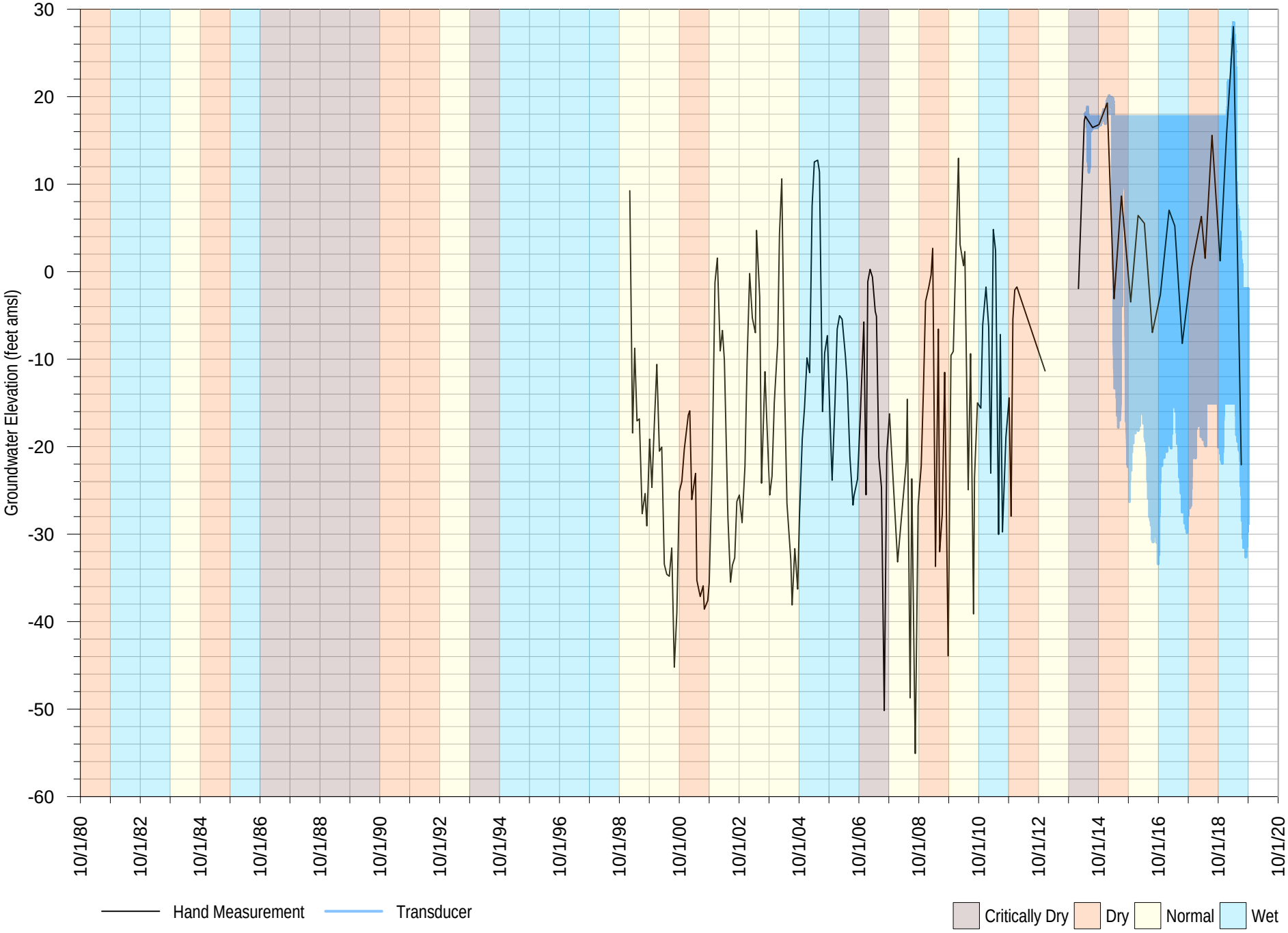
San Andreas

FIGURE A-65



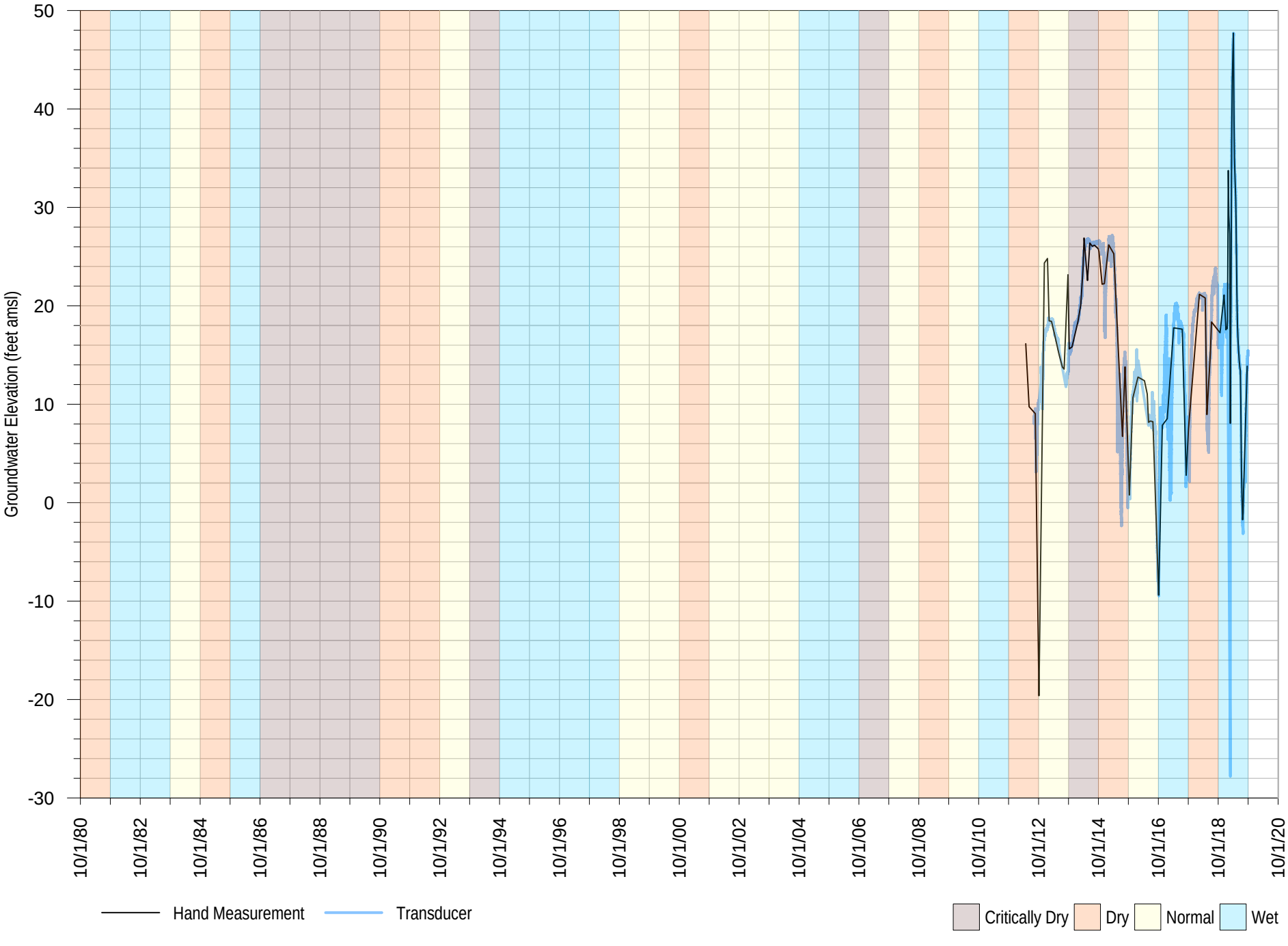
SC-18AA

FIGURE A-66



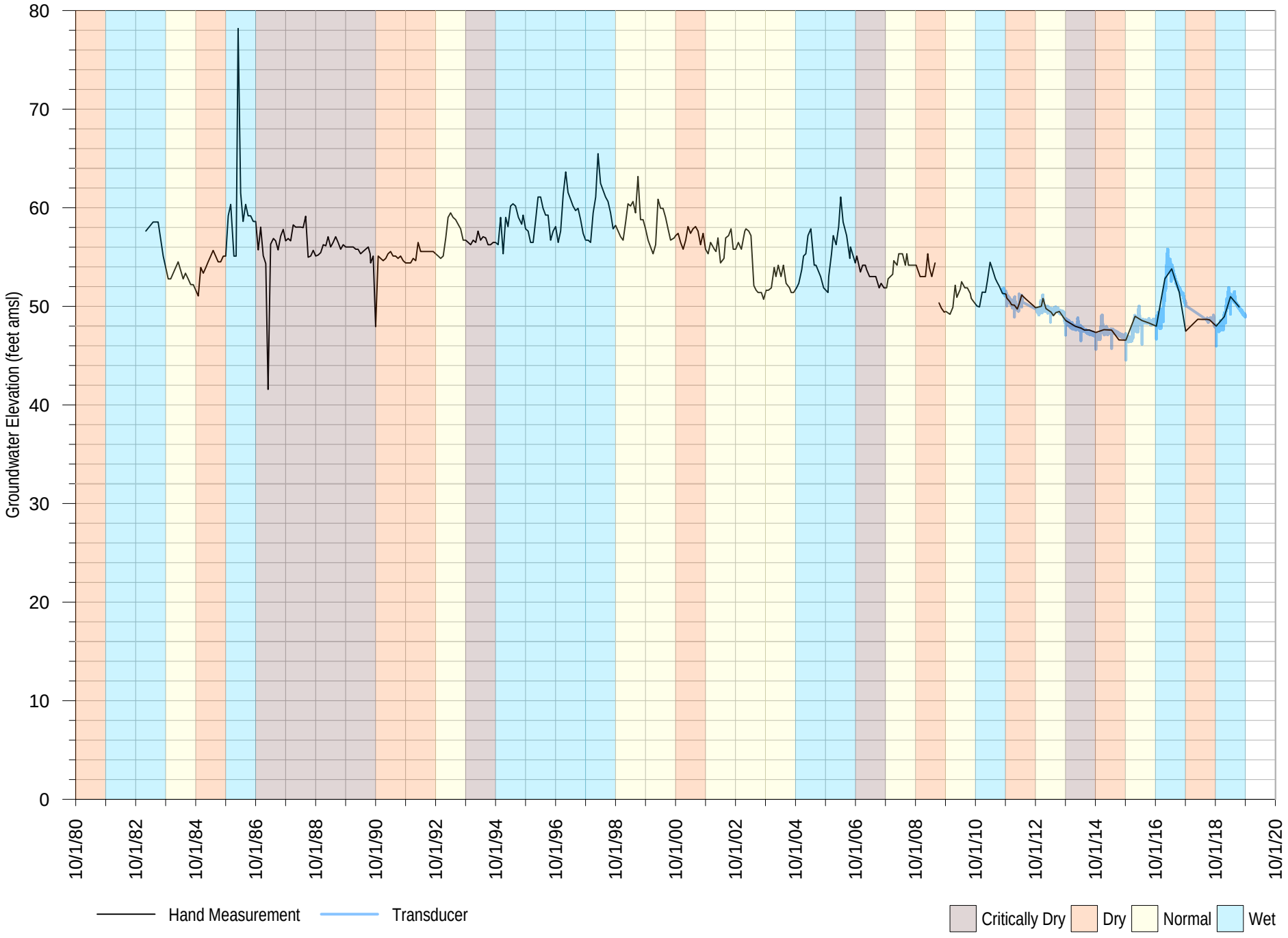
SC-22AAA

FIGURE A-67



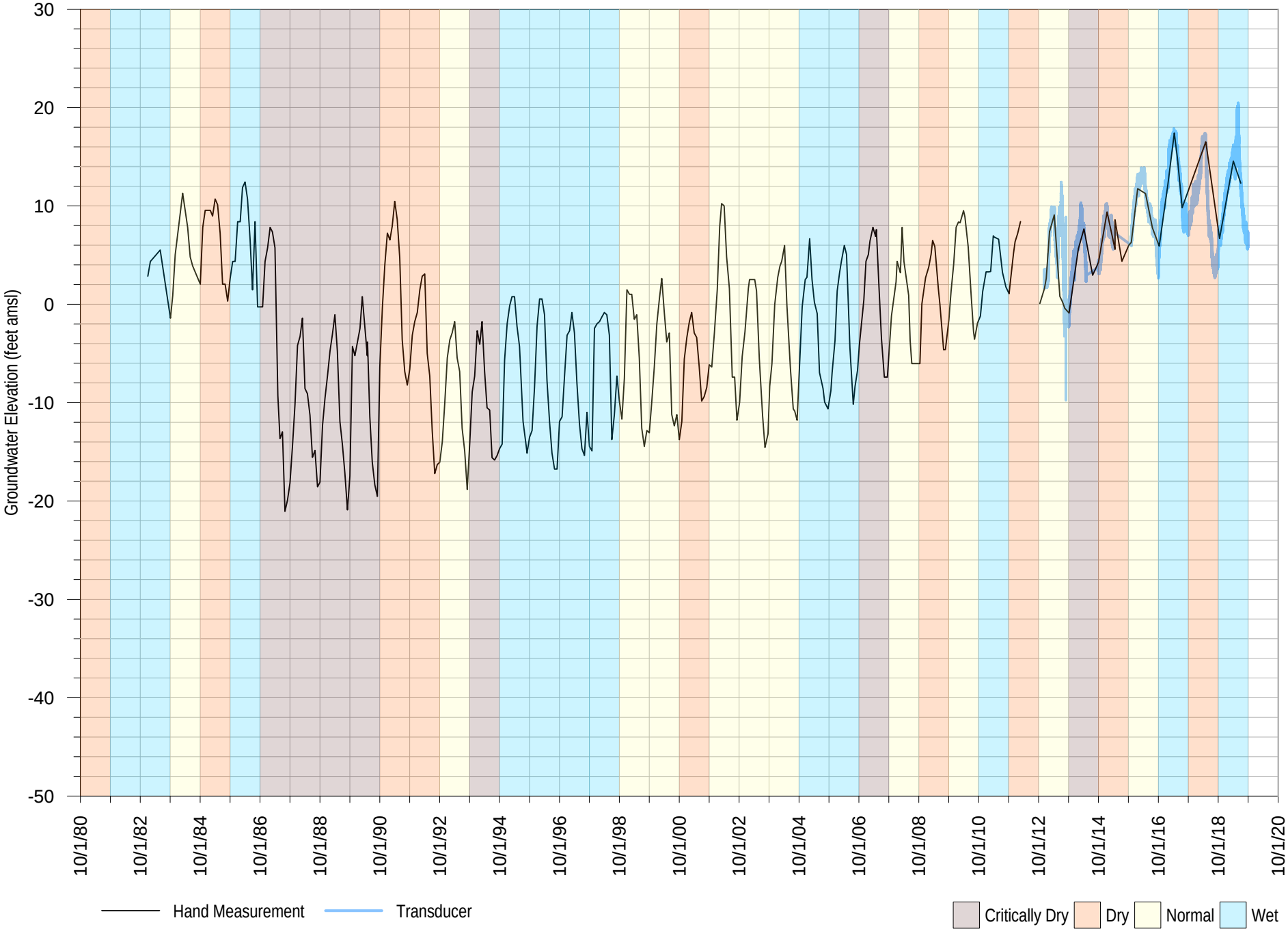
SC-3C

FIGURE A-68



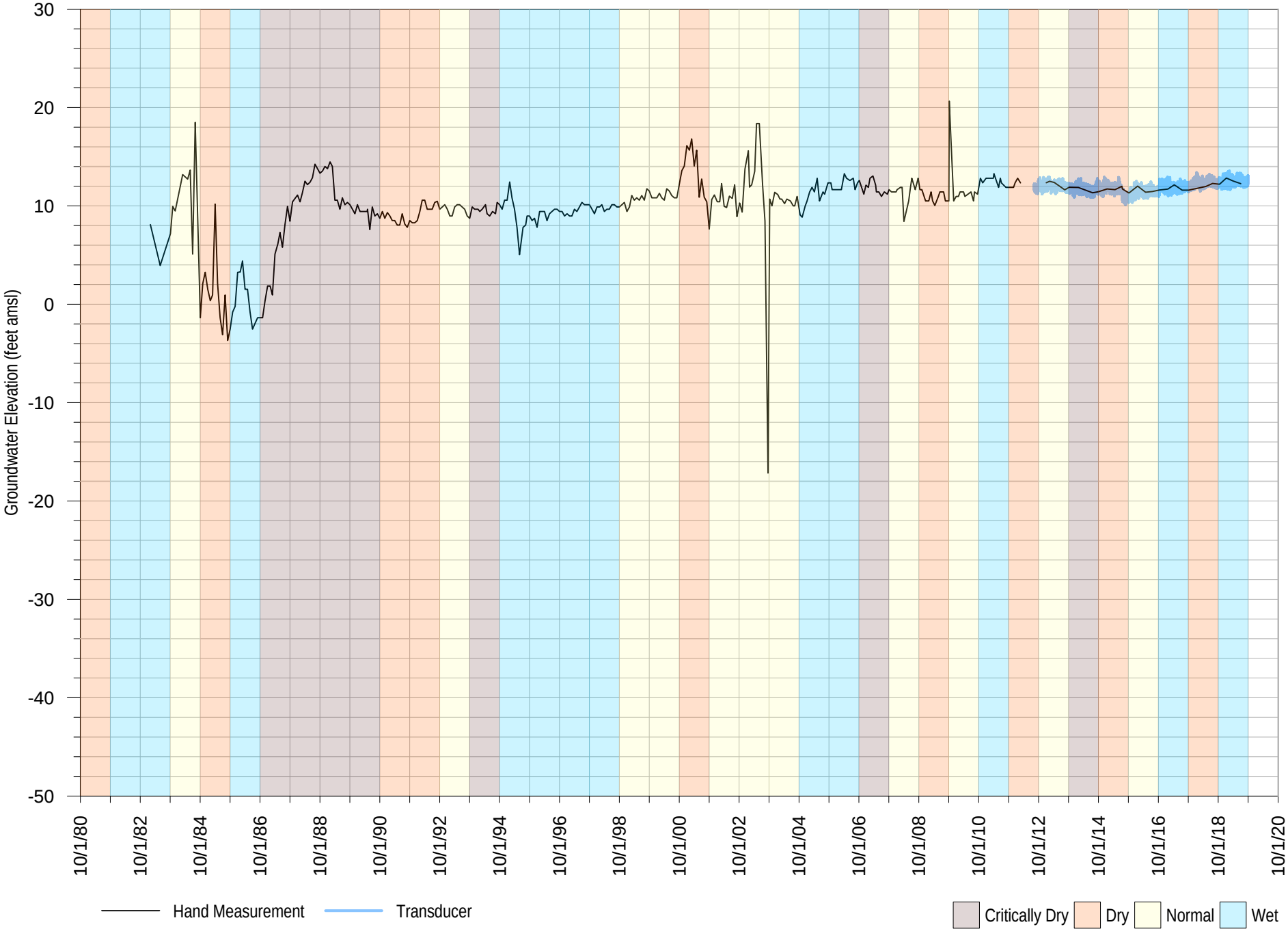
SC-9A

FIGURE A-69



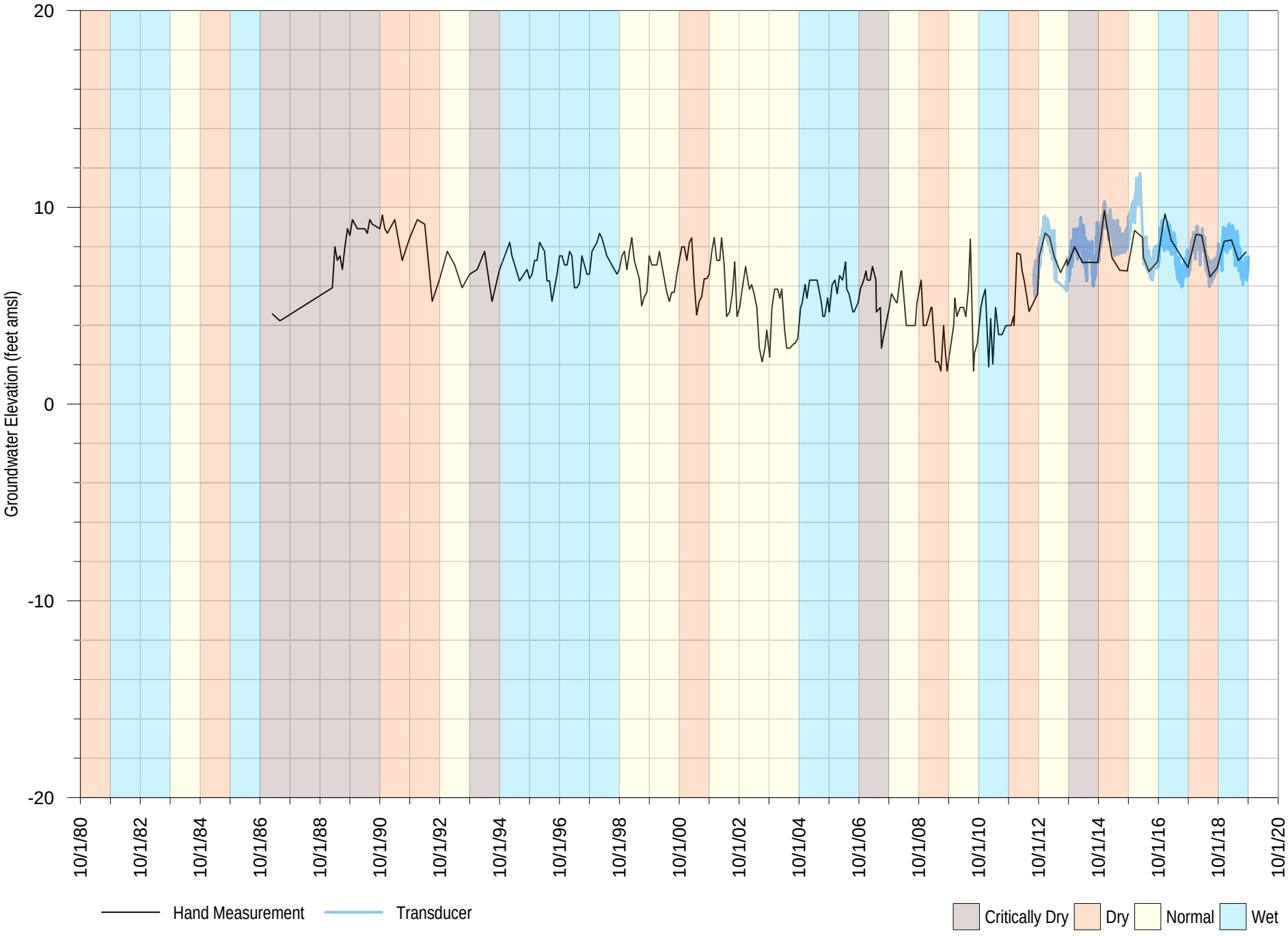
SC-9E

FIGURE A-70



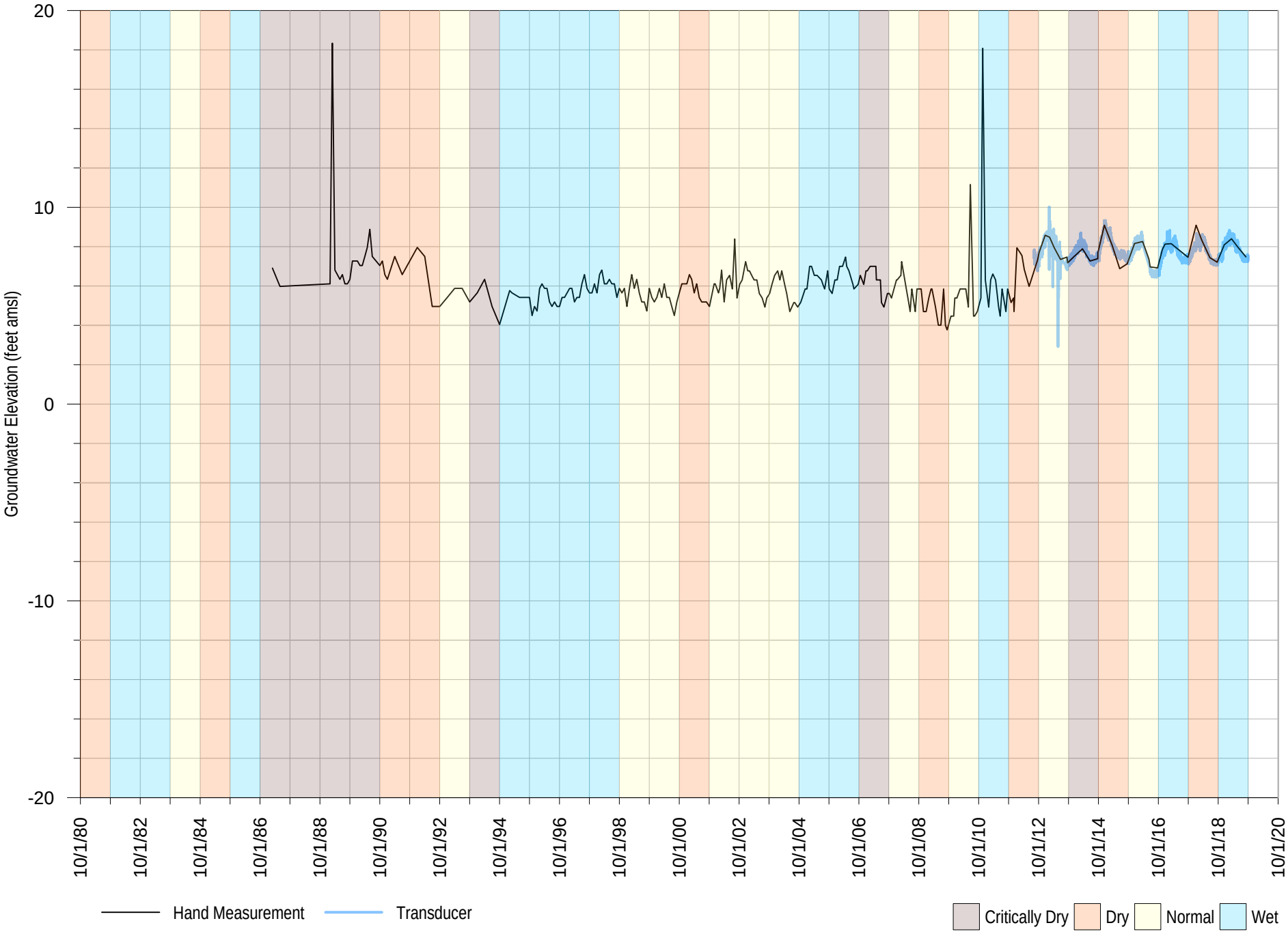
SC-A1A

FIGURE A-71



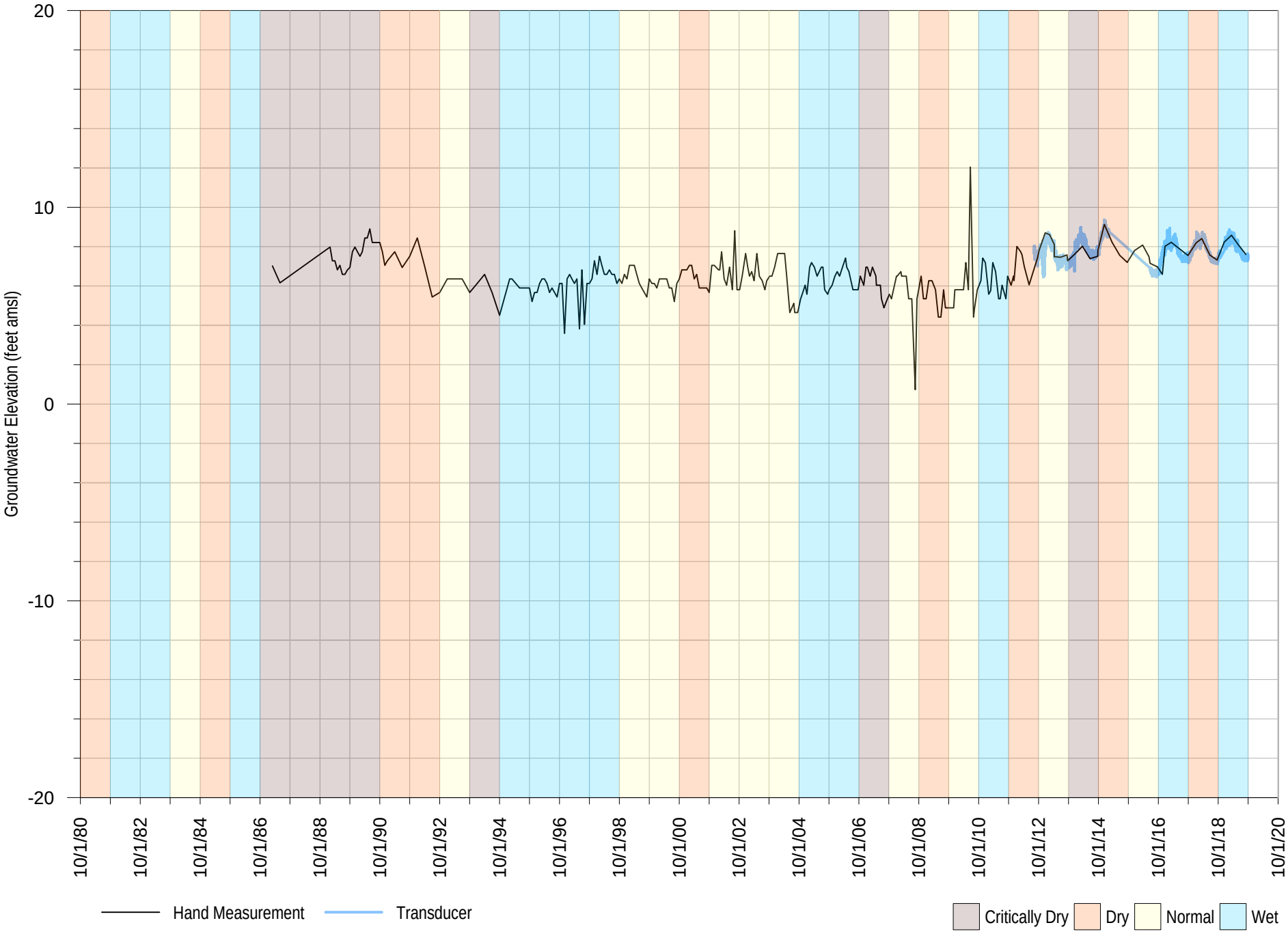
SC-A1C

FIGURE A-72



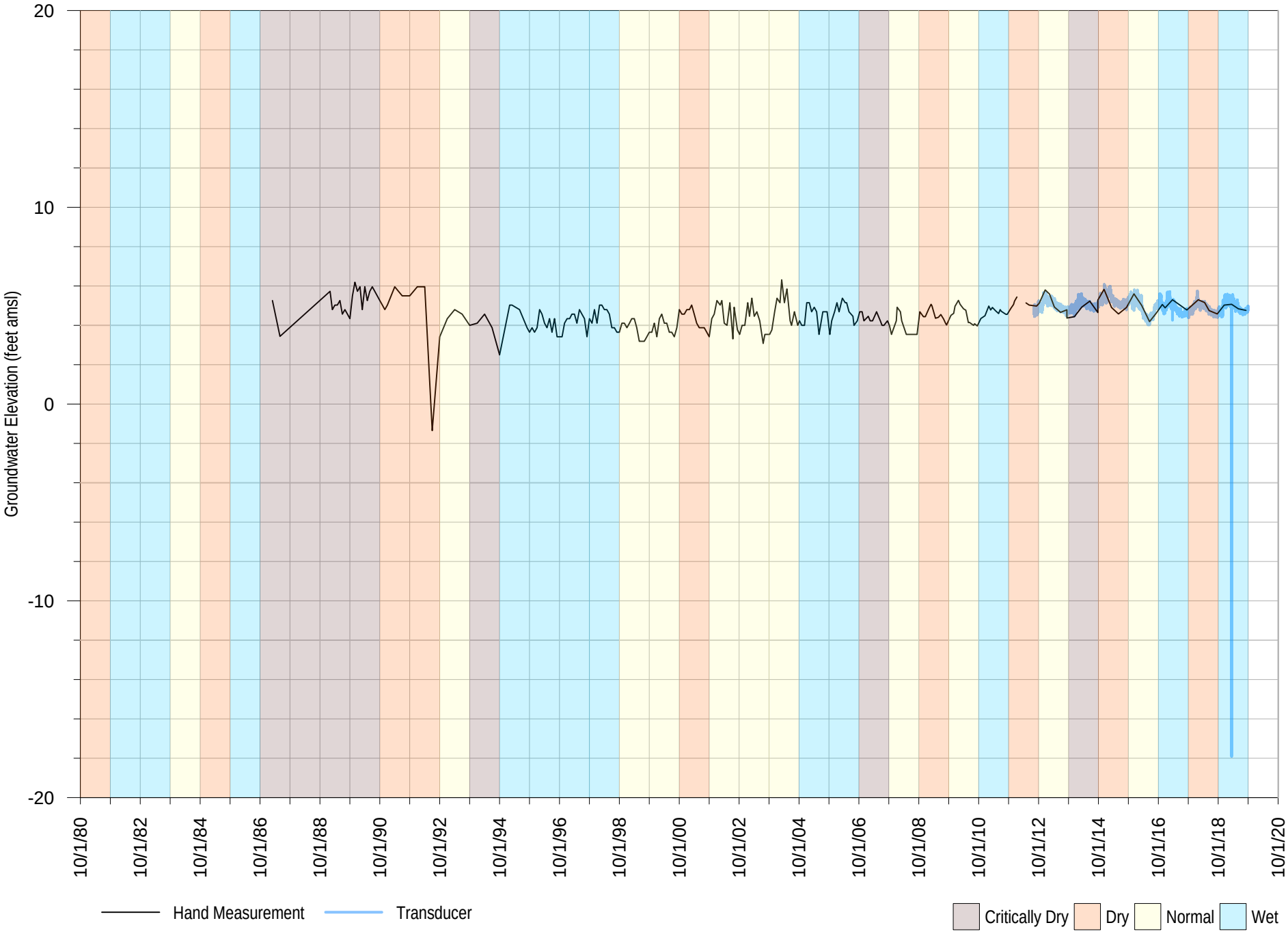
SC-A1D

FIGURE A-73



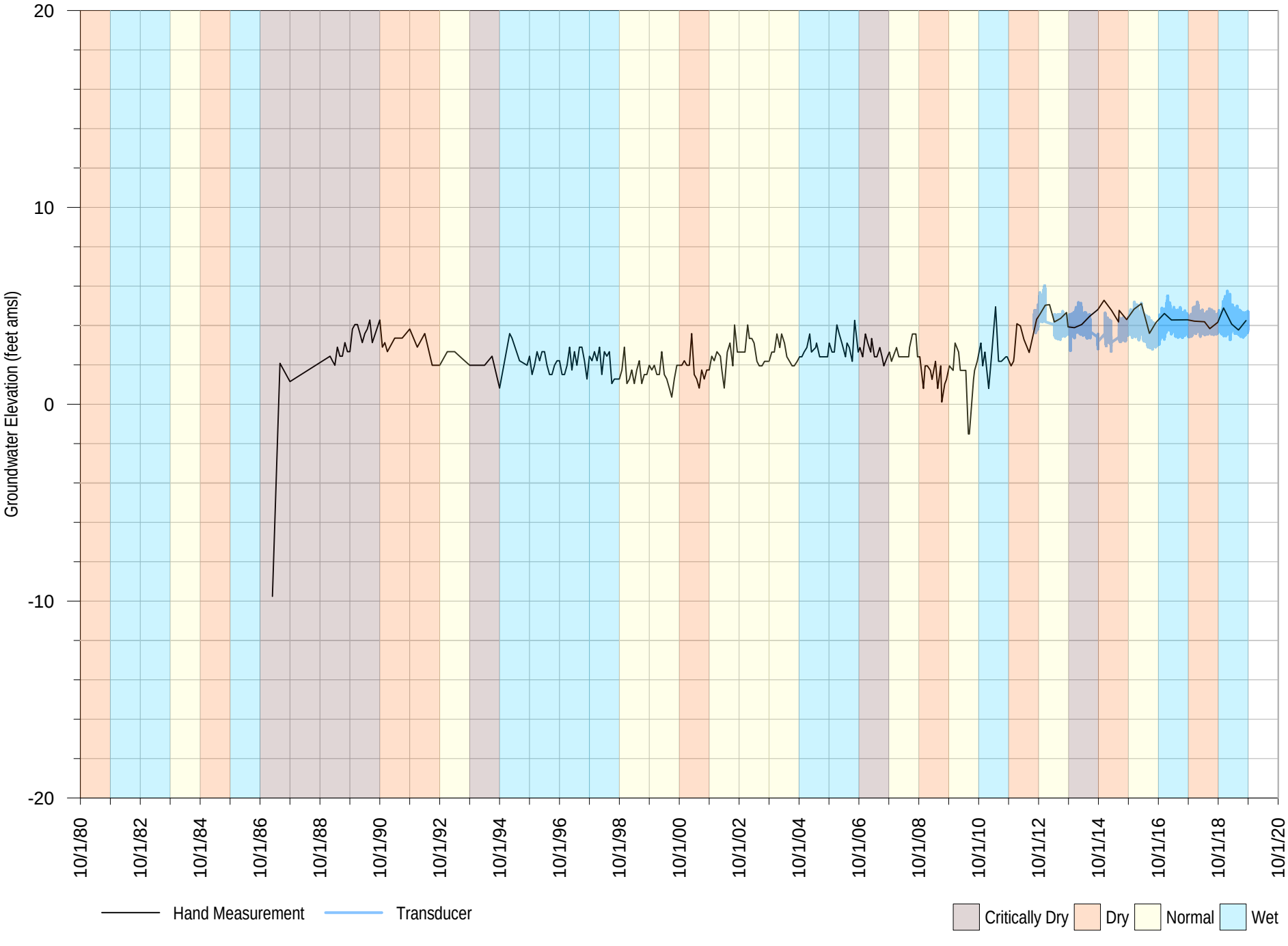
SC-A2C

FIGURE A-74



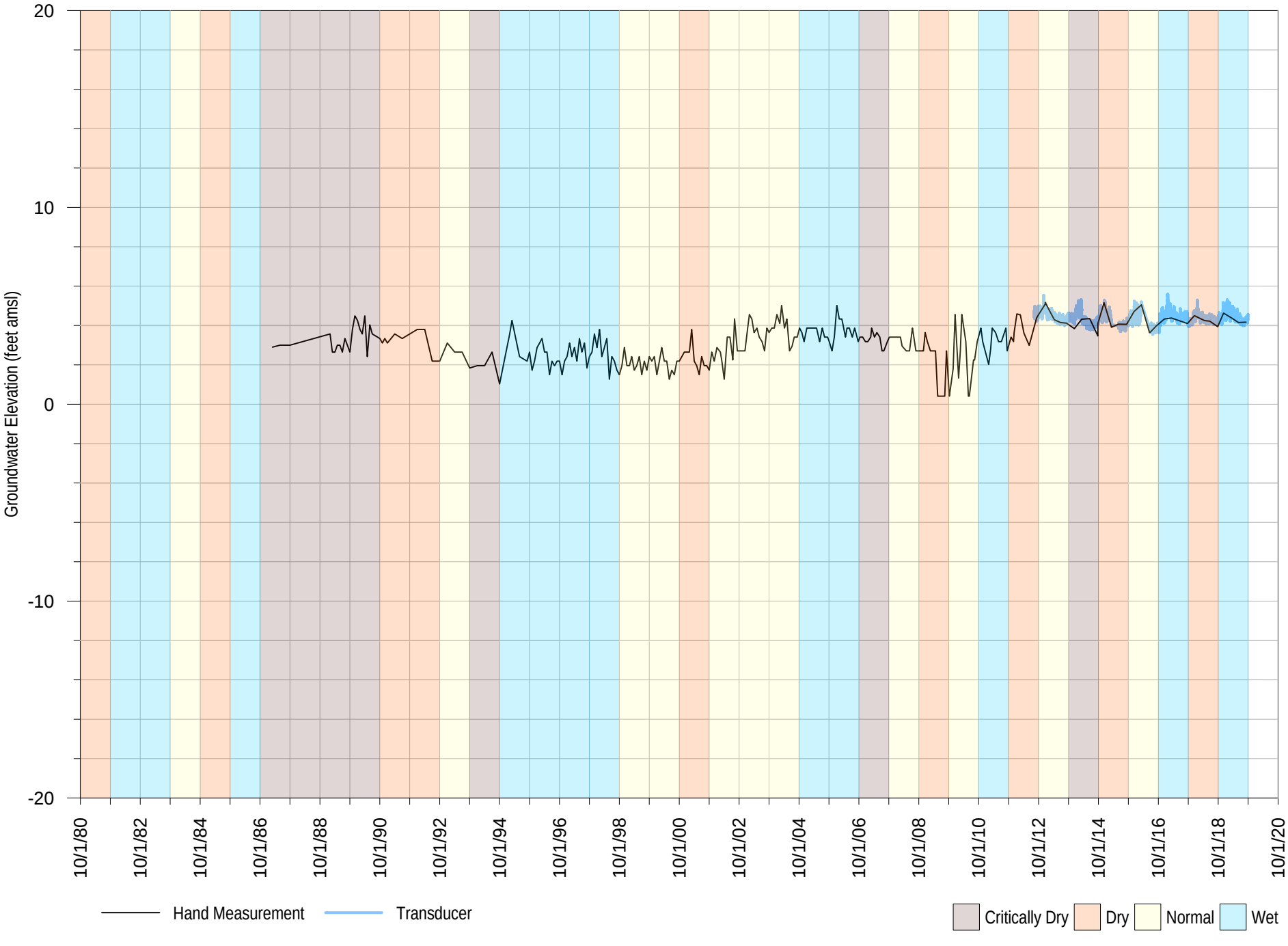
SC-A3B

FIGURE A-75



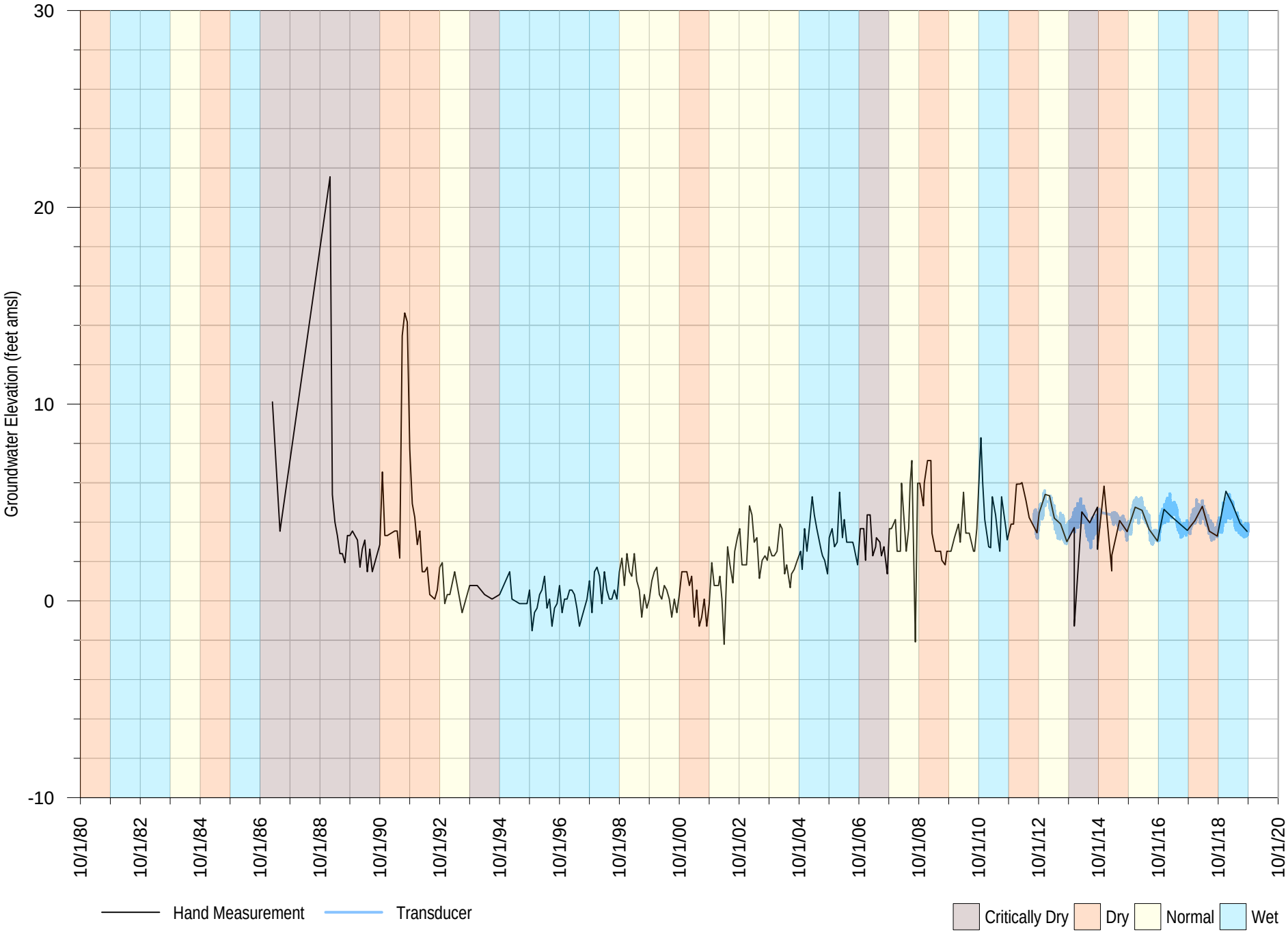
SC-A3C

FIGURE A-76



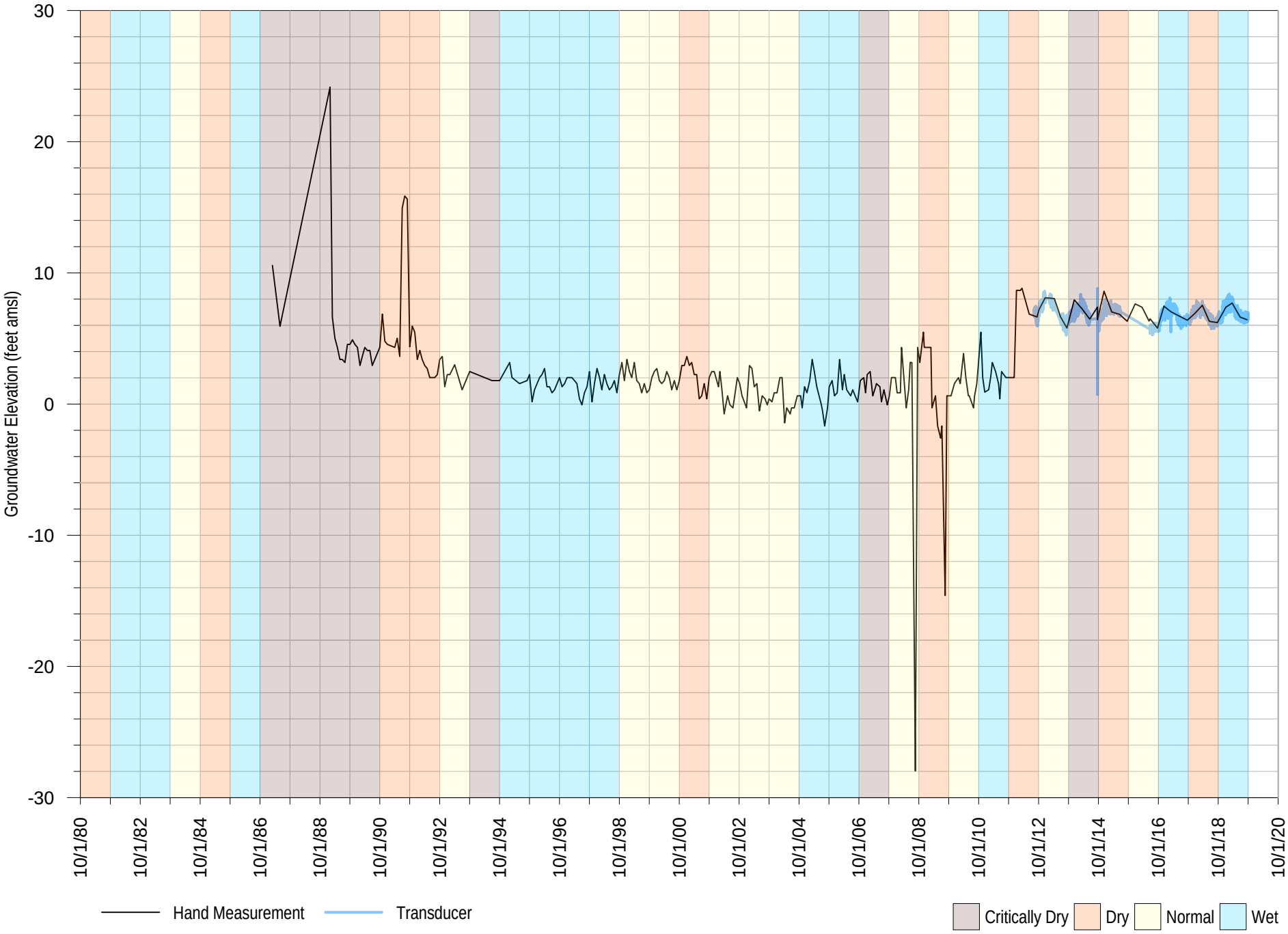
SC-A5A

FIGURE A-77



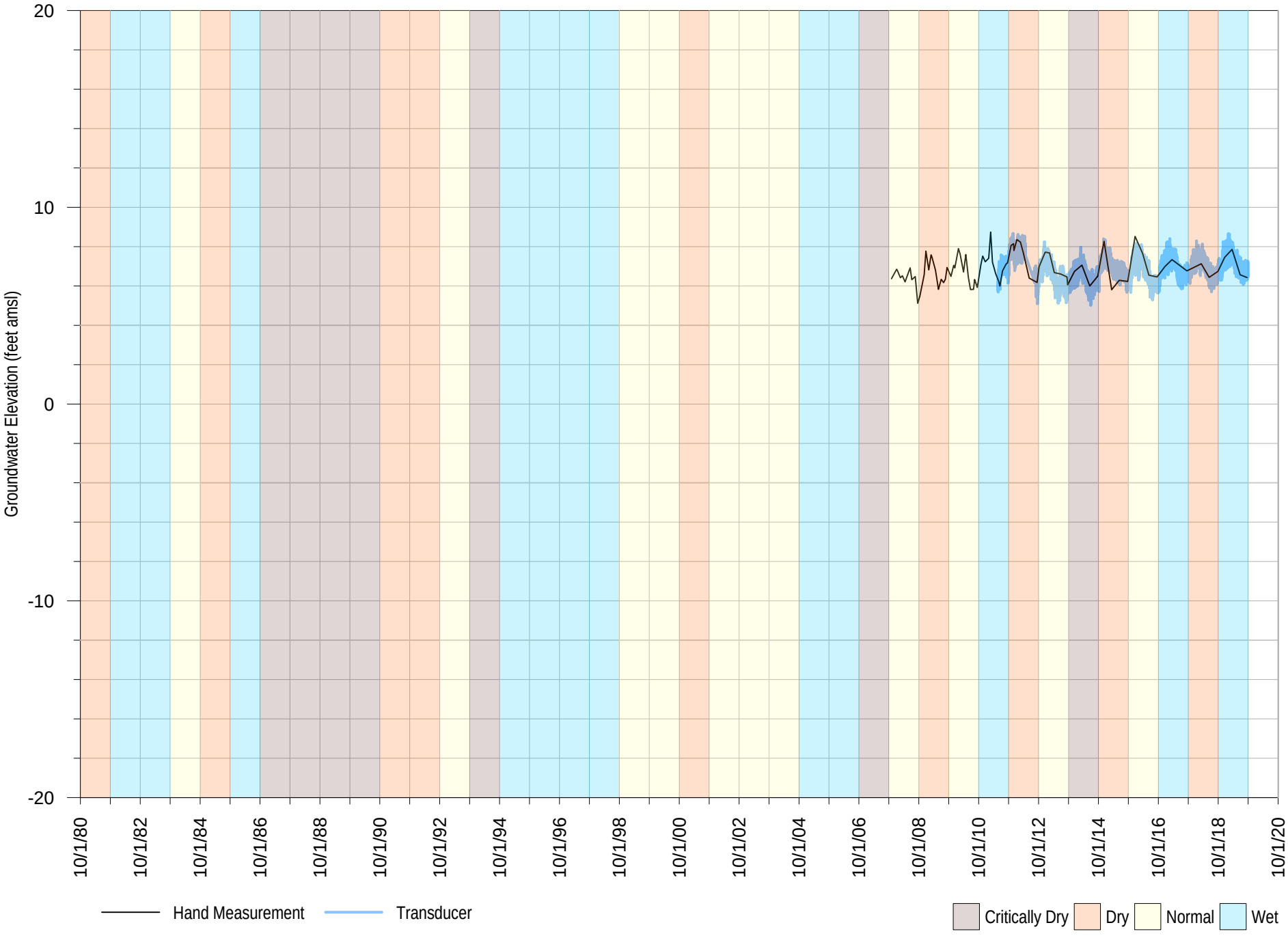
SC-A5B

FIGURE A-78



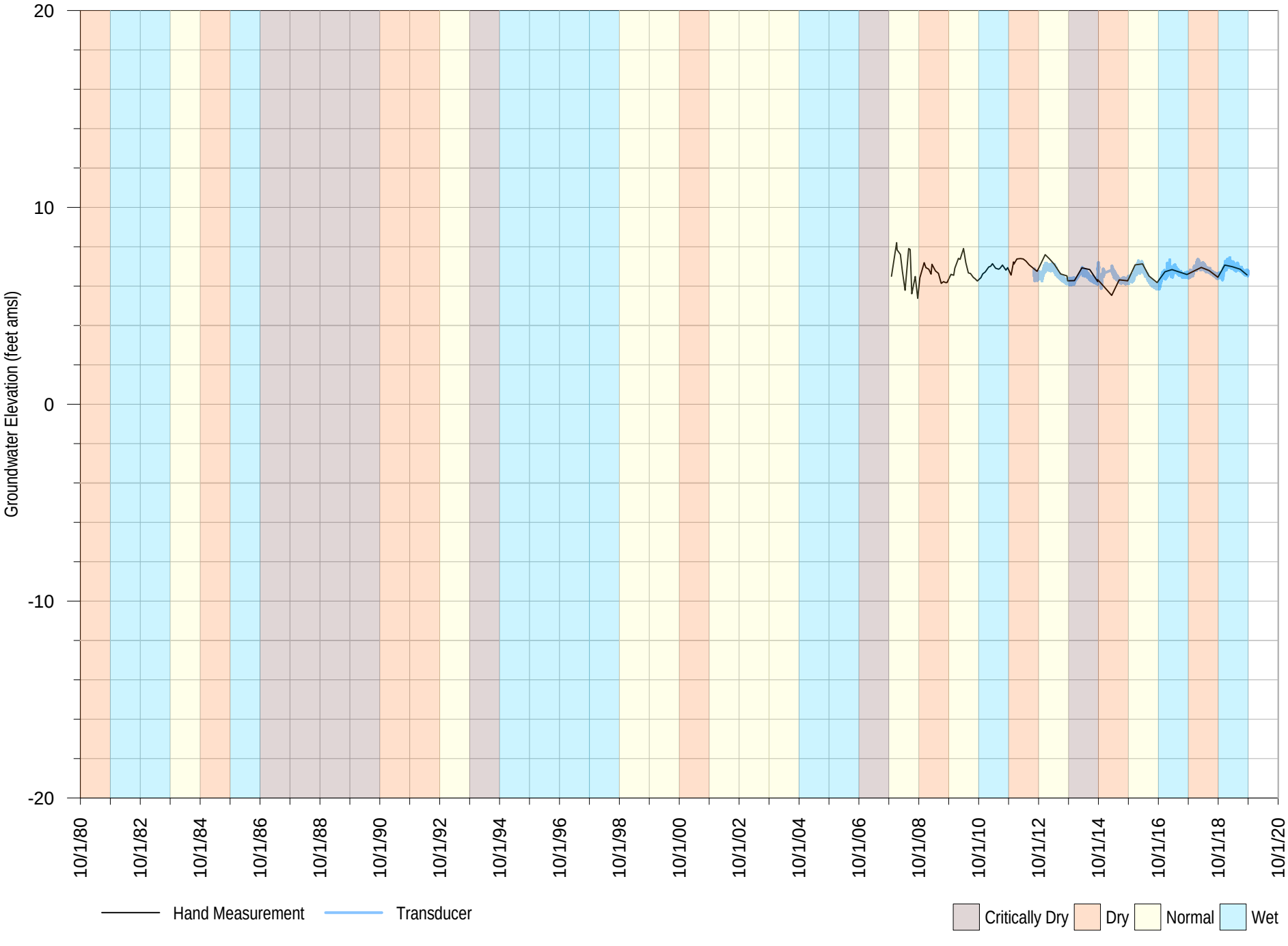
SC-A8B

FIGURE A-79



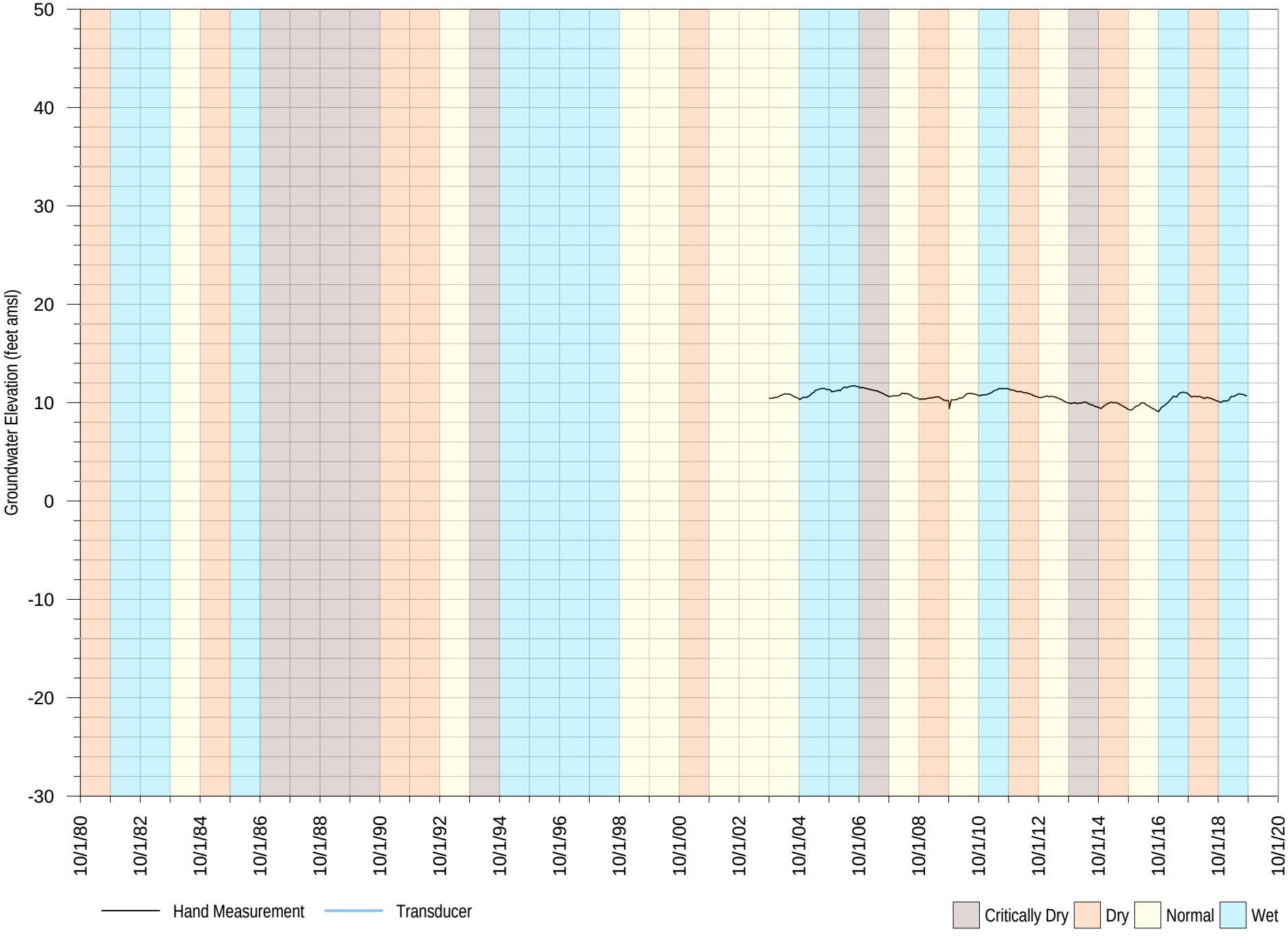
SC-A8C

FIGURE A-80



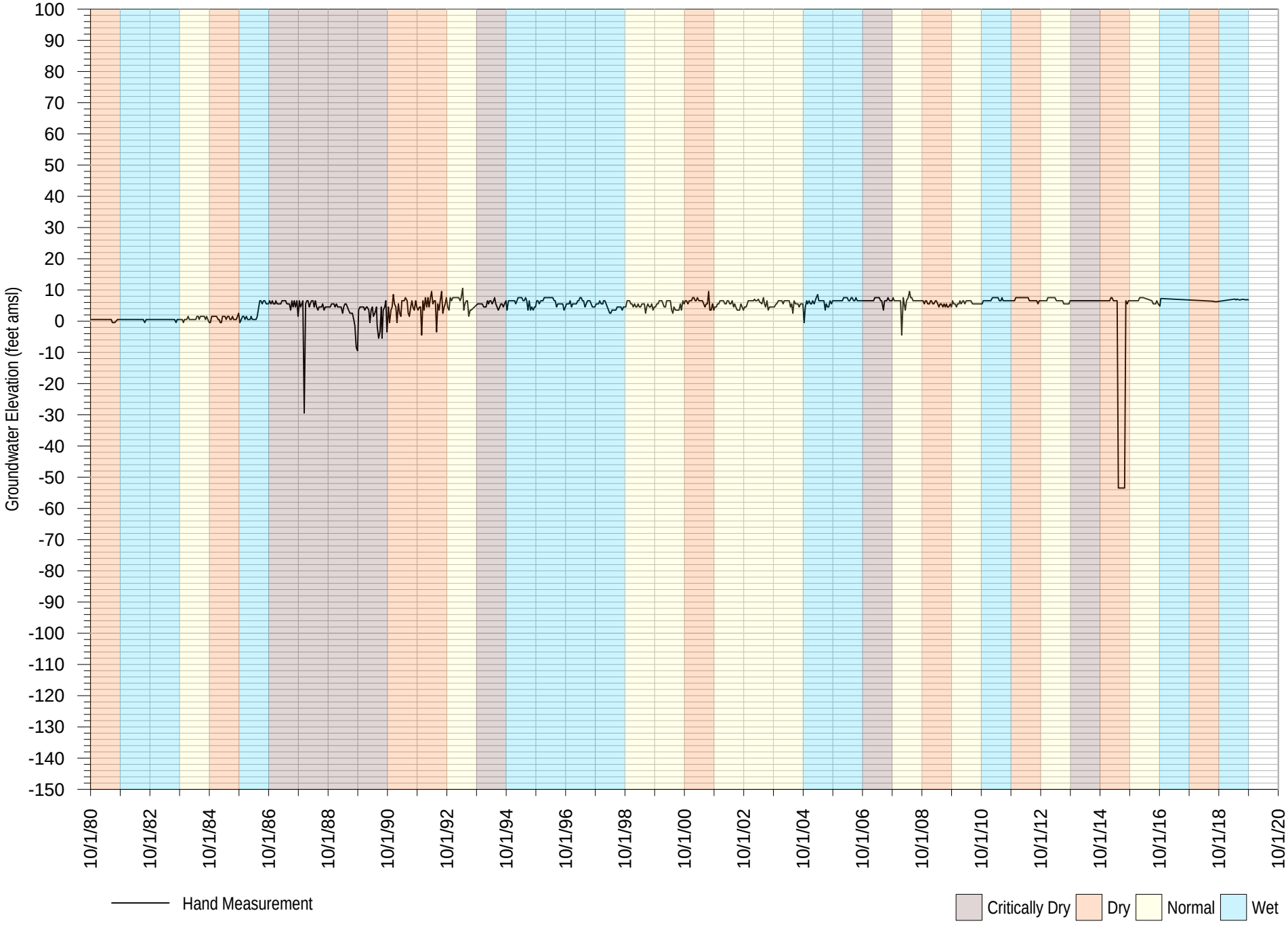
Schwan

FIGURE A-81



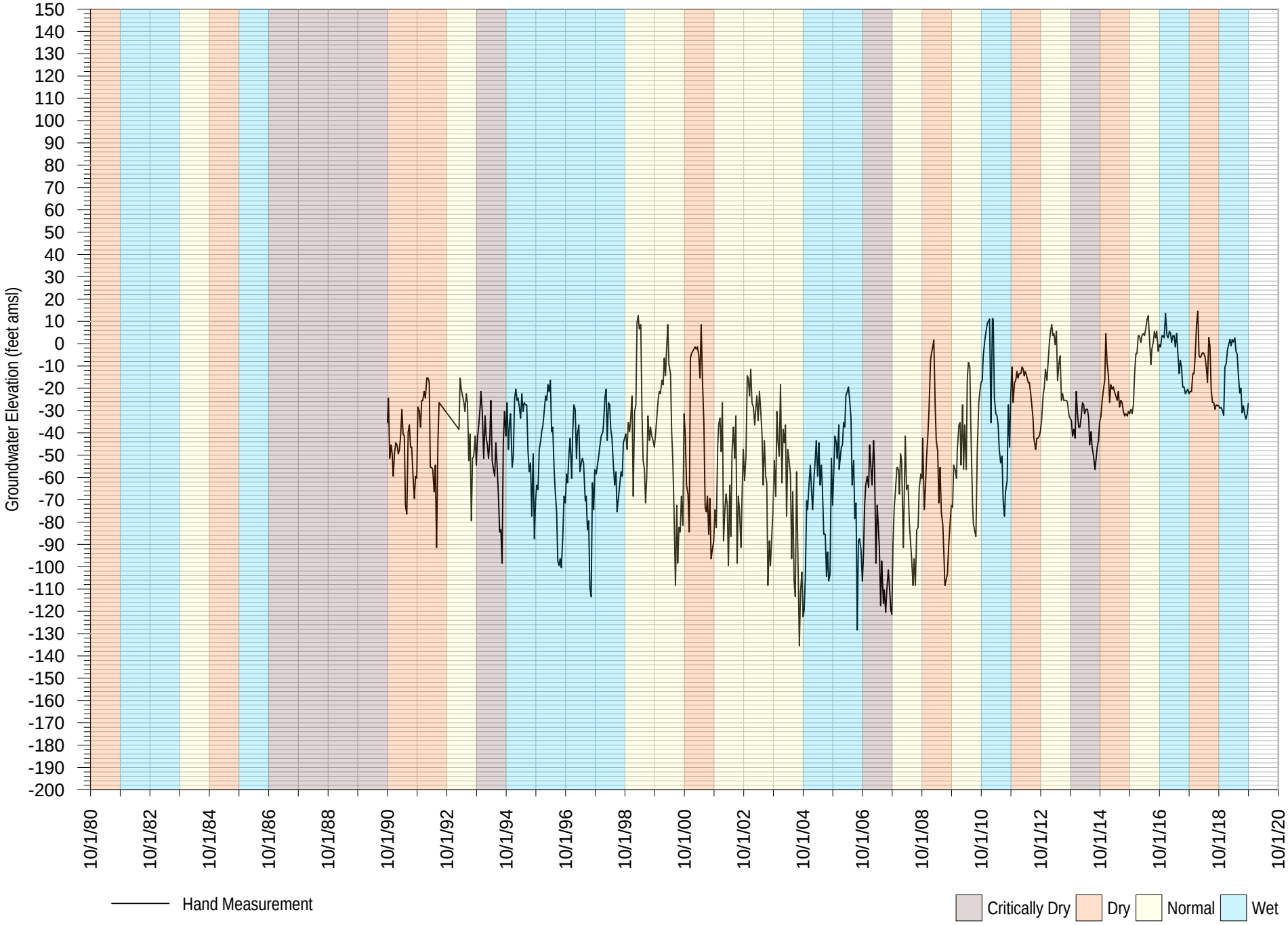
Seascape

FIGURE A-82



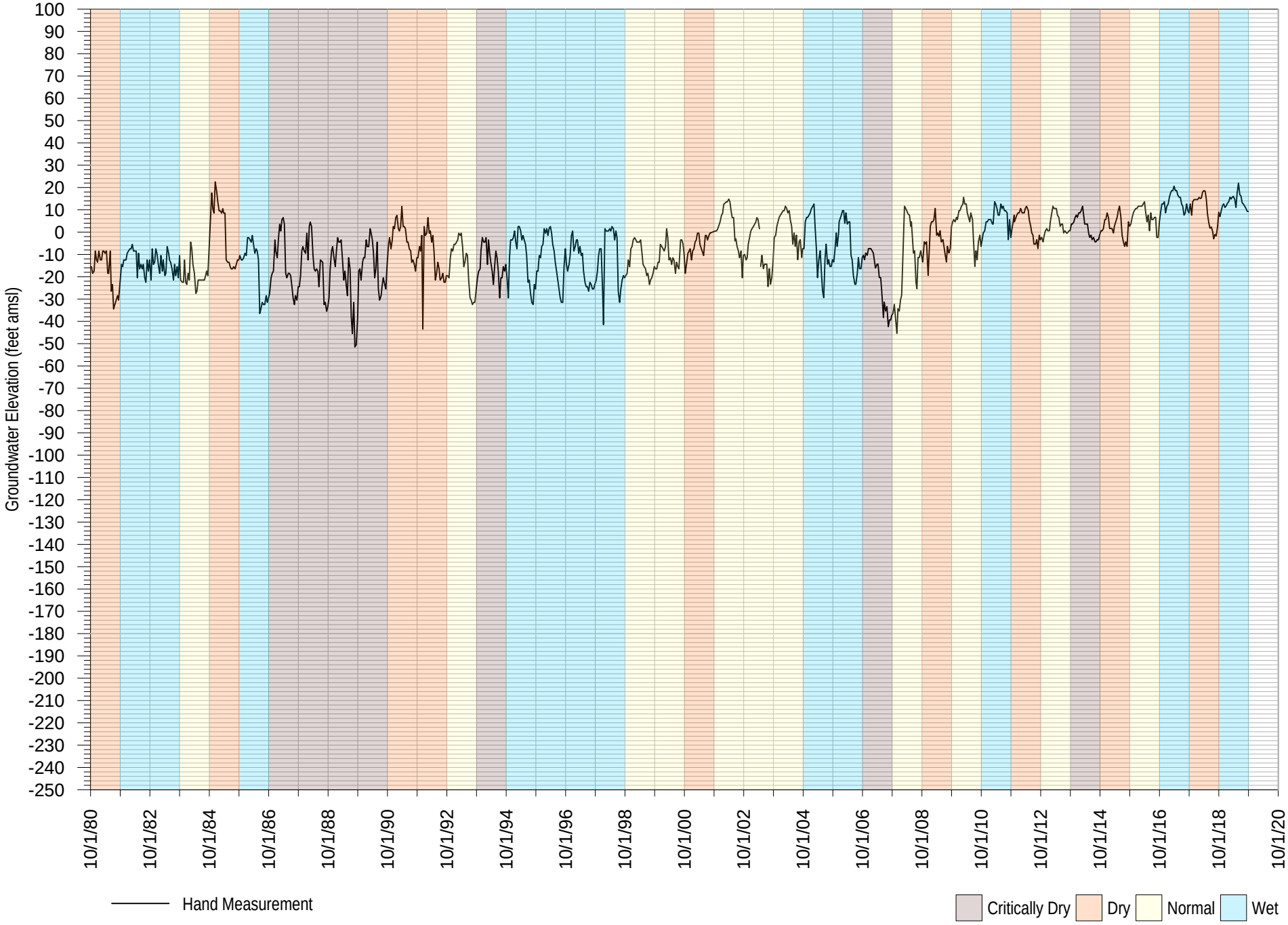
T.Hopkins

FIGURE A-83



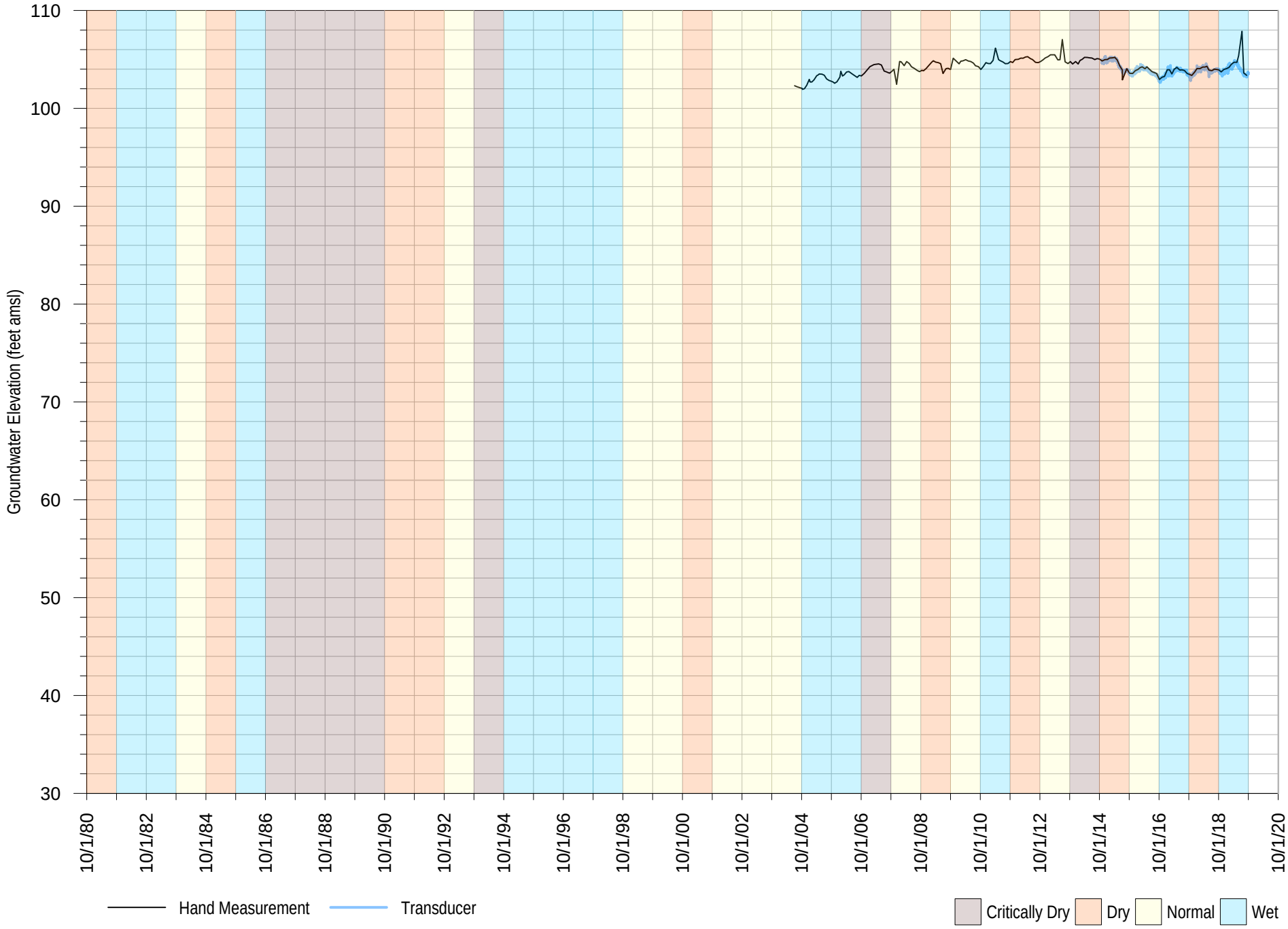
Tannery

FIGURE A-84



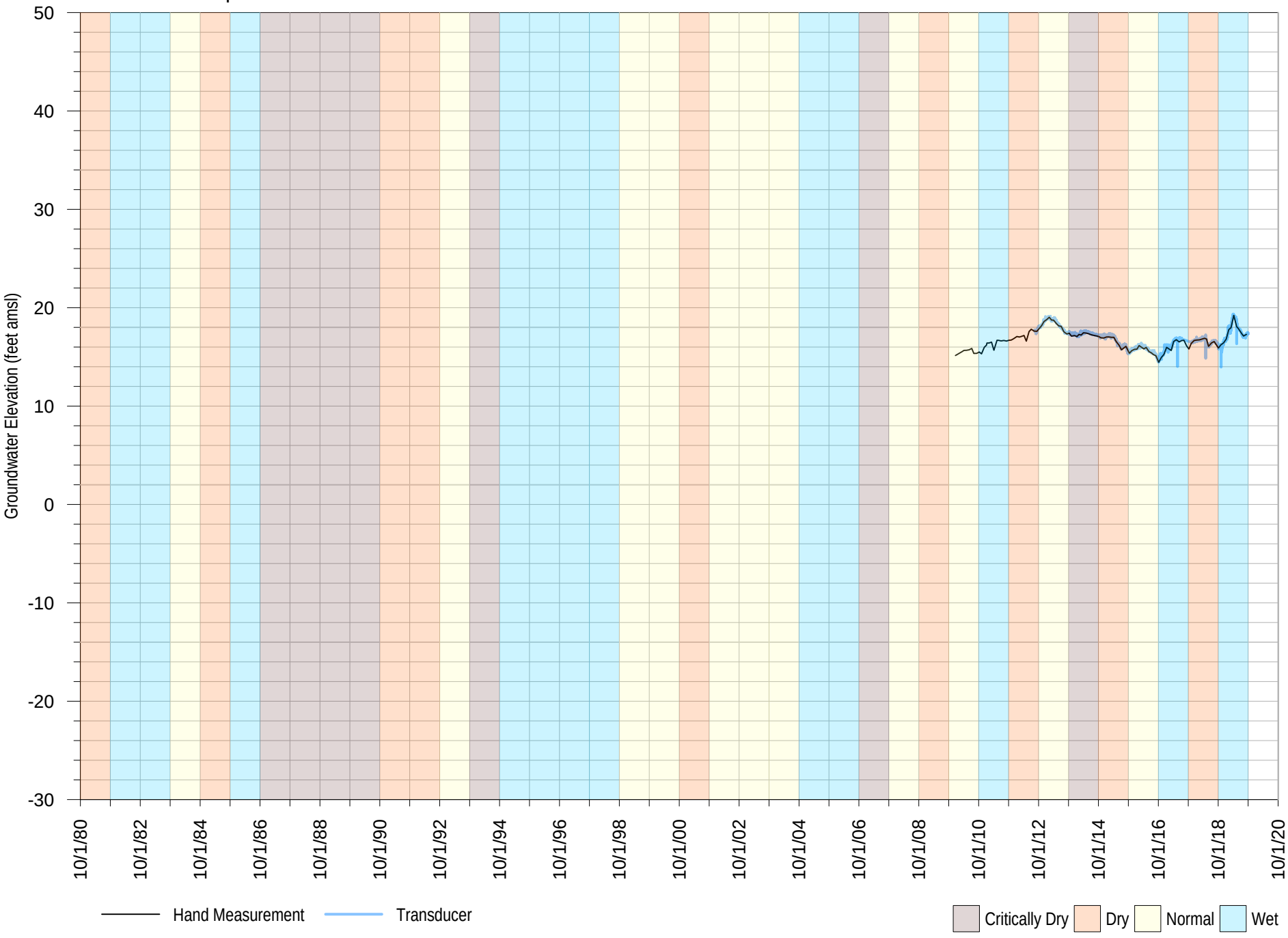
Thurber Shallow

FIGURE A-85



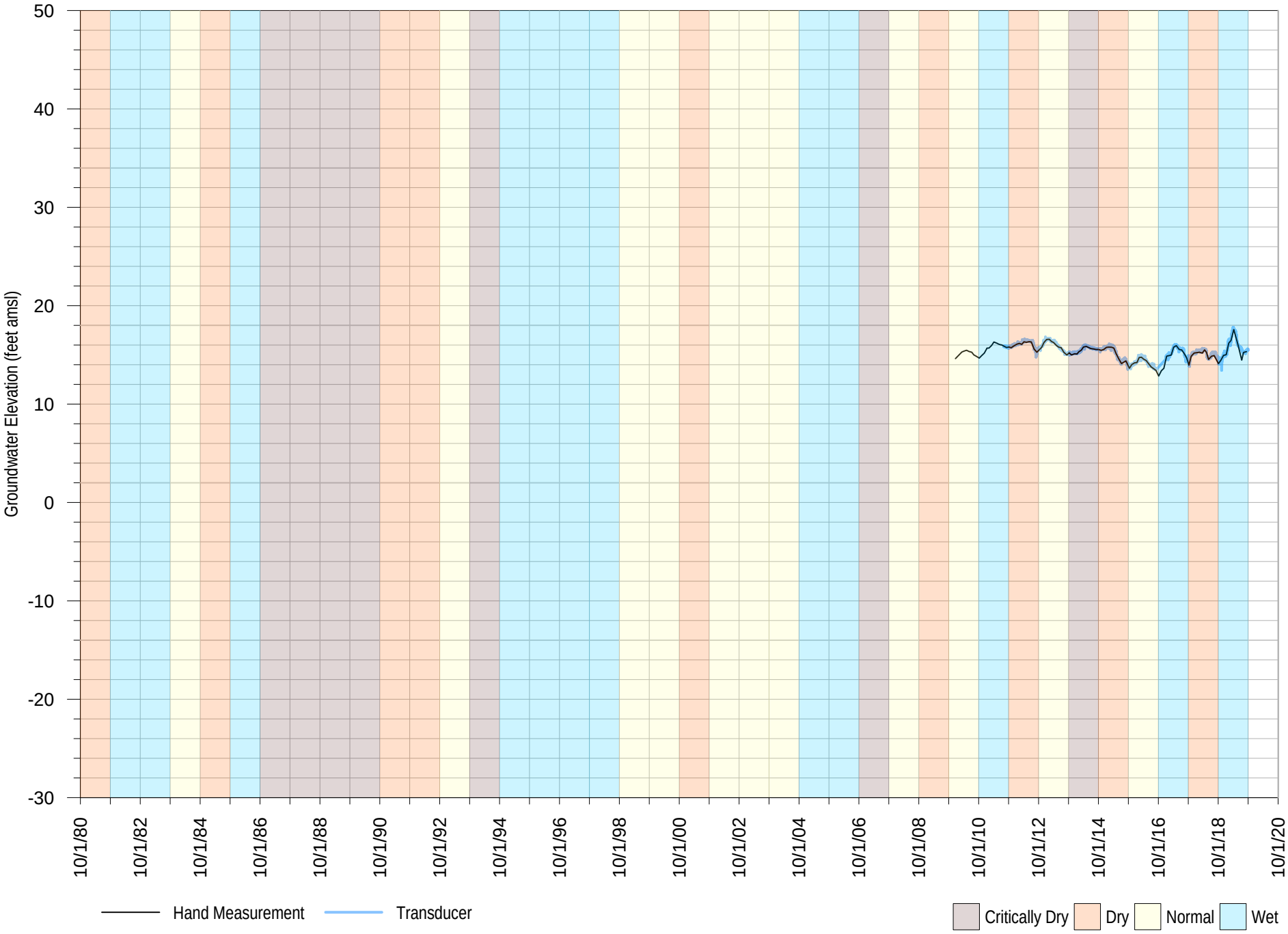
Auto Plaza Deep

FIGURE A-87



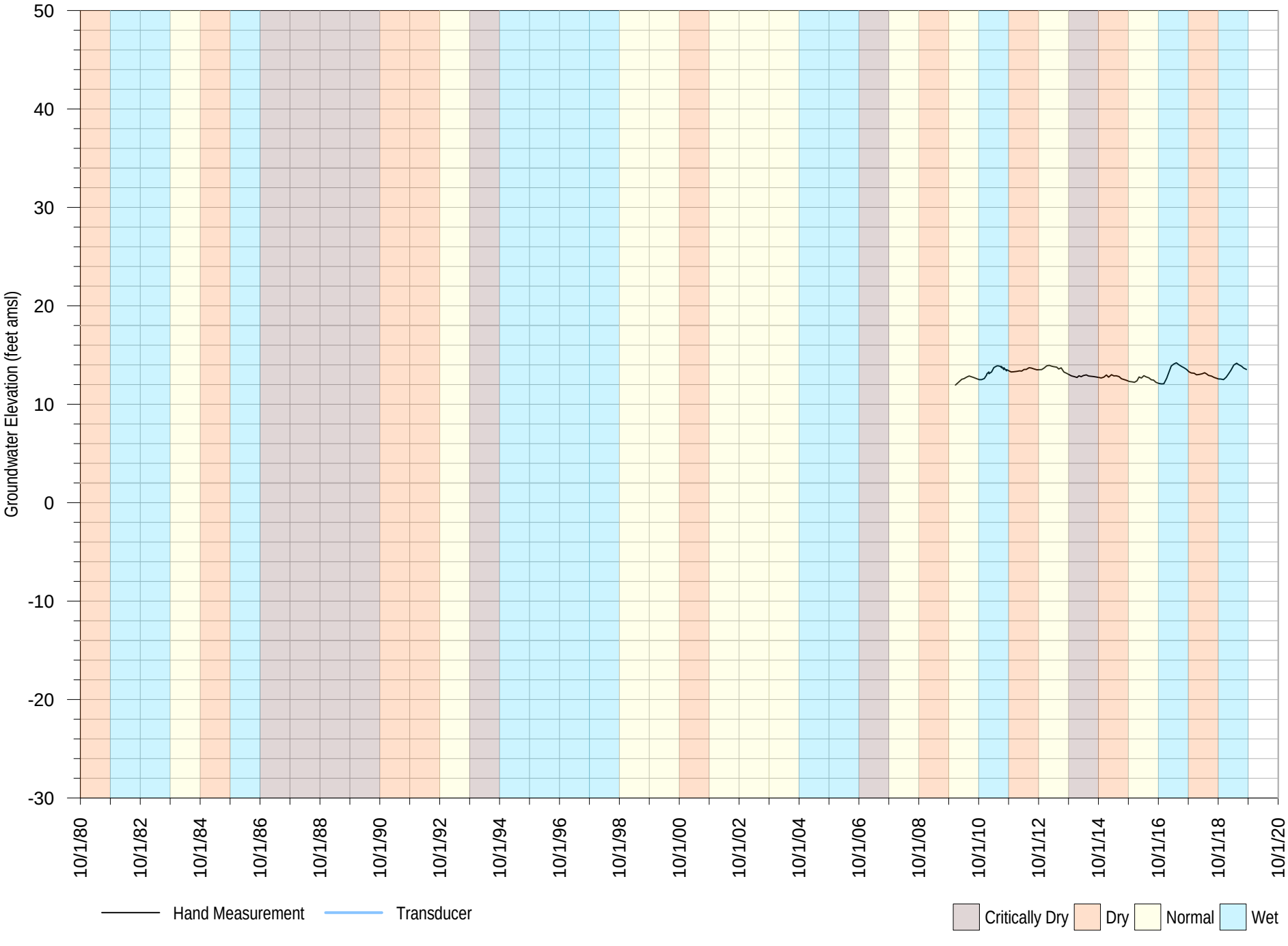
Auto Plaza Medium

FIGURE A-88



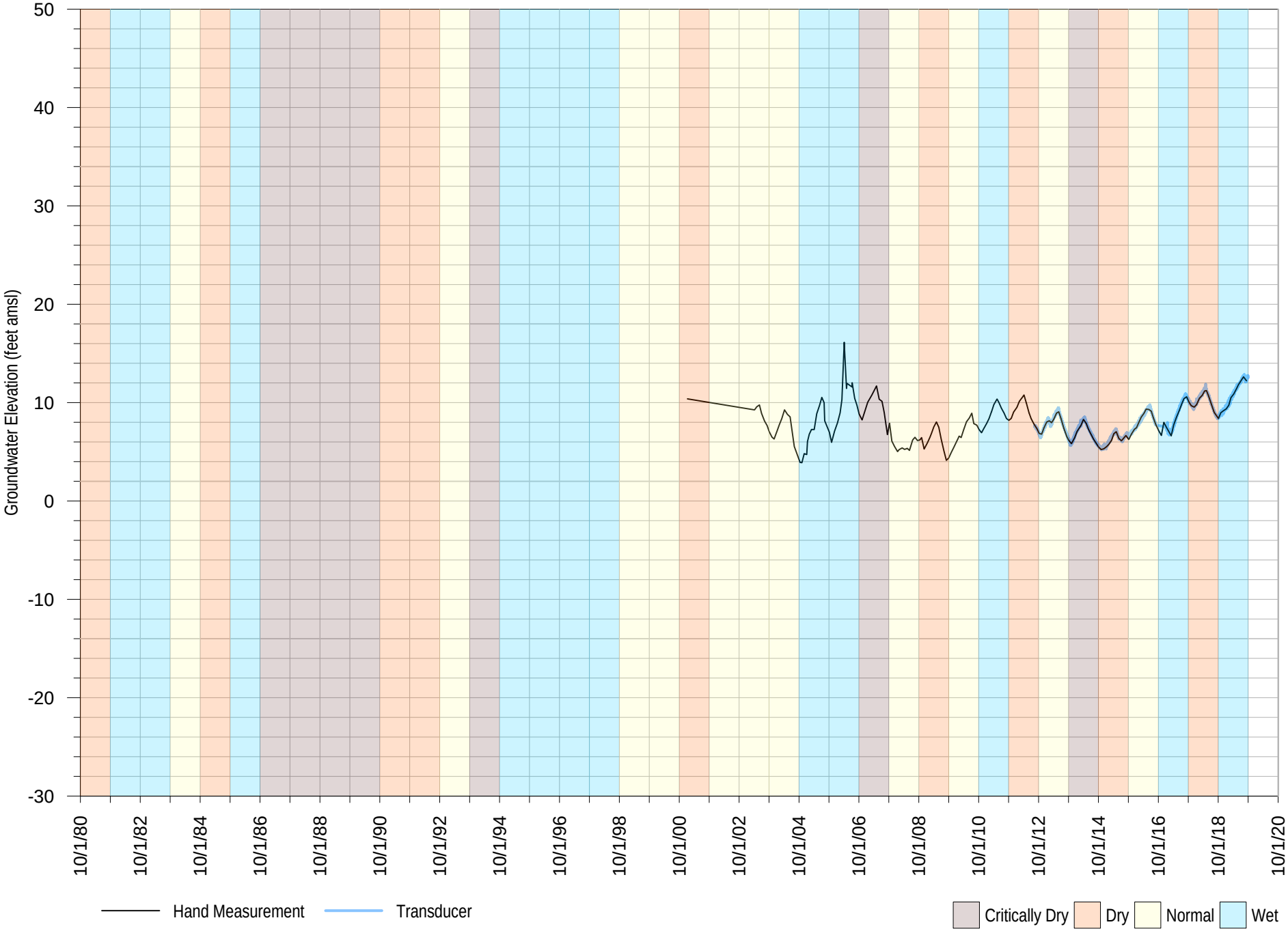
Auto Plaza Shallow

FIGURE A-89



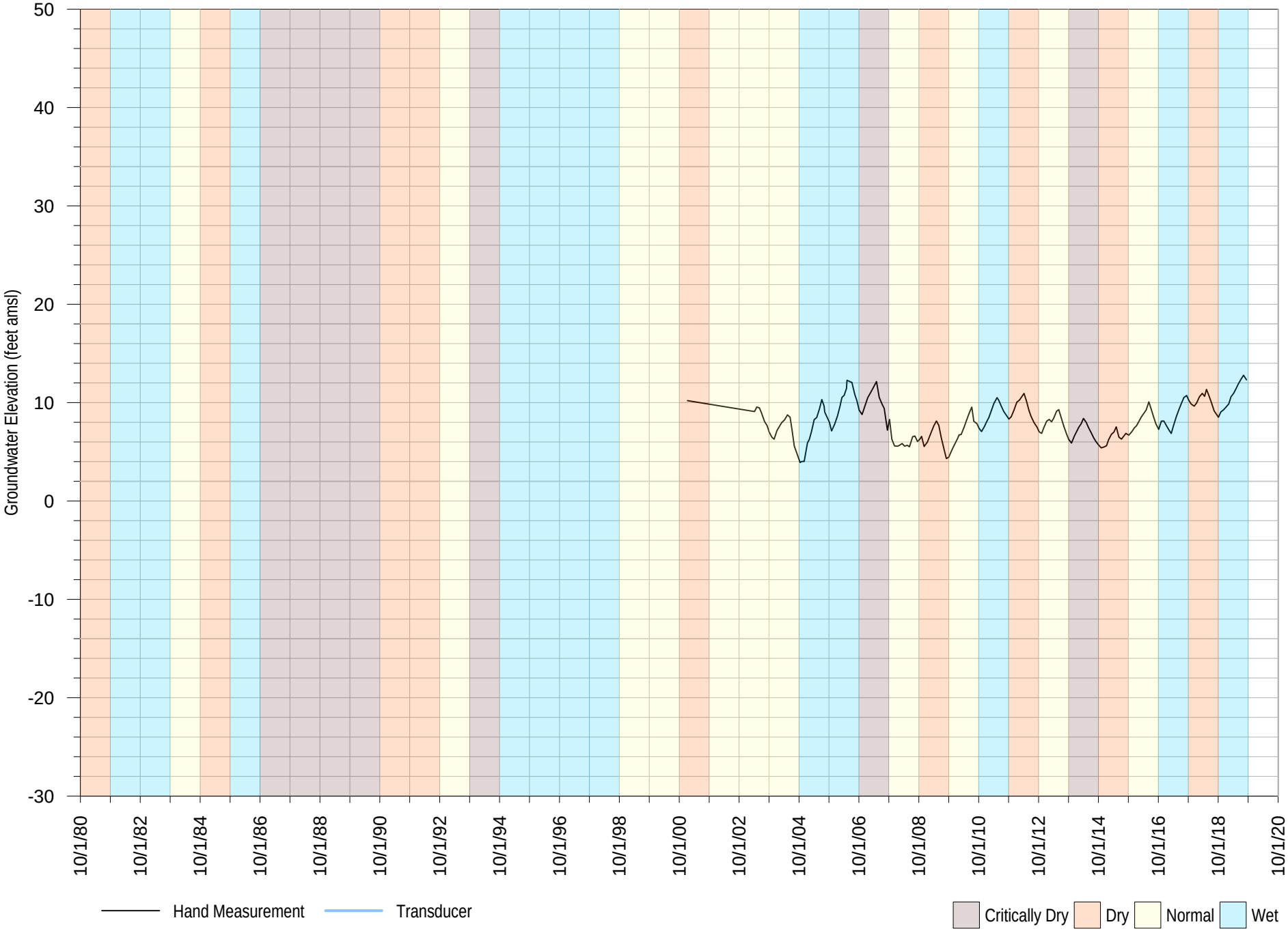
Beltz 4 Deep

FIGURE A-90



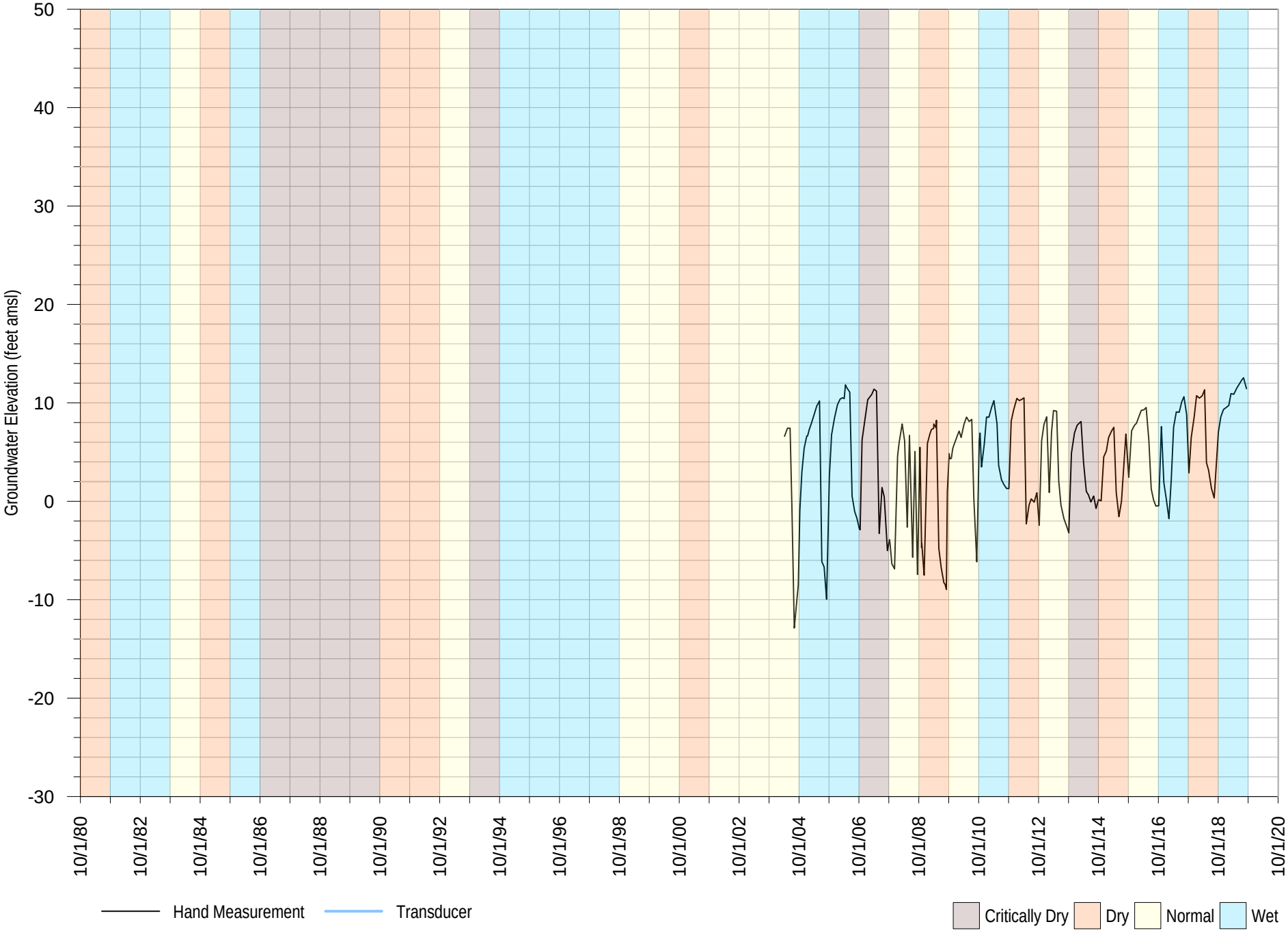
Beltz 4 Shallow

FIGURE A-91



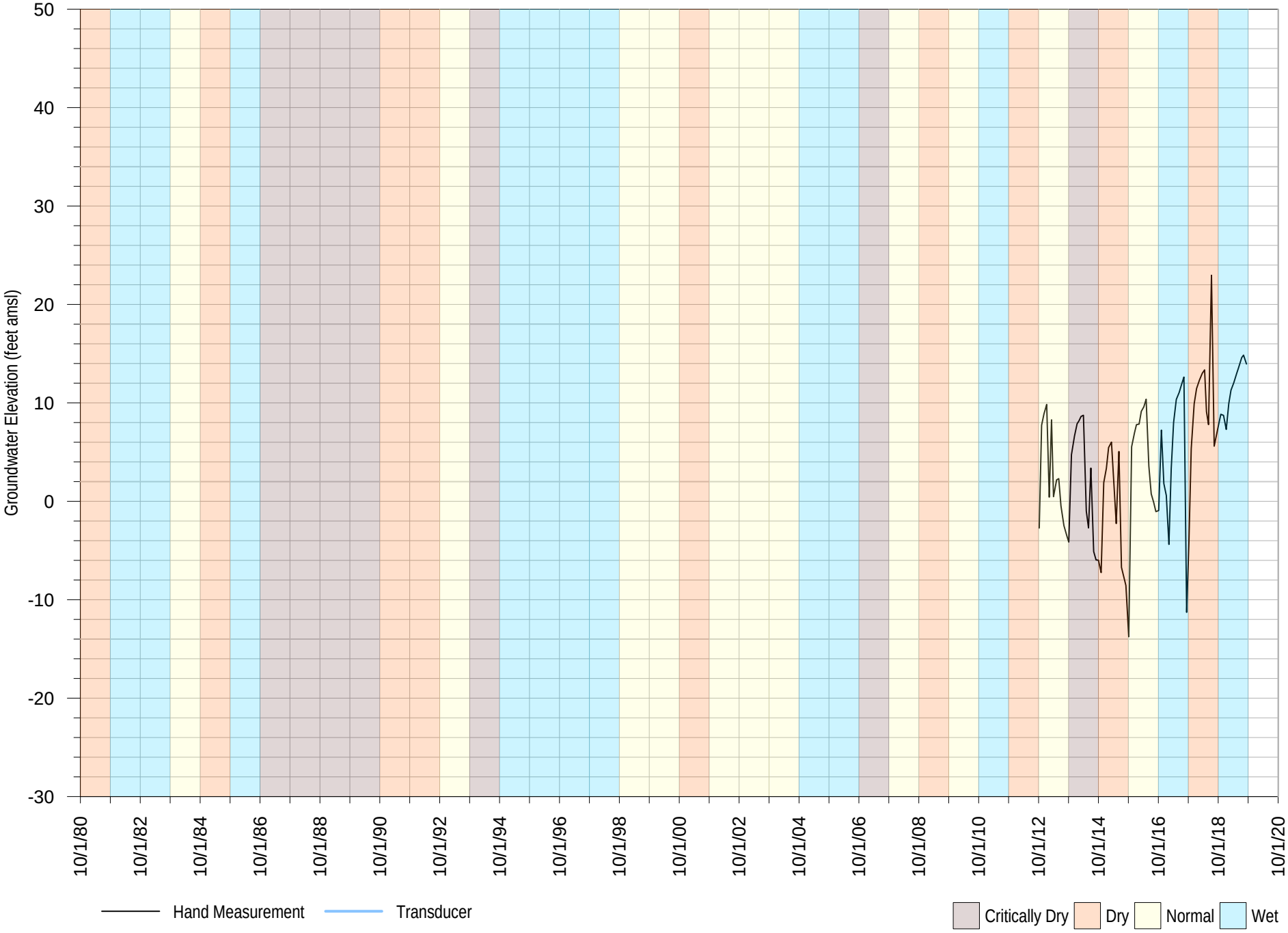
Beltz 6

FIGURE A-92



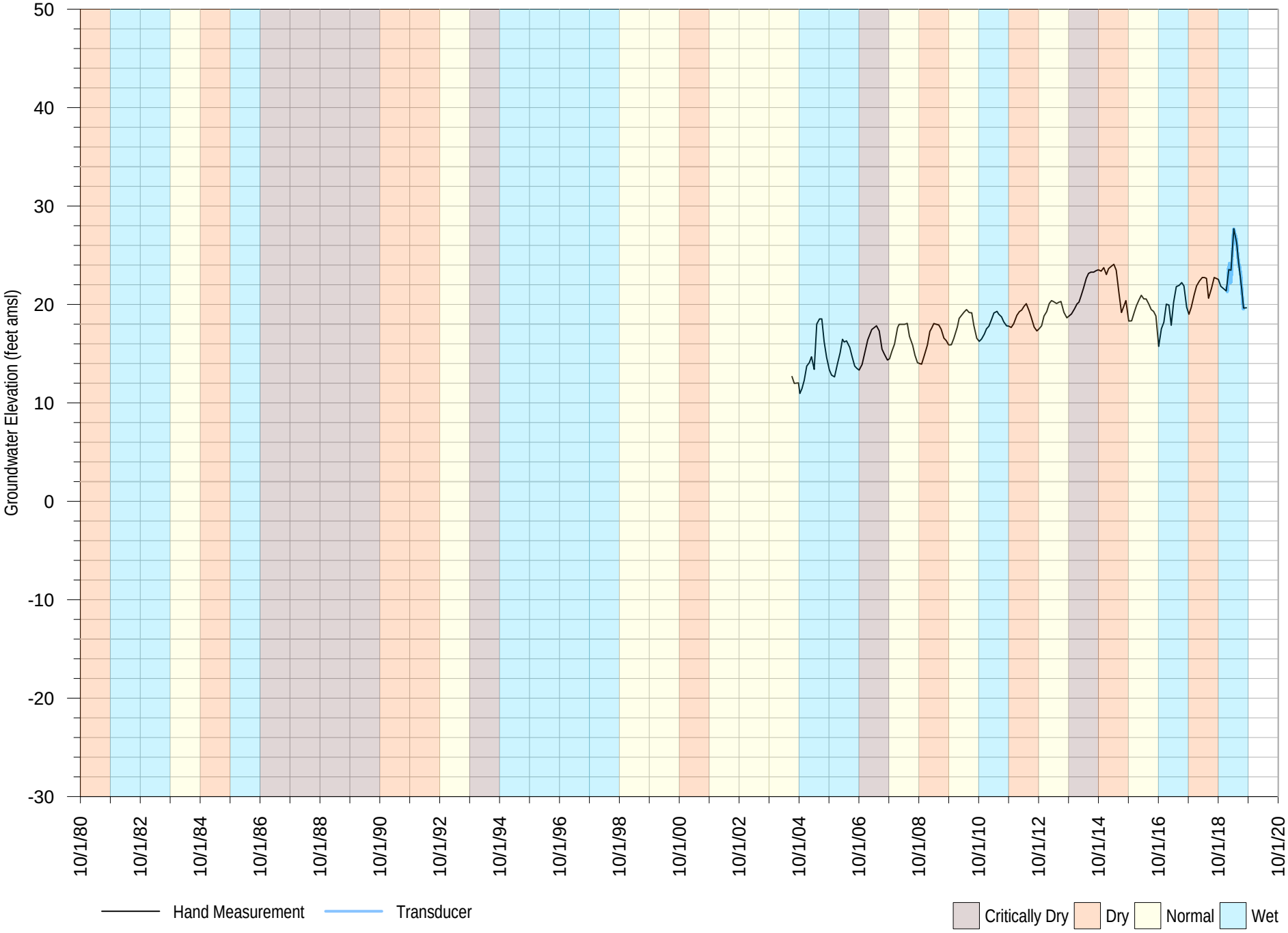
Beltz 7 Deep

FIGURE A-93



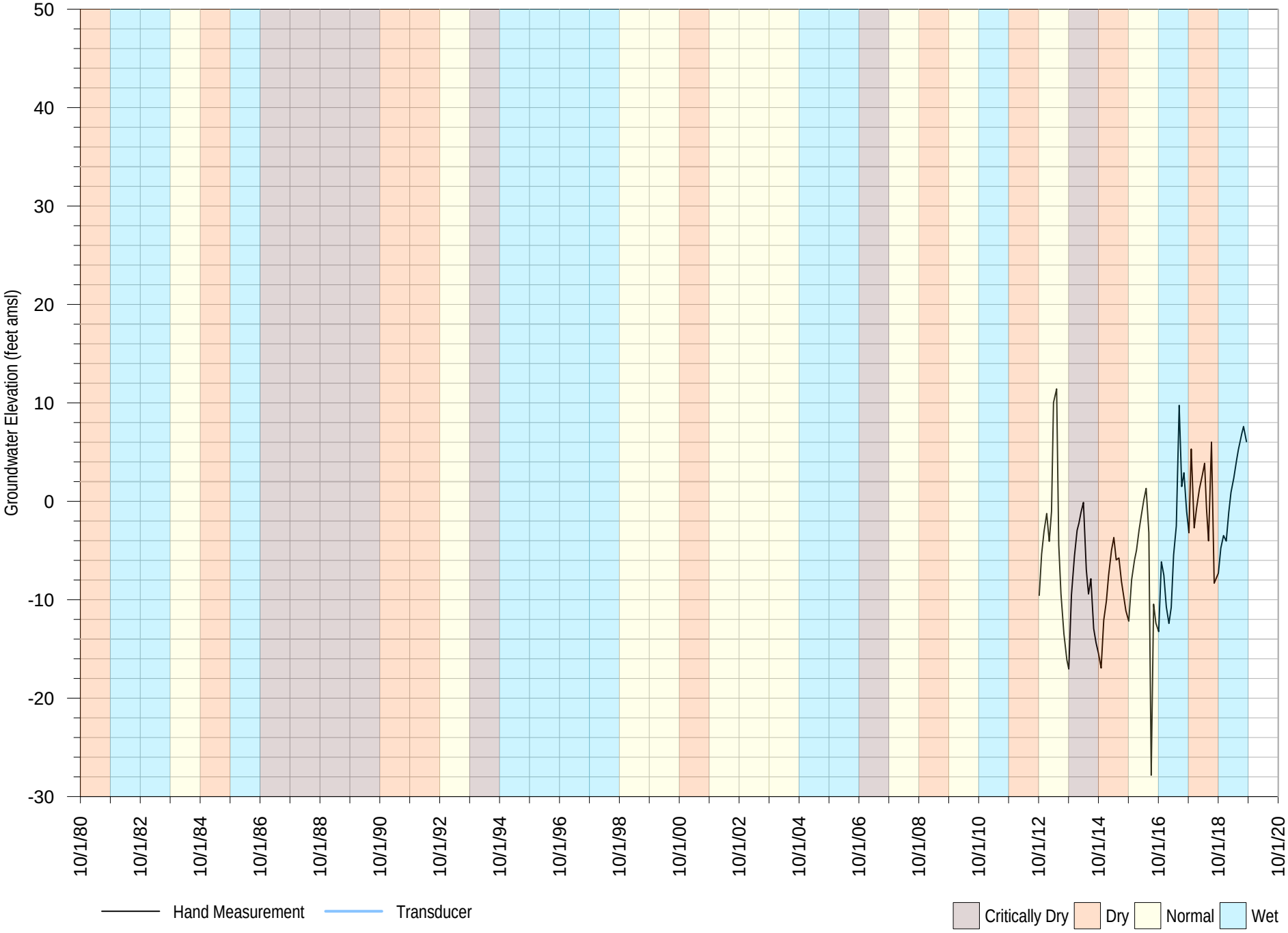
Beltz 7 Santa Margarita Test Well

FIGURE A-94



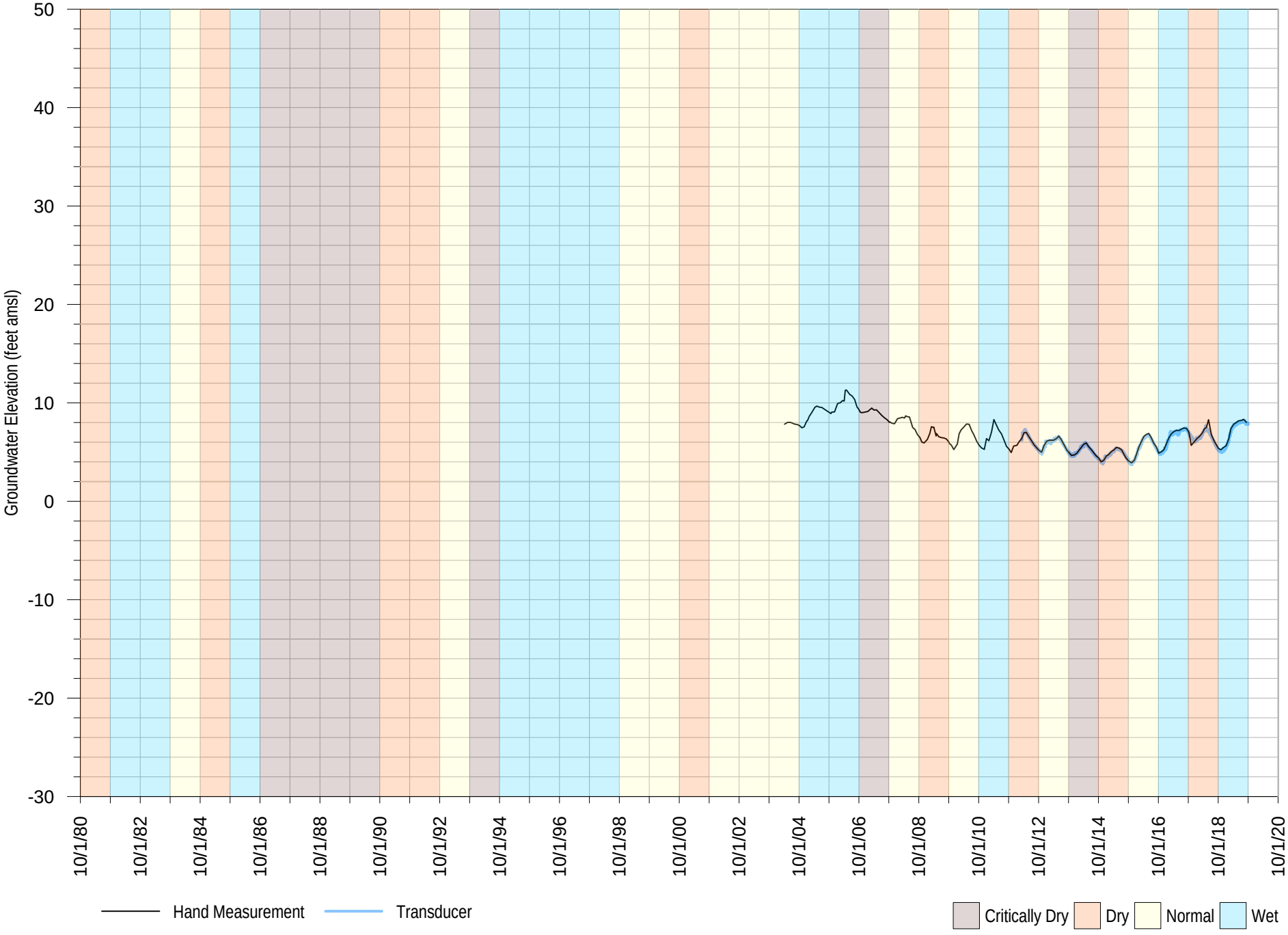
Beltz 7 Shallow

FIGURE A-95



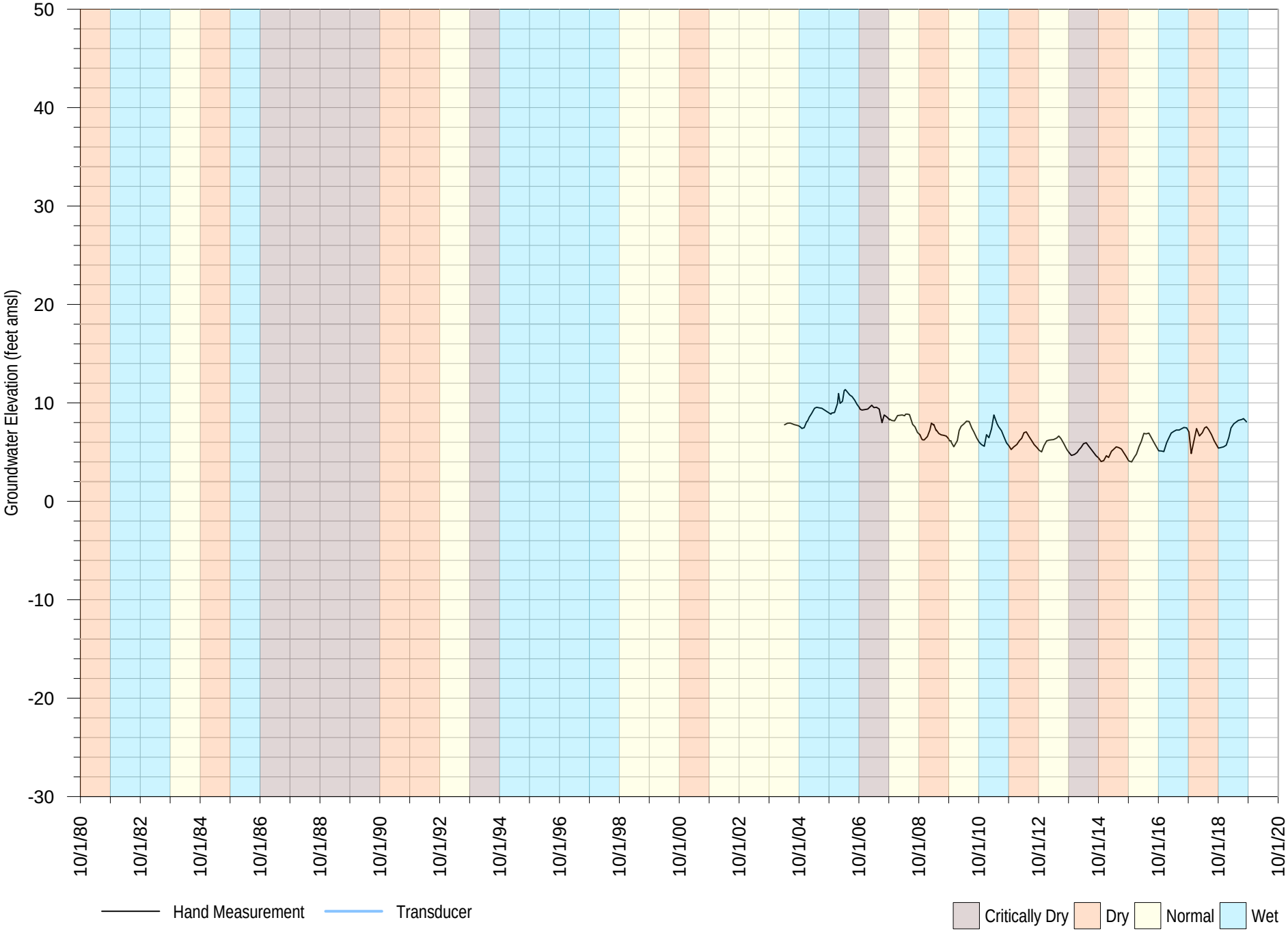
Corcoran Medium

FIGURE A-96



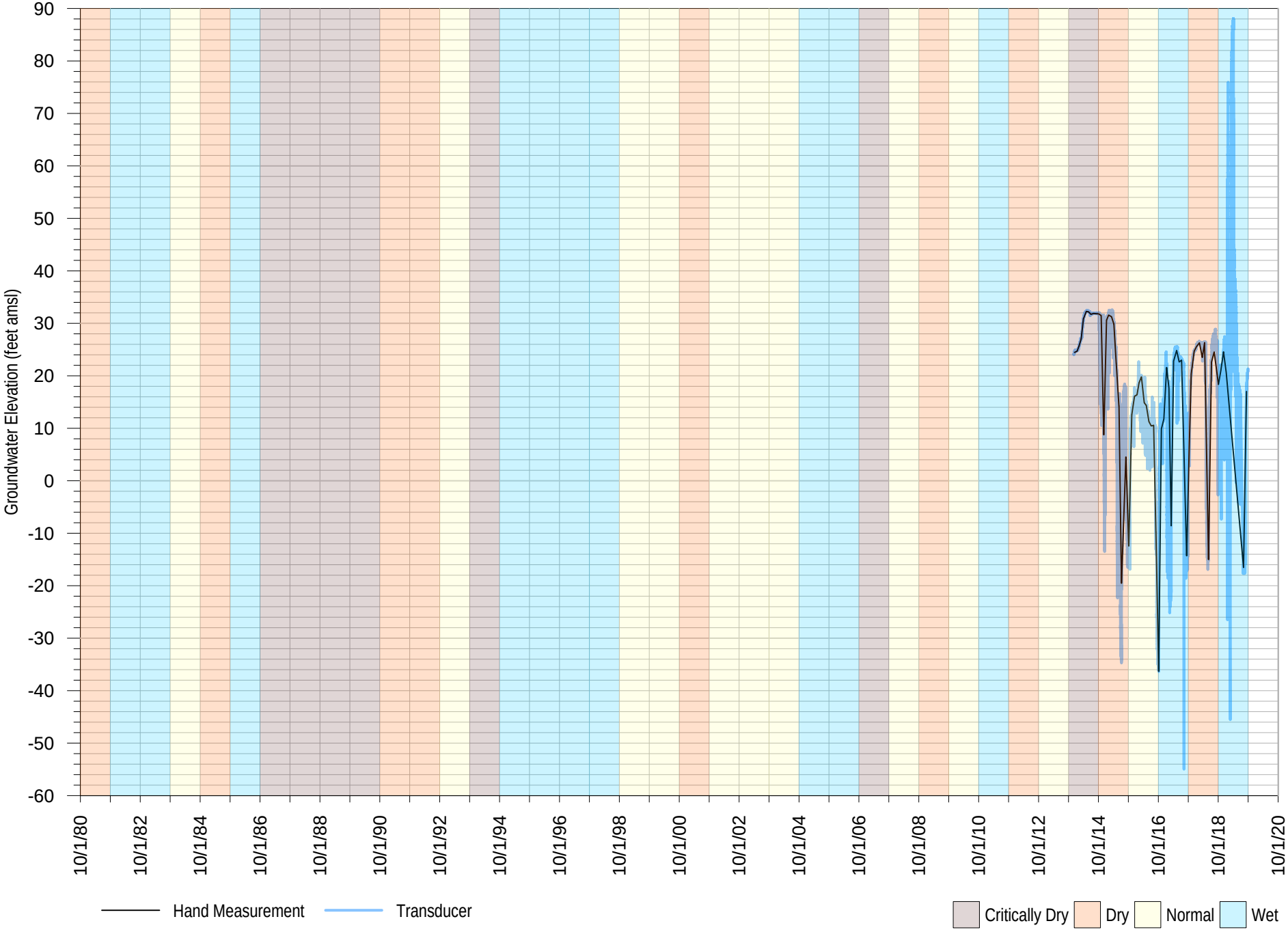
Corcoran Shallow

FIGURE A-97



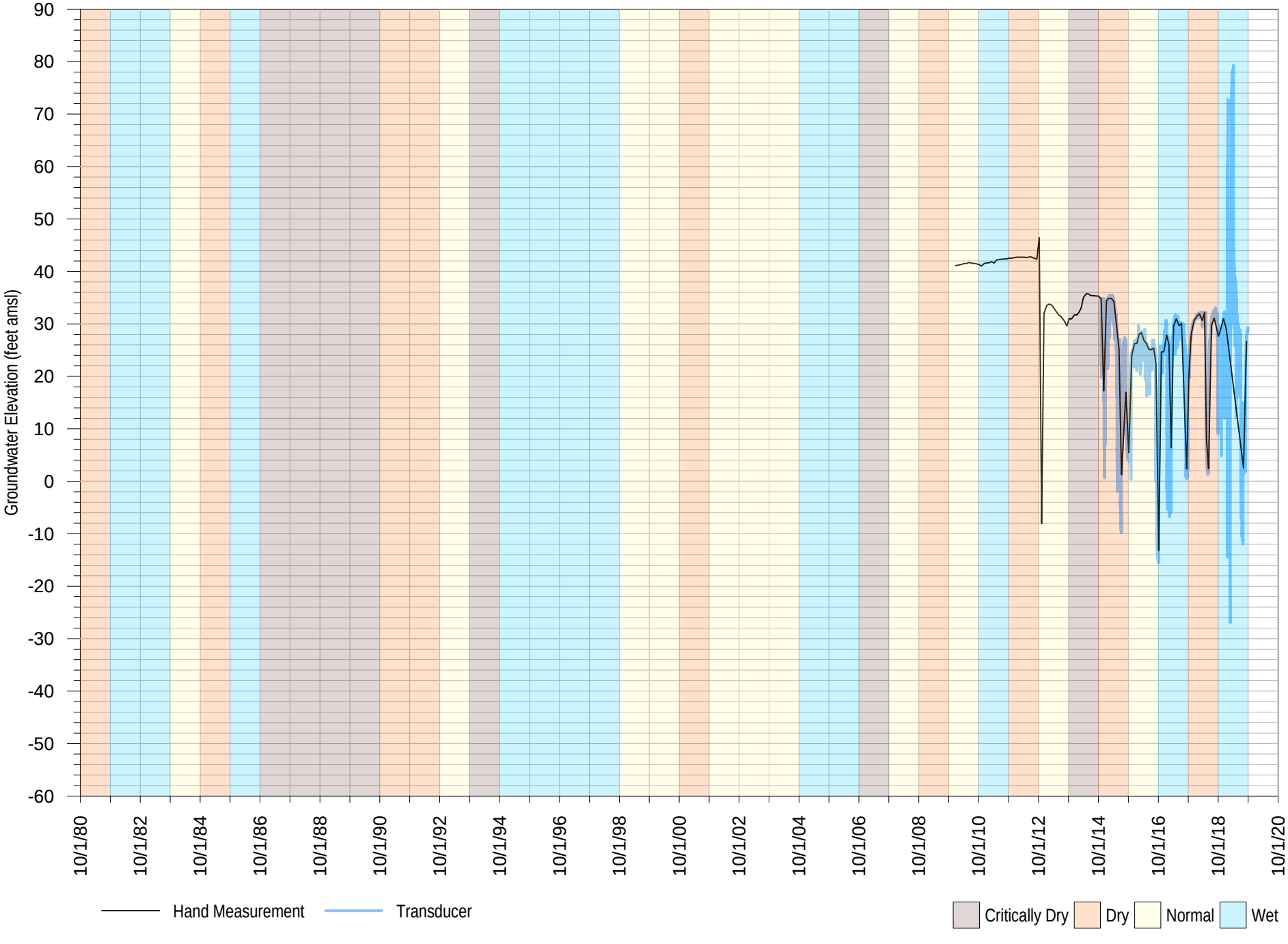
Cory 4

FIGURE A-98



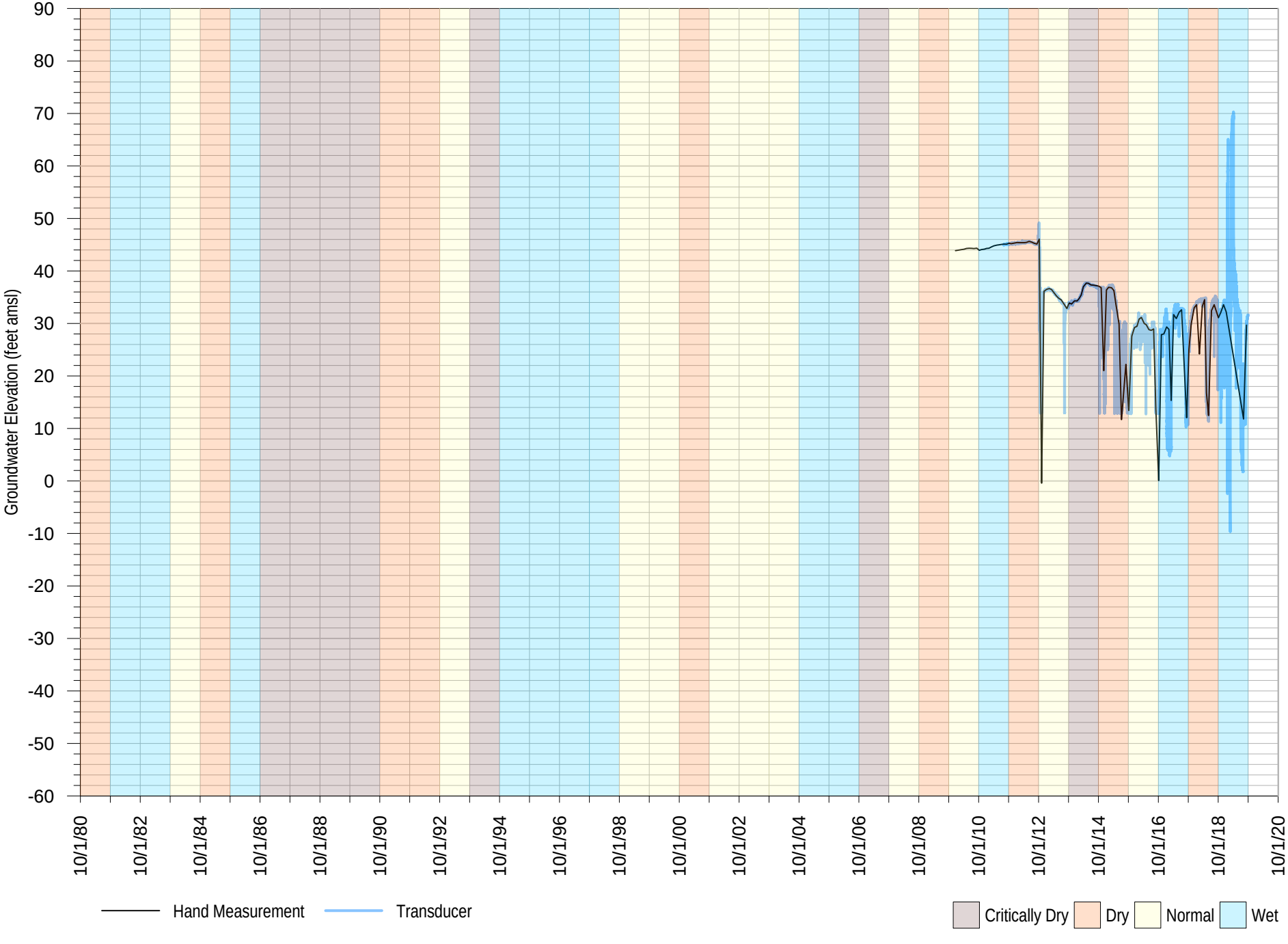
Cory Deep

FIGURE A-99



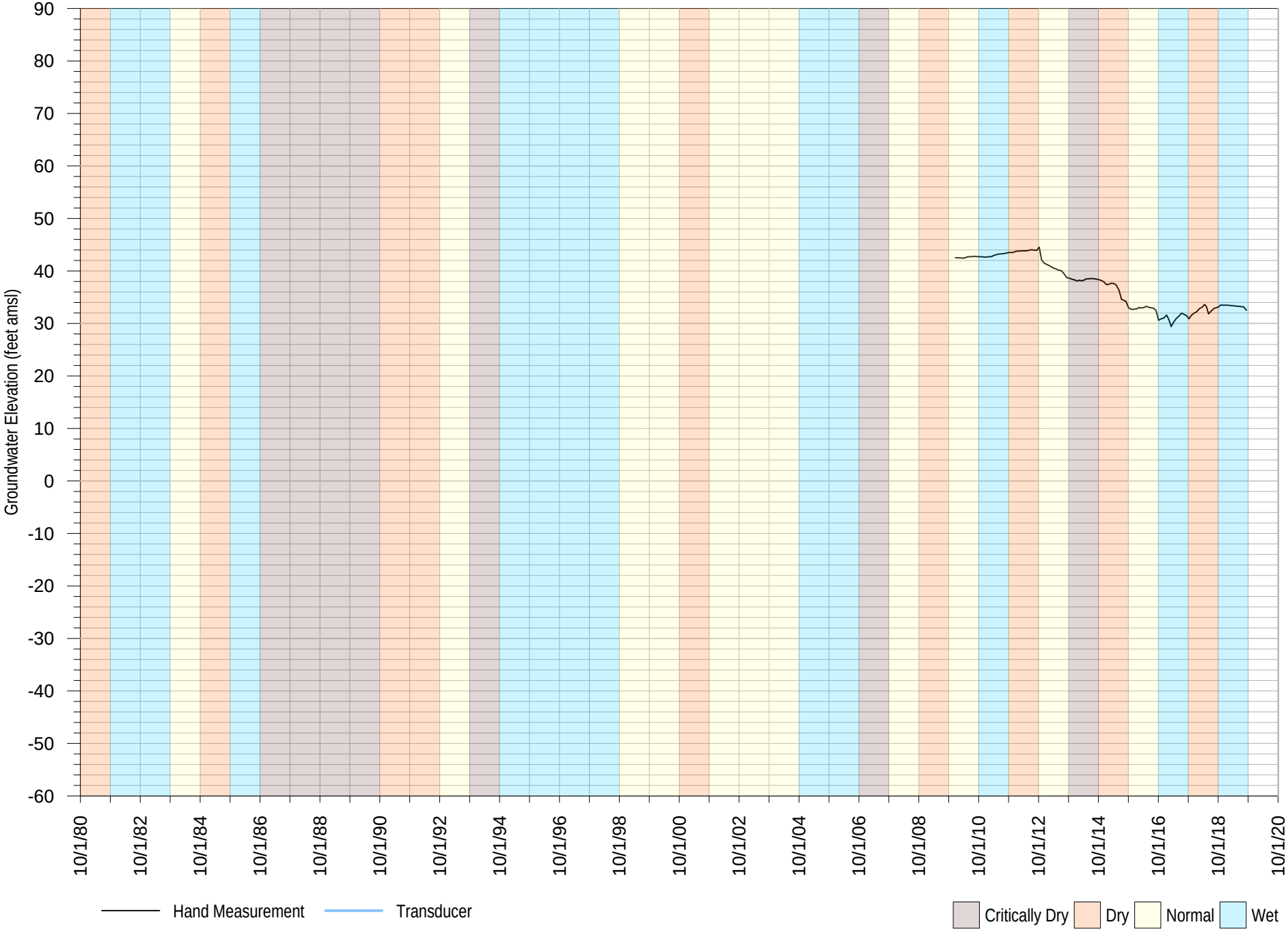
Cory Medium

FIGURE A-100



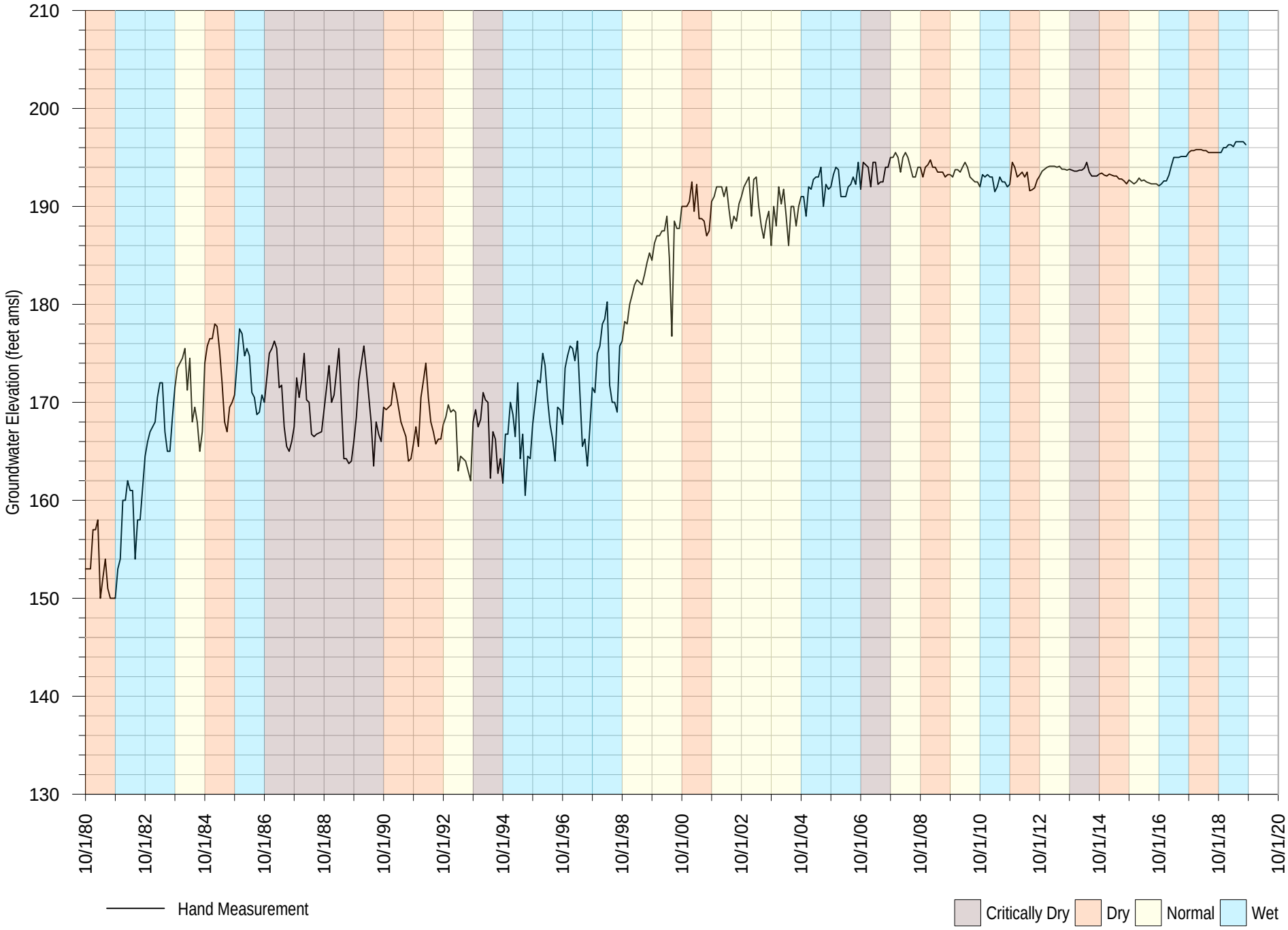
Cory Shallow

FIGURE A-101



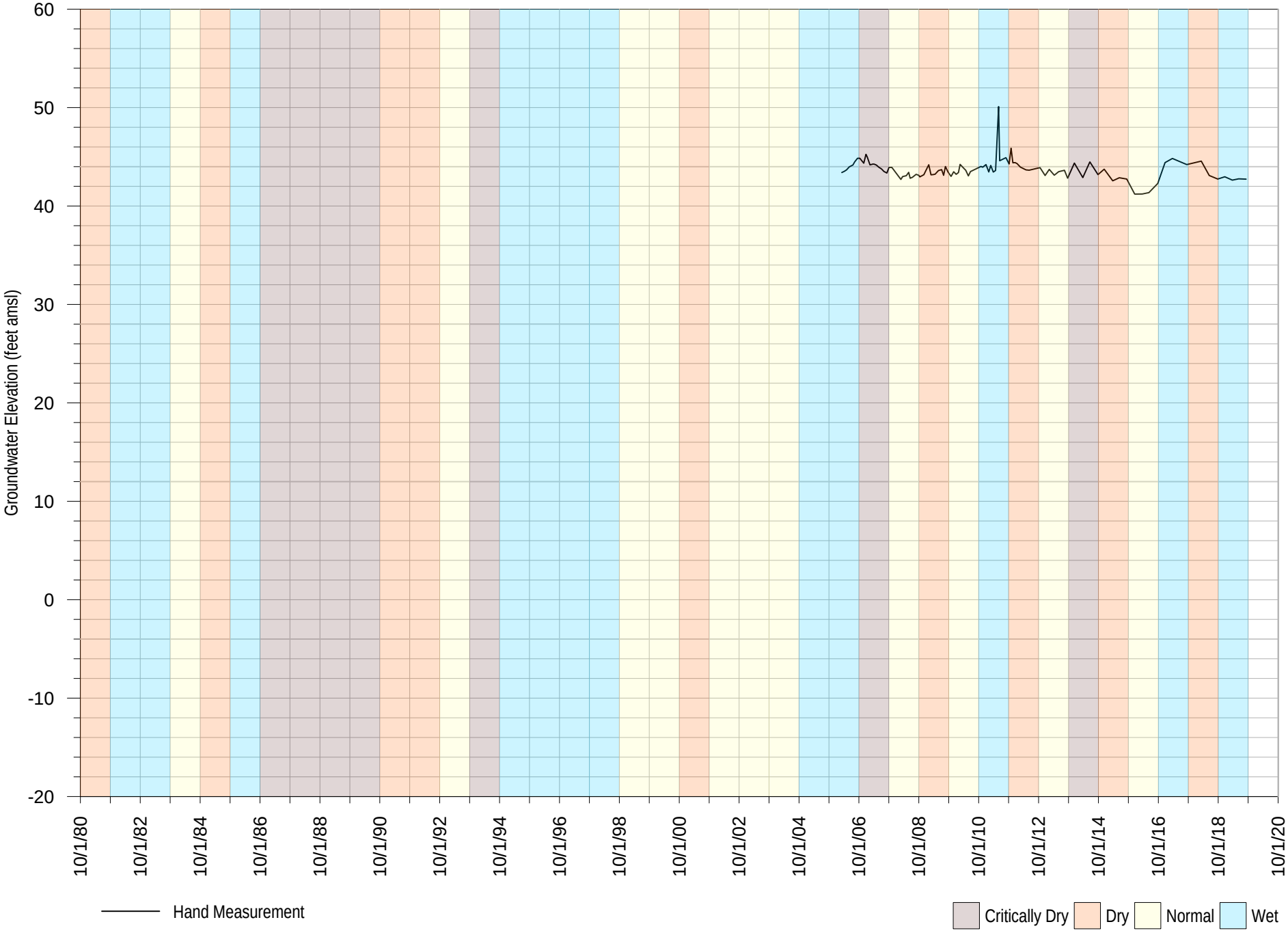
Cox 3

FIGURE A-102



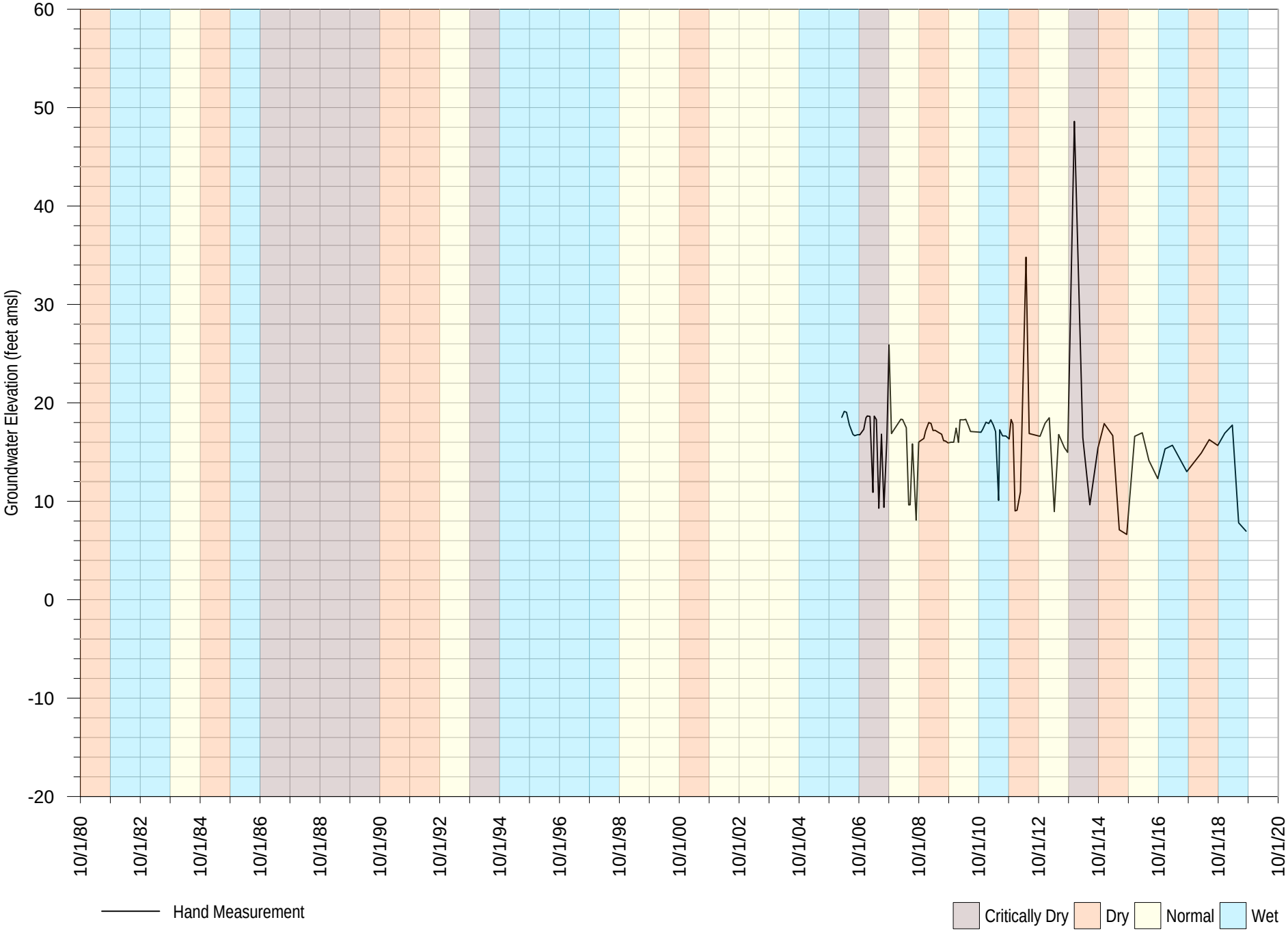
CWD-12A

FIGURE A-103



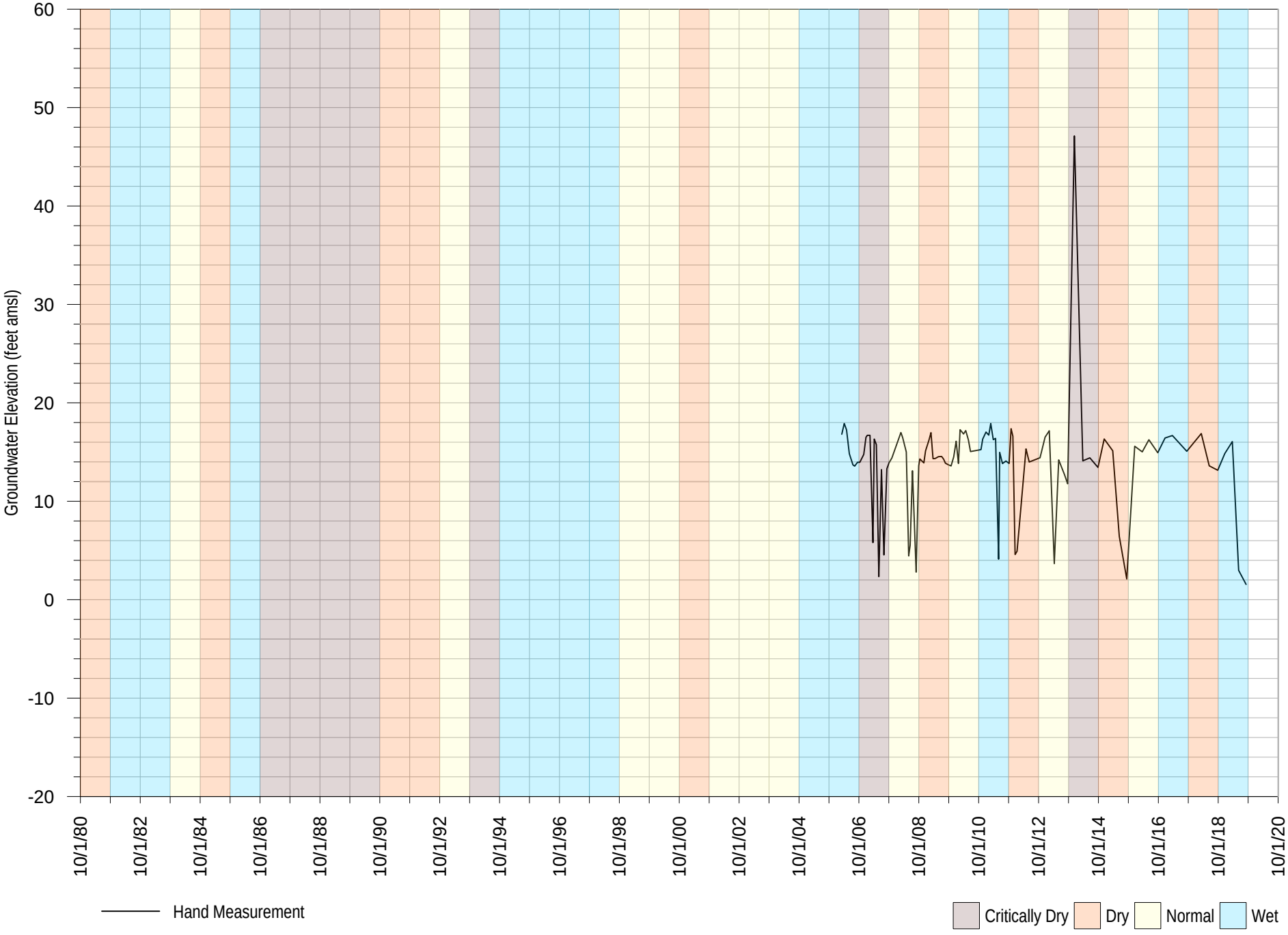
CWD-12B

FIGURE A-104



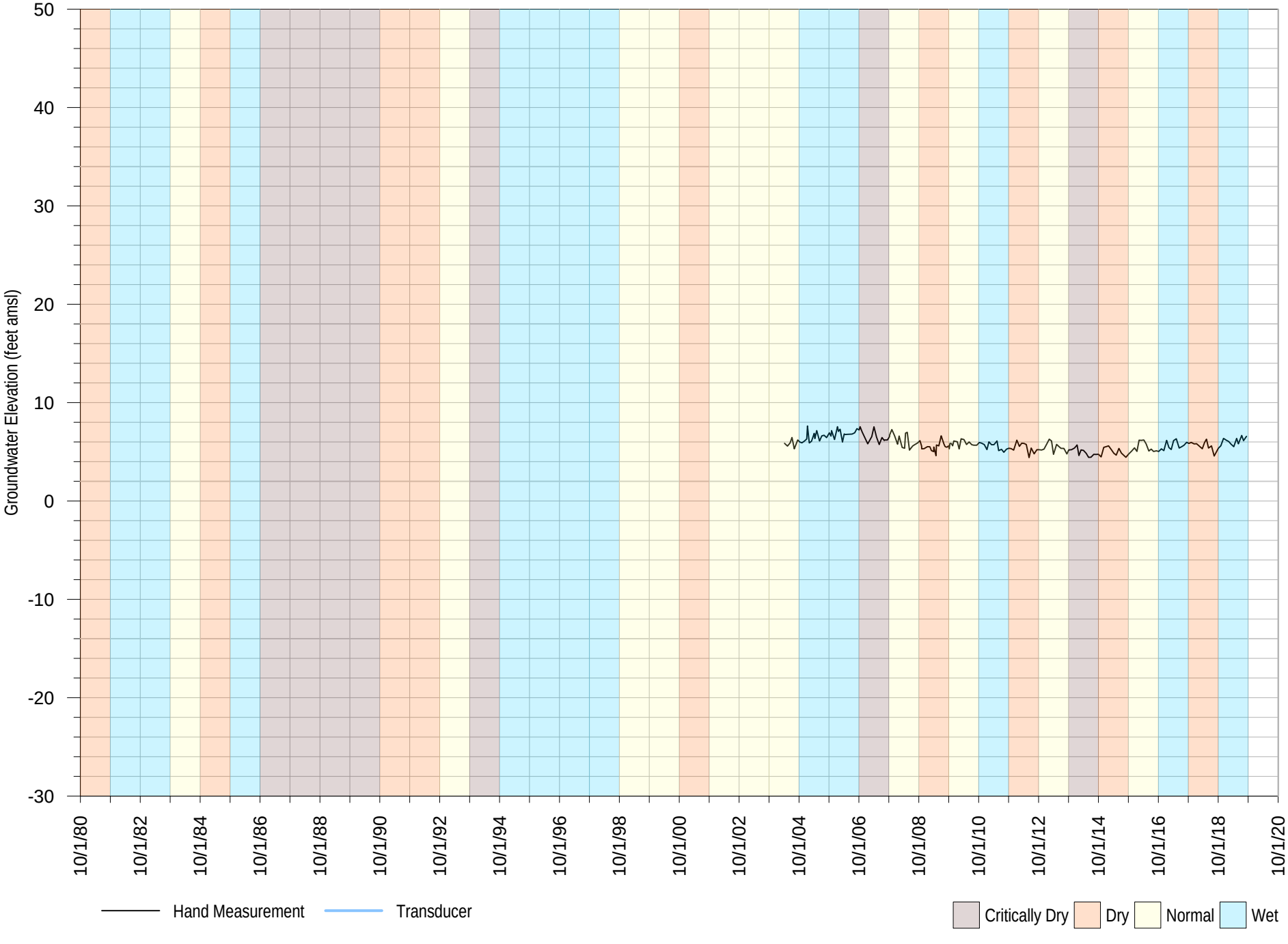
CWD-12C

FIGURE A-105



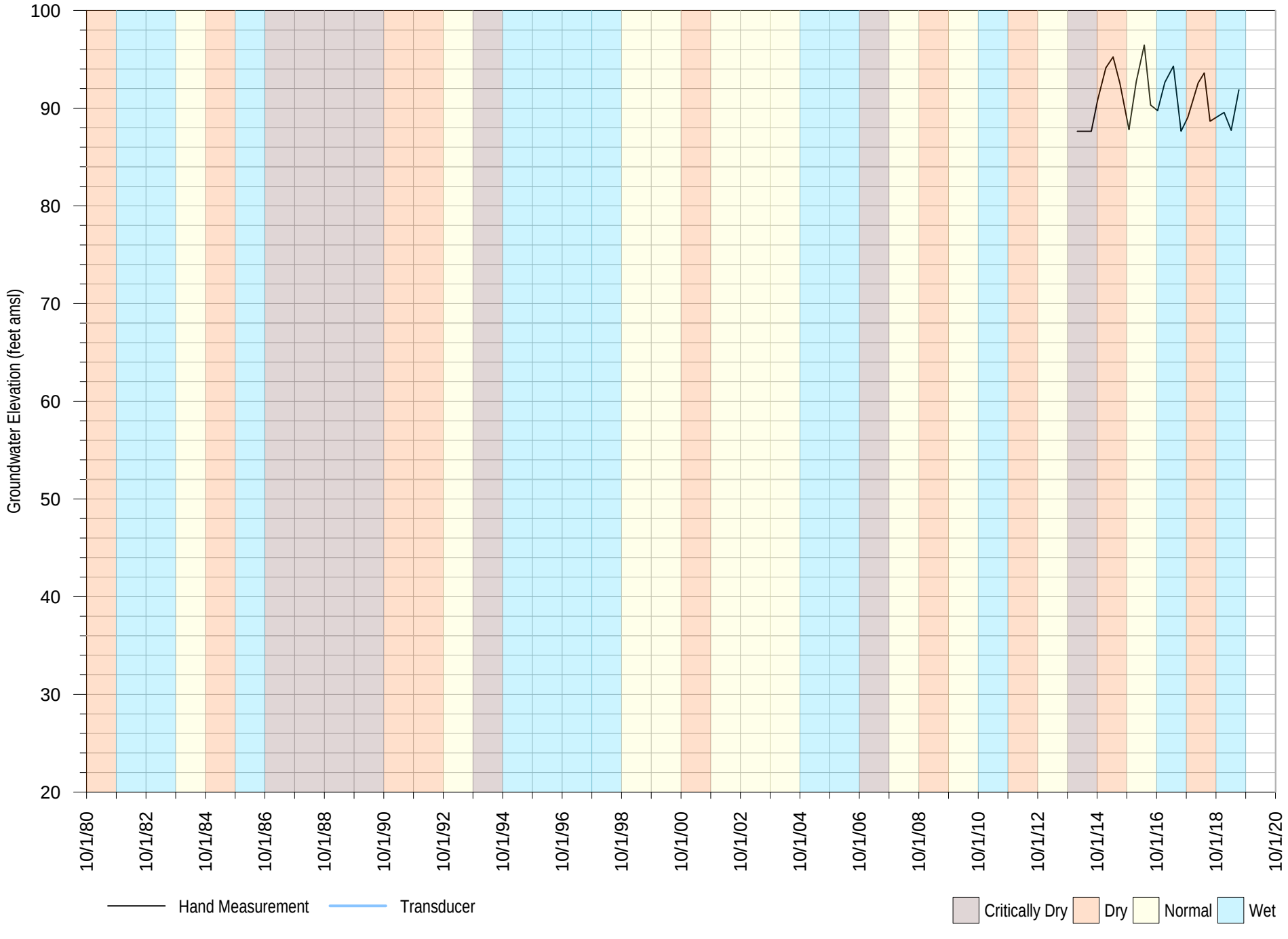
Moran Lake Shallow

FIGURE A-106



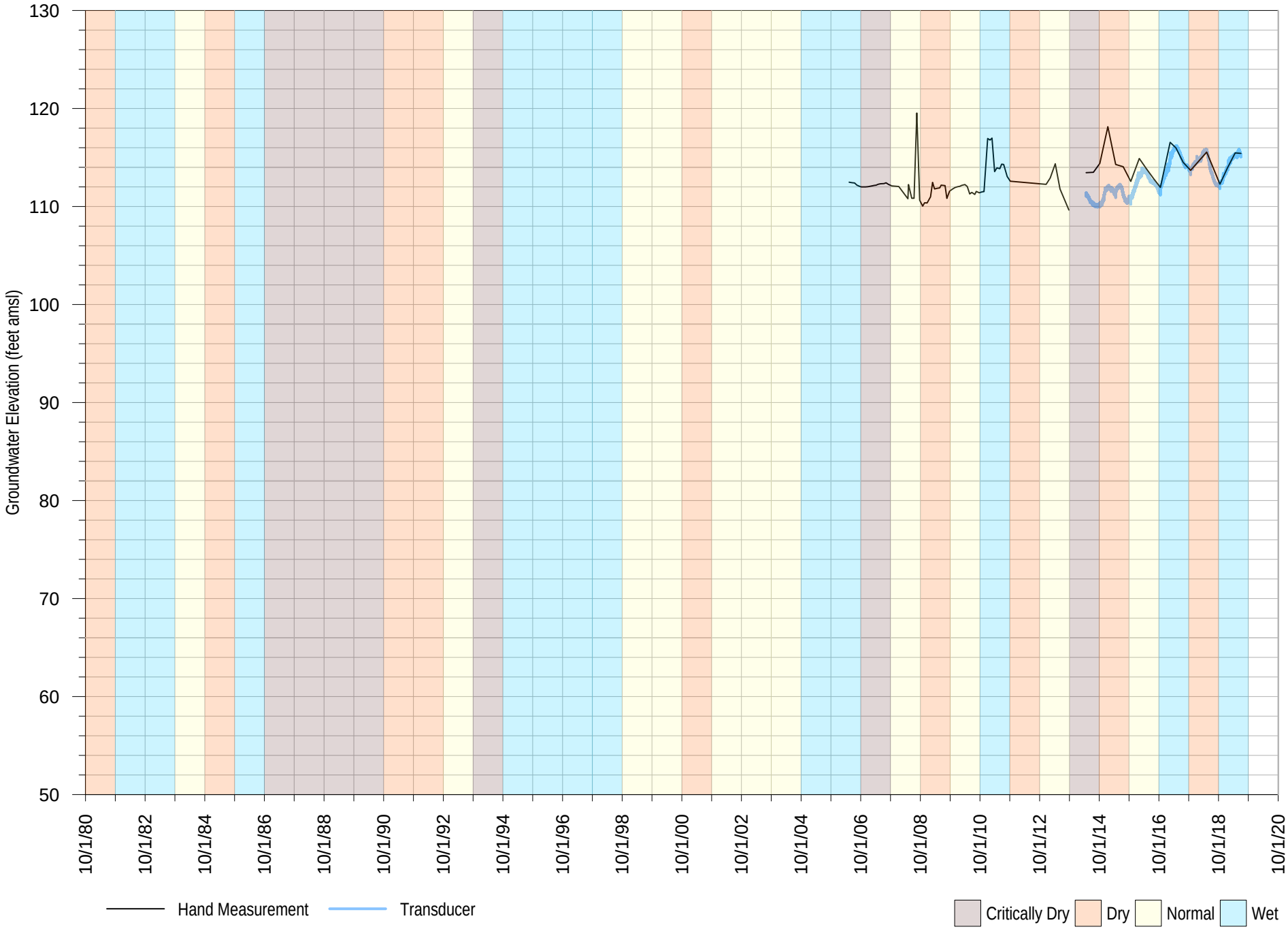
SC-10AAA

FIGURE A-107



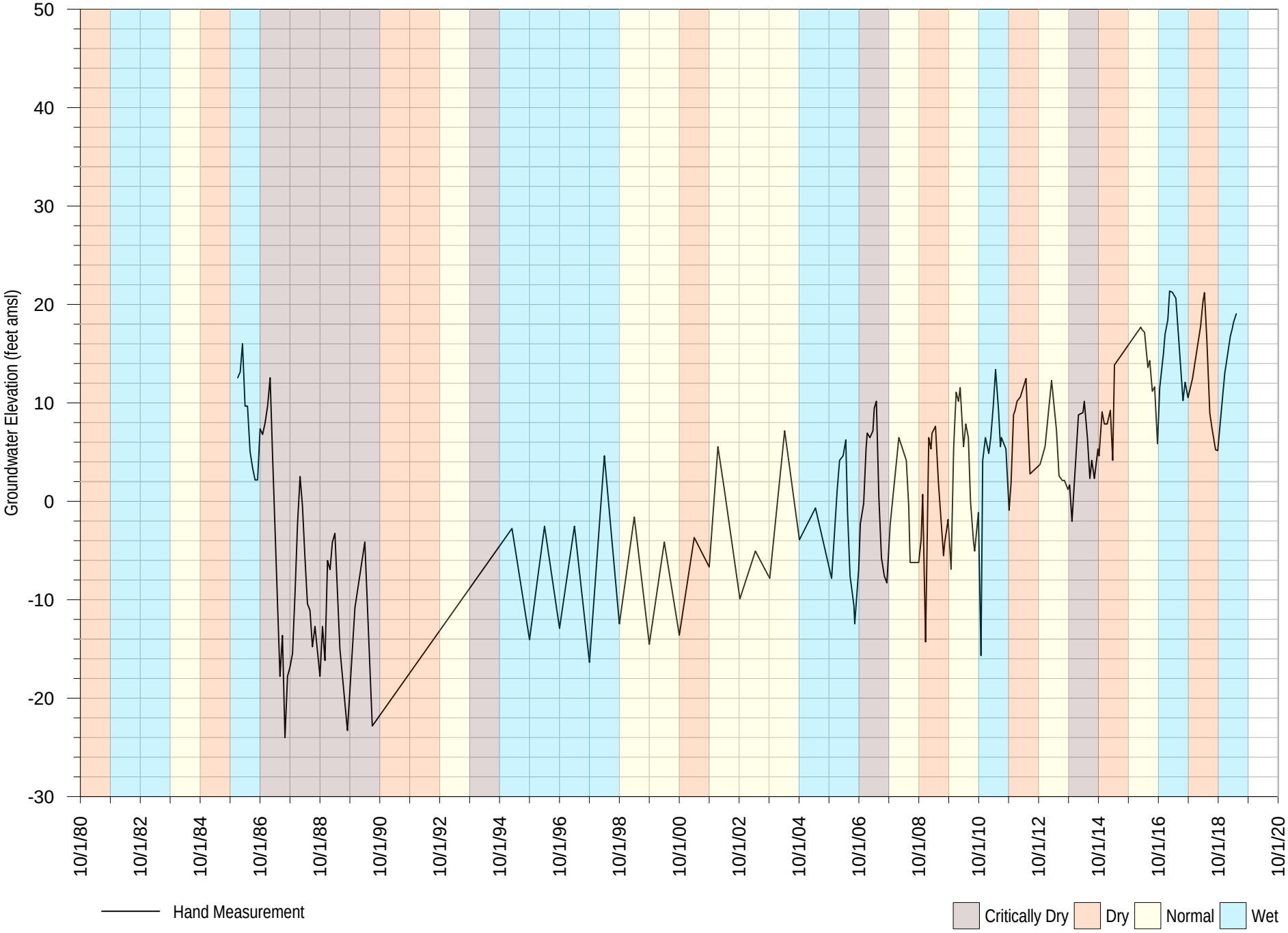
SC-11A

FIGURE A-108



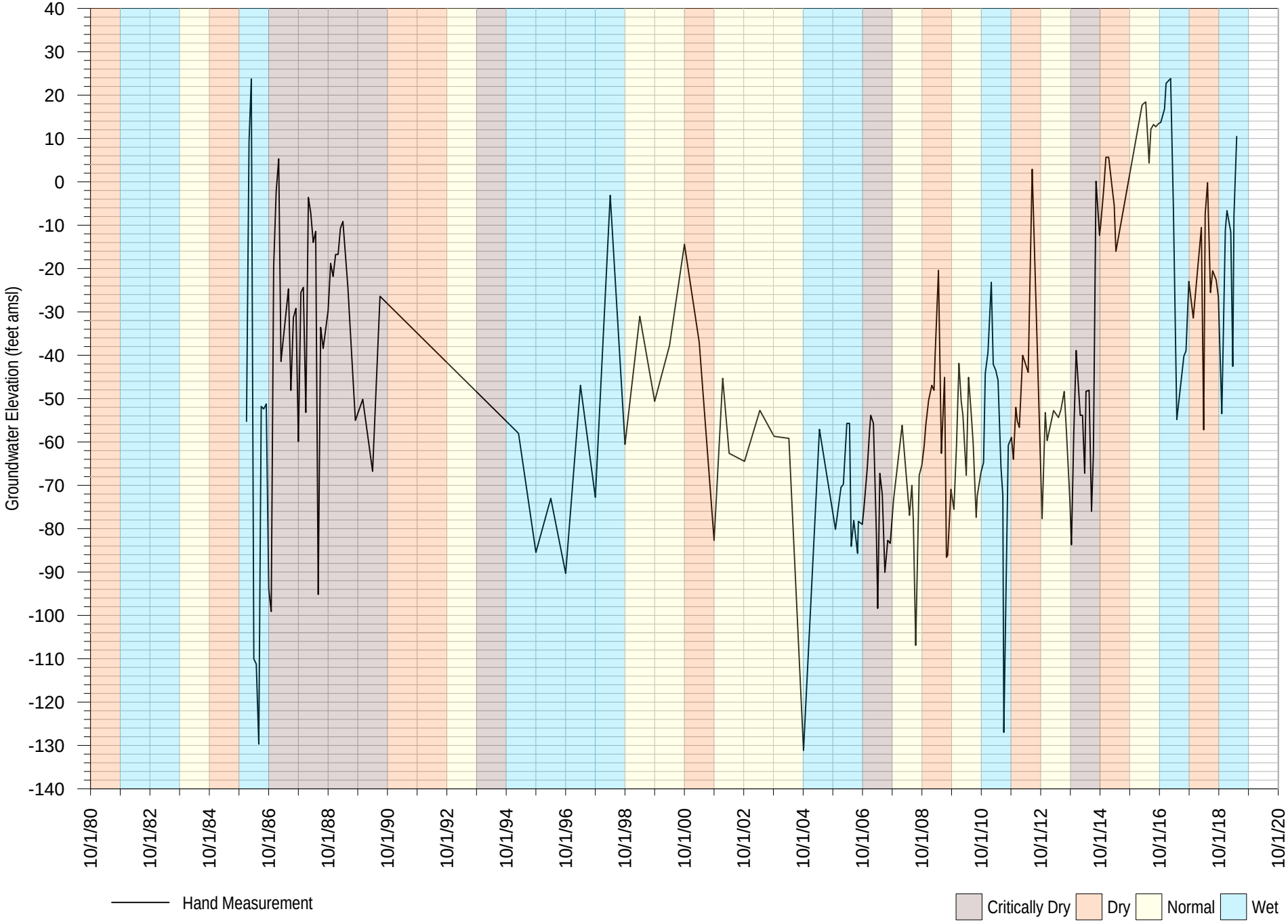
SC-14A

FIGURE A-109



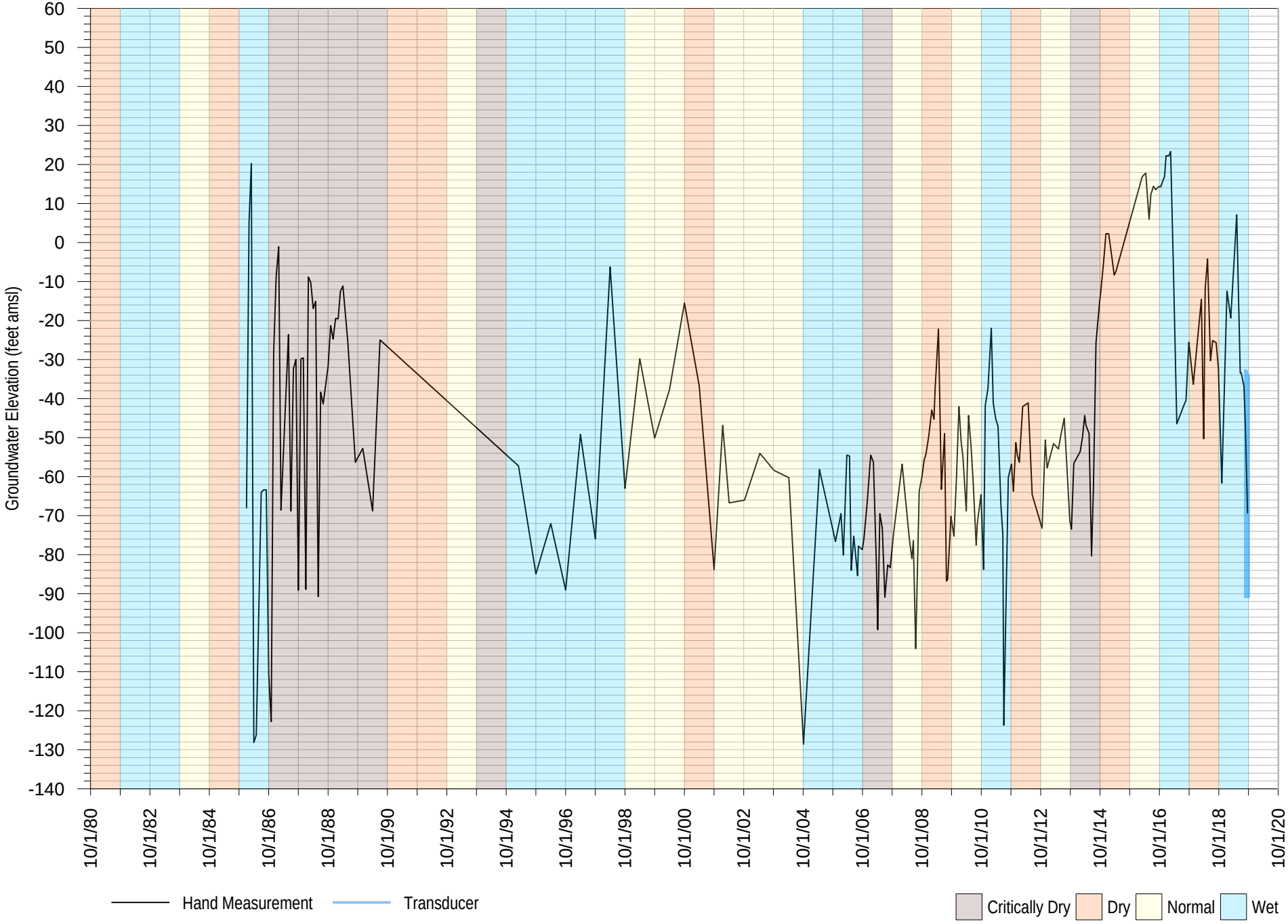
SC-14B

FIGURE A-110



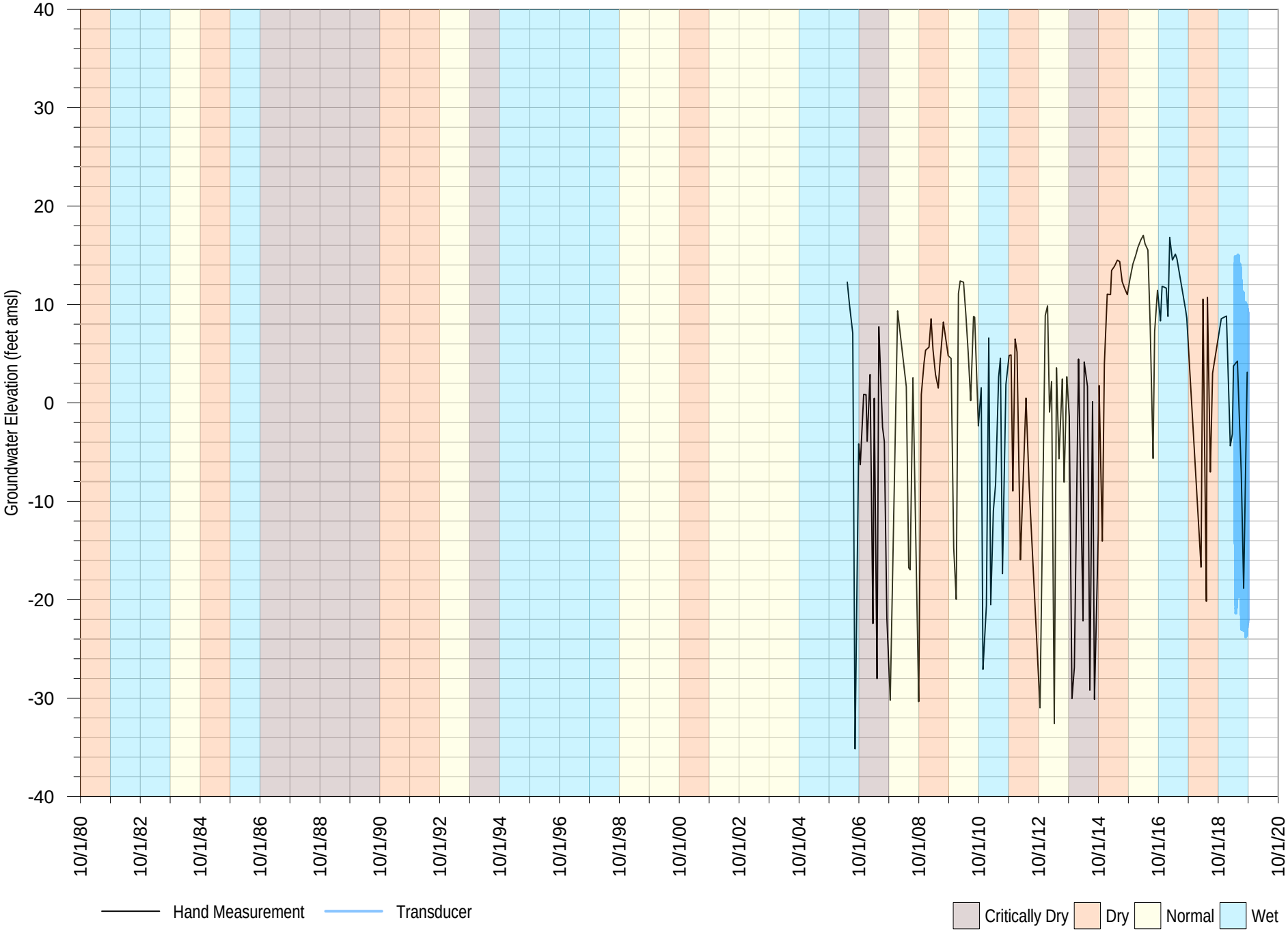
SC-14C

FIGURE A-111



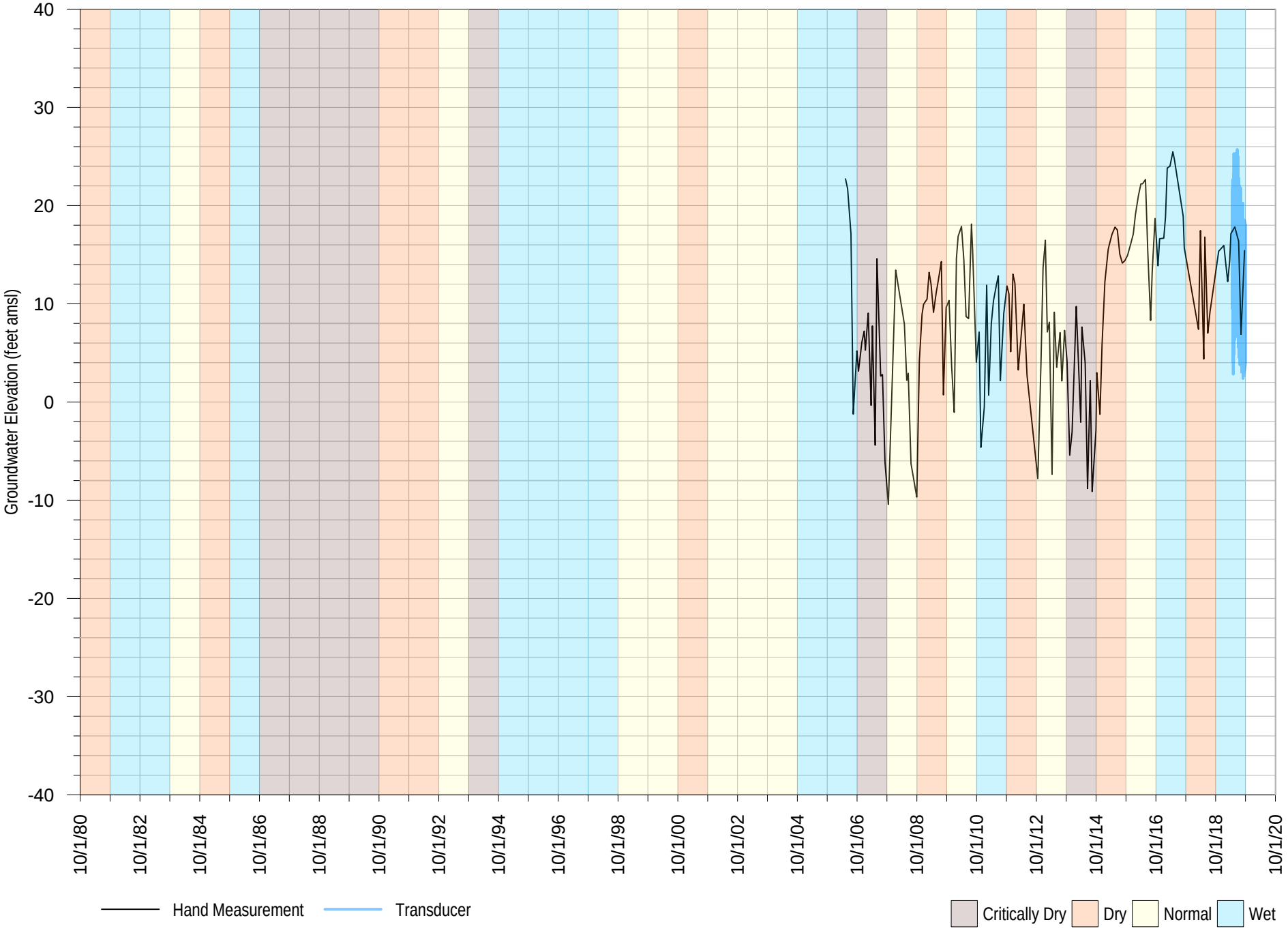
SC-15A

FIGURE A-112



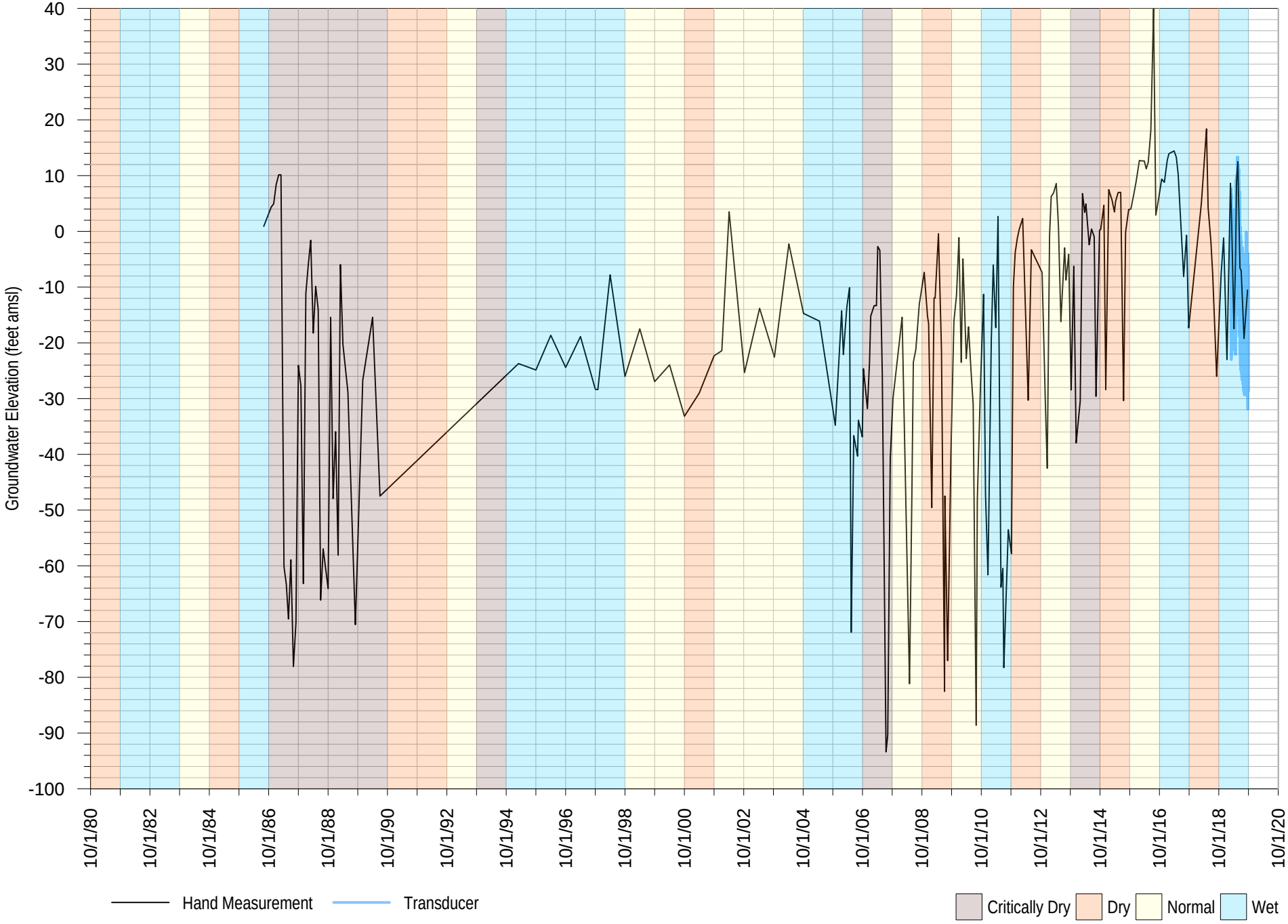
SC-15B

FIGURE A-113



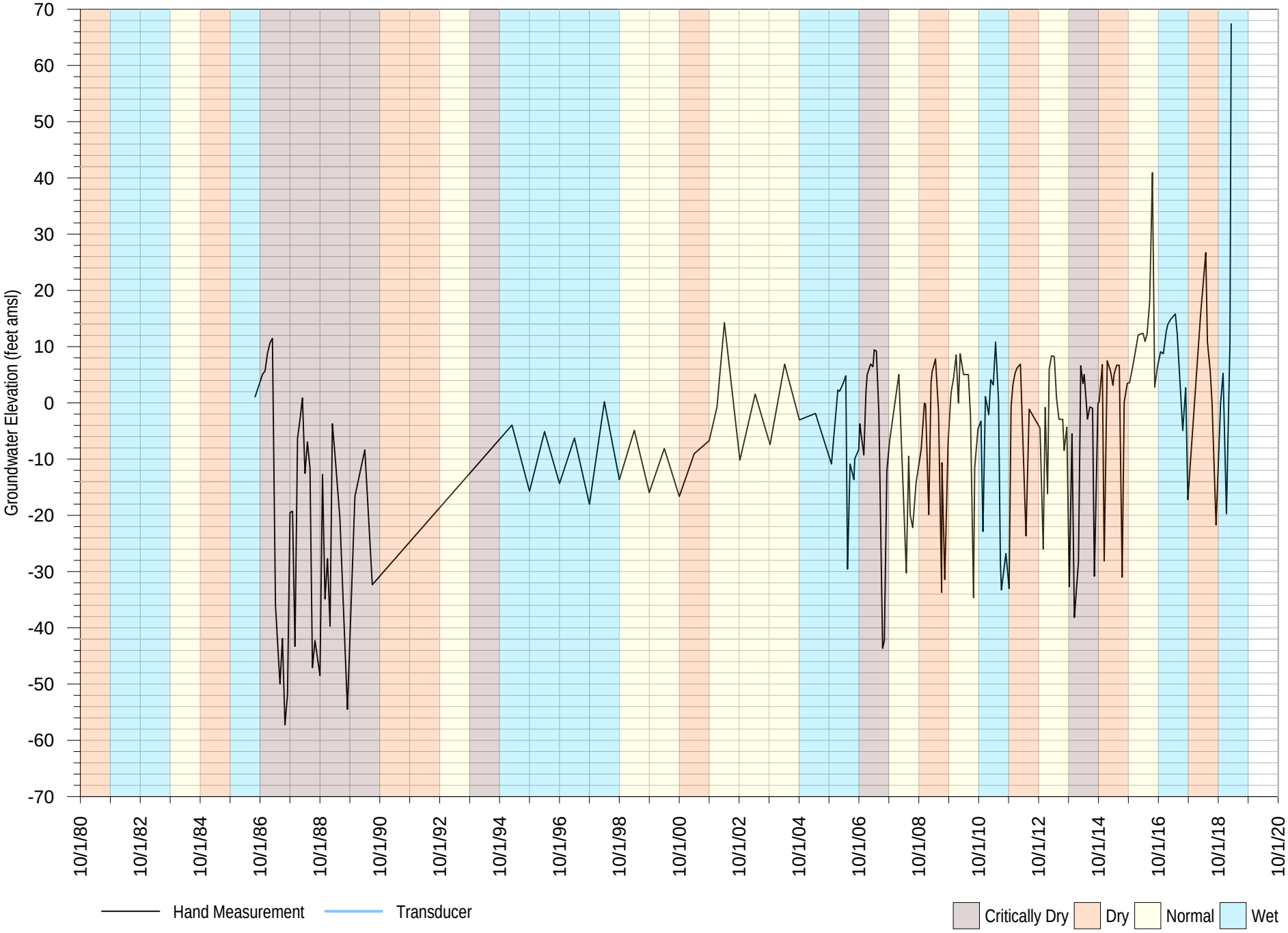
SC-16A

FIGURE A-114



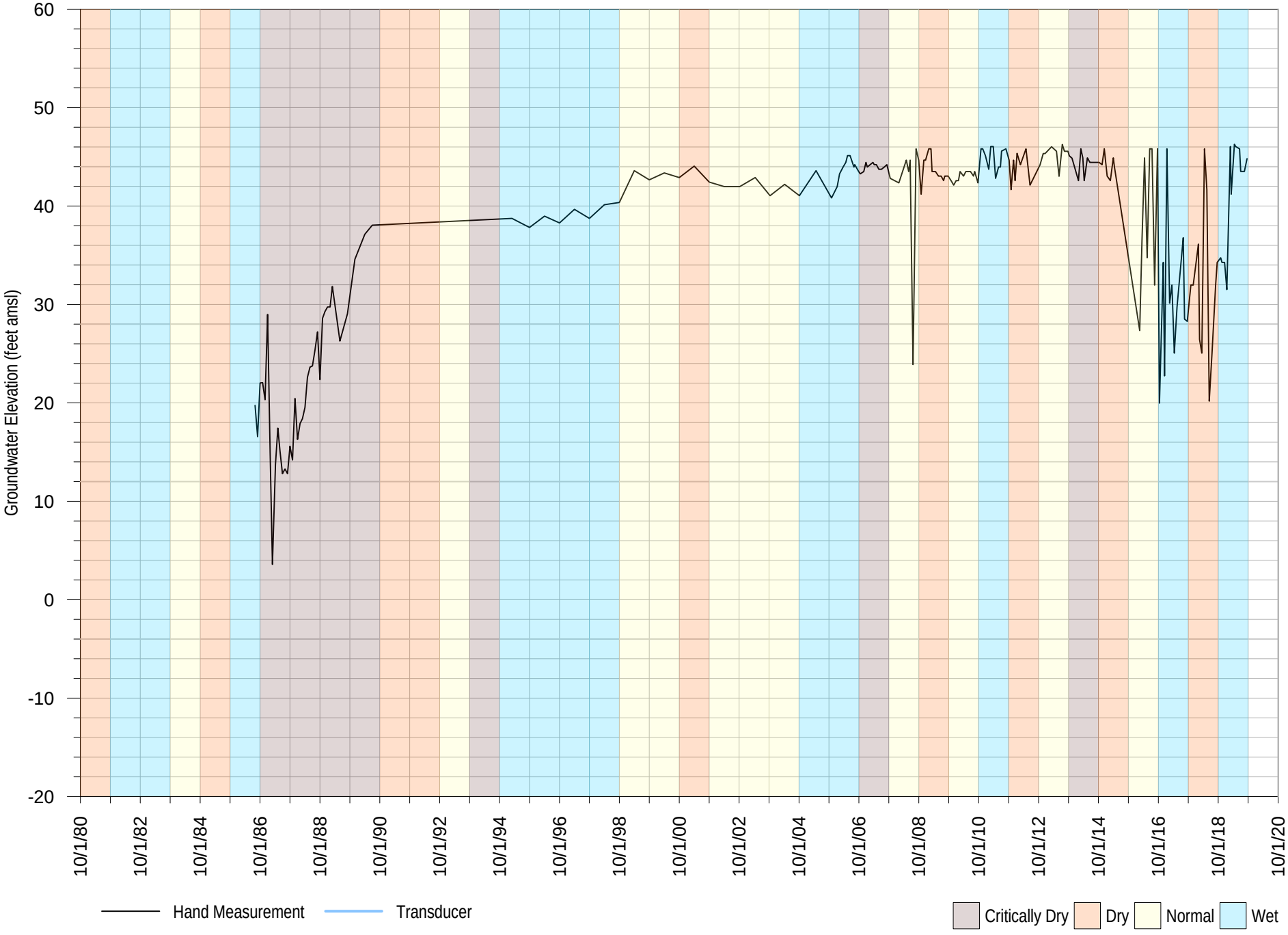
SC-16B

FIGURE A-115



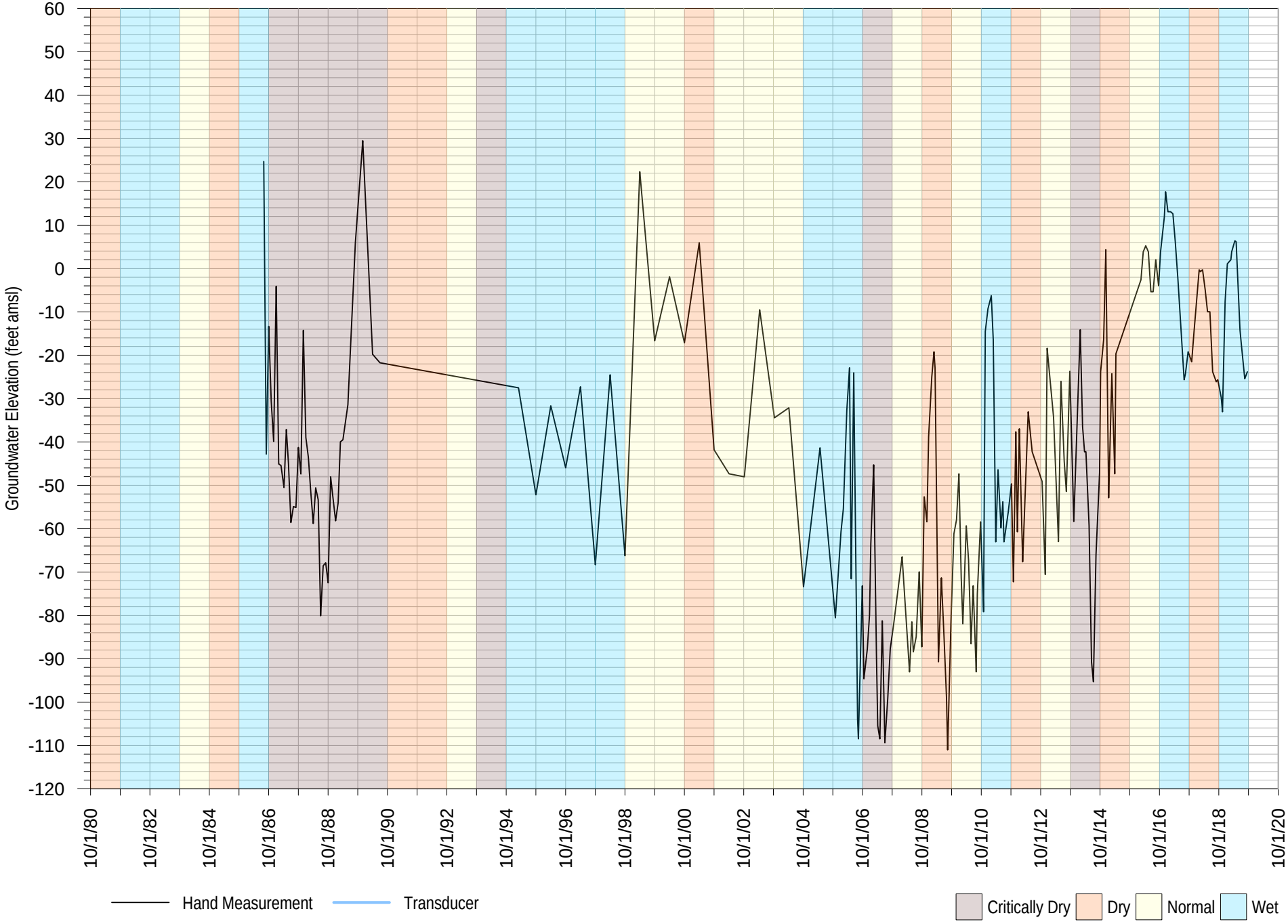
SC-17A

FIGURE A-116



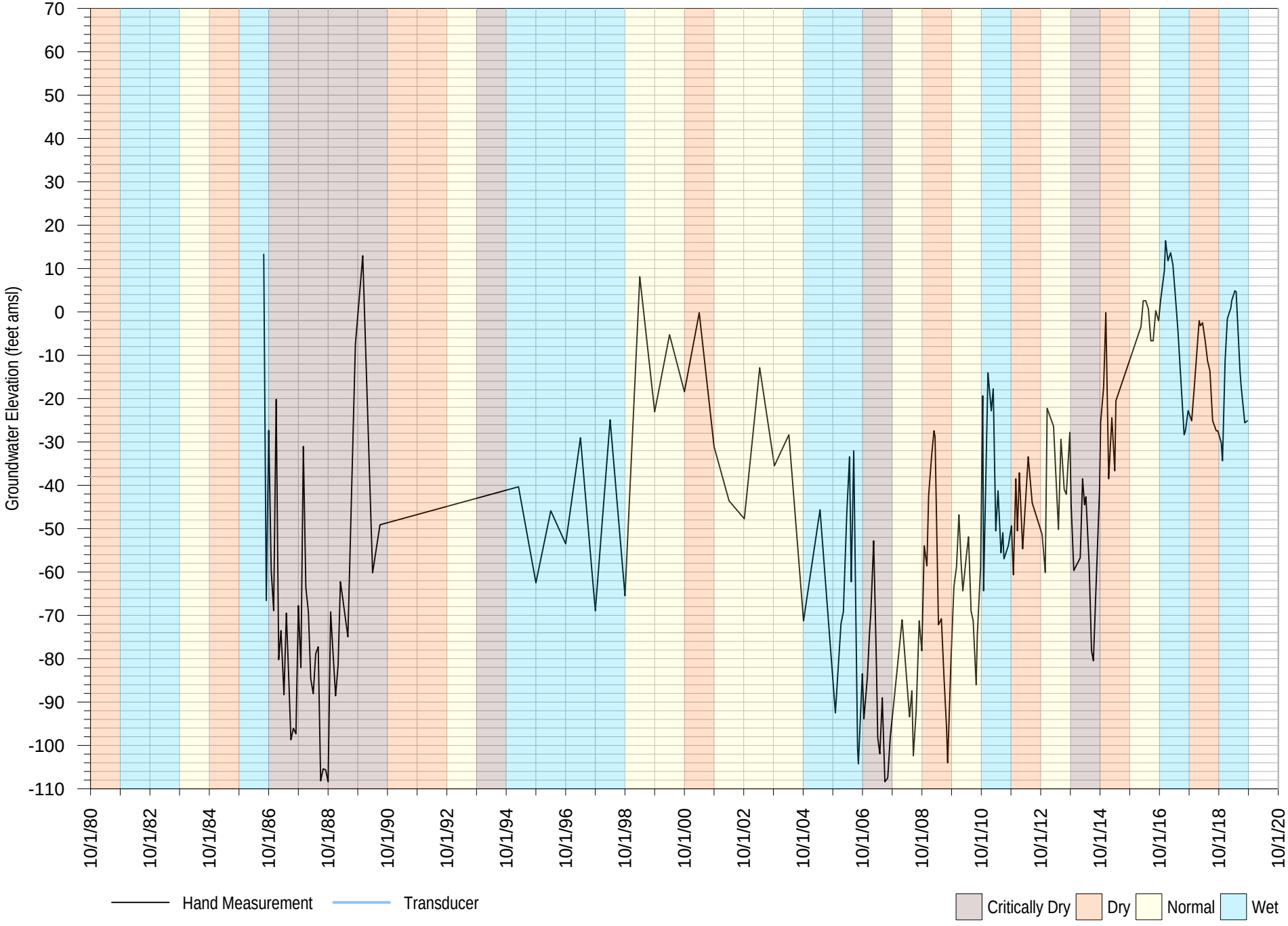
SC-17B

FIGURE A-117



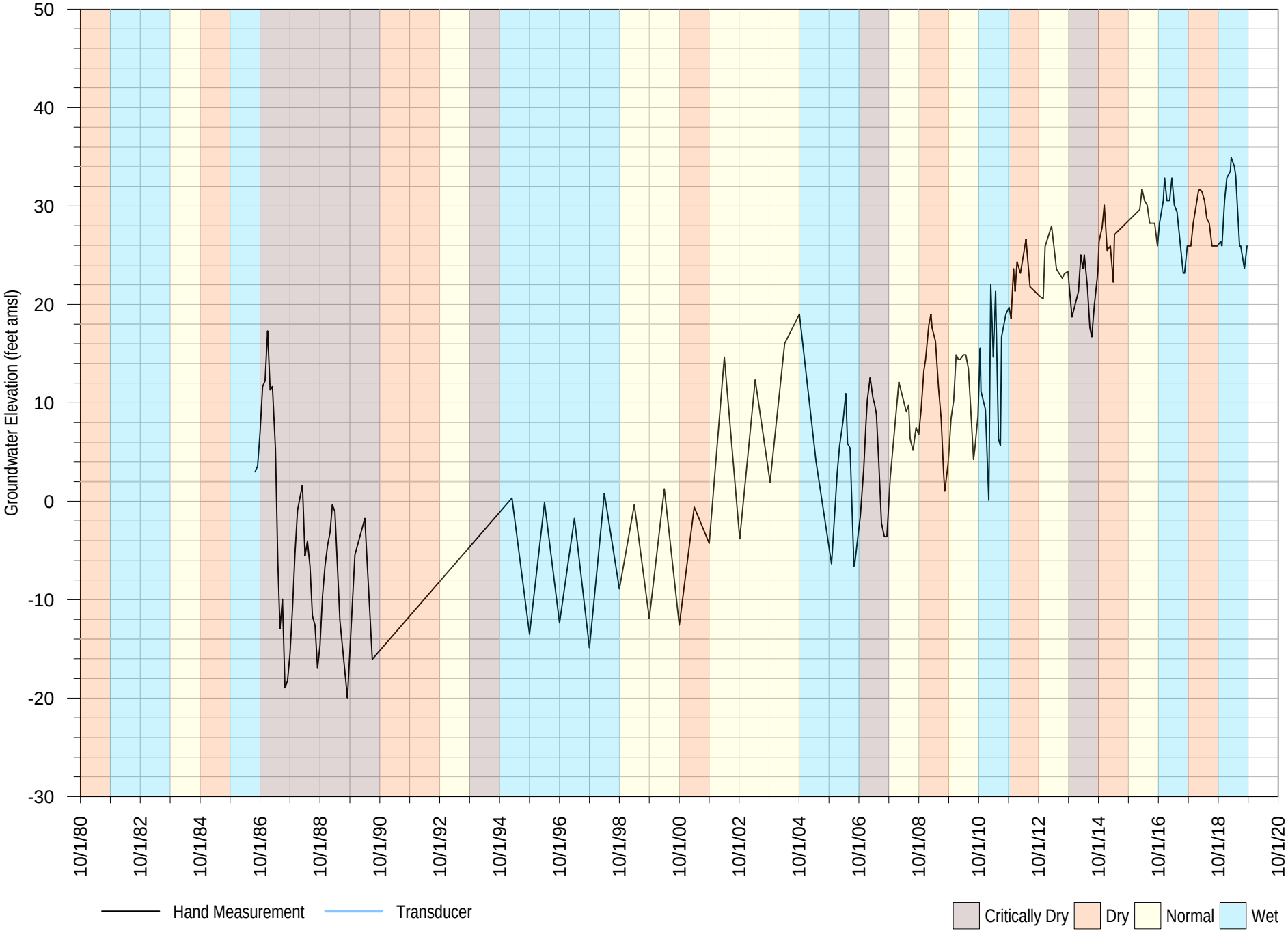
SC-17C

FIGURE A-118



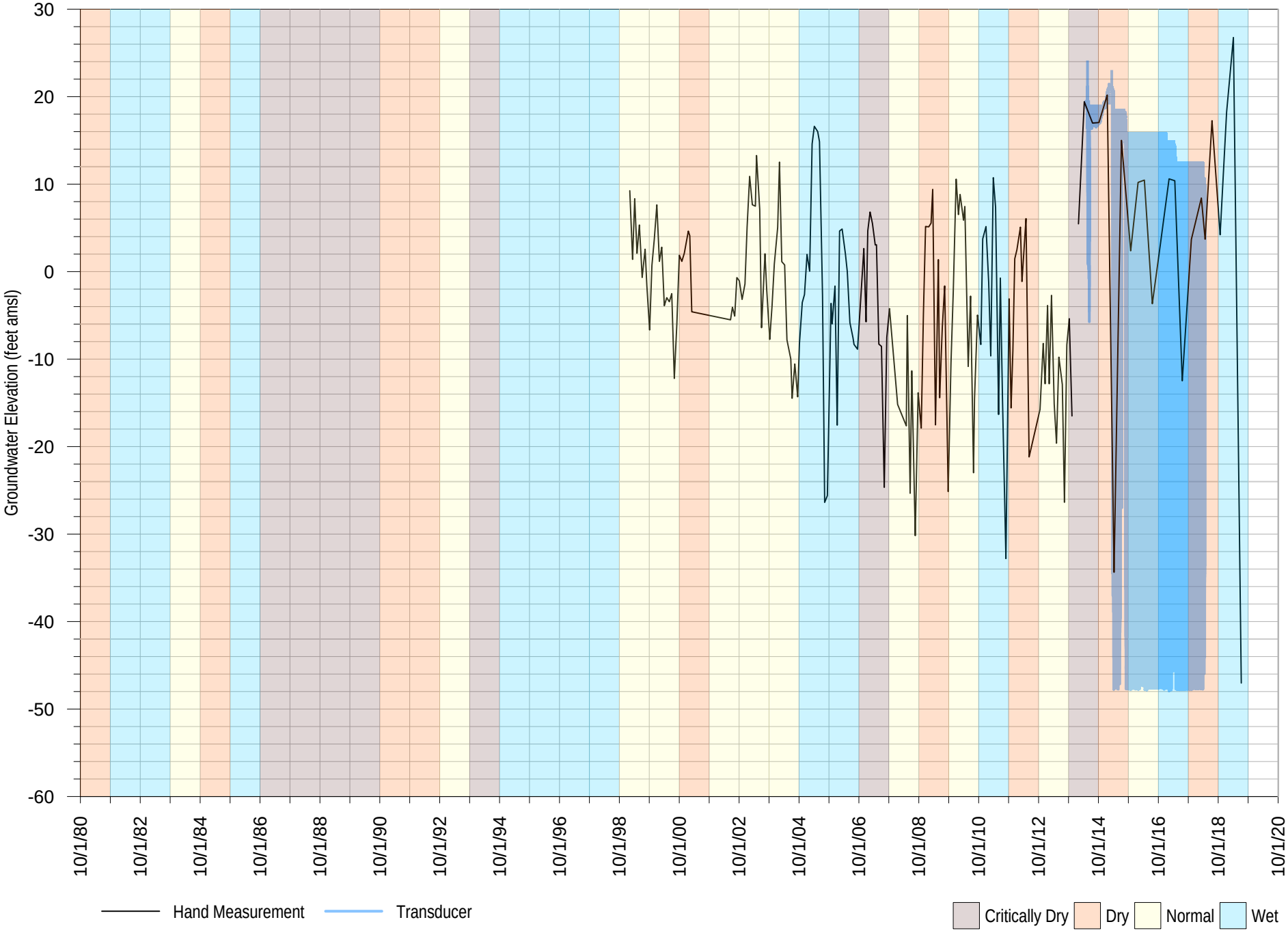
SC-17D

FIGURE A-119



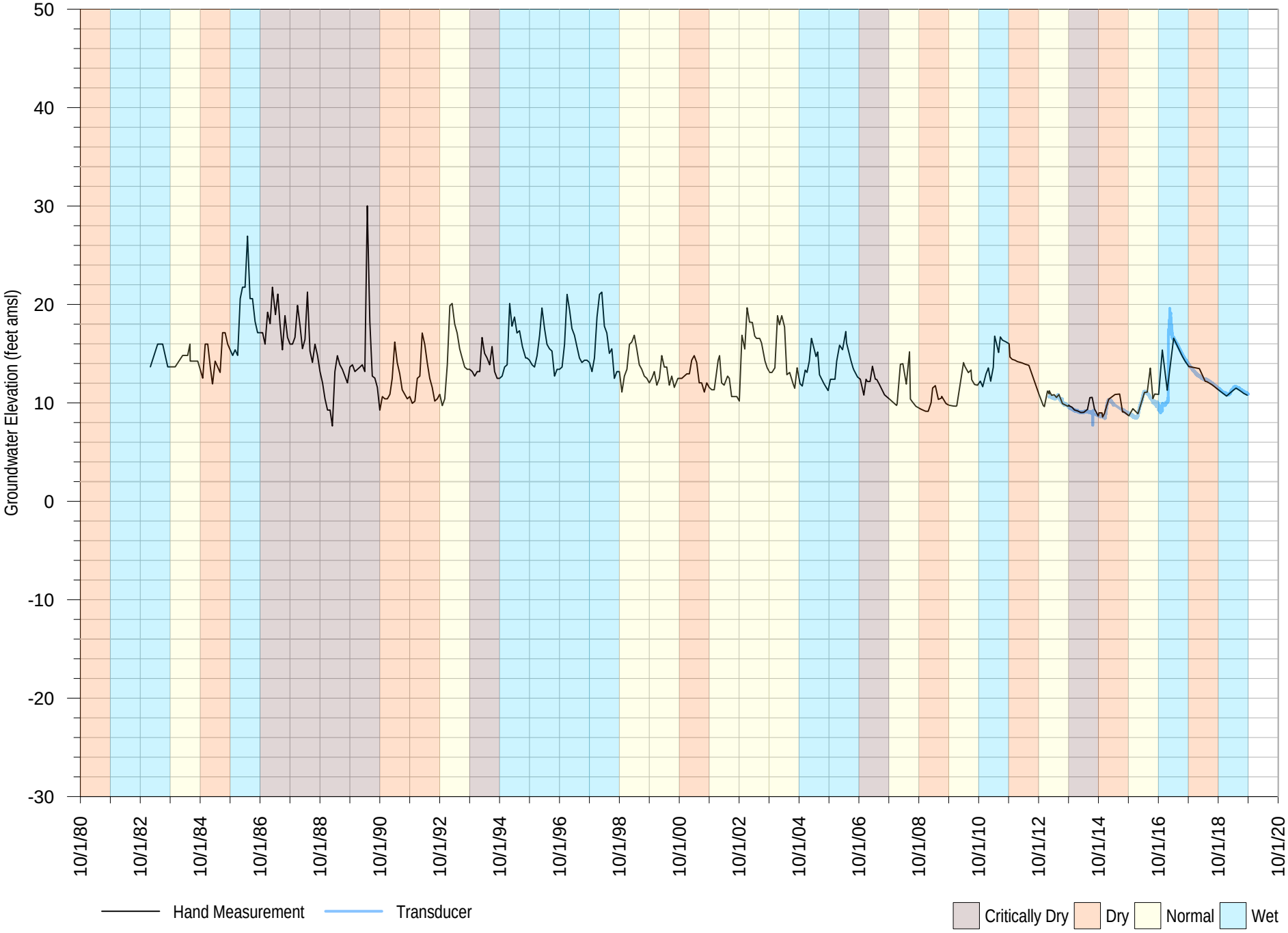
SC-18A

FIGURE A-120



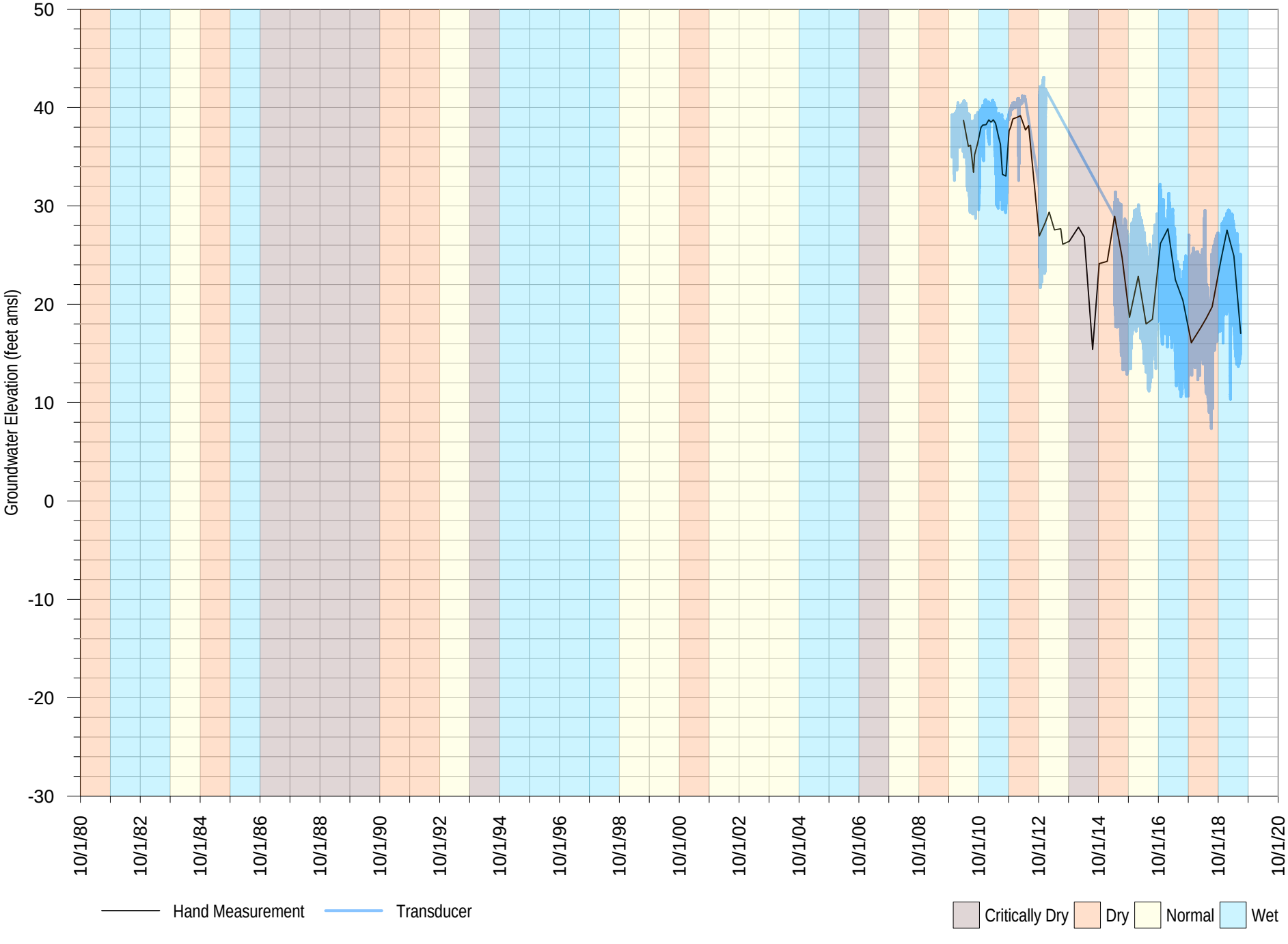
SC-1B

FIGURE A-121



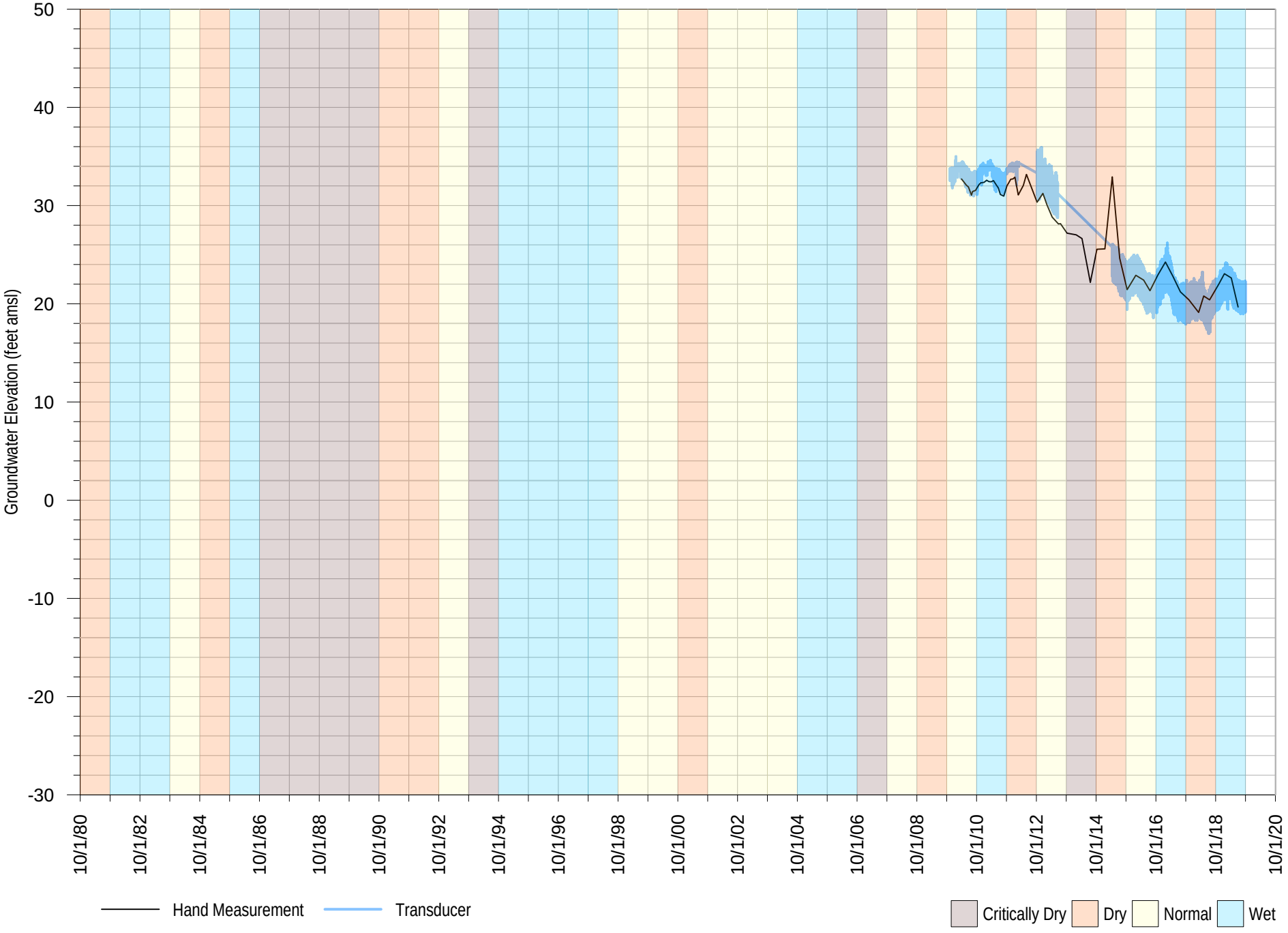
SC-20A

FIGURE A-122



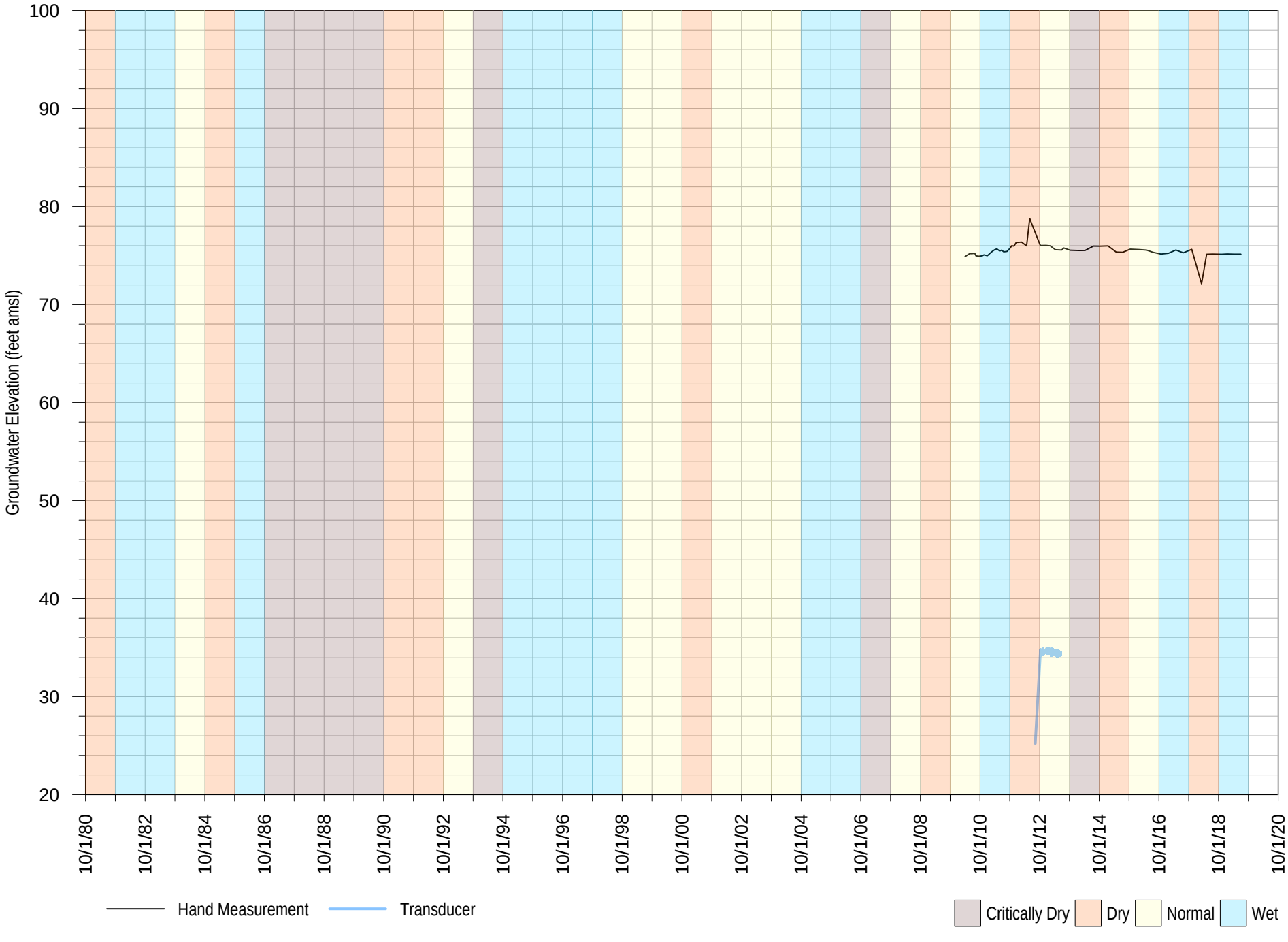
SC-20B

FIGURE A-123



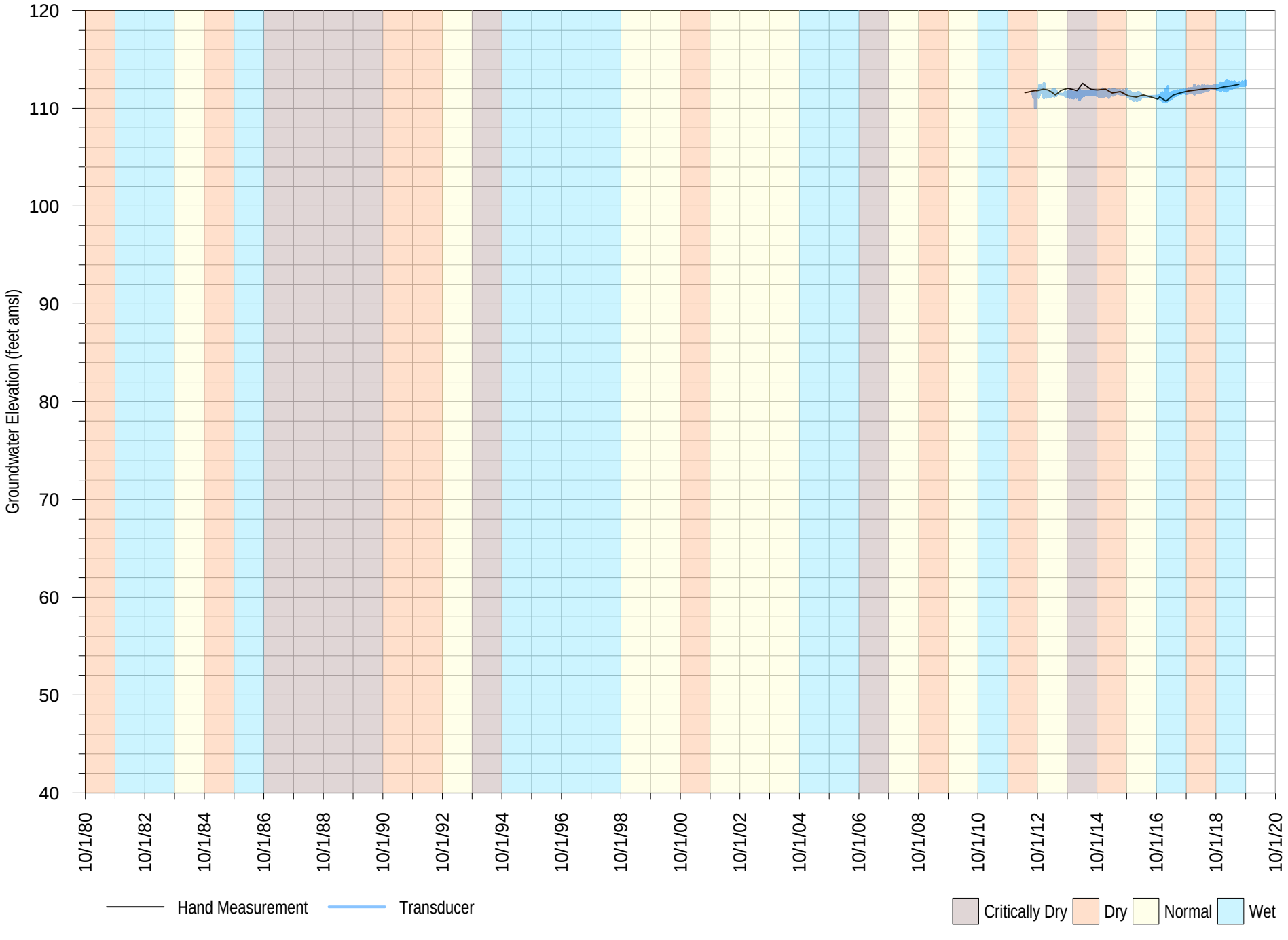
SC-20C

FIGURE A-124



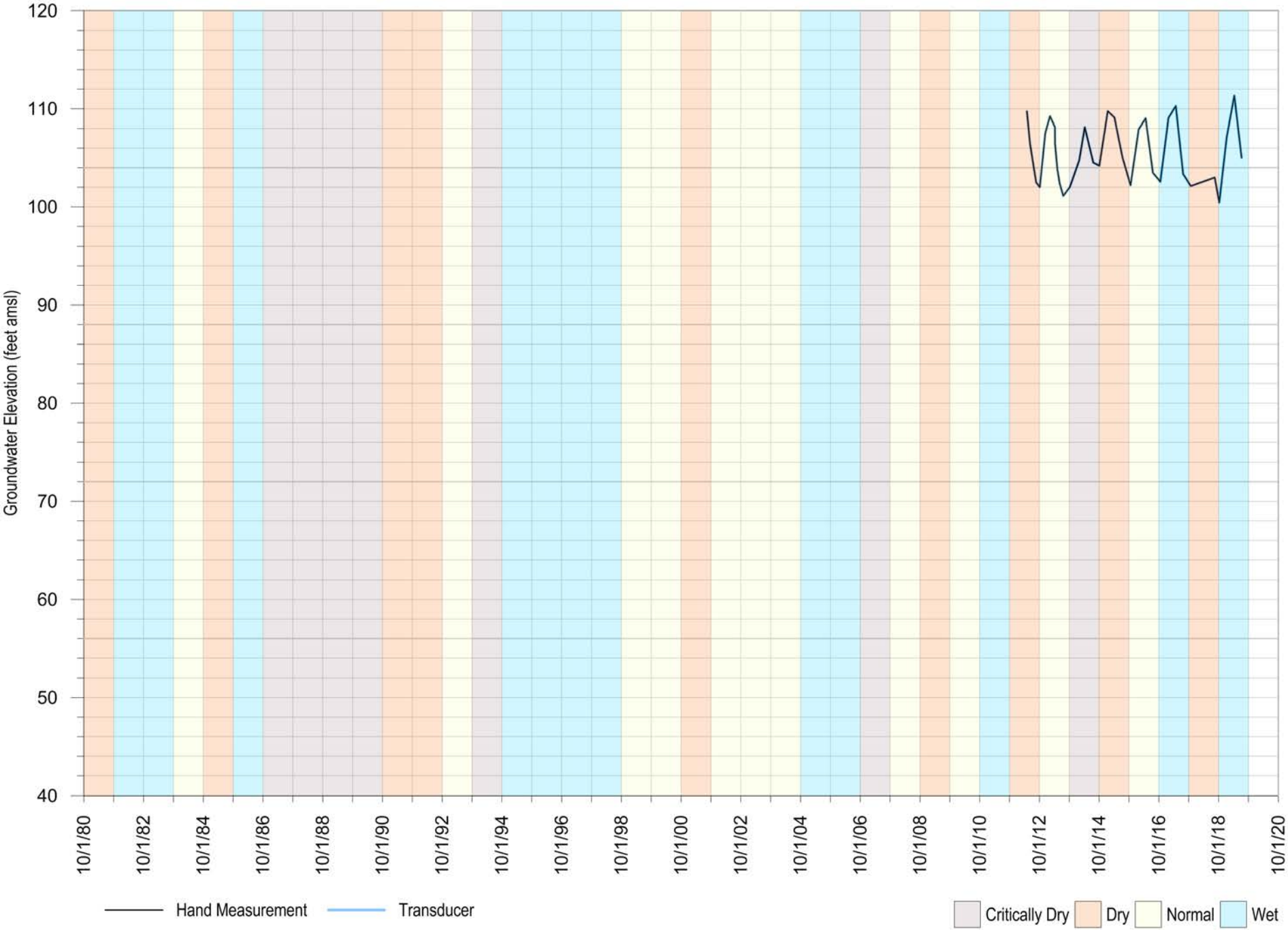
SC-21A

FIGURE A-125



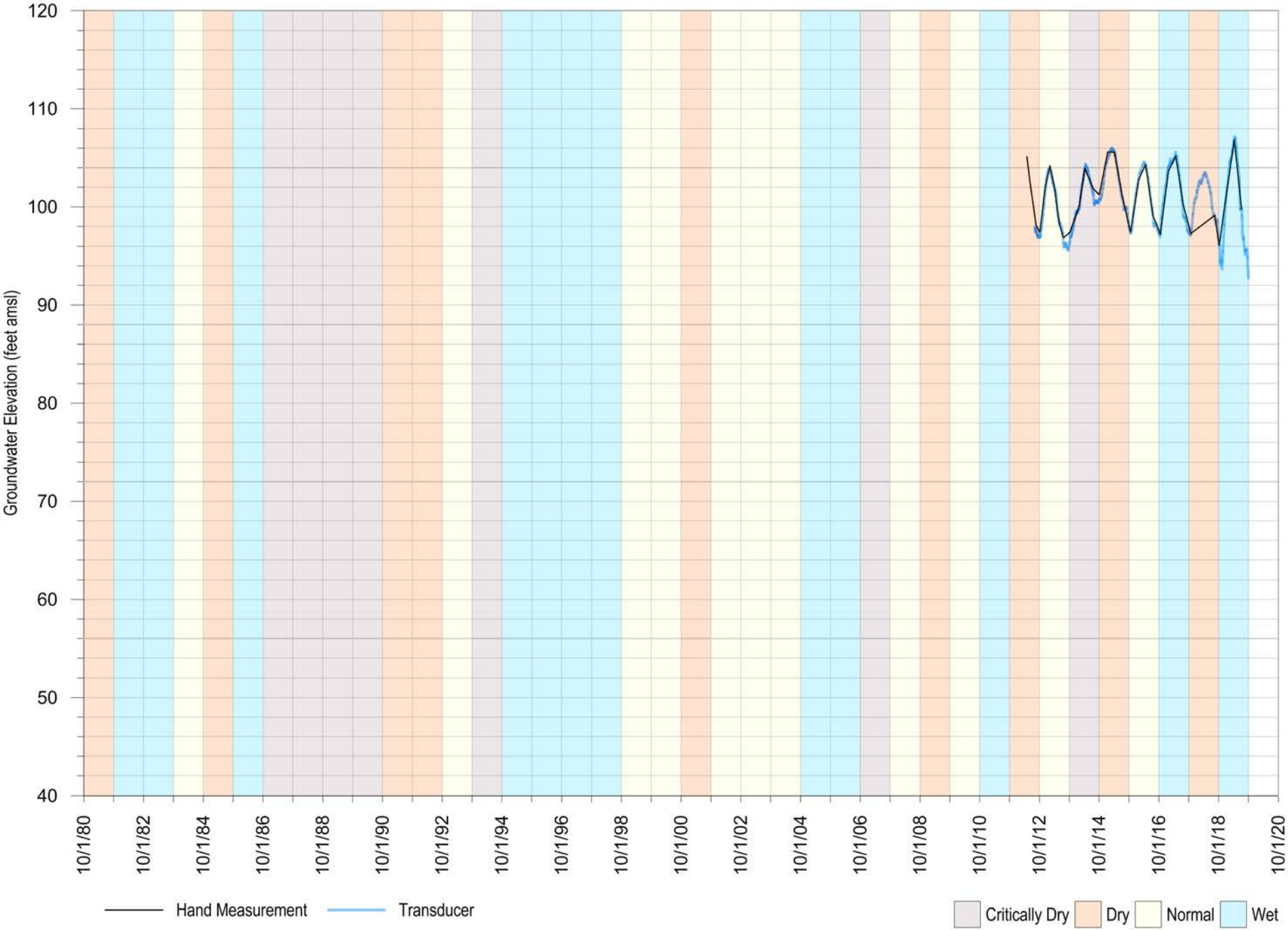
SC-21AA

FIGURE A-126



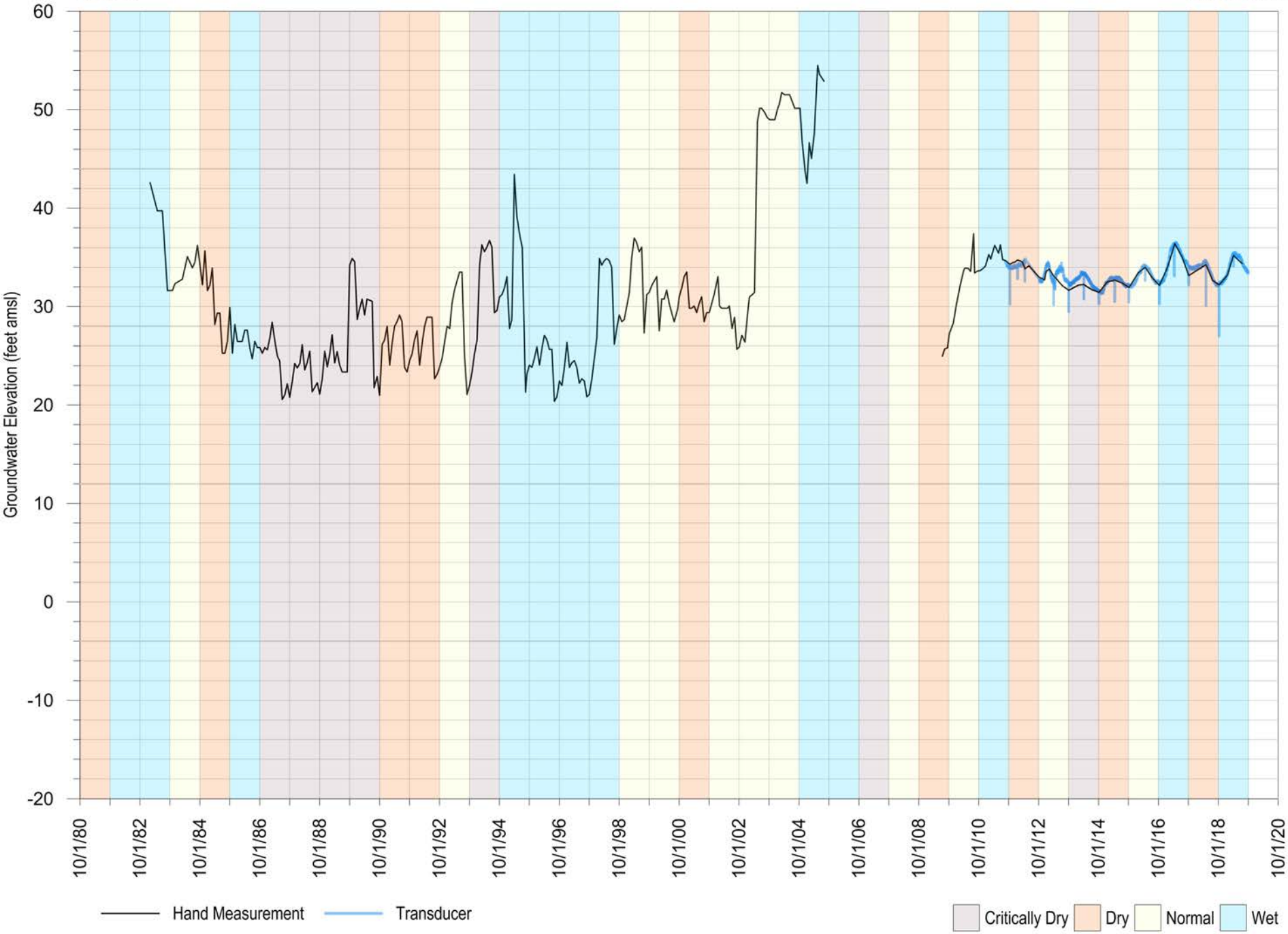
SC-21AAA

FIGURE A-127



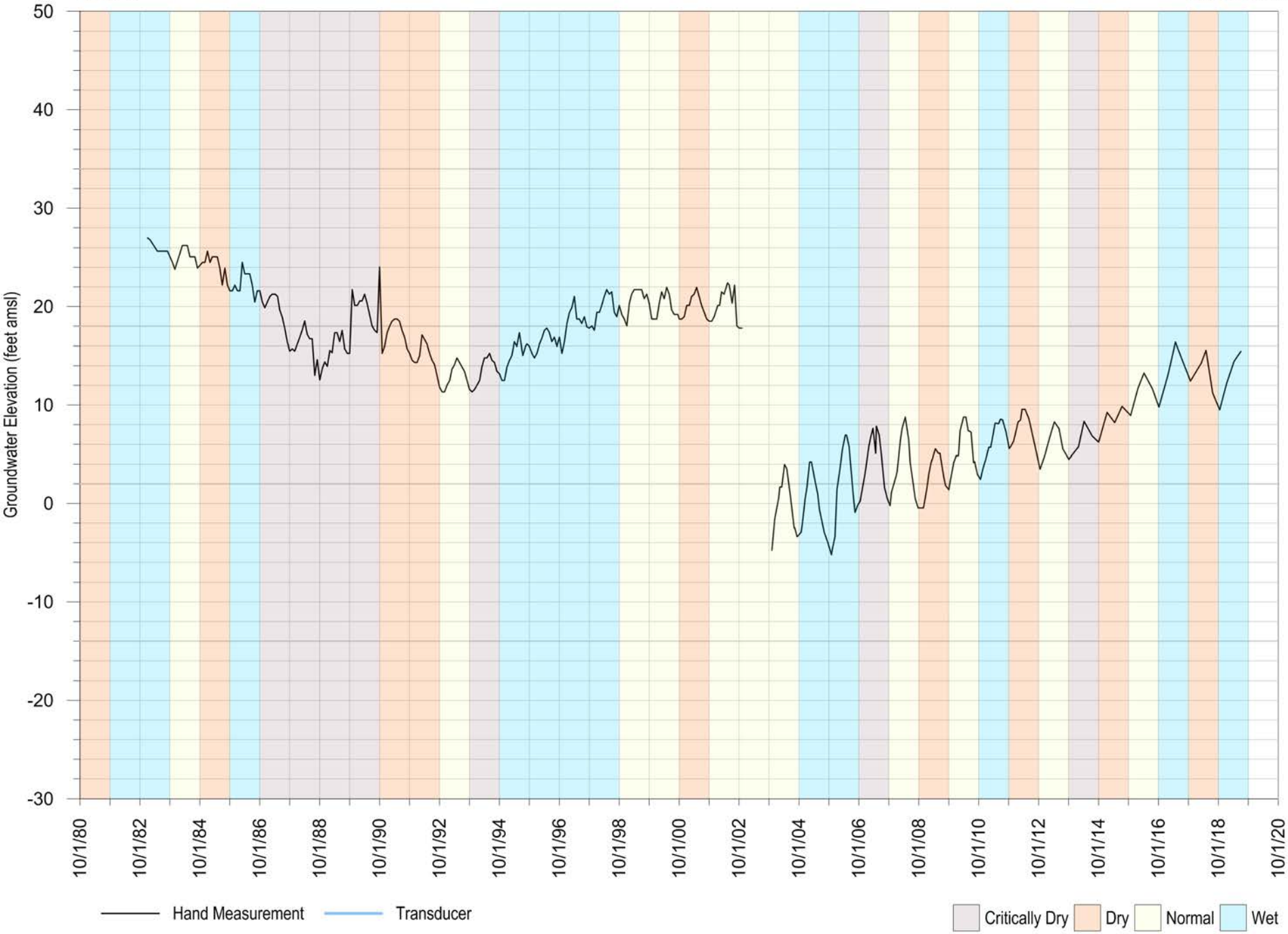
SC-3B

FIGURE A-128



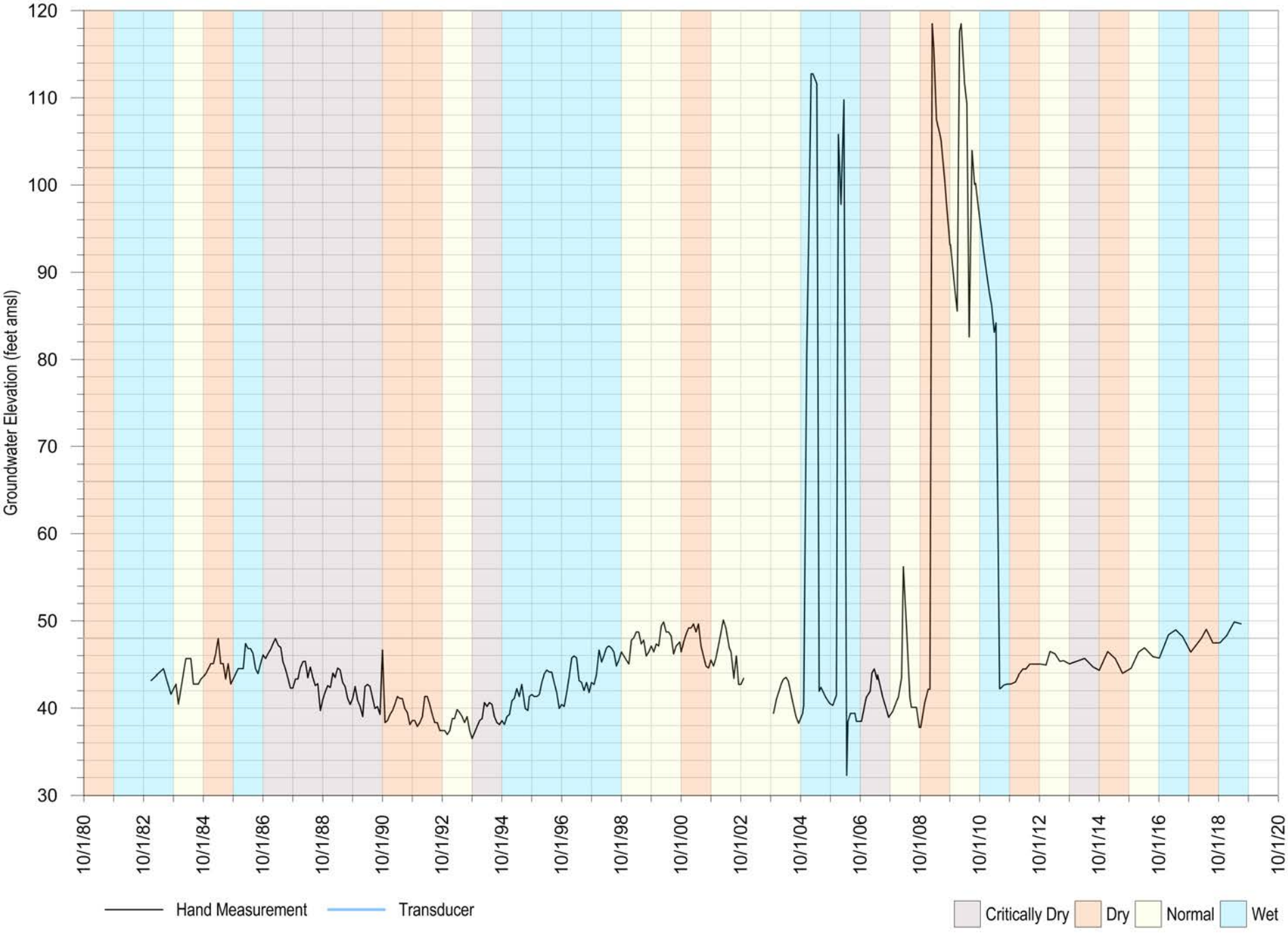
SC-5B

FIGURE A-129



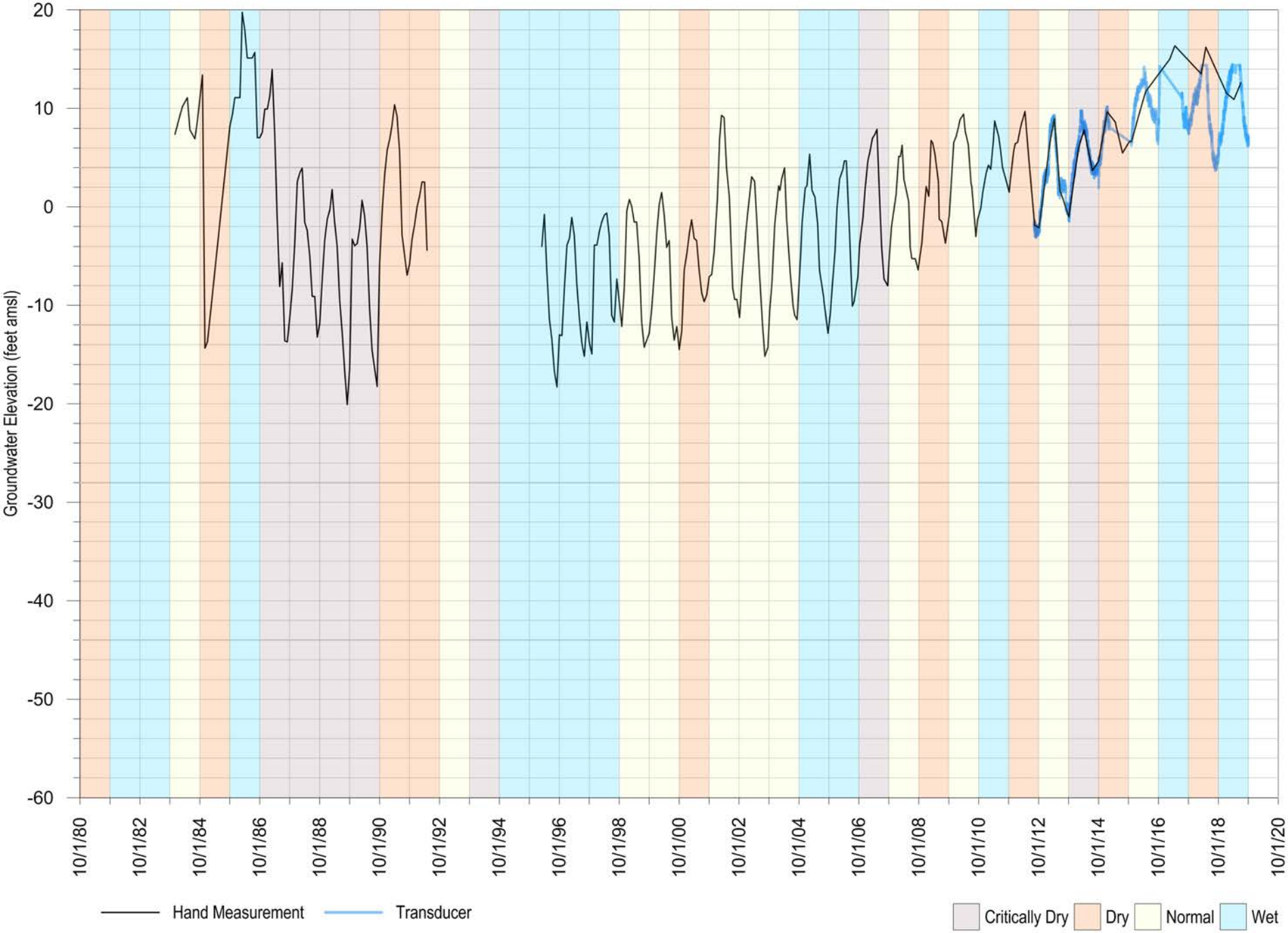
SC-5C

FIGURE A-130



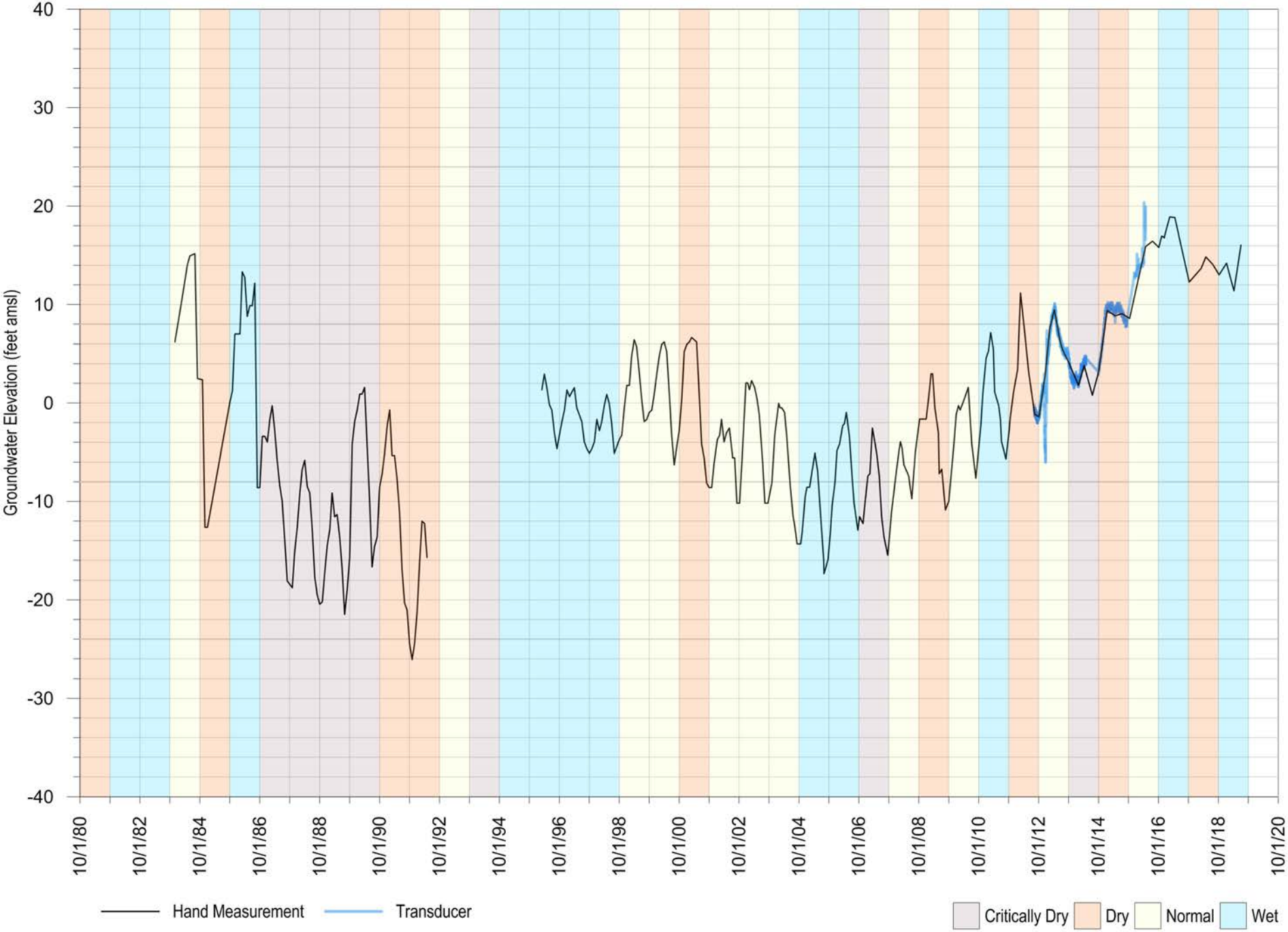
SC-8A

FIGURE A-131



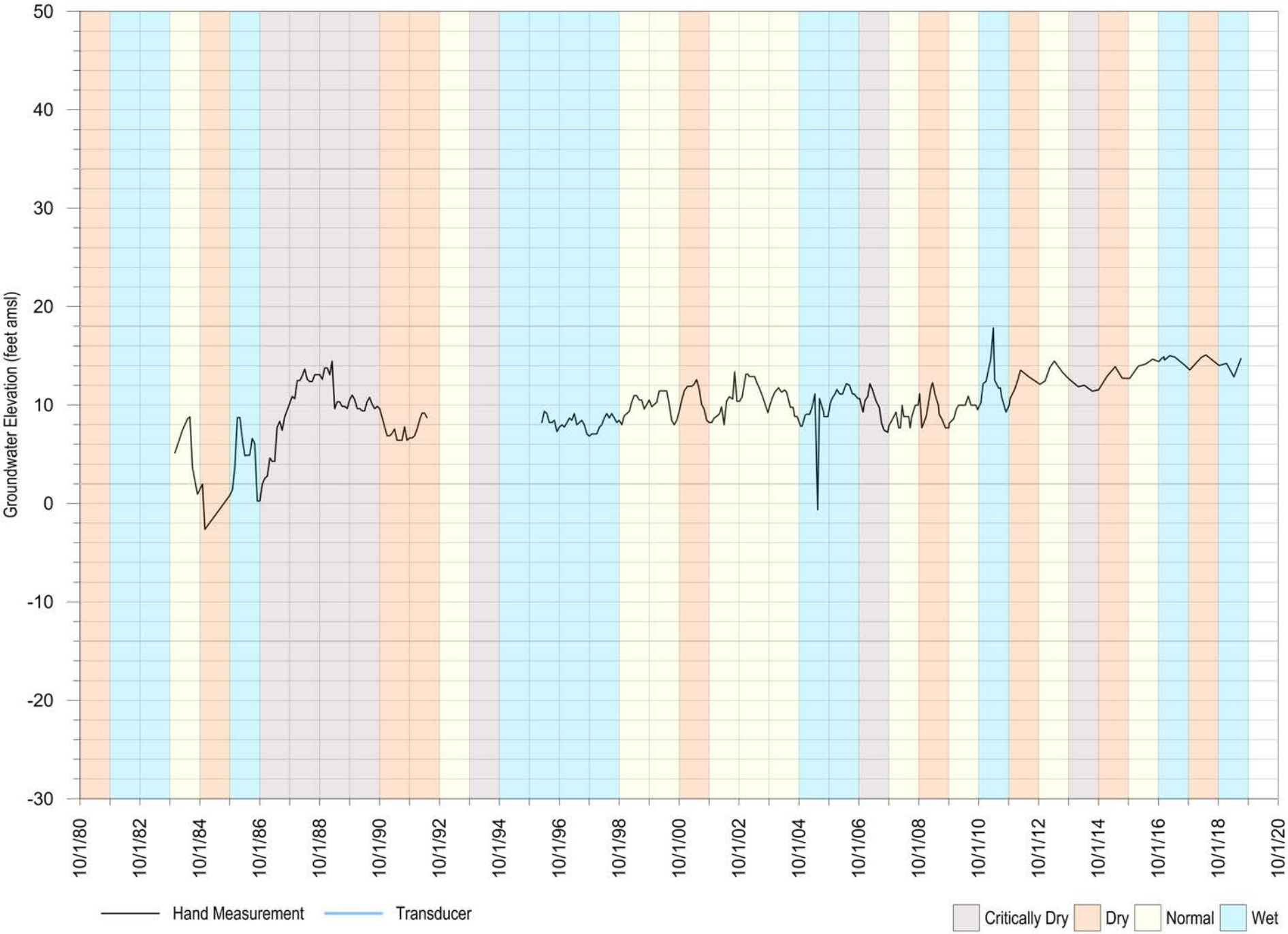
SC-8C

FIGURE A-132



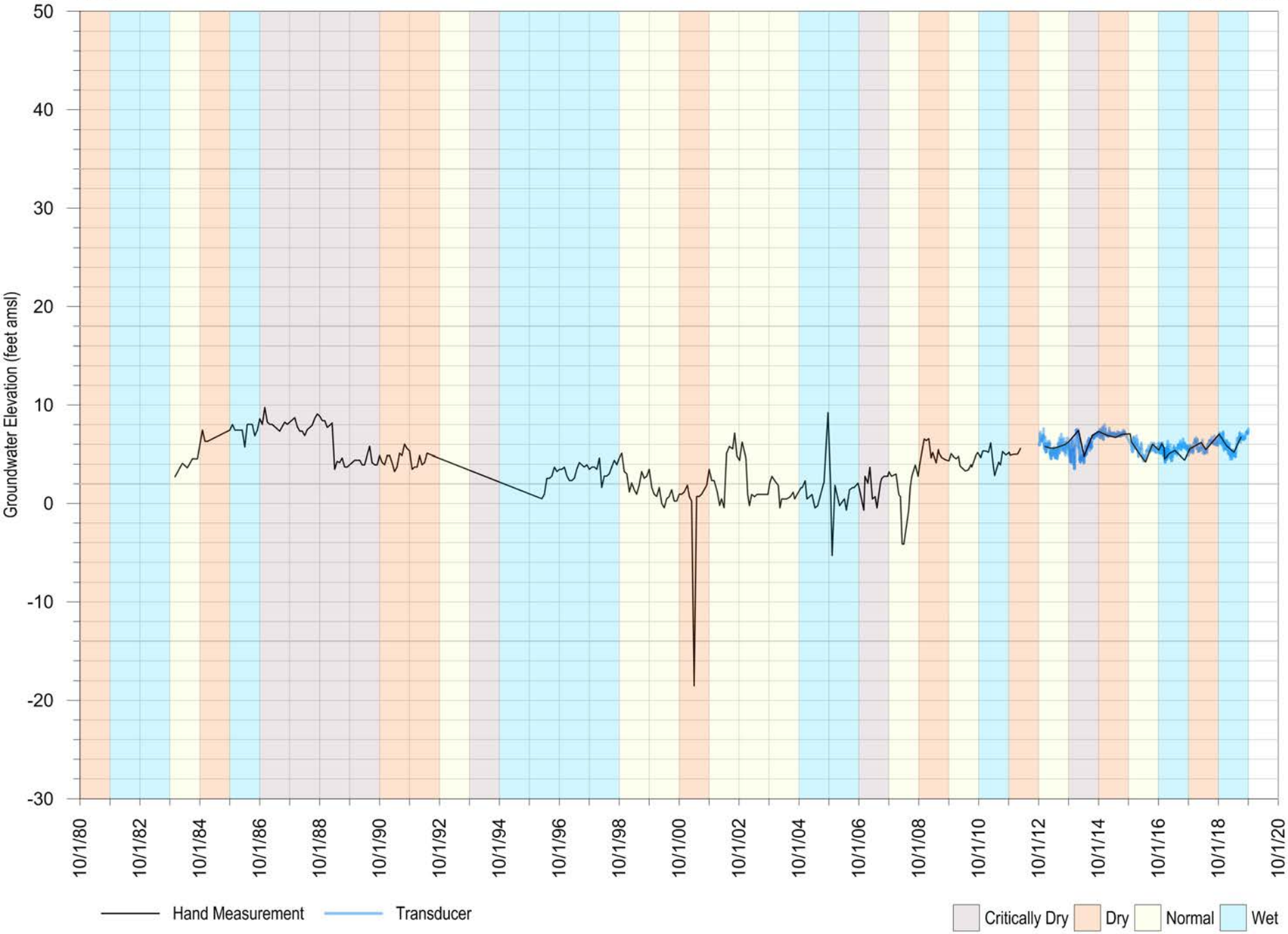
SC-8E

FIGURE A-133



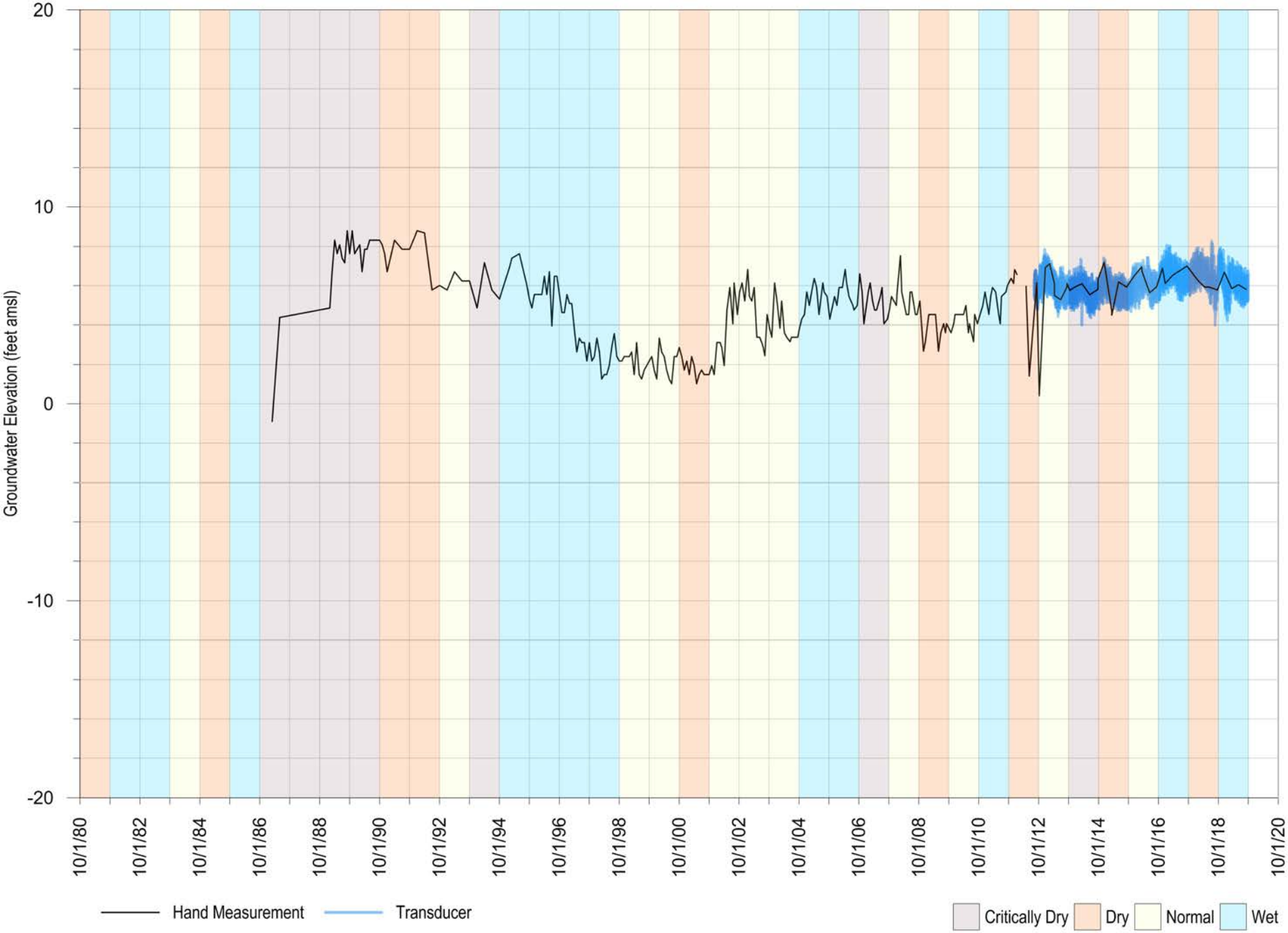
SC-8F

FIGURE A-134



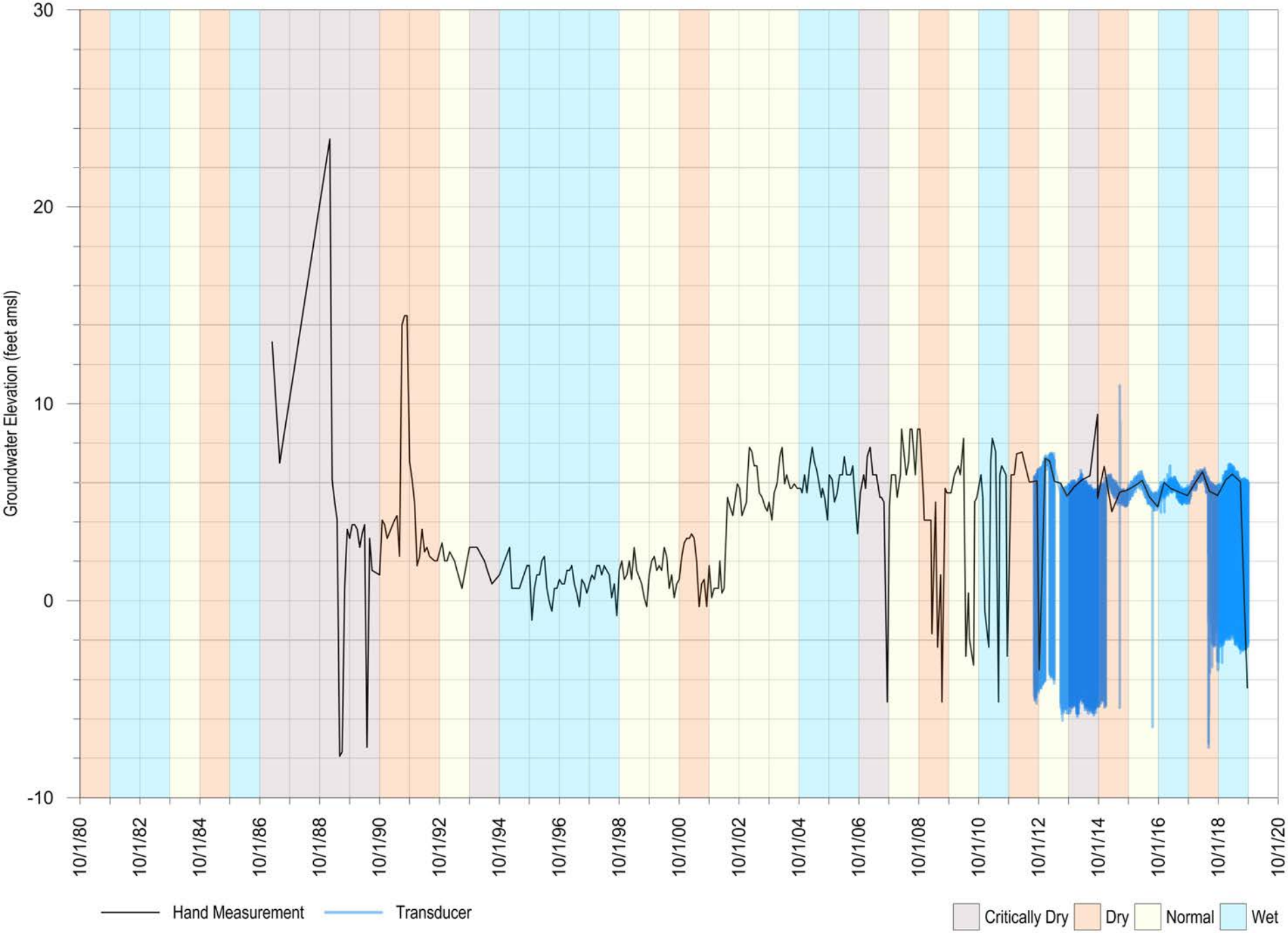
SC-A2B

FIGURE A-135



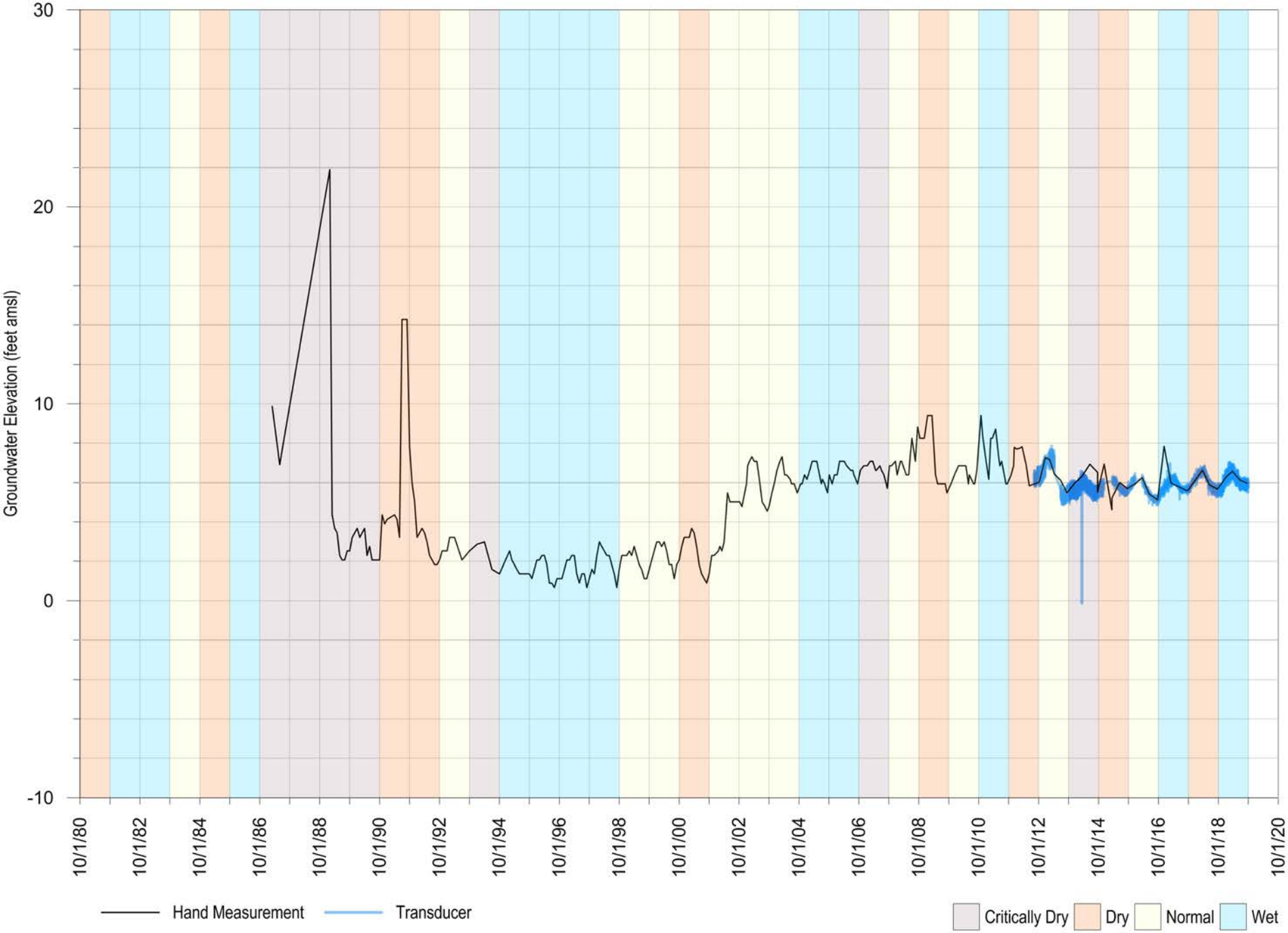
SC-A5C

FIGURE A-136



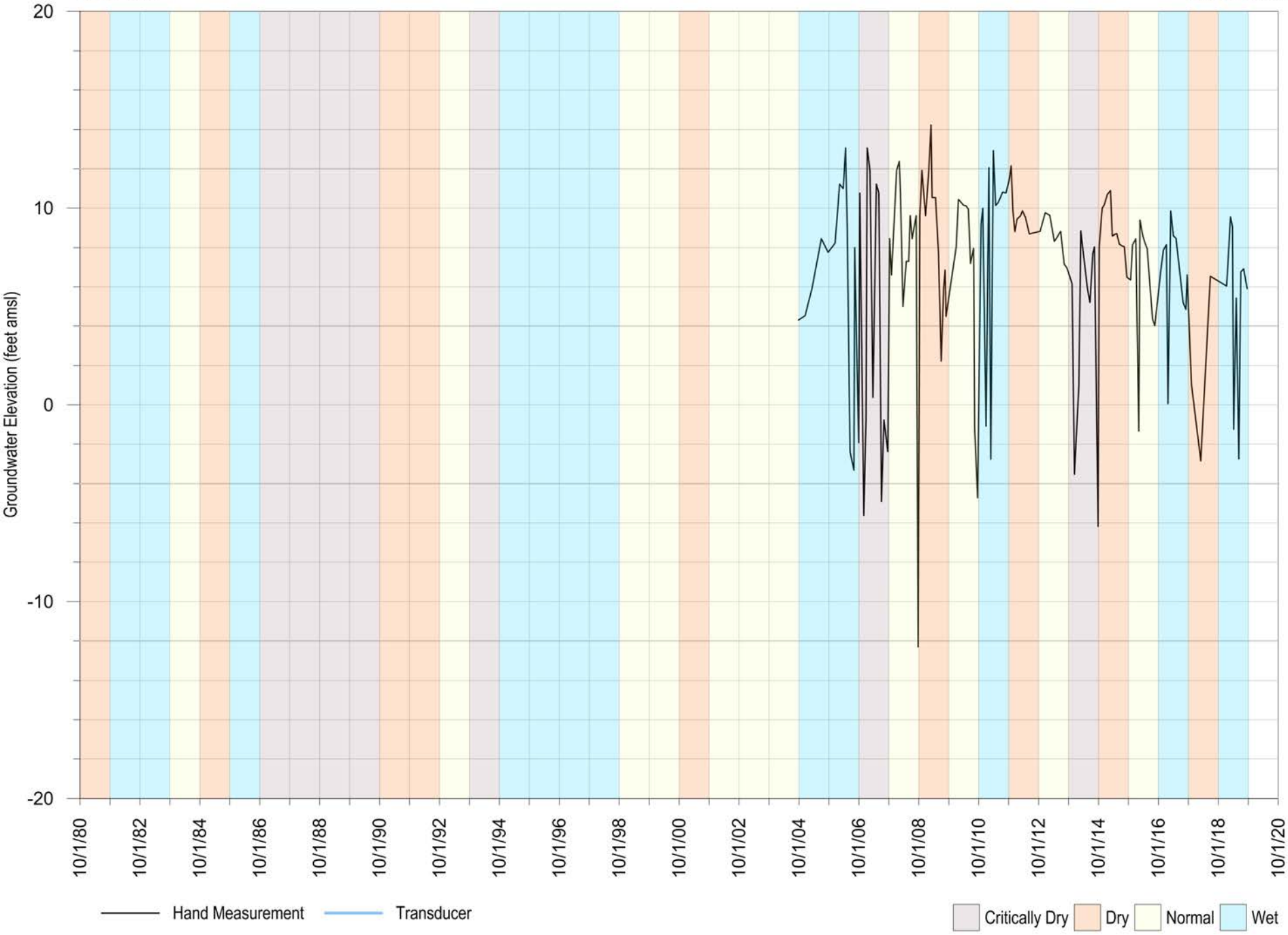
SC-A5D

FIGURE A-137



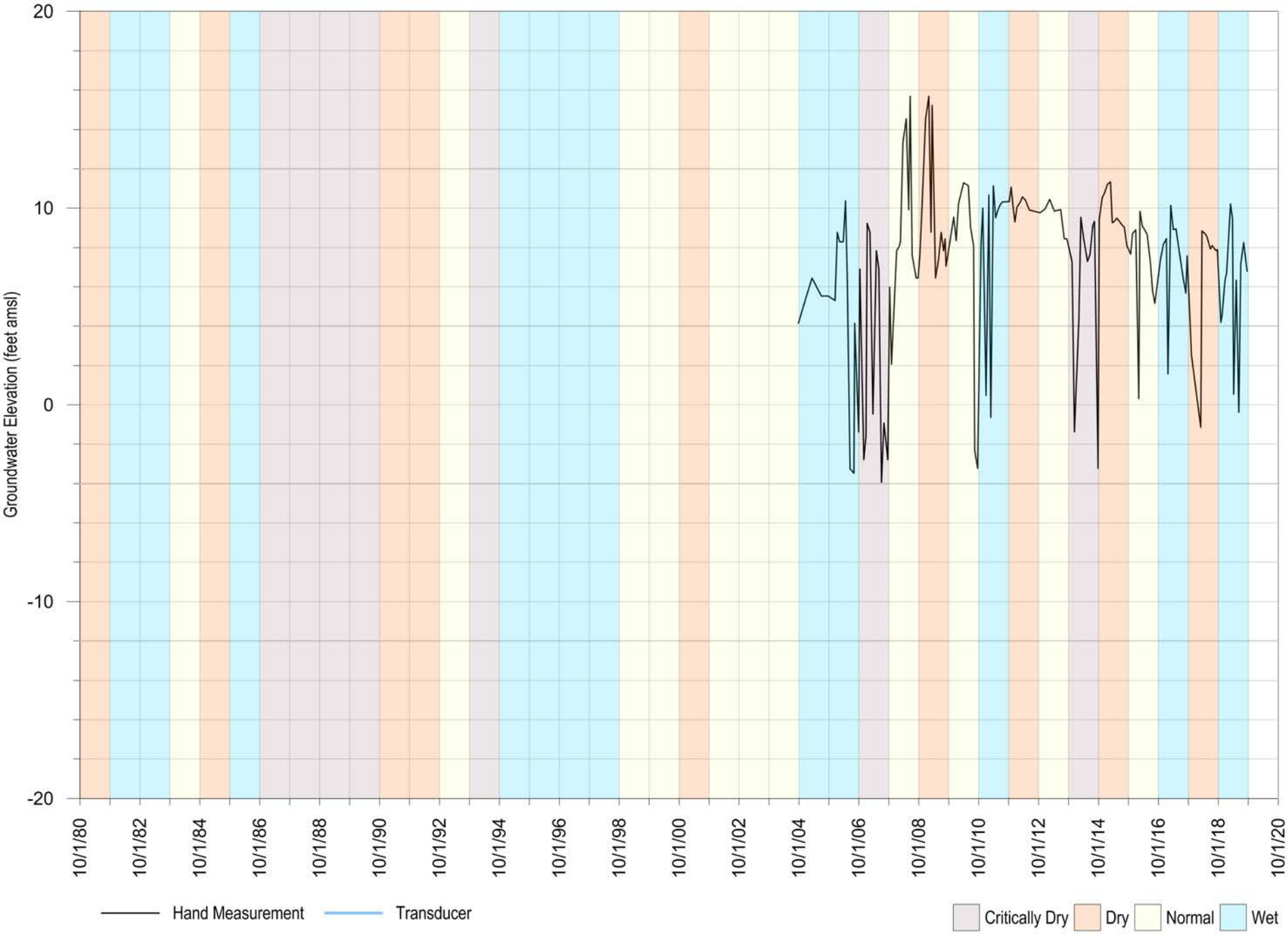
SC-A6A

FIGURE A-138



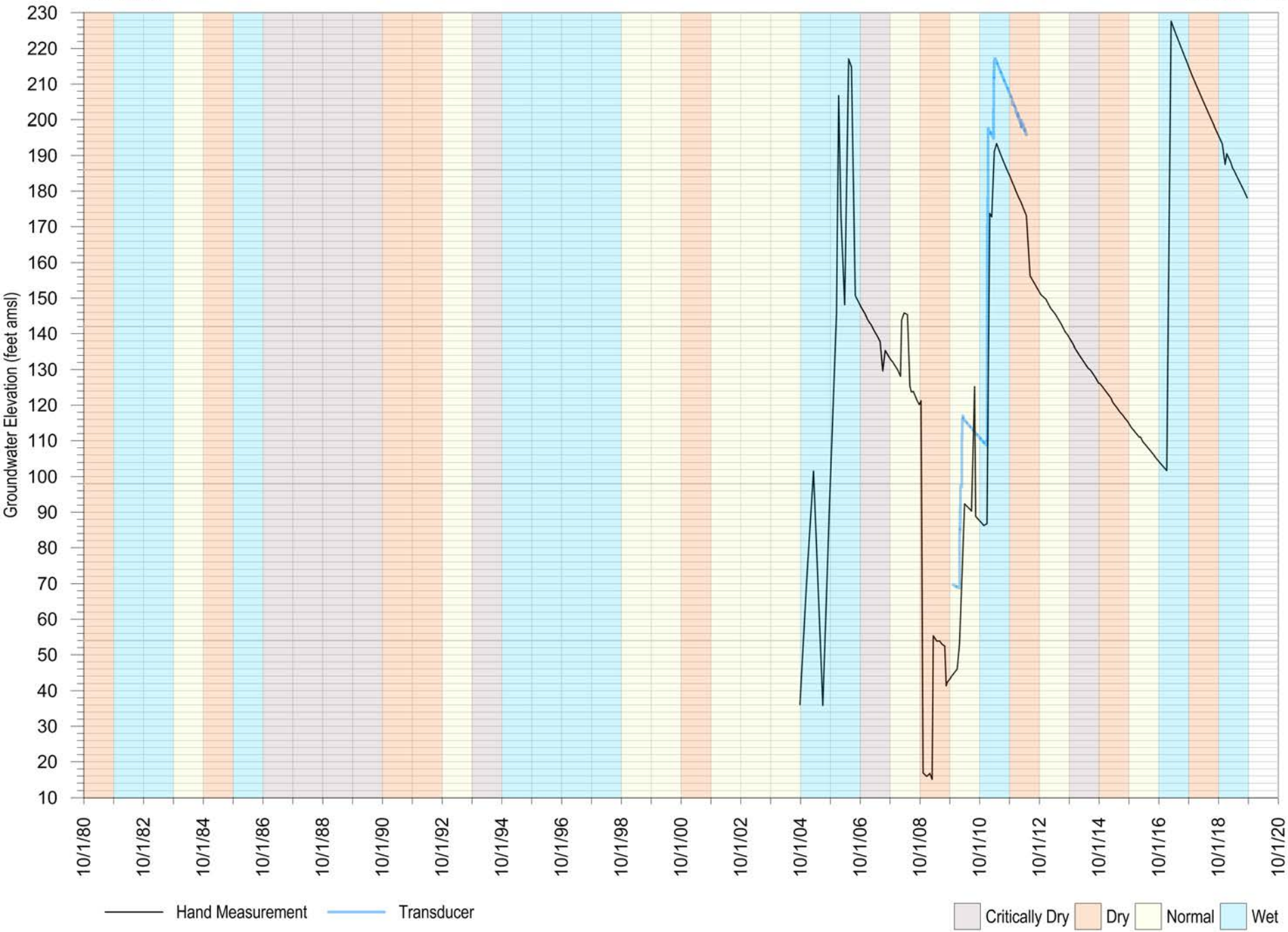
SC-A6B

FIGURE A-139



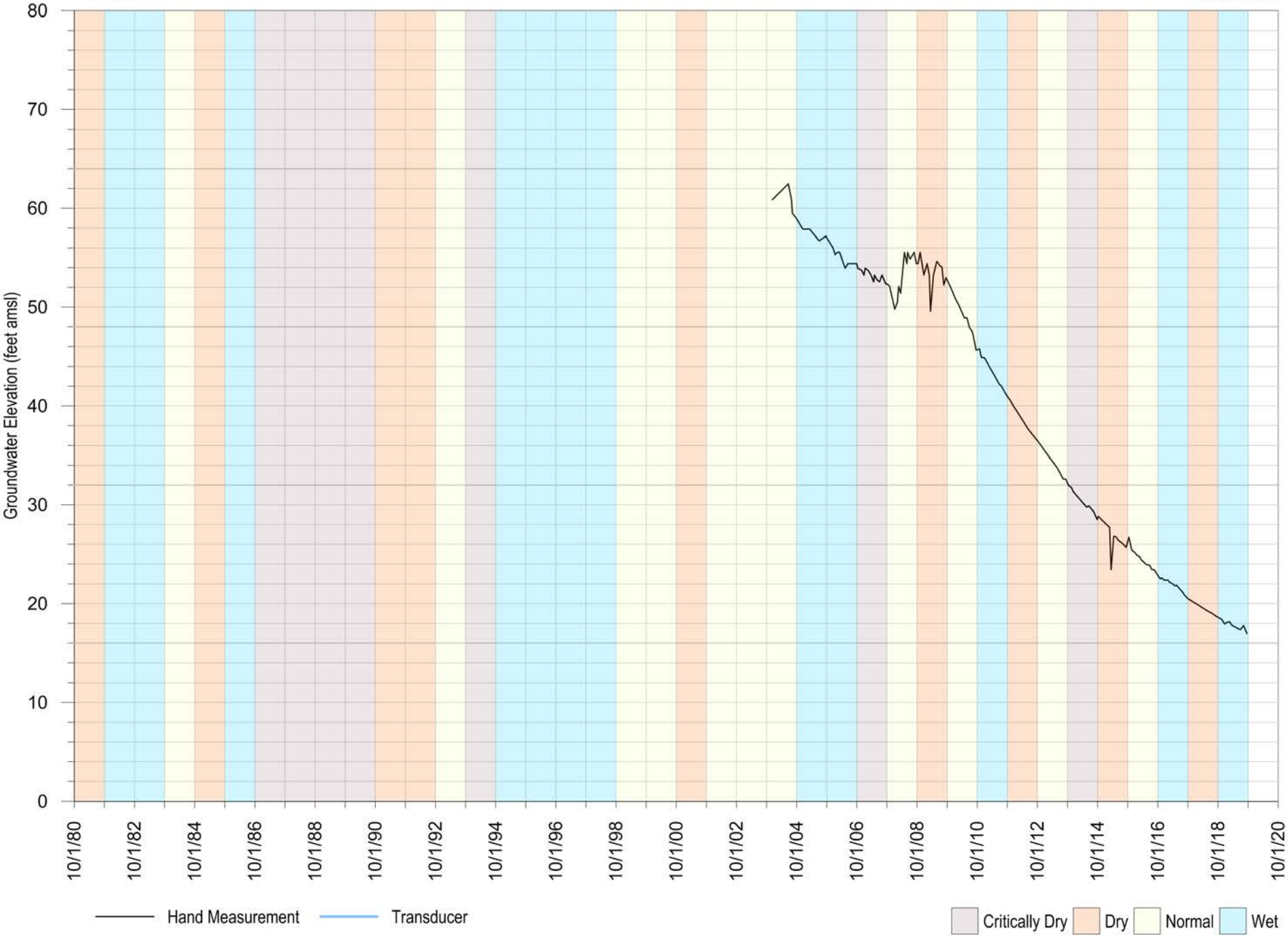
SC-A6C

FIGURE A-140



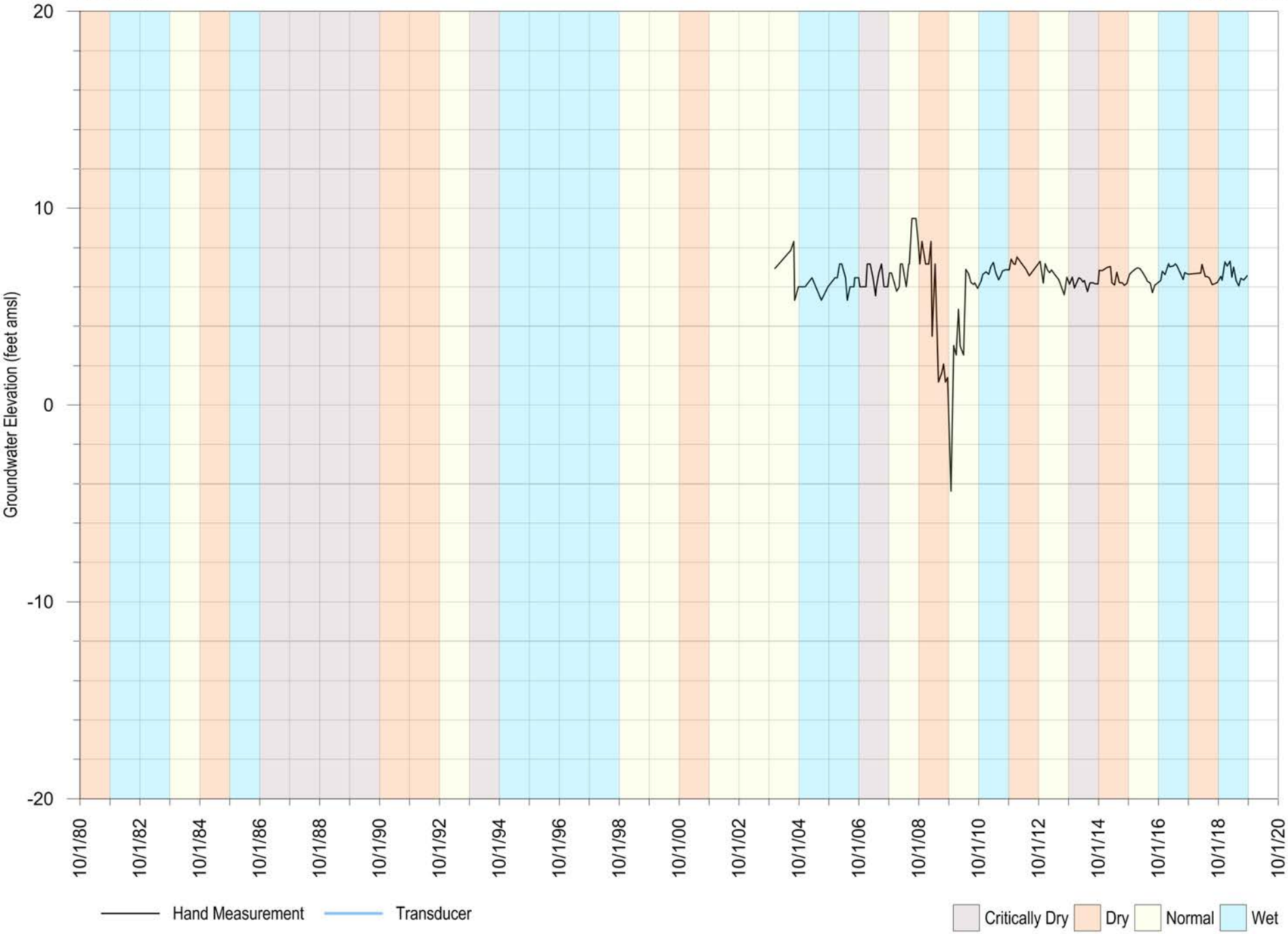
SC-A7A

FIGURE A-141



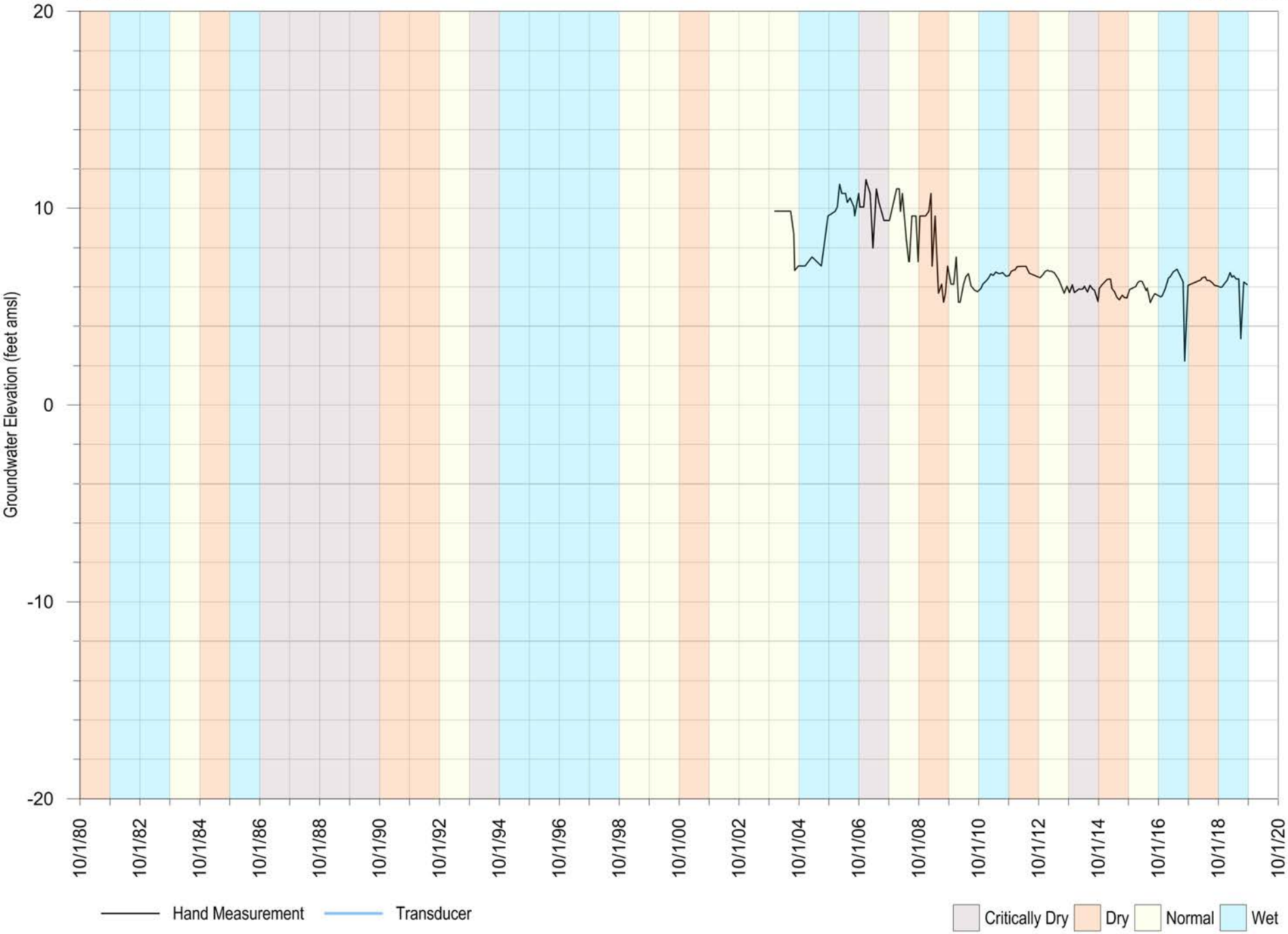
SC-A7B

FIGURE A-142



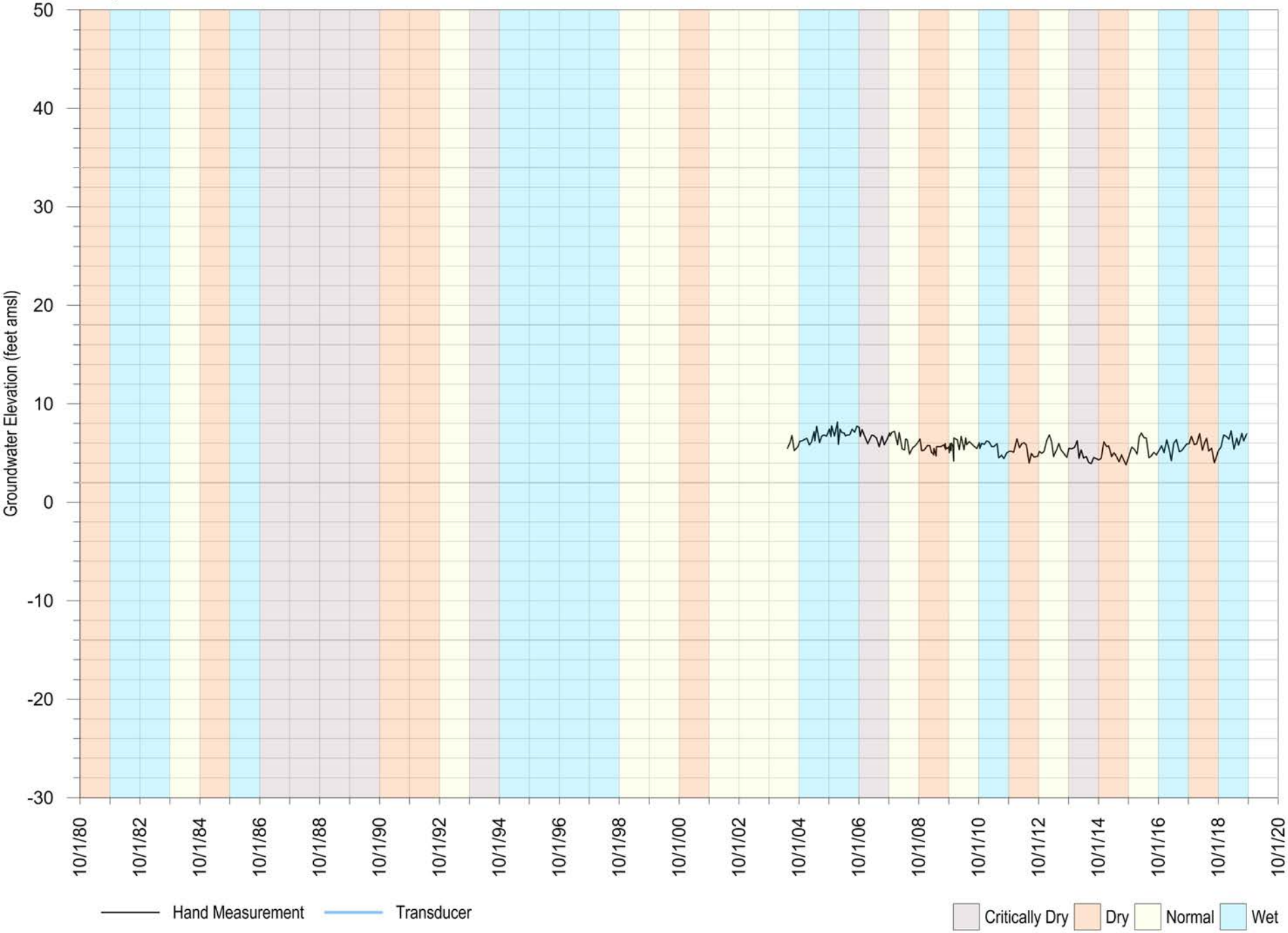
SC-A7D

FIGURE A-143



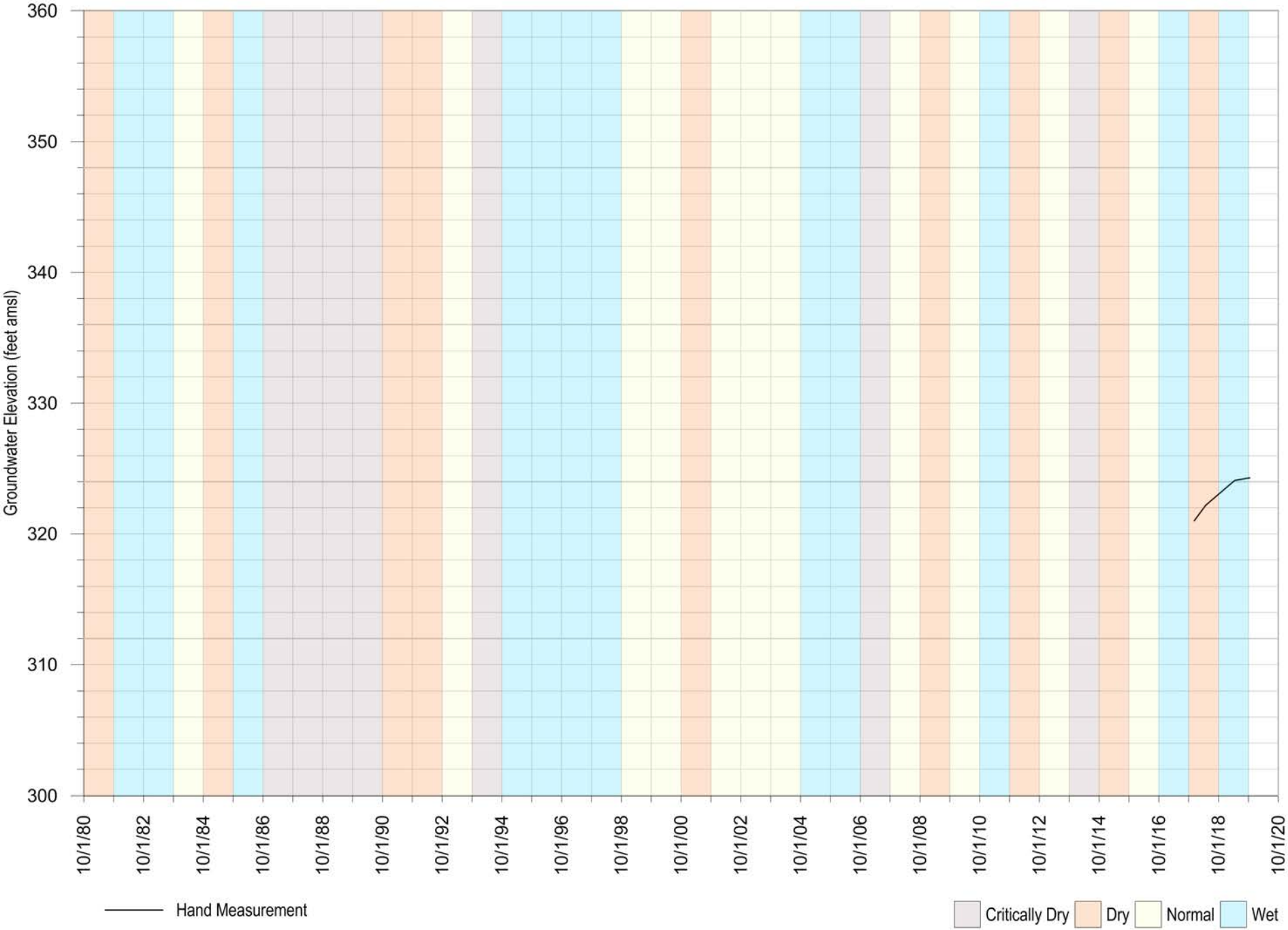
Soquel Point Shallow

FIGURE A-144



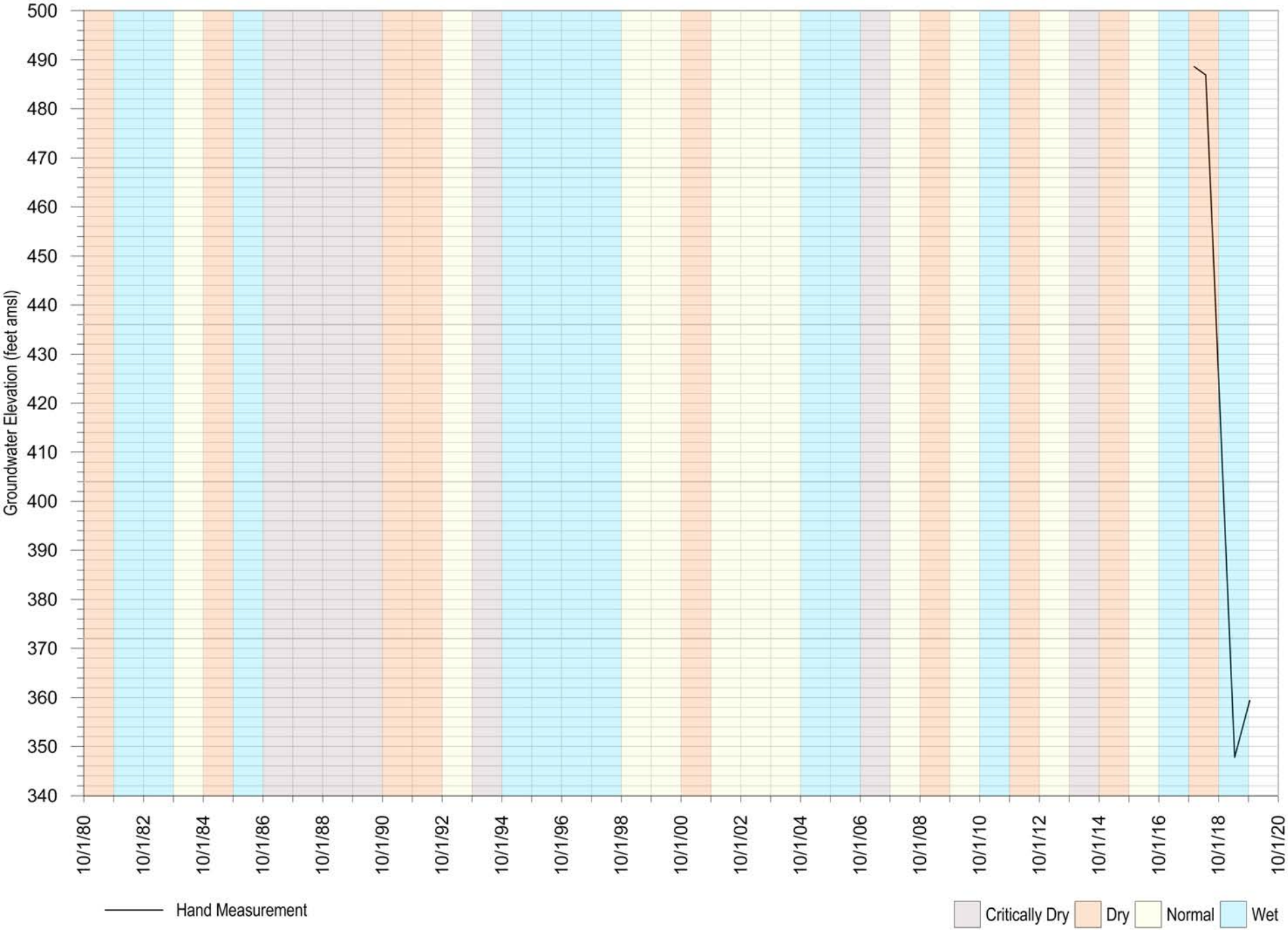
Private Well 3

FIGURE A-145



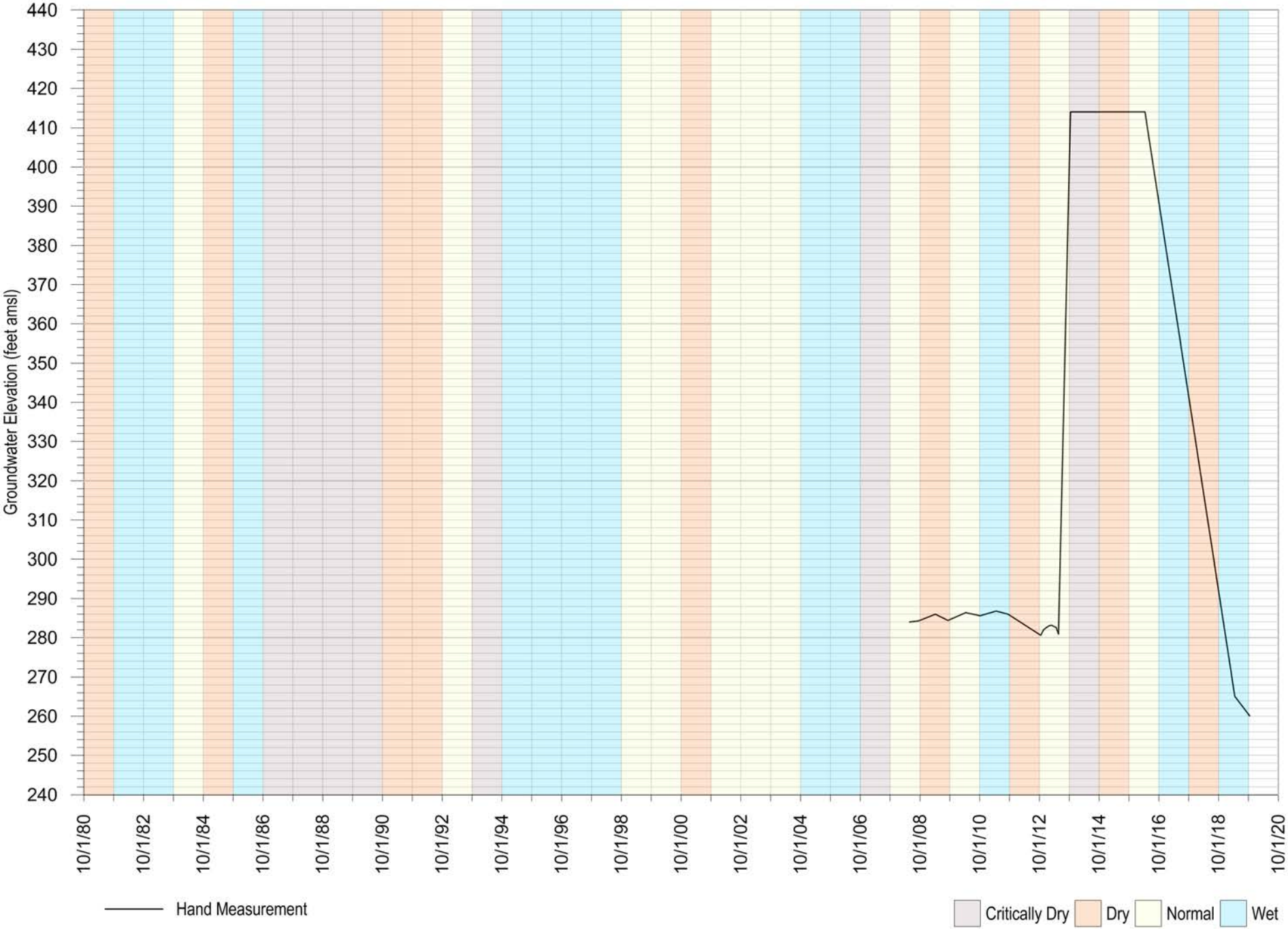
Private Well 4

FIGURE A-146



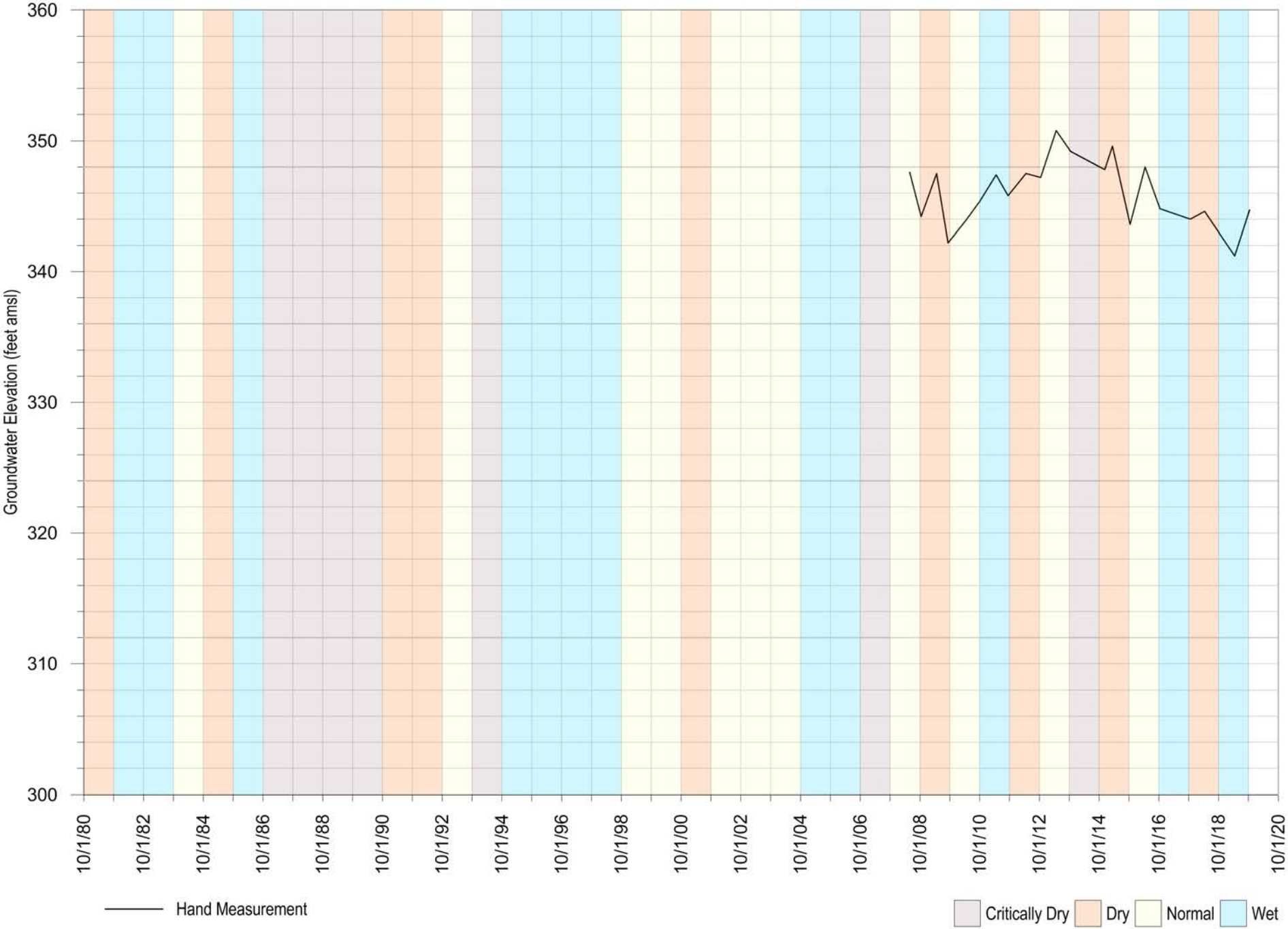
Private Well 5

FIGURE A-147



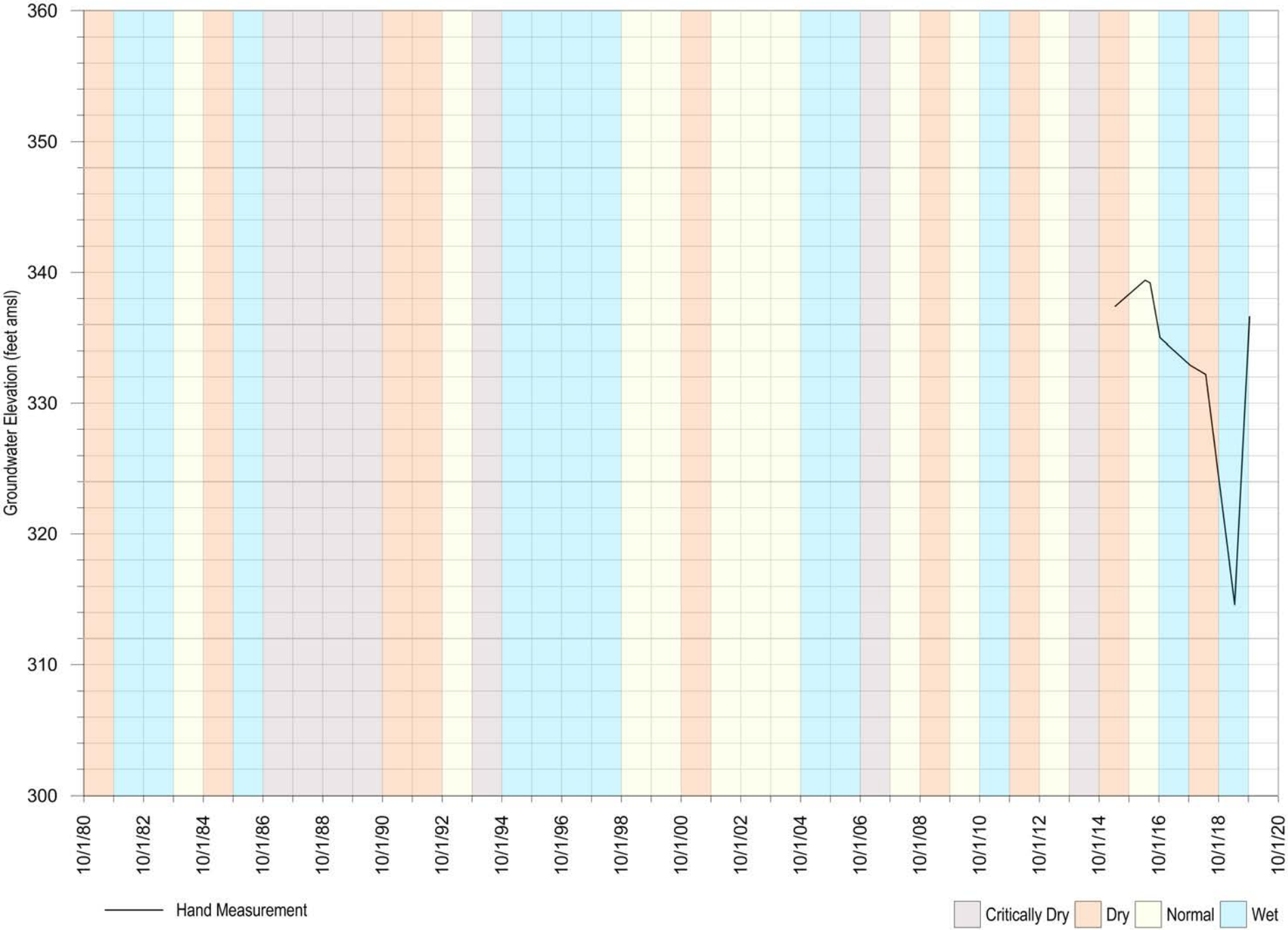
Private Well 6

FIGURE A-148



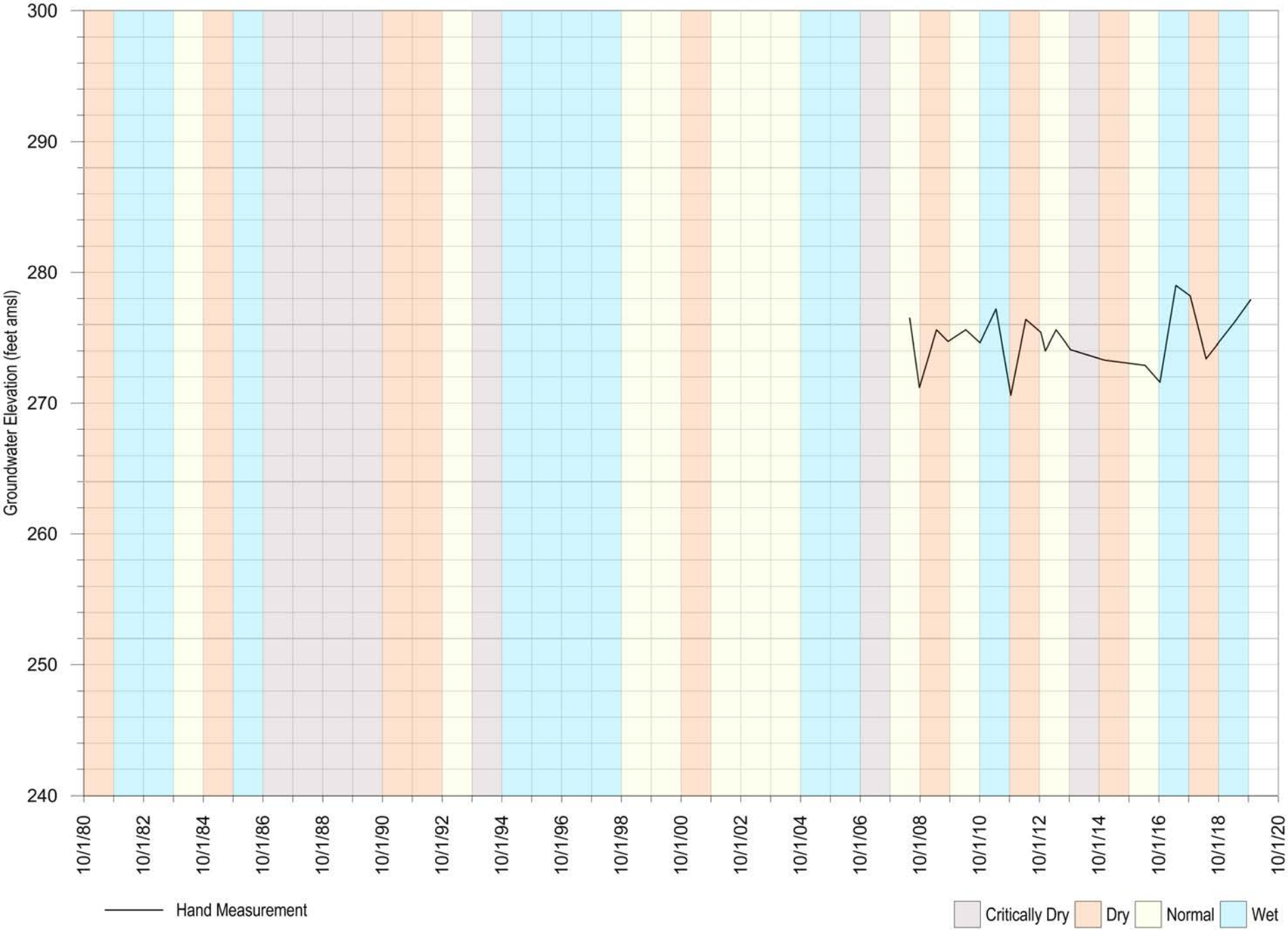
Private Well 7

FIGURE A-149



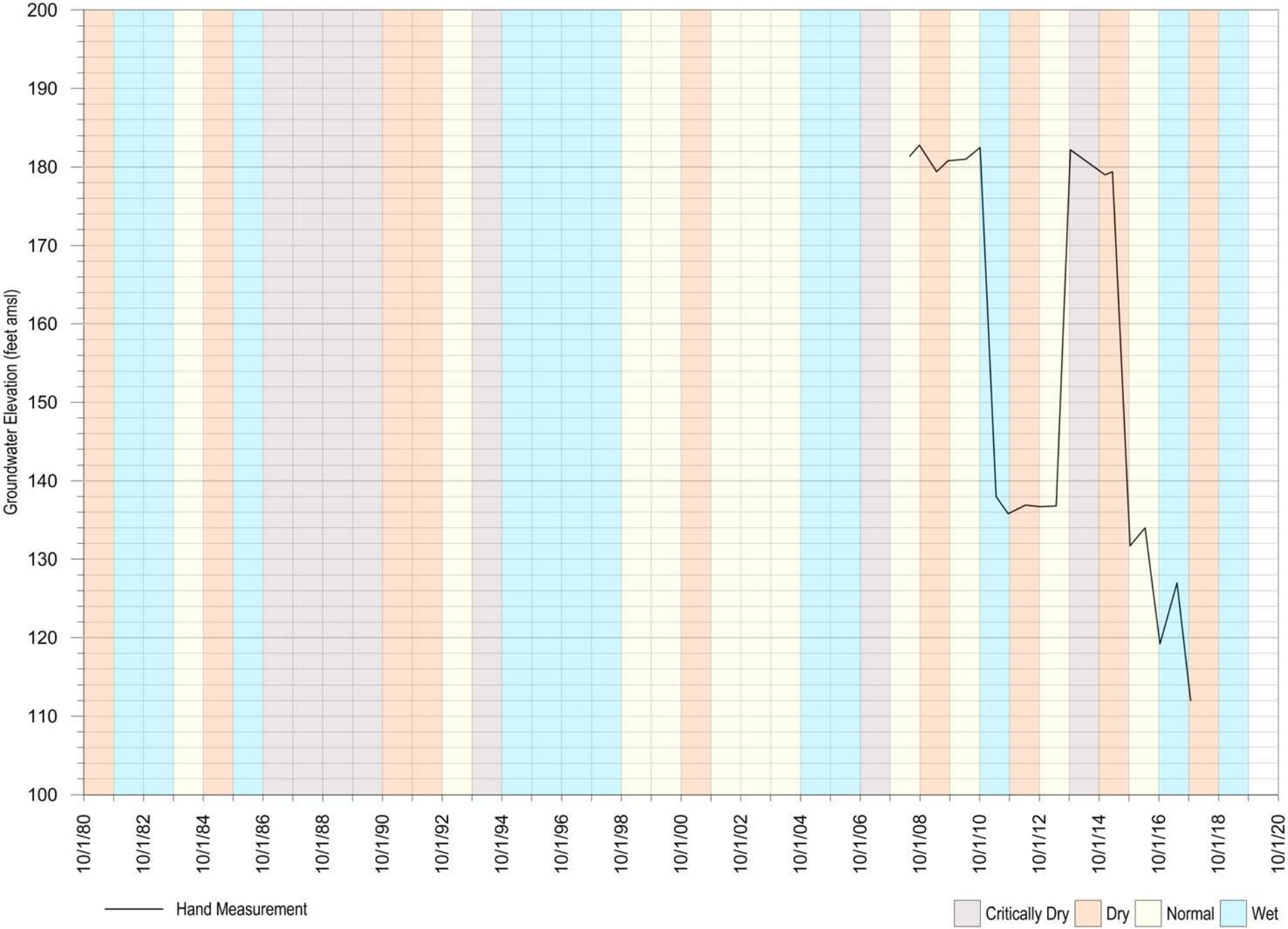
Private Well 8

FIGURE A-150



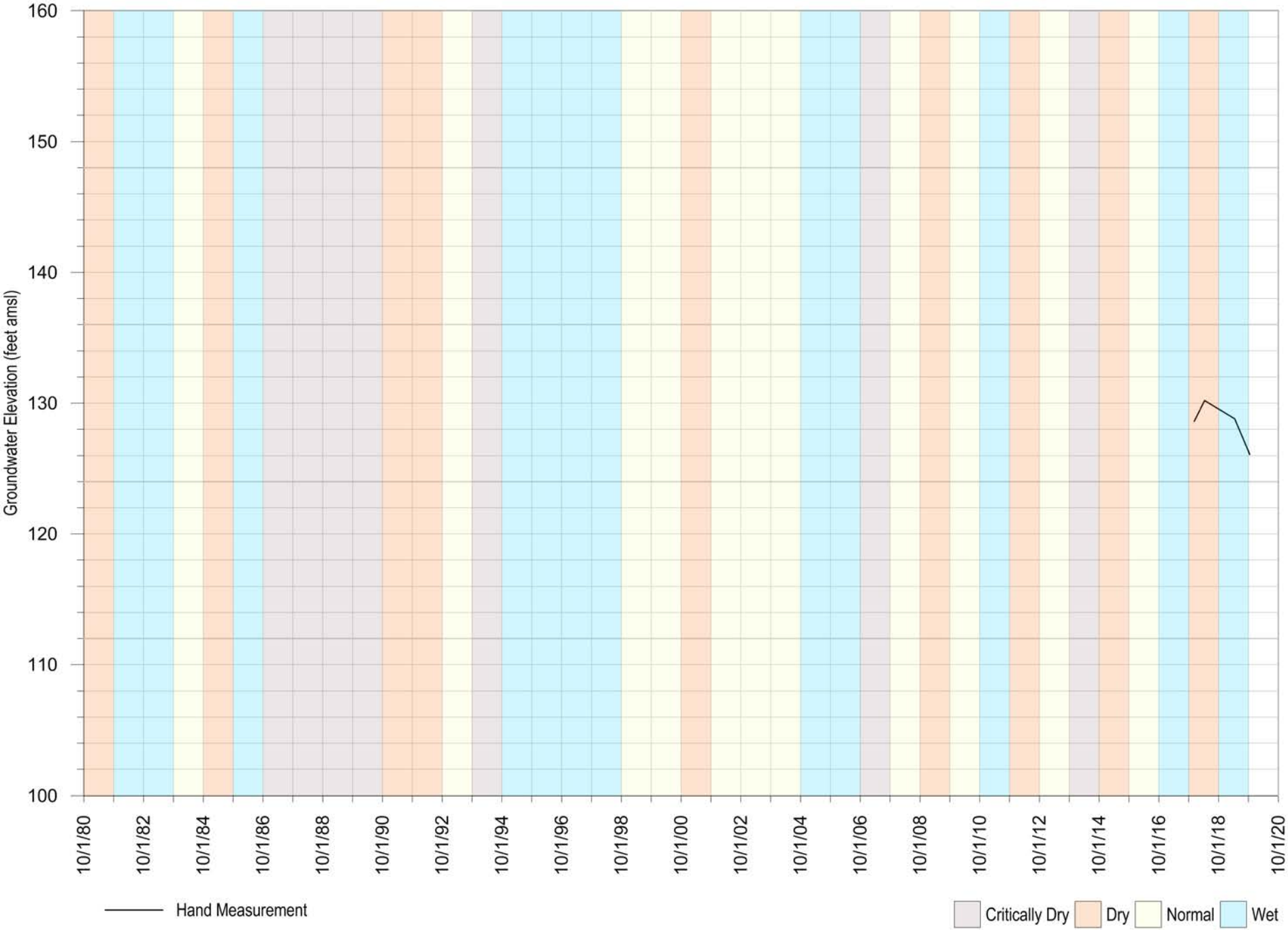
Private Well 9

FIGURE A-151



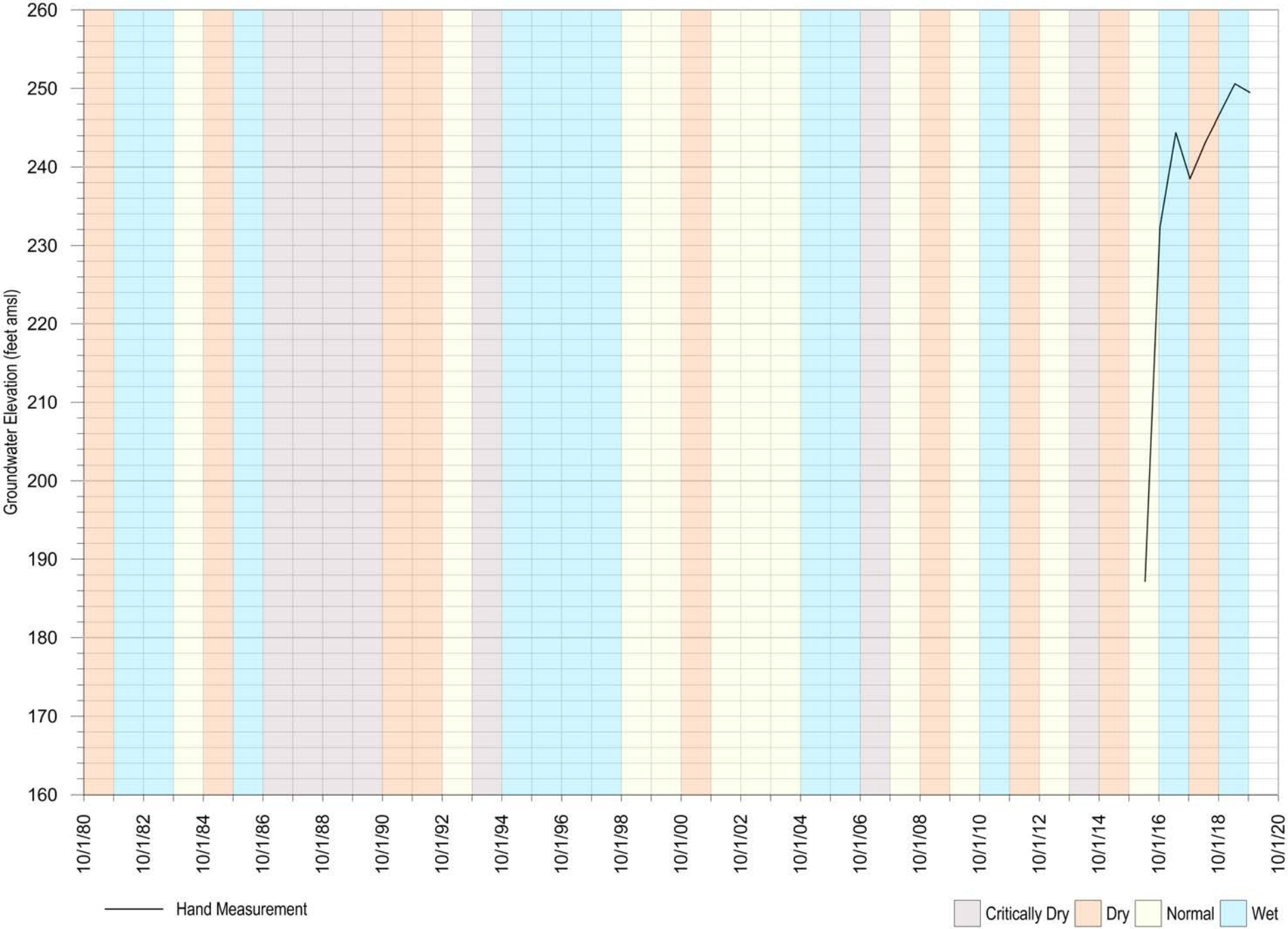
Private Well 10

FIGURE A-152



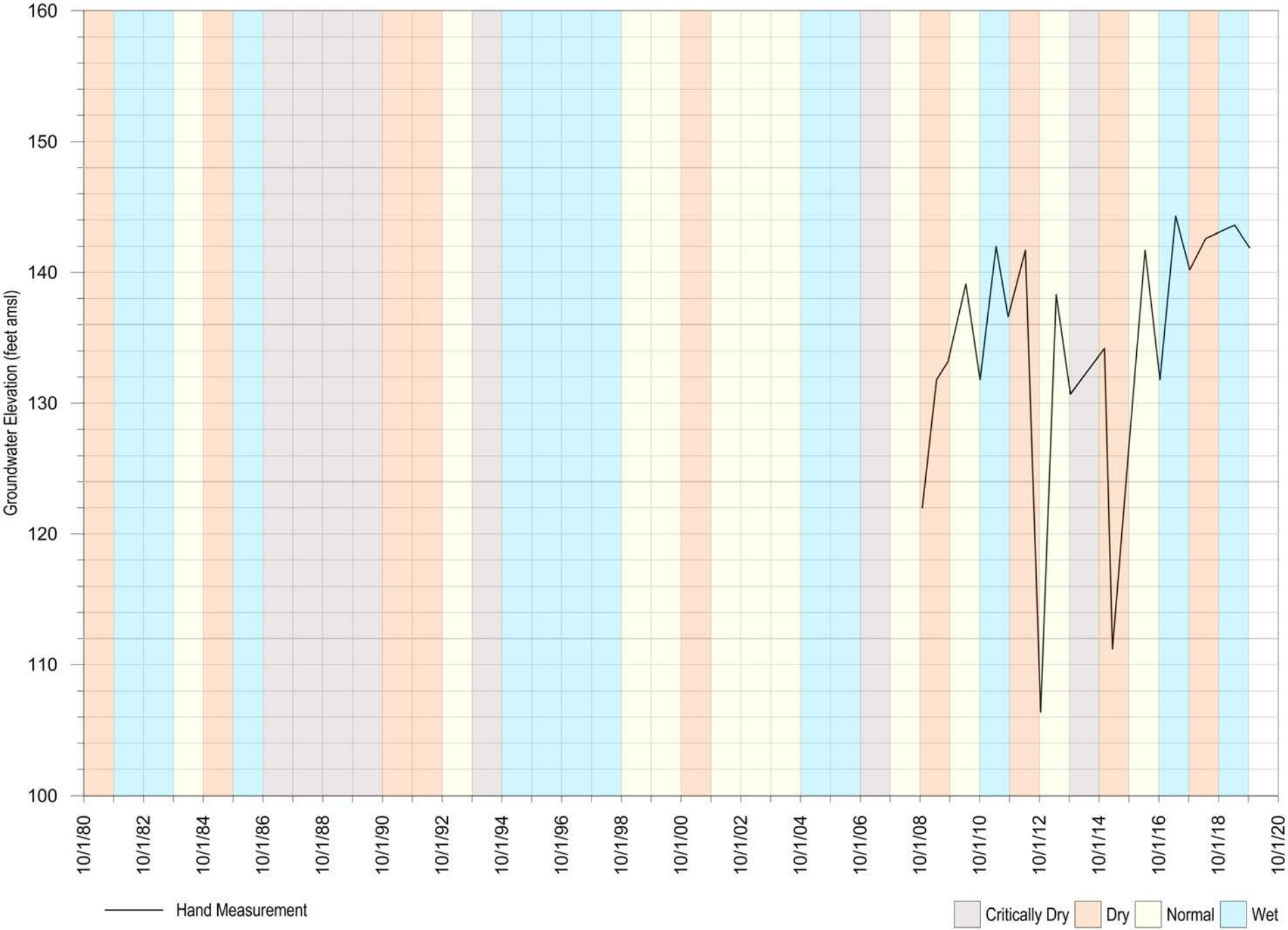
Private Well 11

FIGURE A-153



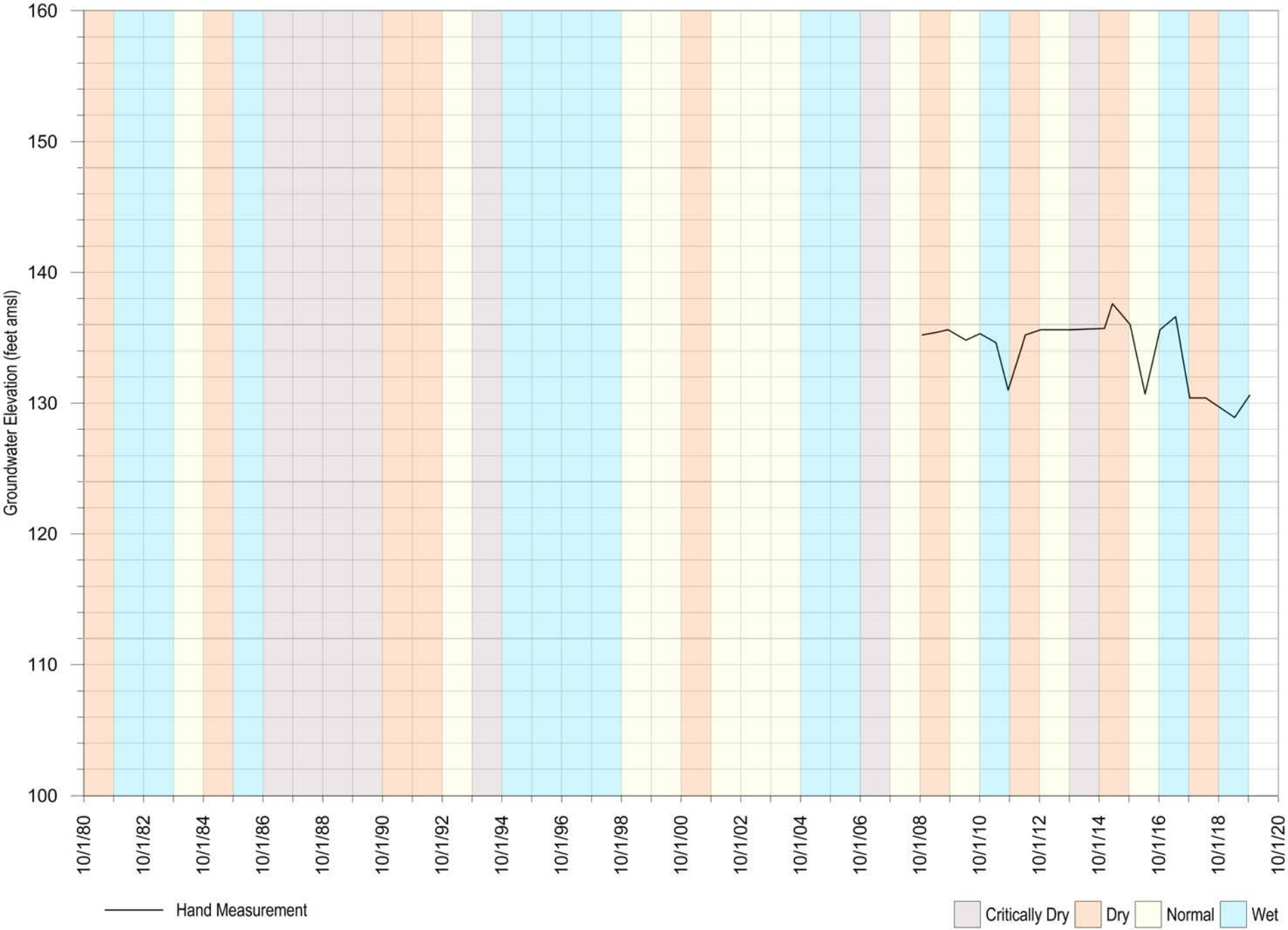
Private Well 12

FIGURE A-154



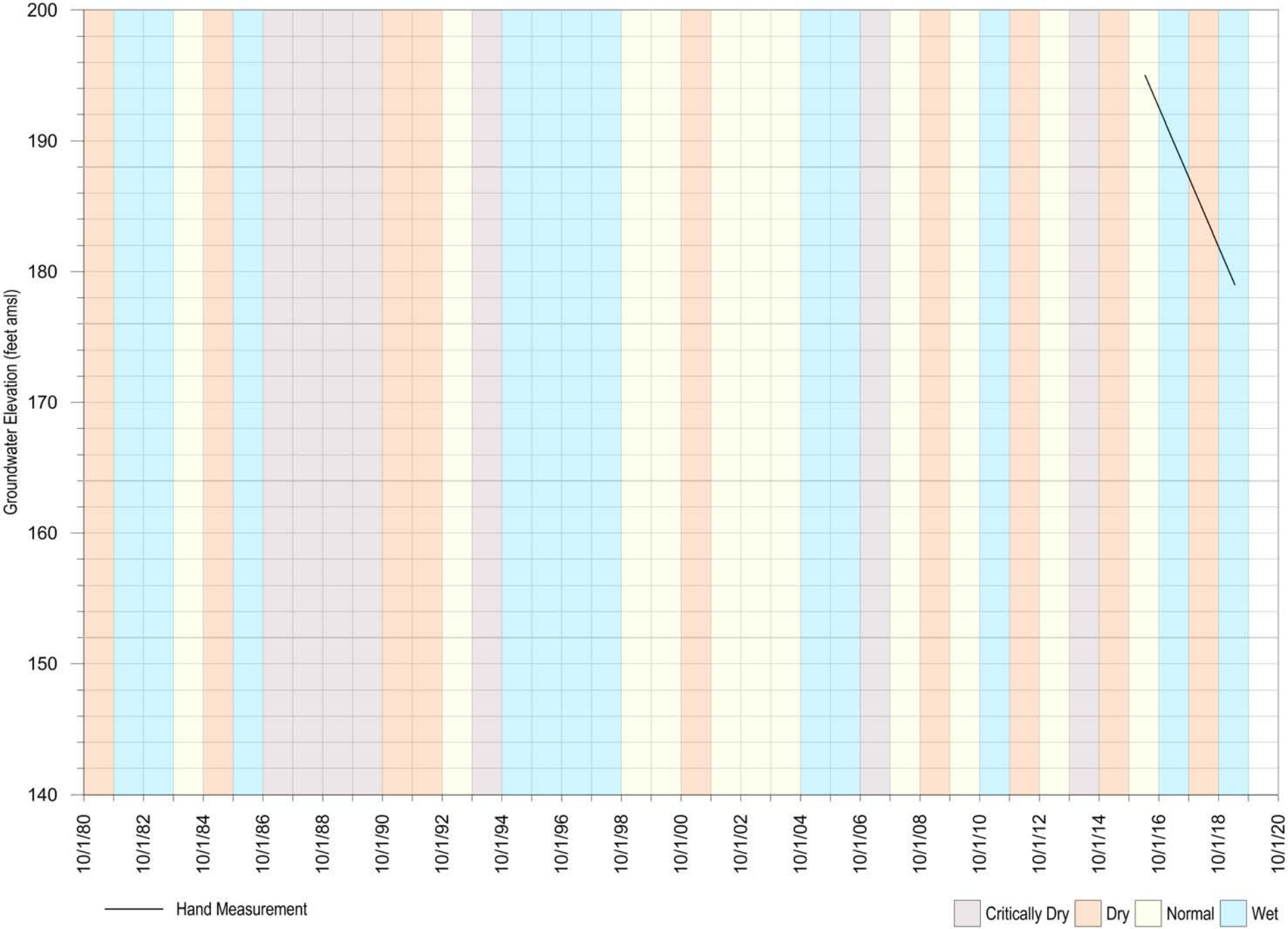
Private Well 13

FIGURE A-155



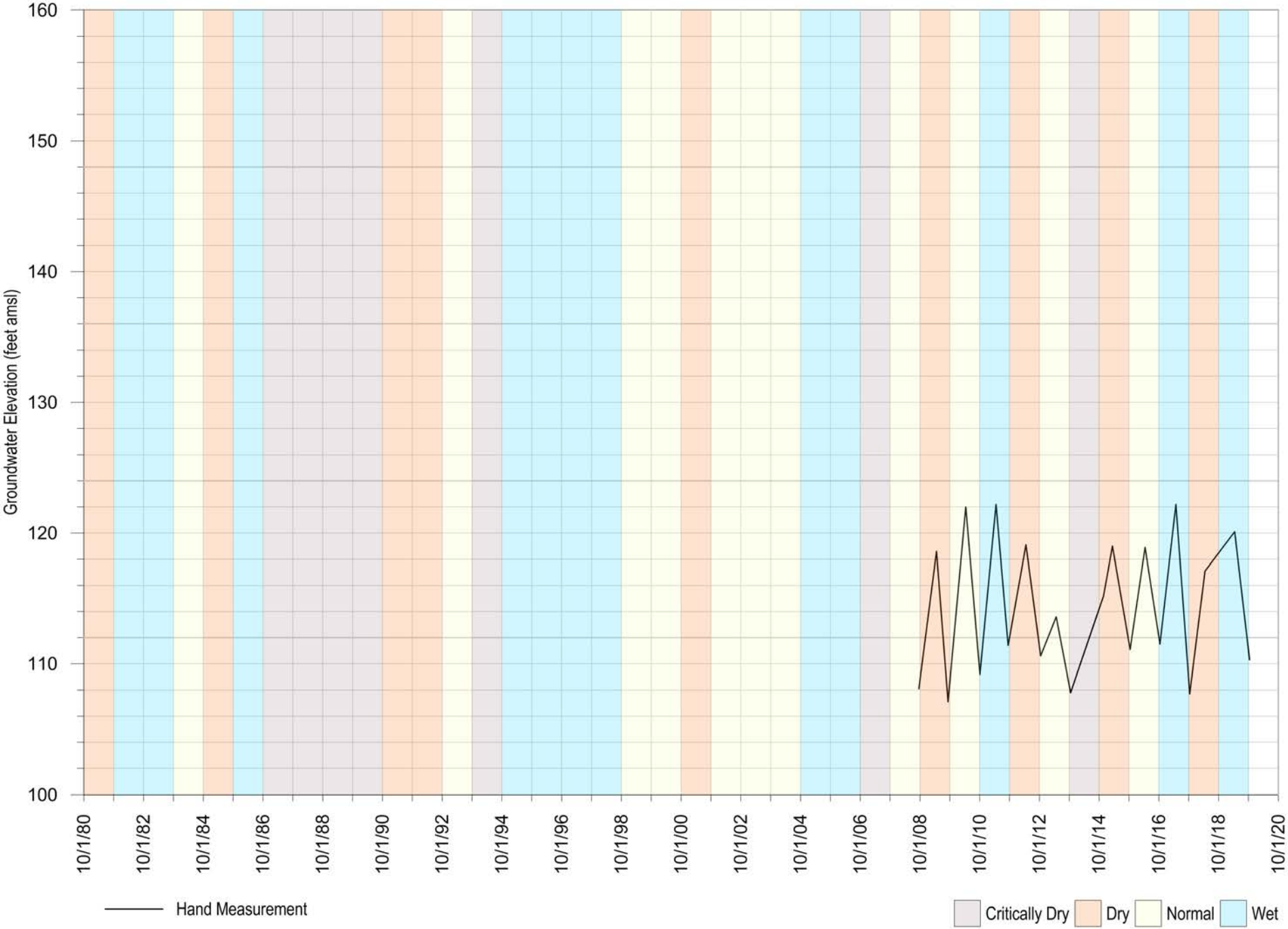
Private Well 14

FIGURE A-156



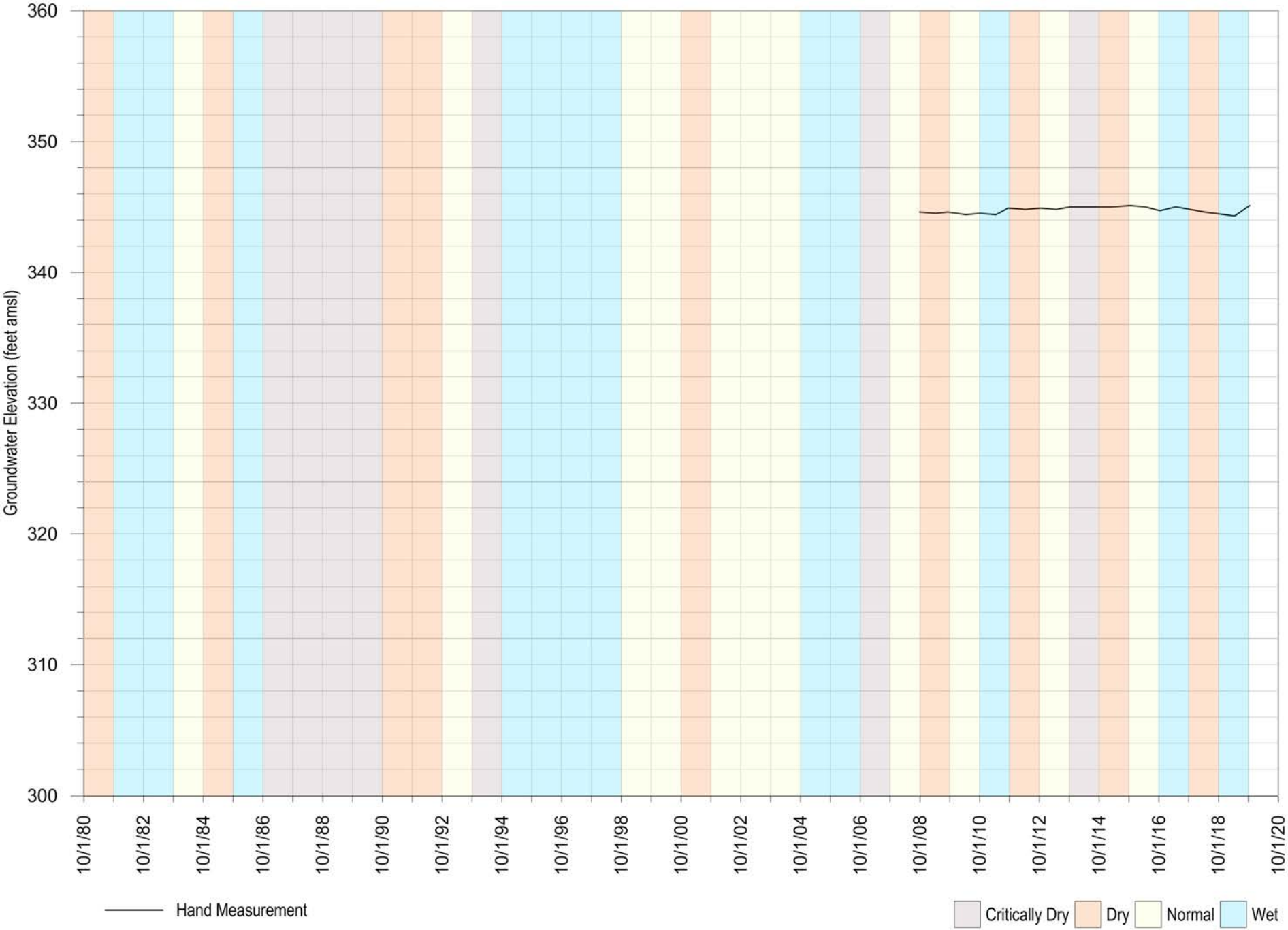
Private Well 15

FIGURE A-157



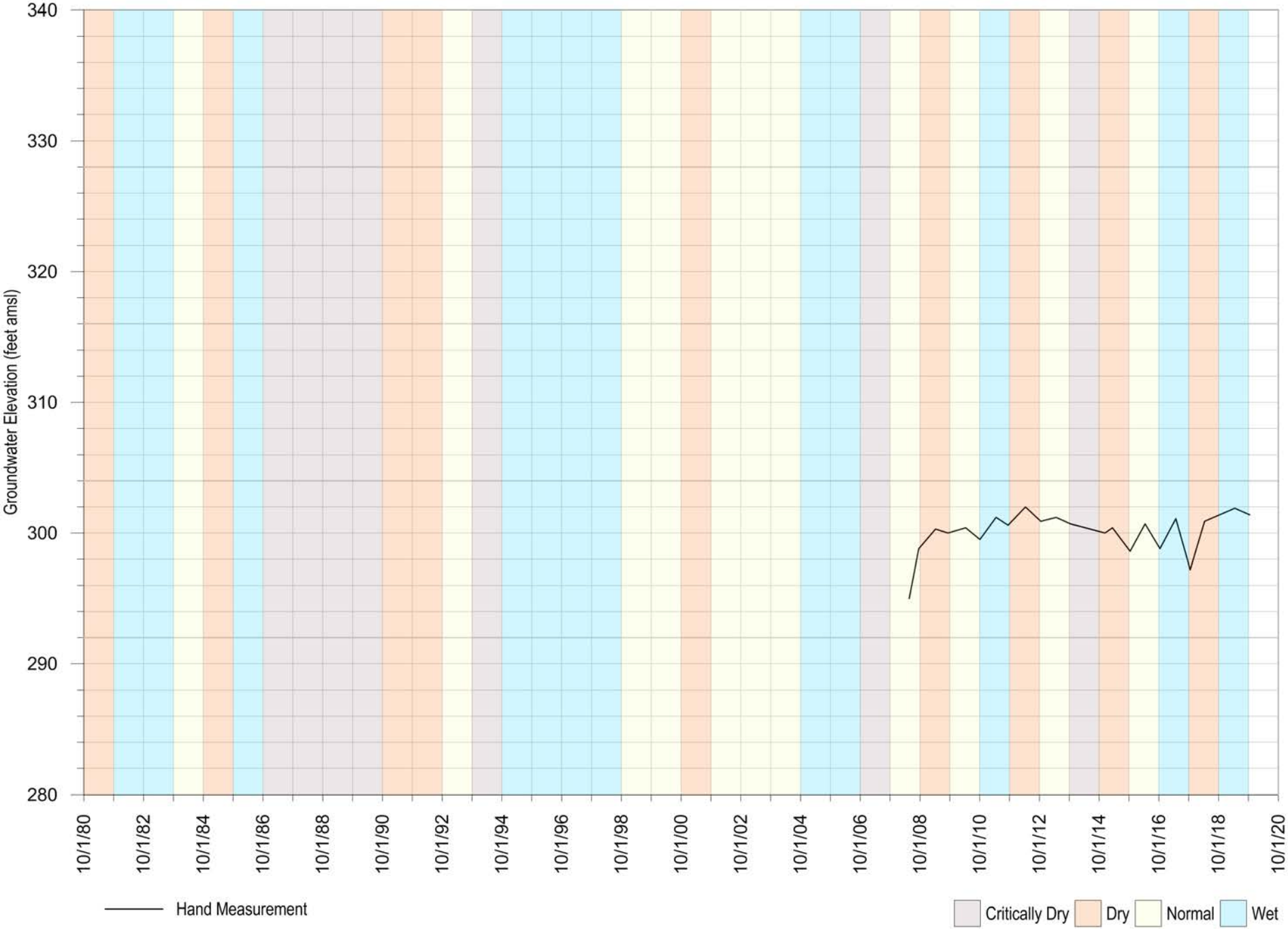
Private Well 16

FIGURE A-158



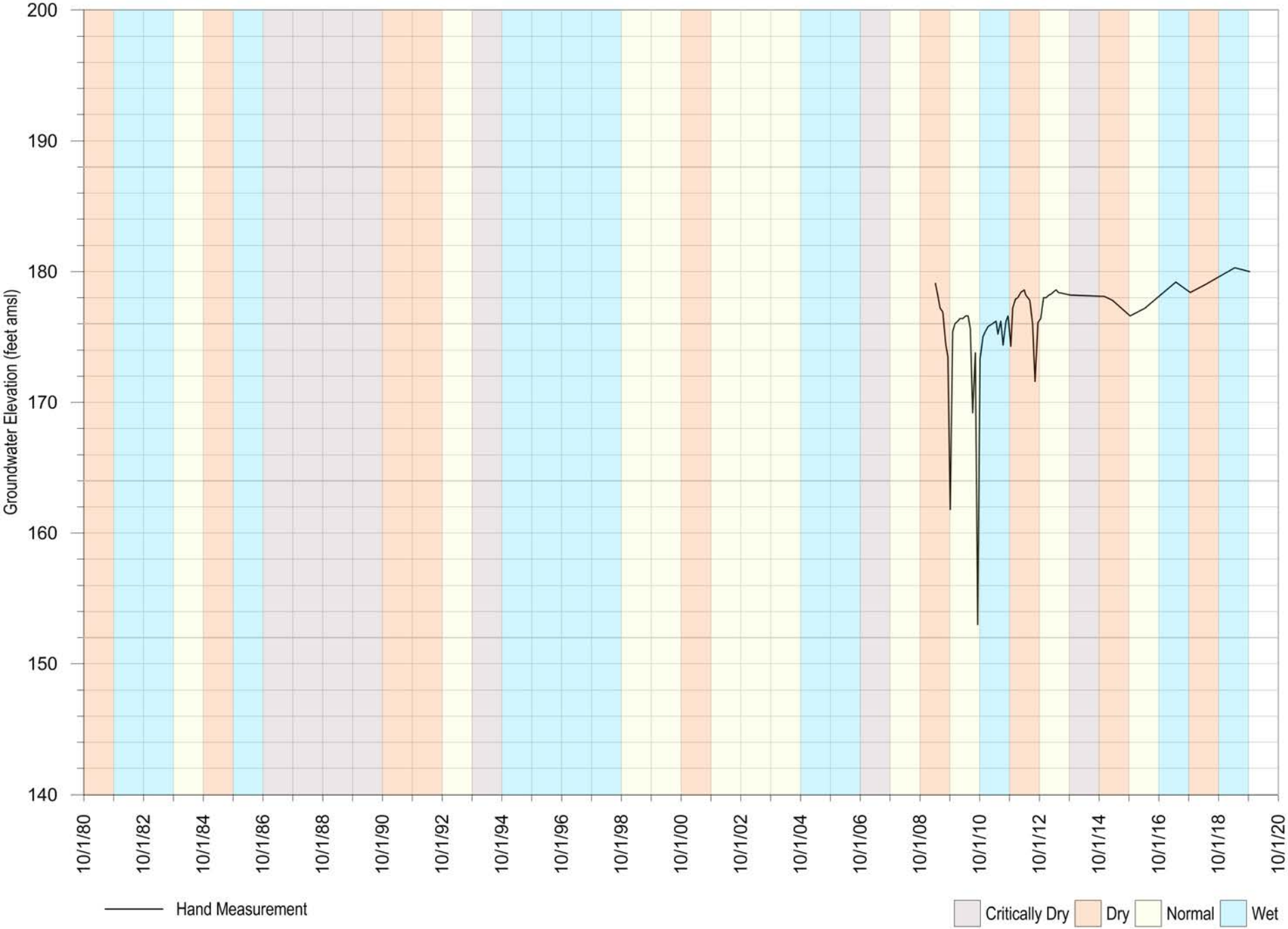
Private Well 17

FIGURE A-159



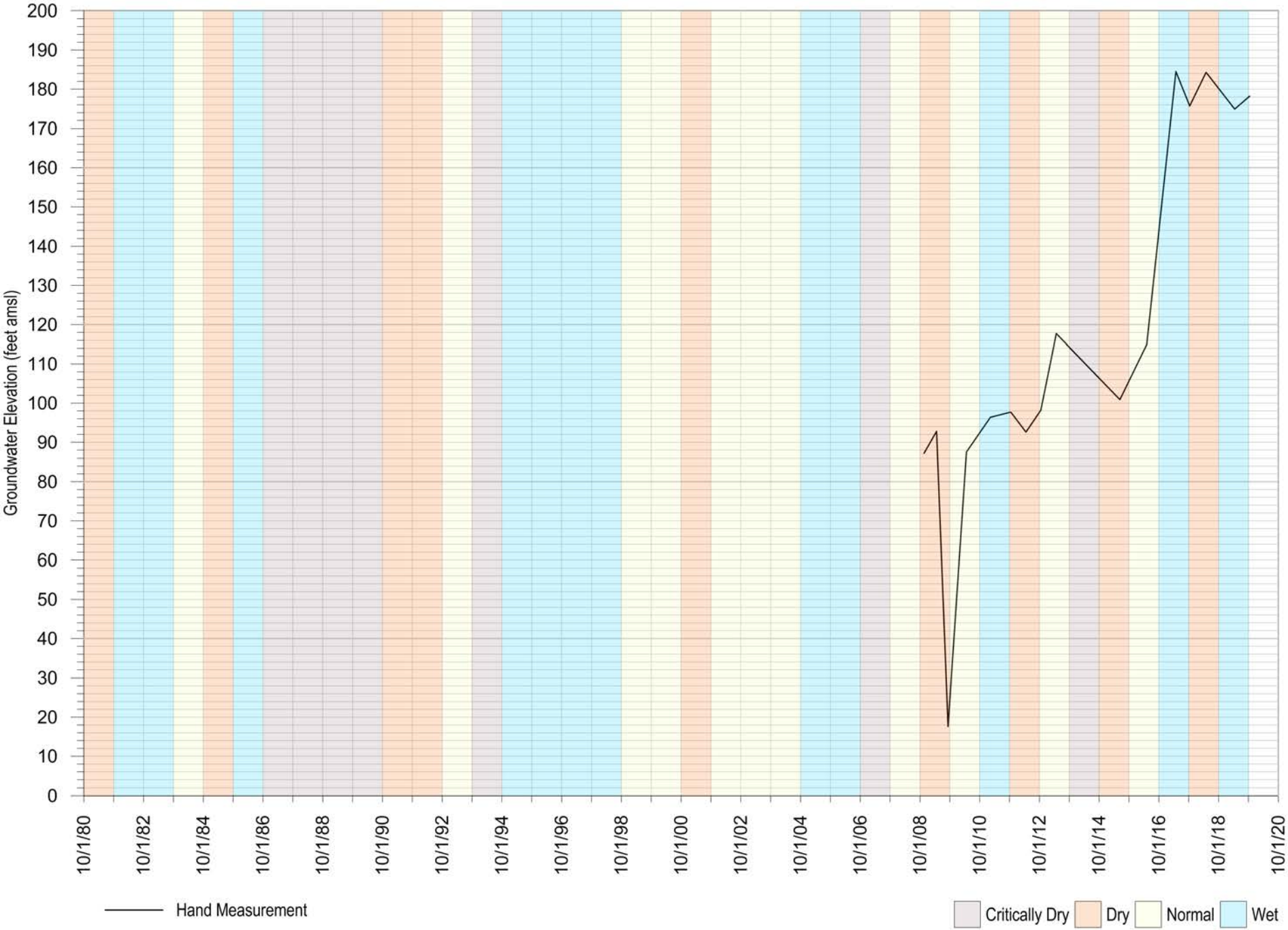
Private Well 18

FIGURE A-160



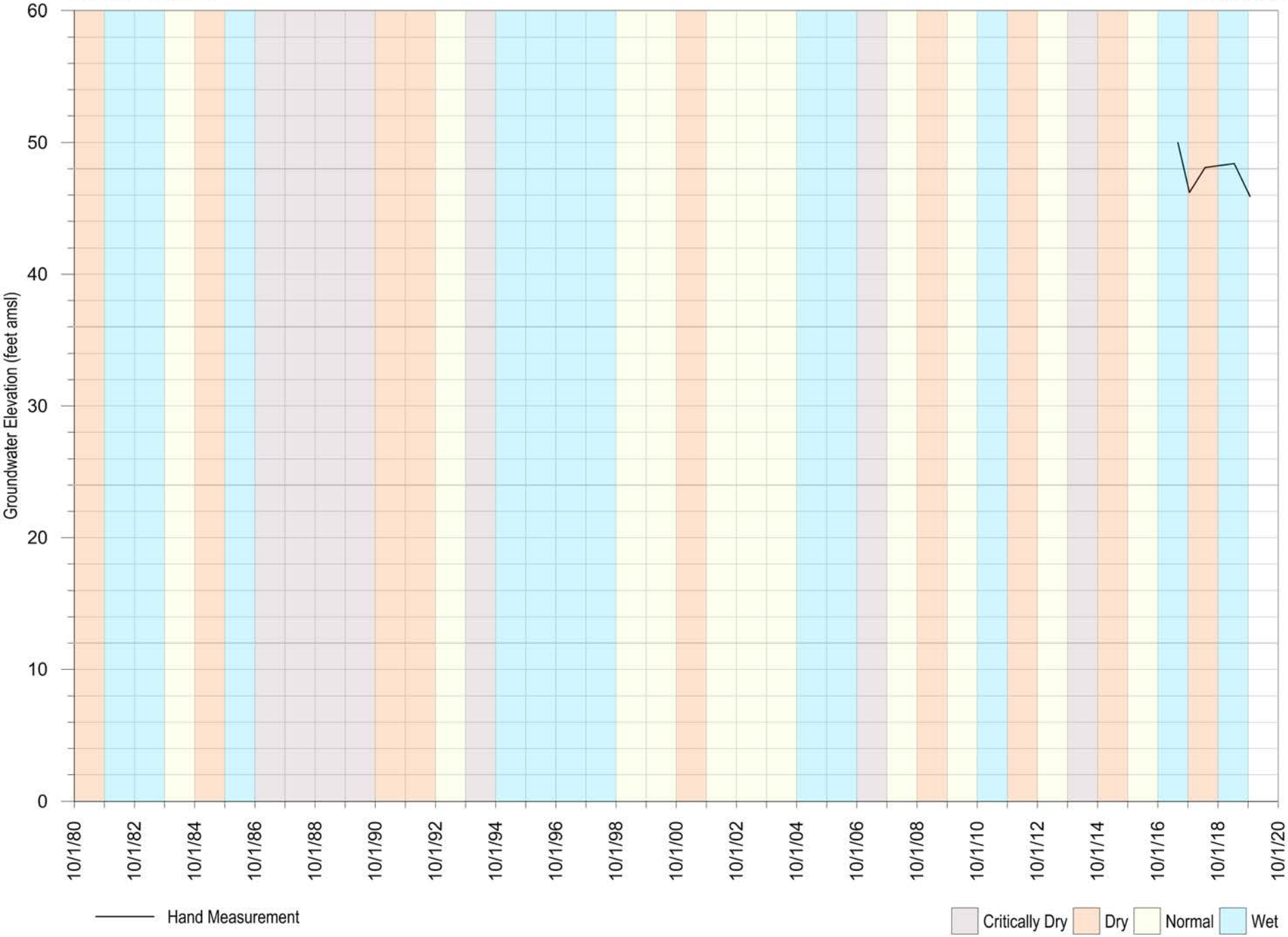
Private Well 19

FIGURE A-161



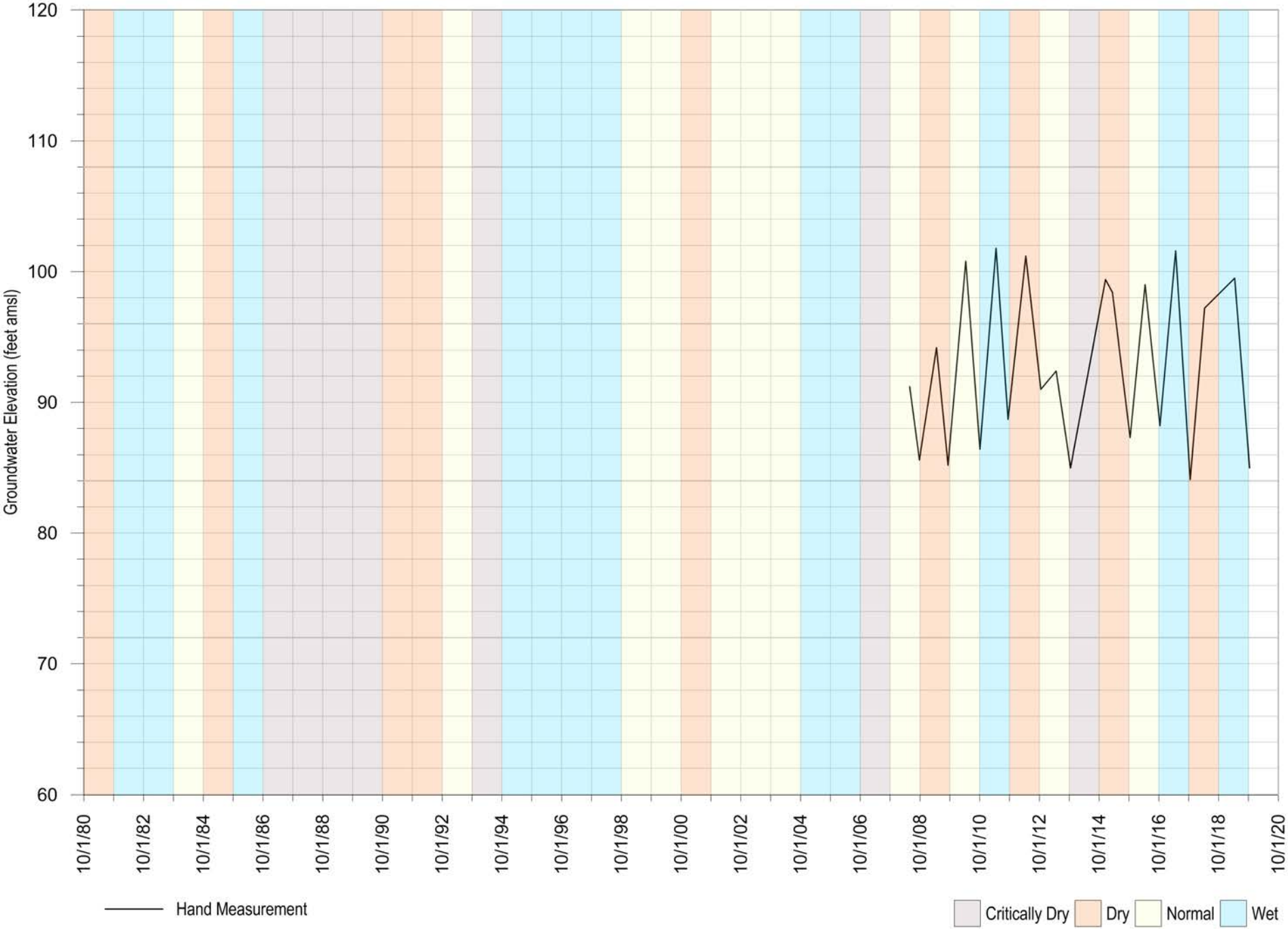
Private Well 20

FIGURE A-162



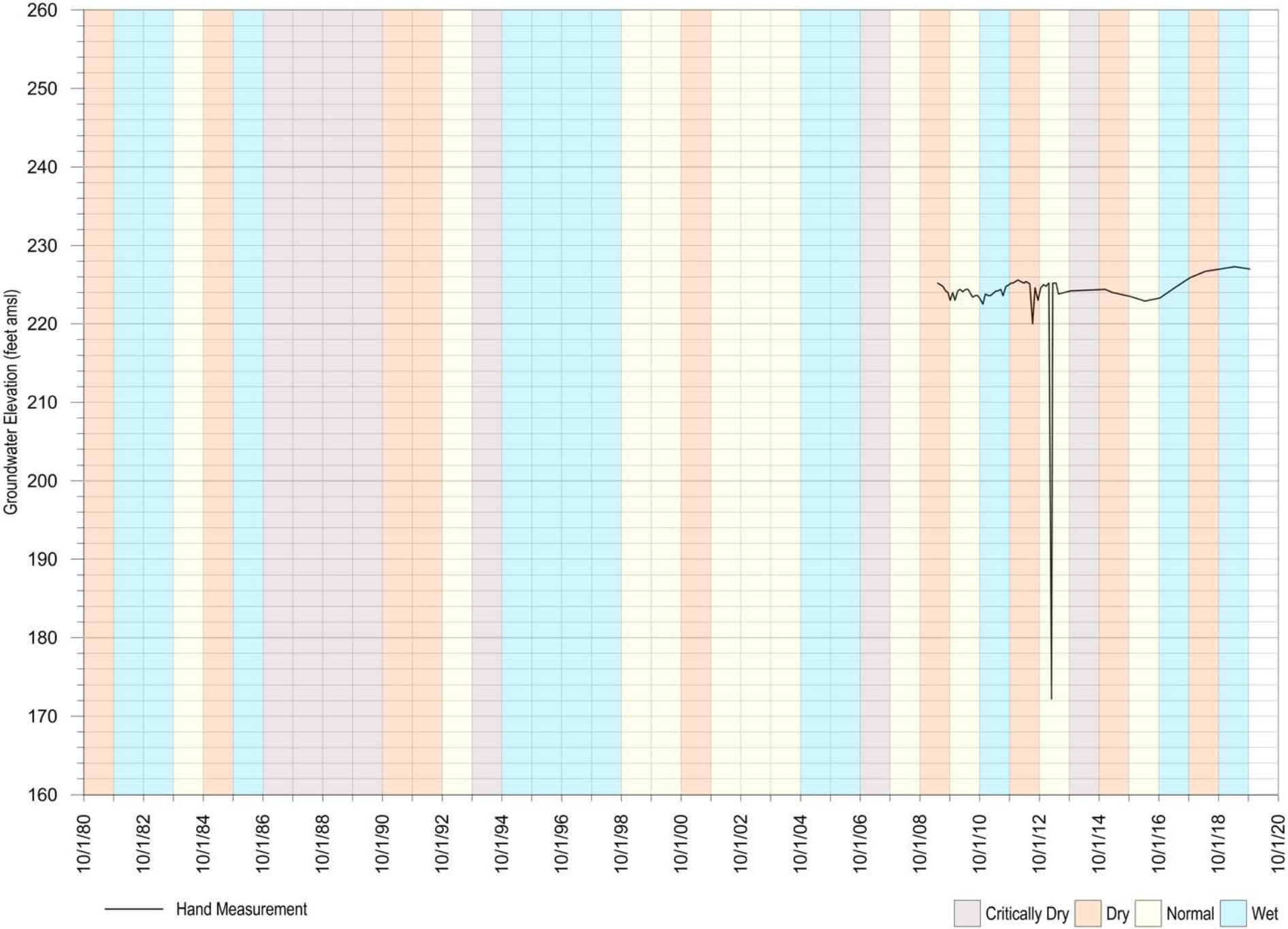
Private Well 21

FIGURE A-163



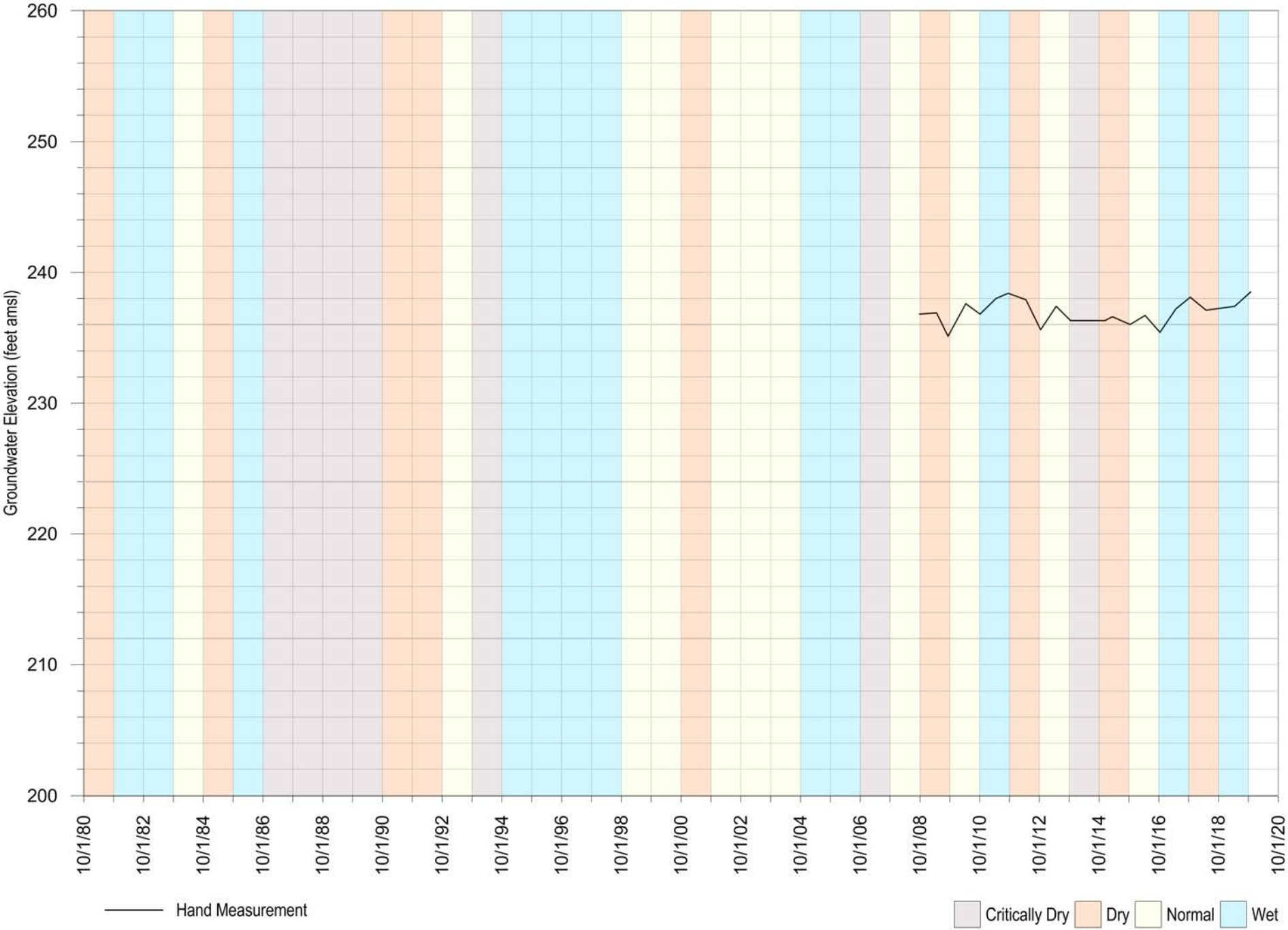
Private Well 22

FIGURE A-164



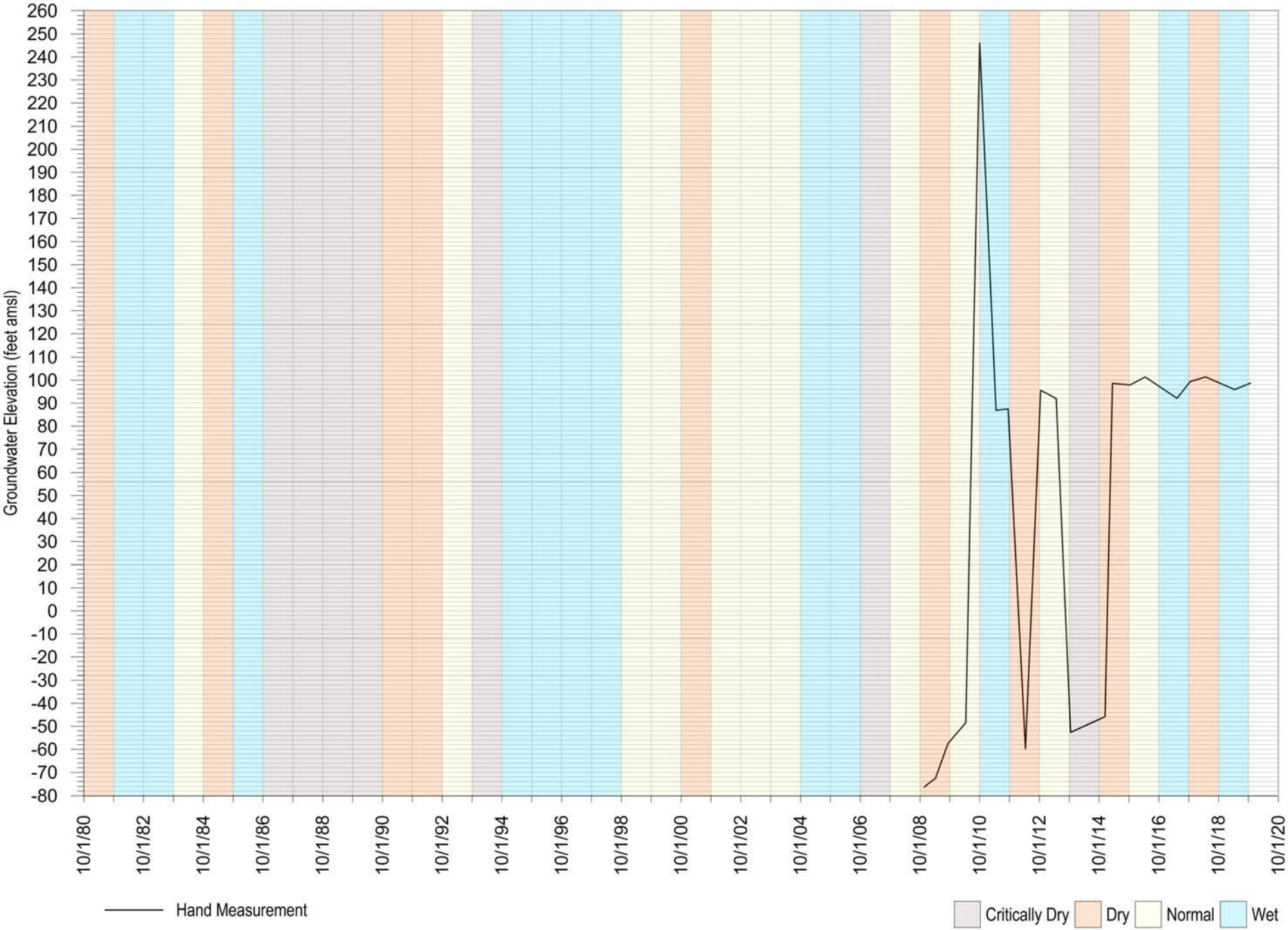
Private Well 23

FIGURE A-165



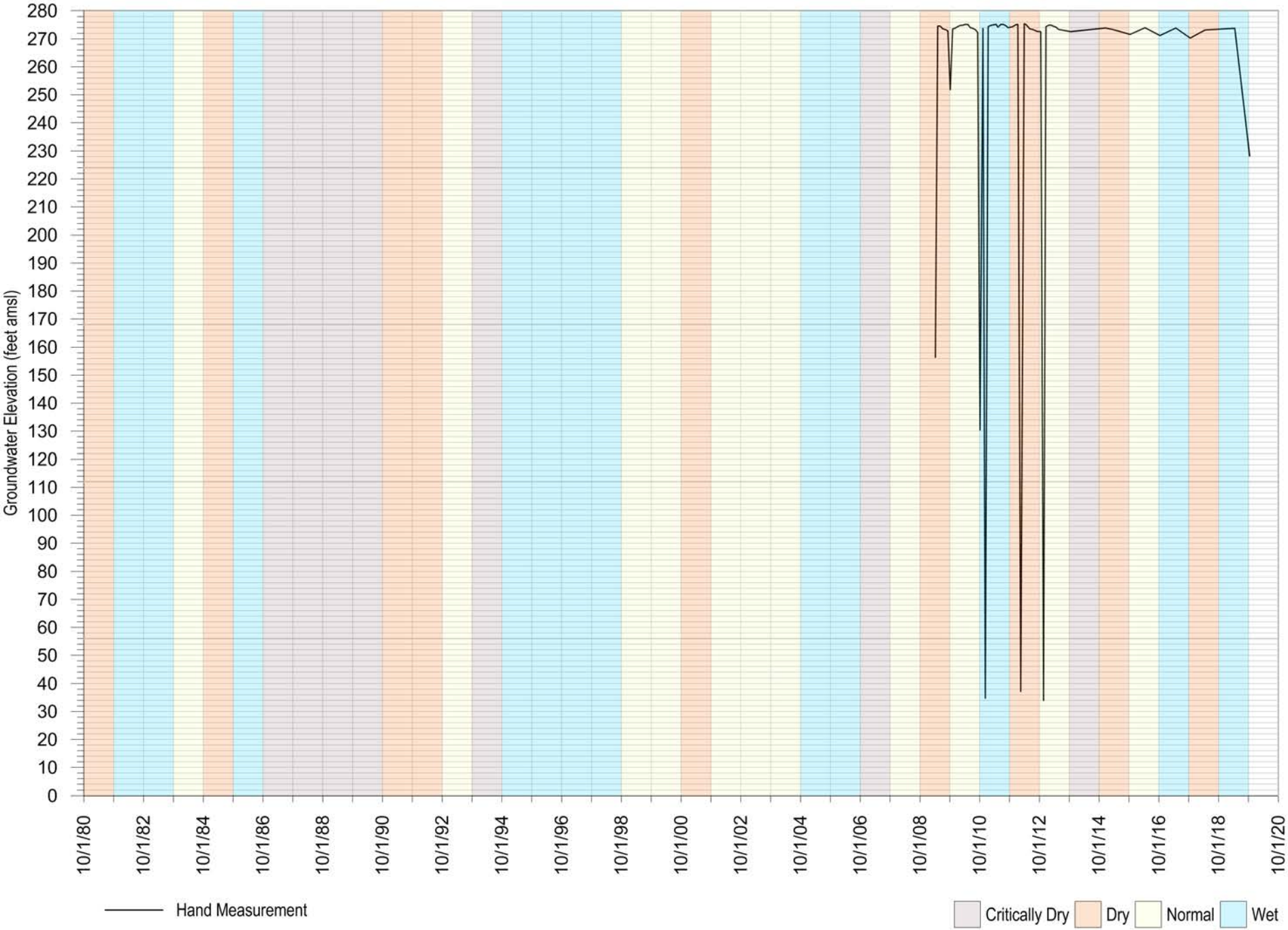
Private Well 24

FIGURE A-166



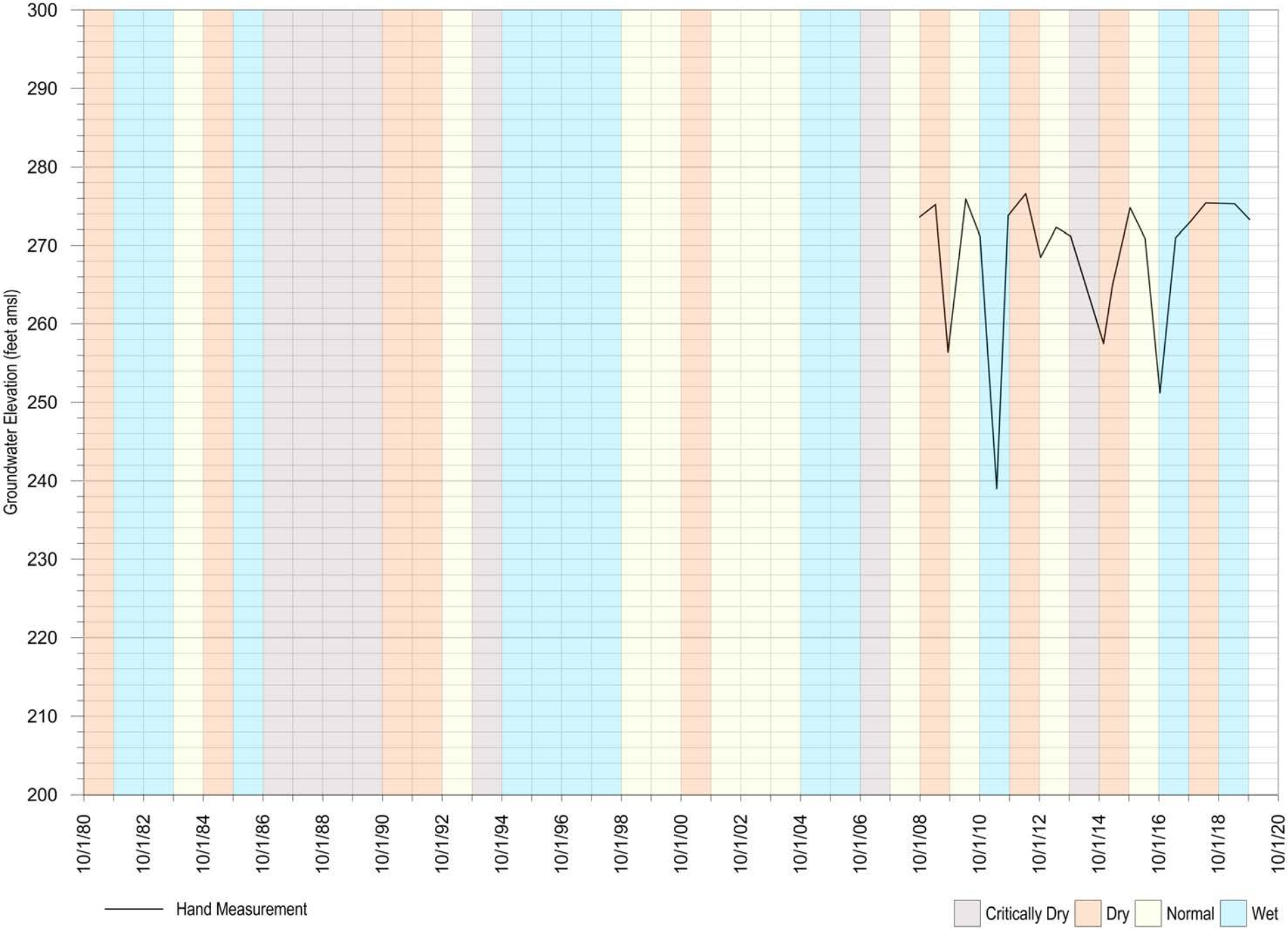
Private Well 25

FIGURE A-167



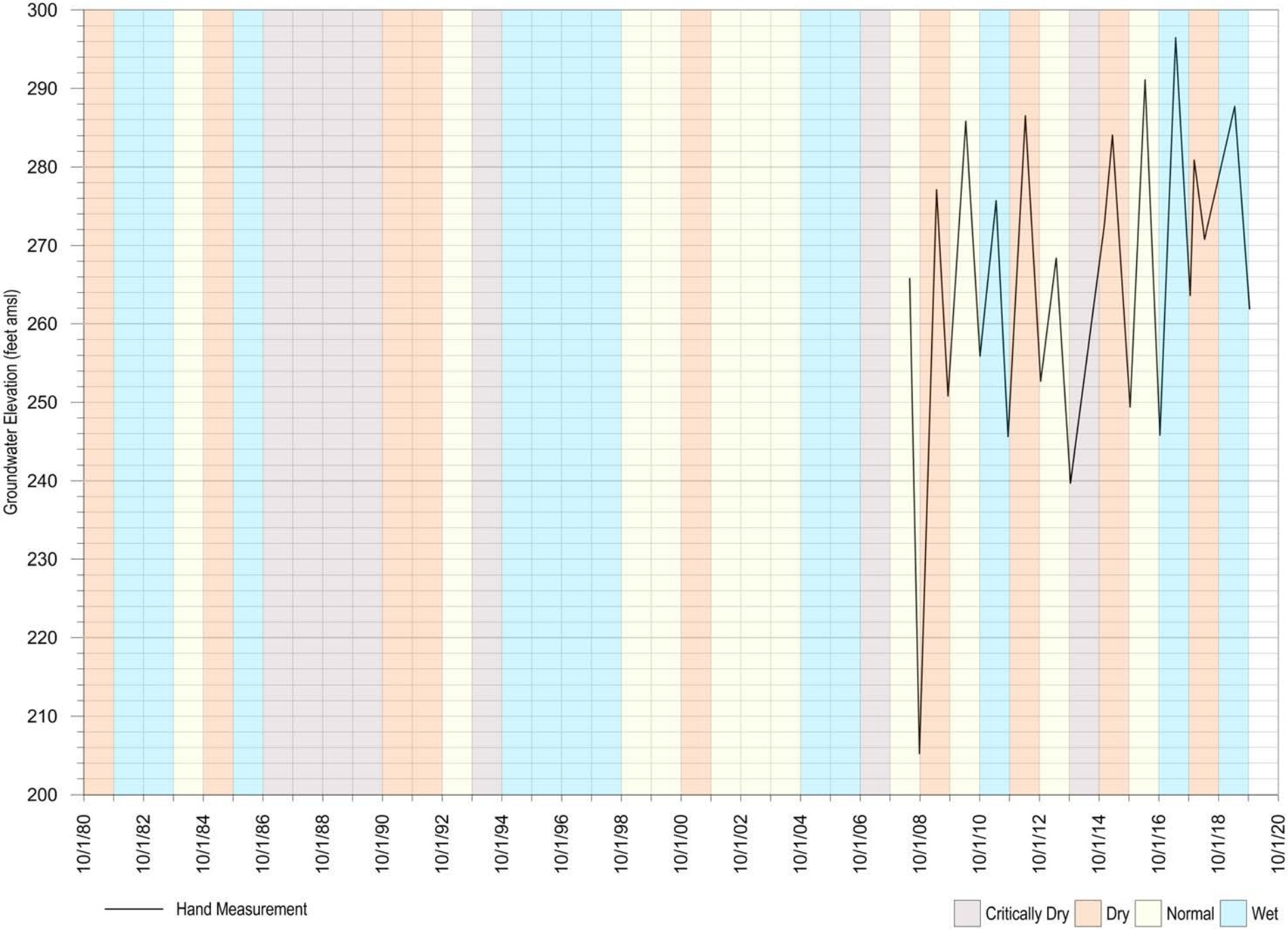
Private Well 26

FIGURE A-168



Private Well 27

FIGURE A-169



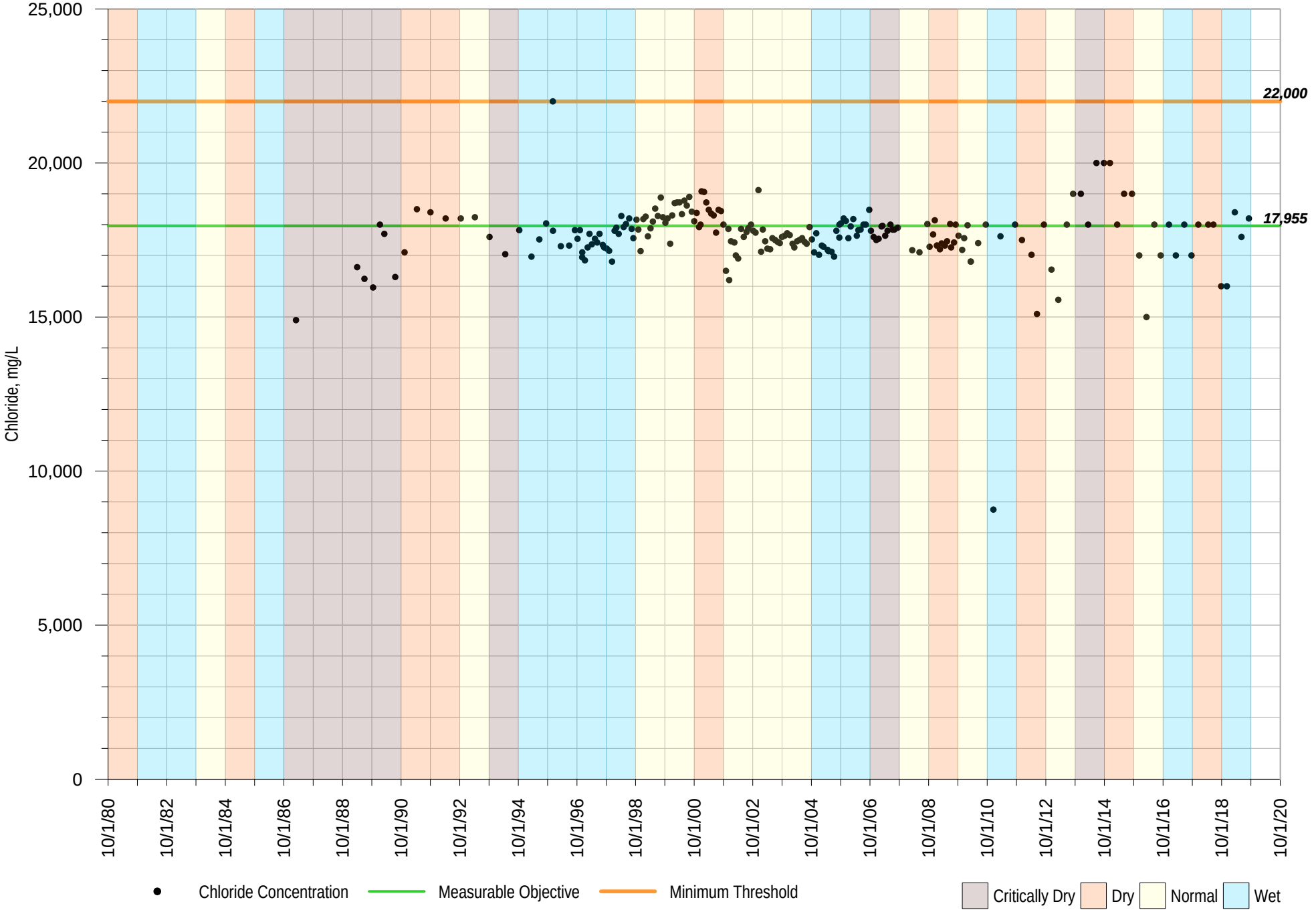
MONTGOMERY & ASSOCIATES

Appendix B

Coastal Monitoring Well Chemographs

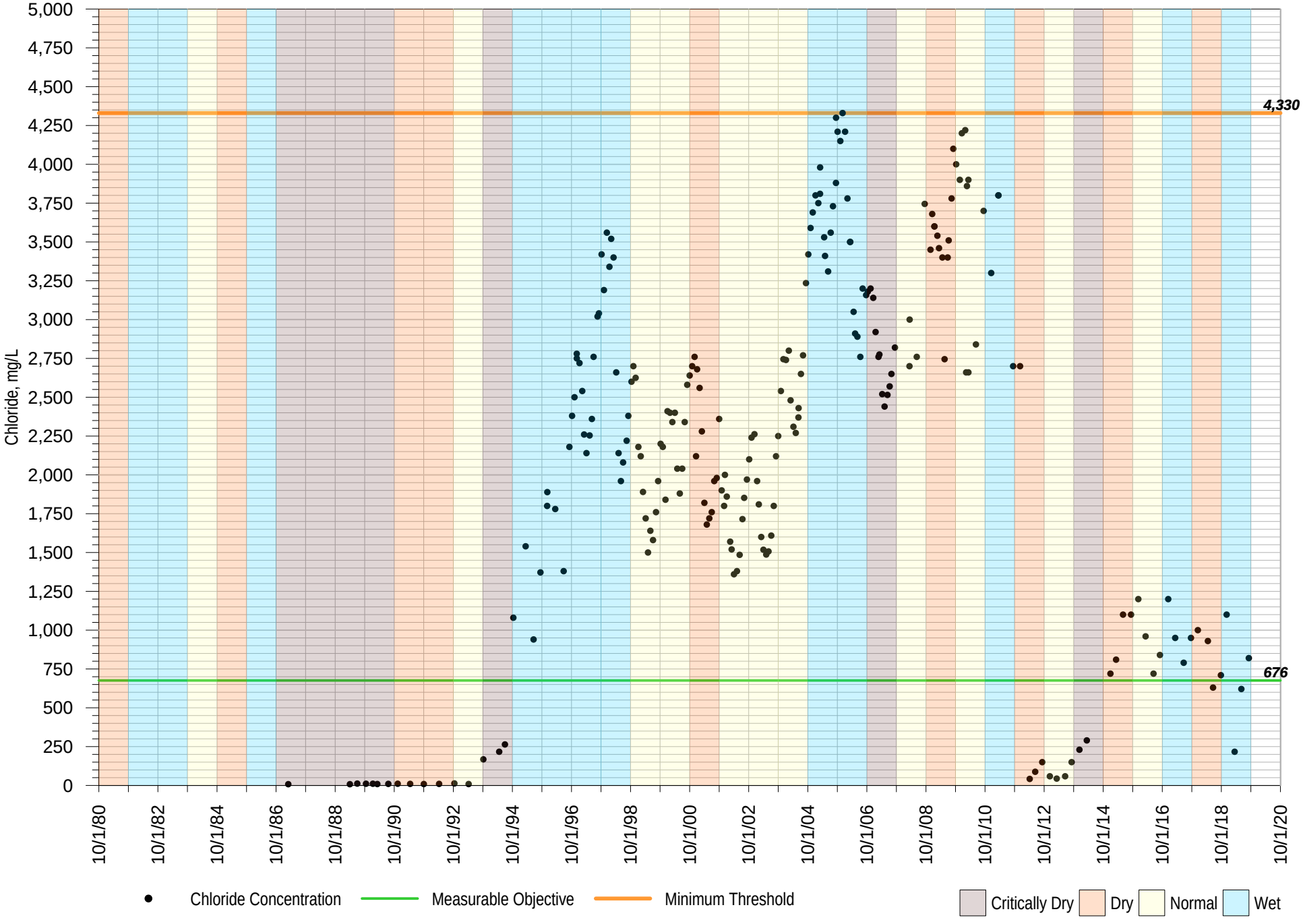
SC-A3A

FIGURE B-1



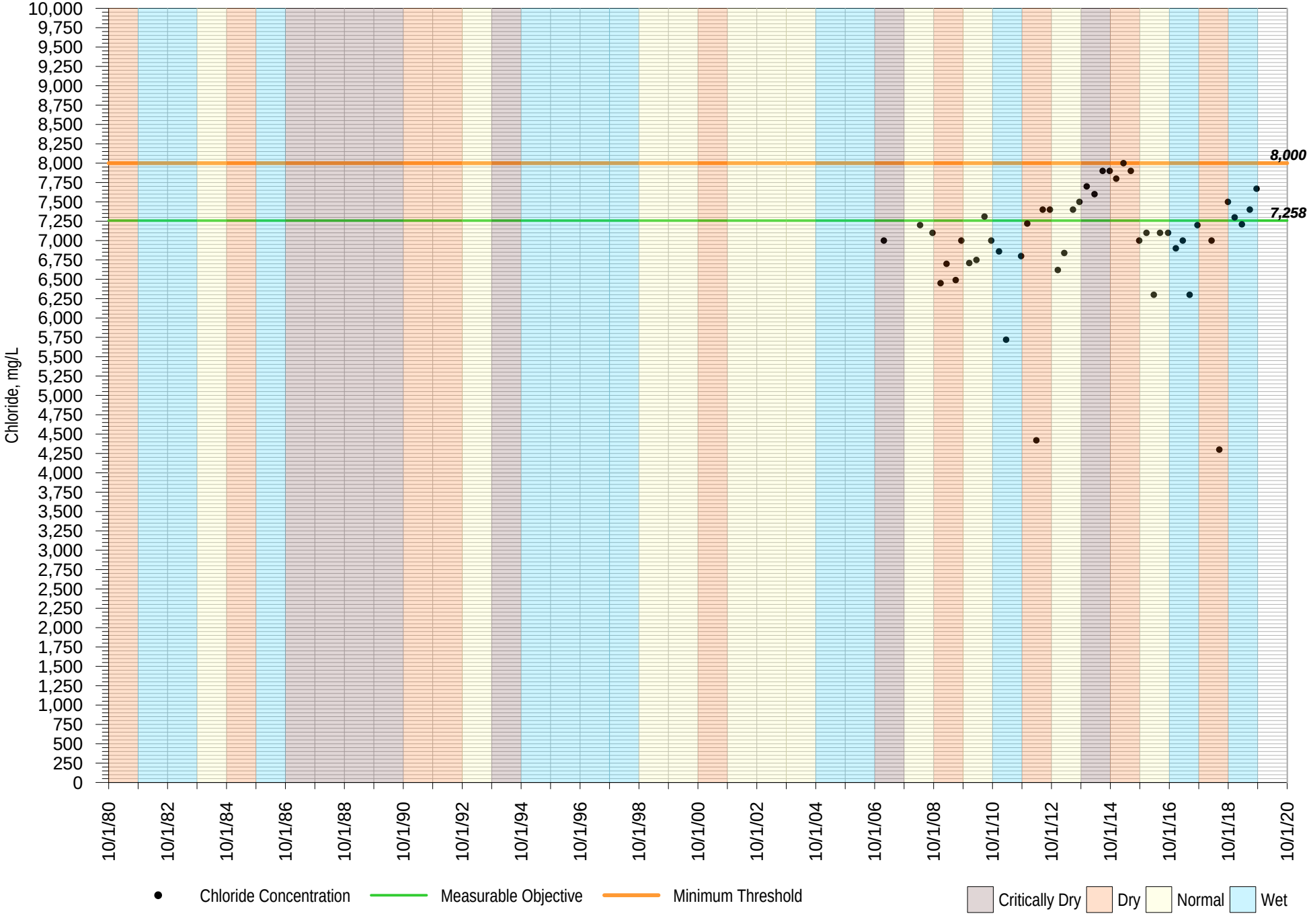
SC-A3B

FIGURE B-2



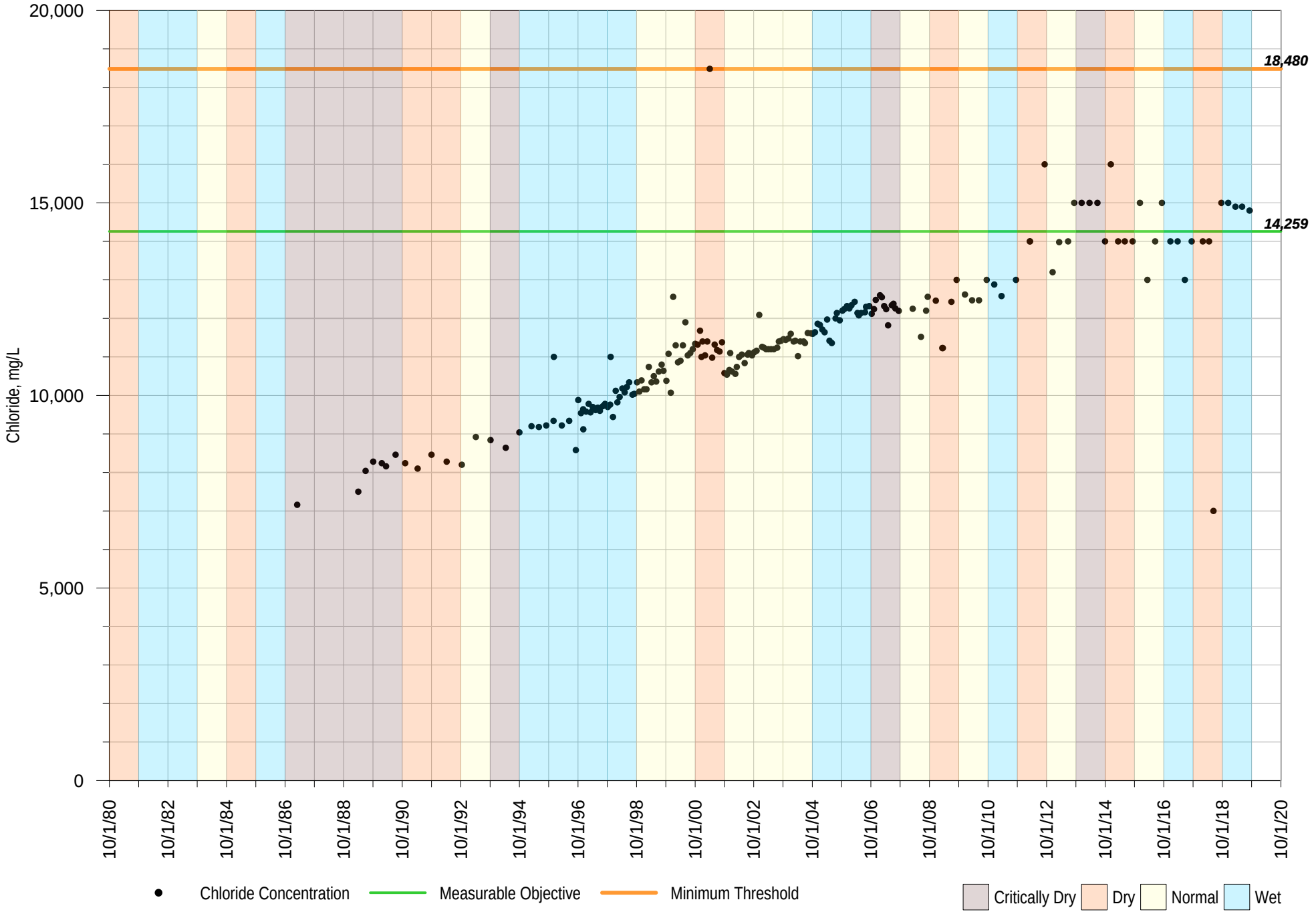
SC-A8A

FIGURE B-3



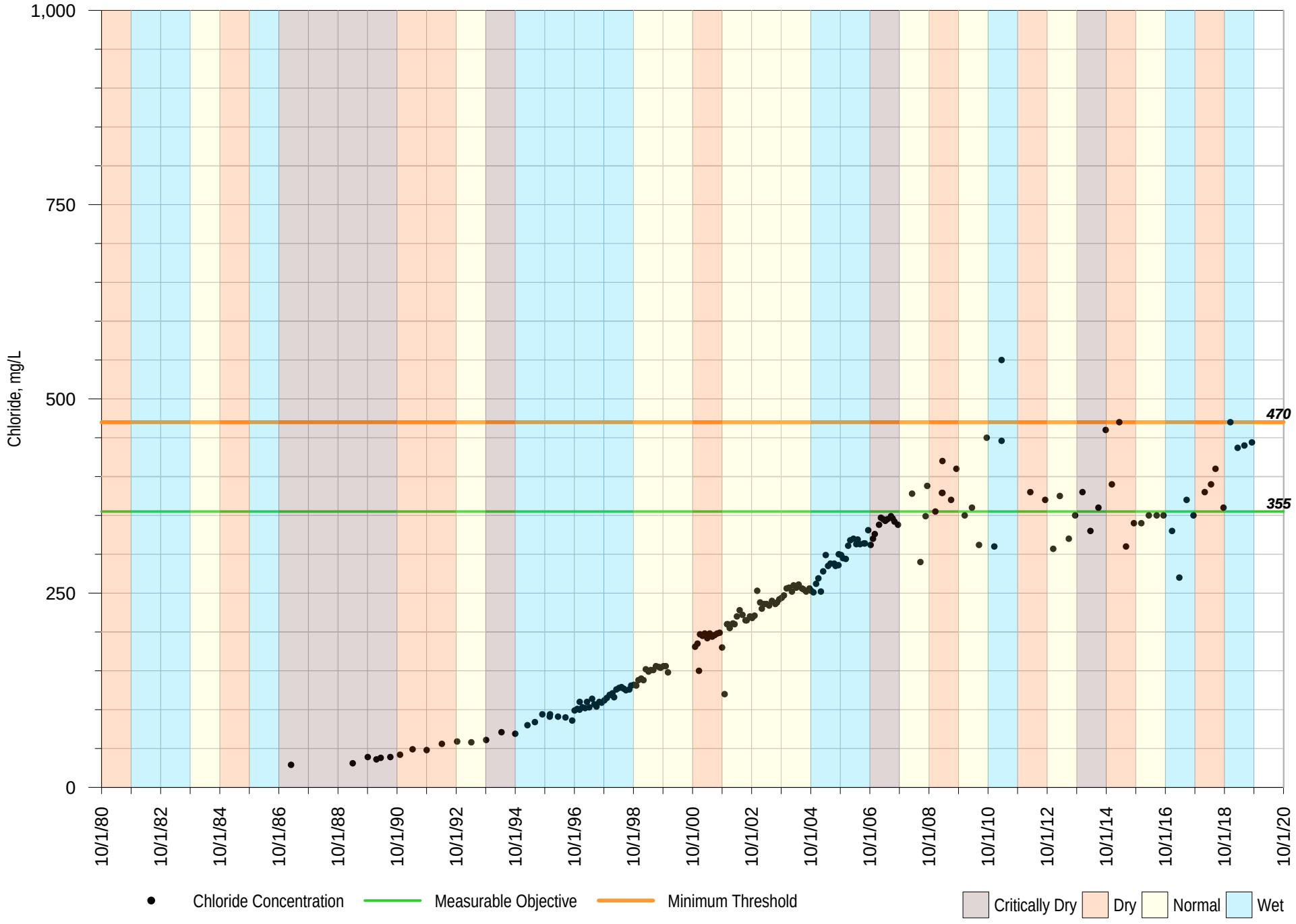
SC-A2A

FIGURE B-4



SC-A2B

FIGURE B-5



Moran Lake Medium

FIGURE B-6

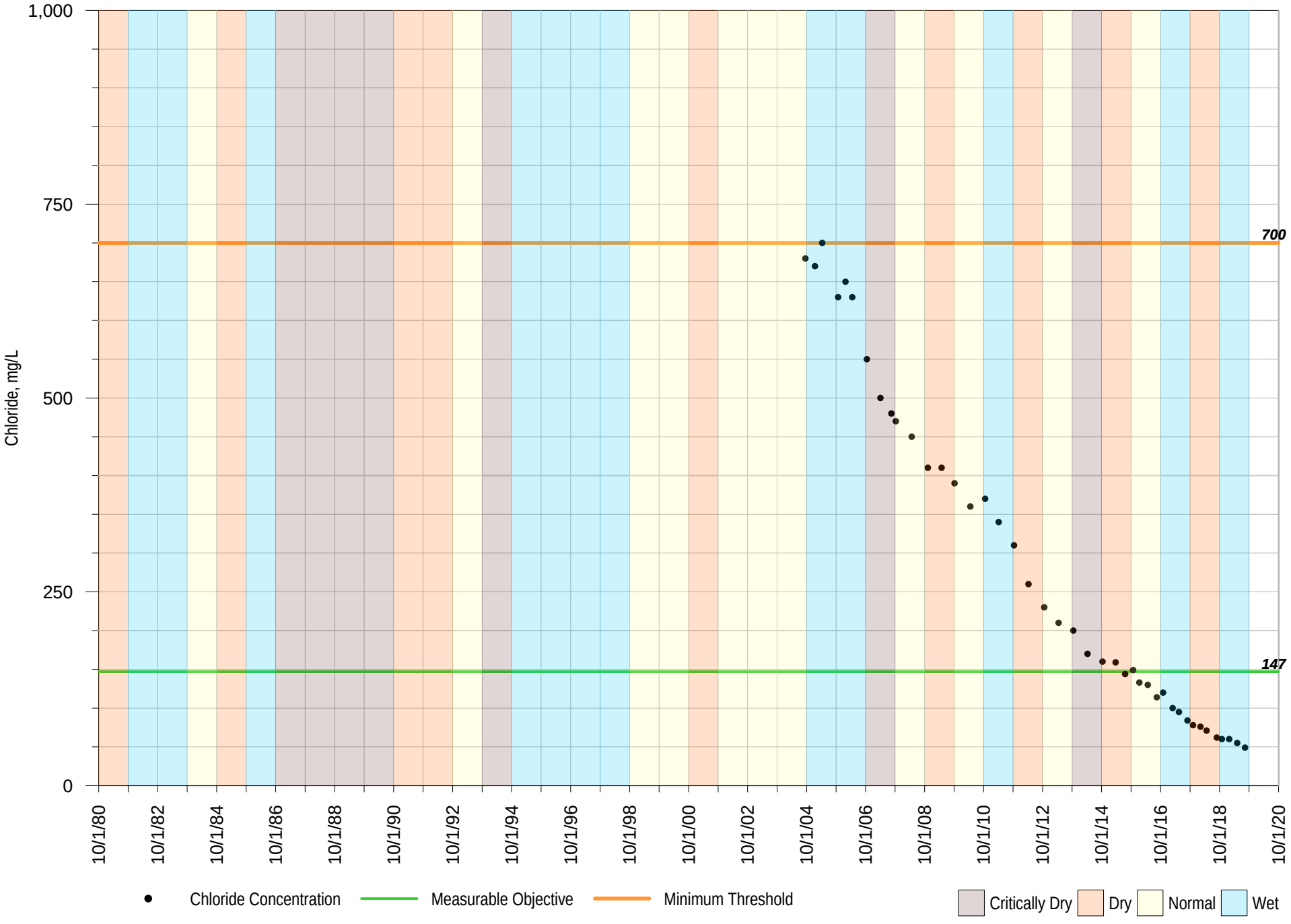
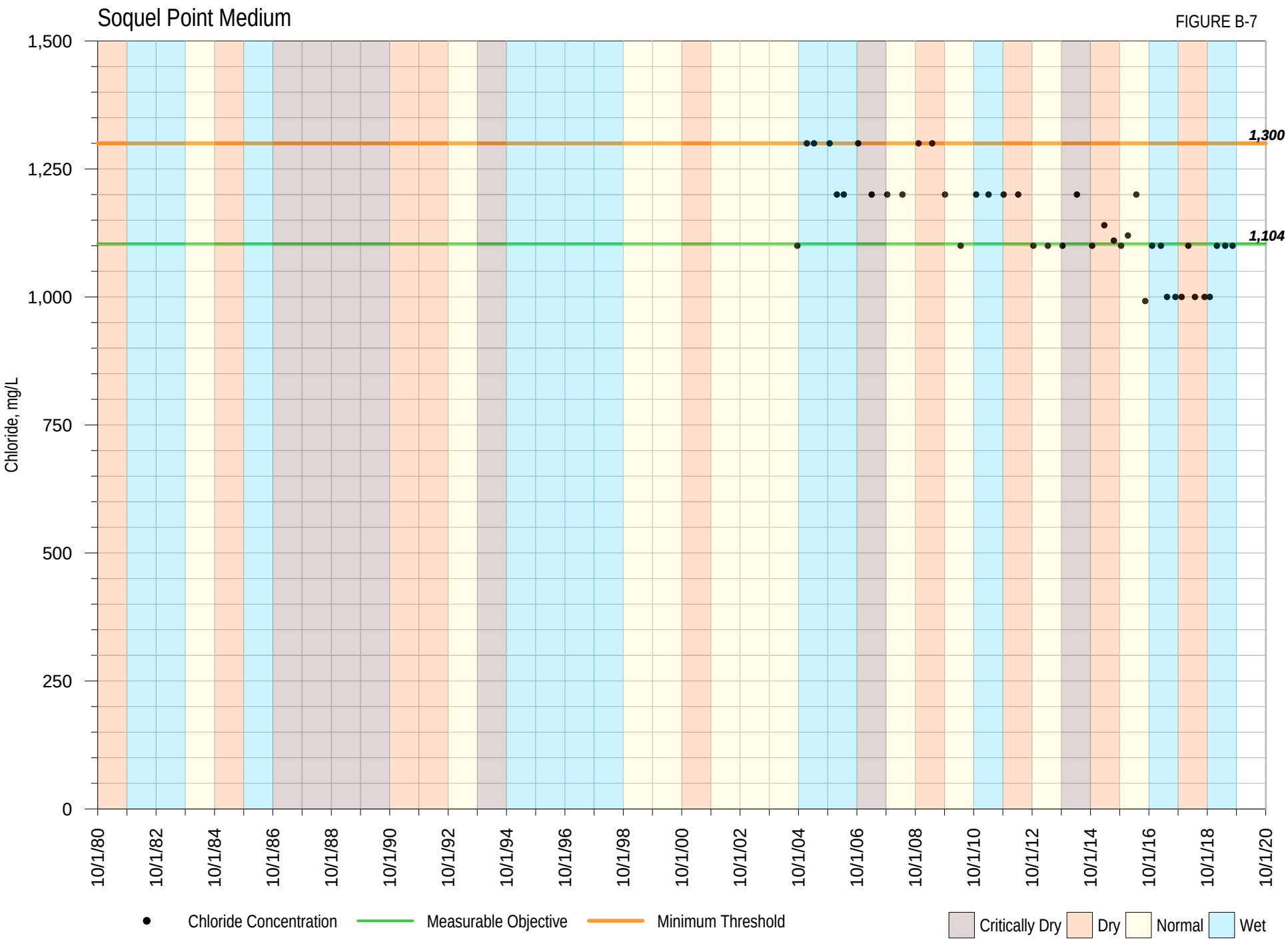
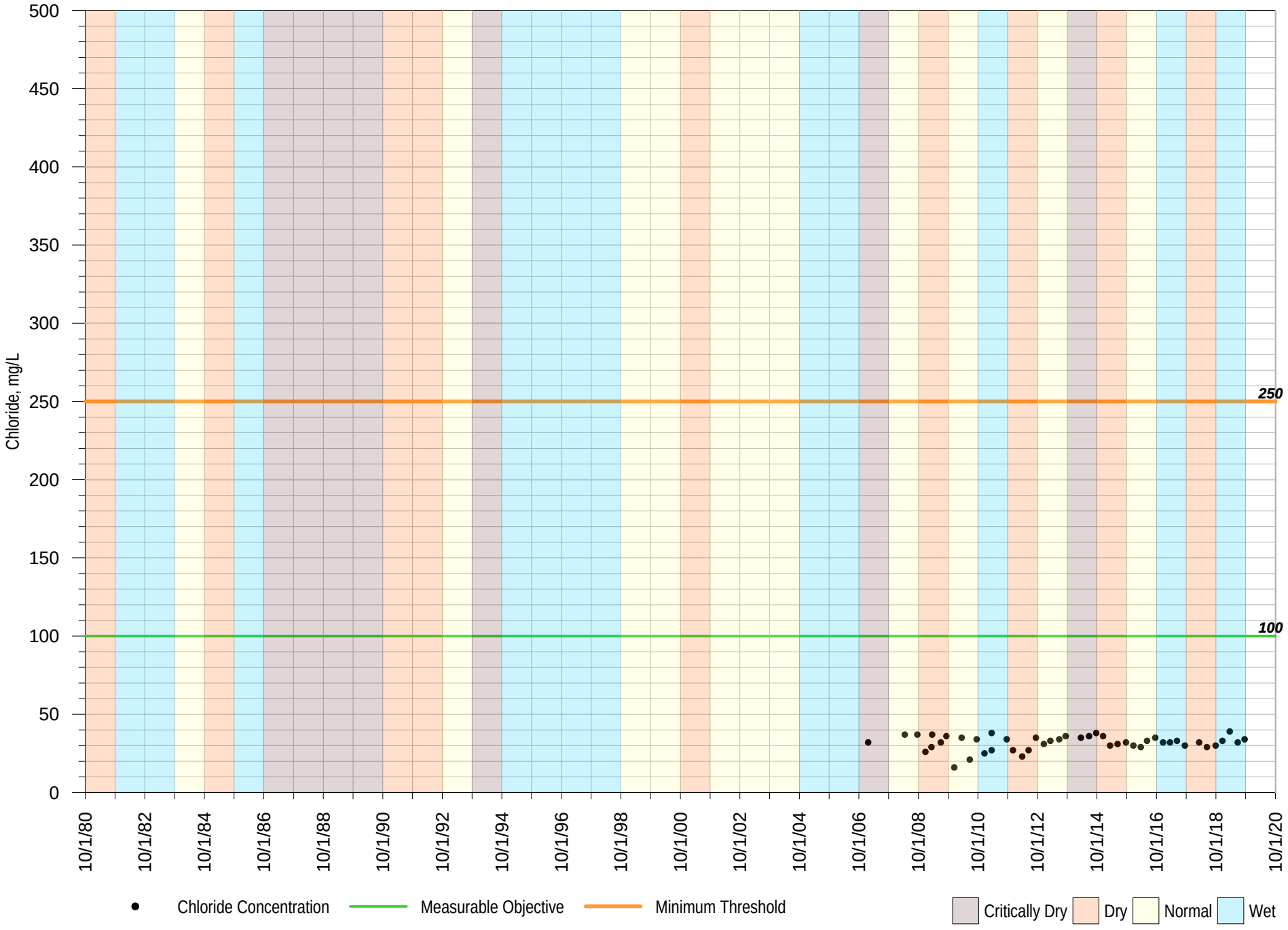


FIGURE B-7


Soquel Point Medium
Chloride, mg/L
1,500
1,250
1,000
750
500
250
0
1,300
1,104
10/1/80
10/1/82
10/1/84
10/1/86
10/1/88
10/1/90
10/1/92
10/1/94
10/1/96
10/1/98
10/1/00
10/1/02
10/1/04
10/1/06
10/1/08
10/1/10
10/1/12
10/1/14
10/1/16
10/1/18
10/1/20
Chloride Concentration
Measurable Objective
Minimum Threshold
Critically Dry
Dry
Normal
Wet

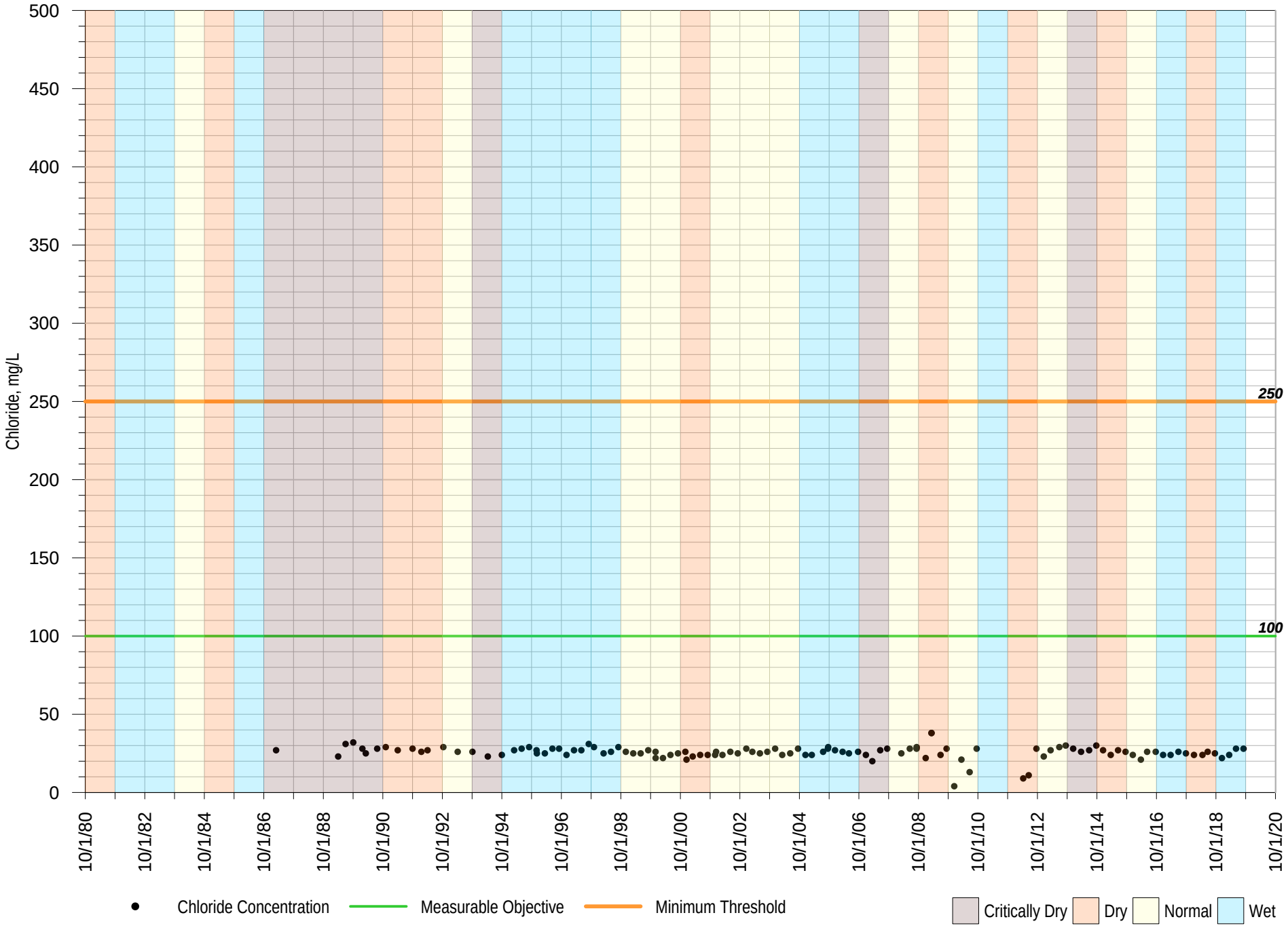
SC-A8B

FIGURE B-8



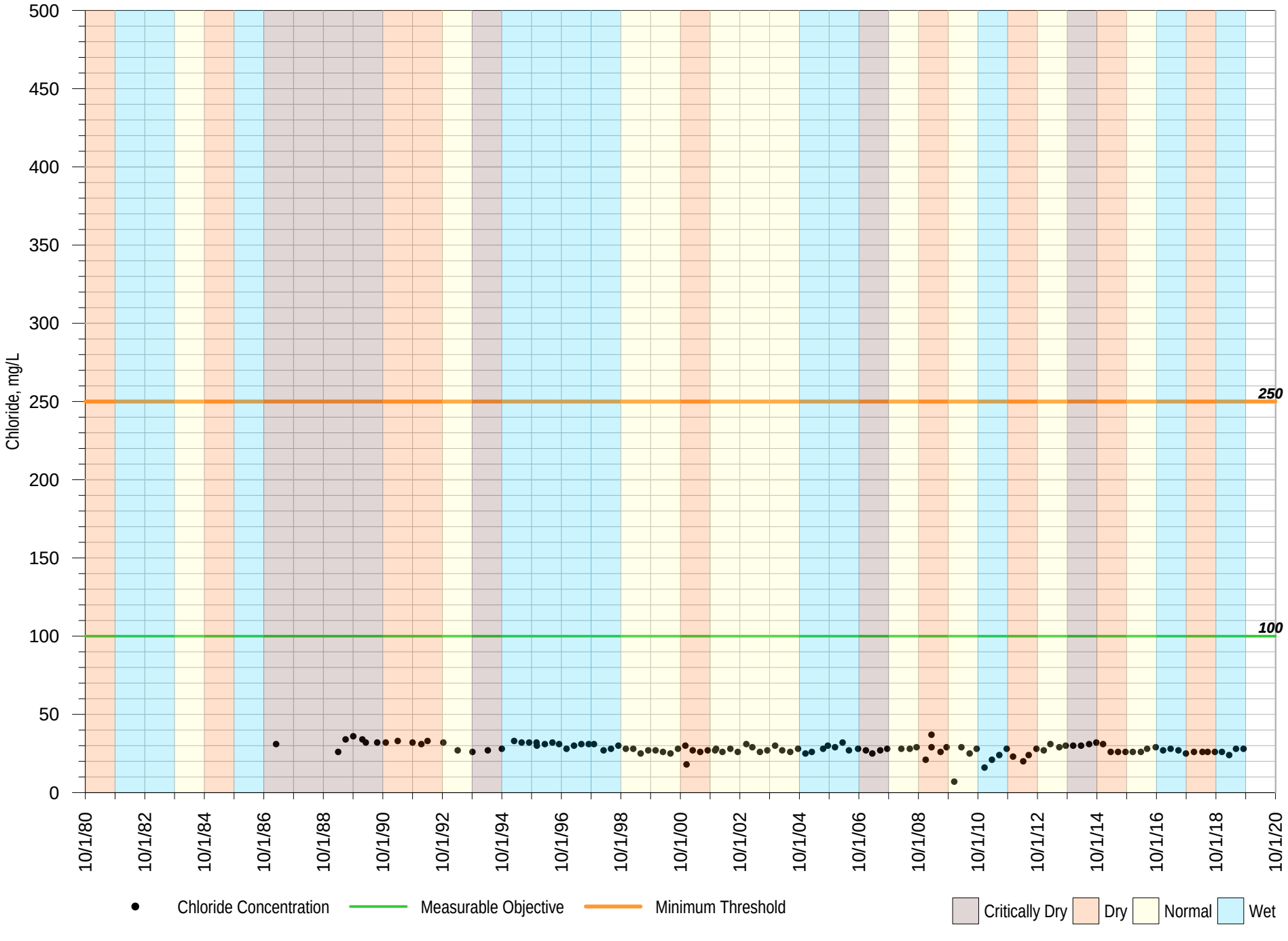
SC-A1B

FIGURE B-9



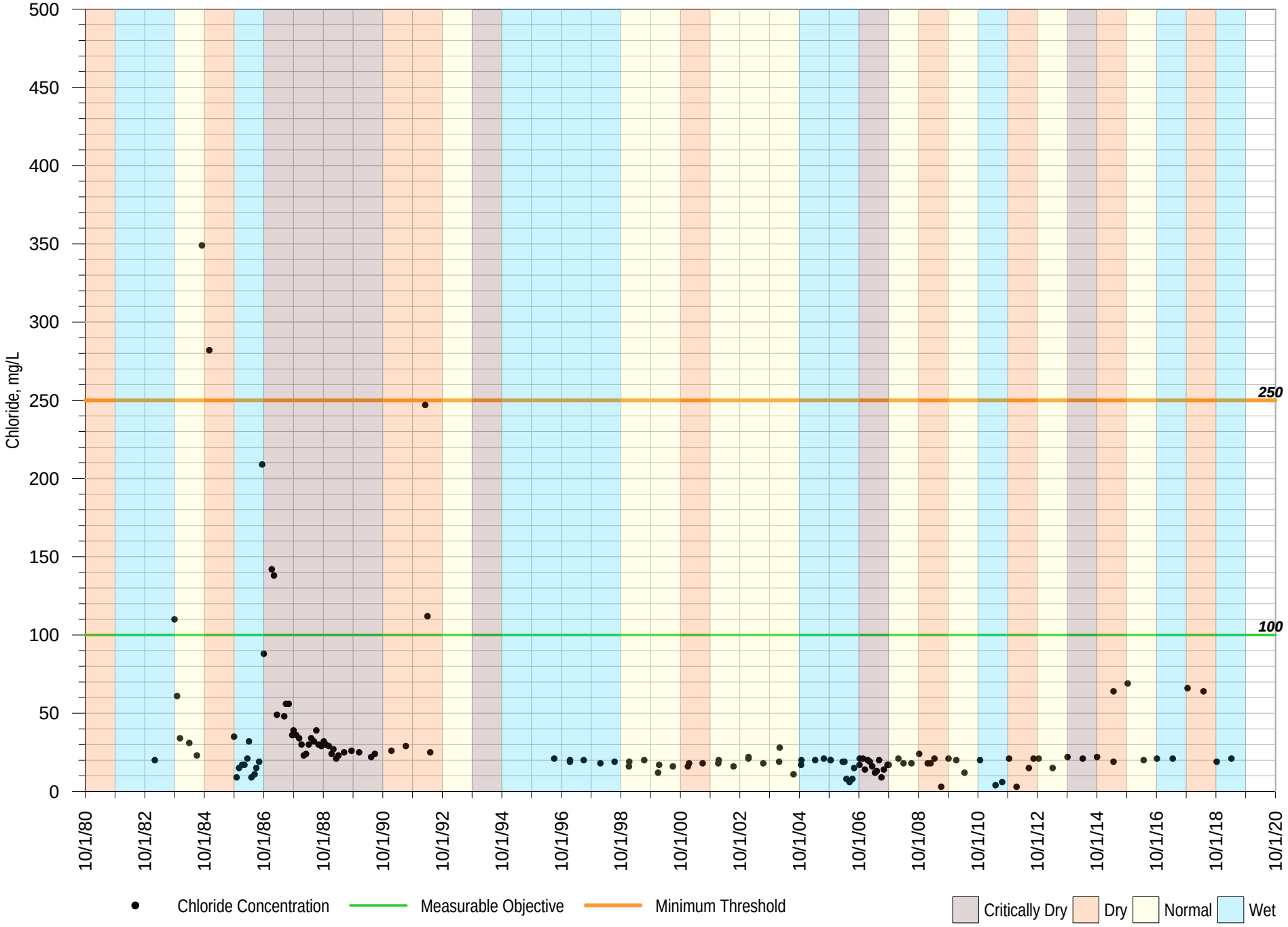
SC-A1A

FIGURE B-10



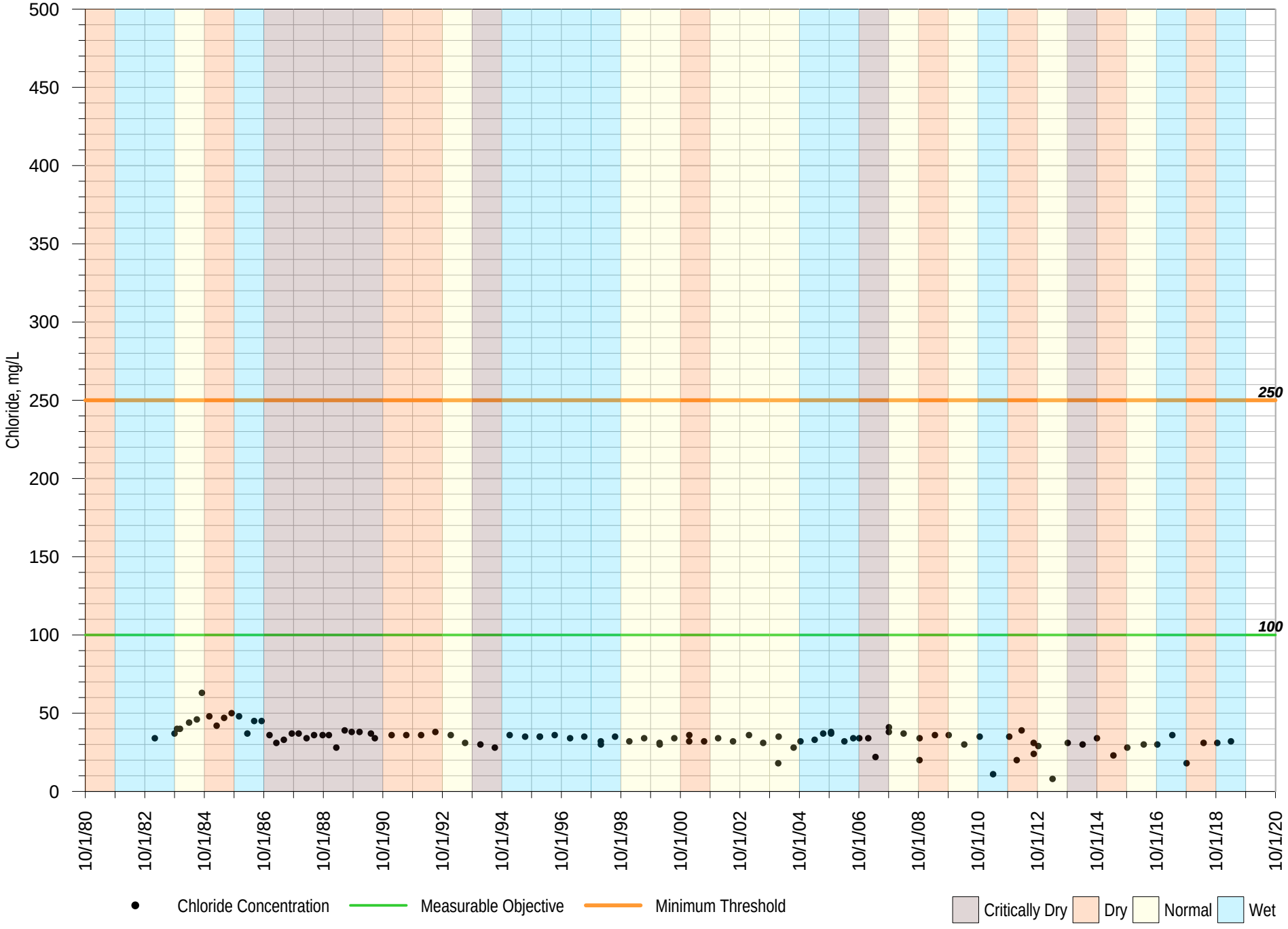
SC-8D

FIGURE B-11



SC-9C

FIGURE B-12



SC-8B

FIGURE B-13

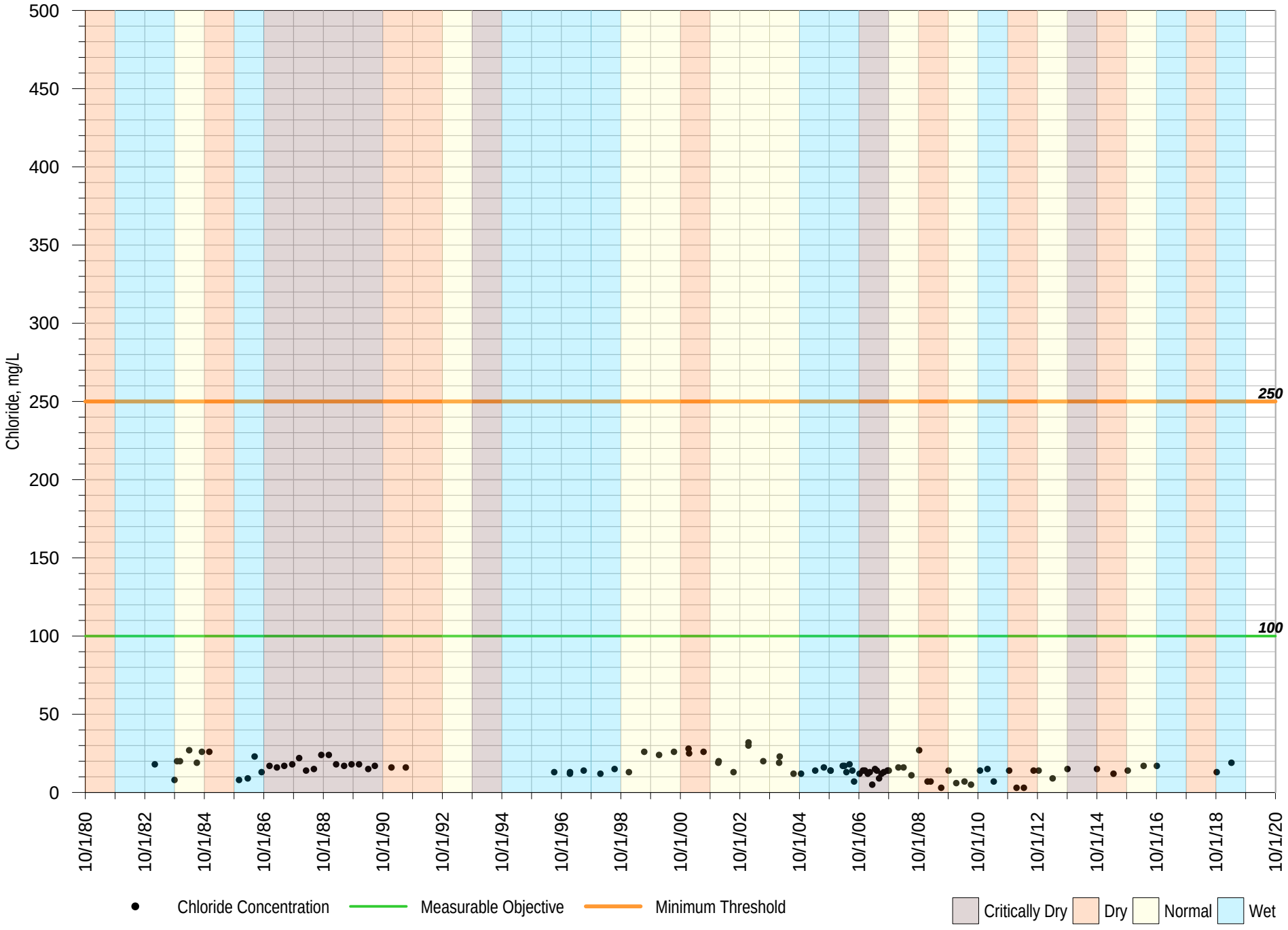
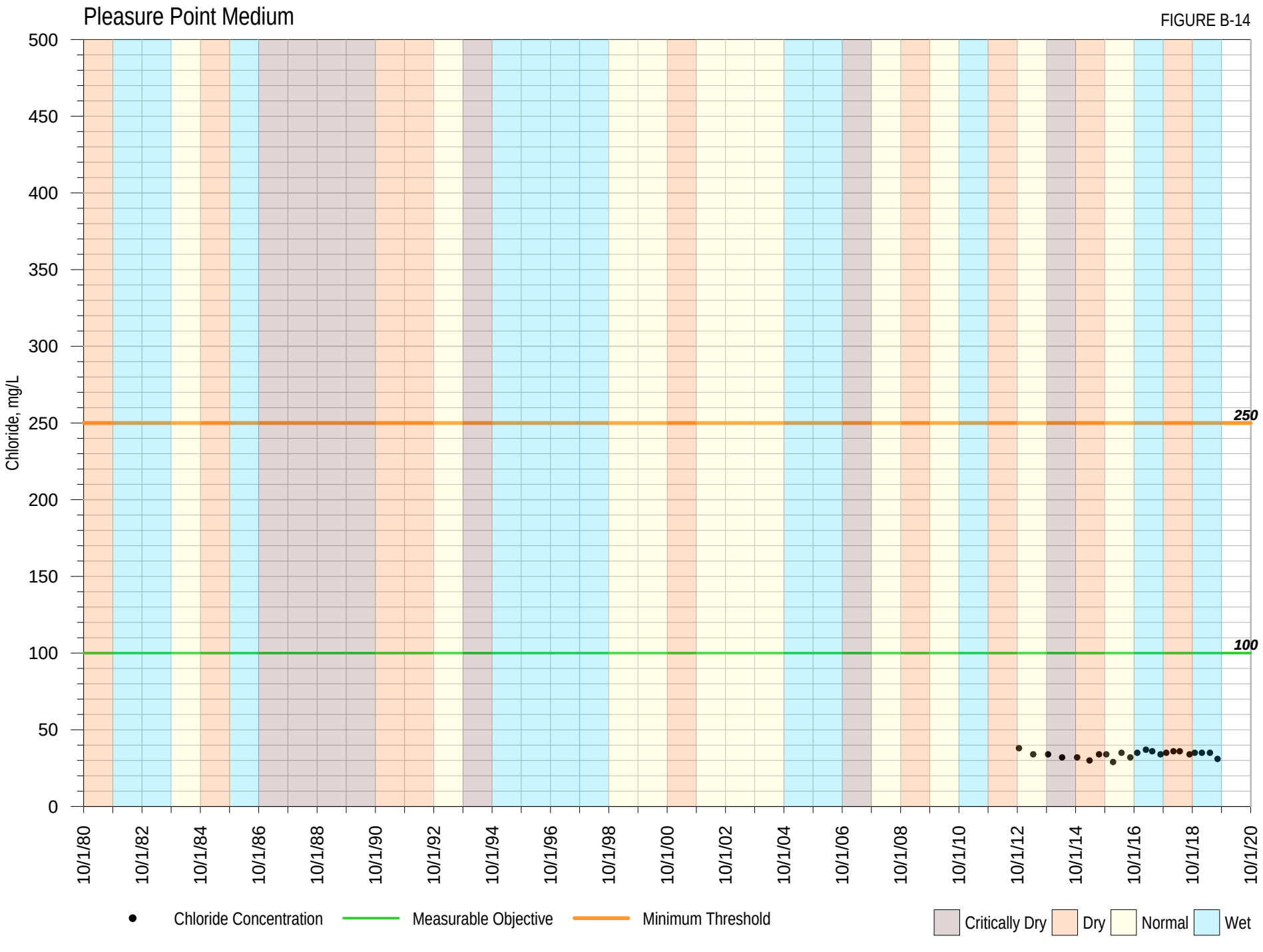
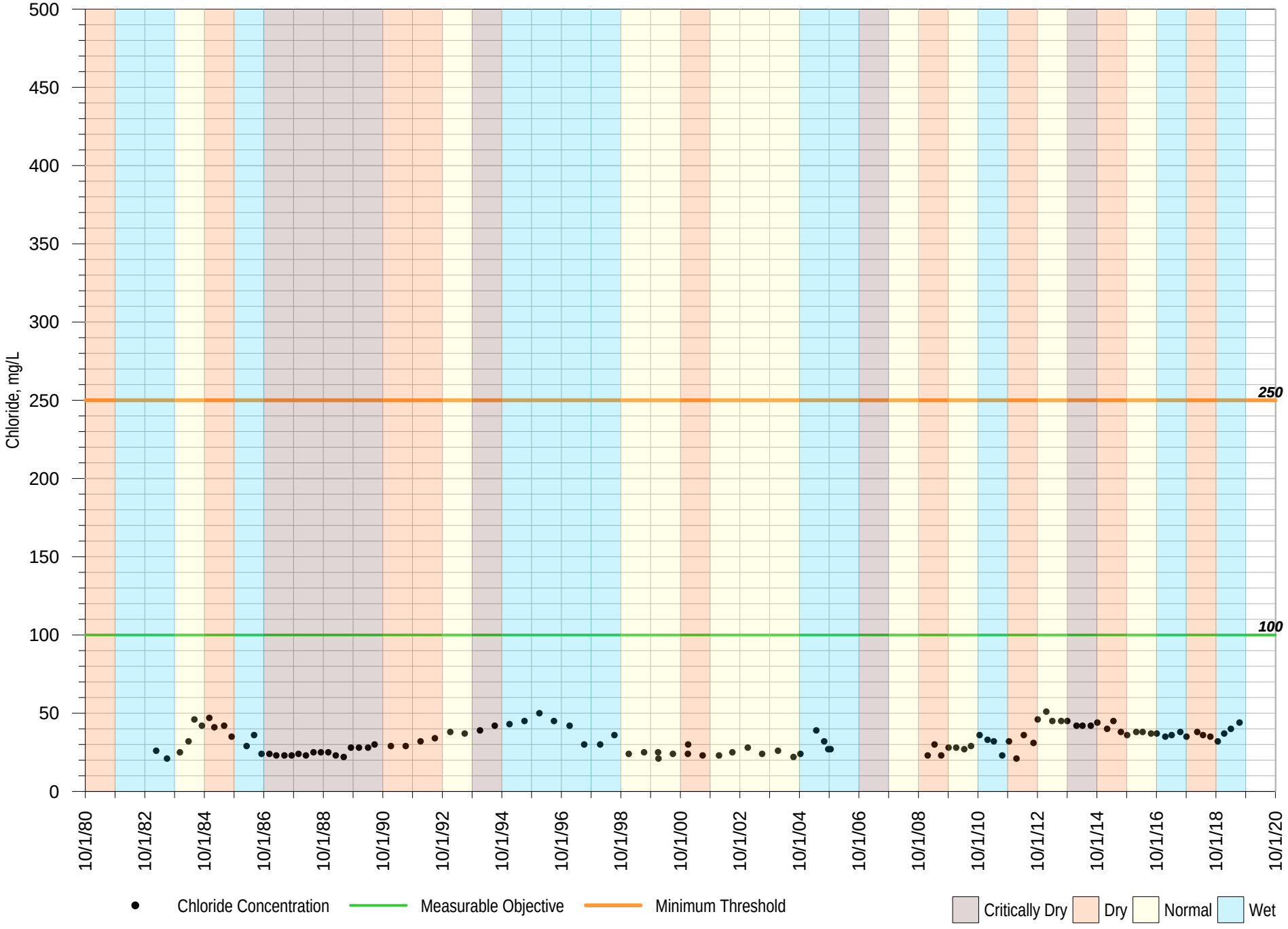


FIGURE B-14


Pleasure Point Medium
Chloride, mg/L
500
450
400
350
300
250
200
150
100
50
0
250
100
10/1/80
10/1/82
10/1/84
10/1/86
10/1/88
10/1/90
10/1/92
10/1/94
10/1/96
10/1/98
10/1/00
10/1/02
10/1/04
10/1/06
10/1/08
10/1/10
10/1/12
10/1/14
10/1/16
10/1/18
10/1/20
Chloride Concentration
Measurable Objective
Minimum Threshold
Critically Dry
Dry
Normal
Wet

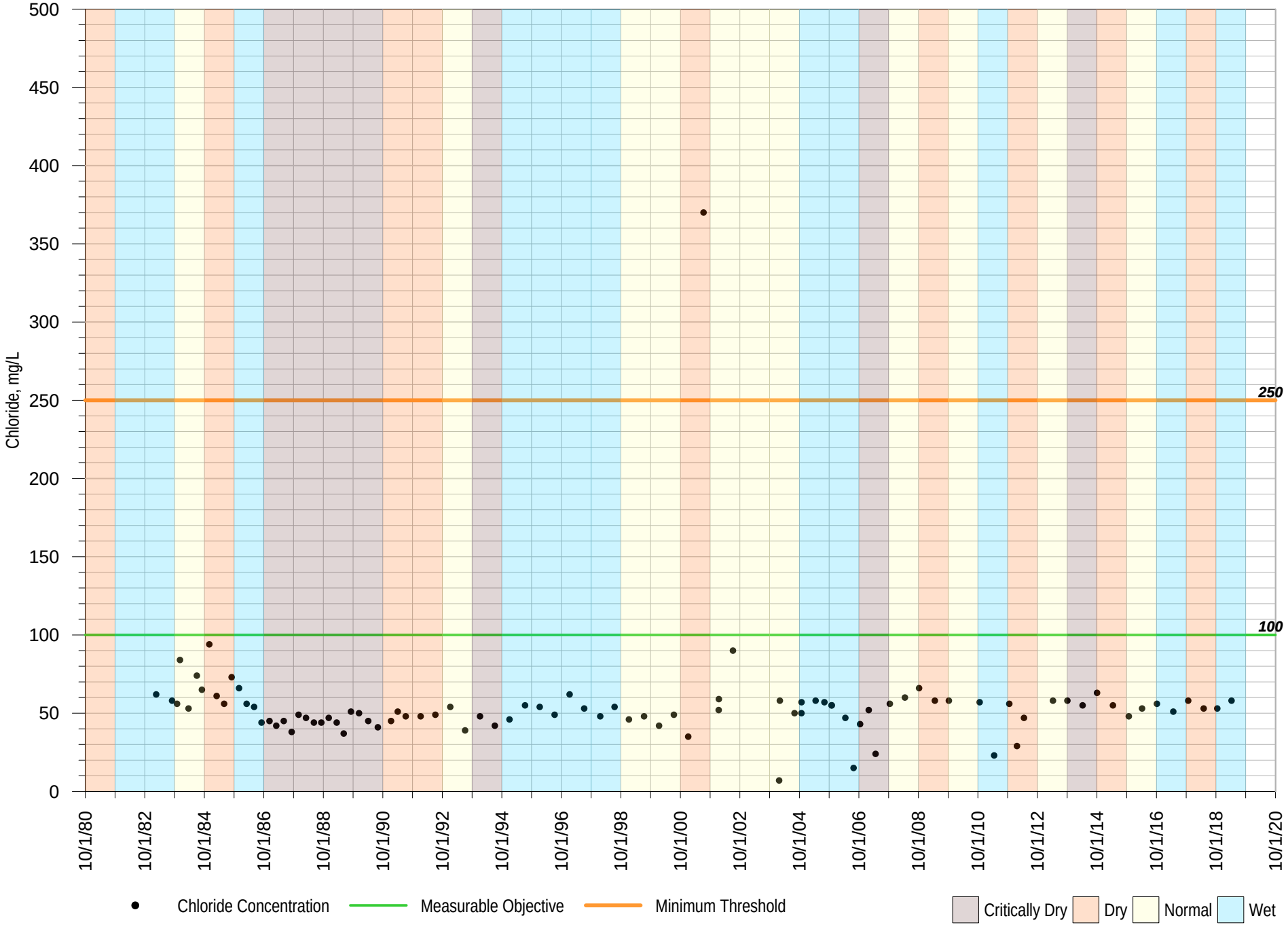
SC-1A

FIGURE B-15



SC-5A

FIGURE B-16



SC-3A

FIGURE B-17

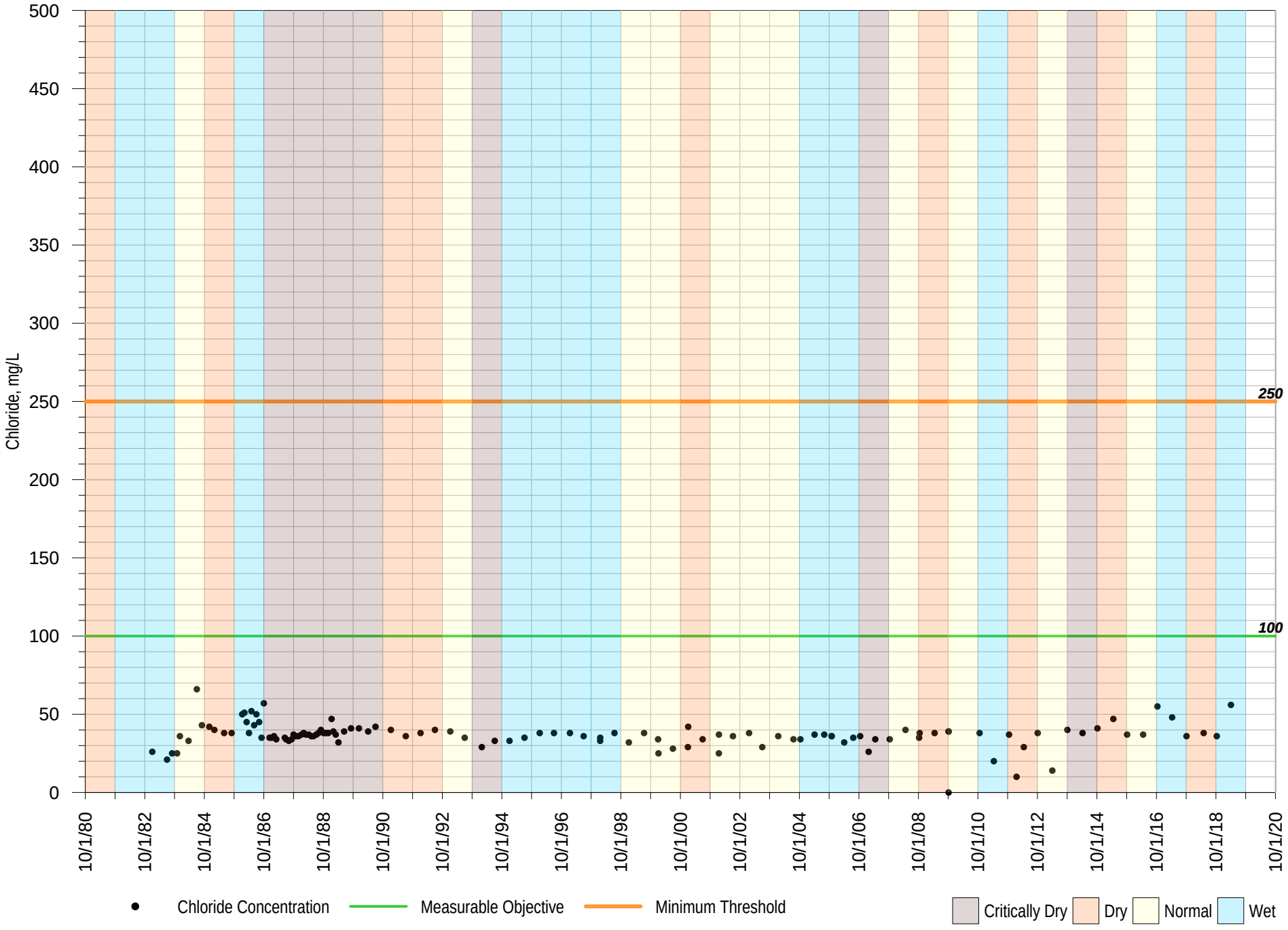


FIGURE B-18

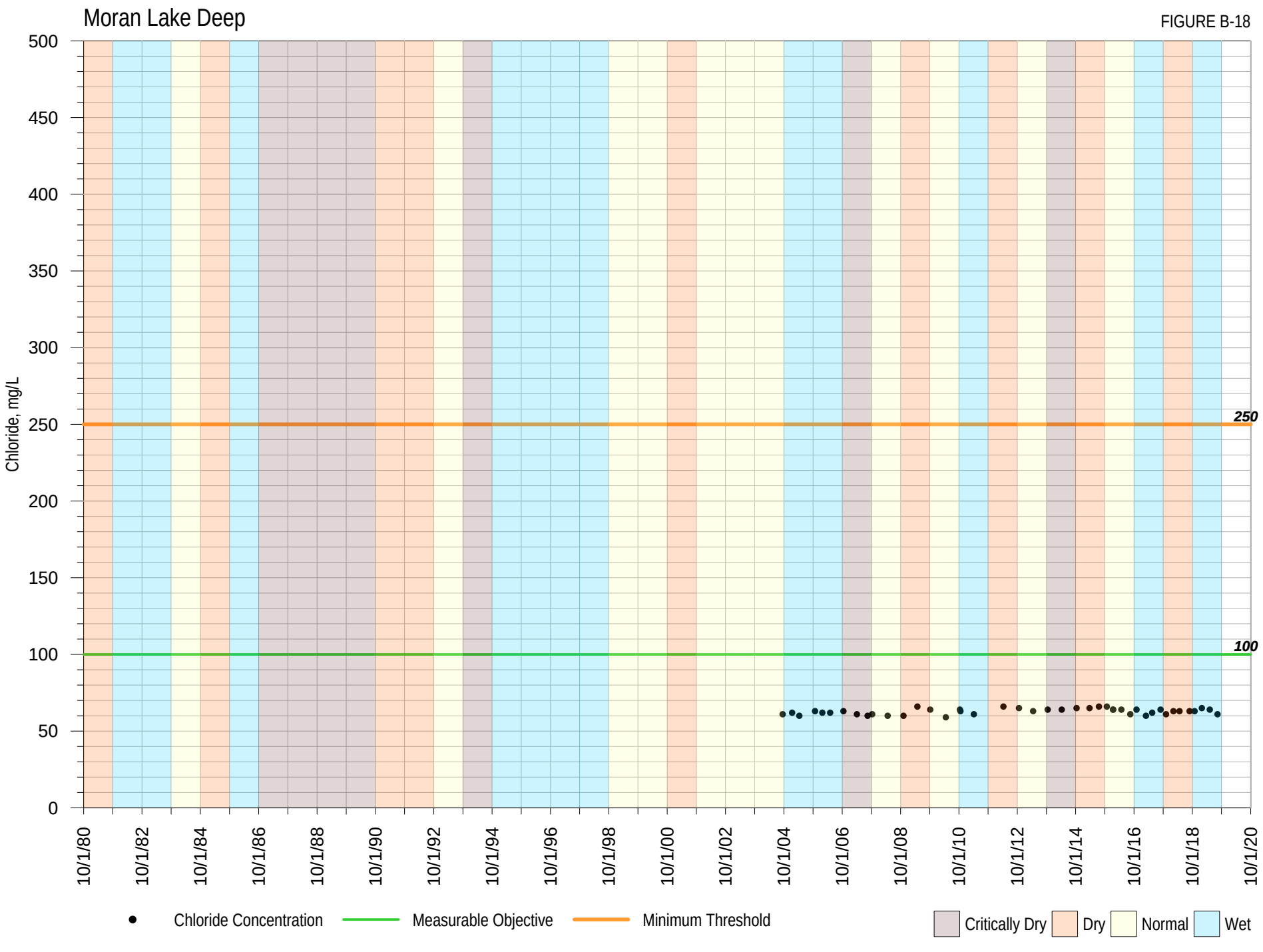

Moran Lake Deep
Chloride, mg/L
500
450
400
350
300
250
200
150
100
50
0
250
100
10/1/80
10/1/82
10/1/84
10/1/86
10/1/88
10/1/90
10/1/92
10/1/94
10/1/96
10/1/98
10/1/00
10/1/02
10/1/04
10/1/06
10/1/08
10/1/10
10/1/12
10/1/14
10/1/16
10/1/18
10/1/20
Chloride Concentration
Measurable Objective
Minimum Threshold
Critically Dry
Dry
Normal
Wet

FIGURE B-19

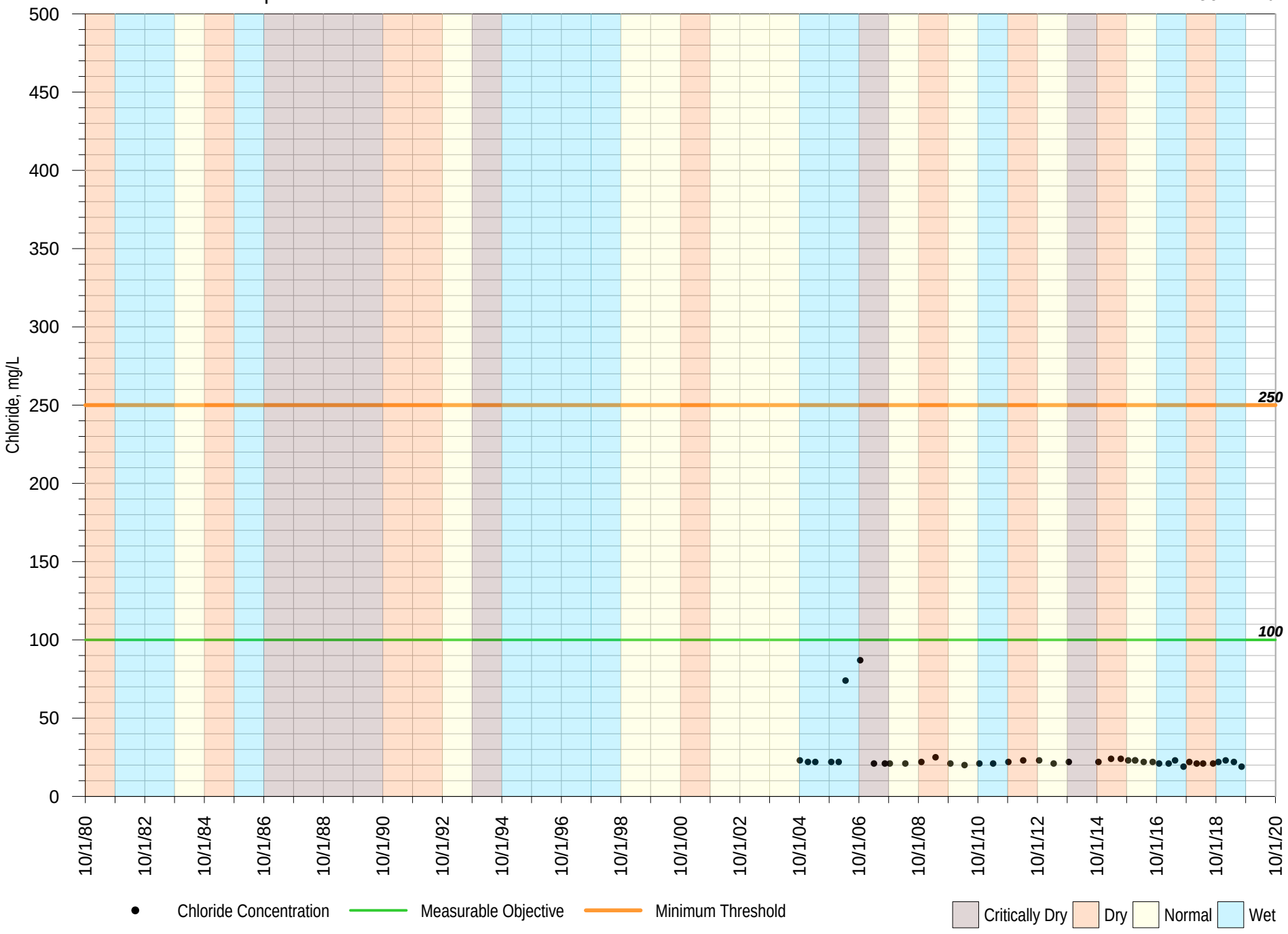
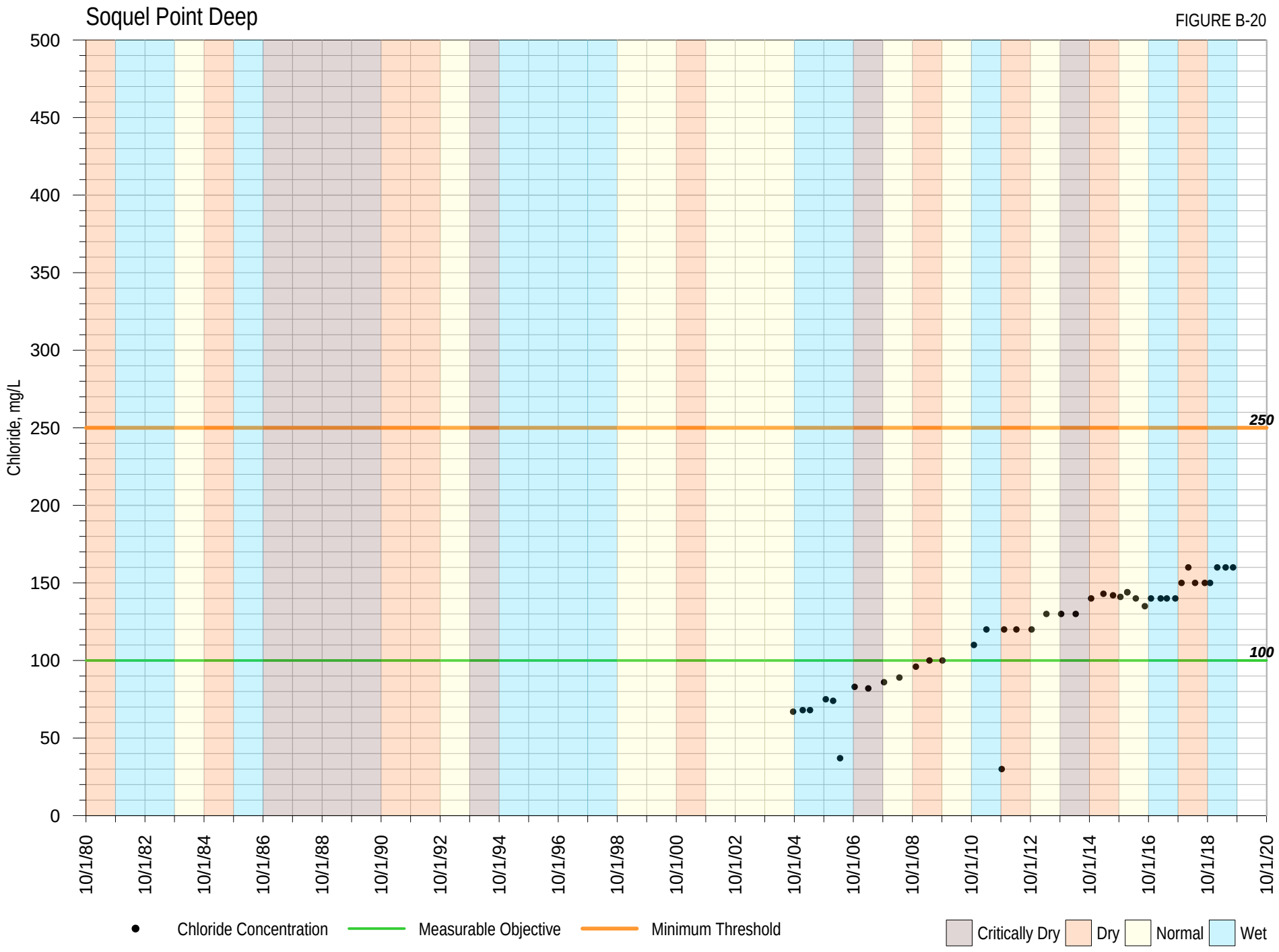
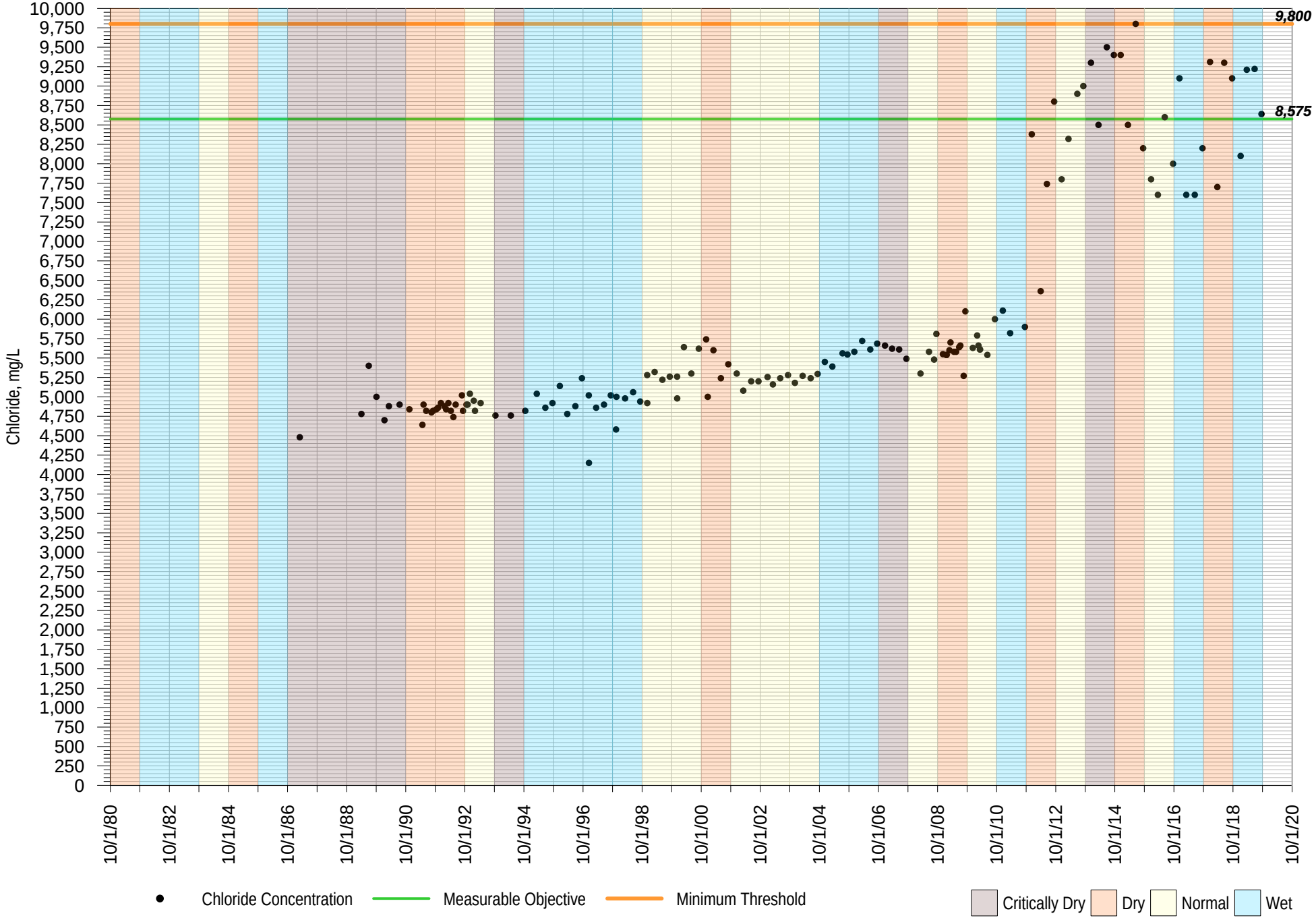

Pleasure Point Deep
Chloride, mg/L
500
450
400
350
300
250
200
150
100
50
0
250
100
10/1/80
10/1/82
10/1/84
10/1/86
10/1/88
10/1/90
10/1/92
10/1/94
10/1/96
10/1/98
10/1/00
10/1/02
10/1/04
10/1/06
10/1/08
10/1/10
10/1/12
10/1/14
10/1/16
10/1/18
10/1/20
Chloride Concentration
Measurable Objective
Minimum Threshold
Critically Dry
Dry
Normal
Wet

FIGURE B-20


Soquel Point Deep
Chloride, mg/L
500
450
400
350
300
250
200
150
100
50
0
250
100
10/1/80
10/1/82
10/1/84
10/1/86
10/1/88
10/1/90
10/1/92
10/1/94
10/1/96
10/1/98
10/1/00
10/1/02
10/1/04
10/1/06
10/1/08
10/1/10
10/1/12
10/1/14
10/1/16
10/1/18
10/1/20
Chloride Concentration
Measurable Objective
Minimum Threshold
Critically Dry
Dry
Normal
Wet

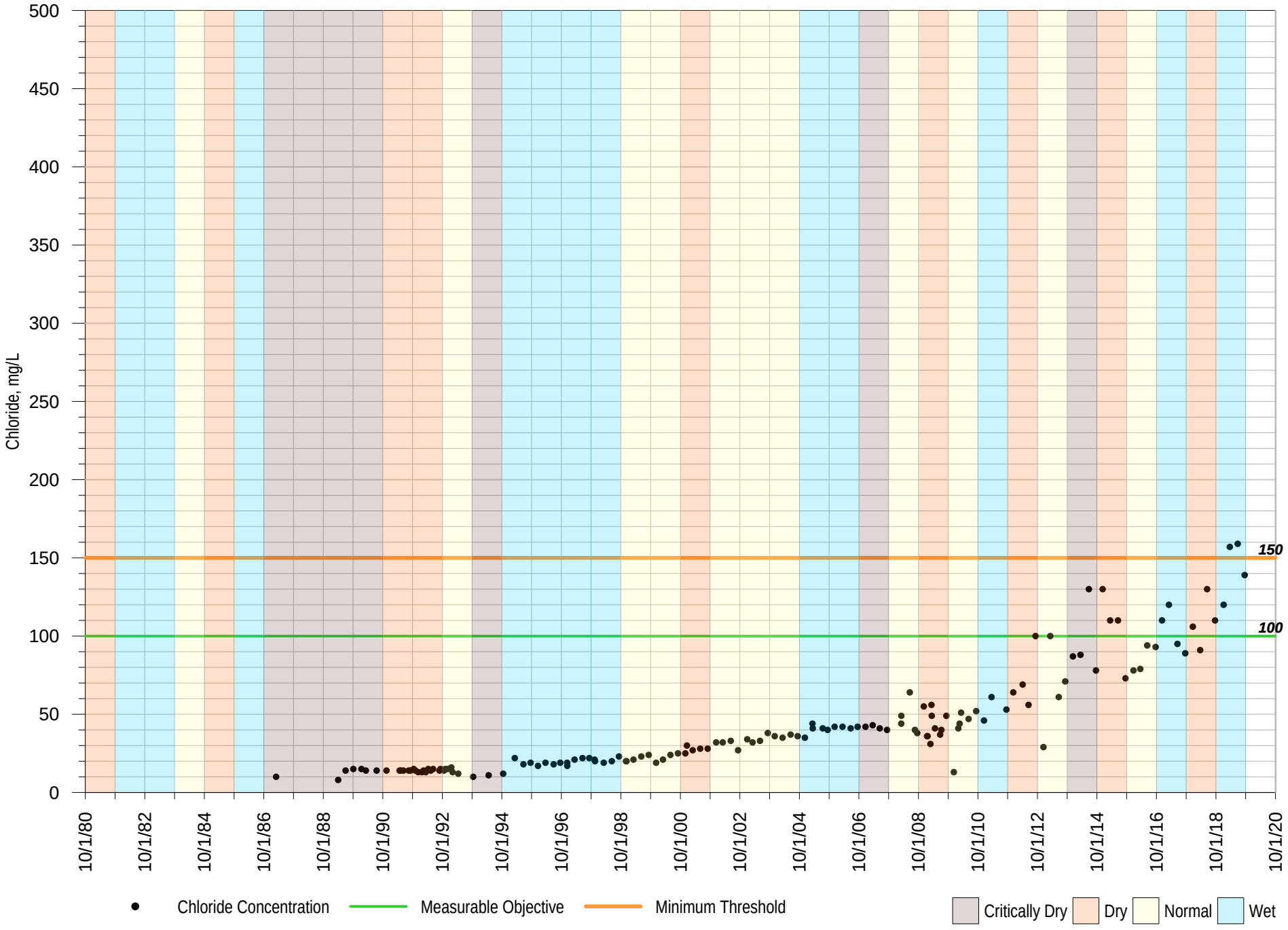
SC-A5A

FIGURE B-21



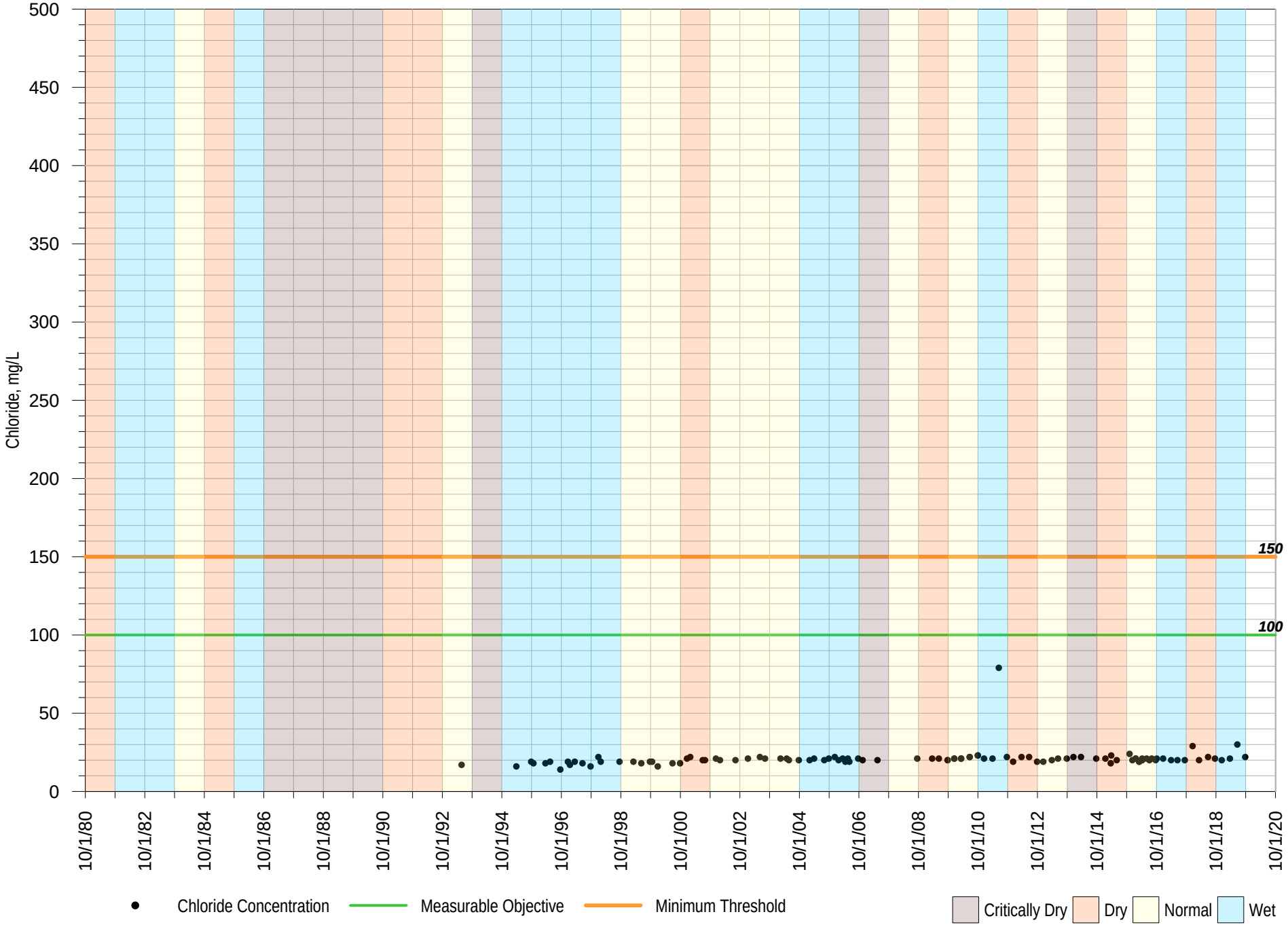
SC-A5B

FIGURE B-22



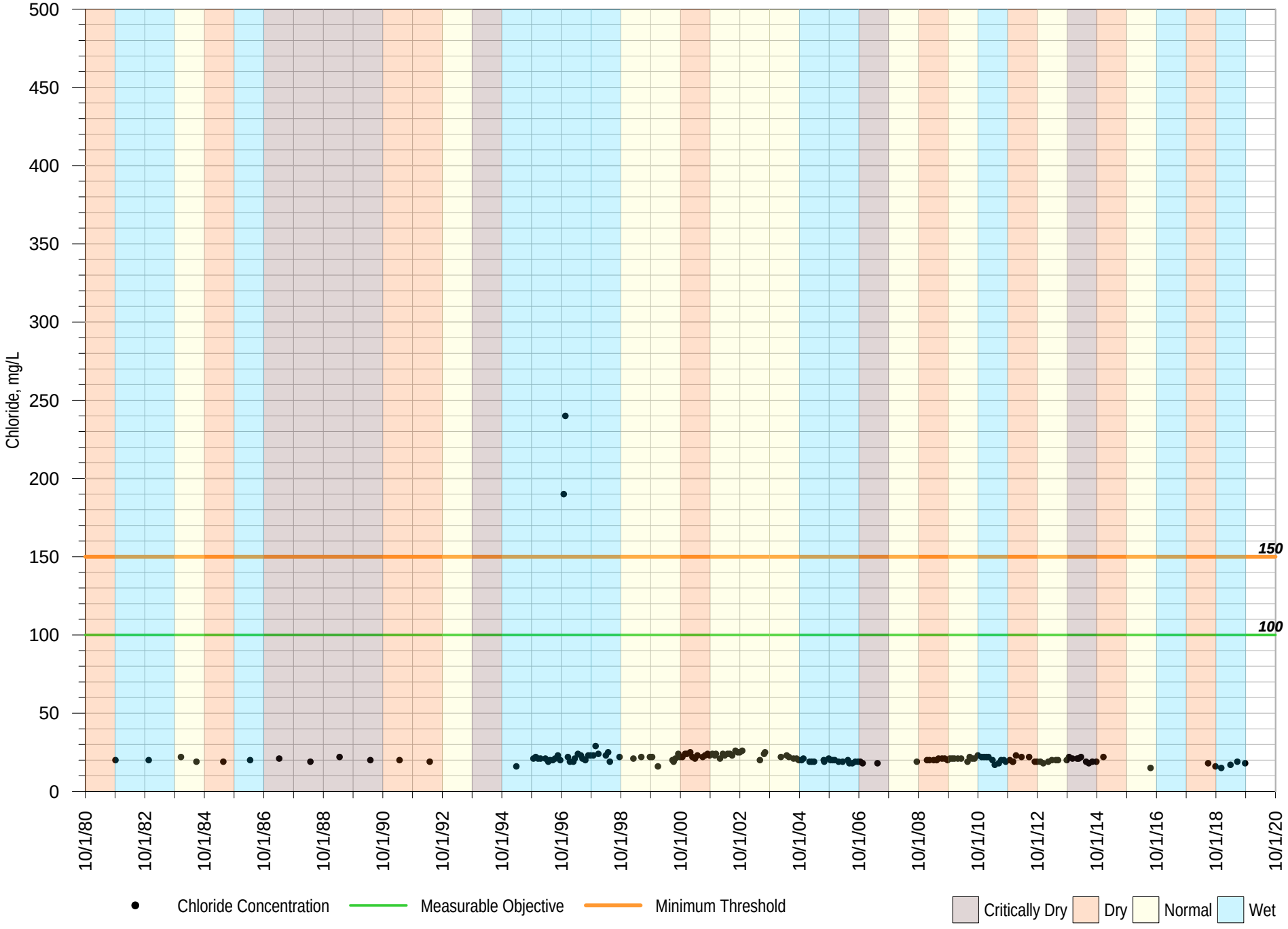
San Andreas

FIGURE B-23



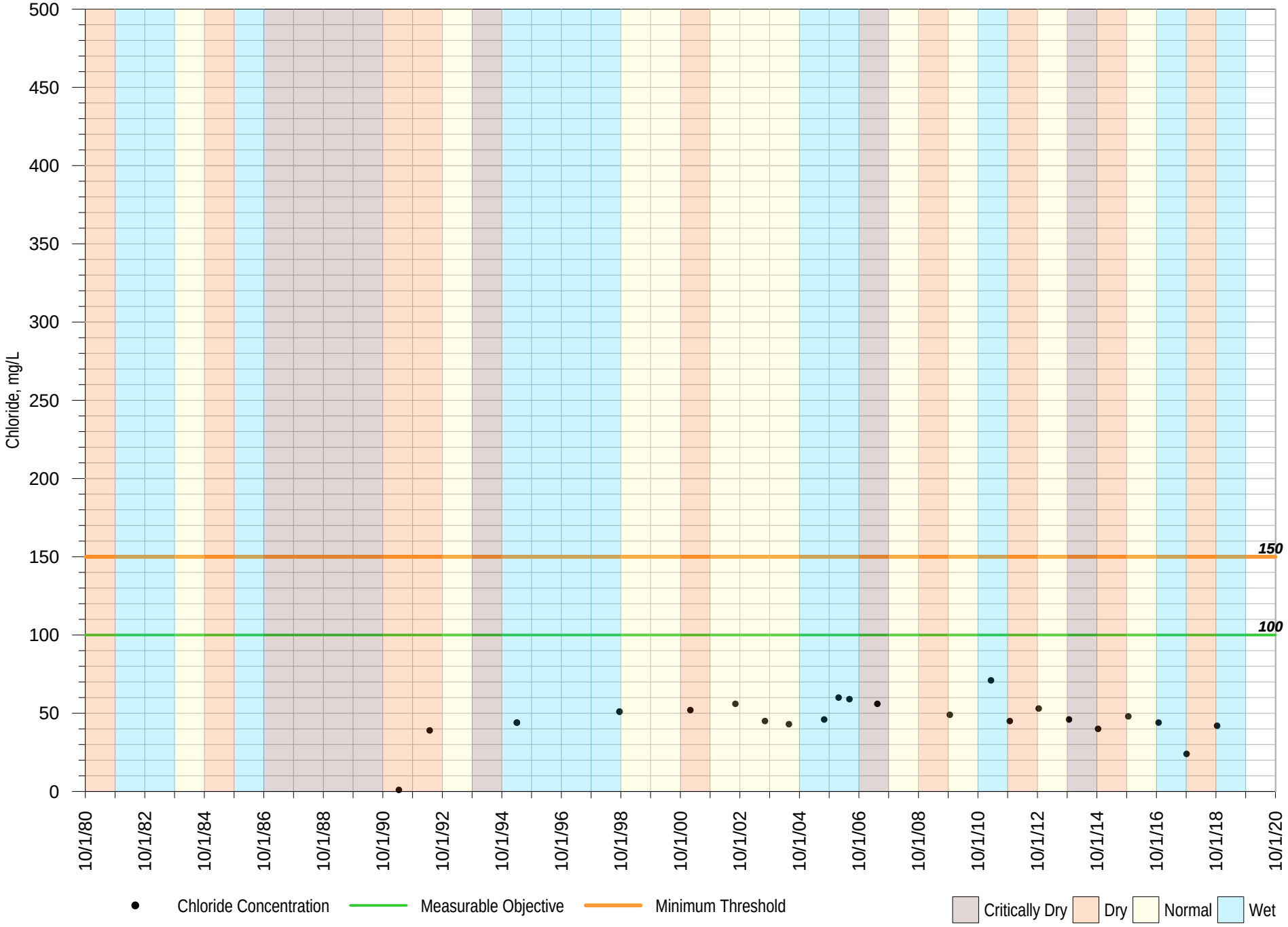
Seascape

FIGURE B-24



T.Hopkins

FIGURE B-25



Estates

FIGURE B-26

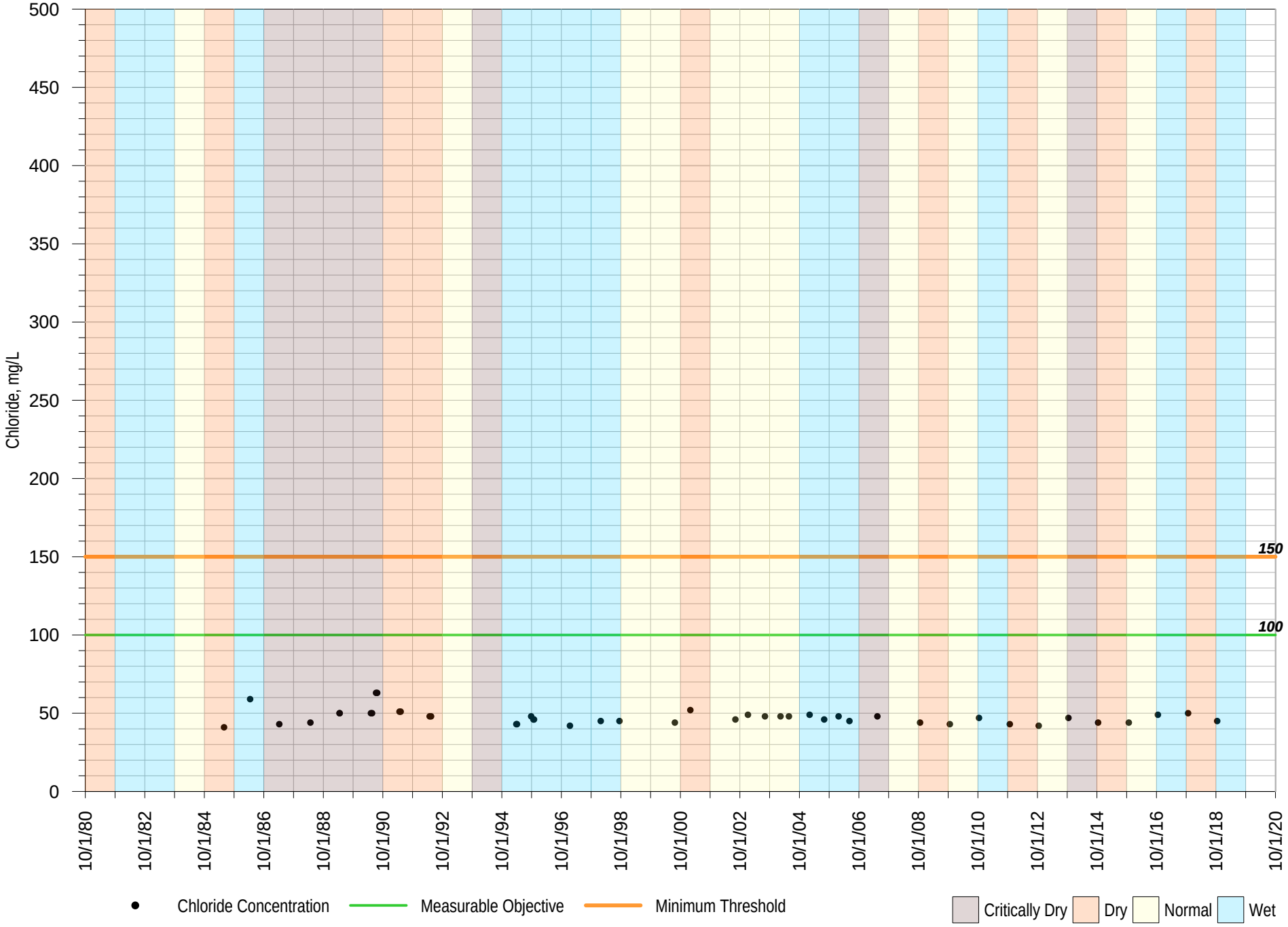
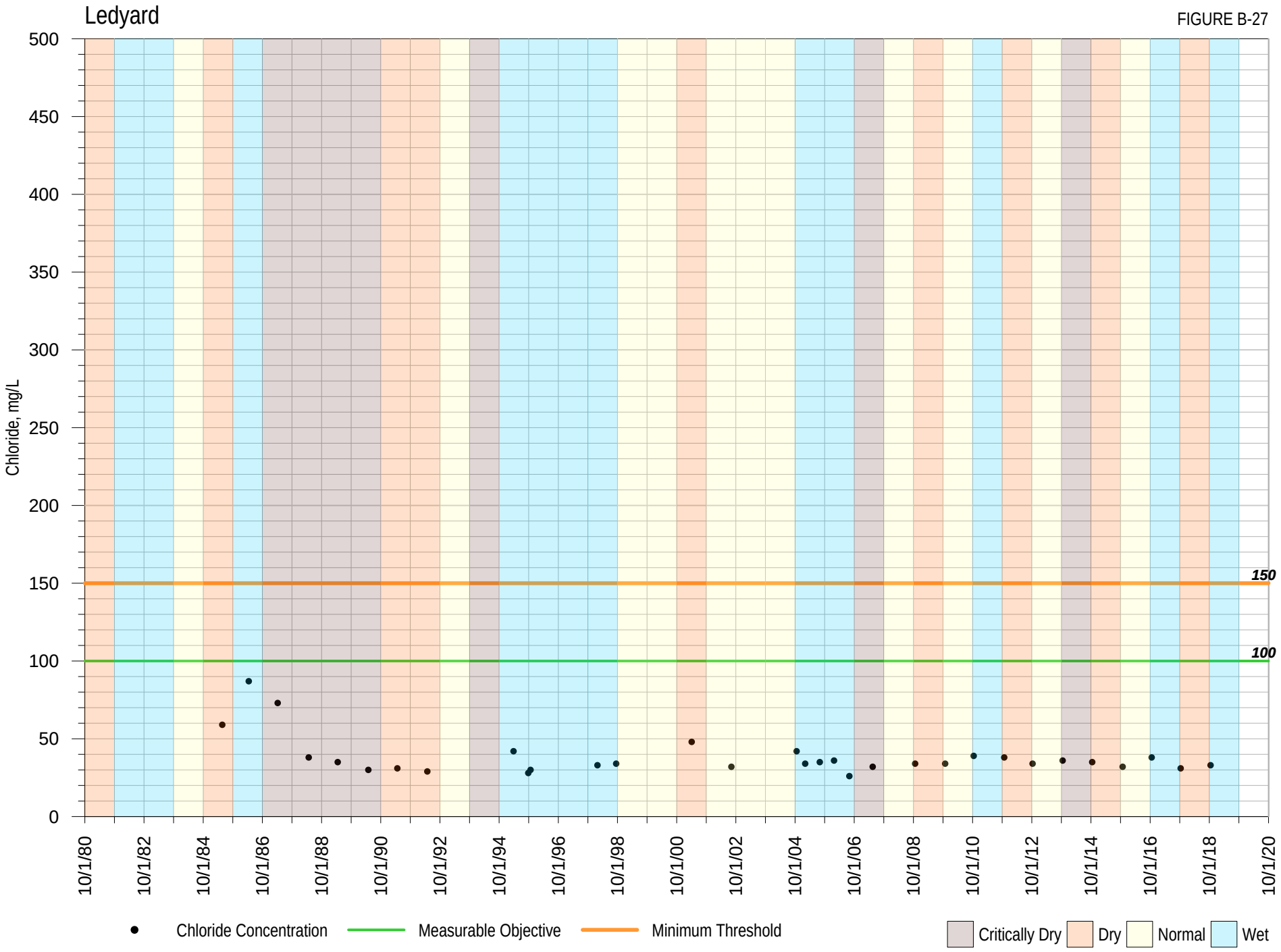


FIGURE B-27


Ledyard
Chloride, mg/L
500
450
400
350
300
250
200
150
100
50
0
150
100
10/1/80
10/1/82
10/1/84
10/1/86
10/1/88
10/1/90
10/1/92
10/1/94
10/1/96
10/1/98
10/1/00
10/1/02
10/1/04
10/1/06
10/1/08
10/1/10
10/1/12
10/1/14
10/1/16
10/1/18
10/1/20
Chloride Concentration
Measurable Objective
Minimum Threshold
Critically Dry
Dry
Normal
Wet

Garnet

FIGURE B-28

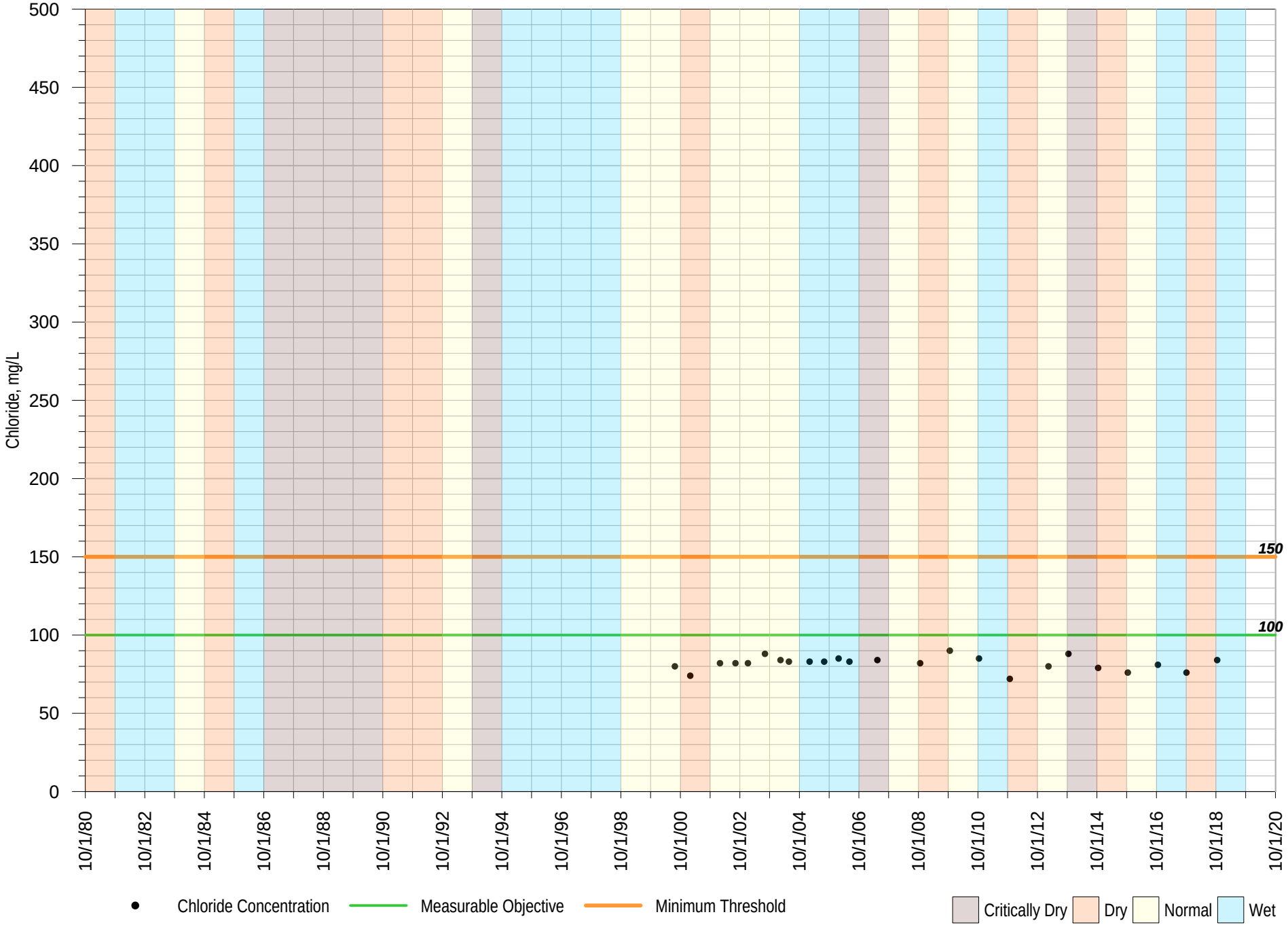
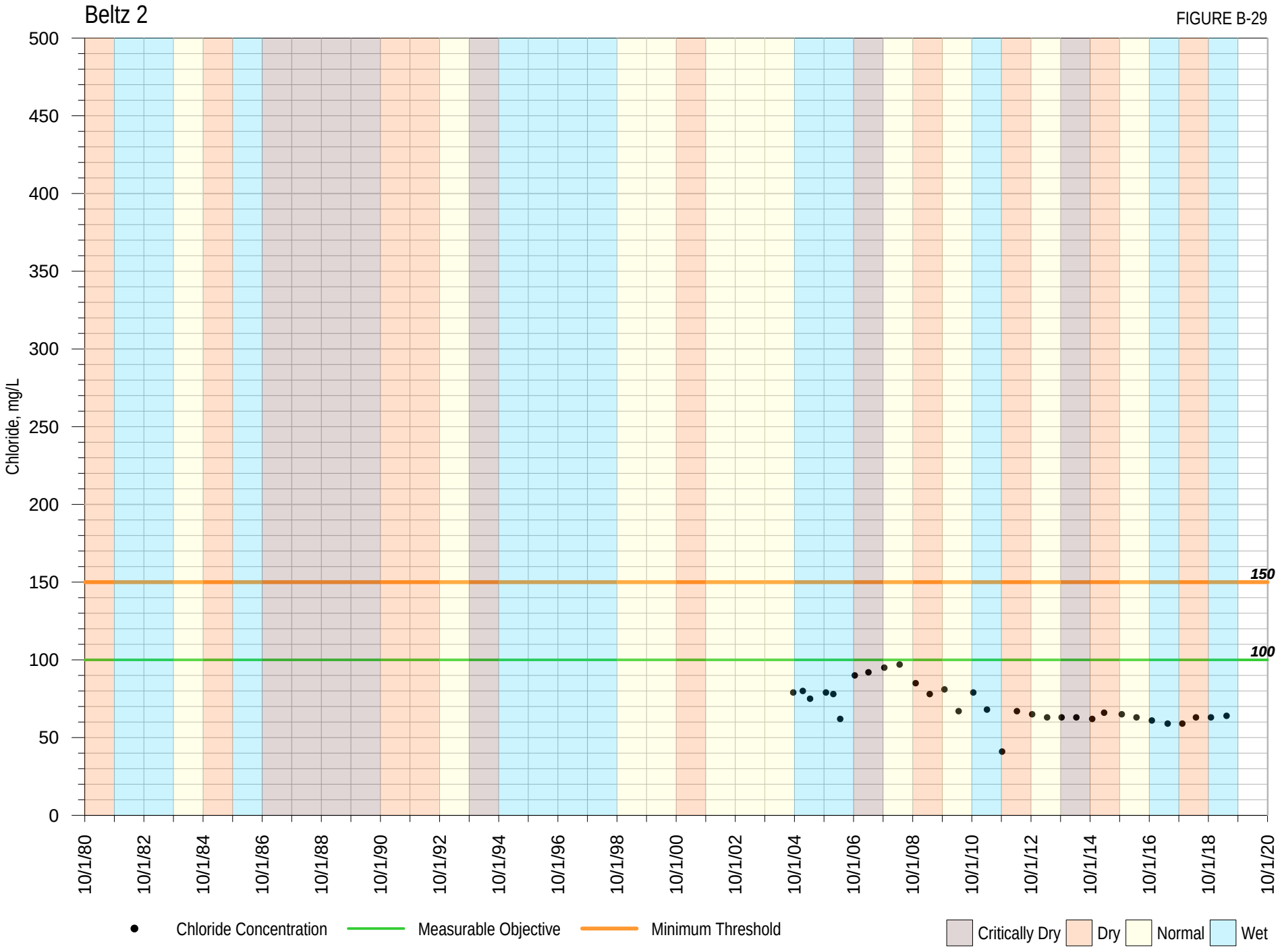
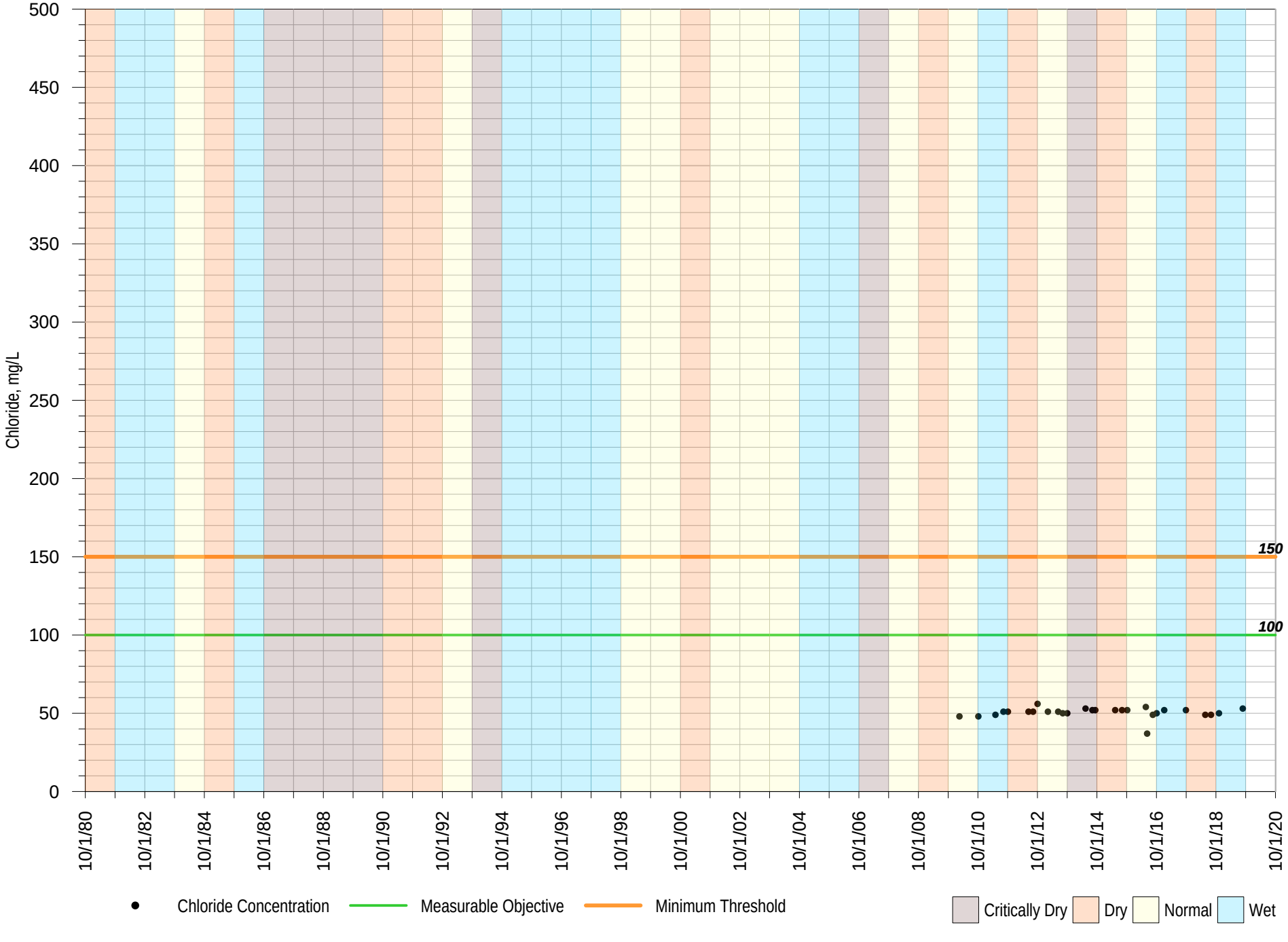


FIGURE B-29


Beltz 2
Chloride, mg/L
500
450
400
350
300
250
200
150
100
50
0
150
100
10/1/80
10/1/82
10/1/84
10/1/86
10/1/88
10/1/90
10/1/92
10/1/94
10/1/96
10/1/98
10/1/00
10/1/02
10/1/04
10/1/06
10/1/08
10/1/10
10/1/12
10/1/14
10/1/16
10/1/18
10/1/20
Chloride Concentration
Measurable Objective
Minimum Threshold
Critically Dry
Dry
Normal
Wet

Beltz 8

FIGURE B-30



SC-22AA

FIGURE B-31

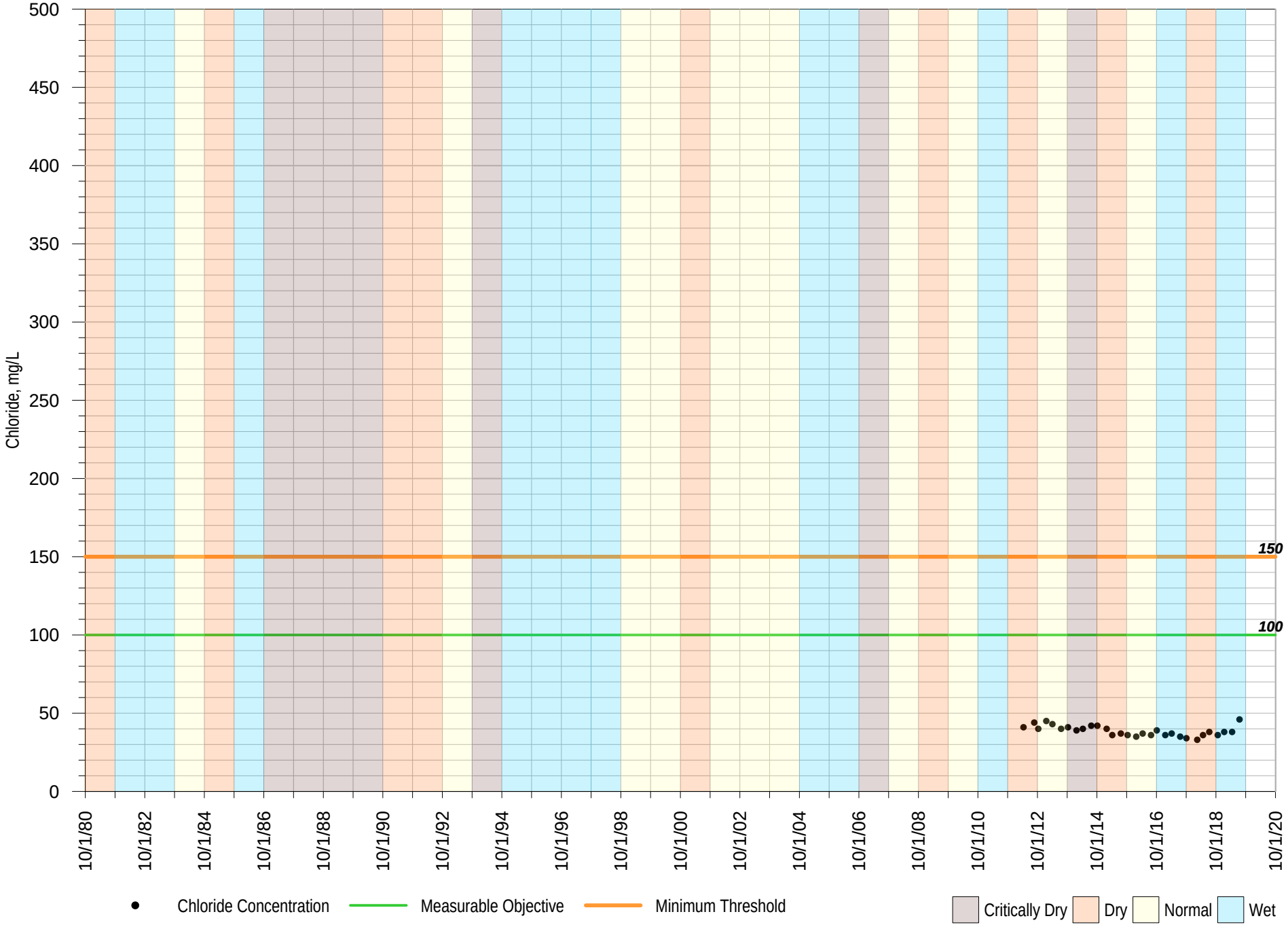
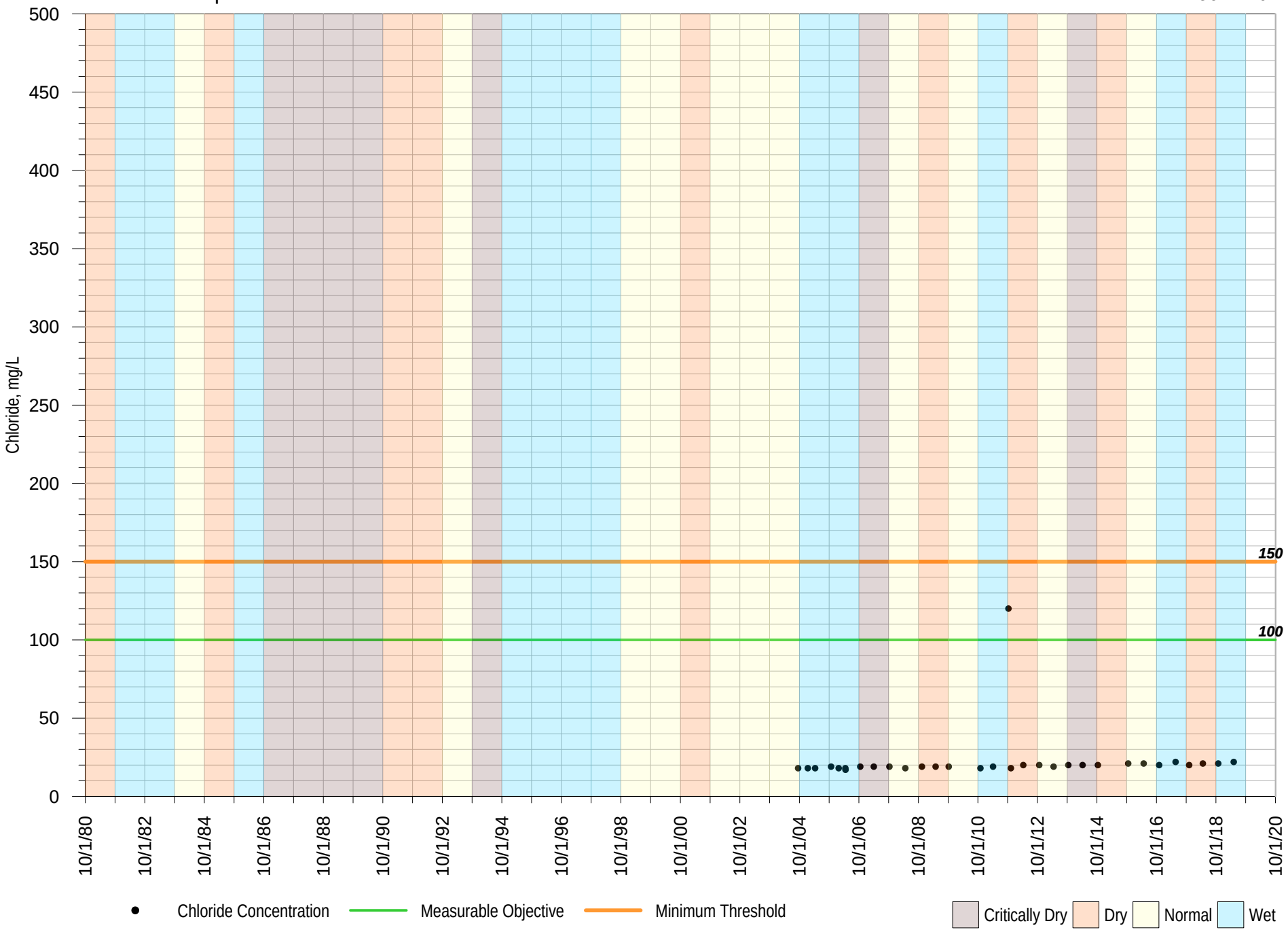
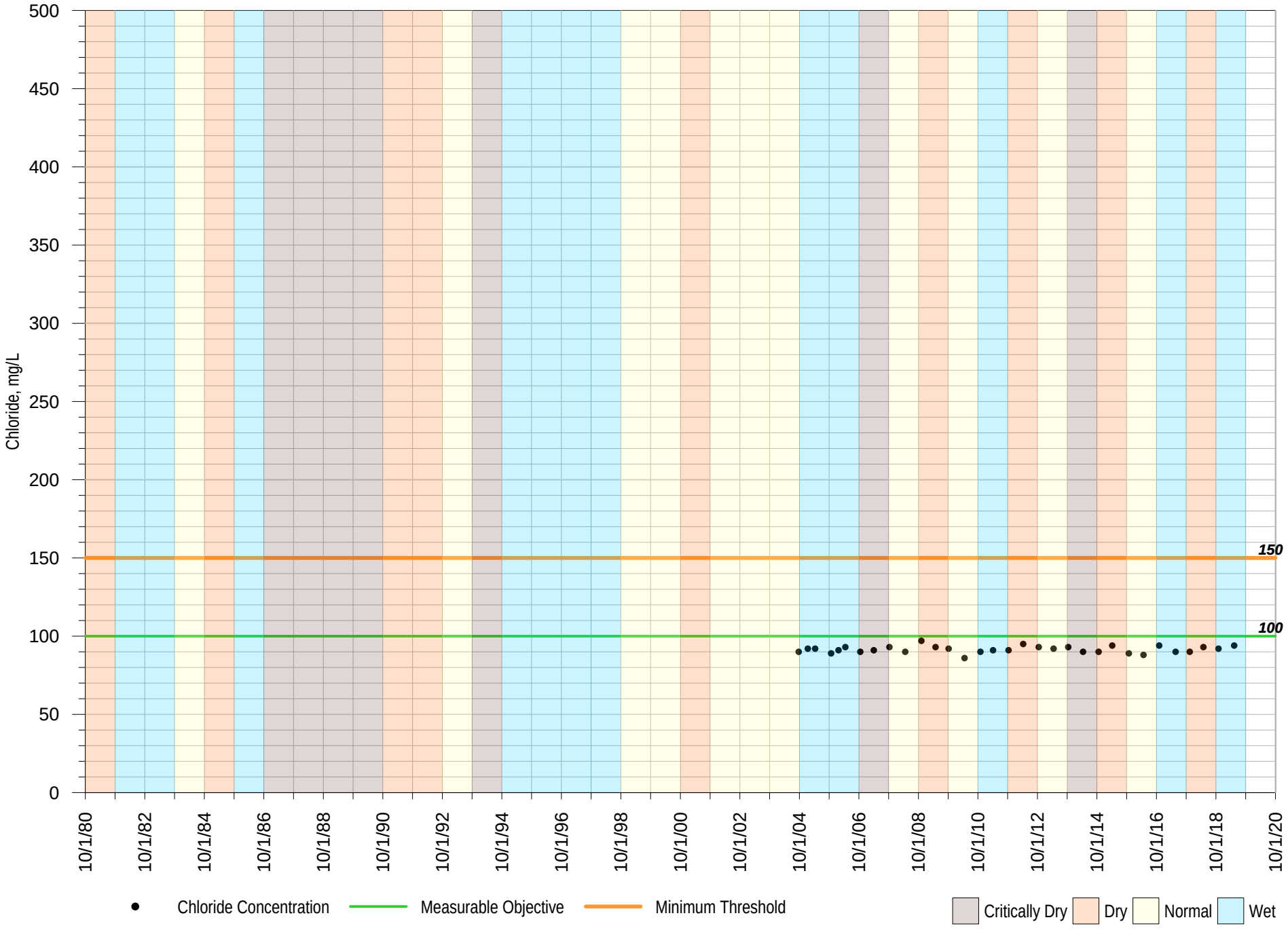


FIGURE B-32


Corcoran Deep
Chloride, mg/L
500
450
400
350
300
250
200
150
100
50
0
150
100
10/1/80
10/1/82
10/1/84
10/1/86
10/1/88
10/1/90
10/1/92
10/1/94
10/1/96
10/1/98
10/1/00
10/1/02
10/1/04
10/1/06
10/1/08
10/1/10
10/1/12
10/1/14
10/1/16
10/1/18
10/1/20
Chloride Concentration
Measurable Objective
Minimum Threshold
Critically Dry
Dry
Normal
Wet

Schwan

FIGURE B-33



SC-22AAA

FIGURE B-34