

Sustainable Management Criteria and Projects and Management Actions for the WMA

MAY 26, 2021



DUDEK

Geosyntec 
consultants

Presentation Content

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2. Introduction to Projects and Management Actions
 1. Western Management Area Projects and Management Actions
 2. Basin Wide Projects and Management Actions

Sustainable Management Criteria (SMC) Overview

- Lompoc Plain
 - All six sustainability indicators are applicable
 - Sufficient spatial and temporal data to characterize historical conditions and define undesirable results
 - Representative monitoring network defined to characterize conditions in both the Upper and Lower Aquifers
 - No historical indications of undesirable results associated with any of the six indicators

Undesirable Results Not Occurring

Sustainable Management Criteria (SMC) Overview

- **Lompoc Upland**
 - Applicable sustainability indicators:
 - Chronic lowering of groundwater levels
 - Reduction of groundwater in storage
 - Degradation of water quality
 - Land subsidence
 - Depletion of interconnected surface water
 - Proposing additional monitoring locations for the Representative Monitoring Network to characterize conditions in the western portion of the subarea
- **Santa Rita Upland**
 - Applicable sustainability indicators:
 - Chronic lowering of groundwater levels
 - Reduction of groundwater in storage
 - Degradation of water quality
 - Land subsidence
 - Depletion of interconnected surface water
 - Proposing additional monitoring locations for the Representative Monitoring Network to characterize conditions in the southern portion of the subarea

The Upper Aquifer is not a principal aquifer in the Uplands
SMCs are only established for the Lower Aquifer

Undesirable Results Not Occurring

Sustainable Management Criteria (SMC) Overview

- **Santa Ynez River Alluvium**
 - Governed by water rights and environmental agreements
 - Considered surface water not subject to SGMA
 - GSA does not have authority to manage water rights and other agreements
 - No SMCs established for some Sustainability Indicators
 - The main aquifer underlies the Santa Ynez alluvial Subarea on east side of CMA
- **Lompoc Terrace**
 - Degree of connectivity to principal aquifer is uncertain
 - Proposing to monitor groundwater elevations, but no established SMCs
- **Burton Mesa**
 - Not connected to principal aquifer
 - SMCs not established

Undesirable Results Not Occurring

Groundwater Levels and Groundwater in Storage

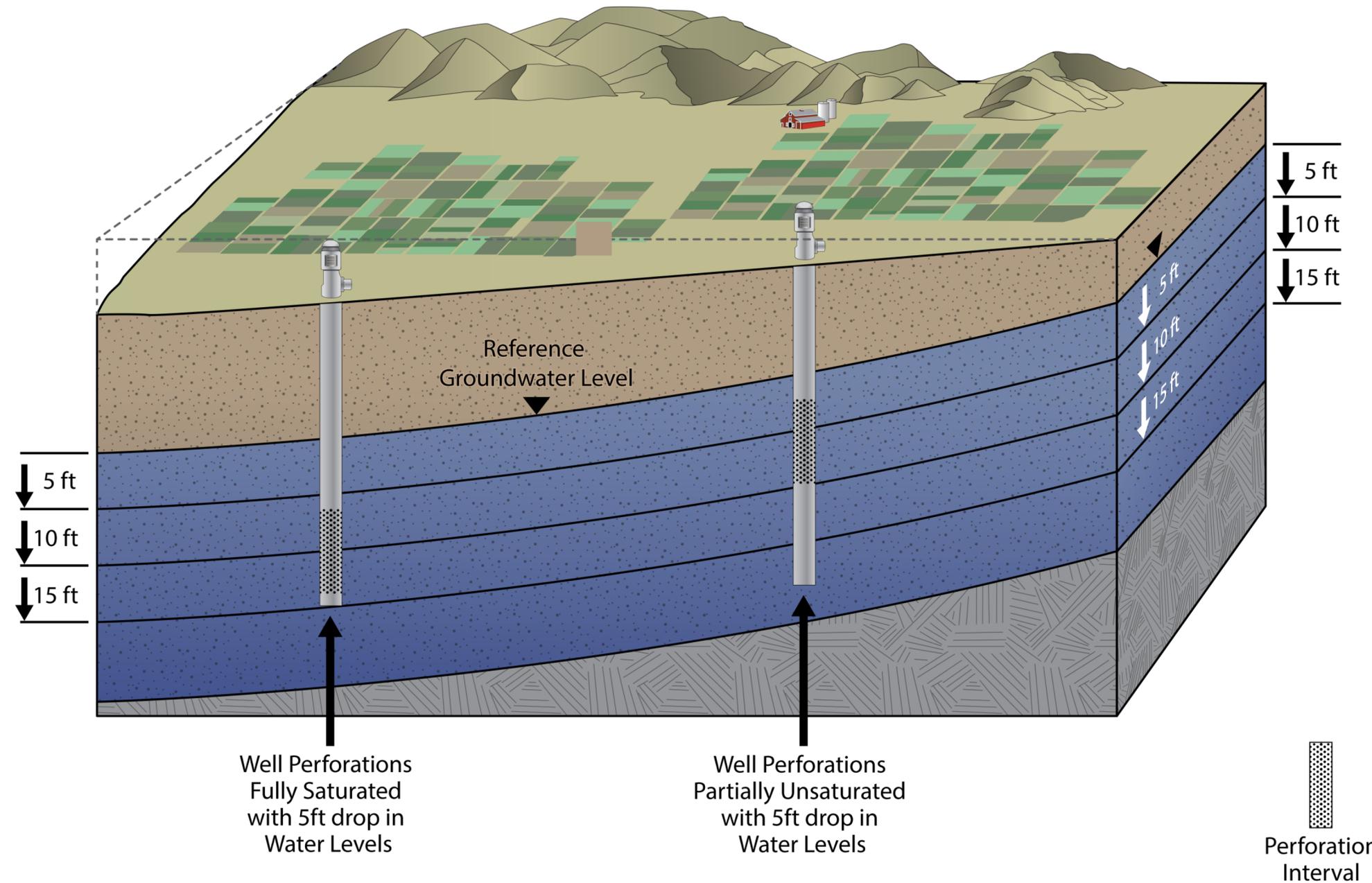
SMC Approach

- Collected and analyzed all available well data
 - Geosyntec Prepared the Regional Geology and 3D Geologic Model for the Santa Ynez River Valley Groundwater Basin
- Compiled well use type, construction information, and historical water level availability
 - Wells with suitable data used to prepare analysis of Undesirable Results and Minimum Thresholds
- Subset of wells were selected for Representative Monitoring Points (RMPs)
 - Selection based on location, construction, accessibility and availability of historical record
 - Where possible, RMPs include wells in an existing monitoring program
 - Some wells currently monitored for one Sustainability indicator (SIs) will be examined for multiple SI monitoring
- Reviewed potential occurrence of undesirable results (URs) associated with historical low water levels and droughts.
- Selected proposed minimum thresholds (MTs) and measurable objectives (MOs) based on the analyses above and correlated results to well construction information to check for potentially excessive water level declines associated with well function.

Wells identified in the WMA that were incorporated into the Undesirable Result analysis

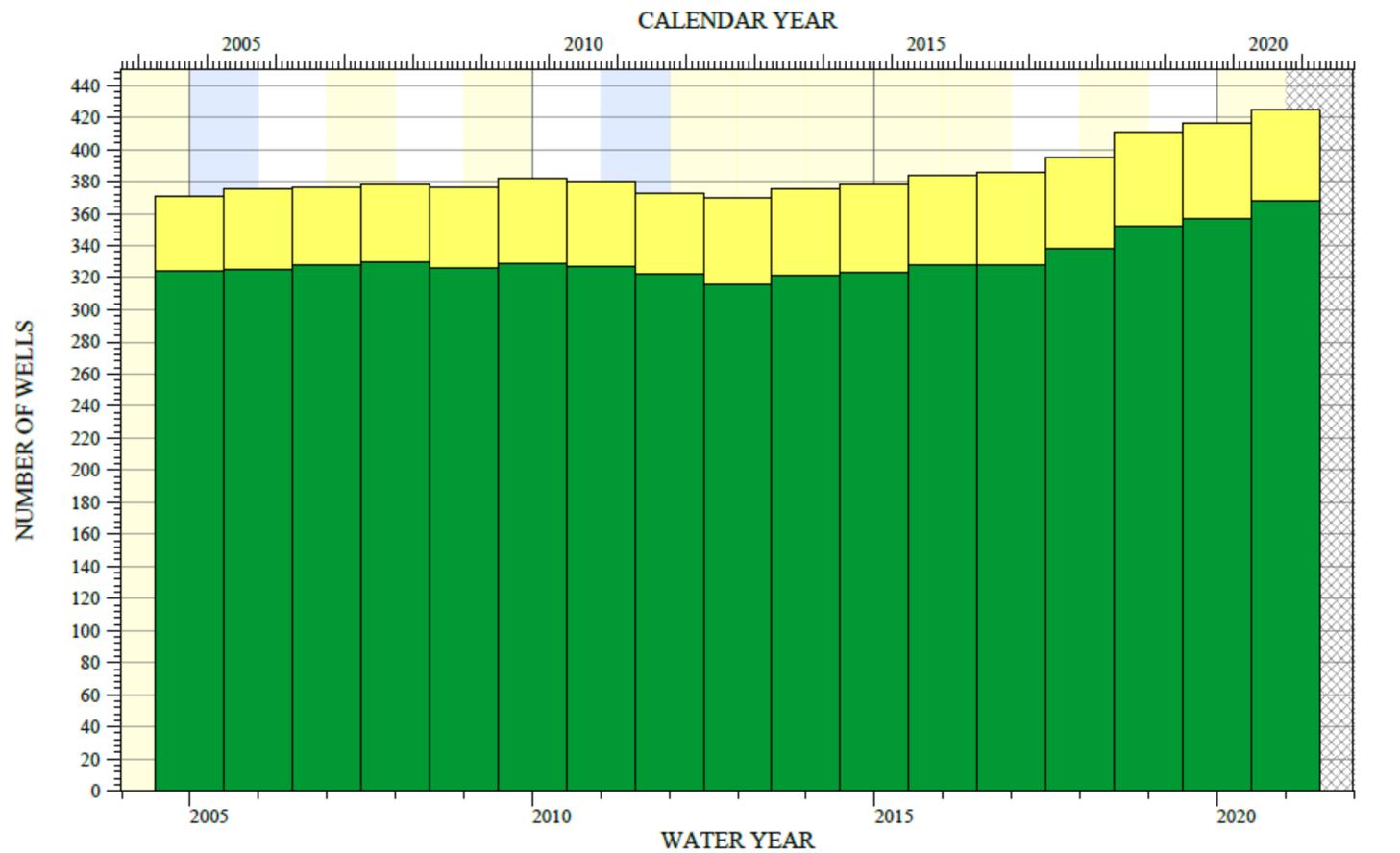
Wells included in Well Impact Analysis

Usage Type	Lower Aquifer	Upper Aquifer	Subtotal
Agricultural	70	60	130
Municipal	9	3	12
Domestic	137	18	155
Other	51	35	86
Total	267	116	383



Undesirable Results: Chronic Lowering of Groundwater Levels

No historical evidence of a depletion of agricultural, domestic, and municipal supply



District Zone A, Santa Ynez River Alluvium, Excluded Source: Santa Ynez River Water Conservation District (2005-2021)

REGISTERED ACTIVE AND INACTIVE WELLS DISTRICT ZONES B & F

Water Year Type (1942-2020)

- Wet
- Above/Below Normal
- Dry / Critically Dry
- No Data

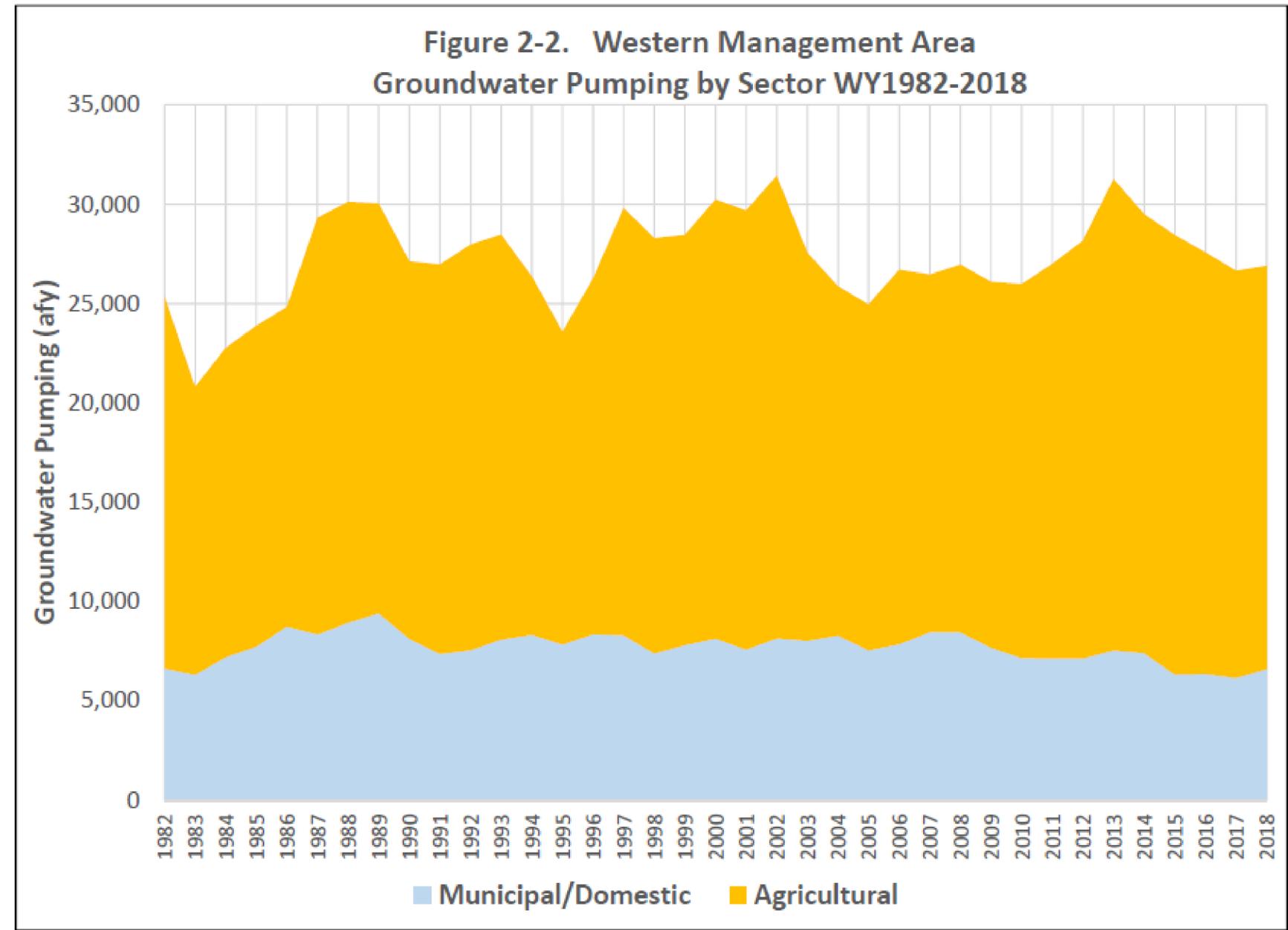
Well Type

- Active
- Inactive

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WMA
Santa Ynez River Valley Groundwater Basin
Western Management Area
Groundwater Sustainability Agency

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Source: Stetson Engineers Inc.

Current Monitoring Network – Groundwater Elevation

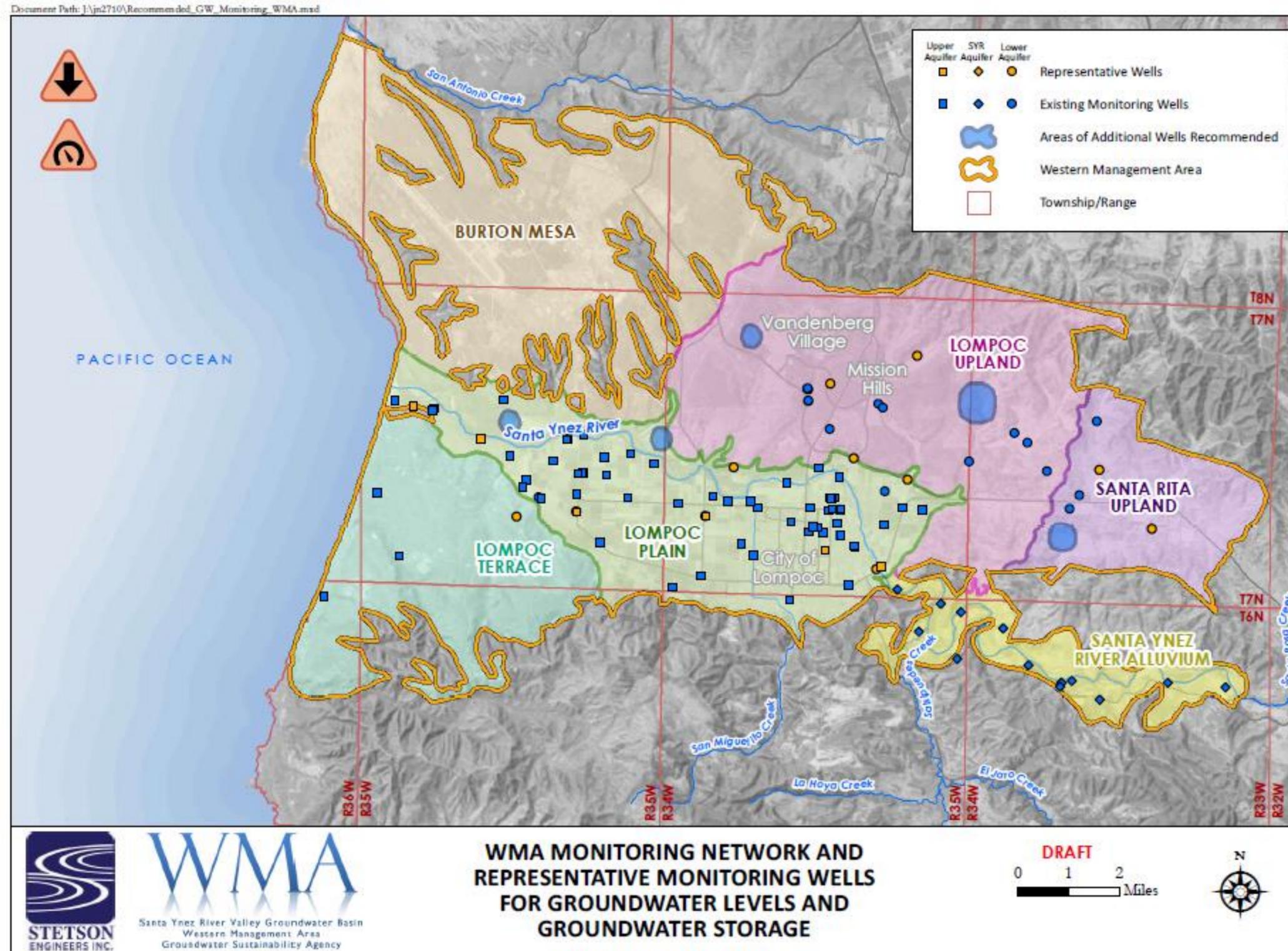
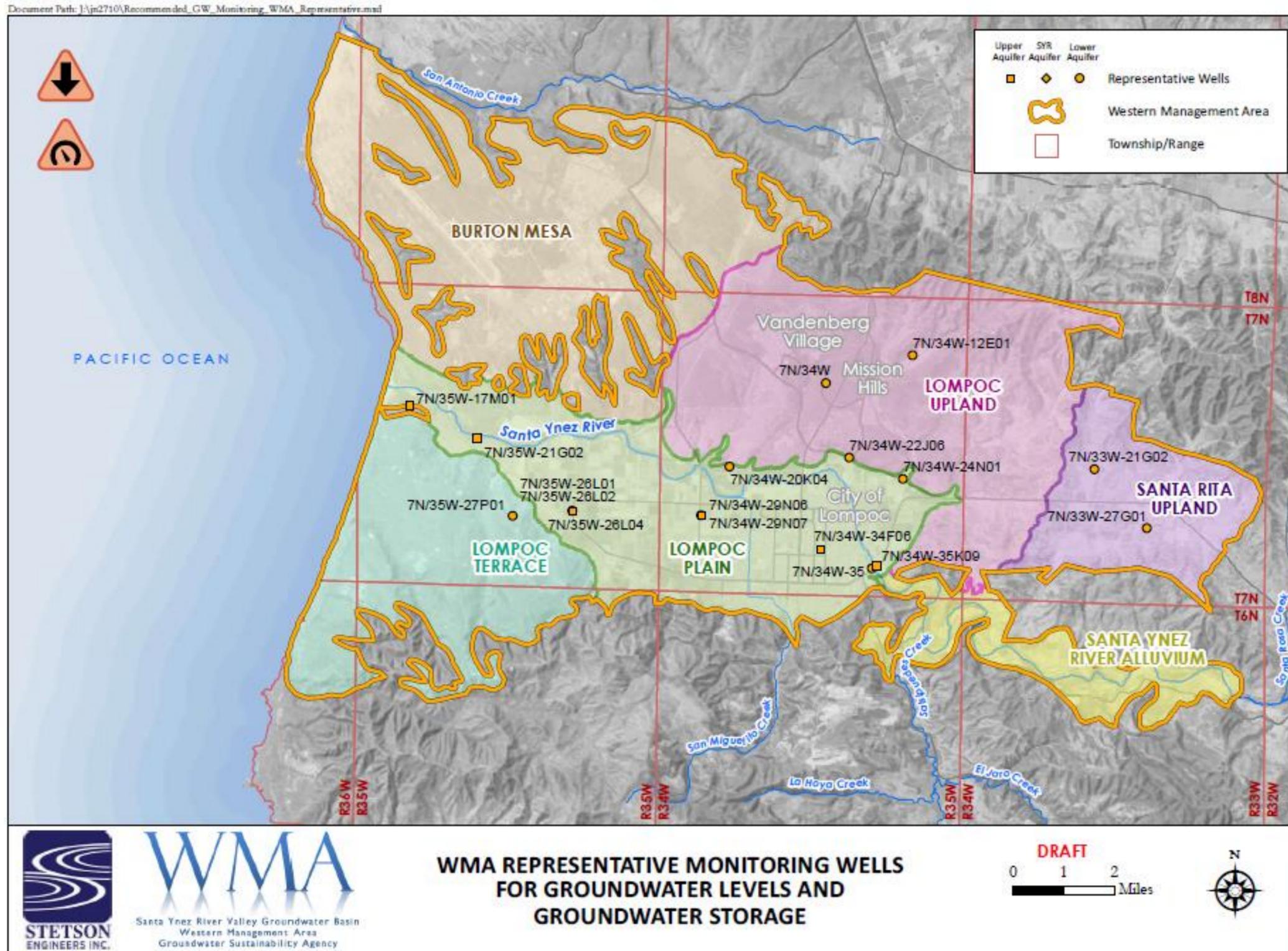


FIGURE 2-1

Wells Identified for Representative Monitoring Groundwater Levels and Groundwater in Storage



Representative Monitoring Wells (RMWs): Groundwater Levels(WL) and Storage (GWS)

Subarea	Well ID	Construction Date	Principal Aquifer	WMA WL Monitoring	WMA GWS Monitoring	WMA WQ Monitoring	WMA GDE Monitoring	WMA SWI Monitoring	WMA LS Monitoring	Notes
Lompoc Plain	7N/35W-17M1	1964	UA	N	N	N	Maybe	Y	NA	
Lompoc Plain	7N/35W-26L1	1987	UA	Y	Y	Y	NA	NA	NA	
Lompoc Plain	7N/35W-26L2	1987	UA	Y	Y	Y	NA	NA	NA	
Lompoc Plain	7N/34W-29N6	1987	UA	Y	Y	Y	NA	NA	NA	
Lompoc Plain	7N/35W-21G2	1982	UA	Y	Y	Y	NA	NA	NA	
Lompoc Plain	Lompoc 2	1963	UA	-	-	-	NA	NA	NA	a
Santa Ynez River Alluvium	USBR Node 9	1929	SYRA	Y	Y	Y	Y	NA	NA	
Santa Ynez River Alluvium	USBR Node 5	1948	SYRA	Y	-	Y	Y	NA	NA	
Santa Ynez River Alluvium	USBR Node 2	1965	SYRA	Y	-	Y	Y	NA	NA	
Lompoc Plain	7N/35W-26L4	1987	LA	Y	Y	Y	NA	NA	NA	b
Lompoc Plain	7N/34W-20K4	1941	LA	Y	Y	Y	NA	NA	NA	b
Lompoc Plain/Lompoc Upland	7N/34W-22J6	-	LA	Y	Y	Y	NA	NA	NA	c
Lompoc Plain/Lompoc Upland	7N/34W-24N1	1924	LA	Y	Y	Y	NA	NA	NA	c
Lompoc Plain	7N/34W-29N7	1987	LA	Y	Y	Y	NA	NA	NA	b
Lompoc Terrace	7N/35W-27P1	1963	LA	Y	Y	Y	NA	NA	NA	c
Lompoc Upland	7N/34W-12E1	1949	LA	Y	Y	Y	NA	NA	NA	c
Santa Rita Upland	7N/33W-21G2	-	LA	-	-	Y	NA	NA	NA	c
Santa Rita Upland	7N/33W-27G1	1961	LA	Y	Y	Y	NA	NA	NA	d
Lompoc Plain	Lompoc 11	-	LA	-	-	-	Maybe	NA	NA	a
Lompoc Upland	VVCSO Old County Fire Station	-	LA	-	-	-	NA	NA	NA	a
Lompoc Upland	MH CSD 7	2009	LA?	Y	Y	Y	NA	NA	NA	
Santa Rita Upland	7N/33W-28D3	1971	LA?	Y	Y	Y	NA	NA	NA	e
Lompoc Plain	7N/35W-23E05	1994	LA?	Y	Y	Y	Maybe	NA	NA	c
Lompoc Plain	7N/35W-24J4	1961	UA	Y	Y	Y	Maybe	NA	NA	

Table Notes

- a) Well location and record of measurement coincides with requirements to characterize WL, GWS, and WQ. Screen information required for final incorporation into RMW network
- b) Water levels behave like Upper Aquifer. Screen information required for final incorporation into RMW network
- c) Water levels behave like Lower Aquifer. Screen information required for final incorporation into RMW network.
- d) Completion depth suggests Lower Aquifer. Screen information required for final incorporation into RMW network.

General Considerations for Minimum Thresholds (MTs) and Measurable Objectives (MOs)

- Undesirable Results have not occurred within the WMA even during historical (and current) drought periods.
- Groundwater levels that drop below the top of well screens may cause increases in energy costs, poor function, or pump failure..
- SMCs may be iterative as additional data is acquired.
- The 2011 groundwater level was prior to the current drought and subsequent to mixed climate conditions.
- Historical low elevations in the Upper Aquifer were approximately 5-20 feet below 2020 conditions.
- Groundwater elevations in the Lower Aquifer currently at historical low conditions

Potential MTs and MOs for Groundwater Elevation and Groundwater in Storage

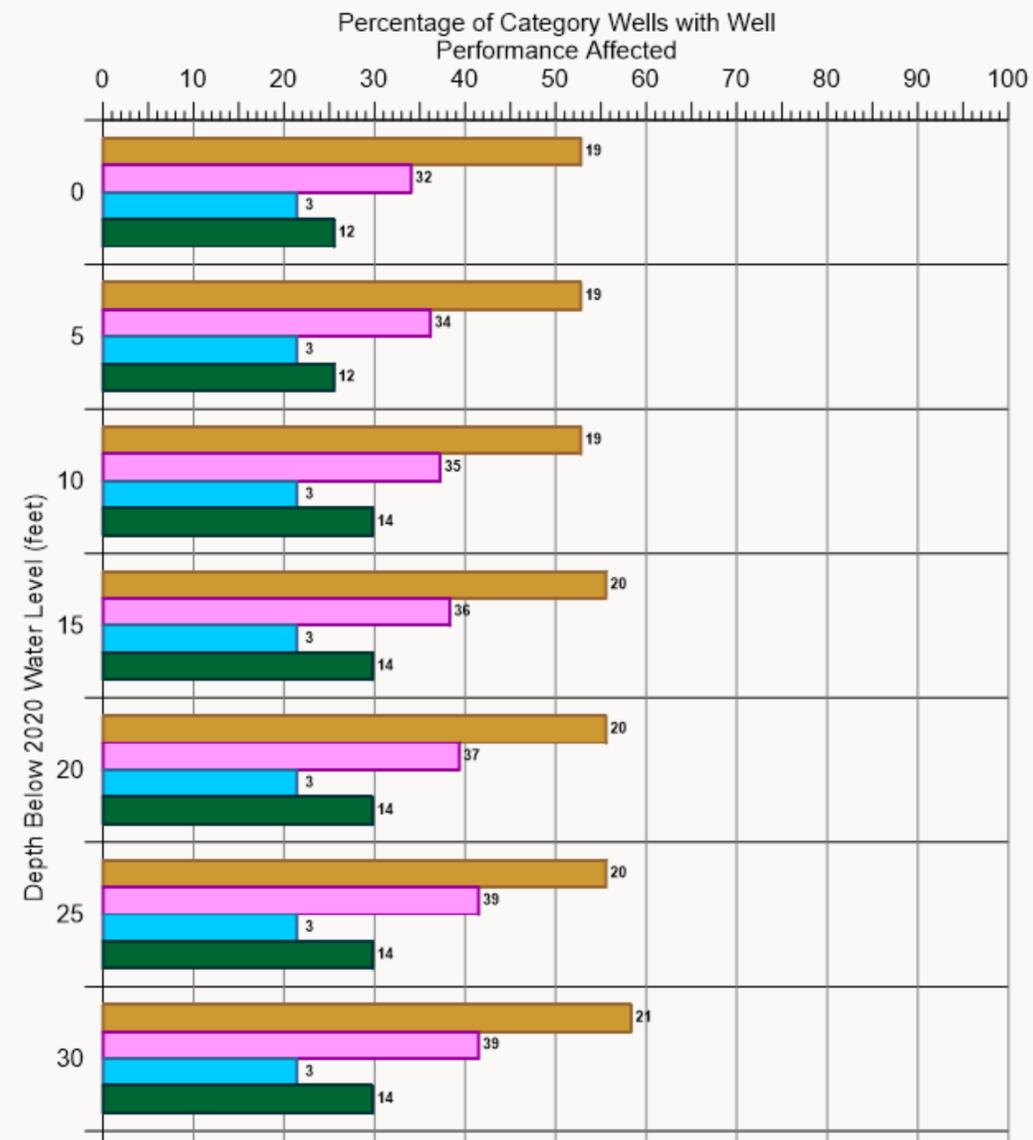
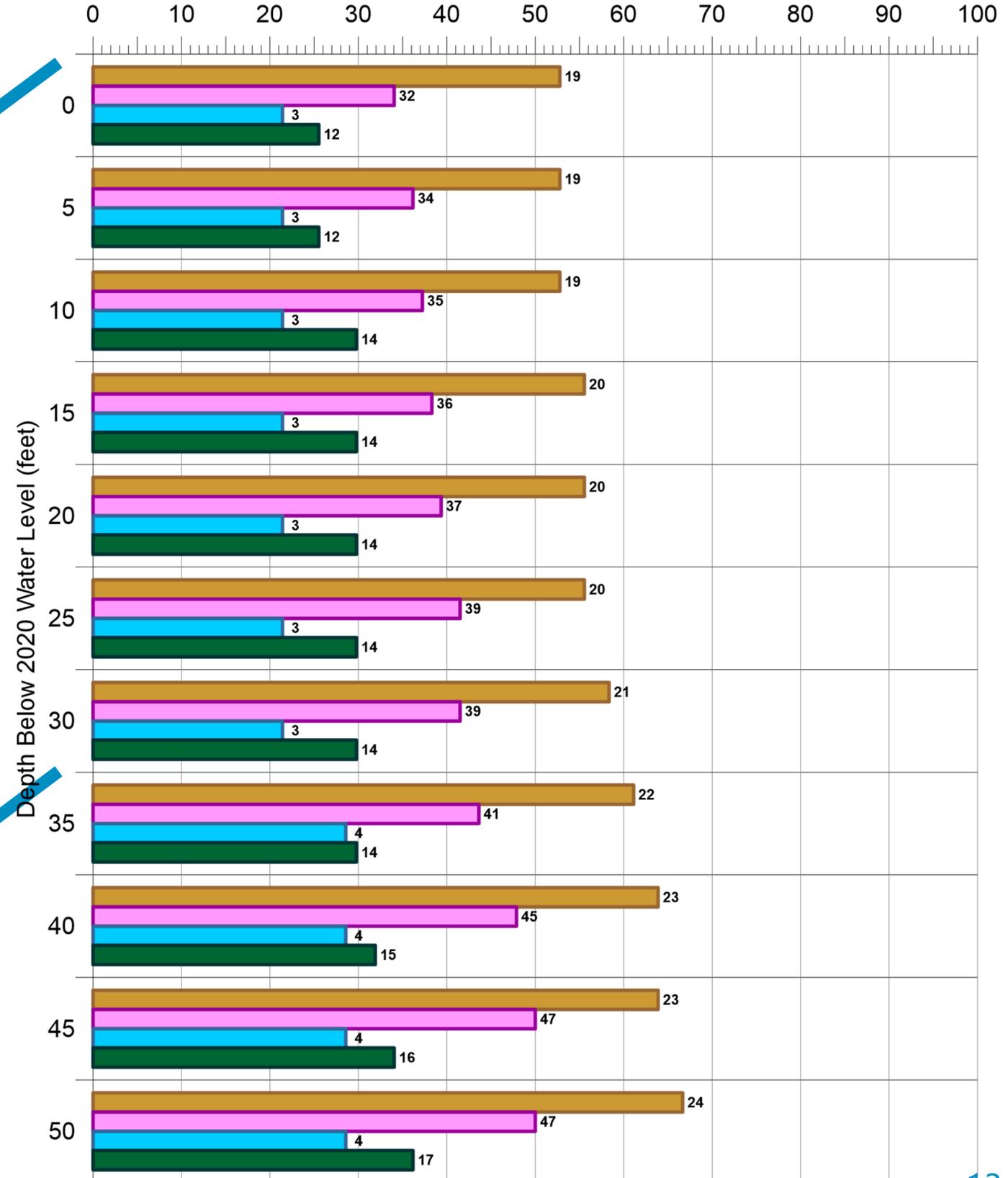
- Minimum Threshold = 20 feet below 2020 groundwater level
- Measurable Objectives = 2011 groundwater level
- Undesirable Result occurs with minimum threshold exceeded in half of the RMPs for a period of 2 consecutive years.

Water Levels and Groundwater in Storage – Lower Aquifer Well Impact Analysis

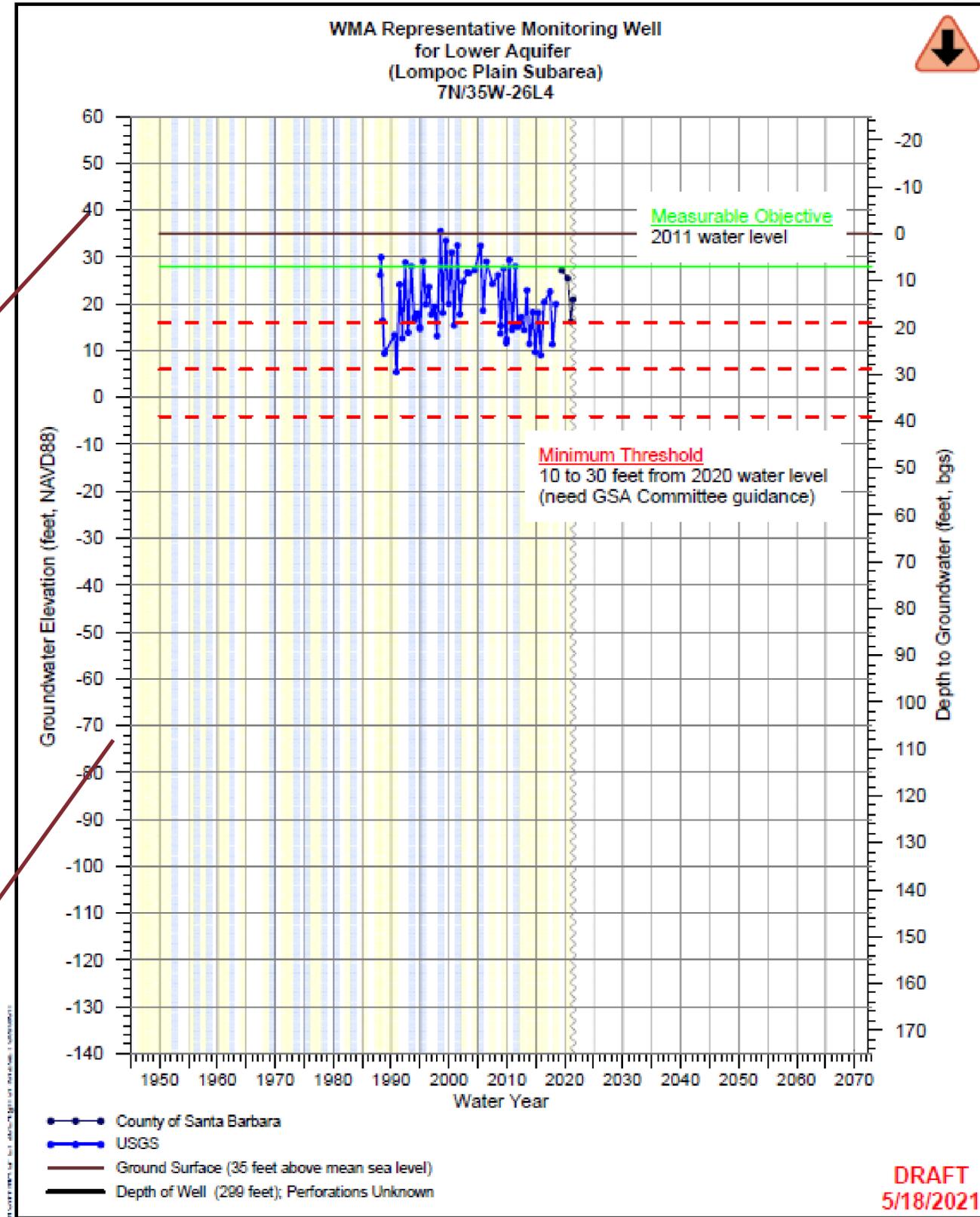
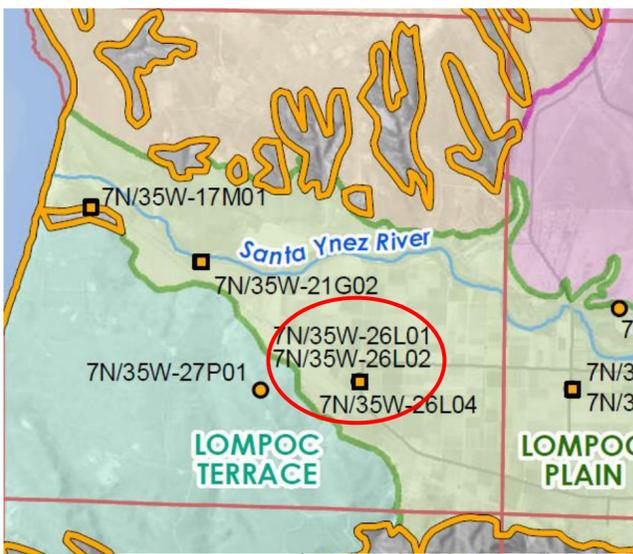
No. of wells analyzed

Agricultural	70
Municipal	9
Domestic	137
Other	51
Total	267

Percentage of Category Wells with Well Performance Affected



Well 7N/35W-26L4



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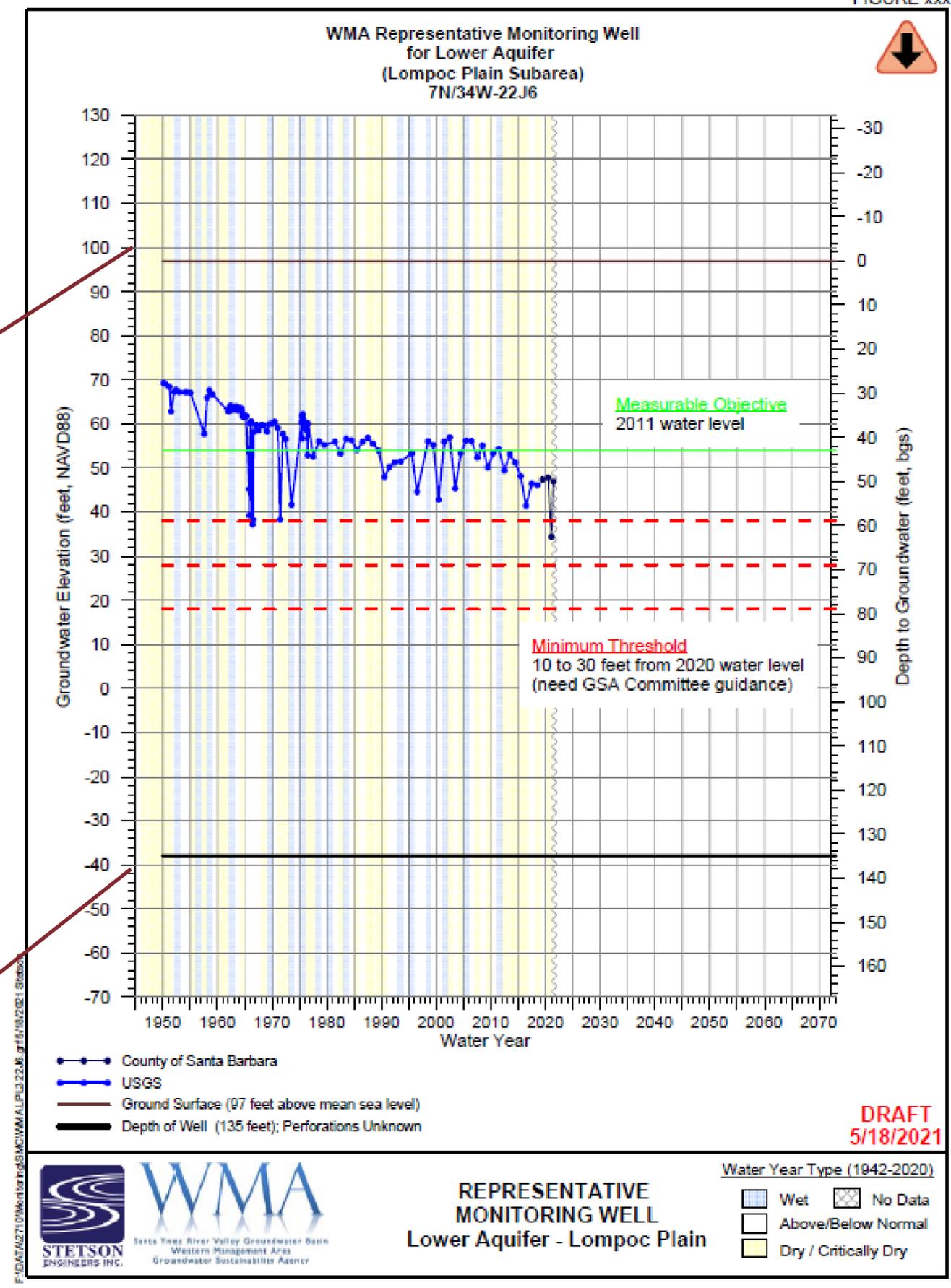
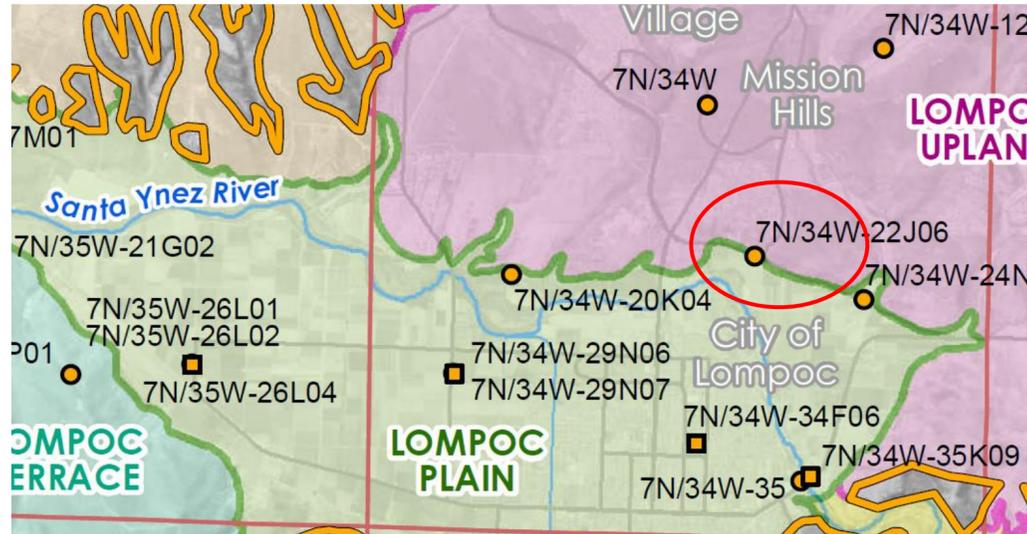
WMA
Santa Ynez River Valley Groundwater Basin
Western Management Area
Groundwater Sustainability Agency

REPRESENTATIVE MONITORING WELL
Lower Aquifer - Lompoc Plain

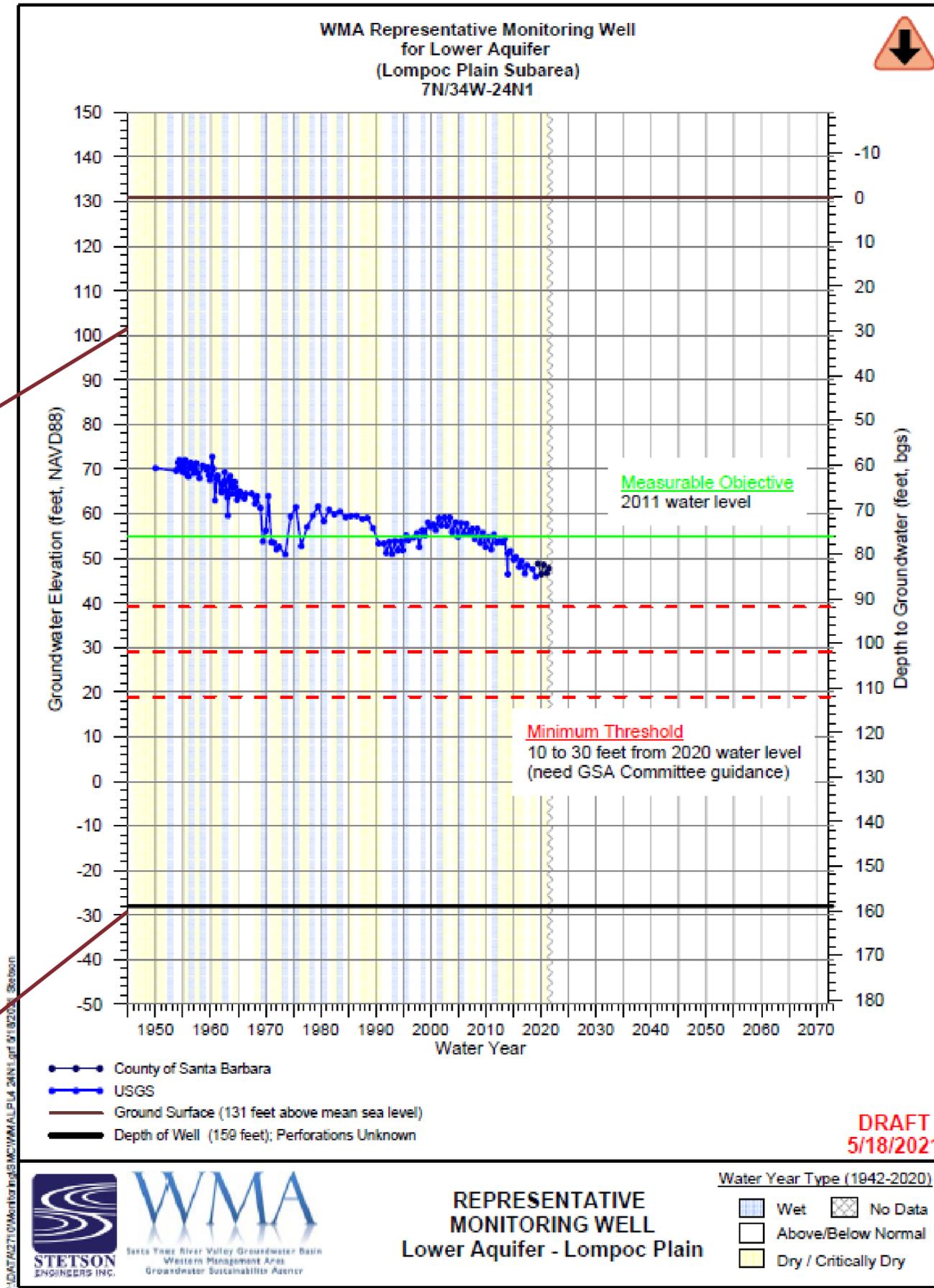
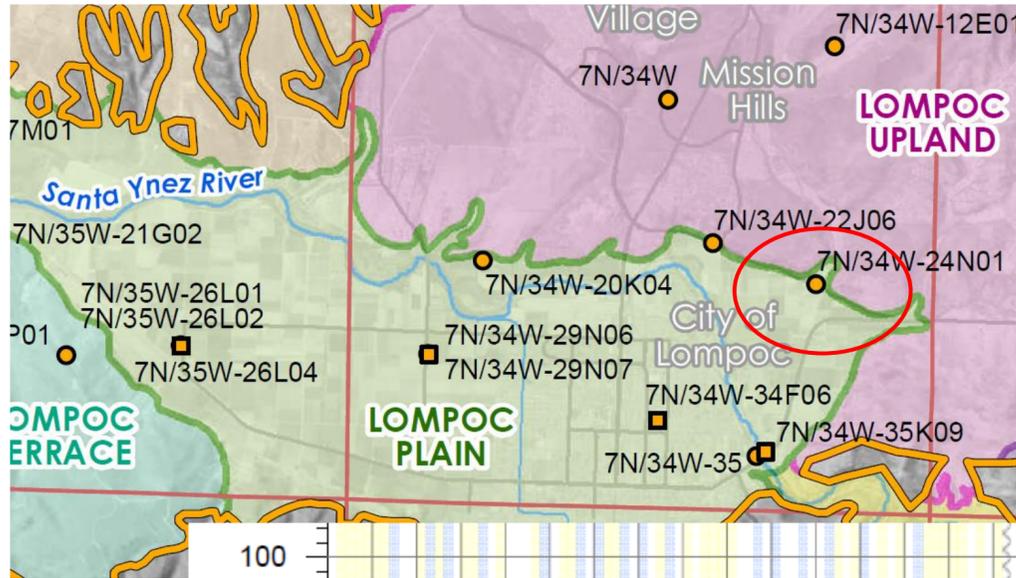
Water Year Type (1942-2020)

- Wet
- Above/Below Normal
- Dry / Critically Dry
- No Data

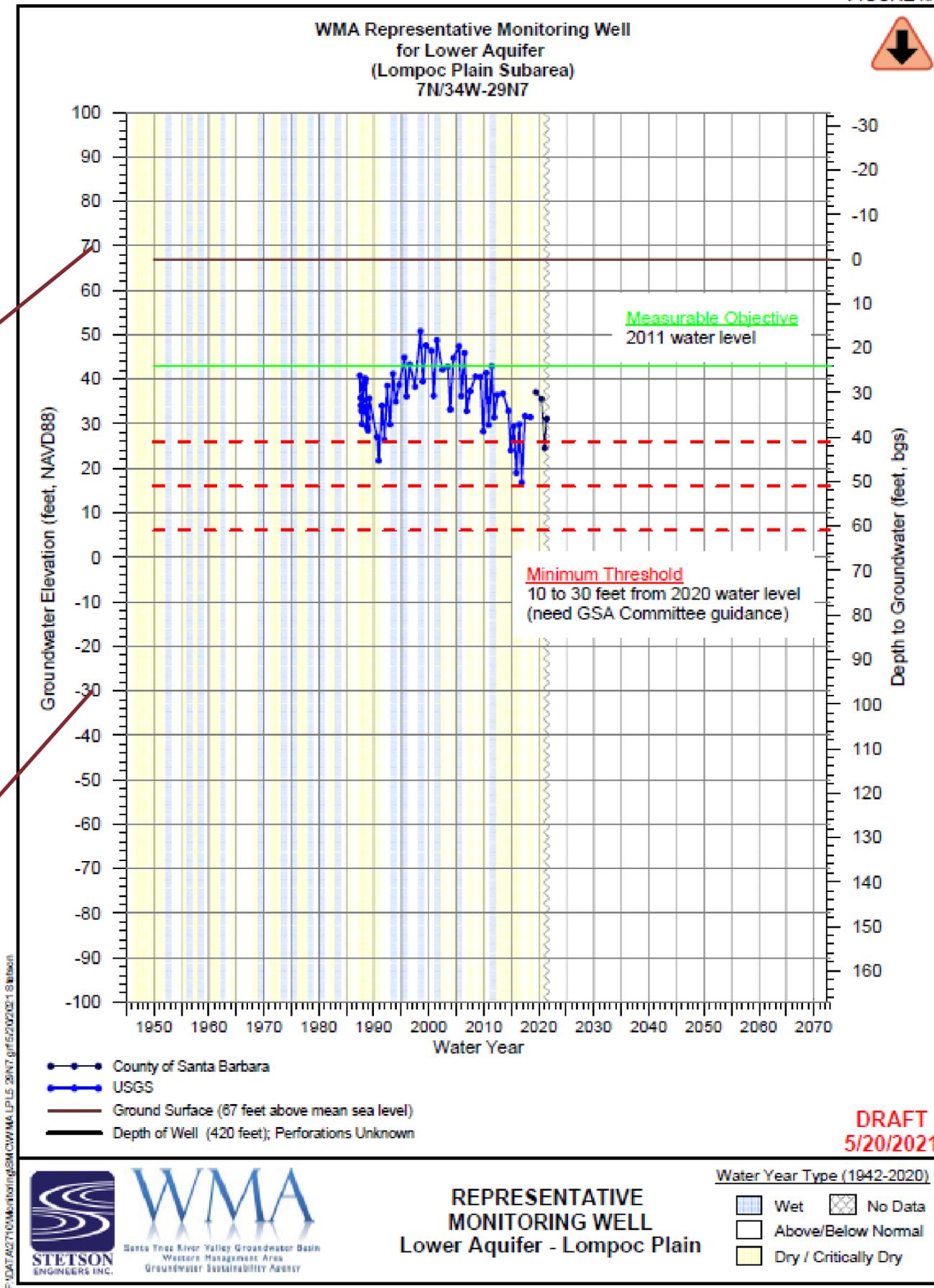
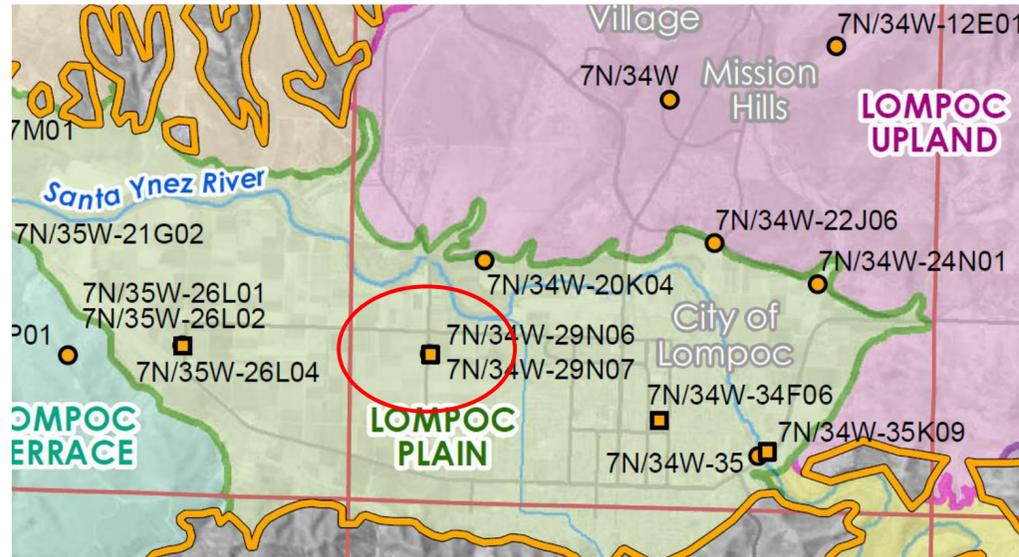
Well 7N/35W-22J6



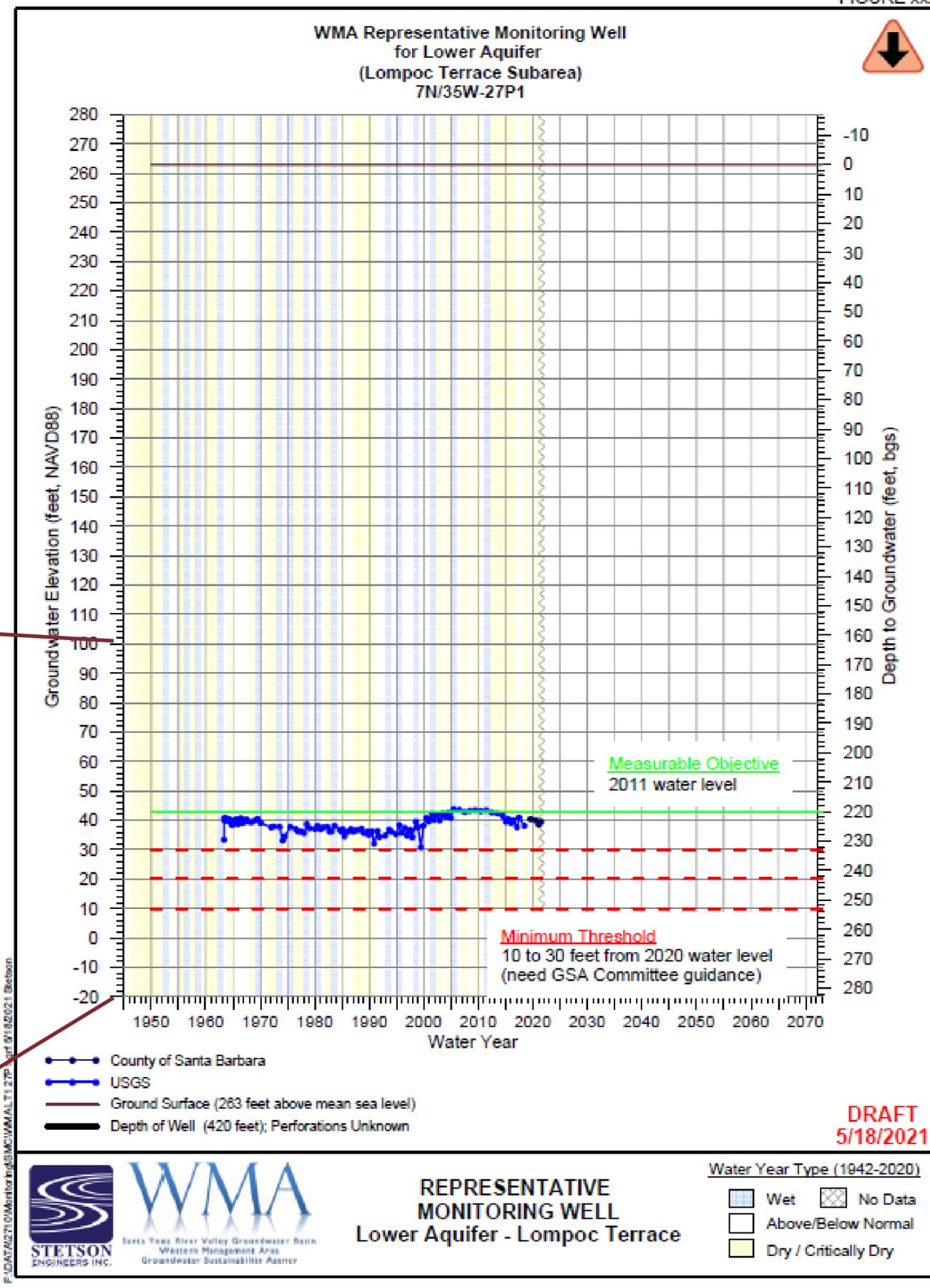
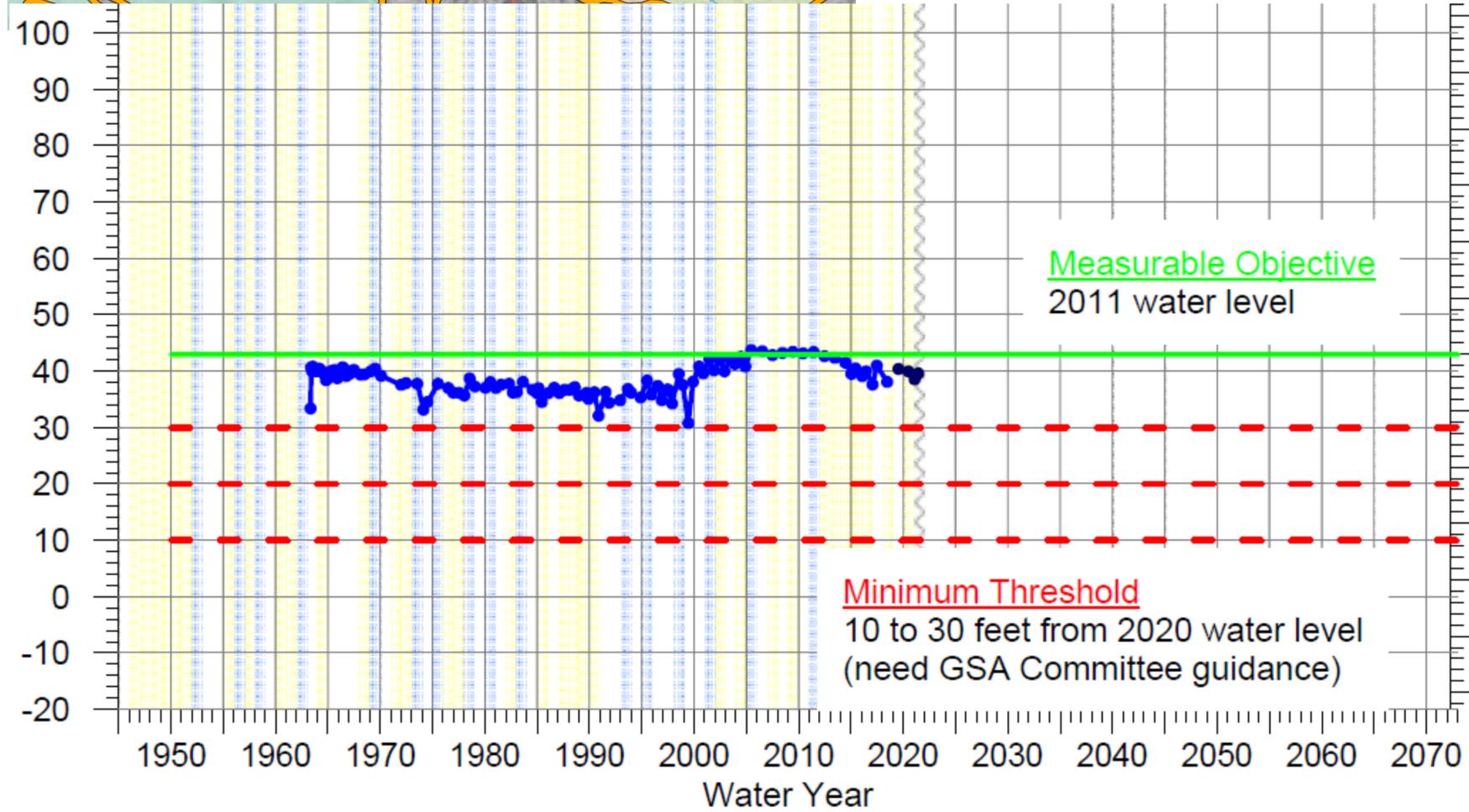
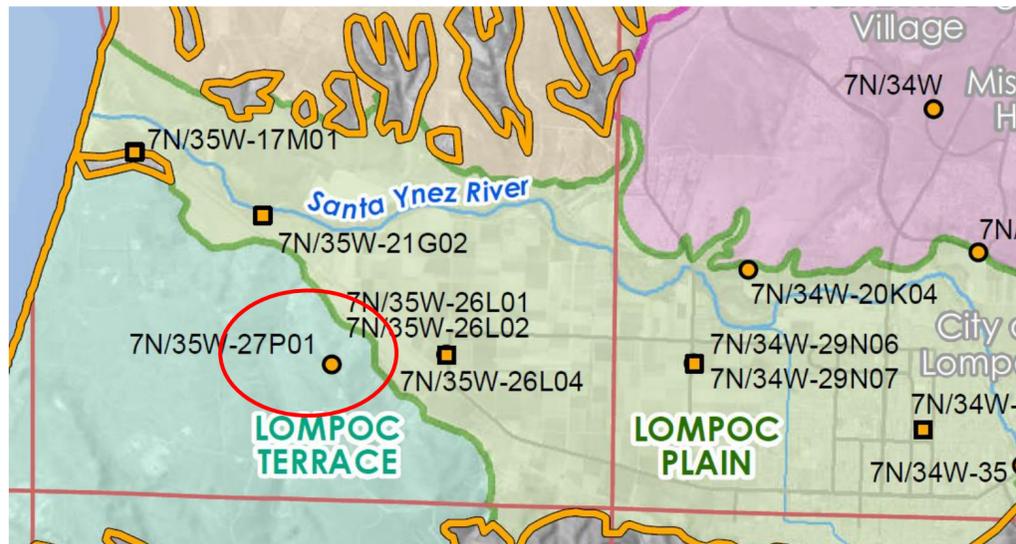
Well 7N/35W-24N1



Well 7N/35W-29N7



Well 7N/35W-27P1



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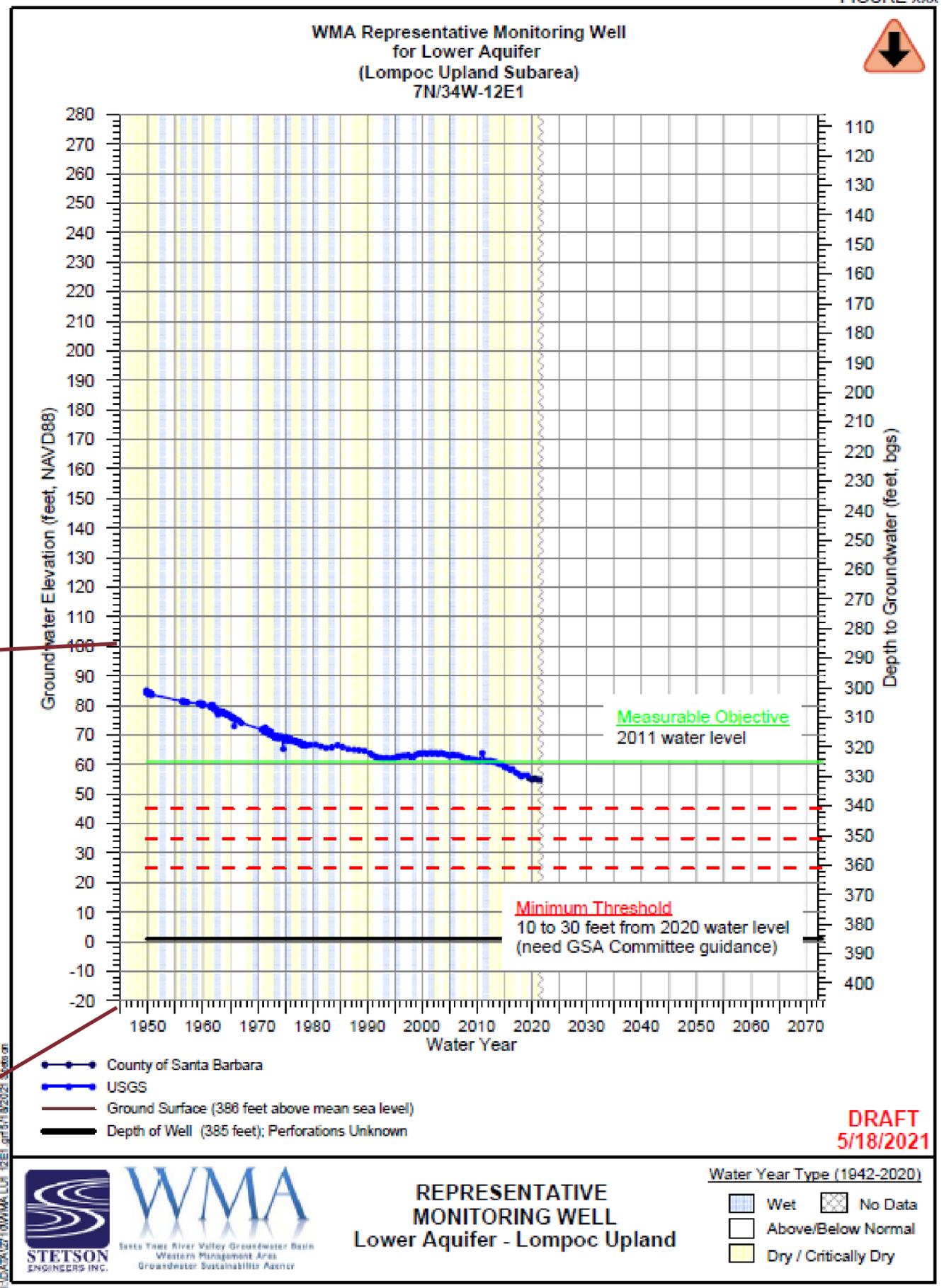
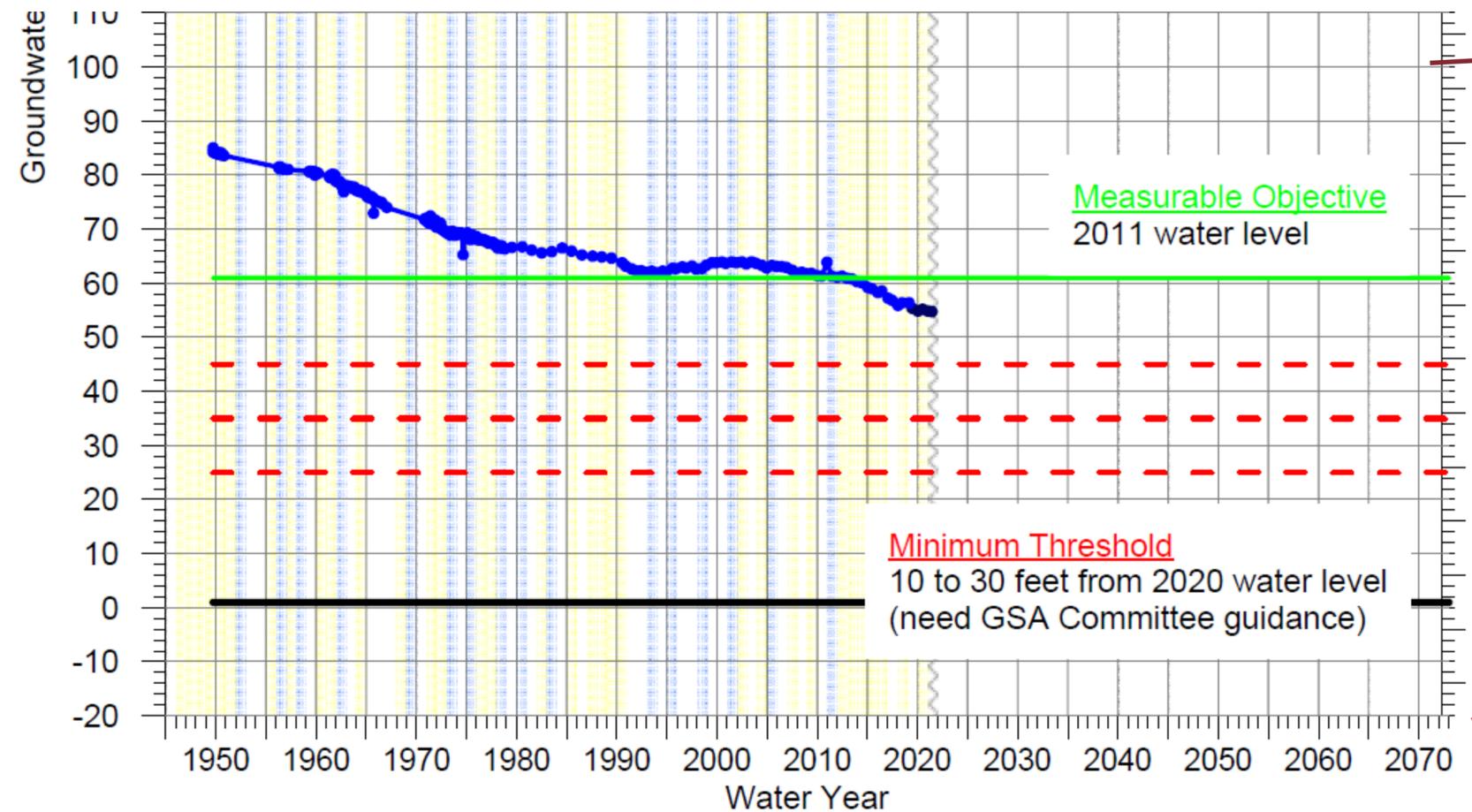
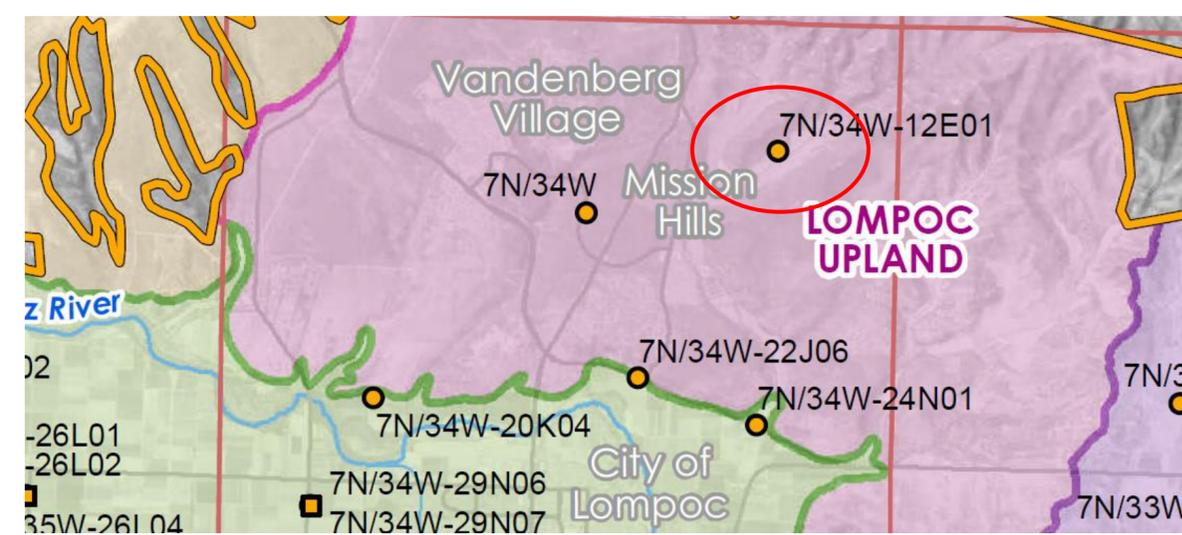
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REPRESENTATIVE MONITORING WELL
Lower Aquifer - Lompoc Terrace

Water Year Type (1942-2020)

 Wet	 No Data
 Above/Below Normal	 Dry / Critically Dry

Well 7N/35W-12E1



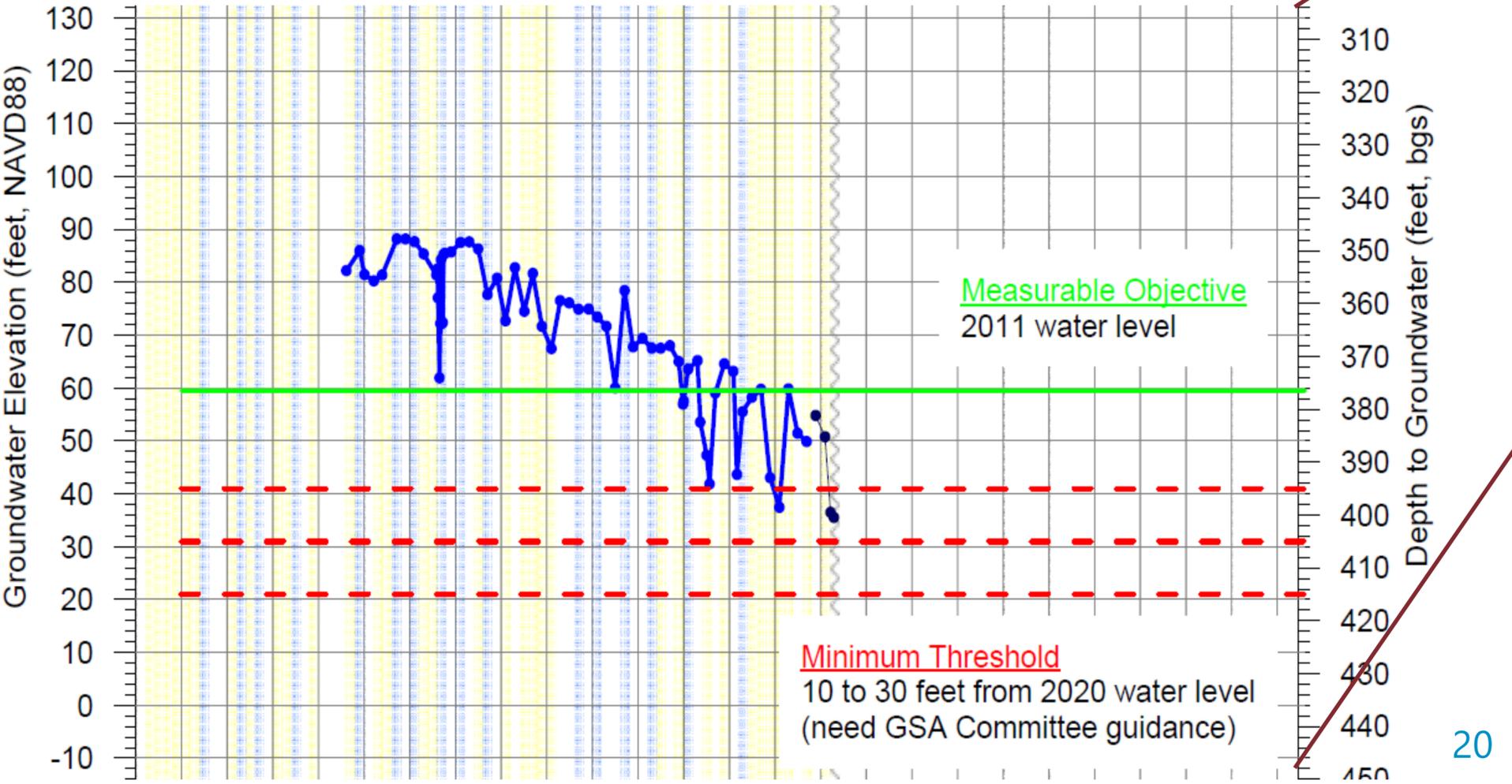
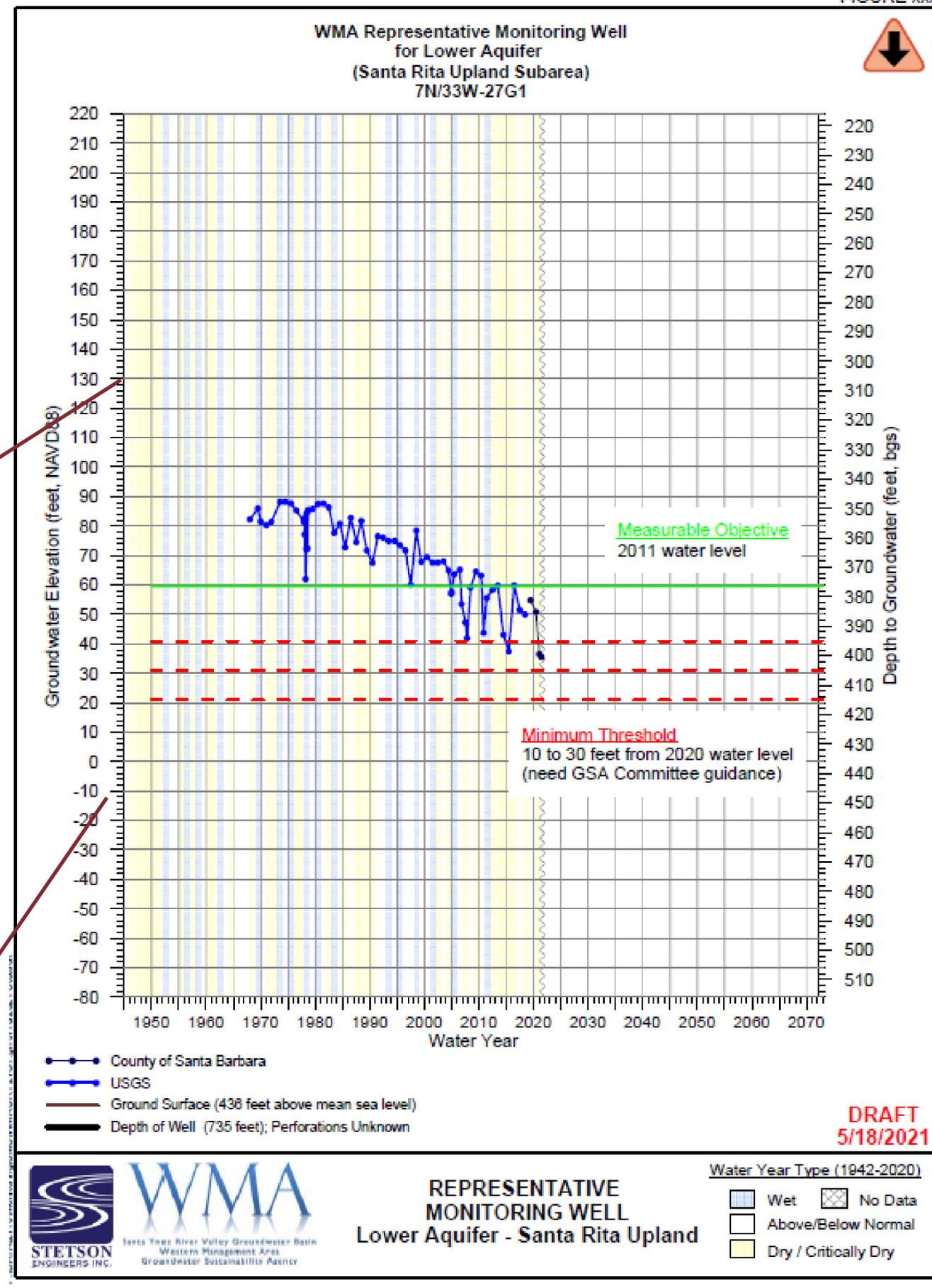
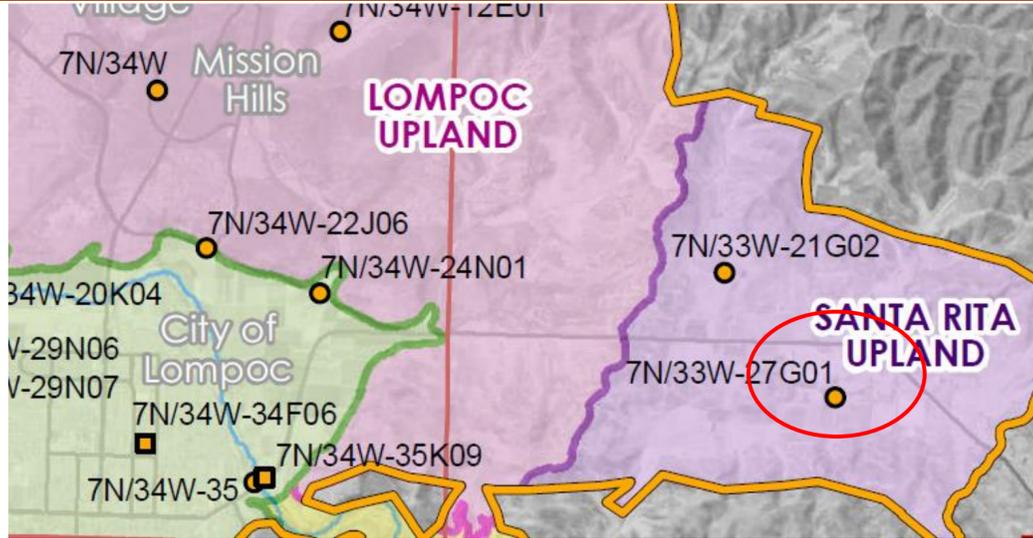
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REPRESENTATIVE
MONITORING WELL
Lower Aquifer - Lompoc Upland

Water Year Type (1942-2020)	
	Wet
	No Data
	Above/Below Normal
	Dry / Critically Dry

Well 7N/35W-27G1



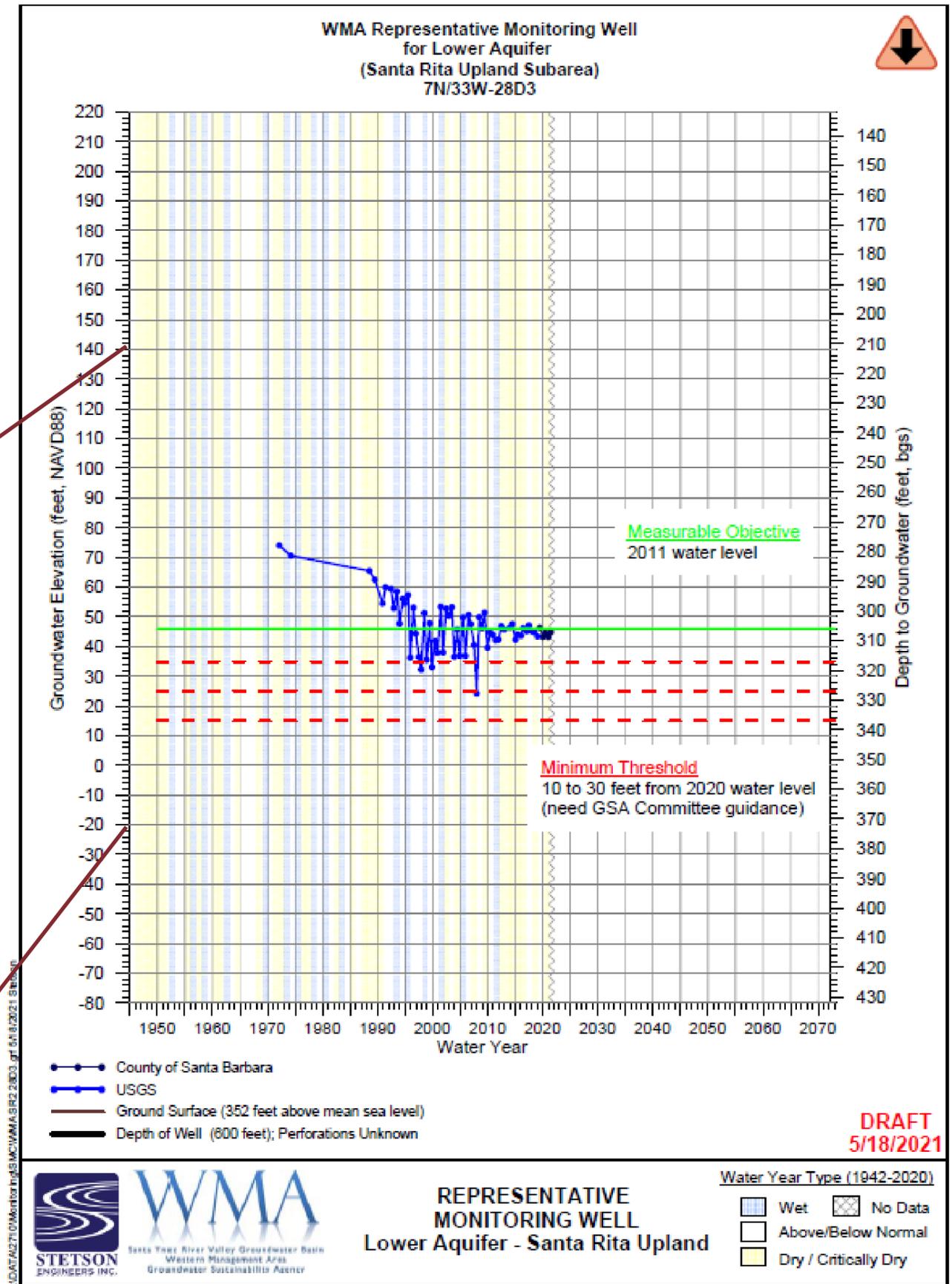
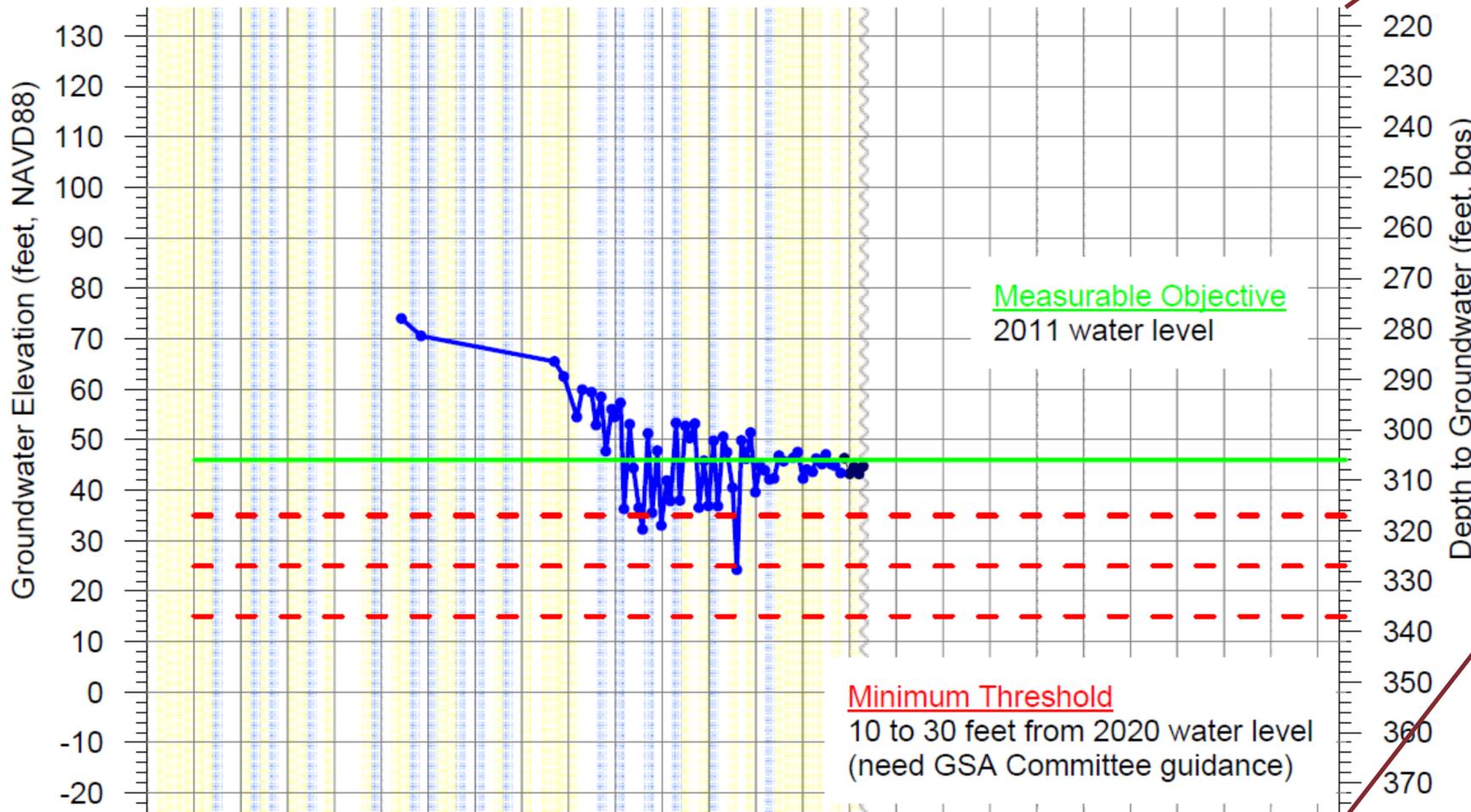
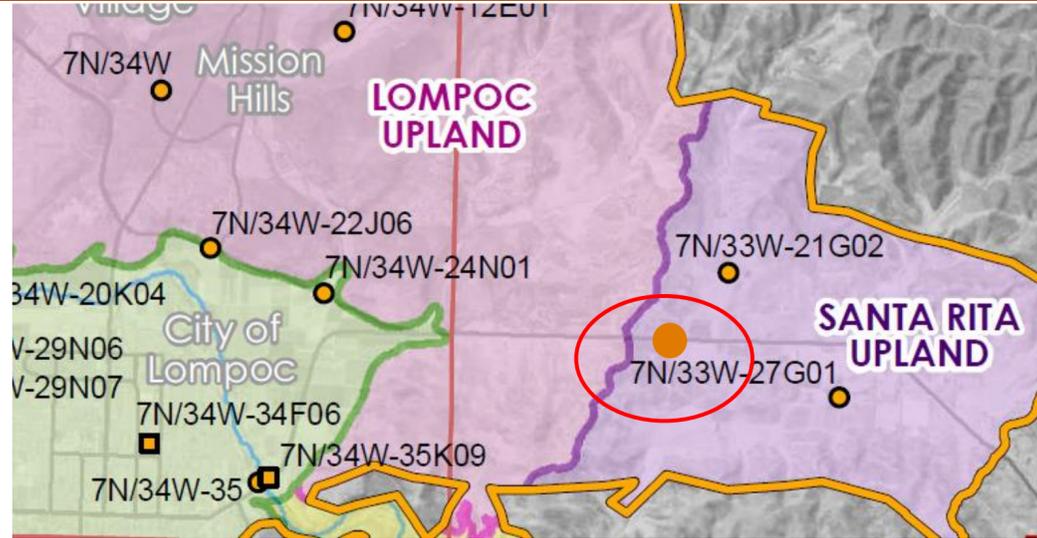
STETSON ENGINEERS INC. **WMA** Santa Ynez River Valley Groundwater Basin Western Management Area Groundwater Sustainability Agency

REPRESENTATIVE MONITORING WELL Lower Aquifer - Santa Rita Upland

Water Year Type (1942-2020)

- Wet (Blue shading)
- Above/Below Normal (White shading)
- Dry / Critically Dry (Yellow shading)
- No Data (Cross-hatched shading)

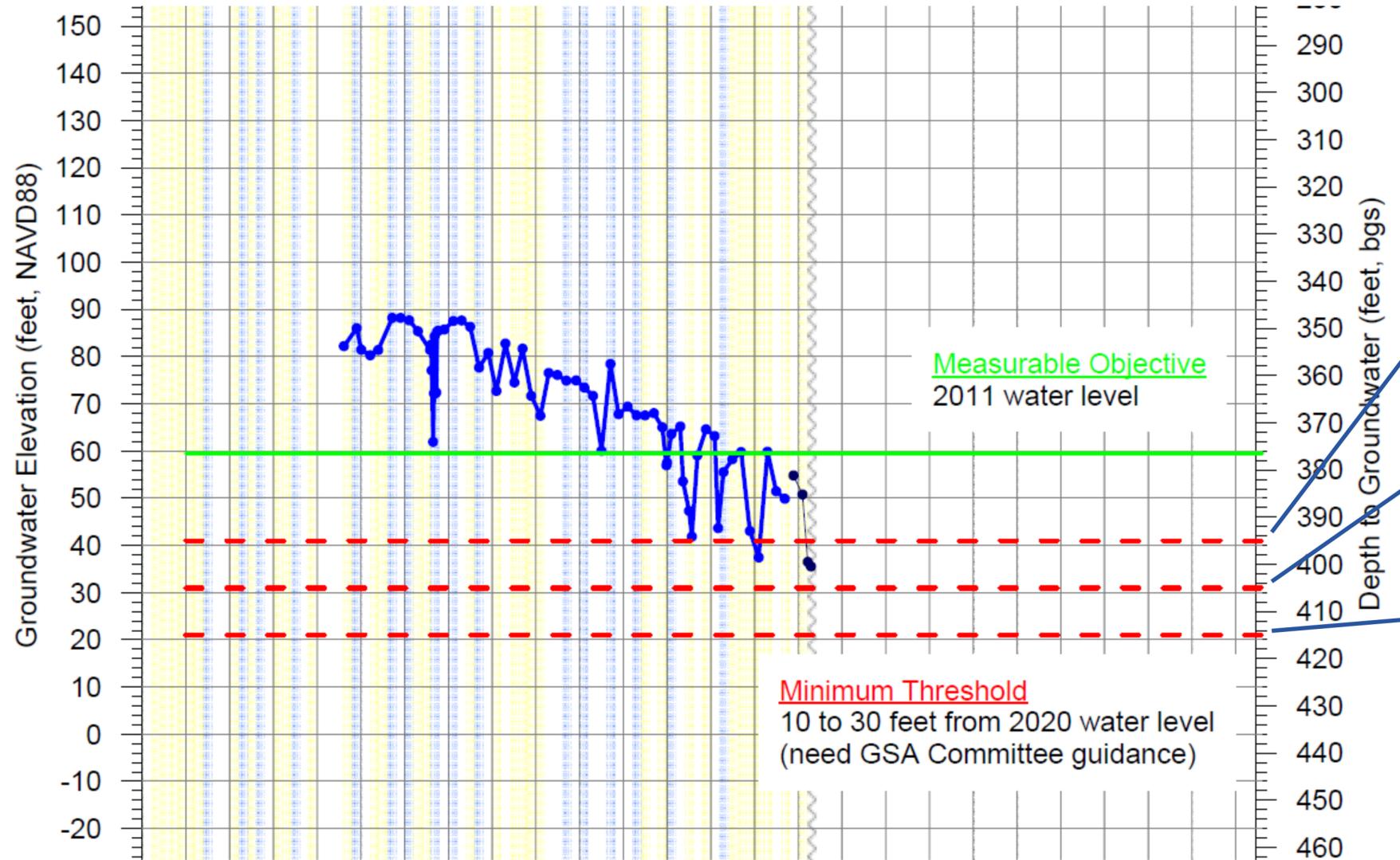
Well 7N/33W-28D3



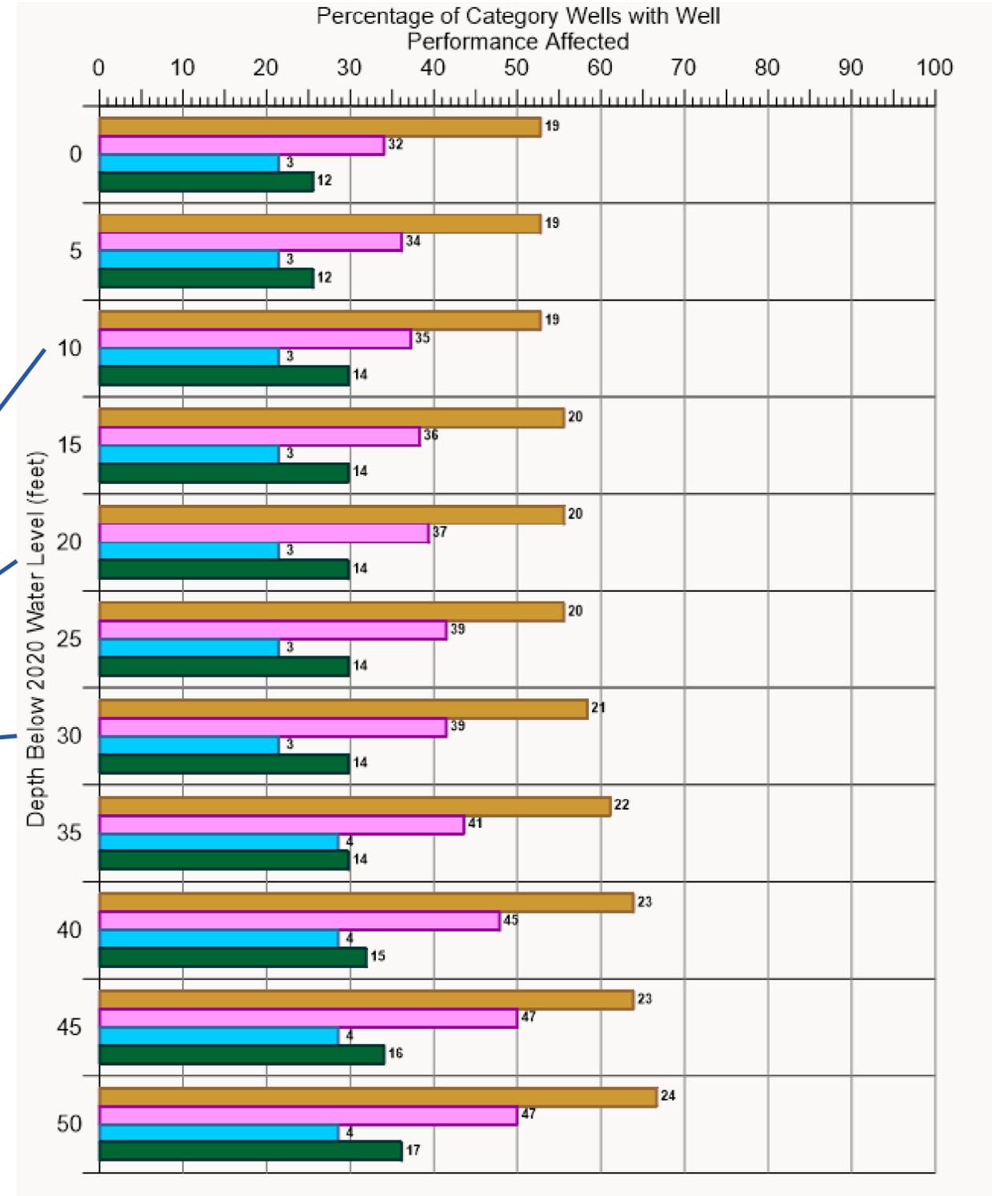
Proposed Minimum Thresholds and Undesirable Results

Water Levels and Water in Storage - Well Impact Analysis

Well 7N/35W-27G1

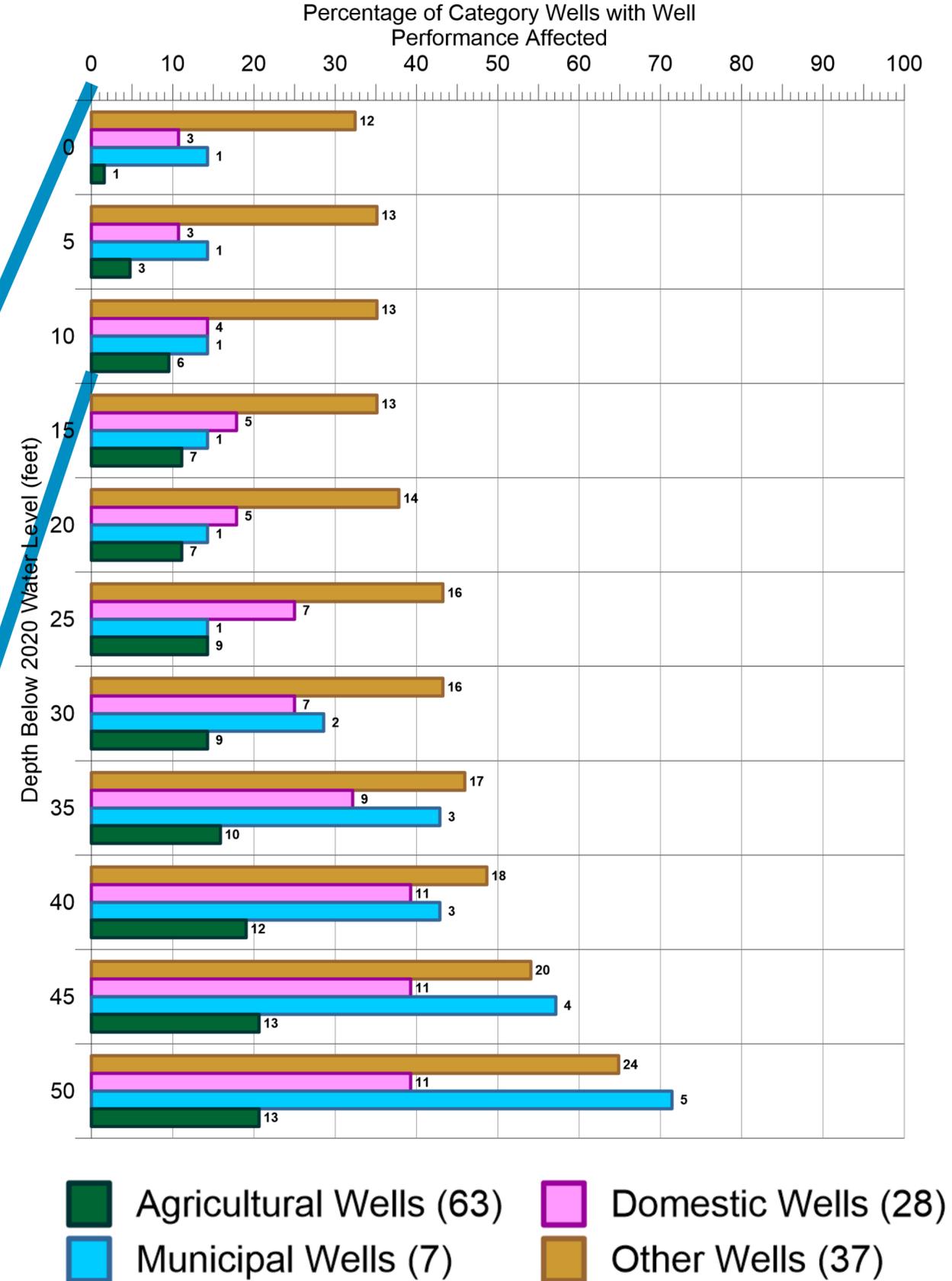
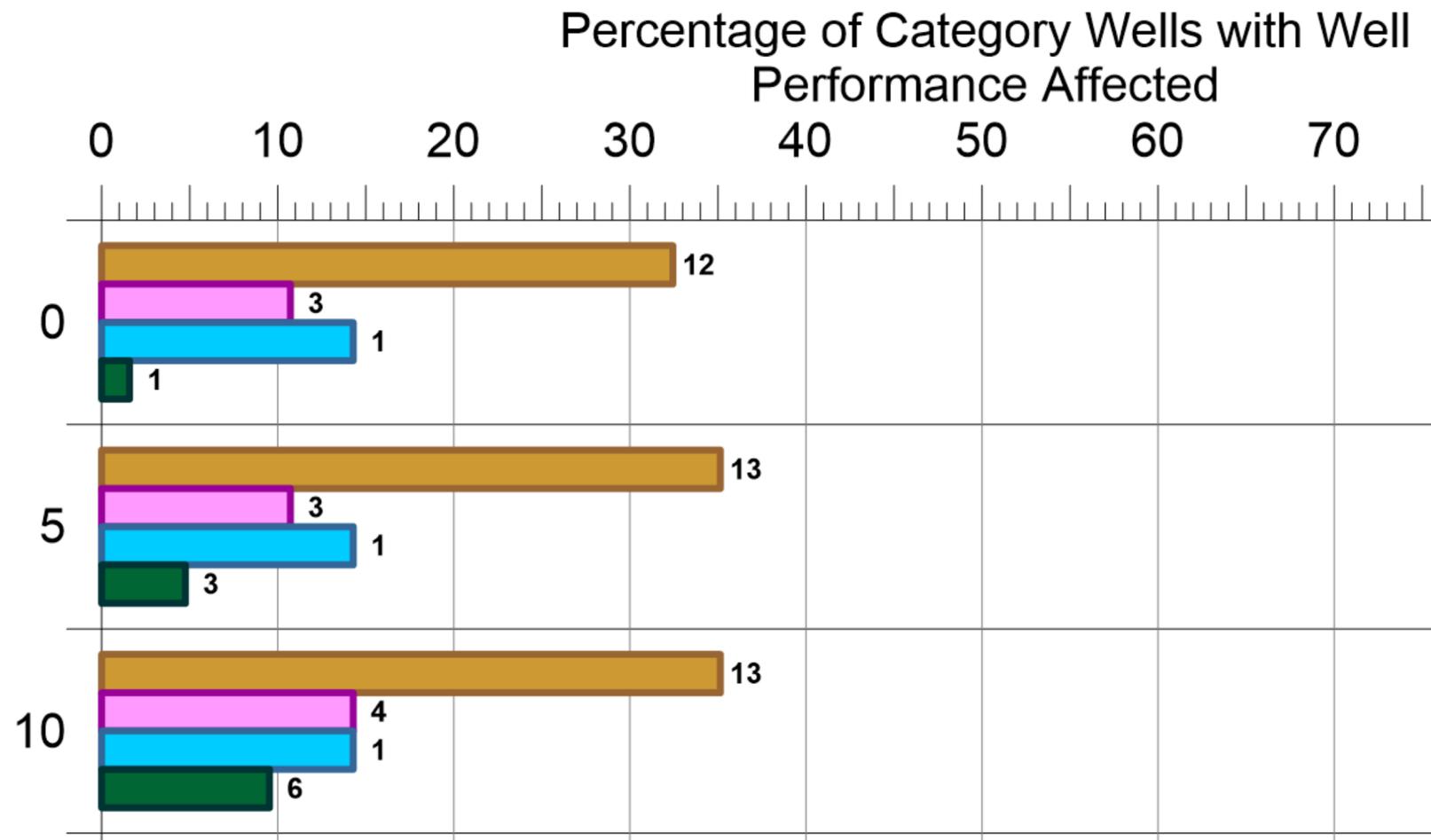


■ Agricultural Wells ■ Domestic Wells
■ Municipal Wells ■ Other Wells

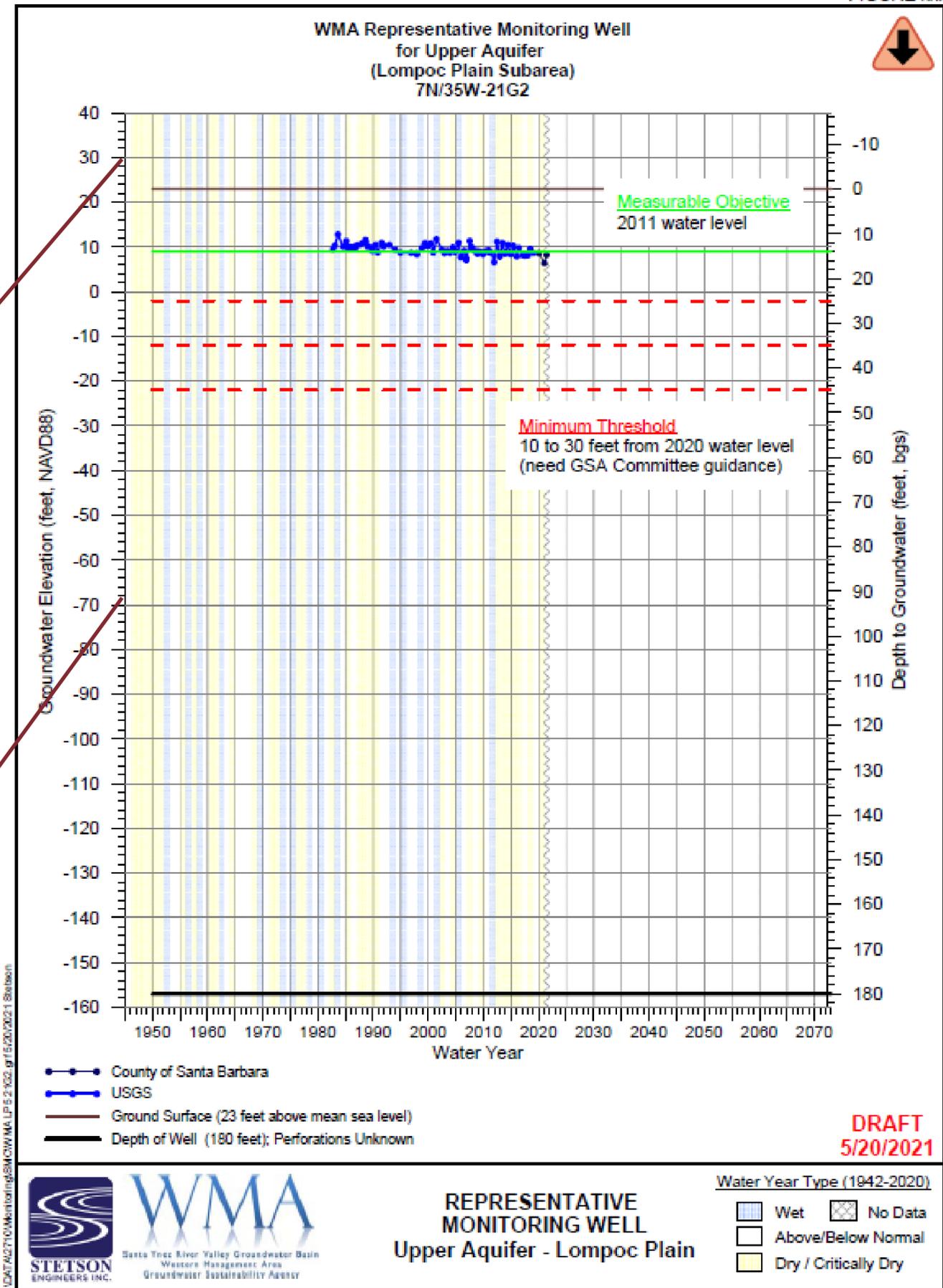
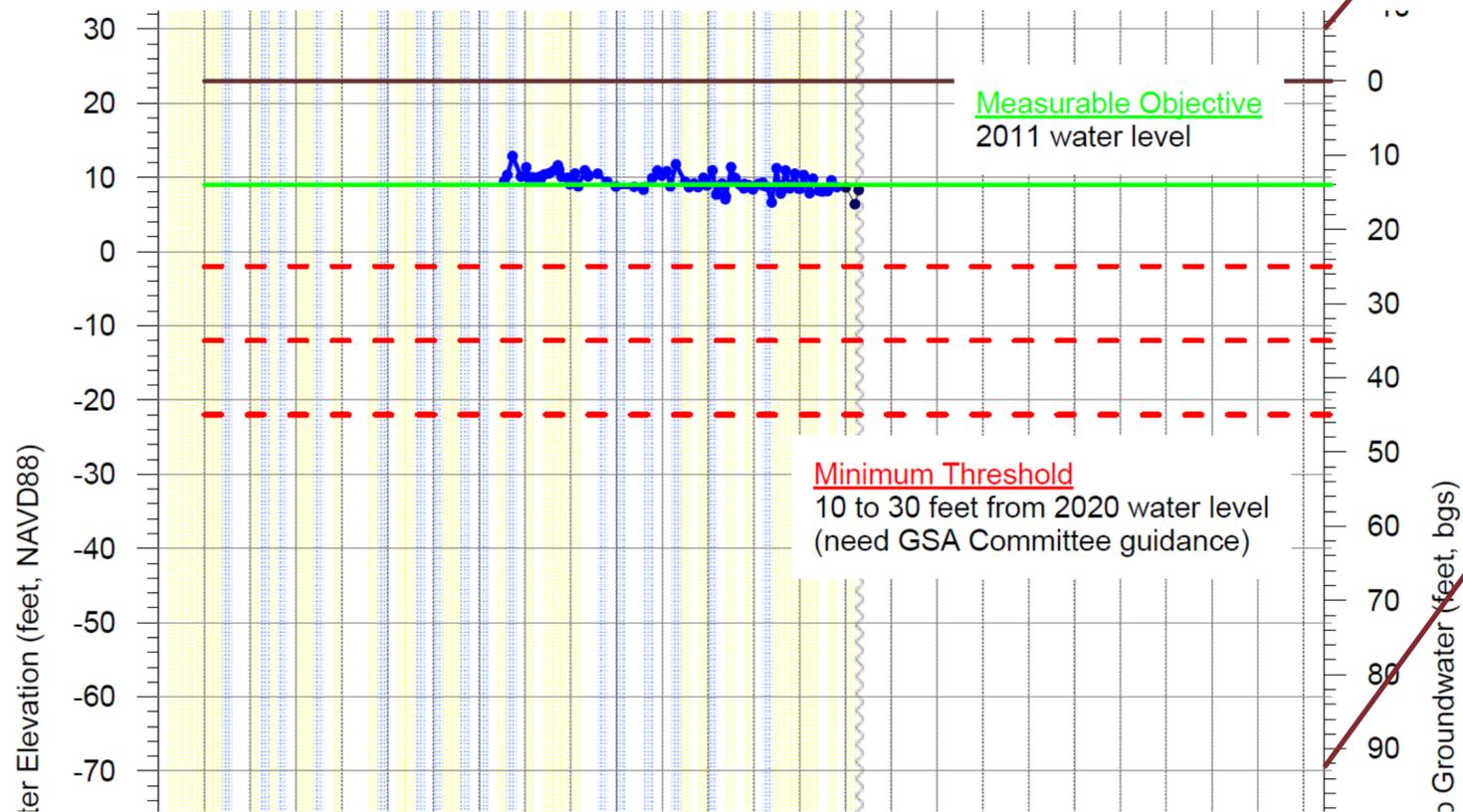
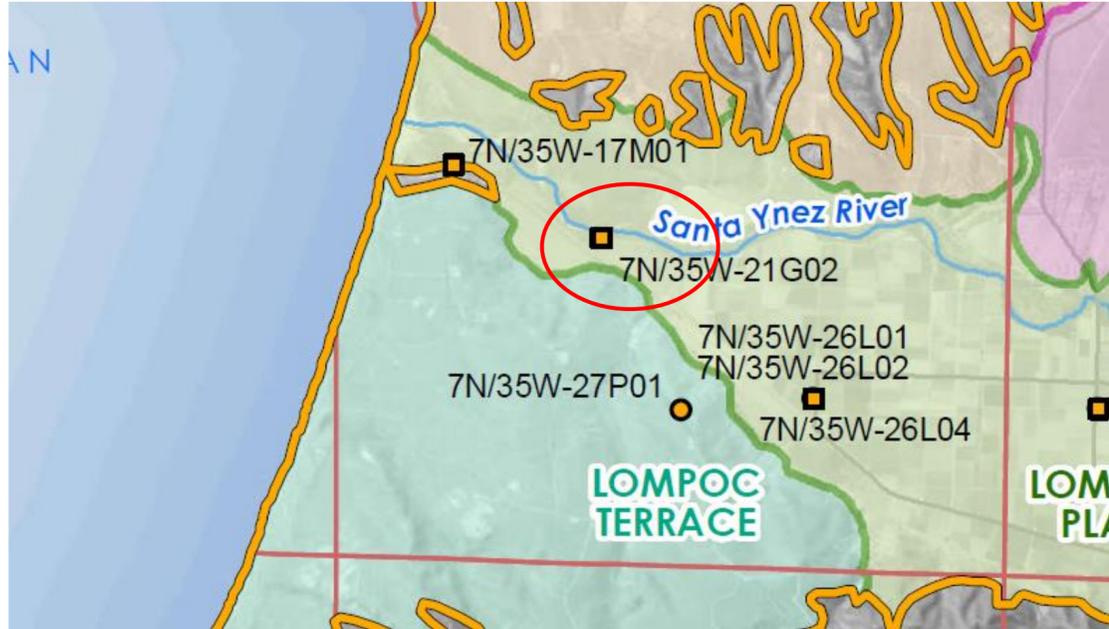


Water Levels and Groundwater in Storage – Upper Aquifer Well Impact Analysis

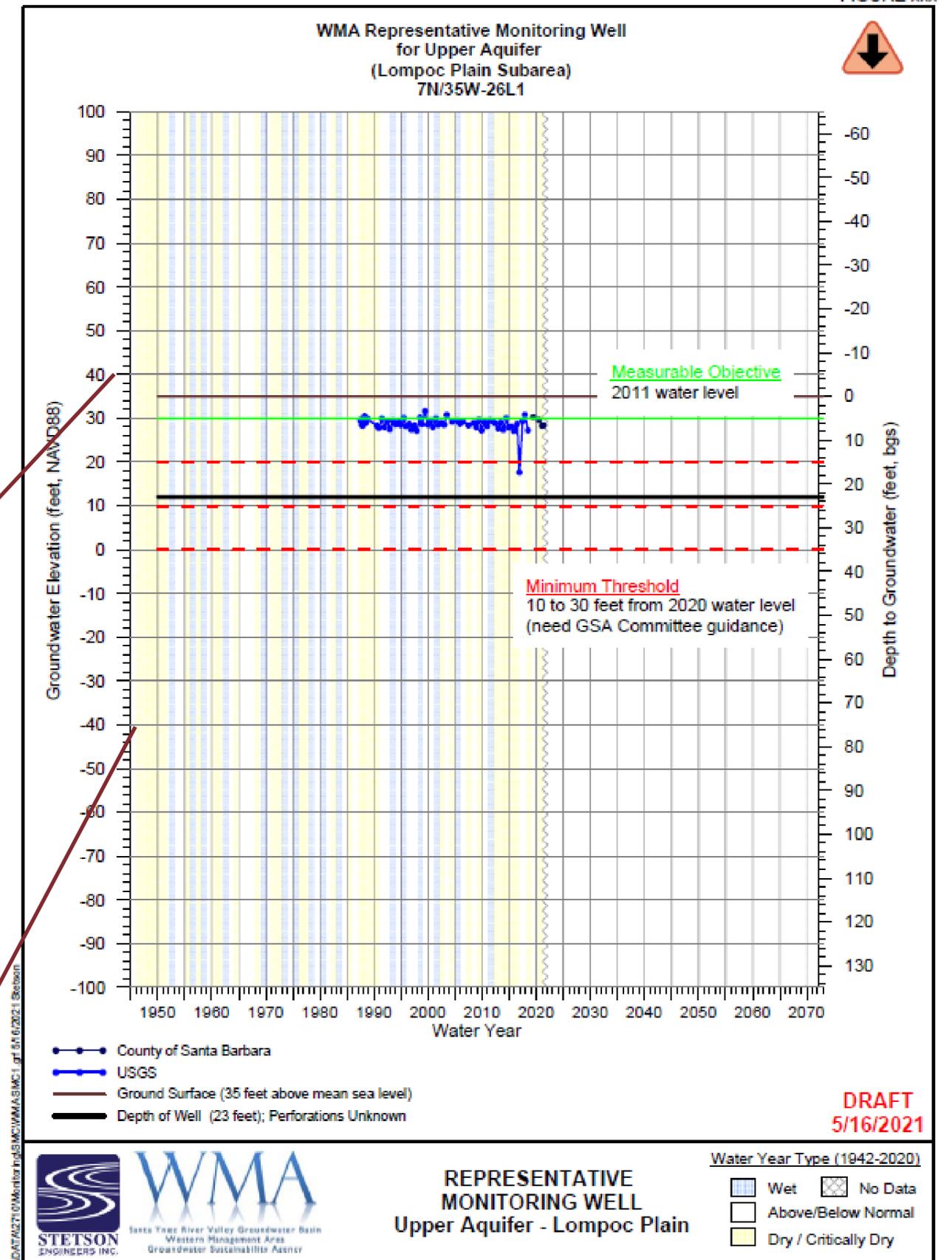
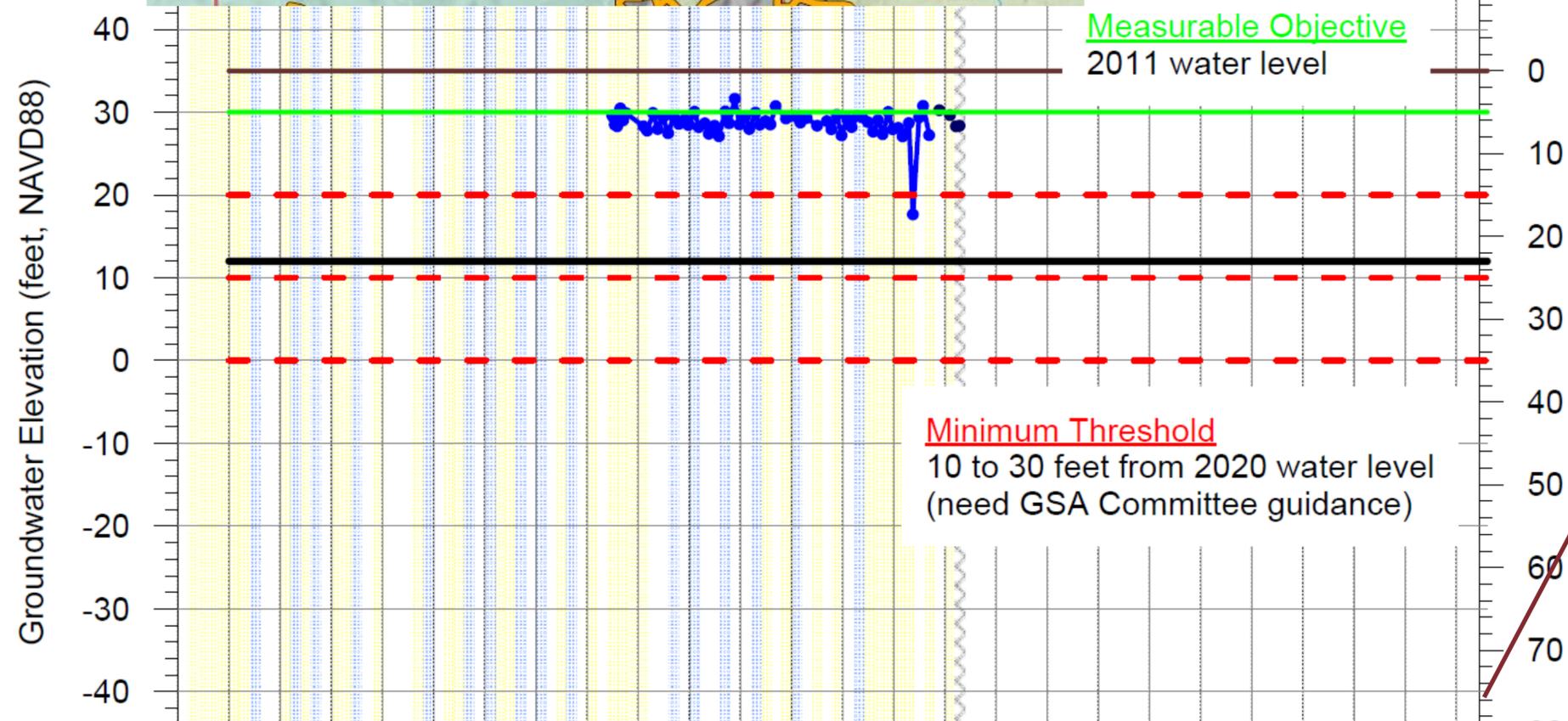
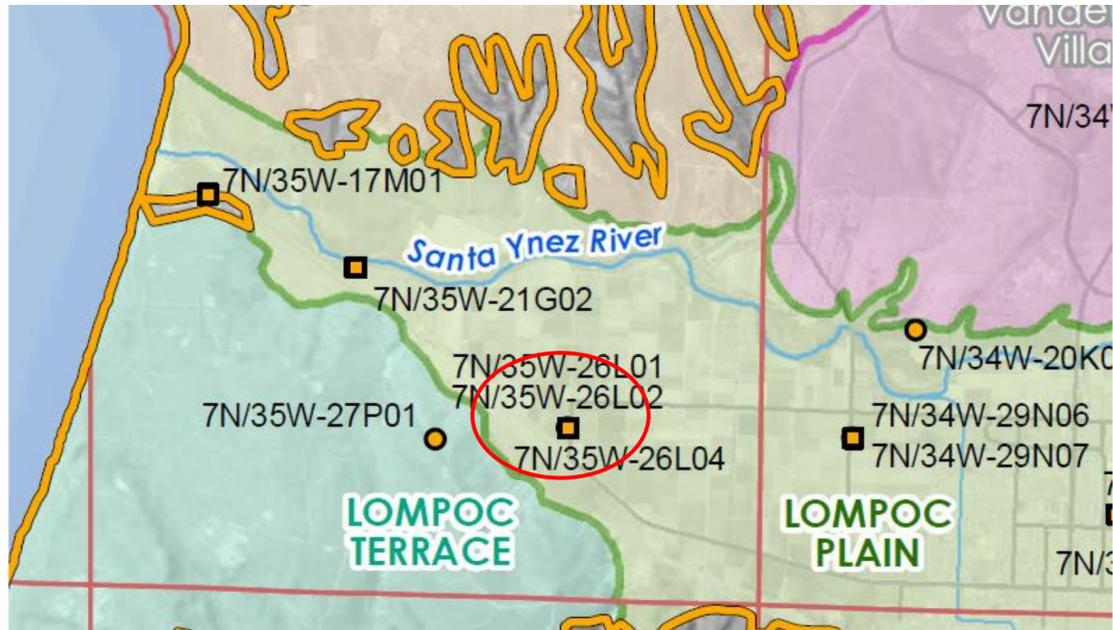
No. of wells analyzed	
Agricultural	60
Municipal	3
Domestic	18
Other	35
Total	116



Well 7N/35W-21G2



Well 7N/35W-26L1



Well 7N/35W-26L2

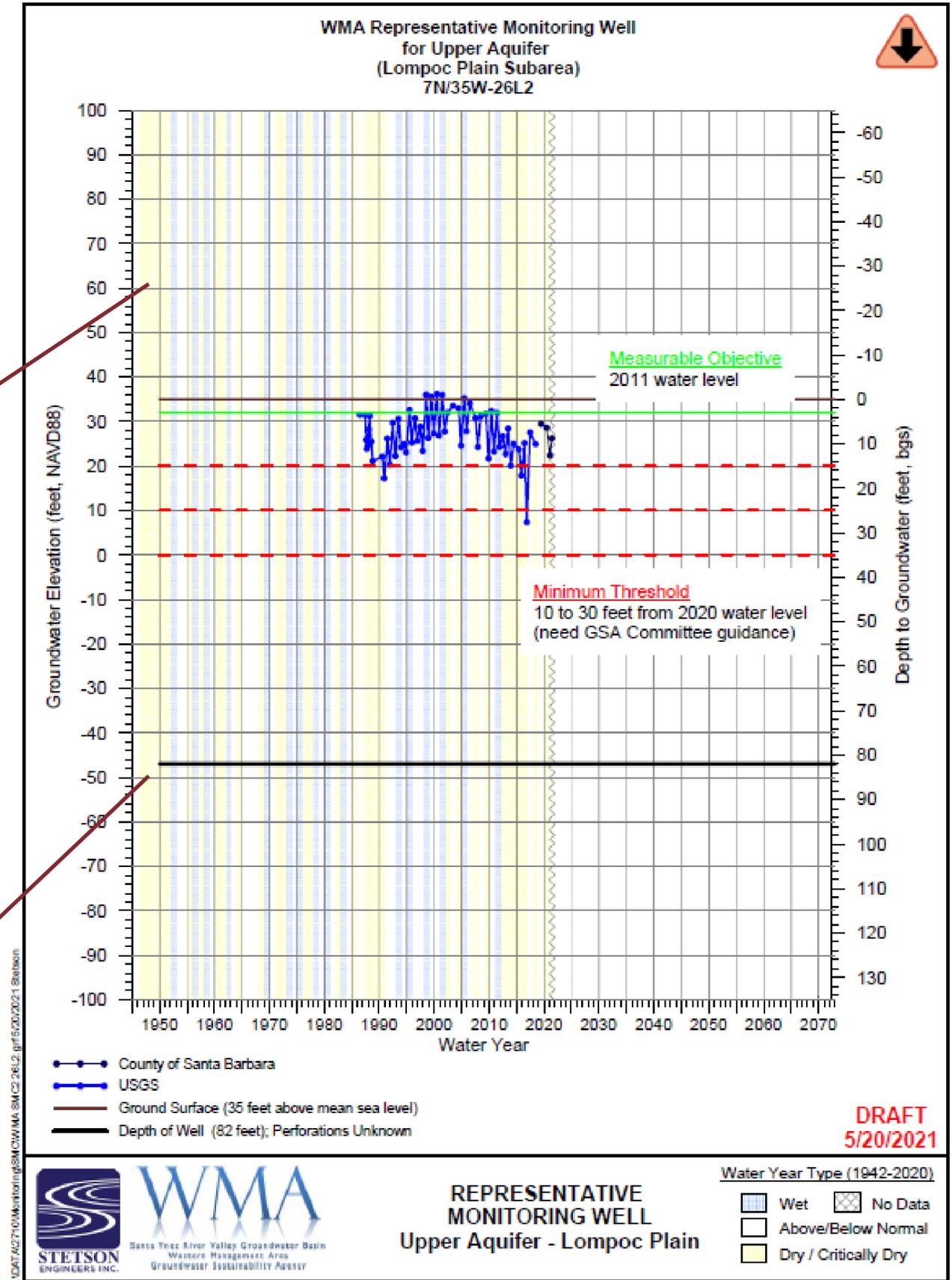
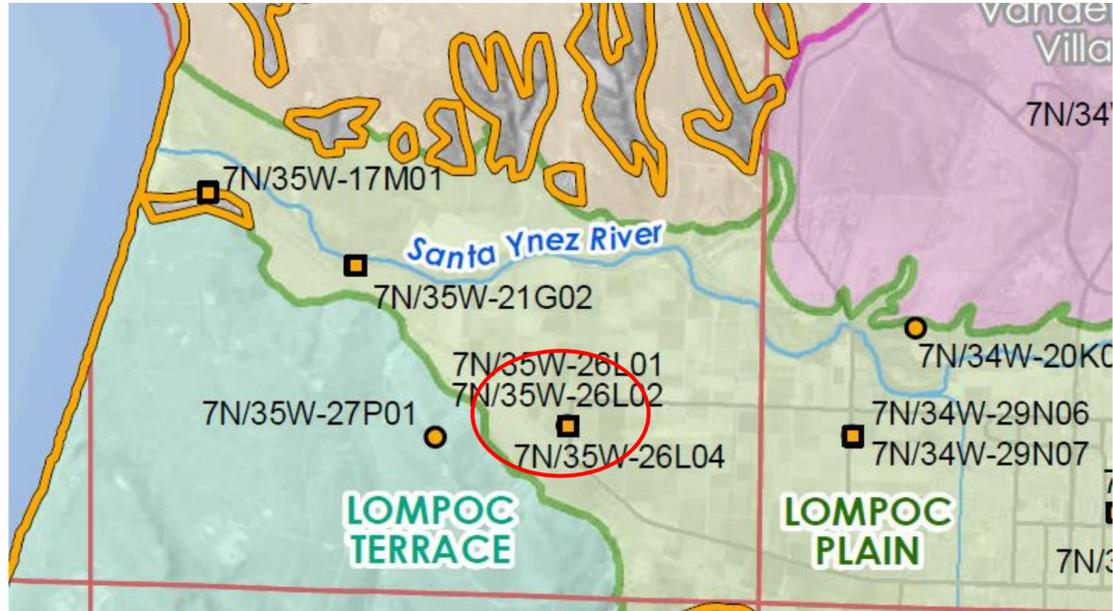
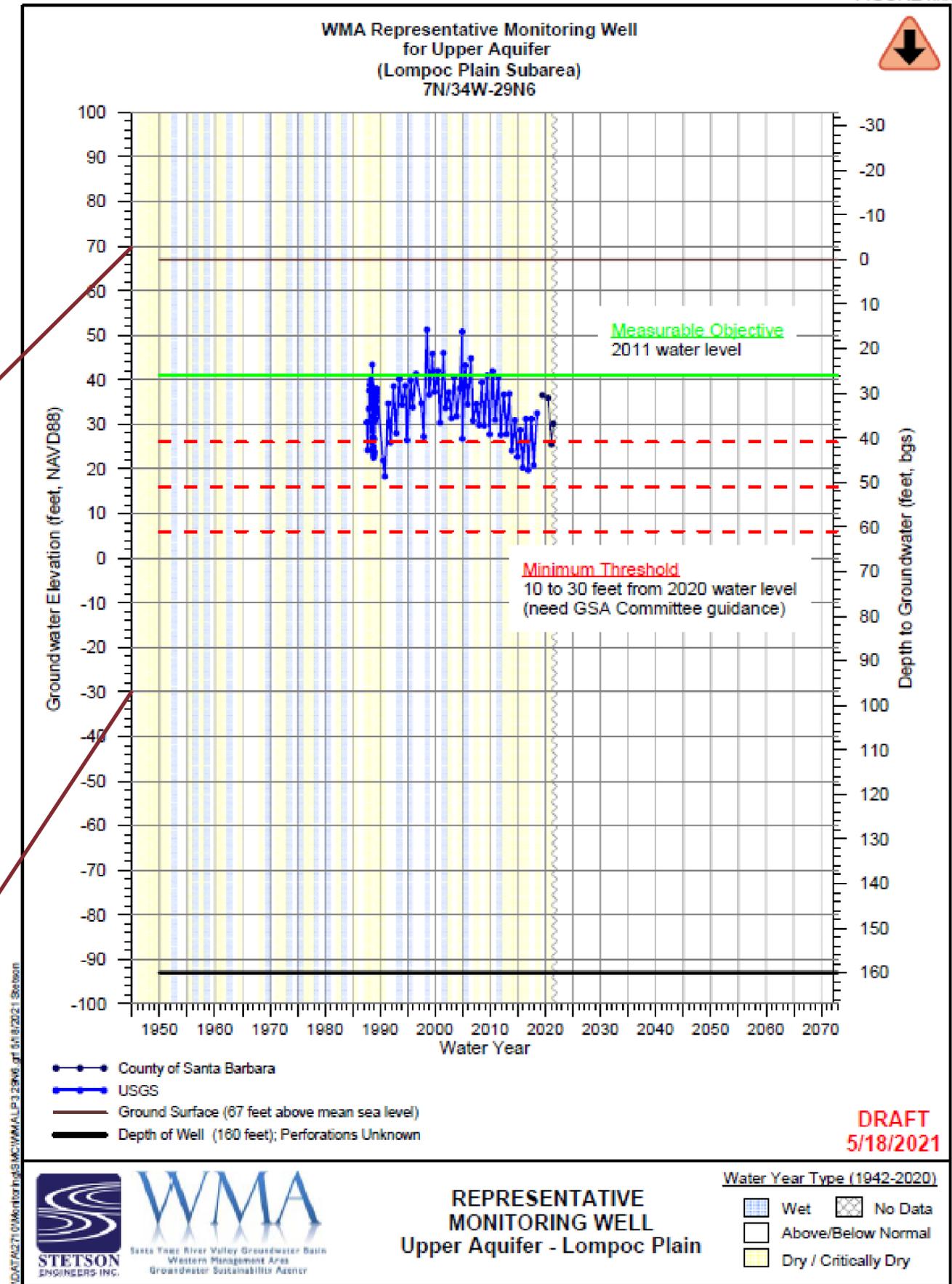
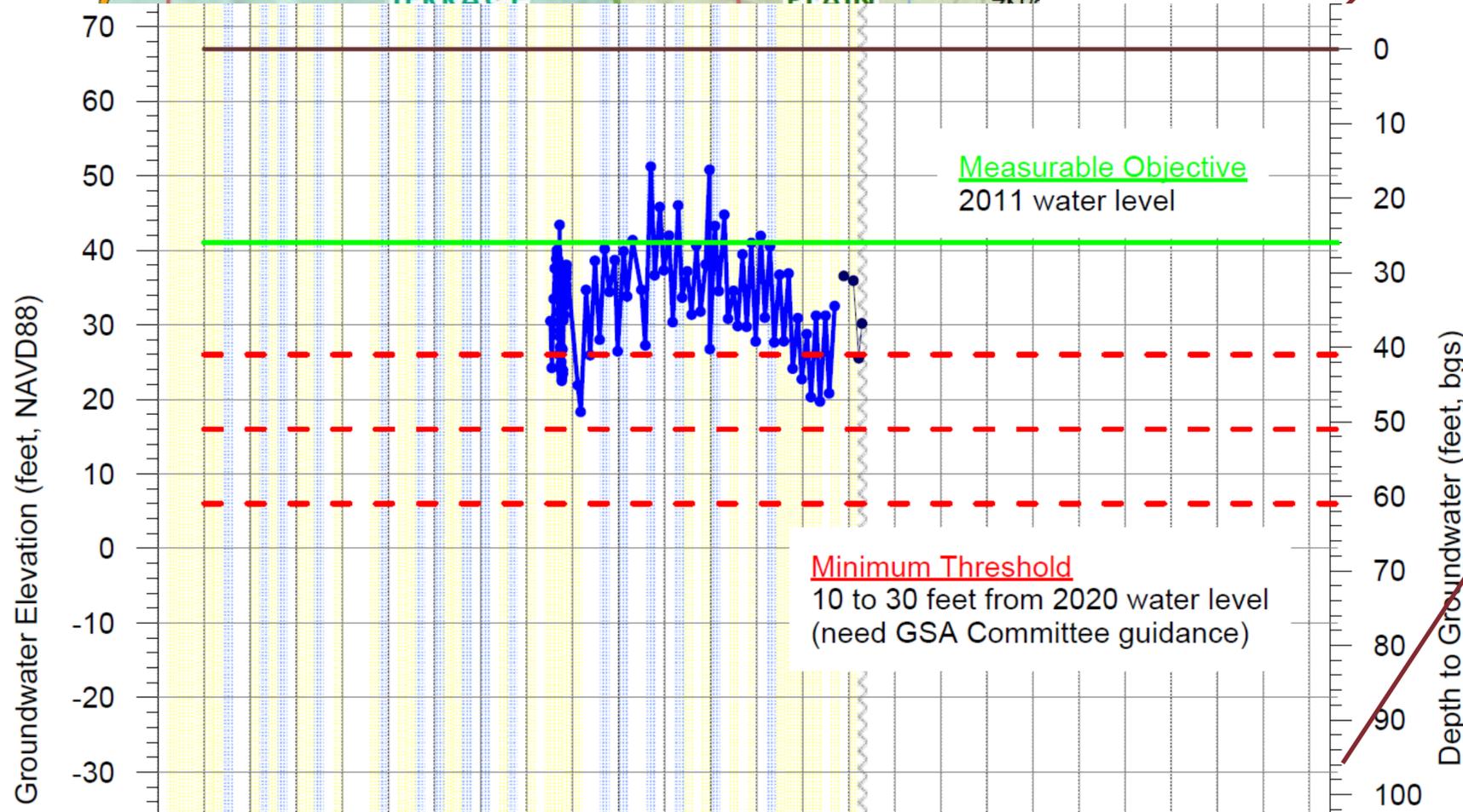
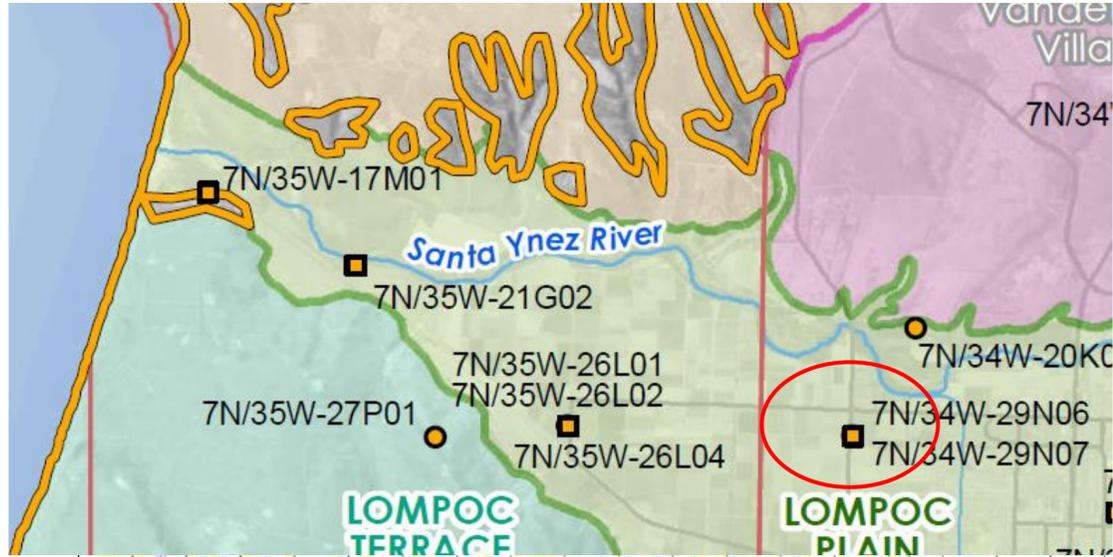
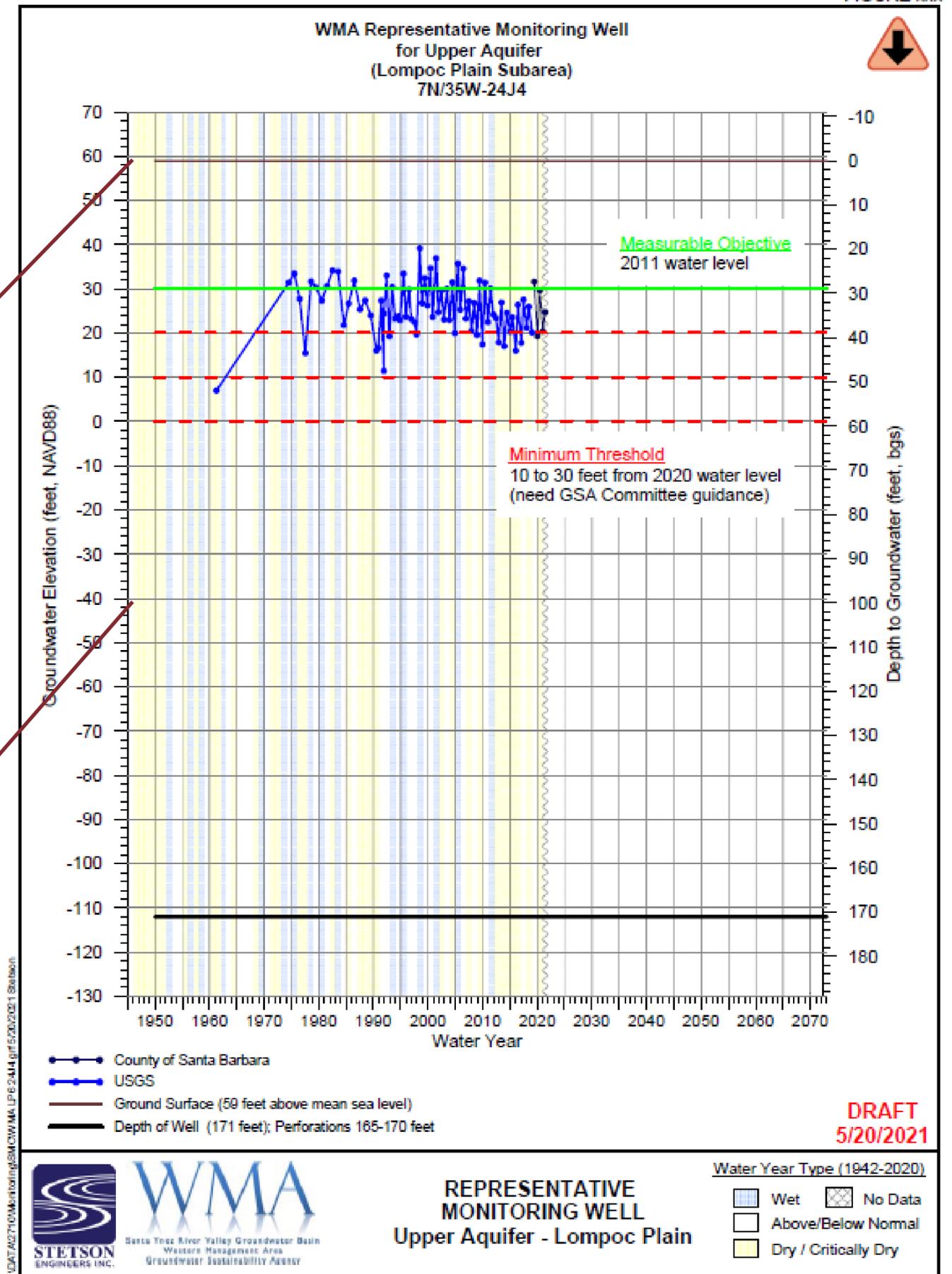
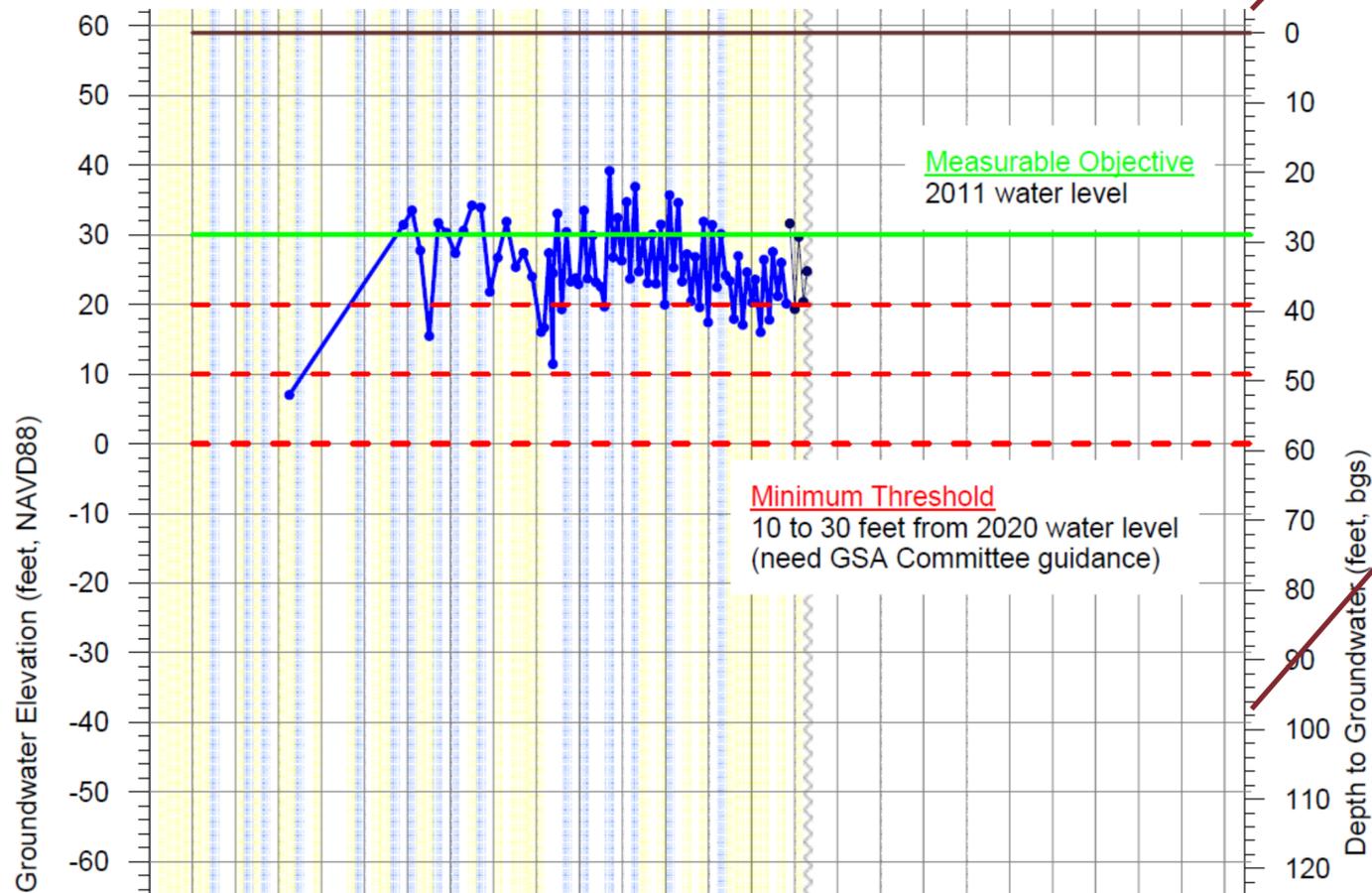


FIGURE xxx

Well 7N/34W-29N6



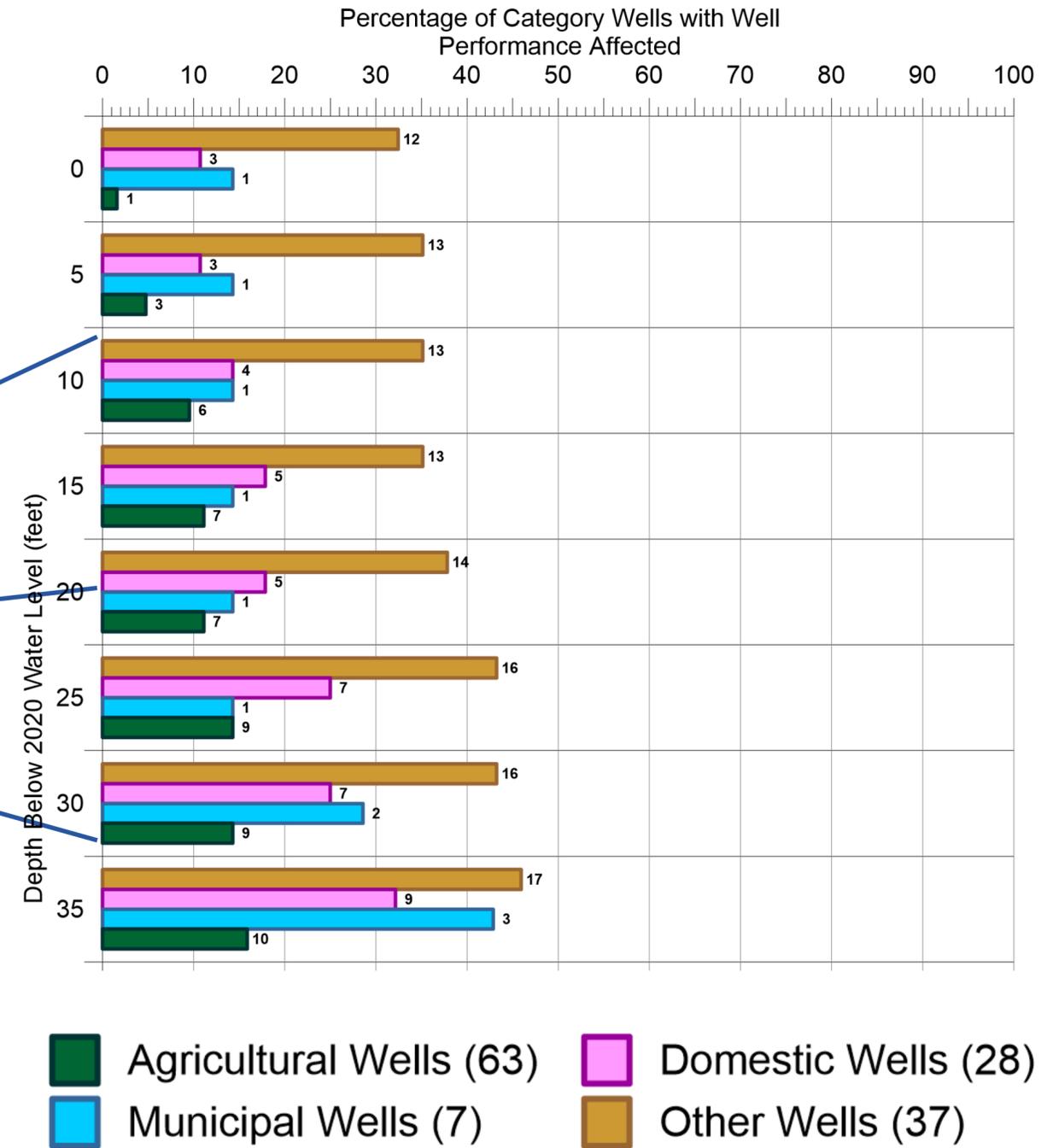
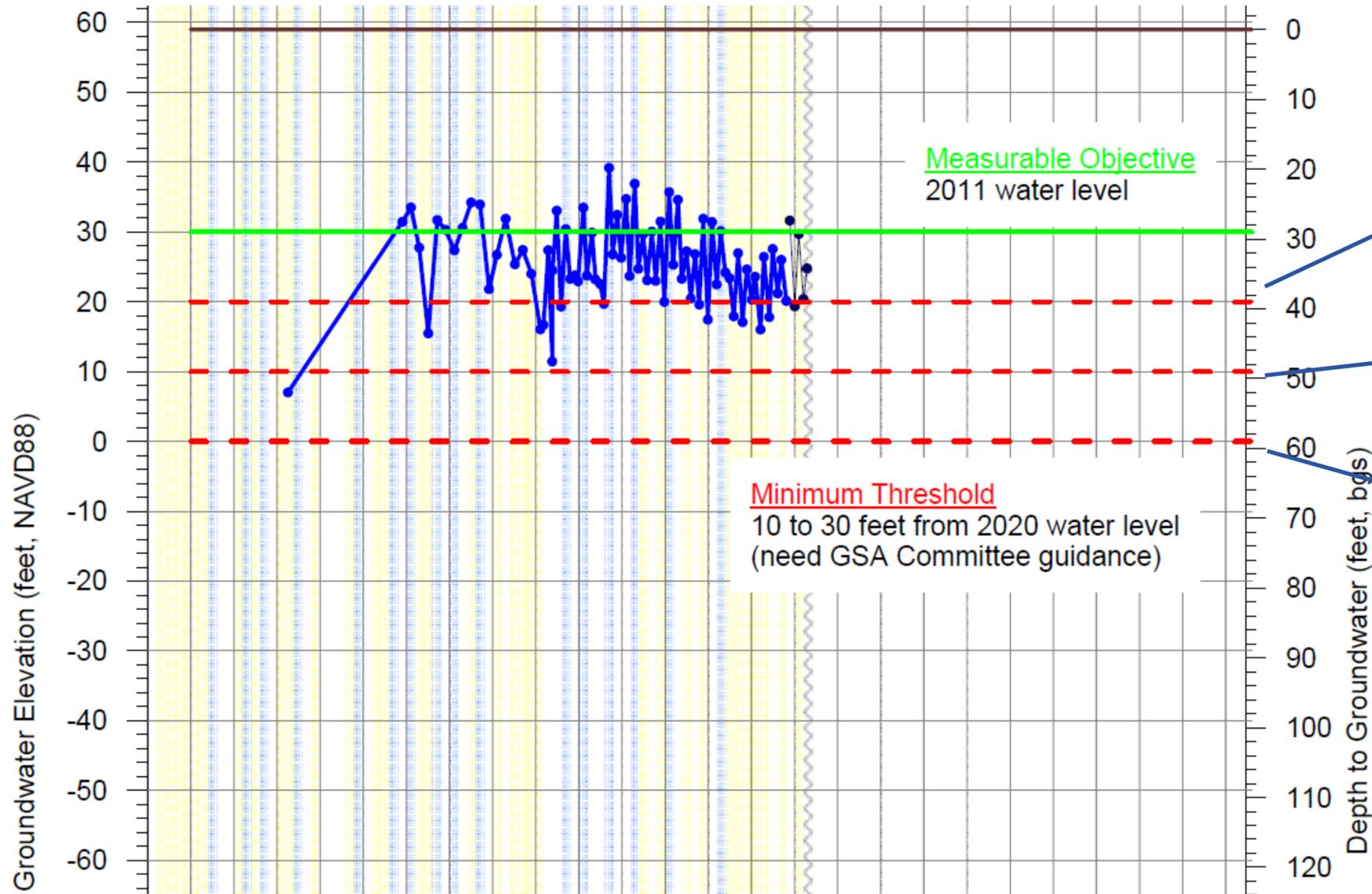
Well 7N/35W-24J4



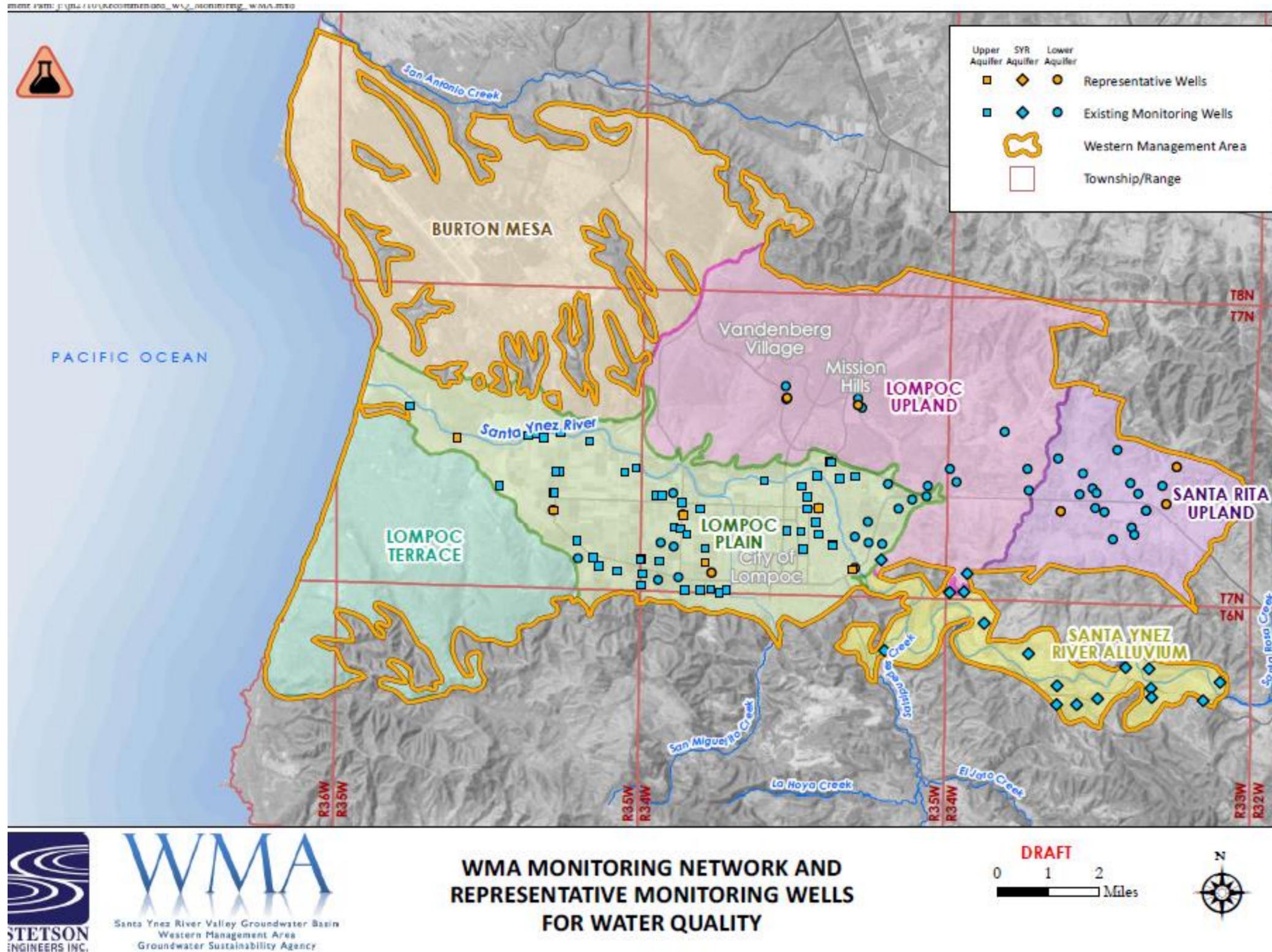
Proposed Minimum Thresholds and Undesirable Results

Water Levels and Water in Storage - Well Impact Analysis

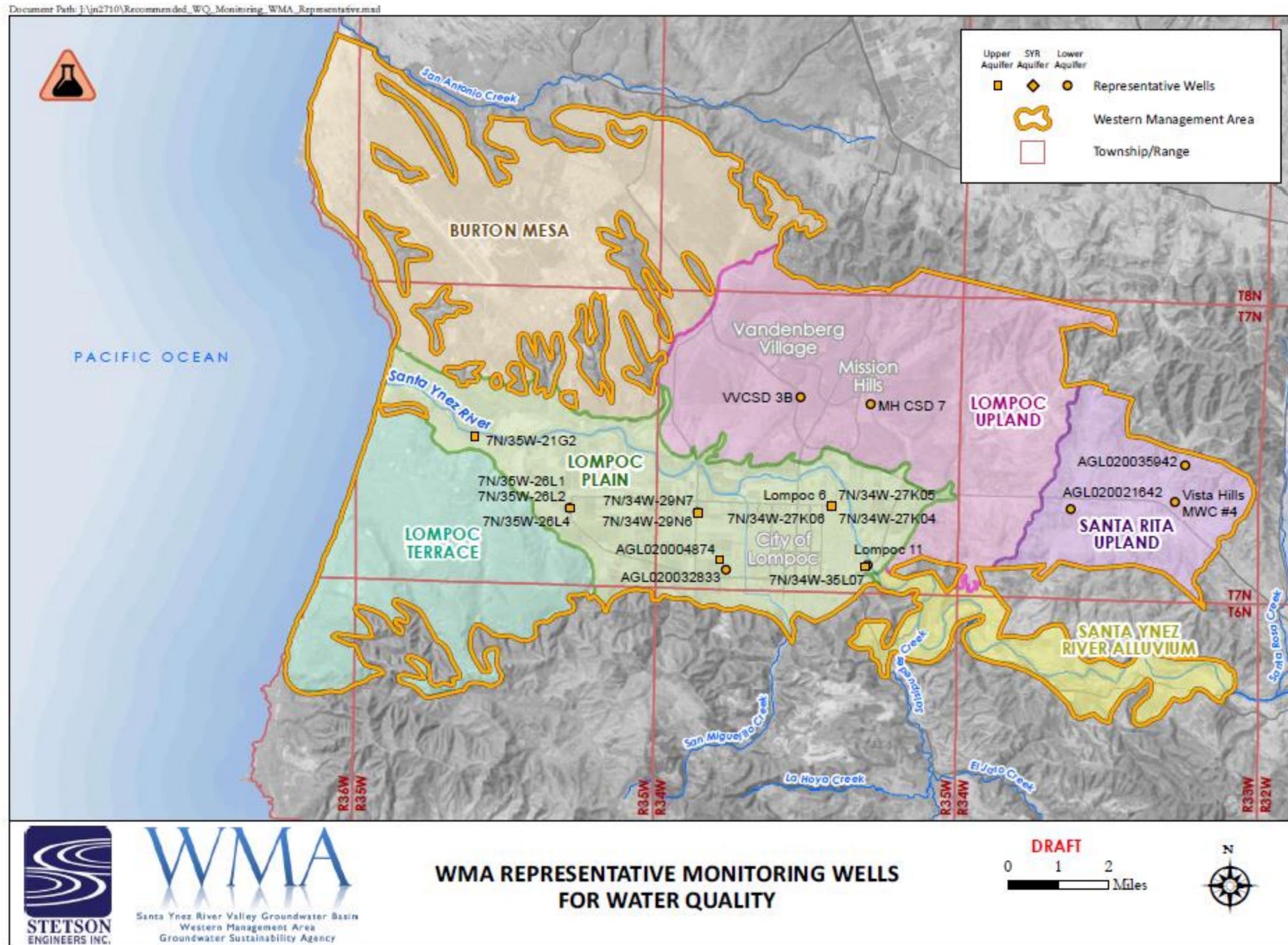
Well 7N/35W-24J4



Current Monitoring Program – Water Quality



Wells Identified for Representative Monitoring Groundwater Quality



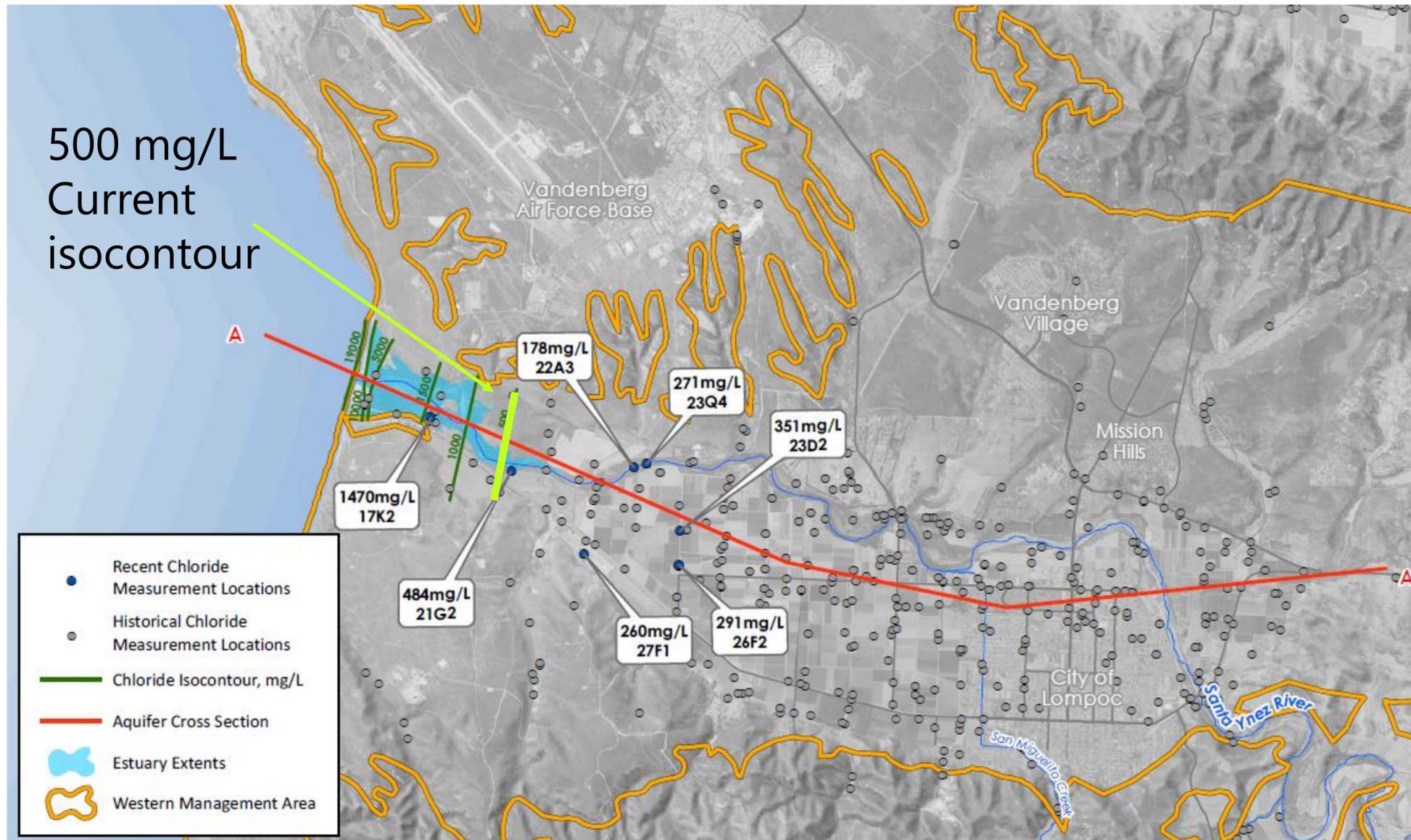
Undesirable Results: Water Quality

Subarea	Salinity as Total Dissolved Solids (TDS)		Chloride		Sulfate		Boron		Sodium		Nitrate as N	
	WQO (mg/L)	Avg 2015-2018	WQO (mg/L)	Avg 2015-2018	WQO (mg/L)	Avg 2015-2018	WQO (mg/L)	Avg 2015-2018	WQO (mg/L)	Avg 2015-2018	WQO (mg/L)	Avg 2015-2018
Lompoc Plain	1250	1600	250	285	500	518	0.5	0.666	250	190	2	9.9
Lompoc Upland	600	756	150	157	100	174	0.5	0.29	130	89	2	1.9
Lompoc Terrace	750	-	210	-	100	-	-	-	100	-	1	-
Santa Rita Upland	1500	583	150	95	700	149	0.5	0.248	100	68	1	1.5

- Salt and nutrient concentrations are higher than Basin Plan Water Quality Objectives in the Lompoc Plain and Lompoc Upland
- Measurable Objectives for SGMA to be the Water Quality Objectives from the Basin Plan
- Water Quality Thresholds established at current condition concentrations
 - Exception: Minimum threshold for Nitrate is the MCL of 10 mg/L
- SMCs not set for Santa Ynez River Alluvium Subarea
 - Water quality impacted by releases from Cachuma Reservoir in accordance with water rights

Undesirable Results for Seawater Intrusion

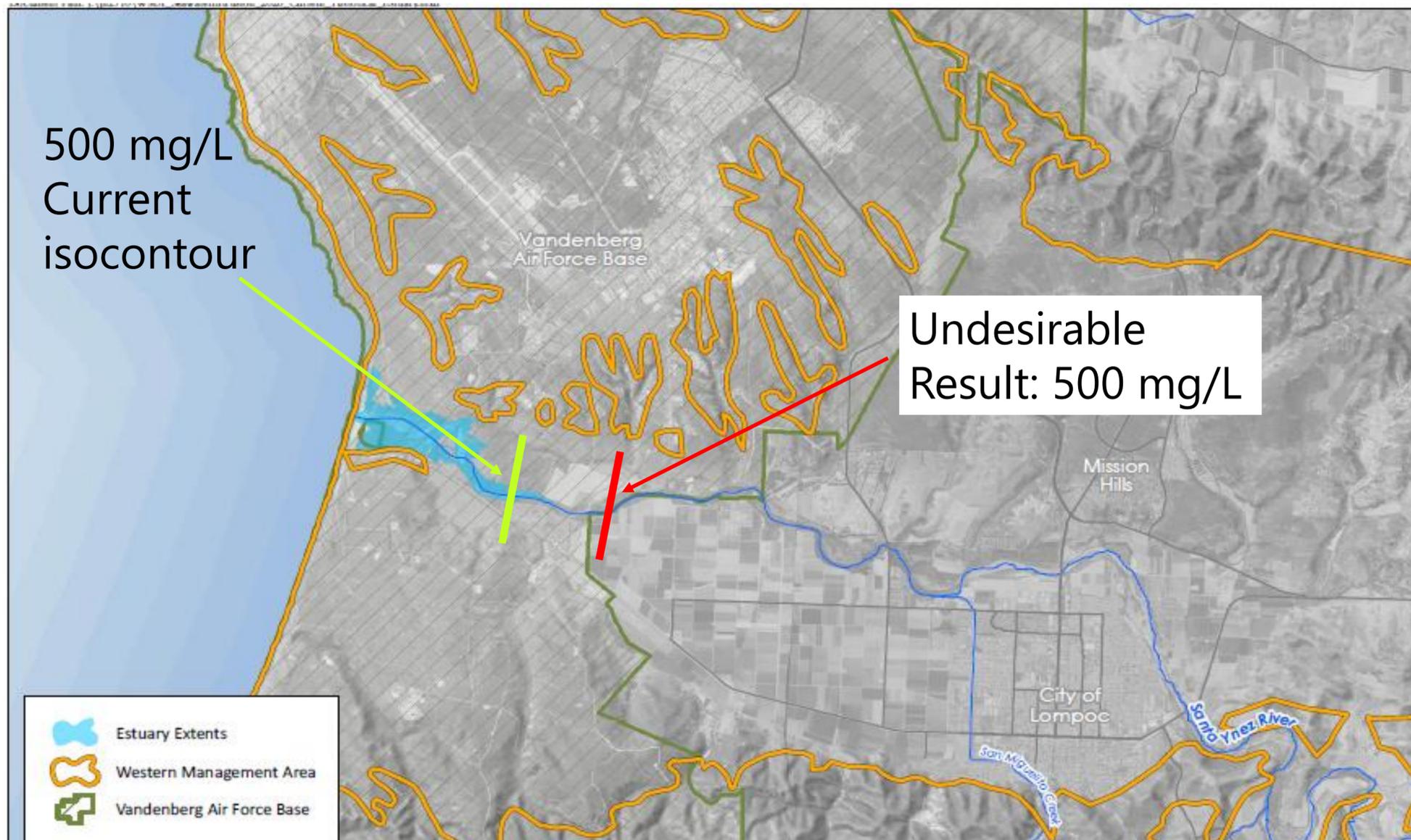
“...chloride concentration isocontour where seawater intrusion may lead to an undesirable result” (§354.28 (c) (1) – Minimum Thresholds)



- Chloride concentration trends are not indicative of historical seawater intrusion
- Title 22 Secondary Drinking Water Standard for Chloride:
 - Recommended Standard: 250 mg/L
 - Upper Limit: 500 mg/L
 - Short-term limit: 600 mg/L

Undesirable Results for Seawater Intrusion

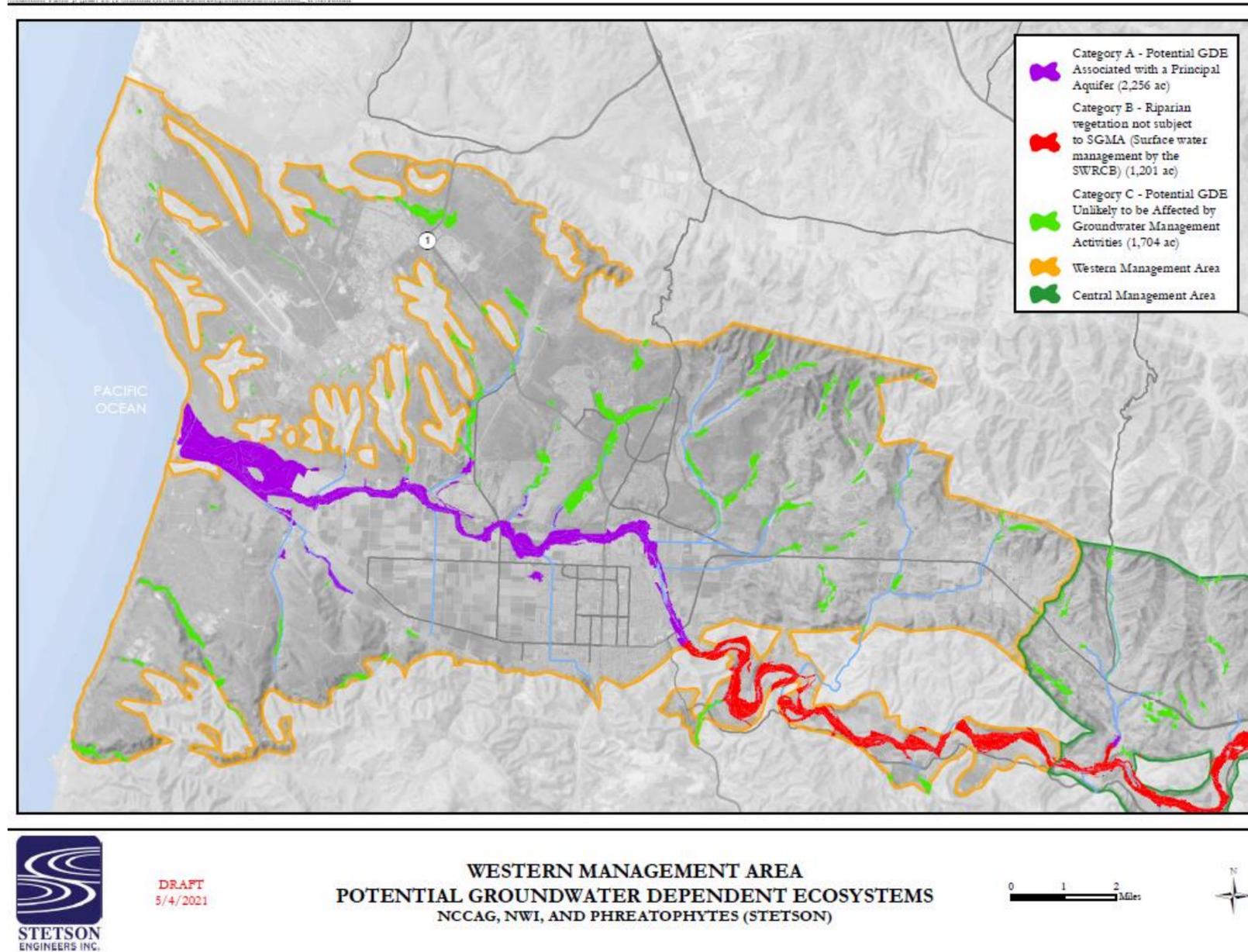
“...chloride concentration isocontour where seawater intrusion may lead to an undesirable result” (§354.28 (c) (1) – Minimum Thresholds)



- Title 22 Secondary Drinking Water Standard for Chloride:
 - Recommended Standard: 250 mg/L
 - Upper Limit: 500 mg/L
 - Short-term limit: 600 mg/L
- Undesirable for 500 mg/L to migrate east of Vandenberg Air Force Base

Undesirable Results: Interconnected Surface Water

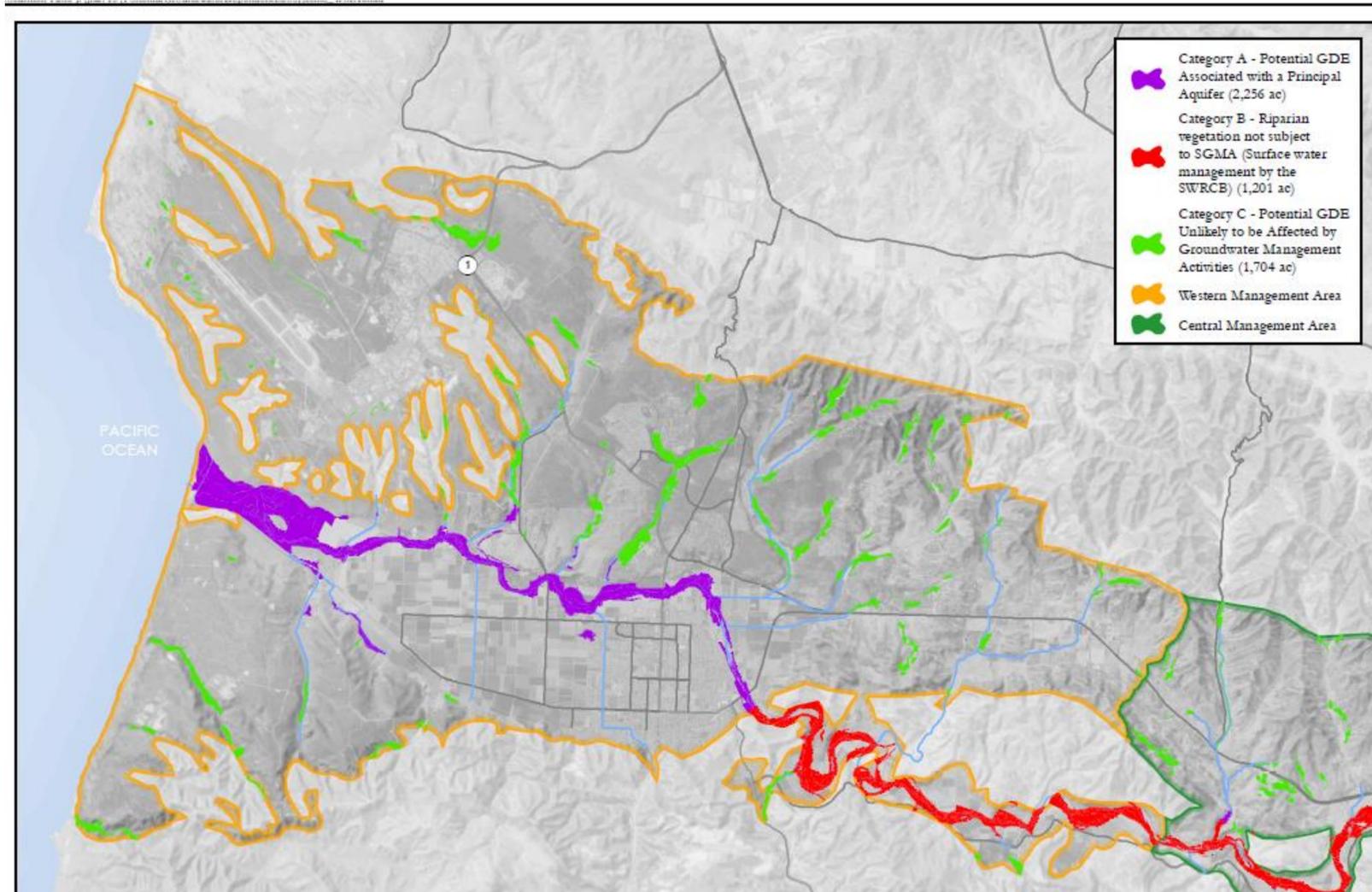
“...the rate or volume of surface water depletions *caused by groundwater use* that has adverse impacts on beneficial uses of surface water” (§354.28 (c) (1) – Minimum Thresholds)



- Category A:
 - Health of vegetation communities has remained stable since 1985 (TNC, 2021)^a
 - Not considered vulnerable to groundwater production (Jones and Stokes 2000)
 - Groundwater levels managed by releases from Cachuma Reservoir under SWRCBC Order 2019-148
 - Proposed Undesirable result:
 - Groundwater elevations near the SY River that drop below historical low water levels in the Upper Aquifer

Undesirable Results: Interconnected Surface Water

“...the rate or volume of surface water depletions *caused by groundwater use* that has adverse impacts on beneficial uses of surface water” (§354.28 (c) (1) – Minimum Thresholds)



- Depletion of interconnected surface water assessed by identifying the presence of groundwater dependent ecosystems (GDEs)
- Category C:
 - Not likely affected by groundwater management
 - No undesirable results established



DRAFT
5/4/2021

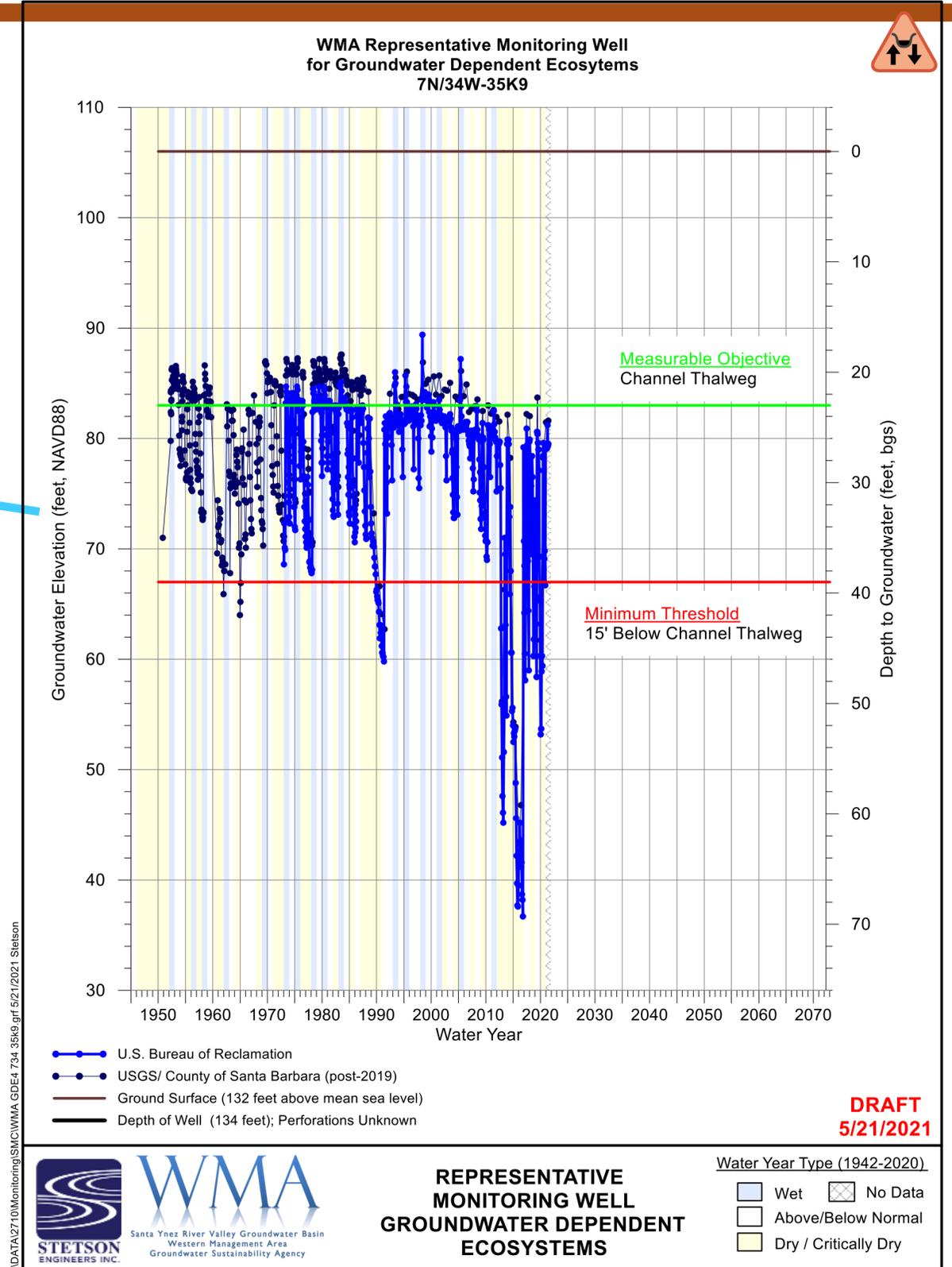
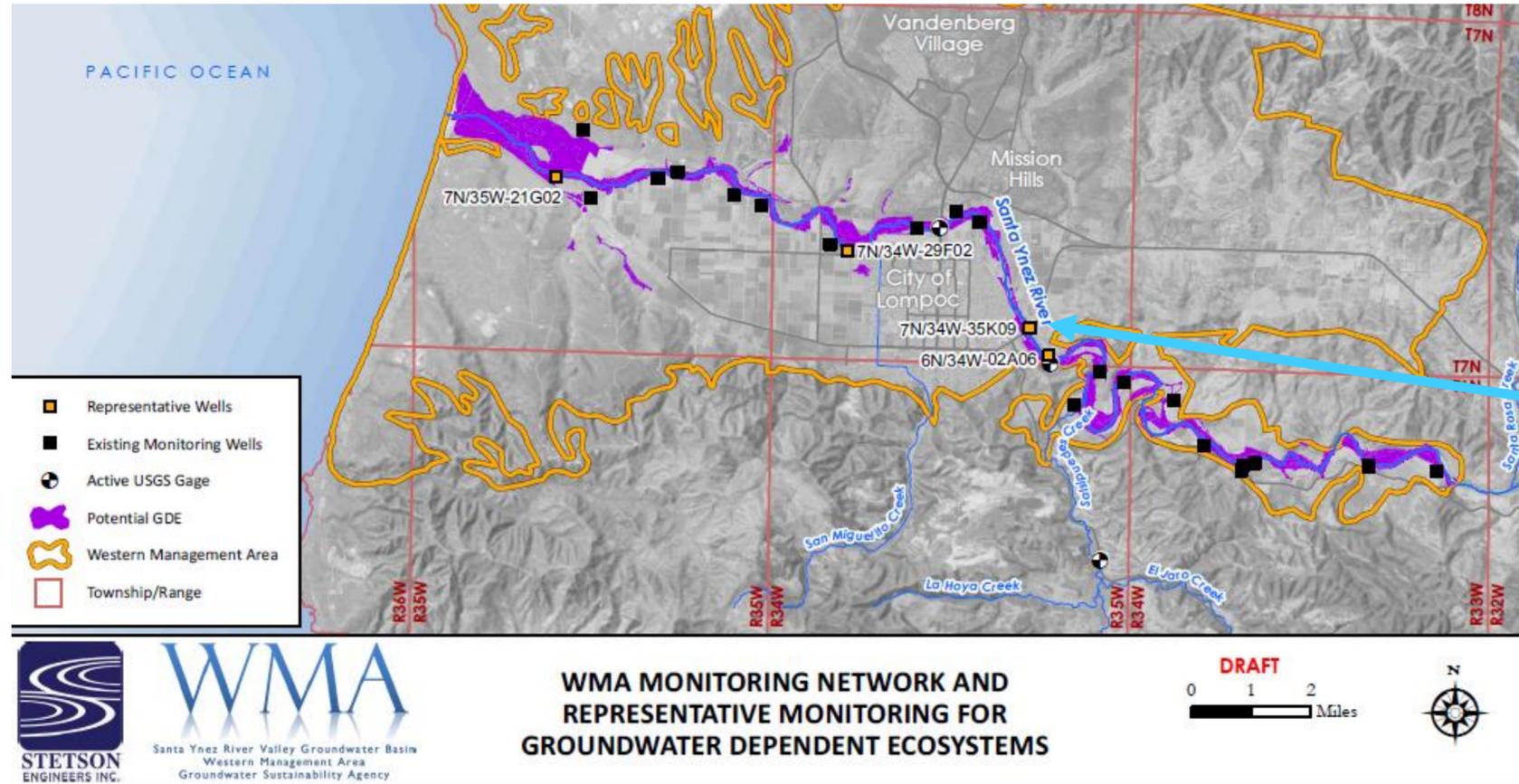
WESTERN MANAGEMENT AREA
POTENTIAL GROUNDWATER DEPENDENT ECOSYSTEMS
NCCAG, NWI, AND PHREATOPHYTES (STETSON)

0 1 2 Miles



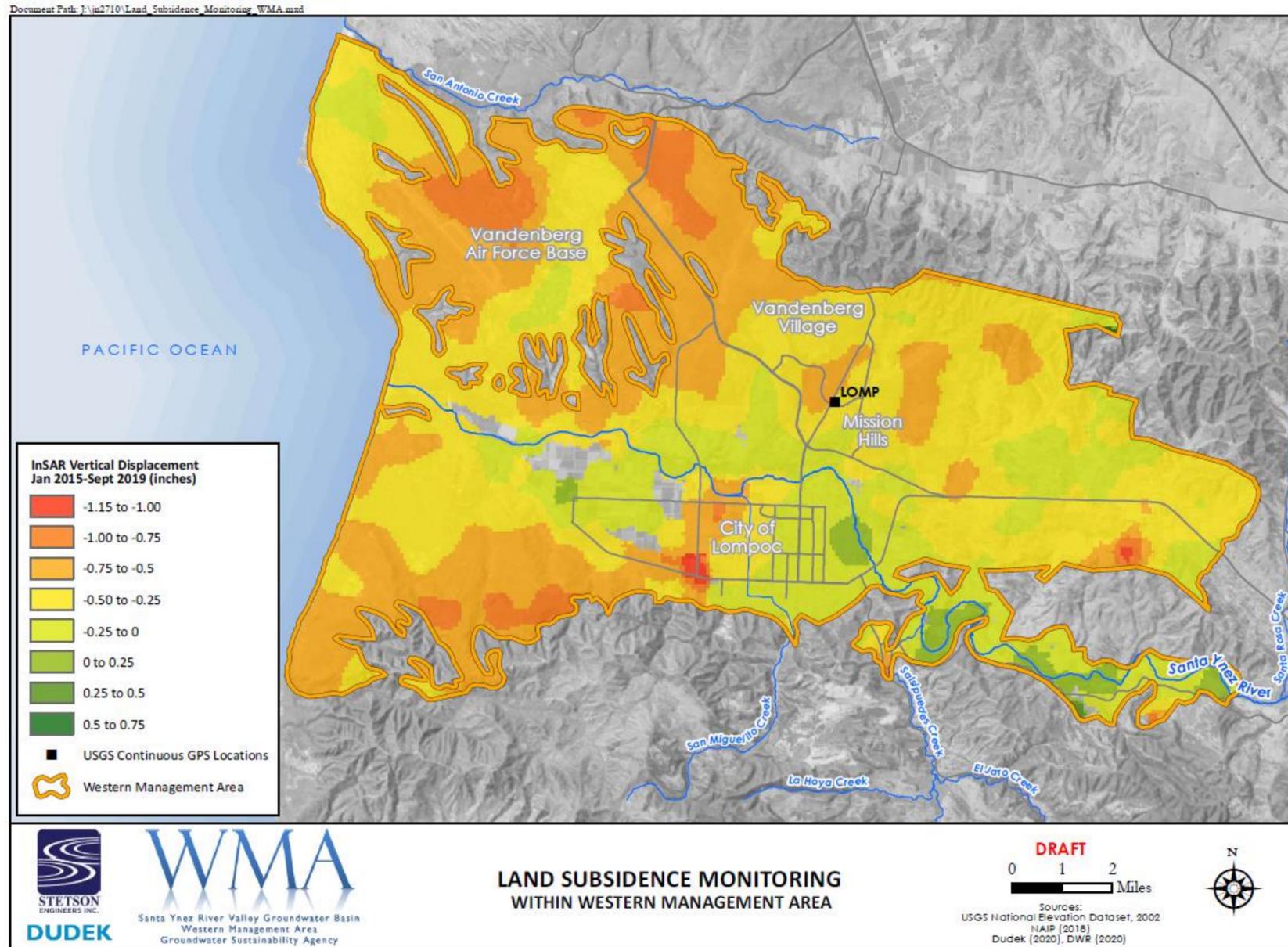
FIGURE XX

Undesirable Results: Interconnected Surface Water



Undesirable Results: Land Subsidence

“...the rate and extent of subsidence that substantially interferes with land uses and may lead to undesirable results” (§354.28 (c) (1) – Minimum Thresholds)



- No historical evidence of groundwater-related subsidence in the WMA:
 - City of Lompoc, Solvang Public Works Department, Santa Ynez River Conservation District, Central Coast Water Authority
- Undesirable Results not likely to occur
- Propose:
 - Ongoing monitoring of InSAR data, continuous GPS data, and reported infrastructure failure by relevant agencies
 - Proposed minimum threshold of a half-foot of subsidence from 2015 elevation caused by groundwater extraction and interfering with land uses or infrastructure.

Projects and Management Actions

- "...a description of the projects and management actions the Agency has determined will achieve the sustainability goal for the basin, including projects and management actions to respond to changing conditions in the basin." (§354.44 (a))
- May be set to achieve aspirational goals
- Triggered in response to approach of minimum thresholds
- Projects and Management Action example project purposes:
 - Fill data gaps
 - Increase water supply
 - Increase water use efficiency
 - Respond to emergencies or droughts
 - Improve water quality

Example Projects and Management Actions

WESTERN MANAGEMENT AREA:

Data Gaps:

- Video Logging
- Well Metering Program

Improve Water Quality:

- Water softener ban
- Groundwater pre-treatment

Increase Water Supply:

- Lompoc Regional Water Treatment Plant Groundwater Recharge Project
- Diversion of Santa Ynez River water to spreading basins

Drought/Emergency Response:

- Interconnection of Lompoc, Mission Hills, and Vandenberg Village water systems
- Groundwater well deepening

Example Projects and Management Actions

BASIN WIDE:

Data Gaps:

- Continued geophysical studies

Increase Water Supply:

- Watershed management programs
- Phreatophyte removal program

Questions?

