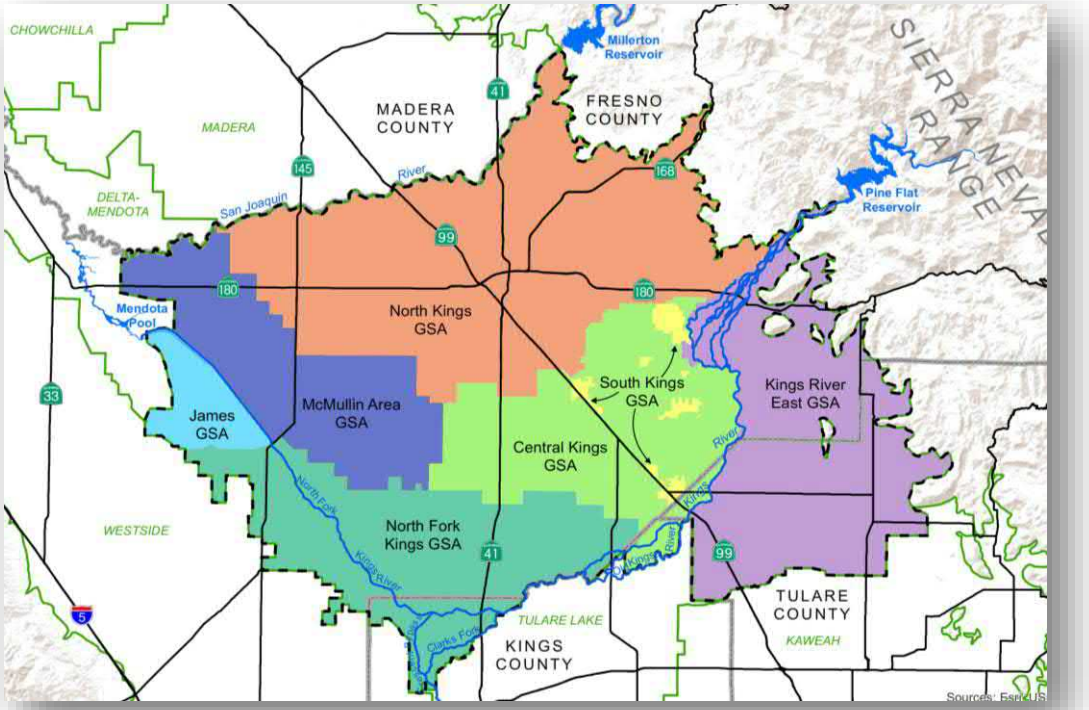
Kings Subbasin
Groundwater Sustainability Agencies



Groundwater Sustainability Annual Report

April 2022

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Abbreviations

AF	Acre-Foot
AF/YR	Acre-Foot Per Year
Coalition	Kings River Water Quality Coalition
CVDRMP	Central Valley Dairy Representative Monitoring Program
CVP	Central Valley Project
DWR	Department of Water Resources
EDT	Electronic Data Transfer
ET	Evapotranspiration
FID	Fresno Irrigation District
GAMA	Groundwater Ambient Monitoring and Assessment
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
ILRP	Irrigated Lands Regulatory Program
JID	James Irrigation District
KRCD	Kings River Conservation District
KRWQC	Kings River Water Quality Coalition
NGS	National Geodetic Survey
SGMA	Sustainable Groundwater Management Act

Executive Summary

This is the annual report prepared for the Kings Subbasin for Water Year 2021. The Kings Subbasin has seven Groundwater Sustainability Agencies (GSAs) (see Figure 1-1), all of whom prepared and submitted individual Groundwater Sustainability Plans (GSPs). The seven GSAs have worked cooperatively since 2016 to coordinate the development of their GSPs and have jointly prepared this single annual report for the entire Kings Subbasin.

This report has been prepared in accordance with the requirements for annual reports as identified in the GSP Emergency Regulations (i.e., California Code of Regulations section on Groundwater Sustainability Plans). Included in the body of the report are the regulation requirements. The outline of this report is similar to the structure headings used in the common outline used for each of the GSPs within the basin. The following is a short listing of what is included in each of the sections:

- Section 1 Introduction – A brief introduction of the intent and purpose of this report.
- Section 2 Land Use – A description of recent available land use data used in the report for the estimation of groundwater pumping.
- Section 3 Groundwater Pumping – An estimation of the GW pumping within the basin and a description of how the estimation was calculated.
- Section 4 Sustainable Management Criteria – A update as to the status of each of the Sustainability Indicators applicable to the basin, including groundwater levels (hydrographs and contours), estimation of groundwater storage change, groundwater quality data, land subsidence and surface to groundwater interconnection.
- Section 5 Monitoring Network – A description of any changes or problems with the monitoring network.
- Section 6 – An update of project and management actions undertaken during the reporting period.

This annual report includes data from Water Year 2021 (Oct 2020 to Sept 2021), however in several places additional data from 2015 is included.

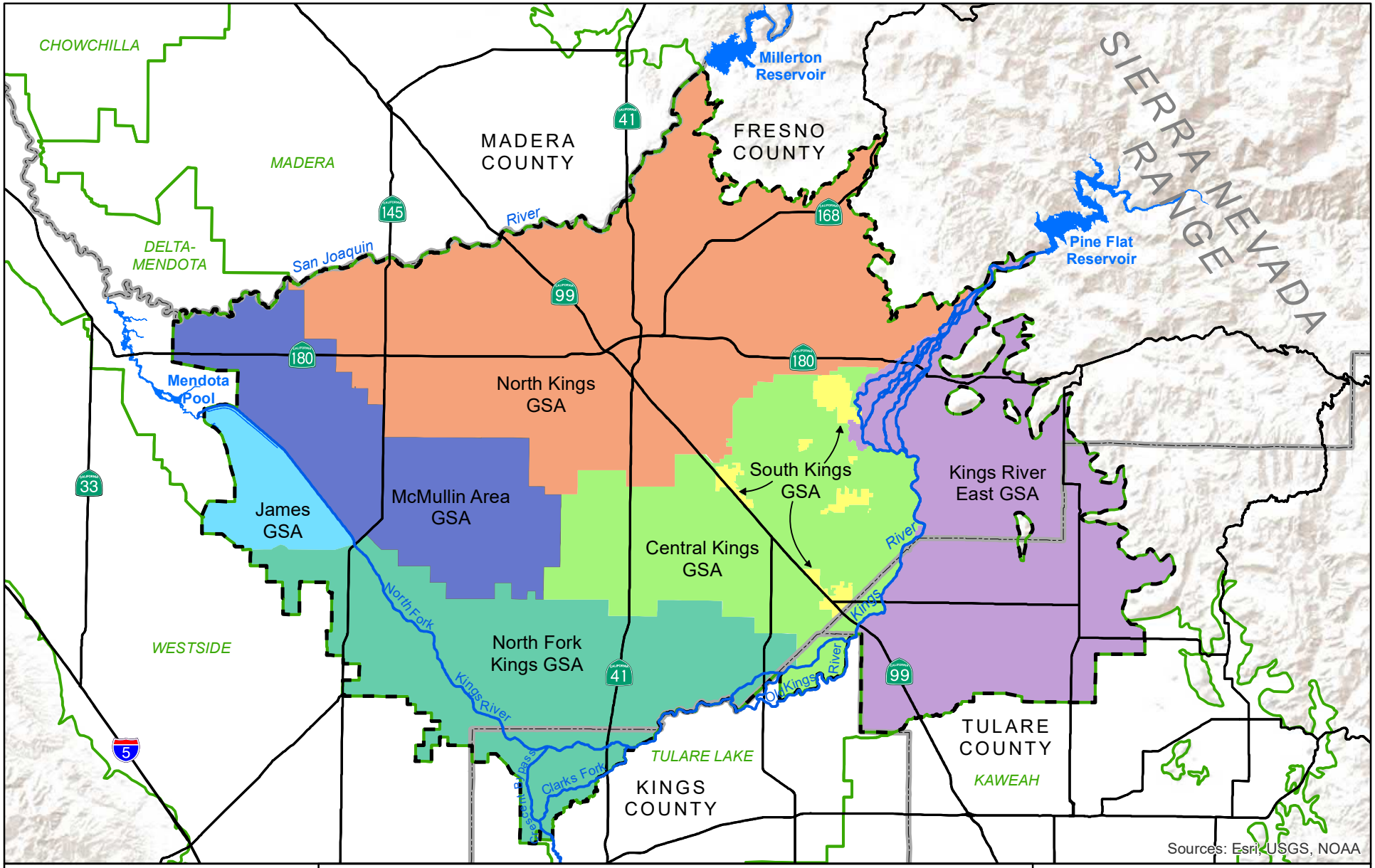
1 Introduction

356.2(a) General information, including an executive summary and a location map depicting the basin covered by the report.

The Sustainable Groundwater Management Act (SGMA) requires groundwater sustainability agencies (GSAs) to submit annual reports to DWR each April 1 following adoption of a groundwater sustainability plan (GSP). This is the annual report prepared for the Kings Subbasin for Water Year 2021. The Kings Subbasin has seven Groundwater Sustainability Agencies (GSAs) (see **Figure 1-1**), all of whom prepared and submitted individual Groundwater Sustainability Plans (GSPs). The seven GSAs have worked cooperatively since 2016 to coordinate the development of their GSPs and have jointly prepared this single annual report for the entire Kings Subbasin.

This report has been prepared in accordance with the requirements for annual reports as identified in the GSP Emergency Regulations (i.e., California Code of Regulations section on Groundwater Sustainability Plans). GSP annual reports provide information on groundwater conditions and implementation of the plan for the prior water year. The period covered by this report is October 1, 2020 through September 30, 2021, however there are portions of the report that cover from 2015 to 2021.

The structure of this annual report is similar to the common heading structure used for all of the GSPs in the basin. For additional clarification or information on the basin plan area or conditions, please refer to the GSPs. As acknowledged by the Department of Water Resources, it is important to note that there are still some data gaps and missing information as the GSAs continue to gather information for improved analysis and decision making.



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2 Land Use and Surface Water Supplies

356.2(b) (3) Surface water supply used or available for use, for groundwater recharge or in-lieu use shall be reported based on quantitative data that describes the annual volume and sources for the preceding water year.

2.1 Overview of Surface Water Supplies in Kings Basin

Surface water in the Kings Basin comes from several sources, including the Kings River and San Joaquin River, with smaller amounts imported from other areas. In general, the Kings River provides about 85% of the surface water used in the Kings Basin. Central Valley Project water from the Friant Unit comprises about 10% of surface water use. The remaining surface water include South of Delta CVP water, San Joaquin River Settlement water, and riparian diversions from the Kings and San Joaquin Rivers.

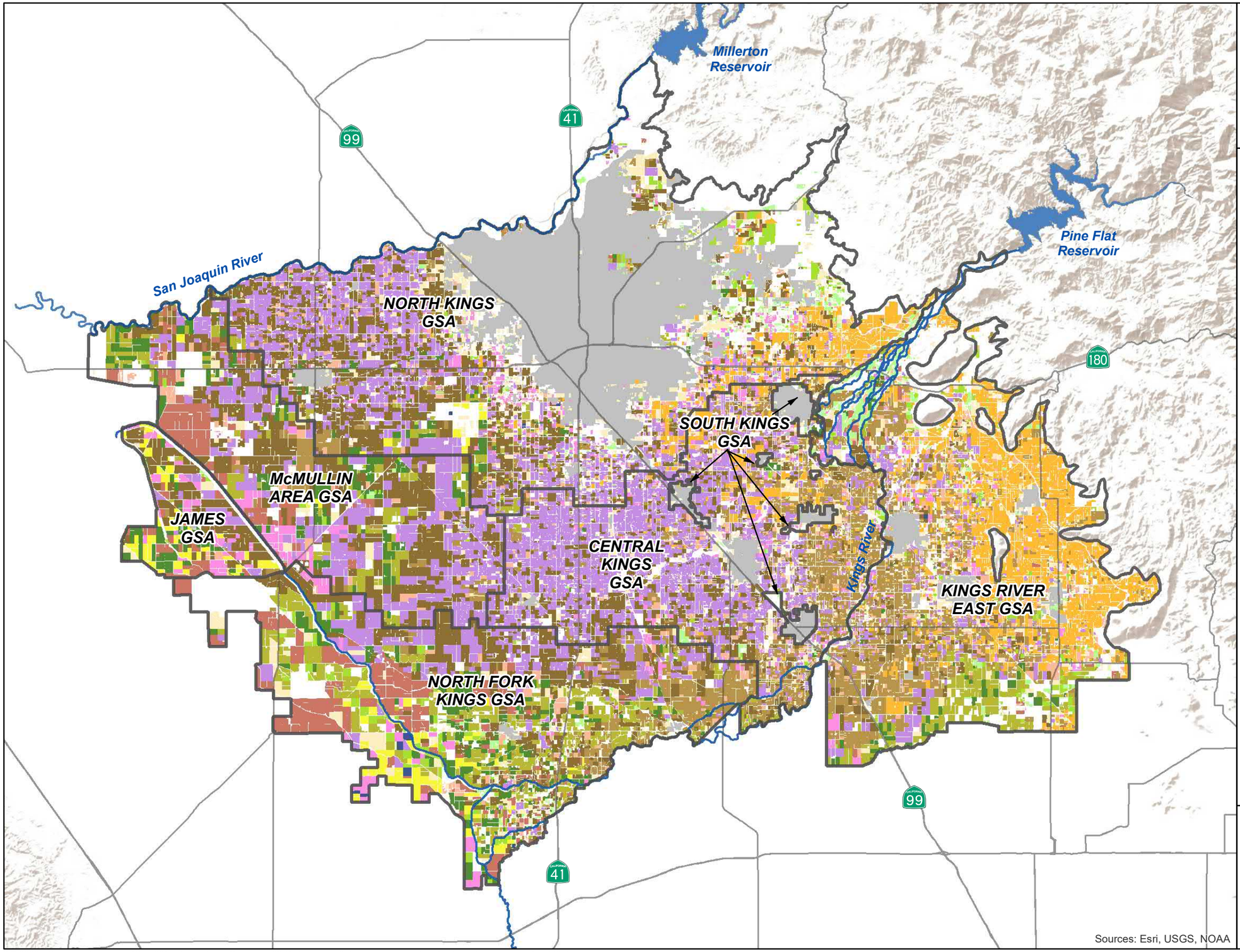
2.2 Recent Land Use Data

Historically, DWR Land Use Maps have been utilized for land use data in the Kings Basin. These maps were used in developing all the Groundwater Sustainability Plans in the Subbasin, and for consistency, were also used in estimating water demands for this report. The most recent DWR land use mapping was prepared in 2018. This is considered the best available information for 2021. **Figure 2-1** is the DWR Land Use Map for 2018.

Kings Subbasin

Land Use (DWR 2018)

Figure 2-1



Legend

- Kings Subbasin GSAs
- Highway
- Waterway

Land Use (DWR 2018)

- Citrus
- Grapes
- Pistachios
- Almonds
- Misc Deciduous
- Cotton
- Corn, Sorghum and Sudan
- Alfalfa and Alfalfa Mixtures
- Misc Grain and Hay
- Mixed Pasture
- Misc Field Crops
- Truck, Nursery, and Berry Crops
- Young Perennials
- Urban
- Idle

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Sources: Esri, USGS, NOAA

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Crop water demands for agricultural areas were calculated based on the land use map, estimated evapo-transpiration rates, and effective precipitation estimates. Evapotranspiration was based on DWR values published in DWR Bulletin 160 (DWR, 2019) for 1998-2011, with reference ETo adjusted for 2021 based on the California Irrigation Management Information System (CIMIS) station at Parlier. Effective precipitation was based on an empirical formula from DWR (1989). Annual precipitation contours were generated from several local weather stations, and the monthly distribution throughout the Basin was assumed to be similar to the long-term monthly distribution at the Fresno Airport Weather Bureau station.

The 2018 DWR Land Use Map was compared to the 2016 DWR Land Use maps for consistency and changes in land use. In general, the total irrigated area has changed little since 2016, although there was a slight increase in some GSAs. In addition, the mix of cropping did change in all of the GSAs. Specifically the area of grains, hay, alfalfa and young perennials decreased, while the area of almonds, pistachios and citrus increased. Unit evapotranspiration rates were also higher than previous periods, and effective precipitation was very low due to the low overall precipitation. This resulted in higher crop water demands than previous years and higher groundwater pumping because of reduced surface water supplies.

2.3 Description of Hydrology for Period

Table 2-1 shows the hydrologic year type for water years 2015 to 2021 based on an index created for the Kings Groundwater Sub-basin. The water year types were defined based on percentage of average long-term Kings River diversions to the Kings Subbasin from 1955-2021. The water year types include: Dry (<75%), Normal (75%-125%) and Wet (>125%). This index is used since Kings River water provides the majority of surface water in the Kings Groundwater Sub-basin and is considered a good overall indication of wetness and correlates with the amount of groundwater required to be pumped. Several years prior to 2021 are shown since they influence antecedent conditions, including groundwater levels, soil moisture content and surface water storage. Water years 2017-2019 were overall wetter than average but were preceded by an extremely dry period. Overall, the last seven years were on average 14% drier than average conditions. This period also includes extreme dry and extreme wet years, which is reflective of the variability of Kings River water supply.

Table 2-1 – Water Year Type (2015-2021)

Water Year	% Historical Diversions	Water Year Type
2015	20%	Dry
2016	75%	Normal
2017	158%	Wet
2018	100%	Normal
2019	151%	Wet
2020	75%	Normal
2021	**23%**	**Dry**
Average	86%	Normal

Note: Water Year includes October of previous year to September of current year. Values rounded to nearest whole number.

2.4 Surface Water Deliveries

Table 2-2 summarizes the surface water source and surface water uses in the Kings Basin in water year 2021.

Table 2-2 – Kings Basin Surface Water Deliveries (WY2021)

Source	Volume (AF)
Kings River	246,000
Other	89,000
Total	335,000

Notes:
1 - 'Other' Water Sources include Friant CVP water, South of Delta CVP water, Schedule 2 San Joaquin River Settlement water, riparian diversions from the Kings River and San Joaquin River, recycled water, and other surface water supplies.
2- Values rounded to nearest 1,000 AF, values may differ due to rounding errors

Table 2-3 summarizes surface water use by water use sector.

Table 2-3 – Kings Basin Surface Water Use (WY2021)

Water Use	Volume (AF)
Direct Use	313,000
Managed Recharge	22,000
Total	335,000

Notes:
1 – Direct use includes urban and agricultural use
2 – Managed Recharge only includes intentional recharge. Other sources of groundwater recharge including canal seepage, pipeline leakage and wastewater effluent recharge occur in the Subbasin but are not included in the value above, because they do not fall under DWR's definition of Managed Recharge.
3 – Values rounded to the nearest 1,000 AF, values may differ due to rounding errors

Accuracy

Accuracies of measured and estimated surface water supplies are based on confidence intervals for water budgets developed by Cal Poly Irrigation Training and Research Center (1999). Surface water diversions for agricultural and urban uses are measured with flumes or weirs with accuracies of about +/-5%. Surface water for intentional recharge is based on deliveries to recharge basins. Some recharge basins are metered with accuracy estimated at +/-5%. Some recharge deliveries were not metered and were estimated based on deliveries to metered basins or observations by field staff, with overall accuracies estimated at +/- 25%. Overall, intentional recharge deliveries have an estimated accuracy of +/-15%.

More detailed surface water data is provided in **Appendix A,** including the DWR Surface Water Supply table.

3 Groundwater Pumping

356.2(b) (2) Groundwater extraction for the preceding water year. Data shall be collected using the best available measurement methods and shall be presented in a table that summarizes groundwater extractions by water use sector, and identifies the method of measurement (direct or estimate) and accuracy of measurements, and a map that illustrates the general location and volume of groundwater extractions.

Following are discussions on the types of groundwater pumping in the Kings Groundwater Basin, including the pumping volumes, source of the information, measurement method and level of accuracy.

3.1 Urban Groundwater Use

Urban groundwater use includes pumping for cities and other municipalities, collectively called Municipal and Industrial (M&I) use, and rural domestic pumping. M&I groundwater pumping is metered and recorded with accuracies of +/- 5%.

Rural domestic groundwater pumping is not measured and was estimated based on census data in rural areas, and an assumed 0.5 AF/capita/year based on typical indoor water usage and landscaped areas in the region. These estimates have an accuracy of +/-20% and only comprises a small portion of the total urban demands. This was the same method used in the GSPs prepared for the Kings Basin.

3.2 Irrigation Groundwater Use

Groundwater is used extensively for crop irrigation throughout the Kings Basin. In James GSA, there are no private irrigation wells, and all irrigation groundwater is pumped by wells owned and operated by James Irrigation District (JID). JID also owns and operates some wells in McMullin Area GSA that deliver groundwater to the JID system. The JID wells are all metered with measurement accuracy of +/-5%.

Irrigation groundwater in the other GSAs is pumped from private wells that are not metered. Pumping from these wells was estimated through a water budget approach, which has an estimated accuracy of +/- 15%. This is also called the 'Land Use' method, since it is based largely on the water demands of the land use. Following are discussion on how this method was employed.

In a simple situation, groundwater pumping = crop applied water demands – surface water deliveries. However, in many areas surface water deliveries to growers differ from headgate diversions due to system losses and deliveries for intentional recharge. In these situations, irrigation groundwater pumping is estimated using the following formula:

Private Irrigation Pumping = (Crop evapotranspiration – effective precipitation) / irrigation efficiency – Surface water deliveries to growers

where:

Surface Water Deliveries to Growers = Headgate diversions – System losses – Intentional recharge

and

System Losses = Channel evaporation + Channel seepage + Reservoir evaporation + Reservoir seepage + Operational Spills

As a result, private irrigation pumping was calculated with the following formula:

Private Irrigation Pumping = (Crop evapotranspiration - effective precipitation) / Irrigation efficiency – Headgate diversions + Channel evaporation + Channel seepage + Reservoir evaporation + Reservoir seepage + Operational spills + Intentional recharge

These calculations were performed for each GSA for water year 2021.

No groundwater is pumped for environmental use or other uses not described above.

3.3 Groundwater Pumping Volumes

Table 3-1 summarizes the volumes of estimated groundwater for each measurement method.

Table 3-1 – Groundwater Measurement Methods (WY 2021)

Water Sector	Method	Volume (AF)	Accuracy
Agricultural	Land Use	2,061,000	+/-15%
M&I and Agricultural	Metered	187,000	+/-5%
Rural Domestic	Estimated	45,000	+/-20%
-	Total	2,293,000	-

Note: Values rounded to the nearest 1,000 AF, values may differ due to rounding errors

These values are also presented in the DWR Groundwater Extraction Methods table found in **Appendix A**

Table 3-2 summarizes the groundwater pumped by water use sector in water year 2021

Table 3-2 – Groundwater Pumping by Water Use Sector (WY 2021)

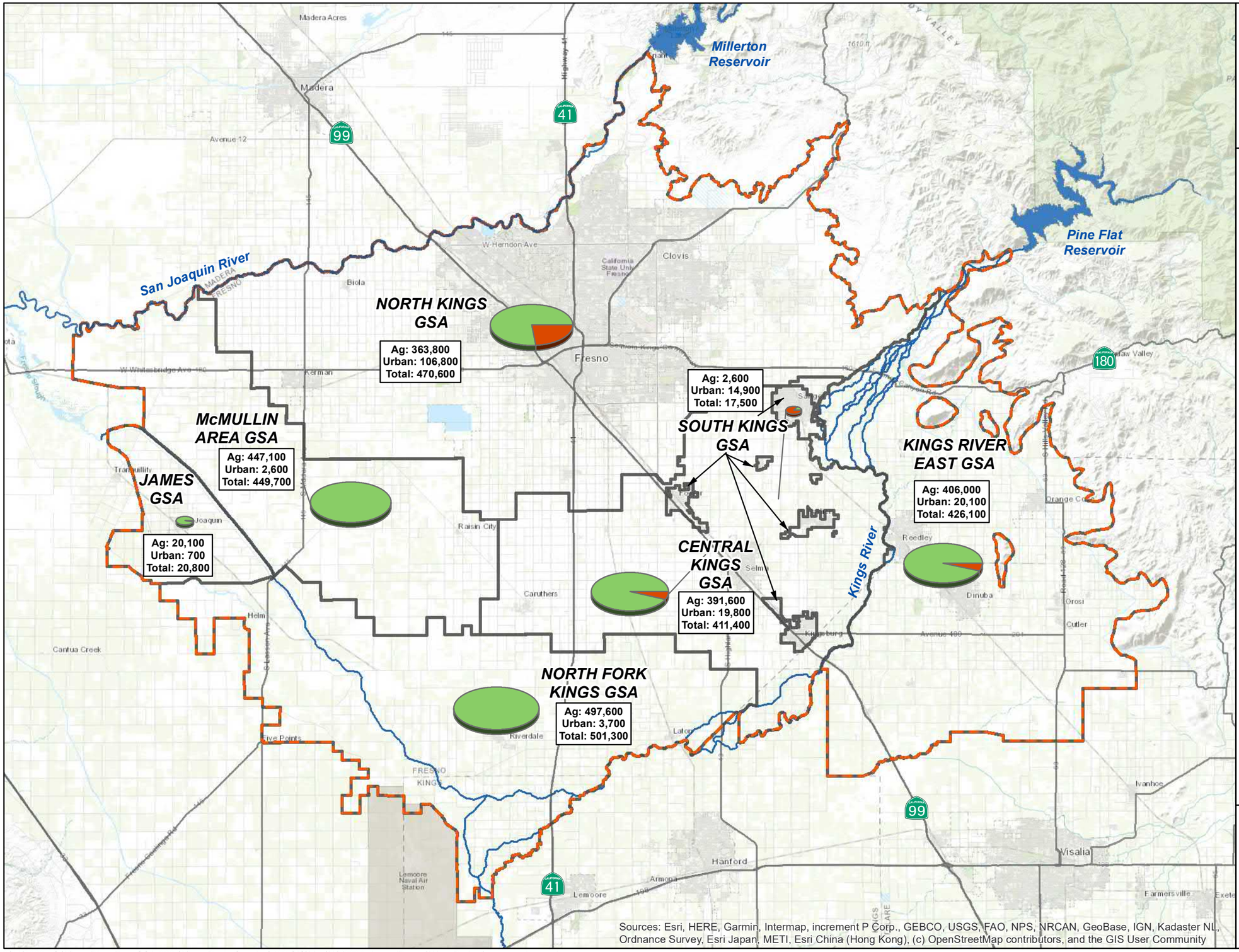
Source	Volume (AF)
Urban[1]	169,000
Agriculture[2]	2,125,000
Total	2,294,000

1 – Urban use includes M&I and rural domestic pumping
2 – Agricultural use includes crop irrigation and dairy water use
3 - Values are rounded to the nearest 1,000 AF, values may differ due to rounding errors

These values are also presented in the DWR Groundwater Extractions table found in **Appendix A**.

3.4 Geographic Distribution of Groundwater Pumping

Figure 3-1 shows estimated groundwater pumping (agricultural and urban) for each of the seven GSAs.



Kings Subbasin

Groundwater Extraction by GSA
Water Year 2021
(Acre-Feet)

Figure 3-1

Kings Subbasin GSAs

Kings Subbasin

Pumping By Water Use Sector (AF)*

Agriculture

Urban

*Volumes rounded to the nearest 100 AF

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3.5 Total Water Use

> 356.2(b) (4) Total water use shall be collected using the best available measurement methods and shall be reported in a table that summarizes total water use by water use sector, water source type, and identifies the method of measurement (direct or estimate) and accuracy of measurements. Existing water use data from the most recent Urban Water Management Plans or Agricultural Water Management Plans within the basin may be used, as long as the data are reported by water year.

Table 3-3 summarizes total water use by water use type and sector for WY2021

Table 3-3 – Summary of Total Water Use for WY 2021 (AF)

Description	Urban	Agriculture	Total
Groundwater	169,000	2,125,000	2,293,000
Surface Water	80,000	255,000	335,000
Total	249,000	2,380,000	2,628,000

Notes:
1 - Surface water includes contract diversions, riparian diversions and recycled water used for both recharge and direct use
2 – Values rounded to the nearest 1,000 AF; values may differ slightly from other reported values due to rounding errors

These values are also presented in the DWR Total Water Use table found in **Appendix A**. Refer to discussions in previous sections for information on measurement methods and accuracy.

The data presented in **Table 3-3** is a short snapshot of water conditions, and not necessarily representative of long-term average hydrology. This information was not used to develop a 2021 annual water budget for comparison to change in groundwater storage. An annual water budget would likely not be accurate due to time lags in various forms of recharge, and inaccuracies that tend to balance out over longer time periods. However, this information will eventually be used in a long-term multi-year water budget analysis.

4 Sustainable Management Criteria

4.1 Sustainable Goal

As identified in Section 4.1 of each of the GSPs, the sustainability goal of the Kings Subbasin and each GSA is to ensure that by 2040 the basin is being managed to maintain a reliable water supply for current and future beneficial uses without experiencing undesirable results. This goal will be met by balancing water demand with available water supply to stabilize declining groundwater levels without significantly and unreasonably impacting water quality, land subsidence, or interconnected surface water. The goal of the basin is to correct and end the long-term trend of a declining water table understanding that water levels will fluctuate based on the season, hydrologic cycle, and changing groundwater demands within the basin and its proximity.

4.2 Groundwater Levels

> 356.2(b) (1) (A) Groundwater elevation contour maps for each principal aquifer in the basin illustrating, at a minimum, the seasonal high and seasonal low groundwater conditions.
> 356.2(b) (1) (B) Hydrographs of groundwater elevations and water year type using historical data to the greatest extent available, including from January 1, 2015, to current reporting year.

The Kings Subbasin monitoring network includes hundreds of wells used for developing groundwater contour maps and estimating change in storage. As identified in the GSPs of the subbasin, a subset of these wells includes one hundred and twenty-four (124) indicator wells (Sustainable Management Criteria or SMC) in the Kings Subbasin for which Interim Milestones, Measurable Objectives and Minimum Thresholds have been set (**Figure 4-1**). **Appendix B** contains the groundwater elevation and depth to water data for each indicator well in tabular format for spring and fall for the years 2015 to 2021. **Appendix C** contains hydrographs for the indicator wells. These hydrographs graphically show Interim Milestones, Measurable Objectives, Minimum Thresholds and the trend line over the hydrologic base period from 1997 to 2012. The hydrographs have inset maps showing the location of the well within the respective GSA. Additional information on the hydrographs includes the well names (local and/or state names as available) and the ground surface elevation.

In general, since 2015, water levels continued to decline at the end of a historic drought and in some cases reaching lowest points recorded in fall 2021. After the wet 2016/2017 winter, groundwater levels generally rose though spring 2017 and continued to increase in some areas even through fall of 2017. Some wells continued to see increases in water levels, while some showed declines after the normal 2017/2018 winter. Some rebound occurred in the spring 2019 data in some wells after the wet 2018/2019 winter. From spring 2019 to fall 2020 water levels generally decreased as evidenced by the estimated storage change from fall 2019 to fall 2020. As well, the general trend in declining water levels continued from fall 2020 to fall 2021 and the estimated change in storage also increased over the previous period, as discussed below. Subbasin wide, the general trend is decreasing water levels in normal to dry years and increasing water levels in wet years.

There are only a few locations in the Subbasin where wells are known to be perforated solely below the Corcoran clay or the deeper confined portion of the aquifer east of the Corcoran clay. Newer community wells are typically sealed across shallow contaminated water and probably reflect hydraulic conditions in deeper groundwater. To date there is insufficient geographic distribution of data from wells known to be perforated below the Corcoran clay where it is present or from deeper wells east of the Corcoran clay to contour the lower aquifer zone or deep groundwater. However, since the last annual report, construction information has been obtained for several wells perforated solely below the Corcoran clay and a new nested/clustered monitor well was built in North Fork Kings GSA which has a casing perforated solely below the Corcoran clay, as well as casings between the Corcoran clay and the C clay, and a casing perforated above the C clay. Water level data from this monitor well will be useful in understanding the hydraulic conditions in the various aquifer zones in this hydrogeologically complex area. The Subbasin will continue to gather data to better define the groundwater conditions in the confined aquifer, but for now, data is only available to map the unconfined aquifer conditions.

4.2.1 Water Level Maps/Contours

Water surface elevation contour maps were generated for the unconfined aquifer for fall of each year from 2015 to 2020 and spring 2020 based on the available water level data and these maps were included in the Water Year 2020 Annual Report. This Annual Report has the spring and fall 2021 water

surface elevation contour maps in **Appendix D**. The seasonal high and seasonal low groundwater conditions for the 2021 water year are presented in **Appendix D** as the spring 2021 and fall 2021 water surface elevation contours maps respectively. The tabular water level data from spring and fall seasons from spring 2015 to fall 2021 are included here in **Appendix B**.

The water surface elevation contours represent the unconfined aquifer above the Corcoran clay and generally above the conceptual base of unconfined groundwater east of the Corcoran clay. In areas of the Subbasin where the shallow A clay is present these contours are meant to represent the portion of the aquifer below it but above the Corcoran clay. As well where the C clay is present, the contours are meant to represent the portion of the aquifer between the C clay and the Corcoran clay.

The number of wells evaluated within the Kings Subbasin to develop the groundwater surface elevation contours in spring and fall 2021 has increased to over 1,000 wells. Additional well data was also evaluated outside of the Kings Subbasin to assist in generating the contour maps but the number of wells with data available outside the Subbasin is variable and not included in the total number.

The process used to generate the contours was similar to what was used by the Subbasin for development of the GSPs. Well locations and groundwater elevations were plotted on the Kings Subbasin maps for the seasons being contoured. Groundwater level elevations that appeared inconsistent with the majority of other wells in an area were typically not used. Wells with significantly different water levels may be perforated in the confined portion of the aquifer, or may be composite wells perforated across clay layers, or may be perforated in shallow groundwater above the A clay where it is present or other local clays. In some locations where a well reading was significantly different than other wells in the immediate vicinity, it was discarded because it was believed that these readings were likely erroneous or anomalous (well pumping nearby, well recently pumped, oil, acoustic sounder reading, not enough steel tape, etc). Effort was made to use the same wells season to season in this evaluation so that the storage change calculations, described below, were not unduly affected by the use of data from different wells or data from wells that did not have data in the other season(s).

Groundwater elevation contours were generated utilizing ArcGIS software and then the contours were reviewed and edited for consistency, and to remove apparently anomalous data. It should be noted that some data was used, even if the data point was new or had not been used in other maps in the period, if the data was reasonably consistent with the contours. This is done so that through time more wells are used in the contouring process to better define the groundwater surface. A caveat to this is that the Cities of Fresno and Clovis supplied additional data which was not included for fall 2021 so that the water surface elevation contours and storage change calculations were consistent with past fall seasons. Use of this data will be evaluated in future seasons and incorporated as appropriate. The Subbasin is currently re-surveying all well elevations in the monitoring network, but at the time of this report, updated reference point elevations were only available for North Fork Kings GSA. Future water surface elevation maps will use the new survey data throughout the Subbasin as it becomes available. ArcGIS used the groundwater surface elevation and the 10 meter horizontal resolution USGS National Digital Elevation Model to create depth to water surfaces for use in the storage change estimation discussed below.

Kings Subbasin Coordinated Effort

Water Level Monitoring Network

Figure 4-1

Legend

- Indicator Well
- Groundwater Sustainable Agency
- Township/Range

T11S
T12S
T13S
T14S
T15S
T16S
T17S
T18S

R16E R17E R18E R19E R20E R21E R22E R23E R24E R25E

Madera Acres, Madera, Chowchilla, Fairmead, Tollhouse, Millerton Lake, Biola, Clovis, Fresno, Kerman, Tranquility, San Joaquin, Raisin City, Reedley, Selma, Orange Cove, Dinuba, Orosi, Cutler, Helm, Cantua Creek, Five Points, Riverdale, Laton, Ivanhoe, Visalia, Hanford, Armona, Lemoore, Farmersville, Exeter

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Sources: Esri, USGS, NOAA

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4.3 Groundwater Storage

356.2(b) (5) (A) Change in groundwater in storage maps for each principal aquifer in the basin.
356.2(b) (5) (B) A graph depicting water year type, groundwater use, the annual change in groundwater in storage, and the cumulative change in groundwater in storage for the basin based on historical data to the greatest extent available, including from January 1, 2015, to the current reporting year.

Technical Memorandum 2 in the Kings Subbasin GSPs identifies the current specific yield values used in storage change calculations for the Kings Subbasin. The change in groundwater storage per specific yield unit are illustrated on **Figure 4-2**. Specific yield values vary by location and depth and Technical Memorandum 2 describes specific yield at depth intervals from 10'-50', 50'-100', 100'-200' and 200'-300', and below 300 feet. Storage change was estimated based on changes in storage above 400' below the groundwater surface. Starting in fall 2015 storage change estimations were made from fall to fall to better temporally align with the October 1 to September 30 water year period (**Figure 4-3**). It should be noted that previous storage change estimates, prior to fall 2015, were prepared based on changes from spring to spring.

The process for estimating the groundwater storage change from fall 2020 to fall 2021 was the same process utilized by the GSAs in the Subbasin in preparation of their GSPs and previous annual reports and included the following steps:

1. The final wells selected from the water surface elevation review and contouring process were used to create depth to water surfaces, as described above.
2. Using the depth to water surfaces, the average depth to water value was determined for each unique specific yield unit. The average depth to water was determined using ArcGIS Spatial Analyst.
3. For each specific yield unit, the average depth to water of that area was used to determine the height of water above 400 feet for each depth zone.
4. The height of water in each depth zone was multiplied by the specific yield for that depth zone and then by the total acreage within that Specific Yield unit.
5. Values for each depth zone were added to determine total volume in storage above 400 feet.
6. The groundwater in storage volume by specific yield units were totaled by GSA to estimate the GSA total for that year.
7. Steps 1 through 6 were repeated for the ending year being considered.
8. The total volume in storage estimated for the starting year was subtracted from the total volume estimated for the ending year to determine the total change in volume between the two years.

Figure 4-2 shows the Subbasin specific yield units and which specific yield units had minimal (-0.1 to +0.1 AF per acre), increasing (>0.1 AF per acre) or decreasing (< -0.1 AF per acre) storage change from fall 2020 to fall 2021.

There is some inconsistent well data in certain areas that affects year to year estimations of storage change. The GSAs have and will continue to work to improve the reliability of data within the basin. For example, several composite wells and a well perforated below the Corcoran clay were identified while preparing the fall 2021 water surface elevation contours, and these data were not considered on the fall unconfined groundwater map shown in **Appendix D**. **Table 4-4** below shows the estimates of storage change year by year from fall 2015 to fall 2021. The total estimated cumulative change in storage for the

Kings Subbasin from fall 2015 to fall 2021 can be seen on **Figure 4-3**, below. The fall 2020 to fall 2021 estimated storage change is negative 890,000 acre-feet across the entire Kings Subbasin Over the fall 2015 to fall 2020 period the cumulative storage change was estimated to be positive by about 230,000 acre-feet but when the estimated storage change from fall 2020 to fall 2021 is included the estimated cumulative change in storage for the fall 2015 to fall 2021 period is an estimated negative 660,000 acre-feet (**Figure 4-3**). The positive increase in storage from fall 2016 to fall 2017 and from fall 2018 to fall 2019 seem reasonable given the wet winters in 2016/2017 and 2018/2019, the normal 2017/2018 winter, and the ability of Pine Flat reservoir to maintain hold over storage for delivery in subsequent years. As well, the negative storage change from fall 2015 to fall 2016 is reasonable considering it was the last dry year of the drought with Kings River surface supplies at about 75.1% of normal based on the running average. The negative storage change from fall 2020 to fall 2021 also seems reasonable considering the estimated increase in groundwater demand, overall low effective precipitation, low to no holdover storage in Pine Flat following a 75% water year, and high evapotranspiration rates for the 2020-2021 water year.

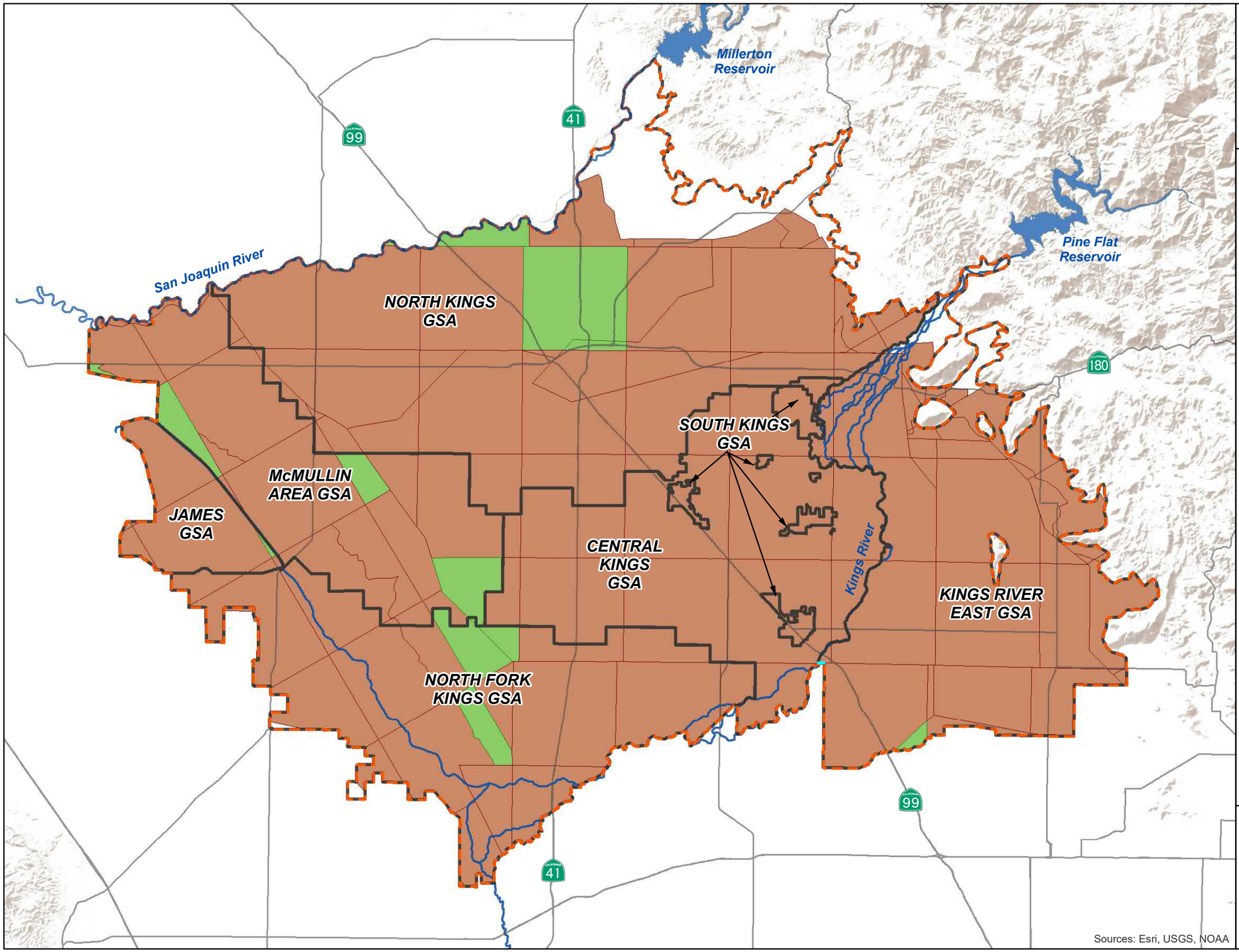
Table 4-1 – Kings Subbasin - Estimated Annual Change in Storage, Fall 2015 to Fall 2021

Kings Subbasin GSA	Est. Storage Change Fall 15 to Fall 16	Est. Storage Change Fall 16 to Fall 17	Est. Storage Change Fall 17 to Fall 18	Est. Storage Change Fall 18 to Fall 19	Est. Storage Change Fall 19 to Fall 20	Est. Storage Change Fall 20 to Fall 21
Total Est. Storage Change (AF)	**-170,000**	**960,000**	**-400,000**	**390,000**	**-550,000**	**-890,000**

Kings Subbasin GSAs

Relative Change in Storage
by Specific Yield Unit
Fall 2020 to Fall 2021

Figure 4-2



Legend

- Kings Subbasin GSAs
- Kings Subbasin (2019)
- Highway
- Waterway

Specific Yield Unit

Storage Change

- Decrease
- Increase

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Sources: Esri, USGS, NOAA

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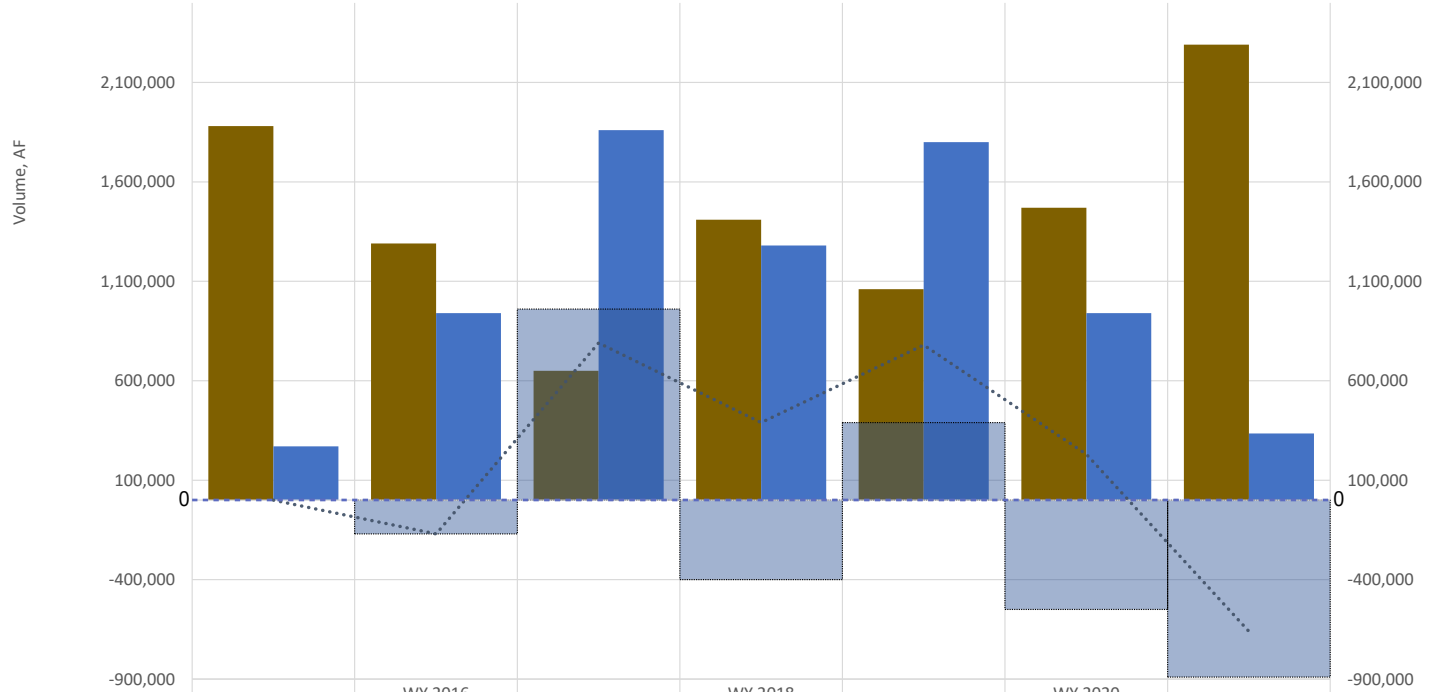
Kings Subbasin

Estimated Annual and Estimated Cumulative Groundwater Storage Change from Fall 2015 to Fall 2021



	WY 2015 (19.9%, Dry)	WY 2016 (75.1%, Normal)	WY 2017 (160.3%, Wet)	WY 2018 (100.0%, Normal)	WY 2019 (151.5%, Wet)	WY 2020 (75.0%, Normal)	WY 2021 (22.8%, Dry)
Water Year Est. Total GW Use, AF	1,880,000	1,290,000	650,000	1,410,000	1,060,000	1,470,000	2,290,000
Water Year Surface Water Deliveries, AF	270,000	940,000	1,860,000	1,280,000	1,800,000	940,000	335,000
Est. Annual GW Storage Change, AF	0	(170,000)	960,000	(400,000)	390,000	(550,000)	(890,000)
Est. Cumulative Change in Storage, AF	0	(170,000)	790,000	390,000	780,000	230,000	(660,000)

Notes:
1 - Annual storage change is from fall to fall. Estimated storage change is listed under the ending year evaluated. For example, estimated storage change from Fall 2015 to Fall 2016 is under the Water Year (WY) 2016 column.
2 - WY begins Oct. 1 of preceding year and runs through Sept. 30 of listed year. For example, WY 2015 begins Oct. 1, 2014 and continues through Sept. 30, 2015.
3 - Values rounded to nearest 10,000 acre-feet.
4 - Kings River WY Types based on WY% - less than 75% = Dry, from 75% to 125% = Normal, greater than 125% = Wet. WY type may cha nge based on the running average, see note 5.
5 - WY% is a running average, therefore WY% shown typically vary yearly. For example, the 2015 WY% was 19.7% based on the average through WY 2020, while the average for WY 2015 is 19.9% based on the average through WY 2021.
6 - WY Surface Water Deliveries = Kings Subbasin, Kings River Headgate Diversions + Central Valley Project + estimated San Joaquin and Kings River Riparian.
7 - Water Year Est. Total GW use for WY 2020 was adjusted from the value reported in the WY 2020 annual report.

Figure 4-3

4.4 Seawater Intrusion

The Kings Subbasin is not hydrologically located near the ocean nor near saline sinks. Therefore, no criteria has been established for undesirable results.

4.5 Groundwater Quality

The Kings Basin's Groundwater Quality Monitoring Network is comprised of the individual GSA groundwater quality monitoring networks described in each GSA's GSP. A map of the overall network is shown in **Figure 4-4.**

The groundwater quality monitoring networks for the GSAs are comprised primarily of community and non-community public supply wells. Groundwater quality data from these wells are publicly available from the water suppliers or through online databases such the State Safe Drinking Water Information System (http://sdwis.waterboards.ca.gov/PDWW/) or the California Water Boards' Electronic Data Transfer (EDT) database. McMullin also utilizes groundwater quality data from the American Avenue Landfill and is publicly available on the California Water Board's online GeoTracker database as it becomes available. Some GSAs are also utilizing data from the Kings River Water Quality Coalition (KRWQC) under the Irrigated Lands Regulatory Program (ILRP).

4.6 Land Subsidence

As discussed in the GSP, the basin is primarily relying on land subsidence survey information from observation points surveyed by KRCD as part of their land subsidence network. Data was provided from KRCD for measurements taken in December 2019 and October2021. P&P surveyed the previous KRCD monuments located in MAGSA in January 2022. The cumulative elevation change over that 2 year period was mapped and is shown in **Figure 4-5**. The observations generally indicate little to no change throughout a majority of the basin, with a moderate amount of change in the western and southwestern portion of the basin. This matches the InSAR data for October 2019 through October 2021/January 2022 as shown in **Figure 4-6**.

Kings Subbasin Coordinated Effort

Water Quality Monitoring Network

Figure 4-4

Legend

- Selected Representative Groundwater Monitoring Wells
- Groundwater Sustainable Agency
- Township/Range

T11S
T12S
T13S
T14S
T15S
T16S
T17S
T18S

R16E R17E R18E R19E R20E R21E R22E R23E R24E R25E

Madera Acres
Madera
Chowchilla
Tollhouse
Clovis
Fresno
Kerman
Tranquility
San Joaquin
Raisin City
Caruthers
Selma
Cantua Creek
Five Points
Riverdale
Lemoore
Armona
Hanford
Visalia
Orange Cove
Reedley
Dinuba
Sanger
Parlier
Cutler
Ivanhoe
Exeter
Farmersville

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Sources: Esri, USGS, NOAA

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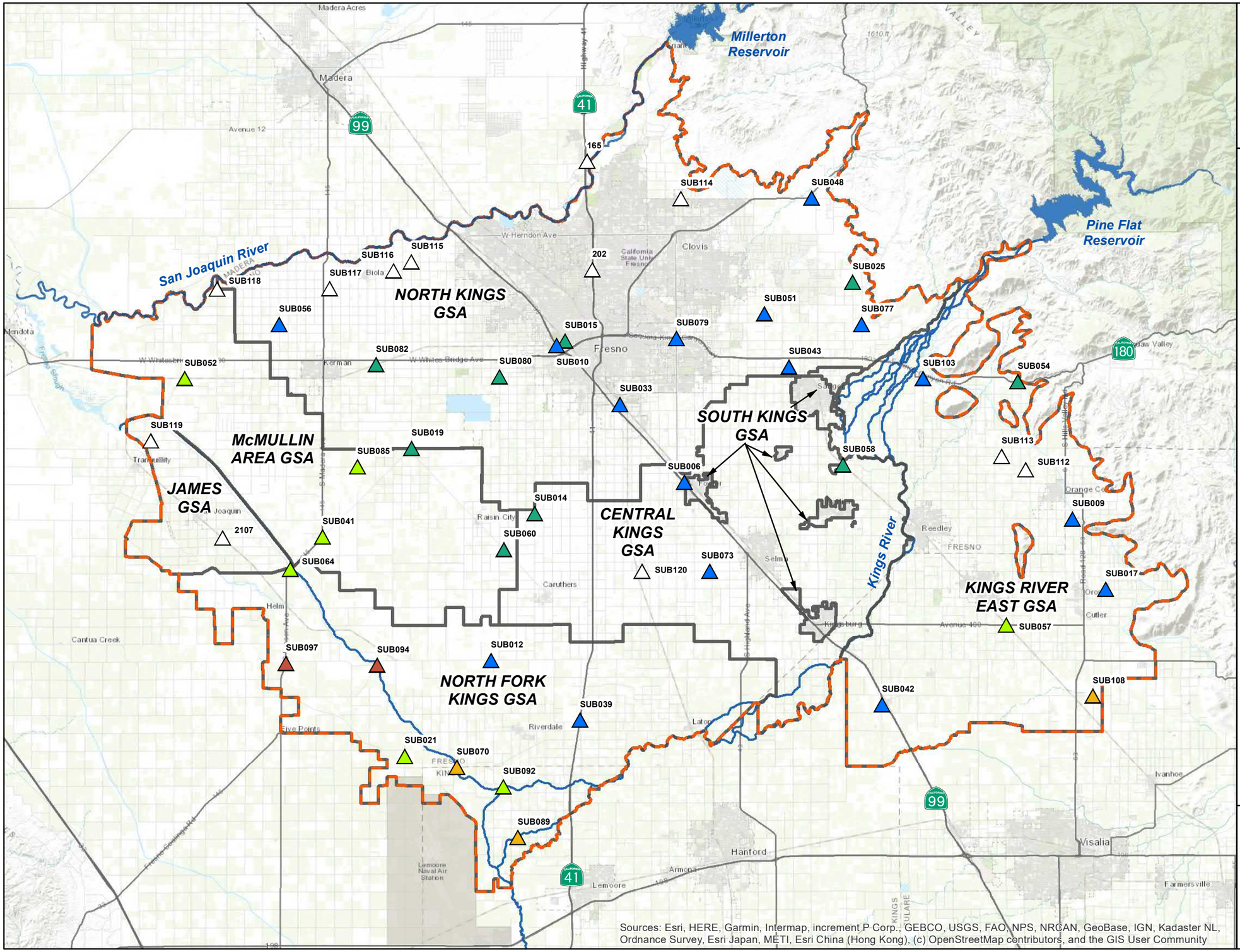

Kings Subbasin

Land Subsidence Monitoring
December 2019/January 2020 to
October 2021/January 2022

Figure 4-5

Kings Subbasin GSAs

Kings Subbasin

Subsidence Monitoring Location

Elevation Change (Ft)

- 0.00 to 0.75
- -0.19 to 0.01
- -0.39 to -0.20
- -0.59 to -0.40
- > -0.60
- No Comparison Data*

**Verified data exists only for one time period, so no comparison of elevations is available.*

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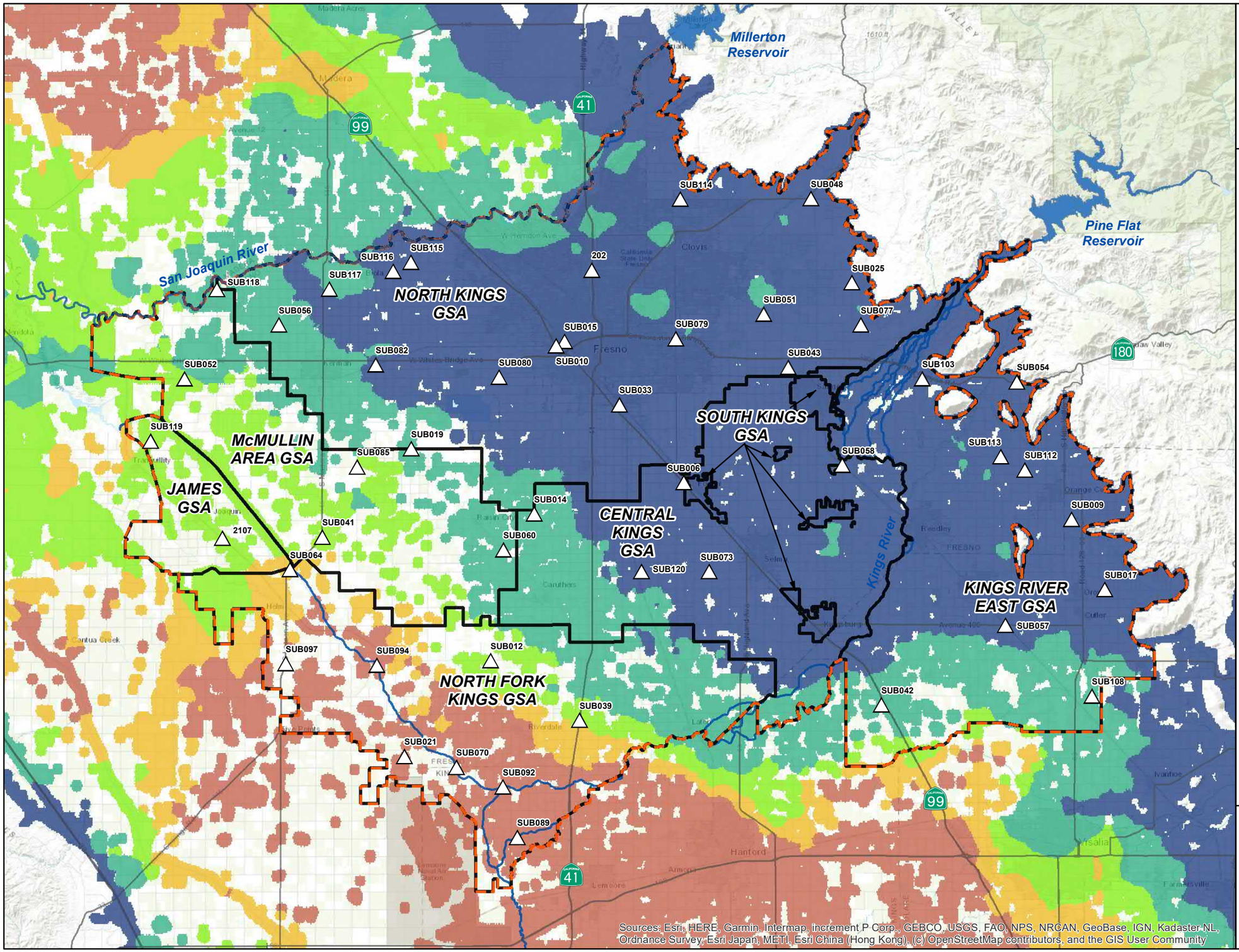

Kings Subbasin

Land Subsidence Monitoring
December 2019 - October 2021/
January 2022

Figure 4-6

Kings Subbasin GSAs

Kings Subbasin

Subsidence Monitoring Location

DWR Altamira SAR - Oct 2019 to Oct 2021

Displacement in Feet

- 0 to 0.2
- -0.2 to 0
- -0.4 to -0.2
- -0.6 to -0.4
- > -0.6

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4.7 Surface to Groundwater Interconnection

The Kings Subbasin GSAs have established a groundwater level monitoring network which includes wells near the rivers that will be monitored to better understand potential surface to groundwater interconnections issues. DWR has provided comment on the GSP for the GSAs to reconsider Surface to Groundwater Interconnection. The GSAs will be reviewing and addressing during a GSP update process.

The Kings Subbasin Hydrographs presented in **Appendix C** indicate that groundwater in wells near Kings River had declining groundwater levels during the drought period until approximately spring of 2016 when groundwater levels rose until 2018, corresponding with the wet time period at the end of the drought.

5 Monitoring Network

The Kings Basin GSAs have identified different data gaps within their GSPs that they intend to fill, and are still reviewing their monitoring networks. During this water year, the GSAs have spent significant effort to gather construction information via well video equipment for Representative Monitor Wells that were included in the network because of a good history of data collection but lacked construction information. As definitive construction information is gathered, updates will be made through the SGMA monitoring network portal. Work will continue into the 2022 water year to gather the remaining construction information for wells in the water level monitoring network. No changes have been made to the monitoring network during the period of this report (WY2021). The GSAs will be considering possible changes to the monitoring network with the planned GSP revisions to be completed during WY 2022.

6 Groundwater Projects and Management Actions Status

> 356.2(b) (5) (C) A description of progress towards implementing the Plan, including achieving interim milestones, and implementation of projects or management actions since the previous annual report.

Since completion and submittal of the GSPs in January of 2020, each of the GSAs in the Kings Basin has been actively working on implementing their GSPs including project development and design, gathering of information to fill data gaps including well construction information, continued stakeholder outreach and engagement, development of initial policies, and other items. Some of the activities and actions implemented by the GSAs as a group since January 2020 include:

- Continued monthly coordination meetings with a representative from each of the GSAs.
- Updated Data Management System (DMS)
- Preparation of Annual Reports
- Preparation of a coordinated outreach effort including video, storymap, press release and social media that highlighted the significant amount of recharge basins that have been built or are under construction since GSPs have been submitted.
- Sponsorship of the facilitation of a quarterly conference call between the 11 San Joaquin Valley Basin Point of Contact individuals with DWR staff.
- Preparation of a successful joint grant application that will provide construction funding for 4 projects in three GSAs, including multiple projects with DAC benefits.

Some of the activities and actions implemented by the individual GSAs during Water Year 2021 include:

Central Kings GSA

- Consolidated ID has purchased an additional 60 acres to be used for construction of groundwater recharge basins. 20 acres is located adjacent to the community of Tombstone (DAC).

James GSA

- Continued work to construct new monitor well through SGMA Planning Grant, visited/located proposed site.
- Applied for grants to complete project(s) listed in the James GSP

Kings River East GSA

- Helped secure implementation funding through the basin for a needed stormwater and recharge project within the SDAC of Sultana CSD.
- Alta Irrigation District continues to secure funding for construction of a new groundwater basin that will capture flood water or other available water sources.
- Alta Irrigation District is working on implementing various elements of its Functional Aquifer Recharge Management program.
- Kings River East GSA is collecting construction information about wells within the GSA's monitoring network.
- City of Dinuba and Formation Environmental are working on a Wellfield Remedial Investigation/Feasibility Study, which will identify and prioritize implementation of projects to enhance water supply reliability and improve water quality.

McMullin GSA

- Policy Book and Rules and Regulations – All required policies are now complete. Rules and Regulations for implementation of policies are complete for the Well Metering, Measurement, Monitoring and Construction policy and are nearing finalization for the Export policy.
- Grants – Completed BOR WaterSMART grant for water marketing study. Completed BOR WaterSMART Small Scale grant for installation of elevation sensors and telemetry on representative monitoring wells. Executed MOA with Raisin City WD (MAGSA member) to assume responsibility for a $7,000,000 NRCS RCPP PL566 grant for construction of additional canals extending the Terranova Project (now entitled McMullin Expansion Project) and for management of $1,000,000 in EQIP funds for On-Farm Recharge AND received a $10,000,000 grant from the SWRCB Stormwater program for additional canal extensions and improvements resulting in a newly revised stormwater and OFR project ($22,000,000) across approximately 20,000 acres. Received additional landowner parcel level grants, commitments and associated funding in the amount of approximately $8,000,000 for water and energy efficiency advancements in the GSA.
- Non-Grant Activities – Aquaterra Water Bank continues its development and refinement. Environmental (CEQA and NEPA) are ongoing and engineering is progressing toward approximately 30% status. Project now includes approximately 65 miles of canals, 30 lift stations, 4500 acres of dedicated recharge, 100,000 acres of potential OFR, 90 dedicated extraction wells and approximately 1.8 million acre-feet of underground storage. Engaged in final stage negotiations with several potential priority preferred partner entities which will acquire priority access to the banking facilities for deposit and withdrawal in exchange for provision of financial

capital for construction of improvements. Applied for a Temporary Diversion Permit for floodwater. Applied for a Permanent Water Right for Surplus Flood Flows.

- Outreach – conducted Vision 2022 Outreach Event with stakeholders setting forth plans and goals for the 2022 calendar year. Updated on numerous topics of interest to the GSA. Conducted a Well Registration which resulted in over 95% compliance and REGISTRATION OF OVER 900 WELLS AND WELL OWNERS. Well registration is first step in achieving 100% well metering (with appurtenant telemetry tied to data base management system) by 2025 and nearing implementation of an associated incentive and rebate program for early adopting landowner/well owners.

North Fork Kings GSA

- Technical Advisory Group continues to meet monthly to discuss methods for implementation of the GSP.
- Updated and new resources continue to be added to the GSA website to provide information on the NFKGSA to stakeholders.
- Work continues by the policy committee on development of policies and procedures for implementation.
- Landowner survey sent to all landowners to gather information and further outreach efforts.
- Monthly field level crop water use data obtained from LandIQ, enabling the GSA to calculate net groundwater use.
- Spreadsheet tool developed to analyze actual crop water use data.
- Current crop acreage information obtained from LandIQ.
- Multi-completion monitor well installed through the DWR TSS program to monitor unconfined, semi-confined and confined aquifer conditions.
- Newsletters highlighting NFKGSA activities mailed to landowners on a quarterly basis for education and outreach.
- Coordination with Fresno County to ensure well permit applications are routed to the GSA manager for review and comment prior to installation of the well.
- Riverdale ID pursuing development of a new recharge project.
- Progress continues on the Laton North Recharge Project.
- Progress continues on conceptual layout of recharge project at Elkhorn site.

North Kings GSA

- Completion of 150 acres of groundwater recharge basins by Fresno Irrigation District at four sperate locations (Central and Wagner Basins) allowing for an additional 2,660 acre-feet of water to be recharged into the aquifer.
- Fresno Irrigation District received Round 1 Prop 68 grant funds to construct the Savory Basin which adds an additional 20 acres of recharge basins to FID's network of recharge basins, bringing their total estimated acreage to over 900 acres. Construction on the Savory Basin started in August 2021 and will be completed in Spring 2022. The Savory Recharge Basin is estimated to add an additional 900 acre-feet of water to the aquifer and is located adjacent to the Shady Lakes Mobile Home Park, a severely disadvantaged community receiving quantifiable benefits from the recharge occurring with in the basin.
- Secured Prop 68 Round 1 funding for the City of Kerman to intertie the Lyons Park Basin with FID's Little Houghton Canal to all intentional groundwater recharge to occur within the City of Kerman's boundaries. Construction is set to commence in Fall 2022.

- Updated the project list in the GSP: In June 2021, the NKGSA Board of Directors approved an updated project list for the groundwater sustainability plan. The updated project list includes projects that have been completed since the GSP was adopted in January 2020 and the inclusion of new projects identified by member agencies since the GSP was adopted. The updated project list is included on the North Kings GSA website. The NKGSA plans to do a project solicitation annually to document the progress on identified projects and allow agencies within its boundary to add new projects to reach the identified sustainability goals.
- Working with entities within the North Kings GSA boundary to determine initial mitigation targets for each agency. Development of a draft member agency mitigation policy was developed and will be considered by the NKGSA board in the future.
- The NKGSA Board adopted the New Well Review Policy (Policy No. 2021-001) for the purpose of facilitating the review of new well permit applications and gathering data for construction of new well permits within the North Kings GSA boundary.
    - Since January 2021, the North Kings GSA has been working with the permitting agencies within its boundary, primarily Fresno County, to review well permit applications and has reviewed over 400 permit applications. The North Kings GSA worked with its Policy Workgroup consisting of a broad stakeholder group to develop the new well review policy.
- The North Kings GSA partnered with the other Kings Subbasin GSAs to develop a Domestic Well Owner guidance document for domestic well owners within the Kings Subbasin.
- The North Kings GSA participated in a broad coalition of San Joaquin Valley organizations to develop and distribute dry well resources for domestic well owners during summer of 2021. The North Kings GSA distributed resources on its website and via email to the Interested Persons list.
- The North Kings GSA partnered with the other Kings Subbasin GSAs to develop a school site guidance document for public and private schools within the Kings Subbasin. The outreach with Schools included a live webinar in which 30 schools participated and which featured a local landscape specialist to talk about the drought tolerant landscaping at school sites.
- Reviewed planning documents during the comment period allowing for water supply and demand information to be provided to the GSA managers for consideration prior to the development being approved.
- Strong presence on social media for stakeholder updates and engagement.
- Development of e-news blogs for distribution to the NKGSA general interest stakeholder list (Interested Persons) on important GSA topics and key decisions being made at the NKGSA board meetings.
- Website improvements to allow capability for posts on recent news and updates, the addition of stakeholder specific resources, clear links to social media channels, and multiple website locations to sign up to the Interested Persons list for email updates.
- Development and distribution of “Stakeholder Spotlight” video series to educate the public on the North Kings GSA’s member agencies and diverse stakeholder groups.
- Representative Monitoring Network: Gathered additional construction information for representative monitoring wells and development of access and indemnification agreements with well owners to ensure continued usage of the site for water level and water quality monitoring purposes.
- Initiation of a boundary flow study to quantify the volume of water being lost at its boundary to help inform future decisions related to the GSA’s commitment to recapture the boundary flows for use within its boundary.

South Kings GSA

- Secured construction funding through the coordinated basin effort and began design engineering and environmental work on North Sanger Groundwater Recharge Project, funded with Prop 68 Implementation funding.
- Completed two basin intertie projects in the City of Sanger (Kelly Basin and West Sanger Basin) for the purposes of groundwater recharge.
- Completed project to expand groundwater recharge capacity at Garner Lateral Basin in Kingsburg.
- Negotiated land purchase for groundwater recharge basin in Fowler (Escrow closing in early 2022).
- Completed Development Impact Fee Study for SKGSA (adoption by Board and implementation by member agencies in early 2022).
- Continued work on construction of new monitor well(s) in Fowler.

7 References

California Department of Water Resources, *California Water Plan Update – 2018*, Bulletin 160-18, 2019.

California Department of Water Resources, *Effective Precipitation - A Field Study to Assess Consumptive Use of Winter Rains by Spring and Summer Crops*, February 1989.

Cal Poly Irrigation Training and Research Center, "*Irrigation Water Balance Fundamentals*", USCID Conference on Benchmarking Irrigation System Performance Using Water Measurement and Water Balances, San Luis Obispo, March 10, 1999.

Appendix A – Water Supply Data

Kings Groundwater Basin
Groundwater Extractions

Basin Number	Water Year	Total Groundwater Extractions (AF)	Water Use Sector Urban (AF)	Water Use Sector Industrial (AF)	Water Use Sector Agricultural (AF)	Water Use Sector Managed Wetlands (AF)	Water Use Sector Managed Recharge (AF)[1]	Water Use Sector Native Vegetation (AF)	Water Use Sector Other (AF)	Water Use Sector Other Description
5-022.08	2021 (Oct. 2020 - Sept. 2021)	2,293,436	168,571	0	2,082,555	0	21,601	0	42,310	-

Notes: 1 - Recharge only include intentional recharge. Other sources of groundwater recharge including canal seepage, pipeline leakage and wastewater effluent recharge occur in the Subbasin, but are not included in the value above.

Kings Groundwater Basin
Groundwater Extraction Methods

Basin Number	Water Year	Meters Volume (AF)	Meters Description	Meters Type	Meters Accuracy (%)	Meters Accuracy Description	Electrical Records Volume (AF)	Electrical Records Description	Electrical Records Type	Electrical Records Accuracy (%)	Electrical Records Accuracy Description
5-022.08	2021 (Oct. 2020 - Sept. 2021)	187,169	Flow meters	Direct	0-5%	Typical accuracy for propeller and magnetic meters	0	-	-	-	-

Basin Number	Water Year	Land Use Volume (AF)	Land Use Description	Land Use Type	Land Use Accuracy (%)	Land Use Accuracy Description	Groundwater Model Volume (AF)	Groundwater Model Description	Groundwater Model Type	Groundwater Model Accuracy (%)	Groundwater Model Accuracy Description
5-022.08	2021 (Oct. 2020 - Sept. 2021)	2,060,967	Calculated pumping from crop water demands minus surface water deliveries	Estimate	10-20%	Based on accuracy of Crop evapotranspiration estimates	0	-	-	-	-

Basin Number	Water Year	Other Method(s) Volume (AF)	Other Method(s) Description	Other Method(s) Type	Other Method(s) Accuracy (%)	Other Method(s) Accuracy Description
5-022.08	2021 (Oct. 2020 - Sept. 2021)	45,300	Rural domestic pumping estimated based on vegetated area and standard indoor use	Estimate	10-20%	Accuracy based on professional judgement

Kings Groundwater Basin
Surface Water

Basin Number	Water Year	Methods Used To Determine	Water Source Type Central Valley Project (AF)	Water Source Type State Water Project (AF)	Water Source Type Colorado River Project (AF)	Water Source Type Local Supplies - Kings River (AF)	Water Source Type Local Imported Supplies (AF)	Water Source Type Recycled Water (AF)	Water Source Type Desalination (AF)	Water Source Type Other (AF)	Water Source Type Other Description
5-022.08	2021 (Oct. 2020 - Sept. 2021)	Flumes and water meters	49,592	0	0	245,722	0	9,252	0	30,099	Riparian diversions and other non-project water

Kings Groundwater Basin
Total Water Use

Water Year	Total Water Use (AF)	Methods Used To Determine	Water Source Type Groundwater (AF)	Water Source Type Surface Water (AF)	Water Source Type Recycled Water (AF)	Water Source Type Reused Water (AF)	Water Source Type Other (AF)	Water Source Type Other Description
2021 (Oct. 2020 - Sept. 2021)	2,628,101	Sum of all water supplies	2,293,436	295,314	9,252	0	30,099	Riparian water diversions

Water Year	Water Use Sector Urban (AF)	Water Use Sector Industrial (AF)	Water Use Sector Agricultural (AF)	Water Use Sector Managed Wetlands (AF)	Water Use Sector Managed Recharge (AF)[1]	Water Use Sector Native Vegetation (AF)	Water Use Sector Other (AF)	Water Use Sector Other Description
2021 (Oct. 2020 - Sept. 2021)	246,358	0	2,317,832	0	21,601	0	42,310	JID Wells Pumped in McMullin GSA

Appendix B – Groundwater Level Data

Unique Well ID	Measuring Agency	Local Well ID	GSA	DTW Sp. '15	WSE Sp. '15	DTW Fall '15	WSE Fall '15	DTW Sp. '16	WSE Sp. '16	DTW Fall '16	WSE Fall '16	DTW Sp. '17	DTW Fall '17	WSE Fall '17	DTW Sp. '18	WSE Sp. '18	DTW Fall '18	WSE Fall '18	DTW Sp. '19	WSE Sp. '19	DTW Fall '19	WSE Fall '19
CID06	CID	6	Central Kings GSA	58.2	284.2	68.3	274.1	65.5	276.9	63.6	278.8	60.1	54.3	288.1	48.4	294.0	57.4	285.0	59.0	283.4	53.6	288.3
CID28	CID	28	Central Kings GSA																			
CID31	CID	31	Central Kings GSA	56.6	270.0	62.7	263.9	57.5	269.1	56.3	270.3	51.8	45.9	280.7	50.8	275.8	52.2	274.4	49.9	276.6	47.5	279.0
CID32	CID	32	Central Kings GSA	57.7	259.9	68.8	248.8	64.1	253.5	66.3	251.3	59.9	56.1	261.5	57.9	259.7	58.4	259.2	56.2	261.4	53.4	264.2
CID41	CID	41	Central Kings GSA	39.3	250.7	36.4	253.6	43.5	246.5	31.5	258.5	25.5	22.9	267.1	27.1	262.9	25.0	265.0	26.4	263.6	22.1	278.6
CID48	CID	48	Central Kings GSA	132.4	105.1	138.7	98.8	136.6	100.9	144.0	93.5	141.5	146.7	90.8	141.6	95.9	143.3	94.2	139.9	97.6	142.8	111.9
CID56	CID	56	Central Kings GSA	156.4	92.0	161.4	87.0	160.2	88.2	165.5	82.9	164.6	167.8	80.6	166.7	81.7	170.6	77.8	166.5	81.9	171.1	74.8
CID62	CID	62	Central Kings GSA	77.6	201.6																	
CID65	CID	65	Central Kings GSA	66.5	228.6	70.5	224.6	74.9	220.3	78.2	216.9	81.5	67.5	227.7	64.2	230.9	65.1	230.1	67.1	228.1	64.6	230.7
CID67	CID	67	Central Kings GSA			106.9	159.5	107.7	158.7	113.0	153.4	112.6	113.9	152.5	109.6	156.8	111.4	155.0	108.9	157.5	110.8	155.9
CID74	CID	74	Central Kings GSA	122.4	131.4	126.6	127.2	127.1	126.7	132.2	121.6	131.5	134.9	118.9	132.5	121.3	136.0	117.8	131.3	122.4	137.3	118.0
1010034-002	James Irrigation District	1010034-002	James ID																109.5	63.1	109.5	63.1
15S16E28A003M	James Irrigation District		James ID	96.0	72.5	100.5	68.0			101.8	66.7	92.7	94.2	74.3	92.8	75.7	95.0	76.1	92.5	78.6	89.2	81.9
15S16E29N001M	James Irrigation District	Horn	James ID	116.0	57.5			115.3	58.2			108.6			101.7	71.8						
16S17E04P001M	James Irrigation District	D12	James ID	169.6	5.4	171.6	3.4			176.0	-1.0	165.2	167.5	7.5	168.0	7.0	171.2	3.8	162.4	12.6	165.0	10.0
366502N1201782W001	James Irrigation District	C65	James ID	127.1	40.7	150.5	17.3	119.1	48.7	141.9	25.9	117.5	117.7	50.1	114.5	53.3	118.8	49.0	107.8	60.0	123.1	44.7
14S24E17C001MX	OCID	17C1	Kings River East GSA	21.3	441.5	21.3	441.6	21.6	441.2	21.3	441.6	13.9	13.6	449.2	16.1	448.7	15.0	447.9	14.3	448.6	14.1	448.7
15S24E11A001MX	OCID	11A1	Kings River East GSA	31.0	398.9	49.4	380.6	32.0	397.9	35.6	394.4	23.0	17.7	412.2	17.7	412.8	19.6	410.4	9.3	420.7	7.3	422.7
15S25E19A001MX	OCID	19A1	Kings River East GSA			75.1	383.5	64.3	394.4	75.1	383.5	64.0	32.8	425.9	51.5	407.8	49.3	409.3	45.2	413.4	39.0	419.6
16S25E10J001MX	OCID	10J1	Kings River East GSA	63.5	359.1	75.4	347.2	68.2	354.4	78.9	343.7	57.2	63.2	359.4	57.7	365.0	65.4	357.2	57.1	365.5	52.2	370.4
B013B	AID	B013B	Kings River East GSA	20.0	376.6	18.9	371.9	20.5	370.2	16.6	374.2	12.9	11.8	378.9	14.9	375.9			15.1	375.6	17.5	373.2
H020A	AID	4A	Kings River East GSA			55.8	305.8			54.8	306.8				50.2	311.3	51.7	310.8				
I045A	AID	I045A	Kings River East GSA	74.6	325.2			84.6	318.3	93.3	309.6		70.8	332.1	65.8	337.1	70.4	332.5	60.6	342.3	44.6	358.3
I055A	AID	I055A	Kings River East GSA			92.7	273.0					85.3	85.8	279.8	81.1	284.5	93.9	271.7	81.1	284.5	77.8	287.9
I073A	AID	I073A	Kings River East GSA	66.6	271.4	71.8	264.9	68.7	267.9	71.7	265.0	65.7	62.0	274.6	62.6	274.0	65.1	271.5				
K086B	AID	80	Kings River East GSA			90.7	225.9			86.2	230.4				70.7	246.0	73.8	242.8			72.3	244.4
KRWD04	KRWD	KRWD04	Kings River East GSA	17.5	319.8	18.6	318.7	19.6	317.7	19.0	318.3	17.0	18.0	319.3	19.0	318.3	19.0	318.3	17.0	320.3		
M065A	AID	M065A	Kings River East GSA	90.4	273.2	98.0	263.2	92.2	269.0			92.3	86.8	274.4	86.5	274.7			89.8	271.4	81.7	279.5
M105A	AID	M105A	Kings River East GSA																			
M130B	AID	M130B	Kings River East GSA			99.8	218.8	92.4	226.2			87.3	83.9	234.7	82.8	235.8	85.5	233.1	82.3	236.2	86.1	232.5
O123A	AID	O123A	Kings River East GSA			81.2	271.5	73.5	279.2			70.1	45.5	307.2	54.2	298.5	55.5	297.2	59.7	293.0	53.3	299.4
T136A	AID	T136A	Kings River East GSA																			
T139A	AID	T139A	Kings River East GSA	69.2	316.9	87.8	297.6	79.9	305.4	89.3	296.0	79.2			69.3	316.1	79.2	306.1	70.0	315.4	67.3	318.1
W172A	AID	W172A	Kings River East GSA										61.8	230.9	70.3	222.4	68.2	224.4			52.4	240.2
X156A	AID	X156A	Kings River East GSA	54.6	294.0	62.2	284.6	61.8	285.0	68.8	278.0	58.6	61.8	285.0	60.2	286.6	59.9	286.9	62.1	284.7	59.4	287.4
X176A	AID	X176A	Kings River East GSA	103.3	187.0	115.6	175.1	108.7	181.9				110.7	179.9	105.3	185.4			107.0	183.4	103.6	187.1
X213A	AID	X213A	Kings River East GSA																			
X218B	AID	143	Kings River East GSA			82.9	209.8								62.1	230.6	62.2	230.5			59.9	232.7
X234B	AID	X234B	Kings River East GSA			94.1	233.7	95.4	232.4	103.2	224.6		89.5	238.3	93.6	234.2	99.1	228.6			94.6	233.1
14S17E05C001MX	Fresno Irrigation District	FD5D1	McMullin Area GSA																			
15S17E13R002M	James ID	15S17E13R002M	McMullin Area GSA														198.8	-16.2	179.4	3.2	192.9	-10.3
15S18E02A001MX	Fresno Irrigation District	FD02A1	McMullin Area GSA																			
15S18E30L001M	James ID	15S18E30L001M	McMullin Area GSA																228.7	-33.3		
365463N1199268W001	Department of Water Resources	16S19E17C001M	McMullin Area GSA																		223.7	-29.2
366082N1201199W001	James ID	15S17E21J001M	McMullin Area GSA														216.2	-21.7	205.4	-10.9		
366188N1199104W001	Department of Water Resources	15S19E21C003M	McMullin Area GSA																			
367705N1202691W001	USBR	13S16E30L003M	McMullin Area GSA			103.5	73.9	109.7	67.7	125.8	51.6	72.8	117.5	59.9	117.0	60.4						
367757N1201874W001	USBR	13S16E26A001M	McMullin Area GSA	104.0	89.4	100.8	92.6	100.3	93.1			73.7	78.0	115.4	71.0	122.4			67.5	125.9	92.0	101.4
367782N1202141W001	USBR	13S16E27C001M	McMullin Area GSA	73.5	114.9	63.9	124.5	72.3	116.1	72.2	116.2	52.8	73.0	115.4	57.0	131.4	79.0	109.4	53.0	135.4	99.0	89.4
A01	KRCD	A01	McMullin Area GSA	143.0	19.6	152.0	10.6	127.0	35.6	150.0	12.6	114.0	119.0	43.6	109.0	53.6	132.0	30.6	113.5	48.3	118.2	43.6
A07	KRCD	A07	McMullin Area GSA	76.0	94.8	81.0	89.8	75.0	95.8	82.0	88.8	78.0	82.0	88.8	87.0	83.8	86.0	84.8	75.0	94.4	85.1	84.3
A17	KRCD	A17	McMullin Area GSA			156.0	54.8	140.0	70.8	147.0	63.8	144.0	147.0	63.8	140.0	70.8	146.0	64.8	138.0	72.1	146.7	63.4
A20	KRCD	A20	McMullin Area GSA	82.0	105.7	164.0	23.7	134.0	53.7	164.0	23.7											
A23	KRCD	A23	McMullin Area GSA			196.0	-4.9	174.0	17.1	191.0	0.1		200.0	-8.9	176.0	15.1			176.5	12.5	193.2	-4.2
A24	KRCD	A24	McMullin Area GSA			193.0	-17.7	151.0	24.3	153.0	22.3	146.0	132.0	43.3	134.0	41.3	140.0	35.3	130.5	42.8	148.3	25.0
A30	KRCD	A30	McMullin Area GSA	238.0	-57.8					220.0	-39.8		203.0	-22.8	213.0	-32.8	215.2	-35.0	197.5	-19.6		
A34	KRCD	A34	McMullin Area GSA			171.0	45.3	162.0	54.3			160.0	167.0	51.3	163.0	53.3	167.0	49.3	156.0	59.0	165.0	50.0
A46	KRCD	A46	McMullin Area GSA			127.0	113.2	123.0	117.2	128.0	112.2	124.0	128.0	112.2	125.0	115.2	150.0	90.2			126.0	113.7
A51	KRCD	A51	McMullin Area GSA	179.0	50.8	183.0	46.8	185.0	44.8	185.0	44.8	199.0	188.0	41.8	189.0	40.8	193.0	36.8	180.0	48.5	193.7	34.8
A53	KRCD	A53	McMullin Area GSA	239.0	-26.0			215.0	-2.0			242.0			242.0	-29.0	235.0	-22.0	229.0	-17.9	243.3	-32.2
A58	KRCD	A58	McMullin Area GSA	237.0	-42.2	239.0	-44.2	232.0	-37.2	245.0	-50.2	238.0	232.0	-37.2			238.0	-43.2	233.0	-40.6	241.6	-49.2
A62	KRCD	A62	McMullin Area GSA	178.0	60.1	187.0	51.1	182.0	56.1	193.0	45.1	186.0	193.0	45.1	183.0	55.1	194.0	44.1	181.5	54.8	190.7	45.6
364002N1197624W001	Laguna ID	18S20E02A001M	North Fork Kings GSA	148.1	94.7	180.5	62.3						140.1	102.7	165.0	77.8	172.0	70.8				
364591N1200135W001	KRCD	17S18E09R001M	North Fork Kings GSA			216.0	-18.2	210.0	-12.2			195.0	232.4	-34.6	219.0	-21.2						
364603N1197510W001	Liberty WD	17S20E12Q001M	North Fork Kings GSA	139.1	103.6	167.8	74.9	140.7	102.0			148.2	151.8	90.9	146.2	96.5			142.2	100.5	148.7	94.0
364667N1197041W001	Liberty WD	17S21E09M001M	North Fork Kings GSA	109.1	141.8	121.7	131.0	125.6	127.1			122.3	127.6	125.1	123.2	129.5	130.5	122.2	121.1	131.6	124.8	126.0
364668N1198257W001	Liberty WD	17S20E08L001M	North Fork Kings GSA	179.5	49.7	196.5	36.2	178.0	54.7			174.0	176.2	56.5	178.2	54.5	193.2	39.5	171.2	61.5	188.4	40.8
364682N1198732W001	Liberty WD	17S19E11H001M	North Fork Kings GSA			207.8	14.9	197.8	24.9			197.0							192.9	29.8	196.5	21.8
364739N1196227W001	Laguna ID	17S22E07A001M	North Fork Kings GSA			98.5	174.2	98.8	173.9			101.6	105.7	167.0			110.0	162.7				
364813N1198968W001	Liberty WD	17S19E03L001M	North Fork Kings GSA	193.4	22.3	216.0	4.0	194.1	25.9			193.1	194.0	26.0	218.5	1.5	201.6	18.4	191.2	28.8	227.2	-11.5
364816N1197785W001	Laguna ID	17S20E02M001M	North Fork Kings GSA																			
364893N1200127W001	KRCD	16S18E33Q001M	North Fork Kings GSA			232.0	-33.3	211.4	-12.7			215.5	240.4	-41.7			244.0	-45.3				
364916N1198366W001	Liberty WD	16S20E31P001M	North Fork Kings GSA	184.8	52.6	208.4	29.3	195.5	42.2			190.2	194.3	43.4			200.0	37.7	201.3	36.4	199.8	37.6
364960N1197554W001	Liberty WD	16S20E35J001M	North Fork Kings GSA	132.9	114.6	141.9	107.8	138.8	110.9			142.7	147.2	102.5	143.5	106.2			143.4	106.3	149.2	98.2
364967N1197193W001	Liberty WD	16S21E31J001M	North Fork Kings GSA	114.3	141.4	128.6	129.1	123.4	134.3			137.0	135.8	121.9	134.0	123.7	146.2	111.5	137.2	120.5	135.0	120.7
365143N1198529W001	Liberty WD	16S19E25B001M	North Fork Kings GSA	178.0	53.7	188.1	48.6	182.1	54.6			190.0			216.9	19.8			184.9	51.8		

Unique Well ID	Measuring Agency	Local Well ID	GSA	DTW Sp. '15	WSE Sp. '15	DTW Fall '15	WSE Fall '15	DTW Sp. '16	WSE Sp. '16	DTW Fall '16	WSE Fall '16	DTW Sp. '17	DTW Fall '17	WSE Fall '17	DTW Sp. '18	WSE Sp. '18	DTW Fall '18	WSE Fall '18	DTW Sp. '19	WSE Sp. '19	DTW Fall '19	WSE Fall '19
365150N1197327W001	Liberty WD	16S21E30C001M	North Fork Kings GSA	115.4	142.3	127.6	130.1	123.5	134.2			128.8	134.3	123.4	130.6	127.1	133.4	124.3	130.3	127.4	134.1	123.6
B06	KRCD	B06	North Fork Kings GSA	187.0	-4.3	185.0	-2.3	182.0	0.7	186.0	-3.3				182.0	0.7	183.0	-0.3			181.6	-1.2
B22	KRCD	B22	North Fork Kings GSA	211.0	-11.8	210.0	-10.8	203.0	-3.8	209.0	-9.8	199.0	199.0	0.2	202.5	-3.3	208.0	-8.8			200.7	-4.6
B31	KRCD	B31	North Fork Kings GSA	202.0	6.0	199.0	9.0	198.0	10.0	202.0	6.0	181.0	187.0	21.0	189.5	18.5					184.2	20.9
LID14	LID	LID14	North Fork Kings GSA	174.0	61.9	183.0	52.9	164.0	71.9	188.0	47.9	157.0	157.0	78.9	151.0	84.9	181.0	54.9	155.0	80.9	169.0	55.5
LID21	LID	LID21	North Fork Kings GSA	170.0	57.7	187.0	40.7	167.0	60.7	181.0	46.7	150.0	153.0	74.7	147.0	80.7	164.0	63.7	155.0	72.7	156.0	58.6
LID25	LID	LID25	North Fork Kings GSA	254.5	-41.6	260.0	-47.1	223.0	-10.1	237.0	-24.1	187.0	179.0	33.9	171.0	41.9	174.0	38.9	174.0	38.9	168.0	35.2
LID26	LID	LID26	North Fork Kings GSA	254.5	-40.6	239.0	-25.1	210.0	3.9	231.0	-17.1	182.0	173.0	40.9	172.0	41.9	200.0	13.9	172.0	41.9	184.0	16.1
12S19E33P001MX	City of Fresno	FC160	North Kings GSA	86.9	214.0	102.0	198.9	93.6	207.3			104.8	101.1	199.8	99.8	201.1	103.6	197.3	100.7	200.2	104.1	196.8
12S19E36J001MX	City of Fresno	FC091	North Kings GSA	146.8	185.0			145.8	186.0			149.0			153.4	178.4	152.3	179.5	152.0	179.8	156.2	175.6
12S20E23D001MX	City of Fresno	FC295	North Kings GSA	151.9	212.5	155.8	208.6	155.0	209.4	159.0	205.4	155.4									157.0	207.4
12S20E34K001MX	City of Fresno	FC092	North Kings GSA	160.8	199.3	162.9	197.2	165.1	195.0	178.5	181.6	162.8	169.5	190.6	161.9	198.2	170.5	189.6	165.3	194.8	169.0	191.1
13S17E25C001MX	Fresno Irrigation District	FD25C1	North Kings GSA	86.1	145.8	93.6	138.3	94.1	137.8	94.1	137.8		83.1	148.8	84.1	147.8	85.1	146.8	84.1	147.8	81.1	150.8
13S17E33M001MX	Fresno Irrigation District	FD32H1	North Kings GSA	117.4	92.7			116.9	93.2	119.9	90.2	112.4	113.4	96.7	111.4	98.7	112.9	97.2	107.4	102.7	111.4	98.7
13S18E17A001MX	Fresno Irrigation District	FD17A1	North Kings GSA	70.0	183.2	72.0	181.2	72.0	181.2	69.0	184.2	65.0							65.0	188.2	63.0	190.2
13S18E33M001MX	Fresno Irrigation District	FD32J1	North Kings GSA	91.5	145.8	94.5	142.8	93.5	143.8	91.5	145.8	85.5	82.0	155.3	84.5	152.8	79.5	158.8	81.5	155.8	79.5	157.8
13S19E11L001MX	City of Fresno	FC035	North Kings GSA	120.3	184.4	120.4	184.3	120.8	183.9	123.1	181.6	119.0	121.5	183.2	119.8	184.9	121.8	182.9	120.9	183.8	122.4	182.3
13S19E29A001MX	Fresno Irrigation District	FD29A1	North Kings GSA	81.7	185.2	87.7	179.2	88.7	178.2	90.7	176.2		91.7	175.2	89.7	177.2	90.7	176.2	86.7	180.2	90.7	176.2
13S20E27C001MX	City of Fresno	FC069	North Kings GSA	131.0	179.1	133.7	176.4	130.1	180.0	132.0	178.1	130.0	133.6	176.5	133.6	176.5	132.7	177.4	128.6	181.5	125.0	185.1
13S20E30B001MX	City of Fresno	FC074	North Kings GSA	125.0	179.0	126.0	178.0	124.2	179.8	126.0	178.0	123.2	127.5	176.5	121.0	183.0	122.0	182.0	120.9	183.1	120.7	183.3
13S21E19E001MX	City of Fresno	FC080	North Kings GSA	133.9	200.9	139.2	195.6	114.6	220.2	114.1	220.7	128.5	115.5	219.3	142.9	191.9	139.2	195.6	130.0	204.8	113.1	221.7
13S22E07R001MX	Fresno Irrigation District	FD07R1	North Kings GSA	56.5	335.1	61.5	330.1	58.5	333.1	62.5	329.1	51.5	61.0	330.6	59.0	332.6	59.5	332.1	58.5	333.1	62.5	329.1
13S22E32A001MX	Fresno Irrigation District	FD32A1	North Kings GSA	52.2	318.6	58.7	312.1	54.7	316.1	56.2	314.6	51.7	53.7	317.1	50.2	320.6	55.7	315.1	49.7	321.1	53.2	317.6
13S23E30B001MX	Fresno Irrigation District	FD30B1	North Kings GSA	19.2	391.6	35.2	375.6	19.7	391.1	18.7	392.1	6.7	10.2	400.6	13.2	397.6	8.2	402.6	6.7	404.1	9.7	401.1
13S23E33B001MX	Fresno Irrigation District	FD33B1	North Kings GSA	17.9	413.9	21.4	410.4	13.9	417.9	15.4	416.4	7.9	13.9	417.9	14.4	417.4	12.9	418.9	10.9	420.9	12.9	418.9
14S18E09H001MX	Fresno Irrigation District	FD09H1	North Kings GSA	104.2	132.1	108.2	128.1	108.2	128.1	106.7	129.6	101.2	92.2	144.1	93.2	143.1	91.2	145.1	92.2	144.1	91.7	144.6
14S18E32D001MX	Fresno Irrigation District	FD32D1	North Kings GSA	143.7	68.6	158.7	53.6	152.2	60.1	158.7	53.6	147.7										
14S19E17C001MX	Fresno Irrigation District	FD17C1	North Kings GSA	90.9	158.9			98.9	151.0	98.9	150.9	94.9	93.9	156.0	90.9	158.9	92.9	156.9	92.4	157.4		
14S19E33D001MX	Fresno Irrigation District	FD33D1	North Kings GSA	78.0	161.5	93.5	146.0	81.0	158.5	90.0	149.5	81.0	80.5	159.0	74.5	165.0	87.5	152.0	80.0	159.5	83.5	156.0
14S20E10M001MX	City of Fresno	FC003	North Kings GSA	109.7	181.7	109.9	181.5	111.6	179.8	110.0	181.4	107.5	107.1	184.3	106.1	185.3	104.1	187.3	101.0	190.4	101.6	189.8
14S20E22J001MX	City of Fresno	FC040	North Kings GSA			89.5	193.0					84.7										
14S21E06Q001MX	City of Fresno	FC077	North Kings GSA	113.8	195.8	116.5	193.1	113.3	196.3	115.2	194.4	112.9	113.6	196.0	112.9	196.6	110.3	199.3	113.7	195.9	107.1	202.5
14S21E22D001MX	Fresno Irrigation District	FD22D1	North Kings GSA	75.2	242.6	80.2	237.6			83.2	234.6	80.2	82.2	235.6	79.2	238.6			79.7	238.1	83.2	234.6
15S19E02M001MX	Fresno Irrigation District	FD03J1	North Kings GSA	107.8	135.1					115.3	127.6	111.3	113.3	129.6	111.3	131.6	110.3	132.6			109.8	133.1
15S19E14M001MX	Fresno Irrigation District	FD14M1	North Kings GSA			145.4	95.8	142.5	98.8	145.4	95.8	140.5	140.5	100.8	139.4	101.8	138.4	102.8	137.4	103.8	140.5	100.8
15S20E07Q001MX	Fresno Irrigation District	FD07P1	North Kings GSA	108.8	143.4	114.3	137.9	112.3	139.9												108.3	143.9
15S20E13E001MX	Fresno Irrigation District	FD13E2	North Kings GSA	82.9	199.1	88.9	193.1	91.0	191.1	92.9	189.1	92.5	92.5	189.6	91.4	190.6	91.9	190.1	89.4	192.6	92.0	190.1
367113N1200785W001	USBR	14S17E14J001M	North Kings GSA	171.0	39.5	144.8	65.7	158.5	52.0	156.3	54.2	144.3			149.0	61.5	153.0	57.5	130.0	80.5	147.0	63.5
367556N1196666W001	Department of Water Resources	13S21E34J002M	North Kings GSA	72.9	267.6	75.3	265.2	74.8	265.7	73.4	267.1	78.2	71.9	268.6			79.5	261.0	72.1	268.4	71.7	268.8
368468N1196593W001	Fresno Irrigation District	FC34H1	North Kings GSA	63.1	329.4	66.1	326.4			66.1	326.4	61.3	117.9	274.6	61.8	330.7	61.5	331.0	61.0	331.5		
368571N1197002W001	Fresno Irrigation District	FC29K1	North Kings GSA	90.0	291.5	102.2	279.3			94.9	286.6	90.5	76.0	305.5	77.6	303.9	77.0	304.5	80.2	301.3	75.5	306.0
368572N1195413W001	Fresno Irrigation District	FC26L1	North Kings GSA	29.9	457.7								68.5	419.1	22.7	464.9					47.2	440.4
368683N1196185W001	Fresno Irrigation District	FC19N1	North Kings GSA	44.5	396.1	89.4	351.2			48.2	392.4	26.2	24.5	416.1	31.1	409.5	35.5	405.1	55.3	385.3	35.2	405.4
CID10	CID	10	South Kings GSA	48.5	317.7	51.6	314.6	52.0	314.2	48.6	317.6	47.8	45.6	320.6	47.7	318.5	47.4	318.8	48.9	317.3	46.1	320.1
CID12	CID	12	South Kings GSA	52.7	288.3	63.6	277.4	60.3	280.7	62.6	278.4	57.4	59.5	281.5	54.7	286.3	58.3	282.7	54.7	286.3	56.5	285.1
CID16	CID	16	South Kings GSA			76.4	242.4	75.7	243.1	79.8	239.0	78.9	76.1	242.7	73.2	245.6	73.6	245.2	72.0	246.8	72.0	248.7
CID25	CID	25	South Kings GSA	65.7	261.6	72.1	255.2	72.6	254.7	73.2	254.1	74.0	66.2	261.1	64.3	263.0	65.5	261.8	65.7	261.6	61.4	268.9
CID34	CID	34	South Kings GSA	57.1	239.7	61.9	234.9	63.3	233.5	65.7	231.1	64.2	58.6	238.2	57.8	239.0	58.2	238.6	56.8	240.0	54.6	243.2

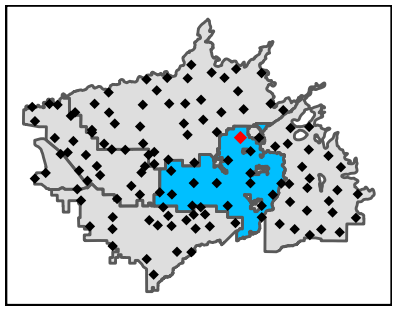
Unique Well ID	Measuring Agency	Local Well ID	GSA	DTW Sp. '20	WSE Sp. '20	DTW Fall '20	WSE Fall '20	DTW Sp. '21	WSE Sp. '21	DTW Fall '21	WSE Fall '21
CID06	CID	6	Central Kings GSA	54.5	287.4	58.1	284.3	63.8	278.6	71.1	271.3
CID28	CID	28	Central Kings GSA								
CID31	CID	31	Central Kings GSA	49.0	277.5	53.1	273.5	53.2	273.4	59.6	267.0
CID32	CID	32	Central Kings GSA	54.0	263.6	57.6	260.0	57.6	260.0	68.9	248.7
CID41	CID	41	Central Kings GSA	25.4	275.3	25.2	264.8	31.0	259.0	30.5	259.5
CID48	CID	48	Central Kings GSA	141.1	113.7	145.2	92.3	142.9	94.6	153.5	84.0
CID56	CID	56	Central Kings GSA	167.2	78.8	174.4	74.0	170.3	78.1	181.5	66.9
CID62	CID	62	Central Kings GSA								
CID65	CID	65	Central Kings GSA	64.3	231.0	66.1	229.1	68.7	226.5	73.5	221.7
CID67	CID	67	Central Kings GSA	108.1	158.6	111.6	154.8	110.8	155.6	117.5	148.9
CID74	CID	74	Central Kings GSA	132.3	123.0	139.5	114.3	135.7	118.1	144.0	109.8
1010034-002	James Irrigation District	1010034-002	James ID	108.1	64.5	128.0	44.6				
15S16E28A003M	James Irrigation District		James ID	91.8	79.3	98.0	74.1	95.4	75.7	109.0	62.1
15S16E29N001M	James Irrigation District	Horn	James ID			116.3	57.2	106.6	69.5	128.5	47.6
16S17E04P001M	James Irrigation District	D12	James ID	170.7	4.3	172.9	2.1	198.3	-15.6	208.0	-25.3
366502N1201782W001	James Irrigation District	C65	James ID	118.6	49.2	127.7	40.1	120.2	47.6	134.7	33.1
14S24E17C001MX	OCID	17C1	Kings River East GSA	17.2	445.6	15.2	447.7	18.7	444.2	23.2	439.7
15S24E11A001MX	OCID	11A1	Kings River East GSA	9.2	420.7	11.3	418.7	15.5	414.4	32.8	397.1
15S25E19A001MX	OCID	19A1	Kings River East GSA	38.5	420.2	44.2	414.4	37.1	421.3	62.2	396.2
16S25E10J001MX	OCID	10J1	Kings River East GSA	51.2	371.4	54.1	368.5	55.3	367.0	75.6	346.7
B013B	AID	B013B	Kings River East GSA	14.3	370.6	16.8	374.0	20.9	374.6	32.5	362.9
H020A	AID	4A	Kings River East GSA			55.7	305.8	50.7	309.6	55.6	304.7
I045A	AID	I045A	Kings River East GSA	72.6	331.1	83.1	319.8	63.4	335.8	88.5	310.7
I055A	AID	I055A	Kings River East GSA	74.3	293.5	86.5	279.2	82.2	281.4	95.5	268.1
I073A	AID	I073A	Kings River East GSA	66.0	269.3	69.0	267.6	65.6	272.1	73.6	264.0
K086B	AID	80	Kings River East GSA			79.1	237.5	75.7	240.6	93.9	222.4
KRWD04	KRWD	KRWD04	Kings River East GSA	14.8	322.4	16.8	321.4	19.8	318.4	18.8	319.4
M065A	AID	M065A	Kings River East GSA			92.7	268.5	89.4	273.1	115.4	247.1
M105A	AID	M105A	Kings River East GSA								
M130B	AID	M130B	Kings River East GSA			94.3	224.2	83.6	229.3	101.4	211.5
O123A	AID	O123A	Kings River East GSA	58.6	304.3	62.7	290.0	63.0	287.8	84.5	266.3
T136A	AID	T136A	Kings River East GSA								
T139A	AID	T139A	Kings River East GSA	76.0	306.9	74.9	310.5	76.3	309.0	99.1	286.1
W172A	AID	W172A	Kings River East GSA	70.4	222.9	71.9	220.7	68.7	223.8		
X156A	AID	X156A	Kings River East GSA	60.0	284.9	66.3	280.5	63.0	285.1	65.6	282.4
X176A	AID	X176A	Kings River East GSA	111.6	179.4	116.5	174.2	102.8	186.5	110.7	178.5
X213A	AID	X213A	Kings River East GSA								
X218B	AID	143	Kings River East GSA	64.9	229.1	68.8	223.9	65.2	224.6	72.9	217.0
X234B	AID	X234B	Kings River East GSA	97.0	230.1	100.2	227.6	100.5	225.8	108.1	218.3
14S17E05C001MX	Fresno Irrigation District	FD5D1	McMullin Area GSA	113.0	89.9	126.0	76.9	119.0	83.9	132.0	70.9
15S17E13R002M	James ID	15S17E13R002M	McMullin Area GSA	178.2	4.4	198.4	-15.8	209.0	-13.4	219.1	-23.5
15S18E02A001MX	Fresno Irrigation District	FD02A1	McMullin Area GSA								
15S18E30L001M	James ID	15S18E30L001M	McMullin Area GSA					239.5	-41.9	241.7	-44.1
365463N1199268W001	Department of Water Resources	16S19E17C001M	McMullin Area GSA	208.8	-14.3	217.3	-22.8	233.0	-12.3	236.5	-15.8
366082N1201199W001	James ID	15S17E21J001M	McMullin Area GSA					201.9	-19.3	185.9	-3.3
366188N1199104W001	Department of Water Resources	15S19E21C003M	McMullin Area GSA					166.0	68.6	173.2	61.4
367705N1202691W001	USBR	13S16E30L003M	McMullin Area GSA			126.5	50.9	82.5	94.9	116.3	61.2
367757N1201874W001	USBR	13S16E26A001M	McMullin Area GSA					68.0	125.4	111.0	82.4
367782N1202141W001	USBR	13S16E27C001M	McMullin Area GSA			127.0	61.4	68.0	120.4	97.9	90.6
A01	KRCD	A01	McMullin Area GSA	109.7	52.1	149.4	12.4	130.2	31.6	175.8	-14.0
A07	KRCD	A07	McMullin Area GSA	84.5	85.9	86.3	83.1	85.0	84.4	90.6	78.9
A17	KRCD	A17	McMullin Area GSA	140.0	71.1	146.4	63.7	142.6	67.5	159.8	50.3
A20	KRCD	A20	McMullin Area GSA								
A23	KRCD	A23	McMullin Area GSA	187.1	2.9	194.8	-5.8	189.3	-0.3	198.7	-9.6
A24	KRCD	A24	McMullin Area GSA	136.1	38.2	130.7	42.6	139.8	33.5	156.5	16.8
A30	KRCD	A30	McMullin Area GSA	-2.0				227.0	-49.1	265.7	-87.7
A34	KRCD	A34	McMullin Area GSA	165.0	53.0	197.0	18.0	181.0	34.0	181.7	33.3
A46	KRCD	A46	McMullin Area GSA	145.0	116.7	129.0	110.7	126.0	113.7	137.0	102.7
A51	KRCD	A51	McMullin Area GSA	192.0	36.5	197.7	30.8	191.0	37.5	199.7	28.8
A53	KRCD	A53	McMullin Area GSA			240.5	-29.4	230.0	-18.9	243.3	-32.2
A58	KRCD	A58	McMullin Area GSA	237.2	-42.8	247.0	-54.6	229.4	-37.0	251.0	-58.6
A62	KRCD	A62	McMullin Area GSA	184.0	53.3	192.9	43.4	187.1	49.2	196.9	39.4
364002N1197624W001	Laguna ID	18S20E02A001M	North Fork Kings GSA	145.0	97.8	148.0	94.8	137.0	105.8	155.0	74.5
364591N1200135W001	KRCD	17S18E09R001M	North Fork Kings GSA	205.9	-14.5	213.7	-21.2	222.8	-30.3	233.7	-41.2
364603N1197510W001	Liberty WD	17S20E12Q001M	North Fork Kings GSA	144.8	98.0	149.8	92.9	144.5	98.2	150.4	97.1
364667N1197041W001	Liberty WD	17S21E09M001M	North Fork Kings GSA	120.0	130.8	125.9	125.0	118.1	132.8	130.7	120.2
364668N1198257W001	Liberty WD	17S20E08L001M	North Fork Kings GSA	182.7	46.5	201.6	27.6	176.7	52.5		
364682N1198732W001	Liberty WD	17S19E11H001M	North Fork Kings GSA	187.3	31.0			200.2	18.1		
364739N1196227W001	Laguna ID	17S22E07A001M	North Fork Kings GSA	79.9	192.7	82.9	189.7	79.9	192.7	91.9	180.7
364813N1198968W001	Liberty WD	17S19E03L001M	North Fork Kings GSA	193.5	22.2	194.8	20.9	196.6	19.1	205.5	10.2
364816N1197785W001	Laguna ID	17S20E02M001M	North Fork Kings GSA	148.5	89.2	150.5	87.2	149.5	88.2	149.9	86.3
364893N1200127W001	KRCD	16S18E33Q001M	North Fork Kings GSA	218.2	-18.5	246.8	-48.1			251.0	-52.3
364916N1198366W001	Liberty WD	16S20E31P001M	North Fork Kings GSA	189.9	48.0	200.2	37.2	193.6	43.8	205.1	32.3
364960N1197554W001	Liberty WD	16S20E35J001M	North Fork Kings GSA			153.6	93.9	145.6	101.9		
364967N1197193W001	Liberty WD	16S21E31J001M	North Fork Kings GSA	138.6	117.0	145.3	110.4	130.3	125.4	131.1	124.6
365143N1198529W001	Liberty WD	16S19E25B001M	North Fork Kings GSA								

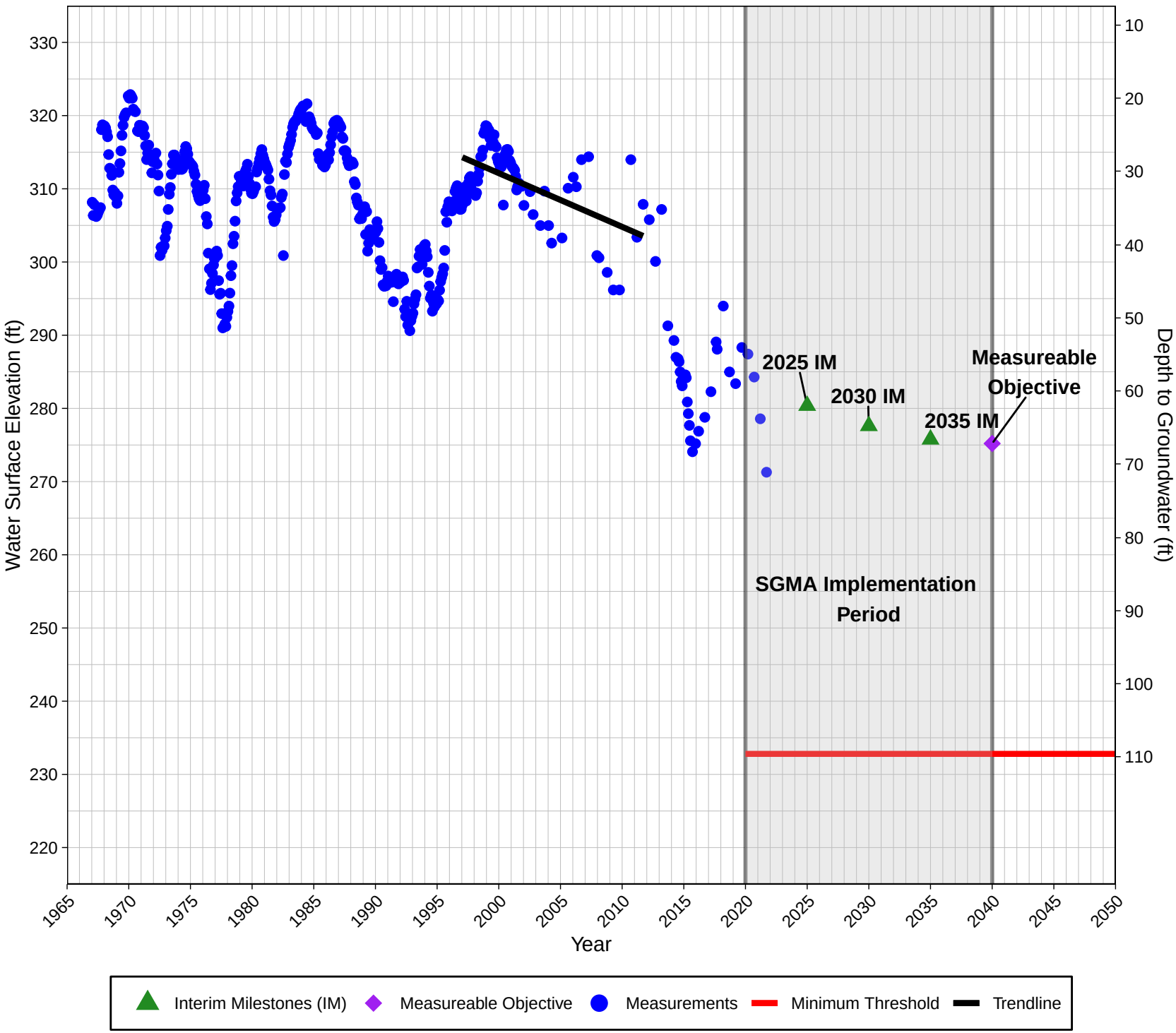
Unique Well ID	Measuring Agency	Local Well ID	GSA	DTW Sp. '20	WSE Sp. '20	DTW Fall '20	WSE Fall '20	DTW Sp. '21	WSE Sp. '21	DTW Fall '21	WSE Fall '21
365150N1197327W001	Liberty WD	16S21E30C001M	North Fork Kings GSA	130.4	127.0	134.5	123.2	131.1	126.6	137.6	120.1
B06	KRCD	B06	North Fork Kings GSA	179.7	2.3	184.8	-4.7	188.9	-6.5	186.2	-3.8
B22	KRCD	B22	North Fork Kings GSA	200.9	-5.9	214.8	-18.9	216.0	-19.9	211.2	-15.0
B31	KRCD	B31	North Fork Kings GSA	183.6	21.9	193.5	11.2	193.3	11.8	202.4	2.7
LID14	LID	LID14	North Fork Kings GSA	167.0	57.5	171.6	52.8	162.7	61.8	178.7	45.8
LID21	LID	LID21	North Fork Kings GSA	165.0	49.6	165.3	49.4	163.2	51.4	159.2	55.4
LID25	LID	LID25	North Fork Kings GSA	158.3	43.2	165.3	37.9	164.3	38.9	252.3	-49.1
LID26	LID	LID26	North Fork Kings GSA	178.9	19.1	183.9	16.2	181.9	18.2	223.9	-23.8
12S19E33P001MX	City of Fresno	FC160	North Kings GSA	102.0	198.9	103.7	197.2	102.1	198.8	106.0	194.9
12S19E36J001MX	City of Fresno	FC091	North Kings GSA	147.0	184.8			157.6	174.2	145.0	186.8
12S20E23D001MX	City of Fresno	FC295	North Kings GSA	155.8	208.6					160.2	204.2
12S20E34K001MX	City of Fresno	FC092	North Kings GSA	161.0	199.1	174.9	185.2	159.0	201.1	203.4	156.7
13S17E25C001MX	Fresno Irrigation District	FD25C1	North Kings GSA	79.1	152.8					97.1	134.8
13S17E33M001MX	Fresno Irrigation District	FD32H1	North Kings GSA	107.4	102.7	119.9	90.2	119.4	90.7	155.4	54.7
13S18E17A001MX	Fresno Irrigation District	FD17A1	North Kings GSA	65.0	188.2	70.0	183.2	72.5	180.7	80.8	172.5
13S18E33M001MX	Fresno Irrigation District	FD32J1	North Kings GSA			87.5	149.8	90.5	146.8	101.5	135.8
13S19E11L001MX	City of Fresno	FC035	North Kings GSA	119.3	185.4	122.2	182.5	121.3	183.4	125.4	179.3
13S19E29A001MX	Fresno Irrigation District	FD29A1	North Kings GSA	88.7	178.2	91.2	175.7	90.7	176.2	97.5	169.4
13S20E27C001MX	City of Fresno	FC069	North Kings GSA	121.0	189.1	140.1	170.0	117.5	192.6	117.2	192.9
13S20E30B001MX	City of Fresno	FC074	North Kings GSA	117.9	186.1	119.0	185.0	118.5	185.5	119.4	184.6
13S21E19E001MX	City of Fresno	FC080	North Kings GSA	122.0	212.8	111.2	223.6	120.5	214.3	128.7	206.1
13S22E07R001MX	Fresno Irrigation District	FD07R1	North Kings GSA	61.5	330.1	65.0	326.6	63.5	328.1	67.5	324.1
13S22E32A001MX	Fresno Irrigation District	FD32A1	North Kings GSA	49.7	321.1	56.7	314.1	54.2	316.6	60.5	310.4
13S23E30B001MX	Fresno Irrigation District	FD30B1	North Kings GSA	8.2	402.6	24.2	386.6	17.7	393.1	35.7	375.1
13S23E33B001MX	Fresno Irrigation District	FD33B1	North Kings GSA	13.9	417.9	18.9	412.9	17.9	413.9	22.9	408.9
14S18E09H001MX	Fresno Irrigation District	FD09H1	North Kings GSA	94.2	142.1	101.2	135.1	105.7	130.6	117.7	118.6
14S18E32D001MX	Fresno Irrigation District	FD32D1	North Kings GSA	149.7	62.6	161.7	50.6	155.7	56.6	175.2	37.1
14S19E17C001MX	Fresno Irrigation District	FD17C1	North Kings GSA	89.9	160.0	94.4	155.5	93.9	156.0	98.9	151.0
14S19E33D001MX	Fresno Irrigation District	FD33D1	North Kings GSA	78.0	161.5	81.0	158.5	76.0	163.5	87.0	152.5
14S20E10M001MX	City of Fresno	FC003	North Kings GSA	99.0	192.4	100.0	191.4	96.0	195.4	105.4	186.0
14S20E22J001MX	City of Fresno	FC040	North Kings GSA								
14S21E06Q001MX	City of Fresno	FC077	North Kings GSA	104.7	204.9	104.8	204.8	101.3	208.3	105.9	203.7
14S21E22D001MX	Fresno Irrigation District	FD22D1	North Kings GSA	80.7	237.1	84.2	233.6				
15S19E02M001MX	Fresno Irrigation District	FD03J1	North Kings GSA	108.8	134.1	112.8	130.1	112.3	130.6	122.3	120.6
15S19E14M001MX	Fresno Irrigation District	FD14M1	North Kings GSA	139.5	101.8			151.0	90.3	157.0	84.3
15S20E07Q001MX	Fresno Irrigation District	FD07P1	North Kings GSA	112.3	139.9	116.3	135.9	116.3	135.9	123.3	128.9
15S20E13E001MX	Fresno Irrigation District	FD13E2	North Kings GSA	90.5	191.6	93.5	188.6	94.0	188.1	98.5	183.6
367113N1200785W001	USBR	14S17E14J001M	North Kings GSA								
367556N1196666W001	Department of Water Resources	13S21E34J002M	North Kings GSA	70.5	270.0	71.0	269.5	71.0	269.5	74.5	266.0
368468N1196593W001	Fresno Irrigation District	FC34H1	North Kings GSA			58.5	334.0	58.3	334.3	60.5	332.0
368571N1197002W001	Fresno Irrigation District	FC29K1	North Kings GSA	71.2	310.3	75.0	306.5	78.8	302.8	82.5	299.0
368572N1195413W001	Fresno Irrigation District	FC26L1	North Kings GSA	24.3	463.3	26.0	461.6	24.8	462.9	28.5	459.1
368683N1196185W001	Fresno Irrigation District	FC19N1	North Kings GSA	33.9	406.7	73.0	367.6	39.0	401.6	42.5	398.1
CID10	CID	10	South Kings GSA	47.9	318.3	47.6	318.6	49.8	316.4	54.3	311.9
CID12	CID	12	South Kings GSA	54.2	287.4	56.8	284.2	56.3	284.7	73.1	267.9
CID16	CID	16	South Kings GSA	69.8	250.9	73.6	245.2	73.0	245.8	82.2	236.6
CID25	CID	25	South Kings GSA	60.6	269.7	65.3	262.0	66.4	260.9	75.8	251.5
CID34	CID	34	South Kings GSA	53.6	244.2	57.2	239.6	56.7	240.1	63.0	233.8

Appendix C – Groundwater Monitor Well Hydrographs

CID06

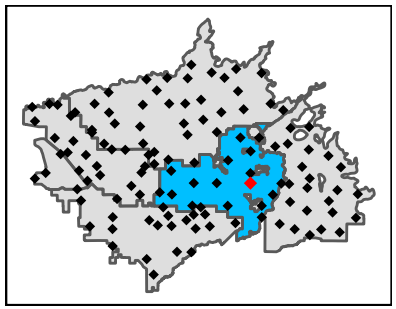
State Well ID: <Null>
Ground Surface Elevation: 342 ft
Central Kings Groundwater Sustainability Agency

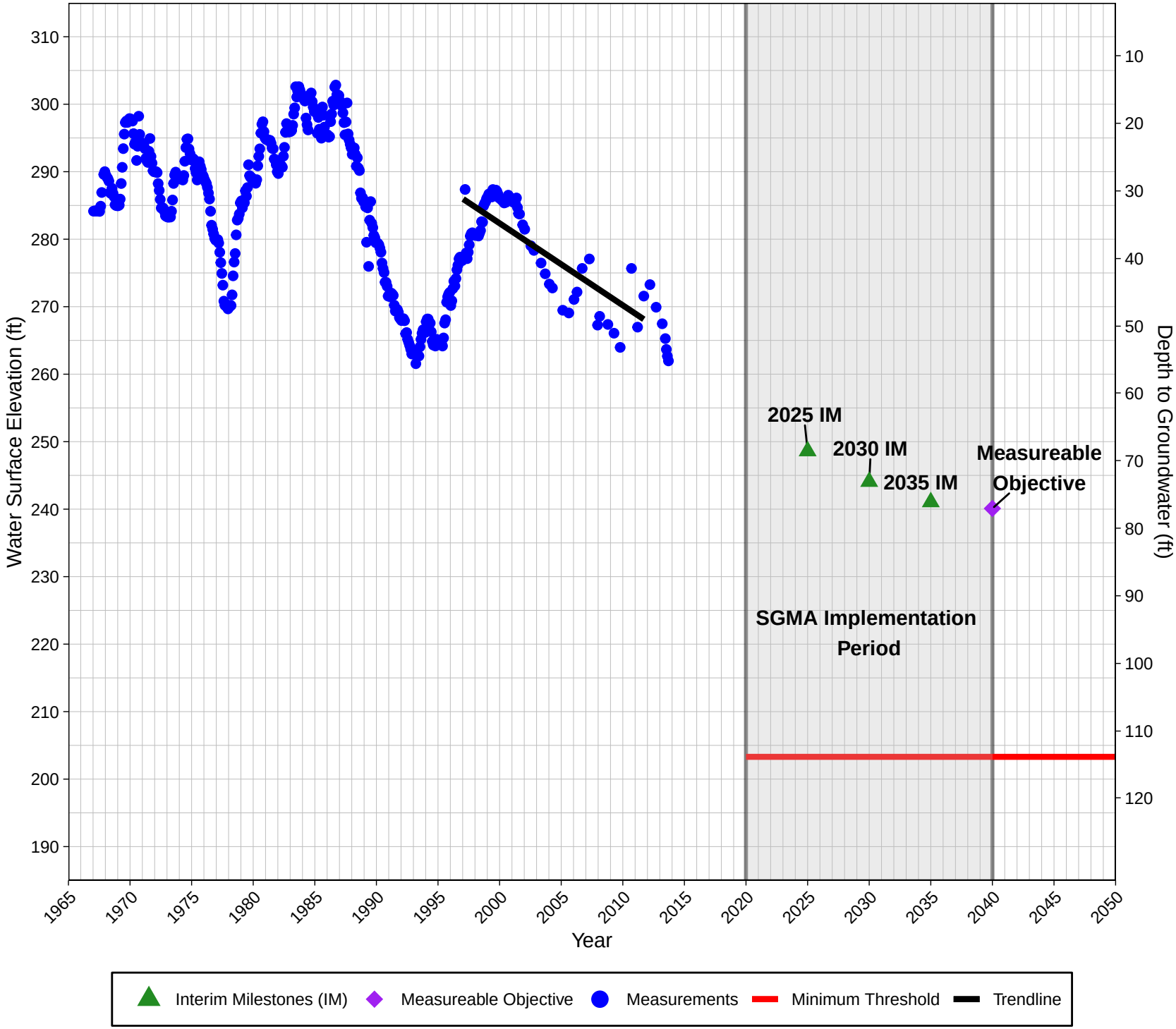




CID28

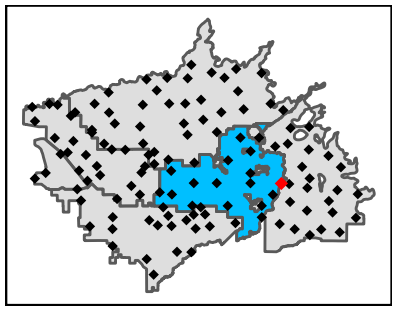
State Well ID: 15S22E33R001M
Ground Surface Elevation: 317 ft
Central Kings Groundwater Sustainability Agency

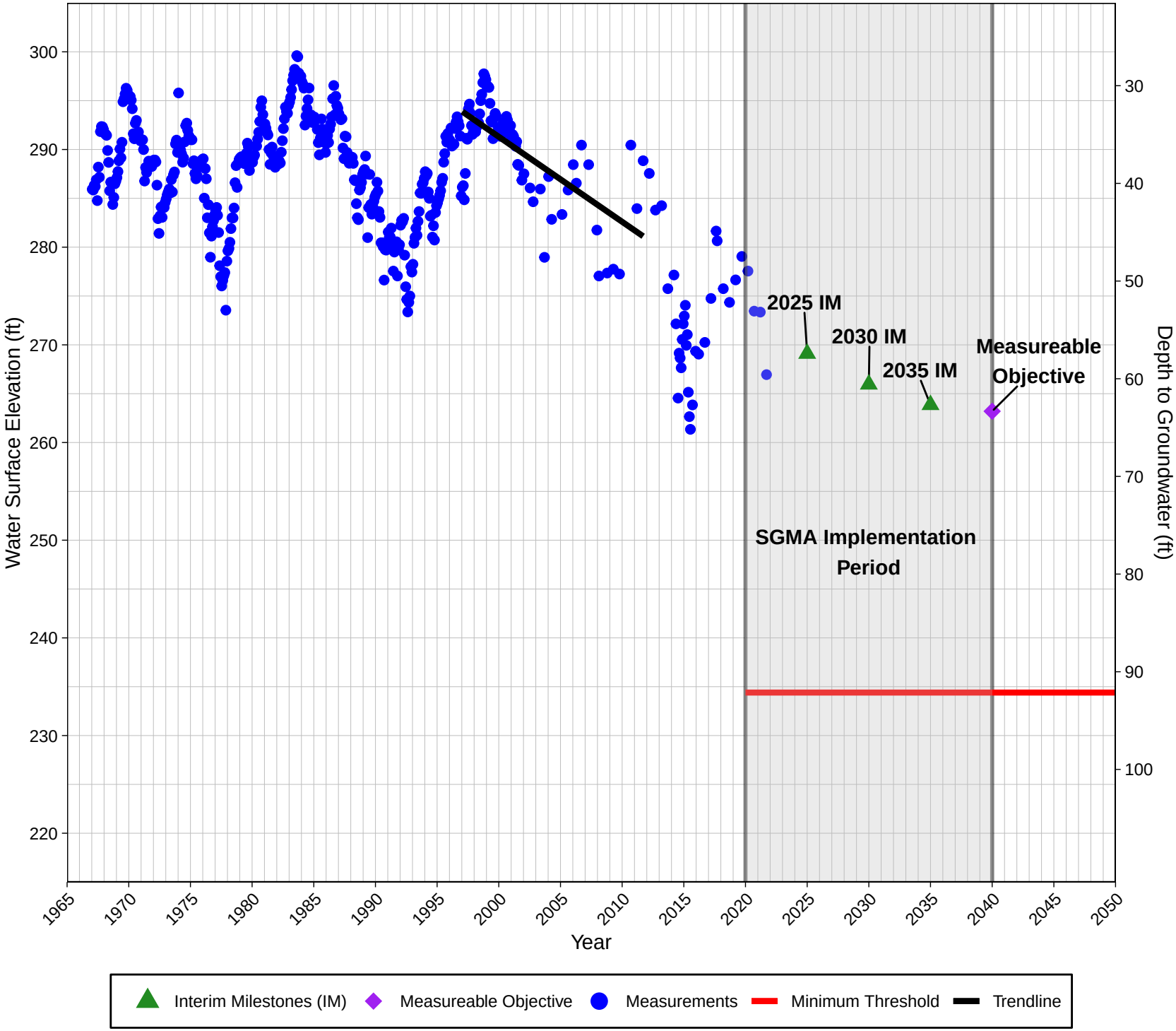




CID31

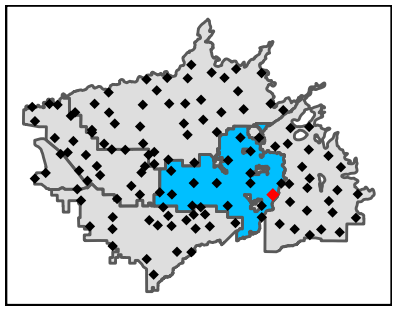
State Well ID: 15S23E33P001M
Ground Surface Elevation: 327 ft
Central Kings Groundwater Sustainability Agency

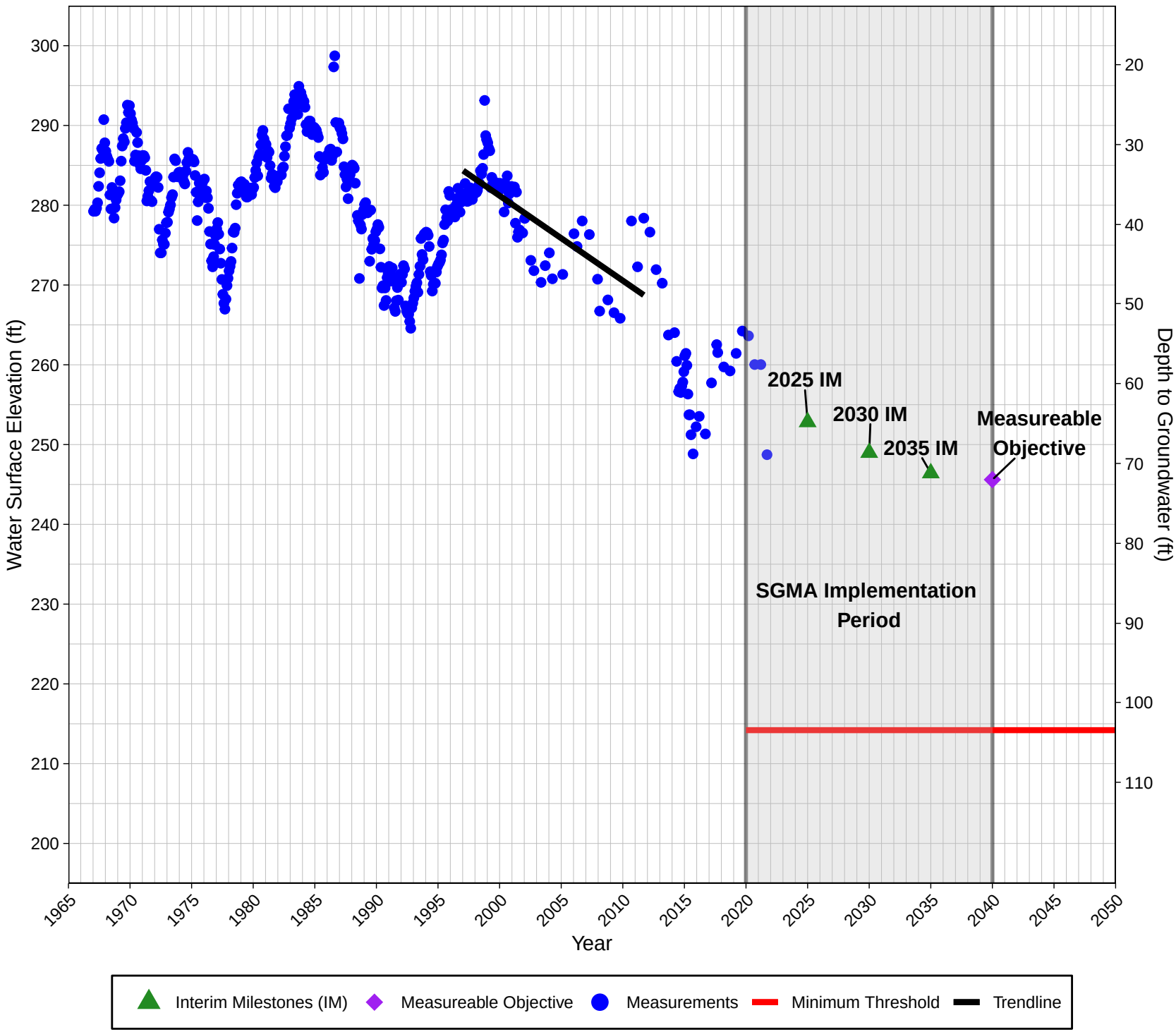




CID32

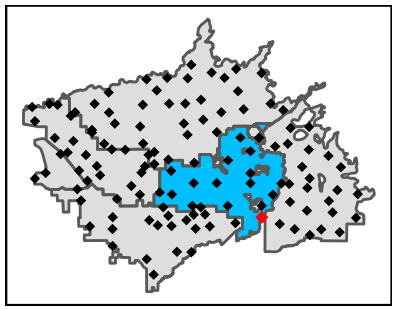
State Well ID: 16S23E18A001M
Ground Surface Elevation: 318 ft
Central Kings Groundwater Sustainability Agency

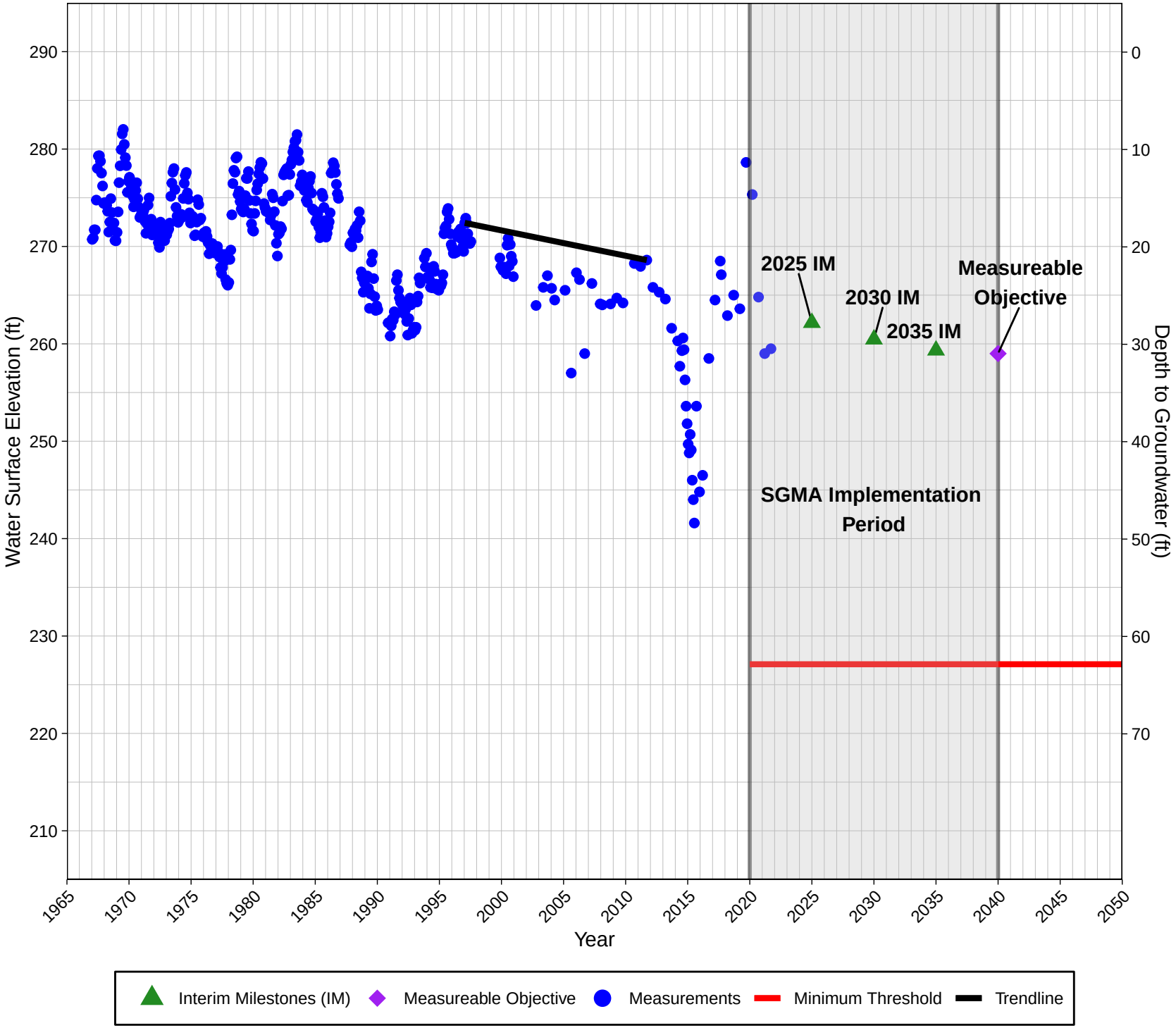




CID41

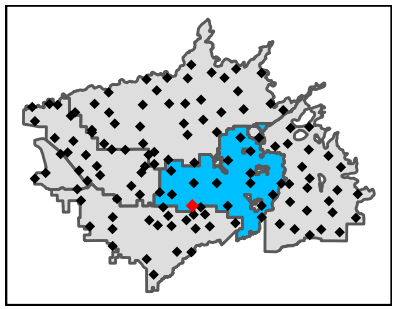
State Well ID: 17S22E01C001M
Ground Surface Elevation: 290 ft
Central Kings Groundwater Sustainability Agency

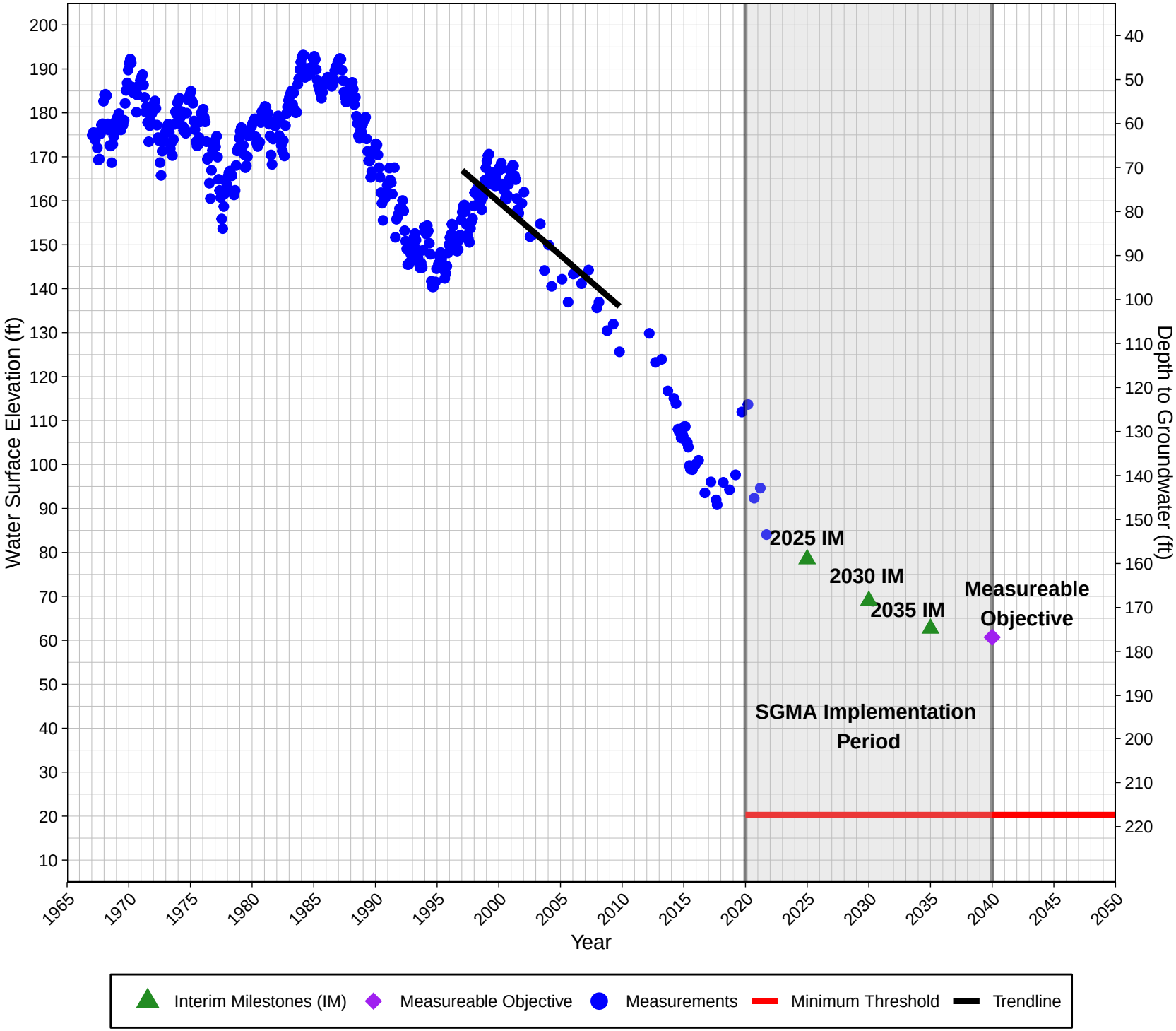




CID48

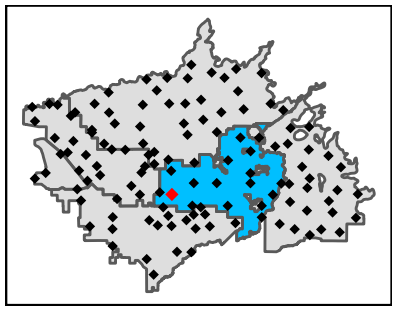
State Well ID: <Null>
Ground Surface Elevation: 238 ft
Central Kings Groundwater Sustainability Agency

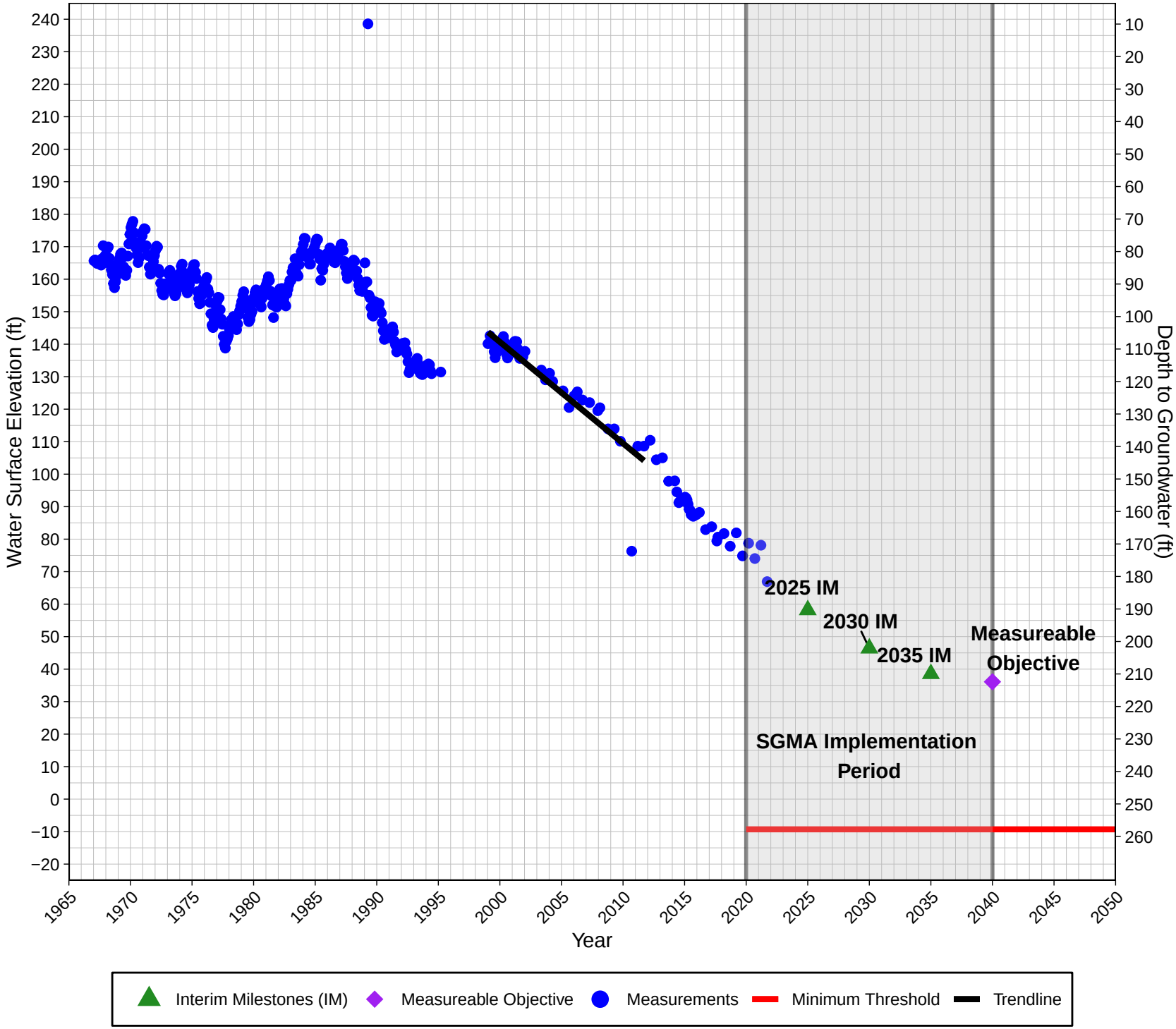




CID56

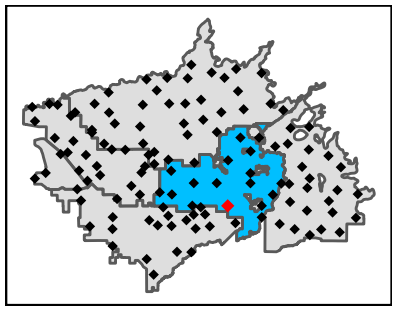
State Well ID: 16S20E18A001M
Ground Surface Elevation: 248 ft
Central Kings Groundwater Sustainability Agency

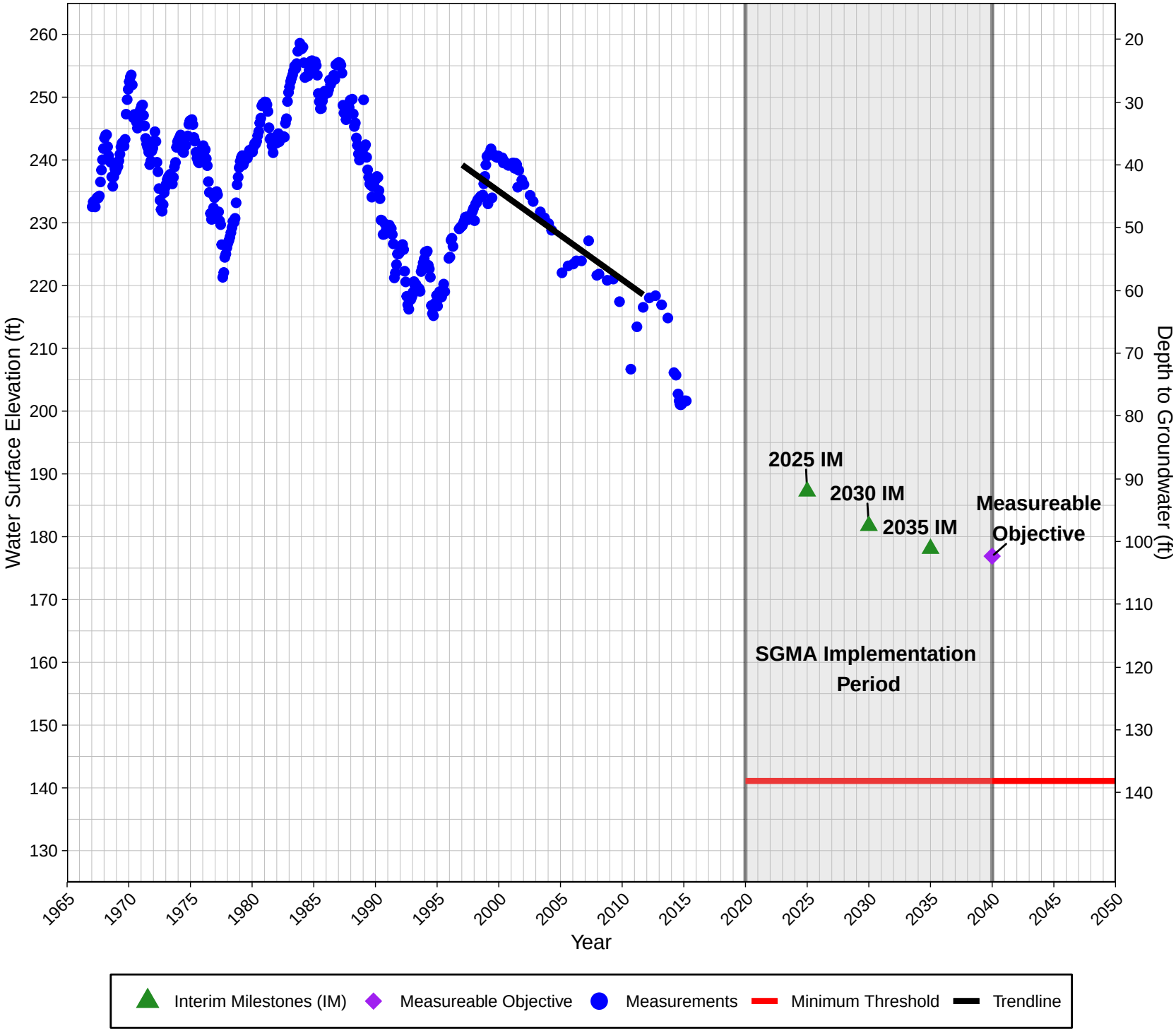




CID62

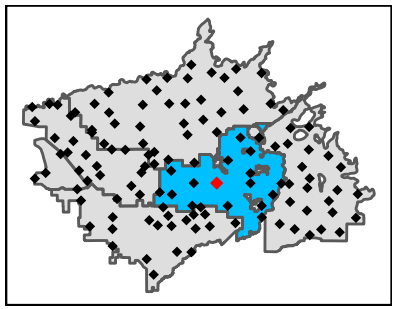
State Well ID: 16S21E23R001M
Ground Surface Elevation: 279 ft
Central Kings Groundwater Sustainability Agency

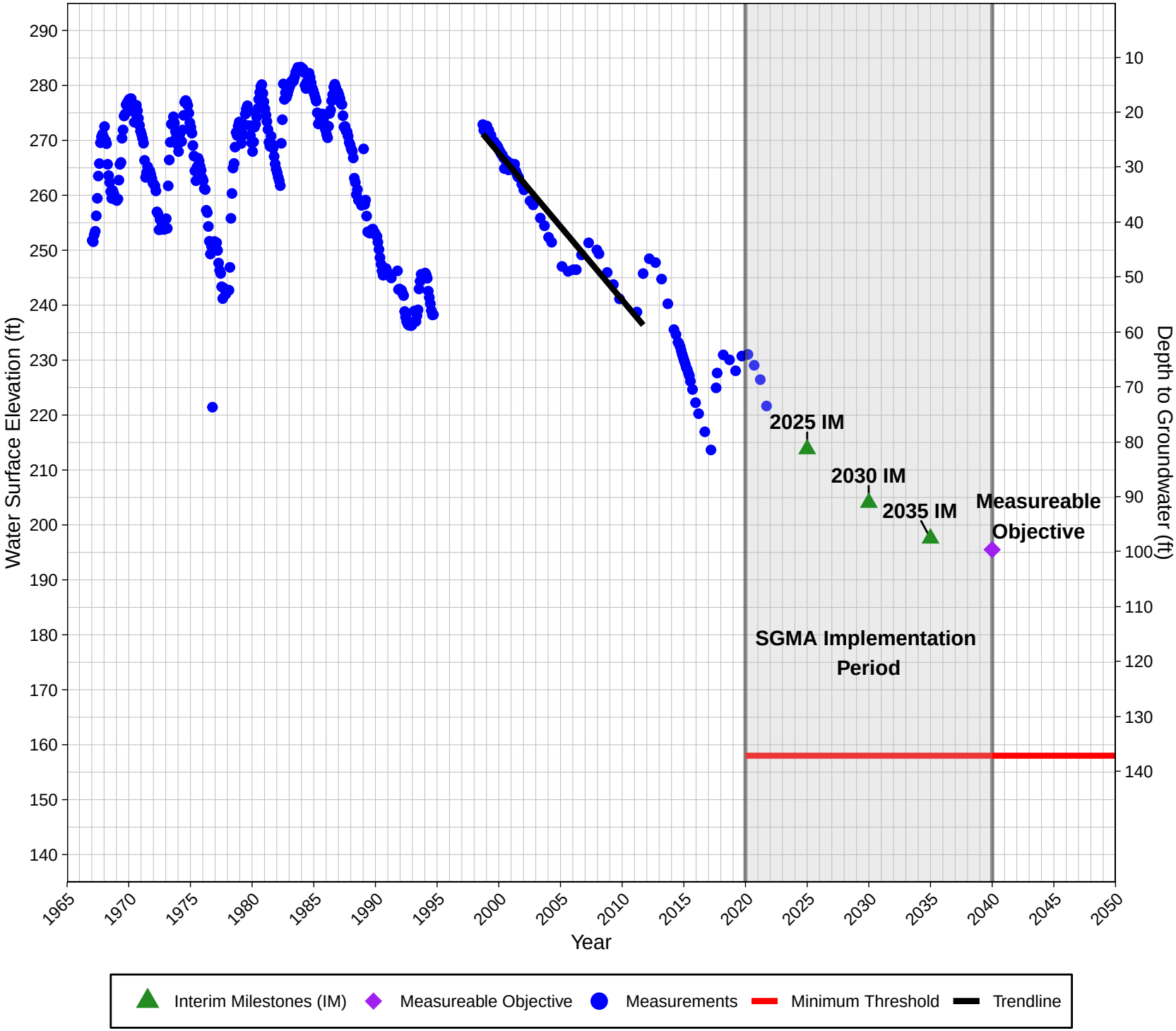




CID65

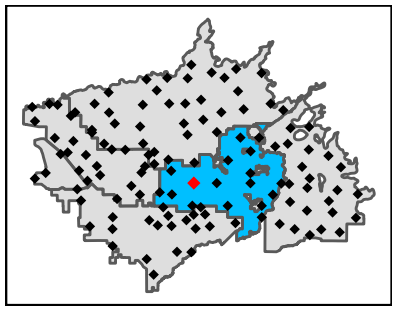
State Well ID: 15S21E34N001M
Ground Surface Elevation: 295 ft
Central Kings Groundwater Sustainability Agency

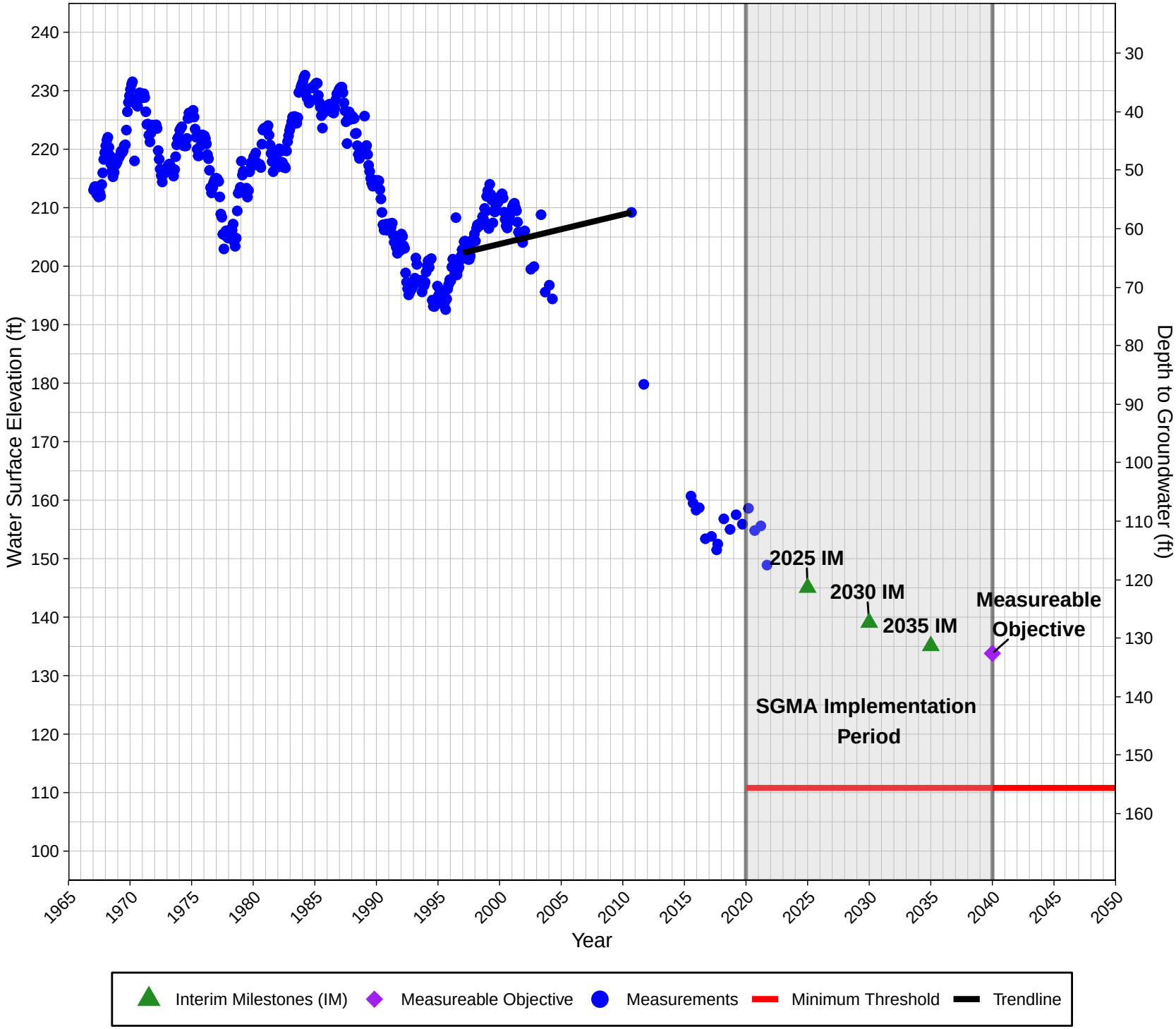




CID67

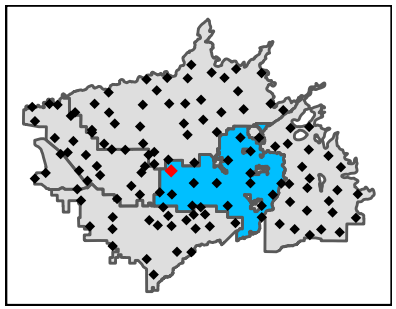
State Well ID: <Null>
Ground Surface Elevation: 266 ft
Central Kings Groundwater Sustainability Agency

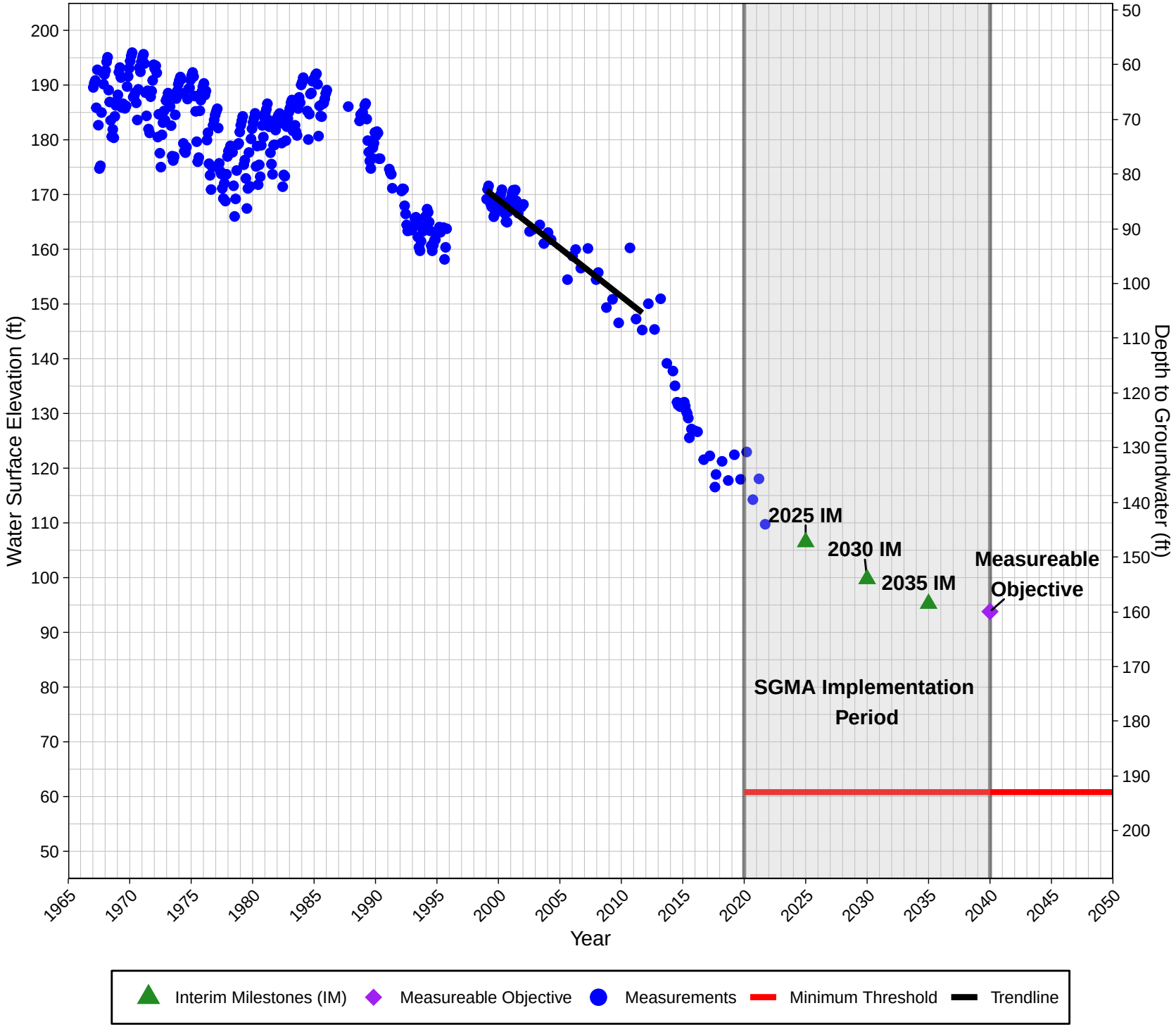




CID74

State Well ID: 15S20E19R001M
Ground Surface Elevation: 254 ft
Central Kings Groundwater Sustainability Agency

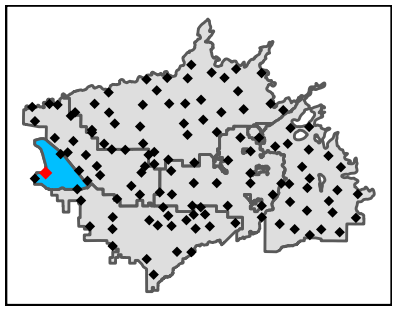




15S16E28A003M

Ground Surface Elevation: 171 ft

James Irrigation District



Water Surface Elevation (ft)

Depth to Groundwater (ft)

Year

2025 IM

2030 IM

2035 IM

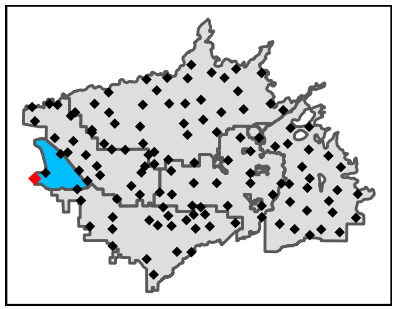
Measureable Objective

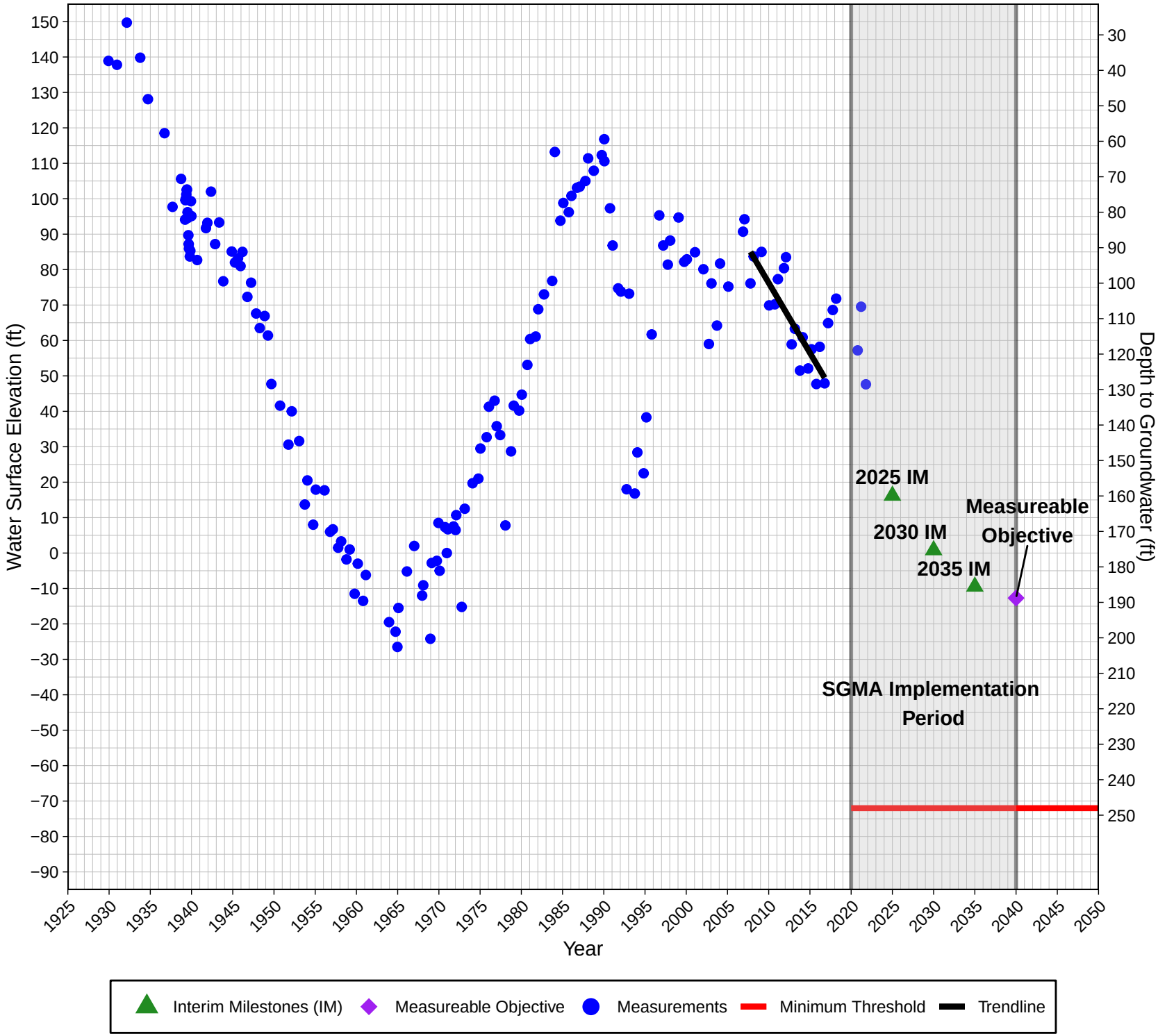
SGMA Implementation Period

Interim Milestones (IM) | Measureable Objective | Measurements | Minimum Threshold | Trendline

15S16E29N001M

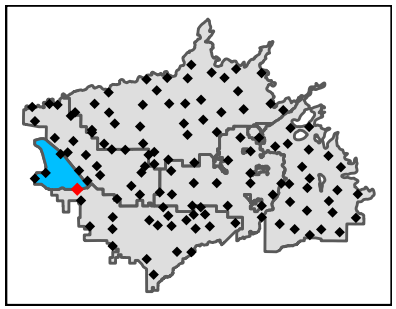
Ground Surface Elevation: 176 ft
James Irrigation District

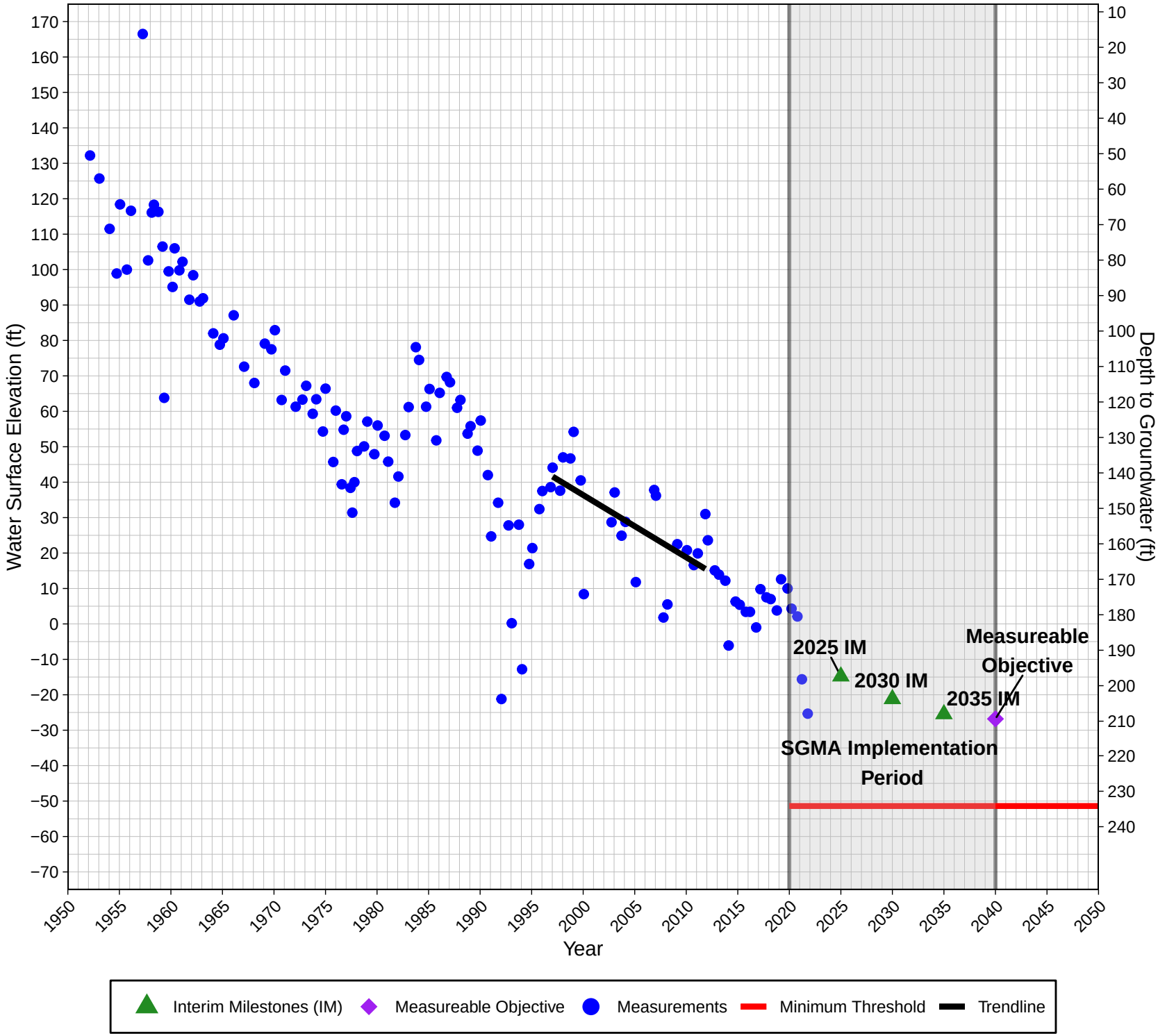




16S17E04P001M

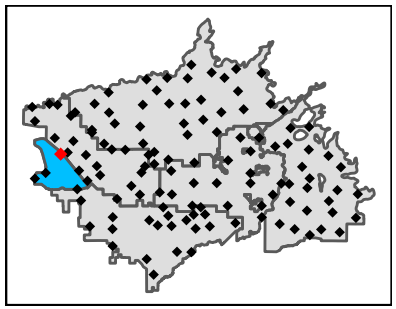
Ground Surface Elevation: 183 ft
James Irrigation District

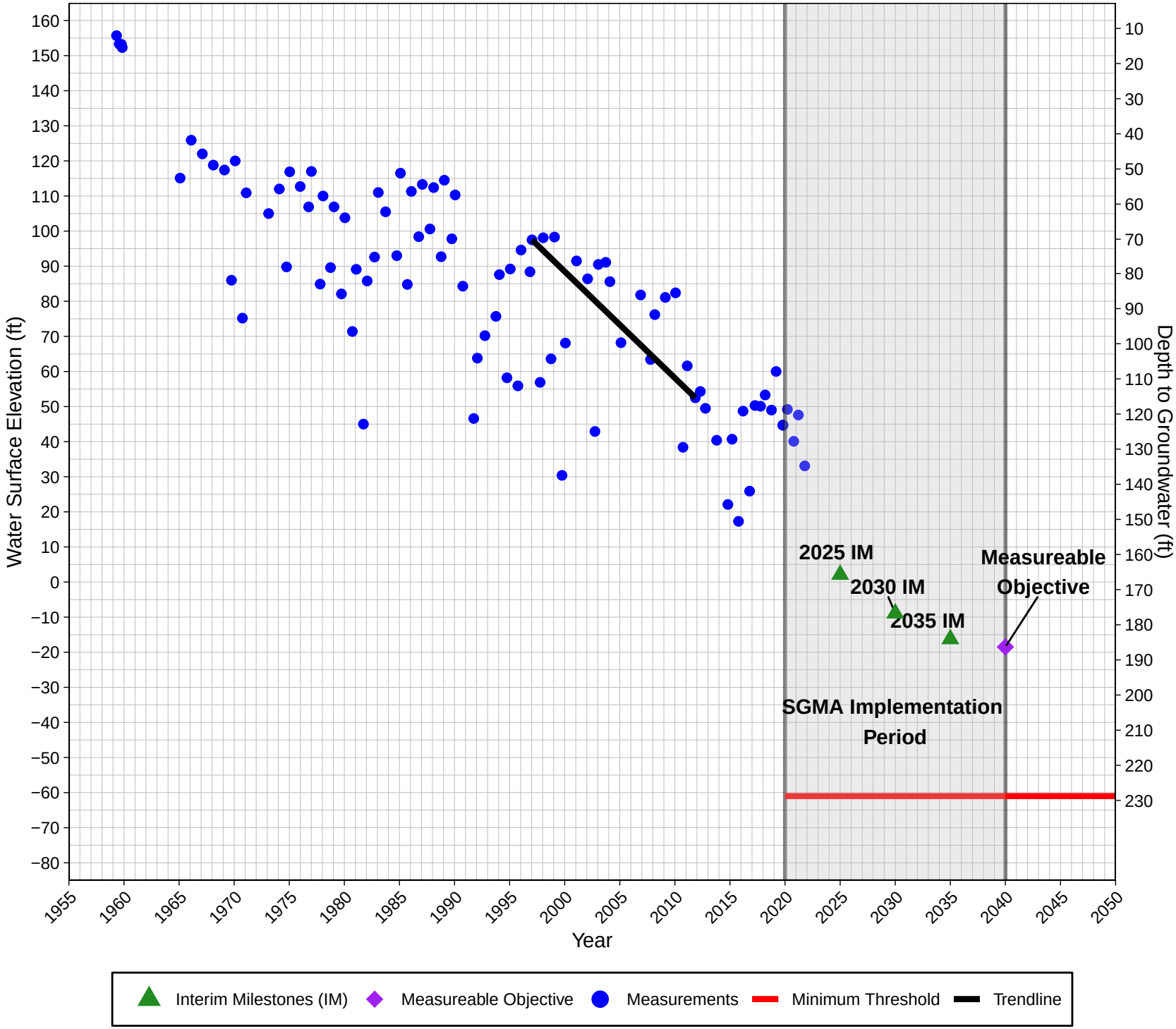


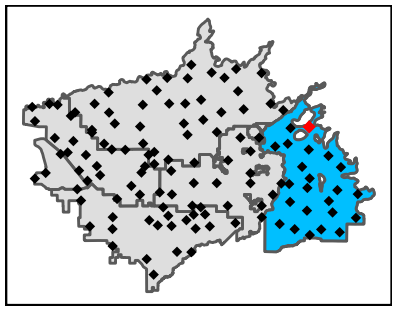


366502N1201782W001

State Well ID: 15S16E01Q002M
Ground Surface Elevation: 168 ft
James Irrigation District







14S24E17C001MX

Ground Surface Elevation: 463 ft

Kings River East Groundwater Sustainability Agency

Water Surface Elevation (ft)

Depth to Groundwater (ft)

Year

2025 IM

2030 IM

2035 IM

Measureable Objective

SGMA Implementation Period

Interim Milestones (IM)

Measureable Objective

Measurements

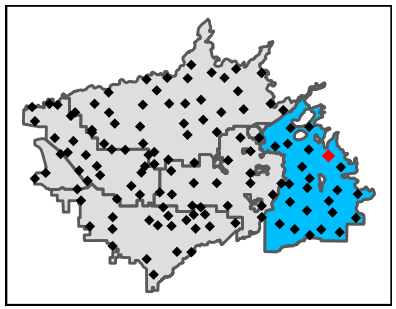
Minimum Threshold

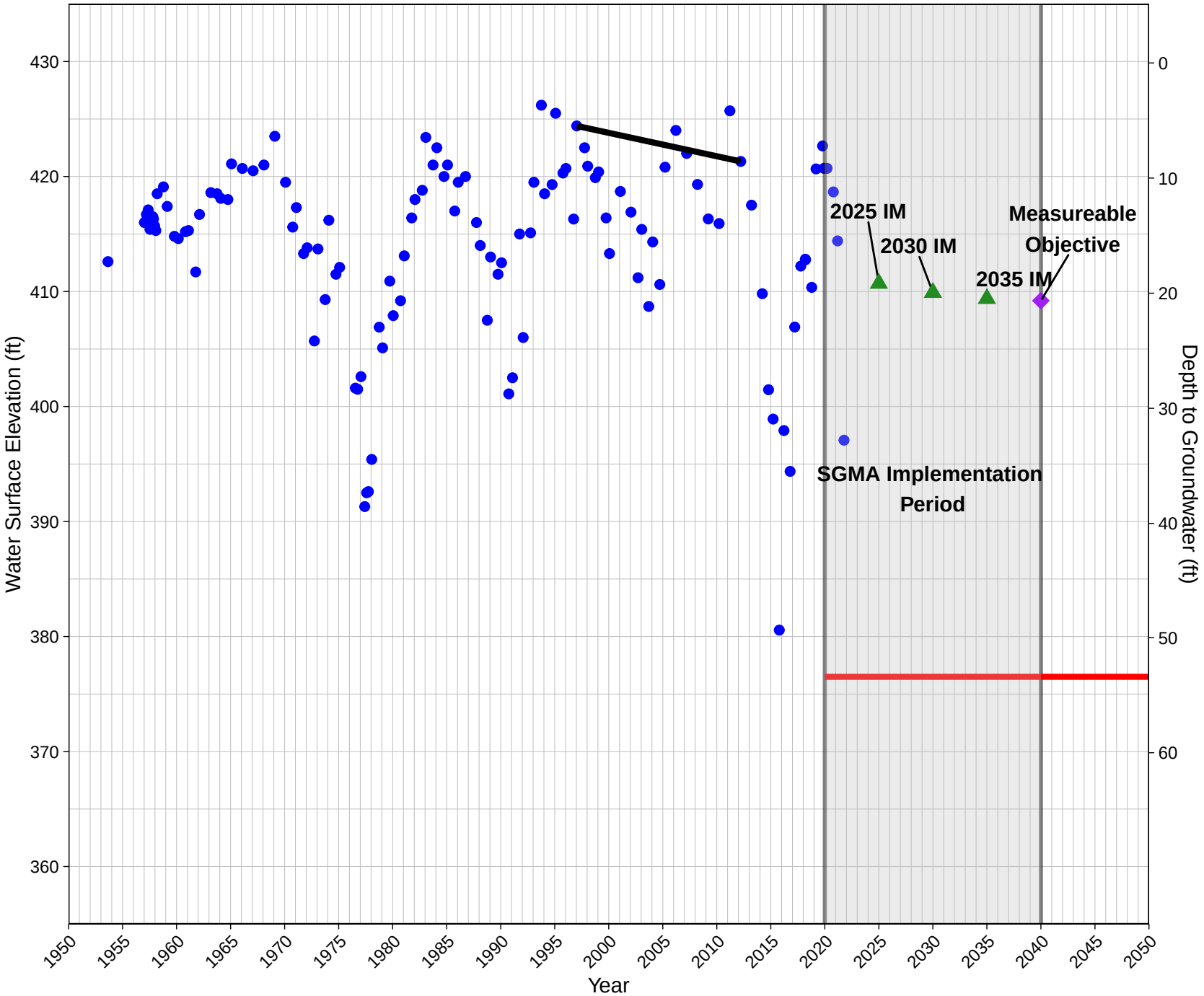
Trendline

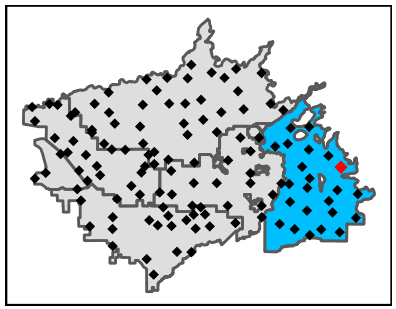
15S24E11A001MX

Ground Surface Elevation: 430 ft

Kings River East Groundwater Sustainability Agency







15S25E19A001MX

Ground Surface Elevation: 458 ft

Kings River East Groundwater Sustainability Agency

Water Surface Elevation (ft)

Depth to Groundwater (ft)

Year

2025 IM

2030 IM

2035 IM

Measureable Objective

SGMA Implementation Period

Interim Milestones (IM)

Measureable Objective

Measurements

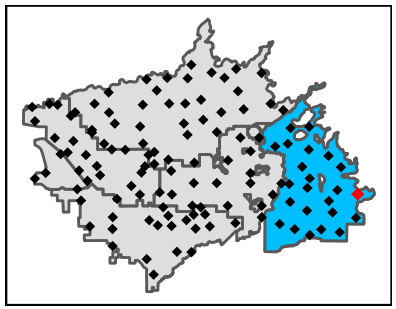
Minimum Threshold

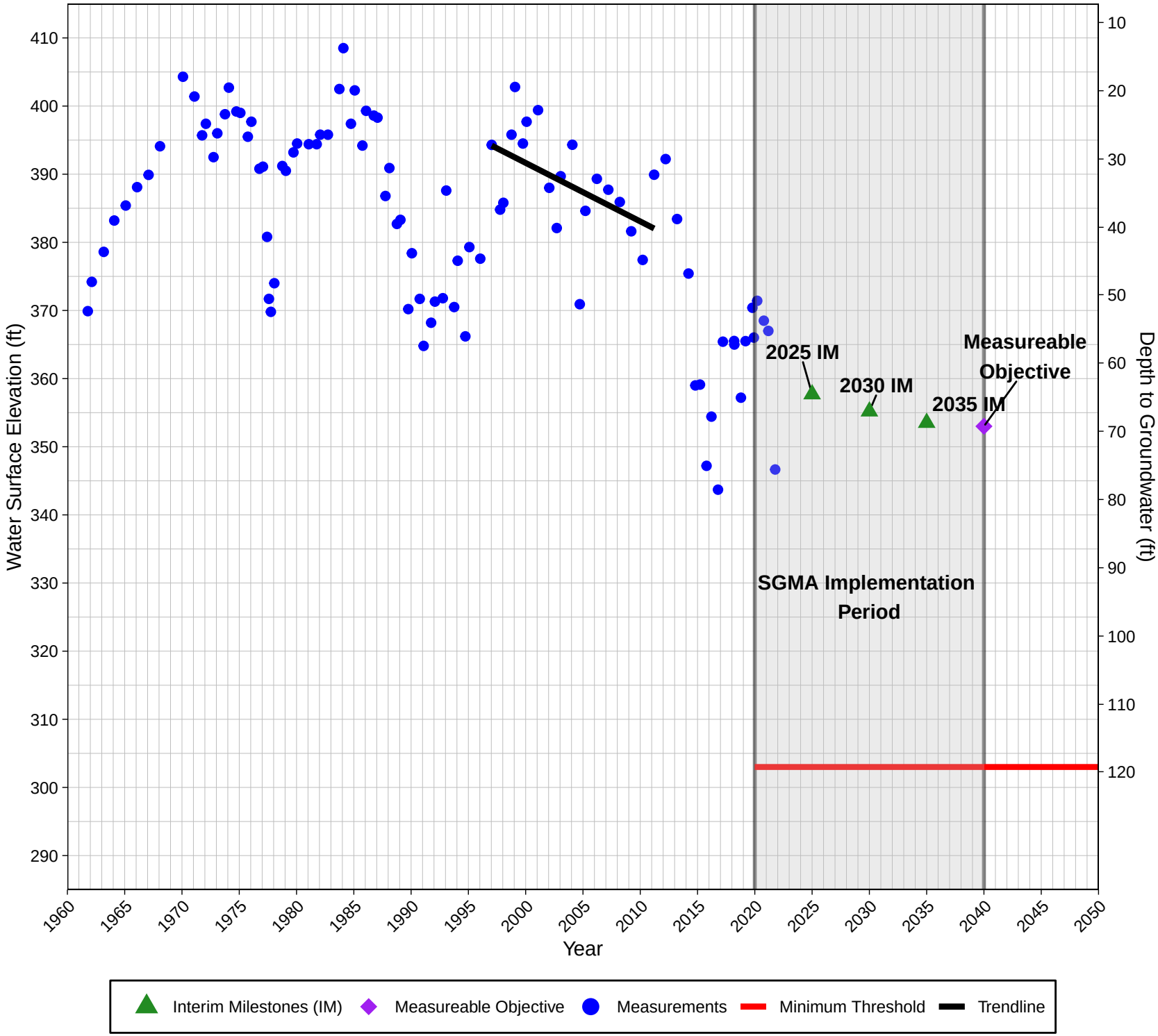
Trendline

16S25E10J001MX

Ground Surface Elevation: 422 ft

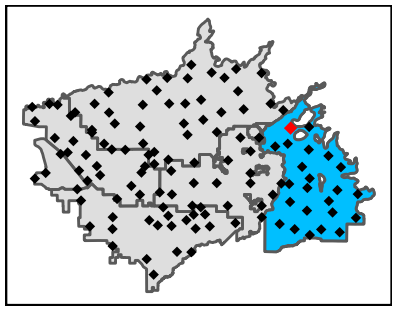
Kings River East Groundwater Sustainability Agency

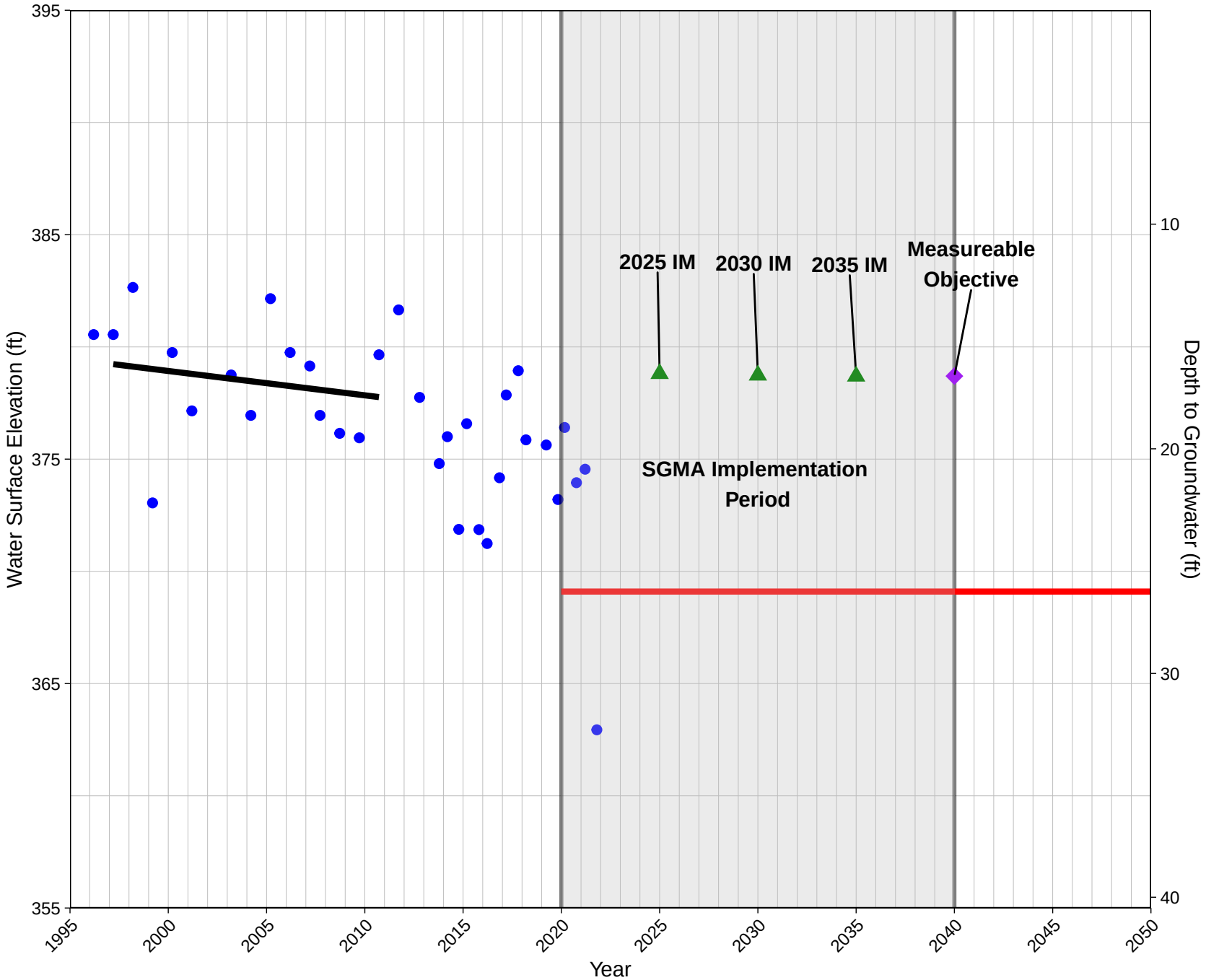




B013B

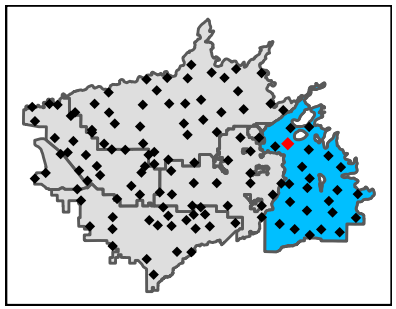
State Well ID: <Null>
Ground Surface Elevation: 395 ft
Kings River East Groundwater Sustainability Agency

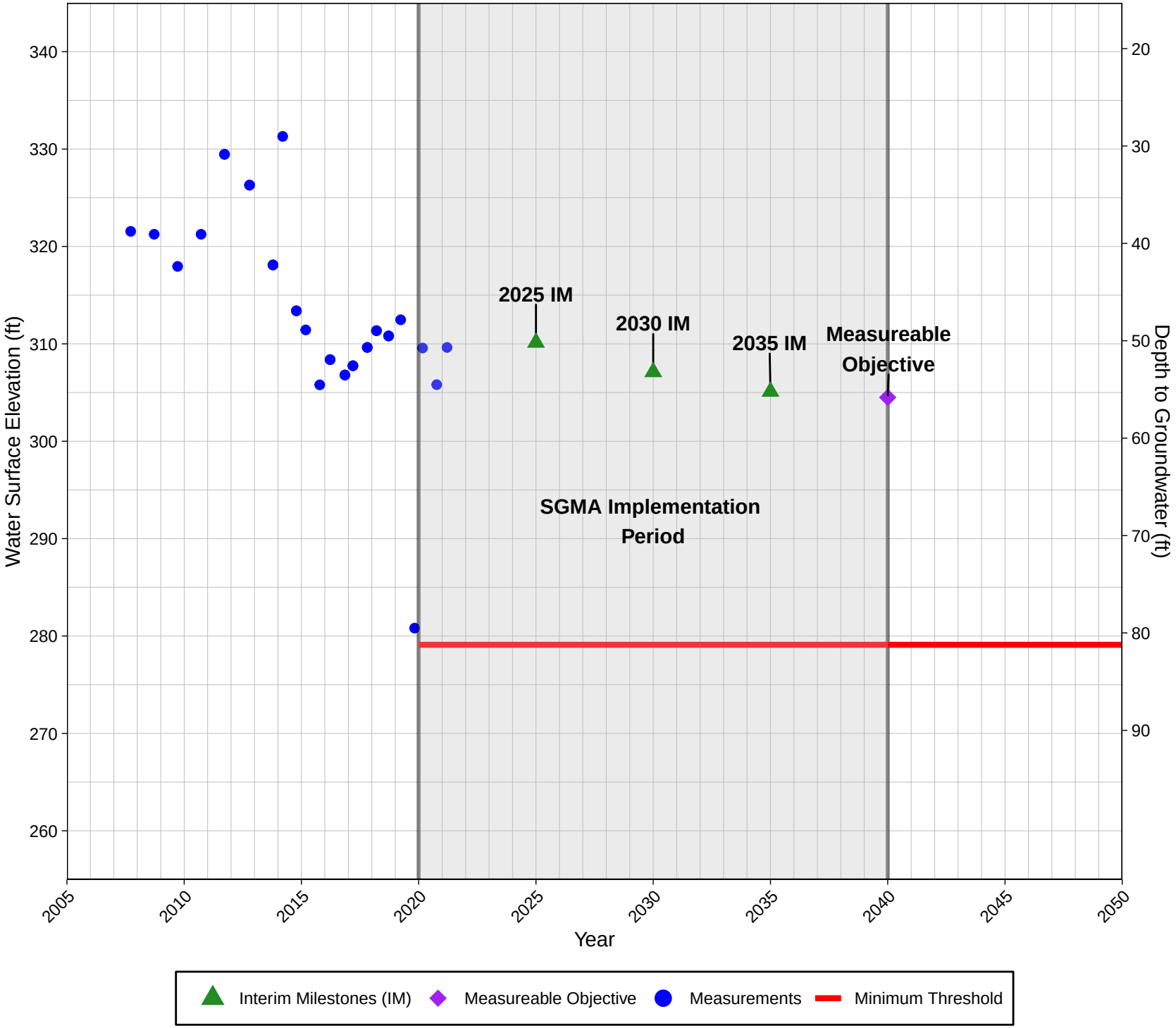




H020A

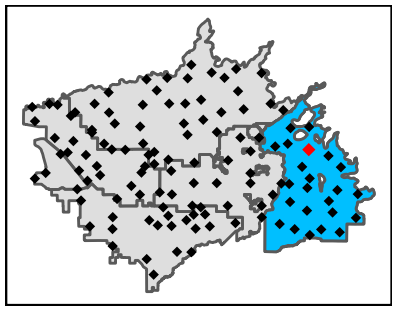
State Well ID: 14S23E34B001M
Ground Surface Elevation: 360 ft
Kings River East Groundwater Sustainability Agency

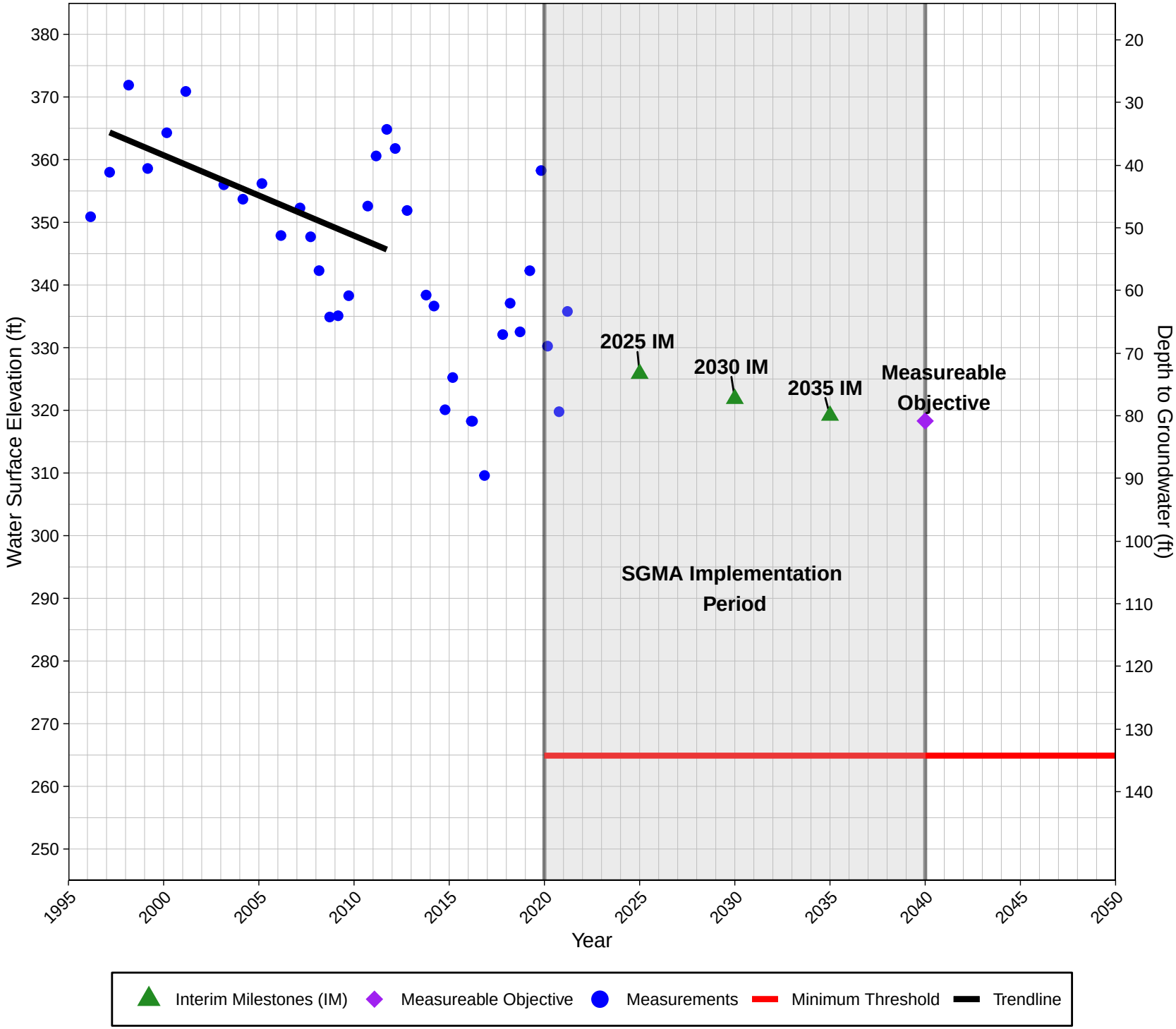




I045A

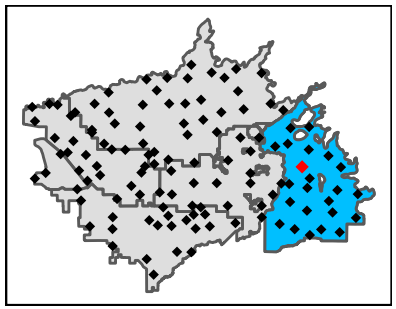
State Well ID: 15S24E05C001M
Ground Surface Elevation: 399 ft
Kings River East Groundwater Sustainability Agency

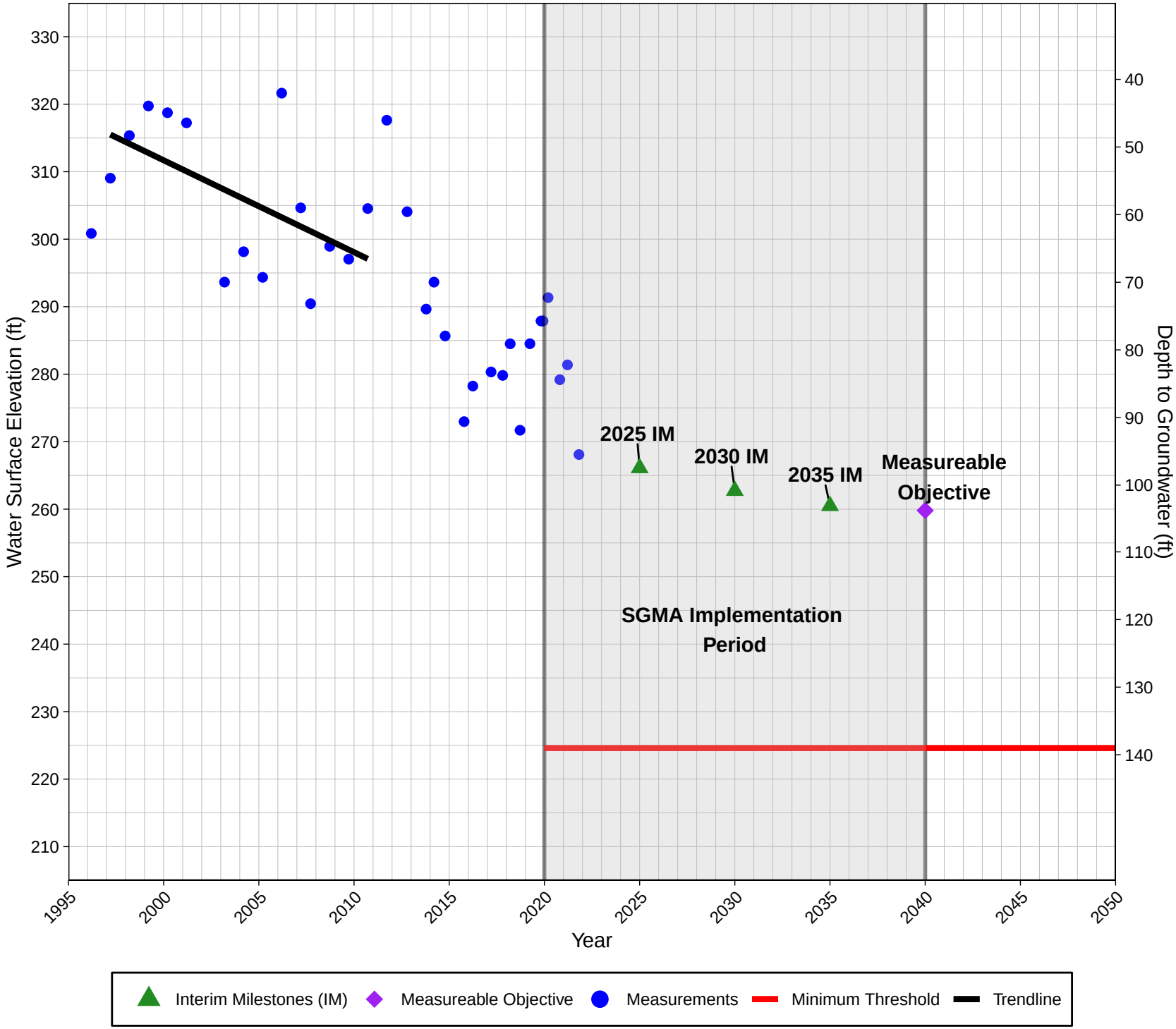




I055A

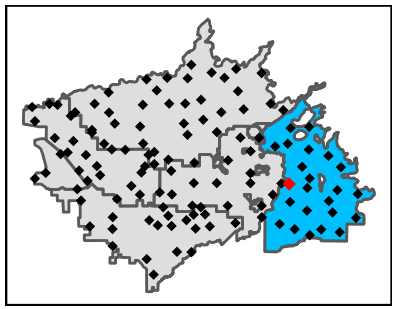
State Well ID: 15S24E19D002M
Ground Surface Elevation: 364 ft
Kings River East Groundwater Sustainability Agency

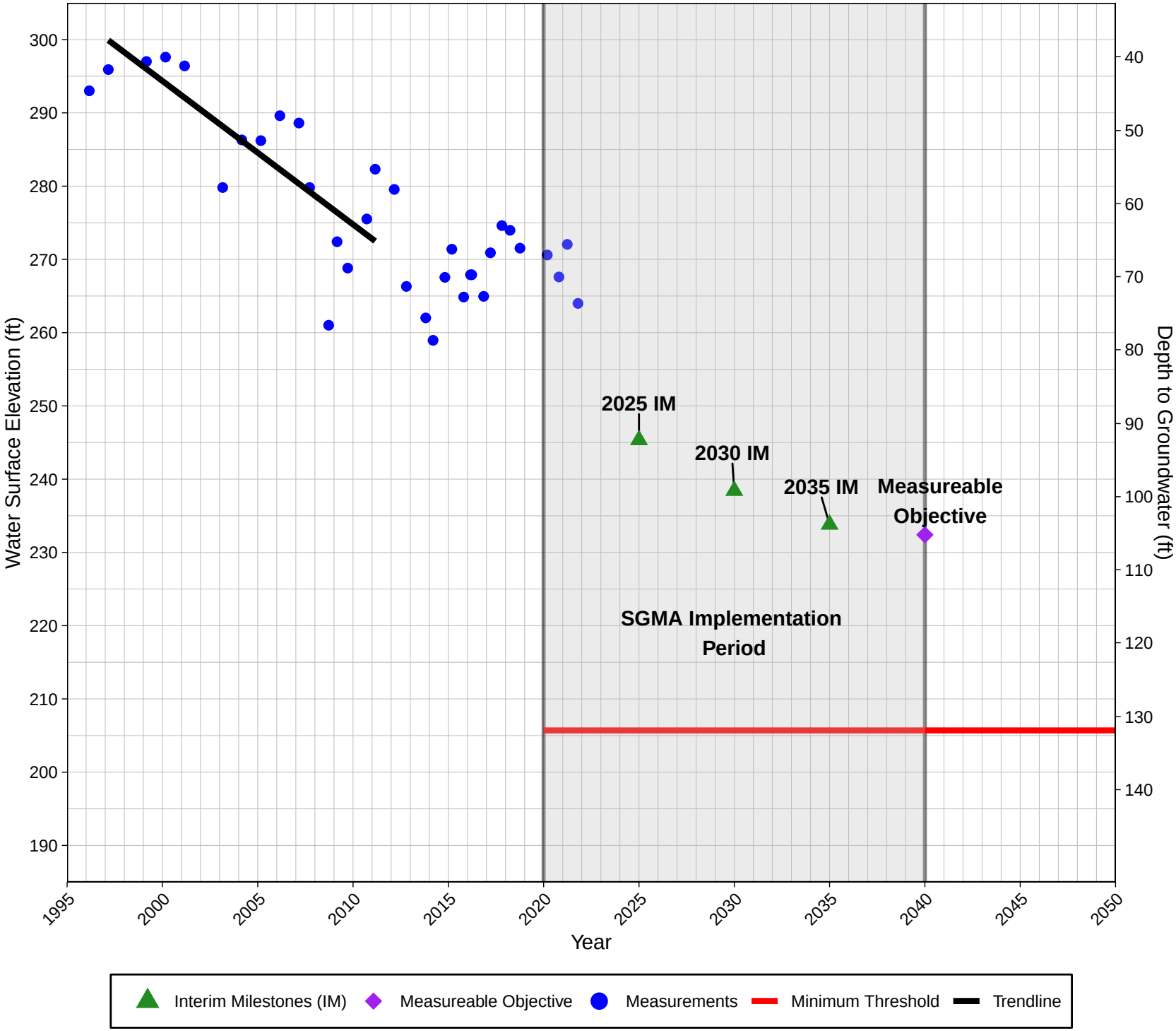




I073A

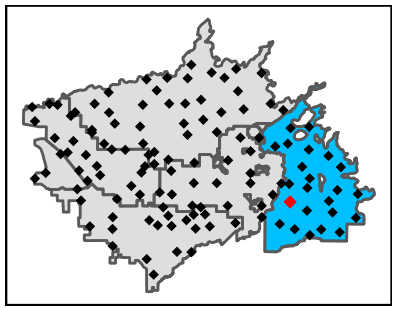
State Well ID: 16S23E03A001M
Ground Surface Elevation: 338 ft
Kings River East Groundwater Sustainability Agency

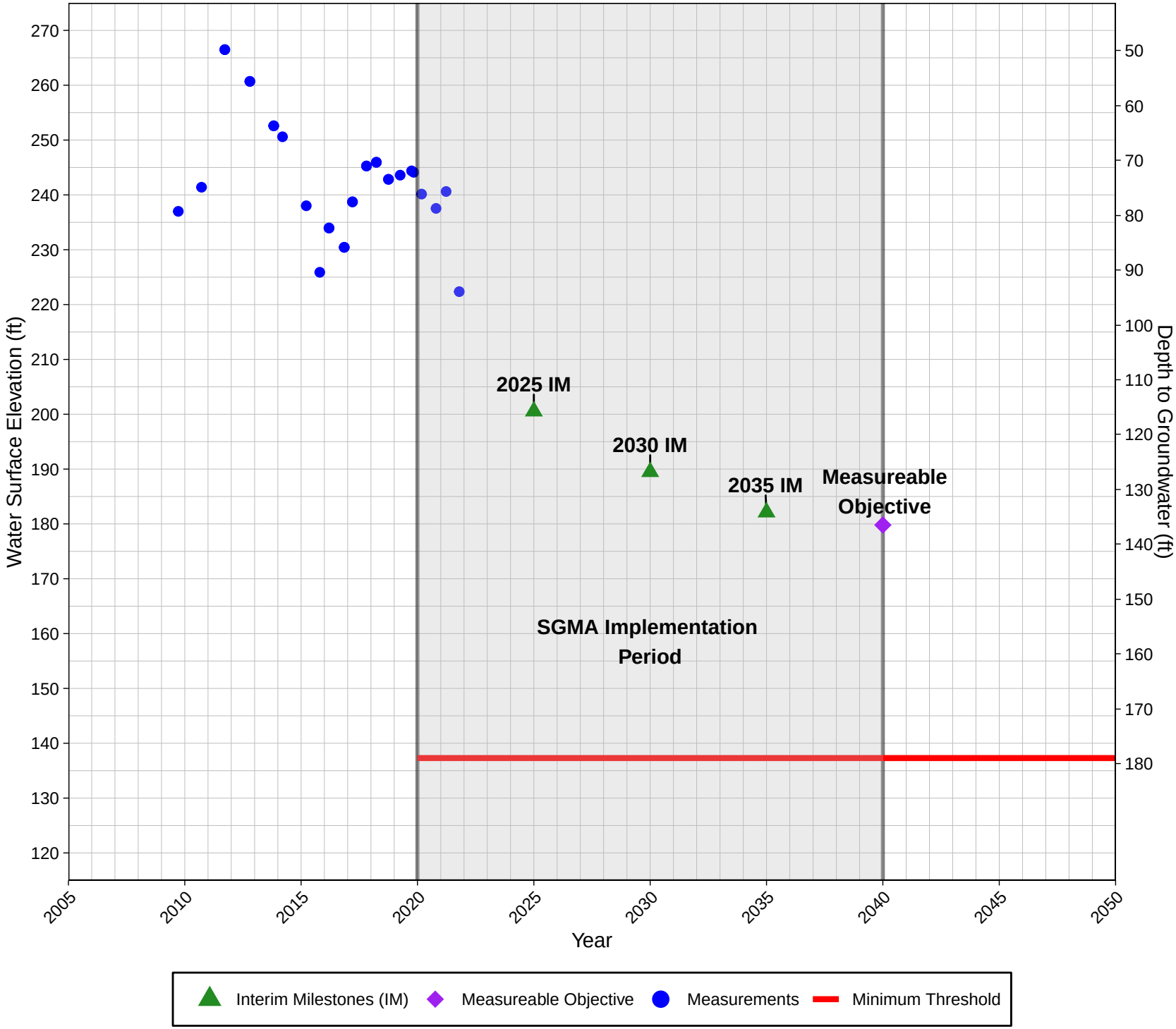




K086B

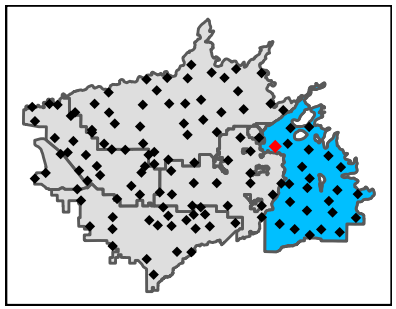
State Well ID: 16S23E23E001M
Ground Surface Elevation: 316 ft
Kings River East Groundwater Sustainability Agency

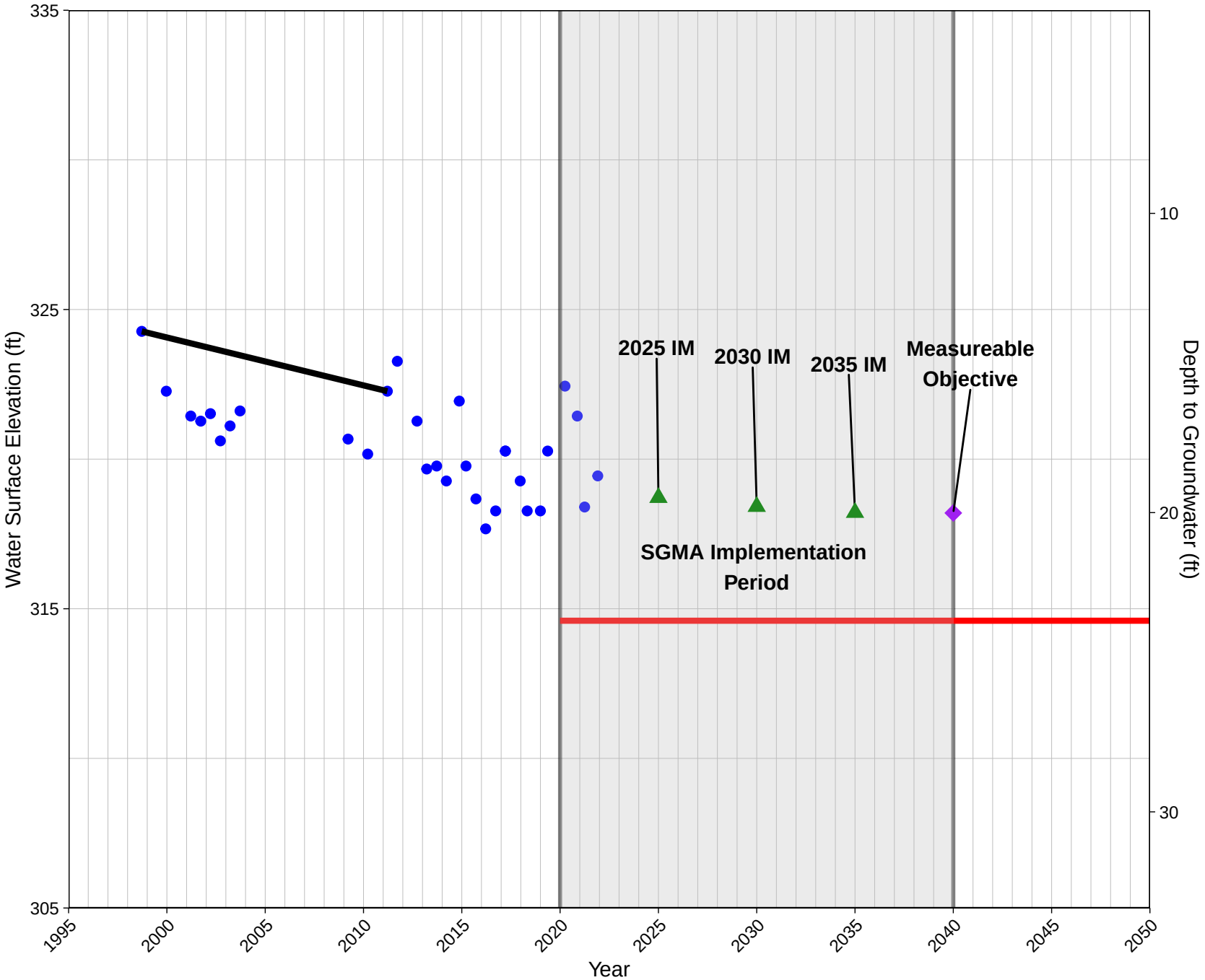




KRWD04

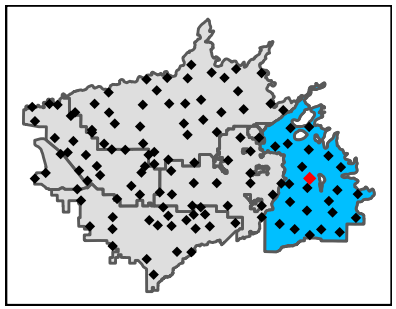
State Well ID: <Null>
Ground Surface Elevation: 338 ft
Kings River East Groundwater Sustainability Agency

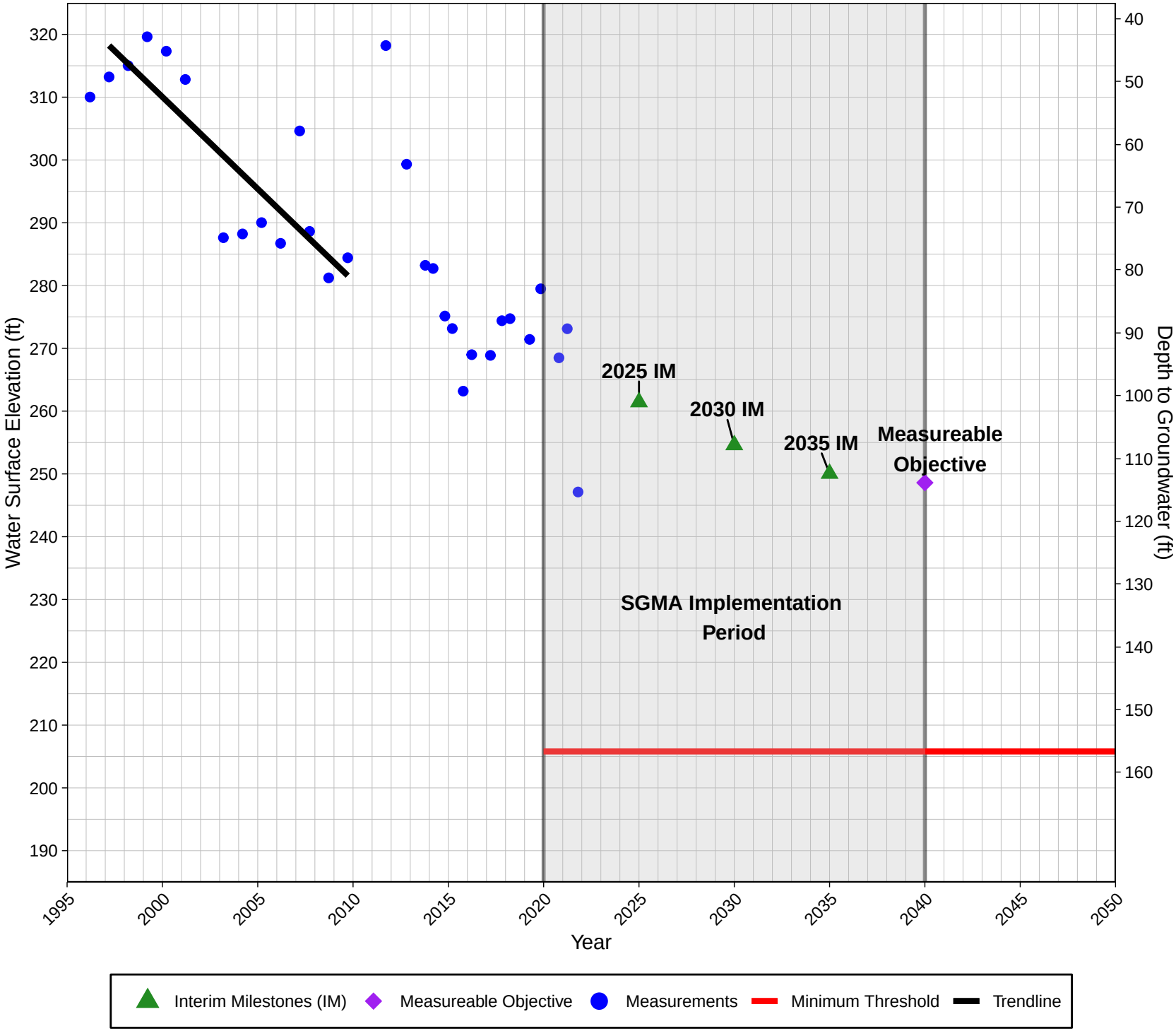




M065A

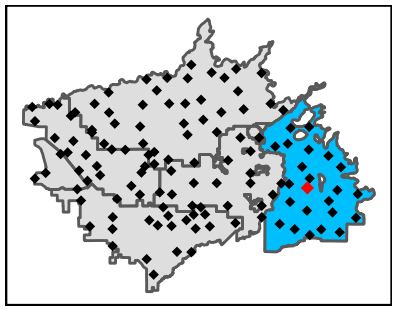
State Well ID: 15S24E32C001M
Ground Surface Elevation: 362 ft
Kings River East Groundwater Sustainability Agency

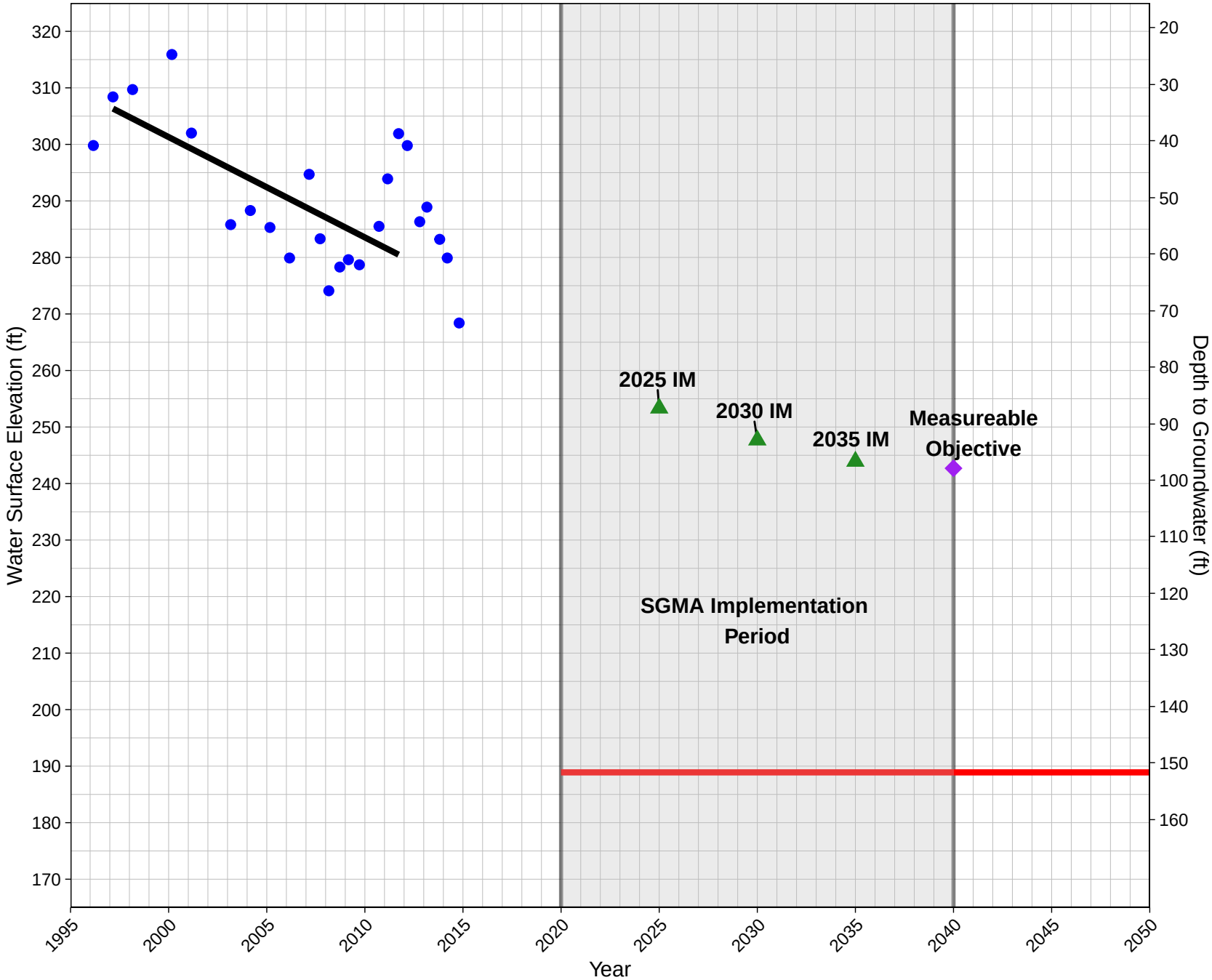




M105A

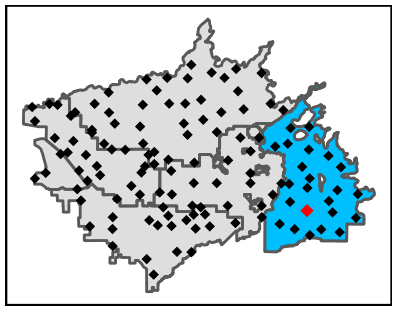
State Well ID: 16S24E05M001M
Ground Surface Elevation: 341 ft
Kings River East Groundwater Sustainability Agency

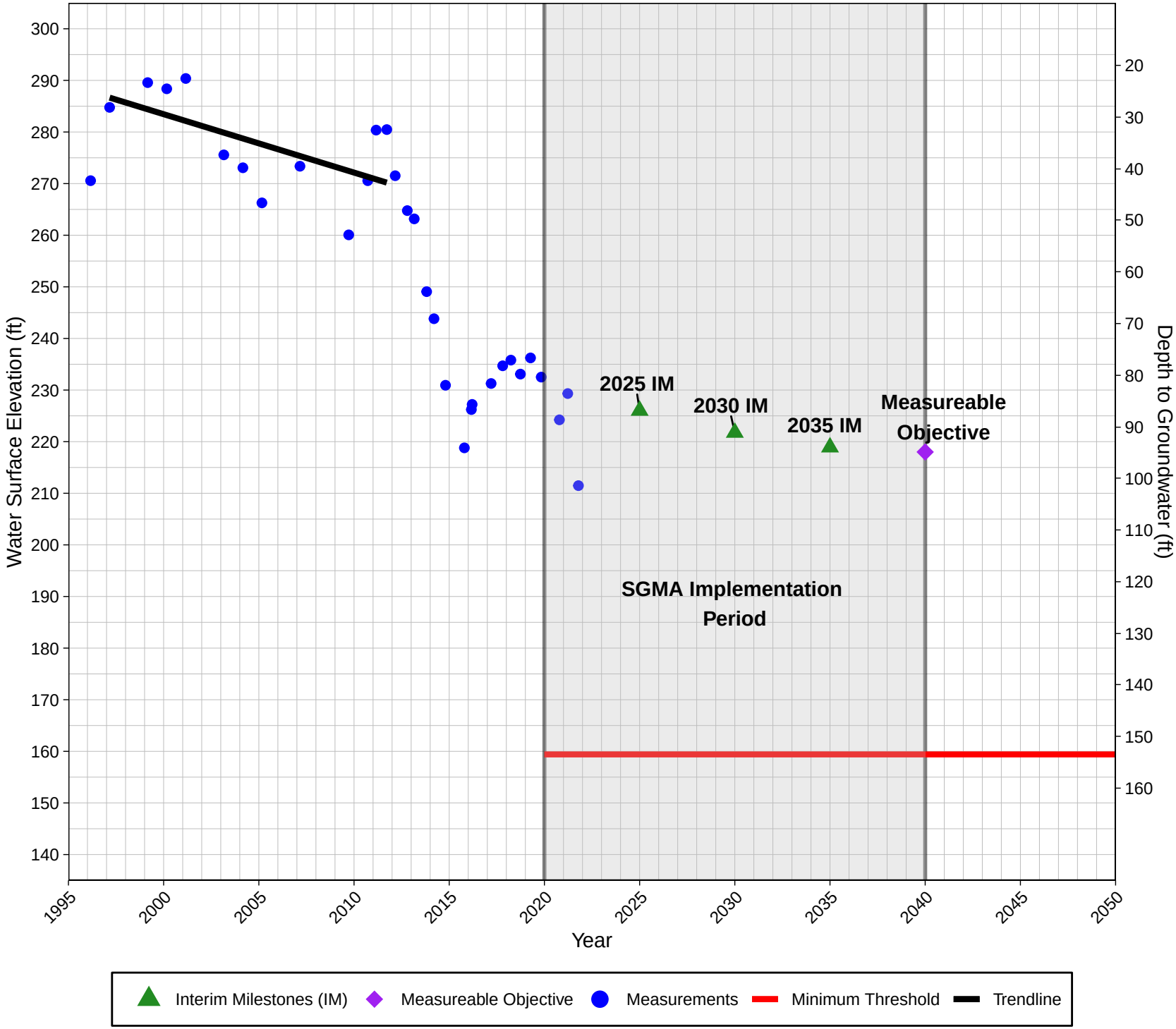




M130B

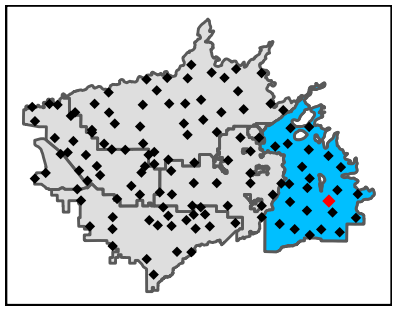
State Well ID: 16S24E30R001M
Ground Surface Elevation: 313 ft
Kings River East Groundwater Sustainability Agency

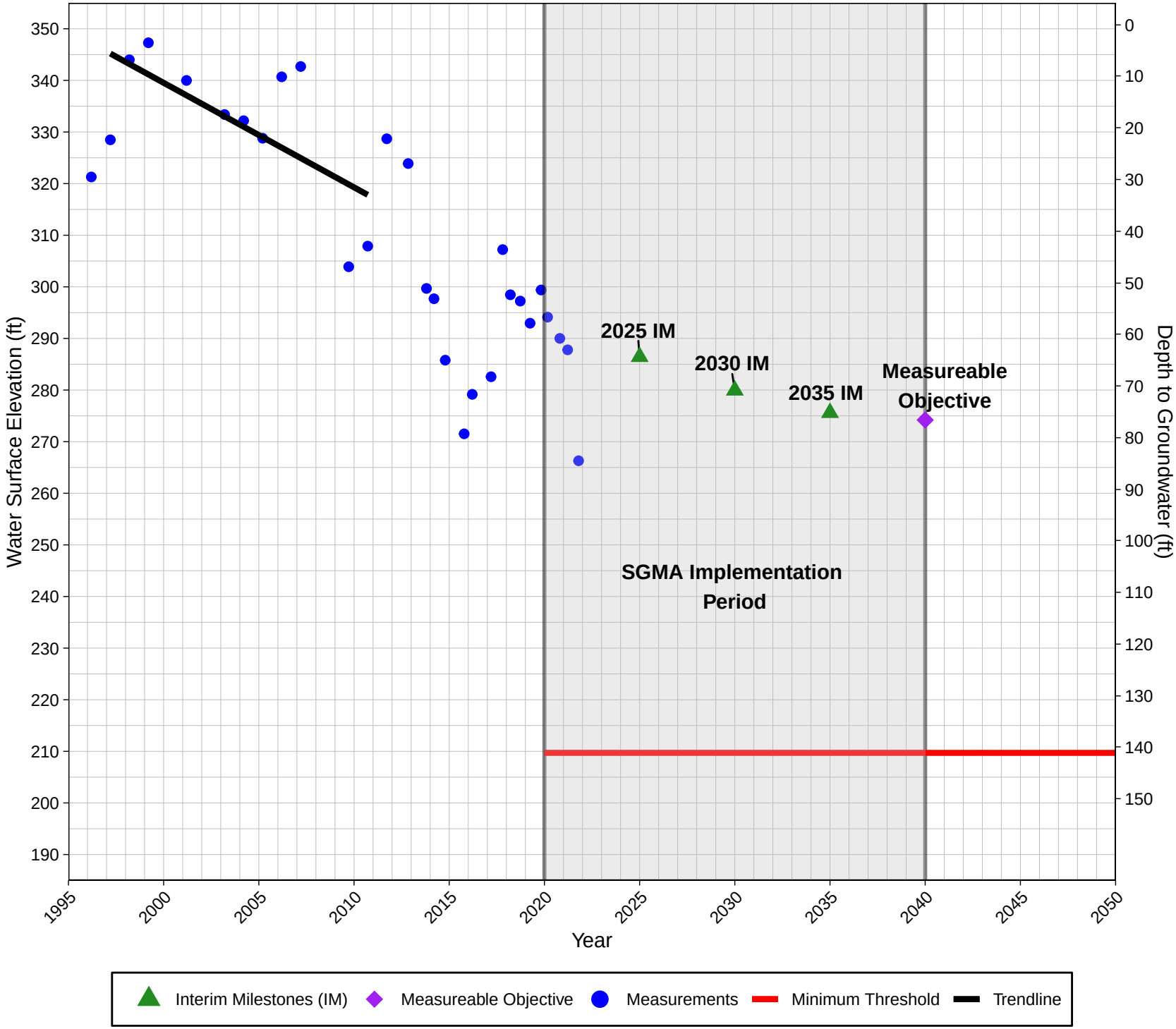




O123A

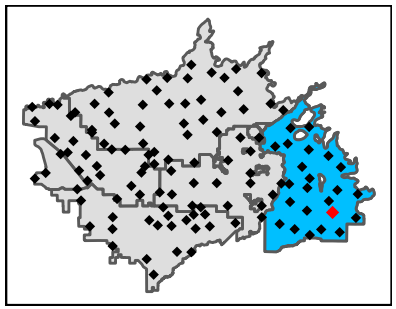
State Well ID: <Null>
Ground Surface Elevation: 351 ft
Kings River East Groundwater Sustainability Agency

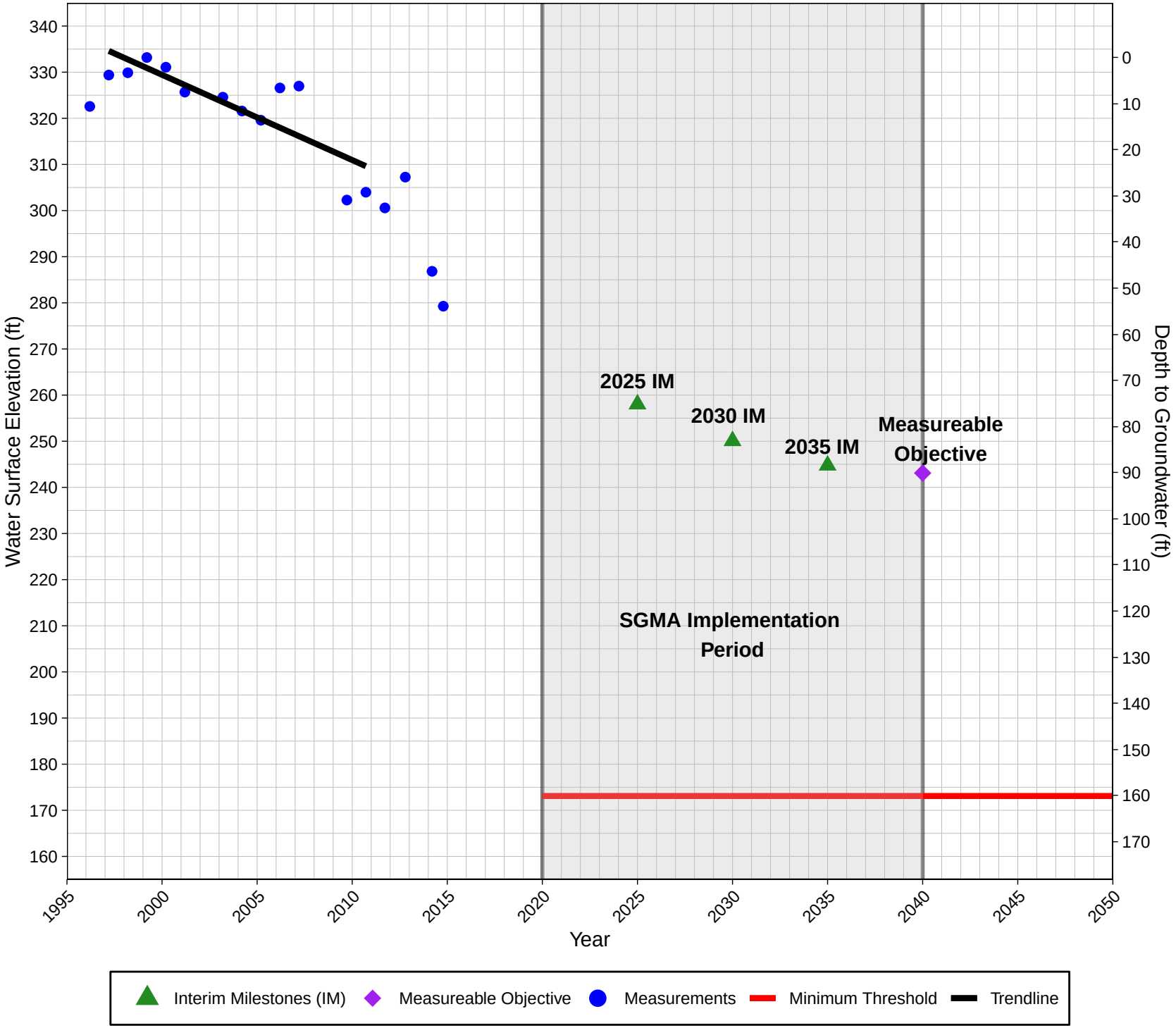




T136A

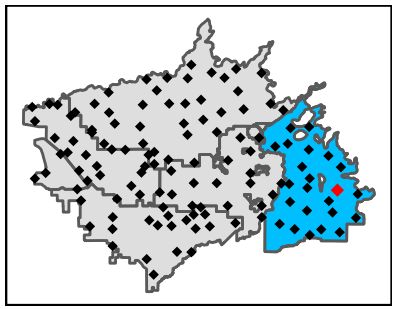
State Well ID: <Null>
Ground Surface Elevation: 333 ft
Kings River East Groundwater Sustainability Agency

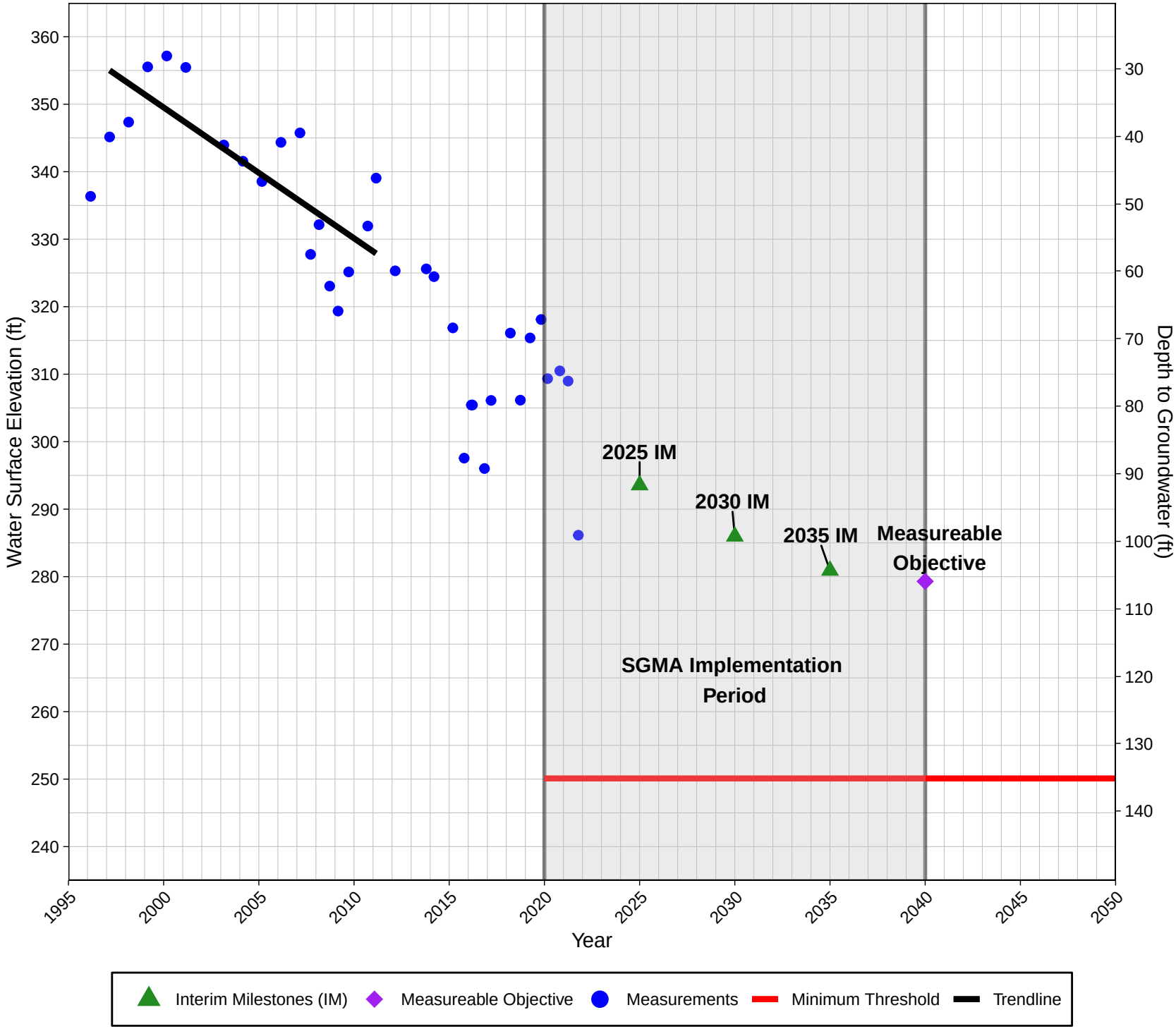




T139A

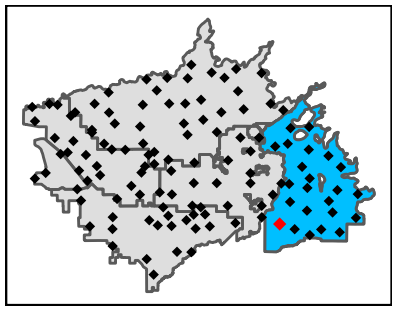
State Well ID: 16S25E07D001M
Ground Surface Elevation: 385 ft
Kings River East Groundwater Sustainability Agency

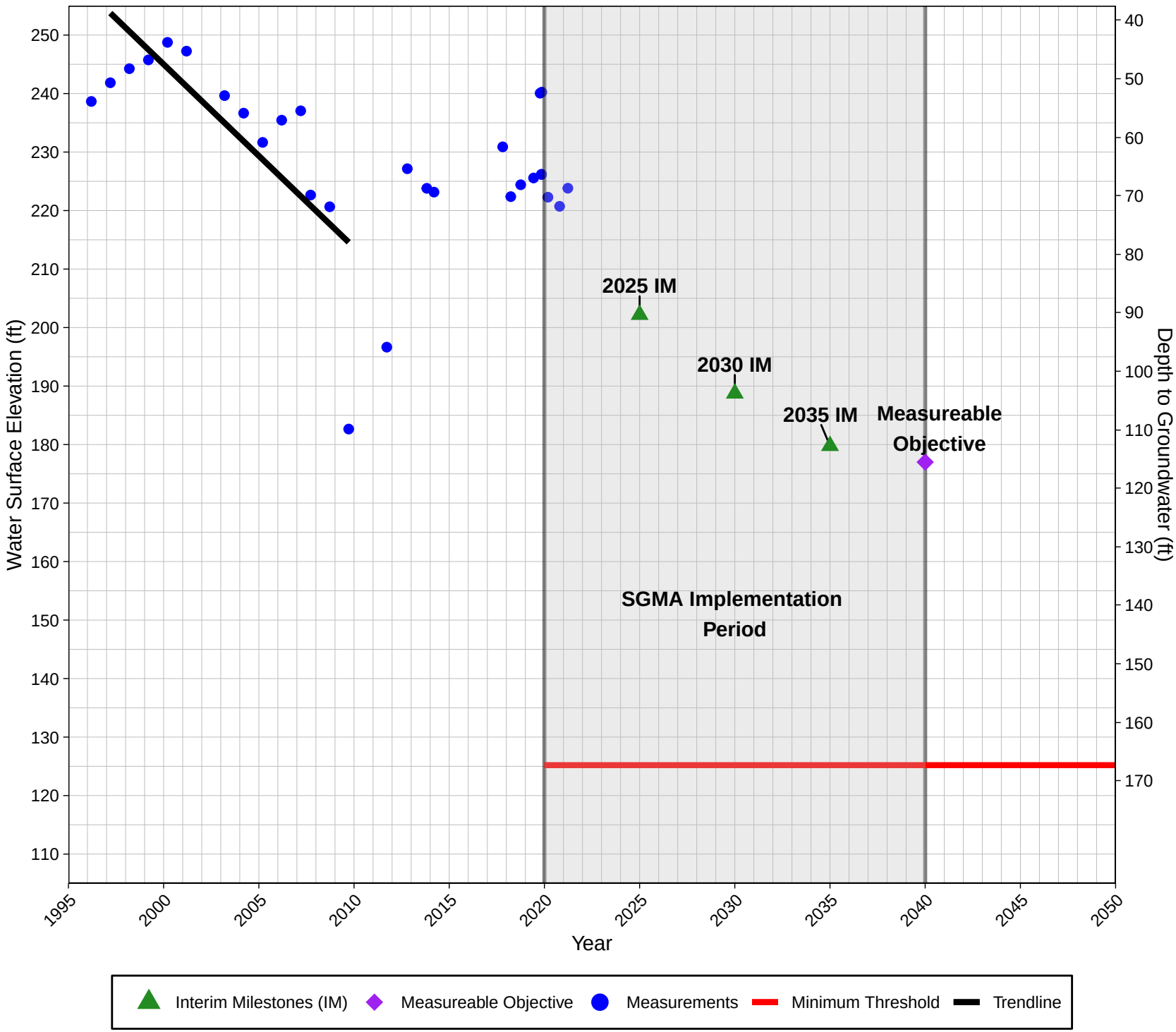




W172A

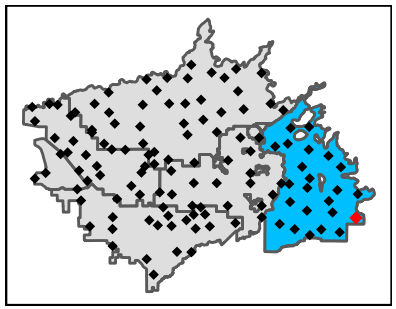
State Well ID: 17S23E09B001M
Ground Surface Elevation: 293 ft
Kings River East Groundwater Sustainability Agency

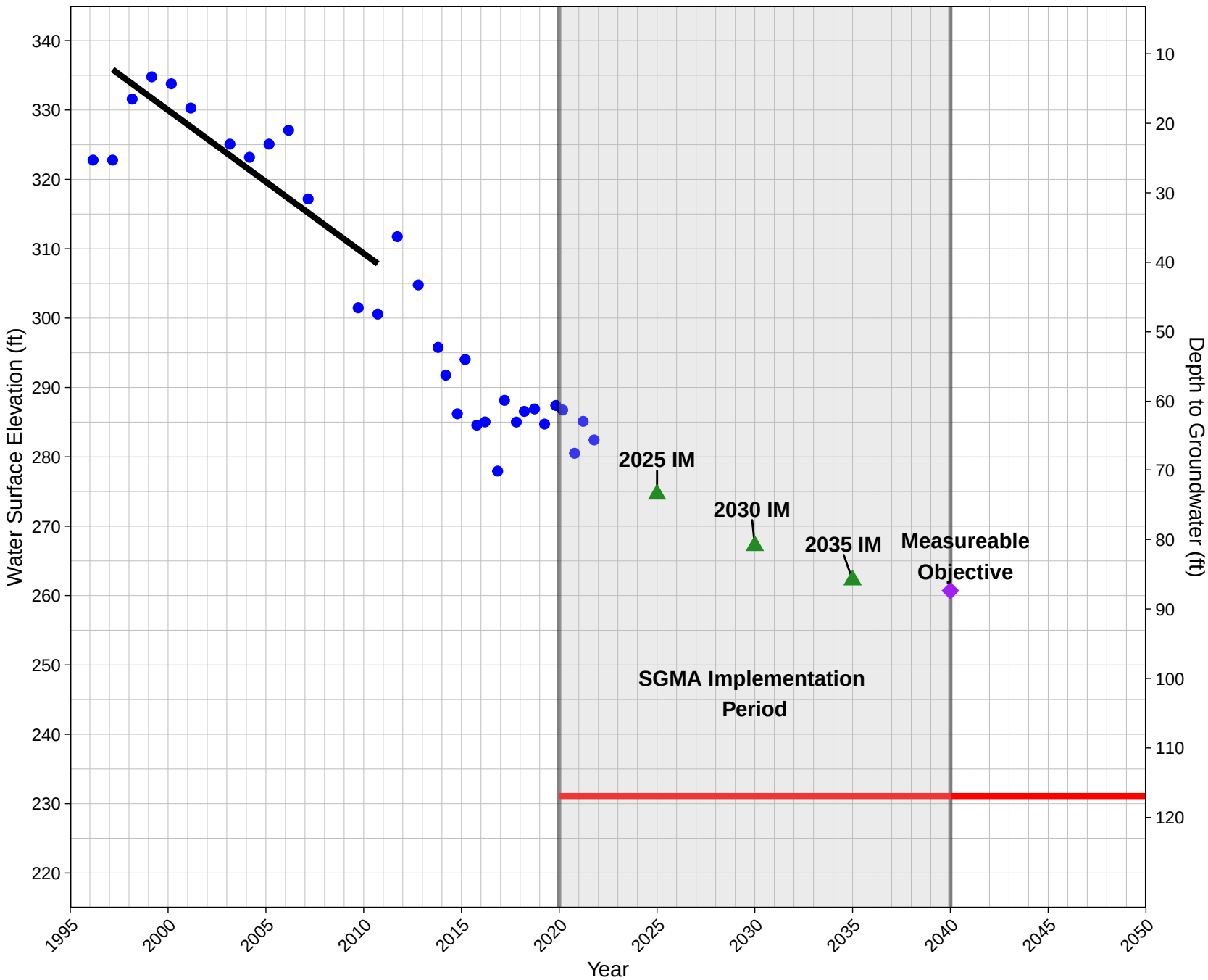




X156A

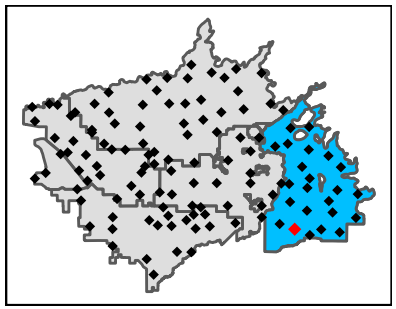
State Well ID: <Null>
Ground Surface Elevation: 348 ft
Kings River East Groundwater Sustainability Agency





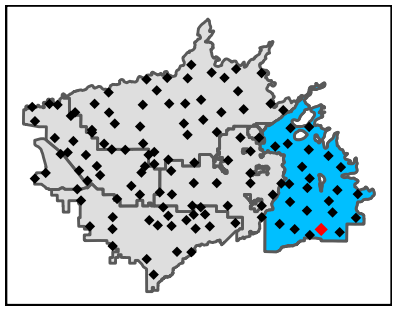
X176A

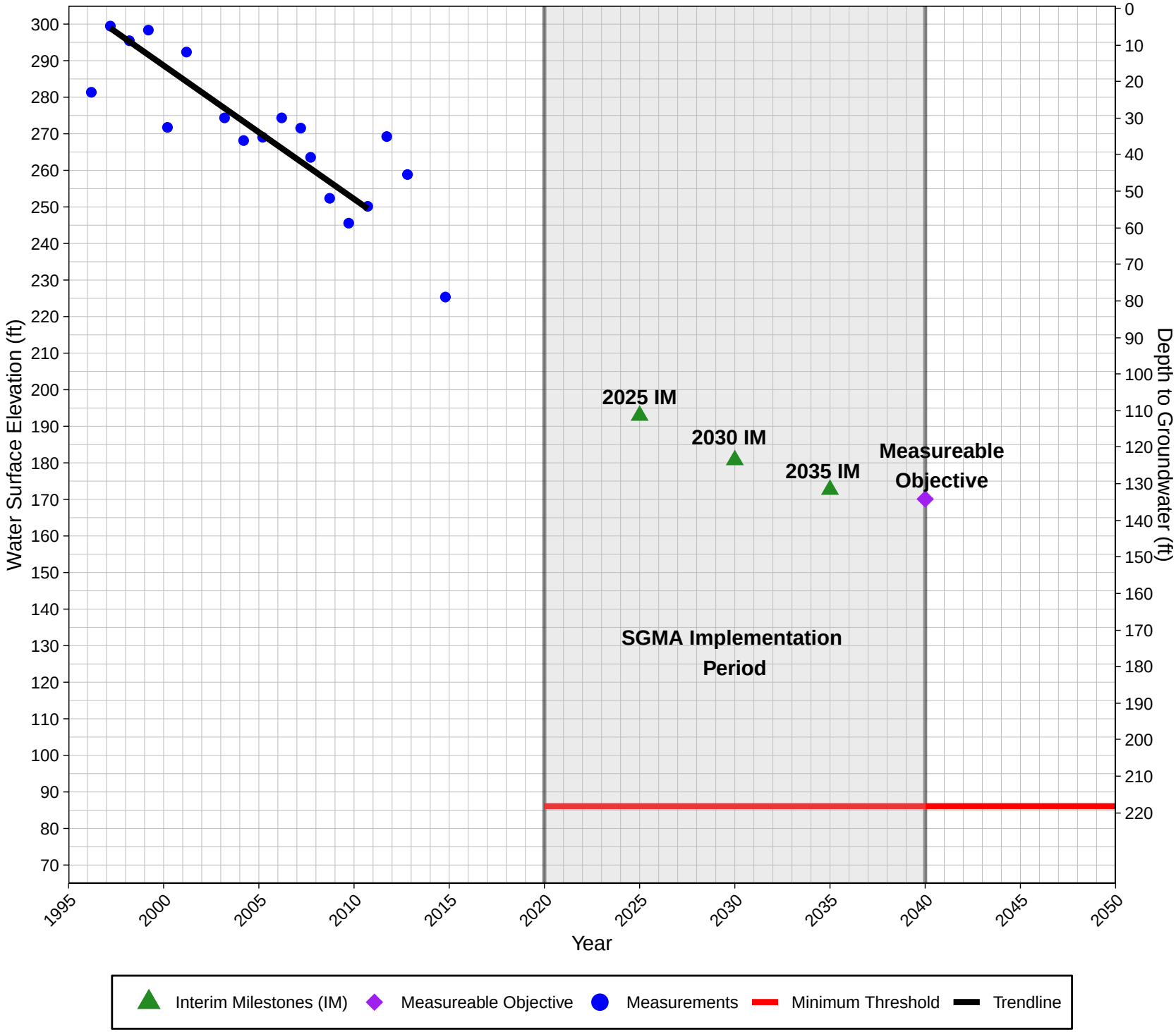
State Well ID: <Null>
Ground Surface Elevation: 289 ft
Kings River East Groundwater Sustainability Agency



X213A

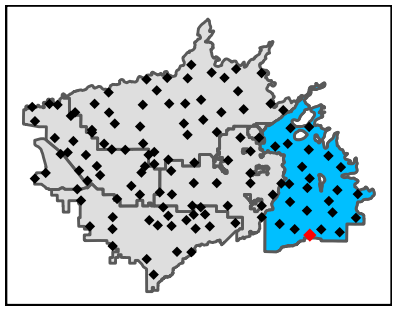
State Well ID: 17S24E15A002M
Ground Surface Elevation: 304 ft
Kings River East Groundwater Sustainability Agency

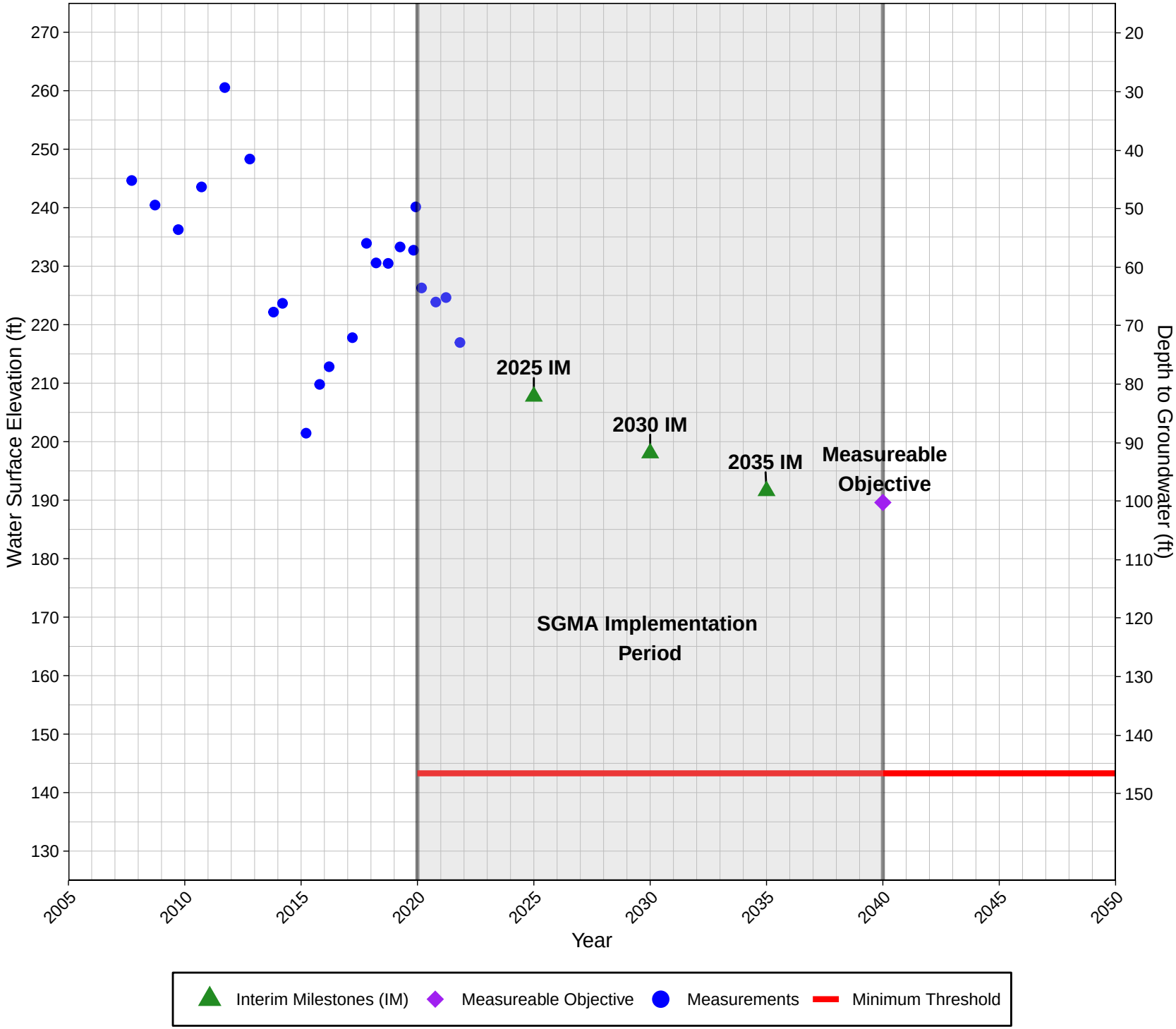




X218B

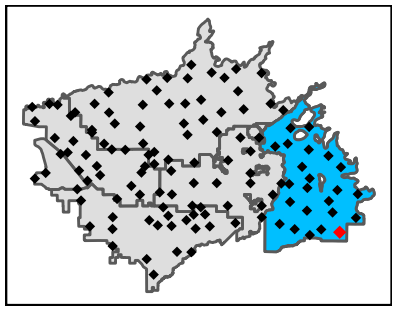
State Well ID: 17S24E20A001M
Ground Surface Elevation: 290 ft
Kings River East Groundwater Sustainability Agency

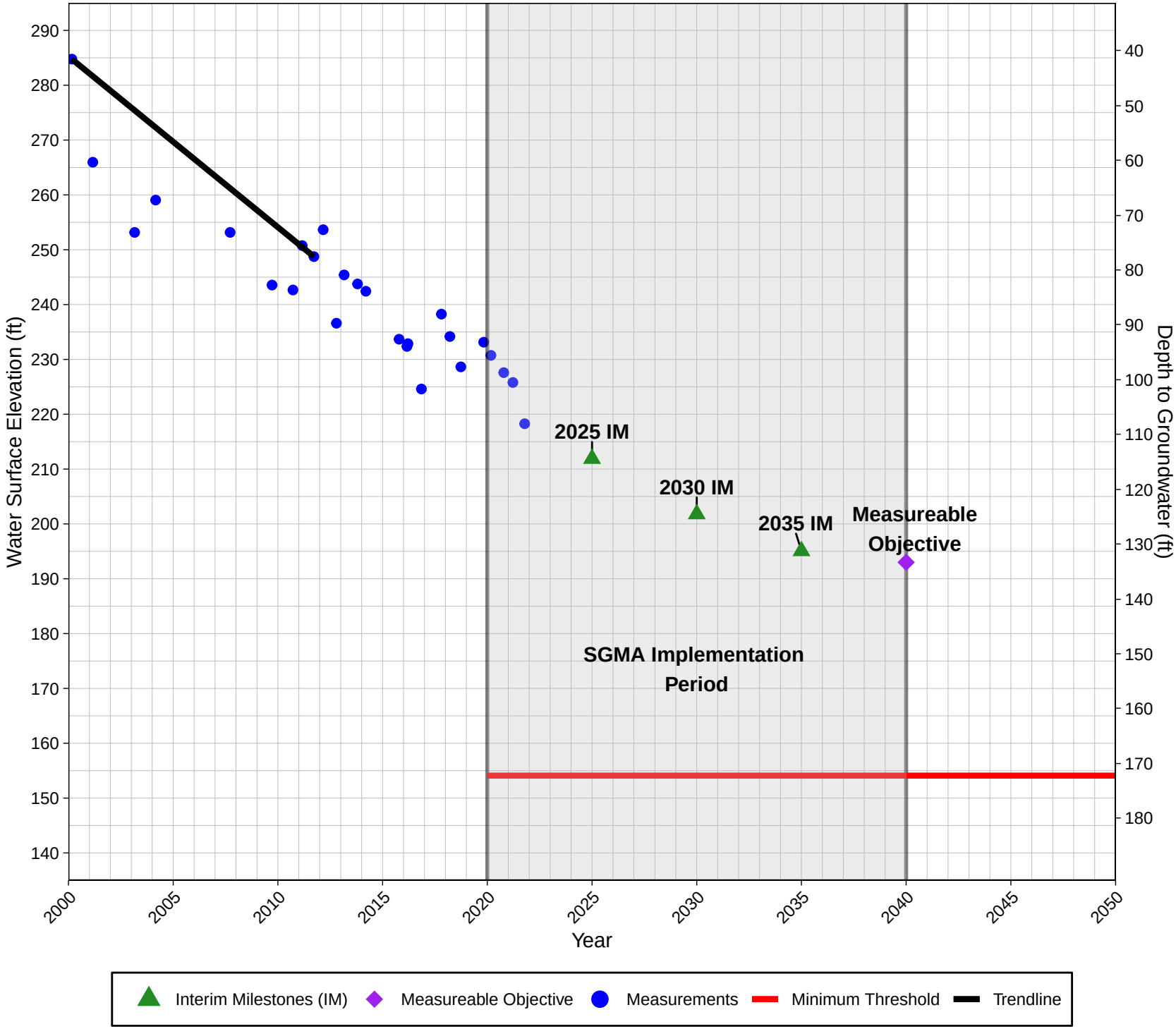




X234B

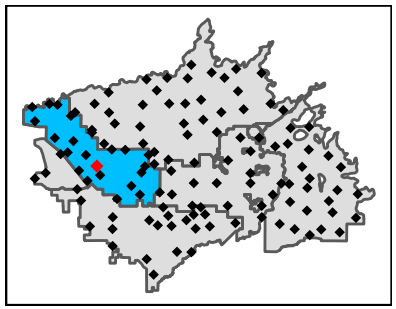
State Well ID: <Null>
Ground Surface Elevation: 326 ft
Kings River East Groundwater Sustainability Agency

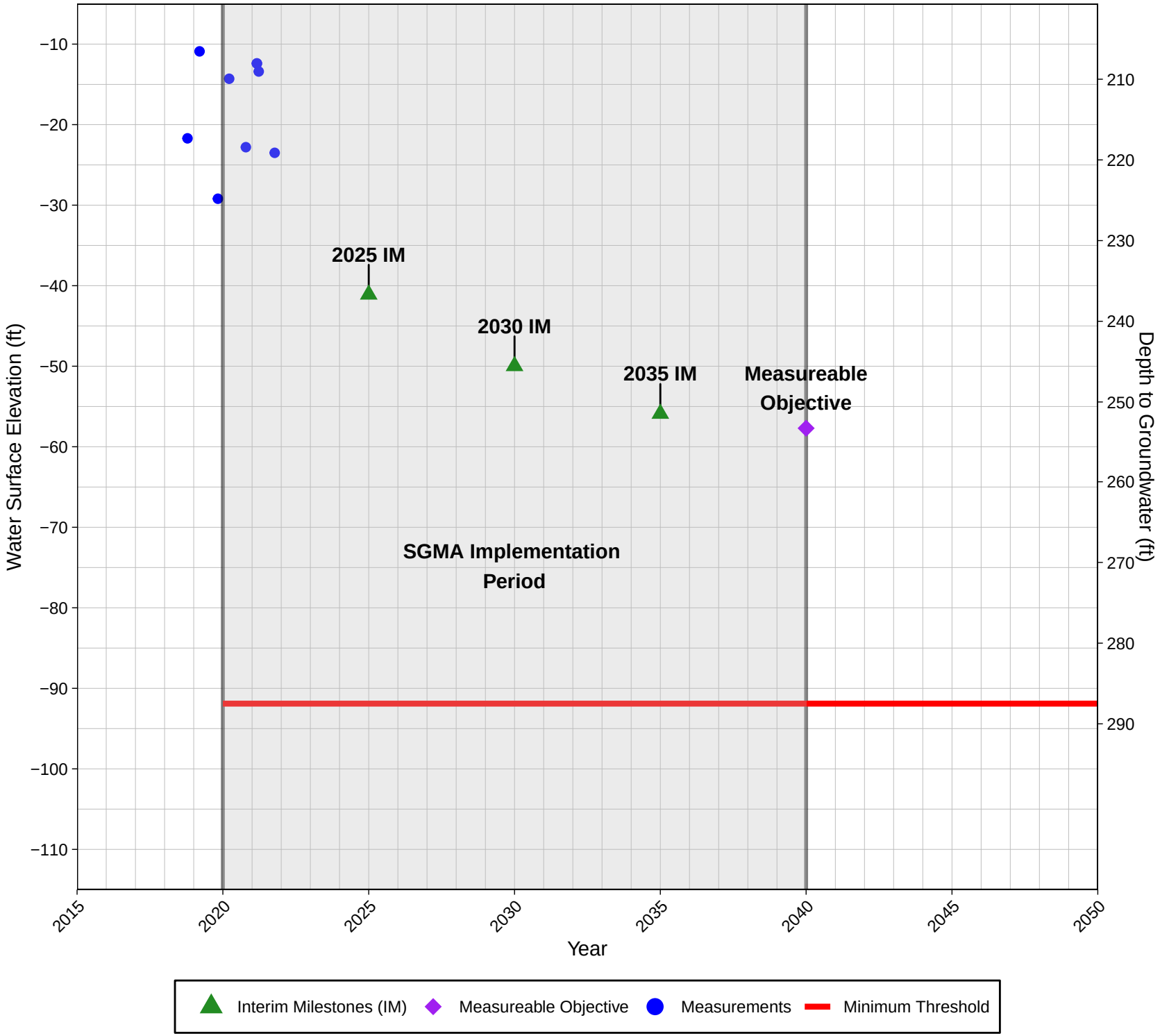




15S17E13R002M

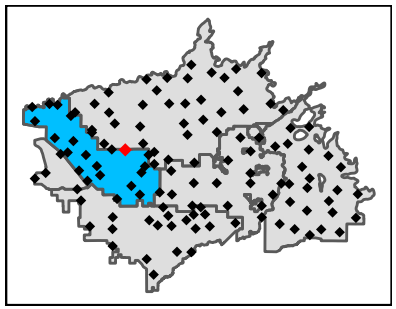
Ground Surface Elevation: 196 ft
McMullin Area GSA





15S18E02A001MX

Ground Surface Elevation: 225 ft
McMullin Area GSA



Water Surface Elevation (ft)

Depth to Groundwater (ft)

Year

2025 IM

2030 IM

2035 IM

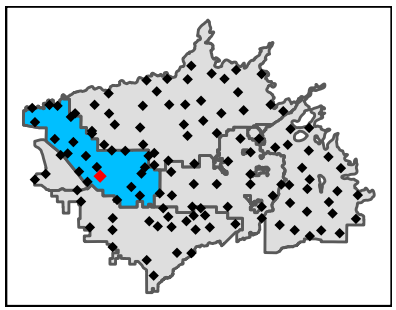
Measureable Objective

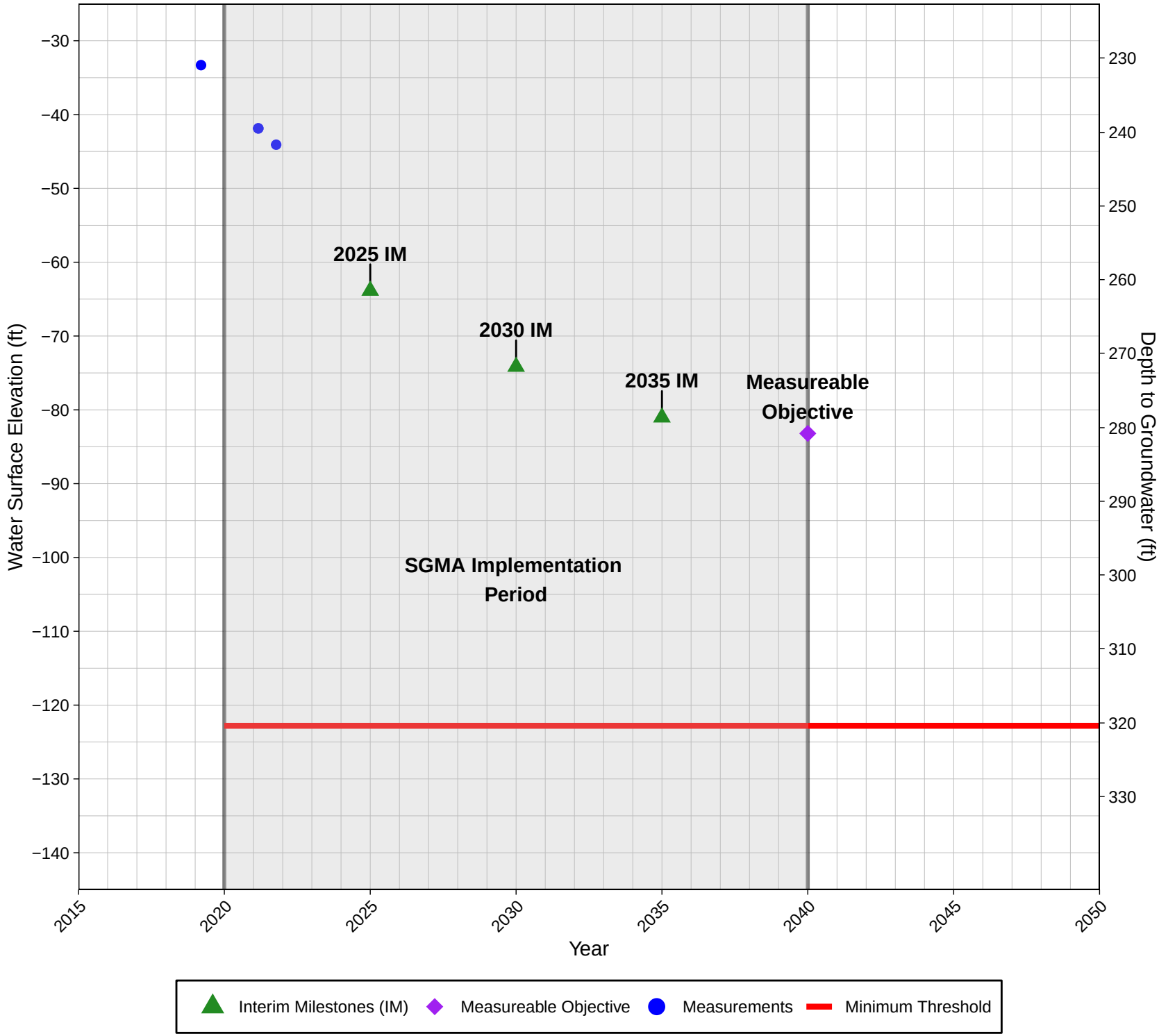
SGMA Implementation Period

Interim Milestones (IM) | Measureable Objective | Measurements | Minimum Threshold | Trendline

15S18E30L001M

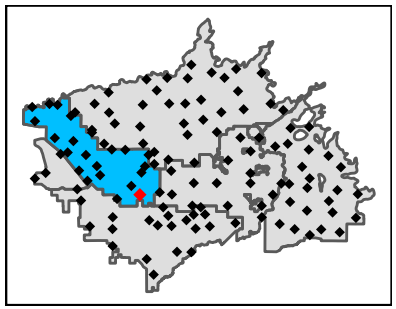
Ground Surface Elevation: 198 ft
McMullin Area GSA

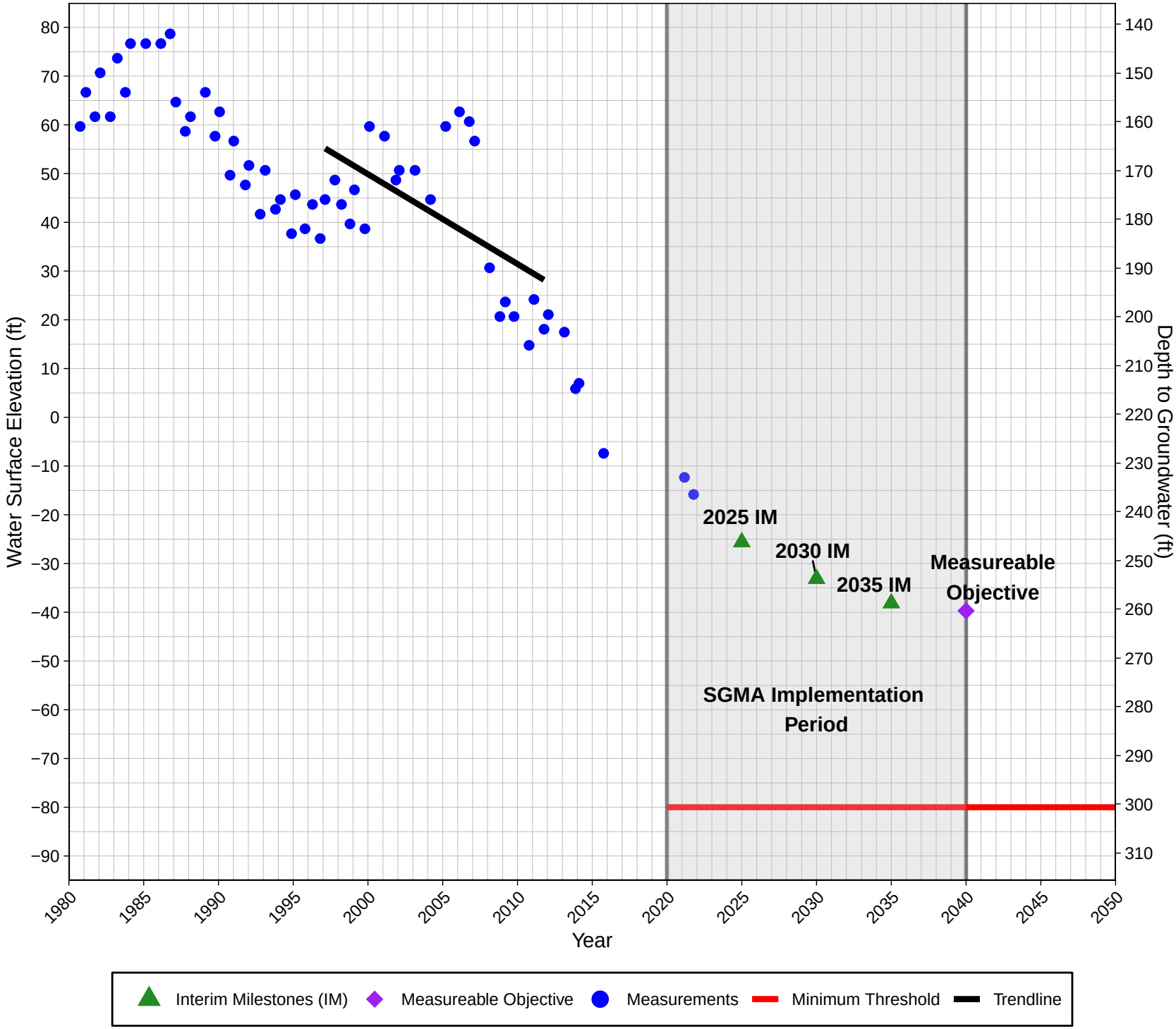




365463N1199268W001

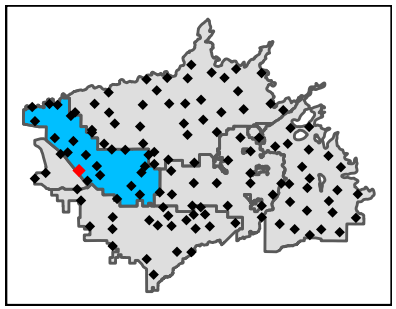
State Well ID: 16S19E17C001M
Ground Surface Elevation: 221 ft
McMullin Area GSA

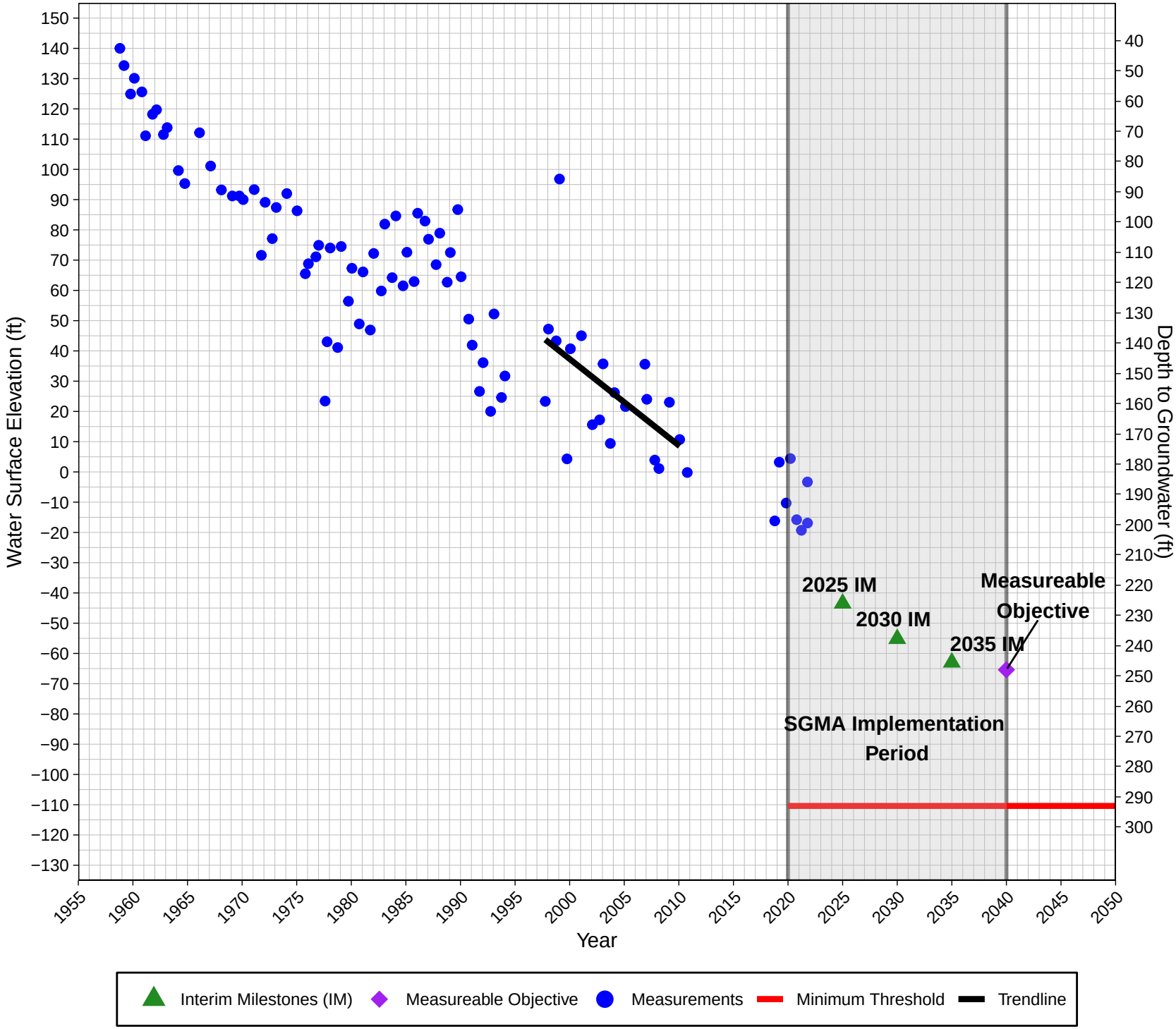




366082N1201199W001

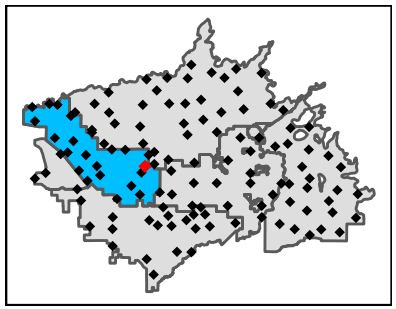
State Well ID: 15S17E21J001M
Ground Surface Elevation: 183 ft
McMullin Area GSA

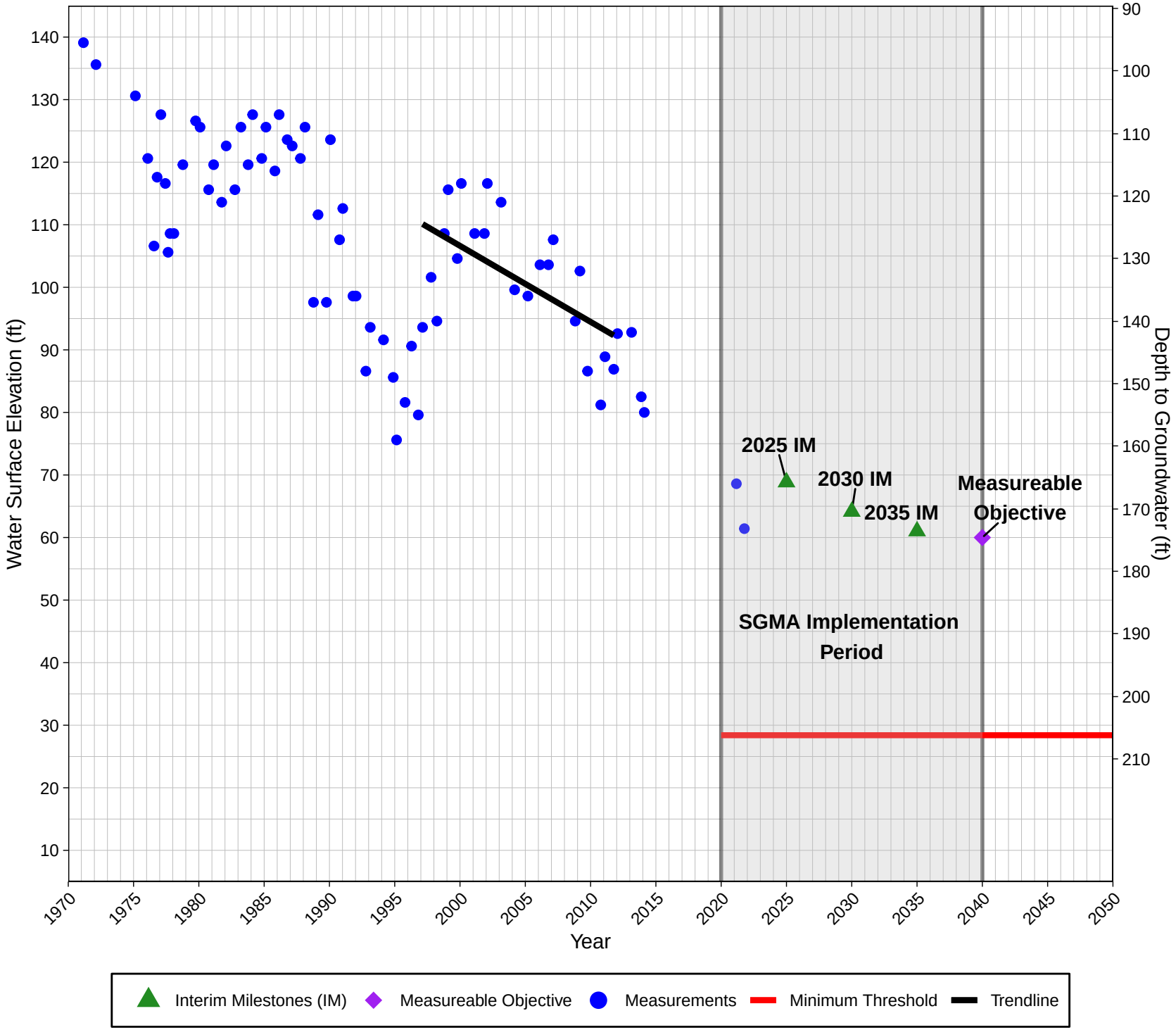


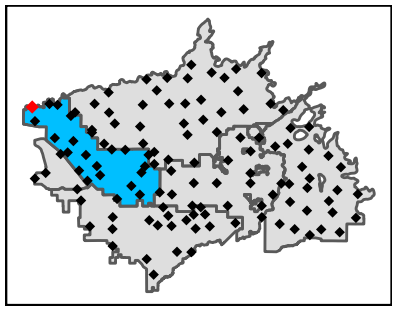


366188N1199104W001

State Well ID: 15S19E21C003M
Ground Surface Elevation: 235 ft
McMullin Area GSA







367705N1202691W001

State Well ID: 13S16E30L003M
Ground Surface Elevation: 177 ft
McMullin Area GSA

Water Surface Elevation (ft)

Depth to Groundwater (ft)

Year

2025 IM

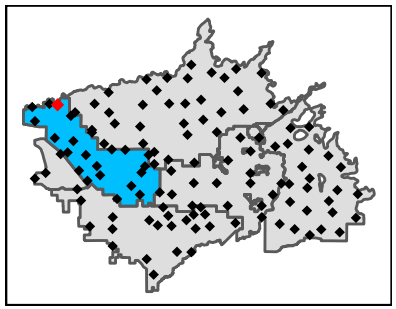
2030 IM

2035 IM

Measureable Objective

SGMA Implementation Period

Interim Milestones (IM) | Measureable Objective | Measurements | Minimum Threshold | Trendline



367757N1201874W001

State Well ID: 13S16E26A001M
Ground Surface Elevation: 193 ft
McMullin Area GSA

Water Surface Elevation (ft)

Depth to Groundwater (ft)

Year

2025 IM

2030 IM

2035 IM

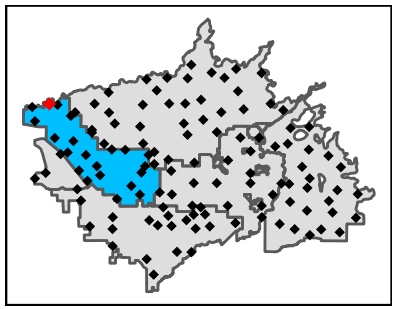
Measureable Objective

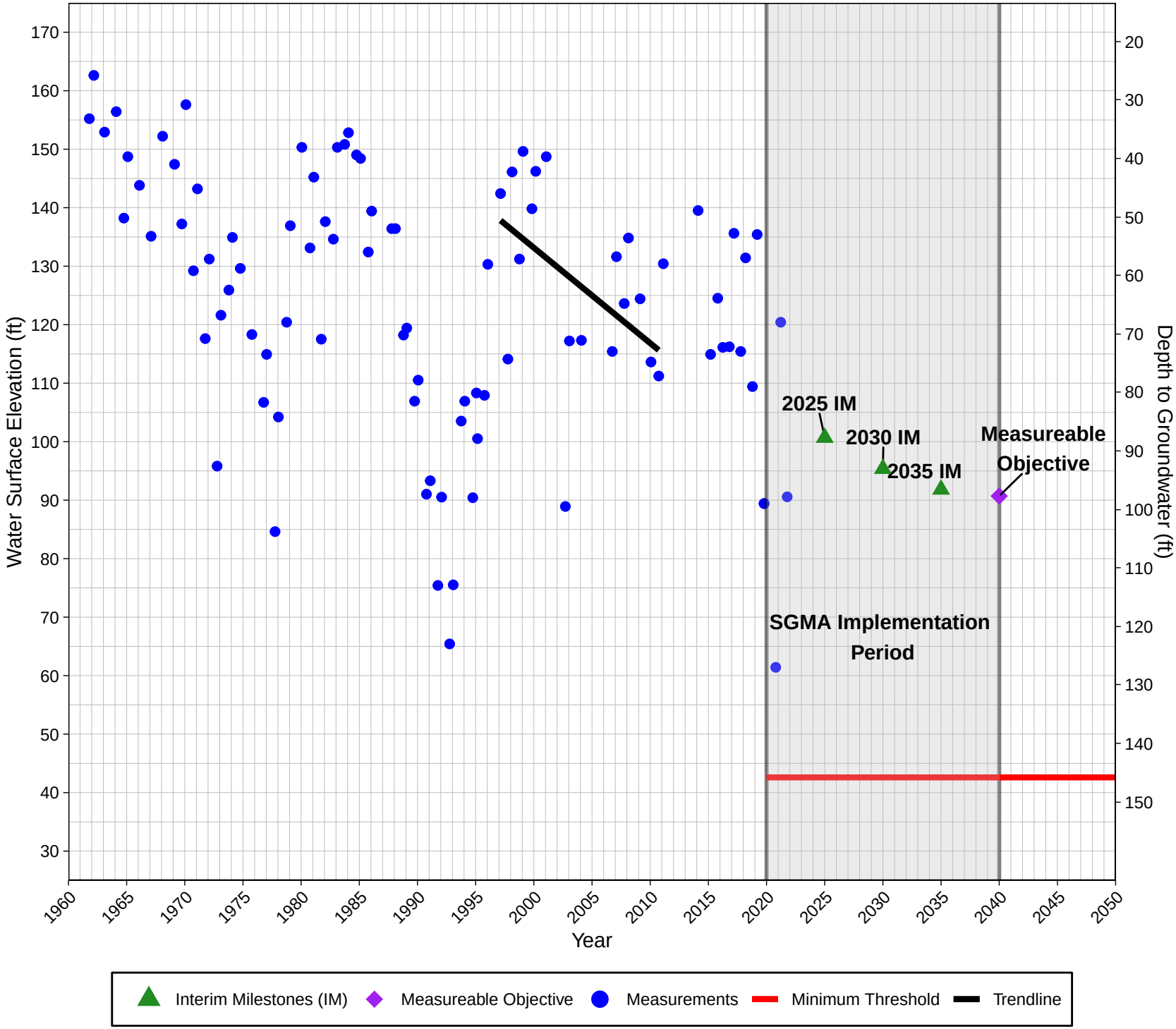
SGMA Implementation Period

Interim Milestones (IM) | Measureable Objective | Measurements | Minimum Threshold | Trendline

367782N1202141W001

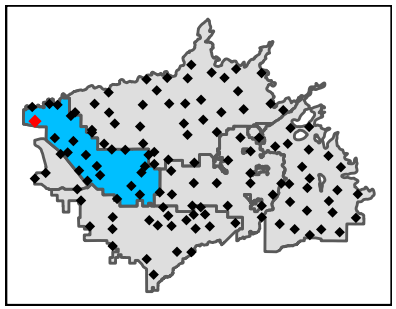
State Well ID: 13S16E27C001M
Ground Surface Elevation: 188 ft
McMullin Area GSA

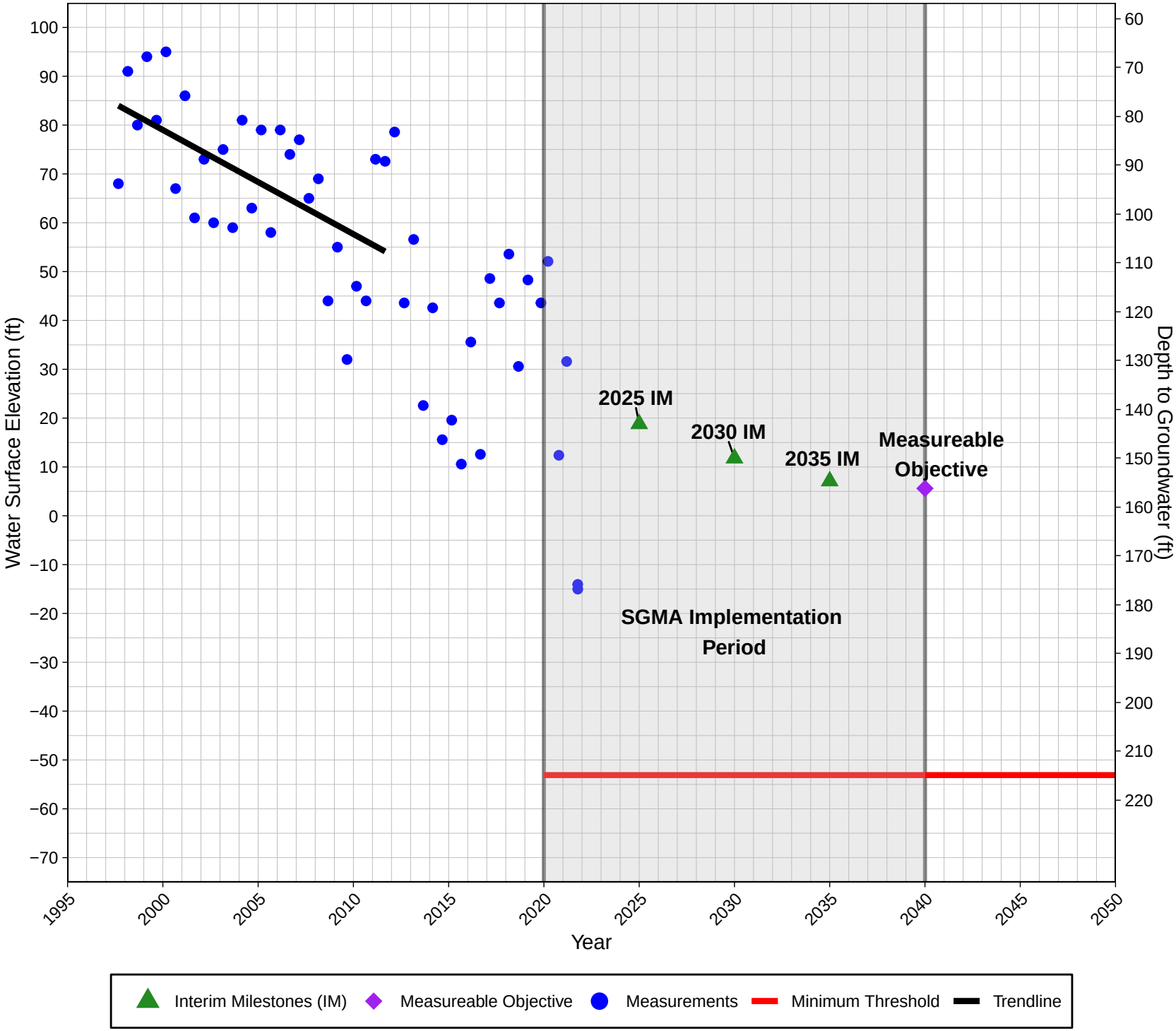




A01

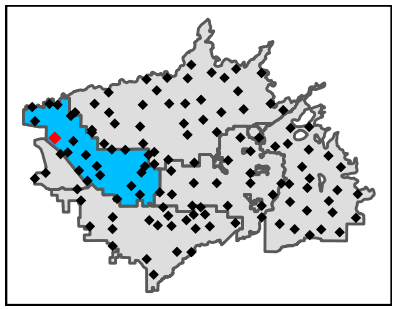
State Well ID: <Null>
Ground Surface Elevation: 162 ft
McMullin Area GSA

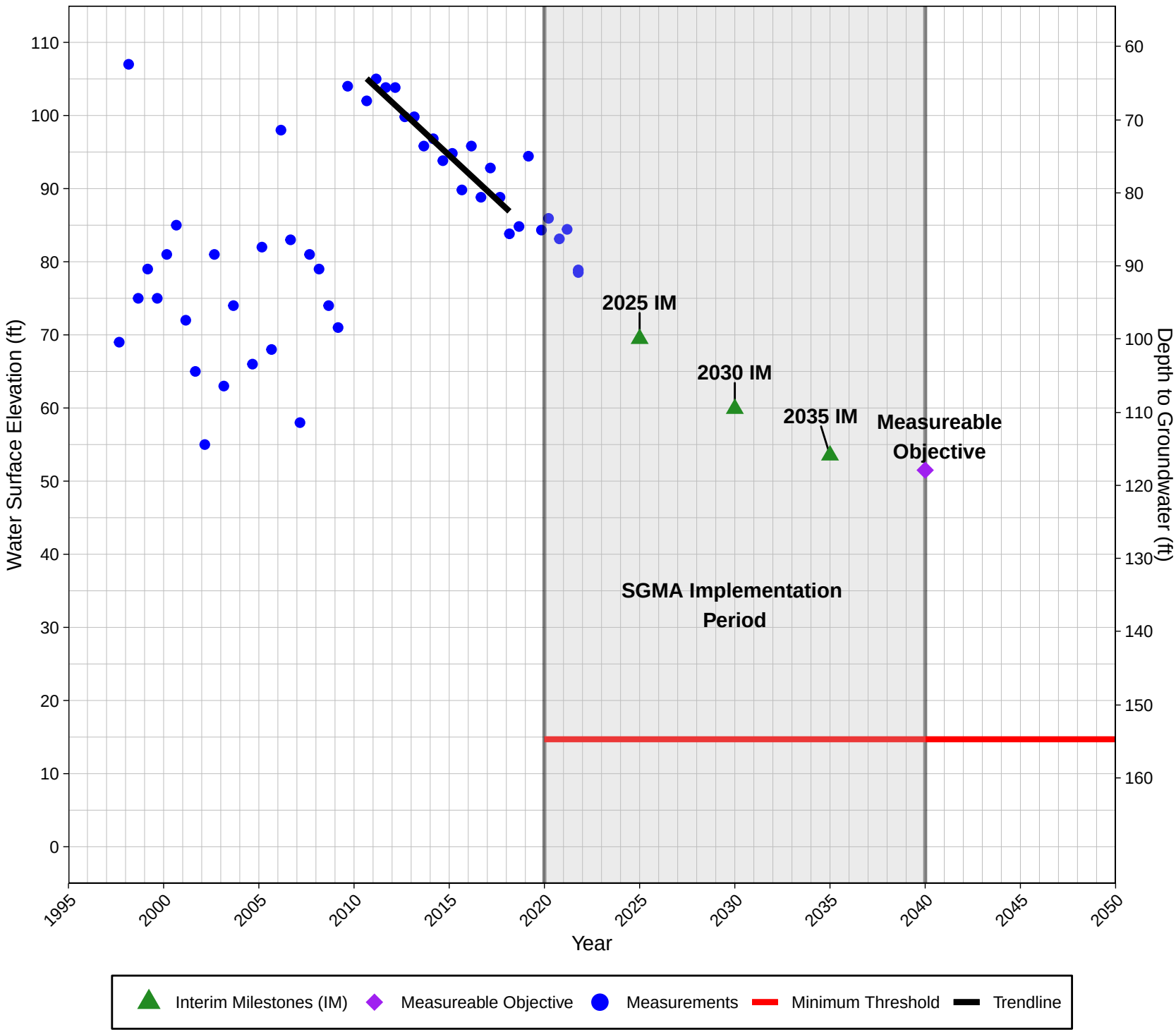




A07

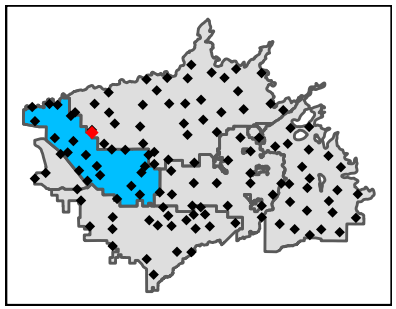
State Well ID: <Null>
Ground Surface Elevation: 169 ft
McMullin Area GSA

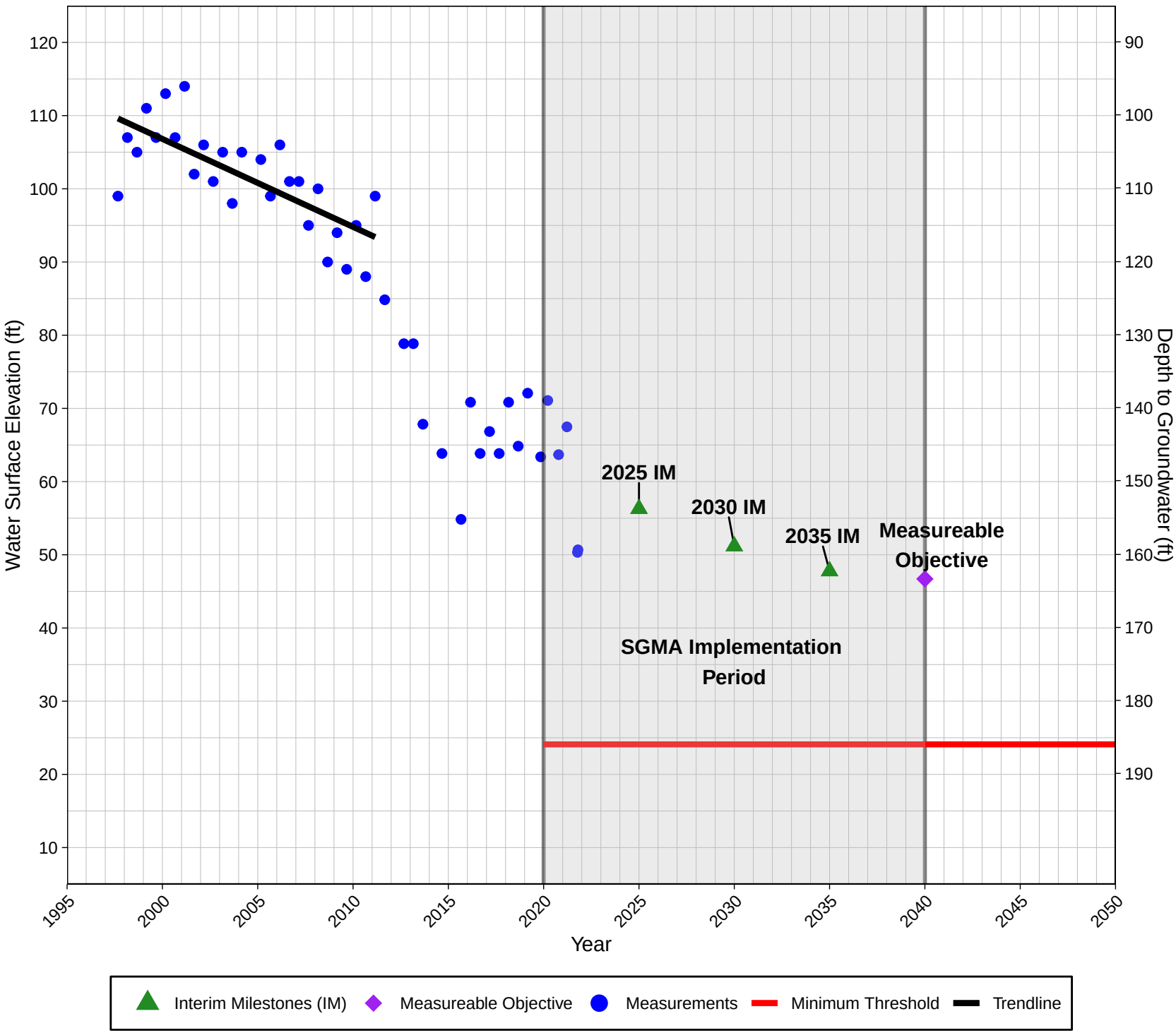




A17

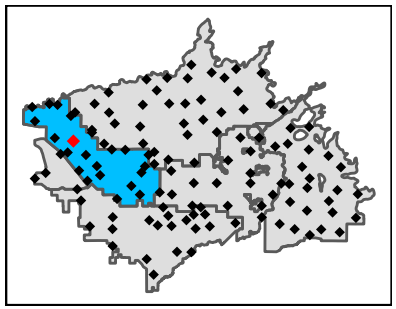
State Well ID: <Null>
Ground Surface Elevation: 210 ft
McMullin Area GSA

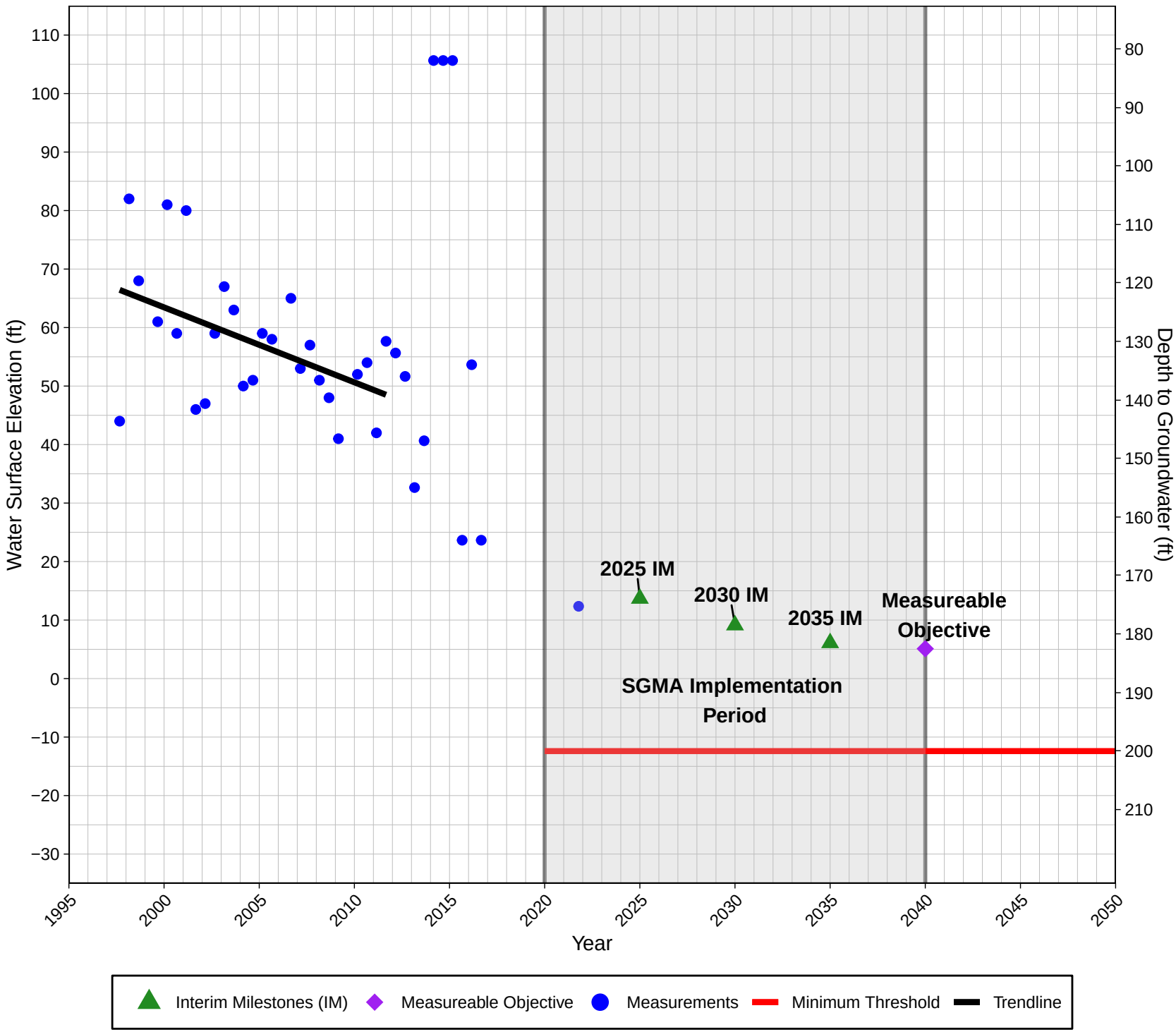




A20

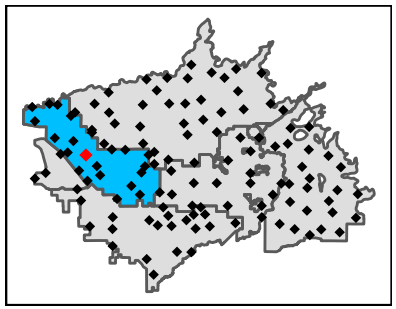
State Well ID: <Null>
Ground Surface Elevation: 188 ft
McMullin Area GSA

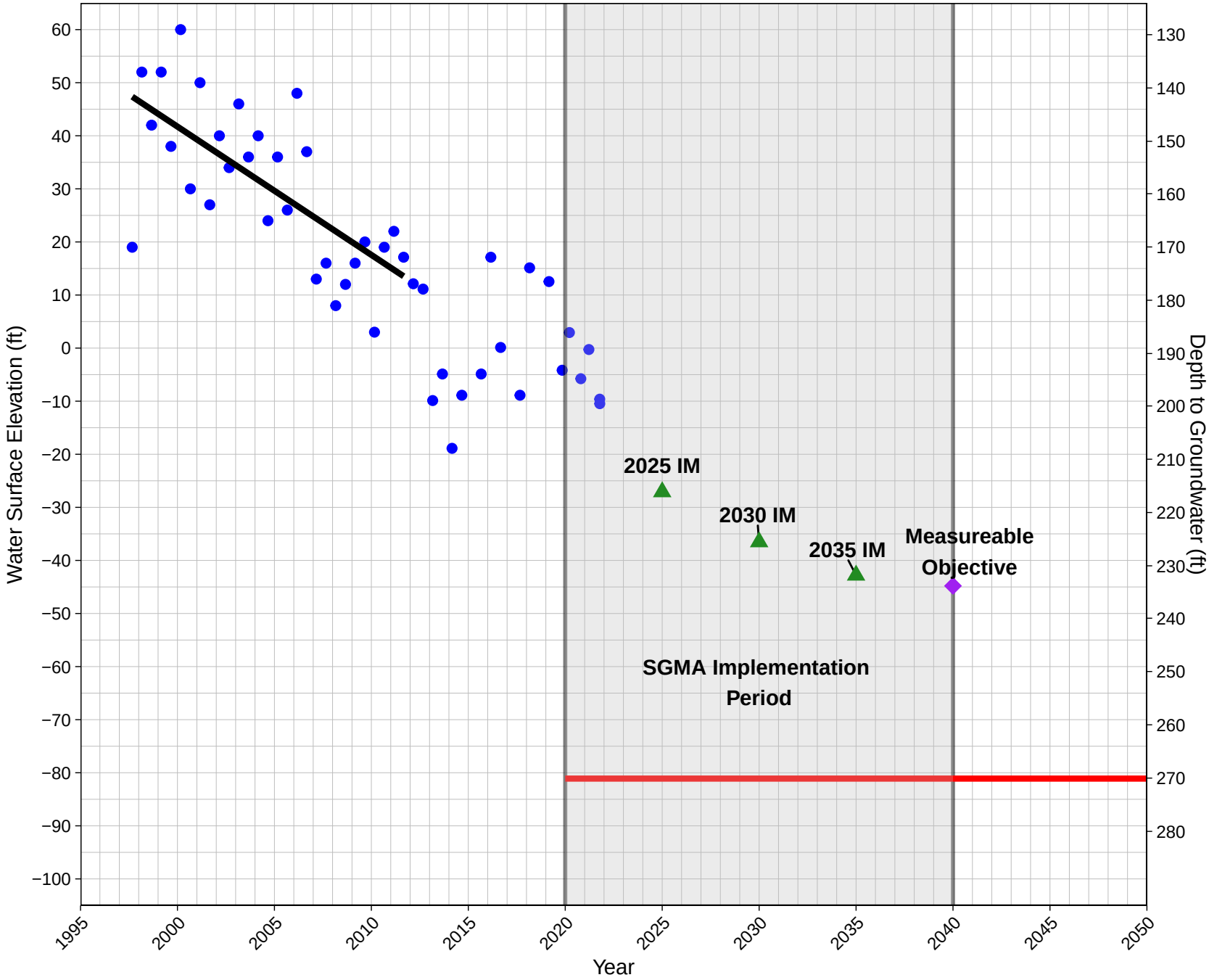




A23

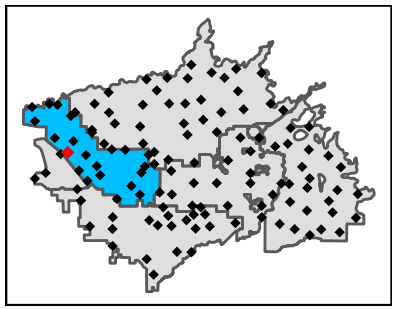
State Well ID: <Null>
Ground Surface Elevation: 189 ft
McMullin Area GSA

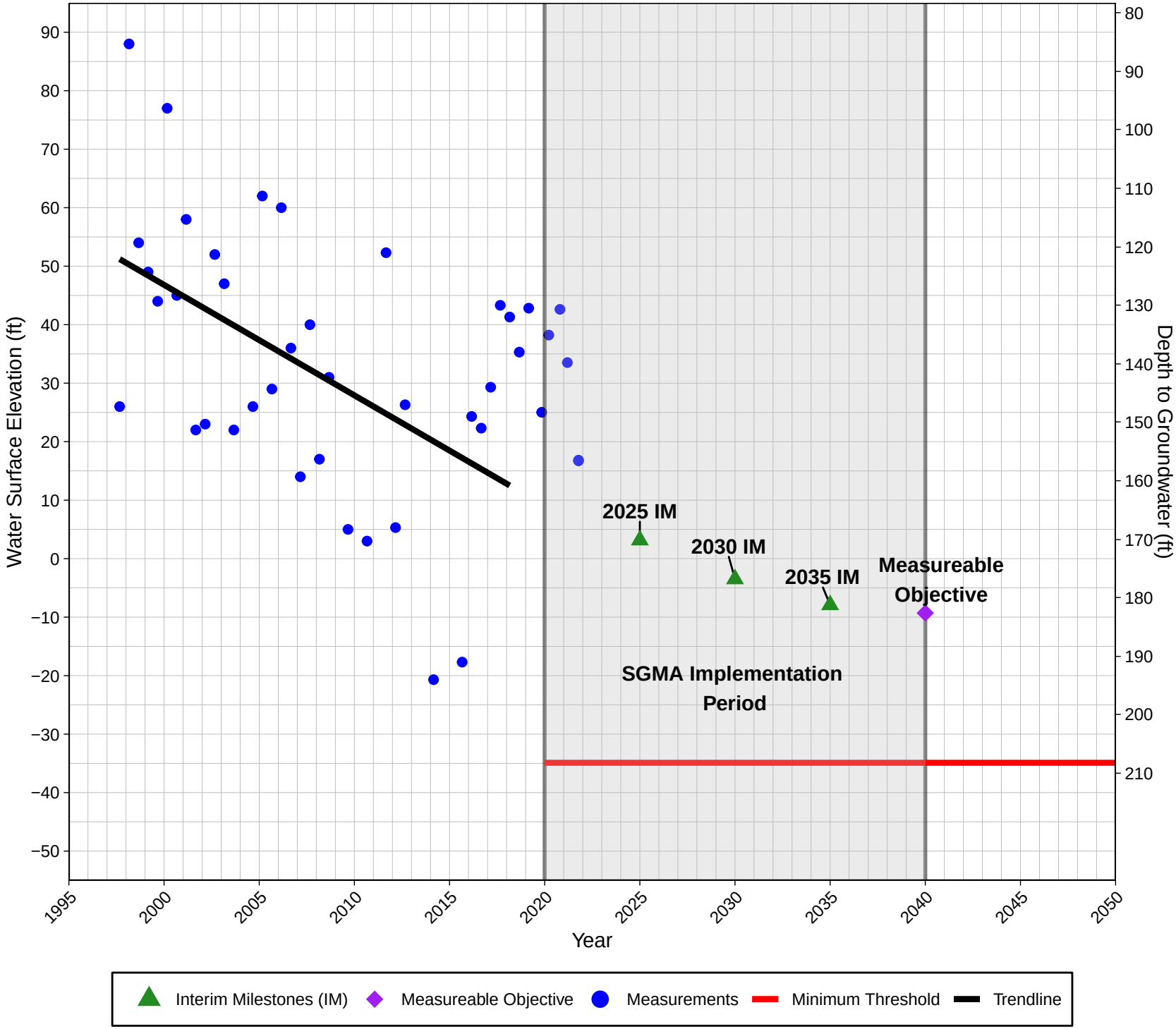




A24

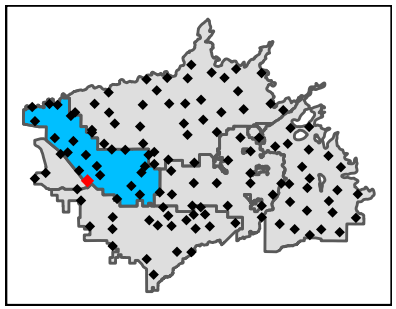
State Well ID: <Null>
Ground Surface Elevation: 173 ft
McMullin Area GSA

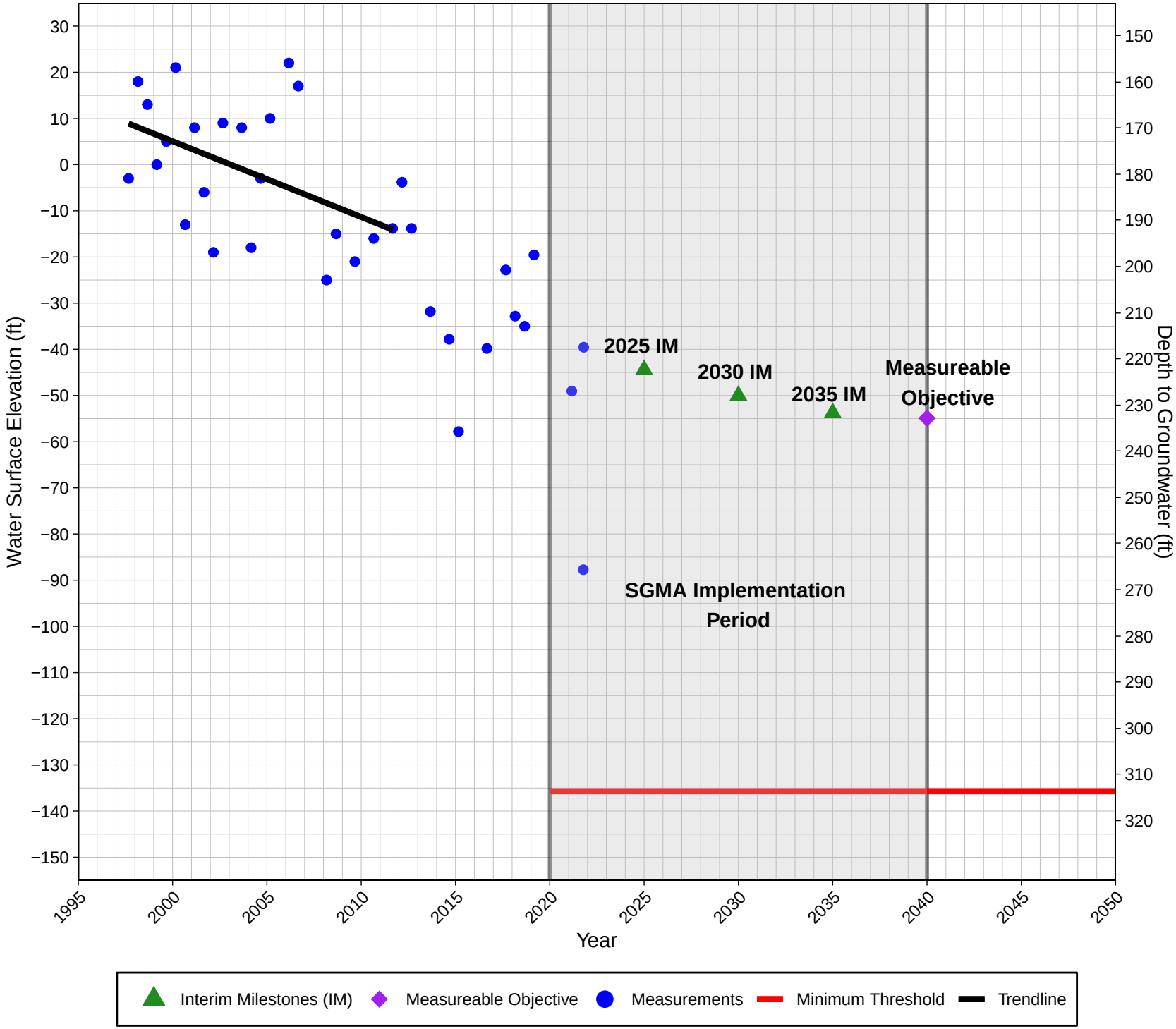




A30

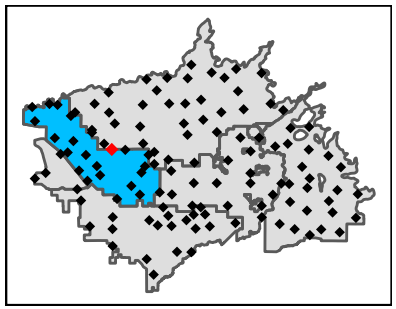
State Well ID: <Null>
Ground Surface Elevation: 178 ft
McMullin Area GSA

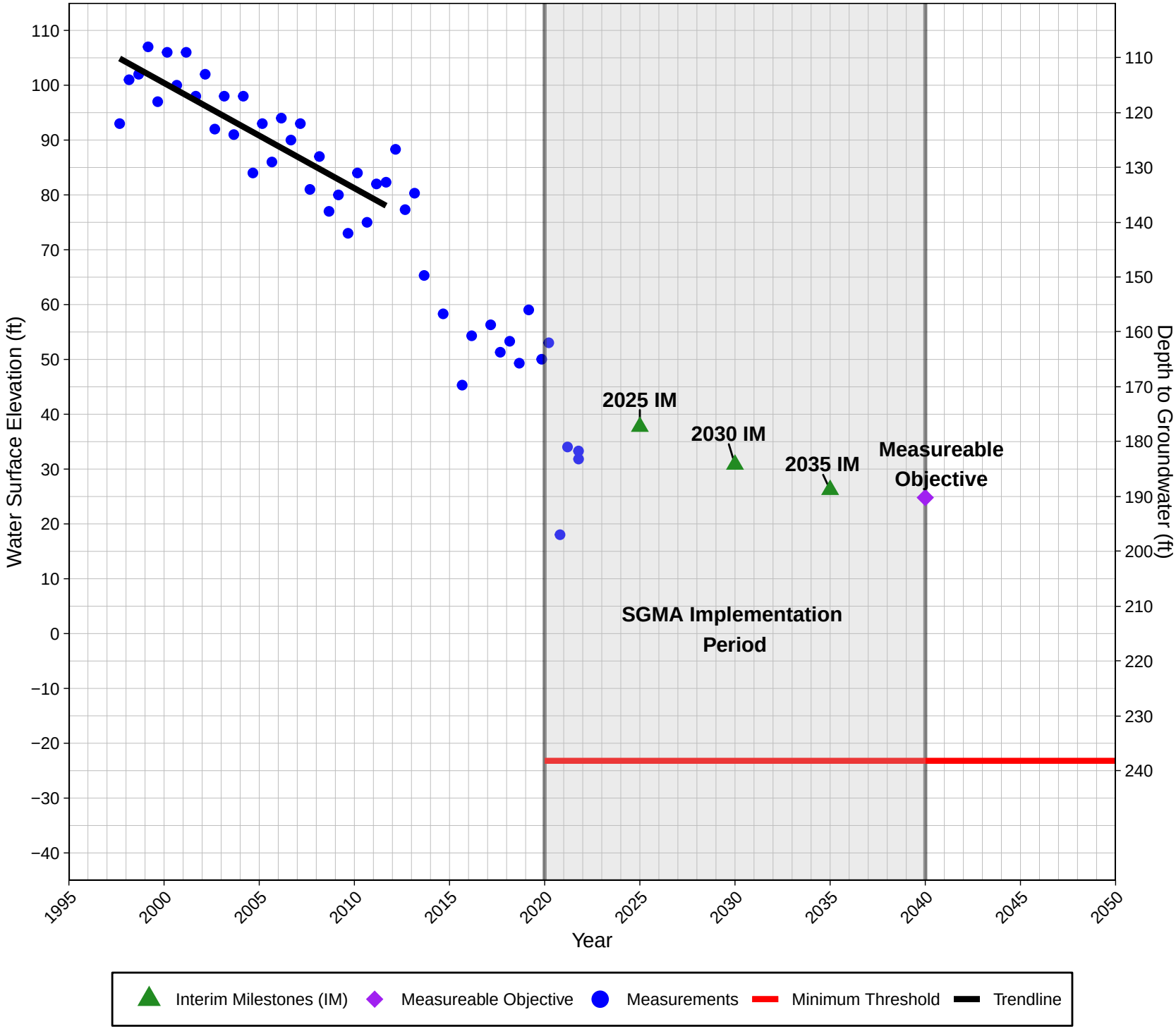




A34

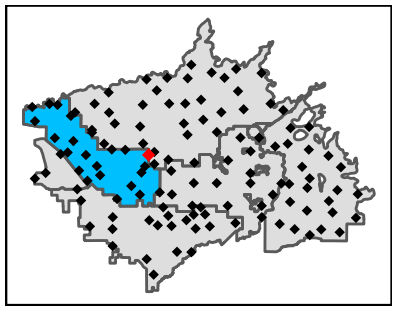
State Well ID: <Null>
Ground Surface Elevation: 215 ft
McMullin Area GSA

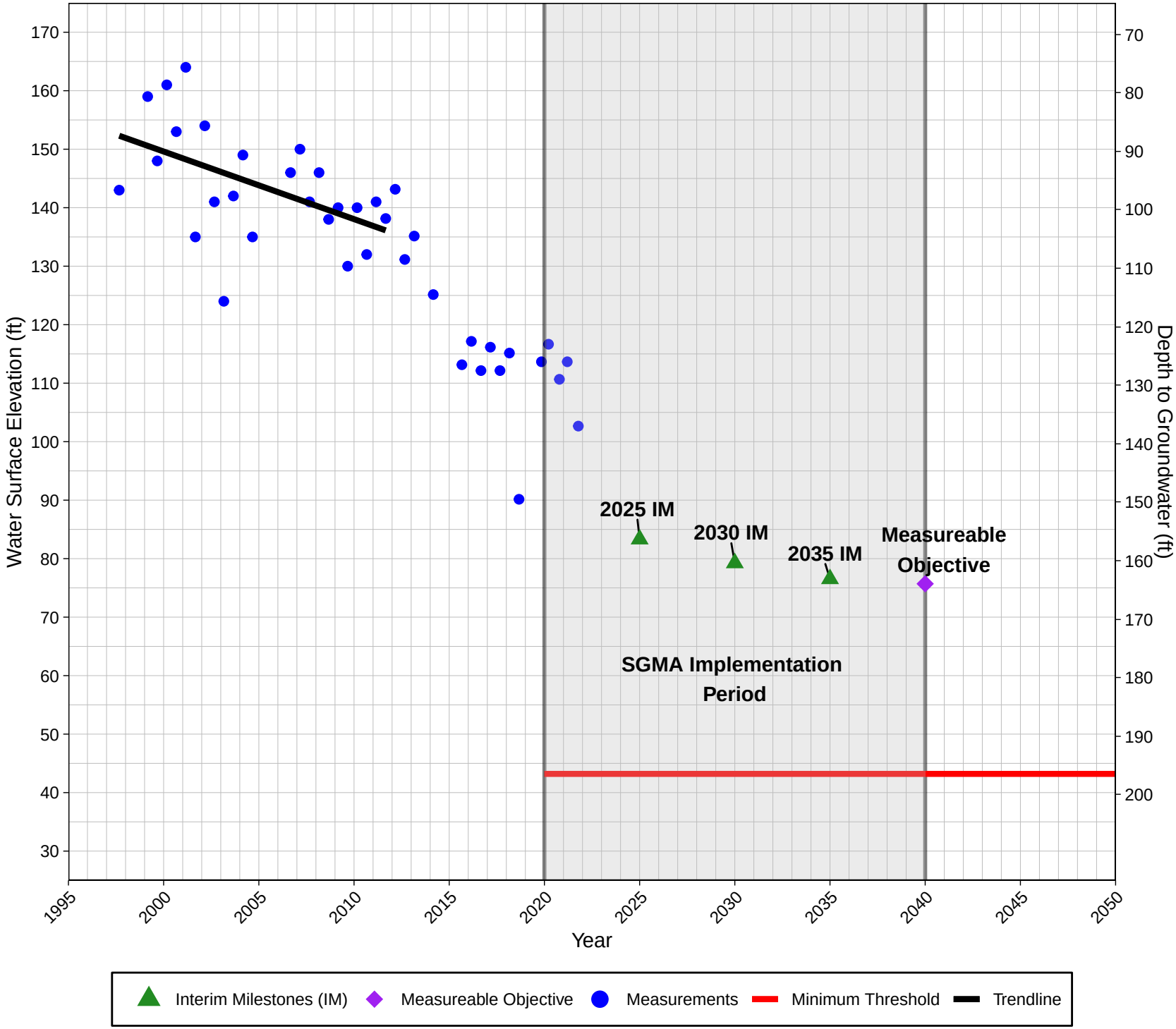




A46

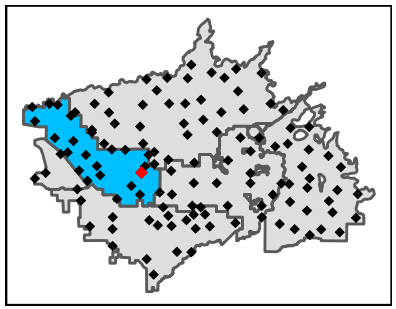
State Well ID: <Null>
Ground Surface Elevation: 240 ft
McMullin Area GSA

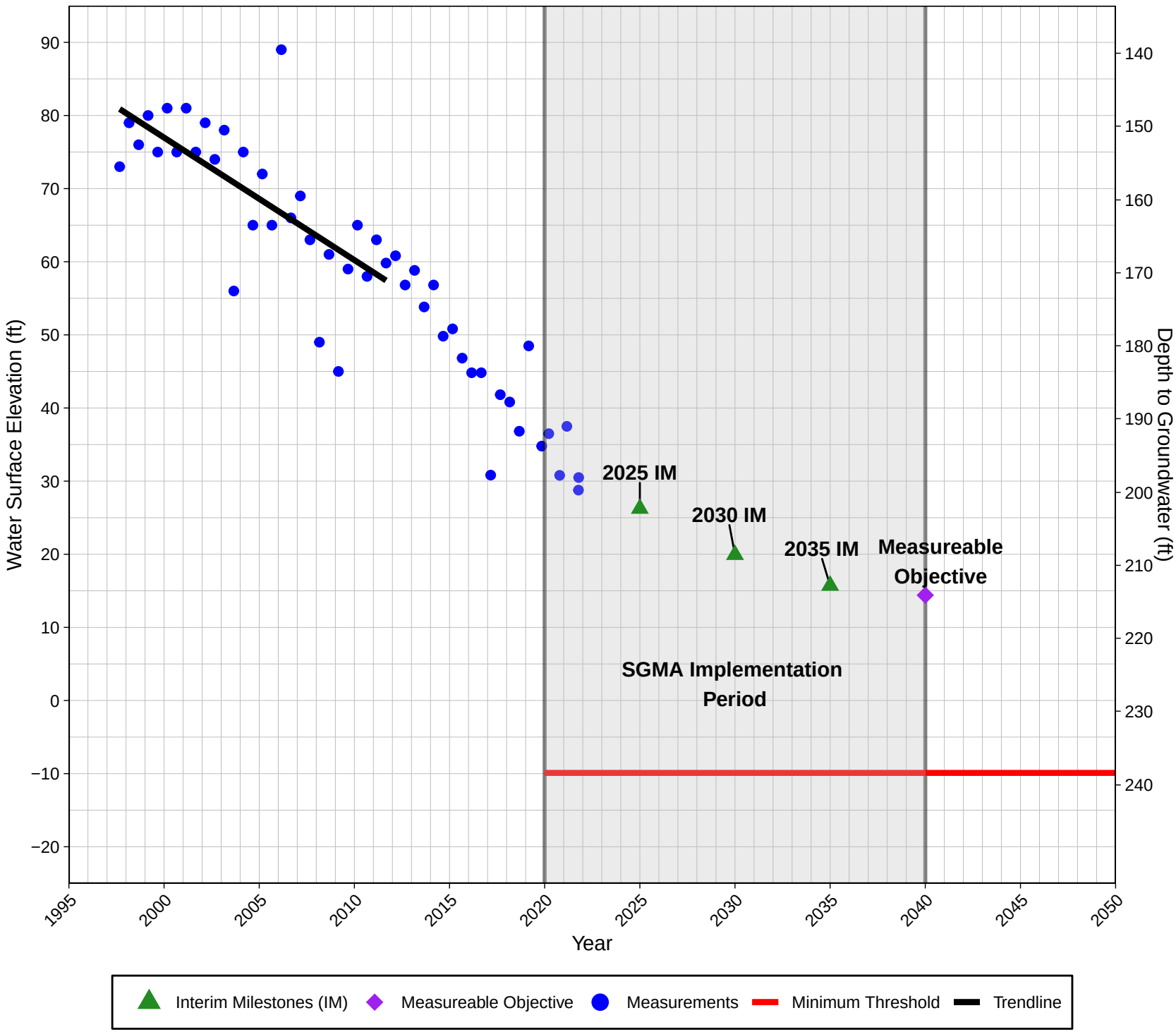


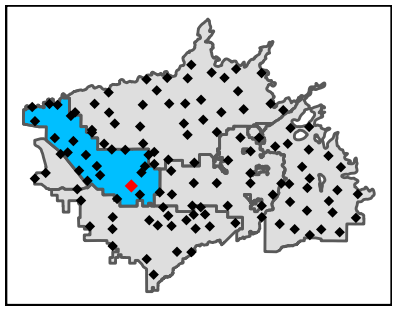


A51

State Well ID: <Null>
Ground Surface Elevation: 228 ft
McMullin Area GSA







A53

State Well ID: <Null>
Ground Surface Elevation: 211 ft
McMullin Area GSA

Water Surface Elevation (ft)

Depth to Groundwater (ft)

Year

2025 IM

2030 IM

2035 IM

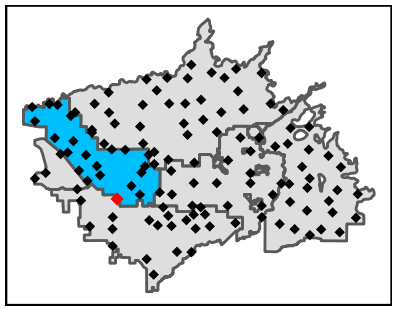
Measureable Objective

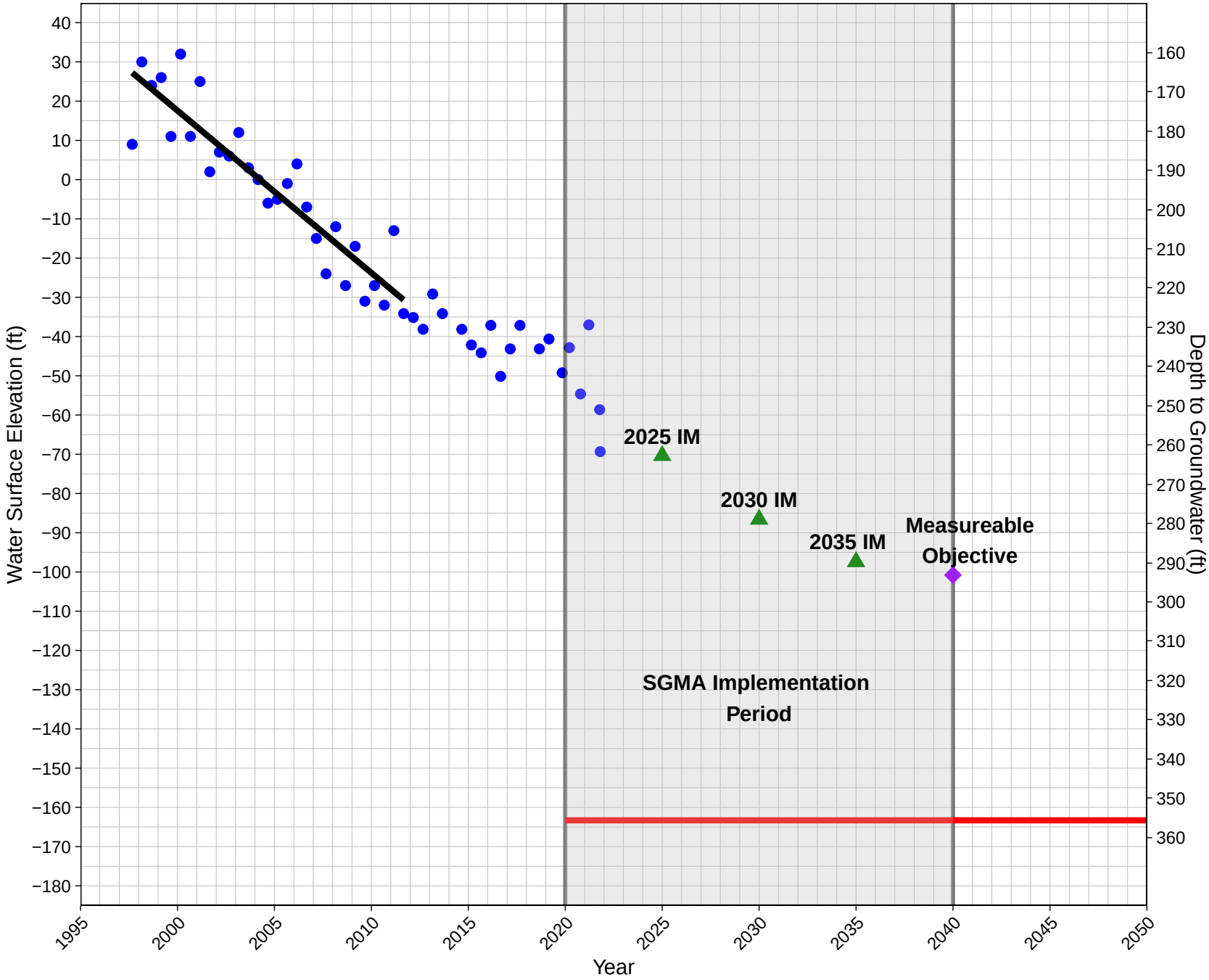
SGMA Implementation Period

Interim Milestones (IM) | Measureable Objective | Measurements | Minimum Threshold | Trendline

A58

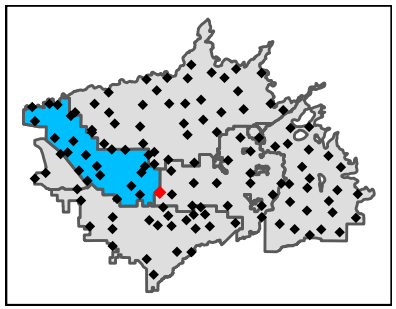
State Well ID: <Null>
Ground Surface Elevation: 192 ft
McMullin Area GSA

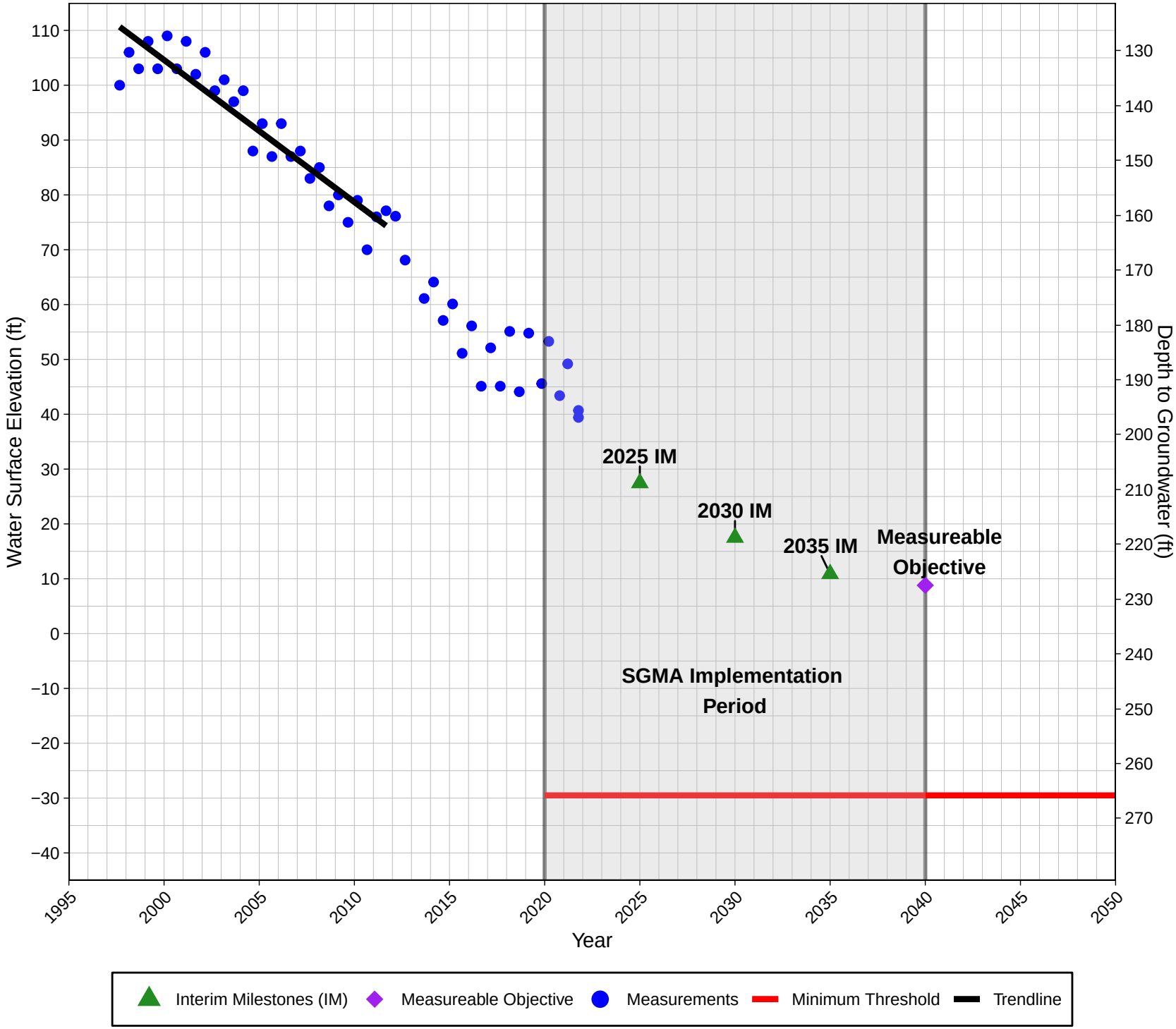




A62

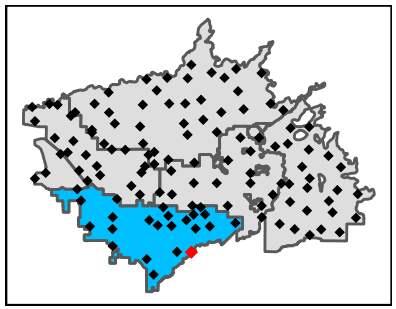
State Well ID: 16S19E14A001M
Ground Surface Elevation: 236 ft
McMullin Area GSA

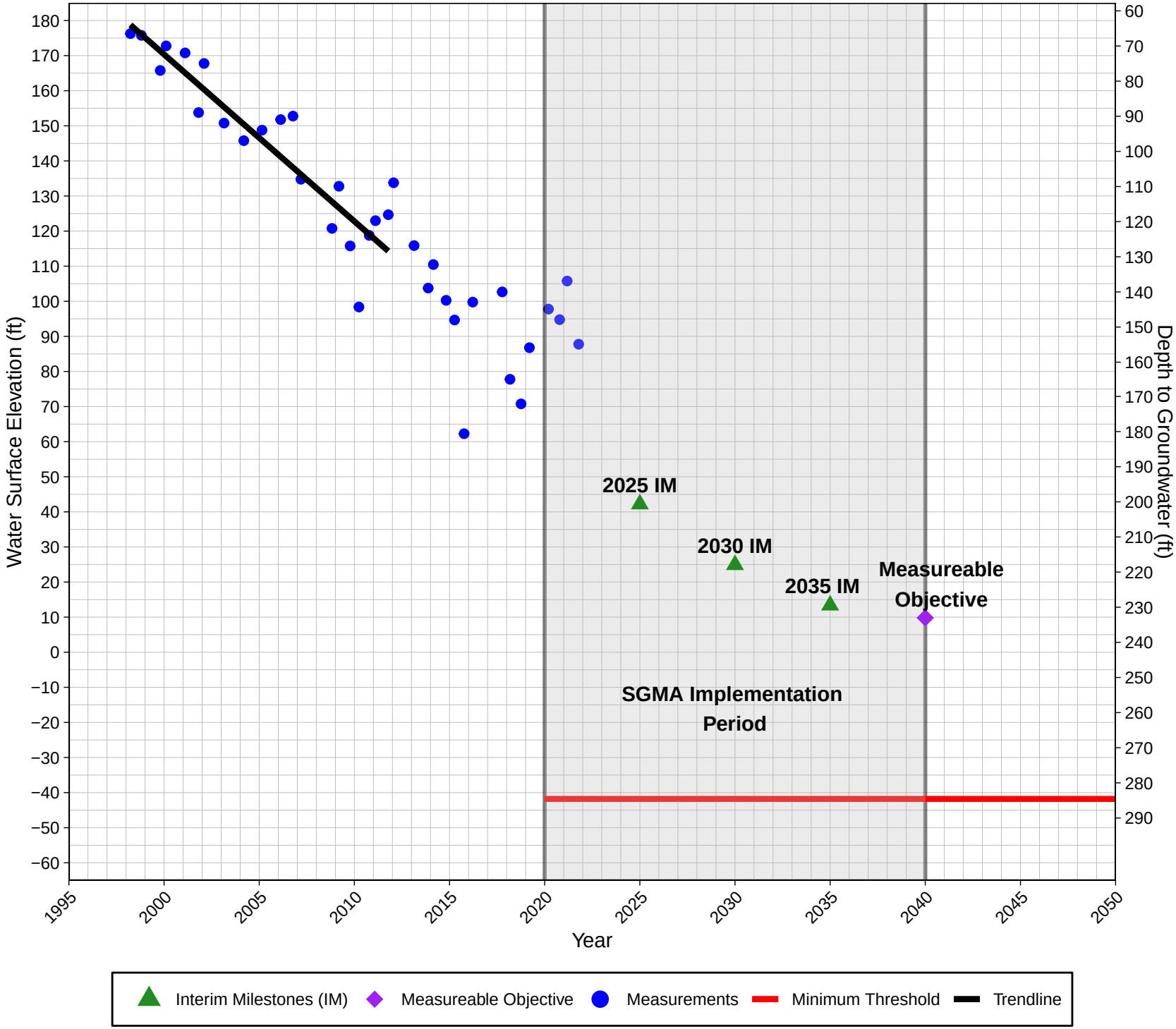




364002N1197624W001

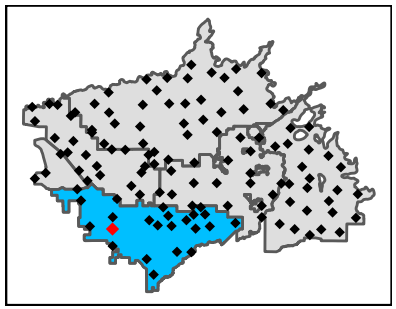
State Well ID: 18S20E02A001M
Ground Surface Elevation: 243 ft
North Fork Kings Groundwater Sustainability Agency

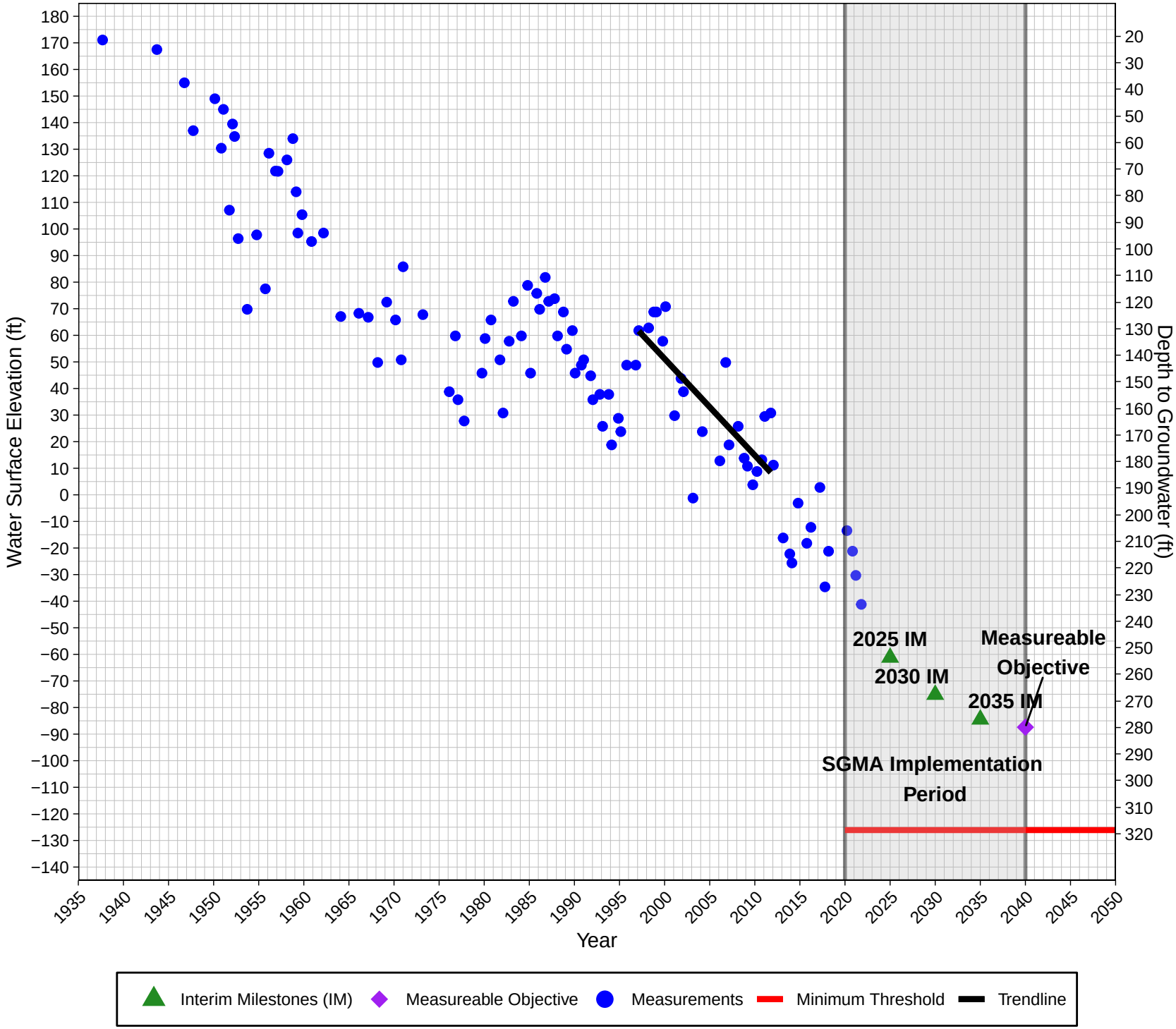




364591N1200135W001

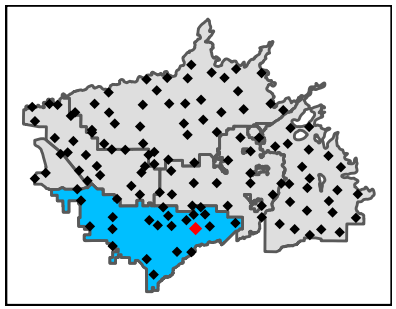
State Well ID: 17S18E09R001M
Ground Surface Elevation: 192 ft
North Fork Kings Groundwater Sustainability Agency

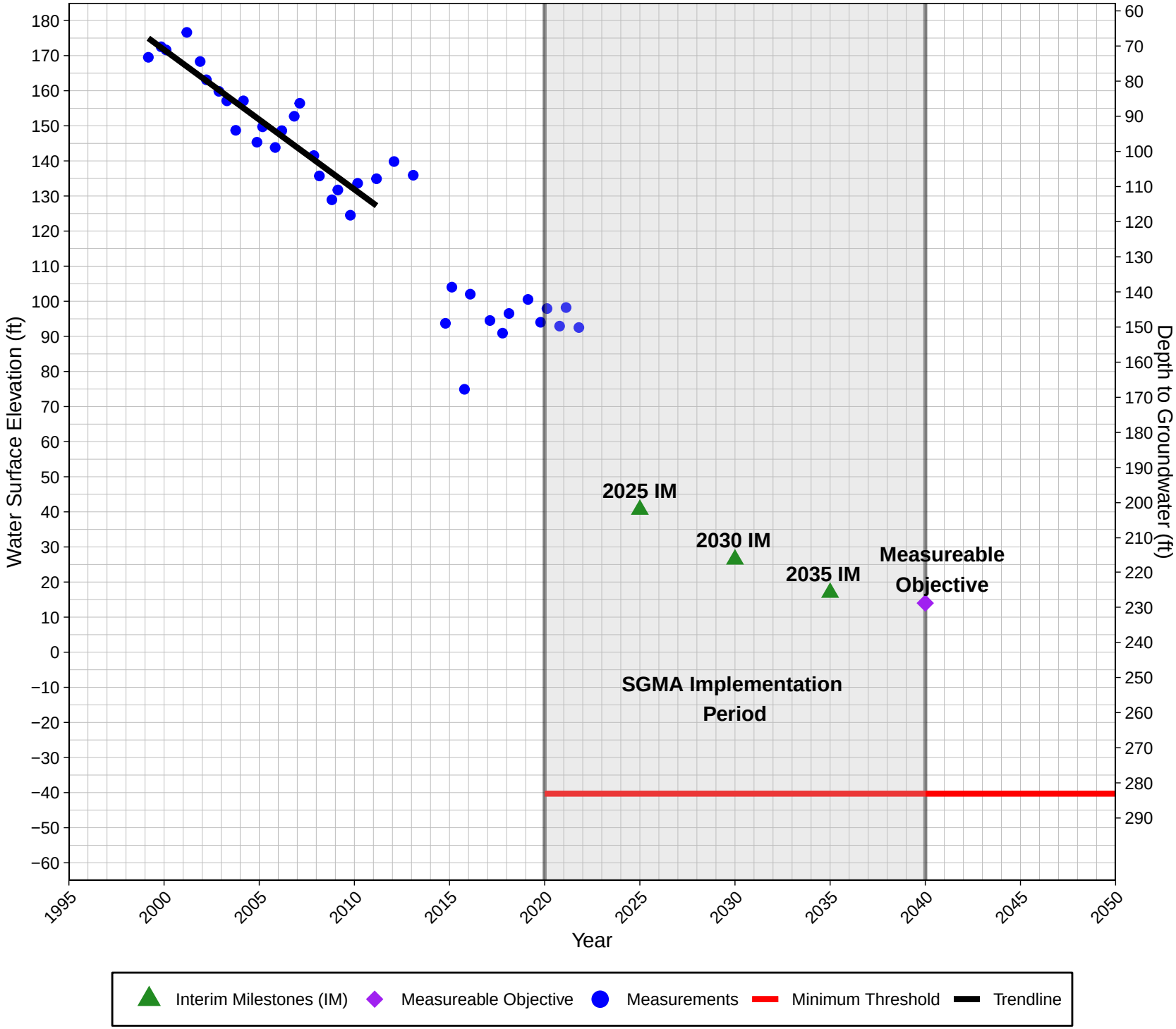




364603N1197510W001

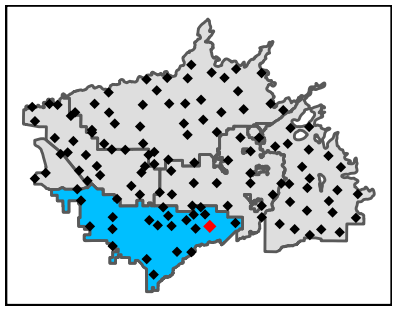
State Well ID: 17S20E12Q001M
Ground Surface Elevation: 243 ft
North Fork Kings Groundwater Sustainability Agency

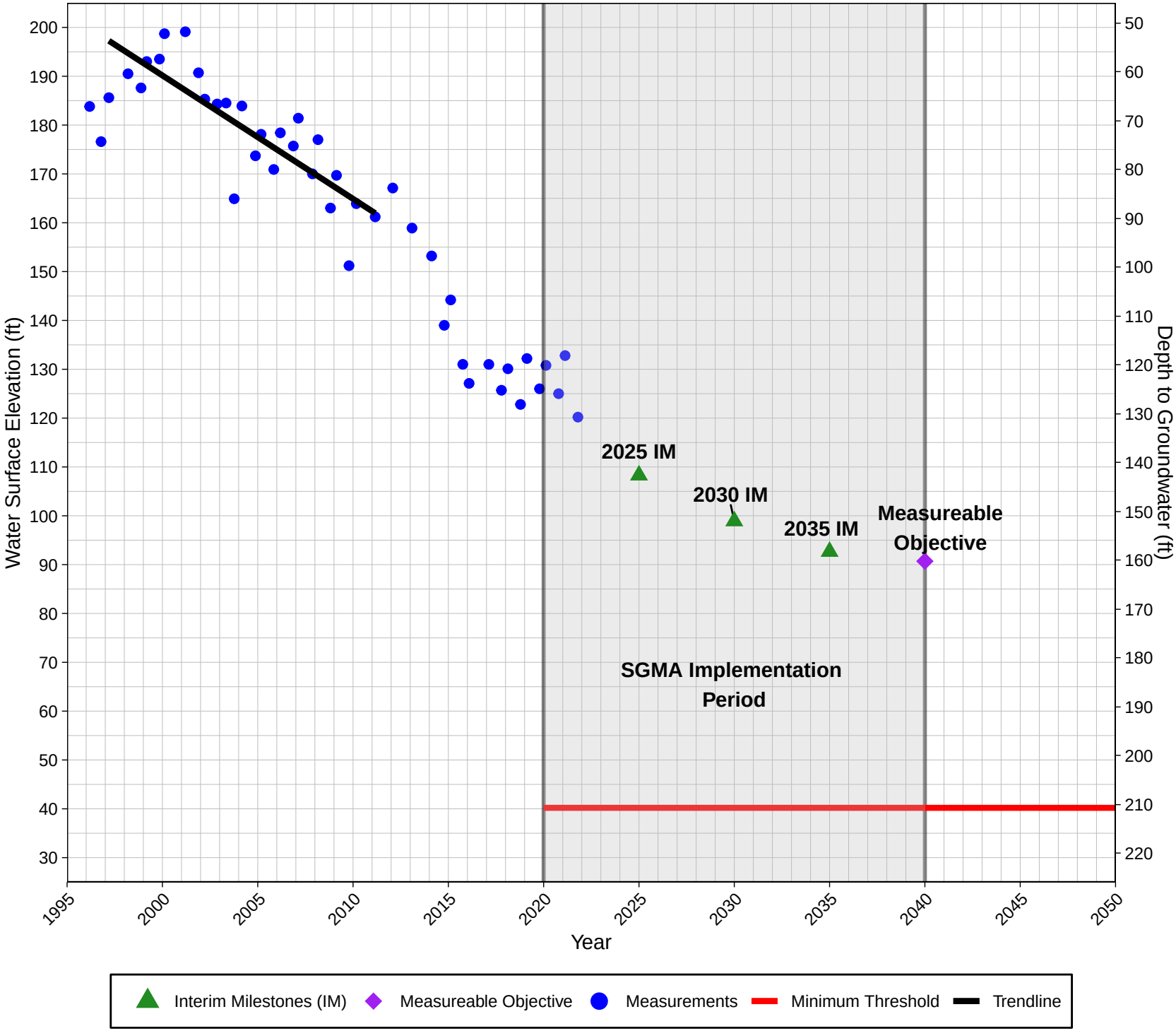




364667N1197041W001

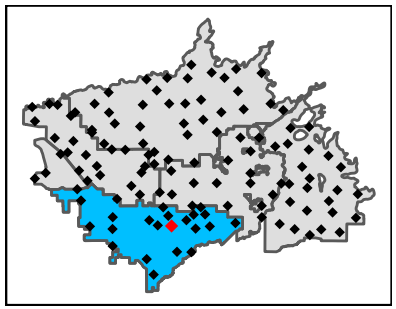
State Well ID: 17S21E09M001M
Ground Surface Elevation: 251 ft
North Fork Kings Groundwater Sustainability Agency

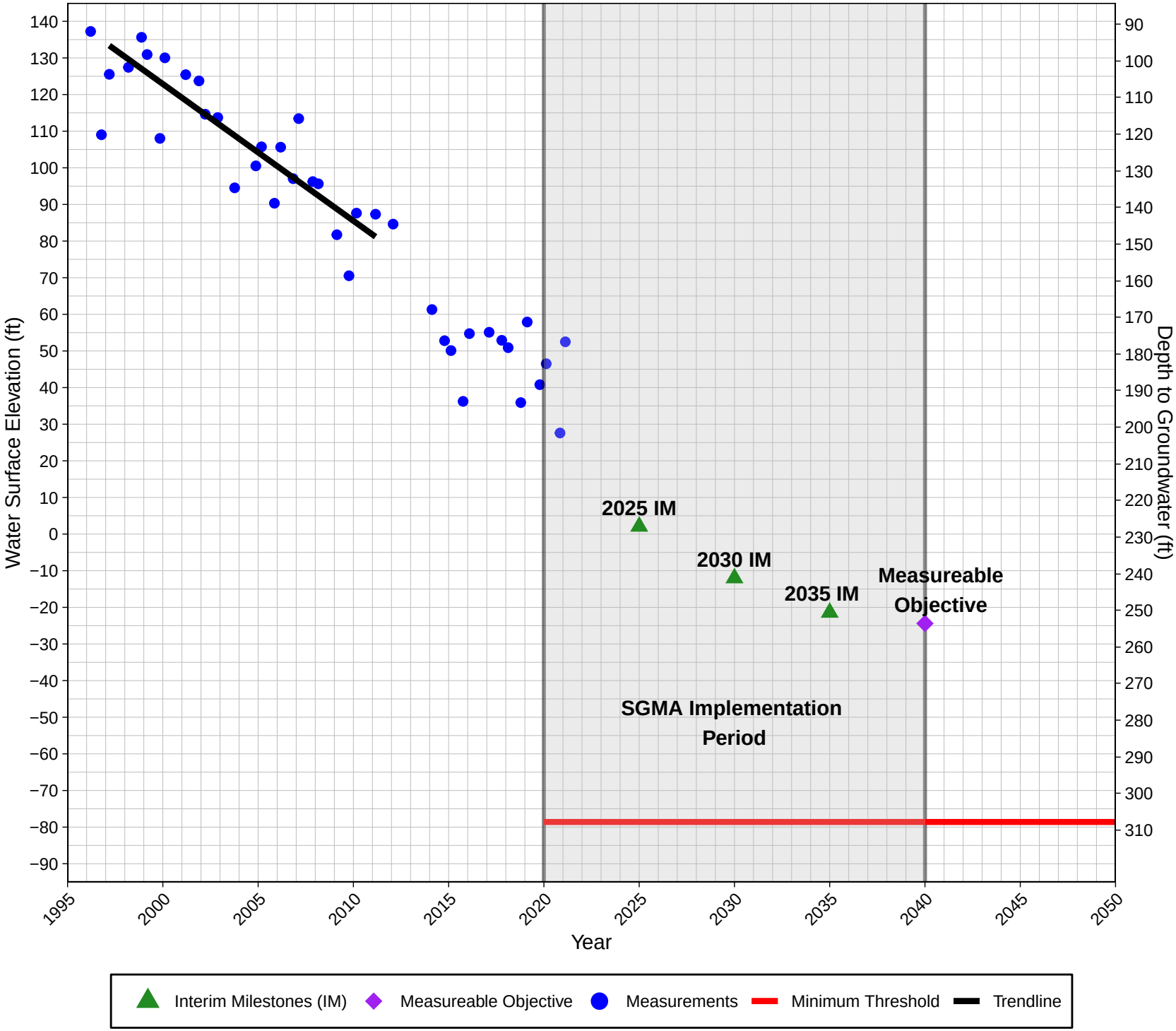




364668N1198257W001

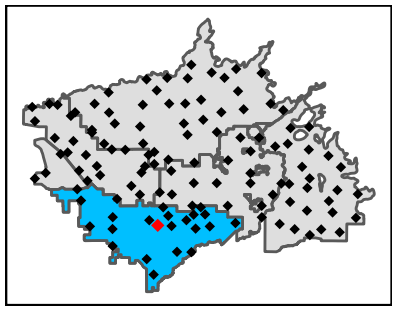
State Well ID: 17S20E08L001M
Ground Surface Elevation: 229 ft
North Fork Kings Groundwater Sustainability Agency

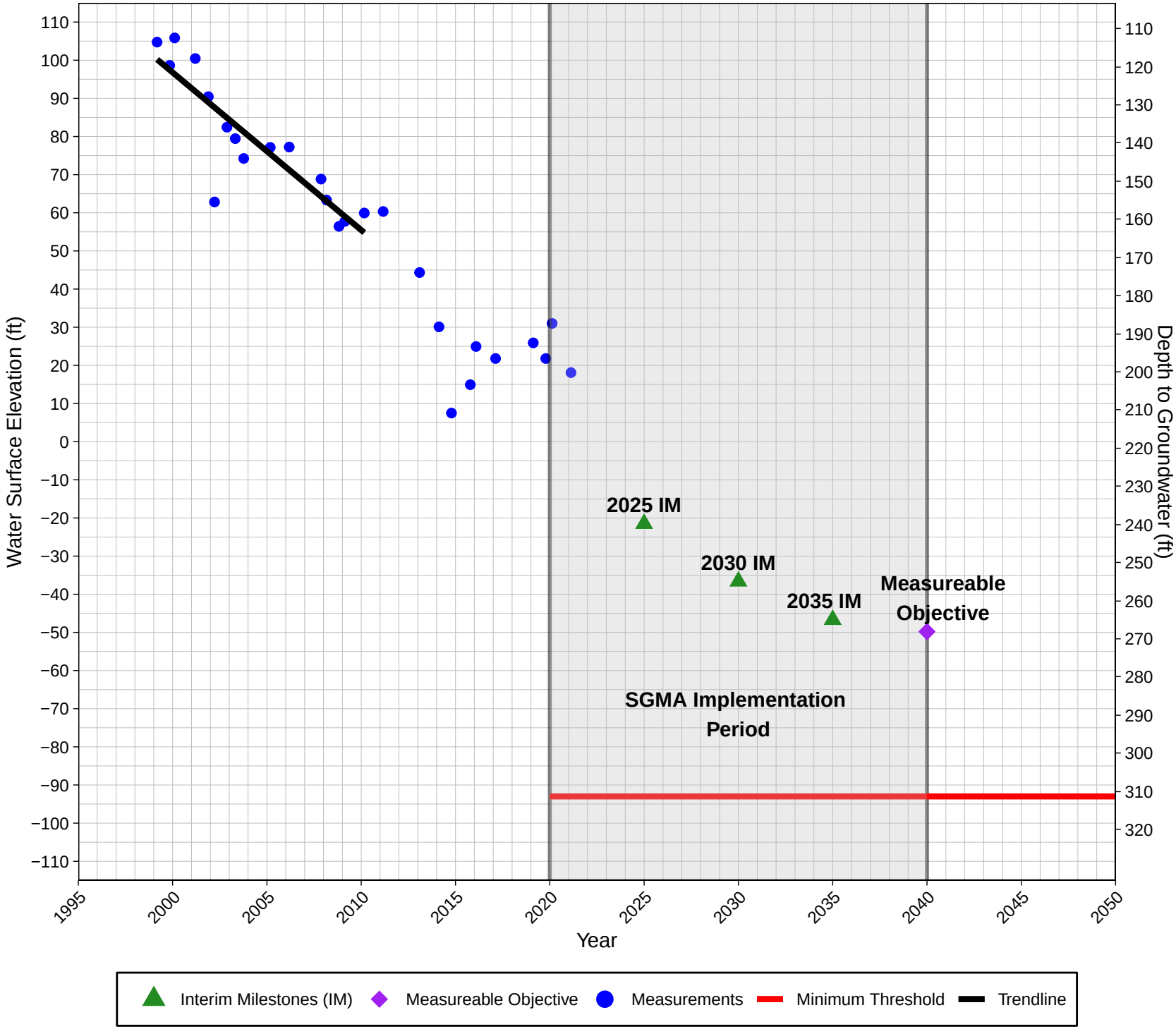




364682N1198732W001

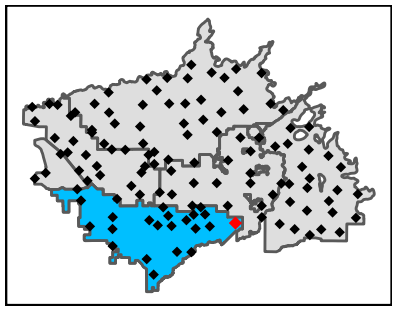
State Well ID: 17S19E11H001M
Ground Surface Elevation: 218 ft
North Fork Kings Groundwater Sustainability Agency

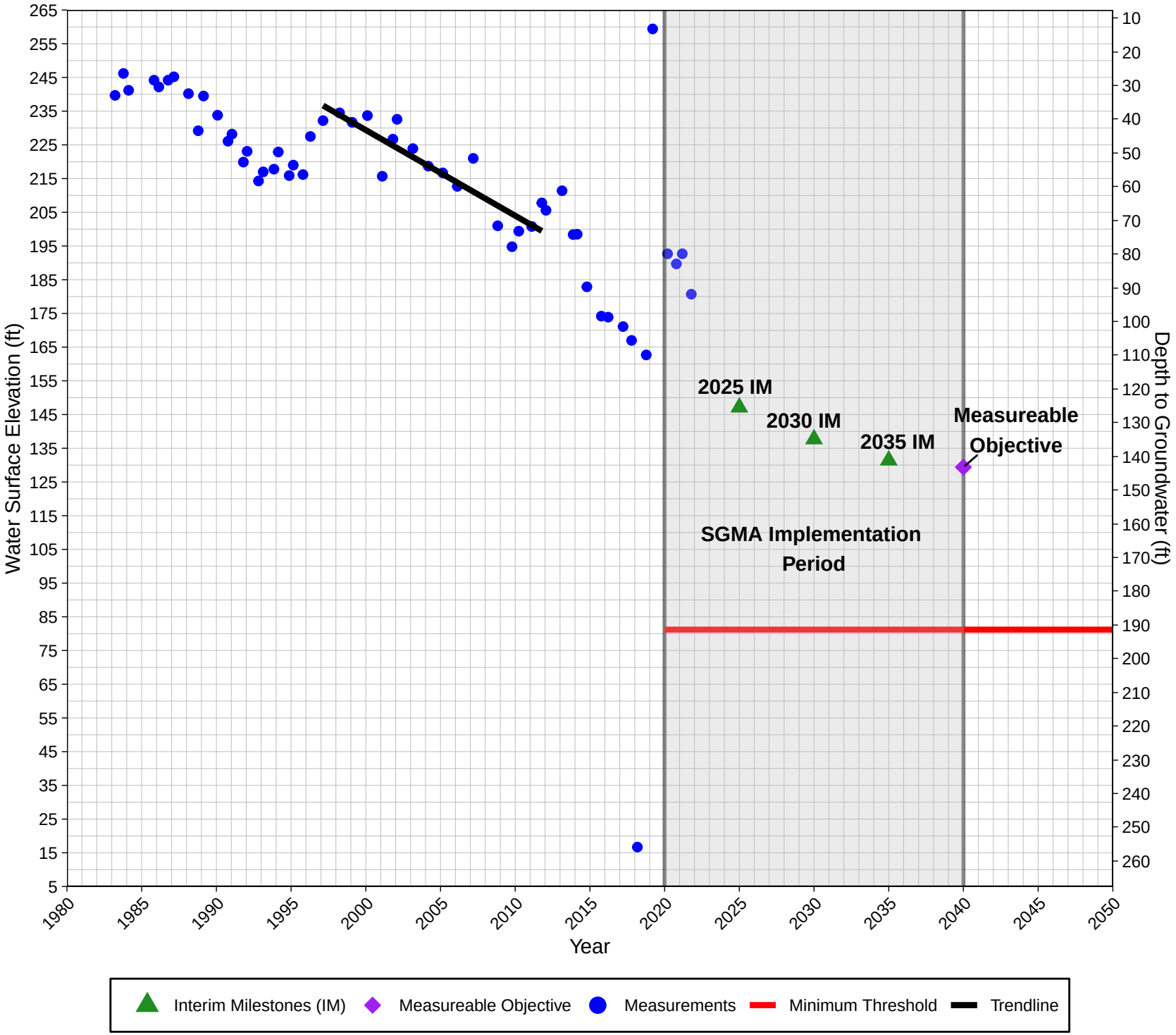




364739N1196227W001

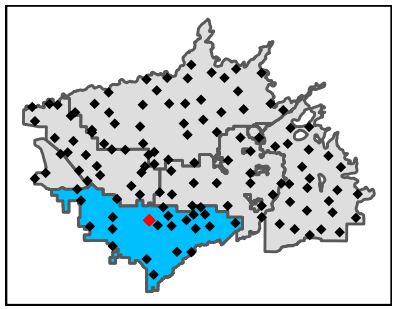
State Well ID: 17S22E07A001M
Ground Surface Elevation: 273 ft
North Fork Kings Groundwater Sustainability Agency

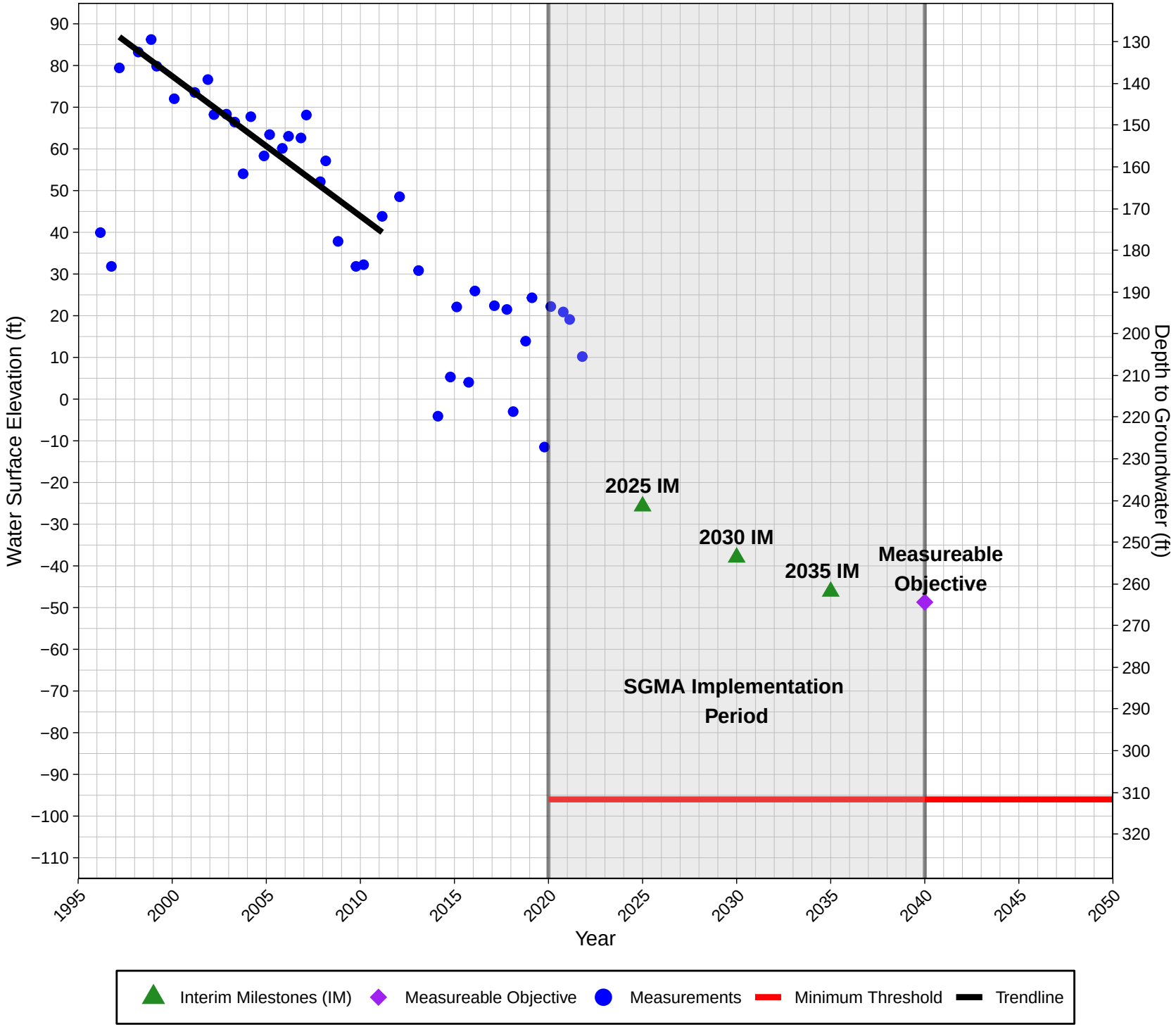




364813N1198968W001

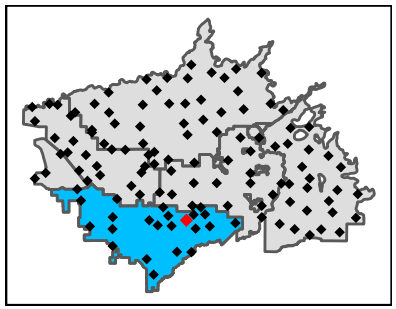
State Well ID: 17S19E03L001M
Ground Surface Elevation: 216 ft
North Fork Kings Groundwater Sustainability Agency

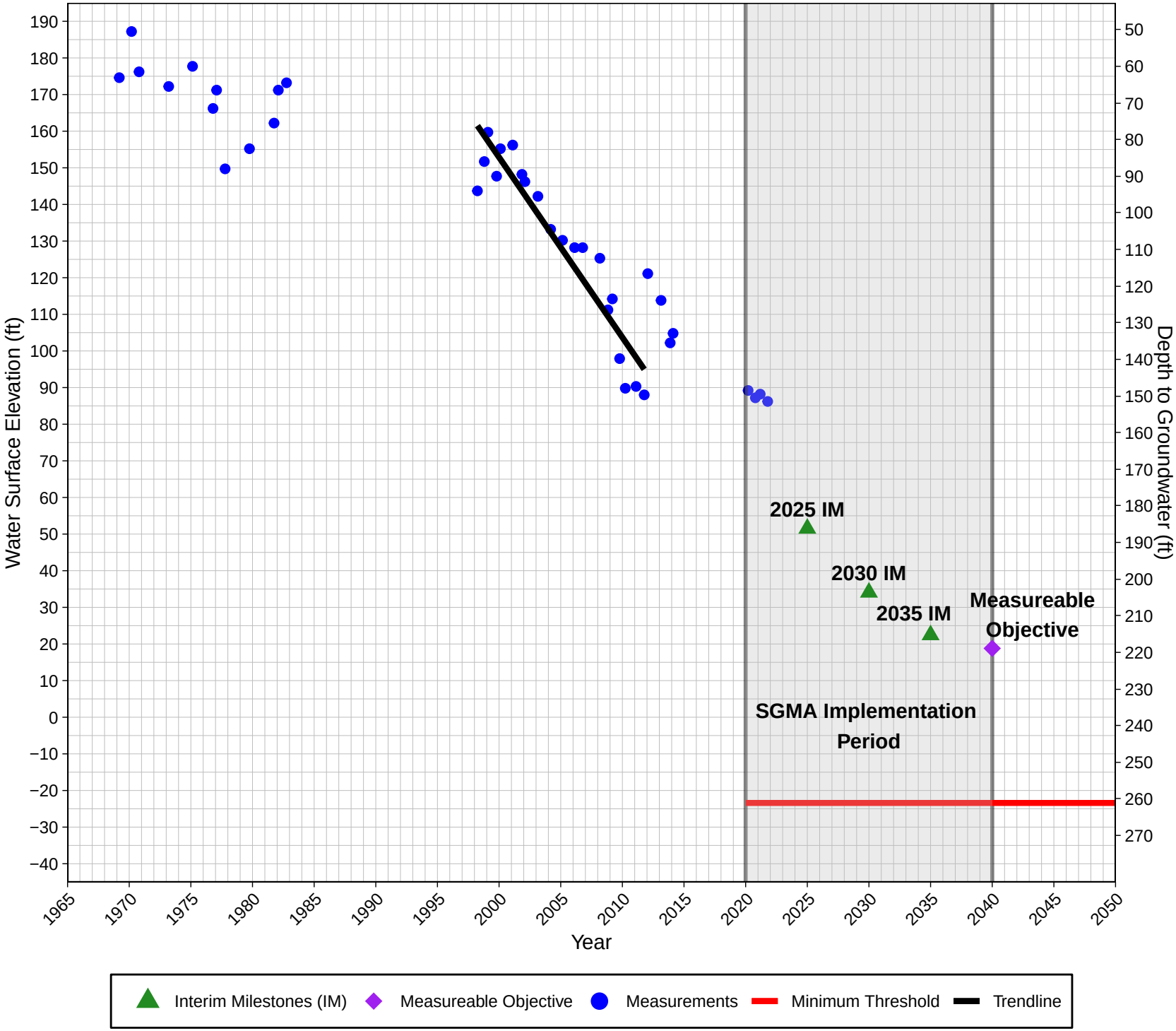




364816N1197785W001

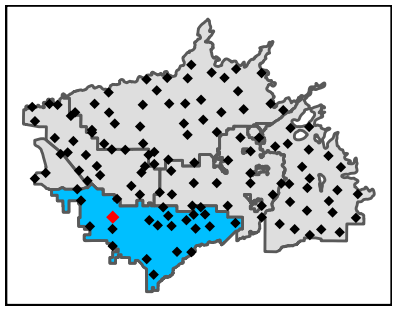
State Well ID: 17S20E02M001M
Ground Surface Elevation: 238 ft
North Fork Kings Groundwater Sustainability Agency

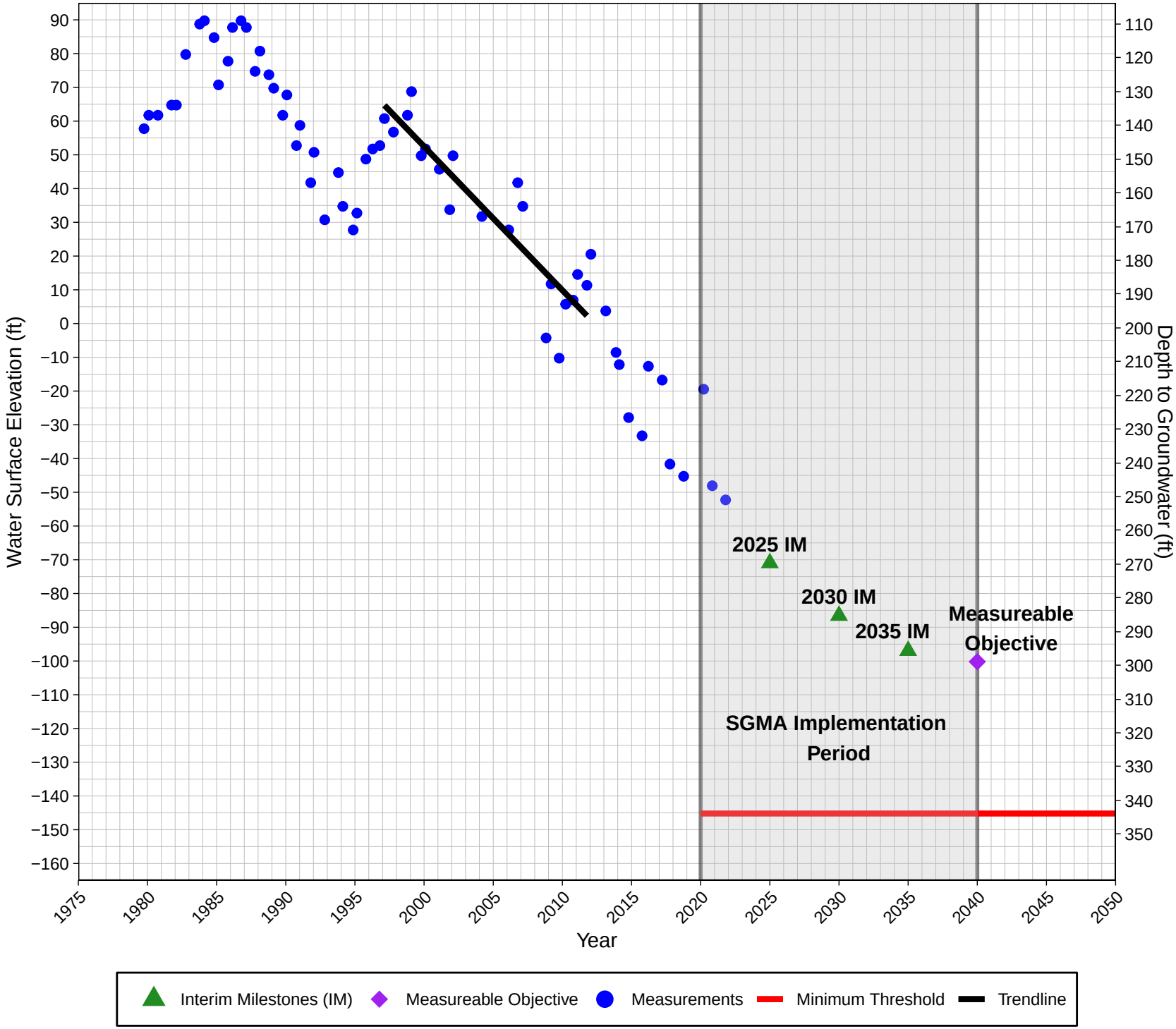




364893N1200127W001

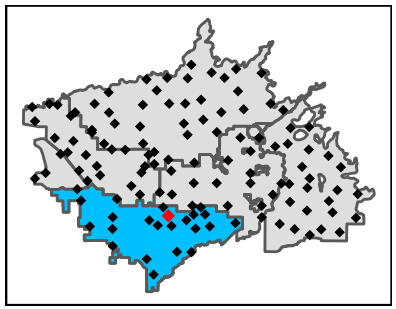
State Well ID: 16S18E33Q001M
Ground Surface Elevation: 199 ft
North Fork Kings Groundwater Sustainability Agency

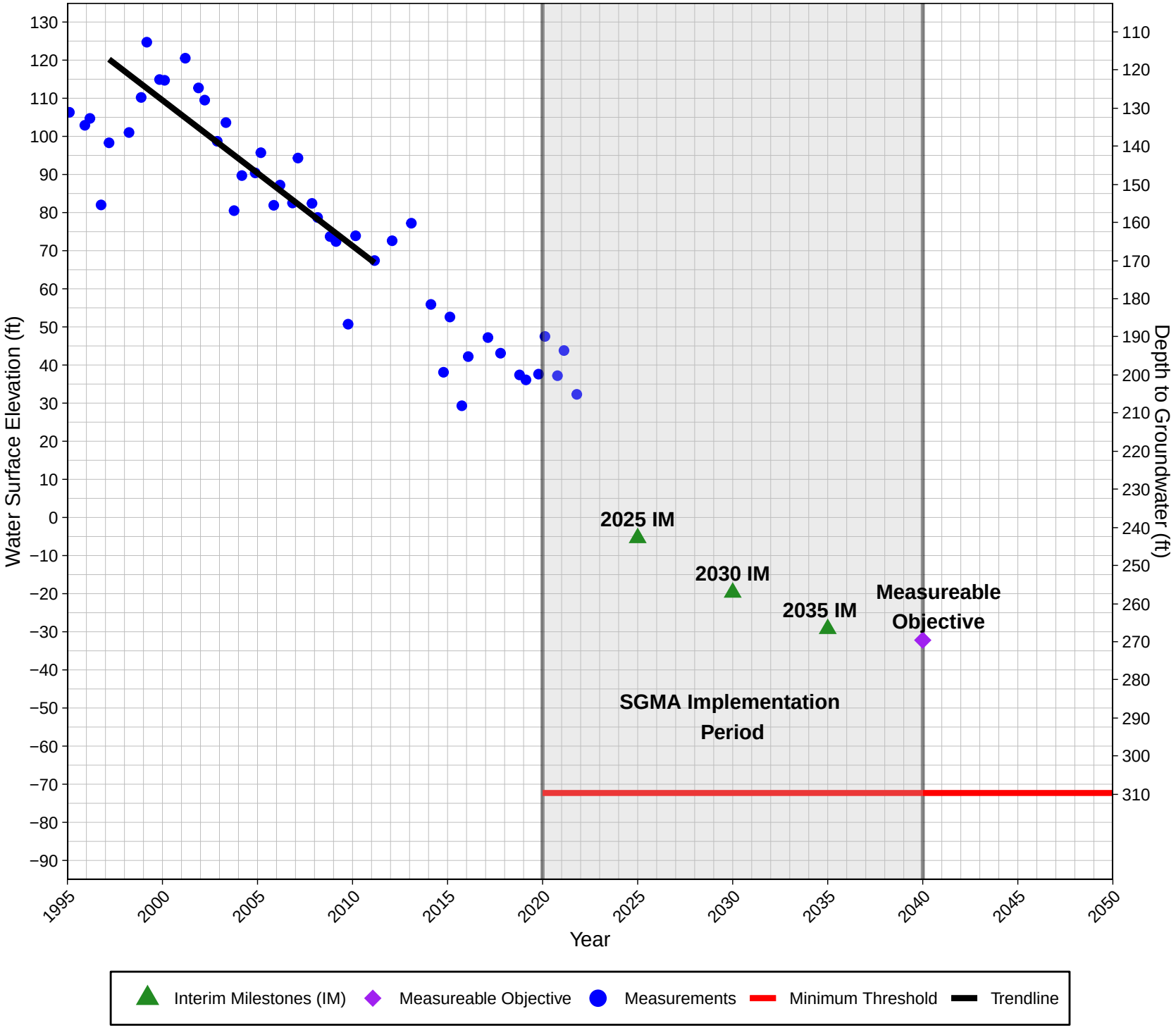




364916N1198366W001

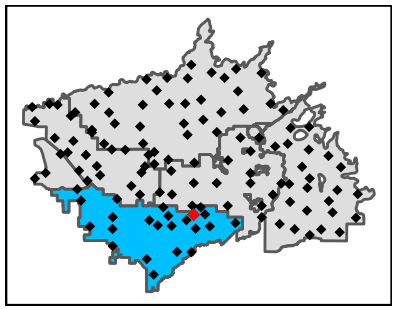
State Well ID: 16S20E31P001M
Ground Surface Elevation: 237 ft
North Fork Kings Groundwater Sustainability Agency

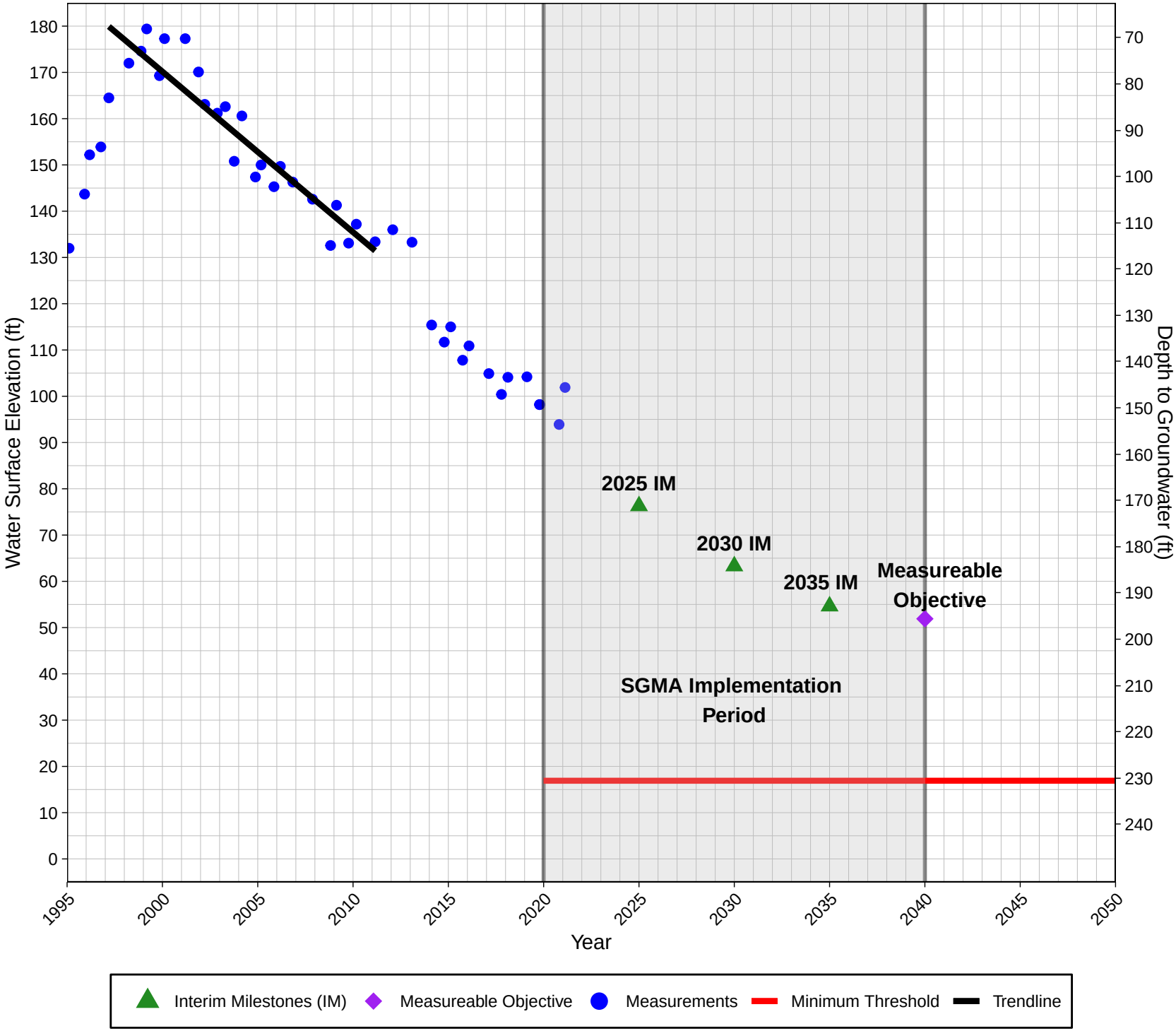




364960N1197554W001

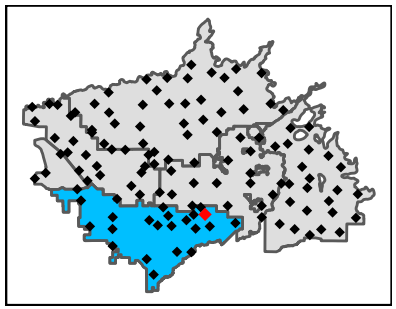
State Well ID: 16S20E35J001M
Ground Surface Elevation: 248 ft
North Fork Kings Groundwater Sustainability Agency

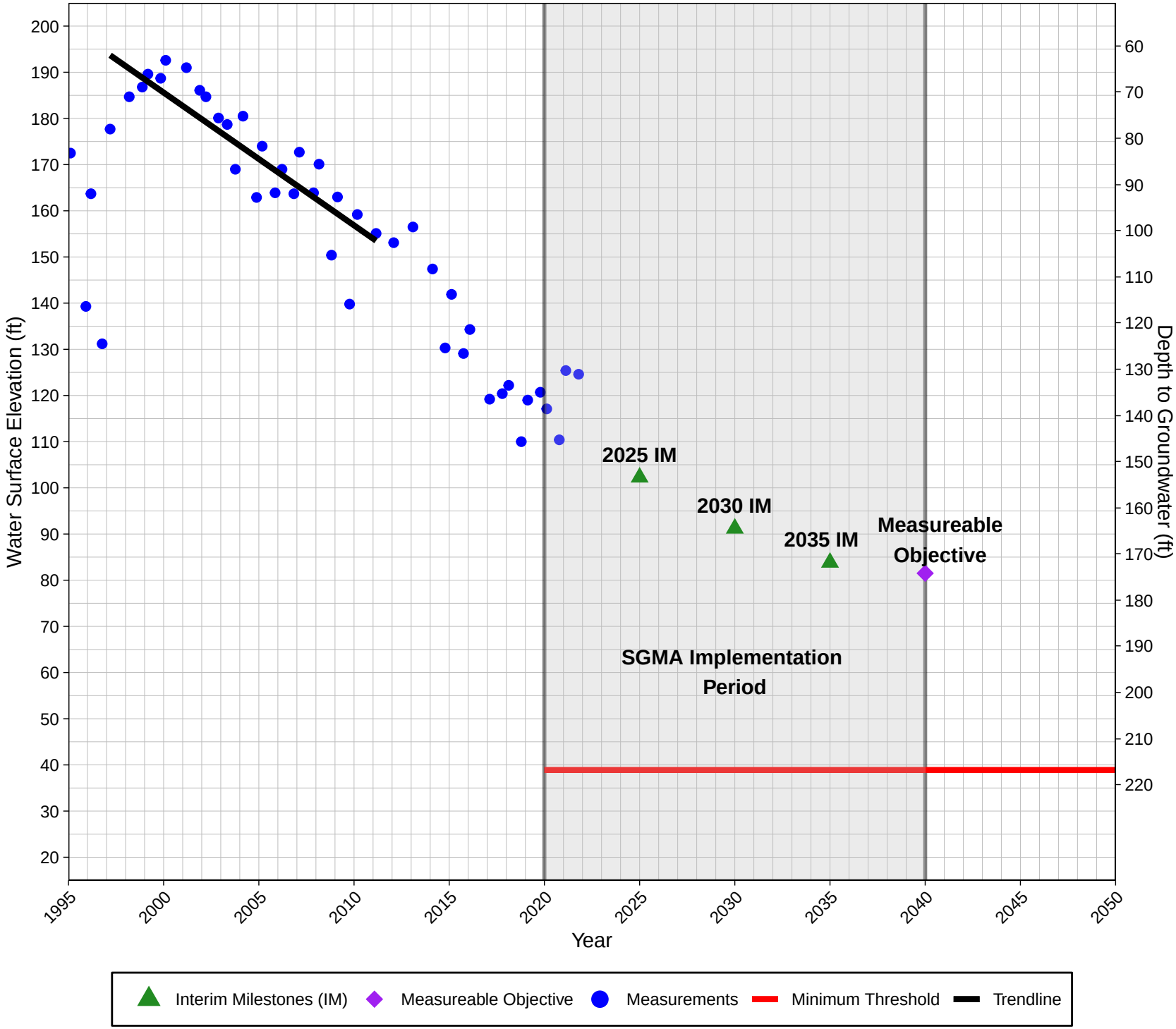




364967N1197193W001

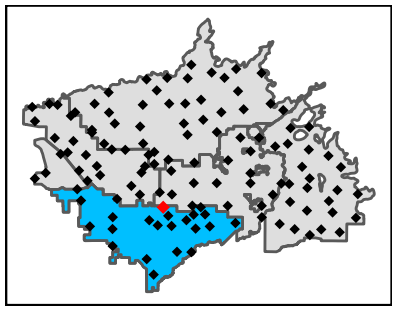
State Well ID: 16S21E31J001M
Ground Surface Elevation: 256 ft
North Fork Kings Groundwater Sustainability Agency

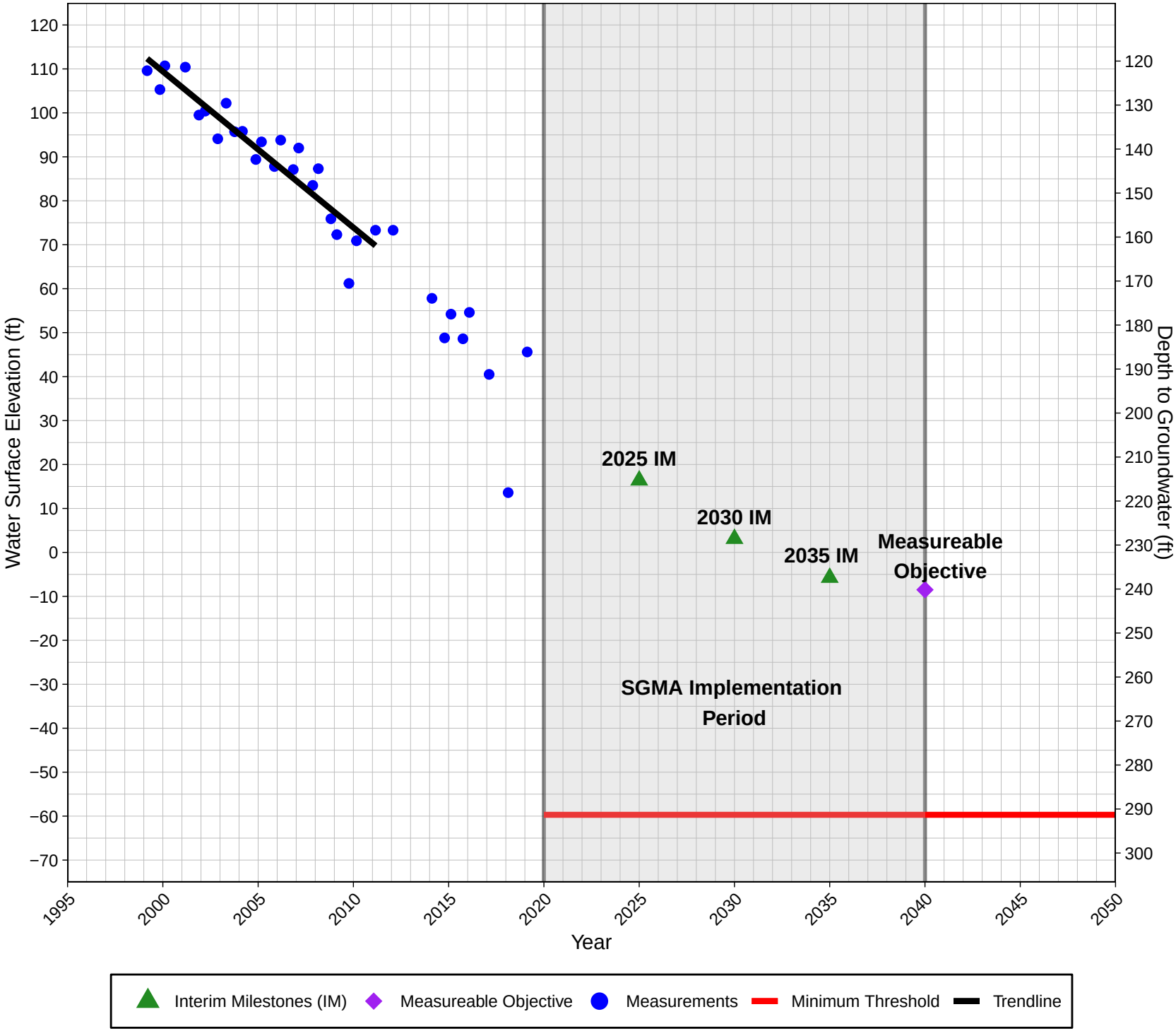




365143N1198529W001

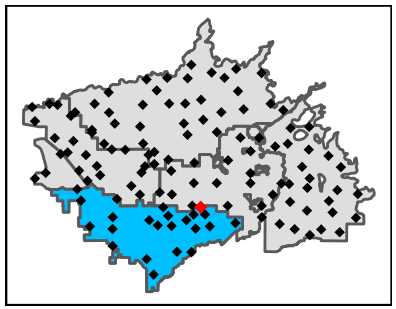
State Well ID: 16S19E25B001M
Ground Surface Elevation: 232 ft
North Fork Kings Groundwater Sustainability Agency

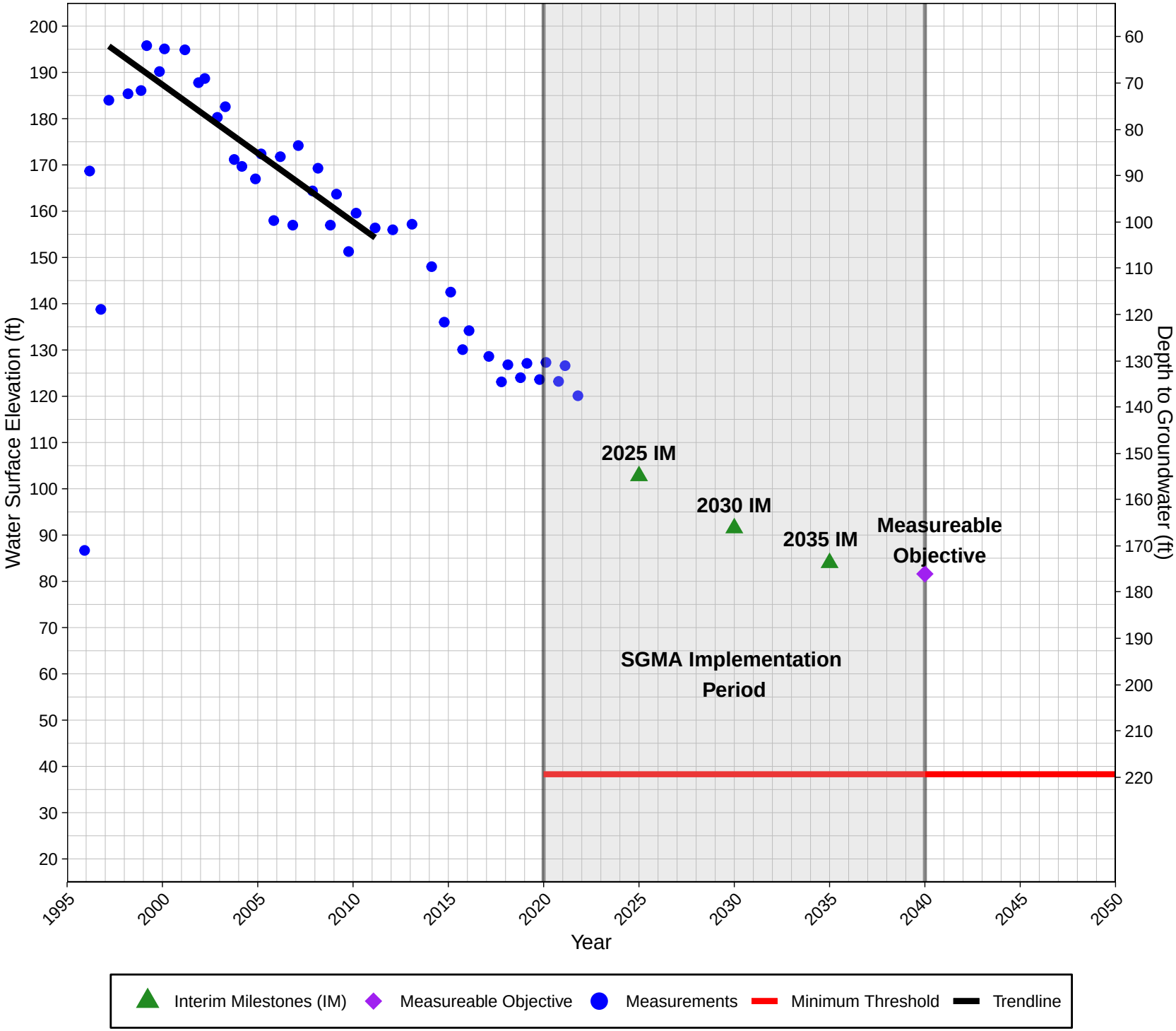




365150N1197327W001

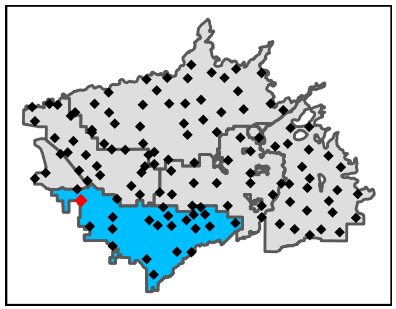
State Well ID: 16S21E30C001M
Ground Surface Elevation: 258 ft
North Fork Kings Groundwater Sustainability Agency

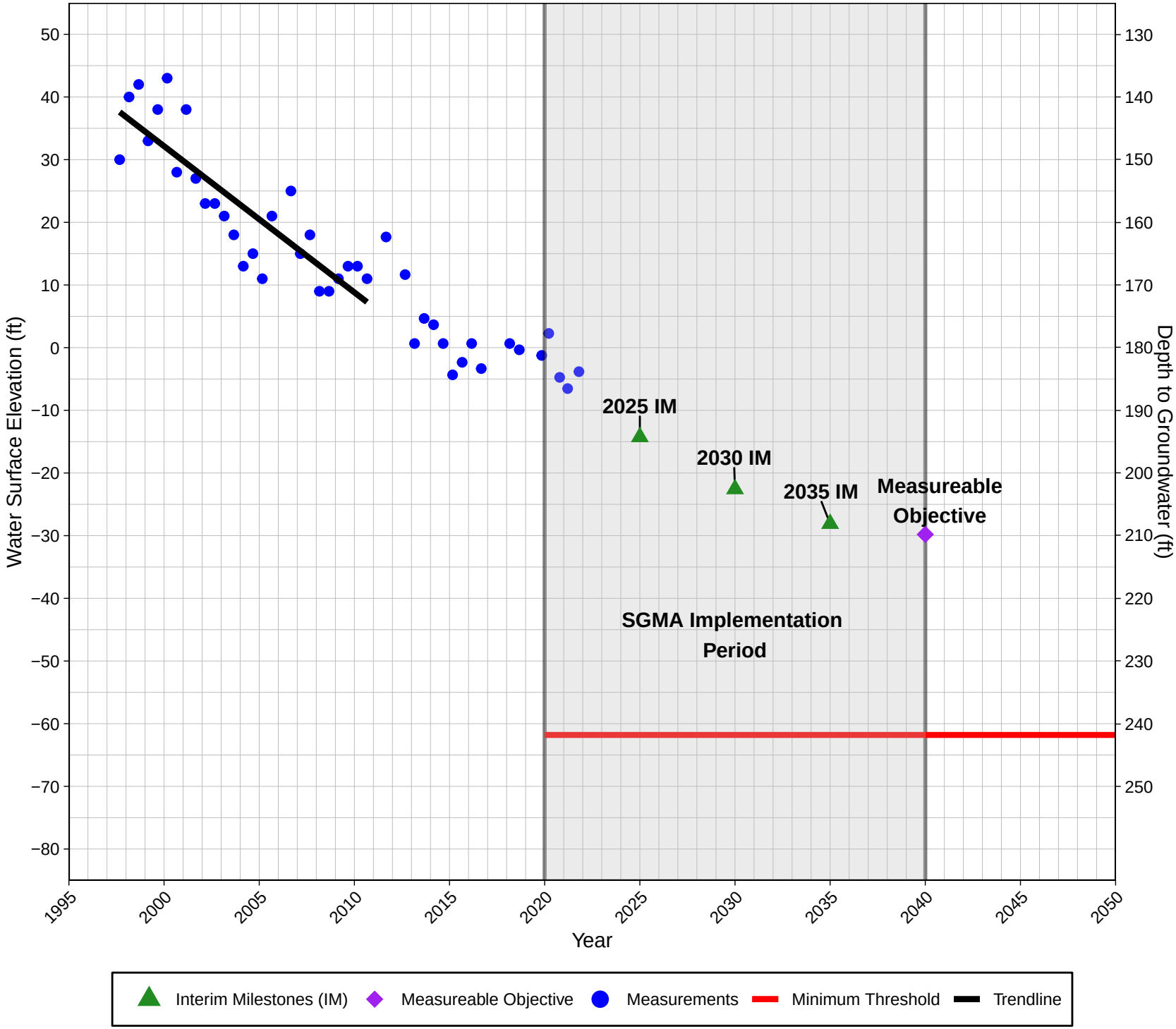




B06

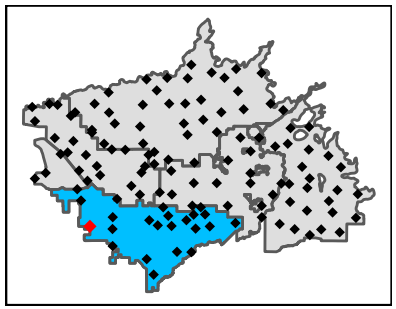
State Well ID: 16S17E15N001M
Ground Surface Elevation: 180 ft
North Fork Kings Groundwater Sustainability Agency

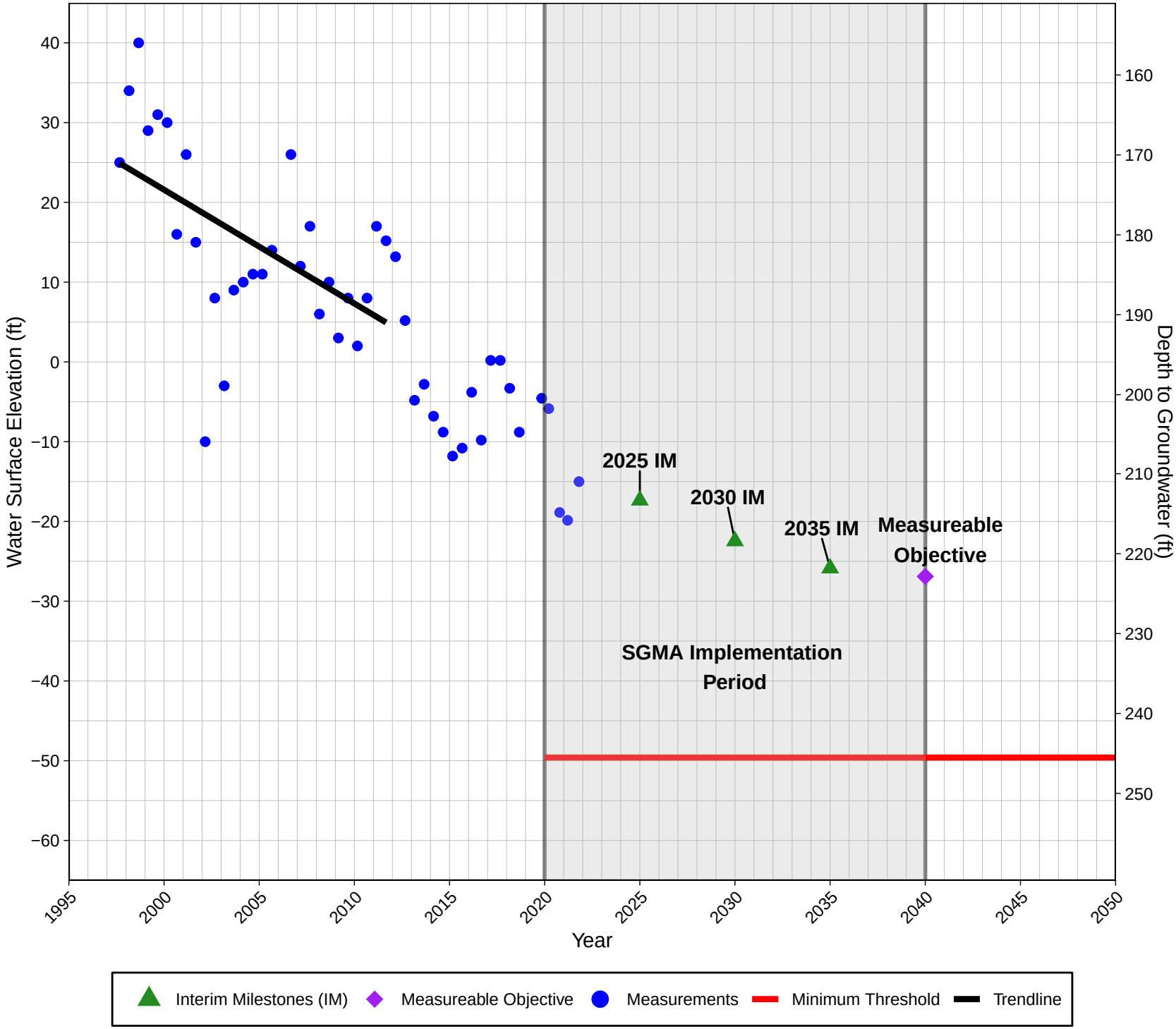




B22

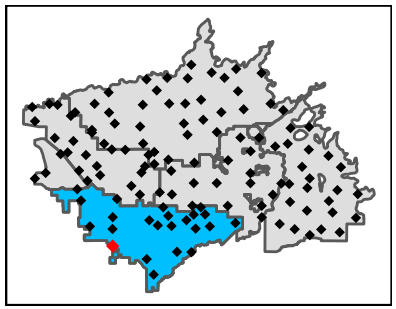
State Well ID: 17S17E11J001M
Ground Surface Elevation: 196 ft
North Fork Kings Groundwater Sustainability Agency

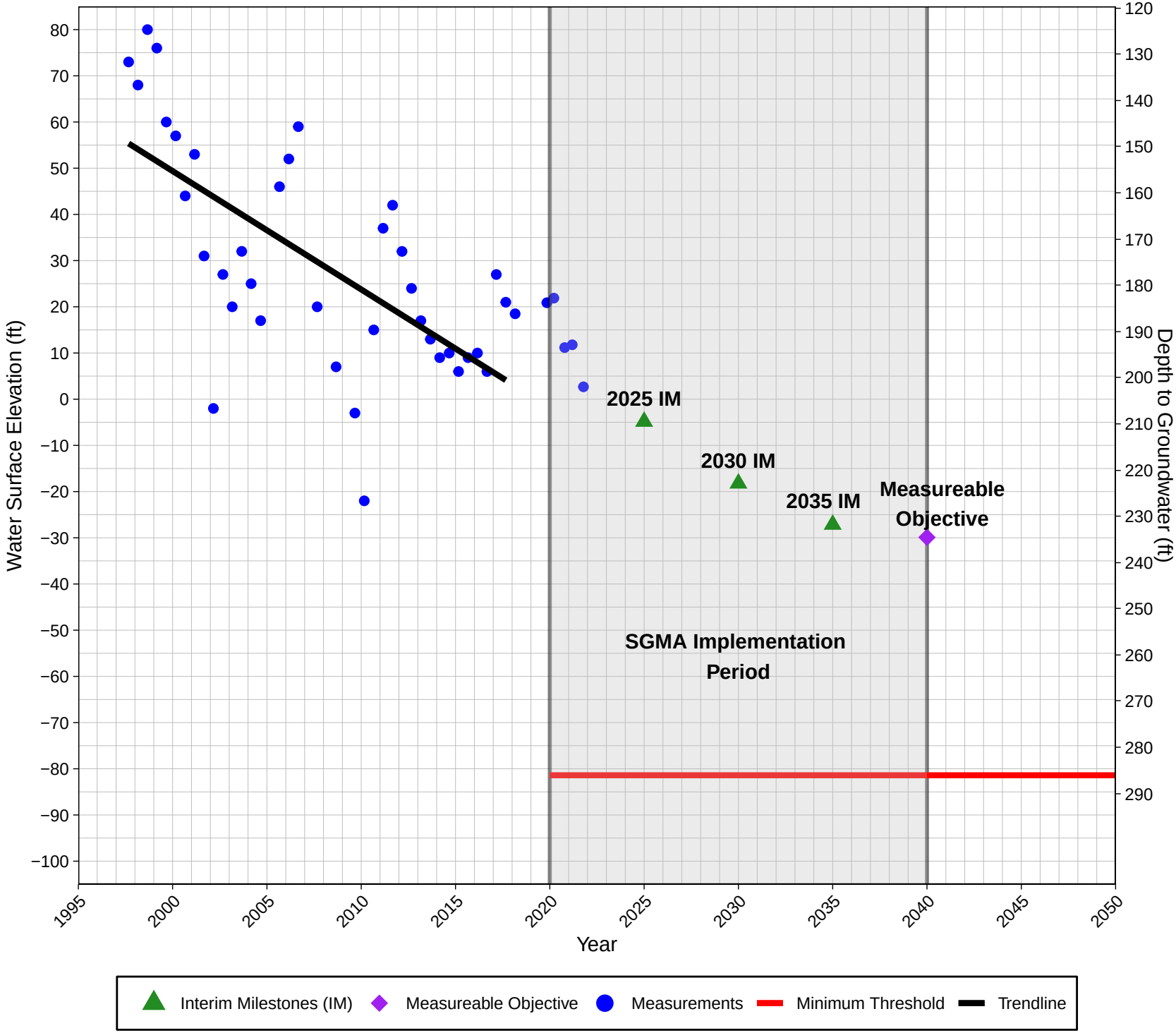




B31

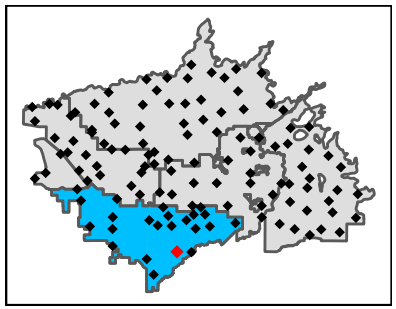
State Well ID: 17S18E27N001M
Ground Surface Elevation: 205 ft
North Fork Kings Groundwater Sustainability Agency

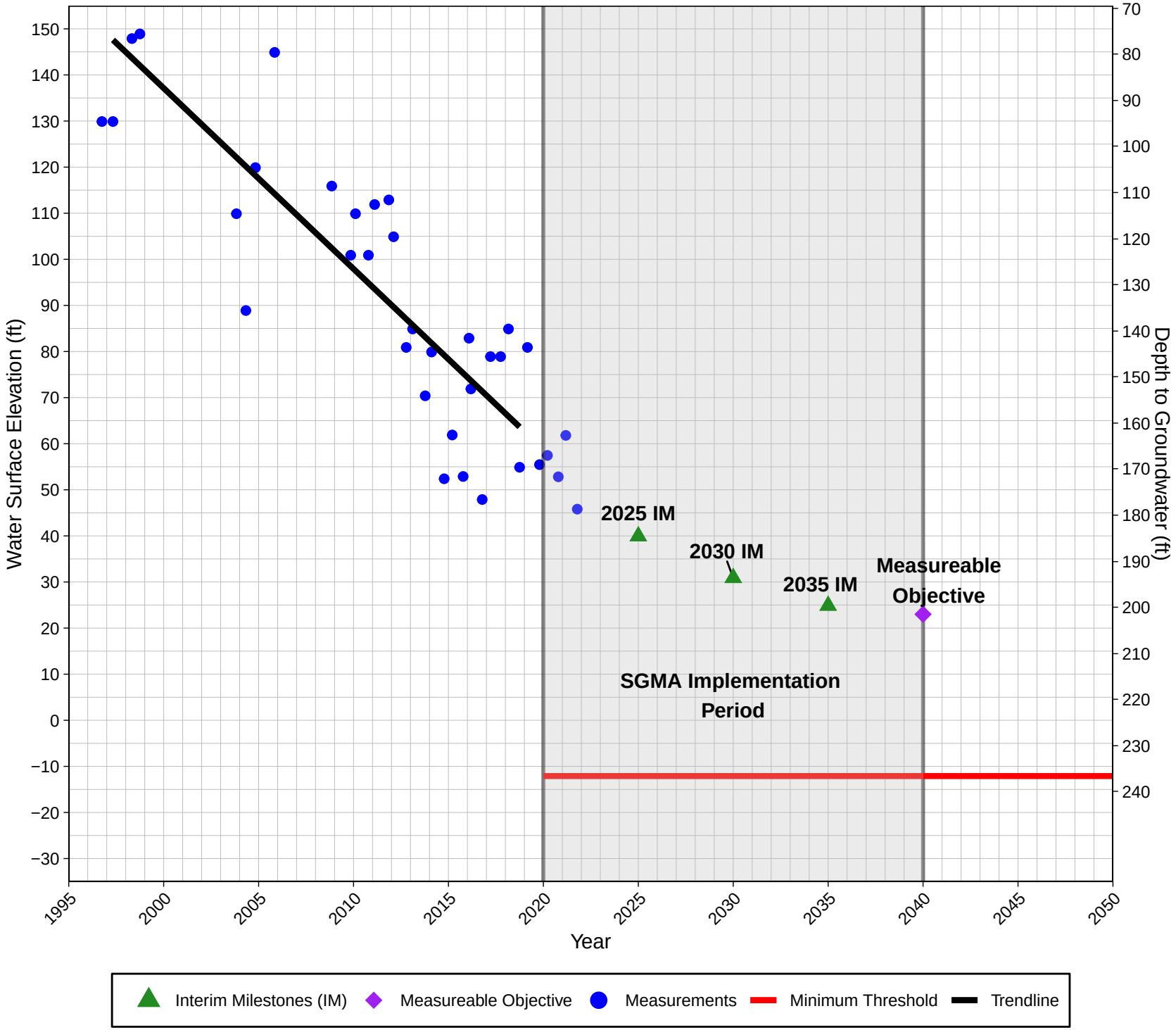




LID14

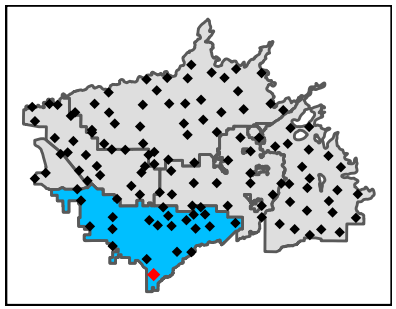
State Well ID: <Null>
Ground Surface Elevation: 224 ft
North Fork Kings Groundwater Sustainability Agency

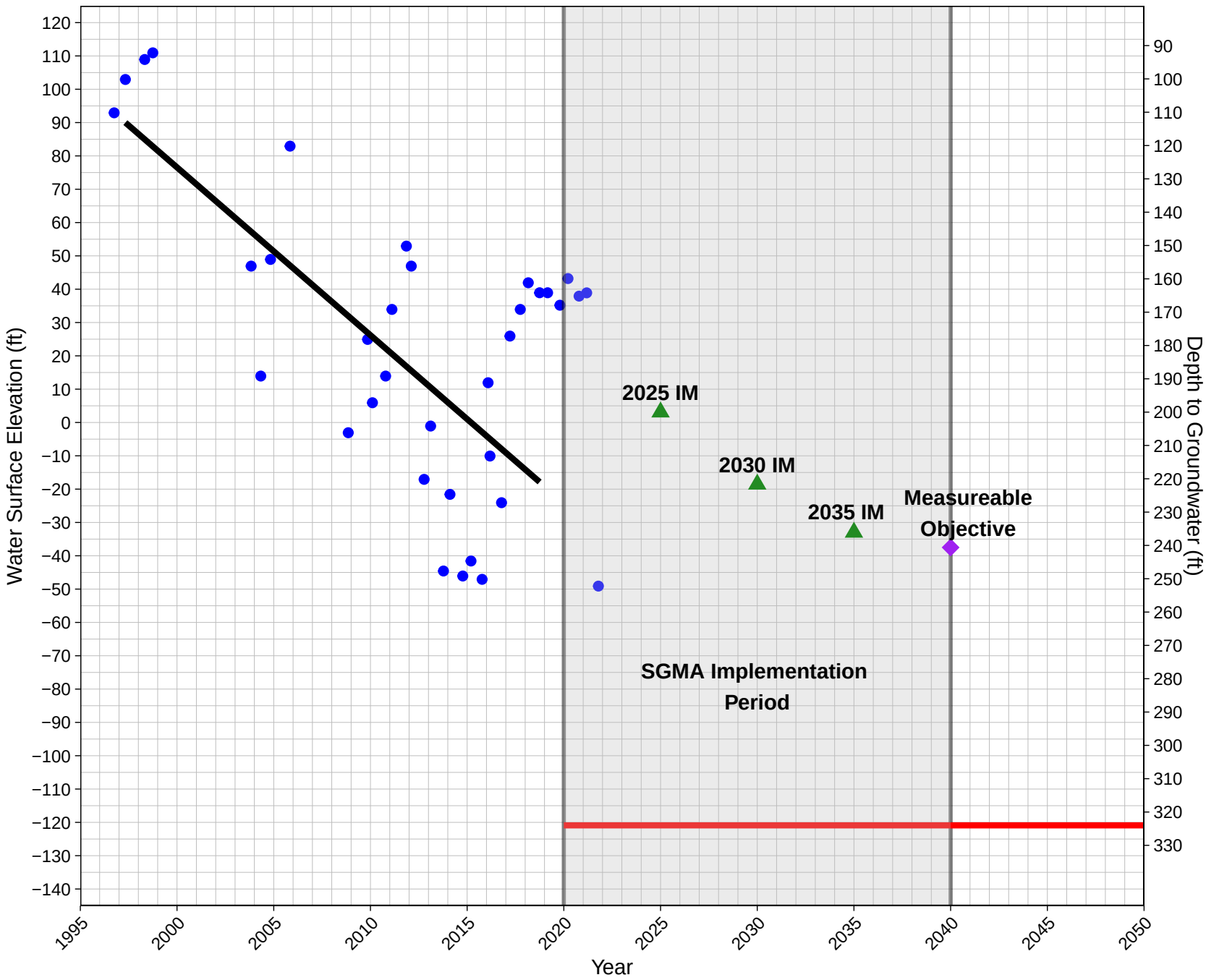




LID25

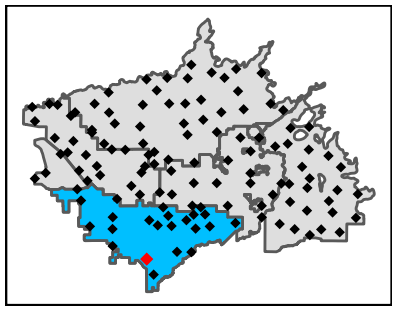
State Well ID: <Null>
Ground Surface Elevation: 203 ft
North Fork Kings Groundwater Sustainability Agency

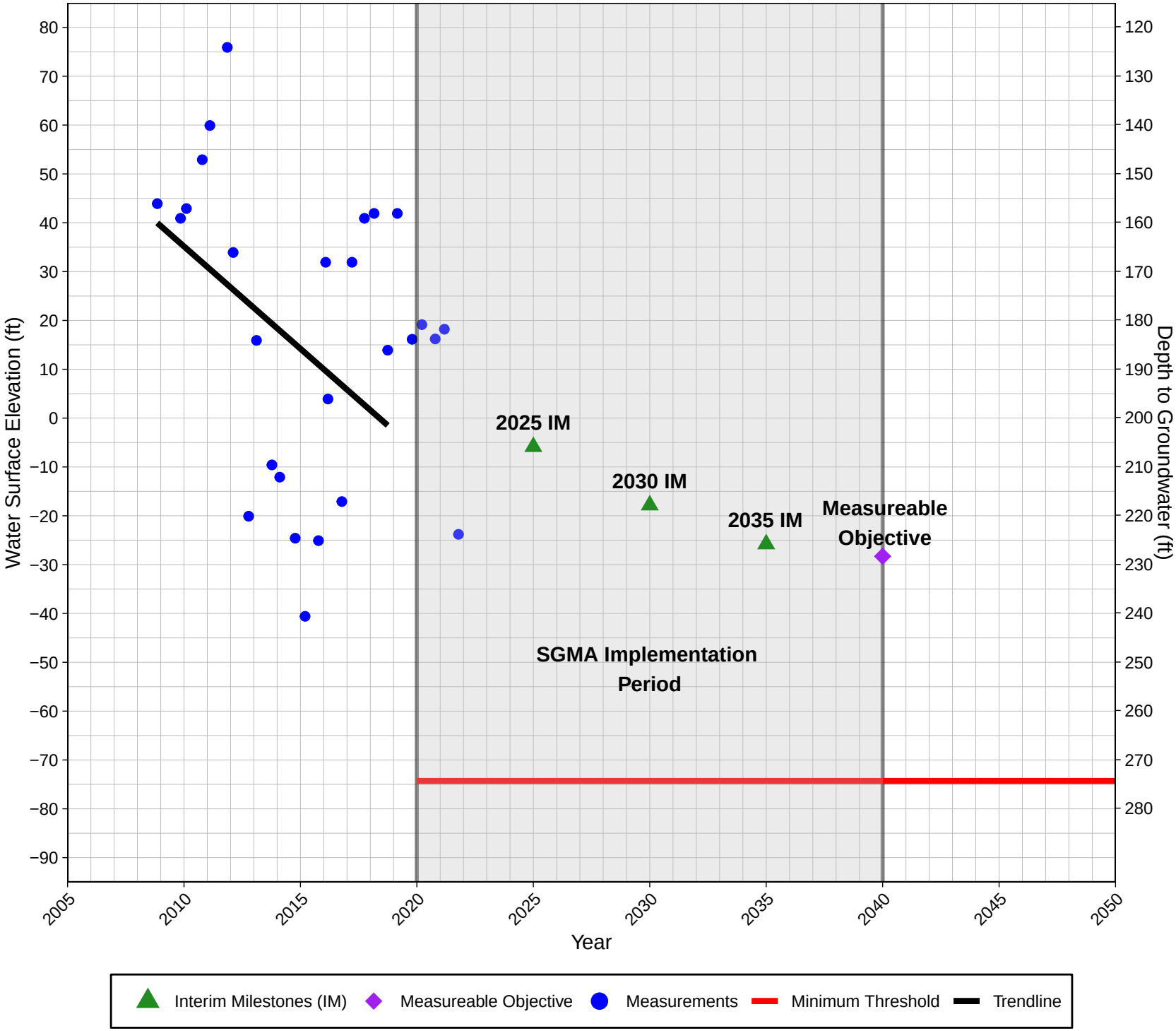




LID26

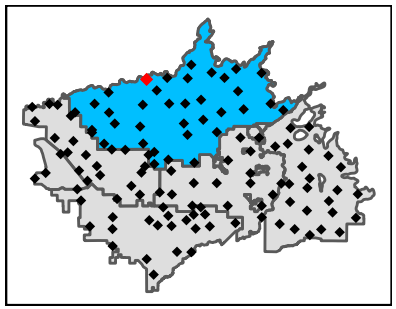
State Well ID: <Null>
Ground Surface Elevation: 200 ft
North Fork Kings Groundwater Sustainability Agency

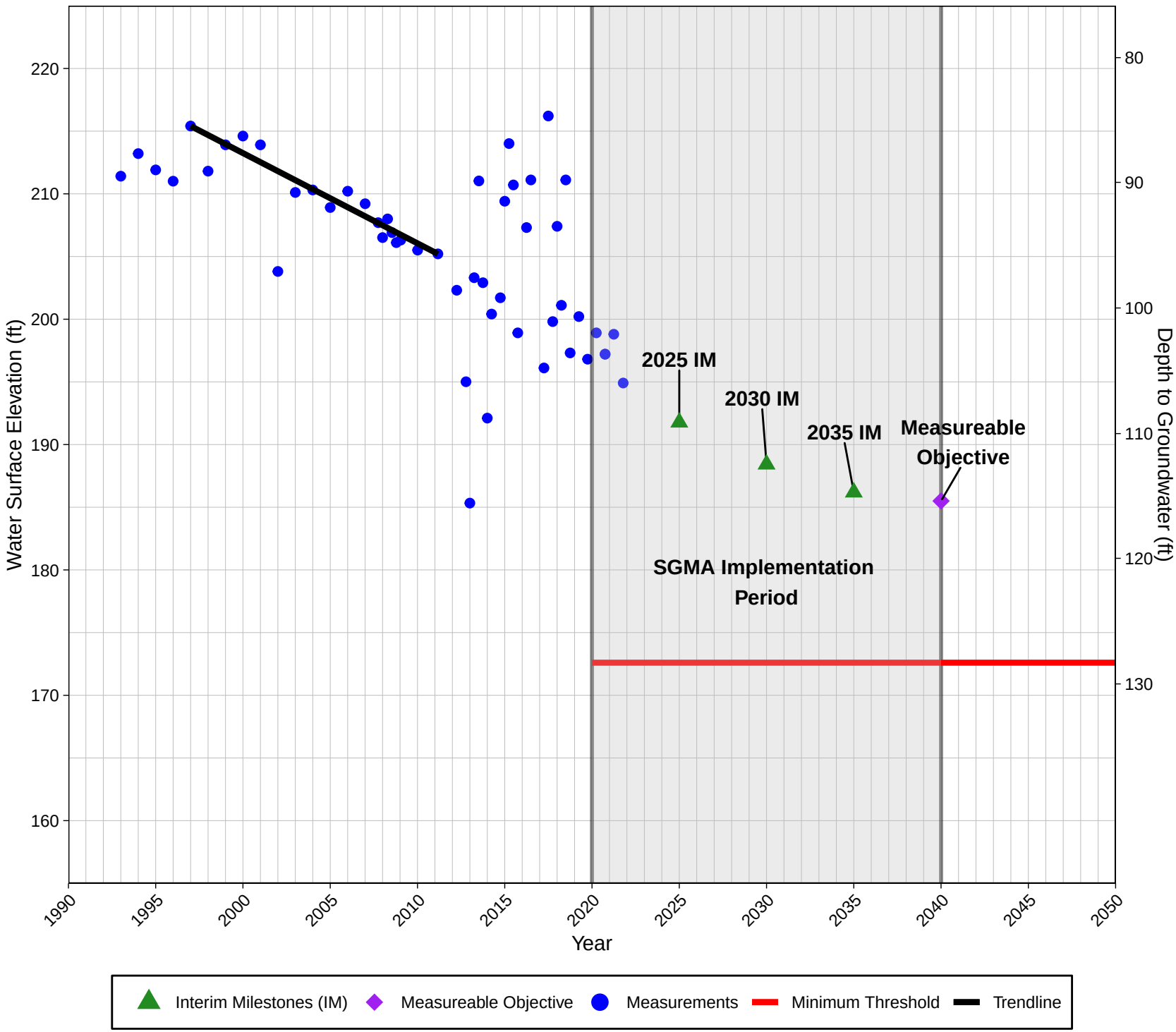




12S19E33P001MX

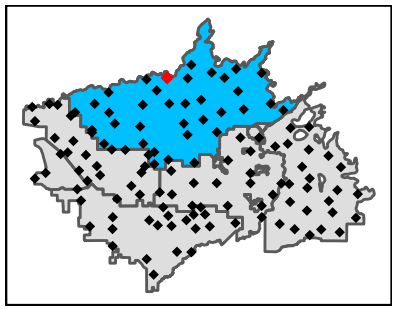
State Well ID: <Null>
Ground Surface Elevation: 301 ft
North Kings Groundwater Sustainability Agency

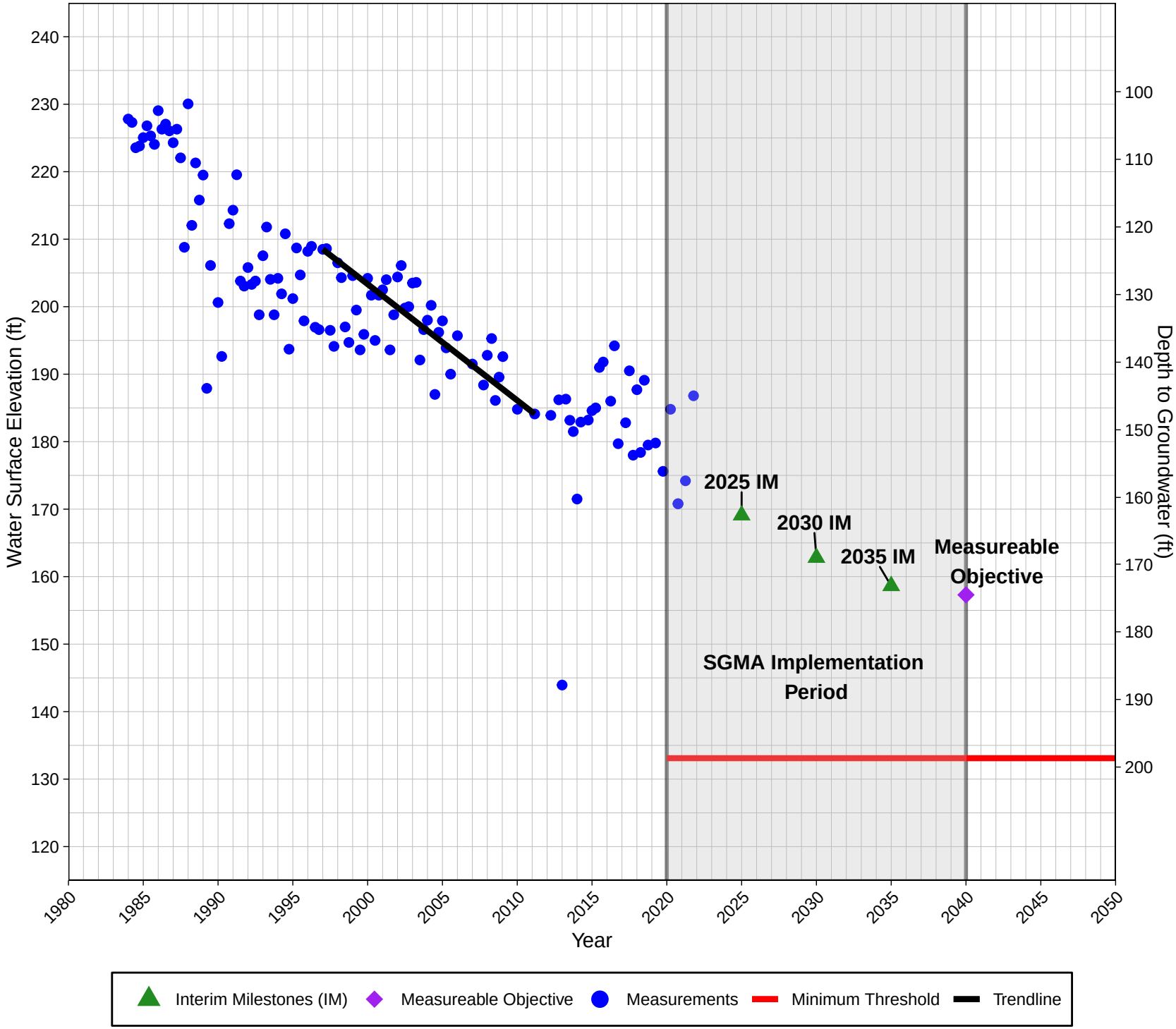




12S19E36J001MX

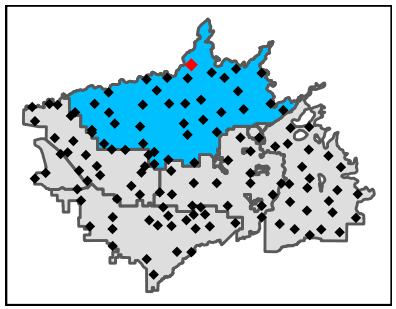
State Well ID: <Null>
Ground Surface Elevation: 332 ft
North Kings Groundwater Sustainability Agency

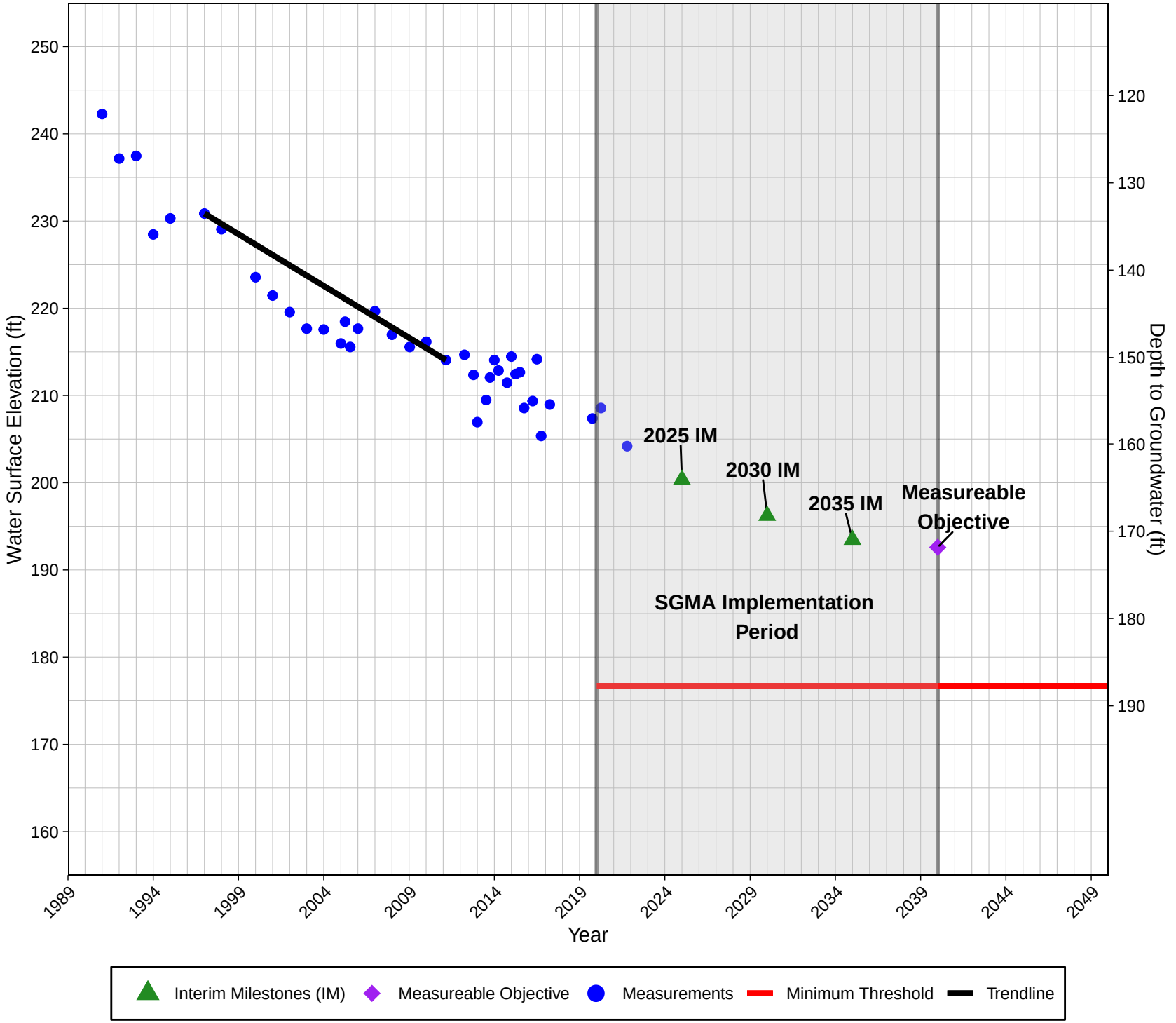




12S20E23D001MX

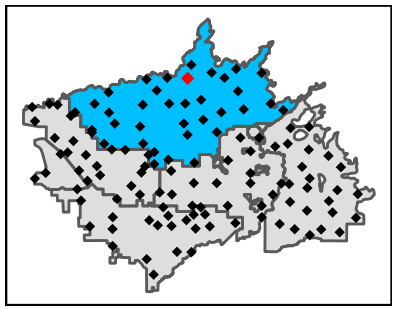
State Well ID: <Null>
Ground Surface Elevation: 364 ft
North Kings Groundwater Sustainability Agency

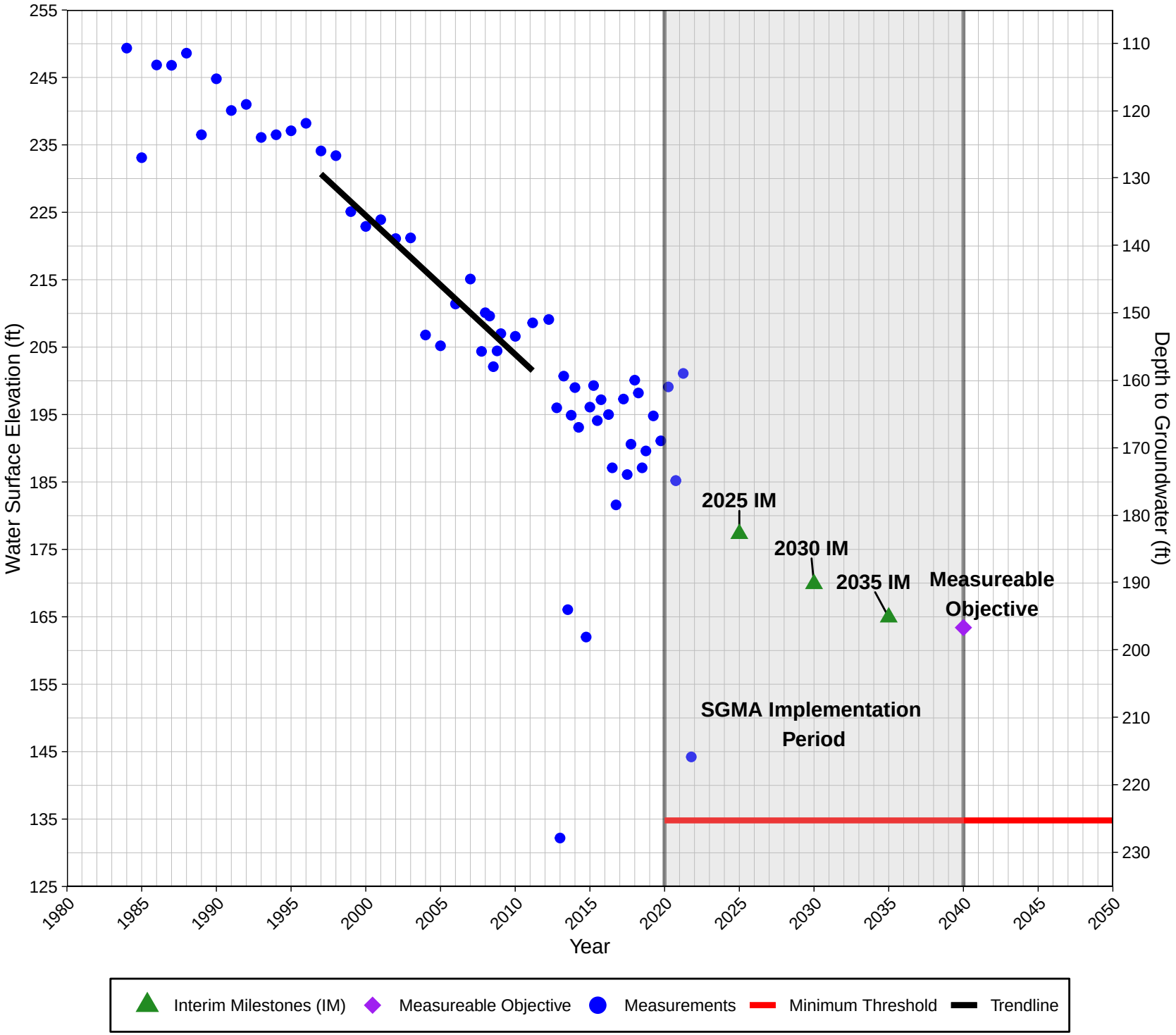




12S20E34K001MX

State Well ID: <Null>
Ground Surface Elevation: 360 ft
North Kings Groundwater Sustainability Agency

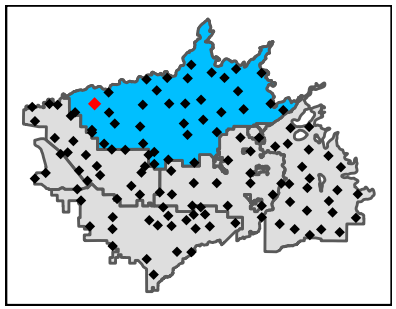


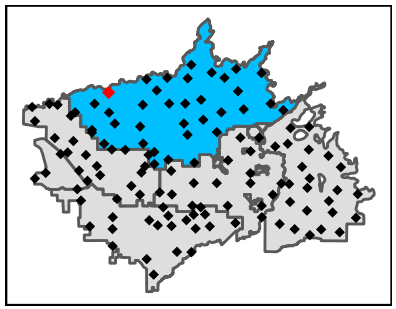


13S17E25C001MX

Ground Surface Elevation: 234 ft

North Kings Groundwater Sustainability Agency





13S18E17A001MX

Ground Surface Elevation: 255 ft

North Kings Groundwater Sustainability Agency

Water Surface Elevation (ft)

Depth to Groundwater (ft)

Year

2025 IM

2030 IM

2035 IM

Measureable Objective

SGMA Implementation Period

Interim Milestones (IM)

Measureable Objective

Measurements

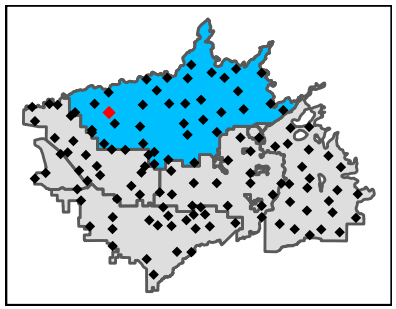
Minimum Threshold

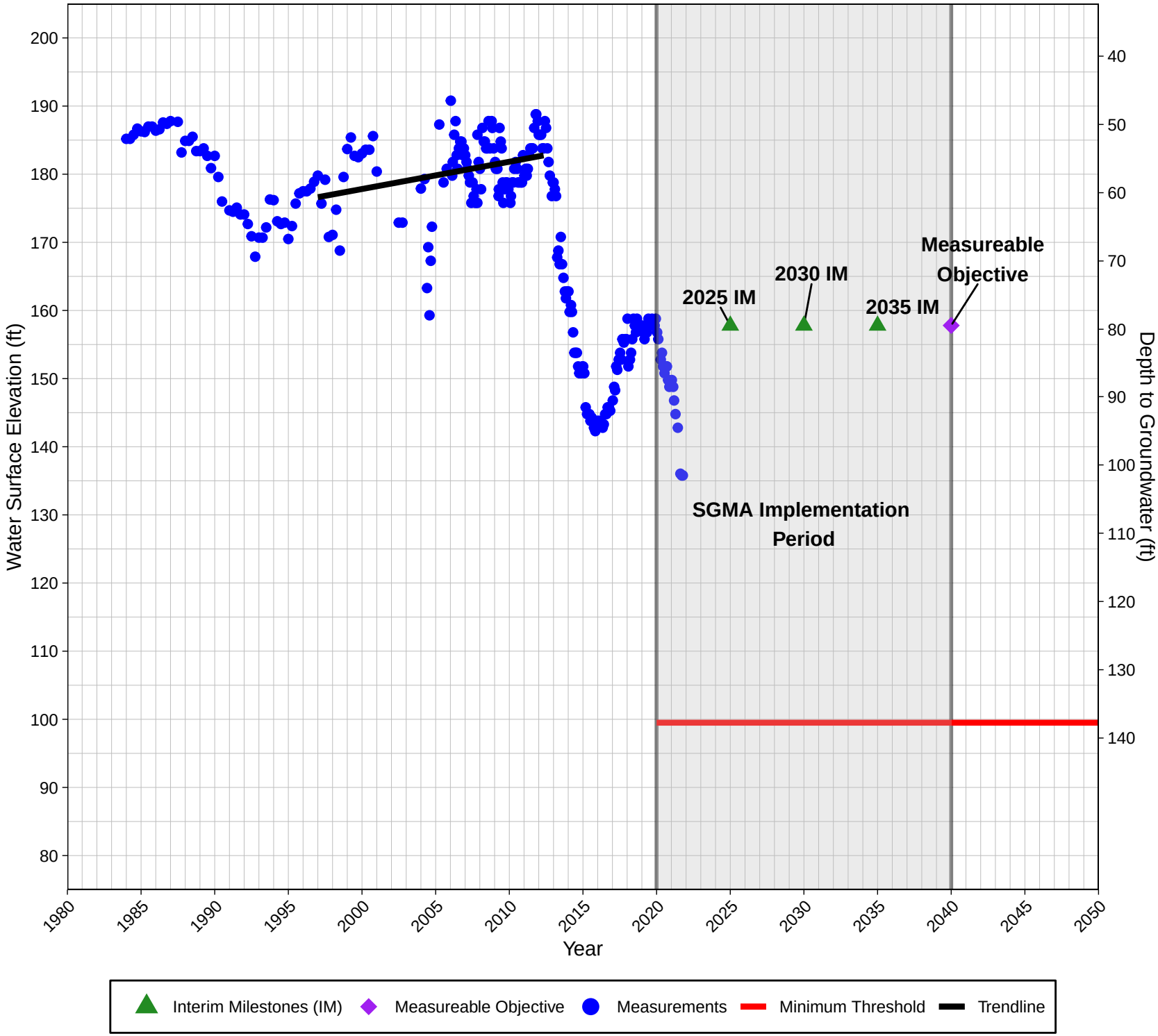
Trendline

13S18E33M001MX

Ground Surface Elevation: 237 ft

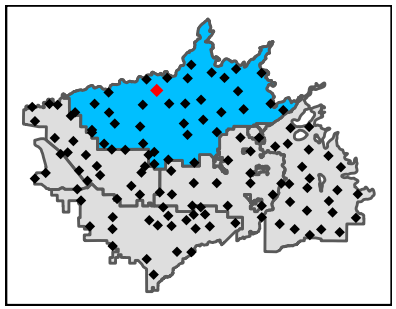
North Kings Groundwater Sustainability Agency

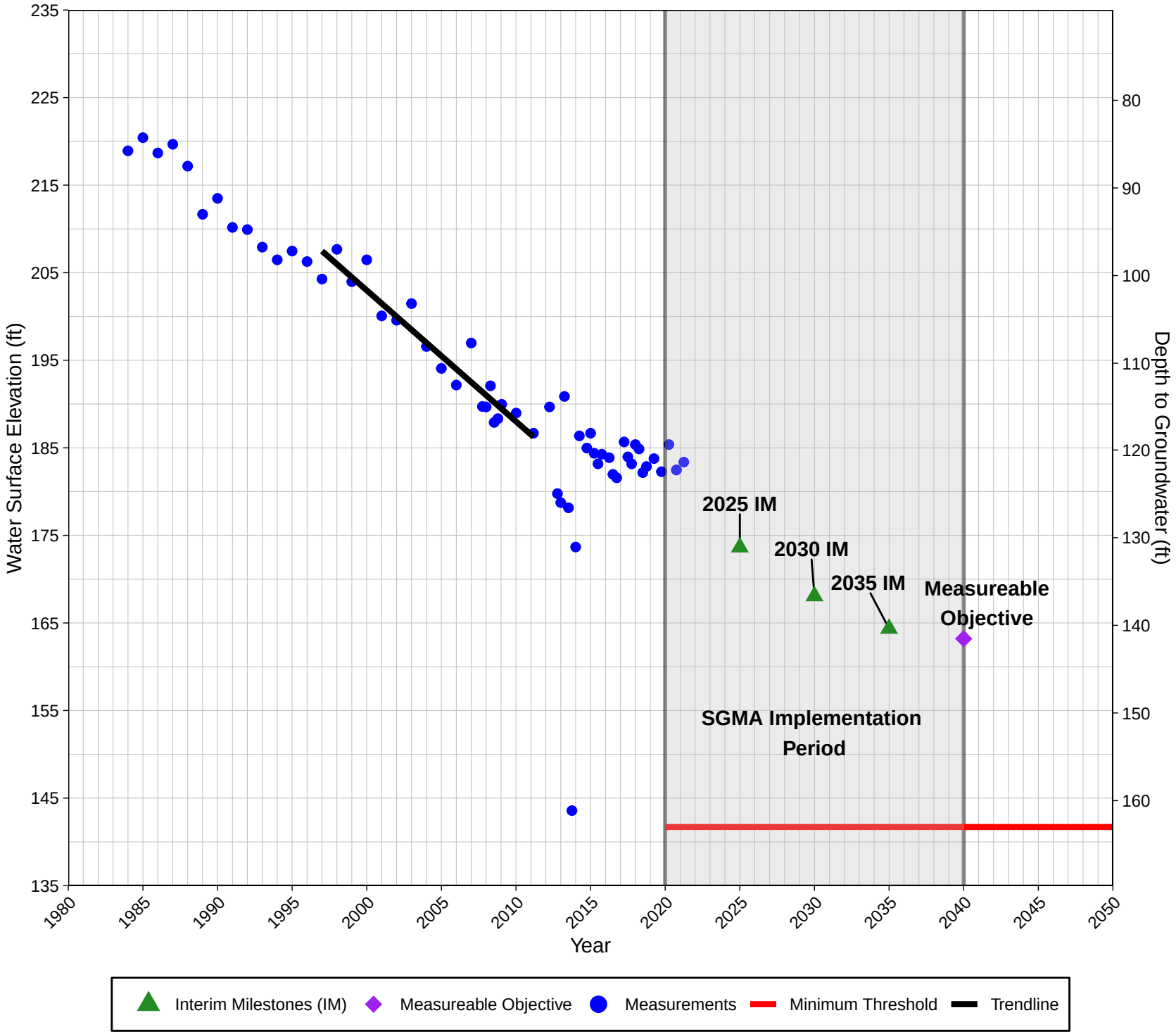




13S19E11L001MX

State Well ID: <Null>
Ground Surface Elevation: 305 ft
North Kings Groundwater Sustainability Agency

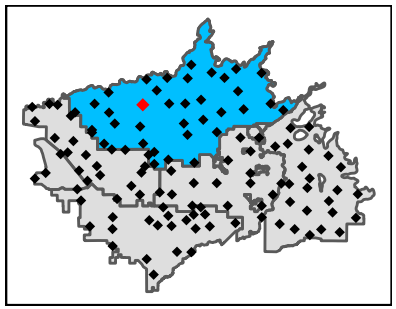


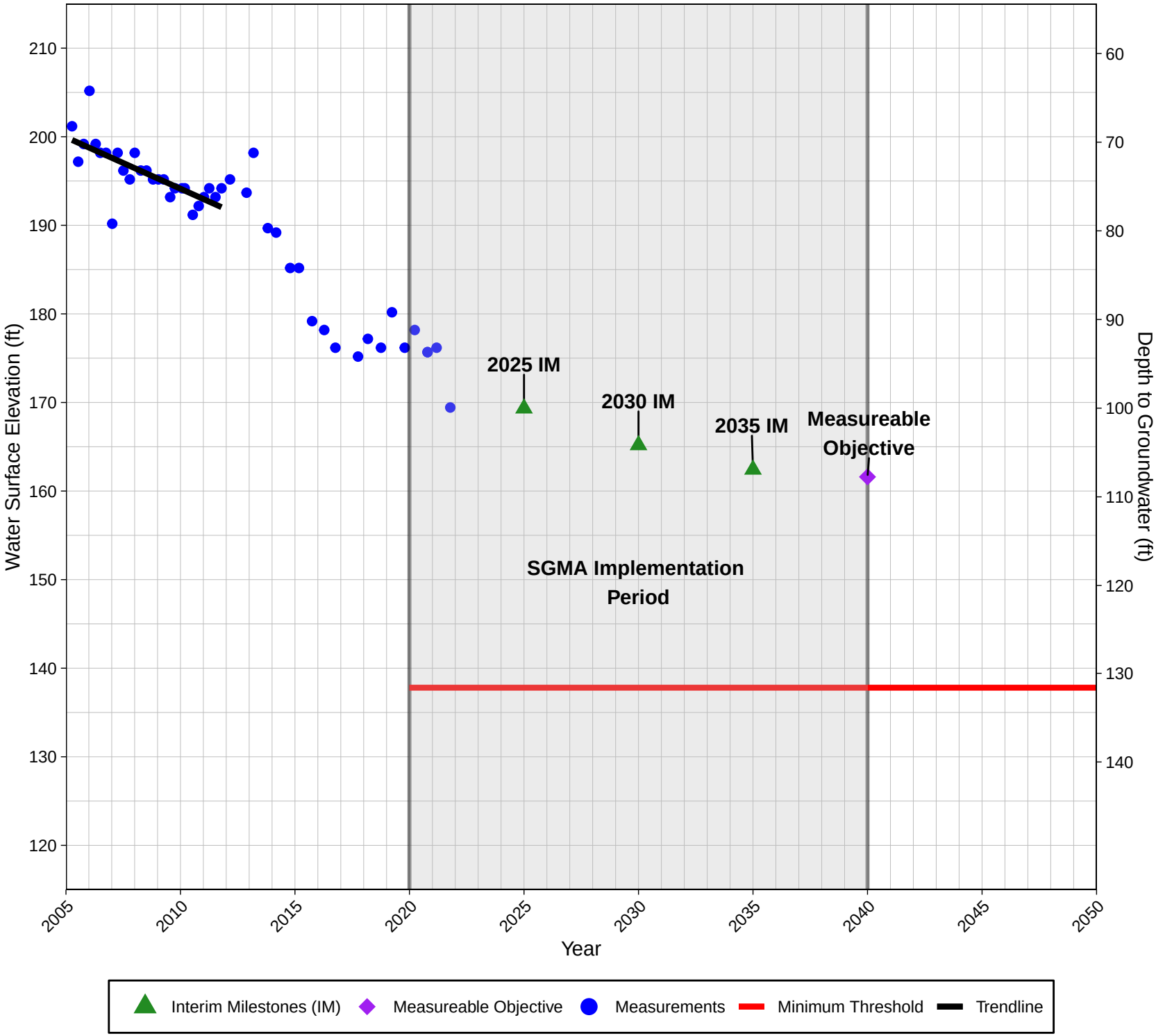


13S19E29A001MX

Ground Surface Elevation: 269 ft

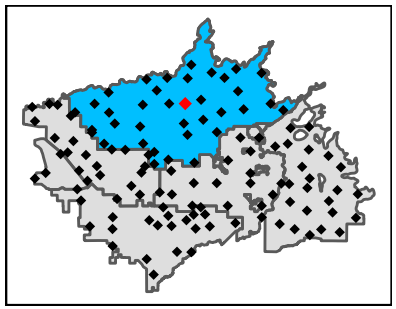
North Kings Groundwater Sustainability Agency

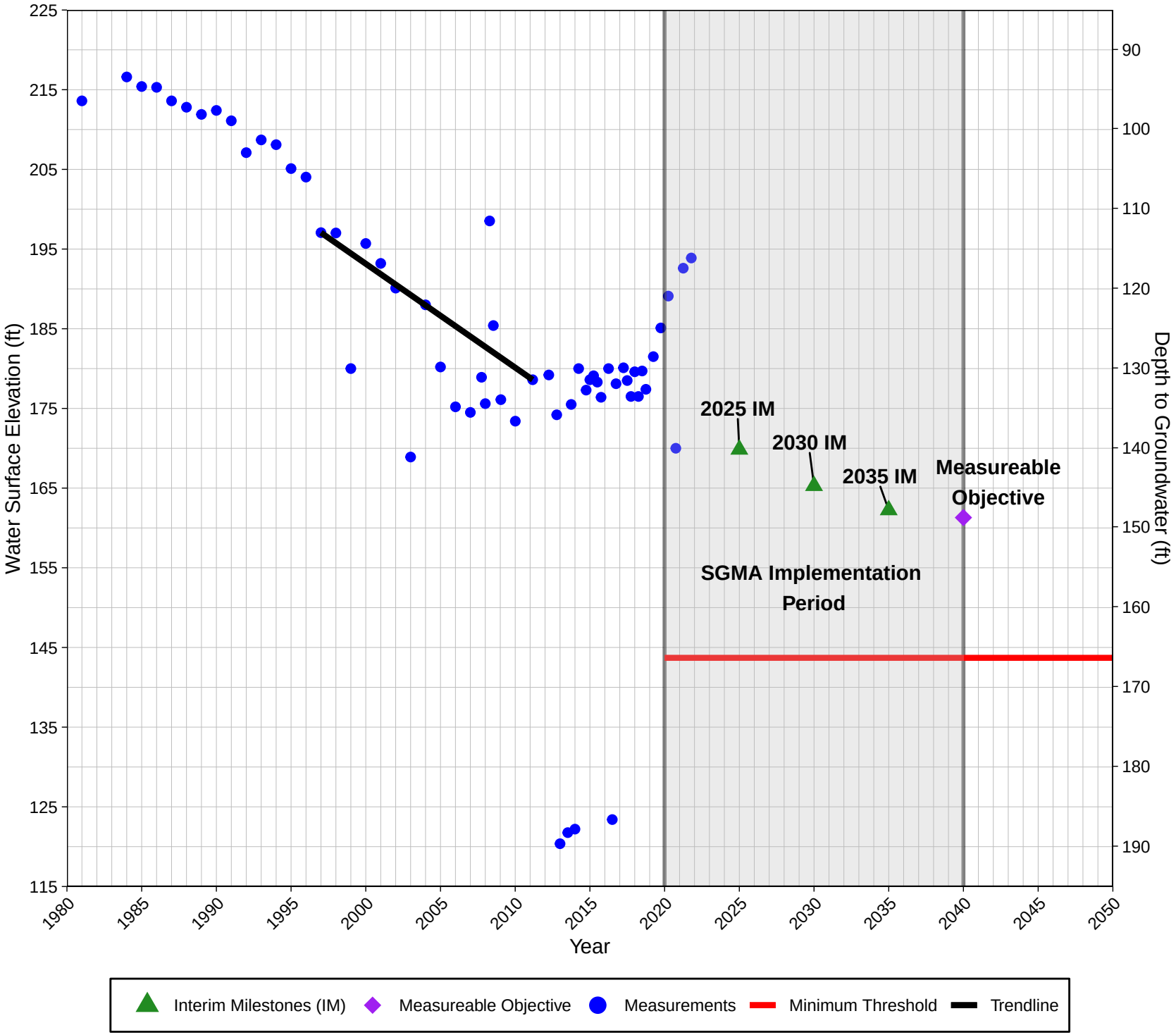




13S20E27C001MX

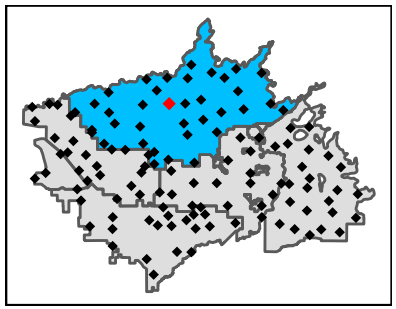
State Well ID: <Null>
Ground Surface Elevation: 310 ft
North Kings Groundwater Sustainability Agency

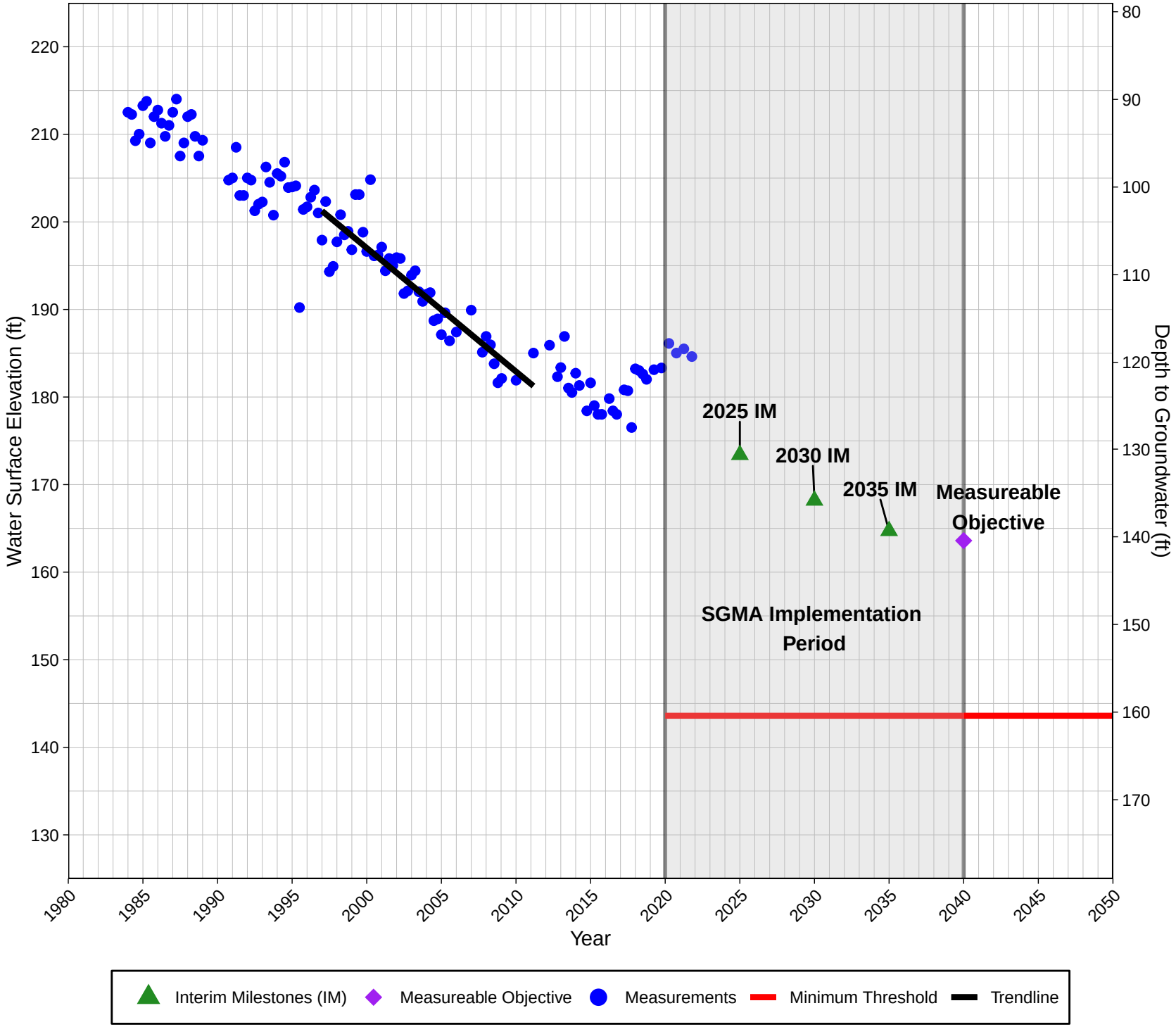




13S20E30B001MX

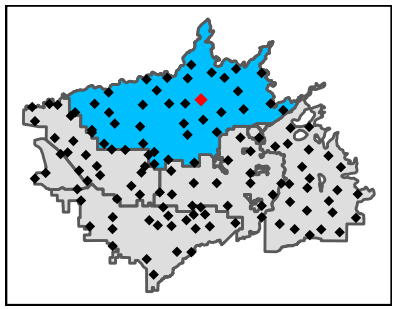
State Well ID: <Null>
Ground Surface Elevation: 304 ft
North Kings Groundwater Sustainability Agency

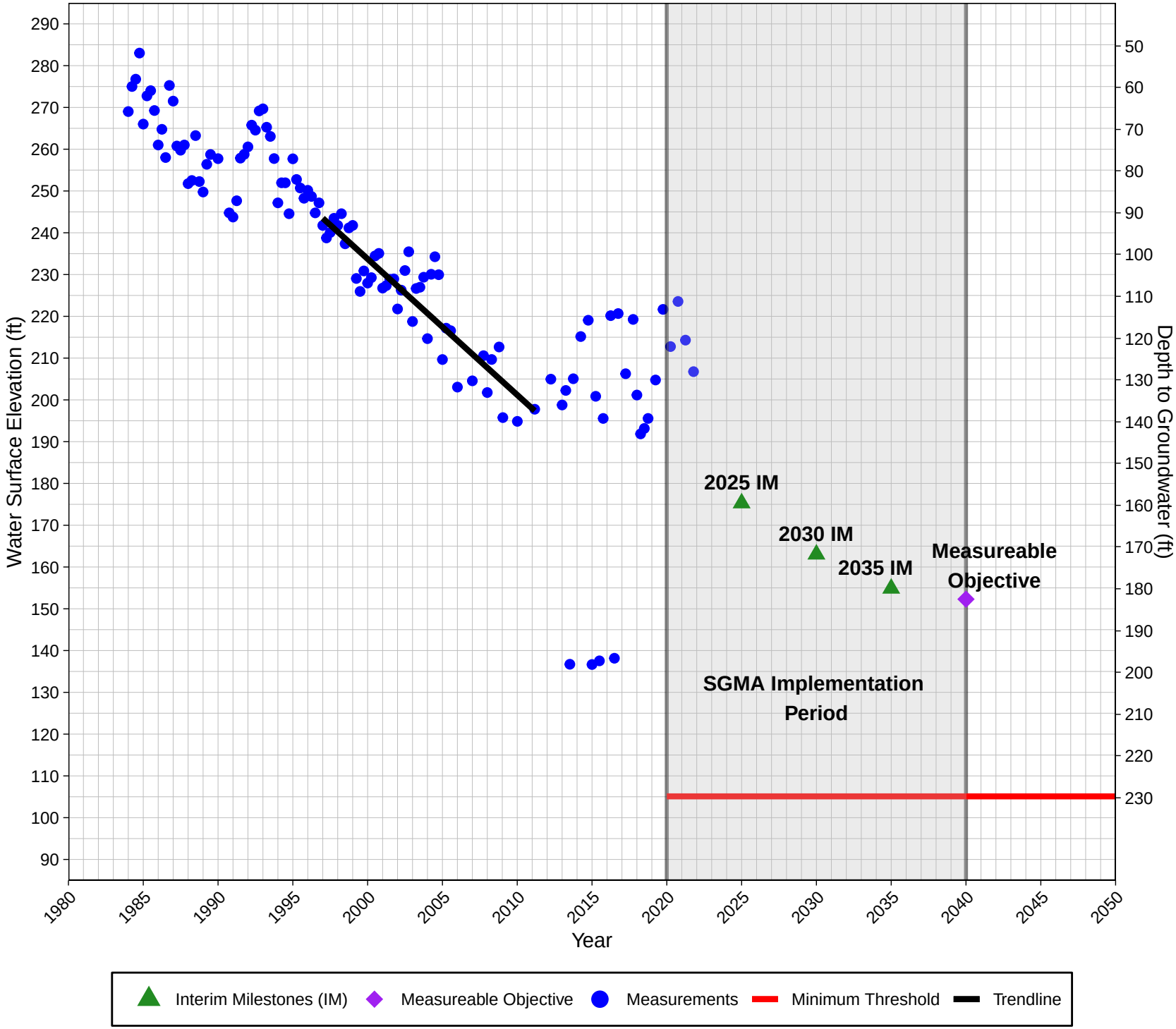




13S21E19E001MX

State Well ID: <Null>
Ground Surface Elevation: 335 ft
North Kings Groundwater Sustainability Agency

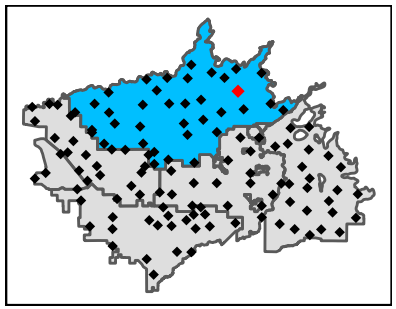


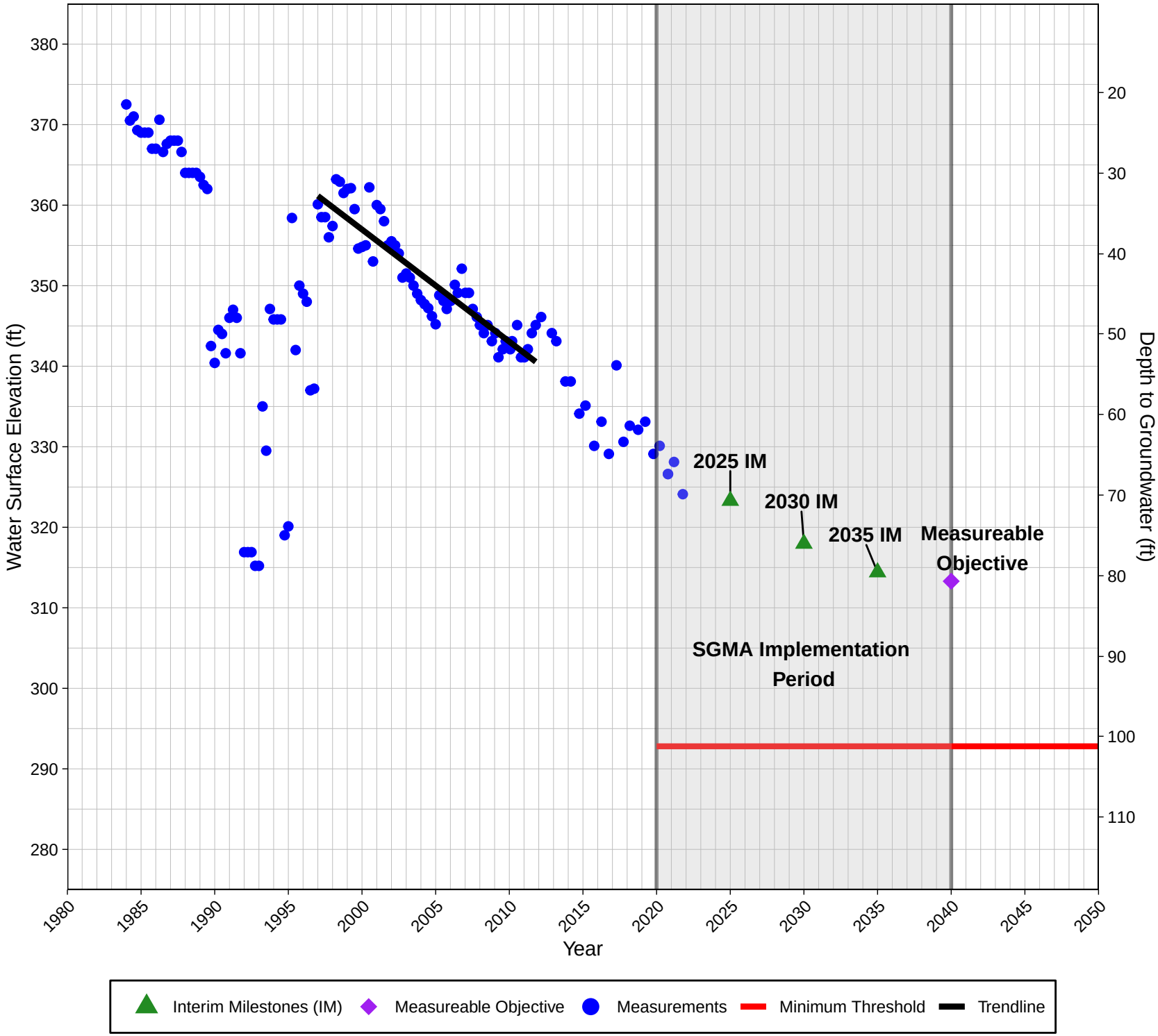


13S22E07R001MX

Ground Surface Elevation: 394 ft

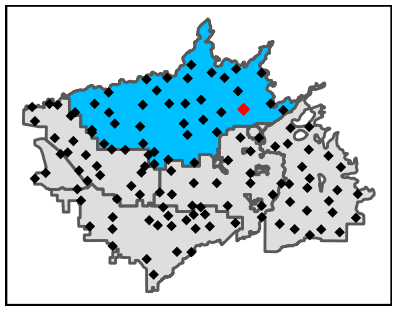
North Kings Groundwater Sustainability Agency

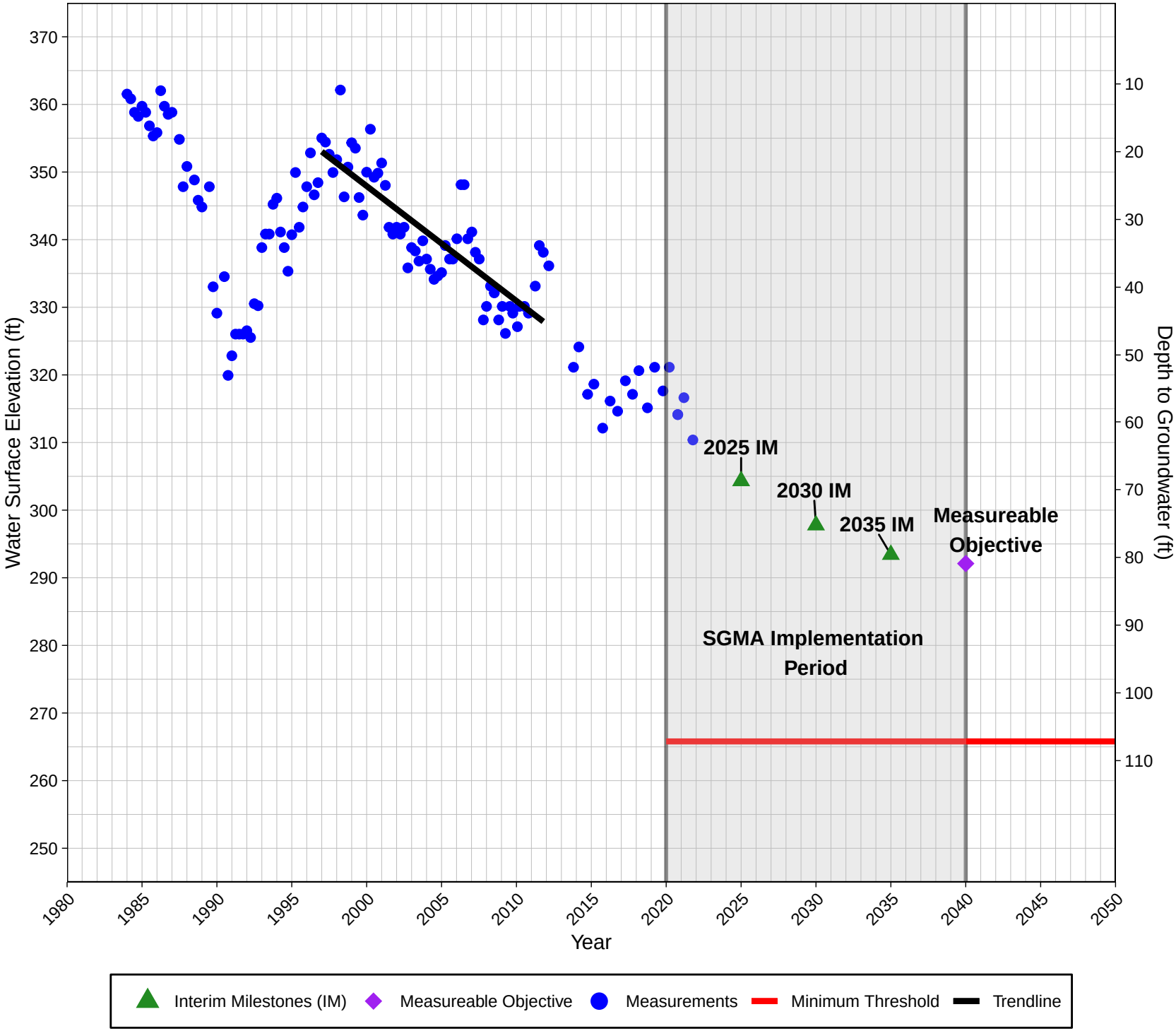




13S22E32A001MX

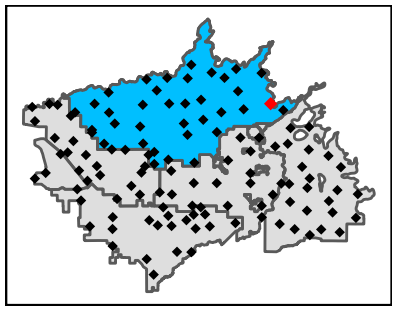
State Well ID: 13S22E32B001M
Ground Surface Elevation: 373 ft
North Kings Groundwater Sustainability Agency

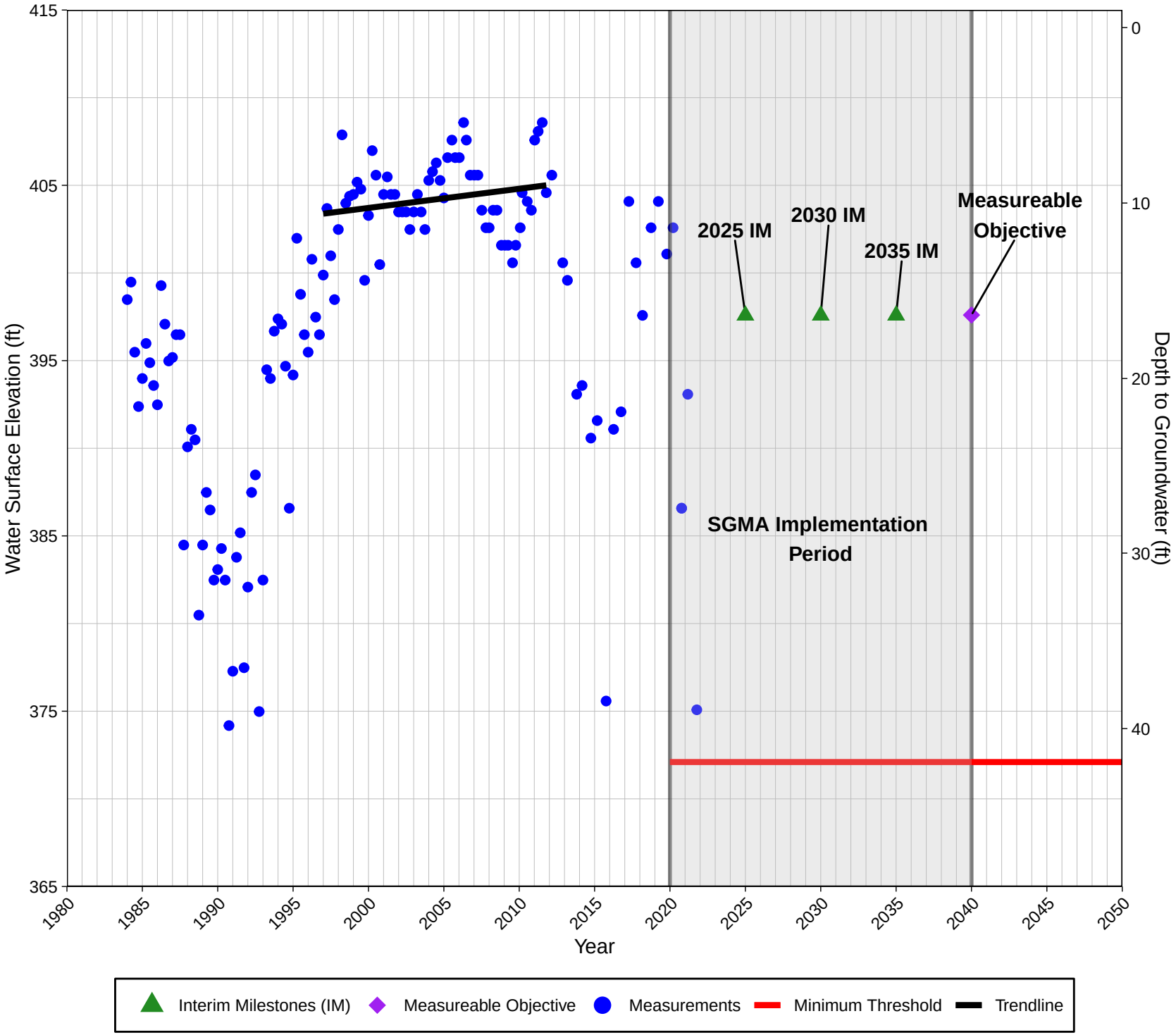




13S23E30B001MX

State Well ID: 13S23E30C001M
Ground Surface Elevation: 414 ft
North Kings Groundwater Sustainability Agency

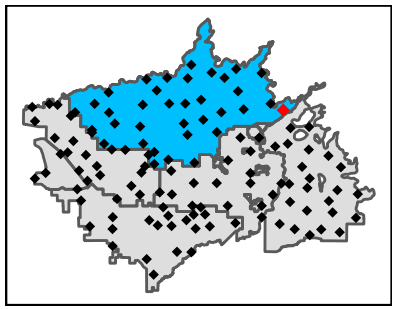


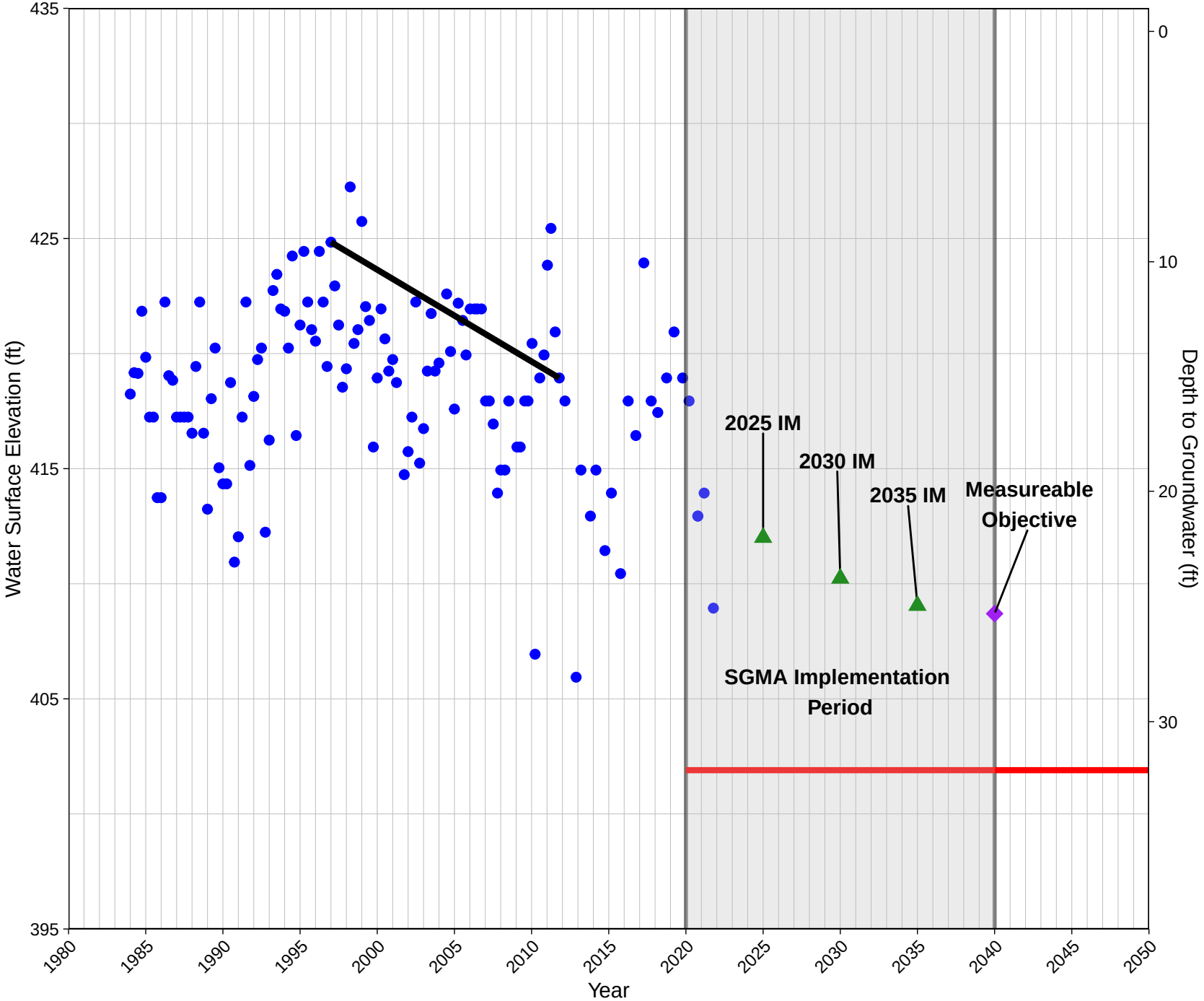


13S23E33B001MX

Ground Surface Elevation: 434 ft

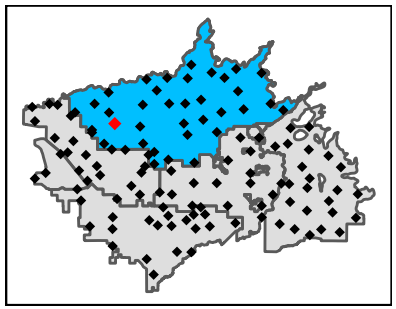
North Kings Groundwater Sustainability Agency

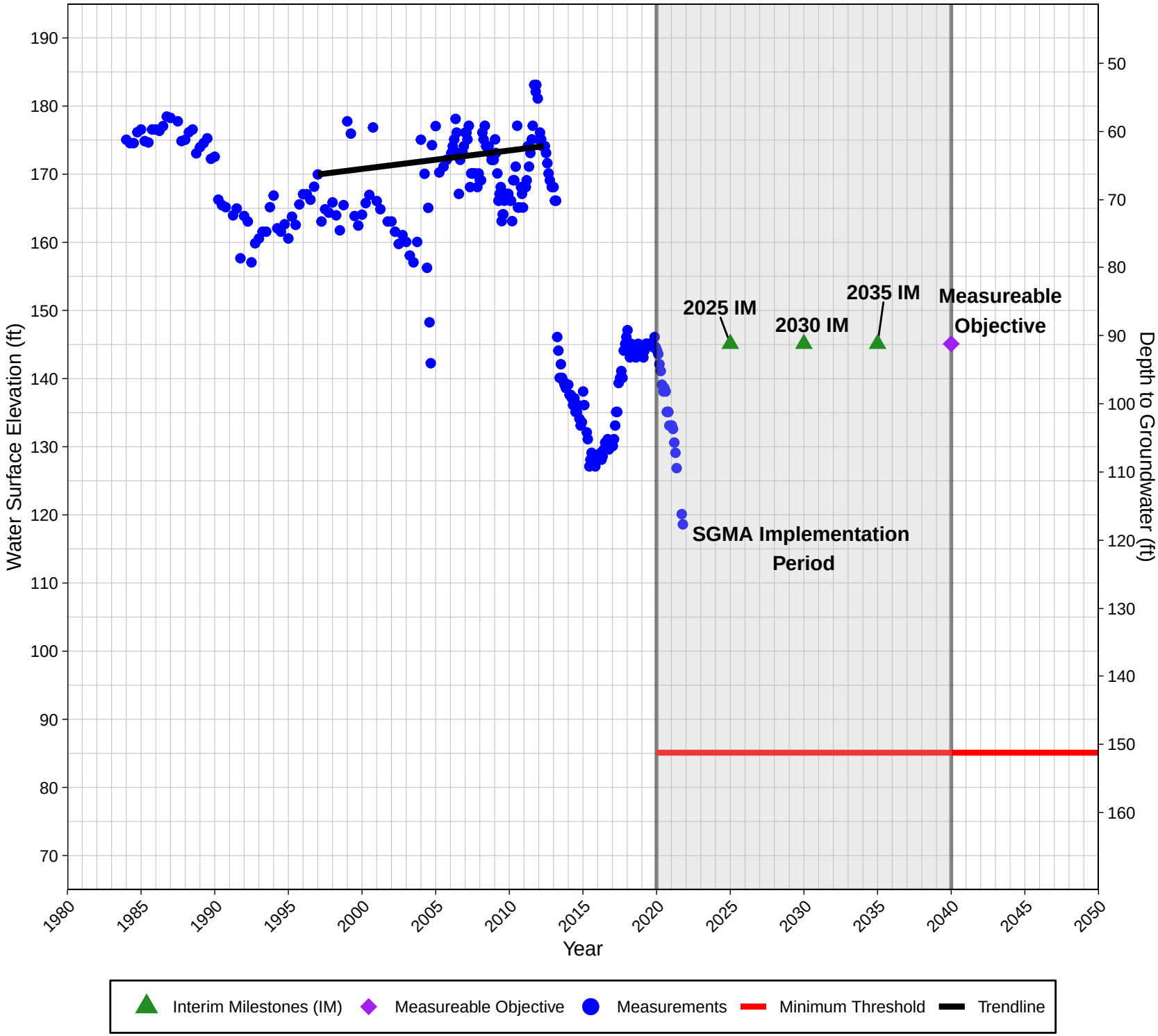




14S18E09H001MX

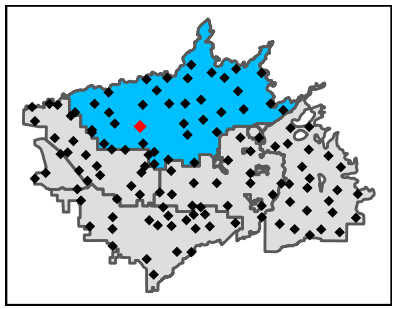
Ground Surface Elevation: 236 ft
North Kings Groundwater Sustainability Agency

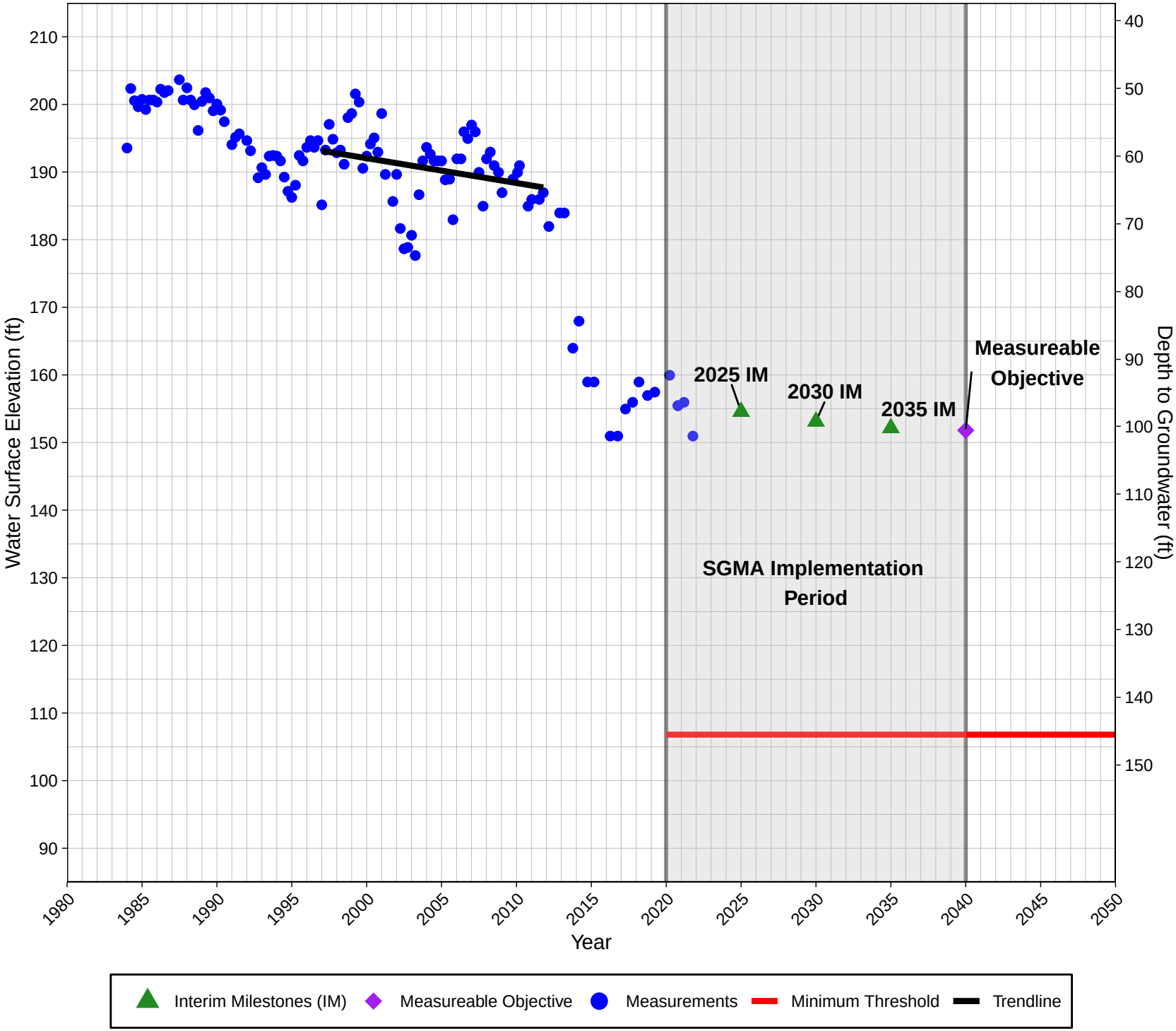




14S19E17C001MX

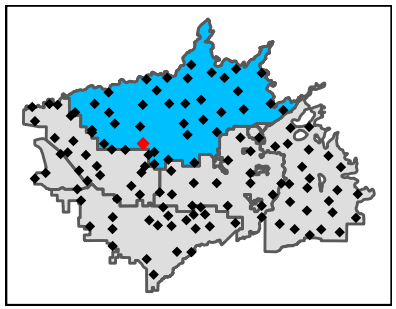
State Well ID: 14S19E17C003M
Ground Surface Elevation: 252 ft
North Kings Groundwater Sustainability Agency

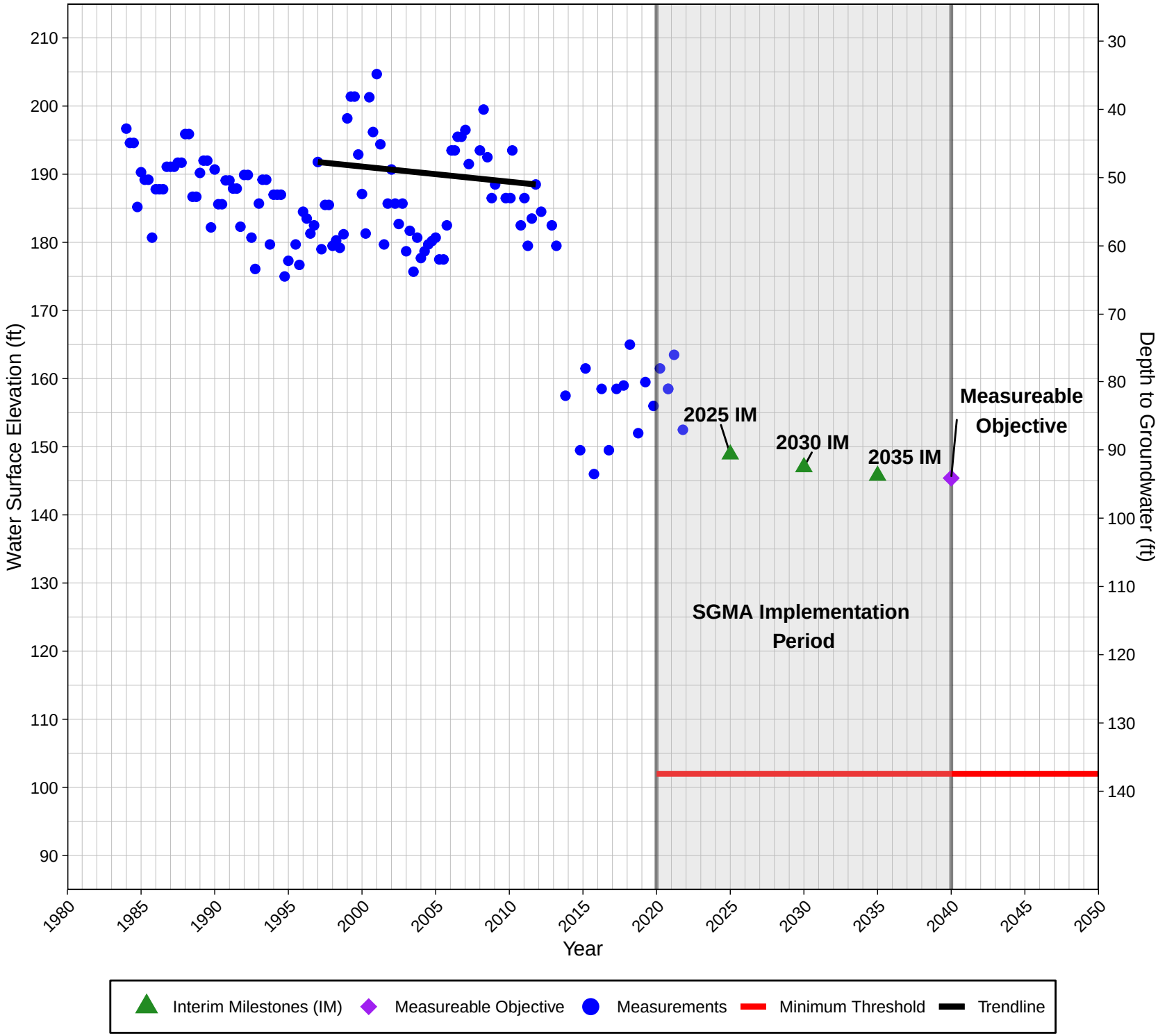




14S19E33D001MX

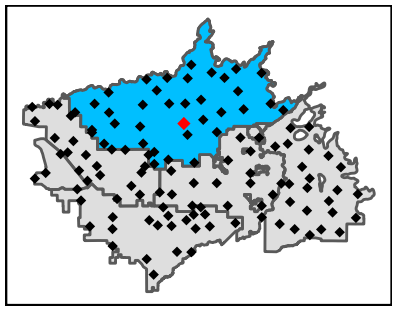
Ground Surface Elevation: 240 ft
North Kings Groundwater Sustainability Agency

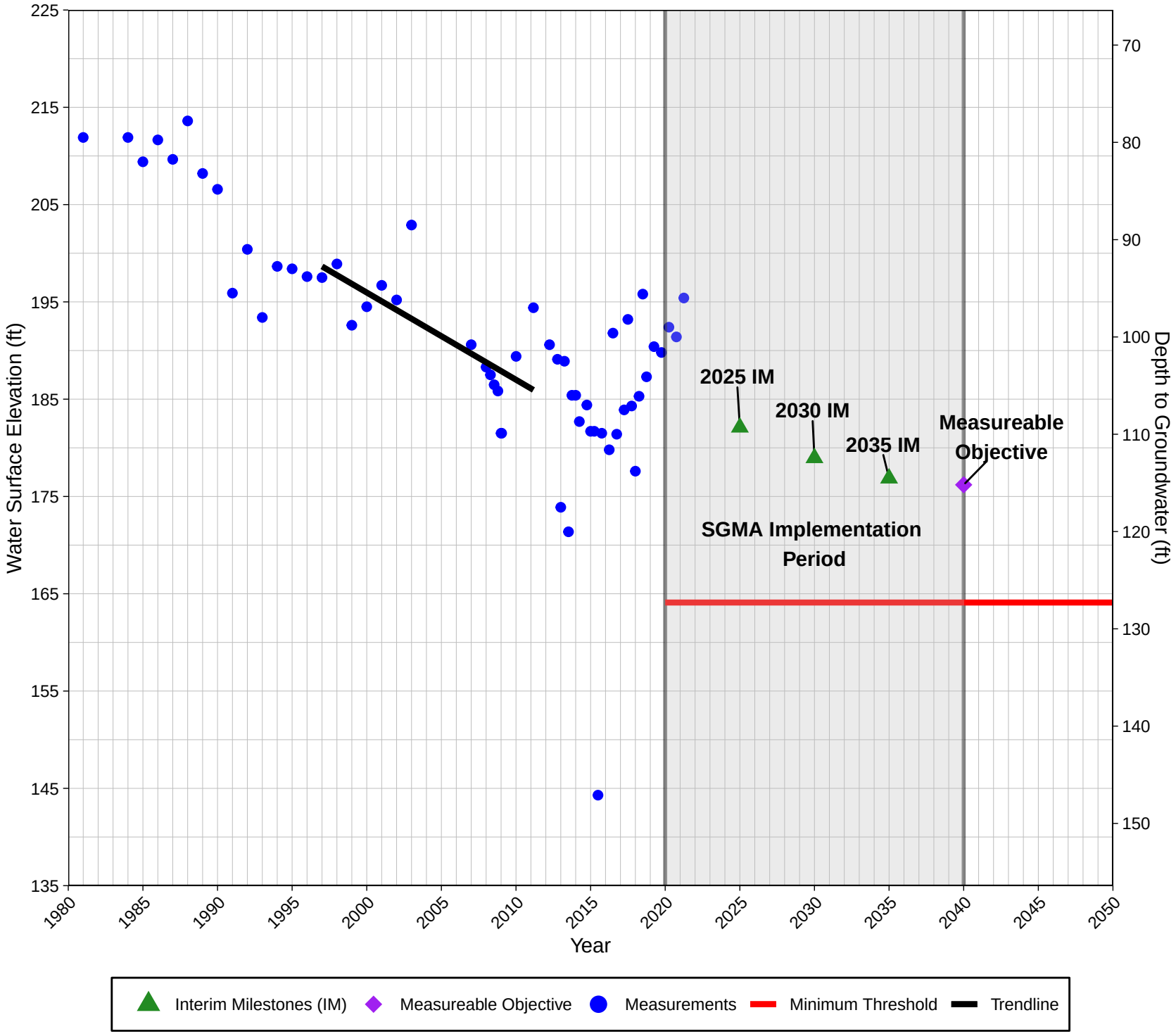




14S20E10M001MX

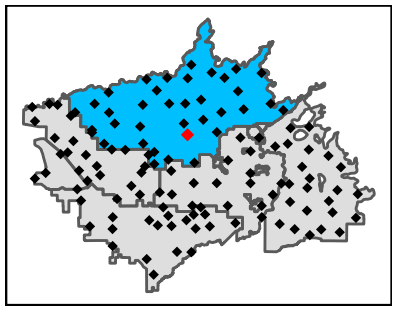
State Well ID: <Null>
Ground Surface Elevation: 291 ft
North Kings Groundwater Sustainability Agency

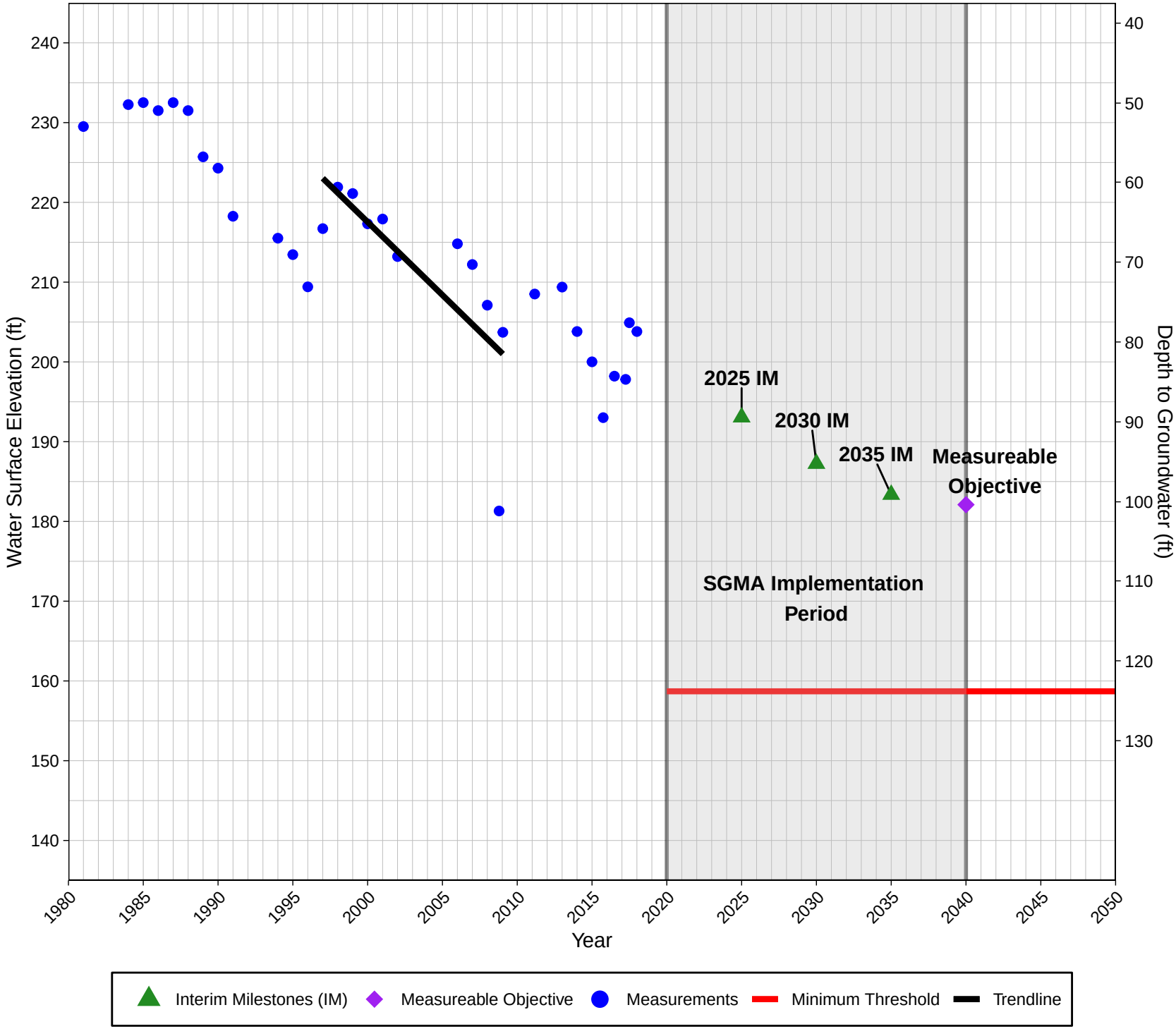




14S20E22J001MX

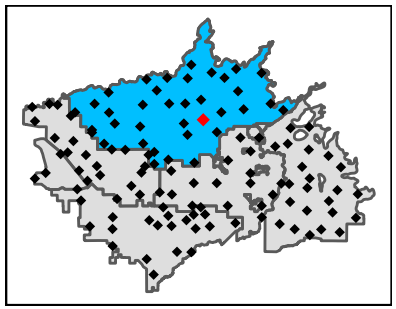
State Well ID: <Null>
Ground Surface Elevation: 282 ft
North Kings Groundwater Sustainability Agency

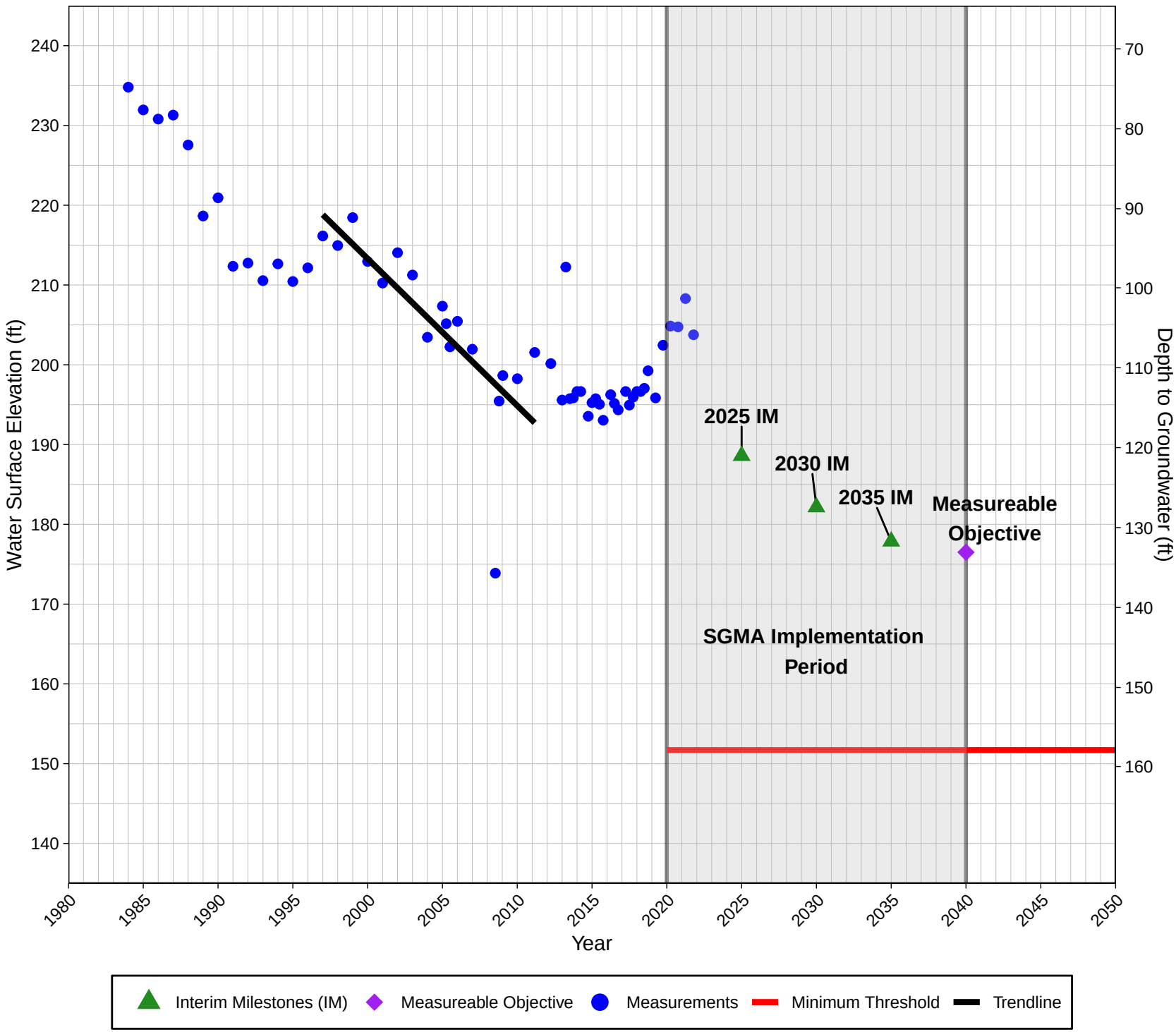




14S21E06Q001MX

State Well ID: <Null>
Ground Surface Elevation: 310 ft
North Kings Groundwater Sustainability Agency

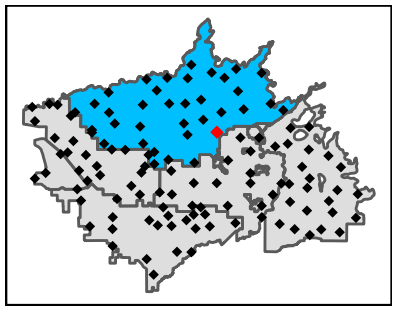


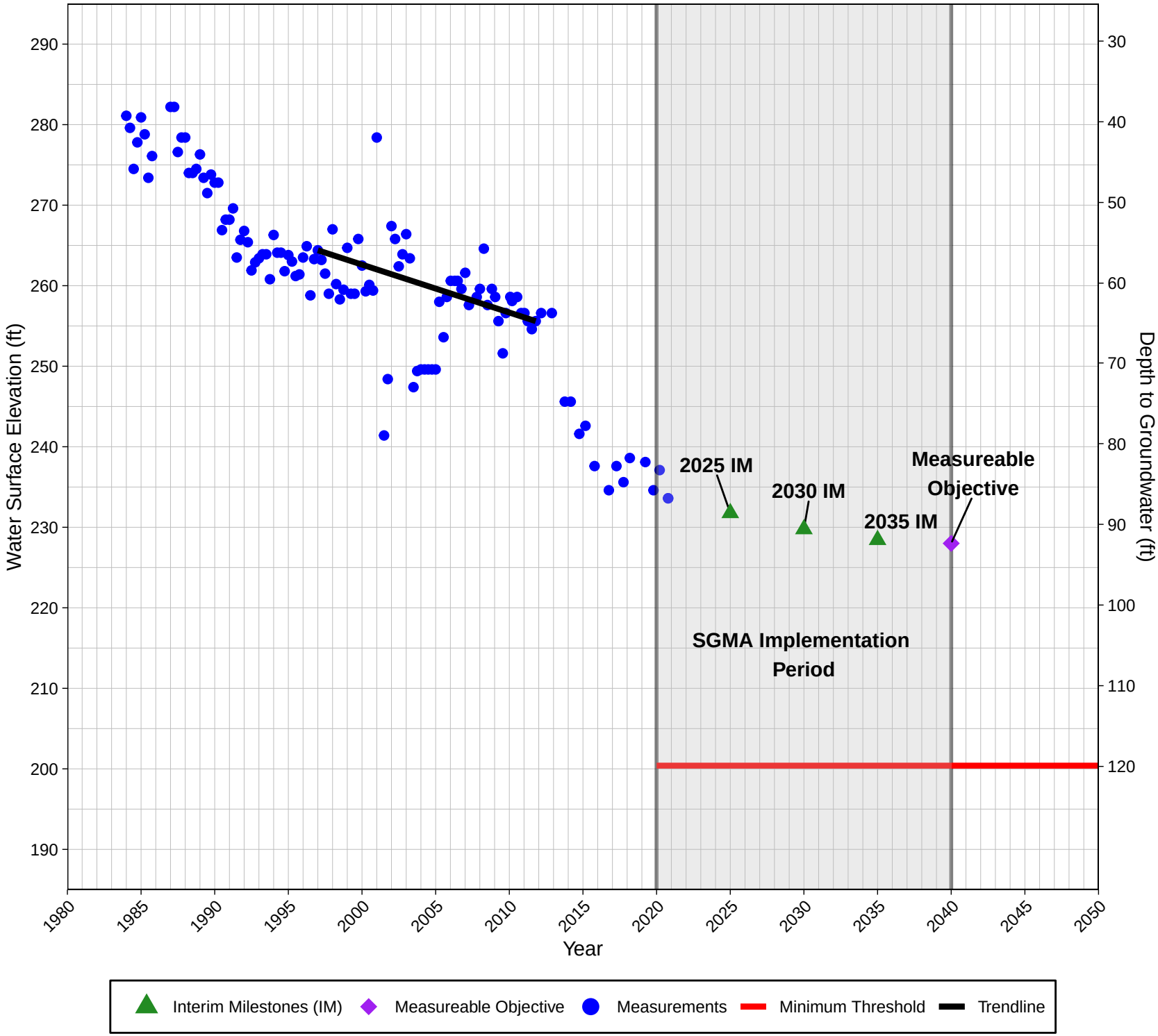


14S21E22D001MX

Ground Surface Elevation: 320 ft

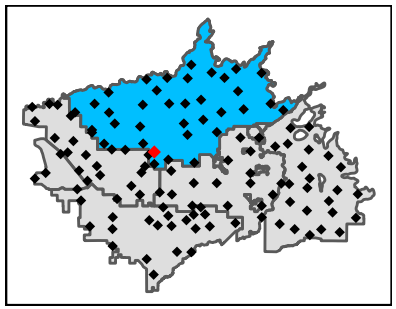
North Kings Groundwater Sustainability Agency

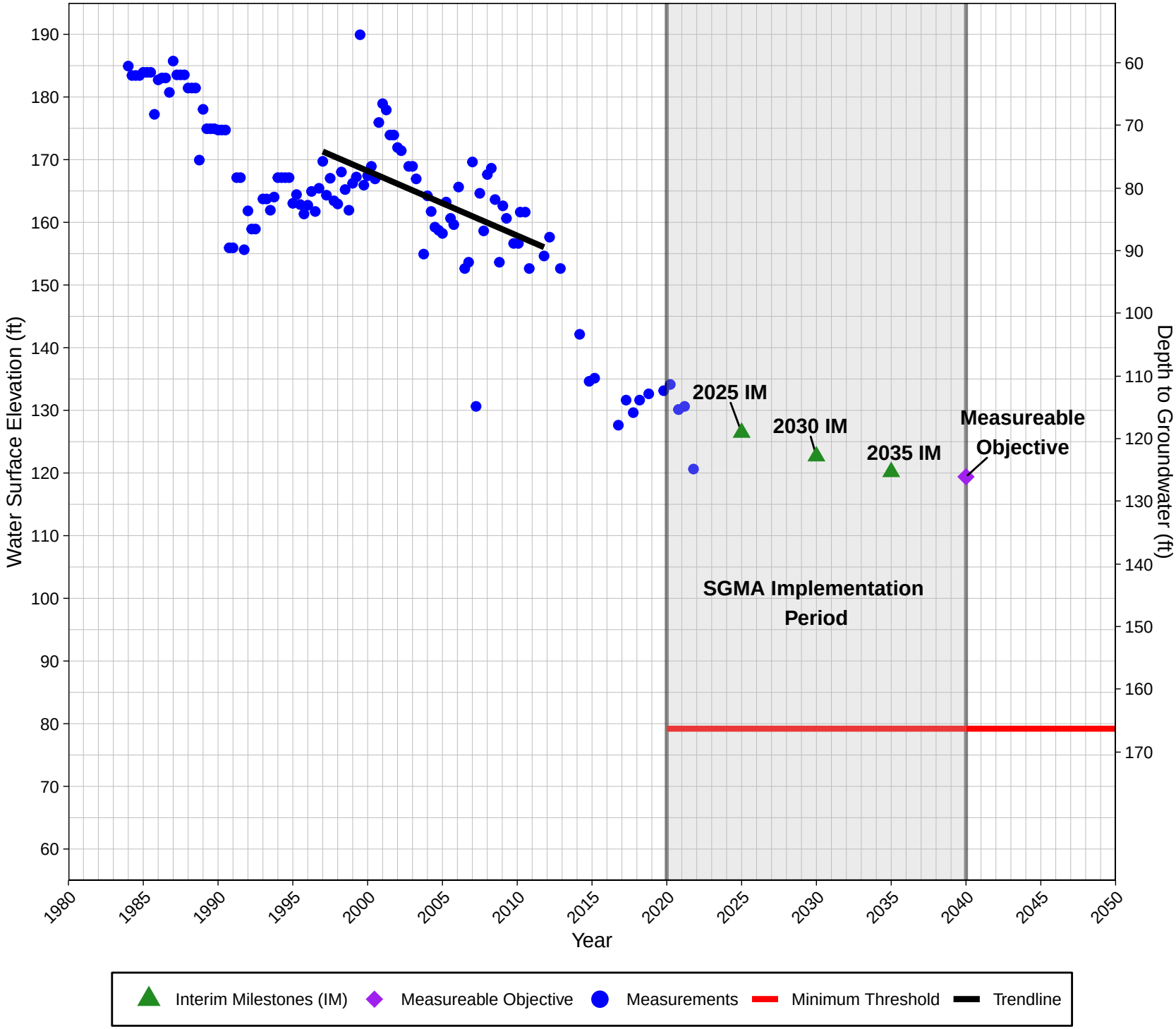




15S19E02M001MX

State Well ID: 15S19E03J001M
Ground Surface Elevation: 246 ft
North Kings Groundwater Sustainability Agency

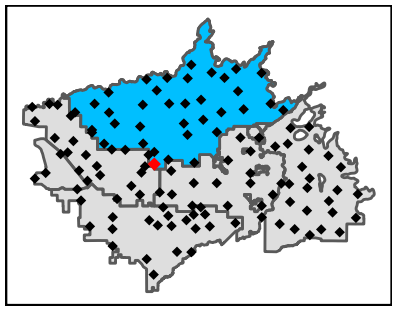


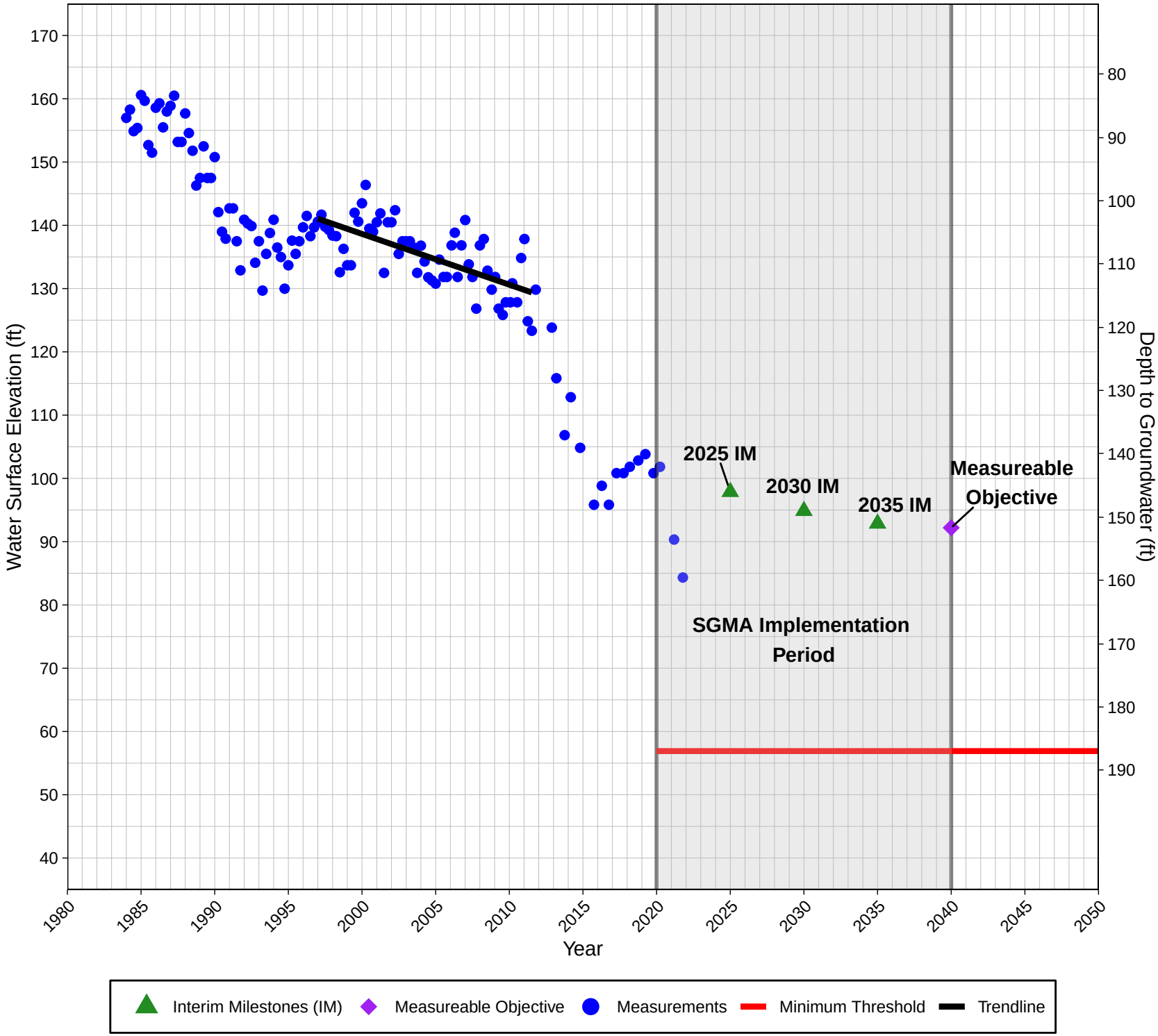


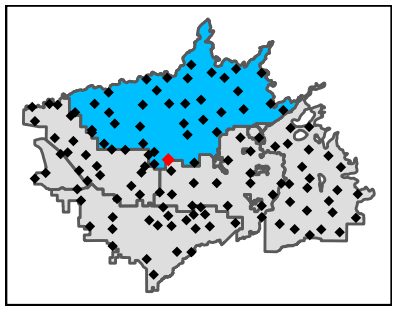
15S19E14M001MX

Ground Surface Elevation: 244 ft

North Kings Groundwater Sustainability Agency







15S20E07Q001MX

Ground Surface Elevation: 252 ft

North Kings Groundwater Sustainability Agency

Water Surface Elevation (ft)

Depth to Groundwater (ft)

Year

2025 IM

2030 IM

2035 IM

Measureable Objective

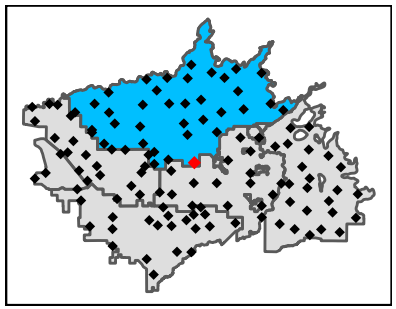
SGMA Implementation Period

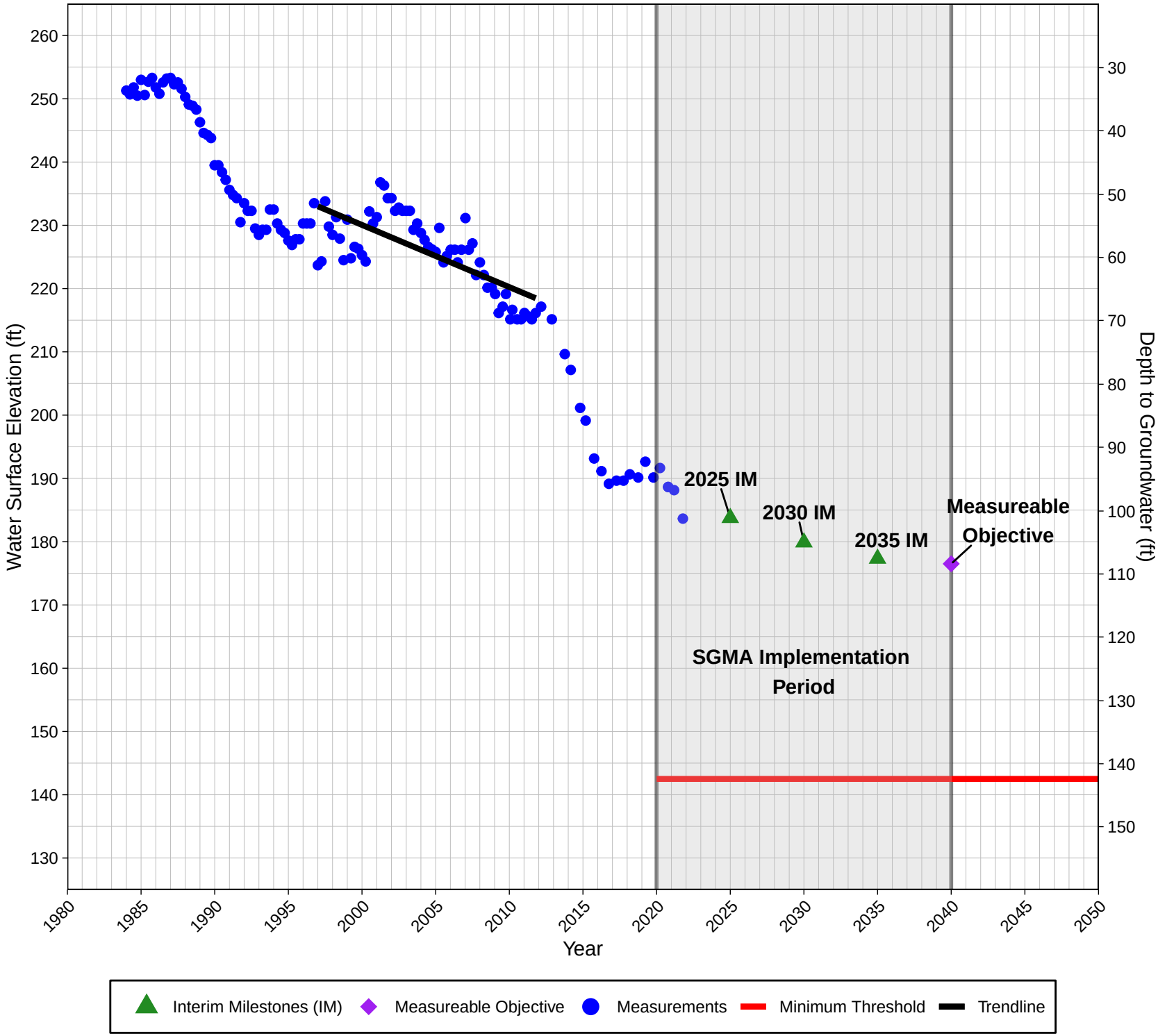
Interim Milestones (IM) | Measureable Objective | Measurements | Minimum Threshold | Trendline

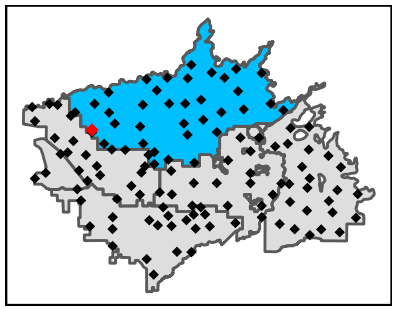
15S20E13E001MX

Ground Surface Elevation: 285 ft

North Kings Groundwater Sustainability Agency







367113N1200785W001

State Well ID: 14S17E14J001M
Ground Surface Elevation: 210 ft
North Kings Groundwater Sustainability Agency

Water Surface Elevation (ft)

Depth to Groundwater (ft)

Year

2025 IM

2030 IM

2035 IM

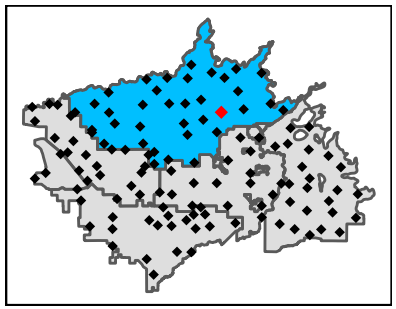
Measureable Objective

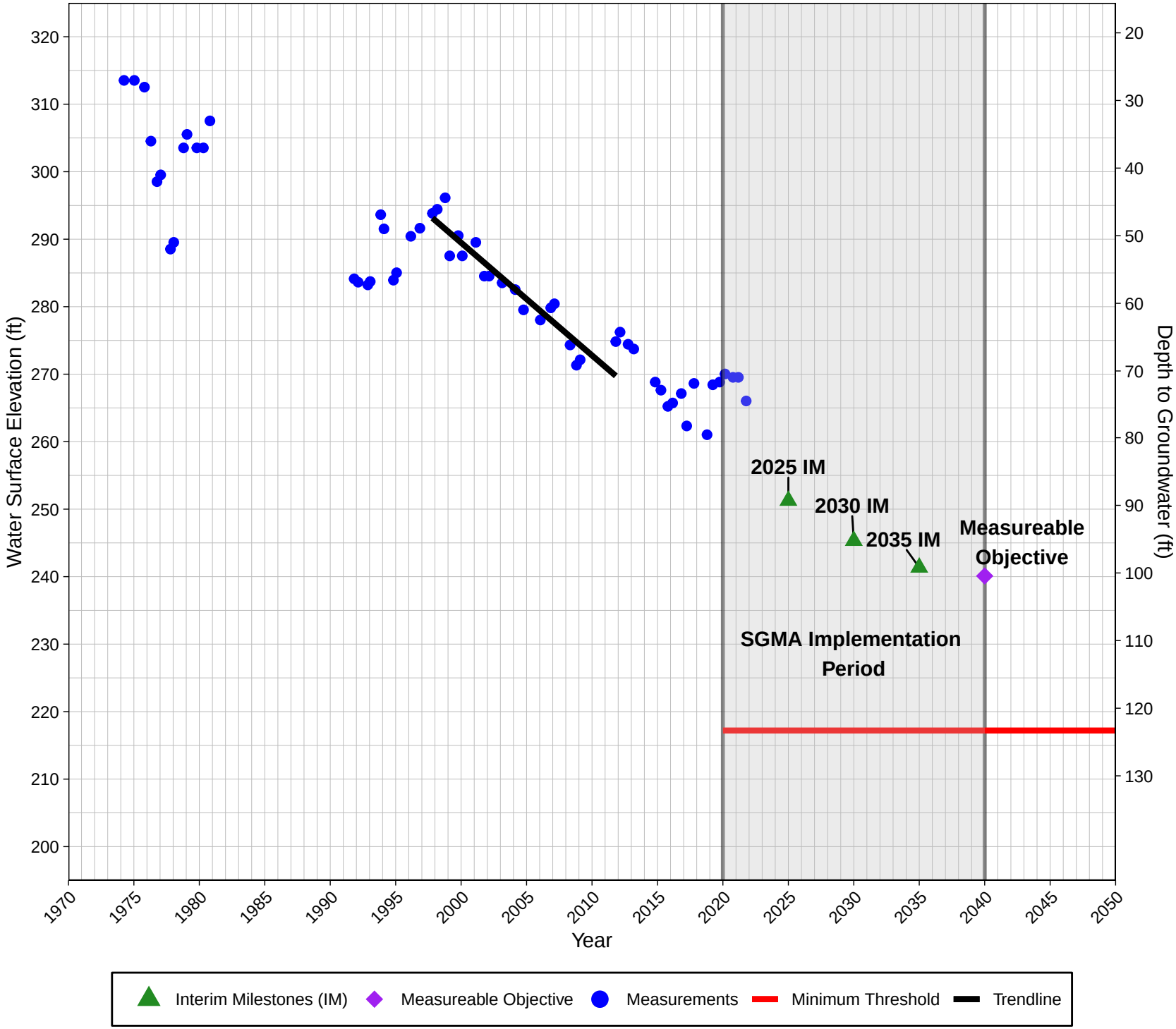
SGMA Implementation Period

Interim Milestones (IM) | Measureable Objective | Measurements | Minimum Threshold | Trendline

367556N1196666W001

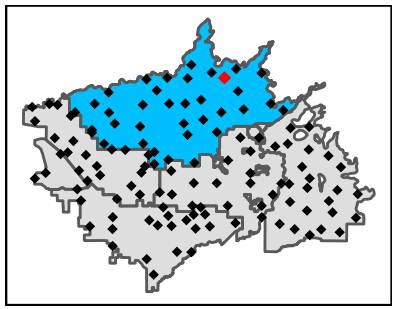
State Well ID: 13S21E34J002M
Ground Surface Elevation: 341 ft
North Kings Groundwater Sustainability Agency

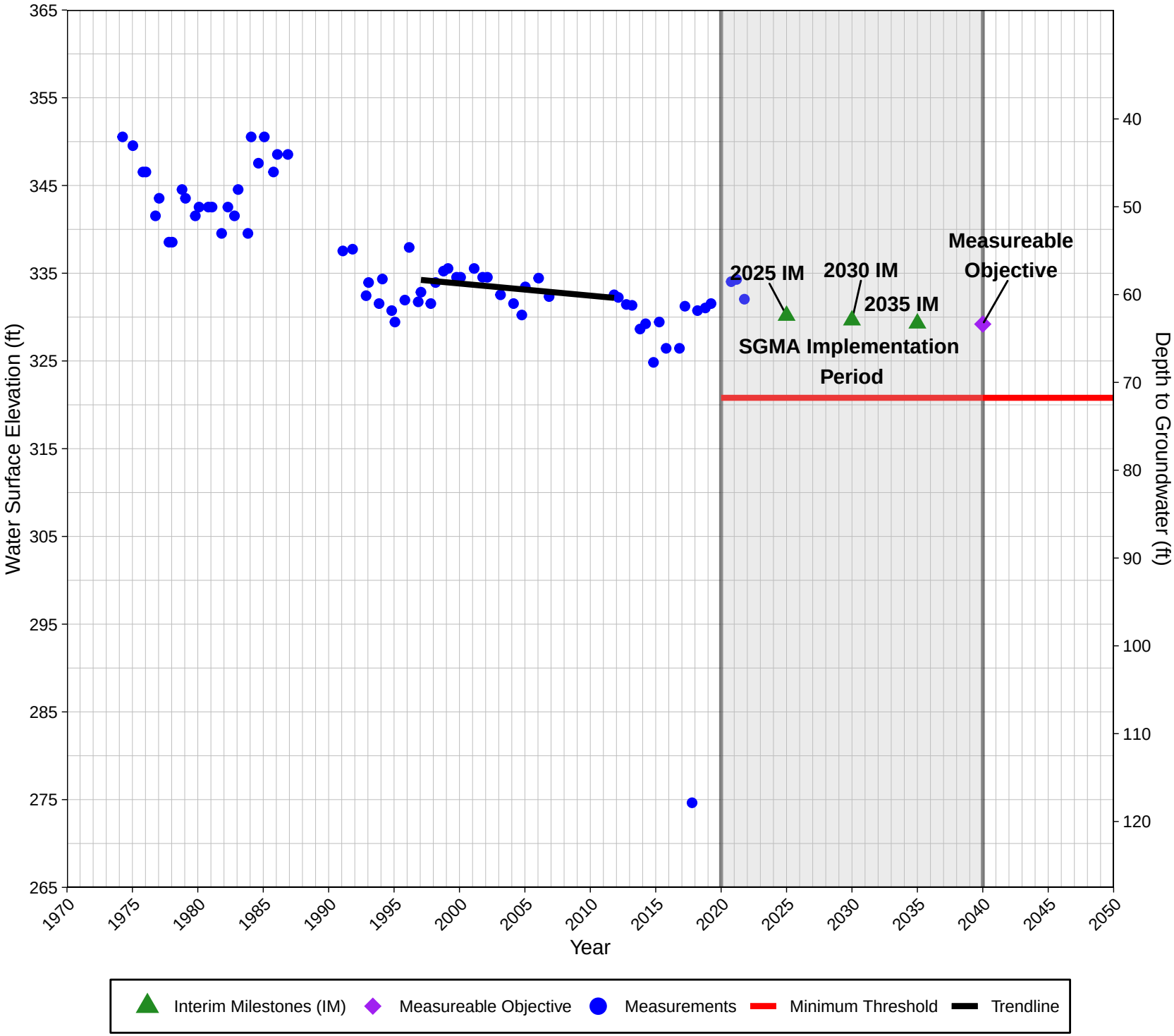




368468N1196593W001

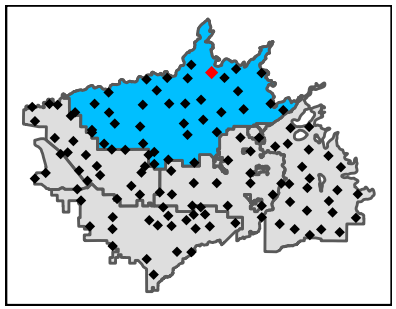
State Well ID: 12S21E34H001M
Ground Surface Elevation: 393 ft
North Kings Groundwater Sustainability Agency

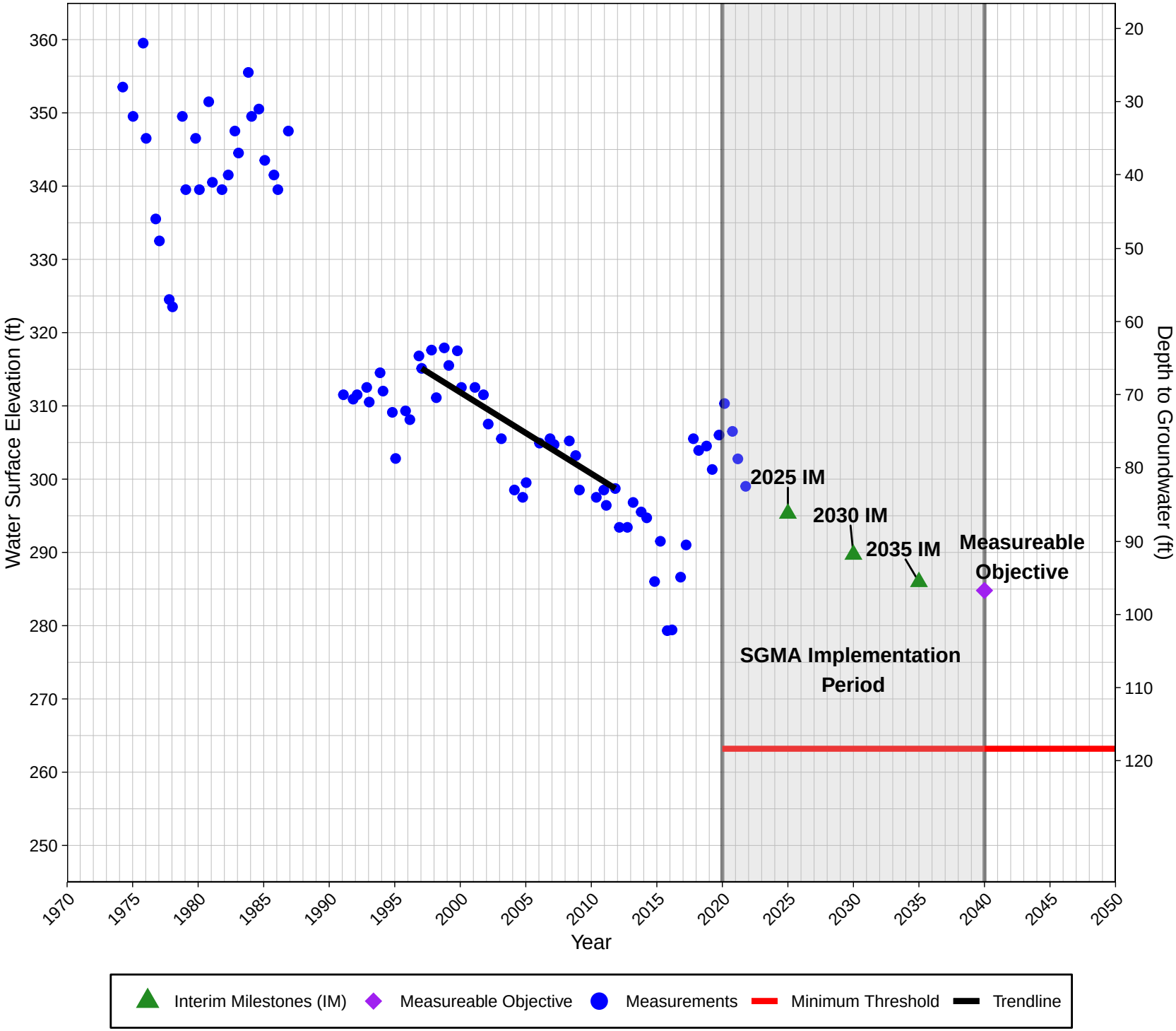


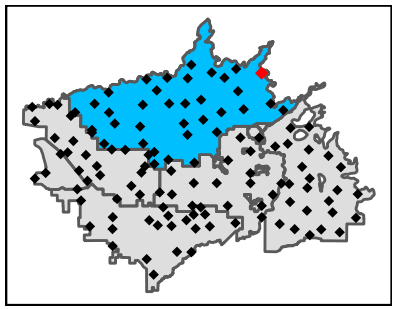


368571N1197002W001

State Well ID: 12S21E29K001M
Ground Surface Elevation: 382 ft
North Kings Groundwater Sustainability Agency







368572N1195413W001

State Well ID: 12S22E26L001M
Ground Surface Elevation: 488 ft
North Kings Groundwater Sustainability Agency

Water Surface Elevation (ft)

Depth to Groundwater (ft)

Year

2025 IM

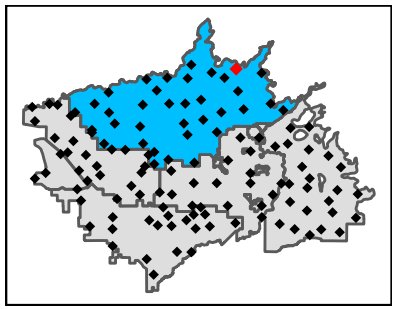
2030 IM

2035 IM

Measureable Objective

SGMA Implementation Period

Interim Milestones (IM) | Measureable Objective | Measurements | Minimum Threshold | Trendline



368683N1196185W001

State Well ID: 12S22E19N001M
Ground Surface Elevation: 441 ft
North Kings Groundwater Sustainability Agency

Water Surface Elevation (ft)

Depth to Groundwater (ft)

Year

2025 IM

2030 IM

2035 IM

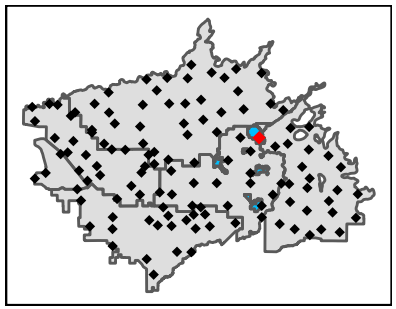
Measureable Objective

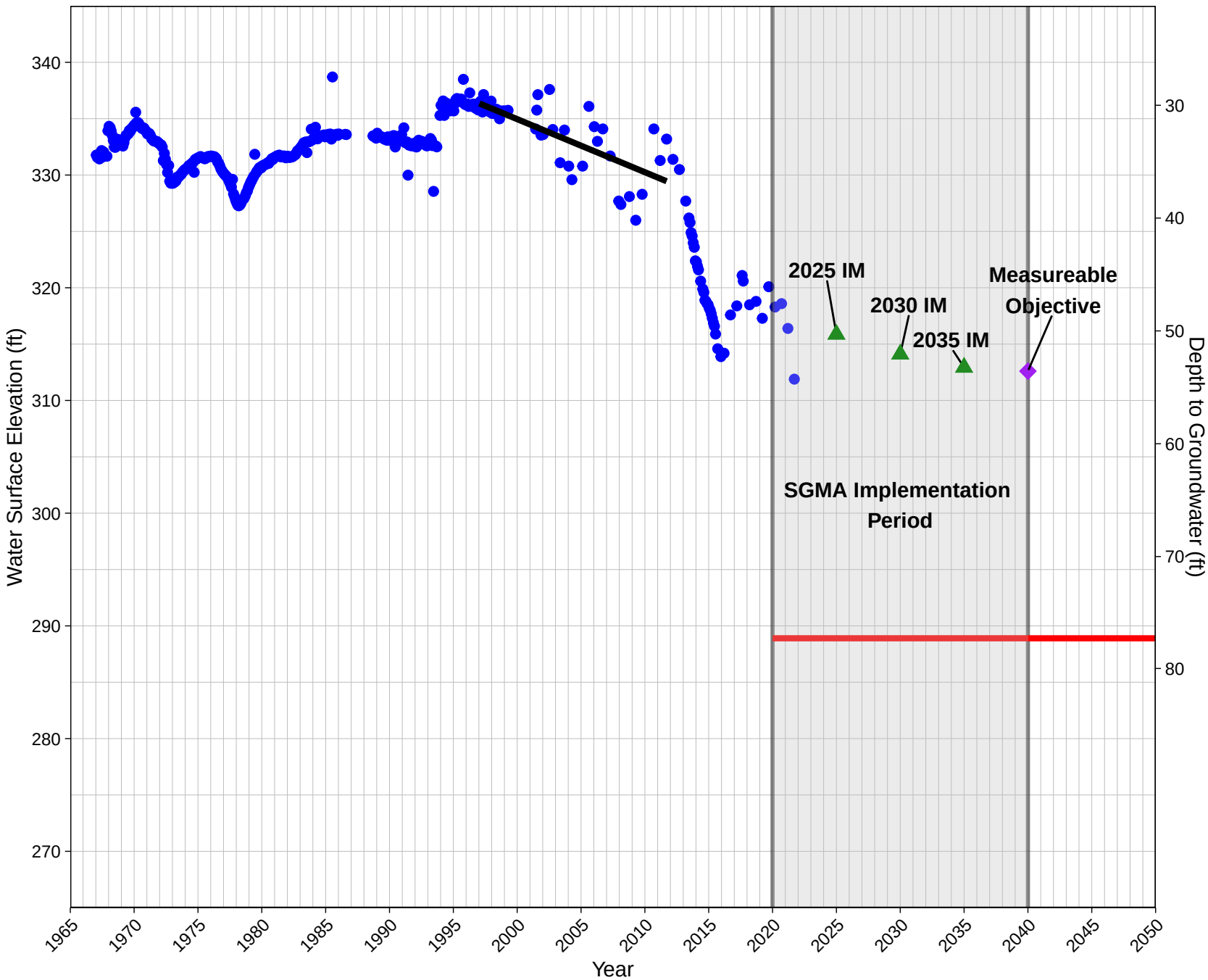
SGMA Implementation Period

Interim Milestones (IM)
Measureable Objective
Measurements
Minimum Threshold
Trendline

CID10

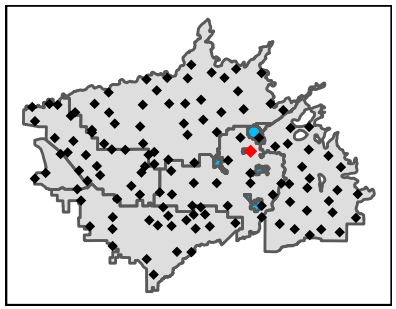
State Well ID: <Null>
Ground Surface Elevation: 366 ft
South Kings Groundwater Sustainability Agency

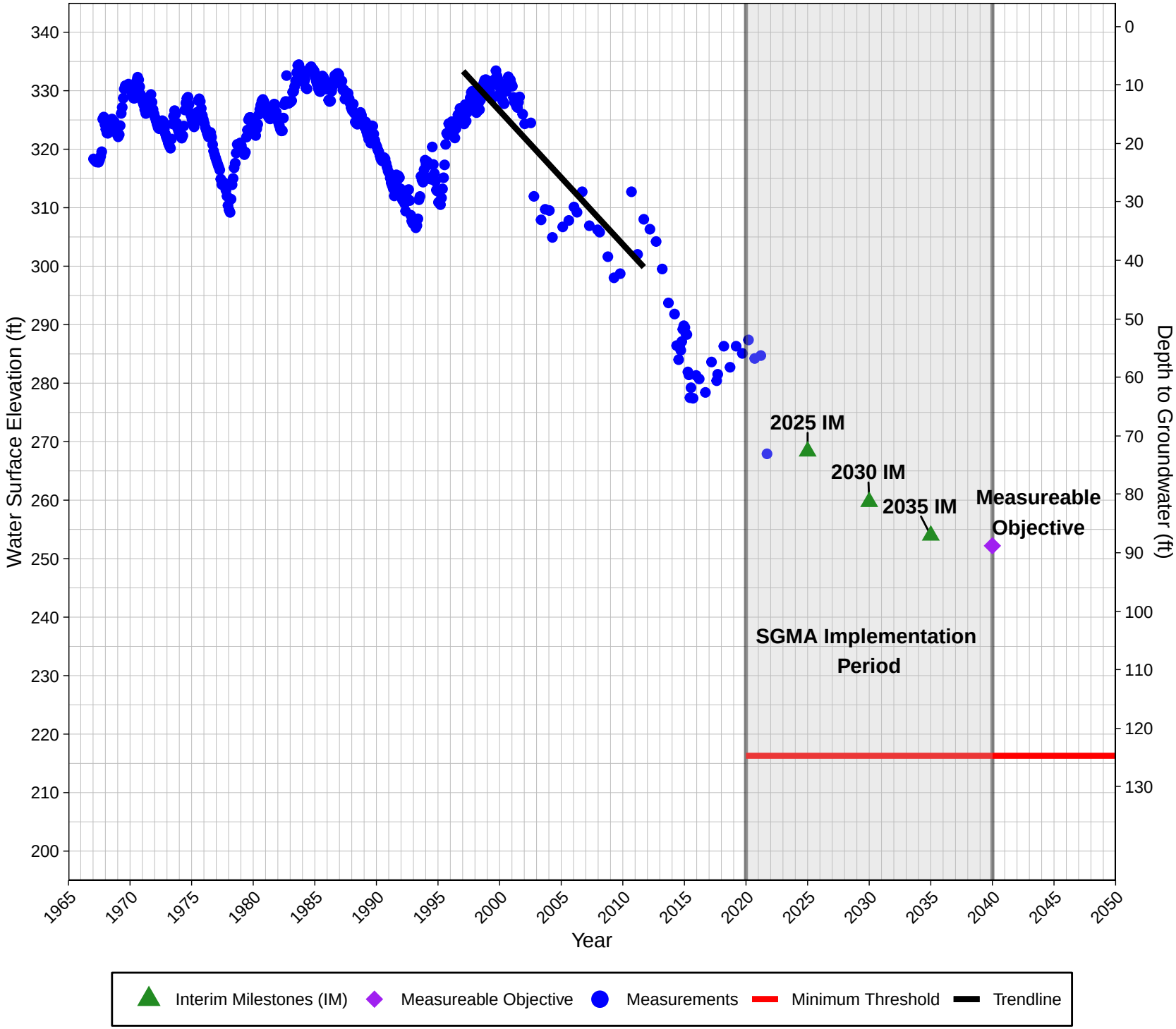




CID12

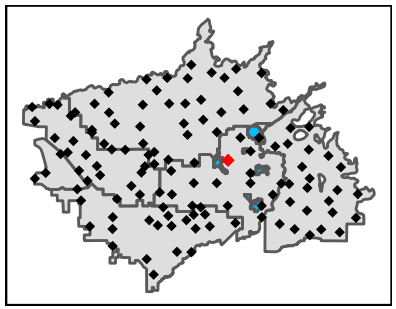
State Well ID: <Null>
Ground Surface Elevation: 341 ft
South Kings Groundwater Sustainability Agency

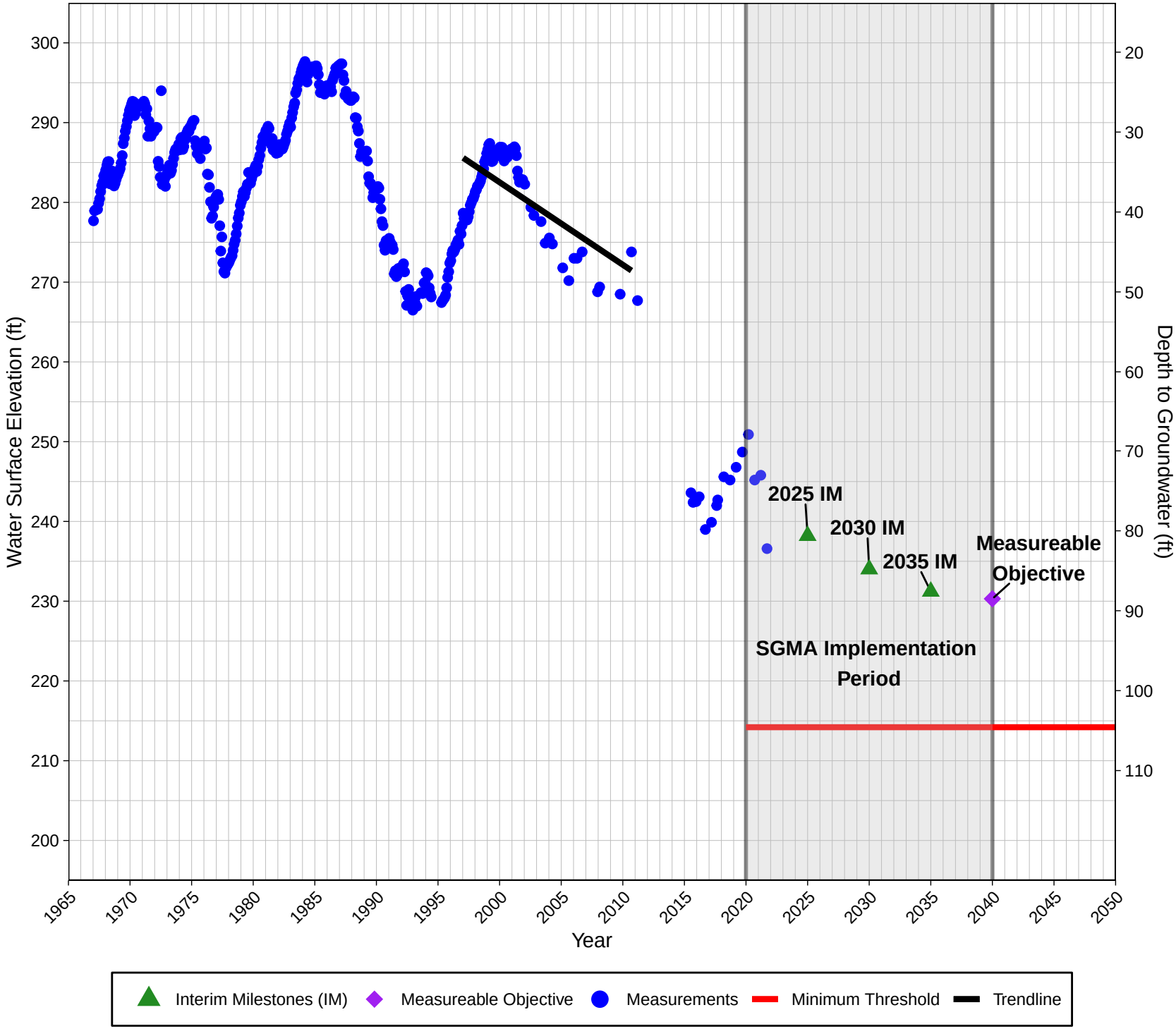




CID16

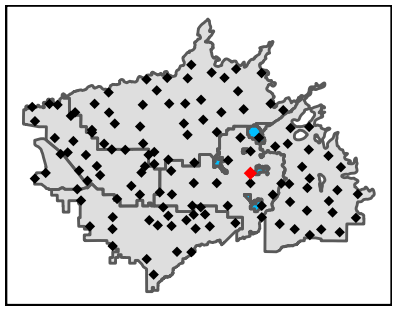
State Well ID: 15S21E14A001M
Ground Surface Elevation: 319 ft
South Kings Groundwater Sustainability Agency

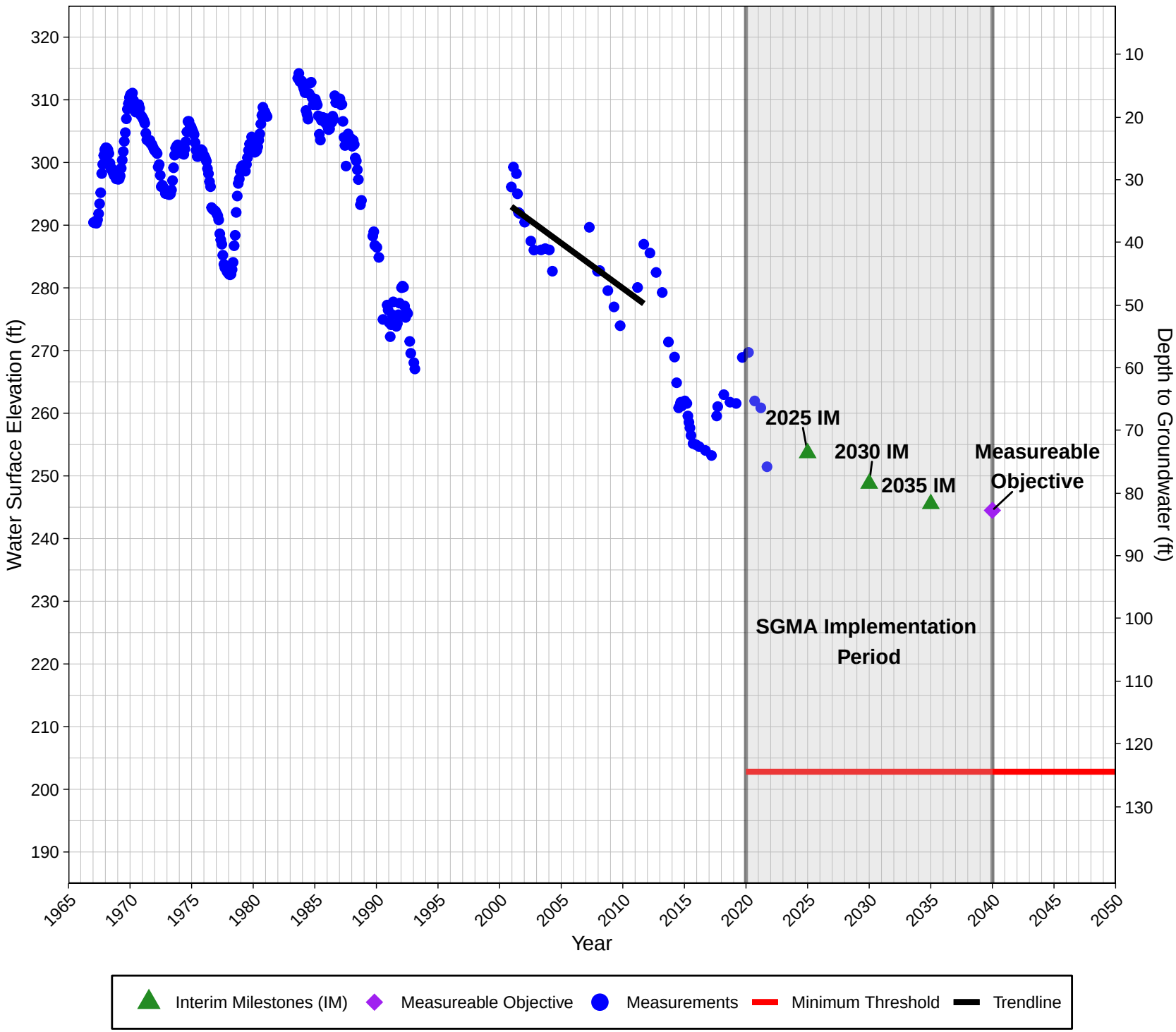




CID25

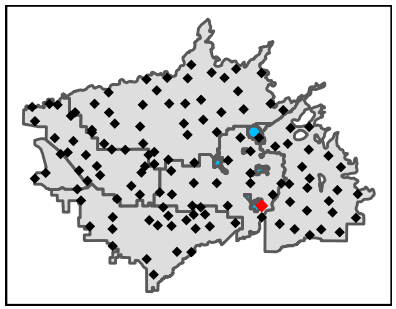
State Well ID: <Null>
Ground Surface Elevation: 327 ft
South Kings Groundwater Sustainability Agency

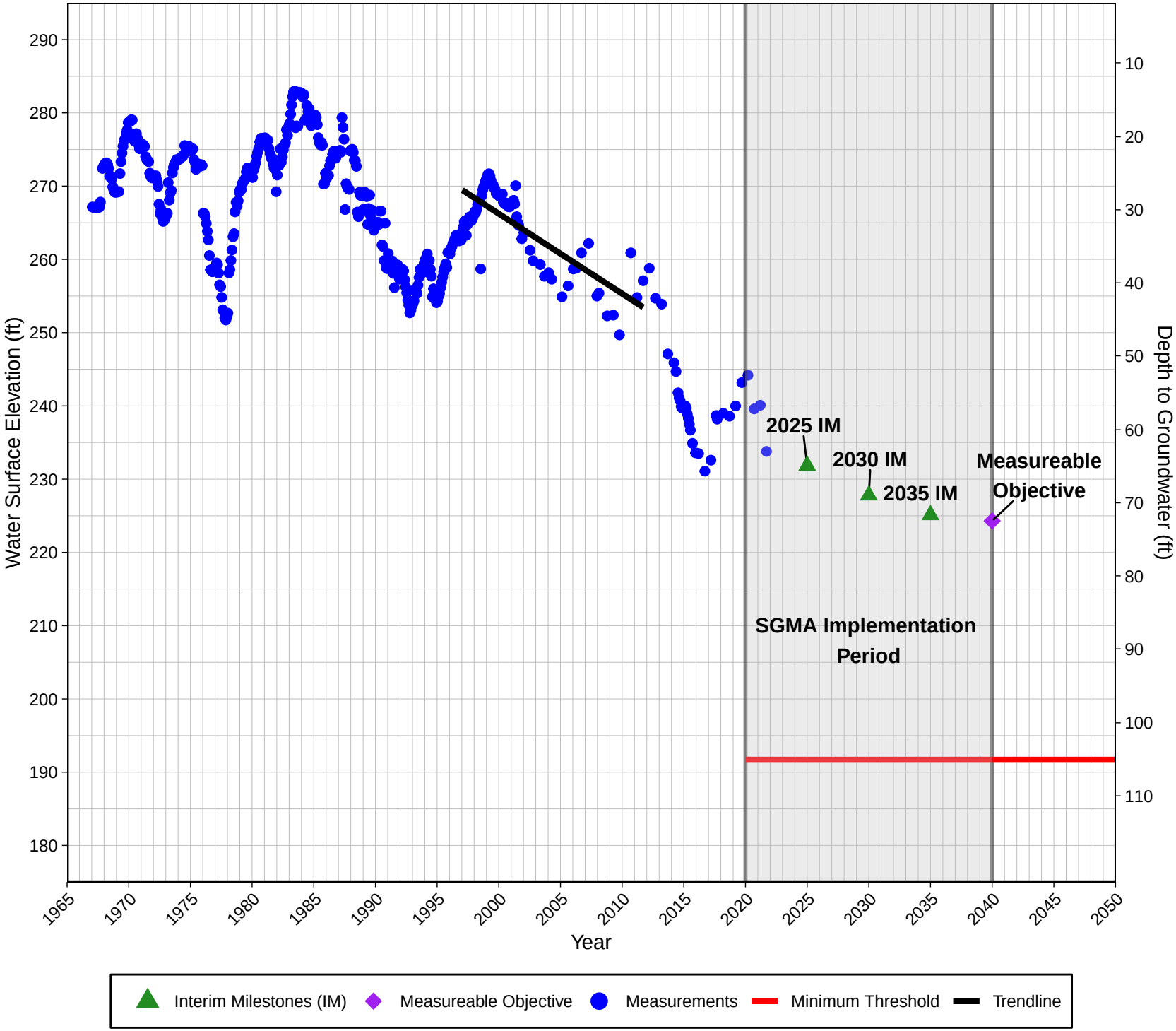




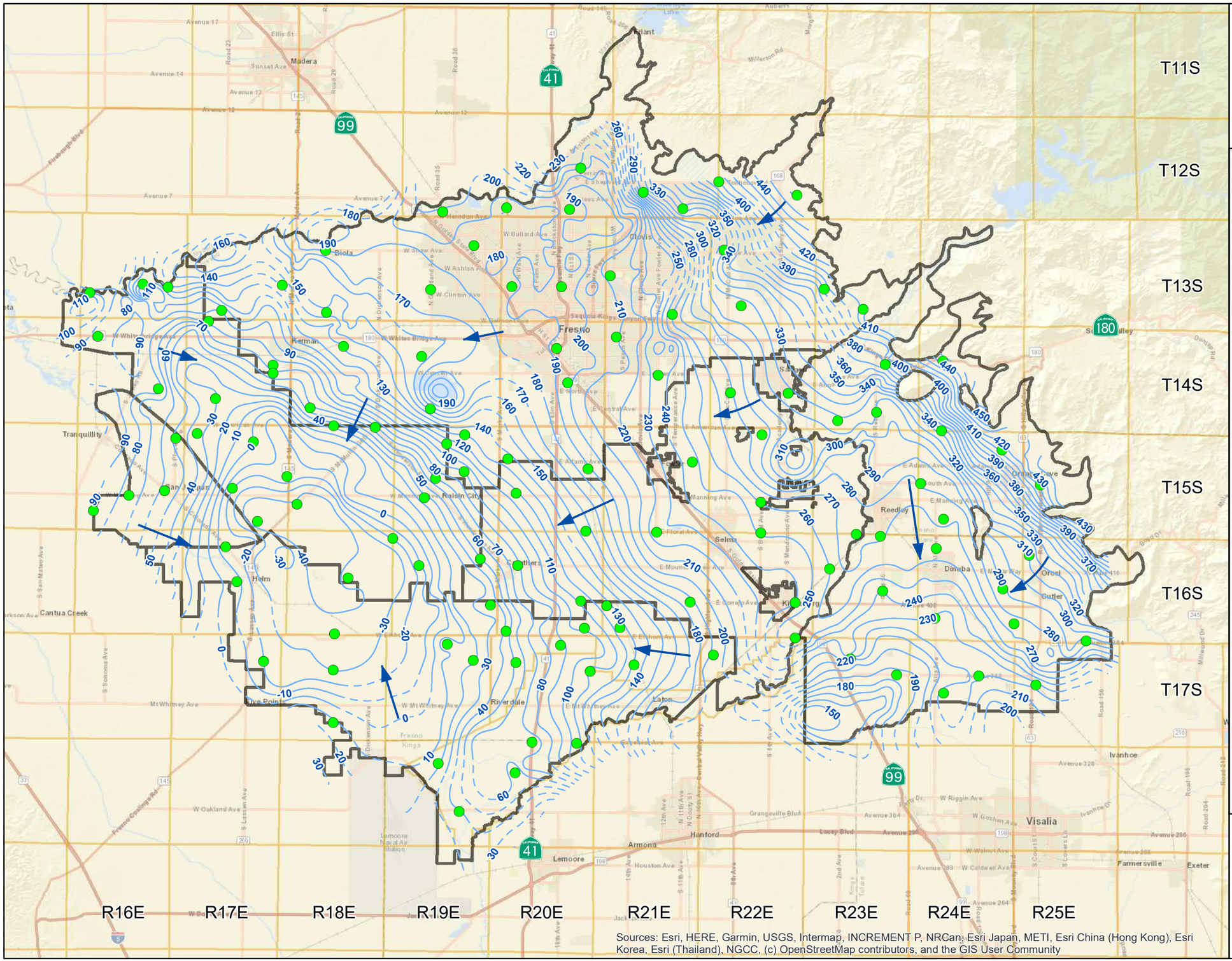
CID34

State Well ID: 16S22E23R001M
Ground Surface Elevation: 297 ft
South Kings Groundwater Sustainability Agency





Appendix D – Groundwater Contour Maps – Water Surface Elevations



Kings Subbasin GSAs

Spring 2021
Groundwater Elevation Contours

- Kings Subbasin GSAs
- Township/Range
- Indicator Wells
- Generalized GW Flow Direction

Water Level Contours

- Line of Equal Elevation (10ft interval)*

**NOTE: Dashed lines represent inferred Line of Equal Elevation*

FIGURE 1

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3/31/2022 : G:\Kings River East GSA-2664\Kings Basin Ongoing\400 GIS\Map\WY2021_AnnualReport\WSE\Spring21_WSE_All_11x17.mxd

Kings Subbasin GSAs

Fall 2021
Groundwater Elevation Contours

- Kings Subbasin GSAs
- Township/Range
- Indicator Wells
- Generalized GW Flow Direction

Water Level Contours

- Line of Equal Elevation (10ft interval)*

**NOTE: Dashed lines represent inferred Line of Equal Elevation*

T11S
T12S
T13S
T14S
T15S
T16S
T17S

R16E R17E R18E R19E R20E R21E R22E R23E R24E R25E

Madera, Chowchilla, Fresno, Kerman, Biola, Tranquillity, San Joquin, Raisin City, Helm, Cantua Creek, Five Points, Riverdale, Lemoore, Lemoore Naval Air Station, Armona, Hanford, Selma, Kingsburg, Reedley, Dinuba, Orosi, Cutler, Sanger, Visalia, Farmersville, Exeter, Ivanhoe, Lanare, Laton, Kings River, Mae Cove

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

FIGURE 2

EST. 1968
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